

# *iQ Series*

COLOR FRONT PANEL ULTRASONIC PRESS SYSTEM

**ES**



HAND PROBE



AUTOMATED



PRESS

## “Q” Series Automation Interface Guidelines



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### System Inputs

Pin	Color	Description
J2-1	BLK	+22V CURRENT LIMITED POWER SUPPLY (250mA MAX)
J2-2	WHT	+22V RETURN (iQ CHASSIS GROUND)
J2-3	RED	REMOTE SETUP SELECTION BIT 0 INPUT
J2-4	GRN	REMOTE SETUP SELECTION BIT 1 INPUT
J2-5	ORN	REMOTE SETUP SELECTION BIT 2 INPUT
J2-6	BLU	REMOTE SETUP SELECTION BIT 3 INPUT
J2-7	WHT/BLK	REMOTE SETUP SELECTION BIT 4 INPUT
J2-8	RED/BLK	ULTRASOUND ACTIVATION / CYCLE START INPUT
J2-9	GRN/BLK	AUTOMATION THRUSTER CONTROL INPUT (NOT USED)
J2-10	ORN/BLK	FRONT PANEL CONTROL LOCK
J2-11	BLU/BLK	PRESS INHIBIT FOR HAND PROBES (DUKANE USE ONLY)
J2-12	BLK/WHT	SYSTEM LATCH RESET INPUT
J2-13	RED/WHT	ISOLATED COMMON (SOURCING OR SINKING INPUTS)
J2-14	GRN/WHT	OPEN CONNECTION
J2-15	BLU/WHT	AUTOMATION CYCLE STOP INPUT

**Note:** For detailed signal descriptions, please refer to the product manual.

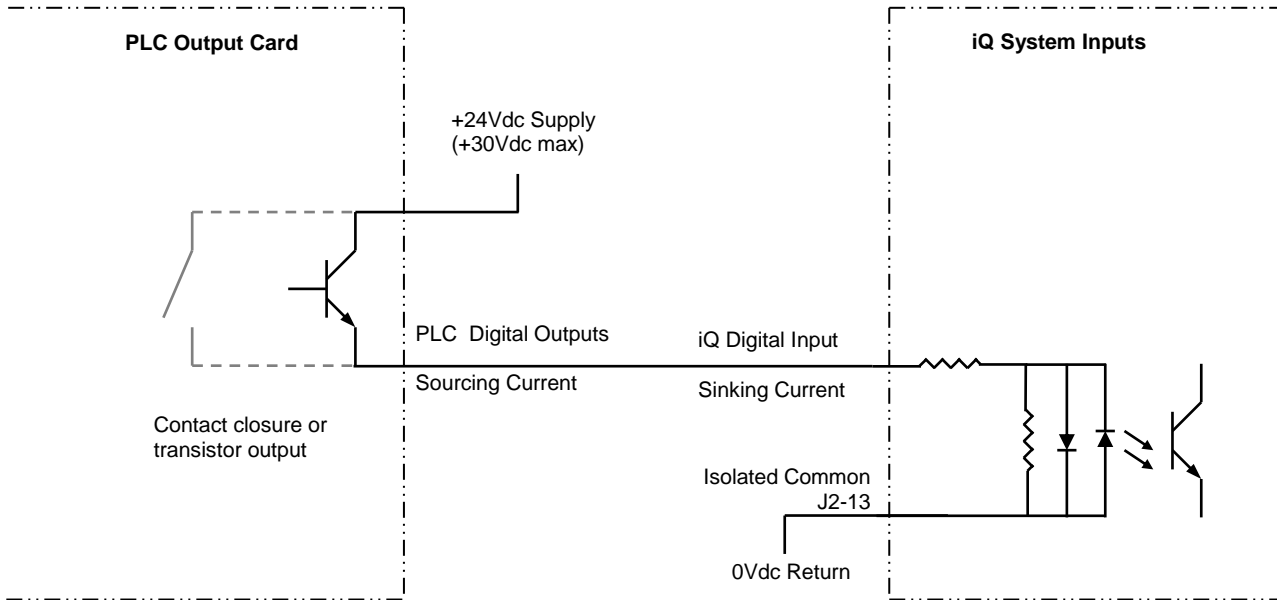
### System Input Cables

Part Number	Length
200-1380-03M	3 meters
200-1380-05M	5 meters
200-1380-07M	7 meters
200-1380-09M	9 meters
200-1380-11M	11 meters
200-1380-13M	13 meters

## Connecting System Inputs

All System Inputs are optically isolated from the internal circuits and can be connected to sinking or sourcing PLC output cards. The inputs will draw approximately 10mA with a 24Vdc supply. The Systems Inputs can also be configured for a contact closure if necessary.

