

M850-W and M850-P Flow Computers

Quickstart Guide



M850-W-x



M850-P-x

2. Safety information
3. General product and delivery information
7. Technical information
8. Mechanical installation
9. Electrical installation
10. Commissioning

Appendix

Please note that this is the 'Quickstart Guide' and that all relevant Sections for this product are contained in the main Installation and Maintenance Instructions IM-P333-26.

Certain computer programs contained in this product [or device] were developed by Spirax-Sarco Limited ('the Work(s)').

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Manufacturer

Spirax Sarco Limited
Runnings Road
Cheltenham
GL51 9NQ
www.spiraxsarco.com

2. Safety information



Safe operation of this product can only be guaranteed if it is properly installed, commissioned, used and maintained by qualified personnel (see the following sections) in compliance with the operating instructions. General installation and safety instructions for pipeline and plant construction, as well as the proper use of tools and safety equipment must also be complied with.

In the UK, your attention is drawn to IEE Regulations (BS 7671). Elsewhere, other regulations will normally apply.

All wiring materials and methods shall comply with relevant EN and IEC standards where applicable.

This product must be installed indoors only

Warning



This product is designed and constructed to withstand the forces encountered during normal use. Use of the product other than as a steam flow computer, or failure to install the product in accordance with these Instructions, product modifications or repair could:

- Cause damage to the product/property.
- Cause injury or fatality to personnel.
- Invalidate the  marking.

Isolate the mains supply before opening the product as hazardous voltages may be exposed.

These instructions must be stored in a safe place near the installation of the steam flow computer at all times.

Warning



This product complies with the requirements of the following directives and harmonized standards:

Low Voltage Directive by meeting the standards of:

- EN 61010-1 Safety requirements for electrical equipment for measurement, control and laboratory use.

Electromagnetic Compatibility Directive by meeting the standards of:

- Immunity EN 61326-1 Table 2
- Radiated and conducted emissions EN 61326-1 Group 1 Class B.

The product may be exposed to interference above the limits of EN 61326 if:

- The product or its wiring is located near a radio transmitter.
- Excessive electrical noise occurs on the mains supply. Power line protectors (ac) should be installed if mains supply noise is likely. Protectors can combine filtering, suppression, surge and spike arrestors.
- Cellular telephones and mobile radios may cause interference if used within approximately 1 metre (39") of the product or its wiring. The actual separation distance necessary will vary according to the surroundings of the installation and the power of the transmitter.

2.1 Intended use

- i) Check that the product is suitable for use with the application.
- ii) Determine the correct installation situation.
- iii) Spirax Sarco products are not intended to withstand external stresses that may be induced by any system to which they are fitted. It is the responsibility of the installer to consider these stresses and take adequate precautions to minimise them.

2.2 Access

Ensure safe access and if necessary a safe working platform (suitably guarded) before attempting to work on the product.

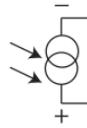
2.3 Lighting

Ensure adequate lighting, particularly where detailed or intricate work is required.

The symbols, used on the product, mean:



Equipment protected throughout by double insulation or reinforced insulation.



Optically isolated current source or sink.



Functional earth (ground) terminal, to enable the product to function correctly. Not used to provide electrical safety.

Caution, Electrostatic Discharge (ESD) sensitive circuit.



Do not touch or handle without proper electrostatic discharge precautions.



Caution, risk of electric shock.



ac - alternating current



Caution, risk of danger, refer to accompanying documentation.



dc - direct current

2.4 Hazardous environment around the product

Consider: explosion risk areas, lack of oxygen (e.g. tanks, pits), dangerous gases, extremes of temperature, hot surfaces, fire hazard (e.g. during welding), excessive noise, moving machinery.

2.5 The system

Consider the effect on the complete system of the work proposed. Will any proposed action (e.g. closing isolation valves, electrical isolation) put any other part of the system or any personnel at risk? Dangers might include isolation of vents or protective devices or the rendering ineffective of controls or alarms. Ensure isolation valves are turned on and off in a gradual way to avoid system shocks.

2.6 Tools and consumables

Before starting work ensure that you have suitable tools and / or consumables available.

2.7 Protective clothing

Consider whether you and/or others in the vicinity require any protective clothing to protect against the hazards of, for example, chemicals, high/low temperature, radiation, noise, falling objects, and dangers to eyes and face.

2.8 Permits to work

All work must be carried out or be supervised by a suitably competent person.

Installation and operating personnel should be trained in the correct use of the product according to the Installation and Maintenance Instructions.

Where a formal 'permit to work' system is in force it must be complied with. Where there is no such system, it is recommended that a responsible person should know what work is going on and, where necessary, arrange to have an assistant whose primary responsibility is safety.

Post 'warning notices' if necessary.

2.9 Handling

Manual handling of large and/or heavy products may present a risk of injury. Lifting, pushing, pulling, carrying or supporting a load by bodily force can cause injury particularly to the back. You are advised to assess the risks taking into account the task, the individual, the load and the working environment and use the appropriate handling method depending on the circumstances of the work being done. Arrange suitable lifting gear if required.

2.10 Disposal

The M850 contains a battery. On disposal of the unit or component, appropriate precautions should be taken in accordance with Local/National regulations.

Unless otherwise stated in the Installation and Maintenance Instructions, with the exception of the battery, this product is recyclable and no ecological hazard is anticipated with its disposal providing due care is taken.

2.11 Returning products

Customers and stockists are reminded that under EC Health, Safety and Environment Law, when returning products to Spirax Sarco they must provide information on any hazards and the precautions to be taken due to contamination residues or mechanical damage which may present a health, safety or environmental risk. This information must be provided in writing including Health and Safety data sheets relating to any substances identified as hazardous or potentially hazardous.

3. General product and delivery information

The M850 forms part of a flowmetering system and is used with the Spirax Sarco range of flowmeters: Gilflo, ILVA, linear flowmeters and orifice plate assemblies - See Section 4 'System overview' which illustrates the complete system. Depending on the application, it may also be supplied with a differential pressure transmitter, pressure transmitter and / or a temperature transmitter.

This Quickstart Guide will enable the rapid connection and commissioning of the flowmetering system - All the details for this are displayed in a simple and easy to read format.

Warning: This Guide is not intended as a substitute for the full Installation and Maintenance Instructions IM-P333-26 that needs to be read by the person responsible for installing the unit.

3.1 Equipment delivery, handling and storage

Factory shipment

Prior to shipment, the Spirax Sarco M850 is tested, calibrated and inspected to ensure proper operation.

Receipt of shipment

Each carton should be inspected at the time of delivery for possible external damage. Any visible damage should be recorded immediately on the carrier's copy of the delivery slip. Each carton should be unpacked carefully and its contents checked for damage:

Content of M850-P

1 x Flow computer M850-P
2 x Fixing clamps
1 x Printed Quickstart Guide
1 x USB (Full installation and maintenance instructions, configuration software)
1 x Set of terminal blocks
1 x Carton package

Content of M850-W

1 x Flow computer M850-W
1 x Printed Quickstart Guide
1 x USB (Full installation and maintenance instructions, configuration software)
1 x Carton package

If it is found that some items have been damaged or are missing, notify Spirax Sarco immediately and provide full details. In addition, damage must be reported to the carrier with a request for their on-site inspection of the damaged item and its shipping carton.

Storage

If a flow computer is to be stored for a period prior to installation, the environmental storage conditions should be at a temperature between -30 °C and 70 °C (-22 °F and 158 °F), and between 5% and 95% relative humidity (non-condensing).

Before installing and connecting the power ensure there is no condensation within the unit.

