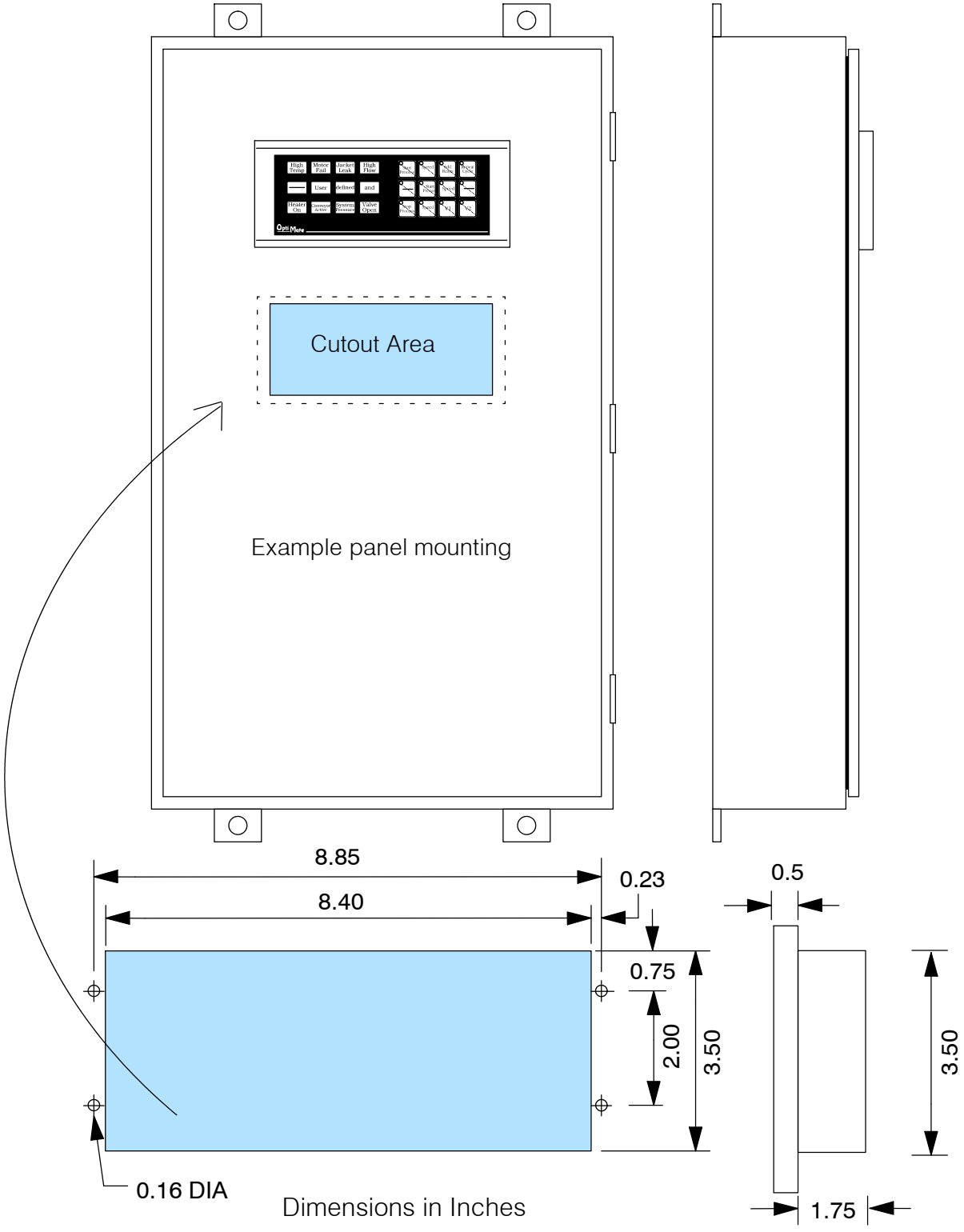
Installing the Panel

In this section you will be given all of the information you need to install the panel. Before actually installing the OP-1212 panel, it may be helpful to examine the specifications and make sure that the requirements of your application are met.

