PWS-1711/1760 PLC WORKSTATION

APPLICATION MANUAL

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About PWS1711/1760

G.1 Introduction

The PWS1711/1760 is equipped with a 5.7" quarter VGA sized (320Hx240V) flat panel display and analog resistive touch screen. The IP 65 (NEMA 4) rated front panel seal and INDUSTRIAL GRADE touch screen make the product rugged and durable. There are two display options: blue mode STN LCD, and color STN LCD. You can choose appropriate ones according to your application's requirement. PWS1760-CTN Workstation comes with a LPT port that allows you to hardcopy the current screen. This is a way of generating documents with sophisticated formats.

PWS1711/1760, a sister series of PWS3100 PLC Workstation, is equipped with a small size LCD display screen. Functionally speaking, the PWS1711/1760 is as powerful as the PWS3100.

This chapter describes how to install your Workstation in a panel, set its DIP switches, and make cables for its communications and printer ports.

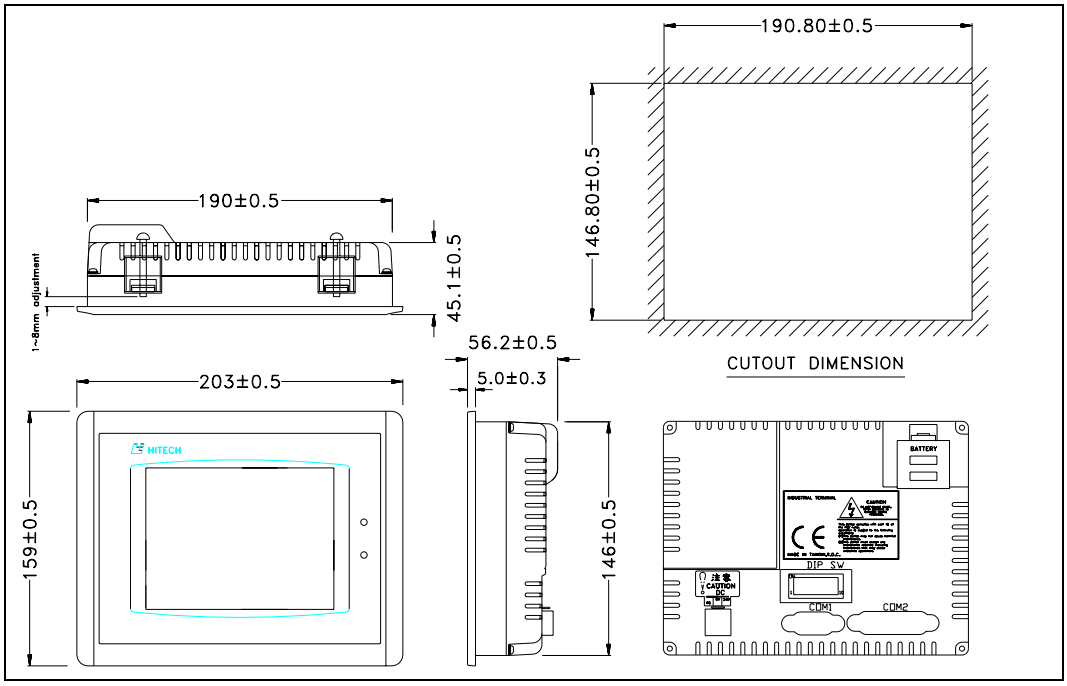
G.2 General Specification of PWS1711/1760

Item	PWS1711-STN	PWS1760-CTN
Display Type	Monochrome blue mode STN LCD, 16 gray levels	Color mode STN LCD, 256 gray levels
Display Size	5.7" (diagonal)	
Number of Pixels	320x240	
Display Adjustment	Contrast adjustable from touch screen	
Back Light	CCFT; Life time is 20,000 hours under normal temperature and humidity	
Touch Screen	Analog resistive type; Max. Number of switches are 40x30 Chemically strengthened glass backing panel; Over 1 million point activations; Hard coat is resistant to most solvents and chemicals	
Input Power	24VDC±10%; Isolation; Under 12W	
CPU	Intel 80188	SA1100-166; 32bit RISC; 166MHz
Flash Memory	704K Bytes	1826K Bytes
Battery Backed Memory	X	64K Bytes
Communication Ports	COM1/9pin: RS232/RS485; COM2/25pin: RS232/RS422/RS485	
Printer Port	X	EPP printer port
Front Panel Seal	IP65 / NEMA 4	
Operating Temperature	0~50℃	
Storage Temperature	-20~60℃	
Ambient Humidity	20-90% RH (non-condensing)	
Vibration Endurance	0.5mm displacement, 10-55Hz, 2 hours per X, Y, and	

