



Application Services (866) 284-5509

## Technical Bulletin AS 022006 JM

### I/O Wiring for the ICD and ICM

**Purpose:**

This defines each of the Inputs and Outputs (I/O) available on the Insight ICD and ICM controllers. Examples are shown for some common types of I/O connections. All I/O is 24VDC ONLY.

#### ***INSIGHT ICD & ICM Configurable Inputs***

<b>FREE SPEED *</b>	Allows the spindle to turn at the set FREE SPEED.
<b>SOFT START *</b>	Allows the spindle to turn at the set SOFT START speed.
<b>FORWARD *</b>	Sets the spindle to turn in the FORWARD direction.
<b>REVERSE *</b>	Sets the spindle to turn in the REVERSE direction.
<b>CONFIG 1 through 4 *</b>	Tell the Insight IC which configurations to run. See table below for External Binary input table. Configurations 1 through 4 are in the default I/O map.
<b>CONFIG 5 through 8</b>	Tell the Insight IC which configurations to run. See table below for External Binary input table. These can be added to the I/O map using Ingersoll Rand ICS software.
<b>SPINDLE ENABLE</b>	Enables the selected spindle (must be held HIGH to operate spindle).
<b>SPINDLE DISABLE</b>	Disables the selected spindle (in 2-Line Enable/ Disable Mode only, spindle is disabled when this signal is HIGH).
<b>GANG RESET</b>	Resets the GANG COUNT to 0.
<b>CONFIG RESET</b>	Resets the Configuration # to the lowest configuration number.
<b>SAFETY LATCH</b>	This is the other "Free Speed" input when the Start Mode is set to "Dual". When both of these inputs are used, it works as a "2-Hand No-Tie-Down" circuit.
<b>BYPASS SPINDLE</b>	Sets the indicated spindle to bypass in a POWERHEAD configuration.
<b>RESET OUTPUTS</b>	Resets all OUTPUTS to the non-active condition.

<b>CONFIG ADVANCE</b>	Advances the configuration to whichever configuration is set up in the "Configuration Advance" variable.
<b>GANG ADVANCE</b>	Advances the Gang Count by one (1).
<b>PLC READY</b>	Not used at this time.
<b>EXT. EVENT STOP</b>	Stops the spindle if the "External Event Stop" function is selected in an Angle Control step.
<b>USER INPUT 1 through 8</b>	Used with Fieldbus. Signals coming in to the physical inputs on the ICD/ ICM controller will be displayed as Fieldbus inputs at the PLC.

- \* These inputs are in the default I/O map that is in each controller when it is new. I/O Map can be changed easily using any of the Ingersoll Rand ICS Software packages.









## ***INSIGHT ICD & ICM Configurable Outputs***

<b>PHD ACCEPT</b>	HIGH when Powerhead tightening sequence is “OK”.
<b>PHD CONFIG 1 through 8</b>	When controller receives a configuration input from either a bar code reader or internal selection, it will send out configuration via the “Config Out X” outputs. The 16-position socket tray (PFS-SOCKET-16F) can be used to compare selected configuration with the configuration selected by user via socket selection. If they match the “Correct Out” line from the socket tray is set high (this will be sent to the ENABLE input of the controller).
<b>PHD CYCLE COMPLETE</b>	HIGH when Powerhead sequence is complete.
<b>PHD GANG COMPLETE *</b>	HIGH when # of “OK” cycles=GANG COUNT.
<b>PHD IN CYCLE</b>	HIGH when Powerhead sequence is running.
<b>PHD PAINT MARKER</b>	HIGH, for 0.0-9.9sec when tightening sequence is “OK”.
<b>PHD REJECT</b>	HIGH when Powerhead tightening sequence is not “OK”.
<b>PHD REJECT BUZZER</b>	HIGH, for 0.0-9.9 sec when Powerhead sequence is not “OK”.
<b>PHD REVERSE OPERATION</b>	HIGH when powerhead is operating in reverse.
<b>PHD SYSTEM READY</b>	<p>The System Ready output is active when all of the following conditions are true for ALL SPINDLES in a Powerhead:</p> <ul style="list-style-type: none"><li>• The RISC processor has successfully booted and downloaded all programmed parameters to the MCE</li><li>• A tool is connected to the MCE and the MCE is powered</li><li>• There are no system faults</li><li>• System not in cycle</li><li>• System is ready to start next cycle</li></ul>
<b>SPINDLE ACCEPT *</b>	HIGH when tightening sequence is “OK”.
<b>SPINDLE BYPASS</b>	Selected spindle won’t run (bypassed) in POWERHEAD mode.
<b>SPINDLE CYCLE COMPLETE*</b>	HIGH when either “OK” or not “OK” tightening is completed.
<b>SPINDLE HIGH TORQUE *</b>	HIGH when Torque value is above the HIGH TORQUE LIMIT.
<b>SPINDLE HIGH ANGLE *</b>	HIGH when Angle value is above the HIGH ANGLE LIMIT.
<b>SPINDLE IN-CYCLE *</b>	HIGH when the spindle is in a cycle.
<b>SPINDLE LOW TORQUE *</b>	HIGH when Torque value is below the LOW TORQUE LIMIT.
<b>SPINDLE LOW ANGLE *</b>	HIGH when Angle value is below the LOW ANGLE LIMIT.

