

DataChart®

PAPERLESS RECORDING SYSTEMS



MONARCH INSTRUMENT

Innovation in Instrumentation

Paperless Recording Systems

Industry demands a higher level of reliability, better efficiency, more flexibility and lower costs. These industry requirements were kept clearly in focus when we designed our fourth generation of Paperless Recording Systems:

The Data-Chart 2000 Series



Because your data is so important Data Chart recorders were designed to be ultra-reliable. We chose the finest components available and combined them with a robust modular mechanical structure. Our optimized design means fewer components are needed. Fewer components means fewer failures.

Up to 2 Megabytes of non-volatile memory keeps your data safe. You will never lose recorded data, even during a power outage. Data is downloaded automatically to your choice of removable media: 3.5" 1.44 Meg disk or CompactFlash™ card (up to 128 MEG in size).

Time is Money! Corporate downsizing and cost cutting leaves you with less time to accomplish your goals. Data-Chart recorders are virtually maintenance free. No paper or pens to replace, no mechanical parts to wear out and because they are digital instruments, they requires less time to calibrate. This allows you to use your time more efficiently.

We're Flexible. Data Chart recorders are unparalleled in providing the highest level of flexibility of any paperless recorder made in the world. Universal inputs, networking capability, powerful math packages and a multitude of display choices allow you to display, record and communicate your data the way you want.

Display Modes

You can choose from more than 20 different display modes including trends, bargraphs and digital indicators. Select pen colors, background colors and much more. You can configure the DC2000 the way you want it!

Simple Setup

Our intuitive touchscreen control makes configuring the DC2000 a breeze. We make full use of our screen with a large, easy to follow menu system.



Outstanding Viewability

The DC2000 has a brilliant 5.6" TFT active matrix color LCD display which is the largest of any 144mm square recorder. We've even added a special anti-glare coating to optimize viewability under any conditions.

Ordering Information

Display

C	TFT Active Matrix Display
M	Monochrome Display

Power

1	90-127, 194-264 Vac
2	18-30 Vdc
1st	90-264 Vac w/screw terminal connectors

Isolated Input Modules

Module	Channels	Description
U2	2	Universal DC V/I T/C and RTD
U4	4	Universal DC V/I T/C and RTD
U6	6	Universal DC V/I T/C and RTD
U12	12	Universal DC V/I T/C and RTD

Data Storage-Removable

0	3.5" Disk Drive
1	Compact Flash Card Drive

Output Options

0	No Alarm Outputs
1	6 Form C Relays 3A@250 Vac, 3Ctrl Inputs
2	3 Form C Relays 3A@250 Vac, 3Ctrl Inputs
3	6 SS Relays 0.5A@30Vdc, 3Ctrl Inputs
4	3 SS Relays 0.5A@30Vdc, 3Ctrl Inputs

Communications

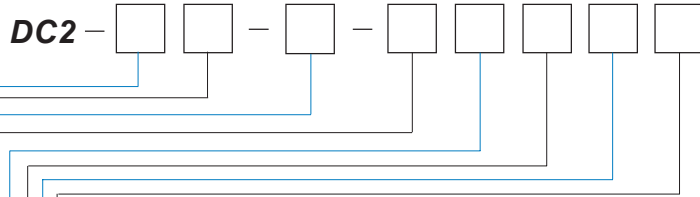
0	None
1	RS485 / RS232 - Isolated
2	Ethernet - 10BaseT

Data Storage - Internal

0	1 Mbyte
1	2 Mbyte

Printer Port

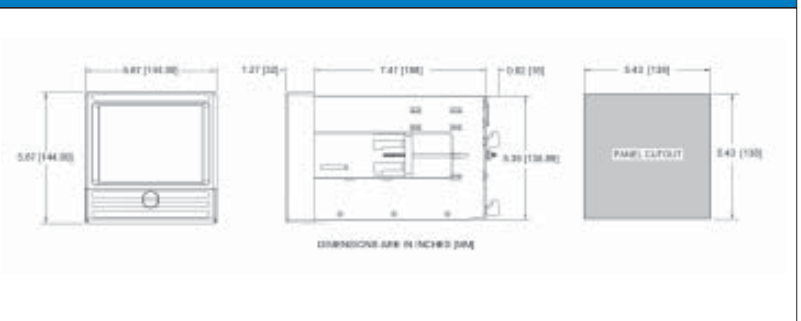
0	None
1	Parallel Printer Port (25 Pin D Shell)