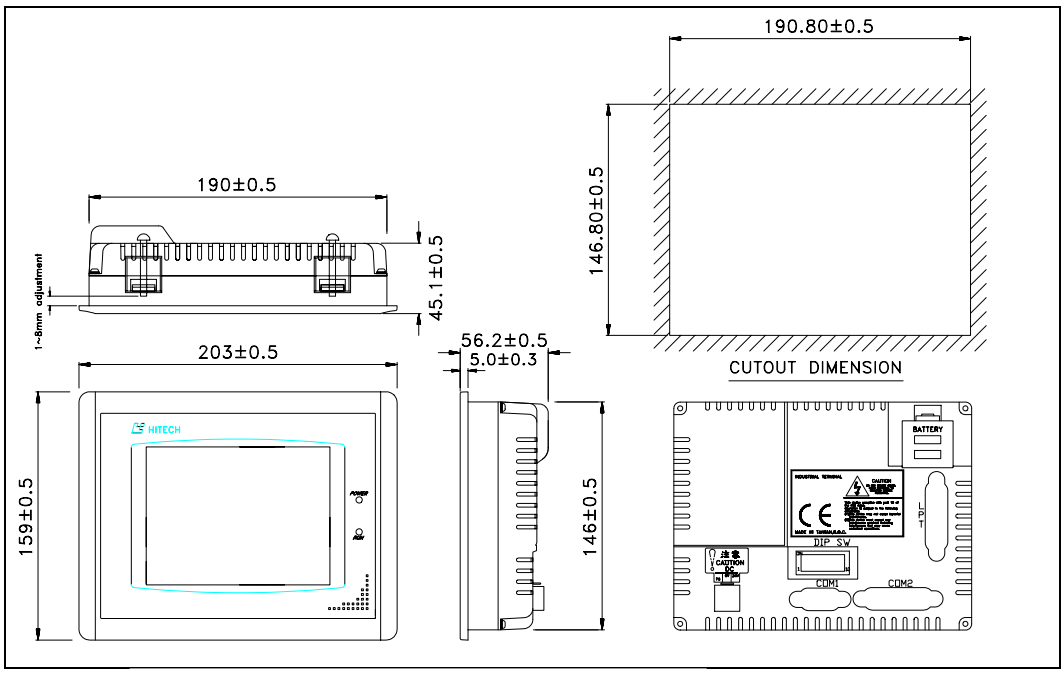
	Z-axis directions
Shock Endurance	10g, 11ms three times in each direction of X, Y, and Z axes
RF Emissions	CISPR 22, Class A
Electrostatic Discharge	EN61000-4-2/1995
RF Susceptibility	ENV50140/1993
High Frequency Transients	EN61000-4-4/1995
Weight	1.25 Kg
Cooling	Natural cooling

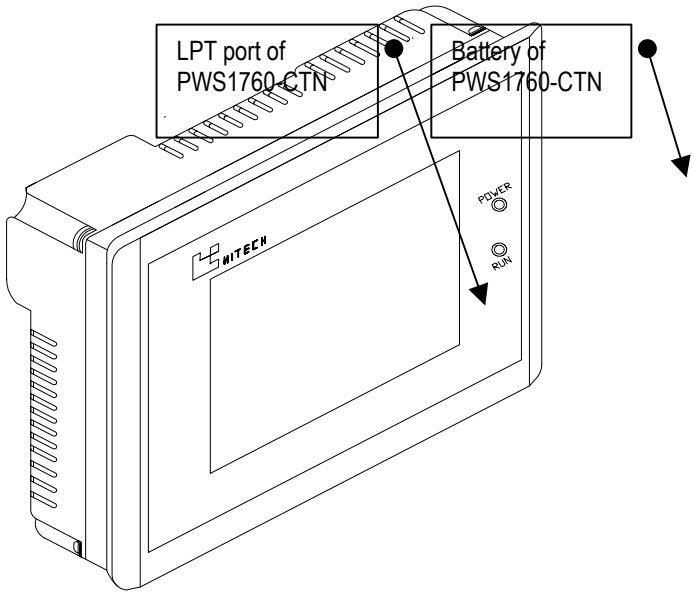
G.3 Dimensions of PWS1711-STN

This section illustrates the dimensions of the Workstations themselves as well as the cutout dimensions(193.6x151.8mm). The unit of dimensions is millimeter. You should allow 10 cm (4") of clearance behind the workstation for cable connectors and 5 cm (2") above and below for airflow.

