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**PAT 4.0 AUTOMATIC CABLE TIE INSTALLATION SYSTEM  
ELECTRONIC INTERFACE USER MANUAL**

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Original Instructions

**EI (Electronic Interface) Instructions**  
**For use with the following Systems &**  
**respective Operational Manuals:**

**PAT 4.0 FAMILY TOOLS: Automatic Cable Tie Installation Tools**  
**PDM4.0: Dispenser**  
**PHM: Feeder Hoses**  
**Operation Manual (PA27647A01)**

**PDM4.0 Data Manager Operations Manual (PA25060A01)**

**EI I/O port (25 Pin Connector) is internally connected**  
**to Optically Isolated Modules.**



## WARNING

- TO REDUCE THE RISK OF INJURY, USER MUST READ INSTRUCTION MANUAL

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## 1: INTRODUCTION

The PAT Fully Automatic Cable Tie Installation System was designed by Panduit Corporation to install Panduit continuously molded cable ties for high volume wire harnessing applications.



**NOTE:** *In the interest of higher quality and value, Panduit products are continually being improved and updated. Consequently, pictures may vary from the enclosed product.*

## 2: SYSTEM SPECIFICATIONS

The Panduit Corporation PAT Cable Tie Installation System consists of four compatible units: the PAT Installation Tool, the PDM Dispenser, the PHM Feeder Hose, and Panduit Pan-Ty XMR Cable Ties. Cable ties are available in reels of 5000 pcs.

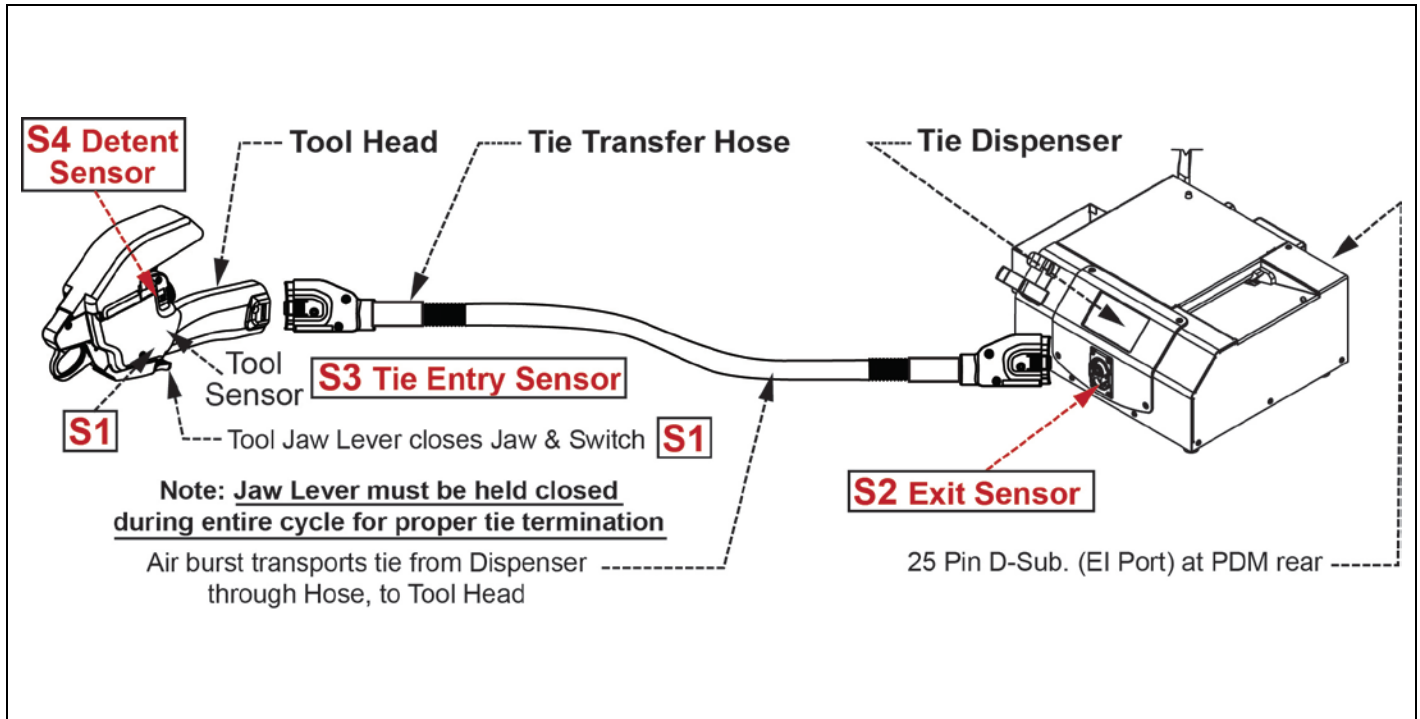
**NOTE:** Any substitution may cause serious damage to the system and/or injury to the operator.

