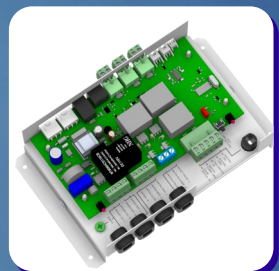


MLM+ MULTI-ZONE FAN COIL UNIT CONTROLLER

- ✱ WORKS WITH VAV DIFFUSERS
 - MATCHES FAN SPEED TO DIFFUSER DEMAND
 - NO DUMPING AT LOW FAN SPEED
 - CONTROL MULTIPLE VAV ZONES WITH ONE FCU
 - SAVE BY SELECTING LARGER FCU'S
 - NO OVER OR UNDER CONDITIONING
 - SOFTWARE WIZARD AIDS SETUP
- ✱ WORKS WITH CAV DIFFUSERS
- ✱ INTEGRATES WITH MLM+ & THE BMS
- ✱ TWO AND FOUR-PIPE FAN COIL UNITS
- ✱ WITH OR WITHOUT ELECTRIC HEATING
- ✱ EC & 3 SPEED FAN CONTROL
- ✱ 220V AC - 12V DC POWER SUPPLY
- ✱ PIR, DOOR & WINDOW SWITCH OVERRIDE
- ✱ AUTO WATER SUPPLY TEMP DETECTION
- ✱ ADJUST SETTINGS WITH RICKARD STAT
- ✱ FREE MLM+ FCU COMMISSIONING & MANAGEMENT SOFTWARE

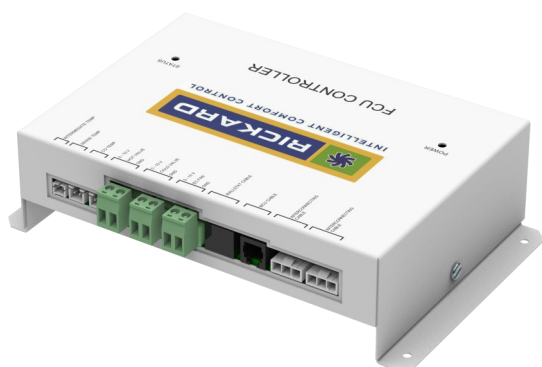


FEATURES

Rickard's Fan Coil Unit Multi-Zone Controller is more than a traditional FCU controller. As the name suggests, the controller can now be combined with Rickard's VAV diffusers so that the FCU can handle multiple zones without the need for pressure sensors or dampers. Since the FCU and diffusers are linked through the tried and tested MLM+ system, the FCU can regulate the fan speed and hence duct pressure from the diffusers average demand.

The benefits of an FCU Multi-Zone Controller over a traditional FCU supplying constant volume diffusers are:

- Zones with different loads can be ducted to the same FCU. Individual temperature control and comfortable occupants at every zone.
- Control more Zones.
- Reduce cost by installing fewer, larger FCU's.
- Fan speed matches diffuser demand creating excellent circulation and no dumping at low fan speed.
- Never over or under condition different zones again.
- To conserve energy, the Fan Coil Unit Multi-Zone Controller can power down the Fan Coil Unit if the room is unoccupied and/or if a window



or door is left open.

If desired, the Controller can be used to control the FCU with CAV diffusers. The following applies to a system connected to VAV or CAV diffusers.

Since the Rickard FCU Multi-Zone Controller uses the tried and tested MLM+ system, commissioning, managing and integrating your Fan Coil Units with the BMS is easier than ever before.

The Fan Coil Controller is capable of managing the operation of both two and four-pipe fan coil units, 6-way valves and with or without electric heating. Fan coils with EC fans, 3-speed fans, AC valves, and electric heating can be controlled with the appropriate Fan Coil Controller model. A built in 220V AC to 12V DC Switch Mode Power Supply (SMPS) removes the need for an external power supply unit or transformer.

Two dry contact inputs are supplied allowing a PIR and/or door or window reed switch to trigger the override. In addition, a loosely regulated 12V supply is available allowing devices such as PIRs to be directly powered from the Fan Coil Controller.