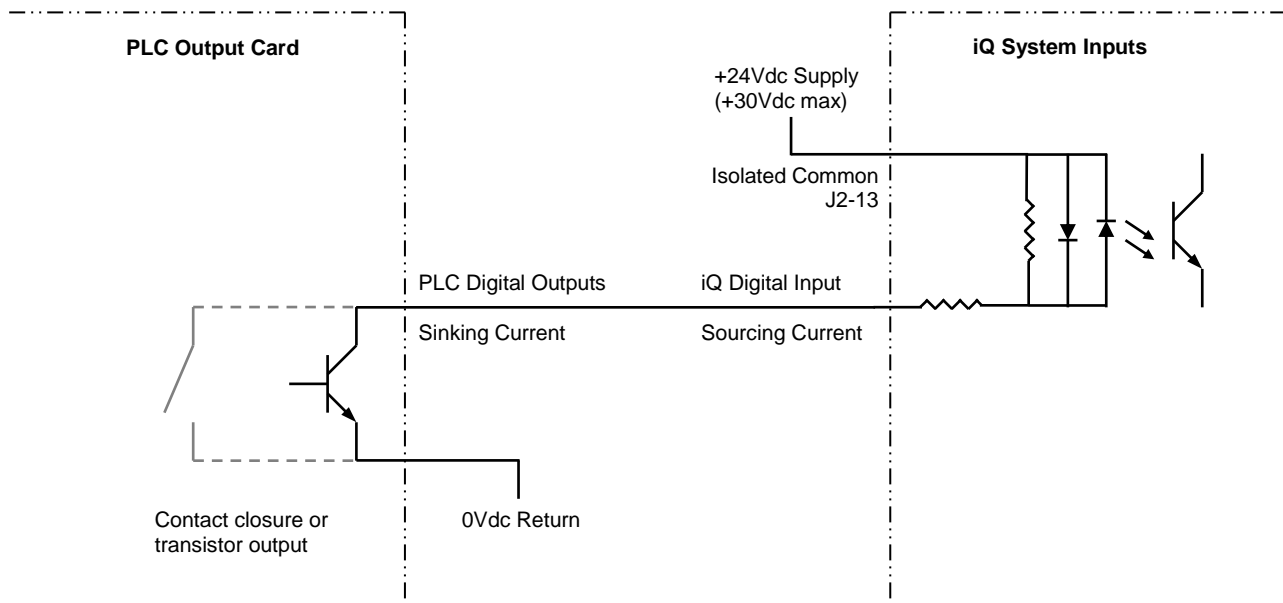
### PLC Sourcing Output Card



**Note:** All System Inputs share the same Isolated Common (J2-13). It is critical that the isolated common is connected to the positive supply or ground.

**Warning:** Any connection to the Ultrasound Activation/Cycle Start Input (J2-8) or the Automation Thruster Control Input (J2-9) should be disabled during an emergency stop condition.

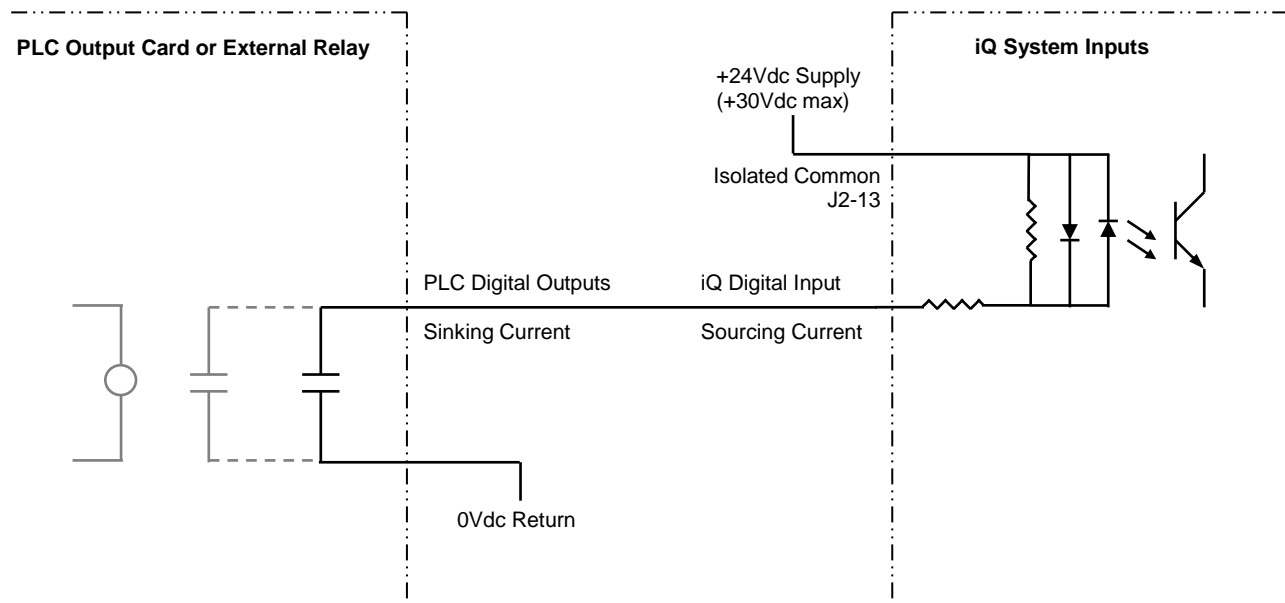
## Connecting a PLC Sinking Output Card



**Note:** All System Inputs share the same Isolated Common (J2-13). It is critical that the isolated common is connected to the positive supply or ground.