3.2 Purpose

M850-P and M850-W devices are microprocessor based, universal flow computers designed for measurement of:

- Flow and heat of steam and water according to IAPWS-IF97,
- Flow and heat of liquids other than water according to characteristics provided by user,
- Flow of technical gases.

M850 flow computers can be used for three different applications of an installation. The flow computers are designated for industrial application in independent measurement applications and as component of computerized measurement and control systems. Implemented math functions enable calculation of flow and energy balances. Extended functions of events and process values recording make it possible to perform analysis of technological processes and alarm conditions. Data recording of process values enables to use this device in places beyond the reach of computer networks. Four output relays provide with signaling and simple control functions. The flow computers are a freely programmable in a broad range and enables configuration of displaying the results depending on user's needs. Comprehensive programming menu allows simple configuration of the instrument.

The device has a panel mount or wall mount construction for indoor industrial applications.

Flow computers can work with the following flowmeters:

- Differential pressure devices ILVA and Gilflo type
- Differential pressure devices (orifices and nozzles) according to iteration algorithm according to PN EN ISO 5167 standard (only for water and steam)
- Differential pressure devices with approximation by square root curve
- Volume flowmeters
- Mass flowmeters.
- Devices are available in six language versions: English, French, German, Spanish, Portugese or Polish. Language change is available from the device keyboard.

3.3 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. A UL approved version is available in the -W- wall mounted version only.

Available versions:

M850	-x	
	-P	Panel mounted version
	-W	Wall mounted version
	-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	UL approved version, available in -W- wall mounted version only

3.5 Assistance, service, returns and decommissioning

3.5.1 For technical assistance

Contact your local Spirax Sarco representative. Details can be found on order / delivery documentation or on our web site: www.spiraxsarco.com



3.5.2 Service, Maintenance & Cleaning

No special servicing, preventative maintenance or inspection of the product is required.

For cleaning, use a dry cloth. Do not use detergent or water.

3.5.3 Serviceable parts

There are no user serviceable parts, battery is good for the life of the product.

3.5.4 Returning faulty equipment

Please return all items to your local Spirax Sarco representative. Please ensure all items are suitably packed for transit (preferably in the original cartons).

Please provide the following information with any equipment being returned:

1. Your name, company name, address and telephone number, order number and invoice and return delivery address.
2. Description and serial number of equipment being returned.
3. Full description of the fault or repair required.
4. If the equipment is being returned under warranty, please indicate:
 - Date of purchase.
 - Original order number.

3.5.5 Decommissioning

If the product is to be decommissioned please pay full attention to all sections of Section 2. Safety Information.

7. Technical information

M850-W and M850-P

I type (0/4-20 mA current loop analog inputs)

Transmitters supply	24 Vdc +10% / -20%; max 22 mA per channel (protected with PTC 50 mA fuse and 100 Ω resistor in series)
Maximum input voltage	± 40 Vdc / SELV

RTD type (3 analog inputs for temperature sensors)

Max input voltage	± 40 Vdc / SELV
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PULS type inputs (binary / pulse / frequency)

Maximum input voltage	± 40 Vdc / SELV
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4-20 mA analog outputs

Maximum loop power supply voltage	28 Vdc / SELV
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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
Maximum switching power	750 VA / 90 W
Over voltage category	CAT III

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 or 60 Vdc) / SELV
Maximum ON resistance	20 Ω
Galvanic isolation (optoisolation)	250 Vac continuous; 1500 Vac for 1 minute

RS-485/422

Maximum bus terminal voltages	-8 V ... +13 V / SELV
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Ethernet port

Connection type	RJ-45 / SELV
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Power supply (M850-W-x and M850-W-x-UL)

Rated supply voltage	100-240 Vac; 50/60 Hz \sim
Supply voltage range	85 to 264 Vac; 47 .. 63 Hz \sim
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

Enclosure (M850-W-x and M850-W-x-UL)

Protection class	IP65 (not UL evaluated)
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Enclosure (M850-P-x)

Protection class (front / rear)	IP65 / IP20 (not UL evaluated)
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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
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

8. Mechanical installaton

Note: Before actioning any installation observe the 'Safety information' in Section 2.

M850

The M850 is available for **wall mounting** M850-W or for **panel mounting** M850-P.

Note: All versions must be fitted away from sources of excessive heat, electrical interference and from all areas liable to flooding.

Safety note - product specific

This product **must** be installed indoors only, in one of the following ways:

Wall mounting

Fit cable glands/conduit with a minimum IP65 rating or install in a clean dry room to provide a pollution degree 3 environment in accordance with EN 60529 (Specification for degrees of protection provided by enclosures - IP code).

- Any unused cable glands/conduit entries **must** be sealed with an appropriate IP blind grommet.

Panel mounting

The panel mount version of the M850 is supplied with an IP65 rated seal to be fitted between the flow computer and the panel it is to be mounted into.

In addition a blanking panel (Figure 7) is also available to reduce the apperature size if you are replacing an existing M800 with the new M850 (also IP65 rated).



Fig. 7 Blanking panel

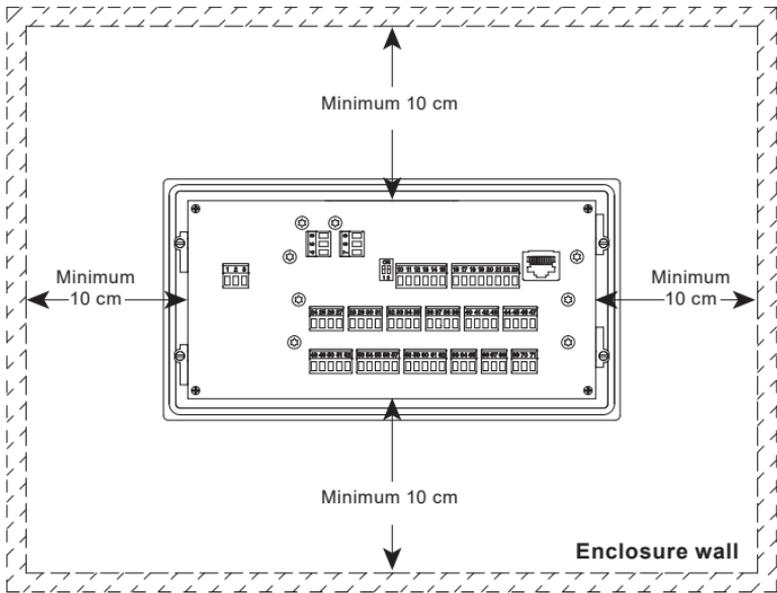


Fig. 8 Panel unit rear view

Environmental conditions

The flow computer should be located in an environment that minimises the effects of heat, vibration, shock and electrical interference.

The flow computer should also be installed away from external magnetic fields, such as those generated from electric motors and large transformers.

