



1. CDi99 Wiring

1.1 Overview

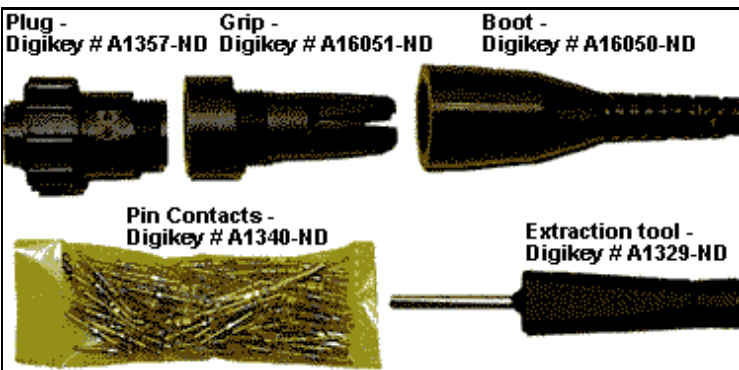
End-users attempting to do their own wiring should thoroughly read this document and become familiar with the terminology. Inputs to the controller and outputs to solenoids are arranged in a logical manner. If for example, channel 1 is wired for temperature, output 1 will control temperature. We use "70G-OAC" series, opto-isolated relays manufactured by Grayhill. These relays provide an LED to display status and have a built-in, 5 Amp fuse. They can switch up to 3 Amps@280V. All CDi external connections are implemented through plastic, circular, polarized, CPC series 1 connectors from AMP. Digikey stocks these, and their part numbers are shown in the illustration. For clarity:

Description	Digikey Part #
Plug	A1357-ND
Grip	A16051-ND
Boot	A16050-ND
Pin	A1340-ND
Extraction tool	A1329-ND



1.2 CPC Connectors

All sensor inputs (pH, temperature, DO, etc.) and the RS485 network connect to the controller. All outputs (solenoids), and common alarm connect to the output relay box. Logic control (5 Volt) signals from the controller are connected to the output relay box through a 16-wire cable. This cable is supplied with the output relay box. Identify and familiarize yourself with the CPC components shown: plug, grip, boot, pin, extraction tool. The necessary tools for successful installation are:

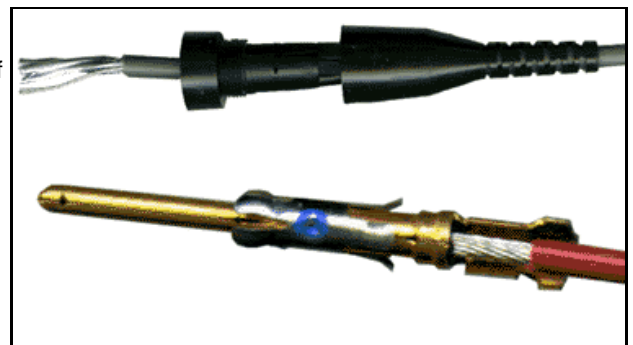


1. Soldering Iron.
2. Hand Crimping Tool. If a crimping tool is not available, use a pair of needle nose pliers.
3. The extraction tool shown is needed if you make a mistake wiring the connector. Insert the tool through the face of the connector and push the plunger to extract the contact. Some practice may be necessary to achieve skill in doing this.

1.3 CPC Connector Assembly

The pin in the picture has been magnified several times to better show detail. To prepare the cable-end proceed as follows:

1. Thread the cable-end through the boot and grip.
2. Strip-off about an inch (2.5-3cm) of the cable jacket.
3. Strip-off about 3/16" (5mm) of insulation from the end of each conductor.
4. Crimp and solder the pins.
5. Insert the pins into the plug.
6. Tighten the grip onto the plug - (turn grip clockwise).
7. Tighten the boot - (turn boot clockwise)



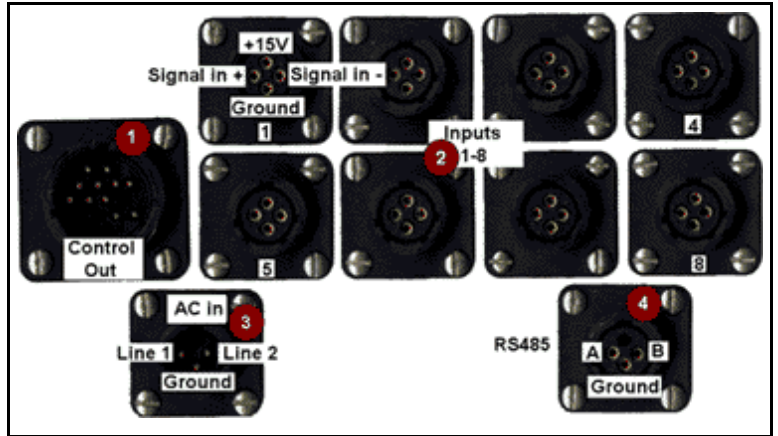


2. CDi99 Controller & Output Box Connections

2.1 Controller Receptacles

There are four groups of receptacles on the bottom face of the controller. These four (4) groups are identified by the red circles in the illustration. They are:

1. Logic control and alarm signal outputs to the output relay box.
2. Cluster of eight (8) inputs. These are arranged in two rows of four and are numbered from top to bottom and left to right.
3. AC power input.
4. RS485 Network.

