CE

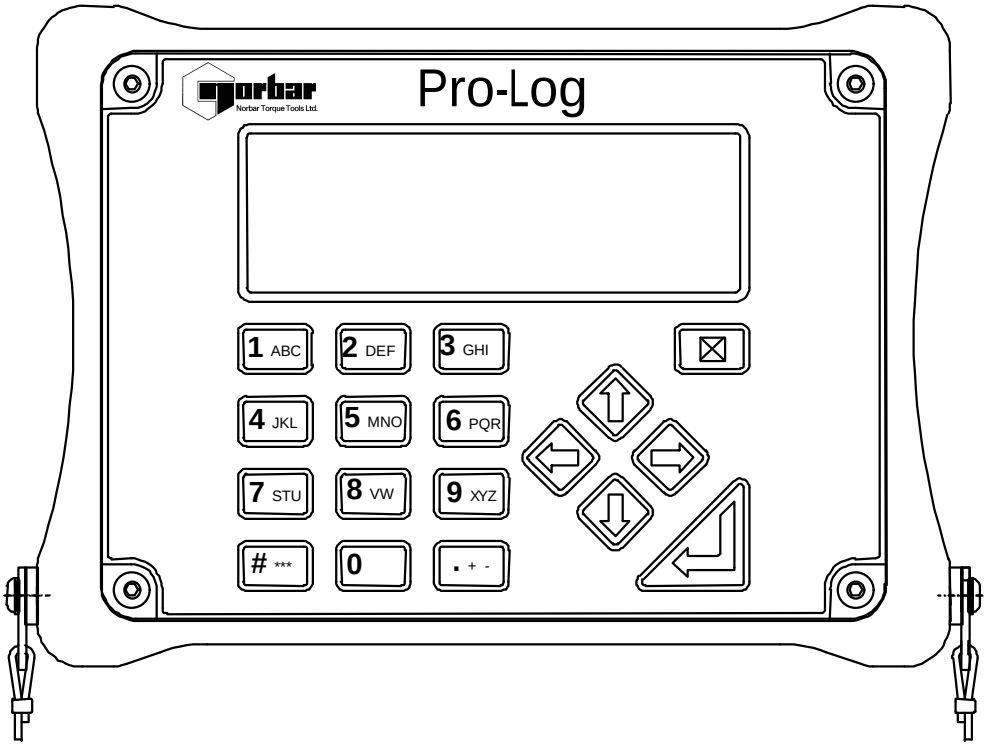
Norbar Torque Tools Ltd.

Pro-Log

OPERATOR'S HANDBOOK (PART No 34263) Issue 2

(ENGLISH)

FOR USE WITH PRO-LOG'S FITTED WITH VERSION 37702.102 & 37704.102 SOFTWARE



MODEL NUMBERS COVERED BY THIS MANUAL

40330.SE PRO-LOG
40330.NE PRO-LOG

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CONTENTS

PARTS INCLUDED:-

PART NUMBER-	DESCRIPTION	QUANTITY
40330.SE or .NE	Pro-Log Instrument	1
25498	M4 x 10mm long neck strap screws	2
38877	9 volt DC power supply	1
38879	Pro-Log carry case	1
38881	Neck strap clip	2
38882	Neck strap clip spacer	2
38883	Neck strap	1
24933	2.5mm Hex key	1
34263	Operators Handbook	1
34266	Quick Reference Card	1
	Calibration Certificate	1

NOTE:- languages fitted *40330.SE – English, French, German, Italian, Spanish, Dutch & Portuguese.*

40330.NE – English, French, German, Danish, Finnish, Norwegian, Swedish.

TRANSDUCER LEADS AVAILABLE :-

PART NUMBER	DESCRIPTION
60216.200	Pro-Log to 10 way Transducer connector
60217.200	Pro-Log to 6 way Transducer connector
60223.200	Pro-Log to no connector
60230.210	Pro-Log to miniature Transducer connector

NOTE:-The suffix after the part number indicates the length of the lead in cm, thus XXXXX.200 = 2 meters. If Transducer leads are required of a non-standard length (to the nearest meter), the new suffix must be added to the part number when ordering.

TRANSDUCER COMPATIBILITY :-

Four wire bridge, millivolt per volt (mV/V) output transducers conforming to the specifications in the ‘Transducer Interface’ section of this manual.

Example:- A 100 N m transducer has a 2.048 mV/V output at its torque capacity. The Pro-log excitation voltage is 5 volts (V), therefore its millivolt output (mV) is 2.048 x 5 = 10.24 mV, so at 10% of toque capacity (10 N m) the mV output = 1.024.

Norbar transducers with the following suffix are all suitable for use with the Pro-Log.

XXXXX.IND	Transducer calibrated in mV/V.
XXXXX.INDA	Transducer calibrated in mV/V with integral angle encoder.
XXXXX.LOG	Transducer calibrated with a Pro-log in units of calibration. A mV/V figure is also supplied.
XXXXX.LOGA	Transducer calibrated with a Pro-log in units of calibration with integral angle encoder. A mV/V figure is also supplied.

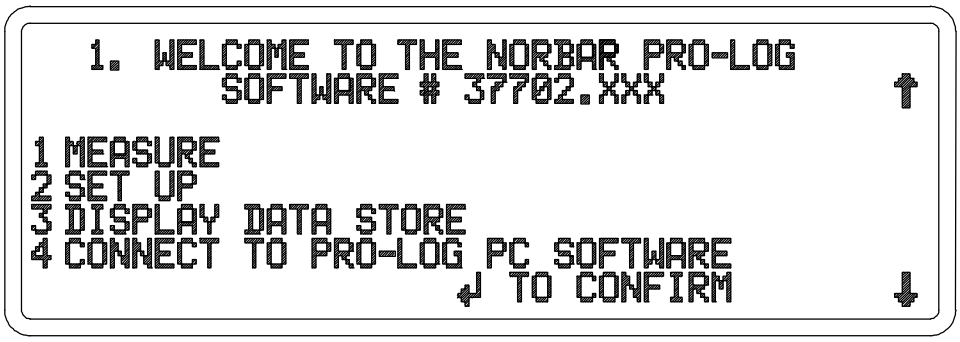
NOTE:- ETS Transducers previously supplied with an amplifier module will need to be modified for use with the Pro-Log.

INTRODUCTION

Pro-Log is a hand held measuring instrument for interfacing to most strain gauge type transducers with a millivolt / volt output (mV/V). Angle or speed measurement can also be performed simultaneously. When used with the 'smart' range of transducers from Norbar, simply connecting the transducer will automatically set up the Pro-Log for use.

Pro-Log can be powered from the ac power adapter supplied, or the internal battery pack. Battery life can be greatly increased from a minimum of 16 hours by making use of the auto power down function, which will send the instrument into standby mode if no key has been pressed or measurement reading taken for the specified time. The battery is constantly monitored and indication is given on the display if it should become low or flat. When low battery has been shown on the display there is approximately 20 minutes of use left. To recharge the batteries simply connect the ac power adapter between the Pro-Log and a live a.c supply. Recharging is independent of the on/off switch and indication of external power is shown by the illumination of display back light.

Pro-Log is a menu driven system with full control via the front panel keys. The main menu is shown below followed by an explanation of each selection option.



