

## Modular Room Control (MRC) Series Expansion Board

### Application

The Modular Room Control (MRC) system has the ability to expand its input/output capabilities with the use of expansion boards. Expansion boards allow control of the Fan Coil Unit (FCU) or Packaged Terminal Air Conditioning (PTAC) to be moved from the MRC Thermostat to a location that may better fit the specific needs of the hotel. For example, in a retrofit situation, there may not be enough existing wires between the original thermostat and the FCU. Instead of going through the expense and effort of pulling the required number of wires, the existing wires can be used to provide communication between the MRC Thermostat and the expansion board via a local bus. This expansion board could be located within the FCU to locally interface with the inputs and outputs.

Additional applications include controlling multiple FCUs or PTACs in parallel (for example, suite application) or controlling line voltage lighting circuits.

The expansion boards communicate to the MRC Thermostat through a wired (local bus) or wireless connection when used in conjunction with the Infrared (IR) transceiver.

### 5-Triac Expansion Board

The MRC19-EXP1 Triac Expansion Board is used to expand the functionality of the MRC Thermostat when 24 VAC triac operation is feasible. Use the MRC19-EXP1 expansion board to control compatible low voltage relays or low voltage loads, such as a valve. This expansion board also has one additional Binary Input (BI) that could be used to monitor the window, or compressor alarm in a heat pump, and it has one Analog Input (AI) that could be used as an Aquastat for seasonal changeover.

### 6-Relay Expansion Board

The MRC19-EXP2 Relay Expansion Board has six Single-Pole, Single-Throw (SPST), 100-300 VAC, 20 ampere relays on board. Relays five and six can be configured to switch as a pair, allowing both legs of the circuit to be controlled. Use the MRC19-EXP2 where the use of triac switching on low voltage is not preferred, or when line voltage switching is required. Typical applications would include line voltage switching in FCU or PTAC units or lighting controls. The MRC19-EXP2 also has the additional BI and AI inputs.

### Analog Expansion Boards

The MRC19-EXP3 and MRC19-EXP4 expansion boards have proportional control (0-10 VDC) capabilities, that would be typically used for hot or cold water valves with proportional actuators.

The MRC19-EXP3 combines the MRC19-EXP1 5-triac expansion board with an additional Analog Output board.

The MRC19-EXP4 combines the MRC19-EXP2 6-relay expansion board with an additional Analog Output board.

### IR Transceiver (EYE)

The MRC19-EYE0 IR transceiver allows wireless communication from the MRC Thermostat to the expansion boards. The transceiver can be surface mounted underneath the FCU/PTAC or mounted within a J box, behind a Decora® style cover plate. Communications do not require line of sight to the MRC thermostat. The expansion board provides power for the IR transceiver.

## Installation

The following items are required for control of the expansion boards:

- the MRC Thermostat
- an expansion board (one of the four models)
- an EYE IR transceiver when used with wireless communication (also requires the IR transceiver in the MRC Thermostat)

In a typical installation, the expansion board would be installed within the FCU or PTAC equipment electrical cabinet. Power for the expansion board would be provided by the FCU or PTAC power supply. If the MRC19-EXP1 or EXP3 triac models are used, then 24 VAC is required. The MRC19-EXP2 and EXP4 models can be powered by 100 to 300 VAC.

Communication between the MRC Thermostat and the expansion board would be a three wire, minimum 24 gage conductors. See Figure 6 for details.

When the MRC19-EYE0 IR transceiver is used, it should be mounted in a position to receive the IR communication from the IR transceiver on the MRC Thermostat. It does not require line of sight between the two IR transceivers.

## Dimensions

Refer to Figure 1 through Figure 5 for dimensions.

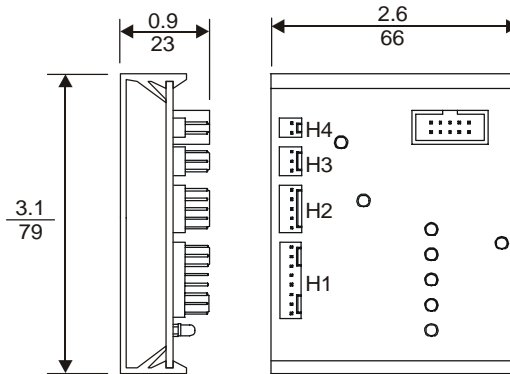


Figure 1: 5-Triac Expansion Board Dimensions, in. (mm)

