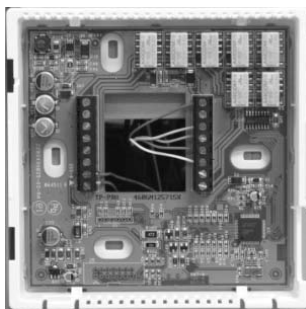


TSTATECM2W01
Two—Wire Relay Module
For use with the Côr®7 and
Côr®7C Thermostats



Installation Instructions



Designed in the USA.


NOTE: Read the entire instruction manual before starting the installation.

TABLE OF CONTENTS

	PAGE
SAFETY CONSIDERATIONS	1
INTRODUCTION	2
INSTALLATION CONSIDERATIONS	3
INSTALLATION	5
TROUBLESHOOTING	11
WIRING DIAGRAMS	15–34

SAFETY CONSIDERATIONS

Read and follow manufacturer instructions carefully. Follow all local electrical codes during installation. All wiring must conform to local and national electrical codes. Improper wiring or installation may damage Thermostat.

Recognize safety information. This is the safety–alert symbol . When you see this symbol on the equipment and in the instruction manual, be alert to the potential for personal injury.

Understand the signal words **DANGER**, **WARNING**, and **CAUTION**. These words are used with the safety–alert symbol. **DANGER** identifies the most serious hazards which will result in severe personal injury or death. **WARNING** signifies a hazard which could result in personal injury or death. **CAUTION** is used to identify unsafe practices which may result in minor personal injury or product and property damage. **NOTE** is used to highlight suggestions which will result in enhanced installation, reliability, or operation.

INTRODUCTION

The C r Two-Wire Relay Module for use with the C r  7 and C r  7C Thermostats allows installation in homes where there are not sufficient wires to connect to the equipment and/or the C-wire for thermostat power. The module is mounted near or on the indoor equipment. The unit communicates to the C r 7 Series Thermostat through the two wires that carry a combination of power and communications data that is unique to these products.

This gives greater flexibility to the installer when there are insufficient numbers of wires at the thermostat wall location. This prevents the installer from having to run additional thermostat wiring, thus saving on installation time.

INSTALLATION CONSIDERATIONS

Power

The Two-Wire Relay Module is powered by 24VAC. Only 2 wires are required for connection between the Côt 7 Series Thermostat and the Two-Wire Relay Module. These two wires (V+ and Vg) do not provide ordinary 24VAC. They carry a combination of power and communications data that is unique to these products.

Humidify Equipment and Connections

The humidify output connects directly to 24VAC operated humidifiers. An isolation relay may be required when using powered humidifiers. No other connection or interlock is required. Any of several installer-selectable operating modes are available.



WARNING

ELECTRICAL OPERATION HAZARD

Failure to follow this warning could result in personal injury or death.

DO NOT connect furnace HUM terminal directly to Thermostat Control HUM terminal. This will bypass furnace safety controls. See Low Voltage Wiring Diagrams and notes for proper connection.

Dehumidify Equipment and Connections

The dry contact output connects to the dehumidify input on variable-speed furnaces and fan coils. Additional dehumidification is done by controlling the compressor. A variety of operating modes are available on the Côt 7 Series

Thermostats. The dry contact must be configured for dehumidification. See Wiring Diagrams for more information.

Outdoor Temperature Sensor (TSTATXXSEN01-B)

Outdoor air temperature sensor (OAT) is an optional accessory that will connect to the Two-Wire Relay Module. Optimum performance is obtained when Wi-Fi weather is setup or an outdoor temperature sensor is used with the Côt 7 Series Thermostats. If not using Wi-Fi weather, plan on installing an OAT so that 2 wires can be run from Equipment Control Module to an outdoor location, preferably on the north side of the house or near the outdoor equipment. Caution should be used when selecting the location of the OAT. Direct sunlight or heat from the outdoor equipment could cause the outdoor temperature at the sensor to be inaccurate. The sensor can be mounted to outdoor unit and existing control wires may be used for its connection. Details are provided in sensor instructions.

Remote Indoor Temperature Sensor

A wired remote temperature sensor may be used where it is desirable to install the Côt 7 Series Thermostat in a limited access location while measuring the temperature in the living space. The remote room sensor may be used as a stand-alone or average with local sensor.

Install the Two-Wire Relay Module

Install the Two-Wire Relay Module near or on the cabinet of the indoor furnace or fan coil. Connection from the Thermostat to the Module requires only two wires. All other control wires are connected to the Two-Wire Relay Module from the HVAC equipment.

Wiring

For all wiring applications, use 22 AWG or larger wire. Continuous wire lengths over 100 ft. (30.5 m) should use 20 AWG or larger. Wire lengths are not to exceed 250 ft. (76 m) per run.

INSTALLATION



CAUTION

UNIT DAMAGE HAZARD

Failure to follow the recommended wiring practices could result in damage to the wall control and personal property.

Improper wiring or installation may damage Thermostat Control. Check to make sure wiring is correct before proceeding with installation or turning on power.

Installation Notes:

- Never remove the Two-Wire Relay Module board from the plastic housing. Doing so could warp and damage the components on the board.
- The Two-Wire Relay Module should be mounted before wires are attached.
- Provide sufficient excess wiring behind the mounting plate. Coil the wiring, creating a service loop, and place in mounting box or in the cabinet to remove strain against the terminal strip.



Fig. 1 – TSTATECM2W01 Carton Contents

Carton contains the following components.

1. Two–Wire Relay Module
2. Stand–off for Equipment Control Module
3. Plastic anchors and screws

Install Two–Wire Relay Module Control

Follow the installation instructions for installing the Côr 7 Series Thermostat.



