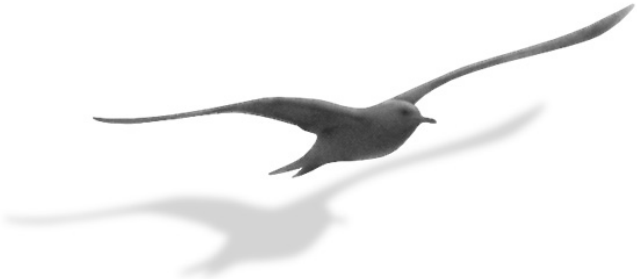
EV-100 Series

Setup Guide



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Contents

About this Setup Guide

This Setup Guide describes how to install your EV-100 series digital panel meter and configure it for most common applications. If you require more detailed information, please order a copy of the "EV-100 Series User Guide".

EV-100 series digital panel meters are marked with the international hazard symbol. It is important to read this Setup Guide before installing or commissioning your panel meter as it contains important information relating to safety and EMC.

Introduction to the EV-100 Series

The EV-100 series consists of a range of four digital panel meters, the EV-101, EV-102, EV-103 and EV-104. All four models are designed to interpret and display a wide range of process signals, including signals from 16 thermocouple types and 4 resistance thermometers.

All models in the EV-100 series have a sensitivity to 1.0µV or 0.2µA per displayed value. The signal input is measured every 0.1 seconds and displayed every 0.5 seconds. You can view either the measured value, the maximum value, the minimum value or the average value.

The facilities available on each of the four models in the EV-100 series are listed in the table opposite.

Facility	EV-100 Model			
	101	102	103	104
Number of Display Digits	4	4	5	5
4 Configurable Alarms	✓	✓	✓	✓
2 Alarm Relays		✓		✓
2 Function Keys	✓	✓	✓	✓
2 Status Inputs			✓	✓
Scaling and Linearisation	✓	✓	✓	✓
Configurable Maths Functions	✓	✓	✓	✓
Configurable Decimal Point Position	✓	✓	✓	✓
24V Transmitter Supply	✓	✓	✓	✓
10V Transducer Supply	✓	✓		
Variable 0 - 12V Transducer Supply			✓	✓
Serial Communications Interface			✓	✓
Analogue Output			✓	✓

Configuration

All EV-100 models can be configured via the front panel buttons. In addition to this, the EV-103 and EV-104 can be configured by using the "EV-100 Configuration Program" running on a PC connected to the instrument. A "Configuration Adapter Box" can also be supplied which allows you to configure EV-101 and EV-102 units using the EV-100 Configuration Program. Full details on the EV-100 Configuration Program and the Configuration Adapter Box are given in the "EV-100 Series User Guide" which can be made available on request.

Alarms

All EV-100 models have four user configurable alarms. Each alarm can be configured to be high, low or deviation. A high alarm is triggered when the displayed value goes above the alarm setpoint. A low alarm is triggered when the displayed value goes below the alarm setpoint. When you configure a deviation alarm you must specify a deviation band formed by the high and low deviation points. As long as the displayed value remains within this band, the alarm will not be triggered. In addition to this, the EV-102 and EV-104 models each have two alarm relays. See p.34 and p.40 for details.

Scaling and Linearisation

The signal input from most types of thermocouples and resistance thermometers can be automatically interpreted by the EV-100 as soon as the "range" parameter has been set. Details on how to set the range parameter are given on p.30. However, if you are using a sensor for which the EV-100 does not have a pre-set range, you can manually scale or linearise the EV-100 to display the value of any input signal type. See p.32 and p.52 for details.

Analogue Output

The EV-103 and EV-104 incorporate an analogue output which can be configured to transmit the measured value, the maximum, minimum or average value, or any value sent via the serial communications interface. See p.42 for details.

Status Inputs and Function Keys

All models in the EV-100 series have two function keys which can be configured to perform many of the most commonly used facilities, such as tare or alarm acknowledge. In addition to this, the EV-103 and EV-104 models have two status inputs which you can configure to perform all of the facilities available on the function keys, plus several additional facilities. See p.46 and p.48 for details.

Communications Interface

The EV-103 and EV-104 have a serial communications interface, allowing you to use your panel meter as a remote measurement device for a supervisory software system (SCADA) or as a remote display device. See p.44 for details.

For configuration purposes, the EV-103 and EV-104 can be connected via the communications interface to a PC running the EV-100 Configuration Program.

Transducer/Transmitter Power Supply

All models in the EV-100 series have a fixed 24V power supply intended for powering transmitters. In addition to this, the EV-101 and EV-102 have a fixed, regulated 10V power supply, and the EV-103 and EV-104 have a variable, user-programmable 0 - 12V power supply, intended for powering transducers.

Installing the EV-100 Series

Whichever model of EV-100 you are installing, you will need to carry out the following:

- Put the engineering unit label onto the right hand side of the display panel. A sheet of labels is supplied with all EV-100 models covering most commonly used engineering units. If the unit you require is not on the sheet, a blank label is provided on which you can LETRASET™ the symbol you need.
- Insert the EV-100 into the instrument panel. See p.10.
- Connect the EV-100 to the input. See p.12.
- Connect the EV-100 to the power supply. See p.20.

In addition, you may need to carry out the following:

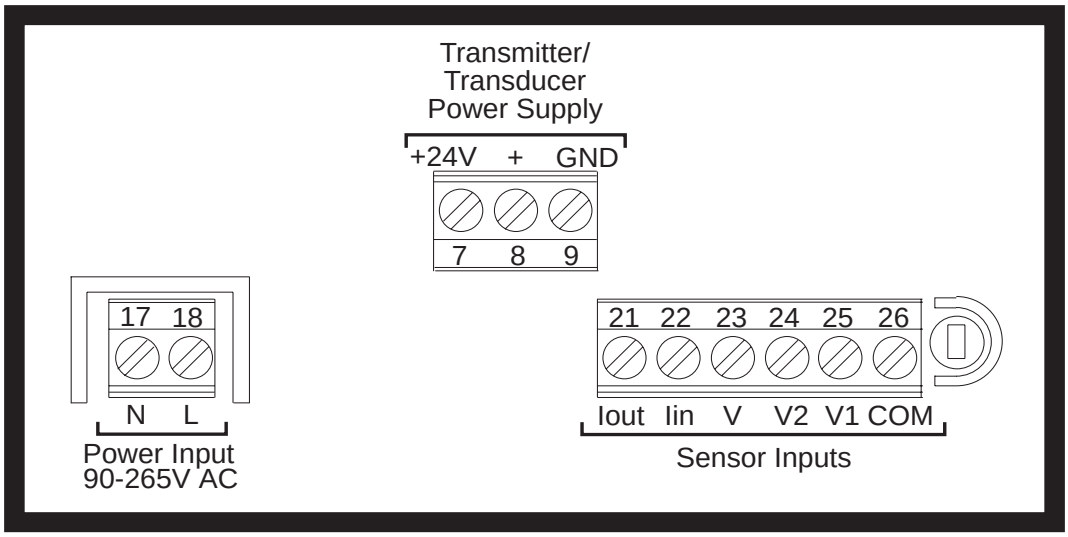
- Connect the analogue output. See p.15.
- Connect the communications interface. See p.16.
- Connect the status inputs. See p.18.
- Connect the transmitter/transducer power supply. See p.19.
- Connect the alarm relays. See p.15.
- Fit the optional rubber seal to prevent water penetrating behind the instrument panel from the front of the EV-100. This is done before you insert the EV-100 into the instrument panel, as described on p.10.

Please note:

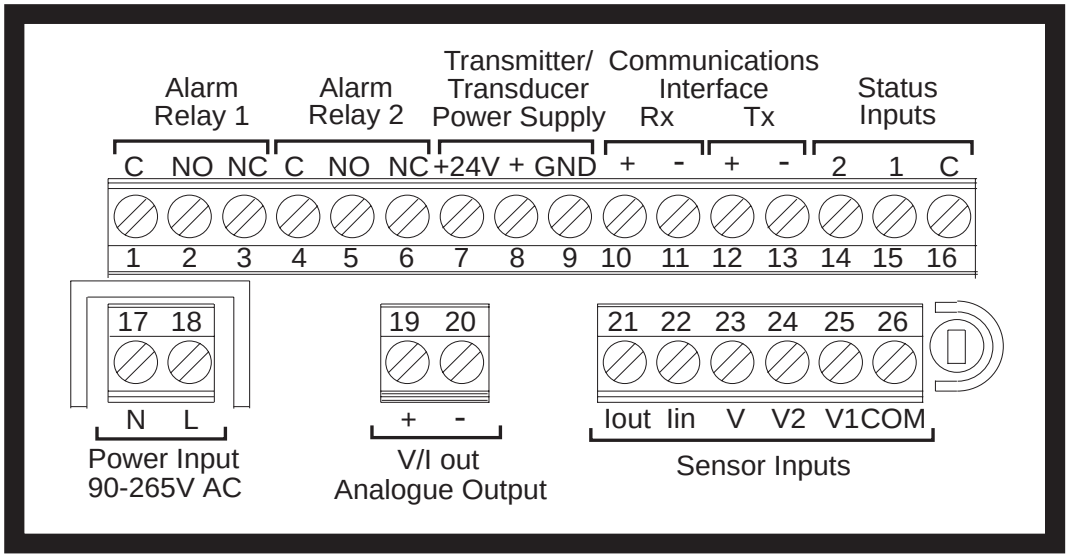
- Ensure that the EV-100 is switched off before carrying out any installation or maintenance work.
- It is recommended that all connections to the terminals are made using bootlace ferrules to afford greater reliability and to prevent short circuits between adjacent terminals.
- Do not install the instrument close to switch gear, contactors or motor starters.
- Do not place signal and power supply wiring in the same loom.

- Use screened cables or wires for all signal/sensor leads with the screen earthed at one point only.

The diagram below shows the rear panel of the EV-101.

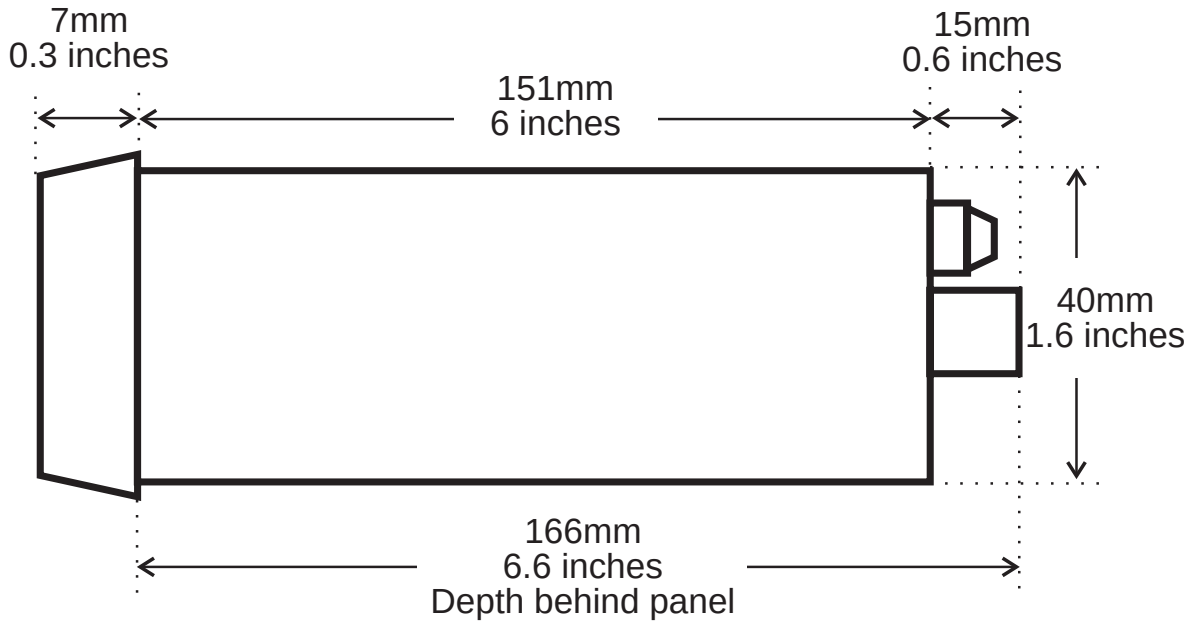


The diagram below shows the rear of the EV-102, EV-103 and EV-104.



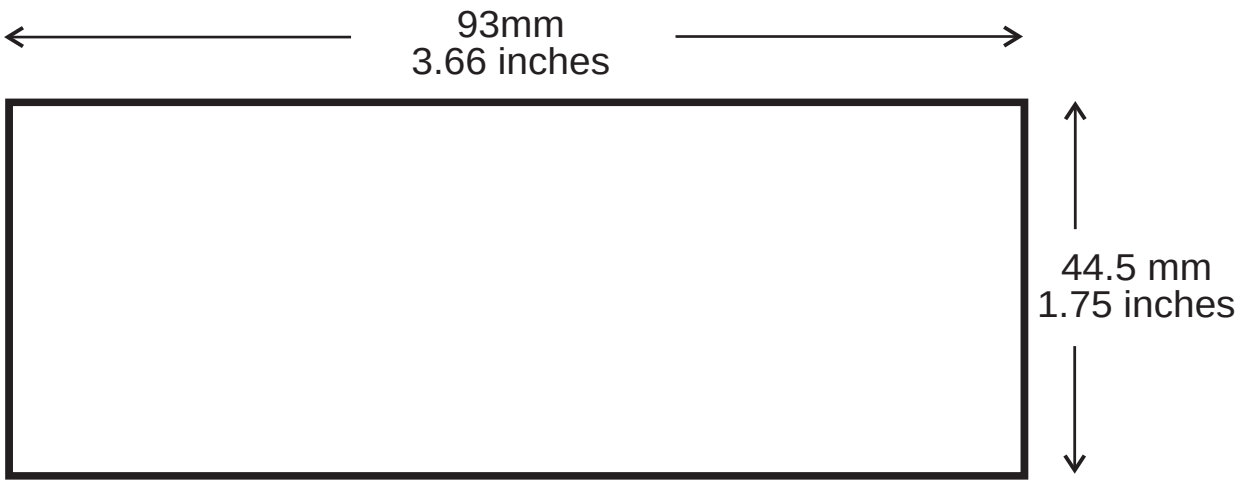
Panel Mounting the EV-100 Series

Ensure that there is sufficient space behind the instrument panel for the depth of the EV-100 unit. The diagram below is a side-view of the EV-100, showing its dimensions.