SYMBOL	EXPLANATION
	<b>Warning: Hazardous Voltage</b> Disconnect power before servicing
	<b>Warning: Head Obstruction</b>
	<b>Warning: Sever Hand</b>
	<b>Warning: Wear Safety Glasses</b>
	<b>Caution: Air Inlet</b>
	<b>WEEE Compliance</b>
	<b>Read the Manual</b>
	<b>VAC</b>
	<b>FUSE</b>

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## Automatic Cable Tie Tool System Overview & Tool Cycle: (Applies to all Panduit Automatic Cable Tie Tool Systems, Listed on Page 1)



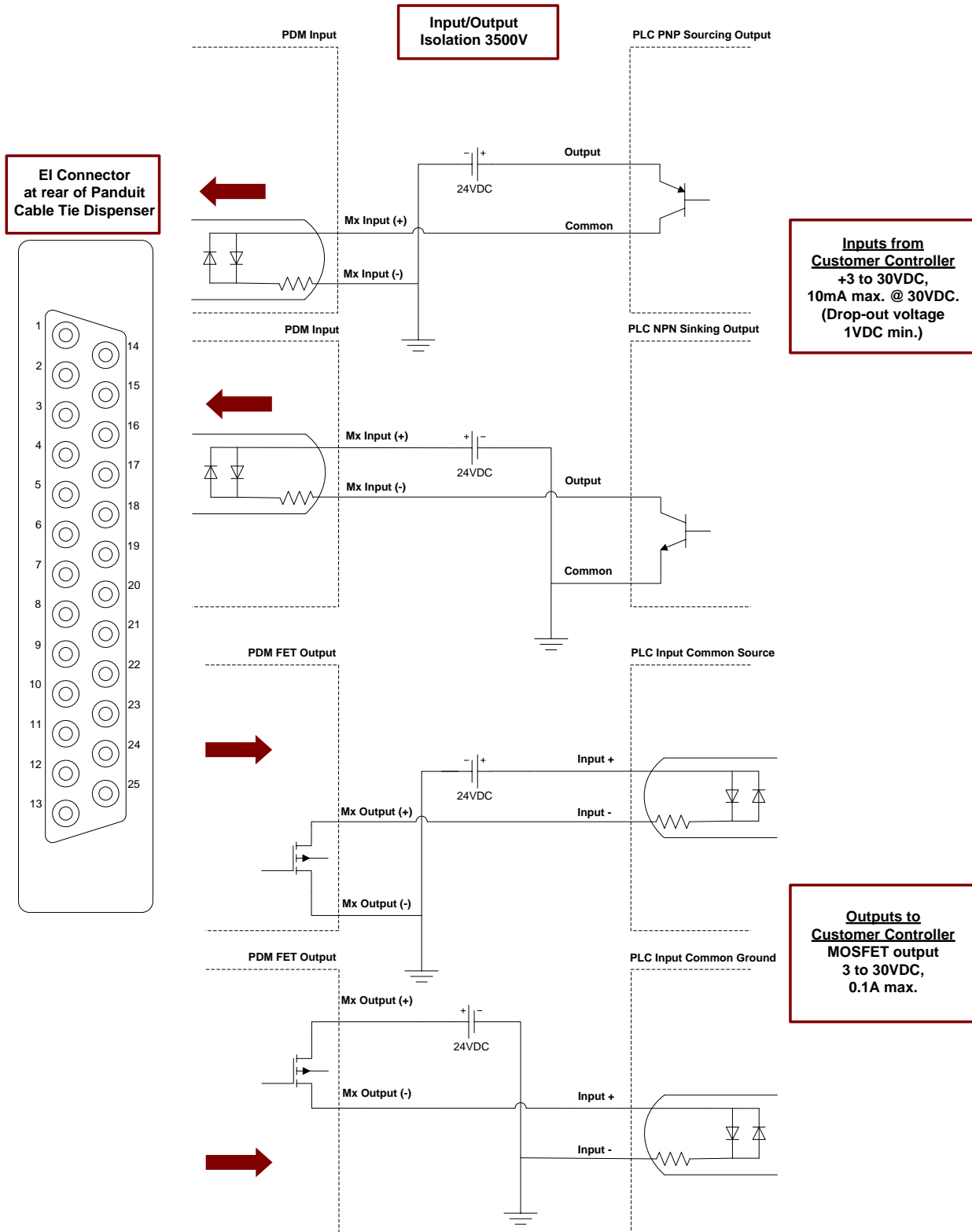
### Tool Cycle with Customer Controlled Tool Actuator / Robot & Use of EI-Port:

1. Customer Controlled Actuator closes Tool Head Jaw lever, closing Jaw & **S1** switch, to enable EI-Port to receive remote trigger input at EI 25 pin D-sub. Connector.  
{NOTE: Customer Actuator must hold Tool Jaw Lever closed during entire cycle for proper Cable Tie Application}
2. Short "primary" air burst sends tie past Dispenser "Gate" and Dispenser Tie Exit Sensor, **S2**, and into Tie Transfer Hose, then "primary" air burst stops.
3. "Gate" in Dispenser closes and second air burst transports tie through Tie Transfer Hose toward Tool Head.
4. Tie enters Tool Head, passing through Tie Entry Sensor, **S3**, stopping in jaws of Tool Head, and Dispenser moves the next tie into position ready for next cycle.
5. Upper Jaw moves to thread tie strap through tie head, then tensioning around wire bundle takes place.
6. Tie reaches desired tension and excess tie strap is cut-off, activating Detent Sensor **S4** to end cycle.

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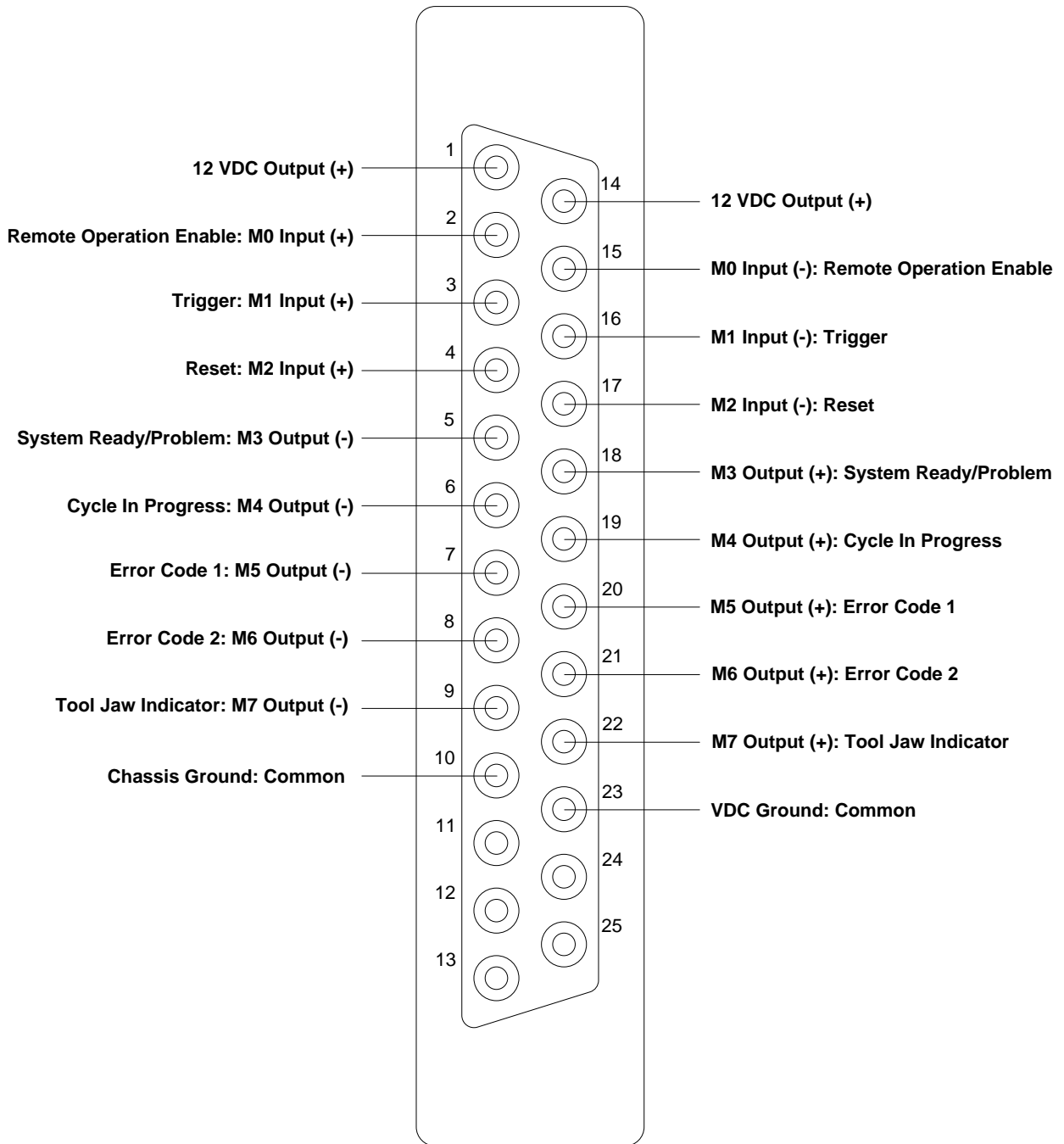
## EI I/O Port Modules: Electrical Specification / Schematic



