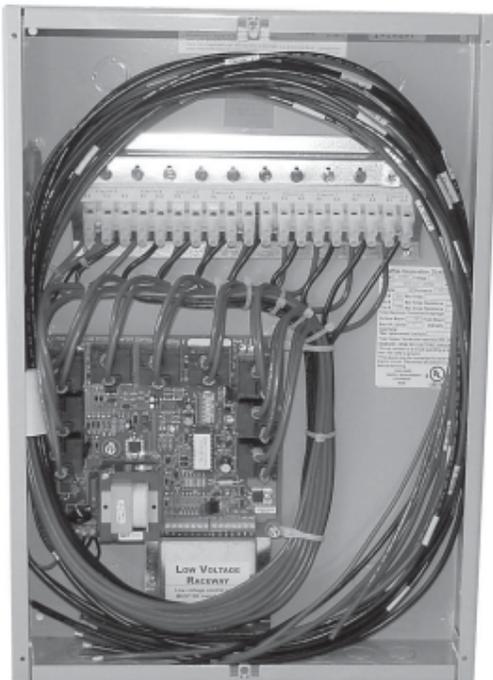




"Commitment to Innovation"

OPERATION & INSTALLATION GUIDE FOR Comfort Control Relay Panel (CCRP)

Off-Peak System Control



9 Pole CCRP



4 Pole CCRP

(Applicable to Software Version 14.0-14.9)

"Manufactured in North America"



NOTE IMPORTANT

- ◆ **The equipment described herein is intended for installation by a qualified technician in accordance with applicable local, state, and national codes and requirements.**
- ◆ **This manual should be retained by the owner upon completion of the installation and made available to service personnel as required.**
- ◆ **Disclaimer:**
 - **Conditions may occur which cause the power line carrier transmitter and receivers to have difficulties communicating; therefore, not operating properly. In no event shall Steffes Corporation be liable for any indirect, special, or consequential damages or lost profits.**
 - **In compiling this manual, Steffes Corporation has used its best judgement based upon information available, but disclaims any responsibility or liability for any errors or miscalculations contained herein, or any revisions hereof, or which result, in whole or in part, from the use of this manual or any revisions hereof.**
 - **Steffes Corporation does not guarantee effective communication of the PLC system in all applications and is not responsible for any communication issues outside normal operating malfunctions.**



RECOGNIZE THESE SYMBOLS AS SAFETY PRECAUTIONS

It is important, both for your personal safety and to avoid possible damage to the equipment and your property, that you observe the safety instructions given following these symbols.

For Customer Use

Please record the serial number of the CCRP below. This number is located inside the panel. Retain this information for future reference.

Serial No. _____



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STEFFES

Comfort Control Relay Panel (CCRP)

GENERAL OPERATION

The Steffes Comfort Control Relay Panel (CCRP) is a device used for the control of electrical loads such as ETS heaters, water heaters, baseboards, electric furnaces, dryers, dishwashers, hot tubs, ceiling cable, etc. The CCRP can control up to nine (9) electrical circuits using its internal, board mounted relays. In addition, its built-in Power Line Carrier (PLC) Transmitter provides communication to and control of an unlimited number of Steffes microprocessor based heating systems, as well as any other devices incorporating the Steffes PLC Receiver through existing power circuits.

Upon receipt of the utility control signal the CCRP will actuate its internal relays to control the devices wired into them. The CCRP is capable of accepting up to six (6) separate utility control signals. This feature works well in areas where the power company has multiple rate strategies.

If utilizing the PLC transmitter feature in the relay panel, it will send the utility control signal through the existing electrical circuits. All Steffes microprocessor based heating systems and other controllable devices incorporating the Steffes PLC Receiver that are served power by the same power company distribution transformer will receive this signal and respond accordingly. The PLC control feature allows for peak control of devices without having to do direct wiring. This feature can reduce installation costs significantly, especially in multiple unit installations and projects such as housing subdivisions, hotels, motels, apartments, condo's, etc.

PLC Communication is very reliable in most applications but can be affected and hindered by connection method used, electrical layout of the application, operation of other equipment in the same electric system, dirty power, etc. Steffes Corporation does not guarantee effective communication of the PLC system in all applications and is not responsible for any communication issues outside normal operating malfunctions.

WARNING

HAZARDOUS VOLTAGE:
Risk of electric shock. Can cause injury or death. System may be connected to more than one branch circuit. Disconnect power to all circuits. Equipment must be installed and serviced by a qualified technician.

