

# **MICRO-LOAD and MICRO-PRO** **Quick User's Guide**

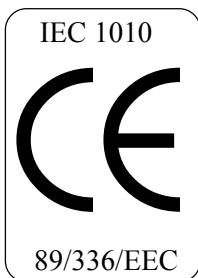
## Programmable Digital Panel Indicator



**MICRO-PRO** - Designed for optimum flexibility , able to accept 4-20mA, 0-10V, 1-5V, 0-10mA, a wide choice of thermocouples, RTDS. Resistance measuring versions available

**MICRO-LOAD** - Designed specifically for weighing, load, torque and strain measurement applications. 1 microvolt resolution capability. 4 and 6 wire bridge connection schemes.

- Common Features -**
- Selectable 3 1/2, 4 1/2 or 5 digit display resolution
  - Selectable display update rate
  - Selectable filtering
  - User definable lineariser with up to 17 points available
  - Dual scale facility for conversion between metric/imperial etc.
  - Universal PSU accepts 110 & 230 VAC and 10-40 VDC
  - 2 user definable function keys
  - 4 open collector or 2 mechanical relay alarms
  - Optional isolated, scaleable Analogue O/P
  - Optional RS232 or RS485 communications
  - Optional computer setup software .....



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Doc. MICROMEN.pm65

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**London Electronics Ltd.** Thorncote Green, Sandy, Near Hatch, Sandy SG19 1PU

## NOTES

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# VERY IMPORTANT WARNINGS



**You should carefully read all warnings and commence installation ONLY when you are satisfied that all warnings are adequately covered.**



! Connections to this equipment shall be carried out in accordance with current IEE regulations, and all wiring shall be separated in accordance with IEC1010

Notes:

! Power supplies to this equipment must be anti-surge fused at 125mA for 230V supply, 250mA for 110V supply or 630mA for DC supplies in the range 12-30VDC

Notes:

! Before installation, check that model number and supply voltage suit your application

Notes:

! Lethal voltages may be present on the circuit board. Do not touch any circuitry when power is applied.

Notes:

! This product is designed for Installation class II service

Notes:

! This product is designed for use in Pollution-Degree 2 environments

Notes:

! Use an insulated screwdriver if adjusting potentiometers and do not touch any circuitry

Notes:

! Replace front cover when meter is unattended

Notes:

! All adjustments to jumper settings or terminations must be made with power removed

Notes:

! Ensure all screw terminals are tight before applying power.

Notes:

***Safety First .....Don't make assumptions..... Always double check.  
If in doubt, ask someone who is QUALIFIED to assist you in the subject.***

# Notes

1) **ALARM Setpoints** .....how to see where they are currently set, how to change the value.

On the meter's front panel , you see 4 annunciators labelled Trip 1 to Trip 4

By briefly pressing the pushbutton below the annunciator, you can see the present value of that trip's setting. The value will show for approximately 2 seconds, and then revert to showing input value.

To alter the trip value, press the appropriate pushbutton for approximately 3 seconds.

You will notice that one digit will brighten. You can increase or decrease the value of that digit by pressing AL1 or AL2 buttons. Then, to change another digit, press F1, and you will see a new digit will brighten. To set a negative alarm level, set the **left-most** digit to a negative sign (-).

When your alarm point has been correctly amended, press F2 to enter and store the value.

Repeat for other alarm setpoint values as required.

## NOTE:

If your meter is fitted with 2 mechanical relays, you may still set alarm values for Trips 3 and 4, which will annunciate on their associated LED's as trip values are exceeded.

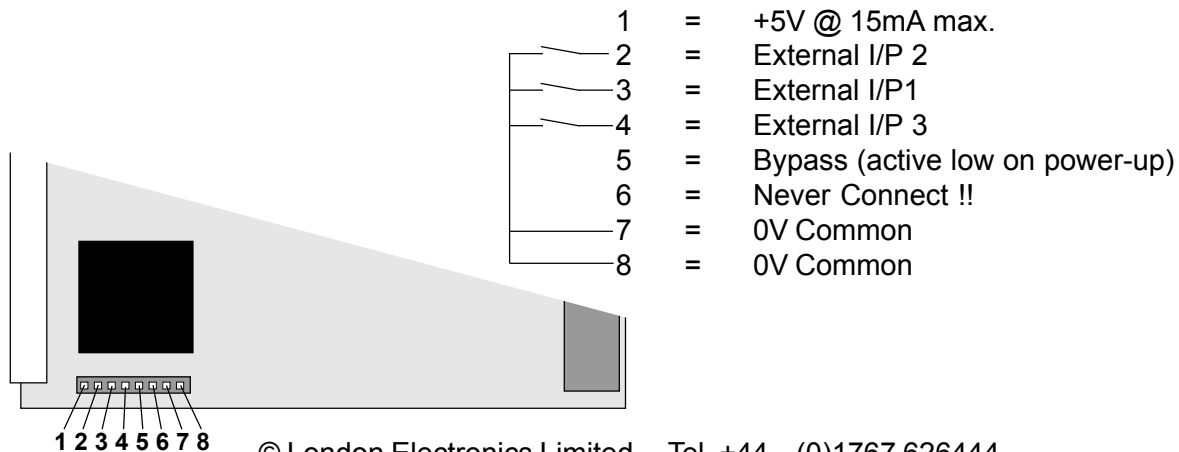
No control outputs will be available for Trips 3 or 4 , however.

## 2) REMOTE CONTACT CLOSURE INPUTS

The MICRO-PRO & MICRO-LOAD permit up to 3 remote contact closures to be accepted, allowing such functions as TARE, LATCH RESET, PEAK, VALLEY, 2nd SCALE, LINEARISER ENABLE etc. to be actioned from a remote point, or within an automated process system. The capabilities of each input are described in the section headed '*Function Keys & External I/P configuration*'

The inputs require a contact closure or opto-isolator E/B junction to operate. All are individually pulled up internally to the meter's +5V rail as shown below, so will only result in 1mA flowing through the contact closure. Consequently, use switches which are designed for low level signals, such as gold plated contact types or self cleaning 'wiper' switches, as there is insufficient current to automatically clear metallic oxides or contamination from the switch contacts. Ensure you screen the control cables and earth the end of the screen nearest to the meter.

The inputs are normally only accessible inside the meter as solder-on pins, near the main microprocessor, as shown below. However, an optional extender card is available to bring these terminations out to detachable screw-plugs, and we strongly recommend the use of this option. (See 'Connections' page 2)



# Panel Requirements



All wiring to this meter must be carried out in accordance with current IEC regulations  
Separation of all power carrying cables must be ensured in accordance with IEC 1010

Installation Class II

Pollution degree 2

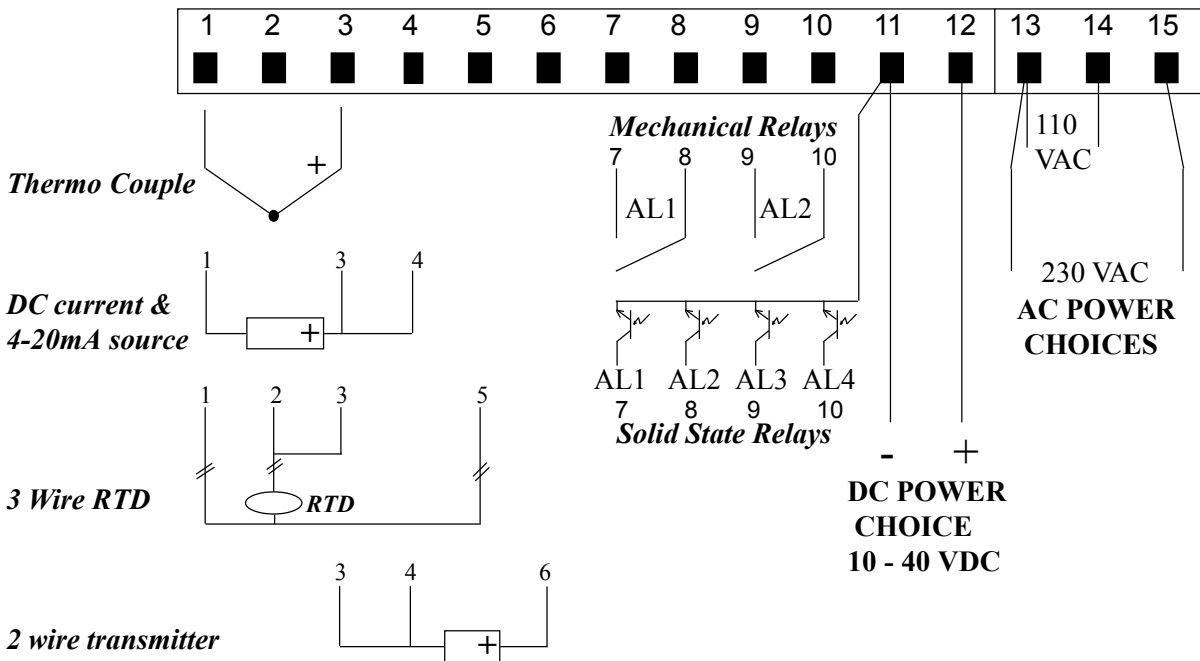
This meter is to be installed within a secure enclosure, to prevent accidental access by persons to the powered connections present on the meter's rear terminals.

CUTOUT DIMENSIONS

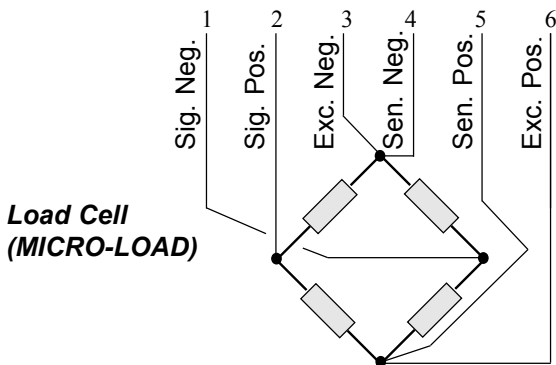
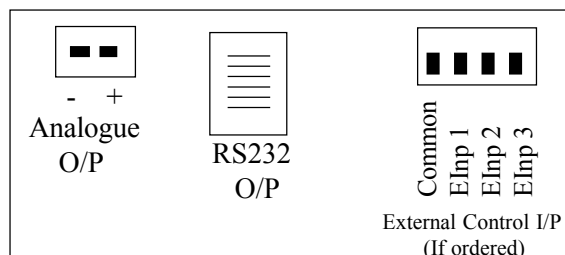
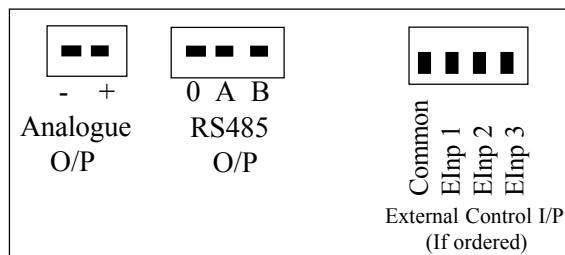
A hole 45 mm high and 92 mm wide, with minimal radius is required

## Connections

**AVOID DISAPPOINTMENT!** Route all signals via individually screened cables. Do **not** mix input and output signals in the same screened cable. Earth the screens at a point as near to the meter as possible and do not earth the screen at the other end. Route all signal cables well away from power cables, relay switching cables and other sources of electrical noise.



