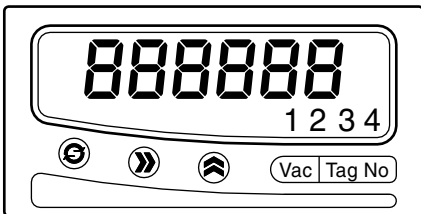


M750

Display Unit


Installation and Maintenance Instructions



1. General safety information
2. General product information
3. Installation
4. Commissioning
5. Spare parts
6. Fault finding

1. General safety information

Your attention is drawn to any National or local regulations. Safe operation of the product depends on it being properly installed, commissioned and maintained by a qualified person in compliance with these operating instructions.

The product is designed and constructed to withstand the forces encountered during normal use. Use of the product for any other purpose, or failure to install the product in accordance with these Installation and Maintenance Instructions, could cause damage to the product, will invalidate the  marking, and may cause injury or fatality to personnel.

Warning

This product complies with the requirements of Electromagnetic Compatibility Directive 2004/108/EC by meeting the standards of:

- EN 61326: 2006 Electrical equipment for measurement, control and laboratory use - EMC requirements. Immunity to industrial locations Annex A.
- Emissions to Class A.

The following conditions should be avoided as they may create interference above the limits specified in EN 61326: 2006:

- The product or its wiring is located near a radio transmitter.
- 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.

Warning

Isolate the mains supply before unplugging the display unit since hazardous voltages will be exposed on the unit base.

If this product is not used in the manner specified by this IMI, then the protection provided may be impaired.

— 2. General product information —

The M750 display unit is a highly accurate and stable digital process indicator that accepts all commonly used process signals. The unit can be used 'stand alone' or, with the Modbus serial communications, as part of a larger system.

Option Pods may be plugged into the M750 base unit, without the need for dismantling or re-calibration, to allow the output from the M750 to be tailored to a specific application. Option Pods are available for relay outputs and/or an isolated 4-20 mA re-transmission. It is possible to have two relay pods attached to the base unit, but only one 4-20 mA retransmission pod. Once an option pod is added to the M750, the unit will automatically detect it and will prompt the user for the appropriate data during commissioning.

Equipment delivery and handling

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. 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 flowmeter is to be stored for a period prior to installation, the environmental storage conditions should be at a temperature between -50°C and +85°C (-58°F and +185°F), and between 10% and 90% relative humidity (non-condensing).

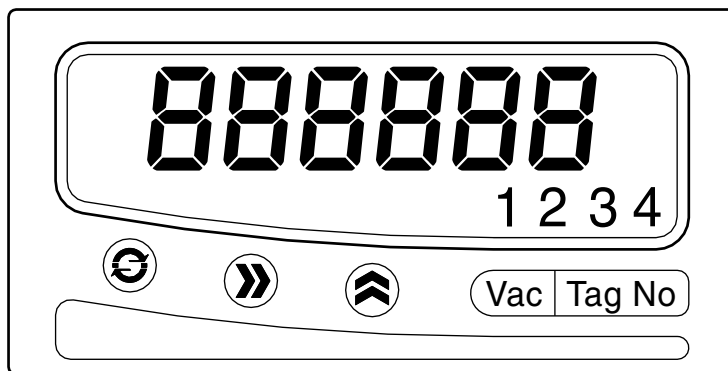


Fig. 1 Display unit

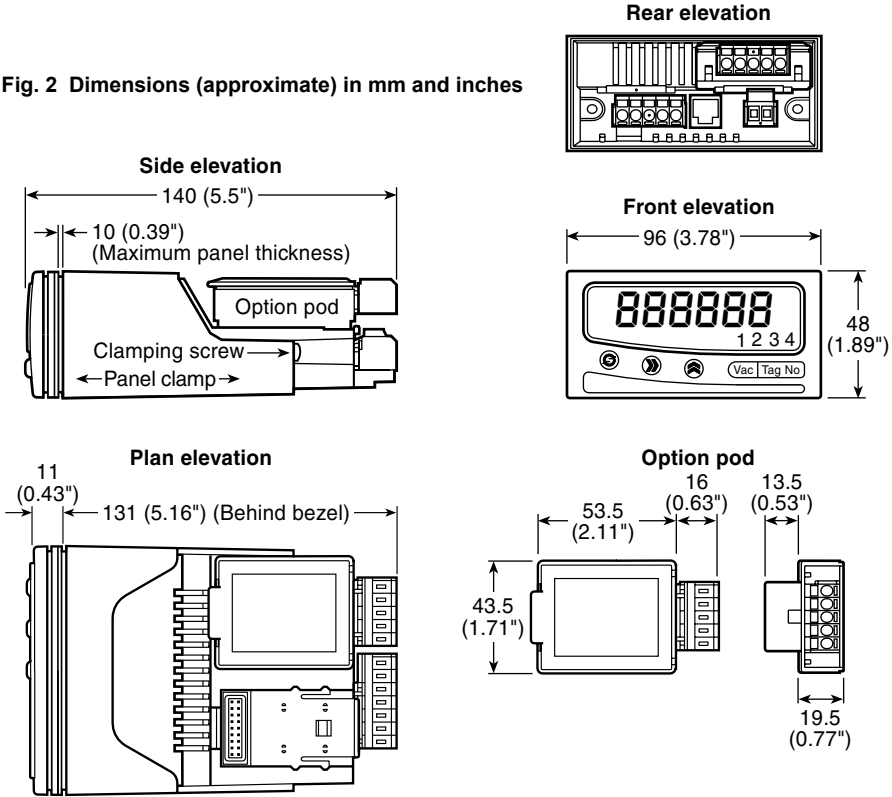
3. Installation

Warning - This Section must be used by competent personnel only. If this equipment is not installed in accordance with these instructions, protection against electrical hazards may be impaired. It is the responsibility of the installer to install this equipment in accordance with the relevant code of practice (for the installation of instrumentation used in the process control systems), issued by a recognized local body.

3.1 Mechanical installation

Ensure that the panel has sufficient depth to install the M750 and its wiring, including the space required to withdraw the wiring connectors.

Fig. 2 Dimensions (approximate) in mm and inches



Panel cut out 92 mm (3.62") x 45 mm (1.77")

Mounting - This equipment is classed as permanently connected equipment. Hazardous voltages may be present on the terminals of this equipment. The equipment must be panel mounted into a suitable enclosure, which provides at least IP20 protection behind the panel. The maximum panel thickness is 10 mm (0.39"). The instrument case has an integral gasket which forms a seal when the instrument is tightened against the panel. The panel should be clean, smooth and at least 1.6 mm (0.06") thick for the seal to be effective.

Warning - Use only the retaining screws provided to clamp the instrument to the panel (screws must be tightened sufficiently to effect a seal but must never be overtightened).

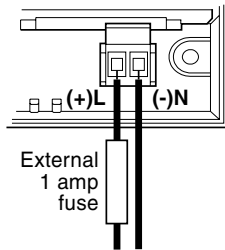
3.2 Electrical installation

All connections are made to sockets, which are removable for ease of maintenance and wiring. Cable size should be between 0.5 mm² (0.02"²) and 1.5 mm² (0.06"²).

Supply - The supply terminals and associated internal circuitry are isolated from all other parts of the equipment in accordance with BS EN 61010-1, for connection to an Installation over-voltage Category II supply, (pollution degree 2). The supply voltage and frequency must remain within the limits stated on the product label.

The mains supply to the unit must be protected by an external 1 amp fuse (see Figure 3) and a suitable switch or circuit breaker must be located close to the equipment, in order to isolate the supply.

Fig. 3



The power supply rating will be indicated on the top of the instrument. Ensure it is correct for the application.

Cables are retained by screws. **Ensure that the exposed section of the cable is fully inserted and that no loose strands are exposed.** 600 Vrms cable 0.5 mm² (0.02"²) to 1.5 mm² (0.06"²) core should be used.

Signal Input/Outputs - All signal input, output and communication terminals and associated internal circuitry are intended for operation at voltages less than 40 Vdc. These circuits, which may become accessible during normal operation, must only be connected to signals complying with the requirements for Safety Extra Low Voltage (SELV) circuits.

Sensor connections - All sensor connections are made via the five way 'fast wiring' socket at the rear of the unit (wire size 0.5 mm² (0.02"²) to 1.5 mm² (0.06"²)).

Note: Screened cable is recommended for thermocouple, RTD and voltage input wiring runs over 10 metres (32.3 ft) long.

To make a connection: insert a small screwdriver blade into the tension clamp orifice, (1, Figure 4), push and twist to deflect clamp into the open position. Do not lever the screwdriver as this may force the connector body sideways. Insert the stripped wire sufficiently into (2) then remove the screwdriver. **Ensure no loose wire strands protrude.**

To avoid connector blocks' being plugged into the wrong connector a polarisation kit is included. This should be used to ensure that the sensor connector block can only be plugged into the sensor connections and the Pod connector blocks can only be plugged into their appropriate connectors.

Fig. 4

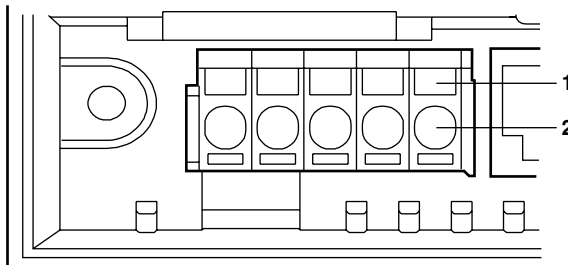
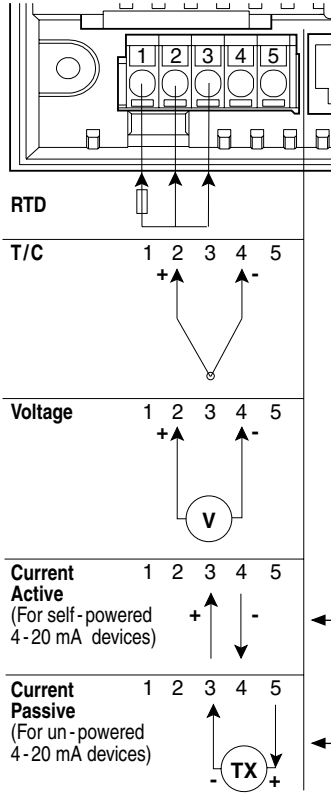


Fig. 5 Sensor connection wiring details:



Warning: Remove power to the unit before connecting the sensor input.