WARNING

- ◆ **Risk of electric shock. Can cause injury or death. DO NOT connect to a circuit operating at more than 150 volts to ground.**
- ◆ **Risk of fire. Personal injury or property damage may result if loading limits are violated. DO NOT overload circuits.**

ELECTRICAL LOADING LIMITS

- ◆ Maximum Fuse Size
 Circuit 1 = 20 AMP (16 AMP Load, Maximum)
 Circuits 2 - 9 = 30 AMP (24 AMP Load, Maximum)

- ◆ Total Input Circuit Ampacity

	<u>Four Pole</u>	<u>Nine Pole</u>
Surface Mounted	100 Amps	200 Amps
Flush Mounted	100 Amps	150 Amps

(Example: 2 - 30 AMP circuits and 7 - 20 AMP circuits = 200 AMPS)

FEATURES

The Comfort Control Relay Panel (CCRP) is an accurate and reliable device offering the following features:

- ★ Multiple configurations available
 - ◆ Four Pole – four (4) relays to control four separate electrical circuits (sequenced on in two stages)
 - ◆ Nine Pole – nine (9) relays to control nine separate electrical circuits (sequenced on in three stages)

- ★ Relays
 - ◆ 30 amp, DC held, board mounted
 - ◆ Pre-wired with 42", 10 AWG leads

- ★ Operates on 120V or 208V/240V

- ★ Electrical Loading Limits
 - ◆ Maximum Fuse or Circuit Breaker Size
 - Circuit 1: 20 Amps
 - Circuits 2 – 9: 30 Amps
 - ◆ Total Input Circuit Fuse or Circuit Breaker Ampacity

	<u>Four Pole</u>	<u>Nine Pole</u>
Surface Mounted	100 Amps	200 Amps
Flush Mounted	100 Amps	150 Amps

- ★ Built-in Power Line Carrier (PLC) Transmitter with 15 selectable communication channels for transmitting information through the existing power lines (wireless communication) to an unlimited number of 1000, 2000, and 2100 series room heaters, Comfort Plus systems, and the Steffes Mini Receivers provided all systems are operating at 240V or less and are on the same power company distribution transformer
 - ◆ Peak and anticipated peak (pre-peak) control signals
 - ◆ Outdoor temperature information for automatic brick core charging of ETS room heaters
 - ◆ Room temperature set back signals (external signaling device required)

- ★ Independent PLC and relay control accept up to six (6) separate power company control signals

- ★ Metal enclosures with power company seal/lockout provision

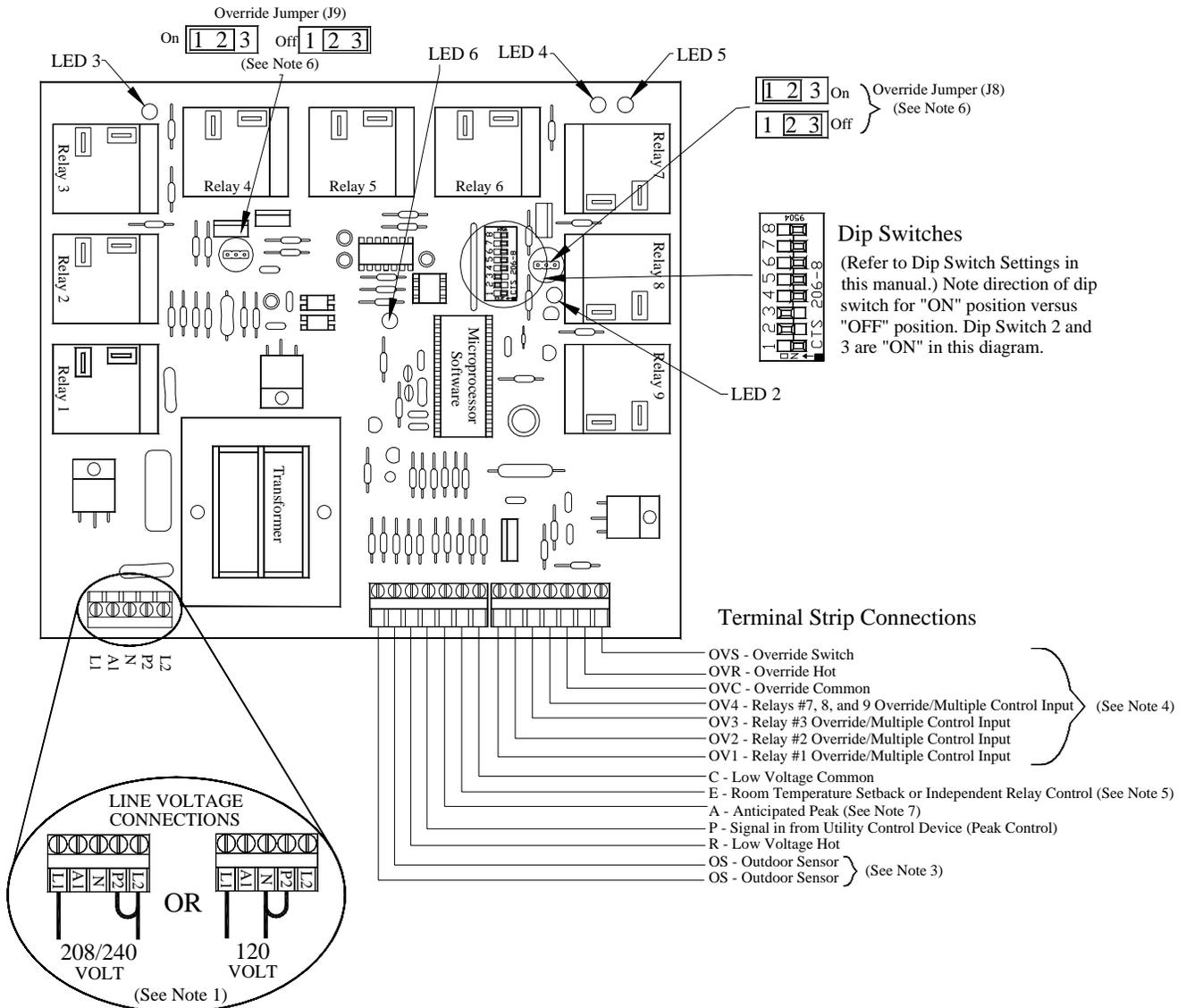
	<u>Four Pole</u>	<u>Nine Pole</u>
◆ Indoor (NEMA 1) – flush or surface mounted:	10" x 16" x 4.25"	14" x 20" x 4"
◆ Outdoor (NEMA 3) – surface mounted:	Not Available	12" x 18" x 4"

