IQ 1000

Westinghouse
IQ-1000

Trip   Reset

Alarm

Function   Value

Step Up

Raise

Help

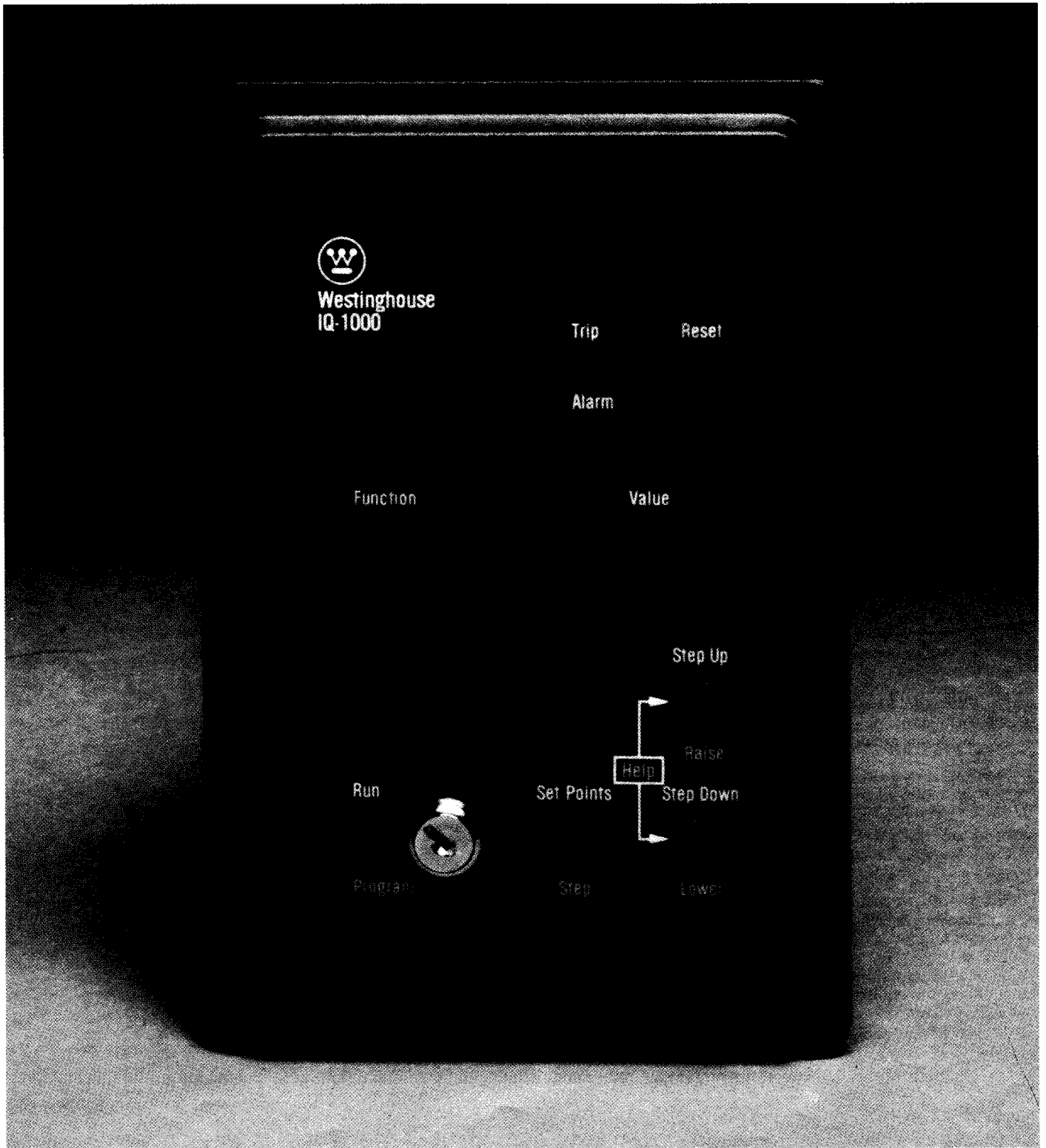Run   Set Points   Step Down

Program   Step   Lower

IQ-1000 Maximizes Motor Utilization

The IQ-1000 is a multifunction, motor protective relay that monitors three phase AC current and makes separate trip and alarm decisions based on preprogrammed motor current and temperature conditions. The IQ-1000's patented motor protection algorithm is based on proven positive and negative (unbalance) sequence current sampling and true RMS calculations. Experience has shown that this algorithm produces a superior model of motor heating, thereby providing the User with maximum motor utilization—a maximum of motor protection with virtually no nuisance tripping.

