

Series DSD-4PB

PROGRAMMABLE DIFFERENTIAL THERMOSTAT

with Maximum and Minimum differential preset

INSTRUCTIONS

(short version)

HOW TO START / STOP:

The ON/OFF key on the left hand side operates as the thermostat ON/OFF switch.

When the thermostat is ON, it will switch the on-board relays as programmed for the process.

When the thermostat is OFF, it will only indicate the current temperatures readings and the relays status, however the user can manually control the state of the relays by operating the AUX1, AUX2 and the optional AUX3 keys. Note, that the manual control of the relays is reset automatically when the thermostat is switched ON.

Note, that the thermostat will re-start automatically when the supply power is interrupted and subsequently restored, if it was ON before the supply power interruption. This feature can be altered in the Advanced User settings.

DISPLAY INDICATIONS:

Normally the display alternates between the current temperature readings and the status of the relays Rel1, Rel2 and optional Rel3.

To also see the current differential settings, press the STEP key repeatedly. The display will scroll through the settings.

USER SETTINGS:

To adjust and/or see more settings values, press the MENU key then press the STEP key repeatedly. The display will scroll through ALL user settings and at that point the settings may also be modified by pressing the UP or DOWN arrow keys.

Note, that the settings will not be altered unless the UP or DOWN keys are used. If the settings are altered, they will be stored in the thermostat memory.

Following are the programmable set points:

HOT = Overheat temperature Limit
Hi.L = High temperature Limit
Lo.L = Low temperature Limit
ICE = Freeze temperature Limit
d.Hi = Maximum difference setting
d.Lo = Minimum difference setting

NOTE 1: All of the above settings may be programmed by the user to any value within their range and they are not checked by the thermostat to determine if the Overheat value for instance is higher or lower than the Freeze value. It is up to the user to make sure that the values are set as needed for the particular control application. However in most cases the order should be as follows: HOT > Hi.L > Lo.L > ICE .

The thermostat will however make sure that the Maximum Difference setting "d.Hi" value is always higher than the Minimum Difference "d.Lo" value.

NOTE 2: All of the above settings refer to both; IN and OUT sensor probes. In the Advanced User Programming procedures it is possible to select which side (IN or OUT) is actually used to determine the particular process control operation.

NOTE 3: To switch the units from C to F and vice versa, press UP and DN arrows simultaneously.

DIFFERENTIAL THERMOSTAT OPERATION:

The thermostat operation is controlled by testing the absolute temperature as well as the temperature difference between the "IN" and "OUT" external sensor probes.

The thermostat is highly programmable. Its mode and sequence of operation is controlled by the programmed temperature settings values and by the specific State Control Table that may, to some extent, be modified by the user. The temperature settings are initially preprogrammed to optimum values for specific applications and may be subsequently altered by the user, at any time, when the thermostat is operating in either ON or OFF state.

Normally, in the differential thermostat control mode, the thermostat will attempt to control the switching of the on-board relays in order to maintain the temperature sensed by the two external probes between the Maximum difference and the Minimum difference settings.

The additional temperature limits are used to prevent the controlled temperatures from traveling outside of the programmed values and / or to signal or take appropriate action when such events occur. The type of action taken is determined by the thermostat operation State Table, that may be also modified by the user, to some extent, by following the Advanced Programming Procedure (see the Advanced User Manual).

The thermostat has two, three or four on-board relays, depending upon the model.

Two main relays Rel1 and Rel2 (HTR2 and HTR1 respectively) each have a Normally Open, Single Pole contacts rated up to 30Amp/250V max.

Either one or both can be used to control one or two separate loads. The relays contacts can be wired up as common or as separate from the thermostat supply. See the example wiring diagrams for detail.

The optional, additional relays (Rel3 and Rel4) may be used for additional alarm functions that operate when the Freeze (ICE) and / or the Overheat (HOT) temperature limits are exceeded. These optional relays are usually rated at 10Amp/250V max. and are normally N.O., SPST or SPDT in some models.

