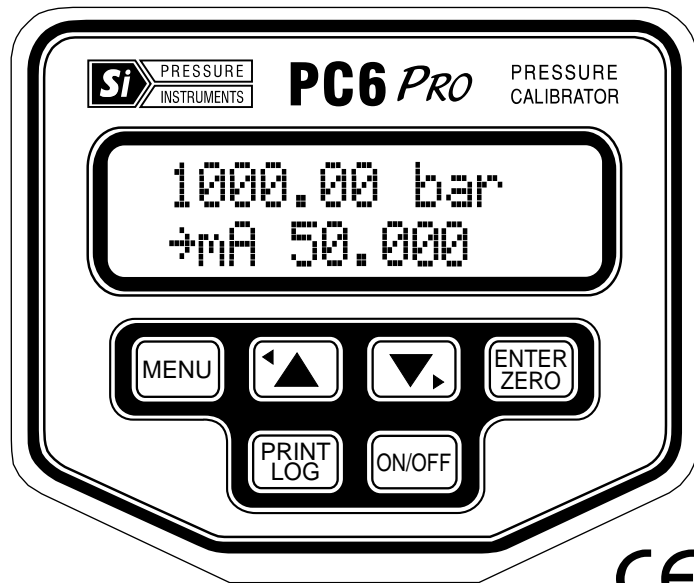


# PC6 *PRO*

# PRESSURE CALIBRATOR

# PC6 *operating* manual



CE

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# WELCOME

This detailed operating manual will help you to become familiar with the many features of the PC6-PRO Calibrator. The simple step by step instructions will quickly guide you through the procedures for using the calibrator and other items needed for accurately testing and calibrating numerous types of instruments. Please take time to carefully read the whole manual before you begin to use the PC6-PRO.

Two versions of the PC6-PRO are available:-

## **PC6-PRO Calibrator:**

All of the functions shown in this manual apply to this unit. The PC6-PRO Calibrator is supplied with a LTP1 Low pressure pneumatic pump for pressures up to 3 bar, TP1 pneumatic pump for pressures up to 40 bar or HTP1 hydraulic pump for pressures up to 1000 bar.

## **PC6-PRO Indicator:**

This is a simplified version of the PC6-PRO Calibrator and does not include the Voltage/Current input/output, or EPM functions.

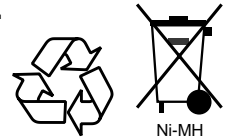
# **SAFETY WARNING!**

## **HIGH PRESSURE:**

**Uncontrolled release of high pressure is hazardous to personnel and may cause damage to equipment. Before connection of any pressure component to the PC6-PRO ensure that the component(s) is/are isolated from the pressure supply and any internal pressure is released slowly.**

## **RECHARGEABLE Ni-MH BATTERIES**

**Rechargeable Ni-MH batteries must be recycled or disposed of properly. May explode if damaged or disposed of in fire. DO NOT short-circuit. CAUTION: Use charger supplied by SI Pressure Instruments only.**



# QUICK REFERENCE

## Keys



Press to turn PC6-PRO on and off



Press to access the menus



Press to accept functions or settings



Press to move cursor up/left or increase values



Press to move cursor down/right or decrease values



Press to print/log/start event depending on previous setting

## Activating Functions



Select menu



position cursor  
under function



press the Enter key

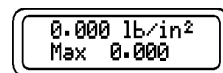
## Exit

To exit out of any menu select 'Exit' option,  
or press key.

## Menu Selection

Pressure

Display



1st Press for Menu 1



2nd Press for Menu 2



3rd Press back to Pressure Display



## Data Entry

Press or to position cursor and press to select required alphanumeric. Press key to release cursor.

For next data entry, repeat the above procedures then press once all data is entered

Note: To quickly scroll through alphanumeric lists hold down the or key.

**Tare** Hold down the key for 4 seconds while in the pressure display mode. The unit will beep after two seconds when the Max. and Min. values reset. After four seconds another beep will sound as the displayed pressure now resets to zero. **This is a temporary function and will be cancelled when the unit is switched off.**

# MANUFACTURER'S SPECIFICATIONS

Model		Pressure Range		Accuracy (FS) up to
		bar	psi	
PC6-PRO-0.1-C	G	-0.1 to 0.1	1.5	0.025%
PC6-PRO-1-C	G or A	-1 to 1	15	0.025%
PC6-PRO-2-C	G or A	-1 to 2	30	0.025%
PC6-PRO-5-C	G or A	-1 to 5	75	0.025%
PC6-PRO-10-C	G or A	-1 to 10	150	0.025%
PC6-PRO-20-C	G or A	-1 to 20	300	0.025%
PC6-PRO-25-C	G or A	-1 to 25	360	0.025%
PC6-PRO-40-C	G or A	-1 to 40	600	0.025%
PC6-PRO-70-C	SG	0 to 70	1000	0.025%
PC6-PRO-100-C	SG	0 to 100	1500	0.025%
PC6-PRO-200-C	SG	0 to 200	3,000	0.025%
PC6-PRO-350-C	SG	0 to 350	5,000	0.025%
PC6-PRO-700-C	SG	0 to 700	10,000	0.025%
PC6-PRO-1000-C	SG	0 to 1000	15,000	0.025%

G = Vented Gauge, A = Absolute, SG = Sealed Gauge  
( For Indicators, substitute 'C' with an 'I' ).  
Alternative pressure ranges are available to special order

**Overload Pressure** 10% FS  
**Pressure Display Resolution** 6 Digits  
**EPM**

External Pressure Modules are available in all of the above ranges. Differential units are available as EPM's. ( See Appendix for EPM details ).

Measurement	Range	Resolution	Accuracy	Input resistance
Voltage*	0 to 100mV	1uV	0.025%FS	1 M
(Auto Range )	0 to 5V	0.1mV	0.025%FS	1 M
	0 to 50V	1mV	0.025%FS	1 M
	0 to 50mA	1uA	0.025%FS	3

Sourcing	Range	Resolution	Accuracy	Max. Load
Voltage*	0 to 10V	0.2mV	0.025%FS	20mA
Current*	0 to 50mA	1uA	0.025%FS	330 Ohm

\* Temperature coefficient  $\pm 0.005\%$  of reading / °C w.r.t. 20°C

**Pressure Units** bar, mbar, Mpa, kPa, p.s.i, kg/cm<sup>2</sup>, atm, inH<sub>2</sub>O, mmH<sub>2</sub>O, mmHg, inHg, mmHg, unit1, unit2 (user defined, factory set only)

**Overload Warning** Flashing display and audible tone at 110% of FS

**Temperature Display** Temperature of pressure sensor module  
(Accuracy:  $\pm 0.5^{\circ}\text{C}$ )

**Pressure Switch Test** Status OPEN/CLOSED

**Operating Temperature** 0 to 50°C

**Calibration Temperature** 20°C  $\pm 2^{\circ}\text{C}$

**Calibrated Temp. range** 0 to 50°C

**Storage Temperature** -20°C to 70°C

**Temperature Effects** 0.001% of reading/°C between 10-40°C

**RS232 Parameters** baud rate 1200, 2400, 4800, 9600, stop bits 1 or 2, status ON/OFF

**Zero Reset** Manual keyboard operation

**Data Capacity** 437 records into a maximum of 20 files, 32k memory additional 585 records, ( 32k memory option available )

**Display** Backlit LCD, 16 character x 2 line alpha numeric

**Humidity** 5 to 95% Relative Humidity non condensing

**Resolution Select** Increase or decrease by a factor of 10

**Power Supply** 6V NI-MH rechargeable battery pack (see warning page ii)/ mains operation via charger (supplied).

**Voltage Output** Regulated D.C supply 10V  $\pm 0.1\%$  max current 30mA

Unregulated D.C supply 24V  $\pm 10\%$  max current 50mA

**Battery Life** Fully charged: up to 10 hours

**Recharge Time** 14-16 hours for full charge

**Low Battery** Continuous check, audio and visual warning

**Dimensions** 92 x 110 x 59mm

**Weight** 850 grams (Calibrator head only)

**Microprocessor** H8/2138

**Recommended Recalibration Period** 1 Year (Max)

# MANUFACTURER'S SPECIFICATIONS (continued)

## Electrical Connections

Ground	Standard 2mm socket
Voltage/Current Input/output	Standard 2mm sockets
Pressure Switch Input	Standard 2mm sockets
Battery	2 pole miniature round connector
RS232	8 pole miniature round connector
EPM (P2)	14 pole miniature round connector

**Pressure Media** Water, Mineral Oil, Non-corrosive gases  
(for other media, contact SI).

**Pressure Connection** 3/8"BSP male 'quick-fit' / 1/4"BSP or 1/4"NPT male  
(Pneumatic).  
3/8"BSP female 'quick-fit' / 1/4"BSP or 1/4"NPT male  
(Hydraulic).

**Software (optional)** The '**SiCal**' software will present downloaded data in various graphical forms such as gauges or a scrolling bar & remotely control the PC6-PRO via the RS232 cable linked to a PC. The downloaded data can be stored in a variety of file types compatible with most analysis database and word processing programs.  
Cal. procedures can be uploaded to the PC6-PRO.

System requirements:  
486 with maths coprocessor.  
Windows 3.1 or higher is required.

# **DESCRIPTION**



## 1.0 Introduction

The PC6-PRO Pressure Calibrator is a microprocessor controlled, precision instrument powered by an internal 6V rechargeable battery pack. It is portable and capable of accurate pressure measurement, voltage or current measurements and sourcing when calibrating transducers, pressure switches, etc. This section describes the equipment from an external viewpoint, allowing the user to become familiar with the various controls and connections provided.

### 1.1 General

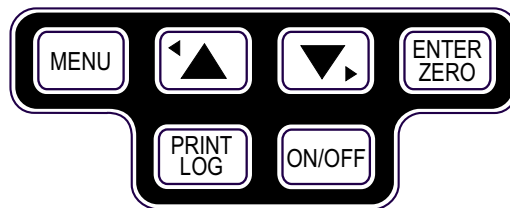
The PC6-PRO is housed in a three part anodised aluminium case with a liquid crystal display unit at the front and a six button membrane keyboard.

The main body contains the circuitry, connections, internal transducer and battery pack.

### 1.2 Keypad

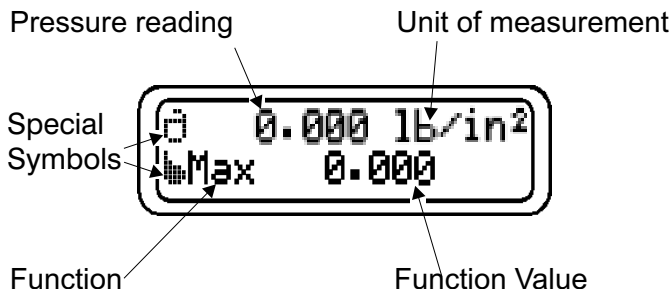
The Keypad is a non-tactile membrane keyboard with six buttons. The keyboard layout is shown below.

**Note:** An audible tone accompanies every key operation.



### 1.3 Liquid Crystal Display (LCD)

The LCD is a 16 character x 2 line alphanumeric LED backlit display which is capable of displaying special characters.



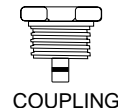
### 1.4 Connection Panel (See Page 4, Fig 2)

The connection panel is located at the top of the case and provides input / output connections as detailed in Fig.2

**1.4.1** Six standard 2mm electrical sockets mounted along the top of the case provide input or output current and voltage and switch status.

Voltage outputs of 10 and 24V are available for use with sensors, transducers, transmitters, etc.

**1.4.2** Pressure connections are made to either a 3/8"BSP (1/4"BSP / 1/4"NPT adaptors) male for low pressure systems (below 40 bar) or 3/8"BSP female (1/4"BSP / 1/4"NPT adaptors) for systems greater than 40 bar.



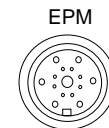
**1.4.3** An 8 way circular miniature connector is used for communication with RS232 standard communication protocols/equipment. The user software '*SiCal*' (optional) can be used to remotely monitor or download data from the PC6-PRO via this connector. (Optional RS232 cable - Part No. 01-0625)



**1.4.4** The 2 way circular miniature connector is used for the battery charger (provided).



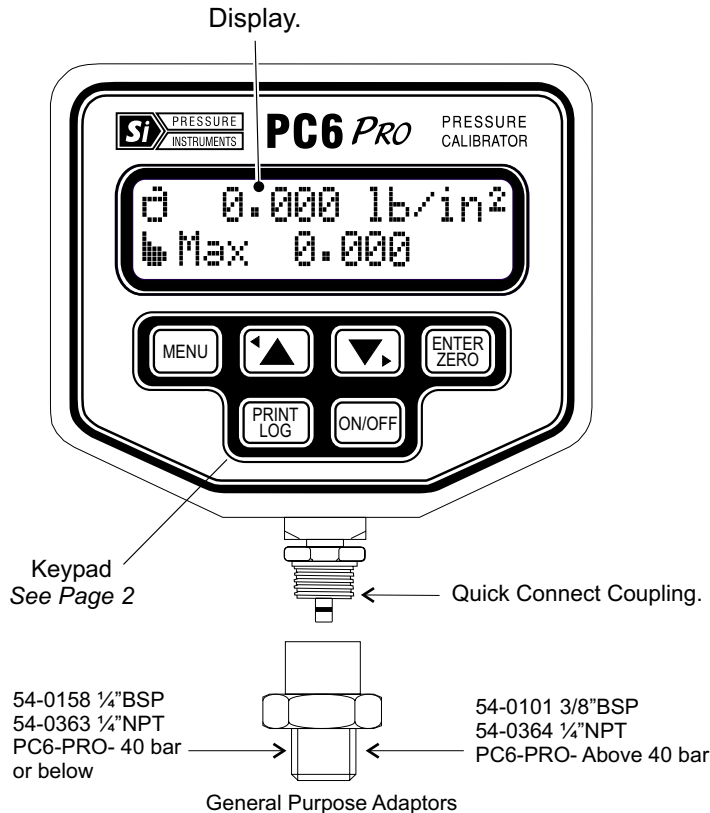
**1.4.5** The 14 way circular miniature connector is used to connect to the EPM (External Pressure Module). These optional modules cover pressure ranges from 0 to 1000 bar.



# ARRANGEMENT OF PC6-PRO

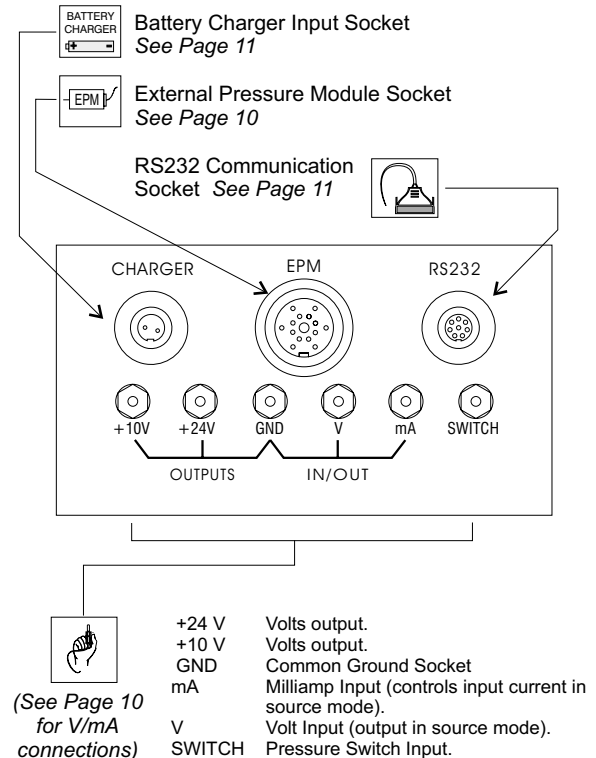
## Front View: LCD & keypad

Fig 1



## Top View: connection panel

Fig 2



# FUNCTIONS (MENU 1)

**PRESSURE DISPLAY** - Allows the user to operate the PC6 for pressure measurements. (Display Functions)

## Menu 1

<b>UNITS</b>		Selection of pressure unit.			
—	bar	bar	----	mbar	millibar
—	MPa	MegaPascals	----	kPa	kiloPascals
—	p.s.i	pounds force per square inch	----	kg/cm <sup>2</sup>	kilograms force per square centimetre
—	atm	atmospheres	----	inH <sub>2</sub> O	inches of Water (at 4°C)
—	mH <sub>2</sub> O	metres of water (at 4°C)	----	mmH <sub>2</sub> O	millimetres of water (at 4°C)
—	inHg	inches of Mercury (at 0°C)	----	mmHg	mm of Mercury (at 0°C)
—	Unit1	user defined unit ( <b>Factory Set Only</b> )	----	Unit2	second user defined unit ( <b>Factory Set Only</b> )
—	Exit	Returns to menu 1			
—	<b>MAX</b>	Displays the maximum pressure measured since the last reset (50 samples per second).			
—	<b>MIN</b>	Displays the minimum pressure measured since the last reset (50 samples per second).			
—	<b>%</b>	Displays the pressure as a percentage between user pre-set high and low alarm values.			
—	<b>TARE</b>	Displays the pressure at the time of tare.			
—	<b>V / mA</b>	Volts / milliamps functions			
	<b>Measure</b>	Displays the following input measurements.			
	— <b>Actual</b>	Displays actual input measurements.			
	— <b>Converted</b>	Displays converted input measurements.			
	— <b>Exit</b>	Returns to Pressure Display.			
	<b>Source</b>	Displays the following outputs.			
	— <b>Actual</b>	Displays actual output measurements.			
	— <b>Converted</b>	Displays converted output measurements.			
	— <b>P to V / P to mA</b>	Displays Pressure to Volts / milliamps conversion.			
	— <b>Exit</b>	Returns to Pressure Display.			
	<b>Exit</b>	Returns to pressure display			
—	<b>SWITCH</b>	Indicates the status of the pressure switch under test (OPEN/CLOSED).			
—	<b>Leak</b>	Allows the PC6 to measure pressure changes over time.			
	— <b>Start</b>	Starts the leak test.			
	— <b>Set-Time</b>	Sets the leak test time.			
	— <b>Exit</b>	Returns to Pressure Display.			
—	<b>Temp C</b>	Allows the user to monitor the temperature around the selected pressure transducer in pressure display mode.			
—	<b>Date &amp; Time</b>	Allows the user to monitor the date & time of the on board real time clock in pressure display mode.			
—	<b>File</b>	Allows the user to view or manipulate a file previously stored in the filing system.			
	— <b>View</b>	Allows the user to see logged file.			
	— <b>Export</b>	Outputs a logged file			
	— <b>Import</b>	Imports a file ( refer to 'SiCal' Instructions for exporting files to PC6 PRO)			
	— <b>Delete</b>	Deletes a logged file.			
	— <b>Exit</b>	Returns to Pressure Display.			
—	<b>Exit</b>	Returns to Pressure Display mode. ( <i>SHORTCUT: To abort any menu level, simply press the MENU key</i> ).			