**Warning:** Any connection to the Ultrasound Activation/Cycle Start Input (J2-8) or the Automation Thruster Control Input (J2-9) should be disabled during an emergency stop condition.

#### Connecting a Relay Contact Closure



#### Notes:

1. Dukane's current limited power supply can be substituted for the +24Vdc supply above. Connecting +22Vdc (J2-1) to Isolated Common (J2-13) would allow a dry contact closure between any System Input and 0V Return (J2-2). Connecting the System Inputs in this way would be similar to activating DPC series System Inputs.
2. All System Inputs share the same Isolated Common (J2-13). It is critical that the isolated common is connected to the positive supply or ground.

**Warning:** Any connection to the Ultrasound Activation/Cycle Start Input (J2-8) or the Automation Thruster Control Input (J2-9) should be disabled during an emergency stop condition.

### System Outputs

Pin	Color	Description
J3-1	BLK	+22V CURRENT LIMITED POWER SUPPLY (250mA MAX)
J3-2	WHT	OPEN CONNECTION
J3-3	RED	+22V RETURN (iQ CHASSIS GROUND)
J3-4	GRN	PROGRAMMABLE STATUS OUTPUT 1
J3-5	ORN	PROGRAMMABLE STATUS OUTPUT 2
J3-6	BLU	ULTRASOUND ACTIVE STATUS OUTPUT
J3-7	WHT/BLK	ANY FAULT STATUS OUTPUT
J3-8	RED/BLK	PRESS TRIGGER STATUS OUTPUT
J3-9	GRN/BLK	SYSTEM OVERLOAD STATUS OUTPUT
J3-10	ORN/BLK	SYSTEM ONLINE STATUS OUTPUT
J3-11	BLU/BLK	PRESS TOP OF STROKE STATUS OUTPUT
J3-12	BLK/WHT	CURRENT LOOP STATUS OUTPUT (NOT USED)
J3-13	RED/WHT	ANALOG MONITOR OUTPUTS GROUND (iQ CHASSIS GROUND)
J3-14	GRN/WHT	NOT USED (iQ CHASSIS GROUND)
J3-15	BLU/WHT	POWER SIGNAL MONITOR OUTPUT (1mV = 1 WATT)
J3-16	BLK/RED	AMPLITUDE MONITOR OUTPUT (10.0V = 100%)
J3-17	WHT/RED	AMPLITUDE/POWER REGULATION STATUS OUTPUT
J3-18	ORN/RED	MPC SYSTEM READY STATUS OUTPUT (NOT USED)
J3-19	BLU/RED	SYSTEM POWER STATUS OUTPUT
J3-20	RED/GRN	BAD PART STATUS OUTPUT
J3-21	ORN/GRN	GOOD PART STATUS OUTPUT
J3-22	BLK/WHT/RED	SYSTEM READY STATUS OUTPUT
J3-23	WHT/BLK/RED	SUSPECT PART STATUS OUTPUT
J3-24	RED/BLK/WHT	ISOLATED COMMON (SOURCING OR SINKING OUTPUTS)
J3-25	GRN/BLK/WHT	OPEN CONNECTION

