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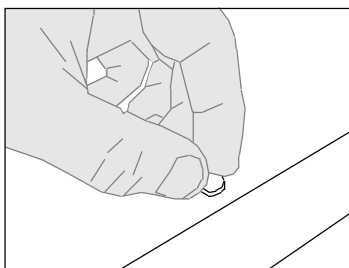
E-mail help@london-electronics.com

<http://www.london-electronics.com>

L175X Series of Large Displays

Loadcell Input

Including 5V Sensor Excitation and RS485 Data Output



Rear case screws - please note


The rear panel is held in place with finger-screws, which only need to be gently tightened. **Do not use tools to tighten or loosen the screws, as this could cause damage to the internal threads.**

User's Manual

Rev.1.0 2 October 2001

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THE LOADCELL INPUT MODEL - L175X

INTRODUCTION

This model is intended for large measurement display use. It accepts the most commonly encountered loadcells with sensitivity from 0.5 to 3mV/V, and is fully scaleable to read in engineering units. Scaling can be carried out remotely, whilst the display is in-situ, and because no potentiometers are used, the display stability is superb.

The decimal point can be placed as required, and the least significant digit can be made to count in units, 2's, 5's or 10's.

The right hand digit can be blanked, effectively 'centralising' the display if less than 5 digit resolution is required.

If specifically ordered, we can supply the displays with a silk screened legend identifying the measurement being displayed, for example, Kg., tonnes, litres etc..

An RS485 output is provided, useful for feeding remote mimic displays.

The configuration settings and calibration constants of the display are stored in non-volatile E²PROM memory, which is retained for at least 10 years. Change to the settings is achieved by way of remote contact closure inputs, allowing alteration of the unit's configuration menu, calibration and brightness.

The case is sealed to IP65/NEMA4, and the lens is 4mm thick polycarbonate, making it ideal for use in food industry washdown applications.

1.0 UNPACKING AND INSPECTION

PLEASE check the carton's contents as soon as possible after receipt, to detect any transit damage or losses. Unpack the contents and check each item in the box against the check list below to make sure you have all items.

Check List :

- Handbook
- Display
- Mounting kit (where appropriate)
- Programming Unit (If Ordered)

In the event of damage, please contact the carrier and advise our sales office of the fault.

Please retain the carton packing material, for future possible use.

2.0 GENERAL INFORMATION

This display is part of a family of units for broadcasting process values and data on easy to read large 7 segment displays. Character heights of 2", 4" or 6" are standard, and, dependent on type, displays are 5 or 7 digit. Extra-large and Daylight viewing displays are available to special order.

The enclosures for the displays are of welded UPVC material with tough lenses, providing certified protection to NEMA4 for the internal electronics.

Case colors are white or black.

The units incorporate a 95 to 265VAC power supply (Which can be used on DC in the range 100 to 300 VDC) for operation off any power source without the need to re-configure.

Display brightness is settable to 4 levels to accommodate differing ambient light conditions and the 3 standard character heights provide a choice of viewing distances of up to 20, 40 and 60 metres. Other character heights and brightnesses are available to special order.

The large displays are based around a common power and control card which is linked to display units of different sizes.

Instrument behaviour is set by way of remote contact closure pushbuttons, which provide access to and alteration of the instrument's menu, and the settings are stored in 10 year non-volatile memory.

2.1 GENERAL SPECIFICATIONS

Display type	Loadcell input display intended for large remote display use.	
Signal inputs	0.5 to 3.0 mV/V typical Can be factory scaled to accept non-standard ranges	
Input Resistances:	Loadcells from 100 Ohms to 10Kilohm	
Excitation Supply:	Nominally 5VDC at 100mA max.	
Accuracy:	0.02% of range, Tempco = 50ppm/Deg.C	
Signal Output	RS485 at 300, 1200, 2400 or 9600 Baud	
Scaling	Zero & Span fully scaleable remotely. Decimal point position selectable Inverse scaling available eg 4-20mA = 100 to 0	
Data format	Serial ASCII at 300,1200,2400 or 9600 baud; 1 start bit, 8data (or 7 data plus parity) and 1 or more stop bits.	
Handshake	No handshake, unit always transmits data	
Case material:	UPVC, White or Black	
Case size:(mm WxH)	5 digit	7 digit
	2" 288x120	384x120
	4" 480x168	672x168
	6" 624x192	864x192
Case depth :	90mm (115 mm including rear cable/glands)	
Weight :	5 digit	7 digit
	2" 2.5Kg	3Kg
	4" 4.5Kg	5Kg
	6" 5.0Kg	6Kg
Display type:		
2" digit height	High efficiency red LED 57mm high 7 segment display tiles	
4" digit height	Ultrabright red LED 102mm high 7 segment display tiles	
6" digit height	144mm high characters formed from twinned individual 5mm round red LEDs	
Daylight viewing versions, whether 2", 4" or 6" are made up of individual 5mm round lensed LED's		
Power supply :	95-264VAC, 100 to 300 VDC, Via Rectifier, non-specific polarity	
Power consumption :	20W typ.	