1 MEASURE

This option allows the user to view the measurement screen, but also gives the user access to the ability to store details of up to 20 non-smart transducers. These stored transducers can be edited or deleted from the store and the whole store can be printed. The last transducer used will always be retained for quick selection. When using intelligent (smart) transducers, there is no need to enter the transducer's details into the Pro-Log as these are stored in the connected transducer.

2 SET UP

This option allows you to set up:-

1. DATA STORE, for block storage of readings taken including block settings for transducer used, limits, modes of operation, frequency response, auto reset hold time and first peak sensitivity. The set up of blocks within the data store is password protected (default password = 000000).

2. LIMITS, for use when operating outside a block. Settings include Torque, Load or Pressure limit units, target value, upper and lower set points, latching or non-latching and direction of operation. These settings are also available for Angle and all limit settings can be saved as defaults (used all of the time) or not (used until power is switched off).

3. ANGLE display and limit outputs can be set up to work in track (peak off), peak in either clockwise, anticlockwise or both directions of operation. The angle can also be set up to work in 'Torque followed by Angle' mode by enabling and setting the threshold value. These angle settings are independent of those within a block and can be enabled as defaults or not.

INTRODUCTION CONTINUED :- _____

4. CURRENT SETTINGS fall into two categories, firstly those settings used by the Pro-Log when not operating in a block. They include; frequency response, first peak sensitivity, auto reset hold time, conversion units enabled / disabled and modes of operation enabled / disabled. All of these settings can be enabled as defaults or not and are password protected (default password = 000000).

The second category settings cannot be set up in a block. They are system parameters which include; language and password to be used, date / time setting and format, serial port settings and power down time when in battery operation. All of these settings can be enabled as defaults or not and are password protected (default password = 000000).

All of the default settings for limits, angle and current settings, as well as blocks added to the data store can be printed if 'print defaults' is selected. This is not password protected.

3 DISPLAY DATA STORE

Selecting 'Display Data Store' allows you to view, statistically analyse and print the data stored in blocks including options for graphical representation of the data. The data store is divided up into 100 blocks, each block can have between 1 and 100 readings stored. Statistical functions for each block are; mean, minimum, maximum, number of readings, sigma, Cp, Cpk and number of readings outside limits. Those can be performed on both Torque and Angle data.

Graphs that can be viewed and printed are either histogram or trend plots. Both types of graph can be shown between limits, between minimum and maximum readings or as a percentage of the transducers rated capacity. All of these graphs are available for both Torque and Angle data.

4 CONNECT TO PRO-LOG PC SOFTWARE

When selected, this menu item gives the user the ability to transfer control of the Pro-Log to a PC. This software is not currently available and is for future release, consult Norbar Torque Tools for further information if required.

The second item in this menu is 'Test serial port output' which is intended for use when setting up communication between a Pro-Log and a PC or printer. The serial port will output the message 'TEST OUTPUT' using the interface specifications set up in 'SERIAL PORT' of the 'CURRENT SETTINGS' option of 'SET UP'.

HYPER TERMINAL INTERFACE :- _____

Entry of information into the Pro-Log can be greatly speeded up by attaching the serial port of the Pro-Log to the serial port of a P.C. and using the standard Hyper Terminal program on Microsoft® Windows 95/98 disks. This gives the P.C. total control of the Pro-Log via the P.C. keyboard with serial output data being able to be viewed and stored. The necessary cables, connectors and instructions are available from Norbar, part no 60229.

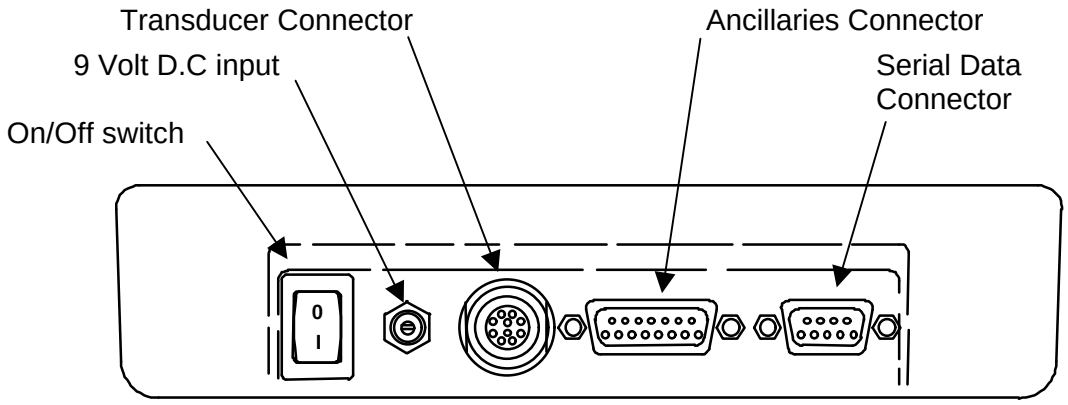
PRO-LOG CALIBRATION AND REPAIR :- _____

Your Pro-Log has been supplied with a current certificate of calibration. To maintain the specified accuracy it is recommended that the Pro-Log and transducers are recalibrated at least once per year.

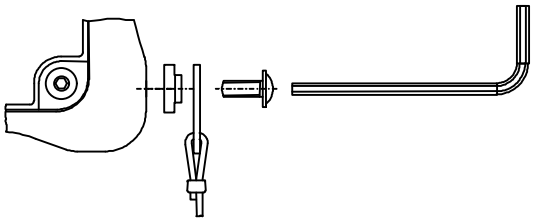
Re-calibration and repair should be carried out at Norbar or by a Norbar approved agent, where all the facilities to ensure the instrument is functioning at maximum accuracy are available.

Alternatively, procedures for calibrating the Pro-Log to the specified accuracy can be found in the Pro-Log service manual Part No. 34264.

OPERATING INSTRUCTIONS



1. Assemble neck strap to Pro-Log as shown below if required.



2. Connect transducer cable between transducer and Pro-Log.

3. Connect to Serial data connector and/or Ancillaries connector if required.

4. Switch On/Off switch to On (I in down position) for battery operation. For AC power operation, plug power adapter into 9 volt DC input then plug power cord into power adapter. Switch on. If the power cord has no plug fitted, wire as follows:

   BROWN-LIVE BLUE-NEUTRAL GREEN / YELLOW-EARTH

NOTE:- It is essential that the Pro-Log is charged for 14 hours to ensure the battery is full. The Pro-Log can be operated from the power adapter whilst the batteries are being charged. Recharging is independent of the on/off switch and indication of external power is shown by the illumination of display back light.

5. Menu number 1 should now be displayed, From here you can go into :

   1 MEASURE See flow diagram on page 10.

   2 SET UP See flow diagram on page 9.

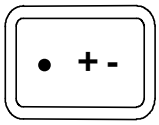
      (DATA STORE) See flow diagram on page 12
      (LIMITS) See flow diagram on page 9
      (ANGLE) See flow diagram on page 9
      (CURRENT SETTINGS) See flow diagram on page 13

   3 DISPLAY DATA STORE See flow diagram on page 11.

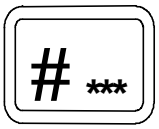
   4 CONNECT TO PRO-LOG PC SOFTWARE See flow diagram on page 9.

NOTE:- The options shown in brackets ( ) are available having selected SET UP.