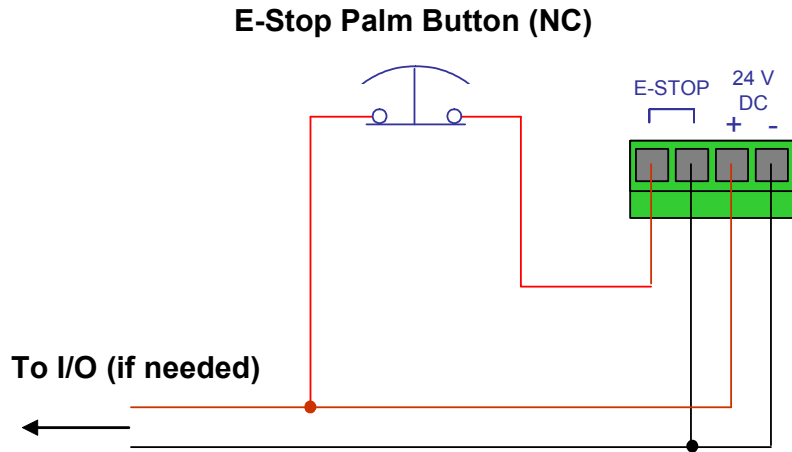
<b>SPINDLE PAINT MARKER</b>	HIGH, for 0.0-9.9 sec when tightening sequence is “OK”.
<b>SPINDLE REJECT</b>	HIGH when tightening sequence is not “OK”.
<b>SPINDLE REJECT BUZZER</b>	HIGH, for 0.0-9.9 sec when tightening sequence is not “OK”.
<b>SPINDLE STATS ALARM</b>	HIGH when one or more STATS ALARMS are outside limits.
<b>SPINDLE TOOL READY</b>	The System Ready output is active when all of the following conditions are true for a spindle: <ul style="list-style-type: none"> <li>• The RISC processor has successfully booted and downloaded all programmed parameters to the MCE</li> <li>• A tool is connected to the MCE and the MCE is powered</li> <li>• There are no system faults</li> <li>• System not in cycle</li> <li>• System is ready to start next cycle</li> <li>• Spindle is in Bypass (Powerhead operation only)</li> </ul>
<b>SPN GRADIENT HIGH</b>	HIGH when the Gradient Check is turned ON and the slope of the last cycle is higher than its Slope High Limit.
<b>SPN GRADIENT LOW</b>	HIGH when the Gradient Check is turned ON and the slope of the last cycle is lower than its Slope Low Limit.
<b>SPN PROG. TOOL SWITCH</b>	When QE-Series momentary switch is activated, this output will turn ON. This can be used with any of the Switch functions.
<b>SPN REDUNDANCY FAULT</b>	Not used at this time.
<b>SPN SLOPE A HIGH</b>	HIGH when the Gradient Check is turned ON and the Slope A of the last cycle is higher than the Slope A High Limit.
<b>SPN SLOPE A LOW</b>	HIGH when the Gradient Check is turned ON and the Slope A of the last cycle is lower than the Slope A Low Limit.
<b>SPN SLOPE B HIGH</b>	HIGH when the Gradient Check is turned ON and the Slope B of the last cycle is higher than the Slope B High Limit.
<b>SPN SLOPE B LOW</b>	HIGH when the Gradient Check is turned ON and the Slope B of the last cycle is lower than the Slope B Low Limit.
<b>SPN STICK SLIP</b>	Indicates that Stick-Slip Enable is ON and a Stick-Slip condition has occurred.
<b>SPN SYSTEM FAULT</b>	Indicates a problem with the system.
<b>USER OUTPUT 1 through 8</b>	Used with Fieldbus. “User Outputs” sent over Fieldbus will turn on these physical outputs on the ICD/ ICM controller.