3.0 INTERNAL CABLES

The units are supplied with approximately 2 metres of free ended cable for power, signal and serial ports. You may connect your own cable to this, via a junction box, or completely remove the supplied cable and install your own.

REMEMBER The signals you will be feeding to the displays are quite small in comparison to some of the undesirable 'noise' generated by certain types of common electrical equipment. To obtain the highest degree of accuracy and reliability from your indication equipment, we strongly suggest that you....

DO NOT run signal cables adjacent to power/switching lines or near equipment liable to generate large amounts of electrical noise, such as contactors, solenoids, fluorescent tubes, discharge lamps, motor control equipment, etc.

Do use shielded, twisted-pair extension cable to minimise the amount of noise being fed into the display.

WARNING: RISK OF LETHAL ELECTRICAL SHOCK



YOU MAY NEED TO OPEN THE CASE TO ALTER JUMPER POSITIONS OR TO PANEL MOUNT THE DISPLAY. BEFORE COMMENCING TO OPEN THE CASE YOU **MUST ENSURE** THAT POWER HAS BEEN **DISCONNECTED**, AND MUST ENSURE THAT POWER CAN IN NO CIRCUMSTANCES BE RE-APPLIED TO THE DEVICE WHILST THE CASE IS OPEN.

3.1 SIGNAL CABLES

The signal and data connectors are at the left hand end of the power and control card. They are connected to extension cables, which are accessible from the rear of the display.

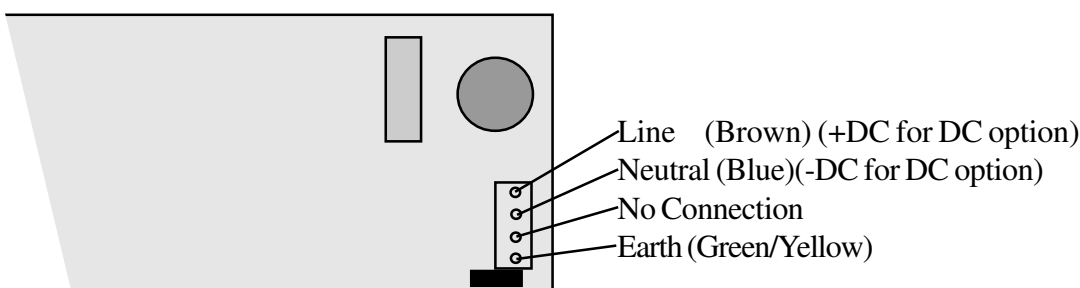
Do not earth the screen or braid of the input, data output or programmer cable outside the display, as it is already internally earthed to the 'screen' terminal.

