## Automation Interface Requirements for J602 Basic I/O Interface
of a DPC 4 Welding System

The DPC 4 welding system offers several features that are intended to communicate with automation. These features allow the automation to control and respond to events that occur during the welding process. This document will provide guidelines that will help you interface automation to a DPC welding system per Dukane Corporation's requirements. Information within this document is intended to supplement the information in the DPC 4 manual (Dukane part # 403-557).

Note: Early production models of the DPC IV welding system referred to J602 as the User I/O interface. The functionality of the Basic I/O Interface and the User I/O Interface are identical. Only the name has changed.

Application Note Topics:

- The J602 Pin assignments
- The 200-1203 Basic Interface Cable
- Status Output Signal Descriptions
- Status Output Interface Examples
- System Input Signal Descriptions
- System Input Interface Examples

Basic I/O
Interface

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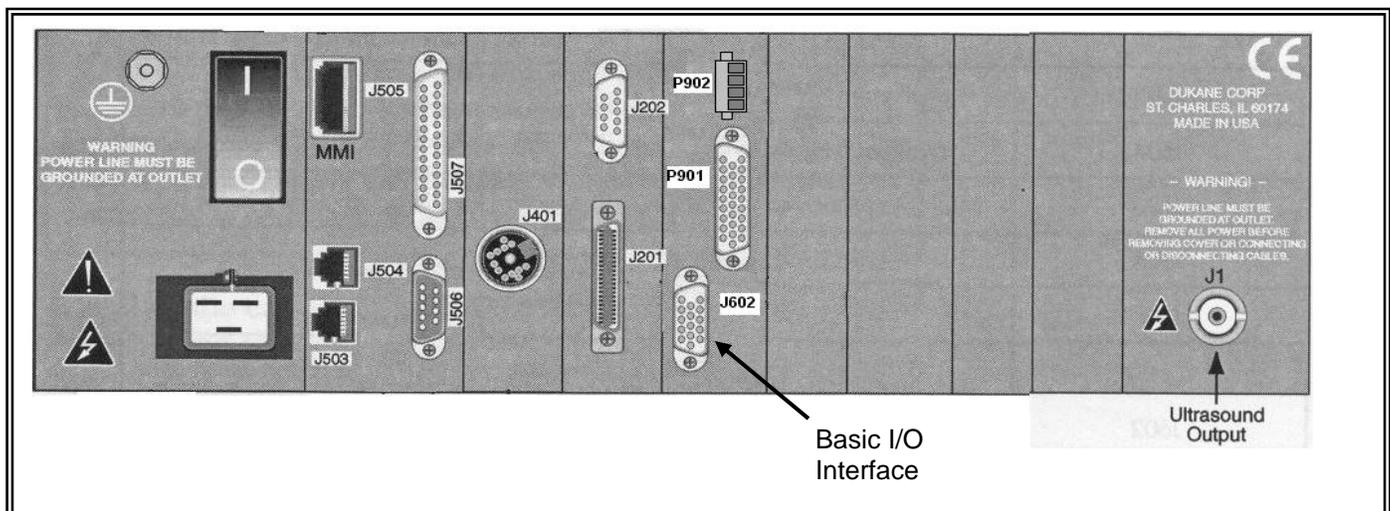
J602 User Interface Connector

The J602 User Interface connector is the primary communications link between the DPC IV and user automation equipment. This connector provides status signals that can be used to monitor DPC weld data analysis results as well as timing issues related to the processing of the weld sequence. It also provides the automation with dedicated communication lines that allows the automation to control the beginning and the end of a welding sequence.

| Pin Number	DPC Signal Name	DPC Signal Type
1	Power Supply	+22 VDC (0.5 amp max)
2	Ground	Power Supply Return
3	Bad Part	Output
4	Suspect Part (see note #2)	Output
5	Good Part	Output
6	Ready (see note #1)	Output
7	Isolated Output Common	Common Pin for Output Signals
8	Automation Input	Input
9	Automation Stop N/C	Input
10	Automation Stop N/O	Input
11	Hand Probe Press Inhibit	Input
12	Input Common	Common Pin for Input Signals
13	Ground	Power Supply Return
14		
15	Ground Detect	Input