- ★ Available options (must be specified at time of ordering)
 - ◆ Current transformer (CT)
 - ◆ Multiple zone, 60-minute, peak override module
 - ◆ Capable of providing peak and automatic charge control for fluid regulated ETS room heating systems (i.e., Steffes "S" series room heating units and most European models).

CCRP

CIRCUIT BOARD CONFIGURATION DIAGRAM

(Refer to Notes on Pages 4 and 5 in this manual)



- For operational information on the green LED lights, see Note 2.
- If NOT utilizing the automatic charge control feature of the CCRP, a 4300 ohm resistor must be placed between the two OS terminals to prevent the 2100, 3100, 4100, or 5100 Series heating system(s) from displaying Error 6 (Er 06).
- The 4-pole CCRP is configured to utilize relays 1, 2, 3, and 7.

NOTES

(Refer to the Circuit Board Configuration Diagram on page 3 of this manual.)

NOTE 1: Line Voltage Connections

This device can be powered with 120V or 208V/240V. In most applications, optimum performance is achieved when connected to 208V/240V. The CCRP is equipped with a factory installed wiring and is configured for 208V/240V. If the CCRP is to be connected to 120V, the transformer tapping **MUST** be changed. To change the transformer tapping to 120V, move the wire jumper to positions P2 and N in the line voltage connections terminal strip. (See Circuit Board Configuration Diagram for reference to proper placement of the jumper and line voltage field wiring connections.)

NOTE 2: Green LED Lights

These lights indicate various circuit board functions:

LED 2 = When illuminated, indicates the relay panel is energized.

LED 3 = When illuminated, indicates the microprocessor has energized relays 1, 2, and 3.

LED 4 = When illuminated, indicates the microprocessor has energized relays 4, 5, and 6.

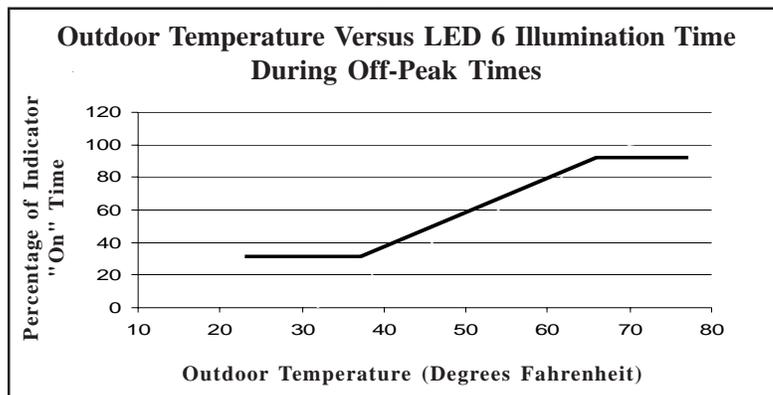
LED 5 = When illuminated, indicates the microprocessor has energized relays 7, 8, and 9.

LED 6 = When the CCRP is energized, this light should illuminate, either in a flashing or a continuous illumination mode, indicating the microprocessor is processing information.

No Illumination: Microprocessor is unable to process information. Check system wiring.

Continuous Illumination: Will occur any time a peak control signal is being received.

Slow Flash (4 second duration): Will occur during off-peak times. The illumination time of the light is in direct relation to the temperature information the CCRP is receiving from the outdoor temperature sensor. A long illumination time indicates warmer temperatures and a short illumination time indicates colder temperatures.