← This is for use with 4-20 mA devices that are self-powered or powered from an external power supply.

← This will provide a voltage supply (19 V @ 25 mA) to power the sensing device, for example a DIVA steam flowmeter or M610/M640 differential pressure transmitter

3.3 Option pods - Installation

Installing pods

Disconnect the power from the unit before adding/removing a Pod.

Caution:- Referring to Figure 6, Slot 1 (alarms 1A and 1B) should be positioned on the left side of the unit looking from the front to correspond to the front panel alarm indicator; Slot 2 (alarms 2A and 2B) is positioned on the right.

To install an Option Pod, slide back the cover to expose the connector socket and plug in the Pod.

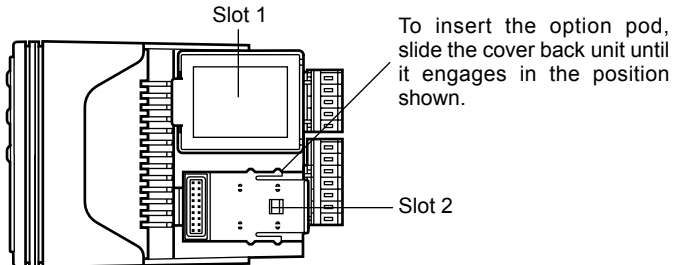


Fig. 6 Installing an option pod

To remove an Option Pod, press the bar below the Pod connector and at the same time pull the Pod upwards.

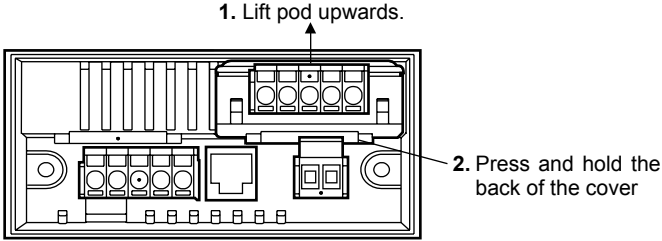


Fig. 7 Removal of option pod

Dual relay pod

The relay terminals and associated internal circuitry are isolated from all other parts of the equipment in accordance with BS EN 61010-1, for connection to an Installation over-voltage Category II supply (pollution degree 2). The relay operating voltage and current must remain within the limits stated.

Cable used should be 600 Vrms cable between 0.5 mm² (0.02"²) and 1.5 mm² (0.06"²)

The relay pod has two 'change over' relays with a common connection, see Figure 8.

Note: Any circuit with an ac potential greater than 33 Vrms and 46.7 V peak must be protected with a 5 A(T) fuse when connected to this pod.

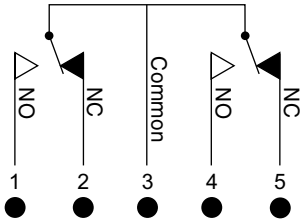


Fig. 8

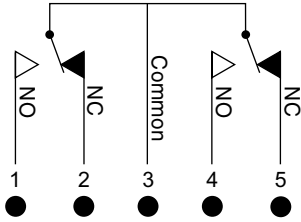
Alarm/relay states

The alarm and relay states can be configured within the configuration mode via the 'InVrt' setting. The 'InVrt' setting refers to the relay sense during powered operation. All other relay output menu settings refer to the alarm state. When in alarm, the relevant front panel LED is lit.

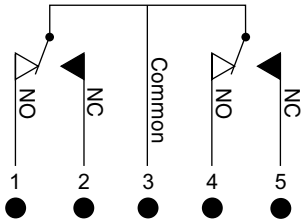
Power	Alarm status	InVrt setting	Relay position (A)	Relay position (B)
Off	X	X	3-5	3-2
On	Not in alarm	nOnInV	3-4	3-1
On	In alarm	nOnInV	3-5	3-2
On	Not in alarm	InVErt	3-5	3-2
On	In alarm	InVErt	3-4	3-1

Figure 9 overleaf illustrates, diagrammatically, the pod wiring diagrams.

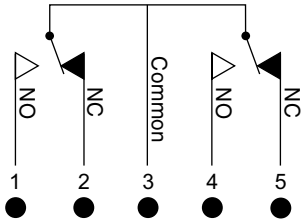
Fig. 9 Pod wiring diagram



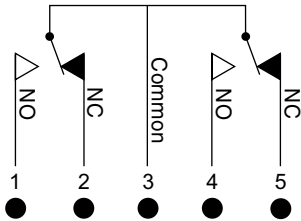
Power off



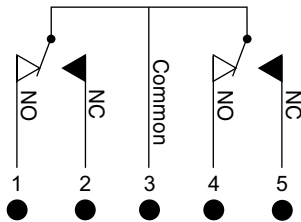
Power on
Relay sense set to 'nOnInV'
Unit not in alarm



Power on
Relay sense set to 'nOnInV'
Unit in alarm



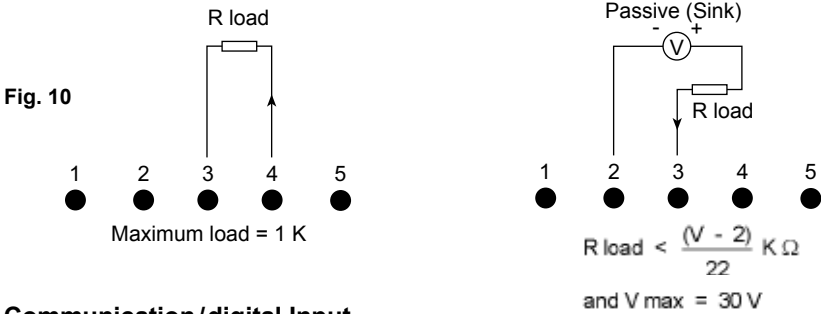
Power on
Relay sense set to 'InVErt'
Unit not in alarm



Power on
Relay sense set to 'InVErt'
Unit in alarm

Isolated 4-20 mA re-transmission pod

The re-transmission pod (when fitted) is designed to provide 0-10 mA, 0-20 mA or 4-20 mA output in active or passive modes. The output can be any proportion of the display range. The pod can be used in two modes (see Figure 10).



Communication/digital Input

This provides the user with either 4 or 2 wire RS485 serial communications together with two digital inputs. The digital inputs are available to allow the user to reset latched alarms or reset totals. Connections are made via a RJ45 connector. A one metre interface is supplied with the unit to allow the user to connect the OPT-3600/series DIN rail mounted breakout board (Figure 11).

To activate, apply a voltage between 5 and 24 V.

Maximum current per channel = V/1 600 amps.

The discreet inputs are reverse-connection and over-voltage protected.

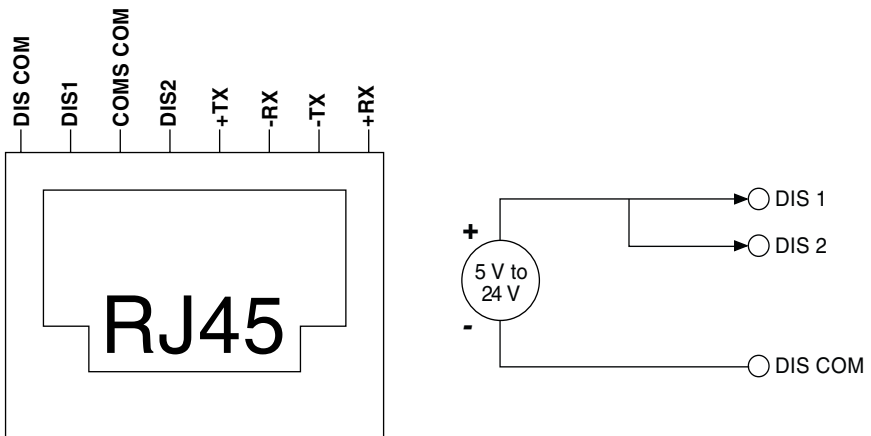


Fig. 11

RS-485 two-wire installation

- Connect the positive terminals (+Tx and +Rx) together at the M750.
- Connect the negative terminals (-Tx and -Rx) together at the M750.
- Use a EIA RS 485 screened with twin twisted pair communication cable (e.g.: Alpha wire, part 6413). **Note:** Twisted pair cable should not be required for short lengths of cable < 1.5 m (< 5 ft). Standard screened cable should suffice.
- Using one twisted pair, connect the M750 positive terminals to the positive wire of bus and the negative terminals to the negative wire of the bus.
- Connect the common (coms com) to the bus common using the second twisted pair. **Note:** The common connection is recommended, but should not be necessary for short lengths < 30 m (< 100 ft).
- Consider terminating the two furthest ends of the bus to match the transmission line impedance using termination resistors - 120 Ω is a common value, but ideally the line impedance should be matched to each individual installation. **Note:** Termination for short lengths of cable should not be necessary < 300 m @ 9 600 Baud (< 1 000 ft @ 9 600 Baud).