WARNING

ELECTRICAL OPERATION HAZARD

Failure to follow this warning could result in personal injury or death.

Before installing Thermostat Control, turn off all power to equipment. There may be more than 1 power disconnect.



CAUTION

UNIT DAMAGE HAZARD

Failure to follow this caution may result in equipment damage or improper operation.

Improper wiring or installation may damage Thermostat Control. Check to make sure wiring is correct before proceeding with installation or turning on power.

1. Turn off all power to equipment.
2. If an existing thermostat is being replaced:
 - a. Remove existing control from wall.
 - b. Disconnect wires from existing thermostat, 1 at a time.
 - c. As each wire is disconnected, record wire color and terminal marking.
 - d. Discard or recycle old control.



CAUTION

ENVIRONMENTAL HAZARD

Failure to follow this caution may result in environmental damage.

Mercury is a hazardous waste. Federal regulations require that Mercury be disposed of properly.

3. Secure thermostat mounting base to wall and make sure all wires extend through hole in mounting base per the C r 7 Series installation instructions.
4. Connect two wires to the Vg and V+ terminals on the C r 7 Series Thermostat, noting their color and which terminal they are attached. Typically the red wire is V+ and black is Vg.
5. Push any excess wire into wall and against mounting base. Seal hole in wall to prevent air leaks. Leaks can affect operation and cause incorrect temperature and/or humidity measurement.
6. Find suitable indoor mounting location for Two-Wire Relay Module, either near or on the indoor furnace or fan coil equipment. See Fig. 2.

IMPORTANT NOTE: Two-Wire Relay Module should not be mounted to duct work or below any other controls or equipment (i.e. humidistat, humidifier, etc.).



Fig. 2 – Equipment Control Module on Equipment

7. Route wires through rear of Two-Wire Relay Module using either a clearance hole or supplied standoff. See Fig. 3.

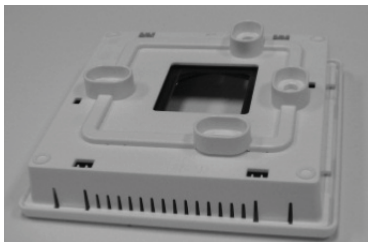


Fig. 3 – Standoff

NOTE: Standoffs are provided as an aid when installing Two-Wire Relay Module on inside equipment or a solid wall.

8. Match and connect equipment wires to proper terminals of each connector block being careful not to over tighten the screws. Correct polarity must be observed when connecting the two wires from the Two-Wire Relay Module to the Côt 7 Series Thermostat mounting base. If wires are connected incorrectly, the Thermostat will not operate.
9. Snap cover over top of Two-Wire Relay Module. See Fig. 4.



Fig. 4 – Cover on Equipment Control Module

10. Turn on power to equipment. On power up, all display segments will light for 5 sec. and two digit code appears on the center of the display which identifies the thermostat equipment type configuration.

Refer to the Côt 7 Series Thermostat installation instructions to set up the thermostat with the Two-Wire Relay Module.

TROUBLESHOOTING

If the display doesn't power up after power is applied, check the Rc/Rh and C terminals for 24VAC. If 24VAC is present, check the voltage between Vg and V+. This voltage will be approximately 12–20VDC. If voltage is present, check the polarity to make sure it is wired correctly. The display will not power up if polarity is reversed.

Error Codes

Comm Error – If the Côt 7 Series Thermostat and the Two–Wire Relay Module cannot communicate via two–wire connection, an Comm Error will be displayed.

HW Failure – If Côt 7 Series Thermostat's internal memory fails, HW Failure will be displayed. Replace Thermostat.

Invalid HUM – If Côt 7 Series Thermostat cannot properly read humidity, Invalid HUM will be displayed. Replace Côt 7 Series Thermostat. If both Humidify and Dehumidify have been set to OFF, the humidity value will not be shown on the screen when cycling through the info button.

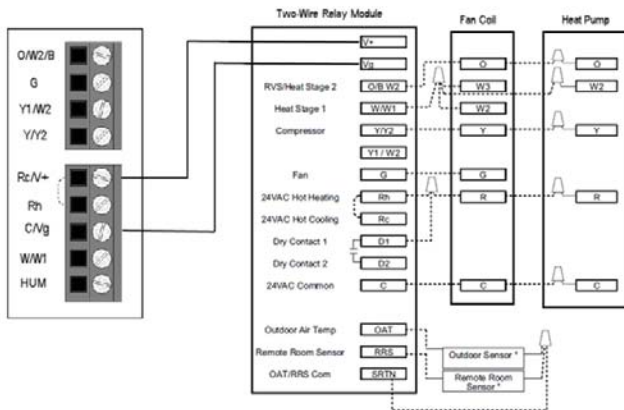
Table 4 can be used as a troubleshooting tool for determining which outputs will be active for a particular configuration and each operating mode.

