

REMOTE PANEL/ELECTRICAL

REMOTE PANEL

The Remote Panel is a device used to control the operation of the heater from a remote location. This unit is available in both a "2 Position" or "3 Position" configuration and with or without a cooling output. It also will accommodate both the Maxitrol discharge temperature dial and the Maxitrol space sensing Selectrstat. It is important to understand the following Remote Panel controls and uses:



Direct Fired Remote Panel

1. **Manual/Off/Auto Switch** - Used to control blower operation and tempering mode of unit. The **AUTO** position allows the unit to "decide", through the use of the intake air thermostat, whether or not heating is needed. The **MANUAL** position allows the user to control whether or not heat is needed. The **OFF** position will turn the blower off when a "3 Position" remote panel is ordered. The **OFF** position will disable all temperature controls when a "2 Position" remote panel is ordered. This switch is a Blower On/Blower Off switch on indirect fired units. Indirect fired remote panels are only available in "3 position" configurations and do not accommodate the "Auto" functionality.
2. **Heat/Vent Switch** – This switch is powered when the Manual/Off/Auto switch is in the **MANUAL** position. It is used to control the tempering mode of the unit. The **VENT** position will prevent the burner from operating and the heater will deliver untempered air. The **HEAT** position will force the burner on and the unit will heat the incoming air. This switch becomes a Heat/Vent/Cool switch when the cooling interlock is ordered. This option provides a 120V cooling output from the remote panel.
3. **Lights**- Displays the current status of unit features. The light definitions are as follows:
 - POWER** - Illuminated when there is power to Remote Panel.
 - BLOWER ON** - Illuminated when the airflow switch in unit is satisfied.
 - BURNER ON** - Illuminates after pilot flame has established and main valve is powered.
 - SAFETY LOCKOUT** - Illuminated when the Flame Safety Control is in Alarm mode. (Not available on indirect fired remote panels)
4. **Temperature Control** – Controls the discharge temperature of a standard unit. The temperature dial is replaced with Maxitrol Selectrstat in Space Heating applications and is used to control the space temperature.

DIRECT FIRED REMOTE PANEL TROUBLESHOOTING GUIDE

Light Indication	Condition	Possible Cause
No Lights	Power not available to Remote Panel	<ul style="list-style-type: none"> • Bad voltage to unit • Disconnect in "OFF" Position • Circuit breaker tripped • Bad Main Transformer
POWER light only	Proper Unit Off Operation	No Problem

	No Power to Motor Starter	<ul style="list-style-type: none"> Manual/Off/Auto Switch in "Off" Position (3 Position Remote Panels Only) Improper damper function Low Temperature Thermostat Timed Out (Option)
	Improper Airflow	<ul style="list-style-type: none"> Starter overload tripped Insufficient Airflow Excessive Airflow Bad airflow switch Problem with air probes Problem with airflow tubing Broken Belt
	Proper Ventilation Operation	No Problem
POWER light BLOWER ON light	No Power to Flame Safety Controller	<ul style="list-style-type: none"> Manual/Off/Auto Switch in "Off" Position (2 Position Remote Panels Only) Heat/Vent Switch in "Vent" Position Gas Pressure Switch Tripped (option) High Temperature Limit Thermostat Tripped Manual/Off/Auto Switch in "Auto" Position and Intake Air Thermostat not Satisfied
POWER light BLOWER ON light BURNER ON light	Proper Heating Operation	No Problem
SAFETY LOCKOUT	Flame Safety Alarm Activated No Flame Detected during Pilot Establishment Period	<ul style="list-style-type: none"> Combination Valve in "Off" Position (Unit Sizes 1-3) Stuck Closed Gas Valve No or Low Gas Pressure Bad Spark Electrode Bad Ignition Transformer Flames Sensor Malfunction Clogged Pilot Orifices

ELCECTRICAL COMPONENTS

There are other various electrical components utilized on heaters. These components are items such as contactors, overloads, relays, circuit breakers, disconnect switches, and transformers. Some of the components used are described below.

DISCONNECT SWITCHES

The disconnect switches used on supply fans serve as the main power shut-off to the unit. Switching the disconnect to the "off" position will remove power from every component in the fan, including the motor. For this reason, disconnect switches must be sized to accommodate the amperage load of the motor and the following table summarizes the switches that are currently being utilized:

HP	Voltage					
	1 Phase 115	1 Phase 208	1 Phase 230	3 Phase 208	3 Phase 230	3 Phase 460
0.33	P&S 20AC2	P&S 20AC2	P&S 20AC2	P&S 7803	P&S 7803	P&S 7803
0.5	P&S 20AC2	P&S 20AC2	P&S 20AC2	P&S 7803	P&S 7803	P&S 7803
0.75	P&S 20AC2	P&S 20AC2	P&S 20AC2	P&S 7803	P&S 7803	P&S 7803
1	P&S 20AC2	P&S 20AC2	P&S 20AC2	P&S 7803	P&S 7803	P&S 7803
1.5	P&S 20AC2	P&S 20AC2	P&S 20AC2	P&S 7803	P&S 7803	P&S 7803
2	P&S 7803	P&S 20AC2	P&S 20AC2	P&S 7803	P&S 7803	P&S 7803
3	P&S 7803	P&S 20AC2	P&S 20AC2	P&S 7803	P&S 7803	P&S 7803
5	N/A	P&S 7803	P&S 7803	P&S 7803	P&S 7803	P&S 7803
7.5	N/A	N/A	N/A	P&S 7803	P&S 7803	P&S 7803
10	N/A	N/A	N/A	P&S 7803	P&S 7803	P&S 7803

CIRCUIT BREAKER

A 5 Amp Square D type GCB circuit breaker is currently used to protect electrical components and valves in the heaters. In the event of a short circuit or a high inrush of current for other reasons, the circuit breaker will trip and prevent any electrical damage downstream of it.

TRANSFORMERS

Transformers are devices used to "step" voltage. In the case of heaters, multi-tap transformers are used to step incoming variable motor voltage down to 120V service for electrical component and valve utilization. 120V to 24V transformers are also used to step the control voltage down for the modulating system and combination valve usage. The size of the transformer is crucial and is measured in "VA" terminology. VA is simply the voltage times the current. In other words, 120V at 1.5Amps would require at least a 180VA transformer. Currently being used are the "Micron Impervitran" line of control transformers. A 200VA transformer (B200MBT13XK) is used on all direct fired heaters and size 1 and 2 indirect fired heaters. A 500VA transformer (B500MBT13XK) is used on the size 3 indirect fired heater.

Another type of transformer on the control board of direct fired heaters is the ignition transformer. This device sends very high voltage to the spark electrode in the pilot assembly causing the flame to ignite. The Allanson 1092 ignition transformer is a 180VA transformer that sends 6000V to the spark electrode. This high potential signal is what causes the spark to occur.

ELECTRICAL WIRING DIAGRAMS

All supply fans have wiring diagrams associated with them. These diagrams are ladder-logic diagrams and are built on a fan by fan basis. The diagrams show available options in the fans and required field wiring. Example wiring diagrams of untempered and heated supply fans follow.