Minitrend V5
Electronic Data Recorder

Specification

Function

Honeywell's Minitrend V5 recorder provides flexible, general-purpose electronic data recording in a DIN standard 144mm format recorder. The recorder accepts up to 16 universal analog inputs and stores data on removable storage media: Floppy disks, PCMCIA/compact flash cards or both (dual storage). The large color active matrix LCD screen provides wide viewing angles along with bright, easy to read displays. The operator interface provides easy, multi-lingual access to the recorder menus for quick set up and replaying of the data.

Navigation in the menus and text entry are quick and intuitive with the use of the front thumbwheel.

Data are stored in binary encrypted format, together with the recorder configurations, in secure files.

A number of communication possibilities are offered, including an ethernet interface as standard, RS232 and RS485.

Other advanced features include; Fuzzy Logging, Custom Screen Design and advanced data security to meet 21CFR Part 11 compliance for electronic data recording.

The TrendManager Pro V5 Software Suite complements the capabilities of the recorders by providing the benefits of configuration, data analysis and data acquisition using a personal computer. It ties your process together, providing for real-time or FTP communications with the recorders through a Local Area Network (LAN) or the Internet. TrendManager Pro V5 Software Suite provides the tools for viewing real time data, data analysis, data archiving and configuration for the entire family of electronic data recorders.

Features

• ***5.5" Color Active Matrix Display***— makes it easy to interpret process data and take action with the easy to understand bar charts, digital values, trends or the customized display.

• ***Ethernet Connectivity*** — with support for various protocols provides unlimited connectivity to local area networks (LANs) or the Internet.

• ***Paperless Chart Recording*** — eliminates the need for paper and pens with their associated cost and mess.

• ***Web Server*** —

If the recorder is connected to a LAN, all process variables, alarms and messages, can be browsed from an internet navigator.

Features, Continued

• ***Up to 16 Analog Inputs*** — up to sixteen universal analog inputs available that can monitor process variables from a variety of sensors.

• ***Data Storage*** — A number of data storage options are available; these include a standard 1.44MB floppy and PCMCIA interface. In addition to this the recorder is capable of supporting dual redundant storage media for added security.

• ***Standard Mounting*** — fits standard cutout and allows for easy replacement of existing 100 mm paper chart recorders.

• ***CE Mark*** — Conformity with 73/23/EEC, Low Voltage Directive and 89/336/EEC EMC Directive.

• ***Total Data Integrity*** — data is stored in secure files based on pen designations making it easy to retrieve the data based on process information rather then having to remember file names

• ***Independent Display Chart Speeds and Logging rates*** — logging rates can be programmed completely separate from the chart display speed, allowing the data to be displayed and stored at the rates that best suits the application.

• ***Batch Mode*** — Batch control markers are entered via the front of recorder, by the web page, or automatically on events including barcode reading. Using Trend Manager Pro, Batch data can be viewed, graphed and exported to a spreadsheet.

• ***Logarithmic Scales*** — All displayed scales can be set as linear or logarithmic.

• ***Universal Power*** — the instrument is designed to work between 90 Vac and 250 Vac.

Features, Continued

• ***Language Support*** — Standard language prompts for English (US & UK), French, German, Italian, Portuguese, Spanish, Polish, Hungarian, Turkish, Romanian, Slovak and Czech.

• ***Real Time Clock*** — provides accurate time stamping of logged data and events and is battery backed up to prevent a loss of the clock time/date.

• ***Large Memory Buffer*** — Up to 8Mbyte battery-backed buffer helps protect data during routine operation.

• ***Password Protection*** — multiple levels of password protection provided to ensure compliance with 21CFR Part 11. Up to 4 levels of password protection with up to 20 different users are available for use. The password can prevent unauthorized entry to the entire recorder configuration or just portions of the recorder configuration or operation.

• ***Fuzzy Logging*** — This standard feature provides a unique method to increase the storage capacity of the recorder. The data is monitored to determine changes in process data; if no changes are observed data is logged periodically. If data is changing rapidly, it is recorded normally at the programmed rate. By not logging data that is static, data compression of up to 100:1 or more can be observed saving valuable disk space. The amount of disk space left is easily observed and can be set up as an alarm limit to provide notice before data could be lost.

Options

- ***Fast scanning*** **-** for fast processes, the signal can be sampled and recorded up to 50 times per second
- ***Alarm Outputs*** — up to 64 "software" alarms are easily set by users to display and record selected out-of-limit conditions. Up to 8 SPDT relays are available or up to 16 discrete outputs (24Vdc, 1A) are available to activate the user's external equipment.
- ***Communications*** — the recorder supports FTP, real time Trendbus, Modbus, web and e-mail over the Ethernet communications port. The recorder is also capable of Modbus RTU communications over an RS485 network. An RS232 port allows the use of an ASCII barcode reader to mark the chart or record batch specific data when used in conjunction with Event Markers.
- ***Math*** — A full function math package is available on the recorder. This feature can handle math expressions that can consist of expressions up to 250-characters in length.
- ***Totalizers*** — Each pen can be associated with a totalizer. With the use of extra pens, the totalized values can be displayed and recorded; multiple totals can be calculated out of the same variable (weekly, monthly, etc).

Options

- ***12/24Vdc instrument power*** —
- ***Transmitters power supply*** —

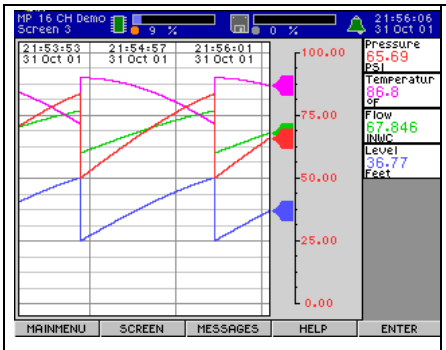
24Vdc, 200 mA maximum

- ***Digital Input*** — a number of digital input options are available. The digital inputs allow users to initiate from a remote location through a dry contact closure. Selected recorder functions, such as start/stop/reset totalization, mark the chart.
- ***Event Markers/Actions*** — provides an easy method for a user to mark an event or message on the electronic recorder. These messages are time stamped and can be up to 43 characters long. Additionally, certain recorder actions such as start/stop recording, digital inputs actions, user key presses, etc., can also be logged. Event Markers can be used to automatically generate Batch commands.
- ***Extended Security Software*** — an optional software function providing extended features including entry of unique User ID's and associated passwords, timeout of password entry, password expirations, and traceability by user.
- ***Validation Documentation*** — Honeywell can provide the additional documentation associated with using the recorder in a validated process.

