DTM
Distributed Transmitter-Monitor
# Table of Contents

**DTM Series Distributed Transmitter-Monitor Introduction** .......................................................... 3  
- Fully Digital .................................................................................................................................. 3  
- Fully Programmable and Flexible .................................................................................................. 3  
- Highly Reliable System .................................................................................................................. 4  
- Additional Features ..................................................................................................................... 4  

**Selection Guide of DTM Modules** ................................................................................................. 5  

**DTM10 Proximity Distributed Transmitter-Monitor** ................................................................. 6  
- Applications include: ..................................................................................................................... 6  
- DTM10 Fully Configurable via Software ......................................................................................... 6  
- DTM10 Features .......................................................................................................................... 6  
- Ordering Information .................................................................................................................... 9  
- Optional Accessories ................................................................................................................... 12  
- DTM10 System Installation ........................................................................................................... 13  

**DTM20 Seismic Vibration Distributed Transmitter-Monitor** ..................................................... 18  
- Applications include: ..................................................................................................................... 18  
- DTM20 Fully Configurable via Software ......................................................................................... 18  
- DTM20 Features .......................................................................................................................... 18  
- Ordering Information .................................................................................................................... 21  
- Optional Accessories ................................................................................................................... 22  
- DTM20 System Installation ........................................................................................................... 23  

**DTM30 Temperature Module** ..................................................................................................... 25  
- DTM30 Features .......................................................................................................................... 25  
- Specifications ............................................................................................................................... 25  
- Ordering Information .................................................................................................................... 26  
- Optional Accessories ................................................................................................................... 26  
- DTM30 System Installation ........................................................................................................... 27  

**DTM96 Communication Module** .................................................................................................. 29  
- DTM96 Features .......................................................................................................................... 29  
- Specifications ............................................................................................................................... 29  
- Ordering Information .................................................................................................................... 30  
- Optional Accessories ................................................................................................................... 30  
- DTM96 System Installation ........................................................................................................... 31  

**DTM-CFG Configuration and Calibration Software** ................................................................. 32  
- DTM-CFG Features ....................................................................................................................... 32  
- Specifications .................................................................................................................................. 32  
- Order Information .......................................................................................................................... 32  

**Accessories I** ................................................................................................................................. 33  
**Accessories II** ............................................................................................................................... 34  

**Digital Network Connection Diagram** ......................................................................................... 35
DTM Distributed Transmitter-Monitor

DTM Series Distributed Transmitter Monitor Introduction

Fully Digital

The DTM series digital transmitter monitor is ProviTech's vibration monitor, vibration transmitter and vibration switch all rolled into one package. Each DTM module can be operated independently or networked together to create a machine protection system. It has all the functionalities of an API 670 multi-channel monitor plus a unique field linearization feature which enables the use of any manufacturers' probe and extension cable combination. DTM modules are fully programmable, flexible, and highly reliable.

Fully Programmable and Flexible

The DTM is modular in nature and can easily be expanded into a larger vibration system with the addition of a:

- **DTM10** (Proximity Probe Sensor Module)
- **DTM 20** (Case Vibration Sensors Module)
- **DTM 30** (Temperature Module)
- **DTM 96** (Communication Module)
- **DTM-CFG** (Configuration Software)

**DTM10** is a proximity probe sensor module which provides measurements in radial vibration, axial position (thrust), and speed / phase reference. The DTM10 works with any proximity probe system combination (including other manufacturers) and can be used:
- With or without Probe Driver
- In any combination of probe and extension cable. The DTM10 has a field linearization feature which enables the DTM10 to interface to any proximity probe system. This feature greatly reduces the requirement for spare parts.
- Works with any shaft material (Steel, Tungsten, K-monel and more).