Optimum Motor Protection

By simply programming the IQ-1000 with the motor's electrical characteristics (such as full load current and locked rotor current), the IQ-1000's algorithm will automatically tailor the optimal protection curve to the motor being monitored. No guesswork or approximation is needed in selecting a given protection curve because the IQ-1000 matches the protection, from an "infinite" family of curves, to each specific motor.

Application-related motor load problems are further addressed through the use of such functions as Jam, Underload, and Ground Fault protection. As an example, see the typical motor protection curve shown on opposite page.

Motor Protection and Data

As illustrated in the typical motor protection curve, the IQ-1000 can provide a cost effective alternative to several conventional protective relays including short-time and long time-time current relays, instantaneous overcurrent relays, ground fault relays, and more. Metered data is also stored in the IQ-1000 providing a "picture" of the motor conditions, including motor temperature if RTDs are used, just prior to the time of trip. This information is available either directly using the IQ-1000's built-in display or remotely using Westinghouse INCOM—a low-cost local area network.

IQ-1000 Protection Features

- Instantaneous overcurrent trip level and start delay: Device 50
- Locked rotor current: Device 51
- Maximum allowable stall time.
- Ultimate trip current level: Device 51
- I^2t alarm level: Device 74
- Zero Sequence Ground Fault trip level with start and run time delays: Device 50G/51G
- Separate trip and alarm motor temperature set points (ten RTD inputs are available as an option):
  Six Stator Windings-Overtemperature: Device 49

Two Motor Bearings-Overtemperature: Device 38
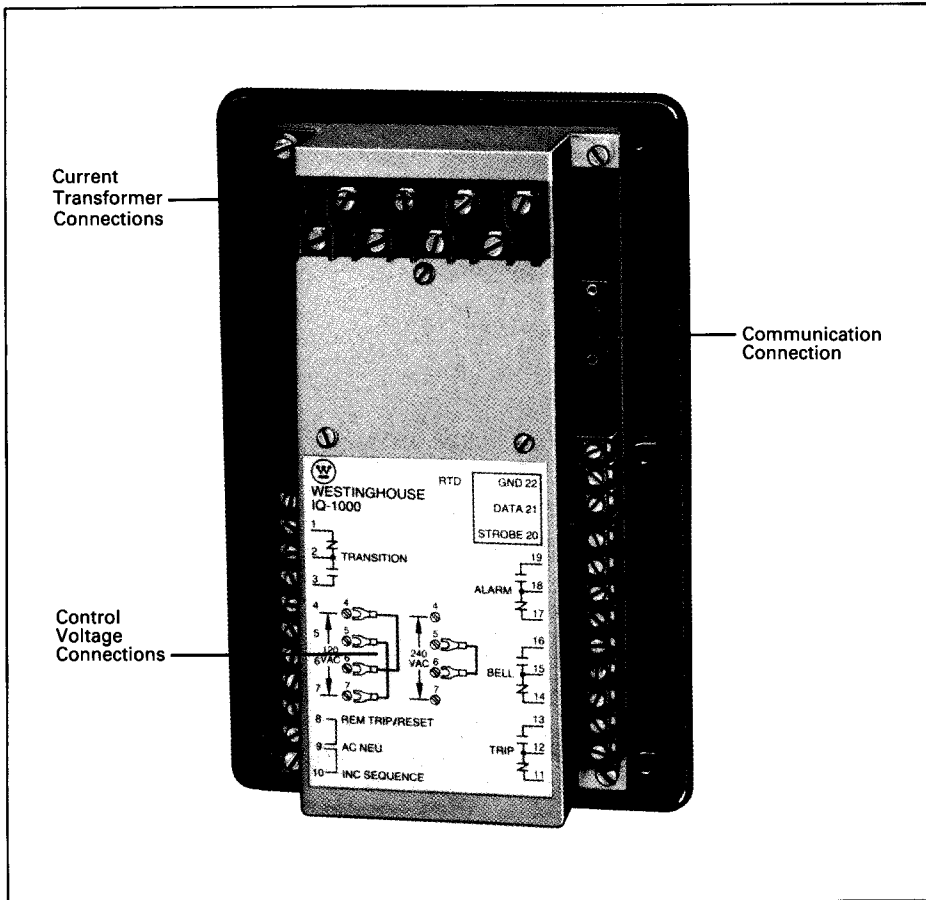
Two Load Bearings-Overtemperature: Device 38

