Hardware User Manual

(Manual Part Number MAN-UT-MARQUEE, Rev. 2)

DESIGNED, MANUFACTURED and Distributed by

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WARNING!

Programmable visualization products such as the Tough Smart Marquee are not fail-safe devices and as such must not be used for stand-alone protection in any application. Any reliance on these devices for equipment or personnel safety is unwarranted.

WARNING: If the Marquee is used in a CLASS I, DIV. 2 environment, the following conditions must be met: Class I, Div. 2 methods; AND — must conform to all rules and requirements of applicable jurisdictions regarding Class I, Div. 2 installations; ALSO — peripheral equipment controlling this device or being controlled by it shall be suitable for service in the location in which they are used. Failure to comply with any of the above installation requirements will invalidate the device's qualifications for service in CLASS I, DIV. 2 hazardous locations.

WARNING: EXPLOSION HAZARD — do not disconnect equipment unless power has been switched off or the area is known to be non-hazardous.

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Manual P/N MAN-UTIC-MARQUEE, Revision 2, 4/17

The diagrams and examples in this user manual are included for illustrative purposes only. The manufacturer cannot assume responsibility or liability for actual use based on the diagrams and examples.

Table of Contents

Purpose of this Manual

Manual Title: Tough Smart Marquee Hardware Manual

Purpose

This Tough Smart Marquee User Manual will give you all the information necessary to install the Tough Smart Marquee (TSM) in a fixed location in your work environment, and how to wire it to other components in your control system. Included are mounting diagrams and instructions for installation, Connections and Wiring requirements, Maintenance Information, Programming Information, and Troubleshooting.

This manual is a good reference guide for those who install the Marquee, as well as those who program it. If you understand the TSM, or Marquees in general, you can find all the information you need to start and maintain your system in this manual.

The following table provides you with updated information. If you call technical support with a question about this manual, please be aware of the revision number and date.

Revision	Author	Date	Pages Effected	Description of Changes
1.0	EG/ECF	October 2008	All	Original Release of Manual
2.0	DI	April 2017	All	Rewrite for TSM V2.0

Technical Support

If you need assistance, please call our technical support at 1-800-711-5109.

You can also email technical at sales@uticor.net.

Manual Organization

The information below provides an overall description of the topics covered within this manual.

Chapter 1: Getting Started

Provides Manual Organization and lists what you need to get started to display messages. Gives you a quick reference to get familiar with your Tough Smart Marquee. Discusses how to get help with questions you might encounter and how to contact Technical Support.

Chapter 2: Models and Equipment

Provides you with a table listing the various models, their part numbers and special features. Lists the important features and hardware specifications for different models.

Chapter 3: Installation, Wiring and Connection Information

Provides information about preparing the marquee for operation such as setting the DIP switches, connecting Power and how to interface Slave Marquees for Serial communication. Shows the mounting and cutout dimensions for the different models. Explains the different ways to mount the Marquee. Shows the setup screens displayed after initial power up of the display.

Tough SmartMarquee

Chapter 1: Getting Started

1.1 Installing the Tough Smart Marquee – Overview

This section is designed to take you through a quick start on how to use the TSM (Tough Smart Marquee). It assumes that you are a first-time user of TSM. By following the 3 Simple Steps, you will be creating and displaying messages on your TSM in no time.

Mounting

The TSM is a suspension mount unit. Please refer to the beginning of **Chapter 3: Installation** for environmental factors, hardware requirements and instructions.

Connections & Wiring

Once your TSM is mounted, you are ready to connect your unit to the power source, PLC, and other devices. Note that the TSM is an AC powered unit (120/240 VAC). For more details, refer to **Chapter 3: Wiring and Connections.**

Program and Run

Install the Tough Smart Marquee software. Connect your TSM to a PLC. Have your TSM start displaying messages!

1.2 What You Need to Get Started

1.2.1 Hardware

- Tough Smart Marquee (TSM) display
- 110/220 VAC input cord with stripped wire on one end
- TSM Programming Cable (UT-CPG1)
- Ethernet Cable (if applicable)
- Serial (RS232/RS422/RS485) PLC Communication Cable (based on PLC)
- PC requirements:
    - PC with a mouse and serial port (USB port may be used with Serial to USB converter [Aten, Belkin, or Tripp Lite recommended])
    - Standard Windows XP, Windows 7, or Windows 10 operating system.
- User Manual

1.2.2 Software

- ToughSmartMarquee software (version 1.0.8 or higher)

1.3 Need Help?

1.3.1 Tech Support

If you need assistance, please call our technical support at 1-800-711-5109.

North America Toll Free: 1-800-711-5109
World Wide: 1-563-359-7501

Fax: 563-359-9094

You can also email technical at sales@uticor.net. You can also visit our website at www.uticor.net.

1.3.2 Documentation

Queries	Information Resource
TSM Mounting and Installation	Tough Smart Marquee Hardware Manual (this manual)
TSM Wiring and Connections	Tough Smart Marquee Getting Started Guide Tough Smart Marquee Hardware Manual (this manual)
TSM PLC Connectivity	Tough Smart Marquee Getting Started Guide Tough Smart Marquee Hardware Manual (this manual)
TSM Programming	Tough Smart Marquee Started Guide Tough Smart Marquee Programming Software Help

Note: The Tough Smart Marquee Getting Started Guide is a simpler step by step process for setting up the TSM. All the information that is in the Tough Smart Marquee Getting Started Guide is also included in the Hardware User Manual (this manual).

Chapter 2: Models and Equipment

2.1 Product Overview for the Tough Smart Marquee (TSM)

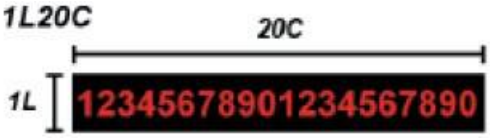
The TSM (Tough Smart Marquee) is a Master Marquee model; it monitors connected devices, such as PLCs, and is capable of issuing string messages or triggering messages based on external events to other marquees and devices.

The TSM is the most sensible marquee for stand-alone and Plant-wide communication displays with large character sizes so that the messages are visible up to 400 feet. Character visibility can be enhanced by scrolling or blinking the message.

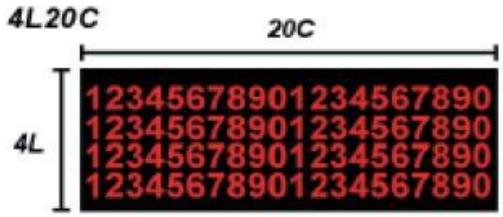
The TSM are offered in 16 different models, each with either Red or Tri-Color LEDs, to suit every application. You can display messages in 2", 4", 6", 8" and 8" Narrow characters. All TSM models are capable of communicating over RS-232, RS422, and Ethernet communications.

TSM can be interfaced with PLCs, PCs, and embedded controllers. You can also take advantage of TSM's International Character Set to display your messages in multiple international languages.

2" characters - readable from 100 feet
4" characters - readable from 200 feet
6" characters - readable from 300 feet
8" characters - readable from 400 feet
8" Narrow characters - readable from 400 feet



1L refers to one line or "row" that equals 20 characters (each 2" high). 20C refers to 20 characters, all of which are 2" high.



TSMs are available in several sizes. The smallest size is called the 1L20C. The other sizes are multiples of the smallest size, such as the 4L20C (shown above), and the 2L40C (which has two lines of text but is twice the length; thus supporting twice the number of 2" characters per line), etc. See chart in section 2.5.2 for a complete listing of sizes, with their full range of text possibilities.

2.1.1 Physical Characteristics

Tough Smart Marquees are enclosed in NEMA 12 or NEMA 4 extruded aluminum housing, or a NEMA 4x Welded Steel housing, with NEMA ICS 2-230 level of electrical noise immunity. Three grommets are provided for routing wires through the back access plate. The connectors and set-up switches can be accessed by removing the back access plate.

TSM can be mounted in three different ways. It can be mounted on a wall, ceiling or on top of the machine depending upon the application. Section 3 describes the various ways to mount and install the TSM.

2.1.2 Messages

How messages look depends on the way they are sent. Messages have options that determine message output and visual appearance. A network of two groups of a TSM and Tough Slave Marquees with 8 marquees in each group can be set up. When the message contains group and unit number information, the message can be displayed on one, some, or on all of the Tough Marquees.

