Instruction Manual
D103412X012
June 2026

Fisher™ FIELDVUE™ DVC6200f Digital Valve Controller for FOUNDATION™ Fieldbus



This manual applies to:

Device Type	4602
Device Revision	4
Hardware Revision	8, 9
Firmware Revision	3.1
DD Revision	3
Instrument Level	FD, PD, AD, PST

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Section 1: Introduction and Specifications

1.1 Installation, Pneumatic and Electrical Connections and Initial Configuration

Refer to the DVC6200 Series Quick Start Guide (D103556X012) for DVC6200f installation, connection and initial configuration information. If a copy of this quick start guide is needed contact your Emerson sales office or visit our website at Fisher.com.

Scan or click to access field support.

1.2 Scope of the Manual

This instruction manual is a supplement to the quick start guide that ships with every instrument. This instruction manual includes product specifications, supplementary installation information, reference materials, custom setup information, maintenance procedures and replacement part details for the DVC6200f digital valve controller.

NOTE

All references to the DVC6200f digital valve controller include the DVC6205f base unit unless otherwise indicated.

This manual describes device setup using an Emerson handheld communicator. For information on using Fisher ValveLink™ software with the instrument, refer to the appropriate user guide or help.

WARNING

Do not install, operate or maintain a DVC6200f digital valve controller without being fully trained and qualified in valve, actuator and accessory installation, operation and maintenance. To avoid personal injury or property damage, it is important to carefully read, understand and follow all of the contents of this manual, including all safety cautions and warnings. If you have any questions about these instructions contact your Emerson sales office before proceeding.

1.3 Instrument Description

DVC6200f digital valve controllers for FOUNDATION Fieldbus are communicating, microprocessor-based instruments. In addition to the traditional function of converting a digital signal to a pneumatic output pressure, the DVC6200f digital valve controller, using FOUNDATION Fieldbus communications protocol, gives easy access to information critical to process operation as well as process control. This can be done using a DeltaV™ console, another FOUNDATION Fieldbus system console or with ValveLink software version 13 or later.

Using a compatible Fieldbus configuration device, you can obtain information about the health of the instrument, the actuator and the valve. You can also obtain asset information about the actuator or valve manufacturer, model and serial number. You can set input and output configuration parameters and calibrate the instrument.

Using the FOUNDATION Fieldbus protocol, information from the instrument can be integrated into control systems.

Figure 1. FIELDVUE DVC6200f Digital Valve Controller Mounted on a Fisher Sliding-Stem Valve Actuator



X1182-1_Fieldbus

Figure 2. FIELDVUE DVC6200f Digital Valve Controller Integrally Mounted to a Fisher GX Control Valve and Actuator System



W9616_Fieldbus

DVC6200f digital valve controllers can be mounted on single or double-acting sliding-stem actuators, as shown in Figure 1 or on rotary actuators. It can also be integrally mounted to Fisher 657/667 sizes 30i to 76i actuators or the Fisher GX control valve and actuator system, as shown in Figure 2. The DVC6200f mounts on most Fisher and other manufacturers' rotary and sliding-stem actuators.

DVC6200f digital valve controllers are available with several selections of control and diagnostic capability. Control selections include:

- Standard Control (SC)—Digital valve controllers with Standard Control have the AO, PID, CSEL, ISEL, OS, AI, MAI, DO and four DI function blocks in addition to the resource and transducer blocks.
- Fieldbus Control (FC)—Digital valve controllers with Fieldbus Control have the AO function block in addition to the resource and transducer blocks.
- Fieldbus Logic (FL)—Digital valve controllers with Fieldbus Logic have the DO and four DI function blocks, in addition to the resource and transducer block.

The diagnostic capabilities include:

- Partial Stroke Test (PST)
- Performance Diagnostics (PD)
- Advanced Diagnostics (AD)
- Fieldbus Diagnostics (FD)

Partial Stroke Test, Performance and Advanced Diagnostics are available with ValveLink software. They provide visibility to instrument alerts. Fieldbus Diagnostics can be viewed with any host system.

1.4 Instrument Blocks

The digital valve controller is a block-based device. For detailed information on the blocks within the digital valve controller, see the Detailed Setup section of this manual.

The DVC6200f digital valve controller includes the resource and transducer block:

- Resource Block—The resource block contains the hardware specific characteristics associated with a device; it has no input or output parameters. The resource block monitors and controls the general operation of other blocks within the device. For example, when the mode of the resource block is Out of Service, it impacts all function blocks.
- Transducer Block—The transducer block connects the analog output function block to the I/P converter, relay and travel sensor hardware within the digital valve controller.

Function Blocks

In addition to the resource and transducer block, the digital valve controller may contain the following function blocks, Refer to Appendix E, Function Blocks, for block specific information. For additional information on function blocks, refer to Appendix D, FOUNDATION Fieldbus Communication.

- Analog Output (AO) Function Block—The analog output function block accepts the output from another function block (such as a PID block) and transfers it as an actuator control signal to the transducer block. If the DO block is selected, the AO block is not functional.
- Proportional-Integral-Derivative (PID) Function Block—The PID function block performs proportional-plus-integral-plus-derivative control.
- Control Select (CSEL) Function Block—The control select function block selects from two or three control signals in a manner determined by the SEL_TYPE when the block is in Auto mode.
- Input Selector (ISEL) Function Block—The input selector function block selects from up to four inputs and may provide the selected signal as input to the PID block. The input selection can be configured to select the first good input signal; a maximum, minimum or average value; or a hot spare.
- Output Splitter (OS) Function Block—The output splitter function block accepts the output from another function block (such as a PID block) and creates two outputs that are scaled or split, according to the user configuration. This block is typically used for split ranging of two control valves.
- Analog Input (AI) Function Block—The analog input function block monitors the signal from a DVC6200f sensor or internal measurement and provides it to another block.

- Multiple Analog Input (MAI) Function Block—The Multiple Analog Input (MAI) function block has the ability to process up to eight DVC6200f measurements and make them available to other function blocks.
- Discrete Output (DO) Function Block—The discrete output function block processes a discrete set point and sends it to a specified output channel, which can be transferred to the transducer block for actuator control. In the digital valve controller, the discrete output block provides both normal open/closed control and the ability to position the valve in 5% increments for course throttling applications. If the AO block is selected, the DO block is not functional.
- Discrete Input (DI) Function Block—The discrete input function block processes a single discrete input from a DVC6200f and makes it available to other function blocks. In the digital valve controller, the discrete input function block can provide limit switch functionality and valve position proximity detection.

1.5 Using This Manual

Navigation paths and fast-key sequences are included for procedures and parameters that can be accessed using a handheld communicator.

For example, to access Resource Block Mode:

Handheld Communicator	RB > Configure/Setup > Setup > Resource Block Mode

An overview of the resource and transducer block menu structures are shown in Appendix B. Menu structures for the function blocks are included with each function block section in Detailed Setup.

Throughout this document, parameters are typically referred to by their common name or label, followed by the parameter name and index number; for example, Write Priority (WRITE_PRI [39]). However, not all interface systems support the use of the parameter label and instead use only the Parameter Name, followed by the index number, when referring to the block parameters.

1.6 Specifications

Specifications for the DVC6200f digital valve controller are shown in Table 1.

Table 1. Specifications

Available Mounting	Instrument Blocks
DVC6200f digital valve controller and DVC6215 feedback unit: ■ Integral mounting to 657/667 or GX actuators ■ Integral mounting to Fisher rotary actuators, ■ Sliding-stem linear applications ■ Quarter-turn rotary applications DVC6205f base unit for 2 in. pipestand or wall mounting (for remote-mount) The DVC6200f digital valve controller or DVC6215 feedback unit can also be mounted on other actuators that comply with IEC 60534-6-1, IEC 60534-6-2, VDI/VDE 3845 and NAMUR mounting standards.	Resource Block Transducer Block complies with FOUNDATION Fieldbus specification FF-906 for valve stroke testing **Function Block Suites** ■ Standard Control (throttling control) Includes AO, PID, CSEL, ISEL, OS, AI, MAI, DO and DI function block ■ Fieldbus Control (throttling control) Contains the AO function block ■ Fieldbus Logic [discrete (on/off) connectivity] Includes DO and DI function blocks

- continued -

Table 1. Specifications (continued)

Function Block Instantiation

If a host system supports block instantiation, a maximum of 20 function blocks can be instantiated in the device at any given time from the available function blocks, which may include AO (1), DO (1), AI (4), DI (6), MAI (1), PID (4), OS (3), ISEL (2), CSEL (2)

Note: Only the function blocks available in the function block suite can be instantiated by the host system.

Block Execution Times

AO Block: 20 ms
PID Block: 20 ms
ISEL Block: 20 ms
OS Block: 20 ms
AI Block: 20 ms
MAI BLock: 35 ms
DO Block: 20 ms
DI Block: 15 ms
CSEL Block: 15 ms

Electrical Input

Voltage Level: 9 to 32 V
Maximum Current: 19 mA
Reverse Polarity Protection: Unit is not polarity sensitive
Termination: Bus must be properly terminated per ISA SP50 guidelines

Digital Communication Protocol

FOUNDATION Fieldbus registered device

Physical Layer Type(s):
121—Low-power signaling, bus-powered, Entity Model I.S.
511—Low-power signaling, bus-powered, FISCO I.S.

Fieldbus Device Capabilities

Backup Link Master capable

Supply Pressure(1)

Minimum Recommended: 0.3 bar / 5 psig higher than maximum actuator requirements
Maximum: 10.0 bar / 145 psig or maximum pressure rating of the actuator, whichever is lower
Medium: Air or Natural Gas

Supply medium must be clean, dry and noncorrosive

Per ISA Standard 7.0.01

A maximum 40 micrometer particle size in the air system is acceptable. Further filtration down to 5 micrometer particle size is recommended. Lubricant content is not to exceed 1 ppm weight (w/w) or volume (v/v) basis. Condensation in the air supply should be minimized.
Pressure Dew Point: at least 10°C less than the lowest ambient temperature expected

Per ISO 8573-1

Maximum particle density size: Class 7
Oil content: Class 3
Pressure Dew Point: Class 3

Output Signal

Pneumatic signal, up to full supply pressure
Minimum Span: 0.4 bar / 6 psig
Maximum Span: 9.5 bar / 140 psig
Action: ■ Double, ■ Single Direct or ■ Reverse

Steady-State Air Consumption(2)(3)

Standard Relay
At 1.4 bar / 20 psig supply pressure:
Less than 0.38 normal m^3/hr /14 scfh
At 5.5 bar / 80 psig supply pressure:
Less than 1.3 normal m^3/hr / 49 scfh

Low Bleed Relay
At 1.4 bar / 20 psig supply pressure:
Average value 0.056 normal m^3/hr / 2.1 scfh
At 5.5 bar / 80 psig supply pressure:
Average value 0.184 normal m^3/hr / 6.9 scfh

Maximum Output Capacity(2)(3)

At 1.4 bar / 20 psig supply pressure:
10.0 normal m^3/hr / 375 scfh
At 5.5 bar / 80 psig supply pressure:
29.5 normal m^3/hr / 1100 scfh

Operating Ambient Temperature Limits(1)(4)

-40 to 85°C / -40 to 185°F
-52 to 85°C / -62 to 185°F for instruments utilizing the Extreme Temperature option (fluorosilicone elastomers)
-52 to 125°C / -62 to 257°F for remote-mount feedback unit

Independent Linearity(5)

Typical Value: ±0.50% of output span

Electromagnetic Compatibility

Meets EN 61326-1:2013
Immunity—Industrial locations per Table 2 of the EN 61326-1 standard. Performance is shown in Table 2.
Emissions—Class A
ISM equipment rating: Group 1, Class A

Lightning and Surge Protection—The degree of immunity to lightning is specified as Surge immunity in Table 2. For additional surge protection, commercially available transient protection devices can be used.

Vibration Testing Method

Tested per ANSI/ISA-75.13.01 Section 5.3.5. A resonant frequency search is performed on all three axes. The instrument is subjected to the ISA specified 1/2 hour endurance test at each major resonance.

Humidity Testing Method

Tested per IEC 61514-2

- continued -

Table 1. Specifications (continued)

Hazardous Area Approvals and Other Certifications	Electrical Housing
CSA - Intrinsically Safe, FISCO, Explosion-proof, Division 2, Dust Ignition-proof (Canada) FM - Intrinsically Safe, FISCO, Explosion-proof, Non-Incendive, Dust Ignition-proof (United States) ATEX - Intrinsically Safe, FISCO, Flameproof, Type n, Dust by intrinsic safety IECEx - Intrinsically Safe, FISCO, Flameproof, Type n, Dust by intrinsic safety or by enclosure Natural Gas Certified, Single Seal Device - CSA, FM, ATEX and IECEx Marine Approvals - Lloyds, DNV, ABS, Bureau Veritas CML - Certification Management Limited (Japan) CUTR - Customs Union Technical Regulations ESMA - Emirates Authority for Standardization and Metrology - ECAS-Ex (UAE) INMETRO - National Institute of Metrology, Quality and Technology (Brazil) KOSHA - Korean Occupational Safety and Health Agency (South Korea) KTL - Korea Testing Laboratory (South Korea) CCC - China Compulsory Certification NEPSI - National Supervision and Inspection Centre for Explosion Protection and Safety of Instrumentation (China) PESO CCOE - Petroleum and Explosives Safety Organisation - Chief Controller of Explosives (India) SANS - South Africa National Standards UKCA - United Kingdom Conformity Assessment Not all certifications apply to all constructions. Contact your Emerson sales office or refer to the DVC6200f product page at Fisher.com for approval specific information.	CSA - Type 4X, IP66 FM - Type 4X, IP66 ATEX - IP66 IECEx - IP66 **Connections** Supply Pressure: 1/4 NPT internal and integral pad for mounting 67CFR regulator Output Pressure: 1/4 NPT internal Tubing: 3/8-in. recommended Vent: 3/8 NPT internal Electrical: 1/2 NPT internal or M20 **Actuator Compatibility** Sliding-Stem Linear Linear actuators with rated travel between 6.35 mm / 0.25 in. and 606 mm / 23.375 in. Quarter-Turn Rotary Rotary actuators with rated travel between 45° and 180°(6) **Weight** DVC6200f Aluminum: 3.5 kg / 7.7 lbs Stainless Steel: 8.6 kg / 19 lbs DVC6205f: 4.1 kg / 9 lbs DVC6215: 1.4 kg / 3.1 lbs **Construction Materials** Housing, module base and terminal box Standard: A03600 low copper aluminum alloy Optional: Stainless steel Cover: Thermoplastic polyester Elastomers Standard: Nitrile Extreme Temperature: Fluorosilicone

- continued -

Table 1. Specifications (continued)

Options	Declaration of SEP
■ Supply and output pressure gauges or ■ Tire valves ■ Integral mounted filter regulator ■ Low-Bleed Relay(7) ■ Extreme Temperature ■ Natural Gas Certified, Single Seal Device ■ Remote Mount(8) ■ Stainless Steel Contact your Emerson sales office or go to Fisher.com for additional information.	Fisher Controls International LLC declares this product to be in compliance with Article 4, paragraph 3 of the PED Directive 2014/68/EU and Part 1, Requirement 8 of the PESR Regulation. It was designed and manufactured in accordance with Sound Engineering Practice (SEP) and cannot bear the CE marking related to PED compliance or the UKCA mark related to the PESR Regulation. However, the product may bear the CE or UKCA marking to indicate compliance with other applicable European Community Directives or UK Regulations (Statutory Instruments).

NOTE: Specialized instrument terms are defined in ANSI/ISA Standard 51.1 - Process Instrument Terminology.

1. The pressure/temperature limits in this document and any other applicable code or standard should not be exceeded.
2. Normal m3/hour - Normal cubic meters per hour at 0°C and 1.01325 bar, absolute. Scfh - Standard cubic feet per hour at 60°F and 14.7 psia.
3. Values at 1.4 bar / 20 psig based on a single-acting direct relay; values at 5.5 bar / 80 psig based on double-acting relay.
4. Temperature limits vary based on hazardous area approval. Lower temperature limit for CUTR Ex d approval with fluoro-silicone elastomers is -53°C / -63.4°F.
5. Not applicable for travels less than 19 mm / 0.75 in. or for shaft rotation less than 60 degrees. Also not applicable for digital valve controllers in long-stroke applications.
6. Rotary actuators with 180 degree rated travel require a special mounting kit; contact your Emerson sales office for kit availability.
7. The Quad O steady-state consumption requirement of 6 scfh can be met by a DVC6200f with low bleed relay A option, when used with up to 4.8 bar / 70 psi supply of Natural Gas at 16°C / 60°F. The 6 scfh requirement can be met by low bleed relay B and C when used with up to 5.2 bar / 75 psi supply of Natural Gas at 16°C / 60°F.
8. 4-conductor shielded cable, 18 to 22 AWG minimum wire size, in rigid or flexible metal conduit, is required for connection between base unit and feedback unit. Pneumatic tubing between base unit output connection and actuator has been tested to 91 m / 300 ft with minimal pneumatic lag. At 30 m / 100 ft there was no performance degradation.

Table 2. EMC Summary Results—Immunity

Port	Phenomenon	Basic Standard	Test Level	Performance Criteria(1)
Enclosure	Electrostatic discharge (ESD)	IEC 61000-4-2	4 kV contact 8 kV air	A(2)
	Radiated EM field	IEC 61000-4-3	80 to 1000 MHz at 10 V/m with 1 kHz AM at 80% 1400 to 2000 MHz at 10 V/m with 1 kHz AM at 80% 2000 to 2700 MHz at 10 V/m with 1 kHz AM at 80%	A
	Rated power frequency magnetic field	IEC 61000-4-8	30 A/m at 50/60 Hz	A
I/O signal/ control	Burst	IEC 61000-4-4	1 kV	A(2)
	Surge	IEC 61000-4-5	1 kV	B
	Conducted RF	IEC 61000-4-6	150 kHz to 80 MHz at 3 Vrms	A

Performance criteria
DVC6200: +/- 1%
DVC6205 Remote Mount: +/- 2%
1. A = No degradation during testing.
   B = Temporary degradation during testing, but is self-recovering.
2. Excluding Simulate function, which meets Performance Criteria B.

1.7 Related Information

Fieldbus Installation and Wiring Guidelines

This manual describes how to connect the Fieldbus to the digital valve controller. For a technical description, planning and installation information for FOUNDATION Fieldbus, refer to the Foundation Technology Overview, available from the Fieldbus Foundation and Fieldbus Installations in a DeltaV System, available from your Emerson sales office.

Related Documents

Other documents containing information related to the DVC6200f digital valve controller include:

- DVC6200f Digital Valve Controller Product Bulletin (D103399X012)
- DVC6200f FD Digital Valve Controller Product Bulletin (D103422X012)
- DVC6200f Digital Valve Controller - PST Instrument Level Product Bulletin (D104160X012)
- DVC6200 Digital Valve Controller and Magnet Array Dimensions (D103543X012)
- Fisher FIELDVUE Digital Valve Controller Product Selection (D104363X012)
- FIELDVUE DVC6200 Series Quick Start Guide (D103556X012)
- CSA Hazardous Area Approvals, DVC6200 Series Digital Valve Controllers (D104203X012)
- FM Hazardous Area Approvals, DVC6200 Series Digital Valve Controllers (D104204X012)
- ATEX Hazardous Area Approvals, DVC6200 Series Digital Valve Controllers (D104205X012)
- IECEx Hazardous Area Approvals, DVC6200 Series Digital Valve Controllers (D104206X012)
- DVC6200f Digital Valve Controller PST Calibration and Testing using ValveLink Software (D104217X012)
- AMS Trex™ Device Communicator User Guide
- ValveLink Software Help or Documentation

All documents are available from your Emerson sales office or at Fisher.com.

1.8 Educational Services

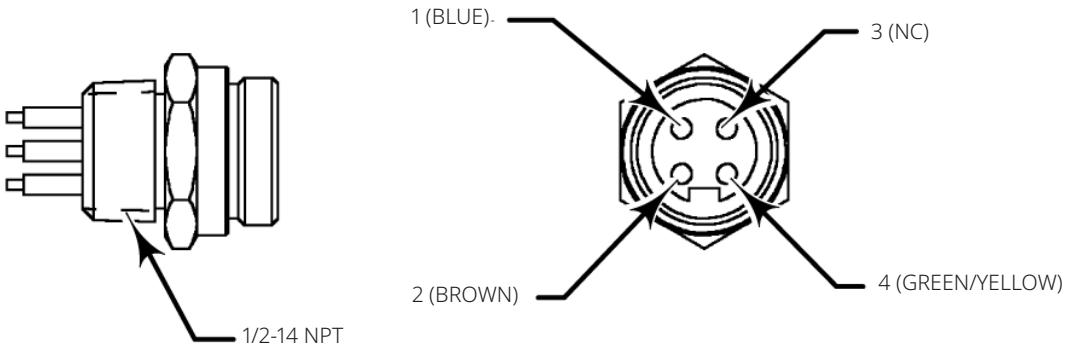
Emerson Educational Services
Phone: +1-800-338-8158
E-mail: education@emerson.com
https://www.emerson.com/en/corporate/education-services

Section 2: Wiring Practices

2.1 Quick Connect Cable Entry

The DVC6200f is offered with a quick connect cable entry option, shown in Figure 3, for the FOUNDATION Fieldbus signal. The quick connect cable entry provides an easier and more reliable interface to Fieldbus devices and support modules by providing a standard connection.

Figure 3. Quick Connect Connector



18B9424-A

NOTES:

1. COLORS ARE WIRE COLORS.
2. NC = NO CONNECTION.

NOTE

The quick connect cable entry option is only available for intrinsically safe and non-incendive installations.

Refer to Figure 20 for identification of parts.

⚠ WARNING

Personal injury or property damage, caused by fire or explosion, can result from the discharge of static electricity. Connect a 14 AWG / 2.08 mm2 ground strap between the digital valve controller and earth ground when flammable or hazardous gases are present. Refer to national and local codes and standards for grounding requirements

To avoid static discharge from the plastic cover, do not rub or clean the cover with solvents. Clean with a mild detergent and water only.

To avoid personal injury or property damage, do not use the Quick Connect option on instruments in explosion-proof or flameproof installations.

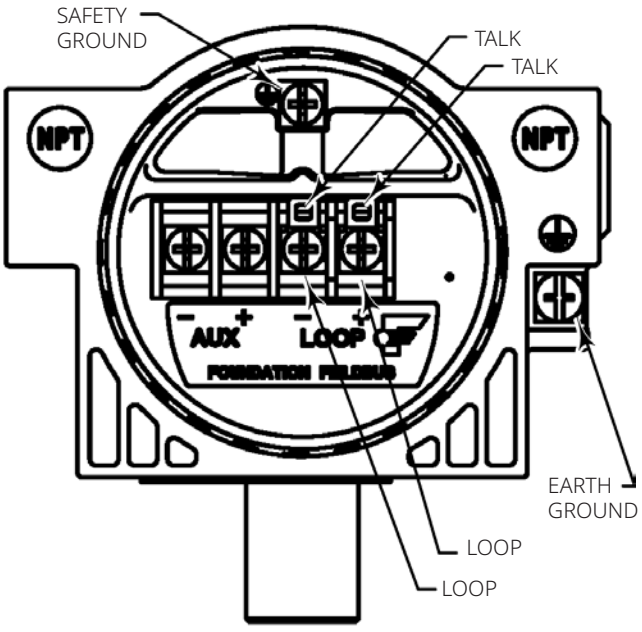
1. The quick connect cable entry should be installed on the digital valve controller at the factory. If it is, proceed to step 3. If not continue with step 2.
2. To install the Quick Connect:
   a. Remove the terminal box cap (key 4) from the terminal box (key 3).
   b. Apply sealant to the threads of the quick connector.
   c. Insert the wire pigtail into the desired conduit opening on the terminal box. Tighten the quick connector in the conduit opening.
   d. The instrument is not polarity sensitive. Refer to Figure 4. Connect the blue wire to the negative (-) LOOP terminals in the terminal box. Connect the brown wire to the positive (+) LOOP terminal. Isolate the green/yellow wire inside of the DVC6200f and ensure that the shield is totally isolated at the instrument end.

NOTE

The green/yellow wire is isolated inside the DVC6200f to help prevent ground loop issues.

   e. Replace the terminal box cap on the terminal box and tighten until no gap remains. Secure the terminal box cap by engaging the lock screw.
3. Connect the field wiring connector to the installed quick connector.

Figure 4. Loop Connections Terminal Box



GE41456-A

2.2 Communication Connections

WARNING

Personal injury or property damage caused by fire or explosion may occur if this connection is attempted in a potentially explosive atmosphere or in an area that has been classified as hazardous. Confirm that area classification and atmosphere conditions permit the safe removal of the terminal box cap before proceeding.

A FOUNDATION Fieldbus communicating device, such as an Emerson handheld communicator or a personal computer running ValveLink software, interfaces with the DVC6200f digital valve controller from any wiring termination point in the segment. If you choose to connect the Fieldbus communicating device directly to the instrument, attach the device to the LOCAL connections inside the terminal box to provide local communications with the instrument.

2.3 Simulate Enable Jumper

WARNING

Personal injury or property damage caused by fire or explosion may occur if this connection is attempted in a potentially explosive atmosphere or in an area that has been classified as hazardous. Confirm that area classification and atmosphere conditions permit the safe removal of the terminal box cap before proceeding.

Install a jumper across the SIMULATE ENABLE terminals to enable the instrument to accept a simulate command. (These terminals are marked AUX on the terminal board, see Figure 4). With the jumper in place and the simulate parameter in the AO or DO block set to enabled, the transducer block ignores the output of the AO or DO block. The simulate value and status become the readback value and status to the AO or DO block and the transducer block is ignored. For more information on running simulations, see the Detailed Setup section of this manual, the FOUNDATION Fieldbus specifications and the host documentation.

WARNING

Removing the jumper will disable the simulate, which may cause the valve to move. To avoid personal injury and property damage caused by the release of pressure or process fluid, provide some temporary means of control for the process.

Section 3: Basic Setup

3.1 Basic Setup

Handheld Communicator	TB > Configure/Setup > Basic Setup

⚠ WARNING

Changes to the instrument setup may cause changes in the output pressure or valve travel. Depending on the application, these changes may upset process control, which may result in personal injury or property damage.

When the DVC6200f digital valve controller is ordered as part of a control valve assembly, the factory mounts the digital valve controller and sets up the instrument as specified on the order. When mounting to a valve in the field, the instrument needs to be setup to match the instrument to the valve and actuator.

Before beginning basic setup, be sure the instrument is correctly mounted as described in the Installation section.

Basic Setup includes the following procedures:

- Device Setup
- Performance Tuner (Optional)

NOTE

The DVC6200f may keep the Transducer Block Mode Out-of-Service if the instrument is not properly mounted.

To setup and calibrate the instrument, the Transducer Block Mode must be Manual and the Protection must be None.

When using DD methods, the method will request that you change the mode, but make changes in Protection automatically. If you have a host system that overrides transducer block parameters, ensure that the Protection setting is not left as None. Doing so will result in transducer block parameters being overwritten.

Transducer Block Mode

Handheld Communicator	TB > Device Variables > TB Block Mode

To setup and calibrate the instrument, the transducer block mode must be in Manual. For more information about transducer block mode, refer to page 53.

Protection

Handheld Communicator	TB > Configure/Setup > Detailed Setup > Protection

To setup and calibrate the instrument, the protection must be set to None with the handheld communicator. For more information about configuration protection, refer to page 53.

3.2 Device Setup

Handheld Communicator	TB > Configure/Setup > Basic Setup > Device Setup

Follow the prompts on the handheld communicator display to automatically setup the instrument using specified actuator information. Table 4 provides the actuator information required to setup and calibrate the instrument.

NOTE

If reverse-acting relay B is used, you must manually set the Relay Type (BASIC_SETUP.RELAY_TYPE [42.5]) to B. This will not be set during Device Setup.

1. Select whether Travel, Travel with Pressure fallback (auto recovery or manual recovery) or Pressure Control is desired. Refer to page 57 for additional information.
2. Enter the pressure units: kPa, bar, psi, inHg, inH2O or kg/cm^2.
3. Enter the maximum instrument supply pressure and output pressure range (if required).
4. Enter the manufacturer of the actuator on which the instrument is mounted. If the actuator manufacturer is not listed, select Other.
5. Enter the actuator model or type. If the actuator model is not listed, select Other.
6. Enter the actuator size.
7. Indicate whether a Volume Booster is being used.
8. Specify if factory defaults should be used for basic setup. If you select YES for factory default, the handheld communicator sets the setup parameters to the values listed in Table 3. If you select NO for the factory defaults, the setup parameters listed in the table remain at their previous settings.

Table 3. Factory Default Settings

Setup Parameter(1)	Default Setting
Travel Cutoff Hi Travel Cutoff Lo Travel Integral Gain Travel Calibration Trigger	99.5% 0.5% 9.4 repeats/min No
Travel Integral Enable Travel Integral Limit Hi Travel Integral Limit Lo Travel Integral Deadzone	On 30% -30% 0.25%
Pressure Cutoff Hi Pressure Cutoff Lo Pressure Integral Deadzone Pressure Integral Hi Limit Pressure Integral Lo Limit	99.5% -0.5% 0.25% 50.0% -50.0%
Input Characterization Shutdown Trigger Shutdown Recovery Output Block Timeout	Linear All Off All Auto Recovery 600 sec
STOP Hi Pos STOP Lo Pos	98% 2%

1. For PST instruments, the PST prohibited configuration will be erased if the instrument is set to factory default settings. These parameters will need to be reconfigured if the PST prohibited configuration is desired.

Table 4. Actuator Information for Initial Setup

Actuator Manufacturer	Actuator Model	Actuator Size	Actuator Style	Starting Tuning Set	Travel Sensor Motion[2] Relay A or C[3]	
Fisher	585C and 585CR	25 50 60 68, 80 100, 130	Piston Dbl with or without Spring. See actuator instruction manual and nameplate.	E I J L M	User Specified	
	657	30, 30i 34, 34i, 40, 40i 45, 45i, 50, 50i 46, 46i, 60, 60i, 70, 70i and 80 to 100	Spring and Diaphragm	H K L M	Away from the top of the instrument	
	667	30, 30i 34, 34i, 40, 40i 45, 45i, 50, 50i 46, 46i, 60, 60i, 70, 70i, 76, 76i and 80 to 100	Spring and Diaphragm	H K L M	Towards the top of the instrument	
	1051 and 1052	20, 30 33 40 60, 70	Spring and Diaphragm (Window-mount)	H I K M	Away from the top of the instrument	
	1061	30 40 60 68, 80, 100, 130	Piston Dbl without Spring	J K L M	Depends upon pneumatic connections. See description for Travel Sensor Motion	
	1066SR	20 27, 75	Piston Sgl with Spring	G L	**Mounting Style**	**Travel Sensor Motion**
					A	Away from the top of the instrument
					B	Towards the top of the instrument
					C	Towards the top of the instrument
					D	Away from the top of the instrument
	2052	1 2 3	Spring and Diaphragm (Window-mount)	H K M	Away from the top of the instrument	
	3024	30, 30E 34, 34E, 40, 40E 45, 45E	Spring and Diaphragm	E H K	For P_O operating mode (air opens): Towards the top of the instrument For P_S operating mode (air closes): Away from the top of the instrument	
	GX	225	Spring and Diaphragm	X[1]	Air to Open Towards the top of the instrument	Air to Close Away from the top of the instrument
		750		K		
		1200		M		

- continued -

Table 4. Actuator Information for Initial Setup (continued)

Actuator Manufacturer	Actuator Model	Actuator Size	Actuator Style	Starting Tuning Set	Travel Sensor Motion(2) Relay A or C(3)
Baumann	Air to Extend	16 32 54	Spring and Diaphragm	C E H	Away from the top of the instrument
	Air to Retract				Towards the top of the instrument
	Rotary	10 25 54		E H J	Specify

NOTE: Refer to Table 14 for feedback connection (magnet assembly) information.

1. X = Expert Tuning. Proportional Gain = 4.2; Velocity Gain = 3.0; Minor Loop Feedback Gain = 18.0
2. Travel Sensor Motion in this instance refers to the motion of the magnet assembly.
3. Values shown are for Relay A and C. Reverse for Relay B.

Typically Device Setup determines the required setup information based upon the actuator manufacturer and model specified. However, if you enter OTHER for the actuator manufacturer or the actuator model, then you will be prompted for setup parameters such as:

- Actuator Style—Select spring and diaphragm, piston double-acting without spring, piston single-acting with spring, piston double-acting with spring.
- Valve Style—Select the valve style, rotary or sliding-stem.
- Zero Power Condition—this identifies whether the valve is fully open or fully closed when the input is 0%. If you are unsure how to set this parameter, disconnect the instrument from the segment. (With double-acting and single-acting direct digital valve controllers, disconnecting the instrument from the segment is the same as setting the output A pressure to zero. For single-acting reverse digital valve controllers, disconnecting the instrument from the segment is the same as setting the output B pressure to supply.)

⚠ WARNING

If you answer YES to the prompt for permission to move the valve when setting the Travel Sensor Motion, the instrument will move the valve through its full travel range. To avoid personal injury and property damage caused by the release of pressure or process fluid, isolate the valve from the process and equalize pressure on both sides of the valve or bleed off the process fluid.

- Travel Sensor Motion—Device Setup asks if it can move the valve to determine travel sensor motion. If you answer Yes, the instrument will stroke the valve the full travel span to determine travel sensor motion. If you answer No, then you must specify the direction of travel movement. For quarter-turn actuators determine rotation by viewing the rotation of the magnet assembly from the back of the instrument.

NOTE

Travel Sensor Motion in this instance refers to the motion of the magnet assembly. Note that the magnet assembly may be referred to as a magnetic array in user interface tools.

For instruments with relay A or C - If increasing air pressure at output A causes the magnet assembly to move up or the actuator shaft to rotate counterclockwise, enter “Towards Top of Instrument/CCW.” If it causes the magnet assembly to move down or the actuator shaft to rotate clockwise, enter “Away From Top of Instrument/CW.”

For instruments with relay B - If decreasing air pressure at output B causes the magnet assembly to move up or the actuator shaft to rotate counterclockwise, enter “Towards Top of Instrument/CCW.” If it causes the magnet assembly to move down or the actuator shaft to rotate clockwise, enter “Away From Top of Instrument/CW.”

NOTE

Relay A adjustment may be required before Device Setup can determine travel sensor motion. Follow the prompts on the handheld communicator display if relay adjustment is necessary.

Table 4 lists the required Travel Sensor Motion selections for Fisher and Baumann actuators.

- Tuning Set—There are twelve tuning sets to choose from. Each tuning set provides a preselected value for the digital valve controller gain settings. Tuning set C provides the slowest response and M provides the fastest response. For smaller actuators use tuning set C or D. For larger actuators using tuning set F or G. Table 5 lists the values for preselected tuning sets.

NOTE

Tuning set B is only available in Pressure Control Mode.

Table 5. Gain Values for Preselected Tuning Sets

TUNING SET	TRAVEL			PRESSURE		
	Proportional Gain	Velocity Gain	Minor Loop Feedback Gain	Proportional Gain	Integrator Gain	Minor Loop Feedback Gain
B	- - -	- - -	- - -	0.5	0.3	35
C	4.4	3.0	35	2.2	0.1	35
D	4.8	3.0	35	2.4	0.1	35
E	5.5	3.0	35	2.8	0.1	35
F	6.2	3.1	35	3.1	0.1	35
G	7.2	3.6	34	3.6	0.1	34
H	8.4	4.2	31	4.2	0.1	31
I	9.7	4.8	27	4.8	0.1	27
J	11.3	5.6	23	5.6	0.1	23
K	13.1	6.0	18	6.6	0.1	18
L	15.5	6.0	12	7.8	0.1	12
M	18.0	6.0	12	9.0	0.1	12
X (Expert)	User Adjusted	User Adjusted	User Adjusted	User Adjusted	User Adjusted	User Adjusted

WARNING

Changes to the tuning set may cause the valve/actuator assembly to stroke. To avoid personal injury or property damage caused by moving parts, keep hands, tools and other objects away from the valve/actuator assembly.

In addition, you can select Expert, which allows you to individually set the proportional gain, velocity gain and minor loop feedback gain for travel tuning and pressure proportional gain, pressure integrator gain and pressure minor loop feedback gain for pressure tuning. Refer to page 54 for additional information on travel tuning and page 56 for pressure tuning.

NOTE

Use Expert tuning only if standard tuning has not achieved the desired results.

Stabilize/Optimize or Performance Tuner may be used to achieve the desired results more rapidly than expert tuning.

Table 4 provides tuning set selection guidelines for Fisher and Baumann actuators. These tuning sets are only recommended starting points. After you finish setting up and calibrating the instrument, use Stabilize/Optimize to adjust the tuning set to get the desired response.

When Device Setup is complete you are asked if you wish to run Auto Calibration now. Select yes to automatically calibrate instrument travel at this time. Follow the prompts on the handheld communicator display. The calibration procedure uses the valve and actuator stops as the 0% and 100% calibration points. For additional information, refer to Auto Calibration in the Calibration section.

NOTE

Single-acting relay B and C are not user-adjustable. However, it is recommended that you check the relay adjustment for double-acting relay A in new installations before proceeding with travel calibration.

Refer to page 142 for relay adjustment instructions.

If after completing setup and calibration the valve cycles or overshoots (unstable), or is unresponsive (sluggish), you can improve operation by running Performance Tuner or Stabilize/Optimize.

Performance Tuner

Handheld Communicator	TB > Configure/Setup > Detailed Setup > Response Control > Travel Tuning > Performance Tuner

⚠ WARNING

During performance tuning the valve may move, causing process fluid or pressure to be released. To avoid personal injury and property damage caused by the release of process fluid or pressure, isolate the valve from the process and equalize pressure on both sides of the valve or bleed off the process fluid.

The Performance Tuner is used to determine digital valve controller tuning. It will move the valve slightly and monitor the effects of small tuning changes until an optimum control response is achieved. Because the Performance Tuner can detect internal instabilities before they become apparent in the travel response, it can generally optimize tuning more effectively than manual tuning. Typically, the Performance Tuner takes 3 to 5 minutes to tune an instrument, although tuning instruments mounted on larger actuators may take longer.

Section 4: Detailed Setup

4.1 Resource Block

The resource block contains the hardware specific characteristics associated with a device; it has no input or output parameters. The resource block monitors and controls the general operation of other blocks within the device. Most of the resource block parameters are operational parameters that provide information about the instrument such as identification, hardware information, available options, etc. and are read only. Configuration of the resource block involves selecting features from those that are available, setting the mode, setting write lock and setting up alert reporting details.

The following procedures address only the key resource block parameters; however, all resource block parameters are listed in Table 7.

Configure/Setup

Handheld Communicator	RB > Configure/Setup

Resource Block Mode

Modes

The resource block can be in one of two modes (MODE_BLK [5]):

- Automatic (Auto) is the operational mode for this block. When the resource block is in the Auto mode, all other function blocks are allowed to function normally.
- Out of Service (OOS)—Placing the resource block in Out of Service mode stops all function block execution, by setting their modes to Out of Service as well. The actual mode of the function blocks is changed to Out of Service, but the function block target modes are retained. Placing the resource block in the Out of Service mode does not affect the mode of the transducer block.

Write Lock

Write Lock (WRITE_LOCK [34]) determines if writes are permissible to other device parameters. The write lock feature must be selected to be able to use Write Lock (see Features Available). When Write Lock is set to Locked, no writes are permitted to any parameters within the device except to set Write Lock to Not Locked. When locked, the device functions normally, updating inputs and outputs and executing algorithms. When Write Lock is set to Not Locked, the Write Alarm (WRITE_ALM [40]) alert is active.

Write Priority (WRITE_PRI [39]) sets the priority for Write Alarm. The lowest priority is 0. The highest is 15.

Communication Timeout

Shed Remote Cascade

NOTE

Typically this parameter does not need to be changed. The unit will be operational using the default values assigned by the factory. Perform this procedure only if a remote computer is sending setpoints from your "advanced" control.
Default value for RCas Timeout is 20 seconds.

Shed Remote Cascade (SHED_RCAS [26]) determines how long function blocks in the DVC6200f should wait before giving up on remote computer writes to RCas parameters. When the timeout is exceeded, the block sheds to the next mode as defined by the block shed options. If Shed Remote Cascade is set to 0, the block will not shed from RCas. Enter a positive value in the Shed Remote Cascade field. Time duration is in 1/32 milliseconds (640000 = 20 secs).

Shed Remote Out

NOTE

Typically this parameter does not need to be changed. The unit will be operational using the default values assigned by the factory. Perform this procedure only if a remote computer is sending setpoints from your "advanced" control.

Default value for Shed Remote Out is 20 seconds.

Shed Remote Out (SHED_ROUT [27]) determine how long function blocks in the DVC6200f should wait before giving up on computer writes to ROut parameters. When the timeout is exceeded, the block sheds to the next mode as defined by the block shed options. If Shed Remote Out is set to 0, the block will not shed from ROut. Enter a positive value in the Shed Remote Out field. Time duration is in 1/32 milliseconds (640000 = 20 secs).

Options

Diagnostic Tier (DIAG_OPTIONS [103]) show which diagnostic options are available in the instrument.

Function Block Options (FB_OPTIONS [102]) show which function blocks are available in the instrument.

Miscellaneous Options (MISC_OPTIONS [104]) indicate which miscellaneous licensing options are enabled.

Features Available (FEATURES [17]) indicates which feature options are available in the resource block.

- Reports enables alert and event reporting. Reporting of specific alerts may be suppressed. See Alerts on page 61.
- Fault State enables the ability of the output block to react to various abnormal conditions by shedding mode. See parameter descriptions for Set Fault State (SET_FSTATE [29]) and Clear Fault State (CLR_FSTATE [30]) in Table 7 and "Action on Fault Detection".
- Write Lock permits using Write Lock (WRITE_LOCK [34]) to prevent any external change to parameter values. Block connections and calculation results will proceed normally, but the configuration is locked. Also see Write Lock, on page 19.
- Multi-bit Alarm (Bit-Alarm) Support permits the instrument to treat each Field Diagnostic alert separately when broadcast to the Host. Without Multi-Bit Alarm Support, an individual Field Diagnostic alert must be acknowledged before another Field Diagnostic alert can be broadcast to the Host.

Features Selected

NOTE

Typically this parameter does not need to be changed. The unit will be operational using the default values assigned by the factory.

Fault State, Software Write Lock and Output Readback are set by default.

Features Selected (FEATURE_SEL [18]) indicates which Resource Block Options features have been selected and is used to select the desired features.

- Reports—Selecting reports enables alert and event reporting. Reporting of specific alerts may be suppressed. See Alerts on page 61.
- Fault State—Selecting fault state enables the ability of the output block to react to various abnormal conditions by shedding mode. See parameter descriptions for Set Fault State (SET_FSTATE [29]) and Clear Fault State (CLR_FSTATE [30]) in Table 7 and "Action on Fault Detection".
- Soft Write Lock—When selected, permits using Write Lock (WRITE_LOCK [34]) to prevent any external change to parameter values. Block connections and calculation results will proceed normally, but the configuration is locked. Also see Write Lock, on page 19.
- Multi-bit Alarm (Bit-Alarm) Support— When selected, the instrument will allow the instrument to treat each Field Diagnostic alert separately when broadcast to the Host.

Alarm Handling

Alert Key (ALERT_KEY [4]) is a number that permits grouping alerts. This number may be used to indicate to the operator the source of the alert, such as the instrument, plant unit, etc. Enter a value between 1 and 255.

Confirm Time (CONFIRM_TIME [33]) determines the time, in 1/32 of a millisecond, the instrument waits for confirmation of receipt of a report before trying again. If Confirm Time is 0, the instrument does not retry to send the report. Enter 0 or a value between 320,000 (10 secs) and 640,000 (20 secs).

Limit Notify (LIM_NOTIFY [32]) is the number of alert reports that the device can send without getting a confirmation up to the maximum permitted in Maximum Notify (MAX_NOTIFY [31]). If Limit Notify is set to zero, no alerts are reported. Enter a value between 0 and 4.

To have the instrument report alerts without having the host poll the alerts parameters, select the Reports feature (see Feature Select).

Maximum Notify (MAX_NOTIFY [31]) indicates the maximum number of alert reports that the device can send without getting a confirmation. This limit is determined by the amount of memory available for alert messages. The number can be set lower, to control alert flooding, by adjusting Maximum Alerts Allowed (LIM_NOTIFY [32]).

Block Alarm Disabled The Block Alarm (BLOCK_ALM [36]) is used for all configuration, hardware, connection failure or system problems in the block. Alarm Summary (ALARM_SUM [37]) determines if the Write Alarm (WRITE_ALM [40]) and Block Alarm [BLOCK_ALM [36]) are disabled.

Block Alarm Auto Acknowledge (ACK_OPTION [38]) determines if the block alarm will be automatically acknowledged.

Discrete Alarm Disabled The Write Alarm (WRITE_ALM [40]) is used to alert when parameters are writable to the device. Alarm Summary (ALARM_SUM [37]) determines if the Discrete Alarm is disabled.

Discrete Alarm Auto Acknowledge (ACK_OPTION [38]) determines if the Write Alarm associated with the block will be automatically acknowledged.

Identification

Device ID (DEVICE_ID [110]) is the 32 character Device ID.

Electronics Serial Number (ELECTRONICS_SN [106]) is set at the factory.

Factory Serial Number (FACTORY_SN [107]) is the instrument serial number set at the factory.

Field Serial Number (FIELD_SN [108]) is the serial number of instrument assigned in field.

Tag Description (TAG_DESC [2]) is used to assign a unique 32 character description to each block within the digital valve controller to describe the intended application for the block.

Strategy (STRATEGY [3]) permits strategic grouping of blocks so the operator can identify where the block is located. The blocks may be grouped by plant area, plant equipment, etc. Enter a value between 0 and 65535 in the Strategy field.

Manufacturer (MANUFAC_ID [10]) identifies the manufacturer of the instrument. It is used by the host system to locate the DD file for the device. For Fisher the Manufacturer ID is 0x5100.

Device Type (DEV_TYPE [11]) identifies the type of device. It is used by the host system to locate the DD file for the device. For a DVC6200f digital valve controller the device type is 0x4602.

Diagnostic Options (DIAG_OPTIONS [45]) shows the diagnostic options available in the instrument.

Version

Device Revision (DEV_REV [12]) is the manufacturer's revision number associated with the resource, used by an interface device to locate the DD file for the resource.

Firmware Revision (FIRMWARE_REVISION [105]) identifies the revision of the firmware that is currently in use.

Standby Firmware Revision (STBY_FIRMWARE_REVISION [111]) identifies the revision of the alternative firmware.

Hardware Revision (HARDWARE_REVISION [83]) identifies the revision of the electronic hardware.

ITK Version (ITK_VER [41]) identifies the major version of the Interoperability Tester used by the Fieldbus Foundation in certifying the device as interoperable. This device revision meets the requirements of version 6.

Alert Handling

Simulate Enabled/Disabled (FD_SIMULATE [73]), when enabled, allows the user to write to the following Field Diagnostic and Instrument alert parameters; Failed Active, Maintenance Active, Offspec Active and Check Active. This provides a way to simulate these alerts for testing. In order to enable Field Diagnostic Alerts Simulate, the Aux Terminal must be jumpered.

Simulate Active Alerts is cleared on a power cycle. It can also be cleared manually or by removing the Aux terminal jumper.

Refer to Alerts on page 61 for additional information setting Field Diagnostic and Instrument alerts.

Enable/Disable FD Simulation

All Diag Tiers FD Alerts

PST Diag Tier FD Alerts

Parameters Affected by Restart with Defaults

Table 6. Parameters Affected by Restart with Defaults

INDEX NUMBER	PARAMETER NAME	INITIAL VALUE
Resource Block		
1	ST_REV	0
2	TAG_DESC	spaces
3	STRATEGY	0
4	ALERT_KEY	0
5	MODE_BLK	
	TARGET	OOS
	PERMITTED	AUTO or OOS
	NORMAL	AUTO
14	GRANT_DENY	All bits: 0
18	FEATURE_SEL	Set by mfgr.
20	CYCLE_SEL	0:0
26	SHED_RCAS	640000
27	SHED_ROUT	640000
28	FAULT_STATE	1: Clear
32	LIM_NOTIFY	MAX_NOTIFY
33	CONFIRM_TIME	640000
34	WRITE_LOCK	1: Unlocked
37	ALARM_SUM_DISABLED	All bits: 0
38	ACK_OPTION	Disabled
39	WRITE_PRI	0
AO Block		
1	ST_REV	0
2	TAG_DESC	spaces
3	STRATEGY	0
4	ALERT_KEY	0
5	MODE_BLK	
	TARGET	OOS
	PERMITTED	OOS+MAN+AUTO+CAS+RCAS
	NORMAL	CAS+Auto
8	SP	Dynamic
9	OUT	Dynamic
11	PV_SCALE	
	EU 100%	100
	EU 0%	0
	Engineering Units	%
	Decimal Places	0
12	XD_SCALE	
	EU 100%	100
	EU 0%	0
	Engineering Units	%
	Decimal Places	0
14	IO_OPTS	All off
15	STATUS_OPTSY	All off
17	CAS_IN	BAD
		Not Connected
		Not Limited
18	SP_RATE_DN	+INF
19	SP_RATE_UP	+INF
20	SP_HI_LIM	100
21	SP_LO_LIM	0
22	CHANNEL	Setpoint

- continued -

Table 6. Parameters Affected by Restart with Defaults (continued)

INDEX NUMBER	PARAMETER NAME	INITIAL VALUE
AO Block (continued)		
23	FSTATE_TIME	0
24	FSTATE_VAL	0
26	RCAS_IN	
	Status	BAD
		Not Connected
		Not Limited
	Value	0 Trk
27	SHED_OPT	Uninitialized
PID Block Parameters		
1	ST_REV	0
2	TAG_DESC	spaces
3	STRATEGY	0
4	ALERT_KEY	0
5	MODE_BLK	
	TARGET	OOS
	PERMITTED	OOS+MAN+AUTO+CAS+RCAS+ROUT
	NORMAL	AUTO
8	SP	Dynamic
9	OUT	Dynamic
10	PV_SCALE	
	EU 100%	100
	EU 0%	0
	Engineering Units	%
	Decimal Places	0
11	OUT_SCALE	
	EU 100%	100
	EU 0%	0
	Engineering Units	%
	Decimal Places	0
13	CONTROL_OPTS	0: Bypass enable
14	STATUS_OPTS	All off
15	IN	
	Status	BAD
		Not Connected
		Not Limited
	Value	0
16	PV_FTIME	0
17	BYPASS	Uninitialized
18	CAS_IN	
	Status	BAD
		Not Connected
		Not Limited
	Value	0
19	SP_RATE_DN	+INF
20	SP_RATE_UP	+INF
21	SP_HI_LIM	100
22	SP_LO_LIM	0
23	GAIN	1
24	RESET	+INF
25	BAL_TIME	0
26	RATE	0
27	BKCAL_IN	
	Status	BAD
		Not Connected
		Not Limited
	Value	0

- continued -

Table 6. Parameters Affected by Restart with Defaults (continued)

INDEX NUMBER	PARAMETER NAME	INITIAL VALUE
	PID Block (continued)	
28	OUT_HI_LIM	100
29	OUT_LO_LIM	0
30	BKCAL_HYS	0.5%
32	RCAS_IN	
	Status	BAD Not Connected Not Limited
	Value	0 Trk
33	ROUT_IN	
	Status	BAD Not Connected Not Limited
	Value	0 Trk
34	SHED_OPTS	Uninitialized
38	TRK_IN_D	
	Status	BAD Not Connected Not Limited
	Value	0
39	TRK_VAL	
	Status	BAD Not Connected Not Limited
	Value	0
40	FF_VAL	
	Status	BAD Not Connected Not Limited
	Value	0
41	FF_SCALE	
	EU 100%	100
	EU 0%	0
	Engineering Units	%
	Decimal Places	0
42	FF_GAIN	0
45	ALARM_SUM	
	DISABLED	All Off
46	ACK_OPTION	All Off
47	ALARM_HYS	0.5%
48	HI_HI_PRI	0
49	HI_HI_LIM	Infinity
50	HI_PRI	0
51	HI_LIM	Infinity
52	LO_PRI	0
53	LO_LIM	- Infinity
54	LO_LO_PRI	0
55	LO_LO_LIM	- Infinity
56	DV_HI_PRI	0
57	DV_HI_LIM	+INF
58	DV_LO_PRI	0
59	DV_LO_LIM	-INF
66	BIAS	
69	SP_FTIME	0
70	MATHFORM	Standard
71	STRUCTURECONFIG	Err on PI_D
72	GAMMA	
73	BETA	1
74	IDEABAND	0

- continued -

Table 6. Parameters Affected by Restart with Defaults (continued)

INDEX NUMBER	PARAMETER NAME	INITIAL VALUE
	ISEL Block	
1	ST_REV	0
2	TAG_DESC	spaces
3	STRATEGY	0
4	ALERT_KEY	0
5	MODE_BLK	OOS
	TARGET	OOS+MAN+AUTO
	PERMITTED	AUTO
	NORMAL	BAD
8	OUT_RANGE	
	EU_100	100
	EU_0	0
	UNITS_INDEX	%
	DECIMAL	0
10	STATUS_OPTS	All off
11	IN_1	
	Status	BAD
		Not Connected
		Constant
	Value	0
12	IN_2	
	Status	BAD
		Not Connected
		Constant
	Value	0
13	IN_3	
	Status	BAD
		Not Connected
		Constant
	Value	0
14	IN_4	
	Status	BAD
		Not Connected
		Constant
	Value	0
15	DISABLE_1	
	Status	BAD
		Not Connected
		Constant
	Value	Use
16	DISABLE_2	
	Status	BAD
		Not Connected
		Constant
	Value	Use
17	DISABLE_3	
	Status	BAD
		Not Connected
		Constant
	Value	Use
18	DISABLE_4	
	Status	BAD
		Not Connected
		Constant
	Value	Use

- continued -

Table 6. Parameters Affected by Restart with Defaults (continued)

INDEX NUMBER	PARAMETER NAME	INITIAL VALUE
	ISEL Block (continued)	
19	SELECT_TYPE	All off
20	MIN_GOOD	0
22	OP_SELECT	
	Status	BAD
		Not Connected
		Constant
	Value	0
25	IN_5	
	Status	BAD
		Not Connected
		Constant
	Value	0
26	IN_6	
	Status	BAD
		Not Connected
		Constant
	Value	0
27	IN_7	
	Status	BAD
		Not Connected
		Constant
	Value	0
28	IN_8	
	Status	BAD
		Not Connected
		Constant
	Value	0
29	DISABLE_5	
	Status	BAD
		Not Connected
		Constant
	Value	Use
30	DISABLE_6	
	Status	BAD
		Not Connected
		Constant
	Value	Use
31	DISABLE_7	
	Status	BAD
		Not Connected
		Constant
	Value	Use
32	DISABLE_8	
	Status	BAD
		Not Connected
		Constant
	Value	Use
33	AVG_USE	8
34	ALARM_SUM	
	DISABLED	All off
35	ACK_OPTION	All off
36	ALARM_HYS	0.5%
37	HI_HI_PRI	0
38	HI_HI_LIM	Infinity
39	HI_PRI	0
40	HI_LIM	Infinity
41	LO_PRI	0
42	LO_LIM	-Infinity
43	LO_LO_PRI	0

- continued -

Table 6. Parameters Affected by Restart with Defaults (continued)

INDEX NUMBER	PARAMETER NAME	INITIAL VALUE
ISEL Block (continued)		
44	LO_LO_LIM	-Infinity
50	ALM_SEL	All off
DI Block		
1	ST_REV	0
2	TAG_DESC	spaces
3	STRATEGY	0
4	ALERT_KEY	0
5	MODE_BLK	
	TARGET	OOS
	PERMITTED	OOS+MAN+AUTO
	NORMAL	AUTO
10	XD_STATE	0
11	OUT_STATE	0
13	IO_OPTS	All off
14	STATUS_OPTS	All off
15	CHANNEL	0
16	PV_FTIME	0
20	ALARM_SUM	
	DISABLED	All off
21	ACK_OPTION	All off
22	DISC_PRI	0
23	DISC_LIM	0
OS Block		
1	ST_REV	0
2	TAG_DESC	spaces
3	STRATEGY	0
4	ALERT_KEY	0
5	MODE_BLK	
	TARGET	OOS
	PERMITTED	OOS+AUTO+CAS
	NORMAL	AUTO+CAS
10	OUT_1_RANGE	
	EU_100	100
	EU_0	0
	UNITS_INDEX	%
	DECIMAL	0
11	OUT_2_RANGE	
	EU_100	100
	EU_0	0
	UNITS_INDEX	%
	DECIMAL	0
13	STATUS_OPTS	All Off
14	CAS_IN	
	Status	Bad Not Connected Not Limited
	Value	0
19	BKCAL_1_IN	
	Status	Bad Not Connected Not Limited
	Value	0

- continued -

Table 6. Parameters Affected by Restart with Defaults (continued)

INDEX NUMBER	PARAMETER NAME	INITIAL VALUE
OS Block (continued)		
20	BKCAL_2_IN	
	Status	Bad Not Connected Not Limited
	Value	0
21	BAL_TIME	0 seconds
AI Block		
1	ST_REV	0
2	TAG_DESC	spaces
3	STRATEGY	0
4	ALERT_KEY	0
5	MODE_BLK	
	TARGET	OOS
	PERMITTED	OOS, MAN, AUTO
	NORMAL	AUTO
10	XD_SCALE	
	EU_100	100
	EU_0	0
	UNITS_INDEX	%
	DECIMAL	0
11	OUT_SCALE	
	EU_100	100
	EU_0	0
	UNITS_INDEX	%
	DECIMAL	0
13	I/O OPTS	All Off
14	STATUS OPTS	All Off
15	CHANNEL	0
16	L_TYPE	Uninitialized
17	LOW_CUT	0
18	PV_FTIME	0 Seconds
22	ALARM_SUM	
	DISABLED	All Off
23	ACK_OPTION	All Off
24	ALARM_HYS	0.5%
25	HI_HI_PRI	0
26	HI_HI_LIM	Infinity
27	HI_PRI	0
28	HI_LIM	Infinity
29	LO_PRI	0
30	LO_LIM	-Infinity
31	LO_LO_PRI	0
32	LO_LO_LIM	-Infinity
38	ALM_SEL	All Off
MAI Block		
1	ST_REV	0
2	TAG_DESC	spaces
3	STRATEGY	0
4	ALERT_KEY	0
5	MODE_BLK	
	TARGET	OOS
	PERMITTED	OOS, MAN, AUTO
	NORMAL	AUTO
7	CHANNEL	MAI Values

- continued -

Table 6. Parameters Affected by Restart with Defaults (continued)

INDEX NUMBER	PARAMETER NAME	INITIAL VALUE
DO Block		
1	ST_REV	0
2	TAG_DESC	spaces
3	STRATEGY	0
4	ALERT_KEY	0
5	MODE_BLK	
	TARGET	OOS
	PERMITTED	OOS+MAN+AUTO+CAS+RCAS
	NORMAL	AUTO+CAS
11	PV_STATE	0
12	XD_STATE	0
14	IO_OPTS	All off
15	STATUS_OPTS	All off
17	CAS_IN_D	
	Status	BAD
		Non Specific
		Not Limited
	Value	0
18	CHANNEL	Working Setpoint (D)
19	FSTATE_TIME	0 seconds
20	FSTATE_VAL_D	0
22	RCAS_IN_D	
	Status	BAD
		NoComm with Last Usable Value
		Not Limited
	Value	0
23	SHED_OPT	Uninitialized
27	SP_RATE_UP	3.40×10^{38}
28	SP_RATE_DN	3.40×10^{38}
CSEL Block		
1	ST_REV	0
2	TAG_DESC	Spaces
3	STRATEGY	0
4	ALERT_KEY	0
5	MODE_BLK	
	TARGET	OOS
	PERMITTED	AUTO+MAN+OOS
	NORMAL	AUTO
7	OUT	
	Status	Bad
		Non Specific
		Not Limited
8	OUT_SCALE	
	EU_100	100
	EU_0	0
	UNITS_INDEX	%
	DECIMAL	0
9	GRANT_DENY	All Off
10	STATUS_OPTS	All Off

- continued -

Table 6. Parameters Affected by Restart with Defaults (continued)

INDEX NUMBER	PARAMETER NAME	INITIAL VALUE
CSEL Block		
11	SEL_1	
	Status	Bad Not Connected Not Limited
12	SEL_2	
	Status	Bad Not Connected Not Limited
13	SEL_3	
	Status	Bad Not Connected Not Limited
14	SEL_TYPE	Uninitialized
15	BKCAL_IN	
	Status	Bad Not Connected Not Limited
16	OUT_HI_LIM	100
17	OUT_LO_LIM	0
Transducer Block		
1	ST_REV	0
2	TAG_DESC	Spaces
3	STRATEGY	0
4	ALERT_KEY	0
5	MODE_BLK	
	TARGET	OOS
	PERMITTED	OOS, MAN, AUTO
	NORMAL	AUTO
86	FD_FAIL_MAP_2	Drive Current Processor Impaired Travel Sensor Performance Critical LCP Communications
87	FD_OFFSPEC_MAP_2	Drive Signal Outlet Pressure Sensor Supply Pressure Travel Deviation Movement History Performance Reduced
88	FD_MAINT_MAP_2	Supply Sensor Fail Temperature Sensor Fail Temperature Limit Travel Limit Pressure Fallback Diagnostic in Progress
89	FD_CHECK_MAP_2	Check Latch Active
90	FD_FAIL_MASK_2	All Off
91	FD_OFFSPEC_MASK_2	All Off
92	FD_MAINT_MASK_2	All Off
93	FD_CHECK_MASK_2	All Off
104	PROTECTION	None

4.1 Resource Block Parameter List

- Read/Write Capability: RO - Read Only, RW - Read Write
- Mode: The block mode(s) required to write to the parameter

Table 7. Resource Block Parameter Definitions

Label PARAMETER_NAME	Index Number	RO / RW	Mode	Range	Initial Value	Description
Static Revision ST_REV	1	RO	N/A	0 to 65535	0	Data Type: Unsigned16 The revision level of the static data. Increments by one each time a static parameter changes. The value is reset to 0 whenever a Restart with Defaults is performed. See Restarting the Instrument.
Tag Description TAG_DESC	2	RW	N/A	7 bit ASCII	Spaces	Data Type: Octet String The user description of the intended application of the block. Null characters are not allowed in this data type.
Strategy STRATEGY	3	RW	ALL	0 to 65535	0	Data Type: Unsigned16 Used to identify groupings of blocks. The data is not checked or processed by the block.
Alert Key ALERT_KEY	4	RW	ALL	1 to 255	0	Data Type: Unsigned8 The identification number of the plant unit. Devices in a loop or plant section can be assigned with a common alert key to aid the operator in determining location of alerts.
Block Mode MODE_BLK	5	- - -				
TARGET_MODE	5.1	RW	ALL	3: Auto 7: OOS	7: OOS	Data Type: DS-69 The actual, target, permitted and normal modes. Target: The requested block mode Actual: The current mode of the block Permitted: Allowed modes for Target Normal: Most common mode for Target
ACTUAL_MODE	5.2	RO	N/A	3: Auto 6: IMAN (only during initialization) 7: OOS	N/A	
PERMITTED_MODE	5.3	RW	ALL	3: Auto 7: OOS	3: Auto 7: OOS	
NORMAL_MODE	5.4	RW	ALL	3: Auto 7: OOS	3: Auto	

- continued -

Table 7. Resource Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Mode	Range	Initial Value	Description
Block Error BLOCK_ERR	6	RO	N/A	0: Other 1: Configuration Error 3: Simulate Active 5: Device Fault State Set 6: Need Maintenance Soon 9: Memory Failure 10: Lost Static Data 11: Lost NV Data 13: Need Maintenance Now 14: Power-up 15: OOS	Dynamic	Data Type: Bit String 0 = Inactive 1 = Active Error status associated with hardware or software for the resource block. When an error is shown it may be broadcast to the host through BLOCK_ALM.
Device State RS_STATE	7	RO	N/A	0: Undefined 1: Start/Restart 2: Initialization 3: On-line Linking 4: On-line 5: Standby 6: Failure	5: Standby	Data Type: Unsigned8 State of the function block application state machine.
Test Read Write TEST_RW	8	- - -	ALL	- - -	0	This parameter may be used in interoperability testing to read and write all standard data types supported by the Fieldbus Foundation.
DD Resource DD_RESOURCE	9	RO	N/A	- - -	Spaces	Data Type: Visible String String identifying the VFD tag of the resource that contains the Device Description for this resource.
Manufacturer Id MANUFAC_ID	10	RO	N/A	- - -	0x5100	Data Type: Unsigned32 Manufacturer identification number, used by an interface device or host to locate the DD file for the resource. All manufacturer identification numbers are maintained by the Fieldbus Foundation. A host usually will have a base directory for DD files. In this directory is a subdirectory for each manufacturer id. In each manufacturer id subdirectory is a directory for each device type made by that manufacturer. The device type directories contain files named by combining the device revision for the particular device type with the revision of the device description. The manufacturer id for Fisher is 0x005100.

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Table 7. Resource Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Mode	Range	Initial Value	Description
Device Type DEV_TYPE	11	RO	N/A	- - -	0x4602	Data Type: Unsigned16 Manufacturer's model number associated with the resource, used by an interface device to locate the DD file for the resource.
Device Revision DEV_REV	12	RO	N/A	- - -	Varies with release	Data Type: Unsigned8 Manufacturer's revision number associated with the resource, used by an interface device to locate the DD file for the resource.
DD Revision DD_REV	13	RO	N/A	- - -	1	Data Type: Unsigned8 The minimum revision of the device description (DD) that can be used with the device revision of the instrument.
Grant Deny GRANT_DENY	14	- - -				
GRANT	14.1	RW	ALL	0: Program 1: Tune 2: Alarm 3: Local 4: Operate 5: Service 6: Diagnostic	All bits: 0	Data Type: DS-70 Options for controlling access of a host computer and to block parameters. Parameter contains two attributes Grant and Deny each with program, tune, alarm and local permissions. Clearing a grant permission sets the corresponding deny permission, 0 = N/A, 1 = granted. Deny permissions may be cleared through the Deny attribute but not set, 0 = N/A, 1 = denied.
DENY	14.2	RW	ALL	0: Program Denied 1: Tune Denied 2: Alarm Denied 3: Local Denied 4: Operate Denied 5: Service Denied 6: Diagnostic Denied	All bits: 0	
Hard Types HARD_TYPES	15	RO	N/A	0: Scalar Input 1: Scalar Output 2: Discrete Input 3: Discrete Output	0: 1 1: 1 2: 1 3: 1	Data Type: Bit String 0 = Inactive 1 = Active The types of hardware available as channel numbers in this resource.
Restart RESTART	16	RW	ALL	1: Run 2: Restart resource 3: Restart with defaults 4: Restart processor 11: Restart with Factory Default Blocks	1: Run	Data Type: Unsigned8 Allows a manual restart to be initiated. For details see Restarting the Instrument in this section.

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Table 7. Resource Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Mode	Range	Initial Value	Description
Features FEATURES	17	RO	ALL	0: Unicode 1: Reports 2: Faultstate 3: Soft W Lock 5: Out Readback 10: Multi-bit Alarm (Bit-Alarm) Support 11: Restart/Relink after FB_Action 13:SIF	Bit 0, 1, 2, 3, 5, 10, 11	Data Type: Bit String 0 = Inactive 1 = Active Shows the supported resource block options. Options are turned on and off via FEATURE_SELECT.
Features Selected FEATURE_SEL	18	RW	ALL	0: Unicode 1: Reports 2: Faultstate 3: Soft W lock 10: Multi-bit Alarm (Bit-Alarm) Support 11: Restart/Relink after FB_Action 13: SIF	Bit 0, 1, 2, 3	Data Type: Bit String 0 = Inactive 1 = Active Shows the selected resource block options. For details, see Device Features in this section.
Cycle Type CYCLE_TYPE	19	RO	N/A	0: Scheduled 1: Completion of block execution 2: Manufacture Specific	Bit 0, 1	Data Type: Bit String 0 = Inactive 1 = Active Identifies the block execution methods available for this resource, may be scheduled, completion of block execution
Cycle Selection CYCLE_SEL	20	RW	ALL	0: Scheduled 1: Completion of block execution	All bits: 0	Data Type: Bit String 0 = Inactive 1 = Active Identifies the block execution method selected for this resource.
Minimum Cycle Time MIN_CYCLE_T	21	RO	N/A	- - -	1760	Data Type: Unsigned32 Time duration of the shortest cycle interval (in 1/32 millisecond) of which the resource is capable. In the digital valve controller this value is fixed at 1760 (55 milliseconds).
Memory Size MEMORY_SIZE	22	RO	N/A	- - -	32	Date Type: Unsigned16 Memory, in kilobytes, available for additional function blocks. Because no additional function blocks may be added to DVC6200f instruments, this parameter value is fixed at 32.

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Table 7. Resource Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Mode	Range	Initial Value	Description
Nonvolatile Cycle Time NV_CYCLE_T	23	RO	N/A	Positive	576000	Date Type: Unsigned32 This parameter identifies the minimum time interval (in 1/32 milliseconds) between copies of NV class data to NV memory. NV memory is updated only if there has been a change in the dynamic value. The last value saved in NV memory will be available for the restart procedure or a power cycle. A non-zero value regulates the frequency of writes, thus protecting the life span of the device. If the value is zero, data will never be automatically copied. Changes made by other than publishing to NV parameters will be copied to non-volatile memory immediately. For DVC6200f instruments, this parameter value is fixed at 576,000 (18 seconds).
Free Space FREE_SPACE	24	RO	N/A	- - -	- - -	Data Type: Float Percent of memory available for additional function blocks (see also MEMORY_SIZE).
Free Time FREE_TIME	25	RO	N/A	- - -	- - -	Data Type: Float Percent of block processing time that is free to process additional blocks.
RCAS Timeout SHED_RCAS	26	RW	ALL	Positive	640000	Date Type: Unsigned32 Time duration (in 1/32 millisecond) at which to give up on computer writes to function block RCAS parameters. If this time is exceeded then the function block will change to a mode other than RCAS based on the SHED_OPT parameter setting. Shed from RCAS mode never happens when SHED_RCAS is set to zero.
ROUT Timeout SHED_ROUT	27	RW	ALL	Positive	640000	Data Type: Unsigned32 Time duration (in 1/32 millisecond) at which to give up on computer writes to function block ROUT parameters. If this time is exceeded then the function block will change to a mode other than ROUT based on the SHED_OPT parameter setting. Shed from ROUT mode never happens when SHED_ROUT is set to zero.

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Table 7. Resource Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Mode	Range	Initial Value	Description
Fault State FAULT_STATE	28	RO	N/A	1: Clear 2: Active	1: Clear	Data Type: Unsigned8 Forces output function blocks that are not Out of Service to the fault state condition. While this parameter is active the output function blocks will go to an actual mode of Local Override (LO) and will perform their fault state actions (see Action On Fault Detection for the output blocks on pages 232 and 331 of this section). This parameter is used to test the fault state behavior that normally occurs when there is a communication problem between devices. This parameter is changed by the SET_FSTATE and CLR_FSTATE parameters so long as the feature Fault State is selected (see Feature Selection [index number 18] in this table).
Set Fault State SET_FSTATE	29	RW	ALL	1: Off 2: Set	1: Off	Data Type: Unsigned8 Selecting Set changes the parameter FAULT_STATE to Active. This is essentially a "write only" parameter as it will always read OFF because it is defined as momentary. Writing a value of OFF has no affect. To use this parameter the feature Fault State must be selected (see Features Selected on page 20).
Clear Fault State CLR_FSTATE	30	RW	ALL	1: Off 2: Clear	1: Off	Data Type: Unsigned8 Selecting Clear changes the parameter FAULT_STATE to Clear and clears the output function blocks of the FAULT_STATE if the field condition, if any, has cleared. This is essentially a "write only" parameter as it will always read OFF because it is defined as momentary. Writing a value of OFF has no affect. To use this parameter the feature Fault State must be selected (see Features Selected on page 20).
Maximum Notify MAX_NOTIFY	31	RO	N/A	- - -	4	Data Type: Unsigned8 The maximum number of alert reports that this device can send without getting a confirmation. To control alert flooding, the number can be set lower by adjusting the LIM_NOTIFY parameter value.

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Table 7. Resource Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Mode	Range	Initial Value	Description
Limit Notify LIM_NOTIFY	32	RW	ALL	0 to MAX_NOTIFY	MAX_NOTIFY	Data Type: Unsigned8 The number of alert reports that this device can send without getting a confirmation up to the maximum permitted in the parameter MAX_NOTIFY. If set to zero, then no alerts are reported.
Confirm Time CONFIRM_TIME	33	RW	ALL	> 0 Set by FCS	640000	Data Type: Unsigned32 The time (in 1/32 millisecond) the device waits for confirmation of receipt of an alert report before trying again.
Write Lock WRITE_LOCK	34	RW	ALL	1: Unlocked 2: Locked	1: Unlocked	Data Type: Unsigned8 If set to Locked, no writes from anywhere are allowed except to clear WRITE_LOCK by entering Unlocked. Block inputs will continue to be updated if they are subscribers. The feature Soft Write Lock must be selected to enable writing to this parameter (see Device Features in this section).
Update Event UPDATE_EVT	35	- - -	- - -	- - -	- - -	- - -
UNACKNOWLEDGED	35.1	RW	ALL	0: Uninitialized 1: Acknowledged 2: Unacknowledged	0: Uninitialized	Data Type: DS-73 This alert is generated by any change to the static data. To support tracking changes in static parameter values, the blocks static revision parameter will be incremented each time a static parameter value is changed. Also, the blocks static revision parameter may be incremented if a static parameter is written but the value is not changed. If the Actual Mode is not Out of Service and Reports is selected in the Feature Select parameter, then this parameter will be sent to the host system providing the host has set up alert communications. Changes to static data while the block is Out of Service will be reported when the block transitions to another mode.
UPDATE_STATE	35.2	RO	N/A	0: Uninitialized 1: Reported 2: Not Reported	0: Undefined	
TIME_STAMP	35.3	RO	N/A	- - -	0	
STATIC_REVISION	35.4	RO	N/A	- - -	0	
RELATIVE_INDEX	35.5	RO	N/A	- - -	0	

- continued -

Table 7. Resource Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Mode	Range	Initial Value	Description
Block Alarm BLOCK_ALM	36			- - -		
UNACKNOWLEDGED	36.1	RW	ALL	0: Uninitialized 1: Acknowledged 2: Unacknowledged	Dynamic	Data Type: DS-72 This alarm is generated by a nonzero value in the Block Error. parameter. This alarm has a fixed priority of 2. For a BLOCK_ALM to be broadcast to the host the following conditions must be met: The feature Reports must be selected Alert communication with the host must be setup In the ALARM_SUM parameter, the disable bit for Block Alarm must be clear.
ALARM_STATE	36.2	RO	N/A	0: Uninitialized 1: Clear-reported 2: Clear-not reported 3: Active-reported 4: Active-not reported	Dynamic	
TIME_STAMP	36.3	RO	N/A	- - -	Dynamic	
SUBCODE	36.4	RO	N/A	- - -	Dynamic	
VALUE	36.5	RO	N/A	- - -	Dynamic	
Alarm Summary ALARM_SUM	37			- - -		
CURRENT	37.1	RO	N/A	0: Discrete alarm 7: Block Alarm 8: Fail Alarm 9: Off Spec Alarm 10: Maintenance Alarm 11: Check Alarm	Dynamic	Data Type: DS-74 0: clear, acknowledged, reported, enabled Current alert status, unacknowledged states, unreported states and disabled states of the alarms associated with the function block. The Resource block only has two alarms: Write Alarm and Block Alarm.
UNACKNOWLEDGED	37.2	RO	N/A	See CURRENT	Dynamic	
UNREPORTED	37.3	RO	N/A	See CURRENT	Dynamic	
DISABLED	37.4	RW	ALL	See CURRENT	Dynamic	
Acknowledge Option ACK_OPTION	38	RW	ALL	0: Discrete Alarm (Write Lock off) 7: Block Alarm 8: Fail Alarm 9: Off Spec Alarm 10: Maintenance Alarm 11: Check Alarm	All bits: 0	Data Type: Bit String 0: Disable 1: Enable Selection of whether alarms associated with the block will be automatically acknowledged.
Write Priority WRITE_PRI	39	RW	ALL	0 to 15	0	Data Type: Unsigned8 Priority of the alarm generated by setting WRITE_LOCK to Unlocked. 0 -- Clear associated alert 1 -- Associated alert not sent 2 -- Reserved for alerts that do not require the attention of a plant operator, e.g. diagnostic and system alerts 3 to 7 -- advisory alarms 8 to 15 -- critical alarms

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Table 7. Resource Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Mode	Range	Initial Value	Description
Write Alarm WRITE_ALM	40			- - -		
UNACKNOWLEDGED	40.1	RW	ALL	0: Uninitialized 1: Acknowledged 2: Unacknowledged	Dynamic	Data Type: DS-72 This alarm is generated when Unlocked in the WRITE_LOCK parameter is set. This alarm has a priority of WRITE_PRI. For a WRITE_ALM to be broadcast to the host the following conditions must be met: The feature Reports must be selected Alert communication with the host must be setup In the ALARM_SUM parameter, the disable bit for Write Alarm must be clear. WRITE_PRI must be greater than 1.
ALARM_STATE	40.2	RO	N/A	0: Uninitialized 1: Clear-reported 2: Clear-not reported 3: Active-reported 4: Active-not reported	Dynamic	
TIME_STAMP	40.3	RO	N/A	- - -	Dynamic	
SUBCODE	40.4	RO	N/A	- - -	Dynamic	
VALUE	40.5	RO	N/A	- - -	Dynamic	
ITK Version ITK_VER	41	RO	N/A	- - -	*	Data Type: Unsigned16 Major version of ITK test this device has been tested to. *Initial value depends on the revision of the DVC6200f.
Extended Parameters						
Not used	42 to 51	RO	- - -	- - -	- - -	- - -
FD_VER	52	RO	- - -	- - -	1	Data Type: Uint16
FD_FAIL_ACTIVE	53	RO	- - -	0: Check 1: Drive Current 2: Drive Signal 3: Processor Impaired 4: LCP Button Pressed 5: LCP Communications Lost 6: Travel Sensor Fail 7: Outlet Pressure Sensor Fail 8: Supply Pressure Sensor Fail 9: Temperature Sensor Fail 10: Supply Pressure 11: Temperature Limit 12: Travel Deviation 13: Travel/Setpoint Limit	- - -	Data Type: Bit String, 4 bytes Alert is the act of detecting a condition in the dev device. 0 = Inactive 1 = Active

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Table 7. Resource Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Mode	Range	Initial Value	Description
Extended Parameters						
FD_FAIL_ACTIVE	53	RO	- - -	14: Movement History 16: Performance Critical 17: Performance Reduced 18: Performance Info 19: Latch Active 20: Pressure Fallback 23: PST Pass 24: PST Abnormal 25: FST Pass 26: FST Abnormal 27: Diagnostic in Progress 28: Test Overdue 29: PST Pending 30: Stroke History Time Exceeded	- - -	Data Type: Bit String, 4 bytes Alert is the act of detecting a condition in the dev device. 0 = Inactive 1 = Active
FD_OFFSPEC_ACTIVE	54	RO	- - -	*	- - -	Data Type: Bit String, 4 bytes 0 = Inactive 1 = Active *See FD_FAIL_ACTIVE for Range
FD_MAINT_ACTIVE	55	RO	- - -	*	- - -	Data Type: Bit String, 4 bytes 0 = Inactive 1 = Active *See FD_FAIL_ACTIVE for Range
FD_CHECK_ACTIVE	56	RO	- - -	*	- - -	Data Type: Bit String, 4 bytes 0 = Inactive 1 = Active *See FD_FAIL_ACTIVE for Range
FD_FAIL_MAP	57	RW	AUTO OOS	*	See description	Data Type: Bit String, 4 bytes 0 = Disable 1 = Enable *See FD_FAIL_ACTIVE for Range After Restart with Defaults: LCP Communications | Drive Current | Processor Impaired | Travel Sensor | Performance Critical
FD_OFFSPEC_MAP	58	RW	AUTO OOS	*	See description	Data Type: Bit String, 4 bytes 0 = Disable 1 = Enable *See FD_FAIL_ACTIVE for Range After Restart w/Defaults: Drive Signal | Outlet Pressure Sensor | Supply Pressure | Travel Deviation | Movement History | Performance Reduced

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Table 7. Resource Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Mode	Range	Initial Value	Description
FD_MAINT_MAP	59	RW	AUTO OOS	*	See description	Data Type: Bit String, 4 bytes 0 = Disable 1 = Enable *See FD_FAIL_ACTIVE for Range After Restart w/Defaults: Supply Sensor Fail | Temperature Sensor Fail | Temperature Limit | Travel Limit | Pressure Fallback | Diagnostic in Progress
FD_CHECK_MAP	60	RW	AUTO OOS	*	Check | Latch Active	Data Type: Bit String, 4 bytes 0 = Disable 1 = Enable *See FD_FAIL_ACTIVE for Range
FD_FAIL_MASK	61	RW	AUTO OOS	*	All Disabled	Data Type: Bit String, 4 bytes 0 = Disable 1 = Enable *See FD_FAIL_ACTIVE for Range
FD_OFFSPEC_MASK	62	RW	AUTO OOS	*	All Disabled	Data Type: Bit String, 4 bytes 0 = Disable 1 = Enable *See FD_FAIL_ACTIVE for Range
FD_MAINT_MASK	63	RW	AUTO OOS	*	All Disabled	Data Type: Bit String, 4 bytes 0 = Disable 1 = Enable *See FD_FAIL_ACTIVE for Range
FD_CHECK_MASK	64	RW	AUTO OOS	*	All Disabled	Data Type: Bit String, 4 bytes 0 = Disable 1 = Enable *See FD_FAIL_ACTIVE for Range
FD_FAIL_ALM	65	---				Data Type: DS-87
UNACKNOWLEDGED	65.1	RW	AUTO OOS	0: Uninitialized 1: Acknowledged 2: Unacknowledged	Dynamic	Data Type: DS-87 Alarm is the message notifying a host of an Alert condition.
ALARM_STATE	65.2	RO	---	0: Uninitialized 1: Clear - reported 2: Clear - not reported 3: Active - reported 4: Active - not reported	Dynamic	
TIME_STAMP	65.3	RO	---	---	Dynamic	
SUB_CODE	65.4	RO	---	---	Dynamic	
VALUE	65.5	RO	---	---	Dynamic	

- continued -

Table 7. Resource Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Mode	Range	Initial Value	Description
FD_OFFSPEC_ALM	66	- - -				Data Type: DS-87 Alarm is the message notifying a host of an Alert condition.
UNACKNOWLEDGED	66.1	RW	AUTO OOS	0: Uninitialized 1: Acknowledged 2: Unacknowledged	Dynamic	
ALARM_STATE	66.2	RO		0: Uninitialized 1: Clear - reported 2: Clear - not reported 3: Active - reported 4: Active - not reported	Dynamic	
TIME_STAMP	66.3	RO	- - -	- - -	Dynamic	
SUB_CODE	66.4	RO	- - -	- - -	Dynamic	
VALUE	66.5	RO	- - -	- - -	Dynamic	
FD_MAINT_ALM	67					Data Type: DS-87 Alarm is the message notifying a host of an Alert condition.
UNACKNOWLEDGED	67.1	RW	AUTO OOS	0: Uninitialized 1: Acknowledged 2: Unacknowledged	Dynamic	
ALARM_STATE	67.2	RO		0: Uninitialized 1: Clear - reported 2: Clear - not reported 3: Active - reported 4: Active - not reported	Dynamic	
TIME_STAMP	67.3	RO	- - -	- - -	Dynamic	
SUB_CODE	67.4	RO	- - -	- - -	Dynamic	
VALUE	67.5	RO	- - -	- - -	Dynamic	
FD_CHECK_ALM	68					Data Type: DS-87 Alarm is the message notifying a host of an Alert condition.
UNACKNOWLEDGED	68.1	RW	AUTO OOS	0: Uninitialized 1: Acknowledged 2: Unacknowledged	Dynamic	
ALARM_STATE	68.2	RO	- - -	0: Uninitialized 1: Clear - reported 2: Clear - not reported 3: Active - reported 4: Active - not reported	Dynamic	
TIME_STAMP	68.3	RO	- - -	- - -	Dynamic	
SUB_CODE	68.4	RO	- - -	- - -	Dynamic	
VALUE	68.5	RO	- - -	- - -	Dynamic	

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Table 7. Resource Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Mode	Range	Initial Value	Description
FD_FAIL_PRI	69	RW	AUTO OOS	0 to 15	0	Data Type: Uint8
FD_OFFSPEC_PRI	70	RW	AUTO OOS	0 to 15	0	Data Type: Uint8
FD_MAINT_PRI	71	RW	AUTO OOS	0 to 15	0	Data Type: Uint8
FD_CHECK_PRI	72	RW	AUTO OOS	0 to 15	0	Data Type: Uint8
FD_SIMULATE	73	- - -				Data Type: DS-89 *See bit definitions in FD_FAIL_ACTIVE for Range and Initial Value.
DIAGNOSTIC_ SIMULATE_VALUE	73.1	RW	ALL	*	- - -	
DIAGNOSTIC_ VALUE	73.2	RO		*	- - -	
ENABLE_DISABLE	73.3	RW	ALL	0: Uninitialized 1: Simulate Disabled 2: Simulate Enabled	Simulate Disabled	
FD_RECOMMEN_ ACT	74	RO	- - -	0: Not Initialized 1: No Action Required 2: FD Alert bit 0 3: FD Alert bit 1 to 33: FD Alert bit 31 34: Simulate Active	Not Initialized	Data Type: Uint16
FD_EXTENDED_ ACTIVE_1	75	RO	- - -	*	Dynamic	Data Type: Bit String, 4 bytes *See TB.INST_ALERTS_ACTIVE. GROUP_1_ACTIVE for Range
FD_EXTENDED_ ACTIVE_2	76	RO	- - -	*	Dynamic	Data Type: Bit String, 4 bytes *See TB.INST_ALERTS_ACTIVE. GROUP_2_ACTIVE for Range
FD_EXTENDED_ ACTIVE_3	77	RO	- - -	*	Dynamic	Data Type: Bit String, 4 bytes *See TB.INST_ALERTS_ACTIVE. GROUP_3_ACTIVE for Range
FD_EXTENDED_ MAP_1	78	RW	AUTO OOS	*	*	Data Type: Bit String, 4 bytes See TB.INST_ALERTS_ ENABLE. GROUP_1_ENABLE for Range and Initial Value
FD_EXTENDED_ MAP_2	79	RW	AUTO OOS	*	*	Data Type: Bit String, 4 bytes See TB.INST_ALERTS_ENABLE. GROUP_2_ENABLE for Range and Initial Value
FD_EXTENDED_ MAP_3	80	RW	AUTO OOS	*	*	Data Type: Bit String, 4 bytes See TB.INST_ALERTS_ ENABLE. GROUP_3_ENABLE for Range and Initial Value

- continued -

Table 7. Resource Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Mode	Range	Initial Value	Description
CAPABILITY_LEV	81	RO	- - -	1: SC 2: FC 3: FL 255: Unknown	- - -	Data Type: Uint8
Compatibility Revision COMPATIBILITY_REV	82	RO	- - -	- - -	4	Data Type: Uint8
Hardware Revision HARDWARE_REVISION	83	RO	- - -	- - -	- - -	Data Type: Uint8 Describes electronic hardware revision information.
PD_TAG	84	RO	- - -	- - -	- - -	Data Type: Visible String, 32 bytes
HEALTH_INDEX	85	RO	- - -	- - -	- - -	Data Type: Uint8
Failed Priority FAILED_PRI	86	RW	AUTO OOS	0 to 15	0	Data Type: Uint8
Recommended Action RECOMMENDED_ACTION	87	RO	- - -	- - -	- - -	Data Type: Uint16 Copy of the FD_RECOMMEN_ACT parameter. See FD_RECOMMEN_ACT for Range and Initial Value. Fix for most serious condition.
Failed Alarm FAILED_ALM	88					Data Type: DS-71 Used to report alerts to host system.
UNACKNOWLEDGED	88.1	RW	AUTO OOS	0: Uninitialized 1: Acknowledged 2: Unacknowledged	Dynamic	
ALARM_STATE	88.2	RO	- - -	0: Uninitialized 1: Clear - reported 2: Clear - not reported 3: Active - reported 4: Active-not reported	Dynamic	
TIME_STAMP	88.3	RO	- - -	- - -	Dynamic	
SUB_CODE	88.4	RO	- - -	- - -	Dynamic	
VALUE	88.5	RO	- - -	- - -	Dynamic	

- continued -

Table 7. Resource Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Mode	Range	Initial Value	Description
Maintenance Alarm MAINT_ALM	89	- - -				Data Type: DS-71 Used to report alerts to host system.
UNACKNOWLEDGED	89.1	RW	AUTO OOS	0: Uninitialized 1: Acknowledged 2: Unacknowledged	Dynamic	
ALARM_STATE	89.2	RO	- - -	0: Uninitialized 1: Clear - reported 2: Clear - not reported 3: Active - reported 4: Active-not reported	Dynamic	
TIME_STAMP	89.3	RO	- - -	- - -	Dynamic	
SUB_CODE	89.4	RO	- - -	- - -	Dynamic	
VALUE	89.5	RO	- - -	- - -	Dynamic	
Advise Alarm ADVISE_ALM	90	- - -				Data Type: DS-71 Used to report alerts to host system.
UNACKNOWLEDGED	90.1	RW	AUTO OOS	0: Uninitialized 1: Acknowledged 2: Unacknowledged	Dynamic	
ALARM_STATE	90.2	RO	- - -	0: Uninitialized 1: Clear - reported 2: Clear - not reported 3: Active - reported 4: Active-not reported	Dynamic	
TIME_STAMP	90.3	RO	- - -	- - -	Dynamic	
SUB_CODE	90.4	RO	- - -	- - -	Dynamic	
VALUE	90.5	RO	- - -	- - -	Dynamic	
Failed Enable FAILED_ENABLE	91	RO	- - -	*	*	Data Type: Bit String, 4 bytes Copy of FD_FAIL_MAP. *See FD_FAIL_MAP for Range and Initial Value.
Failed Suppress FAILED_MASK	92	RO	- - -	*	*	Data Type: Bit String, 4 bytes Copy of FD_FAIL_MASK. *See FD_FAIL_MASK for Range and Initial Value. MASK controls whether an alert is reported. If alert is enabled the alert condition is evaluated and the ACTIVE parameter is updated to reflect if alert is active or not. If the bit is set reporting is suppressed. Default is all bits cleared.

- continued -

Table 7. Resource Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Mode	Range	Initial Value	Description
Failed Active FAILED_ACTIVE	93	RO	- - -	*	*	Data Type: Bit String, 4 bytes Copy of FD_FAIL_ACTIVE. *See FD_FAIL_ACTIVE for Range and Initial Value.
Maintenance Priority MAINT_PRI	94	RW	AUTO OOS	0 to 15	0	Data Type: Uint8
Maintenance Enable MAINT_ENABLE	95	RO	- - -	*	*	Data Type: Bit String, 4 bytes Copy of FD_OFFSPEC_MAP. *See FD_OFFSPEC_MAP for Range and Initial Value.
Maintenance Suppress MAINT_MASK	96	RO	- - -	*	*	Data Type: Bit String, 4 bytes Copy of FD_OFFSPEC_MASK. *See FD_OFFSPEC_MASK for Range and Initial Value MASK controls whether an alert is reported. If alert is enabled the alert condition is evaluated and the ACTIVE parameter is updated to reflect if alert is active or not. If the bit is set reporting is suppressed. Default is all bits cleared.
Maintenance Active MAINT_ACTIVE	97	RO	- - -	*	*	Data Type: Bit String, 4 bytes Copy of FD_OFFSPEC_ACTIVE. *See FD_OFFSPEC_ACTIVE for Range and Initial Value.
Advise Priority ADVISE_PRI	98	RW	AUTO OOS	0 to 15	0	Data Type: Uint8
Advise Enable ADVISE_ENABLE	99	RO	- - -	*	*	Data Type: Bit String, 4 bytes Bit-wise OR of FD_MAINT_MAP and FD_CHECK_MAP. *See FD_MAINT_MAP for Range and FD_MAINT_MAP and FD_CHECK_MAP for Initial Value.
Advise Suppress ADVISE_MASK	100	RO	- - -	*	*	Data Type: Bit String, 4 bytes Bit-wise AND of FD_MAINT_MASK and FD_CHECK_MASK. *See FD_MAINT_MASK and FD_CHECK_MASK for Range and Initial Value. MASK controls whether an alert is reported. If alert is enabled the alert condition is evaluated and the ACTIVE parameter is updated to reflect if alert is active or not. If the bit is set reporting is suppressed. Default is all bits cleared.
Advise Active ADVISE_ACTIVE	101	RO	- - -	*	*	Data Type: Bit String, 4 bytes Bit-wise OR of FD_MAINT_ACTIVE and FD_CHECK_ACTIVE. *See FD_MAINT_ACTIVE or FD_CHECK_ACTIVE for Range.

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Table 7. Resource Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Mode	Range	Initial Value	Description
Function Block Options FB_OPTIONS	102	RO	- - -	0: AO 1: DO 2: AI 3: DI 4: PID 5: ISEL 6: OS 7: MAI 8: CSEL	- - -	Data Type: Bit String, 4 bytes 0 = disabled 1 = enabled Indicates which function block licensing options are enabled. One bit for each block type that is supported. Unlicensed blocks cannot be scheduled and the Actual block mode will remain OOS.
Diagnostic Options DIAG_OPTIONS	103	RO	- - -	1: FD 2: AD 3: PD 4: SIS 5: PST 0x81: FD (temporarily PD) 0x82: AD (temporarily PD)	*	Data Type: Uint8 Indicates which diagnostics licensing options are enabled. *Initial value depends on the licensed DVC6200f options.
Miscellaneous Options MISC_OPTIONS	104	RO	- - -	0:Firmware Download 10: Travel Control 11: Pressure Control 12: Fallback Capable	- - -	Data Type: Bit String, 4 bytes Indicates which miscellaneous licensing options are enabled.
Firmware Revision FIRMWARE_REVISION	105	- - -				Data Type: Uint8 Describes software revision information. This is the revision of the firmware that is currently in use.
FIRMWARE_REV_MAJOR	105.1	RO	- - -	- - -	3	
FIRMWARE_REV_MINOR	105.2	RO	- - -	- - -	1	
FIRMWARE_REV_BUILD	105.3	RO	- - -	- - -		
VL_COMPAT_REV	105.4	RO	- - -	- - -	3	
VLM_COMPAT_REV	105.5	RO	- - -	- - -	3	
DD_COMPAT_REV	105.6	RO	- - -	- - -	3	
FIRMWARE_REV_ALL	105.7	RO	- - -	- - -	- - -	Data Type: Visible String Describes software revision information.
Electronics Serial Number ELECTRONICS_SN	106	RO	- - -	NA	Factory Set	Data Type: Visible String Electronics serial number set by manufacturing.
Factory Serial Number FACTORY_SN	107	RO	- - -	NA	spaces	Data Type: Visible String Instrument serial number set by manufacturing.

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Table 7. Resource Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Mode	Range	Initial Value	Description
Field Serial Number FIELD_SN	108	RW	AUTO OOS	Any String	spaces	Data Type: Visible String Instrument serial number set in the field.
Time Since Reset TIME_SINCE_RESET	109	RO	- - -	N/A	0	Data Type: Uint32 Number of seconds since the last time DVC6200f was restarted. Restart due to power up or restart command.
Device ID DEVICE ID	110	RO	- - -	N/A	Device ID	Data Type: Visible String Unique 32 character ID used to identify the device.
STBY_FIRMWARE_REV	111					
STBY_FIRM_REV_MAJOR	111.1	RO	- - -	- - -	*	Data Type: Uint8 Describes firmware revision information. This is the revision of the alternative firmware. *Initial value depends on revision of firmware in standby.
STBY_FIRM_REV_MINOR	111.2	RO	- - -	- - -	*	
STBY_FIRM_REV_BUILD	111.3	RO	- - -	- - -	*	
STBY_VL_COMPAT_REV	111.4	RO	- - -	- - -	*	
STBY_VLM_COMPAT_REV	111.5	RO	- - -	- - -	*	
STBY_DD_COMPAT_REV	111.6	RO	- - -	- - -	*	
STBY_FIRMWARE_REV_ALL	111.7	RO	N/A	XX.XX.XX	NA	Data Type: Visible String Describes firmware revision information. *Initial value depends on revision of firmware in standby. The range of this parameter consists of 55.1 through 55.5 values, converted to text and linked together.
FB_SUPPORTED	112	RO	- - -	0: AO 1: DO 2: AI 3: DI 4: PID 5: ISEL 6: OS 7: MAI 8: CSEL	- - -	Data Type: Bit String, 4 bytes
IO_FIRMWARE_REV	113	RO	- - -	- - -	- - -	Data Type: Uint8

View Lists

View lists allow the values of a set of parameters to be accessed at the same time. Views 1 and 2 contain operating parameters and are defined by the Fieldbus Foundation. View 3 contains dynamic parameters and View 4 contains static parameters with configuration and maintenance information. Views 3 and 4 are defined by the manufacturer.

NOTE

Because individual views are limited in size, View List 4 has multiple parts.

Table 8. Resource Block, View Lists

INDEX NUMBER	PARAMETER	VIEW				
		1	2	3	4	4.1
1	ST_REV	x	x	x	x	x
3	STRATEGY				x	
4	ALERT_KEY				x	
5	MODE_BLK	x		x		
6	BLOCK_ERR	x		x		
7	RS_STATE	x		x		
10	MANUFAC_iD				x	
11	DEV_TYPE				x	
12	DEV_REV				x	
13	DD_REV				x	
14	GRANT_DENY		x			
15	HARD_TYPES				x	
17	FEATURES				x	
18	FEATURE_SEL		x			
19	CYCLE_TYPE				x	
20	CYCLE_SEL		x			
21	MIN_CYCLE_T				x	
22	MEMORY_SIZE				x	
23	NV_CYCLE_T		x			
24	FREE_SPACE		x			
25	FREE_TIME	x		x		
26	SHED_RCAS		x			
27	SHED_ROUT		x			
28	FAULT_STATE	x		x		
31	MAX_NOTIFY				x	

- continued -

Table 8. Resource Block, View Lists (continued)

INDEX NUMBER	PARAMETER	VIEW				
		1	2	3	4	4.1
32	LIM_NOTIFY		x			
33	CONFIRM_TIME		x			
34	WRITE_LOCK		x			
37	ALARM_SUM	x		x		
38	ACK_OPTION				x	
39	WRITE_PRI				x	
41	ITK_VER				x	
52	FD_VER				x	
53	FD_FAIL_ACTIVE	x		x		
54	FD_OFFSPEC_ACTIVE	x		x		
55	FD_MAINT_ACTIVE	x		x		
56	FD_CHECK_ACTIVE	x		x		
57	FD_FAIL_MAP				x	
58	FD_OFFSPEC_MAP				x	
59	FD_MAINT_MAP				x	
60	FD_CHECK_MAP				x	
61	FD_FAIL_MASK				x	
62	FD_OFFSPEC_MASK				x	
63	FD_MAINT_MASK				x	
64	FD_CHECK_MASK				x	
69	FD_FAIL_PRI				x	
70	FD_OFFSPEC_PRI				x	
71	FD_MAINT_PRI				x	
72	FD_CHECK_PRI				x	
73	FD_SIMULATE			x		
74	FD_RECOMMEN_ACT	x		x		
75	FD_EXTENDED_ ACTIVE_1	x		x		
76	FD_EXTENDED_ ACTIVE_2	x		x		
77	FD_EXTENDED_ ACTIVE_3	x		x		
78	FD_EXTENDED_MAP_1				x	
79	FD_EXTENDED_MAP_2				x	

- continued -

Table 8. Resource Block, View Lists (continued)

INDEX NUMBER	PARAMETER	VIEW				
		1	2	3	4	4.1
80	FD_EXTENDED_MAP_3					x
85	HEALTH_INDEX			x		
86	FAILED_PRI					x
87	RECOMMENDED_ ACTION			x		
91	FAILED_ENABLE					x
92	FAILED_MASK					x
93	FAILED_ACTIVE			x		
94	MAINT_PRI					x
95	MAINT_ENABLE					x
96	MAINT_MASK					x
97	MAINT_ACTIVE			x		
98	ADVISE_PRI					x
99	ADVISE_ENABLE					x
100	ADVISE_MASK					x
101	ADVISE_ACTIVE			x		
102	FB_OPTIONS					x
103	DIAG_OPTIONS					x
108	FIELD_SN					x
109	TIME_SINCE_RESET			x		

4.2 Transducer Block

The transducer block accepts a signal from an output block as a set point to position a valve using a pneumatic actuator. Input to the transducer block is in percent. Closed is 0% and open is 100%. The transducer block contains setup and calibration information and can be tuned to closely match the actuator. Input characterization permits modifying the overall characteristic of the instrument-actuator-valve combination in order to modify the installed gain characteristic of the loop. The transducer block can also be used to perform instrument and valve diagnostics and trigger performance alerts.

The following procedures address only the key transducer block parameters; however, all transducer block parameters are listed in Table 16.

Detailed Setup

NOTE

To setup and calibrate the instrument, the transducer block Mode must be Manual and the Protection must be None.

Transducer Block Mode

Handheld Communicator	TB > Detailed Setup > Transducer Block Mode

Modes

The transducer block can be in one of four modes (MODE_BLK [5]):

Automatic (Auto)—This is the normal mode for this block. When the transducer block is in the auto mode, it accepts the output from the AO or DO block as a set point and outputs a drive signal to the I/P converter based upon this set point.

Out of Service (OOS)—Placing the transducer block in Out of Service mode changes the output to the zero power (no I/P drive) condition.

Manual (MAN)—Placing the transducer block in Manual will hold the value at the current setpoint (FINAL_VALUE [13]). The transducer block will not accept changes from the AO or DO blocks. This mode is required to change some parameters and to run some diagnostics.