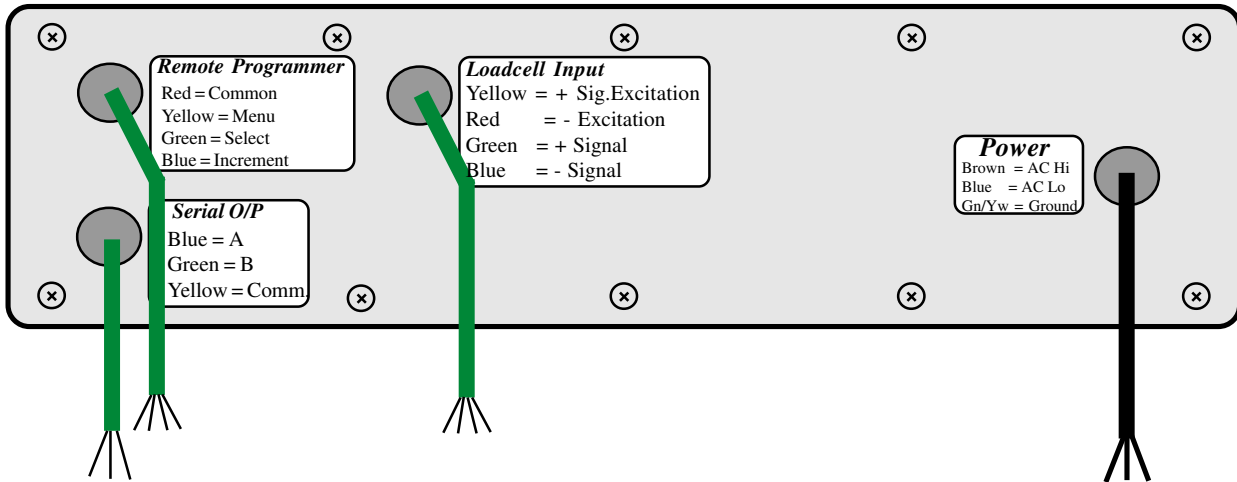
<div style="border: 1px solid black; display: inline-block; padding: 2px;"> ○ ○ ○ ○ ○ </div>	Loadcell Input	1=Screen Braid 2=- Signal Blue 3=- Excitation Red 4=+ Signal Green 5=+Excitation Yellow
<div style="border: 1px solid black; display: inline-block; padding: 2px;"> ○ ○ ○ ○ ○ </div>	Remote Programmer	1=Screen Braid 2=Common Red 3=Select Green 4=Increment Blue 5=Menu Yellow
<div style="border: 1px solid black; display: inline-block; padding: 2px;"> ○ ○ ○ ○ </div>	Serial Data O/P	1=Screen Braid 2=Common Yellow 3=Data B Green 4=Data A Blue

3.2 POWER CABLES

The unit incorporates a switching power supply to enable the unit to operate over the full 95 to 265 Volts range.

The **power lead** must be of 3 core construction, with the grounding wire **bonded to a good ground**





4.0 ANALOGUE INPUT SELECTION

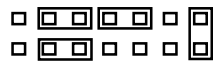
If, when ordering your display you specified the input type required, this will have been set for you prior to despatch, and should be noted on the label on the rear of the display. If you **did not specify** the input type, this will be the *factory default of 0-10mV=0-100.0*. You can re-calibrate the meter, without making any mechanical alterations, via the remote programmer input.

Simply re-calibrate the display, whilst injecting 0% and 100% of desired signal range, as described on pages 8-11.

4.1 JUMPER FUNCTIONS AND POSITIONS

You will not normally need to set any jumper positions on this model, as they are normally factory set and will not alter any user-variable parameters. They should be positioned as shown below, should their positions be accidentally altered.

