Algas-SDI™

...Innovative liquid vaporizing and gas mixing solutions

ISO 9001 Certified

Blendaire

Remote Control Panel

Operations & Maintenance Manual

1140 NW 46 Street, Seattle, Washington, USA 98107
Tel: 206-789-5410 Fax: 206-789-5414 Web: www.algas-sdi.com

ECLIPSE Innovative Thermal Solutions

WARNING

Read the OPERATION MANUAL before operating this equipment.

NOTE: Algas-SDI reserves the right to use alternate manufacturers' components as vendor delivery applicability dictates. Literature contained in the Operation Manual has been supplied by vendors. Please check to be sure supplied data matches your configuration. Contact Algas-SDI if any questions exist.

This equipment uses LPG-a flammable fuel, or NH3-a toxic gas, (depending on the model), handled under pressure. Inherent hazards exist and a thorough understanding of the equipment is required to allow safe operation and maintenance.

Allow only a TRAINED and FULLY QUALIFIED PERSON to service this equipment.

Any time a component must be replaced, use the same type, model, etc. DO NOT SUBSTITUTE! The consequence from such actions are unpredictable and may lead to dire consequences. When components are replaced with components not approved for use in our FM/CSA listed equipment, the FM/CSA listing becomes void for that unit.

WARRANTY

Algas-SDI International, LLC (ASDI) warrants that the equipment is free of defects in materials and workmanship under normal use and service. ASDI agrees to repair or replace, at our option, without charge f.o.b. factory, any part which has proven defective to the satisfaction of Algas-SDI International, LLC within one (1) year from the date of the original installation or within 18 months from the date of shipment, whichever is earlier. Equipment, which in the opinion of ASDI, has been damaged by improper installation or operation, or has been abused or tampered with in any way, will not be accepted for return under warranty.

Algas-SDI International, LLC will not accept back charges for work performed by others upon or in conjunction with ASDI equipment, unless prior authorization is given by means of an Algas-SDI International, LLC purchase order. Algas-SDI International, LLC will not be liable by reason of shutdown, non-operation or increased expense of operation of other equipment, or any other loss or damage of any nature, whether direct or consequential, arising from any cause whatsoever.

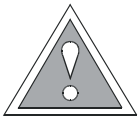
Algas-SDI International, LLC makes NO other warranty of any kind, whatsoever expressed or implied; and all warranties of merchantability and fitness for a particular purpose are hereby disclaimed by Algas-SDI International, LLC and excluded from these terms of sale. No person has any authority to bind Algas-SDI International, LLC to any representation or warranty other than this warranty.

COPYRIGHT

Symbols and Conventions

Special symbols are used to denote hazardous or important information. You should familiarize yourself with their meaning and take special notice of the indicated information.

Please read the following explanations thoroughly.



GENERAL WARNING OR CAUTION

Indicates hazards or unsafe practices which can result in damage to the equipment or cause personal injury. Use care and follow the instructions given.

FLAMMABLE GAS HAZARD

Indicates a potential hazard which can result in severe personal injury or death. Use extreme care and follow the instructions given.

ELECTRICAL DISCONNECT REQUIRED

Indicates a potentially dangerous situation which can result in severe personal injury or death or damage to equipment. Use great care and follow the instruction given.

ASDI CONTACT NUMBERS

If you have questions, need help with your equipment, or want information on other products, contact Algas-SDI at:

Telephone: 206.789.5410

Facsimile: 206.789.5414

Email: sales@algas-sdi.com

Internet: http://www.algas-sdi.com

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Remote Control Panel (RCP) 1

GENERAL DESCRIPTION

This document will outline the operator screens and procedures of the Blendaire Remote Control panel (RCP) manufactured by Algas-SDI International.

The RCP is a sensitive touch screen that provides a convenient way for operators to enter data. Touching the appropriate buttons or cells, change the display screens or allows set point entry by flashing the current value. The items mentioned below are general and will be found on many of the screens. Below is a description of functionality for those items.

Pressing the **NEXT** button advances an operator to the next display screen within a group. In most cases there is additional information that the operators can access.

Pressing the **BACK** button returns the operator to the **PREVIOUS** or **MAIN** screen.

When an alarm occurs, a red alarm banner at the bottom of the screen displays the alarm description. At the same time an alarm window appears describing the fault to the operator. The alarm banner and window appear on all screens to alert the operator to faults no matter which screen is being viewed.

Touch cells with a wide border or dark blue background can be touched to enter set points or time delays. Items that appear in a simple outlined box are display items only.