\* These outputs are in the default I/O map that is in each controller when it is new. I/O Map can be changed easily using any of the Ingersoll Rand ICS Software packages.

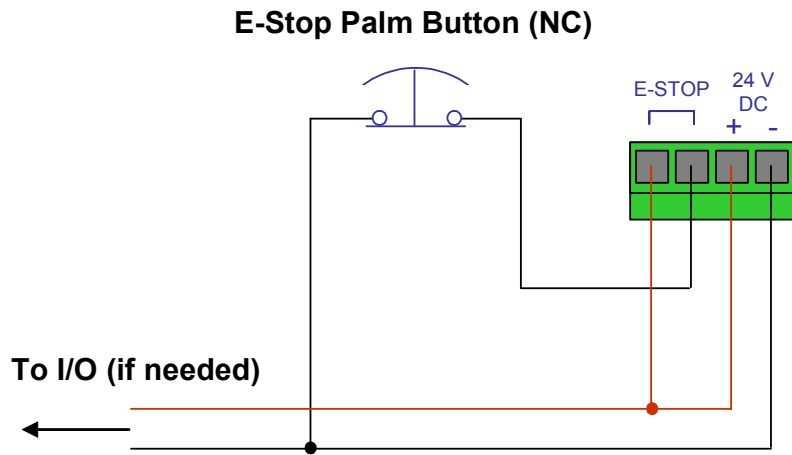


**Examples:**

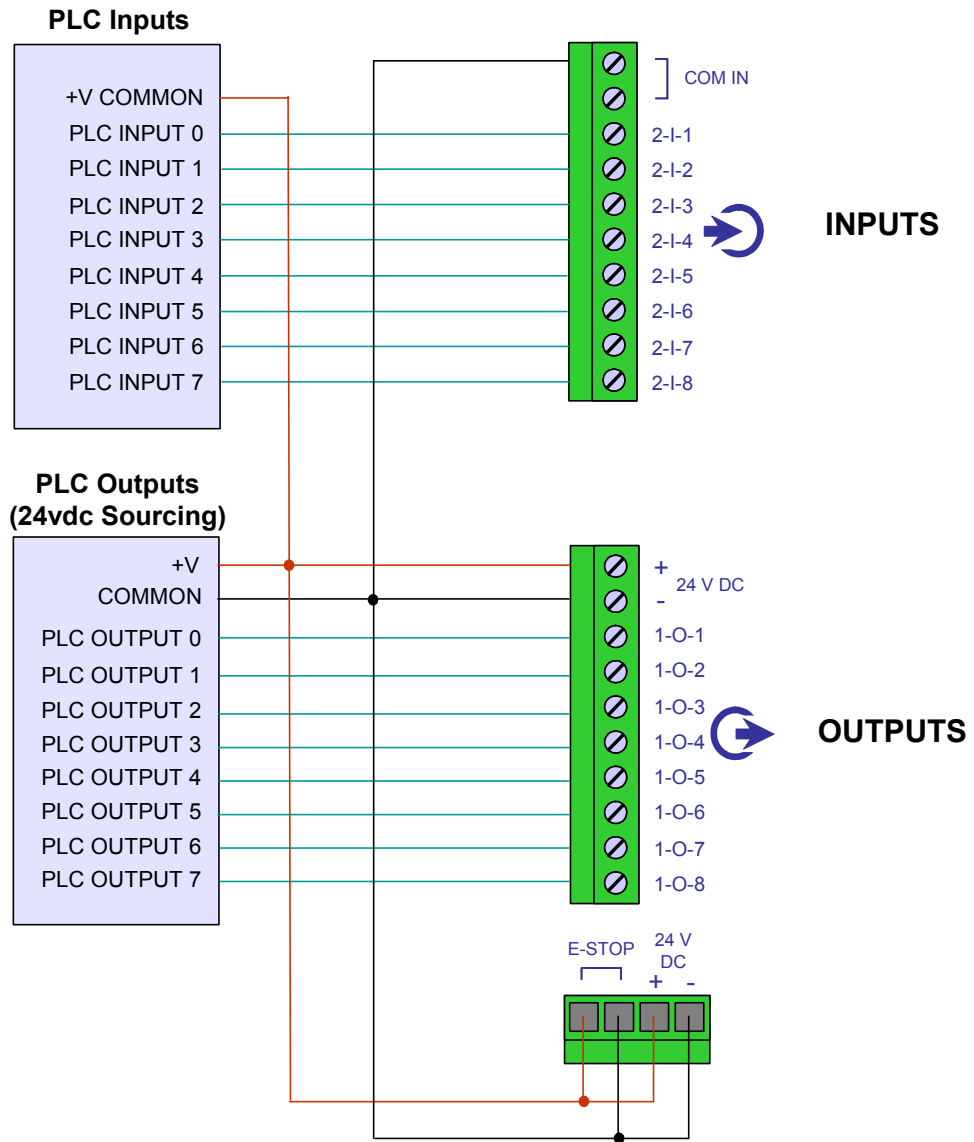
**E-Stop Wiring – High Side Shutoff**