Local Override (LO)—The instrument will take the transducer block to a local override mode when a latch is active.

Protection

Handheld Communicator	TB > Configure/Setup > Detailed Setup > Protection

To configure any parameters in the digital valve controller Write Lock (WRITE_LOCK [34]), in the resource block, must be set to Unlocked (refer to page 19). In addition, protection is provided for various transducer block parameters, as indicated in the Protect Category column of Table 16, to prevent inadvertently overwriting key data by the host system or user.

- None will not protect any transducer block parameters.
- Calibration will protect only Calibration transducer block parameters.
- Setup and Calibration will protect only Setup and Calibration transducer block parameters.
- All—will protect all transducer block Parameters.

NOTE

The Device Setup Auto Travel and Manual Travel methods automatically change transducer block protection for the user.

See Table 16 for individual parameter details.

Response Control

Handheld Communicator	TB > Configure/Setup > Detailed Setup > Response Control

Travel Tuning

⚠ WARNING

Changes to the tuning set may cause the valve/actuator assembly to stroke. To avoid personal injury or property damage caused by moving parts, keep hands, tools and other objects away from the valve/actuator assembly.

Travel Tuning Set (TVL_TUNING_SET [67.10])

There are eleven travel tuning sets to choose from. Each tuning set provides a preselected value for the digital valve controller gain settings.

Tuning set C provides the slowest response and M provides the fastest response. Table 9 lists the proportional gain, velocity gain and minor loop feedback gain values for preselected tuning sets.

In addition, you can specify Expert tuning and individually set the proportional gain, velocity gain and minor loop feedback gain. Individually setting or changing any tuning parameter or running the Performance Tuner or Stabilize/Optimize will automatically change the tuning set to X (expert).

Table 9. Gain Values for Preselected Travel Tuning Sets

Tuning Set	Travel Proportional Gain	Travel Velocity Gain	Travel Minor Loop Feedback Gain
C	4.4	3.0	35
D	4.8	3.0	35
E	5.5	3.0	35
F	6.2	3.1	35
G	7.2	3.6	34
H	8.4	4.2	31
I	9.7	4.8	27
J	11.3	5.6	23
K	13.1	6.0	18
L	15.5	6.0	12
M	18.0	6.0	12
X (Expert)	User Adjusted	User Adjusted	User Adjusted

NOTE

Use Expert tuning if standard tuning has not achieved the desired results.

Stabilize/Optimize may be used to achieve the desired results more rapidly than manually editing the Expert tuning.

Table 4 provides tuning set selection guidelines for Fisher and Baumann actuators. These tuning sets are recommended starting points. After you finish setting up and calibrating the instrument, you may have to select either a higher or lower tuning set to get the desired response.

For an actuator not listed in Table 4, you can estimate a starting tuning set by calculating the casing or cylinder volume. Then, find an actuator in Table 4 with the closest equivalent volume and use the tuning set suggested for that actuator.

Travel Proportional Gain (TVL_PROP_GAIN [72.6]) is the proportional gain for the travel control tuning set. Changing this parameter will also change the tuning set to Expert.

Travel Velocity Gain (TVL_RATE [72.7]) is the velocity gain for the travel control tuning set. Changing this parameter will also change the tuning set to Expert.

Travel MLFB Gain (TVL_MLFB_GAIN [72.5]) is the minor loop feedback gain for the travel control tuning set. Changing this parameter will also change the tuning set to Expert.

Travel Integral Enable (TVL_INTEG_ENABLE [72.1]) is used to enable the integral setting to improve static performance by correcting for error that exists between the travel target and actual travel.

Travel Integral Gain (TVL_RESET [72.8]) (also called reset) is the ratio of the change in output to the change in input, based on the control action in which the output is proportional to the time integral of the input.

Travel Integral Dead Zone (TVL_INTEG_DEADZ [72.4]) is a window around the Primary Setpoint in which the integral action is disabled. The dead zone is configurable from 0 to 2% corresponding to a symmetric window from 0% to +/-2% around the Primary Setpoint. This dead zone value is used during the Auto Calibration of Travel procedure even if the travel integral is disabled; in the case of Auto Calibration travel failures with piston actuators, this value should be set to 1%. Default value is 0.26%.

Travel Integral Limit Hi (TVL_INTEG_LIM_HI [72.2]) provides an upper limit to the integrator output. The high limit is configurable from 0 to 100% of the I/P drive signal.

Travel Integral Limit Lo (TVL_INTEG_LIM_LO [72.3]) provides a lower limit to the integrator output. The low limit is configurable from -100 to 0% of the I/P drive signal.

Performance Tuner

⚠ WARNING

During performance tuning the valve will move,which may cause process fluid or pressure to be released. To avoid personal injury and property damage caused by the release of process fluid or pressure, isolate the valve from the process and equalize pressure on both sides of the valve or bleed off the process fluid.

Performance Tuner is used to determine digital valve controller tuning. It will move the valve slightly and monitor the effects of small tuning changes until an optimum control response is achieved. Because the Performance Tuner can detect internal instabilities before they become apparent in the travel response, it can generally optimize tuning more effectively than manual tuning.

Stabilize/Optimize

WARNING

During Stabilize/Optimize the valve may move, causing process fluid or pressure to be released. To avoid personal injury and property damage caused by the release of process fluid or pressure, isolate the valve from the process and equalize pressure on both sides of the valve or bleed off the process fluid.

If after completing initial setup and calibration the valve cycles or overshoots or is sluggish, you can improve operation by running Stabilize/Optimize.

Stabilize/Optimize is included with the device description (DD) firmware. Stabilize/Optimize is accessible from the transducer block and permits changing the transducer block set point a small amount to see if the valve is unstable or unresponsive. If valve response is unsatisfactory, the method permits adjusting the digital valve controller tuning to improve response.

If the valve is unstable, select Decrease Response to stabilize valve operation. This selects the next lower tuning set (e.g., F to E). If the valve response is sluggish, select Increase Response to make the valve more responsive. This selects the next higher tuning set (e.g., F to G).

If after selecting Decrease Response or Increase Response the valve travel overshoot is excessive, Increase Damping or Decrease Damping can be used to select a damping value not represented in a predefined tuning set. Select Decrease Damping to select a damping value that allows more overshoot. Select Increase Damping to select a damping value that will decrease the overshoot.

When valve operation is satisfactory, select Exit. Before exiting, you are asked if you want to return the transducer block mode to Auto. Select Yes to change the transducer block mode to Auto. Select No to leave the transducer block in its current mode.

Pressure Tuning

WARNING

Changes to the tuning set may cause the valve/actuator assembly to stroke. To avoid personal injury or property damage caused by moving parts, keep hands, tools and other objects away from the valve/actuator assembly.

Pressure Tuning Set (PRESS_TUNING_SET [67.11])

There are twelve pressure tuning sets to choose from. Each tuning set provides a preselected value for the digital valve controller gain settings.

Tuning set C provides the slowest response and M provides the fastest response. Tuning set B is appropriate for controlling a pneumatic positioner. Table 10 lists the proportional gain, pressure integrator gain and minor loop feedback gain values for preselected tuning sets.

In addition, you can specify Expert tuning and individually set the pressure proportional gain, pressure integrator gain and pressure minor loop feedback gain. Individually setting or changing any tuning parameter will automatically change the tuning set to X (expert).

Table 10. Gain Values for Preselected Pressure Tuning Sets

Tuning Set	Pressure Proportional Gain	Pressure Integrator Gain	Pressure Minor Loop Feedback Gain
B	0.5	0.3	35
C	2.2	0.1	35
D	2.4	0.1	35
E	2.8	0.1	35
F	3.1	0.1	35
G	3.6	0.1	34
H	4.2	0.1	31
I	4.8	0.1	27
J	5.6	0.1	23
K	6.6	0.1	18
L	7.8	0.1	12
M	9.0	0.1	12
X (Expert)	User Adjusted	User Adjusted	User Adjusted

NOTE

Use Expert tuning only if standard tuning has not achieved the desired results.

Stabilize/Optimize may be used to achieve the desired results more rapidly than Expert tuning.

Pressure Proportional Gain (PRESS_PROP_GAIN [74.3]) is the proportional gain for the pressure control tuning set. Changing this parameter will also change the tuning set to Expert.

Pressure MLFB Gain (PRESS_MLFB_GAIN [74.11]) is the minor loop feedback gain for the pressure control tuning set. Changing this parameter will also change the tuning set to Expert.

Pressure Integral Gain (PRESS_INTEG_GAIN [74.4]) (also called reset) is the ratio of the change in output to the change in input, based on the control action in which the output is proportional to the time integral of the input. This feature is used during pressure control for greater accuracy during pressure control/fallback. Changing this parameter will also change the tuning set to Expert.

Pressure Integral Dead Zone (PRESS_INTEG_DEADZ [74.6]) is a window around the Primary Setpoint in which the integral action is disabled. The dead band is configurable from 0 to 2%.

Pressure Integral Limit Hi (PRESS_INTEG_HI_LIM [74.7]) provides an upper limit to the integrator output. The high limit is configurable from 0 to 100% of the I/P drive signal.

Pressure Integral Limit Lo (PRESS_INTEG_LO_LIM [74.8]) provides a lower limit to the integrator output. The low limit is configurable from -100 to 0% of the I/P drive signal.

Travel/Pressure Control

Travel/Pressure State (TVL_PRESS.STATE [65.2]) indicates if the instrument is being used for travel control (position control) or as an I/P (pressure control).

Travel/Pressure Select (TVL_PRESS_SELECT [65.1]).

NOTE

When using Pressure Fallback Manual Recovery or Pressure Fallback Auto Recovery, the valve travel has the potential of moving rapidly causing potential process instability when returning to Travel Control.

NOTE

Travel / Pressure Select must be set to Travel for double acting actuators.

Travel / Pressure Select determines if the instrument is setup for position or pressure control. Select Travel, Pressure, Travel with Pressure Fallback/Auto recovery or Travel with Pressure Fallback/Manual Recovery. If the travel sensor fails, and Travel with Pressure Fallback/Auto Recovery is selected, it will return to travel control when the travel sensor starts working again. Travel with Pressure Fallback/Manual recovery will stay in pressure control until Travel Pressure Select is changed to Travel or Travel with Pressure Fallback/Auto recovery. It is not necessary to enable the Travel Sensor Alert for Pressure Fallback to occur.

Travel Deviation Pressure Fallback occurs when the instrument detects that the travel sensor is outside of its normal range of operation or that a gross deviation exists between set point and actual travel. It switches to Pressure Control and no longer uses the travel sensor to position the valve.

Pressure Range Hi (PRESS_RANGE_HI [67.7]) is the high end of output pressure range. Enter the pressure that corresponds with 100% valve travel when Zero Power Condition is closed or 0% valve travel when Zero Power Condition is open. This pressure must be greater than the Pressure Range Lo.

Pressure Range Lo (PRESS_RANGE_LO [67.8]) is the low end of the output pressure range. Enter the pressure that corresponds to 0% valve travel when Zero Power Condition is closed or 100% valve travel when Zero Power Condition is open. The pressure must be less than the Pressure Range Hi.

Travel Deviation/Pressure Fallback

- Deviation Fallback Enabled (DEV_FALLBK_ENABLE [66.1]) enables the fallback behavior.
- Deviation Fallback Threshold (DEV_FALLBK_THRESHOLD [66.2]) If the travel deviation exceeds this threshold for more than the defined Fallback Time then the instrument falls back to pressure control.
- Deviation Fallback Time (DEV_FALLBK_TIME [66.2]) defines the amount of time the travel deviation must exceed the Fallback Threshold before the instrument falls back to pressure control.
- Deviation Fallback Minimum Supply Pressure (DEV_FALLBK_MIN_SUPPLY [66.4]) defines the minimum supply pressure required for the instrument to fall back to pressure control.

Cutoff

- Travel Cutoff Hi (FINAL_VALUE_CUTOFF_HI [16]) defines the high cutoff point for the travel in percent (%) of pre-characterized setpoint. Above this cutoff, the travel target is set to 123.0% of the ranged travel. Travel Cutoff Hi is deactivated by setting it to 125.0%.
- Travel Cutoff Lo (FINAL_VALUE_CUTOFF_LO [17]) defines the low cutoff point for the travel in percent (%) of pre-characterized setpoint. Below this cutoff, the travel target is set to -23%. A Travel Cutoff Lo of 0.5% is recommended to help ensure maximum shutoff seat loading. Travel Cutoff Lo is deactivated by setting it to -25.0%.
- Pressure Cutoff Hi (PRESS_CUTOFF_HI [74.1]) defines the high cutoff point for the pressure in percent (%) of pre-characterized setpoint. Above this cutoff, the pressure target is set to 123.0%. A Pressure Cutoff Open of 99.5% is recommended to ensure valve goes fully open. Pressure Cutoff Hi is deactivated by setting it 125%.
- Pressure Cutoff Lo (PRESS_CUTOFF_LO [74.2]) defines the low cutoff point for the pressure in percent (%) of pre-characterized setpoint. Below this cutoff, the pressure target is set to -23%. A Pressure Cutoff Closed of 0.5% is recommended to help ensure maximum shutoff seat loading. Pressure Cutoff Closed is deactivated by setting it to -25.0%.

Characterization

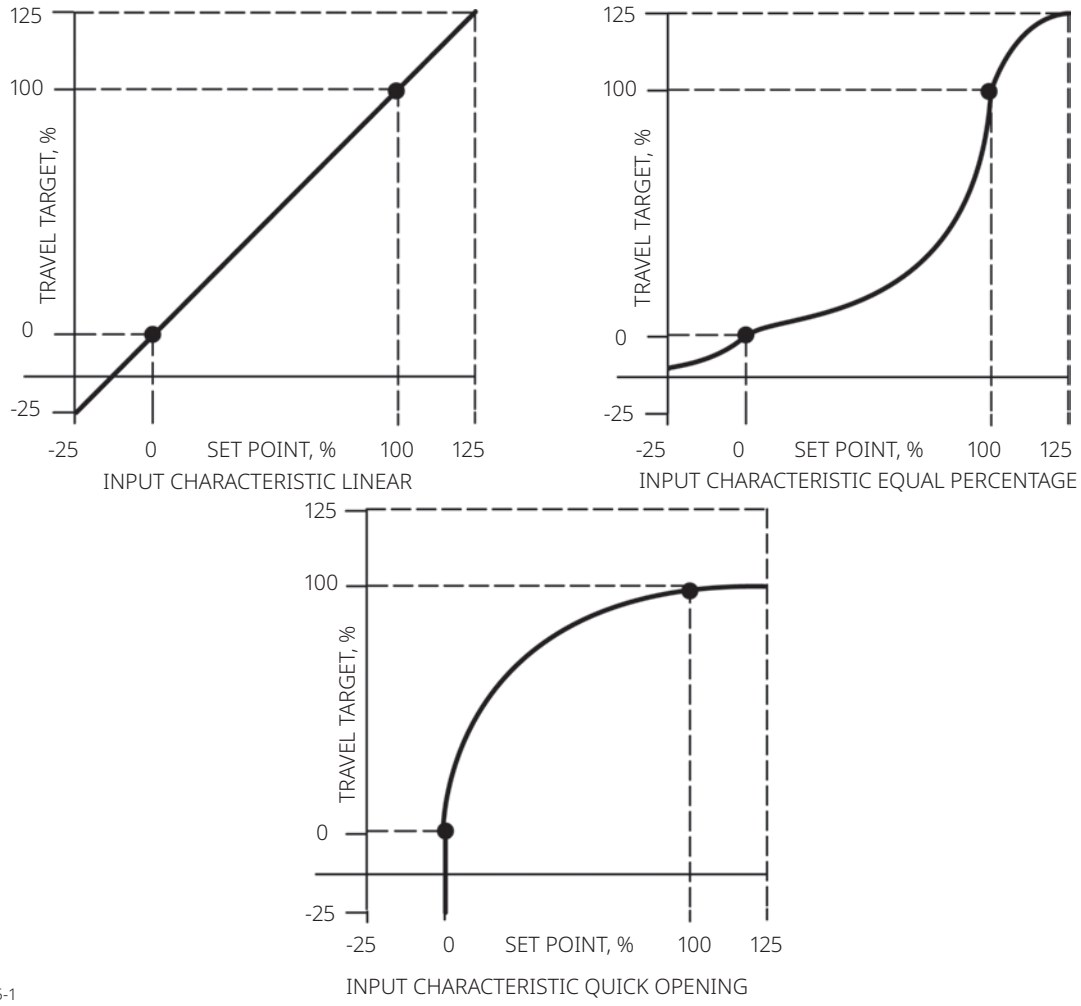
Characterization (INPUT_CHAR [76]) defines the relationship between the travel target and the setpoint received from the output block. Travel target is the output from the characterization function.

You can select from the three fixed input characteristics shown in Figure 5 or you can select a custom characteristic. Figure 5 shows the relationship between the travel target and travel set point for the fixed input characteristics.

Custom Characterization Table

You can specify 21 points on a custom characteristic curve. Each point defines a travel target, in % of ranged travel, for a corresponding set point, in % of ranged set point. Set point values range from -25.0% to 125%. Before modification, the custom characteristic is linear. You cannot modify the custom points if the Input Characterization is set to custom.

Figure 5. Travel Target Versus Ranged Set Point, for Various Input Characteristics (Zero Power Condition = Closed)



Output Block Selection

Output Block Selection (OUTBLOCK_SEL [112]) defines which output function block (AO or DO) will control the setpoint of the valve. The output block that is not selected will shed its mode to reflect that it does not have control of the valve.

Alerts

The DVC6200f provides two levels of alerts; Instrument alerts and Field Diagnostic alerts or PlantWeb alerts. PlantWeb alerts will be presented to hosts that do not support Field Diagnostic alerts.

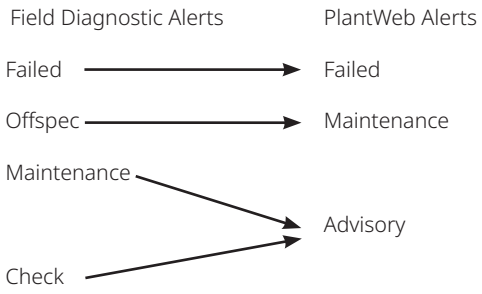
Instrument Alert Conditions

Instrument Alert Conditions, when enabled, detect many operational and performance issues that may be of interest. To view these alerts, open the appropriate status screen on a host such as DeltaV or ValveLink software.

Field Diagnostic Alerts

Some instrument alert conditions can also be used to trigger Field Diagnostic alerts. Field Diagnostic alerts will be reported in Failed, Function Check, Out of Specification or Maintenance Required categories, as configured by the user. When a Field Diagnostic alert occurs, the DVC6200f sends an event notification and waits a specified period of time for an acknowledgment to be received. This occurs even if the condition that caused the alert no longer exists. If the acknowledgment is not received within the pre-specified time-out period, the event notification is retransmitted. This reduces the possibility of alert messages being lost.

Field Diagnostic alerts will be mapped to PlantWeb alerts (PWA) as shown below for older DeltaV systems that do not support Field Diagnostics.



Field Diagnostic alerts are mode-based. Refer to Table C-1 for details.

NOTE

Additional details on setting up and using Field Diagnostic Alerts can be found in Appendix C of this manual.

Field Diagnostic (FD) Alert Category

Select either Enable or Suppress in the desired category for each of the alerts in Electronic, Configuration, Sensor, Environment, Travel, Proximity, Travel History, Test Overdue, Performance and Valve Stroke:

Fail Enable (FD_FAIL_MAP_2 [86]) enables or disables conditions that can cause a failed alert. A failed alert indicates a failure within the device that will make the device or some part of the device non-operational. Table C-2 lists the available Field Diagnostic alerts.

Fail Suppress (FD_FAIL_MASK_2 [90]) determines which of the failed alert conditions are suppressed so that they are not reported. Even if reporting is suppressed, the bit in Fail Active (FD_FAIL_ACTIVE [RB 53]) is still set in the Resource Block.

Check Function Enable (FD_CHECK_MAP_2 [89]) enables or disables conditions that can cause a check function alert. A check function alert indicates that the output signal is temporarily invalid (e.g. frozen) due to ongoing work on the device.

Check Function Suppress (FD_CHECK_MASK_2 [93]) determines which of the check function alert conditions are suppressed. Even if the reporting is suppressed, the bit in Check Function Active (FD_CHECK_ACTIVE [RB 56]) is still set in the Resource Block.

Off Specification Enable (FD_OFFSPEC_MAP_2 [87]) enables or disables conditions that can cause an off specification alert. An off specification alert indicates that the device is operating outside its specified range or internal diagnostics indicate deviations from set values. Table C-2 lists the available Field Diagnostic alerts.

Off Specification Suppress (FD_OFFSPEC_MASK_2 [91]) determines which of the off specification alert conditions are suppressed so that they are not reported. Even if reporting is suppressed, the bit in Off Specification Active (FD_OFFSPEC_ACTIVE [RB 54]) is still set in the Resource Block.

Maintenance Enable (FD_MAINT_MAP_2 [88]) enables or disables conditions that can cause a maintenance alert. A maintenance alert indicates the device or some part of the device needs maintenance soon. Table C-2 lists the available Field Diagnostic alerts.

Maintenance Suppress (FD_MAINT_MASK_2 [92]) determines which of the maintenance alert conditions are suppressed so that they are not reported. Even if reporting is suppressed, the bit in Maintenance Active (FD_MAINT_ACTIVE [RB 55]) is still set in the Resource Block.

Alerts

Handheld Communicator	TB > Configure/Setup > Detailed Setup > Alerts

The following alerts can be enabled/disabled per plant requirements. Select enable within the specific alert menu to enable any of the following alerts or disable to turn off any enabled alert.

Electronic Alerts

Drive Current

- Drive Current (DRIVE_CURRENT [79]) displays the measured Drive Current actually flowing through the I/P converter in percent of maximum drive.
- The Drive Current Alert is active when the drive current to the I/P converter is not flowing as expected.
- Drive Current Shutdown—The Shutdown Trigger (SHUTDOWN_TRIGGER [83.1]) permits enabling or disabling Self Test Shutdown for the Drive Current alert. When enabled, and the alert condition is present, the transducer Actual mode is placed Out of Service. The instrument will attempt to drive the valve to the Zero Power Condition and will no longer execute transducer control function.
- Drive Current Manual Recovery—Shutdown Recovery (SHUTDOWN_RECOVERY [83.2]) permits enabling or disabling Automatic recovery from Self Test Shutdown. When enabled, the transducer block will return to Target mode when Drive Current Shutdown clears. If not enabled, the transducer block will remain Out of Service until power is removed and restored or the user changes the transducer block target mode to Manual or Auto. In any case, the target mode will remain Out of Service, if the condition that caused the shutdown remains or until the shutdown trigger is disabled.
- Drive Current Alert Point (DRIVE_CURRENT_ALRT_PT [83.4]) is when the absolute difference between the Drive Current and Drive Signal exceeds the set threshold for greater than the Drive Current Alert Time.
- Drive Current Alert Time (DRIVE_CURRENT_TIME [83.5]) is the maximum time that the Drive Current Alert Point can be exceeded before the Drive Current Alert is active.
- Drive Current FD Config

Drive Signal

- Drive Signal (DRIVE_SIGNAL [78]) displays the commanded Drive Signal being sent to the I/P converter as a percentage of the maximum drive.

The Drive Signal Alert is active if one of the following conditions exist:

Where Zero Power Condition is defined as closed:

Drive Signal < 10% and Calibrated Travel > 3%

Drive Signal > 90% and Calibrated Travel < 97%

Where Zero Power Condition is defined as open:

Drive Signal < 10% and Calibrated Travel < 97%

Drive Signal > 90% and Calibrated Travel > 3%

- Drive Signal FD Config

Processor Impaired

- The Program Memory Alert is active if a pending Flash or NVM failure is present.
- Program Memory Shutdown—The Shutdown Trigger (SHUTDOWN_TRIGGER [83.1]) permits enabling or disabling Self Test Shutdown. When enabled, and the Program Memory Alert is active, the transducer Actual mode is placed out of service. The instrument will attempt to drive the valve to the zero power condition and will no longer execute transducer control function.
- Program Memory Manual Recovery—Shutdown Recovery (SHUTDOWN_RECOVERY [83.2]) permits enabling or disabling Automatic recovery from Self Test Shutdown. When enabled, the transducer block will return to Target mode when the condition that caused Program Memory Shutdown clears. If not enabled, the transducer block will remain Out of Service until power is removed and restored or the user changes the transducer block target mode to Manual or Auto. In any case, the target mode will remain Out of Service, if the condition that caused the shutdown remains or until the shutdown trigger is disabled.
- The Static Memory Alert is active if a failure occurs in the FRAM memory where the static parameters are stored.
- Static Memory Shutdown—The Shutdown Trigger (SHUTDOWN_TRIGGER [83.1]) permits enabling or disabling Self Test Shutdown. When enabled, and the Static Memory Alert is active, the transducer Actual mode is placed out of service. The instrument will attempt to drive the valve to the zero power condition and will no longer execute transducer control function.
- Static Memory Manual Recovery—Shutdown Recovery (SHUTDOWN_RECOVERY [83.2]) permits enabling or disabling Automatic recovery from Self Test Shutdown. When enabled, the transducer block will return to Target mode when the condition that caused Static Memory Shutdown clears. If not enabled, the transducer block will remain Out of Service until power is removed and restored or the user changes the transducer block target mode to Manual or Auto. In any case, the target mode will remain Out of Service, if the condition that caused the shutdown remains or until the shutdown trigger is disabled.
- The I/O Processor Alert is active if a failure occurs in the I/O processor.
- I/O Processor Shutdown—The Shutdown Trigger (SHUTDOWN_TRIGGER [83.1]) permits enabling or disabling Self Test Shutdown. When enabled, and the I/O Processor Alert is active, the transducer Actual mode is placed out of service. The instrument will attempt to drive the valve to the zero power condition and will no longer execute transducer control function.
- I/O Processor Manual Recovery—Shutdown Recovery (SHUTDOWN_RECOVERY [83.2]) permits enabling or disabling Automatic recovery from Self Test Shutdown. When enabled, the transducer block will return to Target mode when the condition that caused I/O Processor Shutdown clears. If not enabled, the transducer block will remain Out of Service until power is removed and restored or the user changes the transducer block target mode to Manual or Auto. In any case, the target mode will remain Out of Service, if the condition that caused the shutdown remains or until the shutdown trigger is disabled.
- Processor Impaired FD Config

Configuration Alerts

Output Block Timeout

- The Output Block Timeout Alert is active if the analog or discrete output block has not executed for longer than the configured timeout.
- Output Block Timeout Shutdown—The Shutdown Trigger (SHUTDOWN_TRIGGER [83.1]) permits enabling or disabling Self Test Shutdown. When enabled, and the Output Block Timeout Alert is active, the transducer Actual mode is placed out of service. The instrument will attempt to drive the valve to the zero power condition and will no longer execute transducer control function.
- Output Block Timeout Manual Recovery—Shutdown Recovery (SHUTDOWN_RECOVERY [83.2]) permits enabling or disabling Manual recovery from Self Test Shutdown. When enabled, the transducer block will return to Target mode when the condition that caused Output Block Timeout Shutdown clears. If not enabled, the transducer block will remain Out of Service until power is removed and restored or the user changes the transducer block target mode to Manual or Auto. In any case, the target mode will remain Out of Service if the condition that caused the shutdown remains or until the shutdown trigger is disabled.
- Output Block Timeout (OUTPUT_BLK_TIMEOUT [83.3]) is the maximum time between updates from the AO or DO block to the transducer block setpoint.

Blocks Set to Default

- The Blocks Set to Defaults Alert is active if the resource block has undergone Restart with Defaults. This will stay active until the transducer block is changed from Out of Service.

Check Alert FD Alert Config

The Alert Key (ALERT_KEY [4]) is the identification number of the plant unit. Devices in a loop or plant section can be assigned with a common alert key to aid the operator in determining location of alerts.

Sensor Alerts

Travel Sensor

- The Travel Sensor Alert is active if the Travel Sensor reading is outside the functional range or the sensor becomes disconnected.
- Travel Sensor Shutdown—The Shutdown Trigger (SHUTDOWN_TRIGGER [83.1]) permits enabling or disabling Self Test Shutdown. When enabled, and the Travel Sensor alert is active, the transducer Actual mode is placed out of service. The instrument will attempt to drive the valve to the zero power condition and will no longer execute transducer control function.
- Travel Sensor Manual Recovery—Shutdown Recovery (SHUTDOWN_RECOVERY [83.2]) permits enabling or disabling Manual recovery from Self Test Shutdown. When not enabled, the transducer block will return to Target mode when Travel Sensor Shutdown clears. If enabled, the transducer block will remain Out of Service until power is removed and restored or the user changes the transducer block target mode to Manual or Auto. In any case, the target mode will remain Out of Service, if the condition that caused the shutdown remains or until the shutdown trigger is disabled.
- Travel Sensor FD Config

Pressure Sensors

- The Supply Pressure Sensor Alert is active if the Supply Pressure Sensor reading is outside the functional range.
- The Port A Pressure Sensor Alert is active if the Port A Pressure Sensor reading is outside the functional range.
- Pressure Sensor Shutdown—The Shutdown Trigger (SHUTDOWN_TRIGGER [83.1]) permits enabling or disabling Self Test Shutdown. When enabled, and the Pressure Sensor Alert is active, the transducer Actual mode is placed out of service. The instrument will attempt to drive the valve to the zero power condition and will no longer execute transducer control function.
- Pressure Sensor Manual Recovery—Shutdown Recovery (SHUTDOWN_RECOVERY [83.2]) permits enabling or disabling Manual recovery from Self Test Shutdown. When not enabled, the transducer block will return to Target mode when the Pressure Sensor Shutdown clears. If enabled, the transducer block will remain Out of Service until power is removed and restored or the user changes the transducer block target mode to Manual or Auto. In any case, the target mode will remain Out of Service, if the condition that caused the shutdown remains or until the shutdown trigger is disabled.
- The Port B Pressure Sensor Alert is active if the Port B Pressure Sensor reading is outside the functional range.
- Supply Pressure Sensor FD Config
- Output Pressure Sensor FD Config

Pressure Fallback

- The Pressure Fallback Alert is active if a travel sensor failure or a gross travel deviation has resulted in fallback to pressure control.
- Pressure Fallback FD Config

Temperature Sensor

- The Temperature Sensor Alert is active if the Temperature Sensor reading is outside the functional range.
- Temperature Sensor FD Config

Environment Alerts

Supply Pressure

- Supply (SUPPLY_PRESSURE.VALUE [61.2]) displays the instrument supply pressure in kPa, bar or psi.
- The Supply Pressure High Alert is active when the supply pressure exceeds the Supply Pressure High Alert Point.
- Supply Pressure High Alert Point (SUP_PRES_HI_ALRT_PT [83.3])—The Supply Pressure High Alert is active when supply pressure exceeds the Supply Pressure High Alert Point.

- The Supply Pressure Low Alert is active when the supply pressure is lower than the Supply Pressure Low Alert Point.
- Supply Pressure Low Alert Point (SUP_PRES_LO_ALRT_PT [83.9])—When the supply pressure falls below the supply pressure alert point, the supply pressure low alert is active. To disable the supply pressure alert, set Supply Pressure Alert Point to zero.
- Supply Pressure FD Config

Temperature Limit

- Temperature (TEMPERATURE [75]), in Degrees Fahrenheit or Celsius. The temperature is measured from a sensor mounted on the digital valve controller's printed wiring board.
- The Temperature High Alert is active if the temperature is greater than the Temperature High Alert Point.
- Temperature High Alert Point (TEMP_HI_ALRT_PT [83.6])—The Temperature High Alert is active when the instrument temperature exceeds the Temperature High Alert Point.
- The Temperature Low Alert is active if the temperature is lower than the Temperature Low Alert Point.
- Temperature Low Alert Point (TEMP_LO_ALRT_PT [83.7])—The Temperature Low Alert is active when the instrument temperature is lower than the Temperature Low Alert Point.
- Temperature Limit FD Config

Travel Alerts

NOTE
The alerts contained in this section are valid for both travel and pressure control.

Working Setpoint is the output from the characterization function.

Travel (DeChar) (FINAL.VALUE [14.2]) displays the actual position of the valve in percent (%) of calibrated travel.

Travel Deviation

- Travel Deviation (DEVIATION_VALUE [23]) displays the absolute difference in percent between Travel Target and Actual Travel.
- The Travel Deviation Alert (INST_ALERTS_ACTIVE [81.1]) is active if the Travel deviation exceeds the Travel Deviation deadband for more than the Travel Deviation Time.
- Travel Deviation Time (DEVIATION_TIME [22]) is the time, in seconds, that the travel deviation must exceed the Travel Deviation Alert Point before the alert is set.
- Travel Deviation Deadband (DEVIATION_DEADBAND [21]) is the travel in percent threshold (%) of ranged travel required to activate a Travel Deviation alert.
- Travel Deviation FD Config

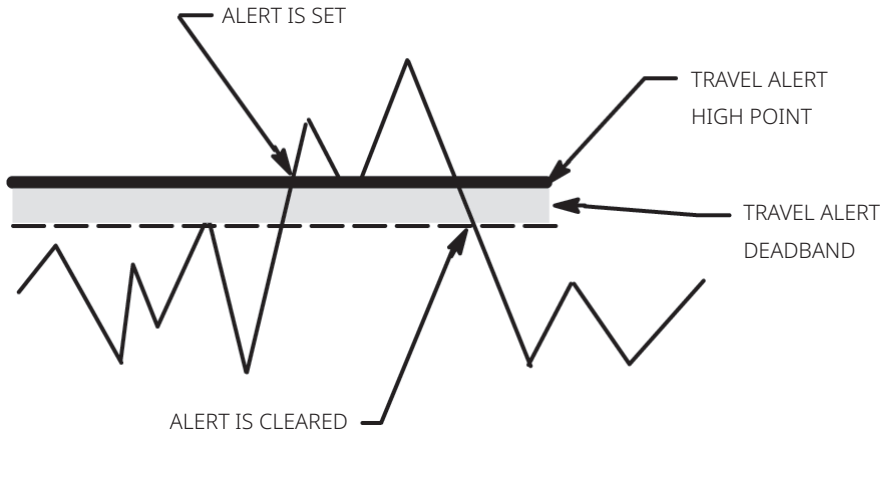
Latch

- The Latch Active Alert is active if the position latch is active.
- Latch Active FD Config

Travel Limit

- The Travel Limit High High Alert is active if the Travel exceeds the Travel Hi Hi Alert point.
- Travel Limit Hi Hi Alert Point (TVL_HI_HI_ALRT_PT [84.14]) is the value of the travel, in percent (%) of ranged travel, which, when exceeded, sets the Travel Alert Hi Hi alert.
- Travel Hi Hi Deadband (TVL_HI_HI_DB [84.15]) is the travel, in percent (%) of ranged travel, required to clear a Travel Hi Hi alert, once it has been set. See Figure 6.

Figure 6. Travel Hi Alert Deadband

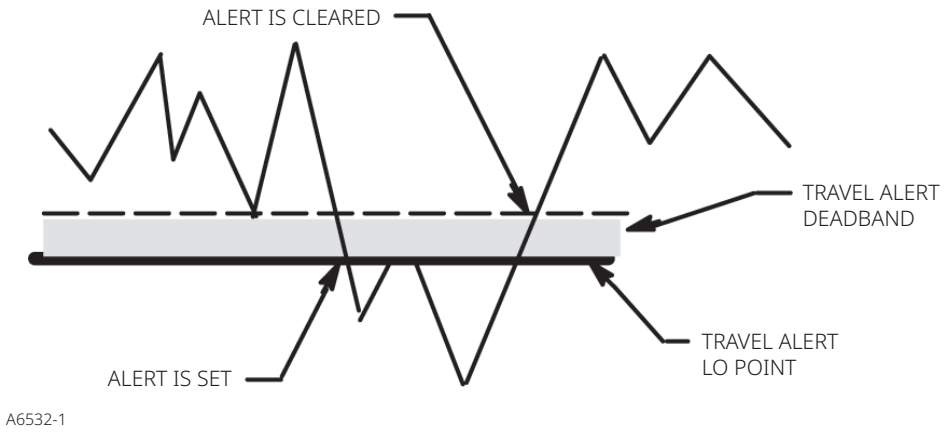


- The Travel Limit Low Low Alert alert is active if the Travel is lower than the Travel Lo Lo Alert point.
- Travel Lo Lo Alert Point (TVL_LO_LO_ALRT_PT [84.8])— The Travel Lo Lo alert is set when the value of the travel, in percent (%) of ranged travel, goes below the Travel Lo Lo Alert Point.
- Travel Lo Lo Deadband (TVL_LO_LO_DB [84.9]) is the travel, in percent (%) of ranged travel, required to clear a Travel Lo Lo alert once it has been set. See Figure 7.
- Travel Limit FD Config

Travel Hi/Lo

- The Travel Limit High Alert is active if the Travel exceeds the Travel Hi Alert point.
- Travel High Alert Point (TVL_HI_ALRT_PT [84.12])—Travel Hi Alert is set if the ranged travel rises above the Travel Hi Alert Point. Once the alert is set, the ranged travel must fall below the alert high point set by the Travel Hi Deadband before the alert is cleared. See Figure 6.

Figure 7. Travel Lo Alert Deadband



- Travel Hi Deadband (TVL_HI_DB [84.13]) is the travel, in percent (%) of ranged travel, required to clear a Travel Hi Alert, once it has been set. See Figure 6.
- The Travel Limit Low Alert is active if the Travel is lower than the Travel Lo Alert point.
- Travel Lo Alert Point (TVL_LO_ALRT_PT [84.10])—The Travel Alert Lo alert is set when the value of the travel, in percent (%) of ranged travel, goes below the Travel Lo Alert Point.
- Travel Lo Deadband (TVL_LO_DB [84.11]) is the travel, in percent (%) of ranged travel, required to clear a travel lo alert, once it has been set. See Figure 7.

Proximity Alerts

NOTE

See page 342 for additional details on using Proximity detection.

Travel (DeChar)

Displays the actual position of the valve in percent (%) of calibrated travel.

Travel Open

- The Travel Open Alert is active if the Travel is greater than the Travel Open Alert Point.
- Travel Open Alert Point (STOP_HI_POS [27]) is the value of the travel in percent (%) or ranged travel, which, when exceeded, sets the Travel Open Alert.
- Travel Open Deadband (TVL_OPEN_DB [84.6]) is the travel in percent (%) of ranged travel required to clear a Travel Open alert, once it has been set.

Travel Closed

- The Travel Closed Alert is active if the Travel goes below the Travel Closed Alert Point.
- Travel Closed Alert Point (STOP_LO_POS [28])—The Travel Closed Alert is set when the value of the travel, in percent (%) of ranged travel, goes below the Travel Closed Alert Point.
- Travel Closed Deadband (TVL_CLOSED_DB [84.7]) is the travel in percent (%) of ranged travel required to clear a Travel Closed alert, once it has been set.

Proximity

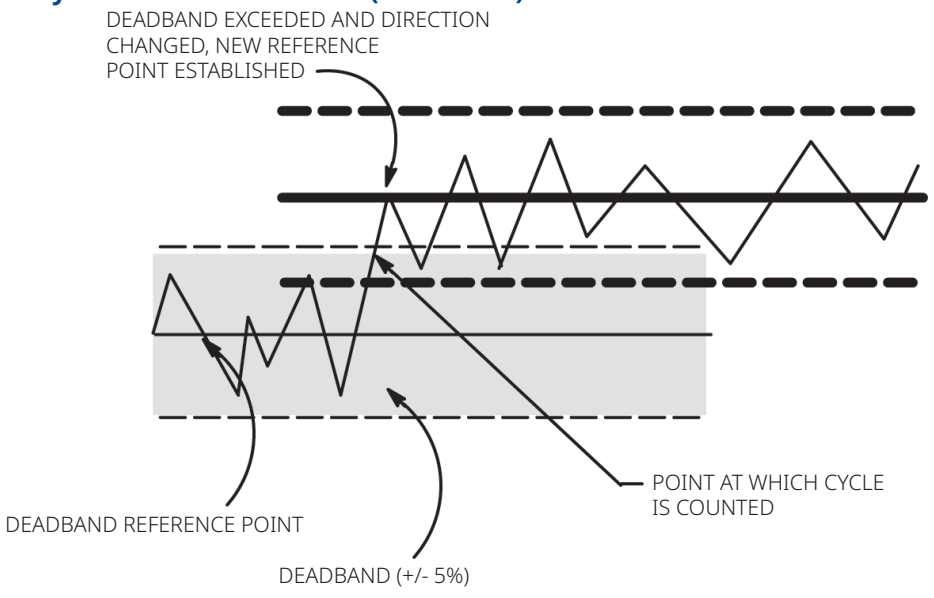
- The Proximity High High Alert (GROUP_2_ENABLE [81.2 bit 9) is active if the Travel is within the detection band set by the Travel Hi Hi Alert Point and the Travel Hi Hi Deadband.
- The Proximity High Alert (GROUP_2_ENABLE [81.2 bit 10]) is active if the Travel is within the detection band set by the Travel Hi Alert Point and the Travel Hi Deadband.
- The Proximity Low Alert (GROUP_2_ENABLE [81.2 bit 11]) is active if the Travel is within the detection band set by the Travel Lo Alert Point and the Travel Lo Deadband.
- The Proximity Low Low Alert (GROUP_2_ENABLE [81.2 bit 12]) is active if the Travel is within the detection band set by the Travel Lo Lo Alert Point and the Travel Lo Lo Deadband.

Travel History Alerts

Cycle Counter

- Cycle Counter (CYCLE_CNTR [39]) records the number of times the travel changes direction. The change in direction must occur after the deadband has been exceeded before it can be counted as a cycle. See Figure 8. You can reset the Cycle Counter by configuring it as zero.
- The Cycle Counter Alert is active if the Cycle Counter exceeds the Cycle Counter Alert Point. It is cleared after you reset the Cycle Counter to a value less than the alert point.
- Cycle Counter Alert Point (CYCLE_COUNT_ALRT_PT [84.4]) is the value of the Cycle Counter, in cycles, which, when exceeded, sets the Cycle Counter Alert.
- Cycle Counter Deadband (CYCLE_COUNT_DB [84.5]) is the area around the travel reference point, in percent (%) of ranged travel, that was established at the last increment of the Cycle Counter. This area must be exceeded before a change in travel direction can be counted as a cycle. See Figure 8.
- Movement History FD Config

Figure 8. Cycle Counter Deadband (set at 10%)



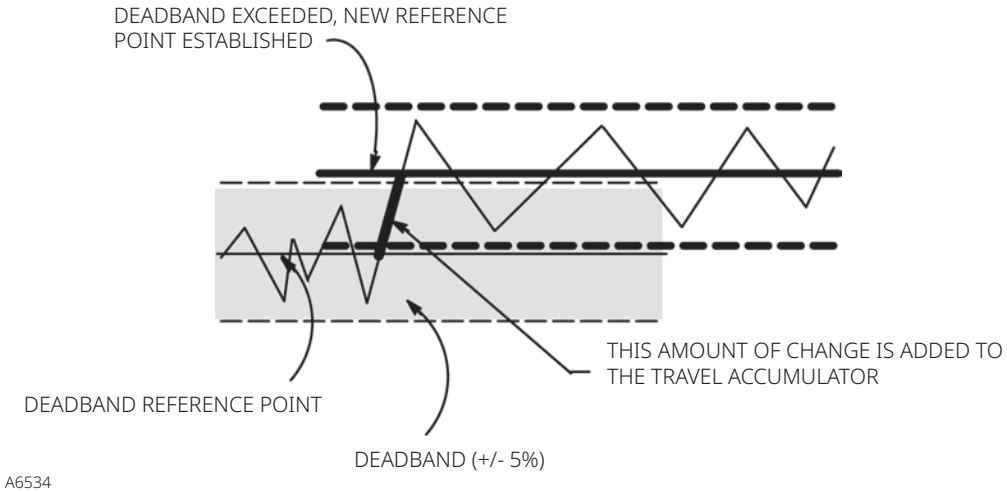
Travel Accumulator

- Travel Accumulator (TRAVEL_ACCUM [29]) records the total change in travel, in percent (%) of ranged travel, since the accumulator was last cleared. The value of the Travel Accumulator increments when the magnitude of the change exceeds the Travel Accumulator Dead-band. See Figure 9. You can reset the Travel Accumulator by configuring it to zero.
- The Travel Accumulator Alert is active if the Travel Accumulator exceeds the Travel Accumulator Alert Point. The Travel Accumulator Alert is set when the Travel Accumulator value exceeds the Travel Accumulator Alert Point. It is cleared after you reset the Travel Accumulation to a value less than the alert point.
- Travel Accumulator Alert Point (TVL_ACCUM_ALRT_PT [84.2]) is the value of the Travel Accumulator, in percent (%) of ranged travel, which, when exceeded, sets the Travel Accumulator Alert.
- Travel Accumulator Deadband (TVL_ACCUM_DB [84.3]) is the area around the travel reference point, in percent (%) of ranged travel, that was established at the last increment of the accumulator. This area must be exceeded before a change in travel can be accumulated. See Figure 9.
- Movement History FD Config

Diagnostic in Progress

- Diagnostic in Progress Alert
- Diagnostic in Progress FD Config

Figure 9. Travel Accumulator Deadband (set at 10%)



Stroke History FD-PD

The stroke history provides either the stroke demand and reset time or the stroke open and close time, depending on the instrument diagnostic level. For example, the PST diagnostic level provides demand and reset stroke time.

- The Open Stroke Time Alert is active when the open stroke time exceeds the configured Open Stroke Time Alert Point (STROKE_OPEN_TIME [85.3])
- The Closed Stroke Time Alert is active when the close stroke time exceeds the configured Closed Stroke Time Alert Point (STROKE_CLOSED_TIME [85.4])
- Stroke History FD Config

Stroke History PST

- The Demand Stroke Time Alert (STROKE_DEMAND_TIME [85.1])is active when the demand stroke time exceeds the configured Demand Stroke Time Alert Point.
- The Reset Stroke Time Alert (STROKE_RESET_TIME [85.2]) is active when the reset stroke time exceeds the configured Reset Stroke Time Alert Point.
- Stroke History FD Config

Performance Alerts

NOTE

Performance Alerts are only available with a PD or a PST instrument. Additionally, for the PD alerts to function properly:

- The transducer block mode must not be out of service.
- The travel/pressure control state must be in travel control mode and
- Bench Set Hi, Bench Set Lo and Nominal Supply Pressure must be set in the Spec Sheets, then enable the Performance Information instrument alert (PD_COMMAND [105.1]).

PD Inside Status shows the status of Performance Diagnostics.

PD Run enables or disables Performance Diagnostics in the instrument (PD Inside). Selecting PD Off disables PD Inside. Selecting PD On enables PD Inside.

Performance Critical

- The Performance Critical Alert is active if the instrument is no longer able to control the valve or performance has been dramatically reduced.
- Performance Critical FD Config

Performance Reduced

- The Performance Reduced Alert is active if the instrument has detected a reduction in performance.
- Performance Reduced FD Config

Performance Information

- The Performance Information Alert is active if the instrument has detected a condition that may pertain to control performance.
- Performance Information FD Config

FST/PST Alerts

PST Abnormal

- PST Abnormal Alert
- PST Abnormal FD Config

PST Pass

- PST Pass Alert
- PST Pass FD Config

FST Abnormal

- FST Abnormal Alert
- FST Abnormal FD Config

FST Pass

- FST Pass Alert
- FST Pass FD Config

PST Pending

- PST Pending Alert
- Auto PST Alert Time
- PST Pending FD Config

Stroke Test Overdue

- PST Overdue Alert
- PST Threshold (PST_THRESHOLD) [133.1]), when enabled, an alert will be active when the set threshold has been exceeded.
- FST Overdue Alert
- FST Threshold (FST_THRESHOLD) [133.2]), when enabled, an alert will be active when the set threshold has been exceeded.
- Stroke Test Overdue FD Config

LCP Communication

- LCP Communication Failure Alert
- LCP Communication FD Config

LCP Button

- LCP Button Stuck Alert
- LCP Trip Button Pressed Alert
- LCP Reset Button Pressed Alert
- LCP Test Button Pressed Alert
- LCP Button Pressed FD Config

Alert Handling

Handheld Communicator	TB > Configure/Setup > Detailed Setup > Alert Handling

Output Block - Echo Block Err—when enabled, the AO or DO BLOCK_ERR [6] parameter will report Field Diagnostic Alerts. The same as Block Error in the resource block.

PD Alert Set PV Status—when selected, PD alerts will set the PV status according to Table 11.

Table 11. Output Block PV Status

FEATURE_SEL Field Diagnostic Alert Set PV Status	Transducer Mode, Actual	Active Field Diagnostic Alarms	AO / DO PV Status(2)	AO / DO PV Substatus	AO / DO PV Limit Substatus(1)
Enabled	OOS	X	Bad	Device Failure	Constant
	Man	X	Bad	Non-specific	Constant
	Auto	Fail	Uncertain	Subnormal	See Table 12
	Auto	Maintenance, no Fail	Uncertain	Non-specific	See Table 12
	Auto	Advisory, no Fail, no Maintenance	Good	Advisory	See Table 12
	Auto	None	Good	Non-Specific	See Table 12
Enabled	OOS	X	Bad	Device Failure	Constant
	Man	X	Bad	Non-Specific	Constant
	Auto	Fail	Good	Non-Specific	See Table 12
	Auto	Maintenance, no Fail	Good	Non-Specific	See Table 12
	Auto	Advisory, no Fail, no Maintenance	Good	Non-Specific	See Table 12
	Auto	None	Good	Non-Specific	See Table 12

NOTES:
X = No Effect
1. PV limit substatus reflects only READBACK limit substatus. SP limit substatus reflects only out block rate limits.
2. Firmware Revision 1.1 and earlier will set AO/DO PV Status to Bad if Feedback Sensor has failed, i.e.; Travel Sensor Fail. However, if the Travel Sensor fails and the instrument falls back to pressure, PV Status will remain good.

Table 12. Limit Sub Status

Out Block	Transducer Mode	In Cutoff Region	Rate Limited	Limit Sub-Status
AO, DO	OOS	X	X	Constant
AO, DO	MAN	X	X	Constant
AO	AUTO	High	X	High Limited
AO	AUTO	Low	X	Low Limited
AO	AUTO	X	High	High Limited
AO	AUTO	X	Low	Low Limited
AO	AUTO	None	None	Not Limited
DO	AUTO	X	High	High Limited
DO	AUTO	X	Low	Low Limited
DO	AUTO	X	None	Not Limited
NOTE: X = No Effect				

Block Errors

Table 13 lists conditions reported in the BLOCK_ERR [6] and XD_ERR [12] parameters.

These alert can be simulated for testing. Refer to the Alert Handling section on page 22 for information on Enable/Disable Simulation.

Table 13. Transducer Block BLOCK_ERR and XD_ERROR Conditions

Condition Number	Condition Name and Description
1	Block Configuration Error - Indicates that one of the following parameters have been configured out of the proper range: 15, 16, 47.1, 47.2, 46.3, 46.5, 42.7, 42.8.
15	Out of Service - Indicates Out of Service Mode.

Instrument

Handheld Communicator	TB > Configure/Setup > Detailed Setup > Instrument

Tag Description (TAG_DESC [2]) is used to assign a unique description to each block within the digital valve controller to describe the intended application for the block.

Units

- Define the output and supply Pressure Units (PRESSURE_UNITS [107]) in either psi, bar or kPa.
- Enter the Temperature Units (TEMPERATURE_UNITS [106]) in degrees Fahrenheit or Celsius. The temperature is measured from a sensor mounted on the digital valve controller's printed wiring board.

- Travel Units—Define the units for valve travel (TRAVEL_UNITS [30]) in inches, centimeters, millimeters or degrees.
- Length Units—Define the units for valve dimensions (LENGTH_UNITS [108]) in inches, centimeters or millimeters.
- Area Units—Define the units for actuator area (AREA_UNITS [109]) in inches^2, centimeter^2 or millimeter^2.
- Spring Rate Units —Define the units for actuator spring rate (SPRING_RATE_UNITS [110]) in lbs/in.^{2} or N/M.

Enter the Relay Type (RELAY_TYPE [67.5]).There are three categories of relays that result in combinations from which to select.

Relay Type: The relay type is printed on the label affixed to the relay body:

A = double-acting or single-acting

B = single-acting, reverse

C = single-acting, direct

Lo Bleed: The label affixed to the relay body indicates it is a low bleed version.

Zero Power Condition (ZERO_PWR_COND [67.2]) identifies whether the valve is open or closed when instrument power is lost. If you are unsure how to set this parameter, disconnect the segment loop power to the instrument. The resulting valve travel is the Zero Power Condition.

Enter the Maximum Supply Pressure (MAX_SUPP_PRESS [67.6]) in psi, bar or kPa, depending on what was selected for pressure units.

Aux Terminal Mode (AUX_MODE [67.9])

- AUX Terminal Disabled
- Simulate, when enabled, allows you to simulate Field Diagnostic alerts upon detection of short across the (+) and (-) terminals. See page 22 for information on Simulate Active Alerts.
- PST, when enabled, allows you to initiate a partial stroke test upon detection of short across the (+) and (-) terminals. See page 80 for additional valve and partial stroke test information.
- Release Latch detects when there is a short across the (+) and (-) terminals. When enabled, the latch will be released.

Calibration Info

- Last Calibration Type indicates the type of the last calibration performed on the instrument. Possible values are: Not Calibrated, Single Point Calibration, Auto Calibration, Manual Calibration.
- Calibration Location (XD_CAL_LOC [55]) indicates the location of the last instrument calibration.
- Calibration Date (XD_CAL_DATE [56]), enter a date with the format MM/DD/YY. Date is a user-defined variable that provides a place to save the date of the last calibration.
- Calibration Person (XD_CAL_WHO [57]) is the name of the person performing last calibration.

Valve and Actuator

Handheld Communicator	TB > Configure/Setup > Detailed Setup > Valve and Actuator

Valve

- Enter the identification number of the Valve Manufacturer (VALVE_MAN_ID [51]) on which the instrument is mounted. Select from the drop-down list or enter the manufacturer's identification number as defined by the Fieldbus Foundation. For Fisher, the manufacturer ID hex value is 005100.
- Enter the Valve Model Number (VALVE_MODEL_NUM [52]), (design letter or type number) for the valve on which the instrument is mounted.
- Enter the Valve Serial Number (VALVE_SN [53]) on which the instrument is mounted.
- Enter the Valve Style (VALVE_TYPE [54]), sliding-stem or rotary, on which the instrument is mounted.
- Enter the Valve Size (VALVE_SIZE [100.1]) on which the instrument is mounted.
- Valve Class (VALVE_CLASS [100.2]) Enter the valve pressure class rating.
- Enter the valve Rated Travel (RATED_TRAVEL [26]) in inches or millimeters for sliding-stem valves or in degrees of rotation for rotary valves.
- Enter the Actual Travel (ACTUAL_TRAVEL [100.3]) in inches or millimeters for sliding-stem valves or in degrees of rotation for rotary valves.
- Enter the valve Shaft Stem Diameter (SHAFT_STEM_DIA [100.4]) in inches or millimeters.
- Enter the valve Packing Type (PACKING_TYPE [100.5).
- Enter the valve Inlet Pressure (INLET_PRESSURE [100.6]).
- Enter the valve Outlet Pressure (OUTLET_PRESSURE [100.7]) in psig, kPa, Bar, inHg, inH_2O or kg/cm^2.

Trim

- Enter the valve Seat Type (SEAT_TYPE [101.1]).
- Enter the valve Leak Class (LEAK_CLASS [101.2]).
- Enter the valve Port Diameter (PORT_DIAMETER [101.3]) in inches or mm.
- Enter the valve Port Type (PORT_TYPE [101.4]).
- Enter the Flow Direction (FLOWDIRECTION [101.5]) through the valve.
- Push Down To (PUSH_DOWN_TO [101.6]) Enter the effect on valve movement when the stem is moved down.
- Flow Tends To (FLOW_TENDS_TO [101.7]) Enter the effect on valve travel with increasing flow.
- Enter the valve Unbalanced Area (UNBALANCED_AREA [101.8]) in $inches^2$ or $millimeters^2$.

Actuator

- Enter the Actuator Manufacture identification number (ACT_MAN_ID [47]) of the actuator on which the instrument is mounted. Select from the drop-down list or enter the manufacturer's identification number as defined by the Fieldbus Foundation. For Fisher, the manufacturer ID hex value is 005100.
- Enter the Actuator Model Number (ACT_MODEL_NUM [48]) on which the instrument is mounted.
- Select the Actuator Style (ACTUATOR_STYLE [67.1]), spring & diaphragm, piston double-acting without spring, piston single-acting with spring or piston double-acting with spring.
- Enter the Actuator Serial Number (ACT_SN [49]) for the actuator on which the instrument is mounted.
- Enter the Actuator Size (ACT_SIZE_ENUM [102.11]) of the actuator on which the instrument is mounted.
- Actuator Fail Action (ACT_FAIL_ACTION [46]) sets the actuator action to be performed upon loss of actuator air pressure.
- Feedback Connection—Refer to Table 14 for Feedback Connection options. Choose the assembly that matches the actuator travel range.

NOTE

As a general rule, do not use less than 60% of the magnet assembly travel range for full travel measurement. Performance will decrease as the assembly is increasingly subranged.

The linear magnet assemblies have a valid travel range indicated by arrows molded into the piece. This means that the hall sensor (on the back of the DVC6200f housing) has to remain within this range throughout the entire valve travel. The linear magnet assemblies are symmetrical. Either end may be up.

Table 14. Feedback Connection Options

MAGNET ASSEMBLY	TRAVEL RANGE		
	mm	In.	Degrees
SStem #7	4.2 to 7	0.17 to 0.28	- - -
SStem #19	8 to 19	0.32 to 0.75	- - -
SStem #25	20 to 25	0.76 to 1.00	- - -
SStem #38	26 to 38	1.01 to 1.50	- - -
SStem #50	39 to 50	1.51 to 2.00	- - -
SStem #110	51 to 110	2.01 to 4.125	- - -
SStem #210	110 to 210	4.125 to 8.25	- - -
SStem #1 Roller	> 210	> 8.25	60 to 90°
RShaft Window #1	- - -	- - -	60 to 90°
RShaft Window #2	- - -	- - -	60 to 90°
RShaft End Mount	- - -	- - -	60 to 90°

- Travel Sensor Motion (TRAVEL_SENSOR_MOTION [67.3])

⚠ WARNING

Setting the Travel Sensor Motion incorrectly may cause the valve to move. To avoid personal injury and property damage caused by the release of pressure or process fluid, isolate the valve from the process and equalize pressure on both sides of the valve or bleed off the process fluid.

Travel Sensor Motion establishes the proper valve travel sensor (feedback) rotation/movement. For quarter-turn actuators, determine rotation by viewing the rotation of the magnet assembly from the back of the instrument.

NOTE

Travel Sensor Motion in this instance refers to the motion of the magnet assembly. Note that the magnet assembly may be referred to as a magnetic array in user interface tools.

For instruments with relay A or C, if increasing air pressure at output A causes the magnet assembly to move up or the actuator shaft to rotate counterclockwise, enter "Towards Top of Instrument/CCW." If it causes the magnet assembly to move down or the actuator shaft to rotate clockwise, enter "Away From Top of Instrument/CW." For instruments with relay B.

For instruments with relay B, if decreasing air pressure at output B causes the magnet assembly to move up or the actuator shaft to rotate counterclockwise, enter "Towards Top of Instrument/CCW." If it causes the magnet assembly to move down or the actuator shaft to rotate clockwise, enter "Away From Top of Instrument/CW."

- Enter the Lever Style (LEVER_STYLE [102.10]) for rotary actuators as either Pivot Point or Rack and Pinion.
- Defines the Lever Arm Length (LEVER_ARM_LENGTH [102.11]) for rotary actuators.
- Enter the actuator Effective Area (EFFECTIVE_AREA [102.2]) in in^2, cm^2 or mm^2.
- Stroking Time Open (STROKING_TIME_OPEN [102.8])—enter the time required to stroke the valve from closed to open.
- Stroking Time Close (STROKING_TIME_CLOSE [102.9])—enter the time required to stroke the valve from open to close.
- Air (AIR [102.3])—select Opens or Closes, indicating the effect of increasing air pressure on the valve travel.
- Upper Bench Set (UPPER_BENCH_SET [102.5])—enter the upper actuator operating pressure .
- Lower Bench Set (LOWER_BENCH SET [102.4])—enter the lower actuator operating pressure.
- Nominal Supply Pressure (NOMINAL_SUPPLY PRESSURE [102.6])—enter the nominal instrument supply pressure.
- Enter the actuator Spring Rate (SPRING_RATE [102.7]) in lbs•in or N•m.

Reference

- Enter valve Trim Style 1 (TRIM_STYLE_1 [101.9]).
- Enter valve Trim Style 2 (TRIM_STYLE_2 [101.10]).

MAI Channel Map

Handheld Communicator	TB > TB > Configure/Setup > Detailed Setup > MAI Channel Map

Allows the user to specify which transducer block parameter is available through each of the MAI Block channels (MAI_CHANNEL_1 through MAI_CHANNEL_8 [111.1 through 111.8]). Transducer block parameters available to each:

1	=	FINAL_VALUE	8	=	ACT_PRESS_DIFF
2	=	TRAVEL_TARGET	9	=	DRIVE_SIGNAL
3	=	FINAL_POSITION_VALUE	10	=	TRAVEL_DEVIATION
4	=	TRAVEL	11	=	TEMPERATURE
5	=	SUPPLY_PRESS	12	=	CYCLE_COUNT
6	=	ACT_PRESS_A	13	=	TRAVEL_ACCUM
7	=	ACT_PRESS_B			

FST/PST

Handheld Communicator	TB > Configure/Setup > Detailed Setup > FST/PST

NOTE

FST/PST is only available with a PST instrument.

FST/PST

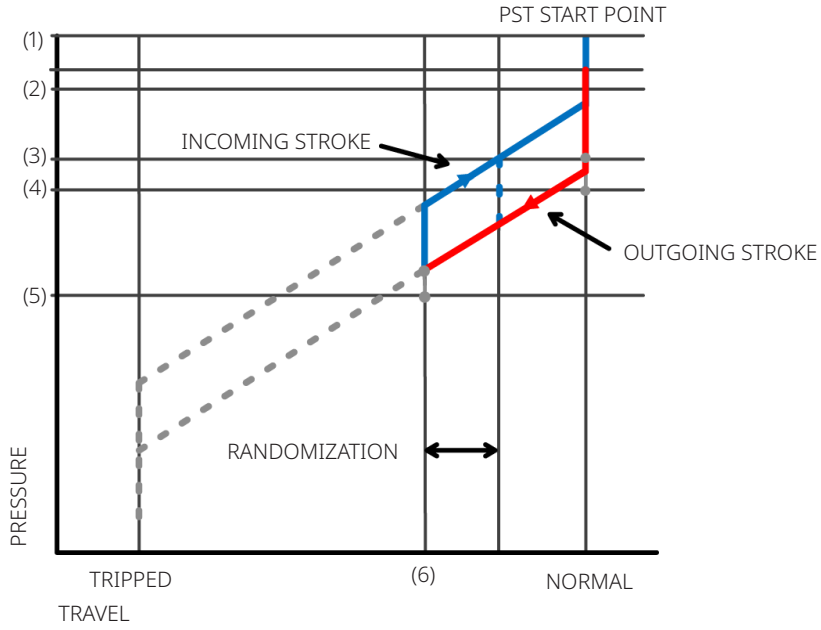
Valve Stroke Test (FST/PST)

A valve stroke test is the process of taking the valve from the normal end to another target position at a preconfigured ramp rate before returning to the normal end while gathering data. The data is analyzed to evaluate the condition of the valve assembly against a set of user defined thresholds. A valve stroke test is only run if everything is normal in the instrument. A safety demand signal will always take precedence over a valve stroke test.

- Valve Stroke Test, select Partial Stroke Test, Full Stroke Test or Disable to select the test to run when the test is initiated using the VST_COMMAND parameter.
- Partial Stroke Start Point defines the normal end of the valve. The valve needs to be at this end for a PST to be initiated. When a FST is initiated the valve will be moved by the test to this end before being ramped to the opposite end and ramped back. Setting this value to Not Configured will disable partial stroke tests.
- Travel Open End defines, in percent (%) of calibrated travel, the point above which the valve is considered to have reached the high end.
- Travel Closed End defines, in percent (%) of calibrated travel, the point below which the valve is considered to have reached the low end.

- Test Pause Time (VST_PAUSE [120]) is the time between the outgoing and incoming strokes of the test. The default value is 5 seconds. The outgoing stroke is from the normal end to the PST target and the incoming stroke is the return stroke to normal. See Figure 10.
- High Friction Breakout Pressure (HI_FRIC_BRKOUT_PRESS [129.3]) indicates that the breakout required a higher force than configured by the user. Refer to Figure 10.
- Low Friction Breakout Pressure (LO_FRIC_BRKOUT_PRESS [129.4]) indicates that the breakout required a lower force than configured by the user. Refer to Figure 10.
- Action On a Failed Test defines if the valve should step or ramp back on a failed stroke test.

Figure 10. Valve Signature Representation



1. SUPPLY PRESSURE
2. INCOMING PRESSURE THRESHOLD
3. LOW FRICTION BREAKOUT PRESSURE THRESHOLD
4. HIGH FRICTION BREAKOUT PRESSURE THRESHOLD
5. OUTGOING PRESSURE THRESHOLD
6. TARGET TRAVEL MOVEMENT 100%

VST Abnormal and Abort Criteria

- VST Abnormal Criteria (VST_ABNORMAL_CRITERIA [129.1])

A partial stroke test is marked as abnormal if it fails one of the following criteria.

The device always evaluates a PST on the following criteria:

1. Target Travel achieved
2. Return to the normal end.

In addition to the above, any of the following can be selected to evaluate a Partial Stroke Test.

1. Breakout Time
2. Outgoing Pressure Threshold
3. Incoming Pressure Threshold
4. High Friction Breakout Pressure
5. Low Friction Breakout Pressure

- VST Abort Criteria (VST_ABORT_CRITERIA [129.2])

The PST is terminated and the valve is returned to the normal end. The return to the normal end will be per the user configuration for an aborted test. The abort criteria will only be active if it is added as a criteria to be evaluated during PST by adding it to the PST Abnormal Criteria.

The device always aborts a PST if the Max Travel displacement is exceeded.

In addition to the above, any of the following can be selected to abort a Partial Stroke Test:

1. Breakout Time
2. Incoming Pressure Threshold
3. High Friction Breakout Pressure

Partial and Full Stroke

- Partial Stroke

PST Max Travel (PST_MAX_TRAVEL [145]) defines how much travel displacement is allowed before the PST aborts (see Figure 11).

PST Minimum Travel is the percentage of total span that the valve moves away from its normal operating end of travel towards its tripped end of travel during the test. The default value is 10%.

Set Point Overdrive (PST_OVERDRIVE_AMT [144]) defines the extent of the set point overdrive over the Minimum Travel Movement when the early turn around is enabled. When the early turn around is not enabled it defines the travel target.

Freeze Analog / Discrete Feedback (PST_OPTIONS [139]) when enabled, freezes the corresponding feedback during a partial stroke test.

Short Duration PST, when enabled, the incoming stroke is initiated as soon as the travel reaches the minimum travel movement. Refer to Figure 11 for a time series representation of this parameter.

Randomized PST, when enabled the instrument randomizes the target travel, for each PST.

PST Randomization is defined in percent (%) of calibrated travel span, it defines the extent of randomization from the minimum travel movement towards the normal end. If the user defined randomization is too large the instrument will cap the max randomization to ensure that there will be at least 1% travel movement away from the defined normal end. Refer to Figure 10.

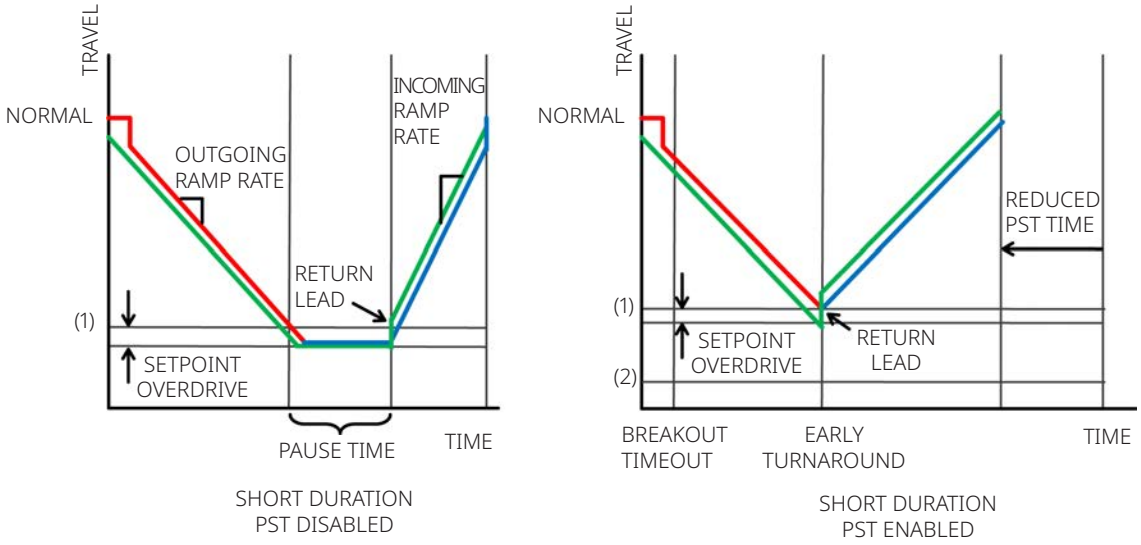
Outgoing Ramp Rate is the rate at which the valve will move during the Outgoing stroke of the Partial Stroke test. The default value is 0.25%/second.

Incoming Ramp Rate is the rate at which the valve will move during the Incoming stroke of the Partial Stroke test. The default value is 0.25%/second.

PST Return Lead (PST_RETURN_LEAD [149]) defines the percent (%) change in setpoint to overcome the hysteresis in the valve assembly. The error between setpoint and actual error is added to this percent change. For example, if the Return Lead is set at 0.5% and there is a 1% error this will be set at 1.5%.

PST Breakout Timeout is the user configured amount of time before which the valve must leave the normal end during a PST.

Figure 11. Time Series Representation of Short Duration PST



1. MINIMUM TRAVEL MOVEMENT
2. MAXIMUM ALLOWABLE TRAVEL

VST Outgoing Pressure Threshold defines the actuator pressure at which a partial stroke test will abort during the outgoing stroke (see Figure 10). This prevents the DVC6200f from exhausting (or building) excessive pressure from/to the actuator in an attempt to move a stuck valve. During PST Calibration, the Partial Stroke Outgoing Pressure Threshold will be set automatically as follows:

Single-Acting Actuators - For those actuators that exhaust pressure from the partial test start point, the Outgoing Pressure Threshold will be a minimum value. For those actuators that build pressure from the partial test start point, the Outgoing Pressure Threshold will be a maximum value.

Double-Acting Actuators - The Outgoing Pressure Threshold will be set to a negative value for actuators where the partial stroke start point is opposite of the Zero Power Condition (e.g., Partial Stroke Start Point = Open and Zero Power Condition = Closed) and to a positive valve for actuators where the partial stroke start point is the same as the Zero Power Condition.

The pressure signal used to determine this parameter depends on relay type and is summarized below.

Relay Type	Pressure Signal
A - Double-acting actuator	Port A - Port B
A - Single-acting actuator	
B	Port B
C	Port A
B Special App.	Port B
C Special App.	Port A

To manually set the partial stroke Outgoing Pressure Threshold, you must examine current partial stroke test results using ValveLink software. The following steps will guide you through the process:

1. Connect the DVC6200f to a system running ValveLink software.
2. Disable Partial Stroke Outgoing Pressure Limit by ensuring it is not selected as an evaluation criteria for PST Abnormal.
3. Run a partial stroke test.
4. Select the Press/Time radio button on the partial stroke graph (refer to the example in Figure 12). If the actuator pressure starts high and moves low, find the minimum actuator pressure (Pmin). If the actuator pressure starts low and moves high, find the maximum actuator pressure (Pmax). Double-acting actuators will display differential pressure. Use Table 15 to estimate the Outgoing Pressure Threshold.
5. Enable the previously disabled Outgoing Pressure Limit - calculate the value using Table 15.

Table 15. Estimates for Outgoing Partial Stroke Pressure Limits

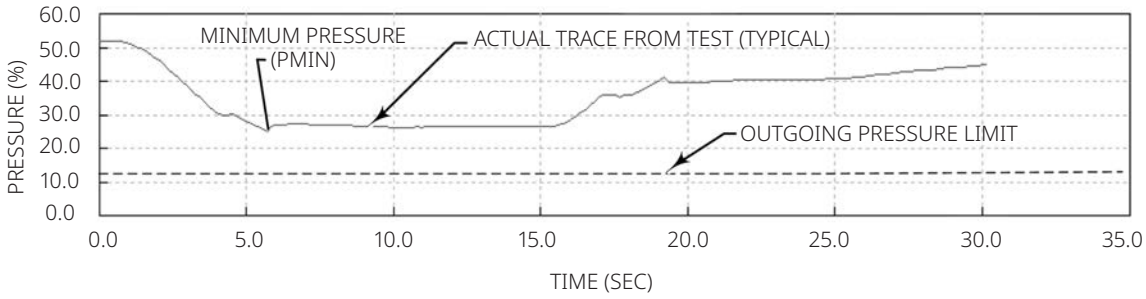
Actuator Style	Relay Type	Zero Power Condition	PST Starting Point	Partial Stroke Pressure Limit(1)
Spring and Diaphragm	A or C	Closed	Open	Pmin - 0.25 * (Bench Set High - Bench Set Low)
			Closed	Pmax + 0.25 * (Bench Set High - Bench Set Low)
		Open	Open	Pmax + 0.25 * (Bench Set High - Bench Set Low)
			Closed	Pmin - 0.25 * (Bench Set High - Bench Set Low)
	B	Closed	Open	Pmax + 0.25 * (Bench Set High - Bench Set Low)
			Closed	Pmin - 0.25 * (Bench Set High - Bench Set Low)
		Open	Open	Pmin - 0.25 * (Bench Set High - Bench Set Low)
			Closed	Pmax + 0.25 * (Bench Set High - Bench Set Low)

- continued -

Table 15. Estimates for Outgoing Partial Stroke Pressure Limits (continued)

Actuator Style	Relay Type	Zero Power Condition	PST Starting Point	Partial Stroke Pressure Limit(1)
Single-Acting Piston	A or C	Closed	Open	0.5 * Pmin
			Closed	Pmax + 0.5 * (Psupply - Pmax)
		Open	Open	Pmax + 0.5 * (Psupply - Pmax)
			Closed	0.5 * Pmin
	B	Closed	Open	Pmax + 0.5 * (Psupply - Pmax)
			Closed	0.5 * Pmin
		Open	Open	0.5 * Pmin
			Closed	Pmax + 0.5 * (Psupply - Pmax)
Double-Acting Piston	A	Closed	Open	Pmin - 0.5 * (Psupply + Pmin)
			Closed	Pmax + 0.5 * (Psupply - Pmax)
		Open	Open	Pmax + 0.5 * (Psupply - Pmax)
			Closed	Pmin - 0.5 * (Psupply + Pmin)

Figure 12. Example Time Series Plot; Actuator Pressure



VST Incoming Pressure Threshold defines the actuator pressure at which a partial stroke test will abort during the incoming stroke (see Figure 10). This prevents the DVC6200f from exhausting (or building) excessive pressure from / to the actuator in an attempt to move a stuck valve.

- Full Stroke

Full Stroke Ramp Rate (FST_RAMP_RATE [156]) is the rate at which the valve will move during the full stroke test.

FST Wait Time (FST_WAIT_TIME [160]) is the amount of time to wait for the valve to move to the normal end after initiation of the full stroke test.

Full Stroke Breakout Timeout (FST_BREAKOUT_TIMEOUT [155]) is the user configured amount of time before which the valve must leave the normal end during a full stroke test.

PST Prohibited

A partial stroke test will not be initiated if any of the following user-configurable conditions are active:

1. Check Bit Alert
2. Drive Current
3. Drive Signal
4. Processor Impaired
5. Travel Sensor
6. Output Pressure sensor
7. Supply Pressure Sensor
8. Temperature Sensor
9. Supply Pressure
10. Temperature Limit
11. Travel Deviation
12. Pressure Fallback
13. PST Abnormal

Auto PST

- Auto PST Current Time (PST_AUTO_CURRENT_TIME [152.3]) shows the current time in the instrument.
- Hours to next Auto PST (PST_AUTO_HOURS_TO_NEXT [152.2]) indicates how many hours until the next auto PST.
- Auto PST State (PST_AUTO_STATE [152.1]) displays the state of the auto PST; Disabled, Waiting, Pending, Starting and Monitoring.
- Type of Auto PST (PST_AUTO_TYPE [151.5]) enables the Auto PST; select Disabled or Run Tests.
- Partial Stroke Initial Start Time (PST_INITIAL_START_TIME [137]) defines the date and time when the first PST will run.
- Partial Stroke Interval (PST_INTERVAL [138]) defines the time between tests.
- Auto PST Next Test

Latch

Handheld Communicator	TB > Configure/Setup > Detailed Setup > Latch

Reset Latch

Latch State (LATCH_STATE [180]) specifies if a latch is active.

Latch Reset Options (LATCH_RESET_OPTS [182]) perform a manual reset by pushing the reset button in the user interface after ensuring the normalcy of the output block and supply pressure.

Latch Position Trip Enable (LATCH_POS_ENABLE [183])— A position latch is used to ensure the valve does not travel below a user configured threshold on low supply pressure.

Position Trip Point (LATCH_POS_THRESH [181]) defines the position threshold which triggers the latch when violated, in percent (%) of travel.

Transducer Block Parameter List

- Read/Write Capability: RO - Read Only, RW - Read Write
- Mode: The block mode(s) required to write to the parameter
- Protection Category: Indicates whether or not the parameter is writable while the PROTECTION parameter is set to a particular level.
  - N/A indicates a read-only parameter that is never writable, regardless of the value of the PROTECTION parameter.
  - NONE indicates a read-only parameter that is always writable, regardless of the value of the PROTECTION parameter.
  - CAL indicates a parameter that is only writable while the value of the PROTECTION parameter is “NONE”.
  - SETUP indicates a parameter that is only writable while the value of the PROTECTION parameter is “NONE” or “CAL”.
  - ALL indicates a parameter that is writable while the value of the PROTECTION parameter is “NONE”, “CAL” or “SETUP & CAL”.

Table 16. Transducer Block Parameter Definitions

Label PARAMETER_NAME	Index Number	RO / RW	Mode	Range	Initial Value	Protect Category	Description
Static Revision ST_REV	1	RO	N/A	0 to 65535	0	N/A	Data Type: Uint16 The revision level of the static data. Increments by one each time a static parameter is written. The value is reset to 0 whenever a Restart with Defaults is performed. See Restarting the Instrument.
Tag Description TAG_DESC	2	RW	ALL	- - -	Spaces	SETUP	Data Type: String The description of the block.
Strategy STRATEGY	3	RW	ALL	0 to 65535	0	SETUP	Data Type: Uint16 Used to help group blocks.
Alert Key ALERT_KEY	4	RW	ALL	1 to 255	0	SETUP	Data Type: Uint8 The identification number of the plant unit. Devices in a loop or plant section can be assigned with a common alert key to aid the operator in determining location of alerts.
Block Mode MODE_BLK	5						Data Type: DS-69 The actual, target, permitted and normal modes. Target: The requested block mode Actual: The current mode of the block Permitted: Allowed modes for Target Normal: Most common mode for Target
TARGET	5.1	RW	ALL	3: AUTO 4: MAN 7: OOS	OOS	NONE	
ACTUAL	5.2	RO	N/A	3: AUTO 4: MAN 7: OOS	N/A	N/A	
PERMITTED	5.3	RW	ALL	3: AUTO 4: MAN 5: LO 7: OOS	AUTO+MAN+OOS	NONE	
NORMAL	5.4	RW	ALL	3: AUTO 4: MAN 7: OOS	3:AUTO	NONE	
Block Error BLOCK_ERR	6	RO	N/A	1: Configuration Error 15: Out-of-Service	Dynamic	N/A	Data Type: Bit String (2 byte) Error status associated with hardware or firmware for the transducer block.
Update Event UPDATE_EVT	7						
UNACKNOWLEDGED	7.1	RW	ALL	0: Uninitialized 1: Acknowledged 2: Unacknowledged	0	NONE	- - -

- continued -

Table 16. Transducer Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Mode	Range	Initial Value	Protect Category	Description
UPDATE_STATE	7.2	RO	N/A	0: Uninitialized 1: Reported 2: Not reported	0	N/A	Data Type: DS-73 Alert generated by change to static data.
TIME_STAMP	7.3	RO	N/A	- - -	0	N/A	
STATIC_REVISION	7.4	RO	N/A	- - -	0	N/A	
RELATIVE_INDEX	7.5	RO	N/A	- - -	0	N/A	
Block Alarm BLOCK_ALM	8	- - -					
UNACKNOWLEDGED	8.1	RW	ALL	0: Uninitialized 1: Acknowledged 2: Unacknowledged	0	NONE	Data Type: DS-72 Used to report the BLOCK_ERR alarm to the host system
ALARM_STATE	8.2	RO	N/A	0: Uninitialized 1: Clear-reported 2: Clear-not reported 3: Active-reported 4: Active-not reported	0	N/A	
TIME_STAMP	8.3	RO	N/A	- - -	0	N/A	
SUBCODE	8.4	RO	N/A	Subcode: Bit Number in BLOCK_ERR	0	N/A	
VALUE	8.5	RO	N/A	Value of parameter at alarm time for a single alarm, 0 for multiple alarms	0	N/A	
Transducer Directory TRANSDUCER_DIRECTORY	9	RO	N/A	1,1	1,1	N/A	Data Type: Array [2] of Unit16
Transducer Type TRANSDUCER_TYPE	10	RO	- - -	- - -	105 (Standard Analog/ Discrete Positioner Valve)	N/A	Data Type: Uint16 Identifies the type of the transducer.
Transducer Type Version TRANSDUCER_TYPE_VER	11	RO	- - -	- - -	0x0201	- - -	Data Type: Uint16
Transducer Error XD_ERROR	12	RO	- - -	Valid Numbers: 0 = No Error	0	N/A	Data Type: Uint8 Error code for the transducer block.
Collection Directory COLLECTION_DIRECTORY	13	RO	- - -	- - -	0	N/A	Data Type: Array [5] of Uint32

- continued -

Table 16. Transducer Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Mode	Range	Initial Value	Protect Category	Description
FINAL_VALUE	14		MAN OOS	- - -	- - -	NONE	- - -
Setpoint Status STATUS	14.1	RW	MAN OOS	- - -	Dynamic	NONE	Data Type: DS-65 **In Travel Control:** Setpoint for valve travel in %, prior to characterization. **In Pressure Control:** Setpoint for implied valve travel as % or pressure range, prior to characterization. FINAL_VALUE is not updated unless the AO block is selected in FEATURE_SELECT. For example, FINAL_VALUE still has last value written by AO channel 1 when DO is in control.
Setpoint VALUE	14.2	RW	MAN OOS	-25 to 125	Dynamic	NONE	
Setpoint Range FINAL_VALUE_RANGE	15	- - -					Data Type: DS-68 High and Low range limit values, engineering units code and number of digits to the right of the decimal place to be used to display the Final Value.
EU_100	15.1	RO	N/A	100	100	N/A	
EU_0	15.2	RO	N/A	0	0	N/A	
UNITS_INDEX	15.3	RO	N/A	1342 (%)	%	N/A	
DECIMAL	15.4	RO	N/A	2	2	N/A	
Travel Cutoff Hi FINAL_VALUE_ CUTOFF_HI	16	RW	MAN OOS	-25 to 125, +INF	99.5	SETUP	Data Type: Float When the servo goes above this % of span, the stem position goes to the upper limit. Cutoffs are OFF when Low is at -25% and high is at +125%. Must be > low cutoff + .625%.
Travel Cutoff Lo FINAL_VALUE_ CUTOFF_LO	17	RW	MAN OOS	-25 to 125, -INF	0.5	SETUP	Data Type: Float When the servo goes below this % of span, the stem position goes to the lower limit. Cutoffs are OFF when Low is at -25% and high is at +125%. Must be < hi cutoff - .625%.

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Table 16. Transducer Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Mode	Range	Initial Value	Protect Category	Description
FINAL_POSITION_ VALUE	18	---					Data Type: DS-65 **In Travel Control:** Valve travel in %, decharacterized to correlate with Setpoint (FINAL_VALUE [14]). **In Pressure Control:** Implied valve travel as a % of pressure range, decharacterized to correlate with Setpoint (FINAL_VALUE [14]). Controls AI channel 3.
Travel Status (Decharacterized) STATUS	18.1	RO	N/A	---	Dynamic	N/A	
Travel (Decharacterized) VALUE	18.2	RO	N/A	---	---	N/A	
WORKING_POS	19	RO	---				Data Type: DS-65
STATUS	19.1	RO	---	---	---	NONE	Data Type: UINT8
VALUE	19.2	RO	---	---	---	NONE	Data Type: Float
WORKING_SP	20	RO	MAN OOS	---	---	NONE	Data Type: DS-65
STATUS	20.1	RO	MAN OOS	---	---	NONE	Data Type: UINT8
VALUE	20.2	RO	MAN OOS	-25% to 125%	---	NONE	Data Type: Float
DEVIATION_ DEADBAND	21		AUTO MAN OOS	---	5	SETUP	Data Type: Float Units = %
DEVIATION_TIME	22		AUTO MAN OOS	---	10	SETUP	Data Type: Float Units = seconds
DEVIATION_VALUE	23	RO		---	---	---	Data Type: Float
POS_ALERT_HI	24		AUTO MAN OOS	---	125	SETUP	Data Type: Float Units = %
POS_ALERT_LO	25		AUTO MAN OOS	---	-25	SETUP	Data Type: Float Units = %
Rated Travel RATED_TRAVEL	26		AUTO MAN OOS	---	0	ALL	Data Type: Float
STOP_HI_POS	27		AUTO MAN OOS	---	99.5	SETUP	Data Type: Float Units = %
STOP_LO_POS	28		MAN OOS	---	0.5	SETUP	Data Type: Float Units = %
Travel Accumulator TRAVEL_ACCUM	29	RO	---	---	---	---	Data Type: Float Total travel expressed in integer % terms. Controls AI channel 13.

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Table 16. Transducer Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Mode	Range	Initial Value	Protect Category	Description
Travel Units TRAVEL_UNITS	30	- - -	ALL	1005 - degree 1012 - cm 1013 - mm 1019 - in.	mm	SETUP	Data Type:Uint16 Travel units for spec sheet ACTUAL_TRAVEL and RATEDTRAVEL only.
PSNR_FSTATE_VAL	31	- - -	AUTO MAN OOS	- - -	0	SETUP	Data Type: Float Not used by device.
FINAL_VALUE_D	32	- - -	MAN OOS	- - -	- - -	NOTE	Data Type: DS-66
STATUS	32.1	- - -	MAN OOS	- - -	- - -	NONE	Data Type: UINT8
VALUE	32.2	- - -	MAN OOS	- - -	- - -	NONE	Data Type: UINT8
FINAL_POSITION_ VALUE_D	33	RO	- - -	- - -	- - -	- - -	Data Type: DS-66
STATUS	33.1	RO	- - -	- - -	- - -	- - -	Data Type: UINT8
VALUE	33.2	RO	- - -	- - -	- - -	- - -	Data Type: UINT8
WORKING_POS_D	34	RO	- - -	- - -	- - -	- - -	Data Type: DS66
STATUS	34.1	RO	- - -	- - -	- - -	- - -	Data Type: UINT8
VALUE	34.2	RO	- - -	- - -	- - -	- - -	Data Type: UINT8
WORKING_SP_D	35	- - -	MAN OOS	- - -	- - -	NOTE	Data Type: DS-66
STATUS	35.1	- - -	MAN OOS	- - -	- - -	NONE	Data Type: UINT8
VALUE	35.2	- - -	MAN OOS	- - -	- - -	NONE	Data Type: UINT8
PSNR_FSTATE_ VAL_D	36	- - -	AUTO MAN OOS	- - -	0	SETUP	Data Type: UINT8
DISCRETE_STATE	37	- - -	AUTO MAN OOS	0: True/False 1: Standard On/Off 2: Expanded On/Off 3: Boolean 00 4: Valves 01 5: Valves 02 6: Valves 03 7: Valves 04	Expanded On/Off	- - -	Data Type: UINT16 Not used by device.

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Table 16. Transducer Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Mode	Range	Initial Value	Protect Category	Description
PSNR_FSTATE_OPT	38	RW	AUTO MAN OOS	8: No Drive	No Drive	SETUP	Data Type: UINT8
Cycle Counter CYCLE_CNTR	39	- - -	- - -	- - -	- - -	SETUP	Data Type: UINT32 Number of cycle transitions above a certain threshold of movement. Controls AI channel 12.
SIGNAL_ACTION	40	- - -	MAN OOS	0: Increase to Open 1: Increase to Close	- - -	- - -	Data Type: UINT8 Identifies whether the valve is open or closed when instrument power is lost.
READBACK_SELECT	41	- - -	MAN OOS	0: Final Position Value 1: Working Position Value	Final Position Value	SETUP	Data Type: UINT8
PSNR_COMMAND	42	- - -	AUTO MAN OOS	0: Normal Operation (Protection = None) 16: Clear PSNR_ COMMAND_STATE (Protection = All) 17: Clear Travel History (Protection = Setup) 51: Auto Cal (with Filter Adj) (Protection = Calibration) 54: Auto Cal Without Biases (Protection = Calibration) 75: Mark Crossover (Protection = Calibration) 76: Cal Abort/ Performance (Protection = None) 100: Manual Cal - Init (Protection = Calibration) 101: Manual Cal - Calc Bias (Protection = Calibration) 102: Manual Cal - Mark Open (Protection = Calibration) Continued on next page:	- - -	- - -	Data Type: UINT16 When SIF activated, a SIF write is required to write while locked.

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Table 16. Transducer Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Mode	Range	Initial Value	Protect Category	Description
PSNR_COMMAND	42	- - -	AUTO MAN OOS	Continued from previous page: 103: Manual Cal - Mark Closed (Protection = Calibration) 104: Manual Cal - Finalize (Protection = Calibration) 125: Performance Tuner (Protection = Calibration) 126: Performance Tuner (Graphite packing) (Protection = Calibration) 127: Performance Tuner (Booster) (Protection = Calibration) 128: Performance Tuner (Graphite packing and Booster) (Protection = Calibration)	- - -	- - -	Data Type: UINT16 When SIF activated, a SIF write is required to write while locked.
PSNR_COMMAND_ STATE	43	RO	- - -	0: Normal Operation 49: Manual Cal Nvm Access 50: Manual Cal - Active 51: Manual Cal - Relay Bias 52: Manual Cal - I/P Bias 53: Manual Cal - Bias Done 54: Manual Cal - Crossover Set 55: Manual Cal - Closed Set 56: Manual Cal - Open Set 57: Manual Cal - Open/Closed Set 58: Manual Cal - Success 59: Manual Cal - Failed Continued on next page:	- - -	- - -	Data Type: UINT16

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Table 16. Transducer Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Mode	Range	Initial Value	Protect Category	Description
PSNR_COMMAND_STATE	43	RO	- - -	Continued from previous page: 60: Auto Cal - Active 61: Auto Cal - High Drive 62: Auto Cal - Low Drive 63: Auto Cal - Success 64: Auto Cal - Failed 100: Performance Tuner - Active 101: Performance Tuner - Moving 102: Performance Tuner - Analyzing 103: Performance Tuner - Adjusting Gains 104: Performance Tuner - Success 105: Performance Tuner - Failed 106: Performance Tuner - Canceling (Aborting)	- - -	- - -	Data Type: UINT16
PSNR_OOS_OPT	44	- - -	AUTO MAN OOS	8: No Drive	No Drive	SETUP	Data Type: UINT8
POS_FEATURES	45	RO		Bit 0: Mandatory Data Bit 1: Mandatory Analog Control Bit 2: Mandatory Discrete Control Bit 3: Mandatory Analog/Discrete Control Bit 4 (Group E): VST Common Practice Bit 6 (Group G): PST Common Practice Bit 8 (Group I): FST Common Practice	Mandatory Data Mandatory Analog Control Mandatory Discrete Control Mandatory Analog/ Discrete Control VST Common Practice PST Common Practice FST Common Practice	- - -	Data Type: BitSTR

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Table 16. Transducer Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Mode	Range	Initial Value	Protect Category	Description
Actuator Fail Action ACT_FAIL_ACTION	46	RW	AUTO MAN OOS	0: Uninitialized 1: Closed 2: Open 3: Hold Last 4: Max 5: Min 255: Indeterminate	Uninitialized	SETUP	Data Type: UINT8 Not used by the device
Actuator Manufacturer ACT_MAN_ID	47	- - -	AUTO MAN OOS	- - -	- - -	SETUP	Data Type: VSTR Not used by device.
Actuator Model Number ACT_MODEL_NUM	48	- - -	- - -	- - -	- - -	SETUP	Data Type: VSTR Not used by device.
Actuator Serial Number ACT_SN	49	- - -	- - -	- - -	- - -	SETUP	Data Type: VSTR Not used by device.
ACT_TYPE	50	- - -	AUTO MAN OOS	0: Uninitialized 1: Linear 2: Rotary 3: Rotary multi-turn 4: Rotary quarter-turn 5: Linear Lever	Uninitialized	SETUP	Data Type: U16 Not used by device.
Valve Manufacturer VALVE_MAN_ID	51	- - -	AUTO MAN OOS	- - -	- - -	SETUP	Data Type: VSTR Not used by device.
Valve Model Number VALVE_MODEL_NUM	52	- - -	- - -	- - -	- - -	SETUP	Data Type: VSTR Not used by device.
Valve Serial Number VALVE_SN	53	- - -	- - -	- - -	- - -	SETUP	Data Type: VSTR Not used by device.
Valve Style VALVE_TYPE	54	- - -	AUTO MAN OOS	0: Globe 1: Gate 2: Butterfly 3: Ball 4: Plug 5: Diaphragm 6: Float 7: Check 8: Triple offset 255: Other	Other	SETUP	Data Type: UINT8 Not used by device.
Calibration Location XD_CAL_LOC	55	- - -	- - -	- - -	- - -	CAL	Data Type: VSTR Not used by device.
Calibration Date XD_CAL_DATE	56	- - -	- - -	- - -	0	CAL	Data Type: Date Not used by device.
Calibration Person XD_CAL_WHO	57	- - -	- - -	- - -	- - -	CAL	Data Type: Not used by device.

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Table 16. Transducer Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Mode	Range	Initial Value	Protect Category	Description
PSNR_COMMAND_ERROR	58	RO	- - -	0: None 1: General 16: Travel Offscale 17: Min Span 18: MLFB Invalid 19: Movement 20:MLFB Changing 21: Cancelled 32: Tuner - No Movement 33: Tuner - Accessories Unstable 34: Tuner - Other 35: Tuner - Pressure Control 36: Tuner - Diagnostic Failure 37: Tuner - Cancel 38:Tuner - Mode Change	- - -	- - -	Data Type: UINT16
UI_SETPOINT	59	- - -	MAN OOS	- - -	- - -	NOTE	Data Type: Float
UI_VALVE_TYPE	60	- - -	Any	0: Undefined 1: Sliding Stem 2: Rotary 255: Other	0	SETUP	Data Type: UINT8
SUPPLY_PRESSURE	61	- - -	- - -				Data Type: DS-65 STATUS indicates the validity of VALUE. VALUE is pressure of air supply, controls AI channel 5.
Supply Pressure Status STATUS	61.1	RO	N/A	Good Process Non Specific Bad Device Failure	- - -	N/A	
Supply Pressure VALUE	61.2	RO	N/A	- - -	- - -	N/A	
PRESSURE_A	62	- - -	- - -				Data Type: DS-65 STATUS Indicates the validity of VALUE. Pressure of primary air output, controls AI channel 6.
Pressure A Status STATUS	62.1	RO	N/A	Good Process Non Specific Bad Device Failure	- - -	N/A	
Pressure A VALUE	62.2	RO	N/A	- - -	- - -	N/A	
PRESSURE_B	63	- - -	- - -				Data Type: DS-65 STATUS indicates the validity of VALUE. VALUE is the Pressure on secondary output, controls AI channel 7.
Pressure B Status STATUS	63.1	RO	N/A	Good Process Non Specific Bad Device Failure	- - -	N/A	
Pressure B VALUE	63.2	RO	N/A	- - -	- - -	N/A	

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Table 16. Transducer Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Mode	Range	Initial Value	Protect Category	Description
PRESSURE_DIFF	64	- - -	- - -				Data Type: DS_65 STATUS indicates the validity of VALUE. VALUE is the difference between PRESSURE_A and PRESSURE_B, controls AI channel 8.
Pressure Differential Status STATUS	64.1	RO	- - -	Good Process Non Specific Bad Device Failure	- - -	- - -	
Pressure Differential VALUE	64.2	RO	- - -	- - -	- - -	- - -	
Travel Pressure Control TVL_PRESSURE_ CONTROL	65	- - -	- - -				Data Type: DS_65
Travel/Pressure Select TVL_PRESS_ SELECT	65.1	- - -	- - -	1 = Travel 2 = Pressure 3 = TVL/PRESS Auto Recv 4 = TVL/PRESS Man Recv	Travel	SETUP	Data Type: UINT8 Selects whether travel sensor or port A pressure is used for feedback.
Travel/Pressure State TVL_PRESS_STATE	65.2	RO	- - -	1 = Travel 2 = Pressure	- - -	- - -	Data Type: UINT8 Indicates which sensor is used for feedback
DEV_FALLBK_ CONFIG	66	- - -	All	- - -		SETUP	- - -
DEV_FALLBK_ ENABLE	66.1	- - -	All	1: Disabled 2: Enabled	Disabled	SETUP	Data Type: U8
DEV_FALLBK_ THRESHOLD	66.2	- - -	All	0 to 125	25	SETUP	Data Type: Float Units = %
DEV_FALLBK_TIME	66.3	- - -	All	0 to 6000	10	SETUP	Data Type: Float Units = sec
DEV_FALLBK_MIN_ SUPPLY	66.4	- - -	All	- - -	413.7 kPa / 60 psi	SETUP	Data Type: Float
Basic Setup BASIC_SETUP	67	- - -					- - -
Actuator Style ACTUATOR_ STYLE	67.1	RW	MAN OOS	1 = Spring and Diaphragm 2 = Piston-Dbl without Spring 3 = Piston-Dbl with Spring 4 = Piston-Sgl with Spring	- - -	SETUP	Data Type:UINT8
Zero Power Condition ZERO_PWR_ COND	67.2	RW	MAN OOS	0 = Closed 1 = Open	- - -	SETUP	Data Type: UINT8 Enum Identifies whether the valve is open or closed when instrument power is lost.
Travel Sensor Motion TRAVEL_SENSOR_ MOTION	67.3	RW	MAN OOS	1 = Counter Clockwise 2 = Clockwise	- - -	SETUP	Data Type:UINT8

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Table 16. Transducer Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Mode	Range	Initial Value	Protect Category	Description
Feedback Connection FEEDBACK_CONN	67.4	RW	MAN OOS	1 = Rotary All 2 = SStem Roller 3 = SStem Standard 0x40 - 0x7F = SensorX	- - -	SETUP	Data Type: UINT8
Relay Type RELAY_TYPE	67.5	RW	MAN OOS	1 = Relay A or C, Double or Single Direct 2 = Relay B—Single Reverse 5 = Relay C - Special App., Single Direct 6 = Relay B - Special App., Single Reverse 9 = Lo-Bleed Relay A or C—Double or Single Direct 10 = Lo-Bleed Relay B—Single Reverse 13 = Lo-Bleed Relay C - Special App., Single Direct 14 = Lo-Bleed Relay B - Special App.—Single Reverse 17 = High Cv 1 Spool 18 = High Cv 1 Rev Spool 33 = High Cv 2 Spool 34 = High Cv 2 Rev Spool 49 = High Cv 3 Spool:	- - -	SETUP	Data Type: UINT8
Maximum Supply Pressure MAX_SUPP_PRESS	67.6	RW	ALL	> 0, <=150	- - -	SETUP	Data Type: Float
Pressure Range Hi PRESS_RANGE_HI	67.7	RW	MAN OOS	> 0, <=150	- - -	SETUP	Data Type: Float Defines pressure corresponding to max pressure in pressure control mode.
Pressure Range Lo PRESS_RANGE_LO	67.8	RW	MAN OOS	>= 0, <=150	- - -	SETUP	Data Type: Float Defines pressure corresponding to minimum pressure in pressure control mode.

