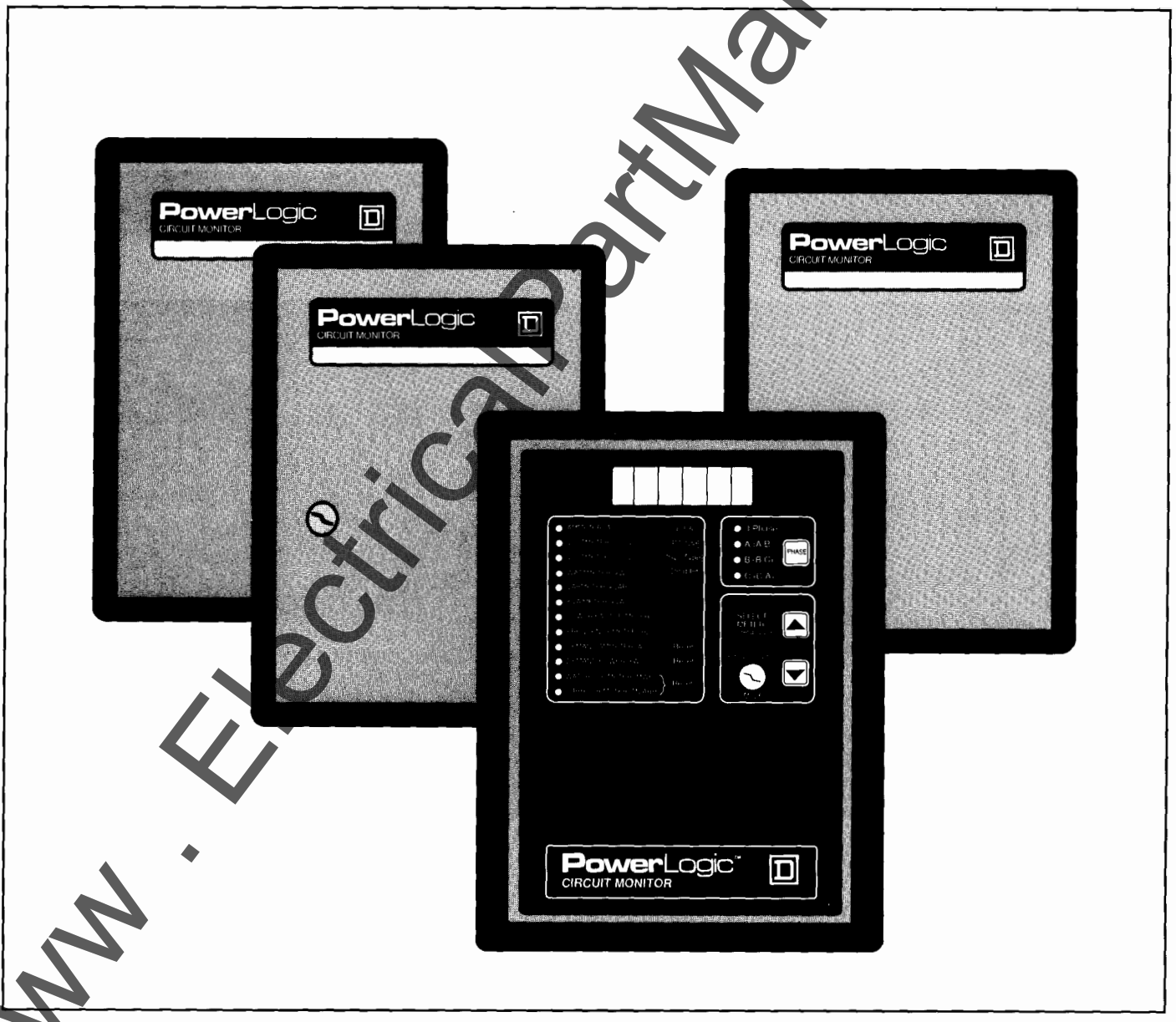
DESCRIPTIVE BULLETIN

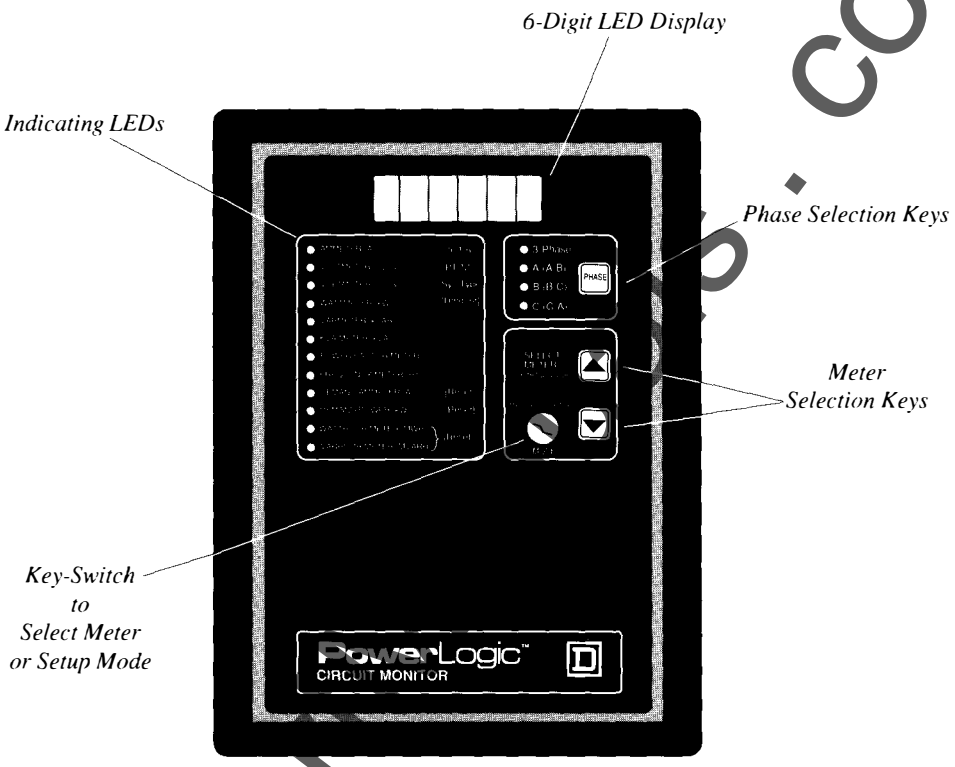
Bulletin DB-100 Rev 1 February, 1991

PowerLogic®
Circuit Monitor



PowerLogic® Circuit Monitor

- INSTRUMENTATION - OVER 70 METERED VALUES
- HISTORICAL CIRCUIT DATA, TIME AND DATES
- WAVEFORM CAPTURE OPTION FOR HARMONIC ANALYSIS
- OPTIONAL STATUS INPUTS, RELAY OUTPUTS
- FACEPLATE DISPLAY OPTION
- RS-485 DATA COMMUNICATIONS STANDARD ON ALL MODELS



Circuit Monitor with Integral Display
(Models CM-150, CM-250)

The PowerLogic® Circuit Monitor is a multi-function, digital instrumentation, data acquisition and control device capable of replacing a variety of discrete meters, transducers, and other components.

In one compact unit, the Circuit Monitor performs the functions of the following discrete meters:

- Ammeters, Voltmeters, and Instrument Switches
- Wattmeter
- Varmeter
- KVA Meter
- Power Factor Meters
- Frequency Meter
- Thermal Demand Ammeters
- Watthour Meter with Demand Attachment
- Varhour Meter
- Recording Meters

