YEAR 2000 COMPLIANT

CE

UL®

User's Guide

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1/8 DIN Panel Mount Universal Temperature & Process Indicator

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GETTING STARTED

This manual is divided into 5 sections which contain all the information needed to install, configure, set up and operate the instrument. Each section is identified clearly by a symbol as shown below.

Displays and Controls

- Displays and function keys
- LED Indication
- Error Messages

Operator Mode (Level 1)

- Operator menus for:
  - *Standard Indicator*
  - *Totalizer/Batch Controller*
  - *Maximum/Minimum/Average Indicator*

Set Up Mode (Level 2)

- Alarm trip points
- Totalizer functions

Configuration Mode (Levels 3 and 4)

- Accessing the configuration levels
- Level 3
  - Hardware assignment and input type
  - Alarm types and hysteresis
  - Operator functions and totalizer setup
  - Digital input and serial communications
- Level 4
  - Ranges and passwords

Installation

- Siting
- Mounting
- Electrical connections

Symbol Identification and Section Contents

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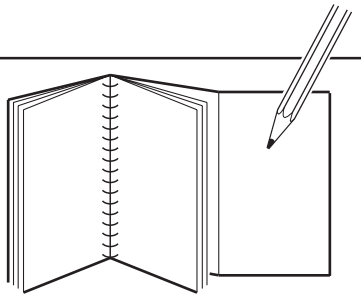
1 DISPLAYS AND FUNCTION KEYS

Information.

The fold-out page inside on the back cover of this manual shows all the frames in the programming levels. Space is provided on the page for writing the programmed setting or selection for each frame.



1.1 Introduction – Fig. 1.1

The instrument front panel display, function keys and LED indicators are shown in Fig. 1.1.

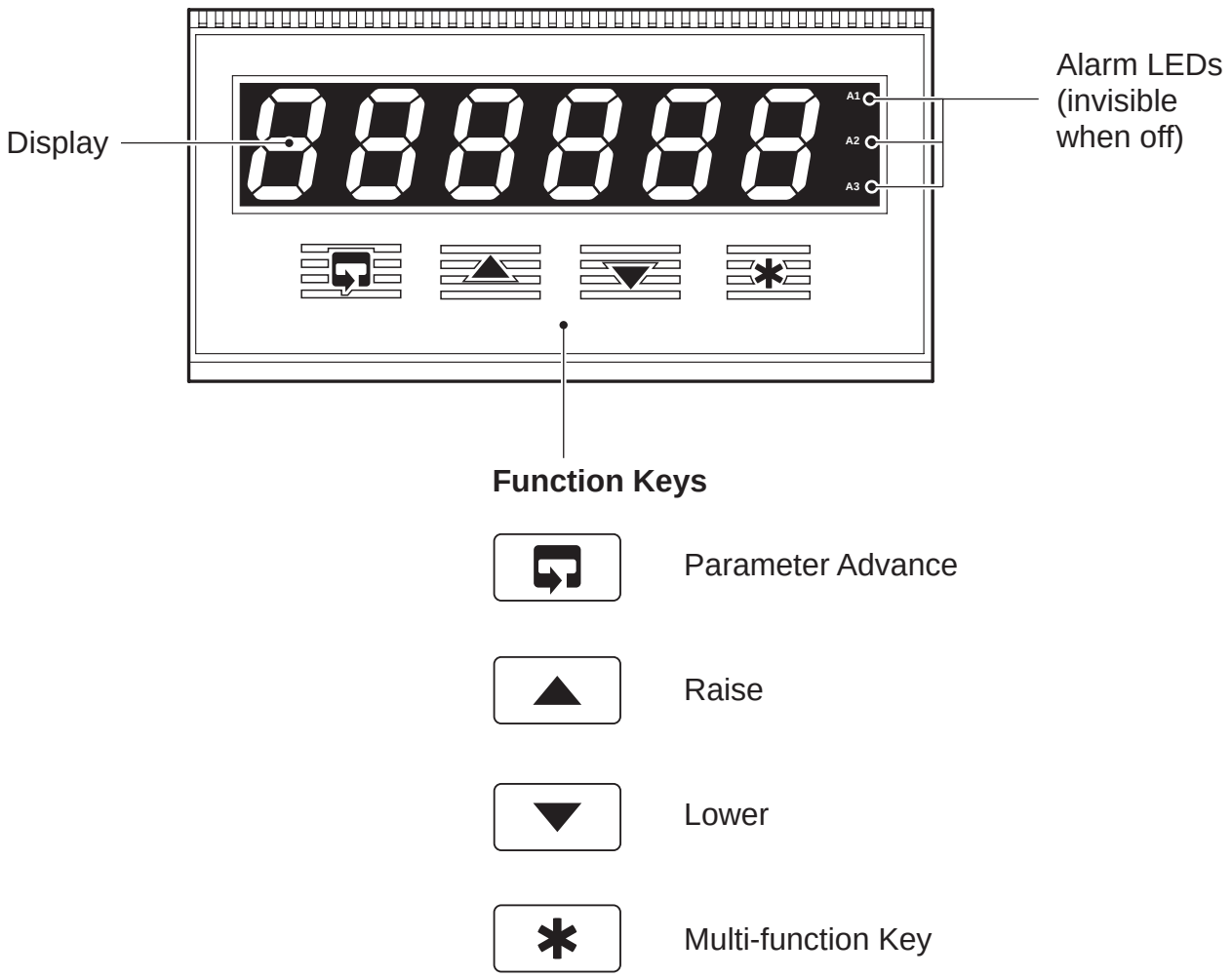
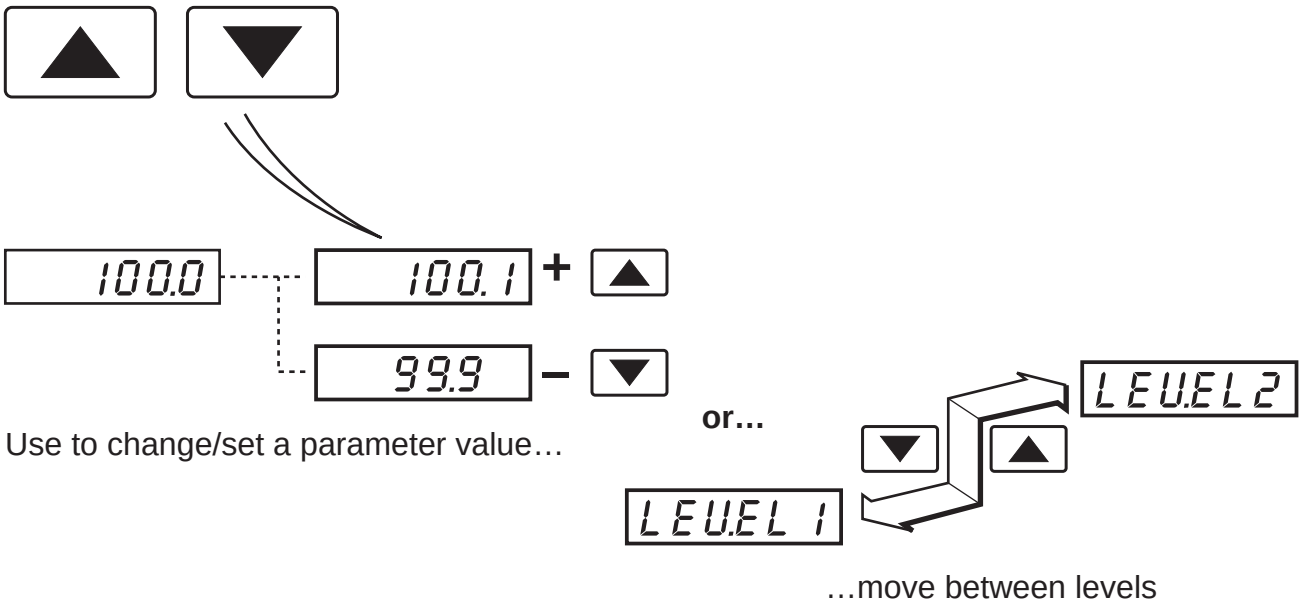


Fig. 1.1 Front Panel Display, Function Keys and Indicators

1.2 Use of Function Keys – Fig. 1.2

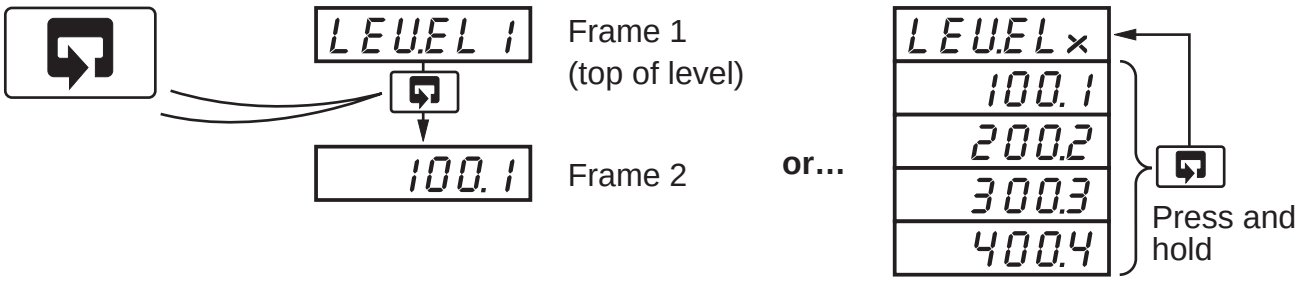
A – Raise and Lower Keys



Use to change/set a parameter value…

…move between levels

B – Parameter Advance Key

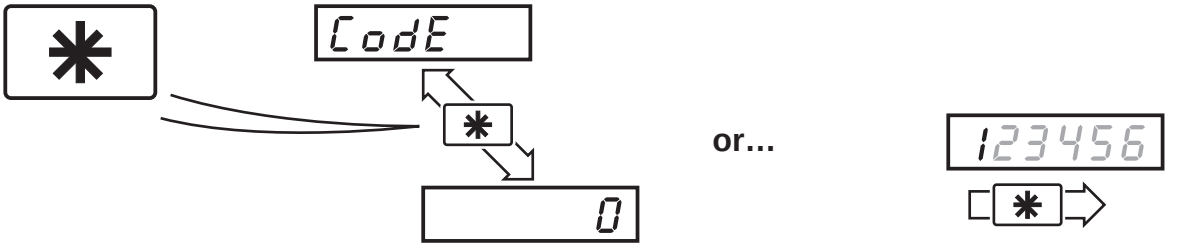


Use to advance to the next frame within a level…

…select the top (LEVEL) frame from within a level

Note. This key also stores any changes made in the previous frame

C – Multi-function Key

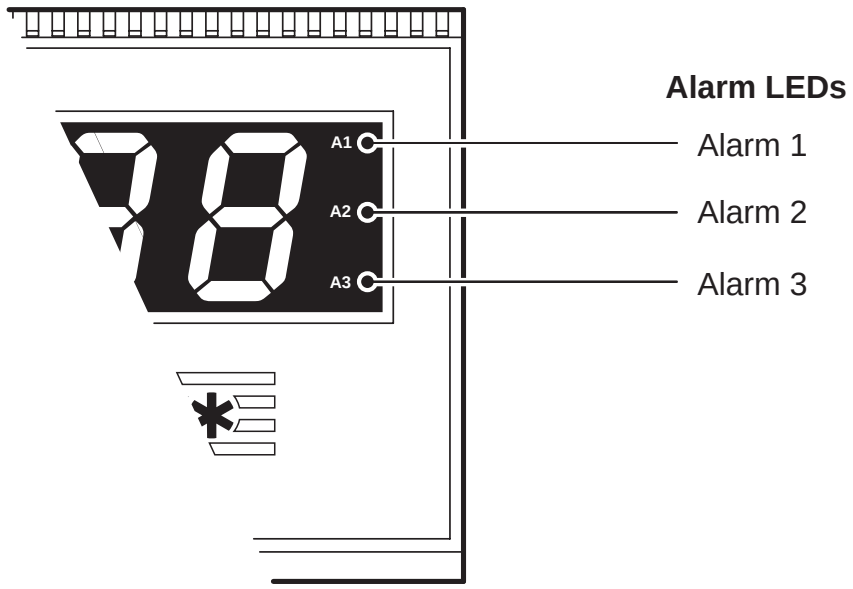


Use to view a parameter setting or selection…

…select individual characters in a frame

Fig. 1.2 Use of Function Keys

1.3 LED Alarms and Indicators



LED Status

All Flashing

- Indicator is in the Configuration Mode – see Section 4.2.

A1, A2 and A3

- Flash when Alarm is active (off when inactive).
- Lit constantly when Alarm 1 is an active latched alarm which has been acknowledged

Fig. 1.3 LED Alarms and Indicators

1.4 Error Messages

Display	Error/Action	To Clear Display
	**Calibration error** Turn power off and on again (if the error persists, contact the Supplier).	Press the ▲ key
	**Configuration error** The configuration and/or setup data for the instrument is corrupted. Turn power off and on again (if error persists, check configuration/setup settings).	Press the ▲ key
	**A to D Converter Fault** The analog to digital converter is not communicating correctly.	Turn power off and on again. If error persists, contact the Supplier
	**Process Variable Over/Under Range**	Restore valid input
	**Option board error** Communications to the option board have failed.	Contact the Supplier

2 OPERATOR MODE

2.1 Introduction

Operator Mode (Level 1) is the normal day-to-day mode of the instrument.

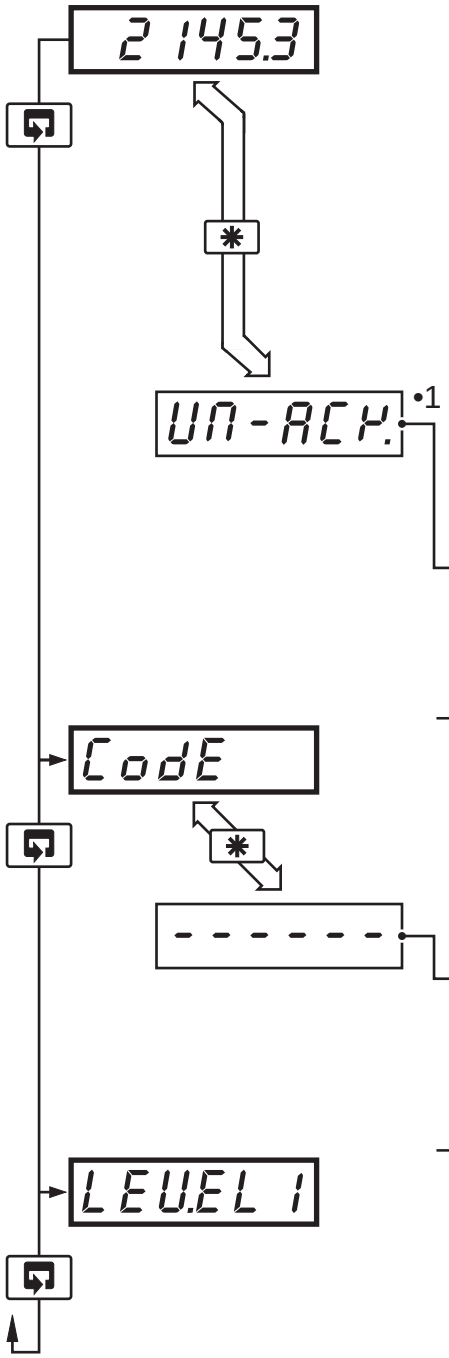
Frames displayed in Level 1 are determined by the indicator functions which are selected during configuration of the instrument – see Section 4.

Note. Only the operating frames relevant to the configured functions are displayed in Operator Mode.

The three indicator functions are:

- **Standard Indicator** – page 8
- **Indicator with Totalization** – page 9
- **Indicator with Max./Min./Average** – page 11

2.2 Operating Page – Standard (Level 1)



Process Variable

2145.3

Normally displayed in engineering units.

27.6

To view the process variable in electrical units, press the ▼ key.

Global Alarm Acknowledge (latch alarms only)

UN-ACK. – alarm unacknowledged
ACK. – acknowledged

Security Code

Enter the correct code to access the setup level (Level 2).

[0 to 9999]

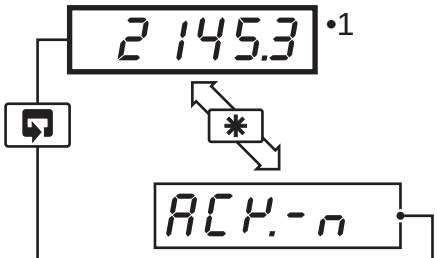
Level 1

✱ **Note.** To select this frame from anywhere in this level, press the ↩ key for a few seconds.

•1 Only displayed if there is an active latch alarm.

2.3 Operating Page – Totalizer (Level 1)

These frames are only displayed if the totalizer function is enabled in the configuration level – see Section 4.3.3

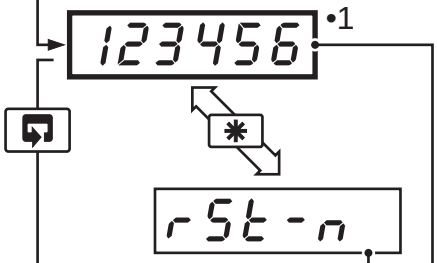


Process Variable

To view the input value (in electrical units), press the ✱ key.

Global Alarm Acknowledge (latch alarms only)

UN-ACK. – alarm unacknowledged
ACK. – acknowledged



Totalizer Value

When this frame is selected, the current counter status is displayed (t-GO or t-StOP).

Stop/Start

t-GO – start totalizer
t-StOP – stop totalizer

Reset

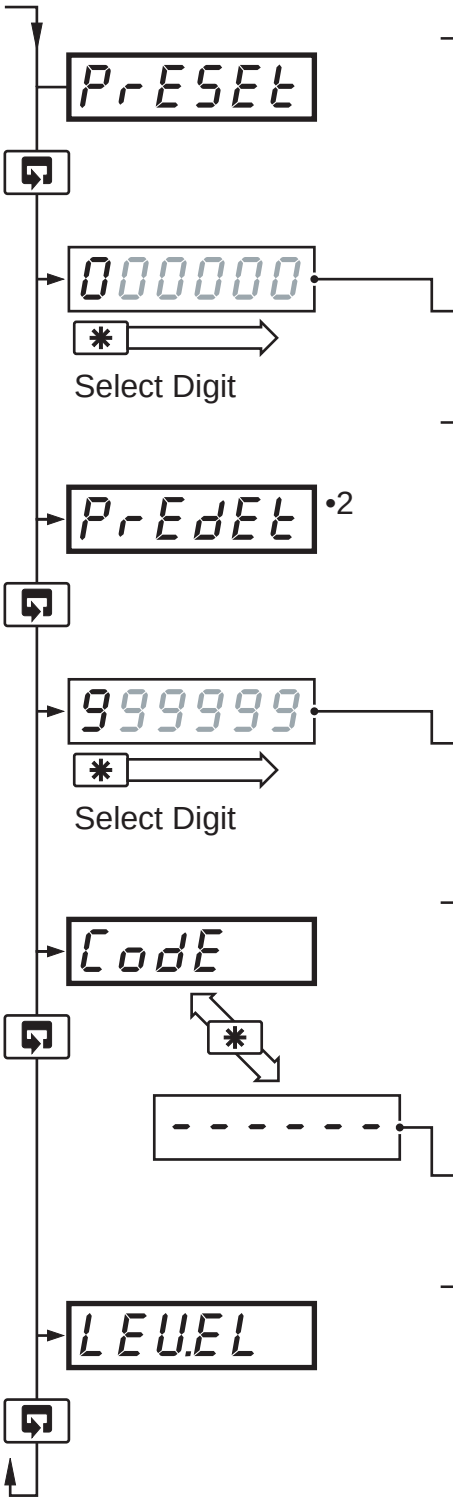
rSt-Y – reset totalizer
rSt-n – do not reset totalizer

To reset the totalizer, select rSt-Y. then press the ✱ key.

Continued on next page.

•1 Totalizer stop/go and reset from these frames can be disabled – see Section 4.3.3.
A digital input can also be used to start/stop or reset the totalizer – see Section 4.3.4

2.3 Operating Page – Totalizer (Level 1)



Preset Total
This is the value the batch total is set to when it is reset

[000000 to 999999 flow units]

Predetermined Total
When the predetermined total is reached, the batch total is reset (with wrap on) or stops (wrap off), depending on the wrap setting – see Section 3.2.

[000000 to 999999 flow units]

Security Code
Enter the correct code to access the setup level.

[0 to 9999]

Level 1

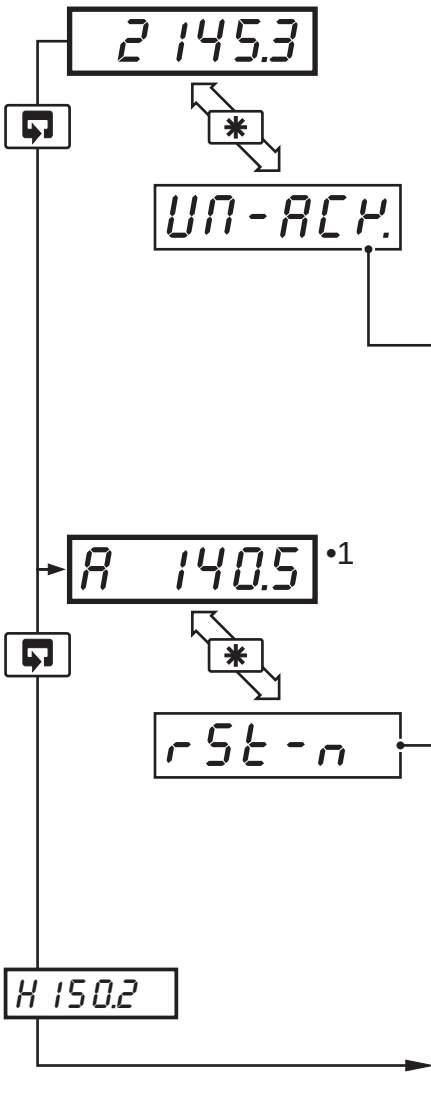
Note. To select this frame from anywhere in this level, press the key for a few seconds.

•1 The predetermined value should be greater than the preset value when the totalizer is counting up and lower than the preset value when the totalizer is counting down.

•2 Only displayed if enabled in the configuration level – see Section 4.3.3.

2.4 Operating Page – Max./Min./Average Functions (Level 1)

Note. It is possible to have totalizer and math functions together.



Process Variable
To view the input value (in electrical units), press the ▼ key.

Global Alarm Acknowledge (latch alarms only)

▲ ▼

UN-ACK. – alarm unacknowledged
ACK. – acknowledged

Average Value
This is the mean average value of the process variable input, since the average was reset.

▲ ▼

rSt-Y – reset
rSt-n – do not reset

To reset the average value, select rSt-Y then press the ✱ key.

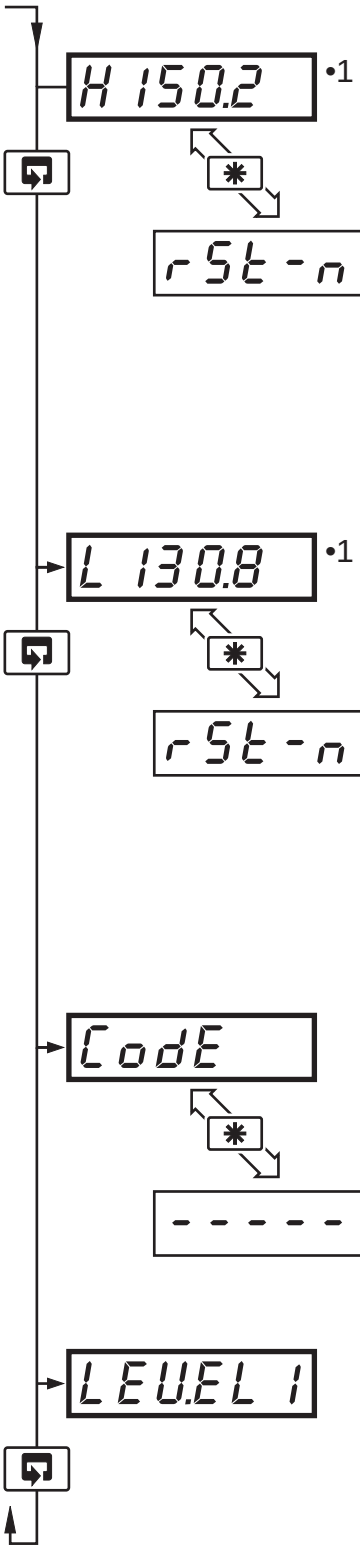
Continued on next page.

•1 This frame can be disabled – see Section 4.3.3.

The average value is reset automatically on power-up and can also be reset from a digital input – see Section 4.3.4.

The reset function in this frame can be disabled – see Section 4.3.3.

...2.4 Operating Page – Math Functions (Level 1)



Maximum Value
This is the maximum value of the process variable since the maximum was reset.

rSt-Y – reset
rSt-n – do not reset

To reset the maximum value, select rSt-Y then press the ✱ key.

Minimum Value
This is the minimum value of the process variable since the minimum was reset.

rSt-Y – reset
rSt-n – do not reset

To reset the minimum value, select rSt-Y then press the ✱ key.

Security Code
Enter the correct code to access the setup level.

[0 to 9999]

Level 1

✱ **Note.** To select this frame from anywhere in this level, press the ↩ key for a few seconds.

•1 This frame can be disabled – see Section 4.3.3.

The average value is reset automatically on power-up and can also be reset from a digital input – see Section 4.3.4.

The reset function in this frame can be disabled – see Section 4.3.3.

3 SET UP MODE

3.1 Introduction

To access the Setup Level (Level 2), the correct password must be entered in the security code frame (CodE) in Level 1– see Fig. 3.1.

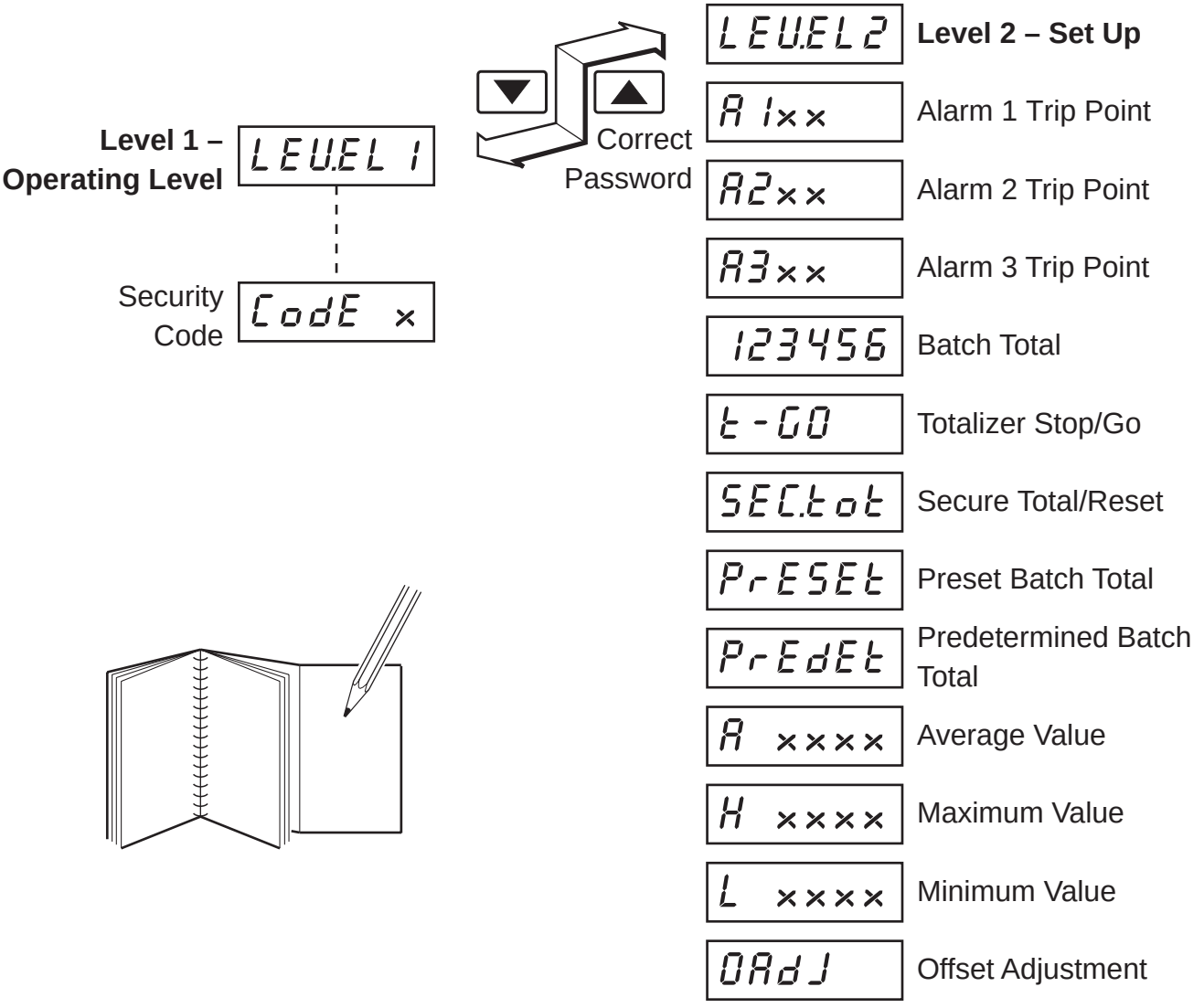
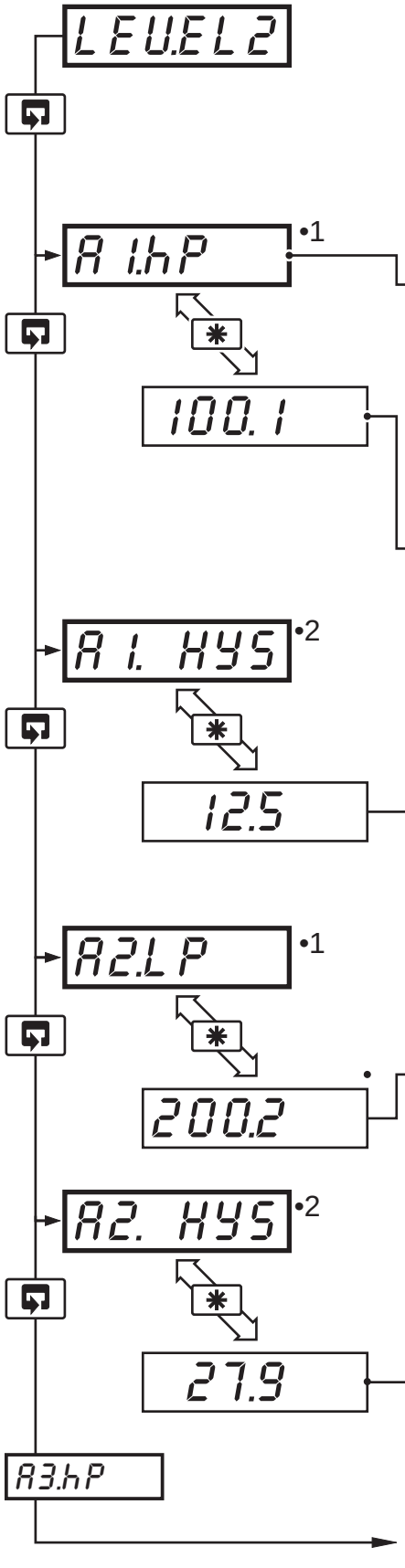


Fig. 3.1 Accessing the Set Up Level (Level 2)

3.2 Set Up Level (Level 2)



Level 2

Note. To select this frame from anywhere in this level, press the key for a few seconds.

Alarm 1 Trip Point

Alarm type:

A1.hP = High process alarm
A1.LP = Low process alarm
A1.HL = Latched high process alarm
A1.LL = Latched low process alarm

[In engineering units]

Alarm 1 Hysteresis Value

[In engineering units]

Alarm 2 Trip Point

Alarm type

[In engineering units]

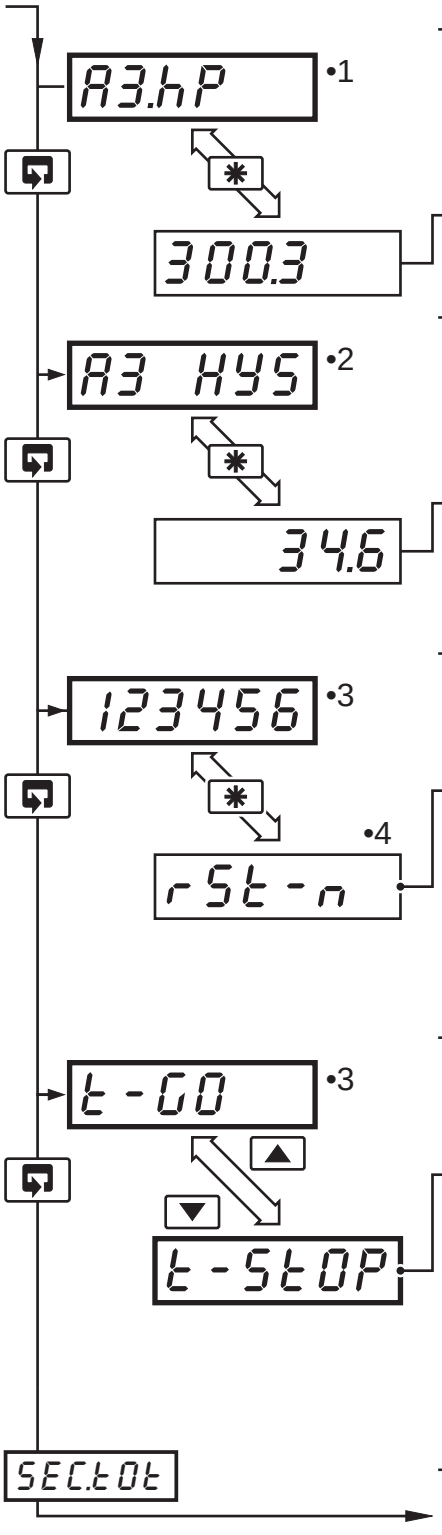
Alarm 2 Hysteresis Value

[In engineering units]

Continued on next page.

•1 Not displayed if the alarm is disabled ('NONE' selected) – see Section 4.3.2.
•2 Only displayed if custom alarm hysteresis is selected – see Section 4.3.2

…3.2 Set Up Level (Level 2)



Alarm 3 Trip Point
Alarm type

[In engineering units]

Alarm 3 Hysteresis Value

[In engineering units]

Totalizer Value

rSt-Y – reset
rSt-n – do not reset

To reset the maximum value, select rSt-Y then press the ✱ key.

Totalizer Stop/Go

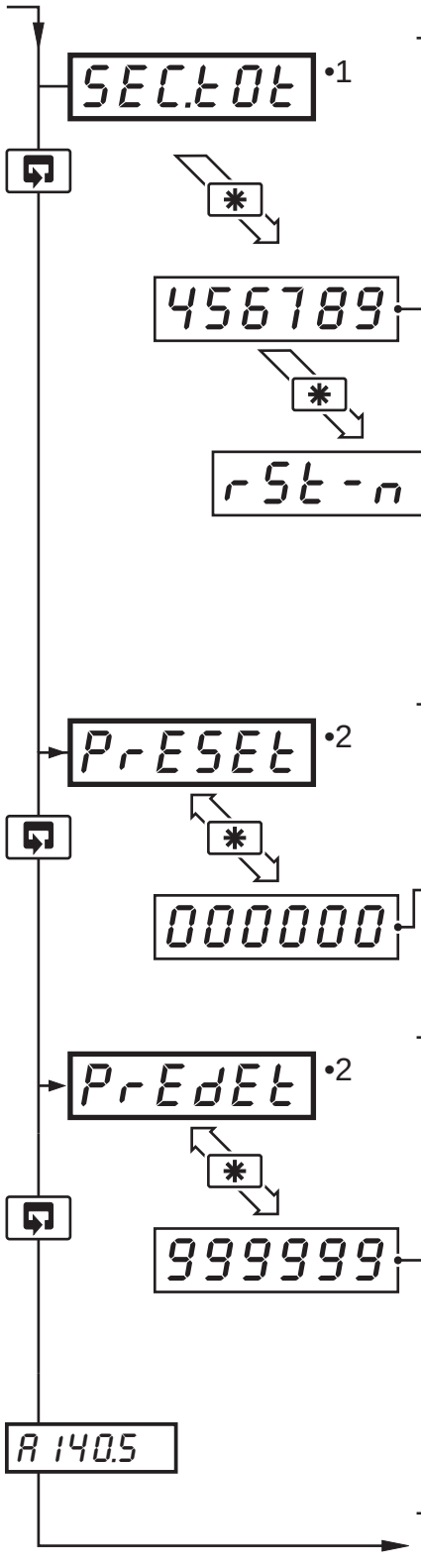
t-GO – start totalizer
t-StOP – stop totalizer

Setting to t-GO starts the totalizer counting towards the predetermined value. Setting to t-StOP holds the totalizer at its present value.

Continued on next page

•1 Not displayed if the alarm is disabled ('NONE' selected) – see Section 4.3.2
•2 Only displayed if custom alarm hysteresis is selected – see Section 4.3.2
•3 Only displayed if enabled in the configuration level – see Section 4.3.3
•4 A digital input can also be used to reset the batch total.

…3.2 Set Up Level (Level 2)



Secure Total
The secure total is independent of the batch total value. When 999999 or 000000 is reached, the total is reset and then continues counting.

Total

Reset

rSt-Y. – reset totalizer
rSt-n. – do not reset totalizer

To reset, select rSt-Y. then press the ✱ key.

Preset Batch Total
This is the value the batch total is set to when it is reset.

[000000 to 999999]

Predetermined Batch Total
When this value is reached the batch total either resets (with wrap on) or stops (wrap off) – see Section 4.3.3.

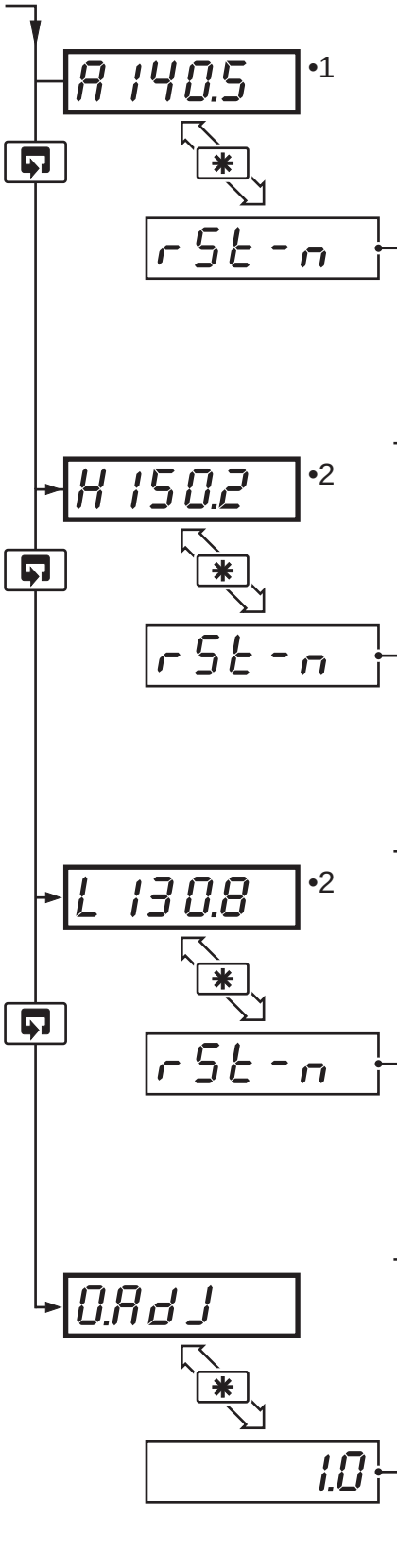
[000000 to 999999]

Continued on next page.

•1 Only displayed if enabled in the configuration level – see Section 4.3.3.

•2 The preset value must be lower than the predetermined value when counting up, and greater than the predetermined value when counting down.

…3.2 Set Up Level (Level 2)



Average Value
This is the mean average value of the process variable input since the average was reset.

rSt-Y. – reset
rSt-n. – do not reset

To reset, select rSt-Y. then press the ✱ key.

Maximum Value
This is the maximum value of the process variable since the maximum was reset.

rSt-Y. – reset
rSt-n. – do not reset

To reset, select rSt-Y. then press the ✱ key.

Minimum Value
This is the minimum value of the process variable since the minimum was reset.

rSt-Y. – reset
rSt-n. – do not reset

To reset , select rSt-Y. then press the ✱ key.

Offset Adjustment
An offset can be applied to the process variable input to enable spot calibration or the removal of system errors.

[±10% of engineering range]

•1 The average value is reset automatically on power-up and can also be reset from a digital input – see Section 4.3.4.

•2 The maximum and minimum values are reset automatically on power-up and can also be reset from a digital input – see Section 4.3.4.

4 CONFIGURATION MODE

4.1 Introduction

The Configuration Mode comprises two levels (3 and 4) as shown in Fig. 4.2.

Configuration Level 3 is divided into four frames. For most simple applications, it is only necessary to set up the parameters in the first frame.

Note.

When in the configuration level:

- All the LED indicators flash.
- All relays and logic outputs are turned off.
- The analog output reverts to 0% (4mA) output level.

4.2 Accessing the Configuration Mode – Fig. 4.1

To access the Configuration Mode, set the security switch to the 'Configure' position (Levels 1 and 2 cannot be accessed from this setting). When the configuration parameters are programmed, reset the security switch to the 'Normal' position and the operating page is displayed automatically .

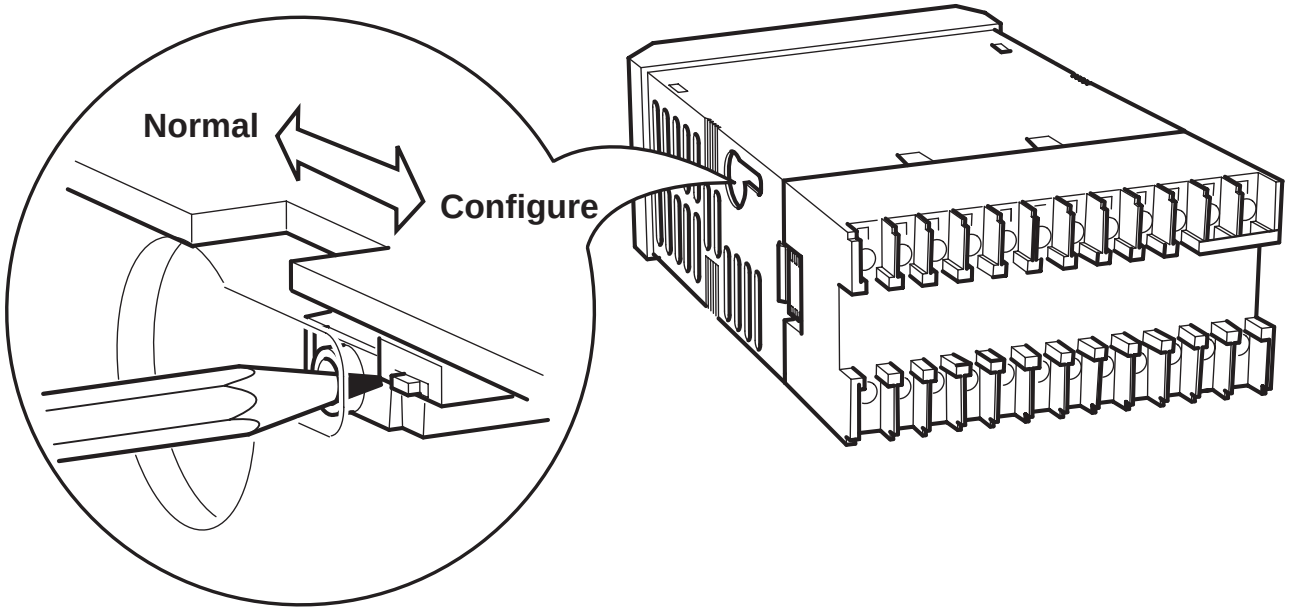


Fig. 4.1 Accessing the Configuration Mode

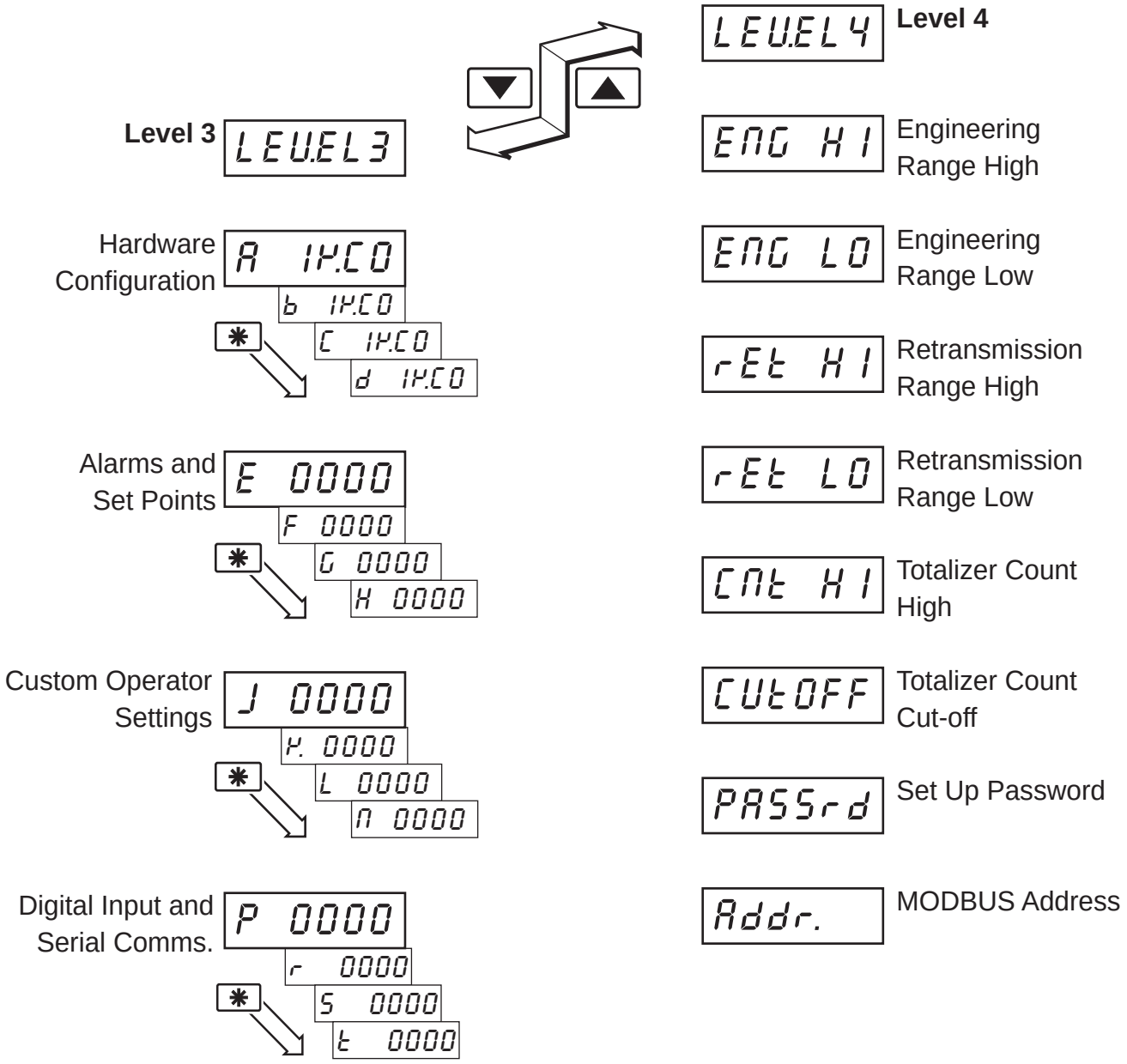
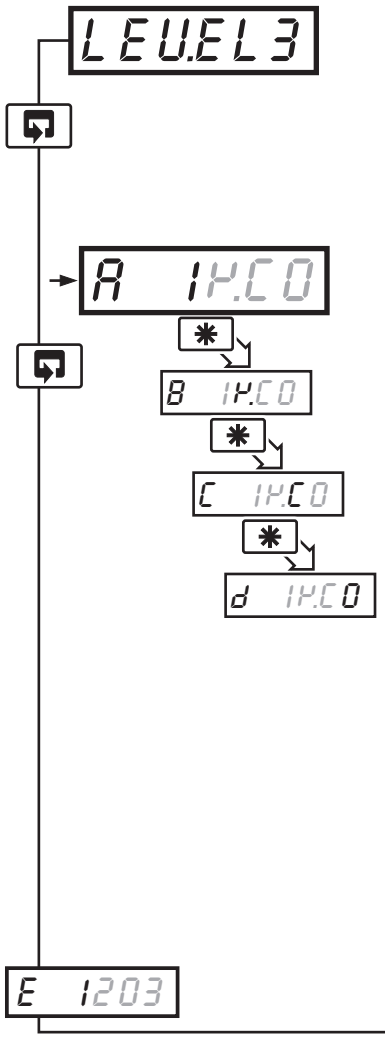


Fig. 4.2 Configuration Levels

4.3 Basic Hardware and Configuration (Level 3) – Fig. 4.3

4.3.1 Hardware Assignment and Input Type



Level 3

Note. To select this frame from anywhere in this level, press the key for a few seconds.

'ABCD' Settings

The first character (A, B, C or D) identifies the parameter to be changed. The current setting is indicated by a flashing letter. Parameter options are shown in Fig. 4.3.

- A = Hardware configuration
- b = Input type and range
- C = Temperature units
- d = No. of decimal points

Note. The temperature ranges default to their maximum values when the input type is changed.

Continued on page 22.

Information.

Count High Calculation

$$\text{Convert flow rate into units/sec} = \frac{\text{actual engineering flow rate}}{\text{flow range time units (in seconds)}}$$

$$\text{Count High} = \frac{\text{units/sec}}{\text{counter factor}}$$ resultant must be >0.001 and <99.999pps.

Counter factor is the engineering value of the least significant digit shown on the totalizer display – see Section 4.3.3.

Totalizer Count Pulse

The totalizer count pulse is on for a preset time of 250ms and off for a minimum of 250ms.

A – Hardware Configuration

50Hz/60Hz		Relay 1 Source	Relay 2* Source	Relay 3* Source	Logic O/P Source	Analog O/P Source
1	A	Alarm 1	Alarm 2	Alarm 3	TCP**	PV
2	b	Alarm 1	Alarm 2	Alarm 3	TWP**	PV
3	C	TCP**	Alarm 1	Alarm 2	TWP**	PV
4	D	TWP**	Alarm 1	Alarm 2	TCP**	PV
5	E	Alarm 1	Alarm 2	Alarm 3	TCP**	PV Average
U		Custom	Custom	Custom	Custom	Custom

TCP = Totalizer Count Pulse TWP = Totalizer Wrap Pulse PV = Process Variable

* Only available if the appropriate option board is fitted.
** Pulse energizes assigned relay

B – Input Type and Range Configuration

Display		Display	
b	T/C Type B	1	0 to 20 mA
E	T/C Type E	2	4 to 20 mA
J	T/C Type J	3	0 to 5 V
K	T/C Type K	4	1 to 5 V
n	T/C Type N	6	0 to 50 mV
r	T/C Type R	7	4 to 20 mA (square root lineariser)
S	T/C Type D	U	Custom Configuration
t	T/C Type T		
P	PT100 RTD		

C – Temperature Units

Display	Temperature Units
C	Degrees C*
F	Degrees F*
0	No temperature units

* Temperature inputs only

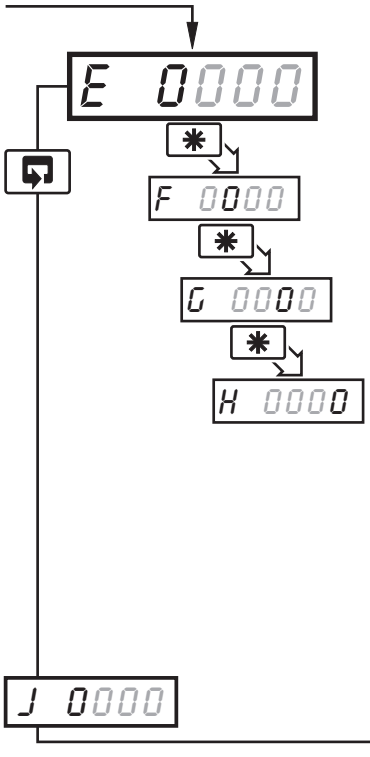
D – Process Variable Display Decimal Places

Display	
0	xxxx
1	xxx . x
2	xx . xx
3	x . xxx
4	x . xxxx

Fig. 4.3 Hardware Configuration and Input/Output Ranges

4.3.2 Alarms – Figs. 4.4 and 4.5

Note. Relays assigned to alarms are de-energized in the alarm state.

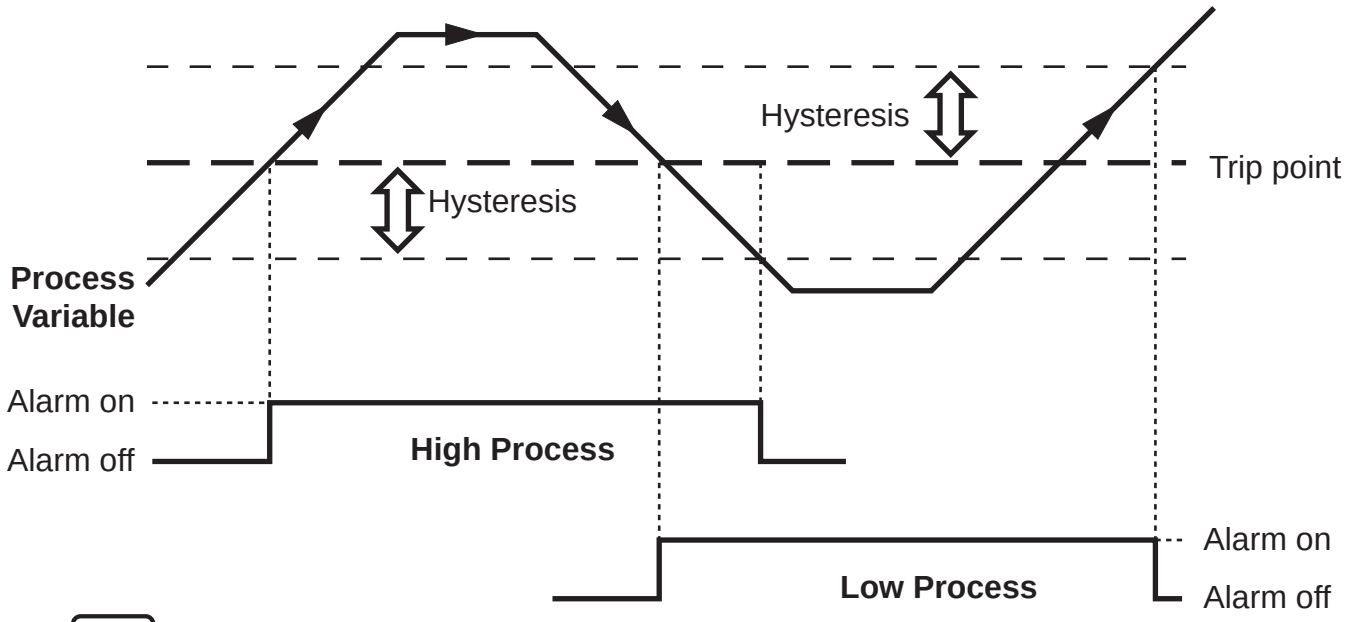


'EFGH' Settings

The first character (E, F, G or H) identifies the parameter to be changed. The current setting is indicated by a flashing letter. Parameter options are shown in Fig. 4.5.

E = Alarm 1 type
F = Alarm 2 type
G = Alarm 3 type
H = Alarm hysteresis

Continued on page 24.



Information.
For latch alarms the relay remains de-energized until acknowledged in Level 1 (or by a digital input)

Fig. 4.4 Alarm Action

E – Alarm 1 Type

Display	
0	None
1	High Process
2	Low Process
3	High Latch
4	Low Latch

F – Alarm 2 Type

Display	
0	None
1	High Process
2	Low Process
3	High Latch
4	Low Latch

G – Alarm 3 Type

Display	
0	None
1	High Process
2	Low Process
3	High Latch
4	Low Latch

H – Alarm Hysteresis

Display	
0	None
1	0.1%
2	0.2%
3	0.5%
4	1.0%
5	2.0%
6	5.0%
U	Custom

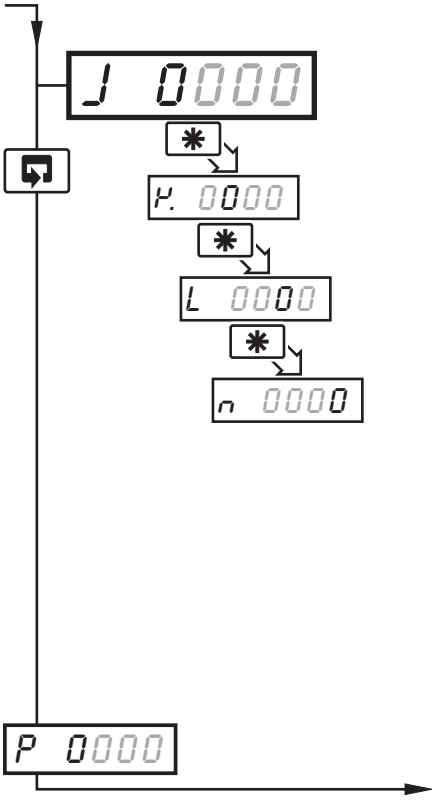
Value in % of engineering range

Value in engineering units ✶

✶ **Note.** When custom alarm hysteresis is selected, the alarm hysteresis values are set individually in the **Set Up Level** – see Section 3.2

Fig. 4.5 Alarm Set Up

4.3.3 Operator Functions and Totalizer Set Up – Fig. 4.6



'JKLN' Settings

The first character (J, K, L or N) identifies the parameter to be changed. The current setting is indicated by a flashing letter. Parameter options are shown in Fig. 4.6.

- J = Totalizer set-up
- H. = No. of decimal places for totalizer
- L = Operator level frame enable
- n = Operator level functions enable/disable

Continued on page 26.

J – Totalizer Set Up

Display	
0	Off
1	Count Up, Wrap Off
2	Count Up, Wrap On
3	Count Down, Wrap Off
4	Count Down, Wrap On

K – Totalizer Display Decimal Places

Display	
0	xxxxxx
1	xxxxx.x
2	xxxx.xx
3	xxx.xxx
4	xx.xxxx
5	x.xxxxx

L – Operator Level Frame Enable

Display	Max/Min Values Displayed	Average Value Displayed	Preset/Predetermined Values Displayed
0	No	No	No
1	Yes	No	No
2	Yes	Yes	No
3	No	Yes	Yes
4	No	No	Yes
5	Yes	No	Yes
6	Yes	Yes	Yes

This frame determines which frames appear in the operating page (Level 1)

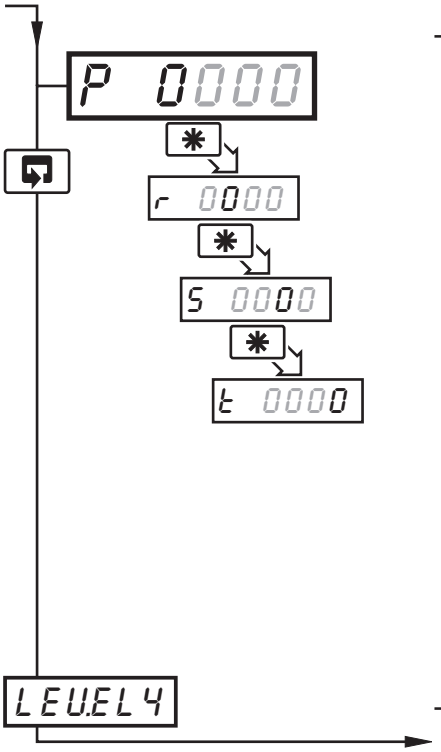
N – Operator Level Math Function & Totalizer Control Enable

Display	Totalizer Stop/Go	Totalizer Reset	Max./Min./Average
0	No	No	No
1	Yes	No	No
2	No	Yes	No
3	Yes	No	Yes
4	No	Yes	Yes
5	Yes	Yes	Yes

This frame determines which functions the operator can control

Fig. 4.6 Totalizer Set Up and Operator Functions

4.3.4 Digital Input and Serial Communications – Figs. 4.7 and 4.8



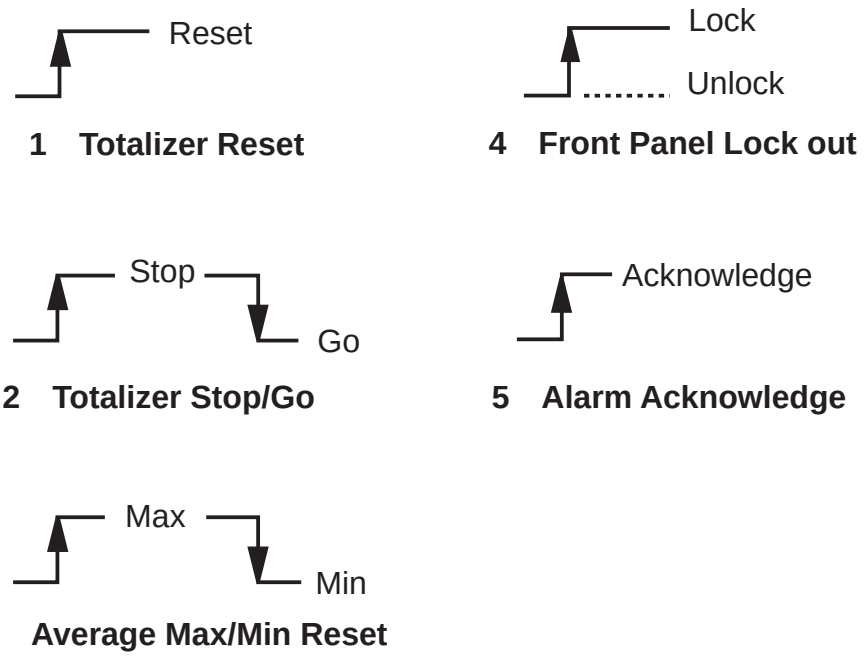
'PRST' Settings

The first character (P, R, S or T) identifies the parameter to be changed and the current setting is indicated by a flashing letter. Parameter options are shown in Fig. 4.8.

- P = Digital input function
- r = Analog input filter
- S = Serial communications configuration
- t = Serial communications parity

Note. For custom settings contact the local distributor.

Continued on page 28.



1 Totalizer Reset

4 Front Panel Lock out

2 Totalizer Stop/Go

5 Alarm Acknowledge

3 Average Max/Min Reset

Information.

Digital input options 1, 2, 3 and 5 are edge-triggered to enable the front panel keys to change the function when the digital input is operational.

Fig. 4.7 Digital Function Configuration

P – Digital Input Function

Display	
0	None
1	Totalizer Reset
2	Totalizer Stop/Go
3	Average, Max/Min Reset
4	Front Panel Lockout
5	Alarm Acknowledge

R – Analog Input Filter

Display	
0	0 seconds
1	1 second
2	2 seconds
5	5 seconds
A	10 seconds
B	20 seconds
C	40 seconds
D	60 seconds

S – Serial Communication Configuration

Display	Baud Rate, 2/4 Wire
0	Off
1	2400, 2 Wire
2	2400, 4 Wire
3	9600, 2 Wire
4	9600, 4 Wire

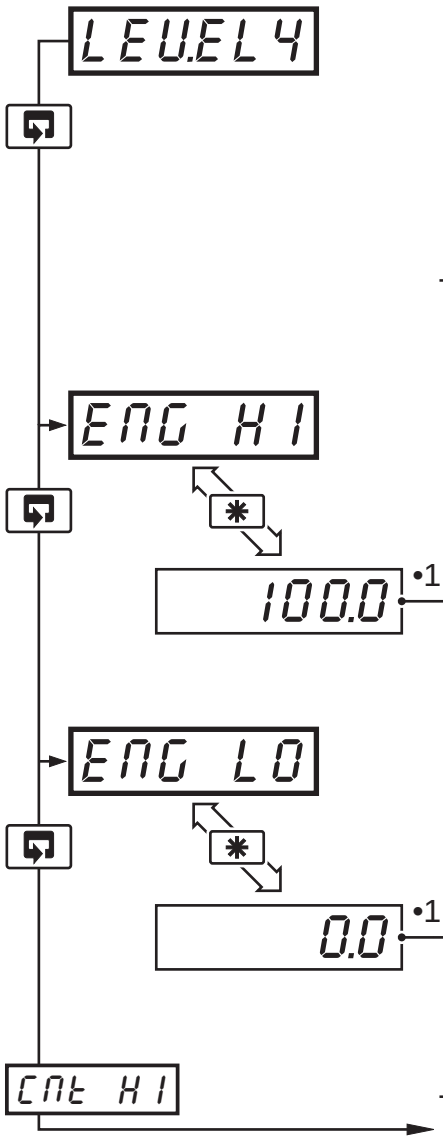
T – Serial Communication Parity

Display	
0	None
1	Odd
2	Even

Note. Settings for options P, S and T are only available if the appropriate option board is fitted.

Fig. 4.8 Digital Function and Serial Communications Configurations

4.4 Ranges and Passwords (Level 4)



Level 4

Note. To select this frame from anywhere in this level, press the key for a few seconds.

Engineering (Display) Range

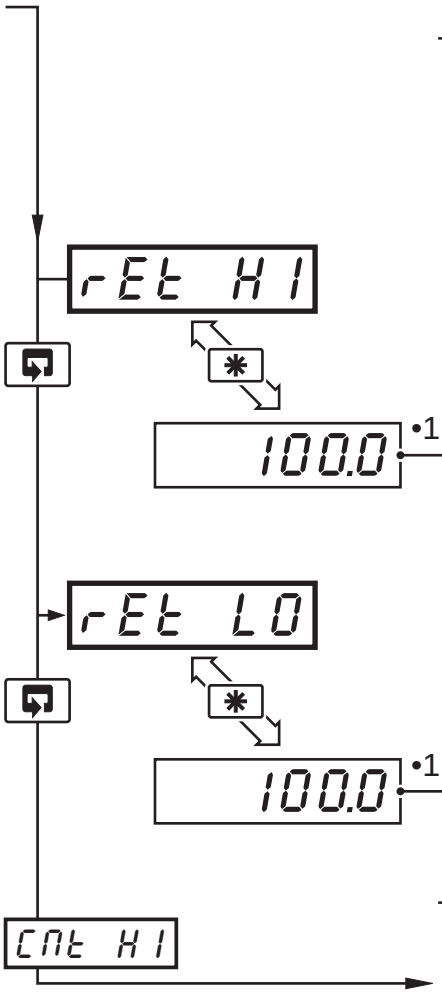
High Value

Low Value

Continued on next page…

•1 The engineering range high and low values are automatically set to the maximum allowed value when thermocouple or RTD is selected in the configuration level – see Section 4.3.1. This value can be modified if required.

…4.4 Ranges and Passwords (Level 4)



Retransmission Range
The retransmission range defines the engineering range to be retransmitted.

High (20mA output)

[–9999 to 99999 (in engineering units)]

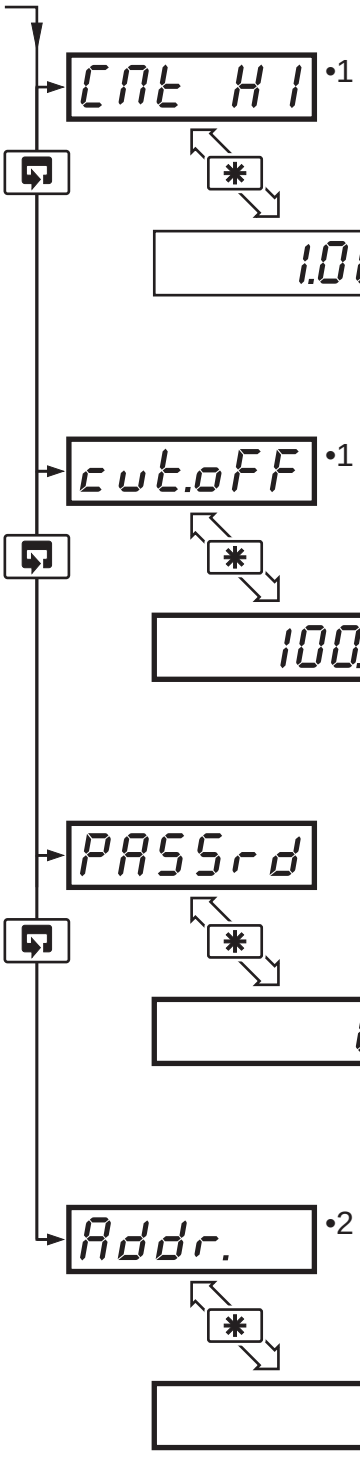
Low (4mA output)

[–9999 to 99999 (in engineering units)]

Continued on next page…

•1 The retransmission range high and low values are automatically set to the maximum allowed value when thermocouple or RTD is selected in the configuration level – see Section 4.3.1. This value can be modified if required.

…4.4 Ranges and Passwords (Level 4)



Totalizer Count High
This frame determines the count corresponding to the full-scale input.

[0.000 and 99.999 pulses/second]

Cut-Off
This frame sets the lowest flow value at which the totalizer is to stop counting.

[In engineering units]

Set Up Password
This password enables access to the set up level (level 2).

[0 to 9999]

MODBUS Address
This frame sets the MODBUS address.

[1 to 99]

•1 Only displayed if enabled in the configuration level – see Section 4.3.3.

•2 Only available if the appropriate option board is fitted.

5 INSTALLATION

5.1 Siting – Figs. 5.1 and 5.2

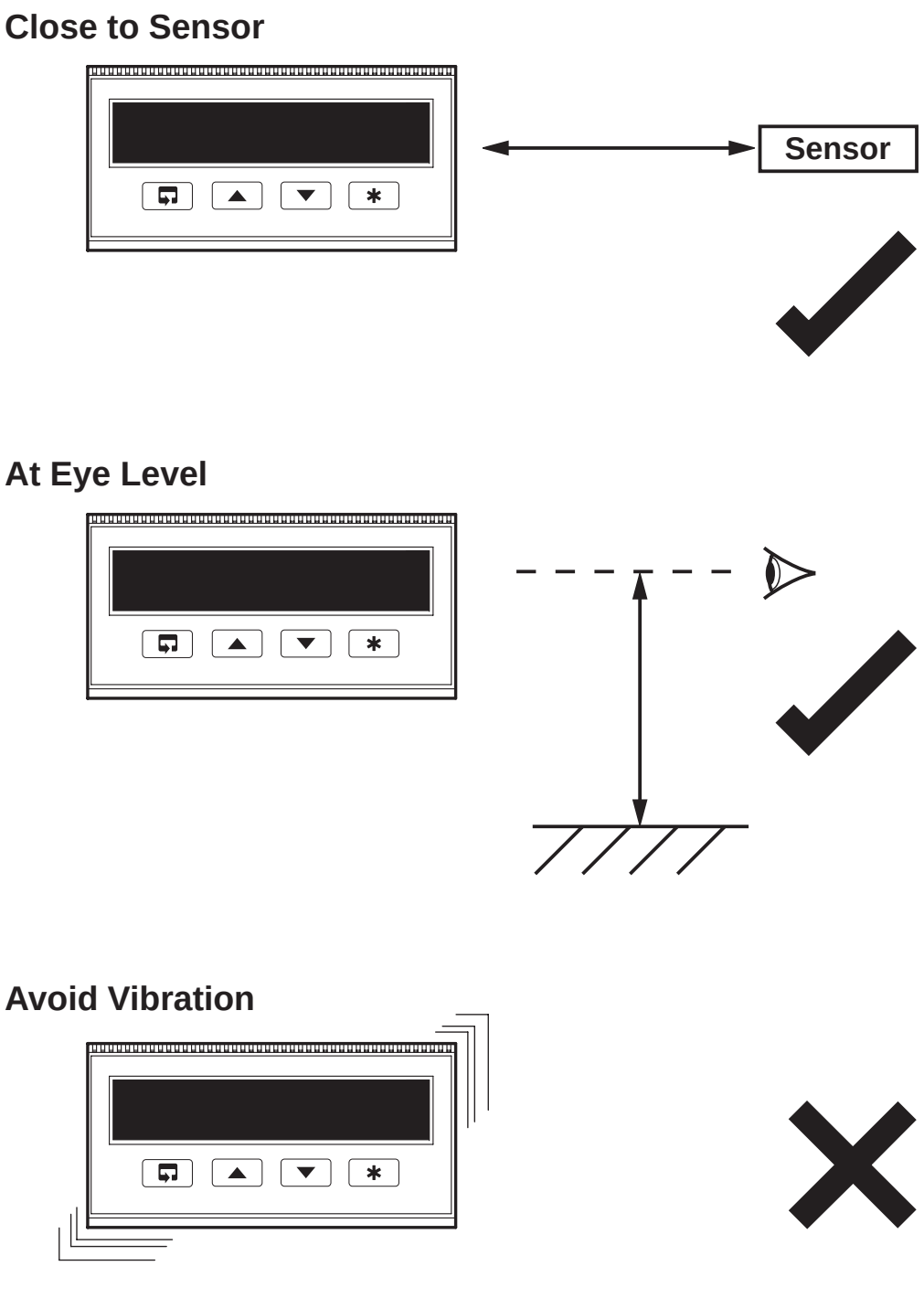
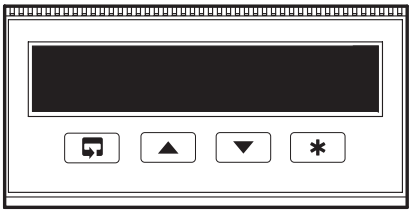
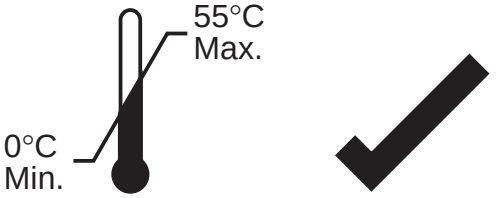


Fig. 5.1 Siting – General Requirements

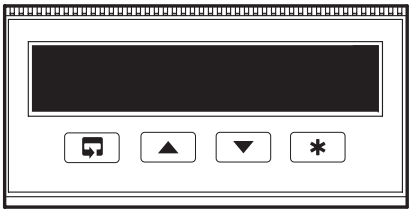
…5.1 Siting – Figs. 5.1 and 5.2

Temperature Limits

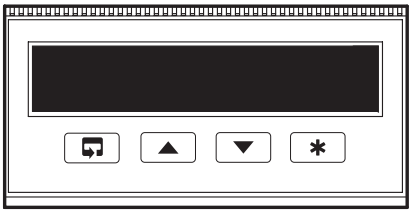




Humidity Limits



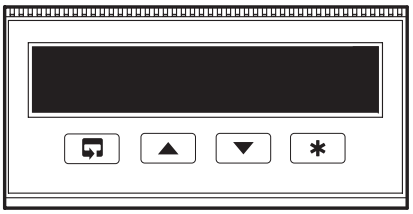
Environmental Limits



IP65/NEMA-3
(front panel)

IP20
(rear)

Use Screened Cable



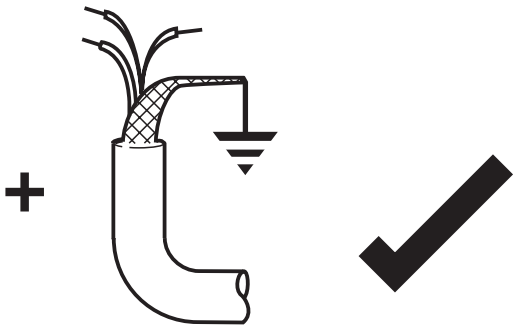


Fig. 5.2 Environmental Requirements

5.2 Mounting – Figs. 5.3 and 5.4

The instrument is designed for panel mounting (see Fig. 5.4). Overall dimensions are shown in Fig. 5.3.

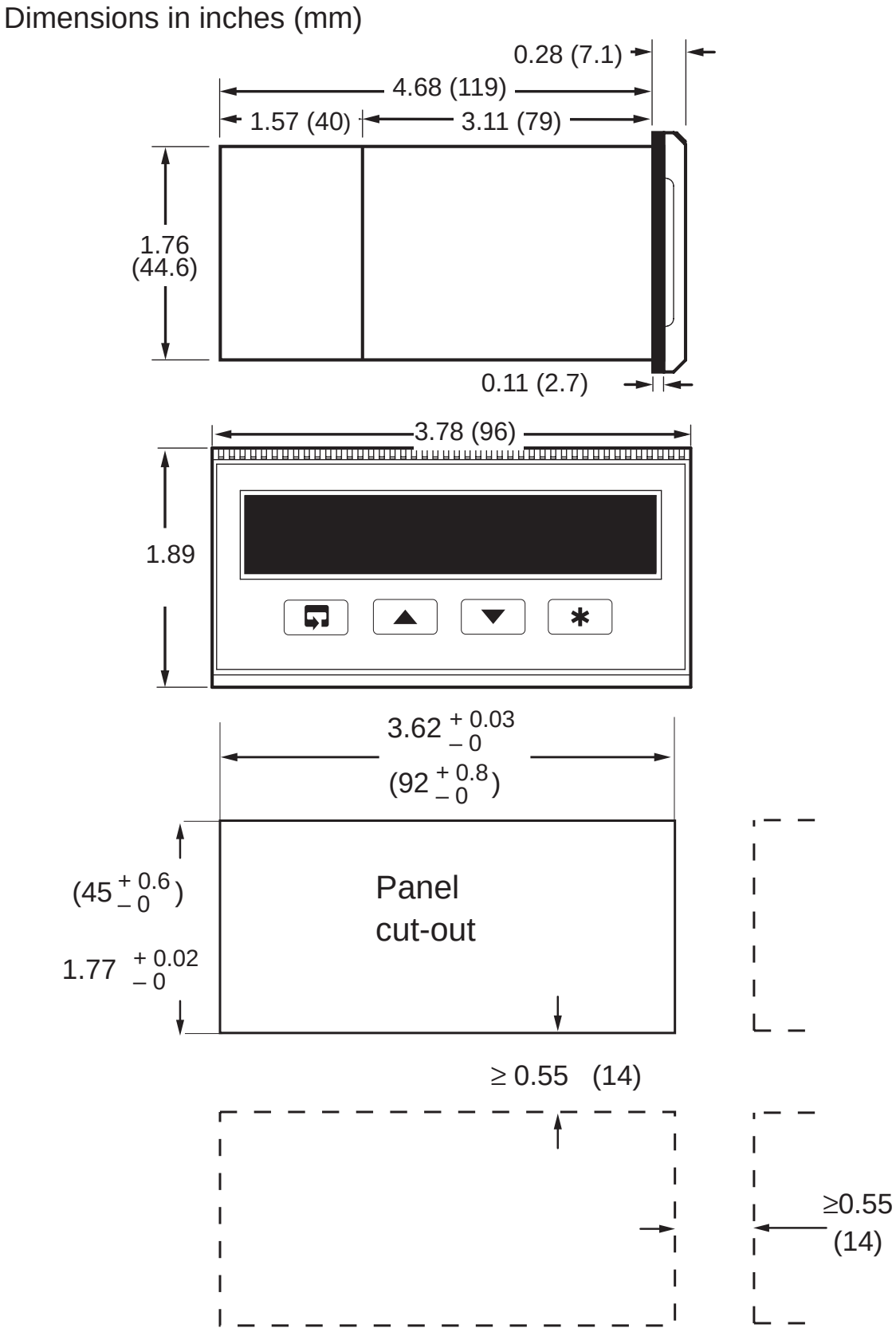


Fig. 5.3 Overall Dimensions

...5.2 Mounting – Figs. 5.3 and 5.4

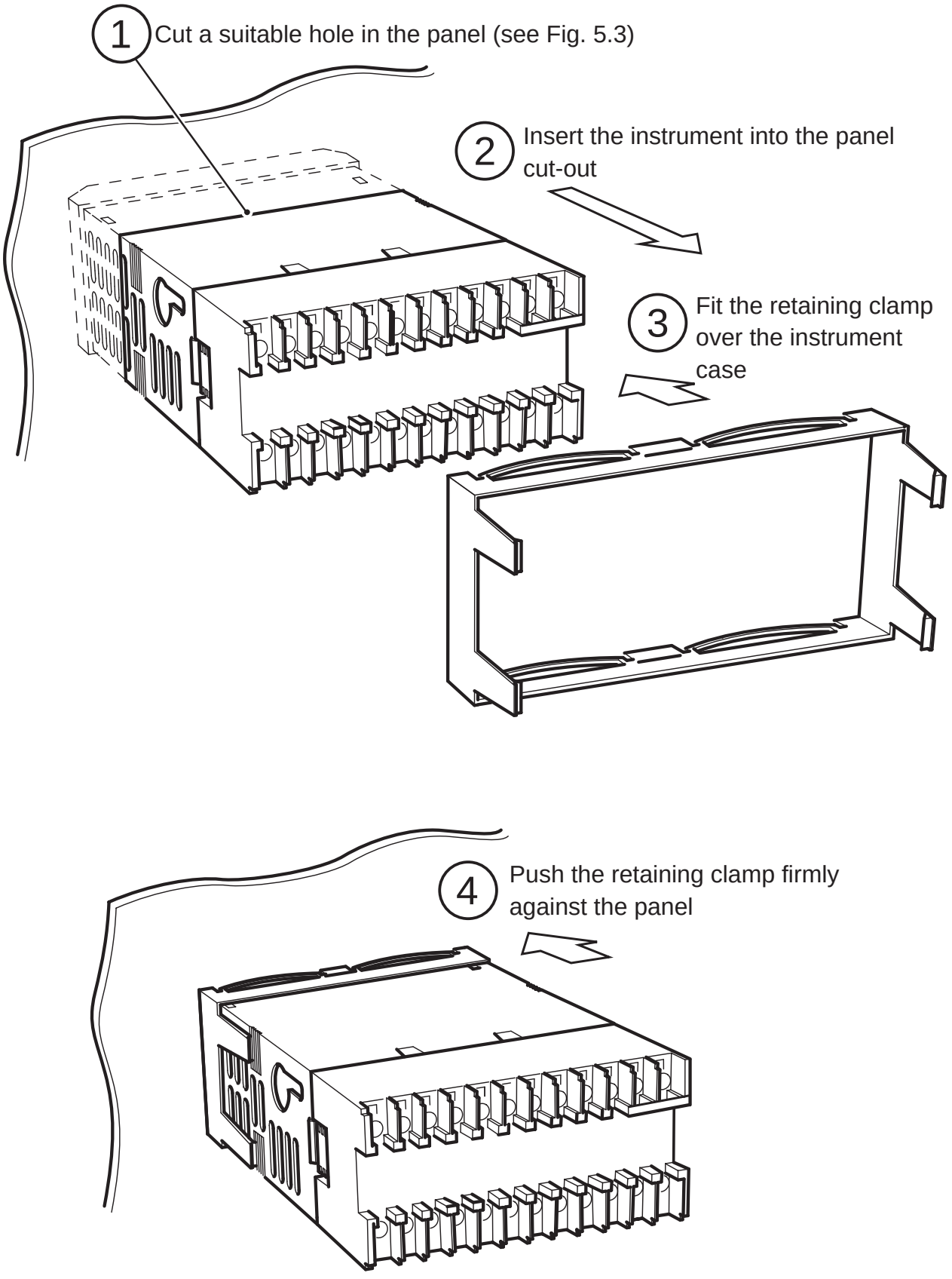


Fig. 5.4 Mounting Details

EC Directive 89/336/EEC

In order to meet the requirements of the EC Directive 89/336/EEC for EMC regulations, this product must not be used in a non-industrial environment.

5.3 Electrical Connections – Figs. 5.5 and 5.6

Warning. Before making any connections, ensure that the power supply, any powered control circuits and high common mode voltages are switched off.

Note. If it is not possible to avoid strong electrical and magnetic fields, screened cables within earthed/grounded metal conduit must be used.

5.4 Relays, Arc Suppression and Outputs

5.4.1 Relay Contact Ratings

Relay contacts are rated at:

115/230V AC at 5A (non-inductive)
250V DC 25W max.

5.4.2 Arc Suppression - Fig. 5.5

Arc suppression components are fitted to relays 2 and 3 only. If relay 1 is required to switch inductive loads, the arc suppression component supplied must be fitted across the contacts used.

5.4.3 Logic Output

18V DC at 20mA

Min load 900Ω

Isolated from Analog Input (not isolated from Retransmission Output). Dielectric strength – 500V d.c. for 1 minute.

5.4.4 Control or Retransmission Analog Output

Max. load 15V (750Ω at 20mA)

Isolated from Analog Input (not isolated from Logic Oouput). Dielectric strength - 500V d.c. for 1 minute.

