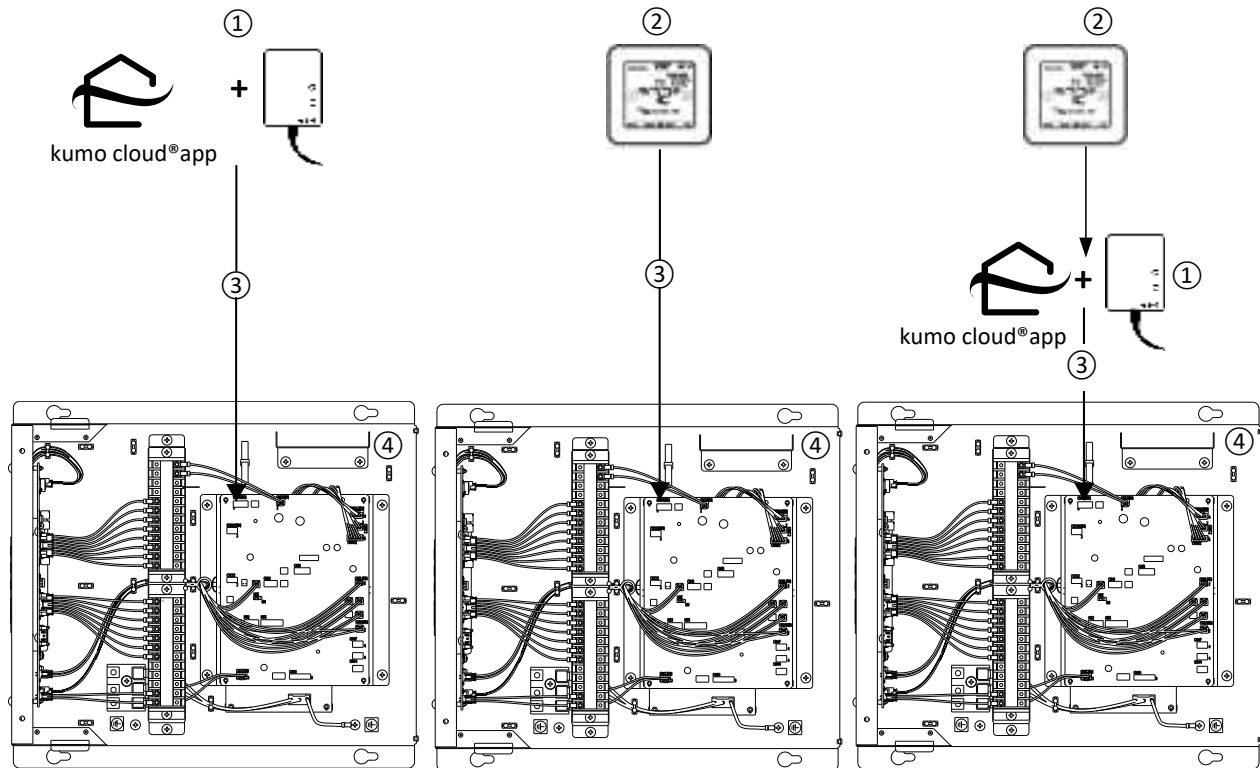




- ① kumo cloud app + Wireless Interface 2
- ② MHK2 controller
- ③ IT terminal cable (CN105: IT terminal communications port)
- ④ PAA unit control box

15.7. DIP switch for emergency thermostat

Using DIP switch SW01 settings on the relay board, you can select one of two modes—Test or Emergency—to operate in.

If DIP switch SW01-4 is set to ON, the PAA unit enters Test mode. While in Test mode, the installer can use the push buttons on the control box user interface to set W1 and W2 to ON or OFF. See the "Control box user interface" image below.

WARNING

To ensure proper and safe operation of the unit, do not leave the home while the Test mode is running. Otherwise, results such as electric shock, fire or explosion may occur.

You can configure the initial (ON or OFF) state of the Test W1 and W2 heat signals in Test mode. Setting DIP switch SW01-2 to ON turns the Test W1 signal ON immediately once the furnace is powered on. Otherwise, the Test W1 signal will be OFF.

Setting DIP switch SW01-3 to ON turns the Test W2 signal ON immediately once the furnace is powered on. Otherwise, the Test W2 signal will be OFF.

Steps to check the furnace operation in Test mode:

- Step 1:** Power off system if not already off.
- Step 2:** Wait for 3 minutes; this ensures that the unit is completely powered down.
- Step 3:** Set SW01-4 to ON for Test mode.
- Step 4:** Turn the furnace breaker ON. Ensure that the outdoor unit system breaker is OFF. You are now in Test mode. Verify the Test mode indicator (red color) on the control box user interface is ON.