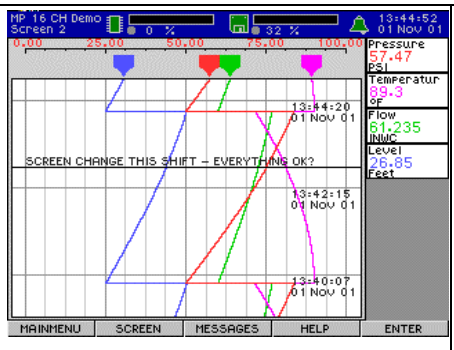
TrendManager Pro V5 Software Suite

- ***TrendViewer*** — Standard software package for viewing, graphing, and printing stored data.
- ***TrendManager Pro*** — is an advanced data analysis/archiving software package. It provides full configuration of the recorders along with e-mail set up. TrendManager Pro also allows files to be exported using comma separated variables (CSV) format.
- ***TrendServer Pro*** — is a fully network aware software package for communicating with the recorders. It supports all the capabilities of Trend Manager Pro plus FTP (file transfer protocol) and Web browser access. TrendServer Pro provides multi-level, multi-user access to the recorder data by various departments with security.
- ***TrendServer Pro with OPC Server*** — TrendServer Pro is available with an OPC Server to make it easier to interface third party HMI software packages that support an OPC Client

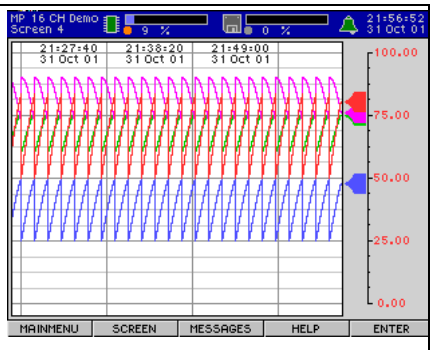
Standard Screens



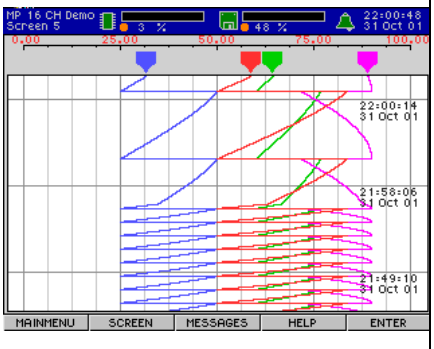
Horizontal Traces and Digital



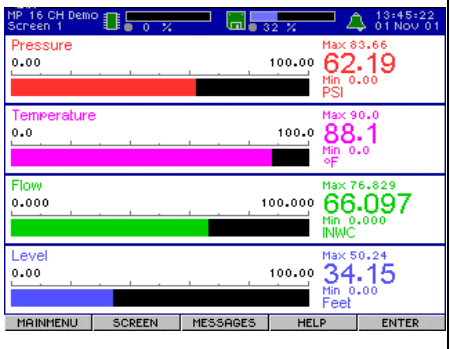
Vertical Traces and Digital



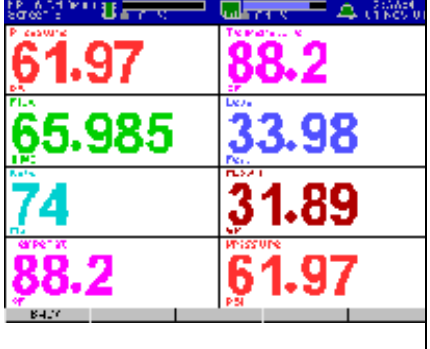
Horizontal Traces



Vertical Traces

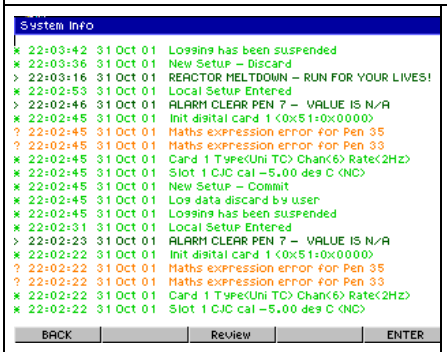


Bar Graphs

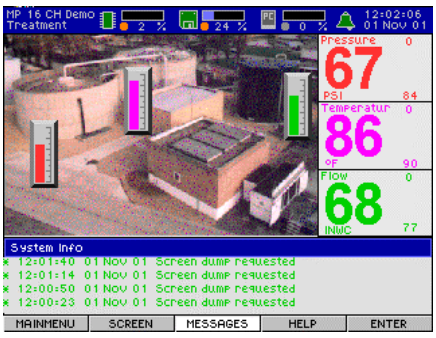


Digital Panel Meter

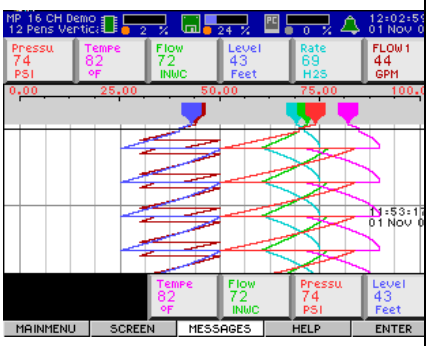
Standard Message Screen and Examples of Custom Screens Designed using Screen Designer



