

MODEL LD - LARGE SERIAL SLAVE DISPLAY



- 2.25" or 4" HIGH RED LED DIGITS
- DISPLAYS UP TO 6 DIGITS OF SERIAL ASCII DATA
- DUAL DISPLAY BUFFER ALLOWS ALTERNATING DISPLAYS
- RS232 OR RS485 SERIAL INTERFACE
- CONNECTS DIRECTLY TO RED LION PRODUCTS WITH SERIAL
- PROGRAMMABLE USER INPUT
- UNIVERSALLY POWERED
- ALUMINUM NEMA 4X/IP65 CASE CONSTRUCTION



GENERAL DESCRIPTION

The Large Serial Slave Display is a versatile display that accepts serial ASCII data from a host device and displays the received characters. The displayable data includes numeric, 7-segment alphabetic and certain punctuation characters.

The 6-digit displays are available in either 2.25" or 4" high red LED digits with adjustable display intensity. The 2.25" high models are readable up to 130 feet. The 4" high models are readable up to 180 feet. Both versions are constructed of a NEMA 4X/IP65 enclosure in light weight aluminum.

The Serial Slave has two internal display buffers, allowing two separate display values or messages to be viewed. The main (primary) display typically shows dynamic data (count, rate, process, etc.), usually received directly from another meter. The secondary display typically shows a fixed message or value, such as a system or machine identifier, or a target production value. The main and secondary displays can be toggled either manually or automatically at a user selected toggle speed. Both displays are retained in memory when power is removed from the unit.

For single meter remote display applications, the Serial Slave can be connected directly to a Red Lion (or compatible) meter with RS232 or RS485 serial communications. The slave can display the meter value on its main display without requiring a PC or other serial interface.

Multiple slaves are connected using an RS485 serial bus. If unique meter addresses are assigned, specific data can be displayed by a single slave on the bus. When multiple slaves are assigned the same address, common data can be displayed by multiple units in different locations.

Serial communications parameters are fully programmable, with baud rates up to 38.4 Kbps. Special command characters allow display selection and display intensity adjustment through the serial input. In addition to the serial input, a programmable User Input is provided to perform a variety of meter functions.

SAFETY SUMMARY

All safety regulations, local codes and instructions that appear in this and corresponding literature, on or with equipment, must be observed to ensure personal safety and to prevent damage to either the instrument or equipment connected to it. If equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

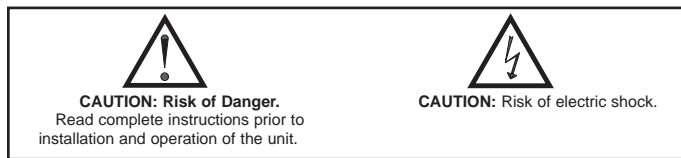
Do not use this unit to directly command motors, valves, or other actuators not equipped with safeguards. To do so can be potentially harmful to persons or equipment in the event of a fault to the unit.



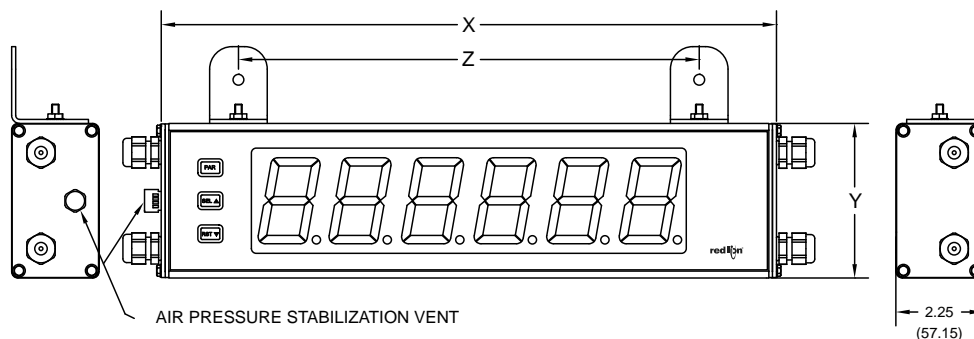
The protective conductor terminal is bonded to conductive parts of the equipment for safety purposes and must be connected to an external protective earthing system.

