

DTM 8000

CONTINUOUS DIGITAL
ALARM-MONITOR SYSTEM

FOR TURBINES,
COMPRESSORS AND MOTORS



DTM8000

DTM8000

Replaces Fisher Rosemount (Series 4002)
and Elcon Instruments (DTM-4000).

DIGITAL ALARM MONITORING SYSTEM

- ◆ Up to 48 independent channels with parallel reading per unit, in step of 4, to suit different applications (16-24-32-40-48 channels).
- ◆ Suitable for Turbines and Compressors, Temperature Alarm-Monitoring.
- ◆ Independent and simultaneous monitoring on all micro-processors controlled channel for maximum integrity and fault tolerance (each channel has its own micro-processor).
- ◆ Automatic self checking for reliable fault detecting operation.
- ◆ Redundant Supply with fault detection for high integrity operation (optional).
- ◆ Two independent Alarm Levels and one isolated Analog Output per channel operated directly by the channel processor to enhance channel integrity and fault tolerance.
- ◆ IP 40 rated front panel standard (IP 54 optional).
- ◆ Total software configuration of Input / Output features provides maximum flexibility and ease of use. No switches or jumpers required.
- ◆ One standard channel card (non dedicated) can be used for any type of input (TC, RTD, mA, Volt) minimizing number of cards to stock and facilitating future expansions.
- ◆ Local or remote cold junction compensation.
- ◆ One shot accurate and complete channel data readout with a single alphanumeric presentation of: TAG (16 Char), VAR. VALUE (5 digit), ENG. UNIT, ALARM SET A and B, and STATUS.
- ◆ Low power circuit has low heat dissipated for reliable operation at high temperatures.
- ◆ Reliable low consumption, fault tolerant architecture, system integrity and self check.
- ◆ Low maintenance cost all vital parts are plug-in modules, including power supply, that can be inserted or extracted without disconnecting power to the unit.



DTM8000

FEATURES

General Description

The DTM 8000 is a Continuous Smart Digital Alarm Monitor System used for the reliable and effective monitoring of up to 48 channels of process variables.

The system is not a multiplexing type machine, but a continuous one, which means there is no delay in monitoring the variables, because each input signal is continuously monitored in a parallel operating mode.

For this unique feature the unit is suitable to monitor critical rotating machines like Turbines and Compressors (for instance: Bearing Temperature), where a few millisecond delay in alarming and shutting down could result in a disaster for the entire machine and plant operation.

Modular

All vital parts of the Monitor, like Power Supply Units, Channel Cards, Channel Alarm and Analog Output Cards, Central Coordinator Cards, etc., are hot swappable interchangeable plug-in modules to facilitate product expansion and service.

Flexibility

Each channel can be configured by software commands for all different types of input, practically encountered in industrial applications.

Input/Output

Each input circuit can be configured for:

- ◆ Thermocouples: Type J, K, T, N, R, S with automatic Cold Junction Compensation, linearization, burnout.
- ◆ RTD: Pt 100 Ω DIN 43760.
- ◆ Transmitter Potentiometer: 100 Ω min., 10 K Ω max.
- ◆ mV: 0 to \pm 100 mV (Input impedance > 10 M Ω).
- ◆ Volt: 0 to \pm 5 V (Input impedance > 50 K Ω).
- ◆ mA: 0 to \pm 20 mA (Input impedance 20 Ω).

Analog Output can be configured for:

0-20 or 4-20 mA.

Alarms can be configured as:

High, Low or Disabled, operating mode NE or ND relay, direct/delayed actuation and adjustable dead band.

Configuration

Quick system setup by an easy to use configuration menu. The display presents options in a simple user friendly form.

Configuration data can be entered directly by the front panel keyboard.

Configuration menu is easily accessed via protection password, to safeguard against unauthorized entry.

Data Presentation

For each channel the display presents, on a high definition back lit 4 line by 20 column alphanumeric display:

- ◆ TAG (16 alphanumeric characters)
Channel Number
- ◆ Variable value (5 digit) Engineering Unit
- ◆ Alarm SET A value Alarm A Status
- ◆ Alarm SET B value Alarm B Status

The display is also used in the setup phase to present, in a simple user friendly form, configuration menus and channel or monitor operating parameters.

