

SYSTEM OVERVIEW

The Telesis® TMP6100/470 PINSTAMP® marking system permanently prints messages into materials such as steel, aluminum, and plastic. A hardened pin is pneumatically accelerated to indent dot matrix characters into the item being marked.

The shape, size, density, and location of characters are determined by the user through the system software.

The marking head moves the pin cartridge through polar motions to reach the correct position for each dot of the characters to be marked.

The system software controls pin extension and retraction to mark the message.

The system is compliant with UL, CSA, CE, and RoHS specifications.

TMP6100 Marking Head. The TMP6100 marking head includes the mechanical motion components to position the marking pin at precise X/Y positions and the pneumatic components to drive the marking pin from and return the pin to the pin cartridge.

The TMP6100 marking head is a polar-coordinate, robotic mechanism which uses stepper motors to independently drive its A- and B-arms. This design provides a 12 x 6 in (304 x 152 mm) marking window.

The marking head moves the pin cartridge through the required polar rotation motions to reach the correct position for each dot. It positions the pin cartridge at coordinate-defined locations within .002 in (0.05 mm) of any point in the window.

The floating pin design permits high-quality, consistent marks on irregular, slightly curved surfaces. It also accommodates applications where marking surfaces cannot be positioned at a consistent distance from the marker.

Marker Cable. The marker cable connects the marking head to the controller. The highly flexible cable is 4 m (13 ft). Optional extension cables are available for greater distances.

Pin Cartridges. Pin cartridges are machined from engineered plastic materials and offer long life with little maintenance. Clasps are used to attach the pin cartridge to the marking head for easy cleaning and pin replacement.

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Marking Pins. Marking pins for the TMP6100 include the 25L-, 25XL-, and 150SA-series. Refer to the marking head installation drawing for pin stroke (pin extension) dimensions. Refer to the marking depth tables for pin cone angles and depths.

Filter/Regulator Unit. The filter/regulator unit includes two regulators with pressure gauges to control the drive air and return air. The first regulator contains a filter to help remove contaminants from the supply air.

Two air lines connect the regulated air to the marking head. Drive air fires the impact pin; return air pushes it back into the cartridge. The standard air lines are 12 ft (3.6 m) and are made of 1/4-inch tubing.

TMC470 Controller. The TMC470 controller provides a text-only operator interface and allows full operational control of the TMP6100 marking head and contains an integrated keyboard with an LCD display. The back panel provides the electrical interface for connecting to optional, remote I/O sources. Refer to *TMC470 Controller Specifications* for details.

Optional System Computer. The TMC470 controller can be connected to a PC that runs the Merlin® III Visual Design software. The PC can be supplied by Telesis or by the customer. Refer to *PC-Based Merlin III Visual Design Software* and *TCP/IP Interface* for details.

SYSTEM OPTIONS

- Marking Head Extension Cables
- Mounting Post with Hand Crank (19.3 in [492 mm] travel)
- Auxiliary Axis Driver Board Kit
- Motorized Z-Axis Tool Post with Programmable Travel
- Motorized Theta-Axis with Programmable Rotary Drive Unit
- TMC470 Controller Wall-Mounting Bracket Kit
- TMC470 Controller Panel-Mounting Bezel/Bracket Kit
- TMC470N NEMA® Enclosure
- Bar Code Scanner or Bar Code Wand with Cable
- Foot Switch (Start Print) or Pushbutton Station (Start/Abort)
- Backup Utility Software
- Upgrade Utility Software
- Logo/Font Generator Software
- Merlin III Visual Design Software
- System Computer (to run the Merlin III software)

SYSTEM SETUP

The TMP6100 is designed to be securely mounted to a fixture with the impact pin pointing downward. Any other configuration must first be evaluated by Telesis for approval.

When designing a fixture, allow for 3-axis adjustment to aid in horizontal, vertical, and lateral alignment of the marking head. The Telesis linear rail style tool post (shown above) is typically used with the optional, motorized Z-axis kit.

1. Mount the marking head using two ½-13 bolts.
2. Mount the filter/regulator assembly within 12 ft (3.6 m) of the marker.
3. Connect the drive air and return air lines to the marking head.
4. Connect the supply air to the input port on the filter/regulator assembly.

CAUTION

The TMC470 is not a sealed unit. Protect it from potentially damaging conditions and contaminants. Do not block the vents in the bottom of the case. Ensure the marking system is electrically isolated from any devices that might generate extreme electromagnetic interference (EMI).

5. Locate the controller as close as practical to the marking head. Standard marker cable length is 4 m (13 ft).
6. Install the controller as a tabletop, wall-mounted, panel-mounted, or enclosure-mounted unit.
7. Connect the marker cable to the marking head and to the controller.
8. Ensure the controller power switch is **OFF**.
9. Connect the power cable to the controller.
10. (optional) For systems that connect to a PC running the Merlin III Visual Design software:
 - ◆ Ensure the PC power switch is **OFF**.
 - ◆ Connect the cable to the controller Ethernet port and to the PC.
 - ◆ Connect the power cable to the PC.
 - ◆ Position the PC power switch to **ON**.
 - ◆ Install the marking system software (customer-supplied PC).
11. Position the controller power switch to **ON**.
12. Start the marking system software.
13. Adjust the pin stroke, drive air, and return air for impact depth.