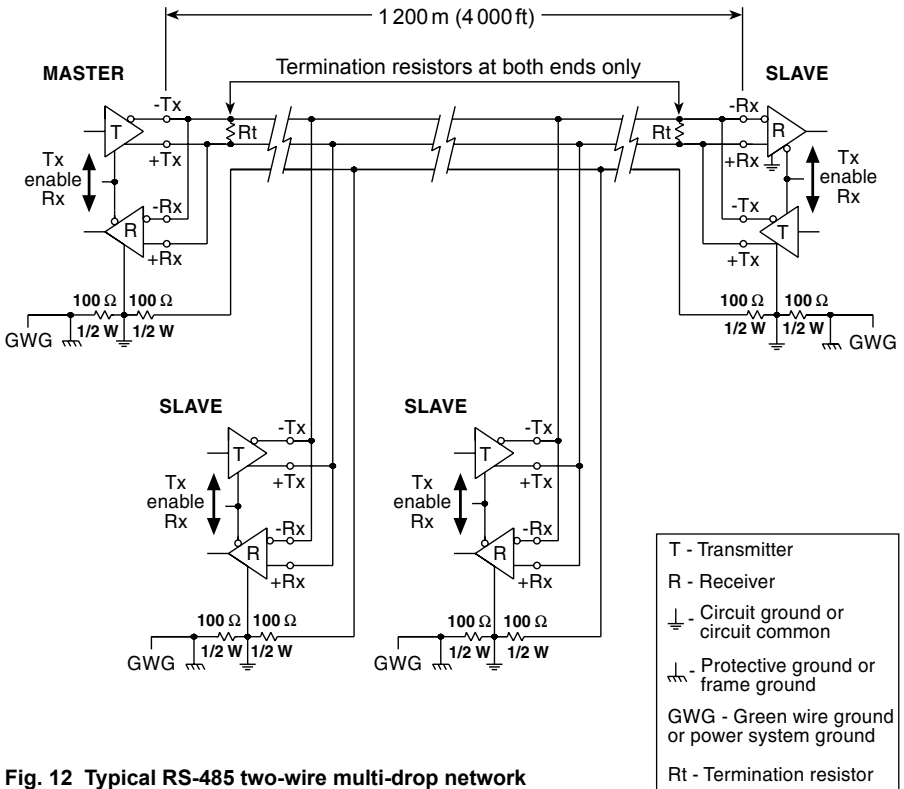


Fig. 12 Typical RS-485 two-wire multi-drop network

RS-485 four-wire installation

- Use an EIA RS 485 screened triple twisted pair communication cable (e.g.: Alpha wire, part 6414). **Note:** Twisted pair cable should not be required for short lengths of cable <1.5m (<5ft).
- Using one twisted pair, connect the M750 +Tx and -Tx terminals to the +Rx and -Rx wires of the bus respectively. Standard screened cable should suffice.
- Using the other twisted pair, connect the M750 +Rx and -Rx terminals to the +Tx and -Tx wires of the bus respectively.
- Connect the common (coms com) to the bus common using the third twisted pair. **Note:** The common connection is recommended, but should not be necessary for short lengths <30 m (<100ft).

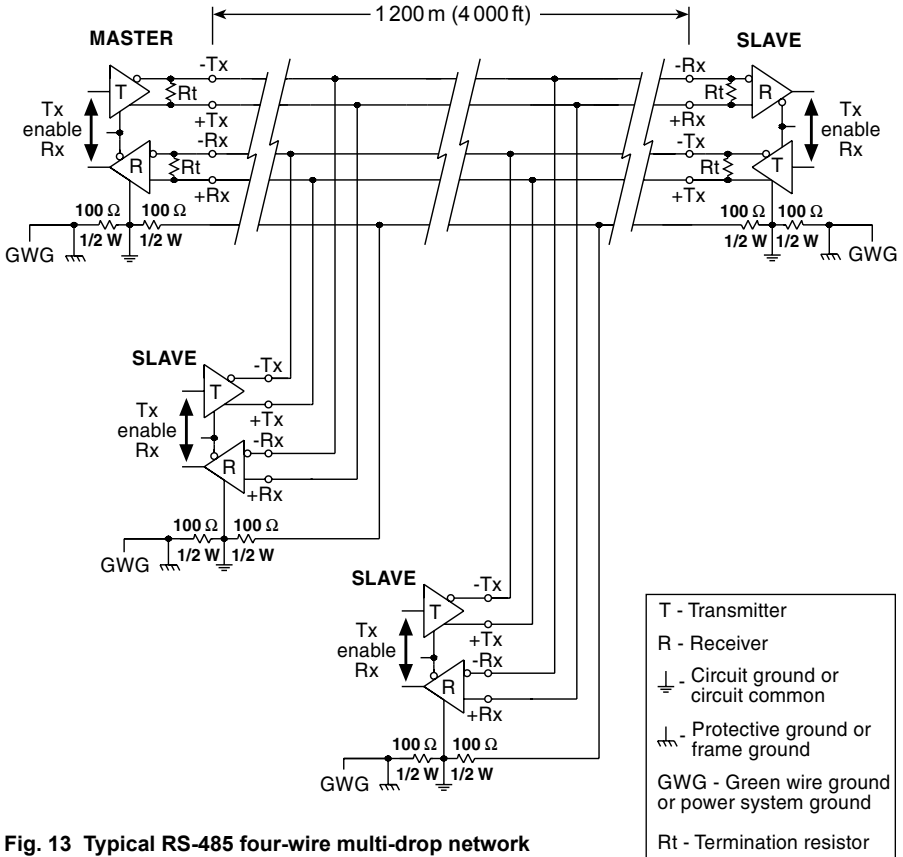


Fig. 13 Typical RS-485 four-wire multi-drop network

3.4 Technical data (@ 20°C)

General

Power supply	90-264 Vac 50/60 Hz
	90-253 Vac 50/60 Hz for compliance with LVD and UL
	BS EN 61010-1 for connection to an installation over-voltage
	Category II supply Pollution degree 2
Power consumption	10 VA (worst case)
Isolation (tested to)	500 V Supply to I/O 3 750 V
Relay supply	BS EN 61010-1 for connection to an installation over-voltage
	Category II supply
	Pollution degree 2
Environmental	IP rating IP65 (front panel only)
	Ambient operating temperature -30 to +60°C (-22°F to +140°F)
	Ambient storage -50 to +85°C (-58°F to +185°F)
	Ambient humidity 10 to 90% RH
	EMC: Emissions and immunity BS EN 61326
	Safety BS EN 61010-1

Universal input types	Sensor	Sensor range and linearisation
Sensor and Sensor range and linearisation	mA	4-20 mA, ± 20 mA, ± 10 mA
	RTD	Pt 100, NI 120, custom
	T/C	K, J, T, R, S, B, N, L, B, E, Custom*
	mV	± 100 mV
	Volts	± 10 V, ± 5 V, 1 - 5 V, ± 1 V
	Minimum span	Any span within the range can be selected, but the recommended span is > 10% of range.
Current input	Basic accuracy	0.05% FS \pm 0.05% of reading
	Thermal drift	200 ppm/°C
	Input impedance	20 Ω
	Linearity	Linear, X ^{1/2} , X ^{3/2} , X ^{5/2} , custom*

A 19 V @ 25 mA isolated power supply is provided to power the current loop.

* Custom can be up to 60 co-ordinate pairs or up to 7 segments of 15th order polynomial.

Output options

Dual relay alarm pod

Two independent mains rated relay outputs

Contacts	2 x changeover relays with common	
Ratings	ac	dc
Maximum load	5 A@250 V	5 A@30 V (inductive load 2 A)
Maximum power	1 250 VA	150 W
Maximum switching	253 volts	125 volts
Electrical life	10 ⁵ operations at rated load	
Mechanical life	50 million operations	
Termination	Standard 5 way tension clamp connector	

Isolated 4-20 mA re-transmission pod

Ranges	0- 10 mA (Active or Passive)
	0-20 mA (Active or Passive)
	4-20 mA (Active or Passive)
Minimum current output	0 mA
Maximum current output	23 mA
Accuracy	0.07% FS
Resolution	1 part in 30,000
Maximum output load	Active 1 K Ω
	Passive [(Vsupply - 2)/20] K Ω
Maximum external supply voltage	30 V (Passive mode)
Voltage effect	0.2 μ A/V
Ripple current	< 3 μ A
Isolation	500 Vac
Stability	1 μ A/ $^{\circ}$ C
Termination	5-way tension clamp connector

Communications

RS485 Mod-bus communications	The M750 is available with RS485 serial communications using MODBUS RTU protocol as standard.
Physical layer	4 wire or 2 wire half duplex RS485
Protocol	Modbus RTU format
Isolation	500 Vac
Maximum fan out	32 units (this can be increased with repeaters)
Termination standard	RS485

3.5 Instrument configuration

The M750 is configured using the three keys on the front panel. The M750 has two modes of operation:

- 1) The 'Run' mode. This mode is automatically entered 5 seconds after the power is applied to the M750. 'Run' mode is the principal mode of operation.
- 2) The other mode of operation is the 'Menu' mode. In this mode the M750 is configured for the application.

The menu navigation method is shown diagrammatically in Section 3.7 'General menu navigation'.

Key press definitions

Each M750 unit has three keys; Cycle, Shift and Increment to allow menu programming.

Fig. 14 Each key pressed individually produces the following menu actions (the shaded circle denotes the key pressed).

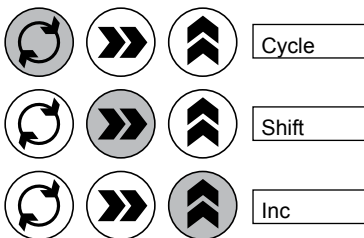
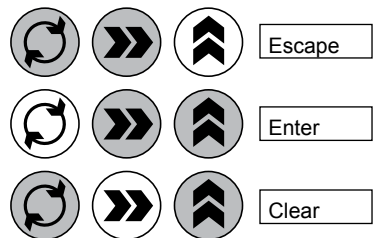


Fig. 15 Keys pressed simultaneously produce the following menu actions (the shaded circle indicates the keys pressed).