Step 5: Press W1 ON on the control box user interface to turn on the first stage of furnace heat. Verify that the furnace fan turns on along with furnace heat.

Step 6: Press W2 ON on the control box user interface to turn on the second stage of furnace heat. Verify that the furnace output increases. This is only applicable for furnaces with two stages. Single-stage furnace shows no difference.

Step 7: Power down the furnace.

Step 8: Set SW01-4 to OFF to disable Test mode.

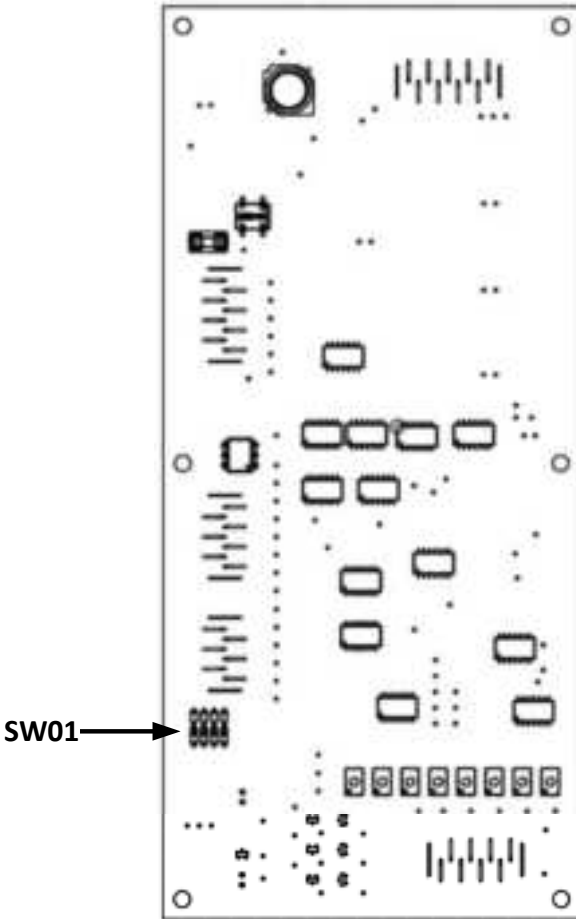


NOTE

- The PAA unit system enters emergency mode if power is still applied to the furnace and (a)

the outdoor unit loses power or (b) there is an error state that does not allow full system control. The PAA unit remains in emergency mode until power is restored to the outdoor unit or the error is resolved.

- If DIP switch SW01-4 is set to OFF, the NAT connected to the PAA unit control box controls the heat applied to the furnace during an emergency mode failover.

Relay board SW01 DIP switch settings**WARNING**

If SW01-2 and SW01-4 are set to ON, the furnace will start heating immediately upon a loss of power to the outdoor unit.

Therefore, during gas furnace test operation or maintenance, be sure to power up the outdoor unit prior to powering up the furnace.

Conversely, when powering down the system, the furnace should be powered down prior to powering down the outdoor unit. If operated improperly, it may result in gas leakage/poisoning, fire or explosion due to unexpected gas furnace operation.

SW01-1 Power to non-adjustable thermostat

- ON (default): Power from the furnace is supplied to the TB-B side (14A).
- OFF: Power supply from the furnace to the TB-B side (14A) is not connected.

SW01-2 W1 initial state in Test mode

- ON: W1 is initially switched on when entering Test mode.
- OFF (default): W1 is initially switched off when entering Test mode.

SW01-3 W2 initial state in Test mode

- ON: W2 is initially switched on when entering Test mode.
- OFF (default): W2 is initially switched off when entering Test mode.

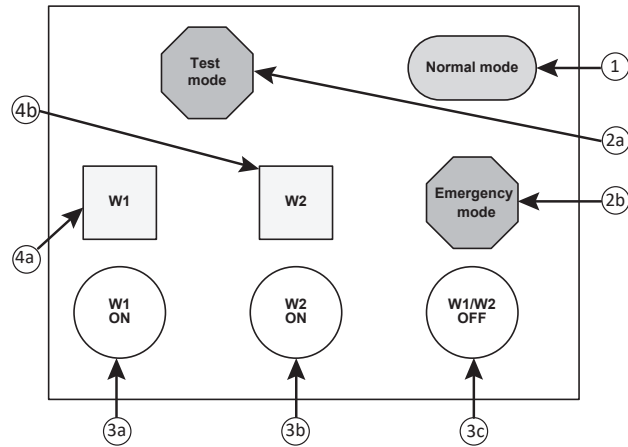
**NOTE**

To enable W2, W1 must be on. Otherwise, W2 will not operate.

