VER 2.0
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90LINK Microprocessor Communication Link.

Model 90LINK

Congratulations ! You have purchased the latest in Microprocessor controlled, Analogue Signal to Serial Data Conversion equipment , designed specially for analogue TPS instruments. We hope that your new 90LINK will provide you with many years of reliable service.

This manual has extensive details. Please read carefully.

If at any stage we can be of assistance, please contact either your local T.P.S. representative or the TPS factory in Brisbane.

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1.

General Information

1.1. Introduction

The TPS Model 90LINK is a field instrument designed interface between a TPS instrument and a computer or serial printer. Automatic datalogging is optionally available. The 90LINK features user programmable datalogging periods and datalogging intervals.

Operation of the 90LINK is via a fully sealed, membrane keypad. This keypad and the intelligent 80 character LCD display, make operation of the 90LINK very simple. The case, keypad and all input connectors are water resistant.

On-line "HELP" messages, calibration and all other functions are continuously available.

1.2. Display

An 80 character LCD alphanumeric display shows Readings, Error Messages and On-line Help.

1.3. Keypad

A water-resistant membrane keypad of 22 keys allows input of Setup information and the selection of operating Modes.

There are 3 groups of keys,
5 function <F> keys and a Menu key,
ON and OFF keys,
10 numeric entry keys, decimal point, minus key, backspace (delete)
and an Enter key.

The Function Keys F1, F2, F3, F4, are used to select menus and parameters.
The F5 key will display HELP information.

DO NOT USE ANY SOLVENT TO CLEAN THE KEYPAD.

1.4. Data Entry

The following notes are a general guide to Data Entry.

1. The present value of the Data will be displayed until a key is pressed.
2. Pressing the 'Menu' key will exit Data Entry and leave the Data unchanged.
3. Press the required keys to enter the desired data.
   For negative data, press the '-' key first.
   Press 'Enter' to finish data entry and store new data.
   Use backspace key '<-', to correct typing errors.
4. If the Data entered exceeds the allowable limits, the 90LINK will beep and display the limits. Enter new data or exit with 'Menu'.

1.5. Connectors

SIGNAL INPUTS 7 PIN : % Relative Humidity Input.

POWER IN/RS232 8 PIN : Power Input, Serial Port.

1.6. Help Information

The 90LINK has help messages available when using Menus and Functions. Press function key <F5> and "HELP" messages will be displayed.

2. Installation

2.1. General Requirements

While the 90LINK is water resistant, care should be taken to avoid splashing the connectors. Always replace the connector covers when not using connectors. Avoid immersing the unit. Prolonged exposure to direct sunlight should be avoided. The 90LINK should be operated in a cool dry environment.

2.2. Connection Details

Plug the recorder cable into the 7 pin Signal Inputs connector on the 90LINK. Connect the other end to the 420 Series Power Supply Unit as per the instructions supplied with that unit.

The RS232 cable is connected into the 8 pin Power/RS232 socket. Note that this cable has a separate socket attached to it, to enable the charger to be simultaneously connected.

The 25 pin “D” connector at the other end of the RS232 cable can be connected directly into a serial printer or RS232 port of a computer.

2.3. Turn On "Run Mode"

Plug in the POWER IN/RS232 cable.
The 90LINK will turn ON when power is applied to the plugpack.
The 90LINK will perform a memory test and display Model and Option details and proceed to "RUN MODE" displaying Relative Humidity Data.

The following keys are active during "RUN MODE".

<OFF> turns automatic datalogging OFF.

<ON> turns automatic datalogging ON.

<F3> prints the display immediately.

<F5> shows Help.

<Menu> selects Main Menu.

Corruption of Memory contents can occur as the result of Low Battery Volts (Meter unused for very long periods), or severe electrical events (eg lightning surges). If Memory test fails the message:

"Configuration and Data Lost"

will be displayed and the 90LINK will perform an Initialisation.
See section 0 for details.

3. Relative Humidity Measurement

The 90LINK displays Relative Humidity during "RUN MODE".

If the Relative Humidity Input is overrange "OVR%RH" will be shown on the display.

4. Real Time Clock

The 90LINK features a real time clock with calendar. This clock has a rechargeable battery and will keep time when the 90LINK is turned OFF.

4.1. Setting The Clock

To set the Time and Date :

(a) When in "RUN MODE" press <MENU> to display the Main Menu.

(b) Press <F5> Setup

(c) Press <F1> to select Set Clock.
The current time (24 hour format) is displayed.
To set time type in hour and minutes and press <Enter>.
Type leading zeros if required. ie. 7:03 is entered as 07:03.
The time is then set and the Date will now be displayed.
Press <Menu> to leave the date unchanged or type in the Day of the Month and the Month and press <Enter>.
Type leading zeros if required. ie. 3rd of May is entered as 03-04.