When a value cell is touched to enter a new set point, a keypad appears so the value can be entered. Minimum and maximum allowable values are displayed in the upper two blue boxes. Operators must enter values within the range or an error message appears forcing the operator to reenter the value. The keypad right and left arrows are used to move the keypad so the operator can access the touch cells behind the keypad when it is displayed.

Standard colors used on the display are as follows:

Magenta = Mixed Gas

Blue = Air

Cyan = Vapor

Screen Descriptions

MAIN SCREEN

The Main screen displays machine status, used to select other displays and operates the machine start stop functions.

When the **START** button is pressed, the machine clears any existing alarm and enters a start mode by energizing the Load Solenoid on the machine. The status item of the display will read **STARTING**. If the Blender is equipped with an outlet solenoid, it will open or energize after an appropriate time delay. If no alarms are present the status description on the **MAIN** screen will read **RUNNING** until an alarm occurs or an operator turns off the machine.

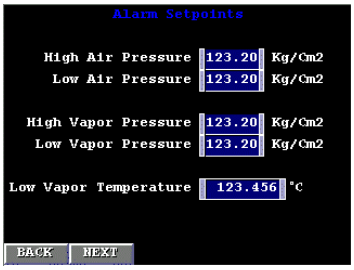
When the **STOP** button is pressed, all solenoids are turned off and the machine stops.

The **SILENCE** button will turn off the alarm horn.

The **SETPTS** button opens the Set Points screen.

Set Points Display

ALARM SET POINTS

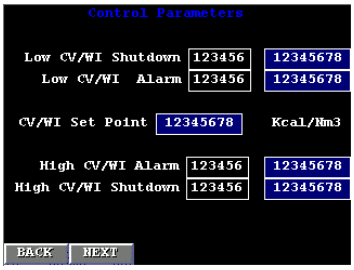


The operators can set alarm set points by touching the appropriate touch cell. The machine will alarm and shut down using the parameters the operators enter.

NOTE

See manufactures Data Sheet for Default Parameters.

CONTROL PARAMETERS



The control set points are used to fail the machine when calorific value (CV) of the gas being manufactured is to high or low. The **CV HIGH** and **LOW WARNING** parameters will warn the operator that corrective action is necessary and will not shutdown the machine. The **CV HIGH** and **LOW SHUTDOWN** parameters are used to shutdown the machine if CV is beyond acceptable levels.

The **CV ALARM** and **SHUTDOWN** parameters are calculated based on the values entered into the Bias set points located to the right of the alarm set point display. This prevents operators from entering values that are unacceptable for machine operations.

SCREEN BRIGHTNESS

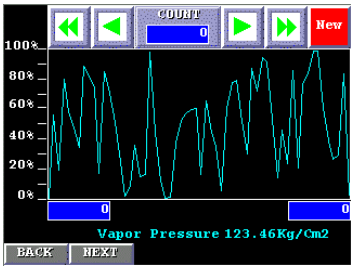
Screen brightness is selected by touching the brightness slide bar and moving the slide bar across the screen until the optimum brightness is achieved.

SET TIME & DATE

When the **TIME** button is touched a time set up key pad appears. The operator must first select **YEAR**, **MONTH**, **DAY**, **HOUR** or **MIN** by touching the appropriate button. Then enter the correct value for the selected item. Enter will save the changes made by the operator. The **ESC** key will abort operator changes. **CLR** deletes the last number entered.

When a new date or time is entered at the panel, the time and date is synchronized with the PLC.

TREND LOG DISPLAYS



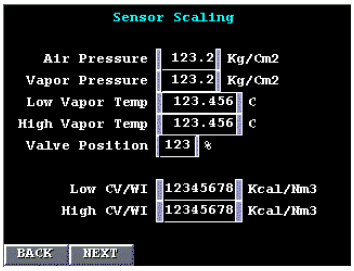
Trend graph displays are provided for each of the pressure, temperature and CV values. The **NEXT** button scrolls though each sensor. The **BACK** button returns to the Main screen. When the **NEW** button is touched, it will appear as though it is depressed. During this time real time data from the sensors is displayed on the graph. When the **NEW** button is not depressed, logged data is displayed.

SET UP (OEM LEVEL)

The parameters on the **SETUP** displays are protected by a password. Only qualified factory representatives are allowed to change the values of these parameters. Any unauthorized settings will void the warrantee.

To enter the password protected area, select the setup button. Enter “1015” on the keypad. The password keypad allows for three wrong password entries before it will close automatically.

