

ATE-32-15V PT/VT Interface Speed Signal Conditioner



A **3-pole Butterworth low-pass filter** is included in the Model ATE-32-15V. This filter blocks high frequency transients from passing through to the frequency counting equipment. The input side of the Model ATE-32 is fully isolated from the output side, so the signal input can be connected either from line to neutral or from line to line of the instrumentation potential transformers (PT /VT).

APPLICATION

The Model ATE-32-15V PT/VT Interface module is used in applications that switch to the PT/VT Interface signal after the unit is on-line and generating power so the low-voltage input capability is not needed.

STATUS LEDs

The Model ATE-32-15V utilizes two status LEDs. The green LED indicates that DC power is applied. The yellow LED is illuminated when the input signal has positive polarity from terminal 1 or 2 to 3 or 4. The yellow LED is extinguished when the input signal has negative polarity. At low input frequencies, the yellow LED will flash visibly to indicate the presence of the input signal. At higher input frequencies, the LED will appear to be illuminated at a reduced intensity due to visual averaging of the flashes.

CALIBRATION

No calibration is required for the Model ATE-32-15V.

SPECIFICATIONS

Power

Supply: 18 to 30 VDC
Consumption: 2 W typical

Input

Amplitude Range: 15.0 VRMS to 180 VRMS

Frequency Range: 6 Hz to 120 Hz

Output

Pulse train 24 Volts peak (typical)

Mounting

TS32 or TS35 DIN Rail

DESCRIPTION

The **Model ATE-32-15V PT/VT Interface Module** is a signal conditioner that converts the output of the Potential Transformer of an electric generator to a 24 Volt pulse train suitable for input to a PLC-based frequency counter. Input amplitude range is 15.0 VRMS to 180 VRMS. Input frequency range is from 6 Hz to 120 Hz. Over 2000 VDC isolation between the input and output circuits protects the governor PLC. The circuitry is housed in a DIN rail mount (23 mm wide). The enclosure has a UL 94 V0 flame retardancy rating.

Noise Immunity is enhanced by a hysteresis circuit in the input stage of the module. The standard hysteresis is ± 0.106 Volt. The ATE-32-15 has been modified to increase the threshold level to 15 VAC RMS.

This small-signal de-sensitization of the Model ATE-32 will improve the measurement of the frequency output of a generator operating at low speed without the application of field excitation.