Panel Specifications:

Physical Specifications	Weight	18 ounces
	Panel Fasteners	Four 6x32 threaded studs
	NEMA Rating	NEMA 4
Environmental Specifications	Operating Temperature	0° to 50° C
	Storage Temperature	–20° to 80° C
	Operating Humidity	5 to 95% (non-condensing)
	Air Composition	No corrosive gases permitted
Operating Specifications	Power Budget Requirement	7 VA @ 8 – 30 VDC 570 mA @ 12 VDC (all Lamps and LEDs ON) 285 mA @ 24 VDC (all Lamps and LEDs ON)
	Power Connector	Removable Terminal Block 2 position
	Absolute Maximum Voltage	32 VDC
	Diagnostics	Power On, CPU
	Communication Link	RS232 or RS422 4800, 9600 and 19200* baud 15 pin female D type connector *Only 4800 and 9600 baud will work with Allen-Bradley PLCs.

Dimensions for Mounting



Power and Cabling Requirements

What Are Your Application Needs?

Your communication cable requirements depends on your particular application. There are two types of configuration possibilities: point-to-point (a single operator interface connected to a PLC) and multi-drop (multiple operator interfaces connected to a PLC).

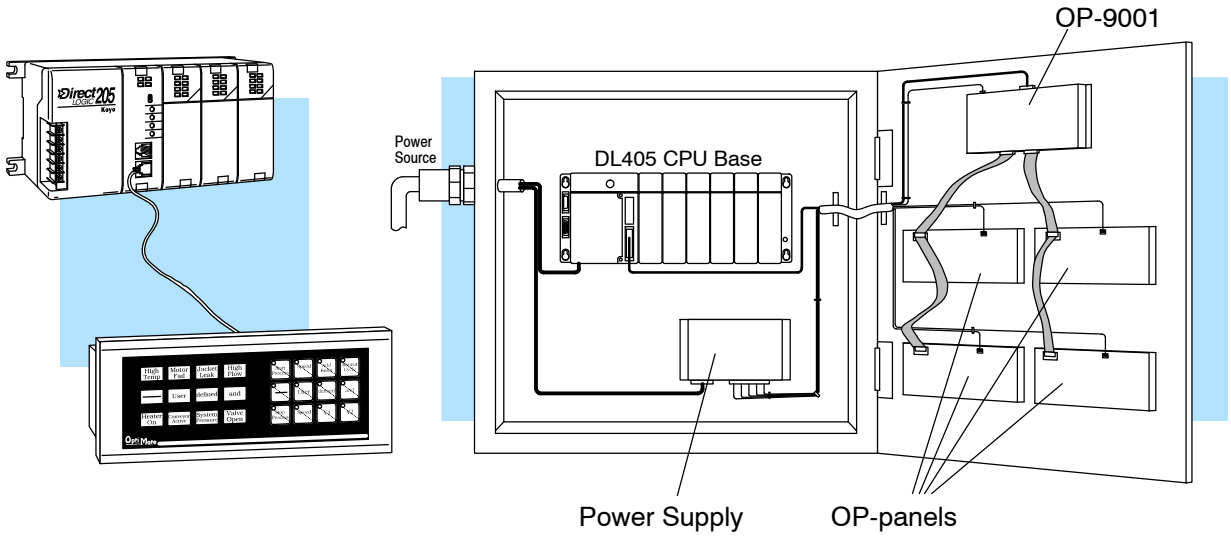
- **Point-to-Point –** If you only need one operator interface connected to one PLC, then choose the appropriate cables from the chart on page 11.
- **Multi-drop –** By using an OptiMate OP–9001 Communications Master, multiple Optimate units can be connected to a single PLC. Up to 31 individual units can be connected in a daisy-chain fashion to the OP–9001. Communications are via RS422 between the OP–9001 and the operator interfaces. When using a quality shielded cable, a total distance of up to 4000 feet between the OP–9001 and the last operator interface unit in the chain can be achieved. If the distance is 30 feet or less, a ribbon cable with easy-to-install crimp-on ribbon connectors can be used.

