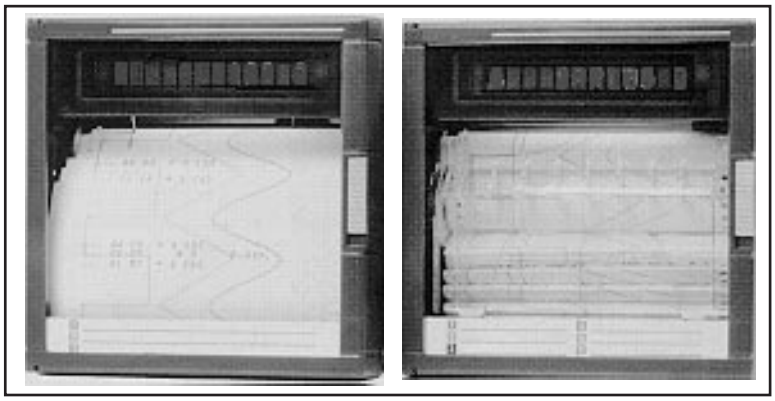
DIGIREC C/D Digital Recorder

CR320
Nov. 15, 1997



The DIGIREC C and D are the highest functionality 100 mm recorders on the market today. They offer the best chart in the industry, with complete process documentation, at any speed, for the most demanding applications. Their accuracy is by far superior due to the wide choice of available ranges and actuations.

The two versions are:
- **DIGIREC C: 1 to 3 continuous pen**
- **DIGIREC D: 3 or 6 channel multipoint**

Their large and bright display, together with their outstanding chart visibility and fluorescent illumination makes it easy to read and interpret from a considerable distance.
They are particularly suitable for chemicals, pharmaceuticals, power generation, metals, environmental monitoring and food processing applications.

MAIN FEATURES

- 100 mm chart width (DIN 16230)
- 0.1 % accuracy full scale (IEC 873) applicable on a very wide choice of actuations and of ranges
- Each input span is adjustable within the selected range, with up to 2 ranges per channel
- Universal input board (T/C, RTD, mV, mA)
- Alphanumeric display: 12 digits or bargraphs, adjustable brightness
- Roll or fan fold chart
- Fully documented chart with trace colour assignment, alarm trend in red, tagging, zooming, zoning, trend or tabular print outs, messages, all up to 500 mm/h mini
- Up to 10 traces (6 analog, 4 digital inputs) on the multipoint DIGIREC D
- Up to 6 analog inputs can be configured on a 3 pen DIGIREC C (Special Request)
- Full configurability thru: front keys and interactive program menu in 6 languages as standard.
Optional: PC software connected via the front jack, or by communication, with multilevel password security
- 12 user configurable messages (14 characters each)
- 4 lines batch header automatically incremented and saved in case of power failure
- Event precursor mode
- Software upgrades by the front jack (via PC, MODEM or E-mail)
- Input calibration traceability (audit-trail)
- 12 alarm set points, assignable to any input, math result, comm signal
- 2 configurable chart speeds, selectable via alarm, logic input, front keys and communication
- Universal power supply 85 to 264 VAC/DC, 24 or 48 VAC/DC
- IP 54 front protection (IEC 529)
- Compact dimensions:
144 x 144 mm x 245 mm

OPTIONS

- Up to 12 relay outputs assignable to alarms or recorder events
- Up to 4 logic inputs
- Mathematic packages, with the results saved in case of power failure. Math functions can be interconnected
- 24 VDC transmitter power supply
- Communication:
ASCII, MODBUS RTU
- Operating temperature up to 60°C
- CSA approved
- 2 Current output 4 to 20 mA option configurable on Analogue Inputs, Maths or Communication

FUNCTIONAL SPECIFICATIONS

Technical data

Technology

Microprocessor based, with non-volatile memory. Flash memory for software upgrade via the front jack

Analogue inputs

DIGIREC C pen recorder
1, 2 or 3 continuous traces.
DIGIREC D multipoint recorder
3 or 6 channels. Inputs are scanned by solid state switches and are galvanically isolated (except for RTD sensor)