IDU	ODU	Equipment Type	Options	Cool Stage 1	Cool Stage 2	Heat Stage 1	Heat Stage 2	Heat Stage 3	Heat Stage 4	EM Heat Stage 1	EM Heat Stage 2
1 Stage Furnace	1 Stage AC	Opt 1=AC	---	Y/Y2	---	W/W1	---	---	---	---	---
Fan Coil 1 Stage Heat	1 Stage HP	Opt 1=HP	RVS=O Opt 10=C	Y/Y2 O/W2/ B	---	Y/Y2	Y/Y2, W/W1	---	---	W/W1	---
Fan Coil 1 Stage Heat	1 Stage HP	Opt 1=HP	RVS=B Opt 10=H	Y/Y2	---	Y/Y2 O/W2/ B	Y/Y2, W/W1, O/W2/ B	---	---	W/W1	---
Fan Coil 1 Stage Heat	2 Stage HP	Opt 1=H2	RVS=O Opt 10=C	Y1/W2 O/W2/ B	Y1/W2 , Y/Y2 O/W2/ B	Y1/W2	Y1/W2 , Y/Y2	Y1/W2 , Y/Y2, W/W1	---	W/W1	---
Fan Coil 1 Stage Heat	2 Stage HP	Opt 1=H2	RVS=B Opt 10=H	Y1/W2	Y1/W2 , Y/Y2	Y1/W2 , O/W2/ B	Y1/W2 , Y/Y2, W/W1/ B	Y1/W2 , Y/Y2, W/W1, O/W2/ B	---	W/W1	---
Fan Coil 2 Stage Heat	1 Stage HP	Opt 1=HP	RVS=O Opt 10=C	Y/Y2 O/W2/ B	---	Y/Y2	Y/Y2, W/W1	Y/Y2, W/W1, Y1/W2	---	W/W1	W/W1, Y1/W2
Fan Coil 2 Stage Heat	1 Stage HP	Opt 1=HP	RVS=B Opt 10=H	Y/Y2	---	Y/Y2 O/W2/ B	Y/Y2, W/W1, O/W2/ B	Y/Y2, W/W1, Y1/W2 , O/W2/ B	---	W/W1	W/W1, Y1/W2

IDU	ODU	Equipment Type	Options	Cool Stage 1	Cool Stage 2	Heat Stage 1	Heat Stage 2	Heat Stage 3	Heat Stage 4	EM Heat Stage 1	EM Heat Stage 2
Fan Coil 3 Stage Heat	1 Stage HP	Opt 1=HP	RVS=O Opt 10=C Opt 43=On (3 stage Heat)	Y/Y2 O/W2/B	---	Y/Y2	Y/Y2, W/W1	Y/Y2, Y1/W2	Y/Y2, W/W1, Y1/W2	W/W1	W/W1, Y1/W2
Fan Coil 3 Stage Heat	1 Stage HP	Opt 1=HP	RVS=B Opt 10=H Opt 43=On (3 stage Heat)	Y/Y2	---	Y/Y2 O/W2/B	Y/Y2, W/W1, O/W2/B	Y/Y2, Y1/W2, O/W2/B	Y/Y2, W/W1, Y1/W2, O/W2/B	W/W1	W/W1, Y1/W2
2 Stage Furnace	2 Stage AC	Opt 1=A2	---	Y1/W2	Y1/W2, Y/Y2	W/W1	W/W1, O/W2/B	---	---	---	---
2 Stage Furnace	1 Stage HP	Opt 1=hh	RVS=O Opt 10=C	Y/Y2 O/W2/B	---	Y/Y2	W/W1	W/W1, Y1/W2	---	W/W1	W/W1, Y1/W2
2 Stage Furnace	1 Stage HP	Opt 1=hh	RVS=B Opt 10=H	Y/Y2	---	Y/Y2 O/W2/B	W/W1	W/W1, Y1/W2	---	W/W1	W/W1, Y1/W2
1 Stage Furnace	2 Stage HP	Opt 1=h2	RVS=O Opt 10=C	Y1/W2 O/W2/B	Y1/W2, Y/Y2, O/W2/B	Y1/W2	Y1/W2, Y/Y2	W/W1	---	W/W1	---
1 Stage Furnace	2 Stage HP	Opt 1=h2	RVS=B Opt 10=H	Y1/W2	Y1/W2, Y/Y2	Y1/W2, O/W2/B	Y1/W2, Y/Y2, O/W2/B	W/W1	---	W/W1	---

IDU	ODU	Equipment Type	Options	Cool Stage 1	Cool Stage 2	Heat Stage 1	Heat Stage 2	Heat Stage 3	Heat Stage 3	EM Heat Stage 1	EM Heat Stage 2
1 Stage Furnace	1 Stage HP	Opt 1=hh	RVS= O Opt 10=C	Y/Y2 O/W2/ B	---	Y/Y2	W/W1	---	---	W/W1	---
1 Stage Furnace	1 Stage HP	Opt 1=hh	RVS= B Opt 10=H	Y/Y2	---	Y/Y2 O/W2/ B	W/W1	---	---	W/W1	---
1 Stage Furnace or Fan Coil	No ODU	Opt 1=H	---	---	---	W/W1	If HP or RH board and Opt 32-2 W/W1, O/W2/ B	---	---	---	---
Air Handler	1 or 2 Stage AC	Opt 1=C	---	Y/Y2	Y1/W2 , Y/Y2 2 SPD only	---	---	---	---	---	---

WIRING DIAGRAMS



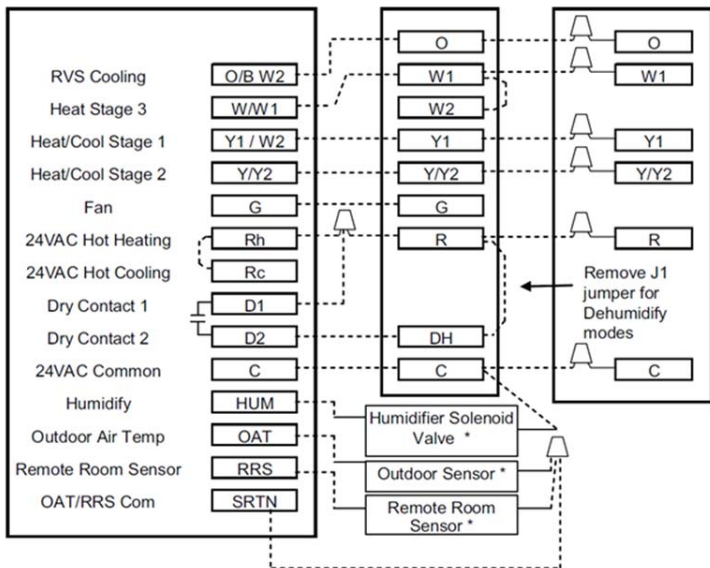
*** Indicates that connection may not be required/available.**

Fig. 5 – Display to Equipment Control Module Connection

Two-Wire Relay Module

Fan Coil

Heat Pump



* Indicates connection may not be required/available.