The Fan Coil Controller can automatically detect a water supply change-over from hot to cold and vice versa, with the aid of a change-over temperature sensor. This allows two-pipe Fan Coil Units to be operated without the need for electric heating.

The setpoint of the Fan Coil Controller can be configured externally via Rickards

Fan Coil Unit Wall Thermostat or MLM+ application.

HARDWARE FEATURES

- Internal 220V AC SMPS.
- Capable of driving:
 - * 220V, 2kW heating elements directly.
 - * AC Valves for both heating and cooling.
 - * 3-speed fan.
 - * EC fan.
 - * Analogue position-controlled valves.
- Two dry contact inputs.
- 12V DC supplementary supply.

ACCESSORIES

- Rickard Fan Coil Wall Thermostat.
 - * Toggles Power
 - * Adjusts Fan Speed
 - * Sets Temperature
 - * Shows Room Temperature

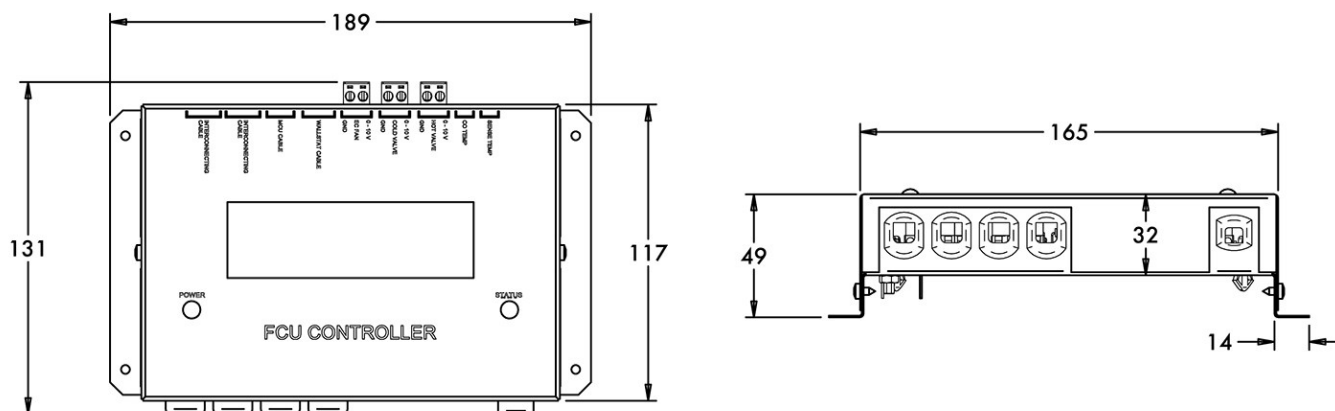
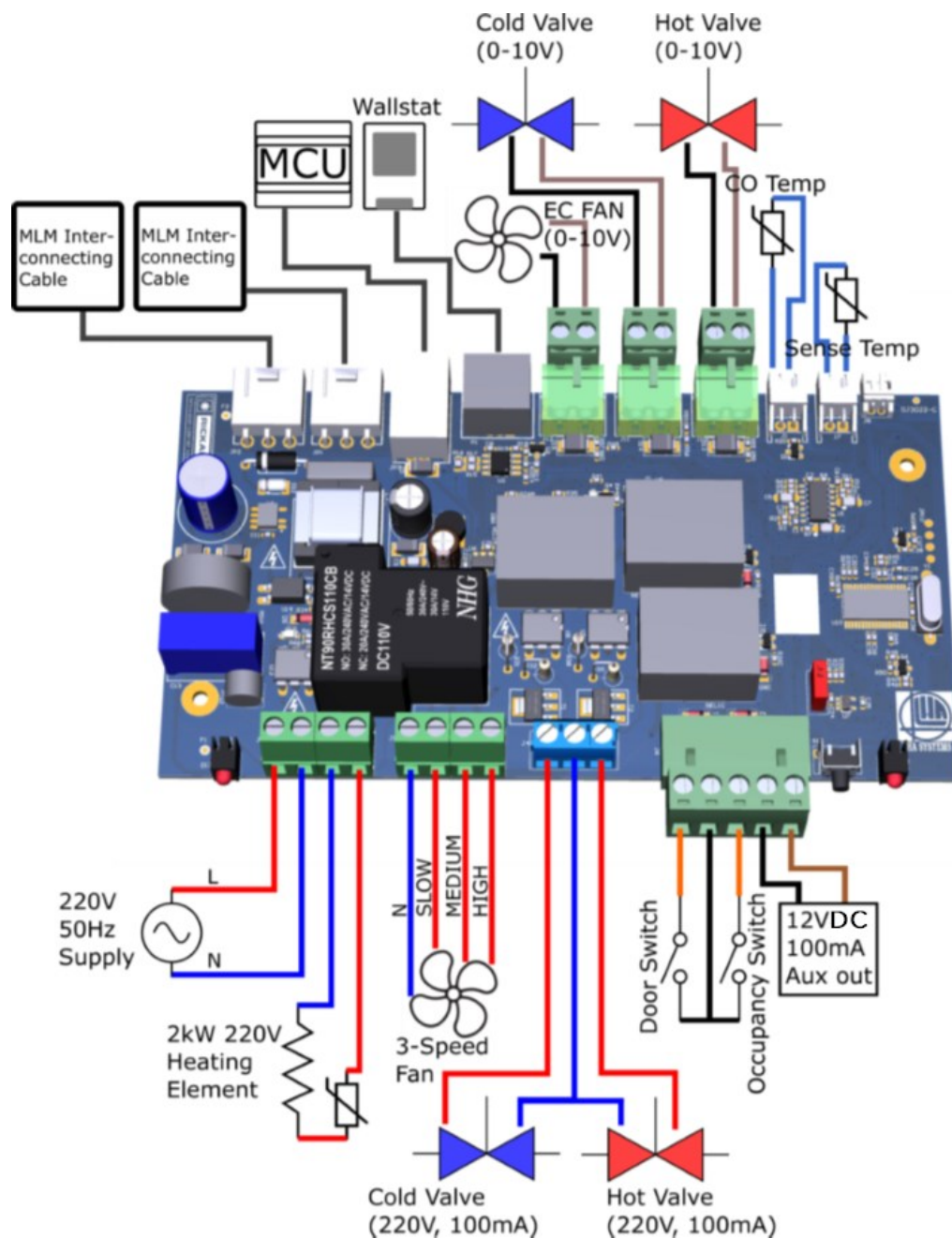
PRODUCT SPECIFICATION

