PULSE / TRI-STATE-TO-ANALOG TRANSDUCERS

PWA SERIES

DESCRIPTION

The **Kele PWA-1A pulse-to-analog transducer** converts a DIP switch selectable pulse-width modulation (PWM) input to 0-18V and 0-20 mA outputs (factory set for 1-5V and 4-20 mA). The **PWA-1A** is furnished in a unique slim-line design housing, which saves panel space, and can be ordered with an optional DIN rail mounting adapter. The **PWA-2A** is a snap-track mounted version of the **PWA-1A.**

The **PWA-1T** tri-state-to-analog transducer converts two contact closure inputs (tri-state/floating control) to 0-18V and 0-20 mA outputs (factory set for 1-5V and 4-20 mA). It is mounted in a unique slim-line design housing, which saves panel space, and can be ordered with an optional DIN rail mounting adapter. The **PWA-2T** is the snap-track mounted version of the **PWA-1T.**

On all models, the outputs are zero and span adjustable for a wide variety of ranges (factory set for 4-20 mA and 1-5 V). Current and voltage outputs are active simultaneously.

PWA-1A
(PWA-1T)

PWA-2A
(PWA-2T)

FEATURES

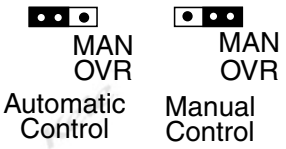
- ***255-step resolution in any range***
- ***Adjustable zero and span***
- ***Positive or negative input reference***
- ***0-20 mA and 0-18 VDC outputs (field adjustable)***
- ***4-20 mA and 1-5 VDC factory-set outputs***
- ***User-selectable time base***
- ***Jumper-selectable manual output***

SPECIFICATIONS

Supply Voltage	24 VAC ±10% or 24 VDC ±10%
Supply Current	120 mA half wave @ 24 VAC, or 50 mA @ 24 VDC
Accuracy	±1% of span
Input	
PWA-1A, -2A	Pulse-width-modulation (PWM)
PWA-1T, -2T	Tri-state/Floating, two dry contacts
Input Signal	
PWA-1A, -2A	PWM: Time base 0.1-2.56, 5.2, 12.85, 25.6 or 0.59-2.93 seconds, DIP switch selectable
PWA-1T, -2T	Tri-state/floating: time base 2.55, 5.1, 12.75, 25.5, 59.9, 90.5, or 119.9 seconds, DIP switch selectable
Output	Simultaneous current and voltage outputs
Output Burden	650Ω maximum (4-20 mA); 25 mA maximum combined current and voltage
Output Current	Factory set at 4-20 mA, adjustable 0-20 mA zero and span
Output Resolution	255 steps
Output Voltage	Factory set 1-5 VDC, adjustable (18 VDC maximum)
Wiring Terminations	Screw terminals
Operating Temperature	32° to 158°F (0° to 70°C)
Operating Humidity	5% to 95% RH (non-condensing)
Dimensions	
PWA-1A, -1T	3.4"H x 2.0"W x 4.8"D (8.6 x 5.1 x 12.4 cm)
PWA-2A, -2T	3.3"H x 4.6"W x 1.5"D (8.3 x 11.8 x 3.8 cm)
Weight	0.8 lb (0.36 kg)
Warranty	1 year

PWA-1A / PWA-2A PWM AND MULTIPLEXED PWM-TO-ANALOG CONTROL

JUMPER SETTINGS



MANUAL OUTPUT CONTROL

The 24V power supply must be connected and the override jumper moved to the MAN OVR position covering the center and inner jumper pins. The manual adjustment potentiometer can then be used to vary the output.

