ControlIR® Series SCR Power Controllers

Models 910/915

Product Data Sheet

Model 910 shown

Single Phase Control Solutions

The Model 910 and 915 Power Control Systems are complete single-phase power control solutions designed specifically for Research Inc. heating solutions. These standard packages are equipped with the appropriate power control and alarm functions to ensure proper heater function and long heating lamp life.

Model 910 - Designed for use with 4555 PanelIR® or 4185 StripIR® heaters. Amperage capability of 20, 40, or 70 amps.

Model 915 - Designed for use with water cooled StripIR®, LineIR®, or E4 ChambIR® heaters. Amperage capability of 20, 40, or 70 amps.

High Reliability/Low Maintenance

Solid-state electronic technology designed for long service life and low maintenance.

Precise Control

Control current or voltage from 0 to 97% with 0.1% resolution resulting in highly accurate, smooth process control capability.

Multiple Line Voltages/Amperages

Multiple models available from 240 to 480 volts and 20 to 70 amperes.

Phase Angle Power Control

Provides precise and stable voltage control. Includes soft-start to ensure long lamp life.

Fast

Switch load power on and off quickly providing the means to respond rapidly to command and load changes.

Control Options

Manual or closed loop control with thermocouple or pyrometer input capability.

RESEARCH INC.

ControlIR-910/915-D-01-C

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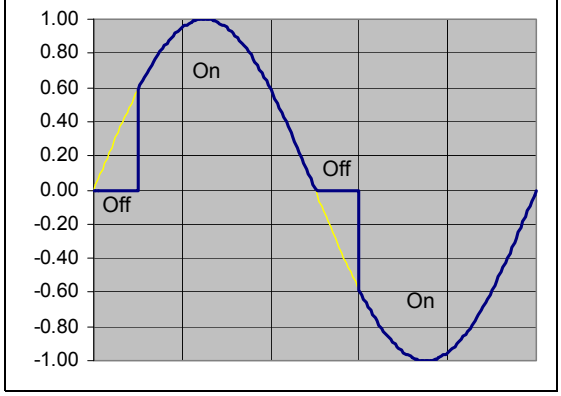
Phase Angle Control

Phase angle power control is a specific technique for turning on (firing) SCRs. The term phase angle refers to the timing of the firing. For applications requiring low-power output, the SCRs are fired late in each AC half-cycle so that the SCRs conduct only briefly. For applications requiring higher power, the SCRs are fired earlier in each AC half-cycle to provide longer SCR on time. Figure 1 illustrates the application of power using phase angle power control. The output with phase angle power control is very constant since the SCR on-time is adjusted within each AC half-cycle. The proportioning of every cycle allows gradual application of voltage to the load. The SCR controls used within the 910/915 are equipped with a soft-start feature to optimize lamp life.

Figure 1 – Phase Angle Fired SCR Control



Standard features

The Model 910/915 Power Control Solutions are equipped with numerous standard features specifically designed for Research Inc. heaters. The 910 is more of a basic control cabinet, while the 915 adds numerous features.

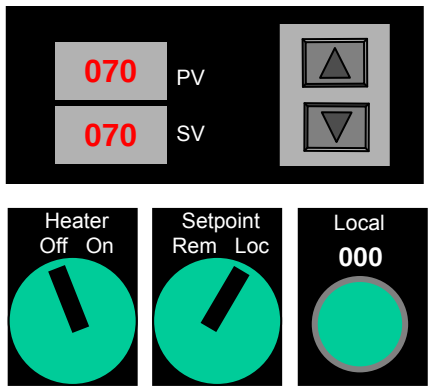
Enclosure (Both 910 and 915)
The enclosure used on both models is an industrial, wall-mount NEMA 12 type enclosure. The following features are included:

- Front-opening door mechanically-interlocked with main disconnect switch
- Door-mounted print and manual pocket

Operator Panel (910 only)
The operator panel (see Figure 2) is designed for simple and safe operation. The operator panel for the Model 910 includes the following features:

- Heater On/Off control switch and indicator light
- Set-point local/ remote control switch
- 10-turn potentiometer with digital dial for precise, repeatable local control
- Mechanically interlocked doors with main power disconnect switches
- Optional lamp out and SCR over-current trip
- Optional temperature controller with either thermocouple or pyrometer input. Note – if an optional digital voltmeter is supplied, it is mounted in the same panel location as the temperature controller.