Industry standard RS-485 data communications allow the Circuit Monitor to replace multiple transducers, analog wires and analog-to-digital conversion equipment. The Circuit Monitor transmits extensive information over a single communications cable to a PowerLogic System Display, a personal computer, SY/MAX® Programmable Controller, or other host system.

In addition to its metering capabilities, Circuit Monitors are available with optional status inputs and relay outputs for monitoring discrete contacts and remote control of devices via the data communications channel.

Circuit Monitors equipped with an exclusive "waveform capture" function offer a new class of circuit information, not previously available using discrete devices. Comprehensive profiles of current and voltage waveforms, suitable for harmonics studies and other power quality analyses, are reported on user-command.

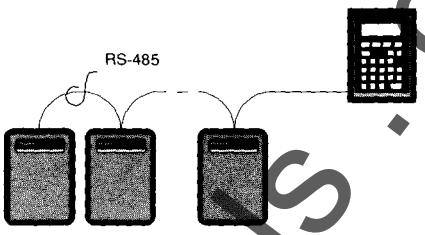
All necessary operations for stand-alone use are supported from the front faceplate of Circuit Monitors equipped with optional display. Meter values are selected from the keypad, and twelve LEDs indicate the displayed reading. A "Phase" button is used to select individual phase or three-phase quantities. Setup and meter reset functions are keyswitch-protected to prevent inadvertent or unauthorized operation.