Run mode structure

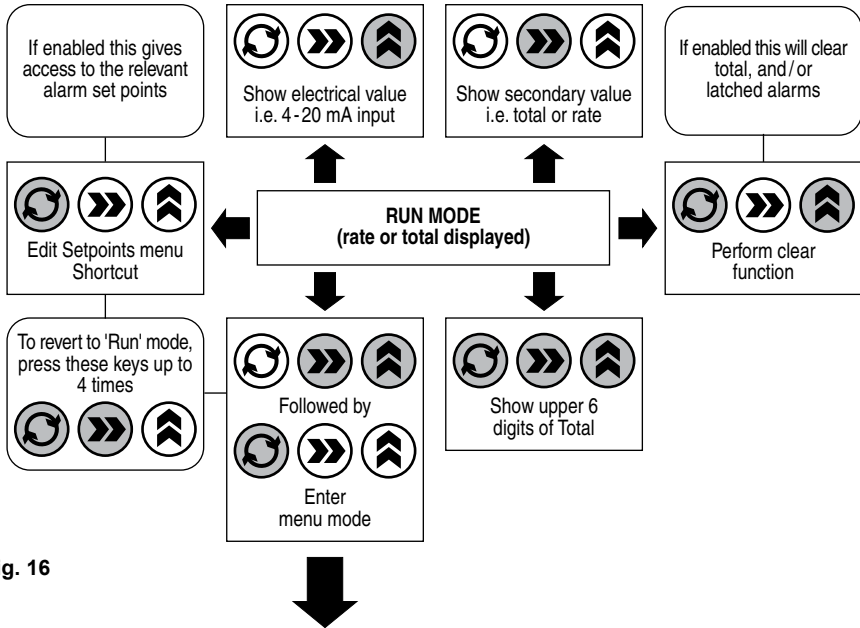


Fig. 16

3.6 Menu mode

This menu configures the M750 to suit the application. The menu covered in this section is the menu structure for all applications. For commissioning the M750 for operation with Spirax Sarco flowmeters see Section 4.

The 'Menu' mode is protected by a passcode and the user is asked for this when the 'Menu' mode is accessed from the run mode. The passcode is set to a default of 0 and can be changed to any value between 0 and 65535. Setting the value to zero (default) removes the passcode prompt and the passcode function is disabled.

3.7 General menu navigation

The following diagram, details how to move around the menu structure and enter data. Figure 17 shows:

- 1) How to enter a real number.
- 2) How to choose an option from a list.
- 3) How to enter and navigate around a sub-menu.

Using these three procedures the user can enter all applicable data to configure the M750 to suit the application.

The options displayed in the menu depend on whether the short menu or full menu option is enabled. (This can be selected in the SYStEn sub-menu.)

In the following section any greyed-out menu items are only accessed when the full menu is enabled.

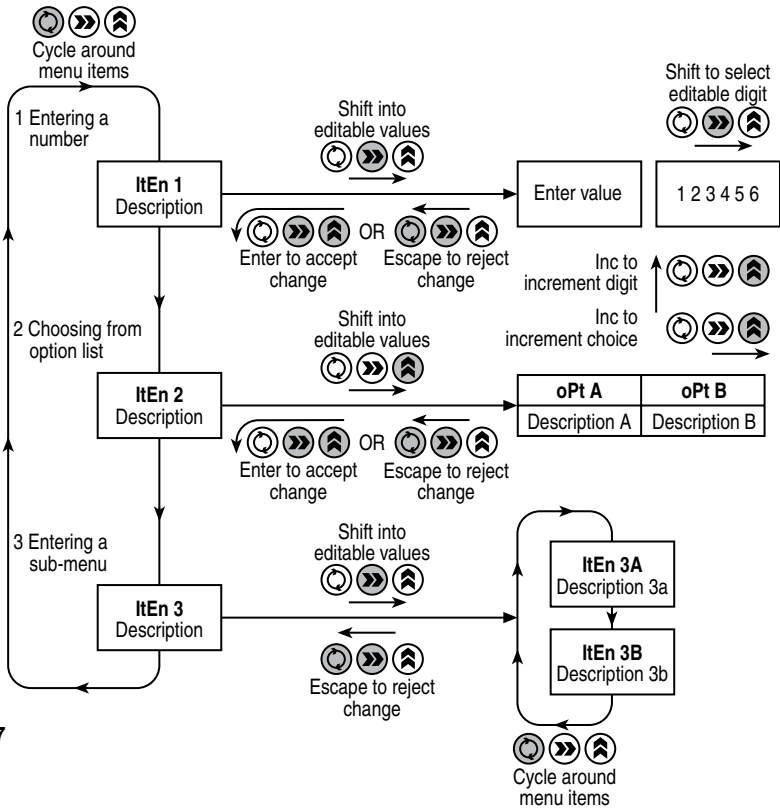


Fig. 17

3.8 Main menu

From Run mode

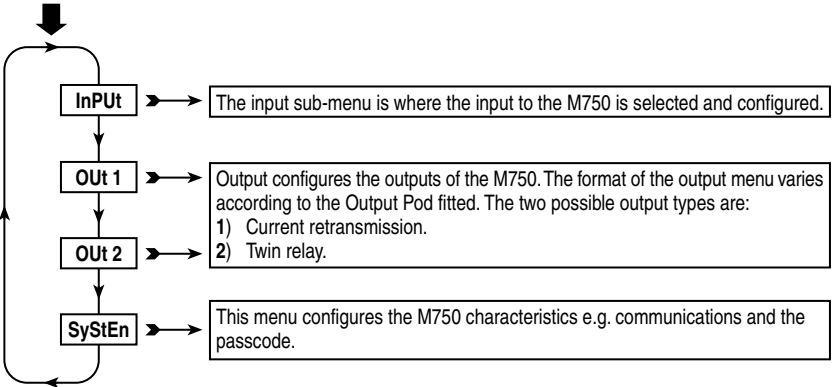
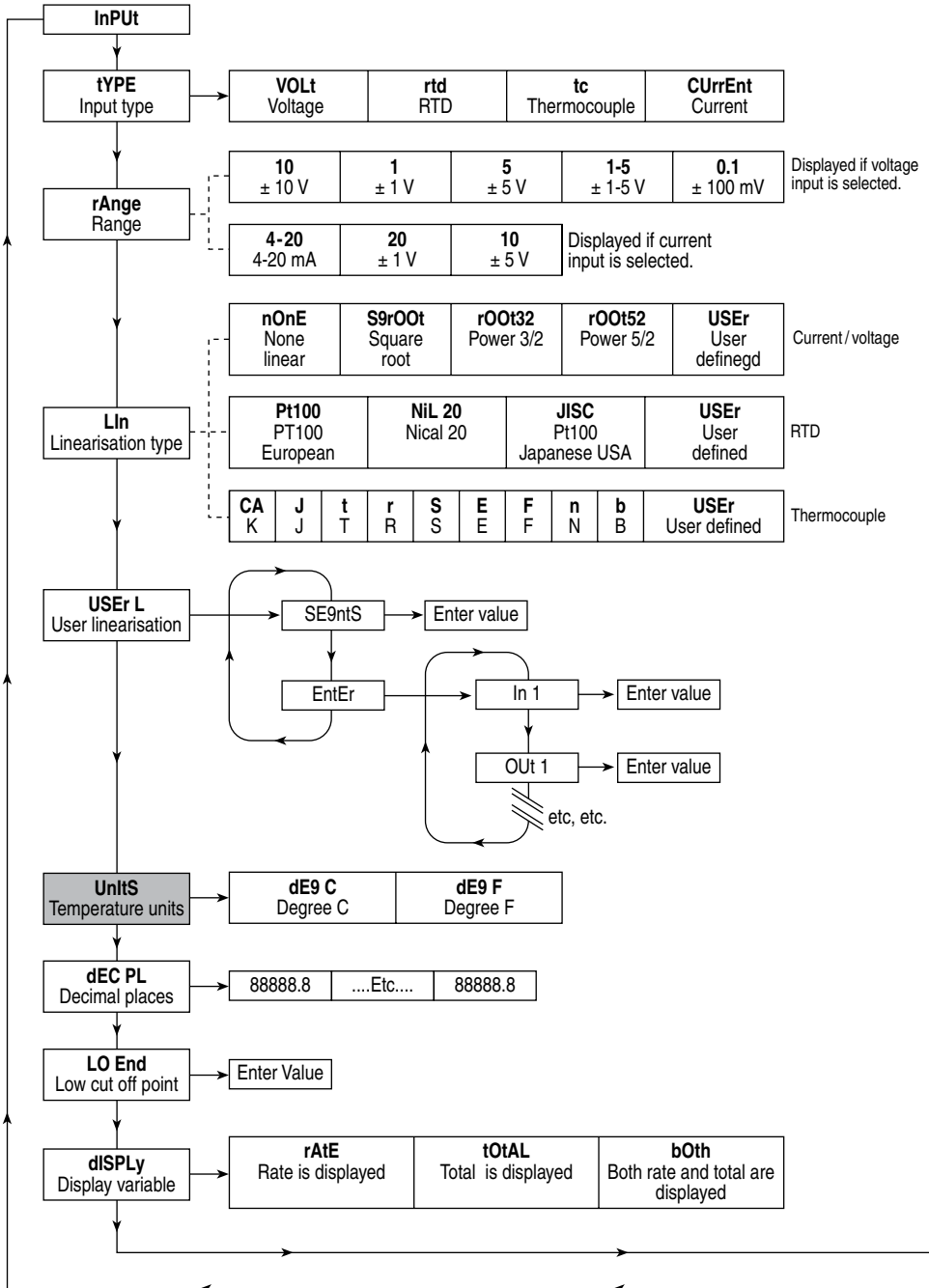
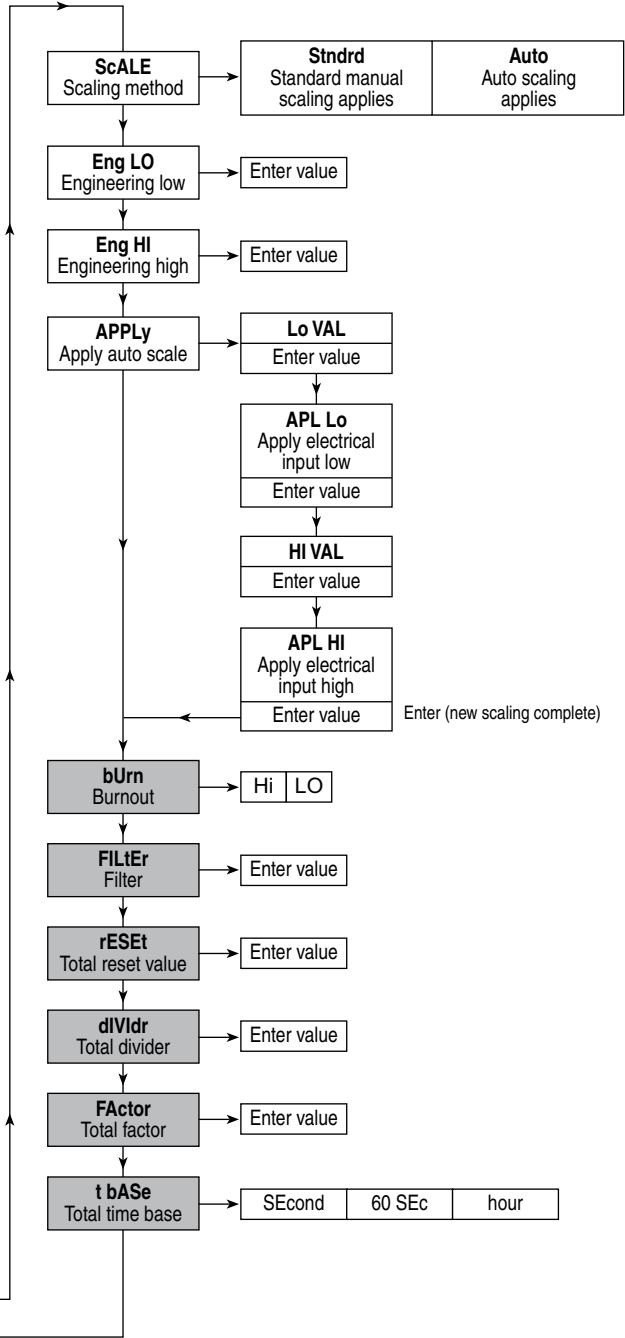