Fig. 6 – FV/FK Fan Coil with 2-Stage Heat Pump

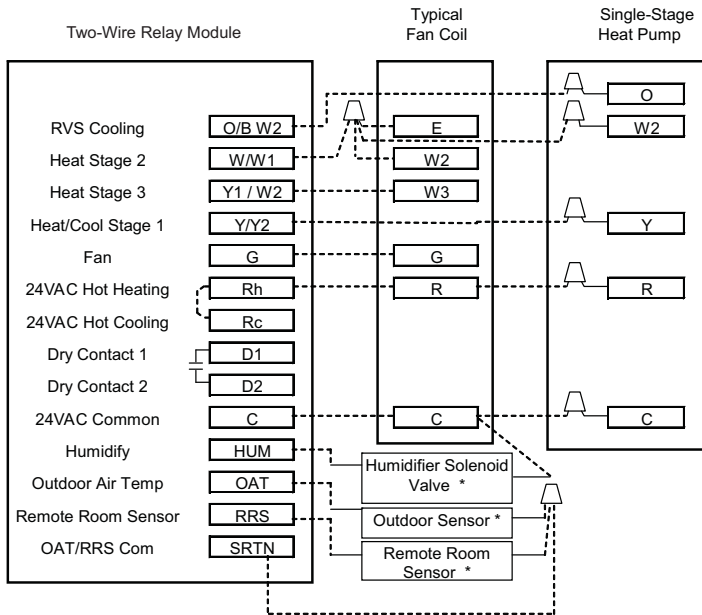
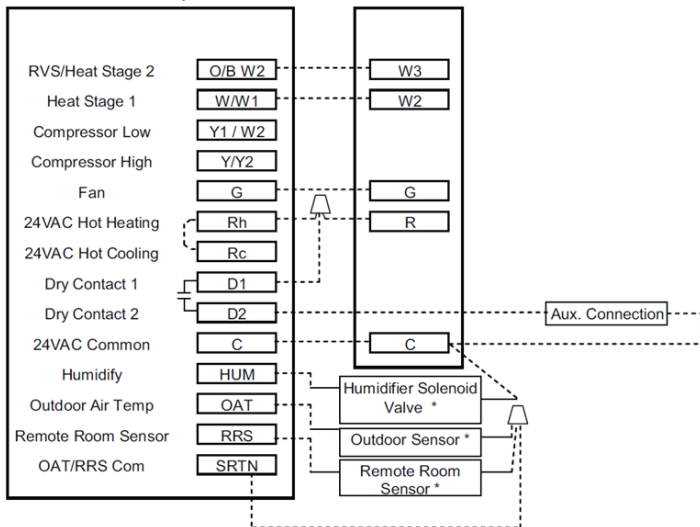


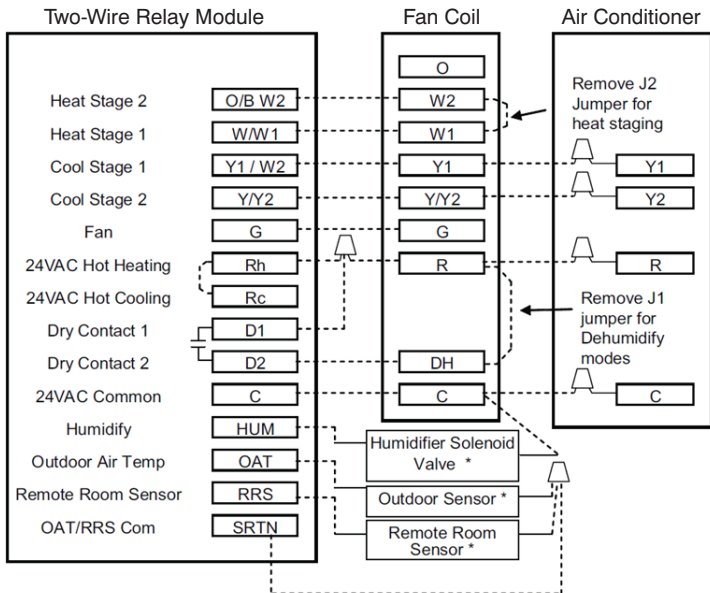
Fig. 7 – Typical Fan Coil with Heat Pump

