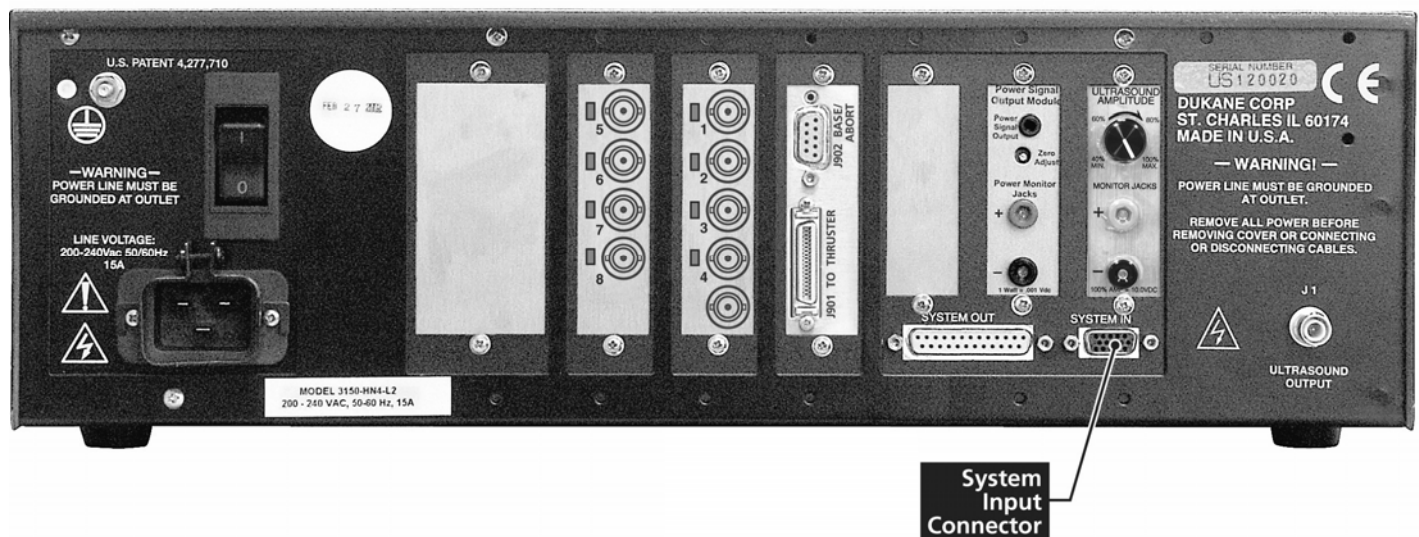


## Automation Interface Requirements for the System Input Interface of a DPC II / II+ Welding System

The DPC II / II+ welding system offers several features that are intended to communicate with automation. These features allow the automation to control 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 II (Dukane part # 403-558) and DPC II+ (Dukane part # 403-551) manuals.

### Application Note Topics:

- The System In Connector Pin assignments
- The 200-1203 Basic Interface Cable
- System Input Signal Descriptions
- System Input Interface Examples



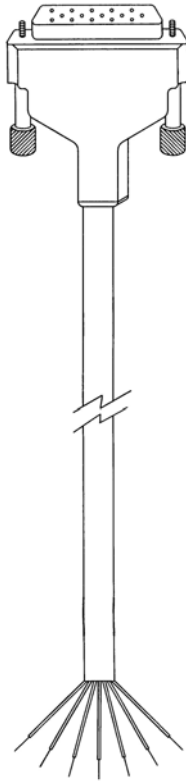
## System Input Connector

The System In interface connector is one of the primary communications links between the DPC II / II+ input port and the user automation equipment. This connector provides the automation with dedicated communication lines that allow 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 (250 mA max)
2	Ground	22VDC Return
3	Isolated Operate Input	Input
4	Isolated Input Common <sup>1</sup>	Common for pin 3, 5, 9
5	Isolated Press Control <sup>2</sup>	Input
6	Not Used	Not Used
7	Ground	+22VDC Return
8	Non Isolated Operate	Input
9	Isolated Automation Stop / Automation End of Weld <sup>3</sup>	Input
10	Not Used	Not Used
11	Hand Probe Press Inhibit	Input
12	MPC Probe/Setup Bit 0 <sup>4</sup>	Input
13	MPC Probe/Setup Bit 1 <sup>4</sup>	Input
14	MPC Probe/Setup Bit 2 <sup>4</sup>	Input
15	Front Panel Control Lock	Input

**Notes:**

1. SH707 on the 110-3606 system I/O PCB must be configured to the JU728 position when this common is used.
2. This input requires the optional 110-3938 press control module. Configuration of the SH901 Jumper on the 110-3938 press control module may also be required.
3. This input is configured for use as Automation End of Weld at the factory. Jumper SH704 must be reconfigured on the 110-3606 System I/O board to permit use of the Isolated Automation Stop feature.
4. The MPC probe bit functionality requires the optional MPC feature. The Setup bit functionality is available on all DPC II+ systems. Please refer to the DPC manual for further details on this feature.