NOTE 3: Outdoor Sensor

If using the CCRP with microprocessor based ETS room heating system(s) and utilizing the automatic charge control option, an outdoor temperature sensor is required. This sensor attaches to the two "OS" positions of the terminal strip in the CCRP. The outdoor sensor sends outside temperature information to the CCRP and the power line carrier transmitter within sends this information to the heater(s), eliminating the need for direct wire connections between the heater(s) and the CCRP.



- **If utilizing the automatic charge control option with fluid regulated ETS room heating systems (i.e., Steffes "S" series heaters and most European models), the CCRP must be special ordered from the factory in this configuration.**
- **If NOT utilizing the automatic charge control feature of the CCRP, a 4300 ohm resistor must be placed between the two OS terminals to prevent the 2100, 3100, 4100, or 5100 Series heating system(s) from displaying Error 6 (Er 06).**

NOTE 4: Overrides (Optional, Power Company Permitting) / Multiple Control Strategies

With the addition of the 3-zone override module to the CCRP, peak override of 6 of the 9 circuits is possible. If enabled, relays 1, 2, 3, 7, 8, or 9 can be used in 60-minute intervals during a peak control period, if desired. Devices controlled by relays 4, 5, and 6 can never be overridden. Installation instructions for this feature are provided with the override module. (Order item #1302060.)

	IMPORTANT
<ul style="list-style-type: none">◆ Devices controlled by relays 4, 5, and 6 can never be overridden.◆ If the CCRP is being used to do both peak control and automatic charge control of fluid regulated ETS room heating systems, then peak override of the fluid regulated ETS heater(s) is not possible.	

For power companies desiring to control loads separately using multiple signals, the override ports in the terminal block can also be used to recognize these signals and trigger the peak control.

- OV1 = allows relay 1 circuit to be overridden or controlled on a separate rate/control strategy
- OV2 = allows relay 2 circuit to be overridden or controlled on a separate rate/control strategy
- OV3 = allows relay 3 circuit to be overridden or controlled on a separate rate/control strategy
- OV4 = allows relay circuits 7, 8, and 9 to be overridden (cannot override these circuits separately) or controlled on a separate rate/control strategy

* The 4-pole CCRP is configured to utilize relays 1, 2, 3, and 7.

NOTE 5: Room Temperature Set Back or Independent Relay Input

If using the CCRP with the 1000, 2000 and/or 2100 series room heating units and utilizing the automatic room temperature set back feature, the addition of a signaling device is required to initiate the set back time. This signaling device attaches to the “E” and “R” positions of the terminal strip in the CCRP. The transmitter in the CCRP receives the set back signal, and, in turn, sends the signal (wireless) to the heater(s).

If the power company uses multiple signals for peak control of devices on different rate strategies, the “E” terminal position can be used as the input port to trigger peak control of those devices on the separate strategy rather than for room temperature set back.

NOTE 6: Jumpers 8 and 9 (Isolated Relay Switching - Multiple Control Strategy Applications)

These jumpers couple the relays to different input signals and enable separate control of the circuits connected to them. If these jumpers are set to the “ON” position, the relays are controlled by the microprocessor on the circuit board through either the “P” or “E” input terminals depending on dip switch 6 setting in the CCRP. If Jumper 8 (J8) is in the “OFF” position, relays 7, 8, and 9 respond only to the OV4 input terminal. If Jumper 9 (J9) is in the “OFF” position, relay 1 responds only to the OV1 input terminal; relay 2 responds only to the OV2 input terminal; and relay 3 responds only to the OV3 input terminal.

Depending upon how the controllable devices are field wired into the circuit board, the positions of J8 and J9 jumpers, and dip switch 6 setting, it is possible to have the CCRP provide individual load control for up to 6 separate control strategies. If utilizing multiple control strategies, refer to Dip Switch Settings description, the Relay Triggering Schematic, and the Example System Wiring Diagram for Multiple Strategies in this manual.

NOTE 7: Anticipated Peak

Typically, power companies are capable of sending one signal for peak control of selected devices. There are some instances; however, where power companies are capable of sending multiple signals for control purposes. In these situations, it is possible to have on-peak hours, off-peak hours, and anticipated peak (pre-peak) hours.

On-peak hours are those times during which a controllable load is disabled. **Off-peak** hours are those times during which a controllable load is allowed to operate. **Anticipated (pre-peak)** hours are those times during which ETS equipment can be prepared for an upcoming on-peak (control) period, or a time when power companies can apply customized control of the ETS equipment. If uncertain as to whether this option is being used in your area, contact your local power company representative.

DIP SWITCH SETTINGS

(If using the built-in PLC Transmitter Feature for Control)

If the power line carrier (PLC) transmitter in the CCRP is being utilized for the control of the 1000 and/or 2000 series heater(s), dip switches 1, 2, 3, 4, 6, and 8 on the heater's circuit board **MUST** be set to the "OFF" position.