Alarm or abnormal monitor or channel status is also highlighted on the front panel by flashing LEDs corresponding to the relevant channel or monitor section.



Cumulative Alarm Acknowledge/Reset

Three cumulative alarm SPDT relay contacts (cumulative Alarm A, cumulative Alarm B, cumulative Fault) are provided.

Any channel in alarm or abnormal status and any Monitor malfunctions will de-energize the corresponding cumulative relay and lit the corresponding cumulative alarm Led on the front panel. Cumulative relay can be used for remote alarm signaling purposes.

The acknowledge key will re-energize the relay returning the system to its normal status.

Remote operation of acknowledge and reset are provided in addition to front panel key.

Channel Alarm and Trip Function

Each channel has two alarm relays (Alarm A and Alarm B) with SPDT contact and flashing Alarm Led on the front panel corresponding channel.

The acknowledge key, in addition to resetting the cumulative alarm relay, changes the Alarm LED from flashing to steady.

Applications

Typical Applications include Temperature Alarm-Monitoring of Gas Turbines and Compressors.

Large quantities of Temperature Monitor Systems have been supplied world-wide, in the past, for Gas Pumping Stations and Chemical Plants, by manufactures like Fisher Rosemount (Series 4002) and Elcon Instruments (DTM-4000).

Although, these manufactures have now discontinued production of these instruments.

G.M. International DTM-8000 can easily be used as a replacement, with improved performances, without need of major modifications.

Input Circuit (All types)

Four input channels per card totally independent and isolated from each other, from ground, supply and output circuits. Each channel is operated by an individual microprocessor and isolated from the field circuit.

Input Protection (All types)

All inputs are protected against overvoltage up to 30V.

RTD Input

Pt 100 Ω , 2/3/4-wires connection with automatic line resistance compensation and sensor / line fault detection (4-wires connection have no line fault detection) linear with temperature over max sensor range, according to DIN 43760 standard.

Range: - 200 to + 850 °C.
 Accuracy: ± 0.5 °C.
 Resolution: 0.1 °C.
 Stability: 0.05 °C/°C.

Transmitting Potentiometer input

Resistance range (end to end) 100 Ω up to 10 K Ω (no burnout detection)

Accuracy: ± 0.2 %.
 Resolution: 0.1 %.

Thermocouple / mV input

Type K, J, T, R, S, N with fixed or automatic Reference Junction Compensation, (local or remote) and sensor/line burnout detection, linear with temperature in the entire range.

Type	Range	Resolution	Accuracy
TC K	-200 to +1300 °C	0.1 °C	± 0.5 °C
TC J	-200 to +750 °C	0.1 °C	± 0.5 °C
TC T	-200 to +400 °C	0.1 °C	± 0.5 °C
TC N	-200 to +1300 °C	0.1 °C	± 0.5 °C
TC R	0 to +1750 °C	0.1 °C	± 2 °C
TC S	0 to +1750 °C	0.1 °C	± 2 °C mV
	0 to ± 100 mV	10 μ V	± 20 μ V

Input impedance: > 10 M Ω .
 Stability: 0.5 μ Volt / °C.

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Analog Input

Current:

-20 to +20 mA (standard 4-20 / 0-20 mA) from externally powered signal sources or loop powered circuits.

Input impedance: 20 Ω .

Accuracy: $\pm 20 \mu\text{A}$.

Resolution: 1 μA .

Stability: 1 $\mu\text{A} / ^\circ\text{C}$.

Voltage:

-5 to +5 V (standard 0-1, 0-5, 1-5 V).

Input Impedance: > 50 K Ω .

Accuracy: $\pm 2 \text{ mV}$.

Resolution: 1 mV.

Stability: 0.5 mV / $^\circ\text{C}$.

Cables Termination

Cables can be easily terminated on compression type 2.5 mm² (12 AWG) terminal blocks.

Analog to Digital Converter

18 Bit bipolar input - integration type (100 ms conversion time)

NMRR 80 dB at 50-60 Hz.

CMRR 120 dB at 50-60 Hz.

Power Supply

Interruption Tolerance

Can withstand 20 ms power loss at nominal supply voltage without causing spurious alarm, fault or loss of control.

Overvoltage Transient Protection

Protected against overvoltage surges and filtered to reduce interferences.

Redundant Supply (Optional)

Redundant Supply unit can be used as Backup Supply. Automatic transfer from Main Supply to Backup Supply will occur when one of the two Units fails, in this case an automatic supply fault detection and alarm signaling is generated.

Isolation

Power Supply versus Input 1500 Vrms.

Power Supply versus Output 1500 Vrms.

Input versus Output 1500 Vrms.

Input versus Input 500 Vrms.

Output versus Output 500 Vrms.

Relay Output Cards (Optional)

Each card has 8 SPDT relay contacts (2 per input channel).

Rating AC: 250 V, 2 A, 500 VA.

Rating DC: 125 V, 2 A, 80 W.

Relay Action Delay Time (software programmable): min. 100 ms; max 25 s.

Analog Output Cards (Optional)

Each card has 4 fully isolated Analog Output Signals: 0-20 / 4-20 mA; 0-5/1-5 V with 250 Ω internal shunt.

Accuracy: $\pm 0.2 \%$ of full scale.

Max. Load: 500 Ω .

Ripple: 50 mVpp.

Environmental Conditions

Temperature:

Operating: -10 $^\circ\text{C}$ to +60 $^\circ\text{C}$.

Storage: -30 $^\circ\text{C}$ to +70 $^\circ\text{C}$.

Relative Humidity:

0 to 90 % (non condensing, up to 35 $^\circ\text{C}$).

Electro Magnetic Compatibility:

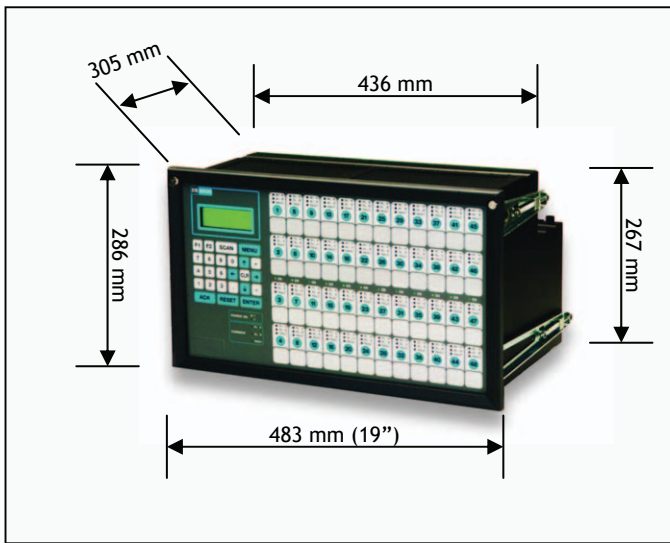
Compliance with EN50081-2 and EN50082-2.

Weight:

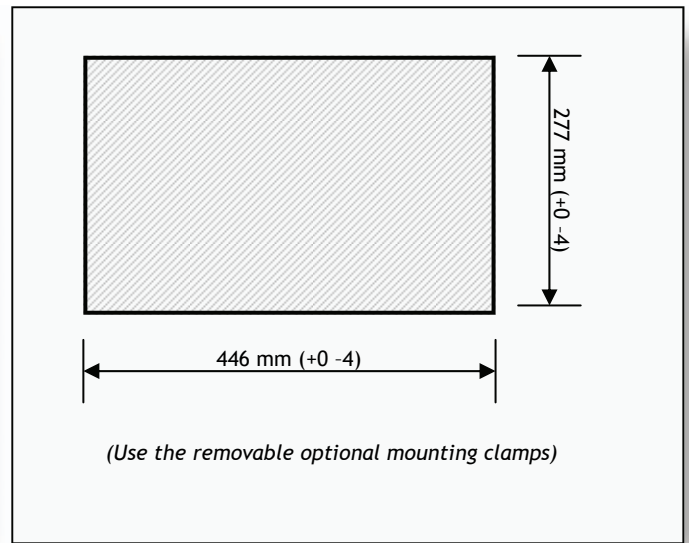
19 Kg (48 channels max extension).