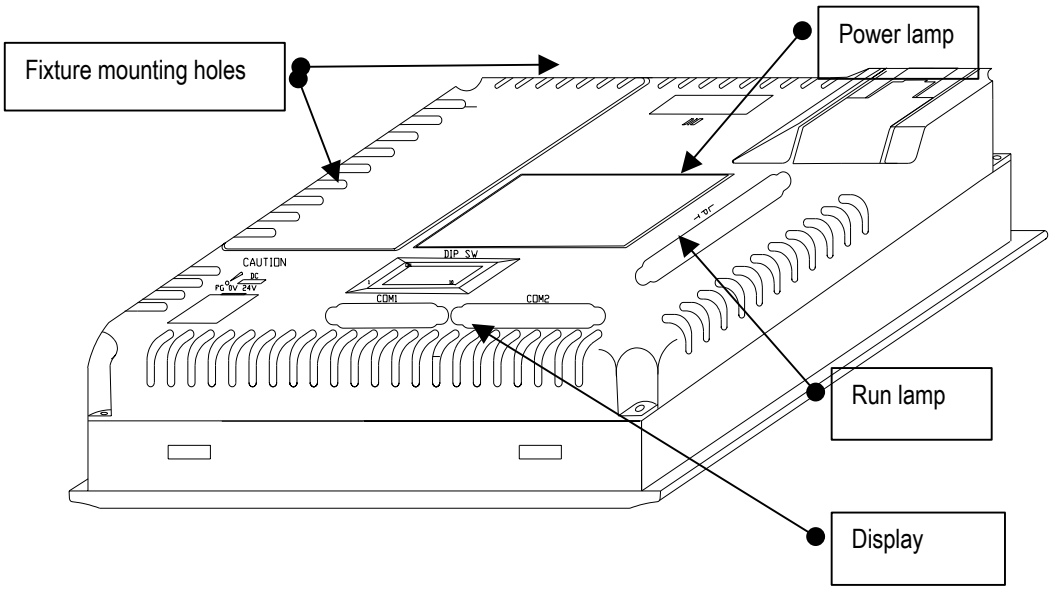


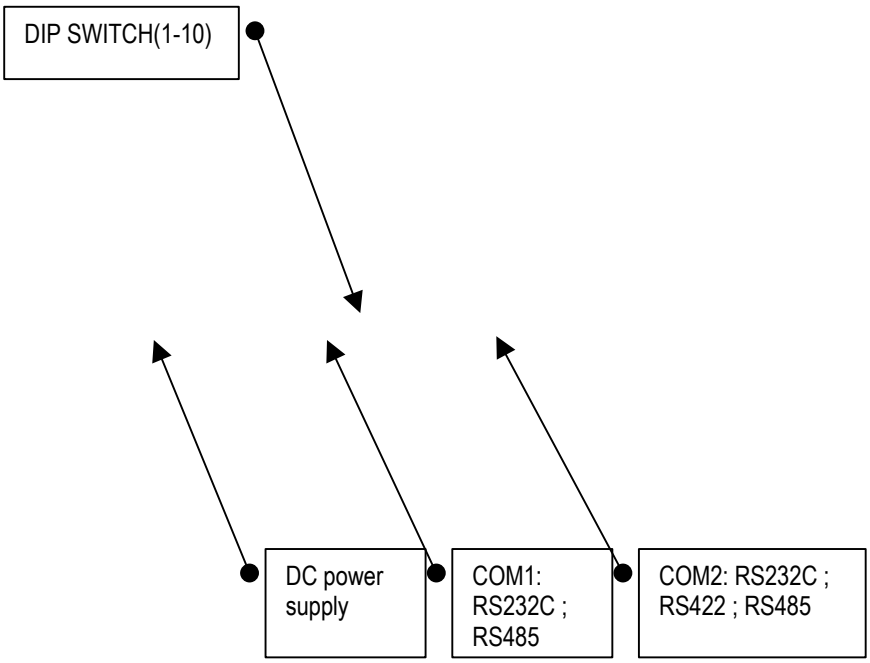
G.3.1 Dimensions of PWS1760-CTN



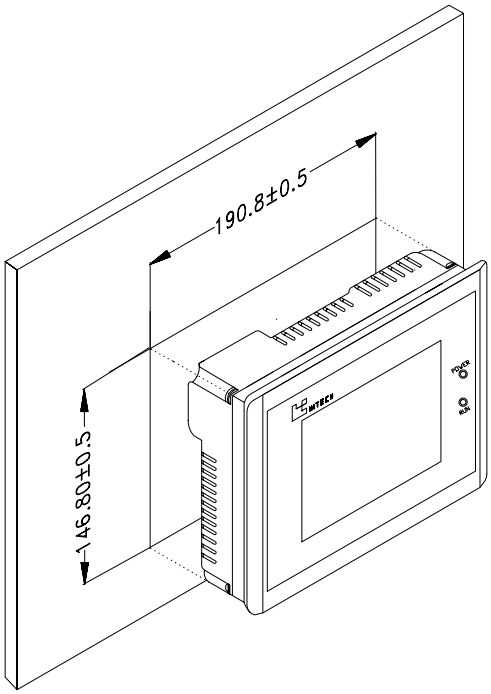


Rear view

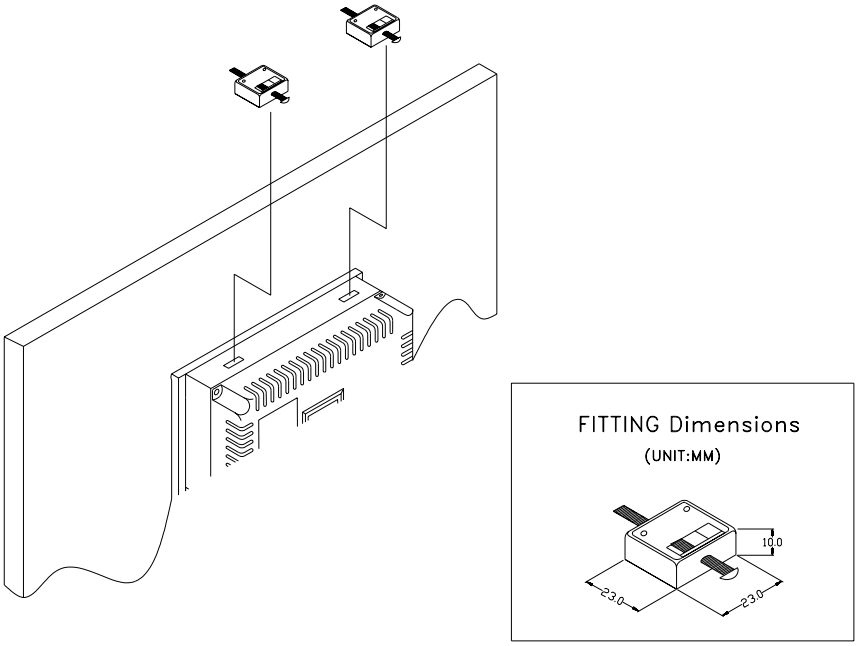

Fixture mounting holes
Power lamp
Run lamp
Display
CAUTION
DC
PG 0V 24V
DIP SW
COM1
COM2


DIP SWITCH(1-10)
DC power supply
COM1: RS232C ; RS485
COM2: RS232C ; RS422 ; RS485

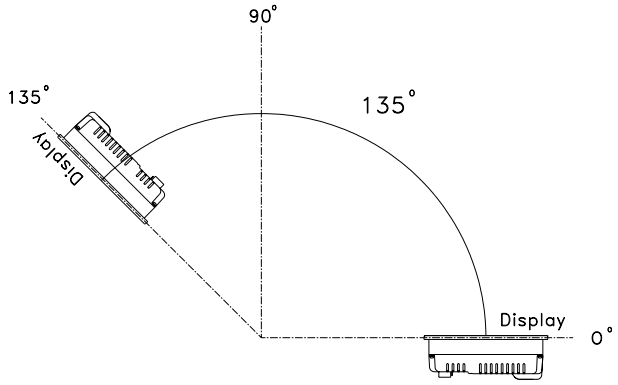
Cut out the mounting hole to match the dimensions shown below. Method of installation: Mount the PWS to the preserved hole from the front side. Attach the mounting brackets from behind, and fasten the screw of the brackets with a screwdriver..



