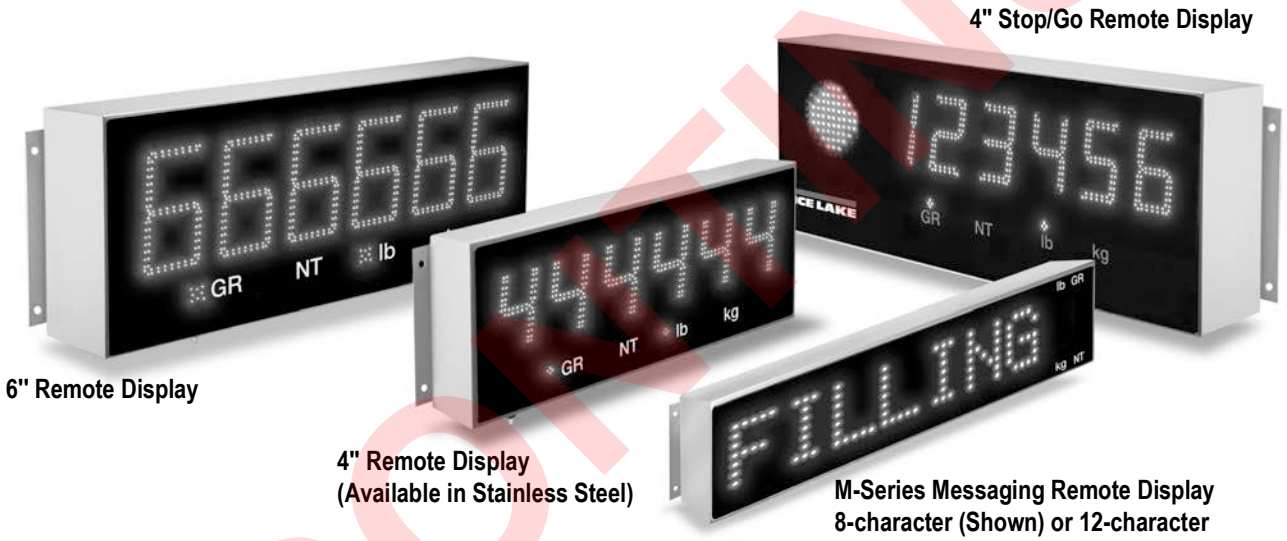
LaserLight® Series

Remote Displays
Version 2.05

Installation Manual



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WEIGHING SYSTEMS

October 2, 2019

PN 75936 Rev C

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1.0 Introduction

This manual is intended for use by service technicians responsible for installing and servicing the LaserLight® LED remote display. Installation procedures are written in the order to be followed by the installer: pre-installation setup, configuration and on-site installation.

Manuals and additional resources are available from the Rice Lake Weighing Systems website at www.ricelake.com
Warranty information can be found on the website at www.ricelake.com/warranties

1.1 Safety Signal Definitions:

DANGER — *Indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury. Includes hazards that are exposed when guards are removed.*

WARNING — *Indicates a potentially hazardous situation that, if not avoided, could result in serious injury or death. Includes hazards that are exposed when guards are removed.*

CAUTION — *Indicates a potentially hazardous situation that, if not avoided, could result in minor or moderate injury.*

IMPORTANT — *Indicates information about procedures that, if not observed, could result in damage to equipment or corruption to and loss of data.*

General Safety

Do not operate or work on this equipment unless this manual has been read and all instructions are understood. Failure to follow the instructions or heed the warnings could result in injury or death. Contact any Rice Lake Weighing Systems dealer for replacement manuals.

WARNING

Failure to heed could result in serious injury or death.

Some procedures described in this manual require work inside the indicator enclosure. These procedures are to be performed by qualified service personnel only.

Do not allow minors (children) or inexperienced persons to operate this unit.

Do not operate without all shields and guards in place.

Do not place fingers into slots or possible pinch points.

Do not use any load-bearing component that is worn beyond 5% of the original dimension.

Do not use this product if any of the components are cracked.

Do not exceed the rated load limit of the unit.

Do not make alterations or modifications to the unit.

Do not remove or obscure warning labels.

Before opening the unit, ensure the power cord is disconnected from the outlet.

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1.2 Overview

The LaserLight remote display features a super-bright LED display and non-glare filtered lens for use in a wide variety of applications. The LaserLight Series are available with a 7-segment, 6-digit display or an eight or 12-character matrix display. The LaserLight remote display is designed to work with most digital weight indicators, host computers, and peripherals using a 20 mA current loop, RS-232 or RS-485 communications.

The unique IntelliBright™ feature uses a photo sensor to read ambient light and automatically adjusts the LaserLight display between day and night settings.

The display has seven internal buttons and three external buttons to set various parameters. The external buttons include two for setting the time and date, and one for the learn sequence. The configuration menu is entered via the setup button and is displayed on the display board panel for easy configuration of the unit.

This manual provides installation and configuration instructions for the display.

1.2.1 Standard Features

The LaserLight 7-segment remote display is available in 4" or 6" digit sizes and the matrix display is available in 2.5" character size with 8 or 12 positions. The LaserLight 4-SG remote display comes in a 4" digit size in a 6" enclosure size. Both styles use an Auto-Learn function which automatically determines the serial settings and data format used by the attached indicator.

Additional standard features include:

- Hold displayed weight (demand input)
- Adjustable daylight/night intensity
- Mirror function (weight only)
- Auto-sensing 115/230 VAC power supply
- Mode and unit legends
- Echo
- Traffic light option (4" digit size only)
- Time and date (4", 4"-SG, 6" only)

Optional Features

Optional features of the LaserLight remote display include:

- Temperature
- Field-installable metal visor for all models
- UL Approved Unit
- Time and date (M-Series, 8 and 12 character)

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UL 48 Approved Safety

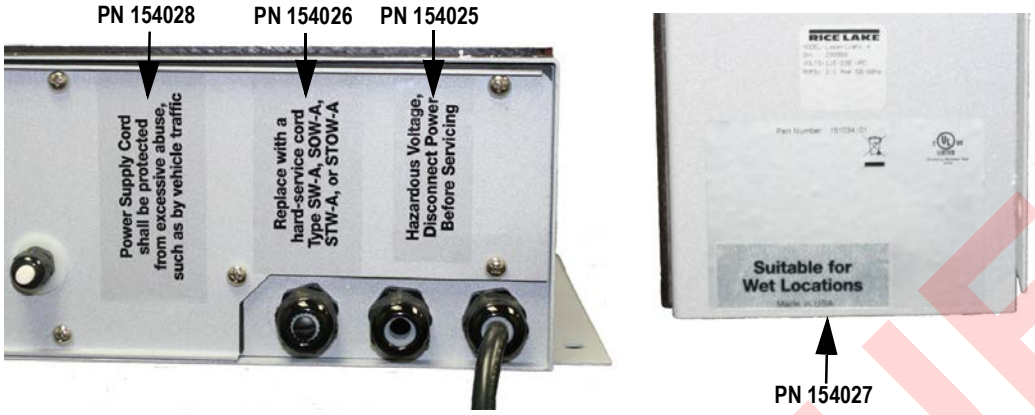

Figure 1-1. Safety Labels – UL Approved Models

UL 48 Approval For

- Wet location
- Cord connected
- Stationary sign

IMPORTANT

Test operation of ground fault circuit interrupter each time the LaserLight is plugged in.

All labels must be in legible condition. If illegible, replace using the part numbers found within Figure 1-1.

1.3 Annunciators

The 7-segment LaserLight remote display uses a set of four high-intensity LED annunciators (Figure 1-2). The matrix display uses two positions of the display to display arrows which provide additional information about the value being displayed (Figure 1-3):

Gross and ***Net*** annunciators are lit to indicate whether the displayed weight is a gross or net weight.

- ***lb***, ***kg*** annunciators indicate the units associated with the displayed value and represent primary and secondary units
- Red, green circle and green arrow annunciators indicate the traffic light state on the display; Feature applies to only the LaserLight 4-SG

Figure 1-2. 7-Segment Front Panel Display

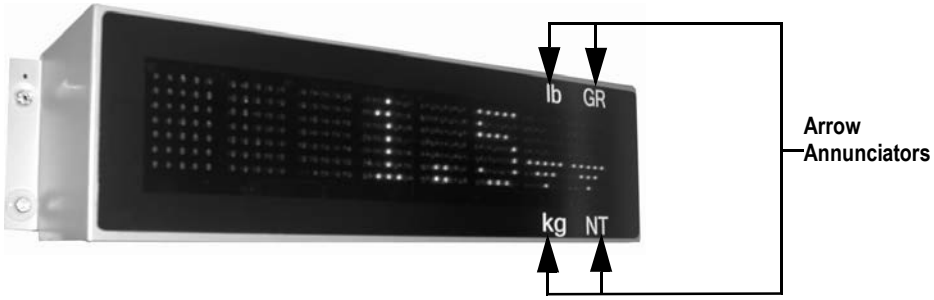

Figure 1-3. Matrix Display Front Panel

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2.0 Installation/Setup

The LaserLight remote display can be set up and configured once it is mounted. This section describes basic installation, AC wiring, RS-232, RS-485 and 20 mA current loop connections. Once installation setup is complete, see Section 3.0 on page 11 for information on configuring the remote display.

WARNING ***The LaserLight has no on/off switch. Before opening the unit, ensure the power cord is disconnected from the power outlet.***

CAUTION ***Use a wrist strap to ground yourself and protect components from electrostatic discharge (ESD) when working inside the enclosure.***

This unit uses double pole/neutral fusing which could create an electric shock hazard. Procedures requiring work inside the remote display must be performed by qualified service personnel only.

2.1 Unpacking and Assembly

Immediately after unpacking, visually inspect the LaserLight remote display for damage. If parts were damaged in shipment, notify Rice Lake Weighing Systems and the shipper immediately. The main components of the LaserLight remote display include:

- Powder coated steel or stainless steel enclosure
- Primary and secondary display boards
- Power supply
- Mounting panel for the CPU board (located on back of mounting plate)

IMPORTANT ***Remove the protective plastic on the lens of the LaserLight as it obscures the display over time and becomes very difficult to remove later on.***

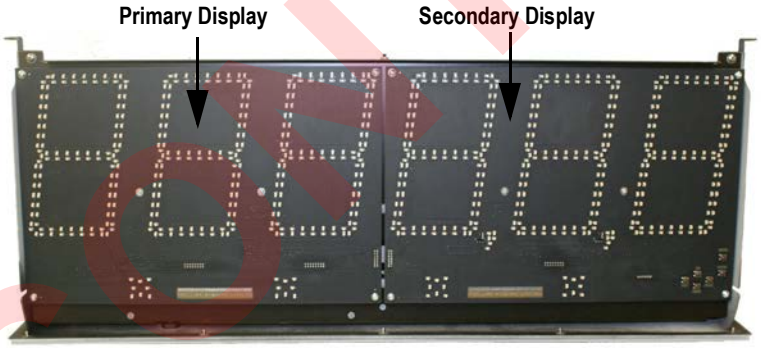

Figure 2-1. Mounting Plate Indicating Primary / Secondary Display Boards (7-Segment Display)

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2.2 Enclosure Disassembly

For ease of installation, remove the mounting plate (which includes the primary and secondary display boards) before installing the LaserLight remote display. This protects the LEDs from unnecessary jarring and makes the enclosure lighter for installation. Use the following steps to remove the mounting plate from the enclosure.

IMPORTANT ***Use caution when lowering/raising the mounting plate to ensure LEDs do not contact the enclosure sides.***

1. Remove the captive screws located on the bottom of the enclosure. The mounting plate is located on the inside of the enclosure, on a frame which can be held in place by tabs and two pins (Figure 2-2).
2. Glide the mounting plate frame downward, allowing it to hang freely beneath the enclosure.
3. Disconnect the chassis ground wire from the top of the mounting plate mounting frame.
4. Disconnect the AC cord assembly from the power supply.
5. Using a slight diagonal twisting motion, slide the mounting plate out from the inside of the enclosure and set it aside.

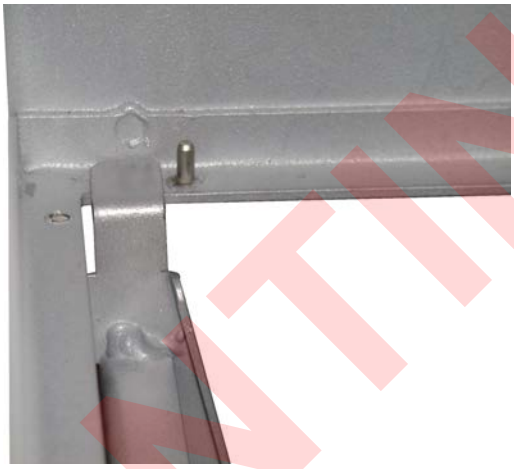

Figure 2-2. Tab Pin Assembly on Inside of Remote Display Enclosure

2.3 Wall Mounting

The LaserLight remote display can be mounted to vertical surfaces or a pole.

Select a site and use installation screws or wall anchors to secure the remote display to a wall using the mounting holes on the flange tabs. The flange hole size accommodates 1/4" hardware.

Figure 2-3. Mounting Flange 4" LED Remote Display

An optional pole mounting kit, which fits 4" - 8" poles, must be used when installing a remote display on a pole (Section 4.4 on page 25).

Once the enclosure is secured, slide the mounting plate down to allow it to hang freely from the enclosure with the tabs secured against the pins. This enables the user to continue wiring the remote display.

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2.4 Wiring

The LaserLight remote display provides three cord grips located on the underside of the enclosure for cabling, one for the power cord (supplied) and two for serial communications. The LaserLight remote display is pre-wired. Only the serial communications cable must be connected. An A/C power cord is also supplied.

Use the following steps to wire the remote display:

WARNING ***The LaserLight remote display has no on/off switch. Before opening the unit, ensure the power cord is disconnected from the power outlet.***

1. Open the display and lower the mounting plate (Section 2.2 on page 5).

IMPORTANT ***Use caution when lowering or raising the mounting plate to ensure the LEDs do not contact the enclosure sides.***

2. Loosen the retaining screws located on the front of mounting plate (Figure 2-4). The mounting plate is hinged on a backplate frame to allow easier access to the AC wiring and the CPU board.