SW01-4 Mode operation

- ON: Test mode operation, which is controlled by push buttons on the PAA unit control box user interface.
- OFF (default): Emergency mode operation, which is controlled by the NAT.

Control box user interface



1. Normal mode (indicator color: green). When illuminated, it means that the system is functioning normally.
- 2a. Test mode (indicator color: red) - installer only setting.
- 2b. Emergency mode (indicator color: red). If illuminated, it means that the system is in error mode. If required, please contact a dealer, contractor or technician with certifications required by laws and codes.
- 3a. W1 ON - installer only settings.
Test mode push button (not illuminated, button color: white)
- 3b. W2 ON - installer only settings.
Test mode push button (not illuminated, button color: white)
- 3c. W1 and W2 OFF - installer only settings.
Test mode push button (not illuminated, button color: white)

- 4a. First stage heat (emergency mode) (indicator color: amber) - installer only settings.
- 4b. Second stage heat (emergency mode) (indicator color: amber) - installer only settings.



IMPORTANT

Be sure to change back to Normal mode operation after Test mode operational checks are completed!



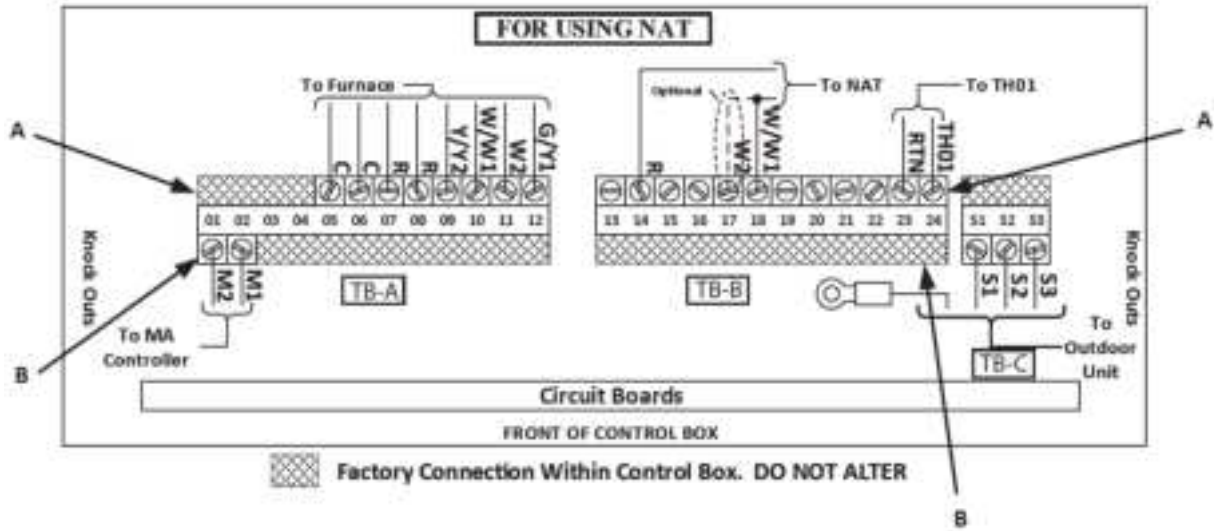
NOTE

- The Test and the Emergency modes cannot occur at the same time.
- To enable W2, W1 must be ON.

The non-adjustable thermostat (NAT), a construction-style thermostat included in the accessories bag, should be used as the emergency thermostat.

Install the NAT in the return air duct next to the TH1 thermistor and connect the NAT between R and W1 on the control box. To enable both W1 and W2 to come on when the emergency thermostat calls for heat, connect the W1 and W2 together to one side of the NAT and R to its other side.

Non-adjustable (emergency) thermostat connection



15.8. Balance points

The PAA unit automatically switches between heat pump heating and furnace heating based upon configuration parameters and operational data.

The unit supports two outdoor temperature set points—Economic Balance Point and Capacity Balance Point—that determine the most efficient method of heating.

15.8.1. Economic balance point

The Economic Balance Point is the outdoor temperature above which it is more efficient to heat with the heat pump and below which it is more efficient to heat with the furnace.

The ideal Economic Balance Point (using a remote controller) will depend on the cost of the fossil fuel being used for the furnace, the efficiency of the furnace, the cost of electricity, and the efficiency of the heat pump for heating based upon various outdoor temperatures.

To configure the Economic Balance Point using MA controller, kumo cloud® app and MHK2 controllers, please refer to the respective manuals.

Use Mode 8 and Mode 10 settings to select the Economic Balance Point that the PAA unit will use. Mode may be referred to as indoor unit function code in some other literature. Please refer to the controls product manual for more information.

