# TRACKER 211 Setup Guide
**(with addendum for Tracker 212)**



A Budget Priced Universal Input Panel Indicator
for Temperature and Process Measurement

Data Track

Celebrating 20 years, in the design and manufacture of innovative hardware and software products for the Telecommunication and Process Measurement Industries.

## TRACKER 200 SERIES

**Digital Panel Indicator Solutions for:**

| | |
|---|---|
| **Displacement** | **- T280, T260, T220, T210 Series** |
| **Temperature** | **- T232, T220, T210 Series** |
| **Frequency** | **- T280 Series** |
| **Totalising** | **- T280 Series** |
| **Weighing** | **- T240, T220, T210 Series** |
| **Pressure** | **- T250, T232, T220, T210 Series** |
| **Encoder** | **- T280 Series** |
| **Timing** | **- T280 Series** |
| **Flow** | **- T280, T220, T210 Series** |

**Ask your Tracker supplier for full details**

## DATA TRACK
## PROCESS INSTRUMENTS

# Contents

# Introduction

This Setup Guide describes how to install and configure your instrument.



**This instrument is 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 Electromagnetic Compatibility EMC.**

The instrument provides the following features as standard:

- Universal input for mV, mA, volt, thermocouple, RTD and resistance.
- 1 configurable alarm with relay output.
- 4 digit bright LED display.
- Transducer/transmitter supplies.
- <110mm behind panel depth (or 100mm without any options fitted).

The instrument provides the following features as options:

- Isolated 4 - 20mA scaleable retransmission output or isolated 0 – 10V retransmission output.
- Up to 2 additional alarms with relay outputs.
- Front panel keypad with function keys.

# Installation

To install your instrument, you will need to carry out the following steps:

- Apply the engineering units label to the right-hand side of the display panel. A sheet of labels covering the most commonly used engineering units is supplied with all units. If the unit you require is not on the sheet, a blank label is provided on which you can use LETRASET™.
- Install the instrument into a panel.
- Make connections to the instrument.

**PLEASE NOTE:**
- Ensure that the power to the instrument is switched off before carrying out any installation or maintenance work.
- It is recommended that all connections to the terminals are made using ferrules to afford greater reliability and to prevent short circuits between adjacent terminals.
- Avoid installing 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 screen earthed at one point only.

## Panel Mounting

The instrument is supplied with an installation kit consisting of a mounting clamp, a panel sealing gasket and terminal connectors.

Ensure that there is sufficient space behind the instrument panel - the instrument requires a depth of 100mm (110mm when any options are fitted) plus enough space to allow safe routing of cables.

To install the instrument:

1. Make panel cut-out with the dimensions as shown overleaf. Panel thickness from 1.5mm to 9.5mm can be accommodated.
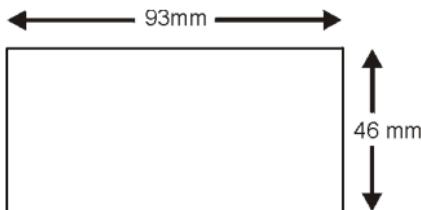
2.  Fit the rubber seal by slipping it over the unit from the rear of the box and pushing it forwards until it sits behind the front lip of the unit.

3.  Insert the instrument into the panel from the front, pushing it through as far as the front lip, to ensure correct seating of the rubber seal between the panel and the unit.

4.  Working from behind the panel, take the mounting clamp, slide over the rear of the instrument and push forwards.

5.  Continue to push the clip forward until the ratchet operates and the clamp is sufficiently compressed to apply adequate pressure on the panel.
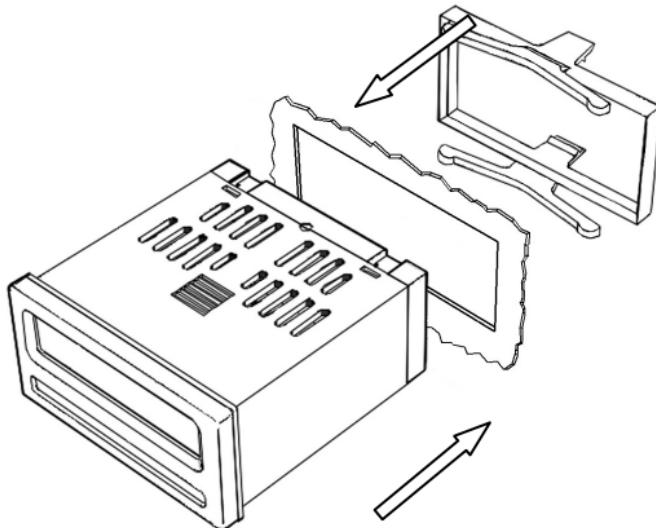
# Connections

