Autogard

DIGITAL POWER MONITOR

SERIES E-220

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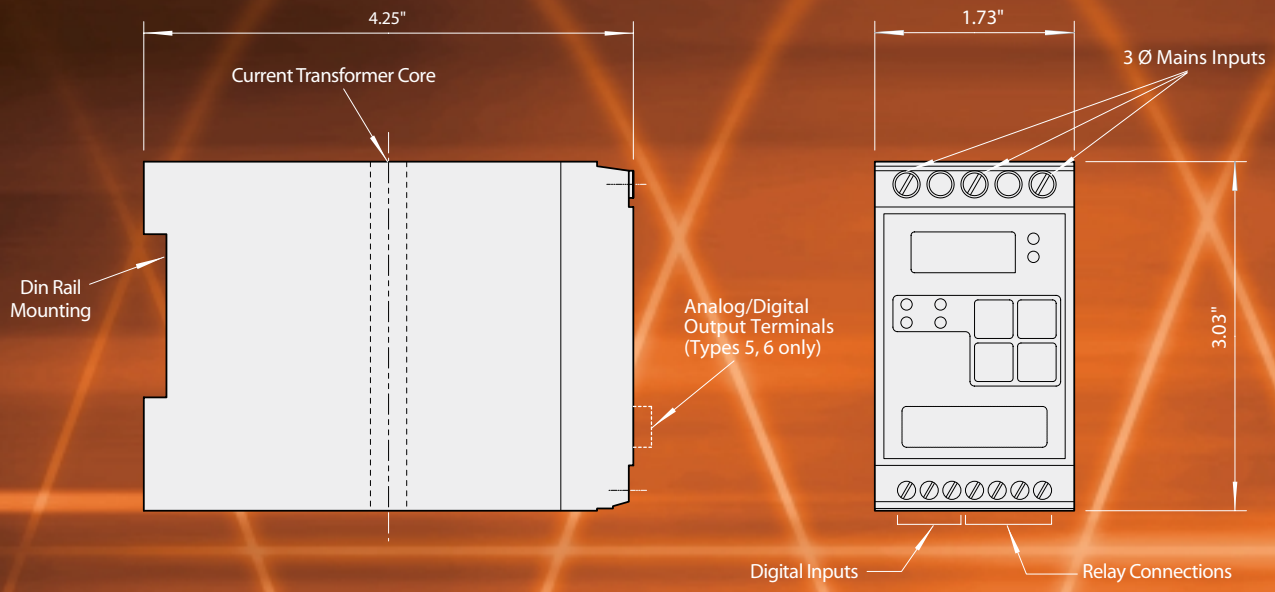
A Digital Power Monitor with programmable trips for monitoring, control and overload protection in 3-phase electric circuits. By measuring true power, more accurate and sensitive load monitoring is achieved than with current measurement devices.



Overview

The E-220 Power Monitor measures the true 3-phase power in an electric circuit. When connected to the supply for an electric motor, it provides an accurate measure of motor load. Losses in modern motors are small, so the E-220 can be used to give a reliable indication of the mechanical power delivered to the drivetrain. Models are available with programmable trips which can be used to control process changes, alarms and motor shut down circuits. Alternatively, transducer options offer analog or digital outputs for use with PLC's or computers.