Figure 2-4. Retaining Screw Location

2.4.1 AC Wiring

The LaserLight power supply can run on either 115 or 230 VAC.

The AC wiring is run through the cord grip to a 3-position AC terminal block bracket on the inside of the enclosure. This bracket can be removed by loosening the two standoffs and lifting it off. It can be lowered and pulled outside of the enclosure to ease wiring connections.

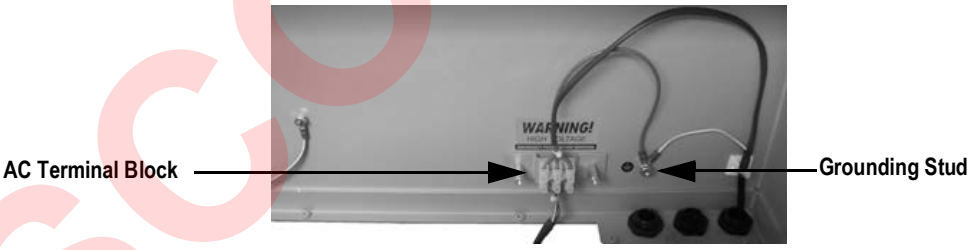

Figure 2-5. Inside Enclosure Backplate Diagram

Refer to the following table for AC wiring connections.

3-Pin Terminal Block on Enclosure Back			To Power Supply	To Power Supply
Pin	Wire	Color	Pin	UL Approved Unit
1	Neutral	Blue or White	1	N
2	Hot	Brown or Black	2	L
3	Ground	Green or Green/Yellow	Ground Tab	⏚

Table 2-1. AC Wiring Connections

IMPORTANT ***Ensure a ground wire is attached to the grounding stud located on the enclosure backplate.***

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2.4.2 Serial Wiring

Serial communications are connected to the CPU board using removable screw terminal plugs on J6, J8 and J9 (Figure 2-9 on page 9).

To connect the communications cable to the remote display:

WARNING ***The LaserLight remote display has no on/off switch. Before opening the unit, ensure the power cord is disconnected from the power outlet.***

1. Open the display and lower the mounting plate (Section 2.2 on page 5).
2. Remove the captive retaining screws and flip forward the hinged mounting plate.

Figure 2-6. LED Primary and Secondary Display Boards (7-Segment Display)

3. Loosen the serial cable cord grip and push enough communications cable into the enclosure to allow attachment to the CPU board.
4. Strip serial cable jacket back to cord grip (metal construction) location to expose the braided shield. Trim the braid, shield wire or foil back to within 1" (1.5 cm) of stripped cable jacket (Figure 2-7).
5. Feed the cable through the dome nut and clamping insert. Fold the braided shield over the clamping insert, making sure the braided shield overlaps the O-ring by 3/32" (0.2 cm).
6. Push the clamping insert into the body and tighten the dome nut.
7. Make cable connections for RS-232, RS-485, or 20 mA current loop communications.
8. Tighten the serial cable cord grip.

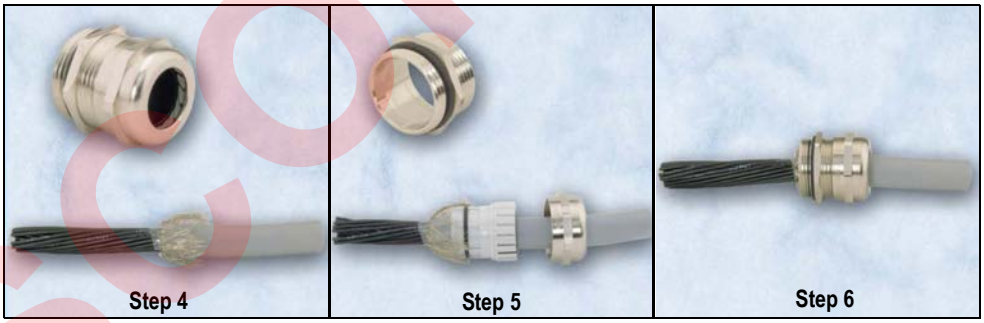

Figure 2-7. Serial Cord Grip Assembly

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RF Interference

If experiencing RF Interference, follow the instructions below.

1. Loop the serial wires through the cylindrical ferrite (PN 66730) provided with this manual.
2. Using the plastic cable ties provided, secure the wires to the ferrite and the serial cable to the learn switch wires to keep ferrite from contacting the CPU board.

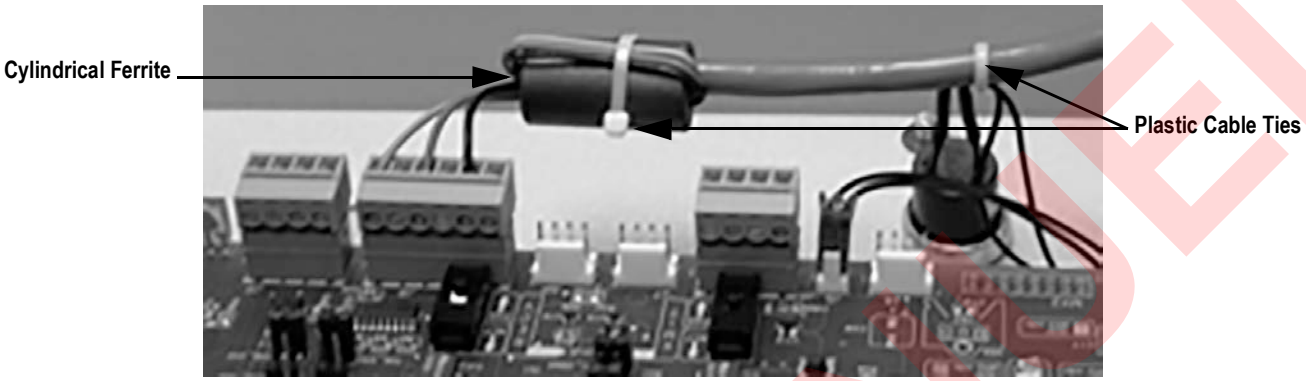

Figure 2-8. Cylindrical Ferrite Placement

Connector	Pin Assignment	Function	Port Position
J1	1	Ground	–
	2	Digin 0	–
	3	Digin 1	–
	4	+5 V	–
	5	DigOut 0	–
	6	DigOut 1	–
	7	Ground	–
J6	1	20 mA Rx+	Port 0
	2	20 mA Rx–	Port 0
	3	20 mA Tx+	Port 1
	4	20 mA Tx–	Port 1
J8	1	RS-232 TxD 0	Port 0
	2	RS-232 TxD 1	Port 1
	3	RS-232 RxD 0	Port 0
	4	RS-232 RxD 1	Port 1
	5	RS-232 SIG GND	–
	6	RS-232 SIG GND	–
J9	1	RS-485 Rx+	Port 0
	2	RS-485 Rx–	Port 0
	3	RS-485 Tx+	Port 0
	4	RS-485 Tx–	Port 0

Table 2-2. Serial Communications Wiring

Note

Terminals J6, J8, and J9 are removable screw terminal plugs.

Port 0 is used for input only and port 1 is used to drive the next LaserLight Remote Display.

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LaserLight Remote Display CPU Board

Port 0 which is connected to the indicator supports three configurations: 20 mA, RS-232, and RS-485 communications.

Port 1 which is the Echo port, supports 20 mA and RS-232 communications.

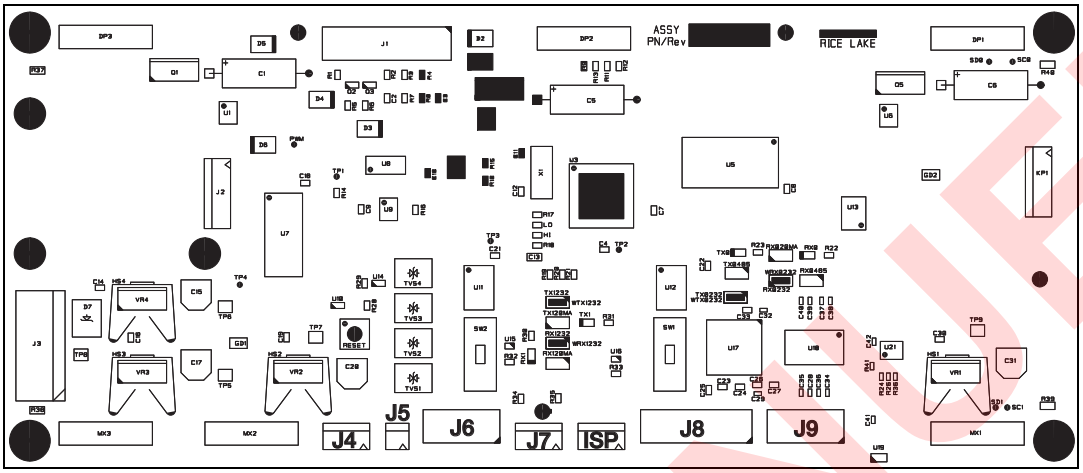

Figure 2-9. LaserLight Remote Display CPU Board

2.4.3 20 mA Current Loop

20 mA current loop communication is provided on connector J6 of the CPU board (Figure 2-9 and Table 2-2 on page 8).

Ensure receive jumpers are across RX0, 20 mA and select active or passive switch settings. Remove unused jumpers (Figure 2-10).

2.4.4 RS-232

The RS-232 connection is provided on connector J8 of the CPU board (Figure 2-9 and Table 2-2 on page 8).

Ensure transmit and receive jumpers are across TX0 232 and RX0 232 (Figure 2-10).

2.4.5 RS-485

The RS-485 connection is provided on connector J9 of the CPU board (Figure 2-9 and Table 2-2 on page 8).

Ensure transmit and receive jumpers are across TX0 485 and RX0 485 (Figure 2-10).

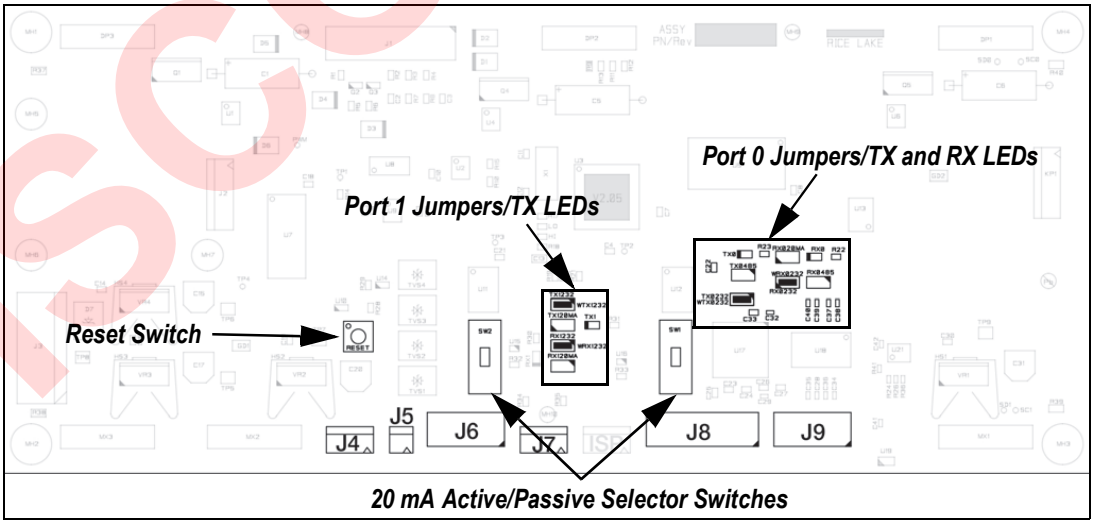

Figure 2-10. Jumper Pin Locations (Board Revision G and Later)

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2.4.6 Reset Switch

The reset switch enables a simulated power up reset. It goes back to normal operation mode. The reset switch eliminates having to unplug the unit to do a reset, see Figure 2-10 on page 9 for the reset switch location on the CPU board.

2.4.7 Communicating with Indicators and LEDs

Small LEDs located on the CPU board flash when serial data is received or sent. The transmit indicators flash when data is being sent out of the port. The receive indicator flashes when the data is received. A steady indicator on receive LEDs reflect a connection with no streaming data, see Figure 2-10 on page 9 for communication indicator locations on the CPU board.

2.4.8 Decimal Point (7-Segment Display)

The primary display board has decimal LED's. These can be changed to commas by moving a jumper located on the front of the display board (Figure 3-2 on page 12).

Ensure the decimal point/comma jumper is in the proper position on the display board.

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3.0 Configuration

Once the LaserLight remote display is installed, it may need to be configured if the indicator requires special settings.

Configuration can be done manually and is explained in Section 3.2.

Using Auto-Learn simplifies installation by automatically detecting the communications format and data rate used by the indicator and eliminates the need for configuration, see Section 3.1 for an overview of Auto-Learn.

3.1 Auto-Learn

The LaserLight remote display incorporates a software feature called Auto-Learn. Auto-Learn examines the serial data stream sent from the attached indicator and attempts to determine the data settings and format used by the indicator.

Auto-Learn occurs automatically when Port 0 is not locked via software configuration (not locked by default) and the connecting indicator is configured to send continuous (streaming) data (Table 3-5 on page 17). It also occurs automatically if the currently streamed format changes. LaserLight Auto-Learns by itself in most cases. This process can be forced by pressing the external Auto-Learn button.

Use the following quick steps for Auto-Learn.

1. Open the enclosure per disassembly instructions in Section 2.2 on page 5 and connect the serial interface.
2. Visually inspect to ensure the Auto-Learn button is connected to J5 on the CPU board, see Figure 3-1 for plug-in location.
3. Power up the remote display.
4. Momentarily press the Learn button.
5. Use the right and left buttons to shift the displayed data string if the displayed weight is not positioned with LSD.

Note

If using an indicator with a Toledo T8142 format, follow Step 1–Step 5 then go to SP IND in the serial menu. Select 1 under special indicators.

