

K20™ Energy Recorder

Next generation energy measurement systems

The model **K20** family of meter/recorders integrates power measurement and data recording in one instrument. Used extensively by electric utilities, energy service companies and performance contractors to accurately and comprehensively measure and record AC electrical energy, the K20 is ideal for residential, commercial and industrial electric power metering applications, as well as measuring parameters such as temperature, flow and status.

status, the K20 offers energy engineers a powerful yet extremely economical data collection tool.



High Power Channel Density

The model K20 recorder provides sixteen (16) current input channels. Using advanced digital sampling, the K20 recorder provides sixteen true RMS power measurement channels as well as discrete parameters: Volts, Amps, Watts, kVA, kWh, kVAh and waveforms are all available. Any current input can be related to any potential input whether phase to neutral or phase to phase. The unique flexible K20 architecture allows the user to create single element single phase power channels, two element, three phase delta load measurements or three element three phase wye measurements. Combined with the ability to make coincident measurements of analog instruments such as temperature sensors and digital signals such as runtime and

Digital and Analog Channels

In addition to power measurement, the K20 provides 15 analog and 16 digital or pulse-input channels. K20 analog channels can directly measure 1000 ohm RTDs and LM34 temperature sensors, as well as 0-5Vdc and 4-20mA signals. Digital channels can be used to measure contact closures as pulses, such as electric utility pulse initiating meters, gas utility meters, and flow meters. Digital channels can also be used to measure contact closure duration (run time accumulation) and as the stimulus for making gated analog average readings. A gated analog reading is, for example, making temperature reads only when another event, such as flow is occurring. Important to do when capturing thermal transfers, i.e., BTU.

Measurement Knowledge Solutions

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Memory Options

Memory is expandable from a standard 128K option to 1M bytes, providing ample data storage capacity for most any situation and channel count requirement.

Networking

Through the use of a robust, two wire network connection, multiple K20 recorders can be networked together to share a single modem or PC. There is no practical limit on how many recorders can be connected to a common network. The facilities to make this network connection are inherent and standard on every K20 recorder. Each data channel can be viewed in real-time either locally or via modem.



PC Software

K20 data loggers come with KTOOLS, PC recorder configuration and data management applications support software. In addition, K20 recorders are MV-90® and Synernet™ compatible. KTOOLS provides recorder

configuration menus that make it fast and simple to set up all channels types; kW, kWh, voltage, current, kVA, temperature channels, etc. are quickly set up and managed with KTOOLS. Site files are easily managed and data retrieval functions via modem or direct connection result in data files that are ready for immediate import into any of the popular PC spreadsheet programs currently in use. The KTOOLS program and all program updates are available

for immediate downloading at our web site: <http://www.enernetcorp.com>.

Parameter Set Configuration

KTOOLS provides a simple and intuitive means to configure recorders. The configuration structure is called a "Parameter Set". Channels are selected and configured with simple point-and-click and fill-in-the-blank actions. There is no "programming" language to learn in order to use a K20.



Real-Time Display

KTOOLS PC software allows the user to view real-time data from recorders. Columns of data can be selected to show AC voltage, watts, power factor, amps, temperature etc.

Local Display

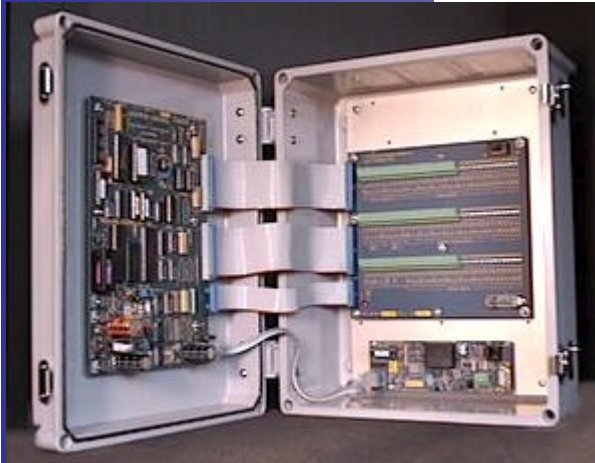
A vacuum florescent local display with four-arrow keypad is an available option on the K20 recorder. The local display is often a valuable tool during installation or it may be needed to provide ongoing local readouts for on-site engineering and maintenance.

■ **Installation and Maintenance**

Installation
 The K20 is designed for fast installation. A fiberglass reinforced polyester enclosure with NEMA 4X rating is the standard K20 housing. This lightweight enclosure provides the right combination of strength and durability, while allowing it to be located outdoors or in areas that can experience water spray, dust and other environmental challenges. The termination board and communication interface board is mounted to a single aluminum back-plate, which can be quickly removed from the enclosure base with four large, easily accessed screws. Removing the back-plate and the snap-off door, on which is mounted the CPU board and display, allows electricians to mount the enclosure, make all necessary penetrations and conduit connections and pull wire into the box, without concern for damaging sensitive electronics. Once the rough work is done, the termination board is placed back in the enclosure for final termination of wiring and the door is simply snapped back on.

