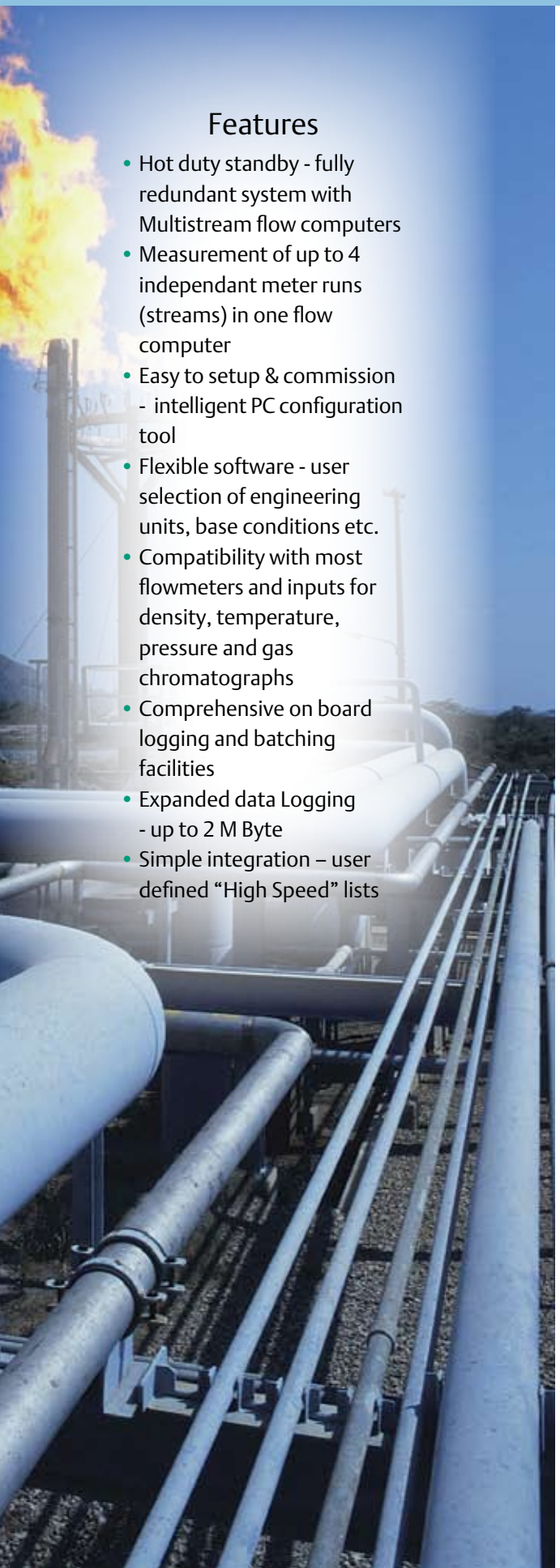
795X Flow Computers
for the gas industry

Remote Automation Solutions

EMERSON
Process Management

Reliable, accurate and versatile



Features

- Hot duty standby - fully redundant system with Multistream flow computers
- Measurement of up to 4 independant meter runs (streams) in one flow computer
- Easy to setup & commission - intelligent PC configuration tool
- Flexible software - user selection of engineering units, base conditions etc.
- Compatibility with most flowmeters and inputs for density, temperature, pressure and gas chromatographs
- Comprehensive on board logging and batching facilities
- Expanded data Logging - up to 2 M Byte
- Simple integration – user defined “High Speed” lists

795X Gas flow computer

The 795X gas flow computer range is suitable for metering natural gas in demanding fiscal and custody transfer applications. Three versions are available and build on the success of the previous Solartron flow computers.

- The 1510 gas flow computer software - is suitable for single stream applications, and runs on the 7951 hardware platform (see D301463X412 for details)
- The 1520 gas dual stream flow computer software is suitable for dual stream applications, and runs on the 7951 hardware platform (see D301463X412 for details).
- The 1540 gas multistream flow computer software - can measure up to 4 streams (meter runs) and interface with upto 4 gas chromatographs and runs on the 7955 hardware platform (see D301462X412 for details).

