

4310 / 4320 Wireless Position Monitor OPC System Integration Guide

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This document will guide you through configuring OPC parameters that pertain to the 4310 and 4320 wireless position monitor.

For detailed information on the 4310 or 4320 wireless position monitor refer to the appropriate instruction manual, available at www.fisher.com or your Emerson Process Management sales office.

4310 Wireless Position Monitor Instruction Manual (D103391X012)

4320 Wireless Position Monitor Instruction Manual (D103392X012)



Introduction

The Smart Wireless Gateway enables IEC62591 WirelessHART® wireless, self-organizing devices to communicate with each other, and manages security and connectivity. The Gateway is the entry point for wireless device data that is then converted to a format that is compatible with other systems. System integration is possible with Modbus, OPC, or TCP/IP via Ethernet or serial connections. This document focuses on OPC system integration for the 4310/4320 wireless position monitor.

OPC Interface

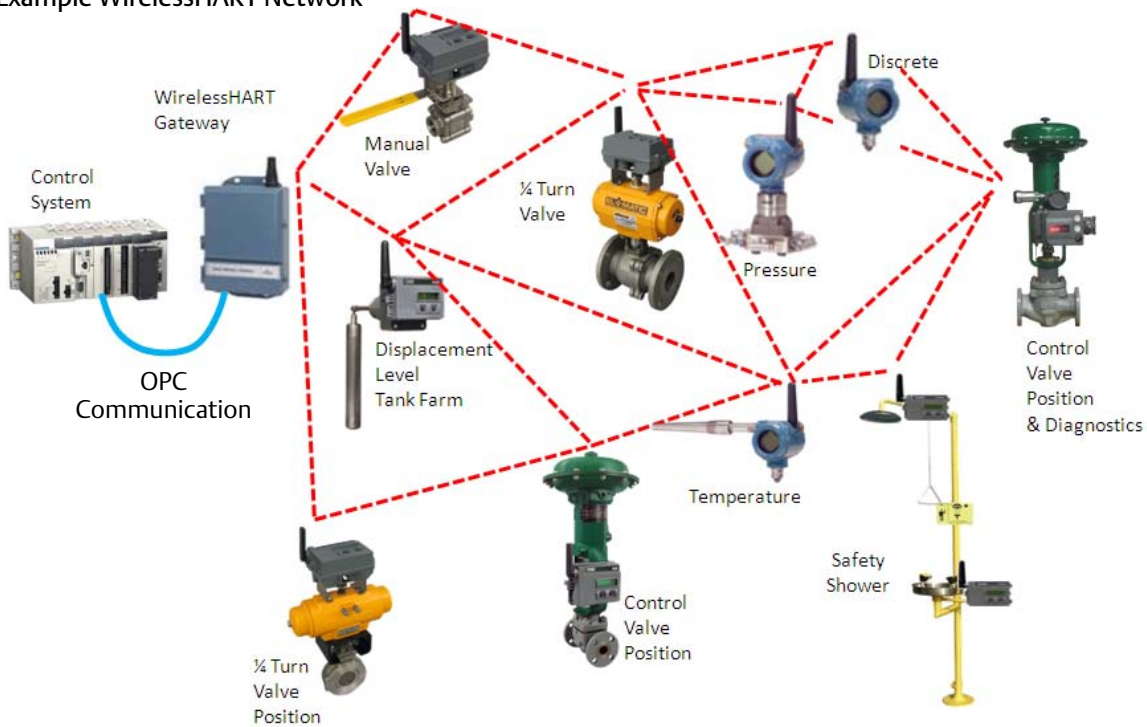
The Smart Wireless Gateway is equipped with one or two 10/100 Based-TX Ethernet communications ports. These connections can be used to access the Gateway's web interface and to communicate Modbus® TCP and OPC protocols.

The primary Ethernet port (Ethernet 1) is used to connect to the host system or other application systems. The secondary Ethernet port (Ethernet 2) can be used as a back up connection or a maintenance port for local access to the Gateway.

The OPC server in the Emerson SmartWireless gateway supports OPC DA v2, v3.

Refer to the Smart Gateway Reference Manual (00809-0200-4420) for cabling, wiring details and general Modbus communications set up.

