

SYSTEM OVERVIEW

The Telesis® SC3500/600 TeleScribe® Marking System permanently inscribes messages into a variety of materials such as steel, aluminum, and plastic. Marking is accomplished by a hardened pin that is pneumatically pressed into the surface being marked. The shape, size, and location of the inscribed characters are determined by the user through the system software. As the marking head moves the pin cartridge through the X/Y axes, the tip of the extended pin displaces the material being marked, thereby forming continuous-line characters. The system software automatically controls pin extension and retraction to mark the message.

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

The **SC3500 Marking Head** includes the mechanical motion components to position the marking pin at precise X/Y positions and the pneumatic components to extend the pin from, and return the pin to the pin cartridge.

The marking head is an X and Y traversing mechanism. Using two stepper motor drives, it accurately and rapidly positions the pin at coordinate-defined locations in the marking window within .025mm (.001"). The SC3500 accommodates the rigorous and rapid positioning of the marking pin through a system of rigid rails and ball bearing saddles, timing belts, and direct-drive, toothed pulleys.

The floating pin design permits high quality, consistent marks where marking surfaces cannot be positioned at a consistent distance from the marker.

The **Marker Cable** connects the marking head to the controller. The head cable is a highly flexible cable. The standard cable length is 4 m (13 ft.). Optional cable extensions are available for greater distances.

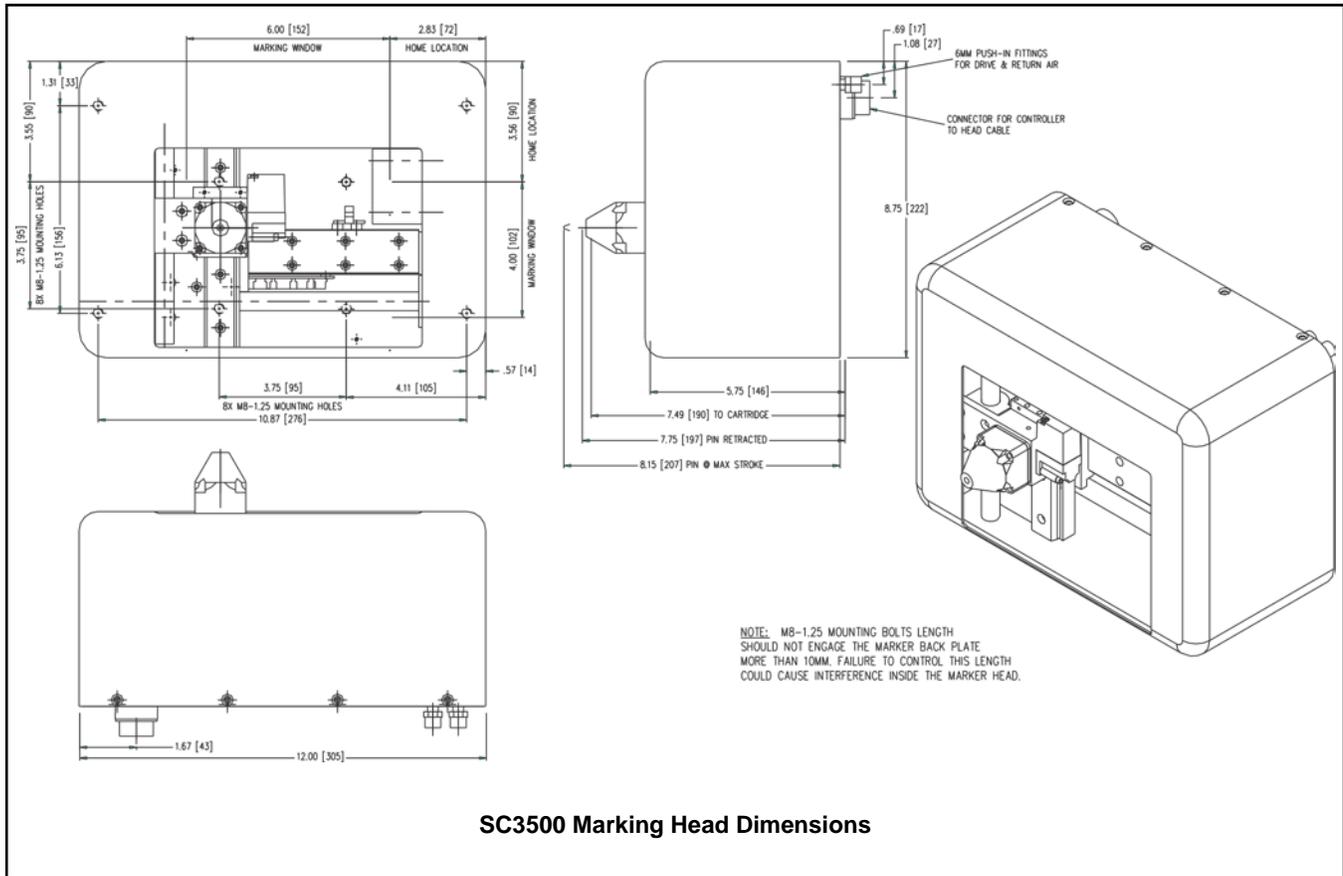
Lightweight **Pin Cartridges** are provided for the marking pins. The machined cartridges, piloted to resist shear loads, offer long life with little maintenance. The cartridge is attached to the marking head with four bolts to allow for easy removal, cleaning, and pin replacement.