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Table 16. Transducer Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Mode	Range	Initial Value	Protect Category	Description
AUX_MODE	67.9	- - -	MAN OOS	0 = Disabled 1 = Simulate 2 = LCP 4 = PST 6 = Release Latch	- - -	SETUP	Data Type: UINT8
Travel Tuning Set TVL_TUNING_SET	67.10	RW	ALL	1 = B, 2 = C, to 12 = M 23 = X	- - -	SETUP	Data Type: UINT8 Letter (B through M or X)
Pressure Tuning Set PRESS_TUNING_SET	67.11	RW	ALL	1 = B, 2 = C, to 12 = M 23 = X	- - -	SETUP	Data Type: UINT8 Letter (B through M or X)
VTUNING_SETS	68	- - -	ALL	- - -		SETUP	- - -
VTUNING_TRAVEL	68.1	- - -	ALL	- - -	0	SETUP	Data Type: UINT8
VTUNING_PRESS	68.2	- - -	ALL	- - -	0	SETUP	Data Type: UINT8
CUTOFF_CONFIG	69	- - -	MAN OOS	- - -	- - -	SETUP	- - -
CUTOFF_TYPE_HI	69.1	- - -	- - -	0: Hard Cutoff	Hard Cutoff	SETUP	Data Type: U8
CUTOFF_TYPE_LO	69.2	- - -	- - -	0: Hard Cutoff	Hard Cutoff	SETUP	Data Type: U8
SOFT_RAMP_RATE_HI	69.3	- - -	- - -	0 to 50	5 %/second	SETUP	Data Type: Float 0 %/s will behave like Hard Cutoff
SOFT_RAMP_RATE_LO	69.4	- - -	- - -	0 to 50	5 %/second	SETUP	Data Type: Float 0 %/s will behave like Hard Cutoff
ENDPT_PRESS_CONFIG	70	- - -	MAN OOS	- - -		SETUP	- - -
ENDPT_PRESS_ENABLE	70.1	- - -	- - -	0: Disabled	Disabled	SETUP	Data Type: U8
ENDPT_PRESS_SETPT	70.2	- - -	- - -	0 to 150 psi	0	SETUP	Data Type: Float
ENDPT_PRESS_SAT_TIME	70.3	- - -	- - -	0 to 15 min	15 sec	SETUP	Data Type: Float
TRAVEL_CAL	71	- - -	- - -				- - -
Travel Count TVL_COUNT	71.1	RO	- - -	- - -	- - -	- - -	Data Type: UINT16 Raw feedback from Travel Sensor
Travel Hi Calibration TVL_HI_CAL	71.2	RW	MAN OOS	<= TVL_FAC_HI >= TVL_LO_CAL	- - -	CAL	Data Type: UINT16 Maximum drive calibration point
Travel Lo Calibration TVL_LO_CAL	71.3	RW	MAN OOS	>= TVL_FAC_LO <= TVL_HI_CAL	- - -	CAL	Data Type: UINT16 Minimum drive calibration point

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Table 16. Transducer Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Mode	Range	Initial Value	Protect Category	Description
Travel Crossover TVL_CROSSOVER	71.4	RW	MAN OOS	>0%, <=100%	- - -	CAL	Data Type: Float Not used for the DVC6200f
Travel Fac Hi TVL_FAC_HI	71.5	RO	- - -	- - -	Set by factory	- - -	Data Type: UINT16 Maximum value of travel sensor counts. Set at factory.
Travel Fac Lo TVL_FAC_LO	71.6	RO	- - -	- - -	Set by factory	- - -	Data Type: UINT16 Minimum value of travel sensor counts. Set at factory.
Travel IP Bias TVL_IP_BIAS	71.7	RW	MAN OOS	0 to 100%	70%	CAL	Data Type: Float
Travel MLFB Bias TVL_MLFB_BIAS	71.8	RW	MAN OOS	0 to 100%	50%	CAL	Data Type: Float
Last Calibration Type TVL_CAL_TYPE	71.9	RW	MAN OOS	0: 1: Single-point 2: Auto 3: Manual 4: Auto Endpts	- - -	CAL	Data Type: UINT8
MLFB_HI_CAL	71.10	- - -	MAN OOS	< = 16383	- - -	CAL	Data Type: UINT16
MLFB_LO_CAL	71.11	- - -	MAN OOS	< = 16383	- - -	CAL	Data Type: UINT16
SETTLING_TIME	71.12	- - -	MAN OOS	< = 900	8	CAL	Data Type: UINT16 Device will allow writes of less than 8 sec, but will set the time to 8 sec.
TRAVEL_TUNE	72	- - -	- - -				- - -
Travel Integral Enable TVL_INTEG_ENABLE	72.1	RW	AUTO MAN OOS	1 = Off 2 = On	- - -	SETUP	Data Type: UINT8
Travel Integral Limit Hi TVL_INTEG_LIM_HI	72.2	RW	AUTO MAN OOS	0 to 100%	- - -	SETUP	Data Type: Float
Travel Integral Limit Lo TVL_INTEG_LIM_LO	72.3	RW	AUTO MAN OOS	-100 to 0%	- - -	SETUP	Data Type: Float
Travel Integral Dead Zone TVL_INTEG_DEADZ	72.4	RW	AUTO MAN OOS	0 to 2%	- - -	SETUP	Data Type: Float
Travel MLFB Gain TVL_MLBF_GAIN	72.5	RW	- - -	> = 0	- - -	SETUP	Data Type: Float
TVL_PROP_GAIN	72.6	- - -	- - -	> = 0	- - -	SETUP	Data Type: Float

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Table 16. Transducer Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Mode	Range	Initial Value	Protect Category	Description
Travel Rate TVL_RATE	72.7	- - -	- - -	> = 0	- - -	SETUP	Data Type: Float
TVL_RESET	72.8	- - -	- - -	> = 0	- - -	SETUP	Data Type: Float
TVL_PRESS_RATE	72.9	- - -	- - -	> = 0	- - -	SETUP	Data Type: Float
TVL_PRESS_RATE_FILT	72.10	- - -	- - -	0 to 1	- - -	SETUP	Data Type: Float
PRESS_CAL	73	- - -	- - -				- - -
Supply Pressure Scale SUPP_PRESS_SCALE	73.1	RW	MAN OOS	> 0	- - -	CAL	Data Type: Float
Supply Pressure Offset SUPP_PRESS_OFFSET	73.2	RW	MAN OOS	0 to 16383	- - -	CAL	Data Type: Float
Pressure A Scale PRESS_A_SCALE	73.3	RW	MAN OOS	> 0	- - -	CAL	Data Type: UINT16
Pressure A Offset PRESS_A_OFFSET	73.4	RW	MAN OOS	0 to 16383	- - -	CAL	Data Type: Float
Pressure B Scale PRESS_B_SCALE	73.5	RW	MAN OOS	> 0	- - -	CAL	Data Type: Float
Pressure B Offset PRESS_B_OFFSET	73.6	RW	MAN OOS	0 to 16383	- - -	CAL	Data Type: Float
PRESS_TUNE	74	- - -	- - -				- - -
Pressure Cutoff Hi PRESS_CUTOFF_HI	74.1	RW	MAN OOS	-25 to 125	99.5%	SETUP	Data Type: Float
Pressure Cutoff Lo PRESS_CUTOFF_LO	74.2	RW	MAN OOS	-25 to 125	0.5%	SETUP	Data Type: Float
Pressure Proportional Gain PRESS_PROP_GAIN	74.3	RW	MAN OOS	>=0, <32	2.2	SETUP	Data Type: Float Proportional gain
Pressure Integral Gain PRESS_INTEG_GAIN	74.4	RW	MAN OOS	>=0, <32	0.1	SETUP	Data Type: Float Integral resets per second
Pressure Rate Gain PRESS_RATE_GAIN	74.5	RW	MAN OOS	>=0, <=512	0	SETUP	Data Type: Float Derivative gain
Pressure Integral Dead Zone PRESS_INTEG_DEADZ	74.6	RW	MAN OOS	>=0, <=2	0.25%	SETUP	Data Type: Float Integrator Deadzone, 1/2 width
Pressure Integral Limit Hi PRESS_INTEG_HI_LIM	74.7	RW	MAN OOS	>=0, <=100	50%	SETUP	Data Type: Float Integrator limits

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Table 16. Transducer Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Mode	Range	Initial Value	Protect Category	Description
Pressure Integral Limit Lo PRESS_INTEG_LO_LIM	74.8	RW	MAN OOS	<=0, >=-100	-50%	SETUP	Data Type: Float Integrator limits
Pressure Integral IC Hi PRESS_INTEG_IC_HI	74.9	RW	MAN OOS	>=-100, <=100	12%	SETUP	Data Type: Float
Pressure Integral IC Lo PRESS_INTEG_IC_LO	74.10	RW	MAN OOS	>=-100, <=100	-12%	SETUP	Data Type: Float
Pressure MLFB Gain PRESS_MLFB_GAIN	74.11	RW	MAN OOS	>0, <=100	35	SETUP	Data Type: Float
Temperature TEMPERATURE	75	RO	- - -	- - -	- - -	- - -	Data Type: Float Electronics temperature - Controls AI channel 11
Input Characterization INPUT_CHAR	76	- - -	MAN OOS	1 = Linear 2 = Equal % 3 = Quick Opening 4 = Reserved 5 = Custom	Linear	SETUP	Data Type: UINT8
Custom Points CUSTOM_POINTS	77	- - -	- - -	-2500 to 12500, excursions permitted, Each X value must be > previous value, each Y value must be > previous value. Checked when CHARACTERIZATION changed to CUSTOM.	1st pt = 0,0 2nd pt = 100,100	SETUP	Data Type: INT16 Array[43] Each item - 2500 to 12500 First integrator is number of valid points. Followed by up to 21 X values and then 21 Y values. X values must be increasing. Y values must be increasing or same. A value of 2050 represents 20.50% Custom Points can be written only if Input Characterization (INPUT_CHAR [50]) **is not custom**.
Drive Signal DRIVE_SIGNAL	78	RO	N/A	0 to 100%	- - -	CAL	Data Type: Float Controls AI channel 9
Drive Current DRIVE_CURRENT	79	RO	N/A	0 to 100%	- - -	N/A	Data Type: Float
MLFB MLFB	80	RO	N/A	-100 to 100%	- - -	N/A	Data Type: Float
INST_ALERTS_ACTIVE	81	- - -	- - -	- - -	- - -	- - -	- - -

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Table 16. Transducer Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Mode	Range	Initial Value	Protect Category	Description
Group 1 Active GROUP_1_ ACTIVE	81.1	RO	- - -	Bit 0: Check Alert Bit 1: Drive Current Bit 2: Drive Signal Bit 3: Pending Memory Fail Bit 4: Static Memory Bit 5: I/O Processor Bit 7: Output Block Timeout Bit 8: Blocks to Defaults Bit 11: Travel Sensor Bit 12: Port A Pressure Sensor Bit 13: Port B Pressure Sensor Bit 14: Supply Pressure Sensor Bit 15: Temperature Sensor Bit 18: Pressure Fallback Bit 19: Travel Deviation Bit 21: Supply Pressure High Bit 22: Supply Pressure Low Bit 23: Temperature High Bit 24: Temperature Low Bit 27: Performance Critical Bit 28: Performance Reduced Bit 29: Performance Info	Dynamic	- - -	Data Type: Bit String 0=inactive 1=active
Group 2 Active GROUP_2_ACTIVE	81.2	RO	- - -	Bit 0: Travel Limit Hi Hi Bit 1: Travel Limit Lo Lo Bit 2: Travel Limit Hi Bit 3: Travel Limit Lo Bit 7: Travel Open Bit 8: Travel Closed Bit 9: Proximity Hi Hi Bit 10: Proximity Hi Bit 11: Proximity Lo Continued on next page:	Dynamic	- - -	Data Type: Bit String 0=inactive 1=active

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Table 16. Transducer Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Mode	Range	Initial Value	Protect Category	Description
Group 2 Active GROUP_2_ACTIVE	81.2	RO	- - -	Continued from previous page: Bit 12: Proximity Lo Lo Bit 15: Cycle Counter Bit 16: Travel Accumulator Bit 18: LCP Comms Bit 19: LCP Stuck Button Bit 20: LCP Demand Button Pressed Bit 21: Demand Time Bit 22: Reset Time Bit 23: Stroke Open Time Bit 24: Stroke Closed Time Bit 25: LCP Reset Button Pressed Bit 26: LCP Test Button Pressed	Dynamic	- - -	Data Type: Bit String 0=inactive 1=active
Group 3 Active GROUP_3_ACTIVE	81.3	RO	- - -	Bit 18: PST Anomaly Bit 19: FST Anomaly Bit 21: PST Success Bit 22: FST Success Bit 23: PST Overdue Bit 24: FST Overdue Bit 25: PST Pending Bit 30: Diagnostic in Progress	Dynamic	- - -	Data Type: Bit String 0=inactive 1=active
PS Event Active PD_EVENT_ ACTIVE	81.4	RO	- - -	Bit 0: High I/P Drive Signal Bit 1: Low I/P Drive Signal Bit 2: High Air Mass Flow Bit 3: Large Travel Deviation Bit 4: Low Supply Pressure Bit 5: High Supply Pressure Bit 6: High Crossover Pressure Bit 7: Low Crossover Pressure Bit 8: No Air Mass Flow Estimate Bit 9 to 16: Reserved	All Bits: 0	- - -	Data Type: Bit String 0=inactive 1=active Performance Diagnostic event status.

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Table 16. Transducer Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Mode	Range	Initial Value	Protect Category	Description
PD Detail 1 Active PD_DETAIL1_ ACTIVE	81.5	RO	- - -	Bit 0: I/P Primary Plugged Bit 1: I/P Nozzle Plugged Bit 2: I/P Latched Bit 4: Relay Jammed Bit 5: Relay Cross Misadj Bit 6: Relay Supply Diaph Leak Bit 7: Relay Port A Diaph Leak Bit 8: Relay Port B Diaph Leak Bit 10: Valve Stuck Low Bit 11: Valve Stuck High Bit 12: Piston Ring Leak Bit 14: Low Supply Pressure Bit 15 : External Leak (High AMF 1a_r) Bit 16: SOV Trip (High I/P 1q_r or Low I/P 1q_r) Bit 17: Air Line Blocked (High I/P 1p_r or Low I/P 1p_r) Bit 18: Reserved Bit 19: Reserved Bit 20: Unknown (High I/P 1x_r or Low I/P 1x_r or Large Tvl Dev 1x_r)	All Bits: 0	- - -	Data Type: Bit String 0=inactive 1=active Performance Diagnostic Critical possible cause.
PD Detail 2 Active PD_DETAIL2_ ACTIVE	81.6	RO	- - -	- - -	All Bits: 0	- - -	Data Type: Bit String 0=inactive 1=active Performance Diagnostic Detail status.

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Table 16. Transducer Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Mode	Range	Initial Value	Protect Category	Description
PD Detail 3 Active PD_DETAIL3_ ACTIVE	81.7	RO	- - -	Bit 0: I/P Primary Plugging (High I/P 1d_y) Bit 1: I/P Nozzle Plugging (Low I/P 1f_y) Bit 2: I/P Calibration Shift (High I/P 1c_y or Low I/P 1c_y) Bit 4: Relay Cross Misadj (High Crossover 1a_y or Low Crossover 2a_y) Bit 5: Relay Port A Diaph Leak (High I/P 1k_y) Bit 6: Relay Port B Diaph Leak (Low I/P 1l_y) Bit 8: Piston Ring Leak (High AMF 1c_y) Bit 11: Low Supply Pressure (Low Supply Pressure 1a_y) Bit 13: External Leak (High I/P 1m_y or Low I/P 1m_y or High AMF 1a_y or Low Crossover 2c_y) Bit 15: Travel Calibration Shift (Large Tvl Dev 1a_y) Bit 16: Unknown (Low I/P 1x_y or High I/P 1x_y or Large Tvl Dev 1x_y)	All Bits: 0	- - -	Data Type: Bit String 0=inactive 1=active Performance Diagnostic Reduce possible cause.
PD Detail 4 Active PD_DETAIL4_ ACTIVE	81.8	RO	- - -	Reserved	All Bits: 0	- - -	Data Type: Bit String 0=inactive 1=active Performance Diagnostic Detail status

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Table 16. Transducer Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Mode	Range	Initial Value	Protect Category	Description
PD Detail 5 Active PD_DETAIL5_ ACTIVE	81.9	RO	- - -	Bit 0 : Relay Disengaged: No Air Mass Flow Estimate Bit 1: Insufficient Press Diff: No Air Mass Flow Estimate Bit 2: Tvl Cal Error: No Air Mass Flow Estimate Bit 3: Reserved Bit 4: High Supply Pressure (1b_y) Bit 5: Reserved Bit 6. Near Travel Cutoff Or Stop Bit 7: Reserved Bit 8: Spec Sheet Fields Empty Bit 9: Sensor Failure Bit 10. Not In Travel Control Bit 11. Transducer Block Mode Not AUTO Bit 12. Wrong Diagnostic Tier Bit 13. PD Command OFF Bit 14. Trigger Data Available*	All Bits: 0	- - -	Data Type: Bit String 0=inactive 1=active Performance Diagnostic Detail status *Bits which, when set, will trigger PERF_ACTIVE bit 2.
PD Detail 6 Active PD_DETAIL6_ACTIVE	81.10	RO	- - -	Reserved	All Bits: 0	- - -	Data Type: Bit String
Shutdown Alerts SHUTDOWN_ ALERTS_ACTIVE	81.11	RO	- - -	Same as SHUTDOWN_ TRIGGER [83.1-]	All Bits: 0	- - -	Data Type: Bit String 0=inactive 1=active Indicates what caused an Instrument Shutdown. Bit remains set even if condition has passed if Shutdown Recovery is Manual. All bits are cleared when MODE_BLK.TARGET is written. Always enabled whenever the corresponding SHUTDOWN_TRIGGER is enabled.
INST_ALERTS_ENABLE	82	- - -	- - -				- - -

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Table 16. Transducer Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Mode	Range	Initial Value	Protect Category	Description
GROUP_1_ENABLE	82.1	- - -	AUTO MAN OOS	Bit 0: Check Alert Bit 1: Drive Current Bit 2: Drive Signal Bit 3: Program Memory Bit 4: Static Memory Bit 5: I/O Processor Bit 7: Output Block Timeout Bit 8: Blocks to Defaults Bit 11: Travel Sensor Bit 12: Port A Pressure Sensor Bit 13: Port B Pressure Sensor Bit 14: Supply Pressure Sensor Bit 15: Temperature Sensor Bit 18: Pressure Fallback Bit 19: Travel Deviation Bit 21: Supply Pressure High Bit 22: Supply Pressure Low Bit 23: Temperature High Bit 24: Temperature Low Bit 27: Performance Critical Bit 28: Performance Reduced Bit 29: Performance Info	• Drive Current • Drive Signal • Program Memory • Static Memory • I/O Processor • Blocks Set to Defaults • Travel Sensor • Pressure A Sensor • Pressure B Sensor • Supply Pressure Sensor • Temperature Sensor • Pressure Fallback • Travel Deviation • Supply Pressure Hi • Supply Pressure Lo • Temperature Hi • Temperature Lo • Performance Critical • Performance Reduced	SETUP	Data Type: Bit String 0=disable 1=enable
GROUP_2_ENABLE	82.2	- - -	AUTO MAN OOS	Bit 0: Travel Limit Hi Hi Bit 1: Travel Limit Lo Lo Bit 2: Travel Limit Hi Bit 3: Travel Limit Lo Bit 7: Travel Open Bit 8: Travel Closed Bit 9: Proximity Hi Hi Bit 10: Proximity Hi Continued on next page:	• LCP Comms • Latch Active	SETUP	Data Type: Bit String 0=disable 1=enable

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Table 16. Transducer Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Mode	Range	Initial Value	Protect Category	Description
GROUP_2_ENABLE	82.2	- - -	AUTO MAN OOS	Continued from previous page: Bit 11: Proximity Lo Bit 12: Proximity Lo Lo Bit 15: Cycle Counter Bit 16: Travel Accumulator Bit 18: LCP Comms Bit 19: LCP Stuck Button Bit 20: LCP Demand Button Pressed Bit 21: Demand Time Bit 22: Reset Time Bit 23: Stroke Open Time Bit 24: Stroke Closed Time Bit 25: LCP Reset Button Pressed Bit 26: LCP Test Button Pressed Bit 27: Latch Active Bit 28: Final Val Hi Bit 29: Final Val Lo	• LCP Comms • Latch Active	SETUP	Data Type: Bit String 0=disable 1=enable
GROUP_3_ENABLE	82.3	- - -	AUTO MAN OOS	Bit 0: Execution Failure Bit 1: Write Lock Integrity Bit 2: Mode Integrity Bit 3: Event Queue Exceeded Bit 4: Sequence Execution Error Bit 5: ISR Safety Monitor Bit 18: PST Anomaly Bit 19: FST Anomaly Bit 21: PST Success Bit 22: FST Success Bit 23: PST Overdue Bit 24: FST Overdue Bit 25: PST Pending Bit 30: Diagnostic in Progress	• PST Anomaly • FST Anomaly • PST Success • FST Success • PST Pending • Diagnostic in Progress	SETUP	Data Type: Bit String 0=disable 1=enable
INST_ALERTS_CONFIG	83	- - -	- - -				

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Table 16. Transducer Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Mode	Range	Initial Value	Protect Category	Description
Shutdown Trigger SHUTDOWN_ TRIGGER	83.1	RW	AUTO MAN OOS	Bit 0: Drive Current Bit 1: Program Memory Bit 2: Static Memory Bit 3: Processor or I/O Processor Bit 4: Travel Sensor Bit 5: Control Pressure Sensor Bit 6: Output Block Timeout Bits 7 to 31: (Reserved)	All Bits: 0	SETUP	Data Type: Bit String 0=attempt control, 1=fail to zero drive e.g. OOS mode Action on specific instrument alerts.
Shutdown Recovery SHUTDOWN_ RECOVERY	83.2	RW	AUTO MAN OOS	Same as SHUTDOWN_ TRIGGER above.	All Bits: 0	SETUP	Data Type: Bit String 0=Auto 1=Manual Recovery action after a shutdown trigger “fail to zero drive” above.
Output Blk Timeout OUTPUT_BLK_ TIMEOUT	83.3	RW	AUTO MAN OOS	Time >= 0, <= 800 seconds	600	SETUP	Data Type: Float The maximum time between updates from the AO or DO block to the transducer block setpoint.
Drive Current Alert Point DRIVE_CURRENT_ ALRT_PT	83.4	RW	AUTO MAN OOS	>=5% <= 100%	10	SETUP	Data Type: Float (percent different) drive signal not reaching I/P accurately.
Drive Current Alert Time DRIVE_CURRENT_ TIME	83.5	RW	AUTO MAN OOS	>= 0.25, <=120 seconds	2	SETUP	Data Type: Float (percent different) drive signal not reaching I/P accurately.
Temperature Hi Alert Point TEMP_HI_ALRT_PT	83.6	RW	AUTO MAN OOS	> -76°F < 257°F	85.555°C / 186°F	SETUP	Data Type: Float Temperature HI Limits
Temperature Lo Alert Point TEMP_LO_ALRT_PT	83.7	RW	AUTO MAN OOS	> -76°F < 257°F	-52.77°C / -63°F	SETUP	Data Type: Float Temperature LO Limits
Supply Pressure Hi Alert Point SUP_PRES_HI_ ALRT_PT	83.8	RW	AUTO MAN OOS	>0, <=150	999.7 kPa / 145 psig	SETUP	Data Type: Float Maximum supply pressure
Supply Pressure Lo Alert Point SUP_PRES_LO_ ALRT_PT	83.9	RW	AUTO MAN OOS	=>=0, <=150	103.4 kPa / 15 psig	SETUP	Data Type: Float Minimum supply pressure
INST_ALERTS_ CONFIG2	84	- - -	- - -				- - -
Travel Deviation Deadband TVL_DEV_DB	84.1	RW	AUTO MAN OOS	>= 0, <= 100	2	SETUP	Data Type: Float

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Table 16. Transducer Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Mode	Range	Initial Value	Protect Category	Description
Travel Accumulator Alert Point TVL_ACCUM_ALRT_PT	84.2	RW	AUTO MAN OOS	>=0	1,000,000	SETUP	Data Type: UINT32 Alerts when accumulated travel is too much
Travel Accumulator Deadband TVL_ACCUM_DB	84.3	RW	AUTO MAN OOS	0 to 100	1	SETUP	Data Type: Float Deadband
Cycle Count Alert Point CYCLE_COUNT_ALRT_PT	84.4	RW	AUTO MAN OOS	>=0	1,000,000	SETUP	Data Type: UINT32 Alerts when number of cycles is too large.
Cycle Count Deadband CYCLE_COUNT_DB	84.5	RW	AUTO MAN OOS	0 to 100	1	SETUP	Data Type: Float Deadband
Travel Open Deadband TVL_OPEN_DB	84.6	RW	AUTO MAN OOS	>=0, <=100	1	SETUP	Data Type: Float Deadband
Travel Closed Deadband TVL_CLOSED_DB	84.7	RW	AUTO MAN OOS	>=0, <=100	1	SETUP	Data Type: Float Deadband
Travel Lo Lo Alert Point TVL_LO_LO_ALRT_PT	84.8	RW	AUTO MAN OOS	-25 to 125	-25	SETUP	Data Type: Float Alert when valve position is less than alert point. Controls DI channels 26 and 30 regardless of alert enable state.
Travel Lo Lo Deadband TVL_LO_LO_DB	84.9	RW	AUTO MAN OOS	>=0, <=100	5	SETUP	Data Type: Float Deadband
Travel Lo Alert Point TVL_LO_ALRT_PT	84.10	RW	AUTO MAN OOS	-25 to 125	-25	SETUP	Data Type: Float Alert when valve position is less than alert point. Controls DI channels 27 and 31 regardless of alert enable state.
Travel Lo Deadband TVL_LO_DB	84.11	RW	AUTO MAN OOS	>=0, <=100	5	SETUP	Data Type: Deadband
Travel Hi Alert Point TVL_HI_ALRT_PT	84.12	RW	AUTO MAN OOS	-25 to 125	125	SETUP	Data Type: Alert when valve position is less than alert point. Controls DI channels 28 and 32 regardless of alert enable state.
Travel Hi Deadband TVL_HI_DB	84.13	RW	AUTO MAN OOS	>=0, <=100	5	SETUP	Data Type: Deadband
Travel Hi Hi Alert Point TVL_HI_HI_ALRT_PT	84.14	RW	AUTO MAN OOS	-25 to 125	125	SETUP	Data Type: Alert when valve position is less than alert point. Controls DI channels 29 and 33 regardless of alert enable state.

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Table 16. Transducer Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Mode	Range	Initial Value	Protect Category	Description
Travel Hi Hi Deadband TVL_HI_HI_DB	84.15	RW	AUTO MAN OOS	>=0, <=100	5	SETUP	Data Type: Deadband
INST_ALERTS_ CONFIG3	85	- - -	ALL	- - -		- - -	- - -
STROKE_DEMAND_ TIME	85.1	- - -	ALL	>= 0 <= 180	0	SETUP	Data Type: Float Threshold for PST devices for the corresponding instrument alert.
STROKE_RESET_ TIME	85.2	- - -	ALL	>= 0 <= 180	0	SETUP	Data Type: Float Threshold for PST devices for the corresponding instrument alert.
STROKE_OPEN_TIME	85.3	- - -	ALL	>= 0 <=180	0	SETUP	Data Type: Float Threshold for AD, FD and PD devices for the corresponding Instrument alert.
STROKE_CLOSED_ TIME	85.4	- - -	ALL	>= 0 <=180	0	SETUP	Data Type: Float Threshold for AD, FD and PD devices for the corresponding Instrument alert.
FD_FAIL_MAP_2	86	- - -	ALL	See RB.FD_FAIL_ MAP	- - -	NONE	Data Type: BitStr Mirror of RB.FD_FAIL_MAP.
FD_OFFSPEC_MAP_2	87	- - -	ALL	See RB.FD_ OFFSPEC_MAP	- - -	NONE	Data Type: BitStr Mirror of RB.FD_OFFSPEC_MAP
FD_MAINT_MAP_2	88	- - -	ALL	See RB.FD_MAINT_ MAP	- - -	NONE	Data Type: BitStr Mirror of RB.FD_MAINT_MAP
FD_CHECK_MAP_2	89	- - -	ALL	See RB.FD_CHECK_ MAP	- - -	NONE	Data Type: BitStr Mirror of RB.FD_CHECK_MAP
FD_FAIL_MASK_2	90	- - -	ALL	All bits off	- - -	NONE	Data Type: BitStr Mirror of RB.FD_FAIL_MASK
FD_OFFSPEC_MASK_2	91	- - -	ALL	All bits off	- - -	NONE	Data Type: BitStr Mirror of RB.FD_OFFSPEC_MASK
FD_MAINT_MASK_2	92	- - -	ALL	All bits off	- - -	NONE	Data Type: BitStr Mirror of RB.FD_MAINT_MASK
FD_CHECK_MASK_2	93	- - -	ALL	All bits off	- - -	NONE	Data Type: BitStr Mirror of RB.FD_CHECK_MASK
FD_SIMULATE_2	94	- - -	ALL	- - -	- - -	- - -	Data Type: DS89 Mirror of RB.FD_SIMULATE

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Table 16. Transducer Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Mode	Range	Initial Value	Protect Category	Description
DIAGNOSTIC_ SIMULATE_VALUE	94.1	- - -	- - -	- - -	- - -	NONE	Data Type: BitSTR
DIAGNOSTIC_VALUE	94.2	RO	- - -	- - -	- - -	- - -	Data Type: BitSTR
ENABLE_DISABLE	94.3	- - -	- - -	- - -	- - -	NONE	Data Type: UINT8
FD_MODE_SHED	95	- - -	OOS MAN	See RB.FD_FAIL_ MAP	0	SETUP	Data Type: BitSTR
FD_OPTIONS	96	- - -	OOS MAN	Bit 0: Output Block "Maintenance Needed" Bit 1: PWA / FD Affects PV Status	Output Block "Maintenance Needed"	SETUP	Data Type: BitSTR
SELFTEST_STATUS	97	RO	- - -	Bit 2: Integrator Limited Low Bit 3: Integrator Limited High Bit 4: Tvl Sensor Span Error Bit 5: MLFB Error Bit 7: Tvl Sensor High Error Bit 8: Tvl Sensor Low Error Bit 9: Pressure B Sensor Failure Bit 10: Pressure A Sensor Failure Bit 11: Supply Sensor Failure Bit 13: IOP Failure Bit 14: Drive Current Alert Bit 15: Simulate Jumper ON	- - -	- - -	Data Type: Bit String
RESERVED_A	98	- - -	- - -	- - -	- - -	NONE	Data Type: UINT8 Array[118]
RESERVED_AI	99	- - -	ALL	- - -	- - -	NONE	Data Type: UINT16
SPEC_SHEET_VALVE	100	- - -	- - -				- - -
Valve Size VALVE_SIZE	100.1	- - -	AUTO MAN OOS	- - -	NULL	ALL	Data Type: VSTR
Valve Class VALVE_CLASS	100.2	- - -	AUTO MAN OOS	- - -	NULL	ALL	Data Type: VSTR
Actual Travel ACTUAL_TRAVEL	100.3	- - -	AUTO MAN OOS	- - -	0	ALL	Data Type: FLOAT Travel Units

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Table 16. Transducer Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Mode	Range	Initial Value	Protect Category	Description
Shaft Stem Diameter SHAFT_STEM_DIA	100.4	- - -	AUTO MAN OOS	- - -	0	ALL	Data Type: FLOAT Length Units
Packing Type PACKING_TYPE	100.5	- - -	AUTO MAN OOS	- - -	NULL	ALL	Data Type: VSTR
Inlet Pressure INLET_PRESSURE	100.6	- - -	AUTO MAN OOS	- - -	0	ALL	Data Type: FLOAT Pressure Units
Outlet Pressure OUTLET_PRESSURE	100.7	- - -	AUTO MAN OOS	- - -	0	ALL	Data Type: FLOAT Pressure Units
SPEC_SHEET_TRIM	101	- - -					- - -
Seat Type SEAT_TYPE	101.1	RW	ALL		NULL	ALL	Data Type: Visible String
Leak Class LEAK_CLASS	101.2	RW	ALL	ANSI Seat Leakage Classification 0: 1: I 2: II 3: III 4: IV 5: V 6: VI 7: BFW 8: STD AIR 9: BFW II 10: BFW III 11: BFW IV 12: BFW V 13: BFW VI 14: 1/10th of IV 15: Bubble Tight	0	ALL	Data Type: Enum (Uint8)
Port Diameter PORT_DIAMETER	101.3	RW	ALL	- - -	0	ALL	Data Type: Float Length units
Port Type PORT_TYPE	101.4	RW	ALL	1=balanced 2=unbalanced	0	ALL	Data Type: Enum (Uint8)
Flow Direction FLOWDIRECTION	101.5	RW	ALL	1=up 2=down	0	ALL	Data Type: Enum (Uint8)
Push Down To PUSH_DOWN_TO	101.6	RW	ALL	1=open 2=close	0	ALL	Data Type: Enum (Uint8)
Flow Tends To FLOW_TENDS_TO	101.7	RW	ALL	1=open 2=close	0	ALL	Data Type: Enum (Uint8)
Unbalanced Area UNBALANCED_ AREA	101.8	RW	ALL	- - -	0.00	ALL	Data Type: Float Area units
Trim Style 1 TRIM_STYLE_1	101.9	RW	ALL	- - -	NULL	ALL	Data Type: Visible String
Trim Style 2 TRIM_STYLE_2	101.10	RW	ALL	- - -	NULL	ALL	Data Type: Visible String

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Table 16. Transducer Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Mode	Range	Initial Value	Protect Category	Description
SPEC_SHEET_ACT	102	---					
Actuator Size ACTUATOR SIZE	102.1	RW	ALL	---	NULL	ALL	Data Type: Visible String
Effective Area EFFECTIVE AREA	102.2	RW	ALL	---	0.00	ALL	Data Type: Float Area units
Air AIR	102.3	RW	ALL	1=open 2=close	0	ALL	Data Type: Enum (Uint8)
Lower Bench Set LOWER_BENCH_SET	102.4	RW	ALL	---	0	ALL	Data Type: Float Pressure units
Upper Bench Set UPPER_BENCH_SET	102.5	RW	ALL	---	0	ALL	Data Type: Float Pressure units
Nominal Supply Pressure NOMINAL_SUPPLY_PRESSURE	102.6	RW	ALL	---	0	ALL	Data Type: Float Pressure units
Spring Rate SPRING_RATE	102.7	RW	ALL	---	0	ALL	Data Type: Float Spring rate units
Stroking Time Open STROKING_TIME_OPEN	102.8	RW	ALL	---	0	ALL	Data Type: Float Seconds
Stroking Time Close STROKING_TIME_CLOSE	102.9	RW	ALL	---	0	ALL	Data Type: Float Seconds
Lever Style LEVER_STYLE	102.10	RW	ALL	1=Pivot Point 2=Rack and Pinion 3=Scotch Yoke	0	ALL	Data Type: Enum (Uint8)
Lever Arm Length LEVER_ARM_LENGTH	102.11	RW	ALL	---	0	ALL	Data Type: Float Length units
ACT_MODEL_ENUM	102.11	RW	ALL	---	0	ALL	Data Type: UINT16
ACT_SIZE_ENUM	102.11	RW	ALL	---	0	ALL	Data Type: UINT16
DEVICE_RECORD	103	---					These parameters can only reset through VL/DD.
Temperature Maximum TEMP_MAX	103.1	RO	N/A	---	-9999.99 F	N/A	Data Type: Float Highest temperature recorded
Temperature Maximum Time TEMP_MAX_TIME	103.2	RO	N/A	---	Undefined	N/A	Data Type: Time Value
Temperature Minimum TEMP_MIN	103.3	RO	N/A	---	9999.99 F	N/A	Data Type: Float Lowest temperature recorded
Temperature Minimum Time TEMP_MIN_TIME	103.4	RO	N/A	---	Undefined	N/A	Data Type: Time Value

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Table 16. Transducer Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Mode	Range	Initial Value	Protect Category	Description
Supply Pressure Maximum SUPP_PRESS_MAX	103.5	RO	N/A	- - -	0.0 psig	N/A	Data Type: Float Highest supply pressure recorded
Supply Pressure Maximum Time SUPP_PRESS_MAX_TIME	103.6	RO	N/A	- - -	Undefined	N/A	Data Type: Time Value
Supply Pressure Minimum SUPP_PRESS_MIN	103.7	RO	N/A	- - -	9999.99 psig	N/A	Data Type: Float Lowest supply pressure recorded
Supply Pressure Minimum Time SUPP_PRESS_MIN_TIME	103.8	RO	N/A	- - -	Undefined	N/A	Data Type: Time Value
Comm Error Count COMM_ERROR_COUNT	103.9	RW	AUTO MAN OOS	- - -	0	SETUP	Not used by the DVC6200f
Protection PROTECTION	104	RW	ALL	1=None 2=Calibration 3=Setup and Calibration 4=All	1=None (after Restart with Defaults) 2=Calibration (from the factory)	NONE	Data Type: Enum Write lock enable/disable. If setting is at or above a parameters protection level then that parameter is read-only.
PERF_DIAG	105	- - -					
PD Run PD_COMMAND	105.1	RW	AUTO MAN	1=PD On 2=PD Off	1=PD On	NONEL	Data Type: Enum Controls whether PD will run or not.
PD Status PD_STATUS	105.2	RO	ALL	1=Not Running 2=Running	- - -	NONE	Data Type: Enum Status of performance diagnostics.
PD Configuration PD_CONFIG	105.3	RW	ALL	0	- - -	NONEL	Data Type: Bit String Bit string for configuring PD setup and options.
PD Extra PD_EXTRA	105.4	RW	ALL	- - -	0	NONE	Data Type: Uint32 Extra 32 bit integer for sending values to PD.
Temperature Units TEMPERATURE_UNITS	106	RW	ALL	C=1001 F=1002	C	SETUP	Data Type: Enum (Uint16)
Pressure Units TB_PRESSURE_UNITS	107	RW	AUTO MAN OOS	kPa=1133 bar=1137 psig=1143 inHg=1155 inH2O=1146 Kg/cm^2=1145	kPa	SETUP	Data Type: Enum (Uint61)
Length Units LENGTH_UNITS	108	RW	ALL	cm=1012 mm=1013 in.=1019	mm	SETUP	Data Type: Enum (Uint8) Not used for spec sheet ACTUAL_TRAVEL OR RATEDTRAVEL

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Table 16. Transducer Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Mode	Range	Initial Value	Protect Category	Description
Area Units AREA_UNITS	109	RW	ALL	cm^2=1025 mm^2=1027 $in.^2$=1030	cm^2	SETUP	Data Type: Enum (Uint8)
Spring Rate Units SPRING_RATE_UNITS	110	RW	ALL	N/m=1165 lb/in=1596	N/m	SETUP	Data Type: Enum (Uint8)
MAI_CHANNEL_MAP	111	- - -	- - -	- - -	- - -	- - -	Data Type:Uint16 This defines which transducer block channels will be sent to each of the 8 MAI channels. No scaling or other conversion will be done. Values will be sent in the currently defined units. If set to 0, then no output to MAI (status will be set to BAD). 1=FINAL_VALUE 2=WORKING_SP 3=FINAL_POSITION_VALUE 4=WORKING_POS 5=SUPPLY_PRESSURE 6=PRESSURE_A 7=PRESSURE_B 8=PRESSURE_DIFF 9=DRIVE_SIGNAL 10=DEVIATION_VALUE 11=TEMPERATURE 12=CYCLE_CNTR 13=TRAVEL_ACCUM
MAI Channel 1 MAI_CHANNEL_1	111.1	RW	MAN OOS	1 through 13	1	SETUP	
MAI Channel 2 MAI_CHANNEL_2	111.2	RW	MAN OOS	1 through 13	2	SETUP	
MAI Channel 3 MAI_CHANNEL_3	111.3	RW	MAN OOS	1 through 13	3	SETUP	
MAI Channel 4 MAI_CHANNEL_4	111.4	RW	MAN OOS	1 through 13	4	SETUP	
MAI Channel 5 MAI_CHANNEL_5	111.5	RW	MAN OOS	1 through 13	5	SETUP	
MAI Channel 6 MAI_CHANNEL_6	111.6	RW	MAN OOS	1 through 13	6	SETUP	
MAI Channel 7 MAI_CHANNEL_7	111.7	RW	MAN OOS	1 through 13	7	SETUP	
MAI Channel 8 MAI_CHANNEL_8	111.8	RW	MAN OOS	1 through 13	8	SETUP	
Output Block Selection OUTBLOCK_SEL	112	RW	MAN OOS	1: AO Block 2: DO Block 3: None (only valid if SIF activated)	1: AO Block	SETUP	Data Type: Enum (Uint8) Controls which output block (AO or DO) the transducer block will respond to.
Block Information BLOCK_INFO	113	RO	- - -	Bit 0: SensorX detected Bit 1: Output Block(s) Scheduled Bit 2: Trigger Capturing Bit 3: Output Block(s) In Service Bit 4: Write Lock Active Bit 5: RB in Auto Bit 6: Cutoff Active Bit 7: "SIF" bit active in RB.FEATURE_SEL	- - -	- - -	Data Type: Bit String (4 bytes)
Reserved B RESERVED_B	114	RW	- - -	- - -	0x00000000	NONE	Data Type: Bit String (4 bytes)

- continued -

Table 16. Transducer Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Mode	Range	Initial Value	Protect Category	Description
Travel Always TRAVEL_ALWAYS	115	RO	- - -	- - -	- - -	- - -	Data Type: DS-65
STATUS	115.1	RO	- - -	- - -	- - -	- - -	Data Type: UINT8
VALUE	115.2	RO	- - -	- - -	- - -	- - -	Data Type: Float
SIF_FINAL_VALUE_D	116	- - -	- - -	- - -	- - -	- - -	Data Type: DS-66
STATUS	116.1	- - -	MAN OOS	- - -	- - -	- - -	Data Type: UINT8
VALUE	116.2	- - -	MAN OOS	- - -	- - -	- - -	Data Type: UINT8
SIF_READBACK_D	117	RO	- - -	- - -	- - -	- - -	Data Type: DS-66
STATUS	117.1	RO	- - -	- - -	- - -	- - -	Data Type: UINT8
VALUE	117.2	RO	- - -	- - -	- - -	- - -	Data Type: UINT8
VST_COMMAND	118	- - -	AUTO MAN OOS	0: Un-initialized 1: Execute VST (store as reference) 2: Execute VST (store as current) 3: Abort stroke test 4: Reset VST_ RESULT to 'no initial result' 8: Execute PST 9: Execute FST 10: Execute PST with Host Timeout 11: Execute FST with Host Timeout 12: Execute Valve Signature 13: Execute Step Response 14: End Wait 15: Execute Online Capture 16: Execute FST with cutoffs/char/ rate-limits 128: Host Present	0	NONE	Data Type: UINT8
VST_MODE	119	- - -	AUTO MAN OOS	0: Disable 1: PST for ESD valves 2: FST for ESD valves	0	SETUP	Data Type: UINT8
VST_PAUSE	120	- - -	AUTO MAN OOS	- - -	5	SETUP	Data Type: Float Units = Seconds
VST_RESULT	121	RO	- - -	0: No initial results 1: Last VST successful 2: Last VST abnormal	- - -	- - -	Data Type: UINT8

- continued -

Table 16. Transducer Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Mode	Range	Initial Value	Protect Category	Description
VST_DETAILED_ RESULT	122	RO	- - -	0: Test command rejected 1: Time Limit Exceeded 2: Press Limit Exceeded 3: Friction Limit Exceeded 4: PST Travel Limit Exceeded 5: Overridden (abort due to external event) 6 to 7: Reserved 8: Travel/Pressure Control Changed 9: No Movement 10: No Return 11: Shutdown 12: Sensor Fail	- - -	- - -	Data Type: Bit String
VST_SAMPLE_INT	123	- - -	ALL	0 to 5000	100	SETUP	Data Type: UINT16 Units = msec
VST_ABORT_MODE	124	- - -	ALL	0: Ramp 1: Step	Ramp	SETUP	Data Type: UINT8
VST_INFO	125	- - -	- - -				- - -
VST_STATE	125.1	RO	- - -	0: Not Running 1: Checking Conditions 2: Finding Storage 3: Freeing Storage 4: Starting 5: Running 6: Cancelling 7: Demand 8: End	- - -	- - -	Data Type: UINT8
VST_STEP_NUM	125.2	RO	- - -	- - -	- - -	- - -	Data Type: UINT8
VST_DETAIL_CODE	126	RO	- - -	0: None 1: Other 2: Wrong Mode 3: Wrong Position 4: Disabled 5: Cal Active 6: Tuner Active 7: No File 8: Wrong Tier 9: Configuration (PST minimum travel never leaves normal) 10: Not Normal 11: Bad Travel Status 12: Pressure Control Continued on next page:	- - -	- - -	Data Type: UINT8

- continued -

Table 16. Transducer Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Mode	Range	Initial Value	Protect Category	Description
VST_DETAIL_CODE	126	RO	- - -	Continued from previous page: 14: Alert Active (FD bit 0) 15: Alert Active (FD bit 1) to 45: Alert Active (FD bit 31) 47: Bad Pressure Status 48: Configuration (PST Max Travel will always be violated) 67: SIF-DO Demand 68: Mode Changed 69: DO Changed 70: Output block shed 71: Demand (LCP) 129: Abort Command 130: LCP Aborted 131: Aux Aborted 193: Outgoing Pressure Threshold 194: Deviation 195: Travel/ Pressure Control Changed 196: No Movement 196: No Movement 197: No Return 198: Breakout Time 199: Travel Time 200: Completion Time 201: Host Timeout 202: Shutdown 206: High Friction Breakout Pressure 206: High Friction Breakout Pressure 207: Low Friction Breakout Pressure 209: Incoming Pressure Threshold 210: Position sensor failed 211: Pressure sensor failed 212: Max Travel	- - -	- - -	Data Type: UINT8

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Table 16. Transducer Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Mode	Range	Initial Value	Protect Category	Description
VST_HOST_TIMEOUT	127	- - -	AUTO MAN OOS	0 to 6000	5	SETUP	Data Type: Float Units = seconds
VST_NORMAL	128	- - -	MAN OOS	0: Closed 1: Open	Open	SETUP	Data Type: U8
VST_CRITERIA_ CONFIG	129	- - -	ALL	- - -	- - -	SETUP	Data Type: BitStr
VST_ABNORMAL_ CRITERIA	129.1	- - -	ALL	Bit 2: Break-out Time Bit 3: Travel Time Bit 4: Test Time Bit 6: Outgoing Pressure Threshold Bit 7: Low Friction Break-out Pressure Bit 8: High Friction Break-out Pressure Bit 9: Incoming Pressure Threshold	0	SETUP	Data Type: BitStr
VST_ABORT_ CRITERIA	129.2	- - -	ALL	Bit 2: Break-out Time Bit 8: High Friction Break-out Pressure Bit 9: Incoming Pressure Threshold	0	SETUP	Data Type: BitStr
HI_FRIC_BRKOUT_ PRESS	129.3	- - -	ALL	>=-150 psig, <=150 psig	0	SETUP	Data Type: Float Units = pressure Can be differential pressure in double-acting.
LO_FRIC_BRKOUT_ PRESS	129.4	- - -	ALL	>=-150 psig, <=150 psig	0	SETUP	Data Type: Float Units = pressure Can be differential pressure in double-acting.
SEATLOAD_LO	129.5	- - -	ALL	- - -	0	SETUP	Data Type: Float Units = force
SEATLOAD_HI	129.6	- - -	ALL	- - -	0	SETUP	Data Type: Float Units = force
PST_OUT_PRESS_ LIM	129.7	- - -	ALL	- - -	0	SETUP	Data Type: Float Units = pressure
PST_IN_PRESS_LIM	129.8	- - -	ALL	- - -	0	SETUP	Data Type: Float Units = pressure
VST_TIME_OF_LAST_ SUCCESS	130	- - -					
PST_TIME_OF_LAST_ SUCESS	130.1	RO	- - -	- - -	Jan 1, 1972	- - -	Data Type: FFTime Read Only except through Reserved A commands.

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Table 16. Transducer Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Mode	Range	Initial Value	Protect Category	Description
FST_TIME_OF_LAST_ SUCESS	130.2	RO	- - -	- - -	Jan 1, 1972	- - -	Data Type: FFTime Read Only except through Reserved A commands.
VST_TIME_OF_LAST	131	- - -					
PST_SUCESS	131.1	RO	- - -	- - -	- - -	- - -	Data Type: Float Units = days
FST_SUCESS	131.2	RO	- - -	- - -	- - -	- - -	Data Type: Float Units = days
VST_TSL_RESET_ RECORD	132	- - -					
PST_RESET_ TIMESTAMP	132.1	RO	- - -	- - -	Jan 1, 1972	- - -	Data Type:FFTime
FST_RESET_ TIMESTAMP	132.2	RO	- - -	- - -	Jan 1, 1972	- - -	Data Type: FFTime
PST_SOURCE_OF_ RESET	132.3	RO	- - -	• 0x00 - None • 0x01 - User Modified • 0x02 - PST • 0x03 - FST • 0x04 - Demand	None (0x00)	- - -	Data Type: UINT8
FST_SOURCE_OF_ RESET	132.4	RO	- - -	• 0x00 - None • 0x01 - User Modified • 0x02 - PST • 0x03 - FST • 0x04 - Demand	Jan 1, 1972	- - -	Data Type: UINT8
VST_OVERDUE_ CONFIG	133	- - -	- - -	- - -	- - -	SETUP	- - -
PST_THRESHOLD	133.1	- - -	AUTO MAN OOS	- - -	0	SETUP	Data Type: Float Units = days
FST_THRESHOLD	133.2	- - -	AUTO MAN OOS	- - -	0	SETUP	Data Type: Float Units = days
VST_PROCESS_LIMITS	134	- - -					
PROCESS_LIMIT_ TYPE	134.1	- - -	ALL	0: Process Limits Disabled	0	SETUP	Data Type: UINT8
PROCESS_LO_LIMIT	134.2	- - -	ALL	- - -	0	SETUP	Data Type: Float
PROCESS_HI_LIMIT	134.3	- - -	ALL	- - -	0	SETUP	Data Type: Float
PST_BREAKOUT_TIME	135	RO	- - -	- - -	- - -	- - -	Data Type: Float Units = seconds
PST_BREAKOUT_ TIMEOUT	136	- - -	AUTO MAN OOS	- - -	0	SETUP	Data Type: Float Units = seconds

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Table 16. Transducer Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Mode	Range	Initial Value	Protect Category	Description
PST_INITIAL_START_TIME	137	- - -	AUTO MAN OOS	- - -	Jan 1, 1972 00:00:00.0	SETUP	Data Type: Date
PST_INTERVAL	138	- - -	AUTO MAN OOS	0 to 3653 (~10 yrs)	0	SETUP	Data Type: Float Units = days
PST_OPTIONS	139	- - -	AUTO MAN OOS	Bit 0: Freeze analog Feedback Bit 1: Freeze discrete Feedback Bit 8: Enable endpoint distribution Bit 9: Enable early-turnaround	- - -	SETUP	Data Type: Bitstring
PST_RAMP_RATE	140	- - -	AUTO MAN OOS	>=0 <=100	0.25	SETUP	Data Type: Float Units = %/s
PST_STRK_TRAV	141	- - -	AUTO MAN OOS	0 to 100	10	SETUP	Data Type: Float Units = %
PST_STRK_TRAV_TIMEOUT	142	- - -	AUTO MAN OOS	- - -	0	SETUP	Data Type: Float Units = seconds
PST_COMPLETION_TIMEOUT	143	- - -	AUTO MAN OOS	- - -	0	SETUP	Data Type: Float Units = seconds
PST_OVERDRIVE_AMT	144	- - -	ALL	> = 0	10	SETUP	Data Type: Float Units = %
PST_MAX_TRAVEL	145	- - -	ALL	0 to 125	0	SETUP	Data Type: Float
PST_STOP_ALERTS	146	- - -	ALL	See RB.FD_FAIL_ACTIVE	0	SETUP	Data Type: Bit String
PST_RETURN_RAMP_RATE	147	- - -	AUTO MAN OOS	<=100	-1	SETUP	Data Type: Float Units = %/sec
PST_RANDOM_MAX	148	- - -	AUTO MAN OOS	>=0 <=10	0	SETUP	Data Type: Float Units = %
PST_RETURN_LEAD	149	- - -	AUTO MAN OOS	>=0 <=100	1	SETUP	Data Type: Float Units = %
PST_AUTO_NEXT_TEST	150	- - -	AUTO MAN OOS	- - -	0	- - -	Data Type: FFTime

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Table 16. Transducer Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Mode	Range	Initial Value	Protect Category	Description
PST_AUTO_CONFIG	151	- - -	- - -				- - -
PST_AUTO_ ALLOWED_HOURS	151.1	- - -	AUTO MAN OOS	Zero = 0x00000001 One = 0x00000002 Two = 0x00000004 Three = 0x00000008 Four = 0x00000010 Five = 0x00000020 Six = 0x00000040 Seven = 0x00000080 Eight = 0x00000100 Nine = 0x00000200 Ten = 0x00000400 Eleven = 0x00000800 Twelve = 0x00001000 Thirteen = 0x00002000 Fourteen = 0x00004000 Fifteen = 0x00008000 Sixteen = 0x00010000 Seventeen = 0x00020000 Eighteen = 0x00040000 Nineteen = 0x00080000 Twenty = 0x00100000 TwentyOne = 0x00200000 TwentyTwo = 0x00400000 TwentyThree = 0x00800000	Nine Ten Eleven Twelve Thirteen Fourteen Fifteen Sixteen	SETUP	Data Type: Bit String
PST_AUTO_ BLOCKED_START	151.2	- - -	AUTO MAN OOS	- - -	- - -	SETUP	Data Type: FFTime
PST_AUTO_ BLOCKED_END	151.3	- - -	AUTO MAN OOS	- - -	- - -	SETUP	Data Type: FFTime
PST_AUTO_ ALLOWED_DAYS	151.4	- - -	AUTO MAN OOS	0x01 Sunday 0x02 Monday 0x04 Tuesday 0x08 Wednesday 0x10 Thursday 0x20 Friday 0x40 Saturday	Monday Tuesday, Wednesday, Thursday, Friday	SETUP	Data Type: Bit String

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Table 16. Transducer Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Mode	Range	Initial Value	Protect Category	Description
PST_AUTO_TYPE	151.5	- - -	AUTO MAN OOS	0: Disabled 1: Alert Only 2: Run Tests	Disabled	SETUP	Data Type: ENUM
PST_AUTO_ALERT_ TIME	151.6	- - -	AUTO MAN OOS	> = 0	96	SETUP	Data Type: U8 Units = Hours
PST_AUTO_INFO	152	- - -	- - -				- - -
PST_AUTO_STATE	152.1	RO	- - -	0: Init 1: Disabled 2: Waiting 3: Pending 4: Starting 5: Monitoring	- - -	- - -	Data Type: Enum
PST_AUTO_HOURS_ TO_NEXT	152.2	RO	- - -	- - -	- - -	- - -	Data Type: Float
PST_AUTO_ CURRENT_TIME	152.3	RO	- - -	- - -	- - -	- - -	Data Type: FFTime Units = 1/32 msec
PST_CAL_TRAV	153	- - -	ALL	- - -	0	CAL	Data Type: U8
FST_BREAKOUT_TIME	154	RO	- - -	- - -	- - -	- - -	Data Type: Float Units = seconds
FST_BREAKOUT_ TIMEOUT	155	- - -	- - -	- - -	0	SETUP	Data Type: Float Units = seconds
FST_RAMP_RATE	156	- - -	AUTO MAN OOS	>=0 <=100	0.25	SETUP	Data Type: Float Units = %/sec
FST_STRK_TRAV_ TIMEOUT	157	- - -	AUTO MAN OOS	- - -	0	SETUP	Data Type: Float Units = second
FST_COMPLETION_ TIMEOUT	158	- - -	AUTO MAN OOS	- - -	0	SETUP	Data Type: Float Units = second
FST_OPTIONS	159	- - -	AUTO MAN OOS	Bit 0: Reserved	0	SETUP	Data Type: Bit String
FST_WAIT_TIME	160	- - -	AUTO MAN OOS	0 to 10 minutes	3 minutes	SETUP	Data Type: Float
VST_HISTORY_0	161	- - -					- - -
ENTRY_TIME	161.1	RO	- - -	2010-Jan-1 — 2146-Feb-7	- - -	- - -	Data Type: FFTime

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Table 16. Transducer Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Mode	Range	Initial Value	Protect Category	Description
ENTRY_SOURCE	161.2	RO	- - -	0: None 0x41: VSig (Command) 0x42: VSig (Batch) 0x61: PST (Command) 0x62: PST (Batch) 0x63: PST (Host Timeout) 0x64: PST (LCP) 0x65: PST (Automatic) 0x66: PST (Aux Term) 0x67: PST (Store as reference) 0x81: FST (Command) 0x82: FST (Batch) 0x83: FST with Host Timeout 0x87: FST (Store as Ref) 0x91: FST (Simulate Output Block) 0xC1: Step (Command) 0xC2: Step (Batch) 0xC4: Step (Internal)	- - -	- - -	Data Type: UINT8
ENTRY_RESULT	161.3	RO	- - -	0: None 1: Success 2: Failed	- - -	- - -	Data Type: UINT8
ENTRY_DETAIL_ CODE	161.4	RO	- - -	See VST_DETAIL_ CODE	- - -	- - -	Data Type: UINT8
ENTRY_MAX_TRAVEL	161.5	RO	- - -	- - -	- - -	- - -	Data Type: Float Units = %
ENTRY_BREAKOUT_ TIME	161.6	RO	- - -	- - -	- - -	- - -	Data Type: Float Units = sec
ENTRY_BREAKOUT_ PRESS	161.7	RO	- - -	- - -	- - -	- - -	Data Type: Float Units = pressure
ENTRY_TRAVEL_TIME	161.8	RO	- - -	- - -	- - -	- - -	Data Type: Float Units = sec
ENTRY_COMPLETE_ TIME	161.9	RO	- - -	- - -	- - -	- - -	Data Type: Float Units = sec
ENTRY_MIN_ FRICTION	161.10	RO	- - -	- - -	- - -	- - -	Data Type: Float
ENTRY_AVG_ FRICTION	161.11	RO	- - -	- - -	- - -	- - -	Data Type: Float
ENTRY_MAX_ FRICTION	161.12	RO	- - -	- - -	- - -	- - -	Data Type: Float

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Table 16. Transducer Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Mode	Range	Initial Value	Protect Category	Description
VST_HISTORY_1	162	- - -	- - -	- - -	- - -	- - -	- - -
ENTRY_TIME	162.1	RO	- - -	2010-Jan-1 — 2146-Feb-7	- - -	- - -	Data Type: FFTime
ENTRY_SOURCE	162.2	RO	- - -	See VST_ HISTORY_0	- - -	- - -	Data Type: UINT8
ENTRY_RESULT	162.3	RO	- - -	See VST_ HISTORY_0	- - -	- - -	Data Type: UINT8
ENTRY_DETAIL_ CODE	162.4	RO	- - -	See VST_ HISTORY_0	- - -	- - -	Data Type: UINT8
ENTRY_MAX_TRAVEL	162.5	RO	- - -	- - -	- - -	- - -	Data Type: Float Units = %
ENTRY_BREAKOUT_ TIME	162.6	RO	- - -	- - -	- - -	- - -	Data Type: Float Units = sec
ENTRY_BREAKOUT_ PRESS	162.7	RO	- - -	- - -	- - -	- - -	Data Type: Float Units = pressure
ENTRY_TRAVEL_TIME	162.8	RO	- - -	- - -	- - -	- - -	Data Type: Float Units = sec
ENTRY_COMPLETE_ TIME	162.9	RO	- - -	- - -	- - -	- - -	Data Type: Float Units = sec
ENTRY_MIN_ FRICTION	162.10	RO	- - -	- - -	- - -	- - -	Data Type: Float
ENTRY_AVG_ FRICTION	162.11	RO	- - -	- - -	- - -	- - -	Data Type: Float
ENTRY_MAX_ FRICTION	162.12	RO	- - -	- - -	- - -	- - -	Data Type: Float
VST_HISTORY_2	163	- - -	- - -				- - -
ENTRY_TIME	163.1	RO	- - -	2010-Jan-1 — 2146-Feb-7	- - -	- - -	Data Type: FFTime
ENTRY_SOURCE	163.2	RO	- - -	See VST_ HISTORY_0	- - -	- - -	Data Type: UINT8
ENTRY_RESULT	163.3	RO	- - -	See VST_ HISTORY_0	- - -	- - -	Data Type: UINT8
ENTRY_DETAIL_ CODE	163.4	RO	- - -	See VST_ HISTORY_0	- - -	- - -	Data Type: UINT8
ENTRY_MAX_TRAVEL	163.5	RO	- - -	- - -	- - -	- - -	Data Type: Float Units = %
ENTRY_BREAKOUT_ TIME	163.6	RO	- - -	- - -	- - -	- - -	Data Type: Float Units = sec
ENTRY_BREAKOUT_ PRESS	163.7	RO	- - -	- - -	- - -	- - -	Data Type: Float Units = pressure
ENTRY_TRAVEL_TIME	163.8	RO	- - -	- - -	- - -	- - -	Data Type: Float Units = sec
ENTRY_COMPLETE_ TIME	163.9	RO	- - -	- - -	- - -	- - -	Data Type: Float Units = sec
ENTRY_MIN_ FRICTION	163.10	RO	- - -	- - -	- - -	- - -	Data Type: Float

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Table 16. Transducer Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Mode	Range	Initial Value	Protect Category	Description
ENTRY_AVG_ FRICTION	163.11	RO	- - -	- - -	- - -	- - -	Data Type: Float
ENTRY_MAX_ FRICTION	163.12	RO	- - -	- - -	- - -	- - -	Data Type: Float
VST_HISTORY_3	164	- - -	- - -				- - -
ENTRY_TIME	164.1	RO	- - -	2010-Jan-1 -- 2146-Feb-7	- - -	- - -	Data Type: FFTime
ENTRY_SOURCE	164.2	RO	- - -	See VST_ HISTORY_0	- - -	- - -	Data Type: UINT8
ENTRY_RESULT	164.3	RO	- - -	See VST_ HISTORY_0	- - -	- - -	Data Type: UINT8
ENTRY_DETAIL_ CODE	164.4	RO	- - -	See VST_ HISTORY_0	- - -	- - -	Data Type: UINT8
ENTRY_MAX_TRAVEL	164.5	RO	- - -	- - -	- - -	- - -	Data Type: Float Units = %
ENTRY_BREAKOUT_ TIME	164.6	RO	- - -	- - -	- - -	- - -	Data Type: Float Units = sec
ENTRY_BREAKOUT_ PRESS	164.7	RO	- - -	- - -	- - -	- - -	Data Type: Float Units = pressure
ENTRY_TRAVEL_TIME	164.8	RO	- - -	- - -	- - -	- - -	Data Type: Float Units = sec
ENTRY_COMPLETE_ TIME	164.9	RO	- - -	- - -	- - -	- - -	Data Type: Float Units = sec
ENTRY_MIN_ FRICTION	164.10	RO	- - -	- - -	- - -	- - -	Data Type: Float
ENTRY_AVG_ FRICTION	164.11	- - -	- - -	- - -	- - -	- - -	Data Type: Float
ENTRY_MAX_ FRICTION	164.12	RO	- - -	- - -	- - -	- - -	Data Type: Float
VST_HISTORY_4	165	- - -	- - -				- - -
ENTRY_TIME	165.1	RO	- - -	2010-Jan-1 -- 2146-Feb-7	- - -	- - -	Data Type: FFTime
ENTRY_SOURCE	165.2	RO	- - -	See VST_ HISTORY_0	- - -	- - -	Data Type: UINT8
ENTRY_RESULT	165.3	RO	- - -	See VST_ HISTORY_0	- - -	- - -	Data Type: UINT8
ENTRY_DETAIL_ CODE	165.4	RO	- - -	See VST_ HISTORY_0	- - -	- - -	Data Type: UINT8
ENTRY_MAX_TRAVEL	165.5	RO	- - -	- - -	- - -	- - -	Data Type: Float Units = %
ENTRY_BREAKOUT_ TIME	165.6	RO	- - -	- - -	- - -	- - -	Data Type: Float Units = sec
ENTRY_BREAKOUT_ PRESS	165.7	RO	- - -	- - -	- - -	- - -	Data Type: Float Units = pressure
ENTRY_TRAVEL_TIME	165.8	RO	- - -	- - -	- - -	- - -	Data Type: Float Units = sec

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Table 16. Transducer Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Mode	Range	Initial Value	Protect Category	Description
ENTRY_COMPLETE_TIME	165.9	RO	- - -	- - -	- - -	- - -	Data Type: Float Units = sec
ENTRY_MIN_FRICTION	165.10	RO	- - -	- - -	- - -	- - -	Data Type: Float
ENTRY_AVG_FRICTION	165.11	RO	- - -	- - -	- - -	- - -	Data Type: Float
ENTRY_MAX_FRICTION	165.12	RO	- - -	- - -	- - -	- - -	Data Type: Float
VST_HISTORY_5	166	- - -	- - -				- - -
ENTRY_TIME	166.1	RO		2010-Jan-1 — 2146-Feb-7	- - -	- - -	Data Type: FFTime
ENTRY_SOURCE	166.2	RO		See VST_HISTORY_0	- - -	- - -	Data Type: UINT8
ENTRY_RESULT	166.3	RO		See VST_HISTORY_0	- - -	- - -	Data Type: UINT8
ENTRY_DETAIL_CODE	166.4	RO		See VST_HISTORY_0	- - -	- - -	Data Type: UINT8
ENTRY_MAX_TRAVEL	166.5	RO	- - -	- - -	- - -	- - -	Data Type: Float Units = %
ENTRY_BREAKOUT_TIME	166.6	RO	- - -	- - -	- - -	- - -	Data Type: Float Units = sec
ENTRY_BREAKOUT_PRESS	166.7	RO	- - -	- - -	- - -	- - -	Data Type: Float Units = pressure
ENTRY_TRAVEL_TIME	166.8	RO	- - -	- - -	- - -	- - -	Data Type: Float Units = sec
ENTRY_COMPLETE_TIME	166.9	RO	- - -	- - -	- - -	- - -	Data Type: Float Units = sec
ENTRY_MIN_FRICTION	166.10	RO	- - -	- - -	- - -	- - -	Data Type: Float
ENTRY_AVG_FRICTION	166.11	RO	- - -	- - -	- - -	- - -	Data Type: Float
ENTRY_MAX_FRICTION	166.12	RO	- - -	- - -	- - -	- - -	Data Type: Float
VST_HISTORY_6	167	- - -	- - -				- - -
ENTRY_TIME	167.1	RO	- - -	2010-Jan-1 — 2146-Feb-7	- - -	- - -	Data Type: FFTime
ENTRY_SOURCE	167.2	RO	- - -	See VST_HISTORY_0	- - -	- - -	Data Type: UINT8
ENTRY_RESULT	167.3	RO	- - -	See VST_HISTORY_0	- - -	- - -	Data Type: UINT8
ENTRY_DETAIL_CODE	167.4	RO	- - -	See VST_HISTORY_0	- - -	- - -	Data Type: UINT8
ENTRY_MAX_TRAVEL	167.5	RO	- - -	- - -	- - -	- - -	Data Type: Float Units = %
ENTRY_BREAKOUT_TIME	167.6	RO	- - -	- - -	- - -	- - -	Data Type: Float Units = sec

- continued -

Table 16. Transducer Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Mode	Range	Initial Value	Protect Category	Description
ENTRY_BREAKOUT_ PRESS	167.7	RO	- - -	- - -	- - -	- - -	Data Type: Float Units = pressure
ENTRY_TRAVEL_TIME	167.8	RO	- - -	- - -	- - -	- - -	Data Type: Float Units = sec
ENTRY_COMPLETE_ TIME	167.9	RO	- - -	- - -	- - -	- - -	Data Type: Float Units = sec
ENTRY_MIN_ FRICTION	167.10	RO	- - -	- - -	- - -	- - -	Data Type: Float
ENTRY_AVG_ FRICTION	167.11	RO	- - -	- - -	- - -	- - -	Data Type: Float
ENTRY_MAX_ FRICTION	167.12	RO	- - -	- - -	- - -	- - -	Data Type: Float
BATCH_INSIDE	168	RO	- - -	- - -	- - -	- - -	- - -
BATCH_STATE	168.1	RO	- - -	•0 - Not Executing •1 - Starting •2 - Executing •3 - Finished •4 - Aborted	- - -	- - -	Data Type: U8
TASK_1_TYPE	168.2	RO	- - -	•0 - None •1 - Transducer to MAN •2 - Transducer to AUTO •3 - Auto Calibrate •4 - Performance Tuner •5 - Total Scan •6 - Step Response •7 - Partial Stroke Test •8 - Full Stroke Test	- - -	- - -	Data Type: U8
TASK_2_TYPE - TASK_11_TYPE	168.3 to 168.12	RO	- - -	See TASK_1_TYPE	- - -	- - -	Data Type: U8
TASK_1_STATE	168.13	RO	- - -	•0x00 - None •0x01 - Pending •0x02 - Starting •0x03 - Executing •0x04 - Done •0x05 - Aborted •0x06 - Skipped	- - -	- - -	Data Type: U8
TASK_2_STATE - TASK_11_STATE	168.14 to 168.23	RO	- - -	See TASK_1_STATE	- - -	- - -	Data Type: U8
BATCH_INSIDE_ STATUS	169	RO	- - -				- - -

- continued -

Table 16. Transducer Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Mode	Range	Initial Value	Protect Category	Description
TASK_1_STATUS	169.1	RO	- - -	• 0x00000000 -No Status • 0x0001XXXX - Autocal Status • 0x0002XXXX - Performance Tuner Status • 0x0003XXXX - Total Scan Status • 0x0004XXXX - Step Response Status • 0x0005XXXX - Online Diag Status • 0x0006XXXX - PST Status • 0x0007XXXX - FST Status	- - -	- - -	Data Type: U32
TASK_2_STATUS to TASK_11_STATUS	169.2 to 169.11	RO	- - -	See TASK_1_ STATUS	- - -	- - -	Data Type: U32
TRIG_CONFIG	170	- - -	- - -				- - -
TRIG_EVENTS	170.1	- - -	AUTO MAN OOS	Bit 4: PressB Change Bit 5: PressA Change Bit 6: Travel Change Bit 7: Solenoid Bit 8: Restart Bit 9: External Bit 10: Cutoff Bit 11: Air mass flow Bit 12: Relay crossover Bit 13: Drive Bit 14: Travel Deviation Bit 15: Low Supply	0	SETUP	Data Type: Bit String
TRIG_PRE_PTS	170.2	- - -	AUTO MAN OOS	0 to 600	600	SETUP	Data Type: UINT16
TRIG_POST_PTS	170.3	- - -	AUTO MAN OOS	0 to 600	600	SETUP	Data Type: UINT16
TRIG_SAMPLE_INTVL	170.4	- - -	AUTO MAN OOS	0 to 10 sec	100	SETUP	Data Type: UINT16 Units = msec
TRIG_FLAGS	170.5	- - -	AUTO MAN OOS	Bit 0: Compression	Compression	SETUP	Data Type: Bit String
TRIG_TRAVE_ THRESH	170.6	- - -	AUTO MAN OOS	0 to 100 %	5	SETUP	Data Type: Float

- continued -

Table 16. Transducer Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Mode	Range	Initial Value	Protect Category	Description
TRIG_PRESSA_ THRESH	170.7	- - -	AUTO MAN OOS	0 to 150 psi	34.5 kPa / 5 psig	SETUP	Data Type: Float
TRIG_PRESSB_ THRESH	170.8	- - -	AUTO MAN OOS	0 to 150 psi	34.5 kPa / 5 psig	SETUP	Data Type: Float
TRIG_DIFF_ACCEL_ THRESH	170.9	- - -	AUTO MAN OOS	> = 0	10341.6 kPa/ sec^2 / 1500 psig/sec^2	SETUP	Data Type: Float
TRIG_INFO	171	RO	- - -				- - -
TRIG_STATE	171.1	RO	- - -	0: Idle 1: Snapping pre-trigger 2: Finding file 3: Deleting file 4: Saving data 5: Cancel 6: Done	- - -	- - -	Data Type: UINT8
TRIG_ERROR	171.2	RO	- - -	0: None 1: Other 7: No File 8: Wrong Tier 129: Abort Command 205: Overflow 208: File Full	- - -	- - -	Data Type:UINT8
LCP_CONFIG	172	- - -	ALL	- - -	- - -	SETUP	- - -
LCP_WHITE_LIGHT_ MAP	172.1	- - -	- - -	See FD_FAIL_MAP	0	SETUP	Data Type: Bit String
LCP_TRIP_ALERT_ TIME	172.2	- - -	- - -	1 to 96	1	SETUP	Data Type: U8 Units = minutes
LCP_RESERVED	172.3	- - -	- - -	- - -	0	SETUP	Data Type: Bit String
LCP_INFO	173	RO	- - -				Data Type: U8
LCP_COMM_STATE	173.1	RO	- - -	0: <blank> 1: Comms Ok 2: Comms Bad	- - -	- - -	Data Type: U8
LCP_LAST_BUTTON_ CODE	173.2	RO	- - -	Bit 0: No Button Pressed Bit 1: Test Button Pressed Bit 2: Demand Button Pressed Bit 3: Reset Button Pressed	- - -	- - -	Data Type: U8
LCP_VERSION	173.3	RO	- - -	0: Unknown 1: LCP100 2: LCP200	Unknown	- - -	Data Type: U8
LCP_POWER_SRC	173.4	RO	- - -	0: <blank> 1: Segment 2: External	<blank>	- - -	Data Type: U8

- continued -

Table 16. Transducer Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Mode	Range	Initial Value	Protect Category	Description
LCP_ALERTS	173.5	RO	- - -	0: <blank> 1: Yes 2: No	<blank>	- - -	Data Type: U8
LCP_BUTTON_RECORD	174	- - -	- - -				- - -
LCP_TEST	174.1	RO	- - -	- - -	Jan 1, 1972	- - -	Data Type: FFTime
LCP_DEMAND	174.2	RO	- - -	- - -	Jan 1, 1972	- - -	Data Type: FFTime
LCP_RESET	174.3	RO	- - -	- - -	Jan 1, 1972	- - -	Data Type: FFTime
FRICTION_MIN	175	RO	- - -				Data Type: DS-65
STATUS	175.1	RO	- - -	- - -	Bad: Not Connected	- - -	Data Type:UINT8
VALUE	175.2	RO	- - -	- - -	-1	- - -	Data Type: Float Units = N or N•m
FRICTION_AVG	176	RO	- - -				Data Type: DS-65
STATUS	176.1	RO	- - -	- - -	Bad: Not Connected	- - -	Data Type: UINT8
VALUE	176.2	RO	- - -	- - -	-1	- - -	Data Type: Float Units = N or N•m
FRICTION_MAX	177	- - -	- - -				Data Type: DS-65
STATUS	177.1	RO	- - -	- - -	Bad: Not Connected	- - -	Data Type: UINT8
VALUE	177.2	RO	- - -	- - -	-1	- - -	Data Type: Float Units = N or N•m
FRICTION_CONFIG	178	- - -	- - -				- - -
FRICTION_MIN_ALERT	178.1	- - -	AUTO MAN OOS	- - -	0	SETUP	Data Type: Float Units = N or N•m
FRICTION_MAX_ALERT	178.2	- - -	AUTO MAN OOS	- - -	0	SETUP	Data Type: Float Units = N or N•m
LATEST_STROKE	179	- - -	- - -				- - -
EVENT_TYPE	179.1	RO	- - -	0: Reserved 1: Demand (Setpoint) 2: Demand (SOV Special App) 3: Reset (Setpoint) 4: Reset (SOV Special App) 5: Stroke Open 6: Stroke Closed 7: Demand (LCP) 8: Reset (LCP) 9: Demand (SOV) 10: Reset (SOV)	0	- - -	Data Type: UINT8 Units = enum
BREAKOUT_TIME	179.2	RO	- - -	- - -	0	- - -	Data Type: Float Units = seconds

- continued -

Table 16. Transducer Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Mode	Range	Initial Value	Protect Category	Description
STROKE_TIME	179.3	RO	- - -	- - -	0	- - -	Data Type: Float Units = seconds
TIMESTAMP	179.4	RO	- - -	- - -	0	- - -	Data Type: FFTime
LATCH_STATE	180	RO	- - -	0: Init 1: Setpoint Latch Engaged 2: Position Latch Engaged 3: LCP Latch Engaged 4: Monitor 5: Ready to Latch	- - -	- - -	Data Type: U8
LATCH_POS_THRESH	181	RO	OOS MAN	0-100	50	SETUP	Data Type: Float Units = %
LATCH_RESET_OPTS	182	- - -	OOS MAN	0: Tripper-Aware Reset 1: Manual Reset	0	SETUP	Data Type: U8
LATCH_POS_ENABLE	183	- - -	OOS MAN	0: Disabled 1: Enabled	0	SETUP	Data Type: U8
DI_FD_CHAN_ CONFIG	184	- - -	OOS MAN	See RB.FD_FAIL_ ACTIVE	0	SETUP	Data Type: Bit String

4.3 View Lists

View lists allow the values of a set of parameters to be accessed at the same time. Views 1 and 2 contain operating parameters and are defined by the Fieldbus Foundation. View 3 contains dynamic parameters and View 4 contains static parameters with configuration and maintenance information. Views 3 and 4 are defined by the manufacturer.

NOTE

Because individual views are limited in size, View Lists 3 and 4 have multiple parts.

Table 17. Transducer Block, View 1 through View 3.5

INDEX NUMBER	PARAMETER	VIEW						
		1	2	3.1	3.2	3.3	3.4	3.5
1	ST_REV	x	x	x	x	x	x	x
5	MODE_BLK	x		x				
6	BLOCK_ERR	x		x				
10	TRANSDUCER_TYPE	x	x	x	x	x	x	x
11	TRANSDUCER_TYPE_VER	x	x	x				
12	XD_ERROR	x		x				
14	FINAL_VALUE	x		x				
15	FINAL_VALUE_RANGE		x					
18	FINAL_POSITION_VALUE	x		x				
19	WORKING_POS	x		x				
20	WORKING_SP	x		x				
23	DEVIATION_VALUE			x				
29	TRAVEL_ACCUM			x				
31	PSNR_FSTATE_VAL		x					
32	FINAL_VALUE_D	x		x				
33	FINAL_POSITION_VALUE_D	x		x				
34	WORKING_POS_D	x		x				
35	WORKING_SP_D	x		x				
36	PSNR_FSTATE_VAL_D		x					
37	DISCRETE_STATE		x					
38	PSNR_FSTATE_OPT		x					
39	CYCLE_CNTR			x				
41	READBACK_SELECT		x					
42	PSNR_COMMAND			x				
43	PSNR_COMMAND_STATE			x				
44	PSNR_OOS_OPT		x					
45	POS_FEATURES		x					
58	PSNR_COMMAND_ERROR			x				

- continued -

Table 17. Transducer Block, View 1 through View 3.5 (continued)

INDEX NUMBER	PARAMETER	VIEW						
		1	2	3.1	3.2	3.3	3.4	3.5
61	SUPPLY_PRESSURE			x				
62	PRESSURE_A			x				
63	PRESSURE_B			x				
64	PRESSURE_DIFF			x				
65	TVL_PRESS_CONTROL			x				
75	TEMPERATURE			x				
78	DRIVE_SIGNAL			x				
79	DRIVE_CURRENT			x				
80	MLFB			x				
81	INST_ALERTS_ACTIVE				x			
97	SELFTEST_STATUS				x			
103	DEVICE_RECORD				x			
113	BLOCK_INFO				x			
115	TRAVEL_ALWAYS					x		
118	VST_COMMAND	x				x		
119	VST_MODE	x				x		
120	VST_PAUSE		x					
121	VST_RESULT	x				x		
122	VST_DETAILED_RESULT	x				x		
125	VST_INFO					x		
126	VST_DETAIL_CODE					x		
130	VST_TIME_OF_LAST_ SUCCESS					x		
131	VST_TIME_SINCE_LAST					x		
135	PST_BREAKOUT_TIME					x		
150	PST_AUTO_NEXT_TEST					x		
152	PST_AUTO_INFO					x		
154	FST_BREAKOUT_TIME					x		
161	VST_HISTORY_0					x		
168	BATCH_INSIDE						x	
169	BATCH_INSIDE_STATUS						x	
171	TRIG_INFO						x	
173	LCP_INFO						x	
174	LCP_BUTTON_RECORD						x	
175	FRICTION_MIN							x
176	FRICTION_AVG							x
177	FRICTION_MAX							x
179	LATEST_STROKE							x

Table 18. Transducer Block, View 4.1 through View 4.10

INDEX NUMBER	PARAMETER	VIEW									
		4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	4.10
1	ST_REV	x	x	x	x	x	x	x	x	x	x
3	STRATEGY	x									
4	ALERT_KEY	x									
10	TRANSDUCER_TYPE	x									
11	TRANSDUCER_TYPE_VER	x									
16	FINAL_VALUE_CUTOFF_HI	x									
17	FINAL_VALUE_CUTOFF_LO	x									
21	DEVIATION_DEADBAND	x									
22	DEVIATION_TIME	x									
24	POS_ALERT_HI	x									
25	POS_ALERT_LO	x									
26	RATED_TRAVEL	x									
27	STOP_HI_POS	x									
28	STOP_LO_POS	x									
30	TRAVEL_UNITS	x									
40	SIGNAL_ACTION	x									
46	ACT_FAIL_ACTION		x								
47	ACT_MAN_ID		x								
48	ACT_MODEL_NUM		x								
49	ACT_SN		x								
50	ACT_TYPE		x								
51	VALVE_MAN_ID			x							
52	VALVE_MODEL_NUM			x							
53	VALVE_SN			x							
54	VALVE_TYPE			x							
55	XD_CAL_LOC				x						
56	XD_CAL_DATE				x						
57	XD_CAL_WHO				x						
58	PSNR_COMMAND_ERROR										
59	UI_SETPOINT					x					
60	UI_VALVE_TYPE					x					
66	DEV_FALLBK_CONFIG					x					
67	BASIC_SETUP					x					
68	VTUNING_SETS					x					
69	CUTOFF_CONFIG					x					
70	ENDPT_PRESS_CONFIG					x					

- continued -

Table 18. Transducer Block, View 4.1 through View 4.10 (continued)

INDEX NUMBER	PARAMETER	VIEW									
		4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	4.10
71	TRAVEL_CAL					x					
72	TRAVEL_TUNE						x				
74	PRESS_TUNE						x				
76	INPUT_CHAR						x				
82	INST_ALERTS_ENABLE						x				
83	INST_ALERTS_CONFIG							x			
84	INST_ALERTS_CONFIG2							x			
85	INST_ALERTS_CONFIG3							x			
86	FD_FAIL_MAP_2								x		
87	FD_OFFSPEC_MAP_2								x		
88	FD_MAINT_MAP_2								x		
89	FD_CHECK_MAP_2								x		
90	FD_FAIL_MASK_2								x		
91	FD_OFFSPEC_MASK_2								x		
92	FD_MAINT_MASK_2								x		
93	FD_CHECK_MASK_2								x		
95	FD_MODE_SHED								x		
96	FD_OPTIONS								x		
104	PROTECTION								x		
106	TEMPERATURE_UNITS								x		
107	TB_PRESSURE_UNITS								x		
108	LENGTH_UNITS								x		
109	AREA_UNITS								x		
110	SPRING_RATE_UNITS								x		
111	MAI_CHANNEL_MAP								x		
112	OUTBLOCK_SEL								x		
123	VST_SAMPLE_INT								x		
124	VST_ABORT_MODE								x		
128	VST_NORMAL								x		
129	VST_CRITERIA_CONFIG								x		
133	VST_OVERDUE_CONFIG								x		
136	PST_BREAKOUT_TIMEOUT									x	
137	PST_INITIAL_START_TIME									x	
138	PST_INTERVAL									x	
139	PST_OPTIONS									x	
140	PST_RAMP_RATE									x	

- continued -

Table 18. Transducer Block, View 4.1 through View 4.10 (continued)

INDEX NUMBER	PARAMETER	VIEW									
		4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	4.10
141	PST_STRK_TRAV									x	
142	PST_STRK_TRAV_TIMEOUT									x	
143	PST_COMPLETION_ TIMEOUT									x	
144	PST_OVERDRIVE_AMT									x	
145	PST_MAX_TRAV									x	
146	PST_STOP_ALERTS									x	
147	PST_RETURN_RAMP_RATE									x	
148	PST_RANDOM_MAX									x	
149	PST_RETURN_LEAD									x	
155	FST_BREAKOUT_TIMEOUT									x	
156	FST_RAMP_RATE									x	
157	FST_STRK_TRAV_TIMEOUT									x	
158	FST_COMPLETION_TIMEOUT									x	
160	FST_WAIT_TIME									x	
170	TRIG_CONFIG									x	
172	LCP_CONFIG									x	
178	FRICTION_CONFIG										x

Section 5: Calibration

5.1 Calibration Overview

When a DVC6200f digital valve controller is ordered as part of a control valve assembly, the factory mounts the digital valve controller on the actuator and connects the necessary tubing, then sets up and calibrates the controller.

For digital valve controllers that are ordered separately, recalibration of the pressure sensors generally is unnecessary. However, after mounting on an actuator, perform the initial setup then calibrate travel by selecting Configure / Setup > Calibration > Auto Calibration. For more detailed calibration information, refer to the following calibration procedures.

5.2 Calibration

Handheld Communicator	TB > Configure/Setup > Calibration

- Auto Calibration automatically calibrates the travel. The calibration procedure uses the valve and actuator stops as the 0% and 100% calibration points. See page 141.
- Manual Calibration permits manual calibration of the travel. This calibration procedure allows you to determine the 0% and 100% calibration points. See page 142.

- Relay Adjust permits adjustment of the pneumatic relay. See page 142.
- Supply Pressure permits calibrating the supply pressure sensor. Normally the sensor is calibrated at the factory and should not need calibration. See page 144.
- Pressure A permits calibrating the pressure A sensor. Normally the sensor is calibrated at the factory and should not need calibration. See page 144.
- Pressure B permits calibrating the pressure B sensor. Normally the sensor is calibrated at the factory and should not need calibration. See page 144.
- PST Calibration permits running a PST calibration. See page 145.

NOTE

The transducer block mode must be set to manual and the protection set to None before the instrument can be calibrated.

WARNING

During calibration the valve will move full stroke. To avoid personal injury and property damage caused by the release of pressure or process fluid, isolate the valve from the process and equalize pressure on both sides of the valve or bleed off the process fluid.

If a double-acting relay is used, you will be prompted to run the relay adjustment when auto or manual calibration is selected. Select Yes to adjust the relay, select No to proceed with calibration. For additional information, refer to Relay Adjustment in this section.

NOTE

Relay Adjustment is only available for the double-acting relay (Relay A).

Auto Calibration

Follow the prompts on the handheld communicator display to automatically calibrate travel.

1. The auto calibration procedure is automatic. It is completed when the Calibration menu appears.

   During calibration, the instrument seeks the high and low end points and the minor loop feedback (MLFB) and output bias. By searching for the end points, the instrument establishes the limits of physical travel, i.e. the actual travel 0 and 100% positions. This also determines how far the relay beam swings to calibrate the sensitivity of the MLFB sensor.
2. Enter the name of the person performing the calibration procedure.
3. Enter the location of the calibration procedure.
4. Enter the date of the calibration procedure.
5. Place the transducer block in Auto and verify that the travel properly tracks the setpoint.

Manual Calibration

NOTE

0% Travel = Valve Closed ; 100% Travel = Valve Open

1. From the adjustment menu, select the direction and size of change required to set the travel at 0% (move the valve to close). Selecting large, medium and small adjustments causes changes of approximately 10.0%, 1.0% and 0.1%, respectively, to the travel feedback movement. Selecting Next will implement the adjustment.

   If another adjustment is required, repeat step 1. Otherwise, select Done and go to step 2.
2. From the adjustment menu, select the direction and size of change required to set the travel to 100% (move the valve to open).

   If another adjustment is required, repeat step 2. Otherwise, select Done and go to step 3.
3. Enter the name of the person performing the calibration procedure.
4. Enter the location of the calibration procedure.
5. Enter the date of the calibration procedure.
6. Verify that the travel properly tracks the setpoint changes.

Relay

Follow the prompts on the handheld communicator display to check relay adjustment. Replace the digital valve controller cover when finished.

NOTE

Relay B and C are not user-adjustable.

Double-Acting Relay

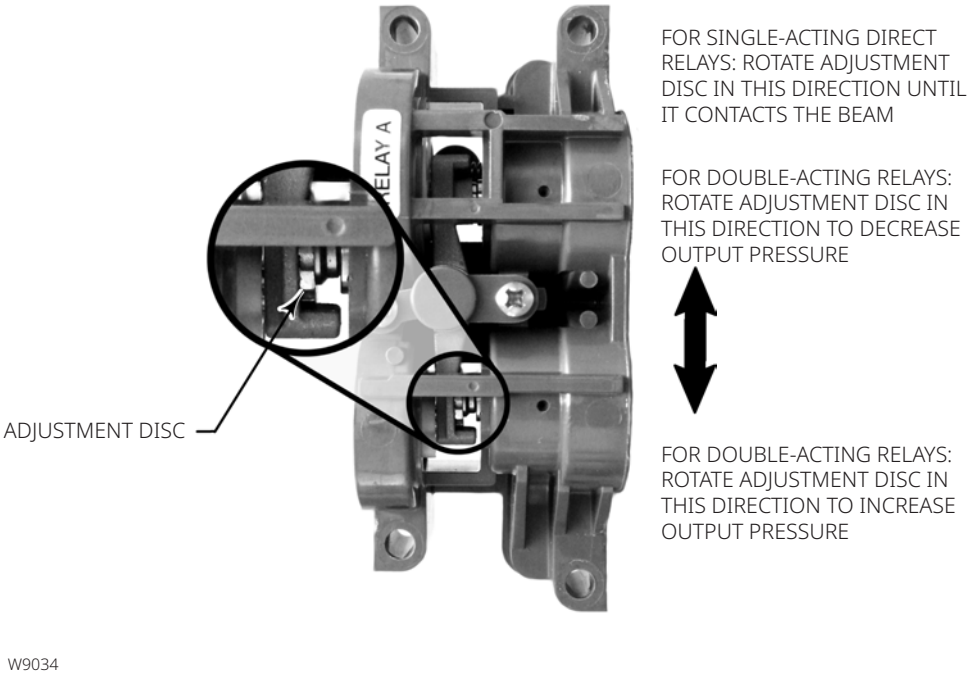
The double-acting relay is designated by “Relay A” on a label affixed to the relay itself. For double-acting actuators, the valve must be near mid-travel to properly adjust the relay. The handheld communicator will automatically position the valve when Relay is selected.

NOTE

Care should be taken during relay adjustment as the adjustment disc may disengage if rotated too far.

Rotate the adjustment disc, shown in Figure 13, until the output pressure displayed on the handheld communicator is between 50 and 70% of supply pressure. This adjustment is very sensitive. Be sure to allow the pressure reading to stabilize before making another adjustment (stabilization may take up to 30 seconds or more for large actuators).

Figure 13. Relay A Adjustment (Shroud Removed for Clarity)



If the low bleed relay option has been ordered stabilization may take approximately two minutes longer than the standard relay.

Relay A may also be adjusted for use in single-acting- direct applications. Rotate the adjustment disc as shown in Figure 13 for single-acting direct operation.

Single-Acting Relays

⚠ WARNING

For instrument level PD and PST only:

If the unused port is monitoring pressure, ensure that the pressure source conforms to ISA Standard 7.0.01 and does not exceed the pressure supplied to the instrument. Failure to do so could result in personal injury or property damage caused by loss of process control.

Single-Acting Direct Relay

The single-acting direct relay is designated by “Relay C” on a label affixed to the relay itself. Relay C requires no adjustment.

Single-Acting Reverse Relay

The single-acting reverse relay is designated by “Relay B” on a label affixed to the relay itself. Relay B is calibrated at the factory and requires no further adjustment.

Supply Pressure Sensor

NOTE

The pressure sensor is calibrated at the factory and should not require calibration.

To calibrate the supply pressure sensor, connect an external reference gauge to the output side of the supply regulator. The gauge should be capable of measuring maximum instrument supply pressure. Follow the prompts on the handheld communicator display to calibrate the instrument's supply pressure sensor.

1. Select a) Zero Only or b) Zero and Span (gauge required).
   a. If Zero Only calibration is selected, adjust the supply pressure regulator to remove supply pressure from the instrument. Press OK. Once calibration is complete, go to step 5.
   b. If Zero and Span calibration is selected, adjust the supply pressure regulator to remove supply pressure from the instrument. Press OK. Adjust the supply regulator to the maximum instrument supply pressure. Press OK. Proceed with step 2.
2. The following message appears:

   > Use the Increase and Decrease selections until the displayed pressure matches the instrument supply pressure.

   Press OK when you have read this message.
3. The value of the pressure appears on the display.
4. From the adjustment menu, select the direction and size of adjustment to the displayed value. Selecting large, medium and small adjustments causes changes of approximately 3.0 psi / 0.207 bar / 20.7 kPa, 0.30 psi / 0.0207 bar / 2.07 kPa and 0.03 psi / 0.00207 bar / 0.207 kPa, respectively. Adjust the displayed value until it matches the supply pressure, select Done and go to step 5.
5. Place the transducer block in Auto and verify that the displayed pressure matches the measured supply pressure.

Pressure A or B Sensor

Handheld Communicator	TB > Configure/Setup > Calibration > Pressure A TB > Configure/Setup > Calibration > Pressure B

To calibrate the output pressure sensor, connect an external reference gauge to the output being calibrated. The gauge should be capable of measuring maximum instrument supply pressure. Select . Follow the prompts on the handheld communicator display to calibrate the instrument's output pressure sensor.

1. Adjust the supply pressure regulator to the maximum instrument supply pressure. Press OK.

2. The instrument reduces the output pressure to 0. The following message appears.

   > Use the Increase and Decrease selections until the displayed pressure matches the output x pressure.

   Press OK when you have read this message.
3. The value of the output pressure appears on the display. Press OK to display the adjustment menu.
4. From the adjustment menu, select the direction and size of adjustment to the displayed value. Selecting large, medium and small adjustments causes changes of approximately 3.0 psi / 0.207 bar / 20.7 kPa, 0.30 psi / 0.0207 bar / 2.07 kPa and 0.03 psi / 0.00207 bar / 0.207 kPa, respectively. If the displayed value does not match the output pressure, press OK, then repeat this step (step 4) to further adjust the displayed value. When the displayed value matches the output pressure, select Done and go to step 5.
5. The instrument sets the output pressure to full supply. The following message appears.

   > Use the Increase and Decrease selections until the displayed pressure matches the output x pressure.

   Press OK when you have read this message.
6. The value of the output pressure appears on the display. Press OK to display the adjustment menu.
7. From the adjustment menu, select the direction and size of adjustment to the displayed value. If the displayed value does not match the output pressure, press OK, then repeat this step (step 7) to further adjust the displayed value. When the displayed value matches the output pressure, select Done and go to step 8.
8. Place the transducer block in Auto and verify that the displayed pressure matches the measured output pressure.

PST Calibration

To perform a PST Calibration, place the instrument transducer block in Manual. Follow the prompts on the handheld communicator display to select the desired Outgoing and Incoming ramp rates, and define the Minimum Travel Movement. The instrument then performs the PST calibration; when prompted, input the desired behavior on a failed PST. On completion of PST calibration the configured parameters are presented for verification.

Refer to DVC6200f PST Calibration and Testing using ValveLink Software (D104217X012) for additional PST configuration and calibration information.

Section 6: Viewing Device Variables and Diagnostics

6.1 View Lists

View Lists allow the values of a set of parameters to be accessed at the same time. View lists are available for the resource and transducer blocks and the function blocks.

Resource Block—Table 8

Transducer Block—Tables 17 and 18

AO Function Block—Table E-3

PID Function Block—Table E-7

CSEL Function Block—Table E-10

IS Function Block—Table E-14

OS Function Block—Table E-20

AI Function Block—Table E-26

MAI Function Block—Table E-30

DO Function Block—Table E-35

DI Function Block—Table E-41

NOTE

Views Lists are used by hosts for efficient monitoring of multiple parameters. Normally you will not be aware of view list usage, as they are hidden by the host software.

6.2 Resource Block

This section contains information on the DVC6200f digital valve controller resource block. The resource block defines the physical resources of the device. The resource block also handles functionality that is common across multiple blocks. The block has no linkable inputs or outputs.

Device Diagnostics

Handheld Communicator	RB > Device Diagnostics

Active FD Alerts indicate the field diagnostic alerts that are active in the device.

- Fail Active (FD_FAIL_ACTIVE [53])
- Check Active (FD_CHECK_ACTIVE [56])
- Offspec Active (FD_OFFSPEC_ACTIVE [54])
- Maintenance Active (FD_MAINT_ACTIVE [55])

Field Diagnostic (FD) Alert Configuration

Enable/Suppress the following Field Diagnostic alerts per plant requirements. Refer to Alerts on page 62 for alert specific information.

- Electronics
  - Drive Current
  - Drive Signal
  - Processesor Impaired
- Configuration
  - Check Alert
- Sensor
  - Travel Sensor
  - Pressure Fallback
  - Supply Pressure Sensor
  - Output Pressure Sensor
  - Temperature Sensor
- Environment
  - Supply Pressure
  - Temperature Limit
- Travel
  - Travel Deviation
  - Latch Active
  - Travel Limit
- Travel History
  - Movement History
  - Diagnostic in Progress
  - Stroke History FD-PD
  - Stroke History PST
- Performance
  - Performance Critical
  - Performance Reduced
  - Performance Info
- FST/PST
  - PST Abnormal
  - PST Pass
  - FST Abnormal
  - FST Pass
  - PST Pending
  - Stroke Test Overdue
  - LCP Communication
  - LCP Button Pressed

Health Index (HEALTH_INDEX [85]) — The device assigns a number to the health of the device with 100 indicating that everything is normal and 10 indicating that immediate attention is required.

Recommended Action (RECOMMENDED_ACTION [87]) lays out a suggested action to be taken to address the condition.

Resource Block Error (BLOCK_ERR [6]) indicates an error status associated with hardware or software for the resource block.

Table 19 lists conditions reported in the BLOCK_ERR [6] parameter.

Table 19. Resource Block BLOCK_ERR Conditions

Condition Number	Condition Name and Description
0	Other - Set if a device initialization error occurred.
1	Block Configuration Error - Set if FEATURE_SEL, CYCLE_SEL or CYCLE_TYPE is set incorrectly.
3	Simulate Active - Indicates that the simulation jumper is in place on the aux terminals. This is not an indication that the I/O blocks are using simulation data. See AO block parameter SIMULATE [10] and DO block parameter SIMULATE_D [10].
6	Device Needs Maintenance Soon - Indicates a Maintenance Field Diagnostic Alert condition is active.
9	Memory failure - Indicates a pending Flash or NVM failure.
10	Lost Static Data - Indicates failure of the memory containing static parameters
11	Lost NV Data - Indicates failure of the memory containing non-volatile parameters.
13	Device Needs Maintenance Now - Indicates a Failed Field Diagnostic Alert condition is active.
14	Power Up - Indicates the device has been powered up and the Resource Block is not running normally.
15	Out of Service (MSB) - The resource block actual mode is Out of Service.

Device State (RS_STATE [7]) indicates the state of the function blocks. Four states are possible:

- Initialization — The instrument enters this state upon restart or failure. The function blocks are in the IMan mode. During the initialization state, all unreported function block alarms are automatically confirmed and acknowledged. Once the instrument is considered operational, block execution is scheduled and the instrument state moves to Online.
- Online — The instrument will be in this state if it is operational. The function blocks are initially in the Auto mode, but can be changed to a higher level mode.
- Standby — The instrument enters this state if the resource block mode is Out of Service (OOS). In this state all function block modes are forced to Out of Service. The transducer block mode is not affected. When the resource block mode is changed to Auto, the instrument state moves to Online.
- Failure — The instrument moves to this state whenever a hardware or memory failure is detected which would prevent reliable operation. All function blocks and the transducer block modes are Out of Service.

Write Lock

- Write Alarm: Alarm State
- Write Lock (WRITE_LOCK [34]) determines if writes are permissible to other device parameters. The Soft Write Lock feature must be selected to be able to use Write Lock (see Selecting Features). When Write Lock is set to Locked, no writes are permitted to any parameters within the device except to set Write Lock to Not Locked. When locked, the block functions normally, updating inputs and outputs and executing algorithms. When Write Lock is set to Not Locked, the Write Alarm alert is active.

Block Alarm (BLOCK_ALM [36]) is used for all configuration, hardware, connection failure or system problems in the block.

- Block Alarm: Alarm State (BLOCK_ALM. ALARM_STATE [36.2]) indicates the state of the Block Alarm. Five states are possible:
  - Uninitialized
  - Clear reported
  - Clear not reported
  - Active reported
  - Active not reported
- Block Alarm: Unacknowledged (BLOCK_ALARM. UNACKNOWLEDGED [36.1])

  1 = Uninitialized

  2 = Acknowledged

  3 = Unacknowledged

Maintenance

- Restart Actions (RESTART [16])

⚠ WARNING

Restarting the instrument may cause loss of process control. To avoid personal injury and property damage caused by the release of pressure of process fluid, isolate the valve from the process and equalize pressure on both sides of the valve or bleed off the process fluid.

You can restart the instrument to reset parameters, links, etc. within the instrument. However, due to the effect that a restart can have on the instrument, and therefore the control loop, restarting the instrument should be used cautiously and only as a last measure. The following procedure describes how to use Restart Options to restart the instrument with a handheld communicator. You can also restart the instrument using ValveLink software or from a host system using the Restart method included with the device description (DD) software.

You can restart the instrument any time it is connected to an active segment.

1. Restart informs you about what can happen when an instrument restart is performed. Select Yes to continue or No to abort without restarting.
2. Select the desired restart action or select EXIT to exit Restart. Select Help (not the Help button) to get information on restart actions.

There are two different restarts: Restart Processor and Restart with Defaults:

When selecting either of these options, Restart informs you of the consequences of this action and asks if you want to continue. Select Yes to perform the restart action, select No to select another action or exit. Restart informs you when the restart is completed. You must acknowledge the message to continue.

Restart Processor—Performing a Restart Processor has the same effect as removing power from the instrument and re-applying power. Configuration and calibration do not change.

Restart with Defaults—Performing a Restart with Defaults should be done with care. This restart resets most of the static and non-volatile parameters for all of the blocks in the instrument to their initial value, as listed in Table 6. After a Restart with Defaults, you should place the instrument in service (the transducer block mode to auto) and run Device Setup and download the instrument configuration from the control system to properly setup the instrument. You also may need to re-establish communication links and trends.

- Fault State (FAULT_STATE [28]), when active, indicates that the resource block is currently forcing the output block to perform its FSTATE action. Selecting Fault State enables the ability to manually set and clear the fault state.
- Set Fault State (SET_FSTATE [29]), when selected, changes the Fault State (FAULT_STATE [28]) to Active. Setting Set FState (SET_FSTATE [29]) to SET manually places the instrument in the fault state.
- Clear Fault State (CLR_FSTATE [30]), when set to CLEAR clears the device fault state, if no faults are currently active.

