

SD-2 Thermostat and Interval Timer in one Unit.

This microcomputer based controller consists of two sections:
Digital Timer and Digital Thermostat, working together to control the power switched to the load.



Front view of the SD-2 controller.

TIMER section:

The Interval Timer is programmed by a single rotary knob located on the left hand side of the controller face plate under the 3-digit LED display indicating the time preset during programming. After the count down starts, the display shows the current time remaining till the expiry. A flashing “-” sign indicates that the countdown is pending. During the countdown, the thermostat section is enabled. When the timer is not running the on-board relays are off and the time display shows text “OFF or “0”. The Timer may be stopped or reset at any time by rotating the control knob to the OFF position. Note, that a variety of standard and custom time ranges are available.

THERMOSTAT section:

The Digital Thermostat section is programmable by rotating the knob on the right hand side. During programming the display shows the preset temperature in either *Celsius* or *Fahrenheit*, depending upon the position of the selection jumper located in the back of the unit. When the thermostat is operating, the display shows the current temperature reading and flashes the target preset temperature every several seconds. In models for heating, the on-board relays are controlled to close when the temperature is lower than the preset. In

models for cooling, the relays action is reversed.

The controller has an “Anti-Cycle” function built in, that prevents the relays from switching too frequently when the temperature is near the switching point.

The temperature preset may be changed at any time or the thermostat action may be suspended by rotating the knob to the desired position. The display will also indicate the current preset temperature. Note, that a variety of standard and custom temperature ranges are available.

Temperature Sensor PROBE:

A number of standard Temperature Probes is available for this controller depending upon the application. Most probes are small in size. The most popular is a black anodized housing appx. 25 mm long and 5 mm diameter (1“lg. x 0.2” dia.). The probes have two thin wires attached at one end.

The wiring may be extended with *any type of a 2-conductor cable* up to appx. 150 m (500 ft.).

Standard probes have 1% accuracy and the operating ranges vary from -4F to +248F (-20C to +120C) up to -60F to +480F (-50C to +250C).

The probes are enclosed in a non-corrosive housing that may be Stainless Steel, chrome plated, black anodized or brass with two PVC or Teflon jacketed leads, sealed with epoxy resin to prevent moisture penetration. Please note that it is advisable to protect the leads with additional coat of, for instance, silicon sealant against possible excessive moisture condensation.

Electrical:

SD-2 controller models are available for 120Vac, 208-240Vac, 12Vac, 24Vac, 50Hz or 60Hz as well as 12V or 24V DC. The supply voltage must be specified when ordering. The controller electronics is protected by one on-board 20 mm, removable fuse that can be serviced in the field.

Standard models have two on-board relays, each Single Pole, Normally Open. The two relays can switch loads up to 30Amp, 240Vac max. each (40 Amp is optional). The contacts of both relays may be completely from each other depending upon the chosen method of wiring.

The Power Relays switching is synchronized with the power line “Zero-Crossing” points giving them increased reliability and eliminating the contacts arcing during the high power switching. This considerably limits any generated interference and increases the life of the relays contacts.



SD-2 controller view with mounting front plate and attached temperature probe with leads extendable up to 500 ft (150m).

isolated from the controller supply and



Mounting kit and accessories included with each controller set.

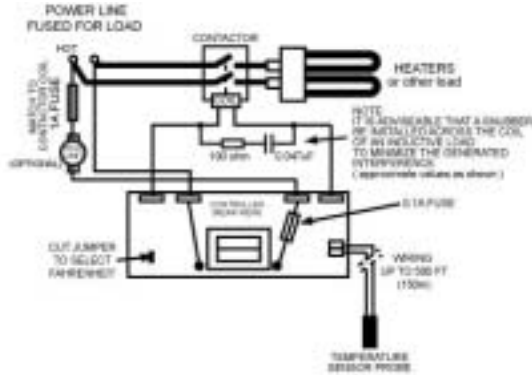
Options:

Many Temperature and Timer ranges, as well as various types of relays and wiring methods may be supplied upon the customer request.