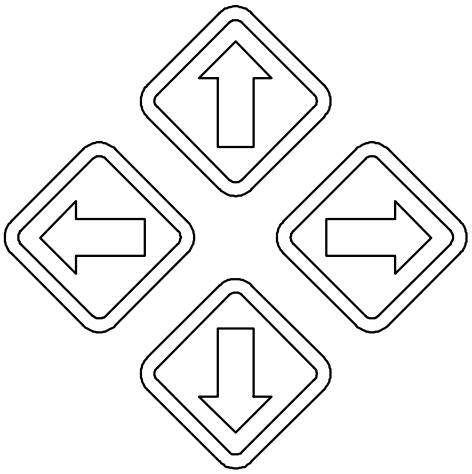
BUTTON FUNCTIONS :- _____



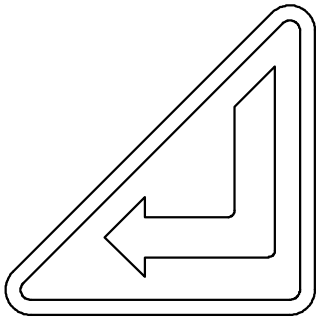
a) Numeric entry of characters.
b) Alpha entry of text. Press and hold until required character is displayed, then release.
c) 0 – 9 are shortcuts for menu selection.



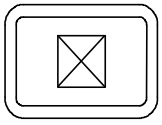
a) Shortcut for menu selection.
b) Entry of # character.
c) Entry of special characters, % ( ) * , / : = \ when entering text. Press and hold until required character is displayed, then release.
d) Selection of blocks for current transducer when in Measure mode.
e) Exit from a partly full block that is in use.



a) To navigate through menu options and choices.
b) Left arrow becomes delete when entering alphanumeric data.
c) Right arrow becomes space when entering alphanumeric data.
d) Use down arrow to move on to next option in a set up menu.



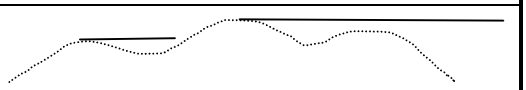
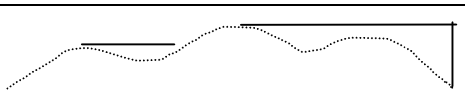
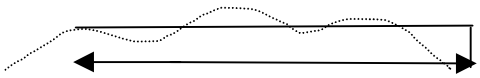
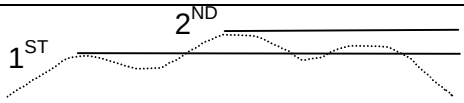
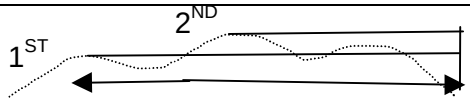
a) Confirmation that all entry's are correct in a set up menu.
b) Performs log function when in measure mode.



a) Exit from measure modes and set up menus.

MODES OF MEASUREMENT :- _____

(Frequency response as set in current settings)

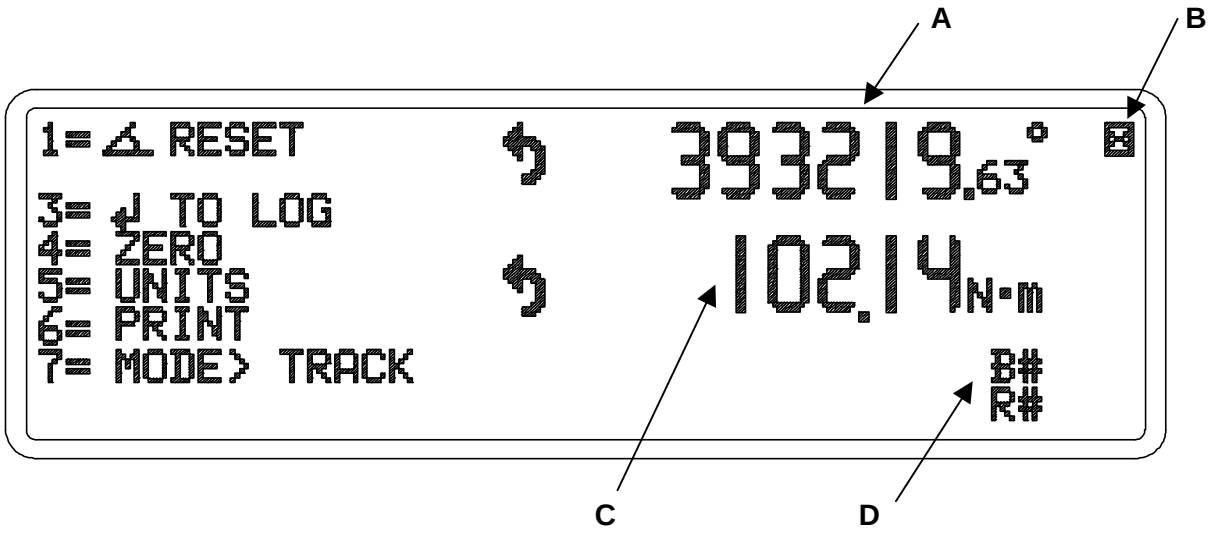
MODE	How it works.	Visual representation
Track	Follows signal.	
Peak Memory & Manual Reset	Hold highest signal until reset by user.	
Peak Memory & Auto Reset	Hold highest signal until signal returns to zero.	
First Peak Memory & Manual Reset	Hold 1st signal peak until reset by user. The first peak is detected with the 'first peak sensitivity' setting'	
First Peak Memory &Auto Reset	Hold 1st signal peak for set time, then resets.	
Second Peak Memory & Manual Reset	Hold 1st signal peak and shows any 2nd peak until reset by user.	
Second Peak Memory & Auto Reset	Hold 1st signal peak for set time, shows any 2nd peak in set time.	

SPECIFIC MODES OF MEASUREMENT :- _____

(Frequency response fixed)

Specific Modes :	Identical to Mode :	Filter Setting
Dial & Electronic	Peak Memory & Manual Reset	500 Hz
Click & Cam	First Peak Memory & Auto Reset	500 Hz
Impulse Tool	Peak Memory & Manual Reset	2500 Hz
Clutch Tool	Peak Memory & Manual Reset	2500 Hz
Stall Tool	Peak Memory & Manual Reset	500 Hz