Signal source
Thermocouple with individual cold junction compensation
Line resistance up to 1000 ohms T/C, mV, mA, V
RTD Pt 100 3-wire connections, lead resistance per wire 40 Ω balanced
Basic mathematic functions
Square Root extraction (√) Differential = (ΔT)
Filter
A digital filter is configurable per input, 0 to 99 seconds
Field calibration
A channel field calibration - 0 % and 100 % span - may be made to certify input sensor loop
Burnout
T/C, mV, Volt, configurable to upscale, to downscale or none
RTD: inherent upscale.
mA: inherent downscale
Scanning time (solid state relays)
Pen: 1 pen = 160 ms
2 pens = 240 ms
3 pens = 330 ms
Mpt: 3 channels = 330 ms /6 channels = 640 ms
Input impedance
10 Mohm for T/C, mV inputs.
>1 Mohm for volt inputs
Stray rejection
Series mode ≥ 60 db.
Common mode at 250 V AC ≥ 130 db (in T/C inputs config.)

Display

12 digit fluorescent display: 8.5 mm high (matrix display) configurable in:
- digital PV values with engineering unit in accordance with the input range
- 1 or 2 bargraphs
Can display analog input, Tags, math results, communication, alarms or event messages

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Brightness
The display brightness is configurable

Recording span

Scaling
Per input, up to 2 analogue scales can be configured to be printed on the chart with the engineering unit channel reference and tag name. Each input can be configured differently
Zoning
Each input can be configured on 0 to 100%, or 0 to 50%, or 50 to 100% of the chart
Pen offset (Pen recorder)
Distance between pen: 2 mm - Offset compensation configurable
Chart definition: 1 step = 0.2 mm
Pen carriage speed
1 second full scale

Chart length

Fan-fold 18 m
(as DIN 16230) / Roll 24 m

Pen trace

Pen
1400 m per pen
Multipoint
250 m per colour

Chart speed

1 or 2 chart speeds, fully configurable, selected by a logic input, alarm or configuration
Speed 1: fully adjustable per step of 1 mm/h, within limit
Speed 2: fully adjustable per step of 1 mm/h, within limit

Speed setting
Pen: 1 to 6000 mm/h (0.04 to 240"/h).
Mpt: 1 to 1500 mm/h (0.04 to 60"/h)
Continuous traces in colour, dotted traces in configurable colour with regular chart documentation (configurable)
Stepping chart motor
Resolution 0.12 mm

Product configuration

• 2 product configurations can be stored and selected by the front keys
Front configuration
• A very simple and interactive product configuration can be carried out on the product with 6 front keys. A friendly program with prompt messages confirms the operation. The prompt messages can be selected in different languages: English, German, French, Spanish, Italian or Swedish.
A 2-level password protects the unit from non-authorized modification (level 1 = limited access; level 2 = full protection)

PC configuration
• Through the front jack the unit can be configured from a PC through a PC interface. This provides the facility to copy the configuration, modify, store, upload or download the product configuration or make a service diagnostic or upgrade a new software or linearize 2 special customer sensors (50 segments each)

Logic inputs

Up to 4 dry contact inputs
(1.5 mA - 12 V DC)

Actions
Change chart speed 1 to speed 2, tab interval 1 to tab interval 2, digital print-out, print message, print inhibit, event trace, print a batch message, tabulate maths calculations. Event marking:
Pen: Pen 1 used as operation marker on the right side of the chart for event 1 and on the left side of the chart for event 2
Mpt: 4 traces maximum on the chart. The trace position and the colour are configurable

Alarms

Set-point
12 alarm set-points, freely assignable to any channel and output relay
Full configurability of set-point, hysteresis and alarm type (high, low, rate of change, deviation)
Function
Can trigger a message, print channel red in alarm, print in alarm, change the range, change the speed, print digital PV values, trigger the event precursor
Output
2, or 6, or 12 SPST relay outputs: 2 A, 250 V AC on resistive load
Contact N.C. in alarm condition (configurable in N.O.)