Marking Pins for the SC3500 are available in various cone angles radius tips, and piston diameters. An optional, diamond-tip pin is also available. Refer to the SC3500 Marking Head Dimensions drawing (on next page) for maximum pin extension (pin stroke).

The **Filter/Regulator Unit** includes two regulators with pressure gauges to control the drive air and return air. The unit contains a filter to help remove contaminants from the supply air. Two air lines connect the regulated air to the marking head. Drive air extends and holds the impact pin while scribing; return air pushes it back into the cartridge. The standard drive/return air lines are 4 m (13 ft.) long made of 6 mm 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.

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SYSTEM SETUP

The drawn sheet metal cover allows for fixture-mounting. When designing the fixture, allow for 3-axis adjustment to aid in horizontal, vertical, and lateral alignment of the marking head.

1. Mount marking head to a suitable, rigid structure. Refer to the SC3500 Marking Head Dimensions drawing for dimensions and hole locations.

CAUTION

Mounting bolts must not extend into the marking head more than 10 mm (3/8").

2. Mount filter/regulator assembly using brackets provided within 4 m (13 ft.) of the marking head.
3. Connect Drive Air line and Return Air line to Drive and Return fittings on 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 the marking head. Standard marking head cable length is 4 m (13 ft)
6. Install controller as a table-top, wall-mounted, panel-mounted, or enclosure-mounted unit, as applicable.
7. Ensure controller power switch is OFF.
8. Connect marker cable to marking head and to controller.
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 marking depth.

SYSTEM OPTIONS

- Marking Head Extension Cables
- Marking Head Mounting Post
- TMC600 Controller Wall-mounting Bracket Kit
- TMC600 Angle Bracket Kit
- Bar Code Scanner or Bar Code Wand with Cable
- Foot Switch (Start Print) or Pushbutton Station (Start/Abort)
- USB Mouse
- USB Keyboard

SC3500 MARKING HEAD

Specifications

The SC3500 marking head specifications are subject to change without prior notice.

Dimensions.....	refer to the <i>SC3500 Marking Head Dimensions</i> drawing
	Note: The overall dimensions of the marking head may be reduced for custom applications.
Weight	10.0 kg (22 lb.)
Operating Temperature.....	0° to 50° C (32° to 122° F), non-condensing
Air Supply	Clean and dry, 4.2 to 8.3 bar (60 to 120 psig)
Air Consumption.....	.04 SCFM (idle) 0.6 SCFM (marking)
Marking Area.....	150 x 100 mm (6.0 x 4.0 in.)
Pin Material	Tungsten Carbide (optionally diamond-tipped)

SC3500 MARKING HEAD (continued)

Marking Characteristics

The SC3500 can produce characters as small as 1.5 mm (.06"), printed at any angle within the 150 x 100 mm (6.0 x 4.0") X/Y marking window. Character strings may be marked at any angle.

Marking Speeds

Marking speeds vary widely, depending on character size. For example, 3mm (.125") high characters may be printed at two characters/sec. (max). Smaller characters may be printed faster; larger characters may require longer printing times. Specific marking times can be verified by a Telesis representative.

Pin Life

Pin life depends largely on the type of material being marked, how hard or abrasive it is, and the required marking depth.

Marking Noise

The SC3500 provides virtually silent marking with a maximum noise level approximately 72 DBA.

Marking Depth

The depth of mark may be adjusted by changing the drive air pressure. Maximum marking depths vary widely, depending on the material being marked, the thickness of the material, the marking pin selection, and the air pressure setting. In cold rolled steel with a thickness of .75 mm (.030") or more, marking depths up to .05 mm (.002") may be achieved. In aluminum with a thickness of 1 mm (.040") or more, marking depths up to .075 mm (.003") may be achieved. In thinner materials, the maximum marking depth may increase significantly. Specific marking depths can be verified by a Telesis representative.

