User's Guide

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LDP-124, LDP-126, LDP-144 AND LDP-146

SERIES FOR SERIAL ASCII INPUT

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The information contained in this document is believed to be correct, but OMEGA Engineering, Inc. accepts no liability for any errors it contains, and reserves the right to alter specifications without notice.

WARNING : These products are not designed for use in, and should not be user for, patient connected applications.
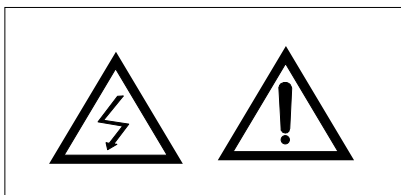
CONTENTS

1.- IMPORTANT SAFETY CONSIDERATIONS

INSTALLATION

PRECAUTIONS.-

The installation and the future use of this unit must be done by suitable qualified personnel. The unit has not AC (mains) switch, it will be in operation as soon as power is connected. The installation must incorporate an external main switch.

The unit has a protection fuse incorporated on the AC socket, if it is necessary to change or replace, use the time-lag fuse according to IEC 127/2 and the values indicated below.

200 mA when the unit is operating at 230 Vac
400 mA when the unit is operating at 115 Vac.

Install also the necessary devices to protect the operator and the process when using the unit to control a machine or process where injury to personnel or damage to equipment or process, may occur as a result of failure of the unit.

See paragraph 6, WIRING and paragraph 8, CONFIGURATION and check that all jumpers AND switches are on the correct position.

SAFETY PRESCRIPTIONS.-

The unit has been designed and tested under EN-61010-1 rules and is delivered in good condition. This operator's manual contains useful information for electrical connections. Do not make wiring signal changes or connections when power is applied to the unit. Make signal connections before power is applied and, if reconnection is required, disconnect the AC (mains) power before such wiring is attempted.

Install the unit in places with a good ventilation to avoid the excessive heating. And far from electrical noise source or magnetic field generators such as power relays, electrical motors, speed controls etc...

The unit cannot be installed in open places. Do not use until the installation is finished.

POWER SUPPLY.-

The power supply must be connected to the adequate terminals (see the connection instructions). The characteristics of the power supply are showed on the label on the rear part. Please make sure that the unit is correctly connected to a power supply of the correct voltage and frequency.

Do not use other power supply otherwise permanent damage may be caused to the unit.

Do not connect the unit to power sources heavily loaded or to circuits which power loads in cycle ON-OFF or to circuits which power inductive loads.

SIGNAL WIRING.-

Certain considerations must be given when install the signal input and control wires. If the wires are longs can act like an antenna and introduce the electrical noise to the unit, therefore :

Do not install the signal input wires in the same conduit with power lines, heaters, solenoids, SCR controls etc....and always far from these elements.

When shielded wires are used, connect the shield to the common terminal and leave unconnected the other end of the shield and do not connect to the machine ground.

SAFETY CONSIDERATIONS

PRESCRIPTIONS.-

Before starting any operation of adjustment, replacement, maintenance or repair, the unit must be disconnected from any kind of power supply.

Keep the unit clean , to assure good functioning and performance. Use for it a clean and humid rag. Do not use for the frontal lens abrasive products, solvents, alcohol, etc... because its transparence could be damaged and this may cause difficulty for a correct vision of the reading.
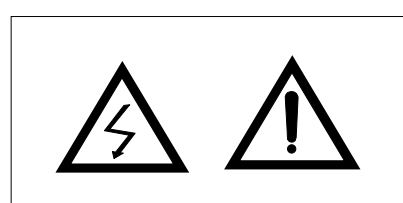
To prevent electrical or fire hazard, do not expose the unit to excessive moisture.

Do not operate the unit in the presence of flammable gases or fumes, such as environment constitutes a definite safety hazard. The unit is designed to be mounted in a metal panel.

If the unit shows signs of damage, or is not able to show the expected measures, or has been stored in a bad conditions or a protection failure can occur, then do not attempt to operate and keep the unit out of service.

IN CASE OF FIRE

1.- Disconnect the unit from the power supply.
2.- Give the alarm according to the local rules.
3.- Switch off all the air conditioning devices.
4.- Attack the fire with carbonic snow, do not use water in any case.
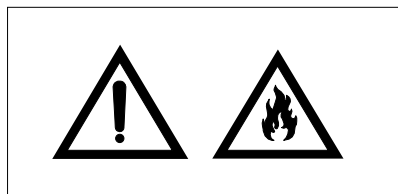
WARNING : In closed areas do not use systems with vaporized liquids.

CONNECTIONS

All wiring connections are made using push-in cable connectors. There is a separate connector block for power supply and input signals. Please make sure that each connector block is connected on the adequate place.

The wire cross section recommended for signal inputs is 1 mm^2 and for power supply 2.5 mm^2.

PANEL MOUNTING

Verify that the panel cut-out is correctly according to the dimensions indicated on page 20 with a minimum depth of 150 mm. (5.9").

Install the fixation pieces in the lateral guides of the unit by its rear part and then turn the screw firmly against the panel, until the unit is totally hold on.

See paragraph 11 on page 20.

2.- UNPACKING AND INSPECTION

It is advisable to do a detailed reading of this Manual before mounting the instrument. This Operator's Manual contains all the technical specifications : electricals as well as mechanics, both necessary to do a correct installation and also a good use of the instrument.
At the same time the user will acquire the knowledge needed to obtain the best performances of the product.

Check that inside the present cardboard box, there are the following :

☐ 1 Instrument Model LDP-1XX-S.

☐ 1 Operator's Manual.

☐ 1 Connector for Power Supply.

☐ 1 Screw-clamp connectors, 4 pins female for signal inputs.

☐ 2 Pieces for fixing the unit against the panel.

REFERENCE KEY

All models have a label on the rear part with their references printed on the following format :

LDP- 1XX- X- X-X

Basic serie

Digit size
2 = 57 mm (2.3")
4 = 100 mm (4")

Number of digits
4 = 4 digits
6 = 6 digits

Power supply
0 = 230 Vac 50/60 Hz.
1 = 115 Vac 50/60 Hz.

Display color : R = Red
G = Green

Model reference : S
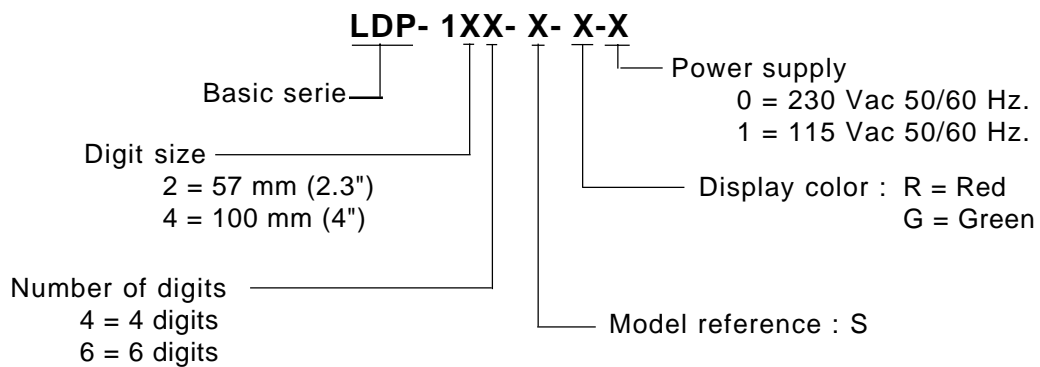
If there are some doubts or inquiries about the present instrument, please contact **OMEGA ENGINEERING´S customer service department.**

When the shipment arrives remove the Packing List and verify that you have received all equipment.
Then inspect the box and the instrument, and if there is evidence of damage caused by bad handling during the transport, it is advisable to make a careful inspection of all damages making a note of all of them and to pass on this information directly to the Transport Company.
If this occurs but with insured material, ask the Transport Company for instructions about submitting a claim

3.- MAIN FEATURES

The LDP-XX-S are a four or six digits plus polarity (only minus) character remote display module. They accept serial ASCII coded data into a differential or single ended line receiver, at common baud rates.

Numeric data and a selection of other characters can be displayed. The character set includes decimal point, overload/alarm and negative sign. Simple messages e.g. Hi Al, Lo Al, °C, °F can be formed with characters presentable on seven segment displays.

