

HEAT-TIMER®

INSTALLATION/OPERATING INSTRUCTIONS

SCP-6 SYSTEM CONTROL PANEL

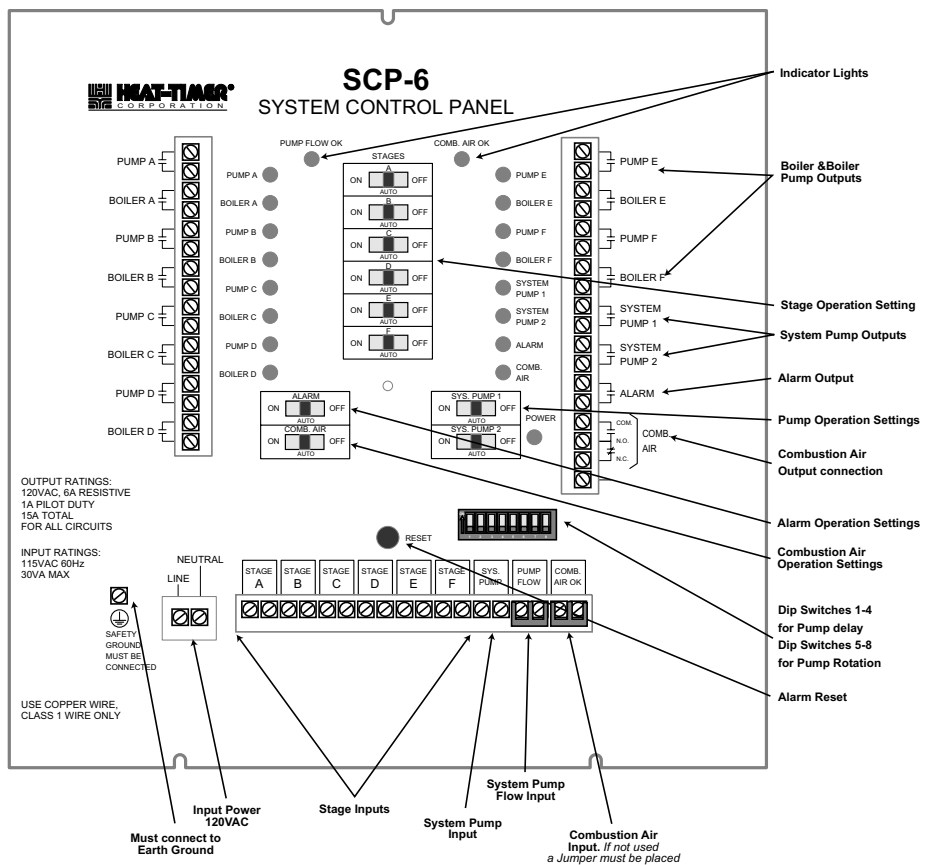
A Multiple Stage Output Panel

Provides Adjustable Boiler (Secondary) Pump Run-on Delay, Combustion Air Interlocks, Primary Pump Lead-Lag, and Primary Pump Failure Alarm

The System Control Panel (SCP-6) is designed to be used with multiple hot water boiler systems. The SCP-6 provides boiler pump run-on delay. In addition, the SCP-6 can provide an interlock to combustion air, and/or a lead-lag function for two primary circulating pumps. The SCP-6 control is designed as an interface between a boiler sequencing control such as a Heat-Timer HWR-Q or SEQ and the boilers and pumps. The SCP-6 panel will control up to six boilers or three lo/hi boilers, six boiler (secondary) pumps, two system (primary) circulator pumps in lead-lag mode, a combustion air damper/fan, and a system pump alarm output.

When the heating system is activated, the SCP-6 will bring on one of two system (primary) circulator pump relays. The system pump lead-lag function can be performed every time the system pump is activated, every 24 hours, every 7 days, or either system pump can be specified to be lead. If there is no proof of flow in 30 seconds, the SCP-6 will activate the lag system pump relay and the alarm relay to signal the user that one of the system pumps has failed.

