TI-P333-29
EMM Issue 5

M850-W and M850-P Flow Computers

Description

The M850 is a flexible and easy to use flow computer that accurately calculates mass and energy flow for steam, gas and liquids across a wide variety of applications.

Standards

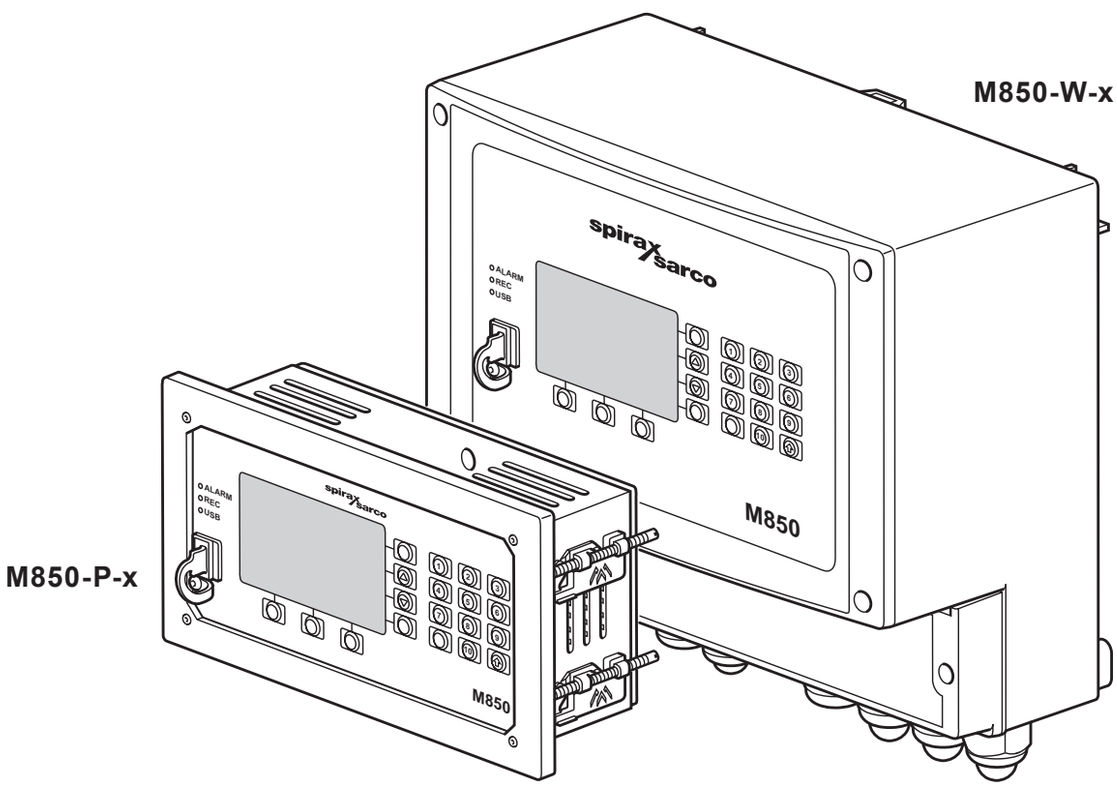
These products fully comply with the requirements of the European Directives and UK Legislations and carry both the UKCA and CE markings.

In addition there is an cULus certified version of the wall mount variant available

The M850 is available with the following certification:

- Uncertainty Certificate / Inspection Report.

Note: All certification / inspection requirements must be stated at the time of order placement.



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Available options

Both versions of the M850 series have the same functions and are available as follows:

M850-P	for panel mounting and is powered by 24 Vdc.
M850-W	for wall mounting and has been adapted to be powered by 100 / 240 Vac.

Additionally, each version can be optionally equipped with one or two analog outputs 4-20 mA.

Offered versions of the instruments:

M850	-x	-x	-x	
	-P			**Panel mounted version**. (CE and cULus approved as standard)
	-W			**Wall mounted version** (CE approved as standard, cULus approval optional)
		-0		Option **without** analog **4-20 mA output**.
		-1		Option **with** one analog **4-20 mA output**.
		-2		Option **with** two analog **4-20 mA outputs**.
			-UL	Option with cULus approval (required for wall mount version only)

Technical data for the M850 series flow computers

User interface, front panel	
Display type	LCD TFT color, 3.5", with LED backlight
Display size / resolution	43.8 mm x 77.4 mm / 272 (RGB) x 480 px,
LED indication	3 two-color LEDs, red / green: ALARM, REC, USB
Keyboard	19 membrane buttons

Inputs organisation		
Number of inputs	6 x I type (0/4-20 mA):	IN1, IN2, IN3, IN4, IN5, IN6
	3 x RTD (4-wire):	IN7, IN8, IN9
	3 x PULS:	IN10, IN11, IN12

