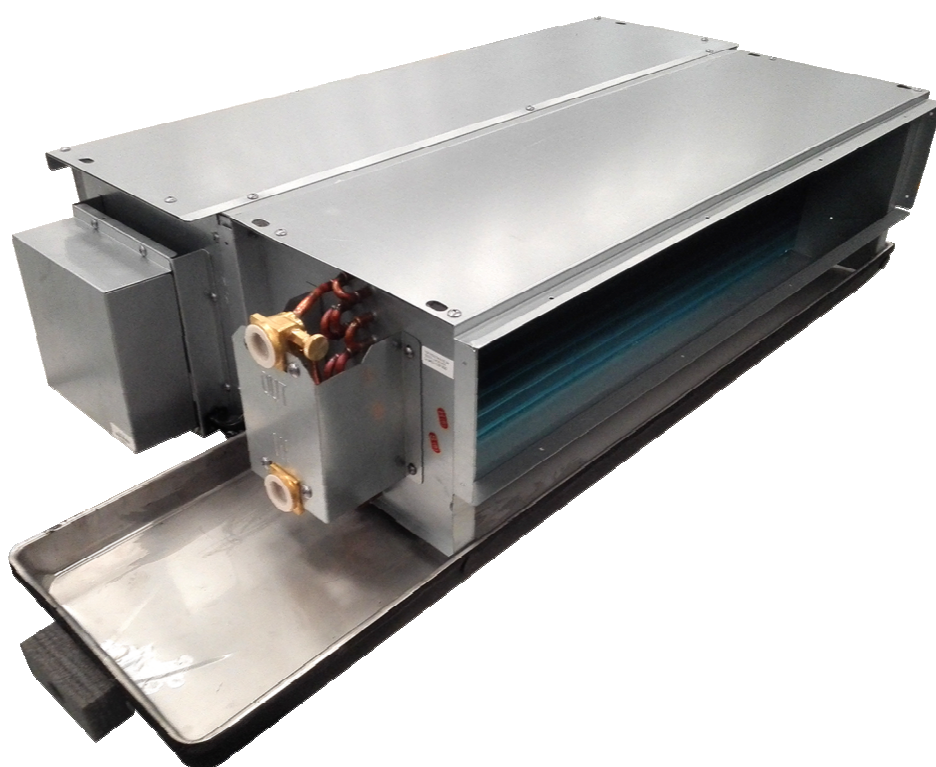




YECFC Fan Coil Unit

**Installation, Operation &
Maintenance Manual**

FORM NO.: 6A4Y-A01A-NE-EN



Air Flow: 150~750L/S

Contents

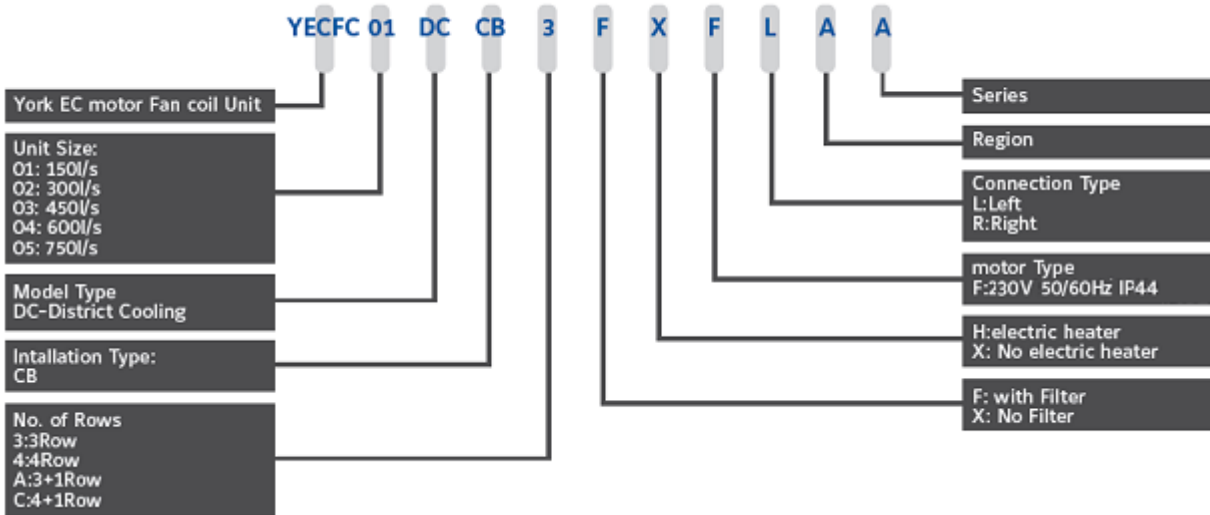
<u>1. Overview of Product</u>	<u>1</u>
1.1 Explanation of Models	1
1.2 Outlines & Dimensions & Weight	1
1.3 Nameplate	6
1.4 Characteristics of Fan Coil Unit	6
1.5 Working Operating Range of Fan Coil Unit	6
<u>2. Transportation & Installation</u>	<u>7</u>
2.1 Transportation	7
2.2 Acceptance	7
2.3 Storage	7
2.4 Lifting of the Unit	7
2.5 Points for Attention before Installation	7
2.6 Points for Attention during Installation	8
2.7 Installation	8
<u>3. Startup & Running of Product</u>	<u>9</u>
3.1 Check before Start Up	9
3.2 Electric Connection	10
3.3 Cold Area Operation	11
<u>4. Maintenance & Service of Product</u>	<u>11</u>
4.1 Air Filter	11
4.2 Cooling Coil and Heating Coil	11
4.3 Fan and Motor Assemblies	11
<u>5. Failure Analysis</u>	<u>12</u>
5.1 Low Air Flow Rate	12
5.2 High Air Flow Rate	12
5.3 High Noise and Vibration Level	12