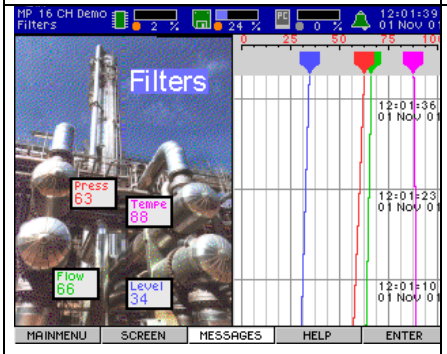
Standard Message Screen



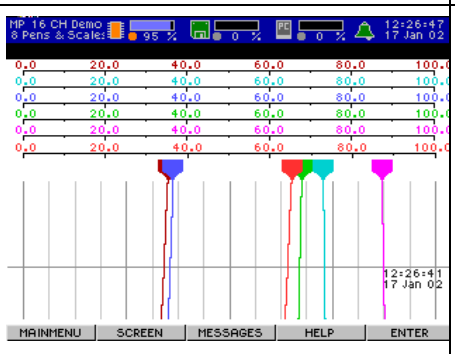
Water Treatment with Messages



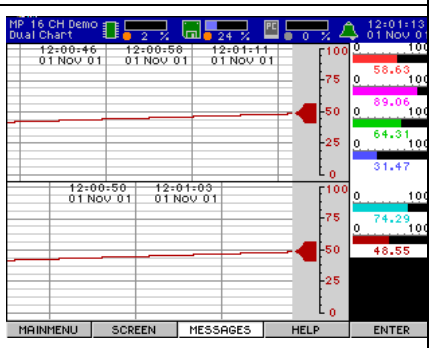
Custom Screen Digital & Trends



Custom screen - Filters



Custom screen – 6 Pens/Scales



Custom screen – Dual Charts

Specifications

Design Attributes	
Digital Indication & Display	*Display Type:* Color LCD (TFT) Industrial grade with brightness adjustment and wide viewing angle *Screen Size:* 5.5" diagonal *Resolution:* QVGA (320 x 240 pixels) *Screen Saver:* Set in minutes from 1 to 255 plus brightness adjustment Digital values displayed include alarms on bars, engineering units, pen name, events including tag, time & date, 20-character description & totalized values.
Display Update Rate	Display values updated every second.
Memory Status Display	A status bar, at the top of the recorder's screen, constantly displays real-time icons of memory % full and Disk % full. These percentages can be used and displayed by allocating a pen in a math expression.
Mimics & Custom Screens	Provides the ability to import custom built screens and/or bit maps from the Screen Designer software.
Other Display Contents	Fully programmable display values in engineering units. Time & date stamp on every division, current time & date. Independent user-definable display screens and groups can be used to show a combination of pens, events, alarm summary and totalizer. Plant diagrams and mimics can be generated and then integrated into the recorder display in conjunction with traditional chart, bar graph and digital displays.
	Horizontal: Thick or thin traces, with or without bar, max/min markers, major & minor divisions, time and date marked, name and description. *Vertical:* Thick or thin traces, with or without bar, max/min markers, major & minor divisions, time and date marked, name and description
Message screen	Displays system information and records any setup activity that has been changed. Provides warning and error message updates, lists alarm activity and places user defined marks on chart facility.

Analog Display Colors

Pen Number	Color	Pen Number	Color
Pen 1	Red	Pen 9	Dark Blue
Pen 2	Magenta	Pen 10	Blue/Green
Pen 3	Green	Pen 11	Khaki
Pen 4	Blue	Pen 12	Salmon
Pen 5	Cyan	Pen 13	Pink
Pen 6	Dark Red	Pen 14	Lime
Pen 7	Dark Purple	Pen 15	Light Blue
Pen 8	Dark Green	Pen 16	Turquoise

Data Storage

Removable Media: 3.5" 1.44Mbyte floppy and PCMCIA/Compact Flash card. Compact Flash is supported by an adaptor PCMCIA /Compact Flash Memory Card Interface.
Supports dual storage media – 1.44Mbyte floppy and PCMCIA/Compact Flash interface (requires extra pens for setting up dual data storage)

Internal Data Buffer: 4 or 8Mbyte battery backed up RAM data buffer, rechargeable battery designed to retain data approximately 3 weeks if fully charged

Setup and screens : Stored internally on EEPROM (8Mb board) or on RAM (4 Mb Board)

Manual Saving: Data saving by inserting external floppy disk or PC card memory

Data Saving Period: Related to log rate, number of pens, total events and alarms. Each pen is capable of its own independent storage rate.

Data Format: Honeywell binary encoded format

Recycling Mode: Internal memory has FIFO (First In First Out) capability where the newest data overwrites the oldest data.

Set for Sample Storage	Time				
Channels	1 Sec	10 Sec	30sec	1 Min	Media Type
2	4D 3H 23M	41D 7H 49M	123D 23H 27M	247D 22H 45M	1.44 MB
	287D 23H 38M	7Y 324D 19H	23Y 244D 8H	47Y 123D 7H	100MB PCMCIA
4	2D 1H 41M	20D 15H 54M	61D 23H 43M	123D 23H 22M	1.44 MB
	143D 23H 53M	3Y 344D 21H	11Y 304D 16H	23Y 244D 3H	100MB PCMCIA
8	1D 0H 49M	10D 7H 57M	30D 23H 51M	61D 23H 41M	1.44 MB
	71D 23H 55M	1Y 354D 22H	5Y 344D 20H	11Y 304D 13H	100MB PCMCIA
12	0D 16H 31M	6D 21H 18M	20D 15H 54M	41D 7H 47M	1.44 MB
	47D 23H 56M	1Y 114D 23H	3Y 34D 21H	7Y 324D 17H	100MB PCMCIA
16	0D 12H 23M	5D 3H 58M	15D 11H 55M	30D 23H 50M	1.44 MB
	35D 23H 57M	359D 23H 29M	2Y 349D 22H	5Y 334D 18H	100MB PCMCIA

Power Requirements

Voltage (VRMS): 90 Vac to 250 Vac (auto select). Frequency: 50/60 Hz
Power Consumption <50 VA. Optional instrument power *Voltage:* 12/24 Vdc +6 Vdc/-1 Vdc. *Power Consumption:* < 30 watts

Password Protection

Four levels of Password protection are provided – Engineer, Supervisor, Technician, and Operator. Password protection restricts user entry to the recorder set up and specific screens.

- Engineer – Highest access to all levels, Supervisor, Technician and Operator.
- Supervisor – 2nd highest level including Technician and Operator access
- Technician – 3rd level including Operator access
- Operator – 4th and lowest level of access.

Clock

Calendar function, daylight savings time adjustable manually or with communications
The time can be adjusted and synchronized using Ethernet scheduler
Tolerance: ±20ppm to a resolution of 1 second
Battery backed up, Lithium battery – 10 years life (powered)

Languages

English UK, English US, French, German, Italian, Portuguese (Brazilian), Spanish, Polish, Hungarian, Turkish, Romanian, Slovak and Czech.

Temperature units

°C, °F or K (Kelvin)

Recorder Identification

Recorder name, Screen name, Time and Date displayed at all times.

