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# Operating Instructions

Model SER-06

Serial ASCII Input remote 6 digit display
Accepts RS232, RS485, RS422, 20mA TTY

Some additional products from London Electronics Ltd.......

PROCESS CALIBRATORS

IP65 SPLASHPROOF COVERS

LARGE DISPLAYS

12345

56789
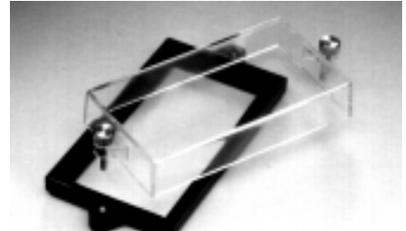
PANEL METERS & CONTROLLERS

199.9

SIGNAL TRANSMITTERS

IEC 1010

CE

89/336/EEC

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IMPORTANT INTRODUCTORY NOTES

Thank you for choosing to use a London Electronics Ltd. product. We hope that you will be entirely satisfied with your purchase, and welcome any comments you may have which will help us to improve the ease of use, clarity of this manual, etc. for future shipments.

We invite you to write to us, free of charge, if posted in the United Kingdom, to:-

London Electronics Ltd.
Customer Services Department
FREEPOST SG334
SHEFFORD
Bedfordshire SG17 5BR

Alternatively you may send us a fax on **01462-850968**   (international code +44)
Or, telephone us on   **01462-850967**   (international code +44)

Or, send us an E-Mail to   **meters@dial.pipex.com**

To enable us to provide a swift and accurate service, please be sure to provide the following information :-

1)   Full Model Number , including all options fitted.
2)   Serial Number
3)   DETAILED description of your difficulties, suggestions etc.
4)   Input Range and Display range

This product is covered by a 2 year warranty, during which period we will put right or replace any meter found to be faulty through bad workmanship or materials. This warranty does not cover damage caused by misuse or accident.

**IMPORTANT**   If the meter is a vital component in your process, you may wish to consider the purchase of a spare to cover the possible eventuality of a failure or accident, as we cannot guarantee instant repair or replacement.

We are constantly striving to improve our products and services, and as a result, changes to instruments do occur. Please ensure that this manual is kept safely for future reference, as future manuals, covering revised designs may no longer describe your product accurately.

We believe these instructions to be accurate, and the product to be competently designed and manufactured. We do not make any claims as to the suitability of this product for any particular application. The choice of product and responsibility for the choice lies with the User.

VERY IMPORTANT WARNINGS

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

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

Notes:

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

Notes:

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

Notes:

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

Notes:

}   This product is designed for Installation class II service

Notes:

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

Notes:

}   Use an insulated screwdriver when adjusting potentiometers and do not touch any circuitry

Notes:

}   Replace front cover when meter is unattended

Notes:

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

Notes:

}   Ensure all screw terminals are tight before applying power.

Notes:

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

SPECIFICATIONS

- ✔ *Menu setup via 3 hidden keys*
- ✔ *ASCII decoding, or Custom*
- ✔ *Fully addressable*
- ✔ *Very competitive pricing*
- ✔ *Fast deliveries from stock*
- ✔ *Jumper selectable I/P formats*
- ✔ *Attractive facia design*
- ✔ *String editing facility*
- ✔ *High quality plug-in terminals*
- ✔ *Units-of-measure label fitted*
- ✔ *Variable brightness facility*

CONNECTION NOTES

The SER-06 will most often be found connected as a remote display for weighing equipment or some other industrial measurement device such as our MICRO-PRO or MICRO-LITE panel meters. A rough guide to typical maximum transmission distances in industrial environments........

Baud	RS232	RS485
600	400 m	1600m
1200	200 m	800 m
4800	50 m	200 m
9600	25 m	100 m

The use of a low capacitance, twisted pair screened signal cable is strongly recommended if you wish to transmit data to the display over distances exceeding 10 metres or in electrically noisy environments. The screen should be earthed at the SER-06 end only. Use UL2092 style for RS232, 20mA, TTL, and style UL2464 for RS485 & RS422 balanced systems.

If the SER-06 is to be used with an existing system such as a weighing computer, please provide us with an extract from that device's operating manual describing the serial data string transmission, so that we can check compatibility and adjust the SER-06 if necessary for you.

