



# **Wired Zone Controller**

## **DWCPX2 Model**

Owner's Manual

Commercial Air Conditioning Units

### **User Notice**

Please read this Owner's manual carefully before operation and retain it for future reference.

## Important Notice

- Johnson Controls, Inc. pursues a policy of continuing improvement in design and performance in its products. As such, Johnson Controls, Inc. reserves the right to make changes at any time without prior notice.
- Johnson Controls, Inc. cannot anticipate every possible circumstance that might involve a potential hazard.
- The installer and system specialist should safeguard against leakage in accordance with local pipe fitter and electrical codes. The following standards may be applicable, if local regulations are not available.  
International Organization for Standardization: (ISO 5149 or European Standard, EN 378). No part of this manual may be reproduced in any way without the expressed written consent of Johnson Controls, Inc.
- This air conditioning accessory will be operated and serviced in the United States of America and comes with all required Safety, Danger, and Caution warnings.
- If you have questions, please contact your distributor or dealer.

## Product Inspection upon Arrival

1. Upon receiving this product, inspect it for any damage incurred in transit. Claims for damage, either apparent or concealed, should be filed immediately with the shipping company.
2. Check the model number, electrical characteristics (power supply, voltage, and frequency rating), and any accessories to determine if they agree with the purchase order.
3. The standard utilization for this unit is explained in these instructions. Use of this equipment for purposes other than what it designed for is not recommended.
4. Please contact your local agent or contractor as any issues involving installation, performance, or maintenance arise. Liability does not cover defects originating from unauthorized modifications performed by a customer without the written consent of Johnson Controls, Inc. Performing any mechanical alterations on this product without the consent of the manufacturer will render your warranty null and void.

### ATTENTION

Please read this manual carefully before using and installing this product

- ◆ Never install the wired zone controller in a wet environment or expose it directly to sunlight.
- ◆ Do not knock, throw, or frequently disassemble the wired zone controller and the wireless zone controller.
- ◆ Never operate the wired zone controller with wet hands.
- ◆ The wired controller is a general model, applicable to several kinds of units. Some functions of the wired controller are not available for certain kinds of units. For more details please refer to the owner's manual of unit. The setting of such unavailable function will not affect unit's operation.
- ◆ The wired controller is universal. The remote receiver is either in the indoor unit or in the wired controller. Please refer to the specific models.
- ◆ As for some indoor units connected with the wired controller, if using the zone controller whose set temperature is adjustable under auto mode, the wired controller receives the mode signal of the zone controller rather than its set temperature under the auto mode.



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## SAFETY MESSAGES



Indicates a hazardous situation that, if not avoided, could result in death or serious injury.



Indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.



Indicates information considered important, but not hazard-related (e.g., messages relating to property damage).

## GENERAL PRECAUTIONS



To reduce the risk of serious injury or death, read these instructions thoroughly and follow all warnings or cautions included in all manuals that accompanied this product and the indoor and outdoor units.

- This system, including this controller, should be installed by personnel certified by Johnson Controls, Inc. Personnel must be qualified according to local, state and national building and safety codes and regulations. Incorrect installation could cause leaks, electric shock, fire or explosion.
- Use appropriate personal protective equipment, such as gloves and protective goggles and electrical protection equipment and tools suited for electrical operation purposes.
- Do not stand on or put any material on the controller.
- When installing the controller cabling to the units, do not touch or adjust any safety devices inside the indoor or outdoor units. All safety features, disengagement, and interlocks must be in place and functioning correctly before the equipment is put into operation. If these devices are improperly adjusted or tampered with in any way, a serious accident can occur. Never bypass or jump out any safety device.
- Use only Johnson Controls recommended or provided as standardized or replacement parts.
- Johnson Controls shall not assume any liability for injuries or damage caused by not following steps outlined or described in this manual. Unauthorized modifications to Johnson Controls products are prohibited as they...
  - may create hazards which could result in death, serious injury or equipment damage.
  - will void product warranties.
  - may invalidate product regulatory certifications.
  - may violate OSHA standards.

**NOTICE**

Take the following precautions to reduce the risk of property damage

- Do not touch the main circuit board or electronic components in the controller or remote devices. Also, make sure that dust and/or steam does not accumulate on the circuit board.
- Locate the wireless zone controller at a distance of at least 3 ft. (approx. 1m) between the indoor unit and electric lighting. Otherwise, the receiver part of the unit may have difficulty receiving operation commands.
- If the wired zone controller is installed in a location where electromagnetic radiation is generated, make sure that the wired zone controller is shielded and cables are sleeved inside conduit tubing.
- If there is a source of electrical interference near the power source, install noise suppression equipment (filter).
- During the run test, check the unit's operation temperature. If the unit is used in an environment where the temperature exceeds the operation boundary, it may cause severe damage. Check the operational temperature boundary in the manual. If there is no specified temperature, use the unit within the operational temperature boundary of 35°~104°F (0~40°C).
- Read installation and appropriate user manuals for connection with PC or peripheral devices. If a warning window appears on PC, the product stops, does not work properly or works intermittently, immediately stop using the equipment.

## INSTALLATION PRECAUTIONS

**WARNING**

To reduce the risk of serious injury or death, the following installation precautions must be followed:

- If the remote sensors are not used with this controller then do not install this controller...
  - in a room where there is no thermostat.
  - where the unit is exposed to direct sunshine.
  - where the unit will be in close proximity to a heat source.
  - where hot/cold air from the outdoors, or a draft from elsewhere (such as air vents, diffusers or grilles) can affect air circulation.
  - in areas with poor air circulation and ventilation.
- Perform the run test using the controller to ensure normal operation. Safety guards, shields, barriers, covers, and protective devices must be in place while the compressor/unit is operating. During the run test, keep fingers and clothing away from any moving parts.