Note #1: This input can be reconfigured in the DPC IV menu choices to activate during the following weld sequence event:

        In Cycle
        Sonics On
        In Hold

Note #2: This input can be reconfigured in the DPC IV menu choices to activate during the following weld sequence event:

        Network Active
        Sonics On

Note: Please refer to the Hardware Setup section of the DPC IV manual for details on reconfiguring pin 4 or pin 6 to the required status output signal.
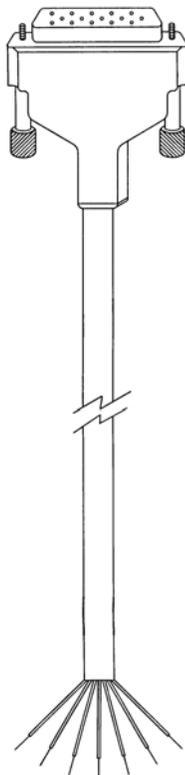
Pin #	Conductor Color
1	Red
2	Black
3	Blue / Black
4	Green / White
5	Blue / White
6	Red / Black
7	White / Black
8	White
9	Orange
10	Blue
11	Orange / Black
12	Red / White
13	Green Black
14	Black / White
15	Green

Part Number	Length
200-1203	10 FT
200-1203-15	15 FT
200-1203-20	20 FT
200-1203-25	25 FT
200-1203-30	30 FT

Status Output signals for the J602 Connector:

There are four status output signals available on the J602 connector. Each of these outputs are driven by a solid state relay that creates a switch closure between the specified output pin and the Output Common pin. These pins can be configured within the DPC software menus to provide a signal that accommodates the requirements of most automation interface equipment. The available configurations for these output signals are:

Active High Outputs – This setting will produce a closed switch condition between the specified output pin and the Output Common pin when the output signal is activated. *(Factory default setting)*

Active Low Outputs - This setting will produce an open switch condition between the specified output pin and the Output Common pin when the output signal is activated.

Maintained Outputs - This setting will produce an output signal that is maintained from the completion of a welding cycle until the beginning of the next welding cycle activation. *(Factory default setting)*

Pulsed Outputs - This setting will produce an output signal that is pulsed a single time for 100 mS as the end of the welding cycle.

Note: Please refer to the Hardware menu section of the DPC IV manual for further information on these features.

Status Output Signal Descriptions:

Bad Part Output –   (J602 pin 3) This status output will activate when the data acquired during the welding sequence exceeds one of the user defined boundaries within the Bad Part Limits portion of the user setup. Please refer to the Process Limits section of the DPC IV manual for further details on selecting and setting up a Bad Part Limit window.

Good Part Output -   (J602 pin 5) This status output will activate when the data acquired during the welding sequence does not exceed any of the user defined boundaries within the Bad Part Limits portion of the user setup. Please refer to the Process Limits section of the DPC IV manual for further details on selecting and setting up a Bad Part Limit window.

Suspect Part Output -   (J602 pin 4) This status output will activate when the data acquired during the welding sequence exceeds one of the user defined boundaries within the Suspect Part Limits portion of the user setup. Please refer to the Process Limits section of the DPC IV manual for further details on selecting and setting up a Suspect Part Limit window.

In Cycle (J602 pin 4 redefined) - This status output will activate when the welding cycle begins. If the status outputs have been set for maintained, In Cycle will deactivate when the Hold portion of the welding cycle has completed. Please refer to the Hardware Setup section of the DCP IV manual for further details on redefining J602 pin 4.

Sonics On (J602 pin 4 redefined) – This status output will activate when the DPC produces the ultrasound welding signal that creates motion in the transducer stack assembly. Activation of this signal will occur during the Weld, Scrub, and Afterburst portions of the weld cycle. Please refer to the Hardware Setup section of the DCP IV manual for further details on redefining J602 pin 4.

In Hold (J602 pin 4 redefined) – This status output will activate when the DPC is processing the Hold portion of the welding cycle. Please refer to the Hardware Setup section of the DCP IV manual for further details on redefining J602 pin 4.