SC3500/600 Marking System

TMC600 CONTROLLER

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

TMC600 Specifications

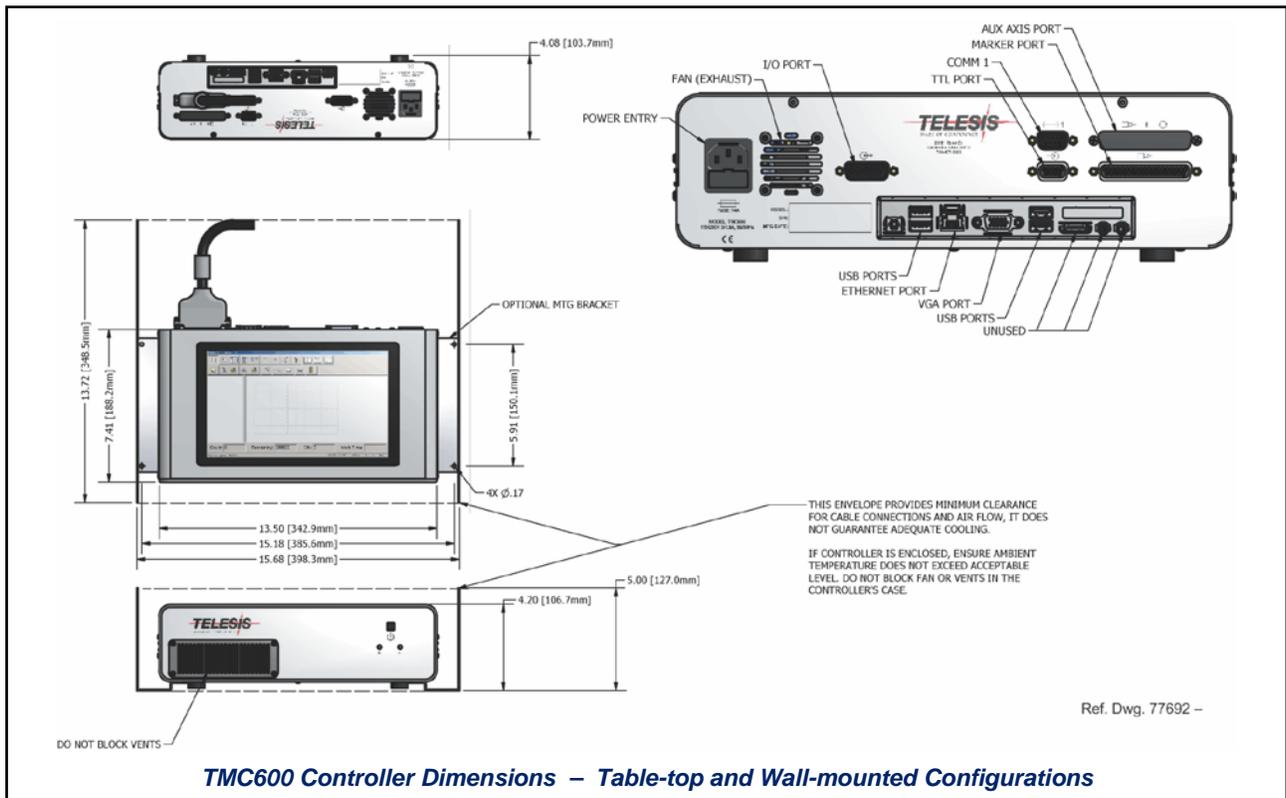
The TMC600 Controller specifications are subject to change without prior notice.

Integrated Processor	Intel® Dual-Core Atom™
Integrated Monitor	10.1 in., color, 1024 x 600, capacitive touch screen LCD
Compliance	CE
Rating	NEMA 1 (I.P. 30)
Configurations	Table-top or wall-mounted
Dimensions.....	see <i>TMC600 Controller Dimensions</i> drawing
Weight	7.00 lb. (3.18 kg) controller only 7.21 lb. (3.28 kg) with wall-mount kit
Operating Temp.	32° to 104° F (0° to 40°C)
Operating Humidity.....	10% to 80% non-condensing
Power Requirements.....	115/230 VAC, 3/1.5 amps, 50/60 Hz, single phase

Cooling.....	Internal, thermostatically controlled fan
Filtering.....	Integrated, 60 ppi contaminant filter
Communications	RS232, TTL, Discrete I/O, TCP/IP, and USB (for 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 nominal current 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



TMC600 Controller Dimensions – Table-top and Wall-mounted Configurations

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

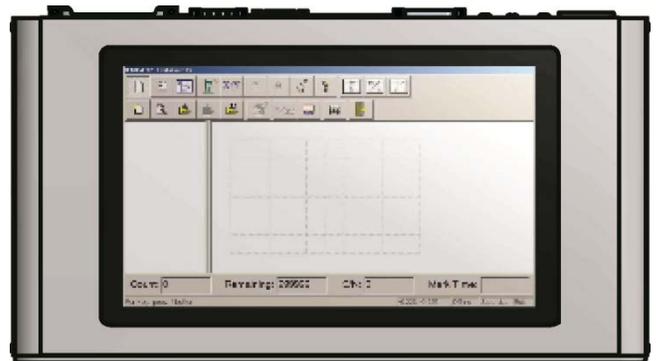
The powerful Telesis MerlinTouch PS software is a Windows® based software package that comes installed in the TMC600 controller. It is a graphical user interface that makes pattern marking and pattern design quick and easy.

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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TMC600 CONTROLLER (continued)

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 port allows connection to remote serial devices such as a host computer or a bar code scanner. See *Host Communications* 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.

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.

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 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.

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* patterns
SPARE_1, 2, 3.....	Three (3) spares for use with the Input command tool or 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 use with the Output command tool or 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 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 RS-232 interface supports both Telesis Extended Protocol and 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).

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.

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
- v Message type v indicates the first variable text field with matching string length
- 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.

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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:
OO;III
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.
- E** Message type E places machine offline and displays data provided in an Error Dialog Window.

- [##]** 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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