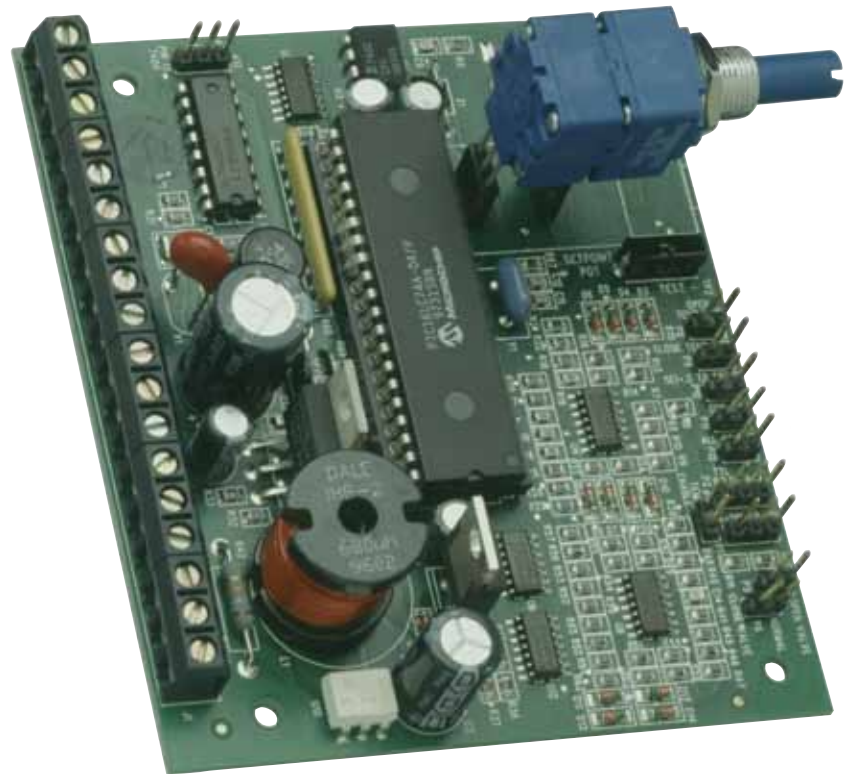




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Sporlan TCB

Temperature Control Board

Bulletin 100-50-1, December 2011



ENGINEERING YOUR SUCCESS.

The Sporlan TCB has been developed to allow the control of most Sporlan electric valves with the use of a generic PID or similar controller, or with the addition of the Sporlan sensor, to perform as a stand alone temperature controller. In addition to the 0 to 10 volt DC or 4 to 20 milliamps signal usual from PID controllers, the TCB can be configured to modulate a valve in response to a TTL (5 volt) signal, or a 24-120 volt AC pulse of three to thirty seconds duration.

The **TCB** may be ordered less potentiometer if an external signal (e.g. 4-20ma) is to be used. See ordering instructions. The board was designed for easy standoff mounting in electrical panels supplied by others, and with screw terminal wiring connections. The unit is small (3.5" x 4.0") and economical and requires only 24 volts AC or 24 VDC at 40 VA for both board and valve power. Operating ambient and storage temperature is -10°F to 160°F.

The **TCB** has been designed to work with Sporlan SEI/SEH Electric Expansion Valves, CDS Electric Suction Control Valves, and SDR Electric Hot Gas Bypass