DIP SWITCH 1: INVERT PEAK

This dip switch is used to match the utility's signaling device to the Steffes microprocessor based heating equipment and the Steffes PLC Receiver(s) for peak control purposes.

FACTORY DEFAULT SETTING = ON

Off = An open utility switch will signal an off-peak time to the heater (charging is enabled in the ETS heater). A closed utility switch will signal an on-peak time (charging is disabled in the ETS heater).

On = A closed utility switch will signal an off-peak time to the heater (charging is enabled in the ETS heater). An open utility switch will signal an on-peak time (charging is disabled in the ETS heater).



The peak control signal is a priority signal. When the room heating units or mini receiver controlled devices are receiving a peak signal, an anticipated peak signal will be overridden.

DIP SWITCH 2, 3, 4, AND 5: TRANSMIT CHANNEL

The transmitter built into the Steffes CCRP is capable of transmitting on one of fifteen channels. The dip switch settings in the CCRP must be set to match the channel setting of the receiving device(s).

To select the power line carrier communication channel desired use the chart below and set dip switches 2, 3, 4, and 5 to the appropriate positions. If dip switches 2, 3, 4, and 5 are all set to the "OFF" positions, the CCRP will not transmit a power line carrier signal.

FACTORY DEFAULT SETTING = CHANNEL 3 (2 ON, 3 ON, 4 OFF, 5 OFF)



- 1. If utilizing the built-in PLC transmitter, a specific channel MUST be selected.**
- 2. 1000/2000 Series heaters will ONLY receive on slow speed channels.**
- 3. If multiple transmitters are installed on the same distribution transformer, do not use both channels one and two. Select one of these channels along with another available "slow" channel.**

CHANNEL	DIP SWITCH #2	DIP SWITCH #3	DIP SWITCH #4	DIP SWITCH #5	CHANNEL SPEED
0	OFF	OFF	OFF	OFF	N/A
1	ON	OFF	OFF	OFF	SLOW
2	OFF	ON	OFF	OFF	SLOW
3	ON	ON	OFF	OFF	FAST
4	OFF	OFF	ON	OFF	FAST
5	ON	OFF	ON	OFF	FAST
6	OFF	ON	ON	OFF	FAST
7	ON	ON	ON	OFF	FAST
8	OFF	OFF	OFF	ON	FAST
9	ON	OFF	OFF	ON	FAST
10	OFF	ON	OFF	ON	FAST
11	ON	ON	OFF	ON	FAST
12	OFF	OFF	ON	ON	SLOW
13	ON	OFF	ON	ON	SLOW
14	OFF	ON	ON	ON	SLOW
15	ON	ON	ON	ON	SLOW

DIP SWITCH 6: INDEPENDENT PLC AND RELAY CONTROL

This dip switch allows for power line carrier control of devices independent of the relay circuits.

FACTORY DEFAULT SETTING = OFF

Off = Relay circuits will be controlled at the same time as the PLC transmitter controlled devices. The relays are coupled with the “P” input terminal.

On = Relay circuits can be controlled separate from the PLC transmitter controlled devices. The relays are coupled with the “E” input terminal.



The CCRP is also capable of providing independent control of some of its relays separate from each other. This feature is used in applications where multiple load control strategies are being utilized. For more information on how to enable independent relay control, refer to Note 7 in the Notes section of this manual.

DIP SWITCH 7: Negative Outdoor Temperature Calibration

This dip switch is used to calibrate the outdoor temperature sensor information downward if it is reading higher than the actual outdoor temperature. In most situations, this procedure does not need to be performed.

FACTORY DEFAULT SETTING = OFF

Off = Standard operating position.

On = A negative 5°F (-5°F) outdoor temperature calibration is applied.

DIP SWITCH 8: Positive Outdoor Temperature Calibration

This dip switch is used to calibrate the outdoor temperature sensor information upward if it is reading lower than the actual outdoor temperature. In most situations, this procedure does not need to be performed.

FACTORY DEFAULT SETTING = OFF

Off = Standard operating position.

On = A positive 5°F (+5°F) outdoor temperature calibration is applied.

TESTING PLC COMMUNICATION

(If using the built-in PLC Transmitter Feature for Control)

The PLC system is a highly accurate and reliable method of control. Communications between the transmitter and a correlating receiver occur on regular basis. It may take up to seven (7) minutes for the transmitter to establish initial communication, depending on the speed of the channel selected and the noise level on the electrical systems. Subsequent communications will occur more rapidly. In the 1000 and/or 2000 series heater, the lower right indicator light on their face plate will illuminate green continuously once the heater begins to retrieve good signal. In the mini receiver device, the red indicator light on its circuit board will illuminate continuously once it is receiving complete information. In the 2100, 3100, 4100, 5100, 6100, 7100, 8100, and 9100 series systems, access the Help Menu to verify power line carrier communication.