HIGH or LOW TEMPERATURE WARNING:

When the sensed temperature on either probe exceeds the highest operating limit of the thermostat test range or when at least one of the the probes or its wiring becomes shorted, a message "Error Temp too Hi or Sensor SHORT" is displayed.

At this point all relays will be switched OFF until the error is corrected.

When the sensed temperature on either probe exceeds the lowest operating limit of the thermostat test range or when at least one of the the probes or its wiring becomes open, a message "Error Temp too Lo or Sensor OPEN" is displayed.

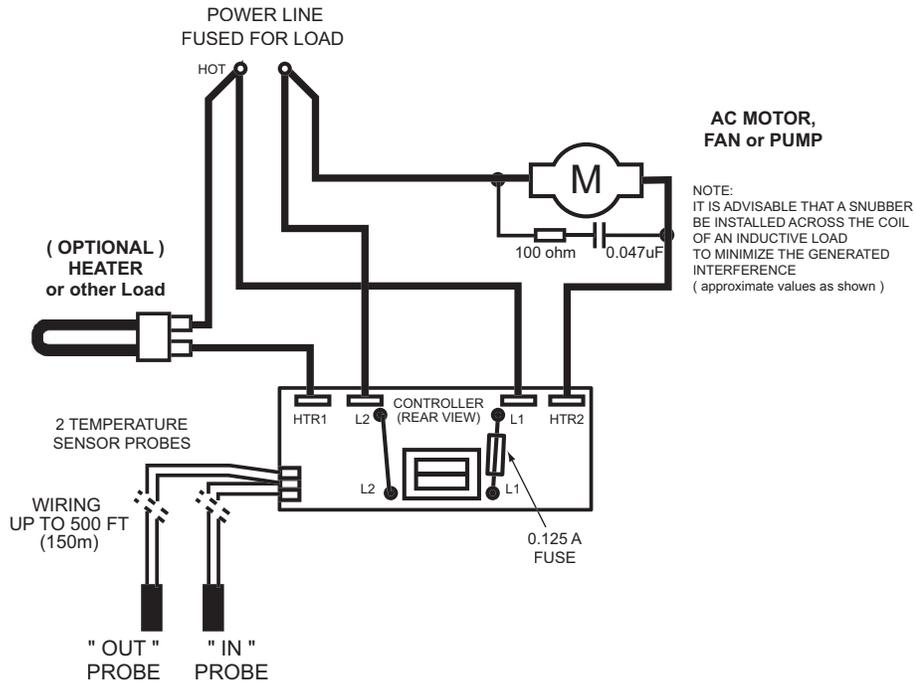
At this point all relays will be switched OFF until the error is corrected.

In both of the above cases the thermostat will remain in either ON or OFF state, as it was before the error occurred.

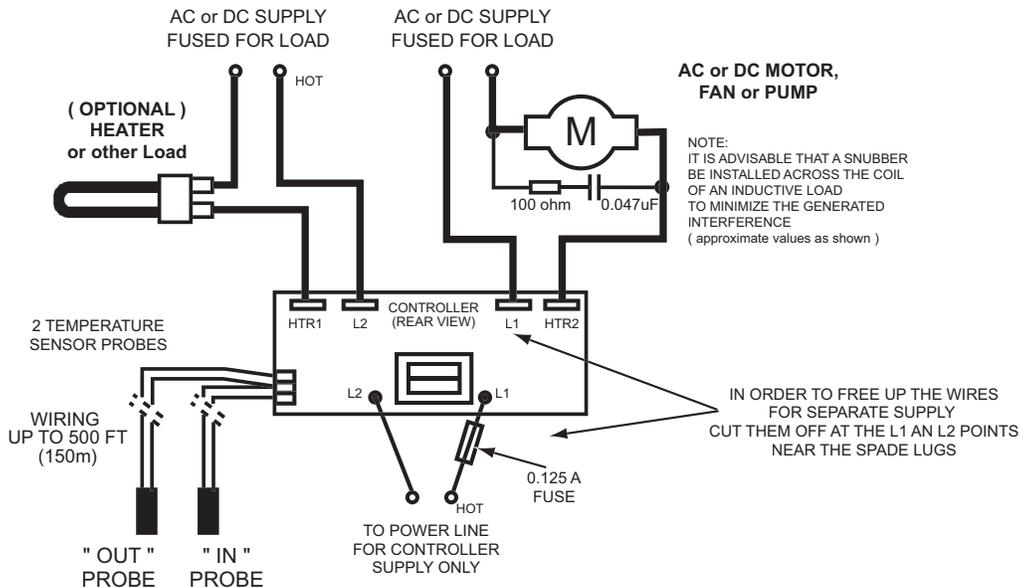
NOTE: If the thermostat was OFF at the time when an ERROR occurred, it will not allow to be switched ON until all errors are corrected.