## SETTING MENU - To set user specific functions. (Set Functions)

### Menu 2

High	Allows the user to set a High Pressure Alarm Limit. (by using the increase/decrease facility above which an alarm sounds.)
Low	Allows the user to set a Low Pressure Alarm Limit. (by using the increase/decrease facility below which an alarm sounds.)
V / mA	
Measure	Voltage / current input settings for Converted Measurement.
Zero	Set Zero.
FS	Set Full scale value.
Text	User defined measurement text.
Root	Switch measurement root function 'on' or 'off'.
Exit	Reverts back to Pressure Display.
Source	Voltage / current output settings.
Range	Sets the following values:-
Zero	Sets Zero value
FS	Sets Full Scale value
Exit	Returns to Source sub-menu.
Convert	Sets the following converted values:-
Zero	Sets converted Zero values.
FS	Sets converted Full Scale values.
Text	User defined converted text.
Exit	Returns to Source sub-menu.
P to V / mA	Sets Pressure to V / mA conversion factors.
Zero	Set zero values.
FS	Set Full Scale values.
Exit	Returns to Source sub-menu.
Setup	Sets the parameters for voltage/current sourcing.
Status	Switches output on or off.
Root	Switch sourcing root function 'on' or 'off'.
Step	Set step value (%FS)
Ramp	Settings for Ramp mode
Status	Switches ramp mode on or off.
Rate	Sets the ramp rate (V or mA/Sec).
Dwell_time	Sets the time for which the output remains at the same level.
Exit	Returns to Source sub-menu.
Exit	Returns to Pressure Display.
Vout	Switches the Power Supply outputs +10V & +24V ON or OFF
Display Light	Switches ON or OFF the LED back light.

## FUNCTIONS (MENU 2) Continued.

Resolution		Selects low, normal or high resolution.
Event		Sets up the event status for RS232 output and for logging functions.
	Key	Sets key driven output or logging.
	Timed	Sets timed output defined by the user.
	Exit	Reverts back to Pressure Display.
Log		Allows the user to setup, amend and view files for logging.
	Log	To select a log file and start logging.
	View	To look at a file.
	Delete	Deletes a file.
	Status	To enable or disable logging.
	Export	To export logged files.
	Import	To import files from a PC. (see 'SiCal' software instructions for exporting files to the PC6)
	Exit	Reverts back to Pressure Display.
RS2332		Settings for RS232 communications.
	Status	To enable RS232 communication.
	Baud-rate	To select the baud rate.
	Stop-bits	To select the number of stop bits.
	Exit	Reverts back to Pressure Display.
Date/Time		Sets up Date & Time parameters
	Set	Sets the date & time.
	View	To look at date & time.
	Exit	Reverts back to Pressure Display.
Language		Allows user to change language.
Zero		Will reset pressure reading to Zero. ( This will remove Zero offset permanently / NOT available for absolute units ).
Port		Selects current pressure module (P1, P2, DPM)
Power_Off		Allows the user to set Power_Off time or to switch the function on or off.
	Key	Switches the auto-power function off.
	Timed	Allows the user to set the auto-power off time in minutes.
	Exit	Reverts back to Pressure Display.
Exit		Returns to Pressure Display

## FUNCTIONS (MENU 3)

### CAL MENU

#### Menu 3

<b>ZERO</b>	Allows user to set zero. ( for absolute units, see page 32 )
<b>CONTINUE</b>	Starts zero calibration procedure.
<b>EXIT</b>	Returns to Cal Menu.
<b>SPAN</b>	Allows user to set span.
<b>CONTINUE</b>	Starts span calibration procedure.
<b>EXIT</b>	Returns to Cal Menu.
<b>HISTORY</b>	Allows user to see overload and zero-span history.
<b>OVERLOAD</b>	Displays period of time over which overload occurred.
<b>ZERO-SPAN</b>	Displays date last calibrated, last span set, range and overload value.
<b>PC6 S/No</b>	Displays the unit's serial number.
<b>PM S/No</b>	Displays the serial number of the currently selected pressure module.
<b>EXIT</b>	Returns to Cal Menu.
<b>Language</b>	Allows user to download different languages.
<b>EXIT</b>	Returns to Pressure Display.

# **OPERATING INSTRUCTIONS**



## 1.5 Introduction

The PC6-RPO enables the user to carry out checks on pressure transducers, transmitters, pressure switches, pressure gauges and process indicators quickly and accurately. It is intended for use as a portable, on-site calibrator, used in close proximity with the equipment under test and without the need to remove the unit from its parent system. This section describes the connections to be made when checking switches, transmitters, etc. It also lists menu options, selection procedures and purpose of options available.

## 1.6 Connections

**1.6.1 Pressure Input** The PC6-PRO measures pressure directly via the connector found underneath the case (i.e. the connection between the PC6-PRO and a hand held pressure test system). Alternatively, connect the item under test to the PC6-PRO with the adaptor and seals provided.

### 1.6.2 EPM (External Pressure Module)

Different pressure ranges can be read by attaching an External Pressure Module to the 14-way socket.

(See Fig.3 opposite)

**Warning:** The PC6-PRO must be switched off prior to connecting or disconnecting EPM.

**1.6.3 Voltage / Current Input / Output** Voltage and Current readings can be taken by connecting the outputs from the item under test to the 'V' or 'mA' and 'GND' input sockets on the connection panel using the connection leads provided.

**Warning:** When measuring voltage or current, make sure 'GND' is connected (where applicable, see fig. 3a)

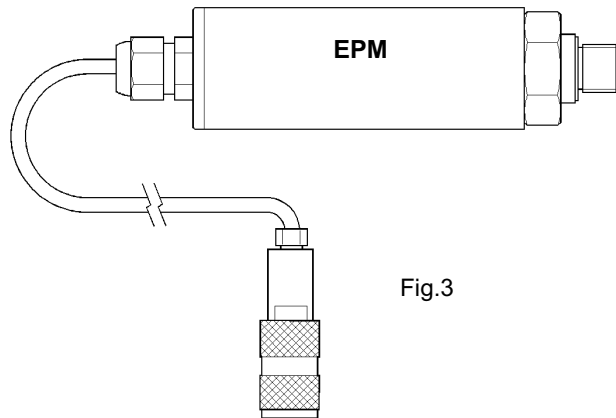


Fig.3

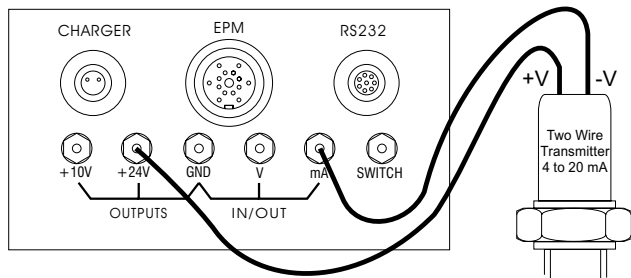
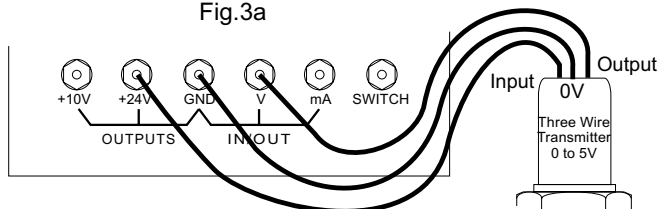


Fig.3a



**1.6.4 Switch Test** The switching pressure of a pressure switch can be monitored by connecting the contacts of the pressure switch between the INPUT 'GND' and 'SWITCH' sockets on the connection panel and pressurizing the pressure switch.

**1.6.5 RS232**

If the RS232 facility is to be used then connections to the 8-way socket must be made to the specifications given in the table below. Alternatively an RS232 communication cable can be purchased from SI suitable for most RS232 applications as shown below.




**RS232 Connections Table**

PIN No.	INPUT/OUTPUT	SIGNAL	STATE
1	Output	Data Terminal Ready (DTR)	Held High
2	Output	Transmit Data (TxD)	
3	Input	Receive Data (RxD)	
4	Output	Request To Send (RTS)	
5	Input	Clear To Send (CTS)	Active High
6	Output	Do not use	
7	Common	Ground	
8	Input	Do not use	




**Note:** Pin 6 and pin 8 should not be used.

**RS232 Output**

Connect the PC6-RPO to a printer or computer using a suitable cable (not supplied) as detailed above and set the parameters as detailed in Para. 2.6 & 2.8. The output can now be obtained as 'single shot' or 'timed' as follows:

**Single Shot** - This output is always available in Display mode when RS232 status & Log status are OFF. The output is obtained each time the  key is pressed (provided any previous output is complete).

**Warning:** The PC6-PRO must be switched off prior to connecting or disconnecting the RS232 cable.

**Timed** - This output is available in Display mode when RS232 status is ON & Log status is OFF. The output cycle is initiated by pressing the  key. Pressing the  key cancels the output. Once initiated, the output is repeated at the selected time interval (see 'Event' function, page 26 ) until the  key is pressed.




**1.6.6 DPM** (Digital Pressure Module) An alternative to the EPM, the DPM communicates via the RS232 socket and is available in -1 to 1000bar/15,000psi pressure ranges with accuracies up to 0.025%

**1.6.7 Battery Charger** The internal battery pack may be recharged (when indicated by the battery low message) by plugging the charger (supplied) into the 'CHARGER' socket.

**CAUTION:** When recharging internal batteries, only the charging unit supplied with the PC6-PRO should be used.

**1.6.8 Voltage Output** A voltage of +10V or +24V may be sourced from the PC6-PRO by connecting to the 2mm sockets. A typical application for this voltage output would be to power a pressure transmitter. ( see Fig. 3. page 10 )

To switch on voltage output function:-

- a) Press the  key twice to activate 'Set' menu.
- b) Select 'V-out' and press the  key.
- c) Select 'ON' and press the  key.

## 1.7 Messages & Parameters

The PC6-PRO registers pressure input at switch on after the initial start-up message. The pressure reading is displayed on the top line of the LCD (see Page 3). Pressure values are monitored, alarm values are compared, alarm warnings and other information messages displayed until the unit is switched off.

### Memory Errors:

Any read / write errors to memory detected at switch on will be reported as: Memory Error 'Error No.'

*Error Numbers:-*

**0** - Onboard eeprom;      **8** - IPM;      **9** - 2nd Onboard eeprom.

Errors with Pressure Modules will be indicated by the message "No P1 (P2 or DPM) proceeded by "PM EEPROM ERROR" at power on.


**1.7.1** When switched on, the unit registers the same state as when last switched off. The display mode (Operating/Set), units of measurement, function and parameter settings, alarm limits and RS232 output control, EPM selection, logged parameters are all retained at switch off, with the exception of the following conditions:

**1.7.2** A battery low state occurring prior to the switch off. When switched on, the unit registers the latest retained set of parameters.

**1.7.3** Any TARE value set during use is not retained and therefore should be set, if required, each time the unit is switched on.

**1.7.4** Maximum and Minimum values are not retained. Current values reflect pressure monitored from the start of the pressure input.

**1.7.5** If the unit is switched off during a LEAK test then the test will be void. When switched on again the unit will start up in LEAK test mode.


**1.7.6 Switch off** When the  key is pressed the 'switch off' message is displayed for two seconds accompanied by an audible bleep (Bleep rate 1 Hz). Normal operation may be resumed by pressing any key during switch off.

**1.7.7 Auto Switch off** The PC6-PRO will automatically turn itself off after a set period (See Page 31 for instructions)


**1.7.8 Pressure Overload** (Bleep rate 4 Hz) 'OVERLOAD' occurs when input pressure exceeds overload pressure level.

**1.7.9 Low Battery Detect** (Bleep rate 1 Hz). 'Low Battery' occurs when internal battery pack drops below 5.5V. Message flashes for 4 seconds, after a further 30 seconds, low battery detection is re-enabled.

**1.7.10 Pressure Switch State Change** (Bleep rate 2 Hz)

Occurs in pressure mode with the pressure switch state display being selected. When the connected pressure switch changes state, the pressure value (upper line) is frozen and the pressure switch state (lower line) display is flashed at 1 Hz unless a log file is open. Normal display update resumes when the  key is pressed.


**1.7.11 Printer Busy** (Bleep rate 1 Hz)


If the receiving device is not ready for input (e.g. device not connected or handshake LOW), 10 seconds after starting an output cycle (single shot or timed output) the message 'Printer Busy' is flashed on the display, together with an audible warning. If the device does not accept input within the next 5 seconds then the output cycle is cancelled and output is stopped until the  key is pressed again.

**1.7.12 Outside User Set Alarm Values** (Bleep rate 2 Hz)

Occurs when measured pressure is lower than the user set Low alarm value or greater than the user set High alarm value and the 'outside limits' message is flashed. Indication ceases when pressure is equal to either alarm value or between the values.

**1.7.13 Display Hold** (Bleep rate 2 Hz)

Occurs in pressure mode. If the  key is pressed once (less than 1 second) the pressure value (upper line) is frozen and the lower line is flashed with the 'Display Hold' message at 1 Hz. Normal display update resumes when any top row key is pressed.

**Note:** The display contents can be printed out during display hold by pressing the  key.

### 1.7.14 Connection Fault:


In voltage / current source mode, if the PC6-PRO is unable to control the voltage/current output (e.g. because there is no loop back in the current mode), the message "Connection Fault" will flash on the lower line accompanied by a bleep at 1 Hz. The message will continue until the fault is rectified or the user exits from source mode.

### 1.7.15 Short Detected:


If the 24V output is ON and it is shorted to 0V, the message "Short detected" will be displayed on the lower line accompanied by a bleep at 1 Hz. This message will be cleared when any key is pressed. In this condition the 24V supply will be switched off for safety.

### 1.7.16 Voltage / Current Overscale:

In Voltage measure mode, if a voltage in excess of 55V is connected to the PC6-PRO the message "OVERSCALE" will be displayed on the lower line, until the voltage falls within the input limits.

In Current measure mode, a current in excess of 55mA enters the mA terminal, the PC6-PRO will display "OVERSCALE" on the upper line and the lower line will scroll the message "Check connections: Press MENU to continue". Pressing the  key will remove the message provided the current measured is within range. This message may also appear in the source mode under connection fault conditions. Source mode will change to measure mode for safety.

If the current overscale message occurs when the PC6-PRO is in timed RS232 output mode, the unit will exit from the timed output mode.

If there is an excess voltage at the mA input when the PC6 is placed into current measurement mode, the message "Connection Fault" will be scrolled on the lower line. Once the fault has been rectified, press the  key to return to measuring mode.

### 1.7.17 RS232 Output Format

The output format is as follows:

LF

Time & date (23:13:30 081100) +LF

display top line (16 characters ) + LF

display lower line (16 characters ) + LF

alarm flag (1 character ) + LF

### 1.7.18 Alarm Flags

A single character is output to indicate the various pressure alarm conditions as given below:

*	overload pressure level exceeded (pressure warnings, 1.7.8 & 1.7.12)
>	pressure exceeds user set high limit
<	pressure below user set low limit
" "	a space if no alarms apply.
c	connection fault
s	short detected







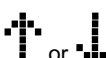

**Note:** If two (or more) conditions occur which require a message display, the highest priority condition in the above list will be displayed. The sequence of messages given above set the priority except 'Switch Off' which comes last.

### 1.7.19 Display Symbols\*

	Log Status ON		Log Status ON File Open		Rs232 Output Status ON		DPM Status ON
---	---------------	---	-------------------------	---	------------------------	---	---------------

	Pressure Port 1 selected		Pressure Port 2 (EPM) selected
---	--------------------------	---	--------------------------------

#### Top line symbols

	Timed Log / output		Keyed Log / output		Source Step Mode or		Measure Mode & P-V / P-mA
	Nudge Mode (UP)		Nudge Mode (DOWN)		Source Mode Ramp or		Root Function





#### Bottom line symbols

\* If more than one symbol is applicable, they are displayed alternatively.