- All common engineering units for parameters such as temperature, pressure, density, calorific value, energy, flow, etc.
- These options cover metric units, imperial / English units and S.I. units, all are user selectable
- Displayed units and units used over communications ports are site selectable
- The conditions to which base, standard or reference volumes are referred are also site configurable eg. 1013.25 mbar, 14.7 psi, 0°C, 15°C, 20°C or 60°F etc.
- Two versions of hardware are available :
  7951 for most single and dual stream applications ask for data sheet D301463X412.
  7955 for applications with upto 4 meter runs (Streams), 5 serial communications ports and Ethernet communications.

Applications

- Gas metering to fiscal requirements
- Custody transfer
- Sales metering
- Pipeline distribution
- Allocation metering

Flow data acquisition and analysis

Hot duty standby

A complete redundancy solution in multi-stream flow measurement applications, hot duty standby allows two 7955 multi-stream flow computers to work together to give a fiscally secure measurement solution with in-built redundancy in the flow computers, with all of the advantages of multi-stream flow computers.

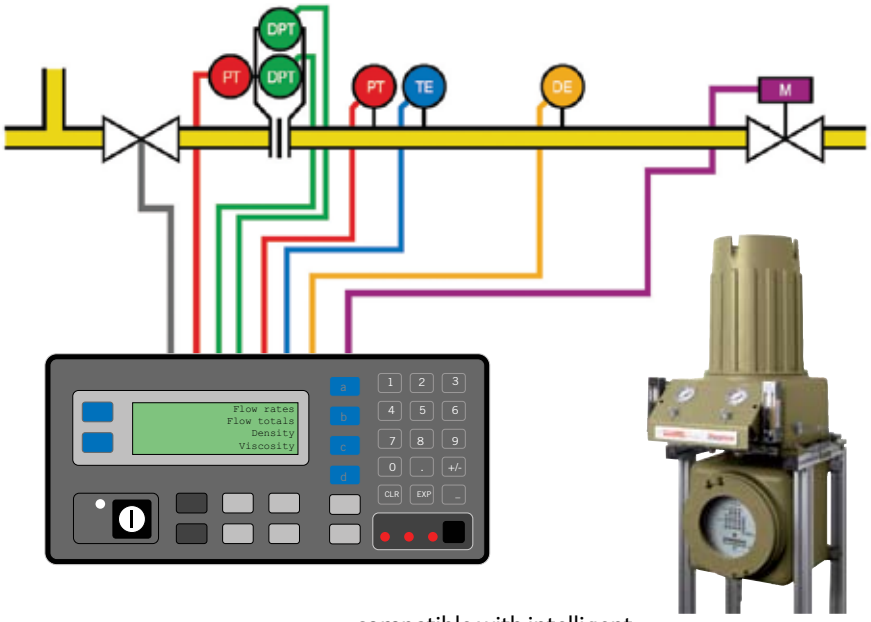
The two 7955 flow computers work together to maintain traceable historical and alarm reports and batches, even if one flow computer should malfunction/lose power.

Critical data such as valve status are frequently synchronised across the two flow computers using a Peer to Peer link. There is also an option to use an encrypted password to allow the totalisers of each flow computer to synchronise with each other, thus giving a seamless audit trail. This practice is becoming more acceptable worldwide, particularly as even in the event of a flow computer failure, the accuracy and integrity of the flow data is maintained without 'losing' any flow.

The system is highly efficient, accurate, and - especially for metering systems with many metering points - highly cost-effective.

Improved measurement uncertainty

Built-in facilities in the 7951 and 7955 significantly improve flow measurement uncertainty - essential for custody transfer applications - and also give improved product quality and reduced wastage.



Pulse Integrity:
With pulsed output type flow meters, e.g. turbine meters and some Coriolis or ultrasonic meters the integrity of pulses received by the flow computer is paramount. The 795X includes pulse Intergity checking to the highest level achievable – it meets the standard of Level A as specified in IP 252/76 & API Ch 5.5.

Linearisation:
The 15X0 Gas application software provides 10-point linearisation curves for correcting the inherent non-linearity of pulsed output type flowmeters or differential pressure primary elements such as venturi tubes

Analog Inputs:
With flow meters or transmitters that use an analog output, the accuracy and resolution of the receiving flow computer's analog to digital (A/D) converter is critical to accurate measurement, the 795X incorporates a 20 Bit A/D converter for resolution of better than 1 part per million.

Intelligent Transmitters:
The 15X0 Gas software is also compatible with intelligent transmitters and flow meters. Differential pressures, pressures, temperatures, densities or flow rates can be read using HART protocol or the flow computer can communicate with Intelligent transmitters or flow meters using Modbus commands to read digital process variables as well as valuable diagnostic data.