**Note:** For detailed signal descriptions, please refer to the product manual.

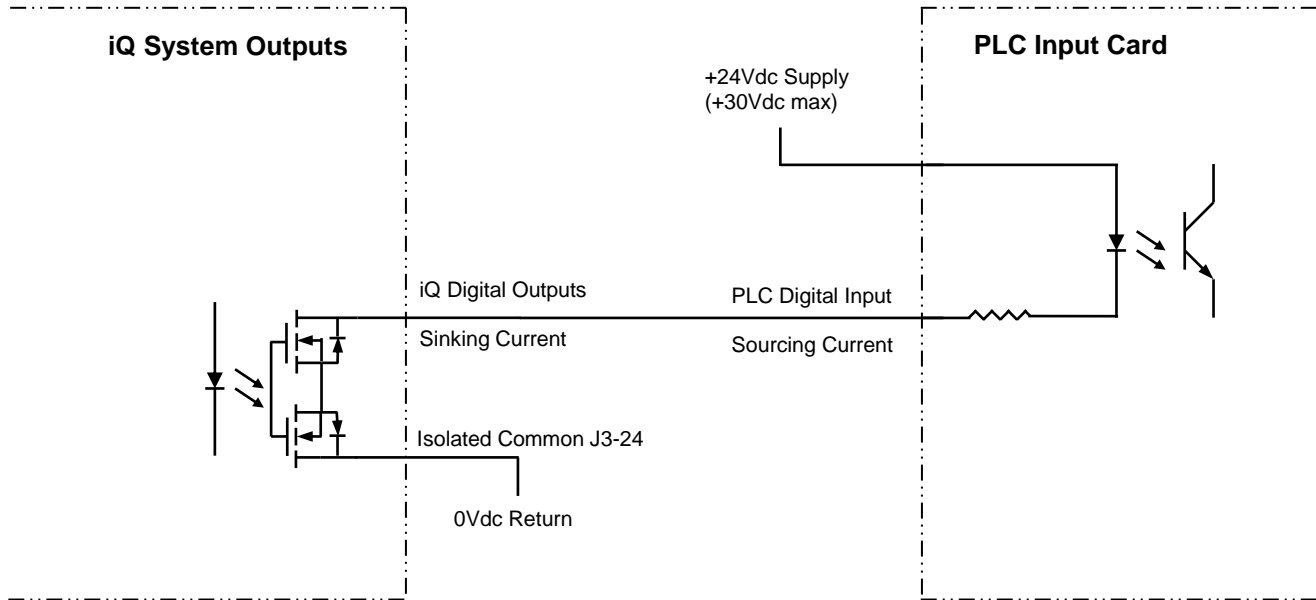
### System Output Cables

Part Number	Length
200-1381-03M	3 meters
200-1381-05M	5 meters
200-1381-07M	7 meters
200-1381-09M	9 meters
200-1381-11M	11 meters
200-1381-13M	13 meters

## Connecting System Outputs

All System Outputs are optically isolated from the internal circuits and can be connected to sinking or sourcing PLC input cards. When J3-1 is used to power the outputs, the total maximum output current for all outputs combined is 250mA. If an external supply is used, as shown in the drawing below, each output can sink or source up to 500mA.

### PLC Sourcing Input Card

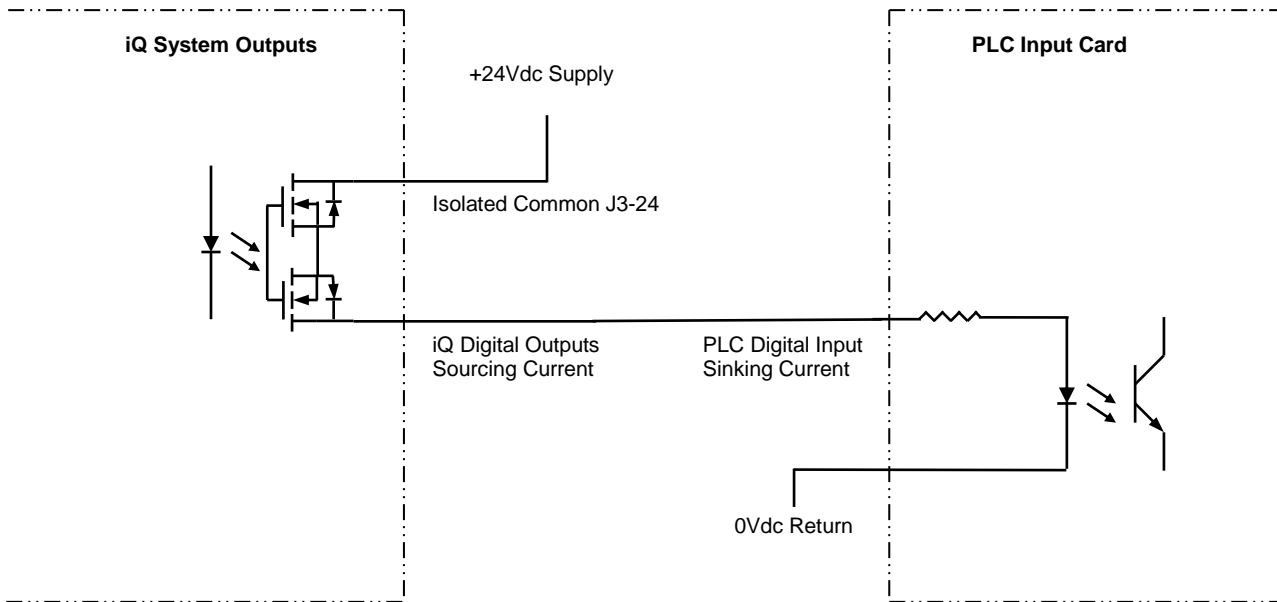


#### Notes:

1. All System Outputs share the same Isolated Common (J3-24). It is critical that the isolated common is connected to the positive supply or ground.
2. J3-1 can be used in place of the 24Vdc supply. If so, J3-24 must be connected to J3-3.