Insert the fixtures into mounting holes on the unit. Don't tighten the screws with too much force or it may cause a damage of the panel.



The unit shall be installed within the angle of 0 to 135 degrees as shown below.



G.3.2 Torque Specifications

After placing the Workstation in the cutout, you should tighten each nut to 0.07 newton-meters (10 inch/pounds) of torque. If you don't have a torque wrench, then try to tighten the nuts to compress the gasket to about 50% of its original thickness.

G.4. Power Connector

The three-position power connector accepts 24VDC only. The unit's power consumption is shown in the following:

Item / Model	1711-STN	1760-CTN

Power Consumption	24VDC±10% ;12W	24VDC±10% ;12W
Fuse Rating	0.5A	0.5A

Be sure to use all three terminals when connecting power. To make a connection, strip about 0.64 cm (1/4") of insulation, turn the screw counter-clockwise until the gap is wide open, insert the wire all the way in, and turn the screw clockwise until it's tight.

You must use Slo-Blo (type T) fuse for the Workstation. The rating of fuse used for each model is shown in the following table. The fuse holder is accessible from the bottom of the Workstation.

G.4.1 Electrical Grounding

You must make sure that your Workstation is properly connected to earth ground, to prevent it from radiating radio frequency noise. You should also ensure that the Workstation is on the same ground as any other equipment connected to its communications ports.

If you connect a communications cable to your unit after static electricity has built up or when the Workstation and the other device are on different grounds, the resulting discharge could damage the electronics in either device.

G.5 Touch Panel

The PWS1711/ PWS1760 is equipped with a 5.7" quarter VGA (320Hx240V) liquid crystal display and analog resistive touch screen.

You can design touch keys for each of your screens. You can configure a touch key to display another screen or control an on/off location within your PLC. The shape of the touch key must be rectangular, but the size of a touch key is configurable and can be as small as a single touch switch or as large as the entire screen. One screen can have up to 40x30 touch keys for PWS1711/1760. For each changeable Object of a screen, the Compile function of ADP3 automatically groups those touch switches that the display area of the Object covers to form a touch key for the selection purpose.

When you press a touch key, the Workstation responds by sounding the buzzer for 200 milli-seconds (default) and reversing the color of that touch key for 200 milli-seconds. With the feedback, you know the Workstation accepts your key-press. You can use Miscellaneous Settings dialog box of ADP3 to set the parameter of touch screen for your Workstation.

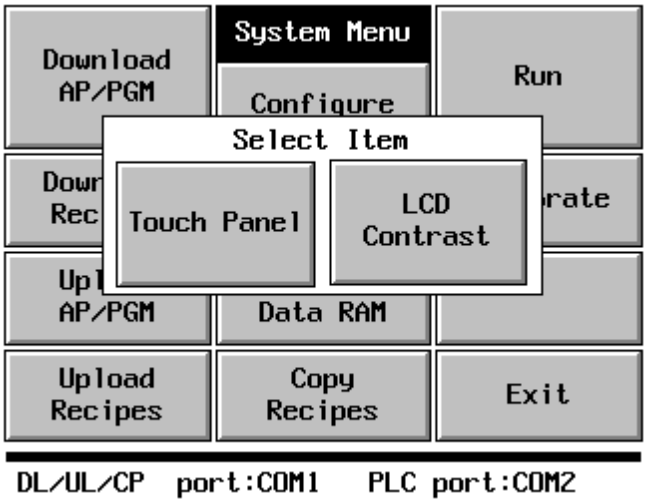
G.5.1 Built-in Touch Keys

The built-in touch keys are touch keys that the ADP3 automatically configure for your application so that you don't have to spend any time to program them. The built-in touch keys allow the operator to select and change a PLC location very easily.

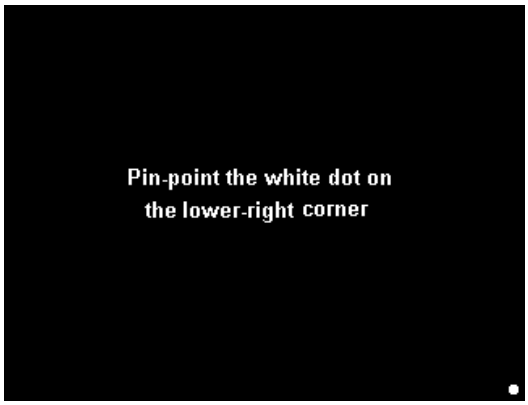
Figure G-1 Figure G-2

There are two groups of built-in touch keys called Numeric Touch Keypad and Password Reentering Keypad that the Workstation displays for you to change data. The Numeric Touch Keypad Its image is shown in the Figure G-1/G-2.

G.5.2 Calibrating Touch Panel



To calibrate the touch panel,



1. Press Calibrate button on the System Menu. The Select Item box appears.

2. Press Touch Panel button on the Select Item box. A white dot appears on the upper-left corner of the screen and the message "Pin-point the white dot of membrane on the upper-left corner" appears.

3. Use a pencil that is not sharp or anything that is soft and suitable to pin-point the white dot on the screen. The small dot moves to the lower-left corner of the screen and the message changes to "Pin-point the white dot of membrane on the lower-right corner."

   Do not use anything that is made of metal or is sharp, such as a screw driver or ball pen to pin-point the touch panel.

4. Pin-point the white dot again. The calibration is completed. The System menu displays again.

G.6 Setting of DIP Switches

There are ten DIP switches that you can access through the back cover. The purposes of these switches are stated in the following:

SW2	SW1	Type of Display
x	x	reserved

SW4	SW3	Running Mode
ON	-	Runs user application.
OFF	ON	Runs burn-in test program.
OFF	OFF	Runs bench test program.

