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*Direct*Touch™ Panel

DP-C321 (Color)/ DP-M321 (Monochrome)

DP-321 USER MANUAL

⚠ WARNING

Rev. E*

Thank you for purchasing automation equipment from Automationdirect.com ™. We want your new ***Direct***Touch™ Panel to operate safely. Anyone who installs or uses this equipment should read this publication (and any other relevant publications) before installing or operating the equipment.

To minimize the risk of potential safety problems, you should follow all applicable local and national codes that regulate the installation and operation of your equipment. These codes vary from area to area and usually change with time. It is your responsibility to determine which codes should be followed, and to verify that the equipment, installation, and operation is in compliance with the latest revision of these codes.

At a minimum, you should follow all applicable sections of the National Fire Code, National Electrical Code, and the codes of the National Electrical Manufacturer's Association (NEMA). There may be local regulatory or government offices that can also help determine which codes and standards are necessary for safe installation and operation.

Equipment damage or serious injury to personnel can result from the failure to follow all applicable codes and standards. We do not guarantee the products described in this publication are suitable for your particular application, nor do we assume any responsibility for your product design, installation, or operation.

If you have any questions concerning the installation or operation of this equipment, or if you need additional information, please call us at 1-770-844-4200.

This publication is based on information that was available at the time it was printed. We constantly strive to improve our products and services, so we reserve the right to make changes to the products and/or publications at any time without notice and without any obligation. This publication may also discuss features that may not be available in certain revisions of the product.

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*** NOTE: Revision C and beyond incorporates a part number change from DP-C320 to DP-C321 and from DP-M320 to DP-M321. The new -321 panels have battery backup of Clock and Calendar.**

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1. SAFETY PRECAUTIONS

Be sure to follow the safety precautions listed below in order to use the ***Direct***Touch™ Panel safely. Automationdirect.com ™ cannot be held liable for any damages incurred if these safety precautions are not followed.

⚠ CAUTION

- Design your system to guard against accidents. The system should have an external protection and safety circuit, so that even if the ***Direct***Touch™ Panel should malfunction or even if there is a defect in the program, the safety of the system is assured.
- Do not use the ***Direct***Touch™ Panel to make switches that are related to safety or people or major damages (Emergency Stop switches, etc.).
- Do not use the ***Direct***Touch™ Panel to drive direct outputs, since they may in turn drive motors and the like. Any such outputs may be ON regardless of PLC ladder logic.
- Use and store the ***Direct***Touch™ Panel in the environment described in the specifications (regarding vibrations, shock, temperature, humidity, etc.).
- Before turning on the power, be sure that the power voltage rating of the ***Direct***Touch™ Panel matches that of your power supply. Using the wrong power supply can damage the unit.
- Do not disassemble or modify the panel, as this may damage the unit. To replace the backlight assembly, follow the procedure specified with the assembly. Only parts supplied by Automationdirect.com or one of its agents should be used.
- The ***Direct***Touch™ Panel touch panel is made of glass. Striking it with hard objects or pressing hard on it may break the glass.
- Do not push down on the touch panel with mechanical pencils, screwdrivers or other sharp objects. Doing so can damage the touch panel or cause malfunctions.
- The Panel has a Lithium battery. Follow the procedure in section 8 to replace the battery.