# **HOW TO SELECT FUNCTIONS (MENU 1)**

## 1.8 Units





To change the units of pressure, proceed as follows:

- Press the  key once, then press  key to choose the units sub-menu
- Select kPa by pressing the  key and then press  key.

The display will indicate the pressure in kPa and the pre-selected 2nd line function.

## 1.9 Max., Min., Switch, Temp °C, Date & Time, %


To display any one of these functions, proceed as follows:

- Press the  key once and then scroll to the required function using the  or  key and then press  key to select it.

The display will show the pressure on the top line and the 2nd line will show the function that has now been selected.

### 1.9.1 Tare:

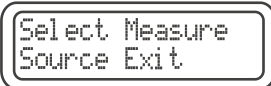
The Tare value can be displayed on the bottom line by selecting 'Tare' from the menu using the  key and pressing the  key.

To activate **Tare** function: hold down the  key for 4 seconds while in the pressure display mode. The unit will bleep after two seconds when the Max. and Min. values reset. At four seconds another bleep will sound as the displayed pressure now resets to zero. This is a temporary function and will be cancelled when the unit is switched off.


### 1.9.2 V, mA (procedures are the same unless otherwise stated)

Two main options are available for 'V' and 'mA':-


- Select 'Measure' for V and mA input.
- Select 'Source' for V and mA output.



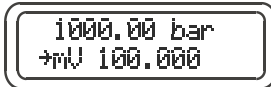
Select Measure  
Source Exit

To measure input voltage or current select 'Measure' and press the  key.



Two options are now available; 'Actual' and 'Convert'.

- 'Actual' is selected by pressing the  key.

An example display below shows the Measure Mode symbol on the second line.



1000.00 bar  
mV 100.000

- Select 'Convert' using the  key and press the  key. To setup the conversion parameters, i.e. zero, full scale or text; see 2.3 on page 22.

To output voltage or current:-

- Select 'Source' using the  key and press the  key.



Three options become available; 'Actual', 'Convert' and 'P→ V' / mA.






- 'Actual' is selected by pressing the  key.

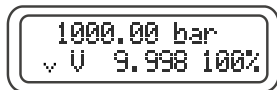
An example display below shows the Source Mode symbol on the second line.



1000.00 bar  
V 10.000 100%

- Select 'Converted' using the  key and then pressing the  key. To set the converted parameters refer to section 2.3.1 on page 23.

- Select 'P→V' /mA using the  key and then press the  key. To set the parameters for this Pressure to Volts / milliamps conversion refer to section 2.3.1 on page 23.
- By pressing and holding the  key for more than two seconds whilst in 'Source Mode' you will activate a 'Nudge' function allowing the source value to be increased or decreased, the longer you hold down the  or  key, the larger the nudge increments will be (see Page 25 for more information).






**Note: NOT Available in Ramp or P-V / P-mA modes**

By pressing and holding the  key again for more than two seconds, the nudge function will be cancelled.

## 2.0 Leak Test

To carry out leak tests, proceed as follows:



- Press the  key once and scroll to the 'Leak' function using the  key. Press  key to select.

Presented with the leak test sub menu, the options 'Start' and 'Set Time' are given as shown below.







### Leak Sub-menu



**'Set Time'** To set the duration of the leak test.


Scroll using the  key to select 'Set Time' and press the  key.




With the first digit now flashing, press  and then select the number required using the   keys and press  key. ( e.g. time set to 999 min.)






With the second digit flashing, press  and again select the number required and press  key.

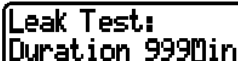



Repeat procedure for third number and press  key.



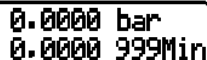
Now select the units of time measurement ( e.g. seconds, minutes, hours, days, etc. ) Scroll through the units with the

  keys and press .






Once the leak test time has been set press the  key to return to the leak test sub-menu.

- Select 'Start' using the   keys and press .



The top line shows 0.0000 pressure and the bottom line shows the current pressure.




- Start the leak test by pressing the  key.
- The top line displays the difference in pressure while the bottom line shows the start pressure and the time counting down.
- When the leak test has finished, to start the leak test again press the  key once to reset the time and again to start the test.
  - If no other leak test is to be carried out, press the  key to return to the leak test sub-menu.



## 2.1 File







This function allows the user to view, export, Import and delete previously stored files.

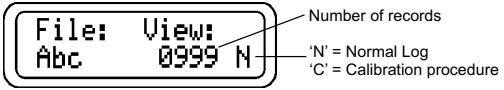
To use the filing system proceed as follows:



- Switch the unit on.
- Press the  key once and scroll to 'File' using the  key and press .

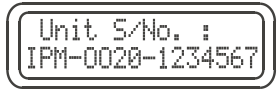




2.11 To view a file, proceed as follows:

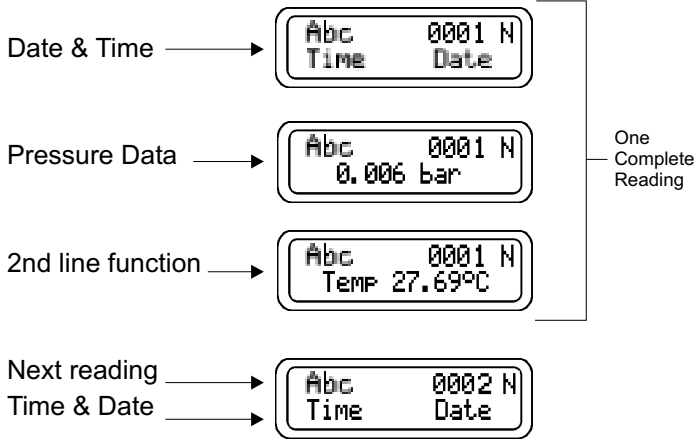
- Select 'View' using  key and press .
- The latest filename is shown in the bottom left hand side of the display. The record count is shown in the bottom right hand side. To select this file press . If another file is required then scroll through the filenames using the   keys and then press  key.







- To move through the record now selected, press the  key or the  key. This will first show the 'IPM / EPM' serial number from which data was read.



- To view the following records in the selected file use the  or  key to advance to the next screen.








Pressing the  or  key will enable the user to go through the records. Once the last record has been viewed an \*\*END\*\* message is displayed. The records then 'wrap around' so the user can move to the first or last file record using the   keys.

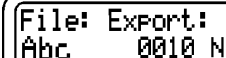
**Note:** At the time of logging, if the pressure is above or below the set limits then a 'High' or 'Low' message will appear after the Pressure Data screen.



## 2.1 File (continued)

2.12 To *Export* a file, proceed as follows:




- Scroll the cursor using the  key and select 'Export' and press the  key.
- Select a file to export using the   keys and press the  key





File: Export:  
Abc 0010 N

Note: Files can be exported to 'SiCal' software

2.13 To *Import* files, proceed as follows:

- Scroll to 'Import' using the  key. Once you finished a calibration procedure in 'SiCal', click on 'Export', press the  key on the PC6-PRO to download. The message "downloading Cal" will be displayed. Once SiCal gives "All done" message, press the  key
- Choose 'Yes' when prompted to 'Stop?'






2.14 To *Delete* files, proceed as follows:

- Scroll the cursor using the  key and select 'Delete' and press the  key.

The following options are available:



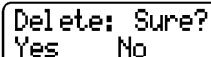
Delete: File All  
Exit

- If you want to delete a particular file then select 'File' using the  key and then press the  key.
- Select a file to delete using the   keys and press the  key.





Delete: File:  
Abc 0010 N

The unit will then display:





Delete: Sure?  
Yes No


If you are sure that the file is to be deleted then the 'Yes' option should be selected using the  key and then entered using the  key.

Once the operation is completed the display will return to the 'File' sub-menu.

If another file is to be deleted then repeat the procedure.

If no more files are to be deleted then press the  key to return to the pressure display.


**Note:** Pressing the  key once at any time during the procedure will take you back to the 'File' sub-menu.

If all the files in the PC6-PRO are to be deleted then select 'ALL' in the Delete sub-menu and press the  key.

The following message is displayed:



Delete: Sure?  
Yes No











- Select 'Yes' or 'No' and press the  key.

# **SET- MENU**


## **(MENU 2)**

## 2.2 Alarm settings 'High', 'Low'

To set High or Low pressure warning limits proceed as follows:

- Press the  key to switch on the PC6-PRO.
- Select the 'Set' menu by pressing the  key twice.
- Select 'High' or Low' by pressing the  key and then press the  key.
- Select the digits to be set by moving the cursor with the   keys and pressing the  key.
- Set the number to the required value using the   keys and then press the  key.
- Repeat the previous two steps to change other digits for the alarm value.






- Once finished setting the alarm limit value press the  key to return to the pressure display.

A bleeping warning ( 2 Hz ) and the 'Outside Limits' message will signal that the measured pressure is lower than the user set low alarm value or greater than the user set high alarm value. The bleeping ceases when the pressure is read between the two values.

**Note:** The PC6-PRO will not allow pressure values to be entered greater than 5% above the maximum working range.

## 2.3 V, mA (Measure mode)

The PC6-PRO can measure voltage or current and simply display it or convert it using the 'Converted, Setup' options and then display the measured value via a conversion factor.

- Select menu 2 by pressing the  key twice.
- Select V or mA by pressing the  key and then press  (e.g. mA is selected).
- The following options will appear, as shown below:









Select: Measure  
Source Exit


- Select 'Measure' using the  key and press the  key



Zero FS Text  
Root Exit

### Zero:







- Select 'Zero' using the  key and then press the  key.
- Using the   keys and the  key, change the value of the converted zero. Press the  key to finish editing.



Measure Z. Conv.  
004.000 000.000

e.g. 4.00 mA will be  
converted to 0.00 bar

### FS (Full Scale):

- From the setup menu select 'FS' using the  key and then press the  key.
- As with the 'zero' above, set the conversion factor for a full scale input using the   keys and the  key. Press the  key to finish editing.




Measure FS Conv.  
020.000 010.000

e.g. Full Scale 20mA will  
be converted to 10 bar

### Text:





The 'Text' function is used for changing the displayed units when the 'converted' (see 1.9.2 on page 15) option is selected. If 20 mA is being measured from a device then this could be converted and displayed as pressure in bar for example.



Measure Text:  
bar

(6 characters max.)

### Root:

- Select 'Root' using the  key and press the  key.
- Select 'On' or 'Off' using the  key and press the  key.

With 'On' is selected, any measurements will be displayed having the root function applied until 'Off' is next selected.

**Note:** Due to display constraints, the six character 'Text' readout will be shortened to display the first three characters when the 'Root' function is switched on. 'Root' function is available in both Actual and Converted modes.

### 2.3.1 V, mA (Source mode)

Select: Measure  
Source Exit












The second option for V and mA is 'Source' (output) mode.

- Select 'Source' using the  key and press the  key.
- The following options are available:-

Source: Range  
Convert P→V

Source: Range  
Setup Exit

**Range:** (sets the upper and lower limits in Source mode)
















- Select 'Range' using the  key and press the  key.
- The following options are available:- 'Zero' or 'FS'.
- 'Zero' is the first option, press the  key to select it.
  - Change the value as required using the   keys and press the  key to enter.
  - To alter the FS value, select 'FS' using the  key and press the  key.
  - Change the value as required using the   keys and press the  to enter.

Note: The 'Zero' and 'FS' values have been limited with respect to each other as follows:


















- The lower range is limited to between 0 and the user's upper range minus 1% of the maximum source range available (e.g. 10 V or 50mA).
- The upper range is limited to between the lower range plus 1% of the maximum source range and the maximum source range available.

**Convert:**




To set up conversion factors for Zero, Full Scale or a user defined (Text) value.

- Select 'Zero' by pressing the  key.
- Change the zero conversion values as required using the   keys and the  key.
- Select 'FS' (full scale) using the  key and press the  key.
- Change the 'FS' conversion values as required using the   keys and the  key.
- Select 'Text' using the  key and press the  key.
- Select a three letter or number text value using the   keys and the  key.
- Once you have completed altering any or all of the convert functions select 'Exit' or press the  key to return to the 'Source' menu.

**P→V / mA:** To setup a pressure to voltage / current conversion

- Select 'P→V/mA' using the  key and press the  key.
- For 'Zero', press the  key to enter.
- Change the V / mA value as required using the   keys and the  key.
- Change the pressure value as required using the   keys and the  key.
- Select 'FS' using the  key and press the  key.
- Change the V / mA value using the   keys and the  key.
- As with the 'Zero', change the pressure value as required using the   keys and the  key.

**Setup:** Sets the parameters for V / mA sourcing

- Change the time if necessary using the   and  keys..

### Status:

- Select 'Status' using the  key and press the  key.
- Select 'Off' or 'On' and press the  key.





### Root:

When switched on, this provides a voltage or current output with the application of square root function.

- Select 'Root' using the  key and press the  key.
- Switch the function 'Off' or 'On' using the  and  key.

### Step: (Not available in P to V / mA mode)

To set the voltage or current output increments (%FS):-

- Select 'Step' with the  key and press the  key.
- Change the value as required using the  and  key.






### Ramp: (Explained on Page 25.)

To set the 'Status', Rate' and 'dwell time' proceed as follows:-

#### Status

- Select 'Status' by pressing the  key.
- Select 'Off' or 'On' using the  key and press the  key

#### Rate

- Select 'Rate' with the  key and press the  key.
- Change the V/sec or mA/sec value using the   keys and press the  key.

#### Dwell\_Time

- Select 'Dwell\_time with the  key and press the  key.

**Ramp Mode: (Not available in P to V / mA mode)**

Ramp mode consists of two parts, a ramp and level. The 'Step' and 'Range' (zero and full scale) determine the values for voltage / current at each of the levels (see Fig.4).

Rate is the Ramp rate or increments in V/sec or mA/sec.

Dwell time is the time for which the output (source) stays on each level, when the dwell time has expired the output will ramp to the next level.

With the Ramp status on, the unit will operate in Ramp Mode, with the Ramp status off, the unit will operate in Step Mode ( using the same steps as the Ramp Mode but with no ramping between levels). In Step Mode, pressing the ▲ or ▼ key will cause the output to increase or decrease to the next level. In Ramp Mode, the ▲ key will start the ramping, the ▼ key will return the unit to Measure Mode.

Pressing the ▲ ▼ together for one second returns the Ramp Mode to its starting point. In Step Mode, pressing the ▲ ▼ Keys together returns to the first Step level.

To enter 'Nudge Mode' (where the output increments in smaller steps) press and hold down the MENU key for two seconds (operates in source 'Step Mode' only). The unit will bleep to indicate that the Nudge Mode has been activated. In Nudge Mode the source symbol changes to either ■■■ or ■■■ depending upon the nudge direction. To exit from

Nudge Mode press and hold the MENU key for 2 seconds

Nudge increments are as follows:

mA range = 1uA  
Lower V range = 0.2mV (up to 5.5V)  
Upper V range = 2mV (5.5 to 10V)

If the ▲ or ▼ key is held down for more than 4 seconds the nudge increment is increased by a factor of 5 accompanied by an audible bleep. A further 2 seconds and the increments will increase by a factor of 5 and again by a factor of 5 after a further 2 seconds (pressing and holding the key for more than 8 seconds will no longer have an effect on increment value increases). When released the nudge increment value will return to normal.

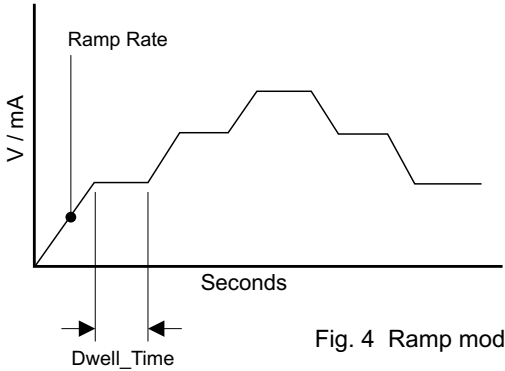









Fig. 4 Ramp mode.



## 2.4 V-out, Display Light







These functions may be selected as follows:

- Switch on PC6-PRO.
- Press the  key twice to select the Set menu.
- Select the required function using the   keys and then press the  key. Each of these functions has an On or Off setting.
- Select the setting using the  key and then press the  key.

**Note:** The display light can also be set On or Off by holding down the  key for more than 2 seconds. The back light is turned off when the PC6-PRO is switched off.








### Port:

This function allows the user to select the current (displayed) pressure module.

- Press the  key twice to select the Set Menu.
- Scroll to 'Port' using the  key and press the  key
- Select a module using the   keys and press the  key to activate.




## 2.5 Resolution

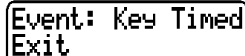
To change the resolution proceed as follows:

- Press the  key twice to select the Set menu.
- Select 'Resolution' using the   keys and press the  key.
- Select the required resolution ( Low, Normal or High ) using the   keys and then press the  key.

**Note:** Resolution will change by a factor of 10.

## 2.6 Event

- Press the  key twice to select the Set menu.
- Select 'Event' using the  key and then press the  key. The Event menu is shown below:



Event: Key Timed  
Exit

### Key:

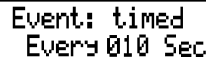
This results in RS232 (status ON) output / data storage triggered by key press.

- Select 'Key' using the  key and then press the  key.









### Timed:

This results in RS232 (status ON) output / data storage at fixed time intervals set by the user.



- Select 'Timed' using the  key and then press the  key.