6.3 Device Variables

Handheld Communicator	RB > Device Variables

Instrument

The following parameters are contained in the the Instrument menu of the resource block.

Identification

- Device ID (DEVICE_ID [110]) is the unique 32 character ID used to identify the device.
- Electronics Serial Number (ELECTRONICS_SN [106]) is set at the factory.
- Factory Serial Number (FACTORY_SN [107]) is the instrument serial number set at the factory.
- Field Serial Number (FIELD_SN [108]) is the serial number of the valve and actuator on which the instrument is mounted.
- Tag Description (TAG_DESC [2]) is unique description of each block within the digital valve controller, used to describe the intended application for the block. Enter an up to 32 character description for the block in the Tag Description field. (This parameter is read/write.)
- Strategy (STRATEGY [3]) permits strategic grouping of blocks so the operator can identify where the block is located. The blocks may be grouped by plant area, plant equipment, etc. Enter a value between 0 and 65535 in the Strategy field.
- Manufacturer (MANUFAC_ID [10]) identifies the manufacturer of the instrument. It is used by the host system to locate the DD file for the device. For Fisher the Manufacturer ID is 0x5100.
- Device Type (DEV_TYPE [11]) identifies the type of device. It is used by the host system to locate the DD file for the device. For a DVC6200f digital valve controller with Standard Control the device type is 0x4602.

Version

- Device Revision (DEV_REV [12]) identifies the device revision number. It is used by the host system to locate the DD file for the device.
- Firmware Revision (FIRMWARE_REV_ALL [105.7]) shows all device firmware revisions currently in operation.
- Standby Firmware Revision (STBY_FIRMWARE_REV_ALL [111.7]) shows all device firmware revisions currently in standby.
- Hardware Revision (HARDWARE_REV [83]) identifies the electronic hardware revision.
- ITK Version (ITK_VER [41]) identifies the major version of the Interoperability Tester used by the Fieldbus Foundation in certifying the device as interoperable. This device revision meets the requirements of version 5.

Options

The following parameters are contained in the the Options menu of the resource block.

Diagnostic Options (DIAG_OPTIONS [103]) show the diagnostic options available in the instrument.

Function Block Options (FB_OPTIONS [102]) show which function blocks are licenced and enabled in the instrument.

Miscellaneous Options (MISC_OPTIONS [104]) indicate which miscellaneous licensing options are enabled.

Features Available (FEATURES [17]) shows the supported resource block options.

DD Information

DD Information contains information about the Device Description (DD).

6.4 Transducer Block

This section contains information on the DVC6200f digital valve controller transducer block. Descriptions of all transducer block parameters are included. The transducer block decouples function blocks from the local output functions required to command output hardware. The transducer block typically contains setup and calibration information.

Device Diagnostics

Handheld Communicator	RB > Device Variables

Alert Conditions

Instrument Alert Conditions, when enabled, detect many operational and performance issues that may be of interest. If there are no alerts active for a particular group the group will not be displayed on the handheld communicator.

Refer to Alerts on page 62 in Detailed Setup for alerts and alert conditions.

NOTE

Additional details on setting up and using Field Diagnostic Alerts can be found in Appendix C of this manual.

Status

Self Test Status (SELFTEST_STATUS [97])

- Integrator Limited Lo indicates the integrator reached its limit and cannot move the valve any further. High valve friction may cause this situation.
- Integrator Limited Hi indicates the integrator reached its limit and cannot move the valve any further. High valve friction may cause this situation.
- Travel Sensor Span Error indicates that span between the endpoints of travel are not far enough apart. This error is reported during automatic calibration.
- MLFB Error indicates that the Minor Loop Feedback sensor gave a non-valid value during automatic calibration.
- Travel Sensor Hi Error indicates the travel sensor has reported a travel position that is significantly above the normal operating range and has failed.
- Travel Sensor Lo Error indicates the travel sensor has reported a travel position that is significantly below the normal operating range and has failed.
- Pressure B Sensor Failure indicates the pressure sensor is reporting a pressure that is significantly outside of the normal operating pressure and has failed.
- Pressure A Sensor Failure indicates the pressure sensor is reporting a pressure that is significantly outside of the normal operating pressure and has failed.
- Supply Sensor Failure indicates the pressure sensor is reporting a pressure that is significantly outside of the normal operating pressure and has failed.
- IOP Failure indicates the I/O processor has failed.
- Drive Current Alert indicates that the Drive Current has exceeded the Drive Current Alert Point for more than the Drive Current Alert Time.
- Simulate Jumper ON indicates the simulate jumper is connected to the DVC6200f between the two AUX terminals.

Block Error

Table 20 lists conditions reported in the BLOCK_ERR [6] and XD_ERROR [11] parameters.

Table 20. Transducer Block BLOCK_ERR and XD_ERROR Conditions

Condition Number	Condition Name and Description
1	Block Configuration Error - Indicates that one of the following parameters have been configured out of the proper range: 15, 16, 47.1, 47.2, 46.3, 46.5, 42.7, 42.8.
15	Out of Service - Indicates Out of Service Mode.

Device Record

The following parameters are contained in the Device Record menu of the transducer block.

Maximum Temperature (TEMP_MAX [103.1]) shows the maximum temperature the instrument has experienced since installation.

Maximum Temperature Time (TEMP_MAX_TIME [103.2]) shows the date and time when the Temperature Maximum occurred.

Minimum Temperature (TEMP_MIN [103.3]) shows the minimum temperature the instrument has experienced since installation.

Minimum Temperature Time (TEMP_MIN_TIME [103.4]) shows the date and time when the Temperature Minimum occurred.

Maximum Supply Pressure (SUPPLY_PRESS_MAX [103.5]) shows the maximum supply pressure the instrument has experienced since installation.

Maximum Supply Pressure Time (SUPP_PRESS_MAX_TIME [103.6]) shows the date and time when the Supply Pressure Maximum occurred.

Minimum Supply Pressure (SUPP_PRESS_MIN [103.7]) shows the minimum supply pressure the instrument has experienced since installation.

Minimum Supply Pressure Time (SUPP_PRESS_MIN_TIME [103.8]) shows the date and time when the Supply Pressure Minimum occurred.

Stroking the Digital Valve Controller Output

Stroke Valve is used to confirm proper valve operation. Follow the prompts on the handheld communicator display to select from the following: Done, Ramp Open, Ramp Closed, Ramp to Target, Step to Target and Stop.

- Done—Select this if you are done. All ramping is stopped when DONE is selected.
- Ramp Open—ramps the travel toward open at the rate of 1.0% per second of the ranged travel.
- Ramp Closed—ramps the travel toward closed at the rate of 1.0% per second of the ranged travel.
- Ramp to Target—ramps the travel to the specified target at the rate of 1.0% per second of the ranged travel.
- Step to Target—steps the travel to the specified target.
- Stop—stops the command.

Trend

Trend chart of Setpoint (WORKING_SP.VALUE [20.2]), Travel (WORKING_POS.VALUE [19.2]) and Supply Pressure (SUPPLY_PRESSURE.VALUE [61.2]).

PST/FST

Partial Stroke Test

Travel (WORKING_POS.VALUE [19.2])

Travel Status (WORKING_POS.STATUS[19.1])

Last Successful PST

- Time Since Last PST Successful (PST_TIME_OF_LAST_SUCCESS [130.1])
- Last Successful PST (SST_SUCCESS [131.1])
- Time Since Last FST Successful (FST_TIME_OF_LAST_SUCCESS [130.2])
- Last Successful FST (FST_SUCCESS [131.2])

PST/FST Info

- PST Calibrated Travel (PST_CAL_TRAVEL [153])
- PST Min Travel (PST_STRK_TRAV [141])
- PST Max Travel (PST_MAX_TRAVEL [145])
- Set Point Overdrive (PST_OVERDRIVE_AMT[144])
- Test Pause Time (VST_PAUSE [120])
- VST State (VST_STATE [125.1])
- VST Result (VST_RESULT [121])
- Test Abnormal Cause (VST_DETAILED_CODE[126])

Device Variables

Handheld Communicator	TB > Device Variables

TB Block Modes

Block Mode: Target (TARGET [5.1]) is the mode requested by the user or host system. Generally, only one mode is allowed to be set, and it must be a permitted mode as defined by the permitted attribute of the mode parameter. Additionally, all cascade targets (Cas, Rcas) must have AUTO set.

Block Mode: Actual (ACTUAL [5.2]) is the current mode of the block. The actual mode may differ from the target mode due to operating conditions of the block.

NOTE

Block Mode:Actual drops the AUTO bit for the cascade targets. For example, target mode might have Cas and Auto set, but actual mode will only have Cas set.

Block Mode: Permitted (PERMITTED [5.3]) defines the modes allowed for the block. This is set by the user or host system but is restricted by the instrument to modes supported by the instrument for the particular block. Any change request to the Target or Normal attribute is checked against the permitted attribute to ensure the requested mode is permitted. When setting the Permitted mode, there is no check against any of the other attributes (Normal or Target modes). Therefore, the normal or target mode attributes may have a value that is not permitted because the permitted attribute was modified after the Normal or Target mode was set. This will have no effect on the instrument until the user attempts to modify the Target or Normal mode. At this time these attributes are tested against the Permitted modes, thus the user cannot change the Normal or Target modes to what was formerly permitted.

Block Mode: Normal (NORMAL [5.4]) is the mode the block should be in during normal operating conditions. The normal mode is set by the user or host system and can only be set to a permitted mode (see permitted mode). The user or host system can compare the actual mode to the normal mode and, based on the results, determine if the block is operating normally.

AO Control - Pre-Characterization

Final Value Setpoint (FINAL_VALUE.VALUE [14.2]) shows the value of the setpoint in % (percent) of ranged travel or pressure. Setpoint is used for both travel and pressure control. This parameter will be written directly if the transducer block is in MAN mode or will be written automatically by the AO block if the transducer block is in AUTO mode.

Final Value Status (FINAL_VALUE.STATUS [14.1]) shows the Foundation Fieldbus status of Setpoint Value; Good, Uncertain or Bad.

Travel (DeChar) (FINAL_POSITION_VALUE.VALUE [18.2]) shows the value of the travel in % (percent) of ranged travel. Travel always represents how far the valve is open.

AO Control-Post Characterization

Working Setpoint is the output from the characterization function.

Working Setpoint Value (WORKING_SP.VALUE [20.2]) displays the actual position of the valve in percent (%) of calibrated travel.

Working Setpoint Status (WORKING_SP.STATUS [20.1]) shows the Foundation Fieldbus status of Travel Value; Good, Uncertain or Bad.

DO Control

Working Setpoint(D) (WORKING_SP_D.VALUE [35.2]) shows the value of the setpoint in discrete values. 0 = closed, 1 = open, 5, 10, 15... = setpoint in 5% units. This parameter will be written directly if the transducer block is in MAN mode or will be written automatically by the DO block if the transducer block is in AUTO mode.

Discrete Working Position(D) shows the value of the setpoint in discrete values. 0 = closed, 1 = open, 5, 10, 15... = travel in 5% units.

Instrument Info

Temperature (TEMPERATURE [75]) displays the internal temperature of the instrument in either degrees Fahrenheit or Celsius.

Protection (PROTECTION [104]) Indicates the status of Protection.

Travel/Pressure State (TVL_PRESS.STATE [65.2]) indicates if the instrument is being used for travel control (position control) or as an I/P (pressure control).

Characterization (INPUT_CHAR [76]) defines the relationship between the setpoint specified by the output function block and the desired valve position.

PD Inside Status (PD_STATUS [105.2]) shows the status of Performance Diagnostics.

Travel Diagnostic Info

Drive Signal (DRIVE_SIGNAL [78]) indicates the drive signal, as a percentage of the maximum drive available, going to the I/P converter from the printed wiring board. In most applications, the drive signal ranges between 50% and 75% of the maximum drive signal.

Cycle Counter (CYCLE_CNTR [39]) records the number of times the travel changes direction. The change in direction must occur after the deadband has been exceeded before it can be counted as a cycle.

Travel Accumulator (TRAVEL_ACCUM [29]) indicates the total change in travel, in percent of ranged travel. The accumulator only increments when travel exceeds the deadband. Then the greatest amount of change in one direction from the original reference point (after the deadband has been exceeded) will be added to the Travel Accumulator.

Travel Count (TVL_COUNT [71.1]) is the Travel Sensor readback displayed in A/D counts.

Reset Travel History

Pressures

Supply (SUPPLY_PRESSURE.VALUE [61.2]) shows the value of the supply pressure.

Pressure A (PRESSURE_A.VALUE [62.2]) shows the value of Output Pressure A.

Pressure B (PRESSURE_B.VALUE [63.2]) shows the value of Output Pressure B.

A Minus B (PRESSURE_DIFF.VALUE [64.2]) shows the value of the output pressure differential.

Section 7: Maintenance and Troubleshooting

The DVC6200f digital valve controller enclosure is rated Types 4X and IP66, therefore periodic cleaning of internal components is not required. If the DVC6200f is installed in an area where the exterior surfaces tend to get heavily coated or layered with industrial or atmospheric contaminants, it is recommended that the vent (key 52) be periodically removed and inspected to ensure there is no partial or full obstruction. If the vent appears to be partially or fully obstructed, it must be cleaned or replaced. Lightly brush the exterior of the vent to remove contaminants and run a mild water/detergent solution through the vent to ensure it is free of any obstruction. Allow the vent to dry before reinstalling.

⚠ WARNING

Personal injury or property damage can occur from cover failure due to overpressure. Ensure that the housing vent opening is open and free of debris to prevent pressure buildup under the cover.

⚠ WARNING

To avoid static discharge from the plastic cover when flammable gases or dust are present, do not rub or clean the cover with solvents. To do so could result in a spark that may cause the flammable gases or dust to explode, resulting in personal injury or property damage. Clean with a mild detergent and water only.

⚠ WARNING

Avoid personal injury or property damage from sudden release of process pressure or bursting of parts. Before performing any maintenance procedures on the DVC6200f digital valve controller:

- **Always wear protective clothing, gloves and eyewear.**
- **Do not remove the actuator from the valve while the valve is still pressurized.**
- **Disconnect any operating lines providing air pressure, electric power or a control signal to the actuator. Be sure the actuator cannot suddenly open or close the valve.**
- **Use bypass valves or completely shut off the process to isolate the valve from process pressure. Relieve process pressure from both sides of the valve.**
- **Vent the pneumatic actuator loading pressure and relieve any actuator spring precompression.**
- **Use lock-out procedures to be sure that the above measures stay in effect while you work on the equipment.**
- **Check with your process or safety engineer for any additional measures that must be taken to protect against process media.**

⚠ WARNING

When using natural gas as the supply medium or for explosion proof applications, the following warnings also apply:

- **Remove electrical power before removing the housing cap. Personal injury or property damage from fire or explosion may result if power is not disconnected before removing the cap.**
- **Remove electrical power before disconnecting any of the pneumatic connections.**
- **When disconnecting any of the pneumatic connections or any pressure retaining part, natural gas will seep from the unit and any connected equipment into the surrounding atmosphere. Personal injury or property damage may result from fire or explosion if natural gas is used as the supply medium and appropriate preventive measures are not taken. Preventive measures may include, but are not limited to, one or more of the following: ensuring adequate ventilation and the removal of any ignition sources.**
- **Ensure that the cover is correctly installed before putting this unit back into service. Failure to do so could result in personal injury or property damage from fire or explosion.**

⚠ WARNING

When replacing components, use only components specified by the factory. Always use proper component replacement techniques, as presented in this manual. Improper techniques or component selection may invalidate the approvals and the product specifications, as indicated in Table 1, may impair operations and the intended function of the device and could cause personal injury and property damage.

Because of the diagnostic capability of the DVC6200f, predictive maintenance is available through the use of ValveLink software. Using the digital valve controller, valve and instrument maintenance can be enhanced, thus avoiding unnecessary maintenance. For information on using ValveLink software, refer to the ValveLink software online help.

7.1 Removing the Magnetic Feedback Assembly

To remove the magnet assembly from the actuator stem, perform the following basic steps.

1. Make sure that the valve is isolated from the process.
2. Remove the instrument terminal box cover.
3. Disconnect the field wiring from the terminal board.
4. Shut off the instrument air supply.
5. Disconnect the pneumatic tubing and remove the DVC6200f or the DVC6215 from the actuator.
6. Remove the screws holding the magnet assembly to the connector arm.

When replacing the instrument, be sure to follow the mounting guidelines in the Installation section. Setup and calibrate the instrument prior to returning to service.

7.2 Module Base Maintenance

The digital valve controller contains a module base consisting of the I/P converter, printed wiring board assembly and pneumatic relay. The module base may be easily replaced in the field without disconnecting field wiring or tubing.

Tools Required

Table 21 lists the tools required for maintaining the DVC6200f digital valve controller.

Table 21. Tools Required

Tool	Size	Component
Phillips Screwdriver	- - -	Relay, printed wiring board assembly and cover screws
Hex key	5 mm	Terminal box screw
Hex key	1.5 mm	Terminal box cover screw
Hex key	2.5 mm	I/P converter screws
Hex key	6 mm	Module base screws

Component Replacement

When replacing any of the components of the DVC6200f, the maintenance should be performed in an instrument shop whenever possible. Make sure that the electrical wiring and pneumatic tubing is disconnected prior to disassembling the instrument.

Removing the Module Base

Refer to Figure 20 or 22 for key number locations.

⚠ WARNING

To avoid personal injury or equipment damage from bursting of parts, turn off the supply pressure to the digital valve controller and bleed off any excess supply pressure before attempting to remove the module base assembly from the housing.

1. Unscrew the four captive screws in the cover (key 43) and remove the cover from the module base (key 2).
2. Using a 6 mm hex socket wrench, loosen the three-socket head screws (key 38). These screws are captive in the module base by retaining rings (key 154).

NOTE

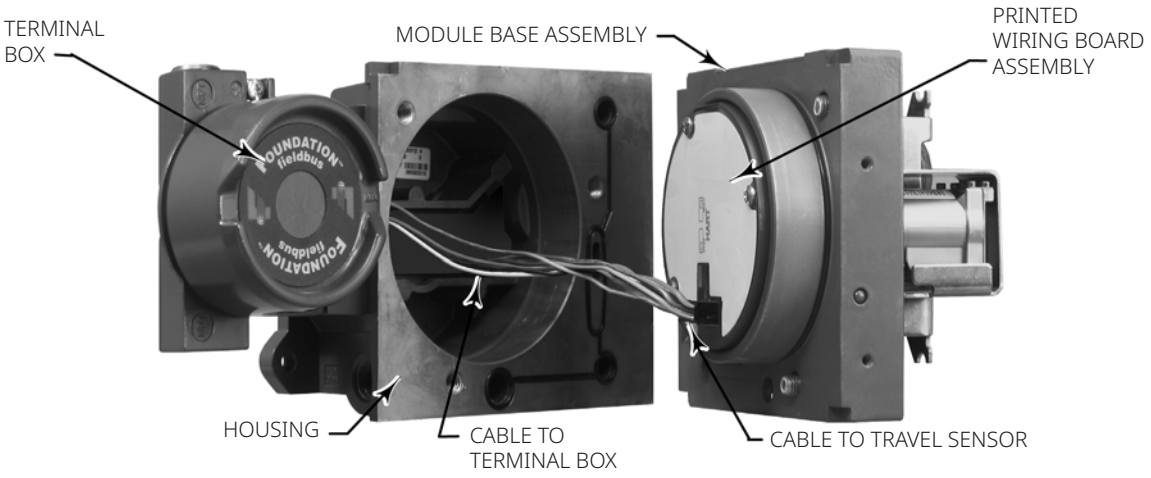
The module base is linked to the housing by two cable assemblies. Disconnect these cable assemblies after you pull the module base out of the housing.

NOTICE

To avoid affecting performance of the instrument, take care not to damage the module base seal or guide surface. Do not bump or damage the bare connector pins on the PWB assembly. Damaging either the module base or guide surface may result in material damage, which could compromise the instruments ability to maintain a pressure seal.

3. Pull the module base straight out of the housing (key 1). Once clear of the housing, swing the module base to the side of the housing to gain access to the cable assemblies.
4. The digital valve controller has two cable assemblies, shown in Figure 14, which connect the module base, via the printed wiring board assembly, to the travel sensor and the terminal box. Disconnect these cable assemblies from the printed wiring board assembly on the back of the module base.

Figure 14. Printed Wiring Board Cable Connections



W9924-1

7.3 Replacing the Module Base

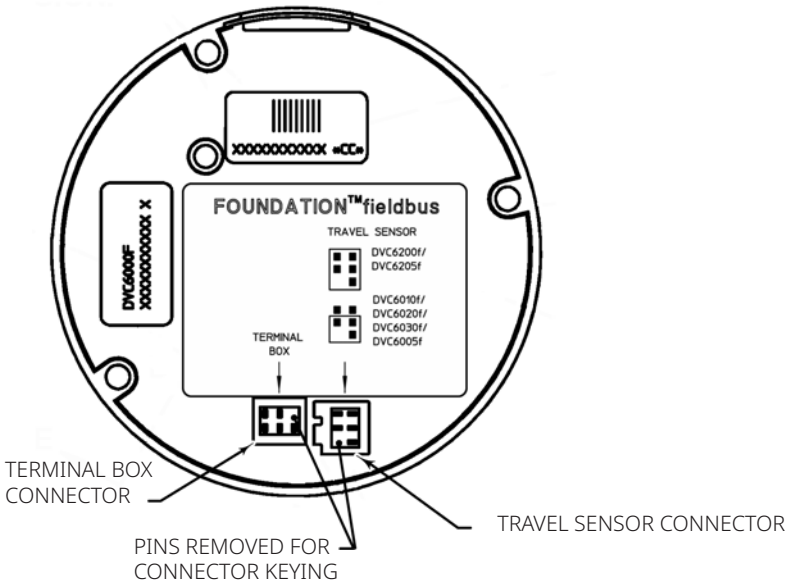
Refer to Figure 20 or 22 for key number locations. Refer to Figure 15 for a view of the back of the PWB assembly sub-module.

NOTE

To avoid affecting performance of the instrument, inspect the guide surface on the module and the corresponding seating area in the housing before installing the module base assembly. These surfaces must be free of dust, dirt, scratches and contamination.

Ensure the module base seal is in good condition. Do not reuse a damaged or worn seal.

Figure 15. Back View of PWB Assembly Sub-Module



GE39341

1. Ensure the module base seal (key 237) is properly installed in the housing (key 1). Ensure the O-ring (key 12) is in place on the module base assembly.
2. Connect the terminal box connector to the PWB assembly (key 50). Orientation of the connector is required.
3. Connect the travel sensor connector to the PWB assembly (key 50). Orientation of the connector is required.
4. Insert the module base (key 2) into the housing (key 1).

NOTE

For stainless steel digital valve controllers pipe thread sealant (key 46) is recommended under the head of the three socket head screws (key 38) prior to attaching the module base to the housing in the next step.

5. Install three socket head screws (key 38) in the module base into the housing. If not already installed, press three retaining rings (key 154) into the module base. Evenly tighten the screws in a crisscross pattern to a final torque of 16 N•m / 138 lbf•in.

NOTICE

Disruption of process control can result if the cable assemblies/wiring are damaged when attaching the cover to the module base assembly.

Ensure that the cable assemblies/wiring are positioned in the cavity of the module base so they do not get compressed or damaged when attaching the cover to the module base assembly in step 6.

6. Attach the cover (key 43) to the module base assembly.

7.4 Submodule Maintenance

The digital valve controller's module base contains the following submodules: I/P converter, PWB assembly and pneumatic relay. If problems occur, these submodules may be removed from the module base and replaced with new submodules. After replacing a submodule, the module base may be put back into service.

NOTICE

Exercise care when performing maintenance on the module base. Reinstall the cover to protect the I/P converter and gauges when servicing other submodules.

In order to maintain accuracy specifications, do not strike or drop the I/P converter during submodule maintenance.

I/P Converter

Refer to Figure 20 or 22 for key number locations. The I/P converter (key 41) is located on the front of the module base.

NOTE

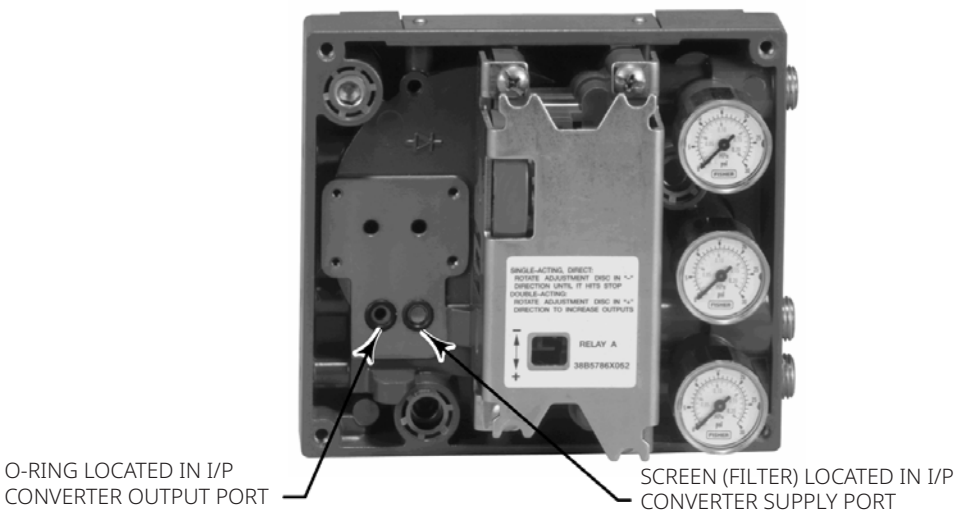
After I/P converter submodule replacement, calibrate the digital valve controller to maintain accuracy specifications.

Replacing the I/P Filter

A screen in the supply port beneath the I/P converter serves as a secondary filter for the supply medium. To replace this filter, perform the following procedure:

1. Remove the I/P converter (key 41) and shroud (key 169) as described in the Removing the I/P Converter procedure.
2. Remove the screen (key 231) from the supply port.
3. Install a new screen in the supply port as shown in Figure 16.
4. Inspect the O-ring (key 39) in the I/P output port. if necessary, replace it.
5. Reinstall the I/P converter (key 41) and shroud (key 169) as described in the Replacing the I/P Converter procedure.

Figure 16. I/P Filter Location



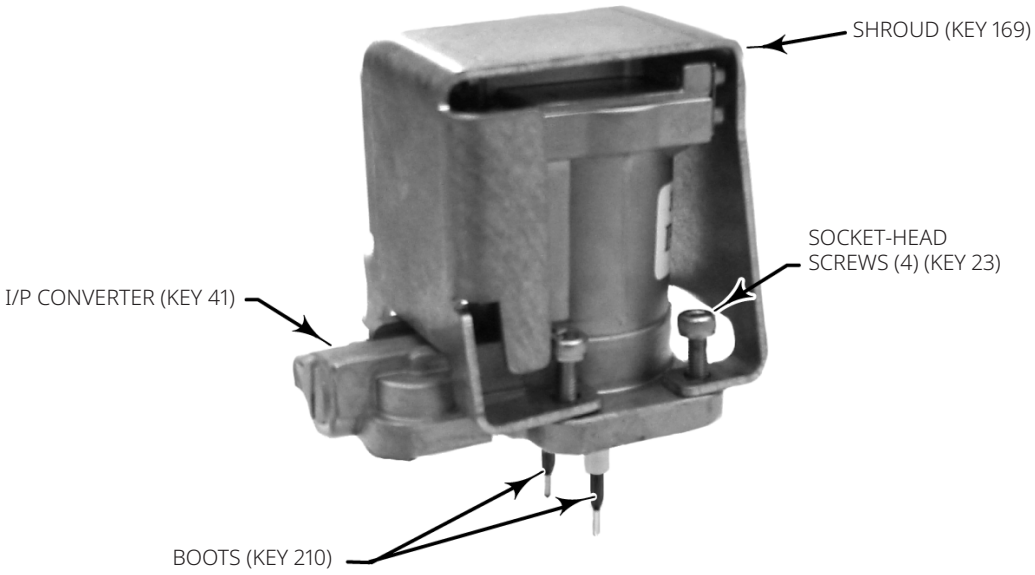
Removing the I/P Converter

1. Remove the front cover (key 43), if not already removed.
2. Refer to Figure 17. Using a 2.5 mm hex socket wrench, remove the four socket-head screws (key 23) that attach the shroud (key 169) and I/P converter (key 41) to the module base (key 2).
3. Remove the shroud (key 169); then pull the I/P converter (key 41) straight out of the module base (key 2). Be careful not to damage the two electrical leads that come out of the base of the I/P converter.
4. Ensure that the O-ring (key 39) and screen (key 231) stay in the module base and do not come out with the I/P converter (key 41).

Replacing the I/P Converter

1. Refer to Figure 16. Inspect the condition of the O-ring (key 39) and screen (key 231) in the module base (key 2). Replace them, if necessary. Apply silicone lubricant to the O-rings.
2. Ensure the two boots (key 210) shown in Figure 17 are properly installed on the electrical leads.
3. Install the I/P converter (key 41) straight into the module base (key 2), taking care that the two electrical leads feed into the guides in the module base. These guides route the leads to the printed wiring board assembly submodule.
4. Install the shroud (key 169) over the I/P converter (key 41).
5. Install the four socket-head screws (key 23) and evenly tighten them in a crisscross pattern to a final torque of 1.6 N•m / 14 lbf•in.
6. After replacing the I/P converter, calibrate travel or perform touch-up calibration to maintain accuracy specifications.

Figure 17. I/P Converter



Printed Wiring Board (PWB) Assembly

Refer to Figure 20 or 22 for key number locations. The PWB assembly (key 50) is located on the back of the module base assembly (key 2).

NOTE

The DVC6200f PWB assembly must be firmware revision 2.0 or later.

NOTE

If the PWB assembly submodule is replaced, calibrate and configure the digital valve controller to maintain accuracy specifications.

Removing the Printed Wiring Board Assembly

1. Separate the module base from the housing by performing the Removing the Module Base procedure.
2. Remove three screws (key 33).
3. Lift the PWB assembly (key 50) straight out of the module base (key 2).
4. Ensure that the O-rings (key 40) remain in the pressure sensor bosses on the module base assembly (key 2) after the PWB assembly (key 50) has been removed.

Replacing the Printed Wiring Board Assembly

1. Apply silicone lubricant to the pressure sensor O-rings (key 40) and install them on the pressure sensor bosses in the module base assembly.
2. Properly orient the PWB assembly (key 50) as you install it into the module base. The two electrical leads from the I/P converter (key 41) must guide into their receptacles in the PWB assembly and the pressure sensor bosses on the module base must fit into their receptacles in the PWB assembly.

3. Push the PWB assembly (key 50) into its cavity in the module base.
4. Install and tighten three screws (key 33) to a torque of 1 N•m / 10.1 lbf•in.
5. Reassemble the module base to the housing by performing the Replacing the Module Base procedure.
6. Setup and calibrate the digital valve controller.

NOTE

Calibration is required for either Travel or Pressure Control after PWB Assembly replacement. Note that only one calibration is needed, depending on control selection.

Pneumatic Relay

Refer to Figure 20 or 22 for key number locations. The pneumatic relay (key 24) is located on the front of the module base.

NOTE

After relay submodule replacement, calibrate the digital valve controller to maintain accuracy specifications.

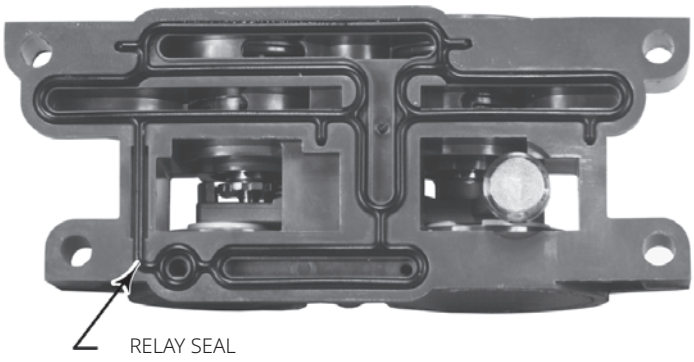
Removing the Pneumatic Relay

1. Loosen the four screws that attach the relay (key 24) to the module base. These screws are captive in the relay.
2. Remove the relay.

Replacing the Pneumatic Relay

1. Visually inspect the holes in the module base to ensure they are clean and free of obstructions. If cleaning is necessary, do not enlarge the holes.
2. Apply silicone lubricant to the relay seal and position it in the grooves on the bottom of the relay as shown in Figure 18. Press small seal retaining tabs into retaining slots to hold relay seal in place.

Figure 18. Pneumatic Relay Assembly



W8074

3. Position the relay (with shroud) on the module base.
4. Use the four shorter screws from the Relay Assembly kit; tighten the four screws in a crisscross pattern to a final torque of 2 N•m / 20.7 lbf•in.
5. Using the handheld communicator, verify that the value for Relay Type parameter matches the relay type installed.
6. After replacing the relay and verifying the relay type, calibrate travel or perform touch-up calibration to maintain accuracy specifications.

Gauges, Pipe Plugs or Tire Valves

Depending on the options ordered, the DVC6200f will be equipped with either gauges (key 47), pipe plugs (key 66) or tire valves (key 67). Single-acting instruments will also have a screen (key 236, Figure 21). These are located on the top of the module base next to the relay.

Perform the following procedure to replace the gauges, tire valves or pipe plugs. Refer to Figures 20 and 21 for key number locations.

1. Remove the front cover (key 43).
2. Remove the gauge, pipe plug or tire valve as follows:

   For gauges (key 47), the flats are on the gauge case. Use a wrench on the flats of the gauge to remove the gauge from the module base. For double-acting instruments, to remove the supply gauge remove one of the output gauges.

   For pipe plugs (key 66) and tire valves (key 67), use a wrench to remove these from the module base.
3. Apply pipe thread sealant (key 64) to the threads of the replacement gauges, pipe plugs or tire valves.
4. Using a wrench, screw the gauges, pipe plugs or tire valves into the module base.

7.5 Terminal Box

⚠ WARNING

Refer to the Maintenance WARNING at the beginning of this section.

Refer to Figure 20 or 22 for key number locations.

The terminal box is located on the housing and contains the terminal strip assembly for field wiring connections.

Removing the Terminal Box

⚠ WARNING

To avoid personal injury or property damage caused by fire or explosion, remove power to the instrument before removing the terminal box cover in an area which contains a potentially explosive atmosphere or has been classified as hazardous.

1. Loosen the set screw (key 58) in the cap (key 4) so that the cap can be unscrewed from the terminal box.

2. After removing the cap (key 4), note the location of field wiring connections and disconnect the field wiring from the terminal box.
3. Separate the module base from the housing by performing the Removing the Module Base procedure.
4. Disconnect the terminal box wiring connector from the PWB assembly (key 50).
5. Remove the screw (key 72). Pull the terminal box assembly straight out of the housing.

Replacing the Terminal Box

NOTE
Inspect all O-rings for wear and replace as necessary.

1. Apply lubricant, silicone sealant to the O-ring (key 34) and install the O-ring over the stem of the terminal box.
2. Insert the terminal box assembly stem into the housing until it bottoms out. Position the terminal box assembly so that the hole for the screw (key 72) in the terminal box aligns with the threaded hole in the housing. Install the screw (key 72).
3. Connect the terminal box wiring connector to the PWB assembly (key 50).
4. Reassemble the module base to the housing by performing the Replacing the Module Base procedure.
5. Reconnect the field wiring as noted in step 2 in the Removing the Terminal Box procedure.
6. Apply lubricant, silicone sealant to the O-ring (key 36) and install the O-ring over the 2-5/8 in. threads of the terminal box. Use of a tool is recommended to prevent cutting the O-ring while installing it over the threads.
7. Apply lithium grease (key 63) to the 2-5/8 in. threads on the terminal box to prevent seizing or galling when thebcap is installed.
8. Screw the cap (key 4) onto the terminal box until no gap remains.
9. Install the set screw (key 58) into the cap (key 4). Secure the cap by engaging the set screw.

7.6 Stroking the Digital Valve Controller Output

After completing maintenance procedures, confirm proper valve operation by stroking the digital valve controller output. Refer to page 153.

7.7 Instrument Troubleshooting

What to Do First

When a problem occurs, check the following first:

Mounting

- Is the feedback linkage connected correctly? See the beginning of this section.

Utility Connections

- Are pneumatic connections correct? Are there any air leaks? See the Installation section.
- Is the air supply pressure sufficient to drive the valve?
- Is the digital valve controller correctly connected to the fieldbus? See the Installation section.
- Is there power to the device? Is the terminal voltage between 9 and 32 volts? See the Installation section.
- Is the segment terminated correctly? See host system documentation.
- Is the host system connected to the segment? See host system documentation.

If communication or output difficulties are experienced with the instrument, refer to the troubleshooting information provided in Table 22.

Also see the Technical Support Checklist found on page 173.

Table 22. Instrument Troubleshooting

Symptom	Possible Cause	Action
Instrument will not communicate.	No power to device	Ensure device is connected to the segment (see host system documentation).
		Measure the terminal voltage. Terminal voltage should be between 9 and 32 V DC.
		Check to be sure device is drawing current. There should be approximately 19 mA.
	Internal device wiring problems.	Verify connectors are plugged into the printed wiring board correctly (see Printed Wiring Board Assembly on page 164).
		Check continuity of cable between terminal box and printed wiring board. If necessary, replace the terminal box assembly (see Replacing the Terminal Box on page 167).
		Check for damaged printed wiring board lands and terminals. If necessary, replace the terminal box assembly (see Replacing the Terminal Box on page 167).
	Incompatible network settings	Change host parameters. Refer to host documentation for procedure.
	Defective printed wiring board (PWB) assembly.	Replace printed wiring board (see Replacing the PWB Assembly on page 164).
	Defective terminal box.	Check continuity from each screw terminal to the corresponding PWB connector pin. If necessary, replace the terminal box assembly (see Replacing the Terminal Box on page 167).
	Defective handheld communicator or ValveLink modem cable.	If necessary, repair or replace cable.
	Fieldbus card defective or not compatible with PC.	Replace Fieldbus card.
Device does not stay on segment.	Incorrect signal level.	Check that segment is properly terminated (see host system documentation).
		Wrong cable type or segment length too long. See Site Planning Guide.
		Bad power supply or conditioner.

- continued -

Table 22. Instrument Troubleshooting (continued)

Symptom	Possible Cause	Action
Device does not stay on segment.	Excess noise on segment.	Check integrity of wiring connections. Make sure cable shield is grounded only at the control system.
		Check for corrosion or moisture on terminals in terminal box (refer to page 167 for terminal box information).
		Check for bad power supply.
	Electronics failing.	Replace printed wiring board assembly (see Replacing the PWB Assembly on page 164).
A value cannot be written to a parameter.	Resource block parameter Write Lock may be set to Locked.	Change Write Lock to Not Locked (refer to page 19).
	If a transducer block parameter, the mode may be incorrect or the parameter may be protected.	Check Table 16. If necessary change the transducer block target mode to Manual.
		Check Table 16. If necessary change data protection.
	You have attempted to write a value that is outside the valid range.	Check the range values listed for the parameter (refer to the parameter tables in Section 4).
	Function block or in/out block mode may be incorrect.	Confirm that block is in correct mode for writing to any given parameter.
Function block actual mode does not change with target mode.	Resource block actual mode is Out of Service.	Change Resource block target mode to Auto (see page 19, Resource Block Mode or host system documentation).
	Transducer block actual mode is not Auto.	Change transducer block target mode to Auto (see page 53, Transducer Block Mode or host system documentation).
	Schedules that define when function blocks execute are not set correctly.	Set the schedules using host system or configuration tool. All function blocks must be in a schedule that is downloaded to the device.
	Configuration error	Look for configuration error bit in BLOCK_ERR. By default, all enumerature type parameters are initialized to 0 (undefined). They must be configured before the block can be put into service.
Input or Output Block does not go to mode target	Resource block actual mode is Out of Service	Change Resource block target mode to Auto (see page 19, Resource Block Mode or host system documentation).
	Transducer block actual mode is not Auto.	Change transducer block target mode to Auto (see page 53, Transducer Block Mode or host system documentation).
	Transducer has detected a hardware failure.	A bad status is passed to the block's READBACK or FIELD_VAL parameter. See transducer section of Detailed Setup for repair information.
	Wrong output block is active.	Use Outblock Selection to select the desired output block. The deselected block will have a bad status for READBACK. This will keep it in IMAN mode when target is other than OOS.
	Output block is not licensed.	The Actual Block Mode (MODE_BLK.ACTUAL [5.2]) will remain out of service and the block cannot be scheduled if the block has not bee licensed. Contact your Emerson sales office to upgrade product licensing.

- continued -

Table 22. Instrument Troubleshooting (continued)

Symptom	Possible Cause	Action
Input or Output Block does not go to mode target	Schedules that define when function blocks execute are not set correctly.	Set the schedules using host system or configuration tool. All function blocks must be in a schedule that is downloaded to the device.
	Configuration error.	Look for configuration error bit in BLOCK_ERR. By default, all enumerature type parameters are initialized to 0 (undefined). They must be configured before the block can be put into service.
Block dynamic parameters do not update	Block actual mode is Out of Service	Change the block target mode to an operational mode (see Appendix D, FOUNDATION fieldbus Communication and host system documentation).
Transducer block Setpoint (FINAL_VALUE [13]) is not being automatically updated from the AO block.	Transducer block mode in not Auto.	Change transducer block mode to Auto.
	AO block is not active.	Change Outblock Selection to AO Control.
Transducer block setpoint Setpoint(D) (SETPOINT_D [32]) is not being automatically updated from the DO block.	Transducer block mode is not Auto.	Change transducer block mode to Auto.
	DO block is not active.	Change Outblock Selection to DO Control.
Valve does not move when the set point is changed	A function block actual mode is Out of Service or Transducer Block Actual mode is Out of Service or Manual.	Change the target mode to an operational mode (see Appendix D, FOUNDATION fieldbus Communication and host system documentation).
		Verify that the correct block (AO or DO) is configured in Feature Select in the resource block. Only the selected out block is able to set the transducer setpoint and move the valve.
	Pneumatic connections are incorrect or supply pressure is incorrect	Check pneumatic connections and supply pressure. Be sure supply pressure regulator is set correctly.
	Instrument is in fault state.	Set Clear FState to Clear (Refer to Fault State on page 21 of the Detailed Setup / Blocks Section or host system documentation).
	The valve has failed.	Apply a pneumatic pressure to the valve actuator and check valve action.
	The I/P converter or relay has failed.	Replace the I/P converter or relay (see Replacing the I/P Converter on page 163).
Valve does not stroke from 0 to 100% with set point change	Insufficient supply pressure or leak in pneumatic connections.	Check supply pressure and supply pressure regulator setting. Check for leaks around pneumatic connections.
	Setpoint may be limited.	Check the AO Block values of SP_HI_LIMIT and SP_LO_LIMIT (see page 237 or host system documentation).
Deviation between set point and actual valve position remains.	Digital valve controller output is in cutoff.	Check values for Travel Cutoff High and Travel Cutoff Low (see page 59 or host system documentation).
	Digital valve controller is not calibrated correctly	Perform Auto or Manual Travel Calibration (Travel Calibration on page 141).
	Incorrect turning. Tuning that is too conservative will result in excess error.	Perform Stabilizing/Optimize Valve Response procedure to adjust tuning and stabilize/optimize valve response (see Stabilize/Optimize on page 56).

- continued -

Table 22. Instrument Troubleshooting (continued)

Symptom	Possible Cause	Action
The valve cycles, does not stay on set point.	Large amount of packing friction.	Perform Stabilizing/Optimize Valve Response procedure to adjust tuning and stabilize/ optimize valve response (see Stabilize/ Optimize on page 56).
		Use a larger size actuator.
Valve responds too slowly.	Insufficient instrument gain.	Perform Stabilize/Optimize Valve Response procedure to adjust tuning and stabilize valve response (see Stabilize/Optimize on page 56).
	I/P converter input filter clogged or air blockage in I/P ass'y nozzle block.	Replace I/P converter filter (see Replacing the I/P Filter on page 162).
		Replace I/P converter (see Replacing the I/P Converter on page 163).
	O-ring(s) between I/P converter missing or hard and flattened losing seal.	Replace O-ring(s) (refer to the I/P Converter section on page 162).
	I/P ass'y out of spec.	I/P ass'y nozzle may have been adjusted. Verify drive signal (55% to 80%). Replace I/P ass'y if drive signal is continuously high or low (see Replacing the I/P Converter on page 163).
	Defective gasket.	Check gasket for closed holes, excessive deformation due to overtightening or "oozing". If necessary, replace gasket (see the beginning of this section).
	Defective relay.	Remove relay, inspect for missing Belleville washer, missing valve spring, missing valve plug. Inspect "lip" under top O-ring for breakage due to relay removal. Inspect O-rings and replace if hard or damaged. Replace parts or relay if I/P ass'y good and air passages not blocked (see Replacing the Pneumatic Relay on page 165).
	If responds slowly only upon air demand, there may be a restriction in the air line, the supply run may be excessively long or the supply regulator may be defective or capacity not large enough.	Check supply line to ensure it is not clogged or damaged. Replace if necessary.
		If supply run is excessively long, a volume tank may need to be installed on the the supply side of the pressure regulator
		Replace supply regulator
Instrument will not calibrate, has sluggish performance or oscillates.	Travel sensor failed.	Replace the housing (key 1)
	Travel feedback is out of accepted range.	Check the mounting. Ensure the correcting mounting kit has been selected and the magnetic array is properly installed.
	Cables not plugged into PWB correctly.	Inspect connections and correct.
	Configuration errors.	Verify configuration. Use Device Setup on page 14.
	Restricted pneumatic passages in I/P converter.	Check screen in I/P converter supply port of the module base. Replace if necessary. If passages in I/P converter restricted, replace I/P converter (see Replacing the I/P Converter on page 163).

- continued -

Table 22. Instrument Troubleshooting (continued)

Symptom	Possible Cause	Action
Instrument will not calibrate, has sluggish performance or oscillates.	O-ring(s) between I/P converter ass'y missing or hard and flattened losing seal.	Replace O-ring(s) (refer to the I/P Converter section on page 162).
	I/P converter ass'y damaged/ corroded/clogged.	Check for bent flapper, open coil (continuity), contamination, staining or dirty air supply. Coil resistance should be between 1680 to 1860 ohms. Replace I/P ass'y if damaged, corroded, clogged or open coil (see Replacing the I/P Converter on page 163).
	I/P converter ass'y out of spec.	I/P converter ass'y nozzle may have been adjusted. Verify drive signal (55 to 80% for double-acting; 60 to 85% for single-acting) with the valve off the stops. Replace I/P converter ass'y if drive signal is continuously high or low (see Replacing the I/P Converter on page 163).
	Defective module base seal.	Check module base seal for condition and position. If necessary, replace seal. Refer to Module Base Maintenance on page 159.
	Defective relay.	Depress relay beam at adjustment location in shroud, look for increase in output pressure. Remove relay, inspect relay seal. Replace relay seal or relay if I/P converter ass'y good and air passages not blocked (refer to Replacing the Pneumatic Relay on page 165). Check relay adjustment (refer to page 142).
	Defective 67CFR regulator, supply pressure gauge jumps around.	Replace 67CFR regulator.
Instrument will not calibrate.	Configuration errors.	Verify configuration.
	Magnet assembly is not correctly installed.	Check the mounting. Ensure the correcting mounting kit has been selected and the magnetic array is properly installed.
	Cables not plugged into PWB correctly.	Inspect connections and correct.
ValveLink diagnostic tests provide erroneous results.	Defective pressure sensor(s).	Replace PWB (see Replacing the PWB Assembly on page 164).
	Pressure sensor O-ring(s) missing.	Replace O-ring(s).
Cannot perform advanced diagnostics.	Instrument does not have proper diagnostic level.	Upgrade diagnostic level.
A Field Diagnostic alert is active, but not reported (broadcast) automatically.	PlantWeb and Field Diagnostic alerts in firmware 1.5 and higher are mode-based. Transducer block mode may be in MAN or OOS.	Check transducer block mode. Change to AUTO if appropriate.
Handheld communicator does not turn on.	Battery pack not charged.	Charge battery pack. Note: Battery pack can be charged while attached to the handheld communicator or separately. The handheld communicator is fully operable while the battery pack is charging. Do not attempt to charge the battery pack in a hazardous area.

7.8 Technical Support Checklist

Have the following information available prior to contacting your Emerson sales office for support.

Reference

1. Instrument serial number as read from nameplate _____
2. What is the firmware version of the DVC6200f? _____
3. What is the hardware version of the DVC6200f? _____
4. What is the Diagnostic level of the DVC6200f? FD___ AD___ PD___ PST___
5. What is the Control level of the DVC6200f? SC___ FL___ FC___
6. What is the address of the DVC6200f? _____

Mode and Status

7. What are the DVC6200f Block Modes?
   Actual Modes: Resource Block ____ Transducer Block____ Analog Output Block ____
   Target Modes: Resource Block ____ Transducer Block____ Analog Output Block ____
   Permitted Modes: Resource Block ____ Transducer Block____ Analog Output Block ____
8. What is the status of the individual function blocks?

Operational

9. Does the digital valve controller respond to the control signal? Yes _____ No _____
   If No, describe
10. Is it on Travel or Pressure control?
11. What are the following parameter readings?
    Setpoint _____ Drive Signal _____%
    Supply Pressure _____ Pressure A _____ Pressure B _____
    Travel Target _____ % Travel _____% Pressure B _____
12. What is the safe position of the valve? Fail Closed ___ Fail Open ___

Interface and Diagnostic Tools

13. What interface and diagnostic tools are available?_____
14. Provide any available supporting documentation, such as Status Monitor, Detailed Setup, any alert readings.

Mounting

Reference

1. Actuator application: sliding-stem? _____ Rotary? _____
2. Which digital valve controller do you have? DVC6200f _____ DVC6205f/DVC6215 _____
3. What Make, Brand, Style, Size, etc. actuator is the DVC6200f mounted on? _____

Operational

4. What is the full travel of the valve?_____
5. What is the Mounting Kit part number? _____

Other

6. If mounting kits are made by Impact Partner/Customer, please provide pictures of installation.

Section 8: Parts

8.1 Parts Ordering

Whenever corresponding with your Emerson sales office about this equipment, always mention the controller serial number.

⚠ WARNING

Use only genuine Fisher replacement parts. Components that are not supplied by Emerson should not, under any circumstances, be used in any Fisher instrument. Use of components not supplied by Emerson may void your warranty, might adversely affect the performance of the instrument and could cause personal injury and property damage.

8.2 Parts Kits

NOTE

All Standard kits with elastomers include nitrile elastomers. Extreme temperature kits include fluorosilicone elastomers.

Kit	Description	Part Number
1*	Elastomer Spare Parts Kit (kit contains parts to service one digital valve controller)	
	Standard	19B5402X012
	Extreme Temperature	19B5402X022
2*	Small Hardware Spare Parts Kit (kit contains parts to service one digital valve controller)	19B5403X032
3*	Seal Screen Kit	
	[kit contains 25 seal screens (key 231) and 25 O-rings (key 39)]	14B5072X182
4*	Integral Mount Seal Kit (for 667 sizes 30i to 76i and GX actuators)	
	[kit contains 5 seals (key 288)]	19B5402X032
5*	Terminal Box Kit	
	Aluminum	
	Standard	19B5401X262
	Standard, M20	19B5401X422
	Standard, Natural Gas Certified	19B5401X892
	Standard, Natural Gas Certified, M20	19B5401X802
	Extreme Temperature	19B5401X272
	Extreme Temperature, M20	19B5401X432
	Extreme Temperature, Natural Gas Certified	19B5401X902
	Extreme Temperature, Natural Gas Certified, M20	19B5401X812
	Stainless Steel	
	Extreme Temperature	19B5401X302
	Extreme Temperature, M20	19B5401X442
	Extreme Temperature, Natural Gas Certified	19B5401X912
	Extreme Temperature, Natural Gas Certified, M20	19B5401X822
6*	I/P Converter Kit	
	Standard	38B6041X152
	Extreme Temperature	38B6041X132
7*	Spare Module Base Assembly Kit	
	[kit contains module base (key 2); drive screws, qty. 2, (key 11); shield/label (key 19); hex socket cap screw, qty. 3, (key 38); self tapping screw, qty. 2 (key 49); pipe plug, qty. 3 (key 61); retaining ring, qty. 3 (key 154); screen (key 236); and flame arrestors, qty. 3 (key 243)]	
	Aluminum	GE18654X012
	Stainless Steel	GE18654X022
8*	Spare Housing Assembly Kit,	
	[kit contains housing (key 1); vent assembly (key 52); seal (only included in Housing A kits) (key 288); seal (key 237); O-ring (key 34); O-ring (only used with integrally mounted regulator) (key 5)]	
	Aluminum	
	Housing A (used for GX actuator)	
	Standard	GE48798X032
	Extreme Temperature	GE48798X042
	Housing B (used for all actuators except GX)	
	Standard	GE48798X072
	Extreme Temperature	GE48798X082
	Stainless Steel	
	Housing B (used for all actuators except GX)	
	Standard	GE48798X092
	Extreme Temperature	GE48798X102
9*	Spare I/P Shroud Kit	
	[kit contains shroud (key 169) and hex socket cap screw, qty. 4 (key 23)]	GE29183X012
10	Remote Mount Feedback Unit Kit[1] (see Figure 23)	- - -
	[remote housing assembly (key25); hex socket set screw (key 58); 1/2 NPT pipe plug (key 62); wire retainer, qty. 2 (key 131); terminal cover (key 255); O-ring (key 256); gasket (Housing A only, used for GX actuator) (key 287); seal (Housing A only, used for GX actuator) (key 288)]	
*Recommended spare parts		

Kit	Description	Part Number
11	Feedback Array Kit	
	Sliding Stem (Linear)	
	[kit contains	
	• feedback array and hex socket cap screws, qty. 2, washer, plain, qty. 2, external tooth lock washer, qty. 2 (only with aluminum feedback array kit).	
	• 210 mm / 8-1/4 in. kit contains feedback array and hex socket cap screws, qty. 4, washer, plain, qty. 4, external tooth lock washer, qty. 4 (only with aluminum feedback array kit) and insert]. Stainless steel kits only for use with stainless steel mounting kits.	
	7 mm / 1/4-in.	
	Aluminum	GG20240X012
	Stainless Steel	GE65853X082
	19 mm / 3/4-in.	
	Aluminum	GG20240X022
	Stainless Steel	GE65853X012
	25 mm / 1-in.	
	Aluminum	GG20240X032
	Stainless Steel	GE65853X022
	38 mm / 1-1/2 in.	
	Aluminum	GG20240X042
	Stainless Steel	GE65853X032
	50 mm / 2-in.	
	Aluminum	GG20240X052
	Stainless Steel	GE65853X042
	110 mm / 4-1/8 in.	
	Aluminum	GG20240X082
	Stainless Steel	GE65853X062
	210 mm / 8-1/4 in.	
	Aluminum	GG20243X012
	Stainless Steel	GE65853X072
	Rotary Array Kit with Pointer and Scale	
	[Kit contains feedback assembly, pointer assembly, travel indicator scale and M3 machine pan head screws qty.2]. Stainless steel kits only for use with stainless steel mounting kits.	
	Aluminum	GG10562X012
	Stainless Steel	GG10562X022
	Rotary Array Kit with Coupler	
	[Kit contains feedback assembly, NAMUR coupler, M3 machine pan head screws qty. 2 and cap screw qt. 1]	
	Aluminum	GE71982X012
	Stainless Steel	GE71982X022
	Rotary Array Kit with Beacon	
	[Kit contains feedback assembly, beacon visual on/off indicator, indicator cover assembly, M3 machine pan head screws qty. 2 and M6 cap screws qty. 4]	
	Aluminum	GH19538X012
	Stainless Steel	GH19538X022
	Arced Mounting Kit	
	[Kit contains feedback assembly, bracket, bias spring, pillow block fillister head machine screws (for aluminum kit). qty. 4, hex socket cap screws (for stainless steel kit), qty. 4, and bushings qty. 2]	
	RShaft #1 / LRC (2)	
	2052 Size 2 & 3, 1051/1052 size 40-70, 1061 size 30-130	
	Sliding Stem > 210 mm / 8.25 inches	
	Aluminum	GE42132X012
	Stainless Steel	GE42132X022
	RShaft #2 / LRC (2)	
	2052 Size 1	
	Aluminum	GE42130X012
	Stainless Steel	GE42130X022
	1051/1052 size 20-33	
	Aluminum	GE42131X012
	Stainless Steel	GE42131X022

*Recommended spare parts
1. The remote mount feedback kit is not orderable by part number due to nameplate/approval requirements. Contact your Emerson sales office for information on ordering this kit.
2. LRC = Linear Roller Cam

Kit	Description	Part Number
12	Mounting Shield Kit [kit contains shield, qty. 3 and machine screws, qty. 6]	GG05242X022
13*	Gasket/Seal Kit, for use with GX actuator [kit contains insulating gasket (key 287) and seal (key 288)]	GE45468X012
14	Alignment Template For linear actuators (except GX) For GX actuators	 GE43826X012 GE20586X012
15*	Bursting Disk Elastomer Kit [kit contains rubber safety disk (qty 10) for cover assembly]	19B5402X062
*Recommended spare parts		

8.4 Parts List

NOTES

Parts with footnote numbers are available in parts kits.

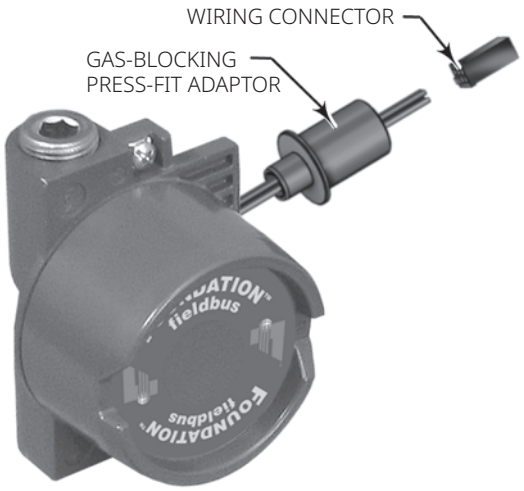
Contact your Emerson sales office for Part Ordering information.

Standard parts with elastomers include nitrile elastomers. Extreme temperature parts include fluorosilicone elastomers.

Housing (see Figures 20 and 22)

Key	Description
1	Housing[8]
11	Drive Screw (2 req'd) (DVC6205f only)
20	Shield (DVC6205f only)
52	Vent, plastic[2]
74	Mounting Bracket (DVC6205f only)
248	Screw, hex head (4 req'd) (DVC6205f only)
249	Screw, hex head (4 req'd) (DVC6205f only)
250	Spacer (4 req'd) (DVC6205f only)
267	Standoff (2 req'd) (DVC6205f only)
271	Screen[8]
287	Gasket, Housing A only (used for GX actuator) (DVC6200f only)
288	Seal (used for 667 size 30i to 76i and GX actuators) (DVC6200f only)
*Recommended spare 2. Available in the Small Hardware Spare Parts Kit 8. Available in the Spare Housing Assembly Kit	

Figure 19. Terminal Box of Natural Gas Certified FIELDVUE DVC6200f Digital Valve Controller



W9923-1

Common Parts (see Figures 20, 21 and 22)

Key	Description	Part Number
16*	O-ring(1) (3 req'd)	- - -
29	Warning label, for use only with LCIE hazardous area classifications	- - -
33	Mach Screw, pan hd, SST(2) (3 req'd)	- - -
38	Cap Screw, hex socket, SST(2) (7) (3 req'd)	- - -
43*	Cover Assembly with rubber safety disk(15) (includes cover screws) Standard Extreme temperature	 GG53748X012 GG53748X022
48	Nameplate	- - -
49	Screw, self tapping (2 req'd)(7)	- - -
61	Pipe Plug, hex socket(7) Housing A with relay C (2 req'd) (used for GX actuator) Housing A with relay B (1 req'd) (used for GX actuator) Housing B with relay B and C (1 req'd) (used for all actuators except GX) Not required for relay A	- - -
63	Lithium grease (not furnished with the instrument)	
64	Pipe thread sealant, anaerobic (not furnished with the instrument)	
65	Lubricant, silicone sealant (not furnished with the instrument)	- - -
154	Retaining Ring(2) (3 req'd)	- - -
236	Screen (required for relay B and C only)(8)	- - -
237	Module Base Seal(1)	- - -

*Recommended spare
1. Available in the Elastomer Spare Parts Kit
2. Available in the Small Hardware Spare Parts Kit
7. Available in the Spare Module Base Assembly Kit
8. Available in the Spare Housing Assembly Kit
15. Extra rubber disks available in the Bursting Disk Elastomer Kit.

Module Base (See Figures 20 and 22)

Key	Description
2	Module Base[7]
11	Drive Screw[7] (2 req'd)
12	O-ring[1]
19	Label, Shield Assembly[7]
61	Pipe Plug, hex socket[7] (3 req'd)
243	Slotted Pin (flame arrestor)[7] (3 req'd)

*Recommended spare
1. Available in the Elastomer Spare Parts Kit
7. Available in the Spare Module Base Assembly Kit

I/P Converter Assembly (See Figures 20 and 22)

Key	Description
23	Cap Screw, hex socket, SST[2] [9] (4 req'd)
39*	O-ring[1] [3] [6]
41	I/P Converter[6]
169	Shroud[6] [9] (not shown, see Figure 17)
210*	Boot, Nitrile[1] [6] (2 req'd) (see Figure 17)
231*	Seal Screen[1] [3] [6]

*Recommended spare
1. Available in the Elastomer Spare Parts Kit
2. Available in the Small Hardware Spare Parts Kit
3. Available in the Seal Screen Kit
6. Available in the I/P Converter Kit
9. Available in the Spare Shroud Kit

Relay (See Figures 20 and 22)

Key	Description	Part Number
24*	Relay Assembly (includes shroud, relay seal and mounting screws, qty. 8) The four shorter screws in this kit are for DVC6200 Series digital valve controllers. The four longer screws are for DVC7K digital valve controllers. **Standard** Standard Bleed Single-acting direct (relay C) Double-acting (relay A) Single-acting reverse (relay B) Low Bleed Single-acting direct (relay C) Double-acting (relay A) Single-acting reverse (relay B) **Extreme Temperature** Standard Bleed Single-acting direct (relay C) Double-acting (relay A) Single-acting reverse (relay B) Low Bleed Single-acting direct (relay C) Double-acting (relay A) Single-acting reverse (relay B)	 38B5786X932 38B5786X852 38B5786X892 38B5786X952 38B5786X872 38B5786X912 38B5786X942 38B5786X832 38B5786X902 38B5786X962 38B5786X882 38B5786X922

*Recommended spare

Loop Connections Terminal Box (see Figures 20 and 22)

Key	Description
4	Terminal Box Cap
34*	O-ring[1] [5]
36*	O-ring[1] [5]
58	Set Screw, hex socket, SST[2]
72	Cap Screw, hex socket, SST[2]
164	Terminal Box Assembly
*Recommended spare 1. Available in the Elastomer Spare Parts Kit 2. Available in the Small Hardware Spare Parts Kit 5. Available in the Terminal Box Kit	

Feedback Connections Terminal Box (see Figure 22)

DVC6205f only

Key	Description
4	Terminal Box Cap
34*	O-ring[1] [5]
36*	O-ring[1] [5]
58	Set Screw, hex socket, SST[2]
62	Pipe Plug, hex hd, SST
262	Adapter
263*	O-ring Standard or Extreme temperature
264	Terminal Box Assembly, remote
*Recommended spare 1. Available in the Elastomer Spare Parts Kit 2. Available in the Small Hardware Spare Parts Kit 5. Available in the Terminal Box Kit	

PWB Assembly (see Figures 20 and 22)

Key	Description
50*	PWB Assembly Standard Control Fieldbus Diagnostics Advanced Diagnostics Performance Diagnostic Partial Stroke Test Fieldbus Control Fieldbus Diagnostics Advanced Diagnostics Performance Diagnostics Partial Stroke Test Fieldbus Logic Fieldbus Diagnostics Advanced Diagnostics Performance Diagnostics Partial Stroke Test
*Recommended spare	

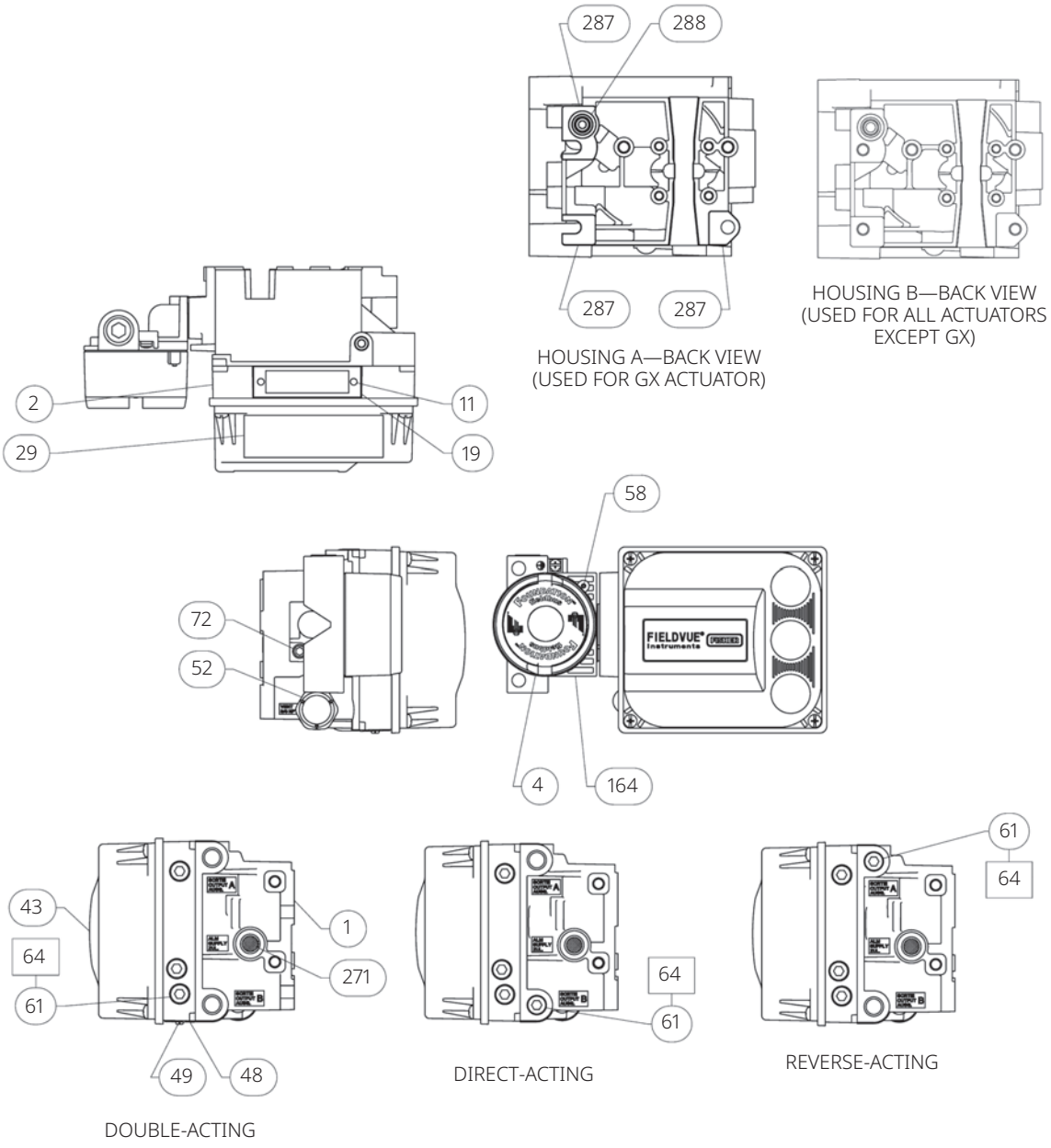
Pressure Gauges, Pipe Plugs or Tire Valve Assemblies (see Figure 21)

Key	Description
47*	Pressure Gauge, nickel-plated brass case, brass connection Double-acting (3 req'd); Single-acting (2 req'd) PSI/MPA Gauge Scale To 60 PSI, 0.4 MPa To 160 PSI, 1.1 MPa PSI/bar Gauge Scale To 60 PSI, 4 bar To 160 PSI, 11 bar PSI/KG/CM^2 Gauge Scale To 60 PSI, 4 KG/CM^2 To 160 PSI, 11 KG/CM^2
66	Pipe Plug, hex hd For units without gauges
67	Tire Valve, used with Tire Valve Option only Double-acting (3 req'd); Single-acting (2 req'd)
*Recommended spare	

DVC6215 Feedback Unit (see Figure 23)

Key	Description
65	Lubricant, silicone sealant (not furnished with the instrument)
256*	O-ring, fluorosilicone
*Recommended spare parts	

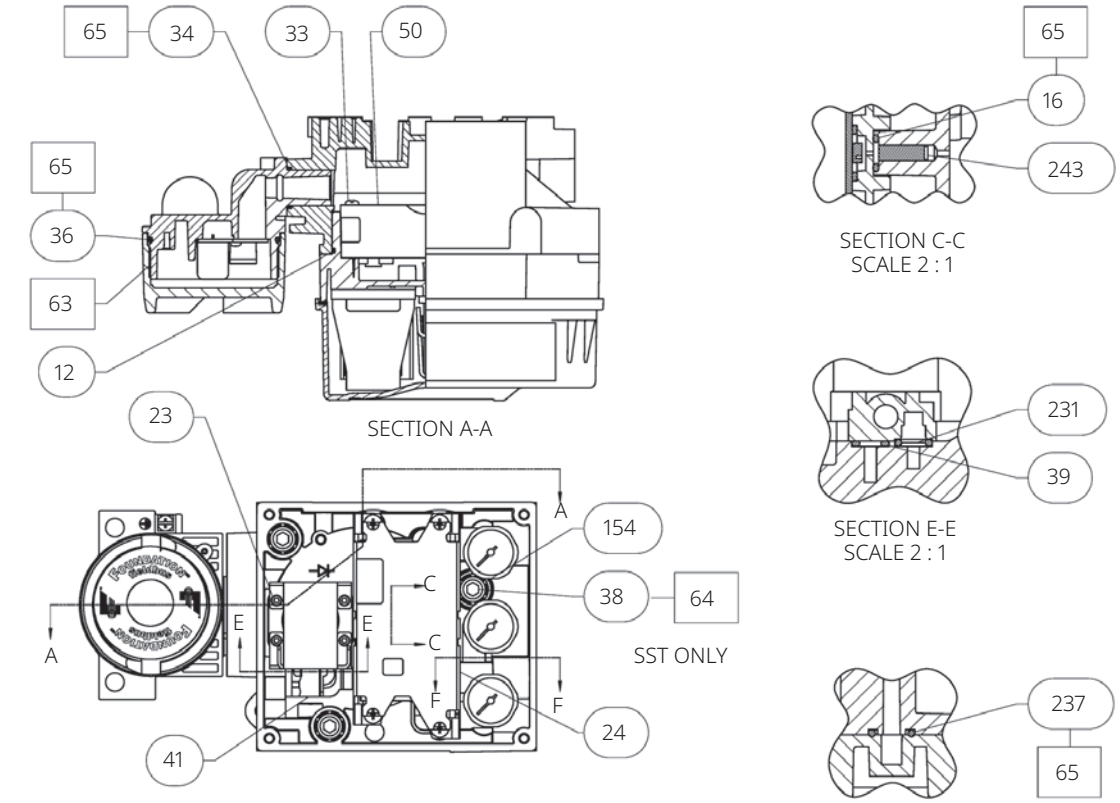
Figure 20. FIELDVUE DVC6200f Digital Valve Controller Housing Assembly



GE40185 sheet 1 of 3

☐ APPLY LUBRICANT, SEALANT OR THREAD LOCK
65 APPLY LUBRICANT ON ALL O-RINGS UNLESS OTHERWISE SPECIFIED

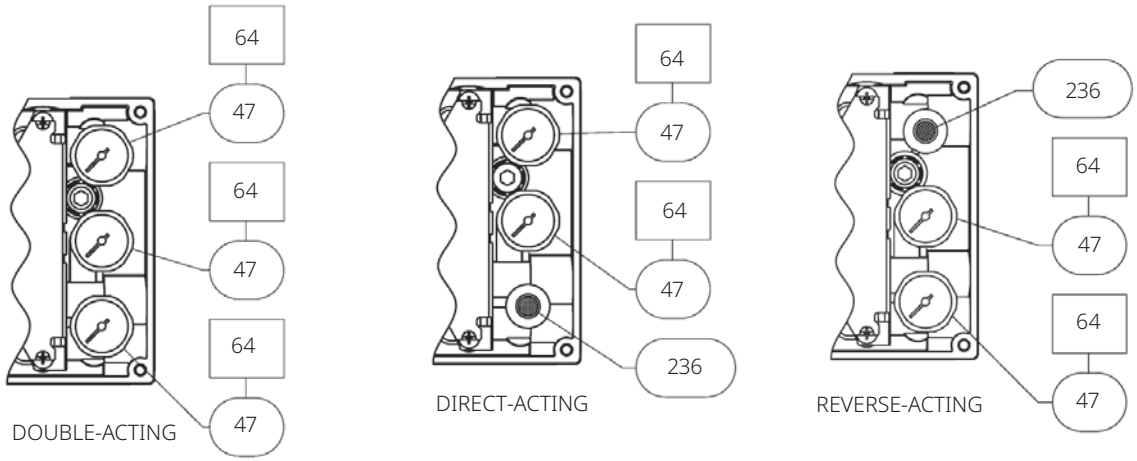
Figure 20. FIELDVUE DVC6200f Digital Valve Controller Housing Assembly (continued)



GE40185 sheet 2 of 3

APPLY LUBRICANT, SEALANT OR THREAD LOCK
APPLY LUBRICANT ON ALL O-RINGS UNLESS OTHERWISE SPECIFIED
65

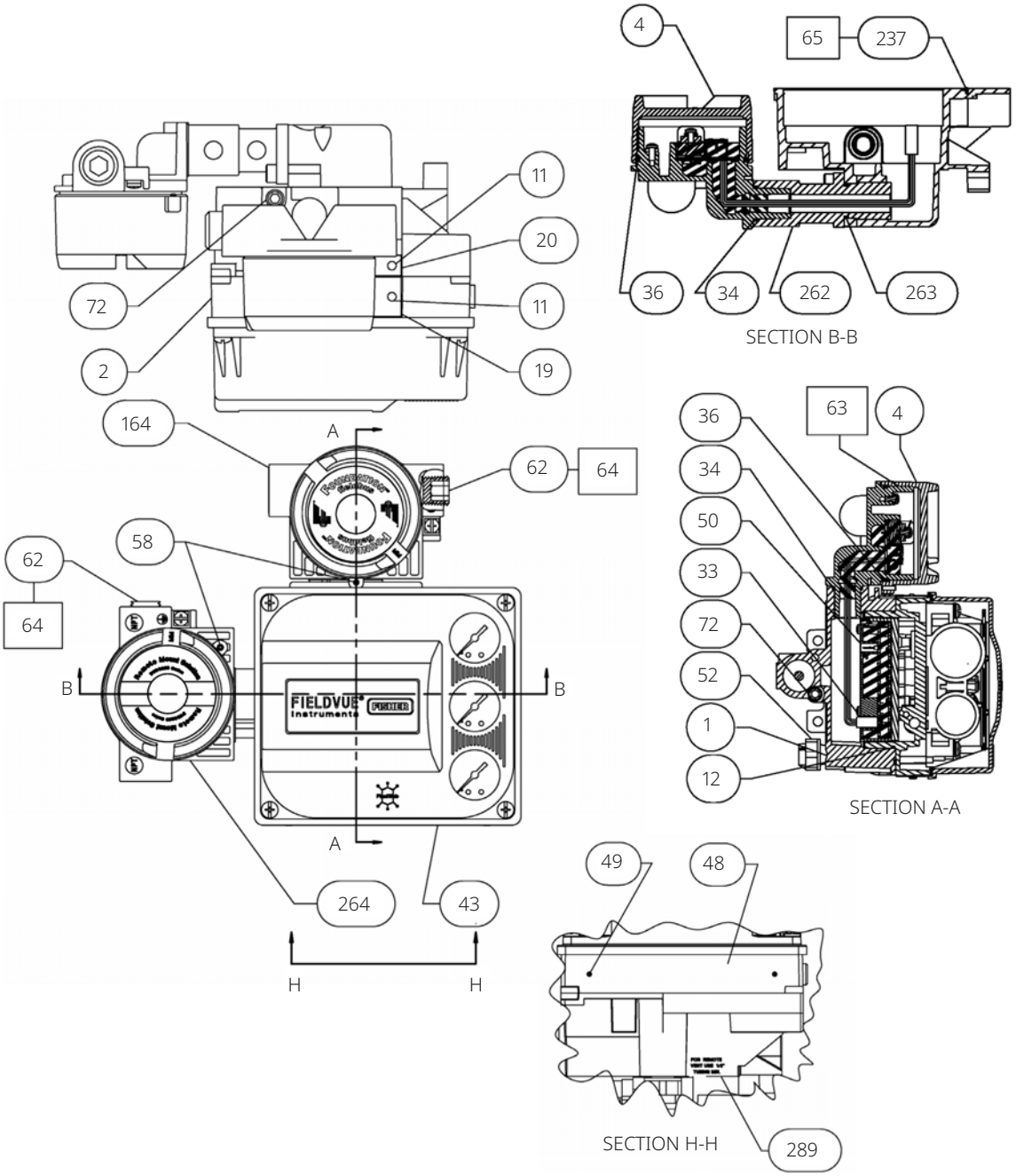
Figure 21. Gauge Configuration



GE40185 sheet 3 of 3

FOR PIPE PLUG OPTION REPLACE (47) WITH (66)
FOR TIRE VALVE OPTION REPLACE (47) WITH (67)
APPLY LUBRICANT, SEALANT OR THREAD LOCK
65 APPLY LUBRICANT ON ALL O-RINGS UNLESS OTHERWISE SPECIFIED

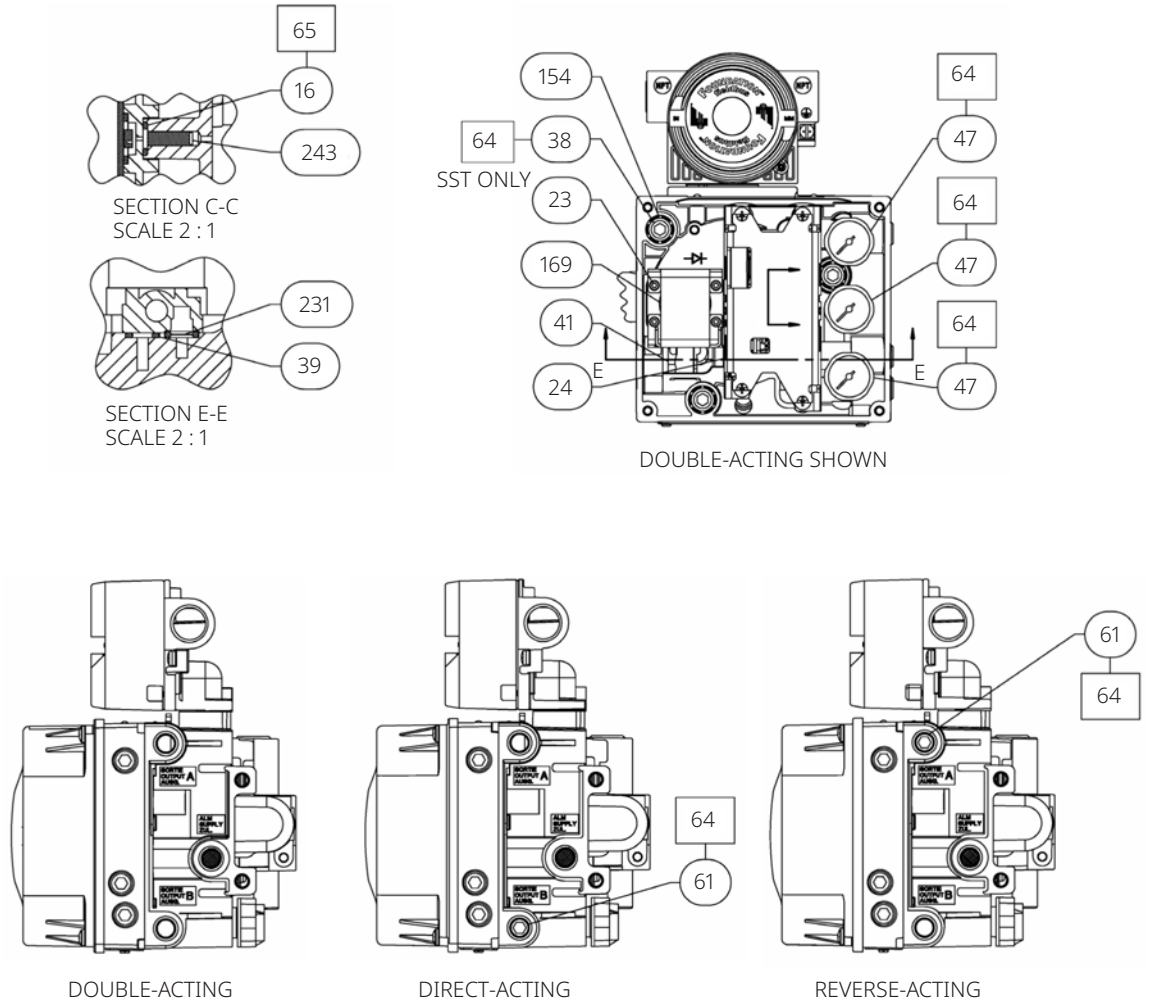
Figure 22. FIELDVUE DVC6205f Base Unit Housing Assembly



GE40181

☐ APPLY LUBRICANT, SEALANT OR THREAD LOCK
65 APPLY LUBRICANT ON ALL O-RINGS UNLESS OTHERWISE SPECIFIED

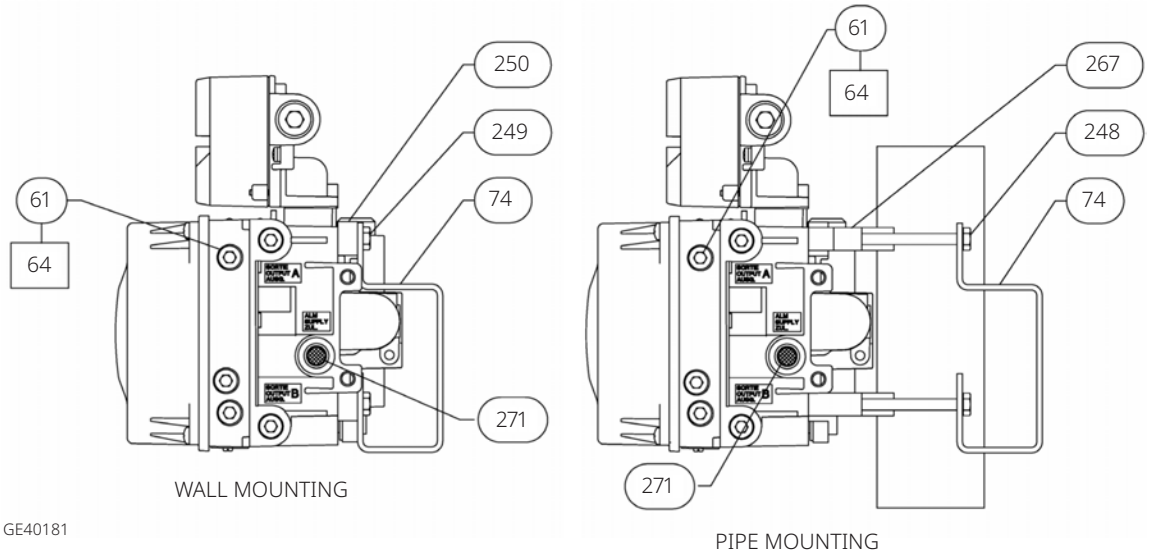
Figure 22. FIELDVUE DVC6205f Base Unit Housing Assembly (continued)



GE40181

☐ APPLY LUBRICANT, SEALANT OR THREAD LOCK
65 APPLY LUBRICANT ON ALL O-RINGS UNLESS OTHERWISE SPECIFIED

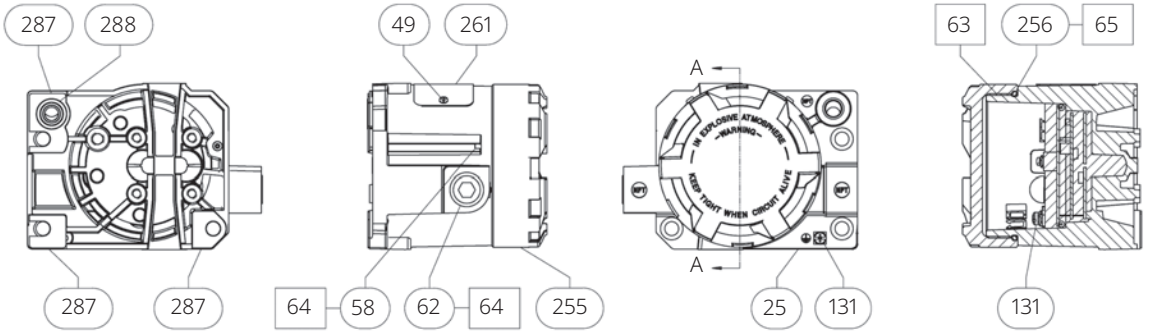
Figure 22. FIELDVUE DVC6205f Base Unit Housing Assembly (continued)



GE40181

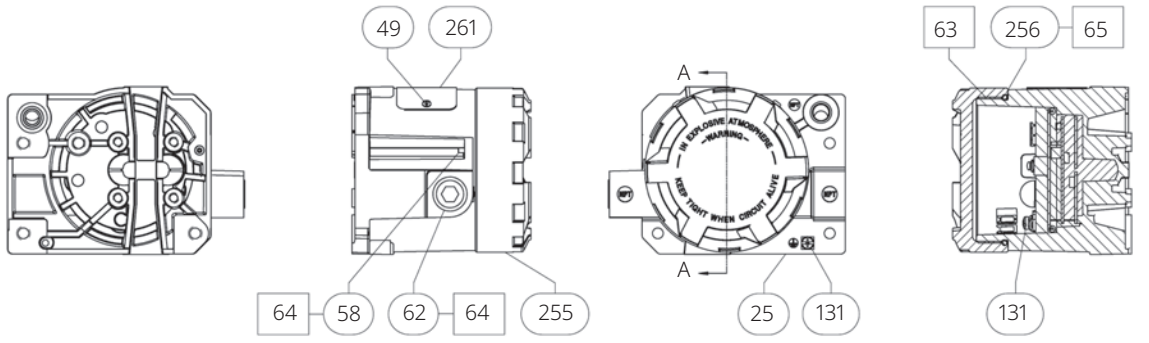
APPLY LUBRICANT, SEALANT OR THREAD LOCK
APPLY LUBRICANT ON ALL O-RINGS UNLESS OTHERWISE SPECIFIED
65

Figure 23. FIELDVUE DVC6215 Remote Feedback Assembly



GE46670-B
PARTS NOT SHOWN: 158
APPLY LUBRICANT/SEALANT

HOUSING A
(USED FOR GX ACTUATOR)



GE40178-B
PARTS NOT SHOWN: 158
APPLY LUBRICANT/SEALANT

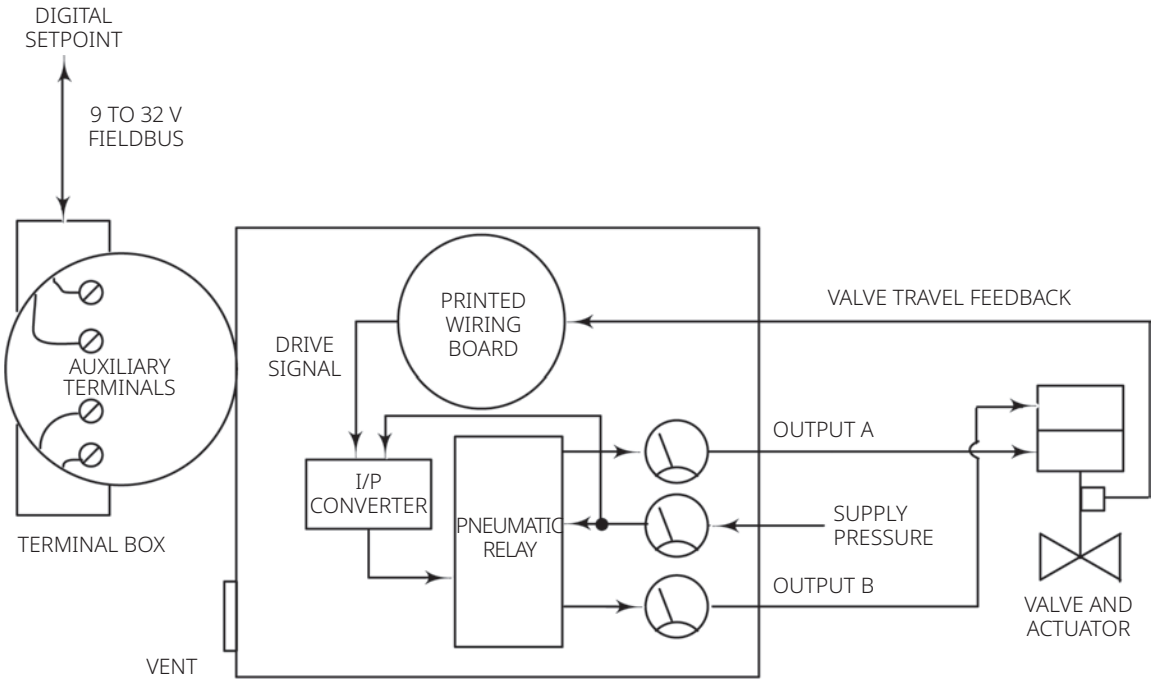
HOUSING B
(USED FOR ALL ACTUATORS EXCEPT GX)

Appendix A: Principle of Operation

A.1 Digital Valve Controller Operation

The DVC6200f digital valve controller has a single module base that may be easily replaced in the field without disconnecting field wiring or tubing. The master module contains the following submodules: current-to-pneumatic (I/P) converter, printed wiring board assembly and pneumatic relay. The relay position is detected by sensing the magnet on the relay beam via a detector on the printed wiring board. This sensor is used for the minor loop feedback (MLFB) reading. The master module can be rebuilt by replacing the submodules. See Figures A-1 and A-2.

Figure A-1. FIELDVUE DVC6200f Digital Valve Controller Block Diagram



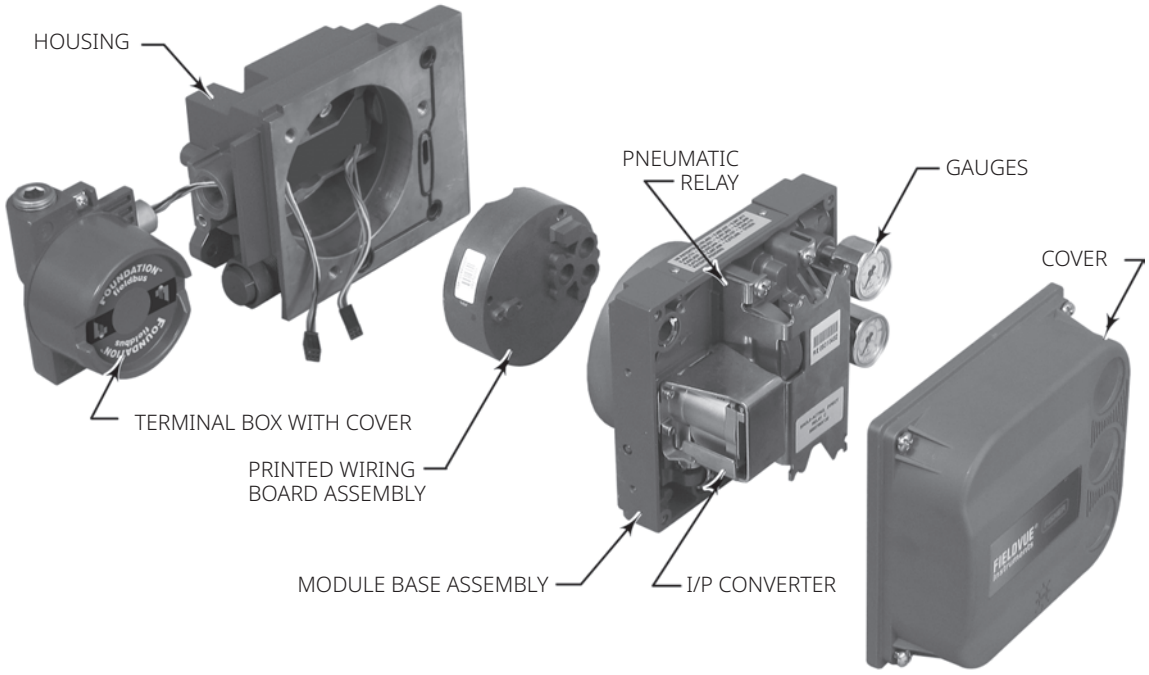
E1376

The DVC6200f digital valve controller is a bus-powered instrument that provides a control valve position in response to a digital setpoint from the control room. The following describes a direct acting DVC6200f digital valve controller mounted on a sliding-stem piston actuator, where the valve is closed with zero power to the instrument.

The setpoint is routed into the terminal box through a single pair of wires and then to the printed wiring board assembly submodule where it is read by the microprocessor, processed by a digital algorithm and converted into an analog I/P drive signal.

As the setpoint increases, the drive signal to the I/P converter increases, increasing the I/P output pressure. The I/P output pressure is routed to the pneumatic relay submodule. The relay is also connected to supply pressure and amplifies the small pneumatic signal from the I/P converter. The relay accepts the amplified pneumatic signal and provides two output pressures. With relay A, an increasing setpoint will produce increasing pressure at output A and decreasing pressure at output B. With relay B an increasing setpoint will produce decreasing pressure at output B (output A is not available). With relay C an increasing setpoint will produce an increasing pressure on output A (output B is not available). The output A pressure is used for double-acting and single-acting direct applications. The output B pressure is used for double-acting and single-acting reverse applications.

Figure A-2. FIELDVUE DVC6200f Digital Valve Controller Assembly



W9925-1

As shown in Figure A-1, the increased output A pressure causes the actuator stem to move upward. The stem position is sensed by the travel sensor. The stem continues to move upward until the correct stem position is attained. At this point the printed wiring board assembly stabilizes the I/P drive signal. This prevents any further increase in the pneumatic signal from the I/P converter.

As the digital setpoint decreases, the drive signal to the I/P converter submodule decreases, decreasing the I/P output pressure. The pneumatic relay decreases the output A pressure and increases the output B pressure. The stem moves downward until the correct position is attained. At this point the printed wiring board assembly stabilizes the I/P drive signal. This prevents any decrease in the pneumatic signal from the I/P converter.

Appendix B: Handheld Communicator Menu Structure

Transducer Block

Configure/Setup

Basic Setup
Detailed Setup

Top Level

Configure/Setup

Basic Setup

Basic Setup

Detailed Setup

Detailed Setup

Transducer Block Mode

Protection

Response Control
- Travel Tuning
  - Travel Tuning Set
  - Travel Proportional Gain
  - Travel Velocity Gain
  - Travel MLFB Gain
  - Travel Integral Enable
  - Travel Integral Gain
  - Travel Integral Dead Zone
  - Travel Integral Limit Hi
  - Travel Integral Limit Lo
  - Performance Tuner
  - Stabilize / Optimize
- Pressure Tuning
  - Pressure Tuning Set
  - Pressure Proportional Gain
  - Pressure MLFB Gain
  - Pressure Integral Gain
  - Pressure Integral Dead Zone
  - Pressure Integral Limit Hi
  - Pressure Integral Limit Lo

Travel/Press Control
- Travel/Pressure State
- Travel/Pressure Select
- Pressure Range Hi
- Pressure Range Lo
- Travel Deviation/Pressure Fallback
  - Fallback Enable
  - Fallback Threshold
  - Fallback Time
  - Fallback Minimum Supply
- Cutoff
  - Travel Cutoff Hi
  - Travel Cutoff Lo
  - Pressure Cutoff Hi
  - Pressure Cutoff Lo
- Characterization
- Custom Characterization Table
- Output Block Selection

Alerts (see page 191)

Alert Handling
- Output Block - Echo Block Err
- FD Alerts set PV StatusInstrument

Instrument
- Tag Description
- Units
  - Pressure Units
  - Temperature Units
  - Travel Units
  - Length Units
  - Area Units
  - Spring Rate Units
- Relay Type
- Zero Power Condition
- Max Supply Pressure
- Aux Terminal Mode
- Calibration Info
  - Last Calibration Type
  - Calibration Location
  - Calibration Date
  - Calibration Person

Valve and Actuator
- Valve
  - Valve Manufacturer
  - Valve Model Number
  - Valve Serial Number
  - Valve Style
  - Valve Size
  - Valve Class
  - Rated Travel
  - Actual Travel
  - Shaft Stem Diameter
  - Packing Type
  - Inlet Pressure
  - Outlet Pressure
- Trim
  - Seat Type
  - Leak Class
  - Port Diameter
  - Port Type
  - Flow Direction
  - Push Down To
  - Flow Tends To
  - Unbalanced Area

Detailed Setup (continued)

Detailed Setup (continued)

- Actuator
  - Actuator Manufacturer
  - Actuator Model Number
  - Actuator Style
  - Actuator Serial Number
  - Actuator Size
  - Actuator Fail Action
  - Feedback Connection
  - Travel Sensor Motion
  - Lever Style
  - Lever Arm Length
  - Effective Area
  - Stroking Time Open
  - Stroking Time Close
  - Air
  - Upper Bench Set
  - Lower Bench Set
  - Nominal Supply Pressure
  - Spring Rate
- Reference
  - Trim Style 1
  - Trim Style 2
- MAI Channel Map
  - MAI Channel 1
  - MAI Channel 2
  - MAI Channel 3
  - MAI Channel 4
  - MAI Channel 5
  - MAI Channel 6
  - MAI Channel 7
  - MAI Channel 8
- FST/PST
  - FST/PST
    - Valve Stroke Test (FST/PST) Latch
      - Valve Stroke Test
      - Partial Stroke Start Pt
      - Travel Open End
      - Travel Closed Open
      - Test Pause Time
      - High Friction Breakout Press
      - Low Friction Breakout Press
      - Action on Failed Test
      - VST Abnormal & Abort Criteria
        - VST Abnormal Criteria
        - VST Abort Criteria
      - Partial & Full Stroke
        - Partial Stroke
        - Full Stroke
    - PST Prohibited
    - Auto PST
      - Auto PST Current Time
      - Hours to next Auto PST
      - Auto PST State
      - Type of Auto PST
      - Partial Stroke Initial Start Time
      - Partial Stroke Interval
      - Auto PST Next Test
- Latch
  - Reset Latch
  - Latch State
  - Latch Reset Options
  - Latch Position Trip Enable
  - Position Trip Point

Calibration

Top Level

Configure/Setup

Basic Setup

Detailed Setup

Calibration

- Auto Calibration
- PST Calibration
- Manual Calibration
- Relay Adjust
- Travel Sensor
- Supply Pressure
- Pressure A
- Pressure B

Alerts

- Alerts
  - Electronic Alerts
    - Drive Current
      - Drive Current
      - Drive Current Alert
      - Drive Current Alert Enable
      - Drive Current Shutdown
      - Drive Current Manual Recovery
      - Drive Current Alert Point
      - Drive Current Alert Time
      - Drive Current FD Config
    - Drive Signal
      - Drive Signal
      - Drive Signal Alert
      - Drive Signal Alert Enable
      - Drive Signal FD Config
    - Processor Impaired
      - Program Memory Alert
      - Program Memory Alert Enable
      - Program Memory Shutdown
      - Program Memory Manual Recovery
      - Static Memory Alert
      - Static Memory Alert Enable
      - Static Memory Shutdown
      - Static Memory Manual Recovery
      - I/O Processor Alert
      - I/O Processor Alert Enable
      - I/O Processor Shutdown
      - I/O Processor Man Recovery
      - Processor Impaired FD Config
  - Configuration Alerts
    - Output Block Timeout
      - Output Block Timeout Alert
      - Output Block Timeout Alert Enable
      - Output Block Timeout Shutdown
      - Output Block Timeout Manual Recovery
      - Output Block Timeout
    - Blocks Set to Default
      - Blocks Set to Defaults Alert
      - Blocks Set to Defaults Alert Enable
    - Check Alert FD Config
    - Alert Key
- Sensor Alerts
  - Travel Sensor
    - Travel Sensor Alert
    - Travel Sensor Alert Enable
    - Travel Sensor Shutdown
    - Travel Sensor Manual Recovery
    - Travel Sensor FD Config
  - Pressure Sensors
    - Supply Pressure Sensor Alert
    - Supply Pressure Sensor Alert Enable
    - Port A Press Sensor Alert
    - Port A Press Sensor Alert Enable
    - Output Pressure Sensor Shutdown
    - Output Pressure Sensor Manual Recovery
    - Port B Press Sensor Alert
    - Port B Press Sensor Alert Enable
    - Supply Pressure Sensor FD Config
    - Output Pressure Sensor FD Config
  - Pressure Fallback
    - Pressure Fallback Alert
    - Pressure Fallback Alert Enable
    - Pressure Fallback FD Config
  - Temperature Sensor
    - Temperature Sensor Alert
    - Temperature Sensor Alert Enable
    - Temperature Sensor FD Config
- Environment Alerts
  - Supply Pressure
    - Supply
    - Supply Pressure High Alert
    - Supply Pressure High Alert Enable
    - Supply Pressure High Alert Point
    - Supply Pressure Low Alert
    - Supply Pressure Low Alert Enable
    - Supply Pressure Low Alert Point
    - Supply Pressure FD Config
  - Temperature Limit
    - Temperature
    - Temperature High Alert
    - Temperature High Alert Enable
    - Temperature High Alert Point
    - Temperature Low Alert
    - Temperature Low Alert Enable
    - Temperature Low Alert Point
    - Temperature Limit FD Config

Alerts (continued)

- Travel Alerts
  - Working Setpoint
  - Travel (DeChar)
  - Travel Deviation
    - Travel Deviation
    - Travel Deviation Alert
    - Travel Deviation Alert Enable
    - Travel Deviation Alert Point
    - Travel Deviation Time
    - Travel Deviation Deadband
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Minimum Temperature Time

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Minimum Supply Pressure

Minimum Supply Pressure Time

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- Reports
- Faultstate
- Soft Write Lock
- Multi-bit Alarm (Bit-Alarm) Support

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Block Alarm Auto Acknowledge

Disc Alm Disabled

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Factory Serial Number

Field Serial Number

Tag Description

Strategy

Manufacturer

Device Type

Diagnostics Tier

Version

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Appendix C: Field Diagnostic Alerts

C.1 Instrument Alert Conditions

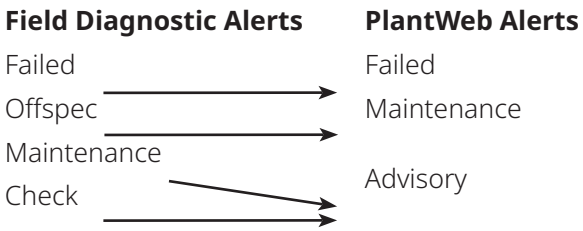
Instrument Alert Conditions, when enabled, detect many operational and performance issues that may be of interest. To view these alerts, the user must open the appropriate status screen on a host such as a ValveLink software or a DeltaV system.