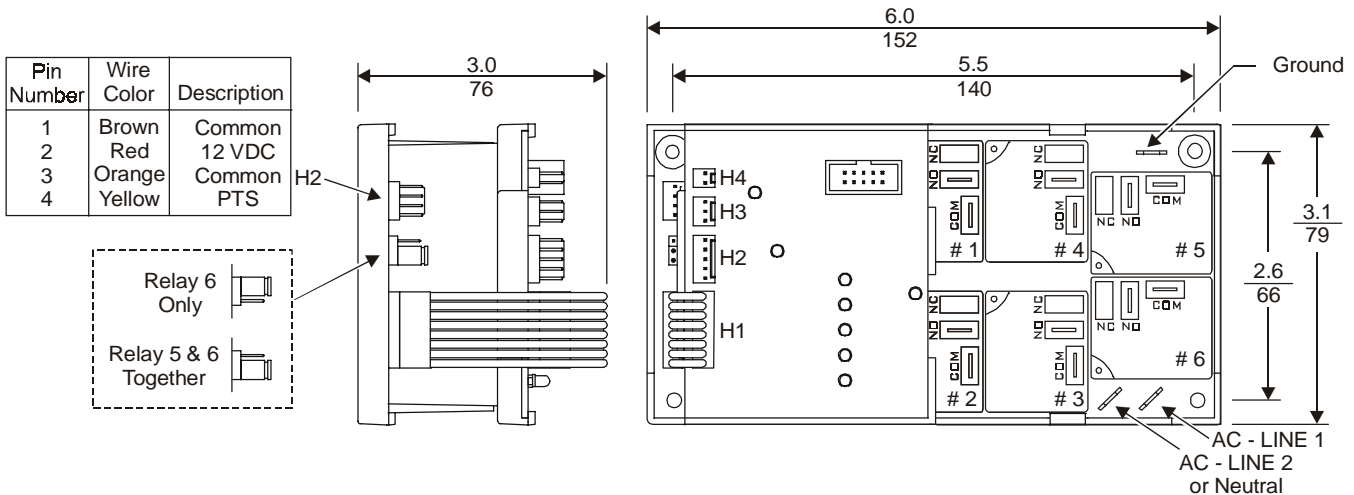
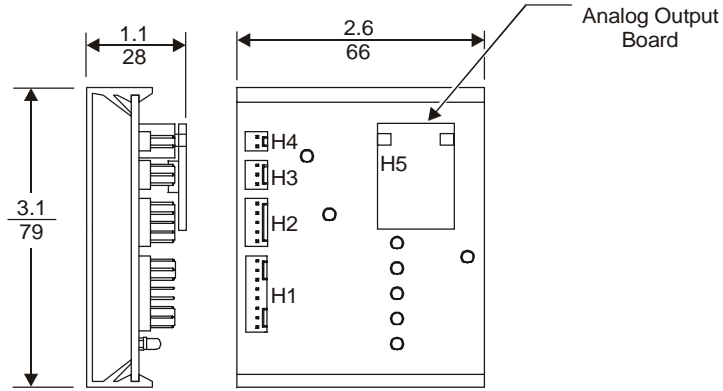
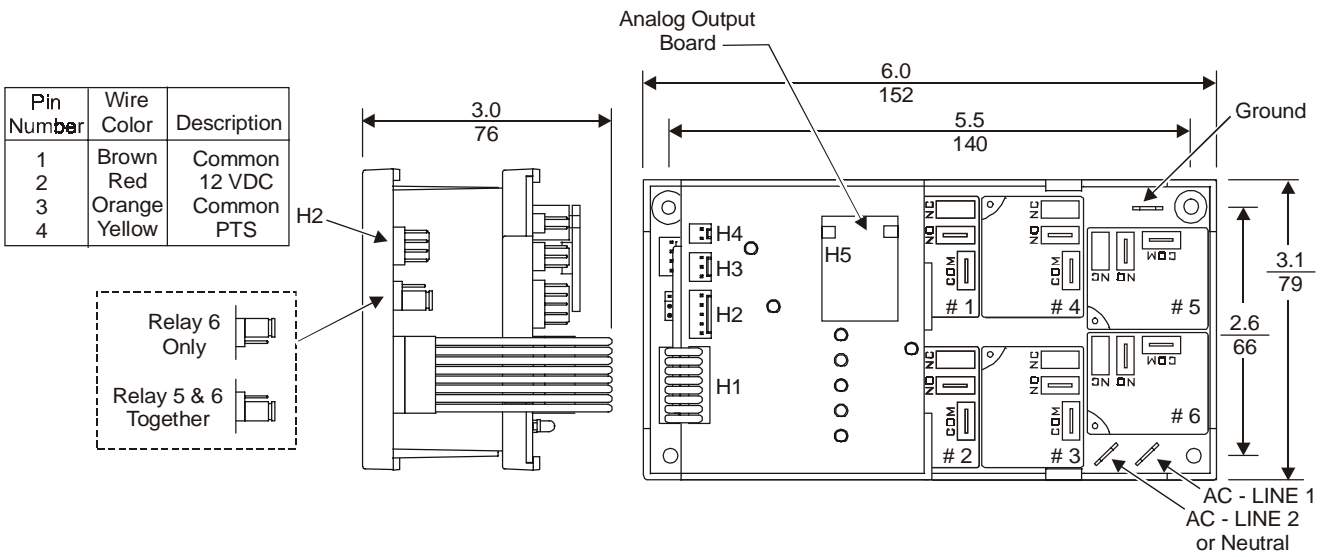