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**I/O Port: Pin-Out (see functions, page 5)**



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**I/O Port Functions**  
**(“M#” indicates I/O Module #)**

IO Function Definition	I/O NUMBER	25 PIN D-SUB Pin Numbers	
		+	-
12 VDC Output @ 0.75 A		1,14	
Chassis Ground			10
DC Ground			23
<b>INPUTS (To Dispenser-EI from Remote Control)</b>			
Remote Operation Enable (ROE)	<b>M0</b>	2	15
Trigger (start cycle)	<b>M1</b>	3	16
Reset	<b>M2</b>	4	17
<b>OUTPUTS (From Dispenser-EI to Remote Control)</b>			
System Ready / Error	<b>M3</b>	18	5
Cycle In Process (CIP)	<b>M4</b>	19	6
Error Code 1	<b>M5</b>	20	7
Error Code 2	<b>M6</b>	21	8
Tool Jaw Indicator	<b>M7</b>	22	9

**Table 1: IO Function Connector Pin Definition**

**Error Code Definition**  
**(“M#” indicates I/O Module #)**  
**(Check PDM display for additional information and correction)**

M5 & M6 Error Code	M5	M6
No Error	Closed	Closed
Exit Sensor Error	Open	Closed
Tool Sensor Error	Closed	Open
Tie/PDM Error	Open	Open

**Table 2: Error Code Definition**

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**Cycle Progress Signal Definition**  
**(“M#” indicates I/O Module #)**  
**(See Flow Chart on pages 6 & 7 for cycle timing)**

Cycle Progress	INPUTS			OUTPUTS				
	M0 ROE	M1 Trigger	M2 Reset	M3 Ready	M4 CIP	M5 Error 1	M6 Error 2	M7 Jaw Indicator
PLC Off	Open	No Effect	No Effect	Closed	Open	Error Code	Error Code	Open
PLC On PDM Error	Closed	Open	Open	Open	Open	Error Code	Error Code	Open
PLC On PDM Ready	Closed	Open	Open	Closed	Open	Error Code	Error Code	Open
PLC On PDM Reset	Closed	No Effect	Closed	Open	Open	Error Code	Error Code	Open
PLC On PDM Ready JAW Closed	Closed	Open	Open	Closed	Open	Error Code	Error Code	Closed
PLC On PDM Ready JAW Closed Cycle In Progress	Closed	Closed	Open	Closed	Closed	Error Code	Error Code	Closed
PLC On PDM Ready Cycle In Progress	Closed	Closed	Open	Closed	Closed	Error Code	Error Code	Open/ Closed
PLC On PDM Ready JAW Closed Cycle Not In Progress	Closed	Closed	Open	Closed	Open	Error Code	Error Code	Closed