The EV-100 is supplied with a mounting kit consisting of two mounting brackets, each with its own headless screw. To insert the EV-100 into the panel, follow the steps listed below:

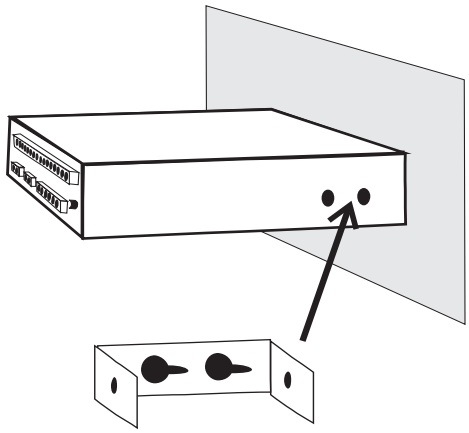
1. Make a cut-out in the panel with dimensions as shown in the diagram below. The panel must have a thickness between 1.5mm and 9.5mm.



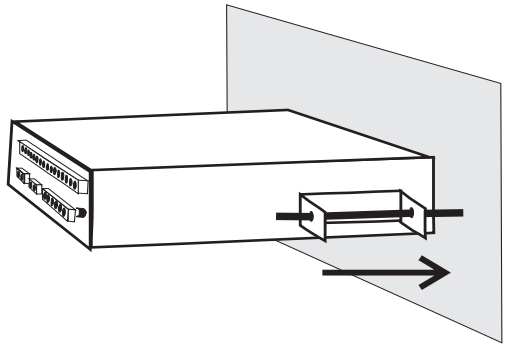
2. To fit the optional rubber seal to prevent water penetrating behind the instrument panel, slip the seal onto the unit from the rear, pushing it forwards until it is sitting behind the front lip of the EV-100.

3. Insert the EV-100 into the instrument panel from the front, pushing it through as far as the front lip. The rubber seal sits between the front of the instrument panel and the front lip of the EV-100.

4. Working from behind the instrument panel, take the two mounting brackets, one for each side of the EV-100 casing, and ensure that the keyholes are pointing in the correct direction, as shown below. With the keyholes placed over the lugs on the EV-100 casing, pull the brackets backwards until they are locked into place.



5. Insert the headless screws supplied through each of the mounting brackets and tighten them until they bite into the instrument panel, securing the EV-100 unit in place.



Connecting to the Input

The connections will vary depending on the type of input from the sensor. The options are as follows:

- Thermocouple input.
- Input in volts, up to a maximum of ±10V.
- Input in millivolts, up to a maximum of ±100mV.
- Input in milliamps, up to a maximum of ±20mA.
- Input from a 2 wire RTD/resistance sensor.
- Input from a 3 wire RTD/resistance sensor.
- Input from a 4 wire RTD resistance sensor.

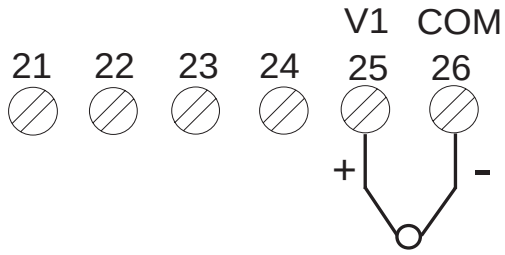
Full details on how to configure the input are given on p.30.

If you are using your panel meter as a remote display device, displaying signals sent via the serial communications port, please refer to the instructions on wiring the communications interface on p.16.

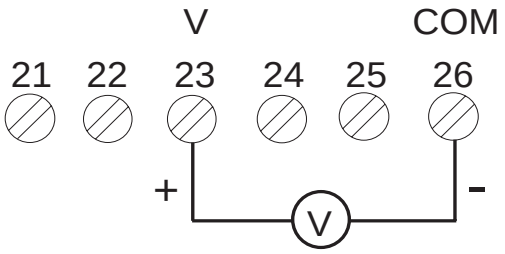
Do not run signal or thermocouple leads next to power supply leads. The signal or thermocouple cable should be screened and the screen connected to earth at one point only. If the thermocouple is grounded, this should be done at one point only. When connecting the EV-100 to a thermocouple, use the correct type of thermocouple extension or compensating cable, ensuring correct polarity.

The diagrams below and overleaf show the connections necessary for each of the possible input types.

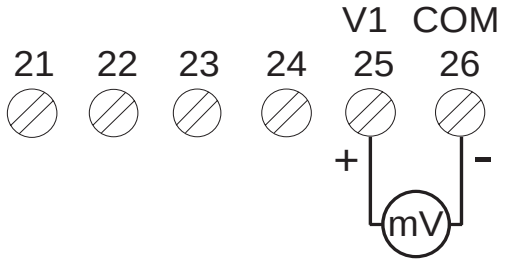
Thermocouple



Signal in Volts (±10V max)

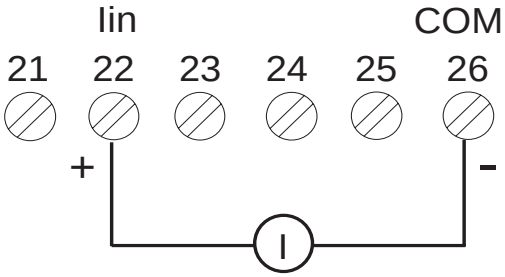


Signal in Millivolts (±100mV max)

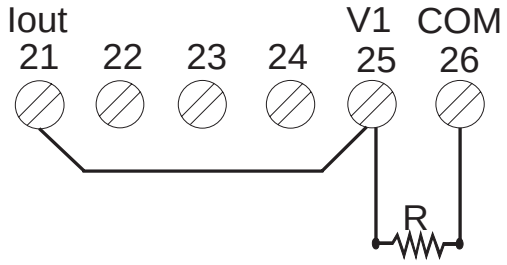


Please follow the instructions on the digital indicator to connect the transmitter!

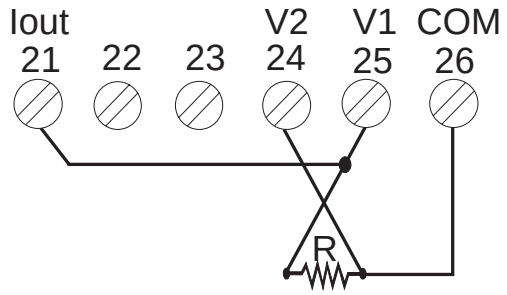
Signal in Milliamps (±20mA max)



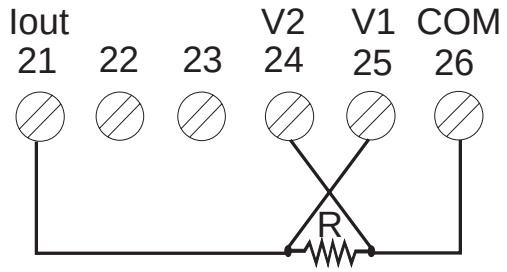
2 Wire RTD/Resistance (0 - 400Ω)



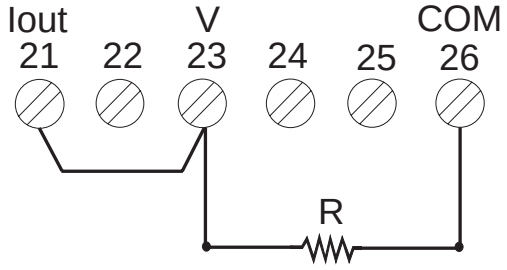
3 Wire RTD/Resistance (0 - 400Ω)



4 Wire RTD/Resistance (0 - 400Ω)

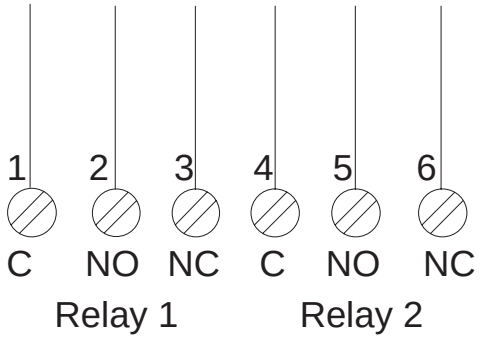


2 Wire Resistance (0 - 4000Ω)



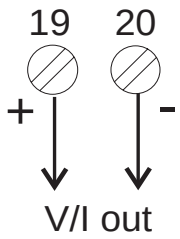
Connecting the Alarm Relays

The EV-102 and EV-104 are both supplied with two alarm relays. Full details on how to configure the alarm relays are given on p.40. The alarm relay connectors are present on the EV-103 but are not operational. The diagram below shows the connections required.



Connecting the Analogue Output

The analogue output facility is available on the EV-103 and EV-104. The analogue output port is present on the EV-102 but is not operational. Full details on how to configure the analogue output are given on p.42. The diagram below shows the connections required.



Connecting the Comms Interface

The EV-103 and EV-104 have a communications interface which can be used for connection to a PC running the EV-100 Configuration Program, or for connection to a master device running a SCADA system. You can also use the EV-100 as a remote display device, displaying a value sent via the communications interface. Full details on how to configure the communications interface are given on p.44.

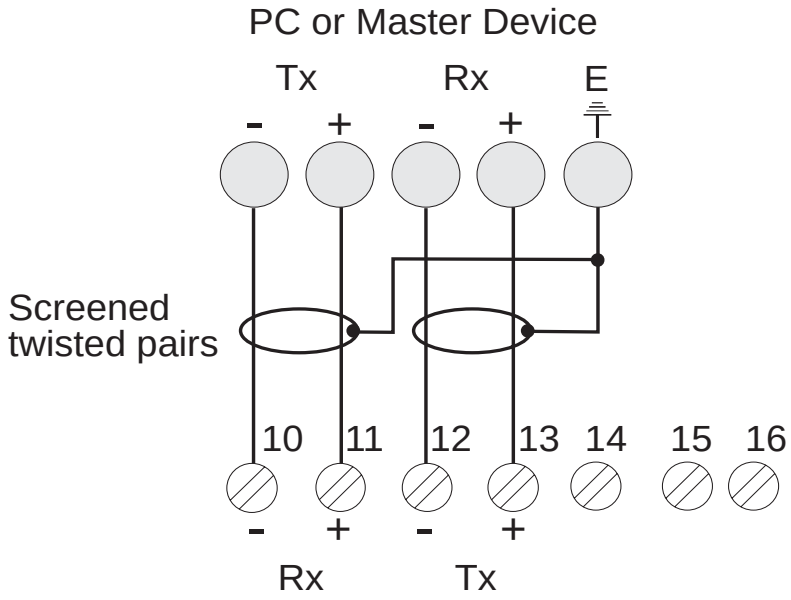
The communications interface is compatible with 4 wire RS422 links, and 2 or 4 wire RS485 links.

Connections to the communications interface should be made using screened twisted pairs. The screen should be connected to earth at one point only. For 4 wire interfaces both pairs should be individually screened and connected to earth at one point only.

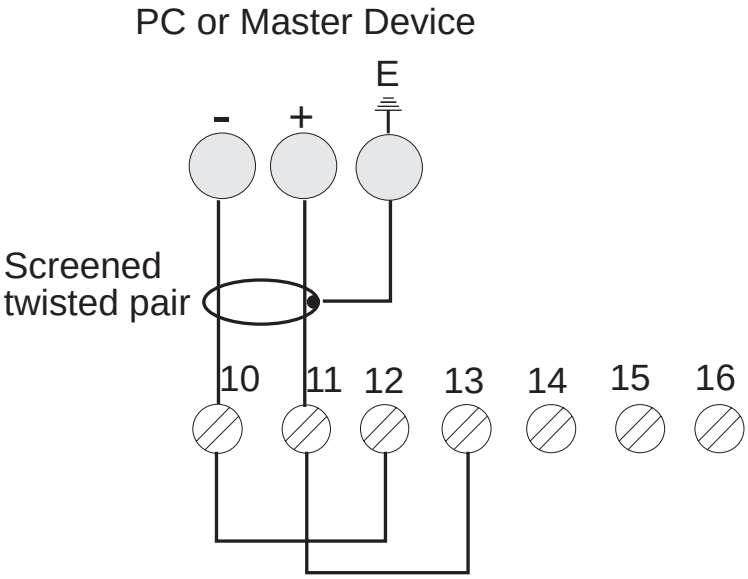
The positive terminals of the unit should be connected to the positive terminals of the master device. Where the unit is operating as part of a multi-unit system, the master device transmitter should be capable of driving a load of 12kΩ for 2 wire half duplex operation.

The diagrams opposite show the connections required.

4 Wire Option



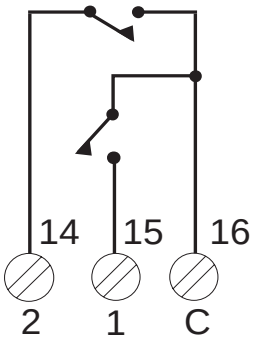
2 Wire Option



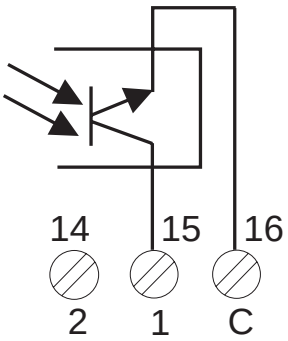
Connecting the Status Inputs

The EV-103 and EV-104 models are fitted with 2 status inputs. Configuration details are given on p.46. The diagrams below show the wiring options.

External Volt-Free Contacts



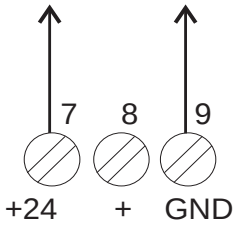
External Isolated Open Collector Outputs



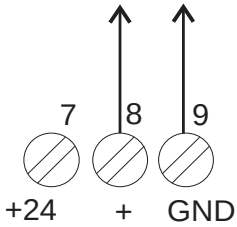
Connecting the Transmitter/Transducer Power Supply

All models of EV-100 are supplied with a 24 volt transmitter power supply. In addition to this, the EV-101 and EV-102 are supplied with a 10 volt transducer power supply. The EV-103 and EV-104 are both supplied with a variable 0 - 12 volt transducer power supply. The diagrams below show the connections required for each of the options.