### SOME SIGNAL O/P LAYOUT SCHEMES



# Specifications

<i>Input Range</i>	<i>Accuracy</i>	<i>Span Tempco</i>	<i>Zero Tempco</i>	<i>Input Resistance</i>
+/-20mV to 2V	+/-0.02%	+/-30ppm/C	+/-1uV/C	>1000 Megohm
+/-2V to 20V	+/-0.01%	+/-30ppm/C	10ppm.Span/C	>25 Kiloohm
+/-1mA to 20mA	+/-0.02%	+/-50ppm/C	40ppm.Span/C	100 Ohm
Thermocouples	see table	+/-30ppm/C	<0.02°C/C	>1000 Megohm
RTD	+/-0.2C	+/-30ppm/C	+/-0.008C/C	500uA excitation

## *Temperature Sensor Input Specifications*

<i>Type</i>	<i>Range</i>	<i>Resolution</i>	<i>Accuracy</i>
J	-200 - 700 C	0.1 C	+/-0.5 C
K	-200 - 1300 C	0.1 C	+/-0.6 C
T	-200 - 400 C	0.1 C	+/-0.3 C
N	-200 - 1300 C	0.5 C	+/-1.0 C
R	-50 - 1750 C	0.5 C	+/-1.0 C
S	-50 - 1750 C	0.5 C	+/-1.0 C
PT100	-200 - 850 C	0.1 C	+/-0.5 C
PT100	-60 - 130 C	0.02 C	+/-0.5 C

## *Alarm Outputs*

- 1) Solid State, 4 open NPN collectors, rated at DC loads only of up to 48V, up to 500mA
- 2) Mechanical Single pole single throw relays, rated at AC 250V 5A or DC 24V 1A resistive

## *Analogue Output Option*

Nominal range 0-20mA. Zero (0%) and Span (100%) fully adjustable to give 4-20mA, 12-16mA etc.  
Drive resistance 0-550 Ohms  
Isolation 500 VRMS

## *RS232 Output Option*

Baud Rates settable from 300 to 9600  
Addresses Available 00 to 99  
Data Levels V.24 Compatible  
Isolation 200 VRMS

## *RS485 Output Option*

Baud Rates settable from 300 to 9600  
Addresses Available 00 to 31  
Data Levels RS485 Compatible, 2 line bus, 120 Ohm term  
Isolation 200 VRMS

## *Power Supply*

AC Supply 100 - 132 VAC if connected between terminals 13 & 14  
200 - 264 VAC if connected between terminals 13 & 15  
  
Consumption 4VA  
Isolation >2500 VRMS  
  
DC Supply 10 -40 VDC  
Consumption typically 400mA at 10V, 120mA at 40V  
Isolation >500 VRMS

## *Excitation*

### **On MICRO-PRO**

Default 24VDC 30mA  
Optionally 10V  
Optionally constant current

### **On MICRO-LOAD**

10VDC 120mA without relays  
10VDC 30mA with relays

## *General*

Operating Temperature -10 to +50 .... Storage Temperature -40 to +85 C  
Humidity 0-90 % rh non condensing  
Size 1/8 DIN (48 x 96mm front) 122 mm depth  
Weight 500 grammes  
Sealing from front - IP54 Optional cover SPC4 increases this to IP65

# Setup Menu

## MAIN OVERVIEW

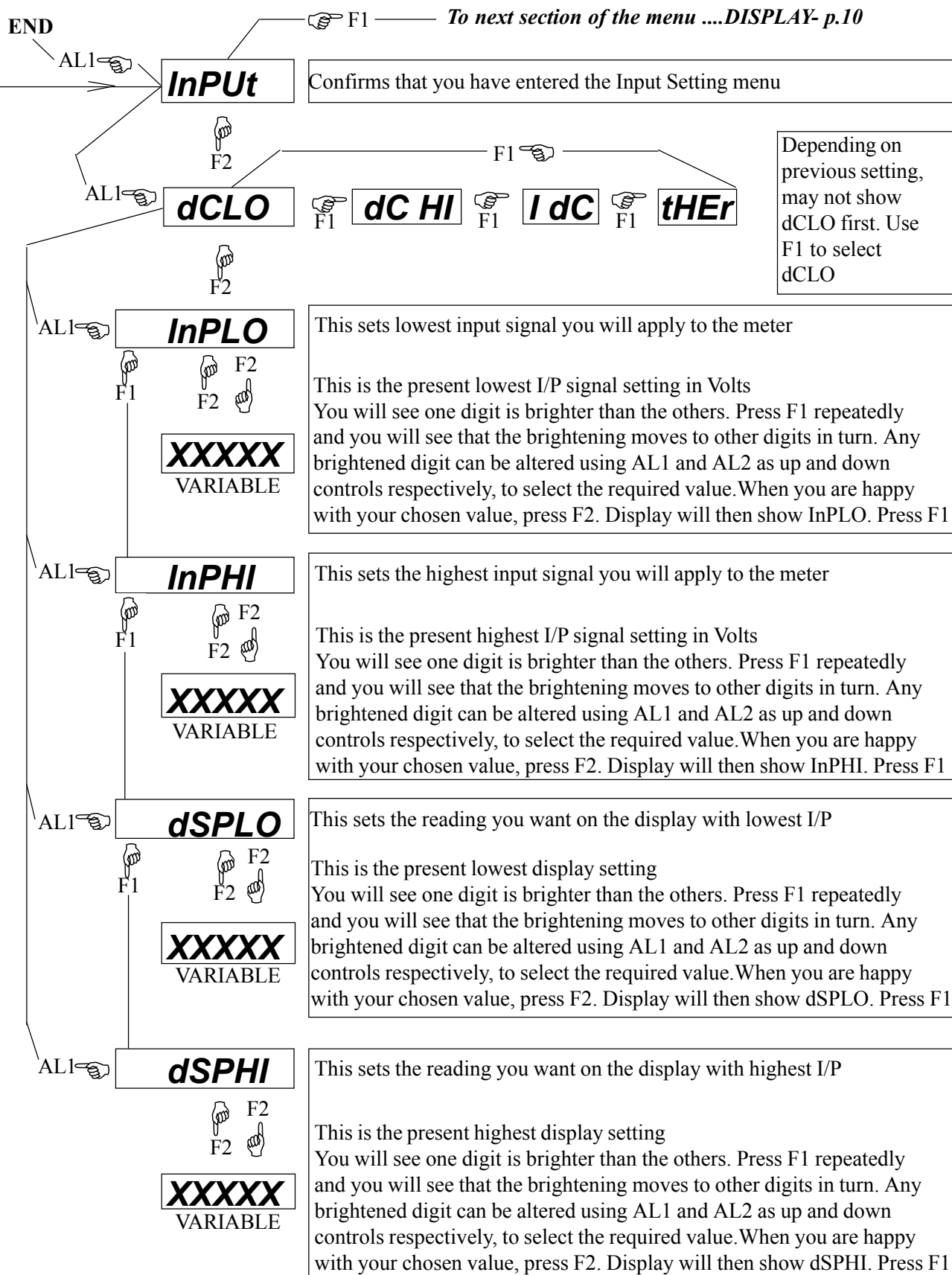
The setup menu is entered by pressing AL1 and F1 keys simultaneously. Main headings are shown here. Separate pages deal with each heading's contents in detail.

<b>PRESS</b>	<b>DISPLAYS..</b>	<b>PURPOSE</b>	<b>See page..</b>
AL1 + F1	<b>SEtUP</b>	Confirms that you have entered the setup menu	
F2	<b>InPUt</b>	Selects input signal range and corresponding display range	<b>5 to 9</b>
F1	<b>dISPL</b>	Selects decimal point , resolution, count by, limits	<b>10</b>
F1	<b>AdC</b>	Analogue to digital convertor sample time and averaging	<b>11</b>
F1	<b>CSLin</b>	Customer Selectable Linearisation data .. up to 17 points	<b>12</b>
F1	<b>FUnC</b>	Sets F1 and F2 key functions, & 3 external contact functions	<b>13</b>
F1	<b>ALR1</b>	Alarm1 Action	<b>14</b>
F1	<b>ALR2</b>	Alarm2 Action	<b>14</b>
F1	<b>ALR3</b>	Alarm3 Action	<b>14</b>
F1	<b>ALR4</b>	Alarm4 Action	<b>14</b>
F1	<b>PEAK1</b>	Peak Detector 1 Action	<b>15</b>
F1	<b>PEAK2</b>	Peak Detector 2 Action	<b>15</b>
F1	<b>SCALE</b>	Second Scale calibration	<b>16</b>
F1	<b>AnOUt</b>	Analogue Output scaling	<b>17</b>
F1	<b>SErOUt</b>	Serial Output port configuration	<b>18</b>
F1	<b>PASS</b>	Password setting	<b>19</b>
F1	<b>SPEC</b>	Specific Parameter Lockouts	<b>19</b>