TMP6100 MARKING HEAD

Specifications

The TMP6100 marking head specifications are subject to change without notice.

Dimensions.....	<i>refer to the TMP6100 Mounting Drawings</i>
Weight	16.8 lb (7.6 kg), not including support tooling
Operating Temperature....	32° to 122° F (0° to 50° C), non-condensing
Air Supply.....	Clean and dry, 40 to 120 psi (2.8 to 8.3 bar)
Air Consumption.....	0.3 SCFM (idle) 1.5 SCFM (marking)
Marking Area	12.0 x 6.0 in (304 x 152 mm)
Pin Types.....	25L-, 25XL-, or 150SA-series
Pin Material.....	Powdered metal, stainless steel with diamond tip, or carbide (25L-, 25XL-series pins) Powdered metal or tool steel with carbide tip (150SA-series pins)

Marking Speeds

Generally, the system will mark two characters per second (using 5x7 font, .125" [3 mm] high characters). The marking speed can be adjusted to allow more precisely formed characters. Doing so, under these same conditions, will result in reduced marking speeds.

Marking speeds vary depending on character size, drive air pressure, dot density, pin stroke, pin cartridge, and pin type. Increased character size, increased dot density, increased pin stroke, or decrease drive air pressure all result in decreased marking speeds.

The use of a heavier marking pin, such as the 25L carbide pin or the 150SA carbide-tipped pin, or the use on non-standard marking pin cartridges will also result in decreased marking speeds.

Additionally, marking speeds will vary depending on where the data is printed within the marking window. Specific times and speeds can be verified by a Telesis representative.

Marking Noise

Although every attempt is made to reduce noise, the material being marked significantly influences the noise level. For example, marking a solid lead block produces less noise than marking a thin-walled steel pipe.

Marking Depth

The following tables provide sample marking depths. Drive air was set at 80 psi (5.5 bar); return air was set at 20 psi (1.4 bar); pin stroke was set to the maximum allowable distance for each pin type to achieve the maximum depth of mark.

NOTICE

The recommended nominal drive air pressure is 80 psi (5.5 bar). Lower drive air pressure can be used, but will result in decreased depth of mark and increased cycle time.

Depths – Type 25L & 25XL Powdered-Metal Pins

MATERIAL (HARDNESS)	22° CONE	30° CONE	45° CONE	60° CONE
Aluminum (RB3)	.005 in .127 mm	.007 in .178 mm	.011 in .279 mm	.016 in .406 mm
Brass (RB18)	.003 in .076 mm	.005 in .127 mm	.009 in .229 mm	.012 in .305 mm
Cold Rolled Steel (RC18)	.003 in .076 mm	.005 in .127 mm	.008 in .203 mm	.012 in .305 mm