If NOT utilizing the automatic charge control feature of the CCRP, a 4300 ohm resistor must be placed between the two OS terminals to prevent the 2100, 3100, 4100, 5100, 6100, 7100, 8100 or 9100 Series heating system(s) from displaying Error 6 (Er 06).

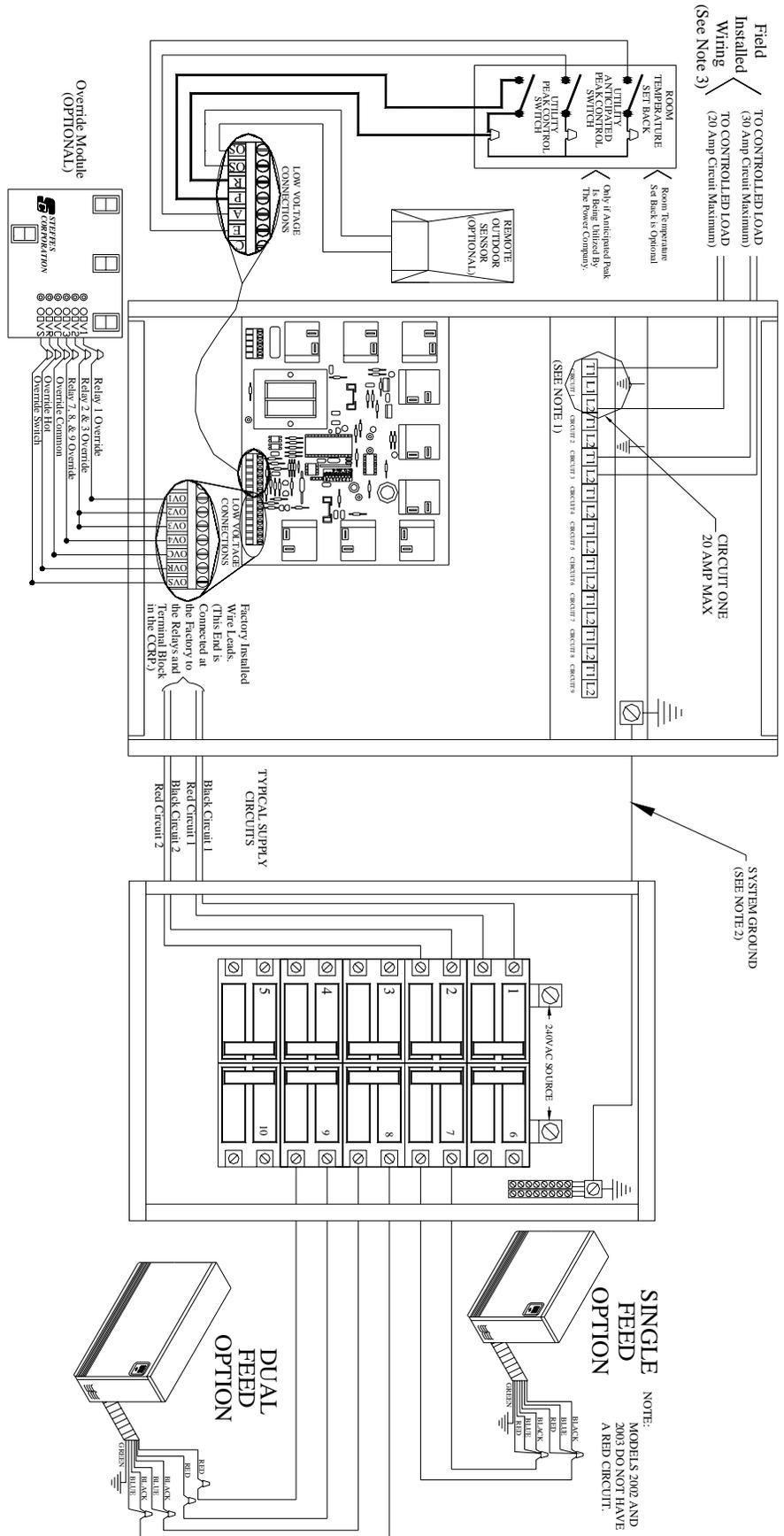
TYPICAL SYSTEM WIRING DIAGRAM - NINE POLE

(Utilizing PLC Control with the Steffes 1000/2000/2100 Series Room Units)