After installation work for the system has been completed, explain the “Safety Precautions,” use, and maintenance of the unit to the customer according to the information in all manuals that accompanied the system. All manuals and warranty information must be given to the user or left near the Indoor Unit.

## ELECTRICAL PRECAUTIONS



Take the following precautions to reduce the risk of electric shock, fire or explosion resulting in serious injury or death:

- Only use electrical protection equipment and tools suited for this installation.
- Insulate the wired zone controller against moisture and temperature extremes.
- Use specified cables between units and controller.
- The polarity of the input terminals is important, so be sure to match the polarity when using contacts that have polarity.
- Highly dangerous electrical voltages may be used in this system. Carefully refer to the wiring diagram and these instructions when wiring. Improper connections and inadequate grounding can cause serious injury or death.
- Before installing the controller or remote devices, ensure that the indoor and outdoor unit operation has been stopped. Further, be sure to wait at least five minutes before turning off the main power switch to the indoor or outdoor units. Otherwise, water leakage or electrical breakdown may result.
- Do not open the service cover or access panel to the indoor or outdoor units without turning OFF the main power supply. Before connecting or servicing controller or cables to indoor or outdoor units, open and tag all disconnect switches. Never assume electrical power is disconnected. Check with meter and equipment.
- Use an exclusive power supply at the controller’s rated voltage.
- Be sure to install circuit breakers (ground fault interrupter, isolating switch, molded case circuit breaker, and so forth) with the specified capacity. Ensure that the wiring terminals are tightened securely to recommended torque specifications.
- This equipment can be installed with a Ground Fault Circuit Breaker (GFCI), which is a recognized measure for added protection to a properly grounded unit. Install appropriate sized breakers / fuses / overcurrent protection switches, and wiring in accordance with local, state and NEC codes and requirements. The equipment installer is responsible for understanding and abiding by applicable codes and requirements.





# Wired Zone Controller DWCPX2

## 1 Controller Interface

### 1.1 Appearance and LCD Icons

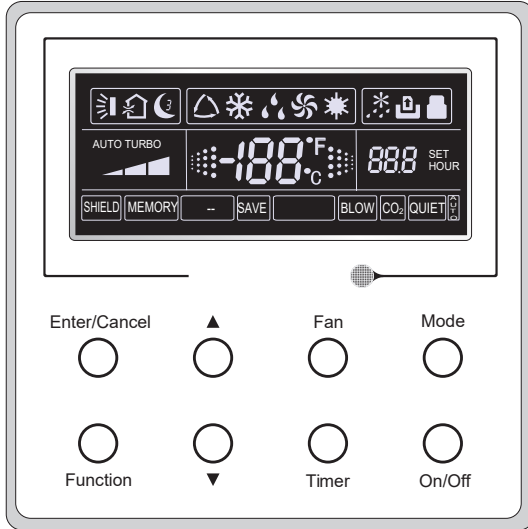


Fig.1 Outside View of the Wired Zone Controller

### 1.2 Introduction to LCD Icons

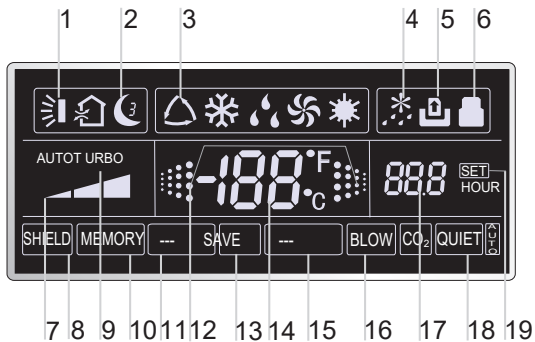


















Fig.2 LCD of the Wired Zone Controller

Table 1

No.	Symbols	Description
1		Swing function.
2		Sleep function (Only sleep 1).
3		Running modes of the indoor unit (Cooling, Dry, Fan, and Heating).
4		Defrosting function for the outdoor unit.
5		Keycard control function.
6		Lock function.
7		High, middle, low or auto fan speed of the indoor unit.
8		The button operation, temperature setting, "ON/OFF" operation, "Mode" setting, and "Save" setting are disabled.
9		Turbo function.
10		Memory function (After power failure and power recovery, the indoor unit resumes the operation in the original state).
11	This row left intentionally blank.	
12		Blinks under ON state of the unit without operation of any button.
13		Energy-saving function (this function is not yet available for this unit).
14		Ambient/preset temperature value.
15	This row left intentionally blank.	
16		Blow function.
17		Timing value.
18		Quiet function (two types: quiet and auto quiet)(this function is not yet available for this unit).
19	SET	Displays under the debugging mode.