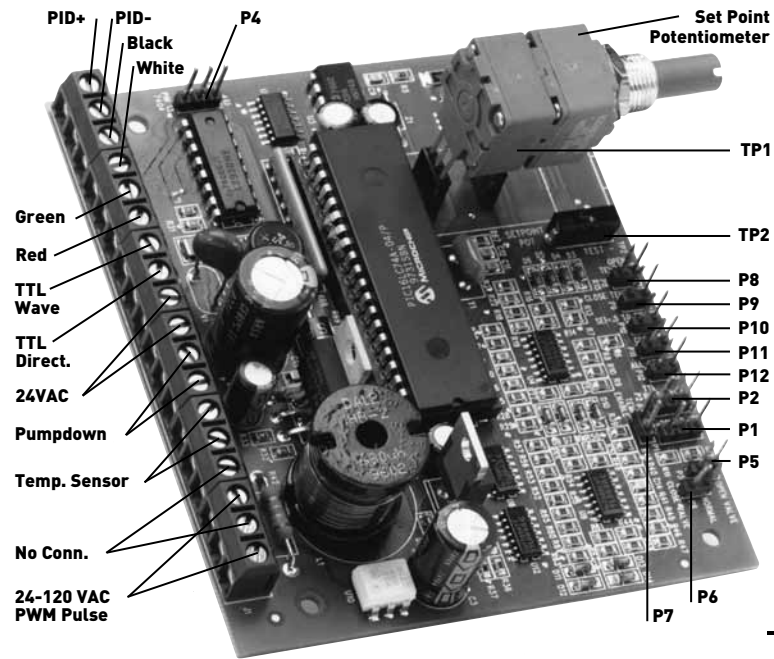


Figure 1

Valves of any capacity except 2500 step valves such as CDST-4 & CDST-7 (see note on page 2). Pin jumpers on the face of the board will permit changes in board

control parameters to suit particular applications. Figure 1 shows the layout of the board with connection points labeled.

LEGEND

TEST POINTS and PIN JUMPERS

TP1	Test Point 1	positive connection point to millivolt voltmeter to read set point temperature
TP2	Test Point 2	negative connection point as above
P1	Pin Jumper 1	voltage or current input selector
P2	Pin Jumper 2	TTL logic or 24-120 VAC Pulse Width Modulated signal input selector
P4	Pin Jumper 4	internal power selector - DO NOT CHANGE
P5	Pin Jumper 5	force valve open switch - valve will open and will remain open as long as jumper is installed
P6	Pin Jumper 6	force valve closes switch - valve will close and remain closed while jumper is installed
P7	Pin Jumper 7	temperature sensor enable selector
P8	Pin Jumper 8	"open on rise" logic selector
P9	Pin Jumper 9	"close on rise" logic selector
P10	Pin Jumper 10	SEI .5 to SEI-11 valve selector (1596 step stroke)
P11	Pin Jumper 11	CDS-8 valve selector (3193 step stroke)
P12	Pin Jumper 12	all other valves selector (6386 step stroke)

WIRING CONNECTIONS

PID+	connect positive side of 4-20 ma or 0-10 VDC signal
INPUT	connect negative side of 4-20 ma or 0-10 VDC signal
BLACK	connect black valve lead
WHITE	connect white valve lead
GREEN	connect green valve lead
RED	connect red valve lead
Square Wave	connect TTL logic (5 VDC) step signal
DIRECTION	connect TTL logic direction signal. 5 VDC = OPEN, 0 VDC = CLOSE
24 VAC	2 connections for 24 VAC or 24 VDC @ 40 VA isolated power input
PUMPDOWN	2 connections for pumpdown contacts. When "shorted" the valve will close and remain closed. When "open" the valve will control normally. For alternate operation see 5. under "Wire the Board" pg 3.
TEMP SENSOR	2 connections for supplied 2 k type B thermistor. Not polarized.
Blank	no connection - for high voltage input isolation.
AC PULSE	for one leg of 24-120 VAC, 3-30 second Pulse Width Modulated signal.
Blank	no connection - for high voltage input isolation.
AC PULSE	for the other leg of 24-120 VAC, 3-30 second Pulse Width Modulated signal.

NOTE: Not all inputs or pin jumpers will be used. See Configuration instructions.

SET POINT POTENTIOMETER

The potentiometer is only used when the TCB acts as a standalone controller. When using an external signal source the potentiometer is not required and may be removed. When used with the optional sensors, temperature range is -40°F to 210°F.

CAUTION: The TCB with potentiometer cannot be used to directly control an Electric Expansion Valve (EEV). EEVs must be controlled by superheat sensing and the TCB can only supply a single temperature signal.

PIN JUMPERS

Pin jumpers are used in electronics as switches for parameters that need not be changed after initial configuration. Always remove power from the board before making pin jumper changes.

The jumper itself is a small plastic housing containing metal contacts. These contacts will fit snugly over two adjoining pins to create an electrical “closure”. In the tables and instructions below, the Letters indicate the pins that are to be connected with the pin jumpers. Care should be taken to make sure both pins are covered by the jumper and the pins themselves are not damaged.