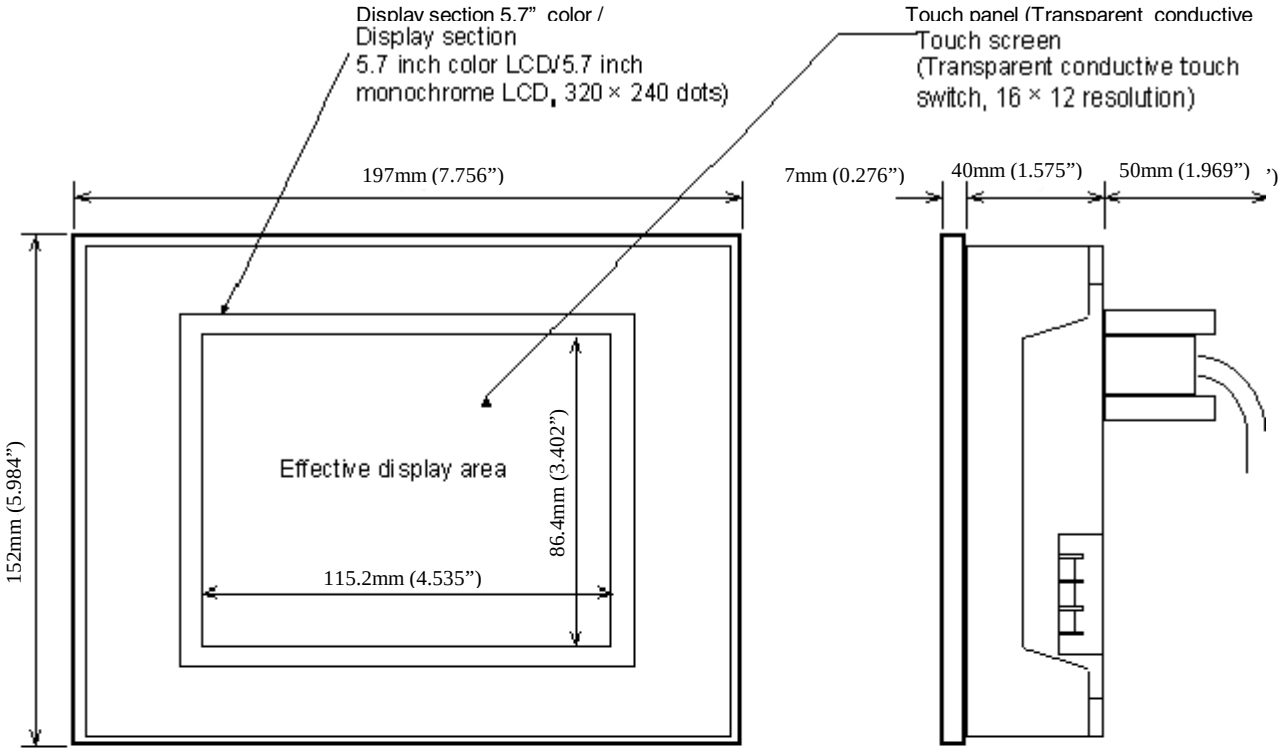
2. CONTENTS

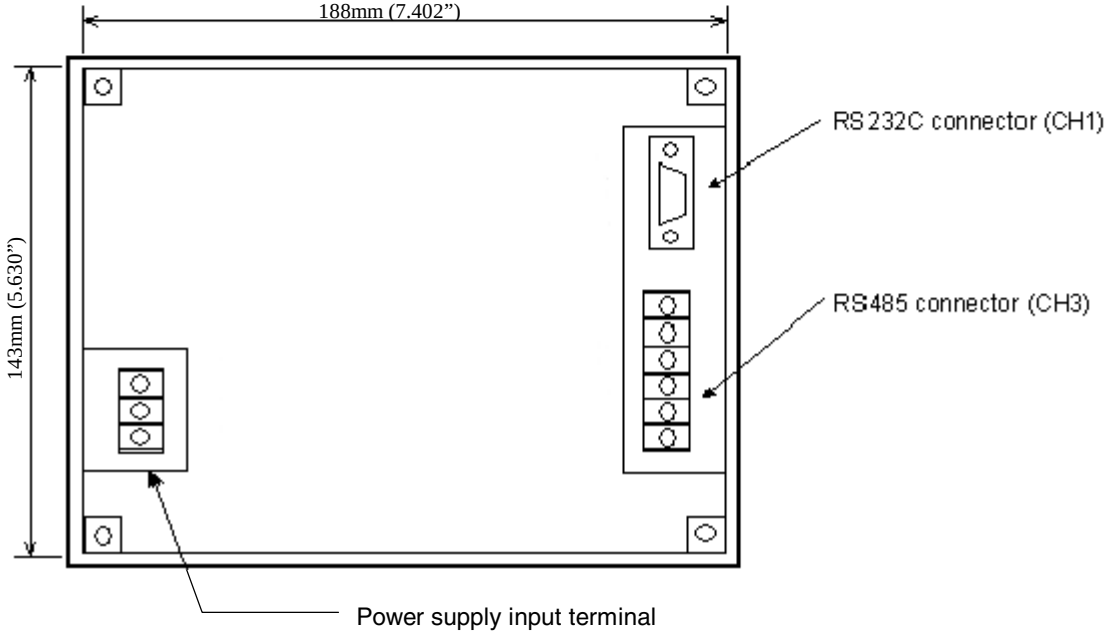
The following items should be in the cardboard container. Be sure to check that all items are included.