Field Diagnostic Alerts

Some instrument alert conditions can also be used to trigger Field Diagnostic alerts that will be reported in Failed, Function Check, Out of Specification or Maintenance Required categories, as configured by the user.

When a Field Diagnostic alert occurs, the DVC6200f sends an event notification and waits a specified period of time for an acknowledgment to be received. This occurs even if the condition that caused the alert no longer exists. If the acknowledgment is not received within the pre-specified time-out period, the event notification is retransmitted. This reduces the possibility of alert messages getting lost.

Field Diagnostic alerts will be mapped to PlantWeb alerts (PWA) as shown below for older DeltaV systems that do not support Field Diagnostics.



Mode-Based Field Diagnostic Alerts

Some Field Diagnostic alerts are not active unless the transducer block (actual) mode is Auto.

1. Alerts which can be triggered by the activities of the service technician are reported only when the transducer block mode is AUTO.
2. Alerts which are unrelated to service technician activities are reported in all transducer block modes.

Exceptions are as follows:

- Alerts can be simulated regardless of transducer block mode but must be enabled to be reported.
- When a shutdown condition exists (either currently active or latched on through the shutdown recovery parameter) in the transducer block, alerts are reported even though the mode of the transducer block is OOS.

Refer to Table C-1 for reporting of Field Diagnostic alerts.

Alert Handling

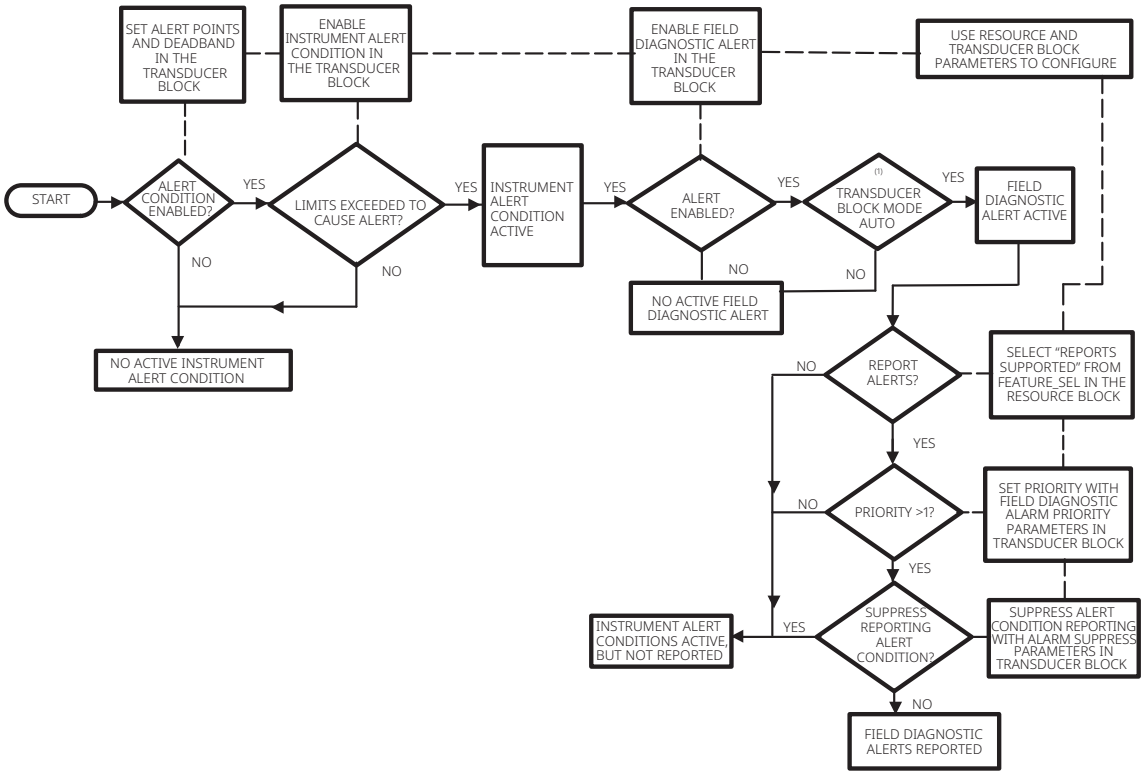
Alert handling is diagrammed in Figure C-1. There are two ways of seeing Field Diagnostic alerts. One way is to see if the instrument alert condition causing the alert is detected. The second is to view alerts reported to the system operator console. For a Field Diagnostic alert to be active, it has to pass four tests.

- The Instrument alert condition is enabled. If a condition is not enabled, the instrument does not check for the alert condition.
- The condition that will cause an alert must exist. For example, the current travel is above the Travel Limit Hi Alert Point.
- The corresponding Field Diagnostic alert must be enabled in one or more of the four categories: Failed, Function Check, Out of Specification or Maintenance Required.
- The transducer block mode must be correct. See Table C-1.

NOTE

Additional details on setting up and using Instrument Alerts can be found on page 61 of this manual.

Figure C-1. Alert Handling



NOTE:

1. CERTAIN FIELD DIAGNOSTIC ALERTS ARE MODE-BASED. SEE TABLE C-1 FOR DETAILS.

Table C-1. Field Diagnostic Alerts Reporting Requirements

Alert	Transducer Block Mode (Actual)
Drive Current	AUTO
Drive Signal	AUTO
Processor Impaired	Any Mode
Output Block Timeout	Any Mode
Block Set to Defaults	Any Mode
Travel Sensor	AUTO
Output Pressure Sensor	Any Mode
Supply Pressure Sensor	Any Mode
Temperature Sensor	Any Mode
Supply Pressure	AUTO
Temperature Limit	AUTO
Travel Deviation	AUTO
Travel Limit	AUTO
Cycle Counter	AUTO
Travel Accumulator	AUTO
Performance Critical	AUTO
Performance Reduced	AUTO
Performance Information	AUTO
Pressure Fallback	AUTO

Alert Reporting

For Field Diagnostic alerts to be reported to the operator console, they must pass four tests:

- Alerts must be active
- Reports must be selected in Feature Select
- Alert priority must be greater than 1
- Reporting must not be suppressed for those conditions that caused active alerts.

Features Selected in the Resource block determines if reporting by the instrument is supported. Refer to page 20 for additional information on Features Selected.

Failed Priority (FAILED_PRI [RB 86]), Maintenance Priority (MAINT_PRI [RB 94]) and Advise Priority (ADVISE_PRI [RB 98]) determine the Field Diagnostic alert priorities. Although 16 priorities are available only three are actually meaningful for Field Diagnostic alerts. If the priority is 0, no reporting occurs. If the priority is 1, reporting is simulated within the instrument, but the alert is not actually reported over the bus. The alert condition is reported for priorities 2 through 15, with the higher priorities taking precedence over the lower priorities.

Failed Suppress (FAILED_MASK [RB 92]), Maintenance Suppress (MAINT_MASK [RB 96]) and Advise Suppress (ADVISE_MASK [RB 100]) determine which of the alert conditions are suppressed so that they are not reported.

Field Diagnostic Alerts Set Block Status

If a Field Diagnostic Alert is active, the AO or DO Block Readback parameter status may change. This behavior is controlled with the Field Diagnostic Alerts Set PV Status parameter in the transducer block.

C.2 Setting Field Diagnostic Alerts

Refer to Table C-2 for information on setting alerts. When selected, Field Diagnostic alerts will set the PV status according to Table C-4.

Table C-2. Setting Field Diagnostic Alerts

Field Diagnostic Alert (Group) (Default Alert Category)	Alert Condition (Default)	What the Alert is Detecting	Related Parameters (Default)	Guidelines for Setting
Drive Current (Electronics) (Failed)	Drive Current (Enabled)	The difference between the expected Drive Current and the actual Drive Current has exceeded the Drive Current Alert Time.	Self Test Shutdown (No) Shutdown Recovery (Manual) Alert Point (10%) Alert Time (2 sec)	Use default settings
Drive Signal (Electronics) (Offspec)	Drive Signal (Enabled)	If one of the following conditions exist for 20 seconds: Where Zero Power Condition is defined as closed: • Drive Signal <10% and Calibrated Travel >3% • Drive Signal >90% and Calibrated Travel <97% Where Zero Power Condition is defined as open: • Drive Signal <10% and Calibrated Travel < 97% • Drive Signal >90% and Calibrated Travel >3%	- - -	Use default setting
Processor Impaired (Electronics) (Failed)	Program Memory (Enabled)	A pending Flash or NVM failure is present.	Self Test Shutdown (No) Shutdown Recovery (Auto)	Use default settings
	Static Memory (Enabled)	A failure of the FRAM memory where static parameters are stored.	Self Test Shutdown (No) Shutdown Recovery (Auto)	Use default setting
	Processor (Enabled)	A failure of the main Processor.	Self Test Shutdown (No) Shutdown Recovery (Auto)	Use default settings
	I/O Processor (Enabled)	A failure of the I/O Processor.	Self Test Shutdown (No) Shutdown Recovery (Auto)	Use default setting

- continued -

Table C-2. Setting Field Diagnostic Alerts (continued)

Field Diagnostic Alert (Group) (Default Alert Category)	Alert Condition (Default)	What the Alert is Detecting	Related Parameters (Default)	Guidelines for Setting
Check	Output Block Timeout (Enabled)	If the analog or discrete output block has not executed for longer than the configured timeout.	Timeout Alert Point (600 s) Self Test Shutdown (No) Shutdown Recovery (Auto)	Enable this alert for loops where the execution is critical. If the AO or DO block is not scheduled or scheduled incorrectly, it will trigger an alert after the Timeout Alert Point has been exceeded. Set the Timeout Alert Point to a value between a. 30 seconds and b. the maximum time before a user should be notified. The minimum number depends on the time it takes for a host to download a configuration to the device. Shutdown can be enabled if it is desired to move the valve to the Zero Power Condition at the same time that the alert is generated.
	Transducer Block Mode error	When there is a mismatch between the Transducer Block Normal, target and actual modes.	- - -	Use default setting
Travel Sensor (Sensors) (Failed)	Travel Sensor (Enabled)	The travel feedback is within acceptable limits.	Self Test Shutdown (No) Shutdown Recovery (Auto)	Double Acting Actuators — **Enable the alert** and configure it to report in the Failed Alert Category. **Self Test Shutdown is generally not enabled**. Single Acting Actuators — If Travel / Pressure Control is configured as Travel with Pressure Fallback: enable the alert and configure it to report in the Maintenance Alert Category. **Do not enable Self Test Shutdown**. If Travel / Pressure Control is configured as Travel: **Enable the alert** and configure it to report in the Failed Alert Category. **Self Test Shutdown is generally not enabled**.
Output Press Sensor (Sensors) (Offspec)	Port A Pressure Sensor (Enabled)	The pressure sensor reading is outside the functional range of the sensor.	Self Test Shutdown (No) Shutdown Recovery (Auto)	If Travel / Pressure Control is configured as Pressure: enable the alert and configure it to report in the Failed Alert Category. Enable the Self Test Shutdown. For all other Travel / Pressure Control selections, **enable the alert** to report in the Maintenance Alert Category and **do not enable the Self Test Shutdown**.
	Port B Pressure Sensor (Enabled)		None	Use default setting

- continued -

Table C-2. Setting Field Diagnostic Alerts (continued)

Field Diagnostic Alert (Group) (Default Alert Category)	Alert Condition (Default)	What the Alert is Detecting	Related Parameters (Default)	Guidelines for Setting
Supply Press Sensor (Sensors) (Maintenance)	Supply Press Sensor (Enabled)	The pressure sensor reading is outside the functional range of the sensor.	None	Use default settings
Temperature Sensor (Sensors) (Maintenance)	Temperature Sensor (Enabled)	The temperature sensor reading is outside the functional range of the sensor.	None	Use default settings
Pressure Fallback (Sensors) (Maintenance)	Pressure Fallback (Enabled)	A travel sensor failure or large travel deviation has resulted in fallback to pressure control.	None	Use default settings
Supply Pressure (Environment) (Offspec)	Supply Press High (Enabled)	The supply pressure has exceeded the Supply Pressure Hi Alert Point.	Alert Point (145 psig)	Enable the alert in the Maintenance Alert Category. Set the Alert Point to **which ever is lower of** a. the maximum instrument pressure of 145 psig or b. the maximum actuator casing pressure. Or c. set to 5 psig over supply pressure.
	Supply Press Low (Enabled)	The supply pressure is lower than the Supply Pressure Lo Alert Point.	Alert Point (19 psig)	Enable the alert in the Offspec Alert Category. Double Acting Actuators — Set the Alert Point above the minimum required for valve shutoff and no greater than **3 psig below** supply pressure. Single Acting Actuators — Set the Alert Point above the minimum required for valve shutoff and no greater than **1 psig below** the supply regulator setting. This is generally about 3 psig above the actuator upper bench set (stroking) pressure.
Temperature Limit (Environment) (Maintenance)	Temperature High (Enabled)	The temperature is greater than the Temperature Hi Alert Point.	Alert Point (186°F)	Use default settings. Other alert points may be chosen to indicate changes in the instrument environment.
	Temperature Low (Enabled)	The temperature is lower than the Temperature Lo Alert Point.	Alert Point (-63°F)	Enable the alert in the Maintenance Alert Category. Set the Alert Point at -40°F if the instrument uses Nitrile elastomers and -63°F if it uses Fluorosilicone elastomers. Other alert points may be chosen to indicate changes in the instrument environment.

- continued -

Table C-2. Setting Field Diagnostic Alerts (continued)

Field Diagnostic Alert (Group) (Default Alert Category)	Alert Condition (Default)	What the Alert is Detecting	Related Parameters (Default)	Guidelines for Setting
Travel Deviation (Travel) (Offspec)	Travel Deviation (Enabled)	The Travel Deviation has exceeded the Travel Deviation Alert Point by more than the Travel Deviation Time.	Alert Point (5%) Alert Time (10 sec) Deadband (2%)	Enable the alert in the Maintenance Alert Category. Use the default settings with valves that are 4 in. and smaller with PTFE packing systems. With other valves, the user can refine the settings with ValveLink software Dynamic Error Band and Step Response Tests. Set the related parameters as follows: Tvl Dev Alert Point—set equal times 2 the Maximum Dynamic Error, minimum 3% Tvl Dev DB — set equal to the Dynamic Error Band, minimum 2% Tvl Dev Time — set equal to the T98 time for a Step Test from 0 to 100% Travel, minimum 10 seconds.
Travel Limit (Travel) (Maintenance)	Travel Limit Hi Hi (Disabled)	The Travel has exceeded the Travel Limit Hi Hi Alert Point	Alert Point (125%) Deadband (5%)	Enable this alert for critical loops, where it is important to alert an operator if the valve is approaching the wide open position. A typical setting might be 95%.
	Travel Limit Lo Lo (Disabled)	The Travel is lower than the Travel Limit Lo Lo Alert Point.	Alert Point (-25%) Deadband (5%)	Enable this alert for critical loops, where it is important to alert an operator if the valve is approaching the closed position. A typical setting might be 5%.
(Travel)	Travel Limit Hi (Disabled)	The Travel has exceeded the Travel Limit Hi Alert Point.	Alert Point (125%) Deadband (5%)	Use the Alert Points and Deadband to configure the Proximity Alerts below.
	Travel Limit Lo (Disabled)	The Travel is lower than the Travel Limit Lo Alert Point.	Alert Point (-25%) Deadband (5%)	Use the Alert Points and Deadband to configure the Proximity Alerts below.
(Proximity)	Travel Open (Disabled)	The Travel is greater than the Open Alert Point.	Alert Point (99.5%) Deadband (5%)	Enable and set to report Travel with DI Block.
	Travel Closed (Disabled)	The Travel is greater than the Closed Alert Point.	Alert Point (0.5%) Deadband (5%)	Enable and set to report Travel with DI Block.
	Proximity Hi Hi (Disabled)	The Travel is within the configured band of the configured center point.	Alert Point (125%) Deadband (5%)	Enable and set to report Travel with DI Block.
	Proximity Hi (Disabled)		Alert Point (125%) Deadband (5%)	Enable and set to report Travel with DI Block.
	Proximity Lo (Disabled)		Alert Point (-25%) Deadband (5%)	Enable and set to report Travel with DI Block.
	Proximity Lo Lo (Disabled)		Alert Point (-25%) Deadband (5%)	Enable and set to report Travel with DI Block.

- continued -

Table C-2. Setting Field Diagnostic Alerts (continued)

Field Diagnostic Alert (Group) (Default Alert Category)	Alert Condition (Default)	What the Alert is Detecting	Related Parameters (Default)	Guidelines for Setting
Movement History (Travel History) (Offspec)	Cycle Counter (Disabled)	The number of travel reversals has exceeded the configured limit.	Alert Point (1,000,000) Deadband (1%)	Bellows Seal Bonnets — enable the alert in the Maintenance Alert Category. Use the bellows manufacturer's cycle life data to set cycle limits.
	Travel Accumulator (Disabled)	The accumulated travel has exceeded the configured limit.	Alert Point (1,000,000) Deadband (1%)	Packing Bonnets — enable the alert in the Maintenance Alert Category. When packing leaks are discovered, set the Travel Accumulator alert to 90% of the current Travel Accumulator Value, triggering an alert prior to anticipated leak.
Performance Critical[1] (Performance) (Failed)	Performance Critical (Enabled)	Critical performance issues based on continuous PD tests internal to the instrument.	None	Use default setting
Performance Reduced[1] (Performance) (Offspec)	Performance Reduced (Enabled)	Reduced performance issues based on continuous PD tests internal to the instrument.	None	Use default setting
Performance Information[1] (Performance) (Check)	Performance Information (Enabled)	Performance Information based on continuous PD tests internal to the instrument.	None	Use default setting
Latch Active (Function Check)	Latch Active (Enabled)	Either the position latch or the setpoint latch is active.		Use default setting
PST Pass[2]	PST Pass (Enabled)	A successful partial stroke test was run	None	None
PST Abnormal[2] (Maintenance)	PST Abnormal (Enabled)	If the valve reached the minimum travel point, returned to the normal end and some simple configuration errors like when the set point change is smaller than the minimum PST travel point. The user can add to this list of evaluation criteria.	Outgoing pressure threshold Incoming pressure threshold Breakout pressure threshold Breakout Time PST completion time	Enable the outgoing pressure threshold and set the alert point.
FST Pass[2]	FST Pass (Enabled)	A successful full stroke test was run.	None	None

- continued -

Table C-2. Setting Field Diagnostic Alerts (continued)

Field Diagnostic Alert (Group) (Default Alert Category)	Alert Condition (Default)	What the Alert is Detecting	Related Parameters (Default)	Guidelines for Setting
FST Abnormal[2] (Maintenance)	FST Abnormal (Enabled)	If the valve reached the opposite end, returned to the normal end. The user can add to this list of evaluation criteria.	FST completion timeout	Use default setting
Diagnostic in Progress (Check)	Diagnostic in Progress (Enabled)	A diagnostic is in progress (PST, FST, Total Scan, Step Response).	None	Use default setting
Test Overdue[2]	PST Overdue (Disabled)	Time since the last good PST is more than the configured PST overdue threshold.	PST Overdue threshold	Enable this alert for valves where periodic PST is required.
	FST Overdue (Disabled)	Time since the last good FST is more than the configured FST overdue threshold.	FST Overdue threshold	Enable this alert for valves where periodic PST is required.
Stroke History	Stroke Open time exceeded (Disabled)	The measured open stroke time is more than the configured stroke open time threshold.	Stroke Open threshold	Enable this alert for valves where stroke open time is critical.
Stroke History	Stroke close time exceeded (Disabled)	The measured close stroke time is more than the configured stroke close time threshold.	Stroke Close threshold	Enable this alert for valves where stroke close time is critical.
PST Pending[2]	Automatic PST Pending (Enabled)	An automatic PST is due sooner than the configured PST Pending alert time	PST Pending Alert Time	Enable this alert when using auto PST and configure an alert time that allows enough time for the operator to safely run a PST when the process permits.

1. Performance Alerts are only available with a PD or a PST instrument.
2. FST/PST Alerts are only available with a PST instrument.

C.3 Using Field Diagnostic Alerts

Refer to Table C-3 for information on using Field Diagnostic alerts.

Table C-3. Using Field Diagnostic Alerts

Field Diagnostic Alert (Group) (Default Alert Category)	Alert Condition (Default)	What the Alert is Detecting	Effect on Valve/ Instrument	Recommended Action	Help
Drive Current (Electronics) (Failed)	Drive Current (Enabled)	The difference between the expected Drive Current and the actual Drive Current has exceeded the Drive Current Alert Time.	If configured for Self Test Shutdown, then the transducer Actual mode is placed Out of Service until the problem is fixed. Out of Service results in the instrument output pressure(s) and actuator position being at the Zero Power Condition.	Check I/P module	The instrument has detected that the difference between the expected Drive Current and the actual Drive Current is greater than the configured limit for more than the configured time 1) Replace the I/P module 2) Calibrate the device. If the problem persists, replace the printed wiring board (PWB) assembly.
Drive Signal (Electronics) (Offspec)	Drive Signal (Enabled)	If one of the following conditions exist for 20 seconds: Where Zero Power Condition is defined as closed: Drive Signal < 10% and Calibrated Travel > 3% Drive Signal > 90% and Calibrated Travel < 97% Where Zero Power Condition is defined as open: Drive Signal < 10% and Calibrated Travel < 97% Drive Signal > 90% and Calibrated Travel > 3%	None - Indicates reduced performance.	Check instrument pneumatics	The instrument I/P drive signal necessary to generate the pressure output from the instrument is not within the expected range. Potential causes include I/P filter plugged, instrument pneumatic relay failure, low supply pressure, air leaks or valve sticking. Test the control valve assembly for proper operation. ValveLink diagnostics can be used for this purpose.
Processor Impaired (Electronics) (Failed)	Program Memory (Enabled)	A pending Flash or NVM failure is present.	If configured for Self Test Shutdown, then the transducer Actual mode is placed Out of Service until the problem is fixed. Out of Service results in the instrument output pressure(s) and actuator position being at the Zero Power Condition.	Replace PWB assembly	An error has been detected in the printed wiring board (PWB) assembly. Replace the PWB assembly.
	Static Memory (Enabled)	A failure of the FRAM memory where static parameters are stored.			
	Processor (Enabled)	A failure of the main Processor.			
	I/O Processor (Enabled)	A failure of the I/O Processor.			

- continued -

Table C-3. Using Field Diagnostic Alerts (continued)

Field Diagnostic Alert (Group) (Default Alert Category)	Alert Condition (Default)	What the Alert is Detecting	Effect on Valve/ Instrument	Recommended Action	Help
Check	Output Block Timeout (Enabled)	If the analog or discrete output block has not executed for longer than the configured timeout.	If configured for Self Test Shutdown, then the transducer Actual mode is placed Out of Service until the problem is fixed. Out of Service results in the instrument output pressure(s) and actuator position being at the Zero Power Condition.	Check Output Block	To correct try the following, in order, until the issue is resolved. 1. Verify that the Transducer block's target and actual modes are equal to its normal mode (typically AUTO). 2. Verify that the Output Block Timeout time is at least twice the macro cycle. 3. Perform a download from the controller.
	Transducer Block Mode error	When there is a mismatch between the Transducer Block Normal, target and actual modes.	- - -	- - -	1. Verify that the Transducer block's target and actual modes are equal to its normal mode (typically AUTO).
Travel Sensor (Sensors) (Failed)	Travel Sensor (Enabled)	The travel feedback is within acceptable limits.	If configured for Self Test Shutdown, then the transducer "Actual" mode is placed Out of Service until the problem is fixed. Out of service results in the actuator being at the Zero Power Condition.	Check mounting and linkage	Travel feedback value is outside expected limits. If this problem occurs during instrument set-up, the most likely cause is faulty mounting or improper adjustment of the travel sensor. If this problem occurs during normal operation, the most likely cause is a failure of the travel sensor or damaged linkage. To correct, 1) Insure proper mounting and linkage adjustment. 2) Inspect and test travel sensor 3) Toggle the transducer target mode. If the problem persists, replace the printed wiring board (PWB) assembly.

- continued -

Table C-3. Using Field Diagnostic Alerts (continued)

Field Diagnostic Alert (Group) (Default Alert Category)	Alert Condition (Default)	What the Alert is Detecting	Effect on Valve/ Instrument	Recommended Action	Help
Output Press Sensor (Sensors) (Offspec)	Port A Pressure Sensor (Enabled)	The pressure sensor reading is outside the functional range of the sensor.	If configured for Self Test Shutdown, then the transducer "Actual" mode is placed Out of Service until the problem is fixed. Out of service results in the actuator being at the "No Power" condition.	Confirm proper air supply	The pressure sensor on-board the device has failed. This may be due to excessive supply pressure or contaminated air. If it is verified that the air supply is ok, replace the printed wiring board (PWB) assembly.
	Port B Pressure Sensor (Enabled)		None - Indicates a possible hardware problem that would degrade diagnostic capability.		
Supply Press Sensor (Sensors) (Maintenance)	Supply Press Sensor (Enabled)	The pressure sensor reading is outside the functional range of the sensor.	None - Indicates a possible hardware problem that would degrade diagnostic capability.	Confirm proper air supply	The pressure sensor on-board the device has failed. This may be due to excessive supply pressure or contaminated air. If it is verified that the air supply is ok, replace the printed wiring board (PWB) assembly.
Temperature Sensor (Sensors) (Maintenance)	Temperature Sensor (Enabled)	The temperature sensor reading is outside the functional range of the sensor.	None - Indicates a possible hardware problem that would degrade instrument calibration and diagnostic capability.	Replace PWB assembly	The temperature sensor on-board the device has failed or the unit has been exposed to an temperature extreme beyond the recommended limits.
Pressure Fallback (Sensors) (Maintenance)	Pressure Fallback (Enabled)	A travel sensor failure or large travel deviation has resulted in fallback to pressure control.	None - Indicates a reduced performance condition.	Check instrument feedback linkage and travel sensor	The instrument has detected that the travel sensor is outside its normal range of operation or that a gross deviation exists between set point and actual travel. It has switched to Pressure Control and is no longer using the travel sensor to position the valve.

- continued -

Table C-3. Using Field Diagnostic Alerts (continued)

Field Diagnostic Alert (Group) (Default Alert Category)	Alert Condition (Default)	What the Alert is Detecting	Effect on Valve/ Instrument	Recommended Action	Help
Supply Pressure (Environment) (Offspec)	Supply Press High (Enabled)	The supply pressure has exceeded the Supply Pressure Hi Alert Point.	None - Indicates a condition that could cause damage to the instrument or actuator.	Confirm proper air supply	The actual supply pressure reading exceeded or is below the configured alert setting.
	Supply Press Low (Enabled)	The supply pressure is lower than the Supply Pressure Lo Alert Point.	None - Indicates a condition that could reduce performance or prevent the valve from shutting tightly.		
Temperature Limit (Environment) (Maintenance)	Temperature High (Enabled)	The temperature is greater than the Temperature Hi Alert Point.	None - Indicates a condition that could shorten service life or lead to reduced performance.	Check instrument environment	The actual temperature reading at the on-board temperature sensor exceeded the configurable temperature limit.
	Temperature Low (Enabled)	The temperature is lower than the Temperature Lo Alert Point.			
Travel Deviation (Travel) (Offspec)	Travel Deviation (Enabled)	The Travel Deviation has exceeded the Travel Deviation Alert Point by more than the Travel Deviation Time.	None - Indicates a reduced performance condition.	Check valve friction, supply air, instrument tuning	The valve travel is not following setpoint. Check operation of the valve and instrument. Possible items include; sticking valve, low supply pressure, broken feedback linkage, instrument pneumatic components, actuator, instrument tubing, poor instrument tubing, poor instrument tuning, etc. Test the control valve assembly for proper operation. ValveLink software diagnostics can be used for this purpose.
Travel Limit (Travel) (Maintenance)	Travel Limit Hi Hi (Disabled)	The Travel has exceeded the Travel Limit Hi Hi Alert Point.	None	Check process loop	The actual valve position has exceeded the configurable travel limit (in %).
	Travel Limit Lo Lo (Disabled)	The Travel is lower than the Travel Limit Lo Lo Alert Point.	None	Check process loop	
- - - (Travel)	Travel Limit Hi (Disabled)	The Travel has exceeded the Travel Limit Hi Alert Point.	None	Check process loop	The actual valve position has exceeded the configurable travel limit (in %).
	Travel Limit Lo (Disabled)	The Travel is lower than the Travel Limit Lo Alert Point.	None	Check process loop	

- continued -

Table C-3. Using Field Diagnostic Alerts (continued)

Field Diagnostic Alert (Group) (Default Alert Category)	Alert Condition (Default)	What the Alert is Detecting	Effect on Valve/ Instrument	Recommended Action	Help
- - - (Proximity)	Travel Open (Disabled)	The Travel is greater than the Open Alert Point	None	Check process loop	The actual valve position has exceeded the configurable travel limit (in %).
	Travel Closed (Disabled)	The Travel is greater than the Closed Alert Point	None	Check process loop	
	Proximity Hi Hi (Disabled)	The Travel is within the configured band of the configured center point.	None	Check process loop	
	Proximity Hi (Disabled)				
	Proximity Lo (Disabled)				
	Proximity Lo Lo (Disabled)				
Movement History (Travel History) (Offspec)	Cycle Counter (Disabled)	The number of travel reversals has exceeded the configured limit.	None	Perform periodic maintenance	Either the actual value of the travel accumulator or the cycle counter has exceeded the configurable limit.
	Travel Accumulator (Disabled)	The accumulated travel has exceeded the configured limit.	None	Perform periodic maintenance	
Performance Critical[1] (Performance) (Failed)	Performance Critical (Enabled)	Critical performance issues based on continuous PD tests internal to the instrument.	None - Indicates control has been lost or severely reduced.	Check I/P, Relay, Valve, Actuator or Ext. Tubing as indicated.	On-board diagnostics have detected a critical performance issue that may result in loss of control or severe reduction in control performance. Check or replace the component indicated in the possible cause detail.
Performance Reduced[1] (Performance) (Offspec)	Performance Reduced (Enabled)	Reduced performance issues based on continuous PD tests internal to the instrument.	None - Indicates reduced performance.	Check I/P, Relay, Valve, Actuator or Ext. Tubing as indicated.	On-board diagnostics have detected a performance issue that has reduced control performance. Check or replace the component indicated in the possible cause detail.
Performance Information[1] (Performance) (Check)	Performance Information (Enabled)	Performance Information based on continuous PD tests internal to the instrument.	None - Indicates information that may pertain to control performance.	No action required.	On-board diagnostics have detected an abnormal performance condition. No immediate action required.

- continued -

Table C-3. Using Field Diagnostic Alerts (continued)

Field Diagnostic Alert (Group) (Default Alert Category)	Alert Condition (Default)	What the Alert is Detecting	Effect on Valve/ Instrument	Recommended Action	Help
Latch Active (Function Check)	Latch Active (Enabled)	Either the position latchor the setpoint latch is active	Valve will not respond to setpoint changes until the latch is cleared.	Position latch has to be cleared manually. Ensure the supply pressure is higher than the threshold and the output block is normal and then perform a reset i.e. press the reset button or issue a reset from the user interface. Setpoint Latch will follow the user configured reset, if the transducer block is targeted to Auto. Manual Reset: Output block initiated demand will latch and need to be cleared by taking the output block to normal and issuing a reset from the user interface.	- - -
PST Pass[2]	PST Pass (Enabled)	A successful partial stroke test was run.	None	No action required.	Informational, no action required.
PST Abnormal[2] (Maintenance)	PST Abnormal (Enabled)	If the valve reached the minimum travel point, returned to the normal end and some simple configuration errors like when the set point change is smaller than the minimum PST travel point. The user can add to this list of evaluation criteria.	Valve may not go to the demand position when commanded.	Identify the cause and address the problem.	If the test was not cancelled then initiate another PST and check if the valve moves smoothly to its PST target position and returns to its normal seat within the configurable PST completion time. Verify that the supply pressure low alert was not active during the test.
FST Pass[2]	FST Pass (Enabled)	A successful full stroke test was run.	None	No action required.	Informational, no action required.

- continued -

Table C-3. Using Field Diagnostic Alerts (continued)

Field Diagnostic Alert (Group) (Default Alert Category)	Alert Condition (Default)	What the Alert is Detecting	Effect on Valve/ Instrument	Recommended Action	Help
FST Abnormal[2] (Maintenance)	FST Abnormal (Enabled)	If the valve reached the opposite end, returned to the normal end. The user can add to this list of evaluation criteria.	Valve may not go to the demand position when commanded.	Identify the cause and address the problem.	If the test was not cancelled then initiate another FST and check if the valve moves smoothly to its FST target position and returns to its normal seat within the configurable FST completion time. Verify that the supply pressure low alert was not active during the test.
Diagnostic In Progress (Check)	Diagnostic in Progress (Enabled)	A diagnostic is in progress (PST, FST, Total Scan, Step Response)	None	None	Informational, no action required.
Test Overdue[2]	PST Overdue (Disabled)	Time since the last good PST is more than the configured PST overdue threshold.	SIL numbers for the shutdown valve may be affected.	Run a successful PST at the earliest possible process window.	The actual duration since a successful stroke test has exceeded a configurable limit. Run a stroke test at the earliest possible process window.
	FST Overdue (Disabled)	Time since the last good FST is more than the configured FST overdue threshold.	SIL numbers for the shutdown valve may be affected.	Run a successful full stroke test at the earliest possible process window.	
Stroke History	Stroke Open time exceeded (Disabled)	The measured open stroke time is more than the configured stroke open time threshold.	Valve stroke times will not be met.	Run a full stroke test / total scan to identify the problem.	Stroke time is outside the configured limit. Check operation of the valve and instrument. Possible items include: sticking valve, low supply pressure, instrument pneumatic components, actuator, instrument tubing etc.
	Stroke close time exceeded (Disabled)	The measured close stroke time is more than the configured stroke close time threshold.	Valve stroke times will not be met.	Run a full stroke test / total scan to identify the problem.	
PST Pending[2]	Automatic PST Pending (Enabled)	An automatic PST is due sooner than the configured PST Pending alert time	Periodic PST may be required to maintain the target SIL level for the valve assembly.	Run a PST per schedule.	- - -

1. Performance Alerts are only available with a PD or a PST instrument.
2. FST/PST Alerts are only available with a PST instrument

Table C-4. Output Block PV Status

FEATURE_SEL Field Diagnostic Alerts Set PV Status	Transducer Mode, Actual	Active Field Diagnostic Alarms	AO/DO PV Status	AO/DO PV Substatus	AO/DO PV Limit Substatus(1)
Enabled	OOS	X	Bad	Device Failure	Constant
	Man	X	Bad	Non-specific	Constant
	Auto	Fail	Uncertain	Subnormal	See Table C-5
	Auto	Maint, no Fail	Uncertain	Non-specific	See Table C-5
	Auto	Advisory, no Fail, no Maint	Good	Advisory	See Table C-5
	Auto	None	Good	Non-Specific	See Table C-5
Not Enabled	OOS	X	Bad	Device Failure	Constant
	Man	X	Bad	Non-Specific	Constant
	Auto	Fail	Good	Non-Specific	See Table C-5
	Auto	Maint, no Fail	Good	Non-Specific	See Table C-5
	Auto	Advisory, no Fail, no Maint	Good	Non-Specific	See Table C-5
	Auto	None	Good	Non-Specific	See Table C-5

NOTES:
X = No Effect
1. PV limit substatus reflects only READBACK limit substatus. SP limit substatus reflects only out block rate limits.

Table C-5. Limit Sub Status

Out Block	Transducer Mode	In Cutoff Region	Rate Limited	Limit Sub-Status
AO, DO	OOS	X	X	Constant
AO, DO	MAN	X	X	Constant
AO	AUTO	High	X	High Limited
AO	AUTO	Low	X	Low Limited
AO	AUTO	X	High	High Limited
AO	AUTO	X	Low	Low Limited
AO	AUTO	None	None	Not Limited
DO	AUTO	X	High	High Limited
DO	AUTO	X	Low	Low Limited
DO	AUTO	X	None	Not Limited

NOTE: X = No Effect

Appendix D: FOUNDATION Fieldbus Communication

DDVC6200f digital valve controllers use the FOUNDATION Fieldbus to communicate with other fieldbus instruments and the control system. Fieldbus is an all digital, serial, two-way communication system which interconnects “field” equipment such as transmitters, digital valve controllers and process controllers. Fieldbus is a local-area network (LAN) for instruments used in both process and manufacturing automation with built-in capability to distribute the control application across the network.

D.1 Function Block Overview

A fieldbus system is a distributed system composed of field devices and control and monitoring equipment integrated into the physical environment of a plant or factory. Fieldbus devices work together to provide I/O and control for automated processes and operations. The Fieldbus Foundation provides a framework for describing these systems as a collection of physical devices interconnected by a fieldbus network. One of the ways that the physical devices are used is to perform their portion of the total system operation by implementing one or more function blocks.

Function Blocks

Function blocks within the fieldbus device perform the various functions required for process control. Because each system is different, the mix and configuration of functions are different. Therefore, the Fieldbus Foundation has designed a range of function blocks, each addressing a different need: Analog Input Block (AI), Multiple Analog Input (MAI), Discrete Input Block (DI), Manual Loader Block (ML), Bias/Gain Station Block (BG), Control Selector Block (CS), P, PD Controller Block (PD), PID, PI, I Controller Block (PID), Ratio Station Block (RA), Analog Output Block (AO) and Discrete Output Block (DO).

Function blocks perform process control functions, such as analog input (AI) and analog output (AO) functions as well as proportional-integral-derivative (PID) functions. The standard function blocks provide a common structure for defining function block inputs, outputs, control parameters, events, alarms and modes and combining them into a process that can be implemented within a single device or over the fieldbus network. This simplifies the identification of characteristics that are common to function blocks.

The Fieldbus Foundation has established the function blocks by defining a set of parameters used in all function blocks called universal parameters. The Fieldbus Foundation has also defined a standard set of function block classes, such as input, output, control and calculation blocks. Each of these classes have a set of parameters established for it. Additionally, they have published definitions for transducer blocks commonly used with standard function blocks. Examples include temperature, pressure, level and flow transducer blocks.

Fieldbus Foundation specifications and definitions allow vendors to add their own, extended parameters, as well as their own algorithms. This approach permits extending function block definitions as new requirements are discovered and as technology advances.

Each block has a tag name. Service personnel need only know the tag name of the block to access or change the appropriate block parameters.

Input events may affect the operation of the algorithm. An execution control function regulates the receipt of input events and the generation of output events during execution of the algorithm. Upon completion of the algorithm, the data internal to the block is saved for use in the next execution, and the output data is snapped, releasing it for use by other function blocks.

Once the inputs are snapped, the algorithm operates on them, generating outputs as it progresses. Algorithm executions are controlled through the setting of internal parameters. Internal parameters do not appear as normal input and output parameters. However, they may be accessed and modified remotely, as specified by the function block.

Figure D-1 illustrates the internal structure of a function block. When execution begins, input parameter values from other blocks are snapped-in by the block. The input snap process ensures that these values do not change during the block execution. New values received for these parameters do not affect the snapped values and will not be used by the function block during the current execution.

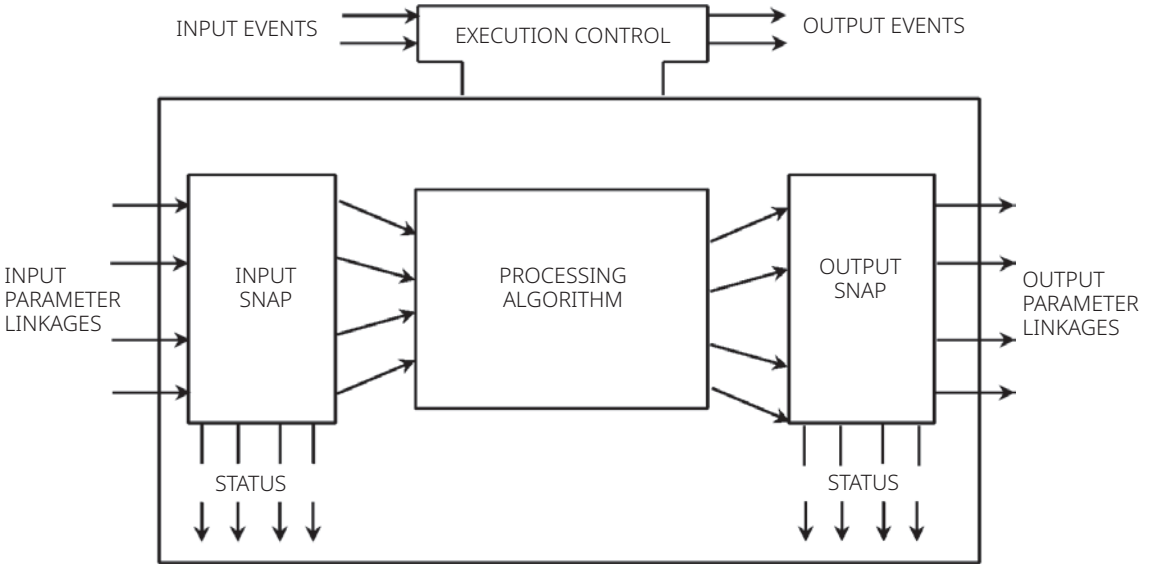
Function blocks are also capable of performing short-term data collection and storage for reviewing their behavior.

Refer to Appendix E for DVC6200f specific function blocks.

Instrument-Specific Blocks

In addition to function blocks, fieldbus devices contain two other block types to support the function blocks. These are the resource block and the transducer block. The resource block contains the hardware specific characteristics associated with a device. Transducer blocks couple the function blocks to local input/output functions.

Figure D-1. Function Block Internal Structure



Resource Blocks

The resource block contains hardware specific characteristics associated with the device; it has no input or output parameters. The algorithm within a resource block monitors and controls the general operation of the physical device hardware. The execution of this algorithm is dependent on the characteristics of the physical device, as defined by the manufacturer. As a result of this activity, the algorithm may cause the generation of events. There is only one resource block defined for a device. For example, placing the resource block in Out of Service mode stops all function block execution, by setting their modes to Out of Service as well. The actual mode of the function blocks is changed to Out of Service, but the function block target modes will not change. Placing the resource block in the Out of Service mode does not affect the mode of the transducer block.

Transducer Blocks

Transducer blocks connect function blocks to local input/output functions. They read sensor hardware and write to effector (actuator) hardware. This permits the transducer block to execute as frequently as necessary to obtain good data from sensors and ensure proper writes to the actuator without burdening the function blocks that use the data. The transducer block also isolates the function block from the specific characteristics of the physical I/O.

D.2 Block Modes

All blocks have modes. The mode determines the source of the set point, the destination of the output, how the block executes and the relationship between setpoint and output. The block mode is determined by the Block Mode parameter. It is a structured parameter composed of the attributes actual, target, permitted and normal. The following defines each of the attributes.

- Target mode—The Target mode is the mode requested by the user or host system. Only one mode is allowed to be set and it must be a permitted mode as defined by the permitted attribute of the mode parameter.
- Actual mode—This is the current mode of the block. The actual mode may differ from the target mode due to operating conditions of the block.
- Permitted mode—The permitted mode defines the modes allowed for the block. This is set by the user or host system but is restricted by the instrument to modes supported by the instrument for the particular block. Any change request to the Target or Normal attribute is checked against the permitted attribute to ensure the requested mode is permitted.

When setting the Permitted mode, there is no check against any of the other attributes (Normal or Target modes). Therefore, the normal or target mode attributes may have a value that is not permitted because the permitted attribute was modified after the Normal or Target mode was set. This will have no effect on the instrument until the user attempts to modify the Target or Normal mode. At this time these attributes are tested against the Permitted modes, thus the user cannot change the Normal or Target modes to what was formerly permitted.

- Normal mode—The normal mode is the mode the block should be in during normal operating conditions. The normal mode is set by the user or host system and can only be set to a permitted mode (see permitted mode). The user or host system can compare the actual mode to the normal mode and, based on the results, determine if the block is operating normally.

Table D-1 lists the modes supported by each block contained in the digital valve controller.

Table D-1. DVC6200f Block Modes

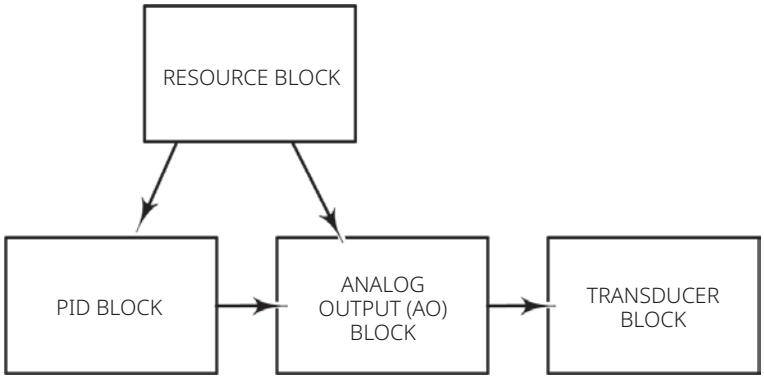
Block	Supported Mode Values
Resource	Auto and OOS
Transducer	Auto, Manual and OOS
AO	RCas, Cas, Auto, Man, LO(1), IMan(1) and OOS
PID	ROut, RCas, Cas, Auto, Man, LO(1), IMan(1) and OOS
CSEL	Auto, Man, IMan(1), OOS
ISEL	Auto, Man and OOS
OS	IMan(1), Auto, Cas and OOS
AI	Man, Auto and OOS
MAI	Man, Auto and OOS
DO	RCas, Cas, Auto, Man, LO(1), IMan(1) and OOS
DI	Auto, Man and OOS
1. This mode cannot be specified as a target mode.	

Changing the block mode requires accessing the Block Mode parameter. For information on using the host system to change the block mode via this parameter, see the appropriate host documentation.

NOTE

A downstream block changing to Out of Service impacts the mode of the upstream block. Refer to the block hierarchy in Figure D-2.

Figure D-2. Digital Valve Controller Block Hierarchy Example



NOTES:

1. CHANGING THE RESOURCE BLOCK TO OUT OF SERVICE CHANGES ALL FUNCTION BLOCKS TO OUT OF SERVICE, BUT DOES NOT AFFECT THE TRANSDUCER BLOCK.
2. CHANGING A DOWNSTREAM BLOCK TO OUT OF SERVICE AFFECTS THE UP STREAM BLOCK. FOR EXAMPLE: WHEN THE TRANSDUCER BLOCK IS OUT OF SERVICE, THE AO BLOCK MODE WILL CHANGE TO IMAN (INITIALIZE MANUAL).

NOTE

There is no mode associated with the FOUNDATION fieldbus Loop. Mode is dependent on the blocks within the Loop.

Explanation of Modes

Out of Service (OOS)—The functions performed by the block are not executed. If the block has any outputs, these typically do not update and the status of any values passed to downstream blocks will be “BAD”. To make changes to some of the parameters in a block requires that the block be Out of Service.

Initialization Manual (IMan)—Only the AO, DO, OS, PID and CSEL blocks support this mode. When one of these blocks detects a loss of a correct path to the downstream block (such as when the downstream block is in the OOS, Man or LO mode), it enters the IMan mode. For example, when the transducer block enters the OOS mode, the AO block enters the IMan mode.

Local Override (LO)—Only the AO, DO and PID blocks support this mode. If the PID block enters the LO mode, the block output follows the tracking value (TRK_VAL), if external tracking is enabled by TRK_IN_D. In the AO and DO block, the block enters LO mode when the block detects that fault state is active. In this case, the output is determined by the selection for I/O_OPTS.

Manual (Man)—If the data status of a function block's input is bad or its target mode is Man, the block enters the manual mode. In this mode, the function block does not update its OUT value. If the target is Man, the user may write a desired value to the output.

Automatic (Auto)—The block performs the specified calculations based on the local set point and outputs the result, independently without interfacing with another block. The user can write to the set point of a block in this mode. Any block outputs continue to update.

Cascade (Cas)—The block performs the specified calculations based on the set point from another block via the cascade input parameter and outputs the result. Any block outputs continue to update.

Remote Output (ROut)—The block outputs are set to the value of the remote output parameter that is written by a host computer or others. To prevent a sudden change in output, the block's calculations are initialized when a change in mode occurs.

Remote Cascade (RCas)—The block performs the specified calculations based on a set point from a host computer or others via the remote cascade input and outputs the result. If the block has any outputs, these continue to update.

Examples of Modes for Various Operational Statuses

Table D-2 shows examples of block mode combinations in a digital valve controller (however it does not show all combinations). When a block changes mode or the data status signal changes for some reason, the other blocks connected to that block identify the change by detecting the change in status of an input signal and change their modes too. For example, when the data status of BKCAL_IN in a PID block changes to bad, the PID block automatically changes its mode to Iman to initialize the control of its downstream block.

Table D-2. Examples of Block Mode Combinations and Operational statuses for an Instrument with Standard Control

OPERATIONAL STATUS	BLOCKS		
	PID	AO	TB(1)
Initial Setup and calibration	- - -	OOS	OOS
Modification of some transducer block parameters	- - -	IMan	Manual
Constant valve position control	- - -	Auto	Auto
PID Single-loop control	Auto	Cas	Auto
PID Cascade-loop control	Primary PID, Auto Secondary PID, Cas	Cas	Auto
1. TB=Transducer Block			

The respective modes to which each block should enter upon occurrence of a communication error and at a restart and the handling of signals in each mode may be defined in the block's option parameters such as IO_OPTS and STATUS_OPTS. For details, see the detailed descriptions of each function block.

D.3 Device Descriptions

Device Descriptions are specified definitions that are associated with blocks. Device descriptions provide for the definition and description of blocks and their parameters.

Device descriptions may also include a set of processing routines called Methods. Methods provide a procedure for accessing and manipulating a series of parameters within a device, such as for setup and calibration. Methods are used for a variety of functions including automatic calibration, setting protection and setting up the instrument. These Methods are a predetermined sequence of steps for information required to setup, calibrate and perform other functions on the instrument.

D.4 Transducer Block Status and Limit Propagation

Every FOUNDATION Fieldbus parameter has a value and a status. The status attribute is divided into three components: Quality, Quality substatus and a Limit. The Quality can be Good (Cascade), Good (Non-Cascade), Uncertain and Bad. Each quality can have a substatus as shown in Table D-3. Each status attribute also has four possible limit states: Not limited, Low limited, High limited and Constant. Refer to the Fieldbus Foundation specifications for a more detailed description. The following describes how the transducer block passes status information to the AO block. For information on status handling by the function blocks within the digital valve controller, refer to the Detailed Setup section.

Table D-3. Status Attribute Quality and Substatus Components

Quality	Substatus
Good (NC)	Non-specific
Good (NC)	Active Block Alarm
Good (NC)	Active Advisory Alarm
Good (NC)	Active Critical Alarm
Good (NC)	Unack Block Alarm
Good (NC)	Unack Advisory Alarm
Good (NC)	Unack Critical Alarm
Uncertain	Non-specific
Uncertain	Last Usable Value
Uncertain	Substitute/Manual Entry
Uncertain	Initial Value
Uncertain	Sensor Conversion not Accurate
Uncertain	Engineering Unit Range Violation
Uncertain	Sub-normal
Good (C)	Non-specific
Good (C)	Initialization Acknowledge
Good (C)	Initialization Request
Good (C)	Not Invited
Good (C)	Not Selected
Good (C)	Local Override
Good (C)	Fault State Active
Good (C)	Initiate Fault State
Bad	Non-specific
Bad	Configuration Error
Bad	Not Connected
Bad	Device Failure
Bad	Sensor Failure
Bad	No Comm, with LUV
Bad	No Comm, no LUV
Bad	Out of Service
(NC)=(Non-cascade) (C)= (Cascade)	

Status Propagation

The transducer block accepts the output from the AO block or DO block if the output parameter status is Good (Non-cascade) or Good (Cascade). When the AO or DO block is Out of Service the output parameter status is Bad. In this case, the transducer block holds the last value.

If the transducer block actual mode is Out of Service, the AO block READBACK parameter status is Bad-Out of Service. This could be caused by a Failed Alert. If a Failed Alert is active, the block error parameter (parameter name BLOCK_ERR) for the Resource block will indicate Device Needs Maintenance Now. For more information on the Resource and Transducer block error indications, refer to the Viewing Device Information section of this manual.

If the transducer block is functioning correctly the AO block READBACK parameter status is Good (Non-cascade)-Non-specific. If a Maintenance or Advisory alert is active the substatus will reflect a Unacknowledged or Active advisory alert. When a Maintenance or Advisory alert is active, the block error for the resource block indicates Device Needs Maintenance Soon.

Limit Propagation

The following describes limit propagation:

AO Block

- If the valve position is below the low cutoff value, the AO block READBACK status limit is LOW_LIMITED.
- If the valve position is above the high cutoff value, the AO block READBACK status limit is HIGH_LIMITED.
- If the transducer block actual mode is Auto and the above conditions are not true, the AO block READBACK status limit is NOT_LIMITED.
- If the transducer block actual mode is Out of Service, the AO block READBACK status limit is CONSTANT.

DO Block

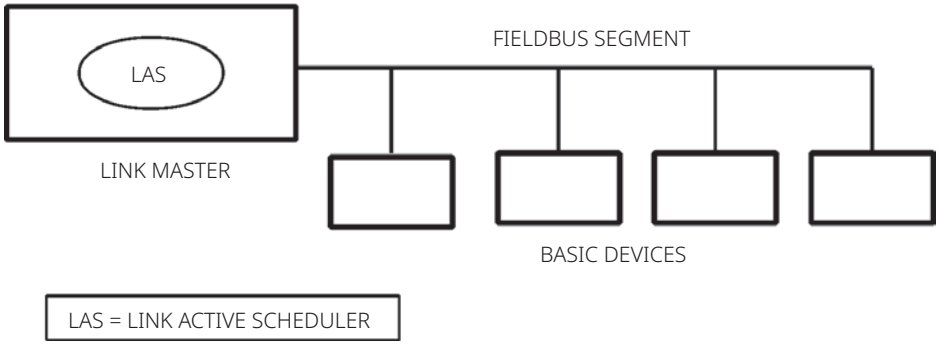
- If the transducer block actual mode is Auto, the DO block READBACK_D status is NOT_LIMITED.
- If the transducer block actual mode is Out of Service, the DO block READBACK_D status is CONSTANT.

The control strategy should be configured to monitor the Analog Output block status and take action where appropriate when the status is no longer Good.

D.5 Network Communication

Figure D-3 illustrates a simple fieldbus network consisting of a single segment.

Figure D-3. Simple Single-Link Fieldbus Network



B2712-1

Device Addressing

Fieldbus uses addresses between 0 and 255. Addresses 0 through 15 are typically reserved for group addressing and for use by the data link layer. If there are two or more devices with the same address, the first device to start will use its programmed address. Each of the other devices will be given one of four temporary addresses between 248 and 251. If a temporary address is not available, the device will be unavailable until a temporary address becomes available. Commission devices use addresses 20 to 35 and standby devices use addresses 232 to 247.

Link Active Scheduler (LAS)

There is only one active Link Active Scheduler (LAS) for the entire fieldbus control system. The digital valve controller includes an LAS. The Link Active Scheduler operates as the bus arbiter for the link and

- recognizes and adds new devices to the link.
- removes non-responsive devices from the link.
- distributes Data Link (DL) and Link Scheduling (LS) time on the link. Data Link Time is a network-wide time periodically distributed by the LAS to synchronize all device clocks on the bus. Link Scheduling time is a link-specific time represented as an offset from Data Link Time. It is used to indicate when the LAS on each link begins and repeats its schedule. It is used by system management to synchronize function block execution with the data transfers scheduled by the LAS.
- polls devices for process loop data at scheduled transmission times.
- distributes a priority-driven token to devices between scheduled transmissions.

The DVC6200f can be designated to act as the backup Link Active Scheduler (LAS) in the event that the LAS is disconnected from the segment. As the backup LAS, the DVC6200f will take over the management of communications until the host is restored. The host system may provide a configuration tool specifically designed to designate a particular device as a backup LAS. Otherwise, this can be configured manually as follows:

1. Access the Management Information Base (MIB) for the DVC6200f.
2. To activate the LAS capability, write 0x02 to the BOOT_OPERAT_FUNCTIONAL_CLASS object (Index 605). To deactivate, write 0x01.

Restart the processor.

Only one device can communicate at a time. Permission to communicate on the bus is controlled by a centralized token passed between devices by the LAS. Only the device with the token can communicate. The LAS maintains a list of all devices are a member of the bus. This list is called the “Live List”.

Two types of tokens are used by the LAS. A time-critical token, compel data (CD), is sent by the LAS according to a schedule. A non-time critical token, pass token (PT), is sent by the LAS to each device in numerical order according to address.

Device Communication

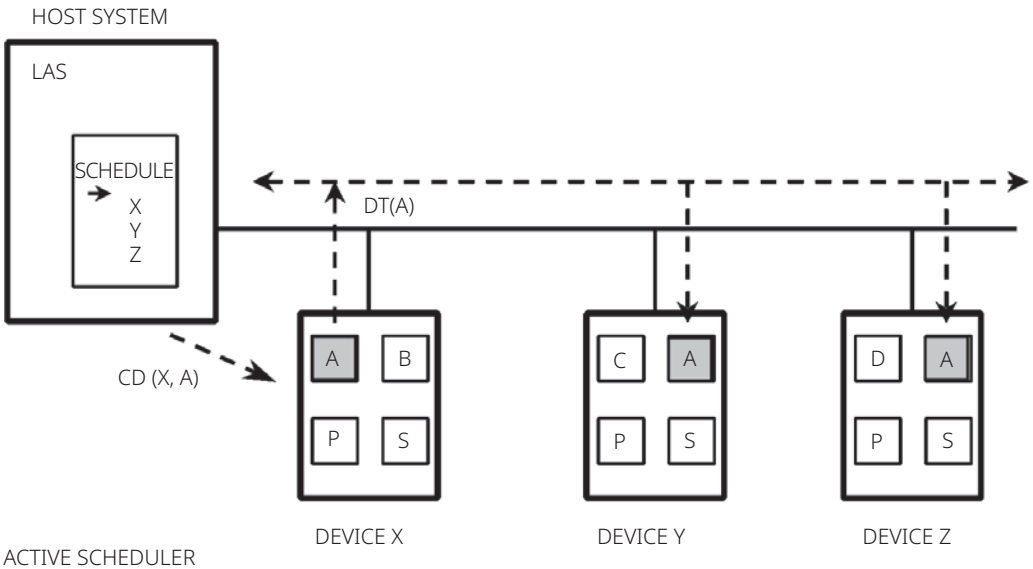
Scheduled Transfers

Information is transferred between devices over the fieldbus using three different types of communication:

- Publisher/Subscriber: This type of communication is used to transfer critical process loop data, such as the process variable. The data producers (publishers) post the data in a buffer that is transmitted to the subscriber (S), when the publisher is issued the Compel Data (CD) message from the LAS. The buffer contains only one copy of the data. New data completely overwrites previous data. Updates to published data are transferred simultaneously to all subscribers in a single broadcast. Transfers of this type are scheduled on a precisely periodic basis.

Figure D-4 diagrams the method of scheduled data transfer. Scheduled data transfers are typically used for the regular cyclic transfer of process loop data between devices on the fieldbus. Scheduled transfers use publisher/subscriber type of reporting for data transfer. The Link Active Scheduler maintains a list of transmit times for all publishers in all devices that need to be cyclically transmitted. When it is time for a device to publish data, the LAS issues a Compel Data (CD) message to the device. Upon receipt of the CD, the device broadcasts or "publishes" the data to all devices on the fieldbus. Any device that is configured to receive the data is called a "subscriber".

Figure D-4. Scheduled Data Transfer



LAS=LINK ACTIVE SCHEDULER

P=PUBLISHER

S=SUBSCRIBER

CD=COMPEL DATA

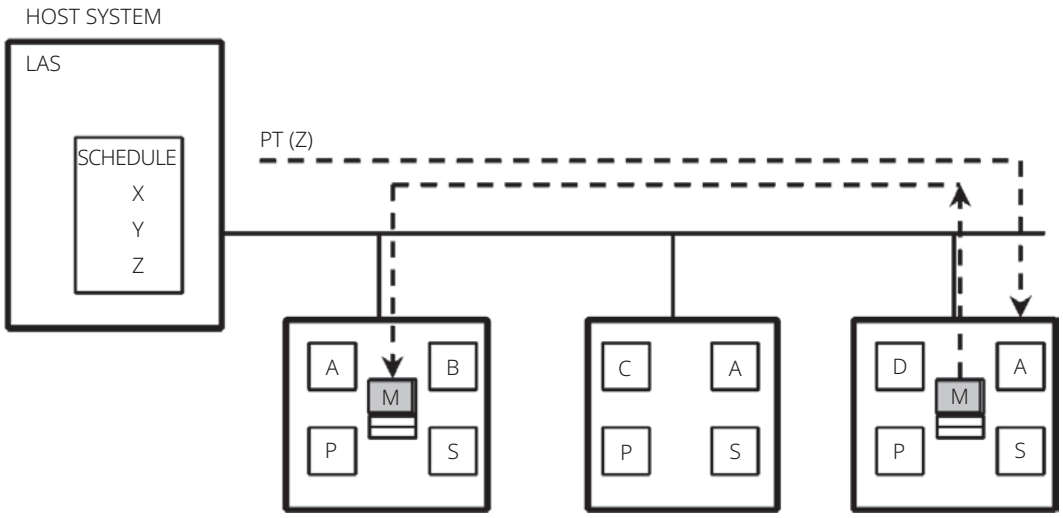
DT=DATA TRANSFER PACKET

B2713-1

Unscheduled Transfers

Figure D-5 diagrams an unscheduled transfer. Unscheduled transfers are used for things like user-initiated changes, including set point changes, mode changes, tuning changes and upload/download. Unscheduled transfers use either report distribution or client/server type of reporting for transferring data.

Figure D-5. Unscheduled Data Transfer



LAS=LINK ACTIVE SCHEDULER
P=PUBLISHER
S=SUBSCRIBER
PT=PASS TOKEN
M=MESSAGE

B2714-1

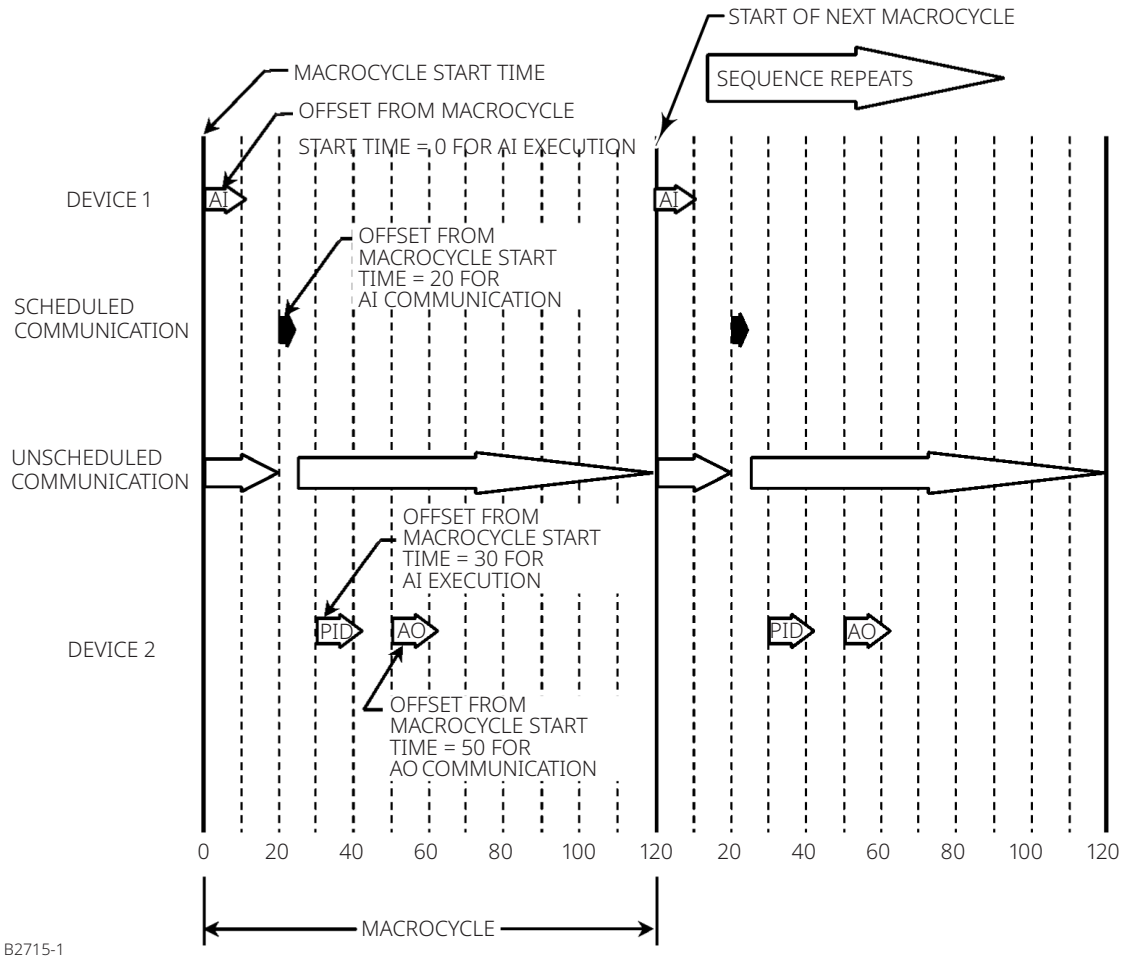
All of the devices on the fieldbus are given a chance to send unscheduled messages between transmissions of scheduled data. The LAS grants permission to a device to use the fieldbus by issuing a pass token (PT) message to the device. When the device receives the PT, it is allowed to send messages until it has finished or until the "maximum token hold time" has expired, whichever is the shorter time. The message may be sent to a single destination or to multiple destinations.

- Report Distribution: This type of communication is used to broadcast and multicast event and trend reports.
- Client/Server: This type of communication is used for request/ response exchanges between pairs of devices, such as a set point change. Like Report Distribution reporting, the transfers are queued, unscheduled and prioritized. Queued means the messages are sent and received in the order submitted for transmission, according to their priority, without overwriting previous messages.

Function Block Scheduling

Figure D-6 shows an example of a link schedule. A single iteration of the link-wide schedule is called the macrocycle. When the system is configured and the function blocks are linked, a master link-wide schedule is created for the LAS. Each device maintains its portion of the link-wide schedule, known as the Function Block Schedule. The Function Block Schedule indicates when the function blocks for the device are to be executed. The scheduled execution time for each function block is represented as an offset from the beginning of the macrocycle start time.

Figure D-6. Example Link Schedule Showing Scheduled and Unscheduled Communication



To support synchronization of schedules, periodically Link Scheduling (LS) time is distributed. The beginning of the macrocycle represents a common starting time for all Function Block schedules on a link and for the LAS link-wide schedule. This permits function block executions and their corresponding data transfers to be synchronized in time.

D.6 Network Management

Information for setting up network communications, including Virtual Communication Relationships (VCRs), host timer recommendations and other network parameters, can be found in the capabilities file (.cff) available from the Fieldbus Foundation website.

Appendix E: Function Blocks

E.1 Analog Output Function Block

Overview

The Analog Output (AO) function block (Figure E-1) assigns an output value to a field device through a specified I/O channel. The block supports mode control, signal status calculation and simulation. Figure E-1 illustrates the internal components of the AO function block and Table E-2 lists the definitions of the block parameters. The digital valve controller measures and uses actual valve position for READBACK [16].

Figure E-1. Analog Output (AO) Function Block



CAS_IN = THE REMOTE SETPOINT VALUE FROM ANOTHER FUNCTION BLOCK.

BKCAL_OUT = THE VALUE AND STATUS REQUIRED BY THE BKCAL IN INPUT OF ANOTHER BLOCK TO PREVENT RESET WINDUP AND TO PROVIDE BUMPLESS TRANSFER TO CLOSED LOOP CONTROL.

OUT = THE BLOCK OUTPUT AND STATUS.

READBACK = ACTUAL VALVE POSITION.

B2716-1

NOTE

The AO block actual mode will not move to Auto unless:

- Resource Block actual mode is Auto and
- AO SHED_OPT [27] is set to a non-zero value.

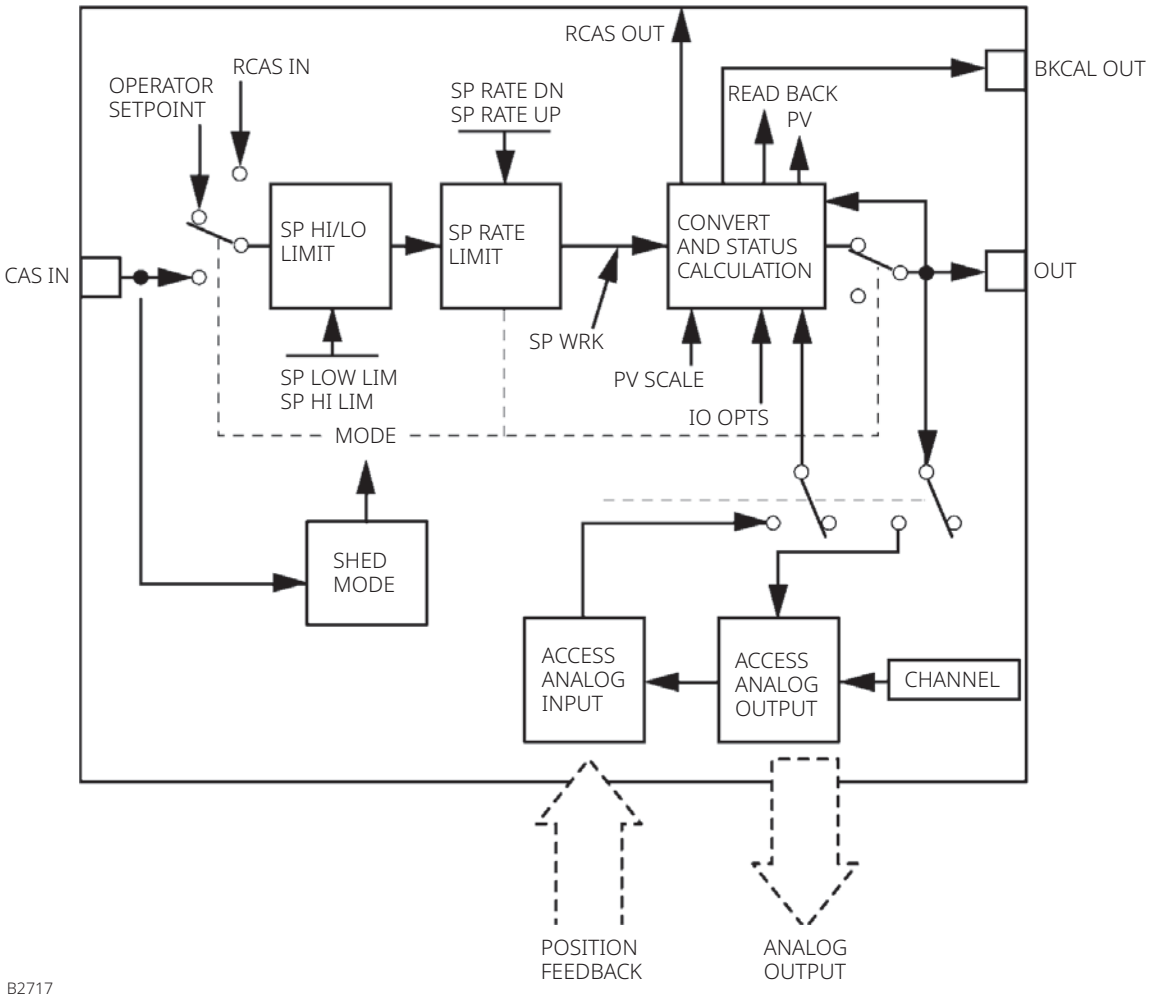
NOTE

Actual Block Mode (MODE_BLK.ACTUAL [5.2]) will remain out of service and the block cannot be scheduled if the block has not been licensed. Contact your Emerson sales office to upgrade product licensing.

NOTE

Actual Block Mode (MODE_BLK.ACTUAL [5.2]) will remain in IMAN and the block Readback status will be Bad - Not Connected if the Output Block Selection is set incorrectly. From the transducer block method Outblock Selection, select the desired output block, see page 61.

Figure E-2. Analog Output Function Block Schematic



Modes

The Analog Output function block supports the following modes:

- Manual (Man)—You can manually set the output to the I/O channel through the OUT [9] attribute. This mode is used primarily for maintenance, calibration and diagnostics.
- Automatic (Auto)—The block output (OUT [9]) reflects the target operating point specified by the setpoint (SP [8]) attribute. Typically the setpoint is set by the user.
- Cascade (Cas)—The SP [8] attribute is set by another function block through a connection to CAS_IN [17]. The SP [8] value is used to set the OUT [9] attribute automatically. This is the most frequently used mode in the digital valve controller.

NOTE

The transducer block must be in Auto for the mode to go to AUTO, CAS, MAN or RCAS.

- RemoteCascade (RCas)—The SP [8] is set by a host computer by writing to the RCAS_IN [28] parameter. The SP [8] value is used to set the OUT [9] attribute automatically.

- Out of Service (OOS)—The block is not processed. The output channel is maintained at the last value and the status of OUT [9] is set to Bad: Out of Service. The BLOCK_ERR [6] attribute shows Out of Service.
- Initialization Manual (Iman)—The path to the output hardware is broken and the AO block output will remain at the last position. This means the transducer block mode is Out of Service or Manual or configured to respond to the DO block.
- Local Override (LO)—The output of the block is not responding to inputs because the fault state action is active or the latch is engaged. OUT [9] freezes or goes to value per IO_OPTS [14].

The target mode of the block may be restricted to one or more of the following modes: Man, Auto, Cas, RCas or OOS.

Mode Handling

Shed Options—RCAS Mode Only

Automatically changing through the permitted modes when starting from a remote mode, fall from (or shed) or climb to a remote mode is determined by the parameter SHED_OPT [27]. A block climbs and sheds through the same path. For example, if SHED_OPT [27] specifies that a block should shed to Auto, then, if the block target mode is set to RCas, the block goes through Auto on the way to RCas.

When the block is in Cas mode and the CAS_IN [17] input goes bad, the block sheds mode to the next lower permitted mode.

You can configure the shed option as follows:

Shed With Return Options

Remote cascade connection failure shifts actual mode but keeps trying to restore remote cascade (in other words, the remote cascade target mode stays in effect).

NOTE

During Shed with Return Options, the actual mode is changed, while the target mode stays the same.

Normal—On failure of a remote cascade connection the block attempts to attain the highest permitted non-remote mode until remote cascade is restored. Cas is the highest permitted non-remote mode and Auto is is the next permitted non-remote mode. If Cas or Auto are not available, the block will shed by default to Man.

Retained Target—The retained target mode is the previous target mode before it was changed to RCAS or ROUT. On failure of a remote cascade connection the block attempts to attain the retained target mode.

Auto—On failure of a remote cascade connection the block attempts to attain Auto, if permitted, until remote cascade is restored.

Man—On failure of a remote cascade connection the block sheds to Man until a remote cascade connection is restored.

Shed With No Return Options

NOTE

During Shed with No Return Options, the target mode is changed, while the actual mode stays the same.

For any shed with no return option, the target mode changes as determined by the option. Therefore, there is no attempt to restore the connection following failure. The behavior on change to the remote cascade target mode is identical to that for Shed With Return Options.

Normal—On failure of a remote cascade connection the block sets the target mode to the highest permitted non-remote mode. Cas is the highest permitted non-remote mode and Auto is is the next highest permitted non-remote mode. If Cas or Auto are not available, the block will shed by default to Man.

Retained Target—The retained target mode is the previous target mode before it was changed to RCAS or ROUT. On failure of a remote cascade connection the block sets the target mode to the retained target mode.

Auto—On failure of a remote cascade connection, the block sets the target mode to Auto, if permitted.

Man—On failure of remote cascade connection, the block sets the target mode to Man, if permitted.

The user may configure SHED_OPT [27] so that it calls for a target mode that is not permitted. When doing this, the mode logic uses the following rules as applied by the remote logic:

- Shed logic never results in a non-permitted target mode.
- Shed logic never attempts to attain an actual mode of Auto or Cas if that mode is not permitted.

Status Handling

Output or readback fault detection is reflected in the status of PV [7], OUT [9] and BKCAL_OUT [25]. A limited SP [8] condition is reflected in the BKCAL_OUT [25] status. When simulation is enabled through the SIMULATE [10] attribute, you can set the value and status for PV [7] and READBACK [16].

When the block is in Cas mode and the CAS_IN [17] input goes bad, the block sheds mode to the next permitted mode.

Setting the Output

To set the output for the AO block, you must first set the mode to define the manner in which the block determines its setpoint. In Manual mode the value of the output attribute (OUT [9]) must be set manually by the user and is independent of the setpoint. In Automatic mode, OUT [9] is set automatically based on the value specified by the set point (SP [8]) in engineering units and the I/O Options attribute. In addition, you can limit the SP [8] value and the rate at which a change in the SP [8] is passed to OUT [9].

In Cascade mode, the cascade input connection (CAS_IN [17]) is used to update the SP [8]. The back calculation output (BKCAL_OUT [25]) is wired to the back calculation input (BKCAL_IN [27]) of the upstream block that provides CAS_IN [17]. This provides bumpless transfer on mode changes and windup protection in the upstream block.

NOTE

You must wire BKCAL_OUT [25] to BKCAL_IN [27] of the upstream block that provides CAS_IN [17]. Otherwise, the AO will not initialize properly and the setpoint at CAS_IN [17] will not be passed to OUT [9].

An analog readback value, such as valve position, is shown by the process value (PV [7]) attribute in engineering units.

To support testing, you can enable simulation, which allows you to manually set the channel feedback. There is no alarm detection in the AO function block.

To select the manner of processing the SP and the channel output value configure the setpoint limiting options, the tracking options and the conversion and status calculations.

Output Block PV Status

The Output Block PV Status is determined by the value of the Field Diagnostic Alerts Set PV Status parameter in the transducer block (FD_OPTIONS, bit 1 [96]), the Transducer Block mode and enabled Active Field Diagnostic alarms. Refer to Table 11.

Set Point Selection and Limiting

To select the source of the SP [8] value use the MODE [5] attribute. In Automatic (Auto) mode, the local, manually-entered SP [8] is used. In Cascade (Cas) mode, the SP [8] comes from another block through the CAS_IN [17] input connector. In RemoteCascade (RCas) mode, the SP [8] comes from a host computer that writes to RCAS_IN [28]. The range and units of the SP [8] are defined by the PV_SCALE [11] attribute.

In Manual (Man) mode the SP [8] automatically tracks the PV [7] value when you select the SP-PV Track in Man I/O option in IO_OPTS [14]. This option can be used to minimize valve movement when the AO block is transitioned from Manual mode to Auto. You can disable this option in OOS mode only.

The SP [8] value is limited to the range defined by the setpoint high limit attribute (SP_HI_LIM [20]) and the setpoint low limit attribute (SP_LO_LIM [21]).

In Auto mode, the rate at which a change in the SP [8] is passed to OUT [9] is limited by the values of the setpoint upward rate limit attribute (SP_RATE_UP [19]) and the setpoint downward rate limit attribute (SP_RATE_DN [18]). A limit of zero disables rate limiting.

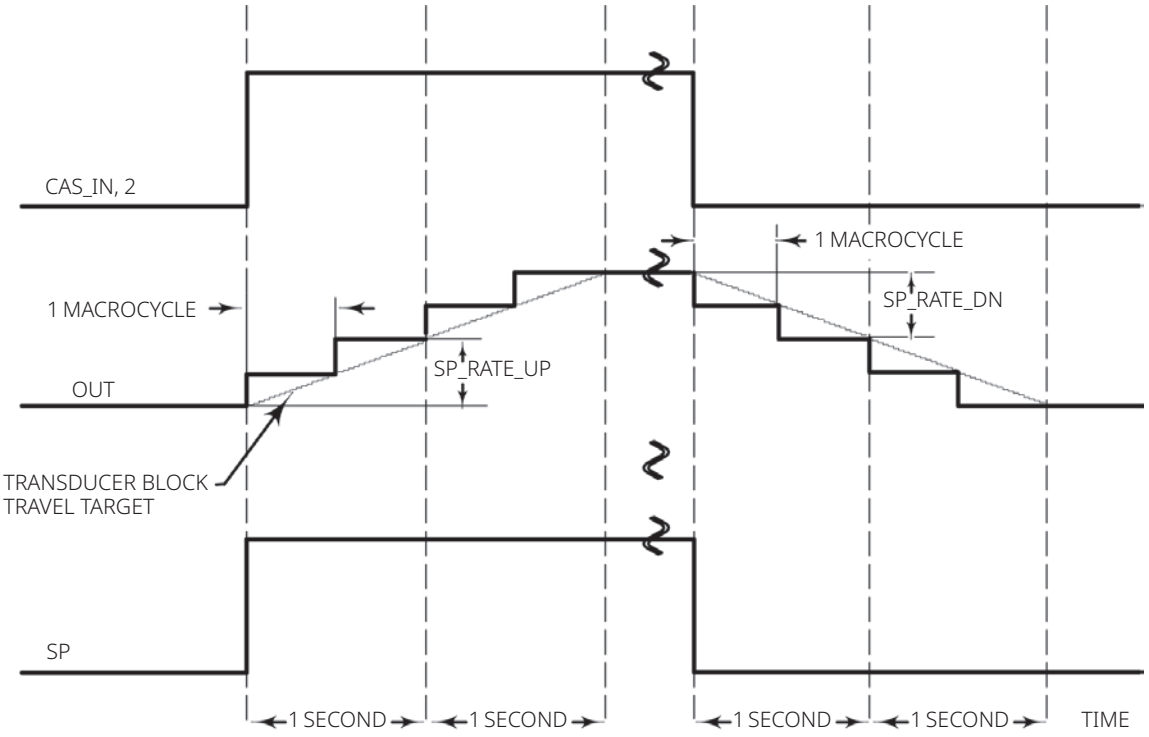
As shown in Figure E-3, the block executes a percentage of the set point change each macrocycle. For example, if the set point rate is set at 10% per second and the macrocycle is 500 milliseconds (0.5 seconds or 50% of 1 second), then during the first macrocycle the set point will change 5% (50% of the 10% per second rate). If the macrocycle is 750 milliseconds (0.75 seconds or 75% of 1 second), then during the first macrocycle the setpoint will change 7.5% (75% of 10).

When the transducer block receives the setpoint change from an AO block with rate limits, it will smoothly move the valve to the requested setpoint at the rate limit configured in the AO block.

In Auto mode, the converted SP [8] value is stored in the OUT [9] attribute. In Man mode, the OUT [9] attribute is set manually, and is used to set the analog output defined by the CHANNEL [22] parameter.

You can access the actuator position associated with the output channel through the READBACK [16] parameter (in OUT units) and in the PV [7] attribute (in engineering units). The digital valve controller supports position feedback and therefore provides the actual valve position in PV [7] and READBACK [16] directly.

Figure E-3. Analog Output Function Block Timing Diagram



Action On Fault Detection

To define the action you wish the valve to take when the block is in CAS mode and the CAS_IN [17] input detects a communication failure or is commanded to go to fault state by the upstream block or the resource block, configure the following parameters:

IO_OPTS [14]: Determines the action OUT [9] will take upon a fault state. If the IO_OPTS [14] “Fault State to Value” is not selected, then OUT [9] holds its last position when Fault State is set. If “Fault State to Value” is selected, OUT [9] goes to the FSTATE_VAL [24] value when Fault State is set.

FSTATE_TIME [23]: The length of time, in seconds, that the AO block will wait to set Fault State. When Fault State is set, the OUT [9] value goes to either the FSTATE_VAL [24] value or holds its last position, depending on I/O_OPTS [14]. When the block has a target mode of CAS, a fault condition will be detected if the CAS_IN [17] has a BAD status or an Initiate Fault State substatus is received from the upstream block.

FSTATE_VAL [24]: Determines the OUT [9] value if IO_OPTS “Fault State to Value” is selected. The OUT [9] value transitions to FSTATE_VAL [24] after FSTATE_TIME [23] elapses and the fault condition has not cleared.

I/O Options

The I/O options parameter (IO_OPTS [14]) allows you to select how the I/O signals are processed. You can set I/O options in Out of Service mode only. The following I/O options are available in the AO block:

Use PV for BKCAL_OUT—Changes the BKCAL_OUT [25] value to the PV [7] value. When the Use PV for BKCAL_OUT option is not enabled (False), the BKCAL_OUT [25] value is the working setpoint value.

Target to Man if Fault State Activated—Set the target mode to Man, thus losing the original target, if Fault State is activated. This latches an output block into the manual mode.

Use Fault State value on Restart—Use the value of FSTATE_VAL [24] for SP [8] when power is restored or if the device is restarted, otherwise use the last value saved in non-volatile memory. This does not act like Fault State, it only uses the value of FSTATE_VAL [24].

Fault State to Value—The output action to take when a fault occurs (if not selected, use hold last value; if selected, use FSTATE_VAL [24]).

Increase to Close—If the Increase to Close bit is set the value to the transducer is inverted, e.g. 20% becomes 80%.

SP-PV Track in Man—Permits the setpoint to track the process variable when the target mode of the block is MAN.

SP-PV Track in LO or IMan—Permits the setpoint to track the process variable when the actual mode of the block is LO or IMan.

SP Track retained Target—Permits the setpoint to track the RCas or Cas parameter based on the retained target mode when the actual mode of the block is LO or Man. When SP-PV track options are enabled, the SP Track retained target will have precedence in the selection of the value to track when the actual mode is Man and LO.

Simulation

When simulate is active, the transducer sub-parameters show the actual transducer block status and value as normally passed back to the AO block. The Simulate sub-parameters are writable and replace actual transducer values.

NOTE

When simulate is active, the output block no longer writes values to the transducer block. If the Output Blk Timeout period is exceeded, the transducer block may move the valve to the Zero Power Condition depending on the configuration of the Output Block Timeout Alert.

Application Information

The configuration of an AO function block and its associated output channels depends on the specific application. A typical configuration for the Analog Output involves the following attributes:

PV_SCALE	Set the range and engineering units to values that correspond to the operation range. For the digital valve controller, PV_SCALE [11] is typically set between 0 and 100%.
BKCAL_OUT	If you are using the CAS_IN [17] connector wired from another block, wire the BKCAL_OUT [25] attribute to the other block's BKCAL_IN [27] attribute.
IO_OPTS	Set the type of tracking and action upon fault state.
SHED_OPT	Set the action to be taken when the set point or output are not updated in a remote mode.

Block Errors

Table E-1 lists conditions reported in the BLOCK_ERR [6] parameter.

Table E-1. AO BLOCK_ERR Conditions

Condition Number	Condition Name and Description
1	Block Configuration Error - CHANNEL and SHED_OPT set to 0
3	Simulate active - Simulation is enabled and the block is using a simulated value in its execution.
4	Local Override - Device in fault state. Actual mode LO.
5	Device Fault State Set - AO block in fault state after FSTATE_TIME because of Bad status or IFS substatus on CAS_IN or Resource block commanded fault state.
6	Device Needs Maintenance Soon - Indicates a Maintenance Field Diagnostic condition is active if Block Error Reporting is enabled. See page 75.
8	Output failure - PV has bad status.
13	Device Needs Maintenance Now - Indicates Failed Field Diagnostic condition is active if Block Error Reporting is enabled. See page 75.
14	Power Up - This condition exists after power up until actual mode is not Out of Service.
15	Out of Service - The block is in Out of Service (OOS) mode.

AO Function Block Parameter List

- Read/Write Capability: RO - Read Only, RW - Read Write
- Mode: The block mode(s) required to write to the parameter

Table E-2. Analog Output Function Block Parameter Definitions

Label PARAMETER_NAME	Index Number	RO / RW	Block Mode	Range	Initial Value	Description
Static Revision ST_REV	1	RO	N/A	0 to 65535	0	Data Type: Unsigned16 The revision level of the static data associated with the function block. The revision value will be incremented each time a static parameter value in the block is changed.
Tag Description TAG_DESC	2	RW	ALL	7 bit ASCII	Spaces	Data Type: Octet String The user description of the intended application of the block.
Strategy STRATEGY	3	RW	ALL	0 to 65535	0	Data Type: Unsigned16 The strategy field can be used to identify grouping of blocks. This data is not checked or processed by the block.
Alert Key ALERT_KEY	4	RW	ALL	1 to 255	0	Data Type: Unsigned8 The identification number of the plant unit. This information may be used in the host for sorting alarms, etc.

- continued -

Table E-2. Analog Output Function Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Block Mode	Range	Initial Value	Description
Block Mode MODE_BLK	5			- - -		Data Type: DS-69 Valid Bits: 7: OOS, 6: IMAN, 5: LO, 4: MAN, 3: AUTO, 2: CAS, 1: RCAS The actual, target, permitted and normal modes of the block. Target: The requested block mode Actual: The current mode of the block (Note: Bit 6 (IMAN) is valid for ACTUAL only) Permitted: Allowed modes for Target Normal: Most common mode for Target
TARGET	5.1	RW	ALL	OOS MAN AUTO AUTO-CAS AUTO-RCAS	OOS until block is configured, then last valid target	
ACTUAL	5.2	RO	ALL	- - -	OOS	
PERMITTED	5.3	RW	ALL	OOS+MAN+AUTO+ CAS+RCAS	OOS+MAN+ AUTO+ CAS+RCAS	
NORMAL	5.4	RW	ALL	- - -	CAS+AUTO	
Block Error BLOCK_ERR	6	RO	N/A	1: Block Configuration Error 3: Simulate Active 4: Local Override 5: Device Fault State Set 8: Output Failure 14: Power-up 15: Out-of-Service	Dynamic	Data Type: Bit String (2 byte) 0=inactive 1=active This parameter reflects the error status associated with the hardware or software components associated with a block. It is a bit string, so that multiple errors may be shown. See Table E-1.
Process Variable PV	7	RO	N/A	PV Status set equal to READBACK status	Dynamic	Data Type: DS-65 The process variable used in block execution. This value is converted from READBACK to show the actuator position in the same units as the setpoint value.
Set Point SP	8		OOS MAN AUTO	PV_SCALE +/- 10%	Dynamic	Data Type: DS-65 The SP of the analog block. Can be derived from CAS_IN, RCAS_IN in normal modes or can track PV in MAN, IMan or LO modes. IO_OPTS is used to determine value of SP in MAN, IMan or LO. If no IO_OPTS for SP tracking are set, SP will freeze when mode changes from CAS or RCAS.
Output OUT	9		MAN OOS	OUT_SCALE +/- 10%	Dynamic	Data Type: DS-65 The primary value and status calculated by the block in Auto mode. OUT may be set manually in Man mode.
Simulate SIMULATE	10			- - -		Data Type: DS-82 Allows the analog input to be manually supplied when simulate is enabled. When simulation is disabled, the simulate value and status track actual value & status.
SIMULATE_STATUS	10.1	RW	ALL	- - -	0	
SIMULATE_VALUE	10.2	RW	ALL	- - -	0	
TRANSDUCER_ STATUS	10.3	RO	ALL	- - -	0	

- continued -

Table E-2. Analog Output Function Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Block Mode	Range	Initial Value	Description
TRANSDUCER_ VALUE	10.4	RO	ALL	- - -	0	Allows the analog input to be manually supplied when simulate is enabled. When simulation is disabled, the simulate value and status track actual value and status.
ENABLE/DISABLE	10.5	RW	ALL	0: Not Initialized 1: Simulation Disable 2: Simulation Active	1: Simulation Disabled	
Process Value Scale PV_SCALE	11	RW	OOS	EU at 100% EU at 0% Units index Decimal Point	100 0 % 0	Data Type: DS-68 The high and low scale values, engineering units code and number of decimal places to be used in displaying the PV parameter and parameters which have the same scaling as PV.
Transducer Scale XD_SCALE	12	RO	OOS	EU at 100% EU at 0% Units index Decimal Point	100 0 % 0	Data Type: DS-68 The high and low scale values and engineering units code are read only. This parameter determines the number of digits to the right of the decimal point used with the value obtained from the transducer for a specified channel.
Grant Deny GRANT_DENY	13	- - -				Data Type: DS-70 Options for controlling access of host computers and local control panels to operating, tuning and alarm parameters of the block. GRANT: 1 = granted, 0= N/A DENY: 1 = denied, 0 = N/A
GRANT	13.1	RW	ALL	0: Program 1: Tune 2: Alarm 3: Local	All bits: 0	
DENY	13.2	RW	ALL		All bits: 0	
I/O Options IO_OPTS	14		OOS	1: SP tracks PV in Man 3: SP tracks PV in LO or Iman 4: SP Track retained target in Man or LO 5: Increase to Close 6: Fault State to value 0=freeze 1=go to Fault State value 7: Use Fault State value on restart 8: Target to Man if Fault State activated 9: Use PV for BKCAL_OUT 0=SP 1=PV	All bits: 0	Data Type: Bit String (2 byte) 0=disable 1=enable Allows you to select the type of tracking and the output value when a fault condition occurs.

- continued -

Table E-2. Analog Output Function Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Block Mode	Range	Initial Value	Description
Status Options STATUS_OPTS	15	- - -	OOS	4: Propagate Failure Backward	All bits: 0	Data Type: Bit String 0=disable 1=enable Options the user may select for the block processing of status.
Readback READBACK	16	RO	N/A	Status	- - -	Data Type: DS-65 Readback is the de-characterized valve position as reported by the transducer block parameter FINAL_POSITION_VALUE [17]. This correlates with the AO block parameter OUT [9], which is the setpoint to the transducer. READBACK is the simulated input if SIMULATE is enabled or the transducer block feedback if SIMULATE is disabled.
				Value	Dynamic	
Cascade Input CAS_IN	17	- - -	ALL	Status	BAD Not Connected Not Limited	Data Type: DS-65 The setpoint value from another function block.
				Value	0	
Setpoint Rate Down SP_RATE_DN	18	- - -	ALL	Positive, 0 disables rate limiting PV units	+INF	Data Type: Float Ramp rate for downward set point changes. When the ramp rate is set to zero, the set point is used immediately.
Setpoint Rate Up SP_RATE_UP	19	- - -	ALL	Positive, 0 disables rate limiting PV units	+INF	Data Type: Float Ramp rate for upward set point changes. When the ramp rate is set to zero, the setpoint is used immediately.
Setpoint High Limit SP_HI_LIM	20	- - -	ALL	PV Scale +/- 10%	100	Data Type: Float The highest set point value allowed. SP_HI_LIM must be greater than SP_LO_LIM.
Setpoint Low Limit SP_LO_LIM	21	- - -	ALL	PV Scale +/- 10%	0	Data Type: Float The lowest set point value allowed. SP_LO_LIM must be less than SP_HI_LIM.
AO Channel CHANNEL	22	- - -	OOS	1=Setpoint	Setpoint	Data Type: Unsigned16 Defines which transducer parameter receives the AO output. Select Setpoint to control valve position.
Fault State Time FSTATE_TIME	23	- - -	ALL	Positive, seconds	0	Data Type: Float Time from failure detection to reaction if failure still exists.
Fault State Value FSTATE_VAL	24	- - -	ALL	PV Scale +/- 10%	0	Data Type: Float Preset value to use if I/O_OPTS Fault State to Value or Use Fault State Value on Restart is set.

- continued -

Table E-2. Analog Output Function Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Block Mode	Range	Initial Value	Description
Back Calculation Output BKCAL_OUT	25	RO	N/A	Status Limits Value	Dynamic	Data Type: DS-65 The value and status required by the BKCAL_IN input of another block to prevent reset windup and to provide bumpless transfer to closed loop control.
Remote Cascade Input RCAS_IN	26	- - -	ALL	Status Value	BAD Not Connected Not Limited 0 Trk	Data Type: DS-65 Target SP and status by supervisory host
Shed Options SHED_OPT	27	- - -	ALL	Defined by FF spec 0=Invalid 1=Normal Shed, Normal Return 2=Normal Shed, No Return 3=Shed to Auto, normal return 4=Shed to Auto, no return. Target mode changes to Auto on detection of a shed condition 5=Shed to Manual, normal return 6=Shed to Manual, No return. Target mode changes to MAN on detection of a shed condition. 7=Shed to retained target, normal return 8=Shed to retained target, no return. (Change target to retained target)	Uninitialized	Data Type: Unsigned8 Defines the action to be taken when the set point is not updated in a remote mode.
Remote Cascade Output RCAS_OUT	28	RO	N/A	Status Value	Dynamic	Data Type: DS-65 Block set point and status after ramping
Update Event UPDATE_EVT	29	- - -				Data Type: DS-73 This alert is generated by any changes to static data.
UNACKNOWLEDGED	29.1	RW	N/A	0:Undefined 1:Acknowledged 2:Unacknowledged	0: Undefined	
UPDATE_STATUS	29.2	RO	N/A	0:Undefined 1:Update reported 2:Update not reported	0: Undefined	
TIME_STAMP	29.3	RO	N/A	- - -	0	
STATIC_REVISION	29.4	RO	N/A	- - -	0	
RELATIVE_INDEX	29.5	RO	N/A	- - -	0	

- continued -

Table E-2. Analog Output Function Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Block Mode	Range	Initial Value	Description
Block Alarm BLOCK_ALM	30	- - -				Data Type: DS-72 The block alarm is used for all configuration, hardware, connection failure or system problems in the block.
UNACKNOWLEDGED	30.1	RW	N/A	0:Undefined 1:Acknowledged 2:Unacknowledged	0: Undefined	
ALARM_STATE	30.2	RO	N/A	0:Undefined 1:Clear reported 2:Clear not reported 3:Active reported 4:Active not reported	0: Undefined	
TIME_STAMP	30.3	RO	N/A	- - -	0	
SUBCODE	30.4	RO	N/A	- - -	0	
VALUE	30.5	RO	N/A	- - -	0	- - -
Extended Parameters						
StdDev STDDEV	31	RO	N/A	positive float	Dynamic	Data Type: Float Standard Deviation. To support DeltaV Variability measurement.
Cap StdDev CAP_STDDEV	32	RO	N/A	positive float	Dynamic	Data Type: Float Capability Standard Deviation. To support DeltaV Variability measurement.

View Lists

View lists allow the values of a set of parameters to be accessed at the same time. Views 1 and 2 contain operating parameters and are defined by the Fieldbus Foundation. View 3 contains dynamic parameters and View 4 contains static parameters with configuration and maintenance information. Views 3 and 4 are defined by the manufacturer.