1. Overview of Product

1.1 Explanation of Models

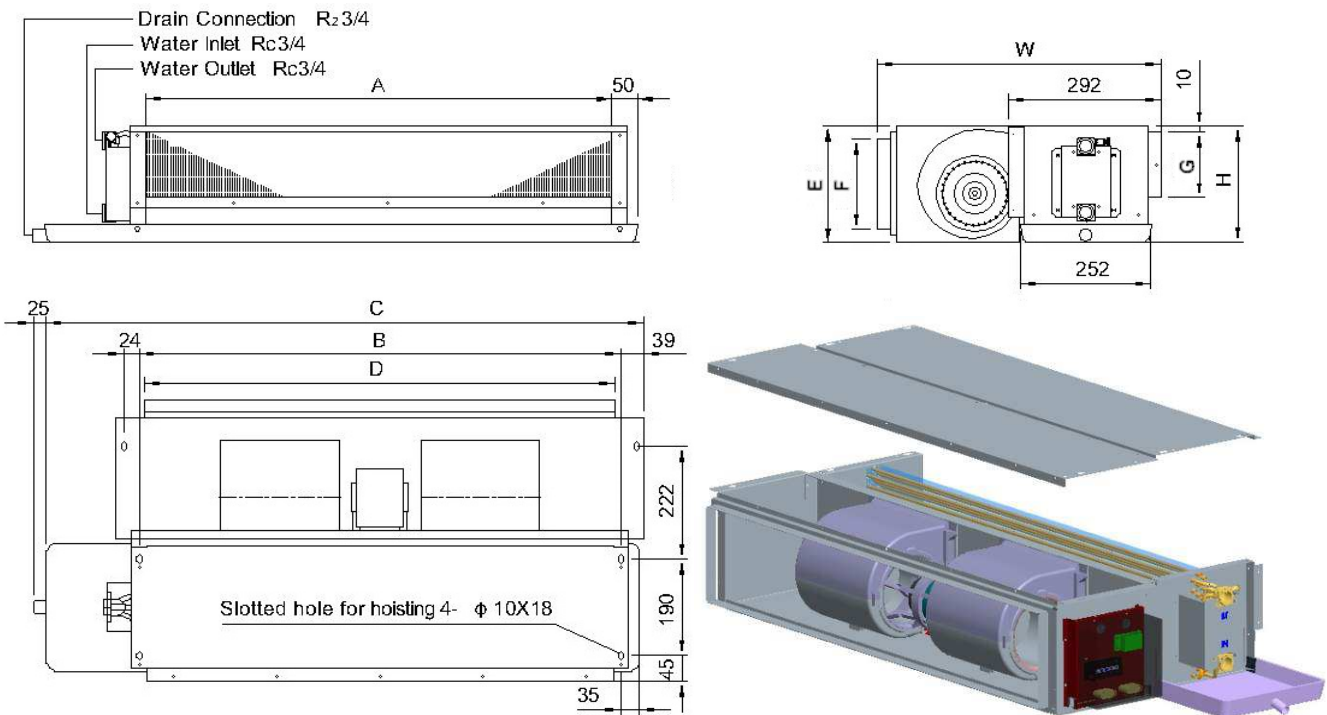
YORK Corporation can supply many types and models of fan coil unit. Users can select applicable products according to their own taste, the installation space and position, etc. Detailed types and models are explained as below.