1. Point-to-Point

A single cable connection from the PLC to the panel gives you access to the PLC's data registers and ladder logic.

2. Multi-drop

Multiple OP-panels can be interfaced to a single PLC. This requires the use of the OP-9001 Communications Master. With the Communication Master, up to 31 panels can be interfaced to a single CPU port. Each can be programmed for entirely different functions. Panels can be distributed up to 4000 feet* from the OP-9001.



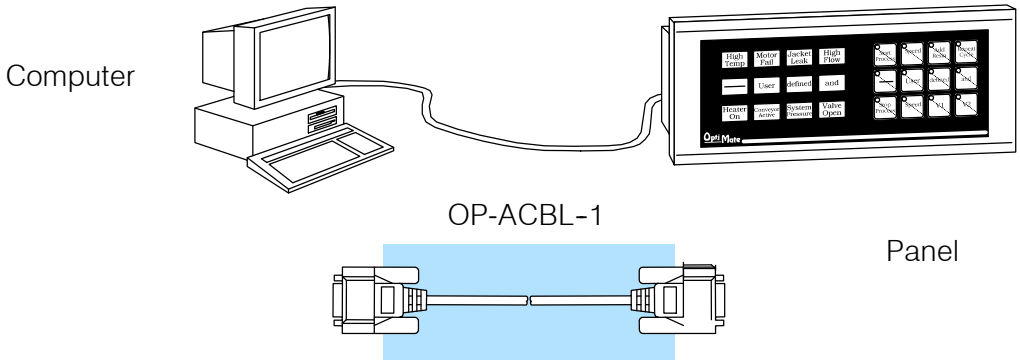
***NOTE:** Please read and follow the cabling requirements in the OP-9001 User Manual (OP-9001-M) when using multiple panels. Failure to follow the guidelines of the User Manual may affect the integrity of the RS422 link, resulting in communication errors.

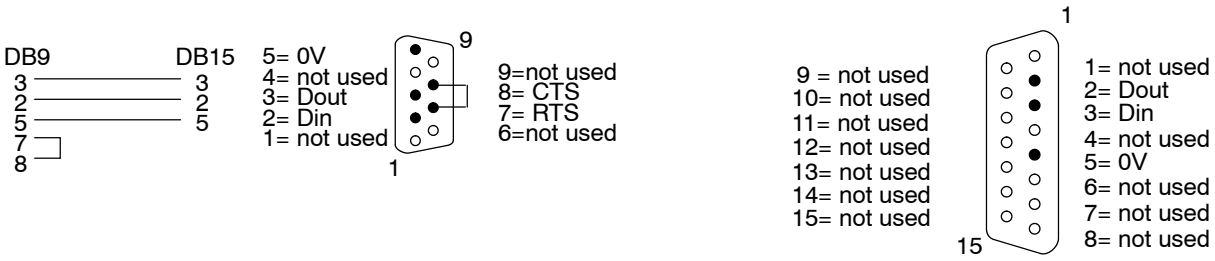
The diagrams shown below give the connector specifications including the pinouts for each end of the available connecting cables.

Programming Cable

The OP-ACBL-1 is used to connect your OP-1212 panel to your computer for programming.

This cable must be used to <u>configure</u> the panel.





PLC to Panel Cable

The OP-ACBL-1 (shown above) is also used <u>to connect Allen-Bradley SLC 5/03 and 5/04 PLCs</u> to an OP-1212 panel. Since the OP-1212 is compatible with all of the ***Direct***LOGIC PLCs, the cabling requirements will vary depending on the PLC type being used. Refer to the table on the next page for matching the proper cable to your PLC. Pin diagrams refer to the ends of the cables and not the communication ports.