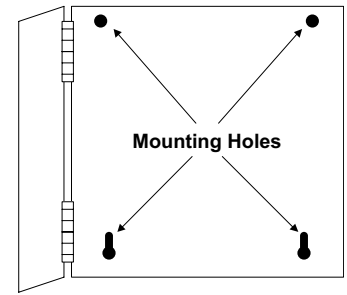
Once combustion air flow has been proved, the SCP-6 will activate the appropriate boiler stage relays and their (secondary) boiler pump relays. As the sequencing control continues to add boiler stages, the SCP-6 will activate additional boiler stages and their boiler pumps. When the sequencing control removes a boiler from the system, the SCP-6 will turn the boiler stage relay off. However, the boiler pump relay for that stage will remain activated for an adjustable time delay period. If at any point the combustion air flow fails, all boiler stages will be turned off. However, the boiler pumps for any boilers that were active will remain on until the time delay period has elapsed.



INSTALLATION

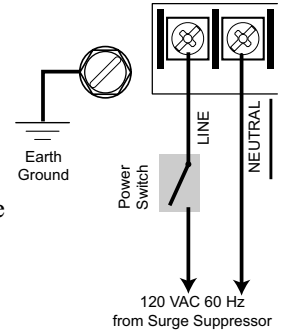
MOUNT THE ENCLOSURE

- Remove the panel from the enclosure.
- Locate the SCP-6 near the sequencing panel and the equipment to be controlled but away from excessively high or low temperatures.
- The surface should be flat and sufficiently wide and strong to hold the SCP-6.
- Screw the enclosure box to the surface through the mounting holes in the back of the enclosure.
- Return the panel to the enclosure and leave the cover open until installation is complete.



Wiring Power Inputs

- Bring the power wires through the bottom left hand K.O. of the enclosure.
- Attach 120V 60 Hz to the Line and Neutral terminals.
- The Ground terminal must be connected to Earth Ground. **DO NOT** use neutral line as earth ground.
- Class 1 voltage wiring must enter the enclosure through a different opening from any Class 2 voltage wiring. Class 1 copper wire is required by UL.
- Heat-Timer recommends the installation of a Surge Suppressor and a power switch before the power line connection for safety and ease of service.



⚠ WARNING

The SCP-6 is an operating control only. The boilers must have all safety and limit controls required by code. It is the responsibility of the installer to verify that all the safety and limits are working properly before and after the SCP-6 is installed.

BOILER STAGES

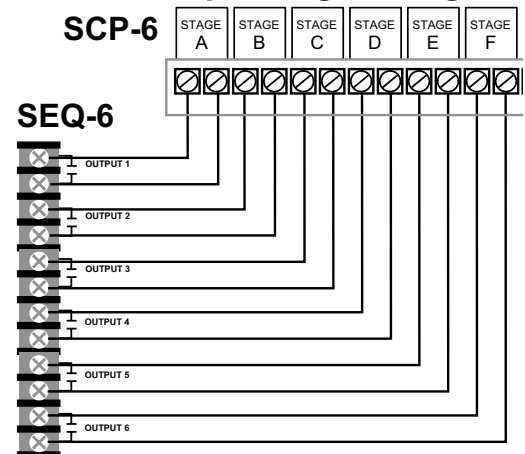
Wiring the Boiler Stages Inputs

- The sequencing panel outputs for each stage must be dry contacts only. If voltage is placed across the SCP-6 input terminals, the SCP-6 may be damaged.
- Wire each sequencing stage output into the corresponding input terminals of the SCP-6. A single SCP-6 can accept up to six stages.

Wiring the Boilers and Boiler Pumps Outputs

- Each stage output has two sets of Normally Open (N.O.) dry contacts.
- These N.O. contacts do not output any power.
- Connect the SCP-6 Boiler outputs in series with the limit circuits of the boiler.
- Connect the SCP-6 Boiler Pump outputs to the pump motor starter or relay.
- Each set of contacts is capable of switching 1A Inductive, 6A Resistive at 120VAC. Maximum total current allowed on all circuits is 15A.