## 2 Buttons

### 2.1 Layout of Buttons

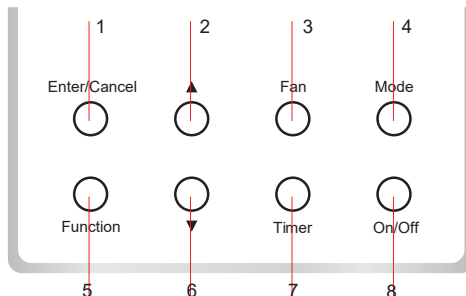




Fig. 3 Buttons on the Wired Zone Controller

## 2.2 Function of the Buttons

Table 2

No.	Name	Function
1	Enter/Cancel	Function selection and cancellation.
2	▲	① Running temperature setting of the indoor unit range:61~86°F(16~30°C) . ② Timer setting, range: 0.5-24 hrs.
6	▼	
3	Fan	Select high/middle/low/auto fan speed.
4	Mode	Select Cooling/Heating/Fan/Dry/Auto mode of the indoor unit.
5	Function	Switching between the functions of Turbo/Save/Blow
7	Timer	Timer setting.
8	ON/OFF	Turn the indoor unit ON/OFF.
4+2	▲ + Mode (Memory)	Press and hold these buttons for five seconds while the unit is OFF to enter/cancel the Memory function. (If memory is set for the indoor unit after a power failure, power recovery will resume as the original setting state. If not, the indoor unit is defaulted to be OFF after power recovery. Memory OFF is the default factory setting.).
3+6	Fan+▼	By pressing them at the same time under off state of the unit,  is displayed on the wired zone controller for the cooling only unit, while is  displayed on the wired zone controller for the cooling and heating unit.
2+6	▲+▼	Upon startup of the unit without malfunction or under OFF state of the unit, press the function buttons at the same time for 5s to enter the lock state. Other buttons won't respond to being pressed. Press buttons again for 5s to exit this state.
4+6	Mode+▼	Under OFF state, the Celsius and Fahrenheit scales can be switched by pressing "Mode" and "▼" for five seconds.
5+7	Function+Timer (Selection of Temperature Sensor)	Under OFF state, you can go to the commissioning status by pressing "Function" and "Timer" for five seconds. Get "00" to appear on the temperature display area by pressing "Mode", then adjust the options which are shown on the timer area by pressing "▲" and "▼". There are a total of four options, as follows: ① Indoor ambient temperature is sensed by the return air temperature sensor ( 01 is displayed in the timer area). ② Indoor ambient temperature is sensed by the wired controller (02 is displayed in the timer area). ③ The return air temperature sensor is selected under the cooling, dry, or fan mode; while the wired controller temperature sensor is selected under the heating or auto mode. (03 is displayed in the timer area). ④ The wired controller temperature sensor is selected under the cooling, dry, or fan mode; while the return air temperature sensor is selected under the heating mode. (04 is displayed in the timer display area).
5+7	Function+Timer (Selection of Fan Speed)	Under OFF state, you can go to the commissioning status by pressing "Function" and "Timer" for five seconds. Press "Mode" button until "01" icon is shown in the temperature display area. The setting status is shown in the timer area. Press "▲" and "▼" button to adjust and two options are available: ① Three low levels (01) ; ② Three high levels (02).

### 3 Operation Instructions

#### 3.1 ON/OFF

Press ON/OFF to turn the unit ON and turn it OFF with another press.

Note: The state shown in Fig. 4 indicates the OFF state of the unit after power on. The state shown in Fig. 5 indicates the ON state of the unit after power on.

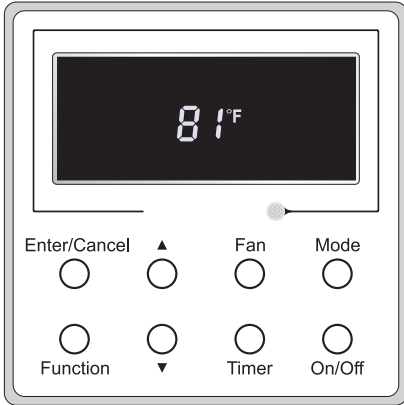


Fig. 4 OFF State

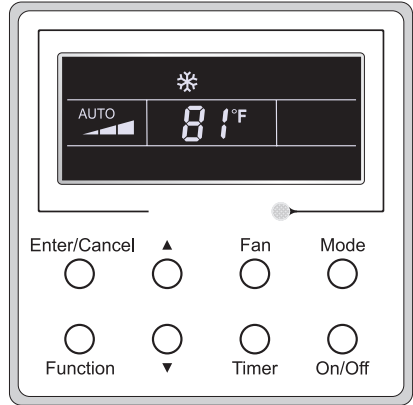
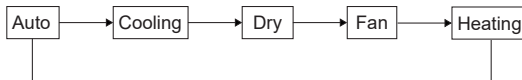


Fig. 5 ON State

#### 3.2 Mode Setting

Under the ON state of the unit, press Mode to switch the operation modes in the following sequence:Auto–Cooling–Dry–Fan–Heating.



#### 3.3 Temperature Setting

Press ▲ or ▼ to increase/decrease the preset temperature. If you press either of these buttons continuously, the temperature is increased or decreased by 1°F(1°C) every 0.5 seconds, as shown in Fig. 6.

In the Cooling, Dry, Fan or Heating mode, the temperature setting range is 61°F~86°F (16°C~30°C). In Auto mode, the setting temperature is not adjustable.

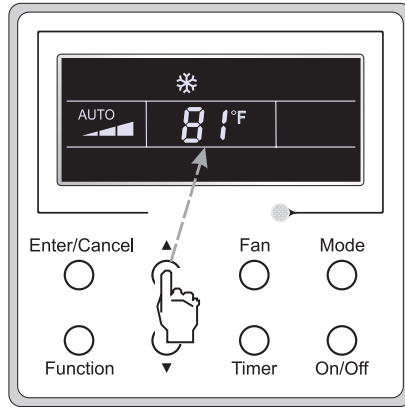


Fig.6

### 3.4 Fan Speed Setting

In the ON/OFF state of the unit, press Fan, and the fan speed of the indoor unit changes sequentially as shown in Fig. 7.

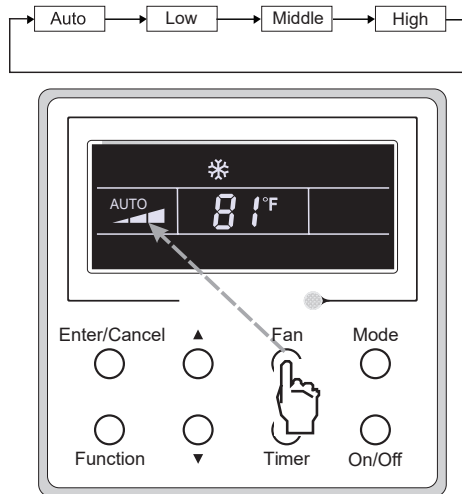


Fig.7

### 3.5 Timer Setting

In the ON state of the unit, press Timer to set the timer OFF on the unit.