Units connected on a common data line may be individually addressed. This is achieved by sending code 03 followed by 02 (or XOFF XON), an address from 0 to 31 (ASCII 30 to 4F) and the data. The address 0 (ASCII 30) is common to all remote displays for simultaneous display of the same message.

The unit may be switch programmed to operate in a "strobed" mode whereby the data string is transferred to the display on reception of a carriage return. Alternatively a "shift" mode can be used in which the characters are displayed according to their current position in the input shift register.

Serie LDP-124-S :   4 digits type LED, seven segments, red or green colour with 57 mm (2.3") height and minus sign for polarity.

Serie LDP-144-S : 4 digits type LED, seven segments, red or green colour with 100 mm (4") height and minus sign for polarity.

Serie LDP-126-S : 6 digits type LED, seven segments, red or green colour with 57 mm (2.3") height and minus sign for polarity.

Serie LDP-146-S : 6 digits type LED, seven segments, red or green colour with 100 mm (4") height and minus sign for polarity.

The common features for all series are the following:

MECHANICAL.-
Housed in a rugged extruded aluminium profile housing for panel mounting or free standing. Finished in anodized black colour. The frontal lens is mounted with a special rubber profile which provides the front part of the unit with an IP-65 protection.
The product has been designed to fulfil a need for use in process control environments and the characters are easily readable at large distances.

CONNECTIONS.-
Connections for Signal Inputs are made using one screw-clamp connector of four terminals located on the rear part of the unit.
The recommended wire cross section for signal input is 1 mm^2.
Connection for Power Supply uses a push-in cable connector with 2 terminals for power and 1 terminal for earth.
The fuse is located in the Power Supply socket, as well as the spare fuse.

4.- INSTRUMENTS DESCRIPTION

4.1 FRONT DESCRIPTION, MODELS : LDP-124-S and LDP-144-S

A : Overrange indicator.
B : Minus sign.
C : Decimal points.
D : 4 digits, seven segments.
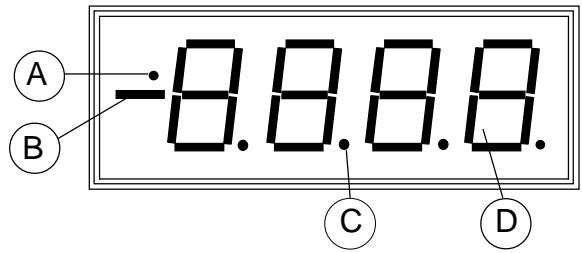
4.2 FRONT DESCRIPTION, SERIES : LDP-126-S and LDP-146-S

A : Overrange indicator.
B : Minus sign.
C : Decimal points.
D : 6 digits, seven segments.

4.3 REAR DESCRIPTION

Attaching screws

1
2
3
N/C

Signal Input
Connector.

Power Supply
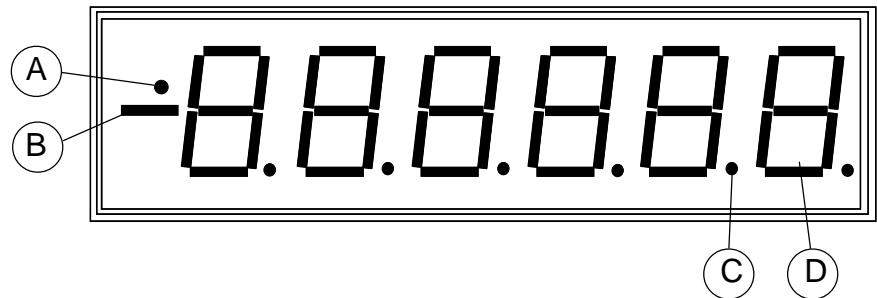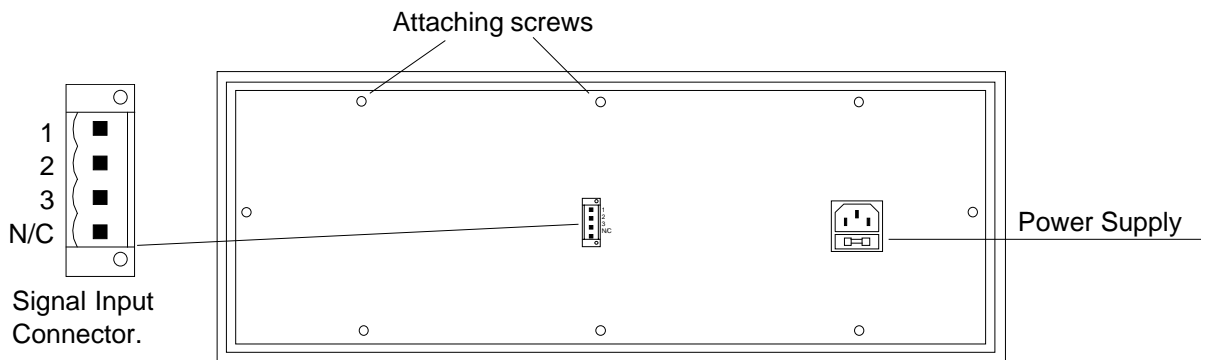
5.- GENERAL SPECIFICATIONS

DISPLAY

Type . . . . 4 or 6 digits, 7 segments, red or green LED.
Height digit . . . . 57 (2.3") or 100 mm. (4")
Range . . . . -9999 to 9999 or -999999 to 999999
Polarity . . . . Minus only (-)
Decimal point . . . . Programmable position.

INPUT SIGNALS   Selectable by internal jumpers.

TTL level   Input impedance . . . . >12 KΩ
                 Logic 1 . . . . ≥ 2 V = stop bit
                 Logic 0 . . . . ≤ 0.8 V = start bit
                 Maximum input . . . . . +12 to -7 V.

2 mA Loop	Logic 1	$\geq$ 1.6 mA = start bit
	Logic 0	$\leq$ 0.2 mA = stop bit
	Level	Internal jumper reversible
	Voltage drop	1 V max at 2 mA.
	Max. loop current . . .	0.5 A.

20 mA Loop	Logic 1	$\geq$ 16 mA = start bit
	Logic 0	$\leq$ 2 mA = stop bit
	Level	Internal jumper reversible
	Voltage drop	1 V max at 20 mA.
	Max. loop current . . .	0.5 A.

Bipolar ±5 V	Input impedance	>12 KΩ
RS-423	Logic 1	$\geq$ 0.5 V = start bit
	Logic 0	$\leq$ 0 V = stop bit
	Open line	Idle
	Level	Internal jumper reversible
	Maximum input	±7 V.

Bipolar ±15V	Input impedance	>30 KΩ
RS-232	Logic 1	$\geq$ 3 V = start bit
(Default	Logic 0	$\leq$ -3 V = stop bit
Setting)	Open line	Idle
	Level	Internal jumper reversible
	Maximum input	±15 V.

Differential	Threshold	Less than ±0.2 V. Internal charge.
RS422/485	Hysteresis	70 mV typical
	Input impedance	>12 KΩ
	Max. diff. input	±12 V.
	Max. Volt. relative to	
	signal common	+12/-7 V.
	Termination	121 Ω jumper selectable

Receiver loop	. . . .	2 mA or 20 mA ±20%
Source :	Open circuit voltage .	5 V. ±5%
	Compliance	3V at 2 or 20 mA.

HANDSHAKE . . . . No handshake required, terminal accepts continuous data.

ENVIRONMENTAL

Operating temperature . . . . . . 0 to +50 ºC (32 to 122 ºF).
Storage temperature . . . . -20 to +85 º C (-4 to 185 ºF).
Relative humidity . . . . 0 to 85 % not condensed.
Protection . . . . IP65. (Front part only).

MECHANICAL

Case material . . . . Aluminium extruded.
Finished . . . . Anodized, black colour.
For dimensions, panel cut-out, depth and weight see table on page 20

ELECTRICAL

Standard power supply . . . . . . 115 Vac. ±10% 50 / 60 Hz. (230 Vac optional)
Consumption . . . . See table on page 20.

6.- WIRING

6.1.- POWER SUPPLY, RECOMMENDED WIRING

POWER SUPPLY
115 Vac (230 Vac Optional).