Accessories

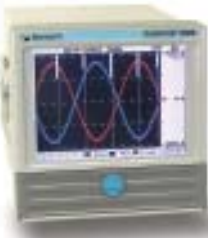
50 ohm precision external shunt resistor for current inputs (+/-0.05%).	MAS50R	
External USB port card reader. Includes cable and SW-3T Software.	CR-3	
Companion Software for Windows 95, 98, NT, XP and 2000.	SW-3T	
Guardian Software for Windows 95, 98, NT, XP and 2000.	GUARDIAN	
Portable maintenance kit. Includes folding legs and carry handle. (factory installed)	PMK-1	
Nylon padded carrying case with shoulder strap. Will hold recorder, power cable and diskettes.	CC-8	
32MB, 64MB or 128MB Industrial Grade CompactFlash™ memory cards.	32MBCF 64MBCF 128MBCF	
DIN rail mount pulse conversion module converts 5 volt TTL or 3-12 volt pulse signals into a linear 0-10 volt proportional signal.	P1-EXT	
The ROS-5W (Remote Optical Sensor) generates a TTL pulse that can be directly input into the P1-EXT module.	ROS-5P	

DC-2000 Installation Dimensions



Example Model Numbers:

DC - 2C1 - U4 - 11200
DC - 2M1 - U12 - 00000



Data Storage vs. Time Guide

Record Rate	1 Channel		2 Channels		4 Channels		6 Channels	
	3.5" disk 1.44 Mb	CompactFlash™ 64 Mb	3.5" disk 1.44 Mb	CompactFlash™ 64 Mb	3.5" disk 1.44 Mb	CompactFlash™ 64 Mb	3.5" disk 1.44 Mb	CompactFlash™ 64 Mb
8/Sec.	24 hours	44 days	12 hours	22 days	6 hours	11 days	4 hours	7.4 days
4/Sec.	48 hours	88.8 days	24 hours	44 days	12 hours	22 days	8 hours	14.8 days
1 Sec.	8.4 days	373 days	4.2 days	186 days	2.1 days	93 days	1.4 days	62 days
10 Sec.	84 days	10.2 years	42 days	5.1 years	21 days	2.5 years	14 days	1.7 years
60 Sec.	504 days	61 years	252 days	30.6 years	126 days	15.3 years	84 days	10 years
10 Min.	13.8 yrs.	612 yrs.	6.9 yrs.	306 yrs.	3.4 yrs.	150 yrs.	2.3 yrs.	102 yrs.

Specifications

Operating

Input Signals

DC Voltage: Linear, Industrial square root, logarithmic
+/- 150mV, +/-1.25V, +/- 2.5V **Accuracy:** 0.06%
+/- 12.5V and +/- 25V **Accuracy:** 0.1%

DC Current: 4-20mA, 0 to 20mA and
10 to 50 mA. **Accuracy:** 0.15% using external 50 ohm
0.1% shunt.

Dry Contact: Open = 0, Closed = 1

External: Signals can be input via serial port (Modbus).

Thermocouple:

Type	Accuracy
J*	0.1%
K**	0.1%
T**	0.2%
E**	0.11%
R	0.16%
S	0.17%
B	0.22%
C	0.13%
N**	0.10%

Resolution: 0.1°C, CJR accuracy: 0.5°C (0 of 50°C)
Thermocouple burnout detection.

Type	Temp Range (°C)	Temp Range (°F)	Accuracy (°C)	Accuracy (°F)
J	-101 to 1200°C	-150 to 2190°F	+/-1.5°C	+/-3.0°F
K	-101 to 1372°C	-150 to 2500°F	+/-1.5°C	+/-3.0°F
T	-101 to 400°C	-150 to 750°F	+/-1.5°C	+/-3.0°F
E	-101 to 1000°C	-150 to 1832°F	+/-1.5°C	+/-3.0°F
R	-50 to 1768°C	-58 to 3200°F	+/-3.0°C	+/-6.0°F
S	-50 to 1768°C	-58 to 3200°F	+/-3.0°C	+/-6.0°F
B	0 to 1820°C	32 to 3300°F	+/-4.0°C	+/-7.0°F
C	0 to 2400°C	32 to 4350°F	+/-3.0°C	+/-6.0°F
N	-101 to 1300°C	-150 to 2372°F	+/-1.5°C	+/-3.0°F
	* (+/-2.5°C -210 to -100°C) **(+/-2.5°C -270 to -100°C)			

RTD: Base accuracy 0.2% or 0.5°C (1°F). Resolution 0.1°C
2 or 3 wire connection. Cable compensation to +/- 50 ohm
open and short circuit detection.