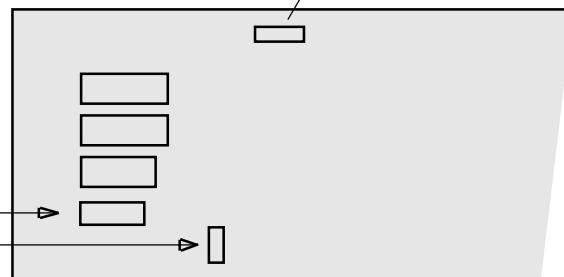
S1 jumpers



S2 Jumper



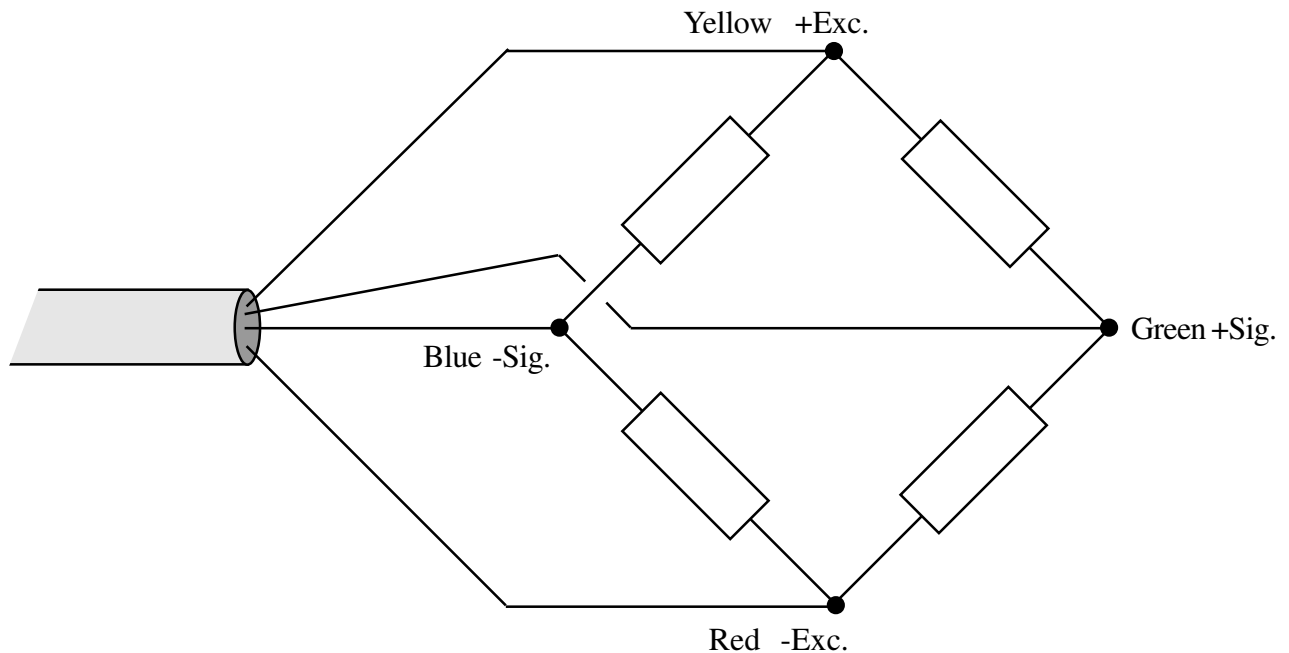
TP1 - This is a test point, and no jumpers should be fitted



SIGNAL, DATA AND CONTACT CLOSURE CONNECTIONS

4.2 Analogue Input Connections

The large display can accept mV bridge input signals directly from an active source, or can excite passive bridges. **Do not** ground the shield of the input cable, but **do** connect it to the shield of your extension cable, which should also **not** be grounded. Typical example is shown below ...



4.3 RS485 Data Output:

The Serial Data O/P cable allows you to feed the measured reading to serial input slave displays, such as our S17XX series, or small 1/8 DIN INTUITIVE-S models, for remote indication purposes.

The output is continuous, with a new string transmitted at roughly 1 second intervals. The format is the reading itself, including decimal point character, in ASCII, terminated by a Carriage Return. The data format is 1 start bit, 8 data bits and 1 stop bit.

The Baud rate is selectable, and is determined by the fourth character of the Configuration Number.

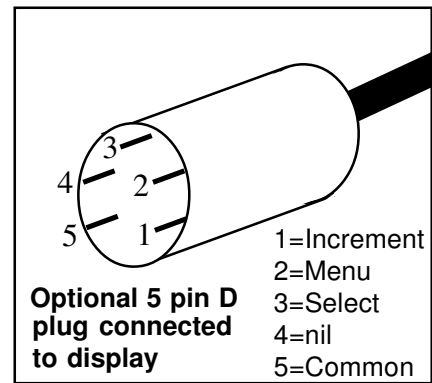
Extension cable should be screened, high quality data cable, and should be routed away from sources of electrical noise such as motors, power cables, inductive devices, discharge lighting circuits etc. **Do not** earth the screen of the data cable, however, as it is already connected to internal earth on the display itself.

Up to 32 slaves having RS485 inputs can be driven from the output port.

4.4 **Contact closure programming input:**

Function **Supplied wire colour**

Increment	Blue	
Select	Green	
Menu	Yellow	
Common	Red	



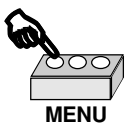
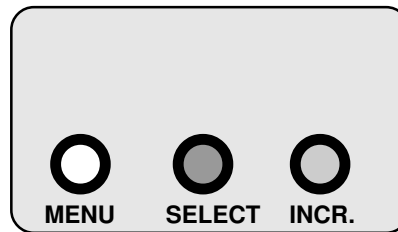
4.5 **PROGRAMMING YOUR DISPLAY**

The Process Large Display offers useful flexibility in scaling and display presentation, and all parameters are adjusted by using the three contact closure programming pushbuttons.

It is worth spending a little time familiarizing yourself with the menu and the programming technique before carrying out a full calibration. The menu structure is described below, and is followed by a flow diagram to add clarity.

The flow diagram uses pictures of our Remote Programmer , consisting of three pushbuttons, arranged as follows....

If you make up your own programmer, please be sure to use good quality pushswitches, and lay them out in the same order as shown here.