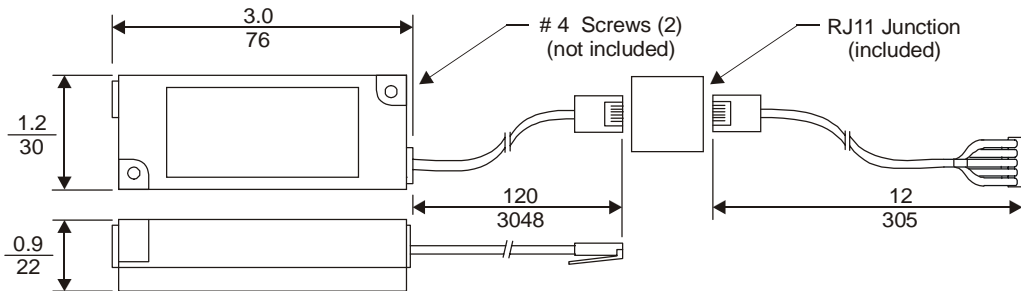
Figure 2: 6-Relay Expansion Board Dimensions, in. (mm)



**Figure 3: 5-Triac with 2 Analog Output Relay Expansion Board Dimensions, in. (mm)**



**Figure 4: 6-Relay with 2 Analog Output Expansion Board Dimensions, in. (mm)**



**Figure 5: EYE IR Transceiver Dimensions, in. (mm)**

## Wiring

### Wiring Connections Required for Expansion Boards



**CAUTION: Risk of Shock.**

Before applying power, make all wiring connections and check the connections. Short-circuited or improperly connected wires may result in permanent damage to the unit.

**IMPORTANT:** Make all wiring connections in accordance with the National Electrical Code (NEC) and all local regulations.

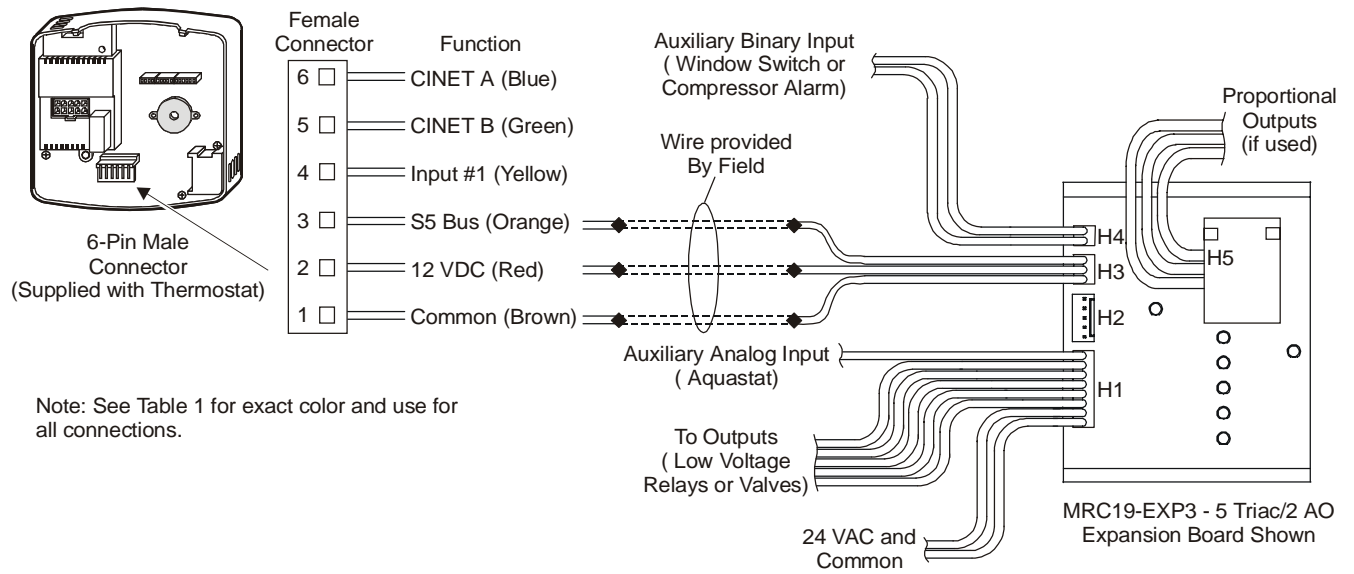
Each MRC19-EXP expansion board includes a mounting base and the wiring harness to connect to the appropriate headers on the boards. Refer to Figure 6, Figure 7, and Table 1 for detailed information.