Ready Output -   (J602 pin 6) This status output will activate at the completion of the Hold portion of the welding sequence. It should be noted that the activation of the Afterburst feature and the return of the pneumatic press to the home position will occur after the activation of the Ready Output status signal. Please refer to the Process Control section of the DPC IV manual for further information on the activation and use of the Afterburst feature. In addition please refer to the Hardware Setup section of the DCP IV manual for further details on redefining J602 pin 6.
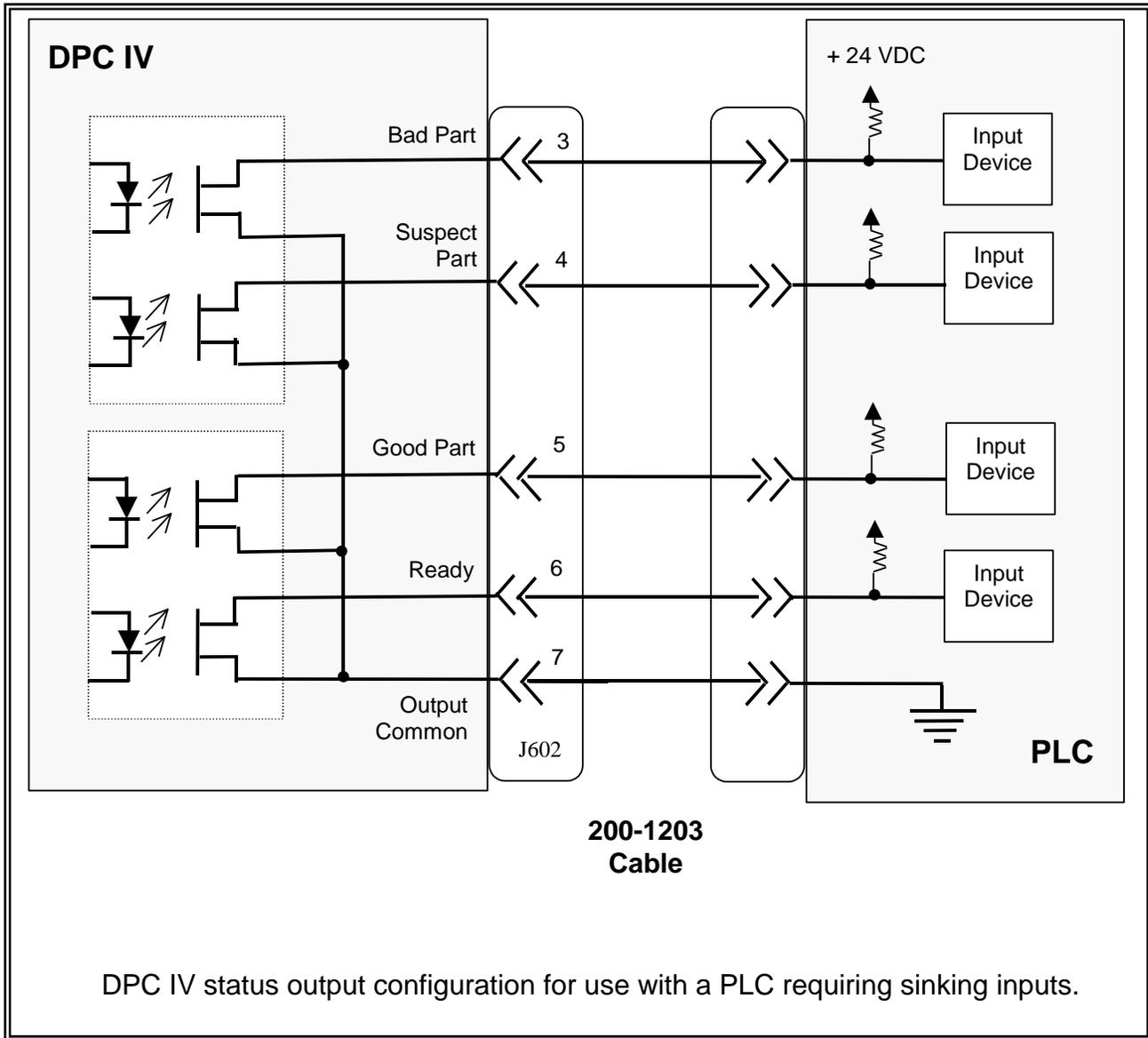
Network Active (J602 pin 6 redefined) – This status output will activate when the DPC is an active node on a DPC network. Please refer to the Network section of the DPC IV manual for further details on setting up a DPC network. Please refer to the Hardware Setup section of the DCP IV manual for further details on redefining J602 pin 6.