SENSOR SCALING

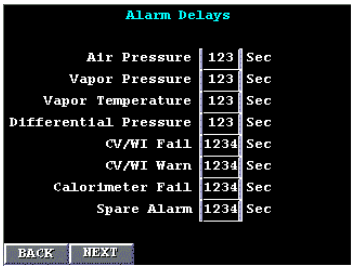


SENSOR SCALING parameters adjust the high and/or low sensor range. The minimum value for air and vapor pressure, and valve position is assumed to be zero. **Low Vap** sets the minimum value for the vapor temperature transmitter and the **High Vap** sets the maximum value. **Low CV** sets the minimum value for the CV range and **High CV** sets the high range value.

START DELAYS

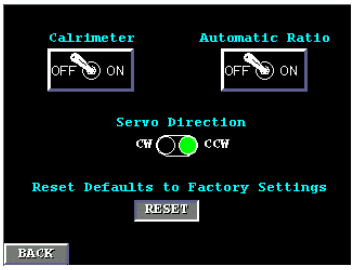
START DELAYS lock out the alarm functions when the start button is pressed for the entered period of time in seconds. This time allows the machine to stabilize the air and vapor pressures and start without generating an alarm.

ALARM DELAYS



Each alarm has an individual delay timer. This timer must be satisfied in order for the alarm to occur. The time value is in addition to any start timer that may be in effect.

BLENDER OPTIONS



Toggle switches are used to enable or disable optional features for the Blendaire from the factory. To enable the option, touch the object description **ON** or **OFF**. The toggle switch will change position to indicate the status of the switch.

CALORIMETER SHUTDOWN ENABLE

When a calorimeter is being used the factory will turn on this parameter. While this parameter is set to **ON**, the **CALRIMETER FAIL** alarm is active and will shutdown the machine when this alarm occurs.

Values for CV are displayed on the **MAIN** screen when **CALRIMETER SHUTDOWN ENABLE** is selected.

AUTOMATIC RATIO CONTROL ENABLE

When the **ARA** feature of the Mixer is turned on, a button labeled ARA will appear on the main screen. This screen will allow the operator to adjust the control PI parameters.

SERVO DIRECTION

This setting will change the direction of the valve. Servo direction is based on which side of the mixer is piped for LPG Vapor and the valve used.

ALARM LOG DISPLAY

The **ALARM LOG** displays alarms that have occurred and shows when they were cleared. The log is cleared when the machine is started. If an active alarm is present, its status on the log screen will be shown as "**ON**".

The up and down arrow keys are used to scroll through the active alarm list.

The button at the top center of the alarm log is used to return to the top of the alarm list.

Touch Panel Configuration

Entering panel setup will give users access to the screen saver, both RS-232/ RS-422 communications parameters and Misc. panel controls.

NOTE

See operator terminal manual for details.

ENTERING PANEL CONFIGURATION MODE

Simultaneously press the upper left and lower right corners of the panel. Four buttons will appear. **SYSTEM SETUP**, **SYSTEM CHECK, UPLOAD AND DOWNLOAD** and **USER MODE**. Pressing the **USER MODE** button will return the operator the main screen of the monitoring application.

RS-232 SETUP PARAMETERS

Connected Device = Not Used

Communications Rate = 9600 bps

Parity Check = Even

Stop Bits = 1

Data Length = 8

RS232C = not used

RS422/485 = PLC

Details are set as follows:

Retry = 1

Timeout = 0

Panel ID# = 0

Xon/Off = Off

RS-422/485 SETUP PARAMETERS

Connected Device = PLC

Communications Rate = 19200 bps

Parity Check = None

Stop Bits = 1

Data Length = 8

RS232C = not used

RS422/485 = PLC

Details are set as follows:

Retry = 1

Timeout = 3.0

Panel ID# = 0

Next panel ID# = 0

Xon/Off = Off

The operator panel communicates to the PLC over the RS422/485 port. Communications parameters must match the communications parameters in the PLC for the Secondary Port.

HOST COMMAND SETUP PARAMETERS

Factory default parameters are set according the chart below.

Start Code = 2	Panel ID# = Not Used
Terminator Code = D	Terminator Code2 = A
End Of Send Code = 1	Check Sum = Used
End Of Data Code = 4	Ack Code = 6
End Code = 3	Nak Code = 15

Blender ARA 2

Screen Item Descriptions

CALORIFIC VALUE

CALORIFIC VALUE is a display of the current calorific value. It is useful when setting up the PI loop for automatic controls. This display will also help operators check the accuracy of the PI adjustments being made automatically.

SET POINT

The **SET POINT** is a display of the current user set point entered into the system. The PI controls will maintain CV levels specified by this set point.

VALVE POSITION

VALVE POSITION is a readout of the current valve Position. This is a useful parameter when setting up the PI controls.