The SER-06 accepts serial ASCII data in the form of RS232, RS485, RS422, RS423, TTL or 20mA TTY , and displays the numeric value of the received data. This is a superior means of providing a remote display, compared with using an analogue retransmission signal such as 4-20mA, because no scaling errors or drift will occur and the remote display will faithfully follow the source.

The various data formats are selected by positioning jumpers at the rear of the display. The displays may also be assigned individual addresses, allowing one data line to feed several displays, at different locations, with different information.

Address setting, baud rate, brightness, and serial protocol may all be set via 3 hidden front panel pushbuttons, which allow you to navigate around a simple menu.

The display can also 'edit' an incoming string, and display only that section of the string you wish to have displayed. You can tell the meter how many digits to display (from 1 to 6) and where in the string those digits are located, referenced to the Carriage Return or any other elected line terminator character.

A 'units-of-measure' window is provided, to allow you to identify the reading being displayed in engineering units, tag numbers etc. Tell us what you wish to be written in the window at the time of ordering and we will mark up the panel for you at no charge. A broad selection of commonly encountered engineering units are provided with each display, pre-cut , with self adhesive backing, for mounting behind the window yourself, if you prefer. We can also provide custom-specific text at no additional cost, provided it is described to us at the time of ordering.

INPUT TYPES

Standard Formats
RS232
RS485
RS423
RS422
TTL
20mA LOOP PASSIVE
20mA LOOP ACTIVE

A jumper selectable termination resistor is provided within the display, for use with balanced data lines such as RS485

Baud Rates
300, 600, 1200, 2400, 4800, 9600
1 start bit,8 data bits, 1 or more stop bits, no parity. Addressable up to 255 addresses

View Down onto Meter

Overall length = 137mm
Max Depth behind panel = 125mm
Max width behind panel = 98mm

GENERAL SPECIFICATIONS

Digit Height	14.2mm, 6 digits
Display type	High Brightness LED
Accuracy	no errors

POWER SUPPLY CHOICES

24 VAC	+/-10%	Option	**'24A'**
110 VAC	+/-10%	Option	**'110A'**
230 VAC	+/-10%	Option	**'230A'**
5 VDC	+/-10%	Option	**'5D'**
11-30 VDC		Option	**'11-30D'**

In all cases, power consumption < 4 VA

Panel Cutout
45 mm high, 92mm wide
Tolerances +1mm, -0mm

Bezel Size=48x96mm

ORDERING GUIDE:

SER-06 - ☐ - ☐ - ☐ - ☐ - ☐
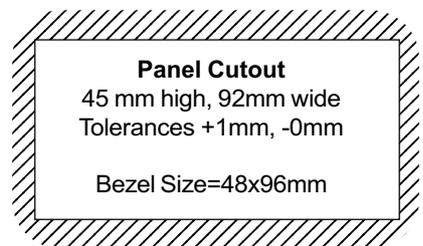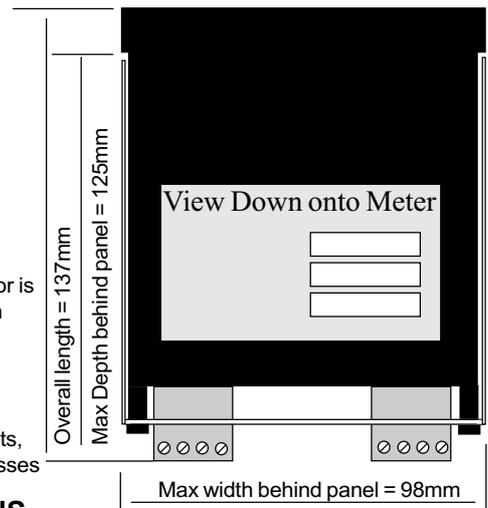
Digit Colour	R =Red G =Green
Supply Voltage	24A 110A 230A 5D 11-30D
Input type	232 484 422 423 TTL 20mA passive 20mA active
Baud Rate	300 600 1200 2400 4800 9600
Units of Measure ..... Your choice, please specify
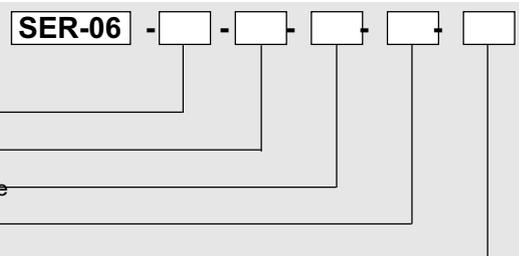
RECOGNISED ASCII CODES