SW5	Communication Parameters
ON	The Workstation uses the parameters set in the Configuration Table for PLC communications.
OFF	The Workstation uses the downloaded parameters for PLC communications.

SW6	Password
ON	The Workstation asks the operator to enter a password after power-on self-test.
OFF	No password is required to start the Workstation.

SW7	System Menu
ON	The Workstation displays System Menu after it gets a legal password or after power-on self-test if SW6 is off.
OFF	The Workstation doesnot display System Menu.

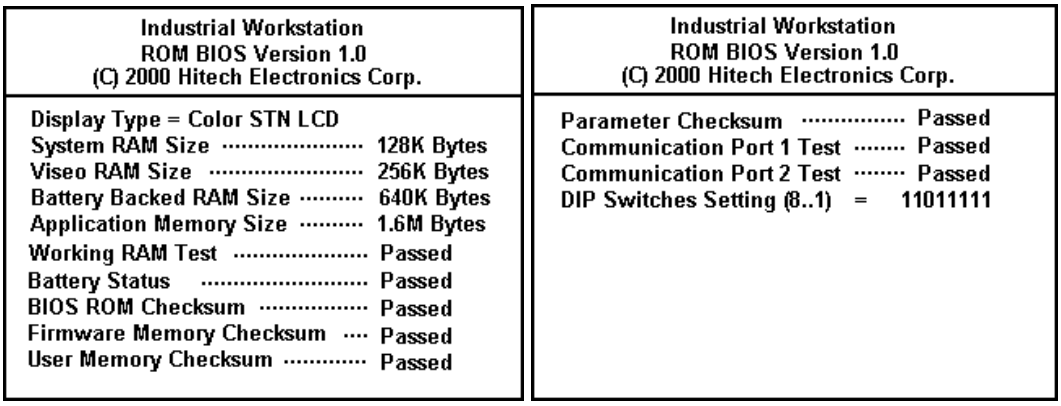
SW8	Default User Level
ON	The default user level is one if the Workstation requires no password to start its operation.
OFF	The default user level is three if the Workstation requires no password to start its operation.

SW9	COM1 Port
ON	Enable RS485 circuitry of the COM1.
OFF	

SW10	COM2 Port
ON	Enable RS485 circuitry of the COM2.
OFF	Enable RS422 circuitry of the COM2.

G.7 Self Test

After power is applied, the Workstation runs a self-test that checks its hardware. After each test, the Workstation displays the result as shown in the following example. The version number of ROM BIOS refers to the EPROM chips, which will likely never change. If your Workstation doesnot have battery or doesnot process data that should be keeped by battery such as recipes and nonvoltile logged data, you can choose not to test the battery by disable "Battery check" in the Configuration Table.



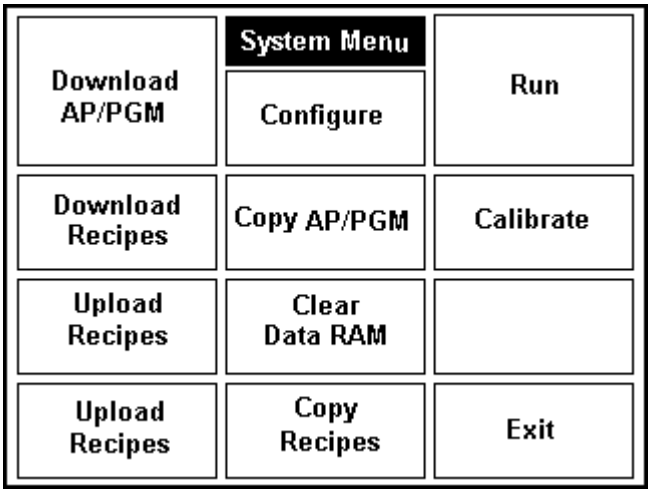
If you have never configured your Workstation, the self-test may report a failure of the real time clock. If this happens, configure as described in section G.10. If you have never downloaded an application to the Workstation, the self-test may report a problem in the flash chips. You can ignore these errors. If you have interrupted a download to the Workstation by switching off the power, disconnect the communication cable, or click cancel button in the ADP3 while a download is in progress, the self-test may report a problem in the Firmware Checksum or Application Checksum. You can ignore these errors and try to download again.

If there are any items of the self-test the Workstation doesn't pass, the message **"System error is detected! Press screen to continue."** appears. The Workstations continues its operation after you press **screen**.

We will not describe the operations of PWS1711 specifically, because of the similarity between the PWS1760 and PWS1711.

G.8 System Menu

After the user level is determined by a password or by the default, the Workstation displays System Menu if the DIP switch No.7 is on; If DIP switch 7 is off, the Workstation starts running your application immediately.



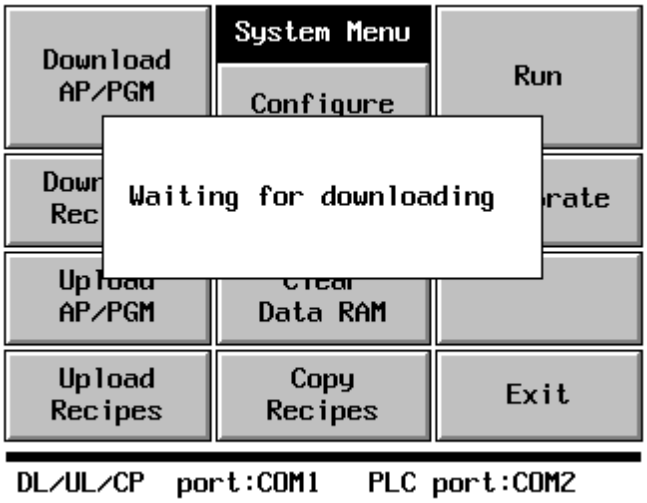
The buttons on the System Menu are summarized in the following:

Button	Function	User Level
Run	Starts running your application.	1-3
Configure	Allows you to set the Workstation's operating parameters.	1
Calibrate	Allows you to calibrate the touch panel and set the contrast or brightness of the display.	1
Download Application	Allows you to download an application to the Workstation from a PC or another Workstation.	1
Upload Application	Allows you to upload the application in the Workstation to a PC.	1
Copy Application	Allows you to copy the application in the Workstation to another Workstation.	1
Download Recipes	Allows you to download recipes to the Workstation from a PC or another Workstation.	1
Upload Recipes	Allows you to upload the recipes saved in the Workstation to a PC.	1

Copy Recipes	Allows you to copy recipes saved in the Workstation to another Workstation.	1
Exit	Starts from the self-test again.	1-3

G.9 Downloading Application

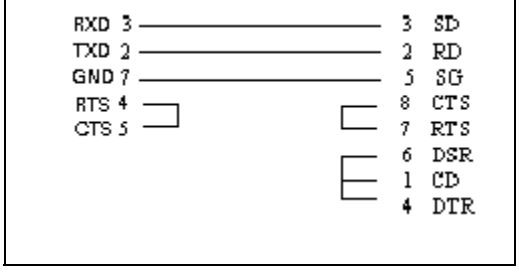
To make the Workstation ready for receiving downloaded application, press the Download Application button on System Menu. The Workstation displays the message "Waiting for downloading..." when it is ready.



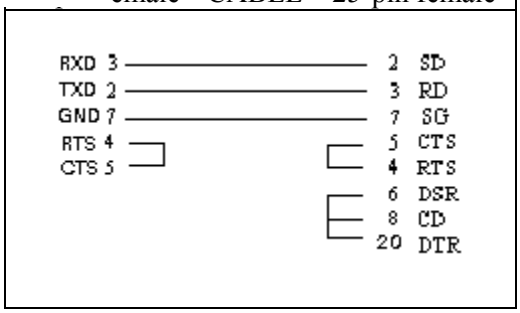
After downloading, the System Menu is active again.

You should have a cable with the following connection for the download.

PWS-COM2 PC COM RS232C
25-pin female --CABLE--- 9-pin female



OM2 PC COM RS232C
emale --CABLE---25-pin female



PWS to PC's 9-pin connector
PWS to PC's 25-pin connector

Warning: To avoid electric shock, be sure to switch off the power when connecting the communication/download cable to the PWS unit.

G.9.1 Downloading Recipes

To make the Workstation ready for receiving downloaded

recipes, press the Download Recipes button on System Menu. The Workstation displays the message "Waiting for downloading...” when it is ready. You may download recipes to the Workstation from a PC or another Workstation.

After downloading, the System Menu is active again.

G.10 Setting Operating Parameters

You can use Communication Parameter dialog box of ADP3 to set the parameters for the communications between your PWS1711/1760 and PLC. The parameters set in ADP3 is transmitted to the Workstation along with all other data when you download an application.

To get Communication Parameters dialog box, click Communications button in Workstation Setup dialog box. The Communication Parameter dialog box appears in Figure G-3. The Workstation uses these parameters for PLC communications, if the DIP switch No.5 is off.

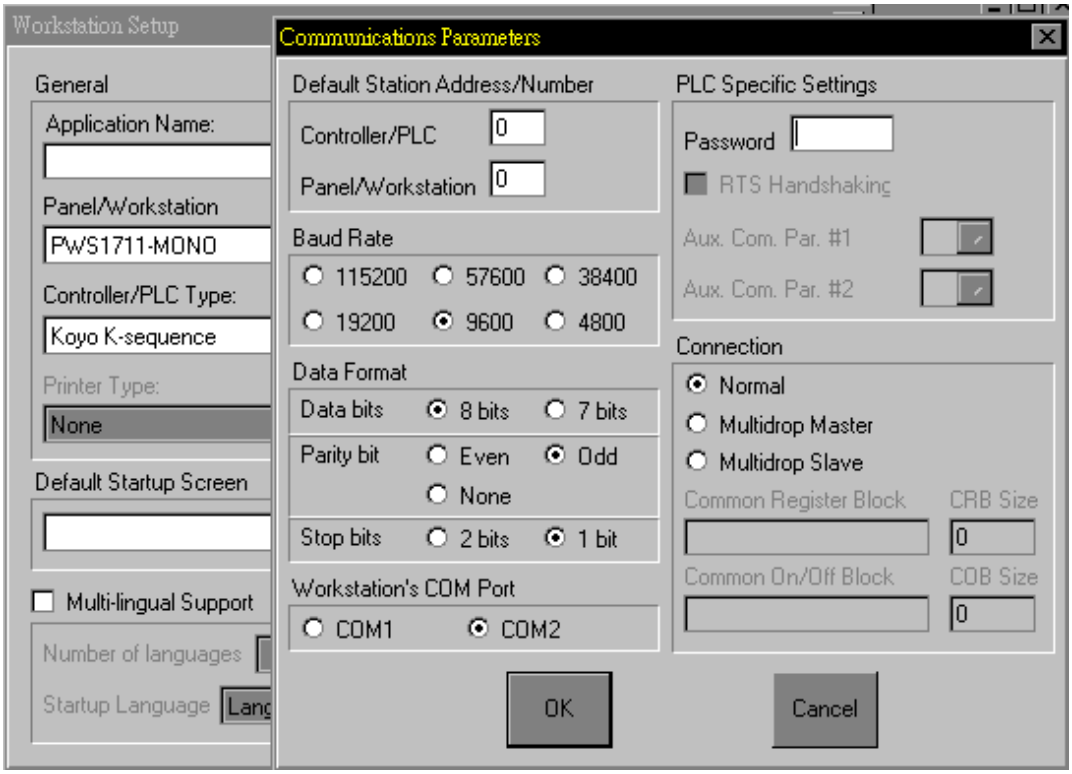
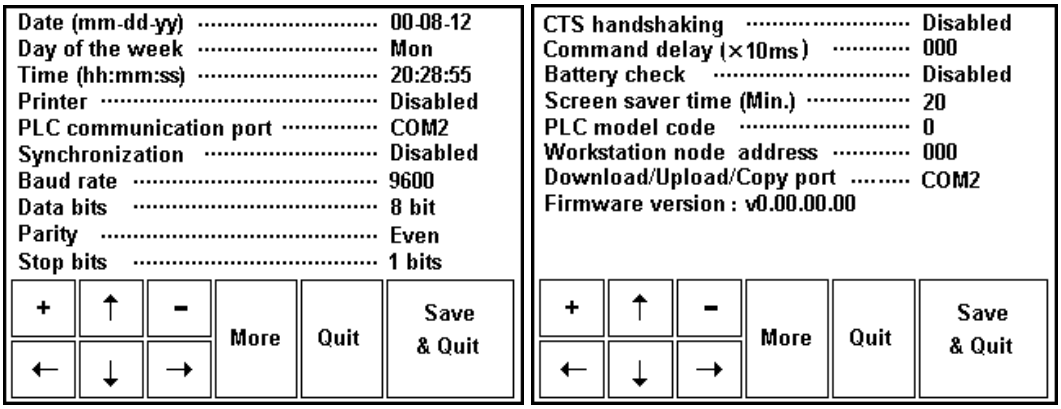