Fig. 18

3.9 Input sub-menu

Fig. 19





3.10 Input sub-menu blocks

Type sub-menu

This allows the type of input required on the M750 to be selected. The M750 will accept a voltage, RTD, thermocouple or current input.

Range

Depending on the input type selected the M750 will either show the voltage ranges or current ranges available. Select the range which is applicable to the input device.

Linearisation type

Again the input type selected will determine the linearisation options available. Current/voltage, RTD, or thermocouple.

User linearisation

When the user selects user-linearisation, up to 60 co-ordinate pairs of interpolation data can be entered via the front panel keys. The 'SE9ntS' value defines the number of segments.

'SE9ntS' = Number of interpolated segments = Number of co-ordinate pairs - 1

'In1' = Electrical input co-ordinate 1

'OUt1' = Process variable (PV) co-ordinate 1

'In2' = Electrical input co-ordinate 2

'OUt2' = PV co-ordinate 2

etc.....

For n segments there are n + 1 co-ordinate pairs

If the electrical input goes below electrical input co-ordinate 1, or above electrical input co-ordinate (n + 1), the input is flagged as being under or over-range, respectively.

Temperature units

This is only available if a thermocouple or RTD input is selected.

Decimal places

The number of decimal places shown on the display can be selected using this option.

Low cut off point

A low cut-off point can be selected. This is the value below which the unit will indicate engineering low (Eng LO). This is set in engineering units and for flowmeters it is generally the minimum flow measurable.

Note - If the unit is required to indicate a value different to the engineering low at the low cut-off point (LO End):

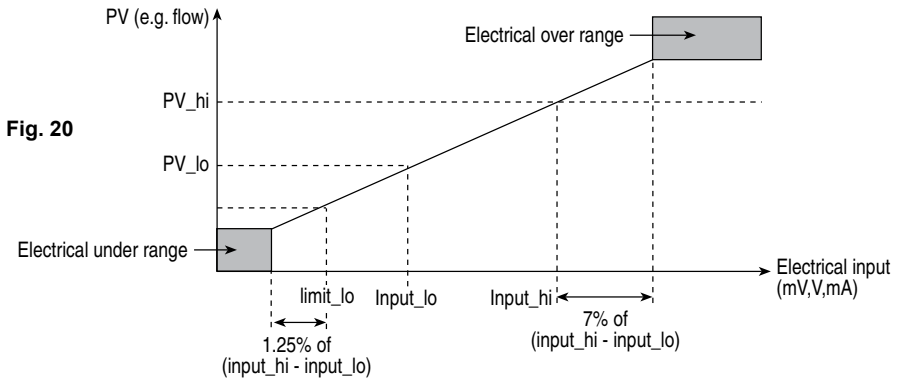
- Enter the value required on low cut-off into Eng LO.
- Enter the range settings in 'User linearisation type' (LIn).

Display variable

This sets the main display shown by the M750 in the run mode. It can be set to show the rate, total or alternate between both.

Scale

The primary function of the M750 is to take an electrical input, and convert it to a displayable Process Variable (PV, also referred to as an engineering value, e.g. flow or temperature). The M750 input signal can be scaled in one of many ways. For 'rtd' or 'tC' (thermocouple) inputs, the user simply chooses the 'tYPE' and 'Lin' (linearity type). For 'CurEnt' or 'VOLT' input types, the user can choose 'Stdndr' or 'AUtO' scaling (from the 'ScALE' submenu). If 'Stdndr' scaling is chosen, the user will encounter 'En9 LO' and 'En9 HI' entries, in order to manually scale the input to the relevant input_lo and input_hi values (see the Table on page 17 for input_lo/hi values). The PV_lo and PV_hi values shown equate to the 'En9 LO' and 'En9 Hi' entries. Scaling is subsequently applied according to the graph shown in Figure 20 (The straight line illustrated in Figure 20 will change if a non-linear linearity type is selected. If the user requires strict control over the out of range limits, the user linearisation should be chosen).



Input type	Range	Limit_lo	Input_lo	Input_hi
Voltage	± 100 mV	-100 mV	0 mV	100 mV
	± 10 V	- 10 V	0 V	10 V
	± 1 V	- 1 V	0 V	1 V
	± 5 V	- 5 V	0 V	5 V
	1-5 V	- 1 V	1 V	5 V
Current	4-20 mA	4 mA	4 mA	20 mA
	± 20 mA	-20 mA	0 mA	20 mA
	± 10 mA	-10 mA	0 mA	10 mA

If 'AUTO' scaling is selected, the 'APPLY' submenu appears (in place of 'En9 LO' and 'En9 HI' entries). The 'APPLY' submenu procedure must be carried out as follows:

1. Shift into the 'APPLY' submenu.
2. Edit and enter the 'LO VAL' engineering value required for low scaling. (This will equate to PV_lo.)
3. The display will flash 'APL LO' to prompt the user to apply the electrical signal corresponding to PV_lo. If the electrical signal goes out of range, the display signifies this, and the input signal won't be accepted by the M750. This applies electrical signal equates to input_lo, in the graph/table above.
4. Repeat steps 2 and 3 for 'HI VAL', and the corresponding high electrical engineering VALs.

Once scaling is complete, and the menu structure is left, if the electrical input is under/over range, the display shows or

Burnout

This defines whether, in the event of a sensor failure (burnout), the output current goes high (21.5 mA) or low (3.6 mA). This is only available if the thermocouple or RTD input type is chosen.

Filter

The user can choose one of three filter types by editing this configuration:

1. Entering a value > 0.3 . A fixed first order recursive filter is applied to the input processing, with a time constant (TC) equating to the actual value entered, in seconds.
2. Entering a value = 0.0. An adaptive first order recursive filter is applied to the input processing, with the time constant adapting to the dynamic behaviour of the input signal.
3. Entering a value x , where $0 < x < 0.3$. No filter is applied to the input processing.

Total reset value.

When the total is reset, it will revert to this value.

Total divider/factor/time base

Factor, divider and time base are used to scale the amount by which the total is incremented every second. The total added every second is:

- $(\text{rate} \times \text{factor}) / (\text{time base} \times \text{divider})$, where time base is = 1, 60, or 3600 seconds.
- The total displayed has a maximum number of 12 digits. In normal running mode the 6 lower digits are shown. By pressing the three front keys together the next 6 digits are shown.

Out of range alarm

When an input goes out of range, the following occurs:

- If fitted, any relays go into alarm state.
- If fitted, the retransmitted current derived from the out of range alarm input goes to 3.8 mA or 21.12 mA, depending on whether the burnout setting is set to low or high, respectively.

When over-range occurs, the display shows

—	—	—	—	—	—
---	---	---	---	---	---

When under-range occurs, the display shows

—	—	—	—	—	—
---	---	---	---	---	---

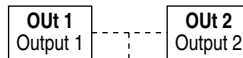
Output sub-menu

The format of the output menus varies according to the output pod fitted. The 2 possible output types are:

- Current retransmission
- Twin relay

The output menu 1/2 will vary accordingly.