The diagram below shows the rear panel terminal connection arrangement.
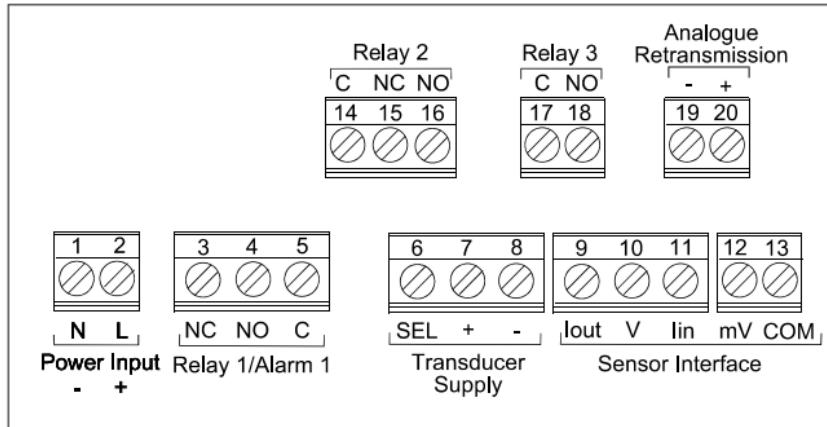


**Rear Panel Terminal Connections**

Ensure the power supply is connected to Terminals 1 & 2 (marked N & L).

# Connecting the Sensor

**Thermocouple/mV**

12    13

+        −
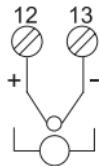
**Resistance & RTD Measurements**

9    10    11    12    13

**Current (±20mA)**

9    10    11    12    13

+

Source

**2-wire 20mA Transmitter**

6    7    8    9    10    11    12    13

+    −              +    −

24V
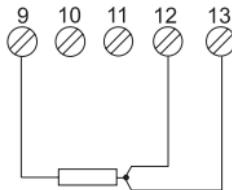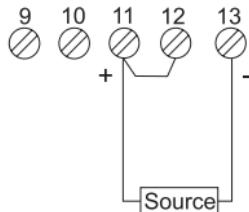
20mA
Transmitter

+                −

**Voltage Measurement**

9    10    11    12    13

+                −

Source

**Bridge Measurement**

6    7    8    9    10    11    12    13

+    −                    +    −

10V Excitation

**Potentiometer**

6    7    8    9    10    11    12    13

+        −

10V Excitation
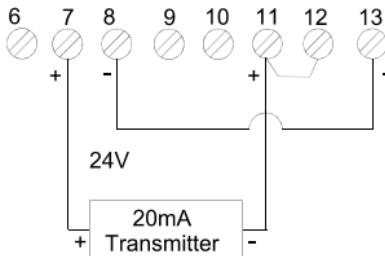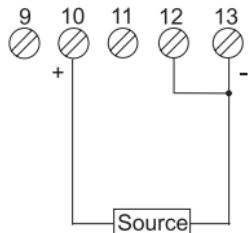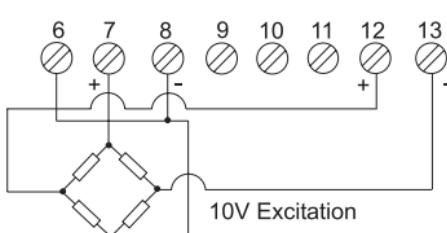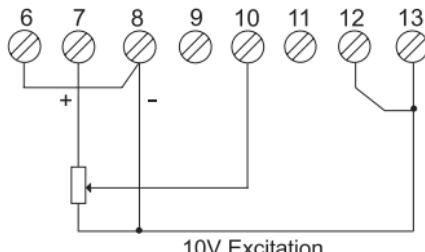
**Transducer Supply**

6    7    8              6    7    8

+    −              +    −

10V              24V
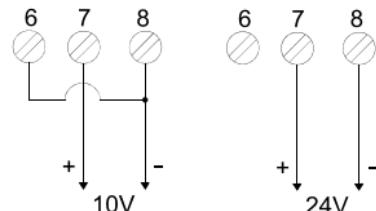
# Powering the Instrument

**THERE ARE 2 SUPPLY VARIANTS**: a mains supply variant and a low voltage supply variant. The instrument is designed to operate from either an AC supply with voltages in the range 90 to 230V AC 50/60Hz mains supply or from a DC supply with voltages in the range 24 to 32V DC (20 to 30V AC) 50/60Hz low voltage supply with a maximum power consumption of 20VA when all outputs are fully loaded and the display has all segments illuminated.

