

Johnson Controls® Fan Coil Units and Direct Digital Controls

This offering includes Johnson Controls® fan coil units with a factory-installed Johnson Controls Direct Digital Controller (DDC), valves, and sensors.

Fan coil control is based on zone, return air, or discharge air temperature sensors. In addition, these configurations support stand-alone networks like the N2 bus or LON network. You can connect Johnson Controls fan coil units to a Metasys® Building Automation System (BAS) (including the Network Automation Engine [NAE]), Network Control Module (NCM), and N30 controller.

Johnson Controls fan coil units offer precise, rigid construction and extremely high quality standards. They are designed to provide maximum comfort and efficiency with minimal generation of noise.



Figure 1: Johnson Controls Fan Coil Units with FX05 Direct Digital Controller

| Features and Benefits | |
|---|--|
| <input type="checkbox"/> Factory-Installed Controls, Configured and Tested for Specific Applications | Reduce startup costs and time, simplifies installation and commissioning, and provides reliable comfort control |
| <input type="checkbox"/> Advanced Application Flexibility | Provides maximum comfort and energy savings in a small but powerful controller |
| <input type="checkbox"/> Compatible with the Metasys N2 Bus or LON Network | Enables supervisory-level management of comfort and energy through the powerful capabilities of the Metasys system |
| <input type="checkbox"/> Integral Display for Service Personnel | Provides fast and simple commissioning by enabling you to quickly view or change application parameters. Individual Light-Emitting Diodes (LEDs) provide status and diagnostic information |
| <input type="checkbox"/> Suitable for a Broad Range of Building Markets | Meets potential needs of hotels, apartments, condominiums, schools, universities, hospitals, and nursing homes. |

Additional Features

Additional features for the Johnson Controls fan coil units with DDC, include:

- hot water, steam, electric, chilled water or Direct-Expansion (DX) applications
- 2-pipe or 4-pipe configurations
- condensate float (drain-pan overflow alarm)
- Aquastat option (local or networked)
- outdoor air damper
- complete valve packages (Y-strainers, clean-outs, circuit setters, P/T ports, ball valves)
- secondary drain pan connections
- motor quick connects

When you choose the Johnson Controls DDC option on Johnson Controls fan coil units, a set of standard controls is pre-installed. Standard controls include the digital controller, current sensing relay, discharge air temperature sensors, transformer, and fan relays.

As part of the controls' package, optional equipment includes the N2 or LON network card. If you require zone control, the zone stat is field installed.

All valve options are a function of the fan coil unit itself and are not included in the standard controls package.

Table 1: Included Equipment

| Type | Equipment |
|------------------------|--|
| Standard | Digital Controller Discharge Air Sensor Transformer Fan Relays |
| Optional | N2 Bus Card LON Network Card Fan Motor Current Sense Relay (CSR) Control Valve Packages |
| Field-Installed | Room Command Module (order separately) Room Thermostat |

Horizontal Low Profile Fan Coils

Figure 2 shows the horizontal basic fan coils. The horizontal basic fan coils have 240 - 1,590 Cubic Feet per Minute (CFM) and 6,300 - 41,400 British Thermal Units per Hour (BTU/H) capacity.



FHF

**Horizontal Concealed
Free Return**



FHP

**Horizontal Concealed
Plenum Return**



FHX

Horizontal Exposed

Figure 2: Horizontal Low Profile Fan Coils

Horizontal High Output Fan Coils

Figure 3 shows the horizontal high output fan coils. The horizontal high output fan coils have 600 - 2,400 CFM and 17,800 - 56,000 BTU/H capacity.



FNF

**Horizontal Concealed
Free Return**



FNP

**Horizontal Concealed
Plenum Return**



FNX

Horizontal Exposed

Figure 3: Horizontal High Output Fan Coils

Vertical Basic Fan Coils

Figure 4 shows vertical basic fan coils. Vertical basic fan coils have 230 - 1,180 CFM and 6,900 - 33,400 BTU/H capacity.