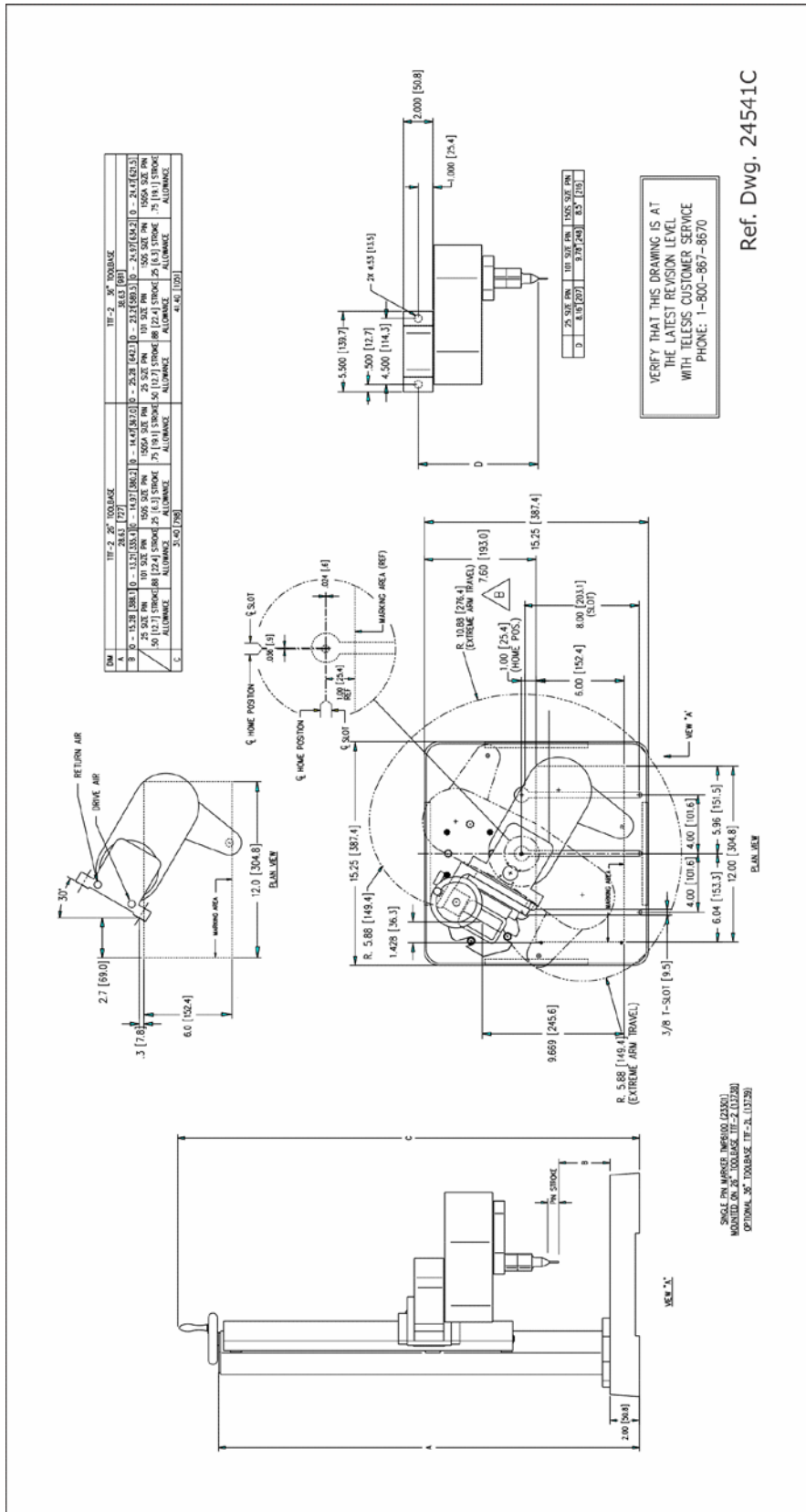
Depths – Type 25L & 25XL Carbide Pins

MATERIAL (HARDNESS)	22° CONE	30° CONE	45° CONE	60° CONE
Aluminum (RB3)	.006 in .152 mm	.007 in .178 mm	.010 in .254 mm	.011 in .279 mm
Brass (RB18)	.005 in .127 mm	.007 in .178 mm	.008 in .203 mm	.009 in .229 mm
Cold Rolled Steel (RC18)	.004 in .010 mm	.005 in .127 mm	.007 in .178 mm	.009 in .229 mm