The diagrams below show how the instrument should be connected to the mains supply. Isolation should be provided by a double pole switch and a time delay 200mA fuse.

**WARNING - The instrument is 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. Application of supply voltages higher than those for which the instrument is intended may compromise safety and cause permanent damage.**

**Recommended Mains Supply Connections**



Live (~)
Neutral

90 - 230V AC
50/60Hz
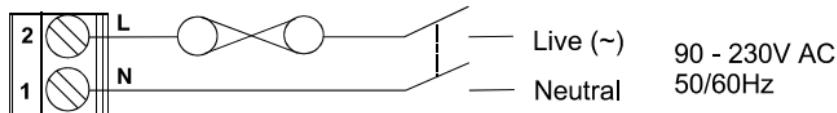
**Recommended Low Voltage Supply Connections**



+ −

24V AC or DC
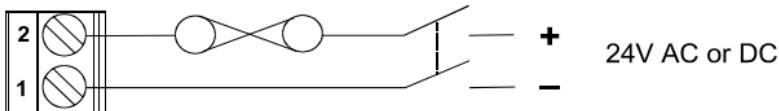
**BEFORE POWERING UP THE INSTRUMENT, check the model label on the underside of the instrument for the supply variant, eg. MAINS OR LOW VOLTAGE.**

# Operator Functions

These functions are only available on units which have the front panel push buttons.

## Operator/Configuration Mode - Key Functions

From the normal runtime display*:*

⏎ **Enter** - Accesses the setup menus.

▣ **Next** - Scrolls forward through the setup menus.

△ **Up** - Function Key 1 (see page 17).

▽ **Down** - Accesses the alarm setpoint(s). Use the **Next** Key for viewing and the **Enter** Key for editing.

✱ **Star** - Function Key 2 (see page 17).

**NOTE:** Units which have the front panel push buttons are externally configurable. Units which do not have front panel push buttons are internally configurable (see page 9).

# The Setup Menus



**Next** **Enter**

**Behind the Front Panel**
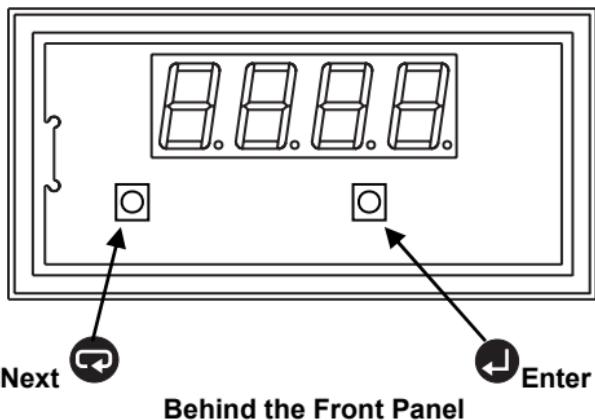
The instrument uses a single level menu structure. The menu system lists *parameters* (eg. *inPt*, *unit*, *dP*, etc.), each of which leads to a list of configurable instrument *options* (eg. the parameter *inPt* leads to the options *mV*, *mA*, *VoLt* etc.).

To enter the setup menus:

1.  Remove the front cover by pushing the extraction tool into the gap below the bezel and then pulling the tool forward to unclip the bezel as shown in the diagram below.
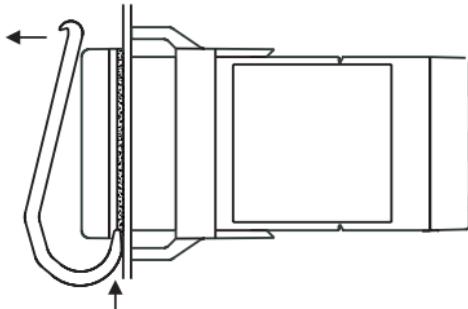


**Removing the Bezel with the Extraction Tool**

2.   Press and hold down the **Enter** Key for approximately 3 seconds until the display begins to flash.

3.   Press the **Next** Key and the flashing display should be replaced with the message *inPt* (the first menu parameter).