Indoor Unit Settings			Outdoor Unit (Extended outdoor air temperature) (see Extended Balance Point section below)
Mode 8	Mode 10	Balance point	
1	1	9° F (-13° C)	-11° F (-24° C)
1	2	14° F (-10° C)	9° F (-13° C)
2	1	Furnace Only	Furnace Only
2	2	19° F (-7° C)	14° F (-10° C)
3	1	27° F (-3° C)	27° F (-3° C)
3	2	32° F (0° C) (default)	32° F (0° C) (default)

**NOTE**

When the PAA unit is connected to a cooling-only unit, configure Mode 8 and Mode 10 for Furnace Only heating.

Below the Economic Balance Point, only the furnace is used for heating. Above the Economic Balance Point, either the heat pump or furnace is used for heating.

In cold climates where the PAA unit may be sized for the cooling load rather than the heating load, the system may not have the capacity to heat the space even at temperatures above the Economic Balance Point.

15.8.2. Capacity balance point

When the PAA unit is first used and the outdoor air temperature is above the Economic Balance Point, the kit first tries to heat the space with the heat pump.

If the kit is unable to heat the space (most likely due to insufficient heating capacity at the current outdoor temperature), the unit records the current outdoor temperature as the Capacity Balance Point and switches to heating with the furnace.

During subsequent calls for heat, if the outdoor temperature is below either the Capacity Balance Point or the Economic Balance Point, then only the furnace is used for heating. If the outdoor air temperature is above both the Capacity Balance Point and

Economic Balance Point, then the heat pump tries to heat the space first.

Capacity Balance Point is incrementally reduced, periodically, until equal to the Economic Balance Point value.

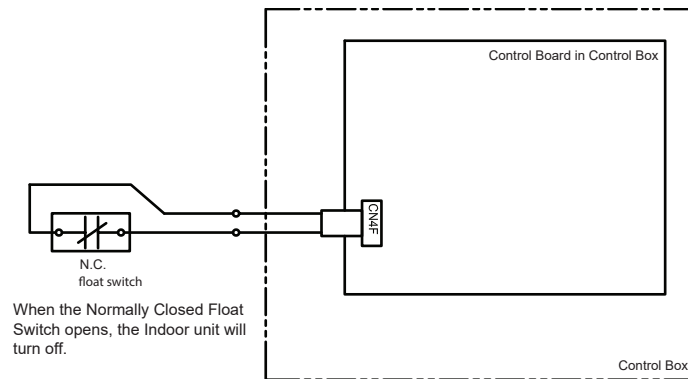
If Mode 25 = 2 and Mode 27 = 2 (which are the recommended initial settings), the PAA unit turns the fan off in Thermo OFF.

15.8.3. Extended balance point

Some outdoor units may have the capacity to report lower outdoor temperatures, below 5° F (-15° C). For information about the outdoor unit's Extended Balance Point capability, refer to the respective outdoor unit manual. The PAA (indoor) unit firmware automatically detects whether the connected outdoor unit has this capability and adjusts the Economic Balance Point accordingly (* see "Outdoor Unit-Extended outdoor air temperature" in the table in the "Economic balance point" section above).