NOMENCLATURE

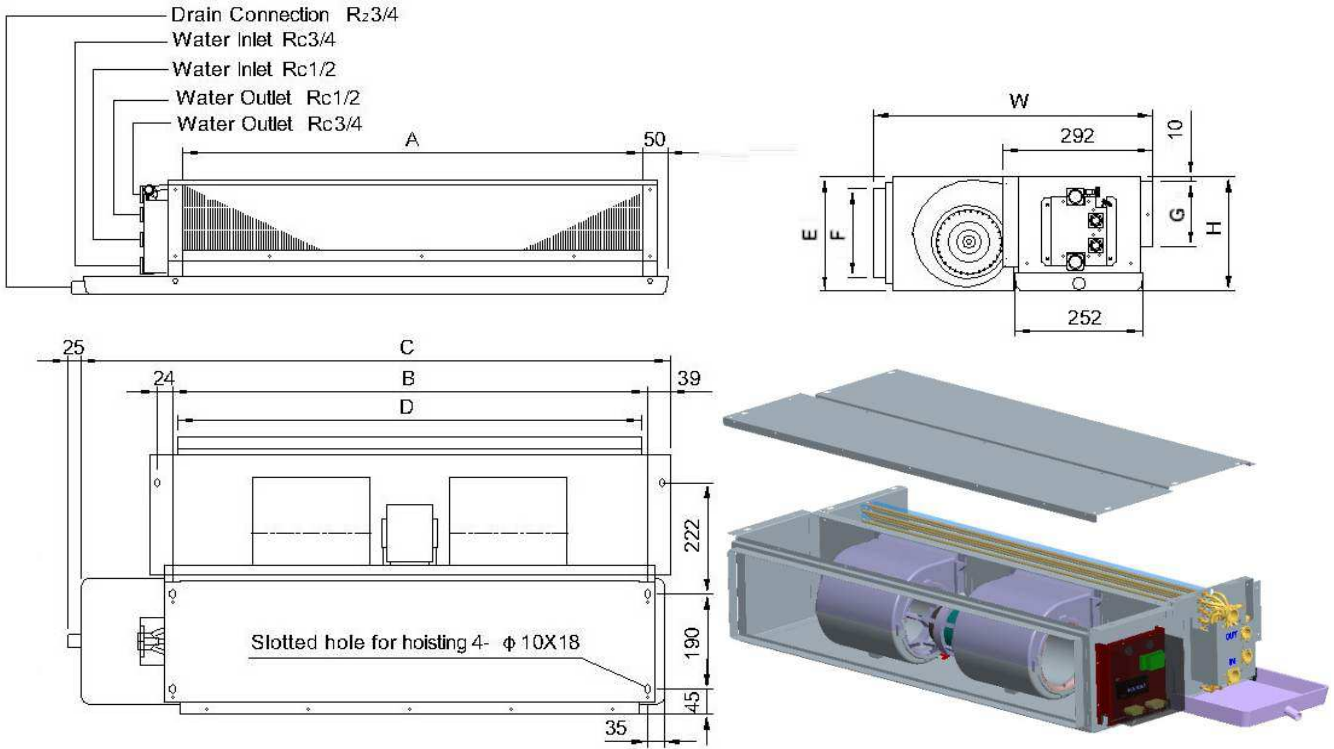


1.2 Outlines & Dimensions & Weight

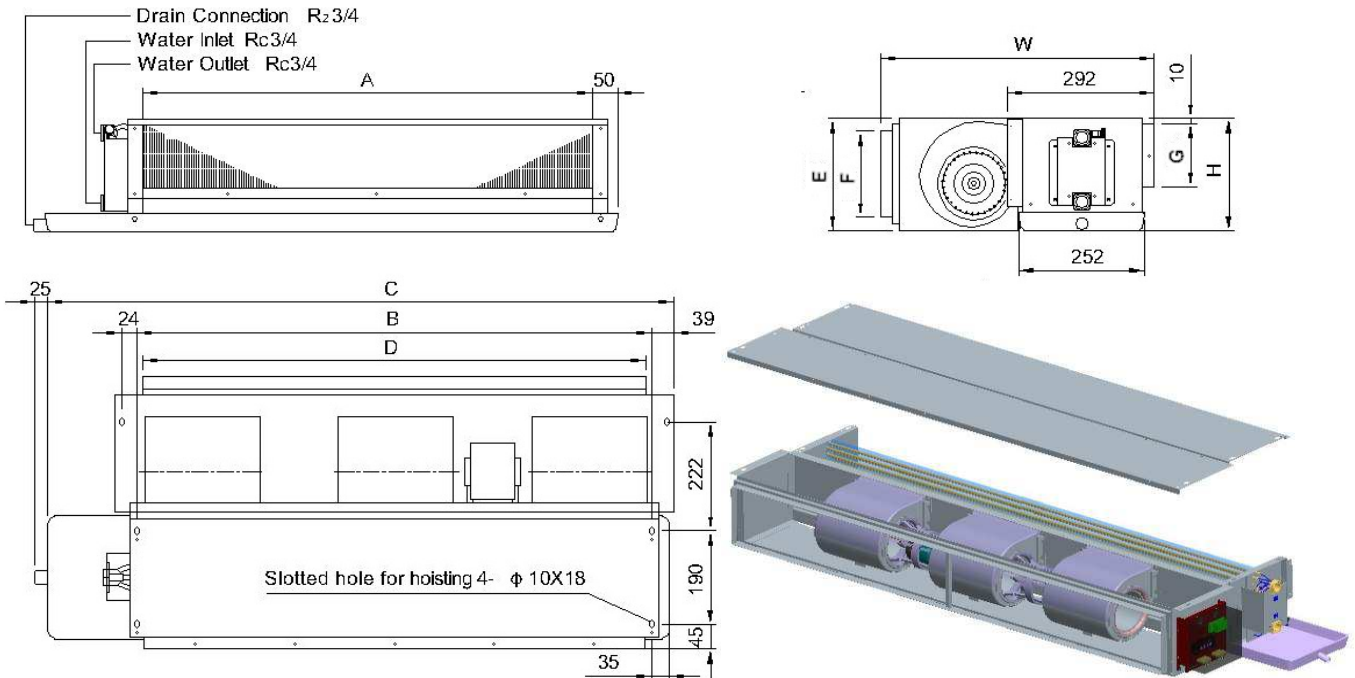
01&02 3/4R Model Cooling



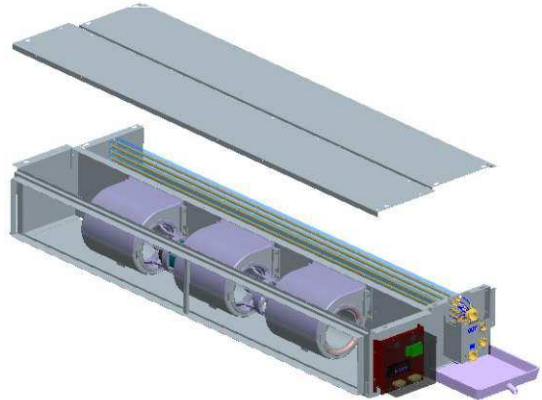
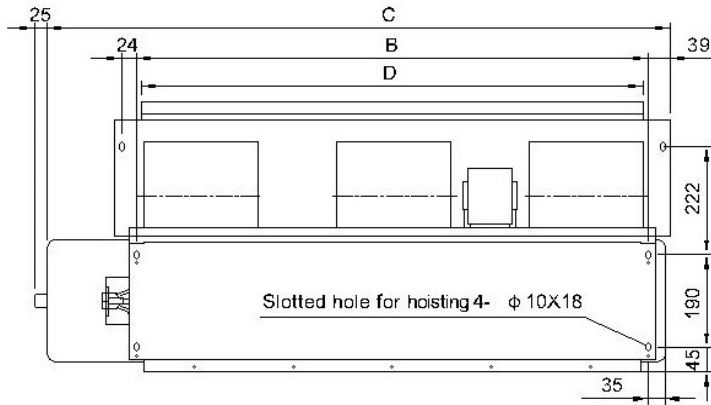
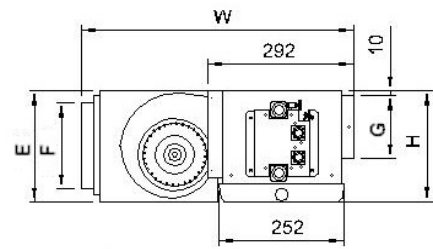
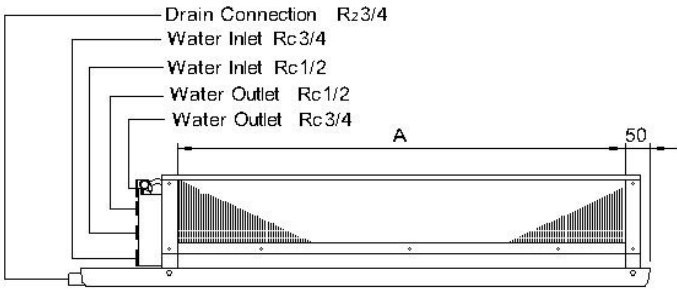
01&02 A/CR Model Cooling and Heating