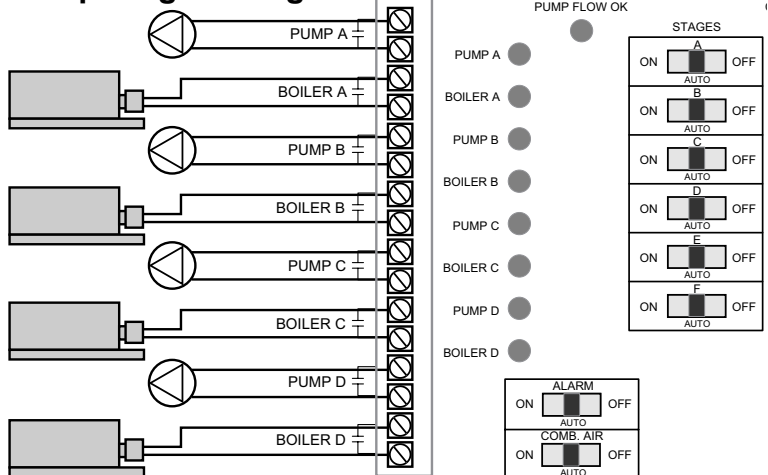
Input Stage Wiring



Setting the Boilers and Boiler Pumps Output Mode

- Each stage has an ON-AUTO-OFF switch.
- In the ON position, both the Stage Boiler and Boiler Pump relays will be activated regardless of sequencer input.
- In the AUTO position, the Stage Boiler and Boiler Pump relays will be made whenever the sequencing panel calls for the stage to be activated (and the combustion air has been proved). When the sequencing panel removes the stage (or it is turned off due to loss of combustion air input), the Stage Boiler relay will deenergize, while the Boiler Pump relay will remain On for the time delay period set by Dip Switches 1 through 4.
- In the OFF position, the stage boiler and pump relays will

Output Boiler and Boiler Pump Stage Wiring



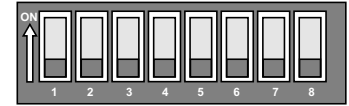
be off and will not be activated if the stage input is made.

- The LED lights marked Boiler and Pump indicate which Stage Boiler and Boiler Pump relays have been activated.

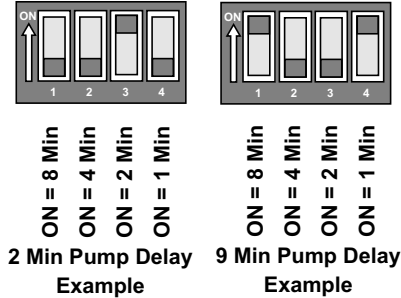
Setting Boiler Pumps (Secondary) Delays (Dip Switches 1 to 4)

- Boiler Pumps can run on for an adjustable delay of up to 15 additional minutes after that Boiler Stage has been turned off, if Stage Switch is set to AUTO.
- Add up the necessary Dip Switch values to reach the desired time delay as shown at right.
- When Dip Switches 1 through 4 are set to OFF, there will be no Boiler Pump delay. The Boiler Pump will turn off at the same time as that Stage Boiler

Dip Switches



Boiler Pump Delay Setting Dip Switches 1 through 4



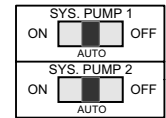
⚠ WARNING

When NOT using the combustion air fan outputs, place a jumper across the Combustion Air OK terminals. Boiler Stages will not operate unless the Combustion Air OK terminals are proved.

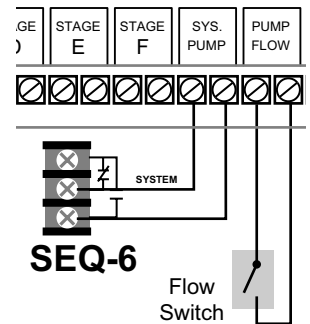
SYSTEM PUMPS (Primary)

Setting System Pumps (Primary) Lead-Lag and Rotation (Dip Switches 5 to 8)

- If a System Pump Switch is set to ON, that System Pump relay will be activated.
- In the AUTO position, one of the System Pump relays will be activated whenever the sequencing panel calls for Pump. Which pump relay is activated will be determined by the position of Dip Switches 5 through 8. If the lead pump does not prove Pump Flow OK in 30 seconds, then both the Lag Pump relay and the Alarm relay will be activated.
- In the OFF position, that System Pump relay will be off. If the Lead Pump is switched OFF and system flow is lost, the SCP-6 will automatically activate the Lag Pump relay and try to prove system flow. However, the Alarm relay will be activated.
- The light marked Pump Flow OK indicates when system flow has been proved (the Pump Flow inputs are shorted together).