Alarm Set Points

Up to 64 integral "soft" alarm set points easily set by user to announce selected out of limit conditions.

Events List

Enabling the user to review events logged, activate date option, filter screen to display specific events e.g. alarm activity only. Reset option available.

Data Replay Mode

Data replay facility on chart displays at normal, fast or slow speeds. Data is replayed from the buffer with the buffered time available for replay dependant on chart speed.

Batch Mode

Batch control markers can be entered via the recorder, by the web page or automatically using Events in TrendManager/Server Pro to create batches of data. Batch data can be viewed, graphed and exported to a spreadsheet. Barcodes or external keyboard inputs may be integrated in the Batch control markers.

Chart Speeds	1 mm/hour, 5 mm/hour, 10 mm/hour, 20 mm/hour , 30 mm/hour, 60 mm/hour, 120 mm/hour, 600 mm/hour, 1200 mm/hour, 6000 mm/hour, 12000 mm/hour Chart speeds can be set independently for each chart and is independent of logging rate
CE Conformity *Immunity* *Product Classification* *Enclosure Rating* *Installation Category (Over-voltage Category)* *Emissions* *EMC Classification* *Safety* *Disturbances*	This product conforms with the protection requirements of the following European Council Directives: **73/23/EEC**, the Low Voltage Directive, and **89/336/EEC**, the EMC Directive. Conformity of this product with any other "CE Mark" Directive(s) shall not be assumed. Complies with EN61326 Class I: Cord Connected, Panel Mounted Industrial Control Equipment with protective earthing (grounding). (EN 61010-1) Front panel designed to IP 54 (Optional Splash proof cover, designed to IP65) Category II: (EN 61010-1) Complies with EN50081-1 (Ref. IEC 664-1) Group 1,Class A, ISM Equipment (EN 55011, emissions), Industrial Equipment (EN 61326, immunity) Complies with EN61010-1: 1993. Panel Mounted Equipment, Terminals must be enclosed within the panel. Complies with EN605555-2, EN60555-3
Seismic Qualification	Complies with IEEE 344-75 (optional)

Analog Inputs		
Number of Inputs	4, 6, 8, 12 or 16 input channels	
Input Types	EMF (mV, V, mA) Thermocouple, RTD	
PT100/200Ω RTD Inputs **Ni 100/120Ω RTD Inputs** **Cu 10/Cu 53**	The universal input card will access and work with all RTD, T/C and Linear input signals. The Fast Scan Input card does not accept Cu 10/CU53 Inputs and if set to RTD or T/C ranges the scan rate is 200ms or 500ms	
Minimum Input Span	Range is fully configurable with span limitation of the operating range selected with 4% under range to 4% over range capability	
Input Resolution	0.0015 % (16 Bit ADC)	
Input Impedance	Current loop resistance dc: 10 ohms ±5%, all other: >1 MΩ	
Source Impedance	*RTD:* 40 ohms per lead maximum, 0.1 °C/Ω, T/C 1000• max., 0.5˚C/100•	
Square Root Extraction	Available as standard on every input type	
Input Sampling Rate	Recorder has 2 available slots of 8 analog inputs each, the input sampling rate is dependent on actuation type. For 20ms sampling all inputs for that slot must be set to linear inputs (mV, mA. V) (20msec scanning must be selected as the Fast Scanning option)	
	Linear only (Fast Scan Card)	20 ms (50 Hz) (one slot - 8 inputs max), 200 ms (5 Hz), 500 ms (2 Hz)
	Thermocouple/RTD	200 ms (5 Hz), 500 ms (2 Hz)
	Universal Card	500 ms (2 Hz)
Input Filter	Single Low pass filter software adjustable from 1 to 15 seconds	
Linear Scales	-999999 to 999999, scale factor of 1 to 9999 Decimal Point automatic or programmable Engineering units, user definable (10 characters) First channel in Screen Layout determines the display chart scale	
Logarithmic scales	1 to 9 decades	
Input Isolation	Fast Scan Card - 100 Vdc channel-to-channel, channel-to-ground Universal Card – 400 Vdc channel-to-channel, channel-to-ground	
Noise Rejection	Universal Card – Series mode > 60db, Common mode > 130db @ 120Vac	
Input Sampling Method	*Method:* Sample, Average, Min-Max	
Dielectric Strength	*Power supply to ground terminal:* 1350 Vac (50/60 Hz), < 1minute	
Insulation Resistance	>9.9 MΩ Each terminal to ground terminal	

Performance

Accuracy – Fast Scannning Card

Input Actuation (Linear)	Range	Accuracy	Temp. Stability ±
Millivolts dc	-100 to 100	+-0.1%	0.01%/˚C
	-200 to 200	+-0.1%	0.01%/˚C
Volts dc	-1.0 to 1.0	+-0.1%	0.01%/˚C
	-10 to 10	+-0.1%	0.01%/˚C
Milliamps **	-10 to 10	+-0.2%	0.01%/˚C
	-20 to 20	+-0.2%	0.01%/˚C

Input Actuation (Thermocouples)	Range		Ref. Accuracy *		Temp. Stability ± Degrees Error Per 1 Degree ΔT
	°F	°C	± °F	± °C	
C(W5)	**32 to 4172**	**0 to 2300**	10.35	5.75	0.06%/˚C
E	**-328 to 1832**	**-200 to 1000**			0.06%/˚C
	-328 to 32	-200 to 0	10.8	6	
	32 to 1832	0 to 1000	5.4	3	
J	**-328 to 2174**	**-200 to 1190**			
	-328 to 32	-200 to 0	8	4.5	0.03%/˚C
	32 to 2174	0 to 1190	4	2.3	0.03%/˚C
K	**-328 to 2462**	**-200 to 1350**			
	-328 to 32	-200 to 0	9	5	0.03%/˚C
	32 to 1832	0 to 1000	4.5	2.5	0.03%/˚C
	1832 to 2462	1000 to 1350	5.4	3	0.03%/˚C
L	**-328 to 1652**	**-200 to 900**	5	2.75	0.03%/˚C
N (Nicrosil Nisil)	**-328 to 2372**	**-200 to 1300**			
	-328 to 32	-200 to 0	2.7	1.5	0.05%/˚C
	32 to 2732	0 to 1300	2.7	1.5	0.04%/˚C
T	**-328 to 752**	**-200 to 400**			
	-328 to 32	-200 to 0	8	4.5	0.08%/˚C
	32 to 752	0 to 400	3.6	2	0.08%/˚C
W	1832 to 4172	1000 to 2300	5.9	3.25	0.15%/˚C
Nickel/Cobalt	-58 to 2372	-50 to 1300	1.8	1	0.05%/˚C
Chromel/Copel	-58 to 1112	-50 to 600	3.6	2	0.05%/˚C