- **Power Supply**
 - * 220Vac $\pm$ 10%, 45Hz-65Hz
 - * Power Consumption: 3.3W absolute max (excluding heater, fan and valves)
- **Environmental**
 - * Operating Temperature Range: 0 to +50°C
 - * Storage Temperature Range: 0 to +70°C
- **Maximum Electrical Ratings**
 - * Heater Element: 220V, 2kW
 - * 3-Speed Fan: 220V, 3A/contact
 - * AC Valves: 220V, 100mA
 - * Aux 12V DC supply: 13V $\pm$ 1V, 100mA
 - * Analogue Controlled EC Fan: 0-10V, 1mA max (10k minimum impedance)
 - * Analogue Controlled Valves: 0-10V, 1mA max (10k minimum impedance)

Variant	A
Electric Heater	YES
3 Speed Fan	YES
220V Valves	YES
Dry Contact Inputs	YES
EC FAN	YES
Analogue Valves	YES
Temperature Sense	YES
MLM+ Interface	YES
12V aux supply	YES

AVAILABLE VARIANTS

WIRING DIAGRAM



CONTROL SCHEME

A single Proportional-Integral (PI) control loop is implemented that controls all control elements (heater, valves and fan) of the Fan Coil Controller. All analogue outputs of the controller are directly mapped to the percentage of control indicated by the control loop, whereas discrete outputs such as the 3-speed fan, AC valves and electric heater operate at predefined control levels meant to approximate the controls output. The table indicates the switching points of the discrete control elements.