The Circuit Monitor can be applied virtually anywhere standard current and voltage transformers are used. This versatility makes it ideal for a variety of applications including:

- Integration into Square D's full line of power equipment.
- Equipment and process control, monitoring of circuit conditions.
- Retrofit into existing facilities and processes.

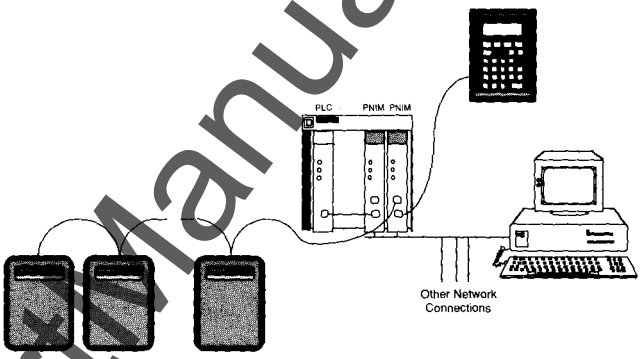
PowerLogic® System Applications

STAND-ALONE METERING
The PowerLogic Circuit Monitor with optional display is a cost-effective alternative to conventional discrete metering devices. A single Circuit Monitor can provide the instrumentation equivalent to many discrete meters. And since Circuit Monitor communications are standard, remote monitoring capabilities may be added as the customer requirements change or as the system expands.

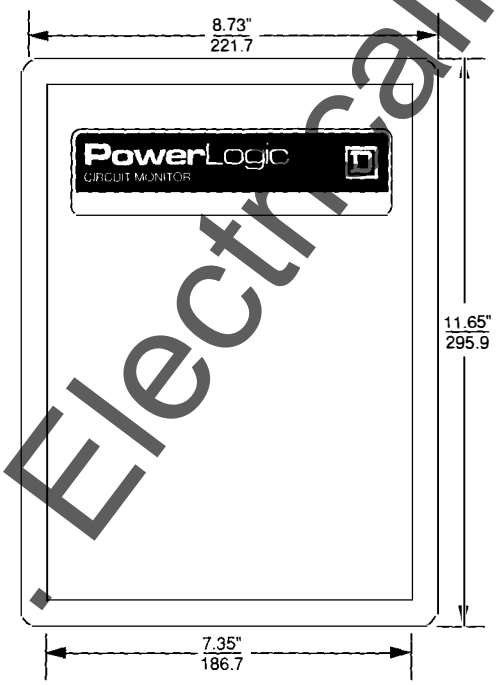


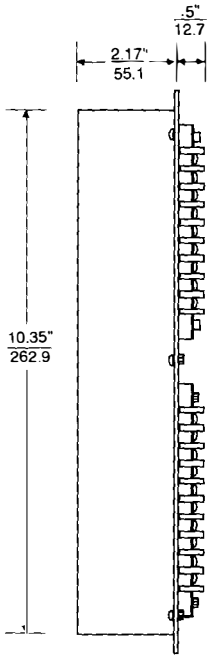
PowerLogic® System 1 or 2

LOCAL & REMOTE MONITORING (& CONTROL)
One or more PowerLogic Circuit Monitors can be connected via data communications to other PowerLogic system components, forming the basis for a power monitoring and control system. In PowerLogic "System 1," Circuit Monitors are connected to a System Display to provide local monitoring. This system is easily upgradable to higher-level systems involving remote monitoring, network options, modem transmission, control functions, and much more.