FORCED POSITION

FORCED VALVE POSITION is a set point, used to position the valve in a suitable position when CV is not being maintained automatically. This value must be set up after initial startup when a known good gas mix is being made automatically. The valve position for forced control must be entered in order to produce a good CV reading under abnormal operating conditions of the system.

MANUAL POSITION

MANUAL POSITION is a set point used to position the valve based on user input. When the manual button is pressed and the Blender is in the manual mode the Manual Position Value is used.

SAMPLE RATE

SAMPLE RATE is the LPG transit time to the heat indicator plus the heat indicator process time.

C.V. LPG

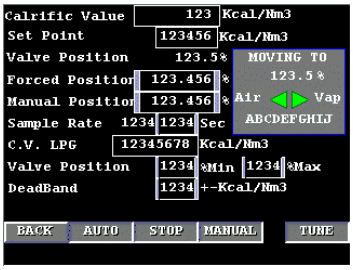
The **C.V. LPG** is an estimate of the LPG Feed Stock Calorific Value. This value is used to anticipate the valve position based on mixed gas CV changes.

VALVE POSITION MIN/MAX

These two parameters are used as valve position minimum and maximum limits. They prevent the valve from traveling past the recommended limits.

DEADBAND

DEADBAND is an area around the set point in which the valve will not respond to movement requests while in Auto mode.



Functionality Description

MANUAL MODE

The **MANUAL** button on the ARA screen is used to operate the valve manually. The manual button can be pressed at any time, the machine does not have to be running. When the manual button is pressed the operation mode text will change to PI in manual and will automatically seek the position entered in the manual position set point. To stop the valve from moving while the machine is stopped, press the **AUTO** Button. When the auto button is pressed and the machine is running, the ARA function will switch to automatic and the operation mode text will change to PI in auto.

The **MANUAL MODE** can be used for startup or maintenance functions.

AUTOMATIC MODE

When the ARA is in the automatic mode, the ARA function will monitor the gas quality after the sample rate has elapsed. After the sample is analyzed, the ARA calculation will determine where the valve needs to be placed in order to produce the specified mix established using the set point parameter entered by the operators.

FORCED CONTROL

When the machine is running and the mixed gas being produced is not within tolerance levels, **FORCED CONTROL MODE** is enabled. This event will place the valve in a position where a known good mix will be produced. The forced position set point is used to determine where the valve needs to be placed under abnormal operating conditions. The **OPERATION MODE** will change to forced control when the forced control function is enabled. If the mix is not corrected in a specified amount of time the machine will shutdown on a CV shutdown alarm.

AUTO TUNE

WARNING

The ARA function should be Auto Tuned at least once prior to Automatic Operations unless the delay time from ratio change to registering that change is known.

After initial startup, the plant must be in operation. Start the mixer in the manual mode and stabilize the calorific value. Press the **TUNE** button to start the auto tune sequence.

At the beginning of the auto tune sequence, the valve will move five percent in a positive direction and stop. This will invoke a change in the calorific value. If calorific value drops, the direction set point for ARA will change after auto tuning. This will ensure a positive reaction when auto tuning is complete.

A timer is used to time the amount of time between movement of the valve and the time calorific value changes by three percent. This time value is entered into the sample rate set point. The sample rate can be changed by the operators to compensate for outside forces on the PI function during auto tuning.

NORMAL OPERATIONS

During initial startup, all set points must be entered and adjusted for accuracy. The forced control set point is the most critical of all PI set points. Select **AUTO PI** mode then **AUTO TUNE**.

The valve will move 5 percent and save the mixed gas response time, which is be saved in the sample rate set point. When auto tuning is done, the system will automatically resume operations in the **AUTO** mode.

When the PI loop is in the auto mode, the PI calculation will determine where the new valve position should be to produce the gas mix that is required by the mixed gas set point.

Valve position, direction and mode of operations is displayed on the ARA screen for operator convenience.

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APPENDIX A

Component Information

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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.

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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.**

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.