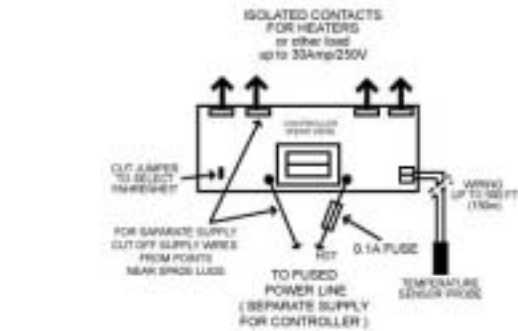
Installation:

SD-2 controllers are normally shipped without enclosures (optional) and are designed to fit in a standard 3-gang electrical box or in a panel. The plastic overlay may be installed on either a customer supplied face plate or the standard Mounting Plate included in the kit. All mounting hardware, screws and wiring connectors are attached. When correctly installed, there are no screws visible on the face plate.

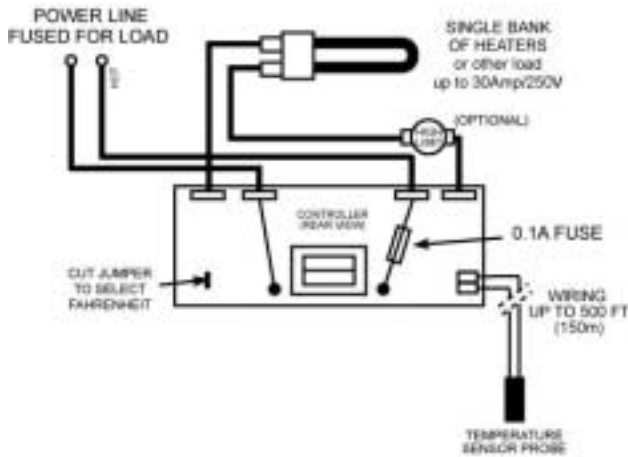
Applications: Sauna, Heaters, Coolers, Steam rooms, Smokers, etc...



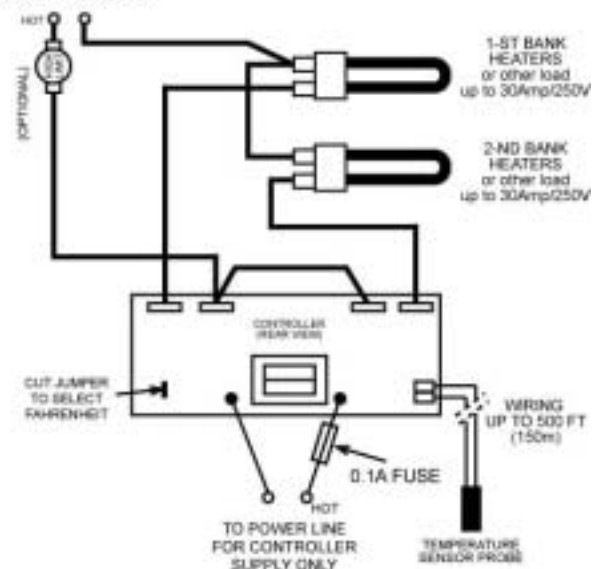
WIRING EXAMPLE WITH EXTERNAL CONTACTOR TO BOOST THE LOAD POWER



