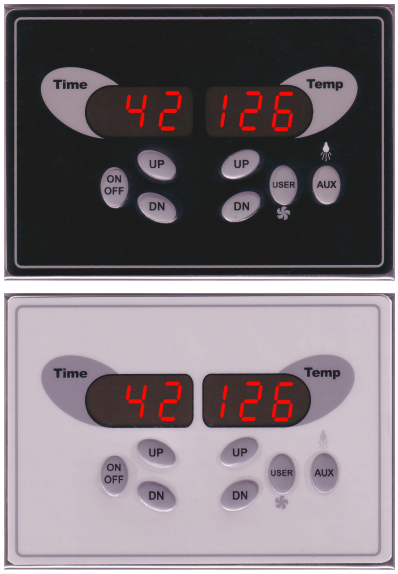
Series SD-4PB Digital Sauna Control Panel

SD-4PB Thermostat and Timer in one Unit with LED display and Powerful Relays

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



Front view of the standard SD-4PB-SN Sauna Control Panel model (with Grey and Black face plate). The LED display colors available in Red, Green or Blue.

GENERAL DESCRIPTION:

Electronic, digital thermostat designed for Heating and/or Cooling.
It has an internal, accurate, programmable thermostat processor, that is self calibrating and does not require any maintenance or adjustments.
The external temperature sensor probe is connected via a screw terminal located on-board.
The internal, programmable timer allows the user to set the thermostat to operate for a preset period of time, depending upon the model; in seconds, minutes, hours or days.
While the timer is running, the thermostat controls the on-board relays, as required to maintain the temperature level preset by the user or as required by customer specifications.
Other operating modes like time accumulating, dual thermostat, dual temperature monitor with two probes, up to three external probes, etc… also available.

TIMER section:

The Timer is programmable using the UP and DN keys located under the "TIME" display. Custom modifications for UP counting or DOWN counting available upon request.
The ON/OFF key will Start or Stop the timer when pressed.
The ON/OFF key, when pressed, will automatically set the controller to the required Time and Temperature preset values and start the timer.
Depending upon the model, a "USER" key can be used to store and recall several special values of timer and temperature settings.
Also, depending upon the model, the timer can perform a count-down from the preset or a count-up to the preset value.
Note, that a variety of standard and custom time ranges is available.
The Timer can be stopped or reset at any time by pressing the ON/OFF key.
A separate function called Delay-Before-Start is available by pressing the Timer UP and DN keys simultaneously or the AUX key, depending upon the model. It allows the user to delay the automatic start of the controller timer after a programmable delay period. The delay range is from 10 minutes up to 99 hours and 50 minutes adjustable in 10 minutes per step.
NOTE that all of the above functionality is customizable and can be changed upon the customer request to perform differently.

THERMOSTAT section:

The Digital Thermostat section is programmable using the UP and DN keys located under the "TEMP" display. During programming the display shows the preset temperature. When the thermostat is operating, the display shows the current temperature reading alternating with the target preset value every several seconds. The controller has an "Anti-Cycle" function built in. It prevents the relays from switching too frequently when the temperature is near the switching point.
The temperature preset can be changed at any time by pressing the UP or DN key. The user can switch to Celsius or Fahrenheit units at any time.
Models are available with temperature preset ranges from –40F (-40C) to +255F (+124C) with standard thermistor sensor probes and up to 960F (+515C) with special thermistor or RTD probes. The sensors wiring is extendable up to 500 ft. (150 m) with any type of a 2 conductor cable.
NOTE, that a variety of standard and custom temperature ranges is available upon request.
There are many other options available for this controller. See the "List of Options" document for details.

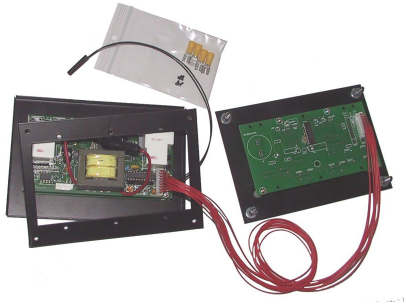
ADDITIONAL functions:

In the standard Sauna Control Panel models two additional keys; "USER" (or Fan) and "AUX" (or Light) can be used to control some OPTIONAL functions. As an example of another option, the controller can have up to two additional relays on-board to control such loads like Fan, Light, Radio, CD Player or other. In standard models these keys may be absent, inactive or perform some other functions, if such custom modifications are requested.