Event: timed  
Every 010 Sec

- Select the digit to be modified using the  key and press the  key. Use the   keys to change the value and press the  key.
- Repeat for next digit and press the  key.
- Change the time measurement units in the same way and press the  key.
- Press the  key to return to the pressure display.



## 2.7 Log

- Switch on PC6-PRO.
- Press the  key twice, scroll to and select 'Log' and press .

The display gives the option to log a file, view a file or change the log status as shown below:



### Log:

- Select 'Log' using the  key and then press the  key.
- Presented with the sub-menu, enter a filename and record count if no files are present, or select a file to log into.








filename


record count

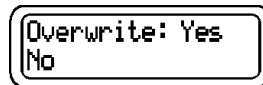
'N' = Normal Log


'C' = Calibration procedure log

### To enter a filename: (max. 8 characters)

- Using the   keys, move to the filename position and press the  key.
- Select the characters/numbers to be used to name the file by scrolling up or down at each position and press the  key when completed.
- Press the  key to move on to the record count.






- As with the filename, define the record count and then press the  key when completed.
- If a file has already been set up with the same name then the 'Overwrite' option screen will be displayed.





- Start logging by pressing the  key. (see 2.6 'Event' on page 26).

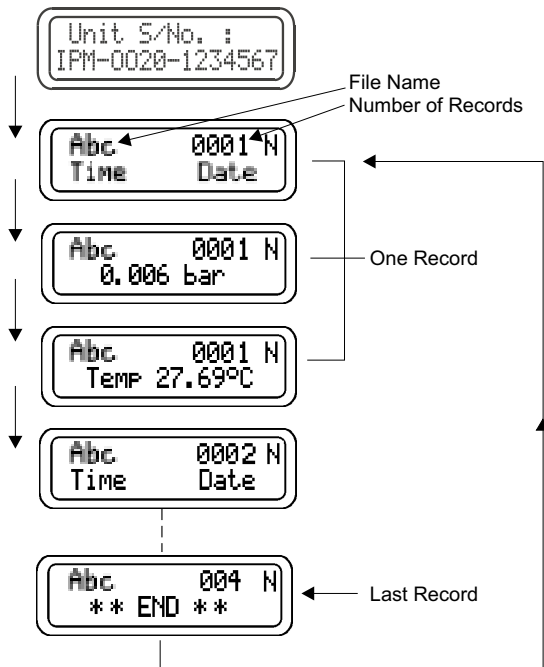
The  symbol will appear to show file is open.




### View:

- Select 'View' from the log menu using the  key and then press the  key.
- Select the file to view using the   keys and then press the  key.

## 2.7 Log continued

- With the file now selected, use the  or  key to show the file contents in the sequence shown below.







**Note:** Use the  or  key to scroll the other way. The direction in which the scrolling moves when using the  key depends on the last key pressed.

Press  twice to return to the 'Log' menu.





## Delete:

To delete a logged file, proceed as follows:

- Select 'Delete' from the log menu using the  key and then press the  key.
- Select 'File', 'All' or 'Exit' using the  key and then press the  key.




Delete: File All  
Exit

## File:

- Using the   keys, select a file and then press the  key.
- A confirmation to delete file prompt is given. Select 'Yes' or 'No' and then press the  key.



Delete: Sure?  
Yes No

## All:

- Select the 'All' option using the  key and then press the  key.
- A confirmation to delete all prompt is given. Select 'Yes' or 'No' and then press the  key.

All Files stored on the PC6-PRO will be deleted.



## Exit:

- Select the 'Exit' option using the  key and then press the  key.


## 2.7 Log (continued)

### Status:

Use this option to enable or disable logging function.

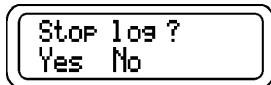
- Select 'Status' from the log menu using the  key and then press the  key.





- Select 'On' or 'Off' and then press the  key.
- The display returns to the log menu.

Once a file has been set using the instructions given, the logging process is shown as active with a disc shaped icon in the top left hand corner of the display.

If you should press the  key whilst logging is in progress then the following screen appears:



Select 'Yes' or 'No' and then press the  key.

**Note:** Pressing the  key allows direct access to the log menu. This is only possible if the log status icon is flashing in the top left hand corner of the display.

### Export:




See 2.12 on page 19 For *Export* procedure.

### Import:

See 2.13 on page 19 for *Import* procedure.


## 2.8 RS232

RS232 standard communication protocol is available on the PC6-PRO. Select the RS232 functions as follows:






- Connect the PC6-PRO to a printer or computer as described in paragraph 1.6.5 on page 11.
- Switch on PC6-PRO.
- Select the Set menu by pressing the  key twice.
- Select 'RS232' option using the  key, then press the  key. The RS232 menu is displayed as below:








### Status:

- Select 'Status' using the  key. Choose 'On' or 'Off' option with the  key and then press the  key. The display returns to the RS232 menu.

### Baud Rate:






- Select 'Baud-rate' using the  key and then press the  key. Select the required baud rate (1200, 2400, 4800 or 9600) using the   keys and then press the  key.

### Stop Bits:

- Select the 'Stop bits' using the  key and then press the  key. Select either 1 or 2 bits with the   keys and then press the  key.

## 2.8.1 DPM

To use the DPM (Digital Pressure Module) with the PC6-PRO:-

- Switch off the PC6-PRO and connect the RS232 cable from the DPM (supplied) to the 'RS232' socket of the PC6-PRO.
- Switch the PC6-PRO back on.
- Press the  key twice. Scroll to 'Port' option using the  key and press the  key to select.
- Select 'DPM' using the  key and press the  key.

When the DPM is selected as the current pressure module, please note the following changes to the unit's operation:-

RS232 status will be switched off and it will not be possible to switch the status back on again while the DPM is connected. Additionally it is not possible to change the RS232 settings while the DPM is connected.

File Export, File Import, downloading of languages, Cal Zero and Cal Span are also not available.




While communicating with the DPM, the PC6-PRO will set (and permanently change) the communications settings of the PC6-PRO and the DPM to the following:

baud-rate	9600
stop bits	1

To alter the DPM RS232 settings (i.e. for use with a line printer) it will be necessary to use the software supplied with the DPM. To return the RS232 settings on the PC6-PRO refer to section 2.8 on page 29.

## 2.9 Date & Time

To select Date & Time proceed as follows:

- Switch on PC6-PRO.
- Press the  key twice to select Set menu.
- Select 'Date & Time' option using the  key and then press the  key.









Date&Time: Set  
View Exit

### To set the time:




- Select 'Set' using the  key, then press the  key.





Set: Time Date  
000000 000000

- Select the digit you want to change using the  key and press  key. Use the   keys to change the value and then press  key.
- Repeat the above step to change the other digits to set time and proceed to the next set of digits to change the date.
- Press the  key to return to the 'Date & Time' menu.

### To View date & time:


- Select 'View' using the  key and then press the  key.
- Press the  key to return to the Date & Time menu.

### 3.0 Language

- Press the  key twice.
- Scroll to 'Language' using either arrow key and press the  key to select.



Language: English  
German Exit




- Select the desired language from the options provided and press the  key.

**Note:** To download different languages, see **3.5** on page 33.

### 3.1 Zero ( *not available on absolute units* )

**Note:** Unlike the 'Tare' function (page 11), 'Zero' reset is a permanent setting.

To reset pressure reading to zero:

- Press the  key twice to select the Set menu.
- Select 'Zero' option using the  key and then press the  key.



\*\* ZERO RESET \*\*  
Press Enter

- Press the  key as instructed.

The Pressure Display will now show the pressure value as zero. If however the pressure reading is not within 5% Full Scale the following message will be displayed and the zero reset will not be possible.



\*\* TOO LARGE \*\*  
No Change-Press

### 3.2 Power\_Off

The PC6-PRO has an auto-power off function. The time after which the unit automatically switches off is adjustable from 1 to 999 minutes. However, the auto-power off will not operate under the following conditions:-








If a key has been pressed during the auto-power off time period.

If a leak test is running.

If the RS232 Status is On.

If the Log Status is On.

If the unit is online with Sical Pro

- Press the  key twice.
- Scroll to 'Power\_Off' function using the  key and press the  key.
- Select 'Key' to turn the auto-power function off.
- Select 'Timed' to set the auto-power off time (in minutes) and press the  key. This automatically turns the auto-power function on.
- Set to desired time using the   keys and press the  key.

# CAL-MENU

## (MENU 3)

**Important note:**


Should you wish to change zero or span settings at any time, the original calibration made at time of manufacture by **SI Pressure Instruments** will no longer apply. We therefore take no responsibility for any false or inaccurate readings that occur after any changes to zero and/or span have been made.

**Calibration Procedure:**

If necessary then the zero and span calibrations should be made using a deadweight tester with an accuracy of 0.01% of reading or better, and carried out in a temperature controlled environment at  $20^{\circ}\text{C} \pm 2^{\circ}$ .

To maintain the accuracy of the calibrator, do not increase the value of 'tol-ppm' above 50 ( see flow charts ).

For full calibration which includes Temperature Compensation between  $0\text{-}50^{\circ}\text{C}$  the PC6-PRO should be sent back to **SI Pressure Instruments**.




To access the Cal Menu, press all four top row buttons at the same time. A beep will accompany this action. Press the  key three times. The functions available are as follows:

### Note: Password








To gain access to the 'Zero' and 'Span' functions, you will be asked to enter a password. Enter the four-digit serial number located on the label on the rear panel of the unit.

### 3.2 Zero: Not available with the DPM (carry out zero/span operations using the software supplied with the DPM).

To calibrate zero :

- Select 'Zero' using the  key and press  key.
- Select 'Continue' option pressing the  key.
- A 'Warming up...' message will be displayed and after several seconds you will be prompted to release pressure and then press 'ENTER' to continue.
- The following screen will then be displayed asking you to set a tolerance.






- If you want to change the tolerance value displayed then press the  key to select the first digit.
- Using the   keys, change the first value and then press the  key to enter it. The next digit will then be selected. Press the  key and change the digit as described above.
- Do the same for the third digit if required and then finish by pressing the  key once more.
- If however the value shown does not need to be changed then press the  key to continue.

- The following message is then displayed:



Example  
Value


- Press the  key twice and wait.
- The unit will now take fifty readings. If the readings taken are not within the tolerance set then you will be prompted to repeat the step. The tolerance may need adjusting in order to continue.
- If the readings are within tolerance then a '\*\* completed \*\* press ENTER' message will be displayed. Press the  key to finish.


**Notes:** If at any time during the procedure you wish to exit and return to the 'Cal menu' then press the  key.

The message: 'Sure ? No Yes' appears. Select 'Yes' to exit or 'No' to continue with the zero calibration.

**Absolute:** For absolute units you will be presented with the following screen. It displays the current pressure reading on the top line and on the second line you set the corrected value.



Set the required value and press the  key.

Select 'Yes' or 'No' at the next screen and press the  key.








The pressure display will now show the new value.




### 3.3 Span:

**Note:** The pressure value at which span is carried out is adjustable up to  $\pm 5\%$  of the unit's full scale range.



To set span:

- Select 'Span' using the  key and press the  key
- The procedure for setting span is exactly the same as the zero calibration up to the 'reg\_val' section. **(Not applicable to absolute units).**
- After pressing the  key twice and waiting for the fifty readings to be taken, you will be prompted to input pressure up to the maximum value of the sensor in that particular unit. Press the  key.
- The unit will now take another fifty readings.
- Provided the readings are within tolerance and 1% of Full Scale you will receive the 'COMPLETED' message.
- Press the  key to finish and return to the 'Cal menu'.

### 3.4 History:

- Press the  key to view the sub-menus.


#### Overload:

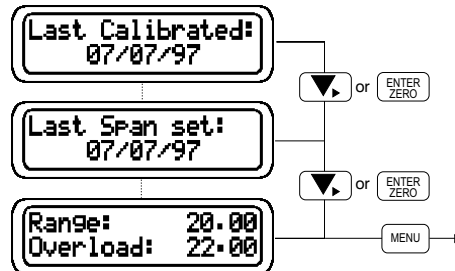
- To view the overload history move the cursor to 'overload' and press the  key. The display will show the time period over which the last overload took place as in the example below:
- Press the  key to return to the 'cal menu'.









Overload History  
30.5 secs


#### Zero/Span:

- To view the last zero calibration date move the cursor to 'zero/span' and press the  key.




- As shown above, the last calibration date is displayed first.
- Pressing the  or  key takes you to the next screen showing the 'last span set' date.
- Pressing the  or  key again the display shows the range of the unit and the overload setting.
- Press the  key to finish.
- Press the  key to exit to pressure display mode.

### PC6-PRO Serial Number:


- To view the unit's serial number move the cursor to 'S/No' and press the  key.

### Pressure Module Serial Number:

- To view the serial number of the selected pressure module, move the cursor to PM\_S/No and press the  key. The accuracy of the sensor will be displayed on the lower line.

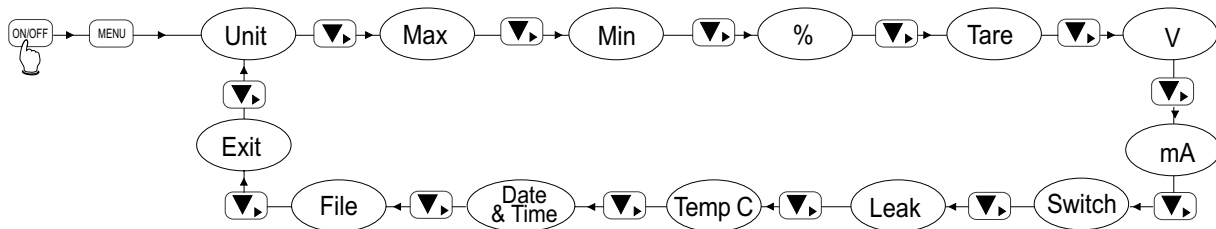
### 3.5 Language: (separate pc software utility needed -contact supplier)

To download different languages:-

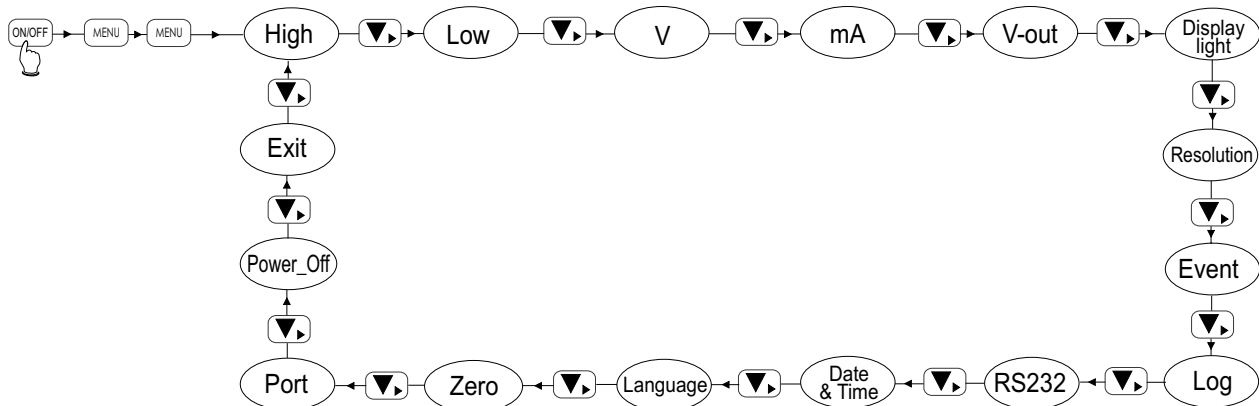
- Connect PC6-PRO to PC via the RS232 cable.
- Scroll to 'Language' and press the  key to select.
- The PC6-PRO will display a 'DOWNLOADING' message until language download is complete.