	DP-C321 (Color)		DP-M321 (Monochrome)	
Name	Quantity	Model	Quantity	Model
DirectTouch™ Panel	1	DP-C321	1	DP-M321
Installation brackets	4	DP-BRK-2	4	DP-BRK-2
Gasket	1	DP-GSK-1	1	DP-GSK-1
This User Manual	1	DP-321-M	1	DP-321-M

3. PANEL LAYOUT

DP-C321 (Color)/DP-M321 (Monochrome)





4. SPECIFICATIONS

Item		Specification
Vibration		5 to 55 Hz, 2G for 2 hours in the X, Y and Z axes
Shock		10G for under 12 ms in the X, Y, Z axes
Operating Temperature		0 to 50°C (32 to 122°F)
Humidity		15 to 85 percent RH, no condensation
Storage Temperature		-10 to 60°C (14 to 140°F)
Atmosphere		No corrosive gases
Power supply	Rated voltage	DC 20.5 V to 28.8 V **Note: Inrush Current: 25A**
	Power consumption	DP-M321: Under 14 W
		DP-C321: Under 14 W
Static resistance (power supply)		1000 Vpp pulse width, 100 ns and 1000 ns common mode
Static resistance (communications)		500 Vpp pulse width, 100 ns and 1000 ns capacity coupling
Withstand Voltage		1000 Vdc (one minute), between power supply input terminal and protective grounding (FG)
Insulation resistance		Over 20 M-ohms at 500 Vdc, between power supply input terminal and protective grounding (FG)
Structure		For building into panels (only to be installed in the front panel). Can be installed vertically or horizontally.
Cooling method		Natural air cooling
NEMA Rating		IP65F (Compare to NEMA 4) A protective cover is required when coming into regular contact with water or oil.
Weight		Under 850 g (1.874 lb.)
External dimensions		197mm (W) × 152mm (H) × 47mm (D) [7. 756" (W) × 5.984" (H) × 1.850" (D)]
Effective display area		115.2mm (H) × 86.4mm (V) [4.535" (H) × 3.402" (V)]

5. INSTALLATION INSTRUCTIONS

⚠ CAUTION

- Be sure to install the unit in an environment that complies to the general specifications.

  Avoid using the unit in the following locations.
  - Locations where the ambient temperature and relative humidity exceed the ranges in the general specifications.
  - Locations that are subject to sudden temperature changes that can lead to dew condensation.
  - Locations that have significant amounts of corrosive gases, flammable gases, solvents and grounding fluids.
  - Locations with excessive amounts of dust, salt and iron dust.
  - Locations that are directly subjected to excessive vibrations or shock.
  - Locations that are subjected to direct sunlight for long periods.
  - Locations near machinery or devices that output strong static electricity.

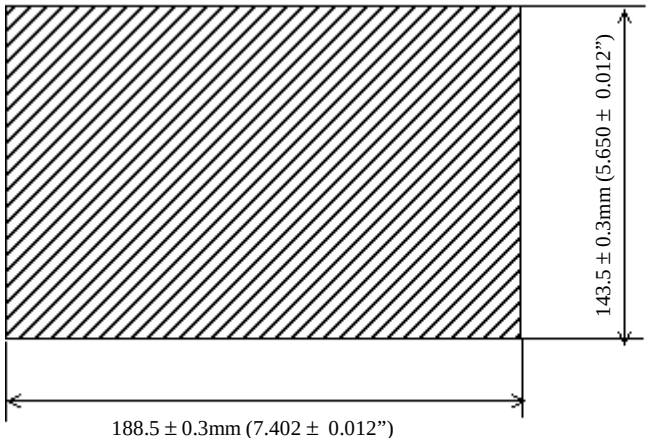
5-1 Panel Orientation

The panel can be installed vertically or horizontally.

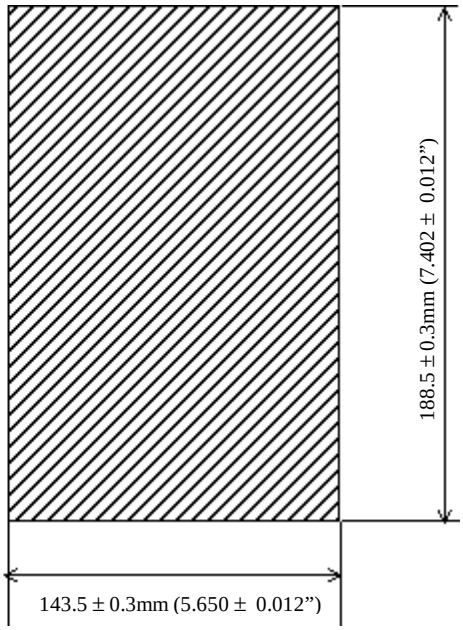
Note: The Cutout dimensions below are very precise!