4.   To cycle through the menu parameters, press the **Next** Key repeatedly.

5.   To view a menu parameter, press the **Enter** Key and the current option for that parameter will be displayed.

6.   To cycle through all of the available options for a parameter, press the **Next** Key.

7.   Press the **Enter** Key to select the required option.

8.   a)   **Editing a Setting**

Some parameters are setup by selecting from a list of options (eg. the parameter *unit* has 3 options: *°C*, *°F* and *EnG*).

The following example will show you how to edit a parameter. We will change the decimal places (labelled *dP*) from 1 to 2.

- With the unit displaying the measured value, press and hold down the **Enter** Key for approximately 3 seconds until the display begins to flash.
- Press the **Next** Key and the flashing display should be replaced with the message *inPt* (the first menu parameter).
- Press the **Next** Key repeatedly until *dP* is displayed.
- Press the **Enter** Key and *nnn.n* will be displayed.
- Press the **Next** Key and the decimal point will move and *nn.nn* will be displayed.
- Press the **Enter** Key to save this setting and exit. When the **Enter** Key is pressed, the display will return to the menu parameter, ie. *dP*.
- Press the **Next** Key repeatedly to scroll through the rest of the menu parameters until the measured value display is restored.

## b) **Editing a Value**

Other parameters are changed by editing a value (eg. the parameter *HdSP* has a default numeric value of [*100.0*]).

Press the **Next** Key to edit the flashing digit and the **Enter** Key to select the next digit for editing.

The following example will show you how to edit a numeric value. We will change the high display value (labelled *HdSP*).

- With the unit displaying the measured value, press and hold down the **Enter** Key for approximately 3 seconds until the display begins to flash.
- Press the **Next** Key and the flashing display should be replaced with the message *inPt* (the first menu parameter).
- Press the **Next** Key repeatedly until *HdSP* is displayed.
- Press the **Enter** Key and *100.0* will be displayed (with the least significant digit flashing).
- Press the **Next** Key to scroll through digit values *0* to *9* and edit the least significant digit.
- To move to the next most significant digit, press the **Enter** Key and the digit will flash.
- Repeat the previous 2 steps until the left most significant digit is flashing.
- Press the **Next** Key to scroll through digit values *-1*, *-* and *0* to *9*.
- If the value allows the *dP* position to be moved, the *dP* will flash. To move the *dP* position, use the **Next** Key.
- Press the **Enter** Key to save this value and exit. When the **Enter** Key is pressed and the left most significant digit is flashing, the display will return to the menu parameter, ie. *HdSP*.
- Press the **Next** Key repeatedly to scroll through the rest of the menu parameters until the measured value display is restored.