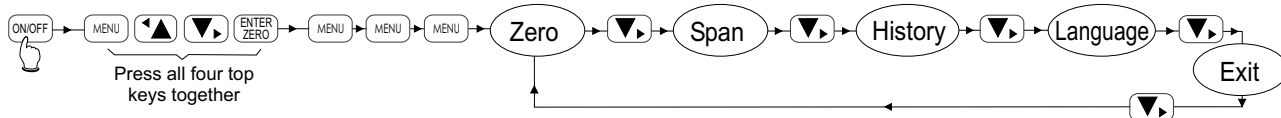
## Menu 1 display menu



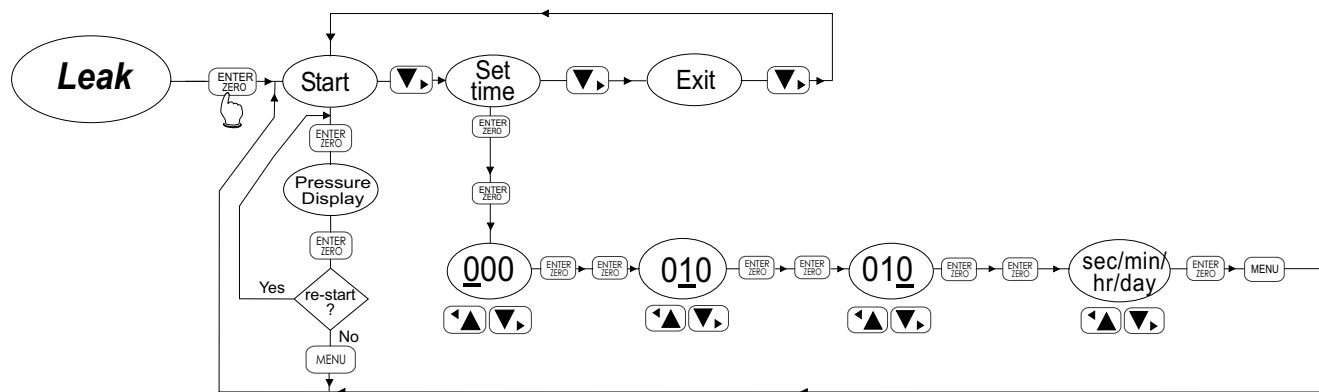
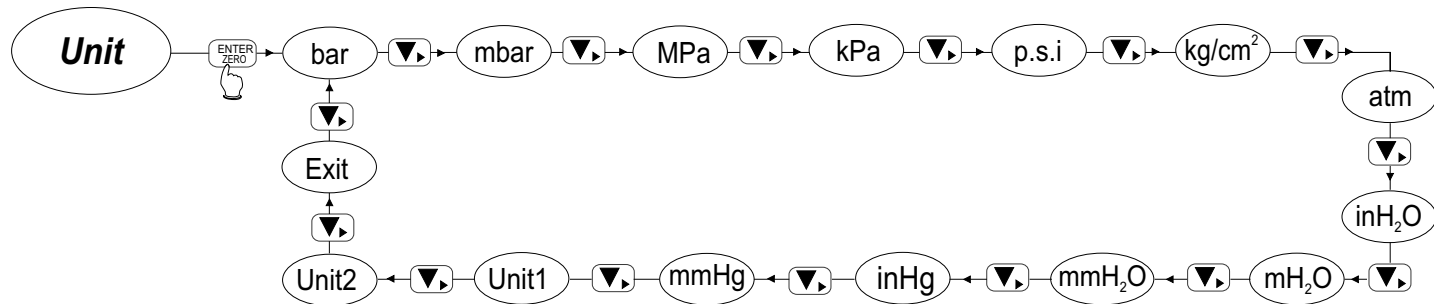
## Menu 2 set menu



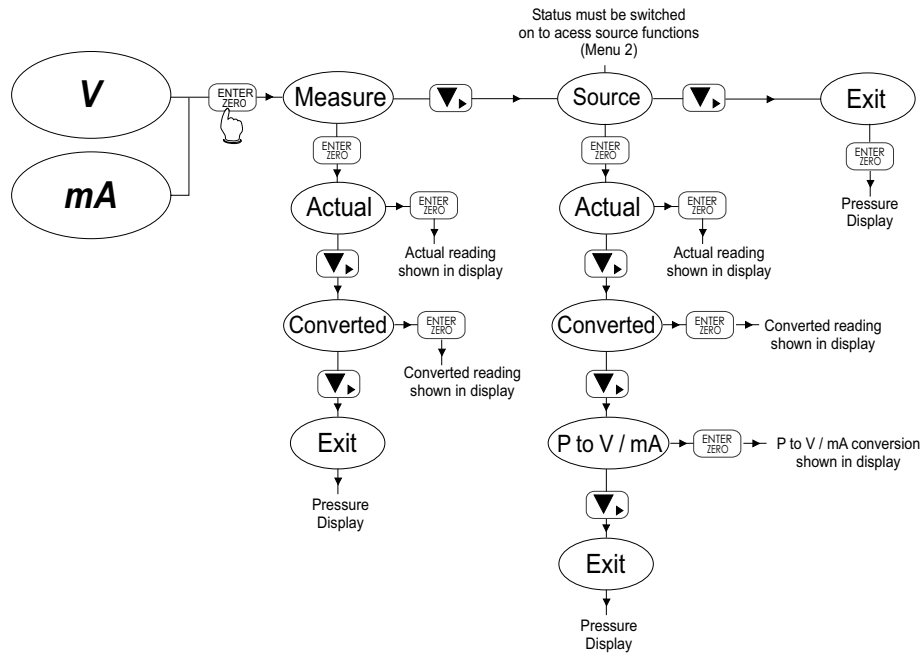
## Menu 3 cal menu

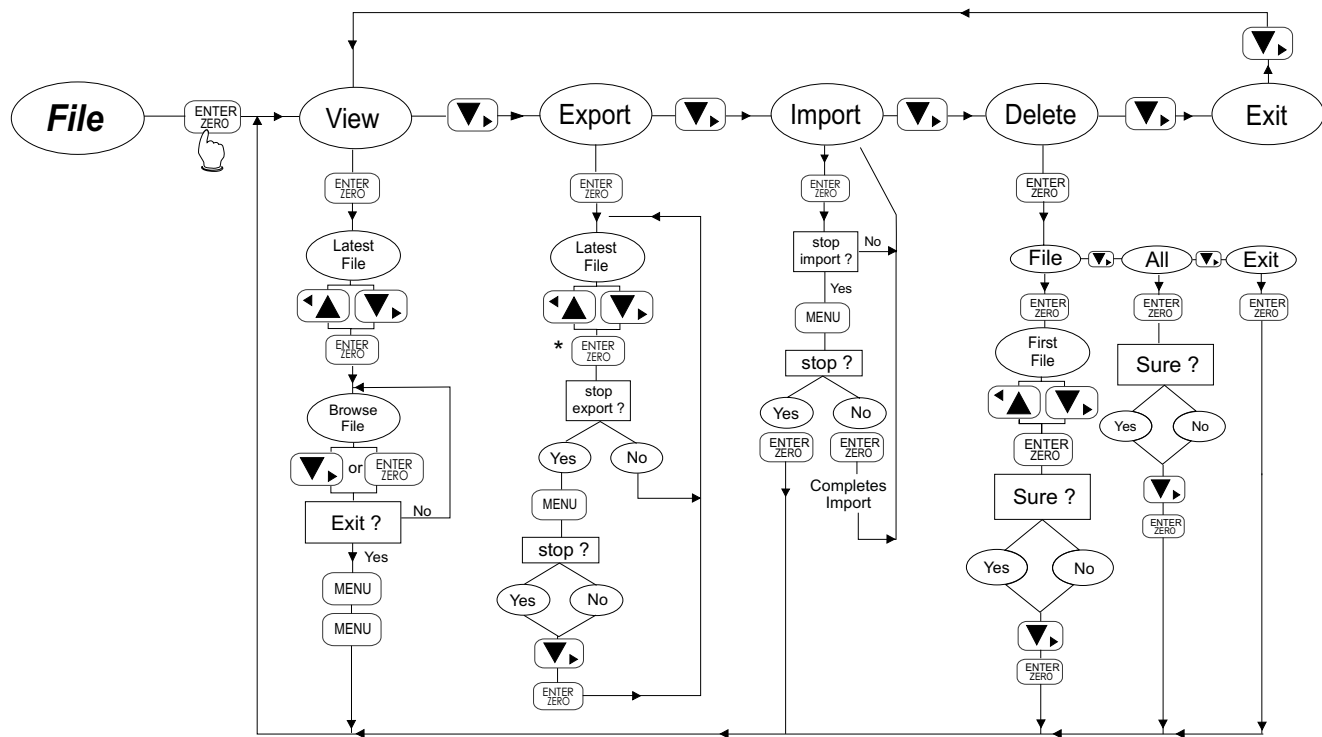


# Menu 1    sub-menu    unit & Leak



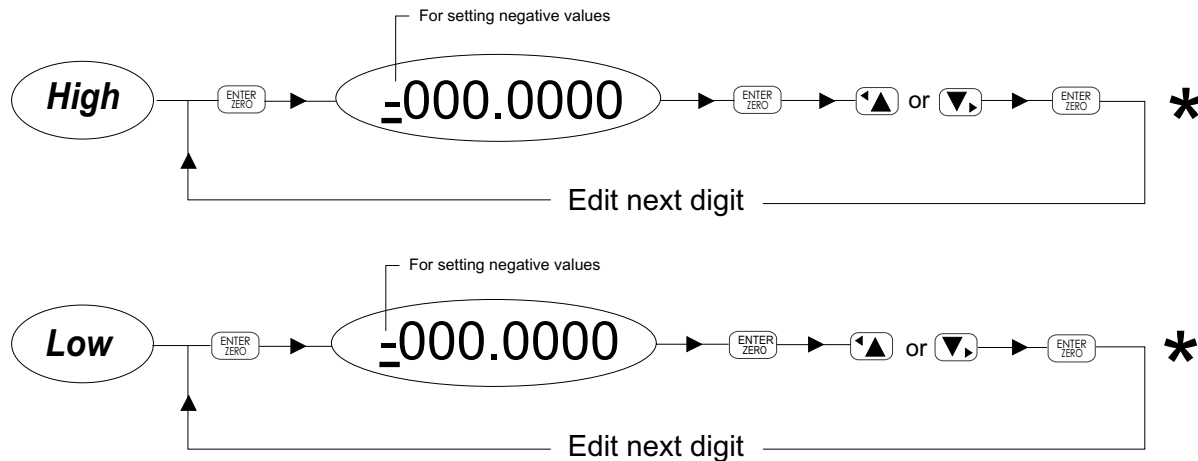
# Menu 1 sub-menu V, mA





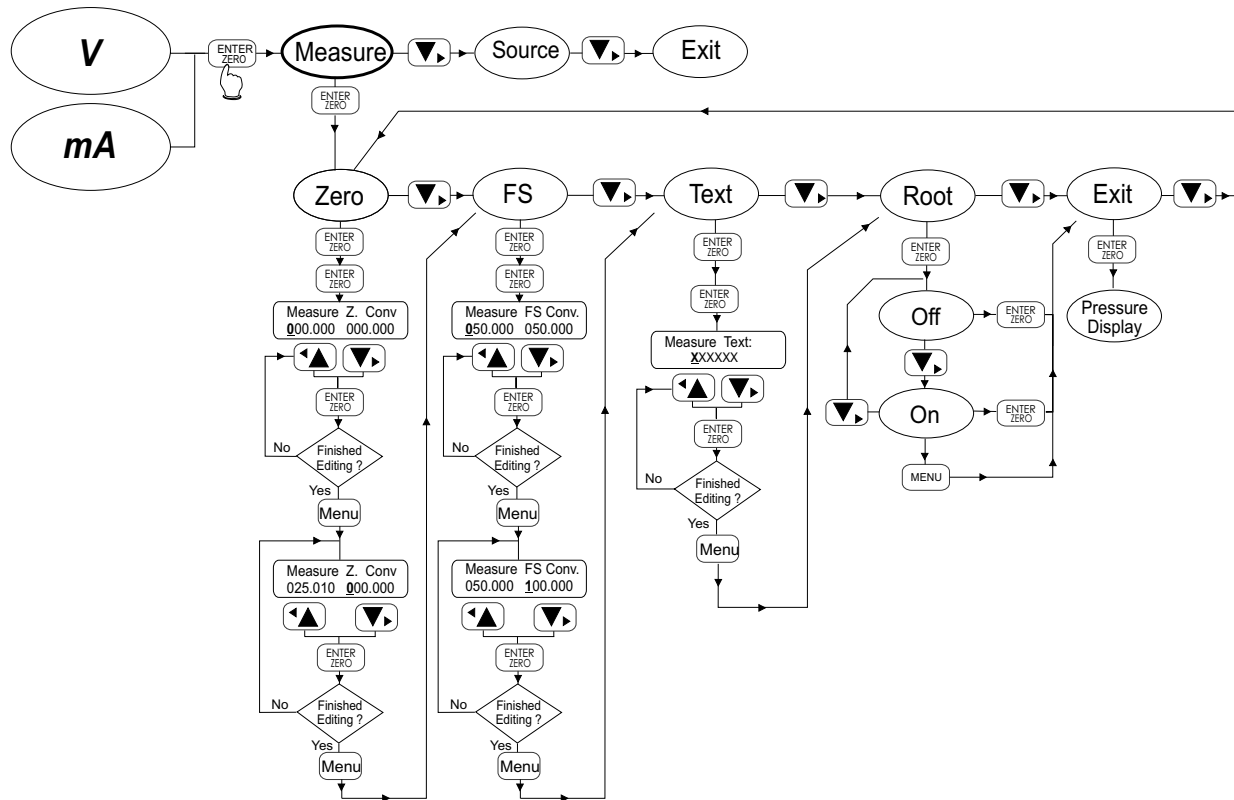
\* not necessary for file export to 'SiCal PRO'.

## Menu 2 High & Low



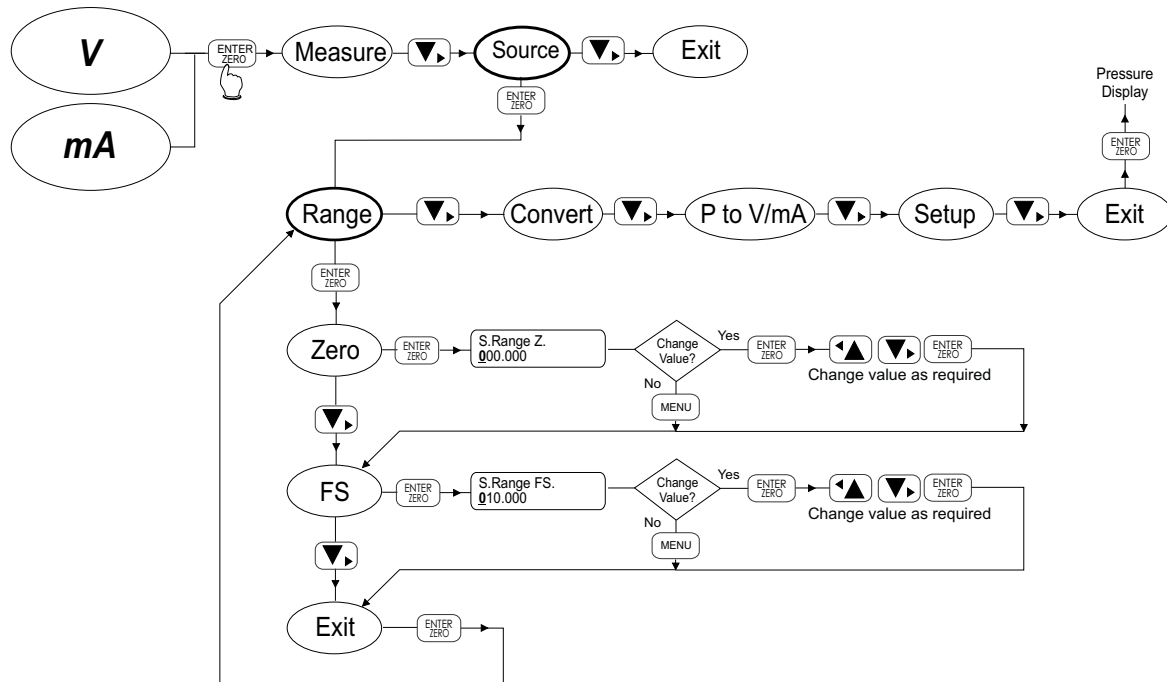
**\*** Once finished editing, press the  **Key to go back to Pressure Display**