It is recommended to lock Port 0 to eliminate un-intentional changes from occurring (Table 3-5 on page 17).

3.2 Manual Configuration

To begin configuration, open the enclosure, see Section 2.2 on page 5 for enclosure disassembly instructions, to access the CPU board (Figure 3-1 and Figure 3-2 on page 12).

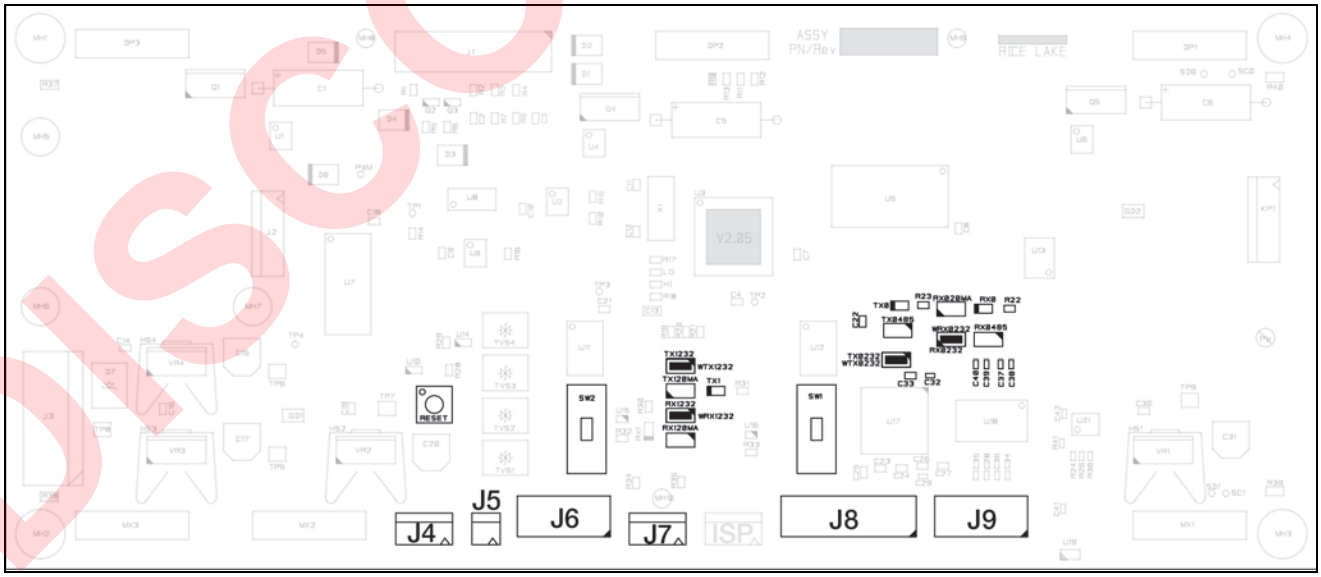

Figure 3-1. LaserLight CPU Board

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The setup button is located on the secondary display board (Figure 3-2).

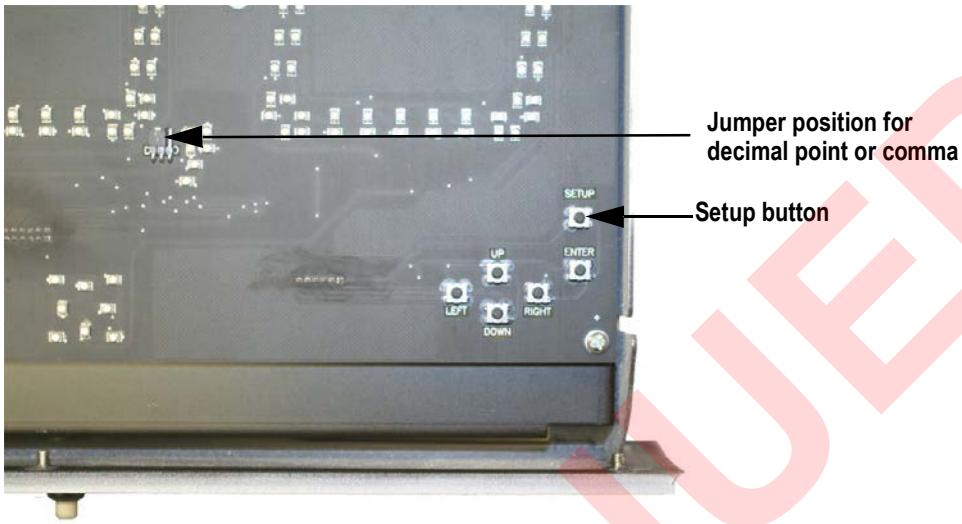

Figure 3-2. Setup Button Location on Secondary Display Board (7-Segment Display)

The display board is mounted on a hinged mounting plate to allow for easy access to the CPU board. Press the **SETUP** button to access main menu configuration parameters.

Main menu parameters include:

- Configuration
- Serial communications
- Test
- Version

The LaserLight remote display can be configured and displayed using a series of menus accessed using internal buttons located on the secondary display (Figure 3-3).

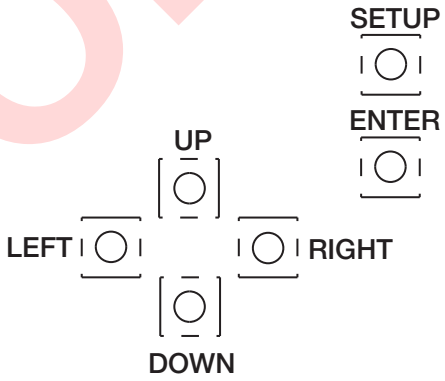

Figure 3-3. Configuration Setup Buttons

Use the **UP/DOWN**, **LEFT/RIGHT** buttons to navigate through menu items and the **ENTER** button for setting a selection.

Figure 3-4. LaserLight Main Menu Options

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Table 3-1 summarizes the functions of each of the main menus and Figure 3-5 illustrates the main menu selections.

7-Segment Display Menu	8-Character Matrix Display Menu	12-Character Matrix Display Menu	Menu Function
CONFIG	CONFIG	CONFIG	Configuration; Configures time and date (option), temperature (option), display brightness, mirroring, and other parameters associated with configuring the remote display
SERIAL	SERIAL	SERIAL	Serial; Configures serial ports
TEST	TEST	TEST	Test; System hardware tests
VER	VERSION	VERSION	Version; Displays installed software version number

Table 3-1. LaserLight Remote Display Menu Summary

When configuring the indicator attached to the remote display, ensure the decimal point configuration is compatible with the remote display. The LaserLight 7-segment remote display allows none, one or two decimal places, see Figure 3-2 on page 12 for jumper positions. The 8- or 12-character matrix displays use of one character position for the decimal point.

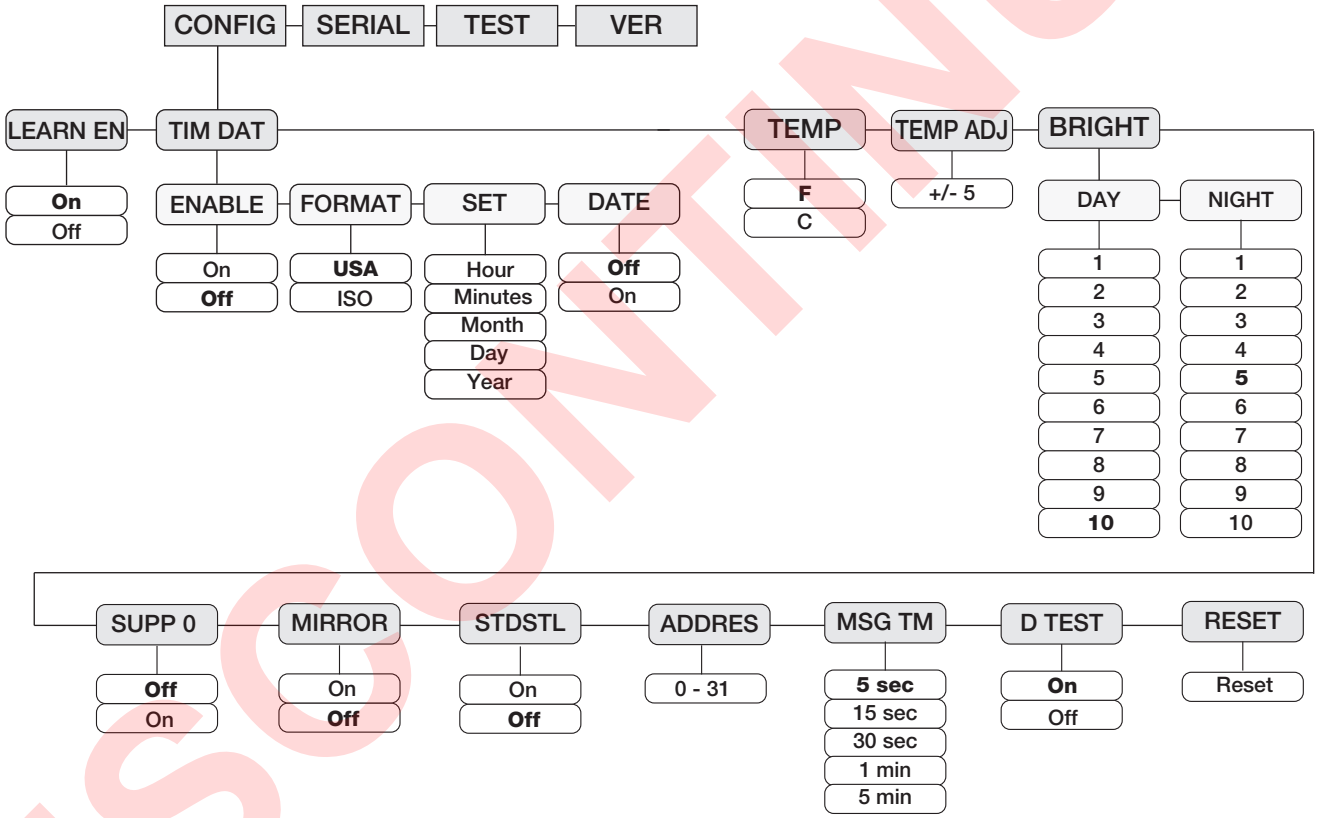

Figure 3-5. Configuration Main Menu Choices

Note ***With the 8 and 12-character matrix displays some of the labels are not shortened, for example STDSTL in the 7-segment is STAND STILL on the 12-character display.***

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CONFIG Menu				
7-Segment Display Parameter	**8-Character Matrix Display**	**12-Character Matrix Display**	**Choices**	**Description**
Level 2 Submenus				
TIMDAT	TIMEDATE	TIME/DATE	Enabled	To enable time and date
			Format	Displays USA or ISO time format
			Set	Sets hours/minutes and month/day/year
			Date	Can disable date
TEMP	TEMP	TEMPERATURE	**F**	Select Fahrenheit
			C	Select Celsius
TEMPADJ	TEMPADJ	DEGREE ADJUST	**+5%**	±5° display; Can add or subtract up to ±5° of both Fahrenheit or Celsius
			-5%	
BRIGHT	BRIGHT	BRIGHTNESS	Day	Selects the brightness during day or nighttime hours
			Night	
SUPP O	SUPP O	SUPPRESS 0	**On**	Select On to enable the suppression of leading zeros in a weight
			Off	
MIRROR	MIRROR	MIRROR	On	Select On to display LED readout in reverse; The menu is viewed normally
			Off	
STDSTL	STD STL	STAND STILL	On	Select On to enable display updated weight only when the scale is not in motion
			Off	
ADDRES	ADDRESS	ADDRESS	**0**–31	Assign a command address by selecting a number between 0–31
MSG TM	MSG TIME	MESSAGE TIME	**5 seconds**	Select amount of time a message stays on the remote display; Time can vary from 5 seconds to 5 minutes; If no serial command is used then this parameter is not used (7-segment DM command only)
			15 seconds	
			30 seconds	
			1 minute	
			5 minutes	
D TEST	DSP TEST	DISPLAY TEST	**On**	Set this parameter On to enable a countdown display test on start up
			Off	
RESET	RESET	RESET CONFIG	--	Resets the remote display to default parameters
LEARN EN	LEARN EN	LEARN EN	**On**	Enable allows weight learn operation; With Learn off, the unit operates for demand messages
			Off	

Table 3-2. Configuration Menu Summary - Level 2

Parameter	Choices	Description
Level 3 Submenus (TIMDAT Parameter)		
ENABLE	On	An additional chip called a “snap hat” is required; Select On to enable time and date option; It is recommended to disable the time/date feature if this additional chip is not wanted; The unit displays at zero or less weight only
	Off	
FORMAT	**USA**	Displays USA format
	ISO	Displays ISO (military time) format
SET	HH/MM	Sets hour/minutes
	MM/DD/YYYY	Sets month/day/year
DATE	On	Select Off to disable the date display if the date and time option is installed; Time is still displayed
	Off	
Brightness (BRIGHT Parameter)		
DAY	1–**10**	Selects the brightness during day; Brightness is set from 1–10 or 10–100% of the full brightness; IntelliBright averages measured ambient light over a ten minute time span
NIGHT	1–**5**–10	Selects the brightness during night; Brightness is set from 1–10 or 10–100% of the full brightness; IntelliBright averages measured ambient light over a ten minute time span

Table 3-3. Configuration Menu Summary - Level 3

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3.3 Serial Communications

The LaserLight remote display has two serial ports available:

- Port 0 - provides communication with the indicator
- Port 1 - provides echoing OF INDICATOR DATA

There are 15 sub-parameters associated with Port 0 and six sub-parameters associated with Port 1 (Figure 3-6).

See Section 2.4.2 on page 7 for serial wiring positions.