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External dimensions



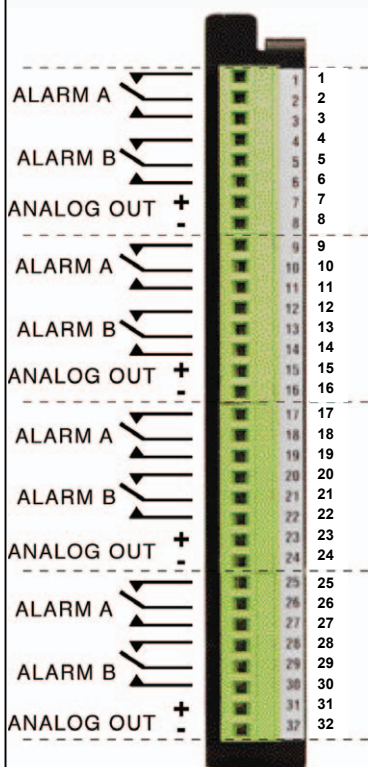
Panel mounting Cut-Out



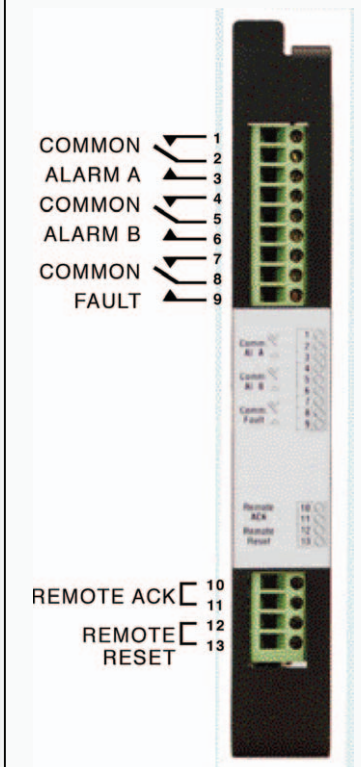
Terminal block connections

Relay and analog Output connections

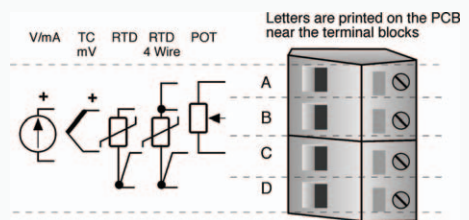
relay contacts shown in de-energized condition