The TSM also features International Character Sets. This option is switch-selectable to allow message display in U.S., English, French, Danish, Swedish, German, Cyrillic, or Japanese Kana.

2.1.3 Where to Use TSM Display

Using Tough Smart Marquee is an excellent way to keep workers in touch with the manufacturing process via the following:

- Monitor Productivity of each machine, line, or the whole plant
- Communicate Alarm and Safety Messages
- Provide Continuous Reports on Factory Conditions

2.2 Tough Smart Marquee Part Number System

TSM - XLXXC - X - X - X - X - X - X
1 2 3 4 5 6 7

1. Size of display:
   XL**YY**C, where “X” = the number of lines of text, and “YY” = the number of characters per line. For example: 4L20C = 4 lines of text, with a maximum of 20 characters per line. **See chart on page section 2.5.2 for a full breakdown of unit sizes, with their display features, dimensions, weights, etc.**

2. Text Color:
   R - Red
   T – Tricolor

3. Master or Slave:
   M – Master
   S – Slave

4. Option card:
   E – No card selected: RS232, RS422/485 & Ethernet ports
   C – Mitsubishi CCLink
   D – DeviceNet
   H – DH+ and Remote I/O
   M – Modbus Plus
   P – Profibus

5-6. Type of enclosure & Housing Material
   N-A – NEMA 12 Aluminum Extrusion
   X-X – NEMA 4 Aluminum Extrusion
   W-C – NEMA 4X Powder Coated Cold Roll Steel
   W-S – NEMA 4X Stainless Steel

7. Display:
   H for high bright outdoor use marquee; only works with Red text color ("**R**" in position 2)

2.3 Tough Smart Marquee Features

- 2" to 8" Tri-Color characters
- International Character Set
- 24 hour Burn-in tested
- NEMA 12
- Pre-Matched LEDs
- 16 Available Models (1 Line 10 Char to 4 Line 40 Char)
- 110/220 VAC Power Input voltage
- UL, CUL, CE, CSA Approval (pending)
- Stationary, Scrolling and Blinking Messages
- 100,000 Hour rated life
- Mixed Character sizes on one Line
- NEMA 12, NEMA 4/4X, Class I, Div II with FDA Compliance, Aluminum or Stainless Steel Industrial enclosures

2.4 TSM Other Parts

There are replacement parts and other optional equipment available to customize or upgrade the TSM to fit your application. The tables below provide you with a list of this equipment. Instructions, if necessary, on how to install this equipment to upgrade your unit are also provided.

Part	Description	Notes
TSM Programming Software	Software to program TSM	Order by request by calling 1-563-359-7501
Grommets	Connectors on the TSM back plate	Order by request by calling 1-563-359-7501
Back Plate	TSM back plate with grommets	Order by request by calling 1-563-359-7501
Mounting Brackets	Mounting Brackets for the TSM	Order by request by calling 1-563-359-7501
Phoenix Connectors	Phoenix connects for plug-in Terminal Block	Order by request by calling 1-563-359-7501

2.5 Unit Specifications

General Specifications for all the TSM models are provided in the following pages.

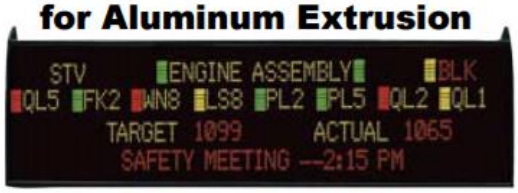
2.5.1 General Specifications for all Tough Smart Marquee's

Enclosure:	NEMA 12, NEMA 4/4X, Class I, Div II with FDA Compliance, Aluminum or Stainless Steel
Power Supply:	110 VAC (102-132) 47-63 Hz / 220 VAC (194-250) 47-63 Hz
Power:	28-180 Watts (Depending on size)
Operating Temperature:	0° to 55° C (32° to 131° F)
Storage Temperature:	-40° to 90° C (-4° to 140° F)
Humidity:	10 – 95% RH, non-condensing
Electrical Interference:	NEMA ICS 2-230 Showering Arc Test
Electrical Tolerance:	ANSI C37.90a-1974 (SWC) Surge Withstand Capability Test
Vibration:	5 to 55 Hz 5G for 2 hours in the X, Y, & Z axes
Shock:	20G for under 12 mSec in the X, Y, & Z axes

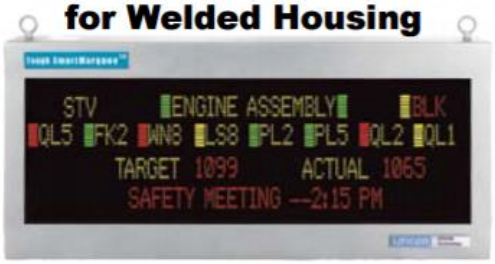
2.5.2 Marquee Dimensions, Weights, and Display Options by Unit

This table shows the dimensions and weights for each Marquee model, according to the housing material selected.

"X-X" in positions 5 and 6 for Aluminum Extrusion



"W-S" in positions 5 and 6 for Welded Housing



"W" Welded Housing Dimension and Weights

Model	Dimension (WxHxD)	Character Height	Characters Per Line	# of Lines	Weight
2L10C	20" X 6.25" X 4.25"	2"/4"	10/5	2/1	20 lbs.
1L20C	40" X 4" X 4.25"	2"	20	1	30 lbs.
2L20C	40" X 11.5" X 4.25"	2"/4"	20/10	2/1	47 lbs.
4L20C	40" X 16.3" X 4.25"	2"/4"/6"/8"/8N	20/10/6/5/10	4/2/1/1/1	65 lbs.
8L20C	40" X 25.9" X 4.25"	2"/4"/6"/8"/8N	20/10/6/5/10	4/2/1/1/1	101 lbs.
2L40C	72" X 11.5" X 4.25"	2"/4"	40/20	2/1	81 lbs.
4L40C	76" X 16.3" X 4.25"	2"/4"/6"/8"/8N	40/20/13/10/20	4/2/1/1/1	112 lbs.
8L40C	76" X 25.9" X 4.25"	2"/4"/6"/8"/8N	40/20/13/10/20	4/2/1/1/1	178 lbs.
2L80C	150" X 11.5" X 4.25"	2"/4"	80/40	2/1	189 lbs.
4L80C	150" X 16.3" X 4.25"	2"/4"/6"/8"/8N	80/40/26/20/40	4/2/1/1/1	250 lbs.

"X" Aluminum Extrusion Housing Dimension and Weights

Model	Dimension (WxHxD)	LED Type	Character Height	Characters Per Line	# of Lines	Weight
2L20C	37.05" x 7.28" x 4.18"	Red/Tricolor	2"/4"	20/10	2/1	18 lbs.
4L20C	37.05" x 12.08" x 4.18"	Red/Tricolor	2"/4"/6"/8"/8N	20/10/6/5	4/2/1/1	34 lbs.
2L40C	73.25" x 7.28" x 4.18"	Red/Tricolor	2"/4"	40/20	2/1	34 lbs.
4L40C	73.25" x 12.08" x 4.18"	Red/Tricolor	2"/4"/6"/8"	40/20/13/10	4/2/1/1	70 lbs.

Chapter 3: Installation

3.1 Installation Considerations

Uticor products have been designed and tested for operation in the most demanding industrial environments. Modern solid-state industrial controls are complex electronic equipment that operates at low levels of voltage and current, coexisting with components that operate at much higher levels of power. The difference in operating power characteristics between the high and low power control devices creates the possibility of unwanted signals being generated causing interference. The interference, which is a by-product of electrical noise, is not present at all times. However, it appears at random and during brief periods of time can cause disruptions and errors in the operation of a control system.

Enhancement of a system's noise level immunity, and its tolerance to other environmental hazards can be accomplished by following proper system installation guidelines. The recommendations that follow are of a general nature and constitute good, solid state industrial installation practice.