System Pump Wiring Input



Wiring the System Pump Input

- Wire the Sys Pump from the sequencing panel System terminals into the SCP-6 Sys Pump terminals which will control the System Pump.
- Do not wire the Sys Pump input on the second or any additional SCP-6s.

Wiring the Pump Flow Input

- Each SCP-6 must receive an input (dry contacts only) from the Primary Flow Switch. If flow switch input is not used, a jumper must be placed across the Pump Flow terminals.
- The output of the Primary Flow Switch must be connected in parallel to all the SCP-6s.
- The switch output must be wired with the same polarity on all the SCP-6s. In other words, if one side of the switch is connected to the Pump Flow left terminal on one of the SCP-6s, then the same side of the switch must be attached to the Pump Flow left terminal on other SCP-6s.
- If the switch is wired with different polarity, the SCP-6 will not work correctly and may be damaged.*

Setting Pump Exercise

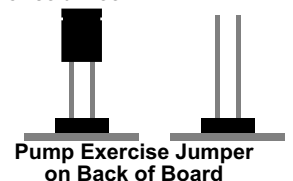
- Each SCP-6 has the capability of exercising any pump for 10 seconds if not operated in a full week.
- The SCP-6 by default is set to exercise the pump. To deactivate Pump Exercise, remove the jumper mounted on the back of the board.

⚠ WARNING

The SCP-6 is set by default to exercise pump. Make sure to set the Pump Exercise Back Jumper option prior to wiring to avoid disconnecting and reconnecting all wiring.

Pump Exercise

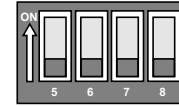
Pump Exercise 10 seconds once a week No Pump Exercise



Setting System Pumps (Primary) Rotation Schedule (Dip Switches 5 to 8)

- The SCP-6 can rotate the System Pump (Primary) lead stage.
- To select the desired System Pump Rotation function, set 5,6,7, and 8 Dip Switches as per the diagram.
- When several rotation Dip Switches are set to ON, the higher number Dip Switch takes priority over lower number ones.

System Pump Rotation Setting Dip Switches 5 through 8



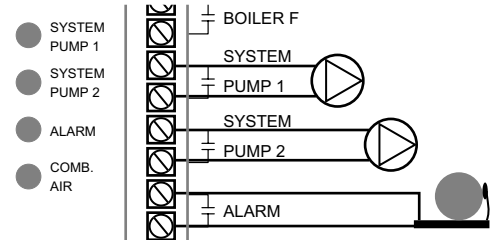
- 5 = ON 7 Day Rotation
- 6 = ON 24 Hour Rotation
- 7 = ON Per Call Rotation
- 8 = ON Sys Pump 2 is Always Lead
- All= OFF Sys Pump 1 is Always Lead

Wiring the System Pump Output

- Wire the System Pump 1 and System Pump 2 terminals to the system pumps or system pump's starters. System Pump 1 and 2 terminals DO NOT supply any power. A separate power source must be provided to power the pumps.
- Each set of contacts is capable of switching 1A Inductive, 6A Resistive at 120VAC.

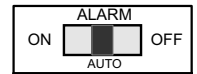
Wiring the System Pump Alarm Output

- The Alarm output terminals do not source any power. A separate power source must be supplied.
- Connect the Alarm relay outputs to an alarm.
- The Heat-Timer Vis-U-Larm (HT #925011) with both a red light and a buzzer may be used for the alarm.
- Each set of contacts is capable of switching 1A Inductive, 6A Resistive at 120VAC.



System (Primary) Pump Failure Alarm Operation

- The alarm output can be tested by moving the switch into the ON position. While the switch is in the ON position, the alarm relay will be activated but the LED light will not turn On.
- With the switch in the AUTO position, the Alarm relay will be activated whenever the Lead Pump fails to prove system flow in 30 seconds. The Alarm can only be cleared by pressing the Reset button.
- To turn the alarm off while the pump is being worked on, switch to the OFF position. This will turn off the alarm relay. However, the red LED light marked Alarm will remain on to indicate that the Alarm had been set and has not yet been cleared.
- The LED light marked Alarm indicates when the Lead Pump has either not been able to establish system flow for 30 seconds, or that the system flow signal has been interrupted for 30 seconds when the Lead Pump relay was activated.
- When Alarm is in AUTO and the Lead System Pump did not prove the flow within 30 seconds, both the Alarm relay and the Lag System Pump relay will activate.



