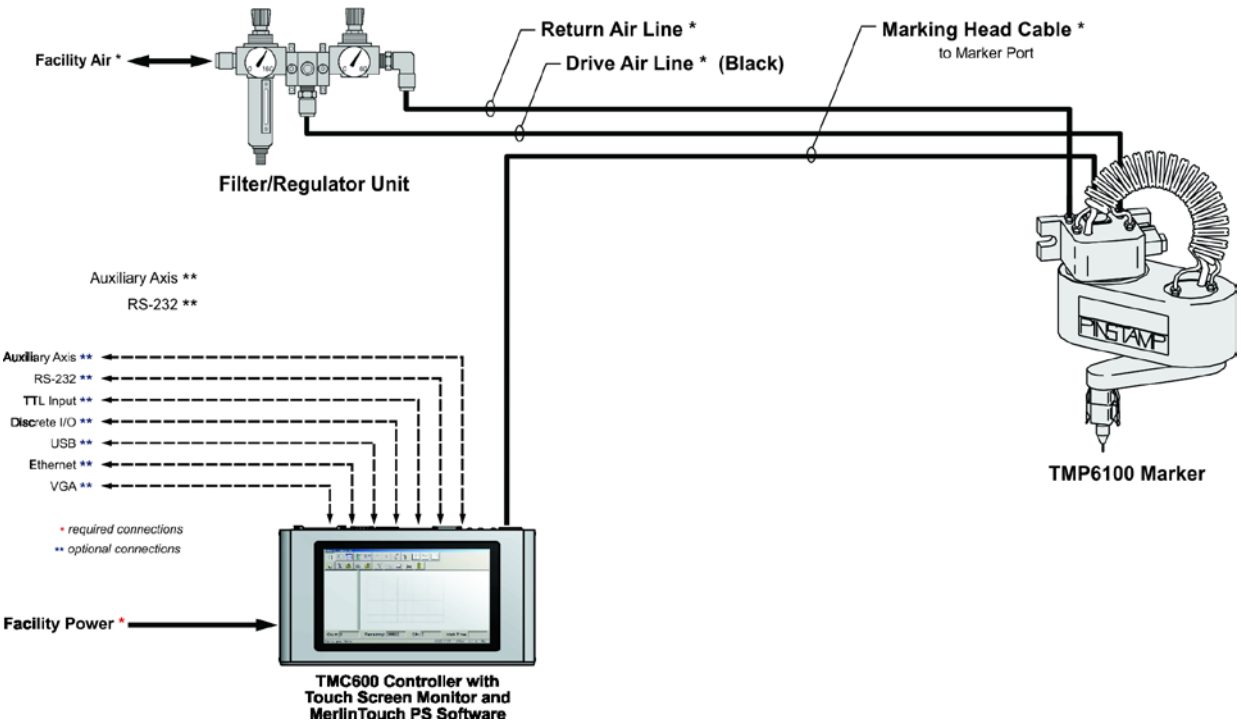



**TMP6100/600 Marking System – General Arrangement Drawing**

## SYSTEM OVERVIEW

The Telesis® TMP6100/600 PINSTAMP® marking system permanently prints messages into a variety of 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 automatically controls pin extension and retraction to mark the message.

The system is compliant with CE specifications.

**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 generous 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 accurately and rapidly 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.