SPECIFICATIONS

- DISPLAY:** 6-digit 2.25" (57 mm) or 4" (101 mm) adjustable intensity Red LED
- POWER REQUIREMENTS:**
AC POWER: 50 to 250 VAC 50/60 Hz, 26 VA
DC POWER: 21.6 to 250 VDC, 11 W
Isolation: 2300 V_{RMS} for 1 min. to all inputs and outputs
- SERIAL INPUT:**
RS485 SERIAL COMMUNICATIONS
Type: Multi-point balanced interface (isolated)
Baud Rate: 300 to 38400
Data Format: 7/8 bits; odd, even, or no parity
Bus Address: 0 to 99; max 32 meters per line
RS232 SERIAL COMMUNICATIONS
Type: Half duplex (isolated)
Baud Rate: 300 to 38400
Data Format: 7/8 bits; odd, even, or no parity
- USER INPUT** (Programmable Function Input):
Active low logic, internal 7.8 KΩ pull-up resistor to +12V.
Trigger levels: V_{IL} = 1.0 V max; V_{IH} = 2.4 V min; V_{MAX} = 28 VDC
Response time: 10 msec typ; 50 msec debounce (activation & release)



DIMENSIONS In inches (mm)



PART NUMBER	X (Length)	Y (Height)	Z (Center)
LD2SS6P0	16 (406.4)	4 (101.6)	12 (304.8)
LD4SS6P0	26 (660.4)	7.875 (200)	22 (558.8)

5. **MEMORY:** Nonvolatile E²PROM retains all programming parameters, main and secondary displays when power is removed.

6. **CERTIFICATIONS AND COMPLIANCES:**

SAFETY

UL Listed, File # E137808, UL508, CSA C22.2 No. 14-M95

LISTED by Und. Lab. Inc. to U.S. and Canadian safety standards

Type 4X Enclosure rating (Face only), UL50

IEC 61010-1, EN 61010-1: Safety requirements for electrical equipment for measurement, control, and laboratory use, Part 1.

IP65 Enclosure rating (Face only), IEC 529

ELECTROMAGNETIC COMPATIBILITY

Emissions and Immunity to EN 61326: Electrical Equipment for Measurement, Control and Laboratory use.

Immunity to Industrial Locations:

Electrostatic discharge	EN 61000-4-2	Criterion A 4 kV contact discharge 8 kV air discharge
Electromagnetic RF fields	EN 61000-4-3	Criterion A 10 V/m
Fast transients (burst)	EN 61000-4-4	Criterion A 2 kV power 1 kV signal
Surge	EN 61000-4-5	Criterion A 1 kV L-L, 2 kV L&N-E power
RF conducted interference	EN 61000-4-6	Criterion A 3 V/rms
Voltage dip/interruptions		Criterion A 0.5 cycle

Emissions:

Emissions	EN 55011	Class B
-----------	----------	---------

Notes:

1. Criterion A: Normal operation within specified limits.

7. **CONNECTIONS:**

Internal removable terminal blocks used for power and signal wiring.

Remove end plates with 1/4" nut driver.

For LD2 versions power is on the right side and serial wiring is on the left side. For LD4 versions, all wiring is on the right side of the unit.

Wire Strip Length: 0.4" (10 mm)

Wire Gauge: 24-12 AWG copper wire

Torque: 5.3 inch-lbs (0.6 N-m) max

Cable Diameter: Outside diameter must be 0.181" (4.6 mm) to 0.312" (7.9 mm) to maintain NEMA 4 rating of cord grips.

8. **ENVIRONMENTAL CONDITIONS:**

Operating temperature: 0 to 50 °C

Storage temperature: -40 to 70 °C

Operating and storage humidity: 0 to 85% max. RH (non-condensing)

Vibration According to IEC 68-2-6: Operational 5 to 150 Hz, in X, Y, Z direction for 1.5 hours, 2 g's (1g relay).

