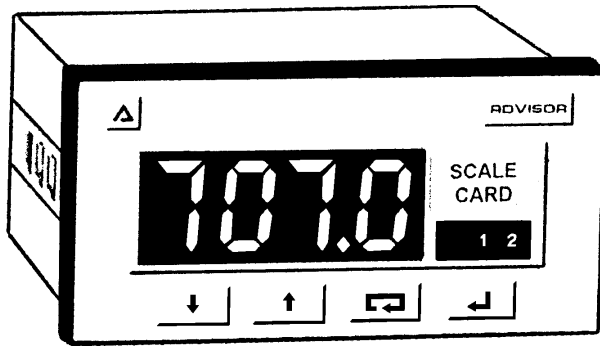


Instruction Manual For Advisor A70

*Economical
Digital Panel Meter (mV, V, mA and A input)*



Features

- Wide Choice of Factory Set Inputs (8 Voltage and 7 Current Inputs)
- 4 Digit Display
- Adjustable Brightness
- 24Vdc, 115Vac & 230Vac Models
- High Accuracy (0.05%)
- Reliable
- Maximum and Minimum Hold
- IP65 Front IP20 Rear
- Easy Clean Membrane Buttons
- Button Disable Function (Anti-tamper)
- Password Protection
- Plain Language Programming Menus
- Optional Transducer Power Supply (user selectable output voltage (5,10,12 or 15Vdc)
- Optional Transmitter Power Supply (24Vdc)
- Optional Dual Alarm Relays, Latching or Non-Latching, High or Low, Delays and Acknowledgement (Changeover 5A rated)
- Optional Analogue 4-20mA Re-transmission
- Optional Tare Function (Weighing Applications)

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1) Unpacking

The packaging for your Advisor A70 includes:

- 1) An Advisor A70 digital panel meter
- 2) A pair of panel mounting clips
- 3) A neoprene sealing gasket
- 4) Full set of connector blocks
- 5) A set of self-adhesive engineering unit labels
- 6) This instruction manual

Check your unit against the above parts list to make sure that nothing has been lost or damaged in transit. Keep the packing box. If in the unlikely event you need to return the Advisor, this will be useful. If any parts are missing or damaged, please contact your supplier.

2) Safety and Warnings

The Advisor A70 has been designed and tested in accordance with the EU directive (73/23/EEC) for Low Voltage (LVD) apparatus and the EU Directive (89/336/EEC) for Electromagnetic Compatibility (EMC). Copies of the certificate of compliance and test reports are available on request.

It should be noted that the instrument is a panel mounted meter and after installation only the front panel is intended for general operator access. Installation must be completed by authorised and qualified personnel.

To ensure safe operation/installation the following warnings must be observed.



CAUTION:

Risk of electric shock



CAUTION:

Read instructions prior to installation and operation.

- **Before installing the meter, ensure the marked rated voltage agrees with the actual power supply voltage.**
- **A safety earth must be connected to a conductive panel into which the meter will be installed. A safety earth must be connected with the AC mains supply to the instrument. (If applicable)**
- **Do not expose the rear of the meter to rain or condensing humidity.**
- **Do not use the meter in a flammable or explosive atmosphere.**

3) Introduction

The Advisor A70 digital panel meter is one of a family of Advisor panel meters. The A70 has been designed specifically to display voltage or current process signals in engineering units. It is a microprocessor based instrument and is consequently easy to use. The A70 is factory set to accept one of a range of input types e.g. 4/20mA. Once set, the input can not be changed. (The Advisor model A75 has a user programmable input). The power supply is also selected at the time of ordering. Each Advisor has a display brightness control and max & min hold already included in the internal software.

There are also several other options that can be included with an Advisor including;

- Dual Alarms
- Analogue Output (4-20mA)
- Transducer power supply output (user selectable)
- Transmitter Power Supply (24Vdc @22mA)
- Internal Calibrator
- Root Extractor
- Tare Function (for weighing applications)

The Advisor has been designed for reliability in harsh environments. The front of the panel meter is rated with an ingress protection of IP65. The programming buttons on the front of the Advisors are sealed membrane type allowing the unit to be kept clean by hosing or wiping down.

4) Electrical Specification

Power Supply

10 to 35Vdc
99 to 132Vac 50/60Hz or
198 to 264Vac 50/60Hz

Power Consumption

4W Max.

Input Range

(factory set to one of the following)
0-100mV, 0-200mV, 0-500mV, 0-1V, 0-2V, 0-5V, 1-5V,
0-10V, 0-20mA, 4-20mA, 0-50mA, 10-50mA, 0-0.5A,
0-1A and 0-2A

Input Impedance

Voltage input > 1 MOhms (0-100mV and 0-200mV >10 MOhms)
Current input < 10 ohms

Isolation

500Vrms between input, power supply and any optional accessory outputs.

Accessories (fitted at factory)

Alarms (Dual)

Single pole changeover contact rated at 250V; 5A ac and 30V;5A dc.

