PQA-D
DELTA POWER MONITOR
AC Powered 50/60/400 Hz

GENERAL

This power monitor is used to continuously measure voltage, frequency and phase rotation on three-phase delta power lines, allowing normal operation of system loads when the voltage and frequency characteristics are within their predetermined limits. In the event that the voltage or frequency (any phase) is not within specification limits, or the phase sequence is other than ABC, the relay de-energizes to operate alarm indicators or system shutdown contactors. Voltage sensing is accomplished with the use of an "RMS" type detector and is relatively insensitive to line distortion.

OPERATION

(For description of operation, see reverse side).

STANDARD SPECIFICATIONS

ELECTRICAL

Input (operating)
- *Voltage (nominal)* . . . . . 115, 220, 440 vrms Delta ± 20%*
- *Frequency (nominal)* . . . . . 50/60/400 Hz (± 20%)
- *Voltage Transients* . . . . . MIL-STD-704D Figure 5

Input (sense)
- *Voltage Band* . . . . . As required*
- *Frequency Band* . . . . . As required*
- *Accuracy*(1) . . . . . ± 1 %
- *Hysteresis* . . . . . 1% typical
- *Phase Sequence* . . . . . ABC
- *Time Delay (pick-up)*(2) . . . . . 250 ms to 10 sec. *
- 77/776 De/ay *(drop-out)*(2). . . . . 250 ms to 10 sec. *

OUTPUT CONTACTS

Contact Form . . . . . DPDT or 3PDT
Contact Rating @ 115V, 400 Hz) . . . . . 10 A Res. 2.5 A Ind.
@ 28 vdc) . . . . . 10 A Res. 6 A Ind.
Contact Life . . . . . 50,000 operations minimum
Contact Resistance . . . . . .075 ohms maximum
Dielectric Strength . . . . . 1000 vrms @ 60 Hz, all terminals to case
Insulation Resistance . . . . . 100 megohms @ 500 vdc, all terminals to case
Power Dissipation . . . . . 6 watts maximum

**Specify in Part Number*

(1) Defined as maximum difference between factory set point and specified set point including phase to phase balance over any combination of input voltage and ambient temperature.

ENVIRONMENTAL

Temperature . . . . . Per MIL-STD-810C, Methods 501.1, 502.2
- *Operating* . . . . . -40°C to + 85°C
- *Storage* . . . . . -65°C to + 150°C

Vibration . . . . . Per MIL-STD-810C, Method 514.2 Procedure 1, 10-80Hz, .06"DA; 80-2000Hz 20g's.
Accelaration . . . . . Per MIL-STD-810C, Method 513.2 Procedure I, and II, ± 10g's
Shock . . . . . Per MIL-STD-810C, Method 516.2 Procedure I, 50g's 11 ± 1ms any axis
Humidity . . . . . Per MIL-STD-810C, Method 507.1 Procedure II
Altitude . . . . . Per MIL-STD-810C, Method 504.1 Category 6 Equipment, Sea level to 70,000 ft.

PHYSICAL

Finish . . . . . Gloss blue # 15177 - FED-STD-595 Meet or exceed MIL-E-5556 or 5557
Connector . . . . . MS 3113H-20-16PN type connector
Marking . . . . . Model number, date code, operating Voltage and wiring diagram
Enclosure . . . . . Steel case, hermetically sealed and potted
Weight . . . . . 54 oz. maximum

(2) Specified time delay does not include input filter response time. Refer to Table 1 for the typical delay which must be added to the specified time delay to account for input filter response.

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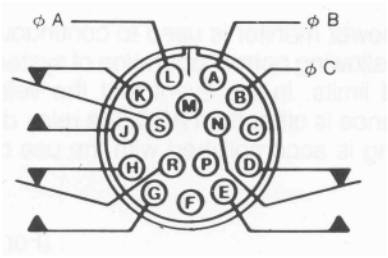
OPERATION

When the voltage and frequency of the three phase delta signal is within its preset limits and the phase rotation is ABC, the output relay will energize after the pick-up time delay period. If the high or low voltage limits or the high frequency limits are exceeded for a time greater than the preset drop-out time delay period, then the relay de-energizes and remains de-energized until all phases return within their specified limits and remain there for longer than the specified pick-up time delay. The output relay will not energize if the phase rotation is other than ABC or if any phase is disconnected. When the relay is energized, loss of any phase* will result in the output relay de-energizing immediately, overriding the time delay circuits.

**A phase loss is defined as complete loss of a phase. Extreme low voltage conditions are recognized by Model PQA-D and will provide a delayed drop out of the control circuit relay. When these power monitors are used with rotating equipment consideration must be given to the possibility of induced (ghost) voltages which might appear on an open line. The existence of such a voltage may mask the phase loss from the Model PQA-D voltage detector. Depending on the magnitude of the "ghost" voltage and the monitors preset voltage limits, this "ghost" might be detected as a low voltage condition and cause a delayed drop out of the control relay, although a phase displacement greater than 36 degrees will be detected and cause an immediate drop out of the control delay.*

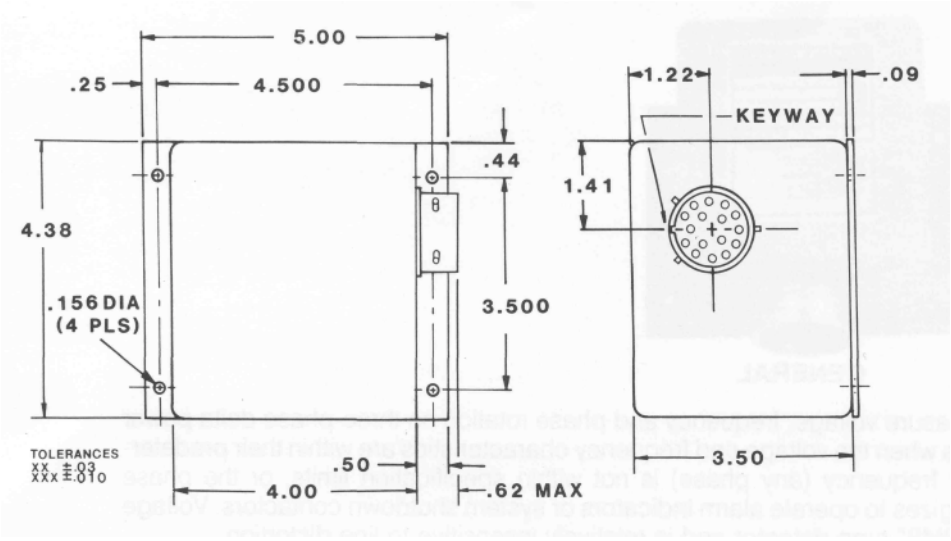
WIRING DIAGRAM



For DPDT Operation Delete Pins D, E, & N.

TABLE 1

% VOLTAGE CHANGE (AV)	SET PT. %	TYPICAL 50/60/400 HZ FILTER RESPONSE MSEC.
-1-20	+ 5	60
-1-20	+ 10	110
4-20	+ 15	175
+ 10	+ 5	100
-10	- 5	90
-20	- 5	80
-20	-10	110
-20	-15	210



ORDERING INFORMATION

To order, specify all parameters using the part numbering system shown below.