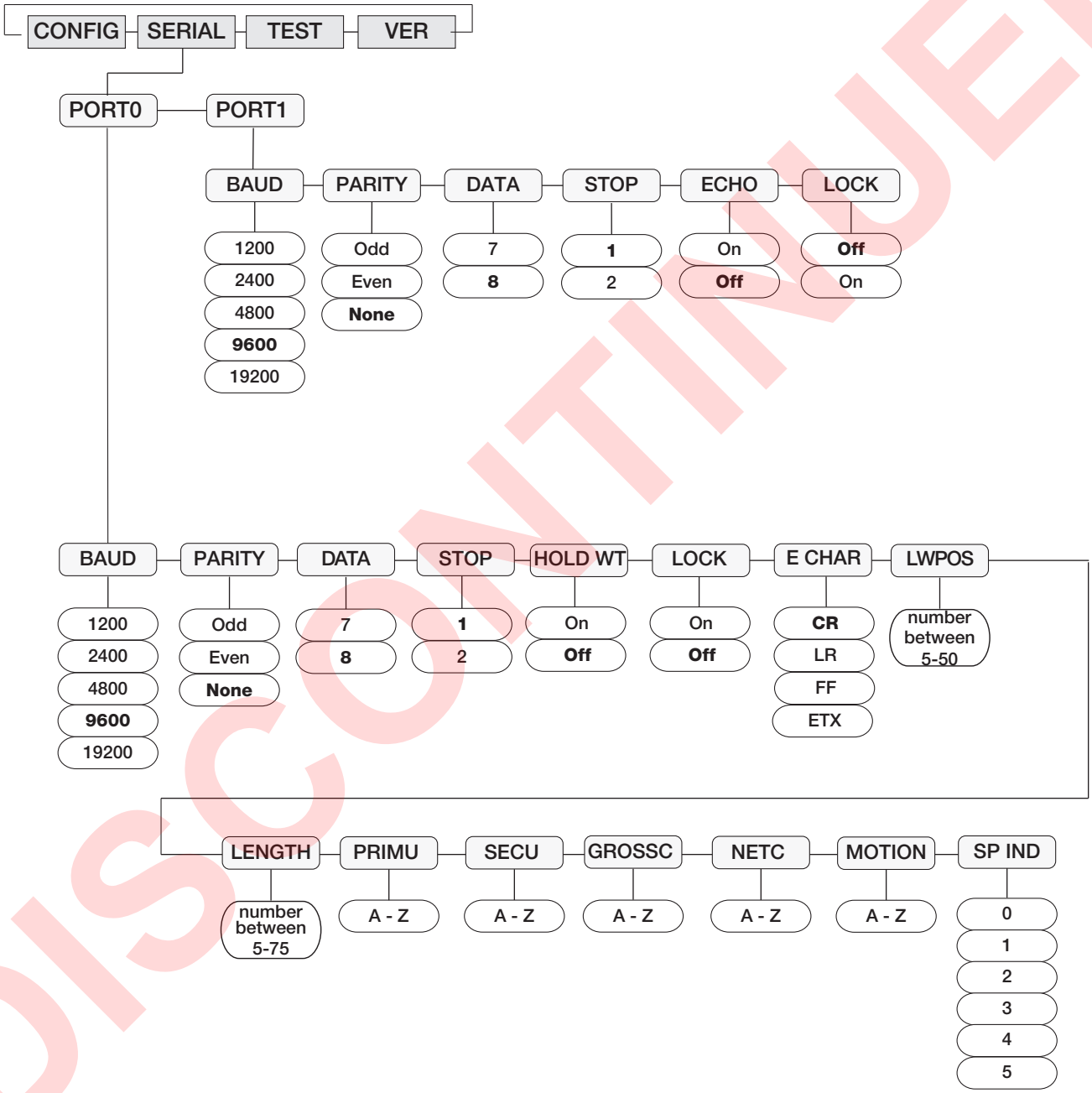

Figure 3-6. Serial Menu

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Serial Menu		
Parameter	**Choices**	**Description**
Level 2 Submenus		
Port 0	BAUD	Configure Port 0; See Level 3 submenu parameter descriptions
	PARITY	
	DATA BITS	
	STOP BITS	
	HOLD WT	Keeps last weight displayed if communication is lost and prevents the remote display from going into an error condition
	LOCK	If enabled, prevents the Auto-Learn parameter from working and ensures settings remain currently set (Section 3.1 on page 11)
	E CHAR	This feature looks at the last character to determine the end of a packet
	LW POS	Can select a number between 5 and 50; Is zero indexed and determines last weight position of the format
	LENGTH	Can select a number between 5 and 75 and determines the length of packet in the string format
	PRIM U	Select primary unit characters
	SEC U	Select secondary unit characters
	GROS C	Select gross character
	NET C	Select net character
	MOTION	Select motion status character
	SP IND	Select, decode status, and settings for special indicator type 0 = none 1 = Toledo 8142 format
PORT 1	BAUD	Configure Port 1, see level 3 submenu parameter descriptions
	PARITY	
	DATA BITS	
	STOP BITS	
	ECHO	Disable this to allow echoing between remote display and other devices; Data settings must be set equal to or greater than device being echoed to
	LOCK	If disabled, remote display uses same settings as indicator after an Auto-Learn

Table 3-4. Serial Communication Menu Summary

DISCONTINUED

Serial Menu				
Port 0 Parameter			**Choices**	**Description**
Level 3 Submenus				
7-Segment Display Parameters	**8-Character Display Parameters**	**12-Character Display Parameters**		
BAUD	BAUD	BAUD	1200	Baud rate; Selects the transmission speed for Port 0
			2400	
			4800	
			9600	
			19200	
PARITY	PARITY	PARITY	ODD	Selects the parity of data of Port 0
			EVEN	
			NONE	
DATA	DATABITS	DATA BITS	7	Selects the number of data bits of Port 0
			8	
7-Segment Display Parameters	**8-Character Display Parameters**	**12-Character Display Parameters**		
STOP	STOPBITS	STOP BITS	**1**	Selects the number of stop bits of Port 0
			2	
HOLD WT	HOLD WT	HOLD WEIGHT	ON	Select On to enable this feature to keep the last weight displayed if communication is lost or if using demand updated weight and prevents remote display from going into an error condition
			OFF	
LOCK	LOCK	LOCK	ON	Select On to make sure the current settings do not get changed and to disable Auto-Learn; When off, the system enables the Auto-Learn function
			OFF	
E CHAR	END CHAR	END CHAR	**CR**	When Auto-Learn is enabled, this feature looks at the last character to determine the end of a packet
			LR	
			FF	
			ETX	
LW POS	L WT POS	LAST WT POS	5–50	Select a number between 5 and 50 to determine the last weight position; If setting up Port 0 manually, the last weight position is zero indexed *Example: <STX>123456<CR> where <STX> is the start of the text character, and <CR> is a carriage return character, the "6" is in the 6th position, not the 7th.*
LENGTH	LENGTH	LENGTH	5–75	Select a number between 5 and 75 to determine the length of the packet in the string format; Formats such as Toledo 8142 end in CR<AA> where <AA> is a 2-byte checksum, the checksum must not be counted when calculating the format length
PRIM U	PRIM UNT	PRIM UNITS	A–Z	Select a primary display character from A-Z; If selected, annunciator is lit
SECD U	SECD UNT	SECD UNITS	A–Z	Select a secondary display character from A-Z; If selected, annunciator is lit
GROS C	GROSS CH	GROSS CHAR	A–Z	Select a gross character from A-Z; If selected, annunciator is lit
NET C	NET CHAR	NET CHAR	A–Z	Select a net character from A-Z; If selected, annunciator is lit
MOTION	MOTION	MOTION	A–Z	Select a motion display character from A-Z; If selected, annunciator is lit
SP IND	SP IND	SPECIAL IND	0	Off (select when not using a special indicator) ***NOTE: If using a Mettler Toledo indicator named something other than a numeric model, Zero may need to be set. If using a Mettler Toledo numbered model indicator, set to one.***
			1	Toledo 8142 format bit-mapped status data
			2	Inclinometer custom program
			3	Flex-Weigh DWM IV
			4	Fairbanks 2500/and 9401 compatible units
			5	AnD 4323

Table 3-5. Port 0 Serial Menu

DISCONTINUED

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3.4 Testing the Remote Display

Serial Menu		
Port 1 Parameter	**Choices**	**Description**
Level 3 submenus		
BAUD	1200	Baud rate; Selects the transmission speed for Port 1
	2400	
	4800	
	9600	
	19200	
PARITY	ODD	Selects the parity of data transmitted from Port 1
	EVEN	
	NONE	
DATA BITS	7	Selects the number of data bits transmitted from Port 1
	8	
STOP BITS	**1**	Selects the number of stop bits transmitted from Port 1
	2	
ECHO	ON	Enable this feature to allow echoing between the remote display and other devices; If enabled and echoing, the baud settings must be set equal to or greater than the device being echoed to
	OFF	
LOCK	**OFF**	If this parameter is disabled, the echo port display uses the same communications settings as the indicator port after an Auto-Learn is run
	ON	

Table 3-6. Port 1 Serial Menu Parameters

The LaserLight remote display provides a test to check the hardware of the remote display. These tests can be accessed through the main menu (Figure 3-7).

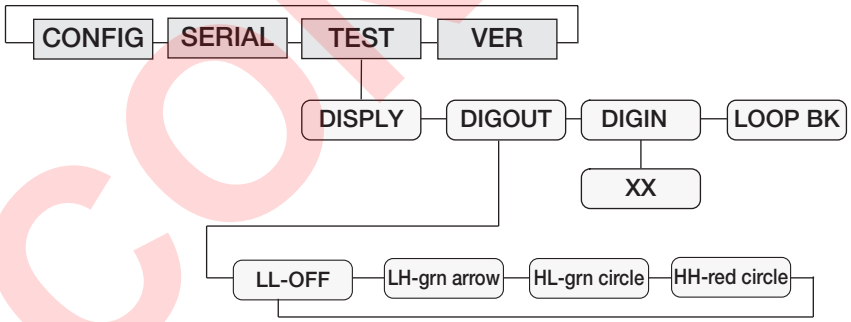

Figure 3-7. Test Menu Choices

3.4.1 Display

When this feature is enabled, all LEDs remain lit until the **ENTER** button is pressed (Figure 3-2 on page 12).

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3.4.2 Digital Outputs

When enabled, this feature provides a way to view the different states of the digital outputs or the stop/go option if installed. Use left and right arrows to increment/decrement and display the states LL, LH, HL, and HH (digital values of the two ports).

Dig Out 1	Dig Out 0	Stop/Go Signal
L	L	Off
L	H	Green Arrow On
H	L	Green Circle On
H	H	Red Stop

Table 3-7. Digital Outputs

The following table lists the relay terminology and digital signal level terminology of each command.

Relay On/Off Terminology
L = ON = 0 V
H = OFF = +5 V

Table 3-8. Relay Terminology

Press the right button again to display LL and the stop/go option displays no light.

Press the right button again to display LH and the stop/go option displays a green arrow.

Press the right button again to display HL and the stop/go option displays a green circle.

When HH is selected, the stop/go option displays a red circle.

3.4.3 Digital Inputs

When enabled, the digital inputs displays the current values read from the digital inputs.

3.4.4 Loop Back

When enabled, this feature provides a loop-back self test for use in diagnosing serial communications errors. The loop-back self test checks the function of the remote display serial port by sending and receiving data to itself. See Figure 3-8 for the required connections.

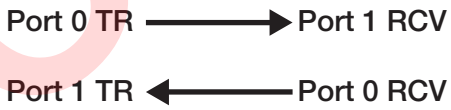

Figure 3-8. Loop Back Example

If Port 1 receives nothing from Port 0 for three seconds, ***Fail 1*** displays on the remote display.

If Port 0 receives nothing from Port 1 for three seconds, ***Fail 2*** displays on the remote display.

If communications are successful between the two, ***Pass*** displays on the remote display.

3.5 Version

When ***Version*** is selected from the main menu choices the current software version displays on the remote display.

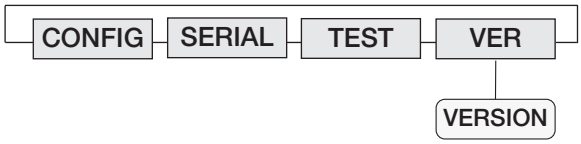

Figure 3-9. Version Menu

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3.6 Demand Print Displaying

The indicator and the LaserLight remote display can be set up to do a demand print display for such applications as cattle weighing. This is useful if to maintain the last weight of an animal.

Demand print display can be set up using Auto-Learn when the Port 0, ***Hold Weight*** parameter is turned ***On***, and it is set up manually by formatting the baud rate, data bits, parity and others of the remote display and the indicator.

Using Auto-Learn, ensure ***HOLD WT*** is on and continuously push the print button on the indicator to attempt a demand print display.

3.7 Serial Commands

The LaserLight remote display has the ability to receive commands, display messages, or use a digital I/O (2 inputs and 2 outputs). When interfaced to an indicator having a configurable serial string like the IQ plus 355, 710, 800, or 810, the print ticket format can be configured to allow the user to use the **Print** key to send a message which temporarily interrupts the streamed weight display. The amount of time the message is displayed is defined by the ***MSG TM*** (message time) parameter under the ***CONFIG*** menu in the remote display, for the 7-segment remote display.

If the LaserLight remote display is interfaced with a programmable smart indicator like the 920i, a user program can be written to allow the user to send messages utilizing softkeys or events. When sending messages from a user program, the user can send one message to temporarily override the streamed weight display or send multiple messages to be displayed one at a time for several seconds each, replacing the weight display all together if desired.

The remote display also accepts serial commands to return the current time and date or to set the time and date to a new setting. This information can be used in conjunction with user programs in the 920i to ensure the indicator and remote display have the same time and date settings.