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

## System Input Signal Descriptions:

**Isolated Operate Input - ( Pin 3 )** This system input signal receives the cycle initiation signal from automation. The minimum duration for the activation of this input is 50 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. This system input can be reconfigured to accommodate sourced (PNP) and sinking (NPN) signals as described in the SH707 configuration section of this document. Please refer to the DPC manual for details on the activation and use of the Operate (cycle initiate) feature.

Note: Reconfiguring the jumper of the SH901 jumper block on the 110-3938 press PCB will configure the system to activate both the press and the ultrasound simultaneously at the top of stroke position of the press.

**Isolated Press Control Input - ( Pin 5 )** This system input receives a signal from automation that activates the Dukane pneumatic press to the down position. The press will remain in the down position until this system input is deactivated. This system input can be reconfigured to accommodate sourced (PNP) and sinking (NPN) signals as described in the SH707 configuration section of this document. SH901 of the 110-3938 press board must also be reconfigured to the "Auto Control" position to activate this system input. Please refer to the DPC manual for details on the activation and use of the Press Control feature.

**Operate Input - ( Pin 8 )** This system input signal receives the cycle initiation signal from automation. The minimum duration for the activation of this input is 50 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. The system input can only accommodate a non-isolated sinking (NPN) signal for activation.

Note: Reconfiguring the jumper of the SH901 jumper block on the 110-3938 press PCB will configure the system to activate both the press and the ultrasound simultaneously at the top of stroke position of the press.

**Isolated Automation Stop/End of Weld - ( Pin 9 )** This system input receives a signal from automation that will stop the processing of portions of the welding cycle. The default functionality for this input is to end the weld portion of the DPC cycle when the system input is activated. This input can be reconfigured to Automation Stop which will stop the processing of all portions of the DPC cycle. Configuration of this feature is described in the SH704 jumper configuration section of this document.

**Hand Probe Press Inhibit - ( Pin 11 )** This system input receives a signal from a Dukane hand probe that disables all press functionality.

**MPC Probe / Setup Bit 1, 2, and 3 - ( Pins 12, 13, 14 )** These system inputs receive a Binary code from automation that (MPC Feature Optional) is used to select a DPC setup and a DPC probe to be used for the next welding cycle. Please refer to the DPC manual or application AN203 for details on the activation and use of the MPC or Remote Setup Select (DPCII+ only) features.

**Front Panel Control Lock - ( Pin 15 )** This system input receives a signal from automation that disables the DPC test switch as well as the key pad for the DPC controller (DPC II+ only).

### Internal DPC Jumper Block Configuration Options

The DPC II / II+ provides four internal jumpers that allow the user to configure the system inputs for compatibility with the users equipment. Three of the configurable jumpers are located on the DPC II / II+ 110-3606 system interface board which is located in bottom of the DPC near the rear panel. The 110-3606 system interface board can be identified as the board connected to the System Input and System Output connectors which extend from the back panel of the DPC II / II+ chassis. The fourth configurable jumper is located on the 110-3937 press control board. The press control board can be identified as the board connected to the press control cable which is connected to the DPC press.

**Warning:** The DPC chassis cover should not be removed until the DPC power cord has been removed from the AC voltage supply. After removing the DPC power cord from the AC voltage supply, the DPC requires fifteen minutes to discharge to safe levels. Do not remove the DPC cover until the DPC has discharged to safe levels. Avoid contact with all internal DPC components that are not specified within the jumper configuration procedure below. Failure to comply with these requirements can result in serious personal injury and damage to the DPC welding system.

#### Automation Cycle Stop / End of Weld Configuration

(Associated with pin 9)

Jumper Block – SH704

JU713 – Normally OFF (Factory Default )

JU714 – Normally ON

JU715 – Automation Stop Fault

JU716 – Automation End of Weld (Factory Default)

Note: There will be two jumpers installed in SH704.