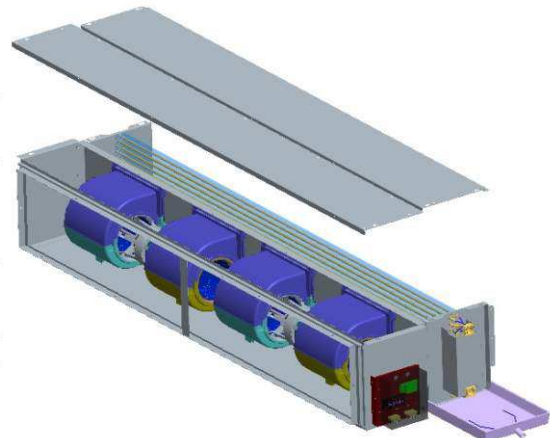
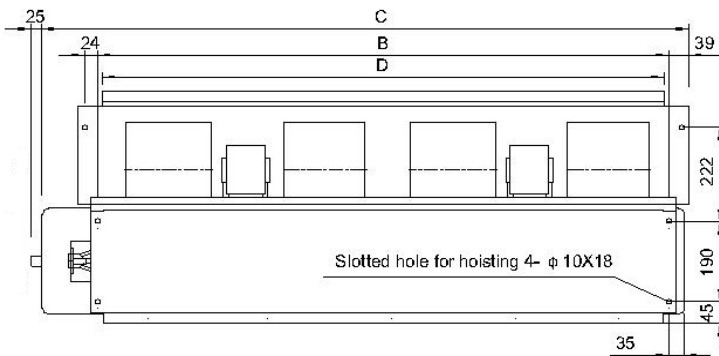
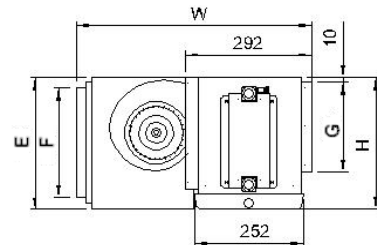
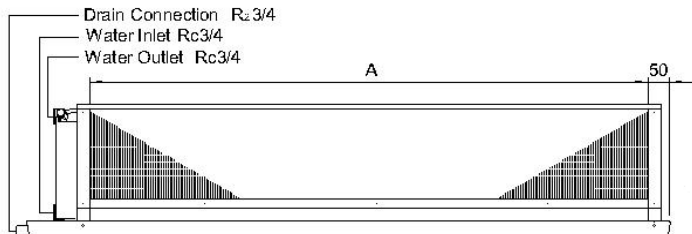
03 3/4R Model Cooling



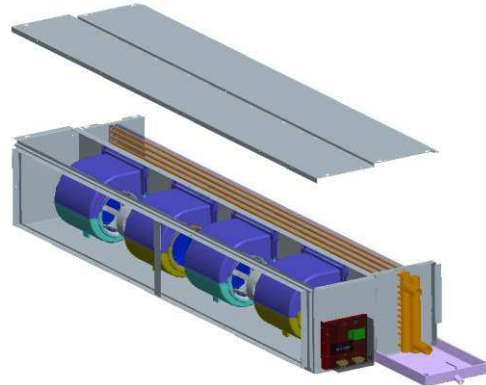
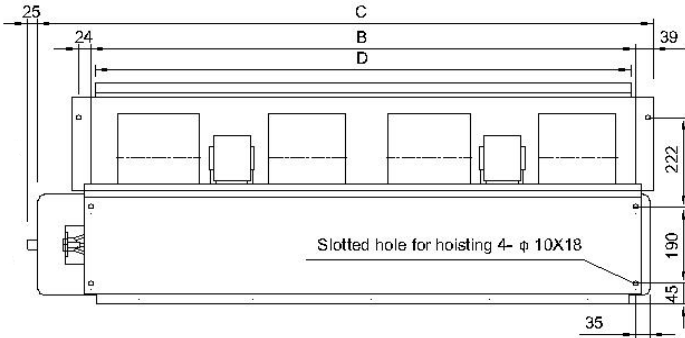
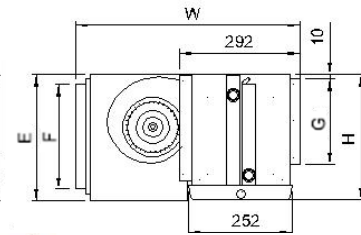
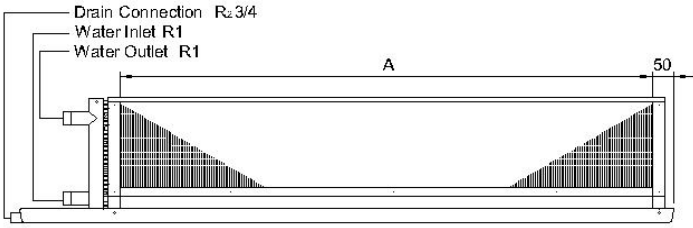
03 A/CR Model Cooling and Heating



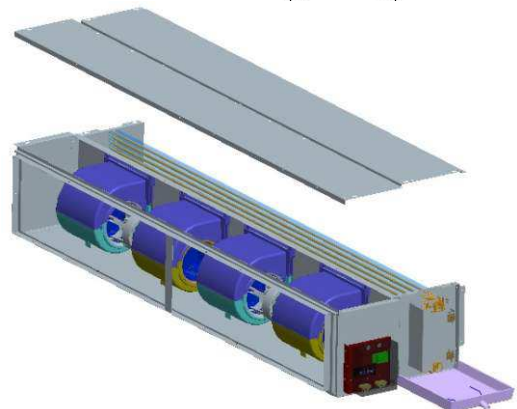
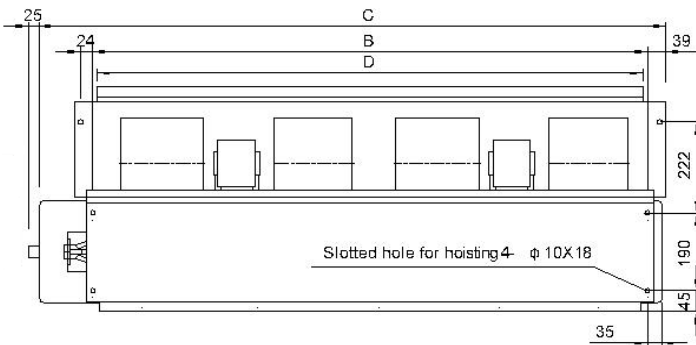
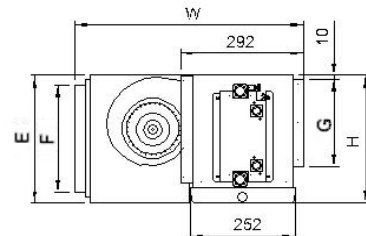
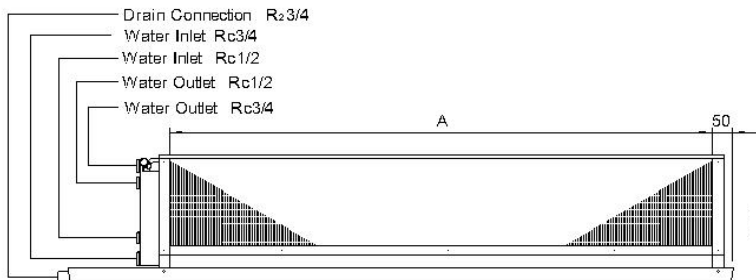
04&05 3R Model Cooling