- Jam trip level with start and run time delays.
- Underload trip level with start and run time delays: Device 37
- Phase Loss and Phase Unbalance trip and alarm level with run delay: Device 46
- Number of motor "starts" allowed per time period: Device 66
- Anti-backspin time delay
- Transition signal: Transition based upon current level with a back-up timer and transition or trip selection.
- Incomplete sequence delay: Device 2/19
- Current Transformer Ratio Selection
- Full load amps
- Trip Mode:
  Mode 1: Trip relay energizes on trip condition
  Mode 2: Trip relay energizes on power up and de-energizes on trip condition

- Phase reversal for non-reversing starters: Device 46; Selection of non-reversing or reversing starters.
- Selection of remote trip or remote reset (for I^2t trip).
- Frequency selection—50Hz or 60Hz
- Selection of auto or manual reset (for I^2t trip).
- Positive and negative (unbalance) sequence current algorithm automatically determines protection curve for a given motor.

IQ-1000 Monitored and Displayed Values

- Motor current for each phase.
- Motor current as a percent of full load amps for each phase.
- Ten Resistance Temperature Detectors (RTDs)—optional.
- Operations count.
- Run Timer (in hours).
- Remaining starts.
- Oldest start: Time remaining before "oldest" start is restored to "remaining" starts

Rear View

Current Transformer Connections

Control Voltage Connections

Communication Connection

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IQ-1000 Inputs and Outputs

Inputs
- 120/240 VAC control power.
- Remote trip/remote reset.
- Incomplete sequence (contact closure report back for reduced voltage starters).
- RTD inputs from optional RTD unit
- Current transformer connections

Outputs: Four Form C relays:
- Trip relay: Device 86
- Bell alarm relay: Device 74
- Alarm (trip pending) relay: Device 74
- Transition relay: Device 48
- INCOM communications port

Customer Benefits
- Motor protection algorithm based on proven positive and negative (unbalance) sequence current sampling and true RMS calculations. Provides maximum motor utilization—a maximum of motor protection with virtually no nuisance tripping.

- The IQ-1000 provides a cost effective alternative to long and short delay current relays, ground fault relays, instantaneous overcurrent relays, phase loss or phase unbalance relays and transition time-delay relays for reduced voltage applications. CT ratios are programmable from 2:1 up to 800:1, based on 5 amp secondary and 10 to 3000 amp primaries.
- A single, compact, standard, door-mounted design simplifies ordering, inventory, and panel layout. Saves panel space.
- User friendly—the IQ-1000 incorporates a "HELP" feature making programming and monitoring easy for the OEM and USER. "Help" messages may be made available in different languages provided standard alpha-numeric characters are used.
- A programmable alarm relay output to warn of a pending trip condition.
- Selectable manual or automatic reset (for I^2t trip).

- The IQ-1000 allows the "duty cycle" of the motor to be programmed to maximize motor life.
- A programmable JAM function provides "load" protection for applications such as conveyors, wood chippers, and rock crushers.
- A programmable Underload function provides response to load problems such as broken belts, drives, or motor shafts, or the loss of affluent in a pumping system.
- The IQ-1000 provides a "snapshot" of all monitored values immediately prior to the time of trip providing valuable trouble shooting/maintenance information.
- Self-diagnostics: The IQ-1000 continually monitors its own vital functions and shuts down (trips) in the event of a failure. An error message is displayed to show the failure cause.
- All setpoints are stored in "non-volatile" memory—battery back-up is not required.
- A key lock program/run switch for security to allow access only to trained personnel. A restart can be activated in an emergency situation.
- Large ½ inch, 8 character LED display for easy viewing in any light source. Display "scrolls" for longer messages.
- **UL** Recognized.