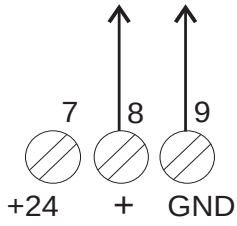
24 Volt Transmitter Power Supply



10 Volt Transducer Power Supply



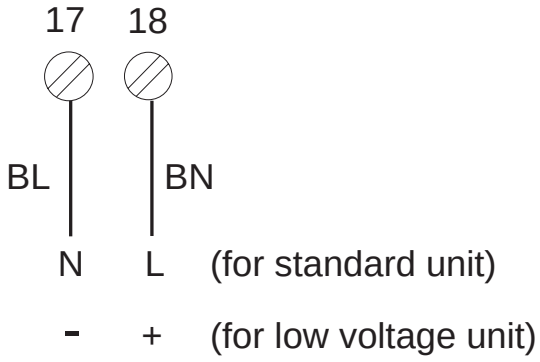
Variable 0 - 12 Volt Transducer Power Supply



Powering the EV-100 Series

The standard EV-100 operates at supply voltages of 90 - 265Vac 50/60Hz. There is also a low voltage version which operates at 10 - 32Vac or 12 - 28Vdc. On both versions, consumption is approximately 10VA for the EV-103 and EV-104 and 7VA for the EV-101 and EV-102. Application of supply voltages higher than those for which the instrument is intended may affect the safety of the instrument and cause permanent damage. Check the label on the top of the unit for the correct supply voltage.

The EV-100 has been designed for installation in an enclosure which provides adequate protection against electric shock. Access to power terminals should be restricted to authorised skilled personnel only. The diagram below shows the connections required to power the instrument.



Power Loss

If the power supply to the EV-100 is broken, all configuration settings are saved, as are the maximum, minimum and average display values and alarm states for latching alarms.

Default Settings

Input Parameters

Type	mV
Range	Linear (Lin)
Unit	Engineering (Eng)
Decimal point position	1
Reference junction	Auto
External reference junction temp	0.0
Automatic reference junction trim	0.0
Sensor break detection	On
Sensor break detection action	Up
Maths	None
Input damping filter	0

Scaling Parameters

Zero display value	0.0
Zero input value	0.0
Span display value	100.0
Span input value	100.0

User Linearisation Parameters

One linearisation point, set to zero.

Alarm 1 Parameters

Alarm type	High
Setpoint	99999 (or 9999)
Deviation high	0
Deviation low	0
Latch	Off
Output	None
Trigger delay	0
Clear delay	0
On hysteresis	0
Off hysteresis	0
Edit setpoint	On
Display messages	On

Alarm 2 Parameters

Alarm type	Low
Setpoint	-19999 (or -1999)
Deviation high	0
Deviation low	0
Latch	Off
Output	None
Trigger delay	0
Clear delay	0
On hysteresis	0
Off hysteresis	0
Edit setpoint	On
Display messages	On

Alarm 3 Parameters

Alarm type	High
Setpoint	99999 (or 9999)
Deviation high	0
Deviation low	0
Latch	Off
Output	None
Trigger delay	0
Clear delay	0
On hysteresis	0
Off hysteresis	0
Link alarms	Off
Display messages	On

Alarm 4 Parameters

Alarm type	Low
Setpoint	-19999 (or -1999)
Deviation high	0
Deviation low	0
Latch	Off
Output	None
Trigger delay	0
Clear delay	0
On hysteresis	0
Off hysteresis	0
Link alarms	Off
Display messages	On

Alarm Relay Parameters

Relay 1 initial state	True
Relay 2 initial state	True
Relay 1 alarm group	No alarms in group
Relay 2 alarm group	No alarms in group

Transducer/Transmitter Power Supply Parameters

Voltage setting	0

Analogue Output Parameters

Type	4 - 20 mA
Source	Measured value (inPt)
Zero value	0
Span value	100
Signal damping	0

Communications Interface Parameters

Comms address	1
Baud rate	9600
Write protect	Off
Parity	Even
Stop bits	1 bit
Modbus span	32000
Modbus span low	0
Modbus span high	100
Modbus binary protocol	Off
Modbus binary protocol delay	0

Status Inputs 1 and 2 Parameters

Tare	Off
Alarm acknowledge	Off
Alarm disable	Off
Display options	None
Reset max, min and av values	Off
Inhibit front panel operation	Off
Analogue output hold	Off
Autozero	Off
Display messages	On

Function Keys 1 and 2 Parameters

Tare	Off
Reset max, min and av values	Off
Autozero	Off
Display options	None

System Configuration Parameters

Password	0
Suppress leading zeros	On
Averaging time	1
Mains frequency	50Hz
System reset to default values	Off
Timeout period	60 seconds

Operator Functions

All the EV-100 series operator functions are illustrated opposite, along with the button presses needed to access them. These functions are described below.

Display Functions

Display the minimum value.

Display the maximum value.

Display the average value.

Entering the Configuration Menu

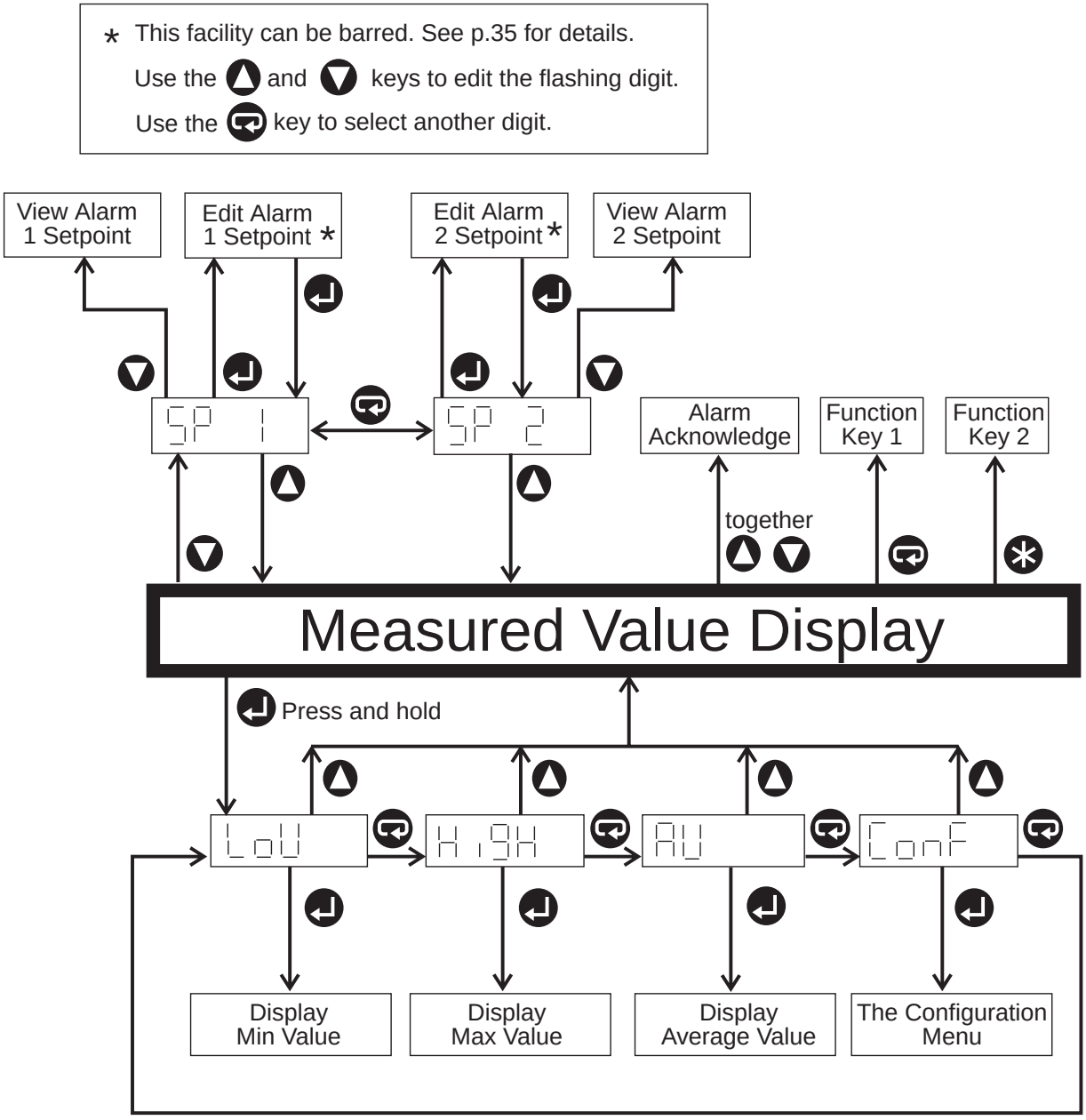
Enter the Configuration Menu, see p.29.

Alarm Functions

Use the functions illustrated opposite to view and change the alarm setpoints and to acknowledge latched alarms. All other alarm facilities are available from the four Alarm Menus, described on p.34.

Function Keys

When you press a function key, the facility assigned to it is performed. You assign a facility to a function key by using the two Function Key Menus, described on p.48.


* This facility can be barred. See p.35 for details.
Use the and keys to edit the flashing digit.
Use the key to select another digit.
View Alarm 1 Setpoint
Edit Alarm 1 Setpoint *
Edit Alarm 2 Setpoint *
View Alarm 2 Setpoint
SP 1
SP 2
Alarm Acknowledge
Function Key 1
Function Key 2
together
Measured Value Display
Press and hold
LoU
HiGH
AU
ConF
Display Min Value
Display Max Value
Display Average Value
The Configuration Menu

Configuring the EV-100 Series

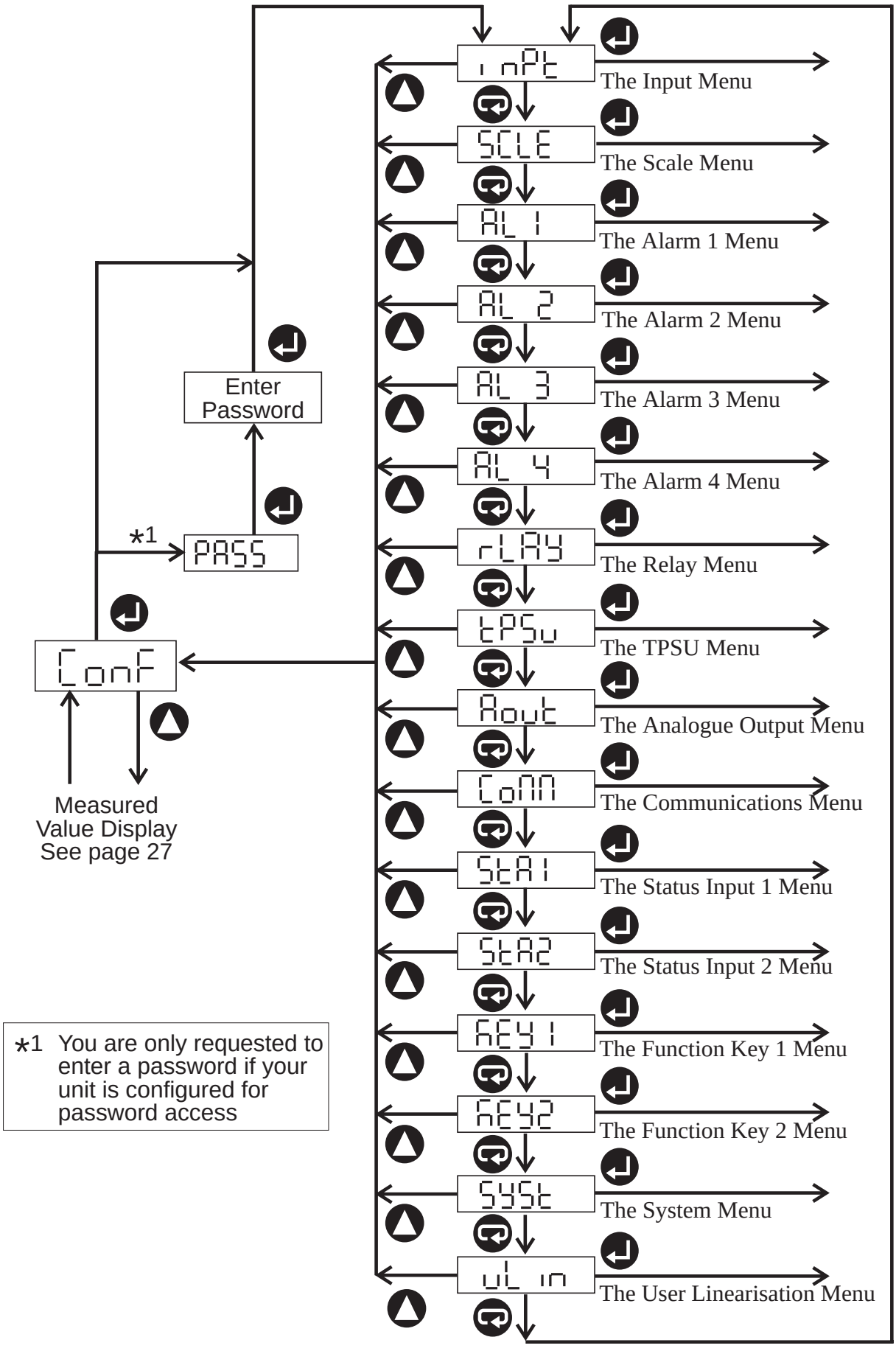
The Configuration Menu allows you access to several sub-menus, as shown in the diagram opposite. For details on how to access the Configuration Menu, refer to the flow diagram on p.27. Depending on your model of EV-100, not all of these sub-menus will be available. Using these sub-menus you can change all of the default parameters listed on p.21 to p.25.

To change a value, press the *Up* and *Down* buttons to edit the flashing digit and press the *Next* button (far left of the button panel) to move from one digit to the next. In some cases you may find it quicker to reset the displayed value to zero before entering the new value. To do this, simply press the *Star* button (on the far right of the button panel).

You can set a negative value by changing the segment on the far left of the display to either "-" or "-1". You do this by pressing the *Up* or *Down* buttons repeatedly to scroll past all the digits.

When the password facility is switched on, the prompt "PASS" is displayed if you try to enter the Configuration Menu. To enter your password, use the *Up* and *Down* buttons to edit the flashing digit and the *Next* button (on the far left of the button panel) to move from one digit to the next.

To exit any menu and return to normal display operation, simply press the *Up* button repeatedly.



*1 You are only requested to enter a password if your unit is configured for password access

Configuring the Input

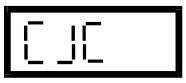
This menu allows you to define the signal input parameters.