Power switch

FUSE and spare fuse .
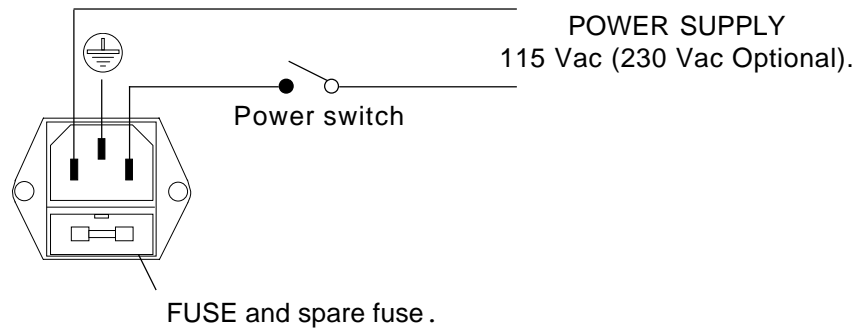
6.2.- PROTECTION FUSES

The unit has a protection fuse located on the power supply socket.

If this fuse must be replaced or changed because the power supply is changed, use the time-lag fuse according to IEC 127/2 with the values indicated on the table.

| Power Supply	Fuse value
230 Vac	0.2 A
115 Vac	0.4 A

6.3.- SIGNAL INPUT CONNECTION

The serial ASCII input circuit can be set to one of 10 arrangements. Unless otherwise specified at the time of order, the input circuit will be factory default set for RS-232 levels. If you are in any doubt about the input conditions, it is advisable to remove the rear panel of the unit and inspect the internal jumper switch positions.

The operating mode of the unit and baut rate are, unless otherwise specified at the time of order, set for the default settings of :

    MODE : strobed display   BAUD : 1200   ADDRESS : 0   BITS : 8   PARITY : none

If you are in any doubt about these settings, they can be determined by powering up the unit with the input line idle, and observing the display at power-up.

To change any set-up conditions see the configuration section
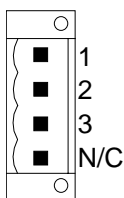
Connections are : 4 way pin connection.
Pin 1 = Signal B
Pin 2 = Signal A
Pin 3 = Signal common
Pin 4 = Not used.
    Note : Signal common should be grounded
        to system common.

Signal connections are different for different input configurations. They are as follows :

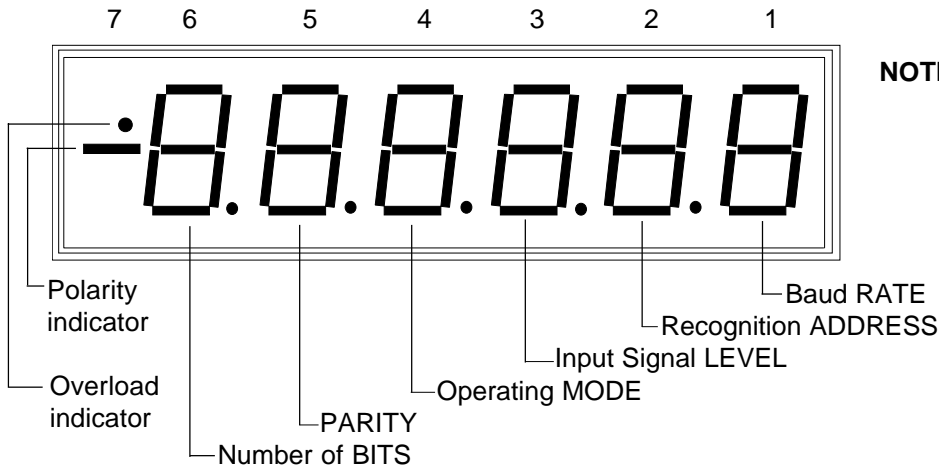| Signal Input Type	Signal Input Connector		
	Pin 1	Pin 2	Pin 3
RS-232 ±15 V	Input	+5 V	GND
RS-422/RS-485 Internal Load	Signal B	Signal A	GND
RS-422/RS-485 External Load	Signal B	Signal A	GND
RS-423 ±5 V	Input	+5 V	GND
2 mA Loop Powered	Loop - / Loop +	Loop + / not used	not used (Loop internally powered) / Loop - (Loop externally powered)
20 mA Loop Powered	Loop - / Loop +	Loop + / not used	not used (Loop internally powered) / Loop - (Loop externally powered)
TTL Level	+5 V	Input	GND

7.- OPERATING DESCRIPTION

7.1.- POWER-UP

Having determined that the unit has been configured for the correct input signal, connect the mains plug to a suitable AC power source and the signal input to the signal source.
Ensure that the source is an idle condition, i.e. not transmitting data, and switch on the mains power.
The unit will power-up displaying its recognition address, its baud rate, the condition at the signal input, its operating mode, the parity and bits number.

The display will be as follows :

NOTE : 4 digit version does not have 2 left hand characters.

- Polarity indicator
- Overload indicator
- Number of BITS
- PARITY
- Operating MODE
- Input Signal LEVEL
- Recognition ADDRESS
- Baud RATE

Character 1, Baud RATE displayed will be a number from 0 to 7. Factory default is 3 (1200 baud).
Character 2, Recognition ADDRESS : The ADDRESS displayed will be 0 by default (30h) or one of 31 other numeric and alphanumeric characters from 1 through to letter O. See Table of Characters.
Character 3, Input Signal LEVEL, will show a symbol "**L**" for a correct idle condition or a symbol "**H**" for an incorrect idle condition. For RS485 signals, ensures the transmitter is in active driving condition, since a 485 driver in a receive condition may give a correct idle indication even if the signal wires are transposed.
Character 4, Operating MODE displayed will be "**F**" for shift mode, or "**r**" for strobe mode, which is the factory default.
Character 5, PARITY will show the symbol "**I**", by default, which means "Ignored" or one of the following characters ; "**n**" for none, "**o**" for Odd and "**E**" for Even.
Character 6, Number of BITS displayed will be 7 for seven bits or 8 for eight bits.
Character 7, will show the Polarity indication.

After 3 seconds of power-up the display will shown "- - - - - - -", (all middle bar and polarity indicator is light-up) it means that the instrument is ready to receive data, and all printable characters received (20, 2B, 2D, 2E and 30 to 5F) will be displayed directly if the instrument is programmed in shift mode or after receiving the code 0D in strobe mode.
It is convenient in this moment and before starting the addressing mode, to send a character XOFF or ETX to clear the internal buffer from uindesirable data. (XOFF recommended).

7.2.- OPERATING MODES

The following serial ASCII protocols are DIP switch selectable :

Mode 0 : Each printable character as it is received is placed in the least significant position and all characters are shifted left one position. Following a carriage return character, the next valid character received causes the display to clear and that character is placed in the least significant position. (If it is a printable character)

Mode 1 : Printable characters are placed in a buffer on reception. Receipt of the carriage return character causes the buffer contents to be transferred to the display.

7.3.- INSTRUMENT ADDRESSING.

Having received the ETX or XOFF character, start the addressing sending the STX or XON character, the next character received is the address of the unit that is to receive data.

There are 32 possible addresses, from code 30 to code 4F hex. These correspond to addresses set up on the switch jumper on the card. Selector S4.

After address character send data characters followed by a character XOFF or ETX to stop the data reception and finish the address selection.

Units with the address, "0" (ASCII 30 hex), will display all data, including the address code sent, and this address will cause any unit to receive data.

The instrument powers-up in the listening condition, so ETX or XOFF must be sent to the unit to start the addressing mode.

Note the ETX character is treated as a carriage return character, in addition to an XOFF character, strobing the last string into the display.

When using ETX, STX as separators for data strings the CR character should be omitted from the end of strings, else a blank display will result.

MESSAGE FORMAT IN ASCII PROTOCOL

STX	Address (hex)	Data	ETX
1 byte	1 byte	n bytes	1 byte

Do not add CR character.

Total bytes = n + 3

XON	Address (hex)	Data	XOFF
1 byte	1 byte	n bytes	1 byte

For STROBE MODE add CR (0D hex) to the data.

Total bytes = n + 3

7.4.- OVERLOAD AND POLARITY INDICATORS

The overload indicator is the upper bar of the 7th character.

The polarity indicator is the middle bar of the 7th character.

This applies even to a 4 digit display, so to light up the overload or polarity indicator, characters 5 and 6 must be padded out with any printable character.

To light the polarity indicator, any character that indicates the middle bar but excludes the upper bar should be sent to the display (for example -) to light the overload indicator, a character that includes the upper bar but excludes the middle bar should be sent (for example 0, or :). To light both overload and polarity indicators the character sent must include both bars (for example ?).