5. Datalogging Function

The 90LINK is equipped with an automatic datalogging function. Once programmed, it is able to record up to 4500 readings and store them into memory, along with the date and time of the reading. Readings can be logged from 1 every minutes to 1 every 1440 minutes.

5.1. Programming the Automatic Logging Function

To program the logging/print period and Starting and Finishing Times :

(a) When in "RUN MODE" press <MENU> to display the Main Menu.

(b) Press <F4> to select Program.

(c) Type in the required Period in minutes. The range is from 1 to 1440.

(d) Type in the Starting Time. This is the time at which automatic logging. All logging periods will begin at the Start Time.
Type in 00:00 for midnight.
Press <Enter> when OK or press <Menu> to quit.

(e) Type in the Finishing Time. This the time at which automatic logging will finish.
The 90LINK may not log at the finishing time as it depends on the period.
To automatically log continuously, make the finish time equal the start time.
If the finish time is less than the start time the 90LINK will log through midnight, ie. From 22:00 to 04:00 with a period of 1 hour will print at 22:00, 23:00, 00:00, 01:00, 02:00, 03:00 and 04:00.
Press <Enter> when OK or press <Menu> to quit.

(f) The period, Starting and Finishing times are now shown.
To keep these new times (changes) press <Enter>.
Press <Menu> to leave times unchanged.

Notes: All times are in 24 hour format.
Midnight can be Entered as 00:00 or 24:00, 24:00 will be shown as 00:00.

5.2.

Starting and Stopping Automatic Logging

To begin automatically logging at pre-programmed intervals (see section 0), press the <ON> key. To stop automatically logging, press the <OFF> key.

Notes: The ON and OFF keys do not switch the 90LINK on and off. To switch the unit on and off, the plugpack power supply must be switched on and off.

Every time the 90LINK logs a reading, that reading is also transmitted down the RS232 port. If a printer or computer is attached to the 90LINK, it receives the reading.

When the memory is full, the 90LINK displays the message “Warning: Logger Full” and does not record the reading into memory. However, the reading is still transmitted down the RS232 port.

5.3. Recalling Data

To recall logged data:

(a) When in "RUN MODE" press <MENU> to display the Main Menu.

(b) Press <F1> to select Recall.

(c) The first logged reading is displayed. To see the next reading, press <Enter>. Alternatively, to see a particular reading, enter the number of the reading and then press <Enter>.

5.4. Printing Data

To print logged data:

(a) When in "RUN MODE" press <MENU> to display the Main Menu.

(b) Press <F2> to select Print.

(c) The entire contents of the 90LINK memory is sent to the RS232 port. Either a printer or a computer can be attached to the port.

(d) The data is sent in the following format:

nnnn_dddddd%RH_dd-mm_hr:mm<cr><lf>

Where:

nnnn	is Right Justified Log Number. Log Number=0 for CURRENT Data.
_	is 1 space,
dddddd	is 6 characters of Relative Humidity data. Right Justified, Signed, including decimal point. Sign: +ve has leading space, -ve leading "-", Right Justified.
%RH	The unit of Relative Humidity measurement.
_	is 1 space,
dd	is day of month with leading "0" padding where needed.
mm	is month number with leading "0" padding where needed.
_	is 1 space,
hr	is hour, 24 hour format with leading "0" padding where needed.
mm	is minute with leading "0" padding where needed.
<cr>	is carriage return character (ACSII decimal 13)

<lf> is line feed character (ASCII decimal 10)

Notes:

__SOVR is sent when the Data is overrange, S=sign, where " "=+ve,"-"=-ve.
"__" is two spaces.

6. RS232 Port

The 90LINK has an RS232 Serial Communication Port. This port will allows any external computer with a Serial Port eg. IBM PC/XT/AT, access to Relative Humidity Measurements from the 90LINK. To use the RS232 port, first plug the RS232 cable into the CHARGER socket on the 90LINK and then plug the other end into your computer. The battery charger can be plugged into the socket on the RS232 cable if required.

6.1. Commands

One command is available to access data.
Commands are sent in the following format: **?X<cr>**
Where X=command
<cr>=carriage return (ASCII 13)

The 90LINK will send **ERROR<lf><cr>** when an Illegal Command is received.
The 90LINK will only perform the serial commands when in Display mode.
BUSY<lf><cr> is sent if a reply is not available eg. in Calibration mode.