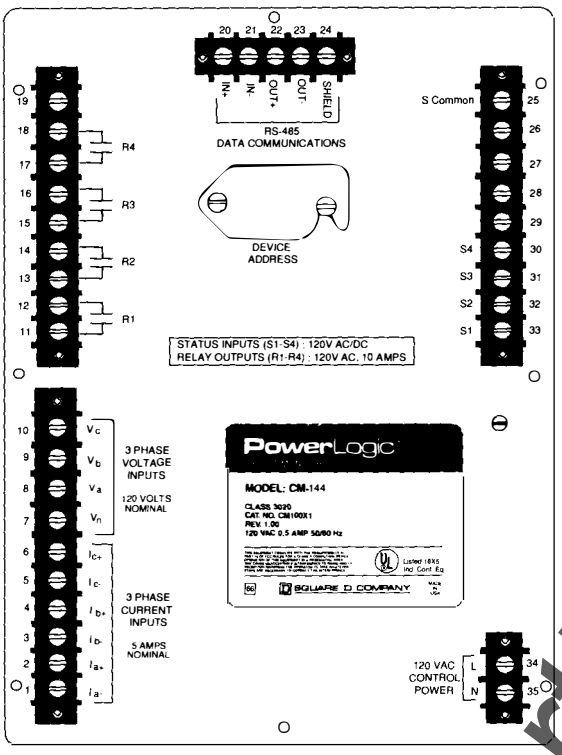
PowerLogic® System 2, 3 or 4





Dimensions in Inches / Millimeters

Weight (approx) = 7 lbs (3.17 kg)



Circuit Monitor with 4 Status Inputs, 4 Relay Outputs
(Models CM-144, CM-244)

STATUS INPUTS

The Circuit Monitor offers four (4) or eight (8) optional digital inputs which can be used to monitor the status of discrete contacts. These may monitor breaker status (Open, Closed, etc.), transformer temperature alarm conditions, cooling fan status, etc. Status information is maintained in memory and reported via the communications channel on command by the requesting host.

RELAY OUTPUTS

Circuit Monitors can be equipped with optional relay outputs which can be externally controlled via the communications channel. These may be used to open or close circuit breakers or contactors, annunciate alarms, etc. A keyswitch is provided to allow protected setup mode and lockout of remote operation during maintenance periods or as needed.

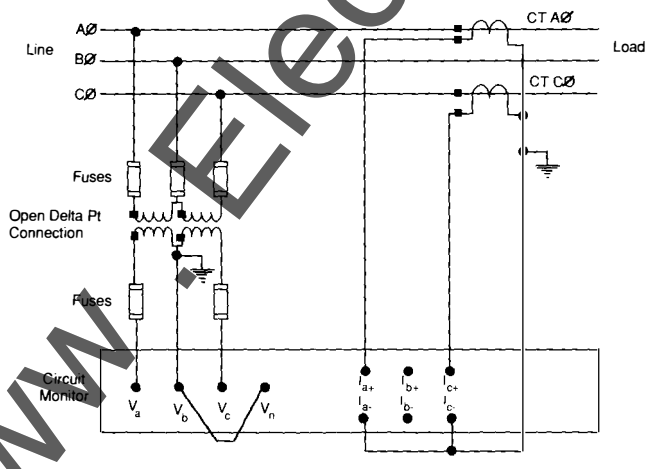
CONNECTIONS TO POWER SYSTEM

PowerLogic Circuit Monitors can be connected to the power system using standard instrument transformers, the same as conventional meters. Wiring is similar to that of a watthour meter, with voltage inputs from standard 120 VAC PTs and current inputs from 5A (nominal) CTs. An external 120 VAC control power source is used to ensure reliable data communications.

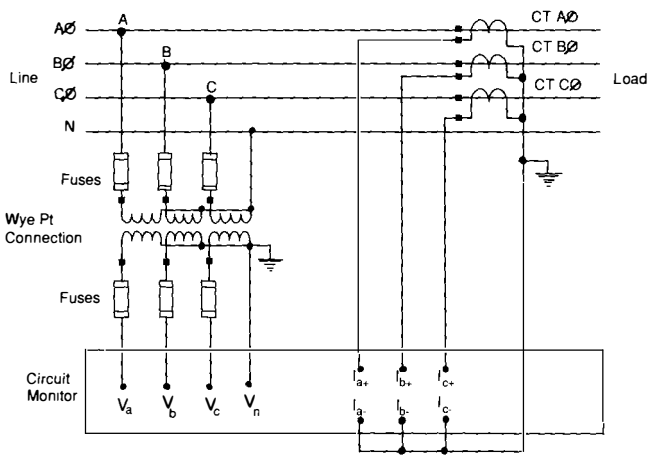
RS-485 data communications connections use shielded, two-twisted-pair wire, providing robust and reliable transmission, even in noisy industrial environments.