RTD Type	Temp Range (°C)	Temp Range (°F)
10 ohm Cu	-70 to 170°C	-94 to 338°F
100 ohm Pt 385	-220 to 850°C	-364 to 1560°F
100 ohm Pt 392	-180 to 820°C	-292 to 1500°F
200 ohm Pt 385	-220 to 400°C	-364 to 750°F
200 ohm Pt 392	-180 to 400°C	-292 to 750°F
120 ohm Ni	-70 to 300°C	-94 to 570°F
1000 ohm Ni	-60 to 209°C	-76 to 408°F
	(DIN 43760)	

Input Resolution

0.0015% of full scale, 16 bit unless otherwise stated

Input Impedance

> 10 Meg on 150mV, 1.25V and 2.5V ranges, >100 K on 5, 12.5, 25 Volt ranges.

Input Channels

2, 4, 6 or 12 direct

Max Input

50 Vdc

CMNR

>100db, 50/60 Hz

Measurement Rate

Measures all direct input channels every 125 milliseconds (each channel 8 times/second independent of no. of channels).

Math Functions

+, -, x, /, logarithms, totalization, powers, averages, timers, and custom equations.

EMC Compliance

Meets or exceeds the requirements of EMC 89/336/EEC

Recording

Recording Rates

Selectable from 8/sec. to 10 minutes

Data Format

Proprietary binary format for data security.

Data Storage

Data stored in non-volatile RAM and recorded automatically, or on demand, to on board removable media.

Full media format and verify capability.

Removable	Media	Measurements	Capacity
	3.5" Disk	700,000	1.44Mb
	Flash Card	31 million	128Mb

Internal

1 Mb RAM (Non-Volatile)
2 Mb RAM (Non-Volatile)

File Types

Data files, Alarm and Event files, Configuration files, Language files.
Multiple files of different names on a single disk.

Display

Display Type Color

CCFL backlit Active Matrix TFT Liquid Crystal Display (5.6 inch) with touchscreen control.

Resolution

320 x 240 pixels.

Display Type Mono

CCFL backlit STN Liquid Crystal Display (5.0 inch) with touchscreen control.

Resolution

240 x 128 pixels.

Display Modes

Graphics (Trending vertical or horizontal), Bar Graphs (vertical or horizontal), Digital Meters, Alphanumeric Alarm and Event
Data or combinations on a split screen. Review trended data. Search by time, date or signal value.

Virtual Chart Speed

Programmable from 0.5in/hr to 600in/hr or 10mm.hr to 15,000mm/hr. Chart speed is independent of storage rate.

Display Windows

Time/Date, Graphics (Bars, Large Digital, Trends), Disk Status, Systems Status, Menu Button Bar, Unit Identification,
Alarms/Events.

Power Requirements

100 to 240Vac, 50/60Hz or 125 to 300Vdc, 35VA max.

Optional 24Vdc +/-15%.

Power Fail Protection

Programmed parameters stored in non-volatile memory. Clock battery backed. Data retention time without power
>12 months. Chart and alarm browse buffers stored in non-volatile memory.

Safety

UL (3111-1) cUL (IEC1010-1) CE low voltage directive 73/23/EEC. Complies with EN 61010-1.

Operating Environment

Temperature

5°C to 40°C per UL3111-1/IEC1010-1 with disk drive. -10°C to 50°C with CompactFlash™ Drive

Humidity

10% to 80% RH per UL3111-1/IEC1010-1.

Wash Down

IP65 Front panel only.

Options

Alarm Contacts

3 or 6 isolated Form C, 3 amp @ 125Vac or 30 Vdc.

Solid State Relays

3 or 6, 0.5 amp @ 30Vdc.

Remote Inputs

3 isolated inputs, user selectable as dry contact or 5 to 12 Vdc (mech. relay), 12 to 24 Vdc (SS relay) activated.. Inputs
share a common. Configurable for chart control, alarm acknowledge/reset, event markers, totalizer reset or logic input.

Communications

ESD protected RS232 with full hand shaking. Supports modem or isolated RS485 port.