SETUP INSTRUCTIONS

CONFIGURE THE BOARD

1. Choose the valve - See **Table 1**
2. Choose the signal - See **Table 2**
3. Set the logic - Refer to instructions on right

MOUNT THE BOARD

Use the four corner mounting holes with plastic or metal standoffs. **Care must be exercised to ensure that mounting screws or metallic standoffs do not contact any track or conductor path on the board.** Location chosen should be dry, protected and close to 24 VAC supply and PID controller. If used, Set Point Potentiometer may be remotely mounted, e.g. through the control panel. Refer to “SET POINT POTENTIOMETER” section for instructions.

WIRE THE BOARD

1. If using an external PID or PLC controller, connect the positive lead to the first screw terminal on the board and the negative lead to the second screw terminal. **CAUTION: The PLC or PID controller must be able to supply 20 milliamps at 12 volts DC into a 600 ohm impedance. Other signals may not control the TCB properly.** If the internal temperature control is used, these terminals will not be used.

2. Connect the valve leads to the next four screw terminals, matching indicated colors.

3. If TTL logic is being used to control the valve, connect the step signal to the Square wave terminal and the direction signal to the DIRECTION terminal. If TTL logic is not used these terminals will not be connected. Contact Sporlan for more information.

4. Connect a 24 VAC, 40 VA transformer to these terminals. **CAUTION: The transformer may not be used for any other device.** The isolated secondary of this transformer is not polarized and may be connected to either screw terminal.

5. Connect the PUMPDOWN signal, if used. The board will close the valve whenever a closure or dry contact across these terminals is present. When the signal is removed or “opened” the valve will resume normal operation. No voltage should be supplied to these terminals. If pumpdown is not required these terminals may not be used.

The TCB pumpdown can be configured to open the valve fully whenever a contact is made across the “pumpdown” terminals. To invoke this function, the supplied pin jumpers on P5 (Open Valve) and P6 (Close Valve) must be placed across both pins of each jumper.

6. Connect the temperature sensor to the two terminals. The leads are not polarized but the sensor must be Sporlan supplied to operate properly.

7. Two blank terminals are included for high voltage isolation. These are the second and fourth terminals up from the bottom of the board. No connections are to be made to these terminals. No screws are present in the terminals.

8. Two terminals are provided for 24-120 VAC Pulse Width Modulated signal inputs. The pulse width may be from 3 to 30 seconds in width and no adjustment to the board is necessary. If the board is controlled by other means these terminals will not be used.

SET THE LOGIC

Placing a jumper on either P8 or P9 will set the logic or direction of “close” in relation to the temperature sensor, or the externally generated signal. The “APPLICATION” section shows the jumper settings for hot gas bypass valve or evaporator control valve applications. Selection of “OPEN ON RISE” or “CLOSE ON RISE” is based on sensor location, application, and controller logic. If the valve operates opposite from the intended manner, move the jumper from P8 to P9 or from P9 to P8. Sporlan will be glad to provide assistance in this selection.

SET THE BOARD

When used as an interface board, setting adjustments are made through the controller used. When used as a standalone controller, setpoint is set with the potentiometer dial and test points. The dial label will provide coarse adjustments, a millivolt voltmeter connected across Test Points 1 and 2 will provide a direct temperature setpoint readout. For Example:

32 mVdc=32°F Setpoint

Table 1

VALVE	STEPS	P10	P11	P12
SEI .5 - 11	1596	XXX	—	—
SEI 50	6386	—	—	XXX
SEH ALL	6386	—	—	XXX
CDS-8*	3193	—	XXX	—
CDS-9, 16 & 17	6386	—	—	XXX
SDR-3	3193	—	XXX	—
SDR-4	6386	—	—	XXX
OTHERS	6386	—	—	XXX