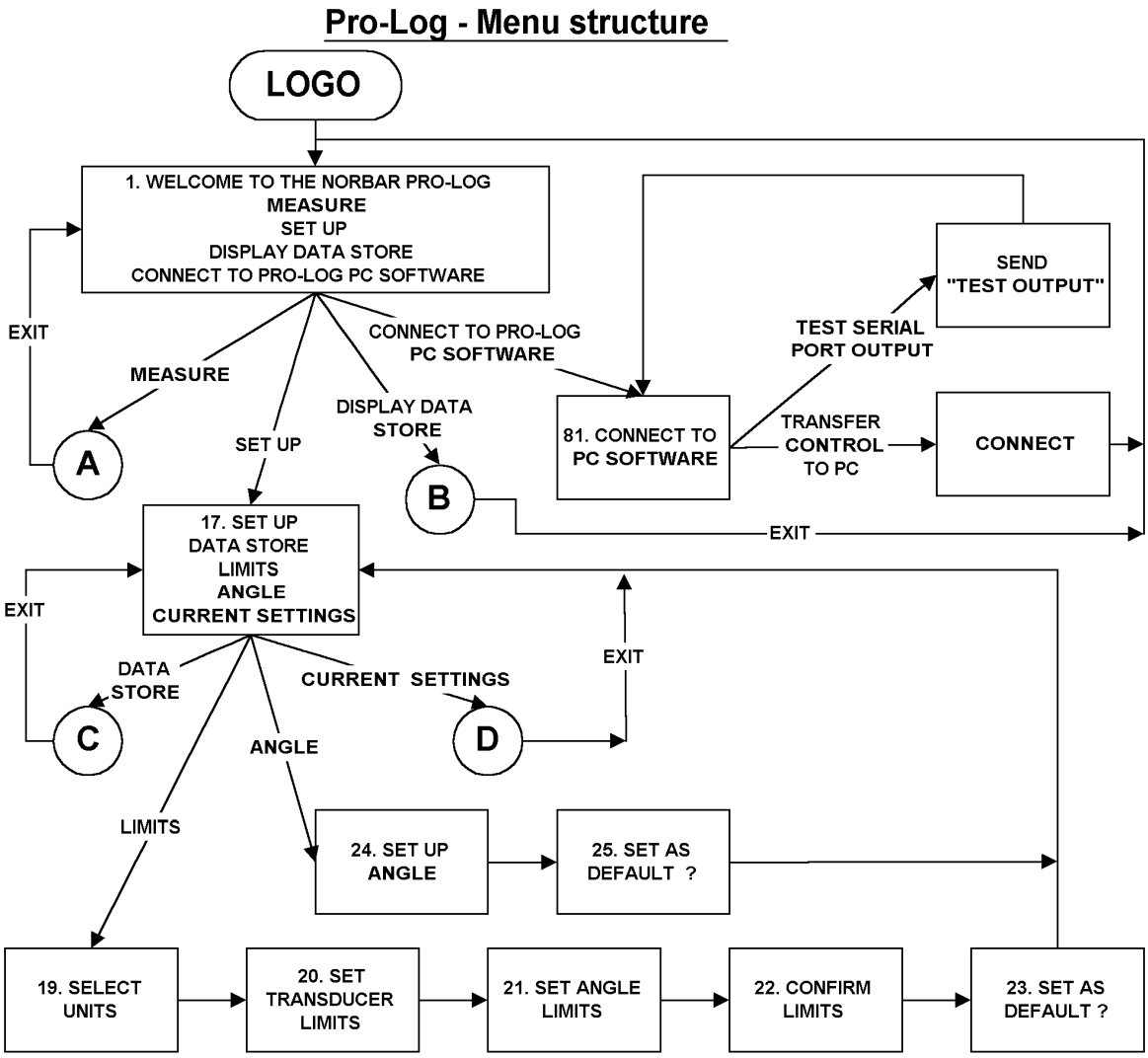
MEASUREMENT SCREEN LAYOUT & OPERATION :- _____

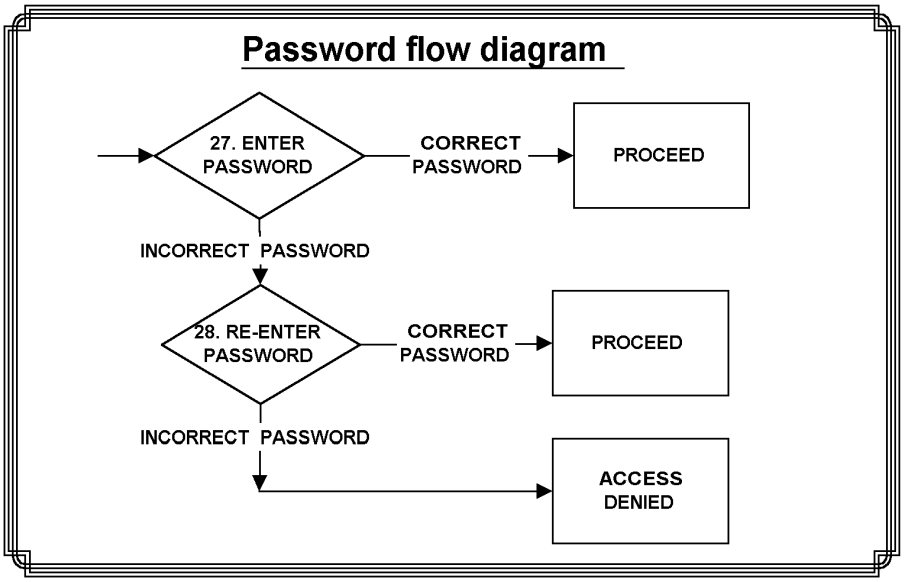


1.	Pressing 1 resets the ANGLE display to zero, this button is not shown for non-angle measurement or if operating in 'Torque followed by Angle' mode.
3.	Pressing 3 toggles the display between '↵ TO LOG' and 'NO LOG'. ↵ TO LOG : ↵ will store and print. Reset and auto reset will store, print and reset. NO LOG : will not store or print.
4.	Pressing 4 resets the TORQUE, LOAD or PRESSURE display to zero in the 'TRACK' mode, this option will not be shown when in any other mode of measurement.
5.	Pressing 5 will step on to the next enabled 'UNITS' of measurement.
6.	Pressing 6 will 'PRINT' the measurement value(s) shown on the display when in 'TRACK' mode. The function of button 6 changes to 'RESET' (memory reset) when in any peak, or first peak memory mode.
7.	Pressing 7 will step on to the next enabled 'MODE OF MEASUREMENT'.
A.	Measurement display for ANGLE or RPM, showing direction and units. If there is no angle or rpm display the TIME and DATE is shown in this area.
B.	Indicates that when the 'EXIT' button is pressed, the measurement screen or set up menu will be closed down.
C.	Measurement display for TORQUE, LOAD or PRESSURE, showing direction and units.
D.	Indicates block number and reading number if operating in a block. Pressing the # button will show you the blocks that can be selected for the transducer in use.