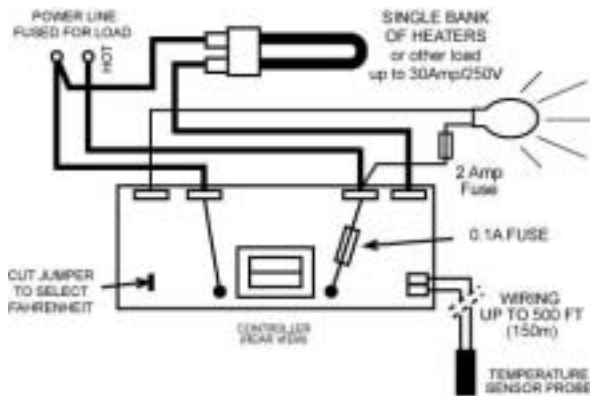
WIRING EXAMPLE WITH POWER LINE SUPPLY SEPARATED FROM THE RELAYS CONTACT



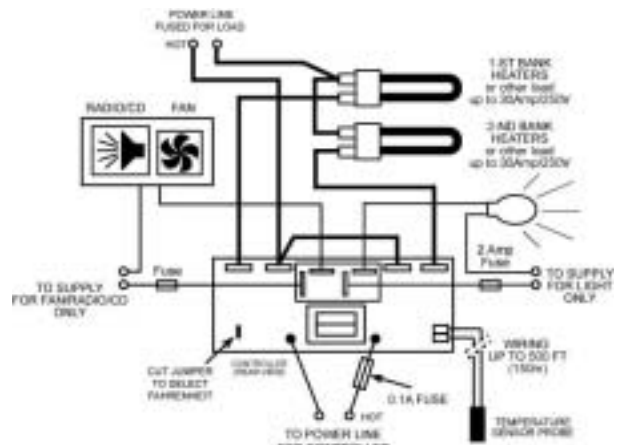
WIRING EXAMPLE WITH POWER LINE SUPPLY COMMON FOR THE CONTROLLER AND THE LOAD



WIRING EXAMPLE WITH 2 BANKS OF LOADS (TO INCREASE THE POWER) AND SEPARATE SUPPLY FOR THE CONTROLLER AND THE LOAD



WIRING EXAMPLE WITH POWER LINE SUPPLY COMMON FOR THE CONTROLLER AND THE LOAD AND WITH OPTIONAL LIGHT CONTROL



WIRING EXAMPLE WITH POWER LINE SUPPLY SEPARATE FOR THE CONTROLLER AND THE HIGH LOAD IN 2 BANKS AND WITH OPTIONAL LIGHT AND FAN/RADIO/CD CONTROL



OPTIONAL SENSOR PROBE PLATES (PLASTIC or METAL)