5-1-1 Hole Cut-out Dimensions

1.) Horizontal installation



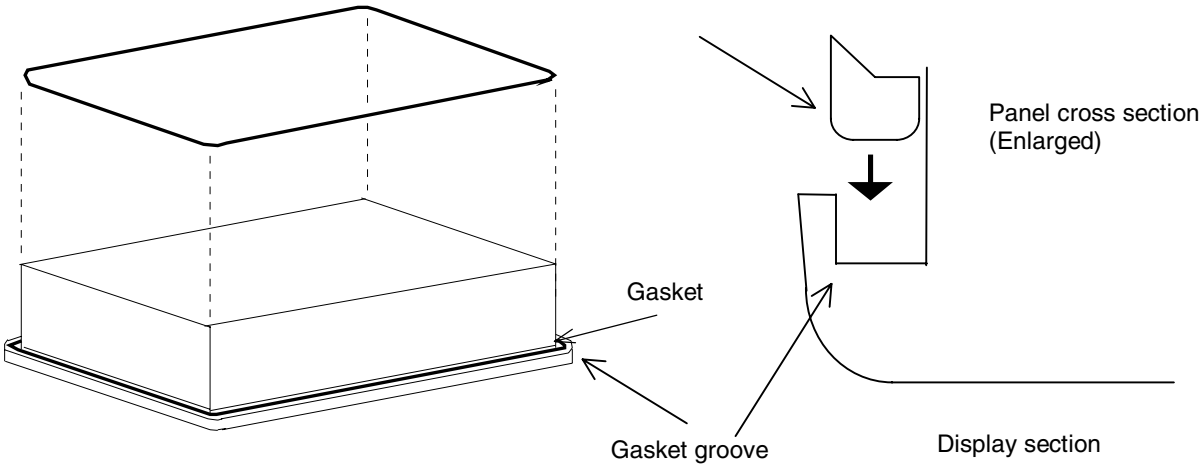
2.) Vertical installation



5-1-2 Installing the Gasket

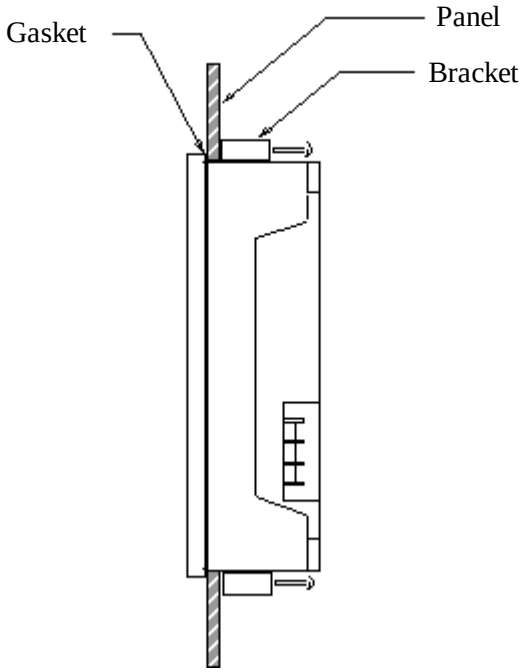
The gasket is located between the panel and front of the ***Direct***Touch™ Panel to prevent water and oil from entering the panel interior.

Install the gasket in the groove around the backside of the front of the ***Direct***Touch™ Panel (the section that comes into contact with the panel) as shown in the figure below.



5-1-3 ***Direct***Touch™ Panel Installation

1.) Insert the unit from the front of the panel, then attach the brackets from the back side of the panel to clamp the unit to the panel. Make sure that the gasket is securely in the groove at this point.



⚠ CAUTION

1 The panel installed in should be 1.6 to 7 mm (0.063 to 0.276”) thick.

2 Use all four brackets.

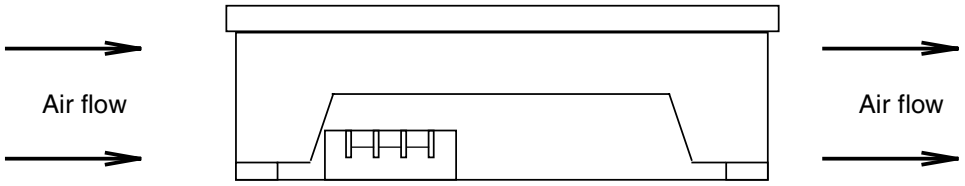
3 Tighten the bracket screws with a torque from 1 to 2 kgf·cm (14 to 28 in.oz.). Make sure that the panel and ***Direct***Touch™ Panel come into contact evenly. Overtightening the screws can lead to deformation of the ***Direct***Touch™ Panel case.