The SER-06 will respond to all ASCII numeric codes , punctuation such as decimal point, and minus sign, and may also be used to display a limited set of alphabetic characters, limited by the nature of the 7 segment displays. Characters which cannot be displayed at all legibly, in either upper or lower case include K,M,W,X. Others, such as U and V could be confused with each other, N,B,D,Q,R,T,Y can only really be shown in lower case, A,E,F,P,S can only really be shown in upper case. Some control codes are :-

| ASCII code	Keyboard character	Action
02	Ctrl B	STX: active only after ETX, XOFF or EOT. Starts the display listening to data. Following ETX or XOFF, IF ADDRESSING IS ENABLED, the next two characters must be the same as the units configured address, or the broadcast address 00. If the unit is configured with the broadcast address 00, the two characters following STX are ignored.
03	Ctrl C	ETX: stops the display from listening to data except ESCape, STX or XON. If so configured, adds a Carriage Return to the data string.
04	Ctrl D	EOT: switches the unit to operate in a subset of BS4505.
06	Ctrl F	ACK: flash command causes the last displayable character entered to flash. Must be added onto each character to be flashing.
0C	Ctrl L	FF: blanks the display
0D	Ctrl M	CR: data terminator; in strobed modes transfers the data string into the display and clears the input buffer. In shift modes, causes the next displayable character to clear the display prior to displaying that character.
11	Ctrl Q	DC1 / XON: same as STX
12	Ctrl R	DC2: sets the display to 25% brightness
13	Ctrl S	DC3 / XOFF: same as ETX, but does not add Carriage Return to data string.
14	Ctrl T	DC4: sets the display to 100% brightness
18	Ctrl X	CAN: sets the display to normal (50%) brightness
1A	Ctrl Z	SUB: switches the unit into configuration mode. See below.
1B	ESCape	ESC: returns the unit to its power-on condition.

⚠ All wiring to this meter must be carried out in accordance with current IEC regulations
Separation of all power carrying cables must be ensured in accordance with IEC 1010
Installation Class II   Pollution degree 2

⚠ This meter is to be installed within a secure enclosure, to prevent accidental access by persons to the powered connections present on the meter's rear terminals.
CUTOUT DIMENSIONS A hole 45 mm high and 92 mm wide, with minimal radius is required

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

RS232

RS485/422 unterminated

RS485/422 terminated

20mA TTY

For all signal types, the left hand pair of jumpers are normally in the positions shown. If your data polarity is inverted, simply move these two jumpers to the vertical or horizontal position.

INPUT
Common
Sig. A
Sig. B
Pullup

1 2 3 4

POWER
240 VAC or DC+
110 VAC
NEUTRAL or DC -
EARTH

5 6 7 8

❌ Rear View of Meter ❌
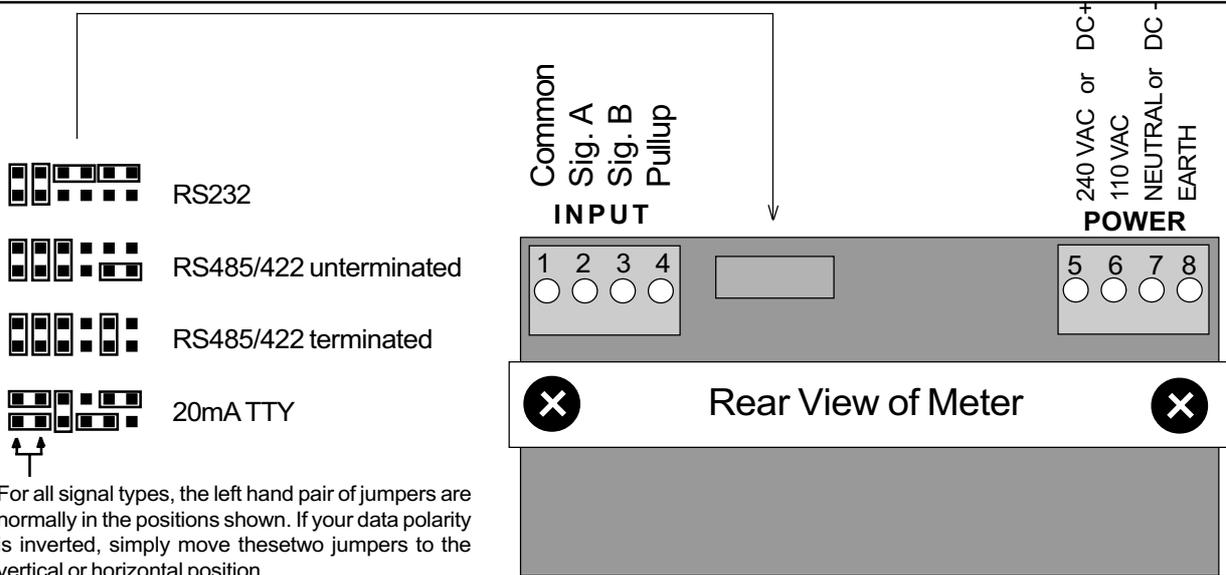
Signal Connections