Technical data for the M850 series flow computers continued on next page

Technical data for the M850 series flow computers

I type (0/4-20 mA current loop analog inputs)	
Signal type	0-20 mA or 4-20 mA
Transmitter connection	2-wire passive transmitter (supplied from M850) or active transmitter (current source transmitter)
Input resistance	95 Ω ±10% (protected with PTC 50 mA fuse in series)
Transmitters supply	24 Vdc +10%/ -20%; max 22 mA per channel (protected with PTC 50 mA fuse and 100 Ω resistor in series)
A/C converter resolution	18 bit (24 bit Sigma-Delta ADC)
50 Hz / 60 Hz filter	Sinc3 digital filter
Damping (1st order Low Pass Software Filter time constant)	2 s / 5 s / 10 s / 20 s / 30 s / 1 min / 2 min / 3 min / 5 min
Measurement resolution	> 0.01% of FS
Accuracy (at T_{amb} = +25 °C / +77 °F)	±0.1% of FS (typical Ω0.05% of FS)
Temperature drift	Maximum ±0.02% of FS / °C
Maximum input voltage	±40 Vdc / SELV
Galvanic isolation between inputs	No; common potential of functional GND for all inputs
Galvanic isolation to Analog Outputs, RS-485 / RS-422, Ethernet	250 Vac continuous; 1500 Vac for 1 minute

RTD type (3 analog inputs for temperature sensors)	
Sensor types	Pt-100 x K; Ni-100 x K; where K = 1..11 (K – multiplier, e.g.: K = 2 for Pt-200)
Measuring range	-200 .. +850 °C /-328 .. +1562 °F for Pt100 x K -60 .. +150 °C / -76 .. +302 °F for Ni100 x K
Sensor connection	4-wire (2-wire with wire bridges)
Wire resistance compensation	Automatic , additional manual in range -99.99 .. +99.99 Ω
Maximum resistance of connecting wires	50 Ω
A/C converter resolution	18 bit (24 bit Sigma-Delta ADC)
50 Hz / 60 Hz filter	Sinc3 digital filter
Damping (1st order Low Pass Filter time constant)	2 s / 5 s / 10 s / 20 s / 30 s / 1 min / 2 min / 3 min / 5min
Measurement resolution	> 0.05% of reading or 0.1 Ω (TBV)
Accuracy (at T_{amb} = +25 °C / +77 °F)	±0.5 °C / ±0.9 °F (typical ±0.3 °C / ±0.54 °F)
Temperature drift	Maximum ±0.02 °C / °C / 0.036 °F / °F
Max input voltage	±40 Vdc / SELV
Galvanic isolation between inputs	No; common potential of functional GND for all inputs
Galvanic isolation to Analog Outputs, RS-485 / RS-422, Ethernet	250 Vac continuous; 1500 Vac for 1 minute

Technical data for the M850 series flow computers continued on next page

Technical data for the M850 series flow computers (continued)

PULS type inputs (binary / pulse / frequency)	
Measuring range	0 .. 20 kHz (cut off for f < 0.001 Hz) (0 ..1 kHz with filter jumper J1 / J2 / J3 ON)
Minimum pulse width	25 µs (0.5 ms with filter jumper J1 / J2 / J3 ON)
Accuracy for frequency measurement (at T_{amb} = +25 °C / +77 °F)	0.02%
Maximum input voltage	±40 Vdc / SELV
Galvanic isolation between inputs	No; common potential of functional GND for all inputs
Galvanic isolation to Analog Outputs, RS-485 / RS-422, Ethernet	250 Vac continuous; 1500 Vac for 1 minute
Configuration (default): OC or Contact open / closed	(Internal jumper J4 / J5 / J6 ON)
Open circuit voltage	5 Vdc
Short circuit current	5 mA
On / off threshold	2.7 V / 2.4 V
Configuration: Voltage Input	(Internal jumper J4 / J5 / J6 OFF)
Signal amplitude	4 .. 36 Vdc
On / off threshold	2.7 V / 2.4 V
Input resistance	≥10 kΩ
Maximum switching power	750 VA / 90 W
Compensated flow and heat energy measurement	
Calculation update rate	1 s
Total accuracy of compensated steam, water, other liquid or technical gas flow measurement	Typical: better then ±0.5% (worst case: better then ±2%)
4-20 mA analog output (optional)	
Number of outputs	1 or 2
Output signal	4-20 mA passive (external current loop supply required)
Resolution	16 bit DAC
Loop resistance (R_L) range for U_{cc} = 24 V	0 .. 600 Ω
Minimum loop power supply voltage	U_{CCmin} = RL x 0.022 + 8
Maximum loop power supply voltage	28 Vdc / SELV
Accuracy (at T_{amb} = +25 °C / +77 °F)	Better than ±0.2% of FS / °C
Temperature drift	Maximum ±0.02% of FS / °C
Galvanic isolation to Analog Inputs, RS-485 / RS-422, Ethernet	250 Vac continuous; 1500 Vac for 1 minute