**DTM20** is a case mounted seismic sensor module which provides case vibration measurements in acceleration, velocity, or displacement. The DTM20 works with any case mounted sensor (including other manufacturers):
- Accelerometers
- Velocity Transducers

**DTM30** is a temperature module which works with:
- Resistance temperature detector (RTD)
- Thermocouple

**DTM96** is a communication module that can be used to network up to (32) DTMs together to form a vibration protection system. The DTM96 can be used to communicate directly with control systems (PLC or DCS) via modbus to provide data from the DTMs such as: alarm status, system status, overall value, and more.

**DTM-CFG** is the software used to configure the DTM modules (DTM10 and DTM20) either with a local laptop computer or a remote computer on the network (requires Modbus connection).

Configurable Parameters:
- Measurement Type (Case Vibration, Radial Vibration, Axial Position, and Speed/Phase)
- Sensor Type and Sensitivity (Proximity Probe, Accelerometer and Velocity Transducer)
- Full Scale Range (g, ips, mm/s, rms, pk, etc..)
- Time Delays
- Alarm Set Points

Observe:
- Alarm and Channel OK Status
- Trip Multiply
- Bypass and Overall Vibration Level

Control:
- Trip Multiply values
- Bypass and Reset functions

Note: The DTM can be pre-configured at the factory. DTM-CFG software is only required when field configuration is desired.
**Highly Reliable System**

The DTM was designed to be used for critical machines as well as balance of plant applications. Built into every DTM is a system redundancy based upon a reliable microprocessor and proprietary system diagnostics which all contribute to a robust system design which will maximize system uptime.

**Power Redundancy** - The DTM module has redundant power supply inputs to maximize the reliability of the system. A single power supply failure will not affect the operation of the system.

**Output Redundancy** - The DTM module is equipped with redundant 4-20mA outputs, redundant relay outputs, and a Modbus communication port. The DTM relay outputs can be configured for any logic configuration required.

**Channel Redundancy** - the DTM can be configured for triple redundancy with multiple DTMs networked together.

**System Diagnostics** - the DTM performs internal diagnostic tests to search for errors: sensor status, supply voltage, system power up, fieldbus status and more. If there is an error, the system OK status LED on the DTM will go off, and an error will be registered for the channel and sent via Modbus.

**Reliable Microprocessor** - critical data and system configuration is stored in a solid-state memory chip. The memory chips are designed not to lose data during an interruption of power. Once power is restored, the critical data and system configuration are recovered from the memory chips.

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**Additional Features**

**Power-Up Inhibit** - This feature decreases false alarms due to higher vibration levels during machine start-up.

**Condition Monitoring** - Each DTM module has a buffered output for easy connection to a condition monitoring system or other vibration analysis hardware.
<table>
<thead>
<tr>
<th>Model Number</th>
<th>DTM10</th>
<th>DTM20</th>
<th>DTM30</th>
<th>DTM96</th>
<th>DTM-CFG</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Radial Shaft Vibration, Thrust &amp; Speed</td>
<td>Case Vibration</td>
<td>Temperature, Dual Channels</td>
<td>Accessory: Communication Module</td>
<td>Accessory: Configuration Software</td>
</tr>
<tr>
<td>Available as Pre-Configured or Field Programmable *1</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td></td>
<td>●</td>
</tr>
<tr>
<td>Vibration Measurements</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Radial Vibration</td>
<td>●</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Axial Position</td>
<td>●</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Speed/Phase Reference</td>
<td>●</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Case Vibration</td>
<td>●</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature</td>
<td>●</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sensor Interfaces</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accelerometer</td>
<td>●</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Velocity Transducer</td>
<td>●</td>
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<tr>
<td>Proximity Probe</td>
<td>●</td>
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<tr>
<td>Works With or Without Probe Driver</td>
<td>●</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thermocouple, RTD</td>
<td></td>
<td>●</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outputs/Communications</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Redundant 4-20mA Output</td>
<td>●</td>
<td>●</td>
<td>S</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relay Output</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Redundant Power Supply Input</td>
<td>●</td>
<td>●</td>
<td>S</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Modbus Output</td>
<td>●</td>
<td>●</td>
<td></td>
<td>● (isolation)</td>
<td></td>
</tr>
<tr>
<td>Buffered Output</td>
<td>●</td>
<td>●</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Features</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Push Button Setup (Limited Settings)</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power-Up Inhibit</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td></td>
<td></td>
</tr>
<tr>
<td>System OK Checking</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hazardous Rating (CSA, ATEX, GOST R)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>II3GExnAII4</td>
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<td>Class I, Div.2; Grps A, B, C &amp; D, T4 2ExnAII4X</td>
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</tbody>
</table>