# Calibration procedure for inputs up to 2 VDC

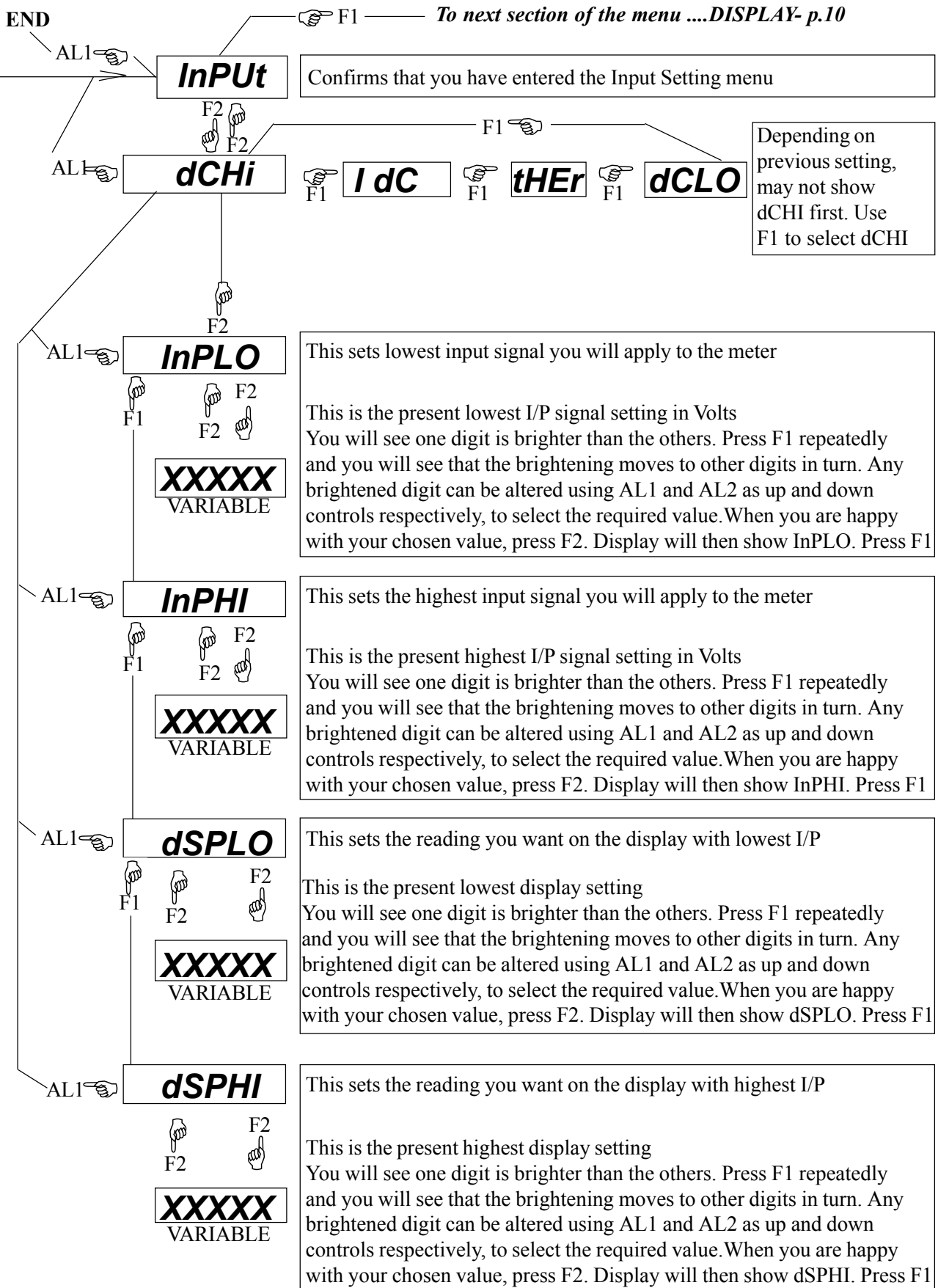
NB ... NOT AVAILABLE ON MODEL MICRO-LOAD



See page 20 for useful Fine Trimming procedures

# Calibration procedure for inputs up to 20 VDC

NB ... NOT AVAILABLE ON MODEL MICRO-LOAD

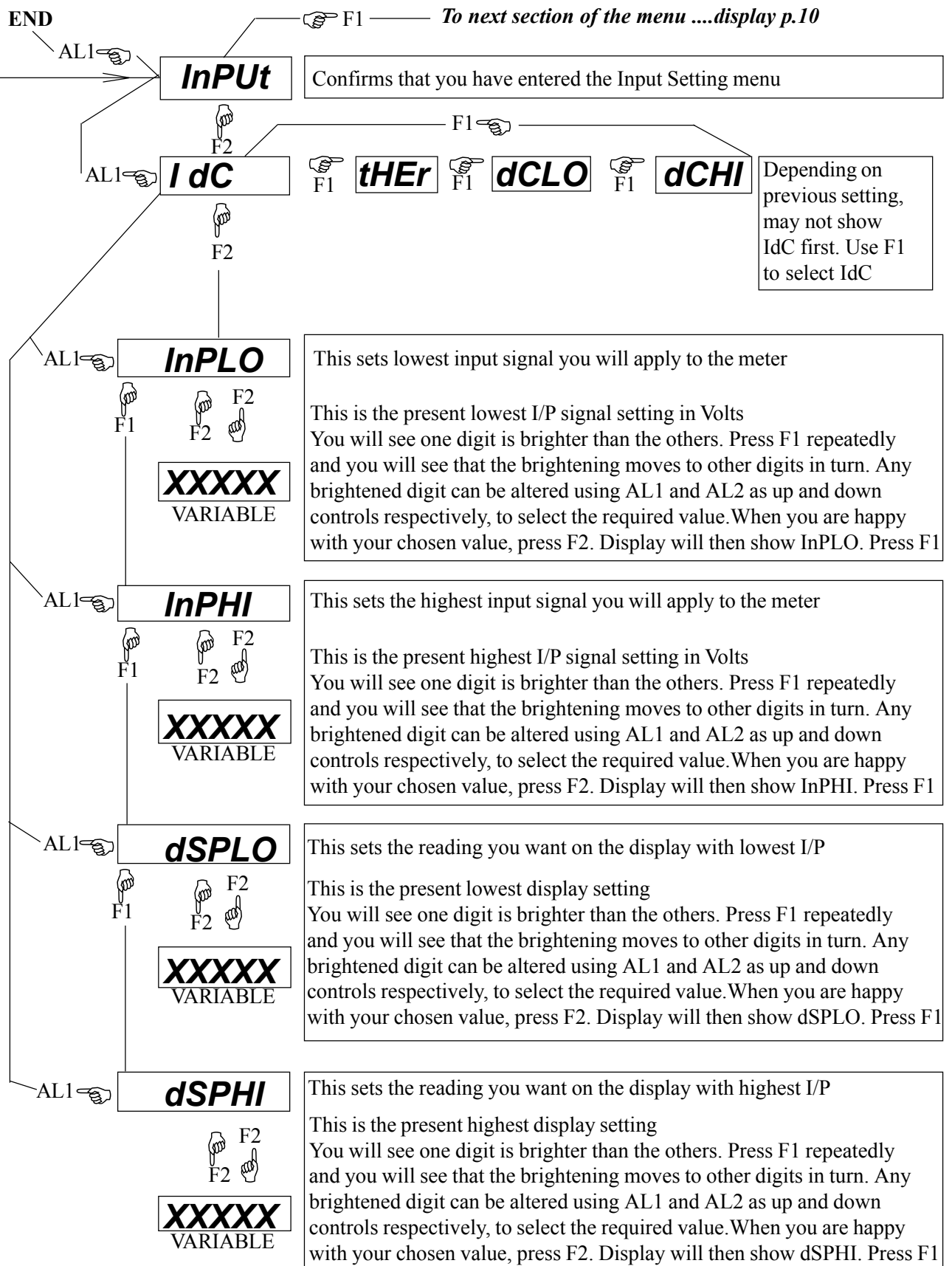


See page 20 for useful Fine Trimming procedures

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# Calibration procedure for inputs up to 20 mA

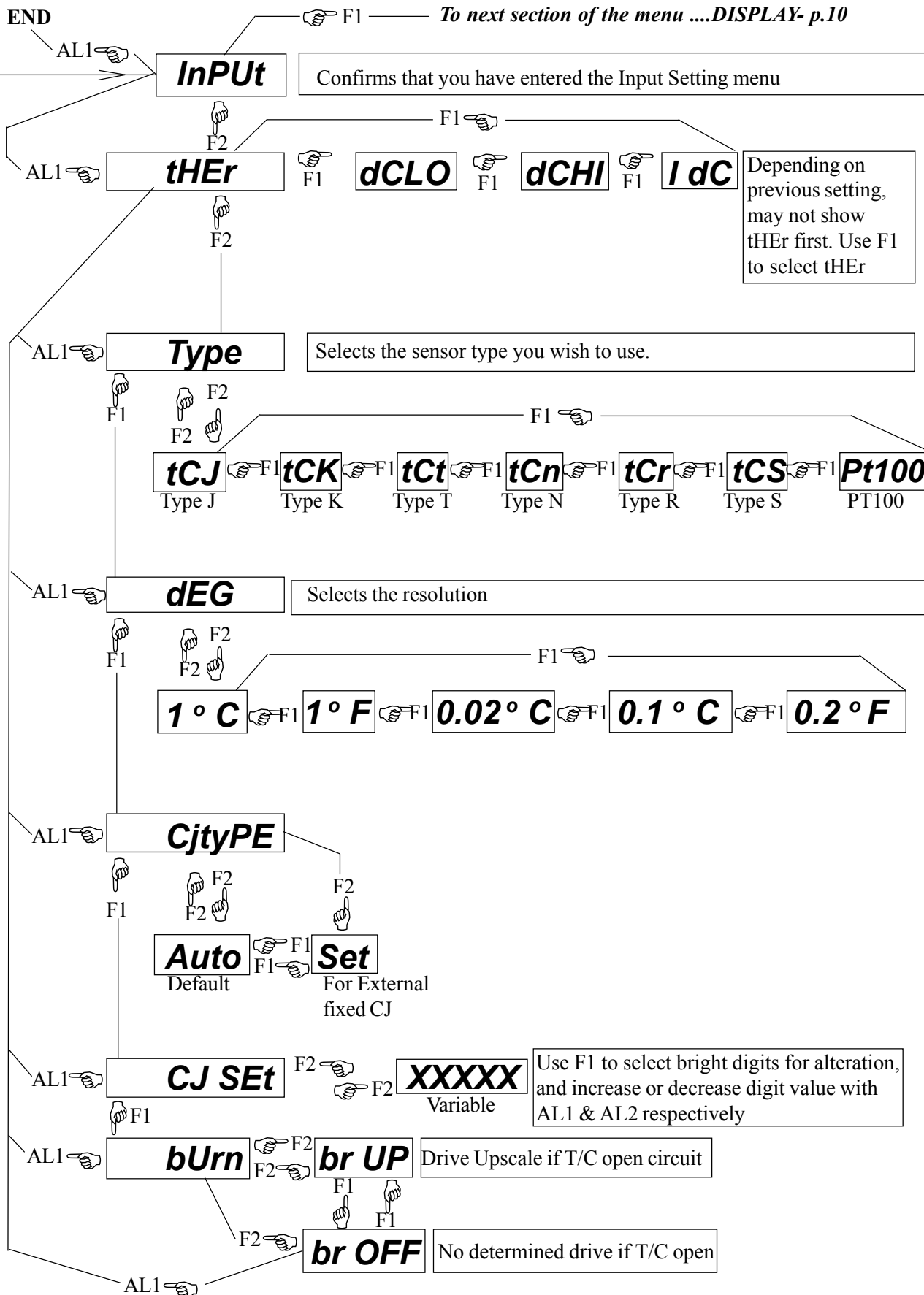
NB ... NOT AVAILABLE ON MODEL MICRO-LOAD