Relay output menu



Retransmission (mA) output menu

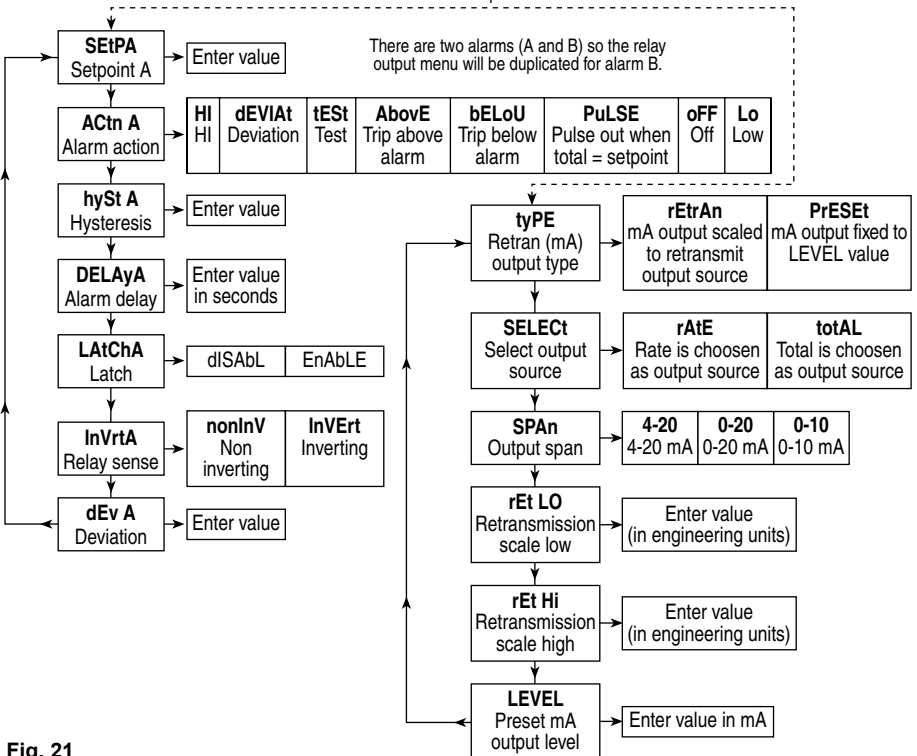


Fig. 21

3.12 Output menu function blocks

Relay output menu

The relay menu shown is for alarm A. There are two alarms A and B so the menu will be duplicated for alarm B. The relay menu will only be displayed if a twin relay pod is fitted to the M750.

Set point A

The set point value defines the engineering value associated with an alarm. For example if an alarm is required when the flow exceeds 10 000 kg/h, the set point will be set to 10 000.

Alarm action

This defines the behaviour of the alarm when the set point is reached.

Alarm action	Alarm behaviour
OFF	The alarm is always off
LO	The alarm triggers when $PV < \text{set point}$, i.e. low alarm
HI	The alarm triggers when $PV > \text{set point}$, i.e. high alarm
dEV	The alarm triggers when PV moves out of a deviation band i.e. if the flow drops below or above the set point by 10%
tESt	Alarm is on
AbOVE	The alarm triggers when the total is $> \text{set point}$
bELOU	The alarm triggers when the total is $< \text{set point}$
PULSE	Alarm pulses when total is a multiple of set point i.e. if set point is set to 10, the alarm will pulse once every 10 units is added to the total. Pulse duration is 100 ms.

Hysteresis

The hysteresis value is the difference between the points at which the alarm triggers and releases, expressed in the relevant engineering unit.

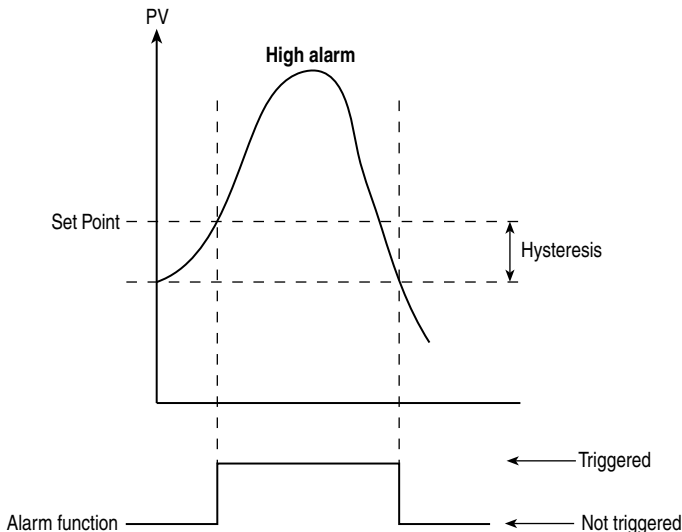


Fig. 22

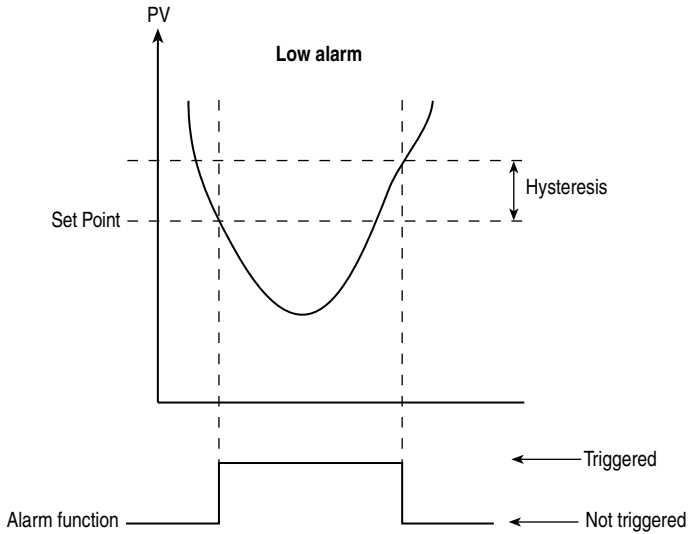


Fig. 23

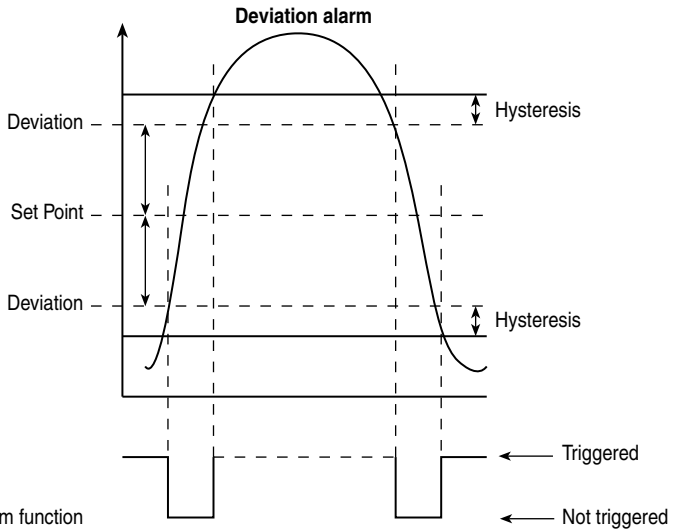


Fig. 24

Alarm delay

The alarm will not trigger until the PV has been in the alarm region for more than the number of seconds set in this option.

Latch

When latch is enabled, an alarm will remain triggered until it is manually cleared.

Relay sense

The 'InVrt' setting refers to the relay sense during powered operation. All other relay output menu settings refer to the alarm state. When in alarm, the relevant front panel LED is lit.

Power	Alarm status	InVrt setting	Relay position (A)	Relay position (B)
Off	X	X	3-5	3-2
On	Not in Alarm	nOnInV	3-4	3-1
On	In Alarm	nOnInV	3-5	3-2
On	Not in Alarm	InVErt	3-5	3-2
On	In Alarm	InVErt	3-4	3-1

Deviation

If the 'dEV' action is chosen in the alarm action option, this value determines the amount by which the PV may change before the alarm is triggered. The value entered should be in the engineering units.

Retransmission (mA) output menu

This menu is only displayed if a current retransmission output pod is fitted.

Retransmission (mA) output type

If 'PrESEt' is chosen, the output current can be edited in 'LEVEL'. Otherwise, the retransmitted current is derived linearly from the process variable, using 'rEt LO' and 'rEt HI'.

Select output source

The retransmission can be set to represent rate or total.

Span

4-20 mA, 0-20 mA or 0-10 mA can be selected as the span of the retransmission.

Retransmission scale low/high

By entering these values, the user can scale the mA output (selected in SPAn) to the PV. Default values will be equal to the engineering low and engineering high values entered in the input menu.

Preset mA output level

This is only available if 'LEVEL' output is chosen.

3.13 System menu

The system menu allows the communications to and from the device to be configured and also allows various functions to be enabled from the run mode. The passcode can also be changed from within this menu.

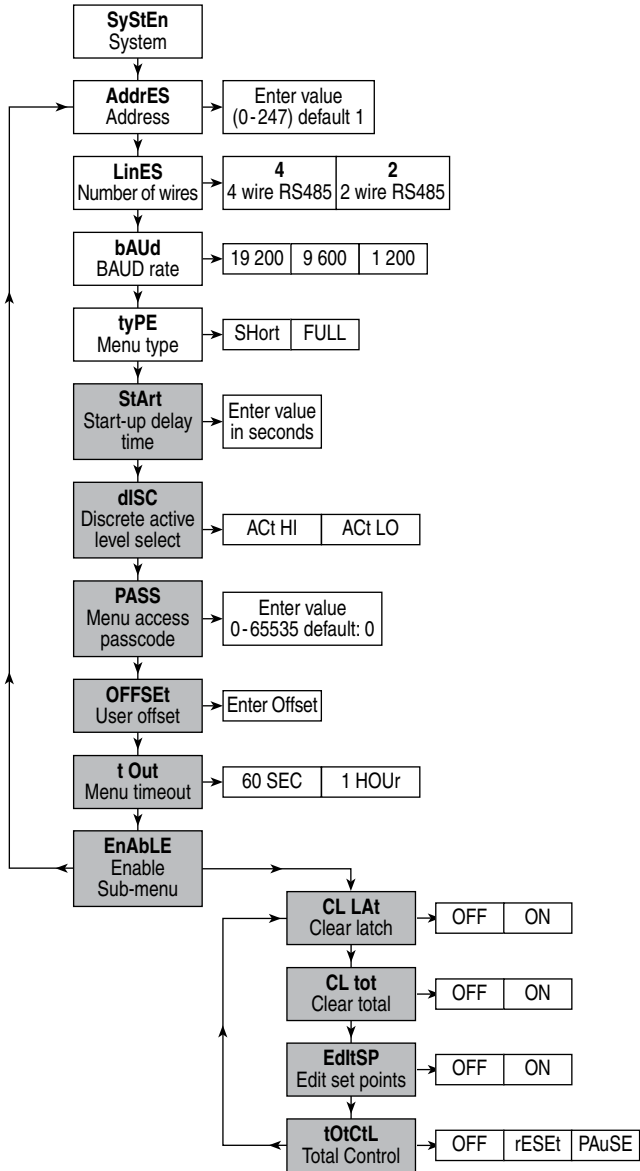


Fig. 25

3.14 System menu function blocks

Modbus device address

This sets the address for the RS485 communications. The default is 1 and the maximum is 247.