4 When installing the ***Direct***Touch™ Panel vertically, make sure that the power supply terminal is located at the top.

5 Make sure that the installation surface is flat and smooth. Even if the gasket is used, IP65F (compare to NEMA 4) may not be attainable if the surface is not flat and smooth.

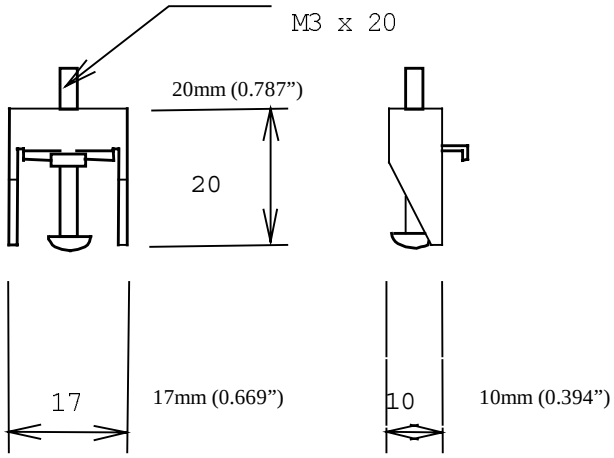
6 Because the DP-C321 uses a color LCD, the optimum viewing angle is limited. Although the optimum viewing angle can be adjusted slightly with the System Mode screen settings, there is a limit to this adjustment. Only install the unit after carefully considering the location and angle.

7 There must be natural air cooling with standard vertical or horizontal installations.
If the ***Direct***Touch™ Panel is installed *flat on* a horizontal surface, as shown below, be sure to use forced air cooling so that the unit does not accumulate heat.



8 Be sure to allow sufficient ventilation space so that heat from the ***Direct***Touch™ Panel does not accumulate.
A basic guideline is to keep the ***Direct***Touch™ Panel at least 100 mm (4”) from other devices, parts and surfaces.

9 Install the ***Direct***Touch™ Panel so that it is not heated by other equipment.



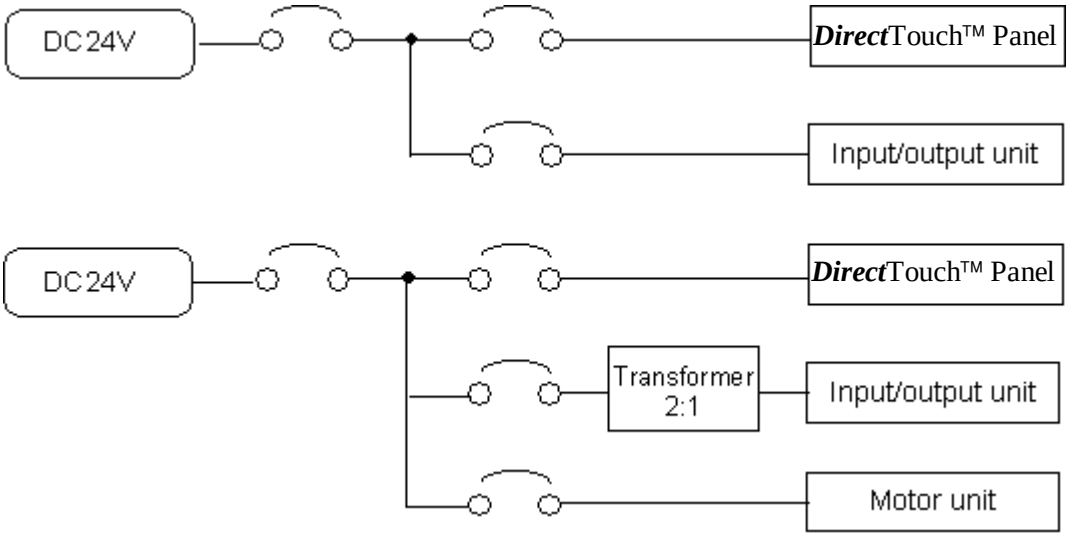
5-1-4 Bracket Dimensions

5-2 Power Supply

Follow the instructions below concerning the wiring of the power supply.