FWC

Vertical Concealed



FWI

**Vertical Exposed
Angled Top**



FWX

**Vertical Exposed
w/o Front Panel**

Figure 4: Vertical Fan Coils

Vertical High Performance Fan Coils

Figure 5 shows the vertical high performance fan coil. The vertical high output fan coil has 400 - 2,000 CFM and 13,600 - 66,400 BTU/H capacity.



FCC

Figure 5: Vertical High Performance Fan Coil

Vertical Stack Fan Coils

Figure 6 shows the vertical stack fan coil. The vertical stack fan coils have 340 - 1,230 CFM and 13,400 - 44,500 BTU/H capacity.



FS

FSC - Vertical Stack Concealed
 FSX - Vertical Stack Exposed
 FSM - Vertical Stack Master
 FSS - Vertical Stack Slave
 FSA - Vertical Stack Tandem Master
 FSB - Vertical Stack Tandem Slave

Figure 6: Vertical Stack Fan Coils

Room Command Modules in Table 2 are available for use with the Johnson Controls fan coil units.

Table 2: Room Command Modules and Features

| Johnson Controls Part Number | Features | | |
|------------------------------|----------------------|---------------------|--------------------|
| | Warmer/Cooler Adjust | Temporary Occupancy | Fan Speed Selector |
| LP-KIT006-000C | X | X | |
| LP-KIT006-003C | X | X | X |

Fan Coil and Valve Specifications

Table 3 indicates supported pipe and valve configurations. The configuration is factory-set in the digital controller based on the fan coil unit order.

2-pipe systems use the same coil for cooling and heating, dependent on the central pumping. 4-pipe systems use two coils for applications where both chilled water and hot water are available. Separate valves are used for heating and cooling.

Table 3: Fan Coil and Valve Specifications

| App | Pipes | Heating or Cooling | Valve Type | Electric Heat |
|-----|--------|-------------------------|-------------------------|---------------|
| 1 | 2 Pipe | Heating | 2 Position | - |
| 2 | 2 Pipe | Heating | 2 Position | Yes |
| 3 | 2 Pipe | Heating | Proportional | - |
| 4 | 2 Pipe | Heating | Proportional | Yes |
| 5 | 2 Pipe | Cooling | 2 Position | - |
| 6 | 2 Pipe | Cooling | 2 Position | Yes |
| 7 | 2 Pipe | Cooling | Proportional | - |
| 8 | 2 Pipe | Cooling | Proportional | Yes |
| 9 | 4 Pipe | Htg/Clg | 2 Position | - |
| 10 | 4 Pipe | Htg/Clg | 2 Position | Yes |
| 11 | 4 Pipe | Htg/Clg | Proportional | - |
| 12 | 4 Pipe | Htg/Clg | Proportional | Yes |
| 13 | 2 Pipe | Htg/Clg with Changeover | 2 Position | - |
| 14 | 2 Pipe | Htg/Clg with Changeover | 2 Position | Yes |
| 15 | 2 Pipe | Htg/Clg with Changeover | Proportional | - |
| 16 | 2 Pipe | Htg/Clg with Changeover | Proportional | Yes |
| 17 | 4 Pipe | Htg/Clg | 2 Position Clg Prop Htg | - |
| 18 | 4 Pipe | Htg/Clg | Prop Clg 2 Pos Htg | Yes |
| 19 | 4 Pipe | Htg/Clg | 2 Position Clg Prop Htg | - |
| 20 | 4 Pipe | Htg/Clg | Prop Clg 2 Pos Htg | Yes |

Fan Coil Accessories

A basic valve package includes isolating ball-type shut-off valves (2 or 4), balancing ball valves with a memory stop (2 or 0), and 2- or 3-way motorized valves with a spring return (24 VAC actuators).

Additional options per coil include a strainer, adjustable flow control valves/circuit setter (with two Pete's plugs), fixed flow control valves/circuit setters, union fittings (before the coil or after manual shutoff valves), P/T ports for measuring pressure and temperature, and an air vent (manual or automatic). A 2-way modulating valve can be provided with shut-off ball valves.