CAUTION: All installation and wiring of the thermostat **MUST** be done **ONLY** when **ALL POWER** to the load and the thermostat is disconnected.

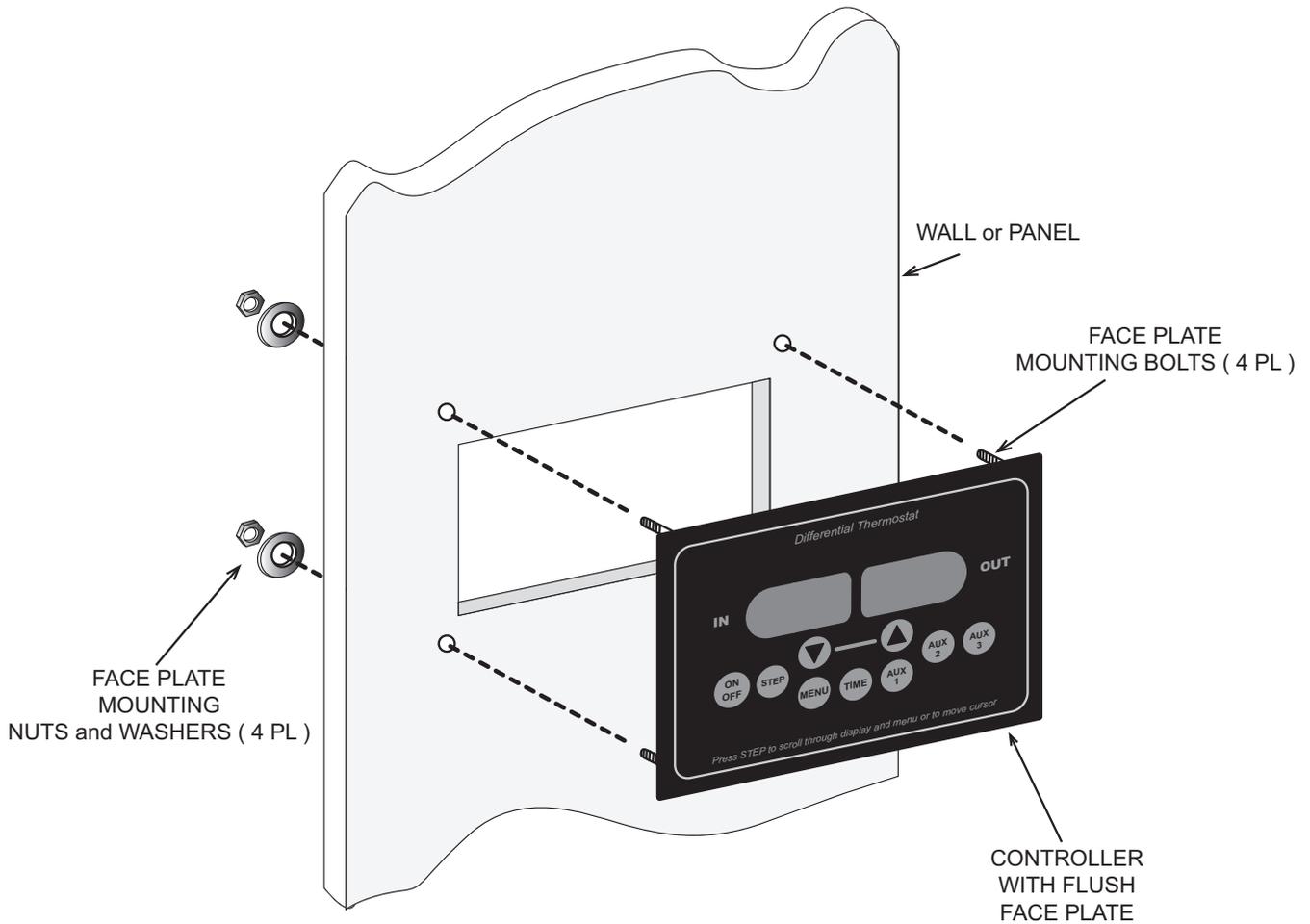
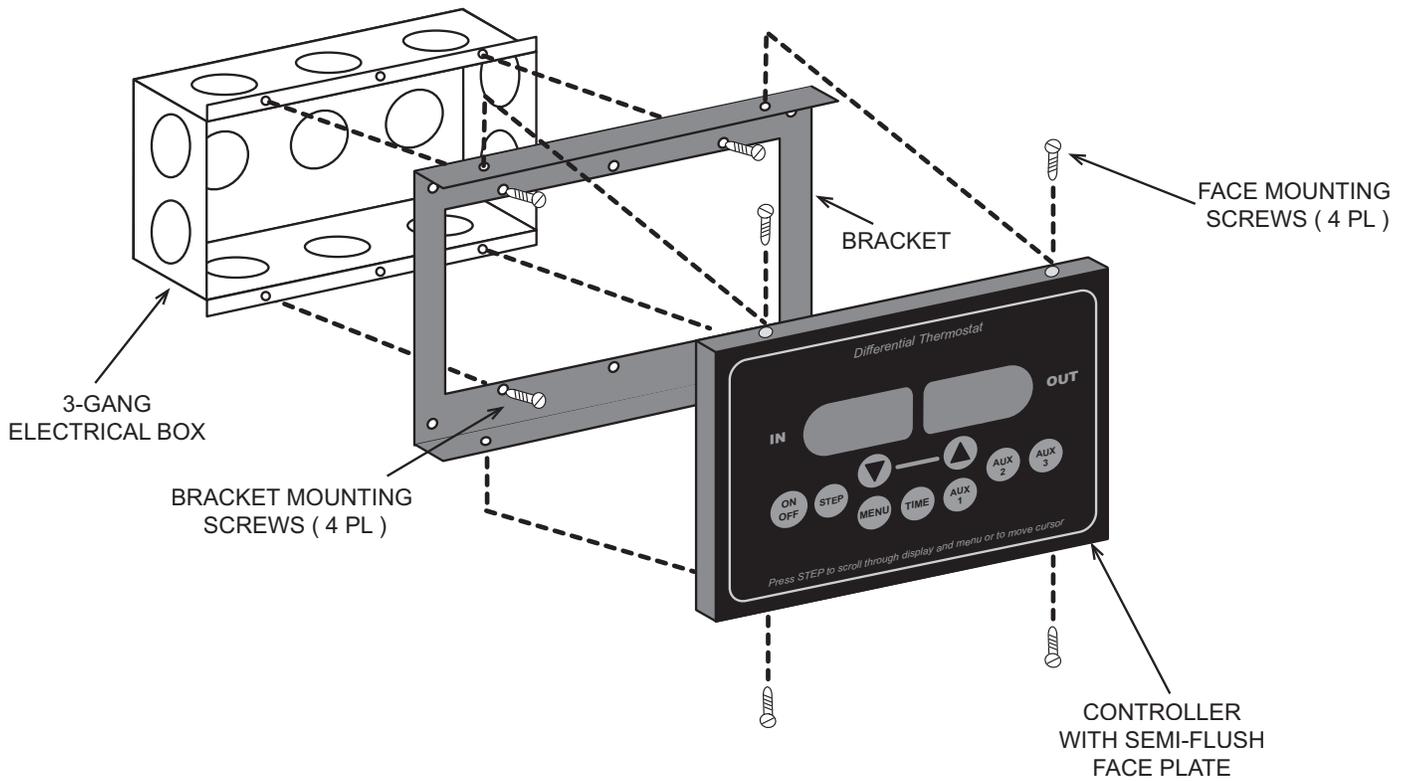
WIRING EXAMPLES