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Technical data for the M850 series flow computers continued on next page

Technical data for the M850 series flow computers (continued)

Binary outputs (M850-W-x and M850-W-x-UL)	
Number of outputs	4
Type of outputs	3 pole (COM, NO, NC) electromechanical relay
Contact rating (resistive load)	3 A at 85 .. 250 Vac / 30 Vdc
Maximum switching voltage	250 Vac / 125 Vdc
Binary outputs (M850-P-x)	
Number of outputs	4
Type of outputs	2 pole Solid State Relay
Contact rating (resistive load)	0.1 A at 24 Vac/dc (max 42 Vac 60 Vdc) / SELV
Maximum ON resistance	20 Ω
Galvanic isolation (optoisolation)	250 VAC continuous; 1 500 Vac for 1 minute
RS-485 / RS-422	
Transmission protocol	ASCII, Modbus RTU, BACnet MSTP, GSM
Number of nodes in network	256
Maximum line length	1 200 m (depends on quality of data cable and baud rate)
Baud rate	2.4, 4.8, 9.6, 19.2, 38.4, 57.6, 115.2, 230.4 kbps
Parity control	Even, Odd, None
Frame	1 start bit, 8 data bits, parity 1 bit, 1 stop bit
Internal terminating resistor	Yes, activated with DIP switch
Maximum bus terminal voltages	-8 V … +13 V / SELV
Minimal driver differential output voltage	1.5 V (for R_L = 54 Ω)
Minimum receiver sensitivity	200 mV
Short-circuit / thermal protection	Yes
Galvanic isolation to Analog Inputs, Analog Outputs, Ethernet	250 Vac continuous; 1 500 Vac for 1 minute

Technical data for the M850 series flow computers continued on next page

Technical data for the M850 series flow computers (continued)

Ethernet port	
Transmission protocol	Modbus TCP, ICMP (ping), DHCP server, http server, BACnet IP
Interface	10 BaseT Ethernet
Data buffer	300 B
Number of opened connections (simultaneously)	4
Connection type	RJ-45 / SELV
LED indication	2 (build in RJ-45 socket)
USB port	
Socket type	A type, according to USB standard
Version	USB 2.0
Recording format	FAT16 (within a limited scope)
Power supply (M850-W-x and M850-W-x-UL)	
Rated supply voltage	100 - 240 Vac; 50 / 60 Hz ∿
Supply voltage range	85 .. 264 Vac; 47 .. 63 Hz ∿
Power consumption	Maximum 20 VA
Over voltage category	CAT III
Power supply (M850-P-x)	
Rated supply voltage	24 Vdc ⎓ (SELV and Limited Energy Supply)
Supply voltage range	18 .. 36 Vdc ⎓
Power consumption	Maximum 8 W
Wire terminals (M850-W-x and M850-W-x-UL)	
Wire connection / terminals	Spring type terminal block
Conductor cross section	Solid 0.2 .. 2.5 mm² Stranded 0.2 .. 1.5 mm² Stranded with ferrule 0.25 .. 1.5 mm² AWG 26 .. 12
Non cULus version cable entry	4 glands type M20, 2 glands type M16
cULus version cable entry	4 conduit hubs ½" NPT

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Technical data for the M850 series flow computers continued on next page

Technical data for the M850 series flow computers (continued)

Wire terminals (M850-P-x)	
Wire connection / terminals	Screw type terminal blocks, plug type
Conductor cross section	Solid 1.5 mm² max Stranded 1 mm² max Stranded with ferrule 0.25 .. 1.5 mm² AWG 30 / 14

Enclosure (M850-W-x and M850-W-x-UL)	
Enclosure type	Wall mounting, Polycarbonate material
Dimensions (height x width x depth)	217 mm x 257 mm x 134 mm (without cable glands) 238 mm x 257 mm x 134 mm (with conduit hub cULus version) 247 mm x 257 mm x 134 mm (with cable glands - non cULus version) 290 mm x 300 mm x 165 mm (in cardboard box)
Weight net (gross)	approx. 1.7 kg (cULus version 2.5 kg)
Protection class	IP65 (not UL evaluated)

Enclosure (M850-P-x)	
Enclosure type	Panel mounting, Lexan Resin 920 material
Dimensions (height x width x depth)	110 mm x 206 mm x 63.5 mm (without terminals) 110 mm x 206 mm x 72 mm (with terminals) 135 mm x 230 mm x 110 mm (in cardboard box)
Panel cut-out dimensions	186 mm x 92 mm
Panel thickness	1 .. 5 mm
Weight net (gross)	approx. 0.6 kg (0.7 kg)
Protection class (front / rear)	IP65 / IP20 (not UL evaluated)