Example WirelessHART Network

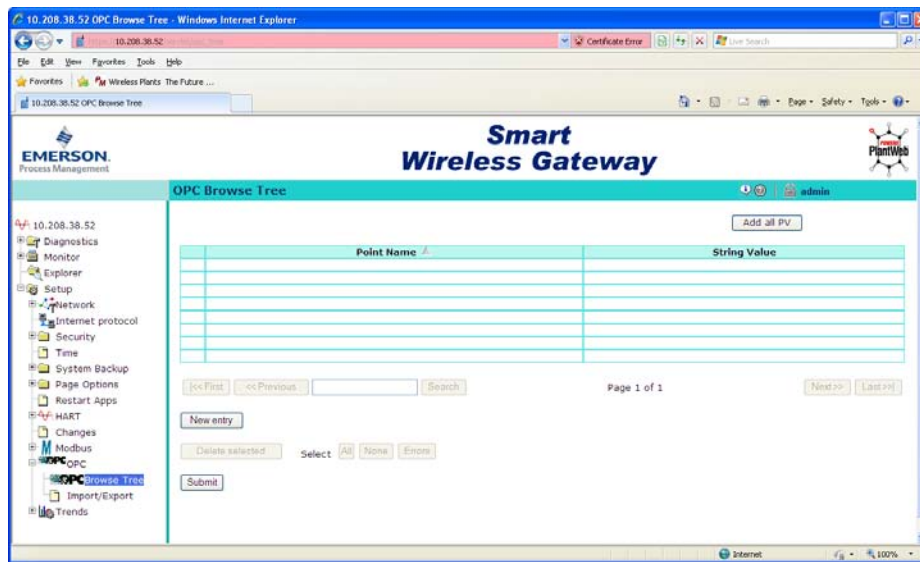


OPC Mapping Instructions using the Emerson Smart Wireless Gateway

To add a new data point to the OPC Browse Tree (see figure 1 for configuration screen layout):

1. Click New entry.
2. Complete all of the table entries for the new data point.
3. Repeat for each new data point.
4. Click Submit.
5. When changes have been accepted, click Return to form.

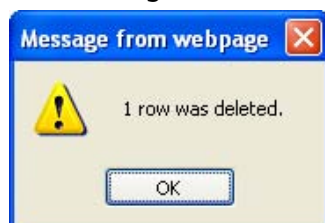
Figure 1. Configuration Screen



To remove a data point from the OPC Browse Tree:

1. Click on the box to the left of the Point Name to delete.
2. Click Delete Selected. A message similar to the one shown in figure 2 should appear.
3. Click OK.

Figure 2. Web Message

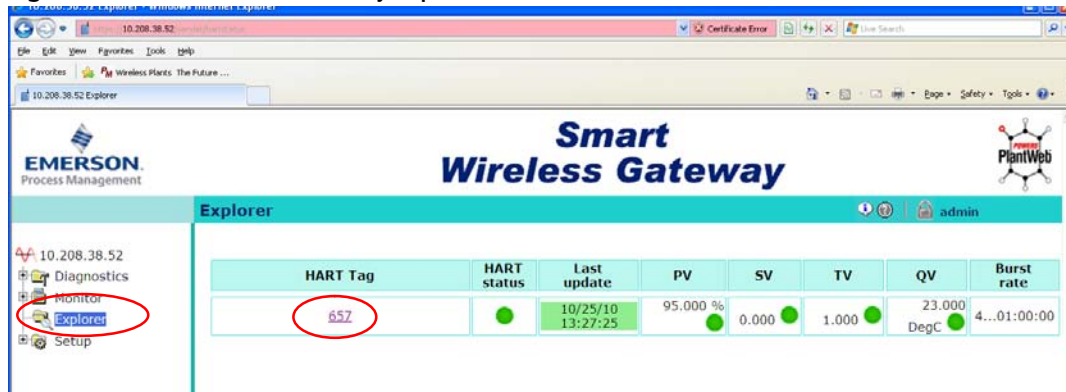


HART Tag

Locate the HART tag of the field instrument to map OPC data.

Click on Explorer on the left side, as shown in figure 3, then identify the appropriate tag. The example shows “657” as the tag of the 4310 or 4320 instrument. Re-tag the device using a handheld (such as the 475 Field Communicator) or go to HART > Device.