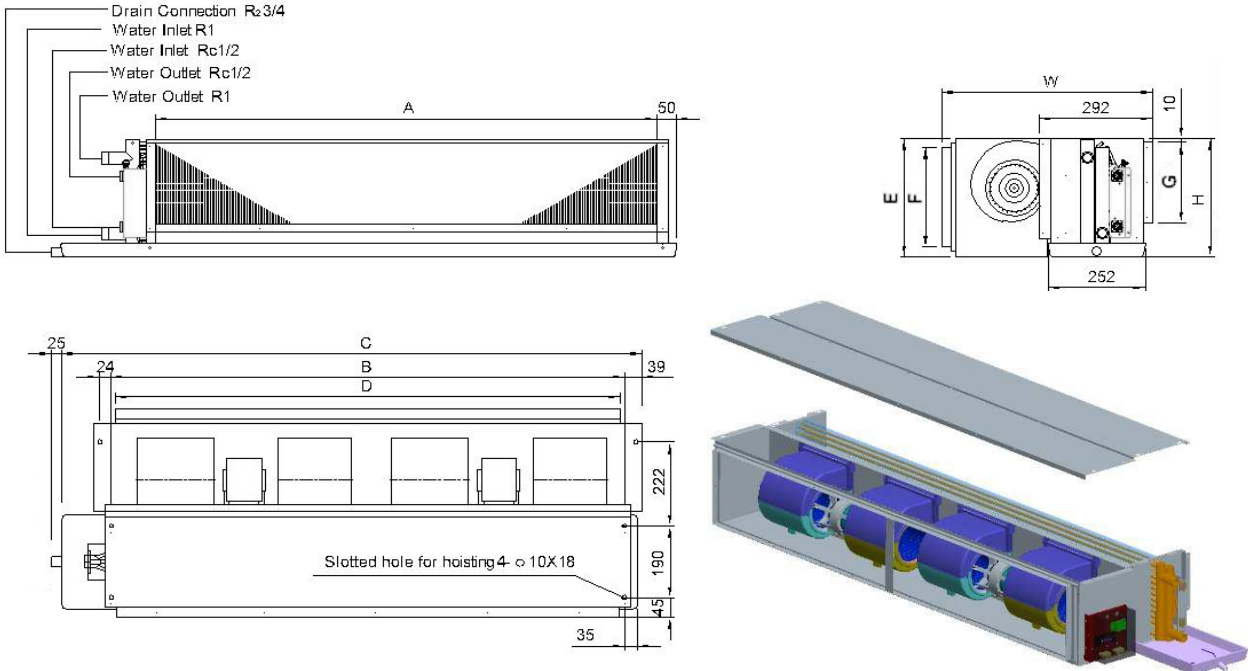
04&05 4R Model Cooling



04&05 AR Model Cooling and Heating



04&05 CR Model Cooling and Heating



Model	A	B	C	E	W	H	G	Plenum Conn Dim (mm x mm)	Return Plenum Conn Dim (D x F)
YECFC-01CB-3(4/A/C)	725	755	1030	233	558	233	130	775 x 130	750 x 190
YECFC-02CB-3(4/A/C)	1005	1035	1310	233	558	233	130	1055 x 130	1030 x 190
YECFC-03CB-3(4/A/C)	1505	1535	1810	233	558	233	130	1555 x 130	1530 x 190
YECFC-04CB-3(4/A/C)	1605	1635	1910	317	558	317	214	1655 x 214	1630 x 274
YECFC-05CB-3(4/A/C)	1820	1850	2125	317	558	317	214	1870 x 214	1845 x 274

Notes:

1. Facing the air outlet, the left type unit has pipes on the left side, right type unit opposite.
2. Filter frame is provided as standard. Filter media is provided as an option.
3. Chiller water inlet/outlet connection size for 04/05 4/C Rows unit is R1". For other unit, the chiller water inlet/outlet connection size is Rc3/4".
4. .Inlet/outlet hot water pipe diameter for 4 pipes unit is Rc 1/2".

Unit Weight, kg					
Model \ Rows	01	02	03	04	05
3 Rows	20.8	24.8	33.4	43.8	52.8
4 Rows	21.5	25.7	34.7	47.9	54.9
3+1 Rows	21.5	25.7	34.7	47.9	54.9
4+1 Rows	22.3	27.0	36.3	49.1	57.8

Notes: Unit weight is without water content.

1.3 Nameplate

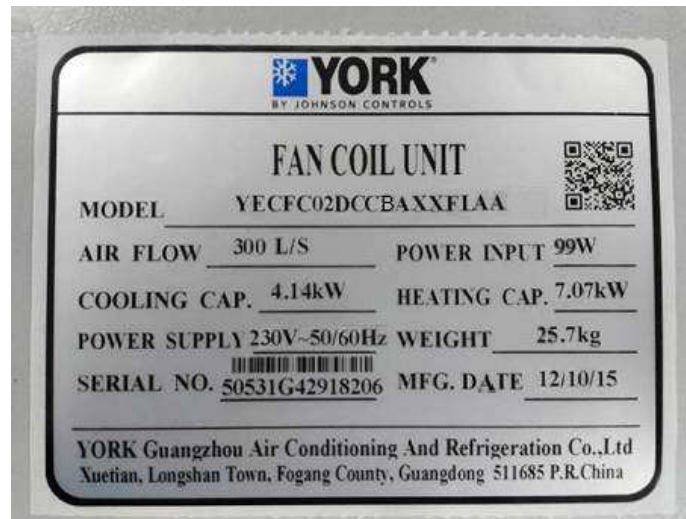
You can get the unit information and simple performance parameters from the nameplate.