15.9. Condensate overflow safety switch connection (CN4F)

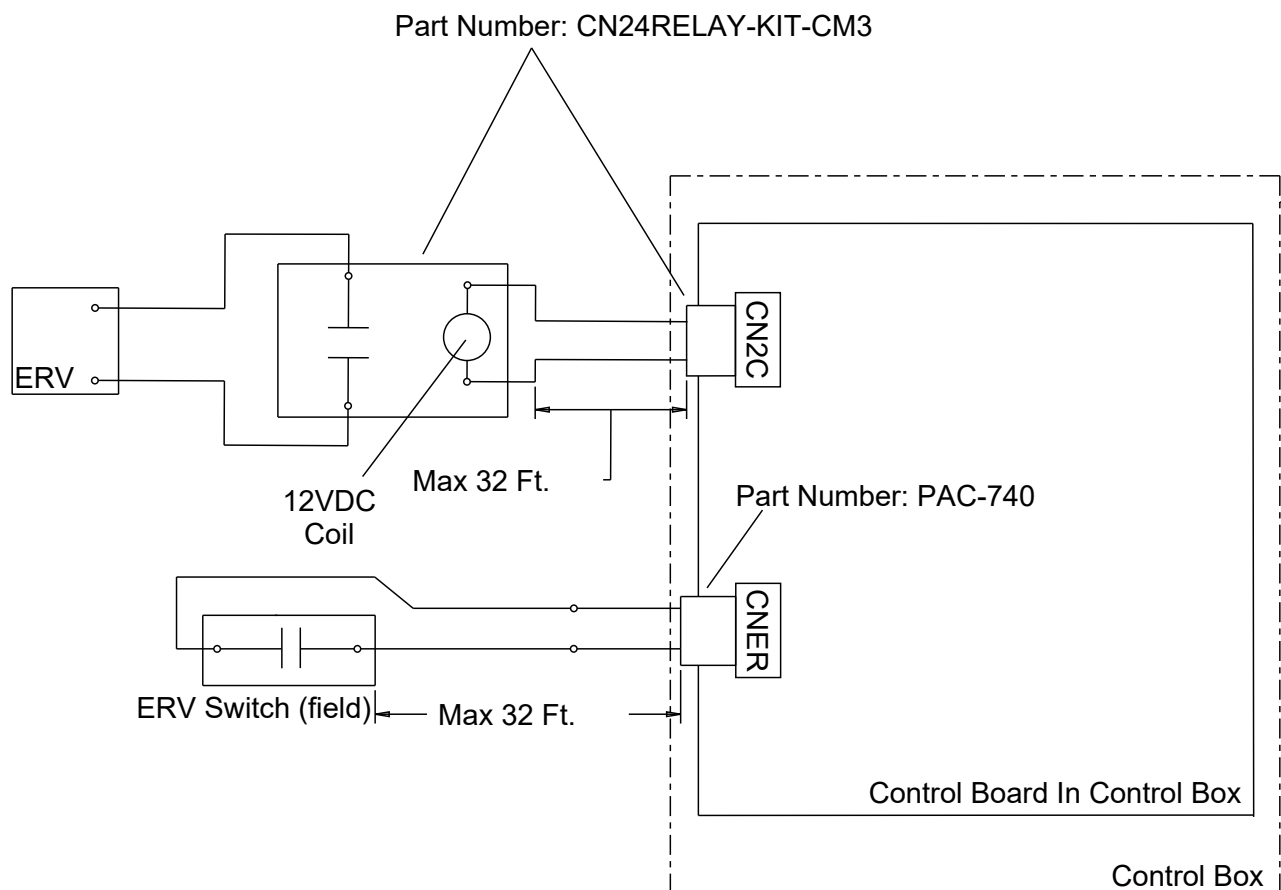
The PAA unit is equipped with a drain pan overflow detection switch and a wire harness for the CN4F connector. The wire harness and switch must be installed before operating the unit. Otherwise the unit will give out an error and cool mode will not run. The normally closed float switch connects to the wires coming from CN4F. When the switch is open, the unit gives out an error and Cool or Dry mode do not run. See diagram below.



Frequently, a condensate pump is used to pump the condensate from the PAA unit to a drain installed at a higher elevation than the PAA unit. Many condensate pumps have an overflow switch that detects if the reservoir is about to overflow for any reason.

Typically, these overflow switches are also normally closed switches that should be wired in series with the drain pan overflow switch as in the illustration above.

15.10. Energy recovery ventilation (ERV)



ERV Switch

- Non-Voltage a-contact input
- Contact rating current ≥ 0.1 A
- Contact rating voltage ≥ 15 VDC
- Minimum applicable load ≤ 1 mA at DC

ERV output	Condition	Furnace blower (expected operation)	CN2C output (expected furnace blower output)
CNER input			
OFF	Cool/Heat/Fan operation	ON ^{1,2}	ON
	Defrost	STOP	OFF
	STOP	STOP	OFF
ON	Cool/Heat/Fan operation	ON ¹	ON
	Defrost	STOP	OFF
	STOP	ON ¹	ON

¹The G/Y1 signal to the furnace is energized to turn on the furnace blower. If kumo cloud® app is used and configured to operate a second stage blower speed, the Y/Y2 signal is also energized.