Allows you to enter the programming menu, and steps down all the variable options



Allows you to select a digit within a variable, for alteration. The digit which can be altered flashes. Each time you press 'SELECT' the flashing digit moves one place to the right. Also toggles between NETT and GROSS when in display mode



Allows you to increase the value of any flashing digit. Each press will increase the value by 1 . Also TARES or ZERO's the display when in display mode.

The Programming Menu

As you enter the menu, prompts will appear on the display. Because they are formed with simple 7 segment displays, they do not appear to be familiar letter shapes, but are described in detail here.

R SPn This is the reading span. It is the difference between full scale and zero scale display values relating to 0% and 100% of applied input signal.

For example, if you wish to calibrate your display so that 0-100% input gives a reading of 0.0 to +75.0, your Reading Span is 75.0. You can set the decimal point when in the R Spn setup section by pressing SELECT 5 times until the whole display flashes, then pressing INCREMENT to place the decimal point in the desired position.

R ZEr This is the display value you wish to have with 0% of input signal. So, for the example given above, R Zer would be 0.0

IPLo and **IPHI** are the 0% and 100% input signals respectively, typically 0 and 20mV, 0. In fact, you do not even need to know the actual 0% and 100% signal levels. The display measures applied 0% and 100% signals, rather than requiring you to tell it the values. So, if calibrating a weighing platform, IP LO means no load on platform, IP HI means known deadweight placed on platform equal to R Spn. The known deadweight should be as near to full scale capacity as possible to ensure optimum accuracy of calibration, though not essential.

If recalibrating the input stage, you would apply 0% signal, say 4ma, at the 'SURE' prompt after IP LO, then save this data by pressing INCREMENT, keeping it pressed, then pressing SELECT also. The display will briefly say IP HI, followed again by 'SURE?'

Now apply 20mA and press INCREMENT, keeping it pressed, and press SELECT.

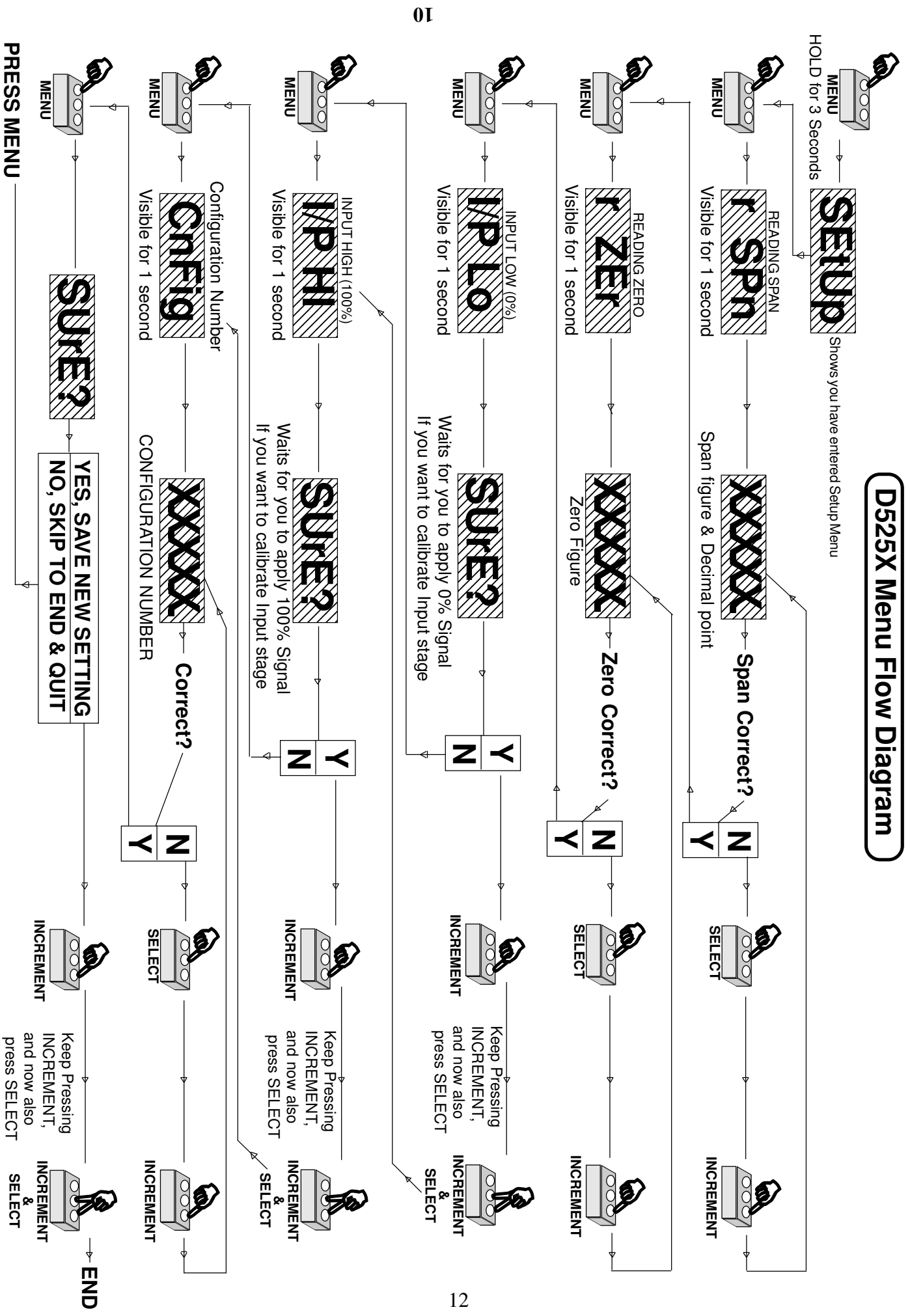
You do not need to carry out this procedure if the display has previously been set for the desired input range. For example, if your display is calibrated 4-20mA for a display range of 0-100.0, and you wish to recalibrate to have 4-20mA giving 0-60.00, you would simply change R Spn to 60.00, from 100.0. When you come to IP Lo and IP HI in the menu, at the prompt 'SURE?', simply press MENU, and you will retain the original 4-20mA input calibration.