Table E-3. AO Function Block, View Lists

INDEX NUMBER	PARAMETER	VIEW			
		1	2	3	4
1	ST_REV	x	x	x	x
3	STRATEGY				x
4	ALERT_KEY				x
5	MODE_BLK	x		x	
6	BLOCK_ERR	x		x	
7	PV	x		x	
8	SP	x		x	
9	OUT	x		x	
11	PV_SCALE		x		
12	XD_SCALE		x		
13	GRANT_DENY		x		
14	IO_OPTS				x
15	STATUS_OPTS				x
16	READBACK	x		x	
17	CAS_IN	x		x	
18	SP_RATE_DN				x
19	SP_RATE_UP				x
20	SP_HI_LIM		x		
21	SP_LO_LIM		x		
22	CHANNEL				x
23	FSTATE_TIME				x
24	FSTATE_VAL				x
25	BKCAL_OUT			x	
26	RCAS_IN			x	
27	SHED_OPT				x
28	RCAS_OUT			x	
31	STDDEV			x	
32	CAP_STDDEV			x	

Handheld Communicator Menu Structure

ANALOG OUTPUT FUNCTION BLOCK

QUICK CONFIG

ALERT KEY
PROCESS VALUE SCALE EU AT 100%
PROCESS VALUE SCALE EU AT 0%
PROCESS VALUE SCALE UNITS INDEX
PROCESS VALUE SCALE DECIMAL
SIMULATE SIMULATE STATUS
SIMULATE SIMULATE VALUE
SIMULATE TRANSDUCER STATUS
SIMULATE TRANSDUCER VALUE
SIMULATE SIMULATE EN/DISABLE
SETPOINT STATUS
SETPOINT VALUE
SETPOINT HIGH LIMIT
SETPOINT LOW LIMIT

COMMON CONFIG

ALERT KEY
I/O OPTIONS
BLOCK MODE TARGET
BLOCK MODE ACTUAL
BLOCK MODE PERMITTED
BLOCK MODE NORMAL
PROCESS VALUE SCALE EU AT 100%
PROCESS VALUE SCALE EU AT 0%
PROCESS VALUE SCALE UNITS INDEX
PROCESS VALUE SCALE DECIMAL
SETPOINT STATUS
SETPOINT VALUE
SETPOINT HIGH LIMIT
SETPOINT LOW LIMIT

ADVANCED CONFIG

FAULT STATE TIME
FAULT STATE VALUE
SHED OPTIONS
SIMULATE SIMULATE STATUS
SIMULATE SIMULATE VALUE
SIMULATE TRANSDUCER STATUS
SIMULATE TRANSDUCER VALUE
SIMULATE SIMULATE EN/DISABLE
SETPOINT RATE DOWN
SETPOINT RATE UP
STATIC REVISION
STATUS OPTIONS
STRATEGY
TRANSDUCER SCALE EU AT 100%
TRANSDUCER SCALE EU AT 0%
TRANSDUCER SCALE UNITS INDEX
TRANSDUCER SCALE DECIMAL

I/O REFERENCE

AO CHANNEL

CONNECTORS

BACK CALCULATION OUTPUT STATUS
BACK CALCULATION OUTPUT VALUE
CASCADE INPUT STATUS
CASCADE INPUT VALUE
OUTPUT STATUS
OUTPUT VALUE

ONLINE

BACK CALCULATION OUTPUT STATUS
BACK CALCULATION OUTPUT VALUE
BLOCK ERROR
CASCADE INPUT STATUS
CASCADE INPUT VALUE
BLOCK MODE TARGET
BLOCK MODE ACTUAL
BLOCK MODE PERMITTED
BLOCK MODE NORMAL
OUTPUT STATUS
OUTPUT VALUE
PROCESS VALUE STATUS
PROCESS VALUE VALUE
REMOTE CASCADE INPUT STATUS
REMOTE CASCADE INPUT VALUE
REMOTE CASCADE OUTPUT STATUS
REMOTE CASCADE OUTPUT VALUE
READBACK STATUS
READBACK VALUE
SETPOINT STATUS
SETPOINT VALUE

STATUS

BLOCK ERROR

OTHER

TAG DESCRIPTION
GRANT DENY GRANT
GRANT DENY DENY
UPDATE EVENT UNACKNOWLEDGED
UPDATE EVENT UPDATE STATE
UPDATE EVENT TIME STAMP
UPDATE EVENT STATIC REV
UPDATE EVENT RELATIVE INDEX
BLOCK ALARM UNACKNOWLEDGED
BLOCK ALARM ALARM STATE
BLOCK ALARM TIME STAMP
BLOCK ALARM SUBCODE
BLOCK ALARM VALUE
STDDEV
CAP STDDEV

ALL

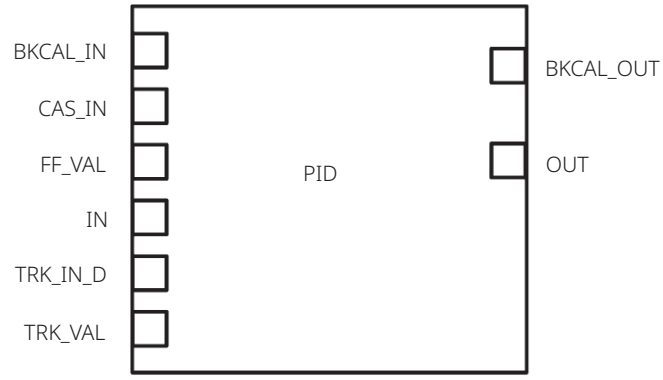
CHARACTERISTICS BLOCK TAG
STATIC REVISION
TAG DESCRIPTION
STRATEGY
ALERT KEY
BLOCK MODE TARGET
BLOCK MODE ACTUAL
BLOCK MODE PERMITTED
BLOCK MODE NORMAL
BLOCK ERROR
PROCESS VALUE STATUS
PROCESS VALUE VALUE
SETPOINT
SETPOINT VALUE
OUTPUT STATUS
OUTPUT VALUE
SIMULATE SIMULATE STATUS
SIMULATE SIMULATE VALUE
SIMULATE TRANSDUCER STATUS
SIMULATE TRANSDUCER VALUE
SIMULATE SIMULATE EN/DISABLE
PROCESS VALUE SCALE EU AT 100%
PROCESS VALUE SCALE EU AT 0%
PROCESS VALUE SCALE UNITS INDEX
PROCESS VALUE SCALE DECIMAL
TRANSDUCER SCALE EU AT 100%
TRANSDUCER SCALE EU AT 0%
TRANSDUCER SCALE UNITS INDEX
TRANSDUCER SCALE DECIMAL
GRANT DENY GRANT
GRANT DENY DENY
I/O OPTIONS
STATUS OPTIONS
READBACK STATUS
READBACK VALUE
CASCADE INPUT STATUS
CASCADE INPUT VALUE
SETPOINT RATE DOWN
SETPOINT RATE UP
SETPOINT HIGH LIMIT
SETPOINT LOW LIMIT
AO CHANNEL
FAULT STATE TIME
FAULT STATE VALUE
BACK CALCULATION OUTPUT STATUS
BACK CALCULATION OUTPUT VALUE
REMOTE CASCADE INPUT STATUS
REMOTE CASCADE INPUT VALUE
SHED OPTIONS
REMOTE CASCADE OUTPUT STATUS
REMOTE CASCADE OUTPUT VALUE
UPDATE EVENT UNACKNOWLEDGED
UPDATE EVENT UPDATE STATE
UPDATE EVENT TIME STAMP
UPDATE EVENT STATIC REV
UPDATE EVENT RELATIVE INDEX
BLOCK ALARM UNACKNOWLEDGED
BLOCK ALARM ALARM STATE
BLOCK ALARM TIME STAMP
BLOCK ALARM SUBCODE
BLOCK ALARM VALUE
STDDEV
CAP STDDEV

E.2 PID Function Block

Overview

The PID function block (Figure E-4) combines all of the necessary logic to perform proportional/integral/derivative (PID) control. The block supports mode control, signal scaling and limiting, feedforward control, override tracking, alarm limit detection and signal status propagation.

Figure E-4. Proportional+Integral+Derivative (PID) Function Block



BKCAL_IN = THE ANALOG INPUT VALUE AND STATUS FROM ANOTHER BLOCK'S BKCAL _OUT OUTPUT THAT IS USED FOR BACKWARD OUTPUT TRACKING FOR BUMPLESS TRANSFER AND TO PASS LIMIT STATUS.

CAS_IN = THE REMOTE SETPOINT VALUE FROM ANOTHER FUNCTION BLOCK.

FF_VAL = THE FEEDFORWARD CONTROL INPUT VALUE AND STATUS.

IN = THE CONNECTION FOR THE PROCESS VARIABLE FROM ANOTHER FUNCTION BLOCK.

TRK_IN_D = INITIATES THE EXTERNAL TRACKING FUNCTION.

TRK_VAL = THE VALUE AFTER SCALING APPLIED TO OUT IN LOCAL OVERRIDE MODE.

BKCAL_OUT = THE VALUE AND STATUS REQUIRED BY THE BKCAL_IN INPUT OF ANOTHER FUNCTION BLOCK TO PREVENT RESET WINDUP AND TO PROVIDE BUMPLESS TRANSFER TO CLOSED LOOP CONTROL.

OUT = THE BLOCK OUTPUT AND STATUS.

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The block supports two forms of the PID equation: Standard and Series. You can choose the appropriate equation using the MATHFORM [70] parameter. The Standard ISA PID equation is the default selection.

$$\text{Standard Out} = \text{GAIN} \times e(x) \times \left(1 + \frac{1}{\tau_r S + 1} + \frac{\tau_d S}{\propto \times \tau_d S + 1}\right) + F$$

$$\text{Series Out} \quad \text{GAIN} \times e(x) \times \left[\left(1 + \frac{1}{\tau_r S}\right) + \left(\frac{\tau_d S + 1}{\propto \times \tau_d S + 1}\right)\right] + F$$

where

GAIN:	proportional gain value
τr:	integral action time constant (RESET parameter) in seconds
s:	Laplace operator
τd:	derivative action time constant (RATE parameter)

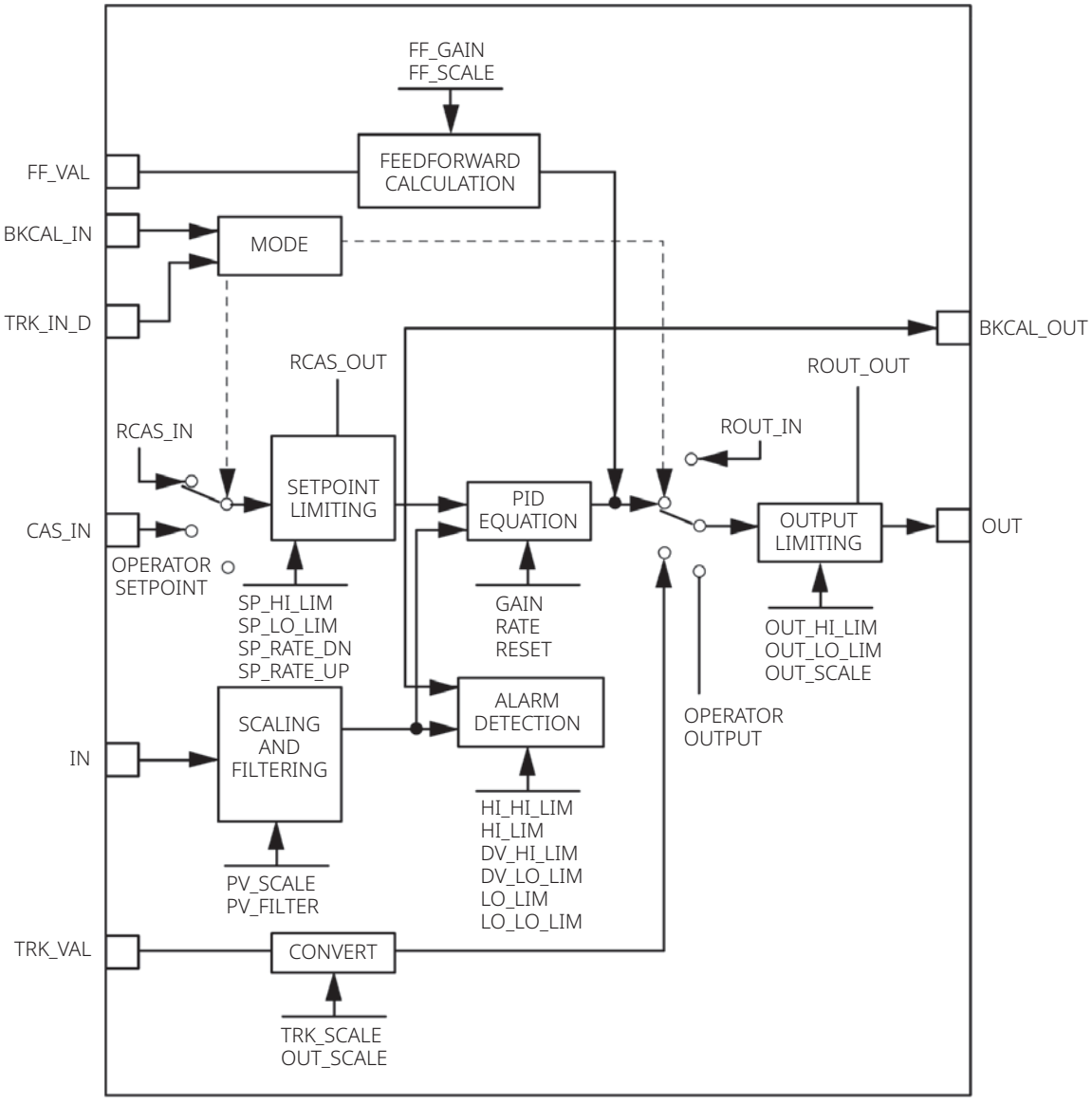
∝: fixed smoothing factor of 0.1 applied to RATE

F: feedforward control contribution from the feedforward input (FF_VAL)

e: error between setpoint and process variable

To further customize the block for use in your application, you can configure filtering, feedforward inputs, tracking inputs, setpoint and output limiting, PID equation structures and block output action. Table E-6 lists the PID block parameters and their descriptions, units of measure and index numbers and Figure E-5 illustrates the internal components of the PID function block.

Figure E-5. PID Function Block Schematic



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Modes

The PID function block supports the following modes:

- Manual (Man)—The block output (OUT [9]) may be set manually.
- Automatic (Auto)—The SP [8] may be set manually and the block algorithm calculates OUT [9].
- Cascade (Cas)—The SP [8] is calculated in another block and is provided to the PID block through the CAS_IN [18] connection.
- RemoteCascade (RCas)—The SP [8] is provided by a host computer that writes to the RCAS_IN [32] parameter.
- RemoteOutput (ROut)—The OUT [9] is provided by a host computer that writes to the ROUT_IN [33] parameter.
- Local Override (LO)—The track function is active. OUT [9] is set by TRK_VAL [39]. The BLOCK_ERR [6] parameter shows Local override.
- Initialization Manual (IMan)—The output path is not complete (for example, the cascade-to-dependent block path might not be open). In IMan mode, OUT [9] tracks BKCAL_IN [27].
- Out of Service (OOS)—The block is not processed. The OUT [9] status is set to Bad: Out of Service. The BLOCK_ERR [6] parameter shows Out of service.

You can configure the Man, Auto, Cas and OOS modes as permitted modes for operator entry.

Mode Handling

Shed Options—RCAS Mode Only

Shed from or climb to a remote mode is determined by the parameter SHED_OPT [34]. A block climbs and sheds through the same path. For example, if SHED_OPT [34] specifies that a block should shed to Auto, then, if the block target mode is set to RCas, the block goes through Auto on the way to RCas. You can configure the shed option as follows:

Shed With Return Options

Remote cascade or remote output connection failure shifts actual mode but keeps trying to restore remote cascade or remote output (in other words, the remote cascade or remote output target mode stays in effect).

Normal—On failure of a remote connection, the block attempts to attain the highest permitted non-remote mode until the remote connection is restored. Cas is the highest permitted non-remote mode and Auto is is the next highest permitted non-remote mode. If Cas or Auto are not available, the block will shed by default to Man.

Retained Target—The retained target mode is the mode the block was in before changing to one of the remote target modes. On failure of a remote connection, the block attempts to attain the retained target mode.

Auto—On failure of a remote connection, the block attempts to attain Auto, if permitted, until the remote connection is restored.

Man—On failure of a remote connection, the block sheds to Man until a remote connection is restored.

Shed With No Return Options

For any shed with no return option, the target mode changes as determined by the option. Therefore, there is no attempt to restore the connection following failure. The behavior on change to a remote target mode is identical to that for Shed With Return Options.

Normal—On failure of a remote connection, the block sets the target mode to the highest permitted non-remote mode. Cas is the highest permitted non-remote mode and Auto is is the next permitted non-remote mode. If Cas or Auto are not available, the block will shed by default to Man.

Retained Target—The retained target mode is the mode the block was in before changing to one of the remote target modes. On failure of a remote connection, the block sets the target mode to the retained target mode.

Auto—On failure of a remote connection, the block sets the target mode to Auto, if permitted.

Man—On failure of a remote connection, the block sets the target mode to Man, if permitted.

The user may configure SHED_OPTS [34] so that it calls for a target mode that is not permitted. When doing this, the mode logic uses the following rules as applied by the remote logic:

- Shed logic never results in a non-permitted target mode.
- Shed logic never attempts to attain an actual mode of Auto or Cas if that mode is not permitted.

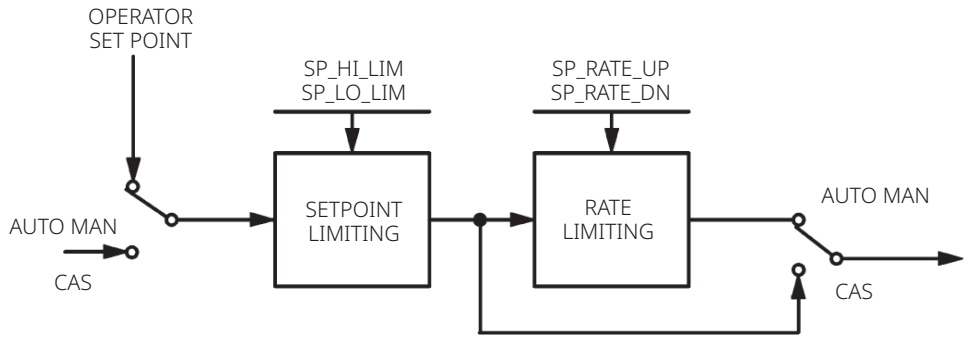
Status Handling

If the input status on the PID block is Bad, the mode of the block reverts to Manual. In addition, you can select the Target to Manual if Bad IN status option to direct the target mode to revert to manual. You can set the status option in Manual or Out of Service mode only.

Set Point Selection and Limiting

The set point of the PID block is only valid when the block is in Auto, Cas or RCas. Figure E-6 illustrates the method for set point selection. You can configure the SP_HI_LIM [21] and SP_LO_LIM [22] parameters to limit the set point. In Cascade or Remote Cascade mode, the set point is adjusted by another function block or by a host computer and the output is computed based on the set point.

Figure E-6. PID Function Block Set Point Selection



In Automatic mode, the set point is entered manually by the operator and the output is computed based on the set point. In Auto mode, you can also adjust the set point limit and the set point rate of change using the SP_RATE_UP [20] and SP_RATE_DN [19] parameters.

In Manual mode the output is entered manually by the operator. In Remote Output mode, the output is entered by a host computer.

Output Selection and Limiting

Output selection is determined by the mode and the set point. In Automatic, Cascade or Remote Cascade mode, the output is computed by the PID control equation. In Manual and Remote Output mode, the output may be entered manually (see also Set Point Selection and Limiting). You can limit the output by configuring the OUT_HI_LIM [28] and OUT_LO_LIM [29] parameters.

Filtering

The filtering feature changes the response time of the device to smooth variations in output readings caused by rapid changes in input. You can adjust the filter time constant (in seconds) using the PV_FTIME [16] or SP_FTIME [69] parameters. Set the filter time constant to zero to disable the filter feature.

Feedforward Calculation

The feedforward value (FF_VAL [40]) is scaled (FF_SCALE [41]) to a common range for compatibility with the output scale (OUT_SCALE [11]). A gain value (FF_GAIN [42]) is applied to achieve the total feedforward contribution.

Output Tracking

Output tracking is enabled through the control options. You can set control options in Manual or Out of Service mode only.

The Track Enable control option must be set to True for the track function to operate. When the Track in Manual control option is set to True, the operator cannot override the tracking function in Manual mode. When Track in Manual is False, the operator can override the tracking function when the block is in Manual mode. Activating the track function causes the block's actual mode to revert to Local Override.

The TRK_VAL [38] parameter specifies the value to be converted and tracked into the output when the track function is operating. The TRK_SCALE [37] parameter specifies the range of TRK_VAL [38].

When the TRK_IN_D [38] parameter is True and the Track Enable control option is True, the TRK_VAL [38] input is converted to the appropriate value and output in units of OUT_SCALE [11].

Set Point Tracking

You can configure the method for tracking the set point by configuring the following control options (CONTROL_OPTS [12]):

- SP-PV Track in Man—Permits the SP [8] to track the PV [7] when the actual mode of the block is Man.
- SP-PV Track in LO or IMan—Permits the SP [8] to track the PV [7] when the actual mode of the block is Local Override (LO) or Initialization Manual (IMan).
- SP-PV Track in ROUT—Permits the SP [8] to track the PV [7] when the actual mode of the block is RemoteOut (ROUT).

- SP Track retained Target—Causes the set point to track the RCAS or CAS parameter based on the retained target mode when the actual mode is MAN or LO.
- Act On IR—If this option is true, then when IR (Initialization Requested) is received on BKCAL_IN [27], the SP [8] will be adjusted within setpoint limits to provide bumpless transfer when the cascade is closed. If the setpoint required to provide bumpless transfer is outside the setpoint limits, then any difference added to provide bumpless transfer will be removed in the BAL_TIME [25].

When one of these options is set, the SP[8] value is set to the PV [7] value while in the specified mode.

You can select the value that a master controller uses for tracking by configuring the Use PV for BKCAL_OUT control option. The BKCAL_OUT [31] value tracks the PV value. BKCAL_IN [27] on a master controller connected to BKCAL_OUT [31] on the PID block in an open cascade strategy forces its OUT [9] to match BKCAL_IN [27], thus tracking the PV from the secondary dependent PID block into its cascade input connection (CAS_IN [18]). If the Use PV for BKCAL_OUT option is not selected, the working set point (SP_WRK [68]) is used for BKCAL_OUT [31].

You can set control options in Manual or Out of Service mode only. When the mode is set to Auto, the SP [8] will remain at the last value (it will no longer follow the PV [7].

PID Equation Structures for Enhanced PID Block

NOTE

Extended parameters are not available at this time for all host systems. Refer to your host system documentation or contact your Emerson sales office for additional information.

Configure the STRUCTURECONFIG [71] parameter to select the PID equation structure. You can select one of the following choices:

- Proportional, integral and derivative on error (PID)
- Proportional and integral on error, derivative on PV (PI_D)
- Integral on error, proportional and derivative on PV (I_PD)
- Proportional on error, derivative on error (PD)
- Integral on error, derivative on error (ID)
- Integral on error, derivative on PV (I_D)
- Two degrees of Freedom (2DOF)

Reverse and Direct Action

To configure the block output action, set the Direct Acting control option. This option defines the relationship between a change in PV [7] and the corresponding change in output. With Direct Acting enabled (True), an increase in PV results in an increase in the output.

You can set control options in Manual or Out of Service mode only.

Alarm Detection

A block alarm will be generated whenever the BLOCK_ERR [6] has an error bit set. The types of block error for the PID block are defined above.

Process alarm detection is based on the PV [7] value. You can configure the alarm limits of the following standard alarms:

- High (HI_LIM [51])
- High high (HI_HI_LIM [49])
- Low (LO_LIM [53])
- Low low (LO_LO_LIM [55])

Additional process alarm detection is based on the difference between SP [8] and PV [7] values and can be configured via the following parameters:

- Deviation high (DV_HI_LIM [57])
- Deviation low (DV_LO_LIM [59])

In order to avoid alarm chattering when the variable is oscillating around the alarm limit, an alarm hysteresis in percent of the PV span can be set using the ALARM_HYS [47] parameter. The priority of each alarm is set in the following parameters:

- HI_PRI [50]
- HI_HI_PRI [48]
- LO_PRI [52]
- LO_LO_PRI [54]
- DV_HI_PRI [56]
- DV_LO_PRI [58]

Alarms are grouped into five levels of priority, as shown in Table E-4.

Table E-4. PID Function Block Alarm Priorities

Priority Number	Priority Description(1)
0	The alarm is disabled
1	An alarm condition with a priority of 1 can be recognized by the system. The device monitors the alarm but does not report it until requested by the host system.
2	An alarm condition with a priority of 2 is reported to the operator, but generally does not require operator attention (such as diagnostics and system alerts).
3 to 7	Alarm conditions of priority 3 to 7 are advisory alarms of increasing priority.
8 to 15	Alarm conditions of priority 8 to 15 are critical alarms of increasing priority.

1. The priority classes “advise” and critical” have no relationship to Plant Web Alerts.

Application Information

The PID function block is a powerful, flexible control algorithm that is designed to work in a variety of control strategies. The PID block is configured differently for different applications.

DeltaV Tune

DeltaV Tune quickly and automatically determines optimal tuning parameters for PID control loops. For more information on DeltaV Tune, refer to DeltaV Books Online or DeltaV documentation.

Block Errors

Table E-5 lists conditions reported in the BLOCK_ERR [6] parameter.

Table E-5. PID BLOCK_ERR Conditions

Condition Number	Condition Name and Description
1	Block Configuration Error—SHED_OPT or BYPASS set to 0
4	Local Override—The actual mode is LO and Track Enable is set.
7	Input failure/process variable has Bad status—The parameter linked to IN is indicating a Bad status.
14	Power Up—Set if devices was powered up with this block in Out of Service (OOS) mode. Cleared on first change of mode to other than OOS.
15	Out of Service—The actual mode is Out of Service (OOS).

PID Function Block Parameter List

- Read/Write Capability: RO - Read Only, RW - Read Write
- Mode: The block mode(s) required to write to the parameter

Table E-6. PID Function Block System Parameters Definitions

Label PARAMETER_NAME	Index Number	RO / RW	Block Mode	Range	Initial Value	Description
Static Revision ST_REV	1	RO	N/A	0 to 65535	0	Data Type: Unsigned16 The revision level of the static data associated with the function block. The revision value will be incremented each time a static pa rameter value in the block is changed.
Tag Description TAG_DESC	2	RW	ALL	7 bit ASCII	Spaces	Data Type: Octet String The user description of the intended application of the block.
Strategy STRATEGY	3	RW	ALL	0 to 65535	0	Data Type: Unsigned16 The strategy field can be used to identify grouping of blocks. This data is not checked or processed by the block.
Alert Key ALERT_KEY	4	RW	ALL	0 to 255	0	Data Type: Unsigned8 The identification number of the plant unit. This information may be used in the host for sorting alarms, etc.

- continued -

Table E-6. PID Function Block System Parameters Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Block Mode	Range	Initial Value	Description
Block Mode MODE_BLK	5	- - -		- - -	- - -	Data Type: DS-69 Valid Bits: 7: OOS, 6: IMAN, 5: LO, 4: MAN, 3: AUTO, 2: CAS, 1: RCAS, 0: ROUT The actual, target, permitted and normal modes of the block. Target: The requested block mode Actual: The current mode of the block Permitted: Allowed modes for Target Normal: Most common mode for Target
TARGET	5.1	RW	ALL	OOS, MAN, AUTO CAS, RCAS, ROUT	OOS until block is configured, then last valid target	
ACTUAL	5.2	RO	ALL	- - -	OOS	
PERMITTED	5.3	RW	ALL	OOS+MAN+AUTO+ CAS+RCAS+ROUT	OOS MAN, AUTO CAS, RCAS ROUT	
NORMAL	5.4	RW	ALL	- - -	AUTO	
Block Error BLOCK_ERR	6	RO	N/A	Defined Bits 1: Block Configuration Error 4: Local Override 7: Input Failure/ Bad PV status 14: Power-up 15: Out-of-Service	Dynamic	Data Type: Bit String 0 = inactive 1 = active This parameter reflects the error status associated with the hardware or software components associated with a block. It is a bit string so that multiple errors may be shown.
Process Value PV	7	RO	N/A	- - -	Dynamic	Data Type: DS-65 The process variable used in block execution.
Setpoint SP	8	- - -	OOS MAN AUTO	PV_SCALE +/- 10%	Dynamic	Data Type: DS-65 The target block setpoint value. It is the result of setpoint limiting and setpoint rate of change limiting.
Output OUT	9	- - -	MAN OOS	Status OUT_SCALE +/- 10%	Dynamic	DS-65 The block output value and status.
				Value	- - -	
Process Value Scale PV_SCALE	10	- - -	OOS	EU at 100% EU at 0% Units index Decimal Point	100 0 % 0	Data Type: DS-68 The high and low scale values, engineering units code and number of digits to the right of the decimal point associated with PV.
Output Scale OUT_SCALE	11	- - -	OOS	EU at 100% EU at 0% Units index Decimal Point	100 0 % 0	Data Type: DS-68 The high and low scale values, engineering units code and number of digits to the right of the decimal point associated with OUT.
Grant Deny GRANT_DENY	12	- - -				Data Type: DS-70 Options for controlling access of host computers and local control panels to operating, tuning and alarm parameters of the block. Not used by the device. GRANT: 0=N/A, 1=granted DENY: 0 = N/A, 1= denied
GRANT	12.1	- - -	ALL	0: Program 1: Tune 2: Alarm 3: Local	All bits: 0	
DENY	12.2	- - -	ALL	0: Program 1: Tune 2: Alarm 3: Local	All bits: 0	

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Table E-6. PID Function Block System Parameters Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Block Mode	Range	Initial Value	Description
Control Options CONTROL_OPTS	13	- - -	OOS	0: Bypass Enable 1: SP tracks PV in MAN 2: SP tracks PV in ROUT 3: SP tracks PV in LO or MAN 4: SP tracks RCAS or CAS in IMAN, LO, MAN or ROUT 5: Direct Acting 7: Track Enable 8: Track in Manual 9: Use PV for BKCAL_OUT 10: Act on IR 12: Restrict SP to limits in Cas and RCas 13: No output limits in MAN	All bits: 0	Data Type: Bit String 0=disable 1=enable Allows you to specify control strategy options.
Status Options STATUS_OPTS	14	- - -	OOS	0: IFS (Initiate Fault State) if BAD IN 1: IFS if BAD CAS_IN 2: Use Uncertain as Good 5: Target to MAN if BAD IN	All bits: 0	Data Type: Bit String 0=disable 1=enable Allows you to select options for status handling and processing.
Input IN	15	- - -	ALL	Status	BAD Not Connected Not Limited	Data Type: DS-65 The primary input value of the block.
				Value	0	
Process Value Filter Time PV_FTIME	16	- - -	ALL	Positive	0	Data Type: Float The time constant of the first-order PV filter. It is the time, in seconds, required for a 63 percent change in the IN value.
Bypass BYPASS	17	- - -	MAN OOS	1=Off 2=On	Uninitialized	Data Type: Enum Used to override the calculation of the block. When enabled, the SP is sent directly to the output.
Cascade Input CAS_IN	18	- - -	ALL	Status	BAD Not Connected Not Limited	Data Type: DS-65 The setpoint value from another block.
				Value	0	
Setpoint Rate Down SP_RATE_DN	19	- - -	ALL	Positive	+ INF	Data Type: Float Ramp rate for downward SP changes. When the ramp rate is set to zero, the SP is used immediately. PV per second
Setpoint Rate UP SP_RATE_UP	20	- - -	ALL	Positive	+ INF	Data Type: Float Ramp rate for upward SP changes. When the ramp rate is set to zero, the SP is used immediately. PV per second

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Table E-6. PID Function Block System Parameters Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Block Mode	Range	Initial Value	Description
Setpoint High Limit SP_HI_LIM	21	- - -	ALL	PV Scale +/- 10%, must be greater than SP_LO_LIM	100	Data Type: Float The highest SP value allowed.
Setpoint Low Limit SP_LO_LIM	22	- - -	ALL	PV Scale +/- 10%, must be less than SP_HI_LIM	0	Data Type: Float The lowest SP value allowed.
Gain GAIN	23	- - -	ALL	greater than 0	1	Data Type: Float The proportional gain value.
Reset RESET	24	- - -	ALL	Positive	+ INF	Data Type: Float The integral action time constant. Seconds per repeat
Balance Time BAL_TIME	25	- - -	ALL	Positive	0	Data Type: Float The specified time, in seconds, for the internal working value of bias to return to the operator set bias. Also used to specify the time constant at which the integral term will move to obtain balance when the output is limited and the mode is AUTO, CAS or RCAS.
Rate RATE	26	- - -	ALL	Positive	0	Data Type: Float The derivative action time constant, in seconds.
Back Calculation Input BKCAL_IN	27	- - -	ALL	Status	BAD Not Connected Not Limited	Data Type: DS-65 The analog input value and status from another block's BKCAL_OUT output that is used for backward output tracking for bumpless transfer and to pass limit status.
				Value	0	
Output High Limit OUT_HI_LIM	28	- - -	ALL	OUT_SCALE +/- 10%	100	Data Type: Float Limits the maximum output value for modes other than manual.
Output Low Limit OUT_LO_LIM	29	- - -	ALL	OUT_SCALE +/- 10%	0	Data Type: Float Limits the minimum output value for modes other than manual.
Back Calculation Hysteresis BKCAL_HYS	30	- - -	ALL	0 to 50%	0.50%	Data Type: Float The amount the output value must change away from the its output limit before limit status is turned off.
Back Calculation Output BKCAL_OUT	31	RO	N/A	- - -	Dynamic	Data Type: DS-65 The value and status required by the BKCAL_IN input of another block to prevent reset windup and to provide bumpless transfer of closed loop control.
Remote Cascade Input RCAS_IN	32	- - -	ALL	Status	BAD Not Connected Not Limited	Data Type: DS-65 Target setpoint and status that is provided by a supervisory host. Used when mode is RCAS.
				Value	0 Trk	

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Table E-6. PID Function Block System Parameters Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Block Mode	Range	Initial Value	Description
Remote Out Input ROUT_IN	33	- - -	ALL	Status	BAD Not Connected Not Limited	Data Type: DS-65 Target output and status that is provided by a supervisory host. Used when mode is ROUT.
				Value	0 Trk	
Shed Options SHED_OPT	34	- - -	ALL	0=Invalid 1=Normal Shed, Normal Return 2=Normal Shed, No Return 3=Shed to Auto, normal return 4=Shed to Auto, no return. Target mode changes to Auto on detection of a shed condition 5=Shed to Manual, normal return 6=Shed to Manual, No return. Target mode changes to MAN on detection of a shed condition. 7=Shed to retained target, normal return 8=Shed to retained target, no return. (Change target to retained target)	Uninitialized	Data Type: Uint8 Defines action to be taken on remote control device timeout. Normal Return - actual mode changes to the next lowest priority non-remote mode permitted but returns to the target remote mode when the remote computer completes the initialization handshake. No Return - Target mode changes to the next lowest priority non-remote mode permitted. The target remote mode is lost, so no return occurs.
Remote Cascade Output RCAS_OUT	35	RO	N/A	- - -	Dynamic	Data Type: DS-65 Block setpoint and status after ramping, filtering and limiting that is provided to a supervisory host for back calculation to allow action to be taken under limiting conditions or mode change. Used when mode is RCAS.
Remote Out Output ROUT_OUT	36	RO	N/A	- - -	Dynamic	Data Type: DS-65 Block output that is provided to a supervisory host for a back calculation to allow action to be taken under limiting conditions or mode change. Used when mode is RCAS.
Tracking Scale TRK_SCALE	37	- - -	MAN OOS	- - -	100 0 % 2	Data Type: DS-68 The high and low scale values, engineering units code and number of digits to the right of the decimal point associated with the external tracking value (TRK_VAL).

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Table E-6. PID Function Block System Parameters Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Block Mode	Range	Initial Value	Description
Tracking Input Discrete TRK_IN_D	38	- - -	ALL	Status	BAD Not Connected Not Limited	Data Type: DS-66 Discrete input that initiates external tracking of the block output to the value specified by TRK_VAL.
				Value	0	
Tracking Value TRK_VAL	39	- - -	ALL	Status	BAD Not Connected Not Limited	Data Type: DS-65 The value (after scaling from TRK_SCALE to OUT_SCALE) applied to OUT in LO mode when external tracking is enabled by TRK_IN_D.
				Value	0	
Feed Forward Value FF_VAL	40	- - -	ALL	Status	BAD Not Connected Not Limited	Data Type: DS-65 The feedforward control input value and status.
				Value	0	
Feed Forward Scale FF_SCALE	41	- - -	MAN OOS	- - -	100 0 % 0	Data Type: DS-68 The high and low scale values, engineering units code and number of digits to the right of the decimal point associated with the feedforward value (FF_VAL).
Feed Forward Gain FF_GAIN	42	- - -	MAN OOS	- - -	0	Data Type: Float The feedforward gain value. FF_VAL is multiplied by FF_GAIN before it is added to the calculated control output. A value of 0 disables feedforward.
Update Event UPDATE_EVT	43	- - -				Data Type: DS-73 This alert is generated by any changes to the static data.
UNACKNOWLEDGED	43.1	RW	N/A	0=Undefined 1=Acknowledged 2=Unacknowledged	0	
UPDATE_STATE	43.2	RO	N/A	0=Undefined 1=Update reported 2=Update not reported	0	
TIME_STAMP	43.3	RO	N/A	- - -	0	
STATIC_REVISION	43.4	RO	N/A	- - -	0	
RELATIVE_INDEX	43.5	RO	N/A	- - -	0	
Block Alarm BLOCK_ALM	44	- - -				Data Type: DS-72 The block alarm is used for all configuration, hardware, connection failure or system problems in the block. The cause of the alarm will be set in the subcode. VALUE Data Type: Unsigned8
UNACKNOWLEDGED	44.1	RW	N/A	0=Undefined 1=Acknowledged 2=Unacknowledged	0	
ALARM_STATE	44.2	RO	N/A	0=Undefined 1=Clear-reported 2=Clear-not reported 3=Active reported 4=Active not reported	0	
TIME_STAMP	44.3	RO	N/A	- - -	0	
SUBCODE	44.4	RO	N/A	- - -	0	
VALUE	44.5	RO	N/A	- - -	0	

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Table E-6. PID Function Block System Parameters Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Block Mode	Range	Initial Value	Description
Alarm Summary ALARM_SUM	45	- - -		- - -	- - -	Data Type: DS-74 Current alert status, unacknowledged states, unreported states and disabled states of the alarms associated with the function block.
CURRENT	45.1	RO	ALL	1: High High Alarm 2: High Alarm 3: Low Low Alarm 4: Low Alarm 5: Deviation High Alarm 6: Deviation Low Alarm 7: Block Alarm	Dynamic	
UNACKNOWLEDGED	45.2	RO	ALL		- - -	
UNREPORTED	45.3	RO	ALL		- - -	
DISABLED	45.4	RW	ALL		- - -	
Acknowledge Option ACK_OPTION	46	- - -	N/A	1: High High Alarm 2: High Alarm 3: Low Low Alarm 4: Low Alarm 5: Deviation High Alarm 6: Deviation Low Alarm 7: Block Alarm	All bits: 0	Data Type: Bit String 0=Disable 1=Enable Used to set auto acknowledgment of alarms.
Alarm Hysteresis ALARM_HYS	47	- - -	ALL	0 to 50%	0.50%	Data Type: Float The amount the alarm value must return to within the alarm limit before the associated active alarm condition clears.
High High Priority HI_HI_PRI	48	- - -	ALL	ALL 0 to 15	0	Data Type: Unsigned8 The priority of the HI HI Alarm.
High High Limit HI_HI_LIM	49	- - -	ALL	PV_SCALE or +INF	+INF	Data Type: Float The setting for the alarm limit used to detect the HI HI alarm condition.
High Priority HI_PRI	50	- - -	ALL	0 to 15	0	Data Type: Unsigned8 The priority of the HI alarm.
High Limit HI_LIM	51	- - -	ALL	PV_SCALE or +INF	+INF	Data Type: Float The setting for the alarm limit used to detect the HI alarm condition.
Low Priority LO_PRI	52	- - -	ALL	0 to 15	0	Data Type: Unsigned8 The priority of the LO alarm.
Low Limit LO_LIM	53	- - -	ALL	PV_SCALE or -INF	-INF	Data Type: Float The setting for the alarm limit used to detect the LO alarm condition.
Low Low Priority LO_LO_PRI	54	- - -	ALL	0 to 15	0	Data Type: Unsigned8 The priority of the LO LO alarm.
Low Low Limit LO_LO_LIM	55	- - -	ALL	PV_SCALE or -INF	-INF	Data Type: Float The setting for the alarm limit used to detect the LO LO alarm condition.
Deviation High Priority DV_HI_PRI	56	- - -	ALL	0 to 15	0	Data Type: Unsigned8 The priority of the deviation high alarm.
Deviation High Limit DV_HI_LIM	57	- - -	ALL	PV_SCALE or +INF	+INF	Data Type: Float The setting for the alarm limit used to detect the deviation high alarm condition.

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Table E-6. PID Function Block System Parameters Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Block Mode	Range	Initial Value	Description
Deviation Low Priority DV_LO_PRI	58	- - -	ALL	0 to 15	0	Data Type: Unsigned8 The priority of the deviation low alarm.
Deviation Low Limit DV_LO_LIM	59	- - -	ALL	-INF or -PV span to 0	-INF	Data Type: Float The setting for the alarm limit use to detect the deviation low alarm condition.
High High Alarm HI_HI_ALM	60			- - -	- - -	Data Type: DS-71 The HI HI alarm data, which includes a value of the alarm, a timestamp of occurrence and the state of the alarm. VALUE Data Type: Float
UNACKNOWLEDGED	60.1	RW	N/A	0=Undefined 1=Acknowledged 2=Unacknowledged	0=undefined	
ALARM_STATE	60.2	RO	N/A	0=Undefined 1=Clear-reported 2=Clear-not reported 3=Active reported 4=Active not reported	0=undefined	
TIME_STAMP	60.3	RO	N/A	- - -	0	
SUBCODE	60.4	RO	N/A	- - -	0	
VALUE	60.5	RO	N/A	- - -	0	
High Alarm HI_ALM	61			- - -	- - -	Data Type: DS-71 The HI alarm data, which includes a value of the alarm, a timestamp of occurrence and the state of the alarm. VALUE Data Type: Float
UNACKNOWLEDGED	61.1	RW	N/A	0=Undefined 1=Acknowledged 2=Unacknowledged	0=undefined	
ALARM_STATE	61.2	RO	N/A	0=Undefined 1=Clear-reported 2=Clear-not reported 3=Active reported 4=Active not reported	0=undefined	
TIME_STAMP	61.3	RO	N/A	- - -	0	
SUBCODE	61.4	RO	N/A	- - -	0	
VALUE	61.5	RO	N/A	- - -	0	
Low Alarm LO_ALM	62			- - -	- - -	Data Type: DS-71 The LO alarm data, which includes a value of the alarm, a timestamp of occurrence and the state of the alarm. VALUE Data Type: Float
UNACKNOWLEDGED	62.1	RW	N/A	0=Undefined 1=Acknowledged 2=Unacknowledged	0=undefined	
ALARM_STATE	62.2	RO	N/A	0=Undefined 1=Clear-reported 2=Clear-not reported 3=Active reported 4=Active not reported	0=undefined	
TIME_STAMP	62.3	RO	N/A	- - -	0	
SUBCODE	62.4	RO	N/A	- - -	0	
VALUE	62.5	RO	N/A	- - -	0	

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Table E-6. PID Function Block System Parameters Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Block Mode	Range	Initial Value	Description
Low Low Alarm LO_LO_ALM	63	- - -				Data Type: DS-71 The LO LO alarm data, which includes a value of the alarm, a timestamp of occurrence and the state of the alarm. VALUE Data Type: Float
UNACKNOWLEDGED	63.1	RW	N/A	0=Undefined 1=Acknowledged 2=Unacknowledged	0=undefined	
ALARM_STATE	63.2	RO	N/A	0=Undefined 1=Clear-reported 2=Clear-not reported 3=Active reported 4=Active not reported	0=undefined	
TIME_STAMP	63.3	RO	N/A	- - -	0	
SUBCODE	63.4	RO	N/A	- - -	0	
VALUE	63.5	RO	N/A	- - -	0	
Deviation High Alarm DV_HI_ALM	64	- - -			- - -	Data Type: DS-71 The DV HI alarm data, which includes a value of the alarm, a timestamp of occurrence and the state of the alarm. VALUE Data Type: Float
UNACKNOWLEDGED	64.1	RW	N/A	0=Undefined 1=Acknowledged 2=Unacknowledged	0=undefined	
ALARM_STATE	64.2	RO	N/A	0=Undefined 1=Clear-reported 2=Clear-not reported 3=Active reported 4=Active not reported	0=undefined	
TIME_STAMP	64.3	RO	N/A	- - -	0	
SUBCODE	64.4	RO	N/A	- - -	0	
VALUE	64.5	RO	N/A	- - -	0	
Deviation Low Alarm DV_LO_ALM	65	- - -			- - -	Data Type: DS-71 The DV LO alarm data, which includes a value of the alarm, a timestamp of occurrence and the state of the alarm. VALUE Data Type: Float
UNACKNOWLEDGED	65.1	RW	N/A	0=Undefined 1=Acknowledged 2=Unacknowledged	0=undefined	
ALARM_STATE	65.2	RO	N/A	0=Undefined 1=Clear-reported 2=Clear-not reported 3=Active reported 4=Active not reported	0=undefined	
TIME_STAMP	65.3	RO	N/A	- - -	0	
SUBCODE	65.4	RO	N/A	- - -	0	
VALUE	65.5	RO	N/A	- - -	0	
Extended Parameters						
Bias BIAS	66	- - -	ALL	OUT_SCALE +/- 10%	0	Data Type: Float The bias value used to calculate output for a PD structure.
Error ERROR	67	RO	N/A	- - -	Dynamic	Data Type: Float The error (SP-PV) used to determine the control action.

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Table E-6. PID Function Block System Parameters Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Block Mode	Range	Initial Value	Description
SP Work SP_WRK	68	RO	N/A	- - -	Dynamic	Data Type: Float The working set point of the block after limiting and filtering is applied. EU of PV_SCALE
SP FTime SP_FTIME	69	- - -	ALL	Positive	0	Data Type: Float The time constant of the first-order SP filter. It is the time, in seconds, required for a 63 percent change in the IN value. Applied after SP rate limiting.
Math Form MATHFORM	70	- - -	OOS	0=Standard 1=Series	0=Standard	Data Type: Unsigned8 Selects equation form (series or standard)
Structureconfig STRUCTURECONFIG	71	- - -	OOS	0=PID terms on error 1=PI terms on error, D term on PV 2=I terms on error, PD term on PV 3=PD terms on error 4=P term on error, D term on PV 5=ID terms on error 6=I term on error, D term on PV 7=2 Deg. of Freedom PID	1=PI terms on error, D term on PV	Data Type: Unsigned8 Defines PID equation structure to apply controller action.
UGamma GAMMA (ugamma)	72	- - -	OOS	> = 0, < = 1	1.0	Data Type: Float Fraction of derivative action taken on error versus PV. For a value of 0.6, then 60% of the derivative action will be based on error and 40% on PV. The value of GAMMA may be changed over a range of 0 to 1 if STRUCTURE is set to Two Degrees of Freedom Control. Otherwise, it is automatically set to a value of 1 or 0 based on the Structure selection.
UBeta BETA (ubeta)	73	- - -	OOS	> = 0, < = 1	1	Data Type: Float Fraction of proportional action taken on error versus PV. For a value of 0.6, then 60% of the proportional action will be based on error and 40% on PV. The value of BETA may be changed over a range of 0 to 1 if STRUCTURE is set to Two Degrees of Freedom Control. Otherwise, it is automatically set to a value of 1 or 0 based on the Structure selection.

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Table E-6. PID Function Block System Parameters Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Block Mode	Range	Initial Value	Description
IDeadBand IDEADBAND	74	- - -	OOS	Positive	0	Data Type: Float Integral action stops when ERROR is within IDEADBAND, proportional and derivative action continue. EU of PV_SCALE
StdDev STDDEV	75	RO	N/A	- - -	Dynamic	Data Type: Float Standard deviation of PV.
Cap StdDev CAP_STDDEV	76	RO	N/A	- - -	Dynamic	Data Type: Float Standard deviation of PV changes.
T Request T_REQUEST	77	RO	ALL	0=Request Tuning 1=Force Tuning 2=Reset Tuner	All bits: 0	Data Type: Bit String Operator request to initiate/ control autotuning.
T State T_STATE	78	RO	NONE	- - -	0	Data Type: Unsigned8 Current autotuner state.
T Status T_STATUS	79	RO	N/A	0=Scan Rate Too Low Warning 1=Insufficient Process Response (obsolete) 2=Scan Rate Too High Warning 3=Inverse Direct Acting Error 4=PV Deviation Too Large 5=Initial PV Deviation Too Large 6=PV Limited or Constant 7=PV Bad 8=Invalid Mode for Tuning 9=BKCAL_IN Non Good or Limited 10=Out Limited 11=Bypass Active 12=Mode Changed 13=Tracking Active 14=Disconnected 15=SP Changed	0=Scan Rate Too Low Warning	Data Type: Bit String Autotuner status.
T Ipgain T_IPGAIN	80	RO	N/A	- - -	0.0	Data Type: Float Integrated process gain.
T Ugain T_UGAIN	81	RO	N/A	- - -	0.0	Data Type: Float Ultimate gain.
T Uperiod T_UPERIOD	82	RO	N/A	- - -	0.0	Data Type: Float Ultimate period.
T Psgain T_PSGAIN	83	RO	N/A	- - -	0.0	Data Type: Float Process static gain.
T Ptimec T_PTIMEC	84	RO	N/A	- - -	0.0	Data Type: Float Process time constant.
T Pdtime T_PDTIME	85	RO	N/A	- - -	0.0	Data Type: Float Process dead time.

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Table E-6. PID Function Block System Parameters Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Block Mode	Range	Initial Value	Description
T Targetop T_TARGETOP	86	RW	ALL	- - -	2	Data Type: Unsigned8 Target oscillation periods.
T Hyster T_HYSTER	87	RW	ALL	> = 0.0	0.0	Data Type: Float Hysteresis
T Relayss T_RELAYSS	88	RW	ALL	> = 0.0	3.0	Data Type: Float Relay step size.
T Gain Magnifier T_GAIN_MAGNIFIER	89	RW	ALL	> 0.1, < 100	1.0	Data Type: Float Scales amount of gain.
T Auto Extra DT T_AUTO_EXTRA_DT	90	RW	ALL	- - -	0	Data Type: Unsigned8 Allow additional cycle with extra deadtime.
T Auto Hysteresis T_AUTO_ HYSTERESIS	91	RW	ALL	- - -	0	Data Type: Unsigned8 Allows calculation of hysteresis based on CAP_STDDEV
T Aoperiods T_AOPERIODS	92	RO	N/A	- - -	0	Data Type: Unsigned8 Actual oscillation periods.

View Lists

View lists allow the values of a set of parameters to be accessed at the same time. Views 1 and 2 contain operating parameters and are defined by the Fieldbus Foundation. View 3 contains dynamic parameters and View 4 contains static parameters with configuration and maintenance information. Views 3 and 4 are defined by the manufacturer.

NOTE

Because individual views are limited in size, View List 4 has multiple parts.

Table E-7. PID Function Block, View Lists

INDEX NUMBER	PARAMETER	VIEW			
		1	2	3	4
1	ST_REV	x	x	x	x
3	STRATEGY				x
4	ALERT_KEY				x
5	MODE_BLK	x		x	
6	BLOCK_ERR	x		x	
7	PV	x		x	
8	SP	x		x	
9	OUT	x		x	
10	PV_SCALE		x		
11	OUT_SCALE		x		
12	GRANT_DENY		x		
13	CONTROL_OPTS				x
14	STATUS_OPTS				x

- continued -

Table E-7. PID Function Block, View Lists (continued)

INDEX NUMBER	PARAMETER	VIEW			
		1	2	3	4
15	IN			x	
16	PV_FTIME				x
17	BYPASS		x		
18	CAS_IN	x		x	
19	SP_RATE_DN				x
20	SP_RATE_UP				x
21	SP_HI_LIM		x		
22	SP_LO_LIM		x		
23	GAIN				x
24	RESET				x
25	BAL_TIME				x
26	RATE				x
27	BKCAL_IN			x	
28	OUT_HI_LIM		x		
29	OUT_LO_LIM		x		
30	BKCAL_HYS				x
31	BKCAL_OUT			x	
32	RCAS_IN			x	
33	ROUT_IN			x	
34	SHED_OPT				x
35	RCAS_OUT			x	
36	ROUT_OUT			x	
37	TRK_SCALE				x
38	TRK_IN_D	x		x	
39	TRK_VAL	x		x	
40	FF_VAL			x	
41	FF_SCALE				x
42	FF_GAIN				x
45	ALARM_SUM	x		x	
46	ACK_OPTION				x
47	ALARM_HYS				x
48	HI_HI_PRI				x
49	HI_HI_LIM				x

- continued -

Table E-7. PID Function Block, View Lists (continued)

INDEX NUMBER	PARAMETER	VIEW			
		1	2	3	4
50	HI_PRI				x
51	HI_LIM				x
52	LO_PRI				x
53	LO_LIM				x
54	LO_LO_PRI				x
55	LO_LO_LIM				x
56	DV_HI_PRI				x
57	DV_HI_LIM				x
58	DV_LO_PRI				x
59	DV_LO_LIM				x
66	BIAS				x
67	ERROR			x	
68	SP_WORK			x	
69	SP_FTIME				x
70	MATHFORM				x
71	STRUCTURECONFIG				x
72	GAMMA (ugamma)				x
73	BETA (ubeta)				x
74	IDEADBAND				x
75	STDDEV			x	
76	CAP_STDDEV			x	
	EPM_PID_OPTS				x

Handheld Communicator Menu Structure

PID FUNCTION BLOCK

QUICK CONFIG

- ALERT KEY
- CONTROL OPTIONS
- DEVIATION HIGH LIMIT
- DEVIATION LOW LIMIT
- GAIN
- HIGH HIGH LIMIT
- HIGH LIMIT
- LOW LIMIT
- LOW LOW LIMIT
- OUTPUT SCALE EU AT 100%
- OUTPUT SCALE EU AT 0%
- OUTPUT SCALE UNITS INDEX
- OUTPUT SCALE DECIMAL
- PROCESS VALUE SCALE EU AT 100%
- PROCESS VALUE SCALE EU AT 0%
- PROCESS VALUE SCALE UNITS INDEX
- PROCESS VALUE SCALE DECIMAL
- RESET
- SETPOINT STATUS
- SETPOINT VALUE
- SETPOINT HIGH LIMIT
- SETPOINT LOW LIMIT

COMMON CONFIG

- ALARM HYSTERESIS
- ALERT KEY
- CONTROL OPTIONS
- DEVIATION HIGH LIMIT
- DEVIATION LOW LIMIT
- GAIN
- HIGH HIGH LIMIT
- HIGH LIMIT
- LOW LIMIT
- LOW LOW LIMIT
- BLOCK MODE TARGET
- BLOCK MODE ACTUAL
- BLOCK MODE PERMITTED
- BLOCK MODE NORMAL
- OUTPUT HIGH LIMIT
- OUTPUT LOW LIMIT
- OUTPUT SCALE EU AT 100%
- OUTPUT SCALE EU AT 0%
- OUTPUT SCALE UNITS INDEX
- OUTPUT SCALE DECIMAL
- PROCESS VALUE FILTER TIME
- PROCESS VALUE SCALE EU AT 100%
- PROCESS VALUE SCALE EU AT 0%
- PROCESS VALUE SCALE UNITS INDEX
- PROCESS VALUE SCALE DECIMAL
- RATE
- RESET
- SETPOINT STATUS
- SETPOINT VALUE
- SETPOINT HIGH LIMIT
- SETPOINT LOW LIMIT

ADVANCED CONFIG

- BACK CALCULATION HYSTERESIS
- FEED FORWARD GAIN
- FEED FORWARD SCALE EU AT 100%
- FEED FORWARD SCALE EU AT 0%
- FEED FORWARD SCALE UNITS INDEX
- FEED FORWARD SCALE DECIMAL
- SHED OPTIONS
- SETPOINT RATE DOWN
- SETPOINT RATE UP
- STATIC REVISION
- STATUS OPTIONS
- STRATEGY
- TRACKING SCALE EU AT 100%
- TRACKING SCALE EU AT 0%
- TRACKING SCALE UNITS INDEX
- TRACKING SCALE DECIMAL
- TRACKING VALUE STATUS
- TRACKING VALUE VALUE

CONNECTORS

- BACK CALCULATION INPUT STATUS
- BACK CALCULATION INTPUT VALUE
- BACK CALCULATION OUTPUT STATUS
- BACK CALCULATION OUTPUT VALUE
- CASCADE INPUT STATUS
- CASCADE INPUT VALUE
- FEED FORWARD VALUE STATUS
- FEED FORWARD VALUE VALUE
- INPUT STATUS
- INPUT VALUE
- OUTPUT STATUS
- OUTPUT VALUE
- TRACKING INPUT DISCRETE STATUS
- TRACKING INPUT DISCRETE VALUE
- TRACKING VALUE STATUS
- TRACKING VALUE VALUE

ONLINE

- BACK CALCULATION INPUT STATUS
- BACK CALCULATION INPUT VALUE
- BACK CALCULATION OUTPUT STATUS
- BACK CALCULATION OUTPUT VALUE
- BLOCK ERROR
- BYPASS
- CASCADE INPUT STATUS
- CASCADE INPUT VALUE
- FEED FORWARD VALUE STATUS
- FEED FORWARD VALUE VALUE
- GAIN
- INPUT STATUS
- INPUT VALUE
- BLOCK MODE TARGET
- BLOCK MODE ACTUAL
- BLOCK MODE PERMITTED
- BLOCK MODE NORMAL
- OUTPUT STATUS
- OUTPUT VALUE
- PROCESS VALUE STATUS
- PROCESS VALUE VALUE
- REMOTE CASCADE INPUT STATUS
- REMOTE CASCADE INPUT VALUE
- REMOTE CASCADE OUTPUT STATUS
- REMOTE CASCADE OUTPUT VALUE
- REMOTE OUT INPUT STATUS
- REMOTE OUT INPUT VALUE
- REMOTE OUT OUTPUT STATUS
- REMOTE OUT OUTPUT VALUE
- SETPOINT STATUS
- SETPOINT VALUE
- TRACKING INPUT DISCRETE STATUS
- TRACKING INPUT DISCRETE VALUE
- TRACKING VALUE STATUS
- TRACKING VALUE VALUE

STATUS

- BLOCK ERROR

(MENU CONTINUED ON NEXT PAGE)

PID FUNCTION BLOCK CONT.

OTHER

TAG DESCRIPTION
BALANCE TIME
GRANT DENY GRANT
GRANT DENY DENY
UPDATE EVENT UNACKNOWLEDGED
UPDATE EVENT UPDATE STATE
UPDATE EVENT TIME STAMP
UPDATE EVENT STATIC REV
UPDATE EVENT RELATIVE INDEX
BLOCK ALARM UNACKNOWLEDGED
BLOCK ALARM ALARM STATE
BLOCK ALARM TIME STAMP
BLOCK ALARM SUBCODE
BLOCK ALARM VALUE
ALARM SUMMARY CURRENT
ALARM SUMMARY UNACKNOWLEDGED
ALARM SUMMARY UNREPORTED
ALARM SUMMARY DISABLED
ACKNOWLEDGE OPTION
HIGH HIGH ALARM UNACKNOWLEDGED
HIGH HIGH ALARM ALARM STATE
HIGH HIGH ALARM TIME STAMP
HIGH HIGH ALARM SUBCODE
HIGH HIGH ALARM FLOAT VALUE
HIGH ALARM UNACKNOWLEDGED
HIGH ALARM ALARM STATE
HIGH ALARM TIME STAMP
HIGH ALARM SUBCODE
HIGH ALARM FLOAT VALUE
LOW ALARM UNACKNOWLEDGED
LOW ALARM ALARM STATE
LOW ALARM TIME STAMP
LOW ALARM SUBCODE
LOW ALARM FLOAT VALUE
LOW LOW ALARM UNACKNOWLEDGED
LOW LOW ALARM ALARM STATE
LOW LOW ALARM TIME STAMP
LOW LOW ALARM SUBCODE
LOW LOW ALARM FLOAT VALUE
DEVIATION HIGH ALARM UNACKNOWLEDGED
DEVIATION HIGH ALARM ALARM STATE
DEVIATION HIGH ALARM TIME STAMP
DEVIATION HIGH ALARM SUBCODE
DEVIATION HIGH ALARM FLOAT VALUE
DEVIATION LOW ALARM UNACKNOWLEDGED
DEVIATION LOW ALARM ALARM STATE
DEVIATION LOW ALARM TIME STAMP
DEVIATION LOW ALARM SUBCODE
DEVIATION LOW ALARM FLOAT VALUE
BIAS
ERROR
SP WORK
SP FTIME
MATHFORM
STRUCTURECONFIG
UGAMMA
UBETA
IDEADBAND
STDDV
CAP STDDEV
T REQUEST
T STATE
T STATUS
T IPGAIN
T UGAIN
T UPERIOD

OTHER (CONTINUED)

T PSGAIN
T PTIMEC
T PDTIME
T TARGETOP
T HYSTER
T RELAYSS
T GAIN MAGNIFIER
T AUTO EXTRA DT
T AUTO HYSTERESIS
T AOPERIODS
EPM PID OPTIONS

ALL

CHARACTERISTICS BLOCK TAG
STATIC REVISION
TAG DESCRIPTION
STRATEGY
ALERT KEY
BLOCK MODE TARGET
BLOCK MODE ACTUAL
BLOCK MODE PERMITTED
BLOCK MODE NORMAL
BLOCK ERROR
PROCESS VALUE STATUS
PROCESS VALUE VALUE
SETPOINT STATUS
SETPOINT VALUE
OUTPUT STATUS
OUTPUT VALUE
PROCESS VALUE SCALE EU AT 100%
PROCESS VALUE SCALE EU AT 0%
PROCESS VALUE SCALE UNITS INDEX
PROCESS VALUE SCALE DECIMAL
OUTPUT SCALE EU AT 100%
OUTPUT SCALE EU AT 0%
OUTPUT SCALE UNITS INDEX
OUTPUT SCALE DECIMAL
GRANT DENY GRANT
GRANT DENY DENY
CONTROL OPTIONS
STATUS OPTIONS
INPUT STATUS
INPUT VALUE
PROCESS VALUE FILTER TIME
BYPASS
CASCADE INPUT STATUS
CASCADE INPUT VALUE
SETPOINT RATE DOWN
SETPOINT RATE UP
SETPOINT HIGH LIMIT
SETPOINT LOW LIMIT
GAIN
RESET
BALANCE TIME
RATE
BACK CALCULATION INPUT STATUS
BACK CALCULATION INPUT VALUE
OUTPUT HIGH LIMIT
OUTPUT LOW LIMIT
BACK CALCULATION HYSTERESIS
BACK CALCULATION OUTPUT STATUS
BACK CALCULATION OUTPUT VALUE
REMOTE CASCADE INPUT STATUS
REMOTE CASCADE INPUT VALUE
REMOTE OUT INPUT STATUS
REMOTE OUT INPUT VALUE
SHED OPTIONS
REMOTE CASCADE OUTPUT STATUS
REMOTE CASCADE OUTPUT VALUE
REMOTE OUT OUTPUT STATUS
REMOTE OUT OUTPUT VALUE
TRACKING SCALE EU AT 100%
TRACKING SCALE EU AT 0%
TRACKING SCALE UNITS INDEX
TRACKING SCALE DECIMAL
TRACKING INPUT DISCRETE STATUS
TRACKING INPUT DISCRETE VALUE
TRACKING VALUE STATUS
TRACKING VALUE VALUE
FEED FORWARD VALUE STATUS
FEED FORWARD VALUE VALUE
FEED FORWARD SCALE EU AT 100%
FEED FORWARD SCALE EU AT 0%
FEED FORWARD SCALE UNITS INDEX
FEED FORWARD SCALE DECIMAL
FEED FORWARD GAIN

ALL (CONTINUED)

UPDATED EVENT UNACKNOWLEDGED
UPDATE EVENT UPDATE STATE
UPDATE EVENT TIME STAMP
UPDATE EVENT STATIC REV
UPDATE EVENT RELATIVE INDEX
BLOCK ALARM UNACKNOWLEDGED
BLOCK ALARM ALARM STATE
BLOCK ALARM TIME STAMP
BLOCK ALARM SUBCODE
BLOCK ALARM VALUE
ALARM SUMMARY CURRENT
ALARM SUMMARY UNACKNOWLEDGED
ALARM SUMMARY UNREPORTED
ALARM SUMMARY DISABLED
ACKNOWLEDGE OPTION
ALARM HYSTERESIS
HIGH HIGH PRIORITY
HIGH HIGH LIMIT
HIGH PRIORITY
HIGH LIMIT
LOW PRIORITY
LOW LIMIT
LOW LOW PRIORITY
LOW LOW LIMIT
DEVIATION HIGH PRIORITY
DEVIATION HIGH LIMIT
DEVIATION LOW PRIORITY
DEVIATION LOW LIMIT
HIGH HIGH ALARM UNACKNOWLEDGED
HIGH HIGH ALARM ALARM STATE
HIGH HIGH ALARM TIME STAMP
HIGH HIGH ALARM SUBCODE
HIGH HIGH ALARM FLOAT VALUE
HIGH ALARM UNACKNOWLEDGED
HIGH ALARM ALARM STATE
HIGH ALARM TIME STAMP
HIGH ALARM SUBCODE
HIGH ALARM FLOAT VALUE
LOW ALARM UNACKNOWLEDGED
LOW ALARM ALARM STATE
LOW ALARM TIME STAMP
LOW ALARM SUBCODE
LOW ALARM FLOAT VALUE
LOW LOW ALARM UNACKNOWLEDGED
LOW LOW ALARM ALARM STATE
LOW LOW ALARM TIME STAMP
LOW LOW ALARM SUBCODE
LOW LOW ALARM FLOAT VALUE
DEVIATION HIGH ALARM UNACKNOWLEDGED
DEVIATION HIGH ALARM ALARM STATE
DEVIATION HIGH ALARM TIME STAMP
DEVIATION HIGH ALARM SUBCODE
DEVIATION HIGH ALARM FLOAT VALUE
DEVIATION LOW ALARM UNACKNOWLEDGED
DEVIATION LOW ALARM ALARM STATE
DEVIATION LOW ALARM TIME STAMP
DEVIATION LOW ALARM SUBCODE
DEVIATION LOW ALARM FLOAT VALUE
BIAS
ERROR
SP WORK
SP FTIME
MATHFORM
STRUCTURECONFIG
UGAMMA
UBETA
IDEADBAND
STDDEV
CAP STDDEV
T REQUEST
T STATE
T STATUS

ALL (CONTINUED)

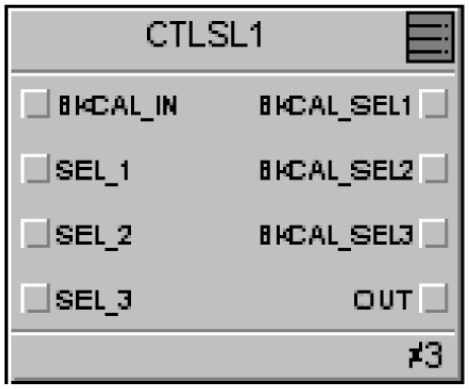
T IPGAIN
T UGAIN
T UPERIOD
T PSGAIN
T PTIMEC
T PDTIME
T TARGETOP
T HYSTER
T RELAYSS
T GAIN MAGNIFIER
T AUTO EXTRA DT
T AUTO HYSTERESIS
T AOPERIODS
EPM PID OPTIONS

E.3 Control Selector Function Block

The Control Selector (CSEL) function block (Figure E-7) selects one of three control signals to perform override control to a PID function block. The block supports mode control. The outputs are calculated based on the actual operation mode, which is determined by parameter values and input value statuses.

There are no standard alarms in this function block. Custom alarms are supported.

Figure E-7. Control Selector (CSEL) Function Block



BKCAL_IN is the analog input value and status from a downstream block's BKCAL_OUT output that is used for backward output tracking for bumpless transfer.

SEL_1 is the first input value to the selector.

SEL_2 is the second input value to the selector.

SEL_3 is the third input value to the selector.

BKCAL_SEL_1 is the selector output value associated with SEL_1 for backward output tracking to an upstream PID function block.

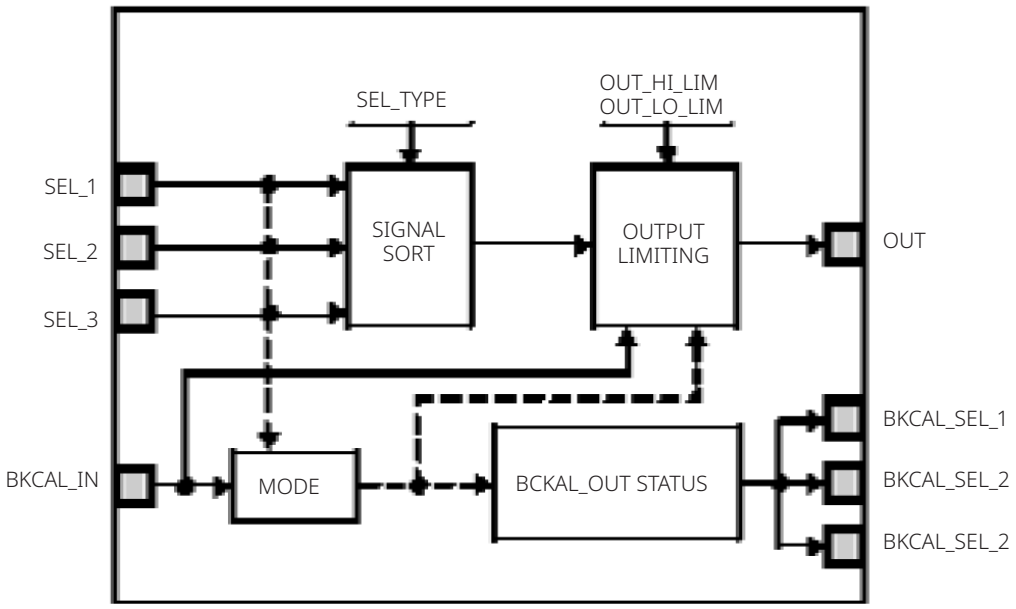
BKCAL_SEL_2 is the selector output value associated with SEL_2 for backward output tracking to an upstream PID function block.

BKCAL_SEL_3 is the selector output value associated with SEL_3 for backward output tracking to an upstream PID function block.

OUT is the output value and status.

The diagram in Figure E-8 shows the internal components of the Control Selector function block:

Figure E-8. Control Selector Function Block Schematic Diagram



Block Execution

The Control Selector function block picks the high, low or middle control signal from two or three PID function block primary outputs and places it at the Control Selector block's primary output. Three back calculation outputs are sent to upstream PID function blocks.

At the beginning of each scan period, the block calculates the actual mode according to the input status, target mode and configured parameter settings. The block steps into the calculated actual mode or stays in the original mode.

Next, the block calculates the forward path primary output:

- In Initializing Manual (IMan) mode, the primary output is unchanged. The BKCAL_SEL_1, BKCAL_SEL_2 and BKCAL_SEL_3 parameter values are passed to the upstream function blocks.
- In Manual (Man) mode, OUT can be set manually.
- In Automatic (Auto) mode, the block selects SEL_1, SEL_2 or SEL_3 as the primary output based on the selection type parameter (SEL_TYPE). The output value is sent back to all the upstream blocks.

NOTE

In Auto mode, when any of the connected SEL_ 1, SEL_2 or SEL_3 inputs have Bad status during block execution, the block transitions its actual mode to Man. When the Bad SEL_1, SEL_2 or SEL_3 input transitions back to Good status, the block resumes Auto operation.

All the output parameter status values are set to indicate the status of the block and the status of the corresponding parameter.

Output Limit Scaling

During download OUT_HI_LIM and OUT_LO_LIM are set to their configured values. If you have not changed these values from their defaults they are set as follows during the first execution of the block:

- OUT_HI_LIM is set to OUT_SCALE(EU100)
- OUT_LO_LIM is set to OUT_SCALE(EU0)

During runtime the limits are restricted as follows:

- OUT_HI_LIM is restricted to OUT_SCALE(EU100) + 0.1 × (OUT_SCALE(EU100) - OUT_SCALE(EU0)).
- OUT_LO_LIM is restricted to OUT_SCALE(EU0) - 0.1 × (OUT_SCALE(EU100) - OUT_SCALE(EU0)).

The OUT parameter is not changed as a result of changing the scale or limits. However, if OUT violates the new limits OUT is forced within the limits on the next execution of the block.

Output Selection and Limiting

You can limit the output by configuring the OUT_HI_LIM and OUT_LO_LIM parameters.

Modes

The Control Selector function block supports four modes:

- Out of Service (OOS)
- Initializing Manual (IMan)
- Manual (Man)
- Automatic (Auto)

Status Handling

The statuses of OUT, BKCAL_SEL_1, BKCAL_SEL_2 and BKCAL_SEL_3 are mode dependent.

Manual mode

The status of OUT is set to Good: Cascade, Constant. The status of BKCAL_SEL_1, BKCAL_SEL_2 and BKCAL_SEL_3 are set to Good: Cascade, Not Invited (NI). The value of BKCAL_SEL_1, BKCAL_SEL_2 and BKCAL_SEL_3 are set to the value of OUT.

Automatic Mode

OUT status is set to Good: Cascade. The limit status of the selected input (SEL_1, SEL_2 or SEL_3) is also copied to OUT.

The status and value of the BKCAL_SEL_1, BKCAL_SEL_2 or BKCAL_SEL_3 parameter corresponding to the selected input is set equal to the OUT status and value. When the OUT status is limited, its limit status is also copied to the associated BKCAL_SEL[x] parameter and its value is set equal to the selected input value. When the OUT status is not limited but the BKCAL_IN status from the downstream block indicates it is limited, the BKCAL_IN limit status and value is copied to the associated BKCAL_SEL[x] parameter.

The status and value of the BKCAL_SEL[x] parameters that do not correspond to the selected input (the non-selected BKCAL_SEL[x] parameters) are set equal to the status and value of the BKCAL_SEL[x] parameter that corresponds to the selected input after its value and status is determined as above. The substatus of the non-selected BKCAL_SEL(x) parameters are set to Not Selected.

When the SEL_TYPE is Low value, the limit status of the non-selected BKCAL_SEL(x) parameters are set to High Limited. When the SEL_TYPE is High value, the limit status of the non-selected BKCAL_SEL(x) parameters are set to Low Limited. When the SEL_TYPE is Middle value, the limit status of the BKCAL_SEL(x) that corresponds to the lowest SEL(x) input is set to Low Limited. The limit status of the BKCAL_SEL(x) that corresponds to the highest SEL(x) input is set to High Limited.

Initializing Manual Mode

When the BKCAL_IN status indicates Initiate Request (IR), the status of OUT is set to Good: Cascade, Initiate Acknowledge (IA). Otherwise, the status of OUT is set to Good: Cascade. The value of OUT is set equal to the value of BKCAL_IN. The value and status of BKCAL_SEL_1, BKCAL_SEL_2 and BKCAL_SEL_3 are set to the value and status of BKCAL_IN.

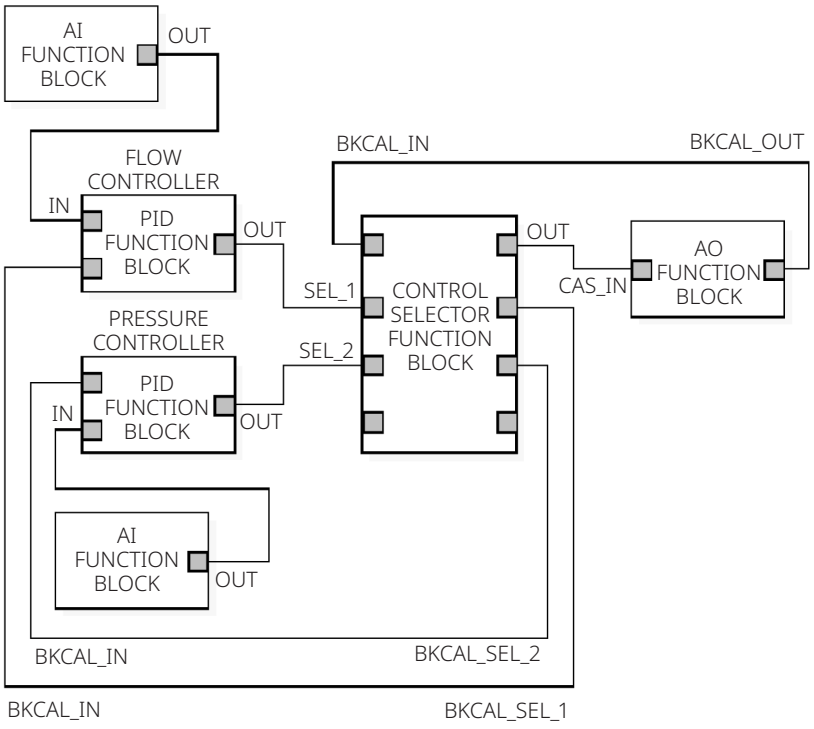
Out of Service Mode

The statuses of all output parameters are set to Bad: Out of Service.

Application Information

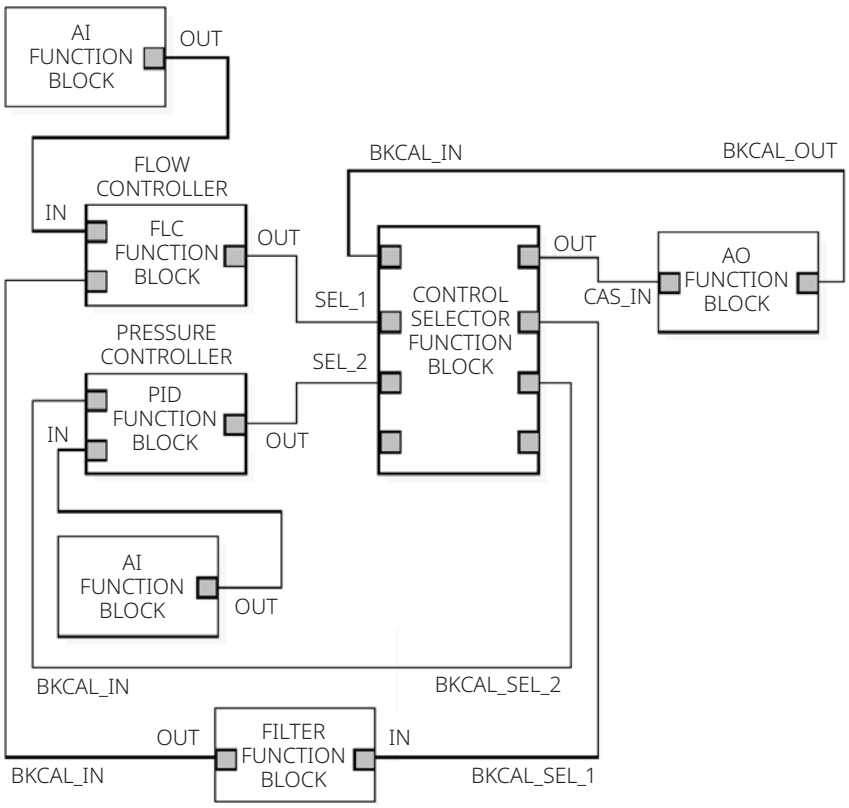
The Control Selector function block is ideal for providing automatic override control. This function block can take three control signals as input. The user can select SEL_TYPE = Low, Medium or High for various control configurations.

Figure E-9. Control Selector Function Block Diagram Example



In the image shown in Figure E-10, a Fuzzy Logic Control (FLC) block is connected to a Control Selector block. Unlike the PID block that uses a positional control equation, the FLC block uses a velocity control equation and can cause output runaway on all blocks connected to a Control Selector block if a downstream block is limited. To prevent output runaway, put a Filter block on the BKCAL wire between the Control Selector block and the FLC block. For modules executing at one second, set the Filter block's TIMECONST parameter to 3 seconds.

Figure E-10. FLC Block Connected to a Control Selector Block

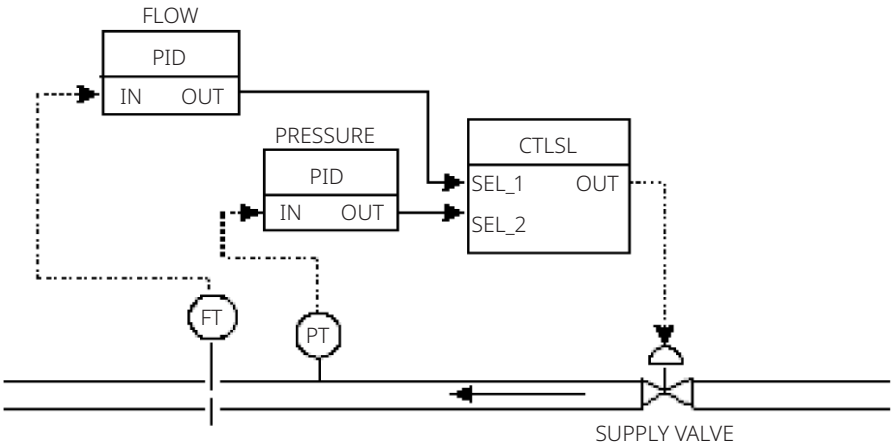


Use the Control Selector function block in a situation where flow is the primary control variable but pressure must be controlled in the event that it rises to an unacceptable level. Figure E-11 illustrates this example.

At normal operating pressures, the pressure PID's high SP requests a maximum valve opening to increase pressure. The flow PID's signal is lower than that of the pressure PID. In this case, SEL_TYPE is set to Low so that the Control Selector function block sends the flow PID's signal on to the supply valve and blocks the pressure PID's signal.

If the flow stream's pressure rises to an unacceptable level, the pressure PID sends a low signal to the supply valve, telling it to close. When this output signal falls below that from the flow PID, the Control Selector function block begins to pass the pressure PID's signal and block the flow PID's signal.

Figure E-11. Flow Control With Pressure Override



NOTE:

IN THIS EXAMPLE, BOTH THE FLOW AND PRESSURE PID BLOCKS CONTROL A SUPPLY VALVE. THE FLOW PID OPERATES IN A PRESSURE REGIME BELOW A SAFETY LIMIT. SINCE THIS IS A LOW PRESSURE FOR THE PRESSURE PID, IT SENDS A HIGH OUTPUT SIGNAL TO THE SUPPLY VALVE, TELLING IT TO OPEN MORE TO INCREASE THE PRESSURE.

Block Errors

Table E-8 lists conditions reported in the BLOCK_ERR [6] parameter.

Table E-8. CSEL BLOCK_ERR Conditions

Condition Number	Condition Name and Description
1	Block Configuration Error—SHED_OPT or BYPASS set to 0
7	Input failure/process variable has Bad status—The parameter linked to IN is indicating a Bad status.
15	Out of Service—The actual mode is Out of Service (OOS).

Control Selector Function Block Parameters

- Read/Write Capability: RO - Read Only, RW - Read Write
- Mode: The block mode(s) required to write to the parameter

Table E-9. Control Selector Function Block System Parameters Definitions

Label PARAMETER_NAME	Index Number	RO / RW	Block Mode	Range	Initial Value	Description
Static Revision ST_REV	1	RO	N/A	- - -	0	Data Type: Uint16 The revision level of the static data associated with the function block. The revision value will be incremented each time a static parameter value in the block is changed.
Tag Description TAG_DESC	2	RW	ALL	- - -	Spaces	Data Type: Octet String, 32 bytes The user description of the intended application of the block.
Strategy STRATEGY	3	RW	ALL	- - -	0	Data Type: Uint16 The strategy field can be used to identify grouping of blocks. This data is not checked or processed by the block.
Alert Key ALERT_KEY	4	RW	ALL	1 to 255	0	Data Type: Uint8 A user-assigned identification number reported in alarm messages from the block that allows HMI applications to sort and filter alarms and events. Set this parameter for each function block to indicate the physical unit the function block is associated with. This information can be used in the host for sorting alarms, and so on.
Block Mode MODE_BLK	5	- - -			- - -	Data Type: DS-69 The actual, target, permitted and normal modes of the block. Target: The requested block mode Actual: The current mode of the block Permitted: Allowed modes for Target Normal: Most common mode for Target
TARGET	5.1	RW	ALL	Bit 3: Auto Bit 4: Man Bit 7: OOS	OOS	
ACTUAL	5.2	RO	N/A	Bit 3: Auto Bit 4: Man Bit 6: Iman Bit 7: OOS	- - -	
PERMITTED	5.3	RW	ALL	Bit 3: Auto Bit 4: Man Bit 7: OOS	AUTO+MAN+ OOS	
NORMAL	5.4	RW	ALL	Bit 3: Auto Bit 4: Man Bit 7: OOS	AUTO	

- continued -

Table E-9. Control Selector Function Block System Parameters Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Block Mode	Range	Initial Value	Description
Block Error BLOCK_ERR	6	RO	N/A	Defined Bits 1: Configuration Error 7: Input Failure 15: OOS	- - -	Data Type: Bit String, 2 bytes 0 = inactive 1 = active This parameter reflects the error status associated with the hardware or software components associated with a block. It is a bit string so that multiple errors may be shown.
Output OUT	7	RW	MAN OOS	- - -	- - -	Data Type: DS-65 The block output value and status.
STATUS	7.1	RW	MAN OOS	- - -	Bad Non Specific Not Limited	
VALUE	7.2	RW	MAN OOS	OUT_SCALE +/- 10%	- - -	
Output Scale OUT_SCALE	8	RW	OOS	- - -	- - -	Data Type: DS-68 The high and low scale values, engineering units code and number of digits to the right of the decimal point associated with OUT.
EU_100	8.1	RW	OOS	- - -	100	
EU_0	8.2	RW	OOS	- - -	0	
UNITS_INDEX	8.3	RW	OOS	- - -	%	
DECIMAL	8.4	RW	OOS	- - -	0	
Grant Deny GRANT_DENY	9	- - -				Data Type: DS-70 Options for controlling access of host computers and local control panels to operating, tuning and alarm parameters of the block. Not used by the device.
GRANT	9.1	RW	ALL	Bit 0: Program Bit 1: Tune Bit 2: Alarm Bit 3: Local Bit 4: Operate Bit 5: Service Bit 6: Diagnostic	All bits: 0	
DENY	9.2	RW	ALL	Bit 0: Program Denied Bit 1: Tune Denied Bit 2: Alarm Denied Bit 3: Local Denied Bit 4: Operate Denied Bit 5: Service Denied Bit 6: Diagnostic Denied	All bits: 0	
Status Options STATUS_OPTS	10	RW	OOS	0: IFS (Initiate Fault State) if BAD IN 2: Use Uncertain as Good	All bits: 0	Data Type: Bit String, 2 bytes 0=disable 1=enable Allows you to select options for status handling and processing.
SEL_1	11	RW	ALL	- - -	- - -	Data Type: DS-65 The first input value to the selector.
STATUS	11.1	RW	ALL	- - -	Bad Non Specific Not Limited	
VALUE	11.2	RW	ALL	- - -	- - -	

- continued -

Table E-9. Control Selector Function Block System Parameters Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Block Mode	Range	Initial Value	Description
SEL_2	12	RW	ALL	- - -	- - -	Data Type: DS-65 The second input value to the selector.
STATUS	12.1	RW	ALL	- - -	Bad Non Specific Not Limited	
VALUE	12.2	RW	ALL	- - -	- - -	
SEL_3	13	RW	ALL	- - -	- - -	Data Type: DS-65 The third input value to the selector.
STATUS	13.1	RW	ALL	- - -	Bad Non Specific Not Limited	
VALUE	13.2	RW	ALL	- - -	- - -	
SEL_TYPE	14	RW	MAN OOS	0: Uninitialized 1: High 2: Low 3: Middle	0	Data Type: UINT8 The selector type: High, Low or Middle value. If selector type is not selected the block will not transition from OOS.
BKCAL_IN	15	RW	ALL	- - -	- - -	Data Type: DS-65 The analog input value and status from another block's BKCAL_OUT output that is used by an upstream block for bumpless transfer.
STATUS	15.1	RW	ALL	- - -	Bad Non Specific Not Limited	
VALUE	15.2	RW	ALL	- - -	- - -	
OUT_HI_LIM	16	RW	ALL	OUT_SCALE +/- 10%	100	Data Type: Float The maximum output value allowed.
OUT_LO_LIM	17	RW	ALL	OUT_SCALE +/- 10%	0	Data Type: Float The minimum output value allowed.
BKCAL_SEL_1	18	RO	- - -	- - -	- - -	Data Type: DS-65 The selector output value associated with SEL_1 for backward output tracking.
STATUS	18.1	RO	- - -	- - -	- - -	
VALUE	18.2	RO	- - -	- - -	- - -	
BKCAL_SEL_2	19	RO	- - -	- - -	- - -	Data Type: DS-65 The selector output value associated with SEL_2 for backward output tracking.
STATUS	19.1	RO	- - -	- - -	- - -	
VALUE	19.2	RO	- - -	- - -	- - -	
BKCAL_SEL_3	20	RO	- - -	- - -	- - -	Data Type: DS-65 The selector output value associated with SEL_3 for backward output tracking.
STATUS	20.1	RO	- - -	- - -	- - -	
VALUE	20.2	RO	- - -	- - -	- - -	
Update Event UPDATE_EVT	21			- - -	- - -	Data Type: DS-73 This alert is generated by any changes to the static data.
UNACKNOWLEDGED	21.1	RW	ALL	0=Undefined 1=Acknowledged 2=Unacknowledged	0	
UPDATE_STATE	21.2	RO	- - -	0=Uninitialized 1=Reported 2=Not reported	0	
TIME_STAMP	21.3	RO	- - -	- - -	0	
STATIC_REVISION	21.4	RO	- - -	- - -	0	
RELATIVE_INDEX	21.5	RO	- - -	- - -	0	

- continued -

Table E-9. Control Selector Function Block System Parameters Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Block Mode	Range	Initial Value	Description
Block Alarm BLOCK_ALM	22			- - -	- - -	Data Type: DS-72 The block alarm is used for all configuration, hardware, connection failure or system problems in the block. The cause of the alarm will be set in the subcode.
UNACKNOWLEDGED	22.1	RW	ALL	0=Undefined 1=Acknowledged 2=Unacknowledged	0	
ALARM_STATE	22.2	RO	N/A	0=Uninitialized 1=Clear - reported 2=Clear - not reported 3=Active - reported 4=Active - not reported	0	
TIME_STAMP	22.3	RO	N/A	- - -	0	
SUBCODE	22.4	RO	N/A	- - -	0	
VALUE	22.5	RO	N/A	- - -	0	

View Lists

View lists allow the values of a set of parameters to be accessed at the same time. Views 1 and 2 contain operating parameters and are defined by the Fieldbus Foundation. View 3 contains dynamic parameters and View 4 contains static parameters with configuration and maintenance information. Views 3 and 4 are defined by the manufacturer.

Table E-10. Control Selector Function Block View Lists

INDEX NUMBER	PARAMETER	VIEW			
		1	2	3	4
1	ST_REV	x	x	x	x
3	STRATEGY				x
4	ALERT_KEY				x
5	MODE_BLK	x		x	
6	BLOCK_ERR	x		x	
7	OUT	x		x	
8	OUT_SCALE		x		
9	GRANT_DENY		x		
10	STATUS_OPTS				x
11	SEL_1	x		x	
12	SEL_2	x		x	
13	SEL_3	x		x	
14	SEL_TYPE				x
15	BKCAL_IN			x	
16	OUT_HI_LIM		x		

- continued -

Table E-10. Control Selector Function Block View Lists (continued)

INDEX NUMBER	PARAMETER	VIEW			
		1	2	3	4
17	OUT_LO_LIM		x		
18	BKCAL_SEL_1			x	
19	BKCAL_SEL_2			x	
20	BKCAL_SEL_3			x	

Handheld Communicator Menu Structure

CONTROL SELECTOR FUNCTION BLOCK

ALL

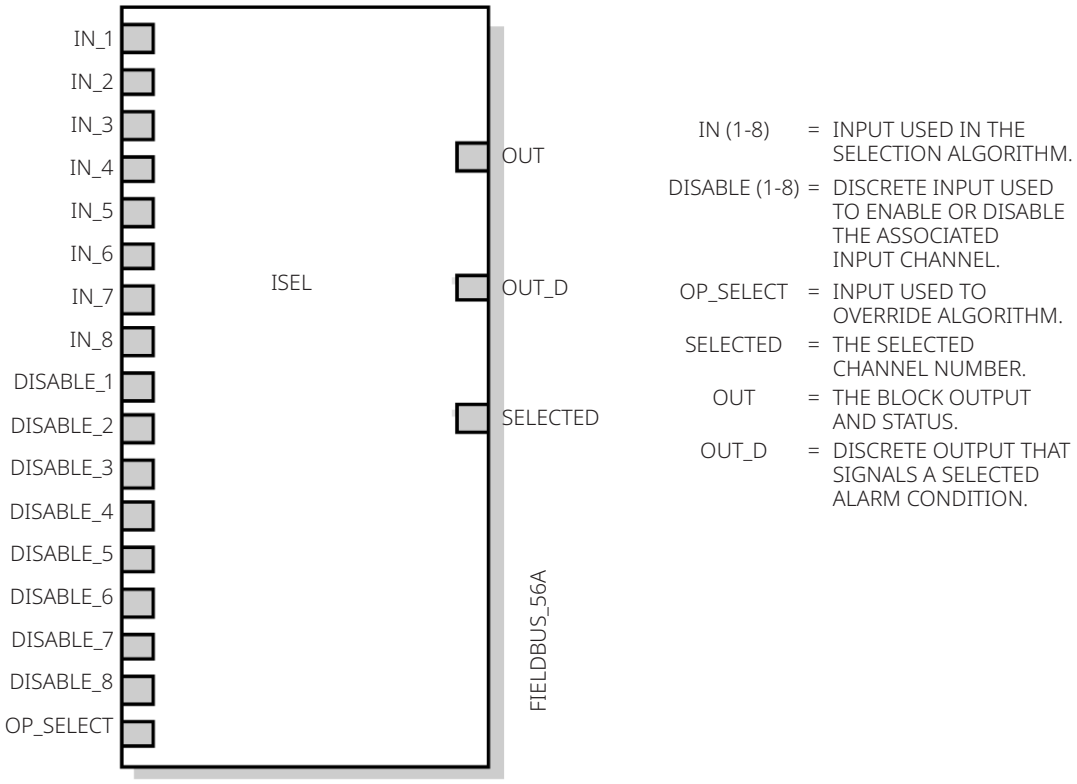
CHARACTERISTICS BLOCK TAG
STATIC REVISION
TAG DESCRIPTION
STRATEGY
ALERT KEY
BLOCK MODE TARGET
BLOCK MODE ACTUAL
BLOCK MODE PERMITTED
BLOCK MODE NORMAL
BLOCK ERROR
OUTPOINT STATUS
OUTPOINT VALUE
OUTPUT SCALE EU AT 100%
OUTPUT SCALE EU AT 0%
OUTPUT SCALE UNITS INDEX
OUTPUT SCALE DECIMAL
GRANT DENY GRANT
GRANT DENY DENY
STATUS OPTIONS
SELECTION 1 STATUS
SELECTION 1 VALUE
SELECTION 2 STATUS
SELECTION 2 VALUE
SELECTION 3 STATUS
SELECTION 3 VALUE
SELECTION TYPE
BACK CALCULATION INPUT STATUS
BACK CALCULATION INPUT VALUE
OUTPUT HIGH LIMIT
OUTPUT LOW LIMIT
BACK CALCULATION SELECTION 1 STATUS
BACK CALCULATION SELECTION 1 VALUE
BACK CALCULATION SELECTION 2 STATUS
BACK CALCULATION SELECTION 2 VALUE
BACK CALCULATION SELECTION 3 STATUS
BACK CALCULATION SELECTION 3 VALUE
UPDATE EVENT UNACKNOWLEDGED
UPDATE EVENT UPDATE STATE
UPDATE EVENT TIME STAMP
UPDATE EVENT STATIC REV
UPDATE EVENT RELATIVE INDEX
BLOCK ALARM UNACKNOWLEDGED
BLOCK ALARM ALARM STATE
BLOCK ALARM TIME STAMP
BLOCK ALARM SUBCODE
BLOCK ALARM VALUE

E.4 Input Selector Function Block

Overview

The Input Selector (ISEL) function block (Figure E-12) can be used to select the first good, maximum, minimum, average or hot backup from as many as eight input values and place it at the output. The block supports signal status propagation. There is no process alarm detection in the Input Selector function block. Figure E-13 illustrates the internal components of the ISEL function block. Table E-13 lists the ISEL block parameters, their index numbers and descriptions.

Figure E-12. Input Selector Function Block



Modes

The ISEL function block supports three modes of operation as defined by the MODE_BLK [5] parameter:

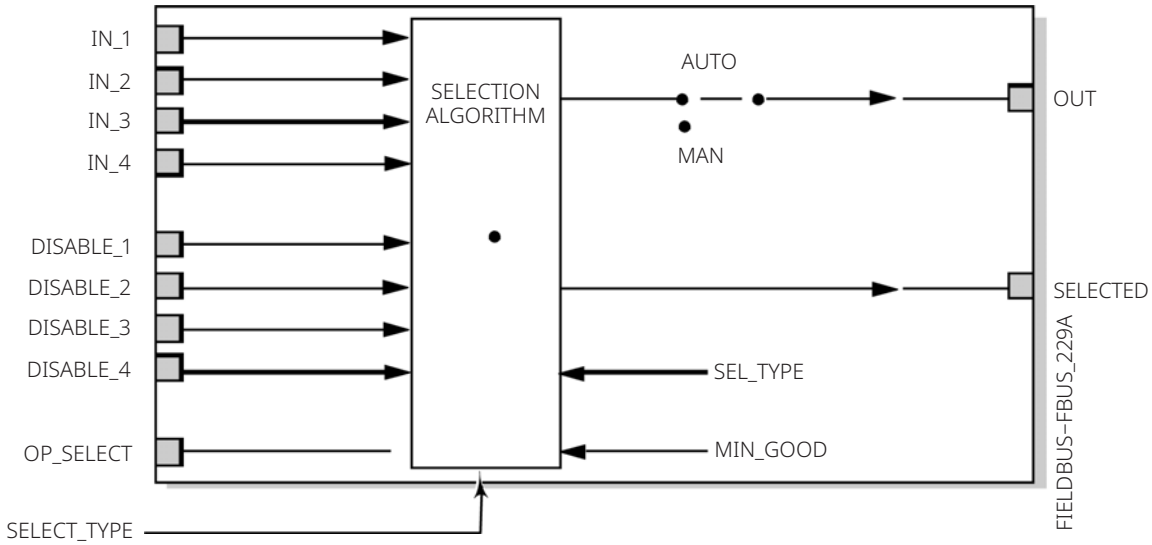
- Manual (Man)—The block output (OUT [7]) may be entered manually.
- Automatic (Auto)—OUT [7] reflects the selected input value.
- Out of Service (OOS)—The block is not processed. The BLOCK_ERR [6] parameter shows Out of Service. In this mode, you can make changes to all configurable parameters. The target mode of a block may be restricted to one or more of the supported modes.

The Input Selector block Actual mode will be Out of Service if any of the following are true:

- The Actual mode of the resource block is not Auto
- The Input Selector block Target mode is Out of Service
- The Input Selector block Target mode is Auto, OP_SELECT [22] is not being used and SELECT_TYPE [19] is 0. In this case, the BLOCK_ERR [6] parameter shows a Block Configuration Error.

The Input Selector block Actual mode will be Manual if all of the above is not true and the Target mode is Manual.

Figure E-13. Input Selector Function Block Schematic



NOTE: THIS FIGURE DOES NOT INCLUDE THE ADDITIONAL FOUR INPUTS IN THE EXTENDED PARAMETERS.

Status Handling

Quality Use and Propagation

In Auto mode, OUT [7] reflects the value and status of the selected input based on the following criteria:

- A bad or disabled input is never used by any of the selection algorithms
- For a selection algorithm to use an input with status of Uncertain, the STATUS_OPTS [10] parameter must have "Use Uncertain as Good."
- STATUS_OPTS [10] is applied before selection.
- If the number of good inputs is less than MIN_GOOD [20] or if the number of inputs evaluated is 0, the status of OUT [7] and SELECTED [21] will be Bad.
- If an input is disabled or its status is Bad and is selected via OP_SELECT [22], then the status of OUT [7] and SELECTED [21] will be Bad. If the quality of the input is Uncertain, and the selection for the STATUS_OPTS [10] parameter is "Use Uncertain as Good," then the status of OUT [7] and SELECTED [21] will be Uncertain. Otherwise the status of OUT [7] and SELECTED [21] will be Good Noncascade.

When the block is in the Manual mode the status and substatus of OUT [7] and SELECTED [21] will be as follows:

- Substatus will be non-specific and the limit will be constant.
- Quality of OUT [7] and SELECTED [21] will be Uncertain if STATUS_OPTS [10] is "Uncertain if in Manual mode." Otherwise, the quality of OUT [7] and SELECTED [21] will be Good Noncascade.

Limit Propagation

Refer to Figure E-14. When SELECT_TYPE [19] is Average, Not Limited is propagated unless all inputs have the same limit status. If ll inputs have the same limit status, the limit status of the inputs is propagated.

If SELECT_TYPE [19] is Middle and the number of inputs used by the algorithm is greater than one: Not Limited is propagated unless all selected inputs have the same limit status, in which case the limit status of the inputs is propagated.

If SELECT_TYPE [19] is Middle and a single input or if Maximum or Minimum then: If the selected input is a constant and Middle, Constant is propagated. Otherwise, if the selected input is a constant and Maximum or Minimum, propagate low if Maximum, propagate high if Minimum. If the selected input is not a constant, propagate selected input limit as is.

When SELECT_TYPE [19] is First Good or Hot Spare or if OP_SELECT [22] is non-zero, propagate selected input limit as is.

Substatus Propagation

Refer to Figure E-15. For SELECT_TYPE [19] of Maximum, Minimum, First Good, Hot Spare and Middle with only one input, simply propagate substatus as is.