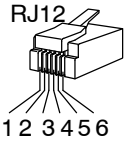
See the next page for matching your PLC to the correct cable.

RJ12 (PLC) DB15

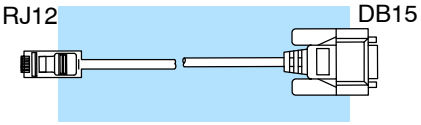
4 — 3
3 — 2
1 — 5

PLC

1= 0V
2= not used
3= Din
4= Dout
5= not used
6= not used



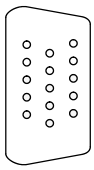
OP-2CBL



15-pin (PLC) DB15

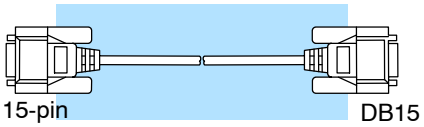
2 — 3
3 — 2
7 — 5
4
5

8= not used
7= 0V
6= not used
5= CTS
4= RTS
3= RXD
2= TXD



15= not used
14= not used
13= not used
12= not used
11= not used
10= not used
9= not used

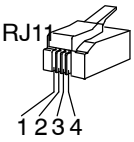
OP-2CBL-1



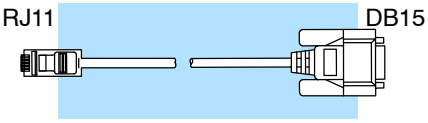
RJ11 (PLC) DB15

2 — 3
1 — 2
4 — 5

1= Din
2= Dout
3= not used
4= 0V



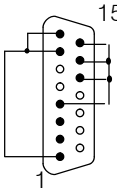
OP-3CBL



DB15 (PLC) DB15

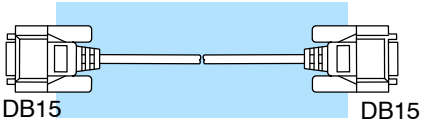
2 — 3
3 — 2
4 — 5
13
14
15
1
7
8

8= YOM
7= CTS
6= not used
5= not used
4= On-line
3= Din
2= Dout
1= YOP



15= tied (0V)
14= tied (0V)
13= tied (0V)
12= not used
11= not used
10= not used
9= not used

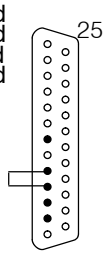
OP-4CBL-1



DB25 (PLC) DB15

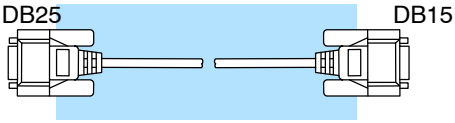
2 — 3
3 — 2
7 — 5
4
5

13= not used
12= not used
11= not used
10= not used
9= not used
8= not used
7= 0V
6= not used
5= CTS
4= RTS
3= Din
2= Dout
1= not used



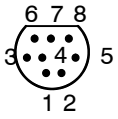
25= not used
24= not used
23= not used
22= not used
21= not used
20= not used
19= not used
18= not used
17= not used
16= not used
15= not used
14= not used

OP-4CBL-2

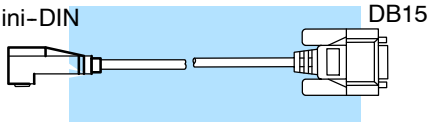


8 Pin Mini DIN DB15

7 — 3
4 — 2
2 — 5



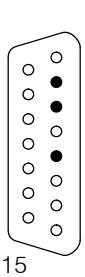
OP-ACBL-2



RS422 Pinout

PLC		Panel
Din +	——	11 = Dout+
Din –	——	12 = Dout –
Dout +	——	9 = Din +
Dout –	——	10 = Din–
0V	——	5 =0V
RTS+		
CTS+		
RTS–		
CTS–		