CnFIg is the Configuration number. This determines the display presentation, filtering effect, and brightness setting.

Use the space below to work out your required settings and record them for later use if necessary.

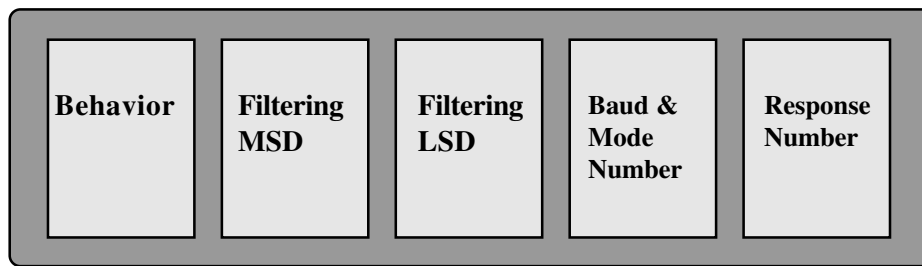
Display Serial Number	=	<input style="width: 100%;" type="text"/>
Approximate 0% Signal	=	<input style="width: 100%;" type="text"/>
Approximate 100% Signal	=	<input style="width: 100%;" type="text"/>
R Spn (Reading Span)	=	<input style="width: 100%;" type="text"/>
R Zer (Reading Zero)	=	<input style="width: 100%;" type="text"/>
Cnfig (Configuration number)	=	<input style="width: 100%;" type="text"/>

D525X Menu Flow Diagram



4.8 THE CONFIGURATION NUMBER & WHAT IT DOES

The configuration number consists of 5 digits and appears briefly after initial power-up, immediately after the digit test sequence when all 8's are displayed.



The significance of each of these digits is described below.....(Default = 40054)

4.9 1st CONFIG. DIGIT-BEHAVIOR

The first digit in the Setup number affects the way the measurement is displayed on the indicator, and can be used to centralise digits if only 3 digits of resolution is required, round up the reading, blank leading zeros etc.

Least Significant digit roundup	1	2	5	10	20	50	100
	↓	↓	↓	↓	↓	↓	↓
No leading zero blanking	0	1	2	3	n.a.	n.a.	n.a.
Leading zero blanking	4	5	6	7	D	E	F
Right hand digit blanking	8	9	A	B	n.a.	n.a.	n.a.

Default = 4

n.a. = Not Available

4.10 2nd & 3rd CONFIG. DIGITS-Filtering

These digits determine the degree of filtering , and as a result the speed of response of the display. Settable range presently limited to 00 to 07 . Select to suit max. period of oscillation of input signal.

00 = no filtering	01=0.5 Sec sample	02=1.0 Sec sample
03 = 2.0 Sec sample	04=4.0 Sec sample	05=8.0 Sec sample
06= 16.0 Sec sample	07=32.0 Sec sample	

4.11 4th CONFIG. DIGIT-BAUD RATE SELECTION DIGIT

For the Process Input display, this digit of the configuration number is used to set the baud rate of the RS485 transmission output.