#### Connecting a PLC Sinking Input Card



#### Notes:

1. All System Outputs share the same Isolated Common (J3-24). It is critical that the isolated common is connected to the positive supply or ground.
2. J3-1 can be used in place of the 24Vdc supply. If so, J3-24 must be connected to J3-1 and 0Vdc to J3-3.

### Automation E-Stop (Abort) Cable Pinouts

Pin	Color	Description
J6-1	BLK	MANUAL ACTIVATION SWITCH 1
J6-2	RED	MANUAL ACTIVATION SWITCH 2
J6-3	GRN	AUTOMATION E-STOP (ABORT) INPUT
J6-4	WHT	E-STOP (ABORT) SENSE
J6-5	BRN	+22V RETURN ( <i>iQ CHASSIS GROUND</i> )
J6-6	BLU	OPEN CONNECTION
J6-7	ORN	+22V RETURN ( <i>iQ CHASSIS GROUND</i> )
J6-8	YEL	OPEN CONNECTION
J6-9	VIO	AUTOMATION E-STOP (ABORT) OUTPUT

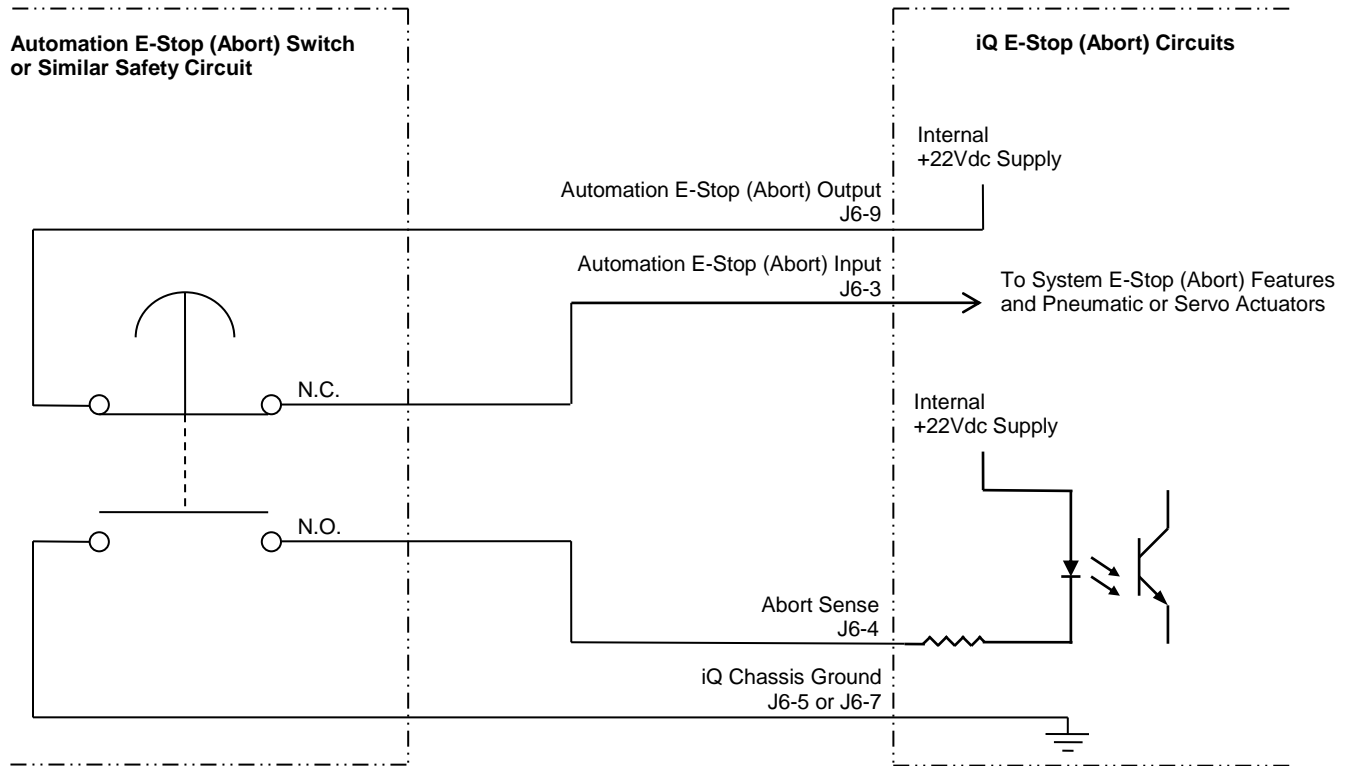
**Note:** For detailed signal descriptions, please refer to the product manual.