Timer on setting: press Timer, and the LCD displays “xx.x hour”, with “hour” blinking. In this case, press ▲ or ▼ to adjust the timing value. Then press Enter/Cancel to confirm the setting.

Timer off setting: press Timer, if LCD won't display xx.x hour, it means the timer setting is canceled.

Timer off setting under the “On” state of the unit is shown in Fig. 8.

## Wire Zone Controller (DWCPX2)

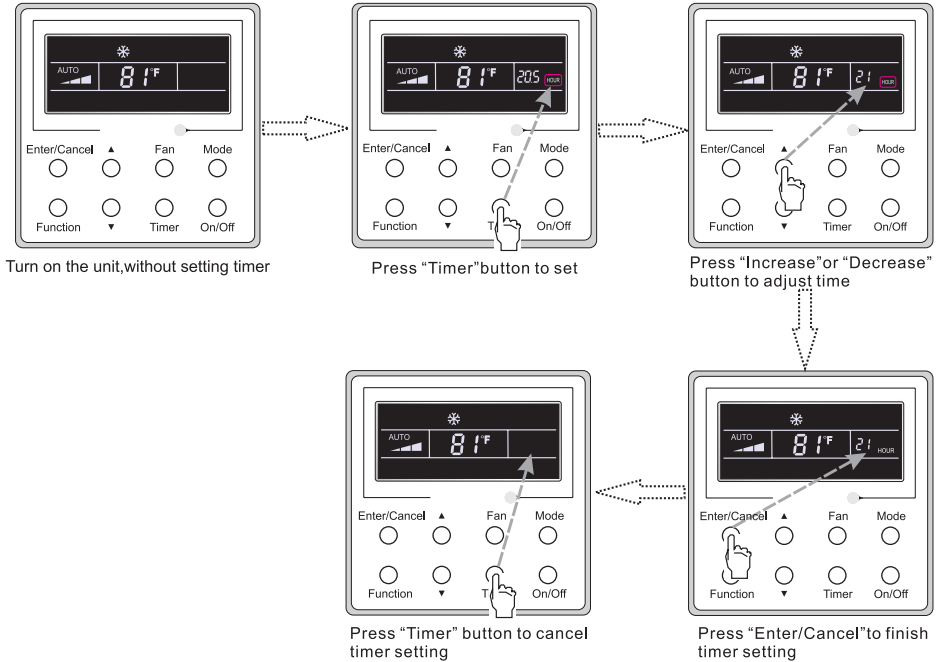


Fig. 8. Timer off Setting in the ON State of the Unit

Timer range: 0.5-24 hr. Every press of ▲ or ▼ increases or decreases the set time by 0.5 hr. If either button is pressed continuously, the set time increases/decreases by 0.5 hr every 0.5s.

### 3.6 Swing Setting

Swing On: Press Function key when the unit is ON to activate the swing function. In this case,



will blink. After that, press Enter/Cancel to make a confirmation.

Swing Off: When the Swing function is on, press Function key to enter the Swing setting interface,



with the icon blinking. After that, press Enter/Cancel to cancel this function.

Swing setting is shown as Fig. 9.

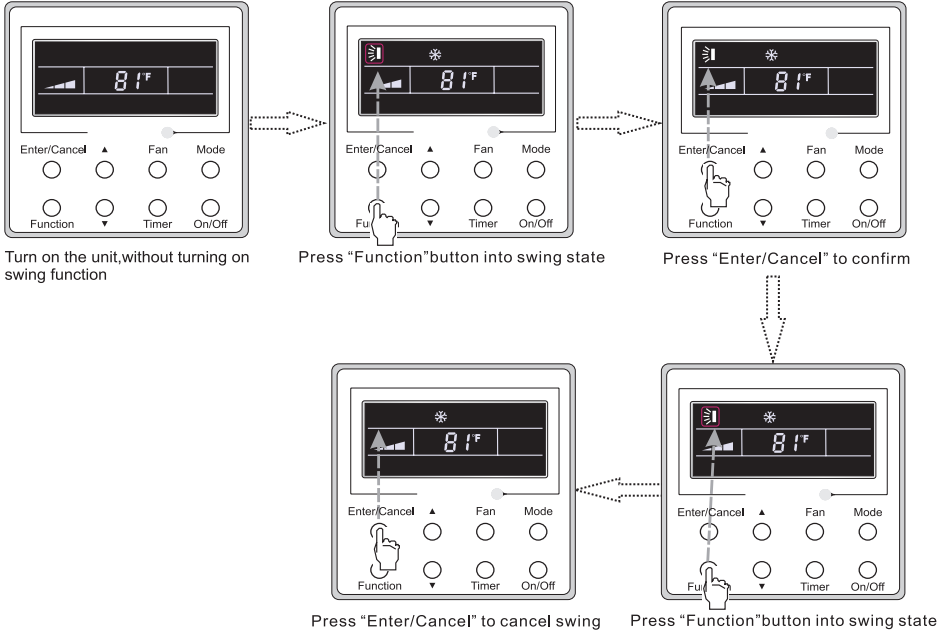


Fig. 9 Swing Setting

#### Note:

- ①. Sleep, Turbo or Blow setting is the same as the Swing setting.
- ②. After the setting is made, press the "Enter/Cancel" key to go back to the setting status or quit automatically 5s later.

### 3.7 Sleep Setting

**Sleep on:** Press Function when the unit is ON until the unit enters the Sleep setting interface. Press Enter/Cancel to confirm the setting.

**Sleep off:** When the Sleep function is activated, press Function to enter the Sleep setting interface. After that, press Enter/Cancel to cancel this function.