3.1.1 General Environmental Installation Considerations

Avoid installing your Marquee in areas where the following conditions may exist:

- Environmental temperatures above or below those specified by the system being installed
- Prolonged exposure to humidity and liquids which may be sprayed or splashed on the equipment
- Dusty environments where airborne particles may accumulate on equipment causing reduction of heat dissipation, and reduction in effective electrical spacing between components
- Areas of excessive vibration
- Areas of high-radiated electrical noise, such as near fields of transmitting antennas and areas in close proximity of arc welding stations

3.1.2 Environmental Specifications

The following table lists the environmental specifications that generally apply to the TSM. However I/O module operation may fluctuate depending upon the ambient temperature and your application.

Parameter	Ratings
Operating Temperature	0° to 55° C (32° to 131° F)
Storage Temperature	-40° to 90° C (-4° to 140° F)
Humidity	10 – 95% RH, non-condensing
Vibration Resistance	5 to 55 Hz 5G for 2 hours in the X, Y, & Z axes
Shock Resistance	20G for under 12 mSec in the X, Y, & Z axes
Electrical Noise	ANSI C37.90a-1974 (SWC) Surge Withstand Capability Test

3.1.3 AC Line Noise

The AC power available in house outlets and at sub-stations powering industrial and commercial applications is generally generated at a power station miles away from the point of usage. The power is “noise” free at the time it is being generated, and meets all specifications for amplitude, frequency, harmonic distortion and others. However, the same specifications cannot be guaranteed at the point of usage, due to the disruptive factors associated with the transmission from generator to consumer.

While the generated power output starts its journey “clean,” and free of noise, it is “polluted” by radio and TV frequencies, spikes from reactive kickbacks due to switching heavy inductive and capacitive loads in transmission lines, and from other interference.

As a result, critical and sophisticated electronic controls may malfunction; false triggering, user program loss and/or modification may occur and even catastrophic failure.

In view of the problems associated with AC power, it is strongly recommended the source, transmission and final end use be given stringent consideration before any commitment to supply the system is given. Some typical problems in power line usage are:

Blackouts: This is the total loss of power. Generally, they are easy to detect and if a situation arises where they cannot be tolerated then an uninterrupted power supply (UPS) should be used.

Brownouts: This occurs when there is a reduction in line voltage amplitude. If this reduction falls within operating limits, no adverse effects will be experienced. However, if they are frequent and severe, a UPS system should be considered.

Voltage Fluctuations: These are amplitude variations (rapid or slow) and can occur above or below the specified limits. Overvoltage conditions may damage equipment if the duration of the voltage condition is lengthy. It may cause disruptions, data loss, and production downtime.

Noise Spikes: Noise spikes and other unwanted signals superimposed on the AC line voltage waveform are the most common problems associated with the distribution of the power from its grid system. The amplitude of these signals can be from several hundred to a few thousand volts and the pulse width from about one to 200 microseconds. Because of their short duration and random occurrences, these harmful signals are difficult to detect.

3.1.4 Dealing with AC Line and Other Electrical Noise

The best option to effectively eliminate or greatly reduce voltage fluctuations, spikes and line noise is through the use of isolation, constant voltage, or power line conditioner transformers.

Isolation transformers are passive devices that do not have DC paths between the circuits they isolate. The transformer provides attenuation to spikes and common mode noise, but has virtually no effect on transverse mode noise and does not provide protection for voltage fluctuations.

Constant voltage transformers are static Ferro-resonant transformers that can accept fluctuating AC voltage input (within a specified range) and maintain a constant voltage output. The transformers provide good attenuation to transverse mode type noise, however, are ineffective for attenuation of common mode type signals.

Power line conditioning transformers provide good line regulation and are effective in providing attenuation to both common and transverse mode types of noise.

All of the mentioned transformer types are available by various manufacturers and they come in different varieties of operating voltages, power ratings, and frequencies.

Make sure that the 110-220VAC Power Source for the Marquee is a clean noise-free power source used for low voltage control systems as described above. It should be isolated from heavy inductive or RF loads such as motors, motor starters, and welding and other RF equipment. Marquee's power source should be either the same as, or of the same quality, as that used to power your PLC.

The power cable and unshielded communication cable must be run in a separate conduit or wiring harness. The shield at both ends should be connected to the Earth Ground Terminals to minimize extraneous electrical noise pick-up.

CAUTION!

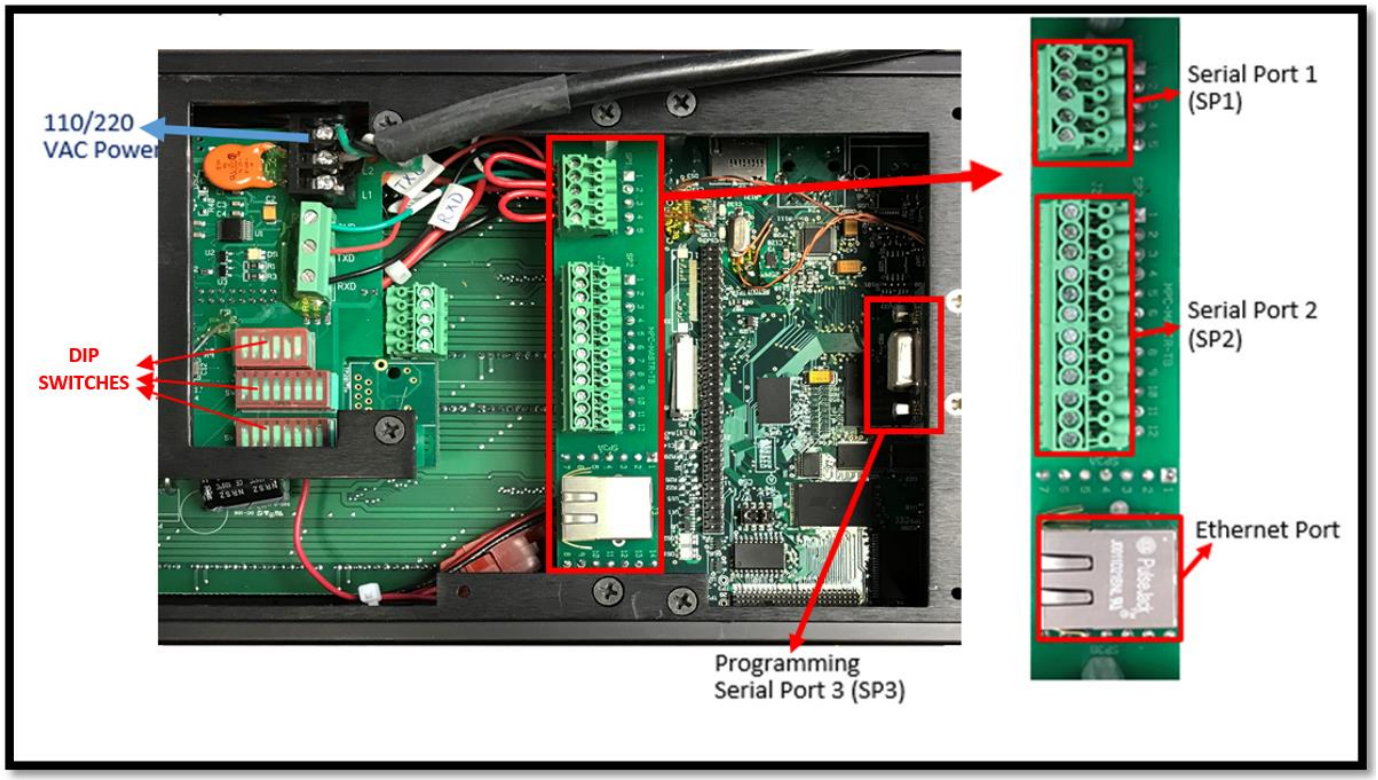
Make sure you connect the Earth Ground wire to the Earth Ground Terminal on the Marquee to avoid possible shock.

3.2 Wiring and Connections

This section of the manual provides information about preparing the marquee for operation, such as setting the DIP Switches, connecting power and preparing to interface the Marquee for serial communication.

3.2.1 Accessing Connectors and Switches

The Marquee has an Access/Cover plate on its backside. This is a gasket cover plate with three sealed grommets for power, serial communication cable, and Ethernet cable. The gasket and the grommet seal must be intact to retain NEMA 12, NEMA 4X Class I, DIV II rating. Once you remove the cover plate by removing the four access screws on the plate, you have access to wiring terminals and 3 different DIP switch banks for marquee parameter selection.