1 Be sure that the input power voltage is within the specified range. Be especially careful of the fall of potential if a long power supply line is used.

2 Make sure that the ***Direct***Touch™ Panel power supply line is separate from those for motors and input/output units.



3 If the power supply has a high degree of static, use a (ferrite core) filter.

4 Make sure that the power supply line is separated from high voltage lines, motor power lines, and input/output signal lines by more than 200 mm (8”).

5-3 Other Connections

Keep the RS-232C and RS-422/485 communications lines at least 200 mm (8”) away from the power supply cable, high voltage lines, motor power lines and input/output signal lines.

6. INTERFACE SPECIFICATIONS

6-1 **RS232C (CH1)** (All circuits within this connector are rated as safety extra low voltage (SELV).

1 Transmission specifications

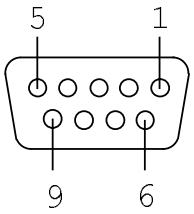
No.	Item	Description
1	Communications method	Full duplex
2	Synchronization	Start-stop synchronization
3	Transmission distance	15 m (49.2’)
4	Connection type	1:1
5	Transmission rate	1200, 2400, 4800, 9600, 19200 and 38400 bps
6	Data format	Start bit: 1 bit Stop bit: 1 and 2 bits Data length: 7 and 8 bits Parity: Even, odd and none

2 **(CH1)** Connector pin numbers and signals

Pin number	Signal	Direction	Description
1	FG		Protective grounding
2	SD	Output	Transmitted data
3	RD	Input	Received data
4	RS	Output	Transmission request signal
5	CS	Input	Reception enabled signal
6	Not used		
7	SG		Signal GND
8	Not used		
9	+5 V		5V power supply (for optional equipment) (Note 1)

Note 1: Make sure that the current used does not exceed 100 mA.

3 Connector pin layout (on the ***Direct***Touch™ Panel)



D-SUB connector (female)

6-2 **RS422/485 (CH3)** (All circuits within this connector are rated as safety extra low voltage (SELV).

1 Transmission specifications

No.	Item	Description	
1	Communications method	Full duplex, five lines	Half duplex, three lines
2	Synchronization	Start-stop synchronization	
3	Transmission distance	500 m (1640')	
4	Connection type	1:N (N ≤ 32) N:PLCs	Does not apply
5	Transmission rate	1200, 2400, 4800, 9600, 19200 and 38400 bps	
6	Data format	Start bit: 1 bit Stop bit: 1 and 2 bits Data length: 7 and 8 bits Parity: Even, odd and none	

2 **(CH3)** Connector pin numbers and signals

Pin number	Signal	Direction	Description
1	FG	—	Protective grounding
2	SG	—	Signal GND
3	RD-	Input	Received data (-)
4	RD+	Input	Received data (+)
5	SD-	Output	Transmitted data (-)
6	SD+	Output	Transmitted data (+)

3 Terminal board layout

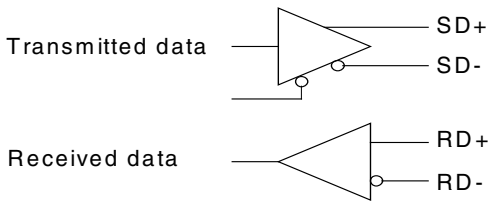
Connector shape: M3 free terminal screw type terminal



• Terminal board screws: M3 × 0.5 × 6L (free terminal screws with washers)

• Terminal board cover: Standard single-action cover included (UL94V-0)

4 Internal circuit



Note: A terminal resistor is not built in, so add one to the terminal board if necessary.

7. OPERATION

7-1 Screen Download

Use the programming cable (DP-PGMCBL) for downloading. The personal computer side of the download cable is a female DSUB 9-pin connector.

For details on the internal connections of the download cable, refer to the Installation chapter of the ScreenCreator™ User Manual (DP-PGMSW-M).

When using the ***Direct***Touch™ Panel for the first time, the user screen data has not been downloaded, so that when the power is turned on, the System Mode screen menu will be displayed. Execute the following procedure to **Download a Project**:

1) Connect the programming cable (DP-PGMCBL) to the RS-232C connector (CH1) and to the PC serial port (usually COM 1). The communications settings are set automatically.

2) Select Up/Download from the System Mode menu. The download screen will be displayed, and the unit will wait for data to be transmitted.