**WIRING FOR MIXED AC LOADS
AT SAME VOLTAGE AS SUPPLY FOR CONTROLLER**



**WIRING FOR MIXED AC and DC LOADS
AND SEPARATE SUPPLY FOR CONTROLLER**



Size: Fits in 3-gang masonry box.
 Dimensions: 5-3/8"x2.75"x2" (136mm x 70mm x 51mm) (WxHxD)
 Face Plate: Steel 6-3/8" x 4.5" (162mm x 114mm) with plastic decal (may be customized)

Series DSD-4PB-2D-2CH DIFFERENTIAL THERMOSTAT
With 1 relay for Heating and 1 relay for cooling.
(models with MIN and MAX Differential preset)

model:

DSD-4PB-2D-2CH-2HP-120-DIFP0P99F-FN40P255-2NA7100KB4100BLK

SPECIFICATIONS:

Supply Voltage: 120Vac, 50/60 Hz (other supply voltages available on request).
Fuse: 0.125A Slow Blow (supply line only)
Power Cons.: 6VA max.
Operating ambient: -20C to +70C (-4F to +158F)
Operating humidity: 95% RH max. non-condensing

Internal relays: 2 relays, each 1 pole, N.O. (additional relays available on request).
Contact rating: Each 30 Amp, 250 Vac max.
Load conn.: Typically 1 relay for heating and 1 relay for cooling or other applications
Both may be wired as Common or Isolated from Supply
Load wiring: 4 x 0.25" quick connect male spade lugs, 2 for supply and 2 for output load
Display: Red LED, 0.56" high, 6 digits, 7 segment (other colors available on request)
Units: User selectable Fahrenheit or Celsius (by pressing UP + DN arrows)
Power ON/OFF Indic.: YES, on display
Load ON Indic.: YES, each relay status indication on display
Error detect: Yes, automatic with scrolling messages on display
MAX Diff. range: 2F (1C) to 99F (55C). User programmable
MIN Diff. range: 0F (0C) to 97F (54C). User programmable
Control range: -40F (-40C) to +255F (+124C) (other ranges available on request).
Accuracy: +/-1%, self-calibrating
Overheat Limit: +255F (+124C) max. User programmable
High set point Limit: +255F (+124C) max. User programmable
Low set point Limit: -40F (-40C) min. User programmable
Freeze Limit: -40F (-40C) min. User programmable
Switch. Delay: Standard 10 sec. User programmable
Temp. Sensor: 2 probes, Thermistor NTC, +/-1%, Metal tube 25mm x 5mm (other optional)
Externally wired up to 500 feet, any wire gauge.
Sensor range: -40F (-40C) to +255F (+124C) (The blind end humidity proof and water
immersible. The wired end must be protected against condensing moisture)
Sensor wiring: 2-conductors each, Low Voltage wiring per probe
extendable up to 500 ft. (150m) with any wire type (26-16 AWG typical)
Process control: User selectable and modifiable 11 arguments State Table, 32 States max.
Typical applications: Ventilation, Humidity condensation control, Solar heating/cooling,
Heating, A/C, Climate cloning, other special applications.

WARRANTY:

Parts and Labor, standard 1-year.