The type of signal input from the sensor. See p.60 for explanation of codes.

The range of the sensor. See p.58 and p.59 for lists of codes. For ranges which are not pre-defined, select “Lin” (for linear relationships), or “uLin” (for non-linear relationships).

The unit for the displayed value. Select “Eng” for any non-temperature unit.

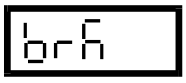
The decimal point position on the display, from 0 - 4 for a 5-digit display (nnnnn - n.nnnn) or 0 - 3 for a 4-digit display (nnnn - n.nnn). Select “Auto” for maximum resolution.



The type of reference junction used, either internal automatic compensation (Auto) or external temperature reference (EXt).

The temperature (in °C) at the external ref point.

The trim value (in °C) for internal compensation, eg. if error = +2°C, trim value = -2.

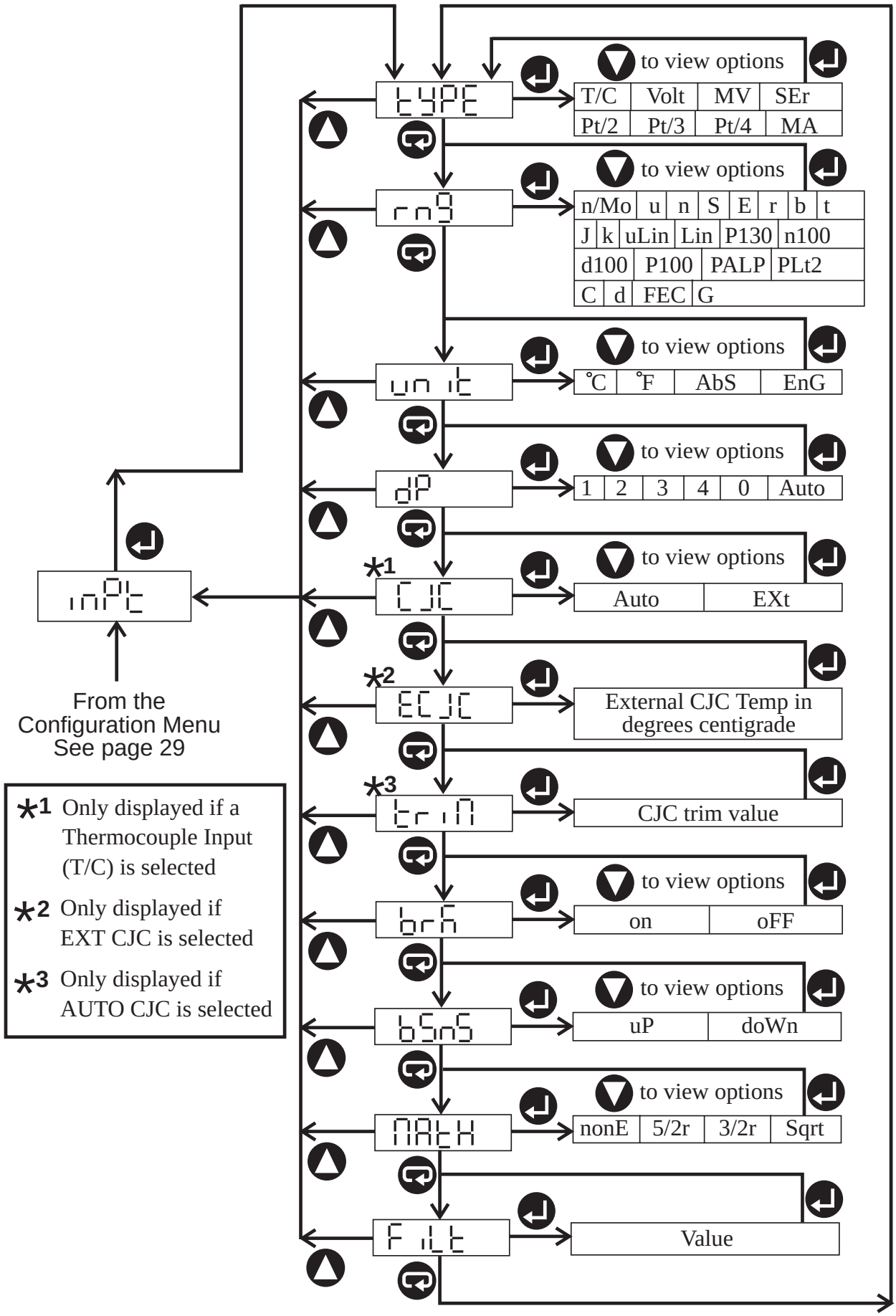


Whether action is to be taken if the input circuit breaks, as defined by the “bSnS” parameter. Select “on” for action or “oFF” for no action.

The action if the input circuit breaks, either “up” (analogue output set to maximum and high alarms triggered) or “down” (analogue output set to minimum and low alarms triggered).

The maths function to be performed. Select from 5/2 root, 3/2 root, square root or none.

The filter time constant to filter noisy signals.


to view options
T/C | Volt | MV | SEr
Pt/2 | Pt/3 | Pt/4 | MA
to view options
n/Mo | u | n | S | E | r | b | t
J | k | uLin | Lin | P130 | n100
d100 | P100 | PALP | PLt2
C | d | FEC | G
to view options
°C | °F | AbS | EnG
to view options
1 | 2 | 3 | 4 | 0 | Auto
to view options
Auto | EXt
External CJC Temp in degrees centigrade
CJC trim value
to view options
on | oFF
to view options
uP | doWn
to view options
nonE | 5/2r | 3/2r | Sqrt
Value
From the Configuration Menu
See page 29
*1 Only displayed if a Thermocouple Input (T/C) is selected
*2 Only displayed if EXT CJC is selected
*3 Only displayed if AUTO CJC is selected

Using the Scaling Facility

If the signal input from your sensor has a linear relationship to the displayed value, and this relationship is not 1:1, you must use the scaling facility to ensure that the measured value is correctly displayed on the EV-100. Before using the scaling facility, the "range" parameter on the Input Menu must be set to linear (Lin). You can also use the scaling facility to calibrate the EV-100 to a sensor output with a consistent linear offset error.

Scaling consists of specifying a low point and a high point in the display range and a corresponding input value for each of these points. You can specifying the low and high points in the input range either by manually entering the values using the front panel controls, or by sending the values to the EV-100 using an external signal source. The prompts displayed in the Scale Menu are described below.

Enter the low display value.

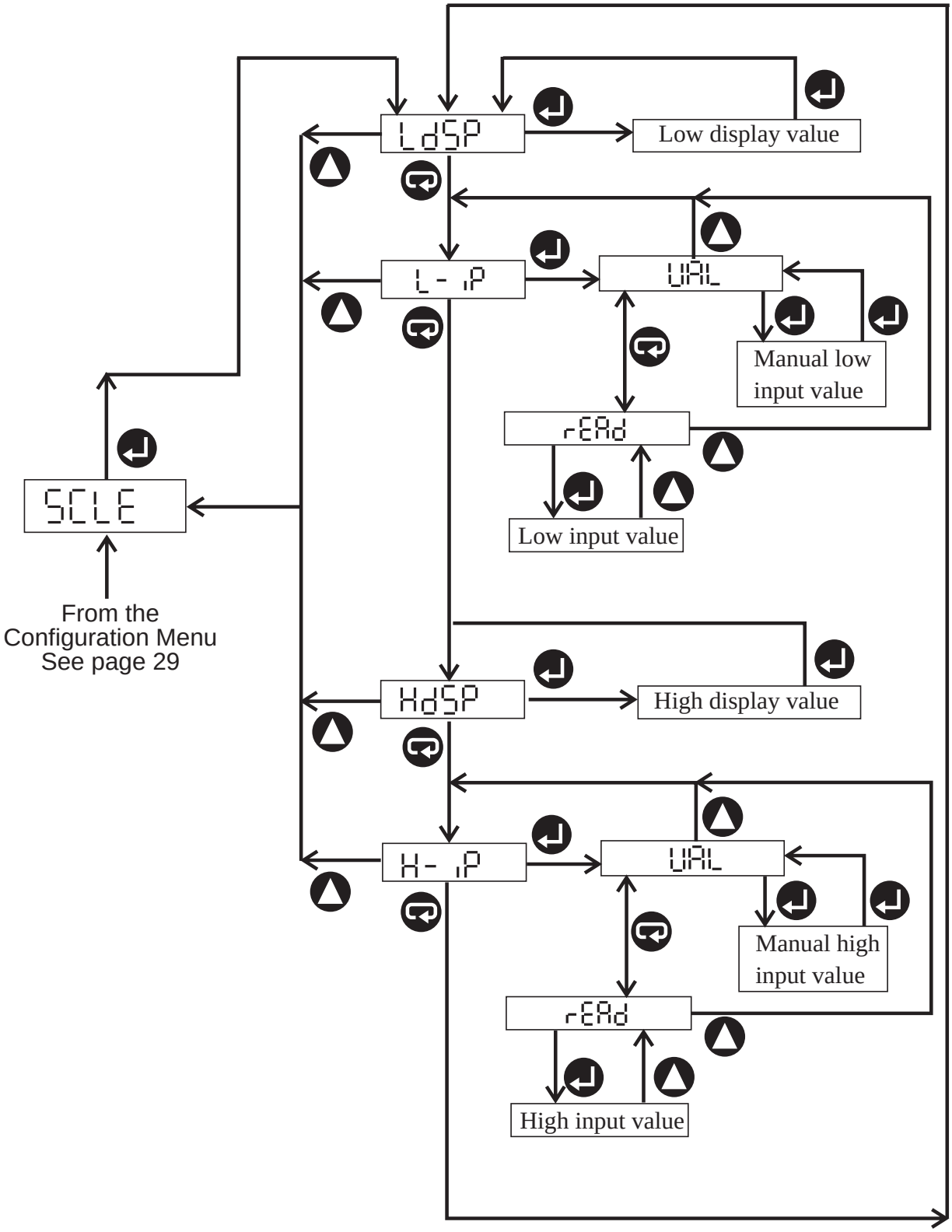
Enter the low input value.

Select between manual value input or using an external signal source.

Read a signal from an external source.

Enter the high display value.

Enter the high input value.


LdSP
Low display value
L-iP
VAL
Manual low input value
rEAd
Low input value
SCLE
From the Configuration Menu
See page 29
HdSP
High display value
H-iP
VAL
Manual high input value
rEAd
High input value

Configuring the Alarms

The EV-100 has four separate alarms, each of which is configured via a separate Alarm Menu. These menus allow you to define various parameters, all of which are described below.

The alarm type, ie. high, low or deviation. See p.6 for details.

Alarm 1 setpoint.

Alarm 2 setpoint.

Alarm 3 setpoint.

Alarm 4 setpoint.

The high deviation point, ie. the difference between the alarm setpoint and the high deviation point.

The low deviation point, ie. the difference between the alarm setpoint and the low deviation point.

The alarm latch option, either latched (on) or non-latched (oFF). A latched alarm must be "acknowledged" before it will clear. See p.27 for instructions on acknowledging alarms.

The alarm relay option. This allows you to specify whether an alarm being triggered will change the state of relays 1 or 2, both or neither.

The trigger delay option. This allows you to specify the delay between the alarm conditions being met and the alarm being triggered.

The clear delay option. This allows you to specify the delay between the alarm conditions being absent and the alarm being cleared.

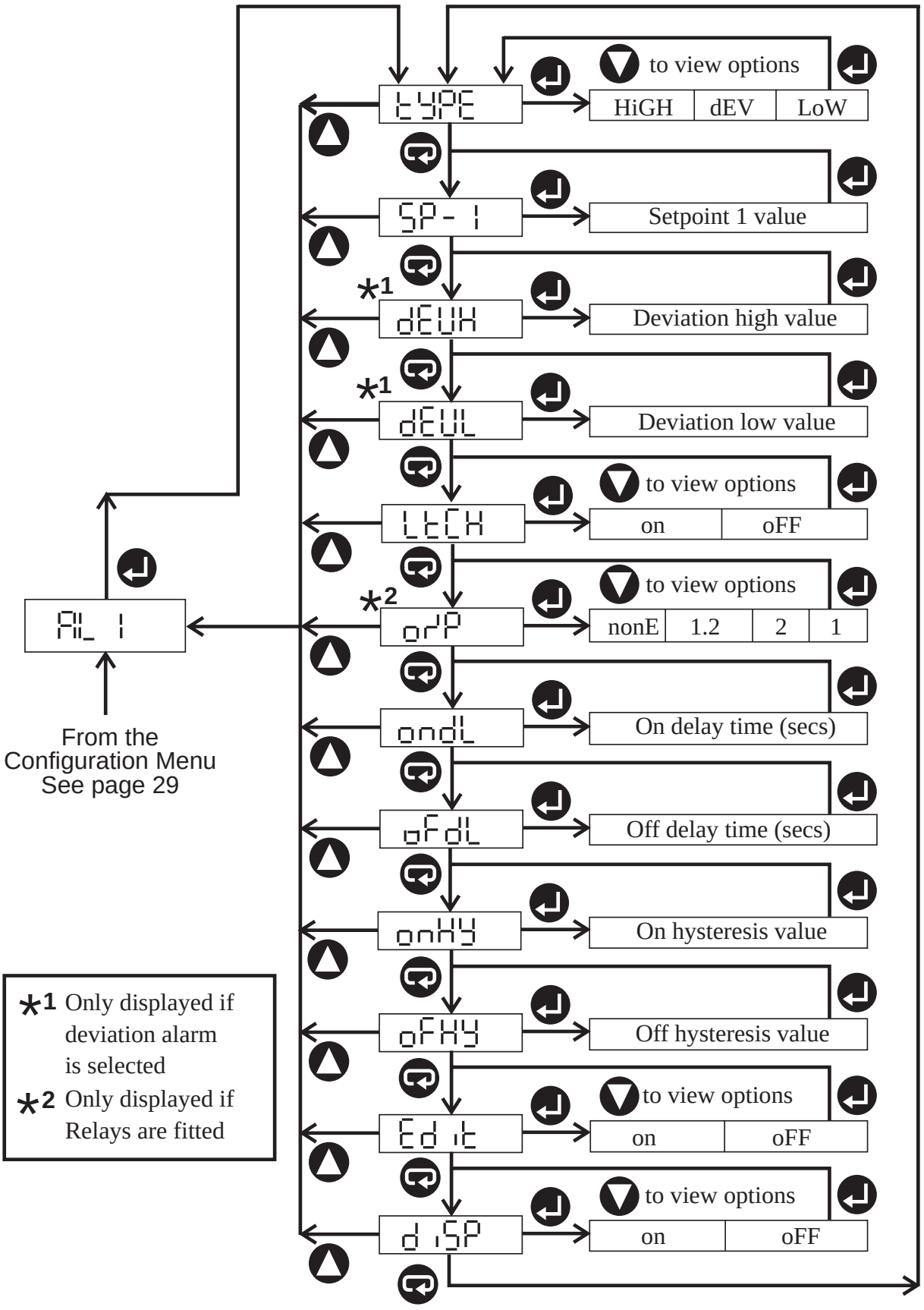
The on hysteresis value, ie. the difference between the setpoint and the on hysteresis point. You can specify on and off hysteresis points either side of the alarm setpoint. The alarm is triggered when the displayed value goes above the on hysteresis point and is cleared when it returns below the off hysteresis point.