Transmitter Power Supply

24Vdc @ 22mA short circuit protected

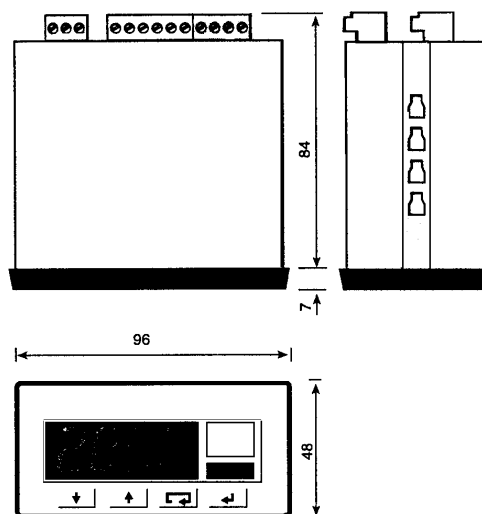
Transducer Supply Output

Selectable output 5,10,12 or 15Vdc @ 22mA, short circuit protected. Drift < 100ppm/°C

Analogue Output (4-20mA)

500 Ohms load max.

5) Dimensions



Recommended panel cut-out: (dimensions in mm)

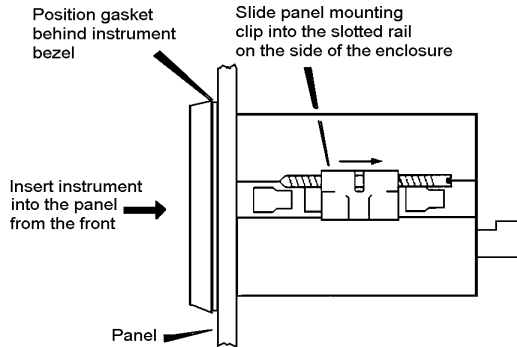
DIN43 700. 92.0+0.8/-0.0 x 45+0.6/-0.0

To achieve an IP65 seal between the instrument and the panel
90.0 +0.5/-0.0 x 43.5 +0.5/-0.0

6) Installation

To install your Advisor, follow the installation procedure as outlined below.

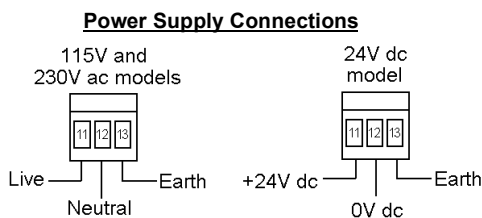
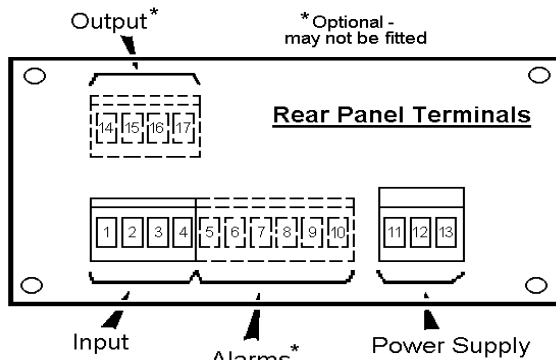
- Insert the instrument into the panel opening from the front.



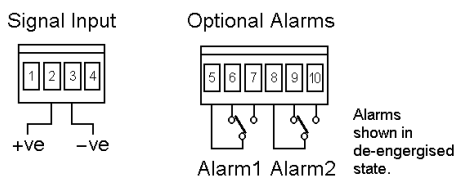
- Fix the two panel mounting clips to opposite sides of the instrument and tighten until the instrument is secure.
- Connect the panel wiring to the rear terminal blocks.

7) Electrical Connections

All connections to the instrument are made using high quality two part PCB connectors with screw clamp terminals (which accept cables between 0.5 and 1.5mm² in diameter). This makes installation and removal much easier.

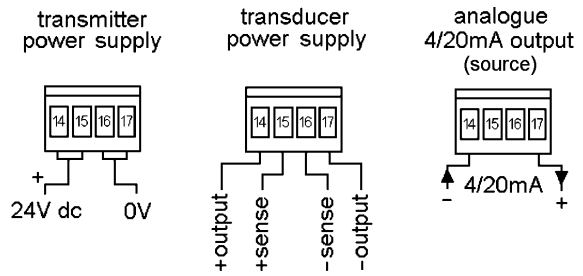


Signal Input and Optional Alarm Connections



NOTE: Alarm terminals may carry up to 240Vac

Optional Output Connections



8) Setting Up

8.1 General

The Advisor panel meters are set up using the four front panel pushbuttons. Parameters are accessed using a menu which may be protected by a user programmable password.

It is possible to disable the pushbuttons to stop any tampering by unauthorized personnel. If the anti-tamper pushbutton disable function has been switched on, you will need to regain "local" control by following the key press sequence as outlined in section 8.7





8.2 Button Functions – In Programming Mode

To enter programming mode, press the scroll and return buttons together.

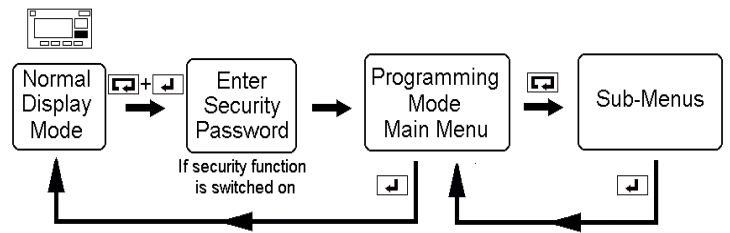


When the instrument is supplied, the security access password is set to "0000". If this password hasn't been changed, then the operator is given immediate access to the programming mode. If the password has been changed, then the operator will need to enter the new password before being able to access programming mode.