COMMAND 1: **?D<cr>** DATA REQUEST

Data is sent in the following format:

nnnn_dddddd%RH_dd-mm_hr:mm<cr>

Where:

nnnn is Right Justified Log Number. Log Number=0 for CURRENT Data.
_ is 1 space,
dddddd is 6 characters of Relative Humidity data. Right Justified, Signed, including decimal point.
Sign: +ve has leading space, -ve leading "-", Right Justified.
%RH The unit of Relative Humidity measurement.
_ is 1 space,
dd is day of month with leading "0" padding where needed.
mm is month number with leading "0" padding where needed.
_ is 1 space,
hr is hour, 24 hour format with leading "0" padding where needed.
mm is minute with leading "0" padding where needed.
<cr> is carriage return character (ACSII decimal 13)

Notes:

__SOVR is sent when the Data is overrange, S=sign, where " "=+ve,"-"=-ve.
"__" is two spaces.
BUSY<cr> is sent when the 90LINK is not in Display Mode or is Busy.
ie in Menus, or when Data is not available.

COMMAND 2: ?S<cr> STATUS

Status is sent in the following format :

90LK+nnnnE<cr>

Where:

90LK	is the code for the model (in this case, the 90LINK)
+	indicates Extended Logger Option installed ie Date and Time will be sent.
nnnn	is current number of logged readings in the 90LINK's memory, right justified.
E	is a space or an "E" when a memory error has occurred. The Logged Data must be Erased to clear this message.

COMMAND 3: ?L<cr> LOGGED DATA REQUEST

Logged Data is sent from Log number 1 to end of data file.
Logged Data can also be requested FROM log number TO log number thus :

?Lnnnn,NNNN<cr>	Where nnnn is starting number, NNNN is end number.
?L,NNNN<cr>	ie START is missing so from the FIRST to NNNN
?Lnnnn,<cr>	ie END is missing so from nnnn to the LAST on File.
?Lnnnn<cr>	ie Send number nnnn only.

Data format is the same as for Data Request (see COMMAND 1.). After each line of data is sent, the 90FL will wait for a character from the Host before sending the next line. If the Host replies with a "Z" (Ascii 90), the Data Request is terminated and **EXIT<cr>** is sent. The data transmission is terminated with **ENDS<cr>**. If the data transmission is interrupted by the operator pressing the "Menu" key, then **EXIT<cr>** will be sent to the Host.

COMMAND 4: ?E<cr> ERASE LOG

Erases Logged Data and sets Log Number to 1.
Sends **ERASED<cr>** to the Host when data erased.

6.2. Immediate Data Request

The data can printed immediately by pressing the <F3> key when in Display Mode.
The data format is the same as for the Data Request Command (see section 0)
and is terminated by <lf><cr>. The log number will be shown as zero.

6.3.

Port Configuration

Three Speeds are available: 300, 1200 and 9600 baud.
Use the Baud Rate function in the Setup Menu to select required speed.
When in "RUN MODE" press <Menu> to display the Main Menu.
Press <F5> to select the Setup Menu.
Press <F2> to select the Baud Rate Menu.
There are 3 Baud Rate options: <F1> 300 baud,
<F2> 1200 baud,
<F3> 9600 baud.

The arrow points to current speed. <Menu> exits without change.
The setup for the serial port is fixed at 8 bits, no parity, 1 stop bit.
The Port does not ECHO commands.
XON/XOFF protocol is supported when printing data.
Software for IBM PC/XT/AT or compatibles is available from TPS.

7. Servicing

7.1. Troubleshooting

No Display	Is Plug Pack plugged in ? Power turned ON ?
Display fog/mist.	Check for water inside.
	Return to TPS Immediately if water present.
Corrupt Data	Perform INITIALISATION. Hold "<-" while turning power ON.
	See section 0.

7.2. Initialisation

Initialisation of the 90LINK may be required as a result of corruption of the Battery-protected Memory. Corruption of Memory contents can occur as the result of Low Battery Volts (Meter unused for very long periods), or severe electrical supply events (eg lightning surges). An internal check of the Memory contents is performed at Power-ON. If this check fails, the message :

"**Configuration and Data Lost**" will be displayed.

The following default values will be loaded when Initialised.
The unit should be re-configured to suit your application.

The 90LINK can also be initialised by holding down the "<-" key at power ON.

PARAMETER	**DEFAULT**	**RANGE OF USER SETTING**
Baud Rate	9600	300, 1200 and 9600 (serial option)
Logging Period	60 mins	1 to 1440 mins (whole minutes)
Start Time	00:00	00:00 to 23:59
Finish Time	00:00	00:00 to 23:59
Timed Printing	Enabled	Enabled/Disabled

8.

Specifications

Range	: 0 to 117.0% Relative Humidity
Resolution	: 0.1% Relative Humidity
Accuracy	: ±0.5% of reading, ±1 count (subject to sensor accuracy)
Display	: 80 character alphanumeric display with user friendly menu and help system.
Keypad	: 5 Function Keys, Menu key and 14 data entry keys, OFF, ON.
Stability	: Instrument: Better than 0.1 % of Full Scale.
Power	: 240V or 12V option.
Dimensions	: 230 x 140 x 100 mm.
Weight	: Typical System Shipping Weight: 1.5 Kg.
RS232 Port	: 8 bit, No Parity, 1 Stop bit X-ON/X-OFF when printing Baud Rate: 300,1200,9600 IBM Compatible.