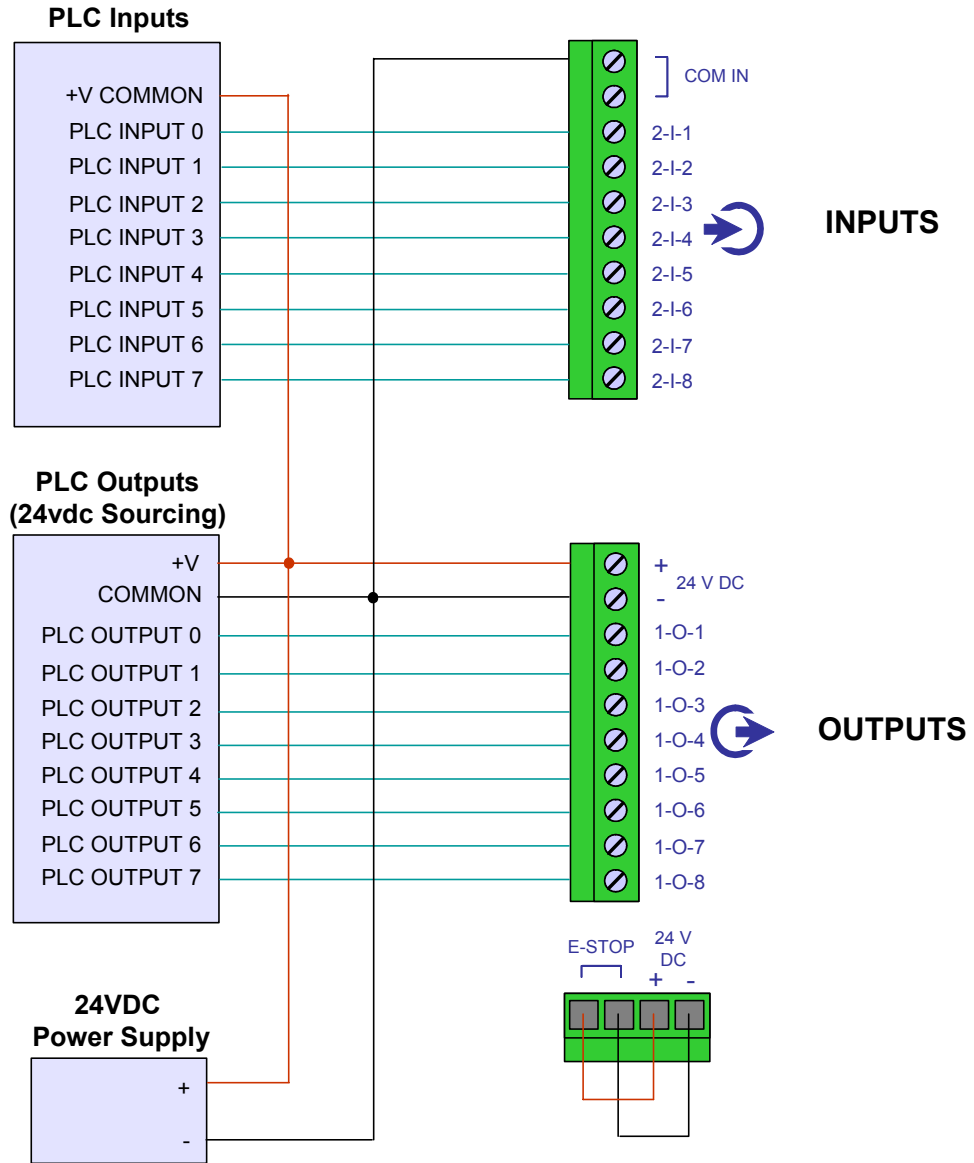
**E-Stop Wiring – Low Side Shutoff**



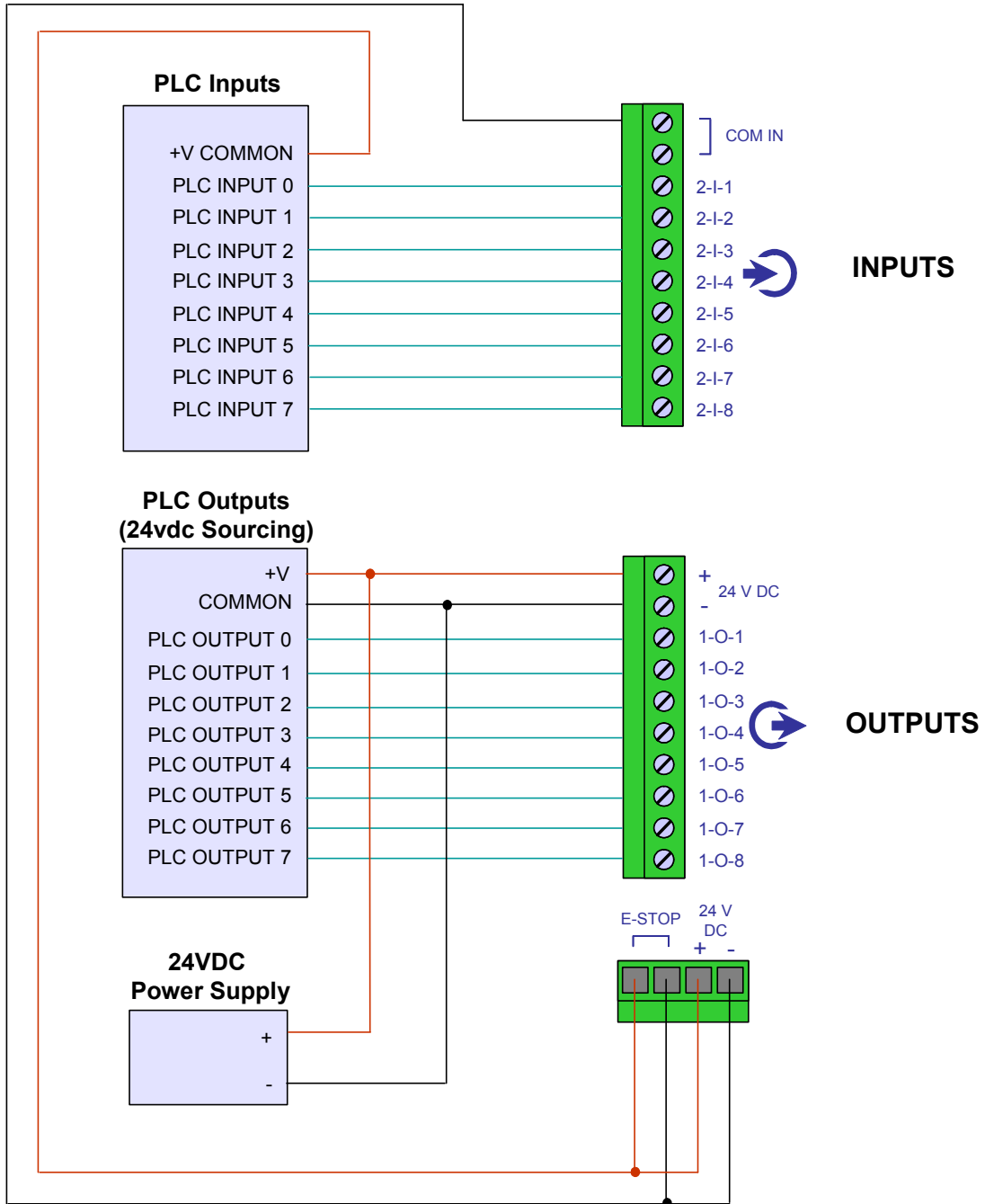
# Internal Power, Standard I/O, PLC Wiring