In Programming Mode, the pushbuttons have the following functions;

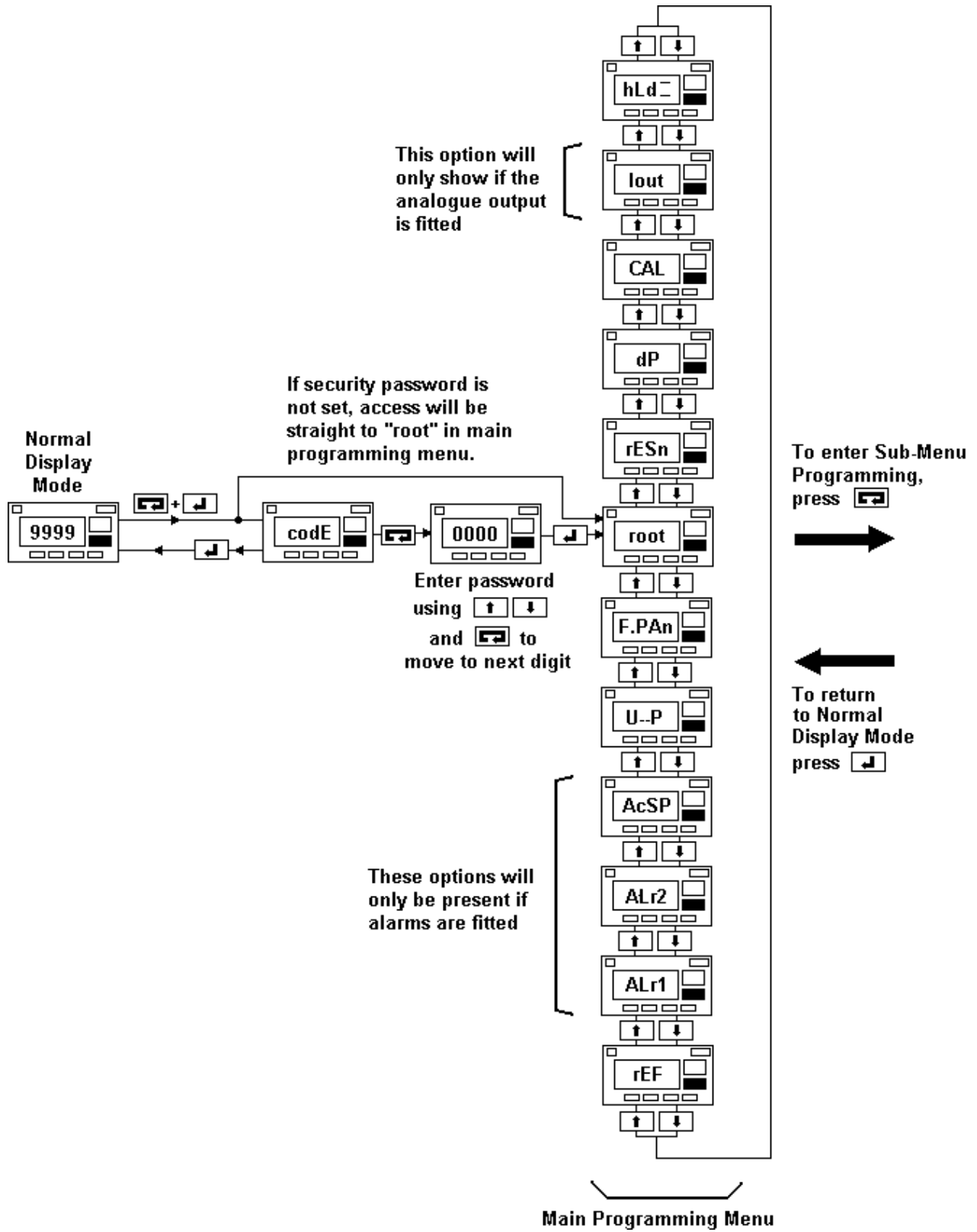
-  Decreases a setting/variable or moves to the previous menu option. This button is referred to as the "down button"
-  Increases a setting/variable or moves to the next menu option. This button is referred to as the "up button"
-  Select a menu option or "scroll into" next menu option. This button is referred to as the "scroll button".
-  Confirm variable selection or return to previous menu option or exit programming mode. This button is referred to as the "return button".

8.3) General Programming Structure



The above flow chart gives a general overview of the programming structure for an Advisor. The key point to remember is that if you ever get lost or unsure of what function you are programming, keep pressing the return button and eventually you will get back to the normal display mode.

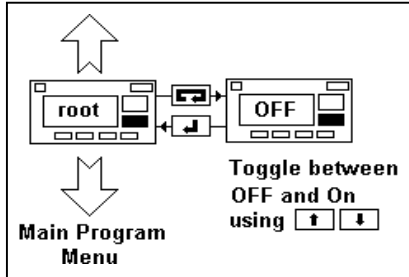
8.4) Main Programming Menu Flowchart



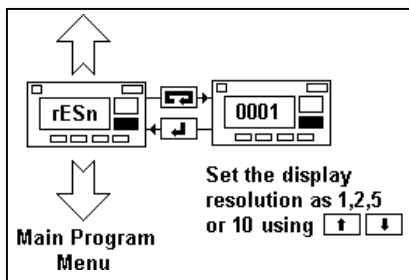
8.5) Sub Menu Programming

The "Sub-Menu" Programming allows the operator to enter the variables and functions required.