Control Element	3 Speed Fan	220V Valves	Heater
Control Method	PI Controlled Approximation 0 = off Low = 1% + 3% Medium = 33% ± 3% High = 66% ± 3%	PI Control On and off limits configured via SDO [79] Default: On at 50% Off at 10% (For proportional control set Reset rate	Proportional control On at -0.5 °C Off at -0.2 °C

Cooling: In this mode the fan coil is attempting to cool the room/space.

Idle: In this mode the fan coil will not control the room/space temperature or fan speed.

Fan Only: In this mode the fan operates and temperature is not controlled. The fan operates at a fixed speed set by the Wallstat.

Override: This mode is activated by the door/window input, the occupancy input or by placing the Fan Coil Controller into manual control.

Test Button: The test button activates a display mode in the MLM+ Tool Application and does not alter the operation of the Fan Coil Controller. The Fan Coil Unit can then be identified on the MLM+ Tool.

INSTALLATION AND COMMISSIONING

The Fan Coil Controller can be fitted to a standard MLM+ 24 installation and can interface with the MLM+ Tool V8.16 u4 for commissioning and diagnostics. A built in software wizard guides the user through the process so that everything works as intended.

HARDWARE INSTALLATION

The Fan Coil Controller manages the operation of either a two or four-pipe Fan Coil Unit, 6-way valves and with, or without electric heating. EC fans, 3-speed fans, AC valves, and electric heating can also be controlled. The Fan Coil Controller incorporates a 220V AC to 12V DC SMPS removing the need for a separate power supply or transformer.

Two dry contact inputs are supplied allowing a PIR and/or door or window reed switch to override the operation of the Fan Coil Controller. In addition, a loosely regulated 12V supply is available allowing devices such as PIRs to be directly powered from the Fan Coil Controller. Please see the User Manual for complete Installation and Commissioning Instructions.

OPERATION CONFIGURATION

There are various operational controls that can be configured by the user. Rickard recommends using the wizard to guide you through the configuration process. These include the minimum and maximum fan speed in heating and cooling, the average diffuser disk position to switch fan speed if using VAV diffusers in your installation, turn-on and turn-off limits for the discretely controlled outputs (AC valves and electric heater), the PI loop control variables, and master command (space-temperature measurement, change-over temperature measurement, and setpoint control).

FAN COIL OPERATING MODES

The Fan Coil Controller utilises multiple control modes of operation. These modes include:

Heating: In this mode the fan coil is attempting to heat the room/space.

FAN COIL CONFIGURATIONS & ORDERING

Our FCU's can work with CAV or VAV diffusers. Please pay attention to the number and combination of controllers that can be connected per channel.

FCU'S & CAV DIFFUSERS

In this case up to 15 FCU controllers can be connected to each MCU Channel, iPSU/PSU.

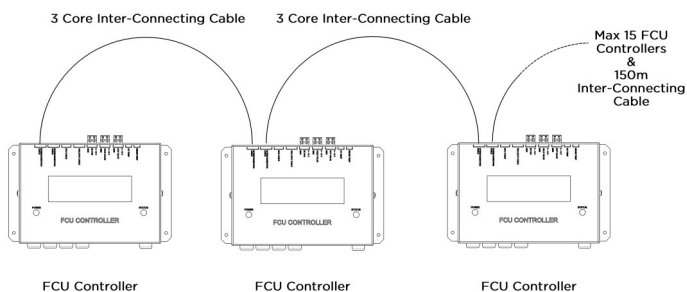
Secondary FCU's: If the FCU is operating as a secondary unit, only an inter-controller cable is required to link the primary (onboard or remote sensing) and secondary FCU controller. Please order an inter-controller cable and specify the required length. Use the MLM+ tool to zone primary & secondary FCU's.

Primary FCU's with Onboard Sensing: The FCU has an onboard controller built in. The FCU controller can operate without a wall thermostat provided it is fitted with a correctly placed room temperature sensor. Commissioning of the unit can be done using the MLM+ tool. Please order a room temperature sensor with the correct length.

2 Pipe Fan Coil Units with hot and cold water supply: In this case it is necessary to sense water pipe temperature when the supply temperature changes. Please order the correct length change over sensor. Our standard length is 0.5m.