Alphanumeric documentation

Messages
12 freely assignable and configurable messages of 14 characters each, including the specific letters used in GE & SW
Can be printed with the date/time on top of the traces by alarms, logic inputs or communication
Batch header
One batch message of 4 lines of 14 characters, fully configurable, with incremented batch numbers and date/time. Printed through digital input and saved upon power interruption

Process variable
The traces can be assigned to analog input, mathematics calculations or communication inputs, and are printed in channel colour. Periodic digital printing at intervals configurable from 60 to 480 mm. Digital print-out of PV values through alarms, digital inputs, communication or front keyboard
Tag name
Each channel can be named by 8 characters

Event precursor

Stand-by
The acquisition data is stored in a buffer memory (FiFo)
A stand-by message is periodically printed
Downloading
On event (alarm, digital input, front key, communication) the data is downloaded to be printed on the chart at pre-configured speed
The history before and after the event represents about 50 mm of chart paper

Mathematics package (optional)

Many functions are available such as:
- Basic mathematics functions
- F_o sterilization
- Mass flows
- Vacuum pressure
- Min, max
- Square root
- Totalization
- Energy consumption
- Averages
- Timers
- Carbone Potential

The maths calculations and results are stored during power interruptions

Digital communication (optional)

Protocols
RS232 ASCII communication to PC application. RS422 or RS485 ASCII communic. output. RS422 or RS485 Modbus RTU communication output.
PC Supervision
Through ASCII communication, application software gives the facility to read PV's, alarms or event status, to store the information on a file, to send a message to the recorder or to modify the product configuration
Autodial
The RS232 ASCII communication can dial automatically a phonenumber of a remote station to send via Modem an Alarm message or a periodic Report

Event
The recorder can be configured to deliver an output signal (alarm relay) on a recorder event such as burnout, paper cassette out, battery fail, alarm condition or communication interrupted

Current output (optional)
2 Current output, signals 4 to 20 mA. configurable on - Analogue Inputs, Mathematic Calculations, or communication Signals -
Base Load Resistor 400 ohms

Power supply

85 to 264 V AC/DC or 24 or 48 V AC/DC (+10-15% nominal)
To transmitters
24 V, 50 mA typical, 75 mA max.
Power consumption
3 pens & Mpt: 55 VA max. (Active power 30w)

Clock timer

Format
Year, month, hour, minute can be set
Power interruption
Battery backed (10 years time, 3 years off power)
Accuracy $\pm 10^{-5}$

Packaging

Weight
Pen&Mpt:3.5kg
Front face
144 x 144 mm according to DIN 43718
Depth
245 mm /9.7" behind panel, including terminals and line protection cover
Front window Polycarbonate
Front protection
IP 54 (IEC 529), IP 55 on request
Lock
Latch or key (DIN 43832-N)
Construction Silicon-free
Chart illumination
Fluorescent light
Option
Rear terminal cover, portable case

Mounting
Panel mounting ±30° from horizontal

Wiring
Rear screw terminals.
Terminal modules are plugged on the instrument

Writing

Pen
1 cartridge per pen, fibre tip,1400 m of trace per colour (blue, red, green)

Multipoint
1 print wheel, 6 colours, 250 m of trace per colour (purple, red, black, green, blue, brown)

Noise immunity
According to CE mark 89/336/EEC EMC directive for industrial environment

Safety protection
According to CE mark 73/23/EEC low voltage directive
Complies with IEC 1010 installation category 2 for personal protection
Designed to meet UL.
CSA C22.2 N142 standard (certified)

Electrical insulation

Input to input
Continuous voltage up to 280 VAC or 400 VDC (except for RTD input)
Input to ground
Test voltage 2.1 kVDC for 1 minute
Input to line voltage
Test voltage 2.1 kVDC for 1 minute
Line voltage to ground
Test voltage 2.1 kVDC for 1 minute
Alarm relay to ground
Test voltage 2.1 kVdC for 1 minute
Logic input to ground
Test voltage 500 VDC for 1 minute

Temperature

Ambient
0 to 50°C (32 to 120°F)
Optionally 0 to 60°C (32 to 140°F)
Storage
-40 to +70°C (-40 to +160°F)

Humidity

Roll
10 to 90% RH non-condensing
Fan-fold
15 to 80% RH non-condensing

Vibrations
Frequency
10 to 60 Hz, amplitude 0.07 mm;
60 to 150 Hz, acceleration 1 g