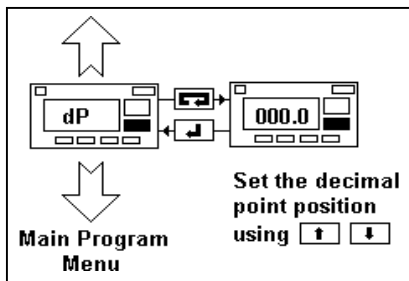
8.5.1) "root" – Square Root Extractor. This function allows the square root linearising function to be enabled or disabled. This in turn allows the output from a sensor with an exponential output signal (e.g. a differential flowmeter) to be displayed in linear form.



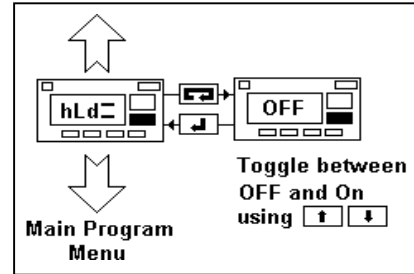
8.5.2) "rESn" - Display Resolution. This function selects the resolution of the least significant display digit. It may be set to 1,2,5 or 10. This function can be useful if the source signal is noisy. E.g. setting a display resolution to 5 would mean the display only increases or decreases in steps of 5 digits, thus "smoothing" the display.



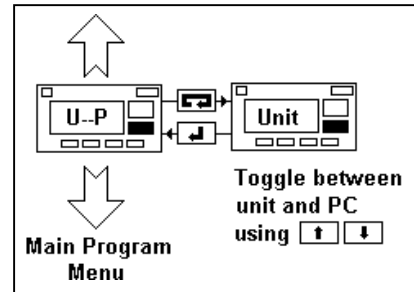
8.5.3) "dP" - Decimal Point. This function allows the decimal point position to be selected.



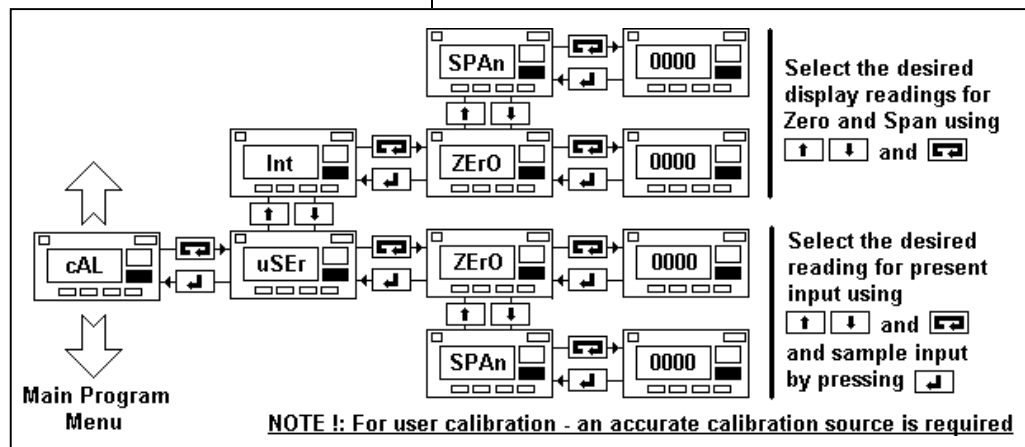
8.5.4) "hLd" - Max and Min Hold. Whether this parameter is set to "On" or "OFF", the maximum and minimum display is always being monitored and stored in the max/min register. In Normal Display Mode with the parameter set to "On", the maximum and minimum can be displayed (by pressing the up and down buttons) and reset (by pressing the up and down buttons together). The maximum and minimum values are lost if there is a power failure.



8.5.5) "U--P" - Display Units or Percentage. In Normal Display Mode, the scroll button can be programmed to give one of two readings, either the actual signal input in its own units or the percentage of span reading. The "units" function will be incorrect if the internal references have not been set. See section 8.5.7)