Transactions

The 15X0 Gas software generates and logs records - often known as batch records or quantity transaction records (QTRs) - of flow totals and other operating details. These can be initiated by a variety of methods, giving total control over their generation, and enabling flow total for each shift or day to be recorded.

Time: A new batch is triggered automatically, typically every hour, shift or day.

Manual: Batches are triggered and stopped manually on demand from the keypad or via a remote comms input.

Daily Batch: a new batch is triggered automatically when the 'contract hour' is reached.

Communications

The 795X has been specifically designed to simplify integration into supervisory systems and networks. It has up to five RS232 and RS485 serial ports supporting MODBUS (ASCII & RTU, IEEE 32 bit and IEEE 64 bit data) and an independant Ethernet port supporting Modbus over TCP/IP.

Any of the 5 serial communications ports can be configured on site to be a slave, master, printer driver or peer.

The 15X0 supports the following Modbus commands:-

- 03 Read holding registers
- 16 Write / Preset multiple registers

The use of 'High Speed Lists' enables all critical parameters to be grouped together within single data base lists, in any order. This grouping then allows the use of more efficient multiple read & multiple write commands, rather than individual locations. These high speed Lists lists can be positioned anywhere within the 0001 to 65,000 Modbus range for maximum compatibility.

The process variables and other values that are transmitted via the communications ports can be in user defined engineering units (metric, imperial/English, US, SI, or a mixture) further simplifying integration.

Flow totals

Along with the main fiscal totals associated with gas flow measurement; un-corrected, corrected, standard, mass and energy totals for each stream, the 795X provides the user with the following additional totals as standard options:-

Station totals
On multi-stream applications, the totals from each stream can be summed or subtracted in order to give various station and sub-station totals.

Forward, Reverse and Net totals
On pipeline applications where bi-directional flow is encountered, the 15X0 software can totalise the forward flow in separate totalisers from the reverse flow and also provide the net flow totals.

Tariff (premium)
The 15X0 software includes 4 additional sets of tariff totals for each stream. These tariff totals allow for the gas flow to be totalised within different totalisers depending on the given flow rate at that time. The feature allows sellers to bill for gas at different premium rates depending upon pre-agreed contracts, for example allowing premiums to be charged should the flow rate exceed certain thresholds.

Report generation and logging

Comprehensive report generation facilities are an integral part of the 15X0 gas flow computer. Standard reports include a complete listing of configuration data; an alarm report; and a listing of 'auditable events', which shows any critical changes made to the operation of the flow computer, such as flow and calibration parameters.

In addition, user-defined reports can be created to generate listings of specified data manually or at pre-determined intervals. All reports can be printed or downloaded when required.

Built-in reliability

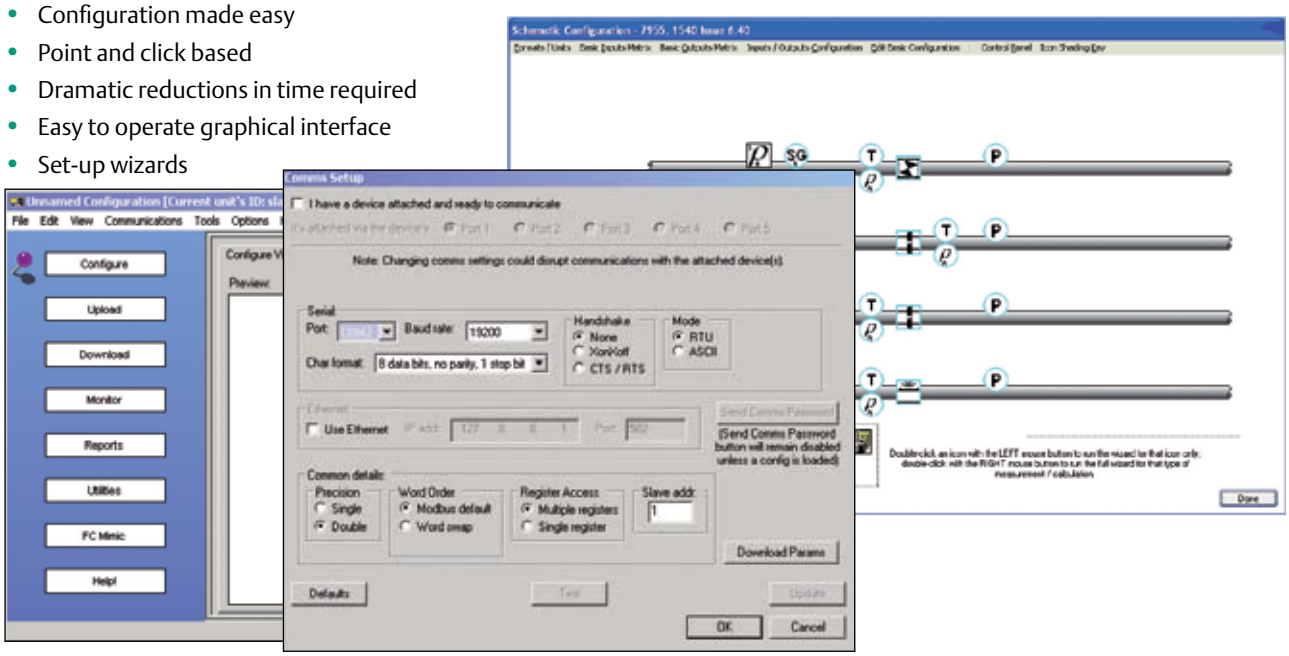
The 15X0 software internal database is continually updated from input channels. Measurement critical data is stored in non-volatile memory, and is triplicated and cross-validated to ensure data remains uncorrupted.