3.2.2 Setting Up DIP Switches

Group and Unit Number: Each TSM is assigned a unit address. A unit address is programmed into each message to specify which unit or units should display that message. The unit address of a TSM is defined by the setting of the Dip Switch located inside the back panel under the access plate. This can be changed at any time to alter the address of the unit. Each unit address consists of two identifiers—a Group and a Unit Number. The unit addresses are divided into Group and Unit Numbers to allow the TSM to address selected subsets of all the TSM displays connected to it.

NOTE: The Unit Number and Group Number selection is applicable only if you use the RS232 port of the Tough Smart Marquee.

CAUTION!

Please DO NOT TOUCH SW1 (the 6-position DIP switch above the 8-position DIP switches)! SW1 is for factory use only!

3.2.3 DIP Switch 1 (SW1)

DIP Switch 1 is preset from the factory

DO NOT touch DIP Switch 1 under any circumstances!

3.2.4 DIP Switch 2 (SW2)

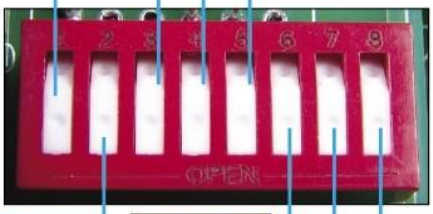
The diagram below illustrates how to set up DIP Switch 2:

Unit Selector

Switches			Unit Number
5	4	3	
0	0	0	1
0	0	1	2
0	1	0	3
0	1	1	4
1	0	0	5
1	0	1	6
1	1	0	7
1	1	1	8

Baud Rate

Switch 1	Baud
0 =	9600
1 =	38.4K



Character Set

Switches			Char. Set
8	7	6	
0	0	0	U.S.
0	0	1	Cyrillic
0	1	0	French
0	1	1	German
1	0	0	English
1	0	1	Danish
1	1	0	Swedish
1	1	1	Kana

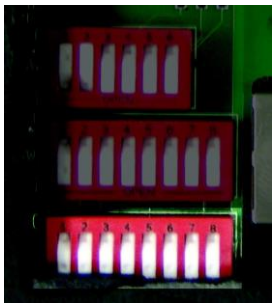
Group Selector

Switch 2	Group #
0 =	1
1 =	2

Open = OFF = 0
Closed = ON = 1

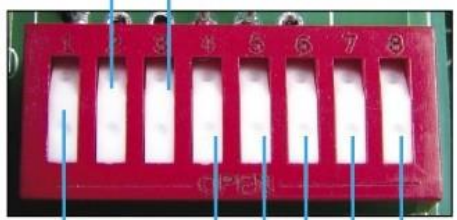
3.2.5 DIP Switch 3 (SW3)

The diagram below illustrates how to set up DIP Switch 3:



Default Character Size

SW2	SW3	Default
1	1	0 = 8 inch
0	1	1 = 6 inch
1	0	2 = 4 inch
0	0	3 = 2 inch



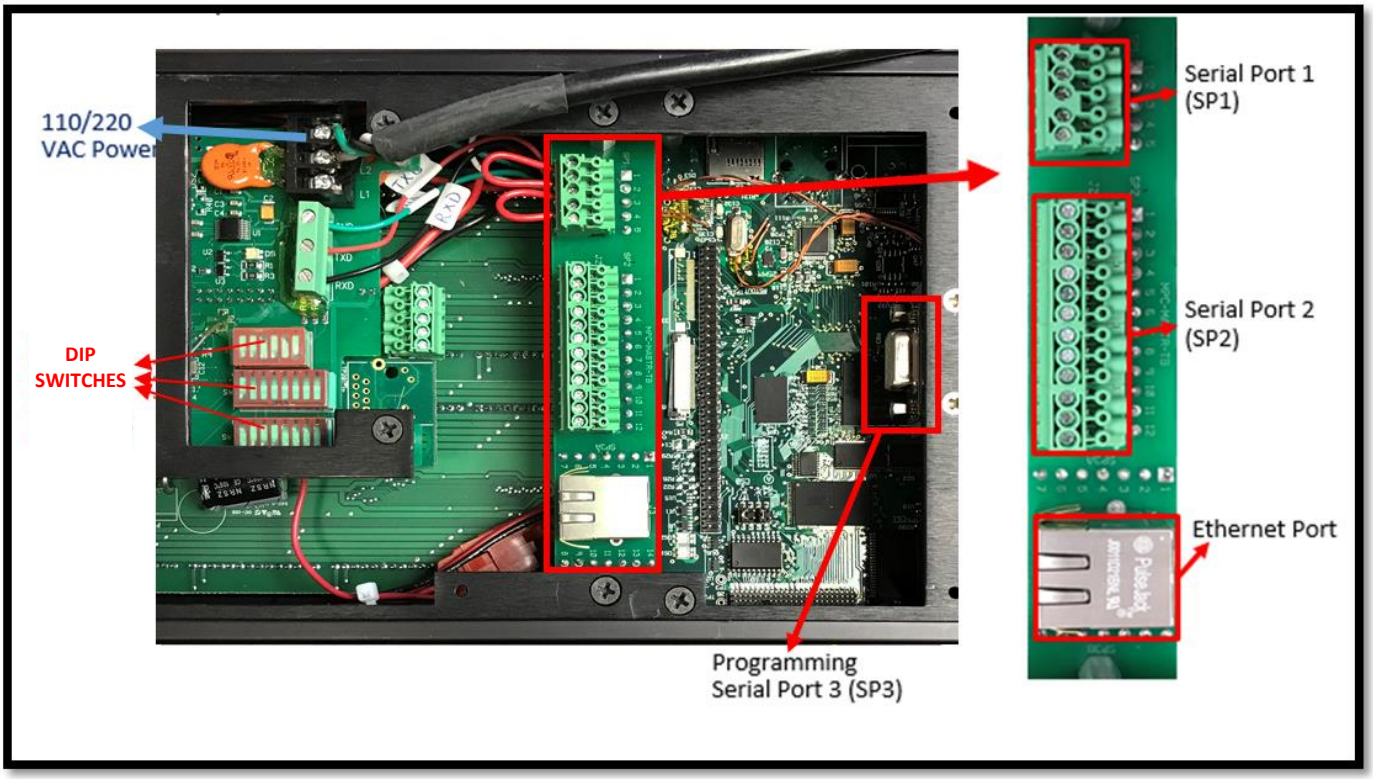
PMD/ASCII Protocol

Default	SW1
0 = PMD	1 = PMD
1 = ASCII	0 = ASCII

Not Used

Open = OFF = 0
Closed = ON = 1

3.3 Serial Communication Ports



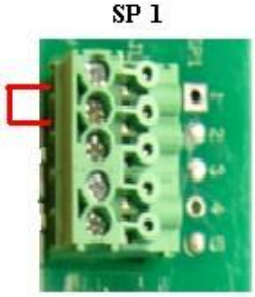
The Tough Smart Marquee has 3 different serial ports for communication. These 3 different serial ports each have a different functionality. Serial Port 1 (SP1) is used to communicate to TSM slaves. Serial Port 2 (SP2) is used to communicate with PLCs serially. And finally Serial Port 3 (SP3) is used to download projects to the TSM and to setup the TSM's IP address. The TSM also has an Ethernet Port that can be used for both PLC communication and to download projects to the TSM.

3.3.1 Serial Port 1 (SP1)

Serial Port 1 (SP1) is pre-wired in the factory as shown below, i.e. Pins 1-2 on SP1 are jumped together. This jumper connects the serial port on the Message Controller board within the marquee, to the serial port of the Message Display board in the marquee. **The jumper is required for the Marquee to display messages sent from the controller.** This port IS **NOT** used for PLC communication or PC to TSM programming. This port can be used to connect a SLAVE marquee to the TSM over RS232.