**See page 20 for useful Fine Trimming procedures**

# Selection procedure for Temperature Sensors

NB ... NOT AVAILABLE ON MODEL MICRO-LOAD

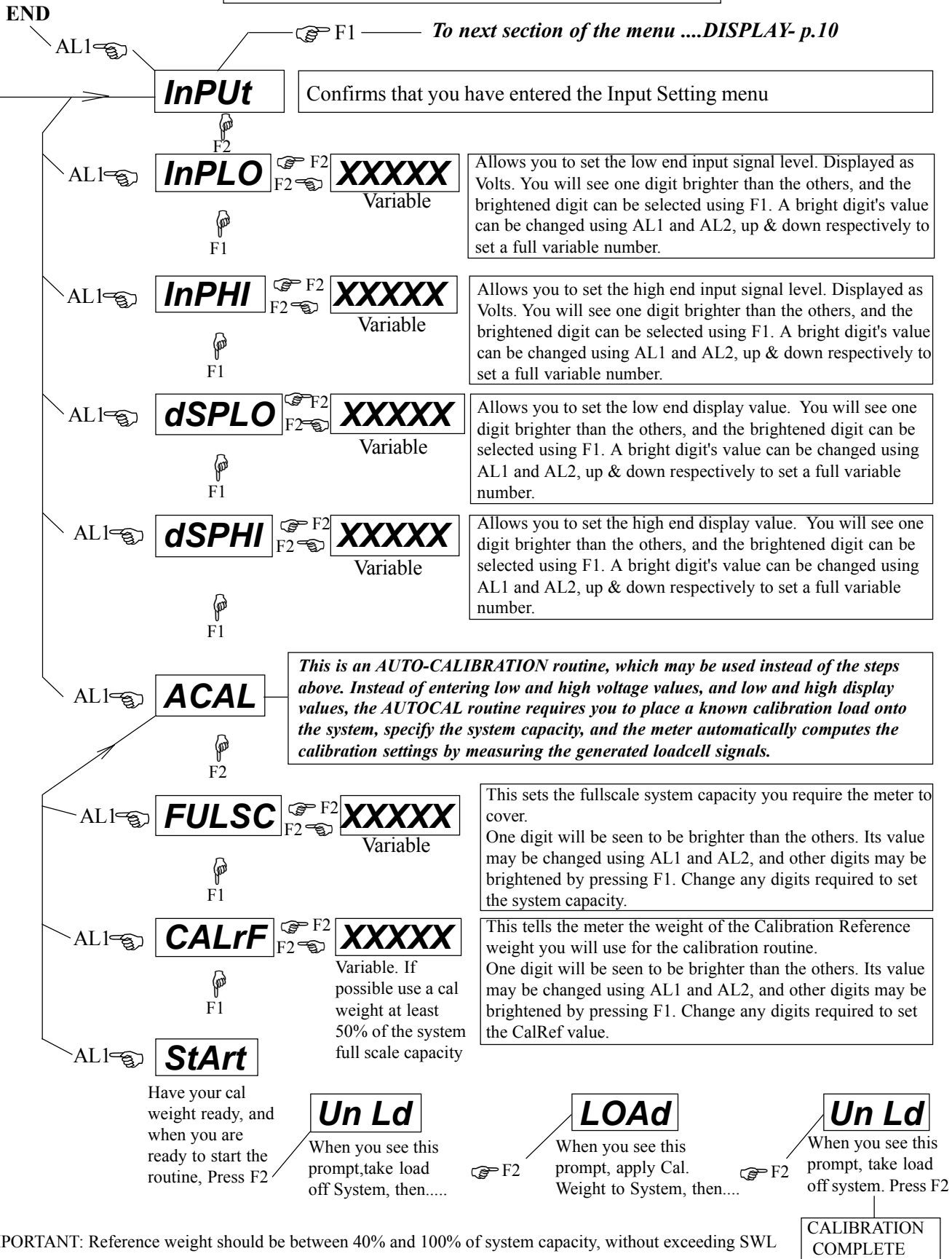


See page 20 for useful Fine Trimming procedures

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# Calibration procedure for LOADCELL inputs

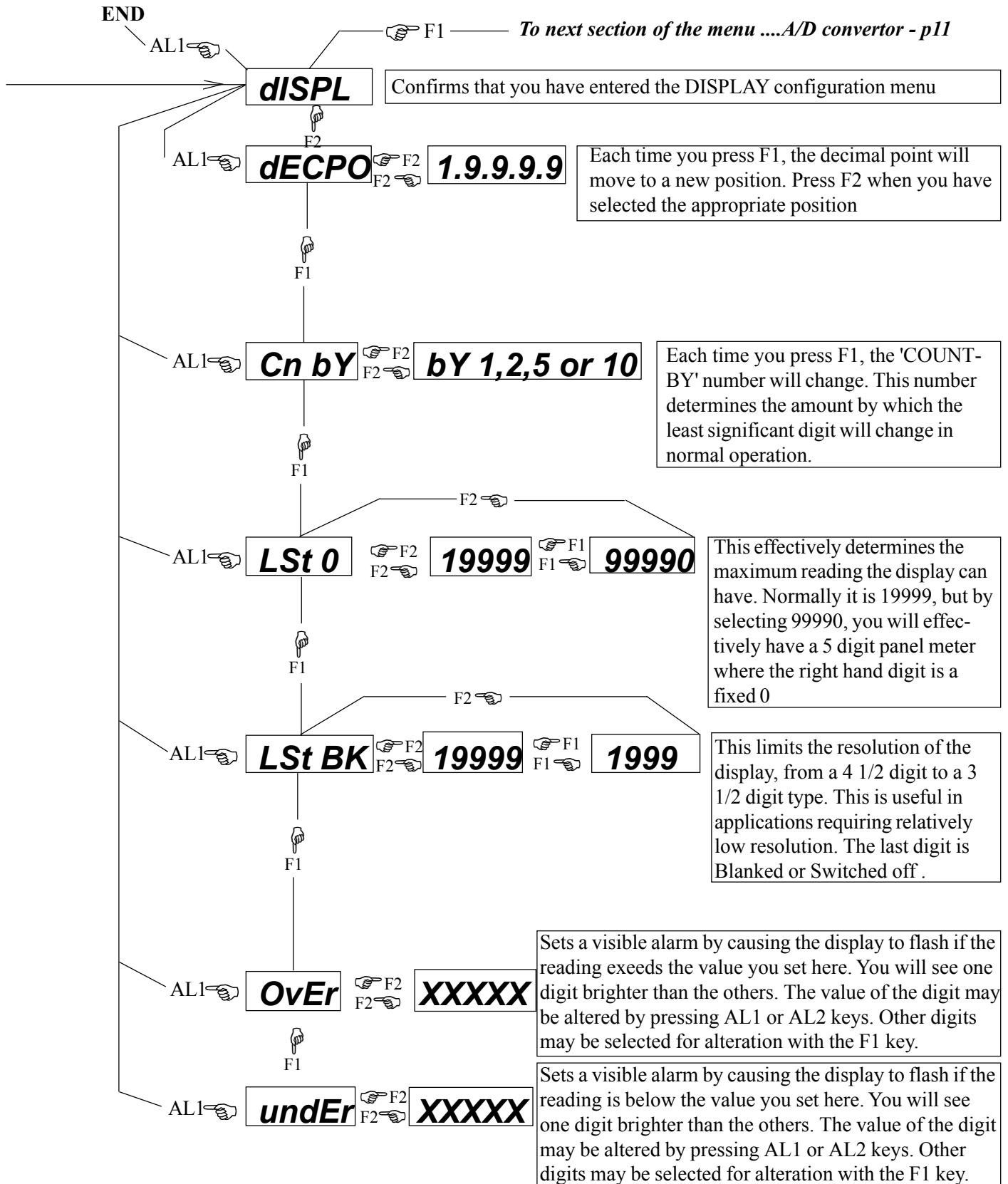
NB ... ONLY AVAILABLE ON MODEL MICRO-LOAD



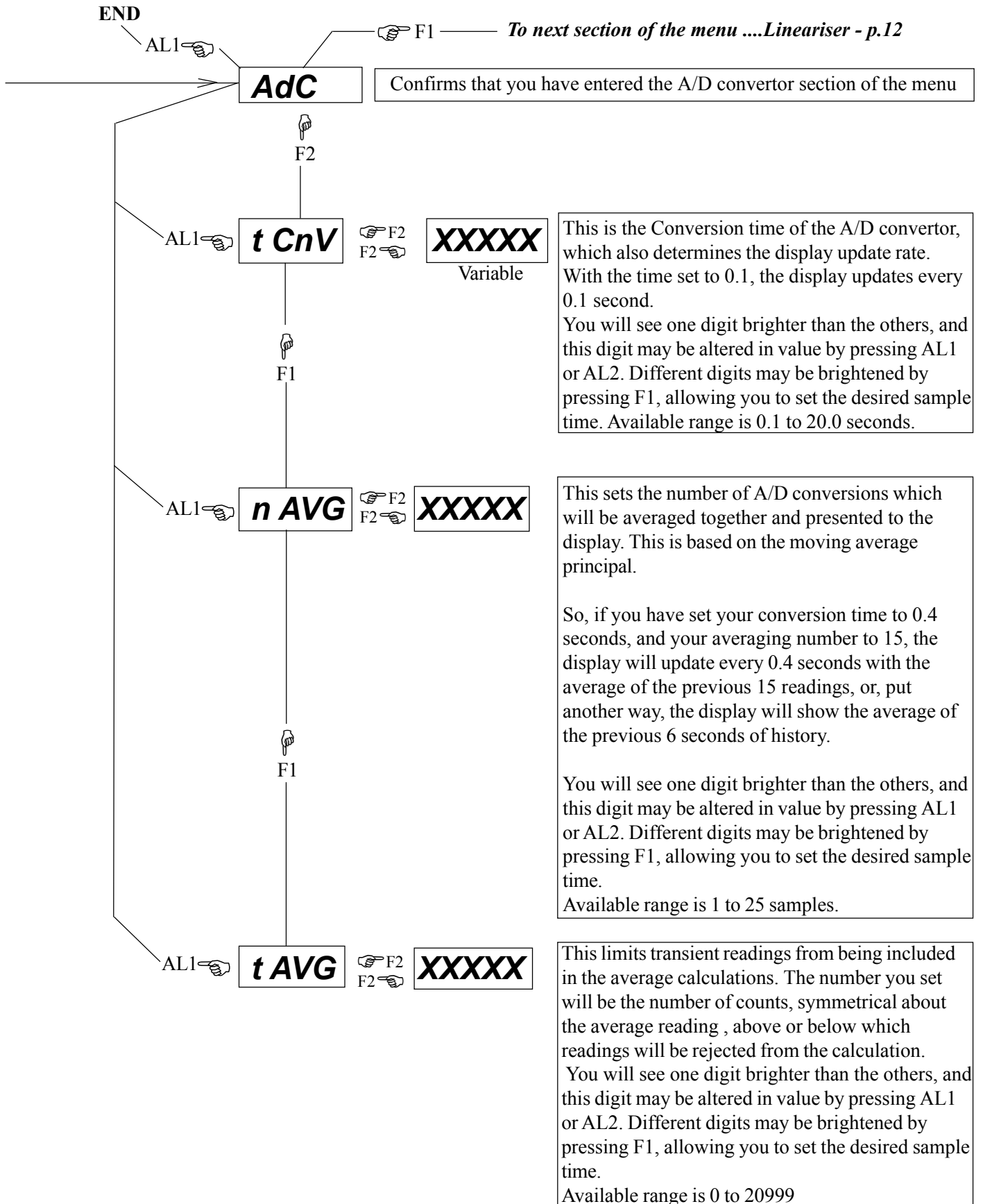
IMPORTANT: Reference weight should be between 40% and 100% of system capacity, without exceeding SWL