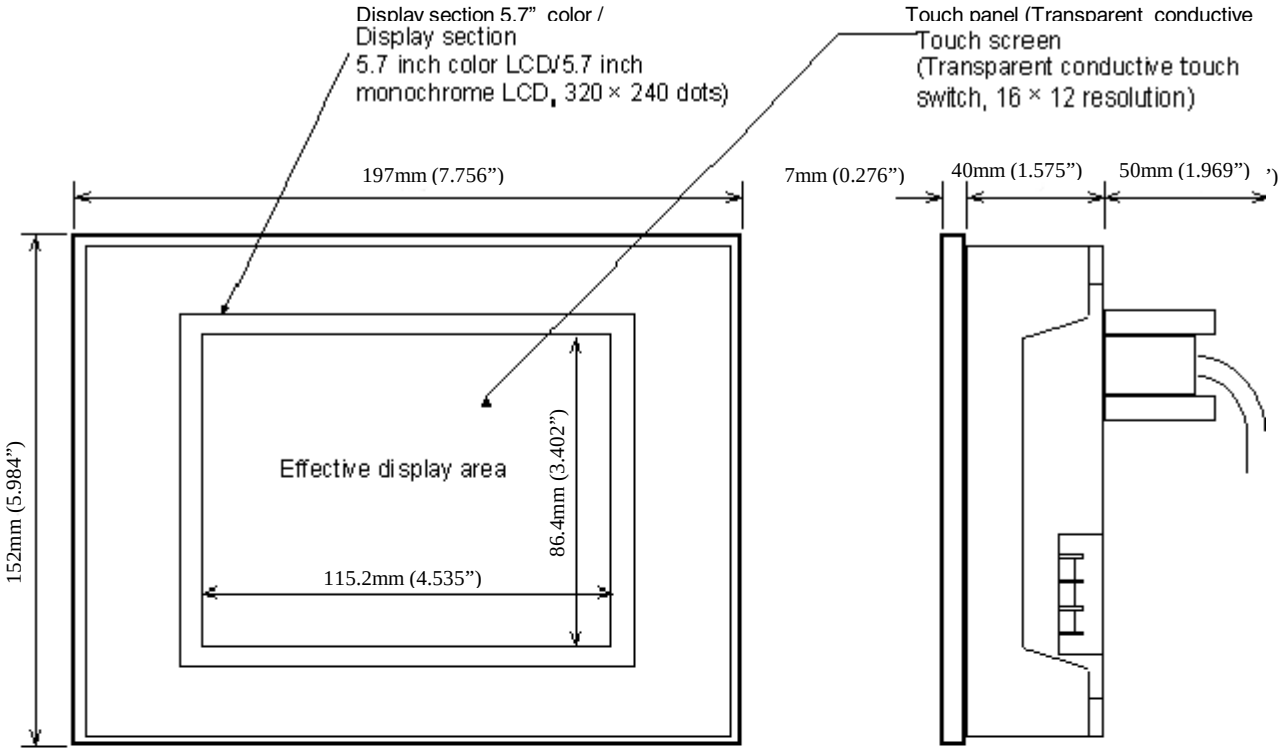
2. CONTENTS

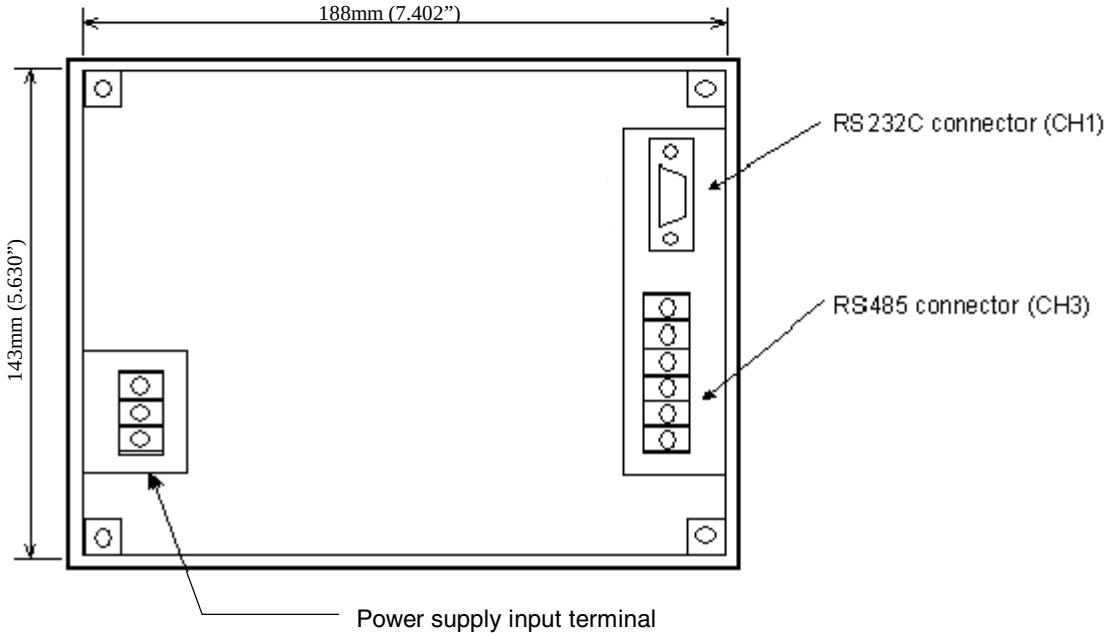
The following items should be in the cardboard container. Be sure to check that all items are included.