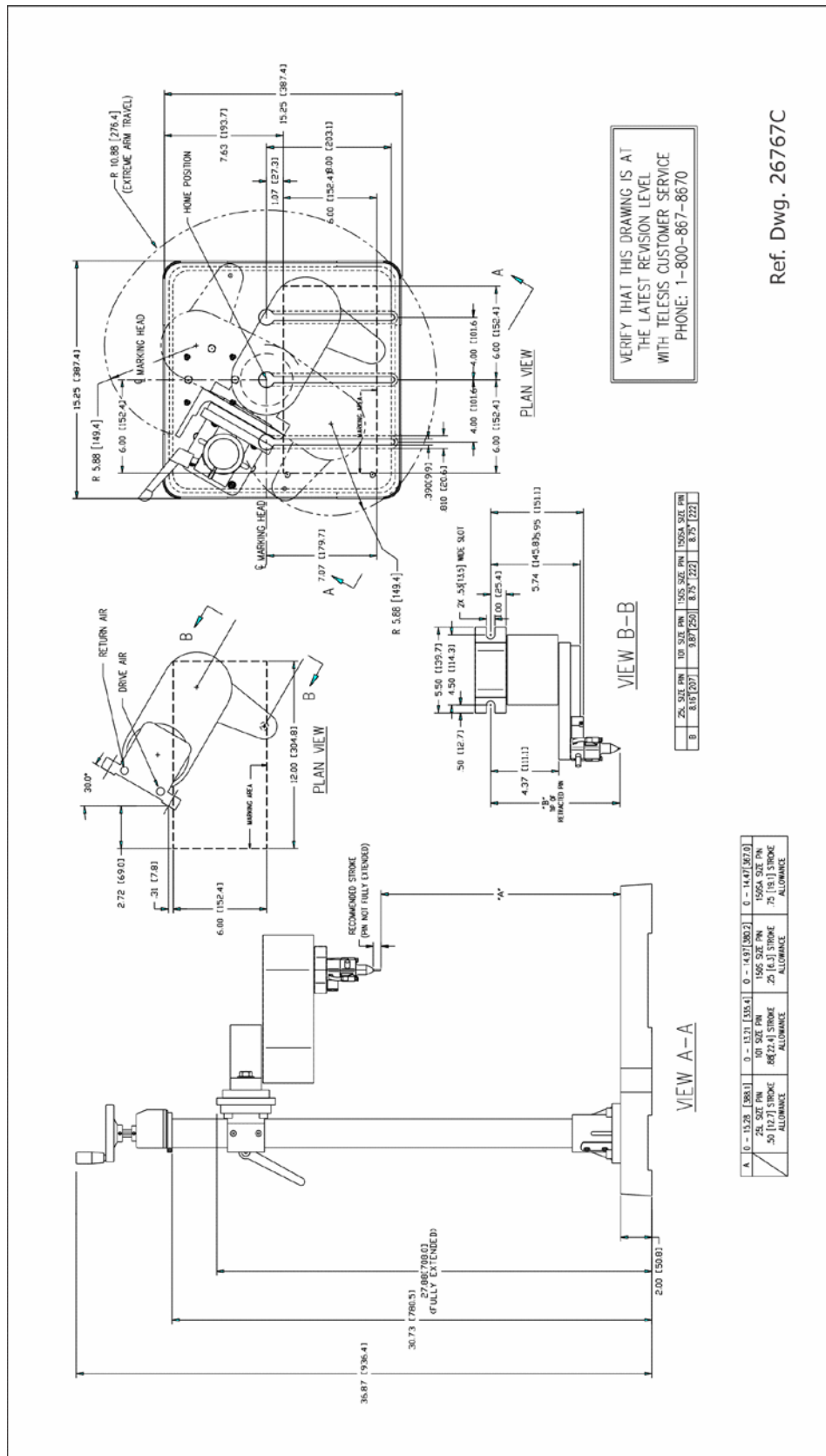
Depths – Type 150SA Pins

MATERIAL (HARDNESS)	22° CONE	30° CONE	45° CONE	60° CONE
Aluminum (RB3)	N/A	.008 in .203 mm	.012 in .305 mm	N/A
Brass (RB18)	N/A	.007 in .178 mm	.010 in .254 mm	N/A
Cold Rolled Steel (RC18)	N/A	.006 in .152 mm	.008 in .203 mm	N/A

TMP6100/470 Marking System



TMP6100 Mounting Drawing (Linear Rail Tool Post)



TMP6100 Mounting Drawing (Tubular Steel Tool Post)

Ref. Dwg. 26767C

TMP6100/470 Marking System

TMC470 CONTROLLER

The TMC470 controller can be installed as a tabletop, wall-mounted, panel-mounted, or enclosure-mounted unit. All configurations provide features and connectivity for external communications. Differences occur only in the mounting configuration.

TMC470 Specifications

The TMC470 controller specifications are subject to change without notice.

Compliance	CE, RoHS
Configurations	Tabletop, wall-, panel-, or enclosure-mounted
Rating.....	NEMA 1 (I.P. 30), tabletop or wall-mounted NEMA 12 (I.P. 65), panel-mounted using appropriate customer-supplied panel NEMA 12 (I.P. 65), enclosure-mounted using Telesis-supplied TMC470N enclosure
Dimensions	refer to the <i>TMC470 Mounting Drawings</i>
Weight	3.69 lb (1.68 kg), controller only 3.90 lb (1.77 kg), with wall-mount kit 5.52 lb (2.51 kg), with panel-mount kit 28.1 lb (12.77 kg), with TMC470N enclosure
Operating Temperature ...	32° to 122°F (0° to 50°C)
Operating Humidity	10% to 80% non-condensing
Cooling	Internal, thermostatically controlled fan
Power Requirements	95 to 250 VAC, 2 amps, 50-60 Hz, single phase
Communications	TTL, Discrete I/O, RS232, RS485, TCP/IP, and USB (data backup & transfer)
Input Signals.....	Twelve (12) total, optically isolated: 8 dedicated, 1 programmable, 3 available 10 VDC (minimum voltage) 30 VDC (maximum voltage) 12 to 24 VDC (nominal voltage) 2.3 mA @ 12VDC; 4.9 mA @ 24VDC (nominal current)
Output Signals.....	Six (6) total, optically isolated: 4 dedicated, 2 available 0.25 amps (maximum current) 0.50 ohms (maximum On resistance) 40 VDC (maximum line voltage) 12 to 24 VDC (nominal line voltage)

Environmental Considerations

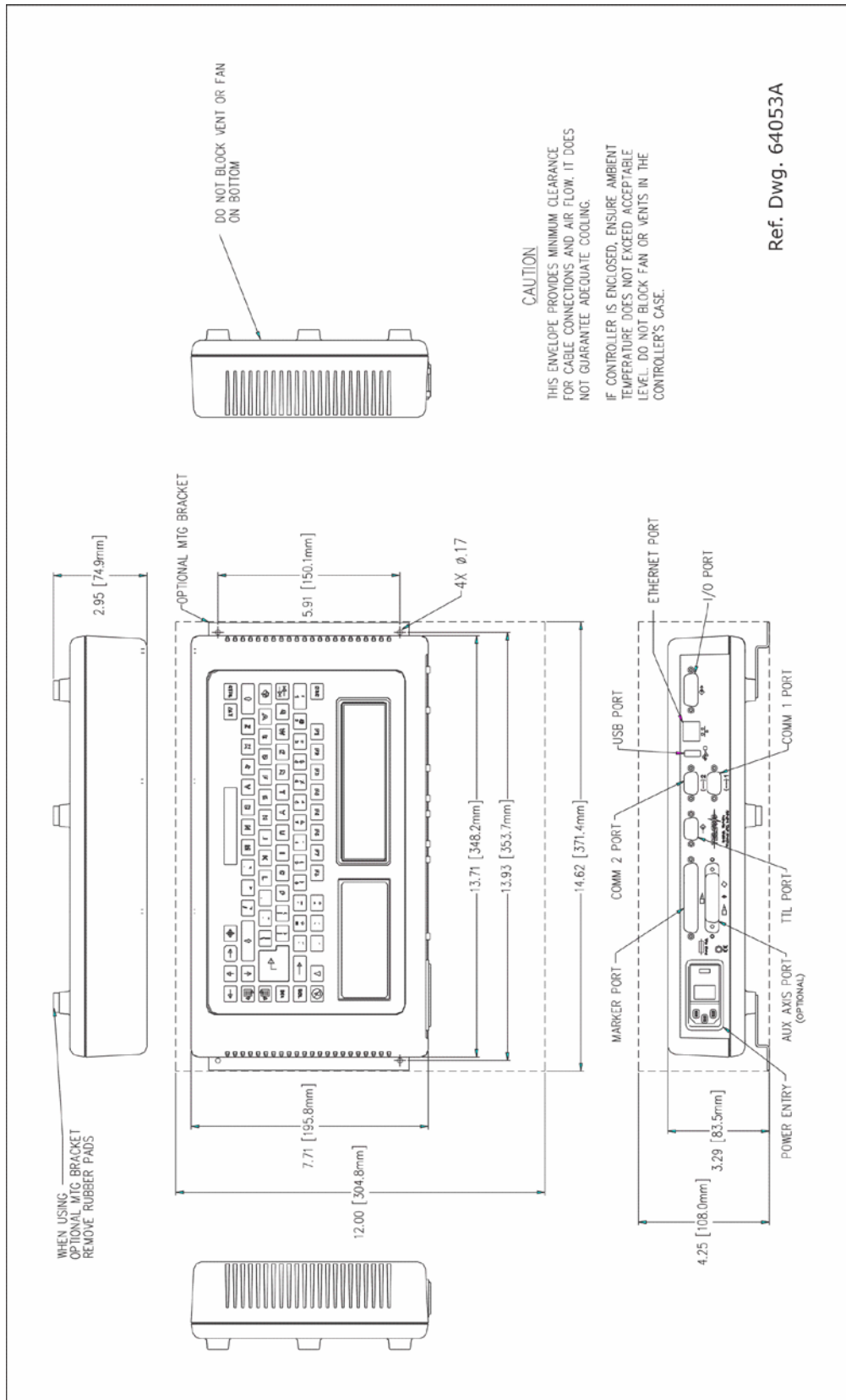
The following environmental considerations must be taken into account when installing the TMC470 controller.