Panel



9= not used
10= not used
11= not used
12= not used
13= not used
14= not used
15= not used

1= not used
2= Dout
3=Din
4= not used
5= 0V
6= not used
7= not used
8= not used

Choosing the Proper Connecting Cables

OptiMate Panel Cables

Depending on which PLC you are using, you may require as many as two cables–one to connect the panel to a personal computer for configuration; and one to connect the panel to the PLC. Here are the requirements:

- **OP-ACBL-1:** *all* units require this cable for configuration. This isa 9-pin male to 15-pin male cable that connects your personal computer to the OptiMate unit. (This cable is also used to connect an OptiMate panel to the Allen-Bradley SLC-500 PLC.
- **CPU Cables:** You will also need the appropriate cable to connect your CPU to the OptiMate unit. Use the chart shown to the right to choose the correct communications cable.
- **OP-ACBL-2:** The 8 Pin Mini-DIN is a non standard connector used for the Micrologix 1000. We recommend using the OP-ACBL-2 cable and modifying the length for any applications between 6.56 - 50 ft.

OP-9001 Cable Connectors

If you're planning to use multiple panels and an OP-9001, then you'll need to build your own custom cables. Since the proper cable choice really depends on your application, we offer the following connectors.

- **OP-CMCON-1** — pack of 4 ribbon cable connectors.
- **OP-CMCON-2** — pack of 4 solder-type connectors.

For electrically noisy environments, we recommend a good shielded cable, such as Belden 9729 or equivalent. This type of cable will require the solder-type connectors. If you're going 30 feet or less, you can use ribbon cable. For ribbon cable, we recommend Belden 9L28015 or 3M 3365/15. See Page 14 for more information.

OptiMate Cables

Family	CPU (or other device)	Port	Cable
DirectLOGIC DL05	DL05: D0-05	Port 1 (RJ12)	OP-2CBL
		Port 2 (RJ12)	OP-2CBL
DirectLOGIC DL06	DL06: D0-06	Port 1 (RJ12)	OP-2CBL
		Port 2 (15 pin)	OP-2CBL-1
DirectLOGIC DL105	DL105: F1-130	One port (RJ12)	OP-2CBL
DirectLOGIC DL205	D2-230	One port (RJ12)	OP-2CBL
	D2-240	Top port (RJ12)	OP-2CBL
		Bottom port (RJ12)	OP-2CBL
	D2-250-1 D2-260	Top port (RJ12)	OP-2CBL
		Bottom port (15 pin)	OP-2CBL-1
	D2-DCM (module)	Only one (25 pin)	OP-4CBL-2
DirectLOGIC DL305	D3-330	Requires DCU*	OP-4CBL-2
	D3-330P	Requires DCU*	OP-4CBL-2
	D3-340	Top port (RJ11)	OP-3CBL
		Bottom port (RJ11)	OP-3CBL
	D3-350	Top port	OP-2CBL
		Bottom port	OP-4CBL-2
DirectLOGIC DL405	D4-430	Top port (15-pin)	OP-4CBL-1
		Bottom port (25-pin)	OP-4CBL-2
	D4-440	Top port (15-pin)	OP-4CBL-1
		Bottom port (25-pin)	OP-4CBL-2
	D4-450	Phone Jack (RJ12)	OP-2CBL
		Top port (15-pin)	OP-4CBL-1
		Bottom port (25-pin)	OP-4CBL-2
	D4-DCM (module)	One port (25-pin)	OP-4CBL-2
	Slice I/O panels	One port (15-pin)	OP-4CBL-1
GE® Series 1	IC610CPU105, 106	Requires DCU*	OP-4CBL-2
GE® Series 90/30	All models (311-351)	RS422 serial port	Not available
GE® Fanuc™ Series 90 Micro	All models	RS422 serial port	Not available
MODICON	ModBus	RS45	OP-MCBL-1