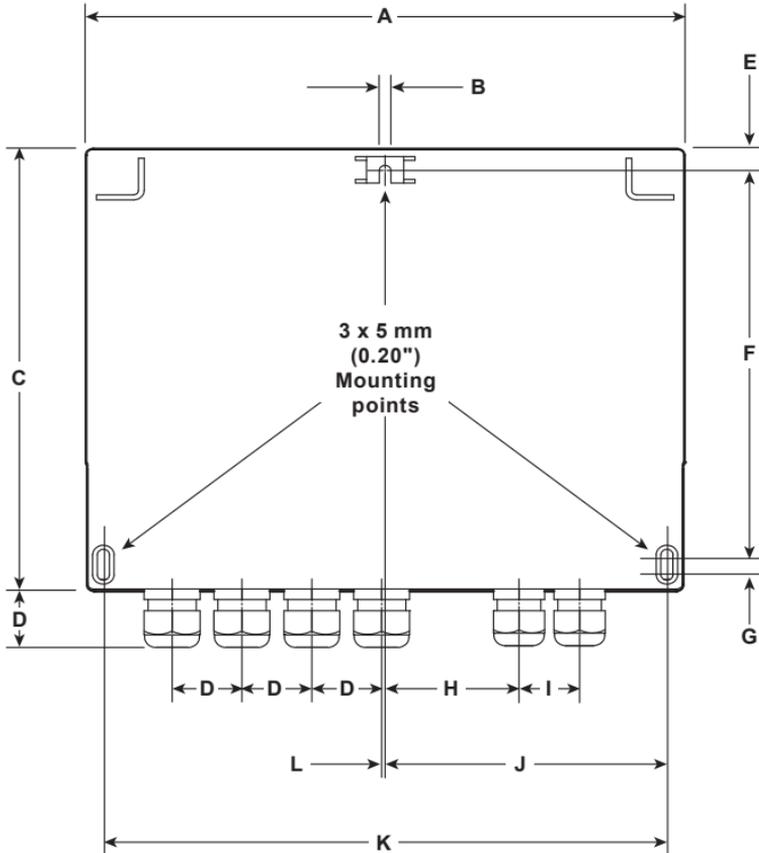
Other considerations

Be sure to allow sufficient clearance for:

- Installation of conduit/wiring.
- Viewing of the display.

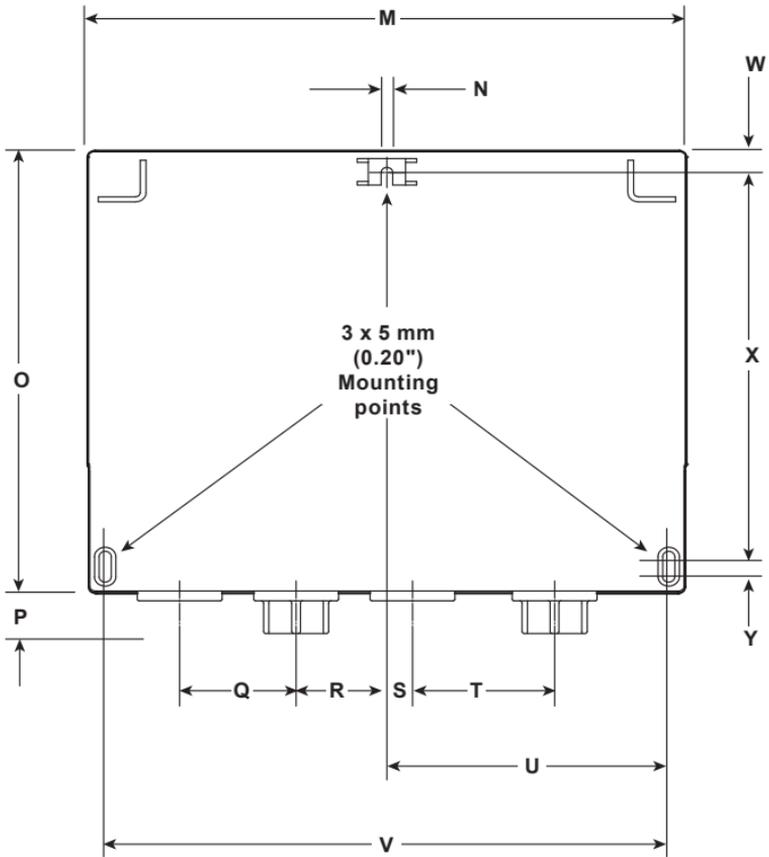
8.1 Mounting instructions for the wall mounted M850-W:

1. Using the dimensions shown below, drill 3 holes suitable for accepting 5 mm (No.10) screws.
2. Remove the terminals enclosure cover to expose the bottom mounting holes.



Dimensions (approximate in mm and inches) - M850-W (non cULus version)

A	B	C	D	E	F	G	H	I	J	K	L
257.00 mm	5.00 mm	217.00 mm	30.00 mm	10.60 mm	189.50 mm	10.00 mm	57.50 mm	26.00 mm	121.00 mm	242.00 mm	1.50 mm
10.12"	0.20"	8.54"	1.18"	0.42"	7.46"	0.40"	2.26"	1.02"	4.76"	9.53"	0.06"



**Dimensions (approximate in mm and inches) -
M850-W (cULus version)**

M	N	O	P	Q	R	S	T	U	V	W	X	Y
257.00 mm	5.00 mm	217.00 mm	21.00 mm	50.00 mm	39.00 mm	11.00 mm	61.00 mm	121.00 mm	242.00 mm	11.00 mm	189.50 mm	10.00 mm
10.12"	0.20"	8.54"	0.83"	1.97"	1.54"	0.43"	2.40"	4.76"	9.53"	0.43"	7.46"	0.39"

M850-W-x



Bottom mounting eyelet (access through the terminal compartment)

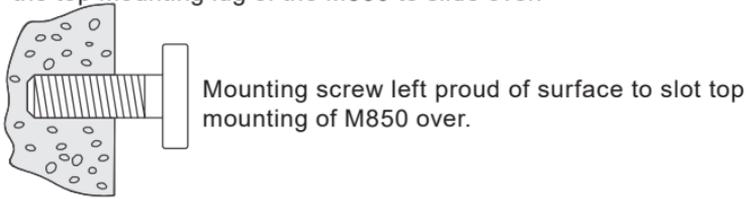
M850-W-x-UL



Fig. 9

Bottom mounting eyelet (access through the terminal compartment)

3. Fix an M5 (No.10) screw to the surface for the top mounting. Leave the head of the screw proud of the surface, just enough to allow the top mounting lug of the M850 to slide over.



4. Slide the top mounting lug over the proud screw.
5. Line up, and fit the screws to the bottom mounting holes.
6. Refit the terminals enclosure cover.

Note:

Before actioning any installation observe the 'Safety information' in Section 2.

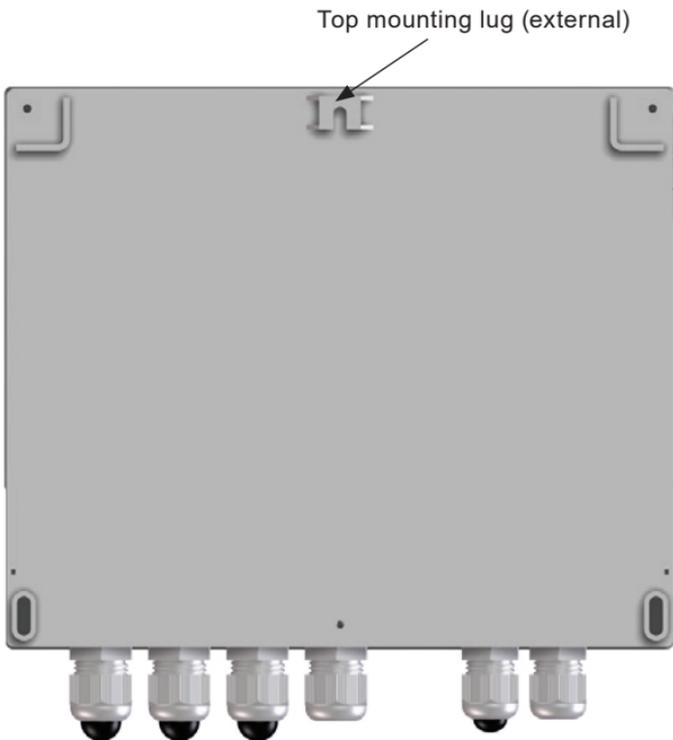
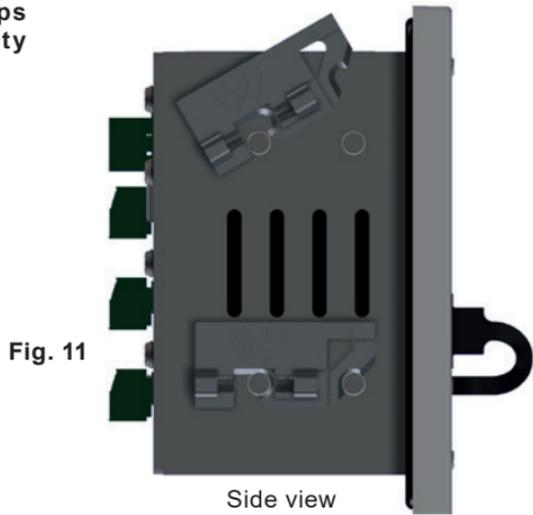