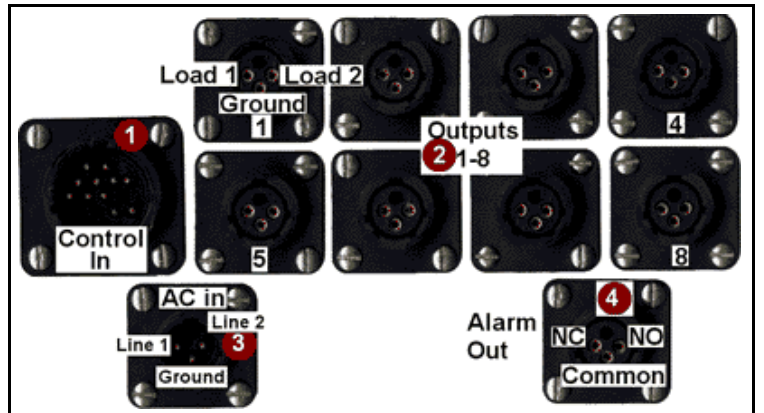


Connections for AC power input	Connections for all 8 inputs	Connections for RS485 network
Pin 1 - Not used	Pin 1 - Power out to sensor (+15V)	Pin 1 - Not used
Pin 2 - Mains Line 2 (neutral)	Pin 2 - Signal in (Neg) from sensor	Pin 2 - RS485 "B" line
Pin 3 - Mains Line 1 (hot)	Pin 3 - Signal in (Pos) from sensor	Pin 3 - RS 485 "A" line
Pin 4 - Mains Ground	Pin 4 - Ground out to sensor (0V)	Pin 4 - RS485 Ground

2.2 Output Box Receptacles

There are four groups of receptacles on the bottom face of the controller. These four (4) groups are identified by the red circles in the illustration. They are:

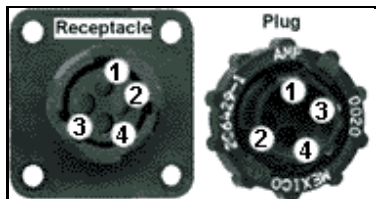
1. Logic control and alarm signal inputs from the controller.
2. Cluster of eight (8) outputs. These are arranged in two rows of four and are numbered from top to bottom and left to right.
3. AC power input.
4. Common alarm contacts.



Connections for AC power input	Connections for all 8 outputs	Connections for common alarm
Pin 1 - Not used	Pin 1 - Not used	Pin 1 - Not used
Pin 2 - Mains Line 2 (neutral)	Pin 2 - Load 2 to solenoid (neutral)	Pin 2 - Normally Open Contact
Pin 3 - Mains Line 1 (hot)	Pin 3 - Load 1 to solenoid (hot)	Pin 3 - Normally Closed Contact
Pin 4 - Mains Ground	Pin 4 - Mains Ground to solenoid	Pin 4 - Common Contact

2.3 Receptacle / Plug Terminal Assignment

There seems to be some confusion regarding the CPC connector pin numbering. Note that pins 2 and 3 appear to be reversed on the plug when viewed from the front. Pin positions are correct when plug and receptacle are mated. There is no difference in the circuit number, regardless of whether we are referring to the receptacle or the plug.





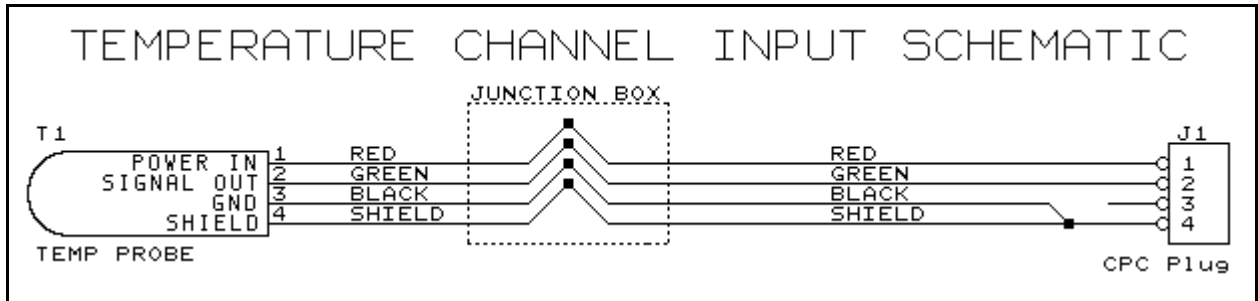
3. Wiring - Input Channels

3.1 Overview

In order to simplify installation we use one type of cable for all inputs and for RS485 communications. This is a four wire, 22 gauge, shielded cable. Individual conductor colors are: Red, Black, Green, White. Generally, red and black are associated with power, green and white with signal. For the remainder of this document, all references to wire color are with respect to this cable.