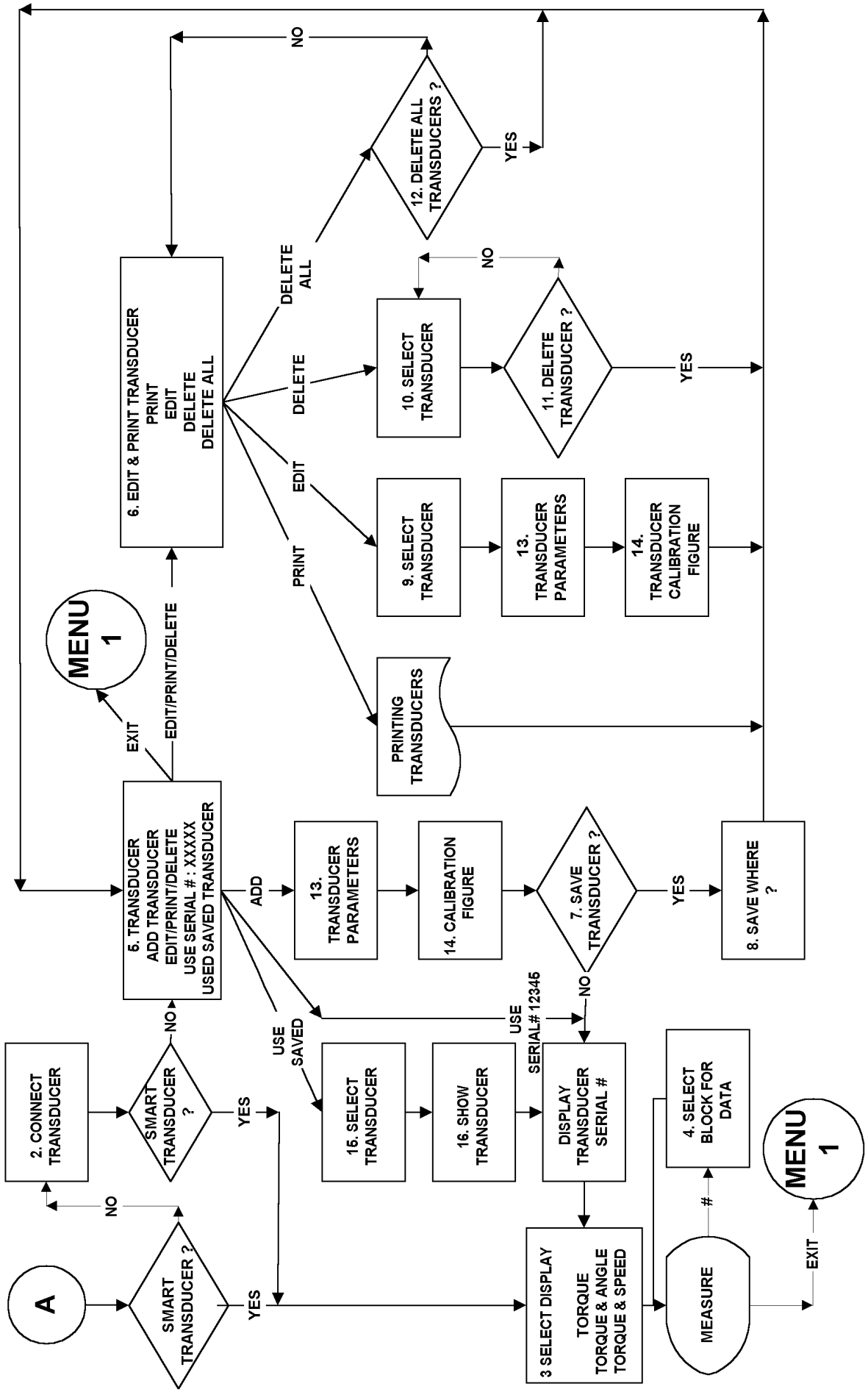
OPERATION FLOW DIAGRAMS :-

All set up menus are numbered on the Pro-Log for ease of identification.