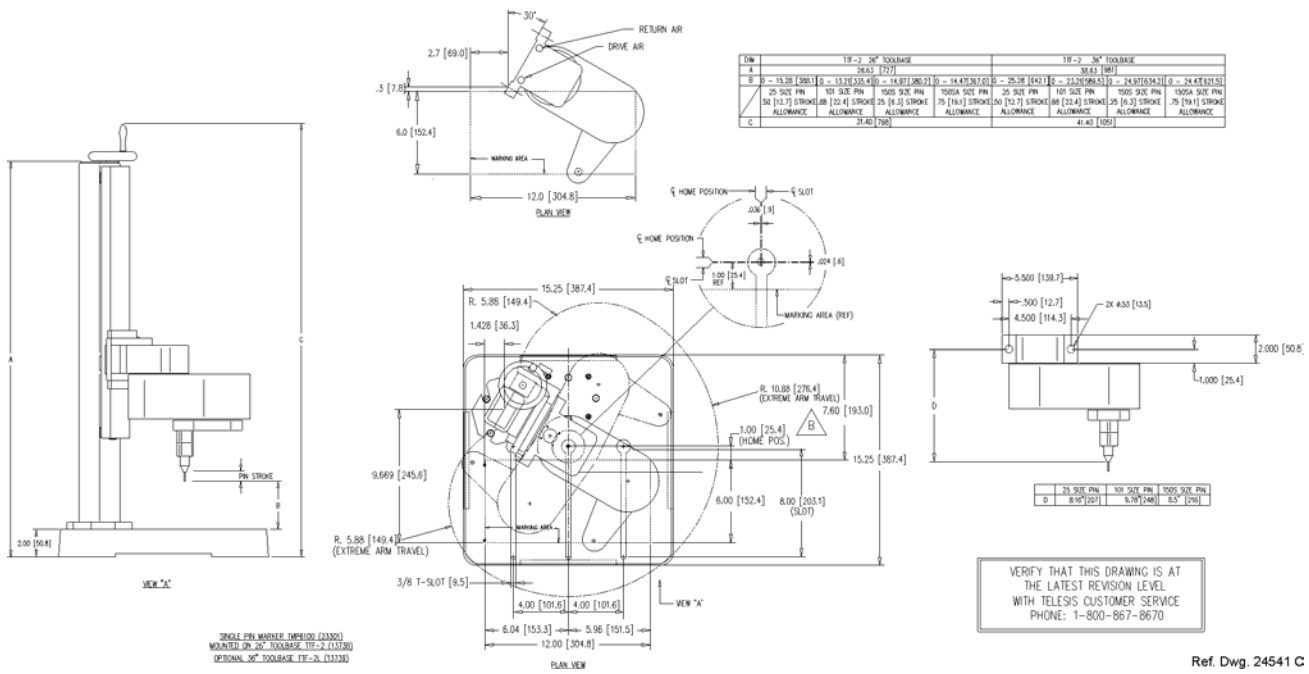
**Marker Cable** connects the marking head to the controller. The highly flexible cable is 4m (13 ft.) long. Optional extension cables are available for greater distances.

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

**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** 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) long made of 1/4" tubing.

**TMC600 Controller** runs the MerlinTouch PS software and provides the user interface for operating the marking system. The controller features an integrated, 10-in., high-resolution, touch screen monitor in the top panel. The back panel of the controller provides the electrical interface for connecting to optional, remote I/O sources. See *TMC600 Controller Specifications* for details.




**TMP6100 Mounting Drawing (Linear Rail Tool Post)**

### 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.

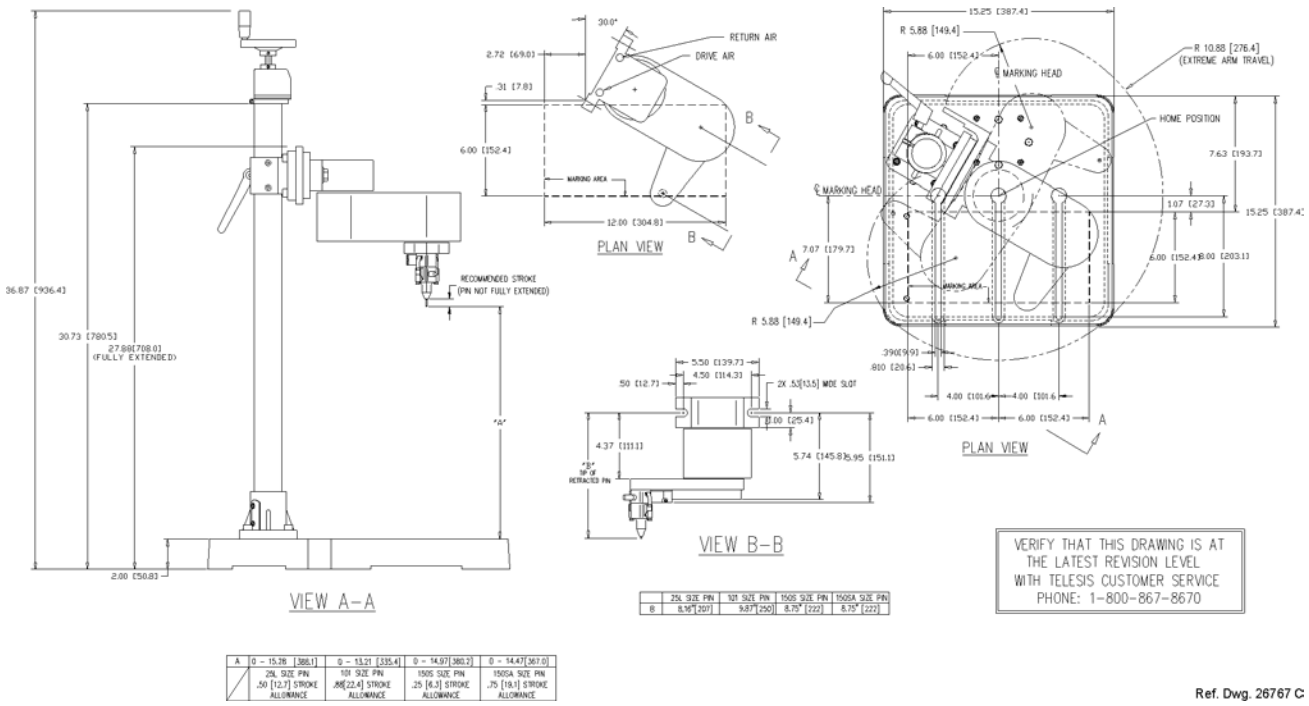
When designing a fixture, allow for 3-axis adjustment to aid in horizontal, vertical, and lateral alignment of the marking head. The Telesis linear rail style tool post (shown above) is typically used with the optional, motorized Z-axis kit.