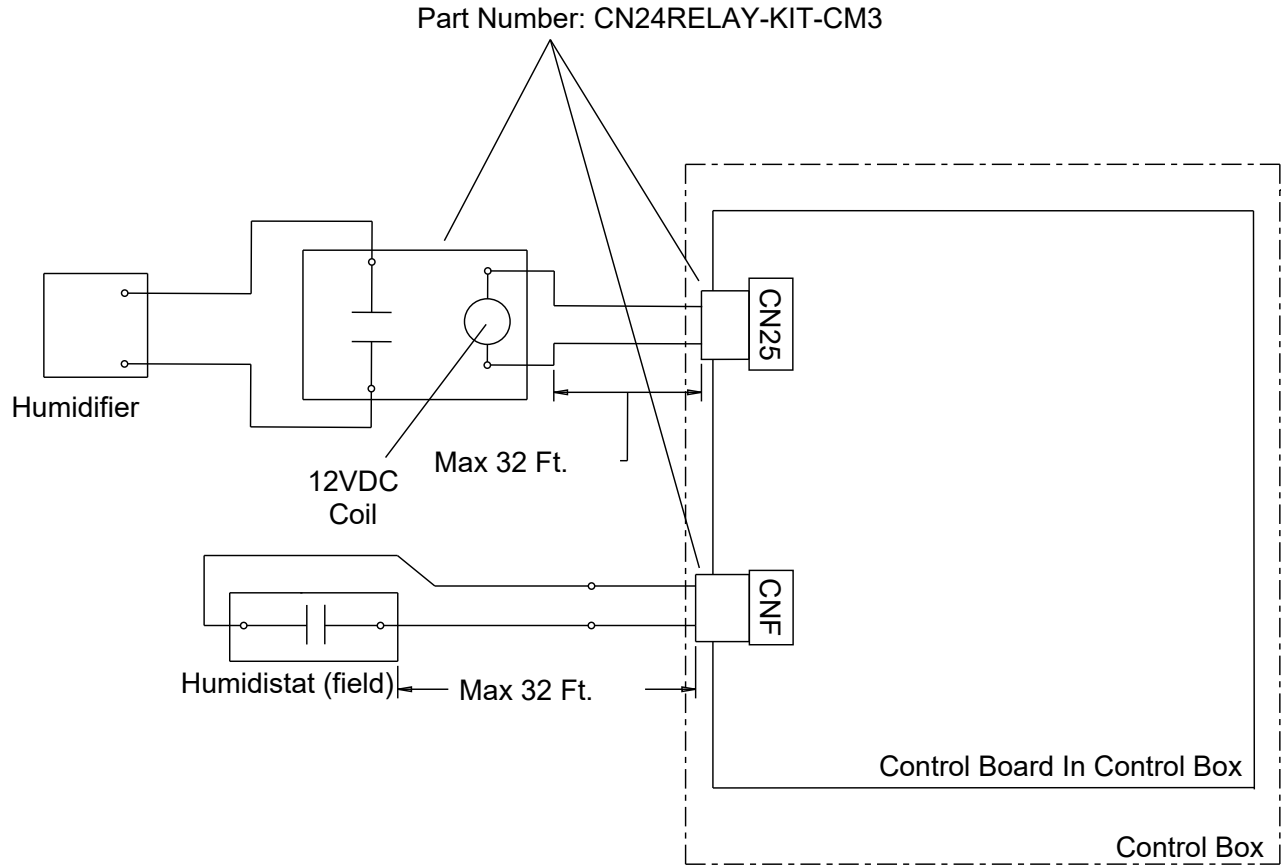
²It is recommended to set Modes 25 and 27 to 2, in order to have the indoor fan stop running when set temperature is met. Otherwise, CN2C will energize the ERV 24/7.

15.10.1. HRV/ERV heating operation for MXZ/NTXM systems

When using an HRV/ERV, please take appropriate consideration when operating it during heating.

Model	Description
MXZ-3C24/3C30/4C36/5C42NA3/4	When the furnace blower is moving air for HRV/ERV operation, the unit may provide warm air to the occupied space, even in Thermo OFF mode.
MXZ-3C24/3C30NAHZ3/4	
NTXMMX24/30/36/42A132/142/152BA/CA	
NTXMPH24/30A132BA/CA	
MXZ-SM36/42/60NAM/2	
MXZ-SM36/42/48NAHZ/2	
NTXMSM36/48/60A142/182AA/BA	
NTXMSH36/42/48A142/152/182AA/BA	

15.11. Humidifier



Humidifier Control

Sequence of operation:

1. The humidistat closes CNF.
2. The furnace blower turns on.
3. CN25 provides 12 VDC to turn on the humidifier (do not exceed 1 watt draw per relay).
4. When the humidistat opens CNF, the furnace blower continues to run for 30 seconds to clear the ductwork of moist air.

5. If defrost starts during humidifier operation, CN25 de-energizes.

Humidistat:

- Non-voltage a-contact input
- Contact rating voltage ≥ 15 VDC
- Contact Rating Current ≥ 0.1 A
- Minimum Applicable Load ≤ 1 mA at DC

Mode no.	Setting no.	Settings
13	1	Humidifier not supported
	2	Humidifier supported
16 (applies if Mode no. 13 Setting no. = 2)	1	See Mode 16 table below.
	2	See Mode 16 table below.