NOTE
IMPORTANT

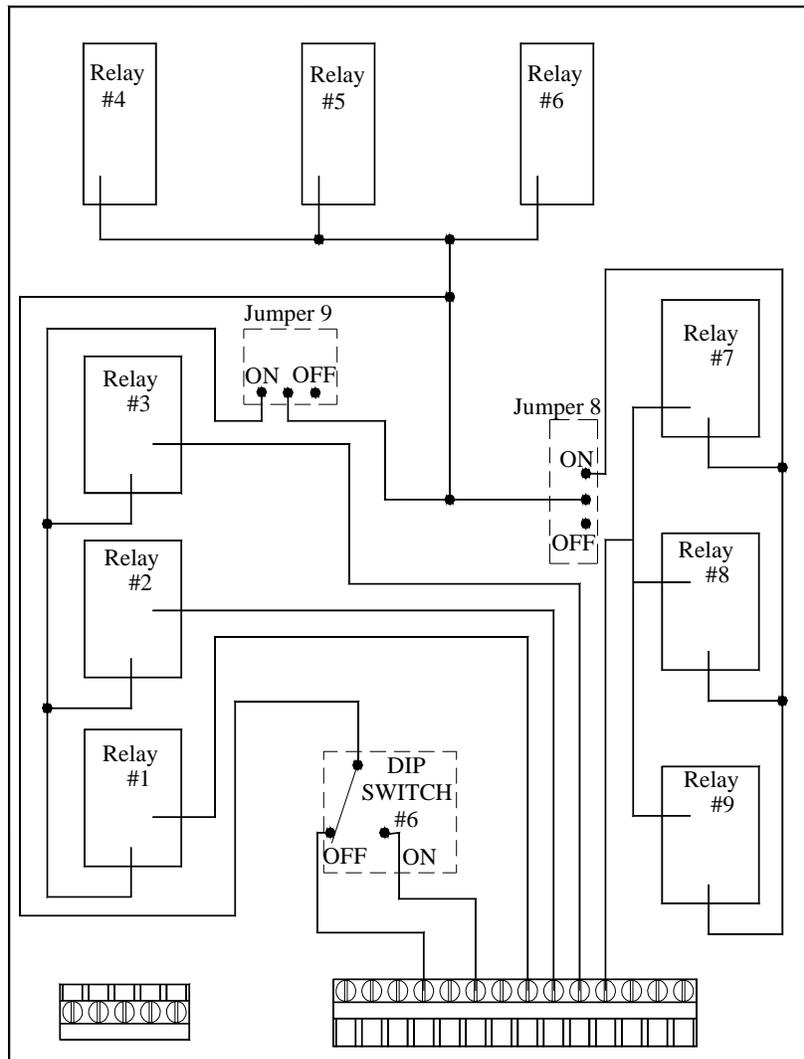
A panel label is provided in the package of screws used to mount the front panel. Apply this label to the service panel to identify the breaker feeding CCRP circuit 1.

1. Loads connected between L1 and L2 on circuit 1 will be uninterrupted. Loads connected between T1 and L2 on circuit 1 will be interrupted. CCRP circuit 1 feeds both output circuit 1 and the panels internal controls. Maximum fuse size is 20 amps.
2. The system grounding and bonding must be sized and installed in compliance with all applicable codes.
3. Any loads requiring greater than a 20 amp circuit, such as a water heater, must never be connected to circuit 1 in the CCRP as circuit 1 is only capable of controlling a maximum of a 20 amp circuit.



RELAY TRIGGERING SCHEMATIC

(For Use with Multiple Rate/Control Strategies Only)