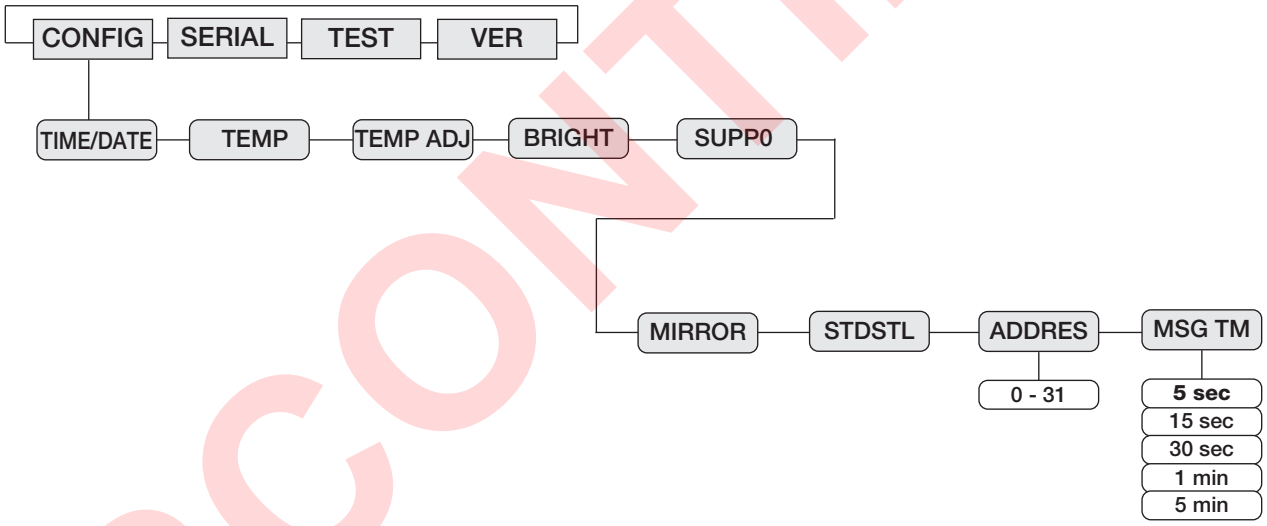

Figure 3-10. Assign Address and Message Timed

DISCONTINUED

3.7.1 Command Format (7-Segment)

4”, 6” and Stop/Go remotes

|<AA><CC>|<Data>!

Where:

| = Pipe character (Ox7C)

AA = Two byte address, ASCII digits (0–31)

CC = Two byte command, ASCII characters

| = Pipe character (Ox7C)

Data = Data depending on command

! = Exclamation point character (0x21)

Command	Description
DM	<Data> is the six character or less message *Example: |00DM|HELLO!*
GT	Get time and date; Information gathered is sent back to the indicator, allowing both the remote display and indicator to match; This is not displayed on the remote display *Example: |00GT!*
ST	Set time and date *Example: |ST08:00:00 2003-01-31!* ***NOTE: Two spaces are required between time and date entries.***
DI	Read digital input levels (returns “0”=LL, “1”=LH, “2”=HL, “3”=HH) (Section 3.7.3 on page 23)
DO	Set digital output levels (“DO0”=LL, “DO1”=LH, “DO2”=HL, “DO3”=HH) (Section 3.7.3 on page 23)
GR	Get relay state; data=relay (ASCII character “0” - “1”) (Section 3.7.3 on page 23)
SR	Set relay state; data=relay (ASCII character “0” - “1”) and state (“ON = gnd, “OFF = +5 V) (Section 3.7.3 on page 23)
GV	Get the version number
DC	Dump configuration parameters (for testing purposes only)
TP	Temperature adjustment; Allows ±5% degree adjustment
Time and date is sent from the remote display depending on the current remote display time and date format; Time and date are sent to the remote display in ISO format: USA Format: HH:MM:SS AM/PM MMM/DD/YYYY ISO Format: HH:MM:SS YYYY-MM-DD If the real time clock is disabled in the remote display, an error message is sent back	

Table 3-9. Command Format

Example Commands and Responses

Get time and date:

|00GT!

Get the version number: example return “2.05”

|00GV!

Set the temperature adjustment

|00TP#!

Where # is -5–+5 (example |00TP-1!, |00TP+3!, |00TP5) default is 0

Dump the configuration parameters (test purposes only):

|00GDC!

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3.7.2 Set or Get the Digital I/O (7-Segment with Stop/Go Light)

Note

Version 2.05 only accepts the serial digital I/O commands listed in this manual. All previous serial Digital I/O commands prior to Version 2.05 do not work properly with this product.

The digital outputs are set to High (OFF) on reset.

Traffic Light State	Dry Contact	Serial Commands
Stop	Dig0 and Dig1 open circuit	|00DO3!
Green Circle	Dig0 open circuit; Dig1 pulled low	|00DO2!
Green Arrow	Dig0 pulled low; Dig1 open circuit	|00DO1!
Off	Dig0 and Dig1 pulled low	|00DO0!

Table 3-10. Serial Commands (Basic Configuration)

To use the two Digital Inputs and Digital Outputs, use J1, see Figure 2-9 on page 9 to connect and use the following message command formats to set or get the Digital I/O

Set Relay (set relay output 1 off)

|00SR1OFF!

Response: OK = success (State: DO1_+5 V) or ?? = error

Get Digital (input) 0

|00GRO!

Response: ON = gnd or OFF = +5 V

Get Digital input levels (all digin)

|00DI!

Response: 0 = LL, 1 = LH 2 = HL, 3 = HH

Set Digital output levels to HH (all digout = +5 V)

|00DO3!

Response: OK = success (states: DO0=DO1=+5 V) or ?? = error

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3.7.3 Display Message Command Format (Matrix Display)

3m8 and 3m12 remotes.

|<AA><DM>|<Timeout>|<Flash>|<Slide On>|<Scroll>|<Scroll Count>|<Data>!

where:

| = Pipe character (0x7C)

AA = Two byte address, ASCII digits

DM = Two byte command, ASCII characters

| = Pipe character (0x7C)

<Display Timeout> = Milliseconds to display the message (N/A for scroll). 32,767 (32 seconds) is the maximum timeout. Values above the number indicates an indefinite display.

| = Pipe character (0x7C)

<Flash> = “Y” or “N”

| = Pipe character (0x7C)

<Slide On> = “Y” or “N”

| = Pipe character (0x7C)

<Scroll> = “Y” or “N”

| = Pipe character (0x7C)

<Scroll Count> = Number of times to scroll the message or “A” for annunciator msg cmd (learn enable = OFF)

| = Pipe character (0x7C)

<Data> = Text to display

! = Exclamation point character (0 x 21)

Command	Description
DM	<Data> is the six character message to display; If less than six characters, send spaces to make it six characters; Some data may not be overwritten *Example: |00DMSTOP !*
GT	Get time and date; Information gathered is sent back to the indicator, allowing both the remote display and indicator to match; This is not displayed on the remote display *Example: |00GT!*
ST	Set time and date *Example: |ST08:00:00 2003-01-31!* ***NOTE: Two spaces are required between time and date entries.***
DI	Get digital input state
DO	Get digital output state
GR	Get relay state; Relay 0-3, 0=Off=LL, state 1=LH, state 2=HL, state 3=On=HH
SR	Set relay state (output relays only); Relay 0-1, state 1=On and 0=Off
GB	Get the number of 5 x 7 Max6953 boards (0 = 7-seg, 2, 3 = 5 x 7)
GV	Get the version number
DC	Dump configuration parameters (for testing purposes only)
TP	Temperature adjustment; Allows ±5% degree adjustment
Time and date is sent from the remote display depending on the current remote display time and date format; Time and date are sent to the remote display in ISO format: USA Format: HH:MM:SS AM/PM MMM/DD/YYYY ISO Format: HH:MM:SS YYYY-MM-DD If the real time clock is disabled in the remote display, an error message is sent back	

Table 3-11. Display Message Command Format

Examples: Scroll the message “Rice Lake Weighing Systems” twice:

|00DM|0|N|N|Y|2|Rice Lake Weighing Systems!

Slide on and flash the message “DRIVE AHEAD” for 5 seconds:

|00DM|5000|Y|Y|N|0|DRIVE AHEAD!

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4.0 Options

Several options are available with the LaserLight remote display:

- Time and date (Standard on 4", 6" and 4"SG models)
- Temperature

Note ***The Time-Date and Temperature options display in three-second cycles (along with weight) when displayed weight is zero or below.***

- Field installable visor
- Pole mount kit
- Traffic light option

4.1 Time and Date

Note ***Time and Date is standard and factory installed on the 4", 6" and 4"SG Models.***

The time and date option can be either factory installed or can be ordered at a later date. See Figure 4-1 for the location of the time and date option.

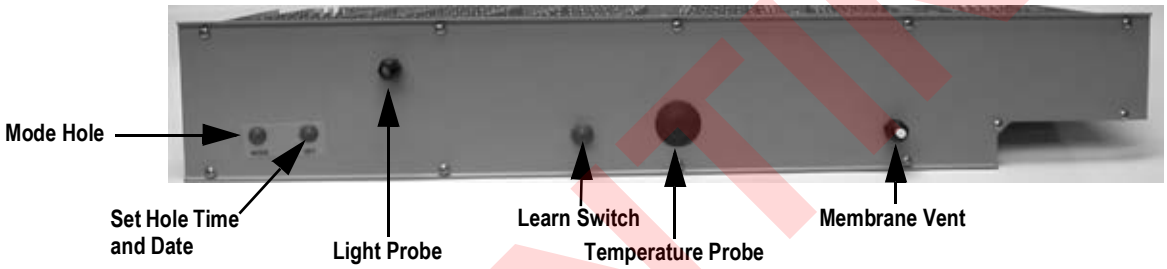

Figure 4-1. LaserLight Bottom Enclosure

If the time and date option (PN 75853) is added after initial installation, see Section 2.0 on page 4 for enclosure disassembly instructions.

To install the this option:

1. Cut the adhesive labels from the option holes and install the time and date switch assembly.
2. Attach time and date wiring to J7 on the CPU board.

   The switch with the blue wires goes in the Mode option hole (outside hole). The other goes in the Set option hole (inside hole).
3. Connect the 4-pin connector to J7.
4. Insert the Yellow clock chip in socket U7.

4.1.1 Setting the Time and Date

1. Go to ***CONFIG*** and enable the Time and Date under ***ENABLE*** (Figure 3-5 on page 13).
2. Press the ***SET*** button to enter the time in Hours.
3. Use the ***MODE*** button to increment the Hours.
4. Press the ***SET*** button to set the Hours and move to Minutes.
5. Use the ***MODE*** button to increment Minutes.
6. Press the ***SET*** button to set the minutes and move to Month.
7. Repeat these steps for Month, Day and Year.

Note ***Time and temperature are only displayed at a weigh of zero (0).***

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4.2 Temperature

If the temperature option (PN 43412) is added after initial installation, see Section 2.0 on page 4 for enclosure disassembly instructions.

To install the this option:

1. Remove the plug from the option hole and insert the temperature probe.
2. Attach temperature probe wiring to J4 on the CPU board.

4.3 Visor Installation

An optional visor can be installed on the LaserLight 7-segment remote display and the 8- or 12-character matrix display. See Figure 4-2 for the remote display with the optional visor installed.

Figure 4-2. LaserLight Remote Display With Optional Visor Installed (7-Segment Display)

Set the visor (PN 75854 - 4" model and the 8-character matrix display or PN 75855 - 6" model and the 12-character matrix display) on top of the remote display and attach the visor using screws and plastic washers provided.

4.4 Pole Mount Kit

The LaserLight remote display can easily be mounted on a pole or steel I-beam using the optional pole mounting kit (PN 75856 - 4", PN 77775 - 6", PN 85343 - 8-character, PN 85344 - 12-character). Use the following steps to install the pole mount option:

1. Use the enclosed 3/8" cap screws, washers and lock nuts from the parts kit to attach the clinching pole brackets to the pole mounting weldment.

Note ***The 6" LaserLight remote display uses four brackets (PN 76999) and the 4", 8- and 12-character display uses two.***

2. Use the enclosed 3/8-16NC bolt (PN 14747), to attach the clinching pole brackets together using washers and lock nuts. Tighten as necessary.
3. Align the back of the LaserLight remote display to the pole mount weldment and ensure the holes line up.
4. Use enclosed 1/4" cap screws, washers and nuts to attach the remote display to the mounting weldment.

Item No.	Part No.	Description
2	77000	Weldment, Pole Mounting (4" Model - 1)
2	76998	Weldment, Pole Mounting (6" Model - 1)
8	14635	Nut, Lock 1/4-20NC Hex (4)
3	14747	Bolt, 3/8-16NCx2-3/4 Hex (4" Model - 1) (6" Model - 2)
10	14955	Screw, Cap 1/4-20NCx1/2 (4)
7	15019	Screw, Cap 3/8-16NCx1 HEX (4" Model - 2) (6" Model - 4)
9	15145	Washer, Plain 3/8 Type A (8)
4	21938	Washer, Plain Type A (4" Model - 4) (6" Model - 8)
5	22072	Nut, Lock 3/8-16NC Hex (4" Model - 3) (6" Model - 6)
6	76999	Bracket, Clinching Pole (4" Model -2) (6" Model - 4)
11	77001	Screw, Mach 3/8-16NC (4" Model - 3) (6" Model - 6)
NOTE: See Figure 4-3 on page 26 for the Part Kit Illustration.		

Table 4-1. Parts Kit Contents (4" and 6" Models)

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Item No.	Part No.	Description
2	85034	Weldment, Pole Mounting (8-Character Model - 1)
2	85035	Weldment, Pole Mounting (12-Character Model - 1)
8	14635	Nut, Lock 1/4-20NC Hex (4)
3	14747	Bolt, 3/8-16NCx2-3/4 Hex (1)
10	14955	Screw, Cap 1/4-20NCx1/2 (4)
7	15019	Screw, Cap 3/8-16NCx1 Hex (2)
9	15145	Washer, Plain 3/8 Type A (8)
4	21938	Washer, Plain Type A (4)
5	22072	Nut, Lock 3/8-16NC Hex (3)
6	76999	Bracket, Clinching Pole (2)
11	77001	Screw, Mach 3/8-16NC (3)
NOTE: See Figure 4-3 for the Part Kit Illustration.		