Input Actuation (RTD's)	°F	°C	± °F	± °C	
PT100 100 ohms (To BS1904)	-328 to 1202	-200 to 650	3.1	1.7	0.05%/˚C
PT200 200 ohms	-328 to 356	-200 to 180	7.2	4	0.05%/˚C
100 ohm Nickel	-76 to 356	-60 to 180	2.7	1.5	0.05%/˚C
120 ohm Nickel	-112 to 464	-80 to 240	3.2	1.75	0.05%/˚C

Reference Temperature	20°C	Reference Sample Rate:	2 Hz (500msec)
Reference Humidity	65% RH ±15%	CJC Temperature Effect:	±0.05°C/°C
Long term stability:	0.2%/year		

* Does not includes reference junction calibration of ±2.0 º C using the standard "ice bath" method of calibration. Factory accuracy can be improved by performing a field calibration.
** Tolerance for these input types includes that of the external dropping resistors

Performance

Accuracy – Universal Input Card

Input Actuation (Linear)	Range	Accuracy	Temp. Stability ±
Millivolts dc	-100 to 100	+-0.1%	0.01%/˚C
	-500 to 500	+-0.1%	0.01%/˚C
Volts dc	-1.0 to 1.0	+-0.1%	0.01%/˚C
	-10 to 10	+-0.1%	0.01%/˚C
Milliamps **	4 to 20	+-0.2%	0.01%/˚C
	0 to 20	+-0.2%	0.01%/˚C

Input Actuation (Thermocouples)	Range		Ref. Accuracy *		Temp. Stability ± Degrees Error Per 1 Degree ΔT
	°F	°C	± °F	± °C	
B	212 to 500	100 to 260	30	16.7	0.13%/˚C
	500 to 1000	260 to 538	8	4.5	
	1000 to 3300	538 to 1820	4	2.3	
C(W5)	32 to 600	0 to 316	3.5	2	0.06%/˚C
	600 to 3600	316 to 1982	3	1.7	
	3600 to 4172	1982 to 2300	3.5	2	
E	-328 to -202	-200 to -130	25	14	0.06%/˚C
	-202 to 1832	-130 to 1000	2.3	1.3	
J	0 to 1600	-18 to 871	1.2	0.6	0.03%/˚C
K	0 to 2400	-18 to 1316	2	1.2	0.03%/˚C
L	-328 to 1652	-200 to 900	5	2.75	0.03%/˚C
N (Nicrosil Nisil)	0 to 2372	-18 to 1300	2	1.2	0.05%/˚C
R	0 to 500	-18 to 260	5	2.8	0.1%/˚C
	500 to 3100	260 to 1704	2.2	1.2	0.1%/˚C
S	0 to 500	-18 to 260	5	2.8	0.1%/˚C
	500 to 3100	260 to 1704	2.2	1.2	0.1%/˚C
T	-300 to 700	-184 to 371	2	1.2	0.08%/˚C
W_W_{26}	1832 to 4172	1000 to 2300	3.5	2	0.06%/˚C
Nickel/Cobalt	-58 to 2480	-50 to 1360	2.4	1.4	0.05%/˚C
Chromel/Copel	-58 to 1110	-50 to 600	3.2	1.8	0.05%/˚C

Input Actuation (RTD's)	°F	°C	± °F	± °C	
PT100 100 ohms IEC α=0.00385	-300 to 1200	-184 to 649	1.4	0.8	0.05%/˚C
PT200 200 ohms	-300 to 1200	-184 to 649	1.4	0.8	0.05%/˚C
100 ohm Nickel	-76 to 356	-60 to 180	4.5	2.5	0.05%/˚C
120 ohm Nickel	-112 to 464	-80 to 240	4.5	2.5	0.05%/˚C
Cu 10	-4 to 482	-20 to 250	2.5	1.4	0.05%/˚C
Cu 53	32 to 302	0 to 150	1.7	0.8	0.05%/˚C

Reference Temperature	20°C	Reference Sample Rate:	2 Hz (500msec)
Reference Humidity	65% RH ±15%	CJC Temperature Effect:	±0.05°C/°C
Long term stability:	0.2%/year		

* Does not includes reference junction calibration of ±1.0 º C using the standard "ice bath" method of calibration. Factory accuracy can be improved by performing a field calibration.