#### Switch Debounce Filter Delay for System Inputs

(Associated with pins 3 and 8)

Jumper Block – SH705

JU717 – No Time Delay (*used for solid state switches*)

JU718 – 1 msec

JU719 – 10 msec (Factory Default)

JU720 – 22 msec

#### System Input Signal Type Configuration

(Associated with pins 3, 5, and 9)

Jumper Block – SH707

JU724 – Non Isolated Sink (Factory Default)

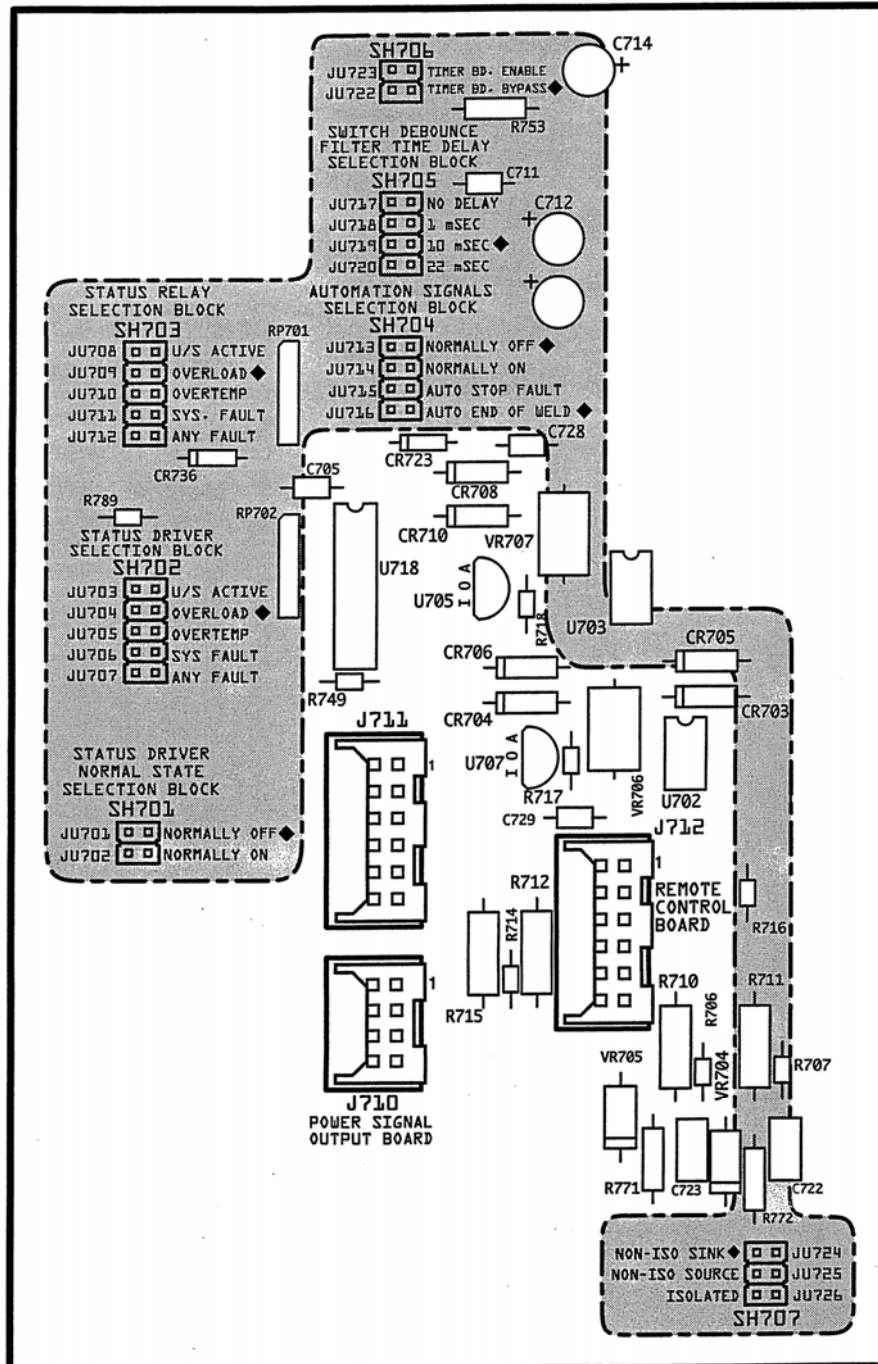
JU725 – Non Isolated Source

JU726 – Isolated Source

Dry contact between input and DPC ground.