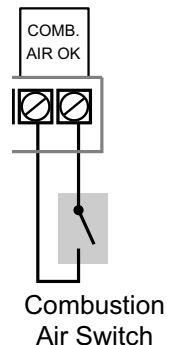
⚠ CAUTION

Switching the Alarm button to OFF will not turn off the red LED light. The light will only be cleared when the Reset button is pushed. If Pump Flow did not prove within 30 seconds, the Alarm LED light will come on again.

COMBUSTION AIR FAN

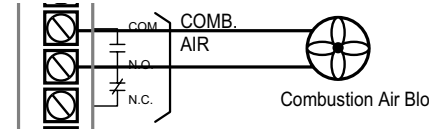
Wiring the Combustion Air Input

- No stage outputs will be activated unless the Combustion Air OK input is closed. (If not using the Combustion Air capability, these input terminals must be jumped together.)
- The Combustion Air OK input must be dry contacts only. If voltage is placed across the SCP-6 input terminals, the SCP-6 may be damaged.
- Each SCP-6 must receive an input (dry contacts only) to the Combustion Air OK switch.
- The Input to the Combustion Air switch must be wired with the **same polarity** to all the SCP-6s. In other words, if one side of the switch is connected to the Combustion Air OK left terminal, then the same side of the switch must be connected to the Combustion Air OK left terminal on other SCP-6s.
- If the switch is wired with different polarity, the SCP-6 will not work properly and may be damaged.
- If using a damper for combustion air, an end switch on the damper motor can be used to switch the Combustion Air OK input terminals closed.



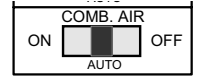
Wiring the Combustion Air Output

- The combustion air output is single pole, double throw relay output with Common, Normally Open (N.O.), and Normally Closed (N.C.) contacts.
- These relay contacts do not output any power. A separate power source must be supplied.
- Connect Combustion Air output to the combustion air fan or the damper.
- The contacts are capable of switching 1A Inductive, 6A Resistive at 120VAC.



Combustion Air Operation

- If the switch is set to ON, the combustion air relay will be activated.
- In the AUTO position, the combustion air relay will be activated whenever the sequencing panel is calling for any one of the boiler stages to fire.
- In the OFF position, the combustion air relay will be off. If using the combustion air interlock, the resulting loss of air flow will cause all the boiler stages to be turned off.
- The LED light marked Combustion Air indicates when the combustion air relay is activated. When the light is on, the combustion air relay is energized.
- The LED light marked Combustion Air OK indicates when combustion air has been proved (the Combustion Air OK inputs are shorted together).



TROUBLESHOOTING

No lights are ON, no outputs are activated - If the POWER light is not on, the SCP-6 may not be receiving power. Check the power supply into the SCP-6. If the power input is correct, the SCP-6 may be damaged. Call the factory for further assistance.

The sequencer is calling for boiler stages, the combustion air output relay is energized, but no boiler stages are activated - Check if the COMBUSTION AIR OK light is on. If it is, then make sure the boiler stage's ON-AUTO-OFF switch is in AUTO. If a boiler stage has been switched OFF, the stage will not run. If the COMBUSTION AIR OK light is not on, place a jumper across the COMBUSTION AIR OK input terminals. If the light still does not come on, the SCP-6 may be damaged. Otherwise, the Combustion Air OK switch may not be working properly, the combustion air fan may not be working, the wires to the panel may be broken, or the system may be wired incorrectly.

▲ IMPORTANT

Remove the jumper on the COMBUSTION AIR OK as soon as the test is completed unless you are NOT using the SCP-6 to control a combustion air fan or damper.

System Pump Failure Alarm is activated - This alarm will come on whenever the lead pump can not establish system flow, or loses system flow for more than 30 seconds. Test the pumps (see TESTING THE OUTPUTS). If both pumps run properly, the Pump Flow switch may not be working properly.