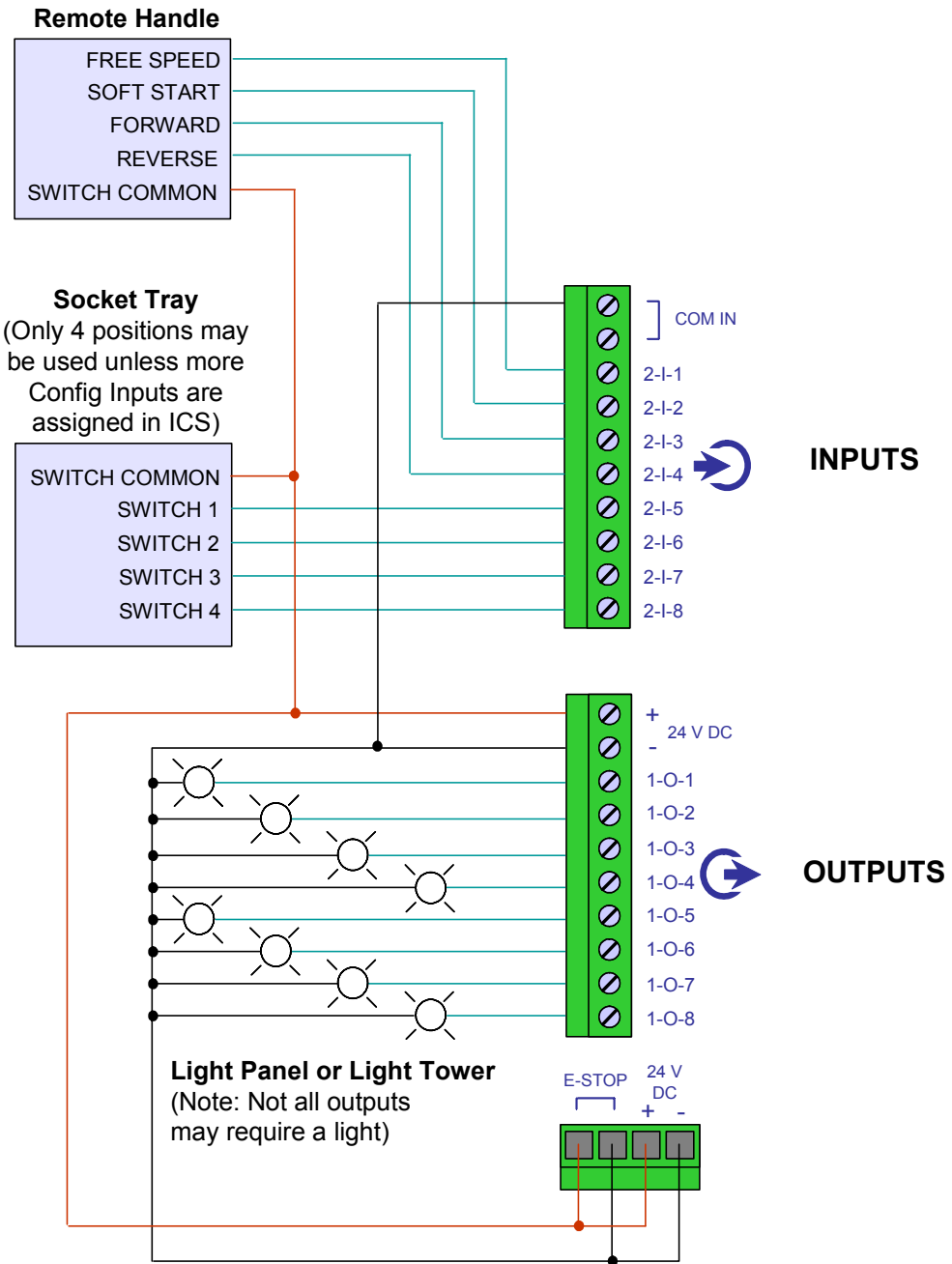
# External Power, Standard I/O, PLC Wiring