7.5.- BS4505 SUBSET

The display powers-up responding to and, if appropriate, displaying the characters sent to it. Having received the character EOT, the display switches to respond to a sub-set of the BS4505 protocol. The four characters received by the display subsequent to EOT are the group number sent twice and the ID number sent twice. If the characters are equivalent to the address of the display (set by internal jumper switches) the display switches to a listening condition, else it ignores any further characters until EOT is again transmitted. Once listening, the STX character is used to start recognition and display characters, and ETX is used as a terminator to strobe data into the display and stop further recognition and display characters. Note that data strings terminated by carriage return should not be used, since carriage return followed by ETX will result in a blank display. The display is a dumb receiver. and provides no response to messages. The block check characters are not used, and the leading alpha characters following STX are treated as printable characters and will appear on the display, if the character string is short enough.

EQUIVALENT ADDRESSES

The combination of Group (G) and ID numbers allows for addresses 1 to 31. The relationship between these addresses, and the switch settings of the display is as shown on page 14.

It is not necessary to send again the sequence [EOT] [G] [G] [ID] [ID] to keep the address selected.

MESSAGE FORMAT IN ASCII PROTOCOL

EOT	G	G	ID	ID		STX	Data	ETX	STX
1 byte		4 bytes				1 byte	n bytes	1 byte	

DATA : In units with 6 digit display only the 6 last characters will be displayed, and the 4 last characters if the unit is a 4 digit display.

ASCII code	Decimal code	Keyboard character	Action
02	02	Ctrl B	STX : Starts the display listening to data. If the instrument has an address other than 0 the next character must be the address of the instrument or a 0 or it will return to not listening.
03	03	Ctrl C	ETX : Stops the display from listening to further data (except codes 02, 11, 04, 1B) transfers last string into the display. Clears the internal buffer.
04	04	Ctrl D	EOT : Switches the display to behave to a sub-set of BS4504.
06	06		ACK : Stars to flash the last character entered at 2 times per second. Decimal point included.
0C	12	Ctrl L	Causes the display to clear blank. Internal buffer included.
0D	13	Ctrl M	End of data : In shift mode, next valid data will clear or Enter the display and insert characters into least significant position. In strobed mode, transfers last string to the display.
11	17	Ctrl Q	XON : Same as STX.
12	18	Ctrl R	DC2 : Sets the display to 25 % brightness.
13	19	Ctrl S	XOFF: Same as ETX but does not transfer last string into the display.
14	20	Ctrl T	DC4 : Sets the display to 100 % brightness.(Normal).
18	24	Ctrl X	CAN : Sets the display to 50 % brightness.
1B	27	Esc	Resets display to its power-on condition.
20	32	Space	Inserts a space.
2B	43	+	Inserts a space.
2D	45	-	Inserts a "-"
2E	46	.	Adds a decimal point to the last character entered.
30-5F	48-95		Inserts characters shown in Table of Characters. In shifted mode the character is entered in the least significant place and all characters are shifted to the left (from LSB to MSB). The character number 7 (from LSB) is lost (polarity and overrange), the character number 6 (MSB) takes the polarity place. It is valid also for the instruments with four digits because the polarity remains in 7th position and characters 5th & 6th will not be displayed. In strobed mode the data is placed in a register rather than the display.

7.7.- TABLE OF CHARACTERS

ASCII code	Keyboard	Display	ASCII code	Keyboard	Display
30	0	ロ	48	H	H
31	1	l	49	I	I
32	2	2	4A	J	J
33	3	3	4B	K	├
34	4	4	4C	L	L
35	5	5	4D	M	∏
36	6	6	4E	N	∩
37	7	7	4F	O	o
38	8	8	50	P	P
39	9	9	51	Q	╕
3A	:	-	52	R	┌
3B	;	_	53	S	5
3C	<	⊏	54	T	┟
3D	=	☰	55	U	⊔
3E	>	⊐	56	V	⊔
3F	?	⊓	57	W	⊔
40	@	BLANK	58	X	↲
41	A	A	59	Y	↳
42	B	b	5A	Z	⊇
43	C	⊏	5B	[	o
44	D	d	5C	\	↳
45	E	E	5D	]	┬
46	F	F	5E	^	⊓
47	G	⊑	5F	-	─

8.- CONFIGURATION

8.1.- POWER SELECTION

See the rear label for power requirements. Power supply selection must be done by suitable qualified personnel or by the local distributor. Contact factory or your local distributor for instructions.

8.2.- INSTRUMENT CONFIGURATION

To change the signal conditioning, the rear panel of the unit needs only to be removed to gain access to the internal DIP and jumpers switches located on the control board.
Be sure that the instrument is disconnected from any power supply before removing the rear panel.

Control board position
for instruments, series
LDP-14X-S

Control board position
for instruments, series
LDP-12X-S

Jumper
selector S1

Jumper
selector S2

Jumper
selector S3

DIP switch selector S4

ON

DIP switch closed =   DIP switch opened =

Jumper closed =   Jumper opened =
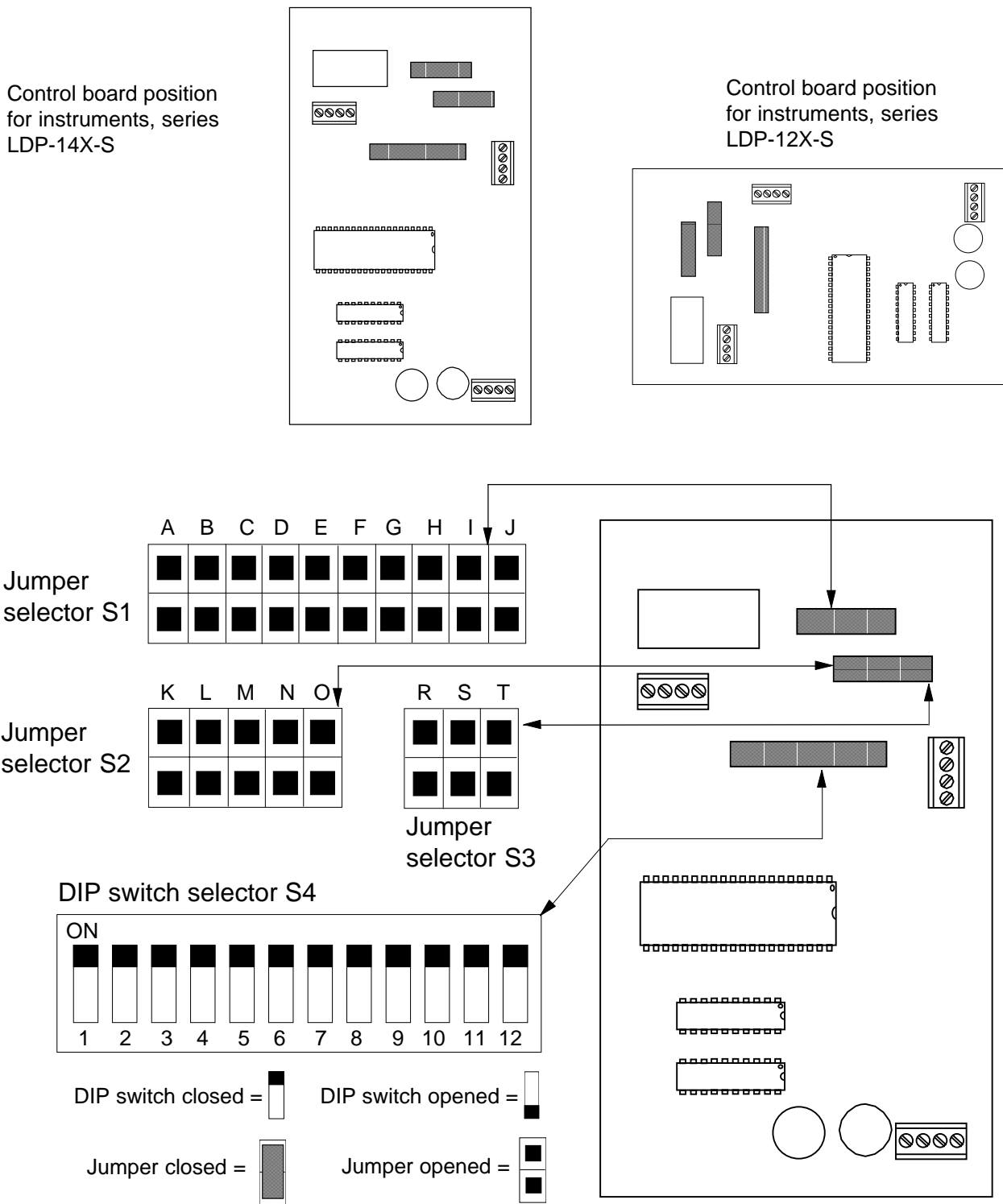
8.3.- CONFIGURATION TABLES for BRIGHTNESS, BAUD RATE, OPERATING MODE, ADDRESS AND SUB-SET BS4505