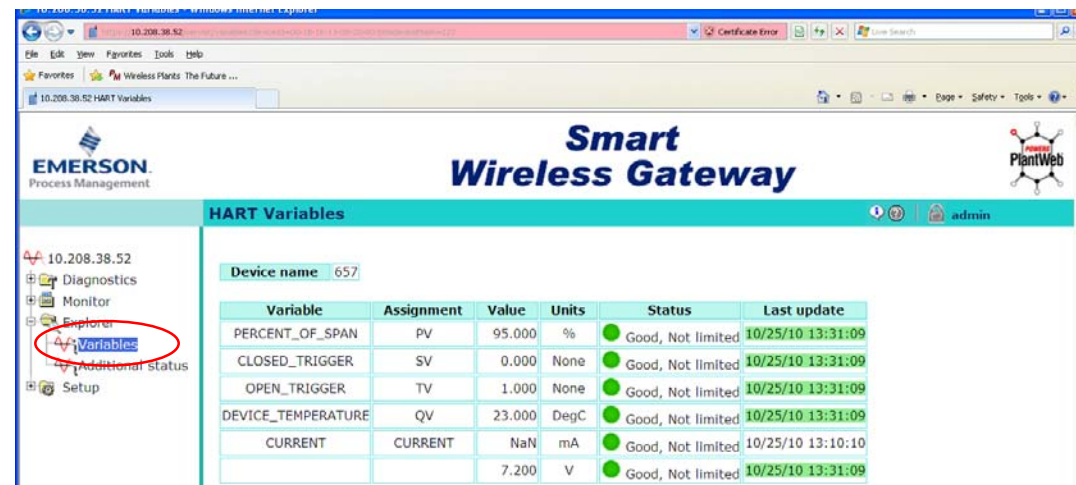
Figure 3. Smart Wireless Gateway Explorer



Standard HART Values

To determine the standard HART values to map, click on the Variables selection, as shown on the left side in figure 4, if there is more than one wireless device. Select the associated assignment values.

Figure 4. Variables



Note

Supply voltage has been assigned to variable 4 (not to be confused with QV).

Additional Status

To take advantage of other data values to be mapped, click on the **Additional status** icon on the left side of the desired tag as shown in figure 5. Select the associated assignment values as indicated in table 1 below.

Note

Values such as Bit0, Bit1, etc. with no other definition are not used by the wireless position monitor.

Figure 5. Additional Status

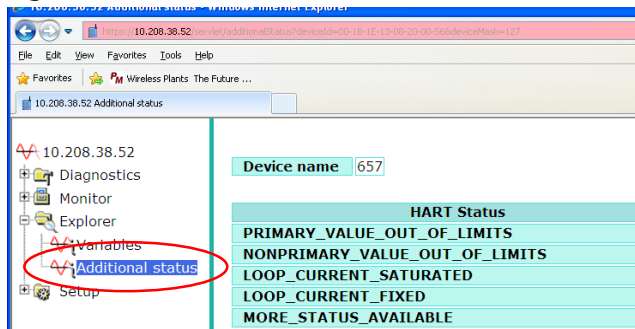


Table 1. Additional Status

HART Status	Additional Status 2	Additional Status 5	Standardized Status 1
PRIMARY_VALUE_OUT_OF_LIMITS	Bit 0	Bit 0	Bit 0
NONPRIMARY_VALUE_OUT_OF_LIMITS	Bit 1	Bit 1	Bit 1
LOOP_CURRENT_SATURATED	Bit 2	Bit 2	Bit 2
LOOP_CURRENT_FIXED	Bit 3	Bit 3	Bit 3
MORE_STATUS_AVAILABLE	Bit 4	Bit 4	Bit 4
COLD_START	Bit 5	Bit 5	Bit 5
CONFIGURATION_CHANGED	Bit 6	Bit 6	Bit 6
DEVICE_MALFUNCTION	Bit 7	Bit 7	Bit 7
			Analog channel saturated
Additional Status 0	Additional Status 3	Extended Status	Standardized Status 2
POSITION_SENSOR_LIMITED_LOW	Bit 0	MAINTENANCE_REQUIRED	SUBDEVICE_LIST_CHANGED
POSITION_SENSOR_LIMITED_HIGH	Bit 1	DEVICE_VARIABLE_ALERT	DUPLICATE_MASTER_DETECTED2
VALVE_CLOSED_ALERT	Bit 2	CRITICAL_POWER_FAILURE	Bit 2
VALVE_OPEN_ALERT	Bit 3		Bit 3
TEMPERATURE_LIMITED_HIGH	Bit 4		Bit 4
TEMPERATURE_LIMITED_LOW	Bit 5		Bit 5
LCD_TEMPERATURE_ALERT	Bit 6		Bit 6
CYCLE_COUNT_ALERT	Bit 7		Bit 7
Additional Status 1	Additional Status 4	Operating Mode	
EVENT_LOG_NOT_EMPTY	Bit 0	Standardized Status 0	Standardized Status 3
BATTERY_WARNING_GETTING_LOW	Bit 1	SIMULATION_ACTIVE	CAPACITY_DENIED
SENSOR_MODULE_ERROR	Bit 2	NONVOLATILE_MEMORY_DEFECT	DUPLICATE_MASTER_DETECTED3
Bit 3	Bit 3	VOLATILE_MEMORY_DEFECT	BANDWIDTH_ALLOCATION_PENDING
Bit 4	Bit 4	WATCHDOG_RESET_EXECUTED	BLOCK_TRANSFER_PENDING
Bit 5	Bit 5	VOLTAGE_CONDITIONS_OUT_OF_RANGE	Bit 4
Bit 6	Bit 6	ENVIRONMENTAL_CONDITIONS_OUT_OF_RANGE	Bit 5
Bit 7	Bit 7	ELECTRONIC_DEFECT	Bit 6
			Bit 7