## Menu 2 sub-menu V, mA (Measure)

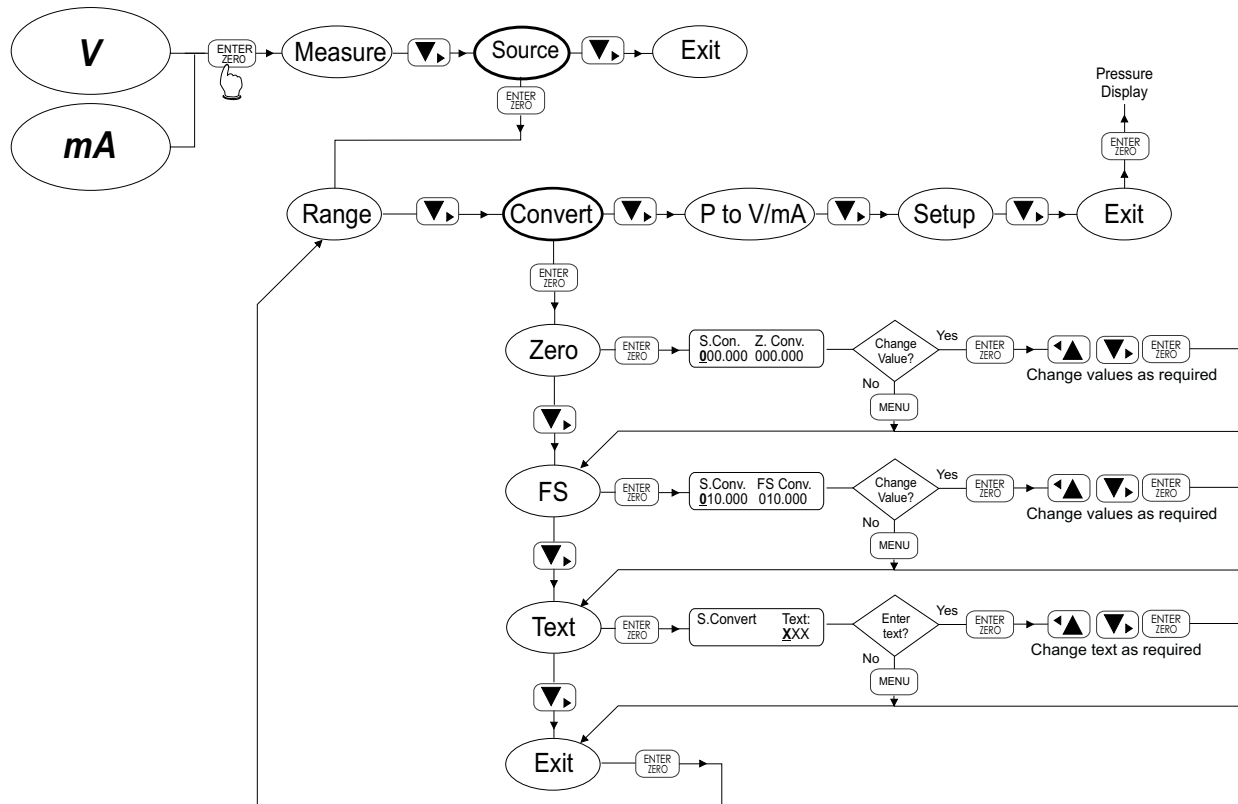




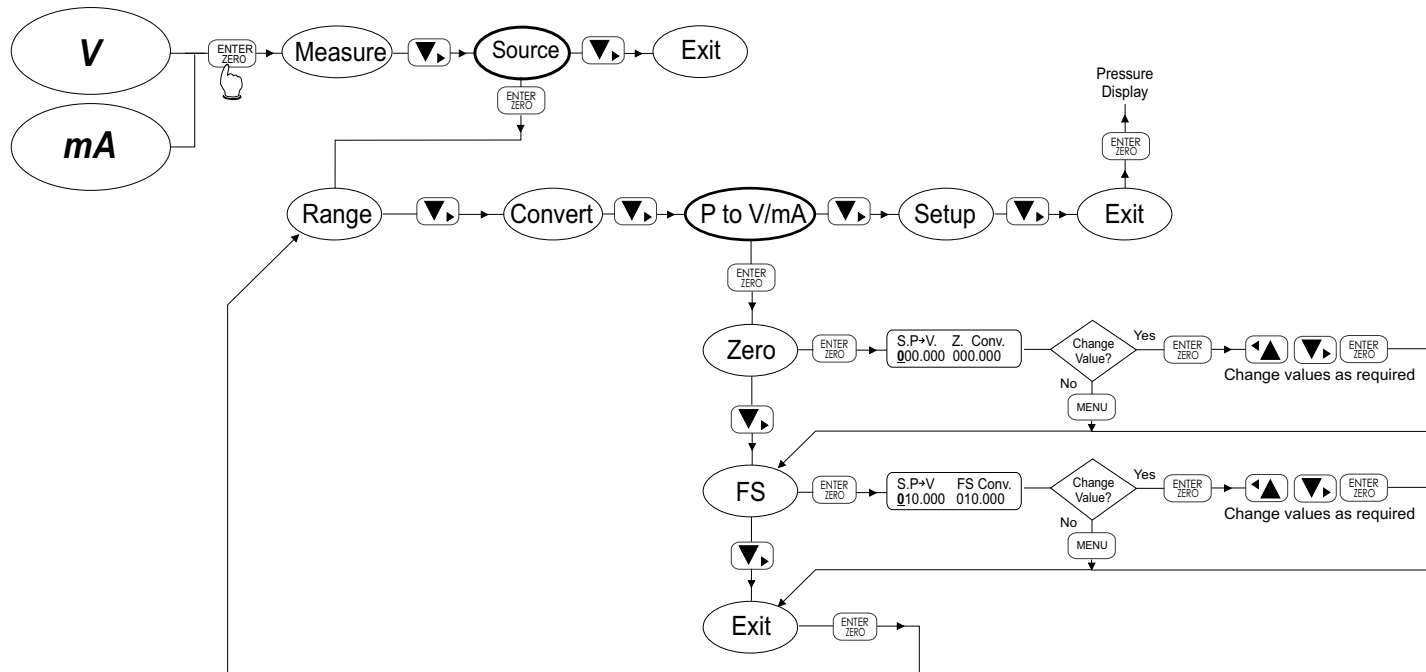
## Menu 2 sub-menu V, mA (Source - Range)



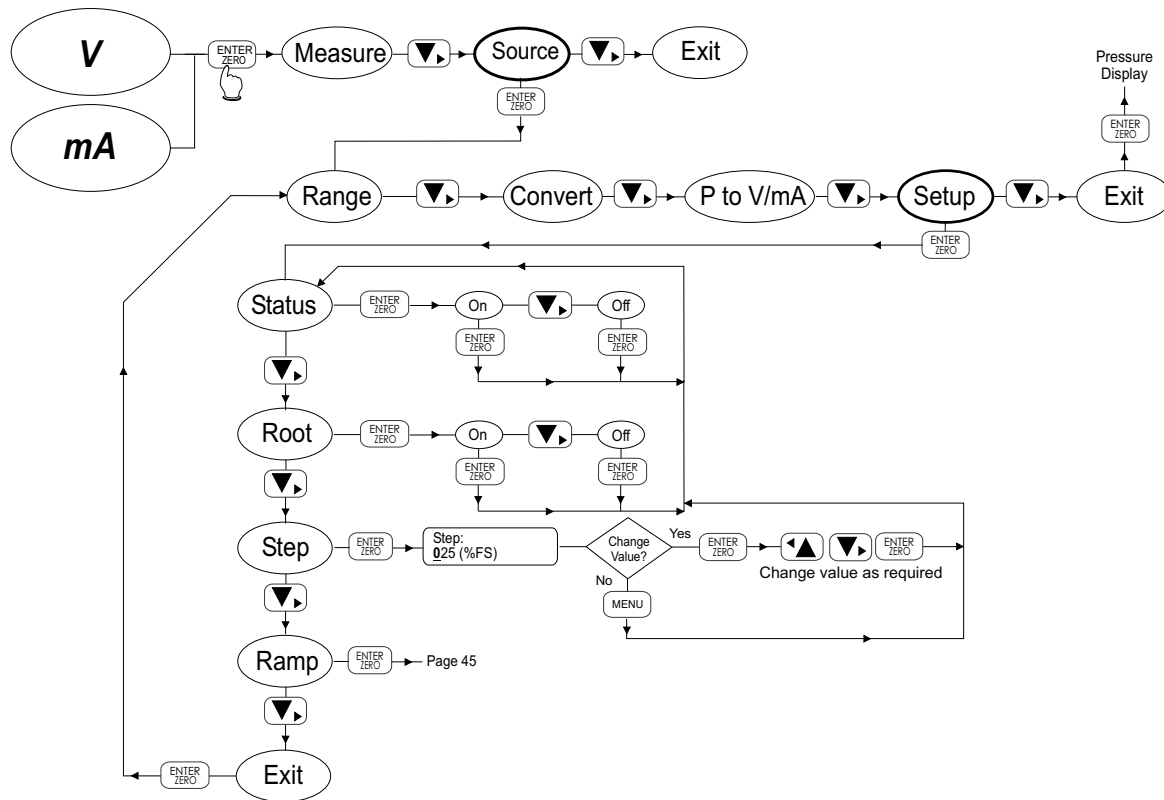
## Menu 2 sub-menu V, mA (Source - Setup)



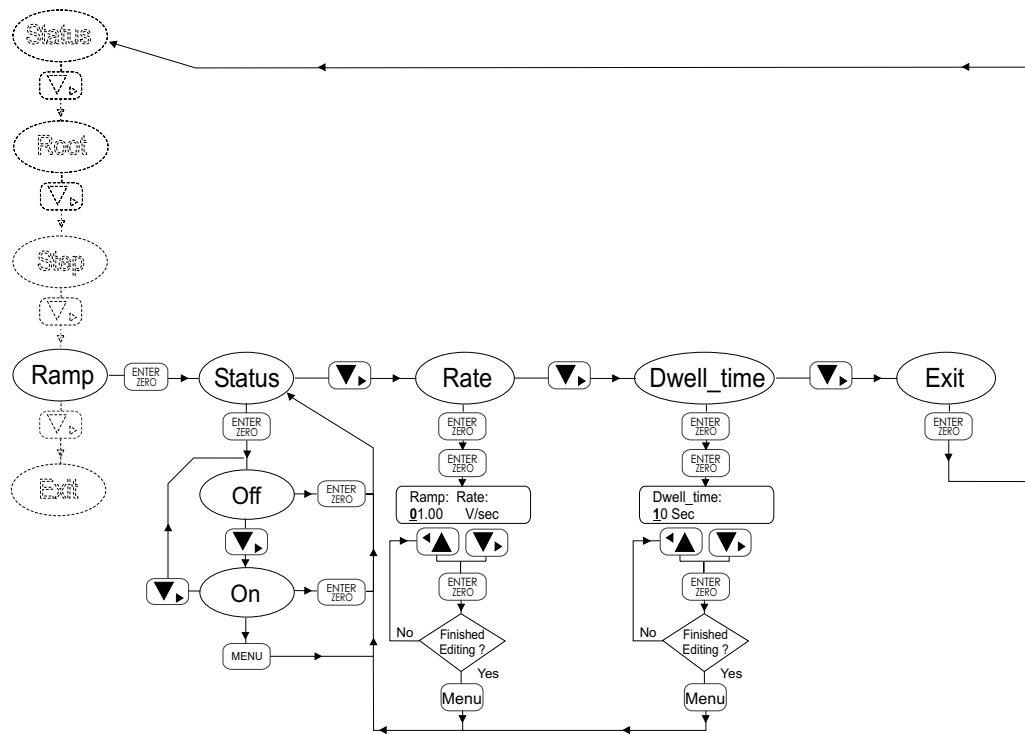
## Menu 2 sub-menu V, mA (Source - P to V / mA)



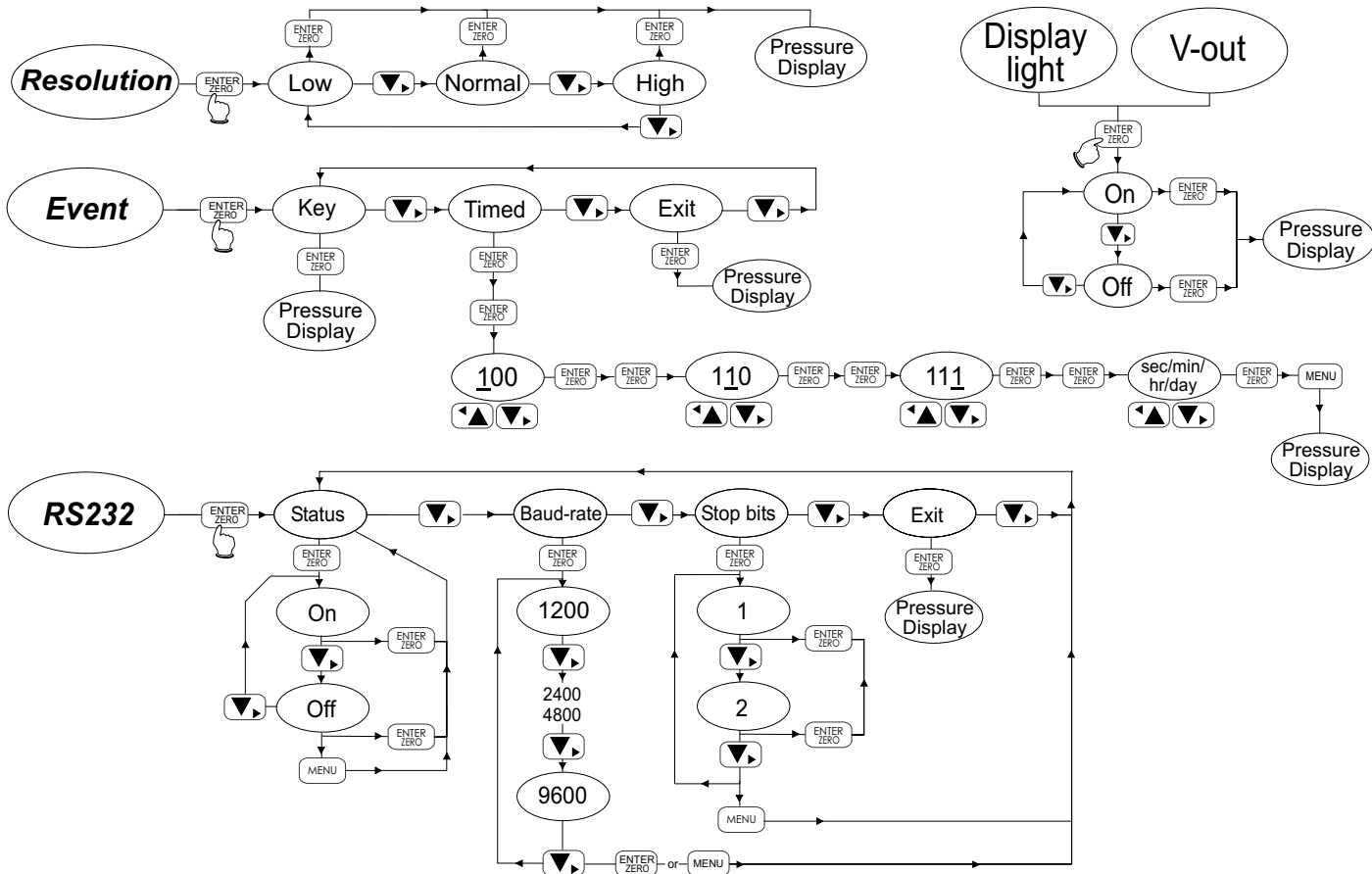
## Menu 2 sub-menu V, mA (Source - Setup)



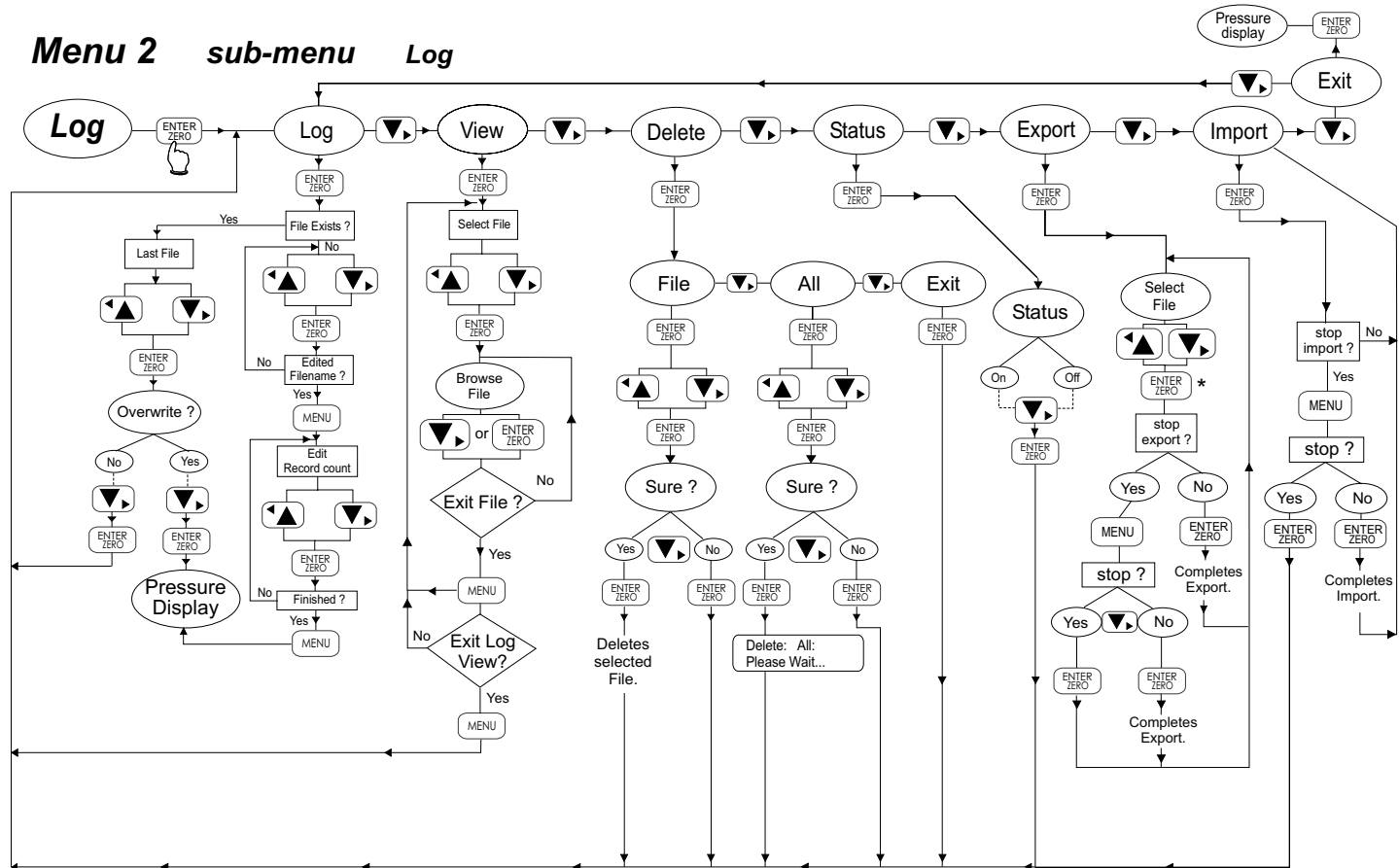
## Menu 2 sub-menu V, mA (Source - Setup - Ramp)