To connect a slave unit to the master TSM, please use terminal numbers on SP1:

2 (Tx)
3 (Rx)
5 (GND)



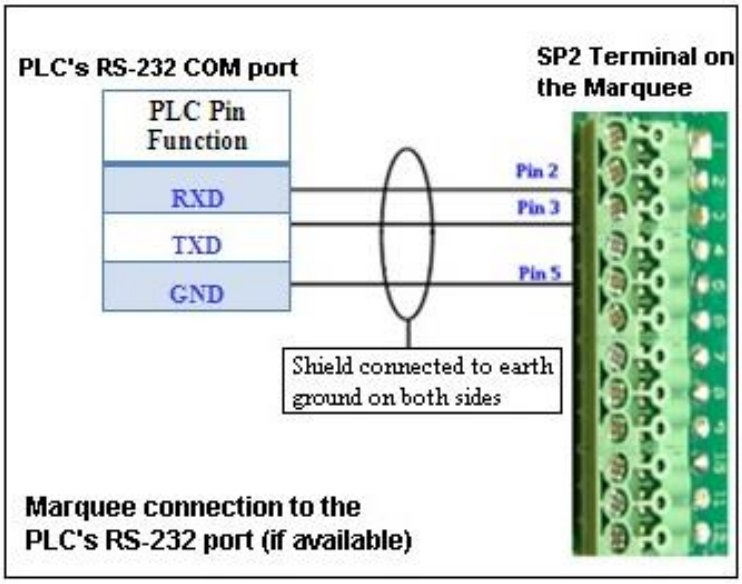
Pin Number	Function
1	RX (Message Display Board)
2	**TXD** (Message Controller Board)
3	**RXD** (Message Controller Board)
4	TXD (Do Not Use)
5	**GND**

3.3.2 Serial Port 2 (SP2)

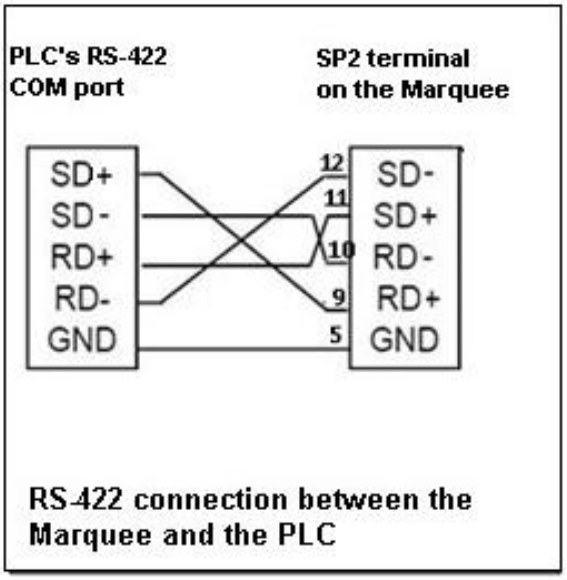
The SP2 connector is used to connect the TSM to the PLC via **RS-232 or RS 422/485** communication. If the user wants to connect the PLC to the TSM over Ethernet, no wiring is required to this port.

SP 2

Pin Number	Pin Function (from the Marquee's perspective)	Marquee serial Communication
1	N.C.	
2	TXD	RS- 232
3	RXD	RS- 232
4	N.C.	
5	GND	RS- 232 / 422 / 485
6	N.C.	
7	N.C.	
8	N.C.	
9	RD+ (Receive Data)	RS- 422 / 485
10	RD- (Receive Data)	RS- 422 / 485
11	SD+ (Send Data)	RS- 422 / 485
12	SD- (Send Data)	RS- 422 / 485



Marquee connection to the PLC's RS-232 port (if available)



RS-422 connection between the Marquee and the PLC

3.3.3 Serial Port 3 (SP3)

The SP3 connector is used to connect the TSM to the PC via a programming cable (**UT-CPG1)**. Once the IP address of the TSM is set by using the programming software and UT-CPG1, the user can use an Ethernet cable to transfer the program to the unit.

Connect the UT-CPG1 to the SP3 Connector using the female 9-pin D-sub connector. This port allows the user to change the IP address of the unit, download a new user program, or upgrade TSM application (firmware) over the serial port

To communicate with the TSM using the Programming software running on a PC, follow these steps:

1. Turn off the power to the unit, and connect serial port of PC to the serial port **SP3** on the TSM's Controller board using an UT-CPG1.
2. Turn ON the power to TSM. Wait until the TSM boots up (about 30 seconds).
3. Now you will be able to communicate to the TSM from the PC through the programming software. You can check /modify IP parameters, download a new user program, or upgrade the Marquee firmware serially.
4. You can also run the TSM while being online with the Programming Software to monitor tags and/or troubleshoot the TSM.

3.3.4 Ethernet Port

The TSM's Ethernet port can be used to program the unit and also for PLC communication using PLC communication protocols such as Allen-Bradley's Ethernet/IP, Modbus TCP/IP, Siemen's ISO over Ethernet etc.

The Factory default settings are:

IP Address: 192.168.0.1
Subnet Mask: 255.255.255.0

This is displayed on the TSM during power up sequence. This can be changed by the user to suit their available IP addresses in their network.

3.4 Power Connection

The TSM's power input is 110-220VAC @ 50-60Hz. Three terminals are provided for connecting operating power to the unit. These terminals are located on the Control Board (see the figure below). Power Input terminals are labeled L1, L2, and chassis ground (8). Always connect the ground terminal to the safety ground.

Connect the unterminated end of the AC Power Cord to L1, L2, and GND (Black or Brown to L1, White or Blue to L2, Green or Green w. Yellow stripe to GND).

Terminal Block	Pin	Lead	Wire *(US)*	Wire *(European)*
	⏚	(GND)	Green	Green/Yellow stripe
	L1	Load	Black	Brown
	L2	Neutral	White	Blue

3.5 Mounting Overview

The diagrams in this chapter provide all the diagrams and dimensions you will need for each model to prepare the mounting area. TSM models are mounted using several different methods, depending on the size and weight of the unit. Due to their size, and the need for visibility, most will be suspended from above. But smaller units can be mounted onto a surface. A variety of suspension rigs and mounting brackets are available with the units.

CAUTION!

To ensure proper cooling of the Tough Smart Marquee:

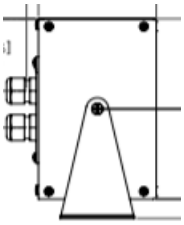
- **Mount on a VERTICAL SURFACE ONLY**
- **Allow 1-inch clearance between rear of panel and enclosure**
- **Allow 4-inches for panel X-Y clearance**

3.5.1 Mounting and Dimensions

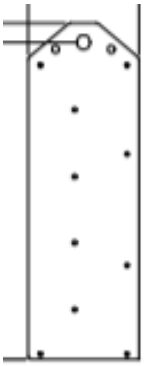
Mounting Overview

Depending on size the TSM will come with different mounting options. For smaller sizes you will have hanging/tilting brackets included with the TSM. The hanging/tilting brackets use the hole on the side of the Marquee and allow for the TSM to be hung using these brackets. Bigger sizes of Marquee will instead have a preinstalled hanging brackets attached to the assembly side of the Marquee. Finally bigger sizes of cold rolled steel Marquees will have attached hanging bolts installed on top of the assembly of the Marquee. Please refer to the dimension drawings to see the type of mounting included with the Marquee.