** Tolerance for these input types includes that of the external dropping resistors

Logging	
Logging Method	Sample, Average, Min/Max
Logging Types	Continuous, Triggered by Events, Fuzzy
Logging Rates	From 20 msec. to 4 days per pen
Fuzzy Logging	A secure data storage technique which typically delivers data compression ratio of 100:1 or more; self teaching, storing the data at a variable rate to match the process
Physical Parameters	
Enclosure	*Case:* Mild steel, zinc plated and passivated *Bezel:* Aluminum, black polyester powder coat
Mounting (Panel)	Flush panel mounting on a vertical plane (± 25º from the horizontal) Mounting adjustable for panel thickness of 2 mm to 100 mm. Adapter kits available for covering existing panel cutouts.
Dimensions	W: 144 mm, H: 144 mm, D: 285 mm (Depth includes 40 mm recommended clearance for power cable and signal connectors as supplied). Cutout 138 x 138mm/5.43 x 5.43”
Weight	3.5 Kg max.
Color	*Bezel:* Black
Wiring Connections	IEC Power Plug. Removable terminal strip for input and alarm connections
Options	
Enclosure (optional)	Splash proof cover, designed to IP65
Alarm Outputs (optional)	An alarm signal is outputted from the rear panel, via a 24-way connector, as a relay contact signal. Programmable alarm set points can be configured to activate up to 16 outputs. *Update rate:* 200 ms for all alarms *Number/Type:* • 4 or 8 relay contacts SPDT, 3 A, 240 Vac/dc (non-inductive, internally suppressed) • 8 I/O or 16 I/O - 1 A 24 Vdc (non-inductive, internally suppressed) *Activation:* Fully programmable internal alarm levels. Freely assignable to any relay or discrete output.
Digital I/O (optional)	8 I/O or 16 I/O - all channels may be selected freely as digital inputs or outputs 8 relays outputs card : two outputs can be converted as inputs : A digital input is provided by a volt free contact between the normally open (NO) and the common (C) terminals of an output relay.
Custom Screens & Mimics (optional)	Provides the capability in the recorder to accept custom screen designs and bit maps from the Screen Designer software. Depending on the size of the screen designs, up to 10 screens can be loaded into the recorder memory.
Event Marker (optional)	User defined process events are recorded and can be set to cause particular recorder actions. Events can consist of recording start/stop, digital inputs, alarms, totalizing actions, timers, barcode, etc. Once an event has been caused it can produce a definable set of effects on the recorder which can include, mark on chart, relay outputs, recording control, counters, totalizing actions, triggering other event with a configurable delay. Each event marker can be recorded for analysis using the TrendManager Software Suite. Event Markers required when using the RS232 port to input bar codes or ASCII messages. Event markers can be used to automatically generate Batch commands.
Transmitter Power (optional)	200mA @ 24 Vdc ± 3 Vdc.
Communication boards (4 options)	- RS-485 supporting Trendbus Real time protocol only ; Trendbus is used in conjunction with TrendServer Pro - Ethernet 10 Base–T with RJ45 connector supporting Real time Trendbus, Modbus, FTP protocol, Internet, e-mail - Ethernet 10 Base –T with RJ45 connector/RS485 Trendbus/RS232 ASCII – Ethernet support Real time Trendbus, Modbus, FTP protocol, Internet, e-mail, RS232 supports bar code input (Event Marker option required to enter bar code messages) ; RS485 supports Trendbus protocol only ; Trendbus is used in conjunction with TrendServer Pro - RS485 (4-wire) supporting Modbus RTU protocol

Analog Outputs (Re-transmission) (optional)	2 or 4 re-transmission outputs available; each output is driven by a pen. Analog inputs, totalized values or any mathematical result can be re-transmitted. *Update Rate:* 200 msec all channels — *Accuracy:* ±0.25 % *Type:* 4 to 20 mA — *Maximum Load Resistance:* 500 *Resolution:* 0.0015% — *Isolation:* 300 Vdc
Totalizers (optional)	One totalizer per input. Totalizer value must be assigned to a pen for display and storage. Multiple totalizations are possible with the use on the extra pens (option). Reset may be manual or programmed (Event markers option necessary). Totalization values are ten digits plus exponent.
Sterilisation (optional)	Each pen can be totalized according to the Fo function at 250 °F (121°C). Total for completion, start temperature and z factor are adjustable.
Extended Security (optional)	Provides full support for 21 CFR Part 11. Includes features for entry of unique User ID's and associated passwords, timeout on inactivity (1 to 10 min.), password expiration (1 to 190 days), up to 20 users, password re-entry lock out for incorrect entry of password more than 3 times, no re-use of passwords (programmable 4 to 12 times), traceability by user name
Agency Approval	CE Mark Standard, CSA (Optional) Certificate Number L101284, UL (Optional) File # 201698
Math Algorithms (optional)	All analog input channels have a math expression block. This is a fully user programmable 250 character free form math expression for each pen. Math calculations available on all pens, with 8 extra pens (option 16 pens). Standard Math includes Add, Subtract, Multiply, and Divide.

Math Expressions

Math Functions (optional)			
Square	Square root	Modulus	Log
LN (natural log)	Lowest	Highest	Round
Reciprocal	Absolute	Totalized	Over
Under	Inside	Outside	SIN
COS	TAN	°F to °C	°C to °F
Rolling Average	Delay	Index Analog	Index Digitals
Index Relay Output	Evaluate	Exponential	Floor
Ceiling	Cold Junction Comp.	Counter Alarms	Counter Digital
Counter Events	Counter User	Root	Power
ACOS	ASIN	ATAN	SINH
COSH	TANH	ASINH	ACOSH
ATANH	AL (Alarm Status)		

TDC Vutronik Recorder Connector	Optional rear cover with 50-pin connector for direct connection of recorder. TDC2000/3000 system using Vutronik Trend Recorder, 24Vdc Instrument Power only.
Miscellaneous	Customer ID Tagging (3 lines of up to 22 characters each line)

Environmental and Operating Conditions

Parameter	**Reference**	**Rated**	**Extreme**	**Transport and storage**
Ambient Temperature	67 °F to 77 °F 19 °C to 25 °C	58 °F to 104 °F 15 °C to 40 °C	32 °F to 122 °F 0 °C to 50 °C 0 °C to 40 °C (Floppy)	–14 °F to 140 °F –10 °C to 60 °C
Relative Humidity (%RH)	50 to 65*	10 to 90*	5 to 90*	5 to 95*
Vibration				
Frequency (Hz)	0	0 to 70	0 to 100	0 to 100
Acceleration (g)	0	0.1	0.2	0.5
Mechanical Shock				
Acceleration (g)	0	1	5	20
Duration (ms)	0	30	30	30
Mounting Position from Vertical				
Tilted Forward	5°	20°	25°	Any
Tilted Backward	5°	20°	25°	Any
Tilted to Side (±)	5°	20°	25°	Any
Power Requirements				
Voltage (VRMS)	119 to 121	90 to 250	90 to 250	N/A
Frequency (Hz)	49.8 to 60.2	47 to 440	47 to 440	N/A
Power Consumption	50 VA maximum			
Warm Up	30 minutes minimum			

* The maximum rating only applies up to 104°F (40°C). For higher temperatures, the RH specification is de-rated to maintain constant moisture content.

Application Software – TrendManager Pro V5 Software Suite

TrendViewer software is available at no charge when ordering any recorder; it allows the user to view, graph and print data.

TrendManager Pro is a stand-alone package that delivers to the user total recorder configuration, simulates the recorder's performance on the PC, and archives, graphs, prints and exports data. Full data graphing, archiving and export tools are included.