Dry contact between input and +22VDC.

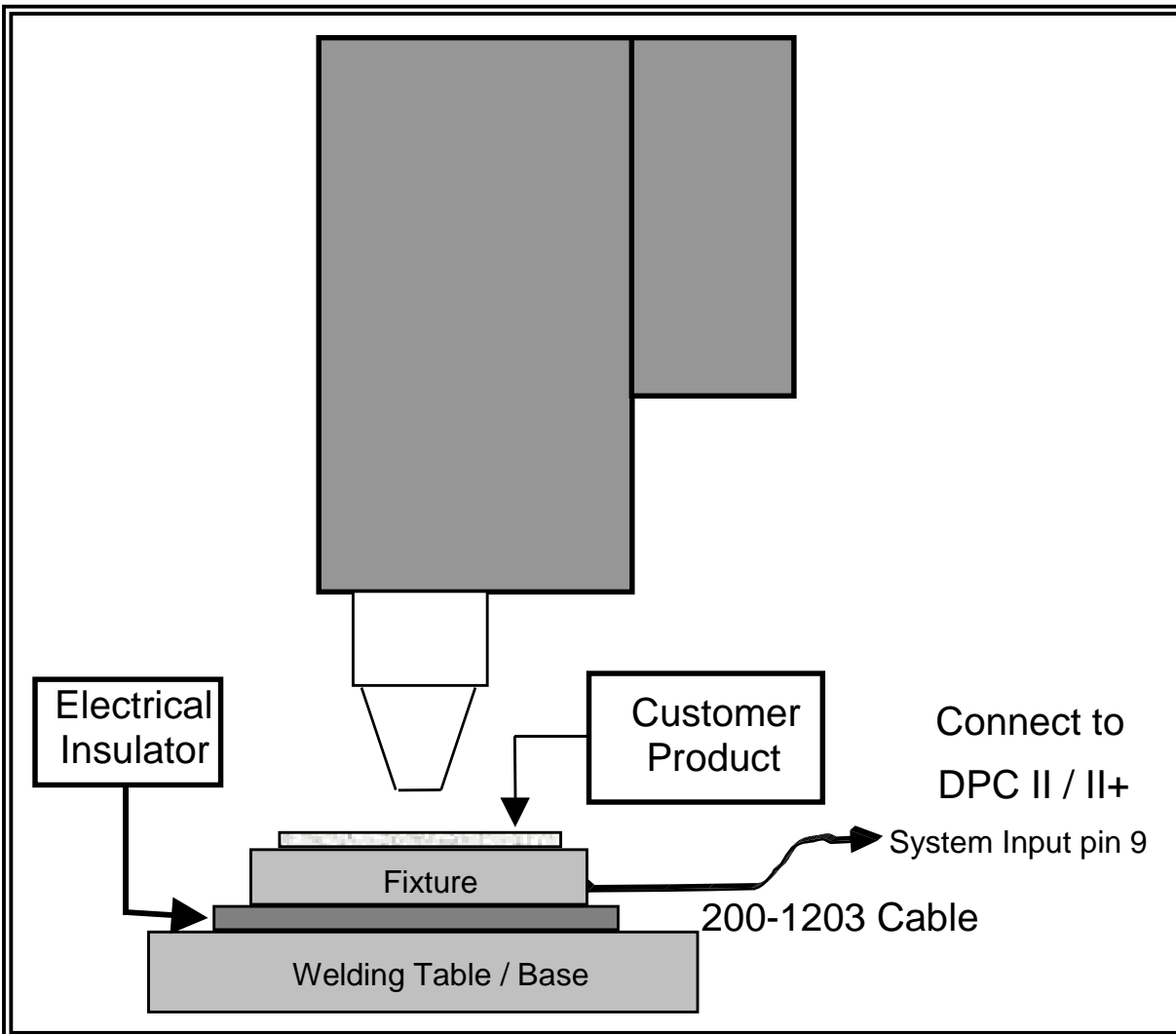
Input can be either sinking (NPN) or sourcing (PNP). A signal of 5 to 24 VDC is required at the isolated input pin. The current is internally limited to 12.5mA.



