Synergy Controller Retransmit Signal Conditioner

Overview

Tidal Engineering's Synergy Controllers, the ¼ DIN Synergy Nano, Synergy Quattro, and Synergy Micro 2 provide state-of-the-art usability and connectivity for environmental test control and data acquisition and combine the functions of a chamber controller and a data logger. These controllers are designed to improve test efficiency by supporting both factory automation and test and measurement protocols and standards.

Each of these controllers provides two 0-5 VDC analog retransmit outputs to drive chart recorders, proportional valves, etc. The TE1803 Retransmit Signal Conditioner provides optical isolation and can convert these retransmit outputs to 4-20 mA or 0-10 VDC. In addition, the retransmit signal conditioner can be used to break ground loops, convert voltage levels, and perform level shifting when sensor signals and the controller inputs or outputs are at different potentials.

The TE1803 Retransmit Signal Conditioner is DIN rail or side mount able and offers selectable input/outputs, 1500 VDC isolation between input and output, and 1500 VDC isolation between 24-volt power and input/output. The field configurable input/output ranges are 0-5 V, 0-10 V, 0-20 mA and 4-20 mA.

The TE1803 conditioner requires a 24 VDC power supply but since the unit provides three port isolation, any power supply in the system can be used and ground loops are not a concern. The unit can also be powered from any controller that includes a full-sized Olympic board (P9-2 +, P9-3 -). In addition, a DIN rail mountable 24 VDC, 15 W power supply, P/N TE2198 is available from Tidal Engineering.

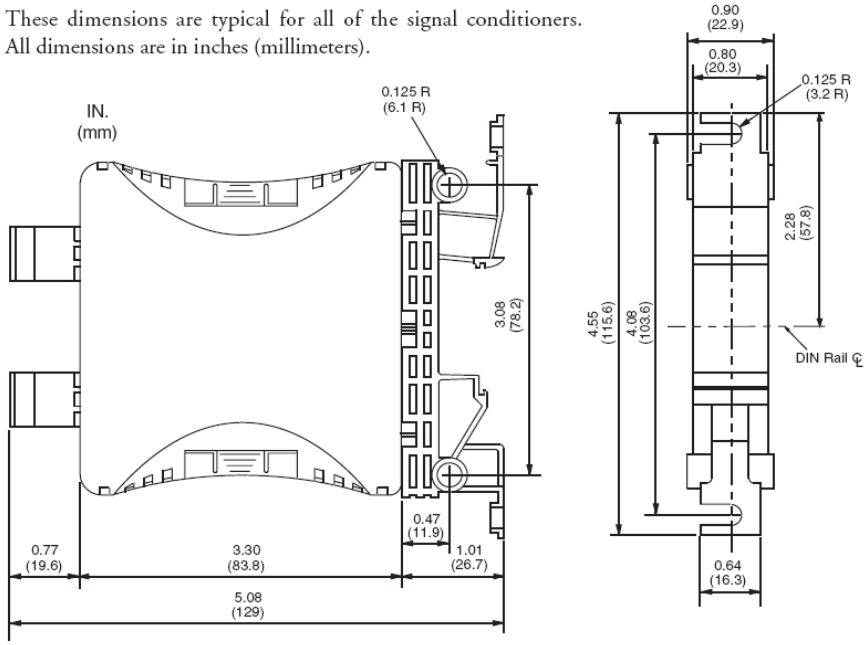

Figure 1 TE1803 Retransmit Converter Dimensions

General Specifications	
Accuracy vs. Temperature	± 0.005% / °C (50ppm/°C)
Input Power	24VDC ±10% @ 50mA
Recommended Fuse	0.032mA Series 217 current inputs
Isolation	1500VDC input - output 1500VDC power - input 1500VDC power - output * applied for 1 second
Maximum Inaccuracy of output (Includes offset,span,linearity)	0.05% FSO @ 25°C 0.25% FSO @ 0 - 60°C
Output Current	21mA maximum (for mA output)
Approx. field cal. range	0 - 25% (0 - 1.5V / 5V mode) 80% - 102% (4 - 5.1V / 5V mode)