Two-Wire Relay Module



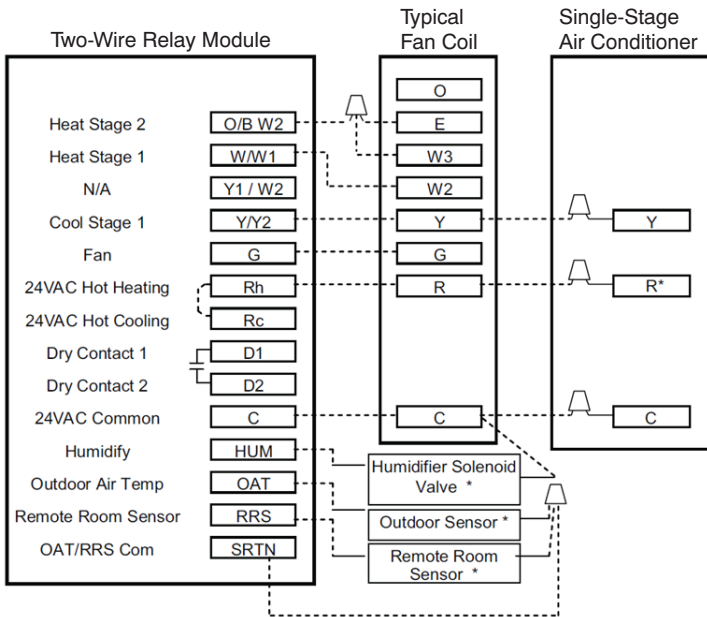
* Indicates connection may not be required/available.

**Fig. 8 – Fan Coil Shown w/Aux.Connection #1
(Heat Pump/Air Conditioner removed for clarity.)**



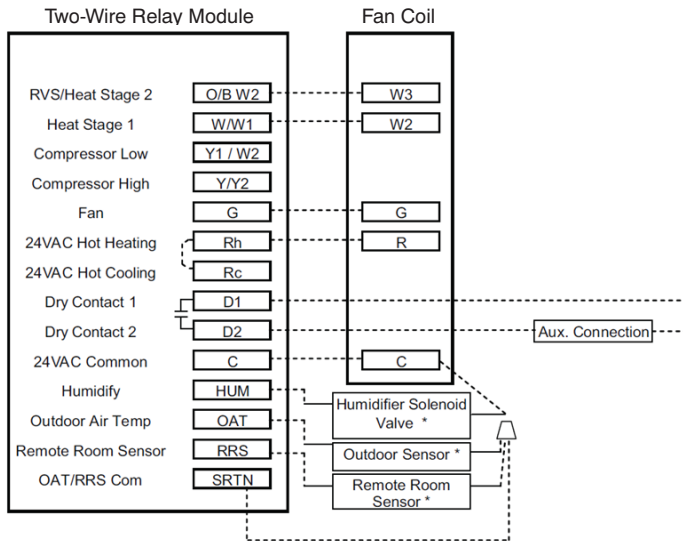
* Indicates connection may not be required/available.

Fig. 9 – FV/FK Fan Coil w/2-Stage Air Conditioner



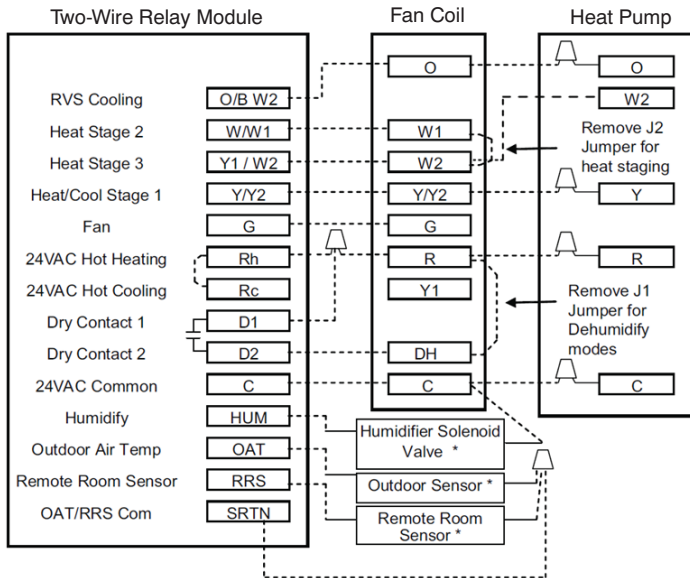
* Indicates connection may not be required/available.

Fig. 10 – Typical Fan Coil with Air Conditioner



* Indicates connection may not be required/available.

**Fig. 11 – Fan Coil Shown with Aux. Connection #2
(Heat Pump/Air Conditioner removed for clarity.)**



* Indicates connection may not be required/available.