Boiler Pumps do not run the specified amount of time after the Boiler Stage turns off - The time periods set by the dip switch are slightly longer than the actual setting. For example, if the switch is set to 5 minutes, the Boiler Pumps will turn off between 5 and 6 minutes later. If the time periods are more than one minute off, carefully check how the dip switch has been set.

The sequencer is not calling, but outputs are active - Check that the ON-AUTO-OFF switches are in the AUTO position. Any pump relay, boiler stage relay, the alarm relay, or the combustion air fan relay will continuously be energized when switched to the ON position.

TESTING THE INPUTS

The SCP-6 inputs must be dry contact closures only. No voltage should be put across the input terminals. To test if an input is working properly:

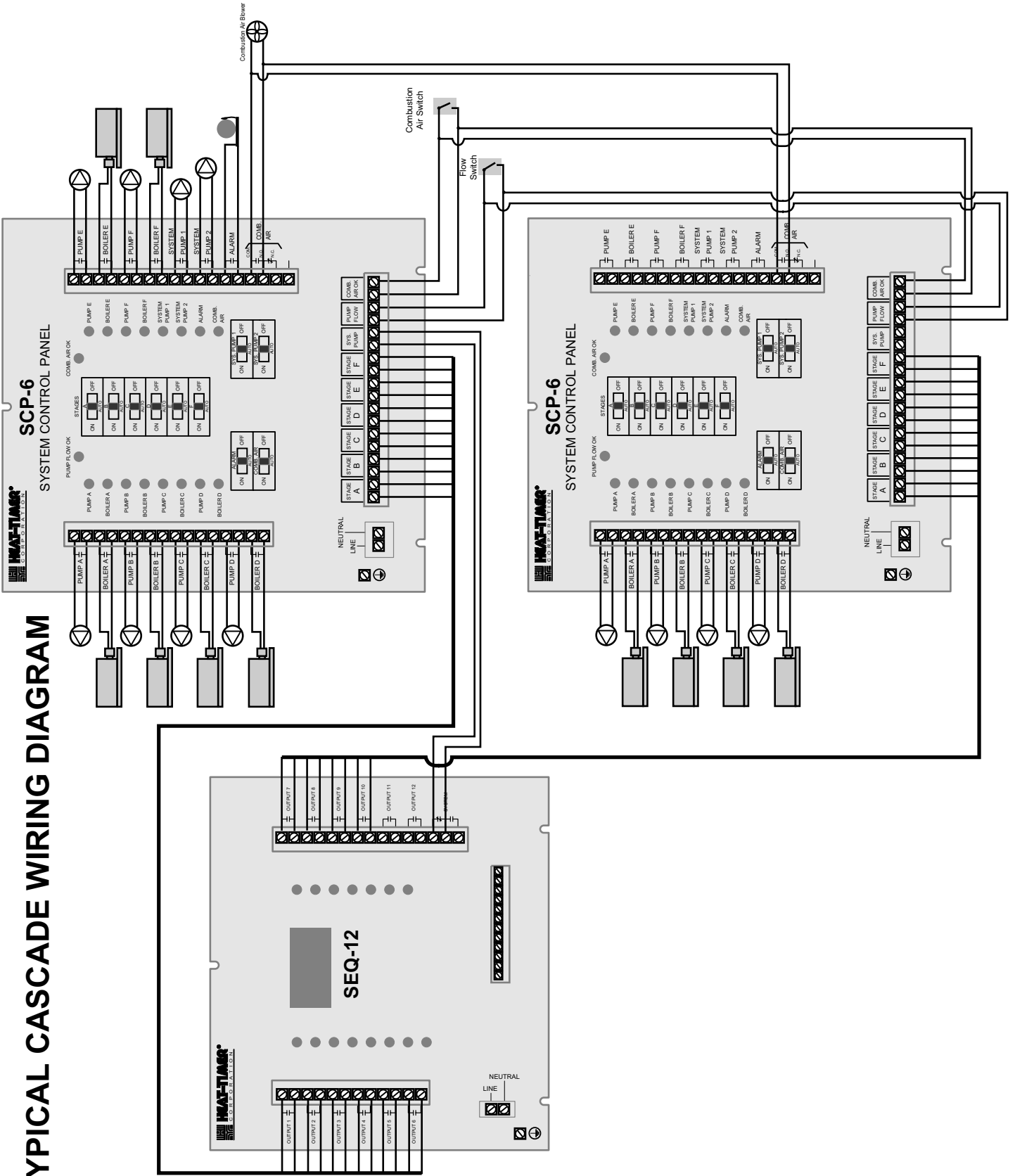
1. Remove the wires attached to the appropriate SCP-6 input terminals.
2. Test the detached pair of wires coming from the sequencing panel or flow switch for continuity.
3. If the wires are continuous, the SCP-6 should respond to the signal. Return the wires to the SCP-6 terminals, and continue with the Troubleshooting procedure.
4. If the wires are not continuous then check the signal at the sequencing panel or flow switch. If the signal is continuous there, the wires between the two units may be broken.