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Terminal Connections

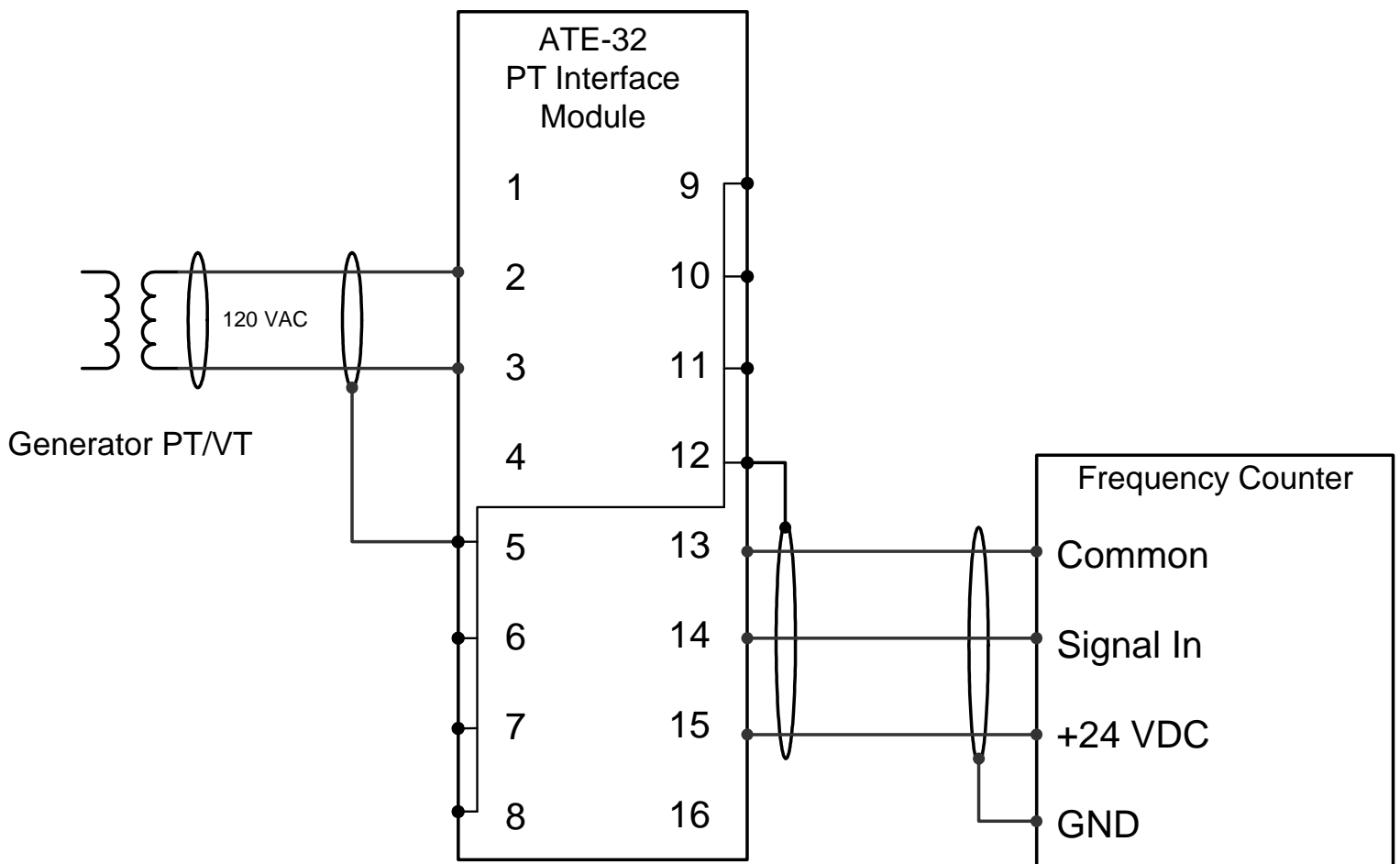
1. +24VDC Power Supply
2. Power Ground
3. Signal Ground
4. Signal Input
- 5, 6, 7, 8, 9, 10, 11 & 12 Shield Bus not connected
- 13 Divide by 2
- 14 Divide by 4
- 15 Divide by 8
- 16 Divide by 16

Optional screw-terminal or spring-clip plugs

Temperature Range

- Operating: 0 to 55 °C (32 to 131 °F)
Storage: -25 to 70 °C (-13 to 158 °F)

Fig 1 – Typical Connecton of ATE-32-15V is the same as ATE-32



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Recently a new ATE-32 application has been developed by BC Hydro for the W.A.C. Bennett powerplant. Mounting one PT Interface on the grid-side of the main breakers produces a pulse-train representative of grid frequency and phase. The speed (or output frequency) of the generator output is adjusted to match the grid frequency, and then phase before closing or opening the breakers to minimize wear and tear on the main breaker contact points. These precise reference signals allow timing the contact closure at the same instant as the zero-crossings. The Input Threshold was set at 5 VAC to block the signal picked up from the corona dancing around inside the high-voltage cage.

As the governor makes small adjustments to generator speed the difference between the two signals diminish. When they get close enough an “enable” signal allows the contact closure using predictive timing to get the relay points to make contact at the exact moment when the voltage difference is zero and the speed difference is very, very small.

Leading this coincidence by the known time-delay from the close-contacts command until the actual contact closure occurs the exact timing can be computed and executed.

The unit’s speed and phase are compared and matched by a few lines of code in the digital governor PLC instead of an external synchronizer costing \$1,000 or more.

One PT Interface on the grid side can provide reference signal for a large fanout of units.

Because the PLC coding is directly manipulated for each unit by the governor control engineer each unit can be individually tuned for optimal synchronization.

Installation Connections are displayed on the side of the module.