7951 flow computer specification

- Expanded data logging facility
- Pulse integrity to IP 252/76, API Ch 5.5 Level A
- 3 Serial communications ports
- High resolution 20 bit A/D converter for analog inputs
- Gas applications 1 or 2 meter runs (streams)
- Liquid applications 1 meter run (stream) and proving
- Reduced cycle time

Introduction

The 7951 flow computer can be utilised for single stream liquid or gas applications, dual stream gas applications and liquid proving.

For applications with up to 4 streams please ask for details of the 7955 Multistream Flow Computer.

Connectors

The 7951 is available with 2 types of connector for termination of field signals :-
Klippon connectors with screw terminals are generally used for single stream applications and some dual stream applications.
'D'- type connectors are generally used for applications with 1 or 2 streams and where proving is required on liquid.

Inputs

Density/Base density/Viscosity

No. of inputs	4
Periodic time	100µs to 5000µs
Periodic time uncertainty	± 6ppm typical
Input trigger level	0.5V Max. input level: 30V
Resolution	1ns at 1.5kHz for 1 second sampling
Input impedance	10kΩ nominal

Pulsed flow meter inputs: typically turbine, PD meter, ultrasonic or Coriolis

Number of inputs	2 (software configurable as either single or dual pulse) [1 off with Klippon connectors]
Pulse integrity checking	IP 252/76, API Ch 5.5 Level A
Pulse interpolation/dual pulse chronometry	API MPMS Ch 4.6
Type	Pulse count, maximum rise time 80ms
Input trigger level	0.5V
Max. voltage level	30V
Frequency range	Dual pulse (A & B) 0 to 5kHz , minimum pulse with 100µS Single pulse 0 to 10KHz, minimum pulse width 50µS

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Analog	
Number of inputs	4 as standard, option of 10 (D-type connectors) 8 (Klippon connectors)
Type	4 to 20 mA, 0 to 20 mA
Span selection	Unlimited (keyboard selectable)
Uncertainty	< ± 0.008% full scale
Resolution	20 bit (1 part per million)
Sampling time	50 ms per channel

Temperature - PRT / RTD		
Number of inputs	4 (using the first four analog channels)	
Configuration	4 wire: Power return line connected to analog input ground	
Temperature range	-220°C to + 220°C for 100Ω PRT	
Limits of error and resolution (100Ω PRT calibrated in region of operation)	Maximum error ± 0.05°C	Resolution ± 0.02°C
Sampling cycle time	50ms per channel	

Status	
Number of inputs	'D' type connector 10 standard, option of 18, Klippon Connector 6.
Input voltage required	5 - 24V per channel
Update rate	0.5ms for prove detect, others 250ms max.

HART	
Number of inputs	8 variables Up to 2 HART loops Point to point and multi drop support (each loop uses an analog input channel)
Sampling time	400 ms per active transmitter

Power	
Voltage	+21V to + 30V dc
Power consumption	Unloaded: 20 watts (max.) Loaded: 35 watts (max.) Max start up current 2A
Transducer energisation: General instrumentation Flowmeter	 One independent 24V output, @ 800mA One independent voltage switchable to 8 or 16V. @ 120mA

Outputs

Analog	
Number of output channels	4 as standard [8 with option board fitted]
Type of output	Current (Powered by FC)
Power	One 24V supply with capacity for 8 outputs @25mA each
Max. loop impedance	1K Ω
Type	4 to 20 mA or 0 to 20 mA (selectable)
Zero offset	20% or 0% (Keyboard selectable)
Span selection	Unlimited (Keyboard selectable)
Accuracy	12 bit (±0.075% of full scale)
Resolution	1 part in 3500
Output impedance	1MΩ minimum
Output representation	Any measured or computed value (Keyboard selectable)
Update rate	0.1 seconds minimum
Isolation	All analog outputs are galvanically isolated from ground (but not from each other)

Pulse Outputs	
Number of outputs	'D'-Type connectors - 5, Klippon Connectors - 3
Type	Open collector
Output rating	200mA @ 24V with programmable on-time
Switch voltage	24V maximum
Maximum frequency	10 Hz