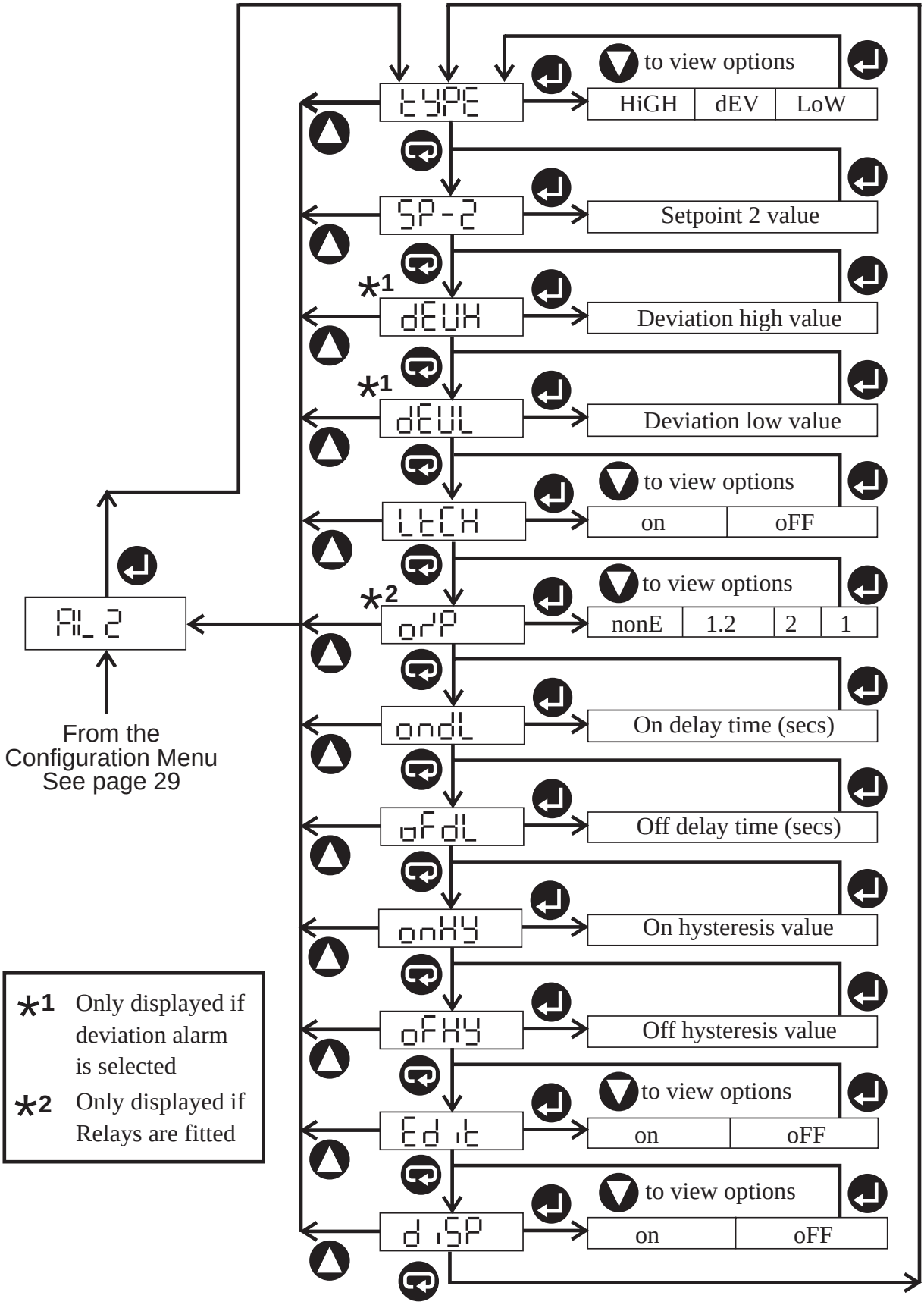
The off hysteresis point, ie. the difference between the alarm setpoint and the off hysteresis point.

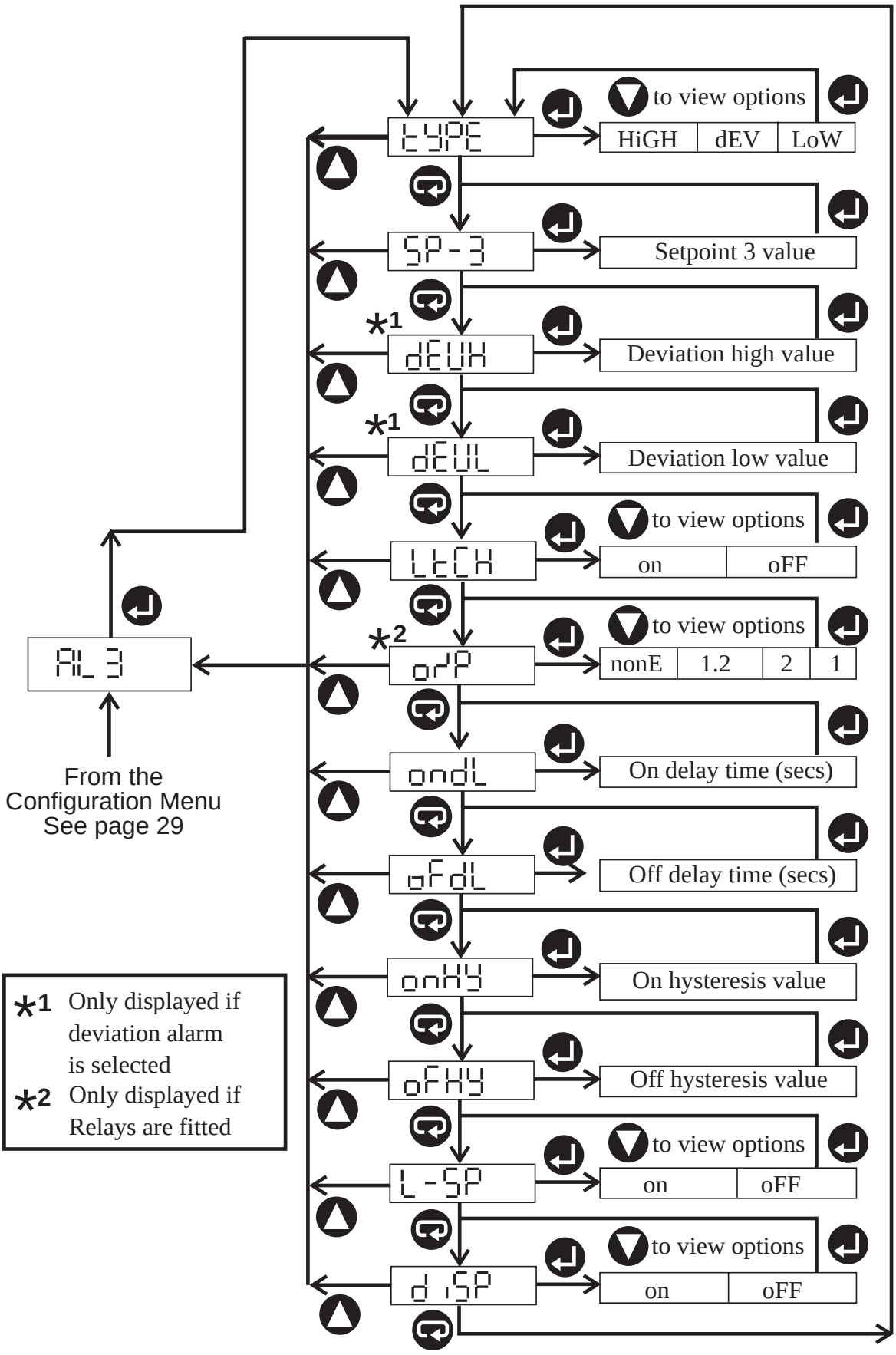
The alarm edit option. This parameter allows you to specify whether or not alarm setpoints 1 and 2 can be edited using the operator functions, as described on p.26.

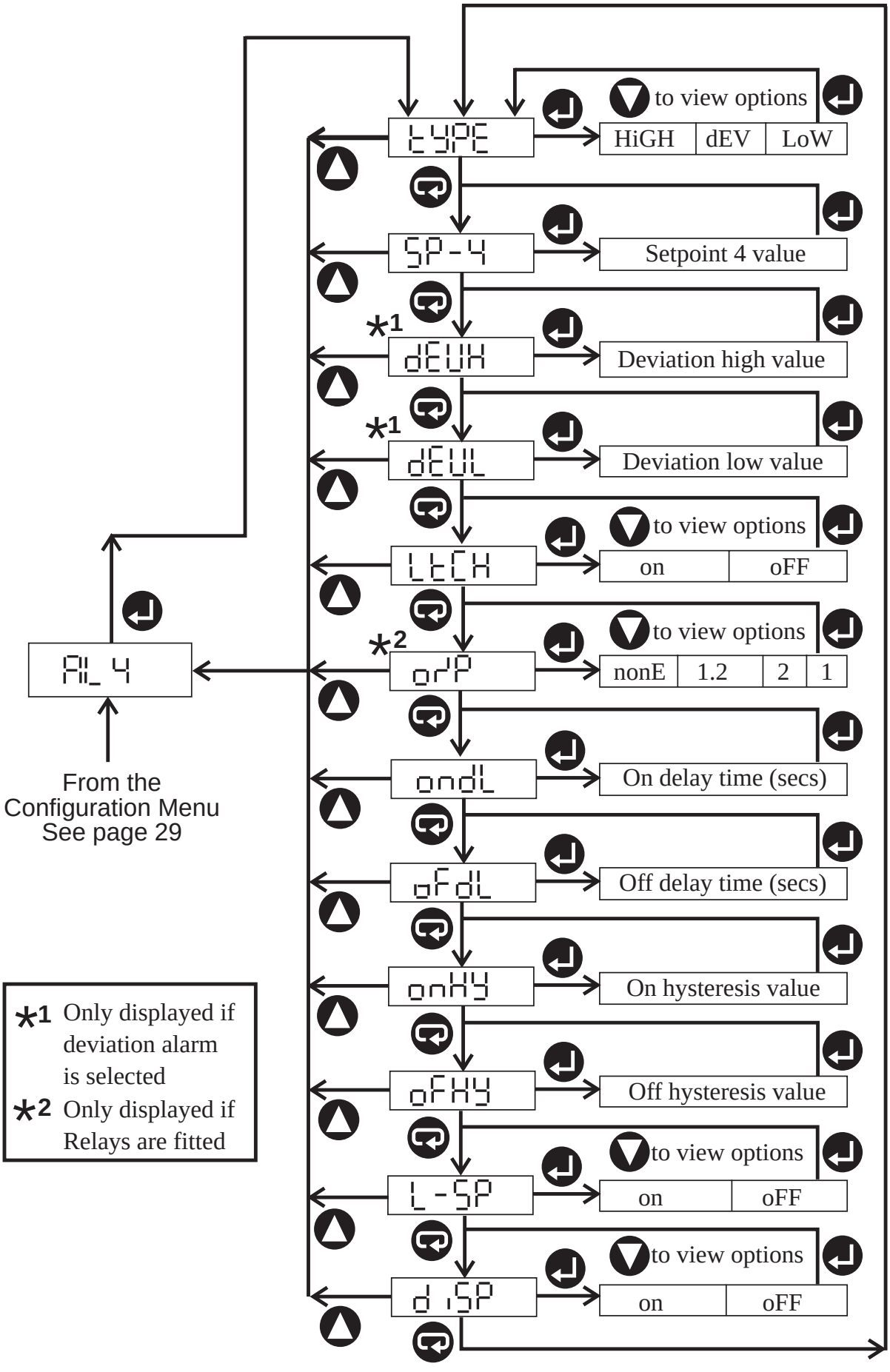
The alarm message display option. This parameter allows you to select whether or not alarm messages are displayed.

The link alarm option. This allows you to link setpoint 3 to setpoint 1, and setpoint 4 to setpoint 2. For example, if setpoint 3 is linked to setpoint 1, and setpoint 1 is changed, setpoint 3 will automatically be changed to match it.


AL 1
From the Configuration Menu See page 29
tYPE
to view options
HiGH
dEV
LoW
SP-1
Setpoint 1 value
*1
dEUH
Deviation high value
*1
dEUL
Deviation low value
LtCH
to view options
on
oFF
*2
orP
to view options
nonE
1.2
2
1
ondL
On delay time (secs)
oFdL
Off delay time (secs)
onHY
On hysteresis value
oFHY
Off hysteresis value
Edit
to view options
on
oFF
diSP
to view options
on
oFF
*1 Only displayed if deviation alarm is selected
*2 Only displayed if Relays are fitted


AL 2
From the Configuration Menu See page 29
tYPE
to view options
HiGH
dEV
LoW
SP-2
Setpoint 2 value
*1
dEUH
Deviation high value
*1
dEUL
Deviation low value
LtCH
to view options
on
oFF
*2
orP
to view options
nonE
1.2
2
1
ondL
On delay time (secs)
oFdL
Off delay time (secs)
onHY
On hysteresis value
oFHY
Off hysteresis value
Edit
to view options
on
oFF
diSP
to view options
on
oFF
*1 Only displayed if deviation alarm is selected
*2 Only displayed if Relays are fitted


AL 3
From the Configuration Menu See page 29
tYPE
to view options
HiGH
dEV
LoW
SP-3
Setpoint 3 value
*1
dEUH
Deviation high value
*1
dEUL
Deviation low value
LtCH
to view options
on
oFF
*2
orP
to view options
nonE
1.2
2
1
ondL
On delay time (secs)
oFdL
Off delay time (secs)
onHY
On hysteresis value
oFHY
Off hysteresis value
L-SP
to view options
on
oFF
diSP
to view options
on
oFF
*1 Only displayed if deviation alarm is selected
*2 Only displayed if Relays are fitted


AL_4
From the Configuration Menu See page 29
tYPE
to view options
HiGH
dEV
LoW
SP-4
Setpoint 4 value
*1
dEUH
Deviation high value
*1
dEUL
Deviation low value
LtCH
to view options
on
oFF
*2
orP
to view options
nonE
1.2
2
1
ondL
On delay time (secs)
oFdL
Off delay time (secs)
onHY
On hysteresis value
oFHY
Off hysteresis value
L-SP
to view options
on
oFF
diSP
to view options
on
oFF
*1 Only displayed if deviation alarm is selected
*2 Only displayed if Relays are fitted

Configuring the Alarm Relays

The EV-102 and EV-104 are fitted with two alarm relays, known as Relay 1 and Relay 2. You can configure these EV-100 models to change the state of the alarm relays either when a single alarm is triggered or when a specific combination of alarms is triggered.