### Automation E-Stop (Abort) Cables

Part Number	Length
200-1546-03M	3 meters
200-1546-05M	5 meters
200-1546-07M	7 meters
200-1546-09M	9 meters
200-1546-11M	11 meters
200-1546-13M	13 meters

## Connecting an Automation Safety Circuit

**WARNING:** Consult the appropriate local regulatory agency (OSHA, UL, CE, etc.) regarding all of the safety requirements for your automated machine. Dukane is not responsible for injuries related to improper safety circuits or safety guarding used in an automated machine. EN 12100-1/-2 and EN 60204-1 safety standards are recommended.



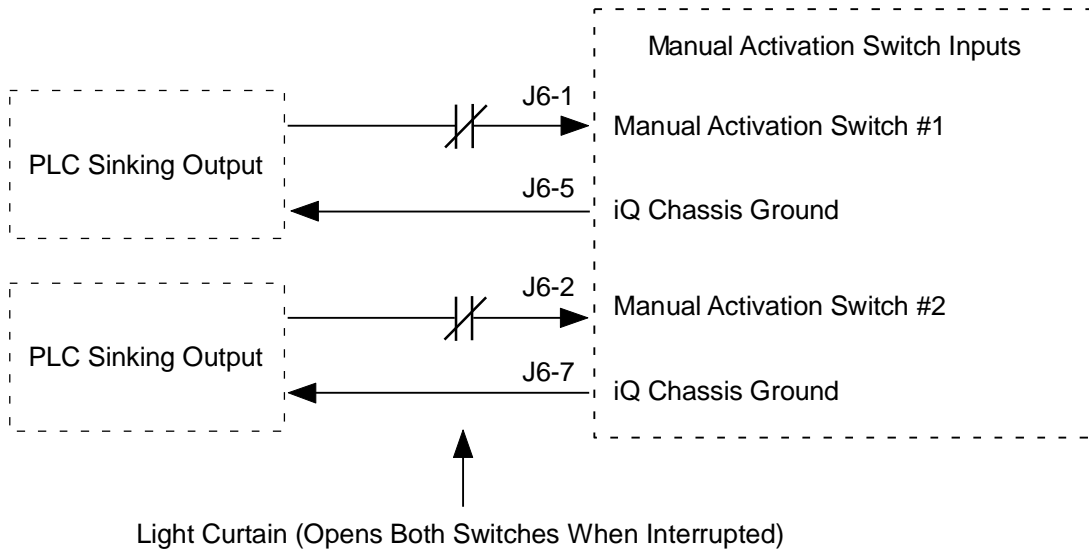
### Notes:

1. To operate the iQ Ultrasonic Press System, J6 pins 3 and 9 must be maintained in a closed connection and J6 pins 4 and 5/7 must be maintained in an open connection.
2. If the connection between J6 pins 3 and 9 is opened, the ultrasonic output will be disabled and power will be removed from the pneumatic or servo actuator.

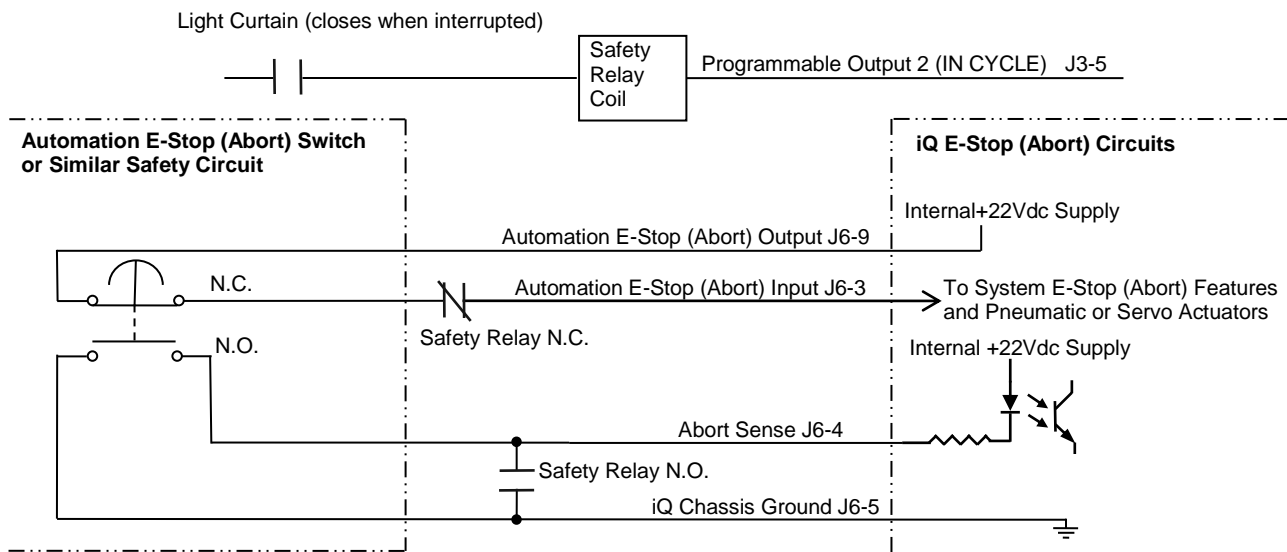
### Connecting a Light Curtain

Some automated machines require light curtains to protect personnel from hazardous conditions, which includes the area where parts are loaded for ultrasonic welding. There are numerous ways to connect light curtains to Ultrasonic welders. The following diagram shows one of these ways. The essence of all connection schemes are to achieve safety while not causing nuisance tripping of the abort circuit. To do so, it is desirable to have the ABORT circuit activated by the light curtain ONLY after a press cycle is in progress. When the press is idle and parts are being loaded and unloaded, it is better to have the light curtains prevent a cycle from starting but to leave the ABORT circuit inactive.

