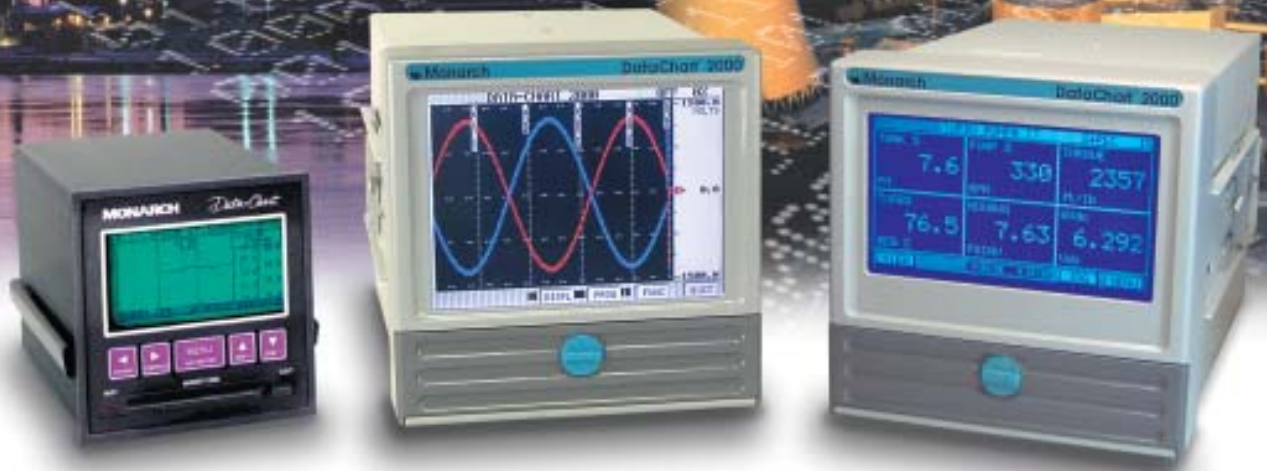


# DataChart®

## PAPERLESS RECORDING SYSTEMS



**MONARCH INSTRUMENT**

*Innovation in Instrumentation*

# DATA-CHART®

## 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, Compact Flash Card or PCMCIA Flash Card (up to 200 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 require less time to calibrate. This allows you to use your time more efficiently.

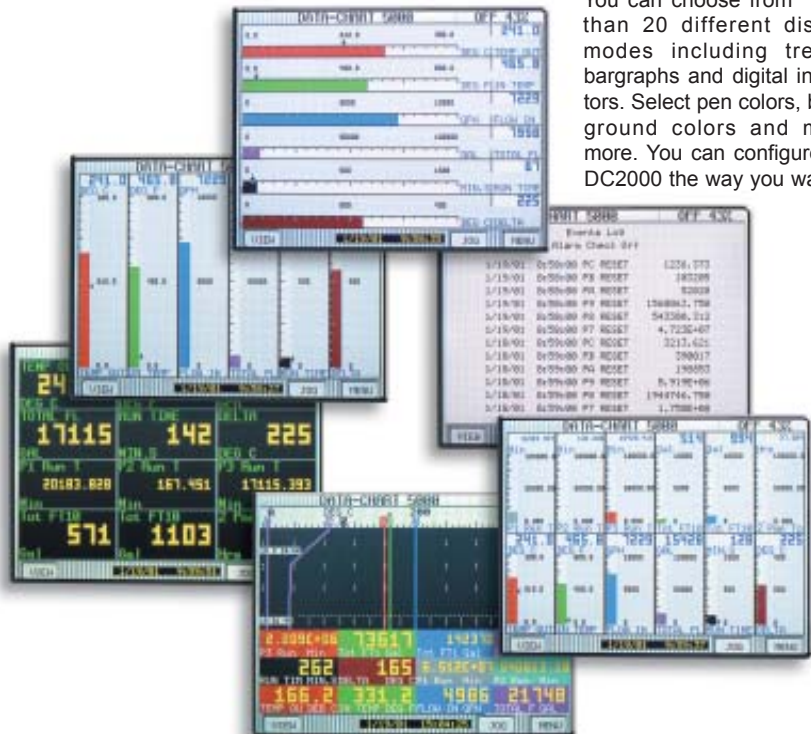
**We're Flexible.** Data Chart recorders are unparalleled in providing the highest level of flexibility of any paperless recorder made in the world. Universal inputs, networking capability, powerful math packages and a multitude of display choices allow you to display, record and communicate your data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