Fig. 12 – FV/FK Fan Coil with 1-Stage Heat Pump

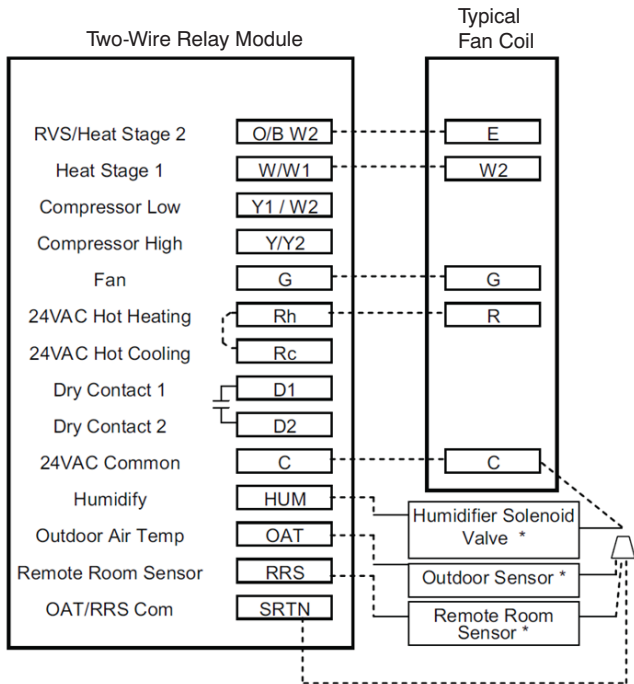


Fig. 13 – Typical Fan Coil Heating Only

Two-Wire Relay Module

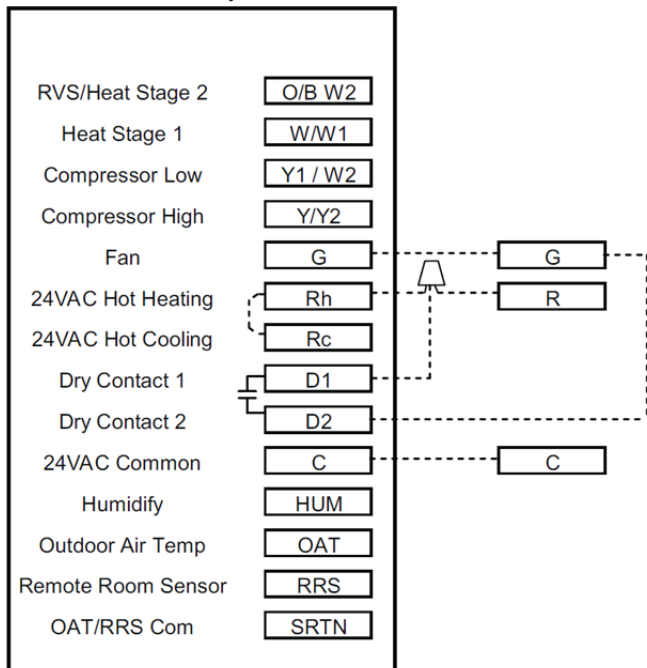


Fig. 14 – Thermostat Control w/Dry Contact Control for Fan Run Time

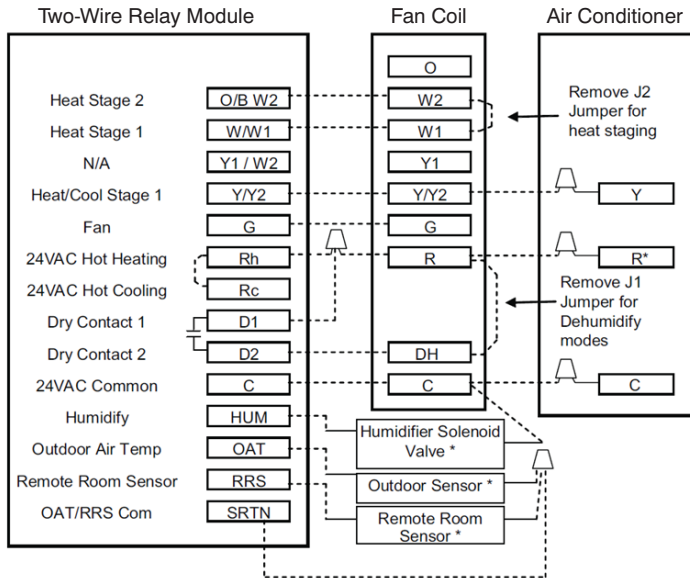
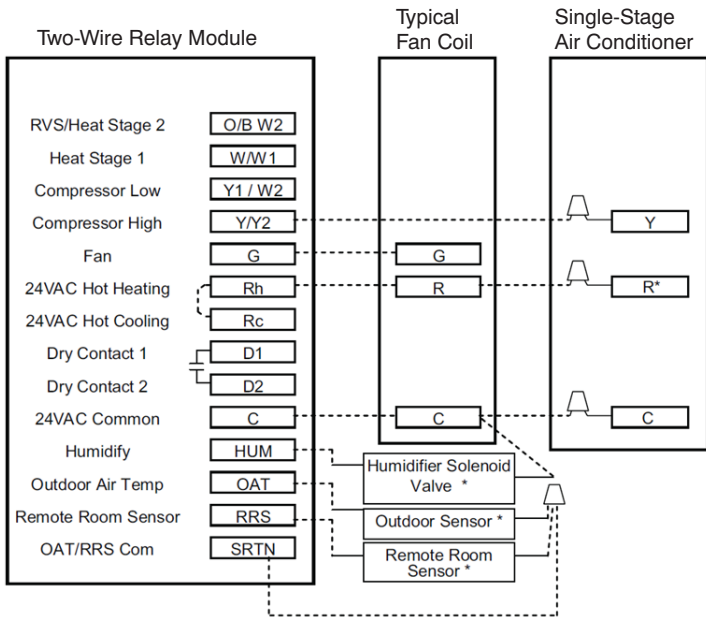
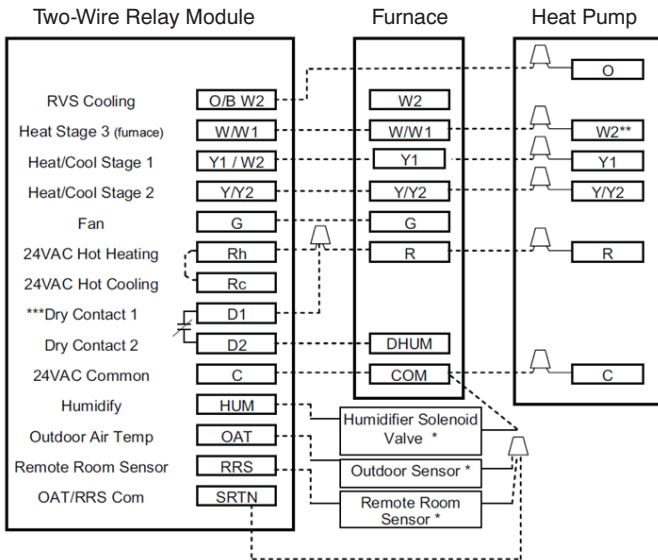


Fig. 15 – FV/FK Fan Coil with 1-Stage Air Conditioner



* Indicates connection may not be required/available.