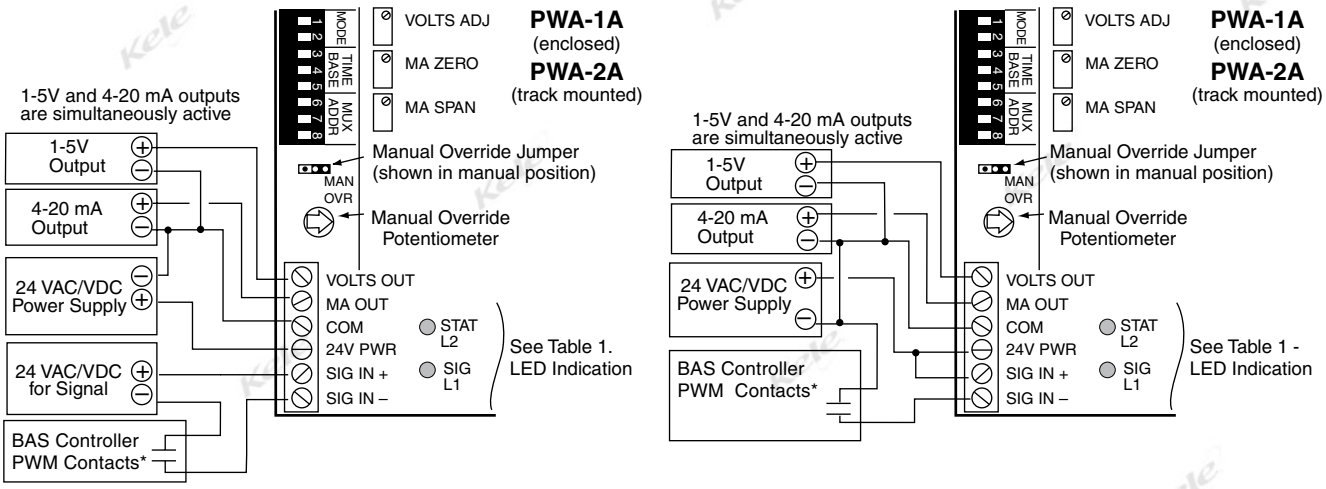
AUTOMATIC OUTPUT CONTROL

Move the override jumper to cover the center and the outer jumper pins.

DIP SWITCH SETTINGS

Switch 1	Operating Mode	Switch 2	PWM Time Base (sec)	Switch 3	Switch 4	Switch 5	Operating Mode	Switch 6	Switch 7	Switch 8
Always off	Single Unit PWM Control	Off	0.1-2.65	Off	Off	Off	Single Unit PWM Control	Off	Off	Off
			0.1-5.2	Off	Off	On				
			0.1-12.85	Off	On	Off				
			0.1-25.6	Off	On	On				
			0.59-2.93	On	Off	Off				

PWA-1A / PWA-2A WIRING



Separate 24V Supplies for Power and Signal

Common 24V Supply for Power and Signal

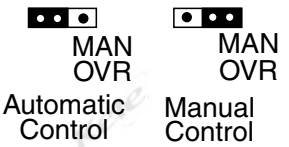
* PWM signal input terminals are optoisolated and polarity insensitive. PWM computer contacts can switch either positive or negative PWM wire lead.

PULSE / TRI-STATE-TO-ANALOG TRANSDUCERS

PWA SERIES

PWA-1T / PWA-2T TRI-STATE-TO-ANALOG CONTROL

JUMPER SETTINGS



MANUAL OUTPUT CONTROL

The 24V power supply must be connected and the override jumper moved to the "MAN OVR" position covering the center and inner jumper pins. The manual adjustment potentiometer can then be used to vary the output.

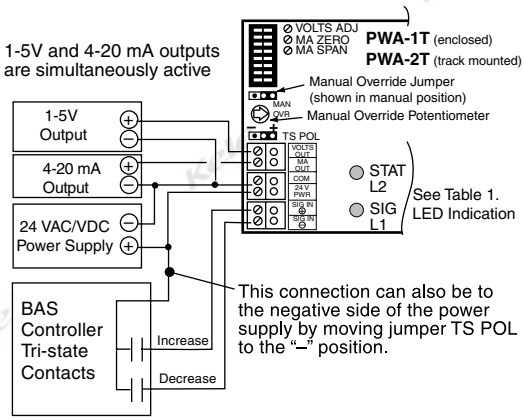
AUTOMATIC OUTPUT CONTROL

Move the override jumper to cover the center and the outer jumper pins.

DIP SWITCH SETTINGS

Switch 1	Operating Mode	Switch 2	Tri-state Time Base	Switch 3	Switch 4	Switch 5	Operating Mode	Switch 6	Switch 7	Switch 8
Always off	**Tri-state control**	Off	**2.55 sec**	Off	Off	Off	**Tri-state Control**	Off	Off	Off
			5.1 sec	Off	Off	On				
			12.75 sec	Off	On	Off				
			25.5 sec	Off	On	On				
			59.9 sec	On	Off	Off				
			90.5 sec	On	Off	On				
			119.9 sec	On	On	Off				

PWA-1T / PWA-2T WIRING



The **PWA-1T** and **PWA-2T** provide a 4-20 mA current source and 1-5 VDC output proportional to the length of time an increase or decrease signal is held. A contact closure wired in series with the SIG IN + terminal will increase the output signal in proportion to the length of the signal given. A contact closure wired in series with the SIG IN – terminal will decrease the output signal in proportion to the length of the signal given.