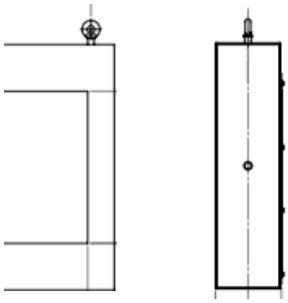
Hanging/Tilting Brackets



Preinstalled Assembly Hanging Brackets

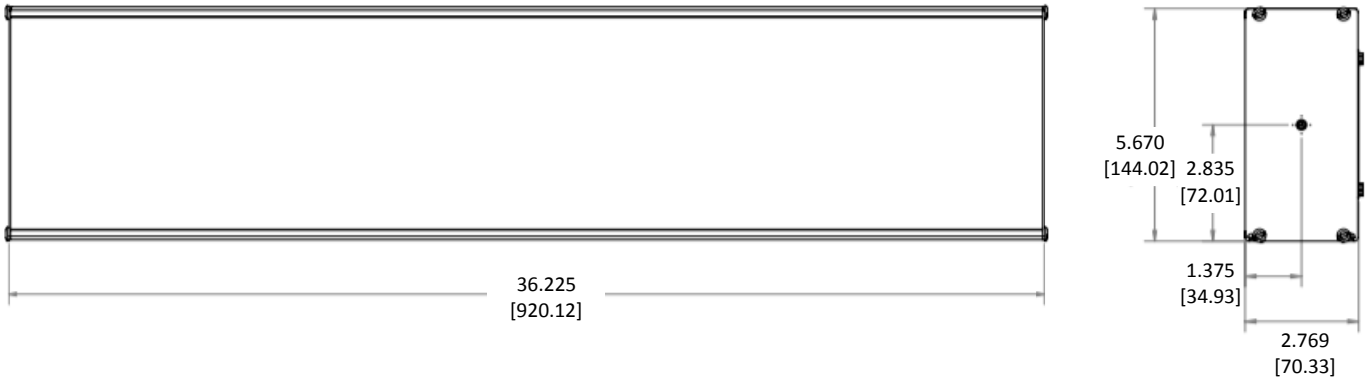


Hanging Bolts

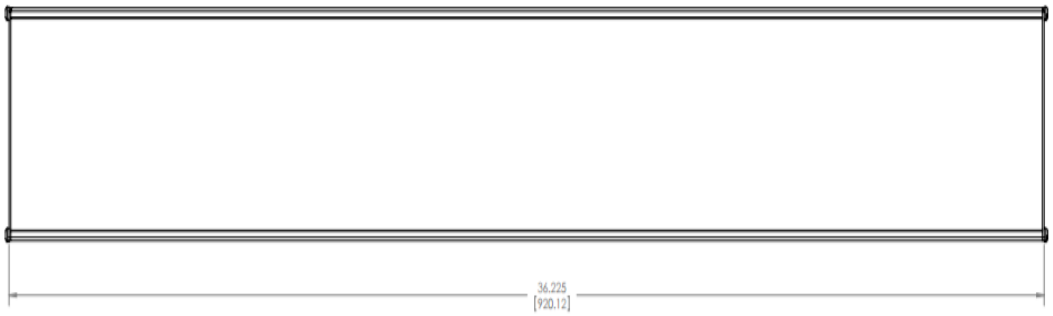


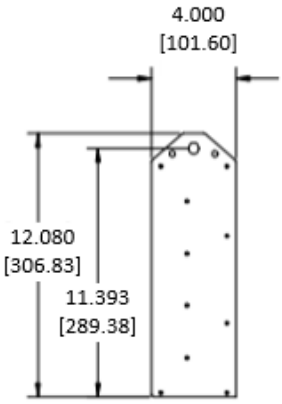
Dimensions of Extrusion Housing

2L20C – Extruded Type

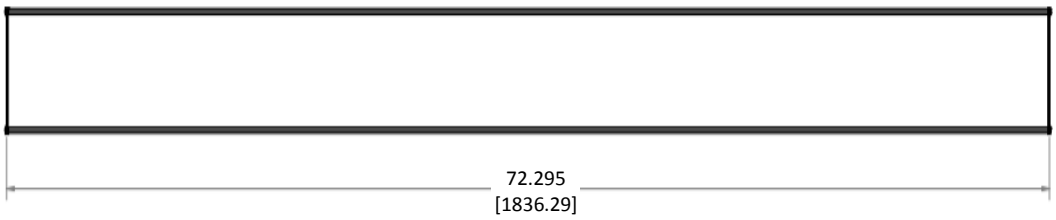


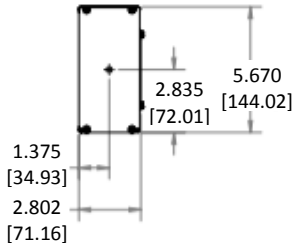
4L20C – Extruded Type



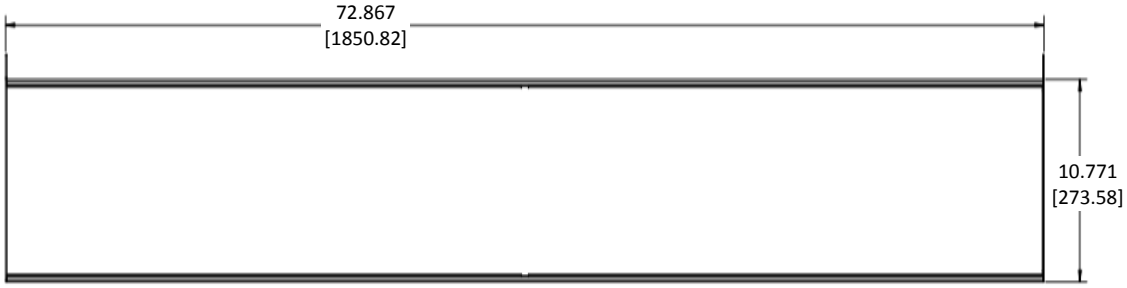


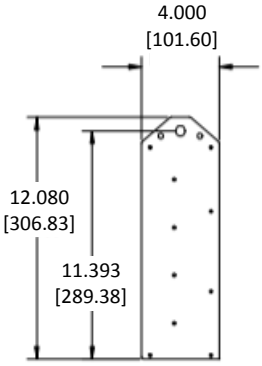
2L40C – Extruded Type





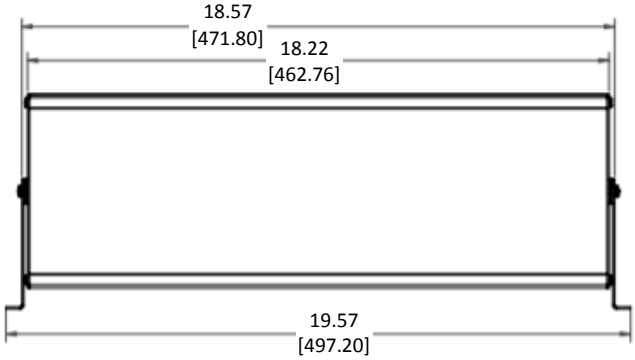