#### Light curtain connections to prevent a cycle from starting. Light curtain disconnects J6-1 and J6-2.



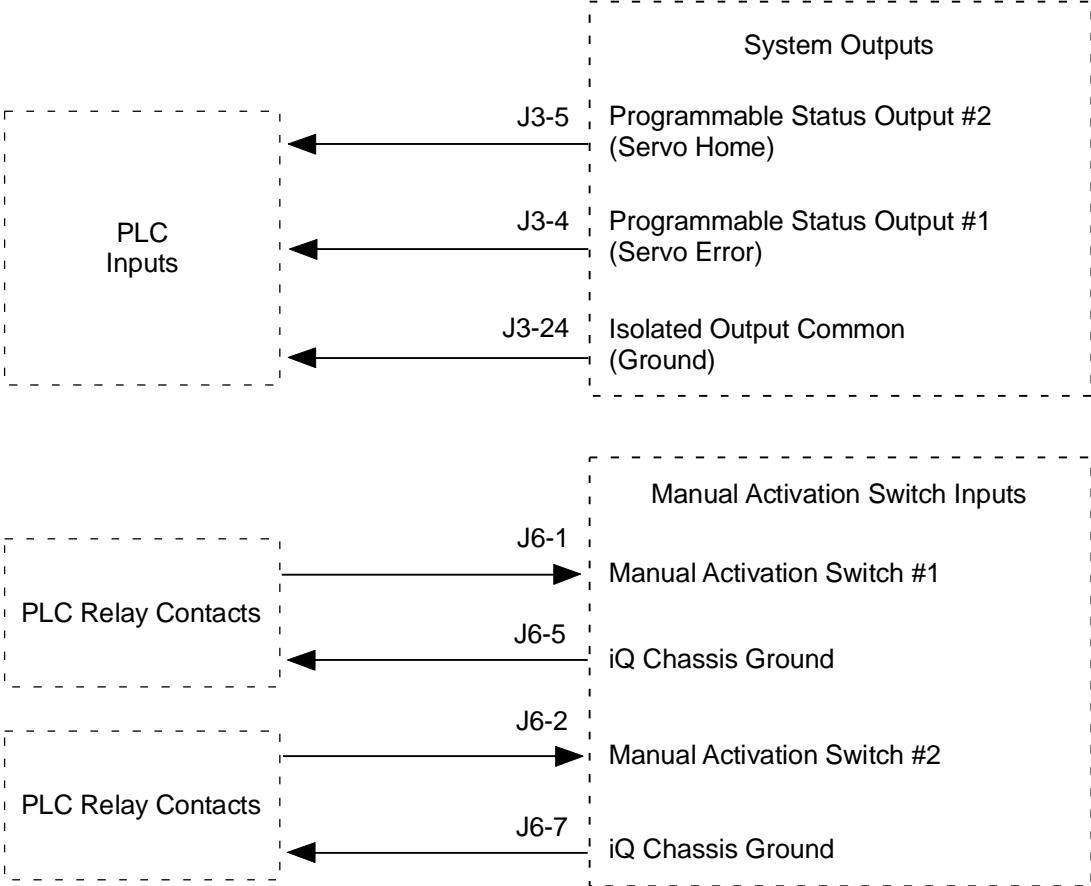
#### Light Curtain connections to cause an ABORT after a cycle is in process.



**Note: Both the above circuits should be incorporated for safety and ease of use.**

## Automation for Servo Systems

Automation Homing / Alarm Cable Connections:



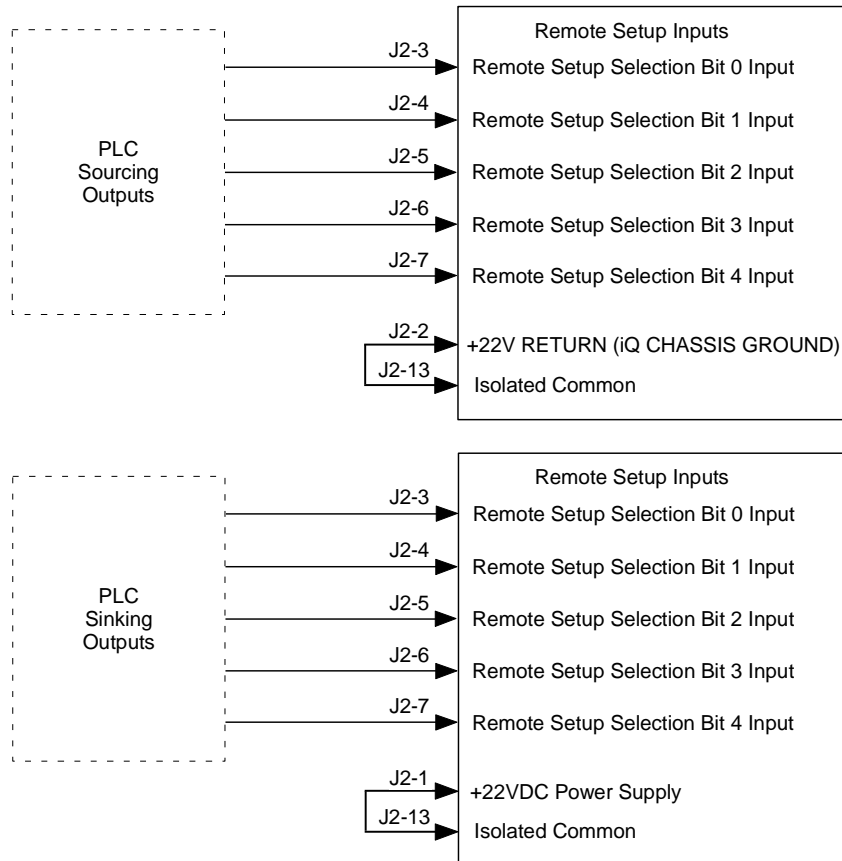
**Note:** See page 8 for detailed connections to iQ system outputs.

### Remote Setup Switching

J2-7	J2-6	J2-5	J2-4	J2-3	Setup Selected
0	0	0	0	0	1
0	0	0	0	1	2
0	0	0	1	0	3
0	0	0	1	1	4
0	0	1	0	0	5
0	0	1	0	1	6
0	0	1	1	0	7
0	0	1	1	1	8
0	1	0	0	0	9
0	1	0	0	1	10
0	1	0	1	0	11
0	1	0	1	1	12
0	1	1	0	0	13
0	1	1	0	1	14
0	1	1	1	0	15
0	1	1	1	1	16

J2-7	J2-6	J2-5	J2-4	J2-3	Setup Selected
1	0	0	0	0	17
1	0	0	0	1	18
1	0	0	1	0	19
1	0	0	1	1	20
1	0	1	0	0	21
1	0	1	0	1	22
1	0	1	1	0	23
1	0	1	1	1	24
1	1	0	0	0	25
N/A	N/A	N/A	N/A	N/A	26
N/A	N/A	N/A	N/A	N/A	27
N/A	N/A	N/A	N/A	N/A	28
N/A	N/A	N/A	N/A	N/A	29
N/A	N/A	N/A	N/A	N/A	30
N/A	N/A	N/A	N/A	N/A	31
N/A	N/A	N/A	N/A	N/A	32

**Note:** Remote setup mode is enabled by selecting "Automation" from Setup Control found in the Process Utilities screen. These system inputs receive a Binary code from the automation that is used to select a setup to be used for the next welding cycle. Setup selections 26-32 are reserved and are not available (N/A). An external +24VDC supply can be used instead of the generator internal supply. See the drawings on pages 4 and 5 for more information.



The following information describes the functionality of the servo specific programmable I/O's

#### Programmable Status Output 1 (J3 pin 4) = **Servo Error Status**

This output is active for the following errors:

- Servo Motor Over Temperature Alarm (U211)
- Servo Amplifier Error Alarm (U203)
- Servo Checksum Error Alarm (at power up) (U205)
- Servo Position Error Limit Exceeded Alarm (U202)
- Servo Command Error Alarm (U204)
- Upper Limit Switch Activated Alarm (U209)
- Lower Limit Switch Activated Alarm (U208)
- Force duration exceeded (U201)
- Part Detected Too Early by the Linear Encoder (U411)
- Part Detected Too Early by the Servo Controller (U206)

#### Programmable Status Output 2 (J3 pin 5) = **Home Servo Status**

- This output is active when automation needs to set the servo to its home position. This will happen when the system powers up or after an E-Stop.
- To home the servo, automation must activate both safety switch inputs (J6 pin 1 and J6 pin 2) until the Home Servo Status output deactivates.  
See below for more information about the safety switch inputs.

#### Safety Switch Inputs = **J6 pin 1 and J6 pin 2**

- These inputs should be activated by a relay contact between the inputs and J6 pin 5/7 (ground). The PLC can use one relay output to control both inputs (tie both safety switch inputs together).
- Automation should also use these inputs for "Teach" commands when iQ Explorer II tells the operator to activate both palm switches.

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