Remote Control / Display Panel:

An optional Remote Panel can be connected with the Main Controller using a single 4-conductor, low voltage cable. The remote panel has all the same functions and displays the same information as the Main Controller. The display colors can be Red, Green or Blue.

Main Sauna Controller and optional Remote Control / Display Panel connected with a cable.



SD-4PB Sauna Controller Set including Main Controller, Remote Panel, Sensor Probe, cable and mounting hardware with two different mounting plates : Semi-Flush and Flush.

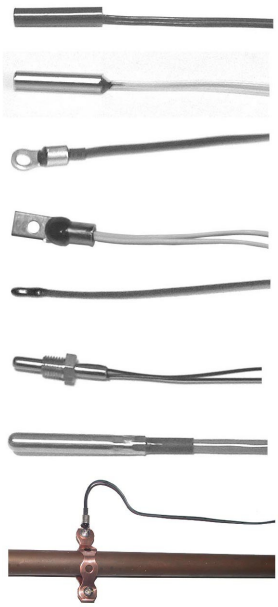
Temperature Sensor PROBE:

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 small, tubular housing appx. 1"lg. x 0.2" dia. (25 mm long and 5 mm diameter). The probe has a 2-conductor wire attached at one end. The other end is sealed and can withstand exposure to unlimited moisture.

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

Standard probes have 1% accuracy and the operating ranges vary from –40F to +255F (-40C to +124C) up to –60F to +960F (-50C to +515C), depending upon the model.

The probes are enclosed in a non-corrosive housing, that may be Stainless Steel, chrome plated, black anodized, brass or plastic with PVC or Teflon jacketed leads, sealed with epoxy resin at the wire end to prevent moisture penetration. In some cases, in order to further improve the moisture resistance or even provide immersability in a liquid. The probes' wiring may need to be additionally protected with silicone sealant, heat shrink or installed in a thermowell.



Variety of available temperature sensor probes.

Electrical:

SD-4 controller models are available for variety of supply voltages: 120Vac, 208-250Vac, 12Vac, 24Vac, 50Hz or 60Hz as well as 12V or 24V DC. The supply voltage should 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 with Single Pole, Normally Open contacts. The two relays can switch loads up to 30Amp, 250Vac max. each (40 Amp is optional). The contacts of both relays can be wired up as completely isolated from the controller supply and 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-4 controllers are designed to almost completely eliminate the EMF (Electro Magnetic Field) radiation.

Options:

Various additional options are available for the SD-4 controllers including: *Stand-by Preheat, Delay-Before-Start, Auto-Manual Light/Fan/CD Relay, Adjustable Differential (hysteresis), High Limit Probe, Remote Start/Stop or Pause, Remote ON/OFF indicator LED lamp, Alarm Buzzer, Usage counter, Accumulating mode,* etc…

As an option, up to two additional, on-board relays can be requested with contacts rated for up to 10Amp/250Vac each. See the "List of Options" for details.

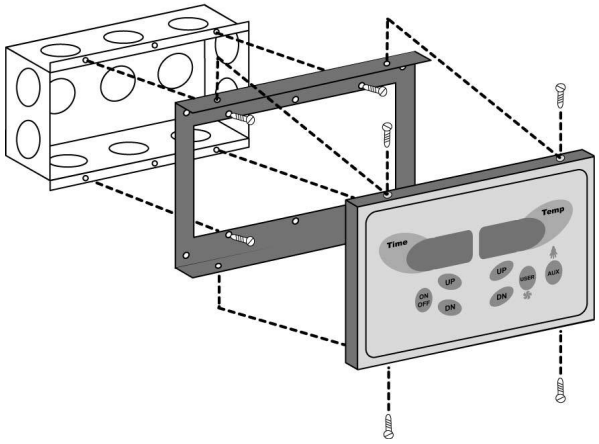
Customized face overlay (decal) and up to 9 push-buttons can be requested for special functionality.

Many Temperature and Timer ranges, as well as various types of operating modes, relays and wiring methods are available.