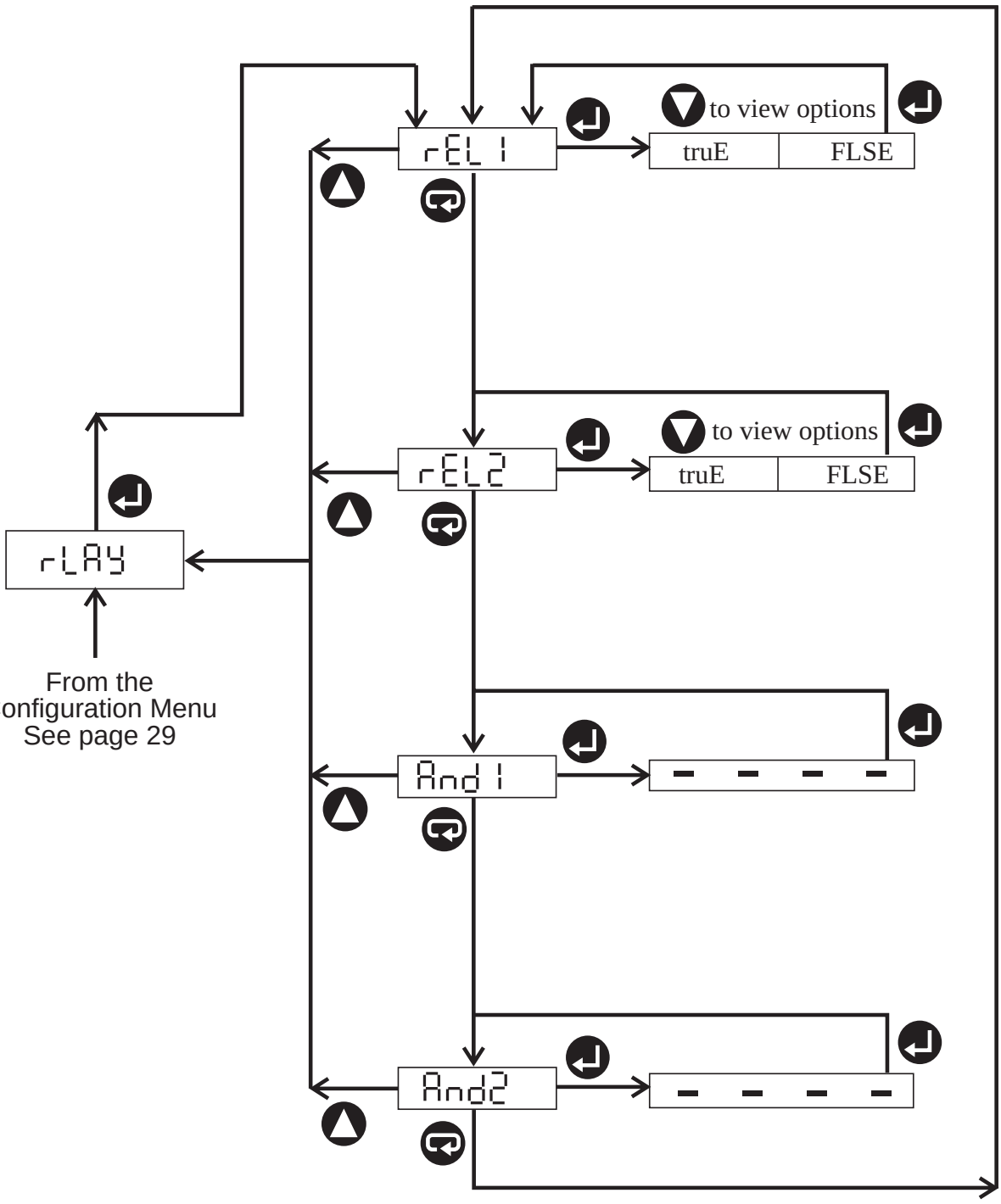
To configure the EV-100 to change the state of an alarm relay when a single alarm is triggered, use the output facility available from each of the individual Alarm Menus. To configure the EV-100 to change the state of an alarm relay when a specific combination of alarms is triggered, use the Relay Menu illustrated opposite. Using the Relay Menu, you can also specify the alarm state of each of the relays, ie. whether the relay is energised or de-energised when an alarm is triggered.

Select alarm state for Relay 1, either energised (TruE) or de-energised (FLSE).

Select alarm state for Relay 2, either energised (TruE) or de-energised (FLSE).

Specify the combination of alarms which is to change the state of Relay 1. For example: “1 2 _ 4” means that the state of Relay 1 is only changed when alarms 1, 2 and 4 are all triggered.

Specify the combination of alarms which is to change the state of Relay 2.


to view options
rEL 1
truE
FLSE
to view options
rEL2
truE
FLSE
rLAY
From the
Configuration Menu
See page 29
And 1
- - - -
And2
- - - -

Configuring the Analogue Output

The EV-103 and EV-104 are fitted with an analogue output. You can configure the analogue output signal to suit your requirements as follows:

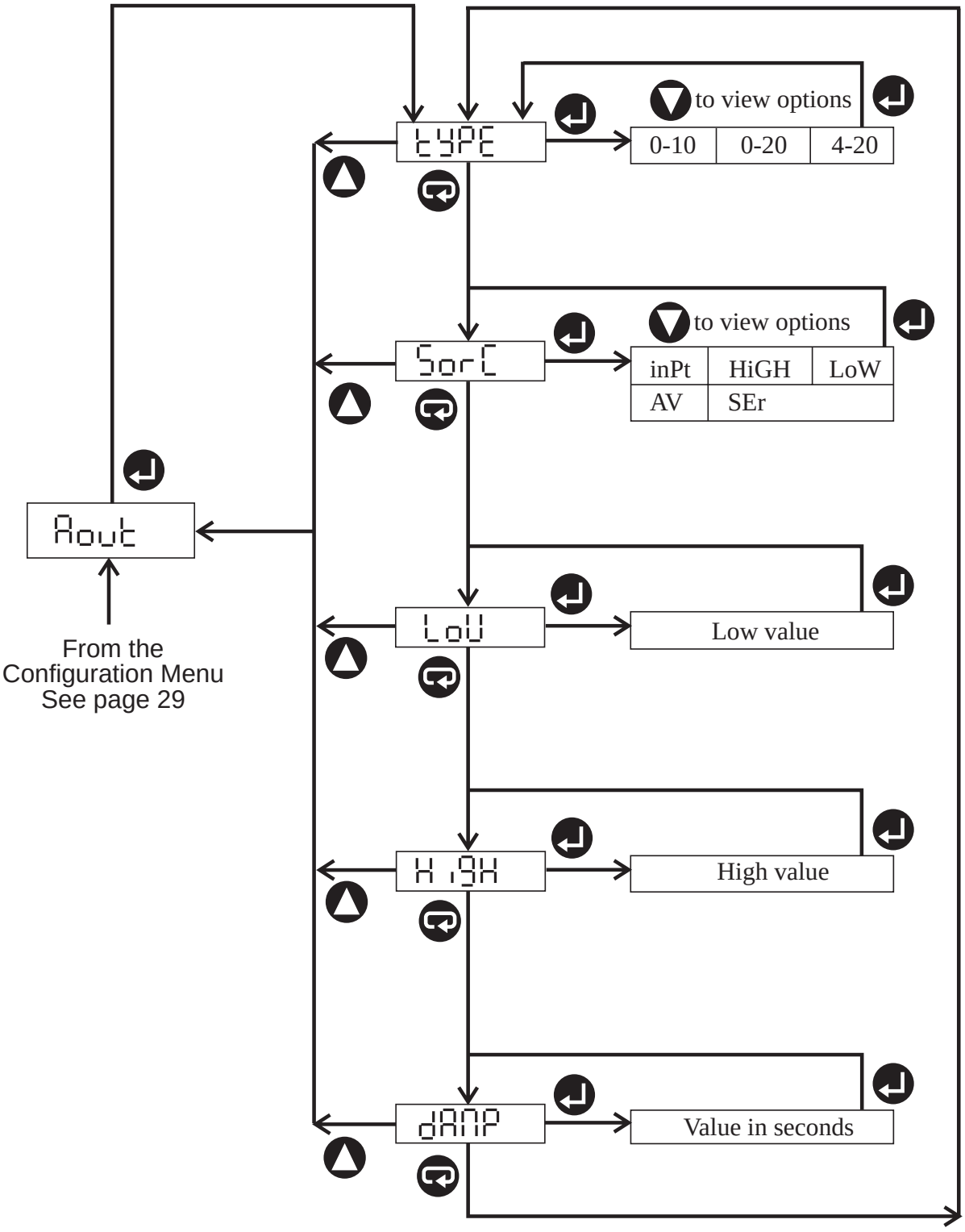
Select the signal type to retransmit, either 0 - 10 volt, 0 - 20mA or 4 - 20mA

Select the signal source to retransmit from the following options: measured value (inPt), maximum value (HigH), minimum value (LoW), average value (AV) or value sent via the serial communications interface (SEr).

and

Select the scaling of the signal output. You can scale the analogue output to retransmit a signal which is proportional to any part of the displayed range. You do this by specifying the low point and the high point of the range which you want to retransmit.

Select the signal damping constant. You can damp the signal which is being retransmitted via the analogue output. This facility can be used to limit the rate of change of fast-moving or noisy signals. The higher the value of the damping constant, the slower the rate of change of the signal. The damping constant can be set in the range 1 - 999.


to view options
tYPE
0-10
0-20
4-20
to view options
SorC
inPt
HiGH
LoW
AV
SEr
AOut
From the
Configuration Menu
See page 29
LoU
Low value
HiGH
High value
dAMP
Value in seconds

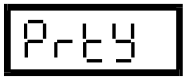
Configuring the Comms Interface

You can configure the communications interface to match that of the device with which the EV-100 is communicating, as follows:

Select the communications address for the EV-100, in the range 1 - 247.

Select the baud rate: 1200, 2400, 4800 or 9600.

Select write protect (on) or write enable (oFF).



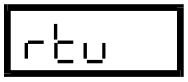
Select the parity, either odd, even or none. If Modbus binary protocol is selected, there is no parity bit and this parameter is ignored.

Set the number of stop bits, either 1 or 2.

If you are using Modbus ASCII or Modbus binary protocol, negative values must be represented by positive values. All values must be scaled to one of the following ranges: 0 - 65335 (65.5K), 0 - 32767 (32.7K), 0 - 32000 (32K).

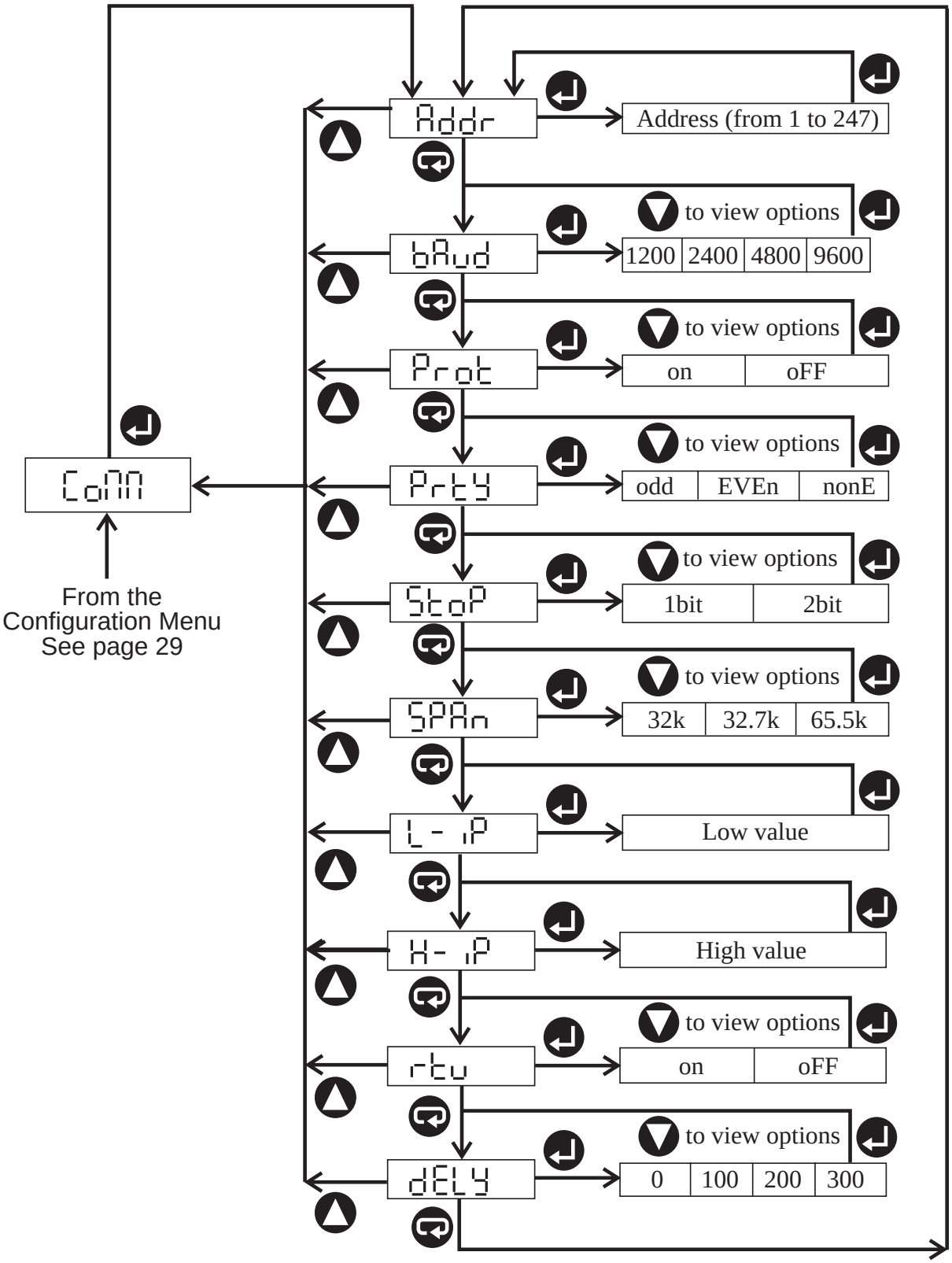
Select the Modbus ASCII or binary low scale point.