OPTIONAL SENSOR PROBE PROTECTIVE SHIELD

NA7100KB4100BLK



NA7100KB4100CHR



NA7100KB4100RDT



NA7100KB4100SQT



NA7100KB4100DPD



NA7100KB4100SHD



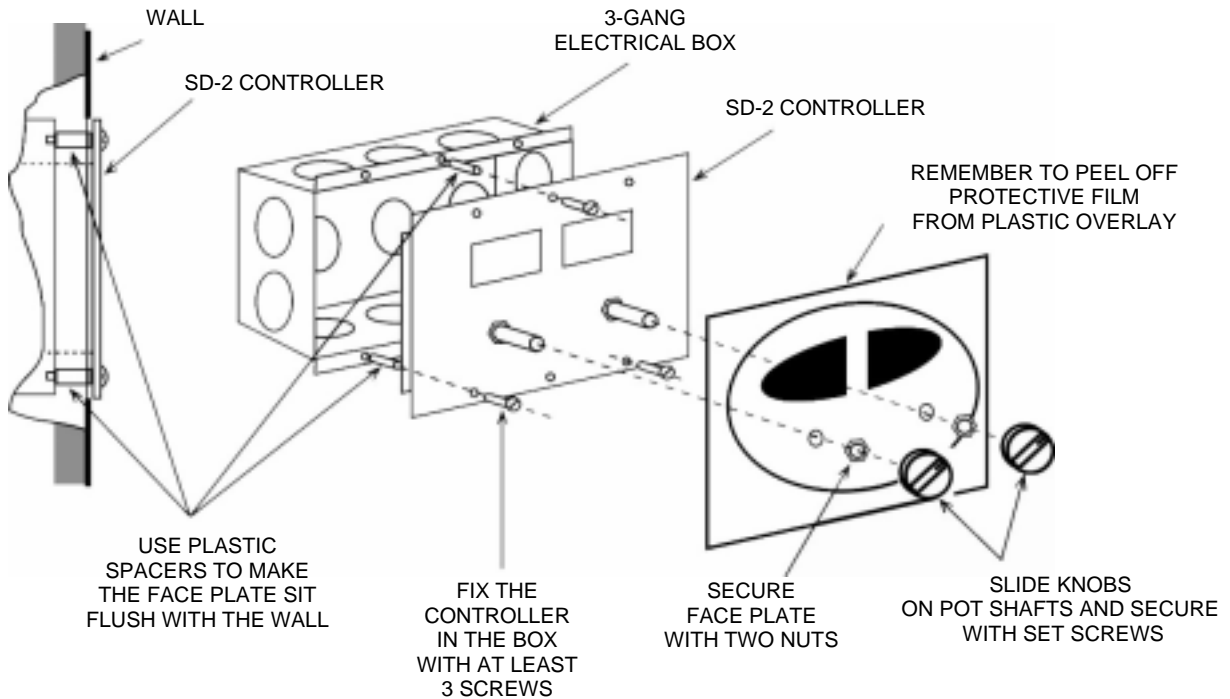