TESTING THE OUTPUTS

The SCP-6 outputs are dry contacts only. They do not output any power. This is true for all the outputs, including the system pumps, alarm, combustion air, boiler stages, and boiler pumps. To test if an output is working properly:

1. Remove any wires attached to those specific SCP-6 output terminals.
2. Switch the ON-AUTO-OFF switch for the appropriate output to the ON position.
3. Test for continuity across the two N.O. output terminals.
4. If the outputs are not continuous, contact the factory.
5. If the N.O. output is continuous, turn the switch OFF and return the output wires to the appropriate terminals.
6. Turn the switch back to ON, and the output should come on. If it does not, the problem is not with the SCP-6, but rather with the output unit itself or the wiring to the output unit.

TYPICAL CASCADE WIRING DIAGRAM



FEATURES

- System Control Panel with 6 boiler inputs and system pump input.
- Selectable system (primary) circulator pump lead/lag function: Alternate every time activated, every 24 hours, every 7 days, or either pump can be specified to always be lead.
- Pump Exercise option for 10 Seconds for every 7 days of no operation. Applies to all pumps.
- Alarm contacts for system (primary) circulator pump failure with LED indicator.
- Manual reset to clear system (primary) circulator pump failure alarm.
- ON/AUTO/OFF switch for system (primary) circulator pump failure alarm.
- ON/AUTO/OFF switches for both system (primary) circulator pump outputs with LED indicators.
- ON/AUTO/OFF switch for combustion fan with LED indicator.
- Combustion air interlock to disable all boiler stages if combustion air is interrupted or cannot be proved.
- ON/AUTO/OFF switch for each boiler stage and its associated boiler (secondary) pump with LED indicators.
- Adjustable delay on break for boiler (secondary) pumps: 0 to 15 minutes of additional pump run time.
- Multiple SCP-6s can be cascaded together for additional boiler stages.

Specifications

Voltage Input:	.....120 VAC 60 Hz
Power Consumption:	.....30 VA Max
Boiler Input terminals:	.....6 boiler inputs.
Boiler and Boiler Pump Output terminals:	.....6 boiler Outputs and 6 Boiler Pump Outputs.
Stages Operation Options:	.....On, Auto, Off.
System Pump Input terminals:	.....System Pumps input, Flow Input.
Boiler, Boiler Pump, Alarm, System Pump Outputs:	...1 S.P.S.T. (N.O.) each
Combustion Air Operation Options:	.....Off, Auto, On. When in Auto, Combustion Air Input terminals are used.
Combustion Air Output:	.....1 S.P.D.T.
System Pump Outputs:	.....2 System Pump Outputs with Lead/Lag rotation.
Pump Delay:	.....Between 1 to 15 Minutes, No Pump Delay. (using Dip Switches)
System Pump Rotation Options:	.....Per call, 24 hours, 7 days, Pump1 On, Pump2 on., All Off. (using Dip Switches)
System Pump Rotation Overlap:	.....5 Second System Pump operation overlap during rotation.
Pump Exercise Options:	.....10 Seconds for every 7 days of pump not running, No Exercise. (using Jumper on back of Board)
Alarm on Flow Failure:	.....30 seconds of no flow.
Rotate System Pump on Flow Failure:	.....Active when Lag System Pump is Set to Auto.
Alarm Reset:	.....Using Reset Button.
Enclosure:	.....NEMA 1
Dimensions:	.....5-1/8" x 13" x 13"
Weight:	.....14 pounds