RS232: typical scheme

View from inside 9 way 'D' conn.
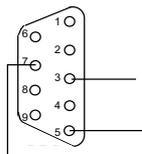
Signal Common	-	**Signal Common**
Data	-	**Sig.B**
RTS (if needed)	-	**Pullup**

RS485/422:
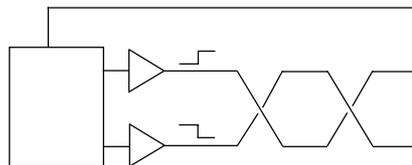
Signal common	-	**Signal Common**
Data A	-	**Sig. A**
Data B	-	**Sig. B**

20mA TTY Passive:
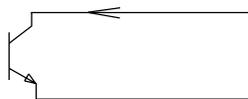
Signal +	-	**Pullup**
Signal return	-	**Sig. B**

20mA TTY Active:
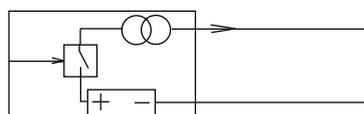
Signal +	-	**Sig. B**
Signal Common	-	**Signal common**

You will need to remove the bezel of the indicator to access the three programming pushbuttons.
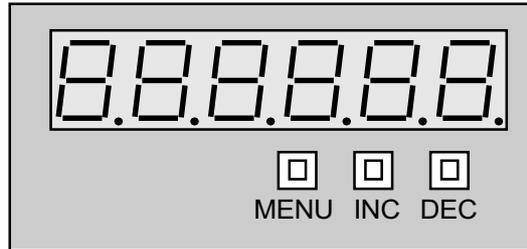
INC = INCREMENT
DEC= DECREMENT

To enter the programming menu, press MENU for approximately 2 seconds. Some of the parameters are described below....

1)   **BAUD**. Use the INC or DEC keys to select your desired baud rate

2)   **CNFG.** This is the configuration number , and determines the response of the indicator to incoming data.

      |0|=   Test Mode. All displayable characters are shown as they arrive, scrolling from right   to left

      |1|=   Normal mode. Incoming data is stored in the buffer and presented to the display on receipt of a carriage return (0d Hex). The decimal point character 2E hex does not occupy the buffer, but is added to the previously received character...so a valid character   must be received before a decimal point can be shown. Some control character responses in this mode are:-
        a) <ETX> or <DC3> will stop the unit responding to further data except for a pair of <ESC> characters or <STX> or <DC1>
        b) <FF> form feed will blank the display and clear the buffer
        c) <DC2> will reduce the brightness to 25%
        d) <CAN> will reduce brightness to 50%
        e) <DC4> will set brightness to 100%

      |2|=   Normal mode, with addressing. String must be <ETX or DC3> <STX or DC1>, <address><data> <ETX or DC3>. Data will be displayed.

      |4|=   STX / ETX termination. Displayable characters following <STX> are stored in a buffer and transferred to the display on receipt of <ETX> No addressing is available.

      |6|=   As config. 4 but with addressing enabled. The first 2 characters after STX must match the unit's address.

      |8|=   String Extraction mode. This mode allows you to display a particular part of a string. A termination character is chosen to work back from, and you set the number of characters to discard (lose), and the number of characters to display.