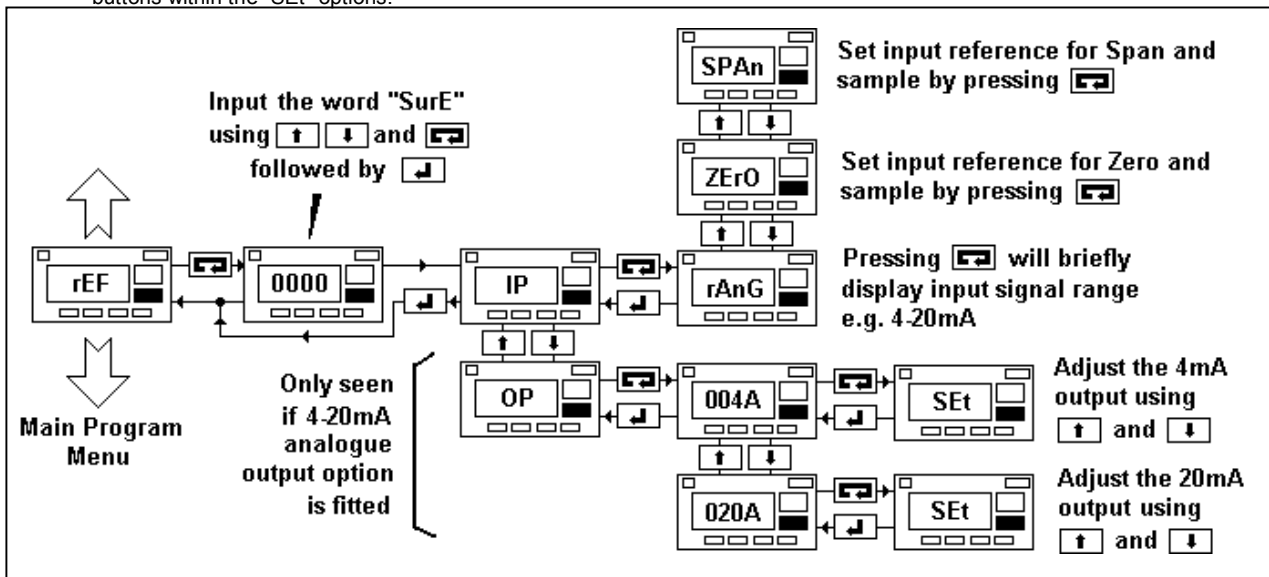
8.5.6) "CAL" - Calibration - internal or external source. For a quick calibration, use the "int" (internal) calibration function. The Advisor allows the "zero" and "span" readings (display range) to be entered. The accuracy of this method is dependent on the accuracy of the internal references set under the "rEF" menu. (See section 8.5.7). The preferred calibration method is to use an accurate, traceable external source. To calibrate using this method, select "uSEr" followed by "Zero" and apply a "zero" signal to the input using an external source. Set the reading desired for this input and press the return button. The signal input will then be sampled. Select "SPAn", set the appropriate input signal and corresponding reading and sample the input again by pressing the return button.



8.5.7) "rEF" – Setting Internal References.

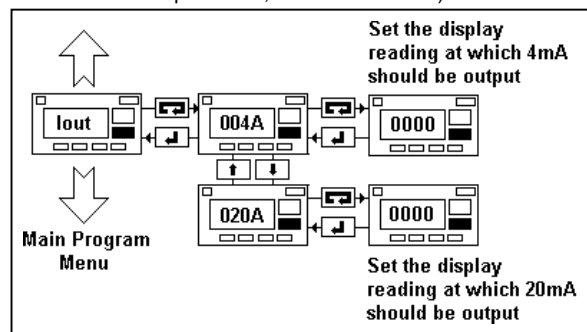
Do NOT enter this program parameter unless you have an accurate and traceable signal source to hand. The internal references are used by the meter to calculate readings for the internal calibrator ("cAL"), the units/percentage function ("U--P") and the analogue output option. The internal references are protected against accidental erasure by the request for the code "sure". The internal input references ("IP") are set by sampling an accurate external signal source at "zero" and "span" levels as shown in the diagram below. E.g. if the signal input range was 1-5V, 1V should be sampled at the "zero" and 5V at the "span".

The 4-20mA analogue output (if fitted) can be adjusted (to a minimum 3.8mA and maximum 22mA) using the up or down buttons within the "SEt" options.

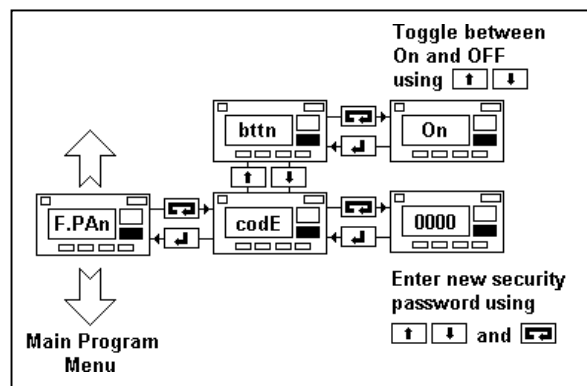


8.5.8) "Iout" – 4-20mA Analogue Output. (If fitted)

This parameter allows the 4-20mA analogue output to be programmed to correspond to any part of the display range. E.g. the display range could be 0-500 Litres, and the 4-20mA re-transmission could be from 100-150 Litres. To set the actual mA output levels, see section 8.5.7).



8.5.9) "F.Pan" - Front Panel Controls, Password and Pushbutton Disable (anti-tamper function).



The front panel controls referred to here allow the operator to set a security access password (or change an existing one) and to switch on the anti-tamper feature - "bttN". If "bttN" is set to "on", then the buttons are enabled, if set to "off" then the buttons are disabled (to re-enable see section 8.7).

The security password that is entered within the "code" parameter will be the password required to gain access to the programming mode from normal display mode. If "0000" (four zeroes) is used, then no password is needed to gain access to programming mode. **If a password has been forgotten, then the emergency access code "FPac" ("Forgotten Panel Access Code") can be used to gain access.** If FPac is entered as a code then the present password will be hidden. If desired, a new password can be entered.