Fig. 10

8.2 Mounting instructions for the panel mounted M850-P:

1. A rectangle aperture 186 mm (7 $\frac{3}{8}$ ") wide x 92 mm (3 $\frac{5}{8}$ ") high is required to mount the panel mounted version of the M850 flow computer.
2. Push the M850 through the aperture ensuring that the seal is fitted correctly.
3. From the reverse side of the panel, using the mounting points on the sides of the M850, assemble the fixing clamps to the body.

Note: Screw clamps removed for clarity



4. Carefully wind in the clamps using the screwdriver slots to tighten the flow computers to the panel.

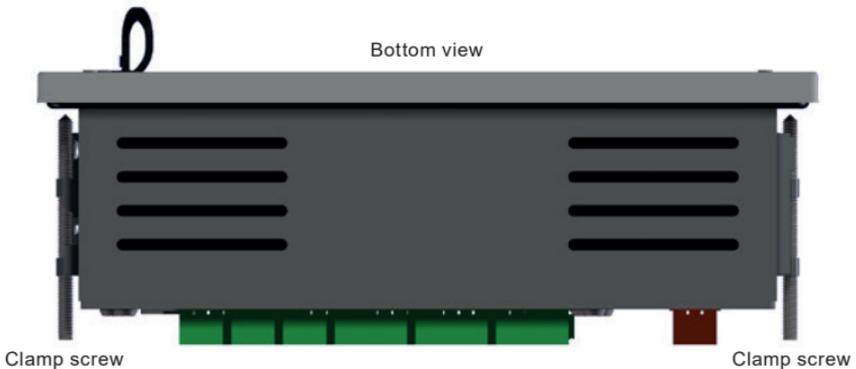


Fig. 12

9. Electrical installation



Note: Before actioning any installation observe the 'Safety information' in Section 2.

9.1 Important - please read the following general wiring notes:

Every effort has been made during the design of the flow computer to ensure the safety of the user but the following precautions must be followed:

1. Maintenance personnel must be suitably qualified in working with equipment containing hazardous live voltages.
2. Ensure correct installation. Safety may be compromised if the installation of the product is not carried out as specified in this manual.
3. Always isolate the flow computer from the mains supply before opening the unit.
4. The design of the flow computer relies on the building installation for overcurrent protection and primary isolation.
5. Overcurrent protection devices rated at 1 amp must be included in all phase conductors of the installation wiring. If overcurrent protection is included in both supply wires then the operation of one must also cause the operation of the other. Refer to IEC 60364 (Electrical Installations of Buildings) or prevalent local standard for full details of requirements for overcurrent protection.
6. Overcurrent protection devices must be fitted to the relay circuit and appropriately rated for the given loads stated in the technical data.
7. Relay contacts must be supplied at the same phase as the product's mains supply.
8. The wall flow computer (M850-W) is designed as an installation category III product.
9. Install wiring in accordance with:



- IEC 60364 - Low-voltage electrical installation.
 - National and Local Electrical Code (NEC) or Canadian code CEC) for the US and Canadian markets. Note; use NEC Class 1 wire with a temperature rating greater than 75 °C. If the cable is to be exposed to a higher temperature, then a higher temperature rating needs to be selected.
10. All external circuits must meet and maintain the requirements of double / reinforced installation as stated in IEC 60364 or equivalent.
 11. Additional protection must be provided to prevent accessible parts (e.g. signal circuits) from becoming Hazardous Live if a wire or screw is accidentally loosened or freed. Ensure all wires are secured to at least one other wire from the same circuit. The attachment must be as close to the terminal block as possible but must not apply undue stress on the connection. Example, use a cable tie to secure the live and neutral wire together. If one wire becomes loose the other wire will prevent it from touching accessible parts.

12. A disconnecting device (switch or circuit breaker) must be included in the building installation. It must:



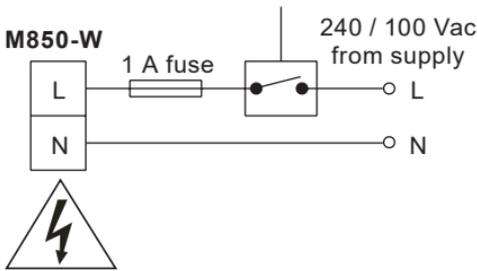
- Have a rating with sufficient breaking capacity.
- Be in close proximity to the equipment, within easy reach of the operator but not cause difficulty in operating.
- Disconnect all phase conductors.
- Be marked as the disconnecting device for the flow computer.
- Not interrupt a protective earth conductor.
- Not be incorporated into a mains supply cord.
- Comply with the requirements for a disconnecting device specified in IEC 60947-1 or UL 60947-1 (Specification for low-voltage switchgear and controlgear - General rules) and IEC 60947-3 or UL 60947-3 (Switches, disconnectors, switch-disconnectors and fuse-combination units).

13. It is important that the cable screens are connected as shown in order to comply with the electromagnetic compatibility requirements.

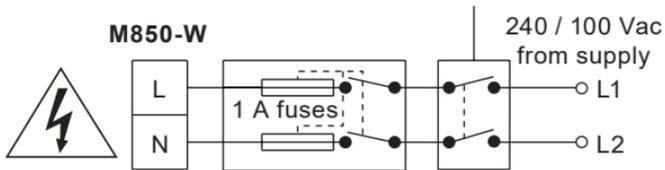
9.2 Important - Please read the following general mains wiring notes:

- 1.** The wiring connections are identified on the label inside the terminal cover of the wall mounting version.
- 2.** Fuses should be installed in all live conductors.
- 3.** Double or reinforced insulation must be maintained between:
 - Hazardous live conductors (mains and relays circuits)and
 - Safety extra low voltages (All other components / connectors / conductors).

Disconnect device conforming to IEC 60947-1 and IEC 60947-3 or UL 60947-1 and UL 60947-3



Disconnect device conforming to IEC 60947-1 and IEC 60947-3 or UL 60947-1 and UL 60947-3



Single phase supply with neutral at earth potential

4. The wiring diagrams show relays and switches in the power off position.

Mains and signal wiring:

For cable / wire recommendations see IM-P333-26 Flow Computer Installation and Maintenance Instructions.