Optional Benefits
- Motor temperature data up to ten RTDs can be "strobed" into the IQ-1000 using only three wires. Self-contained RTD packages are available for 10 OHM, 100 OHM, and 120 OHM RTDs. All temperature values can be individually displayed. The IQ-1000 will trip when any RTD exceeds its setpoint.
- Data Communication—All IQ-1000 data, including trip data, can be transmitted to an interface (IBM Personal Computer or clone) over a low-cost, two wire local area network—Westinghouse INCOM. A small, addressable communications card (PONI) is field mountable to the back of the IQ-1000 and is connected to the two-wire INCOM network.
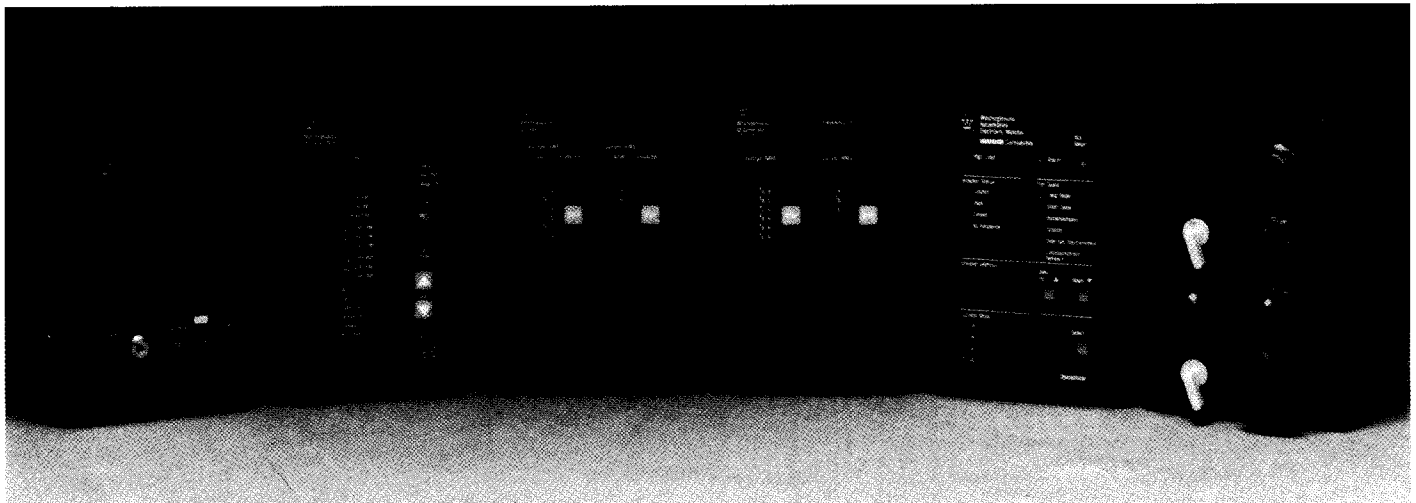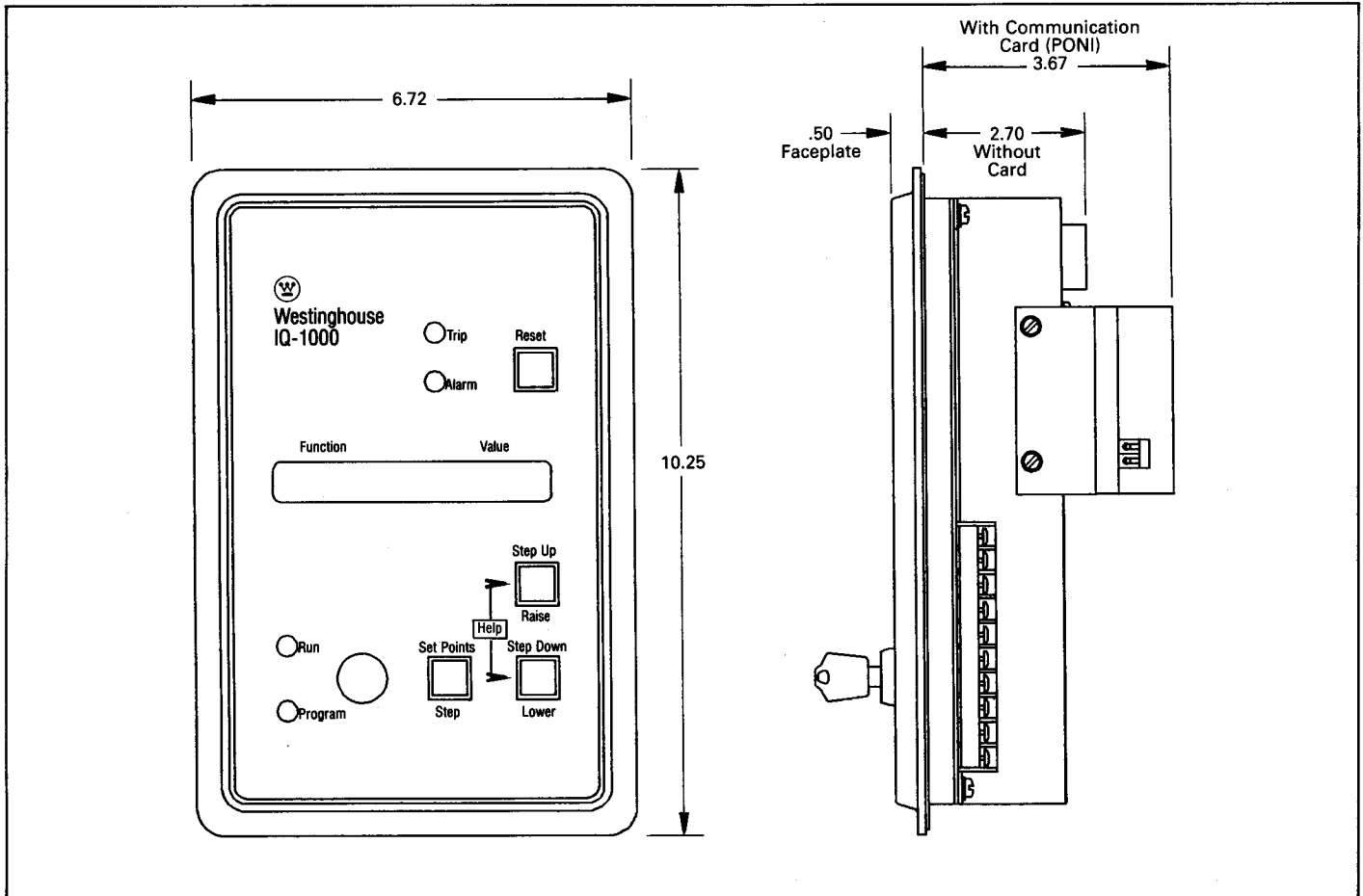
IQ-1000 Motor Protection Curve (without RTDs)
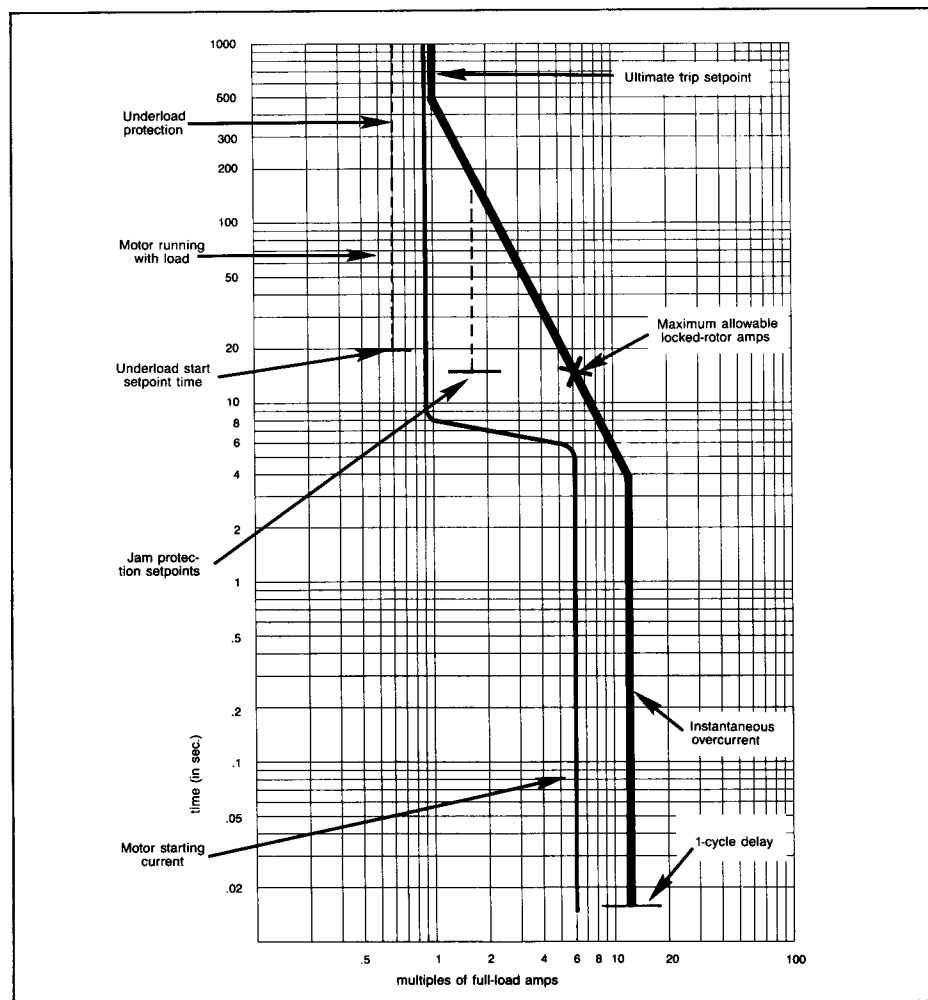
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Dimensions (In inches)

The Westinghouse IQ family: IQ-1000, IQ Data Plus II, IQ Data, IQ Generator, Assemblies Electronic Monitor, and Device Panel