BRIGHTNESS CONFIGURATION

Selector S4 Switch 1	Switch 2	Brightness %
0	0	25
0	1	50
1	0	75
1	1	100

BAUD RATE CONFIGURATION

Selector S4 Switch 5	Switch 6	Switch 7	Baud rate	Code
0	0	0	150	0
0	0	1	300	1
0	1	0	600	2
0	1	1	1200	3
1	0	0	2400	4
1	0	1	4800	5
1	1	0	9600	6
1	1	1	19200	7

OPERATING MODE CONFIGURATION

Selector S4 Switch 3	Switch 4	Operating mode
0	0	Mode 0 (Shift)
0	1	Mode 1 (Strobe)

ADDRESS SETTING

Switch : bit :	8 16	9 8	10 4	11 2	12 1	Address setting	ASCII code
	0	0	0	0	0	0	30
	0	0	0	0	1	1	31
	0	0	0	1	0	2	32
	0	0	0	1	1	3	33
	0	0	1	0	0	4	34
	0	0	1	0	1	5	35
	0	0	1	1	0	6	36
	0	0	1	1	1	7	37
	0	1	0	0	0	8	38
	0	1	0	0	1	9	39
	0	1	0	1	0	10	3A
	0	1	0	1	1	11	3B
	0	1	1	0	0	12	3C
	0	1	1	0	1	13	3D
	0	1	1	1	0	14	3E
	0	1	1	1	1	15	3F
	1	0	0	0	0	16	40
	1	0	0	0	1	17	41
	1	0	0	1	0	18	42
	1	0	0	1	1	19	43
	1	0	1	0	0	20	44
	1	0	1	0	1	21	45
	1	0	1	1	0	22	46
	1	0	1	1	1	23	47
	1	1	0	0	0	24	48
	1	1	0	0	1	25	49
	1	1	0	1	0	26	4A
	1	1	0	1	1	27	4B
	1	1	1	0	0	28	4C
	1	1	1	0	1	29	4D
	1	1	1	1	0	30	4E
	1	1	1	1	1	31	4F

SUB-SET BS4505

Address setting	(G)	(ID)
0	0	0
1	1	1
2	1	2
3	1	3
4	1	4
5	1	5
6	1	6
7	1	7
8	1	8
9	1	9
10	-	-
11	-	-
12	-	-
13	-	-
14	-	-
15	-	-
16	-	-
17	2	1
18	2	2
19	2	3
20	2	4
21	2	5
22	2	6
23	2	7
24	2	8
25	2	9
26	-	-
27	-	-
28	-	-
29	-	-
30	-	-
31	-	-

Switch ON = 1
Switch OFF = 0

DIP switch closed =

DIP switch opened =

8.4.- CONFIGURATION TABLES for BITS, PARITY AND SIGNAL INPUT

BITS AND PARITY CONFIGURATION

Jumpers position in Selector S3	Bits	Parity
R S T	7	Odd
R S T	7	Even
R S T	7	Ignored

Jumpers position in Selector S3	Bits	Parity
R S T	8	Odd
R S T	8	Even
R S T	8	Ignored
R S T	8	None

Jumper closed = [▇]   Jumper opened = [□ □]

SIGNAL INPUT CONFIGURATION

Signal Input Type	Jumpers position in Selector S1 (A B C D E F G H I J)	Selector S2 (K L M N O)	Pin 1	Pin 2	Pin 3	
RS-232 ±15 V			Input	+5 V	GND	
RS-485 RS-422 Internal Load			Signal B	Signal A	GND	
RS-485 RS-422 External Load			Signal B	Signal A	GND	
RS-423 ±5 V			Input	+5 V	GND	
Loop Powered 2 mA			Loop -	Loop +	not used	A
			Loop +	not used	Loop -	B
Loop Powered 20 mA			Loop -	Loop +	not used	A
			Loop +	not used	Loop -	B
TTL Level			+5 V	Input	GND	

A = Loop internally powered
B = Loop externally powered

8.5.- LEVEL LOGIC CONFIGURATION

Level logic for Signal Input configured as 2 mA, 20 mA, RS-423 or RS 232 can be inverted placing the jumpers K and L as shown

K L M N O

9.- CONFIGURATION PROCEDURE

If it is necessary to change the configuration of the instrument, proceed as follows for all models, series **LDP-1XX-S**

1.- Check that the instrument is not powered.
2.- Remove the rear cover taking off all the screws to obtain access to the control board. (See page 6 paragraph 4.3).
3.- Remove all jumpers on the control board. (See paragraph 8.2)
4.- Select brightness using DIP switches 1 & 2 (Selector S4).
5.- Select baud rate using DIP switches 5, 6 & 7 (Selector S4).
6.- Select operating mode using DIP switches 3 & 4 (Selector S4).
7.- Select address using DIP switches 8, 9, 10, 11 & 12 (Selector S4).
8.- Select number of bits and parity using jumpers R, S & T (Selector S3).
9.- Select signal input using jumpers A, B, C, D, E, F, G, H, I & J (Selector S1) and K, L, M, N & O (Selector S2).
10.- Check that the level logic configuration is the appropriate, if not use jumpers K & L. (Selector S2).
11.- Close the rear cover using all the screws removed before.
12.- Power-up the instrument with the appropriate power supply.
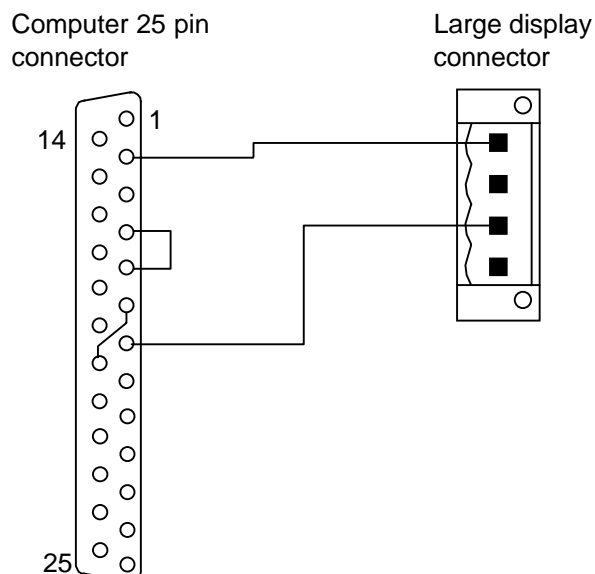
10.- EXAMPLE APPLICATIONS (For signal type RS-232)

The LDP-1XX-S as a remote display for an IBM computer with connector of 9 pins.