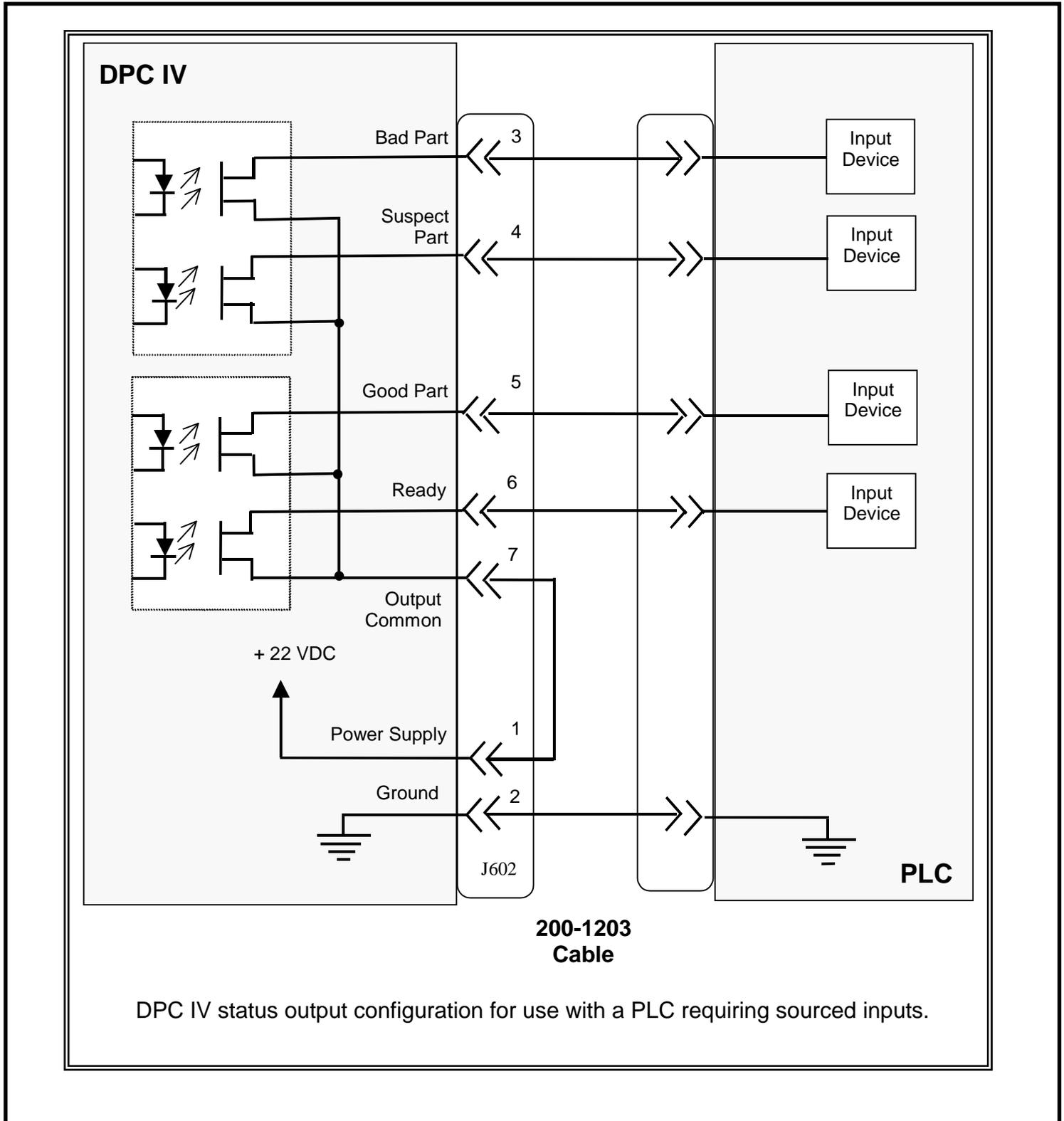
Sonics On (J602 pin 6 redefined) – This status output will activate when the DPC produces the ultrasound welding signal that creates motion in the transducer stack assembly. . Please refer to the Hardware Setup section of the DCP IV manual for further details on redefining J602 pin 6.
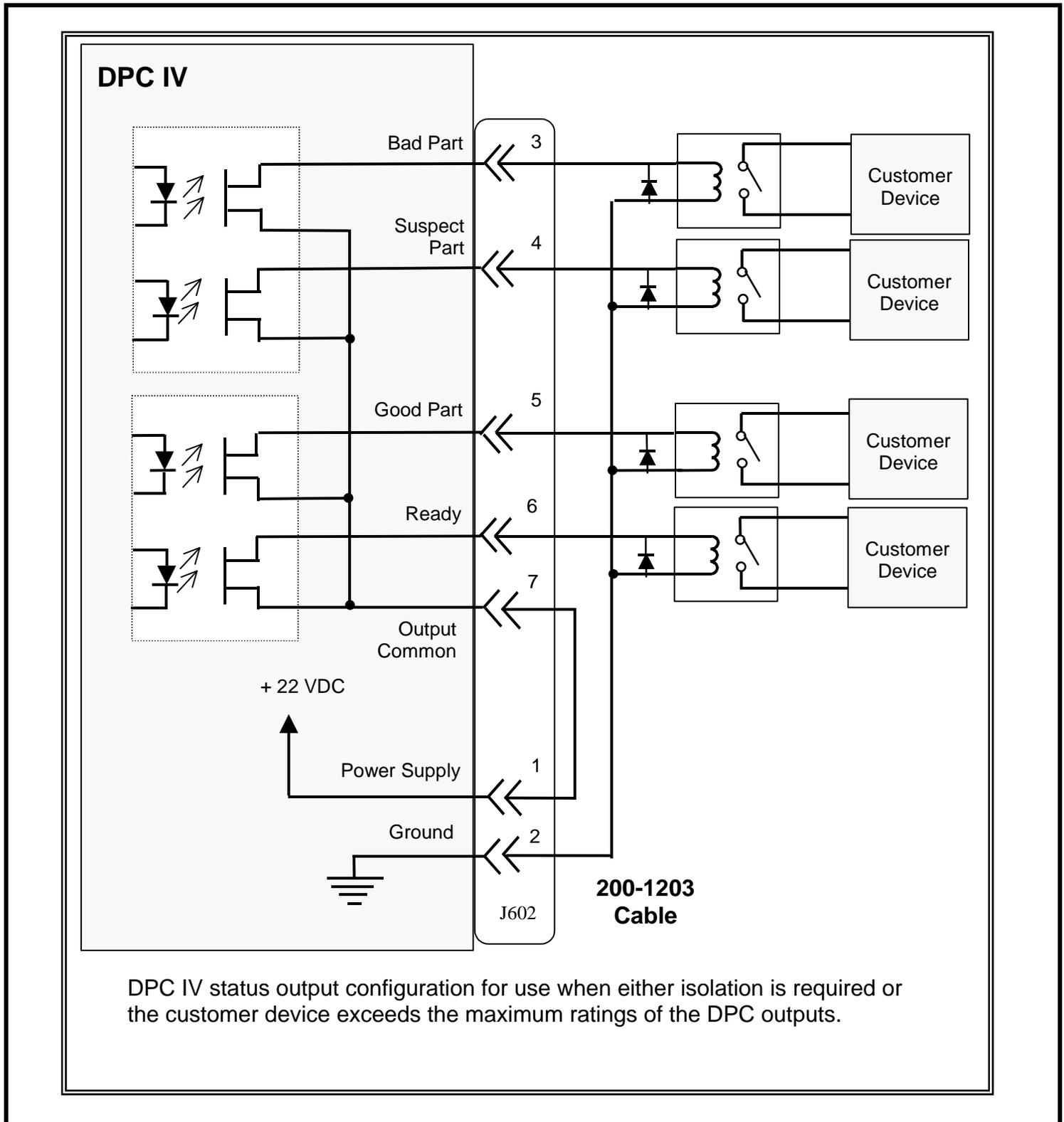
The DPC status output pins can be configured to adapt to several types of automated devices. The ratings for the DPC Status output pins are:

Maximum Voltage Rating = +24 VDC
Maximum Current Rating = 100 mA

Status Output Interface Examples:

DPC IV

+ 24 VDC

Bad Part — 3 — Input Device

Suspect Part — 4 — Input Device

Good Part — 5 — Input Device

Ready — 6 — Input Device

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Output Common

J602

PLC

200-1203 Cable

DPC IV status output configuration for use with a PLC requiring sinking inputs.

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http://www.dukane.com/us

DPC IV status output configuration for use with a PLC requiring sourced inputs.

Within the diagram:

DPC IV

Bad Part — 3
Suspect Part — 4
Good Part — 5
Ready — 6
Output Common — 7
+ 22 VDC
Power Supply — 1
Ground — 2

J602

Input Device (×4)

PLC

200-1203 Cable

DPC IV

Bad Part — 3 — Customer Device

Suspect Part — 4 — Customer Device

Good Part — 5 — Customer Device

Ready — 6 — Customer Device

Output Common — 7

+ 22 VDC

Power Supply — 1

Ground — 2

J602

200-1203 Cable

DPC IV status output configuration for use when either isolation is required or the customer device exceeds the maximum ratings of the DPC outputs.

System Input signals for the J602 Connector:

There are four system input signals available on the J602 connector.   Each of these inputs are configured as sinking inputs (Do not apply voltage to the J602 inputs).

Automation Input -   (J602 pin 8) This system input signal is activated by an external dry contact closure to the DPC Ground pin on J602 pin2). The minimum duration for the activation of this input is 100 mS. The maximum duration of this input is determined by the duration of the weld cycle. This input should be deactivated before the end of the weld cycle to avoid an error condition (Associated Error: # 212 Auto Active at Cycle Start). Please refer to the Initiate Mode section of the DPC IV manual for details on the activation and use of the Auto Initiate mode.

Automation Stop N/O-   (J602 pin 9) This system input signal is activated by an external dry contact closure to the DPC Ground pin on J602 pin2). The minimum duration for the activation of this input is 100 mS. Activation of this input will end the welding cycle and deactivate all valves in the press. This system response will continue until the contact closure to the DPC ground is removed. Weld cycles that have been stopped due to the activation of this input will not be counted in the part count value displayed on the DPC.   Please refer to the Initiate Mode section of the DPC IV manual for details on the activation and use of the Automation Stop mode (Auto Abort).

Automation Stop N/C-   (J602 pin 10) This system input signal is activated by an removing an external dry contact closure to the DPC Ground pin on J602 pin2). The minimum duration for the activation of this input is 100 mS. Activation of this input will end the welding cycle and deactivate all valves in the press. This system response will continue until the contact closure to the DPC ground is replaced. Weld cycles that have been stopped due to the activation of this input will not be counted in the part count value displayed on the DPC. Please refer to the Initiate Mode section of the DPC IV manual for details on the activation and use of the Automation Stop mode (Auto Abort).

Hand Probe Press Inhibit - (J602 pin 11) This system input is activated by an external dry contact closure to the DPC Ground pin on J602 pin2). The minimum duration for the activation of this input is 100 mS. Activation of this input is intended to configure the DPC for a probe system functionality. It will deactivate all valves for the press during a welding cycle. This system response will continue until the contact closure to the DPC ground is removed.