Shock According to IEC 68-2-27: Operational 30 g's (10g relay), 11 msec in 3 directions.

Altitude: Up to 2,000 meters

9. **CONSTRUCTION:** Aluminum enclosure, and steel side panels with textured black polyurethane paint for scratch and corrosion resistance protection. Sealed front panel meets NEMA 4X/IP65 specifications. Installation Category II, Pollution Degree 2.

10. **WEIGHT:**

LD2SS6P0: 4.5 lbs (2.04 kg)

LD4SS6P0: 10.5 lbs (4.76 kg)

ORDERING INFORMATION

MODEL NO.	DESCRIPTION	PART NUMBER
LD	2.25" High 6-Digit Red LED Serial Slave Display, RS232/RS485 Serial Communications	LD2SS6P0
LD	4" High 6-Digit Red LED Serial Slave Display, RS232/RS485 Serial Communications	LD4SS6P0
LD Plug	Panel Hole Plug for LD models	LDPLUG00

1.0 INSTALLING THE METER

INSTALLATION

The meter meets NEMA 4X/IP65 requirements when properly installed.

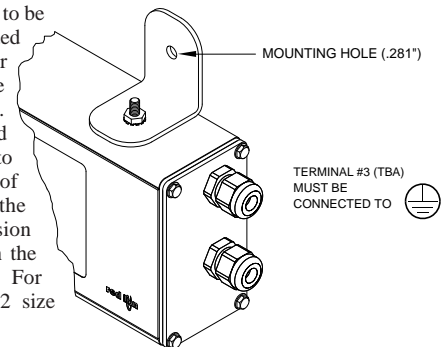
INSTALLATION ENVIRONMENT

The unit should be installed in a location that does not exceed the operating temperature. Placing the unit near devices that generate excessive heat should be avoided. The unit should only be cleaned with a soft cloth and neutral soap product. Do NOT use solvents.

Continuous exposure to direct sunlight may accelerate the aging process of the front overlay. Do not use tools of any kind (screwdrivers, pens, pencils, etc.) to operate the keypad of the unit.

MOUNTING INSTRUCTIONS

This display is designed to be wall mounted or suspended from a ceiling truss or other suitable structure capable of supporting the LDSS. Caution should be exercised when hanging the display to provide for the safety of personnel. If hanging the LDSS, run the suspension cables (or chains) through the mounting bracket holes. For wall mounting use #10-32 size bolts.



2.0 WIRING THE METER

EMC INSTALLATION GUIDELINES

Although this meter is designed with a high degree of immunity to Electro-Magnetic Interference (EMI), proper installation and wiring methods must be followed to ensure compatibility in each application. The type of the electrical noise, source or coupling method into the meter may be different for various installations. The meter becomes more immune to EMI with fewer I/O connections. Cable length, routing, and shield termination are very important and can mean the difference between a successful or troublesome installation. Listed below are some EMC guidelines for successful installation in an industrial environment.

1. The meter should be properly connected to protective earth.
2. Use shielded (screened) cables for all Signal and Control inputs. The shield (screen) pigtail connection should be made as short as possible. The connection point for the shield depends somewhat upon the application. Listed below are the recommended methods of connecting the shield, in order of their effectiveness.
 - a. Connect the shield only at the panel where the unit is mounted to earth ground (protective earth).
 - b. Connect the shield to earth ground at both ends of the cable, usually when the noise source frequency is above 1 MHz.