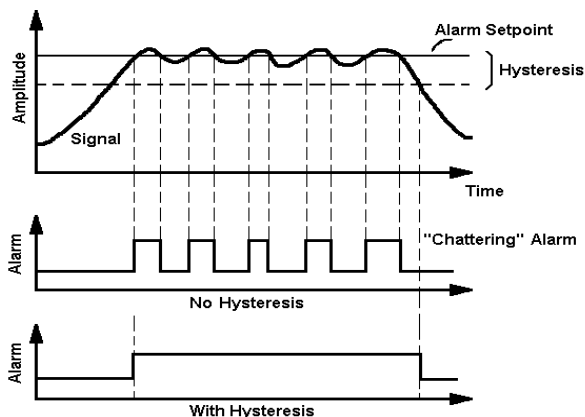
8.5.10) "ALr1" & "ALr2" –Alarm Setpoint Programming (If Fitted).

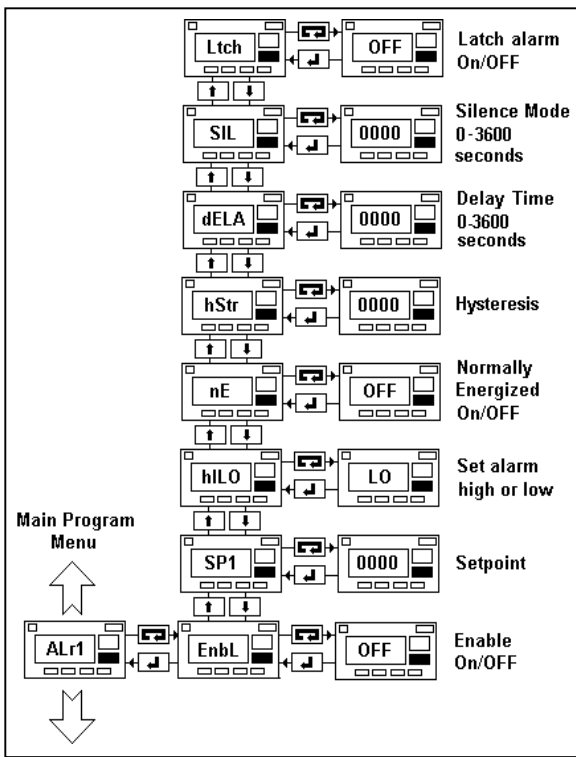
Section 8.6) outlines the parameters that can be set.

8.6)The Alarm Parameters. Alarms 1 & 2 have the same set-up parameters, but operate separately. Each can be set as a high or low alarm. See sub-menu programme flowchart of the following page.

8.6.1) "EnbL" – Enable. This gives a quick way of switching the alarm on or off without having to change all the other alarm parameters. **NOTE: If the alarms are not enabled, the alarm relays will stay in the position determined by the "nE" (normally energized) parameter.**

8.6.2) "hStr" – Hysteresis Hysteresis is set in absolute units not percentage. This function is useful to stop alarm "chatter" as shown in the diagram below.





8.6.3) "SP1" - Setpoint 1. (or setpoint 2). This is the alarm setpoint value and is entered in the same units as the display.

8.6.4) "hILO" - High/Low. Each alarm can be set as either active high or active low.

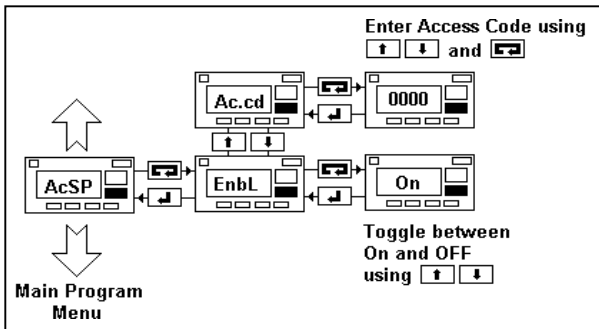
8.6.5) "nE" - Normally Energized. This parameter determines the state of the changeover relay. If "nE" is "on" then the alarm relay is normally energized, meaning that should there be a power failure the alarm will change state (failsafe).

8.6.6) "dELA" - Delay. This function can be used when a delay in an alarm output is required. The delay can be programmed with any value up to 3600 seconds.

8.6.7) "SIL" - Silence. This function allows the relay outputs to be de-activated (or silenced) for up to 3600 seconds. Hence, an alarm sounder connected to the output relays could be momentarily "silenced" by the operator pressing the scroll button. If the input signal was still in the alarm range after the silence time had elapsed, the alarm would re-activate.

8.6.8) "Ltch" - Latch. This function allows the alarms to be latched on. If the input signal causes the alarm to trip, then the relay output(s) will be held in the alarm state even if the input signal falls back into normal operating range. The latched alarm(s) is acknowledged by pressing the scroll button.

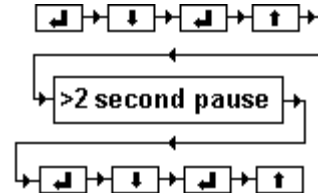
8.6.9) "AcSP" - Access Setpoints. This option



allows an operator access to the alarm setpoints without having to go through all the other programming menus. When this function has been enabled, pressing the scroll and up button together will give the operator access to the setpoints. This function can be password protected by setting an "Access Code" (Ac.cd). It is possible, if desired, to use the same password for access to both the alarm and main menu programming.