Contaminants. The vented TMC470 is rated NEMA 1 (IP30) and contains a thermostatically controlled, variable-speed fan.

In environments where solid or liquid contaminants are present, the contaminants can be drawn into the TMC470 controller and cause the equipment to fail. For that reason, in these types of environments, the controller **must** be located in a sealed industrial enclosure.

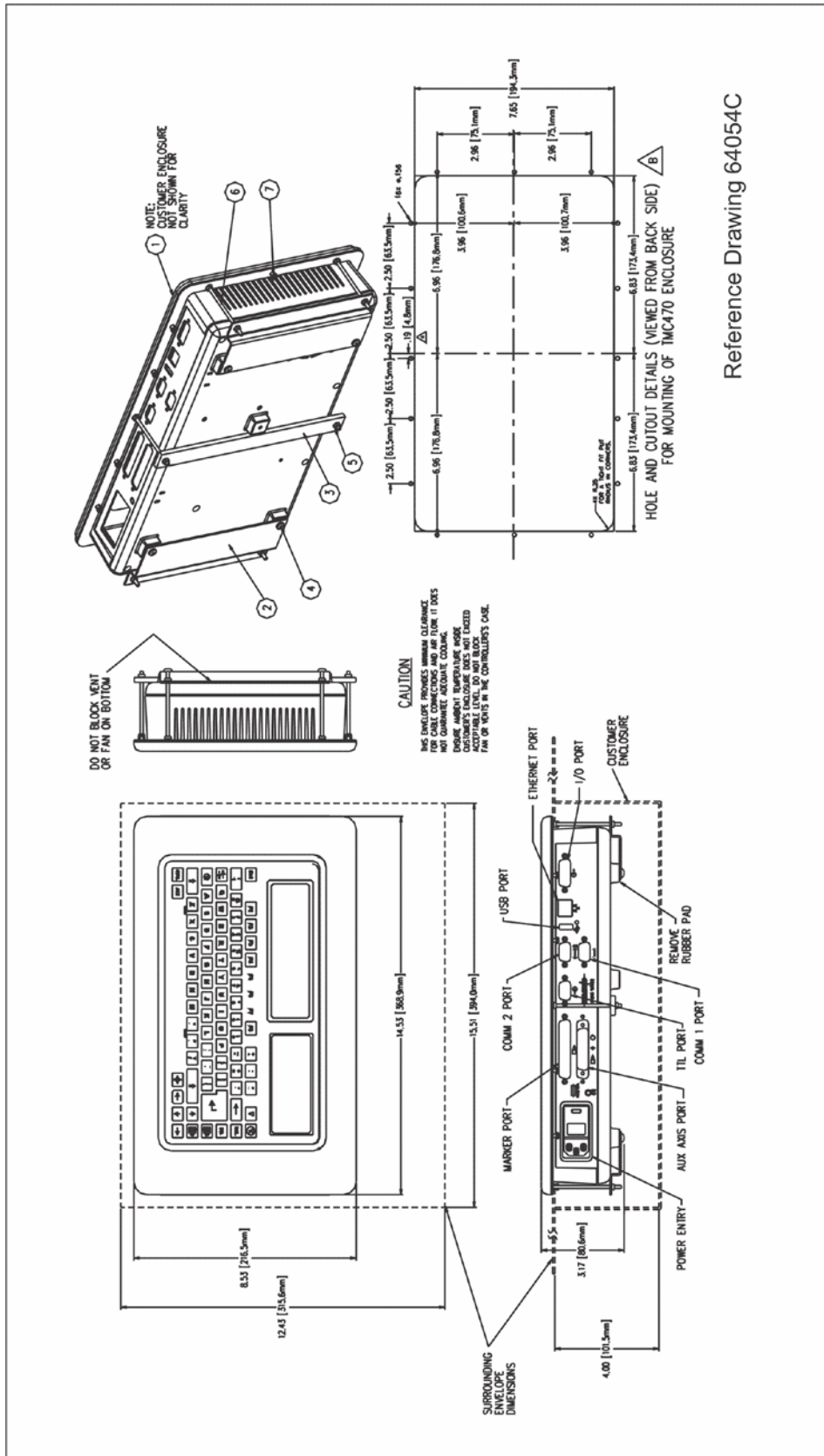
To facilitate such installations, Telesis offers an optional panel mounting kit for use with an appropriate customer-supplied panel or enclosure. Telesis also offers an optional TMC470N NEMA 12 (I.P. 65) enclosure in which the controller can be mounted.