# Configuration Menu Map

① ②

AL 1 → HigH | LoW | nonE

SP-1 → 100.0

hY-1 → 0.1

rEL1 → FLSE | truE

⋆1 AL 2 → HigH | LoW | nonE

⋆1 SP-2 → 100.0

⋆1 rEL2 → FLSE | truE

⋆1 hY-2 → 0.1

⋆2 AL 3 → HigH | LoW | nonE

⋆2 SP-3 → 100.0

⋆2 hY-3 → 0.1

⋆2 rEL3 → FLSE | truE

⋆3 A100 → 100.0

⋆3 A0 → 0.000

⋆4 KEY1 → nonE | zEro | tArE
               HigH | LoW | rSEt

⋆4 KEY2 → nonE | zEro | tArE
               HigH | LoW | rSEt

dFLt

⋆1 If Relay 2 is fitted
⋆2 If Relay 3 is fitted
⋆3 If analogue output is fitted
⋆4 If keypad fitted
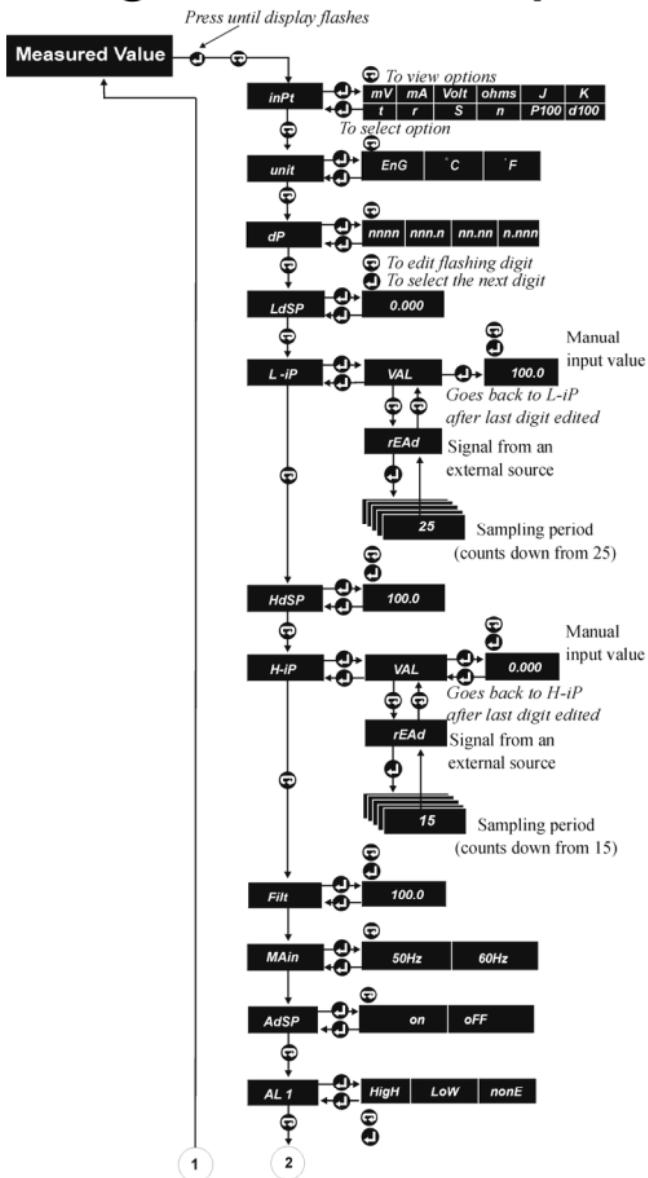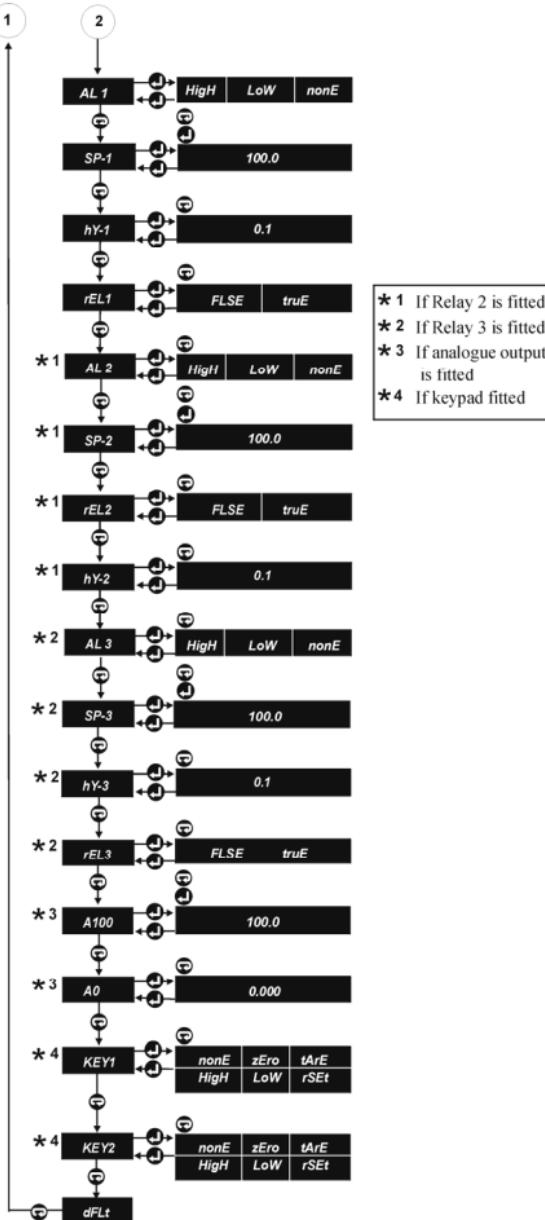
# Menu Options

**Input** *Default: mV*

**inPt** Allows the input type and range to be defined. There are 12 ranges for temperature measurement available. When a thermosensor range is selected, ie. **J**, **K**, **t**, **r**, **S**, **n** or RTD, the instrument will automatically set the appropriate scaling in ºC.