	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.

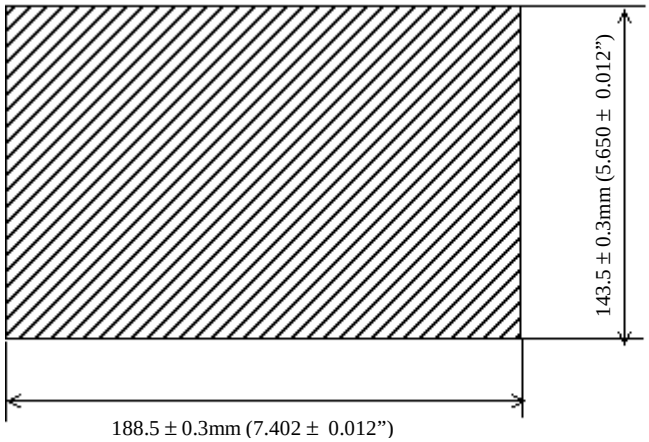
5-1 Panel Orientation

The panel can be installed vertically or horizontally.

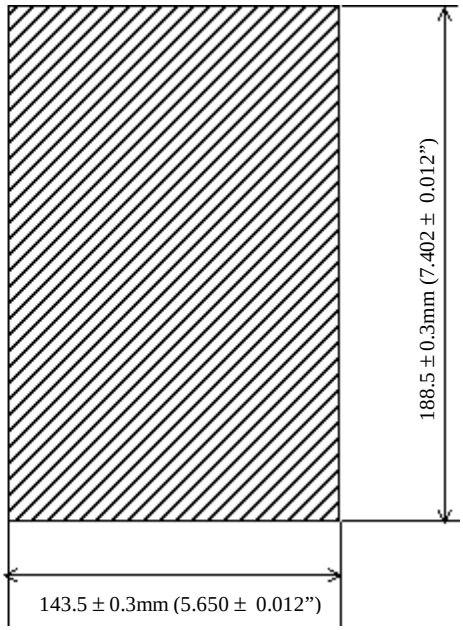
Note: The Cutout dimensions below are very precise!