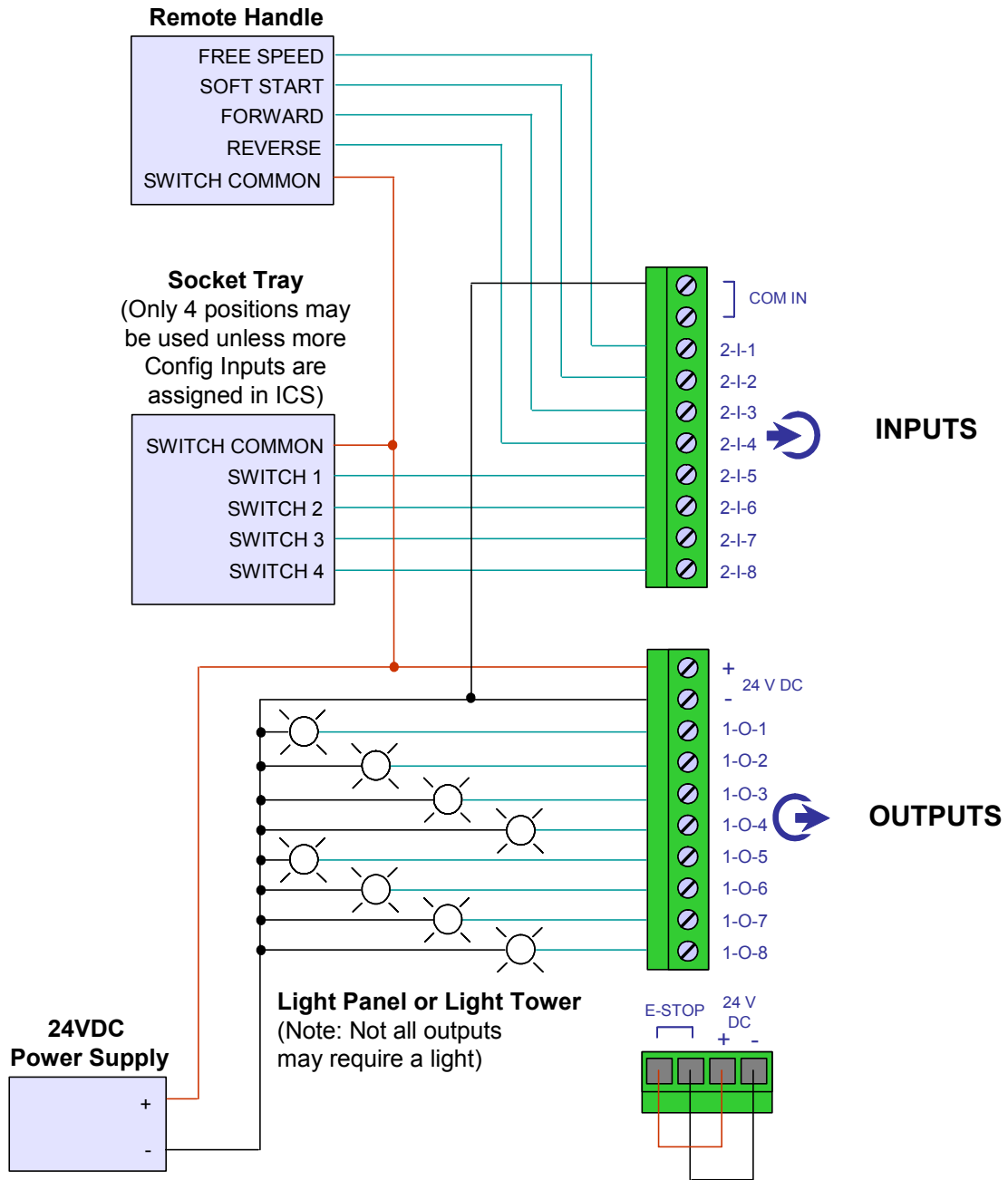
# Mixed Power (Recommended), Standard I/O, PLC Wiring