8.7) Pushbutton Re-enable

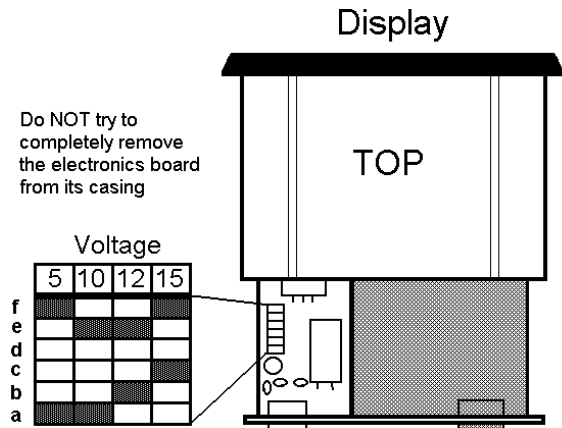
The pushbutton disable function, (also called anti-tamper function) completely disables the pushbuttons – ideal if the Advisor could be open to tampering from unauthorized personnel. Once this function has been switched on, the only way to regain control of the pushbuttons is to push the buttons in the following sequence.



Once this sequence has been followed, the display will briefly show "good" and the buttons will be re-enabled.

8.8) Transducer Supply Output (if fitted).

To change a transducer supply output voltage, internal jumper links must be adjusted. **Switch off the power and disconnect all the connectors.** Remove the four retaining screws at the back of the instrument and carefully slide the electronic board sets out of the case until the top sub-board with the jumper links is revealed (as per diagram). **NOTE: The electronic circuit board sets are not designed to be completely removed from the case !!** Position the links in the appropriate places and carefully re-assemble.



Note: The transducer supply is a 4 wire output – this eliminates cable resistance. The two sense terminals **must be** connected to either the sensor (best practice) or the transducer supply outputs i.e. link rear terminals 14 to 15 and 16 to 17.

8.9) Transmitter Supply Output (if fitted)

The transmitter supply output voltage is 24Vdc and is not adjustable. It supplies up to 22mA – ideal for loop-powered transmitters.

9) General Operation

9.1 Button Functions – In Normal Display Mode



Pressing this button causes the display to show one of the following parameters. Listed in order of priority;

- i) The minimum value held in the max/min register (if enabled).
- ii) The display at which 4mA is re-transmitted on the analogue output (if fitted)
- iii) The display reading corresponding to the lower end of the calibrated range.

After 5 seconds of pressing and holding the down button, the display brightness is reduced.



Pressing this button causes the display to show one of the following parameters. Listed in order of priority

- i) The maximum value held in the max/min register (if enabled)
- ii) The display at which 20mA is re-transmitted on the analogue output (if fitted)
- iii) The display corresponding to the upper end of the calibrated input range.

After 5 seconds of pressing and holding the up button, the display brightness is increased.

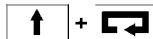


Pressing this button has several effects depending on what parameters have been programmed. It can be programmed to display the input signal in actual units or as a percentage of the input range. It can also be used to silence alarm outputs, acknowledge latched alarms and to activate the tare function.



This button has no effect during Normal Display Mode.

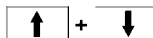
9.1.1) Gaining access to the alarm setpoints.



It may be necessary for an operator to regularly change alarm setpoints. There is an option to allow quick access to the setpoints only. This also means that unauthorized access to the other programming menus can be prevented. To access the alarm setpoint (if the function has been switched on in program mode) the up and scroll buttons should be pressed simultaneously. The operator will then be able to access either SP1 or SP2 by pressing the up or down button. New setpoints can then be set with the up, down and scroll buttons followed by the return button.

A security access code can be programmed to verify authorized access to the setpoints. If this is the case, the operator must enter the security access code using the up, down and scroll buttons, followed by the return button.

9.1.2) Resetting the Max/Min Register



Pressing the up and down buttons simultaneously the max/min hold register is reset to store the present display reading.

9.1.3) Display brightness

It is possible to adjust the display brightness of an Advisor at any time during Normal Display Mode.

To increase the display brightness, press and hold the up button. After 5 seconds, all the segments on the display will light up and the brightness will steadily increase to its maximum. Release the button when the desired brightness is reached. Likewise, the brightness can be reduced by pressing

and holding the down button. The display brightness is “remembered” if there is a power failure.

9.1.4) Unlatching alarms and alarm silencing (if fitted)

A latched alarm is unlatched by pressing the scroll button (to set an alarm latch see section 8.6.8). The alarm output changes state and the alarm LED annunciator is extinguished. An alarm is also silenced (or acknowledged – see section 8.6.7) with the same button press. With a silenced alarm, the alarm LED annunciator will remain lit if the signal input is still within the alarm band.

9.1.5) Tare Function (if fitted)

The tare function is designed primarily for use in weighing applications and is fitted at the factory. A tare function allows the instrument display to be zeroed at any stage so that any further change in input signal can easily be measured. For example, if the Advisor was showing the weight of a container as 25kg and an operator wanted to add 18kg of fluid, the display could be tared and the operator would easily see when 18kg of fluid had been added. Without the tare function, the operator would have to calculate the combined weight.

The tare is initiated by pressing and holding the scroll button for 4 seconds, the word “tArE” is then briefly displayed to let the operator know that the request has been fulfilled. The asterisk LED annunciator will also light up to show that the display is tared. Brief pressing of the scroll button allows the operator to toggle between the tared (net) display and the untared (gross) display. The asterisk LED annunciator switches on and off accordingly. The display can be re-tared again at any time by pressing and holding the scroll button for 4 seconds. The tare value is stored even if there is a power failure.