See page 20 for useful Fine Trimming procedures

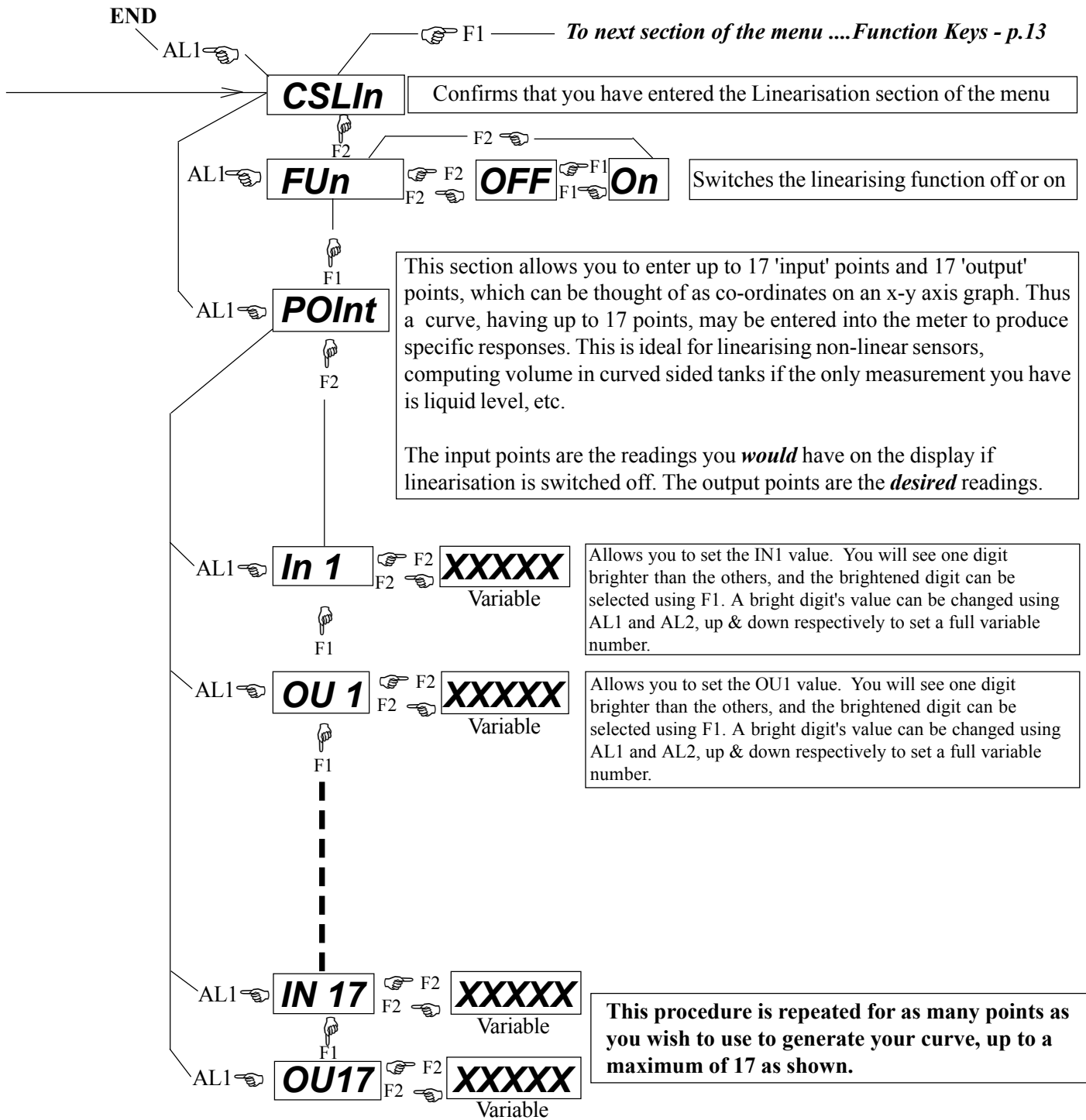
# Display Decimal Point, Resolution, Count By...



# Analogue to Digital Converter Configuration



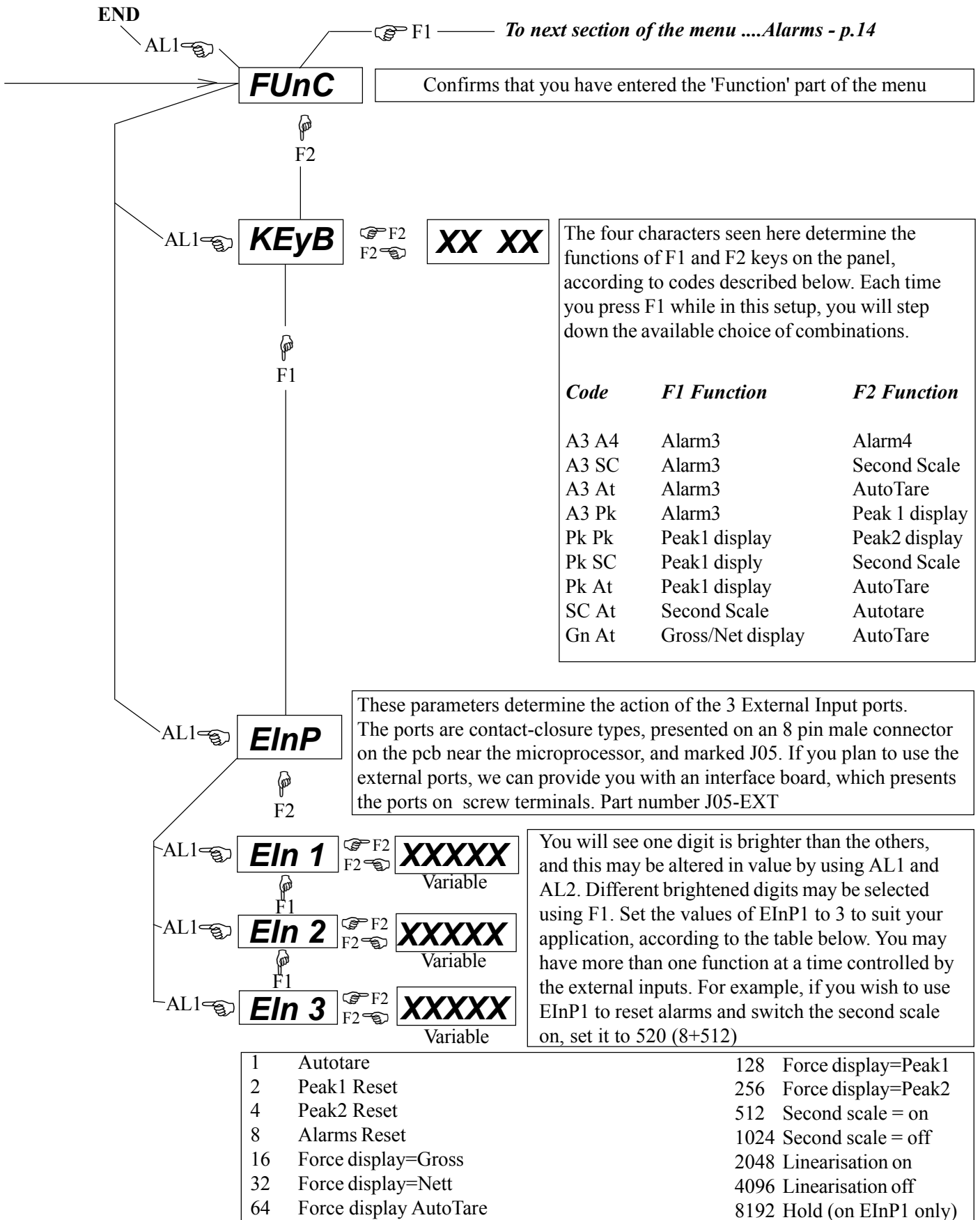
# Customer Selectable Linearisation Setup