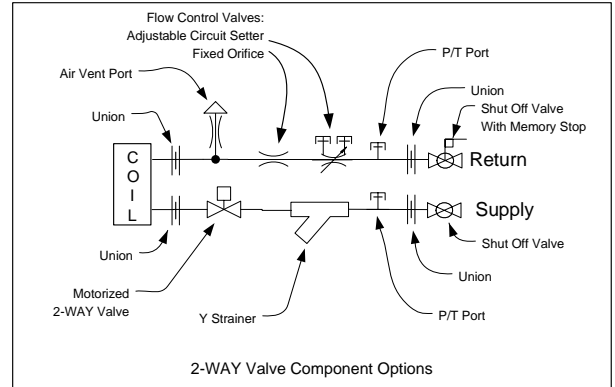


Figure 7: Control Valve Diagram

Table 4: 2-Pipe and 4-Pipe Coil Rows

| Series | 2-Pipe Coil Rows | | 4-Pipe Cooling Rows/Heating Rows (Optional) |
|---------------|------------------|----------|--|
| | Standard | Optional | |
| FWC, FWX, FWI | 3 | 4 | 3/1, 3/2, 4/1 |
| FCC | 3 | 4 | 3/1, 3/2, 4/1, or 4/2 |
| FHP, FHF, FHX | 3 | 4 | 3/1, 3/2, 4/1, or 4/2 |
| FNX, FNF, FNP | 3 | 4 or 6 | 3/1, 3/2, 3/3, 3/4, 4/1, 4/2, 4/3, 4/4, 6/1, 6/2 |
| FS | 3 | 4 | 3/1 (standard), 3/2, or 4/1 |

Table 5: Valve Types

| Size (inches) | Valve Body | | Actuator | |
|---------------|----------------------|----------------------|------------|--------------|
| | 2-Way C _v | 3-Way C _v | 2-Position | Proportional |
| 1/2 | 2.5 | 3 | 24 VAC | 0-10 VDC |
| 3/4 | 5 | 5 | | |
| 1 | 8 | 8 | | |

Table 6: Water Connections (Supply and Return)

| Fan Coil Size | Models | Supply and Return Water Connections Outside Diameter (OD) (inches) |
|---------------|---|--|
| 20-60 | all models with 1- or 2-row coil | 5/8 (16) |
| 20-60 | all basic models (FHP, FHF, FHX, FWC, FWX, FWI, FLC, FLX), 3- or 4-row coil | 7/8 (22) |
| 04-06 | high output models (FNF, FNX, FNP, FCC), 1-, 2-, 3- or 4-row coil | 5/8 (16) |
| 08-20 | high output models (FNF, FNX, FNP, FCC), 1-or 2-row coil | 5/8 (16) |
| 08-12 | high output models (FNF, FNX, FNP, FCC), 3- or 4-row coil | 7/8 (22) |
| 16-20 | high output models (FNF, FNX, FNP, FCC), 3- or 4-row coil | 1 1/8 (29) |

Technical Specifications

| | |
|-------------------------------------|--|
| Product Name | Johnson Controls Direct Digital Controller |
| Power Requirements | 24 VAC +/- 15% |
| Binary Inputs (BI) | (5) BIs not isolated, voltage free contacts |
| Analog Inputs (AI) | (4) AIs, not isolated, A99 Resistive Temperature Device (RTD) , range: -40 to 221°F (-40°C to 105°C), accuracy: 0.5°F @ 68°F (0.3°C @ 20°C) ambient |
| Binary Outputs | (6) BOs (4 relays + 2 triacs), relays are 5A, 250 VAC and triacs are 5 A, 24 VAC |
| Power Consumption | 6 VA |
| Analog Output | 1 AO, -10 VDC, 5 mA |
| Ambient Operating Conditions | -4 to 122°F (-20 to 50°C), 10 to 95 % RH (noncondensing) |

The performance specifications are nominal and conform to acceptable industry standards. For application at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products.



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