Compatible flowmeters

- Turbines - single or dual pulse
- Coriolis - mass or volume
- Ultrasonic time of flight
- Differential pressure
  - Orifice
  - Venturi
  - Dall tube

Point and click PC based configuration

- Configuration made easy
- Point and click based
- Dramatic reductions in time required
- Easy to operate graphical interface
- Set-up wizards



PC_Config

PC_Config is an intelligent Windows PC based software tool that makes dramatic reductions in the time required for configuration of flow computers in fiscal and custody transfer applications. PC_Config allows engineers to set up complete flowmetering systems in a fraction of the time traditionally required for the task.

PC_Config makes the task of configuring both single and multistream flow computers much simpler and the graphical interface makes it easy to operate. 'Point-and-click' icons are used to assemble a measurement task diagram and to identify measurement and alarm points, batching, communication and logging functions. The software then calls on its built-in instrument set-up wizards to create a database showing exactly what information is required for the chosen measurement task: alarm limits, failure modes, communications options, batching, logging etc. With basic metering principles the engineer or technician simply fills in the blanks.

With PC_Config the configuration is typically completed in an office environment and simply downloaded on to the flow computer when it is ready. Edits are automatically time and date stamped to provide an audit trail and there is a built-in reports function for automatic documentation of the process.

In addition, the PC_Config features a virtual flow computer front panel which can be used on-line for live remote control of the flow computer, for trouble shooting and diagnostics, or off-line for training purposes.

FC_BASIC

FC_BASIC is a powerful tool that allows the standard application software to be customized to satisfy the individual site requirements, without the need to issue special application software. 'BASIC' routines can be quickly written to interface to the flow computer database and carry out a selection of special logic functions or scientific calculations.

Typical uses of FC_BASIC are :-

- Additional valve control logic
- Special event driven reports/ data logging

Further information

The range of gas flow computers is based on the successful 795X hardware platform, for specific details ask for technical bulletins:

D301463X412	7951 Specification sheet
D301462X412	7955 Specification sheet
D351485X412	795X Flow computer for liquid applications

Outline functional specification

Calculates	Indicated volume rate & total Gross volume rate & total Energy rate & total Indicated standard volume rate & total Mass rate & total Line density Base density
Conforms to	ISO5167 AGA3 AGA5 AGA8 Gas fractions up to C12 SGERG NX19 NX19-MOD, NX19-MOD3H GOSST, VDE/VDI 2040 GOSST RD 50-213-80 De-Leeuw, Murdoch, Chisolm ISO6976
Monitors, trends & alarm checks:	Temperature, pressure, density and base density
Batch transactions:	Manual, time-based and daily
Alarms:	System; input; limit. All alarms and significant events are logged to facilitate an audit trail
Security:	Via keyswitch or three password levels
Logging & reports:	Pre-formatted reports containing fixed and user selected data User-configurable reports

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