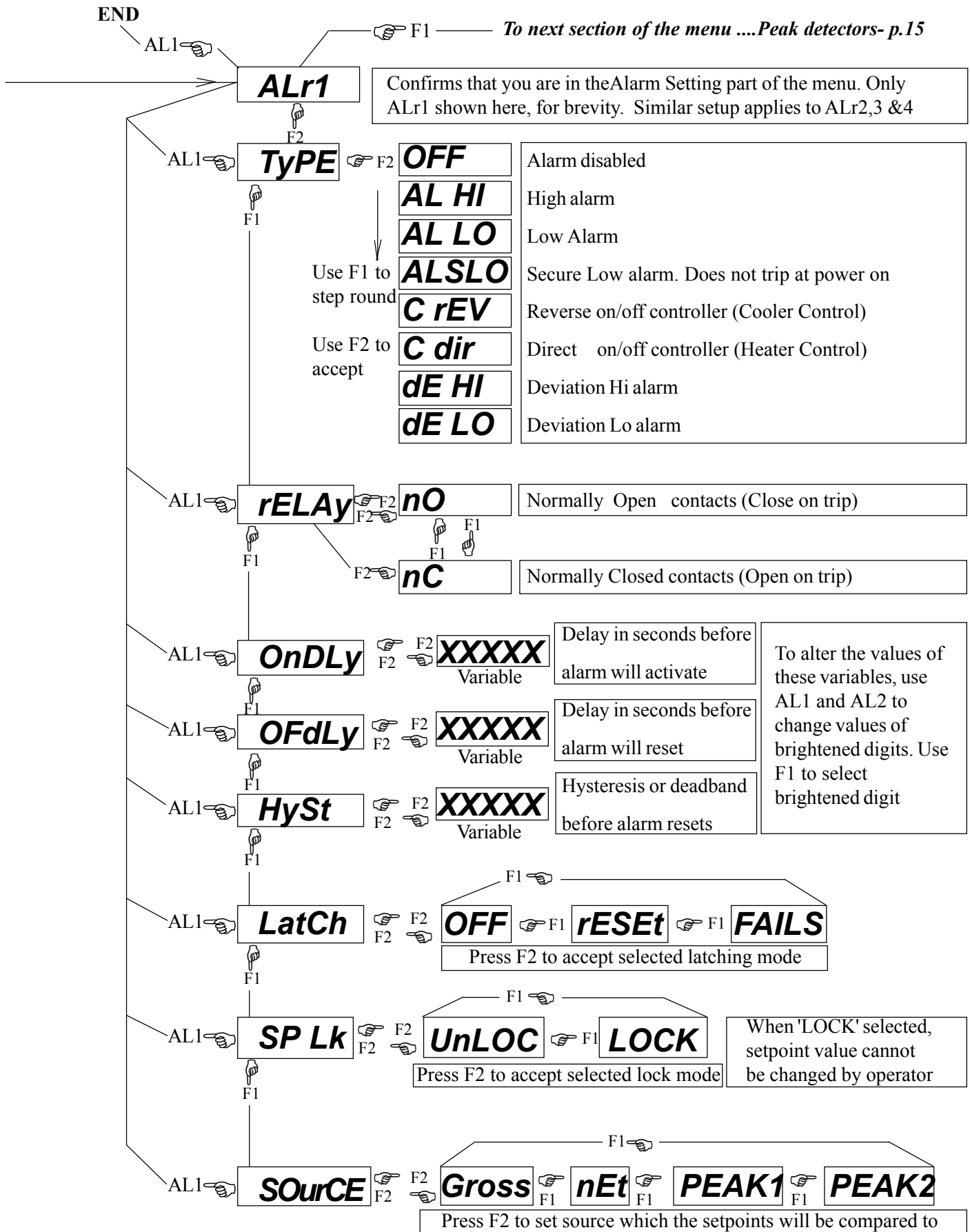
This lineariser facility is ideal for trimming non-linear sensors to obtain optimum precision in your system. It may be used to correct non-linearity in loadcells, RTDs, position sensors, non-linearised temperature transmitters, Differential Pressure flow sensors, and may be used to provide a readout of tank volume in curved-sided tanks when using a base mounted pressure transmitter as the sensing device. Positive and negative slopes may be accommodated with ease, and may be mixed throughout the curve to obtain complex profiles.



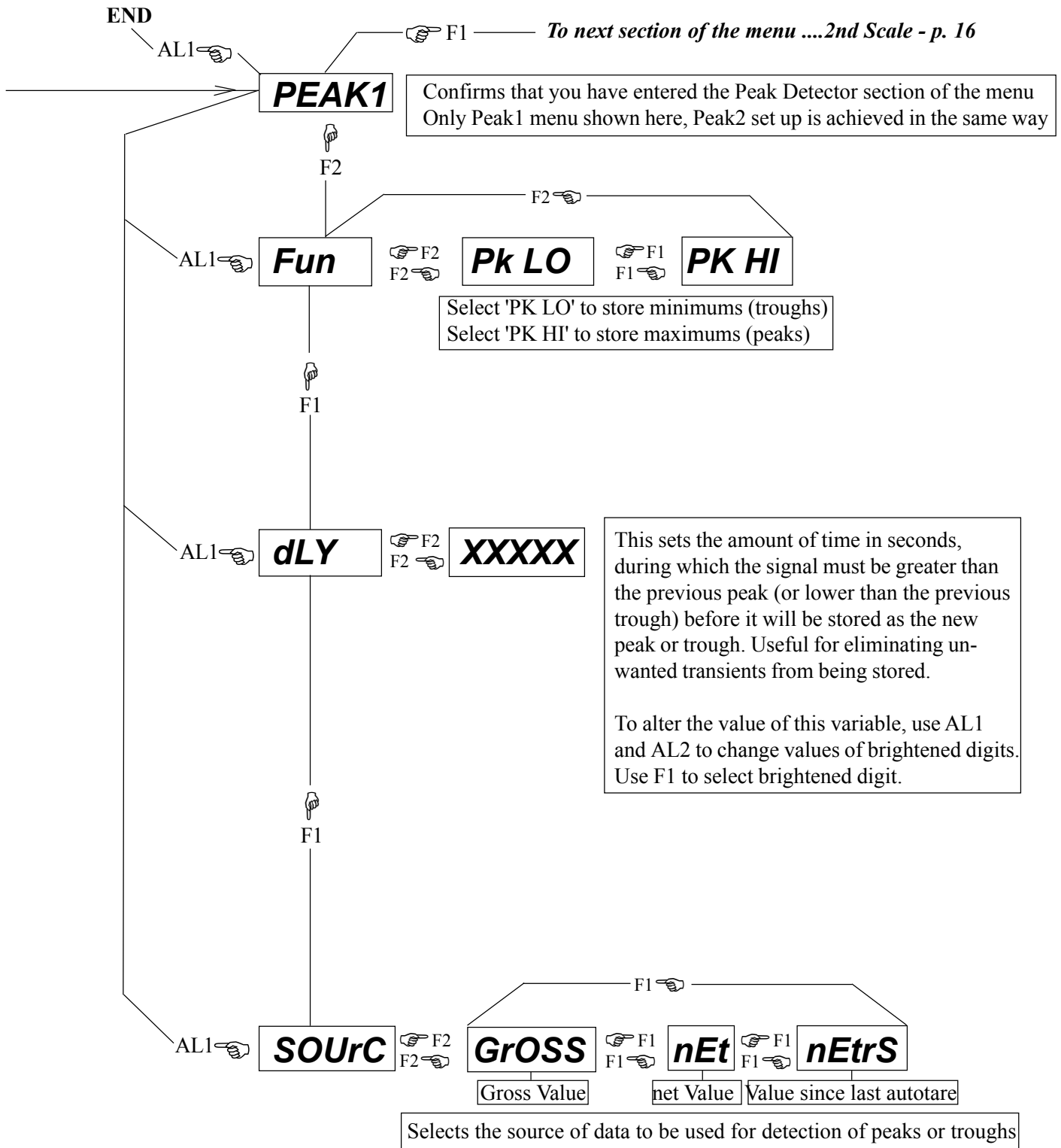
# Function Keys and External I/P Configuration