**Table 3: Cycle Progress Definition**

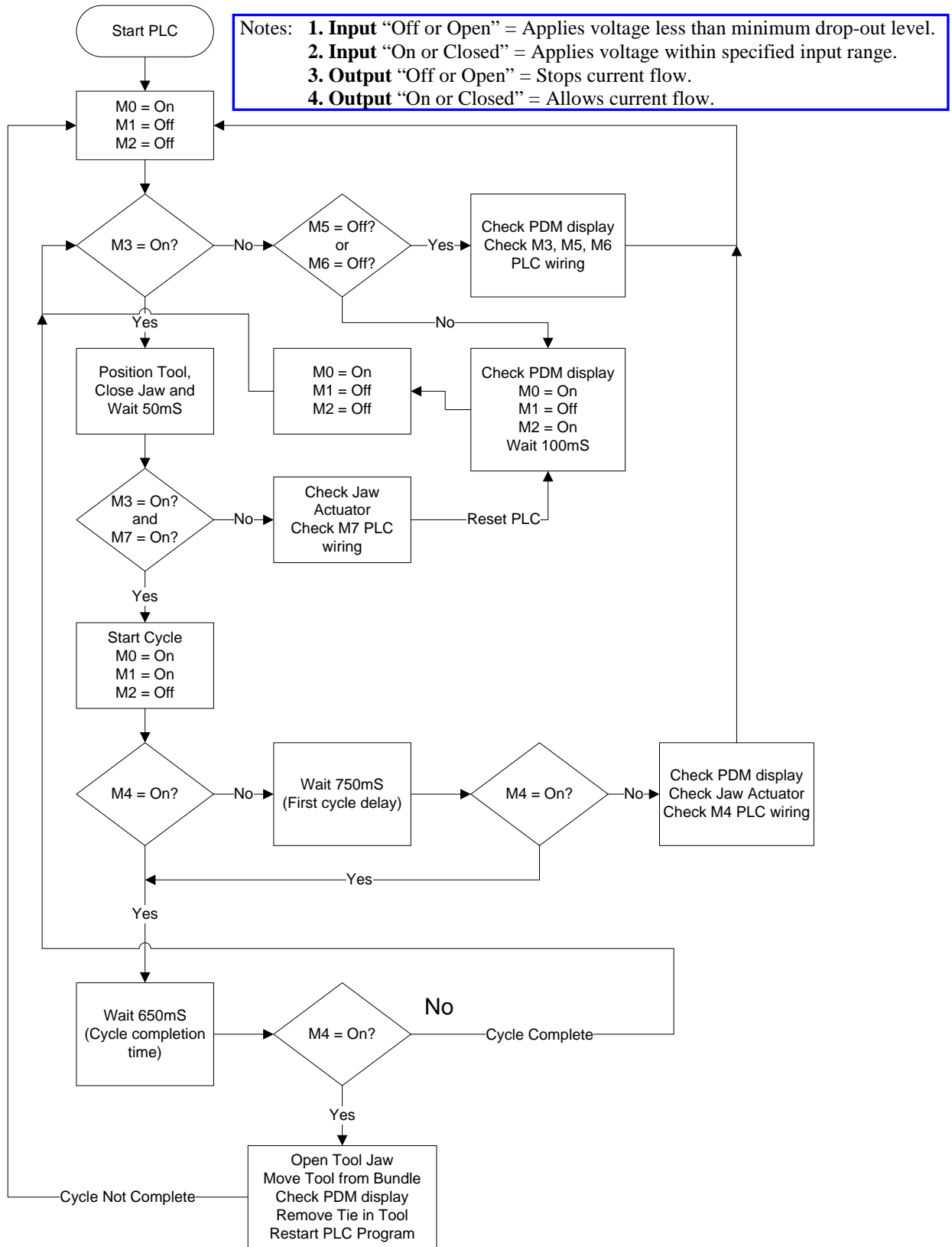
\* **M7 must be closed to start cycle. M7 may remain “Closed” continually or “Open” at end of cycle. M7 should remain closed during entire cycle indicating Tool Jaw Lever is held closed to allow proper cable tie application. If Tool Jaw Lever opens after cycle in progress, the cycle will continue and cable tie may not thread into tool tensioning mechanism. This may create Tie in Tool Error.**