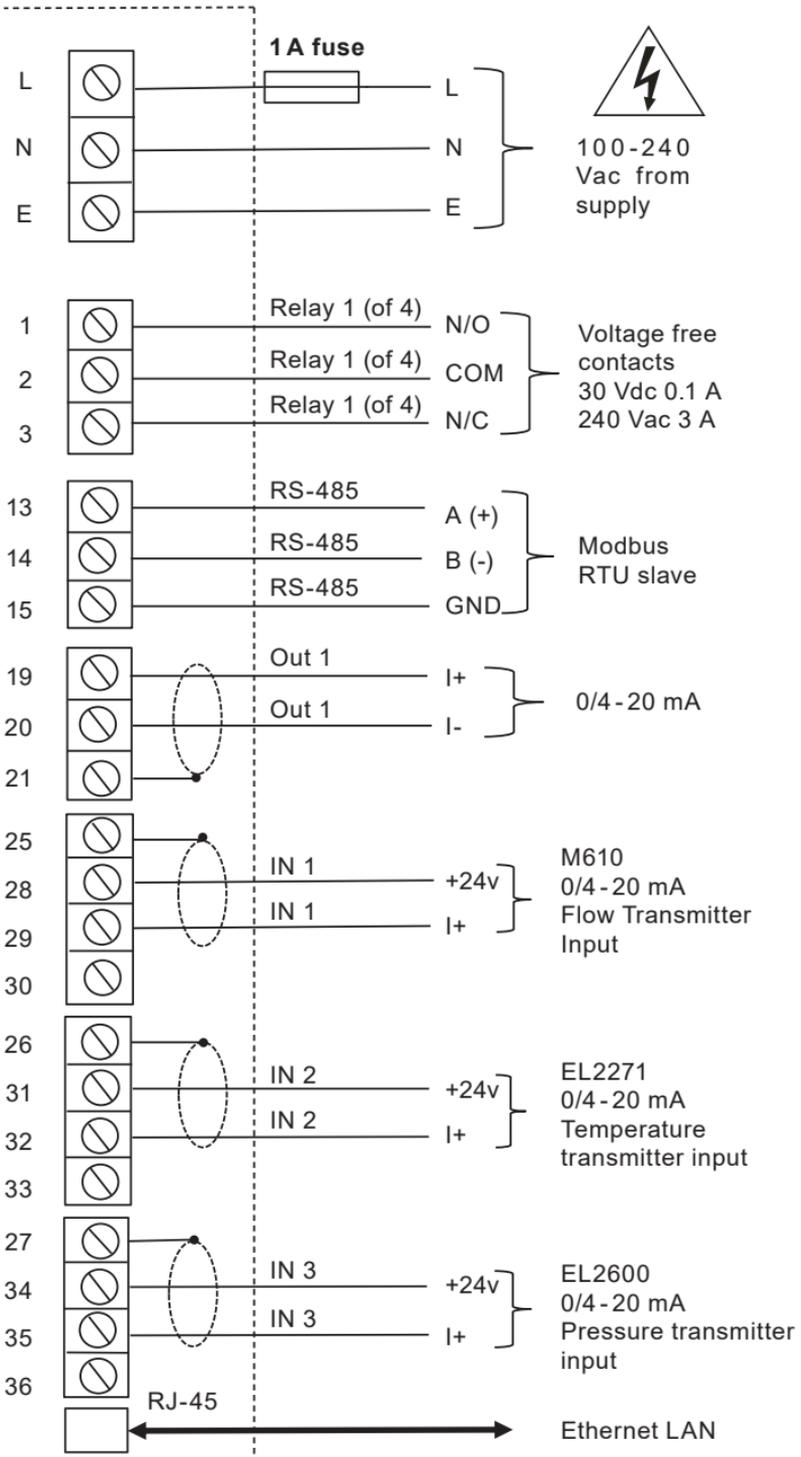
Screen connection

An earth current loop is created if a wire or screen is connected between two earth points, which are at different potential (voltage). If the instructions are followed correctly, then the screen will only be connected to the earth at one end.

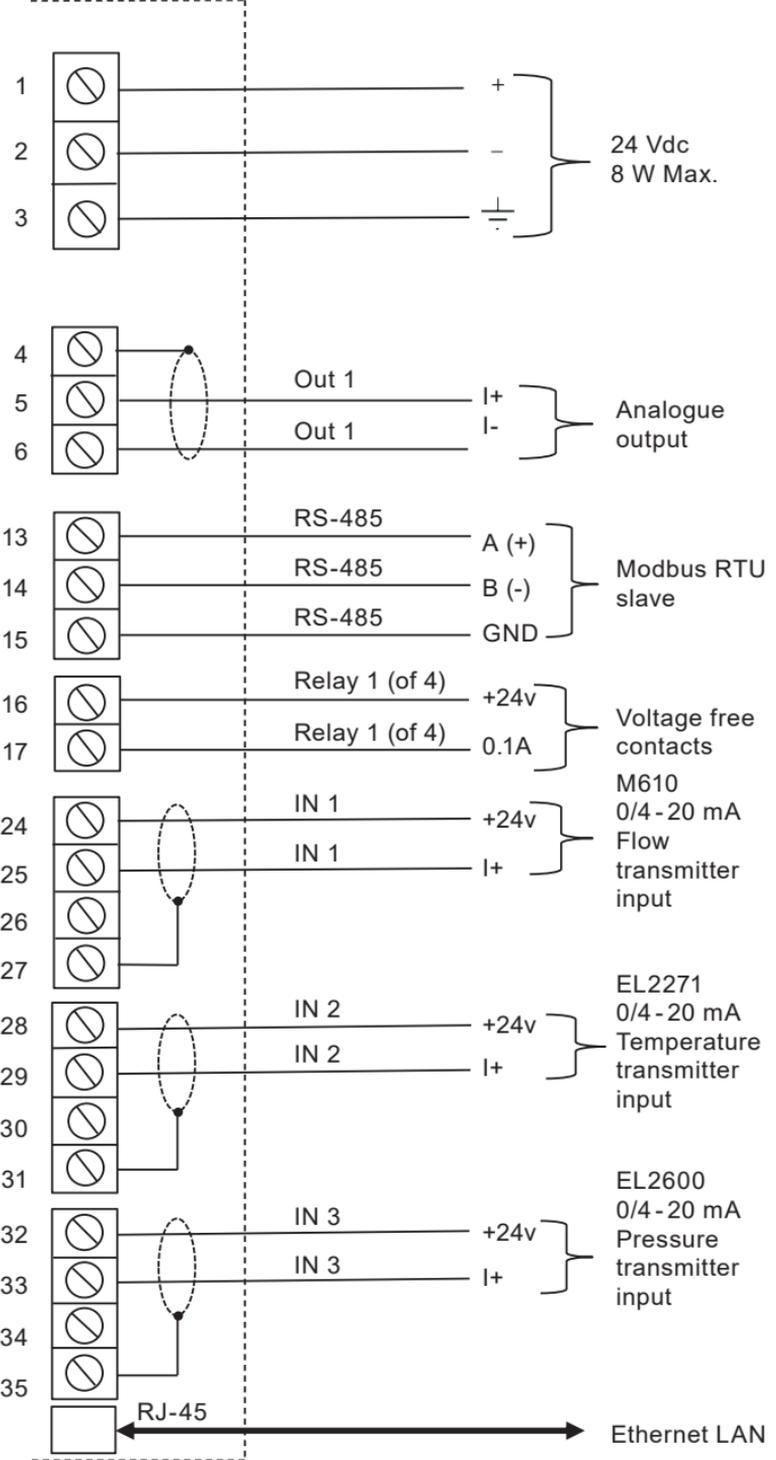
The earth terminal is a functional earth rather than a protective earth.

A protective earth provides protection from electric shock under a single fault condition. This product has double insulation and therefore does not require a protective earth. A functional earth is used in order for the product to operate. In this application, the earth is used as a sink or drain for any electrical interference. The screens must be connected to the earth terminal in order to conform to the EMC directive.