Configuration Examples

Example 1: Using Analog Point Data Values

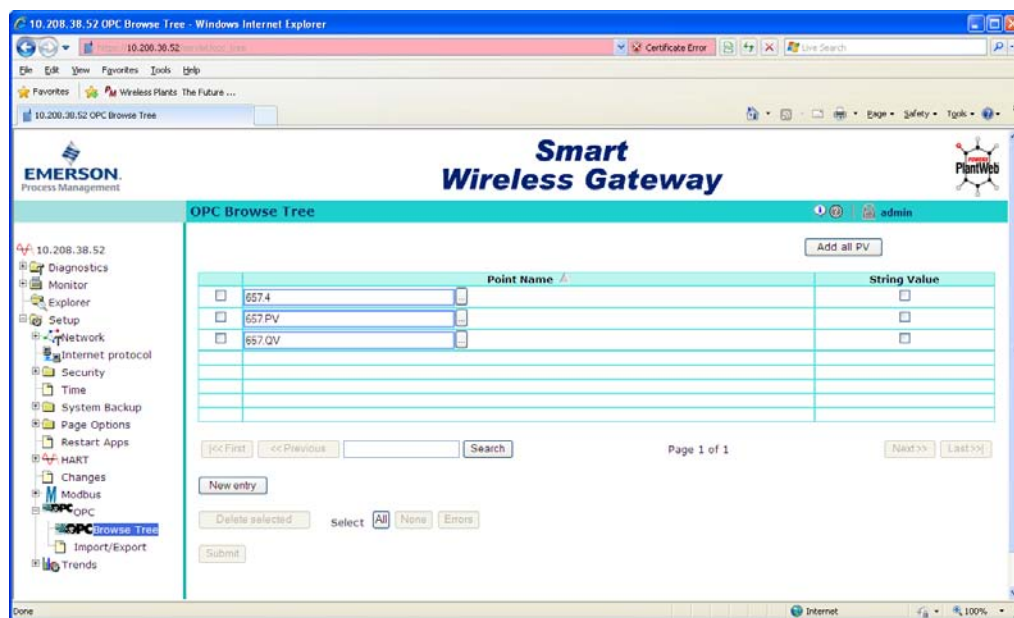
Map the following data using floating point registers in the 40001 to 50000 range:

- % of span feedback (position) tag.PV
- internal device temperature tag.QV
- power module voltage tag.4

Note

It is recommended to schedule power module maintenance when the power module warning (BATTERY_WARNING_GETTING_LOW) occurs. This is at approximately 6.5 volts at room temperature. The device contains a “remaining days left” indication that is available at the local user interface or using AMS Device Manager. This value is updated once per day and is affected by the device’s update rate plus the update rate of the number of device(s) reporting through this device as well their update rates. The critical power failure indication occurs at approximately 6.0 volts.

Figure 6. Mapping OPC Data using Analog Point Data Values



Note

The order in which the point name information appears on the web interface may change after they have been submitted.