Fig. 16 – Typical Fan Coil Cooling Only

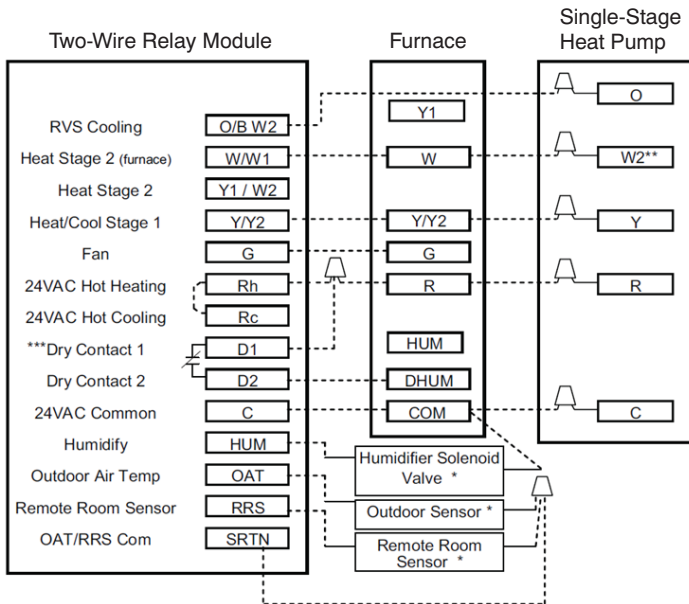


* Indicates connection may not be required/available.

** Some heat pumps may designate W1.

*** Option 19 set to 2.

Fig. 17 – Variable Speed, Multi-Stage, Stage Modulating and Single-Stage Furnace with 2-Stage Heat Pump



* Indicates connection may not be required/available.

** Some heat pumps may designate W1.

*** Option 19 set to 2.

**Fig. 18 – Single-Stage Furnace with Heat Pump
(Hybrid Heat)**

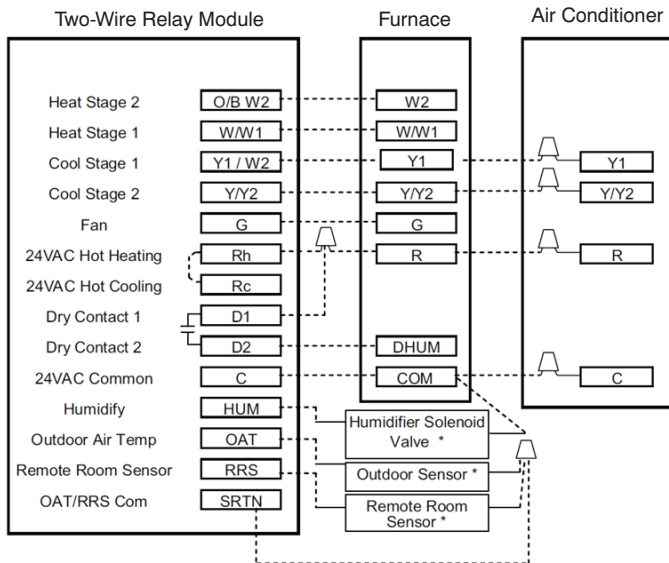


Fig. 19 – Variable Speed, Step Modulating, Multi-Stage and Single-Stage Furnace with Two-Stage Air Conditioner

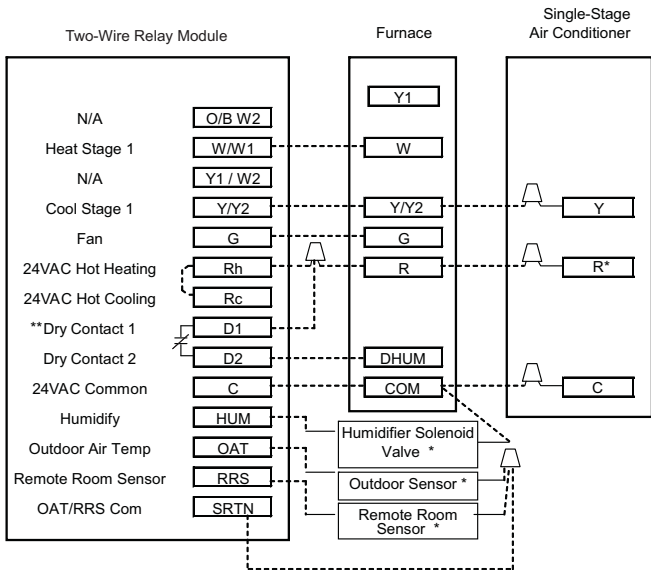
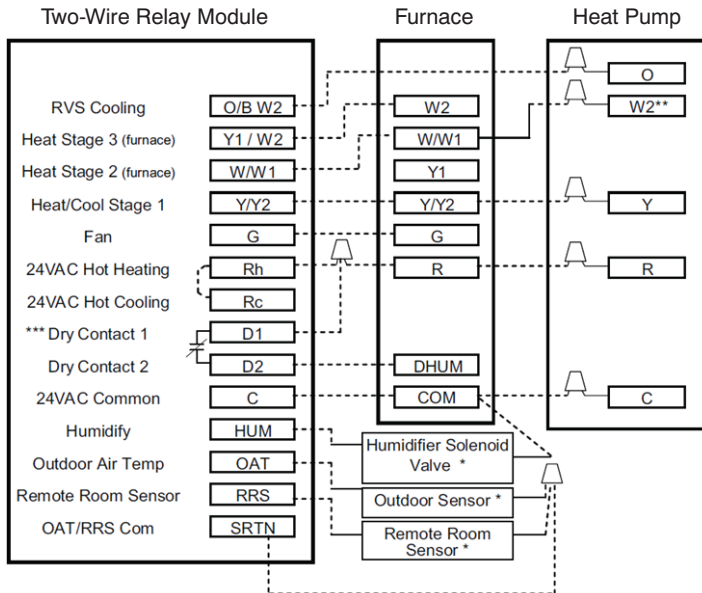


Fig. 20 – Single-Stage Furnace with Single-Speed Air Conditioner



* Indicates connection may not be required/available.