* = Complete Offering, S = Single 4-20mA Output or power supply input

Notes:

*1 = Field programming requires DTM-CFG-K Configuration Software kit. Without the software, the DTMs can only be configured for alarm set points and ZERO adjustment.

*2 = To network up to 32 DTMs via Modbus, requires (1) DTM96 Communication Module
DTM Distributed Transmitter-Monitor

DTM10 Proximity Distributed Transmitter-Monitor
(Shaft Vibration, Thrust Position and Speed)

The DTM10 distributed vibration transmitter-monitor is ideal for monitoring machine vibration using proximity probes and a Modbus interface to a PLC or DCS system. The DTM also contains redundant power supplies and redundant 4-20mA transmissions. Using Provibtech’s unique strategy, the DTM can interface with almost any proximity probe system without hardware changes.

Applications include:

✓ Turbines
✓ Compressors
✓ Motors
✓ Pumps
✓ Fans
✓ Blowers
✓ Centrifuges
✓ Generators
✓ Turbochargers

DTM10 Fully Configurable via Software

✓ Vibration Monitor Module
✓ Thrust Position Monitor Module
✓ Speed Monitor Module
✓ Phase Reference Monitor module

DTM10 Features

✓ Interface with almost any manufacture’s proximity probe system
✓ Works with or without probe driver
✓ Direct Modbus RTU interface
✓ Redundant 4-20mA outputs
✓ Redundant power supplies
✓ Measure shaft vibration, thrust position, or speed
✓ Full digital field-configuration
✓ Dual alarms (SPDT)
✓ LED indication of system OK, Alert, Danger, and Bypass
✓ Local and remote RESET/BYPASS and Trip-multiply
✓ Buffered Output for condition monitoring
✓ Aluminum case for RFI/EMI reduction
✓ Digital condition monitoring (optional)
Specifications

**Electrical**

**Power Supply:**
22-30VDC, 150mA.
Accepts dual power supply inputs

**Galvanic isolation:**
Among power, circuits and alarms

**Frequency Response (-3dB):**
- Normal frequency: 4 ~ 3.0KHz
- Low frequency: 0.5 ~ 100Hz

**Proximity probe Interface:**
- Sensitivity:
  - 5mm and 8mm probe: 8 mV/um (200 mV/mil)
  - 11mm probe: 4 mV/um (100 mV/mil)
  - 25mm probe: 0.787 mV/um (20 mV/mil)

**Buffered Output:**
- Original, un-filtered signal
- Impedance: 150Ω
- Maximum cable distance: 300m (1000ft)
- Sensitivity: same as the sensor
- Local BNC connection and terminal block for phase reference monitor, buffered outputs TTL compatible signal

**4-20mA Output:**
- Dual 4-20mA, sourced (loop power not required)
- Maximum load resistance: 380Ω

**Alarm Setup:**
- 0 ~ 100% FS.
- Accuracy: ±0.1%.

**Relays:**
- Seal: Epoxy
- Capacity: 0.2A/240VAC, 0.4A/110VAC or 2.0A/24VDC, resistive load
- Relay type: SPTD
- Isolation: 1000VDC

**LED Machine Condition Indicator:**
- OK: System OK indication
- ALT: Vibration over ALERT level
- DNG: Vibration over DANGER level
- BYP: System in BYPASS
- TRX: Digital Transmission Active