The DPC system inputs are configured for a dry contact closure activation. The following connection diagram indicates how to interface automation to the system inputs.

System Input Interface Examples:
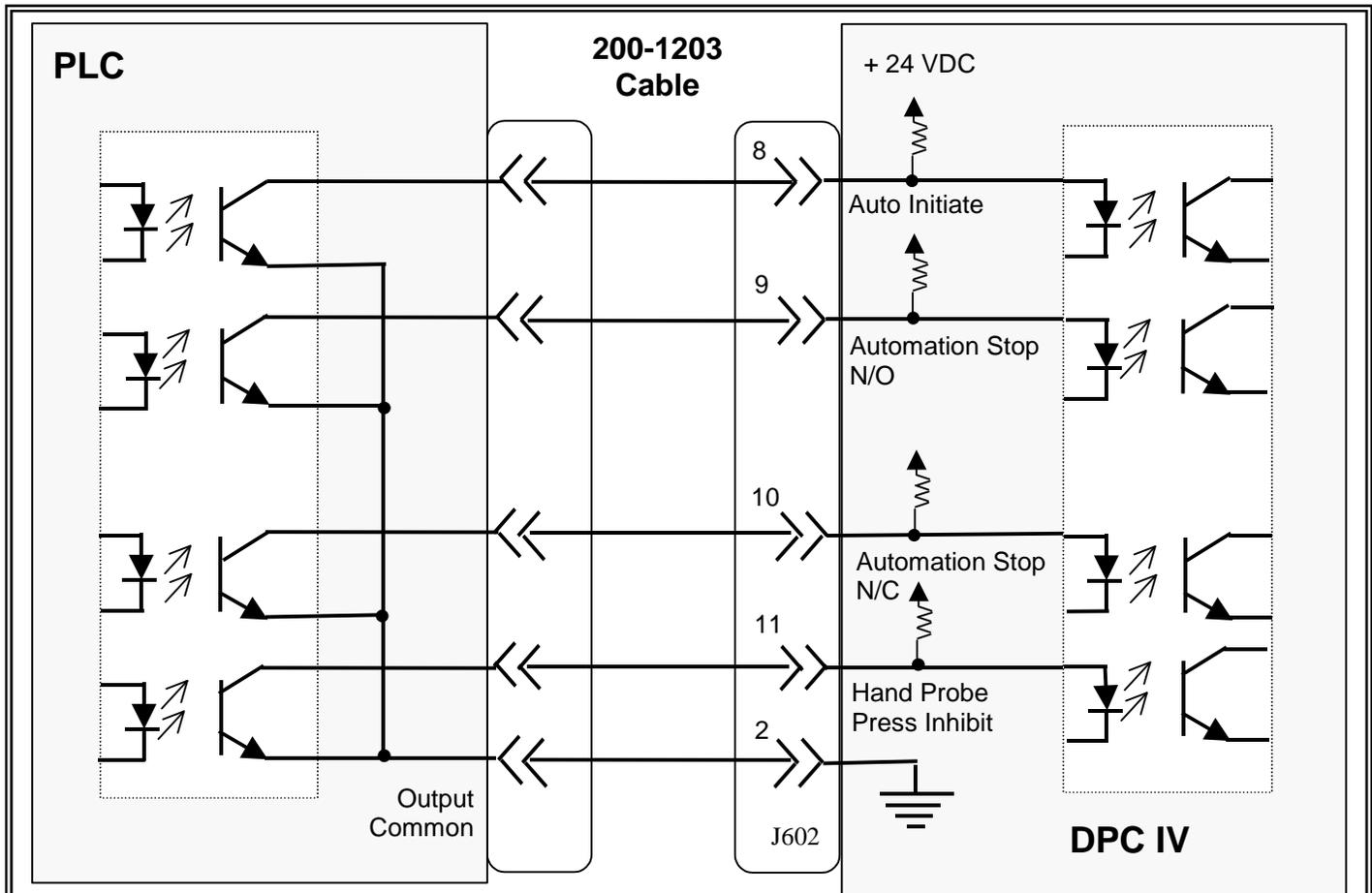