Example 2: Using Bit Data Values

Map the data below using bit values:

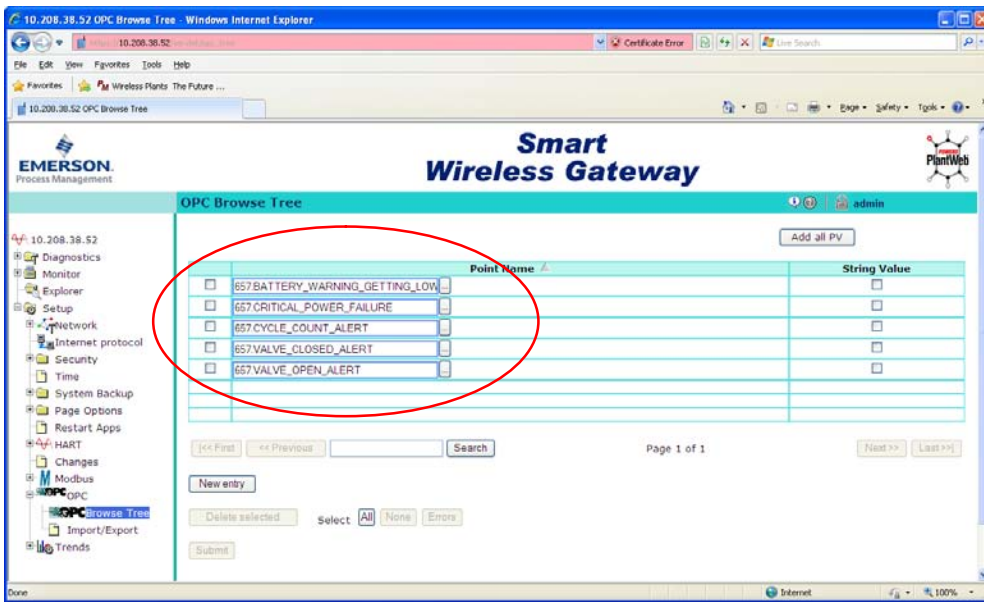
- closed state tag.VALVE_CLOSED_ALERT
- open state tag.VALVE_OPEN_ALERT
- power module needs replacing tag.BATTERY_WARNING_GETTING_LOW
- power level is critical tag.CRITICAL_POWER_FAILURE
- cycle count has been reached tag.CYCLE_COUNT_ALERT

Note

The open and closed alerts are disabled by default in firmware revision 1 of the 4310/4320 wireless position monitor . Refer to page 10 for additional information.

It is recommended to schedule power module maintenance when the power module warning (BATTERY_WARNING_GETTING_LOW) occurs. This is at approximately 6.5 volts at room temperature. The device contains a “remaining days left” indication that is available at the local user interface or using AMS Device Manager. This value is updated once per day and is affected by the device’s update rate plus the update rate of the number of device(s) reporting through this device as well their update rates. The critical power failure indication occurs at approximately 6.0 volts.

Figure 7. Mapping OPC Data using Bit Data Values



Example 3: Using Byte/Word Data Values

Map the data below using byte or word values. This is similar to example 2, however, this example uses the entire groupings.

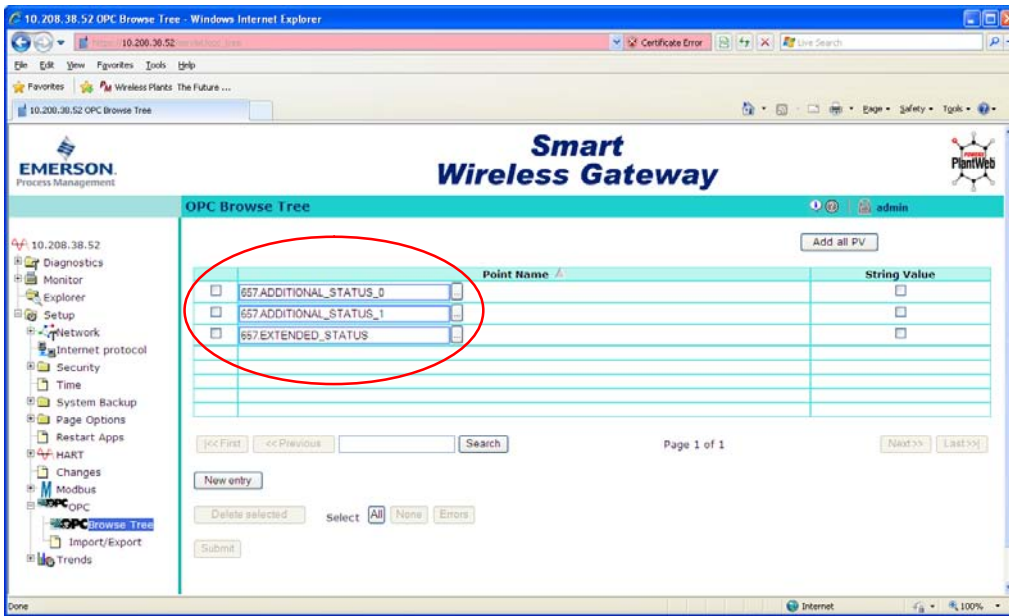
- Located in tag.Additional Status 0
 - closed state
 - open state
 - cycle count alert
- Located in tag.Additional Status 1
 - power module needs replacing
- Located in tag.Extended Status
 - power module needs replacing now