* requires RS232 Data Communications Unit (D3-232-DCU)
** also DC versions

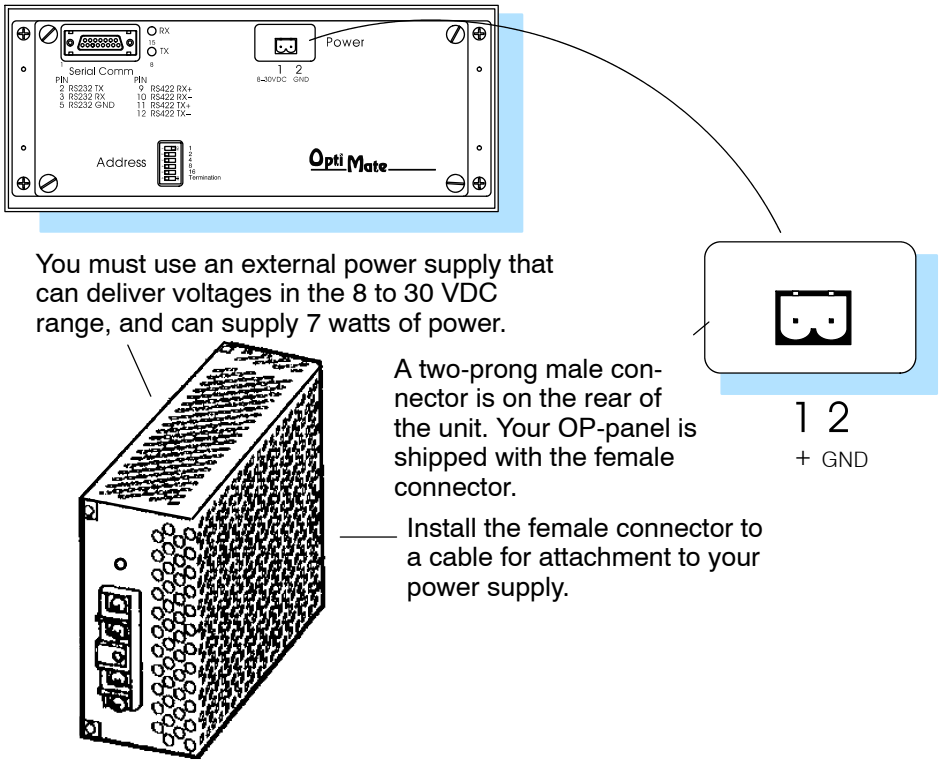
OptiMate Cables (cont'd)			
Family	**CPU (or other device)**	**Port**	**Cable**
TI305™ / SIMATIC® TI305™	325-07, PPX:325-07	Requires DCU*	OP-4CBL-2
	330-37, PPX:330-37	Requires DCU*	OP-4CBL-2
	325S-07 (or 325 w/ Stage Kt)	Requires DCU*	OP-4CBL-2
	330S-37, PPX:330S-37	Requires DCU*	OP-4CBL-2
	335-37, PPX:335-37	Phone Jacks (RJ11)	OP-3CBL
		If DCU is used*	OP-4CBL-2
TI405™ / SIMATIC® TI405™	425-CPU, PPX:425-CPU **	One port (15-pin)	OP-CBL-1
	430-CPU, PPX:430-CPU	Top port (15-pin)	OP-4CBL-1
		Bottom port (25-pin)	OP-4CBL-2
	435-CPU, PPX:435-CPU **	Top port (15-pin)	OP-4CBL-1
		Bottom port (25-pin)	OP-4CBL-2
	Smart Slice™ I/O panels	One port (15-pin)	OP-4CBL-1
Allen-Bradley SLC500	5/03 5/04	Bottom port	OP-ACBL-1
Allen-Bradley	Micrologix1000/1200/1500	One port (8-pin Mini Din)	OP-ACBL-2

* requires RS232 Data Communications Unit (D3-232-DCU)
** also DC versions

Connecting a Power Supply

Power Supply Connections

The OP-1212 panel can operate on DC voltages between 8 and 30 VDC rated at 7 watts. Connect the panel to a power supply (within the required voltage range and wattage) using the terminal block connector supplied. The connector is polarized to prevent reversing the connections. The male receptacle on the rear of the panel will only connect in one way with the female connector that is supplied with your OP-1212 panel. Pin 1 is the positive connection, while Pin 2 is the negative, or ground, connection.