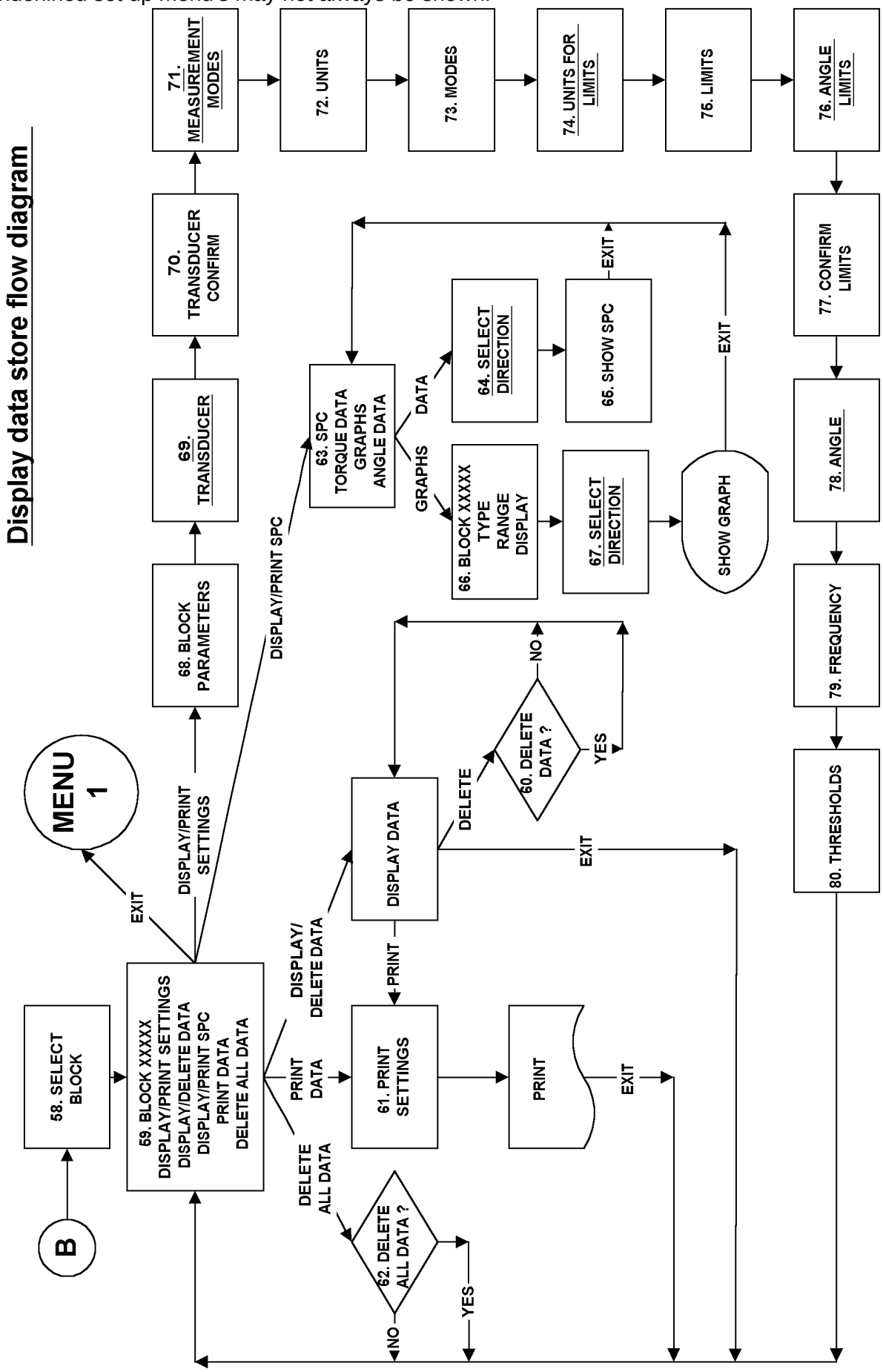




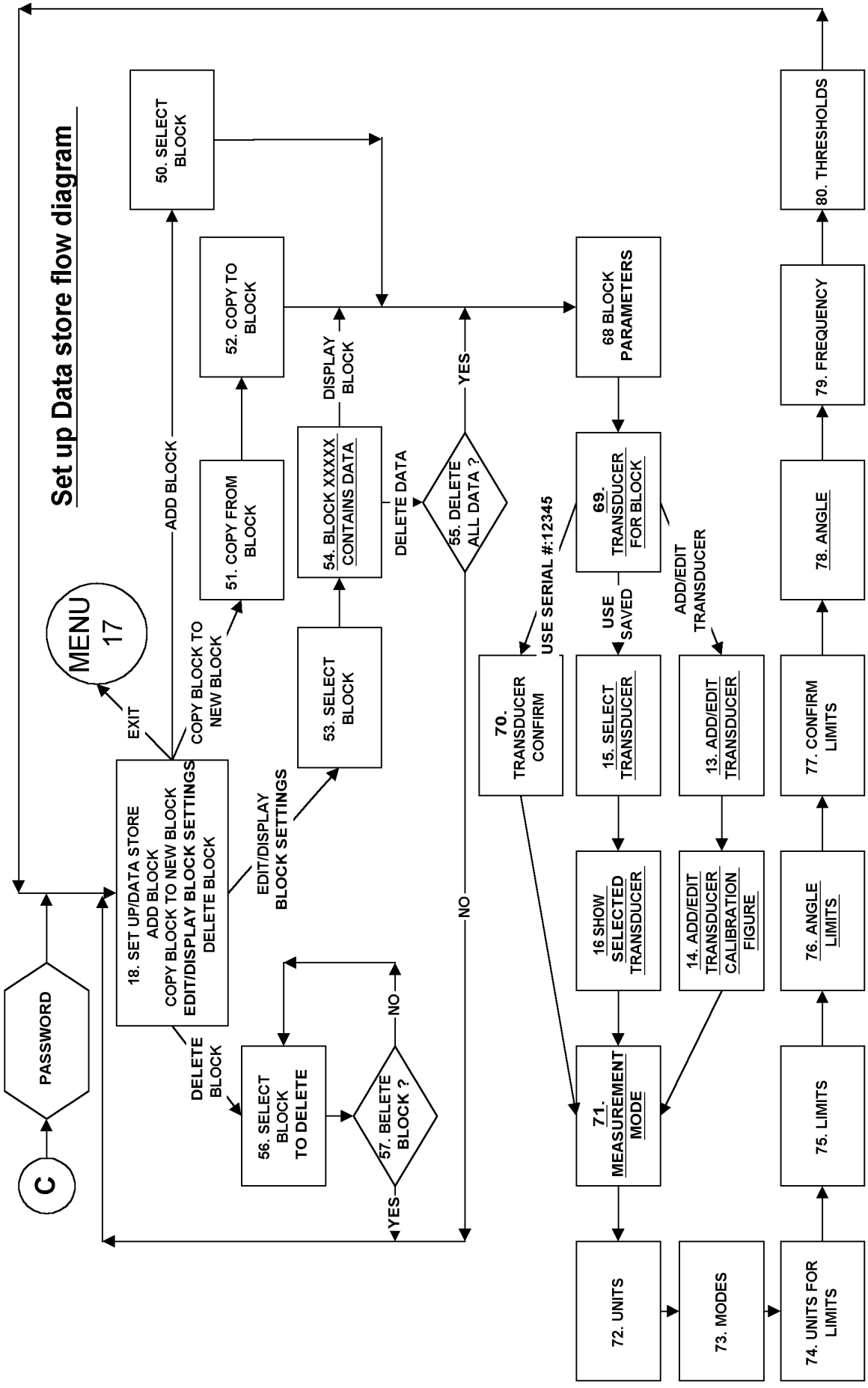
Measure flow diagram



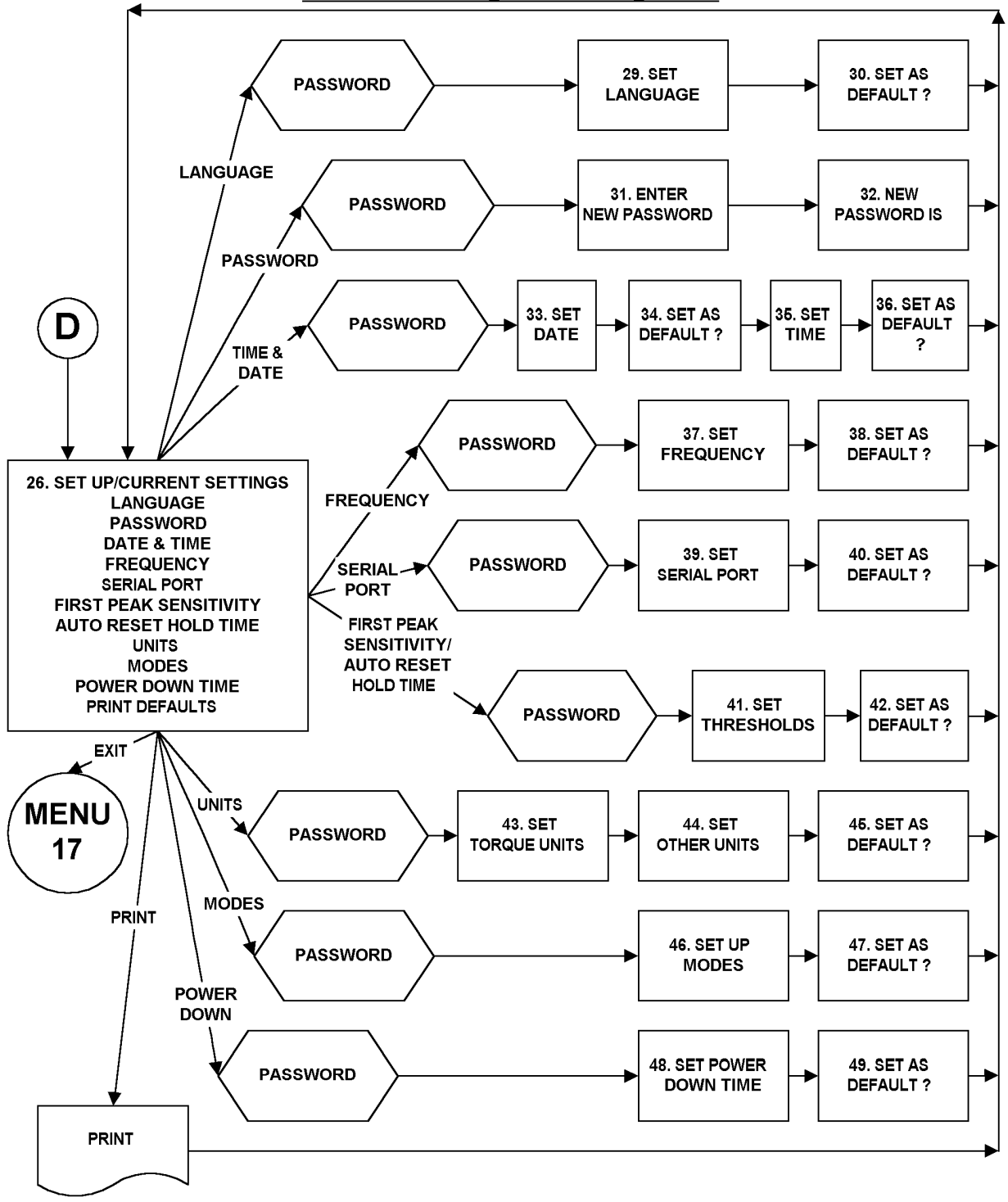
Underlined set up menu's may not always be shown.



Underlined set up menu's may not always be shown.



Current settings flow diagram



TRANSDUCER INTERFACE

INTRODUCTION :-

Pro-Log will accept input from most strain gauge type transducers and 2 channel, 5 volt, quadrature angle encoders and is capable of storing the settings for up to 20 non-smart transducers. Pro-Log can display units of measurement and direction of both torque/force and/or rotation for; Torque & Angle/speed, Torque, Load and Pressure transducers. When used with Norbar 'smart' range of transducers simply connecting the transducer and selecting 'MEASURE' will automatically set up the Pro-Log with the transducer's details.

CONNECTOR TYPE :-

Lemo 10 way panel socket, size 2B. The mating part to this connector is a Lemo 10 way, size 2B free plug, manufacturers part number FGG.2B.310.CLAD722.