PT1000TC38550MM



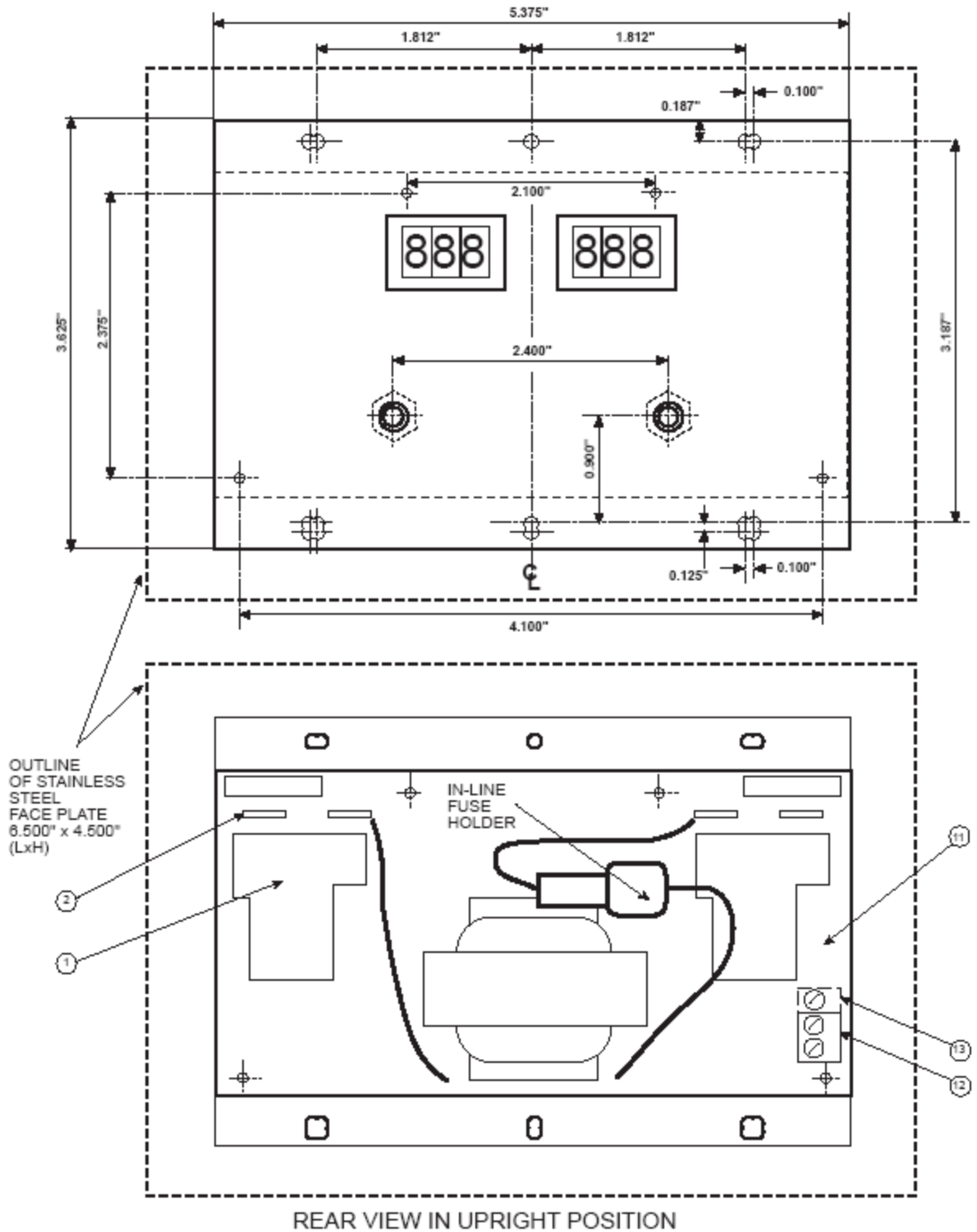
NA7100KB4100PIPTR

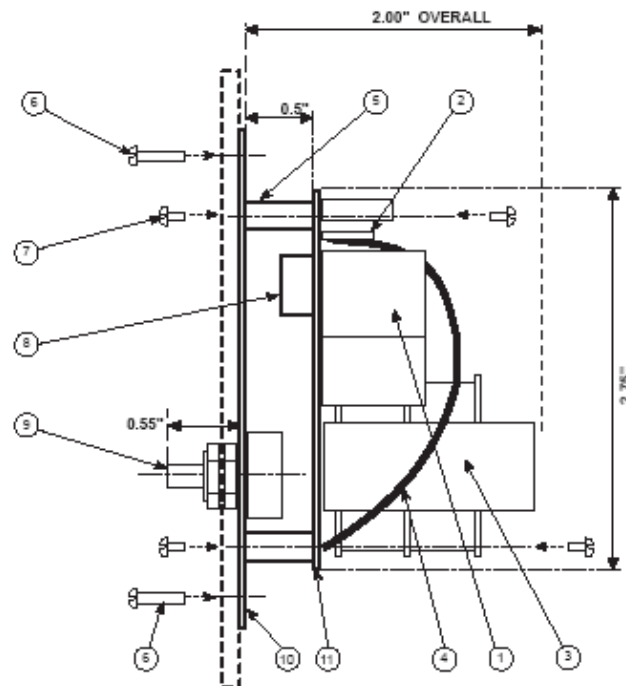


Variety of available temperature sensor probes.