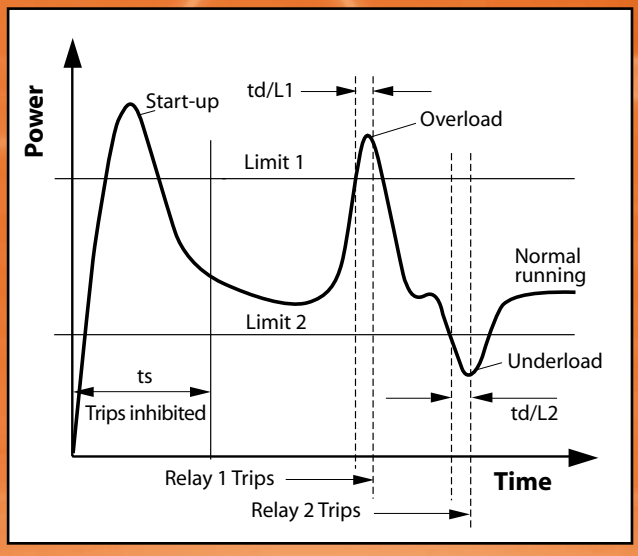
Key Features

- Fully digital design, easy to program via interactive front panel.
- High frequency sampling for accurate real time power measurement.
- Self powered – no separate power supply required.
- Internal current transformer with single wire feed through hole in casing – no coils to wind or count.
- Monitors all sizes of motor (external current transformer for > 25A) and can be used with variable speed drives.
- Measures and displays Power, % Load, RMS voltage, RMS current and Power Factor.
- Programmable limits have delay timers to avoid nuisance trips.
- Can be re-set remotely.

Function

The E-220 uses high frequency sampling techniques, measuring voltage and current in real time to determine the true, instantaneous power.

This value is available as an output or is used in relation to the programmed trip levels. To avoid trips on start-up, a start delay timer can be set. Trip delays can also be programmed to prevent nuisance tripping due to spikes. Resetting is either via the front panel or from a remote signal. The figure below illustrates a typical motor characteristic and the operation of the E-220 (Type 2).



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E-220 Options

All E-220 power monitors measure and display real-time Power, % Load, RMS voltage, RMS current and Power Factor. Types 1 to 4 have relays which can be programmed to trip at selected power levels. Transducer versions (Types 5 and 6) are also available which provide the power as a digital or analog output for use with external control and monitoring equipment. Other types are available with alternate relay configirations to meet your specific requirements. Please consult Autogard.

Type 1 - Single relay, one overload trip

One overload level can be programmed to trip the single relay at the desired power level. The relay is held closed in normal operation and latches open on trip. (ie. N.O. contact which fails safe on loss of power).

Type 2 – 2 relays, one overload trip, one underload trip

This is the most commonly used, general purpose option. In addition to an overload trip, there is an underload limit which can be used to give warning of loss of load due to a process failure or other system abnormality. Each trip has its own fail safe relay which is normally held closed and latches open on trip.

Type 3 – 2 relays, one overload warning, one overload trip.

This is another commonly used configuration, where it is desirable, for example, to have a warning indication prior to an overload trip. In this case relay 1 is normally open (NO) and non-latching for use with an alarm. Relay 2 is held closed and latches open on trips for fail safe motor shut down.

Type 4 – 2 relays, 2 independent overload trips

This option is primarily intended for dual mode operation (e.g. 2-speed motors) where separate trip levels are required for 2 different running conditions. Only one trip is active at a time and each has its own latching relay. The relays are normally held closed and latch open on trip. The active trip is selected using a 12-24V DC signal to IN2.

Type 5 – Analog outputs, 0-10V and 4-20mA

Terminals on the front panel provide analog outputs which are proportional to the power level in real time. Both 0-10V and 4-20mA connections are provided. The outputs can be used for monitoring, analysis or control purposes. This version does not include any trips or relays.

Type 6 – Digital output, RS485 in ASCII

This version is similar to the Type 5 but is used when a digital signal is preferred. The unit outputs an ASCII character string, denoting the power values in real time. Refer to the installation data sheet for details of format. As with Type 5, this version does not include any trips or relays.

Voltage Ranges

The E-220 is suitable for use with motor voltages between 380 and 460V AC 3-phase. For 575V AC please specify model E-221. Type and frequency options are the same as for E-220. For other voltages, please consult Autogard.

Current Ranges

The E-220 measures current using an internal Current Transformer (CT). This is suitable for 380/460V motors up to 25HP. For larger motors, an external current transformer is also required – please request "External CT 300A/5A" when ordering. For other motor voltages, or power ratings over 300HP, please consult Autogard.