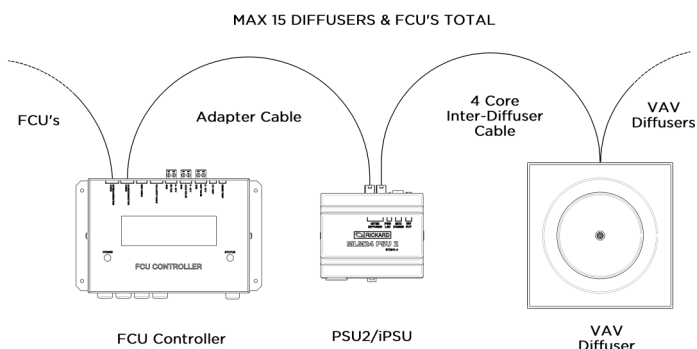
FCU with Remote Sensing: Please order a Rickard FCU Wall Thermostat. 8m RJ45 cable included.

Rickard mini-BMS or BACnet BMS: An MCU and cabling is required. Each FCU controller requires a 3 core inter-controller cable connection. One RJ9 cable connects one of up to 15 FCU controllers to 1 of 4 MCU channels. Please order an RJ9 cable/ channel <= 150m.



FCU'S & VAV DIFFUSERS

In this case it is possible to connect a number of FCU's and VAV diffusers per MCU channel, iPSU/PSU. No more than a total of 15 FCU's and VAV diffusers can be connected per channel. An adapter cable that connects the FCU's to the diffuser network is required to connect the two types of hardware. This 3-core cable has a 3-pin mini-fit connector on one end (FCU) and a 4-pin mini-fit connector (VAV Diffuser) on the other.



Please see full page schematic for more detail.

FAN COIL WALLSTAT

The Fan Coil Wallstat can alter the operational mode of the Fan Coil Controller, adjust the fan speed, set the setpoint, display the space-temperature and cause the Fan Coil Controller to power off.

The Fan Coil Wallstat utilises four user control buttons, these being, power, display cycle, increment and decrement.

FAN COIL WALLSTAT MODES

- **Off:**
- **Automatic Control:** Control of valves, heater and fan in order to reach the setpoint temperature.
- **Manual Fan Only Control:** Temperature control is turned off and the fan speed can be set to low, medium or high.



DISPLAY

The Fan Coil Wallstat can indicate three possible displays.

1. Room Temperature

A bracketed thermometer indicates temperature display.

The room temperature value is displayed.



2. Fan Speed Control

A bracketed fan shows fan speed adjustment.

A value of 1-3 or A for Automatic and a corresponding bar graph indicates the fan speed.



3. Set Point Display

The abbreviation SP indicates setpoint adjustment. The setpoint value is displayed.



STANDARD OFFERING

The standard Rickard Fan coil unit multi-zone controller is supplied without a power cable, inter-controller cable, wallstat or sensors.