# Alarms 1 to 4 ... Configuring their Action

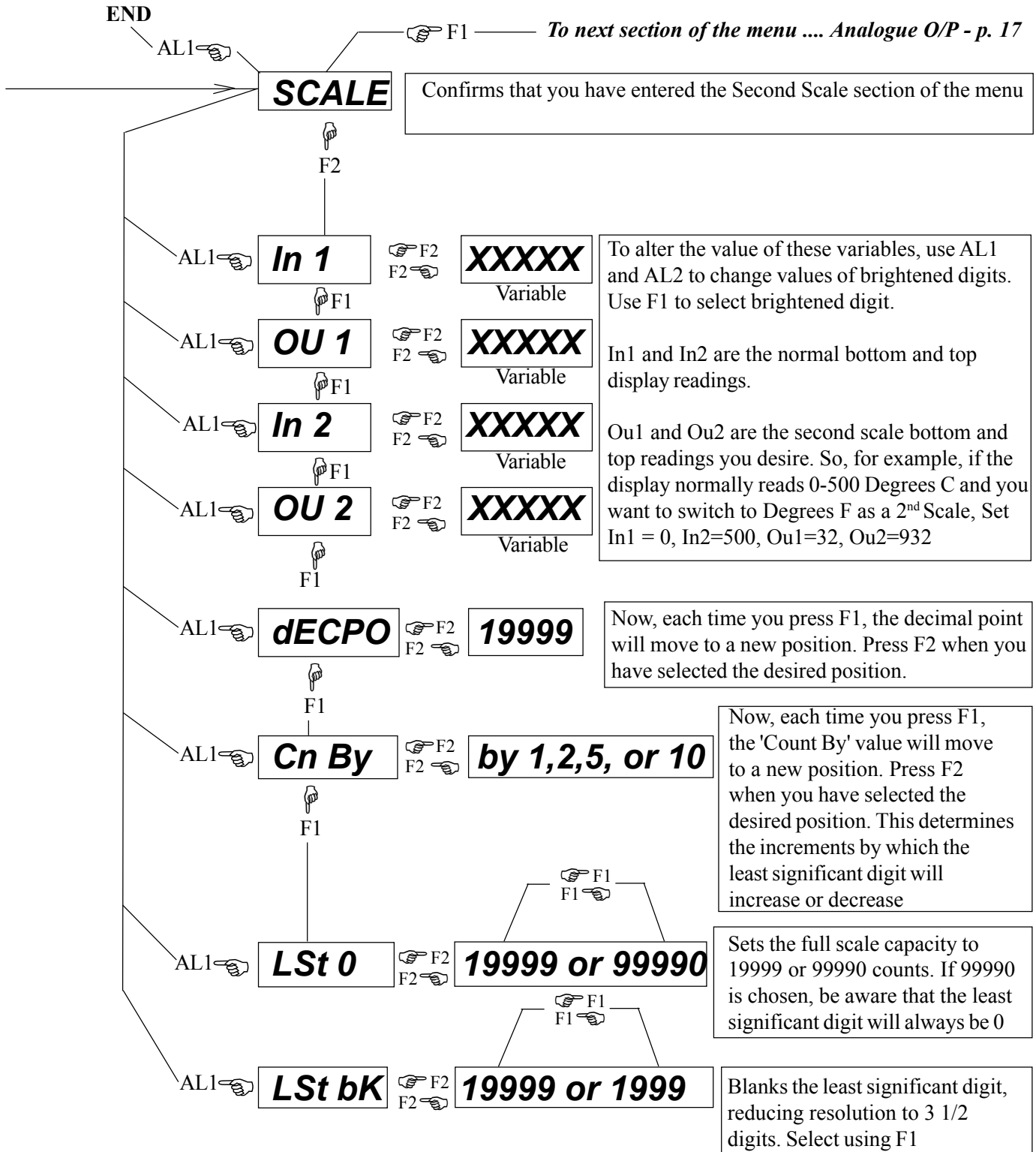


# Peak/Trough Detectors 1 & 2 Configuration



**To reset any stored peak or valley, simply press the peak button for more than 2 seconds.**

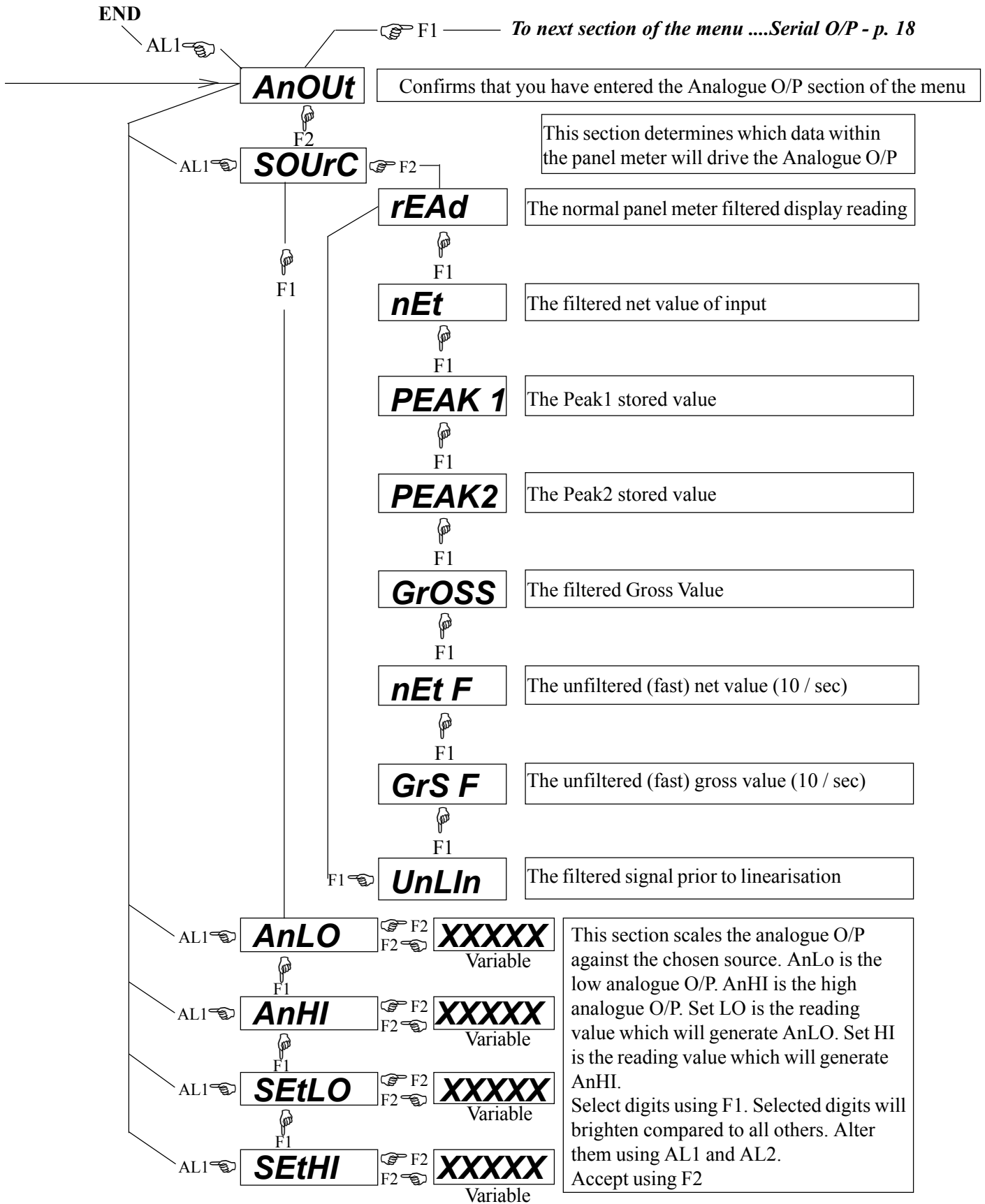
# Second Scale Configuration



### How to enable the second Scale:

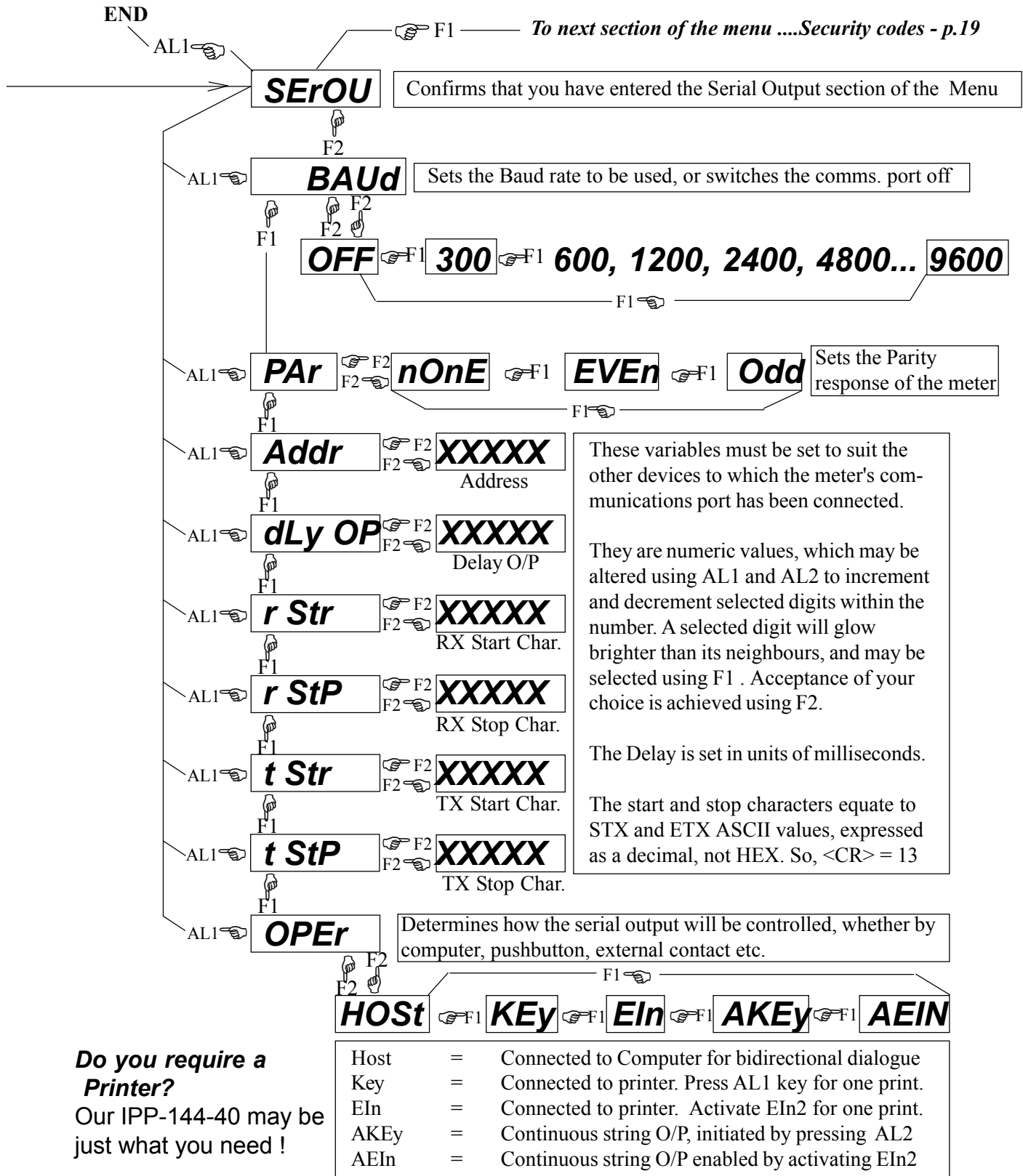
You can call up the second scale by setting the function of either F1 or F2 to be 'SC', or via the external input connectors. See page 13... "Function Keys & External I/P Configuration"

# Analogue Output Port Configuration



# Serial Output Port Configuration

Read this in conjunction with the meter's SERIAL COMMUNICATIONS GUIDE

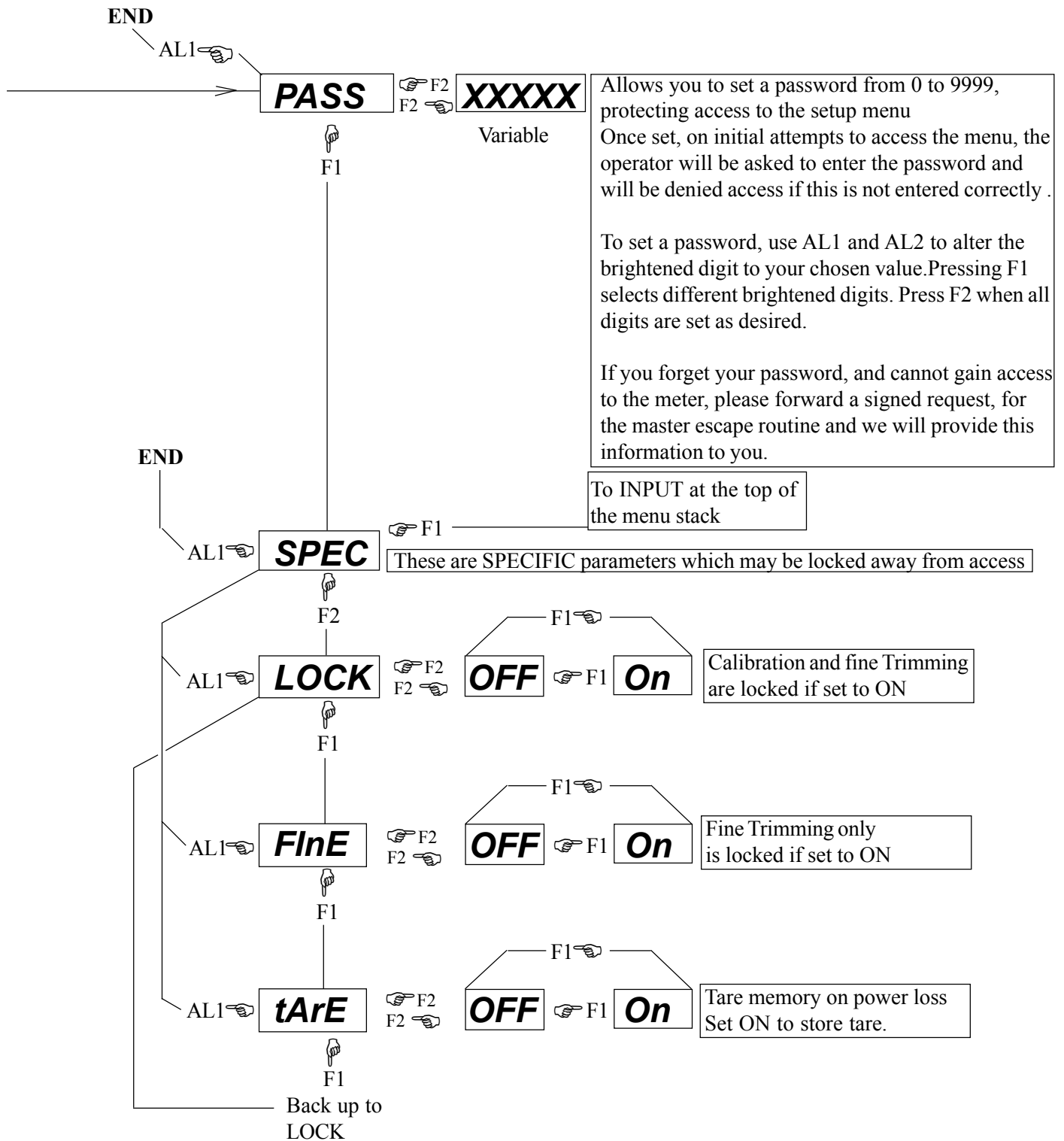


**Do you require a Printer?**  
 Our IPP-144-40 may be just what you need !

The reading data transmitted out of the serial port when it is configured for Key, EIn, AKEy or AEIn will either be the basic reading, the net, the peak, the gross or the unlinearised input, depending on the menu choice you made on page 17, for the analogue output, even if an analogue output board is not fitted.