TYPICAL VOLTAGE AND CURRENT INPUT CONNECTIONS

3-Phase / 3-Wire



3-Phase / 4-Wire



INSTRUMENTATION
Employing true RMS, 3-element sensing, the Circuit Monitor provides accurate instrumentation readings, even on circuits with waveform distortion through the 31st harmonic. Metering capabilities include instantaneous values (rms values updated each second), demand quantities and energy readings.

The Circuit Monitor provides an alternate calculation of 3-phase current called "Apparent RMS" for use in trouble-shooting power system problems associated with harmonic distortion. Apparent RMS readings are based on peak currents divided by the square root of 2 for comparison with trip settings of protective relays and trip units which employ peak-detection to determine overload response. For balanced three-phase circuits with sinusoidal waveforms, "Apparent RMS" will equal "3-Phase Average" current.

MINIMUM / MAXIMUM HISTORY
For each instantaneous reading, a running minimum and maximum history is maintained in nonvolatile memory. This data provides a valuable record of the operating range of circuit parameters since the last reset by the user.

Summary of Circuit Monitor Instrumentation

INSTANTANEOUS READINGS

RMS Current Values
- Phase A Current
- Phase B Current
- Phase C Current
- 3-Phase Average Current
- Apparent RMS Current

RMS Voltage Values
- Phase A-B Voltage
- Phase B-C Voltage
- Phase C-A Voltage
- Phase A-N Voltage
- Phase B-N Voltage
- Phase C-N Voltage

Power Factor Values
- Phase A Power Factor
- Phase B Power Factor
- Phase C Power Factor
- 3-Phase Total Power Factor

3-Phase Total Power Values
- Real Power, 3-Phase Total
- Reactive Power, 3-Phase Total
- Apparent Power, 3-Phase Total

Frequency
Temperature

DEMAND READINGS

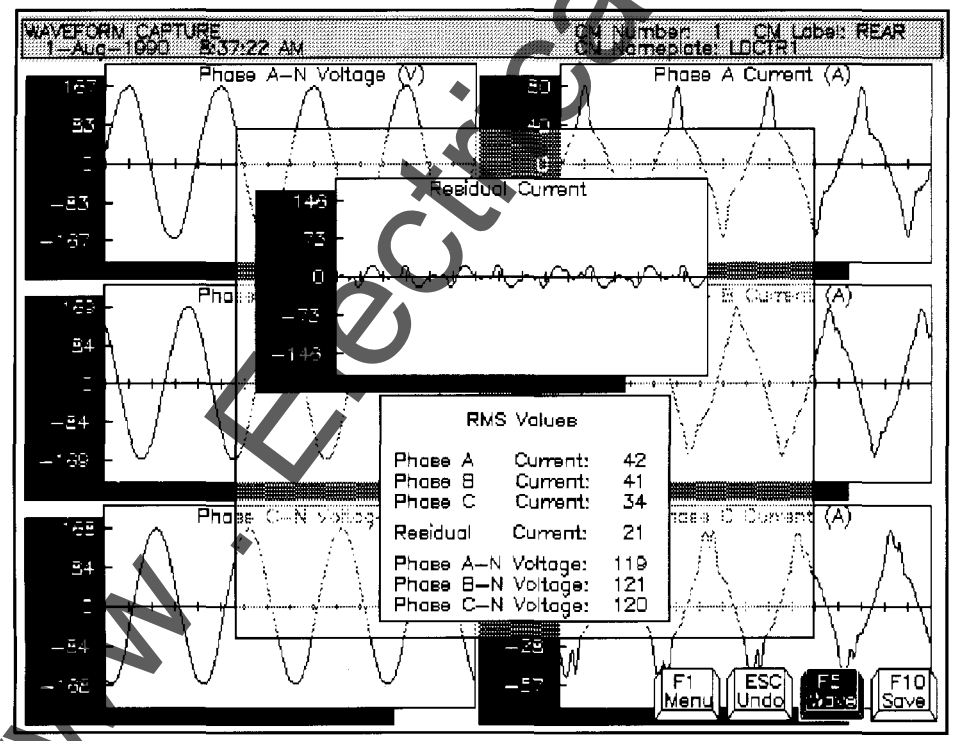
Current Values
- Average Demand Current Phase A
- Average Demand Current Phase B
- Average Demand Current Phase C
- Peak Demand Current Phase A
- Peak Demand Current Phase B
- Peak Demand Current Phase C

Real Power Values
- Average Demand Real Power
- Predicted Demand Real Power
- Peak Demand Real Power

ENERGY READINGS

Energy Accumulated
Reactive Energy Accumulated

ENERGY MANAGEMENT ALARMS
The Circuit Monitor includes 3 independent energy management alarm levels as defined by the user. Associated data can be used as a diagnostics tool for power management or integrated into existing energy management and control systems.