Select the Modbus ASCII or binary high scale point.



Select “on” for Modbus binary protocol, or “oFF” for Modbus ASCII protocol and/or Data Track Process Instruments ASCII protocol.

Set the Modbus binary protocol pre-transmission delay, either 0, 100, 200 or 300 milliseconds.


CoMM
From the Configuration Menu
See page 29
Addr
Address (from 1 to 247)
bAud
to view options
1200
2400
4800
9600
Prot
to view options
on
oFF
PrtY
to view options
odd
EVEn
nonE
StoP
to view options
1bit
2bit
SPAn
to view options
32k
32.7k
65.5k
L- iP
Low value
H- iP
High value
rtu
to view options
on
oFF
dELY
to view options
0
100
200
300

Configuring the Status Inputs

The EV-103 and EV-104 are each fitted with two status inputs. You can assign any one or more of the following functions to a status input so that the function is performed when the status input is switched on and continues until the status input is switched off. To assign a function, select “on” as illustrated opposite.

The tare facility.

The alarm acknowledge facility.

The alarm disable facility.

Any one of the following functions: lamp test (LtSt), display average value (AV), display maximum value (HigH), display minimum value (LoW), display hold (HoLd).

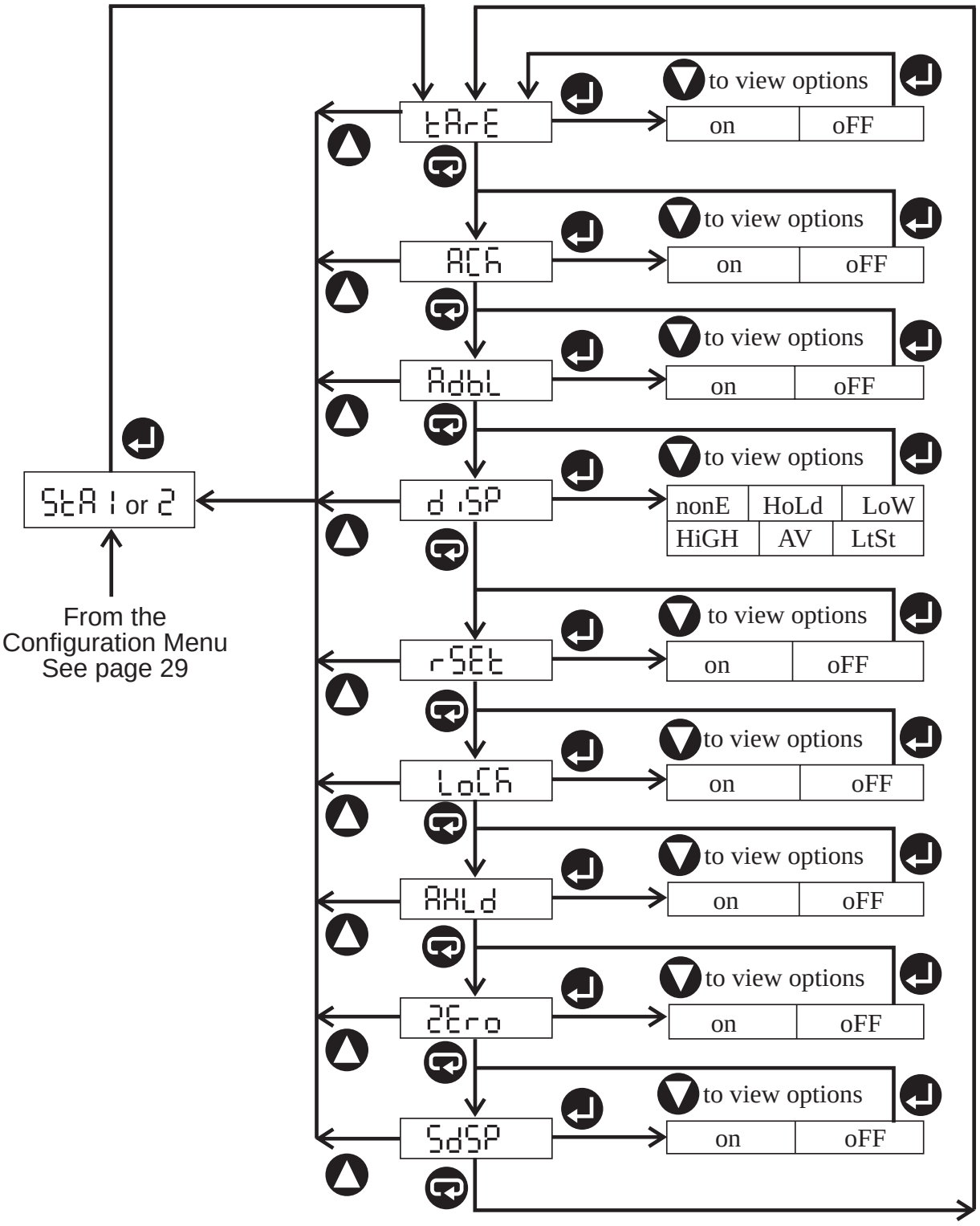
The reset facility. This resets the maximum, minimum and average values.

Inhibit front panel operation.

The analogue output hold facility. This freezes the analogue output signal at a constant level.

The autozero facility. This resets the display to zero, permanently removing any offset error.

The status input message facility, causing a message to be intermittently displayed when a status input is switched on.


to view options
tArE
on
oFF
to view options
ACA
on
oFF
to view options
AdbL
on
oFF
to view options
d iSP
nonE
HoLd
LoW
HiGH
AV
LtSt
to view options
rSEt
on
oFF
to view options
LoCA
on
oFF
to view options
AHLd
on
oFF
to view options
2Ero
on
oFF
to view options
SdSP
on
oFF
StA 1 or 2
From the
Configuration Menu
See page 29

Configuring the Function Keys

The EV-100 front panel has two function keys:

Function key 1  Function key 2 

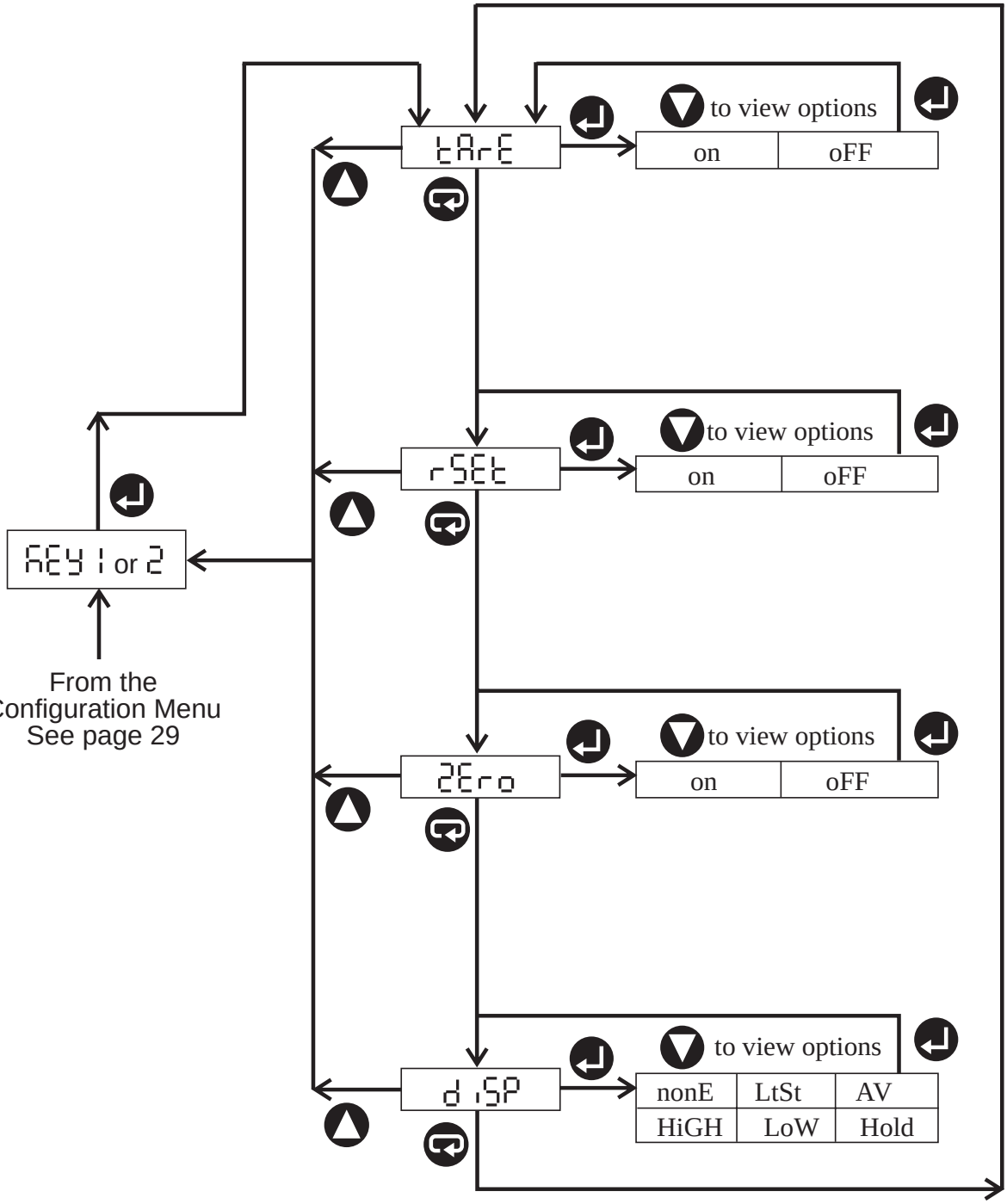
You can assign any one or more of the functions listed below to each of the function keys. To assign a function to a function key, select “on” as shown in the diagram opposite.

The tare facility. When tare is assigned to a function key, pressing the key once will switch the facility on, pressing it again will switch it off.

The reset facility. This resets the maximum, minimum and average values. When reset is assigned to a function key, the function will be performed as soon as you press the key.

The autozero facility. This resets the display to zero, permanently removing any offset error. When autozero is assigned to a function key, pressing the key once will cause “ZEro” to be flashed for 5 seconds. If you press the key again within this period, autozero is performed.

Any one of the following functions: lamp test (LtSt), display average value (AV), display maximum value (HigH), display minimum value (LoW), display hold (HoLd). If one of these is assigned to a function key, the function will operate for as long as the key is held down.


to view options
tArE
on
oFF
to view options
rSEt
on
oFF
KEY 1 or 2
From the
Configuration Menu
See page 29
to view options
2Ero
on
oFF
to view options
diSP
nonE
LtSt
AV
HiGH
LoW
Hold

The System Menu

The facilities available from this menu are as follows:

The password facility. This allows you to switch on password protection so that the Configuration Menu cannot be accessed without entering a password. Switch on password protection by creating any password in the range 1 - 99999. If the password is set to 0, the facility is switched off.

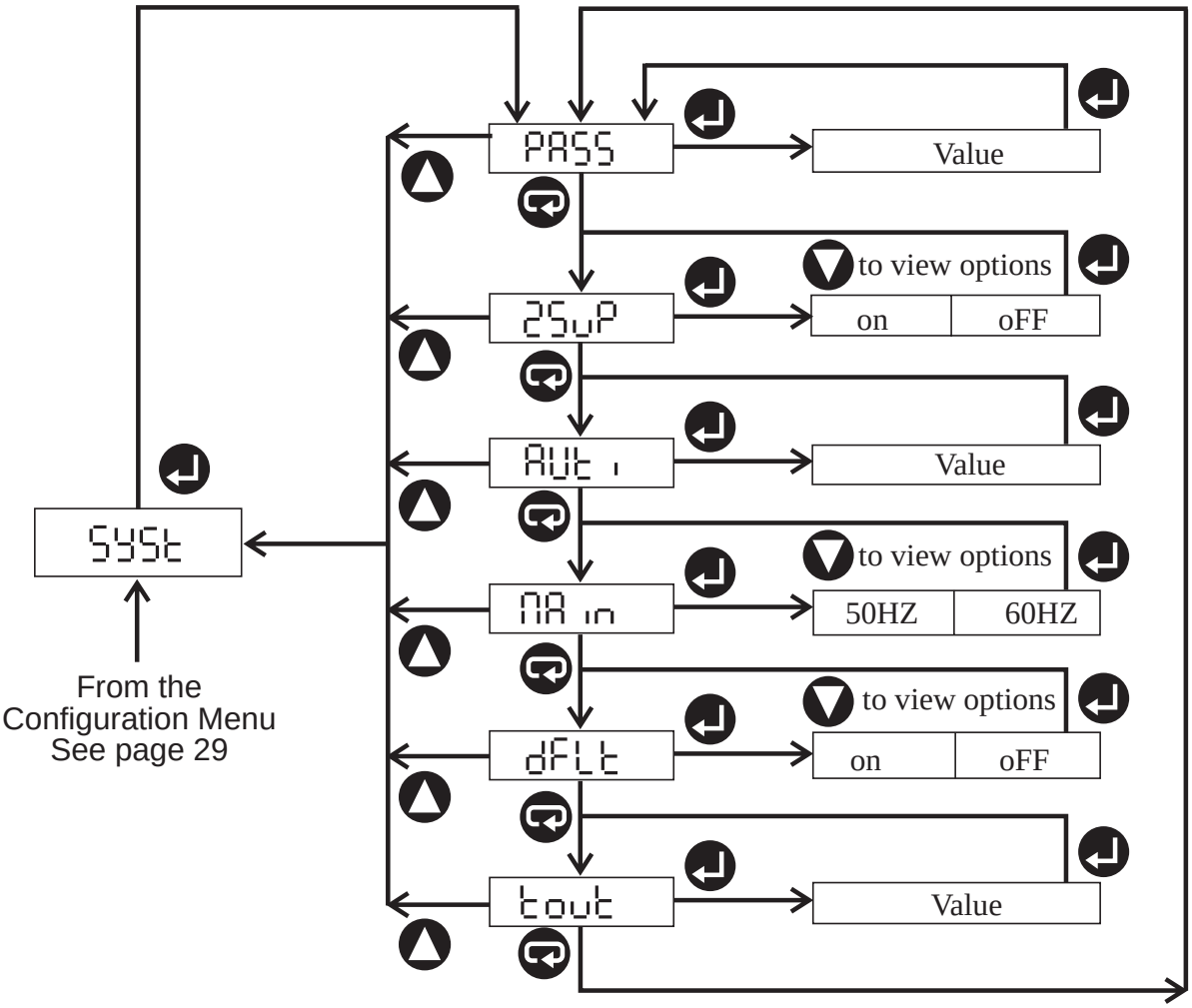
The leading zero suppression facility. This allows you to suppress leading zeros on the display (on) or display leading zeros (oFF).