There are essentially five connections available on the expansion boards. Each is labeled with a header designation such as H1 through H5.

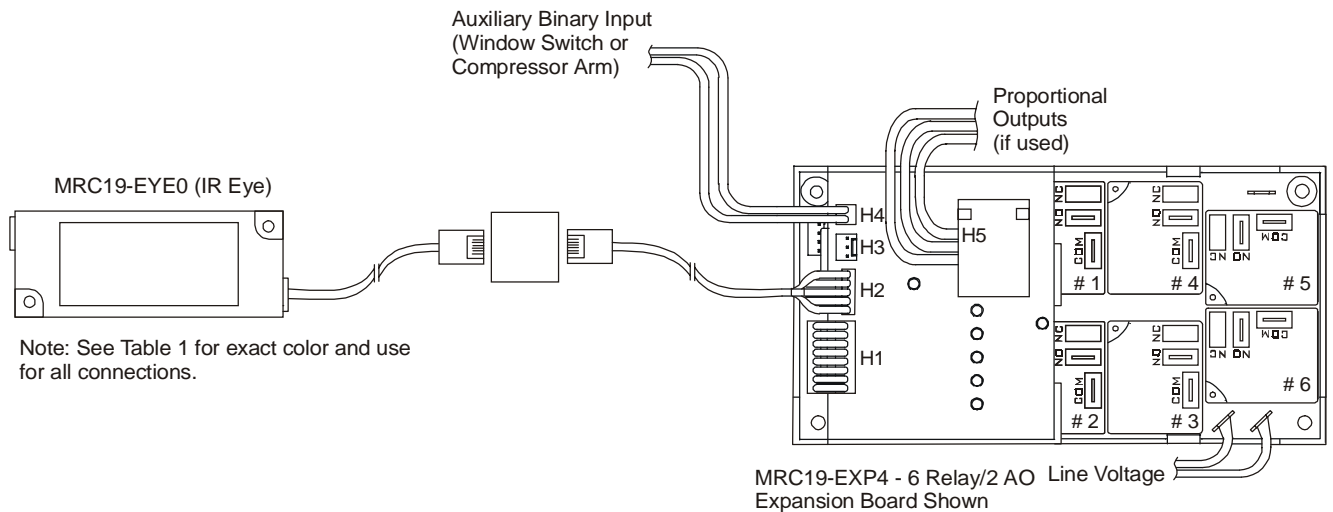
- H1 header – this is the connection point for the power supply, outputs and Analog Input. On the relay models, this connection is completed at the factory and does not require a field connection.
- H2 header – this is the connection point for the IR transceiver when used in a wireless application.
- H3 header – this is the connection point for the local bus between the MRC Thermostat and the expansion board.
- H4 header – this is the connection point for a local Binary Input such as a window switch (MRC19-MDS1).
- H5 header – this is the connection point for the Analog Outputs (AO). The two AOs share a common.

**Table 1: Header Connector Color Chart**

Pin	Wire Color	Header Description				
		1	2	3	4	5
1	Brown	24 VAC Common	Common	Common	Common	Common
2	Red	24 VAC	AGC	12 VDC	Auxiliary BI	AO1
3	Orange	Output # 1	12 VDC	S5 TX/RX		AO2
4	Yellow	Output # 2	IR5 TX			
5	Green	Output # 3	IR5 RX			
6	Blue	Output # 4				
7	Violet	Output # 5				
8	Grey	Auxiliary AI				



**Figure 6: Typical Connections when MRC Thermostat Is Hard Wired to the Expansion Boards Via Local Bus**



**Figure 7: Typical Connections when MRC Thermostat Is Wireless to the Expansion Boards**

## Technical Specifications

<b>Product</b>	Modular Room Control (MRC) Series Expansion Board
<b>Power Requirements</b>	24 VAC at 50/60 Hz, 24 VDC Nominal, 2.4 VA (MRC19-EXP1 and EXP3) 100 to 300 VAC at 50/60 Hz, (MRC19-EXP2 and EXP4)
<b>Agency Listings</b>	FCC UL CSA
<b>Ambient Operating Conditions</b>	41 to 149°F (5 to 65°C) 0-95% RH noncondensing
<b>Ambient Storage Conditions</b>	33 to 149°F (1 to 65°C)
<b>Shipping Weight</b>	MRC19-EXP1 and MRC19-EXP3 – 0.13 lb (0.06 kg) MRC19-EXP2 and MRC19-EXP4 – 0.89 lb (0.40 kg)

*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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