Model	Current Consumed at 12VDC	Current Consumed at 24VDC
OP-1212	240mA (all Lamps and LEDs OFF)	120mA (all Lamps and LEDs OFF)
	570mA (all Lamps and LEDs ON)	285 mA (all Lamps and LEDs ON)

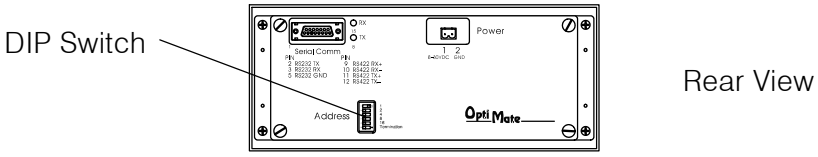
NOTE: Consult our catalog or website, www.automationdirect.com, to purchase a power supply.

Connecting the Panel to your Personal Computer

Assigning an Address to the OP-1212

A 6-position DIP switch on the rear of the OP-1212 is used to assign a hardware address to the panel. Each panel must have a unique address. Any address between 0 and 30 can be used when communicating between a panel and a PLC or the OP-9001 Master Communications panel. Address 31, however, is reserved. See the note that follows.

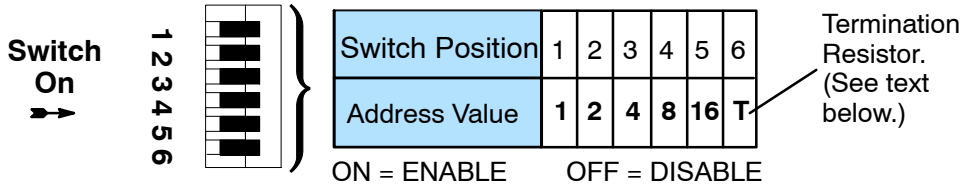
NOTE: You must use Address No. 31 when you are configuring your OP-1212 panel. No other address will work for the configuration process. In a similar manner, if you are connecting more that one OP-panel to a single CPU (through an OP-9001), then the OP-9001 needs to know which set of configuration parameters belong to which OP-panel. You do this by assigning an address in the range of 0 to 30 to each panel connected. Each panel must have a different address.



How to Set the Address

To set the address on the OP-1212, set the apppropriate switches on the dip switch to the desired address. The figure below shows the binary weighting of each switch position. Notice that it is in decimal format. To select address 14 for example, press switches 2, 3 and 4 to the right, and switches 1, 3 and 5 to the left (2 + 4+ 8 = 14). Any address between 0 and 30 is valid for the OptiMate-to-CPU (or to OP9001) communications. Address 31, however selects the configuration mode. Use this mode when you connect your personal computer to the panel for configuration. To select address 31, turn switches 1 through 5 ON.

NOTE: Please note that when the dip switches are changed, the OP-1212 must be power cycled before the new settings will take effect.



The Termination Resistor

Switch position 6 enables or disables an internal termination resistor. The OptiMate panels communicate via an RS232 or RS422 communcations network. If a single panel is used located less than 50 feet from the PLC, use RS232 communication then a termination resistor will not be required (i.e. switch position 6 is turned OFF).