EMI Susceptibility. Although the system has been found to be in compliance with pertinent susceptibility standards, care should be taken when installing near welders and other extreme generators of electromagnetic interference (EMI). Particular care should be taken to ensure welder currents are not injected through the marking head chassis. The marking head chassis is connected to the electrical service earth ground through the marking head cable. The marking head should be electrically isolated from all surfaces that could become part of a welder current path.

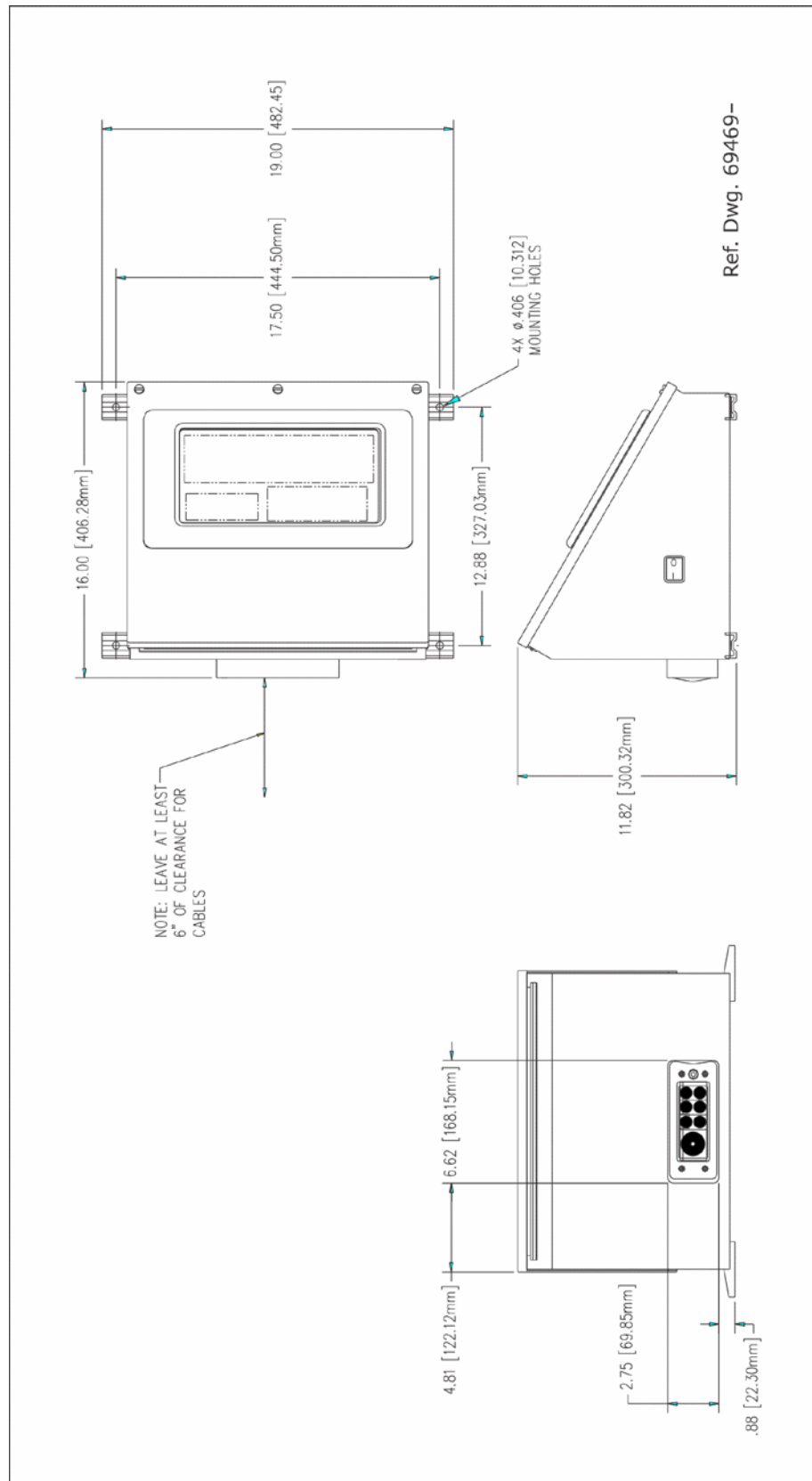


Ref. Dwg. 64053A

TMC470 Controller Dimensions – Tabletop and Wall-Mounted Configurations



TMC470 Controller Dimensions – Panel-Mounted Configuration



TMC470 Controller Dimensions – Enclosure-Mounted Configuration

TMP6100/470 Marking System

TMC470-Based System Software

The system software provides the user interface for the operator to control the marker and is permanently installed in the controller.