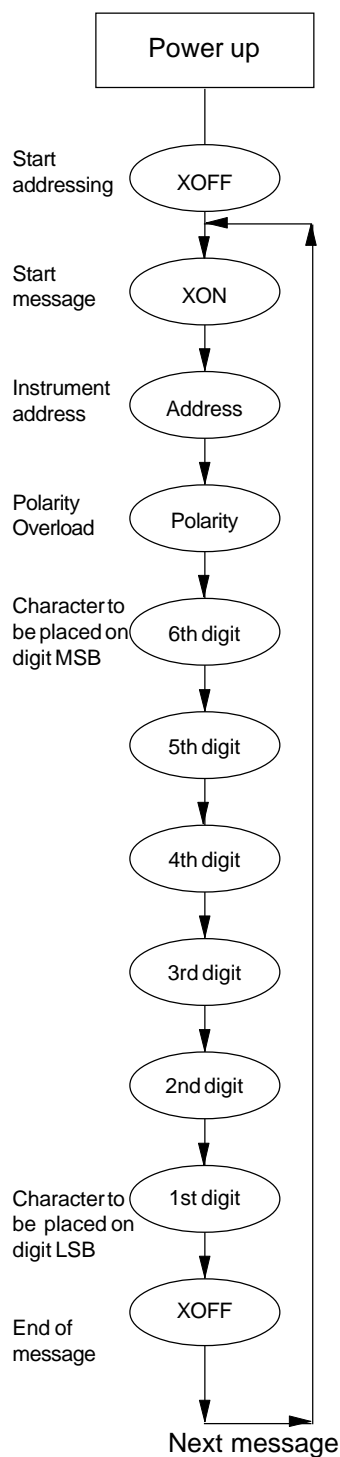| Pin description |
| --- |
| Pin 1 = No connection |
| Pin 2 = No connection |
| Pin 3 = TXD |
| Pin 4 = DTR |
| Pin 5 = Signal Ground |
| Pin 6 = DSR |
| Pin 7 = RTS |
| Pin 8 = CTS |
| Pin 9 = No connection |
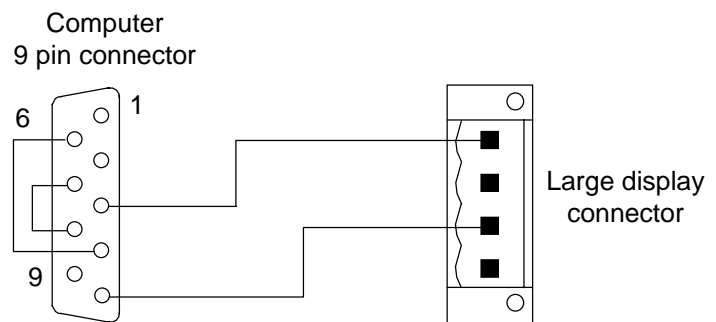
The LDP-1XX-S as a remote display for an IBM computer with connector of 25 pins.

Pin description
Pin 1 = No connection
Pin 2 = TXD
Pin 3 = No connection
Pin 4 = RTS
Pin 5 = CTS
Pin 6 = DSR
Pin 7 = Signal Ground
Pin 8 to 19 = No connection
Pin 20 = DTR
Pin 21 to 25 = No connection

10.1.- SHIFT OPERATING MODE, PROGRAMME EXAMPLE

```
Power up
```

Start addressing → XOFF

Start message → XON

Instrument address → Address

Polarity Overload → Polarity

Character to be placed on digit MSB → 6th digit

5th digit

4th digit

3rd digit

2nd digit

Character to be placed on digit LSB → 1st digit

End of message → XOFF

Next message

ESC : Resets display to its power-on condition. Has priority over any other character.

Address : Configured on the switch selector S4 (+30 hex). All the units with the address, "0" (ASCII 30 hex), will display all data, including the address code sent, and this address will cause any unit to receive data.

Polarity : The middle bar is light-up.

Overload : Led located over the polarity bar is light-up.

```c
/*  ============OMEGA Engineering Inc.=============
/*  Demo programm for series LDP-XX-S connected to a PC      */
/*  Example of comunication in Shift operating mode using XON/XOFF   */
/*  To be used under Turbo "C++" of Borland Version 1.01    */
/*  Fema Version 01, realized on Dec 1th of 1997     */

/*mode shift*/

#include<bios.h>        /*
#include<conio.h>
#include<stdio.h>
#define COM1    0    /*
#define COM2    1    /*

#define TRUE    1
#define FALSE   0

#define EVEN 0x18
#define ODD 0x10
#define NONE 0x0

#define BIT7 0x2
#define BIT8 0x3

#define STOP1 0x0
#define STOP2 0x4

#define BAUD300   0x40
#define BAUD600   0x60
#define BAUD1200 0x80
#define BAUD2400 0xA0
#define BAUD4800 0xC0
#define BAUD9600 0xE0

int main(void)
{
 int count,DONE=FALSE;   /*counter  & end loop condition
 char dat1,men1[25];    /*temporary data and string*/
/*_____Initializing Host port_____*/
 bioscomp(0,(BAUD9600 | BIT8 | NONE | STOP1),COM2);   /*open COM2 port*/
/*_____Initializing instrument_____*/
 bioscom(1,'\x13', COM1);     /*Start addressing (XOFF)*/
 */_____Main loop of the programm_____*/
 ciscr();   /*Clear Screen*/
 while(!DONE){          /*start transmmision loop*/
/*_____Read message introduced using the keyboard_____*/
 count=0
                         /*reading the string introduced using the keyboard*/
 gotoxy(10,3);
 printf("enter the mesage (0-7 characters)");   /*Until press Enter key*/

 do{
        dat1=getche();
        Men1[count]=dat1;
        count++;
        }while (dat1!='\x0d);
 men1[count]='\r';
/*_____Send the message and present it on the screen_____*/

 cirscr();
 bioscom(1,'\x11',COM2);     /*Send XON*/
 gotoxy(12.10);
 printf("XON");
 bioscom(1,'0' , COM2);    /* Send address*/
 printf("0");
 count=0

/*_____Message Loop Transmmision_____*/
 while (men1[count]!='\r'){
        /*Covert to capital letters to see the small letters*/
        if (men1[count]<123 & men1[count]>96) men1[count]=men1[count]-32;
*/Print on the screen and send every message character to the port until carriage return*/
        printf("%c", men1[count]);
        bioscom(1,men1[count],COM2);
        count++;

 bioscom(1,'\x13',COM2);     /*Send XOFF; End of message*/
 printf("XOFF");
 }
return 0;
}
```
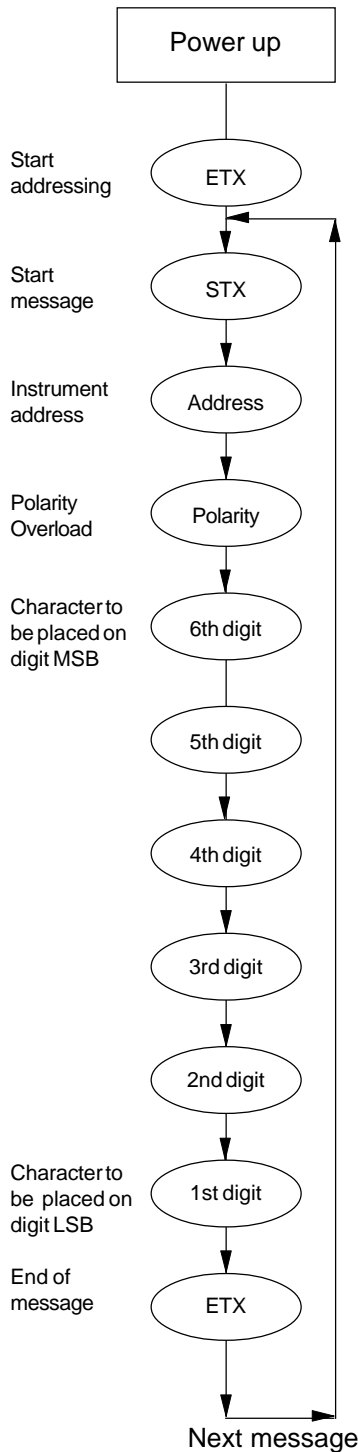
```
'  ============OMEGA Engineering Inc.=============
'  Demo programm for series LDP-XX-S connected to a PC
'  Example of comunication in Shift operating mode using XON/XOFF
'  Realizer for Microsoft Qbasic, version 1.1
'  Fema Version 01, realized on Dec 1th of 1997

OPEN "COM2:9600,N,8,1,OP0,RS,TB20,RB20" FOR RANDOM AS #1
'Open port 2 without protocols, 9600, 8, none, buffers for 20 characters'
CLS
PRINT#,CHR$(19)
DO
LOCATE 10,5
INPUT "Enter message";A$
A$ = UCASE$(A$)          'Conversion to capital letters'
CLS
LOCATE 12,5
PRINT "XON 0" + A$ + " XOFF"                    'Print string on screen'
PRINT #1, CHR$(17) + "0" +A$ + CHR$(19) 'Send string to the port'
LOOP WHILE NOT (A$="")                          'Until empty string is entered'
```