3) Start the ScreenCreator™ software and execute downloading.
Refer to the ScreenCreator™ User Manual for specific instructions.

4) Note: To cancel downloading, press 'Cancel' on the touchscreen. This will clear all the contents in the panel memory. (Do not cancel if you wish to Download!)

5) After downloading is completed, the screen will display the normal end screen.

6) After the 'Ok' button is pressed, the unit will return to the menu. Select User Mode and start operation.

When screen data has already been downloaded, the unit will not go to System Mode when power is turned on. Therefore, if downloading is required to make changes to the screen data, then follow the procedure described in section 7-2 (next) to enter the System Mode screen.

7-2 System Settings

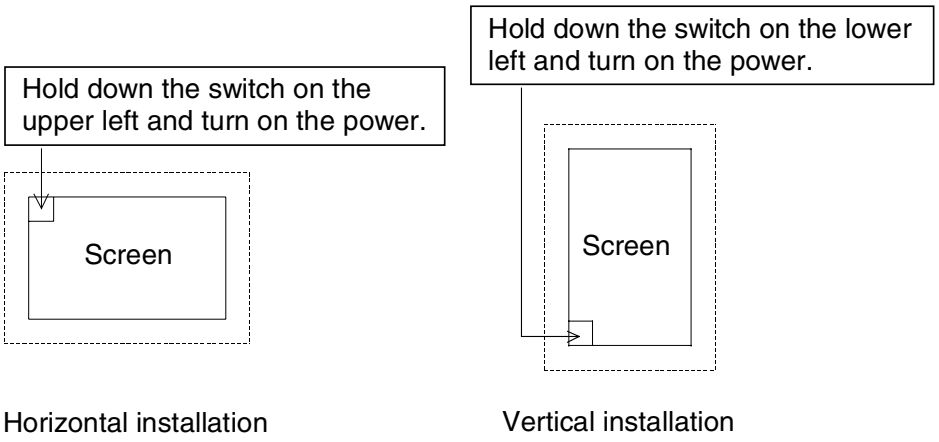
There are two methods for switching to the System Mode screen.

- If the ***Direct***Touch™ Panel is installed horizontally hold down the switch on the upper left of the touch panel or if it is installed vertically hold down the switch on the lower left, then turn on the power.

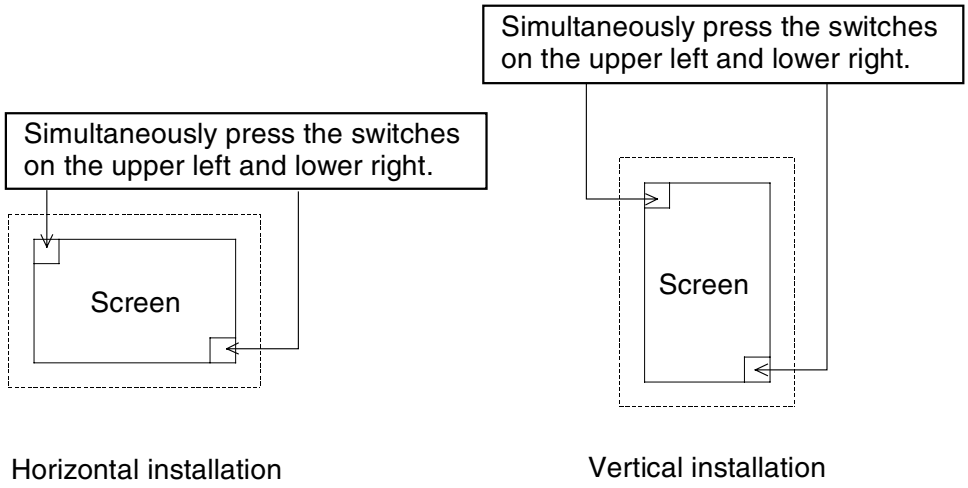
- When in User Mode in which the user screen is displayed, simultaneously press the switches on the upper left and lower right of the touch panel, regardless of the way the ***Direct***Touch™ Panel is installed. (See the diagrams below.)

  If a screen has not been downloaded, then turning ON the power will display the System Mode screen menu.

Transition when power is turned on:



Transition from User Mode:



Refer to the ScreenCreator™ User Manual for details on communication and printer settings.

In each screen the "ENT" key stands for enter and the "ESC" key stands for escape (cancel).

7-2-1 Communication Port Setup

Set the communications type and communications parameters for the various communications ports.