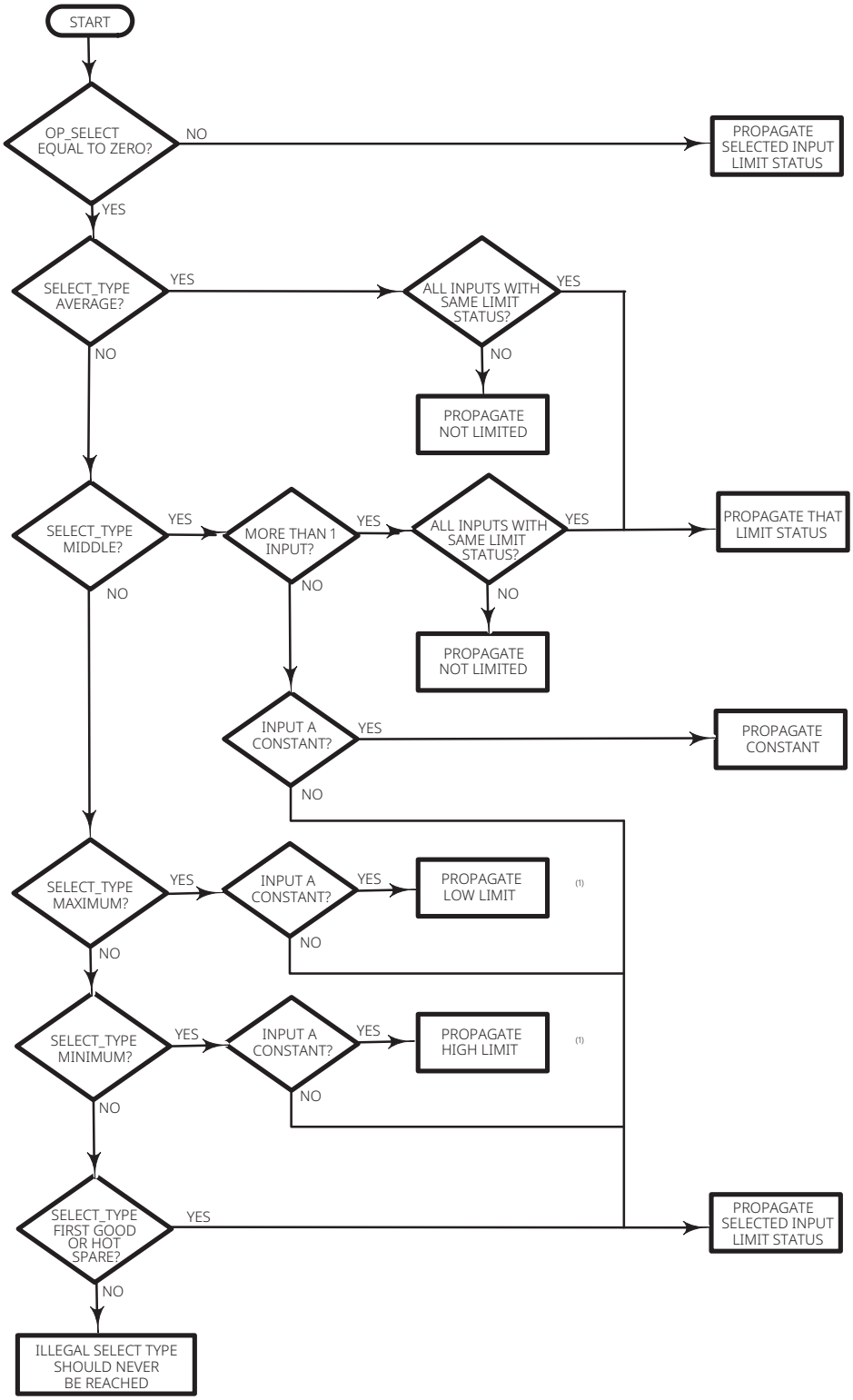
For SELECT_TYPE [19] of Maximum and Minimum with more than one input with the same value, propagate substatus if all inputs are the same.

For SELECT_TYPE [19] of Average or Middle with more than one input, propagate NonSpecific.

If the status of OUT [7] is Bad, then the substatus will be as follows:

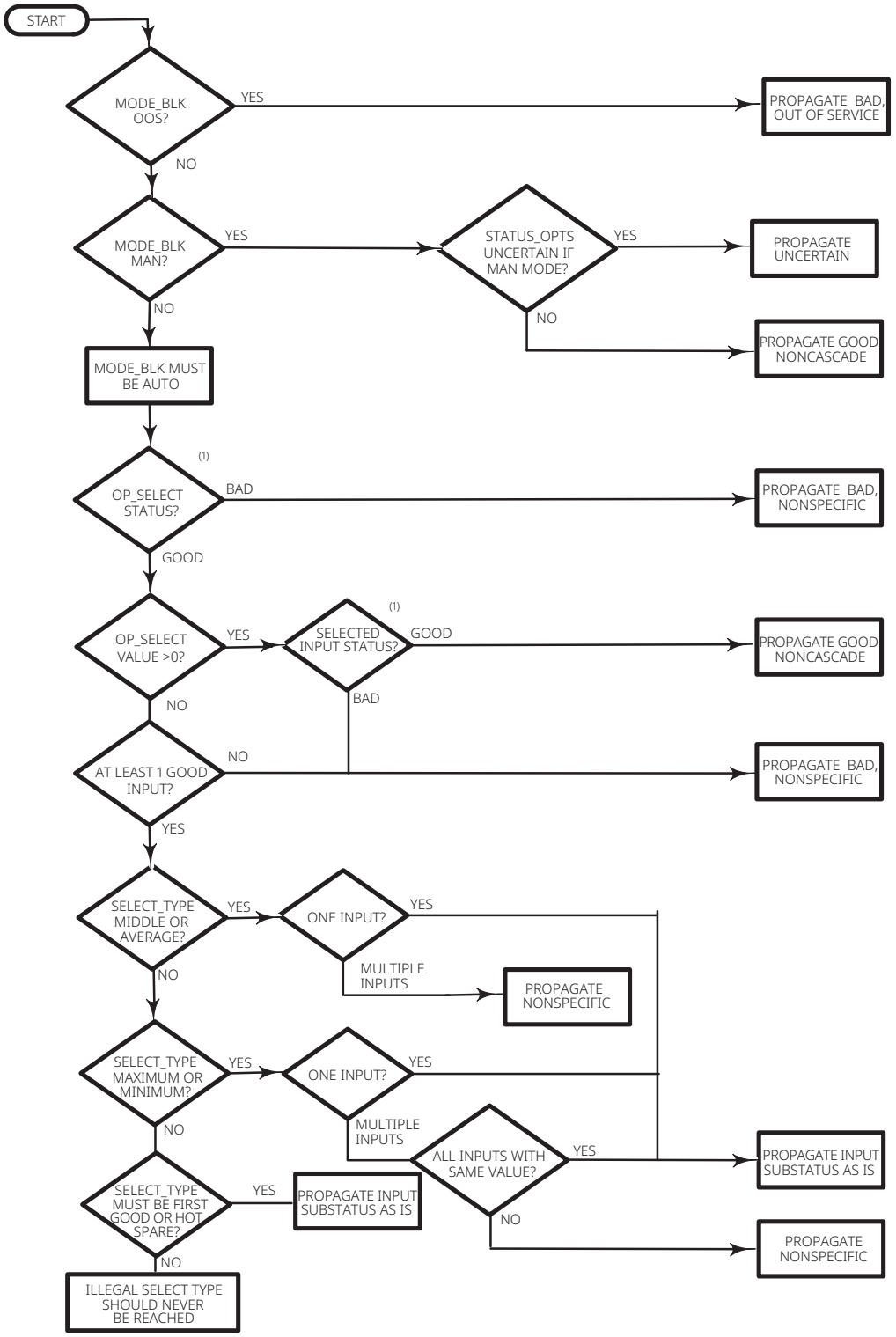
- Out of Service if the Target mode is Out of Service.
- Configuration Error with a BLOCK_ERR [6] of Configuration Error if the Actual mode is Out of Service.
- Otherwise a substatus of Non-Specific.

Figure E-14. Input Selector Block Limit Propagation



NOTE:
1. LIMIT MANIPULATION FOR A CONSTANT INPUT FOR MAXIMUM AND MINIMUM IS BASED UPON THE FOUNDATION FIELDBUS SPECIFICATION. THE REASONING IS BASED ON HIGH SELECT PROVIDING A LOW LIMIT STATUS AND LOW SELECT PROVIDING A HIGH LIMIT STATUS.

Figure E-15. Input Selector Block Substatus Propagation



NOTE:

1. AN INPUT STATUS MAY BE BAD, GOOD OR UNCERTAIN. IF BAD, THE INPUT IS NOT USED AND THE STATUS IS PROPAGATED AS BAD WITH SUBSTATUS NON-SPECIFIC. IF GOOD IT IS USED AND THE STATUS IS PROPAGATED AS GOOD (NON-CASCADE). IF UNCERTAIN AND STATUS_OPTS IS "USE UNCERTAIN AS GOOD" THEN THE INPUT IS USED AND THE STATUS IS PROPAGATED AS GOOD (NON-CASCADE), OTHERWISE IT IS NOT USED AND THE STATUS IS PROPAGATED AS BAD WITH SUBSTATUS NON-SPECIFIC.

STATUS_OPTS Supported

In the STATUS_OPTS [10] parameter, you can select from the following options to control the status handling:

- Use Uncertain as Good—sets the OUT [7] status to Good when the selected input status is Uncertain.
- Uncertain if in Manual mode: sets the OUT [7] status to Uncertain when the mode is Manual.

NOTE

The block mode must be Out of Service to set STATUS_OPTS [10].

Input Selection

The ISEL function block reads the values and statuses of as many as eight inputs (IN_1 [11], IN_2 [12], IN_3 [13], IN_4 [14], IN_5 [25], IN_6 [26], IN_7 [27], IN_8 [28]). To use any of the six selection algorithms to select the output, OP_SELECT [22] must be 0. To specify which algorithm to use, configure the selector type parameter (SELECT_TYPE [19]) as follows:

- Maximum—selects the input with the highest value from the inputs that are not bad and not disabled.
- Minimum—selects the input with the lowest value from the inputs that are not bad and not disabled.
- Average—calculates the average value of the inputs that are not bad and not disabled and provides it as the output. For example, if the number used to average (AVG_USE [33]) is 4 and the number of connected inputs is 6, then the highest and lowest values would be dropped prior to calculating the average. If AVG_USE [33] is 2 and the number of connected inputs is 7, then the two highest and lowest values would be dropped prior to calculating the average and the average would be based on the middle three inputs.
- Middle—If the number of good usable inputs is odd, then it selects the middle value. If the number of good usable inputs is even, then it averages the middle two values and selects status as worst of two. If both inputs' limit status are not the same then it sets limit status of Not Limited.
- First Good—selects the first input that is not bad and not disabled, starting with IN_1 [11].
- Hot Spare—initially uses the input selected as first good. If the selected input goes bad, the first good selection is repeated. If the selected input remains good, it stays selected. If the originally selected input returns to good status the selection does not change. Selection changes only if the currently selected input goes bad.

Disabling Inputs

Use the parameters DISABLE_1 [15], DISABLE_2 [16], DISABLE_3 [17], DISABLE_4 [18], DISABLE_5 [29], DISABLE_6 [30], DISABLE_7 [31] and DISABLE_8 [32] to disable the corresponding inputs. An input that is disabled will not be used by any of the selection algorithms.

The status of the disable parameter must be “Good,” “Good_Cascade,” or “Uncertain” with a STATUS_OPTS [10] of “Use Uncertain as Good” in order to be evaluated. If the status of the disable parameter is Bad, its last usable value is maintained and acted upon. If the device restarts, losing the last usable value, the last usable value is set to disabled.

IN_1 through IN_8 and DISABLE_1 through DISABLE_8 are non-volatile type parameters so if they are Linked they will automatically have Bad status until connections are re-established. If they are not Linked, they will be restored with the previous value from NVM across device restarts.

Direct Selection of Inputs

The parameter OP_SELECT [22] can be used to select a particular input. If OP_SELECT [22] is non-zero, the selection algorithm is bypassed and the value of OP_SELECT [22] is interpreted as the input number to select. If the OP_SELECT [22] value is greater than the number of inputs, then the highest input is selected. The status of OP_SELECT [22] must be "Good," "Good_Cascade," or "Uncertain" with a STATUS_OPTS [10] of "Use Uncertain as Good" in order to be evaluated. If the status of OP_SELECT [22] is Bad, then the OUT [7] status is Bad.

Identification of Selected Inputs

For a SELECT_TYPE [19] of Maximum, Minimum, Middle, First Good and Hot Spare, SELECTED [21] indicates the number of the selected input. When Middle is computed from more than one input, SELECTED [21] is set to 0.

For a SELECT_TYPE [19] of Average, SELECTED [21] indicates the number of inputs used in the average calculation.

When the block mode is Manual, SELECTED [21] is set to 0.

Alarm Detection

A block alarm will be generated whenever the BLOCK_ERR [6] has an error bit set. The types of block error for the PID block are defined above.

Process alarm detection is based on OUT [7] value. You can configure the alarm limits of the following standard alarms:

- High (HI_LIM [40])
- High high (HI_HI_LIM [38])
- Low (LO_LIM [42])
- Low low (LO_LO_LIM [44])

In order to avoid alarm chattering when the variable is oscillating around the alarm limit, an alarm hysteresis in percent of the PV span can be set using the ALARM_HYS [36] parameter. The priority of each alarm is set in the following parameters:

- HI_PRI [39]
- HI_HI_PRI [37]
- LO_PRI [41]
- LO_LO_PRI [43]

ACK_OPTION [35] is used to set automatic acknowledgement of alarms.

ALARM_SUM [34] indicates the current alert status, unacknowledged states and disabled states of the alarms associated with the function block.

Alarms are grouped into five levels of priority, as shown in Table E-11.

Table E-11. ISEL Function Block Alarm Priorities

Priority Number	Priority Description(1)
0	The priority of an alarm condition changes to 0 after the condition that caused the alarm is corrected.
1	An alarm condition with a priority of 1 can be recognized by the system. The device monitors the alarm but does not report it until requested by the host system.
2	An alarm condition with a priority of 2 is reported to the operator, but generally does not require operator attention (such as diagnostics and system alerts).
3 to 7	Alarm conditions of priority 3 to 7 are advisory alarms of increasing priority.
8 to 15	Alarm conditions of priority 8 to 15 are critical alarms of increasing priority.
1. The priority classes “advise” and “critical” have no relationship to Plant Web Alerts.	

Block Errors

Table E-12 lists conditions reported in the BLOCK_ERR [6] parameter.

Table E-12. ISEL BLOCK_ERR Conditions

Condition Number	Priority Description(1)
1	Block Configuration Error - If OP_SELECT is not being used and SELECT_TYPE = 0. This implies OP_SELECT status is good and actual mode is AUTO.
14	Power Up - Set if the Target mode is Out of Service when powered up until the mode is changed.
15	Out of Service - The block is in Out of Service (OOS) mode.

ISEL Function Block Parameter List

- Read/Write Capability: RO - Read Only, RW - Read Write
- Mode: The block mode(s) required to write to the parameter

Table E-13. Input Selector Function Block Parameter Definitions

Label PARAMETER_NAME	Index Number	RO / RW	Block Mode	Range	Initial Value	Description
Static Revision ST_REV	1	RO	N/A	0 to 65535	0	Data Type: Unsigned16 The revision level of the static data associated with the function block. The revision value will be incremented each time a static parameter value in the block is changed.
Tag Description TAG_DESC	2	RW	ALL	7 bit ASCII	spaces	Data Type: Octet String The user description of the intended application of the block.
Strategy STRATEGY	3	RW	ALL	0 to 65535	0	Data Type: Unsigned16 The strategy field can be used to identify grouping of blocks. This data is not checked or processed by the block.

- continued -

Table E-13. Input Selector Function Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Block Mode	Range	Initial Value	Description
Alert Key ALERT_KEY	4	RW	ALL	1 to 255	0	Data Type: Unsigned8 The identification number of the plant unit. This information may be used in the host for sorting alarms, etc.
Block Mode MODE_BLK	5	- - -				Data Type: DS-69 Valid Bits: 7: OOS, 4: MAN, 3: AUTO The actual, target, permitted and normal modes of the block. Target: The requested block mode Actual: The current mode of the block Permitted: Allowed modes for Target Normal: Most common mode for Target
TARGET	5.1	RW	ALL	OOS, MAN, AUTO	OOS until block is configured, then last valid target	
ACTUAL	5.2	RO	ALL	- - -	- - -	
PERMITTED	5.3	RW	ALL	OOS+MAN+AUTO	OOS+MAN+AUTO	
NORMAL	5.4	RW	ALL	- - -	AUTO	
Block Error BLOCK_ERR	6	RO	N/A	1: Block Configuration Error 14: Power Up 15: Out-of-Service	Dynamic	Data Type: Bit String 0=Inactive 1=Active This parameter reflects the error status associated with the hardware or software components associated with a block. It is a bit string, so that multiple errors may be shown.
Output OUT	7	- - -	MAN OOS	Status OUT_RANGE Value	Dynamic	Data Type: DS-65 The block output value and status.
Output Range OUT_RANGE	8	- - -	ALL	EU at 100% EU at 0% Units Index Decimal Point	100 0 % 0	Data Type: DS-67 High and low scale values, engineering units code and number of digits to the right of the decimal point associated with OUT.
Grant Deny GRANT_DENY	9	- - -				Data Type: DS-70 Options for controlling access of host computers and local control panels to operating, tuning and alarm parameters of the block. Not used by device. GRANT: 0=N/A, 1=granted DENY: 0=N/A, 1=denied
GRANT	9.1	- - -	ALL	0: Program 1: Tune 2: Alarm 3: Local	All bits: 0	
DENY	9.2	- - -	ALL		All bits: 0	
Status Options STATUS_OPTS	10	- - -	OOS	2: Use Uncertain as GOOD 8: Uncertain if MAN	All bits: 0	Data Type: Bit String Allows you to select options for status handling and processing. The supported status option for the input selector block is: “Use Uncertain as Good”, “Uncertain if Man mode.”

- continued -

Table E-13. Input Selector Function Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Block Mode	Range	Initial Value	Description
Input 1 IN_1	11	- - -	ALL	Status	BAD Not Connected constant	Data Type: DS-65 The block output value and status.
				Value	0	
Input 2 IN_2	12	- - -	ALL	Status	BAD Not Connected constant	Data Type: DS-65 The block output value and status.
				Value	0	
Input 3 IN_3	13	- - -	ALL	Status	BAD Not Connected constant	Data Type: DS-65 The block output value and status.
				Value	0	
Input 4 IN_4	14	- - -	ALL	Status	BAD Not Connected constant	Data Type: DS-65 The block output value and status.
				Value	0	
Disable Analog Input 1 DISABLE_1	15	- - -	ALL	Status	BAD Not Connected constant	Data Type: DS-66 Enable/Disable for Input_1, If parameter is TRUE then input is disabled. If parameter status is BAD it is not evaluated.
				Value 0=Use 1=Disable	0 = Use	
Disable Analog Input 2 DISABLE_2	16	- - -	ALL	Status	BAD Not Connected constant	Data Type: DS-66 Enable/Disable for Input_2, If parameter is TRUE then input is disabled. If parameter status is BAD it is not evaluated.
				Value 0=Use 1=Disable	0 = Use	
Disable Analog Input 3 DISABLE_3	17	- - -	ALL	Status	BAD Not Connected constant	Data Type: DS-66 Enable/Disable for Input_3, If parameter is TRUE then input is disabled. If parameter status is BAD it is not evaluated.
				Value 0=Use 1=Disable	0 = Use	
Disable Analog Input 4 DISABLE_4	18	- - -	ALL	Status	BAD Not Connected constant	Data Type: DS-66 Enable/Disable for Input_4, If parameter is TRUE then input is disabled. If parameter status is BAD it is not evaluated.
				Value 0=Use 1=Disable	0 = Use	
Select Type SELECT_TYPE	19	- - -	ALL	1=First Good 2=Minimum 3=Maximum 4=Middle 5=Average 6=Hot Spare	All Off	Data Type: Unsigned8 Determines the selector action.
Min Good MIN_GOOD	20	- - -	ALL	1 to 4 0 initial value only	0	Data Type: Unsigned8 The minimum number of inputs which are “good” is less than the value of MIN_GOOD then set the OUT status to “bad”.

- continued -

Table E-13. Input Selector Function Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Block Mode	Range	Initial Value	Description
Selected SELECTED	21	RO	N/A	Status	- - -	Data Type: DS-66 The integer indicating the selected input number.
				Value 0 to 8	Dynamic	
Operator Select OP_SELECT	22	- - -	ALL	Status	BAD Not Connected constant	Data Type: DS-66 An operator settable parameter to force a given input to be used.
				Value 0 to 8	0	- - -
Update Event UPDATE_EVT	23	- - -				Data Type: DS-73 This alert is generated by any change to the static data.
UNACKNOWLEDGED	23.1	RW	N/A	0=Undefined 1=Acknowledged 2=Unacknowledged	0	
UPDATE_STATE	23.2	RO	N/A	0=Undefined 1=Update Reported 2=Updated not reported	0	
TIME_STAMP	23.3	RO	N/A	- - -	0	
STATIC_REVISION	23.4	RO	N/A	- - -	0	
RELATIVE_INDEX	23.5	RO	N/A	- - -	0	
Block Alarm BLOCK_ALM	24	- - -				Data Type: DS-72 The block alarm is used for all configuration, hardware, connection failure or system problems in the block. The cause of the alert is entered in the subcode field. The first alert to become active will set the active status in BLOCK_ERR. As soon as the Unreported status is cleared by the alert reporting task, another block alert may be reported without clearing the Active status, if the subcode has changed.
UNACKNOWLEDGED	24.1	RW	N/A	0=Undefined 1=Acknowledged 2=Unacknowledged	0	
ALARM_STATE	24.2	RO	N/A	0=Undefined 1=Clear reported 2=Clear not reported 3=Active reported 4=Active not reported	0	
TIME_STAMP	24.3	RO	N/A	- - -	0	
SUBCODE	24.4	RO	N/A	- - -	0	
VALUE	24.5	RO	N/A	- - -	0	
Extended Parameters						
In 5 IN_5	25		ALL	Status	BAD Not Connected constant	Data Type: DS-65 Input value and status.
				Value	0	
In 6 IN_6	26		ALL	Status	BAD Not Connected constant	Data Type: DS-65 Input value and status.
				Value	0	

- continued -

Table E-13. Input Selector Function Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Block Mode	Range	Initial Value	Description
In 7 IN_7	27	- - -	ALL	Status	BAD Not Connected constant	Data Type: DS-65 Input value and status.
				Value	- - -	
In 8 IN_8	28	- - -	ALL	Status	BAD Not Connected constant	Data Type: DS-65 Input value and status.
				Value	0	
Disable Analog Input 5 DISABLE_5	29	- - -	ALL	Status	BAD Not Connected constant	Data Type: DS-66 Enable/Disable for Input_5, If parameter is TRUE then input is disabled. If parameter status is BAD it is not evaluated.
				Value 0=Use 1=Disable	0 = Use	
Disable Analog Input 6 DISABLE_6	30	- - -	ALL	Status	BAD Not Connected constant	Data Type: DS-66 Enable/Disable for Input_6, If parameter is TRUE then input is disabled. If parameter status is BAD it is not evaluated.
				Value 0=Use 1=Disable	0 = Use	
Disable Analog Input 7 DISABLE_7	31	- - -	ALL	Value	BAD Not Connected constant	Data Type: DS-66 Enable/Disable for Input_7, If parameter is TRUE then input is disabled. If parameter status is BAD it is not evaluated.
				Status 0=Use 1=Disable	0 = Use	
Disable Analog Input 8 DISABLE_8	32	- - -	ALL	Value	BAD Not Connected constant	Data Type: DS-66 Enable/Disable for Input_8, If parameter is TRUE then input is disabled. If parameter status is BAD it is not evaluated.
				Status 0=Use 1=Disable	0 = Use	
Number used to average AVG_USE	33	- - -	- - -	1 to 8	8	Data Type: Unsigned8 Number used to average the output. The number of min and max dropped is the number of inputs minus AVG_USE.
Alarm Summary ALARM_SUM	34	- - -				Data Type: DS-74 Current alert status, unacknowledged states, unreported states and disabled states of the alarms associated with the function block.
CURRENT	34.1	RO	N/A	1: Hi Hi 2: Hi 3: Lo Lo 4: Lo	All Off	
UNACKNOWLEDGED	34.2	RO	N/A			
UNREPORTED	34.3	RO	N/A			
DISABLED	34.4	RW	ALL			
Acknowledge Option ACK_OPTION	35	- - -	ALL	1: Hi Hi 2: Hi 3: Lo Lo 4: Lo	All Off	Data Type: Bit String Selection of whether alarms associated with the block will be automatically acknowledged. 0=Disable 1=Enable

- continued -

Table E-13. Input Selector Function Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Block Mode	Range	Initial Value	Description
Alarm Hysteresis ALARM_HYS	36	- - -	ALL	0 to 50%	0.50%	Data Type: Float Hysteresis on alarms
High High Priority HI_HI_PRI	37	- - -	ALL	0 to 15	0	Data Type: Unsigned8 Priority of the alarm
High High Limit HI_HI_LIM	38	- - -	ALL	- - -	Infinity	Data Type: Float Value of analog input which will generate an alarm
High Priority HI_PRI	39	- - -	ALL	0 to 15	0	Data Type: Unsigned8 Priority of the alarm
High Limit HI_LIM	40	- - -	ALL	- - -	Infinity	Data Type: Float Value of analog input which will generate an alarm
Low Priority LO_PRI	41	- - -	ALL	0 to 15	0	Data Type: Unsigned8 Priority of the alarm
Low Limit LO_LIM	42	- - -	ALL	- - -	-Infinity	Data Type: Float Value of analog input which will generate an alarm
Low Low Priority LO_LO_PRI	43	- - -	ALL	0 to 15	0	Data Type: Unsigned8 Priority of the alarm
Low Low Limit LO_LO_LIM	44	- - -	ALL	- - -	-Infinity	Data Type: Float Value of analog input which will generate an alarm
High High Alarm HI_HI_ALM	45	- - -				Data Type: DS-71 The high high alarm data, which includes a value of the alarm, a timestamp of occurrence and the state of the alarm.
UNACKNOWLEDGED	45.1	RW	N/A	0=Undefined 1=Acknowledged 2=Unacknowledged	0	
ALARM_STATE	45.2	RO	N/A	0=Undefined 1=Clear reported 2=Clear not reported 3=Active reported 4=Active not reported	0	
TIME_STAMP	45.3	RO	N/A	- - -	0	
SUBCODE	45.4	RO	N/A	- - -	0	
VALUE	45.5	RO	N/A	- - -	0	
High Alarm HI_ALM	46	- - -				Data Type: DS-71 The high alarm data, which includes a value of the alarm, a timestamp of occurrence and the state of the alarm.
UNACKNOWLEDGED	46.1	RW	N/A	0=Undefined 1=Acknowledged 2=Unacknowledged	0	
ALARM_STATE	46.2	RO	N/A	0=Undefined 1=Clear reported 2=Clear not reported 3=Active reported 4=Active not reported	0	
TIME_STAMP	46.3	RO	N/A	- - -	0	

- continued -

Table E-13. Input Selector Function Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Block Mode	Range	Initial Value	Description
SUBCODE	46.4	RO	N/A	- - -	0	Data Type: DS-71 The high alarm data, which includes a value of the alarm, a timestamp of occurrence and the state of the alarm.
VALUE	46.5	RO	N/A	- - -	0	
Low Alarm LO_ALM	47	- - -				Data Type: DS-71 The low alarm data, which includes a value of the alarm, a timestamp of occurrence and the state of the alarm.
UNACKNOWLEDGED	47.1	RW	N/A	0=Undefined 1=Acknowledged 2=Unacknowledged	0	
ALARM_STATE	47.2	RO	N/A	0=Undefined 1=Clear reported 2=Clear not reported 3=Active reported 4=Active not reported	0	
TIME_STAMP	47.3	RO	N/A	- - -	0	
SUBCODE	47.4	RO	N/A	- - -	0	
VALUE	47.5	RO	N/A	- - -	0	
Low Low Alarm LO_LO_ALM	48	- - -				Data Type: DS-71 The low low alarm data, which includes a value of the alarm, a timestamp of occurrence and the state of the alarm.
UNACKNOWLEDGED	48.1	RW	N/A	0=Undefined 1=Acknowledged 2=Unacknowledged	0	
ALARM_STATE	48.2	RO	N/A	0=Undefined 1=Clear reported 2=Clear not reported 3=Active reported 4=Active not reported	0	
TIME_STAMP	48.3	RO	N/A	- - -	0	
SUBCODE	48.4	RO	N/A	- - -	0	
VALUE	48.5	RO	N/A	- - -	0	
Output Discrete OUT_D	49	- - -	MAN OOS	Status	- - -	Data Type: DS-66 Discrete output to indicate a selected alarm value.
				Value 0, 1	- - -	
Alarm Select ALM_SEL	50	- - -	ALL	Status	- - -	Data Type: Bit String Used to select the process alarm conditions that will cause the OUT_D parameter to be set.
				1: Hi Hi 2: Hi 3: Lo Lo 4: Lo	All Off	

View Lists

View lists allow the values of a set of parameters to be accessed at the same time. Views 1 and 2 contain operating parameters and are defined by the Fieldbus Foundation. View 3 contains dynamic parameters and View 4 contains static parameters with configuration and maintenance information. Views 3 and 4 are defined by the manufacturer.

Table E-14. ISEL Function Block, View Lists

INDEX NUMBER	PARAMETER	VIEW			
		1	2	3	4
1	ST_REV	x	x	x	x
3	STRATEGY				x
4	ALERT_KEY				x
5	MODE_BLK	x		x	
6	BLOCK_ERR	x		x	
7	OUT	x		x	
8	OUT_RANGE		x		
9	GRANT_DENY		x		
10	STATUS_OPTS				x
11	IN_1	x		x	
12	IN_2	x		x	
13	IN_3	x		x	
14	IN_4	x		x	
15	DISABLE_1	x		x	
16	DISABLE_2	x		x	
17	DISABLE_3	x		x	
18	DISABLE_4	x		x	
19	SELECT_TYPE				x
20	MIN_GOOD				x
21	SELECTED	x		x	
22	OP_SELECT	x		x	
25	IN_5	x		x	
26	IN_6	x		x	
27	IN_7	x		x	

- continued -

Table E-14. ISEL Function Block, View Lists (continued)

INDEX NUMBER	PARAMETER	VIEW			
		1	2	3	4
28	IN_8	x		x	
29	DISABLE_5	x		x	
30	DISABLE_6	x		x	
31	DISABLE_7	x		x	
32	DISABLE_8	x		x	
33	AVG_USE				x
34	ALARM_SUM	x		x	
35	ACK_OPTION				x
36	ALARM_HYS				x
37	HI_HI_PRI				x
38	HI_HI_LIM				x
39	HI_PRI				x
40	HI_LIM				x
41	LO_PRI				x
42	LO_LIM				x
43	LO_LO_PRI				x
44	LO_LO_LIM				x
49	OUT_D	x		x	
50	ALM_SEL				x

Handheld Communicator Menu Structure

INPUT SELECTOR FUNCTION BLOCK

QUICK CONFIG

- ALERT KEY
- MIN GOOD
- OUTPUT RANGE EU AT 100%
- OUTPUT RANGE EU AT 0%
- OUTPUT RANGE UNITS INDEX
- OUTPUT RANGE DECIMAL
- SELECT TYPE

COMMON CONFIG

- MIN GOOD
- BLOCK MODE TARGET
- BLOCK MODE ACTUAL
- BLOCK MODE PERMITTED
- BLOCK MODE NORMAL
- OUTPUT RANGE EU AT 100%
- OUTPUT RANGE EU AT 0%
- OUTPUT RANGE UNITS INDEX
- OUTPUT RANGE DECIMAL
- SELECT TYPE

ADVANCED CONFIG

- ALERT KEY
- STATIC REVISION
- STATUS OPTIONS
- STRATEGY

CONNECTORS

- DISABLE ANALOG INPUT 1 STATUS
- DISABLE ANALOG INPUT 1 VALUE
- DISABLE ANALOG INPUT 2 STATUS
- DISABLE ANALOG INPUT 2 VALUE
- DISABLE ANALOG INPUT 3 STATUS
- DISABLE ANALOG INPUT 3 VALUE
- DISABLE ANALOG INPUT 4 STATUS
- DISABLE ANALOG INPUT 4 VALUE
- INPUT 1 STATUS
- INPUT 1 VALUE
- INPUT 2 STATUS
- INPUT 2 VALUE
- INPUT 3 STATUS
- INPUT 3 VALUE
- INPUT 4 STATUS
- INPUT 4 VALUE
- OPERATOR SELECT STATUS
- OPERATOR SELECT VALUE
- OUTPUT STATUS
- OUTPUT VALUE
- SELECTED STATUS
- SELECTED VALUE

ONLINE

- BLOCK ERROR
- DISABLE ANALOG INPUT 1 STATUS
- DISABLE ANALOG INPUT 1 VALUE
- DISABLE ANALOG INPUT 2 STATUS
- DISABLE ANALOG INPUT 2 VALUE
- DISABLE ANALOG INPUT 3 STATUS
- DISABLE ANALOG INPUT 3 VALUE
- DISABLE ANALOG INPUT 4 STATUS
- DISABLE ANALOG INPUT 4 VALUE
- INPUT 1 STATUS
- INPUT 1 VALUE
- INPUT 2 STATUS
- INPUT 2 VALUE
- INPUT 3 STATUS
- INPUT 3 VALUE
- INPUT 4 STATUS
- INPUT 4 VALUE
- BLOCK MODE TARGET
- BLOCK MODE ACTUAL
- BLOCK MODE PERMITTED
- BLOCK MODE NORMAL
- OPERATOR SELECTED STATUS
- OPERATOR SELECTED VALUE
- OUTPUT STATUS
- OUTPUT VALUE
- SELECTED STATUS
- SELECTED VALUE

STATUS

- BLOCK ERROR

OTHER

- TAG DESCRIPTION
- GRANT DENY GRANT
- GRANT DENY DENY
- UPDATE EVENT UNACKNOWLEDGED
- UPDATE EVENT UPDATE STATE
- UPDATE EVENT TIME STAMP
- UPDATE EVENT STATIC REV
- UPDATE EVENT RELATIVE INDEX
- BLOCK ALARM UNACKNOWLEDGED
- BLOCK ALARM ALARM STATE
- BLOCK ALARM TIME STAMP
- BLOCK ALARM SUBCODE
- BLOCK ALARM VALUE
- IN 5 STATUS
- IN 5 VALUE
- IN 6 STATUS
- IN 6 VALUE
- IN 7 STATUS
- IN 7 VALUE
- IN 8 STATUS
- IN 8 VALUE
- DISABLE ANALOG INPUT 5 STATUS
- DISABLE ANALOG INPUT 5 VALUE
- DISABLE ANALOG INPUT 6 STATUS
- DISABLE ANALOG INPUT 6 VALUE
- DISABLE ANALOG INPUT 7 STATUS
- DISABLE ANALOG INPUT 7 VALUE
- DISABLE ANALOG INPUT 8 STATUS
- DISABLE ANALOG INPUT 8 VALUE
- NUMBER USED TO AVERAGE
- ALARM SUMMARY CURRENT
- ALARM SUMMARY UNACKNOWLEDGED
- ALARM SUMMARY UNREPORTED
- ALARM SUMMARY DISABLED
- ACKNOWLEDGE OPTION
- ALARM HYSTERESIS

OTHER CONTINUED

- HIGH HIGH PRIORITY
- HIGH HIGH LIMIT
- HIGH PRIORITY
- HIGH LIMIT
- LOW PRIORITY
- LOW LIMIT
- LOW LOW PRIORITY
- LOW LOW LIMIT
- HIGH HIGH ALARM UNACKNOWLEDGED
- HIGH HIGH ALARM ALARM STATE
- HIGH HIGH ALARM TIME STAMP
- HIGH HIGH ALARM SUBCODE
- HIGH HIGH ALARM FLOAT VALUE
- HIGH ALARM UNACKNOWLEDGED
- HIGH ALARM ALARM STATE
- HIGH ALARM TIME STAMP
- HIGH ALARM SUBCODE
- HIGH ALARM FLOAT VALUE
- LOW ALARM UNACKNOWLEDGED
- LOW ALARM ALARM STATE
- LOW ALARM TIME STAMP
- LOW ALARM SUBCODE
- LOW ALARM FLOAT VALUE
- LOW LOW ALARM UNACKNOWLEDGED
- LOW LOW ALARM ALARM STATE
- LOW LOW ALARM TIME STAMP
- LOW LOW ALARM SUBCODE
- LOW LOW ALARM FLOAT VALUE
- OUTPUT DISCRETE STATUS
- OUTPUT DISCRET VALVE
- ALARM SELECT

ALL

- CHARACTERISTICS BLOCK TAG
- STATIC REVISION
- TAG DESCRIPTION
- STRATEGY
- ALERT KEY
- BLOCK MODE TARGET
- BLOCK MODE ACTUAL
- BLOCK MODE PERMITTED
- BLOCK MODE NORMAL
- BLOCK ERROR
- OUTPUT STATUS
- OUTPUT VALUE
- OUTPUT RANGE EU AT 100%
- OUTPUT RANGE EU AT 0%
- OUTPUT RANGE UNITS INDEX
- OUTPUT RANGE DECIMAL
- GRANT DENY GRANT
- GRANT DENY DENY
- STATUS OPTIONS
- INPUT 1 STATUS
- INPUT 1 VALUE
- INPUT 2 STATUS
- INPUT 2 VALUE
- INPUT 3 STATUS
- INPUT 3 VALUE
- INPUT 4 STATUS
- INPUT 4 VALUE
- DISABLE ANALOG INPUT 1 STATUS
- DISABLE ANALOG INPUT 1 VALUE
- DISABLE ANALOG INPUT 2 STATUS
- DISABLE ANALOG INPUT 2 VALUE
- DISABLE ANALOG INPUT 3 STATUS
- DISABLE ANALOG INPUT 3 VALUE
- DISABLE ANALOG INPUT 4 STATUS
- DISABLE ANALOG INPUT 4 VALUE

ALL CONTINUED

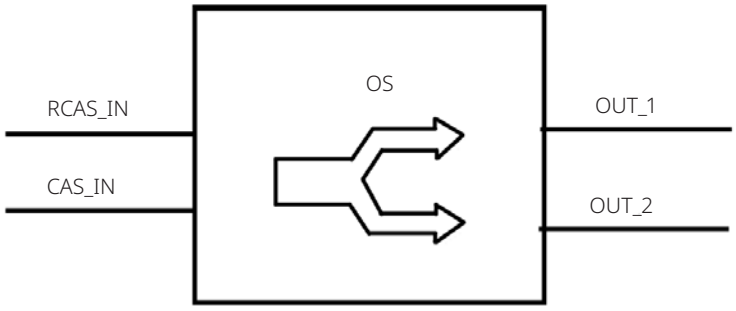
- SELECT TYPE
- MIN GOOD
- SELECTED STATUS
- SELECTED VALUE
- OPERATOR SELECT STATUS
- OPERATOR SELECT VALUE
- UPDATE EVENT UNACKNOWLEDGED
- UPDATE EVENT UPDATE STATE
- UPDATE EVENT TIME STAMP
- UPDATE EVENT STATIC REV
- UPDATE EVENT RELATIVE INDEX
- BLOCK ALARM UNACKNOWLEDGED
- BLOCK ALARM ALARM STATE
- BLOCK ALARM TIME STAMP
- BLOCK ALARM SUBCODE
- BLOCK ALARM VALUE
- IN 5 STATUS
- IN 5 VALUE
- IN 6 STATUS
- IN 6 VALUE
- IN 7 STATUS
- IN 7 VALUE
- IN 8 STATUS
- IN 8 VALUE
- DISABLE ANALOG INPUT 5 STATUS
- DISABLE ANALOG INPUT 5 VALUE
- DISABLE ANALOG INPUT 6 STATUS
- DISABLE ANALOG INPUT 6 VALUE
- DISABLE ANALOG INPUT 7 STATUS
- DISABLE ANALOG INPUT 7 VALUE
- DISABLE ANALOG INPUT 8 STATUS
- DISABLE ANALOG INPUT 8 VALUE
- NUMBER USED TO AVERAGE
- ALARM SUMMARY CURRENT
- ALARM SUMMARY UNACKNOWLEDGED
- ALARM SUMMARY UNREPORTED
- ALARM SUMMARY DISABLED
- ACKNOWLEDGE OPTION
- ALARM HYSTERESIS
- HIGH HIGH PRIORITY
- HIGH HIGH LIMIT
- HIGH PRIORITY
- HIGH LIMIT
- LOW PRIORITY
- LOW LIMIT
- LOW LOW PRIORITY
- LOW LOW LIMIT
- HIGH HIGH ALARM UNACKNOWLEDGED
- HIGH HIGH ALARM ALARM STATE
- HIGH HIGH ALARM TIME STAMP
- HIGH HIGH ALARM SUBCODE
- HIGH HIGH ALARM FLOAT VALUE
- HIGH ALARM UNACKNOWLEDGED
- HIGH ALARM ALARM STATE
- HIGH ALARM TIME STAMP
- HIGH ALARM SUBCODE
- HIGH ALARM FLOAT VALUE
- LOW ALARM UNACKNOWLEDGED
- LOW ALARM ALARM STATE
- LOW ALARM TIME STAMP
- LOW ALARM SUBCODE
- LOW ALARM FLOAT VALUE
- LOW LOW ALARM UNACKNOWLEDGED
- LOW LOW ALARM ALARM STATE
- LOW LOW ALARM TIME STAMP
- LOW LOW ALARM SUBCODE
- LOW LOW ALARM FLOAT VALUE
- OUTPUT DISCRETE STATUS
- OUTPUT DISCRET VALVE
- ALARM SELECT

E.5 Output Splitter Function Block

Overview

The Output Splitter (OS) block (Figure E-16) provides the capability to drive two control outputs from a single input. Each output is a linear function of some portion of the input. Back calculation support is provided using the same linear function in reverse. Cascade initialization is supported by a decision table for combinations of input and output conditions.

Figure E-16. Output Splitter (OS) Function Block



This block is normally used in split ranging or sequencing of multiple valve applications. A typical split range application has both valves closed when the splitter input is 50%. One valve opens fully as the input drops to 0%. The other valve opens as the input rises above 50%.

A typical sequencing application has both valves closed at 0% input. One valve fully opens as the input rises to 50% and the other stays shut. The second valve opens as the input rises above 50% and the first valve may remain open or shut off quickly.

Because this block is in the control path, it is able to pass limit and cascade initialization information back to the upstream block. Table E-19 lists the OS block parameters and their descriptions, units of measure and index numbers. Figures E-17 and E-18 illustrate the internal components of the OS function block.

Figure E-17. Output Splitter Function Block Schematic

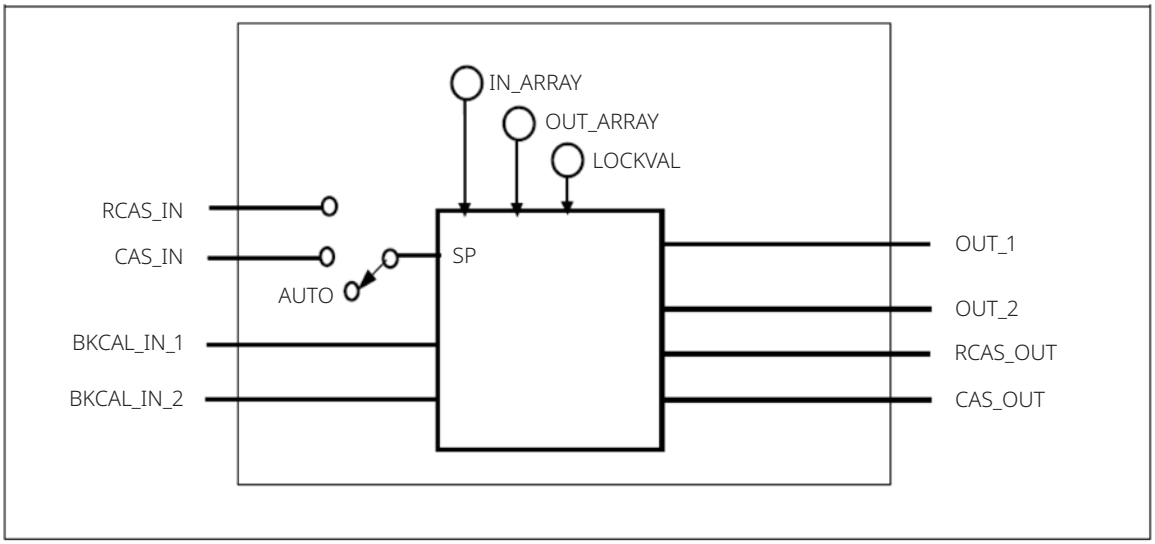
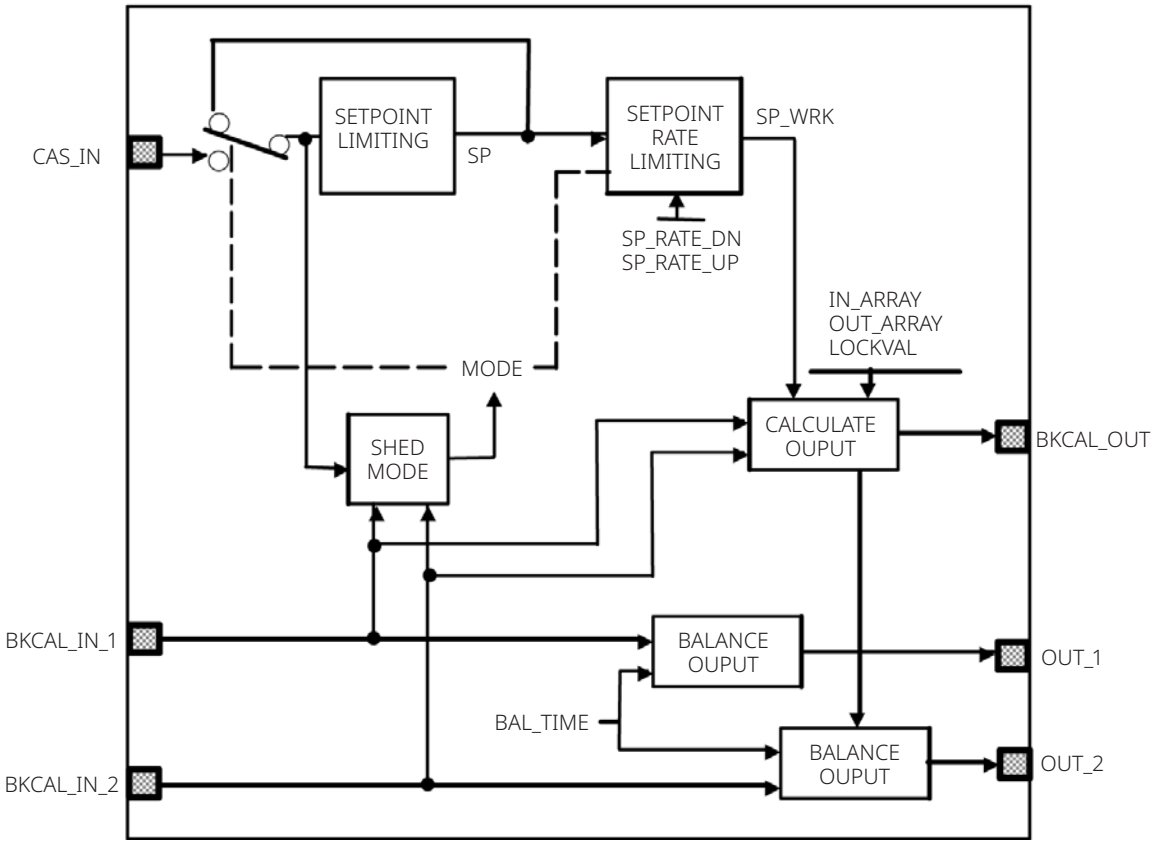


Figure E-18. Output Splitter Function Block Schematic Diagram



Modes

The Output Splitter function block supports the following actual modes:

- Out of Service (OOS)—The block is not processed. FIELD_VAL and PV are not updated and the OUT status is set to Bad: Out of Service. The BLOCK_ERR parameter shows Out of Service. In this mode, you can make changes to all configured parameters.

By using permitted mode the target mode of a block may be restricted to one or more of the following modes: Cas, Auto or OOS.

NOTE

The output splitter function block must be in Auto for the mode to go to CAS.

- Initialization Manual (IMan)—The output path is not complete (for example, the cascade-to-dependent block path might not be open). In IMan mode, OUT tracks BKCAL_IN, which allows for bumpless transfer of control.
- Automatic (Auto)—The block outputs (OUT_1 and OUT_2) reflect the target operating point specified by the setpoint (SP) parameter.
- Cascade (Cas)—The SP parameter is set by another function block through a connection to CAS_IN. The SP value is used to set the OUT parameters automatically. This is the most frequently used mode in this block.

The block's normal mode is Cascade (Cas). You can isolate the block for testing by using Automatic (Auto) mode and adjusting the setpoint.

When a block attached to an output requests initialization, one of the following actions might occur:

- When the other output is not in Cas mode, the block attached to the input is initialized.
- When the other output is in Cas mode, this output returns to the value calculated from its slope in a specified time period.

Status Handling

Sub-status value received at CAS_IN [14] is passed to both outputs, except for those used in the cascade handshake. An IFS goes to both outputs. The status option IFS if Bad CAS_IN is available.

If the Status Option to Propagate failure is set, the block propagates device failure only if both BKCAL_IN show failed status. Otherwise the upstream cascade would be broken by a failure at either output.

The statuses of OUT_1 [8] and OUT_2 [9] are determined by the statuses of BKCAL_IN_1 and BKCAL_IN_2 and the actual mode of the block.

When a BKCAL_IN input sees that its downstream block is not in Cas mode, the Splitter function block sets the corresponding OUT value to the BKCAL_IN value. However, this may not be the same value that is calculated by the splitter algorithm. When the mode of the downstream block is changed to Cas, the difference between the calculated output and the back-calculation input is computed and the difference is added to the calculated output. Next, the difference is reduced to zero over the time defined by the BAL_TIME parameter.

When both BKCAL_IN_1 and BKCAL_IN_2 indicate that the downstream blocks are not in Cas mode or have Bad status, the first downstream block that goes to Cas mode causes the upstream block to initialize so that there is no difference between the calculated output and the back-calculation input. This provides bumpless transfer for the first downstream block.

Limit Handling

The splitter function block is designed to combine the limit information from the two downstream blocks into limits for the upstream block. The general principle is to allow the upstream block to continue control for as long as possible.

The upstream block is high-limited (BKCAL_OUT of the Splitter block has high-limited status) when:

- Both downstream blocks are high-limited (both BKCAL_INS of the Splitter block have high-limited status)

or

- One downstream block is high-limited, the associated output slope is positive and the other block has Bad status or is not in Cas mode

or

- One downstream block is low-limited, the associated output slope is negative and the other block has Bad status or is not in Cas mode

or

- SP is greater than or equal to X22

The upstream block is low-limited when:

- Both downstream blocks are low-limited

or

- One downstream block is low-limited, the associated output slope is positive and the other block has Bad status or is not in Cas mode

or

- One downstream block is high-limited, the associated output slope is negative and the other block has Bad status or is not in Cas mode

or

- SP is less than or equal to X11

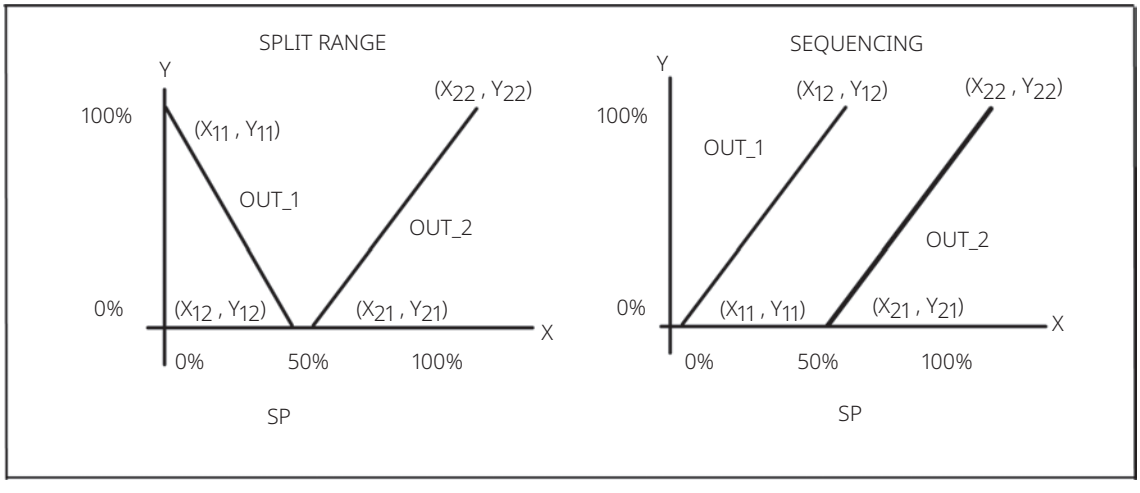
Input to Output Mapping

The relationship of each output to the input may be defined by a line. Each line may be defined by its endpoints. Examples of graphical representations of OUT_1 and OUT_2 vs. SP are shown in Figure E-19 for a split range and a sequencing application.

The block has the same SP structure as the PID block, except that there is no limiting applied to the SP. The SP may be used in Auto mode for testing. The operator would use the output of the PID to accomplish the same purpose. Each downstream block can be taken out of cascade if it becomes necessary to gain control of them.

The examples shown in Figure E-19 do not show the full range of possibilities. The lines could overlap like an X or both start from the origin but have different slopes. The endpoints do not have to lie within 0 to 100%. Limits in the external blocks may effect the useful range of a line. Units of percent are used in the examples because the common application of this block is to valves, but any units may be used to suit the application.

Figure E-19. Split Range and Sequence Operation



The following parameters as paired coordinates are used to specify the output splitter operation:

$X_{11}, Y_{11}, X_{12}, Y_{12}$

$X_{21}, Y_{21}, X_{22}, Y_{22}$

Where X_{nJ} is the value of SP associated with OUT_n and X_{n1} and X_{n2} refer to the 1st and 2nd coordinates of the nth curve respectively. Y_{nJ} is the value of OUT_n and Y_{n1} and Y_{n2} refer to the 1st and 2nd coordinates of the nth curve respectively.

By specifying the coordinates as shown in Tables E-15 and E-16, the endpoints of the lines are defined. The contents of the respective X's are held in the IN_ARRAY parameter and the contents of the respective Y's are held in the OUT_ARRAY parameter. If a set of points are specified such that a region of the input range is not specified, then the corresponding OUT_n will be set to the closest endpoint of the input value, either high or low, when the specified region is exceeded.

Table E-15. IN_ARRAY Coordinates

Index	Coordinate
0	X_{11} - Start value of SP for the OUT_1 line. ($X_{11} < X_{12}$)
1	X_{12} - End value of SP for the OUT_1 line. ($X_{11} < X_{12}$)
2	X_{21} - Start value of SP for the OUT_2 line. ($X_{21} < X_{22}$)
3	X_{22} - End value of SP for the OUT_2 line. ($X_{21} < X_{22}$)

Table E-16. OUT_ARRAY Coordinates

Index	Coordinate
0	Y_{11} - Value of OUT_1 at X_{11}
1	Y_{12} - Value of OUT_1 at X_{12}
2	Y_{21} - Value of OUT_2 at X_{21}
3	Y_{22} - Value of OUT_2 at X_{22}

A configuration error is set in BLOCK_ERR and the actual mode of the block goes to Out of Service if the X values have any of the following conditions: $X_{21} < X_{11}$, $X_{12} <= X_{11}$, $X_{22} <= X_{21}$.

Refer to Figure E-20 for an example of LOCKVAL = true and Figure E-21 for an example of LOCKVAL = false. The parameter LOCKVAL provides an option to specify whether OUT_1 remains at its ending level when control is switched to OUT_2 or goes to Y_{11}. If LOCKVAL is true, OUT_1 remains at its ending value when X is greater than X_{12}. If LOCKVAL is false, then OUT_1 goes to Y_{11} when X is greater than X_{12}.

Figure E-20. OUT with LOCKVAL True

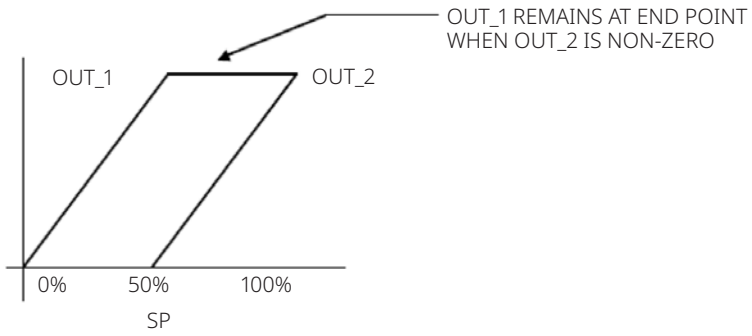
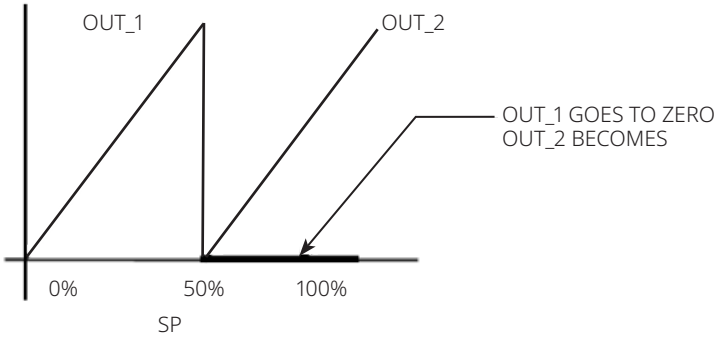


Figure E-21. OUT with LOCKVAL False



Some hysteresis in the switching point may be required because the output may change by a full stroke of the valve. HYSTVAL [12] contains the amount of hysteresis. If X < = X12-HYSTVAL, OUT_1 may be determined by the calculated y value. If X12-HYSTVAL < X < X12 and X has not reached X12 since it was less than X12-HYSTVAL, OUT_1 may be determined by the calculated y value. If X12-HYSTVAL < X < X12 and X has reached X12 since it was less than X12-HYSTVAL, OUT_1 may be determined by the LOCKVAL setting. If X12 < X, OUT_1 may be determined by the LOCKVAL setting.

Initialization and Back Calculation Requirements

Refer to Figure E-22, Output Splitter Configuration, where:

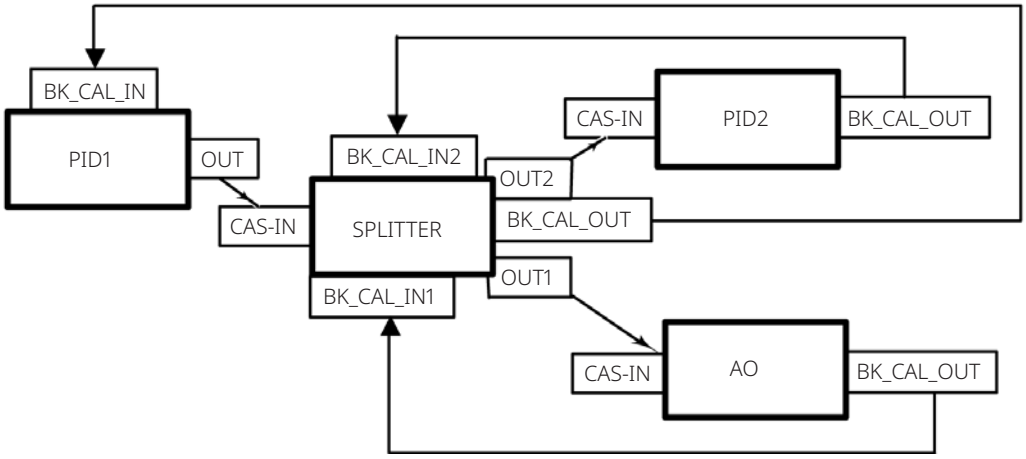
PID1 = Upstream driving controller or function block.

Splitter = Split range function block being described.

AO = Receiver of OUT_1 for 0 to 50% range of SP

PID2 = Receiver of OUT_2 for 50 to 100% range of SP

Figure E-22. Output Splitter Configuration



CAS_IN of the Splitter receives the OUT of PID1. BKCAL_IN of PID1 receives BKCAL_OUT of the Splitter. CAS_IN of the AO receives OUT_1 of the Splitter and PID2 receives OUT_2 of the Splitter. BKCAL_IN_1 of the Splitter receives BKCAL_OUT of the AO and BKCAL_IN_2 of the Splitter receives BKCAL_OUT of PID2.

The discussion in this section defines the behavior which is used to handle the initial value calculation and status which can in turn be sent to PID1. This behavior is defined in such a way that no “bumps” are generated by changing modes and that PID1 does not wind up.

The splitter utilizes special handling for cascade initialization because it has two independent outputs. When a downstream block indicates to the splitter that it wants to initialize, by asserting IR (initialization request) on its BKCAL_OUT, one of two things happens. Under some circumstances, it is possible to pass an initialization request from a downstream block back up to the block upstream of the splitter, so that all three blocks balance for bumpless transfer to cascade mode. Otherwise, the requested splitter output goes to the requested value by placing an internal offset between that output and the output of the curve, and then ramping that offset to zero in BAL_TIME seconds after the cascade is made up.

The splitter normally runs with both outputs connected to blocks in cascade mode. If one or both of the blocks is not in cascade mode, special limiting action is taken. Specifically, if one block indicates that it is not in cascade by NI (not invited) status on its BKCAL_OUT, then the BKCAL_OUT of the splitter asserts limits at the range extremes of the block that is still in cascade mode. Even if the upstream controller does not want to operate in that range, there will be no reset windup when it can move into the range. If both downstream blocks show NI, then the splitter can only wait until one of them requests cascade initialization. BKCAL_OUT of the splitter can hold the upstream block at the value of the SP. The actual mode is IMan.

When cascade initialization is requested, by IR substatus on a BKCAL_IN, it is first necessary to determine if the other BKCAL_IN has NI substatus. If so, the value at the BKCAL_IN asserting IR is taken as the Y value for its curve, and the resulting X value is sent on BKCAL_OUT to PID1. If the other substatus is OK, then the internal offset and BAL_TIME is used. If both blocks have IR substatus, then one output is processed until its cascade is closed. The choice is based on the presence of limit status in BKCAL_IN. If BKCAL_IN_1 is limited, then if BKCAL_IN_2 is not limited then OUT_2 is processed first, else OUT_1 is processed first.

Cascade initialization is also required when the block transitions from Auto to Cas mode. This action is identical to that described for the PID block.

The required actions are summarized in Table E-17.

Table E-17. OUT_ARRAY Coordinates

BKCAL_IN_1	BKCAL_IN_2	BKCAL_OUT	Action
NI	NI	NI	Not Specified
NI	OK	OK	BKCAL_OUT limited to X21 low and X22 high
OK	NI	OK	BKCAL_OUT limited to X11 and X12 high
IR	NI	IR	Initialize cascade to value given by curve X1 vs Y1
IR	OK	OK	Initialize OUT_1 using internal offset from Y1
NI	IR	IR	Initialize cascade to value given by curve X2 vs Y2
OK	IR	OK	Initialize OUT_2 using internal offset from Y2
Note 1: OK means the cascade is closed. Note 2: Recommend using the average of BKCAL_IN_1 and BKCAL_IN_2 or just SP.			

The BKCAL_OUT status shows limited high if an increase in SP cannot be effectively passed on to either output because the BKCAL_IN_n of both outputs indicates that a move in the needed direction is limited. Similarly, limited low is set if a decrease in SP cannot be effectively passed on to either output. The slope of the limited line(s) affects the limit direction. BKCAL_OUT also shows limit status at the X extremes X11 and X22.

Initialization is not automatic under all circumstance because some situations have conflicting needs. In general, when a control region is in trouble, the upstream controller is limited so it will not drive further into that region. When you want to move to the other active region, you can put the upstream controller into Man mode and move it or you can drop the good downstream block out of Cas mode for one evaluation cycle and then restore Cas mode. This initializes the upstream controller to the remaining good region of control.

Block Errors

Table E-18 lists conditions reported in the BLOCK_ERR [6] parameter.

Table E-18. OS BLOCK_ERR Conditions

Condition Number	Condition Name and Description
1	Block Configuration Error—SHED_OPT or BYPASS set to 0
7	Input failure/process variable has Bad status—The parameter linked to IN is indicating a Bad status.
8	Output Failure - Set if OUT quality is bad and the Actual mode is not Out of Service.
14	Power Up - Set if the Target mode is Out of Service when powered up until the mode is changed.
15	Out of Service—The actual mode is Out of Service (OOS).

OS Function Block Parameter List

- Read/Write Capability: RO - Read Only, RW - Read Write
- Mode: The block mode(s) required to write to the parameter

Table E-19. Output Splitter Function Block Parameter Definitions

Label PARAMETER_NAME	Index Number	RO / RW	Block Mode	Range	Initial Value	Description
Static Revision ST_REV	1	RO	N/A	0 to 65535	0	Data Type: Unsigned16 The revision level of the static data associated with the function block. The revision value will be incremented each time a static parameter value in the block is changed.
Tag Description TAG_DESC	2	RW	ALL	7 bit ASCII	Spaces	Data Type: Octet String The user description of the intended application of the block.
Strategy STRATEGY	3	RW	ALL	0 to 65535	0	Data Type: Unsigned 16: The strategy field can be used to identify grouping of blocks. This data is not checked or processed by the block.
Alert Key ALERT_KEY	4	RW	ALL	1 to 255	0	Data Type: Unsigned8 The identification number of the plant unit. This information may be used in the host for sorting alarms, etc.
Block Mode MODE_BLK	5	- - -				Data Type: DS-69 The actual, target, permitted and normal modes of the block Target: The requested block mode Actual: The current mode of the block Permitted: Allowed modes for Target Normal: Most common mode for Target
TARGET	5.1	RW	- - -	7:OOS 3:AUTO 2:CAS	OOS until block configured, then last valid target	
ACTUAL	5.2	RO	- - -	- - -	OOS	
PERMITTED	5.3	RW	- - -	OOS+AUTO+CAS	OOS AUTO CAS	
NORMAL	5.4	RW	- - -	- - -	AUTO+CAS	
Block Error BLOCK_ERR	6	RO	N/A	1: Block Configuration Error 7: Input Failure/ Bad PV Status 8: Output Failure 14: Power-up 15: Out-of-Service	Dynamic	Data Type: Bit String 0=Inactive 1=Active This parameter reflects the error status associated with the hardware or software components associated with a block. It is a bit string, so that multiple errors may be shown.
Setpoint SP	7	- - -	- - -	PV_SCALE +/- 10%	- - -	Data Type: DS-65 Analog setpoint of the block
Output 1 OUT_1	8	- - -	MAN OOS	OUT_SCALE +/- 10%	- - -	Data Type: DS-65 The primary analog output value calculated as a result of executing the function (the first output value and status).
Output 2 OUT_2	9	- - -	MAN OOS	OUT_SCALE +/- 10%	- - -	Data Type: DS-65 The primary analog output value calculated as a result of executing the function (the second output value and status).

- continued -

Table E-19. Output Splitter Function Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Block Mode	Range	Initial Value	Description
Output 1 Range OUT_1_RANGE	10	RO	- - -	EU at 100% EU at 0 % Unit Index Decimal Point	100 0 % 2	Data Type: DS-68 The high and low scale values, engineering units code and number of decimal places to be used in displaying the OUT value, this parameter has no effect on this block.
Output 2 Range OUT_2_RANGE	11	RO	- - -	EU at 100% EU at 0 % Unit Index Decimal Point	100 0 % 2	Data Type: DS-68 The high and low scale values, engineering units code and number of decimal places to be used in displaying the OUT value, this parameter has not effect on this block.
Grant Deny GRANT_DENY	12	- - -				Data Type: DS-70 Options for controlling access of host computers and local control panels to operating, tuning and alarm parameters of the block. GRANT:0=N/A, 1=granted DENY: 0=N/A, 1= denied
GRANT	12.1	- - -	N/A	0: Program 1: Tune 2: Alarm 3: Local	All bits: 0	
DENY	12.2	- - -	N/A		All bits: 0	
Status Options STATUS_OPTS	13	- - -	OOS	1: IFS if BAD CAS_IN	All bits: 0	Data Type: Bit String 0=Disabled 1=Enabled User option for status
Cascade Input CAS_IN	14	- - -	- - -	Status	BAD Not Connected Not Limited	Data Type: DS-65 The remote setpoint from another block.
				Value	0	
Back Calculation Output BKCAL_OUT	15	RO	- - -	Status Limits	- - -	Data Type: DS-65 Output value to another block for backwards output tracking.
Input Array IN_ARRAY	16	- - -	- - -	- - -	All: 0	Data Type: Float Used with OUT_ARRAY to map input to output. See Input to Output Mapping, page 296.
Output Array OUT_ARRAY	17	- - -	- - -	- - -	All: 0	Data Type: Float Used with IN_ARRAY to map input to output. See Input to Output Mapping, page 296.
Lockval LOCKVAL	18	- - -	- - -	0=Undefined 1=no lock 2=lock	0= Undefined	Data Type: Enum Used with OUT_ARRAY to map input to output. See Input to Output Mapping, page 296.
Back Calculation Input 1 BKCAL_1_IN	19	- - -	- - -	Status	BAD Not Connected Not Limited	Data Type: DS-65 The value and status reflecting the BKCAL_OUT of the lower block associated with OUT_1. It is used for initialization and to prevent windup in upstream blocks.
				Value	0	

- continued -

Table E-19. Output Splitter Function Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Block Mode	Range	Initial Value	Description
Back Calculation Input 2 BKCAL_2_IN	20	- - -	- - -	Status	BAD Not Connected Not Limited	Data Type: DS-65 The value and status reflecting the BKCAL_OUT of the lower block associated with OUT_2. It is used for initialization and to prevent windup in upstream blocks.
				Value	0	
Balance Time BAL_TIME	21	- - -	- - -	Positive	0	Data Type: Float Specifies the time for the internal working value of bias or ratio to return to the operator set bias or ratio, in seconds.
Hystval HYSTVAL	22	- - -	- - -	- - -	- - -	- - -
Update Event UPDATE_EVT	23	RO	N/A	- - -	- - -	Data Type: DS-73 This alert is generated by any change to the static data.
UNACKNOWLEDGED	23.1	RW	N/A	0=Undefined 1=Acknowledged 2=Unacknowledged	0= Undefined	
UPDATE STATE	23.2	RO	N/A	0=Undefined 1=Update Reported 2=Updated not reported	0= Undefined	
TIME_STAMP	23.3	RO	N/A	- - -	0	
STATIC_REVISION	23.4	RO	N/A	- - -	0	
RELATIVE_INDEX	23.5	RO	N/A	- - -	0	
Block Alarm BLOCK_ALM	24	- - -				Data Type: DS-72 The block alarm is used for all configuration, hardware, connection failure or system problems in the block. The cause of the alert is entered in the subcode field.
UNACKNOWLEDGED	24.1	RW	N/A	0=Undefined 1=Acknowledged 2=Unacknowledged	- - -	
ALARM_STATE	24.2	RO	N/A	0: Undefined 1: Clear reported 2: Clear not reported 3: Active reported 4: Active not reported	- - -	
TIME_STAMP	24.3	RO	N/A	- - -	- - -	
SUBCODE	24.4	RO	N/A	- - -	- - -	
VALUE	24.5	RO	N/A	- - -	- - -	

View Lists

View lists allow the values of a set of parameters to be accessed at the same time. Views 1 and 2 contain operating parameters and are defined by the Fieldbus Foundation. View 3 contains dynamic parameters and View 4 contains static parameters with configuration and maintenance information. Views 3 and 4 are defined by the manufacturer.

Table E-20. OS Function Block, View Lists

INDEX NUMBER	PARAMETER	VIEW			
		1	2	3	4
1	ST_REV	x	x	x	x
3	STRATEGY				x
4	ALERT_KEY				x
5	MODE_BLK	x		x	
6	BLOCK_ERR	x		x	
7	SP	x		x	
8	OUT_1	x		x	
9	OUT_2	x		x	
10	OUT_1_RANGE		x		
11	OUT_2_RANGE		x		
12	GRANT_DENY		x		
13	STATUS_OPTS				x
14	CAS_IN	x		x	
15	BKCAL_OUT			x	
16	IN_ARRAY				x
17	OUT_ARRAY				x
18	LOCKVAL				x
19	BKCAL_1_IN			x	
20	BKCAL_2_IN			x	
21	BAL_TIME				x
22	HYSTVAL				x

Handheld Communicator Menu Structure

OUTPUT SPLITTER FUNCTION BLOCK

ALL

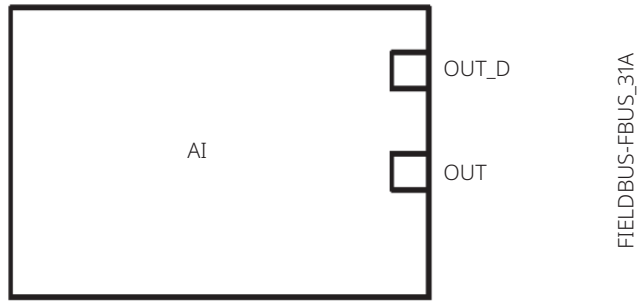
CHARACTERISTICS BLOCK TAG
STATIC REVISION
TAG DESCRIPTION
STRATEGY
ALERT KEY
BLOCK MODE TARGET
BLOCK MODE ACTUAL
BLOCK MODE PERMITTED
BLOCK MODE NORMAL
BLOCK ERROR
SETPOINT STATUS
SETPOINT VALUE
OUTPUT 1 STATUS
OUTPUT 1 VALUE
OUTPUT 2 STATUS
OUTPUT 2 VALUE
OUTPUT 1 RANGE EU AT 100%
OUTPUT 1 RANGE EU AT 0%
OUTPUT 1 RANGE UNITS INDEX
OUTPUT 1 RANGE DECIMAL
OUTPUT 2 RANGE EU AT 100%
OUTPUT 2 RANGE EU AT 0%
OUTPUT 2 RANGE UNITS INDEX
OUTPUT 2 RANGE DECIMAL
GRANT DENY GRANT
GRANT DENY DENY
STATUS OPTIONS
CASCADE INPUT STATUS
CASCADE INPUT VALUE
BACK CALCULATION OUTPUT STATUS
BACK CALCULATION OUTPUT VALUE
INPUT ARRAY[1]
INPUT ARRAY[2]
INPUT ARRAY[3]
INPUT ARRAY[4]
OUTPUT ARRAY[1]
OUTPUT ARRAY[2]
OUTPUT ARRAY[3]
OUTPUT ARRAY[4]
LOCKVAL
BACK CALCULATION INPUT 1 STATUS
BACK CALCULATION INPUT 1 VALUE
BACK CALCULATION INPUT 2 STATUS
BACK CALCULATION INPUT 2 VALUE
BALANCE TIME
HYSTVAL
UPDATE EVENT UNACKNOWLEDGED
UPDATE EVENT UPDATE STATE
UPDATE EVENT TIME STAMP
UPDATE EVENT STATIC REV
UPDATE EVENT RELATIVE INDEX
BLOCK ALARM UNACKNOWLEDGED
BLOCK ALARM ALARM STATE
BLOCK ALARM TIME STAMP
BLOCK ALARM SUBCODE
BLOCK ALARM VALUE

E.6 Analog Input Function Block

Overview

The Analog Input (AI) function block (Figure E-23) processes field device measurements and makes them available to other function blocks. The output value from the AI block is in engineering units and contains a status indicating the quality of the measurement. The measuring device may have several measurements or derived values available in different channels. Use the channel number to define the variable that the AI block processes.

Figure E-23. Analog Input (AI) Function Block



OUT = THE BLOCK OUTPUT VALUE AND STATUS
OUT_D = DISCRETE OUTPUT THAT SIGNALS A SELECTED ALARM CONDITION

The AI block supports alarming, signal scaling, signal filtering, signal status calculation, mode control and simulation. In Automatic mode, the block's output parameter (OUT [8]) reflects the process variable (PV [7]) value and status. In Manual mode, OUT [8] may be set manually. The Manual mode is reflected on the output status. A discrete output (OUT_D [37]) is provided to indicate whether a selected alarm condition is active. Alarm detection is based on the OUT [8] value and user specified alarm limits. Figure E-24 illustrates the internal components of the AI function block and Table E-25 lists the AI block parameters and their units of measure, descriptions and index numbers.

Modes

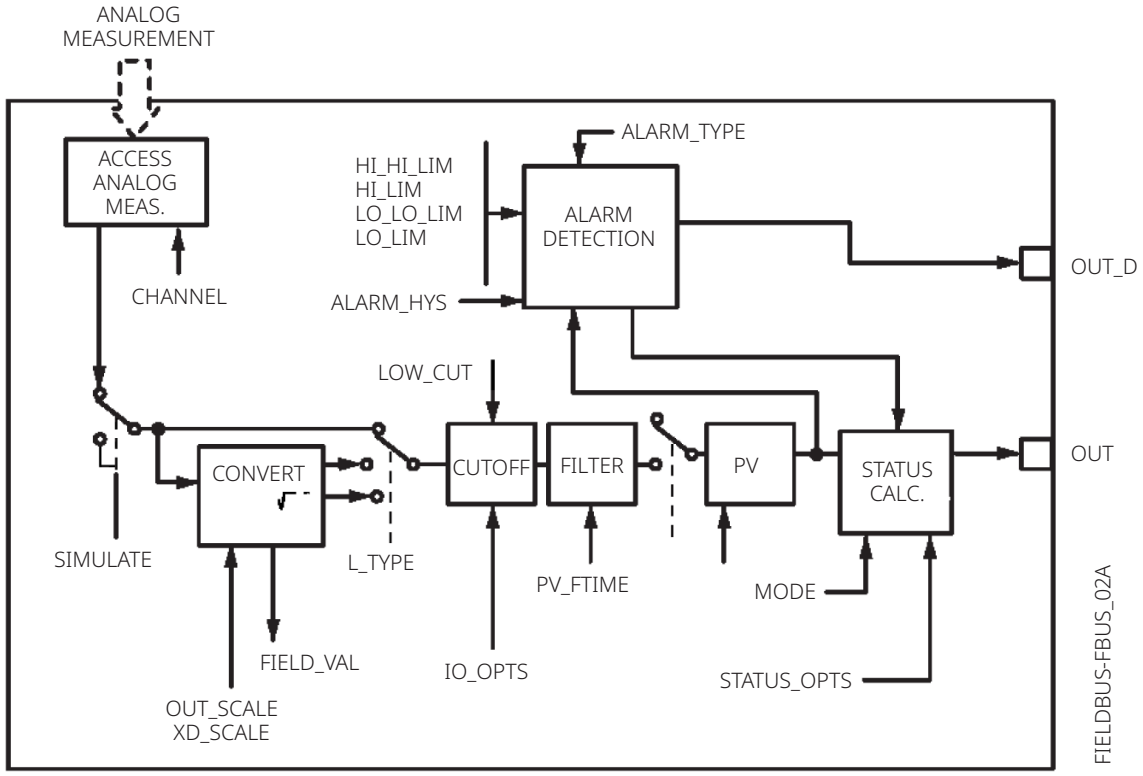
The AI function block supports three modes of operation as defined by the MODE_BLK [5] parameter:

- Manual (Man) The block output (OUT [8]) may be set manually.
- Automatic (Auto) OUT reflects the analog input measurement or the simulated value when simulation is enabled.
- Out of Service (OOS) The block is not processed. FIELD_VAL [19] and PV [7] are not updated and the OUT [8] status is set to Bad: Out of Service. The BLOCK_ERR [6] parameter shows Out of Service. In this mode, you can make changes to all configured parameters. The target mode of a block may be restricted to one or more of the supported modes.

Alarm Detection

A block alarm will be generated whenever the BLOCK_ERR [6] has an error bit set. The types of block errors for the AI block are defined in Table E-23.

Figure E-24. Analog Input Function Block Schematic



NOTES:
OUT = BLOCK OUTPUT VALUE AND STATUS
OUT_D = DISCRETE OUTPUT THAT SIGNALS A SELECTED ALARM CONDITION.

Process Alarm detection is based on the OUT [8] value. You can configure the alarm limits of the following standard alarms:

- High (HI_LIM [28])
- High high (HI_HI_LIM [26])
- Low (LO_LIM [30])
- Low low (LO_LO_LIM [32])

In order to avoid alarm chattering when the variable is oscillating around the alarm limit, an alarm hysteresis in percent of the PV [7] span can be set using the ALARM_HYS [24] parameter. The priority of each alarm is set in the following parameters:

- HI_PRI [27]
- HI_HI_PRI [25]
- LO_PRI [29]
- LO_LO_PRI [31]

Alarms are grouped into five levels of priority, as shown in Table E-21.

Table E-21. AI Function Block Alarm Priorities

Priority Number	Priority Description(1)
0	The priority of an alarm condition changes to 0 after the condition that caused the alarm is corrected.
1	An alarm condition with a priority of 1 is recognized by the system, but is not reported to the operator.
2	An alarm condition with a priority of 2 is reported to the operator, but generally does not require operator attention (such as diagnostics and system alerts).
3 to 7	Alarm conditions of priority 3 to 7 are advisory alarms of increasing priority.
8 to 15	Alarm conditions of priority 8 to 15 are critical alarms of increasing priority.
1. The priority classes “advise” and “critical” have no relationship to Field Diagnostic Alerts.	

Table E-22. Channel Selections for the Analog Input Function Block

Channel	Parameter(1)	Block	Index Number	XD_SCALE Units
2	WORKING_SP	TB	20	% (1342)
3	FINAL_POSITION_VALUE	TB	18	% (1342)
4	WORKING_POS	TB	19	% (1342)
5	SUPPLY_PRESSURE	TB	61	psig (1143), bar (1137), kPa (1133), inHg (1155), inH20 (1146), kg/cm^2 (1145)
6	PRESSURE_A	TB	62	psig (1143), bar (1137), kPa (1133), inHg (1155), inH20 (1146), kg/cm^2 (1145)
7	PRESSURE_B	TB	63	psig (1143), bar (1137), kPa (1133), inHg (1155), inH20 (1146), kg/cm^2 (1145)
8	PRESSURE_DIFF	TB	64	psig (1143), bar (1137), kPa (1133), inHg (1155), inH20 (1146), kg/cm^2 (1145)
9	DRIVE_SIGNAL	TB	78	% (1342)
10	DEVIATION_VALUE	TB	23	% (1342)
11	TEMPERATURE	TB	75	°C (1001), °F (1002)
12	CYCLE_CNTR	TB	39	no units (1588)
13	TRAVEL_ACCUM	TB	29	% (1342)
1. Refer to Table 16 for transducer block parameter descriptions and Table E-2 for AO parameter descriptions.				

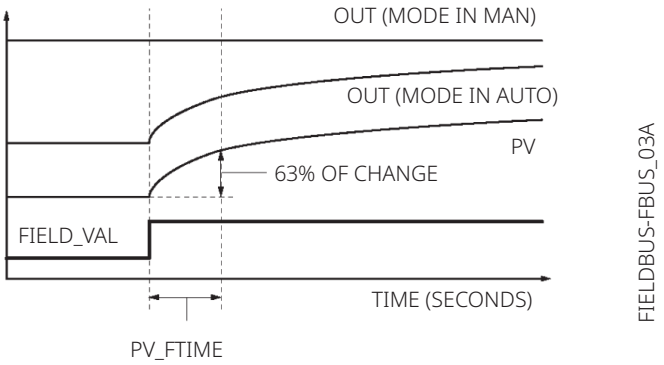
Status Handling

The AI block only gets Good Non-Specified Unlimited or Bad Device Failure for status from the transducer. This is reflected in FIELD_VAL.STATUS [19.1]. PV.STATUS [7.1] is the same as FIELD_VAL.STATUS [19.1]. OUT.STATUS [8.1] can also reflect Bad, Out of Service in addition to PV.STATUS [7.1] values.

In the STATUS_OPTS [14] parameter, you can select from the following options to control the status handling:

Propagate Fail Forward—If the status from the sensor is Bad, Device failure or Bad, Sensor failure, propogate it to OUT without generating an alarm. The use of these sub-status in OUT is determined by this option. Through this option, you may determine whether alarming (sending out an alert) will be done by the block or propagated downstream for alarming.

Figure E-25. Analog Input Function Block Timing Diagram



Uncertain if in Manual mode—The status of the Output is set to Uncertain when the mode is set to Manual.

NOTE

1. The instrument must be in Out of Service mode to set the status option.
2. The AI block only supports the Uncertain if in Manual and Propagate failure. Unsupported options are not grayed out; they appear on the screen in the same manner as supported options.

Filtering

The filtering feature changes the response time of the device to smooth variations in output readings caused by rapid changes in input. You can adjust the filter time constant (in seconds) using the PV_FTIME [18] parameter. Set the filter time constant to zero to disable the filter feature.

Signal Conversion

You can set the signal conversion type with the Linearization Type (L_TYPE [16]) parameter. You can view the converted signal (in percent of XD_SCALE [10]) through the FIELD_VAL [19] parameter.

$$\text{FIELD_VAL} = \frac{100 \text{ X (Channel Value) - EU *@0\%}}{\text{(EU *@100\% - EU *@0\%)}}$$

*XD_SCALE values

You can choose from direct, indirect or indirect square root signal conversion with the L_TYPE [16] parameter.

Direct

Direct signal conversion allows the signal to pass through the accessed channel input value (or the simulated value when simulation is enabled).

PV = Channel Value

Indirect

Indirect signal conversion converts the signal linearly to the accessed channel input value (or the simulated value when simulation is enabled) from its specified range (XD_SCALE [10]) to the range and units of the PV [7] and OUT [8] parameters (OUT_SCALE [11]).

$$PV = \left(\frac{FIELD_VAL}{100}\right) X\ (EU\ **@100\% - EU\ **@0\%) + EU\ **@0\%$$

**OUT_SCALE values

Indirect Square Root

Indirect Square Root signal conversion takes the square root of the value computed with the indirect signal conversion and scales it to the range and units of the PV [7] and OUT [8] parameters.

$$PV = \sqrt{\left(\frac{FIELD_VAL}{100}\right)} X\ (EU\ **@100\% - EU\ **@0\%) + EU\ **@0\%$$

**OUT_SCALE values

When the converted input value is below the limit specified by the LOW_CUT [17] parameter, a value of zero is used for the converted value (PV [7]). This option is useful to eliminate false readings when the differential pressure measurement is close to zero.

NOTE

Invert is the only I/O option supported by the AI block. You can set the I/O option in Out of Service mode only.

Advanced Features

The AI function block provided with the DVC6200f provides added capability through the addition of the following parameters:

ALARM_SEL—Allows one or more of the process alarm conditions detected by the AI function block to be used in setting its OUT_D [37] parameter.

OUT_D—Discrete output of the AI function block based on the detection of process alarm condition(s). This parameter may be linked to other function blocks that require a discrete input based on the detected alarm condition.

STDDEV and CAP_STDDEV—are diagnostic parameters that can be used to determine the variability of the process.

Simulation

To support testing, you can either change the mode of the block to manual and adjust the output value or you can enable simulation through the configuration tool and manually enter a value for the measurement value and its status. To enable simulation, you must first install the Simulate Enable jumper across the instrument AUX terminals (see page 12). Next you must use the configuration tool to enable the parameter SIMULATE [9].

With simulation enabled, the actual measurement value has no impact on the OUT [8] value or the status.

Block Errors

Table E-23 lists conditions reported in the BLOCK_ERR [6] parameter.

Table E-23. AI BLOCK_ERR Conditions

Condition Number	Condition Name and Description
1	Block Configuration Error - the selected channel carries a measurement that is incompatible with the engineering units selected in XD_SCALE, the L_TYPE parameter is not configured or CHANNEL = zero.
3	Simulate Active - Simulation is enabled and the block is using a simulated value in its execution.
7	Input failure/process variable had Bad status - The hardware is bad or a bad status is being simulated
14	Power Up - This condition exists until the AI function block executes for the first time.
15	Out of Service - The actual mode is Out of Service.

Troubleshooting

Refer to Table E-24 to troubleshoot any problem that you encounter.

Table E-24. Troubleshooting

Symptom	Possible Causes	Corrective Action
Mode will not leave OOS	Target mode is not set	Set target mode to something other than OOS
	Configuration error	BLOCK_ERR [6] will show the configuration error bit set. The following are parameters that must be set before the block is allowed out of OOS: • CHANNEL [15] must be set to a valid value and cannot be left at initial value of 0. • XD_SCALE [10]. UNITS_INDEX must match the units in the transducer block channel value. • L_TYPE [16] must be set to Direct, Indirect or Indirect Square Root and cannot be left at an initial value of 0.
	Resource block	The actual mode of the Resource block is OOS. See Resource Block Diagnostics for corrective action.
	Schedule	Block is not scheduled and therefore cannot execute to go to Target Mode. Schedule the block to execute.
Process and/or block alarms will not work	Features	FEATURES_SEL [18] in the resource block does not have Alerts enabled. Enable the Reports Supported bit.
	Notification	LIM_NOTIFY [32] in the resource block is not high enough. Set equal to MAX_NOTIFY [31], also in the resource block.
	Status Options	STATUS_OPTS [14] has Propagate Fault Forward bit set. This should be cleared to cause an alarm to occur.
Value of output does not make sense	Linearization Type	L_TYPE [16] must be set to Direct, Indirect or Indirect Square Root and cannot be left at an initial value of 0.
	Scaling	Scaling parameters are set incorrectly: • XD_SCALE.EU0 and EU100 should match that of the transducer block channel value. • OUT_SCALE.EU0 and EU100 are not set properly.
Cannot set HI_LIMIT [28], HI_HI_LIMIT [26], LO_LIMIT [30] or LO_LO_LIMIT [32] VALUES	Scaling	Limit values are outside the OUT_SCALE.EU0 and OUT_SCALE.EU100 values. Change OUT_SCALE [11] or set values within range.

AI Function Block Parameter List

- Read/Write Capability: RO - Read Only, RW - Read Write
- Mode: The block mode(s) required to write to the parameter

Table E-25. Analog Input Block Parameter Definitions

Label PARAMETER_NAME	Index Number	RO / RW	Write Block Mode	Range	Initial Value	Description
Static Revision ST_REV	1	RO	N/A	0 to 65535	0	Data Type: Unsigned16 The revision level of the static data associated with the function block. The revision value will be incremented each time a static parameter value in the block is changed
Tag Description TAG_DESC	2	- - -	ALL	7 bit ASCII	spaces	Data Type: Octet String The user description of the intended application of the block.
Strategy STRATEGY	3	- - -	ALL	0 to 65535	0	Data Type: Unsigned16 The strategy field can be used to identify grouping of blocks. This data is not checked or processed by the block.
Alert Key ALERT_KEY	4	- - -	ALL	1 to 255	0	Data Type: Unsigned8 The identification number of the plant unit. This information may be used in the host for sorting alarms, etc.
Block Mode MODE_BLK	5	- - -				Data Type: DS-69 Valid Bits: 7: OOS, 4: MAN, 3: AUTO The actual, target, permitted and normal modes of the block. Target: The requested block mode Actual: The current mode of the block Permitted: Allowed modes for Target Normal: Most common mode for Target
TARGET	5.1	RW	ALL	OOS MAN AUTO	OOS until block is configured, then last valid target	
ACTUAL	5.2	RO	ALL	- - -	OOS	
PERMITTED	5.3	RW	ALL	OOS+MAN+AUTO	OOS, MAN, AUTO	
NORMAL	5.4	RW	ALL	- - -	AUTO	
Block Error BLOCK_ERR	6	RO	- - -	1: Block Configuration Error 3: Simulate Active 7: Input Failure/ Bad PV Status 14: Power-up 15: Out-of-Service	- - -	Data Type: Bit String 0=Inactive 1=Active Error status associated with the hardware or software for the AI block.
Process Value PV	7	RO	- - -	PV Status set equal to FIELDV_VAL Status	- - -	Data Type: DS-65 Reflects the scaled value from the configured channel. Units set by OUT_SCALE and L_TYPE.

- continued -

Table E-25. Analog Input Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Write Block Mode	Range	Initial Value	Description
Primary Output OUT	8	- - -	OOS, MAN	OUT_STATE	- - -	Data Type: DS-68 The block output value and status.
Simulate SIMULATE	9	- - -				Data Type: DS-82 A group of data that contains the current transducer value and status, the simulated transducer value and status and the enable/disable bit.
SIMULATE_STATUS	9.1	- - -	ALL	- - -	0	
SIMULATE_VALUE	9.2	- - -	ALL	- - -	0	
TRANSDUCER_ STATUS	9.3	RO	- - -	- - -	0	
TRANSDUCER_ VALUE	9.4	RO	- - -	- - -	0	
ENABLE/DISABLE	9.5	- - -	ALL	0=Not Initialized 1=Simulation Disabled 2=Simulation Active	1=simulate disabled	
Transducer Scale XD_SCALE	10	- - -	OOS	EU at 100% EU at 10% Units Index Decimal Point	100 0 % 2	Data Type: DS-68 Transducer scaling (XD_SCALE) is applied to the value from the channel to produce the FIELD_VAL in percent. The XD_SCALE units code must match the channel units code (if one exists) or the block will remain in OOS mode after being configured.
Output Scale OUT_SCALE	11	- - -	OOS	EU at 100% EU at 10% Units Index Decimal Point	100 0 % 2	Data Type: DS-68 The high and low scale values, engineering units code and number of decimal places to be used in displaying the OUT parameter and parameters which have the same scaling as OUT.
Grant Deny GRANT_DENY	12	- - -	- - -	- - -	- - -	Data Type: DS-70 Options for controlling access of host computer and local control panels to operating, tuning and alarm parameters of the block. GRANT: 0=N/A, 1=granted DENY: 0=N/A, 1=denied
GRANT	12.1	- - -	ALL	Valid Bits 0: Program 1: Tune 2: Alarm 3: Local	All bits: 0	
DENY	12.2	- - -	ALL		All bits: 0	
I/O Options IO_OPTS	13	- - -	OOS	10: Low cutoff	All bits: 0	Data Type: Bit String 0=Disable 1=Enable User options for Output Control.
Status Options STATUS_OPTS	14	- - -	OOS	3: Propagate Failure forward 6: Uncertain if Limited 7: Bad if Limited 8: Uncertain in Man Mode	All bits: 0	Data Type: Bit String 0=Disable 1=Enable User options for Status

- continued -

Table E-25. Analog Input Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Write Block Mode	Range	Initial Value	Description
AI Channel CHANNEL	15	- - -	OOS	See Table E-22	0: Undefined	Data Type: Unsigned16 Used to select the type of threshold that is used to set the output.
Linearization Type L_TYPE	16	- - -	OOS, MAN	0: Uninitialized 1: Direct 2: Indirect 3: Ind. Sqr. Root	0: Uninitialized	Data Type: Enum Linearization type. Determines whether the field value is used directly (Direct), is converted linearly (Indirect) or is converted with the square root (Indirect Square Root). The OUT_SCALE is normally the same as the transducer, but if L_TYPE is set to Indirect or Ind Sqr Root, OUT_SCALE determines the conversion from FIELD_VAL to the output.
Low Cutoff LOW_CUT	17	- - -	ALL	Positive	0	Data Type: Float If calculated output is below this value the output is 0.
Process Value Filter Time PV_FTIME	18	- - -	ALL	Positive	0 seconds	Data Type: Float Time constant of first order filter on PV, in seconds.
Field Value FIELD_VAL	19	RO	- - -	- - -	0	Data Type: DS-65 Value of the field device analog input, with a status reflecting the Transducer condition.
Updated Event UPDATE_EVT	20	- - -				Data Type: DS-73 This alarm is generated whenever a static parameter is changed.
UNACKNOWLEDGED	20.1	RW	N/A	0=Undefined 1=Acknowledged 2=Unacknowledged	0=Undefined	
UPDATE_STATE	20.2	RO	N/A	0=Undefined 1=Update reported 2=Update not reported	0=Undefined	
TIME_STAMP	20.3	RO	N/A	- - -	0	
STATIC_REVISION	20.4	RO	N/A	- - -	0	
RELATIVE_INDEX	20.5	RO	N/A	- - -	0	

- continued -

Table E-25. Analog Input Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Write Block Mode	Range	Initial Value	Description
Block Alarm BLOCK_ALM	21	---				Data Type: DS-72 The block alarm is used for all configuration, hardware, connection failure or system problems in the block. The cause of the alert is entered in the subcode field.
UNACKNOWLEDGED	21.1	RW	---	0=Undefined 1=Acknowledged 2=Unacknowledged	---	
ALARM_STATE	21.2	RO	---	0=Undefined 1=Clear-reported 2=Clear-not reported 3=Active-reported 4=Active-not reported	---	
TIME_STAMP	21.3	RO	---	---	---	
SUBCODE	21.4	RO	---	---	---	
VALUE	21.5	RO	---	---	---	
Alarm Summary ALARM_SUM	22	---				Data Type: DS-74 Current alert status, unacknowledged states, unreported states and disabled states of the alarms associated with the function block. 0=clear 0=acknowledged 0=reported 0=enabled
CURRENT	22.1	RO	ALL	0: Discrete alarm 1: Hi Hi alarm 2: Hi Alarm 3: Lo Lo Alarm 4: Lo Alarm 7: Block alarm	---	
UNACKNOWLEDGED	22.2	RO	ALL		---	
UNREPORTED	22.3	RO	ALL		---	
DISABLED	22.4	RW	ALL		All off	
Acknowledge Option ACK_OPTION	23	---	ALL	0: Discrete alarm 1: Hi Hi alarm 2: Hi Alarm 3: Lo Lo Alarm 4: Lo Alarm 7: Block alarm	All off	Data Type: Bit String 0=Disable 1=Enable Selection of whether alarms associated with the block will be automatically acknowledged.
Alarm Hysteresiss ALARM_HYS	24	---	ALL	0 to 50%	0.50%	Data Type: Float Hysteresis on alarms.
High High Priority HI_HI_PRI	25	---	ALL	0 to 15	0	Data Type: Unsigned8 The priority of the hi hi alarm.
High High Limit HI_HI_LIM	26	---	ALL	OUT_SCALE	Infinity	Data Type: Float Value of analog input which will generate an alarm.
High Priority HI_PRI	27	---	ALL	0 to 15	0	Data Type: Unsigned8 The priority of the high alarm.
Hi Limit HI_LIM	28	---	ALL	OUT_SCALE	Infinity	Data Type: Float Value of analog input which will generate an alarm.
Low Priority LO_PRI	29	---	ALL	0 to 15	0	Data Type: Unsigned8 The priority of the low alarm.
Low Limit LO_LIM	30	---	ALL	OUT_SCALE	-Infinity	Data Type: Float Value of analog input which will generate an alarm.
Low Low Priority LO_LO_PRI	31	---	ALL	0 to 15	0	Data Type: Unsigned8 The priority of the low low alarm.

- continued -

Table E-25. Analog Input Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Write Block Mode	Range	Initial Value	Description
Low Low Limit LO_LO_LIM	32	- - -	ALL	OUT_SCALE	-Infinity	Data Type: Float Value of analog input which will generate an alarm.
High High Alarm HI_HI_ALM	33	- - -				
UNACKNOWLEDGED	33.1	RW	N/A	- - -	0	Data Type: DS-71 The status of the hi hi alarm and its associated time stamp.
ALARM_STATE	33.2	RO		- - -	0	
TIME_STAMP	33.3	RO		- - -	0	
SUBCODE	33.4	RO		- - -	0	
VALUE	33.5	RO		- - -	0	
High Alarm HI_ALM	34	- - -				
UNACKNOWLEDGED	34.1	RW	N/A	- - -	0	Data Type: DS-71 The status of the hi alarm and its associated time stamp.
ALARM_STATE	34.2	RO		- - -	0	
TIME_STAMP	34.3	RO		- - -	0	
SUBCODE	34.4	RO		- - -	0	
VALUE	34.5	RO		- - -	0	
Low Alarm LO_ALM	35	- - -				
UNACKNOWLEDGED	35.1	RW	N/A	- - -	0	Data Type: DS-71 The status of the lo alarm and its associated time stamp.
ALARM_STATE	35.2	RO		- - -	0	
TIME_STAMP	35.3	RO		- - -	0	
SUBCODE	35.4	RO		- - -	0	
VALUE	35.5	RO		- - -	0	
Low Low Alarm LO_LO_ALM	36	- - -				
UNACKNOWLEDGED	36.1	RW	N/A	- - -	0	Data Type: DS-71 The status of the lo lo alarm and its associated time stamp.
ALARM_STATE	36.2	RO		- - -	0	
TIME_STAMP	36.3	RO		- - -	0	
SUBCODE	36.4	RO		- - -	0	
VALUE	36.5	RO		- - -	0	

- continued -

Table E-25. Analog Input Block Parameter Definitions (continued)

LABEL PARAMETER_NAME	INDEX NUMBER	RO / RW	WRITE BLOCK MODE	RANGE	INITIAL VALUE	DESCRIPTION
Extended Parameter						
Output Discrete OUT_D	37		OOS, MAN	OUT_STATE	- - -	Data Type: DS-66 Discrete Output this is true (1) if any of the alarms selected in ALM_SEL are active.
Alarm Select ALM_SEL	38		ALL	1: Hi Hi alarm 2: Hi Alarm 3: Lo Lo Alarm 4: Lo Alarm	All bits: 0	Data Type: Bitstring 0=unselected 1=selected Selected alarms that activate the alarm output.
StdDev STDDEV	39	RO	N/A	Positive float	- - -	Data Type: Float Standard deviation of the measurement.
Cap StdDev CAP_STDDEV	40	RO	N/A	Positive float	- - -	Data Type: Float Capability standard deviation, the best deviation that can be achieved.

View Lists

View lists allow the values of a set of parameters to be accessed at the same time. Views 1 and 2 contain operating parameters and are defined by the Fieldbus Foundation. View 3 contains dynamic parameters and View 4 contains static parameters with configuration and maintenance information. Views 3 and 4 are defined by the manufacturer.