10.2.- STROBE OPERATING MODE, PROGRAMME EXAMPLE

```
/*  ============OMEGA Engineering Inc.============       */
/*  Demo program for series LDP-XX-S connected to a PC       */
/*  Example of comunication in Strobe operating mode using STX/ETX       */
/*  To be used under Turbo "C++" of Borland Version 1.01       */
/*  Fema Version 01, realized on Dec 1th of 1997       */

/*mode strobe*/

#include<bios.h>       /*
#include<conio.h>
#include<stdio.h>
#define COM1     0     /*
#define COM2     1     /*

#define TRUE    1
#define FALSE   0

#define EVEN 0x18
#define ODD 0x10
#define NONE 0x0

#define BIT7 0x2
#define BIT8 0x3

#define STOP1 0x0
#define STOP2 0x4

#define BAUD300    0x40
#define BAUD600    0x60
#define BAUD1200  0x80
#define BAUD2400  0xA0
#define BAUD4800  0xC0
#define BAUD9600  0xE0

int main(void)
{
 int count,DONE=FALSE;   /*counter  & end loop condition
 char dat1,men1[25];   /*temporary data and string*/
 ciscr();  /*Clear Screen*/
/*_____Initializing Host port_____*/
 bioscomp(0,(BAUD9600 | BIT8 | NONE | STOP1),COM2);   /*open COM2 port*/
/*_____Initializing  instrument_____*/
 bioscom(1,'\x3', COM1);      /*Start addressing (ETX, also XOFF)*/
*/_____Main loop of the programm_____*/
 while(!DONE){         /*start transmmision loop*/
/*_____Read message introduced using the keyboard_____*/
 count=0                /*reading the string introduced using the keyboard*/
 gotoxy(10,3);
 printf("enter the mesage (0-7 characters)");   /*Until press Enter key*/
 do{
         dat1=getche();
         Men1[count]=dat1;
         count++;
         }while (dat1!='\x0d);
 men1[count]='\r';
/*_____Send the message and present it on the screen_____*/
 cirscr();
 {
 bioscom(1,'\x2',COM2);      /*Send STX*/
  gotoxy(12.10);
 printf("STX");
 bioscom(1,'0' , COM2);      /* Send address*/
 printf("0");
  count=0

/*_____Message Loop Transmmision_____*/
  while (men1[count]!='\r'){
         /*Covert to capital letters to see the small letters*/
         if (men1[count]<123 & men1[count]>96) men1[count]=men1[count]-32;
*/Print on the screen and send every message character to the port until carriage return*/
         printf("%c", men1[count]);
         bioscom(1,men1[count],COM2);
         count++;
         };
  bioscom(1,'\x3',COM2);      /*Send ETX, End of message*/
   printf("ETX");
 }
 }
return 0;
}
'  ============OMEGA Engineering Inc.============
'  Demo programm for series LDP-XX-S connected to a PC
'  Example of comunication in Strobe operating mode using STX/ETX
'  Realizer for Microsoft Qbasic, VERSION 1.1
'  Fema Version 01, realized on Dec 1th of 1997

OPEN "COM2:9600,N,8,1,CD0,CS0,DS0,OP0,RS,TB20,RB20" FOR RANDOM AS #1
'Open port 2 without protocols, 9600, 8, none, buffers for 20 characters'
CLS
PRINT#1,CHR$(3)
DO
LOCATE 10,5
INPUT "Enter message"; A$
A$ = UCASE$(A$)          'Conversion to capital letters'
CLS
LOCATE 12,5
PRINT "STX 0" + A$ + " ETX"                     'Print string on screen'
PRINT #1, CHR$(2) + "0" +A$ + CHR$(3)  'Send string to the port'
LOOP WHILE NOT (A$="")                          'Until empty string is entered'
```
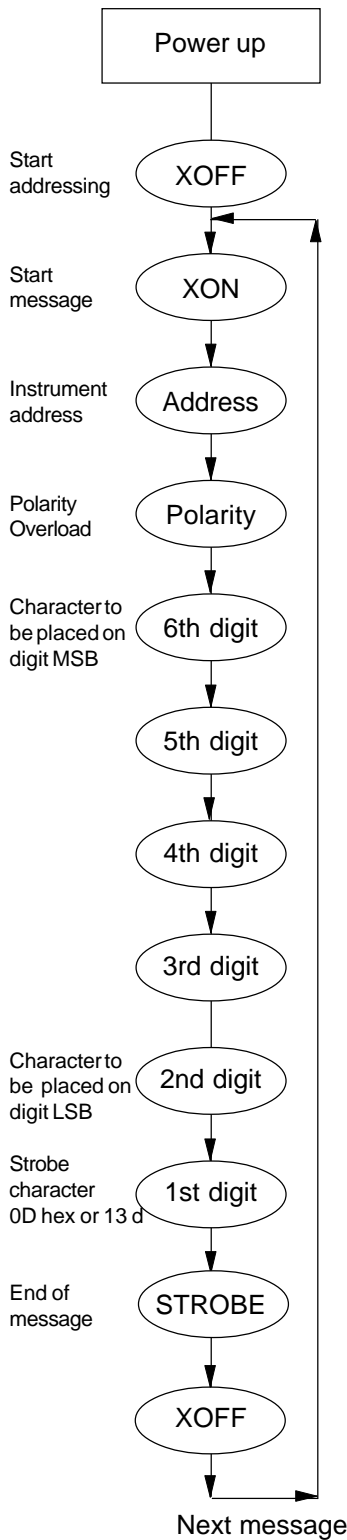

Start addressing	ETX
Start message	STX
Instrument address	Address
Polarity Overload	Polarity
Character to be placed on digit MSB	6th digit
	5th digit
	4th digit
	3rd digit
	2nd digit
Character to be placed on digit LSB	1st digit
End of message	ETX

Power up

Next message

ESC : Resets display to its power-on condition. Has priority over any other character.

Address : Configured on the switch selector S4 (+30 hex). All the units with the address, "0" (ASCII 30 hex), will display all data, including the address code sent, and this address will cause any unit to receive data.

Polarity : The middle bar is light-up.

Overload : Led located over the polarity bar is light-up.

10.3.- STROBE OPERATING MODE USING XON/XOFF, PROGRAMME EXAMPLE

Power up

Start addressing — XOFF

Start message — XON

Instrument address — Address

Polarity Overload — Polarity

Character to be placed on digit MSB — 6th digit

5th digit

4th digit

3rd digit

Character to be placed on digit LSB — 2nd digit

Strobe character 0D hex or 13 d — 1st digit

End of message — STROBE

XOFF

Next message

ESC : Resets display to its power-on condition. Has priority over any other character.
Address : Configured on the switch selector S4 (+30 hex). All the units with the address, "0" (ASCII 30 hex), will display all data, including the address code sent, and this address will cause any unit to receive data.
Polarity : The middle bar is light-up.
Overload : Led located over the polarity bar is light-up.

```c
/* =============OMEGA Engineering Inc.============= */
/* Demo programm for series LDP-XX-S connected to a PC        */
/* Comunication from an IBM compatible computer in Shift
   operating mode using XON-STROBE-XOFF     */
/* In Turbo "C++", Borland Version 1.01          */
/* Fema Version 01, realized on Dec 1th of 1997           */
/* mode strobe*/

#include<bios.h>        /*
#include<conio.h>
#include<stdio.h>
#define COM1    0    /*
#define COM2    1    /*

#define TRUE    1
#define FALSE   0

#define EVEN 0x18
#define ODD 0x10
#define NONE 0x0

#define BIT7 0x2
#define BIT8 0x3

#define STOP1 0x0
#define STOP2 0x4

#define BAUD300    0x40
#define BAUD600    0x60
#define BAUD1200 0x80
#define BAUD2400 0xA0
#define BAUD4800 0xC0
#define BAUD9600 0xE0

int main(void)
{
 int count,DONE=FALSE;    /*counter  & end loop condition
 char dat1,men1[25];   /*temporary data and string*/
 ciscr();              /*Clear Screen*/
/*_____Initializing Host port_____*/
 bioscomp(0,(BAUD9600 | BIT8 | NONE | STOP1),COM2);   /*open COM2 port*/
/*_____Initializing  instrument_____*/
 bioscom(1,'\x19', COM1);      /*Start addressing (XOFF)*/
*/_____Main loop of the programm_____*/

while(!DONE){         /*start transmmision loop*/
/*_____Read message introduced using the keyboard_____*/
 count=0              /*reading the string introduced using the keyboard*/
 gotoxy(10,3);
 printf("enter the mesage (0-7 characters)");   /*Until press Enter key*/
 do{
        dat1=getche();
        Men1[count]=dat1;
        count++;
        }while (dat1!='\x0d');
 men1[count]='\r';
/*_____Send the message and present it on the screen_____*/
cirscr();
{
 bioscom(1,'\x11',COM2);     /*Send XON*/
 gotoxy(12.10);
 printf("XON");
 bioscom(1,'0' , COM2);    /* Send address*/
 printf("0");
 count=0

/*_____Message Loop Transmmision_____*/
 while (men1[count]!='\r'){
        /*Covert to capital letters to see the small letters*/
        if (men1[count]<123 & men1[count]>96) men1[count]=men1[count]-32;
*/Print on the screen and send every message character to the port until carriage return*/
        printf("%c", men1[count]);
        bioscom(1,men1[count],COM2);
        count++;
                }
    bioscom(1,'\x0D',COM2);      /*Send 0D hex STROBE*/
    printf("STROBE");
    bioscom(1,'\x13',COM2);      /*Send XON, end of message*/
    printf(XOFF);
    }
 }
 return 0;
}
```

```
' =============OMEGA Engineering Inc.=============
' Demo program for series LDP-XX-S connected to a PC
' Example of comunication in Strobe operating mode using XON-STROBE-XOFF
' Realizer for Microsoft Qbasic, VERSION 1.1
' Fema Version 01, realized on Dec 1th of 1997

OPEN "COM2:9600,N,8,1,CD0,CS0,DS0,OP0,RS,TB20,RB20" FOR RANDOM AS #1
'Open port 2 without protocols, 9600, 8, none, buffers for 20 characters'
CLS
PRINT#1,CHR$(19)
DO
LOCATE 10,5
INPUT "Enter message";A$
A$ = UCASE$(A$)          'Conversion to capital letters'
CLS
LOCATE 12,5
PRINT "XON 0" + A$ + " (STROBE) XOFF"                    'Print string on screen'
PRINT #1, CHR$(17) + "0" +A$ + CHR$(13) + CHR$(19);  'Send string to the port'
LOOP WHILE NOT (A$="")                     'Until empty string is entered'
```