Table 4-2. Parts Kit Contents (8- and 12-Character Models)

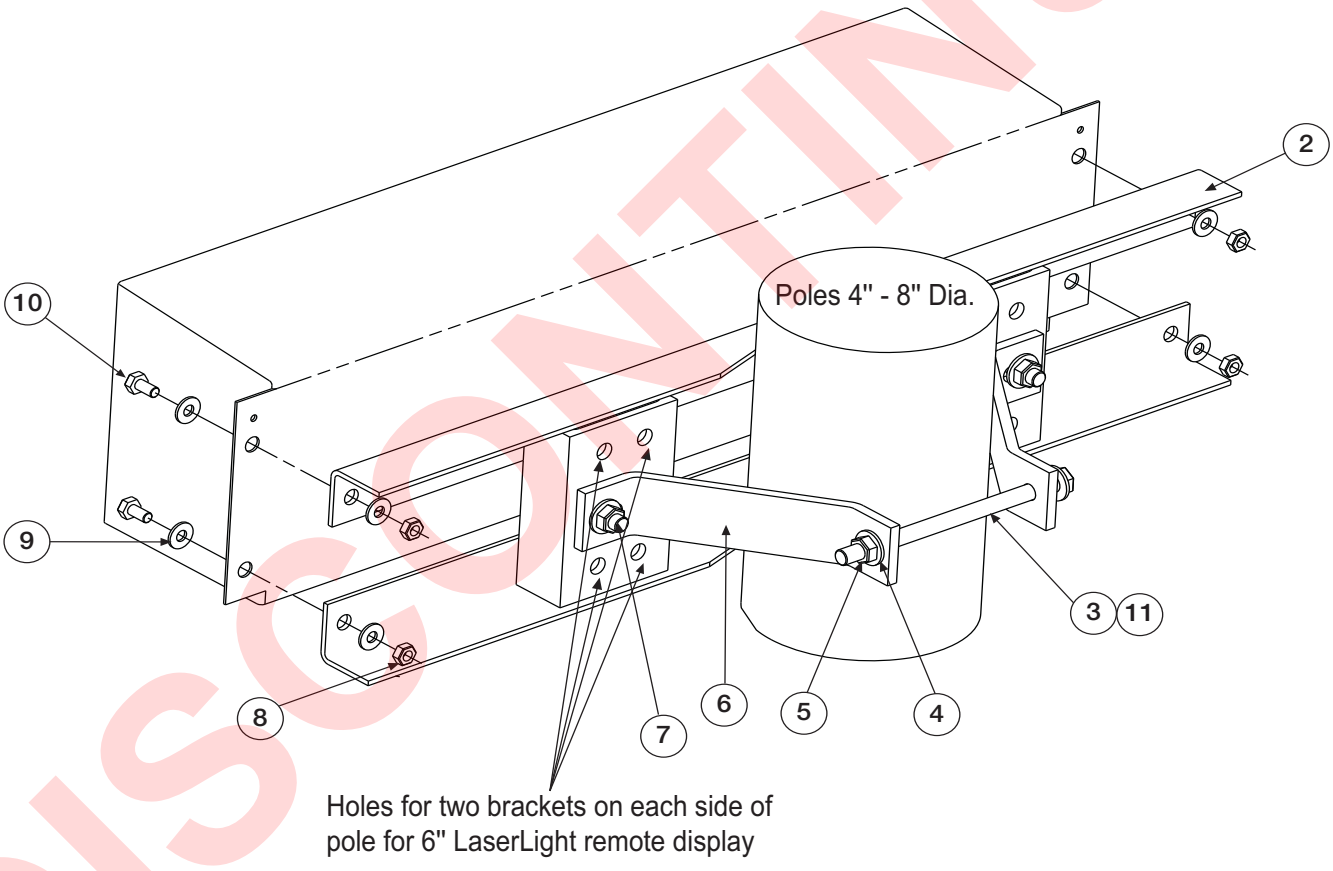

Figure 4-3. LaserLight Pole Mount Assembly

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4.5 Traffic Light Option

The LaserLight 4-SG remote display also comes with a traffic light option which uses 4" display digits in the 6" enclosure. The traffic light is factory configured to be controlled with serial commands but can be controlled by using dry contact switches: one switch or two switches (Section 3.7 on page 20). The following photo illustrates the location of the traffic light board and the wiring for it. Table 4-3 illustrates the wiring from the traffic light board to J1 on the LaserLight CPU board.

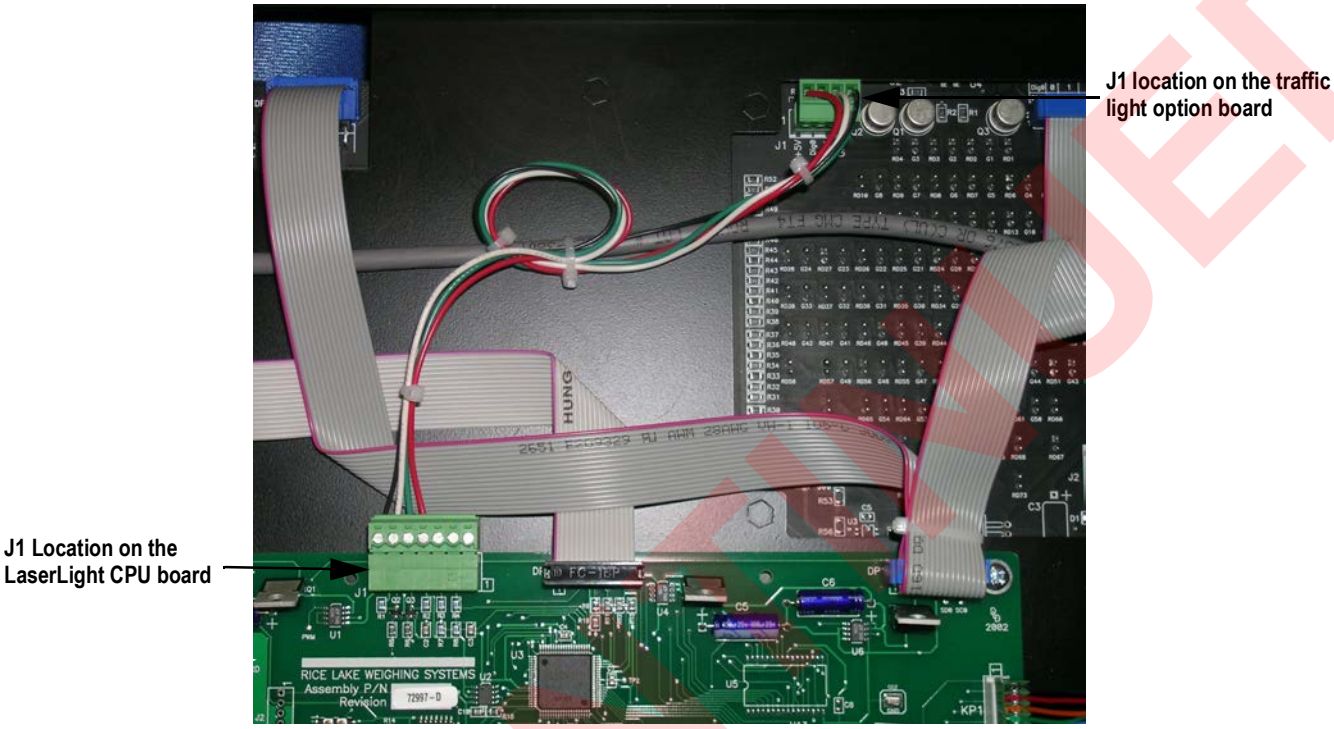

Figure 4-4. Back of the LaserLight 4-SG Remote Display, CPU Board Location and Traffic Light Option

Signal	Traffic Light Board Location J1	LaserLight CPU Board Location J1	Corresponding Wire Color
5 VDC	1	4	Red
DIG O	2	5	Green
DIG 1	3	6	White
GND	4	7	Black

Table 4-3. Traffic Light Wiring

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4.5.1 Dry Contact Wiring

The DIG 0 and DIG 1 pins on the traffic light board (pin 2 and pin 3 on connector J1) have pull up resistors to ensure the operation of the traffic light can be controlled by switching the DIG 0 or DIG 1 (or both) to ground.

Note ***A reset to the LaserLight CPU board sets the D0 and D1 pins on the LaserLight CPU (pins 5 and 6 on J1) to a high pulled up state therefore, the default state of the traffic light is a stop light (red).***

4.5.2 Single Switch Wiring

If a single switch is used for controlling the traffic light, the user must select which two states (out of the four possible) to use.

4.5.3 Two Switch Wiring

If two switches are used for controlling the traffic light it is possible for the user to obtain all combinations of the four possible states. Both switches with contacts closed give the ***OFF*** condition, both switches with contacts open give the ***STOP*** condition, and one switch open and the other closed gives either the ***Go*** or ***Arrow*** condition.

Connect the wires using the following procedures below.

Signal	Dig 1 Signal	Dig 0 Signal
Stop	Open (H)	Open (H)
Arrow	Open (H)	Closed (L)
Go	Closed (L)	Open (H)
Off	Closed (L)	Closed (L)

Table 4-4. Traffic Option Wiring

An example procedure for connecting DIG 1:

1. Disconnect the wire connecting D1 (pin 6 on J1) of the CPU to DIG 1 (pin 3 on J1) of the traffic light pcb at the CPU connector.
2. Solder the wire going to DIG 1 on the traffic light board to the wire going to the switch.
3. Place the wires back into the connector on the CPU board (pin 6 on J1).
4. Connect the other end of the switch wire to one pole of the switch.
5. Connect the remaining switch pole to the digital ground of the indicator (if a common ground between the indicator and the LaserLight does not exist.

   Example: fiber optic communication is used then an additional wire is needed for connecting the switch to the ground on the LaserLight CPU).

Note ***This connection does not harm the CPU board. The digital outputs on the CPU board are designed to be pulled low.***

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5.0 Appendix

5.1 Error Messages

The LaserLight remote display provides several error messages. When an error occurs, the error message displays.

Note ***Some of the actual error messages displayed by the remote display are cryptic and are represented in Table 5-1 as closely as possible with plain text.***

Table 5-1 lists error messages by the LaserLight remote display and meaning.

7-Segment Display Message	Matrix Display Message 8-Character	Matrix Display Message 12-Character	Meaning	Cause
LError	LError	Learn Error	Auto Learn Error	Auto Learn failed
WError	WError	Write Error	Indicator Code	Write error could not save menu settings to the serial EEPROM
Reset	Reset	Reset Config	Invalid Settings	Invalid settings upon power up; All settings reset to their default state
RError	RError	Range Error	Range Error	When the Rice Lake format goes over or under range

Table 5-1. Error Messages

5.2 Replacement Parts

For LaserLight Remote Display Replacement Parts, see the following information:

5.2.1 UL Approved Replacement Parts

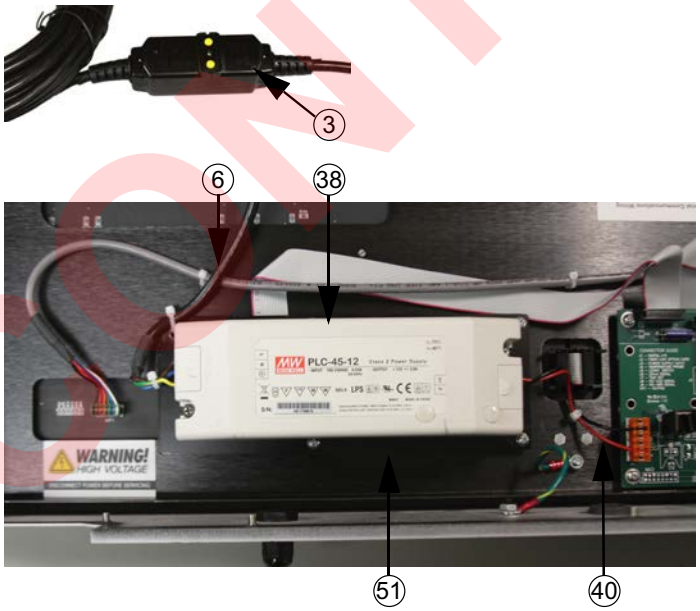

Figure 5-1. UL Approved Power Supply Parts Illustration

Item No.	Part No.	Description
38	153600	Power Supply 12 V 45 W PLC-45-12
51	153617	Adapter Plate UL Power Supply
3	153808	AC Input Power Cord Assembly, GFCI
6	153810	Cable Assembly Terminal Block to Power Supply
40	153811	Cable Assembly Power Supply to CPU

Table 5-2. UL Approved Power Supply Parts List

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5.2.2 7-Segment Display Replacement Parts

Figure 5-2. 4", 4-SG and 6" Remote Display Parts Illustration

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Item No.	Part No.	Description	Qty.
1	16861	Label, Warning High	2
2	76254	Wire Assembly, Ground 10"	1
3	75857	Power Cord Assembly, Remote	1
	153808	UL Approved Item (Figure 5-1 on page 29)	1
4	40672	Wire Assembly, Ground 9" (4 and 4-SG" Model)	1
	15602	Wire, Ground 12" with No. 8 (6" Model)	1
5	72992	Enclosure, Steel 4" (4" Model)	1
	74867	Enclosure, Steel 6" (6" and 4-SG" Model)	1
6	76408	Cable Assembly	1
	153810	UL Approved Item (Figure 5-1 on page 29)	1
7	16892	Label, Earth Ground	1
8	15628	Cord Grip, 1/2 NPT Black	2
9	15630	Locknut, 1/2 NPT Black	2
10	15631	Cable Tie, 3" Nylon	8
11	15650	Mount, Cable Tie 3/4"	4
12	75569	Bracket, Inside Terminal	1
13	45302	Standoff, Fem-Fem 8-32 NC	2
14	44744	Terminal Block, 3 Pos	1
15	14833	Screw, Mach 4-40 NC x 1/2	2
16	14626	Nut, Kep 8-32 NC Hex	6
17	15134	Washer, Lock No. 8 Type A	6
18	72998	Label, Time-Set Covering	1
19	58983	Cable Grip, SL-7 with Nut	2
20	41255	Washer, 1/2 Nylon Flat	2
21	76176	Rod, Clear Extruded	1
22	75861	Switch Assembly, Push Button	1
23	15895	Cover, Switch SRVR NEMA Type 4X	3
24	22262	Seal, Liquid Tight 1/2 NPT	1
25	71349	Filter, Breathing .25 Dia	1
26	72993	Plate, Bottom Gusset (4" Model)	1
	74868	Plate, Bottom Gusset (6" and 4-SG" models)	1
27	76158	Ring, Retaining No. 8	11
28	30625	Washer, Plain No. 8 Nylon	13
29	76157	Screw, Mach 8-32 NC x .375	11
30	75848	Component Plate, Vertical (4" Model)	1
	75847	Component Plate, Vertical (6" Model)	1
	104161	Component Plate, Vertical (4-SG" Model)	1
31	74880	Board, Display Primary 4" (4 and 4-SG" Model)	1
	74882	Board, Display Primary 6" (6" Model)	1
32	74881	Board, Display Secondary (4 and 4-SG" Model)	1
	74883	Board, Display Secondary (6" Model)	1
33	76156	Post, PCB Support Mini	8
41	19538	Post, Slotted Black Seal	1
49	72994	Gasket, Mounting Plate UV (4" Model)	1
	74870	Gasket, Mounting Plate (6" and 4-SG" Model)	1
50	15665	Gland, Reducing 1/2 NPT	3
52	103651	Board Assembly, LED Traffic (4-SG" Model)	1
53	14839	Screw, Mach 6-32 NC x 1/4 (4-SG" Model)	12
54	193696	Cable Gland Assembly, 1/2 NPT Nickel Plated Brass	1