In the Cooling or Dry mode, the temperature will increase by 1°C after the unit runs under Sleep 1 setting for 1 hr and then 1°C for another hour. After that, the unit will run at this temperature.

In the Heating mode, the temperature will decrease by 1°C after the unit runs under Sleep 1 setting for 1 hr and then 1°C for or another hour. After that, the unit will run at this temperature.

The Sleep setting is shown in Fig.10.

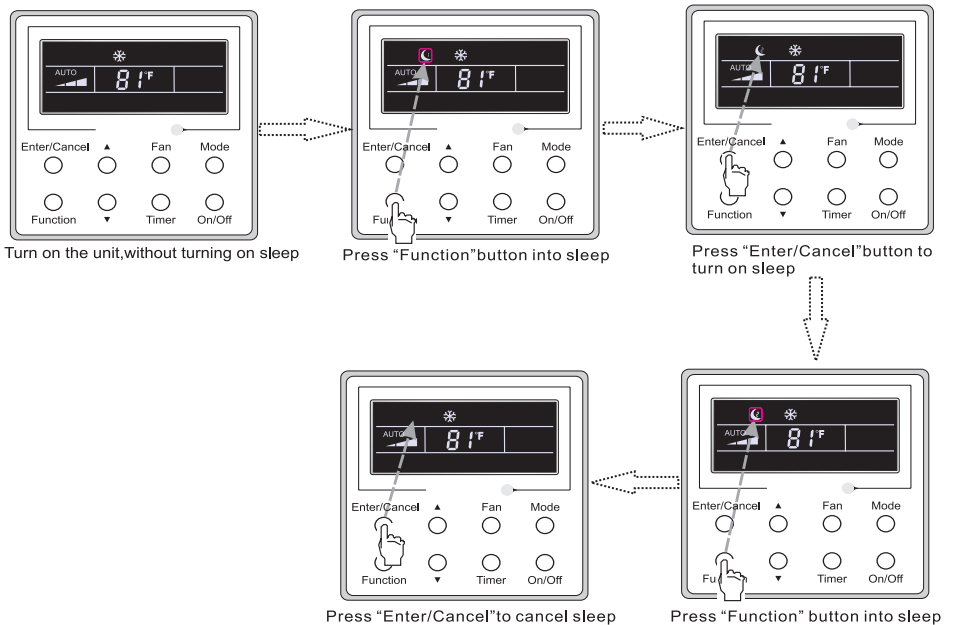


Fig. 10. Sleep Setting



In the Cooling or Heating mode, press Function until the unit enters the Turbo setting interface and then press Enter/Cancel to confirm the setting.

When the Turbo function is activated, press Function to enter the Turbo setting interface and then press Enter/Cancel to cancel this function.

The Turbo function setting is shown in Fig. 11.

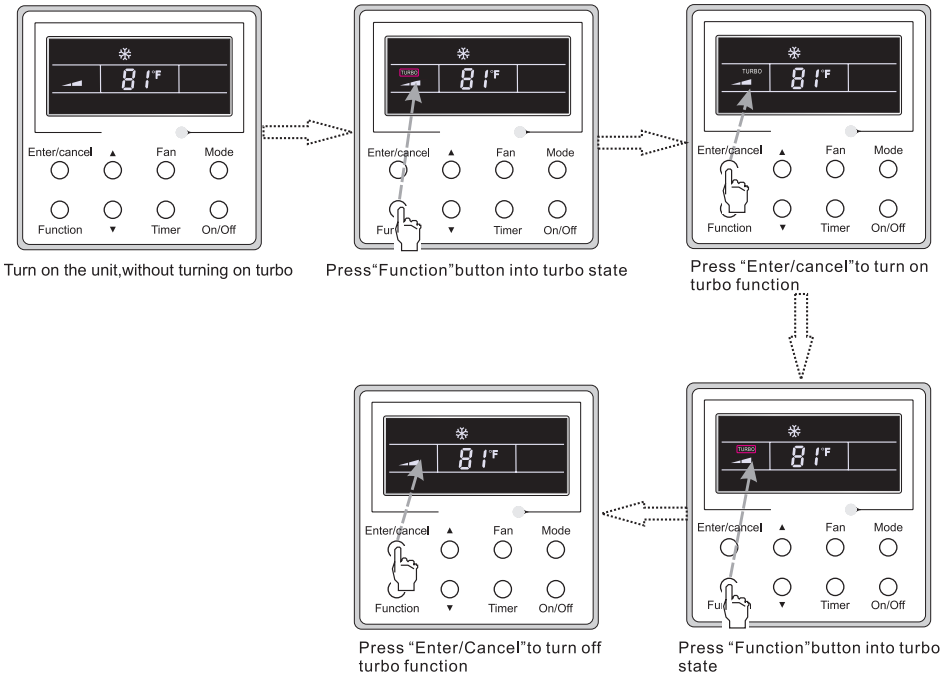


Fig.11. Turbo Setting

3.9 *This section left intentionally blank*

### 3.10 Blow Setting

Blow function: After the unit is turned off, the water on the evaporator of the indoor unit is automatically evaporated to prevent mildew.

In the Cooling or Dry mode, press Function until the unit enters the Blow setting interface and then press Enter/Cancel to activate this function.

When the Blow function is activated, press Function to the enter the Blow setting interface and then press Enter/Cancel to cancel this function.

Blow function setting is as shown in Fig.13

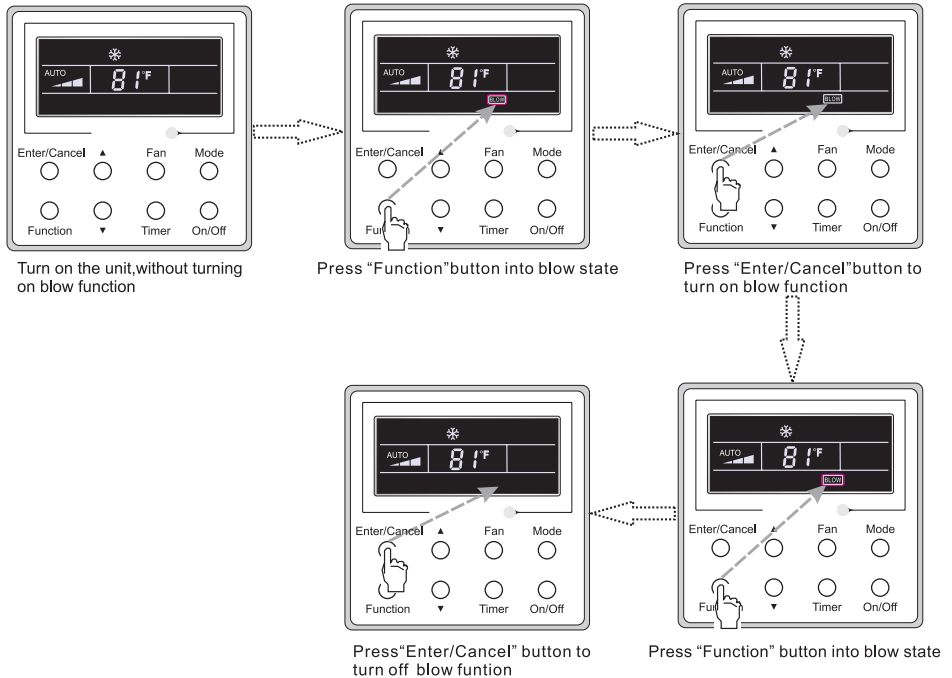


Fig.13. Blow Setting


#### Notes:

① . When the Blow function is activated, if turning off the unit by pressing ON/OFF or by the zone controller, the indoor fan will run at the low fan speed for 2 min, with "BLOW" displayed on the LCD. While, if the Blow function is deactivated, the indoor fan is turned off directly.

② . Blow function is unavailable in the Fan or Heating mode.

### 3.11 Other Functions

#### (1). Lock

Upon startup of the unit without malfunction or under the "Off" state of the unit, press ▲ and ▼ at the same time for 5s till the wired zone controller enters the Lock function. In this case, LCD displays . Then, press these two buttons again at the same time for 5s to quit this function.

Under the Lock state, pressing any other button won't get a response.

#### (2). Memory

Memory switchover: Under the "Off" state of the unit, press Mode and ▲ at the same time for 5s to switch memory states between Memory ON and Memory OFF. When this function is activated, Memory is displayed. If this function is not set, the unit is under the "Off" state after power failure and then power recovery.

Memory recovery: If this function is set for the wired zone controller, the wired zone controller after power failure resumes its original running state upon power recovery.

Memory contents: ON/OFF, Mode, set temperature, set fan speed, and Lock function.

#### (3). Selection of the Temperature Sensor

In the "Off" state of the unit, press both "Function" and "Timer" for 5s to go the commissioning status. In this status, adjust the display in the temperature display area to "00" through the "Mode" button and then adjust the option of the temperature sensor in the timer display area through the ▲ or ▼.

- ①. Indoor ambient temperature is sensed at the return air inlet (01 in the timer display area).
- ②. Indoor ambient temperature is the sensed at the wired controller (02 in the timer display area).
- ③. Select the temperature sensor at the return air inlet under the cooling, dry and fan modes, while selecting the temperature sensor on the wired controller in the heating and auto modes (03 in the timer display area).
- ④. Select the temperature sensor on the wired controller under the cooling, dry, and fan modes, and select the temperature sensor at the return air inlet under the heating mode and auto modes (04 is displayed in the timer display area).

After the setting, press "Enter/Cancel" to make a confirmation and quit this setting status.

Pressing the ON/OFF button also can quit this commissioning status, but the set data won't be stored.

In the commissioning status, if there is no operation for 20 seconds after the last button is pressed, the unit goes back to the previous state without storing the current data.

#### **Note:**

After connecting to the indoor unit, if the type of ambient temperature sensor has not been set manually, the wired controller selects the ambient temperature sensor according to the model of the connected IDU. If controller connects to the cassette type IDU, duct type IDU, floor ceiling type IDU, or ceiling type IDU, it adapts to ③, otherwise it adapts to ①. If the type of ambient temperature sensor is set manually, the wired controller submits to the manual setting, and will not set according to automatic IDU model selection.

01: Three low fan speeds; 02: Three high fan speeds

After the setting, press "Enter/Cancel" to make a confirmation and quit this setting status.

Pressing the ON/OFF button can exit this commissioning status, but the set data won't be stored. In the commissioning status, if there is no operation for 20 seconds after the last button is pressed, the unit goes back to the previous state without storing the current data.

## 4 Installation and Removal

### 4.1 Connection of Signal Line of the Wired Zone Controller

- Open the cover of the electric control box of the indoor unit.
- Guide the single line of the wired zone controller through the rubber ring.
- Connect the signal line of the wired zone controller to the 4-pin socket of the indoor unit.
- Tighten the signal wire with ties.
- The communication distance between the main board and the wired zone controller can extend up to 65 ft. (the standard distance is 26-1/4 ft.).

### 4.2 Installation of the Wired Zone Controller

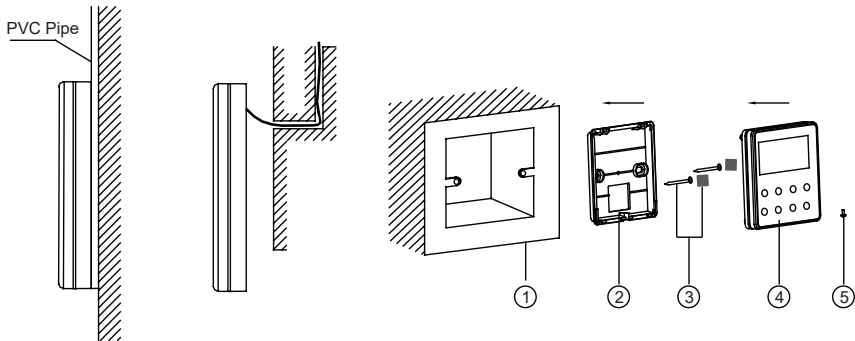


Fig.14. Accessories for the Installation of the Wired Zone Controller

Table 3

No.	1	2	3	4	5
Name	Socket box embedded in the wall	Backplate of the Wired Zone Controller	Screw cover 20×20×2 Screw M4X25	Front Panel of the Wired Zone Controller	Screw ST2.9X6

## Wired Zone Controller (DWCPX2)

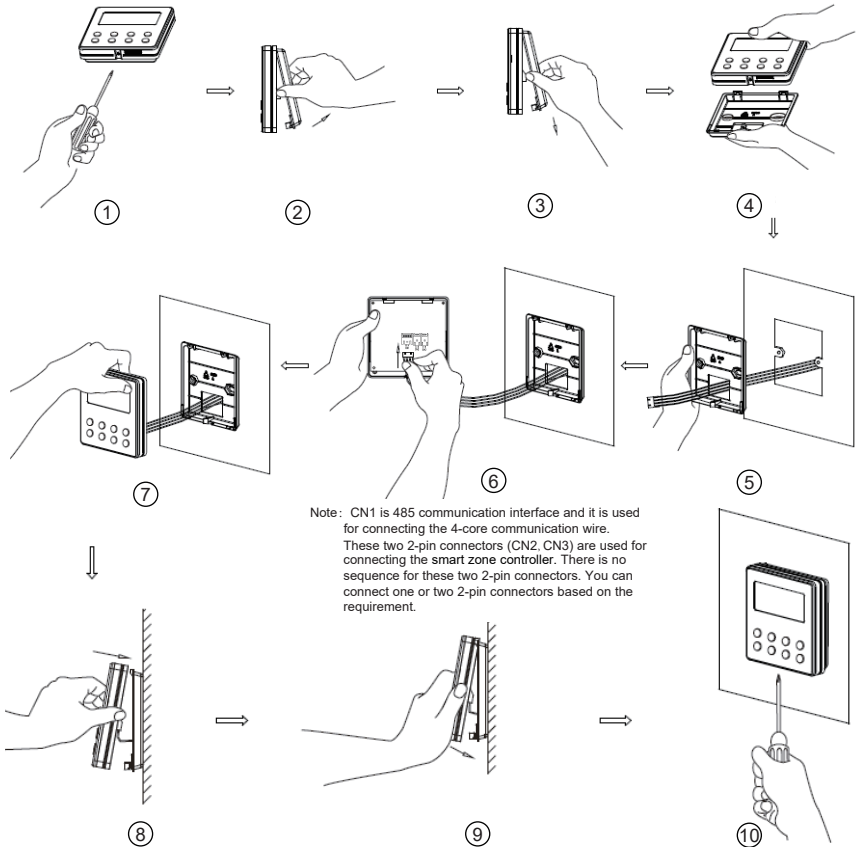


Fig.15

Fig.15 shows the installation steps of the wired zone controller, but there are some issues that need your attention.

1. Prior to the installation, first **DISCONNECT THE POWER SUPPLY** of the wire buried in the installation opening. No operation should be performed with the power on during the entire installation.
2. Pull out the four-core twisted pair line from the installation opening and then place it through the rectangular opening behind the backplate of the wired zone controller.
3. Place the back plate of the wired zone controller on the wall over the installation opening and secure it with M4X25 screws.
4. Insert the four-core twisted pair line into the slot of the wired zone controller and then secure the front panel and the backplate of the wired zone controller together.
5. Finally, secure the front panel and the backplate of the wired zone controller tightly with ST2.9X6 screws.

## Wired Zone Controller (DWCPX2)

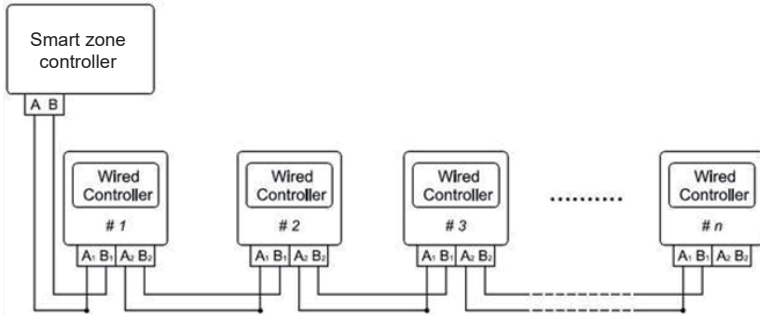


Fig.16

Fig.16 shows the schematic diagram of control system connections. DWCPX2 can connect the smart zone controller (integrated control system). “n” indicates the number of communication node addresses (programmable wired controller DWCPX2). The complete system is composed of the smart zone controller, wired controller DWCPX2, and communication cable. The wired controller DWCPX2 can support 16 communication node addresses at most ( $n \leq 16$ ).

Terminal A and terminal B of the smart zone controller are connected, respectively, to the corresponding communication 2-pin connector terminal of the #1 wired controller by the communication cable; the other 2-pin connector of #1 wired controller is connected to the #2 wired controller through the telecommunication cable, and so forth, until connected to the #n wired controller. Except the last wired controller in the control system (only use CN2 or CN3, and the other one is not connected), there's no sequence or importance for the wired controller. The series number in the figure is only for the sake of clarity.