Minimum System requirements for TrendViewer and TrendManager Pro:

- 200 MHz Pentium processor or higher
- 3.5" Floppy disk drive
- CD-ROM drive
- Monitor recommended screen resolution 800 x 600 minimum requirement, high color
- Windows 98SE, 2000, ME, XP, NT ver. 4.0 with Service pack 6, onwards
- 32 Mbyte of RAM (64 Mbyte recommended)
- 10 Mbyte free hard disk space
- A mouse

TrendServer Pro is a fully network aware package, which allows data viewing, archiving and communications. The recorder uses an RS485 network or can access them directly with the recorder's own Ethernet TCP/IP port. Standard kit includes data archive tools plus E-mail, graph, print import and export data facilities.

Minimum System requirements for TrendServer:

- 450 MHz Pentium processor or higher
- CD-ROM drive
- Monitor recommended screen resolution 1024 x 768 minimum requirement, high color
- 2 Gbyte Hard-drive free disk space
- Windows 98SE, 2000, ME, XP, NT ver. 4.0 with Service pack 6, onwards
- 64 Mbyte of RAM
- TCP IP installed
- A mouse

TrendServer Pro with OPC Server provides the same functions as the TrendServer Pro but includes the added function of an integrated OPC Server to allow easy interfacing to third party HMI software packages that support an OPC Client. This provides a real-time interface between servers and clients.

Screen Designer enables the customers to design unique display layouts for transfer to the recorder's screen. Screen layouts can be created using any combination of indicators such as trending Charts, Digital Panel Meters (DPM), Bar graphs, Bitmaps, Digital pictures and Plant diagrams. Flexibility allows each type of indicator to have elements of its appearance changed to create an individual presentation.

The ***Screen Designer*** software design package is compatible with ***Minitrend V5*** and ***Multitrend Plus V5*** recorders allowing layouts to be transferred on to single or multiple recorders. This contributes to continuity and standardization of process data.

Minimum System requirements for Screen Designer:

- 200 MHz Pentium processor or higher
- 3.5" Floppy disk drive
- CD-ROM drive
- Windows 98SE, 2000, ME, XP, NT ver. 4.0 with Service pack 6, onwards
- 32 Mbytes of RAM (64 Mbytes recommended)
- 16 bit color graphics (24 bit recommended)
- 10 Mbytes free hard disk space
- A mouse

Comparison of Features Supported by Each Application Software Package

Features	Trend Viewer	Trend Manager	Trend Server
Import data from disk ……	*	*	*
Graph data ……	*	*	*
Upgrades available via download (www.trendview.com) ……	*	*	*
Print graph data ……	*	*	*
Print recorder configurations ……	……	*	*
Full Configuration of any recorder on PC ……	……	*	*
Fuzzy logging ……	……	*	*
Events System ……	……	*	*
Archive data on secure databases ……	……	*	*
Export using CSV format ……	……	*	*
Batch Mode ……	……	*	*
Export using OPC links ……	……	……	*
Communicate with up to 256 recorders on RS485 ……	……	……	*
Communicate with recorders using Ethernet TCP/IP ……	……	……	*
Distribute recorder data over plant-wide LAN ……	……	……	*
FTP and Real time Ethernet connection ……	……	……	*
Password protection ……	……	……	*
Send setup to recorder via Ethernet ……	……	……	*
Audit trail manager ……	……	……	*
Web browse a recorder – web browser only required ……	……	……	*

Model Number Interpretation – For complete ordering information see Model Selection Guide 43-TV-16-01

T V M I - _ _ - _ _ - _ _ _ - _ _ _ - _ _ _ - _ _ _ _ _ _ - 0 0

Key number
Minitrend V5 Electronic Data Recorder

Table I - Analog Inputs

Number of Inputs

4	4 _
6	6 _
8	8 _
12	A _
16	B _

Input Type

Universal (T/C, RTD, mV, mA)	_ 0
Fast Scanning	_ F
Fast Scan (slot 1) & Universal (slot 2)	_ M

Table II - Discrete Inputs/Outputs & Analog Outputs

Discrete Inputs/Outputs

None	0 _
4 Relay Outputs	4 _
8 Relay Outputs/2 Digital Inputs	8 _
8 Discrete Inputs/OutputsA _	
16 Dicrete Inputs/Outputs	B _

Analog Outputs Type

None	_ 0
2 Analog Outputs (not available with 12 or 16 AI)	_ 2
4 Analog Outputs (not available with 12 or 16 AI)	_ 4

Table III - Firmware Options

Firmware

None	0 _ _
Math + 8 Extra Pens	M _
_	
Event Markers	E _ _
Math + Totalizers + 8 Extra Pens	C _ _
Math + Event Markers + 8 Extra Pen	G _ _
Math + Totalizers + Event Markers + 8 Extra Pens	A _ _
Math +Totalizers +Event Markers + 16 Extra Pens	P _ _

Screen Options

None	_ 0 _
Custom Screens	_ C _
Custom Screens w/8MB Ram Card *	_ E _
Mimics and Custom Screens*	_ M
_	
Screen Designer w/Mimics and Custom Screens *	_ S _

Security

Standard	_ _ 0
Extended System Security *	_ _ S

Table IV - Communications

Communication Protocol

None	0 _ _
RS485 (Real time Trendbus)	T _ _
Ethernet (Real time Trendbus, Web, FTP, E-mail)	E _ _
Ethernet/RS232/485 (Real time Trendbus, Modbus TCP, Web, FTP, RS232, Barcode)	A _ _
RS485 Modbus RTU Protocol	M _ _

Instrument Power

90 - 240 Vac c/w IEC Power Plug	_ 0 _
90 - 240 Vac c/w US Power Cord	_ B _
12/24 Vdc	_ 2 _

Transmitter Power

None	_ _ 0
Transmitter Power	_ _ P

Table V - Data Storage/Memory Card

Data Storage

None	0 _ _
1.44 Mbyte floppy	F _ _

Memory Card Interface

PCMCIA slot	_ 1 _

No Selection

None	_ _ 0

Table VI - Options

Case/Mounting

Standard Panel Mounting	0 _ _ _ _ _
IP65 cover (designed to)	C _ _ _ _ _
Portable Case	P _ _ _ _ _
Vutronik Trend Recorder Connection	V _ _ _ _ _

Documentation

English	_ U _ _ _ _
French	_ F _ _ _ _
German	_ G _ _ _ _
Italian	_ I _ _ _ _
Spanish	_ S _ _ _ _
Documentation on CD	_ O _ _ _ _