- From the System Setup menu select the communications port to set up.
- The settings screen will be displayed. Set the various parameters. (Communications type, communications rate, parity, stop bit and data length)
  If the settings for the connected unit have not been made in ScreenCreator™, the communications type cannot be set.
- Next, make the detailed settings. (Number of retries, timeout time, station number, and XOn/XOff control)

7-2-2 Host Command Setup

When a special serial communications protocol is to be used (host command method or memory link method), set the communications data format. Only the station number category is valid for

the memory link method.

7-2-3 Switch Setup (Buzzer Sound)

Select whether there is to be a beep sound when a button is pressed on the ***Direct***Touch™ Panel.

7-2-4 Display Control

1 Display Off time setup

This function turns off the display when there is no switch input for a set time. Up to 60 minutes can be set at one minute intervals. If the display is to be left on at all times, set this to 0.

2 Brightness setup (Monochrome panels must be set to **one of the four brightest** settings.)

The brightness of the display can be set to one of eight settings.

7-2-5 Error Display Setup

Select the method for displaying error messages (bottom of the screen or in a window) when errors caused by user applications are generated.

Screen Bottom: Messages and four digit error codes will be displayed at the bottom of the screen.

Window Display: Error messages will be displayed in the error display unit that was assigned when creating the screen.

These settings are only valid for error codes 4000 to 4499 and those in the 5000s.

7-2-6 Display Direction

This setting determines whether the ***Direct***Touch™ Panel is to be used horizontally or vertically. The alignments of the System Mode screen and error messages depend on this setting.

7-2-7 Clock Setup

Enter the Year, Month, Day, Hour and Minutes to set the clock.

7-2-8 Printer Setup

Set the protocol, the Printer Mode and the time-out for the printer being used. During printing of a screen, the Screen Parts operation, screen refresh, and screen selection are disabled.

Note: The settings, except for display direction, are all stored in flash memory when changing to User Mode, so be sure to press the User Mode button after changing the settings

7-3 Before Operation

Check the following items before starting operation for the first time.

- Has screen data been downloaded correctly?
- Have the various system settings been made correctly?

- Have the connectors been connected correctly?
- Is power being supplied correctly?
- Are the connections correct?

8. BUILT-IN BATTERY

8-1 Built-in Battery

The Panel uses a miniature button-type lithium battery (*MATSUSHITA CR2025*) to back up clock and internal memory.

Note: When the "Low Battery Voltage" alarm is displayed on the panel, immediately replace the battery with a new one. Also, if the panel has no power for 3 years or more, replace the battery.

8-2 Battery Replacement Procedure

1. Shut off power to the panel and disconnect the power cable from the terminals.
2. Remove the cover of the battery holder on the rear of the panel.
3. Remove the battery **(+ side up!)** from the battery holder.
4. Insert a new battery in the battery holder **(+ side up!)**.

9. BACKLIGHT (DP-C321)

Note: If the backlight is used in the following ways, the brightness and life of the backlight may be greatly reduced.

- If used in low ambient temperatures (under 5° C or 41° F).
- We recommend the installation of a heater or use in an environment at room temperature.
- Frequently turning the backlight on and off.

10. CLEANING

10-1 Cleaning

- The touch panel is made of glass, so when wiping it off be sure not to apply too much pressure. Applying too much pressure may break the glass.
- Do not wipe the touch panel with thinner, organic solvents, ammonia or strong acids.
- In order to clean the touch panel and case, soak a soft cloth or cotton in a mild detergent or industrial alcohol, then gently wipe the glass and case.
- When using a mild detergent, be sure to wring the cloth thoroughly.

11. PREVENTIVE MAINTENANCE

11-1 Preventive Maintenance

Conduct a *periodic inspection* of the ***Direct***Touch™ Panel at least once a year.

Also conduct the inspection below after moving the ***Direct***Touch™ Panel, modifying it, or changing the connections.

	Item	Description	Criteria	Action
1	Power supply voltage	Measured at the power supply input terminal	Within the range of the general specifications.	Change the supplied power.
2	Ambient environment	Ambient temperature	Within the range of the general specifications.	When used in a cabinet, the temperature in the cabinet should be considered the ambient temperature.
		Ambient humidity		
		Atmosphere		
3	Installation	Are the installation screws loose?	Not loose	Tighten the screws.
		Are the connectors loose?	Not loose	Tighten the connector screws.
		Are the power supply input terminal screws loose?	Not loose	Tighten the screws.
		Are there any problems with wiring?	Broken lines or taught lines	Modify the wiring.

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