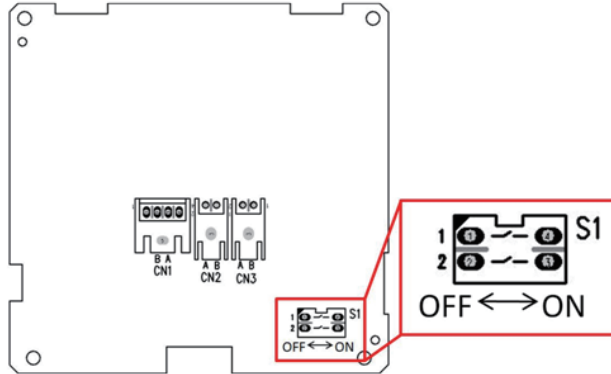


Fig.17

Fig.17 shows schematic diagram of DIP switch. There is a 2-bit DIP switch on the main board of wired controller DWCPX2. As for the last #n wired controller in the control system, the 1-bit and the 2-bit of the DIP switch should be manually pulled to position ON and position OFF respectively. The DIP switches of other wired controllers should be kept at the initial ex-factory status (1-bit and 2-bit are set at position OFF).

### ⚠ CAUTION!

Please pay special attention to the followings during the connection to avoid the malfunction of the air conditioning unit due to electromagnetic interference.

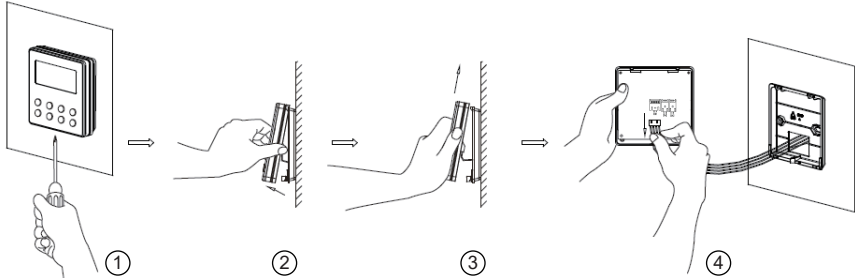
- ① Separate the signal and communication lines of the wired zone controller from the power

## Wired Zone Controller (DWCPX2)

cord and connection lines between the indoor and outdoor unit, with a minimum distance of 8 in. (20 cm); otherwise, the communication of the unit may work abnormally.

② If the air conditioning unit is installed where it is susceptible to electromagnetic interference, then the signal and communication lines of the wired zone controller must be shielding twisted pair lines.

### 4.3 Removal of Wired Zone Controller



## 5 Errors Display

If an error occurs during operation of the system, the error code is displayed on the LCD, as shown in Fig.18. If multiple errors occur at the same time, their codes are displayed sequentially.

**Note:** If an error code is displayed, reference the following Table 4 for error code explanation, and contact you service representative for further assistance.

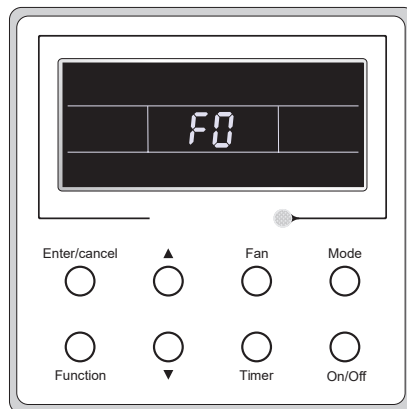



Fig.18



Table 4. Meaning of Each Error

Error	Error Code	Error	Error Code
Return air temperature sensor open/short circuited	F1	Drive board communication error	P6
evaporator temperature sensor open/short circuited	F2	Compressor overheating protection	H3
Indoor unit liquid valve temperature sensor open/short circuited	b5	Indoor and outdoor units unmatched	LP
Indoor gas valve temperature sensor open/short circuited	b7	Communication line misconnected or expansion valve error	dn
IPM temperature sensor open/short circuited	P7	Running mode conflict	E7
Outdoor ambient temperature sensor open/short circuited	F3	Pump-down	Fo
Outdoor unit condenser mid-tube temperature sensor open/short circuited	F4	Defrost or oil return	
Discharge temperature sensor open/short circuited	F5	Forced defrosting	H1
Indoor and outdoor communication error	E6	Compressor startup failure	Lc
DC bus under-voltage protection	PL	High discharge temperature protection	E4
DC bus over-voltage protection	PH	Overload protection	E8
Compressor phase current sensing circuit error	U1	Whole unit over-current protection	E5
Compressor demagnetization protection	HE	Over phase current protection	P5
PFC protection	Hc	Compressor desynchronizing	H7
IPM Temperature Protection	P8	IPM Current protection	H5
Over-power protection	L9	Compressor phase loss/reversal protection	Ld
System charge shortage or blockage protection	F0	Frequency restricted/reduced with whole unit current protection	F8
Capacitor charging error	PU	Frequency restricted/reduced with IPM current protection	En
High pressure protection	E1	Frequency restricted/reduced with high discharge temperature	F9
Low pressure protection	E3	Frequency restricted/reduced with anti-freezing protection	FH
Compressor stalling	LE	Frequency restricted/reduced with overload protection	F6
Over-speeding	LF	Frequency restricted/reduced with IPM temperature protection	EU
Drive board temperature sensor error	PF	Indoor unit full water error	E9
AC contactor protection	P9	Anti-freezing protection	E2
Temperature drift protection	PE	AC input voltage abnormal	PP
Sensor connection protection	Pd	Whole unit current sensing circuit error	U5
DC bus voltage drop error	U3	4-way valve reversing error	U7
Outdoor fan 1 error protection	L3	Motor stalling	H6
Outdoor fan 2 error protection	LA	PG motor zero-crossing protection	U8
compressor inhalation temperature sensor error	dc		