The averaging time facility, allowing you to specify the period over which the average value is calculated in seconds.

This facility allows you to set the mains frequency to 50Hz or 60Hz.

The system reset facility. This allows you to reset the EV-100 to its default settings. Select “on” to reset the unit.

The timeout facility. This allows you to specify the timeout period in seconds. This is the time which can pass without a button being pressed in a Configuration Menu before you are returned to normal display operation.


PASS
Value
to view options
2SuP
on
oFF
AUt ı
Value
to view options
nA in
50HZ
60HZ
to view options
dFLt
on
oFF
tout
Value
SYSt
From the
Configuration Menu
See page 29

The User Linearisation Facility

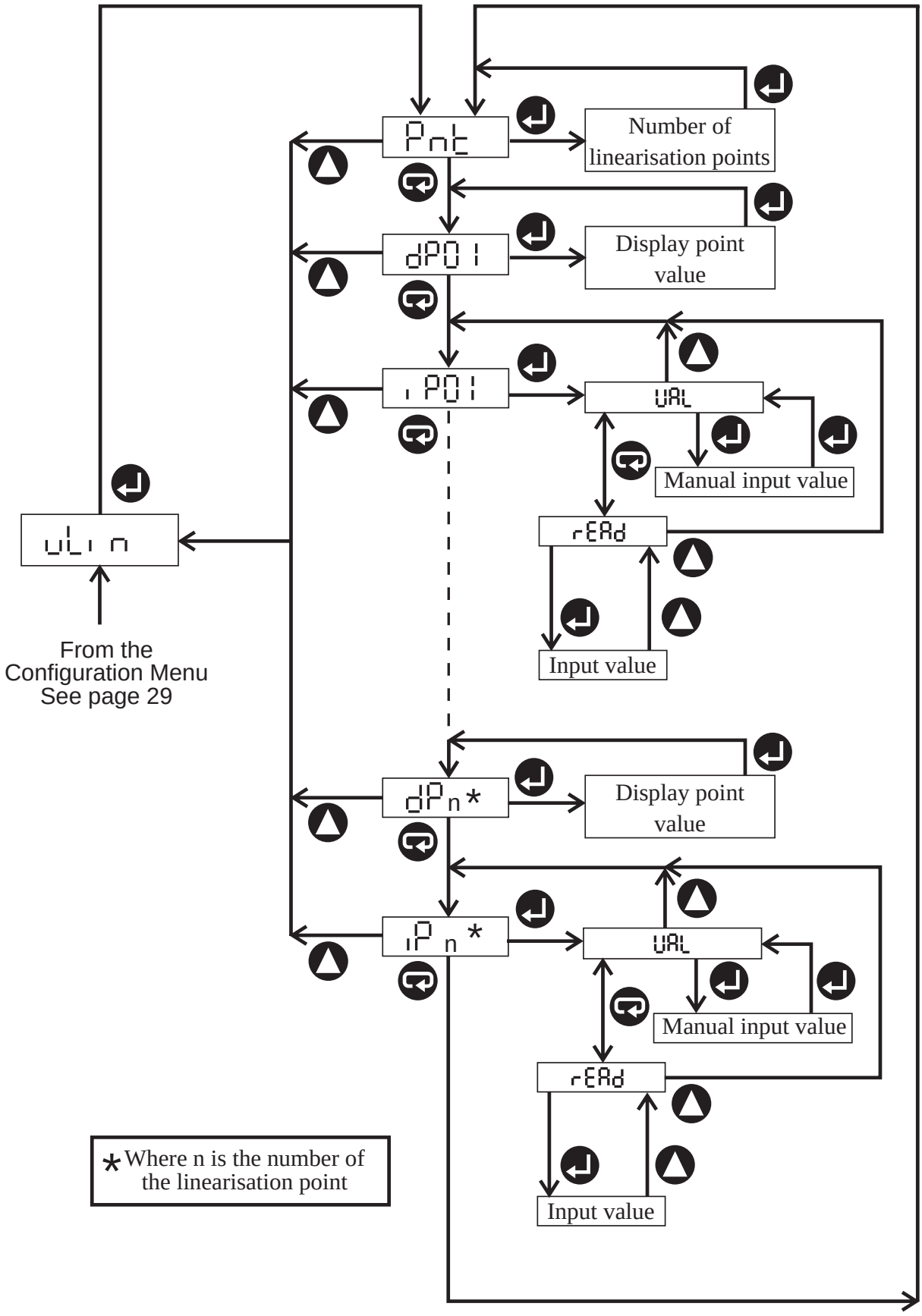
The EV-100 can automatically linearise most types of thermosensor signals, as long as the "range" parameter has been correctly set via the Input Menu. Tables showing the range parameter options available on the EV-100 are given on pages 58 and 59. If the range required by your sensor is not one of those provided, you must set the range parameter to "uLin" and then use the user linearisation facility to define a non-linear relationship between the input and the display. If the relationship between signal input and displayed value is linear, you should use the scaling facility rather than the user linearisation facility to define it.

The user linearisation facility allows you to define up to 24 linearisation points. For each point you must enter both an input value and the corresponding display value. You can define the input value points either by entering them manually via the front panel, or by using an external signal source.

Enter the number of linearisation points you want to define, or increase the current number of linearisation points if you want to add a new one.

Define the display value for a linearisation point.

Define the input value for a linearisation point. Select "VAL" to enter the value manually or "rEAd" if using an external signal source.

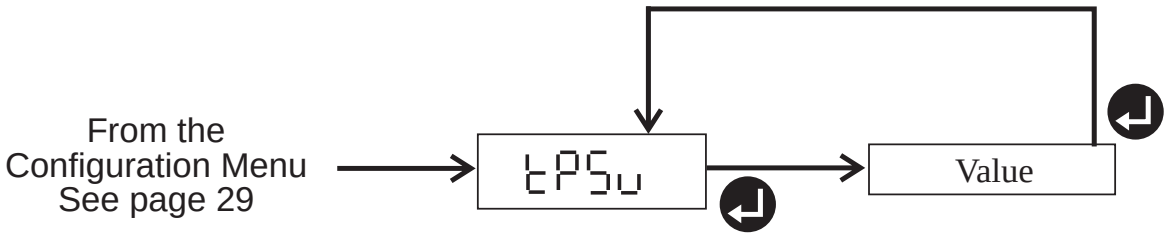

Pnt
Number of linearisation points
dP01
Display point value
iP01
VAL
Manual input value
rEAd
Input value
uLin
From the Configuration Menu See page 29
dPn*
Display point value
iPn*
VAL
Manual input value
rEAd
Input value
*Where n is the number of the linearisation point

Configuring the Transmitter/Transducer Power Supply

All EV-100 models are fitted with a 24 volt power supply intended to power a transmitter.

In addition to this, the EV-101 and EV-102 are fitted with a 10 volt power supply, intended for powering a transducer.

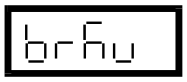
The EV-103 and EV-104 are fitted with a variable 0 - 12 volt power supply, also intended for powering a transducer. This is user configurable via the TPSU Menu illustrated below. You can select the voltage in the range 0.00 - 12.00, with a resolution of 0.01 volts.



Error and Alarm Messages

Error Messages

The input circuit has broken. The sensor break detection option has been set to “down”. See p.30.



The input circuit has broken. The sensor break detection option has been set to “up”. See p.30.

The measured value is too large positively to be displayed on the EV-100, or is above the specified range for the connected sensor.

The measured value is too large negatively to be displayed on the EV-100, or is below the specified range for the connected sensor.

Alarm Messages

Low type alarm n has been triggered.

High type alarm n has been triggered.

Deviation type alarm n has been triggered at the deviation low point.

Deviation type alarm n has been triggered at the deviation high point.

(where n is the alarm number, ie. 1, 2, 3 or 4)

Technical Specification

Power Requirements

Standard units	90Vac - 265Vac 7 - 10 VA. Typically ≏ 40mA @ 250V ac for a EV-104.
Low voltage units	10Vac - 32Vac rms 7 - 10VA. 12 - 28Vdc.

Display

Type	0.56" high brightness 7 segment LED red or green.
Range	-19999 to +99999. (EV-103 and EV-104). -1999 to + 9999. (EV-101 and EV-102).

A/D Converter

Type	Dual slope integrating converter.
Conversion rate	10Hz (10 conversion/s).
Converter resolution	16 bits + sign (1µV).
Common mode rejection	>150dB.
Series mode rejection	>70dB (50Hz or 60Hz).
Drift	50 ppm/°C.

Reference Junction Compensation

Accuracy	±0.5°C.
Resolution	0.1°C.

Current Input

Range	±20mA.
Accuracy	0.05% reading ±4µA.
Resolution	0.5µA.
Input impedance	5Ω typical.
Maximum burden	±100mV typical.

Voltage Inputs

Ranges	±100mV. ±10V.
Accuracy	0.05% reading ±20µV.
Resolution	100mV range 1.52µV. 10V range 152µV.
Input impedance	mV Input >10MΩ. 10V Input >1MΩ.

Sensor Break

On or off, up or downscale.

Alarms/Relays

Alarms	4 off programmable. Low, high or deviation.
Relays	2 off change over (EV-102 and EV-104).
Contact rating	1A @ 250V.

Thermocouple Inputs

Sensor Type	Range	Accuracy(±)	Code
Type B (Pt30%Rh/Pt6 %Rh) (BS 4937 part 7)	0°C to 1820°C linearisation from 400°C	1.5°C	B
Type C (W5%Rh/W26%Rh)	0°C to 2320°C	1°C	C
Type D (W3%Rh/W26%Rh)	0°C to 2320°C	1°C	D
Type E (NiCh/CuNi) (BS 4937 part 6)	-270°C to 1000°C	0.5°C	E
Type G (W/W26%Rh)	0°C to 2320°C	1°C	G
Type J (Fe/NiCu) (BS 4937 part 3)	-210°C to 1200°C	0.5°C	J
Type K (NiCh/NiAl) (BS 4937 part 4)	-270°C to 1372°C	0.5°C	K
Type L (Fe/Con) (DIN 43710)	-200°C to 900°C	0.7°C	FEC
Type N (Nicrosil/Nisil) (BS 4937 part 8 : 1986)	-200°C to 1300°C	0.5°C	N
Type R (Pt13%Rh-Pt) (BS 4937 part 2)	-50°C to 1767°C	1°C	R
Type S (Pt10%Rh-Pt) (BS 4937 part 1)	-50°C to 1767°C	1°C	S
Type T (Cu/CuNi) (BS 4937 part 5)	-270°C to 400°C	0.5°C	T
Type U (Cu/CuNi) (DIN43710)	-200°C to 400°C	0.7°C	U
Ni/Ni 18%Moly	0°C to 1370°C	1°C	N/MO
Platinel II	0°C to 1370°C	1°C	PLT2
Palaplat	0°C to 240°C	1°C	PALP

RTD/Resistance Thermometer Inputs

Input Configuration	2, 3 or 4 wire.	
Excitation Current	0.25mA typical.	
Ranges: Resistance	0 - 400Ω.	
	Accuracy	0.4Ω.
	Resolution	0.01Ω.
Resistance	0 - 4000Ω using 10V input (2 wire).	
	Accuracy	0.5%.
	Resolution	1Ω.

Sensor Type	Range	Accuracy (±)	Code
Pt100 (alpha = 385) (BS1904 : 1984)	-200°C to 850°C	0.5°C	P100
Pt100 (alpha = 392)	-100°C to 457°C	0.5°C	D100
Pt130 (B.S.2G.148)	-200°C to 500°C	0.5°C	P130
Ni100 (DIN 43760)	-60°C to 250°C	0.5°C	N100

Analogue Retransmission Output

Ranges	0 - 10V, 0 - 20mA or 4 - 20mA.
Accuracy	0.2% of span.
Temperature Drift	100ppm/°C.
Update Rate	30Hz.
Output Ripple	< 10mV or <50µA.
Response	63% within 32ms.
	99% within 100ms.
	Output damping programmable.
Resolution	0.05% of span 5mV or 0.01mA.
Maximum O/P	18V @ 25mA.

Transducer/Transmitter Supply

Outputs	24V unregulated transmitter power supply. 10V fixed transducer supply (EV-101 and EV-102). 0 - 12V programmable transducer supply (EV-103 and EV-104).
Resolution	0.01V.
Accuracy	±0.05V (programmable supply). ±0.2V (fixed supply).
Temperature drift	<100ppm /°C.
Output ripple	<5mV.
Update rate	30Hz.
Output current	35mA maximum total load current.

EV-100 Input Type Codes

Code	Input Type
T/C	Thermocouple input
Volt	A signal in volts, up to ±10V
MV	A signal in millivolts, up to ±100mV
SER	A value sent via the serial comms port
PT/4	A signal from a 4 wire RTD/resistance sensor
PT/3	A signal from a 3 wire RTD/resistance sensor
PT/2	A signal from a 2 wire RTD/resistance sensor
MA	A signal in milliamps, up to ±20mA

Index