Tri-state example: Using a standard **PWA-1T** or **PWA-2T** with a 25.5-second time base and a 4-20 mA and 1-5V span with output currently at 4 mA and 1V, pulsing would operate as follows:

1. **5.1-sec increase** pulse issued → Output increases 20% to **7.2 mA, 1.8V**
2. **Another 5.1-sec increase** pulse issued → Output increases another 20% to **10.4 mA, 2.6V**
3. **5.1-sec decrease** pulse issued → Output decreases 20% to **7.2 mA, 1.8V**

TABLE 1. LED INDICATION

L2- STAT (green)	L1- SIG (red)
Steady Green Power On **Slow Green Blink** Attention mode **Rapid Green Blink** Select mode	**Steady Red** PWM or tri-state signal present

CALIBRATION

Tools required: a multimeter and a signal generator.

The **PWA-1A, PWA-2A, PWA-1T,** and **PWA-2T** outputs are factory set at 4-20 mA and 1-5V. To change the calibration, see the instructions below. After calibration, alternate between minimum and maximum input pulses and fine tune the mA and voltage potentiometers for desired mA or volt outputs (typically just one more pass is necessary).

FOR APPLICATIONS REQUIRING CURRENT (mA) ONLY OR CURRENT AND VOLTAGE OUTPUT

1. Using a signal generator:
   PWA-1A, -2A: Apply a minimum input pulse signal.
   PWA-1T, -2T: Apply a contact closure equal to the selected time base, such as 25.5 sec, to the SIG - terminal.
2. With a multimeter connected to mA output, set MA ZERO potentiometer at desired minimum mA output.
3. Using a signal generator:
   PWA-1A, -2A: Apply a maximum input pulse signal.
   PWA-1T, -2T: Apply a contact closure equal to the selected time base to the SIG + terminal.
4. Set MA SPAN potentiometer at desired maximum mA output.
5. Calibration of mA output is complete. If voltage output is also required, proceed to step 6.
6. With multimeter connected to voltage output, set maximum voltage output desired with the VOLT ADJ potentiometer.
7. Determine the ratio of maximum mA output to minimum mA output (i.e., 20 mA maximum output: 4 mA minimum output = 5:1).
8. The minimum voltage is automatically set according to the ratio of maximum-to-minimum mA output. Using the example from step 7 above for the mA range and using a 10V maximum voltage output, the ratio remains the same (i.e., 20 mA maximum: 4 mA minimum = 5:1 = 10V:2V). The minimum voltage output would be automatically set at 2V. Note: To change voltage output, repeat Steps 3, 6, 7, and 8.

FOR APPLICATIONS REQUIRING VOLTAGE OUTPUT ONLY

1. Determine the minimum and maximum voltage output required (0-18V total range).
2. Using the following formula, determine the minimum mA output: minimum mA output = 20 mA x desired minimum volts desired maximum volts
3. Using a signal generator:
   PWA-1A, -2A: Apply a minimum input pulse signal.
   PWA-1T, -2T: Apply a contact closure equal to the selected time base, such as 25.5 sec, to the SIG - terminal.
4. With a multimeter connected to mA output, set MA ZERO potentiometer at calculated minimum mA output (from formula in step 2).
5. Using a signal generator:
   PWA-1A, -2A: Apply a maximum input pulse signal.
   PWA-1T, -2T: Apply a contact closure equal to the selected time base to the SIG + terminal.
6. Set MA SPAN potentiometer at 20 mA.
7. With multimeter connected to voltage output, set the VOLT ADJ potentiometer to desired maximum voltage. The minimum voltage is automatically set according to the ratio of maximum-to-minimum mA output.

ORDERING INFORMATION

MODEL	DESCRIPTION
PWA-1A	Pulse-to-analog enclosed transducer
PWA-2A	Pulse-to-analog snap-track mount transducer
PWA-1T	Tri-state-to-analog enclosed transducer
PWA-2T	Tri-state-to-analog snap-track mount transducer
	OPTIONS
47	DIN rail mounting adapter (For **PWA-1A** and **PWA-1T** only)
C	Factory calibrate for special output range (specify range when ordering)

PWA-1A – **47** ***Example:*** **PWA-1A-47** Enclosed pulse-to-analog transducer with DIN rail mounting