Table 5-3. 4", 4-SG" and 6" Remote Display Parts List

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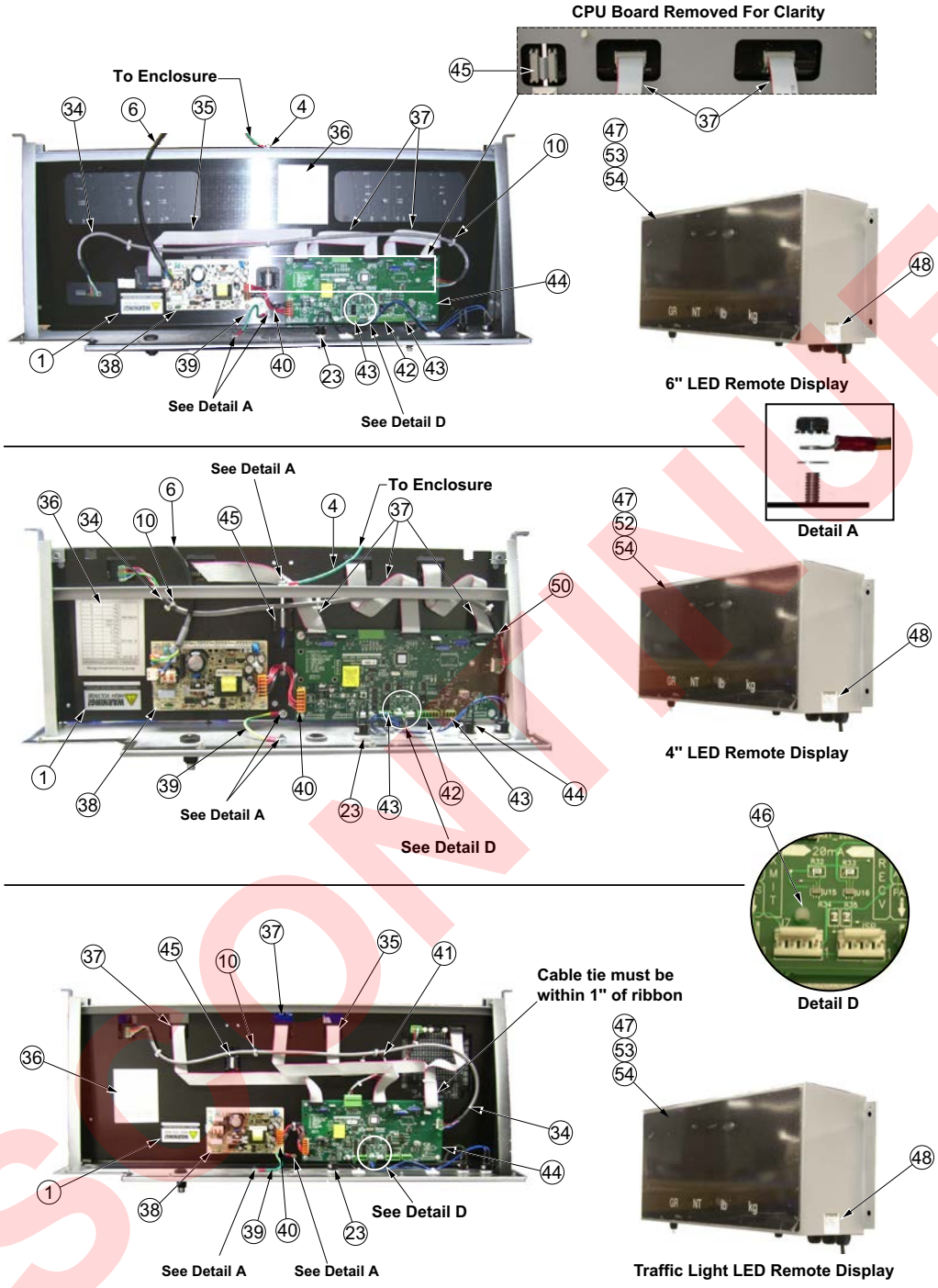

Figure 5-3. 4", 4-SG" and 6" Remote Display Illustration

Part No.	Description	Qty.
15631	Cable Tie, 3" Nylon	2
16159	Bag, Plastic Ziploc 3x5	1
66730	Filter, Cylindrical EMI (4" Model)	1
76513	Conn, 4 Position Screw Terminal	2
76514	Conn, 6 Position Screw Terminal	1

Table 5-4. Items Included in Parts Kit PN 92056

DISCONTINUED

5.2.3 8 and 12-Character Display Replacement Parts

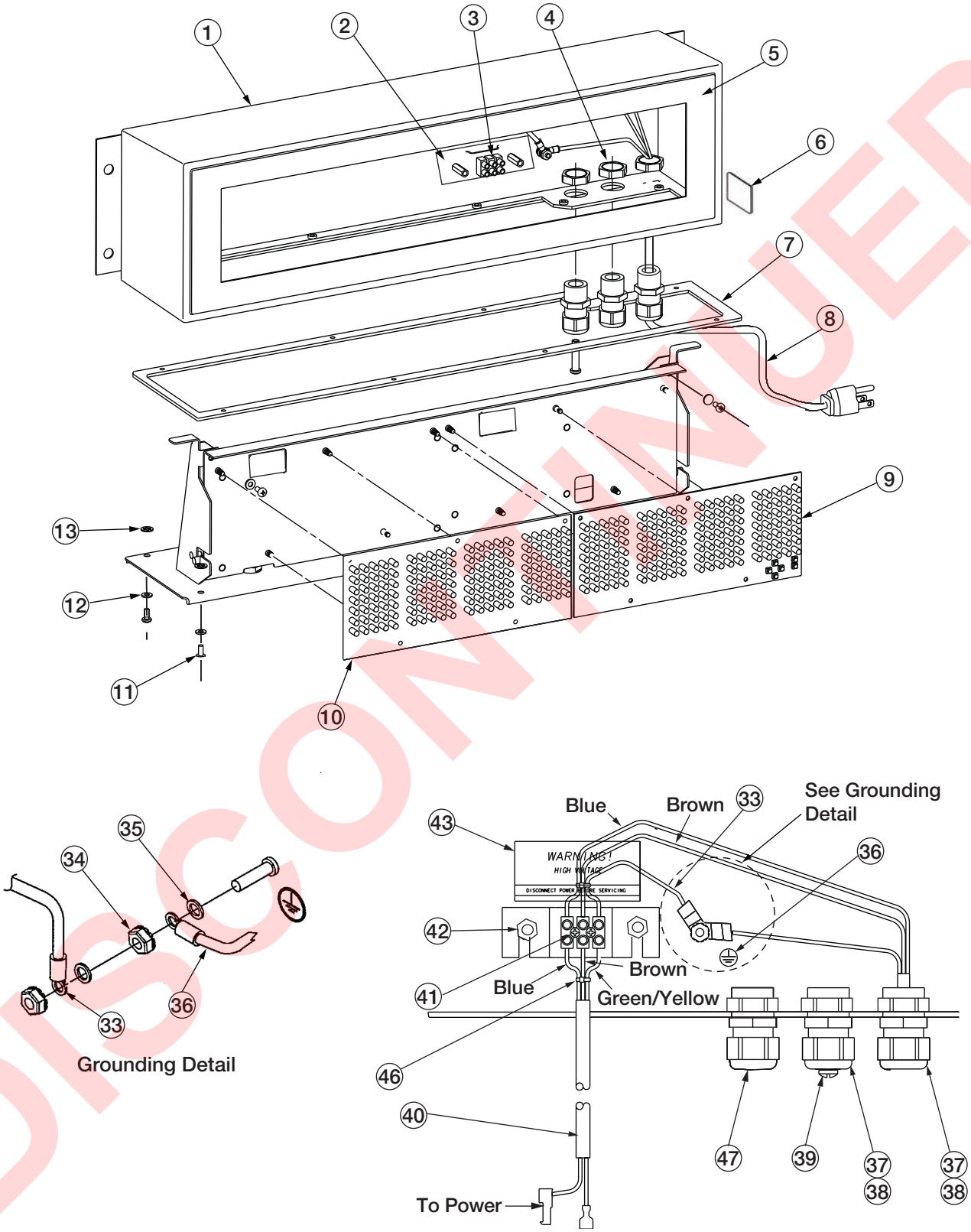

Figure 5-4. 8 and 12 Character LaserLight Assembly Parts Illustration

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Item No.	Part No.	Description	Qty.
1	84844	Enclosure, 8 Digit Laser	1
	84847	Enclosure, 12 Digit Laser	1
2	75569	Bracket, Inside Terminal	1
3	44744	Terminal Block, 3 Position	1
4	15630	Locknut, 1/2 NPT Black	2
5	94613	Lens, Display Front Red	1
6	53308	Label, 1.25x1.25 8000T	1
7	72994	Gasket, Mounting Plate UV, 8 Digit Laser	1
	74870	Gasket, Mounting Plate, 12 Digit Laser	1
8	75857	Power Cord Assembly, Remote	1
	105380	Power Cord Pigtail	1
9	84760	Board, Display LED	1
10	72999	Board, Display LED Primary	1
11	76157	Screw, Mach 8-32NCx.375	11
12	30625	Washer, Plain No. 8 Nylon	11
13	76158	Ring, Retaining No. 8	11
33	76254	Wire Assembly, Ground 10"	1
34	14626	Nut, Kep 8-32NC Hex	6
35	15134	Washer, Lock No. 8 Type A	6
36	16892	Label, Earth Ground	1
37	15628	Cord Grip, 1/2 NPT Black	2
38	15665	Gland, Reducing 1/2 NPT	3
39	19538	Post, Slotted Black Seal	1
40	76408	Cable Assembly	1
41	14833	Screw, Mach 4-40NCx1/2	2
42	45302	Standoff, FEM-FEM 8-32NC	2
43	16861	Label, Warning High	2
46	15631	Cable Tie, 3" Nylon	3
47	193696	Cable Gland Assembly, 1/2 NPT Nickel Plated Brass	1
--	77136	Support, Printed Circuit	1
--	104303	Adhesion Promoter, 3M	2.2
--	130418	Tape, 3M VHB 5952 Black	63
--	14839	Screw, Mach 6-32NCx1/4	18

Table 5-5. 8 and 12 Character LaserLight Assembly Parts List

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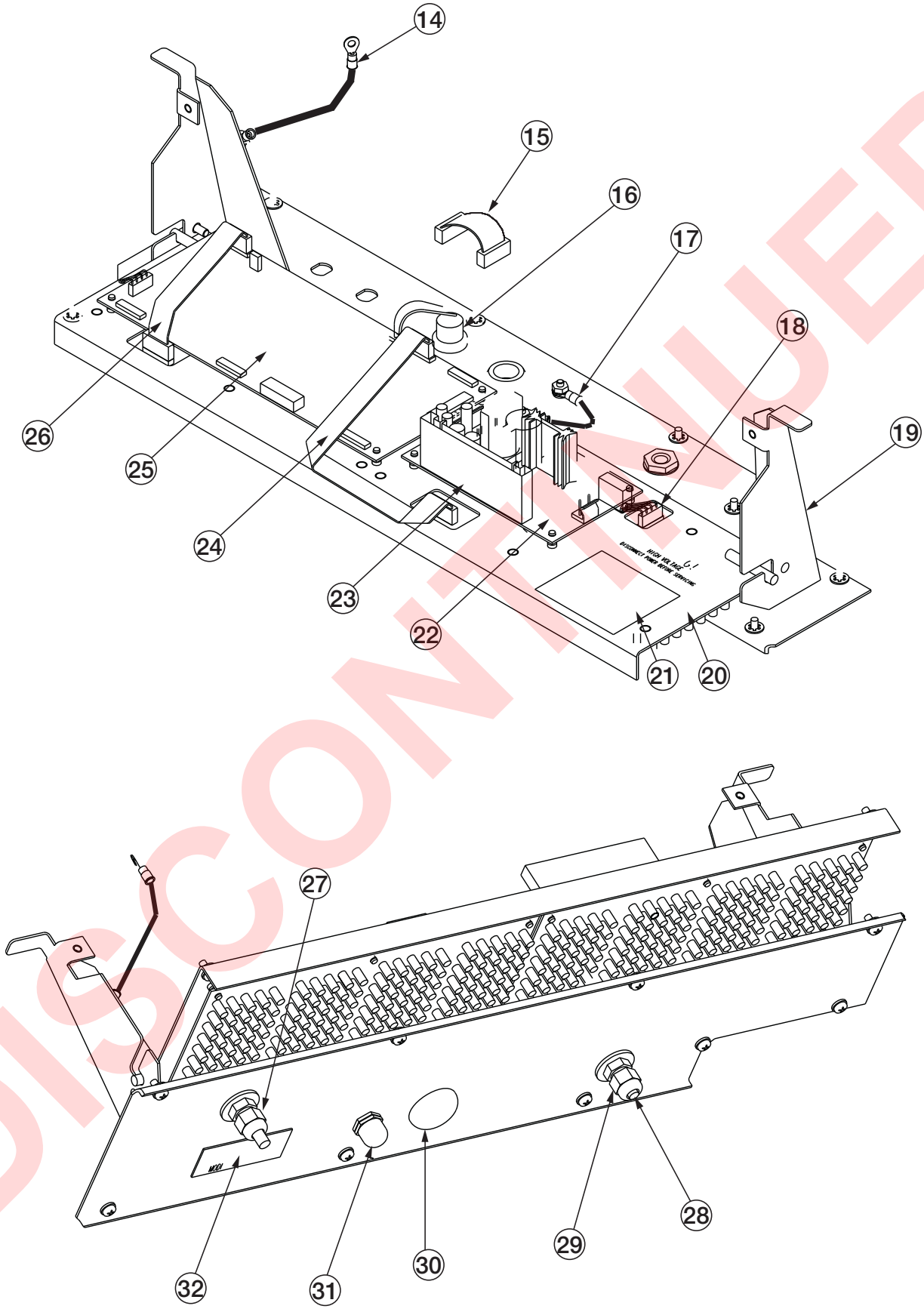