\* **Dispenser outputs M3, M4, M5, M6 & M7 may be monitored by the PLC without the need to drive Dispenser inputs M0, M1 & M2.**

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## EI PLC Program Flow Chart Recommendation





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## Cable Tie Dispenser Display for Errors & Corrective Action

Dispenser Display	Possible Cause	Corrective Action
"Dispenser jam - check tie loading"	Dispenser rotary receiver did not advance next tie into position; due to bent cable tie, or jam of carrier strip in strip exit chute. { <b>PDS-EI Only:</b> Or Cable Tie Reel Moved off of Reel Pivot Disk on Dispenser Frame}	<ol style="list-style-type: none"> <li>1. Press "Buzzer" button to turn buzzer off.</li> <li>2. Check rotary receiver and connection block for jammed cable tie, and check for jam in carrier strip exit chute.</li> <li>3. Press "Unload" to back loose cable ties from rotary receiver &amp; un-jam.</li> <li>4. Cut excess carrier strip and any distorted or damaged cable ties from cable tie reel.</li> <li>5. Close Cover and perform loading procedure.</li> </ol>
"Out of ties or tie in dispenser"	<p>A. Reel empty; dispenser out of cable ties.</p> <p>B. Reel not empty; tool cycled without enough cable ties loaded,</p> <p>C. Cable tie prevented from leaving dispenser.</p>	<p>A. <ol style="list-style-type: none"> <li>1. Press "Buzzer" button to turn buzzer off.</li> <li>2. Press "Continue"; then "Menu" to bring up "Reset" display.</li> <li>3. Press "Reset load" to bring up "Load, Unload, Menu" display and perform the standard reloading procedure.</li> </ol></p> <p>B. <ol style="list-style-type: none"> <li>1. Press "Buzzer" button to turn buzzer off.</li> <li>2. Press "Continue"; then "Menu" to bring up "Reset" display.</li> <li>3. Press "Reset load" to bring up "Load, Unload, Menu" display.</li> <li>4. Press "Load" to load one (1) cable tie and resume operation.</li> </ol></p> <p>C. <ol style="list-style-type: none"> <li>1. Disconnect air hose and feeder hose from dispenser.</li> <li>2. Remove cable tie from Dispenser connector block, if present. (if tie does not come out freely, turn dispenser off / then on again, to reset rotary receiver position). If not able to remove a stuck tie, notify your maintenance department.</li> <li>3. After Cable Tie is removed, reconnect air hose and feeder hose to dispenser.</li> <li>4. Press "Continue"; then "Menu" button to bring up "Reset" display.</li> <li>5. Press "Reset load" to bring up "Load, Unload, Menu" display.</li> <li>6. Press "Load" to load one (1) cable tie and resume operation.</li> </ol></p>
"Cover is open, no tie loaded"	<p>A. Cover was open when "Load" was pressed.</p> <p>B. Cover was open when tool was cycled.</p>	<p>A. <ol style="list-style-type: none"> <li>1. Press "Buzzer" button to turn buzzer off.</li> <li>2. Close Cover.</li> <li>3. Resume loading procedure.</li> </ol></p> <p>B. <ol style="list-style-type: none"> <li>1. Press "Buzzer" to turn buzzer off.</li> <li>2. Close Cover.</li> <li>3. Press "Load" to load one (1) cable tie and resume operation.</li> </ol></p>
"Check for low air pressure" (or "high")	<p>A. Incoming air pressure too low or too high.</p> <p>B. Air not connected.</p>	<p>A. <ol style="list-style-type: none"> <li>1. Press "Buzzer" button to turn buzzer off.</li> <li>2. Set air pressure 65-85 PSIG (4.5-5.8 bar), with max. 10 PSIG (0.7 bar) drop.</li> </ol></p> <p>B. Connect air to PDM.</p>
"Tie stuck in exit sensor" or "Blocked or dirty exit sensor" or "No exit sensor seen – service tool soon"	<p>Exit sensor in dispenser is obstructed by a cable tie or excess debris (dirt, grime). or Cable tie in feeder hose when cycle started. or Exit sensor in dispenser is not functioning properly.</p>	<ol style="list-style-type: none"> <li>1. Press "Buzzer" button to turn buzzer off.</li> <li>2. Disconnect feeder hose from dispenser and remove tie from dispenser connector block if present (if tie does not come out freely, turn dispenser off / then on again, to reset rotary receiver position). If not able to remove a stuck tie, notify your maintenance department.</li> <li>3. Reconnect feeder hose, and resume operation.</li> <li>4. If tie is not found, reconnect feeder hose and follow the same Corrective Action for "Tie in hose - press air burst" error to remove the cable tie from the system.</li> <li>5. If the same error is repeated, clean the dispenser exit sensor lens and resume operation.</li> <li>6. If the same error is still repeated, maintenance is required to replace the exit sensor.</li> </ol>