Protocol: MODBUS RTU, MODBUS ASCII or serial printer port. Ethernet: 10BaseT. Unit may be remotely configured.

Printer Port

Parallel printer port (25 pin D shell connector).

DATA-CHART® 1200 SERIES

Specifications

GENERAL

No. of Channels: 1 or 2
Overall Accuracy: 0.5% of span, 8 bits resolution.
Time: Internal battery backed clock tracks year, month, day, hours, minutes, seconds.
Memory: Internal data buffer of 24k RAM, enables memory card to be removed without loss of data. Data storage direct to memory card.
Memory Card: PCMCIA 2.0 Compatible. Available in 512k to 1Meg sizes.
Unit automatically detects card size. Multiple files per memory card. User can replay all files on card.
Non Volatile Memory: All settings are stored in non-volatile memory. Unit remembers setup even if all power is removed.

RECORDING

Sample Rate: User selectable to 100 samples/sec. (10msec).
Recording Method: User selectable - Average, Peak, Valley, All points.
Recording Time: Up to 512,000 x recording interval (at 8 bits). Equivalent to 100+ hours at 1 sample/sec. (512 Kbyte Memory Card).

INPUT

Input Types: DC V/I, AC V/I, RTD's, T/C's by plug in card selection.
Input Display: 4-digit (-999 to 9999) plus 3 characters for eng. units.
Input Scaling: $y = MX + B$, linearization for T/C and RTD standard
External Input: Optional. May be used to stop and start recording or change sample rate. Can be tied to relay output. TTL compatible. Maximum input is 12Vdc. Works with dry contact input. Reset delay to 255 secs.

ALARMS

Alarm Types: 4 alarms standard, high or low, latching or non latching, tied to internal buzzer or optional relay outputs. May be assigned to either channel or both. May be used to

DISPLAY

Display Type: Twisted Nematic LCD Dot Matrix panel 180x60 pixels, Viewing area; 2.9" x 1.5" back lighting standard. Graph direction: right to left. Vertical Zoom Scroll.
Viewing Modes: Normal, Zoom, Compressed. Viewing Control: Real Time Data, Historic Data, Rewind, Forward, Search, Cursor i.d.

OUTPUTS

Relays: Optional 2 user programmable alarms (high or low, latching or not). SPDT relays rated at 3A.
Serial Port: Optional RS-232C option.

POWER

Input Power: 115Vac or 230Vac 50/60Hz (solder jumper to change), optional 12 to 24Vdc. (1.5W with no relays and backlight off, 3W maximum).

MISCELLANEOUS

Dimensions: 1/4 DIN panel mount 3.78"H x 3.78"W x 5.5"D (96 x 96 x 140mm), extruded aluminum body.
Panel Cutout: 3.62" x 3.62" (91.6 x 91.6mm). Mounting bars supplied.
Operating Temp: 14 to 120°F (-10 to 50°C)
Weight: approximately 2.5 lbs (1.4 kg).

ACCESSORIES

Card Reader: Allows data cards to be read into IBM compatible PC.
Software: Supplied at no charge with card reader. Professional graphics package enables data to be archived on disk displayed and analyzed on screen, exported to spreadsheets or word processors. Multiple graphs can be displayed on one screen. Output to printer.

DATA-CHART®

Companion and Guardian Software

Companion Software is a powerful and intuitive Windows based application that allows you to monitor real time data or review previously recorded data in graphic or tabular format, search files for specific events, link alarm and event files to trended data, print graphic or tabular files and export files to spreadsheet applications such as Excel.

Recorder configurations are easily generated using Companion Software and can be downloaded to your recorders storage media and transferred to the recorder or transferred directly over ethernet or serial line communications. Monitor, configure and control up to 32 units with the RS485 Modbus option or control from remote locations using a modem connection. Whatever the application, Companion Software puts you in complete control.

Guardian Software allows you to create a complete single station data supervisory and storage system. If you need to monitor data in real time or if you require redundant data storage to a PC, Guardian Software is the solution.

Multiple Data-Chart 2000's can be placed on a standard ethernet or Modbus network along with your other plant instruments and monitored in real time. In addition, data can be stored on your local PC greatly improving data management and security!



Minimum System Requirements: IBM Compatible PC running Windows 98 or higher.