Installation:

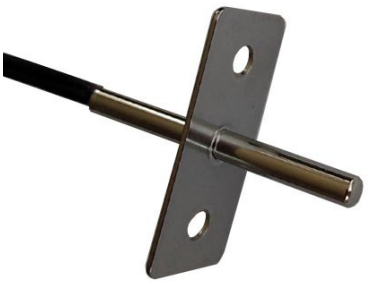
SD-4 controllers are normally shipped without back boxes (optional) and are designed to fit in a standard 3-gang electrical wiring box or in a panel. The plastic overlay can be installed on either a customer supplied face plate or the standard Metal Mounting Plate included in the kit. All mounting hardware, screws and wiring connectors are attached. When correctly installed, there are no screws visible on the face plate.

Applications: Sauna Control Panel, Steam Rooms, Heaters, Coolers, Spa, Tanning Beds, Oven Control, Smokers, etc...

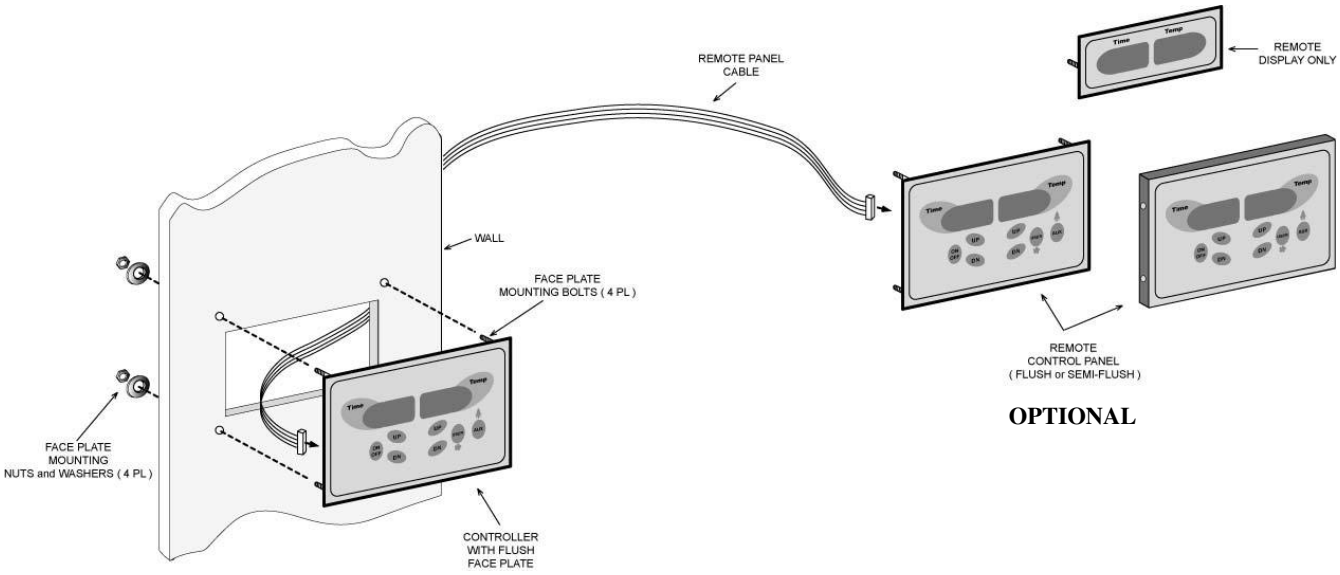


INSTALLATION EXAMPLE: SEMI-FLUSH IN 3-GANG ELECTRICAL WIRING BOX.