11.- INSTALLATION

1.- Prepare a panel cut-out with the dimensions indicated on paragraph 12.
2.- Slide the instrument (1) into the cut-out.
3.- Slide the two fixation pieces (3) with T shape by both lateral sides of the instrument, such as it is shown on the drawing below.
4.- Turn the screw bolt until it is pressed firmly against the panel (4) and the instrument (1) remains totally fixed.
5.- The front part of the instrument has the necessary elements to provide an IP 65 protection. If the panel where this instrument must be installed, it must to comply some protection standards against water splashes, then a rubber profile must be installed with a rectangular or round shape (5) on the place indicated and shown on the drawing below.
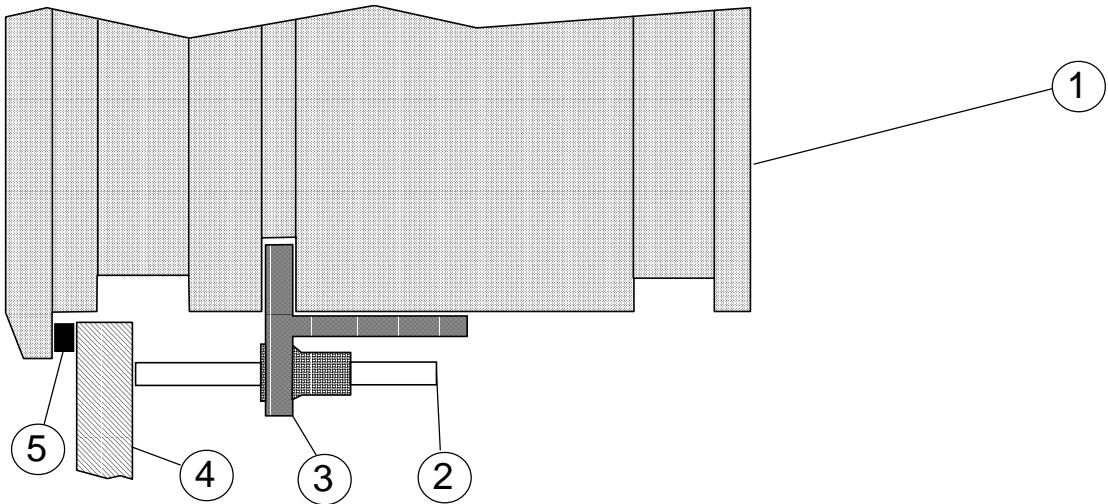
12.- MECHANICAL DIMENSIONS mm (inches)
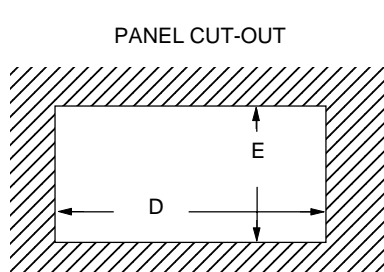
PANEL CUT-OUT

Panel thickness : Max. 14 (0.55)
Min. 2.5 (0.10)

Aluminium back plate

Anti-Glare red lens
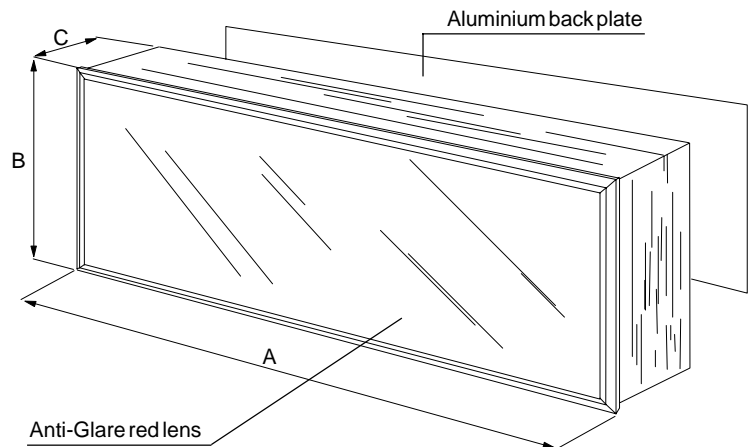
		DIMENSIONS			PANEL CUT-OUT		WEIGHT	POWER
Digits	Height	A	B	C	D	E		
4	57 (2.3)	264 (10.4)	120 (4.75)	112 (4.41)	256 (10.07)	112 (4.4)	2.3 Kg (5 lbs)	6 Va
4	100 (4)	480 (18.9)	180 (7.09)	112 (4.41)	472 (18.58)	172 (6.77)	5 Kg (11 lbs)	12 VA
6	57 (2.3)	384 (15.12)	120 (4.75)	112 (4.41)	376 (14.8)	112 (4.4)	2.7 Kg (6 lbs)	6 VA
6	100 (4)	688 (27.1)	180 (7.09)	112 (4.41)	680 (26.77)	172 (6.77)	5.7 Kg (12.5 lbs)	12 VA

Dimensions in mm. Parenthesis are in inches or pounds.
Add 27 mm (1.1) to the dimension C for power connector.

WARRANTY/DISCLAIMER

OMEGA ENGINEERING, INC. warrants this unit to be free of defects in materials and workmanship for a period of **13 months** from date of purchase. OMEGA warranty adds an additional one (1) month grace period to the normal **one (1) year product warranty** to cover handling and shipping time. This ensures that OMEGA's customers receive maximum coverage on each product.

If the unit malfunction, it must be returned to the factory for evaluation. OMEGA's Customer Service Department will issue an Authorized Return (AR) number immediately upon phone or written request. Upon examination by OMEGA, if the unit is found to be defective it will be repaired or replaced at no charge. OMEGA's WARRANTY does not apply to defects resulting from any action of the purchaser, including but not limited to mishandling, improper interfacing, operation outside of design limits, improper repair, or unauthorized modification. This WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of having been damaged as a result of excessive corrosion; or current, heat, moisture or vibration; improper specification; misapplication; misuse or other operating conditions outside of OMEGA's control. Components which wear are not warranted, including but not limited to contact points, fuses and triacs.

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FOR **WARRANTY** RETURNS, please have the following information available BEFORE contacting OMEGA: 1. Purchase Order number under which the product was PURCHASED, 2. Model and serial number of the product under warranty, and 3. Repair instructions and/or specific problems relative to the product.	FOR **NON-WARRANTY** REPAIRS, consult OMEGA for current repair charges. Have the following information available BEFORE contacting OMEGA: 1. Purchase Order number to cover the COST of the repair, 2. Model and serial number of the product, and 3. Repair instructions and/or specific problems relative to the product.

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