Number of wires

This defines the type of RS485 communication mode. It can either be 4 (full duplex) or 2 (half duplex).

The baud rate

This defines the comms baud rate, i.e. the speed of communications between the M750 and interrogating device. The Baud rate is displayed in bps.

Menu type

When 'SHort' type is chosen, access to the greyed out menu items is restricted. To allow access to these items the 'FULL' menu type should be chosen.

Start-up delay time

The outputs of the M750 will not operate until the start-up delay time (measured in seconds) has expired. The minimum delay is 5 seconds and the maximum 3 600 seconds.

Discrete active level select

The function of the discrete input 'dSc' is to operate as a remote clear button press, i.e. you can use this to reset the totals remotely. This menu item selects whether the clear function is executed when the discrete is high (24 V) 'ACT HI' or low (0 V) 'ACT LO'.

Menu access passcode

When accessing the menus from 'Run' mode, the user is prompted for this passcode. If it is zero (default), then there is no prompt and the password function is disabled. If the passcode is forgotten please contact Spirax-Sarco Limited.

User offset

This value is used to offset the scaled process variable by a fixed amount.

Menu timeout

This sets the amount of time after which the display will revert to the 'Run' mode if no key is pressed.

Clear latch

When set to 'On' latched alarms can be cleared by pressing the clear function on the front panel, or by applying discrete input 1.

Clear total

When set to 'On', the total is reset by pressing the clear button on the front panel.

Edit set points

When set to 'On' the edit set points sub menu can be accessed directly from the run mode.

Total control

This sets the action of the total when the discrete input is applied.

'oFF' means the total is unaffected by the discrete input 1.

'rESEt' means the total is reset when the discrete input 1 is asserted.

'PAuSE' means the total is paused when the discrete input 1 is asserted.

4. Commissioning

The following Section provides guidance on the commissioning of the M750 for use with Spirax Sarco flowmeters. The Section covers the DIVA, Vortex, Gilflo, ILVA and orifice plate flowmeters.

4.1 DIVA flowmeter, Vortex flowmeter and M640 mass transmitter

The DIVA flowmeter, Vortex flowmeter and M640 mass transmitter provide a linear 4-20 mA output representing flowrate. To commission the M750 to operate with these units, the following steps should be followed in conjunction with the general menu structure in Section 3.9.

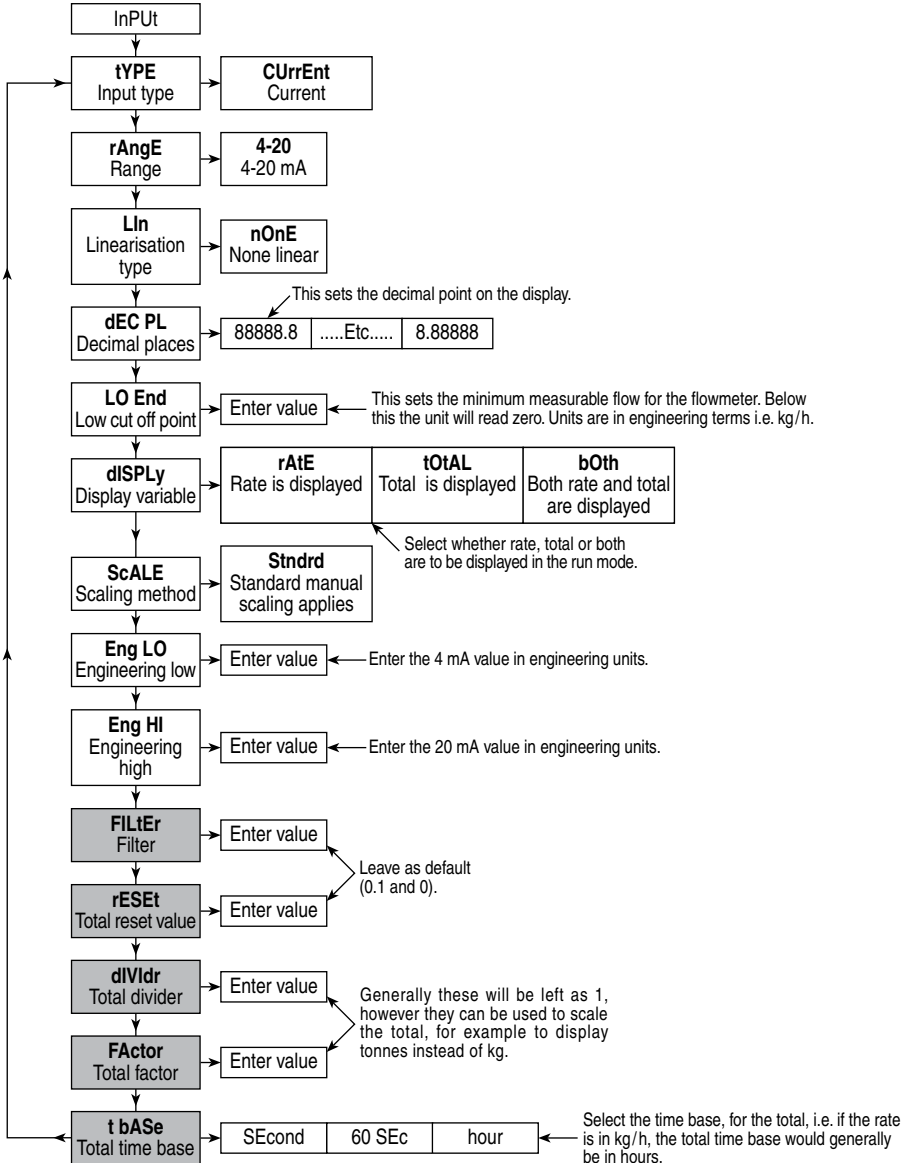


Fig. 26

4.2 Gilflo and ILVA flowmeters

Before commissioning the M750 for use with a Gilflo or ILVA flowmeter a custom calibration pack must be obtained from Spirax-Sarco Limited. This will provide the 4-20 mA output from the DP cell versus the flowrate through the flowmeter in the flowing conditions. As an alternative, Section 3 of the 'Flowmeter's calibration pack' can be used to convert the water equivalent flowrates given in the standard calibration pack to the flowing conditions of the application. To commission the M750 to operate with these units, the following steps should be followed in conjunction with the general menu structure in Section 3.9.

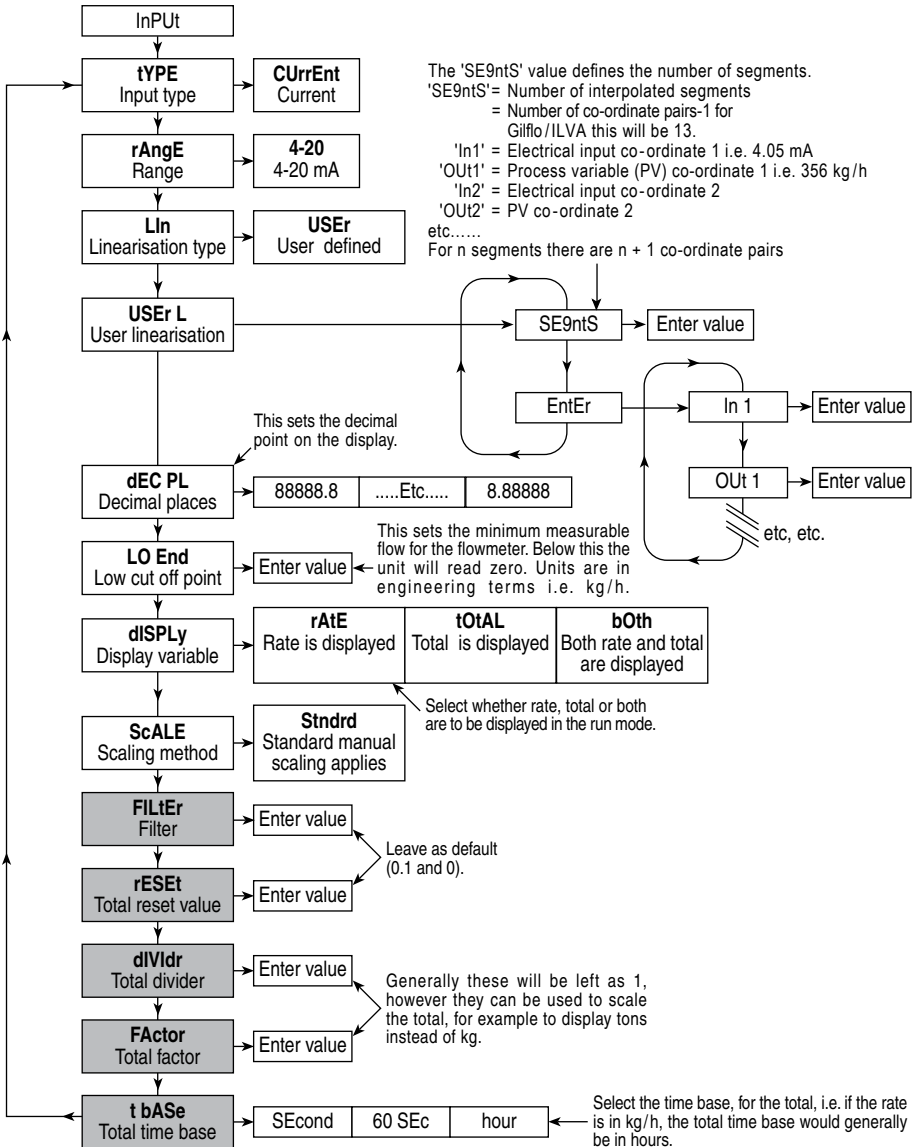


Fig. 27

4.3 Orifice plates

An orifice plate has a square root relationship between the DP output and flowrate. To commission the M750 to operate with these units, the following steps should be followed in conjunction with the general menu structure in Section 3.9.