Figure G-3 Communication Parameter dialog box

If DIP switch 5 is on, the parameters set in the Configuration Table will be used for PLC communications. To set up the Operating Parameters of the Workstation, press the Configure button on System Menu. The Workstation

displays Configuration Table as shown below.



Following are descriptions of each of these parameters. To move among fields, press arrow buttons; to change a parameter, press [+] or [-] to adjust the value or selection. When you are finished, press [Save & Quit] to save all changes you made or press [Quit] to abandon all changes.

Parameter	Description
Date (mm-dd-yy)	You can set the date in the Real Time Clock chip.
Day of the week	You can set the Day-of-week in the Real Time Clock chip.
Time (hh:mm:ss)	You can set the time in the Real Time Clock chip.
Printer	Select **Enabled** if you have printer. The default setting is **Disabled**.
PLC communication port	Select either **COM1** or **COM2** to specify the port that is connected to the PLC. Select **Disabled** if you want to disable the PLC communications. When you disable PLC Communications, the Workstation doesn't communicate with the PLC but still can display screens. The default setting is **COM2**.
Synchronization	Select **Enabled** if you want the synchronization function to be enabled. The default setting is **Disabled**.
Baud rate	Select **4800**, **9600**, or **19200** baud to specify the baud rate for communications between the Workstation and the PLC. The default setting is **9600**.

Parameter	Description
Parity	Select the parity of the communications between the Workstation and the PLC. Your choices are **None**, **Odd**, or **Even**. The default setting is **None**. If you set "Parity" to None, then you cannot set "Data size" and "Stop bits" to 7 and 1; you must set these parameters either to 8 and 1 or to 7 and 2.
Data	Select **7** or **8** to specify the number of data bit for communications between the Workstation and the PLC. The default setting is **8**. If you set "Data size" to 8, then you must set "Stop bits" to 1.
Stop bits	Select **1** or **2** to specify the number of stop bits for the communications between the Workstation and the PLC. The default setting is 1.
CTS handshaking	Select **Enabled** or **Disabled** to specify if the Workstation should wait to transmit until the CTS input on the communication port is asserted. This is sometimes called "hardware handshaking." The default setting is **Disabled**.
Command delay	Enter a number between 0 and 255 to specify the amount of time that the Workstation waits between sending commands to your PLC. The unit of time is 10 milliseconds and the default is 0. In virtually all cases, you should leave the "Command delay" at 0. However, many PLCs consume additional scan time to service requests from the Workstation, and if you find that your PLC's scan time is too long, you can increase the "Command delay" to slow down the Workstation.
Battery check	Select **Enabled** if you want the Workstation to check the battery during self-test. The default setting is **Disabled**.
Screen saver time	Enter a number between 0 and 60 to specify the time that the Workstation turns off the back light of the display if the touch panel has not been touched for that amount time. The unit of time is minute. This is for lengthening the life of the CCFT back light. If you set "Screen saver time" to 0, the Workstation never turns off the back light.
PLC model code	Select a number to specify the sub-type of your PLC. This parameter is only useful for some types of PLCs.
Workstation node address	Select a number to specify the address of your Workstation. This parameter is only useful for some types of PLCs.
Download/Upload/ Copy port	Select either **COM1** or **COM2** to specify the port that you use to download, upload, and copy application and recipes. The default setting is **COM1**.

G.11 Serial Communication Port2 (COM2)

COM2 is a serial port that supports RS-232, RS-422, and RS-485 operation. The pin assignments of the port are listed in the following table:

Pin	Function	Pin	Function
1	Chassis ground	14	RS-422 TXD+ and RS-485 TXD/RXD+
2	RS-232 TXD	15	RS-422 TXD- and RS-485 TXD/RXD-
3	RS-232 RXD	16	RS-422 RXD+
4	RS-232 RTS	17	RS-422 RXD-
5	RS-232 CTS	18-20	(no function)
6	(no function)	21	RS-422 terminating resistor for RXD-; the other terminal of the resistor (120Ω, 1/2W) is already connected with the RXD+
7	Signal ground	22	RS-422 terminating resistor for CTS-; the other terminal of the resistor (120Ω, 1/2W) is already connected with the CTS+
8-11	(no function)	23	RS-422 RTS+
12	RS-422 CTS+	24	RS-422 RTS-
13	RS-422 CTS-	25	(no function)

G.11.1 Serial Communication Port1 (COM1)

The PWS-1711/1760 COM1 is a serial port which supports RS-232/RS485 operation. The pin assignments of the port are listed below. See section G.9 for the examples of connections.