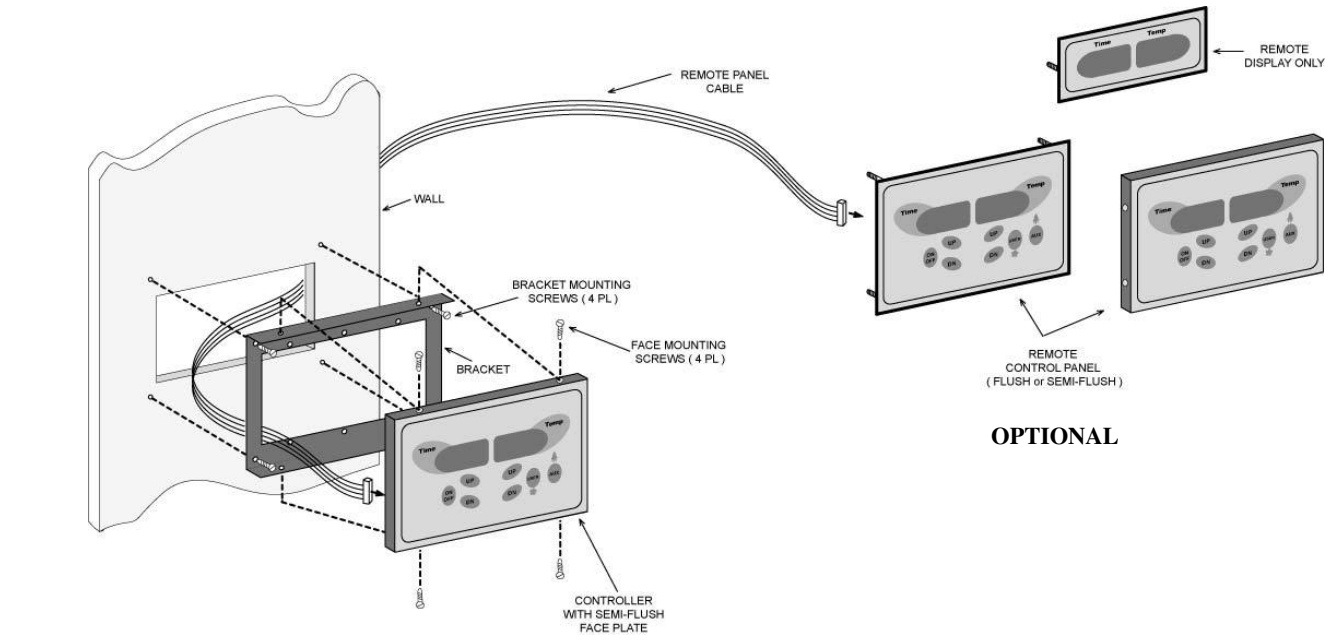
NA7100KB4100SSFLG



Temperature sensor probe with Flange



INSTALLATION EXAMPLE: FLUSH IN A WALL OR PANEL WITH OPTIONAL REMOTE CONTROL / DISPLAY PANEL



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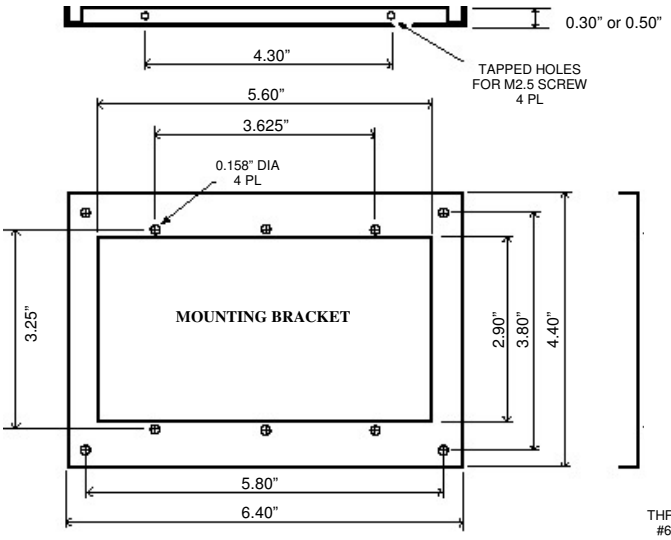
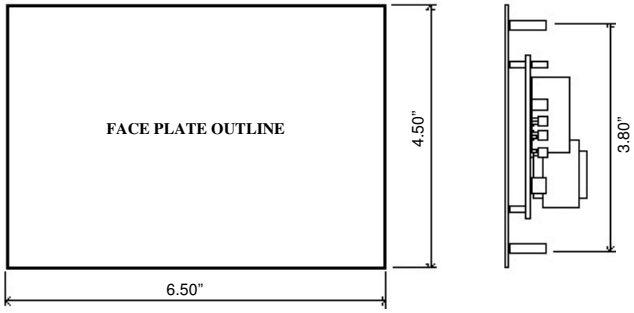
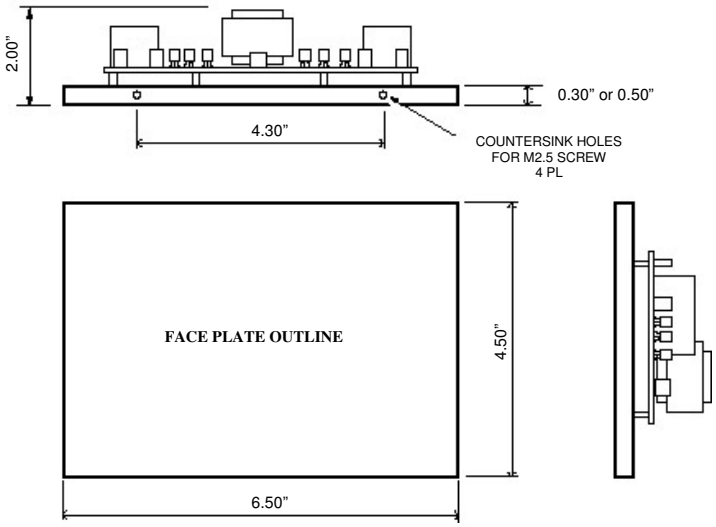