1.4 Characteristics of Fan Coil Unit

- Special hyperbolic design fins enhance heat transfer efficiency Fins spacing is optimized to promote heat exchange efficiency and minimize air pressure drop.
- All fans are statically and dynamically balanced, forwardly curved, DWDI centrifugal type. The EC fan motor assembly is designed for low-noise operation, while having compact dimensions and permitting easy installation and replacement.
- High efficiency electronically commutated (EC) motors is fitted as standard on all units. Motor can be regulated by 0-10VDC signal supplied by a BMS, thermostat or DDC controller. The motor is resiliently mounted, self aligning and oiled for life.
- YECFC fan coil units have a variable speed driven permanent magnet motor and as such have an extremely wide operating envelope. When fan air supply quantities and external static resistances are extremely low, noise generated by air movement is significantly decreased. Under such circumstances, when air movement noise is extremely low, motor noise may become audible in the form of a very low level background hum. This condition is normal with this model of EBM motor when operating at a control voltage of below 4V.
- When units are installed into a ceiling concealed non-ducted application with minimal external static resistance, it may be desirable to limit the minimum control voltage to 4 volts if low levels of motor noise is of concern.
- The installing contractor is responsible to commission fan coil units with minimum and maximum control voltage settings commensurate with the units design operating range.
- The fan and motor performance classes exceed the new ErP15 (European Energy- related Products Directive) Directive.
- Water supply and return header is made of a single forged threaded brass connector. The header provides water distribution through the water circuits for high heat exchange efficiency and reduced water pressure drop.
- Coils are designed for a wide Delta T with chilled water application typically 7-10 degrees C and hot water typically 15-20 degrees C.
- The coil maximum working pressure is 1.6Mpa. Each coil is leak tested by a 2.8Mpa nitrogen overpressure test.
- Optimal design of condensate drain pan can effectively drain condensate water and reduces the growth of bacteria and microbial growth. The drain tray is stainless steel to avoid corrosion and is extended 100mm beyond the casing to capture any condensate from the chilled water control valve.
- The external casing is made of galvanized steel. Insulation is pressed and adhered on inner wall of the panel, which avoids cold bridge. The underside of the drain pan is insulated with primary hot-press molded insulation.
- All factory wiring is provided to terminals located in a metallic box for customer connection.

1.5 Working operating range of fan coil Unit

- It is recommended the temperature of chilled water should not be lower than 5°C.
- It is recommended the temperature of hot water temperature should not be higher than 80°C.
- Conditioned and treated water quality is required.
- For maximum operating life the running temperature $\leq 40^{\circ}\text{C}$ and relative humidity $\leq 95\%$.



2. Transportation & Installation

2.1 Transportation

Units are normally shipped ex-works. They are inspected, tested, and packaged prior to dispatch, carefully loaded into containers, shipped to country of destination, unloaded, and delivered to jobsite.

Immediately upon receipt at jobsite, inspection should be made for any damage, which must be reported to Johnson Controls within 24 hours of receipt of goods.

When moving the fan coil unit, please handle with care and prevent the coil water inlet, outlet and drain pipes from getting bent or damaged. Use only approved lifting equipment. Do not carry the unit by the fan or motor assembly to avoid distortion.



Package for YECFC01~03 Units



Package for YECFC04&05 Units

2.2 Acceptance

All items must be checked against customer purchase order, delivery docket, and submittal drawings for correctness and any claims for non-compliance or short supply reported to Johnson Controls within 72 hours of delivery.

2.3 Storage

If the unit is stored on the jobsite, it should be protected against exposure to the elements.

Specifically units should be securely protected from theft, accidental damage, water ingress, moisture damage, rusting, or dust.

2.4 Lifting of the Unit

During the installation process, be careful to prevent the unit from any damage due to improper lifting and rigging. Use only approved lifting equipment. Safety should always be a priority. Only authorized lifting equipment and trained installers should be used. Equipment should be installed in accordance with all national safety codes.

2.5 Points for Attention before Installation

Before the unit is installed, the following should be verified during the construction of the building:

1. Water Supply
2. Power Supply
3. Supply air, return air, and outside air ducting (if applicable)
4. Ceiling Mounting points
5. Service Access

2.6 Points for Attention during Installation

For ceiling installation, hang the unit on threaded rods using the mounting holes provided. Alternately rubber isolators or spring mounts can be used. YECFC units exhibit low levels of unit vibration and have high levels of balance as each direct drive EC fan / motor assembly is provided as a single manufactured and tested entity from the supplier.

Ensure correct spacing and alignment of mounting points directly above the mounting points on the unit chassis. This is important where the suspension points have been fixed into the concrete slab directly above the unit.

During the installation, be careful to avoid building materials damaging unit panels or components.

Do not remove protective covers from the coil connections until the unit is ready to be piped up.

Before the unit starts operation, any debris in the drain tray and the drain piping should be removed.

Ensure sufficient side clearance to enable air filter removal. Allow at least 600mm service clearance.

Installation of CB series-ceiling concealed type unit: Insert the reserved screws on ceiling to the six kidney-shaped holes.

2.7 Installation

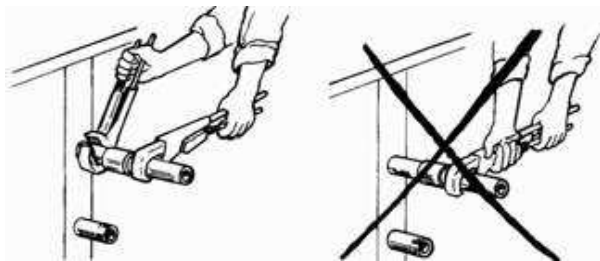
2.7.1 Water Piping

Flow and return water pipes IN and OUT are marked on the unit and water pipework should be connected through flexible couplings to avoid transmission of vibration and to allow for pipework expansion and contraction. YECFC water connections incorporate male pipe threads as scheduled in the table in this manual.

Do not overtighten the water connections. Torque should not exceed 50 N.M so as to avoid breakage. Significant care should be taken when attaching water pipes or water valves to the coil connections.

In order to confirm the unit is not damaged during transportation, leakage inspection (1.0Mpa) for coil is required before installation.

Use a pipe wrench to restrain the pipe connections of the coil when connecting external pipework.



2.7.2 Piping Support

The weight of all connecting water pipes should be independently suspended and should not be borne by the unit.

Provide a minimum of 600mm service access to all water inlet, outlet and drain pipe interfaces.

2.7.3 Determination of Water Handing of the Unit

The water inlet and outlet pipe interfaces can be arranged in the right or left side of the unit. When viewing from the unit air outlet (or reverse the air flow direction), if the water inlet and outlet pipes are at the right side of the unit, the unit is called a Right-handed Unit; conversely, it is a Left-handed Unit.

Ensure correct handing of the unit to be installed.