Additional Status 0	Bit
POSITION_SENSOR_LIMITED_LOW	0
POSITION_SENSOR_LIMITED_HIGH	1
VALVE_CLOSED_ALERT	2
VALVE_OPEN_ALERT	3
TEMPERATURE_LIMITED_HIGH	4
TEMPERATURE_LIMITED_LOW	5
LCD_TEMPERATURE_ALERT	6
CYCLE_COUNT_ALERT	7

Additional Status 1	Bit
EVENT_LOG_NOT_EMPTY	0
BATTERY_WARNING_GETTING_LOW	1
SENSOR_MODULE_ERROR	2

Extended Status	Bit
MAINTENANCE_REQUIRED	0
DEVICE_VARIABLE_ALERT	1
CRITICAL_POWER_FAILURE	2

Figure 8. Mapping OPC Data using Byte/Word Data Values



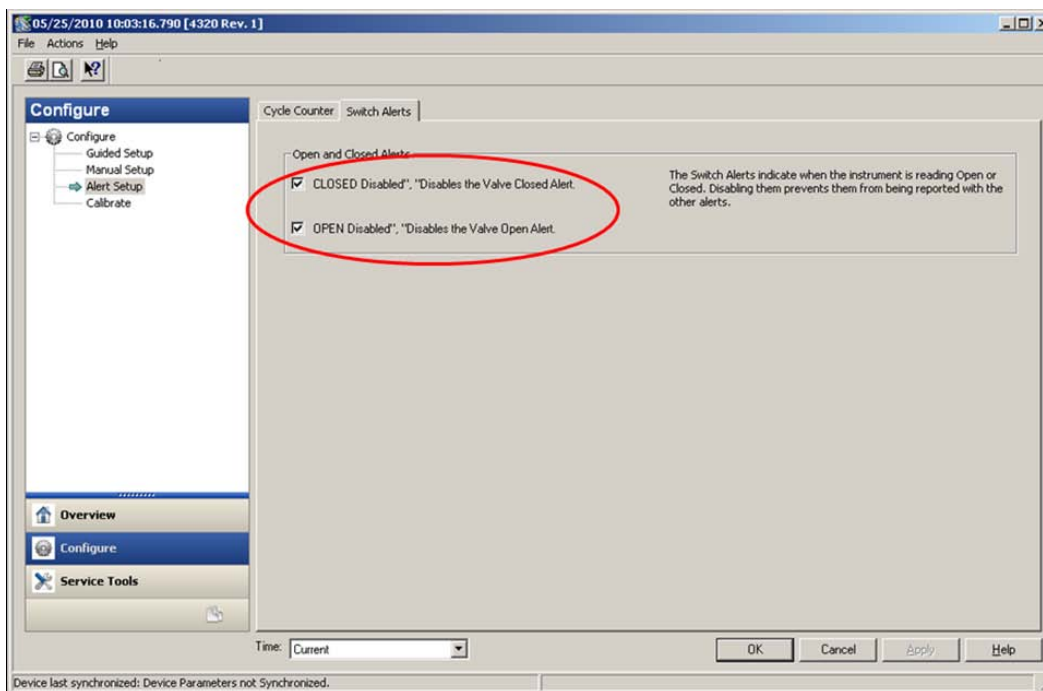
Open /Closed Alert Note

Note

Open and closed alerts are disabled by default in firmware revision 1 of the 4310/4320 wireless position monitor.