Baud Rate digit	4	5	6	7	Default = 5 (1200 Baud)
Baud Rate	300	1200	2400	9600	

4.12 **5th CONFIG. DIGIT-RESPONSE NUMBER**

This character has no relevance on the process meter, as it is concerned solely with serial data input responses. It is set to default as **4**

4.13 **6th 'INVISIBLE' SETUP DIGIT-BRIGHTNESS**

The brightness of the display can be altered using remote pushbutton programming. Once in the Configuration sequence, use 'Select' to make the right-hand digit flash. Press 'Select' once more, and the whole Configuration number will start flashing. Now, each time you press 'Increment', you will notice that the display's brightness will change. There are 4 choices of display brightness. When a suitable brightness has been found, you may store it by pressing 'Menu', at which point the display will show the prompt "SURE?". Press and hold in the INCREMENT button, and, without releasing it, then also press the SELECT button.

5.0 **INSTALLATION**

If possible position the display away from heat and direct sunlight on the display face. The displays should not be exposed to substances liable to damage uPVC, acrylic or glass.

If mounted outside, the display should be protected by a shroud to limit direct falls of rain, the cooling effect of which can give rise to the display sucking in moisture.

DO NOT remove the cables supplied with the indicator, as these contain essential filter components. You should extend cables with a junction box rather than remove and substitute cabling. Screening must be used on your cables.

REMEMBER The signals you will be feeding to the displays are quite small in comparison to some of the undesirable 'noise' generated by certain types of common electrical equipment. To obtain the highest degree of accuracy and reliability from your indication equipment, we strongly suggest that you....

DO use shielded, twisted-pair cable to minimise the amount of noise being fed into the display.

DO NOT run signal cables adjacent to power/switching lines or near equipment liable to generate large amounts of electrical noise, such as contactors, solenoids, fluorescent tubes, discharge lamps, motor control equipment, etc. **DO NOT** ground the shields of signal, data or programmer cables.

5.1 MOUNTING POSITIONS

The panel cutout sizes in mm +/- 1mm are as follows .. (width x height):

	5 digit	7 digit
Digit Height		
2"	279x111	375x111
4"	471x159	643x159
6"	615x183	855x183

Method :

Remove fixing screws and slacken the cable glands. Ease rear case off front section, leaving rubber gasket on front section. Offer front section up to panel cutout. Feed cables through glands in case rear. Slide rear over front section, pulling any excess cable through glands. Fit all screws and washers, and finger tighten glands.

5.3 WALL MOUNTING

Fixing centres (mm, horizontal) Hole pitch 100mm vertical

	5 digit	7 digit
2"	288	384
4"	480	672
6"	624	864

Method : Fix the wall mounting brackets to the wall with rawlplugs and screws or nuts and bolts.
Offer the case up to the brackets and insert the screws and washers supplied at each end of the case. Note the position of the friction washers. Tighten the mounting screws sufficiently to hold the display in position. Do not over-tighten.

5.4 SUSPENSION MOUNTING

Method :

Connect the U shaped bracket with the supplied screws and washers to each end of the display. Tighten the screws sufficiently to hold the display in place. Do not over-tighten.
Drill an 8.5mm diameter hole in the beam where the display is to be fitted. Slide the supplied bolt through the bush. Feed this through the center hole of the suspension bracket and place the bearing washer on top. Push the bolt through the drilled hole and secure with the nut and washers supplied. Please note that the drilled hole should be sufficiently clear from any obstruction to allow the display to swing 360 degrees and pivot up and down.

5.5 MULTIPLE DISPLAY MOUNTING

Refer to the information supplied with the mounting kit.

6.0 TROUBLE SHOOTING AND MAINTENANCE

The Large displays have been designed to provide a long trouble-free life and require no routine maintenance. An annual calibration check is recommended.

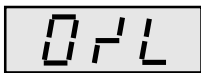
The front lens may be cleaned with a proprietary window cleaner, and the case may be hosed down, and cleaned with a cloth dampened with mild detergent. Surface scratching can be polished out with a mildly abrasive cleaner such as perspex cleaner.

The power supply is for 95 to 264 volts AC, so there is no risk of applying 240 volts to a 110 volt unit. Filtering is incorporated on the power input, to prevent damage due to short spikes on the supply

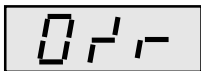
Check wiring prior to powering the units!