Tagging

None	_ _ 0 _ _ _
Linen Tag	_ _ L _ _ _
Stainless Steel Tag	_ _ S _ _ _

Approvals

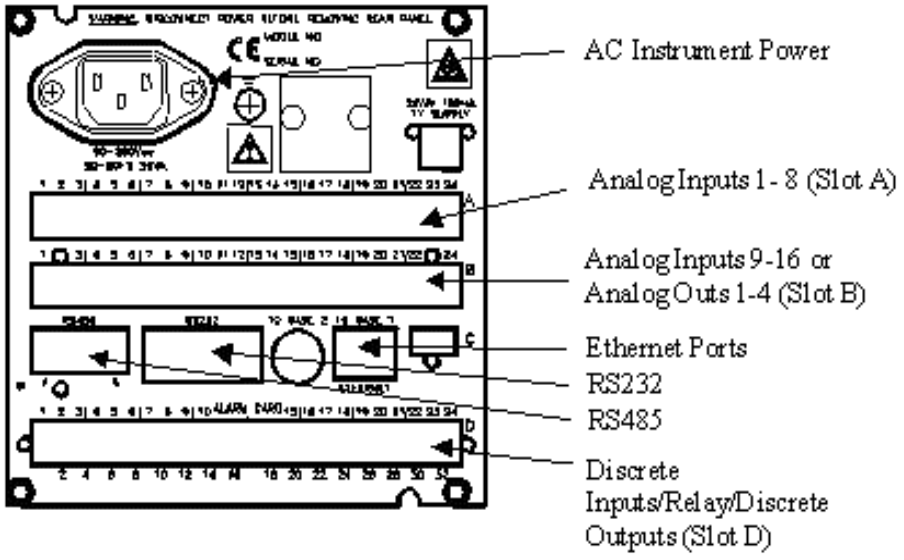
None	_ _ _ 0 _ _
CSA Approval	_ _ _ C _ _
UL Listed	_ _ _ U _ _
UL & CSA Approval	_ _ _ B _ _

Certifications

None	_ _ _ _ 0 _
Certificate of Conformance (F3391)	_ _ _ _ B _
Custom Calibration Test Report	_ _ _ _ C _
Cert. of Conformance & Calib. Test Report	_ _ _ _ E _
Validation Manual	_ _ _ _ V _
Validation Manual c/w Cert. of Conf & Calib Test	_ _ _ _ W _

Software

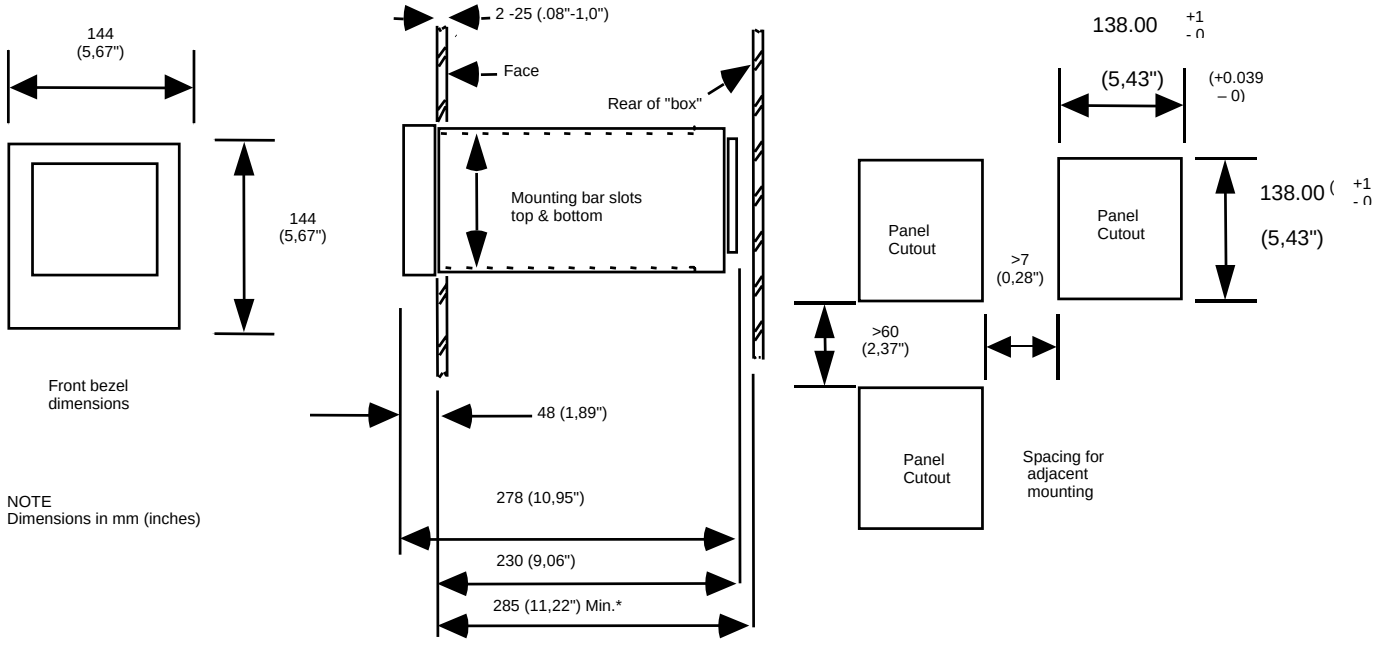
None	_ _ _ _ _ 0
TrendManager Pro	_ _ _ _ _ P
TrendServer Pro (Single User License)	_ _ _ _ _ S
TrendServer Pro w/OPC (Single User License)	_ _ _ _ _ T



90 – 250 V ac Rear Panel AC power is connected via the standard configuration IEC chassis plug on the rear panel

Minitrend Recorder Back panel Layout

Minitrend Recorder Dimension Layout



NOTE
Dimensions in mm (inches)

* Angle Power Plug dependent
For straight plug allow additional 30mm min.

Sales and Service

For application assistance, current specifications, pricing, or name of the nearest Authorized Distributor, contact one of the offices below.

Warranty/Remedy

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Contact your local sales office for warranty information. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace without charge those items it finds defective. ***The foregoing is Buyer's sole remedy and is in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose.*** Specifications may change without notice. The information we supply is believed to be accurate and reliable as of printing. However, we assume no responsibility for its use. While we provide application assistance personally, through our literature and the Honeywell website, it is up to the customer to determine the suitability of the product in the application.

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