Technical data for the M850 series flow computers continued on next page

Technical data for the M850 series flow computers (continued)

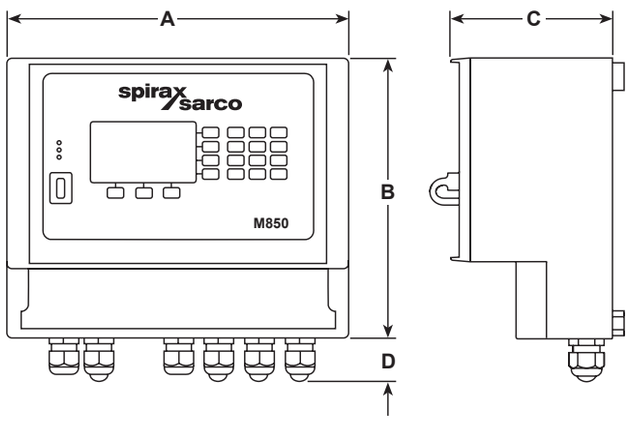
Environmental conditions	
Ambient temperature	0 .. +55 °C (32 .. 131 °F)
Relative humidity	5 .. 95% (non-condensing)
Altitude	≤ 2000 m (6 562 ft) above sea level
Storage temperature	-30 .. +70 °C
Pollution degree	3 Panel version (when installed in an enclosure) 3 Wall version
Electrical safety	EN 61010-1 UL 61010-1, 3rd Edition CAN/CSA-C22.2 No. 61010-1, 3rd Edition
EMC	Immunity EN 61326-1 Table 2 Radiated and conducted emissions EN61326-1 Group 1 Class B
Installation location	Indoor use only

Dimensions / weights (approximate) in mm and kg

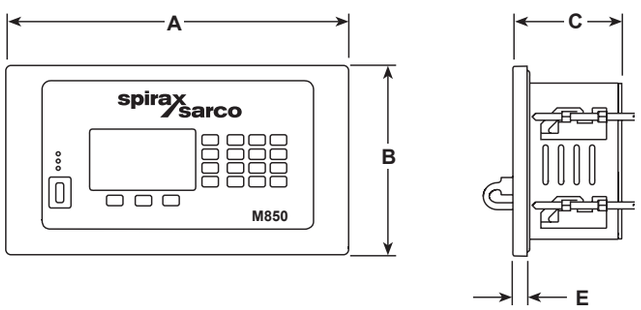
M850	A	B	C	D	E	Weight
M850-W-x (wall mounted)	257	217	134	30*	-	1.70
M850-W-x-UL (wall mounted)	257	217	134	21	-	2.5
M850-P-x (panel mounted)	206	110	72.3	-	9.5	0.60

* Approximate dimension as the cable glands are adjustable.

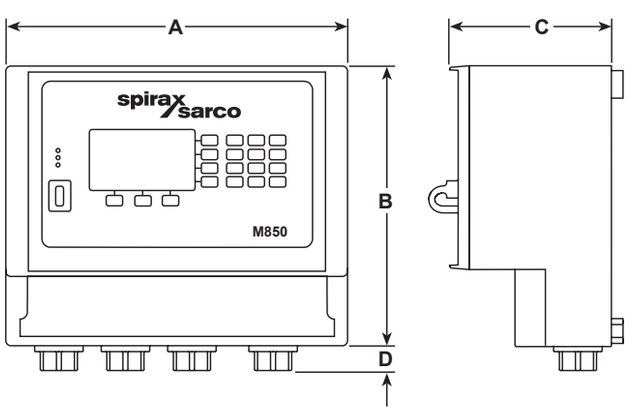
M850-W-x (wall mounted)



M850-P-x (panel mounted)



M850-W-x-UL version



Safety information, installation and maintenance
For full details see the Installation and Maintenance Instructions supplied with the product.

Installation notes:
1. The wall mounted M850-W-x requires 3 mounting screws (not supplied) to mount to a wall or optionally has a DIN rail mounting.
2. The panel mounted M850-P-x is supplied with mounting clamps.
3. An adaptor plate is available as a separate kit, should the M850 be replacing an existing M200 or M800 flow computer.

Disposal
This product is recyclable. No ecological hazard is anticipated with the disposal of this product, provided due care is taken.

How to order
For the correct product nomenclature for the unit that best suits the intended application please revisit page 1 'Available options' before placing an order.
Example 1: 1 off M850-P-1 panel mounted energy monitor with one analog 4-20mA output, 24 Vdc supply
Example 2: 1 off M850-W-2-UL wall mounted energy monitor with two analog 4-20mA outputs, 240 Vac supply

Spare parts
There are no spare parts available for the M850 flow computers.

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Available accessories
Panel mounting adapter plate to replace M800 M200 flow computers.