The software also provides a library for storing, loading, and editing user-defined patterns. *Patterns* are files stored in the controller's memory. Depending on the size of the pattern files, the controller can store up to 200 patterns.

Each pattern contains one or more fields; each field defines a single object. Printable objects can be created to define text strings, arc-text strings, geometric shapes, graphics, and machine-readable data matrix symbols. Non-printable objects can be defined for specific commands to the marker (for example, Pause, Go to, Input, or Output).

Printable text fields can include alphanumeric characters, symbols, and special message flags.

Message flags insert data, such as serial numbers, times, dates and user-defined codes, into the text string.

PC-Based Merlin III Visual Design Software

The TMC470 controller can be optionally connected to a PC that runs the Telesis Merlin III Visual Design software. The software is a 32-bit Windows®-based WYSIWYG application that provides a graphical user interface to make pattern design quick and easy. "Click and drag" to adjust field size, location, or orientation.

The Merlin III software includes tools to create and edit text, arc text, rectangles, circles, ellipses, and lines. Existing DXF files can also be imported for marking.

After downloading patterns to the controller, the PC can be disconnected from the controller to allow the TMC470 to control marking operations. The PC can also remain connected to the controller and allow the Merlin III software to fully control the marking system.

Interface Panel

The back panel of the controller provides ports for connecting the marker, host computers, logic controllers, optional accessories, and remote I/O devices.

Serial Interface. The Comm 1 and Comm 2 ports allow connection to remote serial devices such as a host computer or a bar code scanner. See *Host Communications* for details.

Discrete I/O Interface. The optically isolated I/O port allows you to connect a Programmable Logic Controller (PLC) or other DC I/O source for remotely controlling marker operations. See *Discrete I/O Controls* for details.

TTL Interface. The TTL port allows the system to connect with a simple contact closure circuit such as a remote push button station or foot pedal switch. These types of devices can remotely control Start Print and Stop Print operations.

TCP/IP Interface. The Ethernet port typically connects to a PC over a local area network (LAN) and allows you to define the controller as a client or a server socket using Telesis Extended Protocol. See *Host Communications* for details.

USB Interface. The USB port allows you to connect a memory stick/flash drive for pattern storage or retrieval and for software upgrades.

Auxiliary Axis Interface (optional). The Auxiliary Axis port allows the system to connect with up to four optional motion devices such as motorized tool posts, rotational drive units, and linear slides or actuators.

Discrete I/O Controls

The TMC470 is configured only for 12 VDC to 24 VDC I/O and is provided to connect a PLC or other DC I/O source.

The optically isolated I/O port allows you to remotely select and load patterns, start printing, stop printing, place the marker online, and monitor the system output signals.

Cable connectors and connector pins are supplied with the controller for constructing appropriate interface cables.

Input Signals. Input signals provide the following controls:

INPUT COMM	For all inputs (+ or – supply)
START PRINT	Begins print cycle
STOP	Stops the print cycle
SEL_0 thru _6*	Remotely selects & loads up to 127* pattern files
SPARE_1, 2, 3	Three (3) spares for custom applications

* The system software allows the SEL_6 signal to be configured for remotely selecting patterns or for remotely placing the marker online. If used to place the marker online, pattern selection is reduced to a maximum of 63 patterns.

Output Signals. Output signals indicate the following states:

OUTPUT COMM	For all outputs (+ or – supply)
DONE	Print cycle is complete
READY	System is ready for message or for start print command
PAUSED	System is paused (waiting timeout or command)
NO FAULT	System status (normal or fault detected)
SPARE_1, 2	Two (2) spares for custom applications

Host Communications

The marking system software allows you to configure communication parameters to transmit data to and from a host computer. To provide maximum integration flexibility, the system software supports RS-232 and RS-485 serial interfaces and Ethernet TCP/IP interfaces. The system software also provides Programmable Protocol and Extended Protocol.

RS-232 Interface. The serial (RS-232) communications interface is most often used with remote devices such as host computers, terminals, or bar code scanners.

The Comm 1 RS-232 interface supports both Telesis Extended Protocol and Telesis Programmable Protocol.

The Comm 2 RS-232 interface supports only Telesis Programmable Protocol.

RS-485 Interface. The RS-485 interface is normally used for long transmission distances or multi-drop networks of up to 31 TMC470 controllers. **You must use Telesis Extended Protocol with the RS-485 interface.**

The serial data character format on all transmissions to and from the TMC470 controller is described as follows:

- Asynchronous
- 1200, 2400, 4800, 9600, 19200, 38400, or 115200 Baud
- 1 or 2 Stop Bits
- 7 or 8 Data Bits
- None, Even, or Odd Parity

TCP/IP Interface. The Ethernet (TCP/IP) interface is most often used with host computers communicating over a local area network (LAN). **You must use Telesis Extended Protocol with the TCP/IP interface.**

The Port parameter identifies the host computer socket that is assigned to the marking system. If more than one marking system is installed in a network configuration, each system must use a separate and unique port number.