See page 21 for some common hookup schemes in typical serial communications applications.

# Pass and Lock - Security Configurations



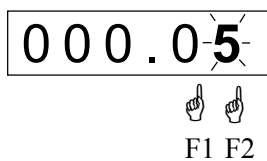
# Fine Trimming of Zero and Span

If you have performed a meter calibration from cold, or are performing an annual calibration check, you may find that the zero and span display values are slightly out and in need of re-trimming. This may be due to sensor ageing, warm-up drift of the meter, or because the sensor has been substituted for another with slightly different characteristics.

A simple routine exists which allows you to 'nudge' the zero and span display values to their desired readings, without having to enter the main menu routine.

You will need to be able to apply 0% and 100% of signal to perform this routine...

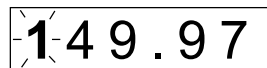
- 1) Apply 0% of signal and press F1 and F2 simultaneously



You will see that the right hand digit will brighten. This means that you may now nudge the display to read the desired value for 0% input. In this case, let us assume you require a display of 000.00

You should reduce the display by 5 counts. To do this, repeatedly press the 'DOWN ARROW' key, AL2. (if the display was too low, simply press the 'UP ARROW' key, AL1), You will need between 2 and 6 presses to reduce by 1 count. Keep pressing until the zero display is correct. Press F2 when the display reads correctly.

- 2) Now apply 100% of input signal.



You will note that the left hand digit is now brightened, meaning that you may now nudge the display to read the desired value for 100% input. In this case, let us assume that you require a display of 150.00

You should increase the display by 3 counts. To do this, repeatedly press the 'UP ARROW' key AL1. (if the display was too high, simply press the 'DOWN ARROW' key, AL2) Again, between 2 and 6 presses will be required in order to alter the least significant digit by 1 increment. Keep pressing until the display is correct.

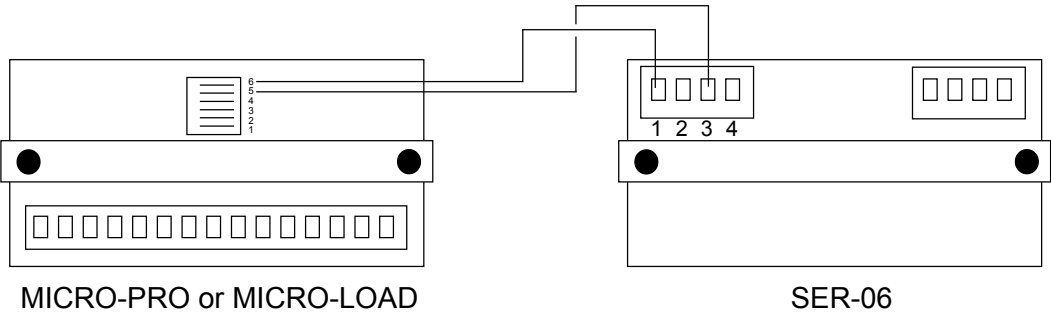
- 3) Press F2 to accept, and the fine calibration routine is complete. Check again by applying 0% and 100%

***For optimum accuracy, allow the instrument and sensor to thermally stabilise by having power applied to them for at least 15 minutes prior to performing a calibration.***



# Serial Communication application notes

1) Connecting a MICRO-PRO or MICRO-LOAD to an SER-06 remote display, to obtain a precise mimic of the meter's display at a remote location, using RS232, without incurring drift, or zero and span errors.



See p.1 Link pins 2 and 8 together  
 See p.18 Set Baud = 300, Par=none  
 Addr=00001, dly OP =00000, rStr=3  
 rStP=13, tStr=2, tStP=13, OPEr=AEIn

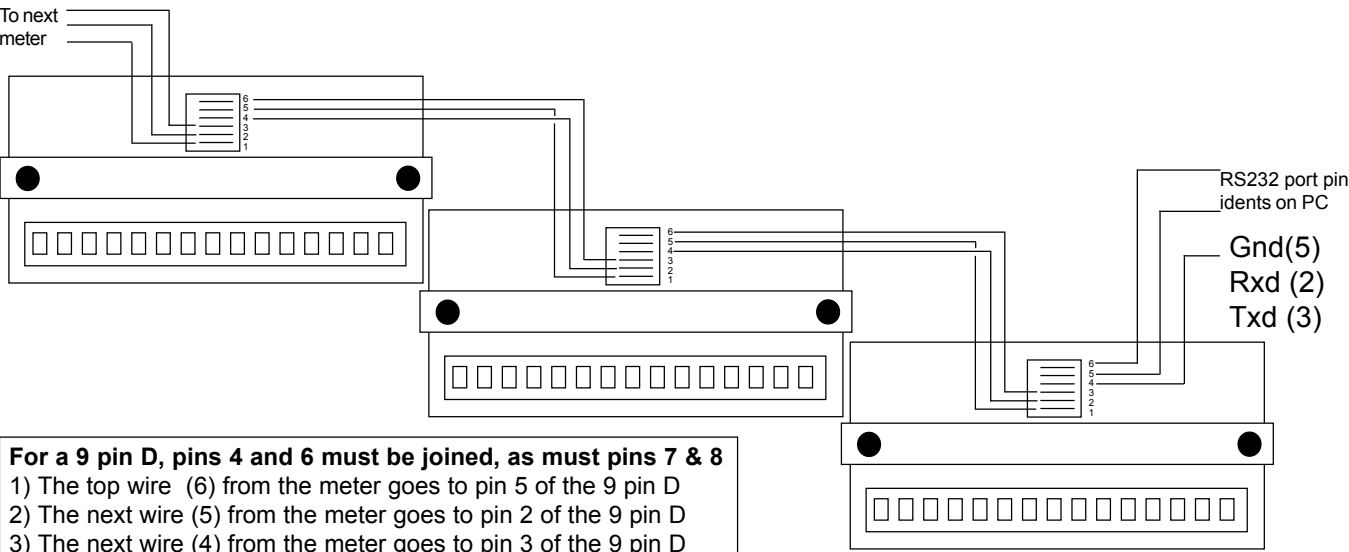
Refer to the SER-06 manual  
 See p.7. Set Baud=03,CnFg=1  
 Addr=00, Idle=30,Save=y.  
 Set jumpers for RS232 per p.5.

This scheme will permit distances of up to 300 metres between the two displays to be achieved. You must use screened twisted pair data cable, and route the cable away from noise sources such as power cables, solenoids, discharge lighting circuits, inverter supplies etc. If it is likely that you will be unable to avoid routing the cable through electrically noisy areas, you should use the RS485 output option for the MICRO-PRO/LOAD and configure the remote display to have RS485 jumper positions. Connect to terminals 2 and 3 of the SER-06 according to page5 in the SER-06 manual. note that the MICRO-PRO/LOAD does not provide a Signal common output in RS485 form, so you will only need to connect the two data wires.

If connecting to an S175X series of large display, use the same menu settings as for the SER-06, connect pin 5 of the RS232 O/P connector on the MICRO-PRO/LOAD to the Blue (Data A) wire. connect pin 5 to the yellow (Sig. common) wire. Set data jumpers for RS232.

2) Daisy chaining a group of MICRO-LOADS/PROS to connect into one RS232 port on a PC.

It is possible to connect up to 32 meters to one RS232 port on a PC, and to use the addressing facilities to allow the PC to individually obtain data from each meter in turn. The Serial communications Handbook should be used to obtain information regarding the various command and answer formats possible.



**For a 9 pin D, pins 4 and 6 must be joined, as must pins 7 & 8**  
 1) The top wire (6) from the meter goes to pin 5 of the 9 pin D  
 2) The next wire (5) from the meter goes to pin 2 of the 9 pin D  
 3) The next wire (4) from the meter goes to pin 3 of the 9 pin D

## NOTES

## NOTES

# Declaration of Conformity

Declaration Number : MICRO Series Iss. 2  
Issue Date : 21 April 1997  
Products Covered : MICRO-PRO & MICRO-LOAD  
Title : Microprocessor Panel Meter

This is to confirm that the Products covered by this declaration have been designed and manufactured to meet the following specifications :

Susceptibility: EN50082-2, IEC1000-4-2 / EN61000-4-2 / IEC801-2  
IEC1000-4-4 / EN61000-4-4 / IEC801-4, ENV50140  
IEC801-3, ENV50141, ENV50204

Emissions: EN50081-1, EN55014, EN55022

Safety: IEC348 / IEC1010

Mechanical IEC68-2-14, IEC68-2-6

Environmental IEC68-2-1, IEC68-2-2, IEC68-2-3, IEC68-2-14

Thus the products conform with the applicable sections of the following standards:

EN50081-2:1993 (normative)  
EN50082-2:1995 (normative)

and comply with the requirements of Council Directive 89/336/EEC relating to Electro-Magnetic Compatibility and IEC348/IEC1010 (72/23/EEC) relating to safety.

## Conditions

The meters are permitted a worst case error of 1% of A/D range during electro-magnetic disturbance, and must recover automatically when disturbance ceases without the need for human intervention, such as resetting, power-down etc.

The meters covered by this certificate must be installed in adherence to the following conditions :-

Signal cabling shall be routed separately to power carrying cabling (includes relay output wiring)  
All signal cabling shall be screened. The screen shall only be terminated at one end to a clean power earth terminal as near to the meter as possible.

Signed as true and correct, for and on behalf of London Electronics Ltd.

J.R. Lees  
Director