To enable open and closed alerts, use AMS Device Manager to open the wireless position monitor. Select Configure > Alert Setup > Switch Alerts.

Figure 9. Enabling Open and Closed Alerts



Definition of Wireless Position Monitor Values

Value from wireless position monitor

Value from Wireless Position Monitor	Data Type	Description
PV	float	Primary variable - % of span. Only in 4320 wireless position monitor.
SV	float	Secondary variable. Open State
TV	float	Tertiary variable. Closed State
QV	float	Quaternary variable. Internal temperature in degrees C.
4	float	Power module voltage.
PRIMARY_VALUE_OUT_OF_LIMITS	bit	Feedback array problems. Check mounting and calibration.
NONPRIMARY_VALUE_OUT_OF_LIMITS	bit	Problems with temperature and other device variables not related to position or switch state.
LOOP_CURRENT_SATURATED	bit	Invalid - no loop current with wireless position monitor.
LOOP_CURRENT_FIXED	bit	Invalid - no loop current with wireless position monitor.
MORE_STATUS_AVAILABLE	bit	Set when any bit in additional status is set.
COLD_START	bit	Set until first WirelessHART message is seen.
CONFIGURATION_CHANGED	bit	Set until configuration cache in gateway has been updated.
DEVICE_MALFUNCTION	bit	Replace 4310/4320 wireless position monitor.
POSITION_SENSOR_LIMITED_LOW	bit	Feedback array problems. Check mounting and calibration.
POSITION_SENSOR_LIMITED_HIGH	bit	
VALVE_CLOSED_ALERT	bit	Position determined as closed.
VALVE_OPEN_ALERT	bit	Position determined as open.
TEMPERATURE_LIMITED_HIGH	bit	Temperature above 80°C.
TEMPERATURE_LIMITED_LOW	bit	Temperature below -40°C.
LCD_TEMPERATURE_ALERT	bit	Temperature below -20°C, LCD has been disabled.
CYCLE_COUNT_ALERT	bit	Number of cycle counts has exceeded configured value indicating maintenance should be conducted.
EVENT_LOG_NOT_EMPTY	bit	An event is stored in the device log.
BATTERY_WARNING_GETTING_LOW	bit	Power level below 6.5 volts. Maintenance suggested soon.
SENSOR_MODULE_ERROR	bit	Error found with position sensor sub-assembly. Replace 4310/4320 wireless position monitor.
MAINTENANCE_REQUIRED	bit	Maintenance is required, Look at other additional status areas to determine specifics.
DEVICE_VARIABLE_ALERT	bit	Set when any variable alert bit is set.
CRITICAL_POWER_FAILURE	bit	Power level below 6.0 volts. Maintenance suggested immediately.
Operating mode	byte	Not applicable for the 4310/4320 wireless position monitor.
SIMULATION_ACTIVE	bit	Not applicable for the 4310/4320 wireless position monitor.
NONVOLATILE_MEMORY_DEFECT	bit	Error found with non-volatile memory. Replace 4310/4320 wireless position monitor.
VOLATILE_MEMORY_DEFECT	bit	Error found with volatile memory. Replace 4310/4320 wireless position monitor.
WATCHDOG_RESET_EXECUTED	bit	Scheduled processing failed to complete in time to prevent the hardware timer from attempting to restart the instrument. Note the configuration of the device and contact the supplier. Replace 4310/4320 wireless position monitor.
VOLTAGE_CONDITIONS_OUT_OF_RANGE	bit	Power module voltage out of range. Check power module levels and replace power module.
ELECTRONIC_DEFECT	bit	Electronic fault not related to the sensor module has been detected. Replace 4310/4320 wireless position monitor.

Analog channel saturated	byte	Not applicable for the 4310/4320 wireless position monitor.
SUBDEVICE_LIST_CHANGED	bit	Not applicable for the 4310/4320 wireless position monitor.
DUPLICATE_MASTER_DETECTED2	bit	Not applicable for the 4310/4320 wireless position monitor.
CAPACITY_DENIED	bit	This device has requested an update from the gateway and was denied. Change updated rate to resolve.
DUPLICATE_MASTER_DETECTED3	bit	Not applicable for the 4310/4320 wireless position monitor.
BANDWIDTH_ALLOCATION_PENDING	bit	This device has requested an update rate from the gateway and is waiting for approval.
BLOCK_TRANSFER_PENDING	bit	Not applicable for the 4310/4320 wireless position monitor.

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