## Output Options

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

## Communications

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

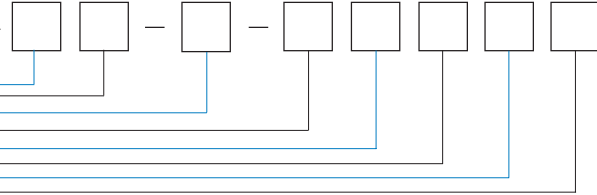
## Data Storage - Internal

0	1 Mbyte
1	2 Mbyte

## Printer Port

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

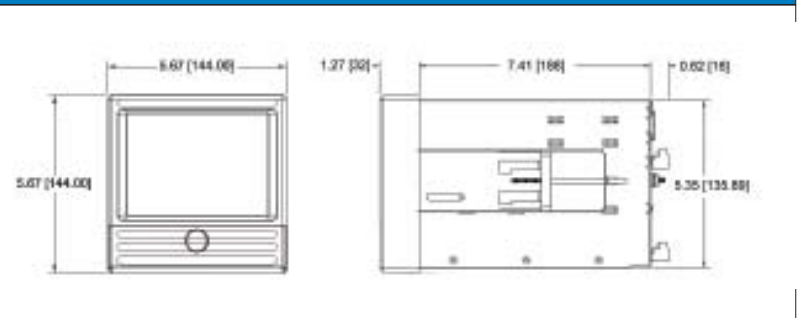
DC2 -



## 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	
10MB or 24MB ATA Flash PCMCIA memory cards. 32MB or 64MB Compact Flash memory cards.	10MB 24MB 32MBCF 64MBCF	
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	ZIP disk 100 Mb	3.5" disk 1.44 Mb	ZIP disk 100 Mb	3.5" disk 1.44 Mb	Zip disk 100 Mb	3.5" disk 1.44 Mb	ZIP disk 100Mb
8/Sec.	24 hours	69 days	12 hours	36 days	6 hours	17 days	4 hours	11 days
4/Sec.	48 hours	138 days	24 hours	69 days	12 hours	34 days	8 hours	23 days
1 Sec.	8.4 days	583 days	4.2 days	291 days	2.1 days	145 days	1.4 days	97 days
10 Sec.	84 days	15 years	42 days	8 years	21 days	4 years	14 days	2 years
60 Sec.	504 days	95 years	252 days	47 years	126 days	24 years	84 days	16 years
10 Min.	13.8 yrs.	958 yrs.	6.9 yrs.	479 yrs.	3.4 yrs.	236 yrs.	2.3 yrs.	159 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.

J	-101 to 1200°C	+/-1.5°C	-150 to 2190°F	+/-3.0°F
K	-101 to 1372°C	+/-1.5°C	-150 to 2500°F	+/-3.0°F
T	-101 to 400°C	+/-1.5°C	-150 to 750°F	+/-3.0°F
E	-101 to 1000°C	+/-1.5°C	-150 to 1832°F	+/-3.0°F
R	-50 to 1768°C	+/-3.0°C	-58 to 3200°F	+/-6.0°F
S	-50 to 1768°C	+/-3.0°C	-58 to 3200°F	+/-6.0°F
B	0 to 1820°C	+/-4.0°C	32 to 3300°F	+/-7.0°F
C	0 to 2400°C	+/-3.0°C	32 to 4350°F	+/-6.0°F
N	-101 to 1300°C	+/-1.5°C	-150 to 2372°F	+/-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.

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, or 6 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.

	Media	Measurements	Capacity
Removable	3.5" Disk	700,000	1.44Mb
	PCMCIA Card	100 million	Up to 200Mb
	or Compact Flash		

#### 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 PCMCIA drive or ZIP™ 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 @ 250Vac or 26 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.  
**Non Volatile Memory:** Unit automatically detects card size. Multiple files per memory card. User can replay all files on card. 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 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 spreadsheet 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.

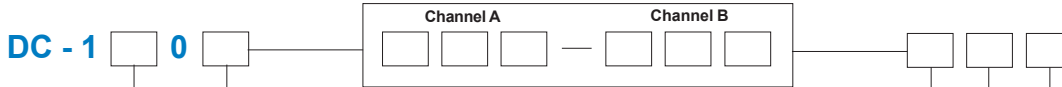
Multiple Data-Chart 2000's can be placed on a standard ethernet or Modbus network along with your other plant instruments and monitored in real time. In addition, data can be stored on your local PC greatly improving data management and security!



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

# DATA-CHART® 1200 SERIES

## Ordering Information



### 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

Input Signals	Non Isolated Part No.	Isolated 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

Input Signals	Non Isolated Part No.	Isolated Part No.	Notes
1-5 VDC	NP0	IP0	250 ohm impedance
4-20 mA DC	NP1	IP1	

#### AC VOLTAGE & CURRENT

Input Signals	Non Isolated Part No.	Isolated 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

Input Signals	Non Isolated Part No.	Isolated 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

Input Signals	Part No.	Range
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

MC256	256k byte
MC512	512k byte
MC1024	1024k byte

#### ACCESSORIES

PC-6	6' Mains Cable
CR-1	Card Reader with cables and power supply. Includes SW-1W IBM PC software at no charge.
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



- 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



Distributed by: