COMMANDER 150 **User Guide**
Universal Process Indicator

ABB

Use of Instructions

⚠ **Warning.**
An instruction that draws attention to the risk of injury or death.

⚠ **Caution.**
An instruction that draws attention to the risk of damage to the product, process or surroundings.

✳ **Note.**
Clarification of an instruction or additional information.

ℹ **Information.**
Further reference for more detailed information or technical details.

Although **Warning** hazards are related to personal injury, and **Caution** hazards are associated with equipment or property damage, it must be understood that operation of damaged equipment could, under certain operational conditions, result in degraded process system performance leading to personal injury or death. Therefore, comply fully with all **Warning** and **Caution** notices.

Information in this manual is intended only to assist our customers in the efficient operation of our equipment. Use of this manual for any other purpose is specifically prohibited and its contents are not to be reproduced in full or part without prior approval of the Technical Publications Department.

Health and Safety

To ensure that our products are safe and without risk to health, the following points must be noted:

1. The relevant sections of these instructions must be read carefully before proceeding.

2. Warning labels on containers and packages must be observed.

3. Installation, operation, maintenance and servicing must only be carried out by suitably trained personnel and in accordance with the information given.

4. Normal safety precautions must be taken to avoid the possibility of an accident occurring when operating in conditions of high pressure and/or temperature.

5. Chemicals must be stored away from heat, protected from temperature extremes and powders kept dry. Normal safe handling procedures must be used.

6. When disposing of chemicals ensure that no two chemicals are mixed.

Safety advice concerning the use of the equipment described in this manual or any relevant hazard data sheets (where applicable) may be obtained from the Company address on the back cover, together with servicing and spares information.

GETTING STARTED

This manual is divided into 5 sections which contain all the information needed to install, configure, commission and operate the COMMANDER 150. 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
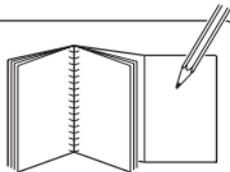- Electrical connections

Symbol Identification and Section Contents

CONTENTS

1 DISPLAYS AND FUNCTION KEYS

> i **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 COMMANDER 150 front panel display, function keys and LED indicators are shown in Fig. 1.1.

Display

Alarm LEDs
(secret-til-lit)

Function Keys

🖵	Parameter Advance
▲	Raise
▼	Lower
✱	Multi-function Key

Fig. 1.1 Front Panel Display, Function Keys and Indicators

3
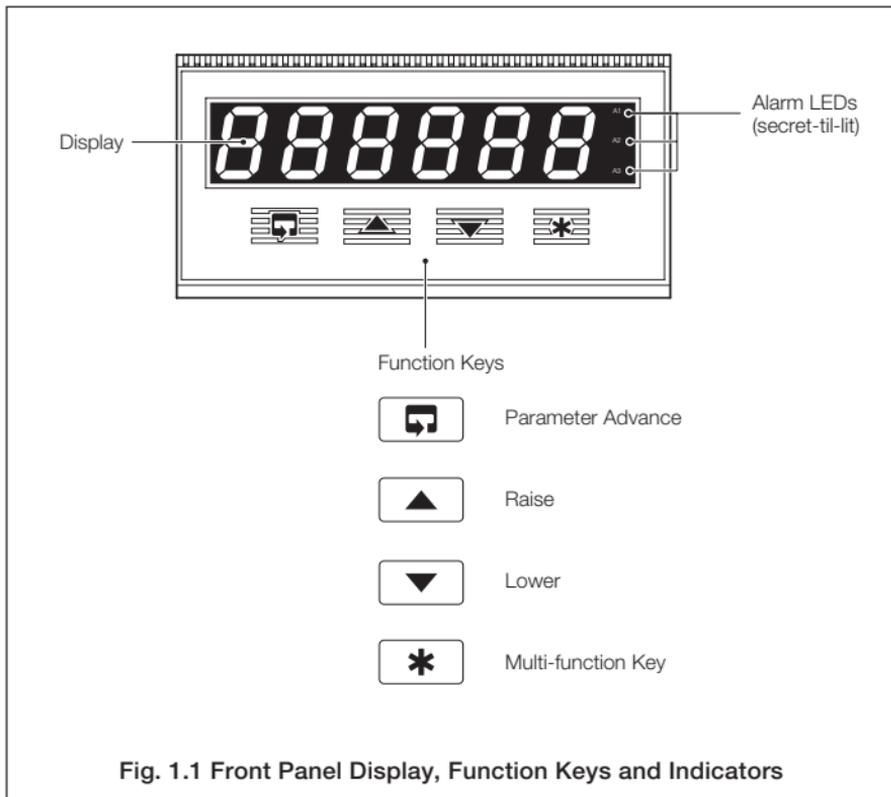
1.2 Use of Function Keys – Fig. 1.2

A – Raise and Lower Keys

Use to change/set a parameter value…

…move between levels

B – Parameter Advance Key

Frame 1 (top of level)

Frame 2

Use to advance to the next frame within a level…

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

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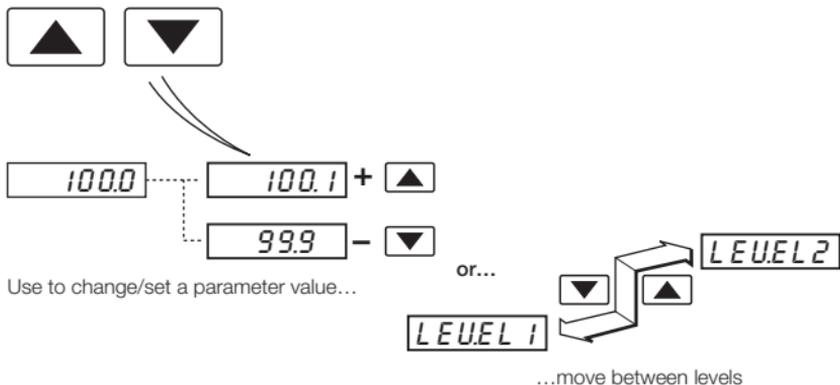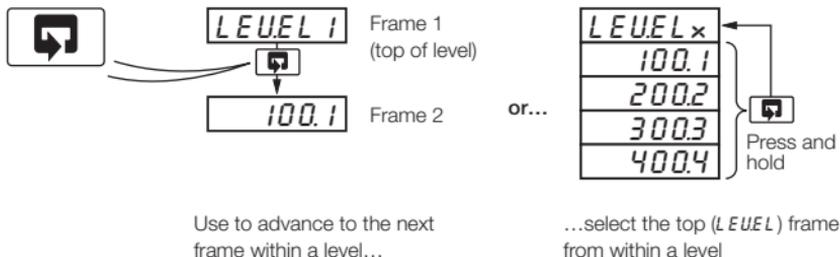
Note. This key also stores any changes made in the previous frame

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

4

1.3 LED Alarms and Indicators

LED   Status

All Flashing

• Indicator is in the configuration mode – see Section 4.2.

A1, A2 and A3

• Flashes 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

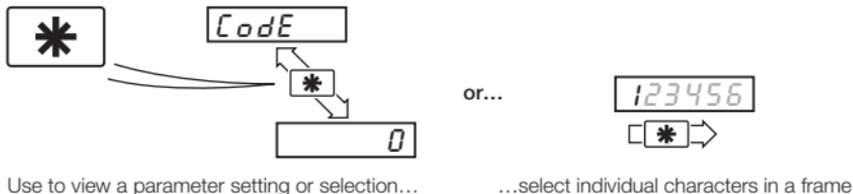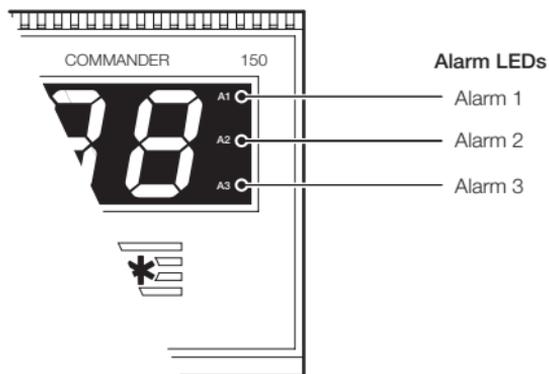| Display	Error/Action	To Clear Display
$CAL.Err$	**Calibration error** Turn mains power off and on again (if the error persists contact the Service Organization).	Press the ▲ key
$CFG.Err$	**Configuration error** The configuration and/or setup data for the instrument is corrupted. Turn mains power off and on again (if error persists, check configuration/setup settings).	Press the ▲ key
$A.d.\ Err$	**A to D Converter Fault** The analog to digital converter is not communicating correctly.	Turn power on and off again. If the error persists, contact the Service Organization
-9999	**Process Variable Over/Under Range**	Restore valid input
$O.Pt.Err$	**Option board error** Communications to the option board have failed.	Contact the Service Organization
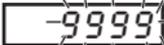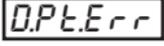
2 OPERATOR MODE

2.1 Introduction

Operator Mode (Level 1) is the normal day-to-day mode of the COMMANDER 150.

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)
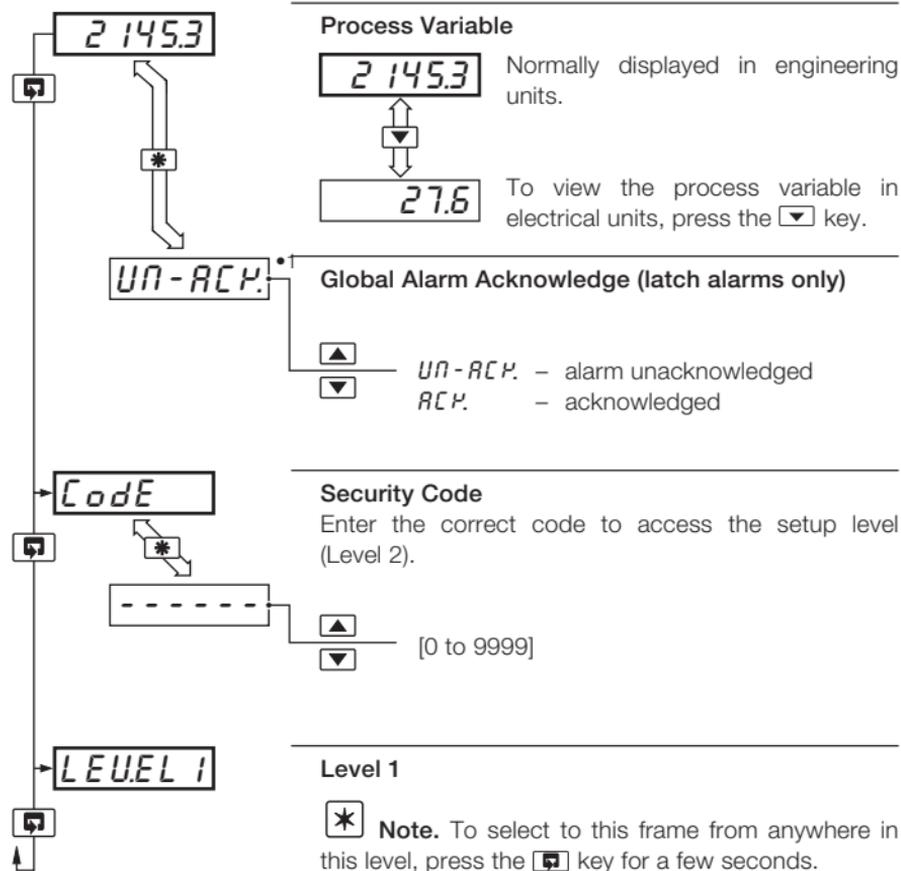
Process Variable

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 to this frame from anywhere in this level, press the ⟳ key for a few seconds.

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

8

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.

| `2145.3` •1 |
| `ACK.-n` |

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`).

| `123456` •1 |
| `rSt-n` |

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

9

…2.3 Operating Page – Totalizer (Level 1)

$$PrESEt$$

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

$$000000$$
Select Digit

▲ •1
▼

[000000 to 999999 flow units]

$$PrEdEt$$ •2

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.

$$999999$$
Select Digit

▲ •1
▼

[000000 to 999999 flow units]

$$CodE$$

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

$$------$$

▲
▼

[0 to 9999]

$$LEUEL$$

Level 1

✱ **Note.** To select to this frame from anywhere in this page, 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.
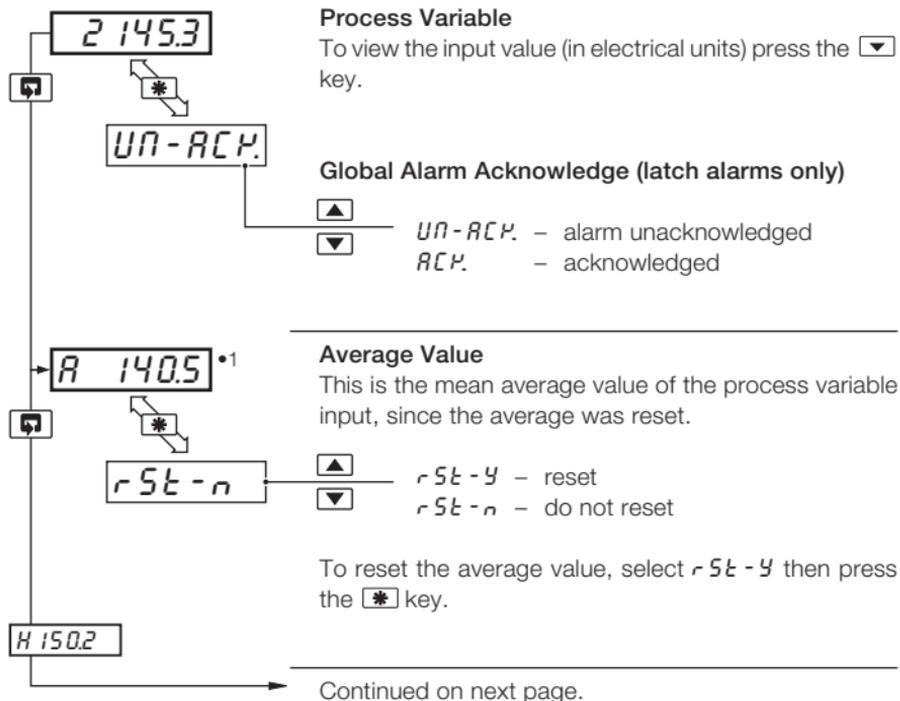
•2 Only displayed if enabled in the configuration level – see Section 4.3.3.

2.4 Operating Page – Maths Functions (Level 1)

✱ **Note.** It is possible to have totalizer and maths functions together.

| 2 145.3 |

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

| UΠ-ACϞ. |

Global Alarm Acknowledge (latch alarms only)

▲
▼
　UΠ-ACϞ. – alarm unacknowledged
　ACϞ. – acknowledged

| A 140.5 | •1

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.

| H 150.2 |

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.

11

…2.4 Operating Page – Maths Functions (Level 1)

$H\ 150.2$ •1	**Maximum Value** This is the maximum value of the process variable since the maximum was reset.
$rSt-n$	▲ / ▼ $rSt-y$ – reset $rSt-n$ – do not reset To reset the maximum value, select $rSt-y$ then press the ✱ key.
$L\ 130.8$ •1	**Minimum Value** This is the minimum value of the process variable since the minimum was reset.
$rSt-n$	▲ / ▼ $rSt-y$ – reset $rSt-n$ – do not reset To reset the minimum value, select $rSt-y$ then press the ✱ key.
$CodE$	**Security Code** Enter the correct code to access the setup level.
$------$	▲ / ▼ [0 to 9999]
$LEUEL\ 1$	**Level 1** ✱ **Note.** To select to this frame from anywhere in this page, press the ⊡ key for a few seconds.

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

The Max. and Min. values are reset automatically on power-up and can also be reset from a digital input – see Section 4.3.4.
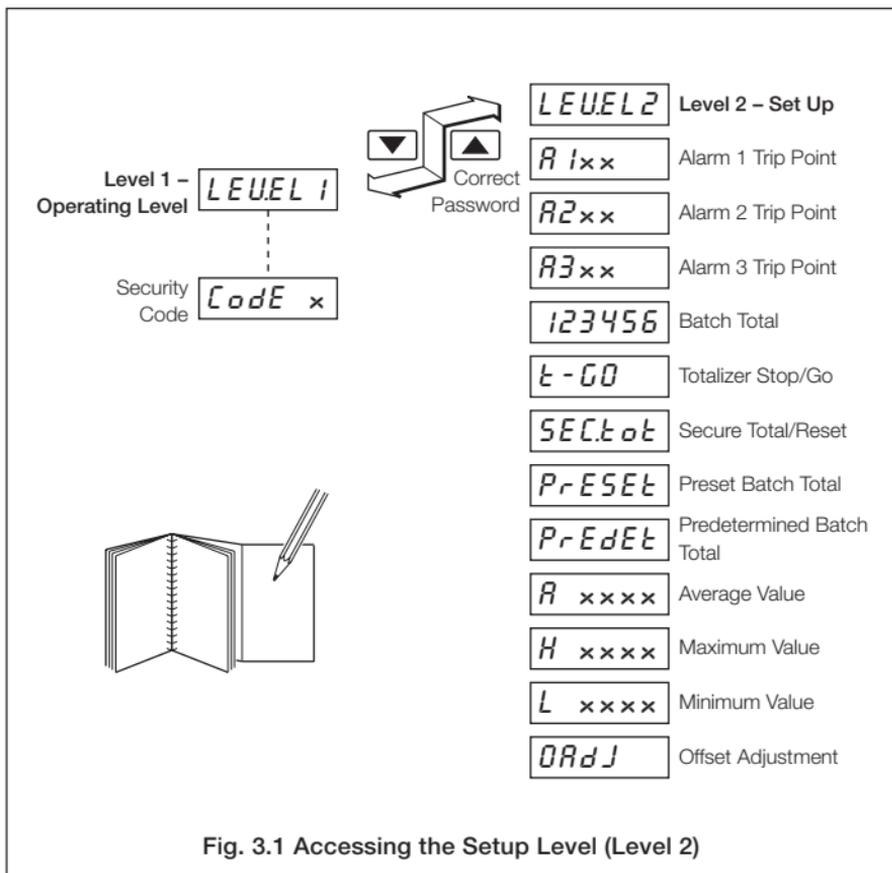
The reset reset function in this frame can be disabled – see Section 4.3.3.

12

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 Setup Level (Level 2)

The diagram shows:

- Level 1 – Operating Level: $LEVEL\ 1$
- Security Code: $CodE\ \times$
- Correct Password (via up/down arrows) leads to:
- $LEVEL\ 2$ — Level 2 – Set Up
- $A1\times\times$ — Alarm 1 Trip Point
- $A2\times\times$ — Alarm 2 Trip Point
- $A3\times\times$ — Alarm 3 Trip Point
- 123456 — Batch Total
- $t-GO$ — Totalizer Stop/Go
- $SEC.tot$ — Secure Total/Reset
- $PrESEt$ — Preset Batch Total
- $PrEdEt$ — Predetermined Batch Total
- $A\ \times\times\times\times$ — Average Value
- $H\ \times\times\times\times$ — Maximum Value
- $L\ \times\times\times\times$ — Minimum Value
- $OAdJ$ — Offset Adjustment

3.2 Setup Level (Level 2)

$LEUEL2$	**Level 2**
	$\boxed{*}$ **Note.** To select to this frame from anywhere in this level, press the $\boxed{\leftarrow}$ key for a few seconds.

$R\,1.hP$ •1
Alarm 1 Trip Point
Alarm type:
$R\,1.hP$ = High process alarm
$R\,1.LP$ = Low process alarm
$R\,1.hL$ = Latched high process alarm
$R\,1.LL$ = Latched low process alarm

100.1

$\boxed{\blacktriangle}$
$\boxed{\blacktriangledown}$ [In engineering units]

$R\,1.\,H95$ •2
Alarm 1 Hysteresis Value

12.5
$\boxed{\blacktriangle}$
$\boxed{\blacktriangledown}$ [In engineering units]

$R2.LP$ •1
Alarm 2 Trip Point
Alarm type

200.2
$\boxed{\blacktriangle}$
$\boxed{\blacktriangledown}$ [In engineering units]

$R2.\,H95$ •2
Alarm 2 Hysteresis Value

27.9
$\boxed{\blacktriangle}$
$\boxed{\blacktriangledown}$ [In engineering units]

$R3.hP$

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   Setup Level (Level 2)

$\boxed{R3.hP}$ •1	**Alarm 3 Trip Point** Alarm type	
$\boxed{3003}$	▲ ▼	[In engineering units]
$\boxed{R3 \ HYS}$ •2	**Alarm 3 Hysteresis Value**	
$\boxed{34.6}$	▲ ▼	[In engineering units]
$\boxed{123456}$ •3	**Totalizer Value**	
$\boxed{rSt-n}$ •4	▲ ▼	$rSt-y$ – reset $rSt-n$ – do not reset To reset the maximum value, select $rSt-y$ then press the ✱ key.
$\boxed{t-GO}$ •3	**Totalizer Stop/Go**	
$\boxed{t-StOP}$	▲ ▼	$t-GO$ – 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.
$\boxed{SEC.tOt}$	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)

$SEC.tOt$ •1	**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.
456789	**Total**
	Reset
$rSt-n$	$rSt-y$ – reset totalizer $rSt-n$ – do not reset totalizer To reset, select $rSt-y$ then press the ✱ key.
$PrESEt$ •2	**Preset Batch Total** This is the value the batch total is set to when it is reset.
000000	[000000 to 999999]
$PrEdEt$ •2	**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.
999999	[000000 to 999999]
$A140.5$	

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.

16

...3.2 Set Up Level (Level 2)

A 140.5 •1	**Average Value** This is the mean average value of the process variable input since the average was reset.
r $5k$ - n	▲ r $5k$ - y – reset ▼ r $5k$ - n – do not reset
	To reset, select r $5k$ - y then press the ✱ key.
H 150.2 •2	**Maximum Value** This is the maximum value of the process variable since the maximum was reset.
r $5k$ - n	▲ r $5k$ - y – reset ▼ r $5k$ - n – do not reset
	To reset, select r $5k$ - y then press the ✱ key.
L 130.8 •2	**Minimum Value** This is the minimum value of the process variable since the minimum was reset.
r $5k$ - n	▲ r $5k$ - y – reset ▼ r $5k$ - n – do not reset
	To reset, select r $5k$ - y then press the ✱ key.
$0.Ad$ J	**Offset Adjustment** An offset can be applied to the process variable input to enable spot calibration or the removal of system errors.
1.0	▲ [±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.

4.1 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 .
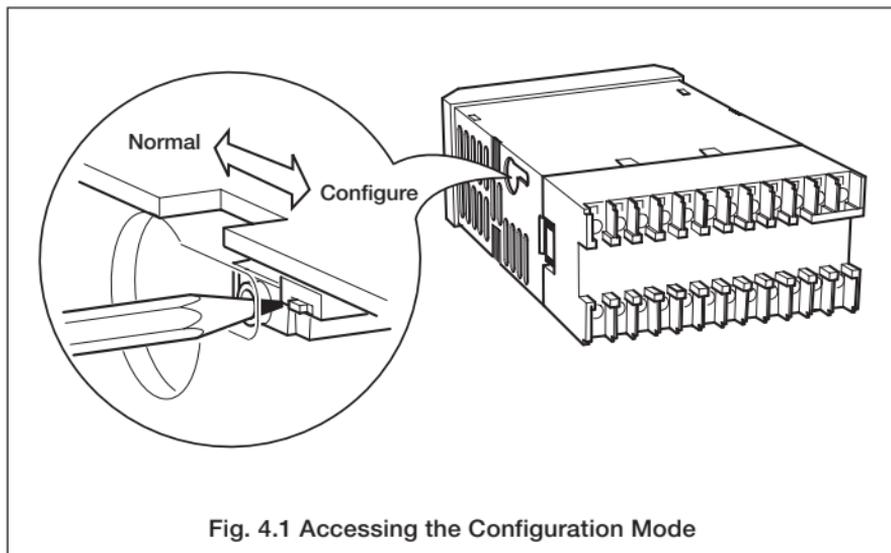
Fig. 4.1 Accessing the Configuration Mode
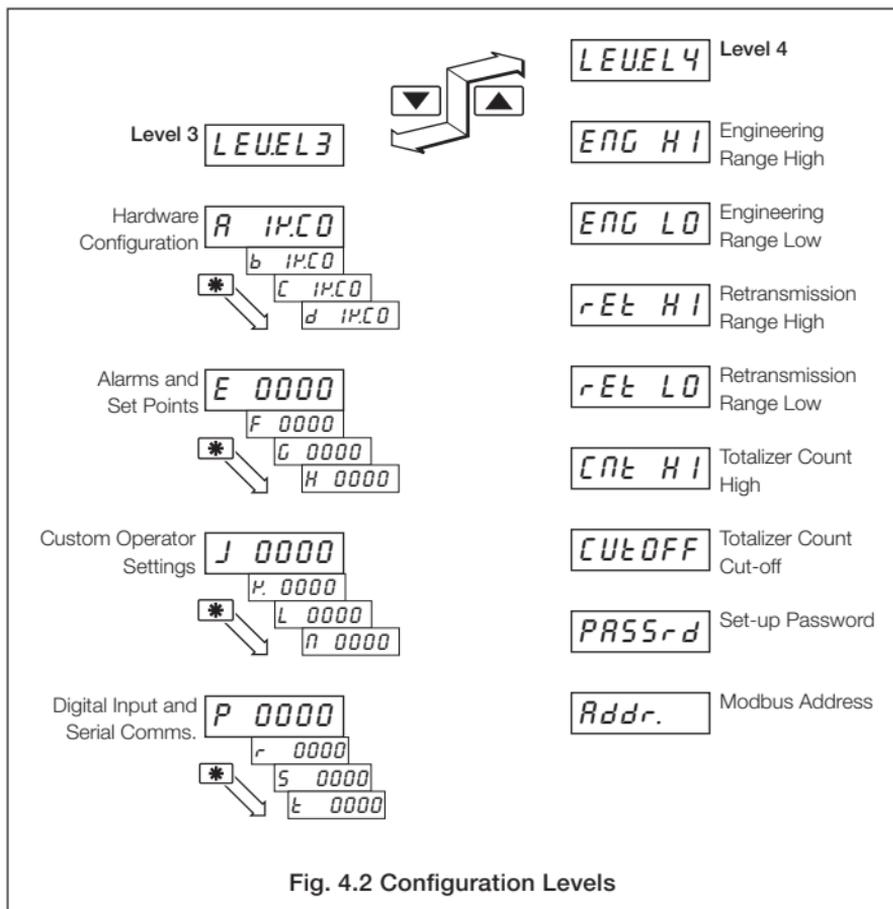
Fig. 4.2 Configuration Levels

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

4.3.1 Hardware Assignment and Input Type

$LEUEL3$
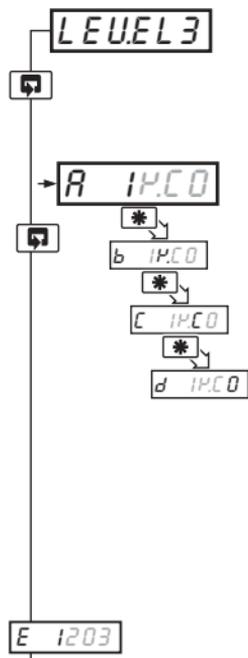
Level 3

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

$R \quad IP.CO$

$b \quad IP.CO$

$C \quad IP.CO$

$d \quad IP.CO$

'ABCD' Settings
The first character (R, 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.

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

$*$ **Note 1.** The temperature ranges default to their maximum values when the input type is changed.

$*$ **Note 2.** For custom settings contact the local distributor.

$E \quad I203$

---

i **Information.**

Count High Calculation

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

Count High $= \dfrac{\text{units/sec}}{\text{counter factor}}$ 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.

20

| `A` `IP.CO` | A – Hardware Configuration |

50Hz/60Hz		Relay 1 Source	Relay 2* Source	Relay 3* Source	Logic O/P Source	Analog O/P Source
`I`	`A`	Alarm 1	Alarm 2	Alarm 3	TCP**	PV
`2`	`b`	Alarm 1	Alarm 2	Alarm 1	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` `IP.CO` | B – Input Type and Range Configuration |

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

| `C` `IP.CO` | C – Temperature Units |

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

* Temperature inputs only

| `d` `IP.CO` | D – Process Variable Display Decimal Places |

Display	
`0`	xxxx
`I`	xxx . x
`2`	xx . xx
`3`	x . xxx
`4`	x . xxxx

Fig. 4.3 Hardware Configuration and Input/Output Ranges

21

4.3.2 Alarms – Figs. 4.4 and 4.5

$\boxed{*}$ **Note.** Relays assigned to alarms are de-energized in the alarm state.
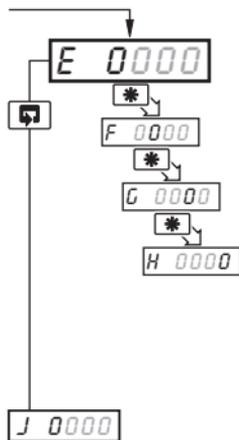
'EFGH' Settings

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

$\boxed{*}$ **Note.** For custom settings contact the local distributor.

$\boxed{i}$ **Information.**
For latch alarms the relay remains de-energized until acknowledged in Level 1 (or by a digital input).
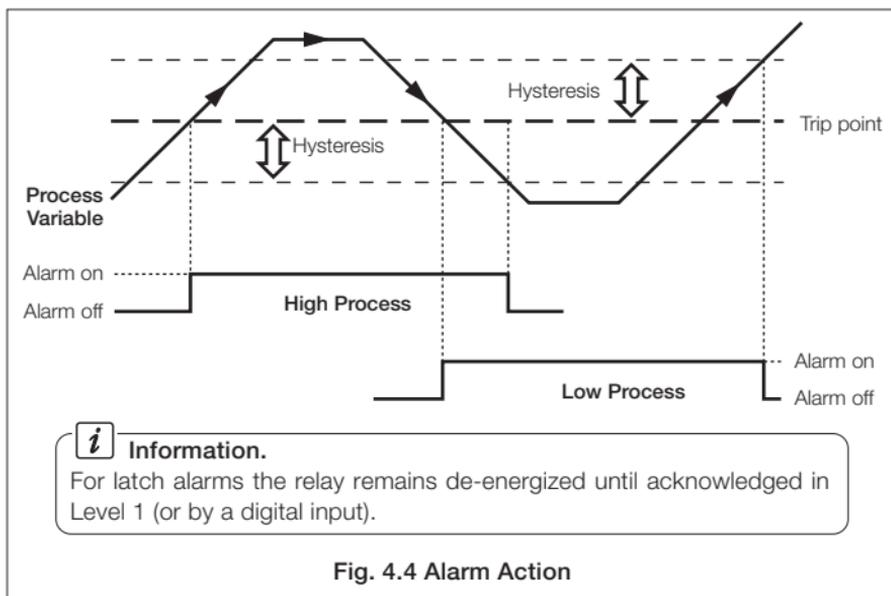
Fig. 4.4 Alarm Action

22

| E 0000 | E – Alarm 1 Type |

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

| F 0000 | F – Alarm 2 Type |

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

| G 0000 | G – Alarm 3 Type |

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

| h 0000 | 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 Setup

4.3.3 Operator Functions and Totalizer Set Up – Fig. 4.6
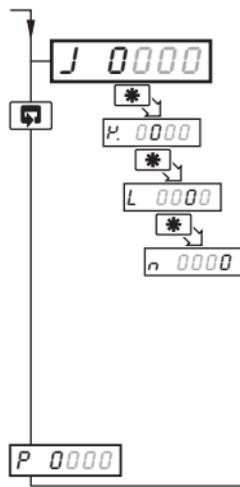
'JKLN' Settings

The first character (J, P, 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
- P = No. of decimal places for totalizer
- L = Operator level frame enable
- n = Operator level functions enable/disable

⭐ **Note.** For custom settings contact the local distributor.

24

J `0000`   **J – Totalizer Setup**

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

$P.$ `0000`   **K – Totalizer Display Decimal Places**

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

L `0000`   **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 `0000`   **N – Operator Level Math Function & Totaliser 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 Setup and Operator Functions

4.3.4 Digital Input and Serial Communications – Figs. 4.7 and 4.8
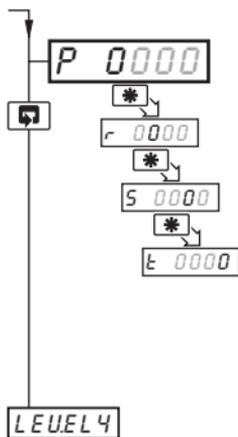
'PRST' Settings

The first character (P, r, 5 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
5 = Serial communications configuration
t = Serial communications parity

⁕ **Note.** For custom settings contact the local distributor.

1 Totalizer Reset — Reset

2 Totalizer Stop/Go — Stop / Go
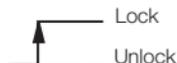
3 Average Max/Min Reset — Max / Min

4 Front Panel Lock out — Lock / Unlock

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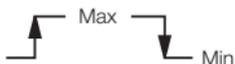
ℹ️ **Information.**
Digital input options 1, 2, 3 and 5 are edge-triggered to enable the front panel keys to change the function when the digital input is operational.

Fig. 4.7 Digital Function Configuration

26

| P 0000 | 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 0000 | 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 0000 | 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 0000 | 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 Configuration

27

4.4 Ranges and Passwords (Level 4)

Level 4

$\boxed{*}$ **Note.** To select to this frame from anywhere in this level, press the $\boxed{\Box}$ key for a few seconds.

Engineering (Display) Range

High Value

`ENG HI`

`100.0` •1 [–9999 to 99999]

Low Value

`ENG LO`

`0.0` •1 [–9999 to 99999]

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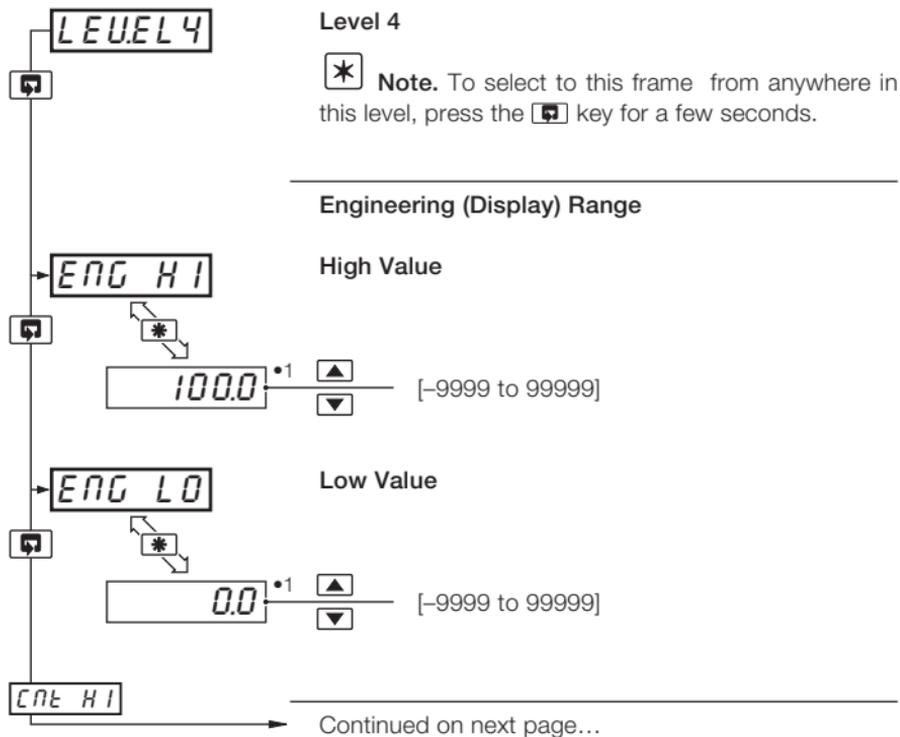
•1 The engineering range high and low values are automatically set to the maximum allowed value when thermocouple or RTD is selected in the configuration level – see Section 4.3.1. This value can be modified if required.

28

…4.4 Ranges and Passwords (Level 4)

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

High (20mA output)

`rEt HI`

`100.0` •1 [–9999 to 99999 (in engineering units)]

Low (4mA output)

`rEt LO`

`100.0` •1 [–9999 to 99999 (in engineering units)]

`Cnt HI`

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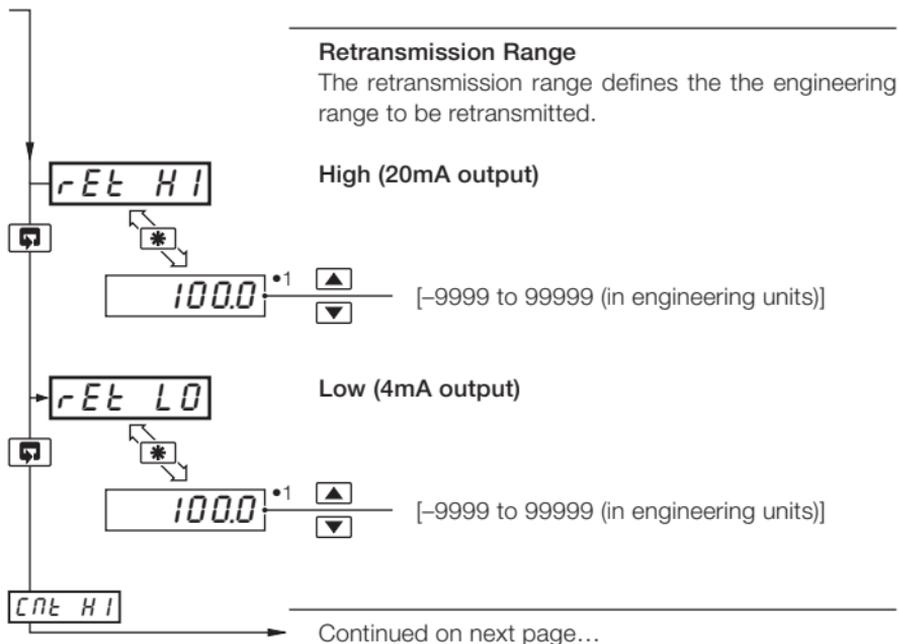
•1 The retransmission range high and low values are automatically set to the maximum allowed value when thermocouple or RTD is selected in the configuration level – see Section 4.3.1. This value can be modified if required.

29

…4.4 Ranges and Passwords (Level 4)

$\boxed{Cnt\ HI}$ •1	**Totalizer Count High**
	This frame determines the count corresponding to the full-scale input.
$\boxed{1.00}$ ▲▼	[0.000 and 99.999 pulses/second]

$\boxed{cut.oFF}$ •1	**Cut-off**
	This frame sets the lowest flow value at which the totalizer is to stop counting.
$\boxed{100.0}$ ▲▼	[In engineering units]

$\boxed{PASSrd}$	**Setup Password**
	This password enables access to the setup level (levels 2).
$\boxed{0}$ ▲▼	[0 to 9999]

$\boxed{Addr.}$ •2	**Modbus Address**
	This frame sets the Modbus address.
$\boxed{1}$ ▲▼	[1 to 99]
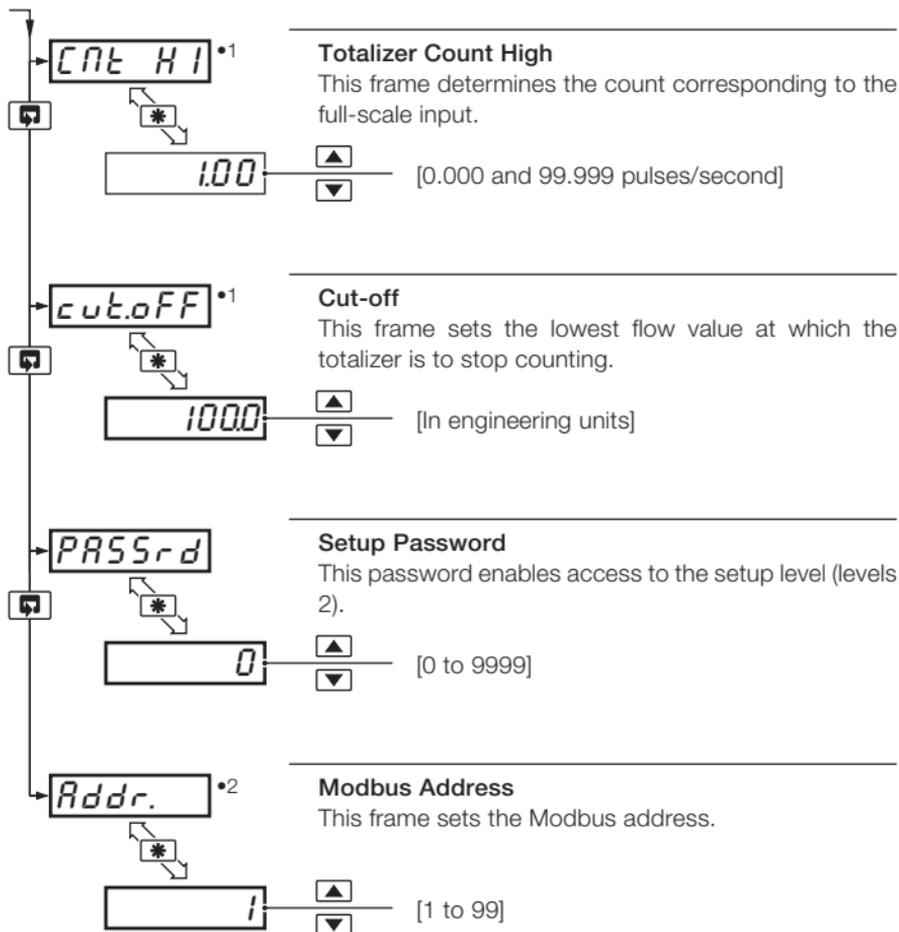
•1 Only displayed if enabled in the configuration level – see Section 4.3.3.

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

5 INSTALLATION

5.1 Siting – Figs. 5.1 and 5.2

Close to Sensor

At Eye Level

Avoid Vibration

Fig. 5.1 Siting – General Requirements
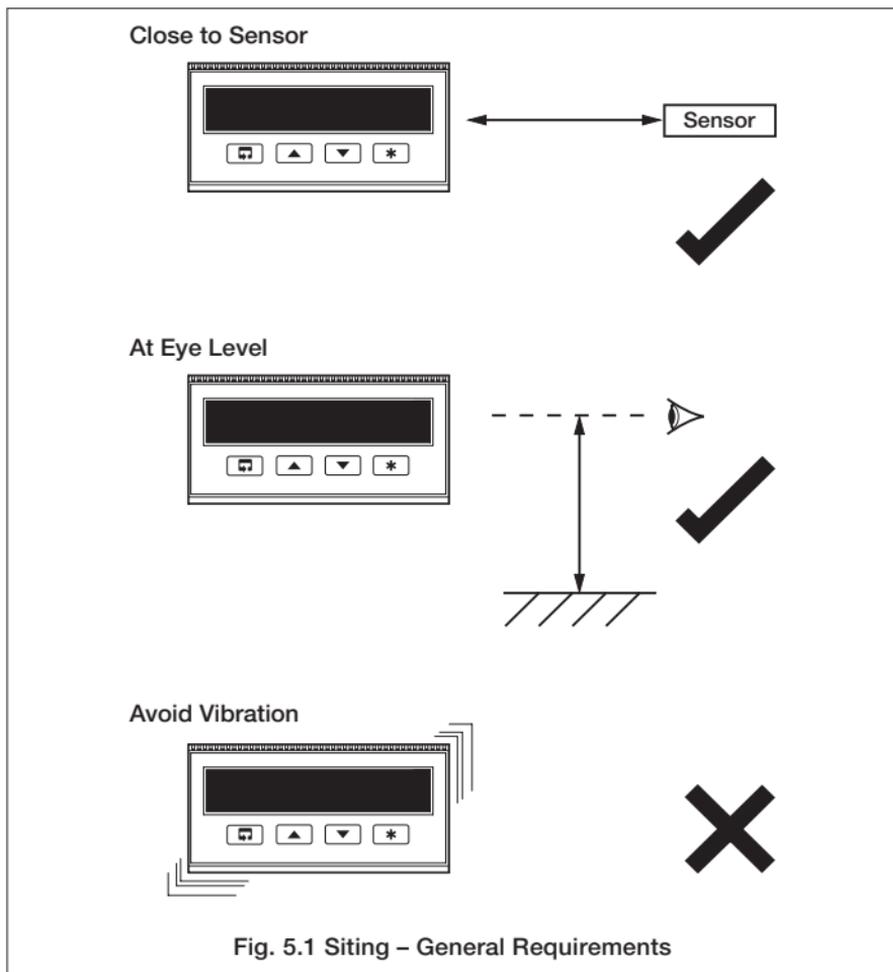
…5.1 Siting – Figs. 5.1 and 5.2

Temperature Limits
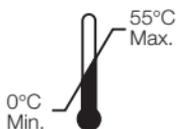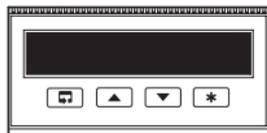
Humidity Limits
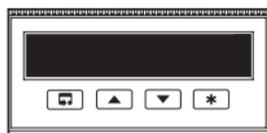
0 to 90% RH

Environmental Limits
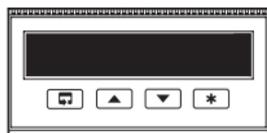
IP65/NEMA3
(front panel)

IP20
(rear)

Use Screened Cable
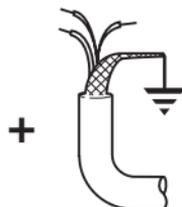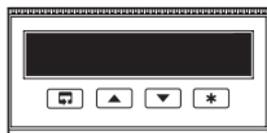
Fig. 5.2 Environmental Requirements

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

1. Cut a suitable hole in the panel (see Fig. 5.3)

2. Insert the instrument into the panel cut-out

3. Fit the retaining clamp over the instrument case

4. Push the retaining clamp firmly against the panel
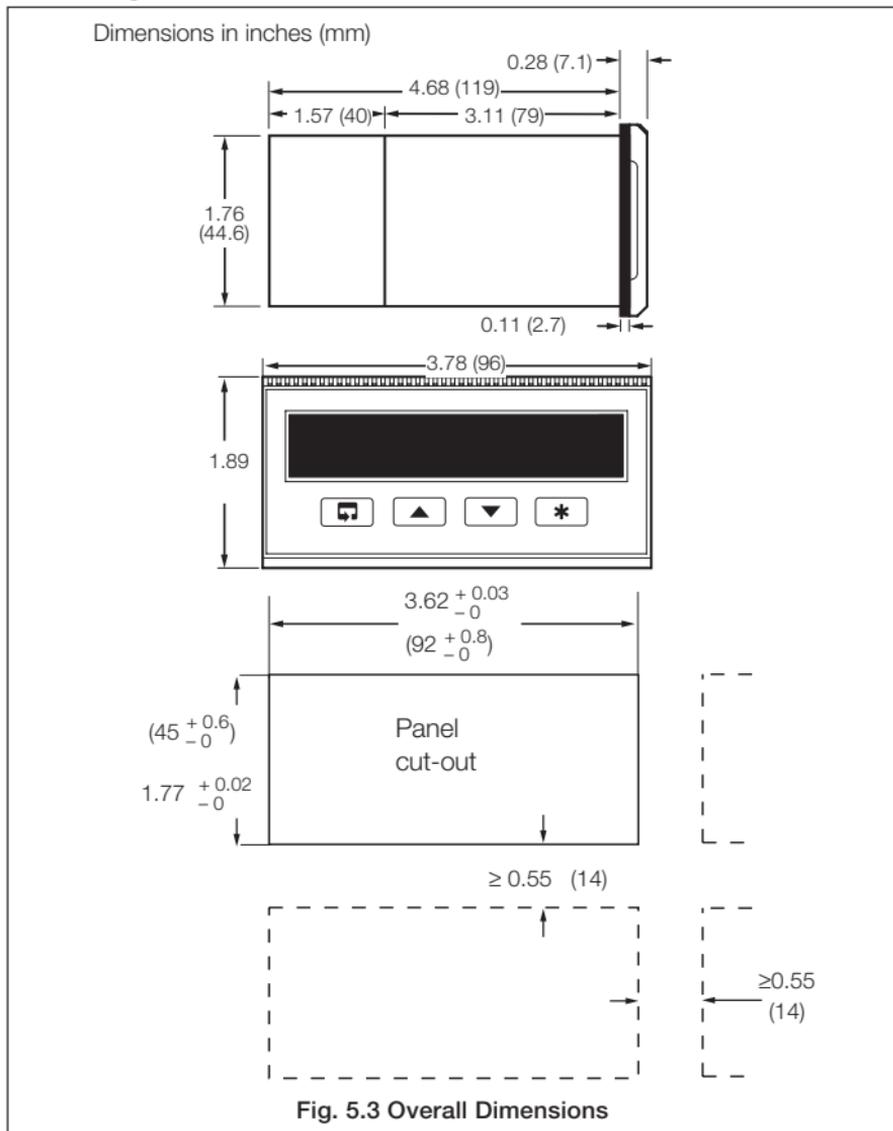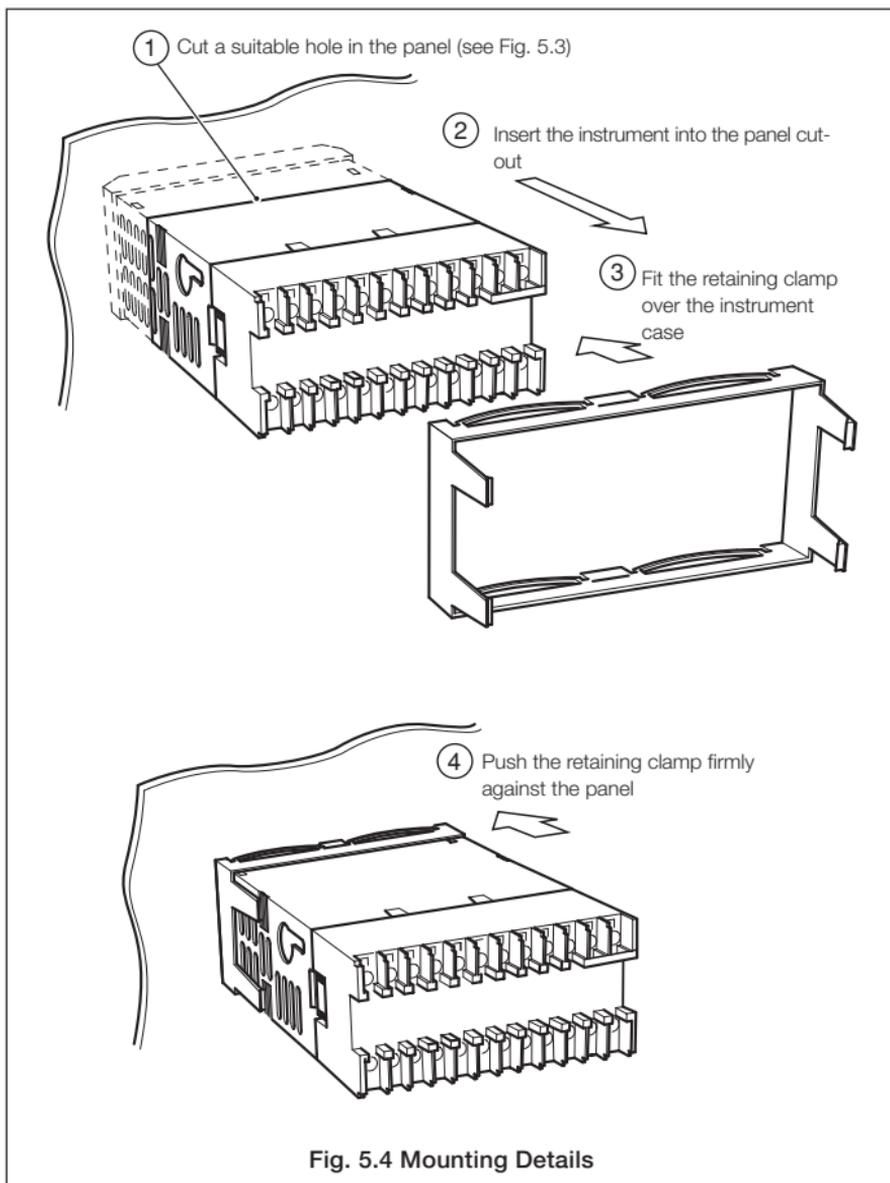
Fig. 5.4 Mounting Details

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 – Fig. 5.5 (overleaf)

⚠ **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 metal conduit must be used.

5.4 Relays, Arc Suppression, Inputs 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

Arc suppression components are fitted to relays 2 and 3 only. If relay 1 is required to switch inductive loads, fit the arc suppression components supplied.

5.4.3 Logic Output

18V DC at 20mA

Min load 900Ω

Isolated from Analog Input (not isolated from Retransmission O/P).

Dielectric strength: 500V d.c. for 1 minute.

5.4.4 Retransmission Analog Output

Max. load 15V (750Ω at 20mA)

Isolated from Analog Input (not isolated from Logic O/P).

Dielectric strength: 500V d.c. for 1 minute.

5.4.5 Digital Input

Type: Volt-free

Minimum Pulse: 250 ms
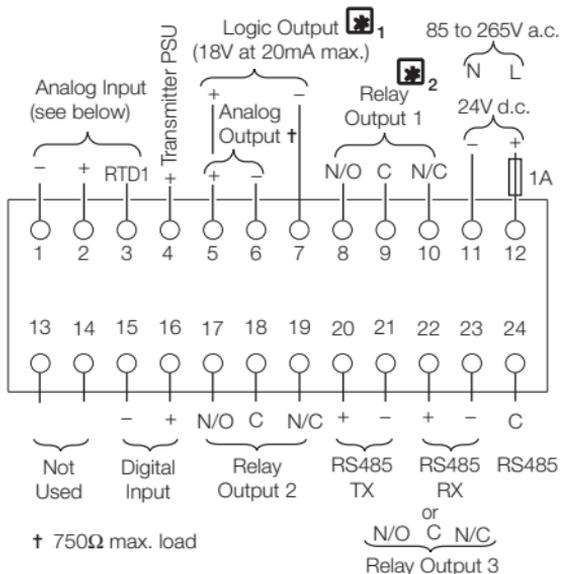
Note 1. The Analog Output and Logic Output use a common positive terminal, capable of driving both outputs simultaneously.

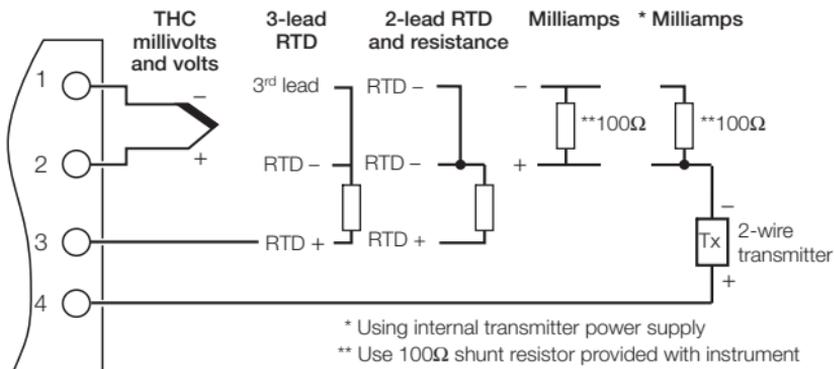**Note 2.** Fit arc suppression components if switching inductive loads.

† 750Ω max. load

* Using internal transmitter power supply
** Use 100Ω shunt resistor provided with instrument

Fig. 5.5 Electrical Connections

LEUEL 2	
A 1xx	_ _ _ _ _ _
A2xx	_ _ _ _ _ _
A3xx	_ _ _ _ _ _
xxxxx	
t-GO	_ _ _ _ _ _
SEC.tot	
PrESEt	_ _ _ _ _ _
PrEdEt	_ _ _ _ _ _
A xxxx	
H xxxx	
L xxxx	
ORdJ	_ _ _ _ _ _

LEUEL 1

_ _ CodE

Instrument Serial Number: _____

Product Code: C 1 5 0 / _ _ _ _/_ _ _
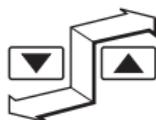
```
                                        LEUEL4
                                        
      ▼  ▲                               ENG HI  _ _ _ _ _ _
LEUEL3

                                        ENG LO  _ _ _ _ _ _
A IN.CO
A_ B_ C_ D_                             rEt HI  _ _ _ _ _ _

E 0000                                  rEt LO  _ _ _ _ _ _
E_ F_ G_ H_

J 0000                                  CNt HI  _ _ _ _ _ _
J_ K_ L_ N_

                                        CUtOFF  _ _ _ _ _ _
P 0000
P_ R_ S_ T_                             PASSrd  _ _ _ _ _ _

                                        Addr.   _ _
```

Customer Support

We provide a comprehensive after sales service via our Worldwide Service Organization. Contact one of the following offices for details on your nearest Service and Repair Centre.

United Kingdom
ABB Limited
Tel: +44 (0)1480 475321
Fax: +44 (0)1480 217948

United States of America
ABB Inc.
Tel: +1 215-674-6000
Fax: +1 215-674-7183

Client Warranty

Prior to installation, the equipment referred to in this manual must be stored in a clean, dry environment, in accordance with the Company's published specification. Periodic checks must be made on the equipment's condition.

In the event of a failure under warranty, the following documentation must be provided as substantiation:

1. A listing evidencing process operation and alarm logs at time of failure.
2. Copies of operating and maintenance records relating to the alleged faulty unit.

IM/C150   Issue 10

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