MODEL WITH LINE TRANSFORMER AND HIGH POWER RELAYS SHOWN



FLUSH MODEL DIMENSIONS

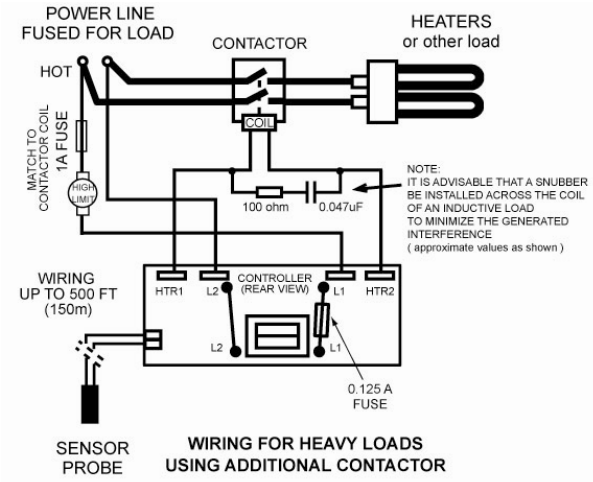


SEMI-FLUSH MODEL DIMENSIONS

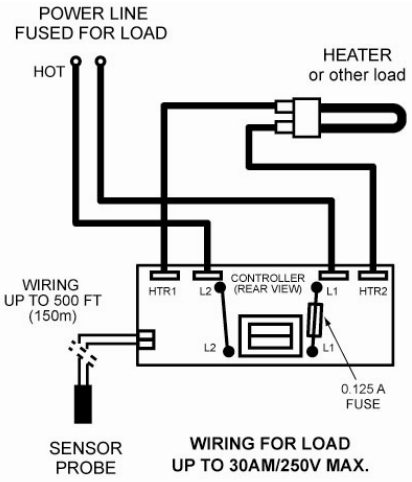
OPTIONAL SENSOR PROBE GUARD-PLATES
(PLASTIC PPP-4 or STAINLESS STEEL PPS-4)

PG-5 OPTIONAL SENSOR PROBE
PROTECTIVE GUARD ONLY

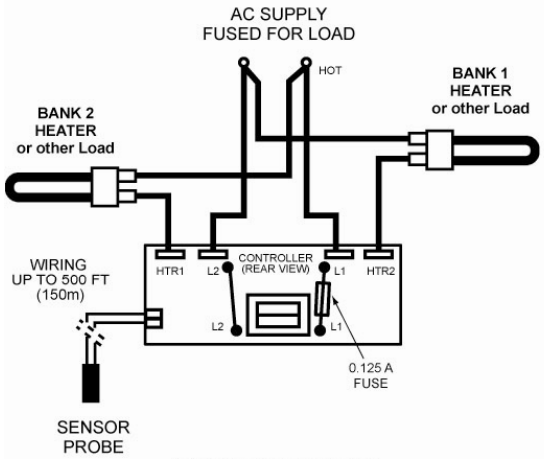
PPB-1RLED REMOTE START/STOP
PUSH-BUTTON WITH LED LAMP