5-1-1 Hole Cut-out Dimensions

1.) Horizontal installation



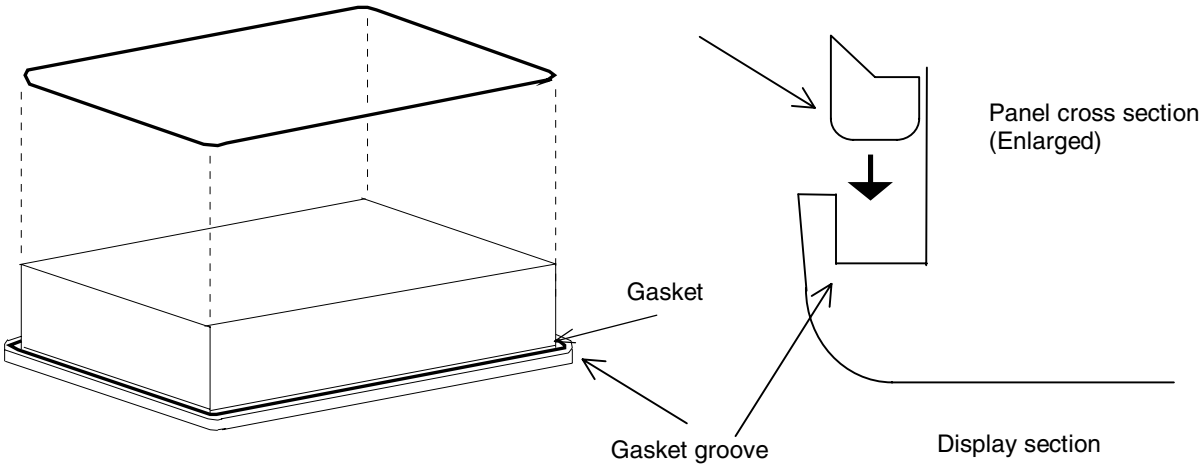
2.) Vertical installation



5-1-2 Installing the Gasket

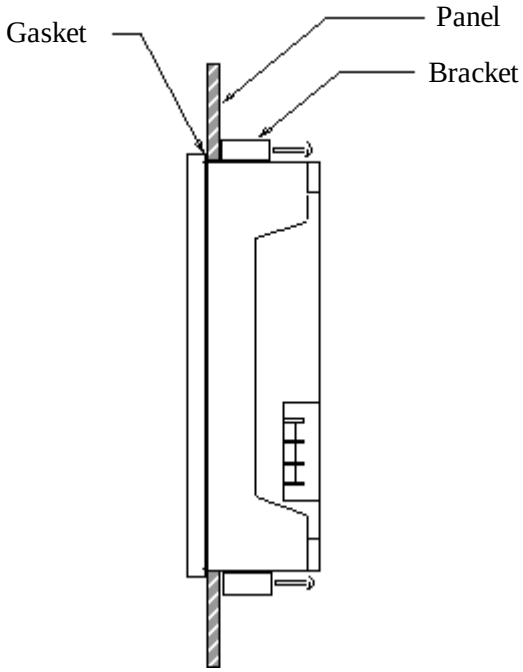
The gasket is located between the panel and front of the ***Direct***Touch™ Panel to prevent water and oil from entering the panel interior.

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.

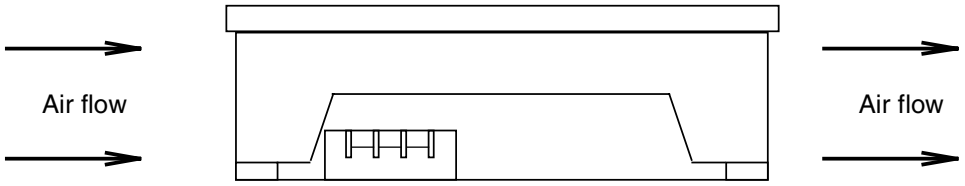
3 Tighten the bracket screws with a torque from 1 to 2 kgf·cm (14 to 28 in.oz.). Make sure that the panel and ***Direct***Touch™ Panel come into contact evenly. Overtightening the screws can lead to deformation of the ***Direct***Touch™ Panel case.

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.

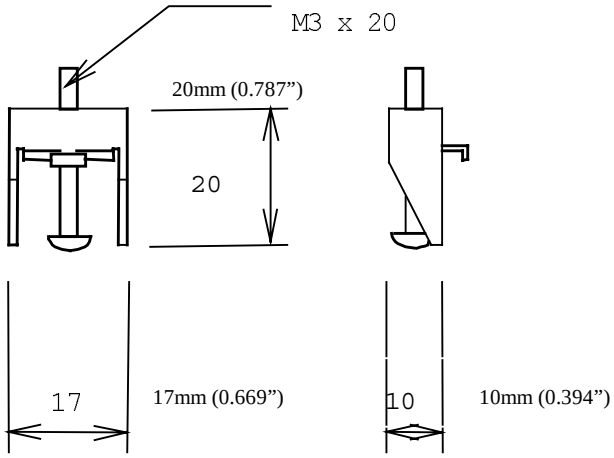
6 Because the DP-C321 uses a color LCD, the optimum viewing angle is limited. Although the optimum viewing angle can be adjusted slightly with the System Mode screen settings, there is a limit to this adjustment. Only install the unit after carefully considering the location and angle.

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.