Mode no. 16	CNF Input (humidistat)	Condition (No Defrost/No Error)	CN25 Output	Furnace Blower
1 ¹	OFF	Heat mode & Ther- mo OFF	OFF	OFF ²
		Heat mode & Ther- mo ON		
	ON	Heat mode & Ther- mo OFF	OFF	OFF ²
		Heat mode & Ther- mo ON	ON	ON ²
2	OFF	Heat mode & Ther- mo OFF	OFF	OFF ²
		Heat mode & Ther- mo ON		
	ON	Heat mode & Ther- mo OFF	ON	ON ²
		Heat mode & Ther- mo ON		

¹ Factory setting
² The G/Y1 signal to the furnace is energized to turn on the furnace blower. If kumo cloud[®] app is used and configured to operate a second stage blower speed, the Y/Y2 signal is also energized.

**NOTE**

- Humidifier output will only run when in heating mode.

- In heating mode, if homeowner prefers that the fan runs even while thermal set point is saturated, set Mode 25 to 1. For the same in cooling mode, set Mode 27 to 1.

16. Test run

16.1. Before test run

After completing installation and the wiring and piping of the indoor and outdoor units, check for refrigerant leakage, looseness in the power supply or control wiring, wrong polarity, and no disconnection of one phase in the supply. Use a 500-volt megohmmeter to check that the resistance between the power supply terminals and ground is at least 1.0 MΩ.

Do not carry out this test on the control wiring (low voltage circuit) terminals.

**WARNING**

If SW01-2 and SW01-4 are set to ON, the furnace will start heating immediately upon a loss of power to the outdoor unit. Therefore, during gas furnace test operation or maintenance, be sure to power up the outdoor unit prior to powering up the furnace. Conversely, when powering down

the system, the furnace should be powered down prior to powering down the outdoor unit. If operated improperly, it may result in gas leakage/poisoning, fire or explosion due to unexpected gas furnace operation.

WARNING

Do not use the air conditioner if the insulation resistance is less than 1.0 MΩ. Otherwise, results such as electric shock, fire or explosion may occur.

Open the stop valves isolating the PAA unit from the outdoor unit before starting operation to avoid refrigerant pipe bursting during furnace operation.

After installation or after the power source to the unit has been cut for an extended period, the insulation resistance will drop below 1 MΩ due to refrigerant accumulating in the compressor. This is not a malfunction. Perform the following procedures.

1. Remove the wires from the compressor and measure the insulation resistance of the compressor.
2. If the insulation resistance is below 1 MΩ, the compressor is faulty or the resistance dropped due the accumulation of refrigerant in the compressor.
3. After connecting the wires to the compressor, the compressor will start to warm up after power is supplied. After supplying power for the times indicated below, measure the insulation resistance again.
 - The insulation resistance drops due to accumulation of refrigerant in the compressor. The resistance will rise above 1 MΩ after the compressor is warmed up for two to three hours. (The time necessary to warm up the compressor varies according to atmospheric conditions and refrigerant accumulation.)
 - To operate the compressor with refrigerant accumulated in the compressor, the compressor must be warmed up at least 12 hours to prevent breakdown.
4. If the insulation resistance rises above 1 MΩ, the compressor is not faulty.

CAUTION

- The compressor will not operate unless the power supply phase connection is correct.
- Turn on the power at least 12 hours before starting operation. – Starting operation immediately after turning on the main power switch can result in severe damage to internal parts. Keep the power switch turned on during the operational season.

16.2. Perform test run

Refer to the installation manual that comes with each remote controller for details.

16.3. Complete self check

Refer to the installation manual that comes with each remote controller for details. IR and RF controller not supported.

[Output pattern A] Errors detected by indoor unit		
Wired remote controller Check code		Symptom
P1	5101	Intake sensor error
P2, P9	5102, 5105	Pipe (liquid or gas pipe) sensor error
E6, E7	6840	Indoor/outdoor unit communication error
P4	2502	Drain sensor error
P5	5701	Drain pump error
P6	1501	Freezing/Overheating safeguard operation
EE	-	Communication error between indoor and outdoor units
P8	1503	Pipe temperature error
E4	6834	MA remote controller signal receiving error

[Output pattern A] Errors detected by indoor unit		
Wired remote controller Check code		Symptom
Fb	4109	Indoor unit control system error (memory error, etc.)

[Output pattern B] Errors detected by unit other than indoor unit (outdoor unit, etc.)	
Check code	Symptom
E9	Indoor/outdoor unit communication error (Transmitting error) (Outdoor unit)
UP	Compressor overcurrent interruption
U3, U4	Open/short of outdoor unit thermistors
UF	Compressor overcurrent interruption (when compressor locked)
U2	Abnormal high discharging temperature/49C worked/ Insufficient refrigerant
U1, Ud	Abnormal high pressure (63H worked)/Overheating safeguard operation
U5	Abnormal temperature of heat sink
U8	Outdoor unit fan protection stop
U6	Compressor overcurrent interruption/Abnormal of power module
U7	Abnormality of super heat due to low discharge temperature
U9, UH	Abnormality such as overvoltage or voltage shortage and abnormal and synchronous signal to main circuit/Current sensor error
others	Other errors (Refer to the outdoor unit service manual.)