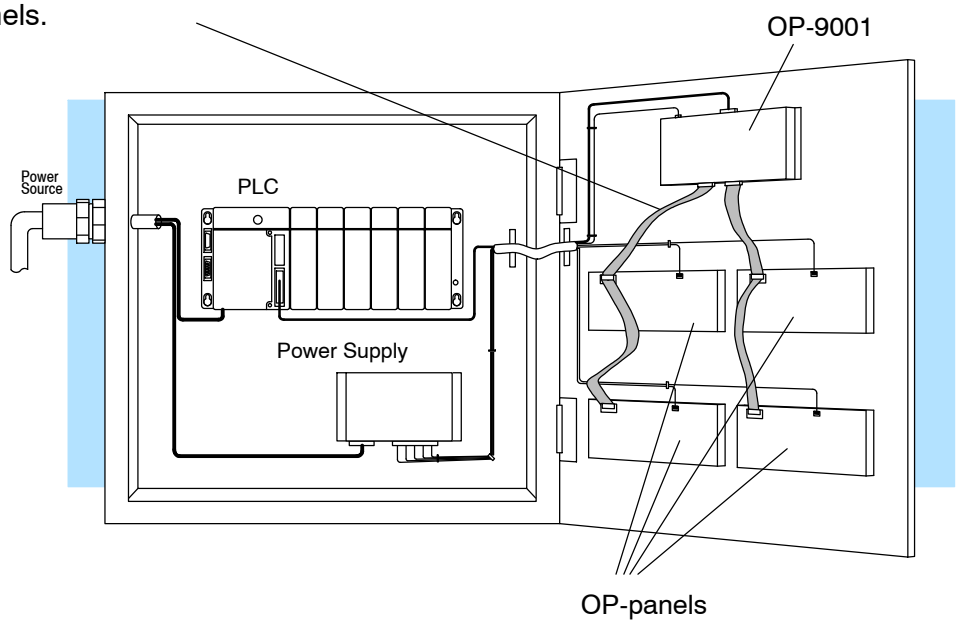
If a panel will be located more than 50 feet from the PLC or multiple panels are used, RS422 ***must*** *be used.* For single panel installations, this means that switch 6 must be enabled (ON). For multi-drop installations, this means **the last panel only** must have switch 6 enabled (ON). All other panels must have switch 6 disabled (OFF). A more detailed description of multiple panel installations is given in the OP-9001-M User Manual.

Using the OP-9001 to Connect Multiple Panels

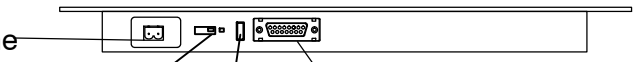
With the addition of the OP-9001 Communications Master panel, you can connect up to 31 panels per a useable CPU port of the PLC. Shown below are the connection requirements. For specifics of the OP-9001 panel itself, please refer to the Communications Master User Manual (OP-9001–M).

NOTE: The OP-9001 must be used in a multiple panel configuration.

Ribbon cable with DB15 male connectors attached. Panels can be connected directly to the OP-9001 ports or be daisy-chained to other OP-panels.



Power supply receptacle. Same as the one on the OP-1212. See Page 12.

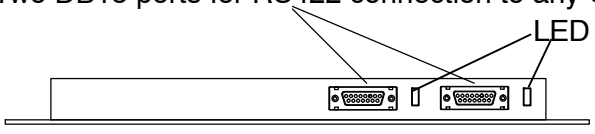


Configuration Jumper

LED

DB15 for connecting to the PLC. See chart on Page 11 for selection of the proper cable.

Two DB15 ports for RS422 connection to any OP-panel.



Belden 9279 Specifications	
No. twisted pairs	2
Nom. Impedance (ohms)	100
Nom. Capacitance (pF/m)	41.0
Wire Gauge (AWG)	24

NOTE: Panels can be located as far away as 4000 feet from the OP-9001 when using shielded cable (Belden 9729 or equivalent). Flat ribbon connections can be used for a distance of 30 feet maximum. For ribbon cable, we recommend Belden 9L28015 or 3M 3365/15.