WAVEFORM CAPTURE
The PowerLogic® Circuit Monitor uses a high-speed sampling technique to perform its "waveform capture" function, making actual current and voltage profiles available on user command for subsequent display and trouble-shooting.

Waveform data may be viewed at a remote personal computer using PowerLogic application software, or exported to other software packages for more specialized analysis.

Real power average demand readings are compared with each setpoint to test for an alarm condition. When a setpoint is exceeded, the Circuit Monitor stores the date and time of the event, and records the maximum level of demand power eventually reached.

Specifications

Metering Specifications

Current Inputs (Each Channel)
- Current Range ..... 0 - 7.0 A AC
- Nominal Current ..... 5A AC

Voltage Inputs (Each Channel)
- Voltage Range ..... 0 - 180V AC
- Nominal Voltage (typical) ..... 120V AC

Frequency Range ..... 23 to 65 Hz
Harmonic Measurement ..... Through 31st
Accuracy (In percent of full scale)
- Current measurements ..... +/- 1.0%
- Voltage measurements ..... +/- 1.0%
- Power ..... +/- 2.0%
- Power Factor ..... +/- 4.0%
- Energy ..... +/- 2.0%
- Frequency ..... +/- 0.5%
- Temperature ..... +/- 2 C
- Time of Day Clock (At 25 C) ..... +/- 1 sec in 24 hrs

Data Update Time 0.817s (4-wire)
(For Instantaneous Readings) 1.000s (3-wire)

Environmental Specifications

Operating Temperature ..... -25 to +70 degrees C
Storage Temperature ..... -40 to +85 degrees C
Humidity Rating ..... 5 - 95% Relative Humidity (non-condensing)

Metering Input Electrical Specifications

Current Inputs
- Overcurrent Withstand Rating ..... 15A Continuous
  50A for 10 sec in 1 hr
  500A for 1 sec in 1 hr
- Burden ..... Less than 0.15VA
- Isolation ..... 1500V, 1 MIN

Voltage Inputs
- Overvoltage Withstand Rating ... 180V AC Continuous
- Input Impedance ..... 1 MegOhm, minimum

Control Power Input

Voltage
- Nominal ..... 120 VAC
- Operating Range ..... 102-132 VAC
- Burden ..... 20 VA
- Frequency Range ..... 45.0 to 65.0 Hz
- Isolation ..... 1500V, 1 min

Ride-Through on Power Loss ..... .244 sec at 120 VAC

Input / Output Specifications

Status Inputs
- Voltage Operating Range ..... 90-138 VAC/VDC
- Input Current Draw ..... 6mA @ 90V; 10mA @ 138V

Relay Outputs
- Contact Ratings ..... 10A @ 120VAC (50/60 Hz); 10A @ 30VDC; A @ 125VDC; A @ 48 VDC

ORDERING INFORMATION

CLASS	TYPE: MODEL	TYPE: SUFFIX
3020	CM208	X1

SQUARE D CATALOG NO.

CAT. CLASS 3020

CIRCUIT MONITOR MODELS:
- CM-100 Instrumentation
- CM-108 Instrumentation, 8 Status Inputs
- CM-144 Instrumentation, 4 Status Inputs, 4 Relay Outputs
- CM-150 Instrumentation plus Integral Display
- CM-200 Instrumentation plus Waveform Capture
- CM-208 Instrumentation, Waveform Capture, 8 Status Inputs
- CM-244 Instrumentation, Waveform Capture, 4 Status Inputs, 4 Relay Outputs
- CM-250 Instrumentation, Waveform Capture, Integral Display

CONTROL POWER INPUT:
- -X1 120 VAC (50/60 Hz)

For Further Information - Contact your nearby Square D sales office or call or write to :
Square D Company • PowerLogic • 330 Weakley Rd • Smyrna, TN 37167 • Ph (615) 459-8500.

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