Seismic Test
Qualified according ANSI/IEEE std 344.1987

Quality assurance
ISO 9001 factory certified

Accuracy

Reference conditions

Temperature
23°C ±2°C (73°F ± 3°F)
Humidity 65% RH ± 5% RH
Line voltage nominal ±1%
Source resistance 0 Ω
Series mode 0 V
Common mode 0 V
Frequency nominal ±1 %

Accuracy
Accuracy of displayed values:
0.1 % of selected input range (IEC 873) (except for ranges marked **, see foll. page)
Cold junction accuracy: 0.5 °C
For mA inputs, the accuracy of the input resistor shall be added to the instrument accuracy. Chart resolution: 0.2 mm

Extreme conditions:

Operating
Temperature
0 to 60°C (32 to 140°F)
Humidity
10 to 90% RH non-condensing
Storage
Temperature
-40 to +70°C (-40 to 158°F)
Humidity
5 to 95% RH non-condensing

Rated limits and associated drifts

Parameter	Rated limits	Influence on accuracy
Temperature	0 to 50°C (32 to 120°F)	0.1 % per 10°C Cold junction 0.3°C/10°C
Supply voltage	85 to 264 V AC	No influence
Source resistance	T/C, mV	6μV per 100 Ω of line resistance 1000 Ω max
	RTD	0.1 °C per Ω in each wire balanced leads 40 Ω max.
Humidity	10 to 90% RH at 25°C	0.1 % max.
Long-term stability		0.1 % per year
Vibrations	1.25 mm at 0 to 14 Hz 1 g at 14 to 250 Hz	

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Available ranges

Linear
0/10 mV
-10/10 mV
0/20 mV
-20/20 mV
0/50 mV
-50/50 mV
10/50 mV
0/100 mV
-100/100 mV
0/500 mV
-500/500 mV
0/1 V
-1/1 V
0/2 V
-2/2 V
0/5 V
-5/5 V
1/5 V
0/10V
-10/10 V
0/20 mA *
4/20 mA*

RTD/OHMS

Pt 100Ω at 0°C

** IEC -50/150°C	**JIS -50/150°C
** IEC -58/302°F	**JIS -58/302°F
** IEC 0/100°C	**JIS 0/100°C
** IEC 32/212°F	**JIS 32/212°F
** IEC 0/200°C	**JIS 0/200°C
** IEC 32/392°F	**JIS 32/392°F
** IEC 0/400°C	**JIS 0/400°C
** IEC 32/752°F	**JIS 32/752°F
** IEC -200/500°C	**JIS -200/500°C
** IEC -328/932°F	**JIS -328/932°F

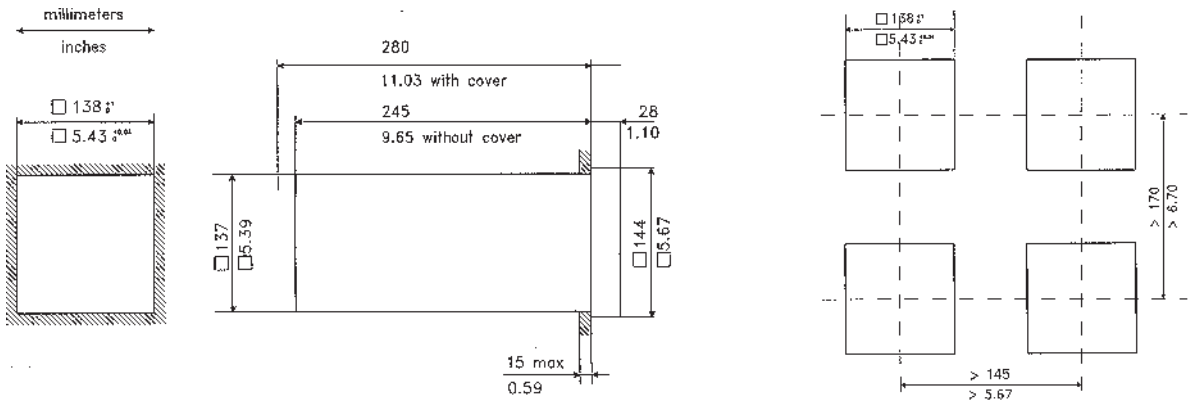
** Ni 50 Ω -80/320°C
** Ni 50 Ω -112/608°F
** Ni 508 Ω -50/250°C
** Ni 508 Ω -58/482°F
** Cu 10 Ω -20/250°C
** Cu 10 Ω -4/482°F
OHM 0/200
OHM 0/2000