2.7.4 Condensed Water Drainage

Install the YECFC fan coil level using a spirit level. Adjust the hanger rods or mounting bolt tension to achieve minimum 5 mm side to side slope towards the drain outlet pipe. Do not install the unit with a slope away from the drain outlet pipe.

The external drain piping should slope downward and away from the fan coil unit.

Note: YECFC units are a “blow through” design.

2.7.5 Water Treatment

Chilled and hot water systems must be filled with clean and properly treated water.

Water circuits must be adequately flushed to remove construction debris.

Poor quality water must be adequately filtered to remove impurities.

Water treatment chemicals shall be applied to prevent scale and corrosion of water circuits.

Water treatment shall be carried out by authorized professionals and shall be tested on a periodic basis.

2.7.6 Air Duct Connection

Where YECFC are used in a ducted application, the connecting between the return air duct and the return air opening or return air plenum and that between the air outlet flange and the supply air duct or plenum must be flexible. The hard connection between the unit and the air outlet flange must be prohibited. During the installation, all air duct(s) should be provided with adequate support. Ductwork should not be supported directly by the fan coil unit.

2.7.7 Electrical Connection

The YECFC is designed for single phase power. The EC fans include integral variable speed drives.

220-240 volt power wiring including neutral and earth (Ground) is required. The supply must have a suitable power isolation switch mounted nearby to the fan coil unit, and appropriately labelled. Wiring must be in accordance with national codes and standards.

2.7.8 Control requirements

YECFC features a control terminal strip for 0-10V DC speed control.

YECFC incorporates variable speed fans that operate from a 0-10V DC control signal.

Fan speed can be continuously varied between maximum and minimum values based on the control voltage limits established in the control device.

The 0-10v control signal can be provided by a building automation system (such as Johnson Controls Metasys) or from an advanced thermostat with a 0-10v variable speed fan output (such as Johnson Controls TEC3000 range).

Minimum control voltage would typically be set between 2 and 4.5 volts DC to achieve minimum fan airflow requirements.

Maximum control voltage would be typically set between 6 and 10 volts DC to achieve design fan airflow at design fan static pressure.

Note: maximum control voltage should not permit excess coil velocity greater than 2.5 m/s.

When YECFC are installed in applications with a high percentage of outside air which may contain higher levels of humidity, the maximum control voltage shall be set to avoid moisture carryover issues.

Note: for jobsites where remote electric heaters are installed, minimum airflow settings should enable the heaters to operate without safety device intervention due to excessively low airflow.

Unit performance of airflow and static pressure vs control voltage can be found in the YECFC catalog.

3. Startup & Running of Product

3.1 Check before Start up

Check the YECFC unit before it is started:

1. Remove any foreign material from the interior and exterior of the unit.
2. Check all components are securely fixed.
3. Check fans can rotate freely.
4. Check power and control wiring and available power is correct.
5. Check that the condensate drain system is installed and functioning correctly.
6. Perform air bleed and system water pressure tests.
7. Check whether the air filter has been installed in place.
8. Check whether the duct has been installed properly (ducted unit applications).
9. Check the water flow is balanced to design requirements.
10. Check the BMS or thermostat are connected and set to correct airflow limits and set-point temperatures.

3.2 Electric Connection

Before wiring, please check voltage, frequency, and phase and confirm whether they are correct. Power connection should be installed according to electric schematic diagram. Earth lead should be connected firmly. Wiring diagram is as Fig.1. The recommended wire size is as below sheet.

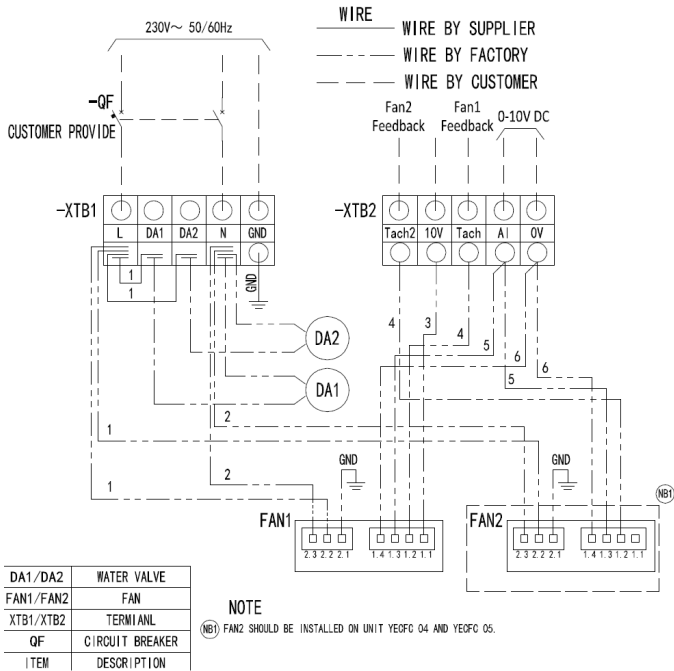
Several different models of unit sharing a single temperature controller are not prohibited.

Wire Size recommended is based on 40°C ambient temperature. Only copper wire can be used.

Please follow the local electrical codes and wiring standards in all cases.

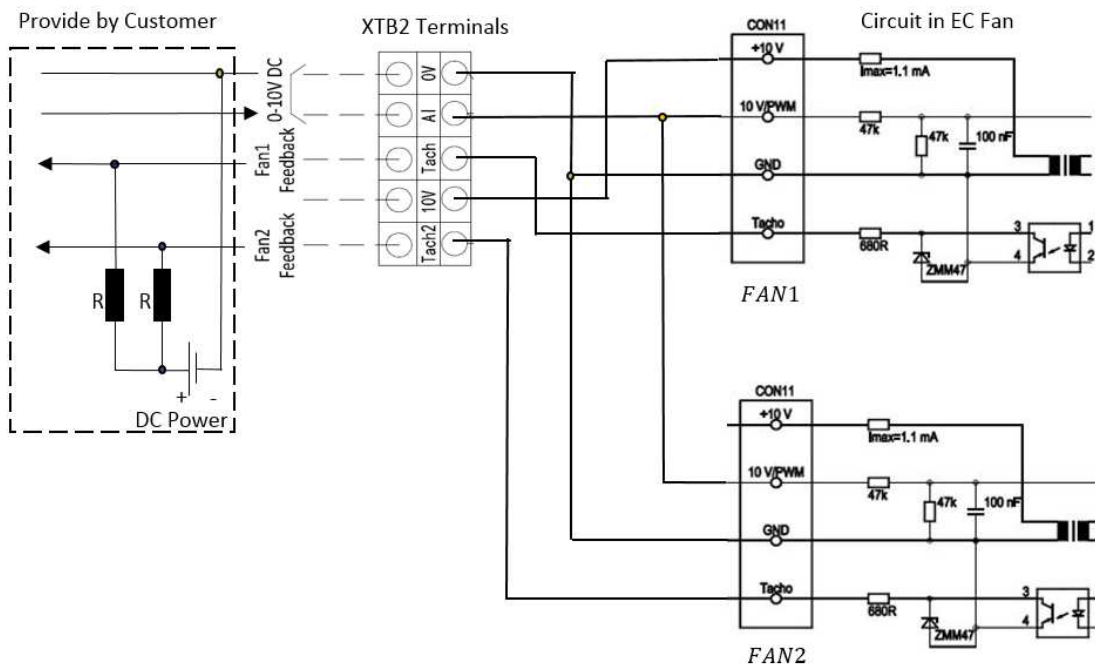
⚠ A circuit breaker should be installed to the supply power.