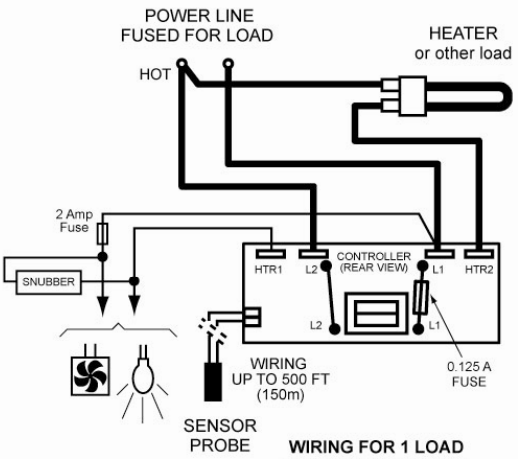
WIRING FOR HEAVY LOADS USING ADDITIONAL CONTACTOR



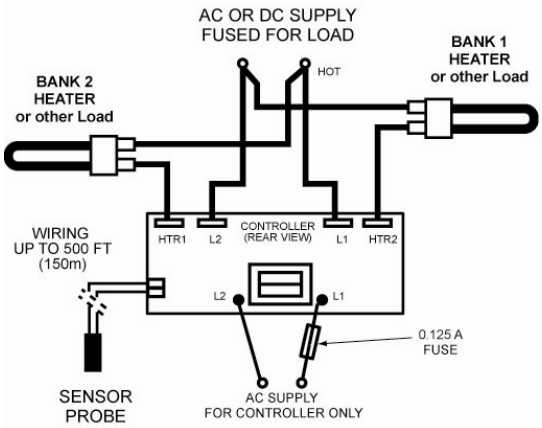
WIRING FOR LOAD UP TO 30AM/250V MAX.



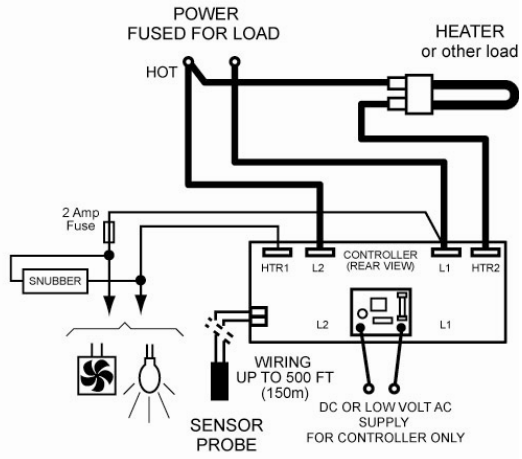
WIRING FOR AC LOADS IN 2 BANKS, EACH FOR 30AMP/250V MAX.



WIRING FOR 1 LOAD UP TO 30AM/250V MAX. AND ADDITIONAL LOADS



WIRING FOR AC or DC LOADS IN 2 BANKS, EACH FOR 30AMP MAX. and WITH SEPARATE SUPPLY FOR CONTROLLER



WIRING WITH LOW VOLTAGE DC OR AC SUPPLY FOR CONTROLLER

SIMPLE WIRING EXAMPLES

Example model: **SD-4PB-I-SN (model for Sauna Control application)**

OPERATING INSTRUCTIONS (example for standard models):

HOW TO START :
Press the "ON/OFF" key to start or stop the timer.
NOTE: After starting, the controller will begin the count down from the preset time value and the preset temperature target value will be automatically set. Depending upon the model and/or the selected mode of operation, the recalled values may be sometimes set to the maximum values allowed.

TIMER ADJUSTMENT :
The user can re-adjust the timer at any time by pressing the timer UP or DN key.
NOTE: Depending upon the model and if the timer was running or not, the readjusted TIMER preset value may be saved in either a permanent or a temporary memory.