Ordering Example

Autogard Power Monitor E-220/60-3

Autogard Model E-220, 380/460V, factory set for 60Hz AC 3-phase mains operation, Type 3.

The specifications contained within this brochure are correct at the time of going to print. Autogard are continually reviewing and updating the specifications on all its product range and therefore reserve the right to change any detail.

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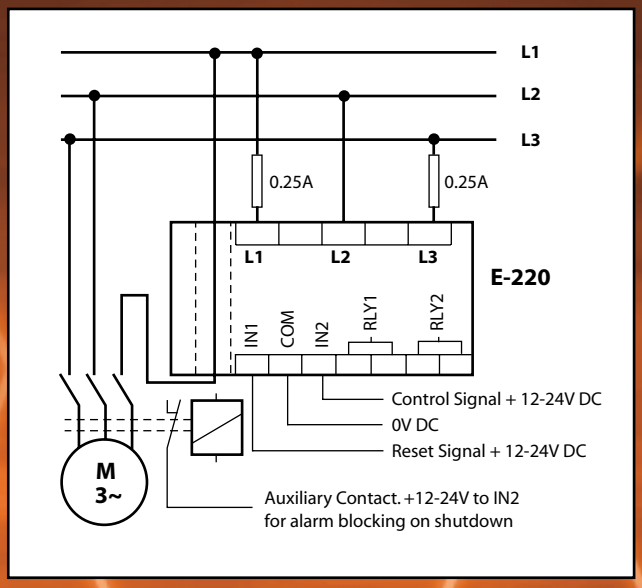
Specification

Voltage Range	380 – 460 V AC
High Voltage Option	575V AC (Model E-221)
Current Range	Internal max 25 A
Supply Frequency	50/60Hz (Factory set)
Power consumption	2 VA
Display	3-digit, 7 segment LED
Units of Power	kW (50Hz models) HP (60 Hz models)
Relays	SPST.
Relay contact rating	250V AC/ 8 A.
Housing Enclosure	Noryl
Housing Base	Lexan
Mounting	35mm DIN rail
Protection Class	IP40 enclosure. (excl. terminals)
Max wire dia for big terminals	12 AWG (4mm^2)
Max wire dia for small terminals	14 AWG (2.5mm^2)
CT wire hole	8 AWG (10mm^2)
Temperature range	5°F - 120°F
Weight	9oz
Dimensions (W x H x L)	1.73" x 3.03" x 4.25"

Typical Wiring Diagram (I < 25A)



Installation

The E-220 must always be installed on the input side of any variable speed drive or soft start. The wiring diagram above is shown as a typical example. Please refer to the Installation manual for full details.

Relays

Relays on Types 1, 2 and 4 are normally held closed and open on trip. The warning trip on Type 3 is NO. Transducer versions, Types 5 and 6, do not have relays. Other configurations are available. Please consult Autogard.

Programming

The E-220 is programmed using the buttons on the front panel. The "Mode" button is used to select the parameter to be programmed and the arrow keys are used to change values.

Setting Trip Levels

The drive should be operated under normal load conditions and the displayed power used to determine the load under normal conditions. The trips should then be programmed at an appropriate level. Alternatively, a theoretical value can be determined for the load and the trips set accordingly.

Start Delay

The start delay timer, Ts, is used to inhibit trips during motor start-up. The shortest possible time should be selected to maintain optimum protection. The Ts LED will be lit as long as the start delay is active.

Trip Delay

The trip delay Td inhibits trips until the limit has been exceeded for the programmed length of time. This avoids tripping due to noise spikes and transients. It should be set to the shortest time which does not produce nuisance trips.

Trip Inhibit

By applying +12-24V DC to terminal IN2, the trips are inhibited. This input may be provided from a PLC to inhibit trips during a certain phase of operation or to avoid unwanted underload trips, for example, on motor shut down. Alternatively, an auxiliary contact may be used to provide +12-24V to IN2 automatically.

Resetting

Trips may be re-set manually using the button on the front panel or remotely by applying a +12-24V DC signal to terminal IN1.

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