**RESET/BYPASS:**
- Front panel push button
- Remote RESET/BYPASS terminals

**Trip Multiply:**
- Double Multiply or Triple Multiply set in DTM-CFG
- Short Trip/Multi terminal to COM terminal
- System alarm level will increase by a factor of 2 or 3 (DTM10-201 / 301 only)

**Modbus:**
- RS485 Modbus RTU
- Not isolated (use DTM96 for isolation)

**Local push button programming:**
- Alert and danger set-point, ZERO calibration

**Software programming (DTM-CFG):**
- Alert and danger set-point, time delay
- ZERO and Full-Scale calibration
- Full-scale high and low setup
- Alarm latching/ non-latching, energized/ de-energized
- Alarms programmable with alert, danger or system ok
- Probe selection, linearization, and system calibration
- Monitor function change: vibration, position, or speed
- Modbus communication setup
- Trip-multiply setup
- Real-time bar-graph and alarms
- Configure speed monitor to phase reference only monitor
- 3 layers of password protection

**Digital condition monitoring (optional)**
- Condition management software or portable vibration data collector of ProvibTech could collect, store, and analyze machine running condition based on vibration via the bus communication of the DTM10.
- Dynamic waveform data:
  - Real-time vibration data could be uploaded and the waveform and spectrum plot could be view by Condition management software or portable vibration data collector.
- Trend Data:
The vibration data could be periodically stored by the DTM10 when it’s powered on. User could collect trend data and view trend plots by Condition management software or portable vibration data collector. The trend sampling interval is configured by the related DTM-CFG software. DTM10’s factory default is 10 hours. Every DTM10 could store maximum 1024 trend data.

Alarm Data:
The dynamic alarm data could be stored by the DTM10 when it’s powered on. The DTM10 only stores one alarm data with highest measured value. User could view waveform and spectrum plot of alarm data by Condition management software or portable vibration data collector.

### Physical

**Dimension:**
- **Height:** 75mm (2.95"")
  
  see figure below
- **Weight:** 2.0lb (1.0kg)
- **Case:** Aluminum cast (copper free)

### Environmental

**Temperature:**
- **Operation:** -40°C ~ +85°C
- **Storage:** -50°C ~ +100°C
- **Humidity:** 90% non-condensing

### Certification

- **CE:** certified with EMC compliance
- **CSA:** Class I, Div. 2, Grps A, B, C&D, T4
- **ATEX:** II 3G Ex nA II T4
- **GOST R:** 2Ex nA II T4X
Ordering Information

**DTM10-AX-BX-CX-EXX-MX-SX**

Customer configurable proximity distributed transmitter-monitor
Distributed vibration monitor, fully field configurable, with Modbus RTU.

**AX: Alarms**

- **A0**: Dual alarms with epoxy sealed relays
- **A1**: No Alarm

**BX: Mounting**

- **B0**: DIN rail mounting
- **B1**: Plate mounting

**CX: External Proximity Driver**

- **C0**: Not required (Requires Probe and Extension Cable) (301, 302, 502 type modules)
- **C1**: Required (Requires Probe, Extension Cable and Probe Driver) (201, 202, 501 type modules)

**EXX: Probe and Cable (Series and Length) -Purchased Separately**

- **E00**: TM0180, 5m Cable
- **E01**: TM0180, 9m Cable
- **E02**: 8mm Probe, 3300, 5m Cable
- **E03**: 8mm Probe, 3300, 9m Cable
- **E04**: 8mm Probe, 7200, 5m Cable
- **E05**: 8mm Probe, 7200, 9m Cable
- **E06**: TM0105, 5m Cable
- **E07**: TM0105, 9m Cable
- **E08**: TM0110, 5m Cable
- **E09**: TM0110, 9m Cable
- **E10**: 11mm Probe, 3300, 5m Cable
- **E11**: 11mm Probe, 3300, 9m Cable
- **E12**: 11mm Probe, 7200, 5m Cable
- **E13**: 11mm Probe, 7200, 9m Cable
- **E99**: Other probe systems (requiring field calibration)