INTERFACE SPECIFICATIONS :-

PARAMETER	MINIMUM	MAXIMUM
Bridge Resistance	350 Ω	1000 Ω
Millivolt / volt value (mV/V)	0.95	3.15
Zero balance	Same as →	+/- 3% of full scale.
Torque/Force Resolution	3.5 Active digits	4.5 Active digits.
Torque/Force full scale transducer ranges	0.010000	1,500,000
Torque units	Dependent on transducer capacity and millivolt / volt value	Nm, dNm, cNm, lbf.ft, lbf.in, ozf.in, ft.lb, in.lb, in.oz, kgf.m, kgf.cm, gf.m, gf.cm
Load units		kN, N, tonf, lbf, ozf, tonnef, kgf, gf
Pressure units		Lbf/sq.in, bar
Displayable overrange	120%	120%
Angle encoder output voltage (Low)	- 0.3 volts	0.5 volts.
Angle encoder output voltage (High)	2 volts	5.3 volts.
Angle encoder pulses/revolution	90	9999
Angle Resolution	Every 4°	Every 0.004°.

INTERFACE PIN CONNECTIONS :-

PIN No	FUNCTION
1	+ve transducer excitation
2	-ve transducer excitation
3	+ve transducer signal
4	-ve transducer signal
5	Digital 0 volts
6	Digital +5 volts
7	Angle signal channel a
8	Angle signal channel b
9	Serial clock (e²prom)
10	Serial data (e²prom)

SERIAL DATA INTERFACE

INTRODUCTION :-

The serial data interface is configured as DTE (Data Terminal Equipment) and conforms to RS-232-C specifications.

When operating in the ‘MEASURE’ mode, data is output on the serial interface automatically when the memory auto-reset mode timer operates, when the 'MEMORY RESET' button is pressed, or by pressing the ‘PRINT’ button when in track mode. The information can include the measured value, units of measurement, angle reading and time/date (as shown on the display). Output can also be requested externally via pin 2 (ancillaries connector), see ancillaries interface section.

When operating in ‘SET UP’, ‘DISPLAY DATA STORE’ or ‘CONNECT TO PRO-LOG PC SOFTWARE’, the means of achieving output will be shown on the display.

CONNECTOR TYPE :-

9 way female ‘D’ type connector.

INTERFACE SPECIFICATIONS :-

	OPTIONS	**FACTORY DEFAULTS**
Parity =	ODD, EVEN or OFF.	OFF.
Baud rate =	1200, 2400, 4800, 9600 or 19200.	9600.
Data bits =	7 or 8.	8.
Stop bits =	1 or 2.	2.
First character =	+/- or NONE.	NONE.
Output units =	YES or NO.	YES.
Output date & time =	YES or NO	NO.
Output line feed =	YES or NO	NO.
Handshake =	NONE, CTS or X-ON/OFF	NONE.
Line delay =	X.XX SECONDS	0.50 SECONDS.
	SET TO FACTORY DEFAULTS	

Maximum number of characters per line = 24.
Maximum number of requests per second in track mode = 1 every 2 seconds.
Transmitted data voltage levels are between +5 to +9 volts and –5 to -9 volts.

INTERFACE PIN CONNECTIONS :-

PIN No	**FUNCTION**
1	Not Connected
2	Received data (from P.C)
3	Transmitted data (from Pro-Log)
4	Not Connected
5	Signal ground 0V.
6	Not Connected
7	Not Connected
8	CTS (clear to send)
9	Not Connected

DATA OUTPUT EXAMPLE :-

Code : DP=Decimal Point. CR=Carriage Return. SP=Space.
Pro-Log with the serial port set to the factory defaults. Reading 1068.4 lbf.ft (clockwise).

1	0	6	8	DP	4	SP	l	b	f	DP	f	t	CR

ANCILLARIES INTERFACE

INTRODUCTION :- _____

The limit logic outputs are intended for Go/No Go control of external equipment, the limit state outputs are displayed and printed for torque/load/pressure and angle. Limit states can also be stored in blocks if required. For more information on limits see 'LIMITS' menu which can be accessed via 'SET UP' from the main menu. Pins 1 & 2 are intended for use as an external memory reset / print to the Pro-Log.

CONNECTOR TYPE :- _____

15 way 'D' type connector.

INTERFACE SPECIFICATIONS :- _____

Digital +5 volts current, 5 mA maximum
External memory reset / print input – Low to high transition (must remain high for at least 200 mS),
Limit output current, High = -1 mA, Low = 1.6 mA

INTERFACE PIN CONNECTIONS :- _____

PIN No	FUNCTION
1	Digital +5 volts (maximum current 5 mA)
2	External memory reset / print (Active High)
3	Torque low limit output (LO)
4	Torque pass limit output (OK)
5	Torque high limit output (HI)
6	Angle low limit output (LO)
7	Angle pass limit output (OK)
8	Angle high limit output (HI)
9	digital 0 volts
10	Not Connected
11	Not Connected
12	Not Connected
13	Not Connected
14	Not Connected
15	Not Connected

NOTE:- All limit outputs are active HIGH.

SPECIFICATIONS

Display	240 x 64 pixel dot matrix display. With update rate of twice per second (2Hz).
Resolution	Up to 19999 (dependent on Transducer specification & units selected)
Weight	0.8 kg (1.76 lb).
Dimensions	45 mm x 145 mm wide x 200 mm.
Accuracy	@ 0.5 mV input +/-0.3% of reading @ 1.0 mV input +/-0.18% of reading @ 2.0 mV – 18.9 mV input +/-0.14% of reading Expressed as an expanded uncertainty using a coverage factor of K=2, to give a confidence level of approximately 95%.
Zero suppression	TRACK None. ALL MEMORY MODES Suppressed from 0 to approximately 0.5% of transducer calibration range.
Angle / Speed measurement	30,000 pulses per second maximum. Maximum angle 999,999.99 degrees. Maximum speed 9999 r.p.m. (revolutions per minute).
Password	000000 (default), must be 6 characters.
Time/date	Hours, minutes & seconds. Standard or American date format.
Time/date compliance	To year 2062.
Units of measurement	See TRANSDUCER INTERFACE section (page 14).
Memory auto-reset trigger	2.5%(High), 5%(Medium), or 10%(Low) of reading.
Memory auto reset hold time	1, 2, 3 or 4 seconds
Frequency response	8^{th} Order butterworth low pass filter with a –3dB point settable from 100 to 6000 Hz
Temperature range	+5°C to +40°C (operating). -20°C to +70°C (storage).
Maximum operating humidity	85% Relative Humidity @30°C.
Power adapter	90 to 264 Volts AC at 50-60 Hz input. 9V, 300 mA DC output (centre positive).
Power down time	1 to 99 minutes (enter 0 to disable)
Power consumption	2.4 W - maximum.
Power cable	2 meters (6 ft 6 ins) long minimum.
Power plug fuse (if fitted)	1 Amp
Battery pack	1500 mAh,6.0 volt (5 cell) NiMH (Recharge time 14 hours).
Back up battery	Renata 190 mAh (CR2032FH).
Case materials / finish	Rigid polyurethane with fine texture acrylic paint finish.
Environment	Indoor use within a light industrial environment.
Electromagnetic Compatibility (EMC) Directive	In conformance with EN 61326 : 1997
Low voltage directive	In conformance with EN 61010-1 : 1993. To environmental conditions Pollution Degree 2 & Installation Category (Over voltage Category) II.
Cleaning	Do not use abrasives or solvent based cleaners.