Table E-26. AI Function Block, View Lists

INDEX NUMBER	PARAMETER	VIEW			
		1	2	3	4
1	ST_REV	x	x	x	x
3	STRATEGY				x
4	ALERT_KEY				x
5	MODE_BLK	x		x	
6	BLOCK_ERR	x		x	
7	PV	x		x	
8	OUT	x		x	
10	XD_SCALE		x		
11	OUT_SCALE		x		
12	GRANT_DENY		x		
13	IO_OPTS				x
14	STATUS_OPTS				x
15	CHANNEL				x
16	L_TYPE				x

- continued -

Table E-26. AI Function Block, View Lists (continued)

INDEX NUMBER	PARAMETER	VIEW			
		1	2	3	4
17	LOW_CUT				x
18	PV_FTIME				x
19	FIELD_VAL	x		x	
22	ALARM_SUM	x		x	
23	ACK_OPTION				x
24	ALARM_HYS				x
25	HI_HI_PRI				x
26	HI_HI_LIM				x
27	HI_PRI				x
28	HI_LIM				x
29	LO_PRI				x
30	LO_LIM				x
31	LO_LO_PRI				x
32	LO_LO_LIM				x
37	OUT_D	x		x	
38	ALM_SEL				x
39	STDDEV			x	
40	CAP_STDDEV			x	

Handheld Communicator Menu Structure

ANALOG INPUT FUNCTION BLOCK

QUICK CONFIG

- AI CHANNEL
- LINEARIZATION TYPE
- TRANSDUCER SCALE EU AT 100%
- TRANSDUCER SCALE EU AT 0%
- TRANSDUCER SCALE UNITS INDEX
- TRANSDUCER SCALE DECIMAL
- OUTPUT SCALE EU AT 100%
- OUTPUT SCALE EU AT 0%
- OUTPUT SCALE UNITS INDEX
- OUTPUT SCALE DECIMAL

COMMON CONFIG

- ACKNOWLEDGE OPTION
- ALARM HYSTERESIS
- ALERT KEY
- HIGH HIGH LIMIT
- HIGH HIGH PRIORITY
- HIGH LIMIT
- HIGH PRIORITY
- I/O OPTIONS
- LINEARIZATION TYPE
- LOW LOW LIMIT
- LOW LOW PRIORITY
- LOW LIMIT
- LOW PRIORITY
- BLOCK MODE TARGET
- BLOCK MODE ACTUAL
- BLOCK MODE PERMITTED
- BLOCK MODE NORMAL
- OUTPUT SCALE EU AT 100%
- OUTPUT SCALE EU AT 0%
- OUTPUT SCALE UNITS INDEX
- OUTPUT SCALE DECIMAL
- PROCESS VALUE FILTER TIME

ADVANCED CONFIG

- LOW CUTOFF
- SIMULATE SIMULATE STATUS
- SIMULATE SIMULATE VALUE
- SIMULATE TRANSDUCER STATUS
- SIMULATE TRANSDUCER VALUE
- SIMULATE SIMULATE EN/DISABLE
- STATIC REVISION
- STATUS OPTIONS
- STRATEGY
- TRANSDUCER SCALE EU AT 100%
- TRANSDUCER SCALE EU AT 0%
- TRANSDUCER SCALE UNITS INDEX
- TRANSDUCER SCALE DECIMAL

I/O REFERENCE

- AI CHANNEL

CONNECTORS

- OUTPUT STATUS
- OUTPUT VALUE

ONLINE

- BLOCK ERROR
- FIELD VALUE STATUS
- FIELD VALUE VALUE
- BLOCK MODE TARGET
- BLOCK MODE ACTUAL
- BLOCK MODE PERMITTED
- BLOCK MODE NORMAL
- OUTPUT STATUS
- OUTPUT VALUE
- PROCESS VALUE STATUS
- PROCESS VALUE VALUE

STATUS

- BLOCK ERROR

OTHER

- TAG DESCRIPTION
- GRANT DENY GRANT
- GRANT DENY DENY
- UPDATE EVENT UNACKNOWLEDGED
- UPDATE EVENT UPDATE STATE
- UPDATE EVENT TIME STAMP
- UPDATE EVENT STATIC REV
- UPDATE EVENT RELATIVE INDEX
- BLOCK ALARM UNACKNOWLEDGED
- BLOCK ALARM ALARM STATE
- BLOCK ALARM TIME STAMP
- BLOCK ALARM SUBCODE
- BLOCK ALARM VALUE
- ALARM SUMMARY CURRENT
- ALARM SUMMARY UNACKNOWLEDGED
- ALARM SUMMARY UNREPORTED
- ALARM SUMMARY DISABLED
- HIGH ALARM UNACKNOWLEDGED
- HIGH ALARM ALARM STATE
- HIGH ALARM TIME STAMP
- HIGH ALARM SUBCODE
- HIGH ALARM FLOAT VALUE
- HIGH HIGH ALARM UNACKNOWLEDGED
- HIGH HIGH ALARM ALARM STATE
- HIGH HIGH ALARM TIME STAMP
- HIGH HIGH ALARM SUBCODE
- HIGH HIGH ALARM FLOAT VALUE
- LOW ALARM UNACKNOWLEDGED
- LOW ALARM ALARM STATE
- LOW ALARM TIME STAMP
- LOW ALARM SUBCODE
- LOW ALARM FLOAT VALUE
- LOW LOW ALARM UNACKNOWLEDGED
- LOW LOW ALARM ALARM STATE
- LOW LOW ALARM TIME STAMP
- LOW LOW ALARM SUBCODE
- LOW LOW ALARM FLOAT VALUE
- OUTPUT DISCRETE STATUS
- OUTPUT DISCRETE VALUE
- ALARM SELECT
- STDDEV
- CAP STDDEV

ALL

- CHARACTERISTICS BLOCK TAG
- STATIC REVISION
- TAG DESCRIPTION
- STRATEGY
- ALERT KEY
- BLOCK MODE TARGET
- BLOCK MODE ACTUAL
- BLOCK MODE PERMITTED
- BLOCK MODE NORMAL
- BLOCK ERROR
- PROCESS VALUE STATUS
- PROCESS VALUE VALUE
- OUTPUT STATUS
- OUTPUT VALUE
- SIMULATE SIMULATE STATUS
- SIMULATE SIMULATE VALUE
- SIMULATE TRANSDUCER STATUS
- SIMULATE TRANSDUCER VALUE
- SIMULATE SIMULATE EN/DISABLE
- TRANSDUCER SCALE EU AT 100%
- TRANSDUCER SCALE EU AT 0%
- TRANSDUCER SCALE UNITS INDEX
- TRANSDUCER SCALE DECIMAL
- OUTPUT SCALE EU AT 100%
- OUTPUT SCALE EU AT 0%
- OUTPUT SCALE UNITS INDEX
- OUTPUT SCALE DECIMAL
- GRANT DENY GRANT
- GRANT DENY DENY
- I/O OPTIONS
- STATUS OPTIONS
- AI CHANNEL
- LINEARIZATION TYPE
- LOW CUTOFF
- PROCESS VALUE FILTER TIME
- FIELD VALUE STATUS
- FIELD VALUE VALUE
- UPDATE EVENT UNACKNOWLEDGED
- UPDATE EVENT UPDATE STATE
- UPDATE EVENT TIME STAMP
- UPDATE EVENT STATIC REV
- UPDATE EVENT RELATIVE INDEX
- BLOCK ALARM UNACKNOWLEDGED
- BLOCK ALARM ALARM STATE
- BLOCK ALARM TIME STAMP
- BLOCK ALARM SUBCODE
- BLOCK ALARM VALUE
- ALARM SUMMARY CURRENT
- ALARM SUMMARY UNACKNOWLEDGED
- ALARM SUMMARY UNREPORTED
- ALARM SUMMARY DISABLED
- ACKNOWLEDGE OPTION

ALL (CONTINUED)

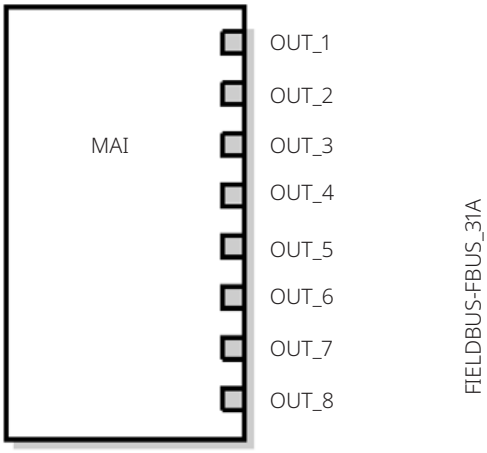
- ALARM HYSTERESIS
- HIGH HIGH PRIORITY
- HIGH HIGH LIMIT
- HIGH PRIORITY
- HIGH LIMIT
- LOW PRIORITY
- LOW LIMIT
- LOW LOW PRIORITY
- LOW LOW LIMIT
- HIGH HIGH ALARM UNACKNOWLEDGED
- HIGH HIGH ALARM ALARM STATE
- HIGH HIGH ALARM TIME STAMP
- HIGH HIGH ALARM SUBCODE
- HIGH HIGH ALARM FLOAT VALUE
- HIGH ALARM UNACKNOWLEDGED
- HIGH ALARM ALARM STATE
- HIGH ALARM TIME STAMP
- HIGH ALARM SUBCODE
- HIGH ALARM FLOAT VALUE
- LOW ALARM UNACKNOWLEDGED
- LOW ALARM ALARM STATE
- LOW ALARM TIME STAMP
- LOW ALARM SUBCODE
- LOW ALARM FLOAT VALUE
- LOW LOW ALARM UNACKNOWLEDGED
- LOW LOW ALARM ALARM STATE
- LOW LOW ALARM TIME STAMP
- LOW LOW ALARM SUBCODE
- LOW LOW ALARM FLOAT VALUE
- OUTPUT DISCRETE STATUS
- OUTPUT DISCRETE VALUE
- ALARM SELECT
- STDDEV
- CAP STDDEV

E.7 Multiple Analog Input Function Block

Overview

The Multiple Analog Input (MAI) function block (Figure E-26) has the ability to process up to eight field device measurements and make them available to other function blocks. The output values from the MAI block are in engineering units and contain a status indicating the quality of the measurement. The measuring device may have several measurements or derived values available in different channels. Use the channel numbers to define the variables that the MAI block processes.

Figure E-26. Multiple Analog Input (MAI) Function Block



OUT1 = THE BLOCK OUTPUT VALUE AND STATUS FOR THE FIRST CHANNEL

The MAI block supports mode control. In Automatic mode, the block's output parameters (OUT_1 to OUT_8 [8 through 15]) reflects the process variable (PV) values and status. In Manual mode, OUT may be set manually. The Manual mode is reflected in the output status. Table E-29 lists the MAI block parameters and their units of measure, description and index numbers.

Modes

The MAI Function Block supports three modes of operation as defined by the MODE_BLK [5] parameter:

- Manual (Man)—The block output (OUT_1 to OUT_8 [8 through 15]) may be set manually.
- Automatic (Auto)—OUT_1 to OUT_8 [8 through 15] reflects the analog input measurement or the simulated value when the simulation is enabled.
- Out of Service (OOS)—The block is not processed. PV is not updated and the OUT status is set to Bad: Out of Service. The BLOCK_ERR [6] parameter shows Out of Service. In this mode, you can make changes to all configurable parameters. The target mode of a block may be restricted to one or more of the supported modes.

Status Handling

In Man mode, the OUT status constant limit is set to indicate that the value is a constant and the OUT status is Good. OUT_X status will be Bad if the transducer detects a problem with sensor associated with the channel.

Application Information

The intended use is for applications where it is necessary to convey DVC6200f measurements from a function.

The configuration of the MAI function block and its associated output channels depends on the specific application.

- CHANNEL [7]: Channel must always be set to 21.

The output parameters (OUT_1 to OUT_8 [8 through 15]) are set through the transducer block Instrument menu. Each output has a channel assigned to it in MAI Channel Map (TB.MAI_CHANNEL_MAP [95]) in the transducer block. For additional information, refer to Table E-29.

Block Errors

Table E-27 lists conditions reported in the BLOCK_ERR [6] parameter.

Table E-27. MAI BLOCK_ERR Conditions

Condition Number	Condition Name and Description
1	Block Configuration Error: the selected channel carries a measurement that is incompatible with the engineering units selected in XD_SCALE, the L_TYPE parameter is not configured or WRITE_CHECK = 0.
7	Input failure/process variable had Bad status - The hardware is bad or a bad status is being simulated.
14	Power Up - This condition exists after power up until the MAI function executes for the first time.
15	Out of Service - The actual mode is Out of Service.

Troubleshooting

Refer to Table E-28 to troubleshoot any problem that you encounter.

Table E-28. Troubleshooting

Symptom	Possible Causes	Corrective Action
Mode will not leave OOS	Target mode is not set	Set target mode to something other than OOS.
	Resource block	The actual mode of the Resource block is OOS. See Resource Block Diagnostics for corrective action.
	Schedule	Block is not scheduled and therefore cannot execute to go to Target Mode. Typically, BLOCK_ERR [6] will show “Power-Up” for all blocks that are not scheduled. Schedule the block to execute.
Block alarms will not work	Features	FEATURES_SEL [18] in the resource block does not have Alerts enabled. Enable the Alerts bit.
	Notification	LIM_NOTIFY [32] in the resource block is not high enough. Set equal to MAX_NOTIFY [31], also in the resource block.

MAI Function Block Parameter List

- Read/Write Capability: RO - Read Only, RW - Read Write
- Mode: The block mode(s) required to write to the parameter

Table E-29. MAI Function Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Mode	Range	Initial Value	Description
Static Revision ST_REV	1	RO	N/A	0 to 65535	0	Data Type: Unsigned16 The revision level of the static data associated with the input selector block. The revision value will be incremented each time a static parameter value in the block is changed.
Tag Description TAG_DESC	2	- - -	- - -	7 bit ASCII	spaces	Data Type: Octet String The user description of the intended application of the block.
Strategy STRATEGY	3	- - -	- - -	0 to 65535	0	Data Type: Unsigned16 The strategy field can be used to identify grouping of blocks. This data is not checked or processed by the block.
Alert Key ALERT_KEY	4	- - -	- - -	1 to 255	0	Data Type: Unsigned8 The identification number of the plant unit. This information may be used in the host for sorting alarms, etc.
Block Mode MODE_BLK	5	- - -				Data Type: DS-69 The actual, target, permitted and normal modes of the block. Target: The requested block mode Actual: The current mode of the block Permitted: Allowed modes for Target Normal: Most common mode for Target
TARGET	5.1	RW	ALL	OOS, MAN, AUTO	OOS	
ACTUAL	5.2	RO	ALL		OOS	
PERMITTED	5.3	RW	ALL	OOS+MAN+AUTO	OOS, MAN, AUTO	
NORMAL	5.4	RW	ALL	AUTO	AUTO	
Block Error BLOCK_ERR	6	RO		1: Block Configuration Error 7: Input Failure/ Bad PV Status 14: Power-up 15: Out-of-Service	- - -	Data Type: Bit String 0 = Inactive 1 = Active This parameter reflects the error status associated with the hardware or software components associated with a block. It is a bit string, so that multiple errors may be shown.

- continued -

Table E-29. MAI Function Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Mode	Range	Initial Value	Description
MAI Channel CHANNEL	7	- - -	- - -	21 only	21 = MAI Values	This variable must be set to 21. Channel assignments to the 8 outputs is done through MAI_CHANNEL_MAP parameter in transducer block. 1=FINAL_VALUE 2=TRAVEL_TARGET 3=FINAL_POSITION_VALUE 4=TRAVEL 5=SUPPLY_PRESS 6=ACT_PRESS_A 7=ACT_PRESS_B 8=ACT_PRESS_DIFF 9=DRIVE_SIGNAL 10=TRAVEL_DEVIATION 11=TEMPERATURE 12=CYCLE_COUNT 13=TRAVEL_ACCUM
Output 1 OUT_1	8	- - -	OOS MAN	Channel assigned by TB.MAI_CHANNEL_MAP	TB.DRIVE_SIGNAL	Data Type: DS-65 The block output value and status.
Output 2 OUT_2	9	- - -	OOS MAN	Channel assigned by TB.MAI_CHANNEL_MAP	TB.DEVIATION_VALUE	Data Type: DS-65 The block output value and status.
Output 3 OUT_3	10	- - -	OOS MAN	Channel assigned by TB.MAI_CHANNEL_MAP	TB.TEMPERATURE	Data Type: DS-65 The block output value and status.
Output 4 OUT_4	11	- - -	OOS MAN	Channel assigned by TB.MAI_CHANNEL_MAP	TB.CYCLE_CNTR	Data Type: DS-65 The block output value and status.
Output 5 OUT_5	12	- - -	OOS MAN	Channel assigned by TB.MAI_CHANNEL_MAP	TB.TRAVEL_ACCUM	Data Type: DS-65 The block output value and status.
Output 6 OUT_6	13	- - -	OOS MAN	Channel assigned by TB.MAI_CHANNEL_MAP	TB.ACT_PRESSURE_A	Data Type: DS-65 The block output value and status.
Output 7 OUT_7	14	- - -	OOS MAN	Channel assigned by TB.MAI_CHANNEL_MAP	TB.ACT_PRESSURE_B	Data Type: DS-65 The block output value and status.
Output 8 OUT_8	15	- - -	OOS MAN	Channel assigned by TB.MAI_CHANNEL_MAP	TB.ACT_PRESSURE_DIFF	Data Type: DS-65 The block output value and status.
Update Event UPDATE_EVT	16	- - -				Data Type: DS-73 This alarm is generated whenever a static parameter is changed.
UNACKNOWLEDGED	16.1	RW	N/A	0=Undefined 1=Acknowledged 2=Unacknowledged	0=Undefined	
UPDATE_STATE	16.2	RO	N/A	0=Undefined 1=Update reported 2=Updated not reported	0=Undefined	
TIME_STAMP	16.3	RO	N/A	- - -	0	
STATIC_REVISION	16.4	RO	N/A	- - -	0	
RELATIVE_INDEX	16.5	RO	N/A	- - -	0	

- continued -

Table E-29. MAI Function Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Mode	Range	Initial Value	Description
Block Alarm BLOCK_ALM	17	---				Data Type: DS-72 The block alarm is used for all configuration, hardware, connection failure or system problems in the block. The cause of the alert is entered in the subcode field.
UNACKNOWLEDGED	17.1	RW	---	0=Undefined 1=Acknowledged 2=Unacknowledged	---	
ALARM_STATE	17.2	RO	---	0=Undefined 1=Clear-reported 2=Clear-not reported 3=Active-reported 4=Active-not reported	---	
TIME_STAMP	17.3	RO	---	---	---	
SUBCODE	17.4	RO	---	---	---	
VALUE	17.5	RO	---	---	---	

View Lists

View lists allow the values of a set of parameters to be accessed at the same time. Views 1 and 2 contain operating parameters and are defined by the Fieldbus Foundation. View 3 contains dynamic parameters and View 4 contains static parameters with configuration and maintenance information. Views 3 and 4 are defined by the manufacturer.

Table E-30. MAI Function Block, View Lists

INDEX NUMBER	PARAMETER	VIEW			
		1	2	3	4
1	ST_REV	x	x	x	x
3	STRATEGY				x
4	ALERT_KEY				x
5	MODE_BLK	x		x	
6	BLOCK_ERR	x		x	
7	CHANNEL				x
8	OUT_1	x		x	
9	OUT_2	x		x	
10	OUT_3	x		x	
11	OUT_4	x		x	
12	OUT_5	x		x	
13	OUT_6	x		x	
14	OUT_7	x		x	
15	OUT_8	x		x	

Handheld Communicator Menu Structure

MULTIPLE ANALOG INPUT FUNCTION BLOCK

QUICK CONFIG

- ALERT KEY

COMMON CONFIG

- ALERT KEY
- BLOCK MODE TARGET
- BLOCK MODE ACTUAL
- BLOCK MODE PERMITTED
- BLOCK MODE NORMAL

ADVANCED CONFIG

- STATIC REVISION
- STRATEGY

I/O REFERENCE

- MAI CHANNEL

CONNECTORS

- OUTPUT 1 STATUS
- OUTPUT 1 VALUE
- OUTPUT 2 STATUS
- OUTPUT 2 VALUE
- OUTPUT 3 STATUS
- OUTPUT 3 VALUE
- OUTPUT 4 STATUS
- OUTPUT 4 VALUE
- OUTPUT 5 STATUS
- OUTPUT 5 VALUE
- OUTPUT 6 STATUS
- OUTPUT 6 VALUE
- OUTPUT 7 STATUS
- OUTPUT 7 VALUE
- OUTPUT 8 STATUS
- OUTPUT 8 VALUE

ONLINE

- BLOCK ERROR
- BLOCK MODE TARGET
- BLOCK MODE ACTUAL
- BLOCK MODE PERMITTED
- BLOCK MODE NORMAL
- OUTPUT 1 STATUS
- OUTPUT 1 VALUE
- OUTPUT 2 STATUS
- OUTPUT 2 VALUE
- OUTPUT 3 STATUS
- OUTPUT 3 VALUE
- OUTPUT 4 STATUS
- OUTPUT 4 VALUE
- OUTPUT 5 STATUS
- OUTPUT 5 VALUE
- OUTPUT 6 STATUS
- OUTPUT 6 VALUE
- OUTPUT 7 STATUS
- OUTPUT 7 VALUE
- OUTPUT 8 STATUS
- OUTPUT 8 VALUE

STATUS

- BLOCK ERROR

OTHER

- TAG DESCRIPTION
- UPDATE EVENT UNACKNOWLEDGED
- UPDATE EVENT UPDATE STATE
- UPDATE EVENT TIME STAMP
- UPDATE EVENT STATIC REV
- UPDATE EVENT RELATIVE INDEX
- BLOCK ALARM UNACKNOWLEDGED
- BLOCK ALARM ALARM STATE
- BLOCK ALARM TIME STAMP
- BLOCK ALARM SUBCODE
- BLOCK ALARM VALUE

ALL

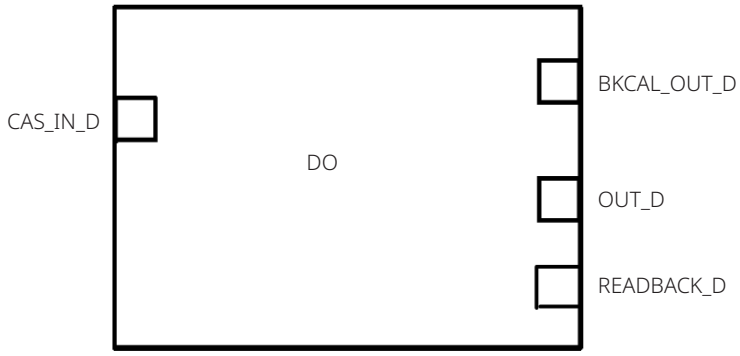
- CHARACTERISTICS BLOCK TAG
- STATIC REVISION
- TAG DESCRIPTION
- STRATEGY
- ALERT KEY
- BLOCK MODE TARGET
- BLOCK MODE ACTUAL
- BLOCK MODE PERMITTED
- BLOCK MODE NORMAL
- BLOCK ERROR
- MAI CHANNEL
- OUTPUT 1 STATUS
- OUTPUT 1 VALUE
- OUTPUT 2 STATUS
- OUTPUT 2 VALUE
- OUTPUT 3 STATUS
- OUTPUT 3 VALUE
- OUTPUT 4 STATUS
- OUTPUT 4 VALUE
- OUTPUT 5 STATUS
- OUTPUT 5 VALUE
- OUTPUT 6 STATUS
- OUTPUT 6 VALUE
- OUTPUT 7 STATUS
- OUTPUT 7 VALUE
- OUTPUT 8 STATUS
- OUTPUT 8 VALUE
- UPDATE EVENT UNACKNOWLEDGED
- UPDATE EVENT UPDATE STATE
- UPDATE EVENT TIME STAMP
- UPDATE EVENT STATIC REV
- UPDATE EVENT RELATIVE INDEX
- BLOCK ALARM UNACKNOWLEDGED
- BLOCK ALARM ALARM STATE
- BLOCK ALARM TIME STAMP
- BLOCK ALARM SUBCODE
- BLOCK ALARM VALUE

E.8 Discrete Output Function Block

Overview

The Discrete Output (DO) function block (Figure E-27) processes a discrete set point and outputs it to the specified I/O channel to produce an output signal. The DVC6200f digital valve controller discrete output block provides both normal open/closed control and the ability to position the valve in 5% increments for coarse throttling applications. The digital valve controller measures and uses actual valve position for READBACK_D [16].

Figure E-27. Discrete Output (DO) Function Block



CAS_IN_D = THE REMOTE SET POINT VALUE FROM ANOTHER FUNCTION BLOCK.
BKCAL_OUT_D = THE VALUE AND STATUS REQUIRED BY THE BKCAL IN D INPUT OF ANOTHER BLOCK FOR OUTPUT TRACKING.
OUT_D = THE BLOCK OUTPUT AND STATUS.
READBACK_D = ACTUAL VALVE POSITION

The DO block supports mode control and simulation. In operation, the DO function block determines its set point and sets the output. The transducer block provides a readback signal of actual position from the instrument. Figure E-27 illustrates the primary inputs and outputs of the DO function block, Figure E-28 illustrates the internal components of the DO function block. Table E-34 lists definitions for the function block parameters.

When setting up the DO block, CHANNEL [18] must be set to 22 and SHED_OPT [23] must be non-zero.

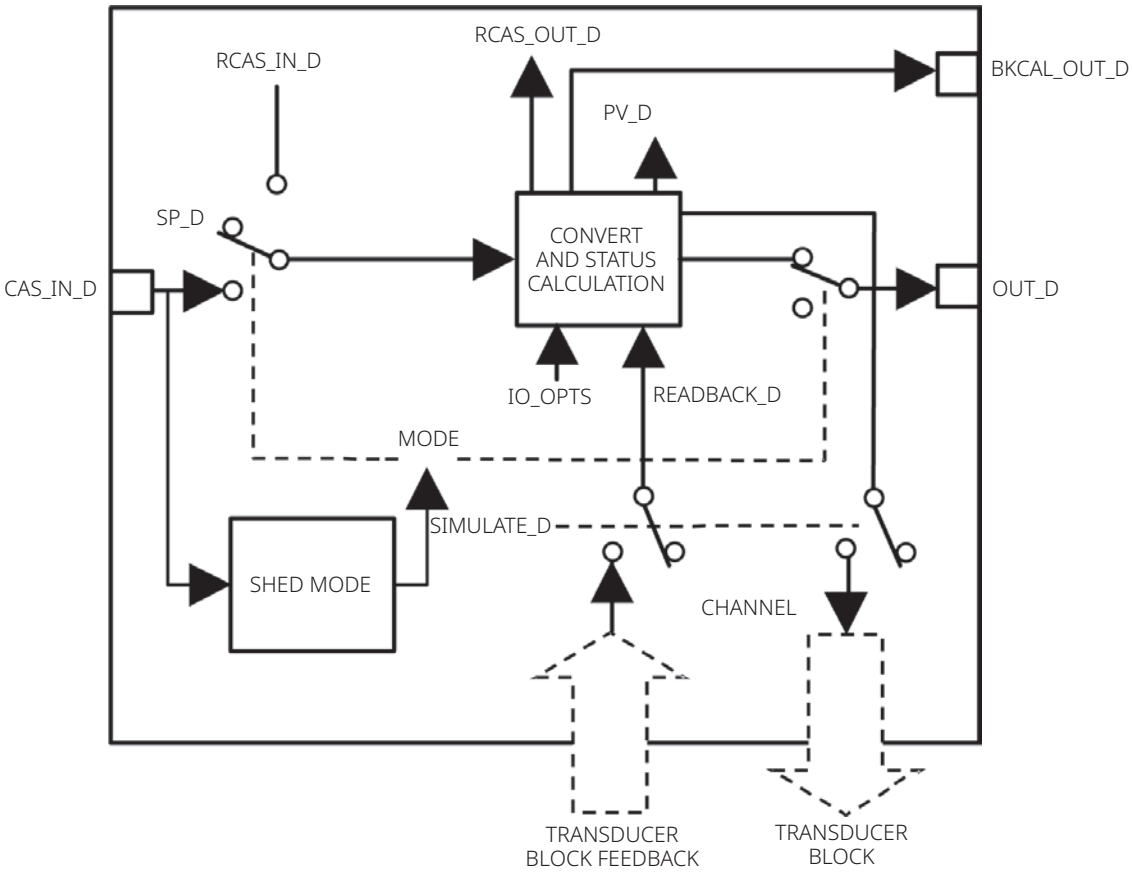
NOTE

Actual Block Mode (MODE_BLK.ACTUAL [5.2]) will remain out of service and the block cannot be scheduled if the block has not been licensed. Contact your Emerson sales office to upgrade product licensing.

NOTE

Actual Block Mode (MODE_BLK.ACTUAL [5.2]) will remain in IMAN and the block Readback status will be Bad - Not Connected if the Output Block Selection is set incorrectly. From the transducer block method Outblock Selection, select the desired output block, see page 61.

Figure E-28. Discrete Output Function Block Schematic



Modes

The DO block supports the following modes:

- Manual (Man)—The block output OUT_D [9] value may be entered manually.
- Automatic (Auto)—The block algorithm uses the local set point SP_D [8] value to determine OUT_D [9].
- Cascade (Cas)—The block uses a set point supplied by another function block.

NOTE

The transducer block must be in Auto for the mode to go to AUTO, CAS or MAN.

- RemoteCascade (RCas)—The block uses a set point supplied by a host computer.
- Out of Service (OOS)—The block is not processed and the output is not transferred to I/O. The BLOCK_ERR [6] attribute shows Out of service.

Mode Handling

Shed Options — RCAS Mode Only

Shed from or climb to a remote mode is determined by the parameter SHED_OPT [23]. A block climbs and sheds through the same path. For example, if SHED_OPT [23] specifies that a block should shed to Auto, then, if the block target mode is set to RCas, the block goes through Auto on the way to RCas. You can configure the shed option as follows:

Shed With Return Options

Remote cascade connection failure shifts actual mode but keeps trying to restore remote cascade (in other words, the remote cascade target mode stays in effect).

Normal—On failure of a remote cascade connection, the block attempts to attain the highest permitted non-remote mode until remote cascade is restored. Cas is the highest permitted non-remote mode and Auto is is the next permitted non-remote mode. If Cas or Auto are not available, the block will shed by default to Man.

Retained Target—The retained target mode is the target mode for the block before changing the target mode to a remote mode. On failure of a remote cascade connection, the block attempts to attain the retained target mode.

Auto—On failure of a remote cascade connection, the block attempts to attain Auto, if permitted, until remote cascade is restored.

Man—On failure of a remote cascade connection, the block sheds to Man until a remote cascade connection is restored.

Shed With No Return Options

For any shed with no return option, the target mode changes as determined by the option. Therefore, there is no attempt to restore the connection following failure. The behavior on change to the remote cascade target mode is identical to that for Shed With Return Options.

Normal—On failure of a remote cascade connection, the block sets the target mode to the highest permitted non-remote mode. Cas is the highest permitted non-remote mode and Auto is is the next highest permitted non-remote mode. If Cas or Auto are not available, the block will shed by default to Man.

Retained Target—The retained target mode is the target mode for the block before changing the target mode to a remote mode. On failure of a remote cascade connection, the block sets the target mode to the retained target mode.

Auto—On failure of a remote cascade connection, the block sets the target mode to Auto, if permitted.

Man—On failure of remote cascade connection, the block sets the target mode to Man, if permitted.

The user may configure SHED_OPT [23] so that it calls for a target mode that is not permitted. When doing this, the mode logic uses the following rules as applied by the remote logic:

- Shed logic never results in a non-permitted target mode.
- Shed logic never attempts to attain an actual mode of Auto or Cas if that mode is not permitted.

Block Initialization

The Fieldbus Foundation specification requires that certain parameters have initial values of uninitialized in function blocks. In addition to setting the Resource block mode to AUTO, the control system or the user must change those parameters from their uninitialized value to a valid value in order for the function block to move from the Out of Service mode. For the DO function block, the parameters that must be initialized are:

SHED_OPT [23] (see page 328 for valid values)

CHANNEL [18]

Status Handling

Under normal operating conditions, the status of OUT_D [9] is Good Non-Cascade and the status of BKCAL_OUT_D [21] is Good:Cascade. If the output hardware fails, the status of BKCAL_OUT_D [21] is set to Bad:Device Fail and the BLOCK_ERR [6] shows Output Failure. If the hardware used for output feedback fails, the status of READBACK_D [16] and PV_D [7] is set to Bad:DeviceFail and the BLOCK_ERR [6] shows Process Variable has Bad Status. If the transducer block mode is Out of Service, the status of READBACK_D [16] and PV_D [7] is set to Bad: Out of Service.

I/O Selection

To select the I/O associated with the discrete output, configure the value of the CHANNEL [18] parameter. Table E-31 lists the valid Channel selections for the DO block.

Table E-31. Channel Selections for the Discrete Output Function Block

Selection	Transducer Block Parameter	Transducer Block Index	Description
22	SETPOINT_D	32	Discrete Valve Control
0	- - -	- - -	Uninitialized

Setting the Output

To set the output for the DO block, you must first set the mode to define the manner in which the block determines its set point and output. In Cascade mode, the set point equals the input value at the CAS_IN_D [17] parameter. In Automatic or Manual mode, the set point must be entered manually by the user. For Automatic, the value must be written to the SP_D [8] parameter and for Manual, the value must be written to OUT_D [9]. In Remote Cascade mode, the set point is determined by a host computer that is writing to the RCAS_IN_D [22] parameter. Table E-32 lists discrete states used by the digital valve controller for the set point.

To further customize the output, configure the following supported I/O options: SP tracks PV in Man, SP tracks PV in LO, SP Track retained target in Man or LO, Fault State to Value, Use Fault State value on restart, Target to Man if Fault State activated and US PV for BKCAL_OUT.

NOTE

You can configure the supported I/O options in Out of Service mode only.

Table E-32. Valve Set Point for Discrete State

Discrete State	Valve Set Point with IO_OPTS Invert = 0	Valve Set Point with IO_OPTS Invert = 1
0	Closed	Open
1	Open	Closed
5	5%	Closed
10	10%	Closed
15	15%	Closed
20	20%	Closed
25	25%	Closed
30	30%	Closed
35	35%	Closed
40	40%	Closed
45	45%	Closed
50	50%	Closed
55	55%	Closed
60	60%	Closed
65	65%	Closed
70	70%	Closed
75	75%	Closed
80	80%	Closed
85	85%	Closed
90	90%	Closed
95	95%	Closed
100	Open	Closed

The SP_PV Track in Man option permits the set point to track the process variable when the block is in Manual mode. With this option enabled, the set point (SP_D [8]) becomes a copy of the process variable (PV_D [7]) and a manually-entered SP_D [8] value is overwritten on the block's next execution cycle. This option can prevent a state change when transitioning from Manual to Automatic mode. You can disable this option in Manual or Out of Service mode only.

The Invert option inverts the set point at SP_D [8] before it is stored in OUT_D [9]. With this option enabled, OUT_D [9] becomes an inverted copy of SP_D [8] where non-zero values of SP_D [8] are considered a logic 1. With this option disabled, OUT_D [9] is a direct copy of SP_D [8]. The readback value is processed through the Invert option to become PV_D [7]. The Use PV for BKCAL_OUT option specifies that BKCAL _OUT equal the value of the process variable (PV_D [7]) instead of the set point (SP_D [8]). If you do not enable this option, BKCAL_OUT will equal SP_D [8].

Output Block PV Status

The Output Block PV Status is determined by the value of the Field Diagnostic Alerts Set PV Status parameter in the transducer block (FD_OPTIONS [96]), the Transducer Block mode and enabled Active Field Diagnostic alarms. Refer to Table 11.

Block Errors

Table E-33 lists conditions reported in the BLOCK_ERR [6] parameter.

Table E-33. DO BLOCK_ERR Conditions

Condition Number	Condition Name and Description
1	Block Configuration Error - SHED_OPT or CHANNEL set to 0 (uninitialized)
3	Simulate active - Simulation is enabled and the block is using a simulated value in its execution.
4	Local Override - Device in fault state. Actual mode LO.
5	Device Fault State Set - DO block in fault state after FSTATE_TIME because of Bad status or IFS substatus on CAS_IN_D or Resource block commanded fault state.
6	Device Needs Maintenance Soon - Indicates a Maintenance Field Diagnostic Alert condition is active if Block Error Reporting is enabled. See page 75.
7	Input failure/process variable has Bad status - PV has bad status and Feature Select in the Resource block has the Out Readback bit set or the transducer block mode is Out of Service.
8	Output failure - PV has bad status or the transducer block mode is Out of Service.
13	Device Needs Maintenance Now - Indicates Failed Field Diagnostic Alert condition is active if Block Error Reporting is enabled. See page 75.
14	Power Up - This condition exists after power up until actual mode is not Out of Service.
15	Out of Service - The block is in Out of Service (OOS) mode.

Action on Fault Detection

Fault State is caused by one of three sources: A status pertaining to CAS, A status pertaining to RCAS or SET_FSTATE [29] in the resource block. To implement Fault State, configure the following parameters:

IO_OPTS [14]: Determines the action OUT_D [9] will take upon a fault state. If the IO_OPTS [14] “Fault State to Value” is not selected, then OUT_D [9] holds its last position when Fault State is set. If “Fault State to Value” is selected, OUT_D [9] goes to the FSTATE_VAL_D [20] value when Fault State is set.

FSTATE_TIME [19]: The length of time, in seconds, that the DO block will wait to set Fault State. When Fault State is set, the OUT_D [9] value goes to either the FSTATE_VAL_D [20] value or holds its last position, depending on I/O_OPTS [14]. When the block has a target mode of CAS, a fault condition will be detected if the CAS_IN_D [17] has a BAD status or an Initiate Fault State substatus is received from the upstream block.

FSTATE_VAL_D [20]: Determines the OUT_D [9] value if IO_OPTS [14] “Fault State to Value” is selected. The OUT_D [9] value transitions to FSTATE_VAL_D [20] after FSTATE_TIME [19] elapses and the fault condition has not cleared.

Simulation

To support testing of the control strategy, you can enable the SIMULATE_D [17] parameter. Normally, the valve position value and status used for READBACK_D [16] in the DO block reflect actual process values to the nearest 5%, as provided by the transducer block. When the SIMULATE_D [17] parameter is enabled, value and status used for READBACK_D [16] is supplied by the user manually. To enable simulation in the DO function block, the simulate jumper must be installed. Refer to page 12 of the Installation section for information on the installation of this jumper.

NOTE

When simulate is active, the output block no longer writes values to the transducer block. If the Output Blk Timeout period is exceeded, the transducer block may move the valve to the Zero Power Condition depending on the configuration of the Output Block Timeout Alert.

The SIMULATE_D [10] parameter has three components:

- Simulate Enable_Disable determines whether the function block will use the actual valve position value and status or Simulate Value and Simulate Status.
- Transducer Value and Status reflect the process values provided by the transducer block.
- Simulate Value and Status may be entered by the user when Simulate Enable_Disable is set to Enabled.

To use simulate, first install the simulate jumper in the terminal box, then set Simulate Enable_Disable to Enabled, then enter the desired values for Simulate Value and Status.

When SIMULATE_D [10] is Enabled, the Simulate Active bit of the BLOCK_ERR [6] parameter is set (refer to the Block Errors description). When the simulate jumper is installed, the Simulate Jumper bit of the transducer block parameter SELFTEST_STATUS [78] is set.

DO Function Block Parameter List

- Read/Write Capability: RO - Read Only, RW - Read Write
- Mode: The block mode(s) required to write to the parameter

Table E-34. Discrete Output Function Block Parameter Definitions

Label PARAMETER_NAME	Index Number	RO / RW	Mode	Range	Initial Value	Description
Static Revision ST_REV	1	RO	N/A	0 to 65535	0	Data Type: Unsigned16 The revision level of the static data associated with the function block. The revision value will be incremented each time a static parameter value in the block is changed.
Tag Description TAG_DESC	2	RW	ALL	7 bit ASCII	spaces	Data Type: Octet String The user description of the intended application of the block.

- continued -

Table E-34. Discrete Output Function Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Mode	Range	Initial Value	Description
Strategy STRATEGY	3	RW	ALL	0 to 65535	0	Data Type: Unsigned16 The strategy field can be used to identify grouping of blocks. This data is not checked or processed by the block.
Alert Key ALERT_KEY	4	RW	ALL	1 to 255	0	Data Type: Unsigned8 The identification number of the plant unit. This information may be used in the host for sorting alarms, etc.
Block Mode MODE_BLK	5	- - -				Data Type: DS-69 Valid Bits: 7: OOS, 5: LO, 4: MAN, 3: AUTO 2: CAS, 1: RCAS The actual, target, permitted and normal modes of the block. Target: The requested block mode Actual: The current mode of the block Permitted: Allowed modes for Target Normal: Most common mode for Target
TARGET	5.1	RW	ALL	OOS MAN AUTO AUTO-CAS, AUTO-RCAS	OOS until block is configured, then last valid target	
ACTUAL	5.2	RO	ALL	- - -	OOS	
PERMITTED	5.3	RW	ALL	OOS+MAN+AUTO+CAS+RCAS	OOS+MAN+AUTO+CAS +RCAS	
NORMAL	5.4	RW	ALL	- - -	AUTO+CAS	
Block Error BLOCK_ERR	6	RO	N/A	1: Block Configuration Error 3: Simulate Active 4: Local Override 5: Device Fault State Set 7: Input Failure / Bad PV Status 8: Output Failure 14: Power-up 15: Out-of-Service	Dynamic	Data Type: Bit String 0=Inactive 1=Active This parameter reflects the error status associated with the hardware or software components associated with a block. It is a bit string, so that multiple errors may be shown.
Process Value Discrete PV_D	7	RO	N/A	PV_D Status set equal to Readback_D Status	Dynamic	Data Type: DS-66 The discrete process variable calculated from READBACK_D.
Setpoint Discrete SP_D	8	- - -	OOS MAN AUTO	PV_STATE	- - -	Data Type: DS-66 The discrete target block output value (set point).
Output Discrete OUT_D	9	- - -	MAN	OUT_STATE	- - -	Data Type: DS-66 Position target of valve. 0=closed, 1=open, 2-100 position the value in 5% steps.
Simulate Discrete SIMULATE_D	10	- - -				Data Type: DS-83 Allows the transducer discrete input or output to the block to be manually supplied when simulate is enabled. When simulation is disabled, the simulate value and status track the actual value and status.
SIMULATE_STATUS	10.1	- - -	ALL	- - -	Bad Not Specific Not Limited	
SIMULATE_VALUE	10.2	- - -	ALL	- - -	0	

- continued -

Table E-34. Discrete Output Function Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Mode	Range	Initial Value	Description
TRANSDUCER_ STATUS	10.3	RO	- - -	- - -	Bad Not Specific Not Limited	Data Type: DS-83 Allows the transducer discrete input or output to the block to be manually supplied when simulate is enabled. When simulation is disabled, the simulate value and status track the actual value and status.
TRANSDUCER_ VALUE	10.4	RO	- - -	- - -	0	
ENABLE/DISABLE	10.5	- - -	ALL	0=Not initialized 1=Simulation Disabled 2=Simulation Active	1	
Process Value State PV_STATE	11	- - -	ALL	- - -	0	Data Type: Uint16 Index to the text describing the states of a discrete output.
Transducer State XD_STATE	12	- - -	ALL	- - -	0	Data Type: Uint16 Index to the text describing the states of a discrete for the value obtained from the transducer.
Grant Deny GRANT_DENY	13	- - -				Data Type: DS-70 Options for controlling access of host computers and local control panels to operating, tuning and alarm parameters of the block. GRANT:0=N/A, 1=granted DENY: 0=N/A, 1=denied
GRANT	13.1	- - -	N/A	0: Program 1: Tune 2: Alarm 3: Local	All bits: 0	
DENY	13.2	- - -	N/A		All bits: 0	
I/O Options IO_OPTS	14	- - -	OOS	Valid Bits 0: Invert 1: SP tracks PV in Man 3: SP tracks PV in LO 4: SP Track retained target in Man or LO 6: Fault State to value 0: freeze 1: go to Fault State value 7: Use Fault State value on restart 8: Target to Man if Fault State activated 9: Use PV for BKCAL_OUT 0: SP 1: PV	All bits: 0	Data Type: Bit String 0=Disable 1=Enable Allows you to select the type of tracking and the output value when a fault condition occurs. Supported I/O options for the DO function block are SP Tracks PV in Man, SP Tracks PV in LO, SP Tracks Retained Target in Man or LO, Fault State to Value, Use Fault state on Restart, Target to Man if Fault State Activated and Use PV for BKCAL_OUT.
Status Options STATUS_OPTS	15	- - -	OOS	4: Propagate Failure Backward	All bits: 0	Data Type: Bit String 0=Disable 1=Enable Options the user may select for the block processing of status.
Readback Discrete READBACK_D	16	RO	N/A	- - -	Dynamic	Data Type: DS-66 0=closed, 1=open, 5, 10, 15, 30...etc. are position in 5% increments.

- continued -

Table E-34. Discrete Output Function Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Mode	Range	Initial Value	Description
Cascade Input Discrete CAS_IN_D	17	- - -	ALL	Status	Bad Non Specific Not Limited	Data Type: DS-66 The remote set point value from another block.
				Value	0	
DO Channel CHANNEL	18	- - -	OOS	0=undefined 22= Working Setpoint (D)	22=Working Setpoint (D)	Data Type: Unsigned16 Defines which transducer parameter receives the DO output. Select Setpoint (D) to control valve position.
Fault State Time FSTATE_TIME	19	- - -	ALL	Positive	0	Data Type: Float Time from detection of a fault in the remote set point to the Fault State output action.
Fault State Value Discrete FSTATE_VAL_D	20	- - -	ALL	- - -	0	Date Type: Unsigned8 Preset discrete SP_D value to use if I/O_OPTS Fault State to Value is set.
Back Calculation Output Discrete BKCAL_OUT_D	21	RO	N/A	- - -	Dynamic	Data Type: DS-66 The value and status required by the BKCAL_IN_D input of another block for output tracking
Remote Cascade Input Discrete RCAS_IN_D	22	- - -	ALL	Status	Bad No Comm with Last Usable Value Not Limited	Date Type: DS-66 Target set point and status provided by a supervisory host to a discrete control or output block.
				Value	0	
Shed Options SHED_OPT	23	- - -	ALL	0=Uninitialized 1=Normal Shed, Normal Return 2=Normal Shed, No Return 3=Shed to Auto, normal return 4=Shed to Auto, no return. Target mode changes to Auto on detection of a shed condition 5=Shed to Manual, normal return 6=Shed to Manual, No return. Target mode changes to MAN on detection of a shed condition. 7=Shed to retained target, normal return 8=Shed to retained target, no return. (Change target to retained target)	0=Uninitialized	Data Type: Unsigned8 Defines action to be taken on remote control device timeout. Normal Return - actual mode changes to the next lowest priority non-remote mode permitted but returns to the target remote mode when the remote computer completes the initialization handshake. No Return - Target mode changes to the next lowest priority non-remote mode permitted. The target remote mode is lost, so no return occurs.

- continued -

Table E-34. Discrete Output Function Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Mode	Range	Initial Value	Description
Remote Cascade Output Discrete RCAS_OUT_D	24	RO	N/A	- - -	Dynamic	Data Type: DS-66 Block set point and status after ramping, provided to a supervisory host for back calculation and to allow action to be taken under limiting conditions or mode change.
Update Event UPDATE_EVT	25	- - -				Data Type: DS-73 This alert is generated by any change to the static data.
UNACKNOWLEDGED	25.1	RW	N/A	0=Undefined 1=Acknowledged 2=Unacknowledged	0=Undefined	
UPDATE_STATE	25.2	RO	N/A	0=Undefined 1=Update reported 2=Updated not reported	0=Undefined	
TIME_STAMP	25.3	RO	N/A	- - -	0	
STATIC_REVISION	25.4	RO	N/A	- - -	0	
RELATIVE_INDEX	25.5	RO	N/A	- - -	0	
Block Alarm BLOCK_ALM	26	- - -				Data Type: DS-72 The block alarm is used for all configuration, hardware, connection failure or system problems in the block. The cause of the alert is entered in the subcode field. The first alert to become active will set the active status in the status parameter. As soon as the Unreported status is cleared by the alert reporting procedure and other block alert may be reported without clearing the Active status, if the subcode has changed.
UNACKNOWLEDGED	26.1	RW	N/A	0=Undefined 1=Acknowledged 2=Unacknowledged	0	
ALARM_STATE	26.2	RO	N/A	0=Undefined 1=Clear reported 2=Clear not reported 3=Active reported 4=Active not reported	0	
TIME_STAMP	26.3	RO	N/A	- - -	0	
SUBCODE	26.4	RO	N/A	- - -	0	
VALUE	26.5	RO	N/A	- - -	0	
Extended Blocks						
Setpoint Rate Up Setpoint Rate Up	27	- - -	- - -	> = 0	3.40×10^{38}	Data Type: Float The ramp rate for SP up in AUTO, CAS and RCAS modes. Measured in PV units/sec.
Setpoint Rate Down SP_RATE_DN	28	- - -	- - -	> = 0	3.40×10^{38}	Data Type: Float The ramp rate for SP down in AUTO, CAS and RCAS modes. Measured in PV units/sec.

View Lists

View lists allow the values of a set of parameters to be accessed at the same time. Views 1 and 2 contain operating parameters and are defined by the Fieldbus Foundation. View 3 contains dynamic parameters and View 4 contains static parameters with configuration and maintenance information. Views 3 and 4 are defined by the manufacturer.

Table E-35. DO Function Block, View Lists

INDEX NUMBER	PARAMETER	VIEW			
		1	2	3	4
1	ST_REV	x	x	x	x
3	STRATEGY				x
4	ALERT_KEY				x
5	MODE_BLK	x		x	
6	BLOCK_ERR	x		x	
7	PV_D	x		x	
8	SP_D	x		x	
9	OUT_D	x		x	
11	PV_STATE		x		
12	XD_STATE		x		
13	GRANT_DENY		x		
14	IO_OPTS				x
15	STATUS_OPTS				x
16	READBACK_D	x		x	
17	CAS_IN_D	x		x	
18	CHANNEL				x
19	FSTATE_TIME				x
20	FSTATE_VAL_D				x
21	BKCAL_OUT_D			x	
22	RCAS_IN_D			x	
23	SHED_OPT				x
24	RCAS_OUT_D			x	
27	SP_RATE_UP				x
28	SP_RATE_DN				x

Handheld Communicator Menu Structure

DISCRETE OUTPUT FUNCTION BLOCK

QUICK CONFIG

- ALERT KEY
- PROCESS VALUE DISCRETE STATUS
- PROCESS VALUE DISCRETE VALUE
- SETPOINT DISCRETE STATUS
- SETPOINT DISCRETE VALUE

COMMON CONFIG

- ALERT KEY
- I/O OPTIONS
- BLOCK MODE TARGET
- BLOCK MODE ACTUAL
- BLOCK MODE PERMITTED
- BLOCK MODE NORMAL
- SETPOINT DISCRETE STATUS
- SETPOINT DISCRETE VALUE

ADVANCED CONFIG

- FAULT STATE TIME
- FAULT STATE VALUE DISCRETE
- PROCESS VALUE STATE
- SHED OPTIONS
- SIMULATE DISCRETE SIMULATE STATUS
- SIMULATE DISCRETE SIMULATE VALUE
- SIMULATE DISCRETE TRANSDUCER STATUS
- SIMULATE DISCRETE TRANSDUCER VALUE
- SIMULATE DISCRETE SIMULATE EN/DISABLE
- STATIC REVISION
- STATUS OPTIONS
- STRATEGY
- TRANSDUCER STATE

I/O REFERENCE

- DO CHANNEL

CONNECTORS

- BACK CALCULATION OUTPUT DISCRETE STATUS
- BACK CALCULATION OUTPUT DISCRETE VALUE
- CASCADE INPUT DISCRETE STATUS
- CASCADE INPUT DISCRETE VALUE
- OUTPUT DISCRETE STATUS
- OUTPUT DISCRETE VALUE

ONLINE

- BACK CALCULATION OUTPUT DISCRETE STATUS
- BACK CALCULATION OUTPUT DISCRETE VALUE
- BLOCK ERROR
- CASCADE INPUT DISCRETE STATUS
- CASCADE INPUT DISCRETE VALUE
- BLOCK MODE TARGET
- BLOCK MODE ACTUAL
- BLOCK MODE PERMITTED
- BLOCK MODE NORMAL
- OUTPUT DISCRETE STATUS
- OUTPUT DISCRETE VALUE
- PROCESS VALUE DISCRETE STATUS
- PROCESS VALUE DISCRETE VALUE
- REMOTE CASCADE INPUT DISCRETE STATUS
- REMOTE CASCADE INPUT DISCRETE VALUE
- REMOTE CASCADE OUTPUT DISCRETE STATUS
- REMOTE CASCADE OUTPUT DISCRETE VALUE
- READBACK DISCRETE STATUS
- READBACK DISCRETE VALUE
- SETPOINT DISCRETE STATUS
- SETPOINT DISCRETE VALUE

STATUS

- BLOCK ERROR

OTHER

- TAG DESCRIPTION
- GRANT DENY GRANT
- GRANT DENY DENY
- UPDATE EVENT UNACKNOWLEDGED
- UPDATE EVENT UPDATE STATE
- UPDATE EVENT TIME STAMP
- UPDATE EVENT STATIC REV
- UPDATE EVENT RELATIVE INDEX
- BLOCK ALARM UNACKNOWLEDGED
- BLOCK ALARM ALARM STATE
- BLOCK ALARM TIME STAMP
- BLOCK ALARM SUBCODE
- BLOCK ALARM VALUE
- SETPOINT RATE UP
- SETPOINT RATE DOWN

ALL

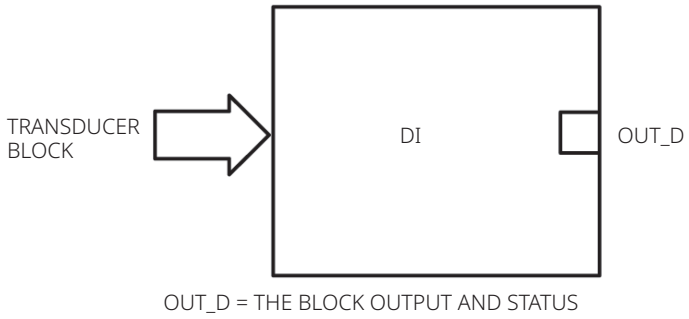
- CHARACTERISTICS BLOCK TAG
- STATIC REVISION
- TAG DESCRIPTION
- STRATEGY
- ALERT KEY
- BLOCK MODE TARGET
- BLOCK MODE ACTUAL
- BLOCK MODE PERMITTED
- BLOCK MODE NORMAL
- BLOCK ERROR
- PROCESS VALUE DISCRETE STATUS
- PROCESS VALUE DISCRETE VALUE
- SETPOINT DISCRETE STATUS
- SETPOINT DISCRETE VALUE
- OUTPUT DISCRETE STATUS
- OUTPUT DISCRETE VALUE
- SIMULATE DISCRETE SIMULATE STATUS
- SIMULATE DISCRETE SIMULATE VALUE
- SIMULATE DISCRETE TRANSDUCER STATUS
- SIMULATE DISCRETE TRANSDUCER VALUE
- SIMULATE DISCRETE SIMULATE EN/DISABLE
- PROCESS VALUE STATE
- TRANSDUCER STATE
- GRANT DENY GRANT
- GRANT DENY DENY
- I/O OPTIONS
- STATUS OPTIONS
- READBACK DISCRETE STATUS
- READBACK DISCRETE VALUE
- CASCADE INPUT DISCRETE STATUS
- CASCADE INPUT DISCRETE VALUE
- DO CHANNEL
- FAULT STATE TIME
- FAULT STATE VALUE DISCRETE
- BACK CALCULATION OUTPUT DISCRETE STATUS
- BACK CALCULATION OUTPUT DISCRETE VALUE
- REMOTE CASCADE INPUT DISCRETE STATUS
- REMOTE CASCADE INPUT DISCRETE VALUE
- SHED OPTIONS
- REMOTE CASCADE OUTPUT DISCRETE STATUS
- REMOTE CASCADE OUTPUT DISCRETE VALUE
- UPDATE EVENT UNACKNOWLEDGED
- UPDATE EVENT UPDATE STATE
- UPDATE EVENT TIME STAMP
- UPDATE EVENT STATIC REV
- UPDATE EVENT RELATIVE INDEX
- BLOCK ALARM UNACKNOWLEDGED
- BLOCK ALARM ALARM STATE
- BLOCK ALARM TIME STAMP
- BLOCK ALARM SUBCODE
- BLOCK ALARM VALUE
- SETPOINT RATE UP
- SETPOINT RATE DOWN

E.9 Discrete Input Function Block

Overview

The Discrete Input (DI) function block (Figure E-29) processes a single discrete input from a field device and makes it available to other function blocks. You can configure inversion and alarm detection on the input value. In the DVC6200f digital valve controller, the discrete input function block can provide limit switch functionality and valve position proximity detection. The DI function block supports mode control, signal status propagation and simulation.

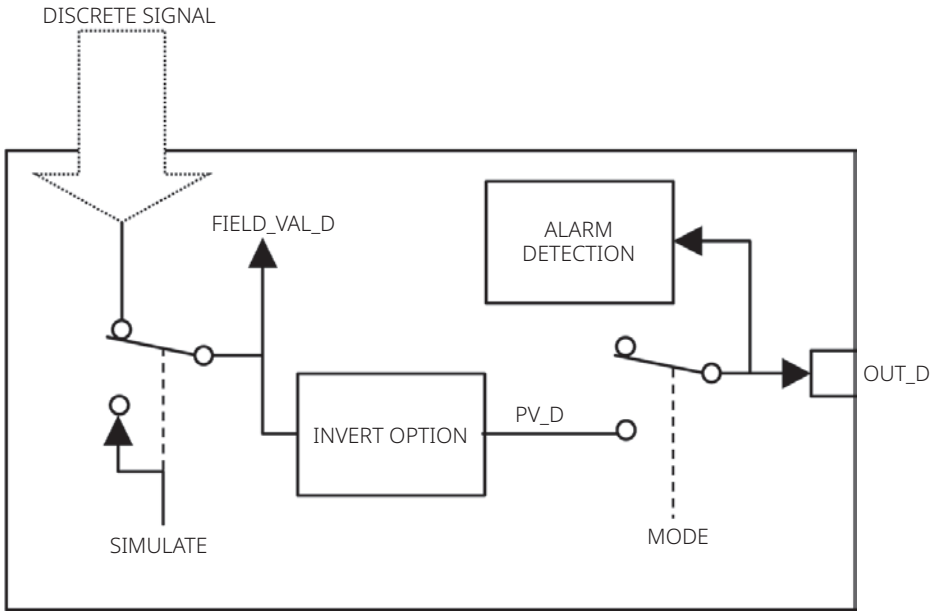
Figure E-29. Discrete Input (DI) Function Block



Normally, the block is used in Automatic mode so that the process variable (PV_D [7]) is copied to the output (OUT_D [8]). You can change the mode to Manual to disconnect the field signal and substitute a manually-entered value for the output. In this case, PV_D [7] continues to show the value that will become the OUT_D [8] when the mode is changed to Automatic.

To support testing, you can enable simulation, which allows the measurement value to be supplied manually through the SIMULATE_D [9] parameter. Figure E-30 illustrates the internal components of the DI function block and Table E-40 lists the definitions of the block parameters.

Figure E-30. Discrete Input Function Block Schematic



Modes

The Discrete Input function block supports the following modes:

- Manual (Man)—The block output (OUT_D [8]) is disconnected from the field and set manually.
- Automatic (Auto)—The block algorithm determines output.
- Out of Service (OOS)—The block is not processed. The OUT_D [8] status is set to Bad: Out of Service. The BLOCK_ERR [6] parameter shows Out of Service.

Block Initialization

The Fieldbus Foundation specification requires that certain parameters in the function blocks have initial values of uninitialized. In addition to setting the Resource block mode to AUTO, the control system or the user must change those parameters from their uninitialized value to a valid value in order for the function block to move from the Out of Service mode. For the DI function block, the CHANNEL [15] parameter must be initialized.

Status Handling

Under normal conditions, a Good: Non-Cascade status is passed through to OUT_D [8]. The block also supports the Status Action On Failure and BLOCK_ERR [6] indications.

When SIMULATE_D [9] is enabled, FIELD_VAL_D [7], PV_D [7] and OUT_D [8] change to the simulated status. When the block is set to Manual mode, OUT_D [7] is set to Good: Non-cascade, Constant status.

I/O Selection

To select the I/O associated with the discrete measurement, configure the value of the CHANNEL [15] parameter.

In the digital valve controller, the four classes of channels are

- Valve travel
- Open/Closed limit switch
- Variable limit switch based on transducer block travel alarm settings.
- Proximity position detection based on transducer block travel alarm settings.

The CHANNEL [15] parameter for each of the four DI blocks available in the digital valve controller may be set independently to achieve the desired position detection. The DI block CHANNEL [15] definitions are listed in Table E-36. Refer to the following descriptions for details of the operation of these channels.

Valve Travel

Channel 23 provides valve travel.

0 = Closed, 1 = 100% open, 5 = 5% open, 10 = 10% open, 15 = 15% open, etc.

Table E-36. Channel Selection for the Discrete Input Function Block

Selection	Transducer Block Parameter[1]	Transducer Block Index Number	Bit Number[2]
23	TRAVEL_D	33	N/A
24	INST_ALERTS_ACTIVE:GROUP_2_ACTIVE	81.2	7: Travel Open
25	INST_ALERTS_ACTIVE:GROUP_2_ACTIVE	81.2	8: Travel Closed
26	INST_ALERTS_ACTIVE:GROUP_2_ACTIVE	81.2	1: Travel Limit Lo Lo
27	INST_ALERTS_ACTIVE:GROUP_2_ACTIVE	81.2	3: Travel Limit Lo
28	INST_ALERTS_ACTIVE:GROUP_2_ACTIVE	81.2	2: Travel Limit Hi
29	INST_ALERTS_ACTIVE:GROUP_2_ACTIVE	81.2	0: Travel Limit Hi Hi
30	INST_ALERTS_ACTIVE:GROUP_2_ACTIVE	81.2	12: Proximity Lo Lo
31	INST_ALERTS_ACTIVE:GROUP_2_ACTIVE	81.2	11: Proximity Lo
32	INST_ALERTS_ACTIVE:GROUP_2_ACTIVE	81.2	10: Proximity Hi
33	INST_ALERTS_ACTIVE:GROUP_2_ACTIVE	81.2	9: Proximity Hi Hi

1. Refer to Table 16 for parameter descriptions.
2. See pages 67 and 69, Travel ALerts and Prox Alerts, for information on accessing these alerts.

Open/Closed Limit Switch

Channels 24 and 25 provide valve open and closed limit switch functionality for the DI block. These channels will detect if the valve position is more than the Travel Open Alert Point for open detection or less than the Travel Closed Alert Point for closed detection. These channels provide an adjustable deadband to clear the detected position.

0= Not Active, 1= Active

Variable Limit Switch

Channels 26 through 29 provide variable limit switch functionality for the DI block. Trip points for this limit switch functionality are based on the Travel Alert settings in the transducer Block. The DI function block provides the same type of position detection as the travel alerts in the transducer block. Table E-37 lists the transducer block parameters used with DI block channels 26 through 29. Refer to Travel and Prox, on page 67 for more information on the transducer block travel alerts.

0= Not Active, 1= Active

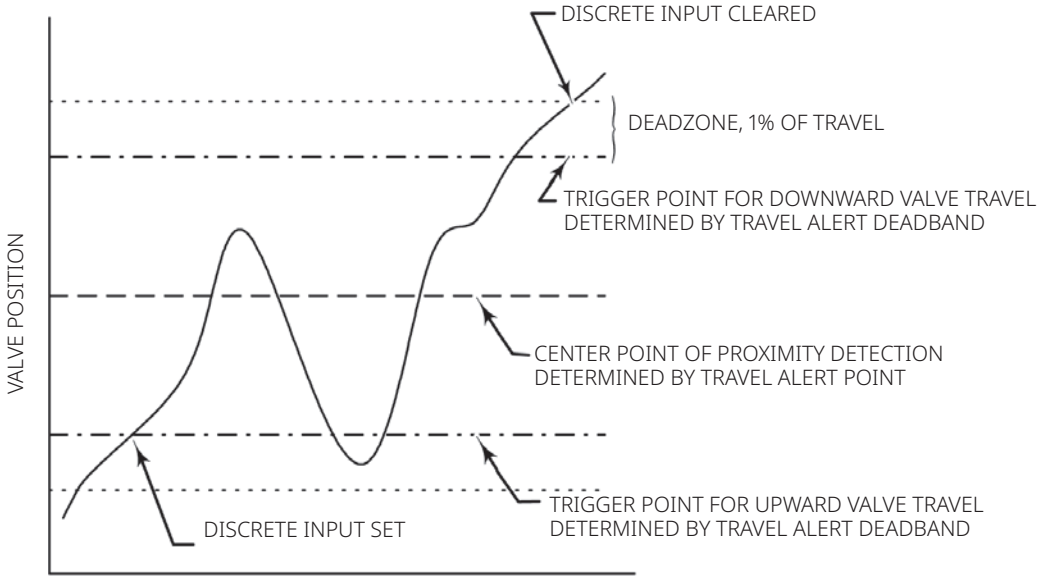
Table E-37. Transducer Block Parameters Used with Discrete Input Function Block Channels 26 through 29 (Variable Limit Switch)

Transducer Block Parameter	Parameter Function
Travel Lo Lo Alert Point	Lo Lo Limit Switch Trip Point
Travel Lo Lo Alert Deadband	Lo Lo Limit Switch Deadband
Travel Lo Alert Point	Lo Limit Switch Trip Point
Travel Lo Alert Deadband	Lo Limit Switch Deadband
Travel Hi Alert Point	Hi Limit Switch Trip Point
Travel Hi Alert Deadband	Hi Limit Switch Deadband
Travel Hi Hi Alert Point	Hi Hi Limit Switch Trip Point
Travel Hi Hi Alert Deadband	Hi Hi Limit Switch Deadband

Valve Position Proximity Detection

Channels 30 through 33 provide valve position proximity detection for the DI block. The transducer block Travel Alert Point and Travel Alert Deadband parameters are also used with the valve position proximity, but they provide a different function. The Travel Alert Point for the selected channel determines the center point for the position to be detected. The Travel Alert Deadband for the selected channel sets the upper and lower trigger points or the width of the proximity detection band. A 1% deadzone exists above and below this band that the travel must exceed to clear the detected position. Figure E-31 illustrates the operation of the proximity detection function. Travel Alert Point refers to Travel Lo Alert Point, Travel Hi Alert Point, Travel Lo Lo Alert Point and Travel Hi Hi Alert Point in Table E-38. Travel Alert Deadband refers to Travel Lo Alert Deadband, Travel Hi Alert Deadband, Travel Lo Lo Alert Deadband and Travel Hi Hi Alert Deadband in Table E-38.

Figure E-31. Discrete Input Proximity Detection Function



0= Not Active, 1= Active

Table E-38 lists the transducer block parameters used for proximity detection with DI block channels 30 through 33.

Table E-38. Transducer Block Parameters Used with Discrete Input Function Block Channels 30 through 33

Transducer Block Parameter	Parameter Function
Travel Lo Lo Alert Point	Lo Lo Proximity Detection Center Point
Travel Lo Lo Alert Deadband	Lo Lo Proximity Detection Width
Travel Lo Alert Point	Lo Proximity Detection Center Point
Travel Lo Alert Deadband	Lo Proximity Detection Width
Travel Hi Alert Point	Hi Proximity Detection Center Point
Travel Hi Alert Deadband	Hi Proximity Detection Width
Travel Hi Hi Alert Point	Hi Hi Proximity Detection Center Point
Travel Hi Hi Alert Deadband	Hi Hi Proximity Detection Width

Field Value Processing

The Invert bit of the IO_OPTS [13] parameter may be used to logically invert the value of FIELD_VAL_D [17] before it is stored as PV_D [7]. PV_FTIME [16] may be used to set the length of time that FIELD_VAL_D [17] must be in a new state before that new state is reflected in PV_D. The PV_D [7] value goes to the mode switch where it becomes OUT_D [8] when the actual mode is AUTO. OUT_D [8] is also tested for an alarm state.

NOTE

Invert is the only I/O option that the DI block supports. You can set the I/O option only when the block mode is Out of Service.

Alarm Detection

To select the state that initiates an input alarm and to set discrete alarm substatus in the output, configure the DISC_LIM [23] parameter. You can enter any value between 0 and 255. A value of 255 disables the alarm. When OUT_D [8] matches the DISC_LIM [23] state, the discrete value of an alarm is set.

Block Errors

Table E-39 lists conditions reported in the BLOCK_ERR [6] parameter.

Table E-39. DI BLOCK_ERR Conditions

Condition Number	Condition Name and Description
1	Block Configuration Error—CHANNEL set to 0 through 10 (uninitialized)
3	Simulate Active—Simulate is enabled. Output does not reflect process conditions
7	Input failure/process variable has Bad status—The hardware is bad or the transducer block mode is Out of Service
14	Power Up—Set after power-up until actual mode is not Out of Service
15	Out of Service—The actual mode is Out of Service (OOS). The block is not being processed.

Action on Failure

In case of hardware failure, FIELD_VAL_D [17], PV_D [7] and OUT_D [8] change to a Bad status and the BLOCK_ ERR [6] parameter shows Process Variable has Bad Status. If the transducer block mode is Out of Service, the status of FIELD_VAL_D [17], PV_D [7] and OUT_D [8] is set to Bad: Out of Service.

Simulation

To support testing of the control strategy, you can enable the SIMULATE_D [9] parameter. Normally the measurement value and status used for FIELD_VAL_D [17] in the DI block reflect actual process values as provided by the transducer block. When the SIMULATE_D [9] parameter is enabled, value and status used for FIELD_VAL_D [17] is supplied by the user manually. To enable simulation in the DI function block, the simulate jumper must be installed. For information on the installation of this jumper, see the Installation section.

The SIMULATE_D [9] parameter has three components:

- Simulate_D enable/disable determines whether the function block will use the actual process value and status or Simulate Value and Simulate Status.
- Transducer Value and Status reflect the process values provided by the transducer block.
- Simulate Value and Status may be entered by the user when enable/disable is set to enabled.

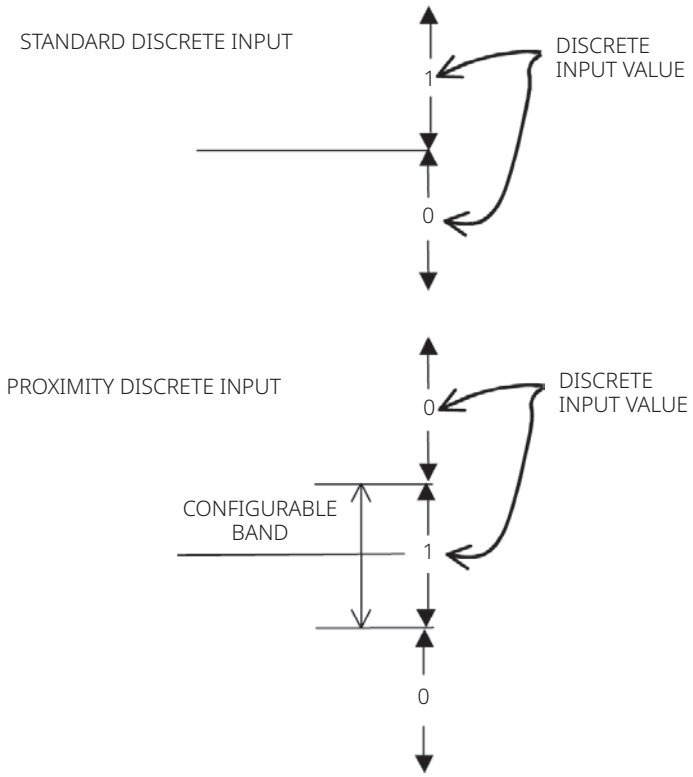
To use simulate, first install the simulate jumper in the terminal box, then set Simulate_D enable/disable to enabled, then enter the desired values for Simulate Value and Status.

When SIMULATE_D [9] is enabled, the Simulate Active bit of the BLOCK_ERR [6] parameter is set (refer to the Block Errors description). When the simulate jumper is installed, the Simulate Jumper bit of the transducer block parameter SELFTEST_STATUS [78] is set.

Application Information

Figure E-32 compares the operation of a standard discrete input to a proximity discrete input. With the standard discrete input, the discrete input changes state when the valve position passes a configurable trip point. This can be used to indicate if the valve position is above or below the trip point.

Figure E-32. Proximity Discrete Input Compared to a Standard Discrete Input



With the proximity discrete input a configurable band can be established about a central point. Whenever the valve position enters this configurable band, the discrete input changes state. A proximity discrete input is useful for applications which require knowing the location of the valve when the valve is not near 0% or 100%.

DI Function Block Parameter List

- Read/Write Capability: RO - Read Only, RW - Read Write
- Mode: The block mode(s) required to write to the parameter

Table E-40. Discrete Input Function Block Parameter Definitions

Label PARAMETER_NAME	Index Number	RO / RW	Block Mode	Range	Initial Value	Description
Static Revision ST_REV	1	RO	N/A	0 to 65535	0	Data Type: Unsigned16 The revision level of the static data associated with the function block. The revision value will be incremented each time a static parameter value in the block is changed.
Tag Description TAG_DESC	2	RW	ALL	7 bit ASCII	spaces	Data Type: Octet String The user description of the intended application of the block.
Strategy STRATEGY	3	RW	ALL	0 to 65535	0	Data Type: Unsigned16 The strategy field can be used to identify grouping of blocks. This data is not checked or processed by the block.
Alert Key ALERT_KEY	4	RW	ALL	1 to 255	0	Data Type: Unsigned8 The identification number of the plant unit. This information may be used in the host for sorting alarms, etc.
Block Mode MODE_BLK	5	- - -				Data Type: DS-69 Valid Bits: 7:OOS, 4:MAN, 3:AUTO The actual, target, permitted and normal modes of the block. Target: The requested block mode Actual: The current mode of the block Permitted: Allowed modes for Target Normal: Most common mode for Target
TARGET	5.1	RW	ALL	OOS MAN AUTO	OOS until block is configured, then last valid target	
ACTUAL	5.2	RO	ALL	- - -	OOS	
PERMITTED	5.3	RW	ALL	OOS+MAN+AUTO	OOS+MAN+AUTO	
NORMAL	5.4	RO	ALL	- - -	AUTO	
Block Error BLOCK_ERR	6	RO	N/A	Defined Bits 1: Block Configuration Error 3: Simulate Active 7: Input Failure / Bad PV Status 14: Power-up 15: Out-of-Service	Dynamic	Data Type: Bit String 0=Inactive 1=Active This parameter reflects the error status associated with the hardware or software components associated with a block. Multiple errors may be shown, see Table E-39.

- continued -

Table E-40. Discrete Input Function Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Block Mode	Range	Initial Value	Description
Process Value Discrete PV_D	7	RO	N/A	PV_D Status set equal to Field_Val_D Status	Dynamic	Data Type: DS-66 The process variable used in block execution. Value is converted from Readback to show the actuator position in the same units as the set point value.
Output Discrete OUT_D	8	- - -	OOS MAN	OUT_STATE	- - -	Data Type: DS-66 The primary discrete value calculated as a result of executing the function.
Simulate Discrete SIMULATE_D	9	- - -				Data Type: DS-83 Allows the transducer discrete input or output to the block to be manually supplied when simulate is enabled. When simulation is disabled, the simulate value and status track the actual value and status.
SIMULATE_STATUS	9.1	- - -	ALL	- - -	0	
SIMULATE_VALUE	9.2	RO	ALL	- - -	0	
TRANSDUCER_ STATUS	9.3	RO	ALL	- - -	0	
TRANSDUCER_ VALUE	9.4	- - -	ALL	- - -	0	
ENABLE/DISABLE	9.5	- - -	- - -	0=Not initialized 1=Simulation Disabled 2=Simulation Active	1=Simulation Disabled	
Transducer State XD_STATE	10	- - -	ALL	- - -	0	Data Type: Uint16 Index to the text describing the states of a discrete for the value obtained from the transducer.
Output Staten OUT_STATE	11	- - -	ALL	- - -	0	Data Type: Unsigned16 Index to the text describing the states of a discrete output.
Grant Deny GRANT_DENY	12	- - -				Data Type: DS-70 Options for controlling access of host computers and local control panels to operating, tuning and alarm parameters of the block. GRANT: 0=NA, 1=granted DENY: 0=NA, 1=denied
GRANT	12.1	- - -	ALL	0: Program 1: Tune 2: Alarm 3: Local	All bits:0	
DENY	12.2	- - -	ALL		All bits:0	
I/O Options IO_OPTS	13	- - -	OOS	0: Invert	All bits:0	Data Type: Bit String 0=Disable 1=Enable Allows you to select how the I/O signals are processed.
Status Options STATUS_OPTS	14	- - -	OOS	3=Propagate Failure Forward 8=Uncertain in MAN mode	All bits:0	Data Type: Bit String 0=Disable 1=Enable Options the user may select for the block processing of status.

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Table E-40. Discrete Input Function Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Block Mode	Range	Initial Value	Description
DI Channel CHANNEL	15	- - -	OOS	0=undefined 23=Valve Position or Pressure (Discrete) 24= PV > 97% 25= PV < 3% 26=PV Below LO LO limit 27=PV Below LO limit 28=PV Above HI limit 29=PV Above HI HI limit 30=PV Within Proximity of LO LO 31=PV Within Proximity of LO 32=PV within Proximity of HI 33=PV within Proximity of HI HI	0=Undefined	Data Type: Unsigned16 Defines the functionality of the discrete input. See I/O Selection for details. Refer to Table E-36.
Process Value Filter Time PV_FTIME	16	- - -	ALL	Positive	0	Data Type: Float Time that FIELD_VAL_D must be in a new state, before the change is reflected to PV_D and OUT_D.
Field Value Discrete FIELD_VAL_D	17	RO	- - -	- - -	0	Data Type: DS-66 Raw value of the field device discrete input, with a status reflecting the transducer condition.
Update Event UPDATE_EVT	18	- - -				Data Type: DS-73 This alert is generated by any change to the static data.
UNACKNOWLEDGED	18.1	RW	N/A	0=Undefined 1=Acknowledged 2=Unacknowledged	0=Undefined	
UPDATE_STATE	18.2	RO	N/A	0=Undefined 1=Update reported 2=Updated not reported	0=Undefined	
TIME_STAMP	18.3	RO	N/A	- - -	0	
STATIC_REVISION	18.4	RO	N/A	- - -	0	
RELATIVE_INDEX	18.5	RO	N/A	- - -	0	

- continued -

Table E-40. Discrete Input Function Block Parameter Definitions (continued)

Label PARAMETER_NAME	Index Number	RO / RW	Block Mode	Range	Initial Value	Description
Block Alarm BLOCK_ALM	19	- - -	- - -	- - -	Dynamic	Data Type: DS-72 The block alarm is used for all configuration, hardware, connection failure or system problems in the block. The cause of the alert is entered in the subcode field. The first alert to become active will set the active status in the status parameter. As soon as the unreported status is cleared by the alert reporting procedure and other block alert may be reported without clearing the active status, if the subcode has changed.
UNACKNOWLEDGED	19.1	RW	N/A	0=Undefined 1=Acknowledged 2=Unacknowledged	- - -	
ALARM_STATE	19.2	RO	N/A	0=Undefined 1=Clear reported 2=Clear not reported 3=Active reported 4=Active not reported	- - -	
TIME_STAMP	19.3	RO	N/A	- - -	- - -	
SUBCODE	19.4	RO	N/A	- - -	- - -	
VALUE	19.5	RO	N/A	- - -	- - -	
Alarm Summary ALARM_SUM	20	- - -	- - -	0: Discrete alarm 7: Block Alarm		Data Type: DS-74 The current alert status, unacknowledged states, unreported states and disabled states of the alarms associated with the function block. 0=clear reported 0=acknowledged 0=reported 0=enabled
CURRENT	20.1	RO	- - -	- - -	All bits: 0	
UNACKNOWLEDGED	20.2	RO	- - -	- - -	All bits: 0	
UNREPORTED	20.3	RO	- - -	- - -	All bits: 0	
DISABLED	20.4	RW	- - -	- - -	All bits: 0	
Acknowledge Option ACK_OPTION	21	- - -	ALL	0: Discrete 1: Block Alarm	All bits: 0	Data Type: Bit String 0=Disable 1=Enable Used to set auto acknowledgement of alarms
Discrete Priority DISC_PRI	22	- - -	ALL	0 to 15	0	Data Type: Unsigned8 Priority of the discrete alarm.
Discrete Limit DISC_LIM	23	- - -	ALL	PV_STATE	0	Data Type: Unsigned8 State of discrete input which will generate an alarm.
Discrete Alarm DISC_ALM	24	- - -				Data Type: DS-72 The discrete alarm is used for indication of a state change in selected discrete channel.
UNACKNOWLEDGED	24.1	RW	N/A	0=Undefined 1=Acknowledged 2=Unacknowledged	- - -	
ALARM_STATE	24.2	RO	N/A	0=Undefined 1=Clear reported 2=Clear not reported 3=Active reported 4=Active not reported	- - -	
TIME_STAMP	24.3	RO	N/A	- - -	- - -	
SUBCODE	24.4	RO	N/A	- - -	- - -	
VALUE	24.5	RO	N/A	- - -	- - -	

View Lists

View lists allow the values of a set of parameters to be accessed at the same time. Views 1 and 2 contain operating parameters and are defined by the Fieldbus Foundation. View 3 contains dynamic parameters and View 4 contains static parameters with configuration and maintenance information. Views 3 and 4 are defined by the manufacturer.

Table E-41. DI Function Block, View Lists

INDEX NUMBER	PARAMETER	VIEW			
		1	2	3	4
1	ST_REV	x	x	x	x
3	STRATEGY				x
4	ALERT_KEY				x
5	MODE_BLK	x		x	
6	BLOCK_ERR	x		x	
7	PV_D	x		x	
8	OUT_D	x		x	
10	XD_STATE		x		
11	OUT_STATE		x		
12	GRANT_DENY		x		
13	IO_OPTS				x
14	STATUS_OPTS				x
15	CHANNEL				x
16	PV_FTIME				x
17	FIELD_VAL_D	x		x	
20	ALARM_SUM	x		x	
21	ACK_OPTION				x
22	DISC_PRI				x
23	DISC_LIM				x

Handheld Communicator Menu Structure

DISCRETE INPUT FUNCTION BLOCK

QUICK CONFIG

- ALERT KEY
- PROCESS VALUE DISCRETE STATUS
- PROCESS VALUE DISCRETE VALUE

COMMON CONFIG

- ALERT KEY
- DISCRETE LIMIT
- I/O OPTIONS
- BLOCK MODE TARGET
- BLOCK MODE ACTUAL
- BLOCK MODE PERMITTED
- BLOCK MODE NORMAL
- PROCESS VALUE FILTER TIME

ADVANCED CONFIG

- DI CHANNEL
- OUTPUT STATE
- SIMULATE DISCRETE SIMULATE STATUS
- SIMULATE DISCRETE SIMULATE VALUE
- SIMULATE DISCRETE TRANSDUCER STATUS
- SIMULATE DISCRETE TRANSDUCER VALUE
- SIMULATE DISCRETE SIMULATE EN/DISABLE
- STATIC REVISION
- STATUS OPTIONS
- TRANSDUCER STATE

CONNECTORS

- OUTPUT DISCRETE STATUS
- OUTPUT DISCRETE VALUE
- STRATEGY

ONLINE

- BLOCK ERROR
- FIELD VALUE DISCRETE STATUS
- FIELD VALUE DISCRETE VALUE
- BLOCK MODE TARGET
- BLOCK MODE ACTUAL
- BLOCK MODE PERMITTED
- BLOCK MODE NORMAL
- OUTPUT DISCRETE STATUS
- OUTPUT DISCRETE VALUE
- PROCESS VALUE DISCRETE STATUS
- PROCESS VALUE DISCRETE VALUE

STATUS

- BLOCK ERROR

OTHER

- TAG DESCRIPTION
- GRANT DENY GRANT
- GRANT DENY DENY
- UPDATE EVENT UNACKNOWLEDGED
- UPDATE EVENT UPDATE STATE
- UPDATE EVENT TIME STAMP
- UPDATE EVENT STATIC REV
- UPDATE EVENT RELATIVE INDEX
- BLOCK ALARM UNACKNOWLEDGED
- BLOCK ALARM ALARM STATE
- BLOCK ALARM TIME STAMP
- BLOCK ALARM SUBCODE
- BLOCK ALARM VALUE
- ALARM SUMMARY CURRENT
- ALARM SUMMARY UNACKNOWLEDGED
- ALARM SUMMARY UNREPORTED
- ALARM SUMMARY DISABLED
- ACKNOWLEDGE OPTION
- DISCRETE PRIORITY
- DISCRETE ALARM UNACKNOWLEDGED
- DISCRETE ALARM ALARM STATE
- DISCRETE ALARM TIME STAMP
- DISCRETE ALARM SUBCODE
- DISCRETE ALARM DISCRETE VALUE

ALL

- CHARACTERISTICS BLOCK TAG
- STATIC REVISION
- TAG DESCRIPTION
- STRATEGY
- ALERT KEY
- BLOCK MODE TARGET
- BLOCK MODE ACTUAL
- BLOCK MODE PERMITTED
- BLOCK MODE NORMAL
- BLOCK ERROR
- PROCESS VALUE DISCRETE STATUS
- PROCESS VALUE DISCRETE VALUE
- OUTPUT DISCRETE STATUS
- OUTPUT DISCRETE VALUE
- SIMULATE DISCRETE SIMULATE STATUS
- SIMULATE DISCRETE SIMULATE VALUE
- SIMULATE DISCRETE TRANSDUCER STATUS
- SIMULATE DISCRETE TRANSDUCER VALUE
- SIMULATE DISCRETE SIMULATE EN/DISABLE
- TRANSDUCER STATE
- OUTPUT STATE
- GRANT DENY GRANT
- GRANT DENY DENY
- I/O OPTIONS
- STATUS OPTIONS
- DI CHANNEL
- PROCESS VALUE FILTER TIME
- FIELD VALUE DISCRETE STATUS
- FIELD VALUE DISCRETE VALUE
- UPDATE EVENT UNACKNOWLEDGED
- UPDATE EVENT UPDATE STATE
- UPDATE EVENT TIME STAMP
- UPDATE EVENT STATIC REV
- UPDATE EVENT RELATIVE INDEX
- BLOCK ALARM UNACKNOWLEDGED
- BLOCK ALARM ALARM STATE
- BLOCK ALARM TIME STAMP
- BLOCK ALARM SUBCODE
- BLOCK ALARM VALUE
- ALARM SUMMARY CURRENT
- ALARM SUMMARY UNACKNOWLEDGED
- ALARM SUMMARY UNREPORTED
- ALARM SUMMARY DISABLED
- ACKNOWLEDGE OPTION
- DISCRETE PRIORITY
- DISCRETE LIMIT
- DISCRETE ALARM UNACKNOWLEDGED
- DISCRETE ALARM ALARM STATE
- DISCRETE ALARM TIME STAMP
- DISCRETE ALARM SUBCODE
- DISCRETE ALARM DISCRETE VALUE

Appendix F: Device Description Installation

F.1 Overview

Several support files are required for the DVC6200f digital valve controller. They are:

- Device Description (DD) files—These files define the data interface to the digital valve controller (file extensions .sym and .ffo).
- Capabilities File—These files allow a host to configure the control system off-line (e.g., without having a device physically attached to the host) (file extension .cff).
- DeltaV Registry File—This file is used by DeltaV to define the device interface (file extension .reg)
- DeltaV fhx File—This file is used by DeltaV to define the device and the data interface to the device (file extension .fhx).
- DeltaV Windows Resource File—These files define the user interface for the device for DeltaV and include the definitions for the transducer block interface and the resource block interface (file extension .dll).

The directory structure defined by the Fieldbus Foundation for device descriptions is as follows:

....\xxxxxx\yyyy\rrddcc.eee

where:

....\	is the path to the DD structure as implemented by the host system. This is typically defined as the base path to the DD since access to the specific device DD is predefined from the base folder. For a DeltaV system, the DDs are included with the support files and are located in a folder named “amsdevices.” For other hosts, the Fieldbus Foundation defines a folder named “release” that is included with the CD-ROM, however, you do not need to retain this folder name.
xxxxxx	is the 6-digit hexadecimal equivalent of the manufacturer's identification number as defined by the Fieldbus Foundation. Fisher Controls' ID number is 5100 (or in the folder format 005100). This number is also stored in the instrument Resource Block in the parameter Mfg ID (parameter name MANUFAC_ID).
yyyy	is the 4-digit hexadecimal equivalent of the device type, as defined by the manufacturer. For example, the device type for the DVC6200f digital valve controller is 4602. This number is stored in the instrument Resource Block in the parameter Device Type (parameter name DEV_TYPE).
rr	is the 2-digit hexadecimal equivalent of the device revision, as defined by the manufacturer. It is stored in the instrument Resource Block in the parameter Device Revision (parameter name DEV_REV).
dd	is the 2-digit hexadecimal equivalent of the device description (DD) revision that applies to the device, as defined by the manufacturer. The host will always use the latest version of the DD that it finds for a particular device revision. When part of the name of a capabilities file, this value is always the same as the value of the DD_REV parameter stored in the Resource Block of the instrument. The value of the DD_REV parameter represents the earliest version of the DD that is compatible with the device revision of the instrument.

cc is a 2-digit hexadecimal equivalent for the capabilities files (.cff) revision, as defined by the manufacturer. The latest revision of the capabilities files, for a particular device revision, is the file with the largest value for this number.

eee is the file extension. At this time, five extensions exist for files, they are:

- .sym—This extension denotes a device description (DD) symbol file as defined by the Fieldbus Foundation.
- .ffo—This extension denotes a complete, tokenized, device description for the instrument as defined by the Fieldbus Foundation.
- .cff—This extension denotes a capabilities file for the instrument as defined by the FOUNDATION Fieldbus Common File Format specification.
- .fhx—This extension denotes a DeltaV device definition file.
- .dll—This extension denotes a windows resource file used by DeltaV.
- .reg—This extension denotes a DeltaV registry file.
- .alm—This extension denotes a DeltaV alarm file (DeltaV version 6 only).

F.2 Device Descriptions and Methods

FOUNDATION fieldbus technology uses Device Descriptions (DD) and function blocks to achieve interoperability between instruments and control systems or hosts from various manufacturers. The DD provides information to describe the data interface to the device.

The following table describes the compatibility between the DVC6200f firmware revisions and DD revisions.

DEVICE DESCRIPTION COMPATIBILITY		
Device Revision	**Firmware Revision**	**DD Compatibility**
4	3.1	3

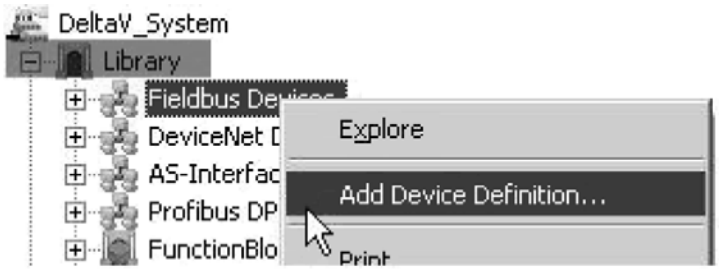
For fieldbus devices, in addition to providing parameter definitions and other information required by the control system to communicate with the fieldbus device, the DD may also include methods. Methods can be used for a variety of functions including automatic calibration, setting protection, setting up the instrument, etc. These methods are a predetermined sequence of steps for information required to setup, calibrate and perform other functions on the instrument. How the method prompts the user and how messages appear is determined by the host system. For information on using methods on the host system see the appropriate host system documentation.

Table F-1 contains the methods available in the DVC6200f, the block it is found in and the page number where it is described.

F.3 Installing DD on a DeltaV ProfessionalPLUS Workstation

The following is general information that may apply when installing the DD on a DeltaV system during the Add Device Definition procedure. This procedure is accessed from the DeltaV/ Library, as shown in Figure F-1. For complete information, refer to the DeltaV documentation.

Figure F-1. Add Device Definition



NOTE

Before beginning the Add Device Definition procedure, it is recommended that the Add Device Utility be installed on DeltaV. This may help prevent installation errors from occurring.

Table F-1. Methods

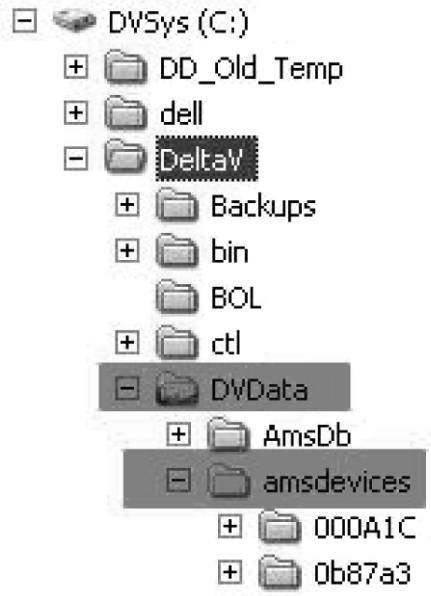
Method	Block	Description Location
Auto Calibration	Transducer	page 141
Block Error Reporting	Transducer	page 75
Block Mode	Transducer	page 53
	Resource	page 19
Display DD Version	Resource	page 357
Instrument Alerts	Transducer	page 61
Manual Travel Calibration	Transducer	page 142
Output A Sensor Calibration	Transducer	page 144
Output B Sensor Calibration	Transducer	page 144
Field Diagnostic Alerts	Transducer	page 61
Relay Adjust	Transducer	page 142
Reset Options	Resource	page 149
Device Setup	Transducer	page 14
Stabilize/Optimize	Transducer	page 56
Stroke Valve	Transducer	page 153
Supply Sensor Calibration	Transducer	page 144
Define Custom Characteristic	Transducer	page 59
Travel Deviation Fallback	Transducer	page 58
Outblock Selection	Transducer	page 61
Field Diagnostic Alerts Set PV Status	Transducer	page 74
Performance Tuner	Transducer	pages 18, 55

NOTE

Be sure to select the correct DD for the DeltaV revision being used. The resource files are different for each revision of DeltaV.

- Device descriptions furnished by Fisher contain only those files applicable to Fisher. All the files are located in the manufacturer ID Folder (005100 for xxxxxx in directory structure above). A readme file is included at the top level. Read this file for any additional information regarding DD installation.
- Device descriptions furnished by the Fieldbus Foundation (on CD-ROM or diskette) contain the files for each registered manufacturer and their associated device(s). It is placed on the media starting with the release folder, which then contains a folder (xxxxxx) for each manufacturer as defined above. For Fisher this folder is 005100. A readme file may be included at the top level. Read this file for any additional information regarding the DD.
- For the DVC6200f—The device type parameter for this unit is 4602. This device includes the AO, PID, CSEL, ISEL, OS, AI, MAI, DO and DI function blocks. From DeltaV Explorer, select the amsdevices\005100\4602 folder (refer to Figure F-2).

Figure F-2. Amsdevices Folder



- The most recent device description for Fisher devices can be downloaded at Fisher.com. If you are downloading from the internet, the file on the website will be compressed (zipped) and must be decompressed (unzipped) before proceeding. Refer to the website download and installation procedures for setting up the DD on your system. Note the folder where the decompressed files are placed. This information will be required later in the installation procedure.

NOTE

Record any warning/error messages from the message window in DeltaV Explorer so that it can be communicated to the DeltaV Technical Support Group.

F.4 Installing DDs on Other Fieldbus Host Systems

The following is a generic procedure for installing the device descriptions on a host system. Refer to your host system documentation for specific information. In general the following may apply:

- Device descriptions furnished by Fisher contain only those files applicable to Fisher. All the files are located in the manufacturer ID Folder (005100 for xxxxxx in directory structure above). A readme file is included at the top level. Read this file for any additional information regarding DD installation.
- Device descriptions furnished by the Fieldbus Foundation contain the files for each registered manufacturer and their associated device(s). It is placed on the media starting with the release folder, which then contains a folder (xxxxxx) for each manufacturer as defined above. For Fisher this folder is 005100. A readme file may be included at the top level. Read this file for any additional information regarding the DD.
- For the DVC6200f Digital Valve Controller—The device type parameter for this unit is 4602. This device includes the AO, PID, CSEL, ISEL, OS, AI, MAI, DO and DI function blocks. From Windows Explorer, select the release\005100\4602 folder.
- The most recent device description for Fisher devices can be downloaded from the internet at www.fisher.com. If you are downloading from the internet, the file on the website will be compressed (zipped) and must be decompressed (unzipped) before proceeding. Refer to the website download and installation procedures for setting up the DD on your system. Note the folder where the decompressed files are placed. This information will be required later in the installation procedure.

NOTE

This procedure will install the necessary Device Description files (*.ffo and *.sym) and Capabilities file (*.cff) for the device.

1. Locate or create the folder on the host system to contain all the DD and capabilities files.

   If you are creating a folder, you can name this new folder whatever you would like and it can have any path you define. For this installation procedure, this folder will be referred to as the base folder.

2. On the CD-ROM or in the website download files, locate the folder with the new support files. This folder is called \RELEASE.
3. Open this folder and select the folder named 005100.
4. Copy the 005100 folder (and all its subfolders) from the CD-ROM or website download location to the base folder.

   If this is an update (the folders already exist), the system informs you that the folders already exist and asks if they should be replaced. Answer Yes or OK so the folders are properly updated.

5. The new support files are now installed. You may have to restart applications and drivers in order for the new files to become active.

   DD installation is complete. Consult the system documentation for commissioning new devices or updating existing devices.

F.5 Displaying the Device Description Version

You can use the DD In Use method to display version information for the device descriptions installed on the system. The DD in Use method is included with the device description (DD) software. For information on using methods, see the host system documentation.

DD in Use displays the version number displayed in the format: device type.device revision. DD revision.

This method is available via the resource block.

Glossary

Algorithm

A set of logical steps to solve a problem or accomplish a task. A computer program contains one or more algorithms.

Alphanumeric

Consisting of letters and numbers.

ANSI (acronym)

The acronym ANSI stands for the American National Standards Institute

ANSI Class

Valve pressure/temperature rating.

Bench Set

Pressure, supplied to an actuator, required to drive the actuator through rated valve travel. Expressed in pounds per square inch.

Byte

A unit of binary digits (bits). A byte consists of eight bits.

Configuration

Stored instructions and operating parameters for a FIELDVUE Instrument.

Control Loop

An arrangement of physical and electronic components for process control. The electronic components of the loop continuously measure one or more aspects of the process, then alter those aspects as necessary to achieve a desired process condition. A simple control loop measures only one variable. More sophisticated control loops measure many variables and maintain specified relationships among those variables.

Controller

A device that operates automatically to regulate a controlled variable.

Deadband

Region around a reference point that must be exceeded before a new event occurs.

Deviation

Usually, the difference between set point and process variable. More generally, any departure from a desired or expected value or pattern.

Device ID

Unique identifier embedded in the instrument at the factory.

Drive Signal

The signal to the I/P converter from the printed wiring board. It is the percentage of the total microprocessor effort needed to drive the valve fully open. In most applications, drive signal ranges from 55% to 75%.

Feedback Arm

The mechanical connection between the valve stem linkage and the FIELDVUE Instrument travel sensor.

Feedback Signal

Indicates to the instrument the actual position of the valve. The travel sensor provides the feedback signal to the instrument printed wiring board assembly. A mechanical linkage connects the travel sensor to the valve stem or shaft.

Firmware

The combination of a hardware device and computer instructions and data that reside as read-only software on that device.

NOTE

1. This term (firmware) is sometimes used to refer only to the hardware device or only to the computer instructions or data, but these meanings are deprecated.
2. The confusion surrounding this term has led some to suggest that it be avoided altogether. The term is included here because of its use in older documentation and culture.

Gain

The ratio of output change to input change.

Hardware Revision

Revision number of the Fisher instrument hardware. The physical components of the instrument are defined as the hardware.

Incoming Ramp Rate

The rate at which the valve will move during the Incoming stroke of the Partial Stroke test. The default value is 0.25%/second.

Instrument Level

Determines the functions available for the instrument.

Leak Class

Defines the allowable leakage by a valve when it is closed. Leak class numbers are listed in two standards: ANSI/FCI 70-2 and IEC 534-4.

Linearity, dynamic

Linearity (independent) is the maximum deviation from a straight line best fit to the opening and closing curves and a line representing the average value of those curves.

Memory

A type of semiconductor used for storing programs or data. FIELDVUE instruments use three types of memory: Random Access Memory (RAM), Read Only Memory (ROM) and Non-Volatile Memory (NVM).

Non-Volatile Memory (NVM)

A type of semiconductor memory that retains its contents even though power is disconnected. NVM contents can be changed during configuration unlike ROM which can be changed only at time of instrument manufacture. NVM stores configuration restart data.

Octet

See byte

Outgoing Ramp Rate

The rate at which the valve will move during the Outgoing stroke of the Partial Stroke test. The default value is 0.25%/second.

Partial Stroke Test (PST)

The process of taking the valve from the normal end to a target position at a preconfigured ramp rate before returning to the normal end while gathering data.

Parallel

Simultaneous: said of data transmission on two or more channels at the same time.

Pressure Sensor

A FIELDVUE instrument internal device that senses the output pressure from the pneumatic relay.

Random Access Memory (RAM)

A type of semiconductor memory that is normally used by the microprocessor during normal operation that permits rapid retrieval and storage of programs and data. See also Read Only Memory (ROM) and Non-Volatile Memory (NVM).

Ramp Rate

See Incoming Ramp Rate and Outgoing Ramp Rate definitions.

Rate

Amount of change in output proportional to the rate of change in input.

Read-Only Memory (ROM)

A memory in which information is stored at the time of instrument manufacture. You can examine but not change ROM contents.

Seat Load

Force exerted on the valve seat, typically expressed in pounds force per lineal inch of port circumference. Seat load is determined by shutoff requirements.

Short Duration PST

During a Partial Stroke test, allows the incoming stroke to be initiated as soon as the travel reaches the minimum travel movement.

Software

Computer programs, procedures and possibly associated documentation and data pertaining to the operation of a computer system.

Temperature Sensor

A device within the FIELDVUE instrument that measures the instrument's internal temperature.

Test Start Point

The normal (not tripped) end of valve travel. The valve must be at this end for a Partial Stroke test to be initiated.

Travel

Movement of the valve stem or shaft which changes the amount the valve is open or closed.

Travel Sensor

A device within the FIELDVUE instrument that senses valve stem or shaft movement. The travel sensor in the DVC6200f is the Hall Effect sensor that measures the position of the magnet assembly.

Travel Sensor Motion

Increasing or decreasing air pressure causes the magnet assembly to move up or down or the rotary shaft to turn clockwise or counterclockwise. Device Setup asks if it can move the valve to determine travel.

Tuning

The adjustment of control terms or parameter values to produce a desired control effect.

Tuning Set

Preset values that identify gain and rate settings for a FIELDVUE instrument. The tuning set and supply pressure together determine an instrument's response to input signal changes.

Watch Dog Timer

A timer that the microprocessor must pulse periodically. If the microprocessor is unable to pulse the timer, the instrument shuts down.

Zero Power Condition

The position of the valve (open or closed) when the electrical segment power to the instrument is removed. Zero Power Condition (ZPC) is determined by relay and actuator action where: for Relay A and C, Port A will be at atmosphere pressure and if double-acting, Port B will be at supply pressure. For Relay B, Port B will be at supply pressure.

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