**Fig. 13 Wiring diagram – ILVA, Gilflo and Orifice plate systems
Wall mounted M850-W steam flow computer**



**Fig. 14 Wiring diagram – ILVA, Gilflo and Orifice plate systems
Panel mounted M850-P steam flow computer**



10. Commissioning

M850 flow computer commissioning using PC software for quick start-up

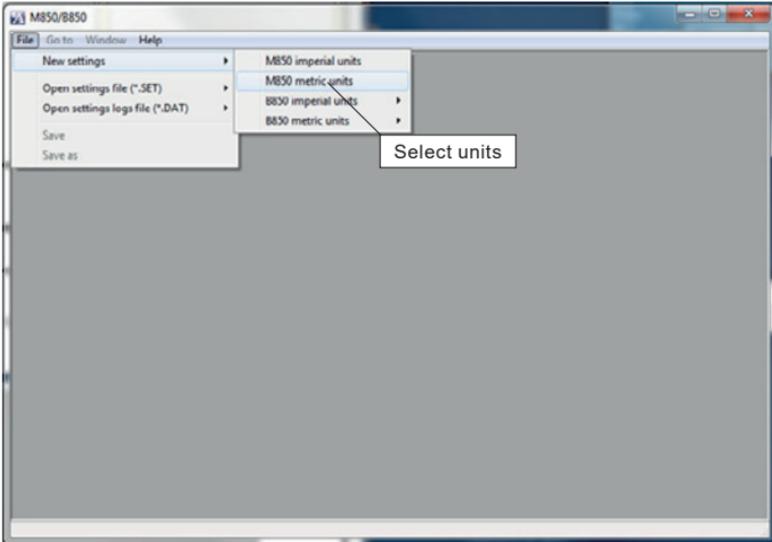
The M850 flow computer can be commissioned via the key pad on the front panel of the unit itself, or via separate PC software. For quick start commissioning the PC software is used and illustrated in this manual.

The quick start commissioning assumes that the M850 will be used with either Spirax Sarco ILVA, Gilflo or M410 (Orifice plate) flowmeters that all use a differential pressure cell. The quickstart guide will show you how to set up the inputs from the DP Cell and pressure and temperature sensors as a stand-alone system only. To commission other types of flowmeters or additional inputs and outputs please refer to the full installation and maintenance manual (IM-P333-26).

1. Download the commissioning software supplied with the product onto your PC.
2. 'Click' on the icon.
3. Select the language you wish the software to use (English, French, German, Spanish, Portuguese or Polish). 'Click' OK.



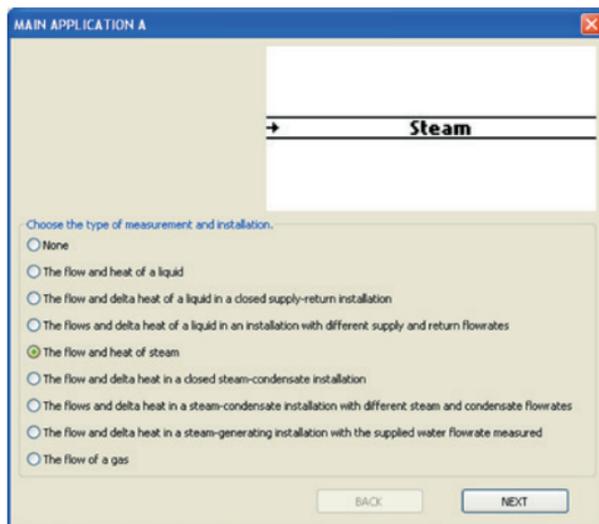
4. A grey screen will appear. 'Click' on File/New Settings and select either imperial or metric units.



5. Type in a name that you wish to identify the flowmeter into application A, i.e. Boiler house. 'Click' on 'Configure the installation'.



6. Select 'The flow of steam' and 'Next'.

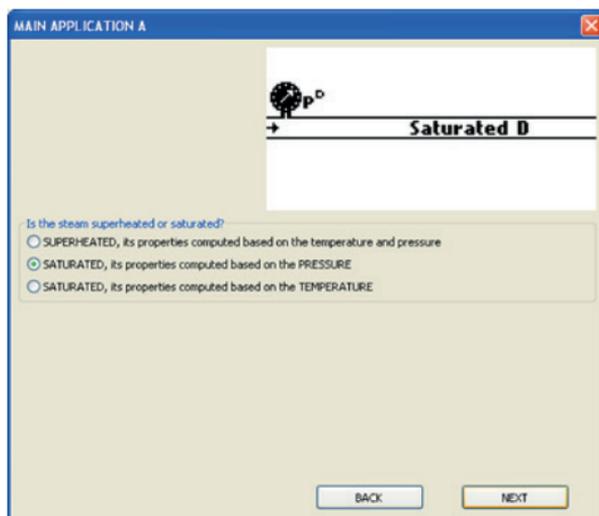


7. Select the option that you require.

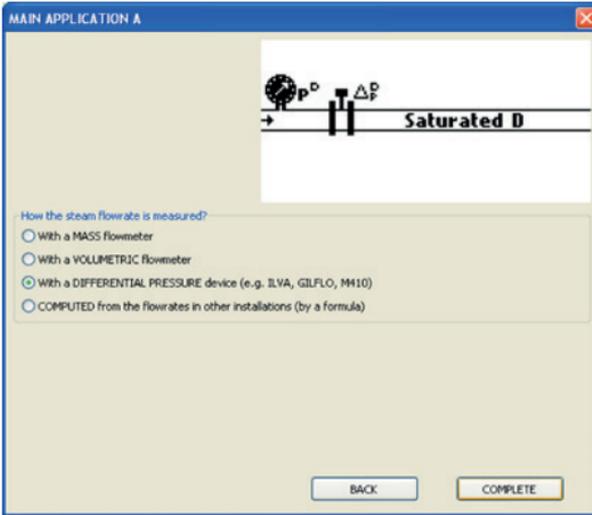
To measure saturated steam either a pressure sensor or temperature sensor can be used.

If Superheated steam is being measured both pressure and temperature sensors will be required to calculate density compensation.

We have used pressure for this sample installation.



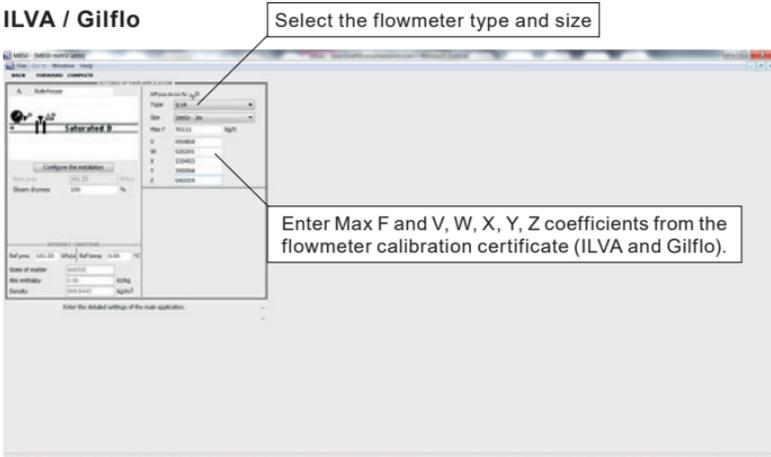
8. Select a differential pressure device and 'Click' on 'Complete'.