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

**CAUTION**

The TMC600 is not a sealed unit. Protect it from potentially damaging conditions and contaminants. Do not block vents in bottom of case. Ensure the marking system is electrically isolated from any devices that may generate extreme electromagnetic interference (EMI).

5. Locate controller as close as practical to marking head. Standard marker cable length is 4 m (13 ft.).
6. Install the controller as a table-top, wall-mounted, panel-mounted, or enclosure-mounted unit, as applicable.
7. Connect marker cable to marking head and to controller.
8. Ensure controller power switch is OFF.
9. Connect power cable to controller.
10. Position controller power switch to ON.
11. Start marking system software.
12. Adjust pin stroke, drive air, and return air for impact depth.




**TMP6100 Mounting Drawing (Tubular Steel Tool Post)**

## SYSTEM OPTIONS

- Marking Head Extension Cables
- Mounting Post with Hand Crank (19.3" [492mm] travel)
- Auxiliary Axis Driver Board Kit
- Motorized Z-axis Tool Post with Programmable Travel
- Motorized Theta-axis with Programmable Rotary Drive Unit
- TMC600 Controller Panel Wall Mountingl/Bracket Kit
- USB Mouse and Keyboard
- Bar Code Scanner or Bar Code Wand with Cable
- Foot Switch (Start Print) or Pushbutton Station (Start/Abort)
- Logo/Font Generator Software

## TMP6100 MARKING HEAD

### Specifications

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

| | |
|---|---|
| Dimensions | *refer to the TMP6100 Mounting Drawings* |
| Weight | 16.8 lb. (7.6 kg) not including support tooling |
| Operating Temperature. | 32° to 104° F (0° to 40° 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" (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) |

**TMP6100 MARKING HEAD** *(continued)*

## 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 widely 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, and/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 may be used, but will result in decreased depth of mark and increased cycle time.