Figure 2 TE1803 Retransmit Conditioner Specifications

Input Ranges	Output Ranges	Switch Position							
		1	2	3	4	5	6	7	8
0 - 5V		1	0	1	1				
0 - 10V		0	0	1	0				
0 - 20mA		1	0	0	1				
4 - 20mA		1	0	0	0				
	0 - 5V					1	1	0	1
	0 - 10V					1	0	0	0
	0 - 20mA					0	1	0	0
	4 - 20mA					0	0	0	0
Factory Default Settings									
4 - 20mA	4 - 20mA	1	0	0	0	0	0	0	0

Specifications	
Input Ranges	0-5V, 0-10V, 0-20mA, 4-20mA
Input impedance	250Ω ±0.1% current input 200KΩ / 400KΩ Voltage Input
Output Ranges	0-5V, 0-10V, 0-20mA, 4-20mA
Load Impedance	2KΩ minimum, voltage output 0Ω minimum, current output
Maximum Load / Current	550Ω @ 24V sink/source
Sample Duration Time	10mS
Filter Characteristic	-3dB @ 3Hz, -6dB/octave
Linearity Error	0.05% FSO maximum
Stability	0.05% FSO maximum

Figure 3 TE1803 Retransmit Converter Dip Switch Settings

For example: to convert the controllers retransmit signal to 4-20 mA, set the dipswitches as follows:

Switch position							
1	2	3	4	5	6	7	8
1	0	1	1	0	0	0	0

Controls

Level LED: The LED is a powerful tool when setting up the signal conditioner. During normal operation the LED will blink at a proportional rate to the selected input signal level. When performing field calibration the LED is used for indication of the internal calibration process.

CAL-Pushbutton: This pushbutton, along with various switch settings, allows you to calibrate the OFFSET and/or SPAN for your application or to restore factory default calibration.

Adjustments

The TE1803 has built-in self-calibration, but also has OFFSET (zero) and SPAN (full scale) adjustment of the input signal. If your application requires different span or offset (i.e. 3.6mA offset and 19.6mA span) you can adjust accordingly.

Calibrating the input signal level –

1. Select the signal range (i.e. 4 - 20mA).

2. Connect 24 volt power to the signal conditioner.

3. Connect the minimum input signal level.

4. Turn Switch 2 ON, press and hold the CAL pushbutton until the LEVEL LED comes ON steady (approx. 3 seconds), then release immediately. If the pushbutton is NOT released while the Level LED is ON steady, the signal conditioner will return to factory calibration.

5. Repeat above sequence for maximum input signal.

6. Turn Switch 2 OFF.

To return to factory calibration-

1. Turn switch 2 ON, press and hold the CAL pushbutton until the LEVEL LED comes ON steady and then starts flashing (approx. 10 seconds), then release the pushbutton. The unit has now been returned to factory calibration.