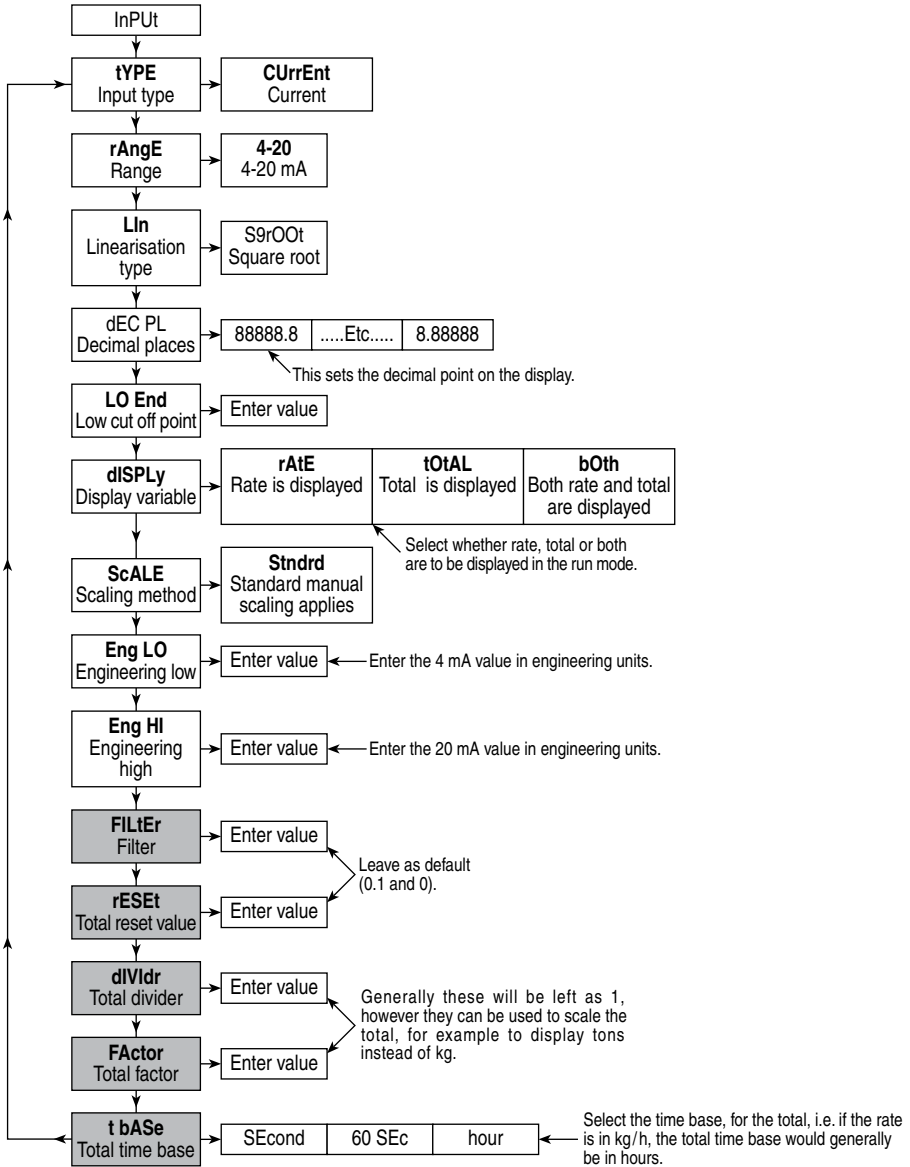


Fig. 28

4.4 M750 outputs

The menu displayed depends upon the option pod fitted to the M750. To commission the M750 outputs, the following steps should be followed in conjunction with the general menu structure in Section 3.9.

Relay output menu

The relay outputs can be set to operate as simple alarms or a pulsed output. There are two relay outputs per pod. The menu structure below describes setting one of the relay outputs as a pulse output and the other as an alarm which activates when the flow goes above a pre-determined value.

Relay A set as pulse output

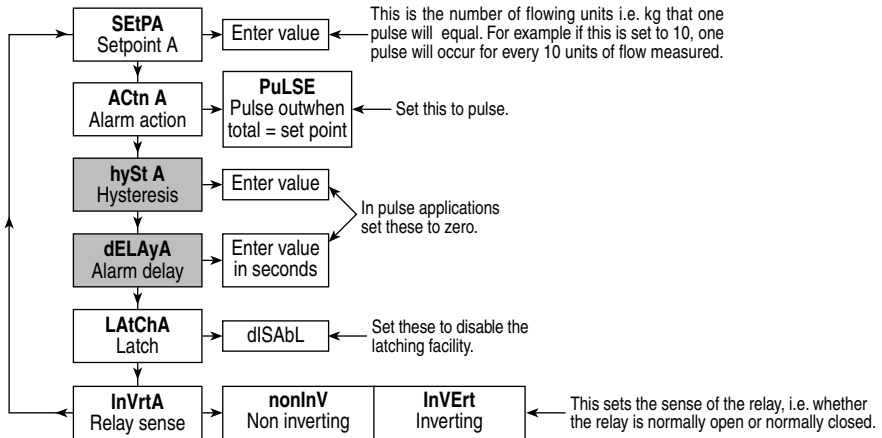


Fig. 29

Relay B set as a high flow alarm

The following menu describes setting the output relay B to alarm if the flowrate goes above a pre-determined maximum.

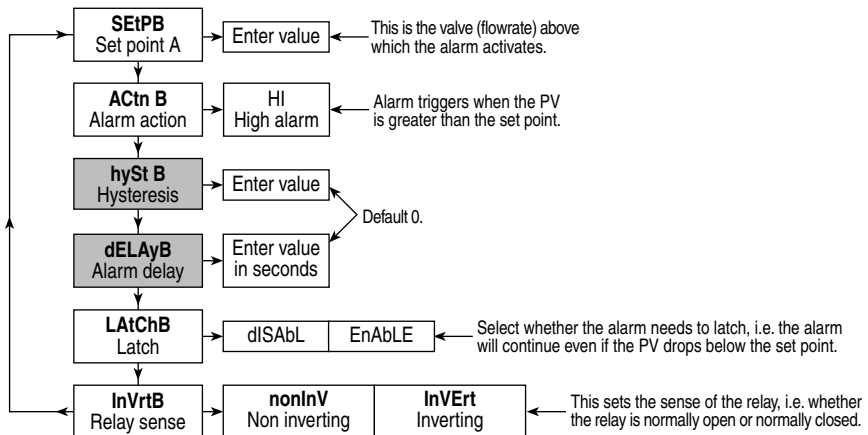


Fig. 30

Retransmission (mA) output menu

The following menu details the setting of the 4-20 mA output on the M750 to give a 4-20 mA output equivalent to the range of the attached flowmeter.

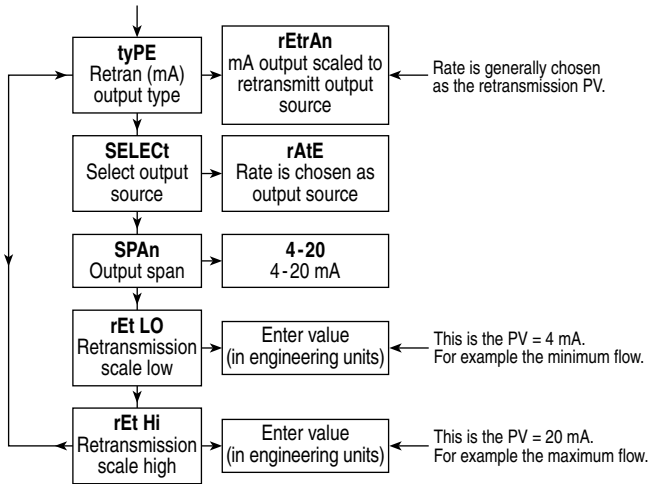


Fig. 31

Note: If the input goes out of range, the mA output goes to 21.5 mA by default.

5. Spare parts

The M750 itself is a non-serviceable item. The output pods can be replaced independently.

6. Fault finding

Many faults, which occur on commissioning, are found to be due to incorrect wiring or commissioning. Therefore it is recommended that a thorough check is carried out should there be a problem.

Symptom	Possible cause	Action
Display is blank	Voltage is out of range.	Check power supply connections.
Display shows <div style="border: 1px solid black; width: 100px; height: 15px; margin-top: 5px;"></div>	Input is out of range (above maximum).	Check that the engineering high value is correct.
Display shows <div style="border: 1px solid black; width: 100px; height: 15px; margin-top: 5px;"></div>	Input is out of range (below minimum).	Check that the engineering low value is correct.
'DP Err' is displayed	The displayed value (excluding total) is greater than 6 digits (i.e. 999999).	This can occur if the PV is configured outside of the displayable range.
'OP CAL' is displayed	The output pod has been corrupted.	Re-configure output. If the error is still present replace the output pod.
'IP CAL' is displayed	The input calibration data has been corrupted.	Re-input calibration data. If the error is still present replace the unit.
Total display after reading high now shows a low value	Total has increased above the displayed 6 low digits of the total.	Press all three front panel keys together and check the 6 high total digits.