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

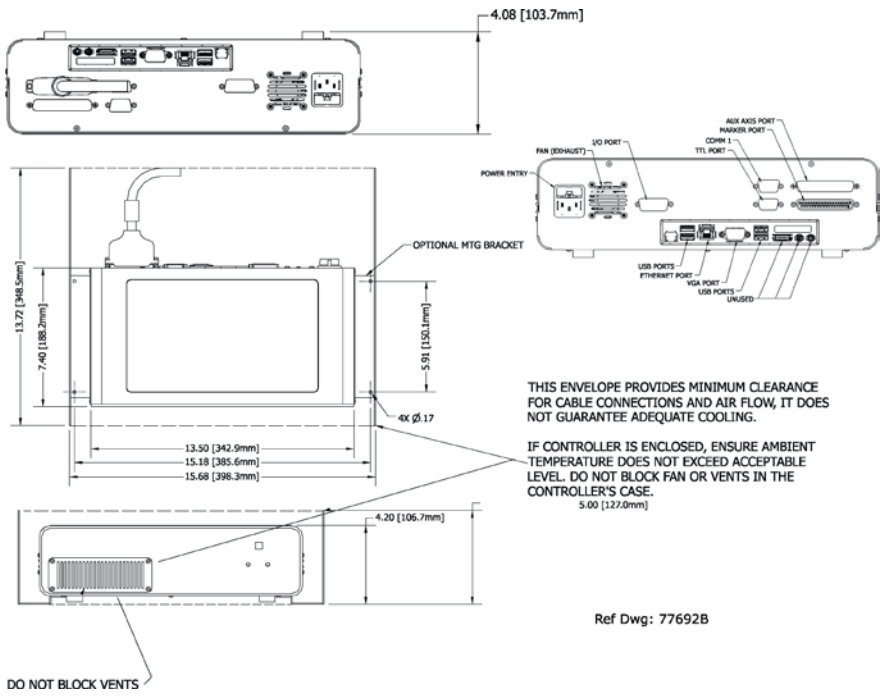
| MATERIAL (HARDNESS) | 22° CONE | 30° CONE | 45° CONE | 60° CONE |
|---|---|---|---|---|
| Aluminum (RB3) | .005 in. .127 mm | .007 in. .178 mm | .011 in. .279 mm | .016 in. .406 mm |
| Brass (RB18) | .003 in. .076 mm | .005 in. .127 mm | .009 in. .229 mm | .012 in. .305 mm |
| Cold Rolled Steel (RC18)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




**TMC600 Controller Dimensions – Wall-mounted Configuration**

### TMC600 CONTROLLER

The TMC600 controller may be installed as a table-top unit, a wall-mounted unit, a wall-mounted unit. All configurations provide features and connectivity for external communications. Differences occur only in the mounting configuration.

### TMC600 Specifications

The TMC600 Controller specifications are subject to change without prior notice.

Compliance ..... CE,

Configurations ..... 10.1 in. color, 1024X600 capacitive touch screen

Rating..... NEMA 1 (I.P. 30) table-top or wall-mounted

Dimensions..... *refer to the TMC600 Controller Dimension Drawings*

Weight ..... 7.00 lb. (3.18 kg) controller only

7.21 lb. (1.77 kg) with wall-mount kit

### TMC600 Specifications *(continued)*

Operating Temperature ..... 32° to 104° F (0° to 40°C)

Operating Humidity..... 10% to 80% non-condensing

Cooling ..... Internal, thermostatically-controlled fan

Power Requirements..... 115 to 230 VAC, 3/1.5 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:
3 dedicated, 3 available

0.25 amps (maximum current)

0.50 ohms (maximum On resistance)

40 VDC (maximum line voltage)

12 to 24 VDC (nominal line voltage)

## TMC600 Controller (continued)

### Environmental Considerations

The following environmental considerations must be taken into account when installing the TMC600 Controller.

**Contaminants.** The vented TMC600 is rated NEMA 1 (IP30) and contains a thermostatically-controlled, variable speed fan. It also incorporates a 60 ppi filter which will filter most common contaminants. However, in certain environments, the possibility exists that contaminants can be drawn into the TMC600 controller and possibly result in failure. For that reason, in these types of environments, the controller must be located in a sealed industrial enclosure.

**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 which could become part of a welder current path.

### System Software

The powerful Telesis MerlinTouch PS software is a Windows® based software package that comes installed in the TMC600 controller. It is a graphical user interface that makes pattern marking and pattern design quick and easy.

The WYSIWYG (what-you-see-is-what-you-get) interface provides a to-scale image of the pattern as it is created. The MerlinTouch PS software includes tools to create and edit a library of pattern files for marking. Each pattern contains one or more fields; each field defines a single object. Printable objects may be created to define text strings, arc-text strings, geometric shapes, graphics, and machine-readable data matrix symbols. Note that for design purposes, Telesis recommends using a mouse for more precise use of the visual editing capabilities via the Drag/Drop option.