Fig.1 Wiring Diagram:



Model	Power	Wire Size	Recommended Breaker (with earth leakage protection)
YECFC01	230V ~50/60Hz	1.0 mm ²	5A 2P C Type
YECFC02	230V ~50/60Hz	1.0 mm ²	5A 2P C Type
YECFC03	230V ~50/60Hz	1.0 mm ²	5A 2P C Type
YECFC04	230V ~50/60Hz	1.0 mm ²	10A 2P C Type
YECFC05	230V ~50/60Hz	1.0 mm ²	10A 2P C Type

Detail Connection for -XTB2:



Notes:

- 1.* Speed control from customer: 0~10V DC control signal from customer should be connected to terminal 'AI' and '0V'. 'AI' for '+', '0V' for '-'. 1V for min speed and 10V for max speed.
2. Speed feedback to customer: pulse type signal (duty ratio is about 50%), open collector, 1 pulses per revolution, electrically isolated. Fan1 feedback via terminal 'Tach' and '0V', Fan2 feedback via terminal 'Tach2' and '0V'. R (resistances, e.g. 10K) and DC power (e.g. DC 24V) should be supplied by customer.
3. +10V to customer: terminal '10V' and '0V' provide a DC 10V power source(1.1 mA). The EC fans will run at full speed if 'AI' and '10V' were short wired, but this function can't be used at the same time with function described in item 1.

The item marked as * is must be wired by customer, and the other 2 items are optional.

3.3 Cold area operation

When operating the fan coil unit in climates where ambient temperatures could result in coil freezing, ensure that the heating energy source is enabled, heating water is up to temperature, and heating water flow is available prior to starting the unit. Once the unit is enabled, open the outside air damper as required. This is to prevent coil frosting which may damage the unit. This is particularly important for units with air on coil conditions based on a high percentage of outside air.

For units that require seasonal drainage of water from the coils, when stopping the unit, close the fresh air damper first, isolate the power to the fan(s), and then isolate the water supply to the unit. Use the water piping drain point to drain the water in the coils to prevent damage from potential freezing.

4. Maintenance & Service of Product

4.1 Air Filter

Air filters should be checked and cleaned, or replaced, as necessary on a periodic basis.

Typically inspect air filters every 3 months, noting that filter cleaning and replacement frequency is dependent on run hours and outside air quality.

The filter can be removed from the unit by sliding the filter out of the return air plenum filter track.

Filters are either washable or throwaway type. For washable filters, clean it per the manufacturer's instructions, dry it as required, and reassemble it back to the filter frame.

4.2 Cooling Coil and Heating Coil

1. On an annual basis, observe for dirt accumulated on the coil heat exchanger and clean coil fins if required (it is recommended to clean it with the low pressure compressed air from the air outlet side).
2. Ensure the coil fins are not damaged. Comb coil fins as required.
3. If there is evidence that air has entered the water system, use the system air vent to bleed air out of the system.
4. When fan coil unit is non-use, the coil should be filled with water in summer so as to avoid rust corrosion; water in coil should be drained out in winter so as to avoid copper pipes cracking.
5. If any coil needs to be replaced, consult with the manufacturer.

4.3 Fan and Motor Assemblies

On an annual basis inspect the EC fan /motor assemblies.

1. Before any work is carried out on the fan or motor, isolate the power and lockout / tagout with appropriate warning signs.
2. Remove the appropriate ductwork to gain access to the fan/motor assembly located in the unit's air plenum.
3. Check whether the fan can rotate freely.
4. Clean the fan blades as required.
5. The normal service life of the fan bearing used in the YECFC unit can be up to 75,000 working hours without service. Bearings are of the sealed type.
6. Check the tension of all motor terminals
7. If a motor needs to be replaced, consult with the manufacturer.

5. Failure Analysis

5.1 Low Air Flow Rate

The actual static pressure needed is greater than the design static pressure and. Thus, the air flow rate is lower than the design value.

Increase fan speed as required.

5.2 High Air Flow Rate

The actual static pressure needed is lower than the design static pressure, making the air flow rate higher than the design value. The increased air flow rate increases coil velocity and increased unit noise level.

Increased air flow rate leads to risk of moisture carryover where coil face velocity exceeds 2.5 m/s.

Decrease fan speed as required.

5.3 High Noise and Vibration level

Check for correct unit isolation.

Verify that there are no vibration paths via duct or pipe to the structure.

Verify there are correctly installed flexible connections between unit, the return air, and the supply air ductwork.

Verify flexible connections are correctly installed to connecting water pipes.

Ensure the unit is correctly hung, and any installed vibration isolators are installed and functioning correctly.



YORK Guangzhou Air Conditioning & Refrigeration Co., Ltd.

Phone: +86 763 4681111

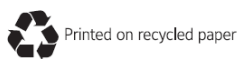
Fax: +86 763 4681114



© 2019 Johnson Controls, Inc.

www.johnsoncontrols.com

FORM NO.: 6A4Y-A01A-NE-EN



SUPERSEDES: 6A4Y-A01A-ND-EN

* Johnson Controls is committed to the continuous product improvement.
Please note the product design may change without notification.

**This manual is for reference only. For the specific product specifications and performance,
Please refer to the purchase agreement.

SAP NO.:5172735