Pin	Function	Pin	Function
1	RS-485 +	6	RS-485 -
2	RS-232 RXD	7	RS-232 RTS
3	RS-232 TXD	8	RS-232 CTS
4	(no function)	9	(no function)
5	Signal ground		

G.11.2 Printer Port (LPT)

LPT is a parallel printer port that can drive a Centronics-type parallel printer. The connector is compatible with the IBM PC's parallel printer connector.

Pin	Direction	Function	Pin	Direction	Function
1	Output	Data Strobe	10	Input	Acknowledge Not
2	Output	DO-data bit 0	11	Input	Busy
3	Output	D1-data bit 1	12	Input	Paper Empty

4	Output	D2-data bit 2	13	Input	Printer Selected
5	Output	D3-data bit 3	14	Output	Auto-feed
6	Output	D4-data bit 4	15	Input	Error Not
7	Output	D5-data bit 5	16	Output	Reset not
8*	Output	D6-data bit 6	17	Output	select
9	Output	D7-data bit 7	18-25	Signal ground	

Note, only PWS1760-CTN support the LPT port.

G.12 Entering Password

After the self-test, if the DIP switch No.6 is on, the Workstation displays a keypad to prompt you to enter a password. If DIP switch No.6 is off, the Workstation doesn't ask you to enter a password and the default user level is 1 after the power-on self-test if the DIP switch SW8 is set to on; the default user level is 3 if the SW8 is set to off.

If a password is required, the Workstation doesn't continue its operation until a legal password is entered.

G.12.1 Password and User Level

The Workstation saves passwords in the Real Time Clock chip. A password must have eight numeric characters. When you create a password, you must specify the user level associative with that password. The user level of a password determines the privilege of the user who enters that password to start the operation of the Workstation. When a user wants to use the function of the System Menu, change to another screen, or make change to a PLC location, the Workstation checks the user's user level. There are three user levels: level 1, level 2, and level 3. Level 1 users have the highest privilege and Level 3 users have the lowest privilege.

The passwords and their user levels of your application are unpredictable until you define them.

G.12.2 Registering Passwords

To register new passwords or modify existing passwords for your application, you have to create an Action button on a screen and assign the function "Display Password Table" to that button. When the Workstation is running the application, a level 1 user can get the password table as the example shown below when he presses and releases an Action button that displays the Password Table.

You can register up to eight passwords for your application. To change a password or the user level of a password,

(1 Select the password or the user level by touching it.
)

(2) If you select a user level, enter a number between 1 and 3 to change the user level. If you select a password, enter eight numeric characters to change the password. When you press [ENTER], the Workstation accepts the change.

(3) To abandon the current change, select another field to exit the current selection.

(4) To save all changes that you made to the password table, press [Save & Quit]. To abandon all changes, press [Quit].

Figure G-4 Numeric keys for password table

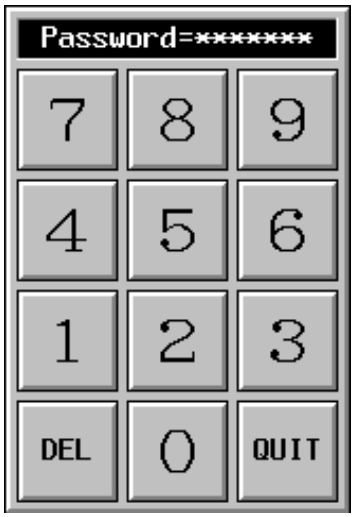


Figure G-5 entering a password

G.13 Adjusting Display Contrast/Brightness

You can adjust the contrast of the STN LCD at any time the Workstation is running your application. To increase the contrast of brightness, press an Action button which is assigned the function of “Contrast Up.” To reduce the contrast of brightness, press an Action button which is assigned the function of “Contrast Down”. To save the setting, press an Action button which is assigned the function of “Save Contrast”. The user can calibrate the LCD contrast by pressing the "Calibrate" button on System Menu as well. The Workstation displays Select item as shown below.

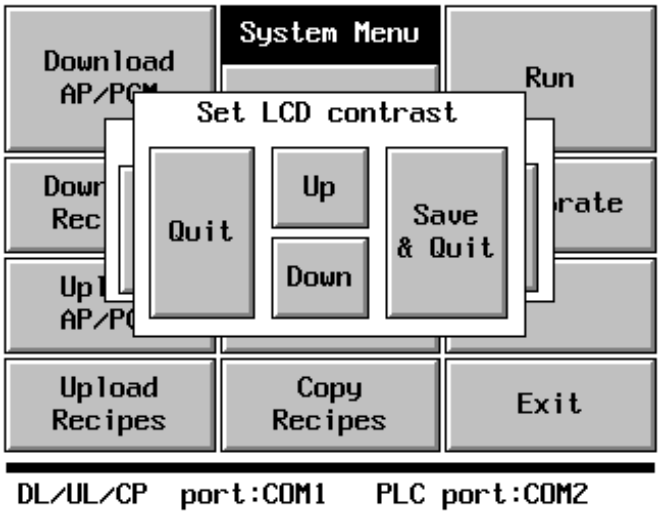

System Menu
Download
Run
Set LCD contrast
Quit
Up
Down
Save
& Quit
Upload
Recipes
Copy
Recipes
Exit
DL/UL/CP port:COM1 PLC port:COM2

Figure G-6