NOTE: Only one jumper is used.
*CDS-8 is Obsolete

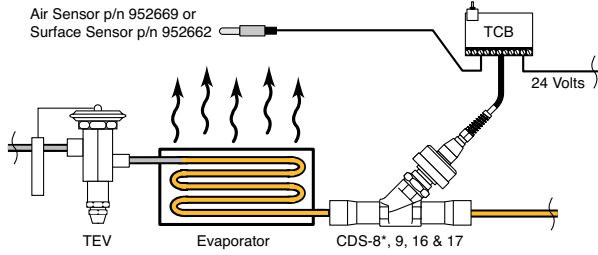
Table 2

INPUT	STEPS	P1	P2	P7
4-20 ma	External	L,C	—	—
0-10 VDC	External	C,R	—	—
TTL LOGIC	External	—	L,C	—
120 VAC PWM	External	—	C,R	—
TEMP SENSOR	External	—	—	Top & Bottom

NOTE: L = left R = right C = center
When board is viewed as shown in Figure 1.

APPLICATIONS

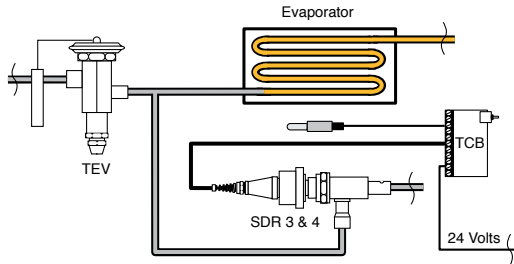
TCB Controlling an Electric Evaporator Control Valve



VALVE	JUMPERS INSTALLED
CDS-8*	P8 - OPEN ON RISE P11 - CDS-8 P7 - TEMP ENABLE
CDS-9, 16 & 17	P8 - OPEN ON RISE P12 - ALL OTHERS P7 - TEMP ENABLE

*CDS-8 is Obsolete

TCB Controlling an Electric Hot Gas Bypass Valve



VALVE	JUMPERS INSTALLED
SDR-3 & SDR-3X	P9 - CLOSE ON RISE P11 - CDS-8 P7 - TEMP ENABLE
SDR-4	P9 - CLOSE ON RISE P12 - ALL ON OTHERS P7 - TEMP ENABLE

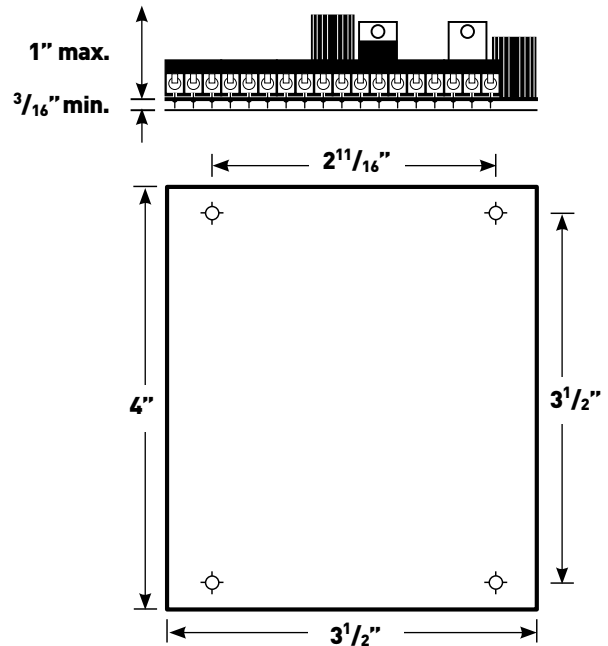
Above are sample applications, many other applications are possible, including heat reclaim, subcooling and desuperheating. Please contact SPORLAN DIVISION - PARKER HANNIFIN, Attn: Product Manager - Electronic Products for suggestions or questions.

ORDERING INFORMATION

Table 3

ITEM DESCRIPTION	ITEM #
TCB with Potentiometer	952664
TCB Less Potentiometer	952660
Air Sensor (-40°F to 210°F)	952669
Surface Sensor with Mounting Clip (-40°F to 210°F)	952662
SMA-12 Battery Powered Valve Actuator and Diagnostic Tool	953276
High Amp TCB to control 2 valves	952792
High Amp TCB with Potentiometer	952793
TCB quick response (EEV interface)*	952714
TCB for 24 VDC input, use standard	952687 -obsolete

*When used to control an Electric Expansion Valve (EEV), the external controller must sense and control superheat. Failure to do so may lead to floodback and system damage. Contact Sporlan with questions.



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