** Some heat pumps may designate W1.

*** Option 19 set to 2.

Fig. 21 – Variable Speed, Multi-Stage and Step Modulating Furnace with Single-Stage Heat Pump

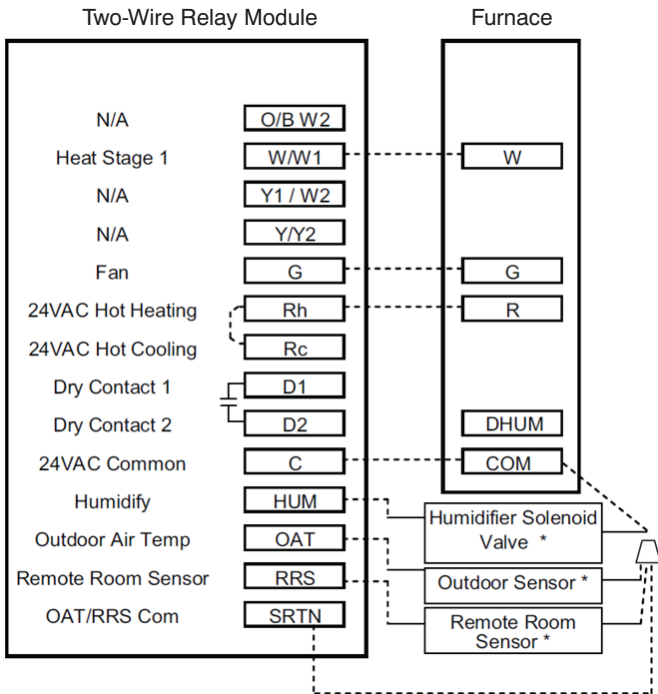
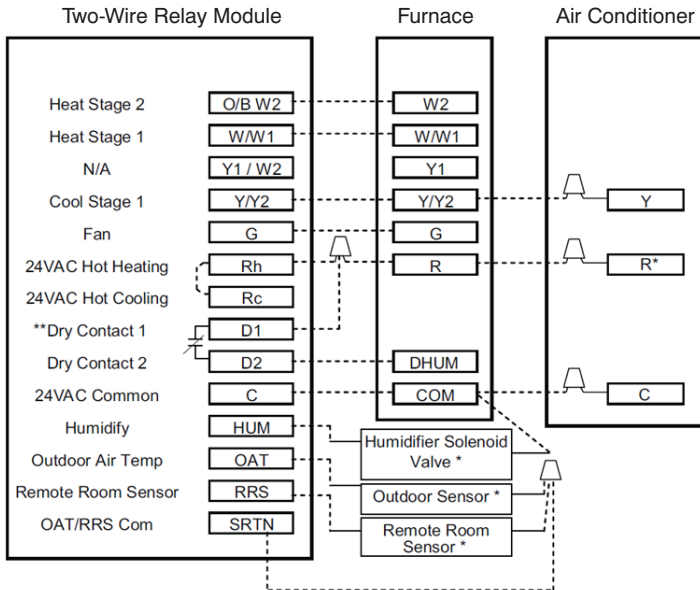


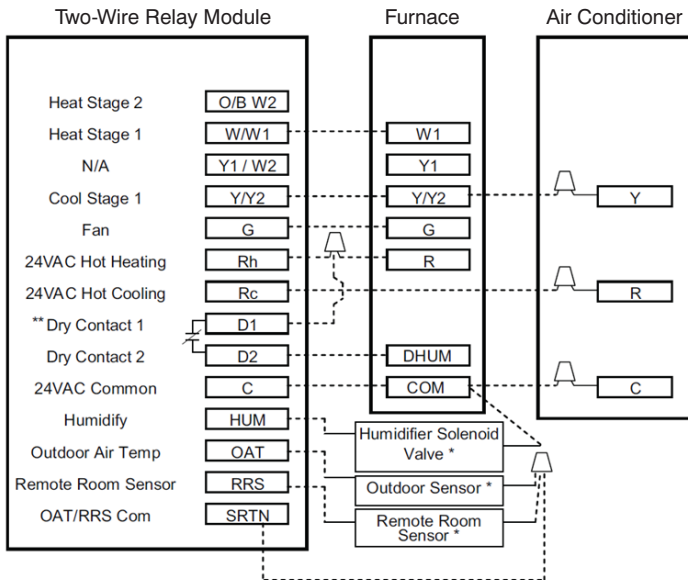
Fig. 22 – Single-Stage Furnace Heating Only



* Indicates connection may not be required/available.

** Option 19 set to 2.

Fig. 23 – Variable Speed, Multi-Stage, Step Modulating and Single-Stage Furnace with Single-Stage Air Conditioner



* Indicates connection may not be required/available.

** Option 19 set to 2.

Fig. 24 – Single-Stage Furnace with Air Conditioner and Split Power

NOTES

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