2. Turn Switch 2 OFF.

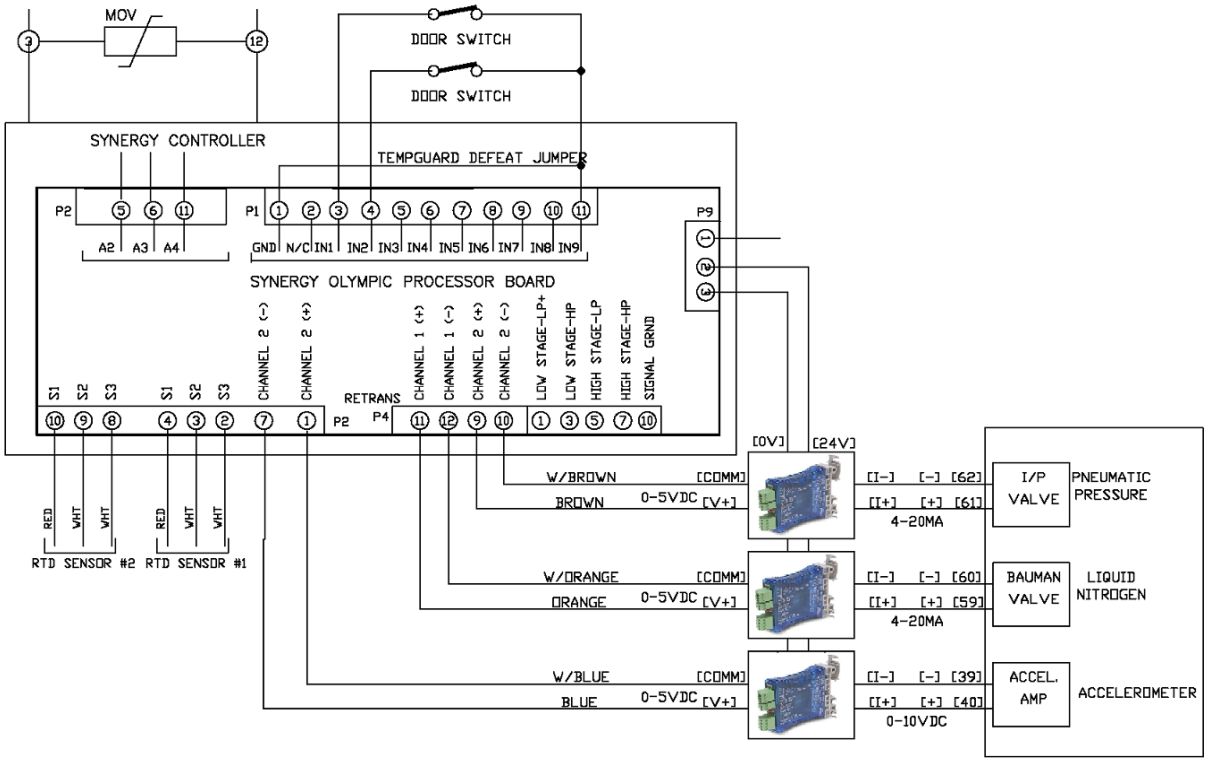

Figure 4 Typical Retransmit Signal Conditioner Application Drawing

The schematic diagram in Figure 4 above provides some example TE1803 conditioner applications. In the drawing the two retransmit controller output signals connect to two TE1803 conditioners to drive two 4-20 mA control valves. In addition, a third conditioner is used to isolate the 0-5 VDC signal on Channel 2.

About the Synergy Controller Family

Tidal Engineering's Synergy Controllers, both the Synergy Micro 2, Synergy Quattro, and the ¼ DIN Synergy Nano provide state-of-the-art usability and connectivity for environmental test control and data acquisition and combine the functions of a chamber controller and a data logger. These controllers are designed to improve test efficiency by supporting both factory automation and test and measurement protocols and standards.

Synergy Controller feature highlights includes:

- ➔ Color touch screen
- ➔ Ethernet, RS-232 and GPIB communications
- ➔ Built in 100 MB Data logger with USB drive support
- ➔ Data Acquisition, up to 64 T-type thermocouples (Optional)
- ➔ Built-in Web Server for remote control; WebTouch Remote ™
- ➔ Compatible with Synergy Manager for PC based control, monitoring and programming.
- ➔ Built-in FTP Server for factory automation and test and measurement applications

For more information regarding these controllers please see the full Synergy Controller Technical Manual on our website at http://www.tidaleng.com/synergy.htm

About Tidal Engineering

Headquartered in Randolph, NJ, Tidal Engineering Corporation has been designing and building award-winning embedded hardware and software for test and measurement and data acquisition applications since 1992. The company is recognized for technical expertise in such areas as Embedded IEEE 488, and turnkey SCADA (Supervisory Control and Data Acquisition) systems.

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