## Menu 2 sub-menu Display light, V-out, Resolution, Event & RS232.

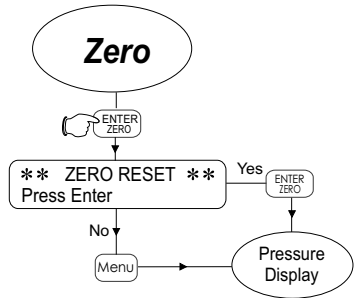
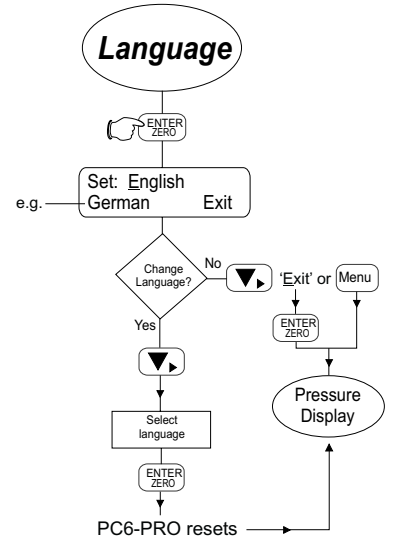
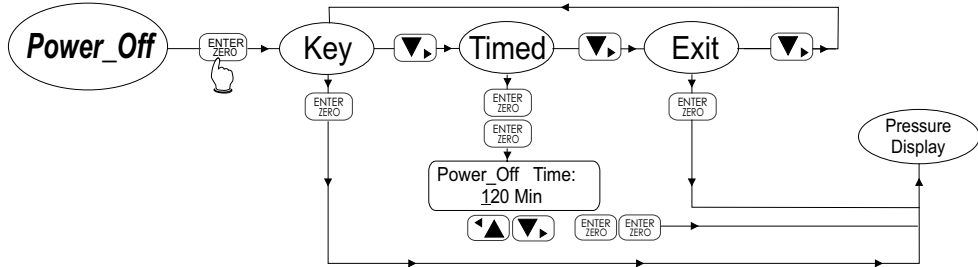
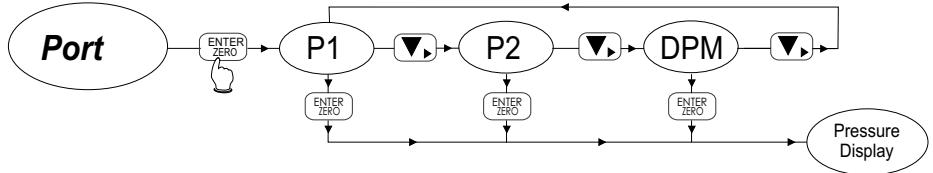
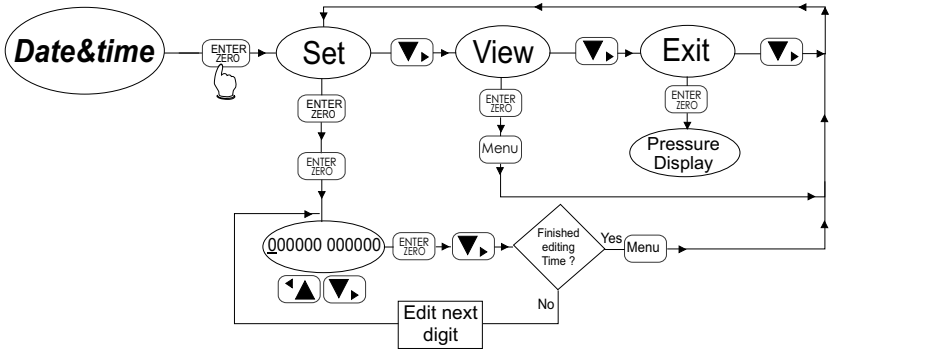


# Menu 2 sub-menu Log



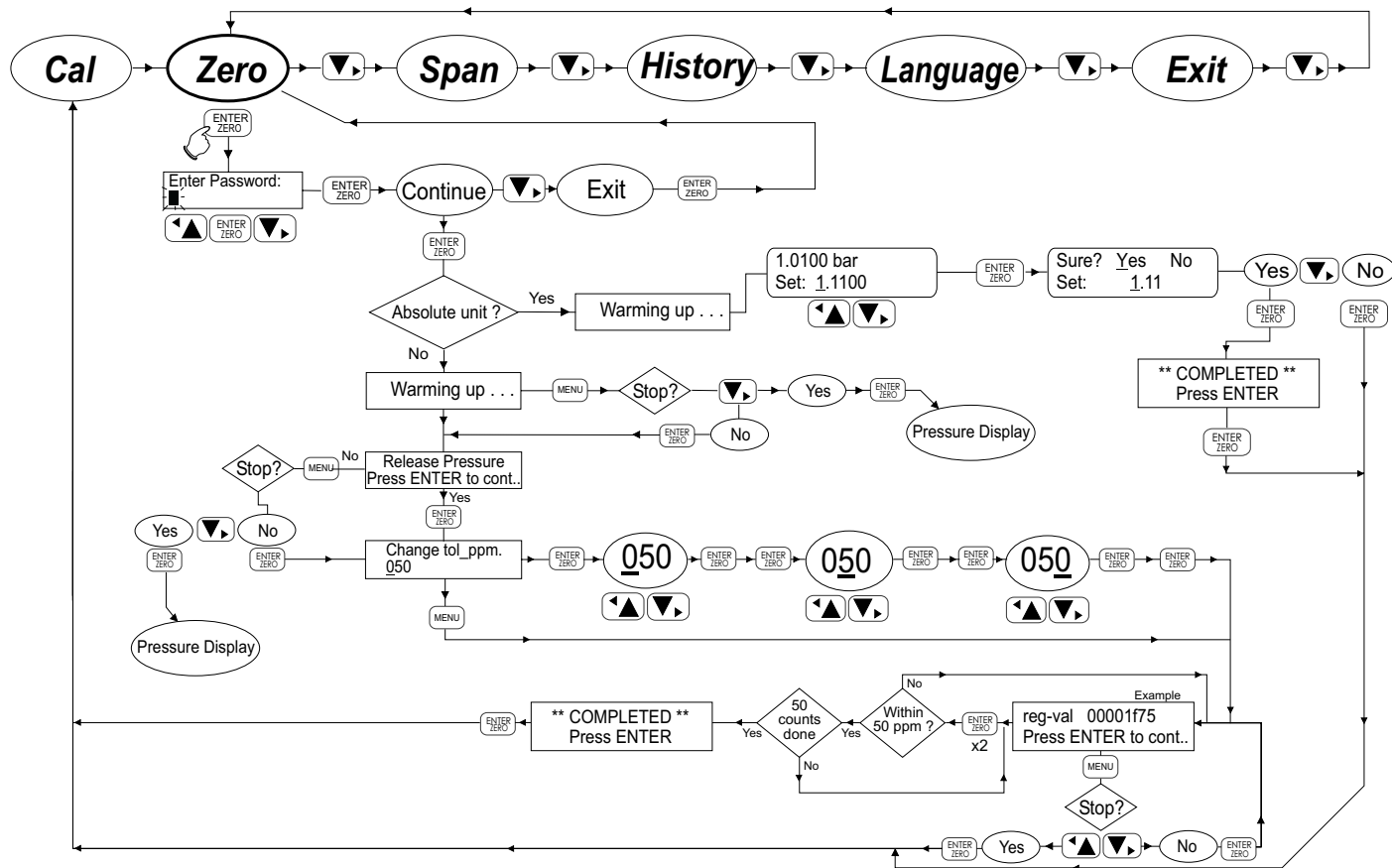
\* ENTER ZERO not necessary for file export to 'SiCal PRO'.

# Menu 2 sub-menu Date&time , Language, Zero , Port, Power\_Off

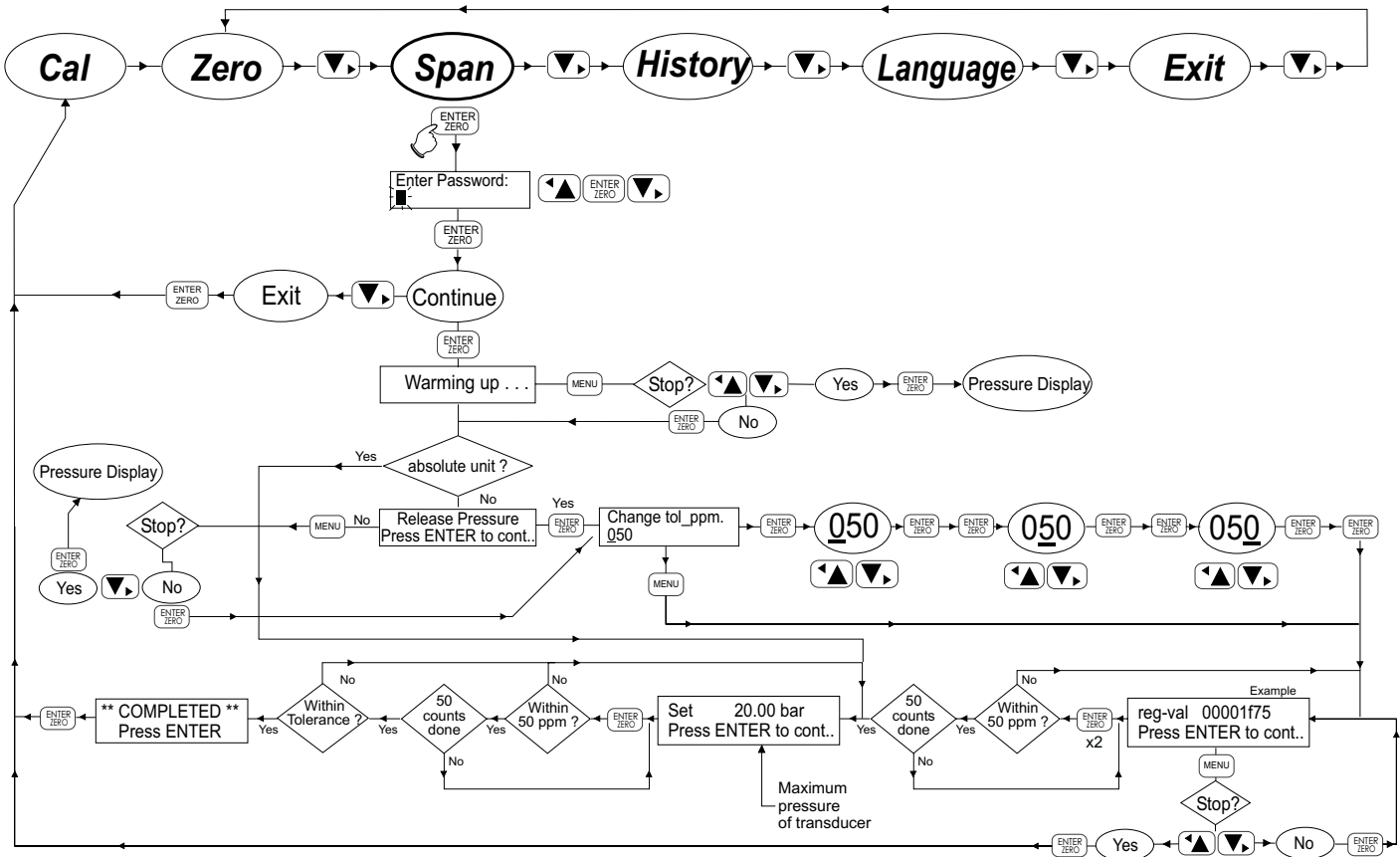




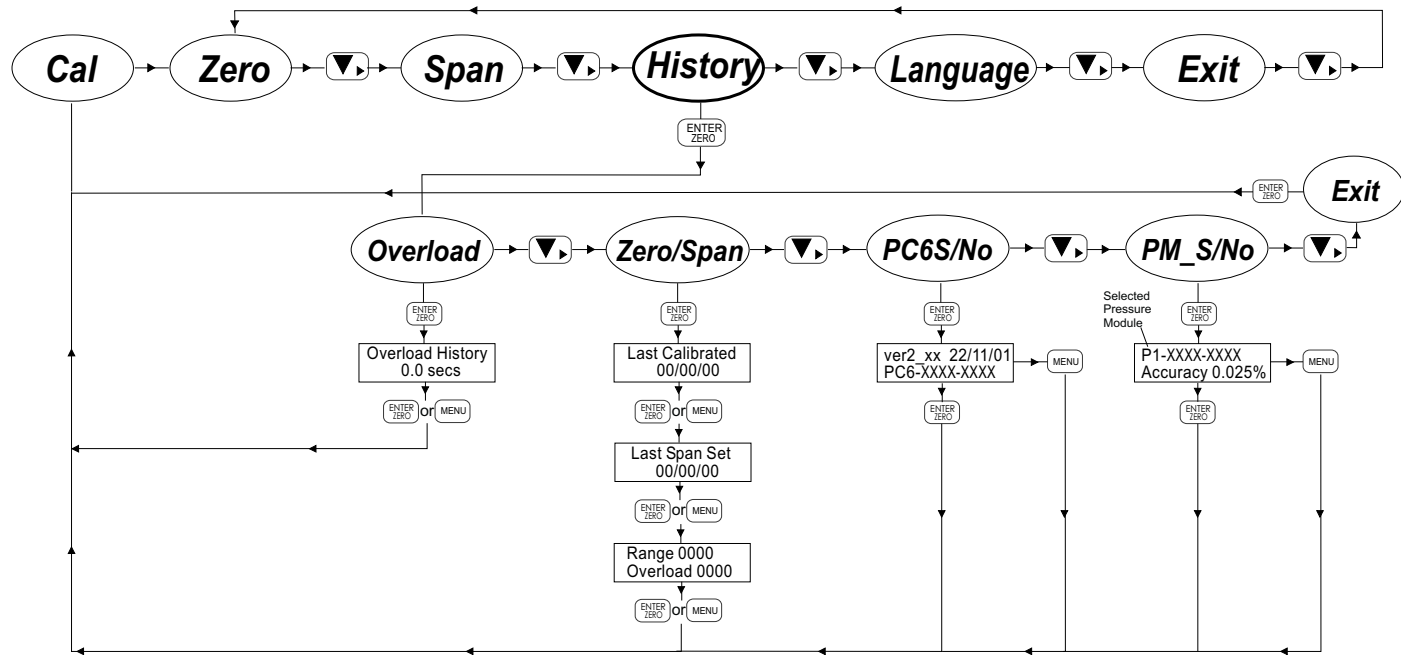
# Menu 3 cal-menu zero



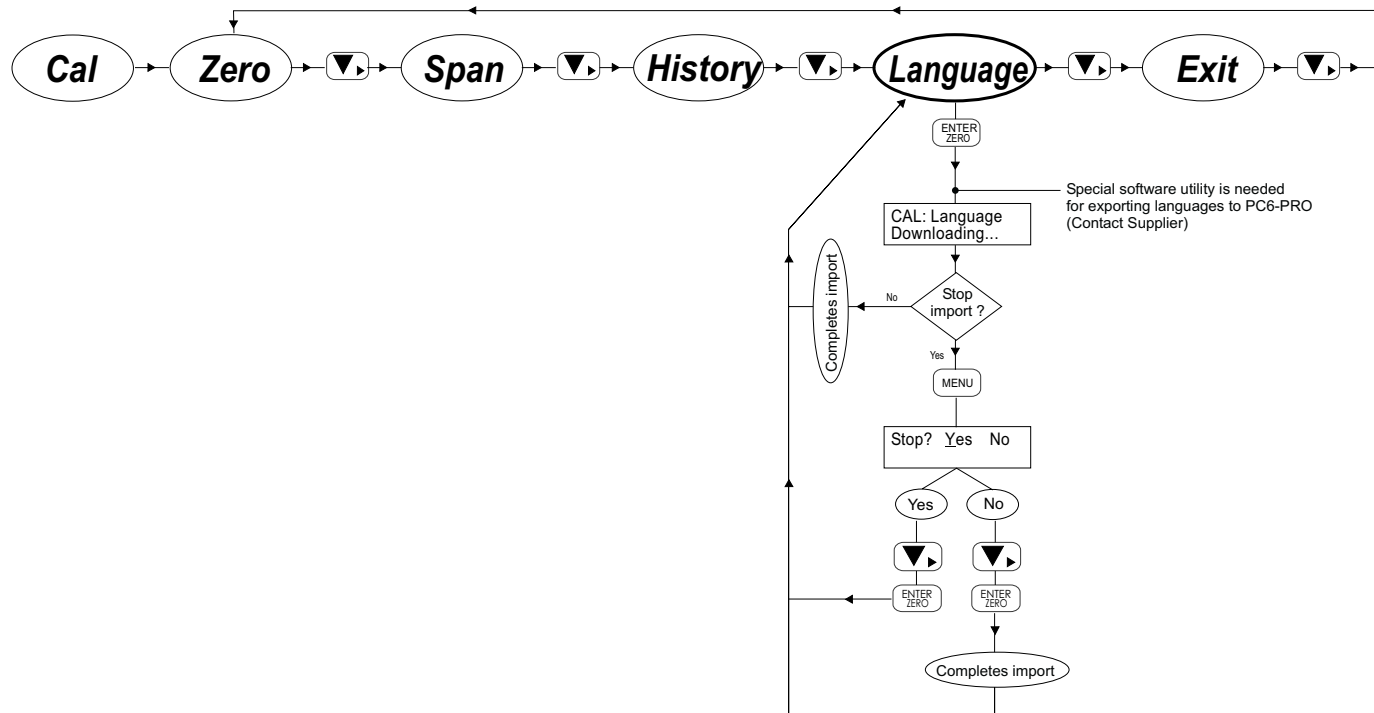
**Menu 3**   *cal-menu*   **Span**



## Menu 3 cal-menu History



## Menu 3 cal-menu Language



# PRESSURE GENERATION

The PC6-PRO Pressure Calibrator is supplied with one of two pressure generation systems:-

<b>HTP1</b>	Hydraulic System	0 to 1000 bar / 15000psi
<b>TP1</b>	Pneumatic System	-1 to 40 bar / 600psi
<b>LTP1</b>	Low Pressure Pneumatic System	-1 to 3 bar / 45psi

These systems are not supplied with the PC6-PRO Indicator but can be purchased separately from SI Pressure Instruments.