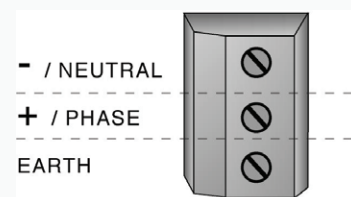
Cumulative Alarm connection details



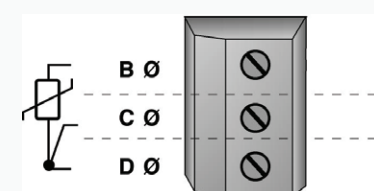
Typical input connections



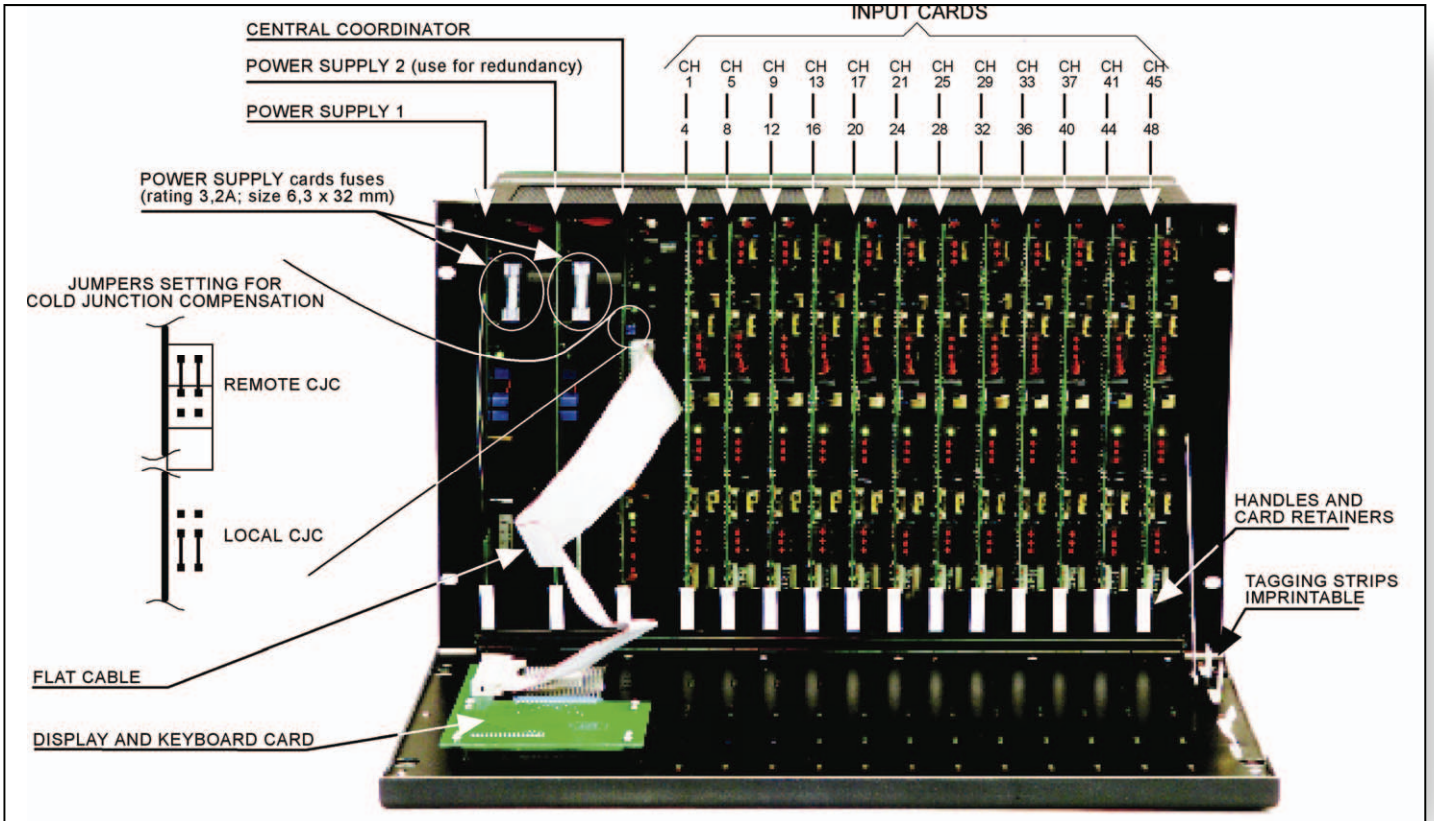
Supply connections



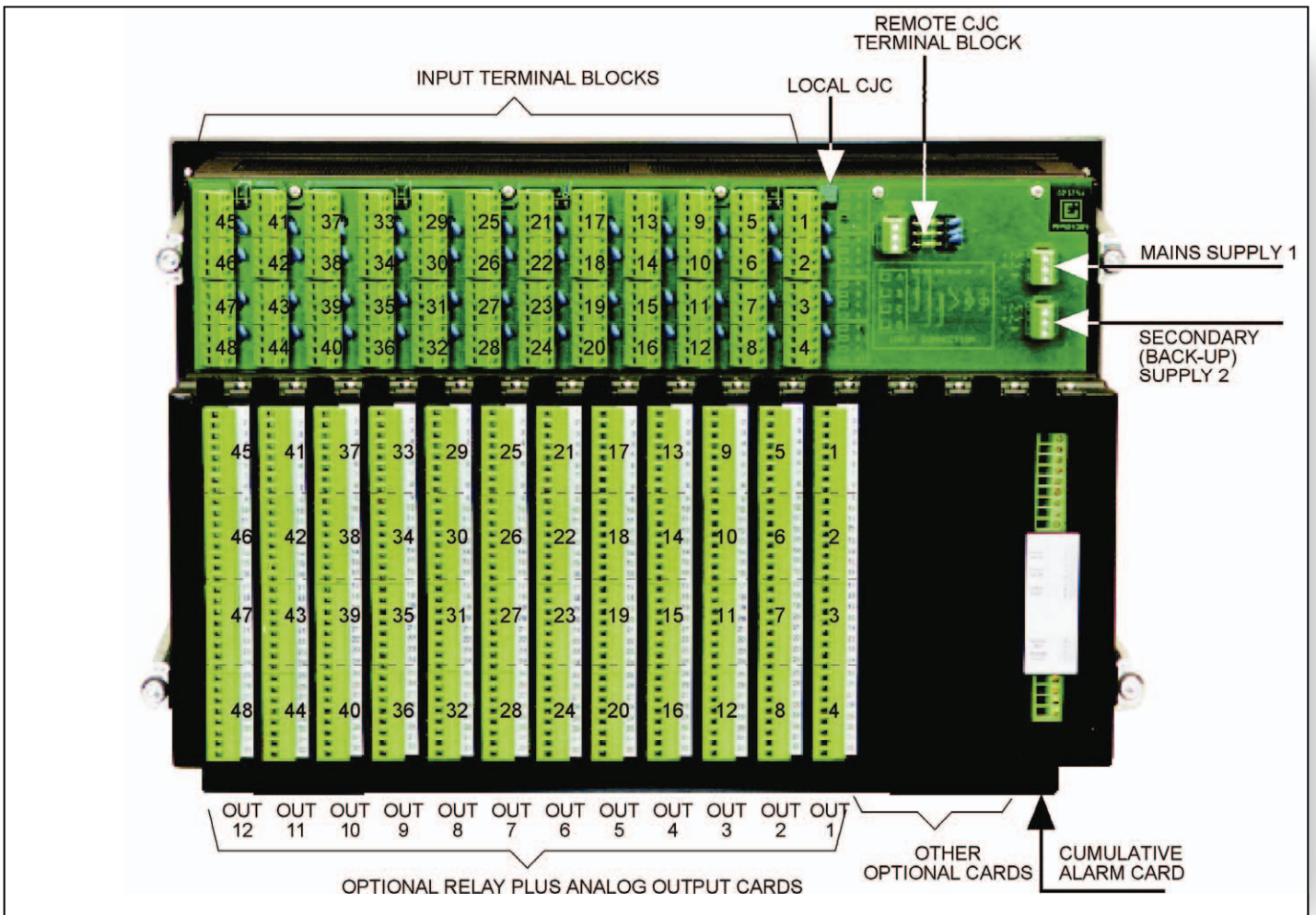
Remote CJC connections



FRONT VIEW



REAR VIEW



ORDERING INFORMATION

DTM-

Number of Input channels

12
16
20
24
28
32
36
40
44
48

Main Supply

24 Vdc 1
115 Vac 2
230 Vac 3

Backup Supply (optional)

not present 0
24 Vdc 1
115 Vac 2
230 Vac 3

Dual Output Relay Cards (optional) Notes 1, 2

not present 0
present 1

Analog Output Cards (optional) Notes 1, 2

not present 0
present 0-20 / 4-20 mA 1
present 0-5 / 1-5 Vdc 2

Cumulative Alarm Card (optional)

not present 0
present 1

Front Panel Degree of Protection

IP-40 (standard) 1
IP-54 (optional) 2

Coding example: DTM-24 2 0 1 1 1 1

Note 1: The number of Optional Relay Outputs and Analog Output channels is the same of the Input Channels

Note 2: Analog Output Option may only be ordered if Output Relay Cards are specified.

Note 3: All information to program the DTM8000 are included in the Operating Instruction Manual. For factory configuration, all parameters have to be specified with order