Figure 2 – Controls Layout (910 only)



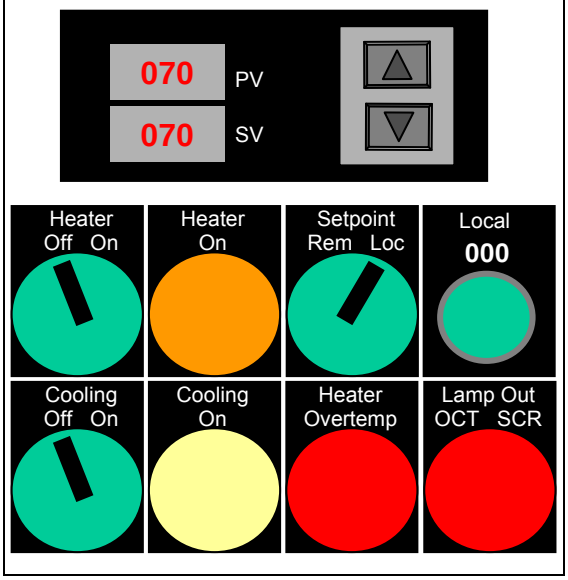
Operator Panel (915 only)
The Model 915 Power Control System is designed with several additional features that are not available on the Model 910. Numerous alarm functions have been added specifically to protect water-cooled heaters such as the StripIR®, LineIR®, and E4 ChambIR® infrared heating systems. PLC logic is used to ensure cooling is actuated before the heaters are energized. Cooling continues to run for several minutes after the heaters are de-energized. The PLC also allows “smart” alarming. Table 1 displays the function of the indicator lights.

Table 1: Operator Panel – Indicator Lamps (915)		
Indicator Lamp	**Lamp On Constant**	**Lamp Flashes**
Heater 'On'	Heater is on	Heater interlock is open
Cooling 'On'	Cooling is on	Cooling off delay – one minute
Heater over-temp	Heater thermostat is open	Temperature controller alarm (optional)
Lamp out - OCT SCR	N/A	Special Option

The operator panel (see Figure 3) for the 915 includes the following features:

- Heater on/off switch and run light
- Cooling on/off switch and run light
- Set-point local/ remote control switch
- 10-turn potentiometer with digital dial for precise, repeatable local control
- Heater over-temperature indicator
- Optional temperature controller with either thermocouple or pyrometer input. Note – if an optional digital voltmeter is supplied, it is mounted in the same panel location as the temperature controller.

Figure 3 – Controls Layout (915 only)



Control Hardware (Both 910 and 915)
The SCR power control included is the Model 1022 single phase, SCR power controller. The 1022 has the following features:

- Phase angle control for T3 lamp loads
- Linear load voltage with respect to command signal.

Other standard control features include:

- 0-5 VDC command signal (remote mode) Class T- type fuses with fast acting, SCR protection
- Fused, 120 VAC control transformer for all control wiring and relay logic
- Terminal connections for field wiring
- Pre-wired from terminal blocks to all installed devices and options
- Remote command signal 0-5 VDC
- Terminal block contacts for remote E-stop switch, remote heater on/off switch.
- Process interlocks for heater thermostat, water and airflow switches
- Integrated contactor controls AC line power to SCR controller

Electrical Ratings

Both the Model 910 and 915 are rated for single phase, 50/60 Hz. Operation. The units each handle a single zone of single phase control. Ratings are shown in Table 2:

Table 2: Electrical Ratings		
	Model 910	**Model 915**
Voltage	240 or 480V, 1 Φ	240 or 480V, 1 Φ
Amperage	20, 40, or 70 Amps	20, 40, or 70 Amps

Options

In addition to the standard features previously listed, several options are available to enhance the functionality of the systems. These options are available on both the Model 910 and 915 and must be specified when ordering.