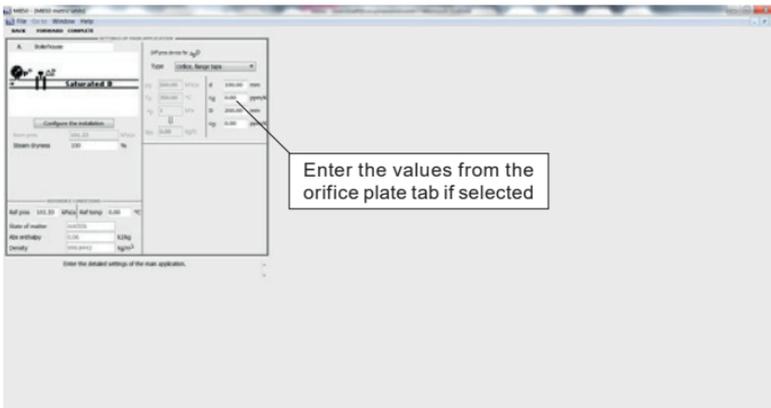
9. Forward through the next two main application screens.
10. Choose the flowmeter type and size you are using from the drop down menu (ILVA, Gilflo or Orifice flange taps (M410)). Enter the MAX F and V-Z coefficients from the flowmeter calibration certificate supplied with the flowmeter (ILVA and Gilflo). Or the information from the Orifice plate tab.

'Click' Forward.

ILVA / Gilflo



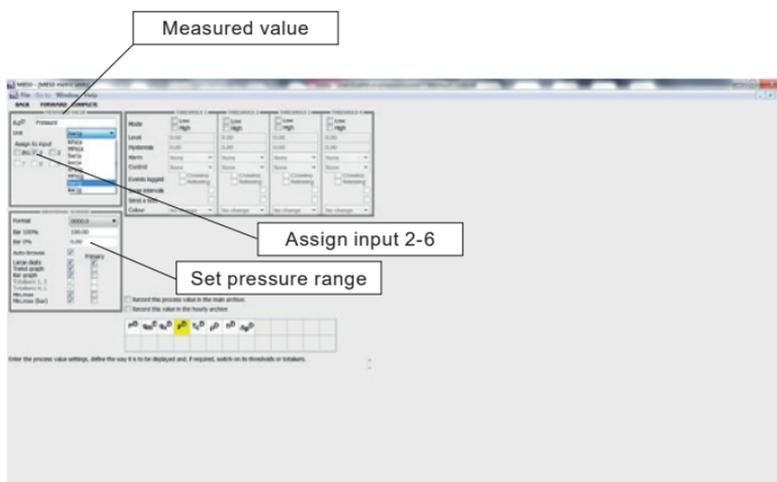
Orifice plate (M410)



11. Forward through the next screen (pD computed value).
12. Forward through the next screen (qmD computed value).
13. Forward through the next screen (qvD computed value).
14. At next screen pD measured value (this is your pressure sensor) add a title i.e.: line pressure and assign an input between 2-6.

Change the units to bar g.

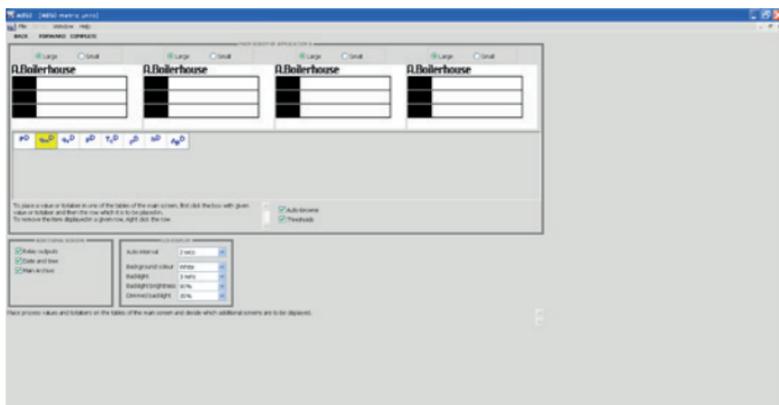
Set pressure range to suit sensor i.e. 4 mA = 0 bar g and 20 mA = 10 bar g.



15. Forward through the next screen (TcD computed value).
16. Forward through the next screen (pD computed value).
17. Forward through the next screen (hD computed value).
18. At next screen Pd measured value (this is your DP Cell), add a title i.e. 'Differential Pressure', select mbar units and assign to input 1.
19. Forward through the next screen (Assignment) - **Note:** The pressure range must be set.
20. Forward through the next screen (main archive).

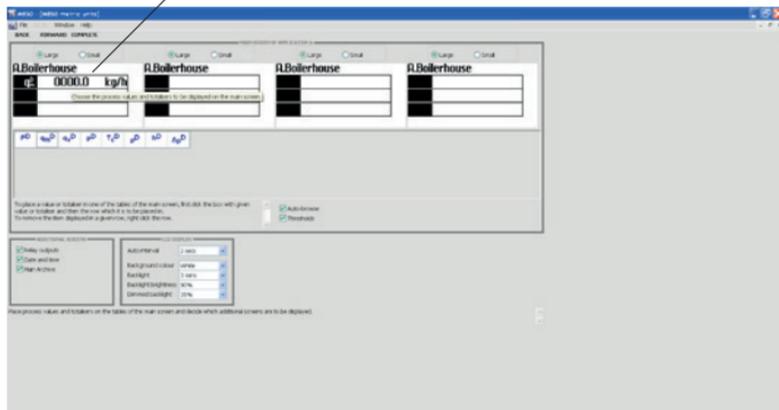
- At the next screen (main screen for Application A), 'Click' on the 'Mass flowrate' icon.

The button will turn yellow.

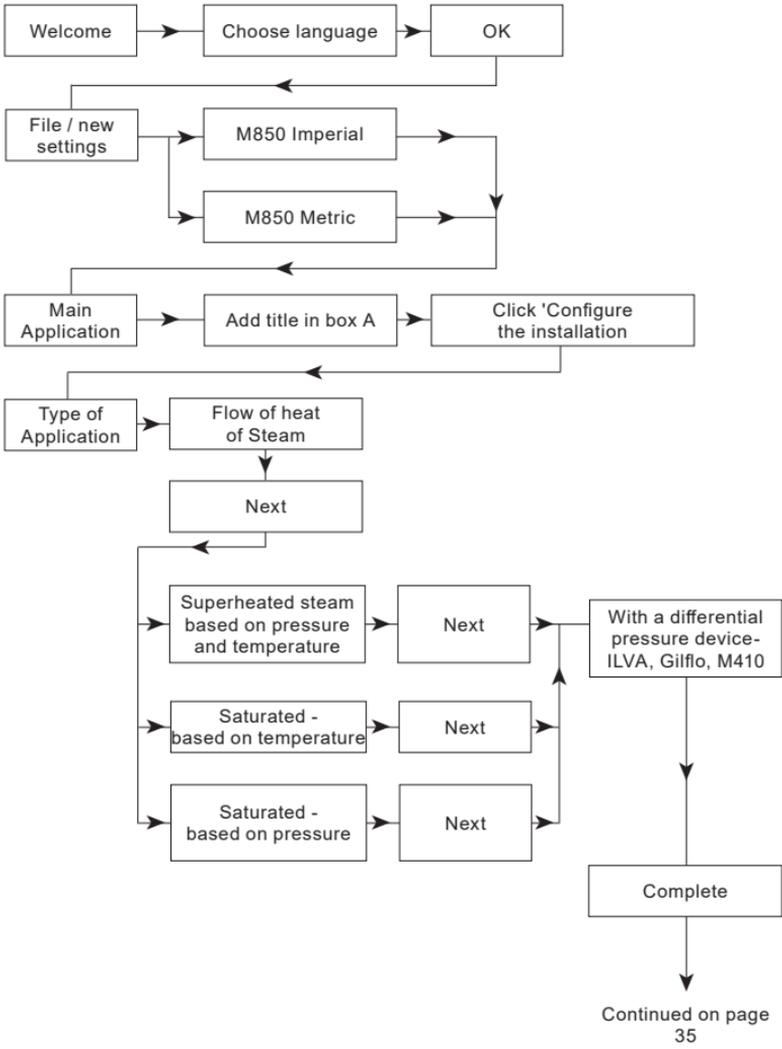


- 'Click' on the top line of table A. The mass flowrate will show in the table.