SD-2 CONTROLLER INSTALLATION IN A 3-GANG ELECTRICAL BOX

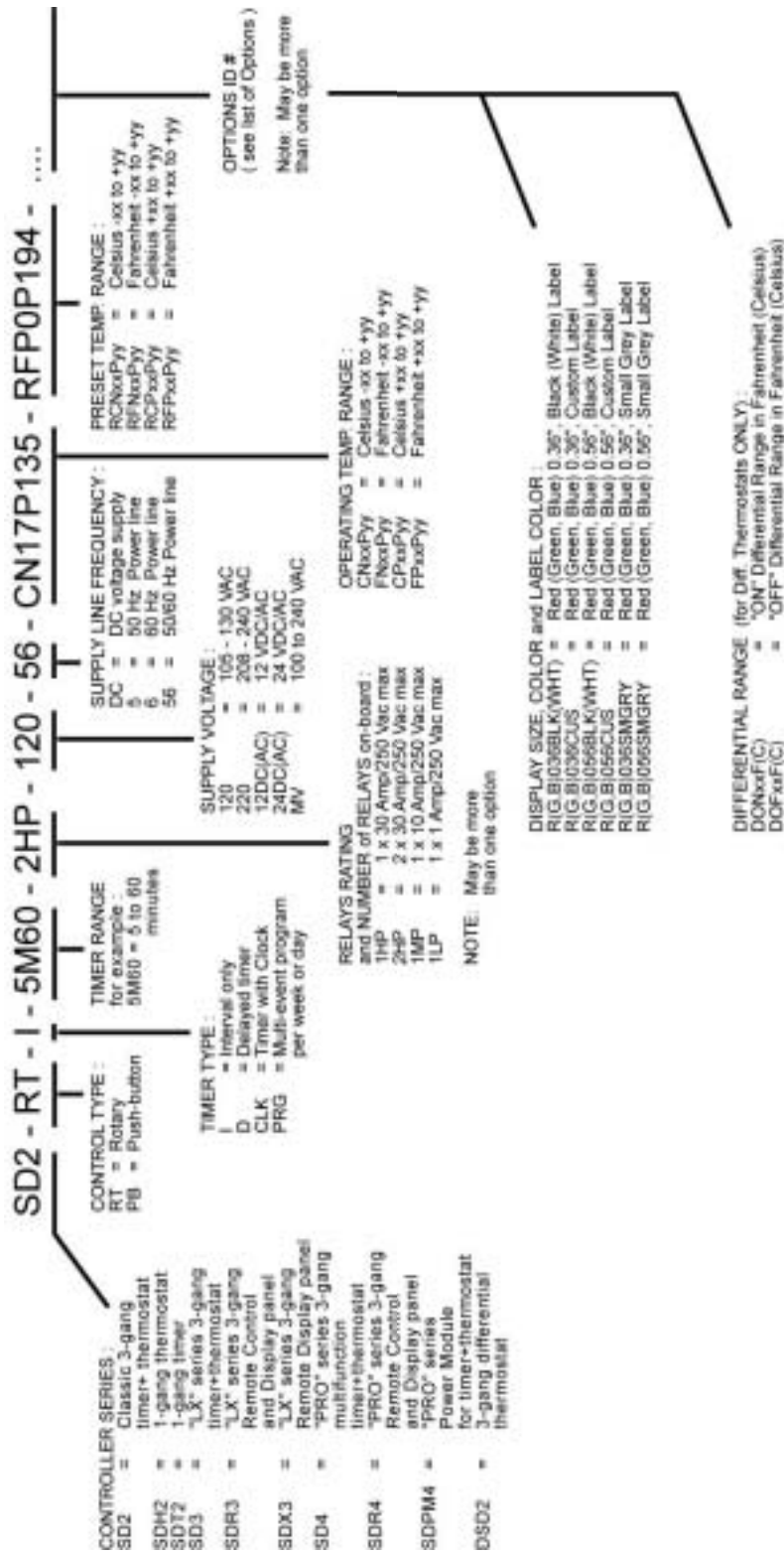




- 1 - POWER RELAYS (30Amp or 10Amp SPST contact)
- 2 - SPADE LUGS for relay contacts
- 3 - LINE TRANSFORMER (120 or 230VAC)
- 4 - WIRES for line voltage trafo.
- 5 - BOARD SPACERS
- 6 - BOX/PANEL MOUNTING SCREWS (#6-32)
- 7 - BOARD SANDWICH MOUNTING SCREWS (#4-40)
- 8 - LED DISPLAY (6 digits)
- 9 - PRESET POTS WITH FACE PLATE HOLDING NUT
- 10 - FRONT MOUNTING BOARD
- 11 - CONTROLLER BOARD
- 12 - PROBE SCREW TERMINAL BLOCK
- 13 - ADDITIONAL TERMINAL FOR OPTIONAL 2-ND PROBE

NOTE:

- 1 - HIGH POWER RELAYS MAY BE REPLACED WITH LOWER POWER
- 2 - SPADE LUGS MAY BE REPLACED WITH WIRES
- 3 - FOR LOW VOLTAGE MODELS (12/24V) THE LINE TRANSFORMER IS ABSENT
- 4 - FACE PLATE LABEL DEPENDS UPON MODEL



IMPORTANT NOTE :

THERE ARE MANY DIFFERENT TYPES AND CONFIGURATIONS FOR THE SD-2 SERIES CONTROLLERS. WHEN ORDERING PLEASE SPECIFY YOUR REQUIRED APPLICATION AND DESCRIBE YOUR EXPECTED OPERATION SO THAT WE CAN ASSIGN THE CORRECT MODEL NUMBER TO YOUR ORDER. FOR INSTANCE, DEPENDING UPON THE MODEL, THIS CONTROLLER CAN BE USED FOR HEATING; COOLING, AIR CONDITIONING, VENTILATION AND VARIETY OF TIMER AND TEMPERATURE RANGES ARE AVAILABLE. ALSO, THE TYPE OF THE TEMPERATURE PROBE MAY CHANGE WITH EACH PARTICULAR APPLICATION.

OPERATING INSTRUCTIONS:

HOW TO START:

1. Set Temperature with "Temp." knob or leave it as is to continue at previous setting. To reset, first turn knob to "LOW".
2. Turn "TIME" knob to "OFF" then rotate until display reads desired time.
3. After several seconds preset time will be locked-in automatically and controller will start.

TEMPERATURE ADJUSTMENT DURING OPERATION:

User may readjust temperature by rotating "TEMP" knob while controller is operating. To make the display show preset value, first turn knob to "LOW".

CONTROL OPERATION:

1. Controller switches the load ON and OFF as required to maintain the preset temperature value compared to the sensor reading while Count Down Timer is running.
2. Every several seconds display will show preset temperature value and then return to current temperature reading.
3. Timer readjustment during operation is not possible. It may only be done by first terminating the count-down (rotate "TIME" knob to "OFF") and restarting the controller.