Product Detection (PD)

- Adjusts lamps between run and idle when product is detected
- Adjustment provided on front panel

Control Options

Three options are available for enhanced system control. A maximum of one of the three control options may be selected.

- **TCT -** Temperature control with thermocouple input enables user-selectable automatic or manual power control. Pre-wired for 'K' type thermocouple.
- **TCP** - Automatic temperature control with pyrometer input enables user-selectable automatic or manual control. Pre-wired for 4-20 mA pyrometer input.
- **VM** - Digital voltmeter indicates system load voltage level as controlled by the 10-turn potentiometer or an external, remote control source.

Table 3: Model 910 Ordering Information

Model	Product Description
910	Single phase SCR Power Control System
Code	**Enclosure**
A	Wall Mount
Code	**Line Voltage**
240	240 Volts AC
480	480 Volts AC
Code	**Current Capacity / per phase**
20	20 Amps
40	40 Amps
70	70 Amps
Code	**Options**
TCT[1]	Temperature controller with thermocouple input
TCP[1]	Temperature controller with pyrometer input
VM[1]	Digital Volt Meter (w/ load voltage transducer)
00	None
	(1) Select one only.

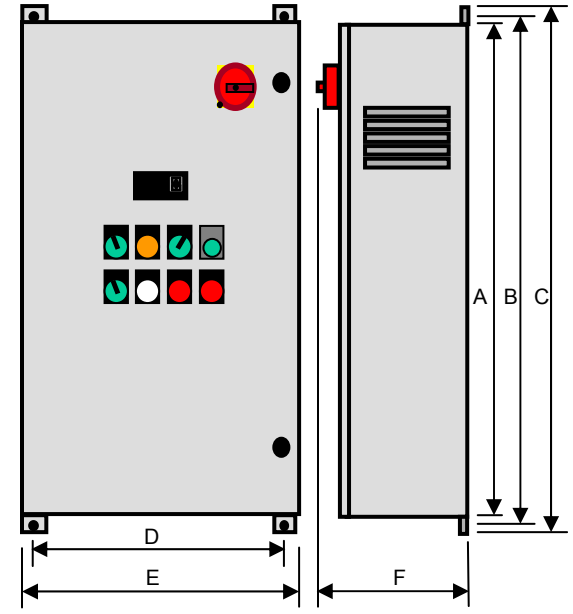
Table 4: Dimensions and Weight

	910, 915 (20 and 40A)	Model 915 (70A)
A	24.00 in (610 mm)	30.00 in (762 mm)
B	25.50 in (648 mm)	31.50 in (800 mm)
C	27.15 in (690 mm)	33.15 in (842 mm)
D	18.50 in (470 mm)	22.50 in (572 mm)
E	20.00 in (508 mm)	24.00 in (610 mm)
F	12.62 in (321 mm)	14.34 in (364 mm)
Weight	100 lb (220 kg)	150 lb (330 kg)

Table 5: Model 915 Ordering Information

Model	Product Description
915	Single phase SCR Power Control System
Code	**Enclosure**
A	Wall Mount
Code	**Line Voltage**
240	240 Volts AC
480	480 Volts AC
Code	**Current Capacity / per phase**
20	20 Amps
40	40 Amps
70	70 Amps
Code	**Options**
TCT[1]	Temperature controller with thermocouple input
TCP[1]	Temperature controller with pyrometer input
VM[1]	Digital Volt Meter (w/ load voltage transducer)
PD	Product Detection (w/ idle potentiometer)
00	None
	(1) Select one only.

Figure 4 – Enclosure Dimensions



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