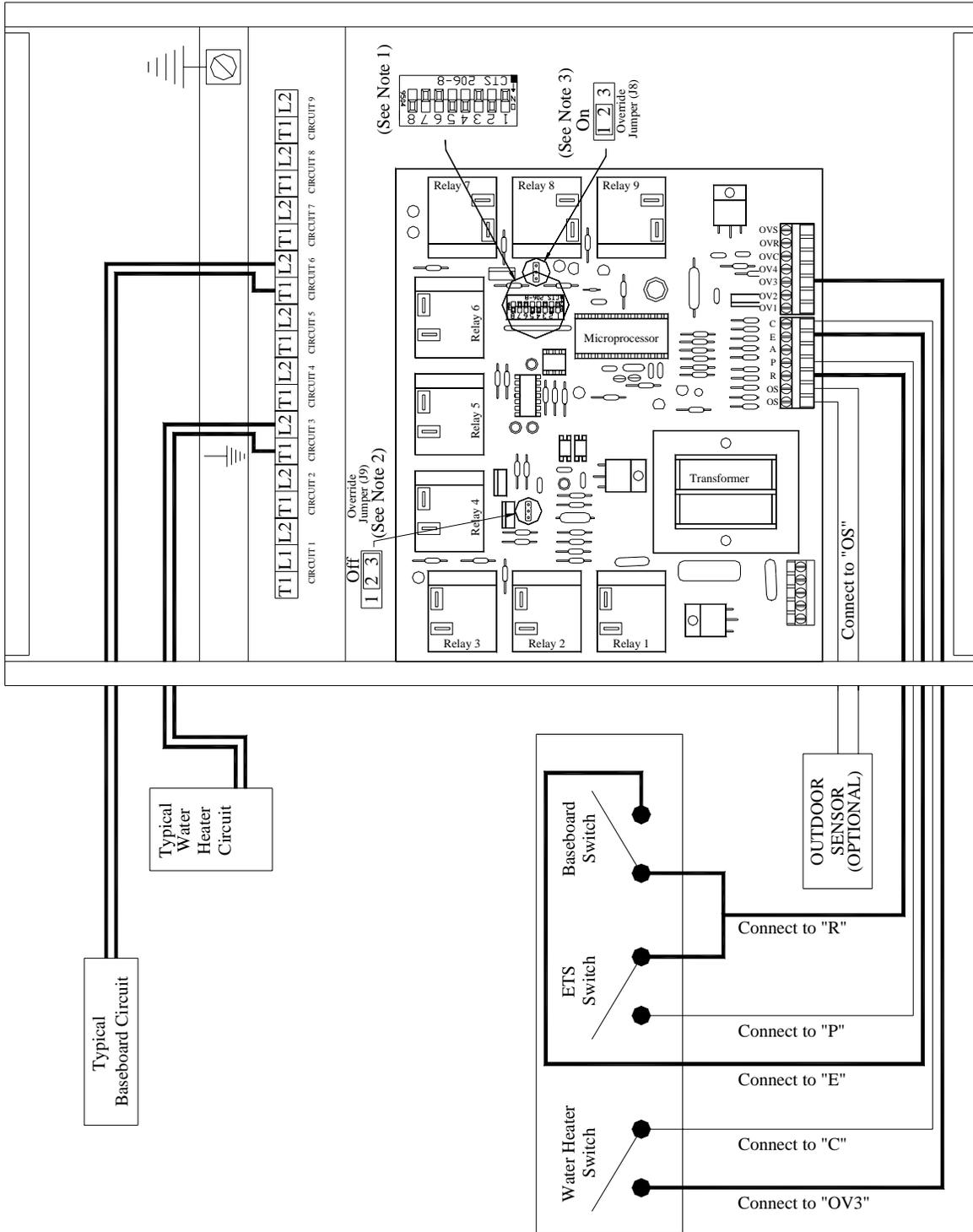
Terminal strip connections

- OVS - Override Switch
- OVR - Override Hot
- OVC - Override Common
- OV4 - Relays #7, 8, and 9 Override or Multiple Control Input
- OV3 - Relay #3 Override/Multiple Control Input
- OV2 - Relay #2 Override/Multiple Control Input
- OV1 - Relay #1 Override/Multiple Control Input
- C - Low Voltage Common
- E - Room Temperature Set Back or Independent Relay Control
- A - Anticipated Peak
- P - Signal in from Utility Control Device (Peak Control)
- R - Low Voltage Hot
- OS - Outdoor Sensor
- OS - Outdoor Sensor
- OS - Outdoor Sensor

L2
P2
N
A1
L1

} Input Voltage

"EXAMPLE" SYSTEM WIRING DIAGRAM FOR MULTIPLE CONTROL STRATEGY APPLICATIONS



1. Dip switch 6 must be "ON" to enable independent relay control. (Refer to dip switch 6 setting description in this manual.)
2. Override Jumper J8 must be "OFF" in this application. (Refer to Note 6 in the Notes section of this manual.)
3. Override Jumper J9 must be "ON" in this application. (Refer to Note 6 in the Notes section of this manual.)



Warranty

WARRANTY STATEMENT

Steffes Corporation (“Steffes”) warrants that the Steffes Comfort Control Relay Panel device is free from defects in materials and workmanship under normal use and service. Steffes’ obligation under this Warranty is limited to the repair or replacement of the device or parts only which prove to be defective under normal use within **one (1) year** of the date of installation and which Steffes’ examination of the returned device or part(s) shall verify to Steffes’ satisfaction that it is defective. The user shall be responsible for any labor costs associated with the repair or replacement of the device or part(s), including the cost of returning the defective device or part(s) to Steffes Corporation.

This Warranty is void if the device is moved from the premises in which it was originally installed. This Warranty shall not apply to the device or its part which have been altered in any respect, or improperly installed, serviced or used, or have been subject to accident, negligence, abuse or misuse.

THE ABOVE WARRANTY BY STEFFES IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES, WHETHER WRITTEN OR ORAL, EXPRESS OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE.

The user assumes all risk and liability whatsoever resulting from the use of this device. In no event shall Steffes be liable for any indirect, special or consequential damages or lost profits.

This Limited Warranty contains the complete and exclusive statement of Steffes’ obligations with respect to the device and any parts thereof. The provisions hereof may not be modified in any respect except in writing signed by a duly authorized officer of Steffes.



3050 Hwy 22 North • Dickinson, ND 58601-9413 • 701-483-5400