DPC IV system input configuration for use when customer equipment provides contact closure signals with not voltage.
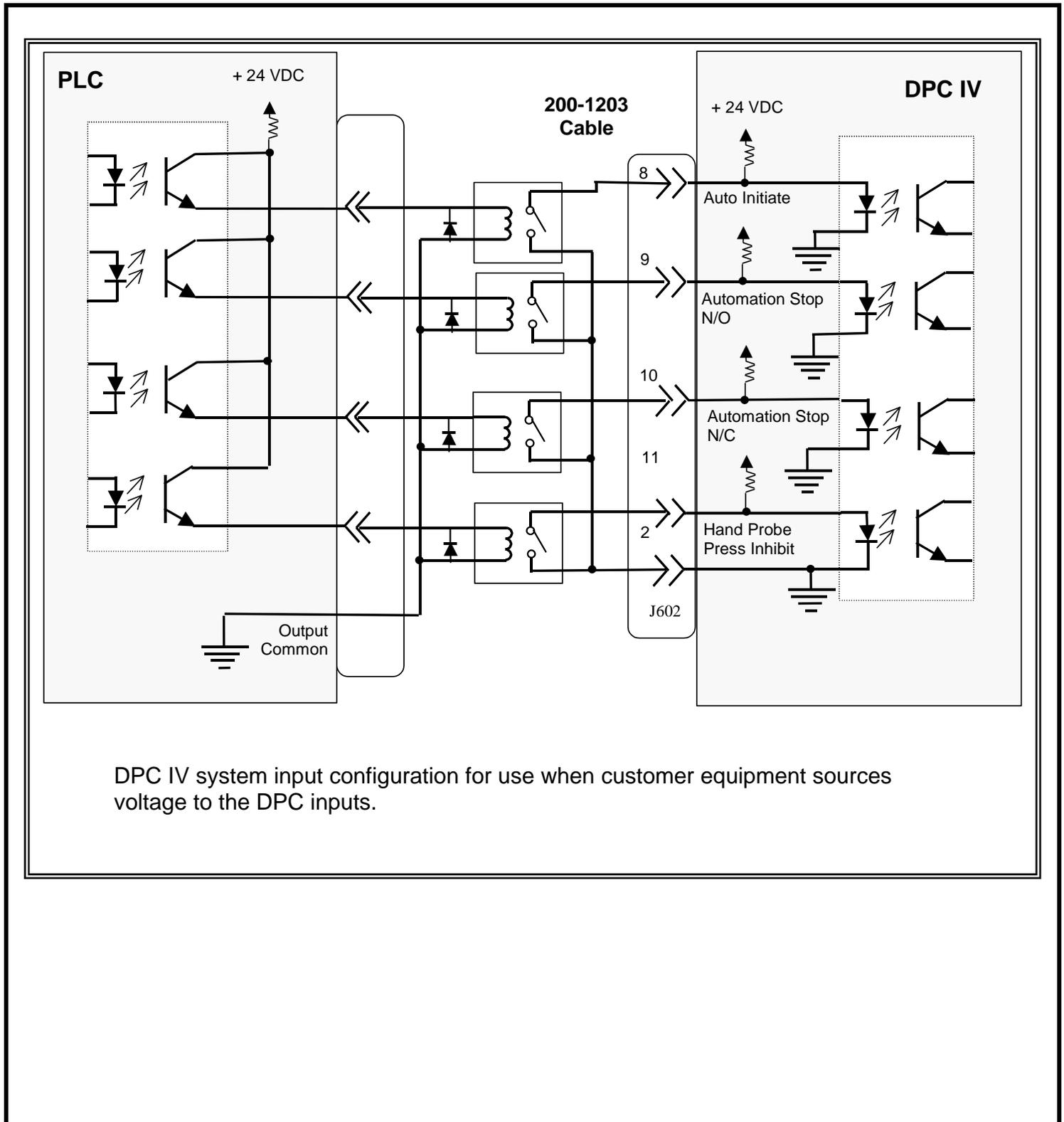
DPC IV system input configuration for use when customer equipment sources voltage to the DPC inputs.