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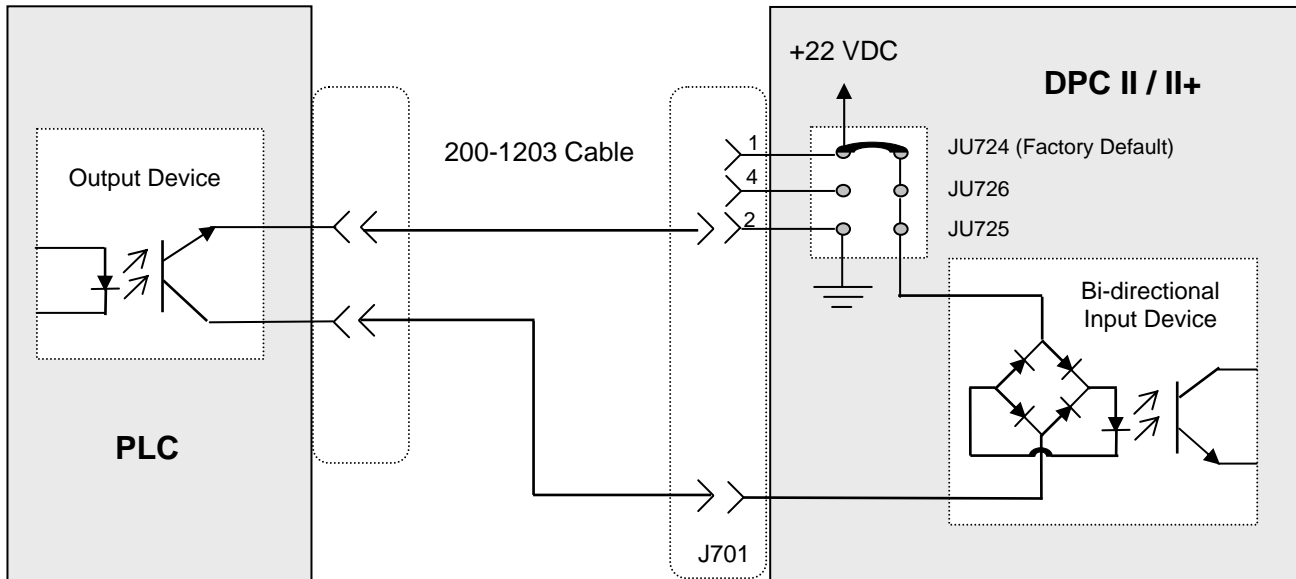
## System Input Interface Example for the DPC Ground Detect Feature:

Note: Internal circuit board jumper for jumper block SH704 must be reconfigured for proper operation of this feature.



## DPC II / II+ System Input Interface Example:

(DPC II / II+ configured to accommodate an NPN type PLC output card that sinks the DPC inputs).



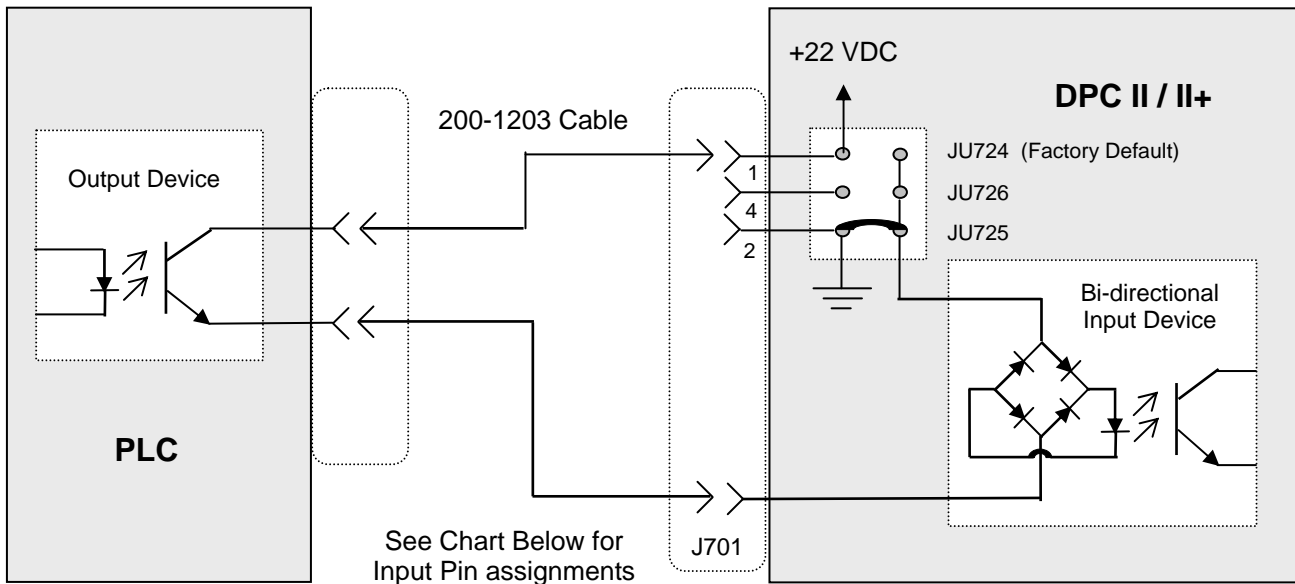
PIN NUMBER	PIN DESCRIPTION
3	ISOLATED OPERATE INPUT
5	ISOLATED PRESS CONTROL
9	ISOLATED AUTOMATION STOP/END OF WELD