**MX: Digital Communication**

- **M0**: With Modbus
- **M1**: With Modbus and digital condition monitoring

**SX: Approvals**

- **S0**: CE
- **S1**: CE
  - CSA: Class I, Div.2, Grps A, B, C&D, T4
  - ATEX: II 3G Ex nA II T4
  - GOST R: 2Ex nA II T4X

**DTM10-201-AX-CX-GX-IX-MX-SX**

Factory configured for vibration (probe driver required)

**AX: Full Scale**

- **A0**: 0 ~ 200um pk-pk
- **A1**: 0 ~ 1000um pk-pk
- **A2**: 0 ~ 10mil pk-pk
- **A3**: 0 ~ 50mil pk-pk
- **A4**: 0 ~ 5 ~ 0.5mil pk-pk
- **A5**: 0 ~ 200um pk-pk (0.5 ~ 100Hz)
- **A6**: 0 ~ 1000um pk-pk (0.5 ~ 100Hz)
- **A8**: 0 ~ 100um pk-pk (0.5 ~ 100Hz)

**CX: Alarms**

- **C0**: Dual alarms with epoxy sealed relays
- **C1**: No Alarm

**GX: Mounting**

- **G0**: DIN rail mounting
- **G1**: Plate mounting

**IX: Frequency Response**

- **I0**: Normal Frequency (4-3000Hz)
- **I1**: Low Frequency (0.5-100Hz)

**MX: Digital Communication**

- **M0**: With Modbus
- **M1**: With Modbus and digital condition monitoring

**SX: Approvals**

- **S0**: CE
- **S1**: CE
  - CSA: Class I, Div.2, Grps A, B, C&D, T4
  - ATEX: II 3G Ex nA II T4
  - GOST R: 2Ex nA II T4X
DTM10-202-AX-CX-GX-SX

Factory configured for axial position (probe driver required)

AX: Full Scale
- A0*: -1.0 - 0 - 1.0mm (-40 - 0 - 40mil)
  (requires TM0180 or other 8mm proximity probe transducer; TM0105 or other 5mm proximity probe transducer)
- A1: -2.0 - 0 - 2.0mm (-80 - 0 - 80mil)
  (requires TM0110 or other 11mm proximity probe transducer)
- A2: -5.0 - 0 - 5.0mm (-0.2 - 0 - 0.2inch)
  (requires TM0120 or other 25mm, 35mm proximity probe transducer)
- A3: -12.0 - 0 - 12.0mm (-0.5 - 0 - 0.5inch)
  (requires TM0150 or other 50mm proximity probe transducer)

CX: Alarms
- C0*: Dual alarms with epoxy sealed relays
- C1: No Alarm

GX: Mounting
- G0*: DIN rail mounting.
- G1: Plate mounting.

SX: Approvals
- S0*: CE
- S1: CE

CSA: Class I, Div.2, Grps A, B, C&D,T4
ATEX: II 3G Ex nA II T4
GOST R: 2Ex nA II T4X

DTM10-501-AX-CX-FXX-GX-SX

Factory configured for speed (probe driver required)

AX: Full Scale
- A0: 0 ~ 1,000 rpm
- A1*: 0 ~ 3,600 rpm
- A2: 0 ~ 6,000 rpm
- A3: 0 ~ 10,000 rpm
- A4: 0 ~ 30,000 rpm
- A5: 0 ~ 50,000 rpm
- A6: phase reference output
- A7: phase reference output for digital condition monitoring

CX: Alarm
- C0*: Dual alarms with epoxy sealed relays
- C1: No Alarm

FXX: Teeth per Revolution
- F01*: 1
- FXX: Customer specify, number of teeth =XX

GX: Mounting
- G0*: DIN rail mounting.
- G1: Plate mounting.