3.2 Temperature

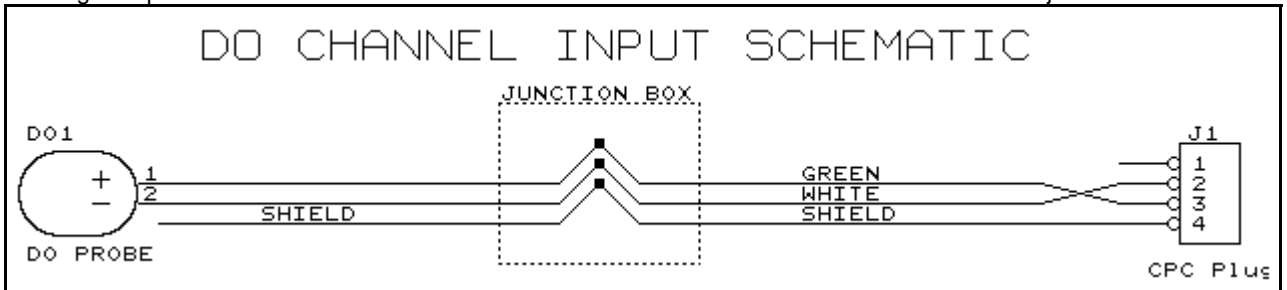
The temperature sensor contains a three-terminal semiconductor device which outputs a current proportional to temperature. This current is converted to a voltage by the amplifier in the controller. The device ground is isolated from the sensor case. Use common electrical "twist-on" connectors to make connections in the junction box.



<i>Temperature Sensor</i>	<i>Junction Box</i>	<i>CDi99 input plug</i>
Red - Sensor Power in	Red	Connect to pin 1
Green - Signal Out	Green	Connect to pin 2
Black - Ground	Black	Connect to pin 4
Shield	Shield	Connect to pin 4

3.3 Dissolved Oxygen

Oxygen probes may use a two or three-wire interface. Two wires are used for signal positive and negative, and the third wire, if present, is the shield. Read the documentation supplied with the DO probe and identify the color of the positive and negative probe wires. Use common electrical "twist-on" connectors to make connections in the junction box.

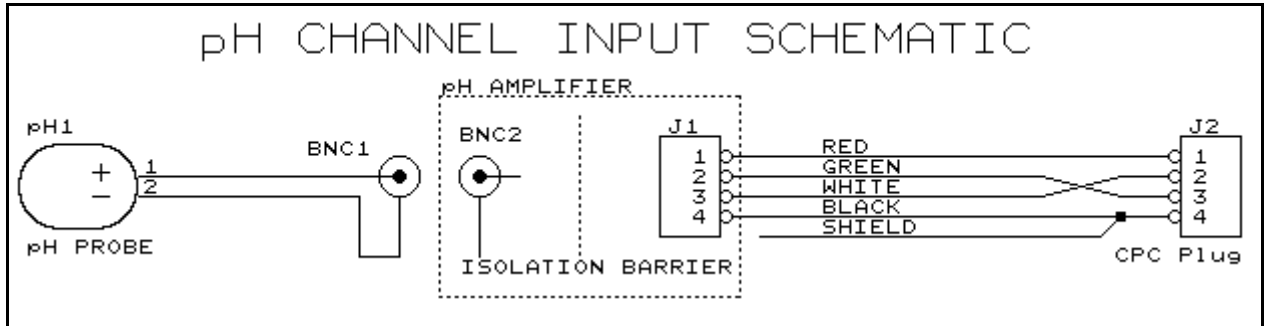


<i>DO probe</i>	<i>Junction Box</i>	<i>CDi99 input plug</i>
Probe + (Positive)	Green	Connect to pin 3
Probe - (Negative)	White	Connect to pin 2
Probe Shield	Shield	Connect to pin 4



3. Wiring - Continued

3.4 pH



<i>pH Amplifier</i>	<i>CDi99 input plug</i>
pH amp connector pin 1 - Red - Power in (+15V)	Connect to pin 1
pH amp connector pin 2 - Green - Signal out + (Pos)	Connect to pin 3
pH amp connector pin 3 - White - Signal out - (Neg)	Connect to pin 2
pH amp connector pin 4 - Black - Power in Ground (0V)	Connect to pin 4 (Twist black and shield together)