Instructions for use of these systems are available on the following pages.

# INSTRUCTIONS FOR USE OF HYDRAULIC HAND HELD PRESSURE TEST SYSTEM - HTP1



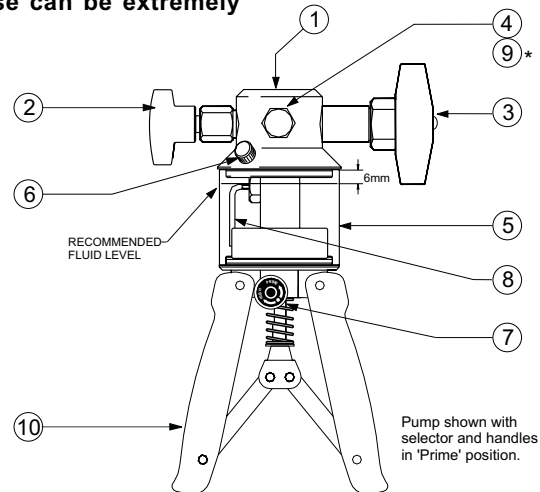
**WARNING : HIGH PRESSURE:-** Uncontrolled release of high pressure is hazardous to personnel and may cause damage to equipment. Before connection of any pressure component to the HTP1 ensure that the component(s) is/are isolated from the pressure supply and any internal pressure is released slowly. Do not connect HTP1 to external pressure source. Pressure built up internally during use can be extremely high, ensure that all connections are made correctly.

## KEY:

1. 3/8"BSP female connection to take master instruments. E.g. PC6 Calibrator, Digital / Analogue indicators.
2. Pressure release valve.
3. Fine control.
4. Front port: 1/4"BSP female to take optional Quick-fit connection and flexible hose.
5. 100cc's Reservoir.
6. Reservoir filling plug.
7. Priming / High pressure selector.
8. Fluid inlet tube.
9. Rear port: Reserved for PRV12 Pressure Relief Valve ONLY.  
(\* Do not use for any other purpose )
10. Pump Handles



PRIME / HIGH PRESSURE  
SELECTOR



1. Remove filling plug (6) and fill reservoir (5) to the recommended level with the appropriate fluid and replace plug.
2. Connect master instrument to pump via connection (1) using the appropriate seals and adaptors.
3. Connect instrument under test to flexible hose / gauge adaptor and attach to pump via the quick-fit connection (4).
4. Adjust the Fine control (3) to 'mid-travel'.
5. Ensure the pressure release valve (2) is **open** ( turn fully clockwise then one turn anticlockwise ). Fully squeeze handles 'in' and turn the selector (7) to the 'prime' position.

6. Operate handles several times to expel air from the pump. ( Ensure that the fluid inlet tube (8) remains immersed in fluid at all times).
7. Close the release valve (2) fully clockwise.
8. Prime system by squeezing handles together and then releasing, allowing the oil to enter the pump cylinder. Repeat as necessary until system is fully primed and low pressure is indicated on either the master or test instrument.
9. With handles fully squeezed 'in' select the 'high' pressure position on selector (7) and operate handles to generate approximate pressure.  
**NOTE:-** Smaller handle strokes enable easier pressure generation at high pressures.
10. Adjust pressure to required value using the fine control (3).

**NOTE:-** Pressure will fall slightly, immediately after pressure generation due to Thermodynamic effects, but will stabilise after a short time.

**WARNING: DO NOT EXCEED MAXIMUM OPERATING PRESSURE INDICATED ON PUMP LABEL !**

11. To totally release pressure from the system turn release valve (2) one turn anticlockwise and select the 'prime' position on selector (7) after first squeezing handles fully in.

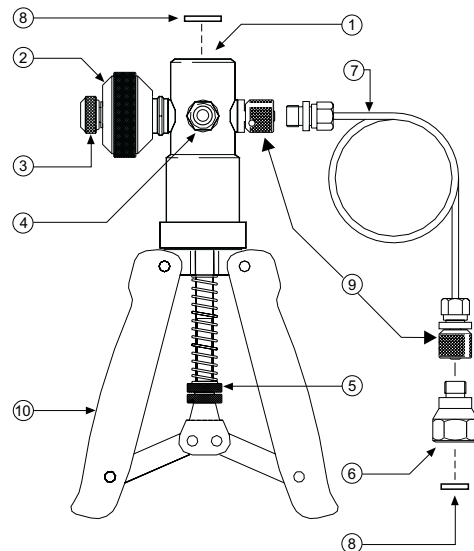
**NOTE:-** Careful use of the release valve (2) and fine control (3) enables a controlled release of pressure, essential for calibration purposes.

12. **RESERVOIR FLUID LEVEL:** If the fluid level in the reservoir falls considerably during use, a partial vacuum can be created in the reservoir which may affect the pump performance. To avoid this, simply allow air to enter the reservoir by partly unscrewing the filling plug (6).
13. **SEAL REPLACEMENT:** Dependant on the frequency of use, the Main Piston Seal (and others) will need replacing. Replacement seals and instructions for fitting are contained in the seal set ( HTPK1 ).

# OPERATING INSTRUCTIONS FOR THE HAND HELD PRESSURE TEST SYSTEM - TP1

## Key:

1. Pressure port - 3/8" BSP Parallel female connection to take master instruments e.g. digital or analogue gauge, PC6 Calibrator.
2. Fine adjustment valve.
3. Pressure release valve.
4. Pressure / Vacuum selector
5. Adjustable stroke for varying maximum pressure output (over pressure protection).
6. BSP or NPT adaptor set
7. Flexible hose to item under test.
8. Nylon seals for BSP adaptors ( see seal kit provided ) **DO NOT use 'PTFE' tape for sealing with parallel threads**
9. Knurled 'quick-fit' connectors
10. Pump Handles



The system is a portable dual source of vacuum and pressure. Each system incorporates a vacuum / pressure selector, a volume control for fine adjustment and adjustable stroke to provide over pressure protection.

## RELEASE VALVE (3)

This can be used to reduce or release the pressure in the system. The rate of pressure reduction is dependent upon the degree of rotation when opening the valve. Minimal force is required to seal the system.

## VOLUME CONTROL (2)

The pressure generated can be finely adjusted by turning the fine adjustment valve (2) either clockwise or anticlockwise to increase or decrease pressure accordingly.

## OVER PRESSURE PROTECTION (5)

To adjust the maximum output pressure of the system turn the nuts (5) to increase or decrease the stroke length.

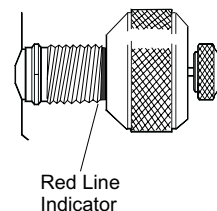


## IMPORTANT

**Under no circumstances should the fine adjustment valve (2) be wound back beyond the red line indicator on the body.** Should this occur, then the pressure must be released from the system before attempting to re-engage the fine adjustment valve.

## PRESSURE/VACUUM SELECTION (4)

Press the selector (4) as indicated on the label to engage the desired mode. Ensure that the release valve (3) is fully closed (clockwise motion) prior to pumping.



## NOTE

The system should only be used for pressurising small volumes due to its small displacement.

If the system has not been used for a period of time, it could be difficult to operate on the first stroke.

The cylinder has been lightly greased on assembly but, if additional lubrication should ever be required, then apply a minimal amount to the inside of the cylinder.

Access is via the three retaining screws located under the black collar.

For seal replacement, refer to service kit TPK1 instructions.



**WARNING: DO NOT CONNECT TP1 TO EXTERNAL PRESSURE SOURCE !**

## Guidelines for use:

1. Connect item under test to pressure port (6) at the end of the flexible hose (7) choosing correct adaptors and seals from the set provided.  
**Note:** Ensure seals are fitted and adaptors tightened to a maximum torque of 15 Nm.
2. Screw fine adjustment valve (2) fully clockwise.
3. Screw fine adjustment valve (2) 4 - 6 full turns anticlockwise.
4. Screw pressure release valve (3) fully clockwise, tightening to ensure good seal.
5. Operate handles until the pressure is close to that finally required. **Ensure handles are fully squeezed together on each stroke to achieve maximum pressure output.**
6. Wind the fine adjustment valve (2) clockwise to increase pressure or anticlockwise to decrease pressure until required pressure is reached.

**Note:** The pressure may take up to 1 minute to settle after increasing pressure due to thermodynamic effects, settling of seals

and expansion of the flexible hose.

**Caution:** NEVER screw the fine adjustment valve (2) beyond the red line indicator.

7. Reductions in pressure can also be achieved by careful use of the pressure release valve (3).
8. Vacuum is achieved using the above procedure and having the changeover valve (4) pushed completely towards the vacuum position.

### **Fault Investigation.**

In the event that the system appears to lose pressure then the procedure above should be repeated ensuring new seals are used, adaptors are tightened sufficiently and the pressure release valve (3) is tightened firmly.

**Note:** The connections to the hand held test system are sealed with 'o' ring or bonded seals and should not leak. The pipe to body connection can be checked but tightened no more than 2 Nm.

**DO NOT** attempt to tighten the other fittings to the test system as this could lead to damage of sealed joints. When testing for leaks it may be noticed that air is drawn in or expelled from around the changeover valve. This is normal and should cause no concern.

# OPERATING INSTRUCTIONS FOR THE LOW PRESSURE HAND PUMP - LTP1

## Key:

1. Pressure release valve.
2. Fine adjustment control.
3. Pressure / Vacuum selector.
4. Knurled 'quick-fit' connectors.
5. Two flexible hoses to item under test and master instrument.
6. BSP or NPT adaptor set.
7. Pump Handle.
8. Nylon seals for BSP adaptors ( see seal kit provided ) **DO NOT use 'PTFE' tape for sealing with parallel threads.**
9. Pressure Relief Valve.

The pump is a portable dual source of vacuum and pressure. Each pump incorporates a vacuum / pressure selector and fine adjustment control.

### RELEASE VALVE (1)

This can be used to reduce or release the pressure in the system. The rate of pressure reduction is dependent upon the degree of rotation when opening the valve. Minimal force is required to seal the system.

### FINE ADJUSTMENT CONTROL (2)

The pressure generated can be finely adjusted by turning the fine adjustment control (2) in or out to increase or decrease pressure accordingly.

### IMPORTANT

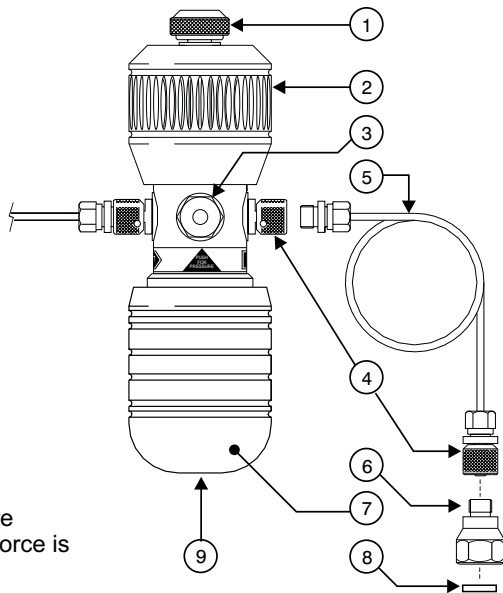
**Do not wind the fine adjustment control (2) any further when the top of the pump body is visible.**

### PRESSURE/VACUUM SELECTION (3)

Press the selector (3) as indicated on the label to engage the desired mode. Ensure that the release valve (1) is fully closed (clockwise motion) prior to pumping.

### PRESSURE PORTS (4)

The hoses (5) are fitted by simply pushing them into the connectors (4) until resistance is felt. To remove the hoses, press the collar in on the connector while pulling on the hose.



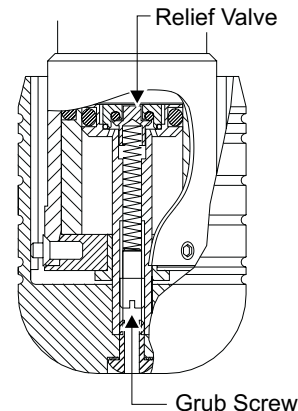
## PRESSURE RELIEF VALVE (8)

The maximum output pressure can be set using the pressure relief valve located inside the main piston, accessed via the handle retaining screw.

### NOTE

The pump should only be used for pressurising small volumes due to its small displacement. If the pump has not been used for a period of time, it could be difficult to operate on the first stroke.

For seal replacement, refer to service kit LTPK1 instructions.



**WARNING: DO NOT CONNECT LTP1 TO EXTERNAL PRESSURE SOURCE.**

### Guidelines for use:

#### 1. Calibration / Comparison against Analogue gauge

- 1.1 Connect a SI Test Gauge ( LTPG's ) to pressure port at the end of one of the flexible hoses (5).
- 1.2 Connect item under test to the pressure port at the end of the second flexible hose (5) choosing correct adaptors and seals.  
**Note:** Ensure seals are fitted and adaptors tightened to a maximum torque of 15 Nm.
- 1.3 Screw fine adjustment control (2) in fully and then out 4 - 6 full turns.
- 1.4 Screw pressure release valve (1) in fully, tightening to ensure good seal.
- 1.5 Using a small screwdriver, adjust the pressure relief valve (8) to set the desired maximum output pressure. Turn the grub screw located in the main piston clockwise to increase or anti-clockwise to decrease the pressure setting.
- 1.6 Operate handle (6) until the pressure is close to that finally required.
- 1.7 Wind the fine adjustment control (2) in to increase pressure or out to decrease pressure until required pressure is reached.

**Note:** The pressure may settle for up to 30 seconds after increasing pressure due to thermodynamic effects, settling of seals and expansion of the flexible hose.

**Caution:** STOP unscrewing the fine adjustment control (2) when the top of the pump body becomes visible.

- 1.8 Reductions in pressure can also be achieved by careful use of the pressure release valve (1).
- 1.9 Vacuum is achieved using the above procedure and having the pressure / vacuum selector (3) pushed completely towards the vacuum position.

## **2. Use With High Resolution Pressure Calibrators**

When used with instruments such as the PC6-PRO Calibrator the connections and use are as for gauges above, however the higher resolution available will amplify the visibility of the thermodynamic effects as mentioned in paragraph 1.7. These will settle to useable values within one minute of pressurisation.

**Note:** On very high resolutions such as 1 mbar or 0.1 inches of water, small movements of the pipe may result in noticeable pressure changes.

## **3. Fault Investigation.**

In the event that the pump appears to lose pressure then the procedure above should be repeated ensuring new seals are used, adaptors are tightened sufficiently and the pressure release valve (1) is tightened firmly.

**Note:** The connections to the hand held test system are sealed with 'o' ring or bonded seals and should not leak.

**DO NOT** attempt to tighten the other fittings to the pump as this could lead to damage of sealed joints.

When testing for leaks it may be noticed that air is drawn in or expelled from around the pressure / vacuum selector. This is normal and should cause no concern.

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# **APPENDIX:**

## **EPM**

### **Datasheet**

## EXTERNAL PRESSURE MODULE (EPM)

The EPM has been developed to work in conjunction with the PC6-PRO Pressure Calibrator to provide additional pressure ranges without incurring the full cost of extra calibrators ( see illustration on Page 65 for typical application ).

The EPM is an intelligent module which contains a pressure transducer, temperature sensor, analogue to digital converter, and the necessary calibration data stored during EPM calibration.

During operation the EPM sends pressure and temperature related information digitally to the PC6-PRO which acts as an intelligent terminal.

The EPM or the PC6-PRO internal pressure sensor can be selected during calibration using the calibrator menu system.

### SPECIFICATIONS

Model	Pressure Range		Acuracy (FS) up to	Model	Pressure Range		Acuracy (FS) up to
	bar	psi			bar	psi	
EPM-0.1	-0.1 to 0.1	1.5	0.025%	EPM-40	-1 to 40	600	0.025%
EPM-1	-1 to 1	15	0.025%	EPM-70	0 to 70	1000	0.025%
EPM-2	-1 to 2	30	0.025%	EPM-100	0 to 100	1500	0.025%
EPM-5	-1 to 5	75	0.025%	EPM-200	0 to 200	3,000	0.025%
EPM-10	-1 to 10	150	0.025%	EPM-350	0 to 350	5,000	0.025%
EPM-20	-1 to 20	300	0.025%	EPM-700	0 to 700	10,000	0.025%
EPM-25	-1 to 25	360	0.025%	EPM-1000	0 to 1000	15,000	0.025%

Alternative pressure ranges and differential input versions are available to special order.

<b>Overload Pressure</b>	10% FS
<b>Pressure Display Resolution</b>	6 Digits
<b>Operating Temperature:</b>	0 to 40°C
<b>Calibration Temperature:</b>	20°C ±2°C
<b>Storage Temperature:</b>	-20 to 70°C
<b>Calibrated Temp. Range:</b>	10 to 40°C
<b>Temperature Effects:</b>	0.001% of reading/°C between 10-40°C
<b>Pressure Connection:</b>	¼"BSP Male
<b>Dimensions:</b>	140mm x 31mm DIA, 1 meter cable
<b>Weight:</b>	450 grams approx.
<b>Material:</b>	All Stainless Steel