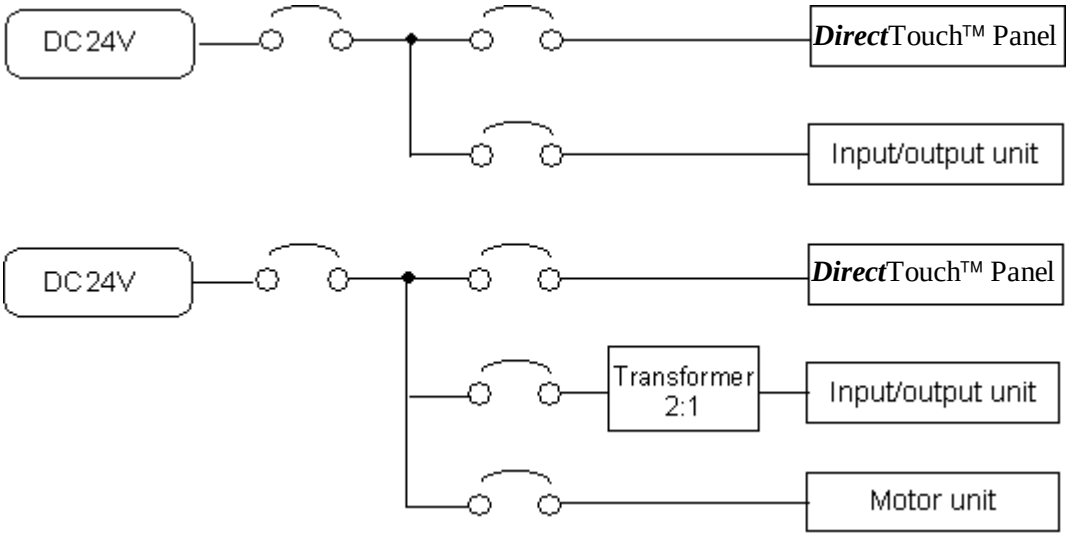
5-1-4 Bracket Dimensions

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

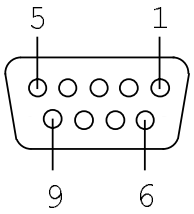
No.	Item	Description
1	Communications method	Full duplex
2	Synchronization	Start-stop synchronization
3	Transmission distance	15 m (49.2’)
4	Connection type	1:1
5	Transmission rate	1200, 2400, 4800, 9600, 19200 and 38400 bps
6	Data format	Start bit: 1 bit Stop bit: 1 and 2 bits Data length: 7 and 8 bits 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 (+)

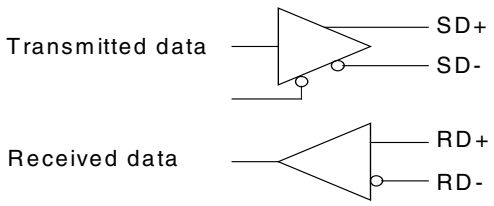
3 Terminal board layout

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

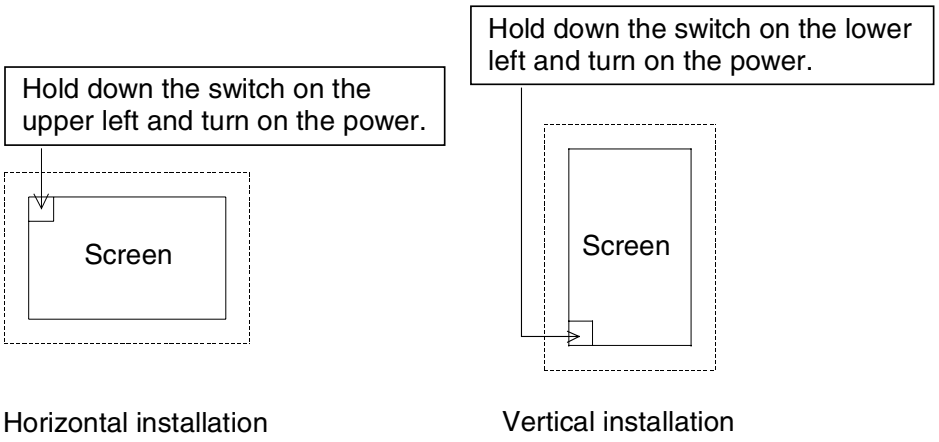
There are two methods for switching to the System Mode screen.

- 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.

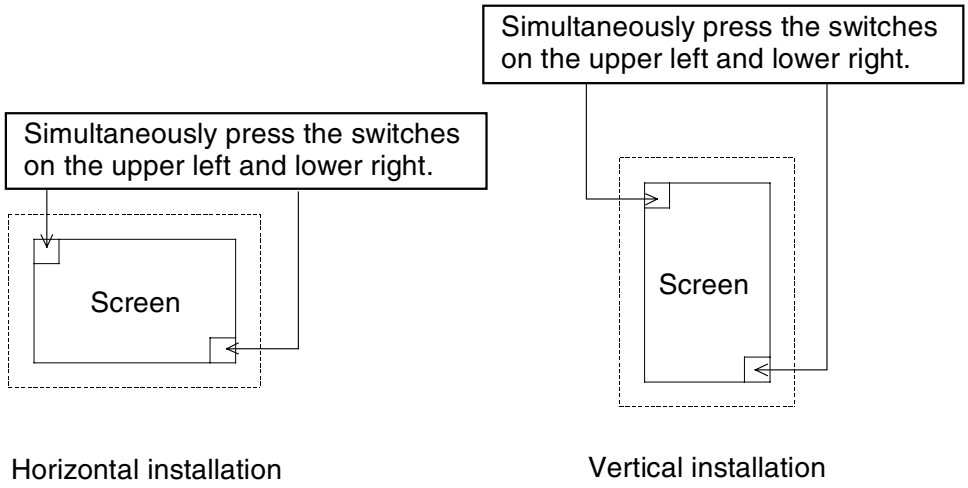
- When in User Mode in which the user screen is displayed, simultaneously press the switches on the upper left and lower right of the touch panel, regardless of the way the ***Direct***Touch™ Panel is installed. (See the diagrams below.)

  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.