## Engineering Units *Default: Eng*

**unit** Allows the user to define the units of measurement to be displayed in **ºC**, **ºF** and **Eng** (linear engineering units).

## Decimal Position *Default: 1*

**dP** Defines the position of the decimal point for the display; **0** or **1** for thermocouples/RTD and **0** to **3** for process inputs.

## High and Low Display Values *Default: Low = 000.0, high = 100.0*

**HdSP** **LdSP** The low display value **LdSP** is used for scaling purposes when combined with the other scaling parameters **L-iP**, **HdSP**, and **H-iP**. These 4 parameters can scale the measured input to any engineering units as long as the relationship between the displayed units is linear. **LdSP** is used to define the value to be displayed for an input defined by **L-iP**. **HdSP** is used to define the value to be displayed for an input defined by **H-iP**.

## High and Low Input Values

**H-iP** **L-iP** Correspond to the signal output values from the sensor which will cause the instrument to display the values set as **LdSP** and **HdSP**. **L-iP** and **H-iP** can be input in mV, V, mA etc.

**VAL** **rEAd** There are 2 methods of setting the low and high input values, either by manually entering a signal value using the **VAL** option or by sampling the sensor output using the **rEAd** option. Values entered manually are entered in the same way as other numeric values (see **Editing a Value** page 11). The value to be entered will usually be supplied with the data accompanying your sensor. However, if it is not available, the output from the sensor may be **rEAd** from an external

source by the instrument. When performing a *rEAd* input as part of the scaling process, the sensor must have the corresponding physical value applied. This may be pressure, weight, temperature etc. The instrument will sample the output from the sensor and save this as the *L-ip* and *H-iP* scaling parameters.

A example of scaling:   0 - 100 mV = 0 -1000 (psi)
                        *LdSP* = 0     *L-iP* = 0 (mV)
                        *HdSP* = 1000 *H-ip* = 100.0 (mV)

## Display Filtering                                            *Default: 000*
**Filt**   This parameter is used to apply a digital filter to the display value. The filter is defined in seconds which approximate to the time constant. This parameter would be used to damp out any effects from noisy signals.

## Mains Frequency                                           *Default: 50Hz*
**MAin** Set to the mains frequency dependent on the local mains supply.

## Alarm Messages Display                                    *Default: On*
**AdSP** Enables display alarm messages when set to *on* or disables messages when set to *oFF*.

**NOTE:** Alarm 3 has the highest priority for messages and Alarm 1 has the lowest.

## Alarm 1 Mode                                             *Default: None*
**AL 1** Defines whether Alarm 1 is disabled when to set to *nonE* or operates as a high or low alarm.

**AL 2**  **AL 3**  As Alarm 1 if Alarms 2 and 3 fitted.

## Alarm Setpoint 1                                      *Default: 100.0*
**SP-1** Defines the alarm setpoint for Alarm 1 in display units.

**SP-2** **SP-3** As Alarm Setpoint 1 if Alarms 2 and 3 are fitted.

## Hysteresis 1                                          *Default: 0.1*
**hY-1** Specifies the size of a band around an Alarm Setpoint within which the measured value may fluctuate without the alarm state changing. It is in the same engineering units as the displayed value and the Setpoint. The hysteresis value defines both the *on* and *oFF* hysteresis.

*on* hysteresis: For a high alarm it is the value (in engineering units) above the setpoint beyond which the alarm is turned on. For a low alarm, it is the measured value below the setpoint beyond which the alarm is turned on.

*oFF* hysteresis: For a high alarm it is the value (in engineering units) below the setpoint beyond which the alarm is turned off. For a low alarm, it is the measured value above the setpoint beyond which the alarm is turned off.

The default hysteresis value for all alarms is 0.1.

**hY-2** **hY-3** As Hysteresis 1 if Alarms 2 and 3 are fitted.

## Relay 1                                               *Default: True*
**rEL1** Defines the operation of Relay 1, which can be in either the energised alarm state (*truE*) or the de-energised alarm state (*FLSE*).

**rEL2** **rEL3** As Relay 1 if Alarms 2 and 3 are fitted.

## A100                                                  *Default: 100.0*
**A100** Defines the display value which corresponds to 20mA or 10V from the optional analogue retransmission.

## A0                                                    *Default: 0.0*
**A0** Defines the display value which corresponds to 4mA or 0V from the optional analogue retransmission.