Thermocouple

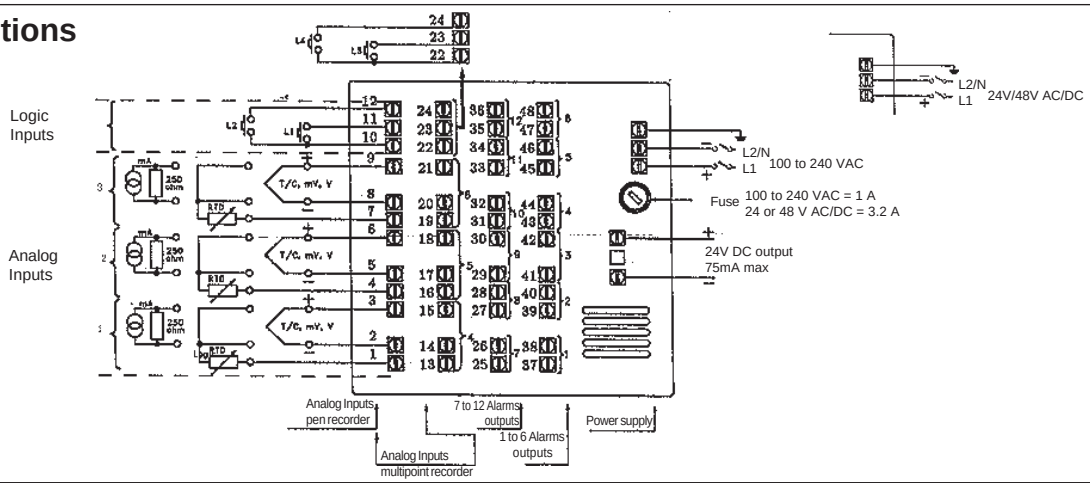
J -50/150°C	S 0/1600°C	U -50/150°C	
J -58/302°F	S 32/2912°F	U -58/302°F	
J 0/400°C	S -20/1760°C	U 0/150°C	
J 32/752°F	S -4/3200°F	U 32/302°F	
J -200/870°C		U 50/150°C	
J -328/1598°F	N 0/400°C	U 122/302°F	
	N 32/752°F	U -200/400°C	
L-50/150°C	N 0/800°C	U -328/752°F	
L -58/302°F	N 32/1452°F		
L 0/400°C	N 0/1200°C	NiMo 0/1400°C	**Reference Accuracy Range**
L 32/752°F	N 32/2192°F	NiMo 32/2552°F	
L -200/870°C	N -20/1300°C		
L -328/1598°F	N -4/2372°F	W-W 26 -20/2320°C	400 to 2300°C
		W-W 26 -4/4208°F	750 to 4200°F
K 0/400°C	T -50/150°C	W5-W 26 -20/2320°C	400 to 2300°C
K 32/752°F	T -58/302°F	W5-W 26 -4/4208°F	750 to 4200°F
K 0/800°C	T 0/150°C		
K 32/1452°F	T 32/302°F	PR 20-40 0/1800°C	1100 to 1800°C
K 0/1200°C	T 50/150°C	PR 20-40 32/3272°F	2010 to 3270°F
K 32/2192°F	T 122/302°F		
K -200/1370°C	T -200/400°C	B 40/1820°C	600 to 1820°C
K -328/2498°F	T -328/752°F	B 104/3308°F	1110 to 3300°F
R -20/1760°C			
R -4/3200°F			

Notes: **: Accuracy: 1 °C (or 1.8 °F)
For non-linear temperature transmitter (1 to 5 V DC, 4 to 20 mA, 0 to 5 V DC, 0 to 20 mA) the transmitter range must be identical to the full actuation range of the recorder. Provision for T/C input for remote compensation box at fixed temperature of 50°C or 60°C. When temperature is not fixed, any input can be used as remote compensation temperature measurement.
* mA inputs into 250 ohms input resistor.

Dimensions



Connections



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