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## Cable Tie Dispenser Display for Errors & Corrective Action (Continued)

Dispenser Display	Possible Cause	Corrective Action
<p>"Blocked or dirty tool sensor" or "Tie stuck in tool sensor"</p>	<p>Tool sensor is obstructed by a cable tie, or excess debris (dirt, grime).</p>	<ol style="list-style-type: none"> <li>1. Press "Buzzer" button to turn buzzer off.</li> <li>2. Disconnect feeder hose from tool. Look for cable tie in tool or tool end of hose and remove cable tie if present; then reconnect feeder hose, and resume operation.</li> <li>3. If cable tie is not found, reconnect feeder hose and follow the same Corrective Action for "Tie in hose - press air burst" error to remove the cable tie from the system.</li> <li>4. If the same error is repeated, clean tool sensor lens.</li> </ol>
<p>"Detent sensor blocked or dirty"</p>	<p>Detent sensor is obstructed by debris because of full Tip Collector, or detent sensor lens is dirty.</p>	<ol style="list-style-type: none"> <li>1. Press "Buzzer" button to turn buzzer off.</li> <li>2. Remove cable tie from jaw area of tool.</li> <li>3. Empty Tip Collector.</li> <li>4. Press "Continue" button and resume operation.</li> <li>5. If message reappears, Tool maintenance required to clean detent sensor.</li> </ol>
<p>"Switch #X is stuck or broken"</p>	<p>A switch (buttons #1, 2, 3, 4 near the Dispenser Display or the Tool Jaw actuator / trigger) was held down or was stuck when the dispenser was turned on. This message remains if there is a bad switch.</p>	<ol style="list-style-type: none"> <li>1. The message will disappear when the designated switch has been freed or released.</li> <li>2. If the message does not disappear, then the designated switch is bad, and the Dispenser or Tool requires maintenance.</li> </ol>
<p>"Jaw sensor error"</p>	<p>Cable tie stopped in tool gripper gears.</p>	<ol style="list-style-type: none"> <li>1. Press "Buzzer" button to turn buzzer off.</li> <li>2. Remove the cable tie from the jaw area.</li> <li>3. Press "Continue" and resume operation.</li> </ol>
<p>"Tie in tool"</p>	<p>Tie in tool jaws-cycle not complete; Due to: Large air pressure drop. Or bundle too large. Or severe bend in hose. Or jaw opened during cycle.</p>	<ol style="list-style-type: none"> <li>1. Press "Buzzer" button to turn buzzer off.</li> <li>2. Remove cable tie and any obstruction from the jaw area.</li> <li>3. Press "Continue" to resume operation.</li> <li>4. Correct any conditions that prevent Tie cycle from being completed.</li> </ol>
<p>"Tie in hose – press air burst" or "Blocked hose-failed back pressure test"</p>	<p>Cable tie stayed in feeder hose during cycle; Due to: Severe bend in hose. Or low air pressure. Or an interrupted cycle.</p>	<ol style="list-style-type: none"> <li>1. Press "Buzzer" button to turn buzzer off.</li> <li>2. Straighten feeder hose to eliminate bends or twists, then point tool away from yourself and others.</li> <li>3. Press "Air burst" to advance cable tie to jaw area of tool, and "Tie in tool" message will appear and buzzer will sound (If tie does not advance to tool jaw after pressing "Air Burst" several times, replace feeder hose). Press "Buzzer" button to turn buzzer off.</li> <li>4. Remove tie from jaw area and press "Continue", then press "Load" to load one cable tie and resume operation.</li> </ol>