## Key 1
`KEY1` On units fitted with the front panel buttons, the following functions may be assigned to either or both function keys: zero, tare, display high (maximum) or low (minimum) value since last reset or reset of the high and low values to the current measured value. See **Default** (below) for related information.

## Key 2
`KEY2` As for Key 1.

## Default                                              *Default: Off*
`dFLt` Allows the instrument to be returned to its factory supplied setup.

**NOTE:** On a 211 with front panel keys, defaulting the unit removes the Key1 and Key2 options from the setup menu. Immediately after defaulting the unit, press either one of the function keys (up-arrow or star) to restore these options.

# Messages

**`brk`** The input circuit, when measuring mV, thermocouple or RTD, has detected an open circuit sensor connection. When a sensor break is detected by the instrument, the measured value will be forced upscale causing any high alarms to be activated.

**`undr`** **`oVEr`** Displayed when the measured value goes out of its allowed range, either outside the normal range of the connected thermosensor or the maximum/minimum display range for the decimal places set.

## Alarm Messages

Alarm messages are 3 letters followed by the alarm number. The codes are:

**`HiA1`** **`HiA2`** **`HiA3`** High alarm. Eg. *HiA3* indicates high Alarm 3 has been activated.

**`LoA1`** **`LoA2`** **`LoA3`** Low alarm.

**NOTE:** Alarm 3 has the highest priority for messages and Alarm 1 has the lowest.

# Configuring User Linearisation from the keypad
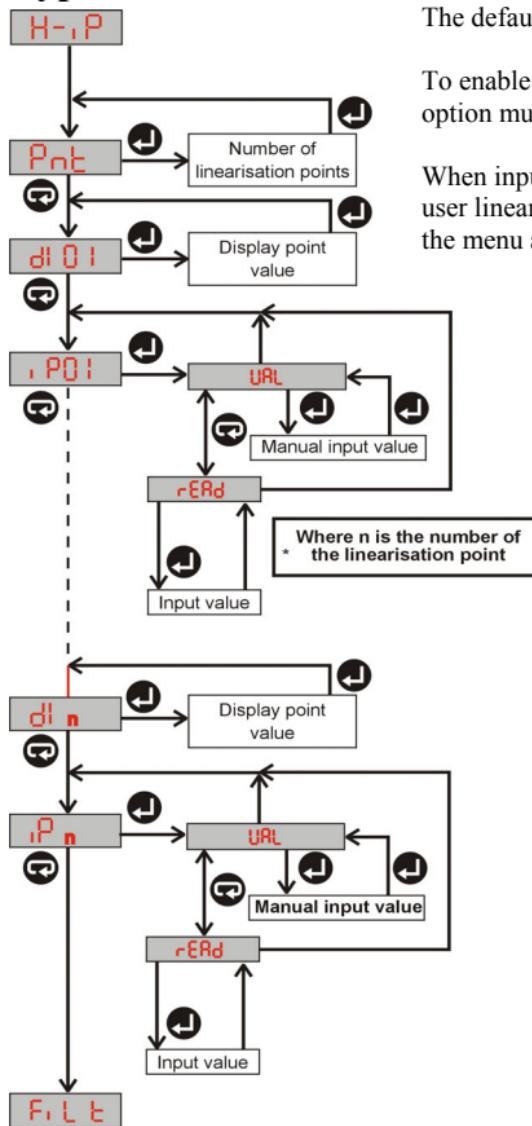
The default input type is ULIN

To enable user Linearisation the ULIN option must be set in the Input menu.

When input is configured as ULIN the user linearisation options will appear in the menu as shown here.



Where n is the number of the linearisation point

## Number of Points

| Pnt |

This parameter defines the number of user linearisation points to be used. This may range from 2 to 24.  2 points will define a linear scale. The number of points defined will determine how many display and input settings will be displayed, for example when the points option is set to 15, the highest display and input values accessible will be *di15* and *iP15.*

### Display Values

| di01 | to | di24 | Defines the value to be displayed at the corresponding input for the point. Together di01 and iP01 define point 1 similarly di02 and iP02 define point 2 etc. A display value may be entered as any value within the displayable range as dictated by the decimal point position.

### Input Values

| iP01 | to | iP24 | Defines the inputs signal level corresponding to the displayed value for the point. Input values are entered directly in mA and represent the output from the Sensor. The input mA value can be entered via the keypad using the VAL option, or the instrument can measure and store the input signal using the read function.

When using the read function to configure the input value ensure that the transmitter is correctly connected and set to output the correct signal level. Note: It is not possible to configure the unit with two input points of the same value either from the menus or the communications interface.