4L40C – Extruded Type

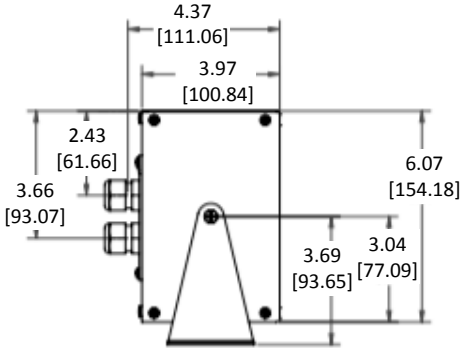




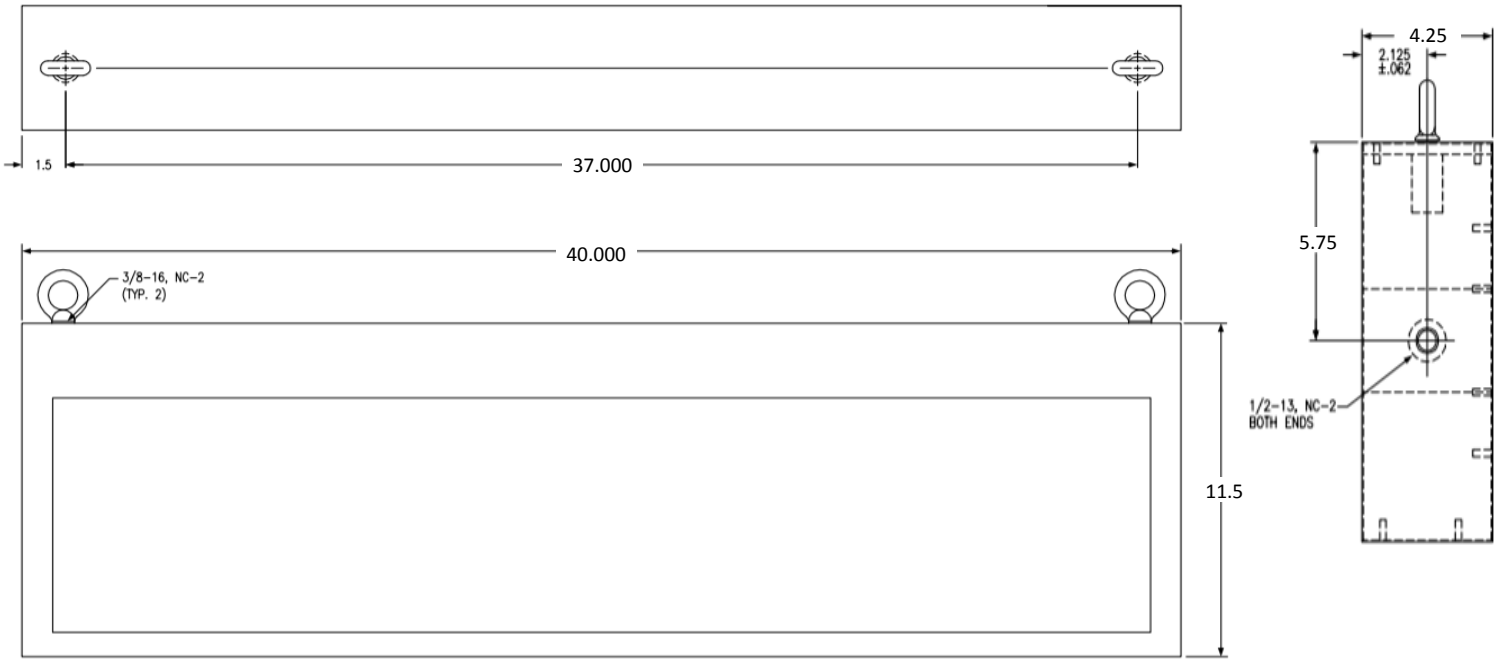
Dimensions of Welded Housing

2L10C – Welded Type

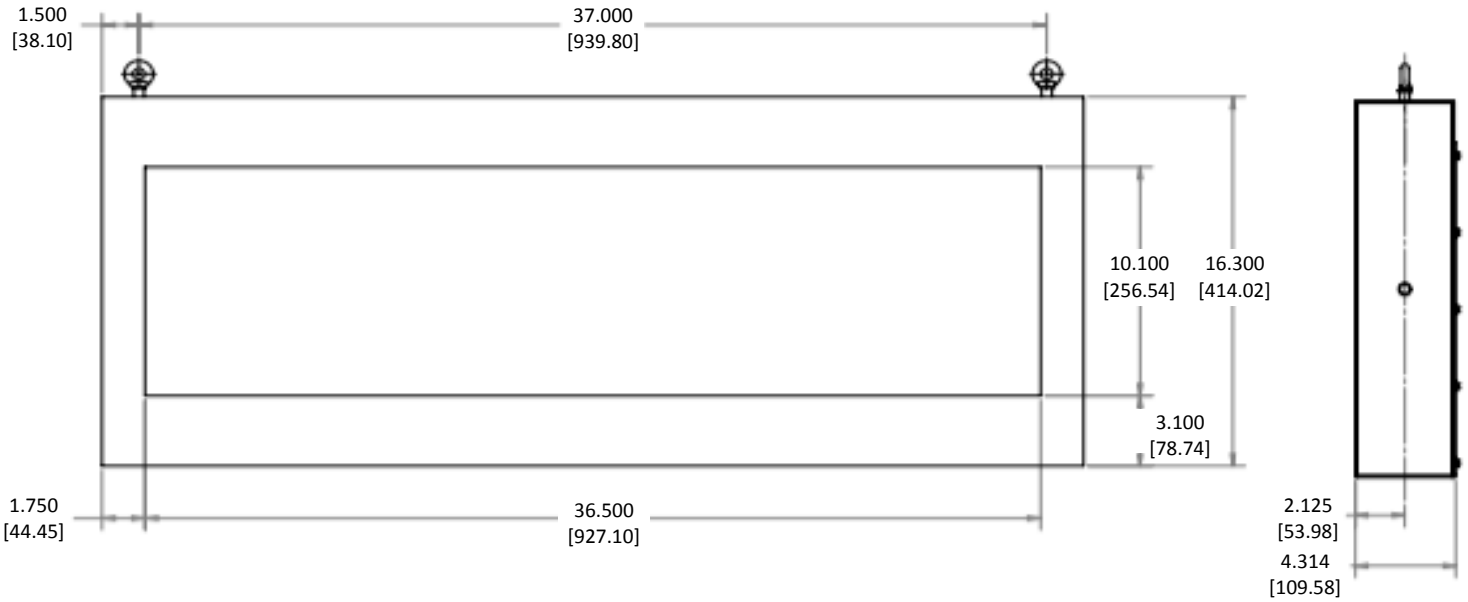




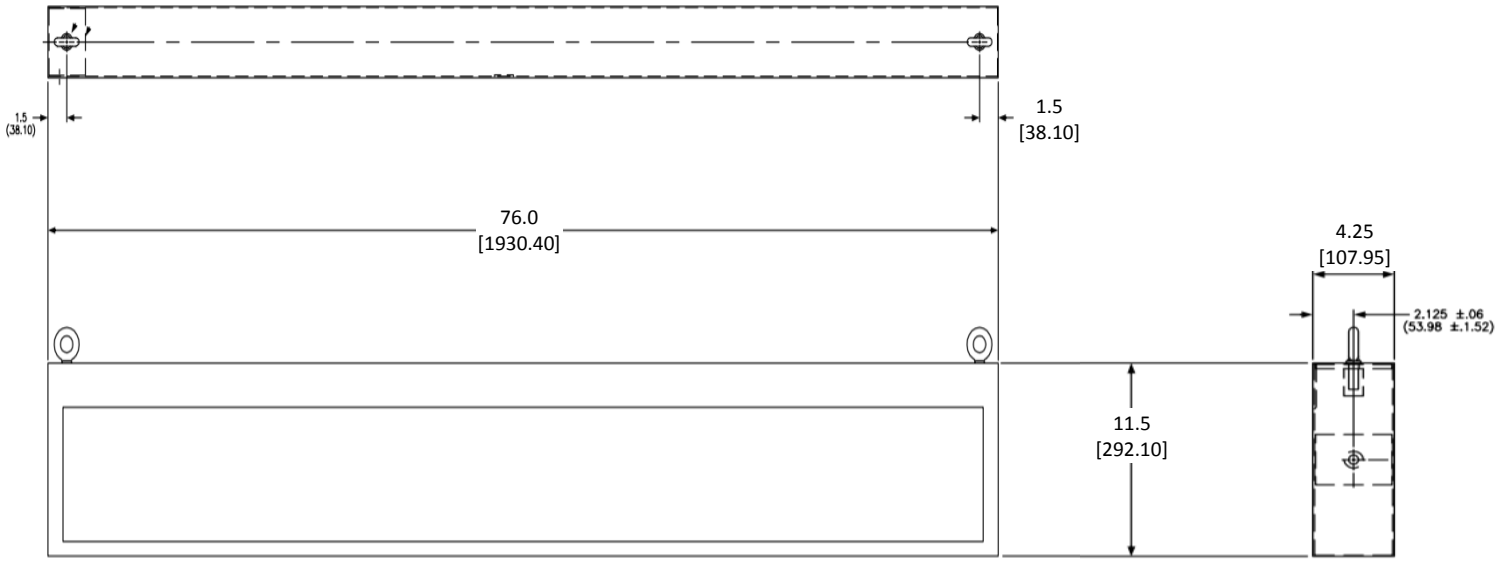
2L20C – Welded Type



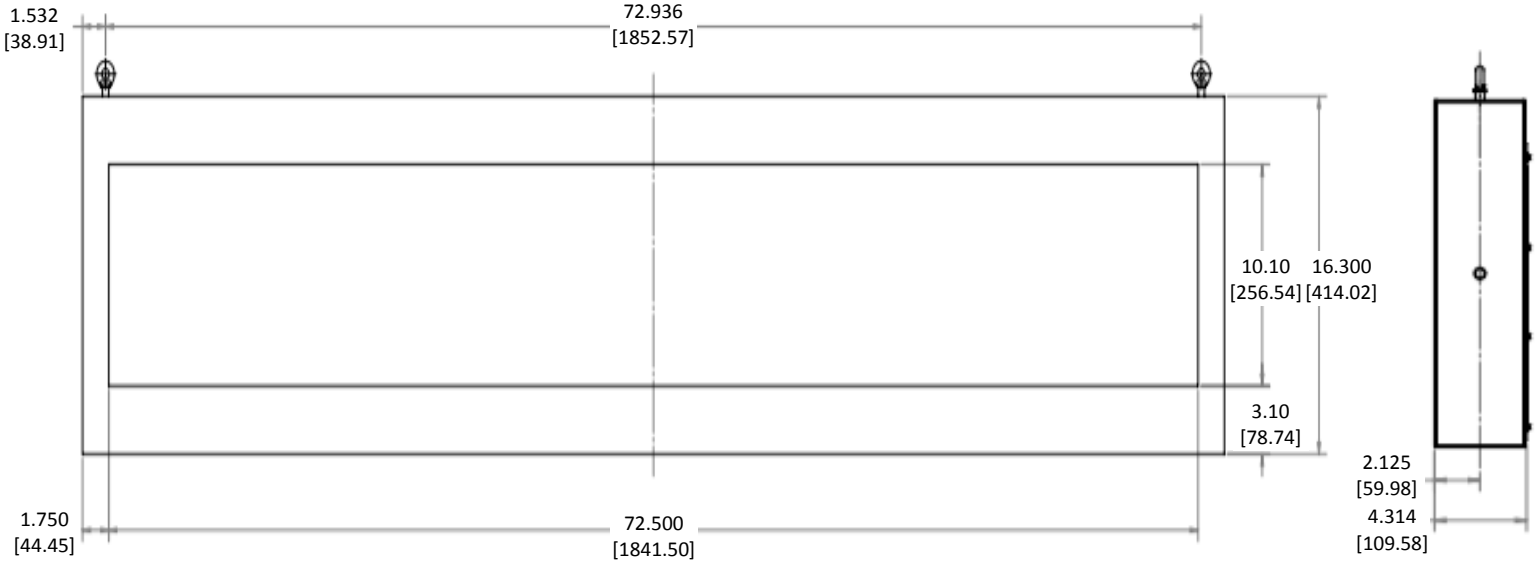
4L20C – Welded Type



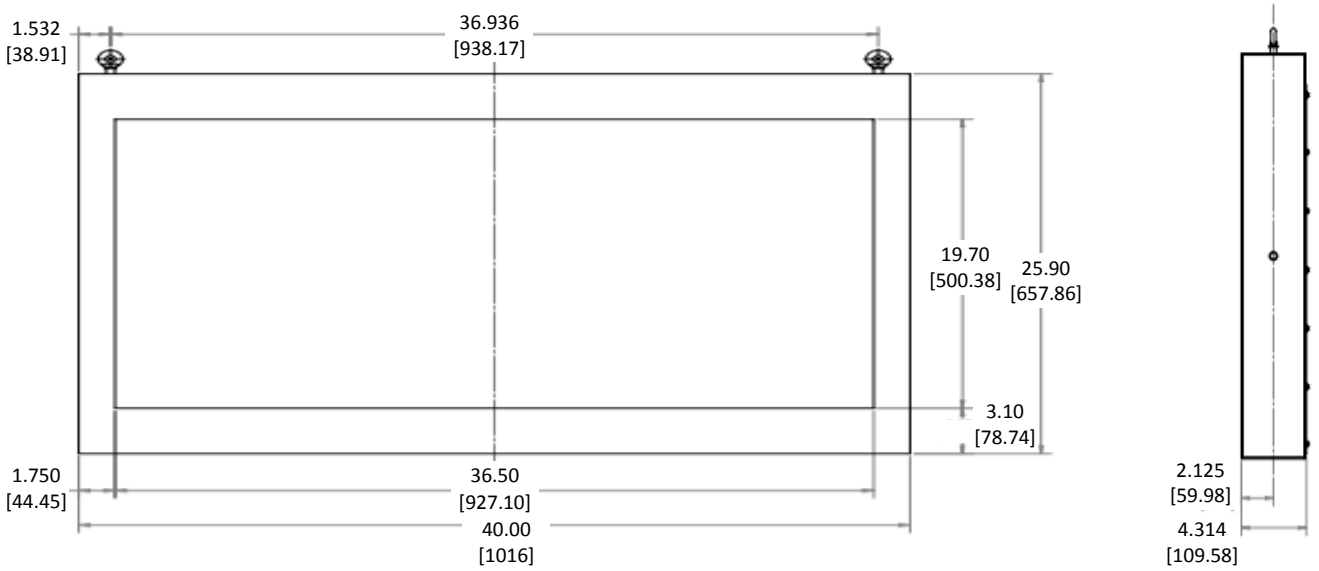
2L40C – Welded Type



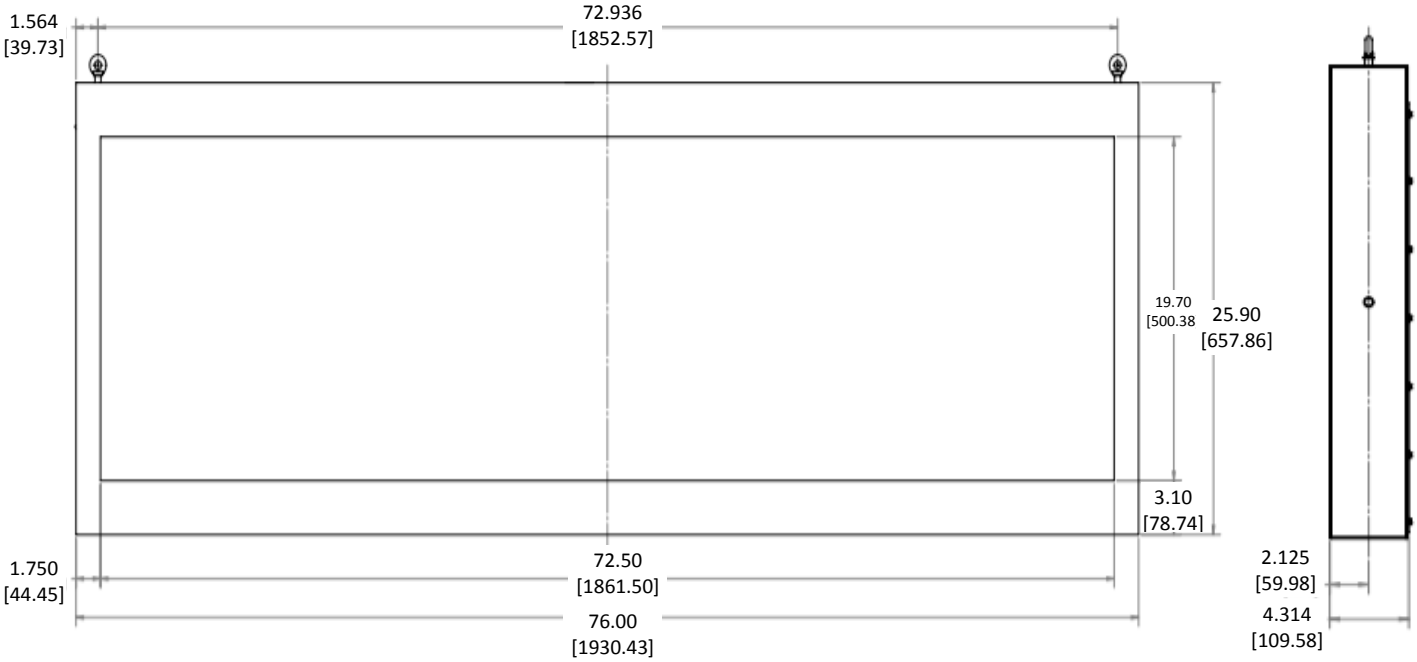
4L40C – Welded Type



8L20C – Welded Type



8L40C – Welded Type



3.6 Power Up Messages

When the Marquee is initially powered up, it automatically displays a series of Messages; mainly the Marquee attributes (Baud rate, Group #, Unit #, etc.) as shown below:

(Firmware Revision)

(Group Number)

(Unit Number)

(COM port Baud rate)

(Character size)

Once the controller board is activated, a scrolling message appears displaying the Tough Smart Marquee's IP address. Example:

After the IP address appears, the programmed messages (Power Up messages followed by PLC Messages) are displayed based on the PLC tag status and control parameters.