- c. Connect the shield to common of the meter and leave the other end of the shield unconnected and insulated from earth ground.
- 3. Never run Signal or Control cables in the same conduit or raceway with AC power lines, conductors feeding motors, solenoids, SCR controls, and heaters, etc. The cables should be ran in metal conduit that is properly grounded. This is especially useful in applications where cable runs are long and portable two-way radios are used in close proximity or if the installation is near a commercial radio transmitter.
- 4. Signal or Control cables within an enclosure should be routed as far as possible from contactors, control relays, transformers, and other noisy components.
- 5. In extremely high EMI environments, the use of external EMI suppression devices, such as ferrite suppression cores, is effective. Install them on Signal and Control cables as close to the unit as possible. Loop the cable through the core several times or use multiple cores on each cable for additional protection. Install line filters on the power input cable to the unit to suppress power line interference. Install them near the power entry point of the enclosure. The

following EMI suppression devices (or equivalent) are recommended:

Ferrite Suppression Cores for signal and control cables:

Fair-Rite # 0443167251 (RLC# FCOR0000)

TDK # ZCAT3035-1330A

Steward # 28B2029-0A0

Line Filters for input power cables:

Schaffner # FN610-1/07 (RLC# LFIL0000)

Schaffner # FN670-1.8/07

Corcom # 1 VR3

Note: Reference manufacturer's instructions when installing a line filter.

- 6. Long cable runs are more susceptible to EMI pickup than short cable runs. Therefore, keep cable runs as short as possible.

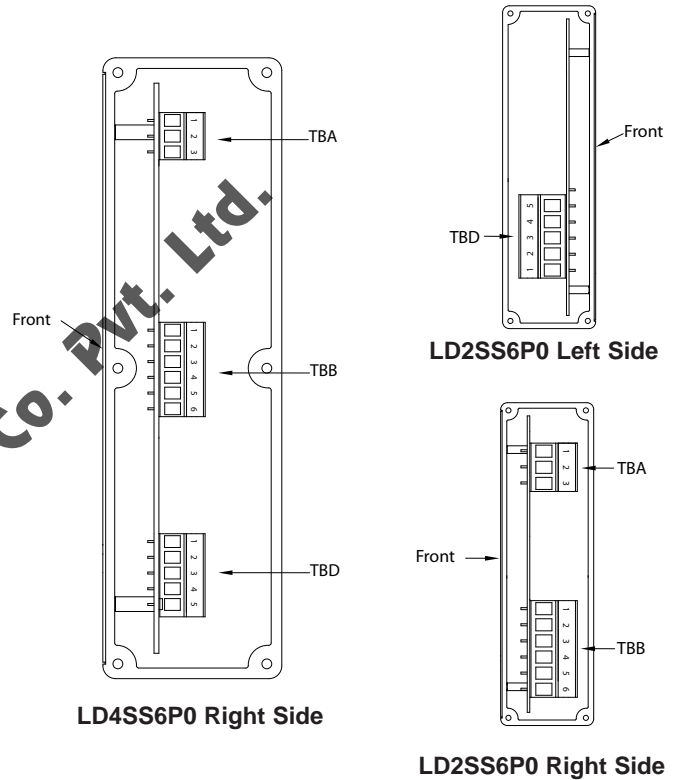
- 7. Switching of inductive loads produces high EMI. Use of snubbers across inductive loads suppresses EMI.

Snubber: RLC# SNUB0000.

WIRING OVERVIEW

Electrical connections are made via pluggable terminal blocks located inside the meter. All conductors should conform to the meter's voltage and current ratings. All cabling should conform to appropriate standards of good installation, local codes and regulations. It is recommended that the power supplied to the meter (DC or AC) be protected by a fuse or circuit breaker. When wiring the meter, compare the numbers on the label on the back of the meter case against those shown in wiring drawings for proper wire position. Strip the wire, leaving approximately 0.4" (10 mm) bare lead exposed (stranded wires should be tinned with solder.) Insert the lead under the correct screw clamp terminal and tighten until the wire is secure. (Pull wire to verify tightness.) Each terminal can accept up to one #14 AWG (2.55 mm) wire, two #18 AWG (1.02 mm), or four #20 AWG (0.61 mm).

Control Electric Co. Pvt. Ltd.

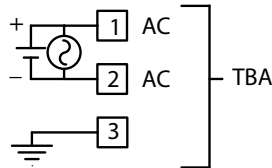


2.1 POWER WIRING

The power wiring is made via the 3 position terminal block (TBA) located inside unit (right side).