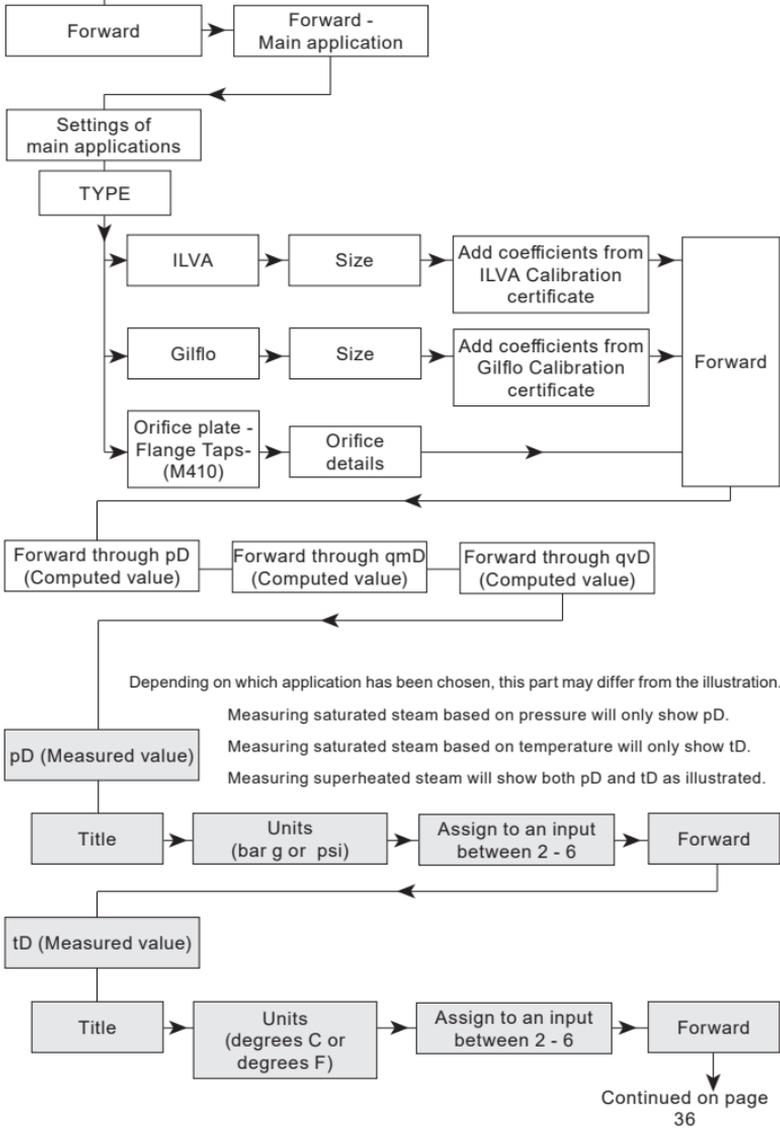
Click on the top line of the table and the mass flowrate will appear on the line.



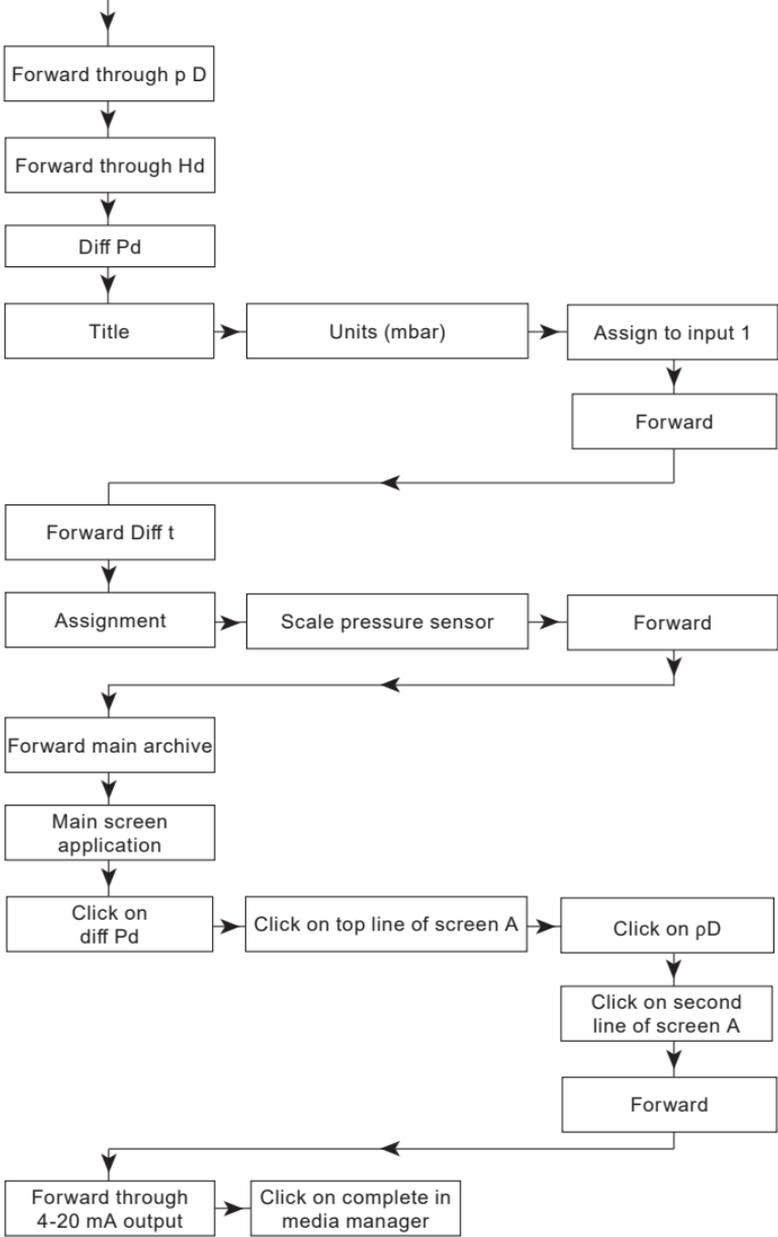
Quickstart commissioning flowchart



Continued from page 34



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Appendix

Failure notification of measurement inputs

Failures associated with particular channels are marked with appropriate symbols on the display.

Symbols of failure:

-F-	RTD sensor failure
- -	4-20 mA transducer failure, current below 3.6 mA
-E-	4-20 mA transducer failure, current above 22 mA
-S-	steam parameters below saturation curve (only when detection of steam saturation is on)
-R-	exceeding the range
-W-	wait (after power on, when data is not ready)
-C-	internal communication error

Symbols of failure are displayed instead of the result for all related channels, e.g. for measurement input and the calculation channel in which the result is used.

No signal from the sensor assigned to the particular input is treated as a failure and marked on the display with the '-F' (failure) symbol. Detection of a failure may trigger displaying the appropriate message and then require confirmation by the user even if the cause of the failure ended earlier. Depending on the settings during programming the device, a failure may cause the excitation of corresponding output relay till the confirmation or for the entire duration of failure. Failure and its disappearance may be recorded in the Event log.

If a GSM module is connected to the RS-485 port, failure information can be sent via text message to specified phone numbers.