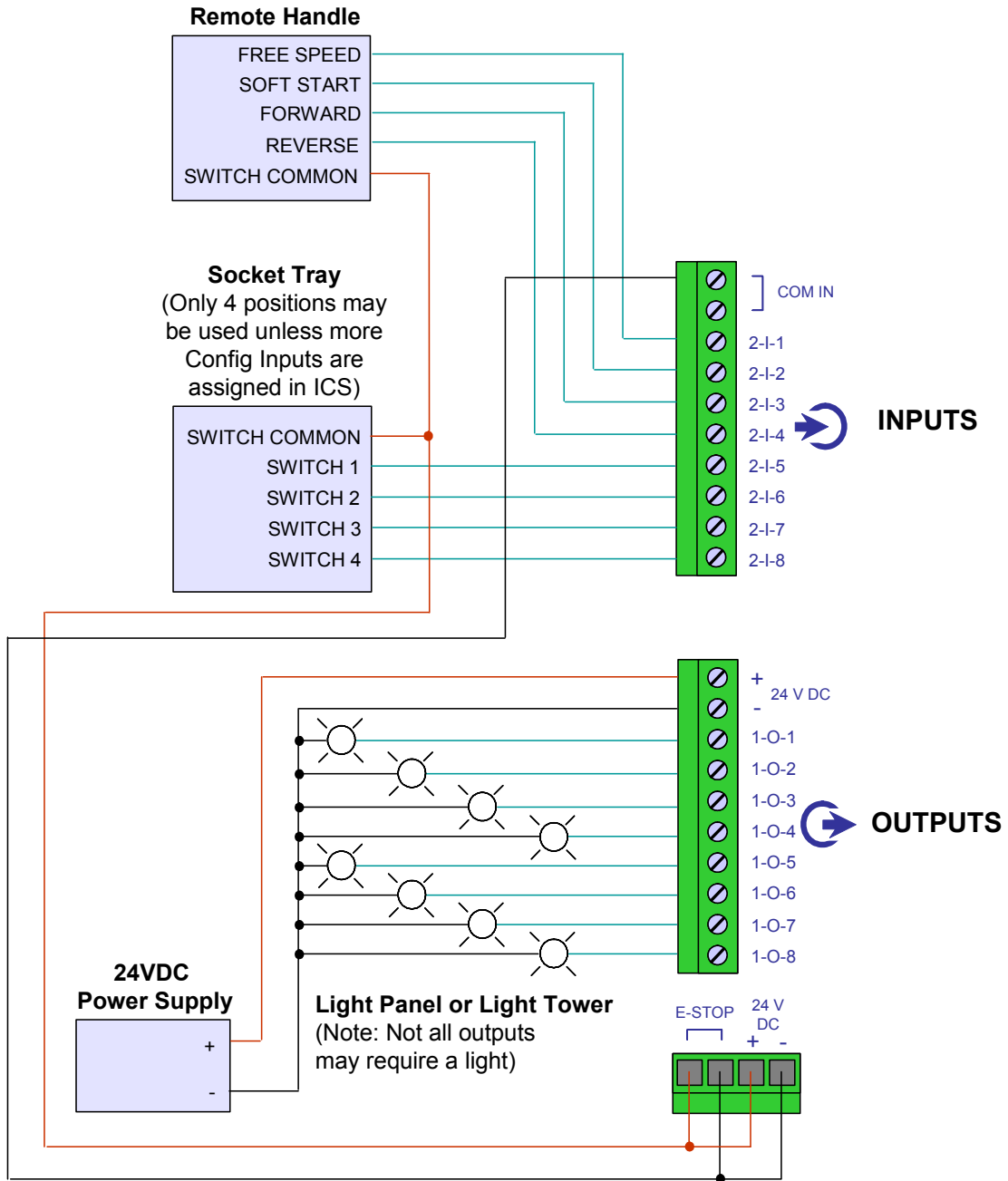
# Internal Power, Standard I/O, Accessory Wiring



# External Power, Standard I/O, Accessory Wiring



**Mixed Power (Recommended), Standard I/O, Accessory Wiring**



See AS 081604 JM for Insight Timing Diagrams  
 See AS 021006 JM for Fieldbus I/O on the Insight ICD and ICM