

Specifications

Power Supply

Model Option	Power Supply Voltage Range	Usage	OVP Category
24U	24 VAC/VDC +/-10% (50/60 Hz AC power)	180 mA	II
120	120 VAC +/-10% 50/60 Hz	50 mA	II
240	240 VAC +/-10% 50/60 Hz	25 mA	II

Use copper wires rated 75°C minimum for power supply connections. Use 20 amps branch circuit protection against the remote possibility of a short.

Output Signal 0-5 VDC, 0-10 VDC or 4-20 mA proportional to watts consumed

Accuracy 0.5% FS (True RMS kW)

Output Loading 4-20 mA: < 500 Ω

0-5/10 VDC: > 100 KΩ

Response Time 120 mS (to 90% of step change)

Frequency Range 40-65 Hz (monitored circuit)

Watt Calculation: kW = Volts x CT Amperage x 1.732

Example at 480 VAC:

CT	kW at Max output (Unity PF)
50 A	41.57 kW
100 A	83.14 kW
150 A	124.71 kW
200 A	166.28 kW
250 A	207.85 kW
300 A	249.42 kW

Monitored Voltage Input 347/600 VAC 3 Phase Wye system with earthed neutral
Measurement Category III

600 VAC 3 Phase Delta system
Measurement Category III

Output Terminals Captive screw, 22-12 AWG copper rated 75°C minimum

Voltage Input Terminals 22-12 AWG copper wires rated 75°C minimum, 600 V max

All Terminals Tighten to 6 inch-pounds torque

Fusing Use field supplied fuses or circuit breakers

Indication Power LED

Isolation Voltage UL listed to 5400 VAC

Enclosure UL94 V-0 Flammability rated

Environmental -4 to 140°F, -20 to 60°C

0-95% RH, Non-condensing
Altitude to 2000 meters (6561 ft)

Pollution Degree 2

Indoor use in UL NRTL certified enclosure

Listings UL/cUL

Model Number Key

APT - 480 - 5A - 24U - 005

Full Scale Output:

005 - 0-5 VDC

010 - 0-10 VDC

420 - 4-20 mA

Power Supply:

24U - 24 VAC/VDC

120 - 120 VAC

240 - 240 VAC

CT Inputs:

5A - 5 A secondary (50-3000 A)

MV - 333 mVAC (5-1500 A)

Monitored Voltage:

120 - 120 V 3-Phase

240 - 240 V 3-Phase

480 - 480 V 3-Phase

600 - 600 V 3-Phase

APT Series kW Transducer

Know Your Power



Other Available Products Include:

DC Current Switches, Ground Fault Sensors

AC & DC Current Switches

Power Transducers

Current & Potential Transformers (CTs & PTs)



NK Technologies



INSTRUCTIONS



APT Series Active Power Transducer w/Proportional Analog Output

Quick "How To" Guide

1. Mount APT KW Transducer to DIN rail or to a back panel in suitable enclosure.
2. With monitored load off, install CTs on monitored lines and secure with mounting feet or tie-wrap as appropriate. Connect CTs to terminals 1-6, observing polarity.
3. Connect line voltage (and neutral if used) to terminals 7-10 ensuring phase relationships between the CTs and voltages is consistent. Use of field supplied fuses/circuit breakers as a means for disconnect is recommended.
4. Connect output terminals 13 and 14 using up to 22-12 AWG copper wires. Tighten to 6 inch-pounds torque.
5. Connect supply voltage (24VAC/VDC, 120VAC or 240VAC; model dependent) to terminals 11-12. Wherever possible, ensure APT supply power is derived from a different source than monitored load. Green LED indicates unit is powered.

792000011 Rev 5

Description

APT Series transducers are intended to monitor KW consumption of three phase motors. They provide an analog signal proportional to the true power consumed by the monitored load and are intended for application on balanced three phase loads.

Wiring

Current Sensing:

Determine the type of electrical load you are monitoring. The APT is typically used to monitor total power of most 3-phase loads. Current transformer (CT) inputs must be 0-5 A or 0-333mV (model dependent, see ordering information) full-scale. Use only UL Listed Energy Monitoring Current Transformers certified under category XGBA.

De-energize the monitored load (installation on which the current is measured), or adopt safe operating procedures when working on hazardous live installation during application and removal of the current sensors on which the current is measured. Place monitored circuit conductor through aperture in CT and mount CT to the back of control panel using integral mounting feet, or use a nylon tie to secure to the conductor. Be sure to observe all notes on polarity. Connect CT to appropriate terminals on APT transducer using 22-12 AWG copper conductors rated 75°C minimum. Tighten terminals to 6 in-lb torque. If installing on a live circuit, be sure to connect the CT secondary before placing the CT over the live conductor. The current transformers cannot exceed 75% of the wiring space of any cross-sectional area within the panel.

Voltage Connection:

The APT transducer can be used to measure power in the Wye or Delta connected system. Ensure the voltage of the system you are monitoring and rated voltage for APT transducer match. De-energize the monitored circuit voltage.

Add fuses if required by local code (fuses not included). Use code approved splice materials and techniques. Connect voltage directly to terminal blocks on APT transducer as indicated on the wiring diagram to the right.

Power Supply and Output Connection:

Connect output wiring to supervisory or other controller. Connect power supply to transducer as shown in wiring diagram using 22-12 AWG copper wires rated 75°C minimum. Green Power LED should illuminate to indicate power is supplied to unit. Energize load to confirm KW transducer is sensing current/voltage and produces an output signal proportional to KW being sensed.

Note: If the equipment is used in a manner not specified by Neilsen-Kuljian, Inc., the protection provided by the equipment may be impaired.

Wiring Schematic Diagram

The APT power transducer must have the current transformers connected properly. The side of the CT marked "H1" **MUST** face the line or source. The CT secondaries are supplied with a white wire and a black wire; the white must be connected to the positive terminal. If the CTs are supplied with terminals only, the positive terminal is marked "X1".

The phase relationships must be matched. The phase connected to voltage input terminal "A" must be the same phase to which the CT measuring phase "A" is connected. The output of the transducer is dependant on the CT ratio, and the connected voltage. There will be full transducer output (20 mA, 5or 10 VDC) when there is current through the CT at the range maximum, voltage at the model selected maximum, and unity power factor. As an example, the transducer selected is:

APT-480-5A-120-420, with 400:5 ratio CTs

When the supplied voltage is at the transducer maximum (480), and the CT has current at maximum (400 amps), and unity power factor, the output will be 20 mA. This represents 332,544 watts.

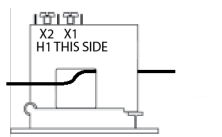
This is a straight mathematical calculation:

$$\text{Voltage (E)} \times \text{Current (I)} \times \text{power factor} \times \text{square root } 3 \text{ (1.732)} = \text{Watts}$$

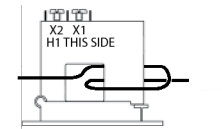
The APT will measure the voltage and current simultaneously, comparing each phase angle to derive the output signal proportional to active or real power.

Please contact the factory for scaling support for two CT input applications.

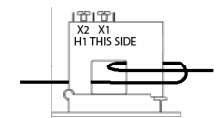
Increasing the CT output: As shown in Example 1, one pass of the monitored conductor through the CT will produce maximum CT output at the CT range. Doubling the conductor twice (Ex.2) will produce maximum output with half the current. Each CT must be doubled in the same manner, either using Ex. 2 or 3, but not a mix of the two.



Example 1



Example 2



Example 3