SX: Approvals
- S0*: CE
- S1: CE

CSA: Class I, Div.2, Grps A, B, C&D,T4
ATEX: II 3G Ex nA II T4
GOST R: 2Ex nA II T4X
**DTM Distributed Transmitter Monitor**

**DTM10-301-AX-CX-EXX-GX-IX-MX-SX**

Factory configured for vibration (built-in probe driver)

**AX:** Full Scale

- A0*: 0 ~ 200µm pk-pk
- A1: 0 ~ 500µm pk-pk
- A2: 0 ~ 100µm pk-pk
- A3: 0 ~ 10mil pk-pk
- A4: 0 ~ 25mil pk-pk
- A5: 0 ~ 5.0mil pk-pk
- A6: 0 ~ 200µm pk-pk (0.5 ~ 100Hz)
- A7: 0 ~ 500µm pk-pk (0.5 ~ 100Hz)
- A8: 0 ~ 100µm pk-pk (0.5 ~ 100Hz)

**CX:** Alarms

- C0*: Dual alarms with epoxy sealed relays
- C1: No Alarm

**EXX:** Probe and Cable

- E00*: TM0180, 5m Cable
- E01: TM0180, 9m Cable
- E02: 8mm Probe, 3300, 5m Cable
- E03: 8mm Probe, 3300, 9m Cable
- E04: 8mm Probe, 7200, 5m Cable
- E05: 8mm Probe, 7200, 9m Cable
- E06: TM0105, 5m Cable
- E07: TM0105, 9m Cable
- E08: TM0110, 5m Cable
- E09: TM0110, 9m Cable
- E10: 11mm Probe, 3300, 5m Cable
- E11: 11mm Probe, 3300, 9m Cable
- E12: 11mm Probe, 7200, 5m Cable
- E13: 11mm Probe, 7200, 9m Cable

**GX:** Mounting

- G0*: DIN rail mounting.
- G1: Plate mounting.

**IX:** Frequency Response

- I0*: Normal Frequency (4~3000Hz)
- I1: Low Frequency (0.5~100Hz)

**MX:** Digital Communication

- M1*: With Modbus
- M2: With Modbus and digital condition monitoring

**SX:** Approvals

- S0*: CE
- S1: CE

CSA: Class I, Div.2, Grps A,B,C&D, T4
ATEX: II 3G Ex nA II T4
GOST R: 2Ex nA II T4

**DTM10-302-AX-CX-EXX-GX-SX**

Factory configured for axial position (built-in probe driver)

**AX:** Full Scale

- A0*: -1.0 - 0 - 1.0mm (-40 - 0 - 40mil)
  (Requires TM0180 or other 8mm proximity probe transducer)
- A1: -2.0 - 0 - 2.0mm (-80 - 0 - 80mil)
  (Requires TM0110 or other 11mm proximity probe transducer)

**CX:** Alarms

- C0*: Dual alarms with epoxy sealed relays
- C1: No Alarm

**EXX:** Probe and Cable

- E00*: TM0180, 5m Cable
- E01: TM0180, 9m Cable
- E02: 8mm Probe, 3300, 5m Cable
- E03: 8mm Probe, 3300, 9m Cable
- E04: 8mm Probe, 7200, 5m Cable
- E05: 8mm Probe, 7200, 9m Cable
- E06: TM0105, 5m Cable
- E07: TM0105, 9m Cable
- E08: TM0110, 5m Cable
- E09: TM0110, 9m Cable
- E10: 11mm Probe, 3300, 5m Cable
- E11: 11mm Probe, 3300, 9m Cable
- E12: 11mm Probe, 7200, 5m Cable
- E13: 11mm Probe, 7200, 9m Cable

**GX:** Mounting

- G0*: DIN rail mounting.
- G1: Plate mounting.