- On wired MA remote controller, check code displayed on the LCD.
- If the unit cannot be operated properly after the above test run has been performed, refer to the troubleshooting section of the ODU service manual for assistance.



NOTE

Operation is not possible for about 30 seconds after cancellation of function selection. (Correct operation)

For description of each LED (LED1, 2, 3) provided on the control board, refer to the following table.

LED 1 (power for microcomputer)	Indicates whether control power is supplied. Make sure that this LED is always lit.
LED 2 (power for remote controller)	Indicates whether power is supplied to the remote controller. This LED lights only in the case of the indoor unit which is connected to the outdoor unit refrigerant address "0".
LED 3 (communication between indoor and outdoor units)	Indicates state of communication between the indoor and outdoor units. Make sure that this LED is always blinking.

16.4. Auto restart function

Indoor controller board

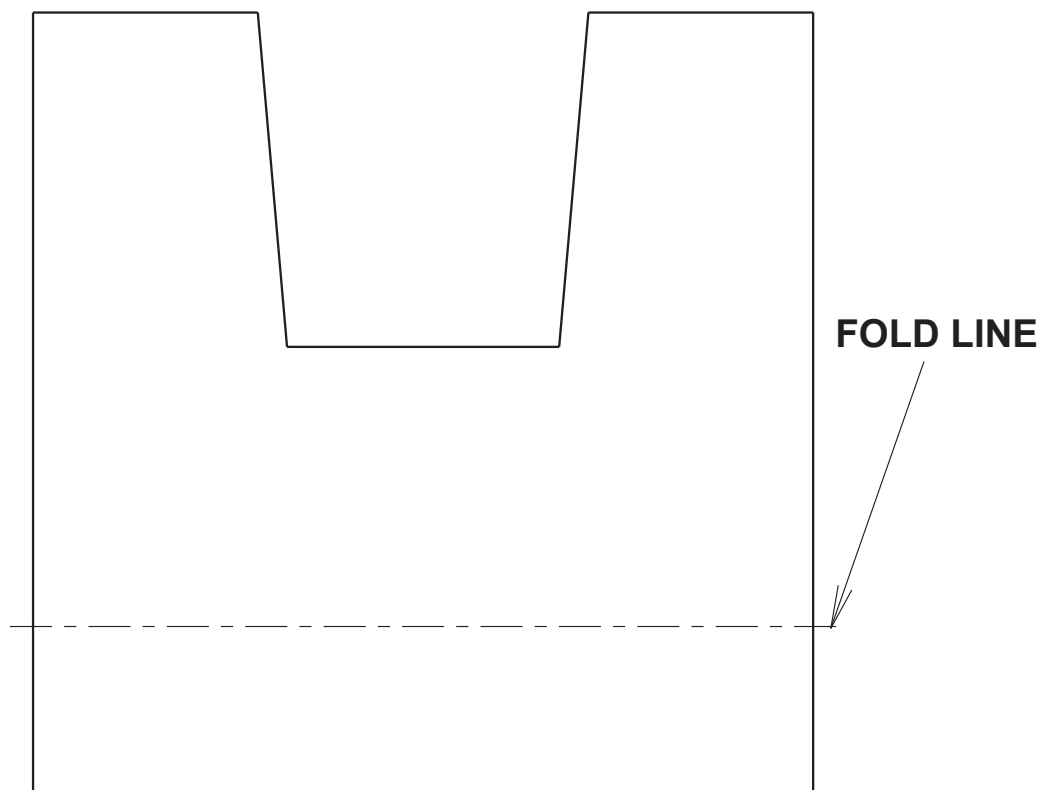
This model is equipped with the AUTO RESTART FUNCTION. When the indoor unit is controlled with the remote controller, the operation mode, set temperature and the fan speed are memorized by the indoor controller board.

The auto restart function works after power is restored after a power failure. The unit will restart automatically approximately 4 minutes after power is restored. Auto restart function is regulated using the remote controller (Mode no. 01).

17. Cut out gauge

Refer to section "Float switch", step 3 for use instructions.

CUT OUT GAUGE TEMPLATE



100% SCALE MODEL

This product is designed and intended for use in the residential and commercial environment.

Manufactured by:
MITSUBISHI ELECTRIC US, INC.



Toll Free: 800-433-4822