Figure 5-5. 8 and 12 Character LaserLight Assembly Parts Illustration (Continued)

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Item No.	Part No.	Description	Qty.
14	40672	Wire Assembly, Ground 9"	1
15	75860	Cable Assembly, Power Supply	1
16	75861	Switch Assembly, Push Button	1
17	45043	Wire, Ground 4" with No. 8	1
18	76246	Cable Assembly, 6 Position, 8 Digit Laser	1
	76246	Cable Assembly, 6 Position, 12 Digit Laser	1
19	84845	Bottom Plate, 8 Digit Laser	1
	84848	Bottom Plate, 12 Digit Laser	1
20	84846	Component Plate, 8 Digit Laser	1
	84849	Component Plate, 12 Digit Laser	1
21	76653	Label, Serial Comm Pin Out	1
22	16774	Fuse Cover, 5x20 mm Blue	1
23	72996	Power Supply, 12 V Board	1
24	76225	Cable, Ribbon 14" long	1
25	85130	Board Assembly, CPU Messaging	1
26	76224	Cable, Ribbon 8" long	1
27	76176	Rod, Clear Extruded	1
28	71349	Filter, Breathing 25 Dia	1
29	58983	Cable Grip, SL-7 with Nut	2
30	22262	Seal, Liquid Tight 1/2 NPT	1
31	15895	Cover, Switch SRVR NEMA Type 4X	1
32	72998	Label, Time-Set Covering	1

Table 5-6. 8 and 12 Character LaserLight Assembly Parts List

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5.3 LaserLight Remote Display Enclosure Dimensions

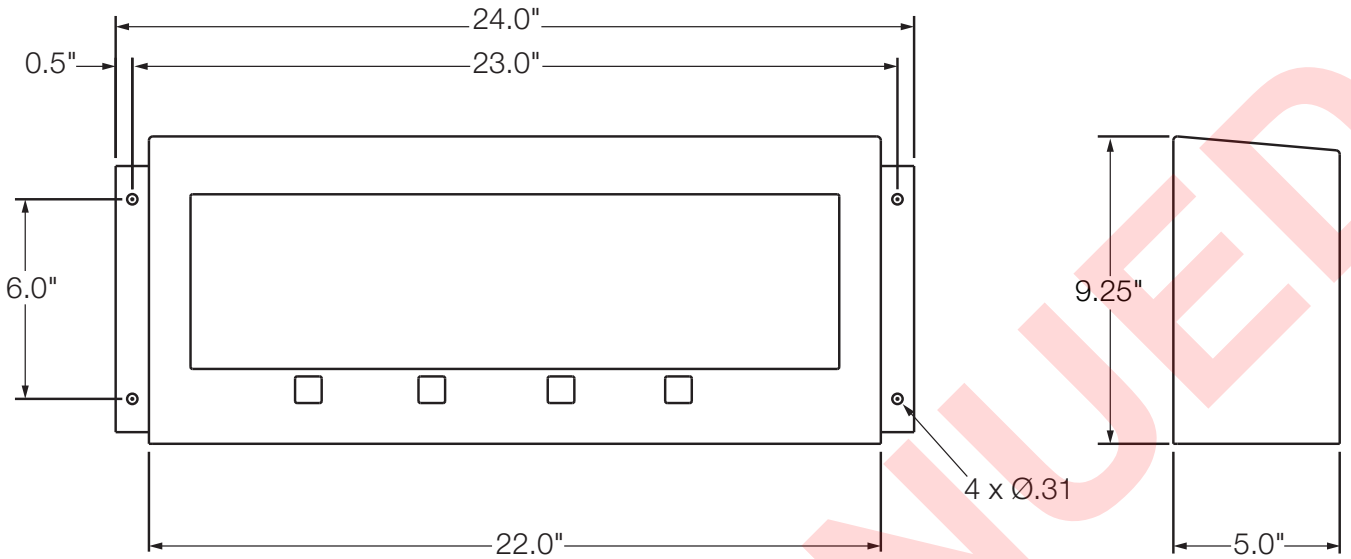

Figure 5-6. 4" Model Enclosure Dimensions

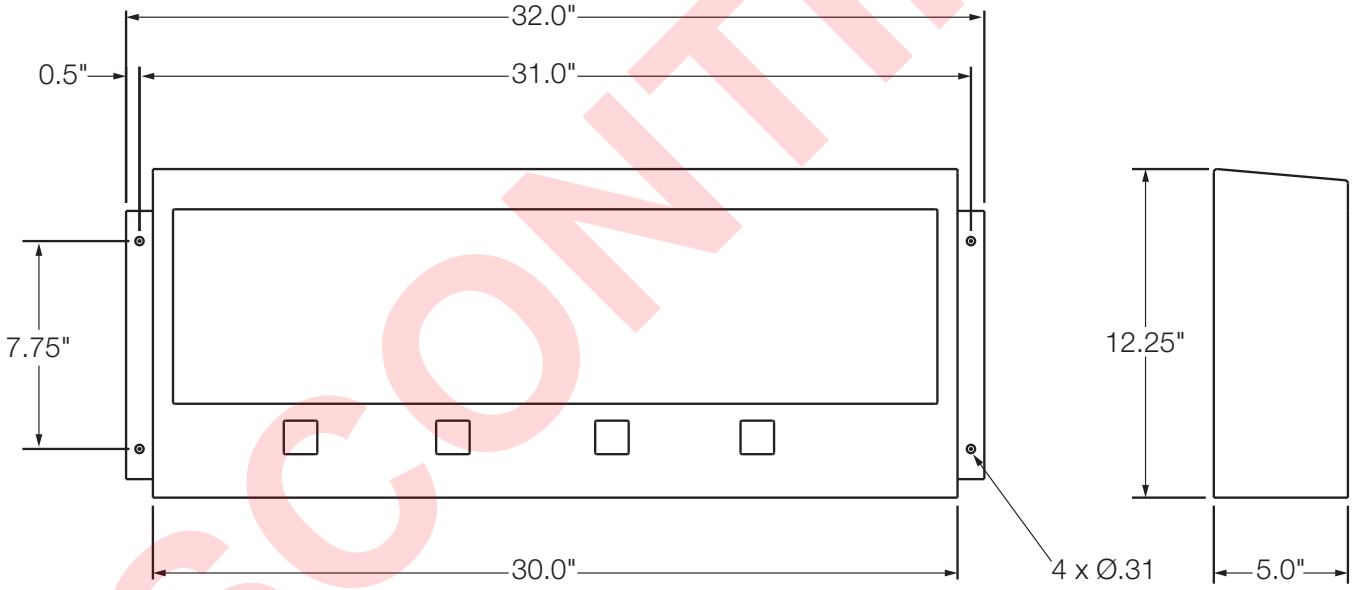

Figure 5-7. 6" Model Enclosure Dimensions

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5.4 LaserLight Matrix Display Enclosure Dimensions

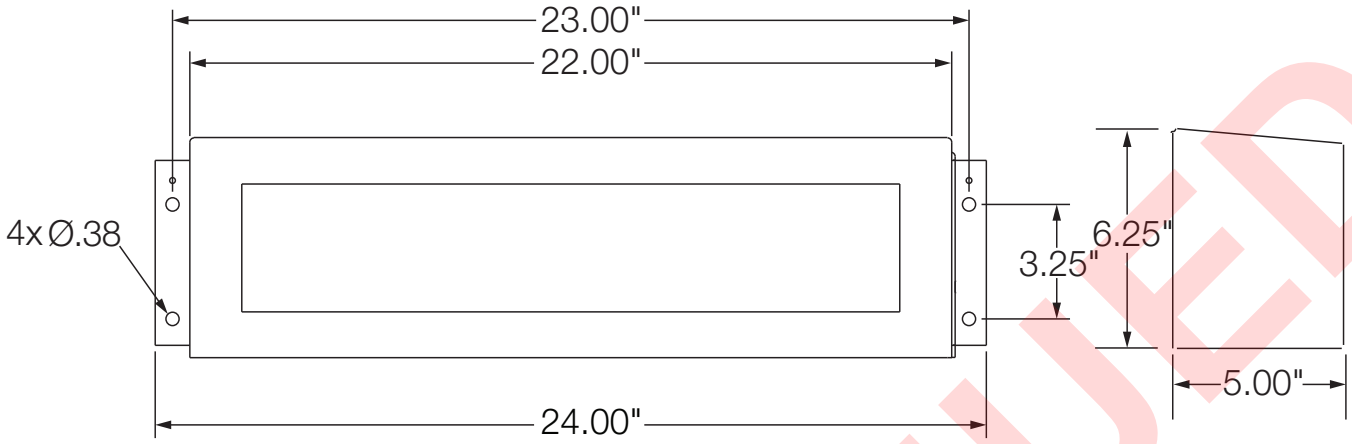

Figure 5-8. 3M8 Enclosure Dimensions

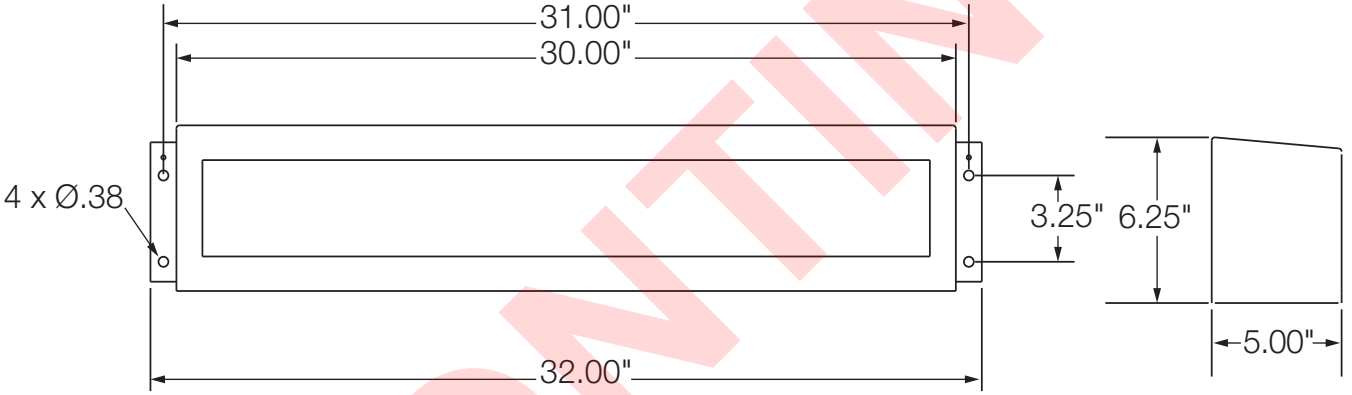

Figure 5-9. 3M12 Enclosure Dimensions

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6.0 Specifications

Operator Interface

Display	6-digit, 7-segment discrete oval precision optical performance red LED lamps 8- or 12-character 5x7 matrix display Contrast enhancement optical filtering 1- or 2-place decimal indication 2.75" digit: 5 x 7 dot matrix using discrete oval precision optical performance red LED lamps Contrast enhanced optical filtering lens 1- or 2-place decimal or comma indication 4 annunciators for GR, NT, lb, kg
Maximum Viewing Distance	150' (50 m)

Input Interface

RS-232, RS-485, 20 mA current loop (active or passive, switch selection)

Output Interface

Independently configurable echo port, RS-232 or 20 mA current loop (active or passive, switch selectable)

Input Data Format

Baud Rate	1200, 2400, 4800, 9600, and 19200 self learning or software selectable
Character Format	7 or 8 data bits, even, odd, or no parity; 1 or 2 stop bits, self learning or software selectable

Update

Continuous or out-of-motion only; Software selectable

Power Consumption

4" (101.6 mm)	21 W
6" (152.4 mm	27 W
8-character	21 W
12-character	27 W
24-SG-character	24 W

Time Option

Software Enable/Disable	12- or 24-hour time format

Date Option

Software Enable/Disable	US or ISO format

Serial Communications

Input Interface	RS-232, RS-485, 20 mA current loop (active or passive, switch selectable)

Environmental

Operating Temperature	-40°F–120°F (-40°C–48.8°C)
Temperature Option	Software selectable °F and °C, temperature probe automatically detected

Enclosure

Dimensions	4" 22" x 5" x 9.25" 6" 30"' x 5" x 12.25" 8-character 22" x 5" x 6.25" 12-character 30" x 5" x 6.25"
Weight	
4" (101.6 mm)	20 lb (9 kg)
6" (152.4 mm)	25 lb (11 kg)
8-character	16 lb (7 kg)
12-character	22 lb (10 kg)
4-SG-character	25 lb (11 kg)
Material	Weather proof, mild steel, powder coated

Warranty

2-year limited warranty

Certifications and Approvals

UL Approval for UL Models Only

c UL us LISTED

File Number: E355385

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