Maintenance
 The K20 recorder system is designed to give you years of trouble free use. Each major assembly of the recorder is 200% tested before leaving our manufacturing facility. Should there be a need, each major assembly can easily be removed from its enclosure in the field.

K20 Energy Recorder



Industry-leading accuracy and dynamic range

True RMS:

- Volts
- Amps
- kW
- kWh
- kVAh

Analog:

- DC Volts
- 4-20mA loops
- Precision RTD
- Resistance

Digital:

- Pulse Count
- Runtime
- Rate

Instrument Power

Any 24vac or 24vdc power source can be used to power the K20. A UL-listed 20VA, 24vac class II control transformer is typically used.

AC Voltage Sensor

120 to 480 volts RMS is sensed using a single energy limiting potential transducer. There is no need to have multiple potential transformers for different voltage configurations as is often the case with other power measurement equipment.

This transducer provides isolation between the K20 and high voltage potentials. The output of the transducer is an in phase low voltage signal, proportional to voltages as they appear at the primary connection. The voltage transducer is housed in a standard 4x4 electrical box.

AC Current Sensors

Current is sensed using UL / ETL-listed internally shunted split and/or solid core current transducers. K20 CTs are safe even with live circuits and leads may be extended hundreds of feet without concern of accuracy loss due to over burdening. K20 CTs are not only intrinsically safe, but because of the fixed internal burden resistor, they are typically smaller and lighter weight than CTs used in many other power measuring devices on the market. K20 CTs can be supplied over a wide current range from one amp full scale to thousands of amps.

K20 Specifications

Enclosure

14 x 11 x 6 — NEMA 4X fiberglass reinforced polyester enclosure.

Recorder Power

Class 2, energy limited 24Vac transformer

AC Power Measurement

RMS Current	8 or 16 channels
RMS Voltage	8 or 16 channels
RMS Power*	8 or 16 channels
kWh*	8 or 16 channels
KVAh*	8 or 16 channels
Power Factor	8 or 16 channels

*(bipolar measurement)**

Current Sensors

Internal burdened CT output 0.333 VRMS at rated current.

Voltage Transducer

Three-phase, four-wire electrical service connection up to 480 volts.

Accuracy

- **Power / kWh:**
±0.4% of reading, 100% to 5% of full scale input, unity to 0.5 PF.
- **Amps / Volts:**
±0.4% of full scale.
- **Power Factor:**
±0.02 PF, 100% to 5% of full scale.

Resolution

- **Amps / Volts:**
0.1% FS minimum
- **Power Factor:**
0.01 PF
- **Power:**
0.1% FS Minimum
- **kWh:**
0.05% FS Minimum

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Contact Closure Inputs

8 or 16 independent floating form "A" contact closures to system common — Configurable as counting or run-time channels.

- **Electrical Pull-up:**
+5 volts dc, 1 Ohm
- **Transient Immunity:**
500 volts / 10 micro seconds
- **Count Rate:**
10Hz Maximum
- **On / Off Duration:**
40 mSec minimum
- **Contact Bounce:**
20 mSec maximum

Analog Inputs

8 or 15 independent single-ended voltage inputs, referenced to circuit common.

- **Range:**
0.0 to +5.0 volts DC
- **Input Impedance:**
10 Mohm minimum
- **A / D Conversion:**
Integrating, 100 mSec. Averaging interval
- **60 Hz Rejection:**
40db minimum up to 1 V P-P
- **Resistance Input:**
Internal 3mA excitation current plus linearization of 1000 ohm platinum Resistive Temperature Device.
- **Accuracy:**
±0.25% Full Scale
- **Resolution:**
Voltage — 1.0mV
Resistance — 0.3 ohms
Temperature — 0.1 ° C

Communications

Local RS-232 or dial up Modem

Data Storage

128K to 1M bytes of battery backed RAM

Price List

K20 Energy Recorder

K20 - 1	— Energy Survey Recorder.....	\$1,345
	8 Power, 8 Analog, 8 Digital Channels (w/out Display)	
K20 - 2	— Energy Survey Recorder.....	\$2,490
	16 Power, 15 Analog, 16 Digital Channels (w/out Display)	
K20 - 3	— Energy Survey Recorder.....	\$1,655
	8 Power, 8 Analog, 8 Digital Channels (with Display)	
K20 - 4	— Energy Survey Recorder.....	\$2,880
	16 Power, 15 Analog, 16 Digital Channels (with Display)	
K20-M	— Memory Upgrade:	
	256K.....	\$ 95
	512K.....	\$ 280
	1MEG.....	\$ 560
120/24VT	120vac/24vac Power Transformer.....	\$ 25
120/480PT	120vac/480vac Potential Transducer.....	\$ 185
	(one included with each K20 logger)	
KTOOLS	K20 PC Host Software.....	\$ N/C
	PC Host software	
MDM-2400	1200/2400 Baud Modem.....	\$ 150

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