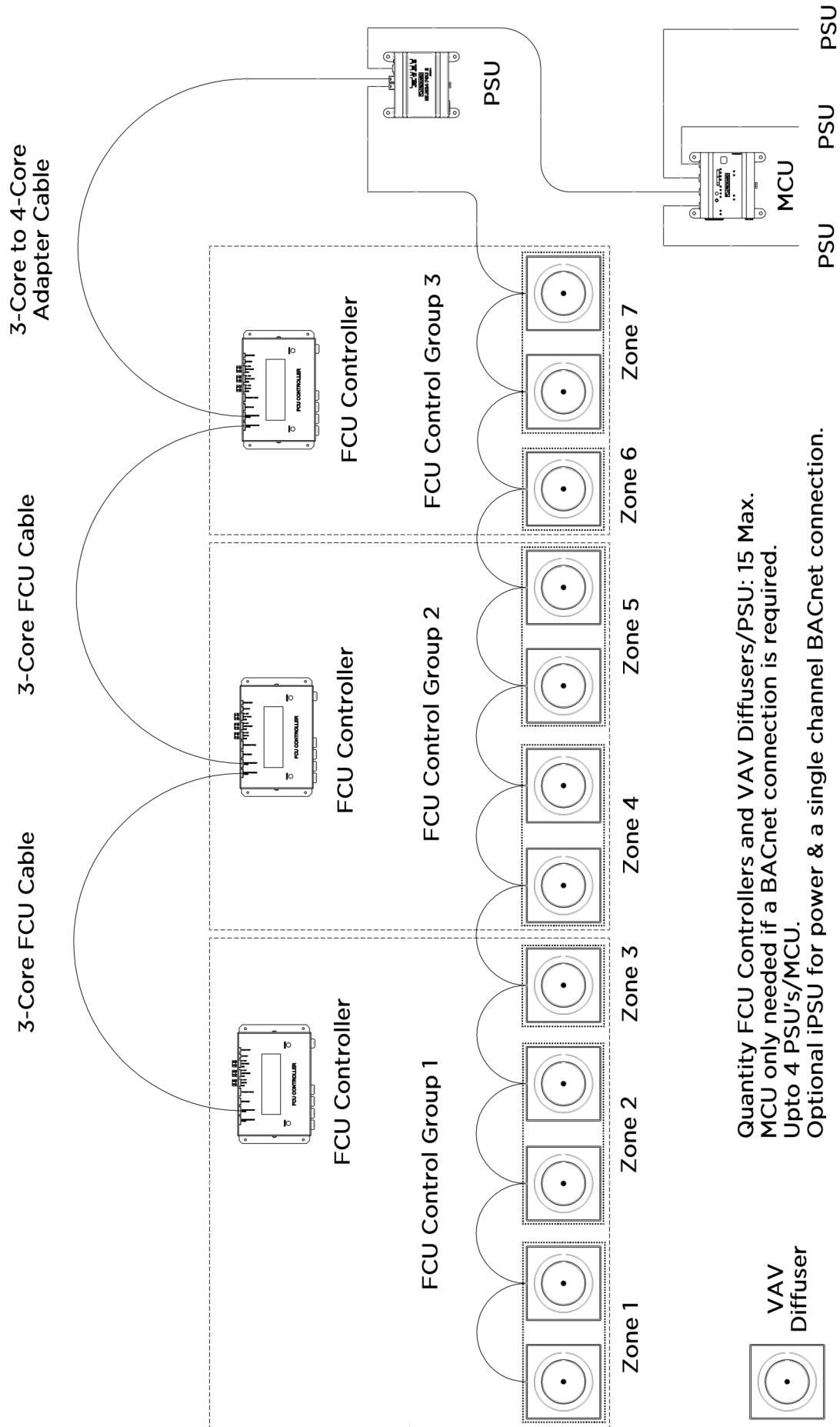
OPTIONS

- **Power cable and plug top:** Please specify cable length and plug type. Please see "Electric Plug Ordering Guide" for plug top ordering information.
- **Inter-FCU controller cables:** Our standard length is 8m. Please specify special lengths.
- **FCU to Diffuser Adapter Cable:** An adapter cable that connects the FCU to the diffuser network is required to connect the two types of hardware. A 3-pin mini-fit connector connects the FCU via a 3-core cable to the diffuser network with a 4-pin mini-fit connector.

ACCESSORIES

- **Fan Coil Wallstat:** One wallstat is required per controller.
- **Master Communications Unit (MCU):** 15 FCU &/ VAV Diffusers can connect to 1 MCU channel. An MCU has 4 channels. The MCU acts as a gateway to the BMS.
- **Intelligent Power Supply Unit (iPSU):** 15 FCU &/ VAV Diffusers can connect to 1 iPSU. An iPSU has 1 channel. The iPSU powers the VAV diffusers and acts as a gateway to the BMS.
- **Temperature sensors:** For room sensing, change over/supply air sensing and intermediate temperature sensing.