AC Power

- Terminal 1: VAC/DC +
- Terminal 2: VAC/DC -
- Terminal 3: Earth Ground

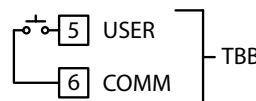


2.2 USER INPUT WIRING

The User Input is wired to Terminals 5 and 6 of TBB as shown.

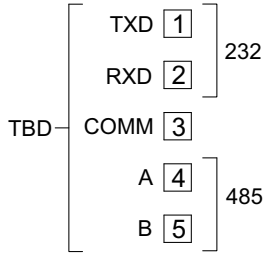
- Terminal 5: User Input
- Terminal 6: User Common

Sinking Logic



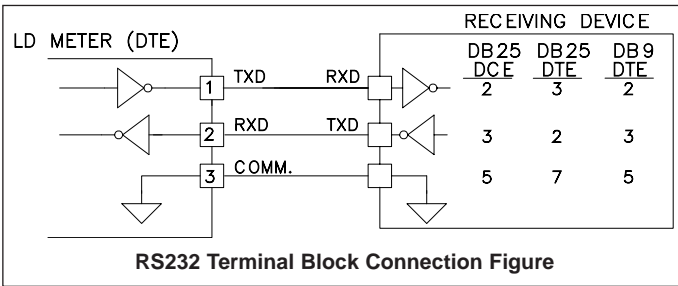
2.3 SERIAL WIRING

The serial connections are made via terminal block TBD located inside the unit on the left side for the LD2 and on the right side for the LD4.



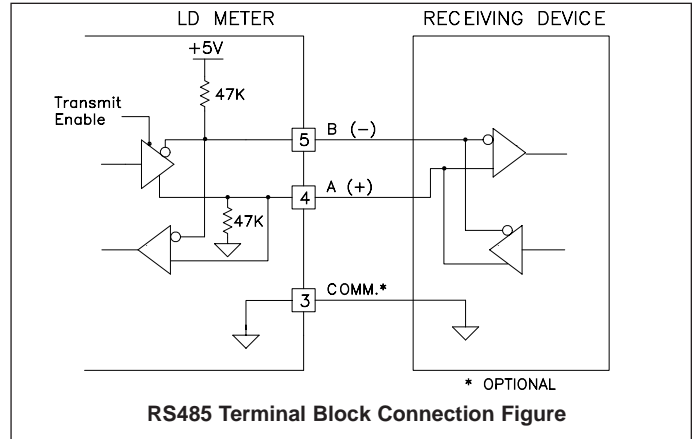
RS232 Communications

RS232 is intended to allow two devices to communicate over distances up to 50 feet. Data Terminal Equipment (DTE) transmits data on the Transmitted Data (TXD) line and receives data on the Received Data (RXD) line. Data Computer Equipment (DCE) receives data on the TXD line and transmits data on the RXD line. The LD emulates a DTE, the TXD and RXD lines must be interchanged for communications to take place. This is known as a null modem connection.



RS485 Communications

The RS485 communication standard allows the connection of up to 32 devices on a single pair of wires, distances up to 4,000 ft. and data rates as high as 10M baud (the LDSS is limited to 38.4k baud). The same pair of wires is used to both transmit and receive data. RS485 is therefore always half-duplex, that is, data cannot be received and transmitted simultaneously.



3.0 REVIEWING THE FRONT PANEL KEYS AND DISPLAY



KEY DISPLAY MODE OPERATION

- PAR** Access Programming Mode
- SEL ▲** Select display (main or secondary)
- RST ▼** Reset display(s) per front panel reset setting

PROGRAMMING MODE OPERATION

- Store selected parameter and index to next parameter
- Advance through selection list/select digit position in parameter value
- Increment selected digit of parameter value

DISPLAY DESIGNATOR

“ 2 ” - To the far right of the display indicates the secondary display is shown.

If display scroll is enabled, the display will toggle automatically between the main and secondary display at the selected scroll interval.