ERROR MESSAGES

A clue to the source of problems may be given by certain error messages, as shown below....



Means 'OverLoad'. Your I/P signal is more than 40mV. Check input cabling, connections, and input source.



Means 'OverRange'. Your scaling has meant that the display value is exceeding 99999. Check scaling and Input level to ensure they are within the permissible limits of the display.

7.0 SAFETY CONSIDERATIONS

This product is protected in accordance with IEC Safety Class 1. The instruments are designed and tested in accordance with IEC publication 348, 'Safety Requirements for Electronic measuring apparatus', and are supplied in a safe condition.

Whenever protection is likely to have been impaired by damage, the equipment shall be made inoperative and be secured against any intended operation.

Removal of the rear cover **WILL EXPOSE LIVE PARTS**. The equipment must be disconnected from the supply before carrying out any adjustments, replacement, or repair with the case opened.

If any work is carried out with the equipment opened and powered, it shall only be carried out by a skilled person who is aware of the hazard involved.

Power connections:

The unit is operable as soon as the mains is applied, there is no mains switch.

The equipment must be connected to a protective earth. Any interruption of the ground conductor inside or outside the equipment is likely to make the equipment dangerous.

The power and signal leads should not be allowed to collect within the instrument; all excess lead must be pulled out through the cable glands.

Note that capacitors inside the instrument may still be charged when the equipment has been disconnected from the supply. Before carrying out any work inside the equipment, a period of one minute should be allowed for capacitors to discharge; to discharge the mains filter capacitors, short together the live and neutral mains wires.

R F I

The equipment generates and uses radio frequency energy, but when properly installed as described, complies with EN55022. The equipment is certified as meeting EN50081-1 and EN50082-1

Shielded cables **MUST** be used for all signal and data leads, but use of a shielded power lead is not required. The power ground wire must be bonded to a good ground, but **DO NOT** ground the signal, data or remote programmer shields.

8.0 Warranty

We warrant our products against defects in materials or workmanship for a period of one year from the date of purchase.

In the event of a defect during the warranty period, the unit should be returned, freight(and all duties and taxes) prepaid by the Buyer to the authorised distributor from where the unit was purchased. The Distributor, at its option, will repair or replace the defective unit. The unit will be returned to the Buyer with freight charges prepaid by the distributor.

LIMITATION OF WARRANTY

The foregoing warranty shall not apply to defects resulting from:

1. Improper or inadequate maintenance by the buyer.
2. Unauthorised modification or misuse.
3. Operation outside the environmental specification of the product.
4. Mishandling or abuse.

The warranty set forth above is exclusive and no other warranty, whether written or oral is expressed or implied. We specifically disclaim the implied warranties of merchantability and fitness for a particular purpose.

EXCLUSIVE REMEDIES

The remedies provided herein are the buyer's sole and exclusive remedies. In no event shall we be liable for direct, indirect, incidental or consequential damages (including loss of profits) whether based on contract, tort or any other legal theory.

NOTES

Declaration of Conformity

Declaration Number : EMC1700 Iss. 5
Issue Date : 14 July 1999
Products Covered : 1700 Series Large Displays
Title : Large Process, Load, Serial
Rate & Totalising Displays

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

EN55022:1987 Conducted Emissions: Class B
EN55022:1987 Radiated Emissions : Class B
IEC801-2:1984 Electro-Static Discharge Immunity: 8kV Air
IEC801-3:1984 Radiated ElectroMagnetic field Immunity: 3V/m
IEC801-4:1988 Fast Transient Immunity : AC 1kV, cable 0.5kV

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

EN50081-1:1992 (normative)
EN50082-1:1992 (normative)

and comply with the requirements of Council Directive 89/336/EEC relating to Electro-Magnetic Compatibility & are designed to meet EN61010 safety directive..

To confirm compliance, representative models within the range have been independently tested and certified by MARCONI INSTRUMENTS EMC Department.

MARCONI CERTIFICATE # : TC96/029C
MARCONI CERTIFICATE Issue # : 1
MARCONI Certificate Issue Date : 14 February 1996

Conditions

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

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

Signal cabling shall be routed separately to power carrying cabling (includes relay output wiring)
All signal cabling shall be screened. The screen shall only be terminated to the power earth terminal

This certificate applies only to meters carrying Serial Numbers 701001 or higher.

Signed as true and correct, for and on behalf of London Electronics Ltd.
Warren Court, Chicksands, Shefford, Bedfordshire SG17 5QB

J.R. Lees
Director