The Address parameter identifies the IP address of the host computer. The marking system software supports both fixed and dynamic addressing.

The Ethernet port can be optionally connected to a PC running the Merlin III Visual Design software.

Any computer that runs the Merlin III software must satisfy the following requirements:

- Windows® operating system: 2000, XP, Vista® (Business), 7 (Professional), or 8 (Professional)
- Pentium® 4 processor
- Sufficient RAM as per operating system requirements

- Video board
- Multi-Gigabyte hard drive
- One available Ethernet port (minimum)
- SVGA color monitor, mouse, and keyboard

Programmable Protocol. Use this protocol where very simple one-way communications are required (such as with bar code scanners). Programmable Protocol provides no error checking or acknowledgment of the transmitted data. Note that XON/XOFF Protocol applies even when Programmable Protocol is selected.

Starting Character specifies where the software begins to count character positions. This number must be entered in decimal format (for example, "2" for ASCII Start of Text "STX").

Terminating Character identifies the end of the transmitted string (usually "13" for the ASCII carriage return character).

Character Position counts from the starting character and ignores all characters preceding it.

Character Length accepts variable-length messages (if set to 0) or messages of a pre-specified, fixed number of characters.

Ignore Character identifies the character to ignore when sent from the host (usually "10" for the ASCII line feed character)).

Message Type allows message-type recognition, which defines how the marking system will use data it receives from the host.

- 1** overwrites the first line of the first text field with data extracted from the host
- P** loads a specific pattern identified by data extracted from host
- Q** updates the text in the first query buffer with data extracted from the host
- V** updates the first variable text flag found in the pattern with data extracted from the host
- 0** (zero) indicates the host will provide the message type, field number (if applicable), line number (if applicable), and data; delegates message type selection to the host on message-by-message basis. The host message must use the format:

Tnn<string>

where:

- T** 1, P, Q, or V indicates the message type.
- nn** Two-digit field number or query text buffer where data will be placed.
Note: Not used with Message Type P.
- <string>** For Message Type P, indicates the pattern name to be loaded. For Message Type 1, Q, or V, indicates the data to be inserted into the field or the query text buffer.

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Extended Protocol. This protocol selection includes error checking and transmission acknowledgment. It should be used in applications where serial communication is a vital part of the marking operation. All communications are carried out in a parent/child relationship with the host being the parent. Only the host can initiate communications. If the host does not receive a response within three seconds, it should retransmit its original message. If no response is received after three tries, it should declare the link to be down.

The following describes the Extended Protocol message format as sent from the host to the TMC470 controller.

SOH TYPE [##] STX [DATA] ETX BCC CR

where:

SOH ASCII Start of Header character (001H). The controller ignores all characters received prior to the SOH.

TYPE A single, printable ASCII character that defines the meaning (type) and content of the message downloaded from the host, where:

1 overwrites a specific field in currently loaded pattern with data supplied in the host message. See [DATA] for details.

C clears the error from the screen.

G initiates a print cycle to mark the currently loaded pattern.

I requests the marker return the status of standard output and input signals. The system returns a hexadecimal code for the 6 output signals and 12 input signals in the following format:

O O ; I I I

where:

bit 1 READY 0x01

bit 2 DONE 0x02

bit 3 PAUSED 0x04

bit 4 NO_FAULT 0x08

bit 5 SPARE_1 0x10

bit 6 SPARE_2 0x20

bit 1 START 0x001

bit 2 STOP 0x002

bit 3 SEL_0 0x004

bit 4 SEL_1 0x008

bit 5 SEL_2 0x010

bit 6 SEL_3 0x020

bit 7 SEL_6 * 0x040

bit 8 SEL_4 0x080

bit 9 SEL_5 0x100

bit 10 SPARE_1 0x200

bit 11 SPARE_2 0x400

bit 12 SPARE_3 0x800

Note: Input SEL_6 can be configured to place the machine online (default) or to remotely select a pattern.

O resets the marker and places it online.

P specifies the pattern name to be loaded for printing. See [DATA] for details.

Q updates a specific query buffer with data supplied in the host message. See [DATA] for details.

S requests the error status.

V updates the variable text in a specific text field of the currently loaded pattern with data supplied in the host message. See [DATA] for details.

[##] Optional two-digit ASCII number that specifies the Station ID of the controller when used in multi-drop network applications. The Station ID can range from 00-31. Note "00" is reserved for applications where only one controller is used. In such applications, this field can be eliminated and "00" is assumed.

STX ASCII Start of Text Character (002H).

[DATA] Optional character string that might be required for certain message types (for example, Type 1, P, Q, and V).

Data is typically sent in the format:

nn<string>

where:

nn = two-digit field number or query text buffer where data will be placed.

Note: Not used with Message Type P.

<string> = For Message Type P, indicates the pattern name to be loaded. For Message Type 1, Q, or V, indicates the data to be inserted into the field or the query text buffer.

ETX ASCII end of text character (003H).

BCC Optional Block Check Code that is generated and sent to improve link reliability by providing fault detection. The BCC is calculated by taking an eight-bit addition of the TYPE and DATA TEXT characters and transmitting them as a three-digit ASCII decimal number in the range from 000 to 255. If the sum is greater than 255, the most significant bit overflows and is discarded.

CR ASCII Carriage Return Character (00DH).

TRADEMARKS

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