DATA-CHART® 1200 SERIES

Ordering Information

DC - 1 **0**

Channel A

Channel B

No. of Channels	
1	One
2	Two

Power	
0	115 Vac with terminal block
3	12 to 24 VDC
4	115 Vac with integral power cable
5	230 Vac with integral power cable

Sensors	
Special Purpose Input	
A	Temp/Humidity Sensor Part No. NS2 Includes sensor with 8 foot cable and dual channel module. 0°C to 50°C, 10 to 90% RH range.
B	Remote Optical Sensor Part No. ROS-5P Includes LED sensor 8 foot cable and mounting bracket.

Card Reader	
Card Reader	Part No. CR-1

Input Channel Options			
DC VOLTAGE & CURRENT			
	Non Isolated	Isolated	
Input Signals	Part No.	Part No.	Notes
0-100 mV DC	ND0	ID0	
0-1 VDC	ND1	ID1	
0-5 VDC	ND2	ID2	
0-10 VDC	ND3	ID3	
0-100 VDC	ND4	ID4	
0-1 mA DC	NI0	II0	100 ohm impedance
0-100 mA DC	NI1	II1	1 ohm impedance
0-1000 ma DC	NI2	II2	0.1 ohm impedance
+/- 50 mV DC	N/A	IB0	
+/- 1 mA DC	N/A	IB1	
+/- 2 VDC	N/A	IB2	
+/- 10 VDC	N/A	IB3	
+/- 15 VDC	N/A	IB4	
PROCESS INPUTS			
	Non Isolated	Isolated	
Input Signals	Part No.	Part No.	Notes
1-5 VDC	NP0	IP0	
4-20 mA DC	NP1	IP1	250 ohm impedance
AC VOLTAGE & CURRENT			
	Non Isolated	Isolated	
Input Signals	Part No.	Part No.	Notes
0-1 VAC	N/A	IA1	
0-260 VAC	N/A	IA2	
0-600 VAC	N/A	IA5	
0-1 amp AC	N/A	IA7	0.2 ohm impedance
0-5 amp AC	N/A	IA9	0.025 ohm impedance
TEMPERATURE			
	Non Isolated	Isolated	
Input Signals	Part No.	Part No.	Temp Range C/F
T/C Type J	NJ0	IJ0	0°C to 480°C/32°F to 900°F
T/C Type J	NJ1	IJ1	-200°C to 760°C/-300°F to 1400°F
T/C Type J	NJ2	IJ2	-60°C to 120°C/-75°F to 250°F
T/C Type K	NK0	IK0	0°C to 720°C/32°F to 1320°F
T/C Type K	NK1	IK1	-120°C to 1080°C/-185°F to 1975°F
T/C Type T	NT0	IT0	-80°C to 400°C/-110°F to 750°F
T/C Type E	NE0	IE0	0°C to 960°C/32°F to 1760°F
RTD 100 ohm plt.	NR1	IR1	0°C to 400°C/32°F to 750°F
RTD 100 ohm plt.	NR2	IR2	0°C to 120°C/32°F to 250°F
RPM/FREQUENCY/TIME			
		Part No.	Range
Input Signals			
5V - TTL or 3V to 12V		IRP	5 to 75,000 RPM / 0 to 2,500 Hz
5V - TTL or 3V to 12V		ITM	0.1 seconds to 10 minutes
Order as Required:			
MEMORY CARDS		ACCESSORIES	
MC256	256k byte	PC-6	6' Mains Cable
MC512	512k byte	CR-1	Card Reader with cables and power supply. Includes SW-1W IBM PC software at no charge.
MC1024	1024k byte	SW-1W	IBM PC software for data transfer, analysis, storage, printing and export to spreadsheets, etc.
		ROS-5P	Remote Optical Sensor with visible red LED, operating range 36 inches, +/- 45°, includes 8 foot cable and mounting bracket. For use with IRP RPM/Frequency module above.

Event Triggering	
0	Internal Alarm
2	External Control

Serial Interface	
0	None
1	RS232


Alarm Outputs	
0	None
1	Dual SPDT

Example Model Numbers:

DC - 1200 - IP1 - IP1 - 211

DC - 1200 - NJ0 - 000 - 000

DC - 1104 - IA4 - 000 - 201

DC-1200 Rear Panel

<ul style="list-style-type: none"> 1 Input Module A 2 Input Module B 3 External Control Trigger 4 2 SPDT Relay Outputs 5 RS232 Bi-Directional Serial Port 6 AC input Power



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