The main user scaling settings (H-iP, Hdsp, L-iP and Ldsp) will further scale the user linearization input points. This may be used to correct for known transducer characteristics (e.g zero offsets) or correct for a change in Specific Gravity if head pressure is used to measure liquid height/ level. The default global scaling has a gain of 1 with no zero offset.

# Example Application



| Level Signal | Tank Content/ Volume |
|---|---|
| 19.45mA | 12000 Litres |
| 17.53mA | 11600 Litres |
| 16.23mA | 10600 Litres |
| 14.4mA | 8600 Litres |
| 12.78mA | 6000 Litres |
| 11.05mA | 3500 Litres |
| 9.22mA | 1500 Litres |
| 7.55mA | 450 Litres |
| 5.4mA | 150 Litres |
| 4.04mA | 0 Litres |
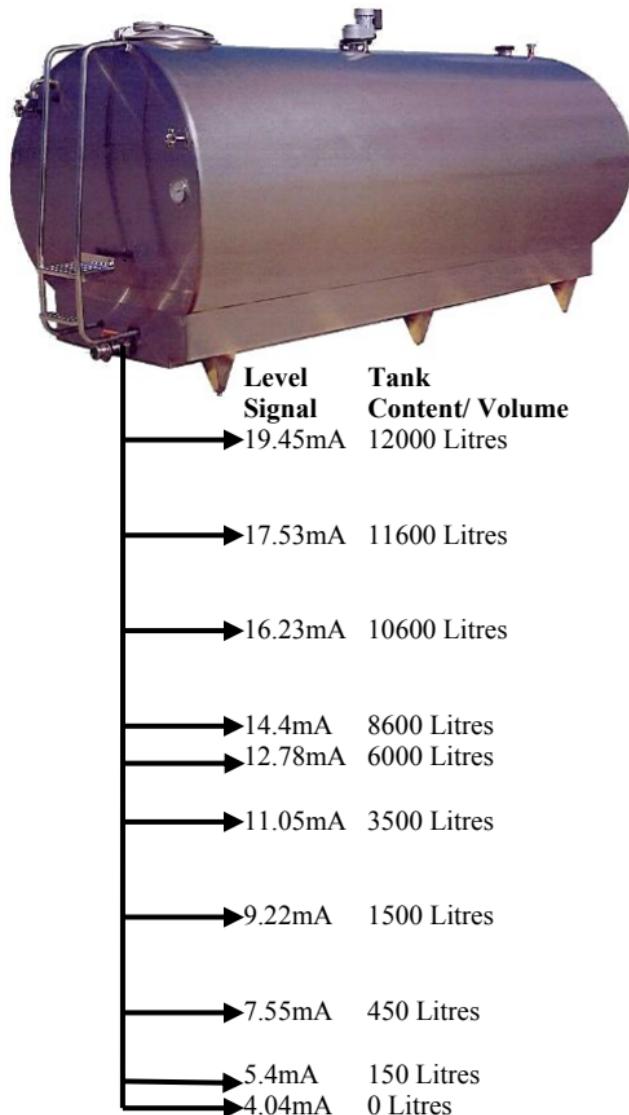
# Example Application
## Linearisation Parameter Values

| Points | 10 | | |
|--------|------|-------|-------|
| Display | Litres | Input | mA |
| dI01 | 0 | iP01 | 4.04 |
| di02 | 150 | iP02 | 5.4 |
| di03 | 450 | iP03 | 7.55 |
| di04 | 1500 | iP04 | 9.22 |
| di05 | 3500 | iP05 | 11.05 |
| di06 | 6000 | iP06 | 12.78 |
| di07 | 8600 | iP07 | 14.4 |
| di08 | 10600 | iP08 | 16.23 |
| di09 | 11600 | iP09 | 17.53 |
| di10 | 12000 | iP10 | 19.45 |

# PC configuration (300-Conf & Software)

The (300-Conf) configuration cable connects from your PC's RS232 serial interface to a jack socket on the rear of the instrument. If your PC is not equipped with a RS232 interface then a USB to RS232 converter cable is required. The configuration software is available free from your distributor or www.datatrackpi.com (downloads section).

> The configuration cable is not isolated to the input signal when it is plugged into the instrument. Check that high voltages are not present on the input signal.
>
> Care should be taken to ensure the jack plug does not touch any live terminals at the rear of the instrument.