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Status/Alarms	
Number of outputs	'D'-Type connectors, 9 standard, option of 17, Kippon connectors 7
Type	FET open drain and 1 off relay (0.5 Amp DC)
Rating	250mA @ 24V
Switching voltage	24V

Communications – Serial	
Number serial ports	3
Type:	RS 232 or RS 485 (selectable) Port 1 is RS 232
Software protocols:	Modbus ASCII, RTU (Master, Slave & Peer) Data type IEEE 32 & 64 Bit commands 03 and 16
Baud rates:	300, 600, 1200, 2400, 4800, 9600, 19200 baud
Stop bits:	Selectable 1 or 2
Parity bits:	Even, odd or none
Number of data bits:	Selectable 7 or 8

Displays	
Number of characters per line:	20 Alpha numeric
Number of lines:	4
Colour of display:	Black/yellow (back lit) Type: LCD, continuously powered

Microprocessor	
Processor:	Motorola
Clock speed:	24 MHz
Computation resolution:	64 Bit (IEEE 754), fully floating point maths package Embedded OSE Real time operating system
Program storage:	2.0 MByte Flash
Data storage:	2.0 MByte RAM
Computation accuracy:	< 1 part in 10^{11}
Process data retention:	Internal lithium cell, 24 months when 7951 is unpowered

Real time clock	
Accuracy:	1 part in 90000
Power:	Internal lithium button cell

Environment	
Storage temperature:	-20°C to + 70°C (-4°F to + 158°F)
Working temperature:	0°C to + 50°C (+32°F to + 122°F)
Humidity:	Up to 90% non-condensing

Physical	
Enclosure:	IP50 from front panel when mounted
Dimensions:	Height 101 mm (3.98") Width 197 mm (7.76") Depth 257 mm (10.1")
Weight:	2.5 Kg (5.5lb)
Vibration:	Tested to IEC 60068-2-6, Part II, frequency range 10 - 150Hz, max acceleration 20m/s^2
EMC Emissions & Immunity:	EN 61326-1997 Industrial locations Emissions EN 55022 & Immunity EN 61000-4

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Ordering codes

7951 EA	Flow Computer		
	A	Klippon connector *note 1,2*	4 analog i/p's as standard (8 analog inputs if option 8 below)
	B	D-type connectors *note 1,2*	4 analog i/p's as standard (10 analog inputs if option 8 below)

Code	Software application *note 4*	
1	Gas applications	- 1510 Single stream Flow Computer software
2	Gas applications	- 1520 Dual stream Flow Computer software
6	Liquid applications	- 2510 Single stream Flow Computer software
Z	Non standard	- please specify full version and issue number with order

Code	Communications ports
3	Three serial comms ports

Code	Analog inputs and outputs *note 2*
4	4 analog inputs and 4 analog outputs
8	8 (Klippon) OR 10 ('D'-Type) analog inputs and 8 analog outputs

Code	Option boards
N	None
H	2 Channel HART board

Code	Connector kits for use with 25 way D-Type connectors *3*
N	No connector kits required
5	5 connector kits for use with 7951 EA B

Code	Configuration tool
N	Not required
B	PC Config and Serial Communications cable

7951 EA	A	1	3	4	N	N	B

Note
1 Option 7951 EA **A** has 1 dual pulsed flowmeter input, for dual stream applications with pulsed flowmeter inputs use option **B**
2 For liquid proving - 'D' -Type connectors and extra Analog I/O (option 8) must be specified
3 Connector kits are not needed with Klippon connectors (option A), they are recommended with D-type connectors (option B), each kit includes a 1.8m cable and a Din rail mounted connector block with screw terminals.
4 Software supplied will be latest issue of software, unless otherwise specified on order

For further details about the 7951 flow computer capability and functionality please see
D351484X412 for liquid hydrocarbon applications
D351485X412 for gas applications

For Multistream Flow Computer applications please ask for details of the 7955 Flow Computers data sheet D301462X412.

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