10) - Troubleshooting

There is no display. Check all the connections are correctly made and check for the correct power on the supply.

The display is not very bright/too bright. Adjust the brightness by pressing and holding the up or down button. (Section 9.1.3)

Display doesn't seem to be responding to a change of input signal. Check the input signal. It may also be possible that someone has accidentally re-calibrated the unit to display the same value over the full input range – check the span and zero settings in the “cAL” parameters (Section 8.5.6) – if necessary re-calibrate with the “Int” (internal) settings. Alternatively, the internal references may have been accidentally reset – re-program them. (Section 8.5.7)

None of the pushbuttons seem to be working. It may be that the pushbuttons have been disabled (i.e. anti-tamper function has been switched on). Enter the button re-enable sequence. (Section 8.7)

The display is too “jumpy”. Check the signal source, it may be noisy. If the signal source cannot be “damped” down, change the resolution of the Advisor. (Section 8.5.2)

I've forgotten my password – how do I get access ? Enter “FPAc” (the emergency code – mnemonic “Forgotten Panel Access Code”) and re-enter a new password in “F.PAn” menu option. (Section 8.5.9)

The alarms are on when they should be off and vice versa. Check the high and low alarm settings (Section 8.6.4) and/or check you have the normally energized (“nE”) parameter correctly programmed (Section 8.6.5)

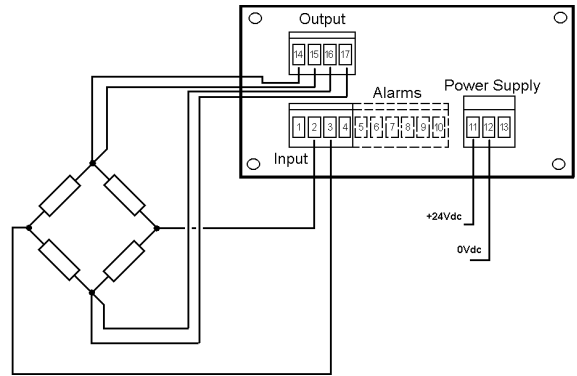
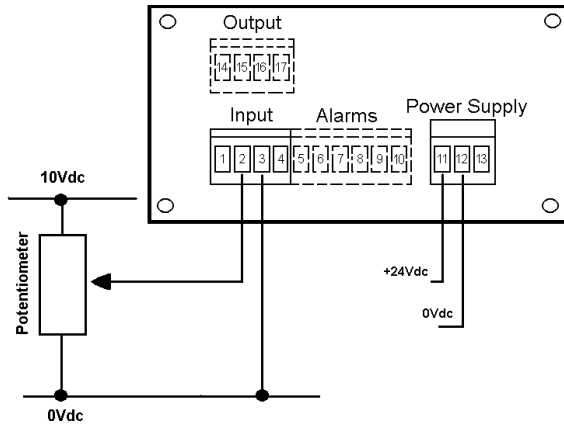
The analogue output current doesn't seem to be correct. The analogue output can be adjusted. (Section 8.5.8)

The transducer output is greater than expected. The transducer supply output is 4 wire i.e. 2 supply lines and 2 sense lines. The sense lines must be connected either directly to the sensor or the supply outputs otherwise the Advisor will "hunt" for a sensor and the output voltage will appear to be excessive. (See section 8.8)

Transducer power supply fitted.

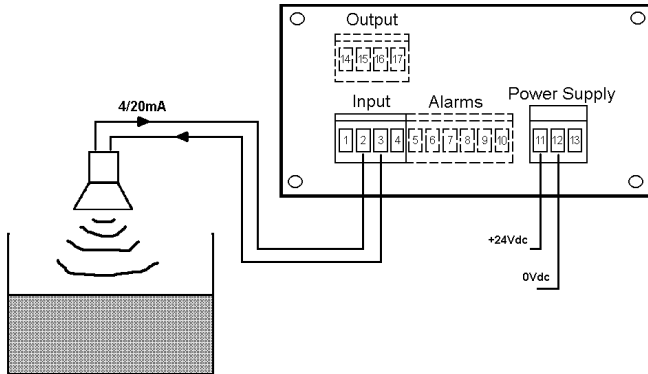
11) Typical Applications

A Position Sensor (0-10V input signal)



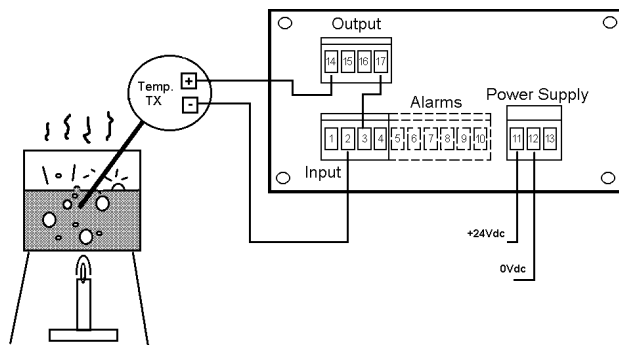
Tank Level Display (4/20mA Active Sensor)

Transmitter has its own power supply



Temperature Display (4/20mA Passive – Loop-powered Transmitter)

24Vdc transmitter power supply option fitted



Weight Display (15Vdc Transducer supply output, 0-100mV input range)