Printable text fields may include alphanumeric characters, symbols, and special message flags. Message flags automatically insert data into the text string, such as serial numbers, times, dates and user-defined codes. Multiple fields may be grouped and saved as a block to form a logo. Existing DXF files can also be imported for marking. Non-printable fields can be created to clearly display a graphical representation of the part being marked. Commands may be defined to perform specific tasks during the marking cycle (e.g., Pause, Go to, Input, or Output).

#### Touch Screen User Interface

The top panel of the controller contains an integrated, 10-in., high resolution, touch screen monitor. The monitor displays the MerlinTouch PS software and provides the user interface for operating the marking system.

***TMC600 Controller with Touch Screen Monitor and MerlinTouch PS Software***

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## Interface Panel

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

**RS 232 Interface.** The Comm 1 and port 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). It 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 ports allow you to connect an optional mouse and keyboard. You may also connect a memory stick/flash drive for pattern storage and retrieval and for performing software upgrades.

**Ethernet Interface.** The Ethernet Port may be used to connect a host computer over a local area network (LAN). It allows you to define the controller as a client or a server socket using Telesis Extended Protocol. See *Host Communications* for details.

**VGA Interface.** The VGA Port allows you to connect a separate VGA monitor for troubleshooting, diagnostics, and testing. Connecting a separate monitor to operate the system is not recommended since the MerlinTouch PS software is specifically designed to display on the controller's integrated, high-resolution, touch screen monitor.

**(optional) Auxiliary Axis Interface.** The Auxiliary Axis Port allows the system to connect with two optional motion devices such as motorized tool posts, rotational drive units. Note that this port is available only if the optional Auxiliary Axis Driver Board is installed in the controller.

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## Discrete I/O Controls

The TMC600 is configured for 12 VDC to 24 VDC I/O only 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.** These 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 |

* System software allows SEL_6 signal to be configured for remotely selecting patterns or for remotely placing the marker online. If used for marker online, pattern selection is reduced to 63 patterns (max).

**Output Signals.** These output signals indicate the following states:

| | |
|---|---|
| OUTPUT COMM ..... | For all outputs (+ or – supply) |
| DONE ..... | Print cycle is complete |
| READY ..... | System ready for message or for start print command |
| PAUSED ..... | System paused (waiting timeout or command) |
| SPARE_1, 2,3 ..... | Three (3) spares for custom applications |

## Host Communications

The marking system software allows you to configure communication parameters to transmit and receive 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 two protocol choices: 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.

**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 addressing and dynamic addressing.

Optionally, the Ethernet Port may be 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
- CD-ROM Disk 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 (e.g., "2" for ASCII Start of Text "STX").

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

**Character Position** counted from the starting character ignoring 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 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** Message type 1 overwrites the *first line of the first text field* with data extracted from the host

**P** Message type P loads a specific pattern identified by data extracted from host

**Q** Message type Q updates the text in the *first query buffer* with data extracted from the host

**V** Message type V updates the *first variable text flag* found in the pattern with data extracted from the host

**0** Message type 0 (zero) indicates that host will provide 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 to indicate 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 Types 1, Q, or V, indicates the data to be inserted into the field or the query text buffer, as applicable.

## Host Communications *(continued)*

**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 has the ability to initiate communications. If the host does not receive a response within three seconds, it should re-transmit 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 TMC600 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** Message Type 1 overwrites a specific field in currently loaded pattern with data supplied in the host message. See [DATA] for details.
- **P** Message Type P specifies the pattern name to be loaded for printing. See [DATA] for details.
- **Q** Message Type Q updates a specific query buffer with data supplied in the host message. See [DATA] for details.
- **V** Message Type 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.
- **O** Message Type O resets marker and places it online
- **G** Message Type G initiates a print cycle to mark the currently loaded pattern
- **I** Message Type I requests the marker return the status of standard output and input signals. The system will return 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 | SPARE_1 | 0x08 |
| bit 5 | SPARE_2 | 0x10 |
| bit 6 | SPARE_3 | 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 may be configured to place machine online (default) or for Remote Pattern Selection.

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

**STX** ASCII Start of Text Character (002H).

**[DATA]** Optional character string that may be required for certain message types (e.g., Type 1, P, Q, and V).

Typically, data is 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 Types 1, Q, or V, indicates the data to be inserted into the field or the query text buffer, as applicable.

**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).

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## TRADEMARKS

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