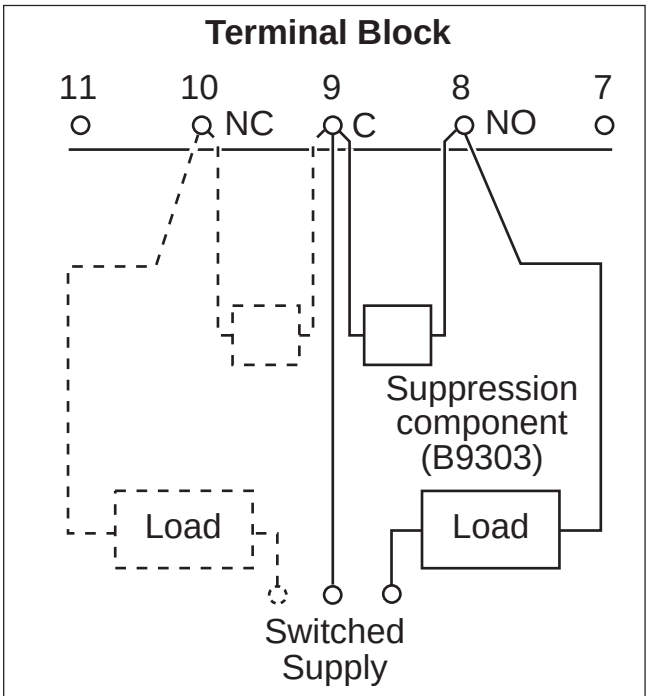
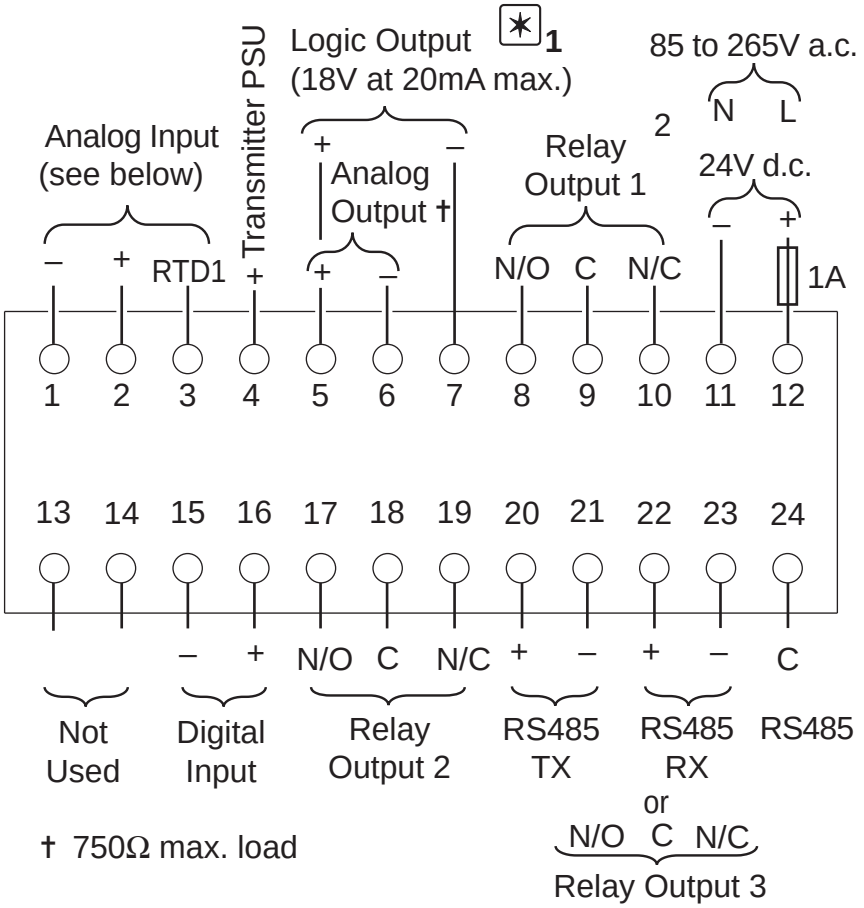


Fig. 5.5 Fitting Arc Suppression Components



✶ **Note 1.** The Analog Output and Logic Output use a common positive terminal, capable of driving both outputs simultaneously.

✶ **Note 2.** Fit arc suppression components if switching inductive loads.

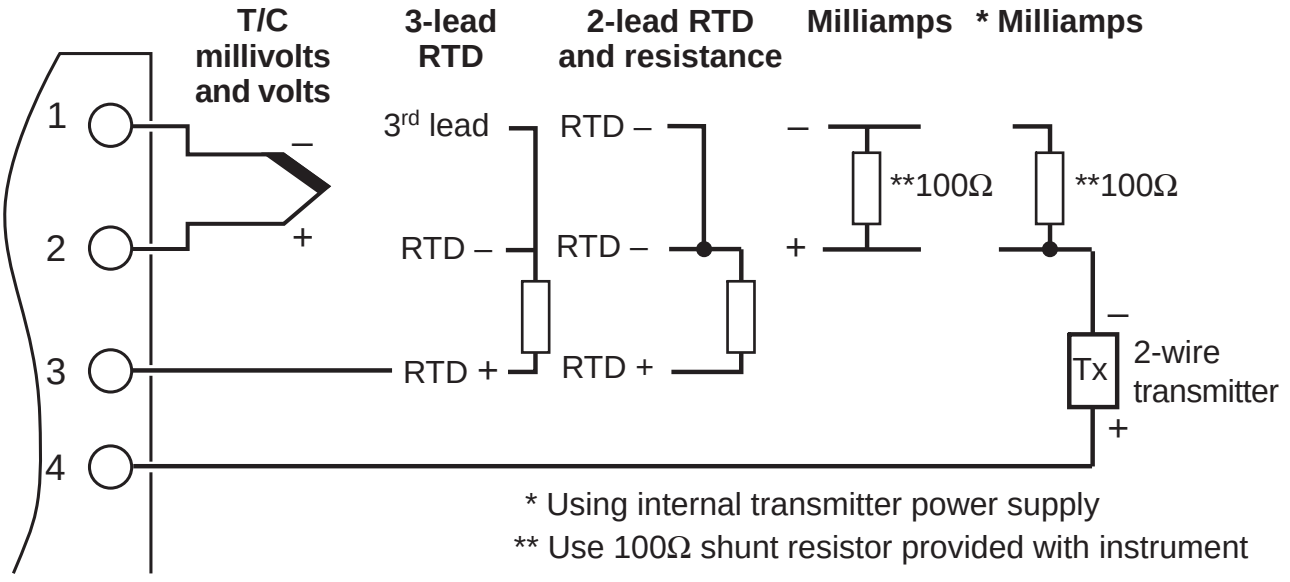
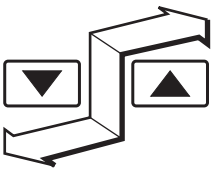


Fig. 5.6 Electrical Connections

CUSTOMER CONFIGURATION LOG



LEVEL3

A INCO

A__ B__ C__ D__

E 0000

E__ F__ G__ H__

J 0000

J__ K__ L__ N__

P 0000

P__ R__ S__ T__

LEVEL4

ENG HI __ __ __ __ __ __

ENG LO __ __ __ __ __ __

rEt HI __ __ __ __ __ __

rEt LO __ __ __ __ __ __

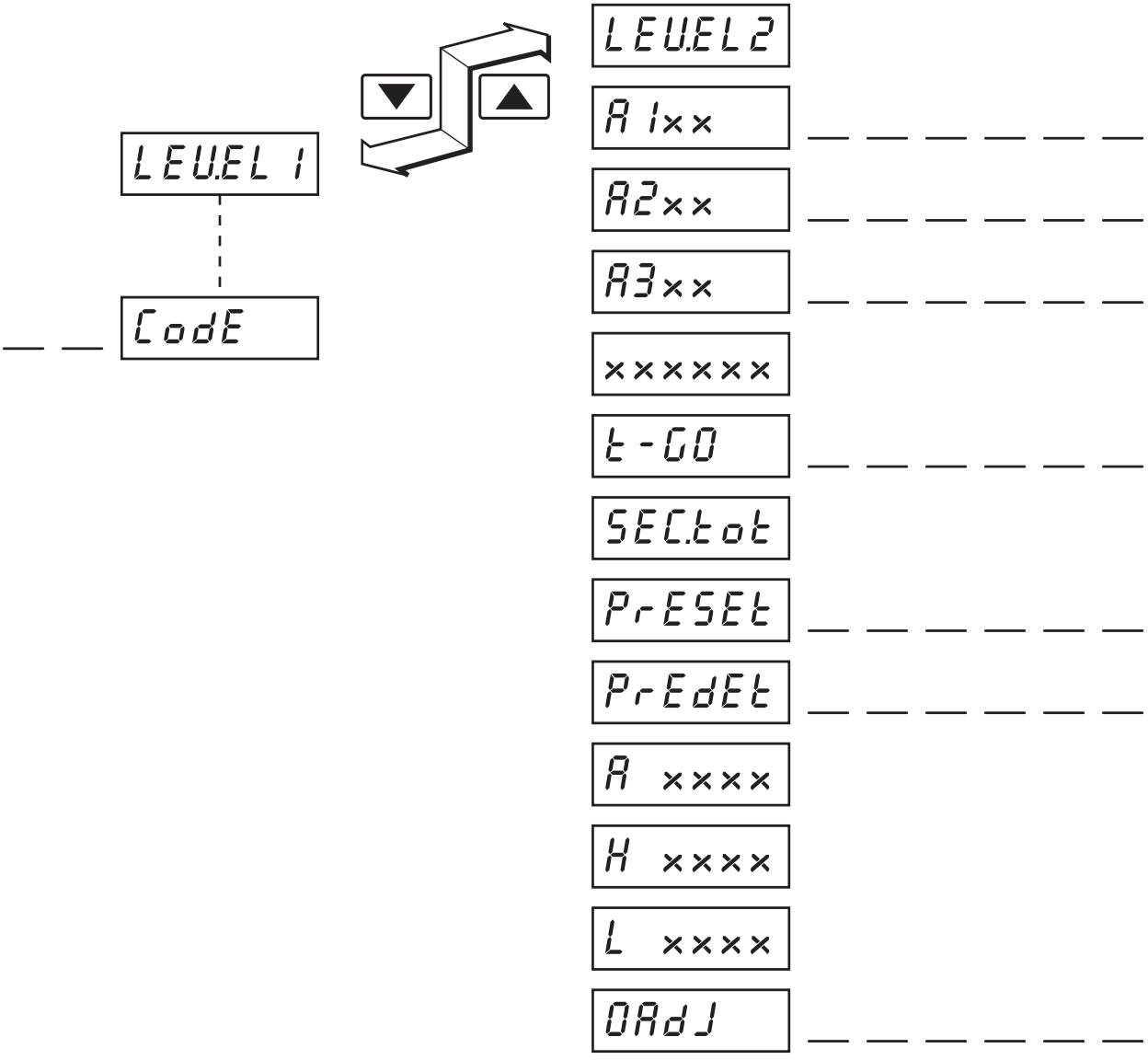
CNt HI __ __ __ __ __ __

CUtOFF __ __ __ __ __ __

PASSrd __ __ __ __ __ __

Addr. __ __

CUSTOMER SETUP LOG



Instrument Serial Number: _____

WARRANTY/DISCLAIMER

OMEGA ENGINEERING, INC. warrants this unit to be free of defects in materials and workmanship for a period of 37 months from date of purchase. OMEGA Warranty adds an additional one (1) month grace period to the normal three (3) year product warranty to cover handling and shipping time. This ensures that OMEGA's customers receive maximum coverage on each product.

If the unit malfunctions, it must be returned to the factory for evaluation. OMEGA's Customer Service Department will issue an Authorized Return (AR) number immediately upon phone or written request. Upon examination by OMEGA, if the unit is found to be defective, it will be repaired or replaced at no charge. OMEGA's WARRANTY does not apply to defects resulting from any action of the purchaser, including but not limited to mishandling, improper interfacing, operation outside of design limits, improper repair, or unauthorized modification. This WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of having been damaged as a result of excessive corrosion; or current, heat, moisture or vibration; improper specification; misapplication; misuse or other operating conditions outside of OMEGA's control. Components which wear are not warranted, including but not limited to contact points, fuses, and triacs.

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Direct all warranty and repair requests/inquiries to the OMEGA Customer Service Department. BEFORE RETURNING ANY PRODUCT(S) TO OMEGA, PURCHASER MUST OBTAIN AN AUTHORIZED RETURN (AR) NUMBER FROM OMEGA'S CUSTOMER SERVICE DEPARTMENT (IN ORDER TO AVOID PROCESSING DELAYS). The assigned AR number should then be marked on the outside of the return package and on any correspondence.

The purchaser is responsible for shipping charges, freight, insurance and proper packaging to prevent breakage in transit.

FOR WARRANTY RETURNS, please have the following information available BEFORE contacting OMEGA:

1. Purchase Order number under which the product was PURCHASED,
2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems relative to product.

FOR NON-WARRANTY REPAIRS, consult OMEGA for current repair charges. Have the following information available BEFORE contacting OMEGA:

1. Purchase Order number to cover the COST of the repair,
2. Model and serial number of the products, and
3. Repair instructions and/or specific problems relative to the product.

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- pH, Conductivity & Dissolved Oxygen Instruments

M2937/0299