TEMPERATURE ADJUSTMENT :
The user can re-adjust the temperature preset at any time by pressing the temperature UP or DN key.
Alternatively, the USER key can be pressed to recall one of the previously stored time and temperature presets.
NOTE: Depending upon the model and if the timer was running or not, the re-adjusted TEMPERATURE preset value may be saved in either a permanent or a temporary memory.

CONTROL OPERATION :
1. The controller switches the load ON and OFF as required to maintain the preset temperature value as compared to the sensor reading while the Count Down Timer is running.
2. Every several seconds the display will show the preset temperature value and then return to the current temperature reading.

AUTOMATIC STOP :
The controller stops automatically when the preset time expires or a malfunction is detected.

OPTIONAL LIGHT / FAN / RADIO control:
Several **optiona**l keys may be active to control some additional loads like : Light, CD/Radio, Fan etc…

DELY-BEFORE-START :
Press the "USER" key or the UP and DN Timer key simultaneously (depending upon the model).
The display will show the most recently set delay value. Use the Timer UP or DN key to change it, if needed. Then press the ON/OFF key to start the delay count-down. To stop, press the ON/OFF key during the count down. After the delay count down expires the controller will automatically start the sauna timer and temperature control as per the most recent preset.

CELSIUS / FAHRENHEIT SELECTION :
To switch between the Celsius and Fahrenheit units, press both, the UP and DN temperature keys simultaneously.

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

TROUBLESHOOTING :
The sensor wiring and controls are continually checked for proper operation. If a malfunction is detected, the controller will automatically switch OFF the load and deactivate itself. At the same time the LED display will show a scrolling message with suggested diagnostics.
The controller cannot be reactivated until all causes of the 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 can be modified to the customer requirements.

Example model: **SD-4PB-I-2HP-120-SN (pre-configured for Sauna Control)**

SPECIFICATIONS:	*VALUE*	*NOTES, COMMENTS or OPTIONS*
Supply Voltage:	105-130Vac, 50/60 Hz	Optional 208-250Vac, 50/60Hz, 12/24V AC/DC
Supply Current (controller):	50 mA RMS max.	Can be lower for different voltages, relays and display brightness or color
High Power Relays:		
Max. Switched Load:	2 x 30 Amp, 250Vac max.	Can be different for other relay models
Optional Low Power Relays:		
Max. Switched Load:	2 x 10 Amp, 250Vac Max.	Can 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	Can be preset to other value on request
Oper. Ambient temperature:	-4 to +158F (-20 to +70C) (standard)	-20 to +90C extended with high temp LEDs
Control temperature :	0 to +255F (-17 to +124C) (standard)	Can be extended up to 960F (515C)
Temp. Preset Range:	+77 to +194F (+25C to +90C) (Sauna)	Other ranges available for other models
Temp. reading accuracy:	+/- 1%	Over the operating range
Hysteresis (differential):	+1F, -0F (+0.5C, -0C)	Can 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 +255F (-40 to +124C) (standard)	Extended temp. avail. on custom orders
Probe wiring distance:	500 Ft (150 m) max.	Can be extended on special order
Probe dimensions:	1” x 0.2” dia (25mm lg. x 5mm dia.)	Chrome plated or other probes per request
Timer Preset Range:	5 to 60 minutes (for sauna models)	Custom ranges available
Timer Display resolution:	1 minute	Custom resolutions on request
Delay-Before-Start range:	10 minutes to 99 hours:50 minutes	Setting in 10 minutes per step
LED Display:	6 digits, 0.56” high	
Display color:	RED, GREEN or BLUE	Different colors upon request
Mechanical:		
Face plate:	Metal, baked powder paint	Flush or Semi-Flush mounted face plate
Face plate dimensions:	6.5” x 4.5” (165mm x 115mm)	
Mounting Bracket:	Metal, baked powder paint	Semi-Flush , depending upon the model
Mounting bracket dimensions:	6.4” x 4.4” (162mm x 112mm)	For Semi-Flush models
Controller dimensions::	5.35” x 2.76” x 1.89” (LxWxD) (136mm x 70mm x 48mm)	Models with transformer
Overall weight:	350 gm	Models with transformer
Shipping Packaging:	Carton with bubble padding	
Accessories pack:	Crimp Spade connector: 4 pcs, Mounting screws: 4 pcs (if needed) Face plate, Bracket and Lexan decal: 1 pc each	