*Note: This diagram provides a simplified representation of the DPC II / II+ input device for the purpose of demonstrating circuit functionality.*



### DPC II / II+ System Input Interface Example:

(DPC II / II+ configured to accommodate a PNP type PLC output card that utilizes the DPC power to source the DPC inputs).

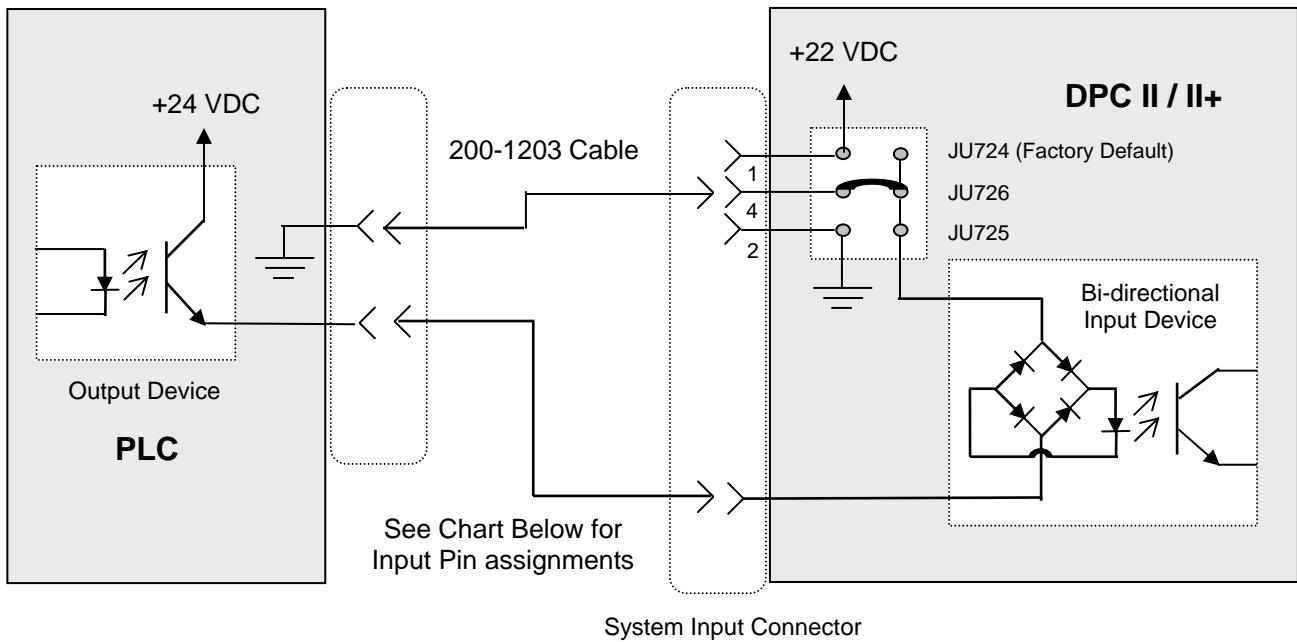


PIN NUMBER	PIN DESCRIPTION
3	ISOLATED OPERATE INPUT
5	ISOLATED PRESS CONTROL
9	ISOLATED AUTOMATION STOP/END OF WELD

*Note: This diagram provides a simplified representation of the DPC II / II+ input device for the purpose of demonstrating circuit functionality.*

## DPC II / II+ System Input Interface Example:

(DPC II / II+ configured to accommodate a PNP type PLC output card requiring isolation)



*PIN NUMBER	PIN DESCRIPTION
3	ISOLATED OPERATE INPUT
5	ISOLATED PRESS CONTROL
9	ISOLATED AUTOMATION STOP/END OF WELD

*Note: This diagram provides a simplified representation of the DPC II / II+ input device for the purpose of demonstrating circuit functionality.*