9. Spares And Accessories

The 90LINK standard kit includes :

90LINK meter.....145101
240v AC Charger.....130009
Handbook.....130050/90LINK
RS232 Computer Interface and cable.....130010

Power Options

Alternate 110v AC Powered.....130017
Solar Powered.....130012
12v power cable and Battery Clips.....130013

Spares And Replacements

240v AC Power Pack.....130009
Handbook.....130050/90LINK

Please contact the factory or your nearest TPS distributor.

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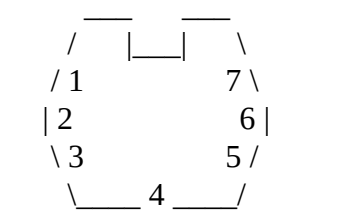
9.1.

Signal Inputs & Power In/Rs232 Plug Wiring

SIGNAL INPUT.
The Signal Input uses a 7 pin waterproof connector.

PIN	Function	Colour
1	Relative Humidity Signal	Clear
2	Common	Braid
3		
4		
5		
6		
7		

Diagram

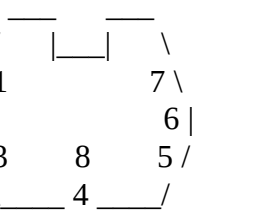


Looking at rear of PLUG.

POWER IN/RS232.
The Power In/RS232 cable uses an 8 pin waterproof connector.

PIN	Function	Colour
1	Power Ground	Black
2	n/c	
3	Switched + Power	(do not use)
4	RxD	Blue
5	RS232 Ground	Black
6	n/c	
7	TxD	Red
8	Power +ve	White

Diagram



Looking at rear of PLUG.

RS232 CABLE.
The RS232 cable shares the Power In/RS232 8 pin plug.
The following is a guide for IBM PC/XT/AT computers and printers.

Function	Power In/RS232 Plug	Male 25 Pin "D" Connector
RxD	4	2
RS232 Ground	5	7
TxD	7	3
		Link 4-5-8 and 6-20

10.

Warranty

TPS Pty. Ltd. guarantees all instruments and electrodes to be free from defects in material and workmanship when subjected to normal use and service. This guarantee is expressly limited to the servicing and/or adjustment of an instrument returned to the Factory, or Authorised Service Station, freight prepaid, within twelve (12) months from the date of delivery, and to the repairing, replacing, or adjusting of parts which upon inspection are found to be defective. Warranty period on electrodes is three (3) months.

There are no express or implied warranties which extend beyond the face hereof, and TPS Pty. Ltd. is not liable for any incidental or consequential damages arising from the use or misuse of this equipment, or from interpretation of information derived from the equipment.

Shipping damage is not covered by this warranty.

PLEASE NOTE:
A guarantee card is packed with the instrument or electrode. This card must be completed at the time of purchase and the registration section returned to TPS Pty. Ltd. within 7 days. No claims will be recognised without the original guarantee card or other proof of purchase. This warranty becomes invalid if modifications or repairs are attempted by unauthorised persons, or the serial number is missing.

PROCEDURE FOR SERVICE

If you feel that this equipment is in need of repair, please re-read the manual. Sometimes, instruments are received for "repair" in perfect working order. This can occur where batteries simply require replacement or re-charging, or where the electrode simply requires cleaning or replacement.
TPS Pty. Ltd. has a fine reputation for prompt and efficient service. In just a few days, our factory service engineers and technicians will examine and repair your equipment to your full satisfaction.

To obtain this service, please follow this procedure:

Return the instrument AND ALL SENSORS to TPS freight pre-paid and insured in its original packing or suitable equivalent. INSIST on a proof of delivery receipt from the carrier for your protection in the case of shipping claims for transit loss or damage. It is your responsibility as the sender to ensure that TPS receives the unit.

Please check that the following is enclosed with your equipment:

- **Your Name and daytime phone number.**
- **Your company name, ORDER number, and return street address.**
- **A description of the fault. (Please be SPECIFIC.)**
  (note: "Please Repair" does NOT describe a fault.)
- **either $12 for return freight for units under warranty,**
- **or $20 to cover inspection costs and return freight.**

(These amounts are not applicable to full-account customers.)

Your equipment will be repaired and returned to you, freight paid.

For out-of-warranty units, a repair cost will be calculated from parts and labor costs. If payment is not received for the additional charges within 30 days, or if you decline to have the equipment repaired, the complete unit will be returned to you freight paid, not repaired. For full-account customers, the repair charges will be debited to your account.

- **Always describe the fault in writing.**
- **Always return the sensors with the meter.**