Due to continuous improvement all specifications are subject to change without prior notice.

TROUBLE SHOOTING

1. Zero does not function in track mode.

Transducer zero must be within +/- 3% of full scale, return defective transducer to Norbar.

2. Angle display only shows zero.

Check that the threshold value has not been set and enabled for angle. From the main menu select 'SET UP', then 'ANGLE', to view and change this option.

3. Battery only powers Pro-Log for a short time.

Battery pack may need replacing (Part number 38876).

NOTE:- Static protection must be worn at all times during this procedure.

a) Switch off and remove ac power adapter.
b) Remove the 4 screws from the corners of the Pro-Log front panel using 2.5 mm hex key provided.
c) Pull front panel forward from the top edge, unplug battery connector (red & black leads) from CONN4.
d) Remove battery pack from case.

Refitting is the reversal of removal.

4. Serial data output is not communicating with other equipment.

a) Check that control word on the Pro-Log and the equipment receiving data match. See page 15.
b) Check that the baud rate is set to the same as the equipment receiving data.
c) Check that the connecting lead is wired correctly at both ends, see page 15.
d) Check if equipment receiving data requires the units of measurement inhibited or a leading character. This is applicable when interfacing to Mitutoyo equipment.

NOTE:- use the 'TEST OUTPUT' to help in fault finding, see connect to PC software on page 4.

5. Serial data output is being overwritten.

Your printer may need a line feed, enable the line feed function via the menus SET UP – CURRENT SETTINGS – SERIAL PORT.

6. Serial data is being output too fast.

Your printer may be too slow. To slow down the output change the delay between lines function via the menus SET UP – CURRENT SETTINGS – SERIAL PORT.

7. Display shows 'SMART TD NOT INITALISED'.

a) Your 'SMART' transducer has lost its memory, return to Norbar.
b) You have an unmodified ETS transducer plugged in.
c) The transducer lead may have a broken connection.

8. Stored data has been lost and no time/date displayed.

The back up battery has failed. Replace or return to Norbar.

NOTE:- Static protection must be worn at all times during this procedure.

9. Password lost.

Contact Norbar.

HINTS & TIPS

Messages	Warning and Error messages are shown to help the user with audible warnings given when necessary.
Priority of settings	Block settings have priority over current settings, however the frequency response for specific modes of measurement is fixed at all times.
Entering information into set up screens	When in a set up screen, after entering one option press the down arrow to enter the next. When all entry's have been made, press '↵'.
More menu items	When the number of menu items is bigger than the screen, the symbol ⇑ or ⇓ is shown.
Auto reset hold time	For quicker operation of auto reset modes, change AUTO RESET HOLD TIME to 1 SECOND in the CURRENT SETTINGS menu.
Inconsistent readings	If readings are inconsistent in first peak mode, try changing FIRST PEAK SENSITIVITY in the CURRENT SETTINGS menu. This will compensate for sensitive torque wrenches.
Disabling units of measurement	If only a few units of measurement are required, the rest can be disabled in the CURRENT SETTINGS menu. The quickest way of setting up is to enter UNITS ENABLE/DISABLE, disable all then enable the required units.
Disabling modes of measurement	If only a few modes of measurement are required, the rest can be disabled in the CURRENT SETTINGS menu. The quickest way of setting up is to enter MODES ENABLE/DISABLE, disable all then enable the required modes.
Changing transducer parameters	If any transducer's parameter is changed i.e. re-calibration of mV/V value, the transducer's stored parameters must be edited as must any blocks wanting to be used that were created for that transducer prior to re-calibration.
Marking non-smart transducers	Mark non-smart transducers with their stored 'T' number for ease of identification.
Disabling power down.	Set the POWER DOWN TIME to 0 in CURRENT SETTINGS.
Maximising battery life.	Set the POWER DOWN TIME to 1 minute in CURRENT SETTINGS.
Exceptions to entering power down.	The Pro-Log does not enter the standby mode when showing a set up menu.

HINTS & TIPS CONTINUED :- _____

Setting up blocks	Set up all the blocks you require before going to the measure screen.
Entering readings into a block.	When entering readings into a block, after the first reading has been input the block reading number will be preceded by a '↑'. This indicates that the last reading can be re-input if '↑' is pressed on the keypad. The reading can be re-input after pressing '#', or accepted by pressing '↵'. Only the previous reading taken can be re-input. Upon filling the block a 'BLOCK FULL' message will be displayed and the user will be prompted to press X , after doing this the block reading number will show '↑R#↑↑↑↑'. The last reading can be re-input if the '↑' is pressed and the block can be exited when pressing '#' returning the user to the measure screen.
Displaying data in a block	Upon entry to 'display/delete data' in a block in the data store, the first reading is shown. To view more readings, press the down arrow.
Creating more blocks	The quickest way of creating blocks is to copy one that already exists and then edit the copied block.
Setting up blocks for non-SMART transducers	The user should enter the measure mode, ADD the desired transducers details and then SAVE the transducer in the store. Exit the measure mode and enter SET UP then DATA STORE. After choosing a block and entering the header details, the transducer can be selected from 2.USE SAVED TRANSDUCER.
Setting up blocks for SMART transducers	The user should enter SET UP then DATA STORE, then after choosing a block and entering the header details the transducer can be selected from 1. USE SERIAL # : XXXXX.
Printing all of the default settings	The user must enter SET UP then CURRENT SETTINGS then select PRINT DEFAULTS. This gives the user a print out of all of the default settings for the items in the CURRENT SETTINGS menu, the LIMITS menu and the ANGLE menu. The printout also contains the block number, block name and block transducer used for all of the blocks created in the DATA STORE.
Downloading data	Downloading of data can be speeded up by changing the LINE DELAY to 0 SECONDS. The user can get to this menu option via SET UP, CURRENT SETTINGS, then SERIAL PORT.

GLOSSARY OF TERMS

WORD or TERM	MEANING
1st peak sensitivity	The amount by which the reading must fall from a peak for the display to be held.
Alphanumeric	The same key can enter letters and numbers.
Block	A set of data readings from the same transducer.
Current Settings	The settings that are being used.
Data	A data reading that is one entry in a block.
Data Store	The area where all blocks are stored.
Defaults	The settings used on power up.
Frequency Response	Frequency value below which signals are passed.
Hold Time	The length of time a reading is displayed for until it is auto reset.
Lemo	Reference for manufacturers of connector.
Log Function	Can be switched off to stop readings being printed and stored, referred to as built in print inhibit controller.
Millisecond (mS)	One thousandth of a second (0.001 second).
Millivolt (mV)	One thousandth of a volt (0.001 volt).
Navigate	Go from one selection to another.
Non-smart	Standard mV/V transducer (NON-INTELLIGENT).
Power Down Time	The length of time that the Pro-Log has not been used before the instrument goes into standby mode.
PC	Personal Computer.
Quadrature	Two square wave outputs, one being 90° out of phase to the other.
RPM	Revolutions Per Minute.
Saved	SET UP information is saved.
SPC	Statistical Process Control.
SMART	Serial Memory Automatic Recognition Transducer.
Smart Transducer	A transducer that holds its own calibration data, (INTELLIGENT).
Stored	Data is stored in the data store.