MANUAL STOP:

Turn "TIME" knob to "OFF" or activate optional REMOTE STOP switch for few seconds. Count-down timer will automatically stop and reset to "0". The load will be switched OFF.

AUTOMATIC STOP:

Controller stops automatically when preset time expires or a malfunction is detected.

IDLE/MONITORING OPERATION:

Display shows "OFF" to indicate that controlled load is switched OFF. After TIMER expired or when "TIME" knob is at "OFF" and after several second of "no-action", controller enters "IDLE" state. To monitor current temperature reading on the display, leave "TEMP" knob at setting higher than "LOW".

CELSIUS/FAHRENHEIT SELECTION:

Controller is normally preset for Celsius degrees. To set Fahrenheit degrees, cut "C/F" jumper on the back of controller as shown in the drawing.

CAUTION: All installation and adjustments of controller options MUST be done ONLY when ALL POWER to load and controller is disconnected.

TROUBLESHOOTING:

Sensor wiring and controls are continually checked for proper operation. If a malfunction is detected, controller will automatically switch OFF the load and deactivate itself. At the same time display will show "Err". Controller cannot be reactivated until all causes of malfunction are fixed.

Following is an example of specifications for a selected model. Note that all Timer and Thermostat ranges, electrical as well as mechanical specifications may be modified to the customer requirements.

Example model: **SD-2-I-2HP-120-SN (preconfigured for Sauna applications)**

<i>SPECIFICATIONS:</i>	<i>VALUE</i>	<i>NOTES, COMMENTS</i>
<i>Electrical:</i>		
Supply Voltage:	105-130Vac, 50/60 Hz	208-240Vac, 50/60Hz or 12/24V AC/DC
Supply Current (controller):	50 mA RMS max.	May be lower for different voltages, relays and display brightness or color
Max. Switched Load:	30 Amp, 240Vac Max.	May be different for other relay models
Switching Reliability:	10,000,000 electrical 10,000,000 mechanical	For AC load
Switching Anti-Cycle:	10 sec. On ON action	May be preset to other value on request
Electr. Ambient temperature:	0 to +50C (32 to +122F) (standard)	0 to +90C extended with high temp LEDs
Control temperature F:	0 to +255F (standard)	May be extended
Control temperature C:	-16 to +140C (standard)	May be extended
Temp. Preset Range:	+37C to +90C (+100 to +194F) (Sauna)	Other ranges available for other models
Temp. reading accuracy:	+/- 1%	Over the operating range
Hysteresis (differential):	+0.5C, -0C (+1F, -0F)	May be set to any value on request
Temp. Display resolution F:	1 F	Other available on request
Temp. Display resolution C:	1 C	Other available on request
Probe Temperature Range:	-40 to +140C (-40 to +284F) (standard)	Extended temp. avail. on custom orders
Probe wiring distance:	500 Ft. (150 m) max.	May be extended on special order
Probe dimensions:	25mm lg. x 5mm dia. (1" x 0.2" dia)	Black or Chrome plated or brass housing
Timer Preset Range:	5 to 60 minutes (for sauna models)	Custom ranges available
Timer Display resolution:	1 minute	Custom resolutions on request
Display color:	Super RED	Different colors upon request
<i>Mechanical:</i>		
Face plate:	Stainless Steel	Controller may be installed without face plate
S.S. face plate dimensions:	165mm x 115mm (6.5" x 4.5")	
Mounting Front plate:	Fiber Glass	Used to install
Mounting plate dimensions:	136mm x 92mm (5.35" x 3.62")	
Controller dimensions::	136mm x 70mm x 48mm (LxWxD) (5.35" x 2.76" x 1.89")	Models with line transformer
Overall weight:	350 gm	Models with line transformer
Shipping Packaging:	Carton padding 6 pcs per volume of 432mm x 127mm x 152mm (17" x 5" x 6")	6 sets per volume, 24 sets per carton
Accessories pack:	Pointer Knobs: 2 pcs Crimp Spade connector: 4 pcs, Mounting screws: 4 pcs S.S. plate and Lexan Label: 1 pc each	