3)   **ADDR** This is the address from 00 to FF. If a unit is set to 00, it will respond to all addresses. If address 00 is sent in a string, all units will repond regardless of their address.

4)   **IDLE** This sets the amount of time the unit will wait, if data is not present or is lost, before displaying a prompt 'Data ?'

THE SETUP MENU

Press Menu for > 2 secs.

`bAUd 12`

Use DEC or INC to select your desired baud rate......

1	=	110
3	=	330
12	=	1200
24	=	2400
48	=	4800
96	=	9600
19	=	19200

Press Menu

`CnF9 0`

Use DEC or INC to select your desired config number.

0, 1, 2, 4, 6, or 8

Press Menu

`Addr00`

Use DEC or INC to select your desired address......

00 to FF

Press Menu

`IdLE 30`

Use DEC or INC to select your desired idle time.....

no	=	none
10	=	10 secs
30	=	30 secs
60	=	60 secs

Press Menu

`LoSE 2`

ONLY APPEARS IF Cnfg = 8

Use DEC or INC to select how many char.'s before the string terminator to discard.

0 to 15 inclusive

Press Menu

`diSP 6`

ONLY APPEARS IF Cnfg = 8

Use DEC or INC to select how many char.'s to display

3, 4, 5 or 6

Press Menu

`Cr =0d`

ONLY APPEARS IF Cnfg = 8

Use DEC or INC to select ASCII Hex termination character (0d=Carriage Return)

Press Menu

`SAVE n`

Press Menu, unit reverts to operating mode

Use DEC or INC to choose to save or not.....

n	=	no
y	=	yes

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ADDRESSING NOTES   (cnfg 2,6 or 8)

Addressing is initialised with the ETX or XOFF character, which stops the unit responding to data.

Following an STX or XON character, the next two characters are treated as address characters. If these characters are 0 0 (the broadcast address) or are the same as the units configured address, the subsequent characters are responded to by the unit.
A unit configured with the broadcast address 00 ignores the address characters, and responds to the third character onwards, until ETX or XOFF is received.

The unit may be configured to treat ETX as a string terminator, so a carriage return terminator is not required.

NOTE The displays may be configured with up to 255 different addresses, using a 2 digit hex number. However, when sending the address characters on a serial string, you should not simply send 1A as ASCII address. Any alpha character in the address string should be represented by ASCII hex 3A to 3F as follows....

Hex Address bit	Required ASCII character
A	: (Colon)
B	; (Semi-colon)
C	< (Less than)
D	= (Equal to)
E	> (Greater than)
F	? (Question mark)

STRING EXTRACTION NOTES (cnfg 8)

The string extraction facility is very often extremely useful in weighing and similar applications, where the actual data to be displayed lies within a compound string.

As an example, let us assume that you wish to display the Nett value (2550) of weight in the following string, where 09786 is an example of a serial number, status number, or similar...

0 9 7 8 6 N E T T 2 5 5 0 k g G R O S S 3 7 9 9 k g <CR>

These are the 4 characters we wish to display

These are the 13 char.'s we want to lose
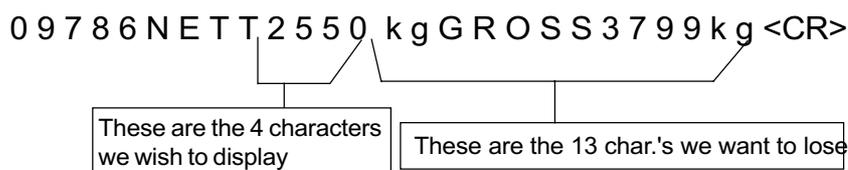
Between the terminator <CR> and 2550 there are 13 characters to discard, so set 'LOSE' to 13
You only wish to display 4 digits, so set 'DISP' to 4
The terminating character is <CR> so set 'Cr' to 0d
The display should show 2550 and no other characters.

Declaration of Conformity

Declaration Number : SER-06 Rev. P2
Issue Date : 21 May 1997
Products Covered : SER-06
Title : Serial I/P Remote Display

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 72/23/EEC safety directive.

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

MARCONI CERTIFICATE # : TC96/042B
MARCONI CERTIFICATE Issue # : 1
MARCONI Certificate Issue Date :14 Feb. 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, Beds. J.R. Lees Director