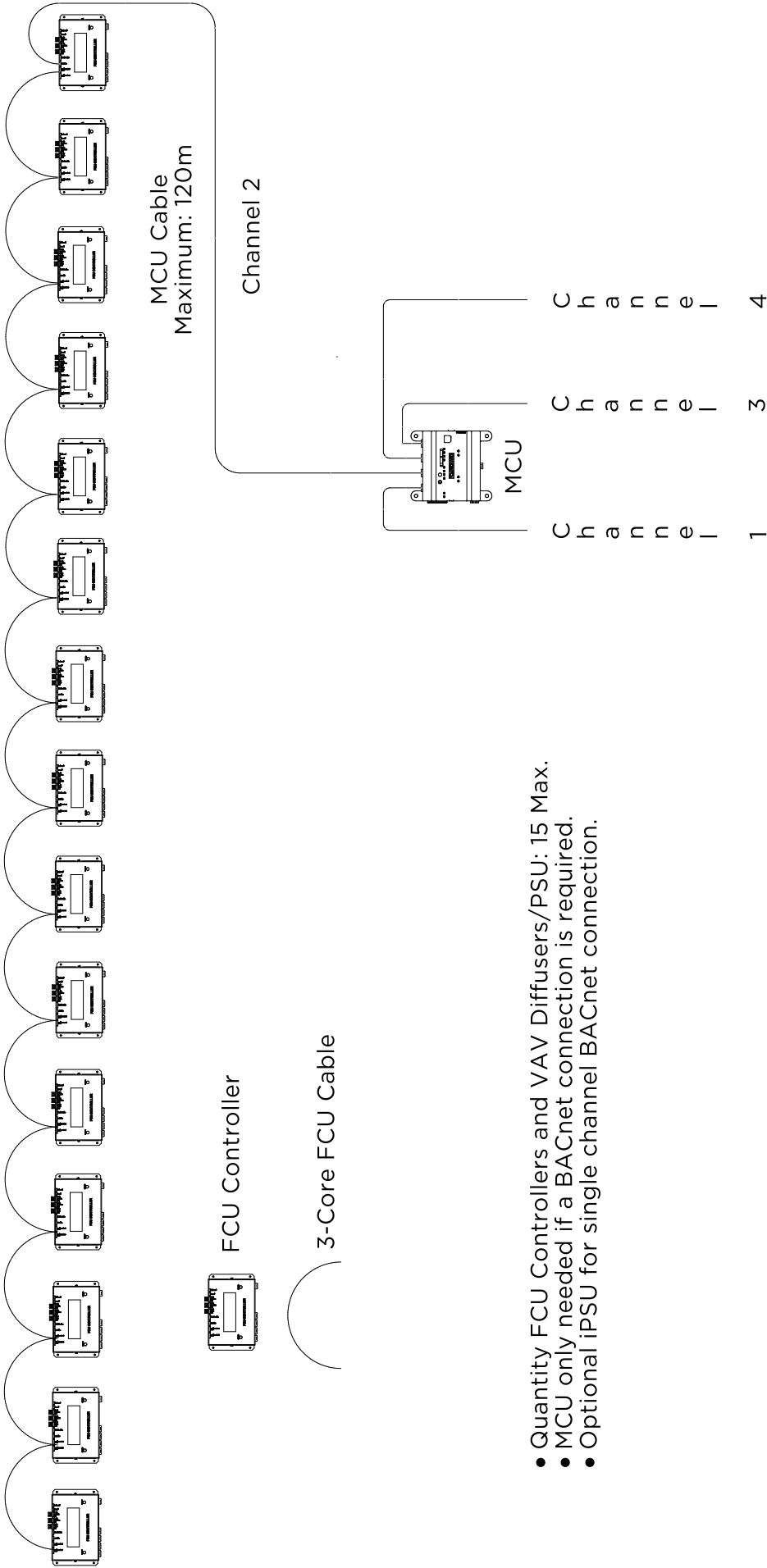
MULTI-ZONE FCU CONTROLLER SCHEMATIC



MULTI-ZONE FCU CONTROLLERS ONLY WITH MCU SCHEMATIC

MULTI-ZONE FCU CONTROLLERS ONLY WITH MCU SCHEMATIC

Maximum: 15 FCU Controllers, 150m Inter-FCU 3-Core Cable



- Quantity FCU Controllers and VAV Diffusers/PSU: 15 Max.
- MCU only needed if a BACnet connection is required.
- Optional iPSU for single channel BACnet connection.