**SX:** Approvals

- S0*: CE
- S1: CE

CSA: Class I, Div.2, Grps A,B,C&D, T4
ATEX: II 3G Ex nA II T4
GOST R: 2Ex nA II T4

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**kmo turbo GmbH**  Phone: +49 7541 95289-0  Fax: +49 7541 95289-20  [info@kmo-turbo.de](mailto:info@kmo-turbo.de)  [www.kmo-vibro.com](http://www.kmo-vibro.com)
**DTM Distributed Transmitter Monitor**

### DTM10-502-AX-CX-EXX-FXX-GX-SX

Factory configured for speed (built-in probe driver)

**AX**: Full Scale
- A0: 0 ~ 1,000 rpm
- A1*: 0 ~ 3,600 rpm
- A2: 0 ~ 6,000 rpm
- A3: 0 ~ 10,000 rpm
- A4: 0 ~ 30,000 rpm
- A5: 0 ~ 50,000 rpm
- A6: phase reference output
- A7: phase reference output for digital condition monitoring

**CX**: Alarms
- C0*: Dual alarms with epoxy sealed relays
- C1: No Alarm

**EXX**: Probe and Cable
- E00*: TM0180, 5m Cable
- E01: TM0180, 9m Cable
- E02: 8mm Probe, 3300, 5m Cable
- E03: 8mm Probe, 3300, 9m Cable
- E04: 8mm Probe, 7200, 5m Cable
- E05: 8mm Probe, 7200, 9m Cable
- E06: TM0105, 5m Cable
- E07: TM0105, 9m Cable
- E08: TM0110, 5m Cable
- E09: TM0110, 9m Cable
- E10: 11mm Probe, 3300, 5m Cable
- E11: 11mm Probe, 3300, 9m Cable
- E12: 11mm Probe, 7200, 5m Cable
- E13: 11mm Probe, 7200, 9m Cable

**FXX**: Teeth per Revolution
- F01*: 1
- FXX: Customer specify, number of teeth =XX

**GX**: Mounting
- G0*: DIN rail mounting.
- G1: Plate mounting.

**SX**: Approvals
- S0*: CE
- S1: CE
  - CSA: Class I, Div.2, Grps A, B, C&D, T4
  - ATEX: II 3G Ex nA II T4
  - GOST R: 2Ex nA IIT 4X

* Denote factory default.

### Optional Accessories

#### DTM-CAL
The DTM field calibration kit is capable of calibrating any 5mm, 8mm, or 11mm probe system. The kit includes:
- DTM-CFG configuration and calibration software CD
- RS485-USB converter with cable
- TM0540 proximity probe field calibration kit

#### DTM-CFG-K
The DTM configuration and calibration software kit includes:
- DTM-CFG configuration and calibration software CD
- RS485-USB converter with cable

#### TM900
Power converter with isolation. Converts 95-250 VAC into 24VDC and is capable of powering up to five DTM modules.

#### Proximity Sensor Systems
- TM0180: 8mm probe
- TM0105: 5mm probe
- TM0110: 11mm probe
- TM0181: Extension cable
- TM0182: Probe driver
- TM0120: 25mm probe system

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kmo turbo GmbH • Phone: +49 7541 95289-0 • Fax: +49 7541 95289-20 • info@kmo-turbo.de • www.kmo-vibro.com
DTM Distributed Transmitter Monitor

DTM10 System Installation

DTM10-201/202/501 Field-Wiring Diagram

Note:
- Power supply 2 and 4-20mA(2) are optional outputs used for redundancy.
- Alert and Danger relays are shown connected as normally open. Connect ARM and NC for normally closed.
- Connecting COM and RST/BYP with an external continuous or momentary closed switch will initiate a remote reset. Temporarily closing the switch will result in a system reset, continuous close will result in a system bypass.
- If the DTM10-201 has the digital condition monitoring function, the Trip/Multi and COM pins are used for phase reference input. Moreover, the DTM10-201 won’t provide Multiply Alarm function anymore, so you should set Multiply Alarm property to “None” by DTM-CFG software.
- If Full Scale of DTM10-501 is phase reference output (A6), Buffer output terminal will provide phase reference signal.
- If Full Scale of DTM10-501 is phase reference output for digital condition monitoring (A7), Trip/Multi terminal provides the phase reference signal for the DTM10-201, DTM10-301 or DM200. A DTM10-501 can provide the phase reference signal for up to 6 DTMs or DM200s.
Note:

✓ Power supply 2 and 4-20mA(2) are optional outputs used for redundancy.
✓ Alert and Danger relays are shown connected as normally open. Connect ARM and NC for normally closed.
✓ Connecting COM and RST/BYP with an external continuous or momentary closed switch will initiate a remote reset. Temporarily closing the switch will result in a system reset, continuous close will result in a system bypass.
✓ If the DTM10-201 has the digital condition monitoring function, the Trip/Multi and COM pins are used for phase reference input. Moreover, the DTM10-201 won’t provide Multiply Alarm function anymore, so you should set Multiply Alarm property to “None” by DTM-CFG software.
✓ If Full Scale of DTM10-501 is phase reference output (A6), Buffer output terminal will provide phase reference signal.
✓ If Full Scale of DTM10-501 is phase reference output for digital condition monitoring (A7), Trip/Multi terminal provides the phase reference signal for the DTM10-201, DTM10-301 or DM200. A DTM10-501 can provide the phase reference signal for up to 6 DTM10s or DM200s.
Note:

- Power supply 2 and 4-20mA(2) are optional outputs used for redundancy.
- Alert and Danger relays are shown connected as normally open. Connect ARM and NC for normally closed.
- Connecting COM and RST/BYP with an external continuous or momentary closed switch will initiate a remote reset. Temporarily closing the switch will result in a system reset, continuous close will result in a system bypass.
- If the DTM10-201 has the digital condition monitoring function, the Trip/Multi and COM pins are used for phase reference input. Moreover, the DTM10-201 won’t provide Multiply Alarm function anymore, so you should set Multiply Alarm property to “None” by DTM-CFG software.
- If Full Scale of DTM10-501 is phase reference output (A6), Buffer output terminal will provide phase reference signal.
- If Full Scale of DTM10-501 is phase reference output for digital condition monitoring (A7), Trip/Multi terminal provides the phase reference signal for the DTM10-201, DTM10-301 or DM200. A DTM10-501 can provide the phase reference signal for up to 6 DTM1s or DM200s.
DTM Distributed Transmitter Monitor

DTM10-201/202/501 Hazardous Area Field-Wiring Diagram (Probe is TM0120)

**Note:**

- Power supply 2 and 4-20mA(2) are optional outputs used for redundancy.
- Alert and Danger relays are shown connected as normally open. Connect ARM and NC for normally closed.
- Connecting COM and RST/BYP with an external continuous or momentary closed switch will initiate a remote reset.
  Temporarily closing the switch will result in a system reset, continuous close will result in a system bypass.
- If the DTM10-201 has the digital condition monitoring function, the Trip/Multi and COM pins are used for phase reference input. Moreover, the DTM10-201 won't provide Multiply Alarm function anymore, so you should set Multiply Alarm property to "None" by DTM-CFG software.
- If Full Scale of DTM10-501 is phase reference output (A6), Buffer output terminal will provide phase reference signal.
- If Full Scale of DTM10-501 is phase reference output for digital condition monitoring (A7), Trip/Multi terminal provides the phase reference signal for the DTM10-201, DTM10-301 or DM200. A DTM10-501 can provide the phase reference signal for up to 6 DTMs or DM200s.
DTM Distributed Transmitter Monitor

DTM10-301/302/502 Field-Wiring Diagram

Note:
- Power supply 2 and 4-20mA(2) are optional outputs used for redundancy.
- Alert and Danger relays are shown connected as normally open. Connect ARM and NC for normally closed.
- Connecting COM and RST/BYP with an external continuous or momentary closed switch will initiate a remote reset. Temporarily closing the switch will result in a system reset, continuous close will result in a system bypass.
- If the DTM10-201 has the digital condition monitoring function, the Trip/Multi and COM pins are used for phase reference input. Moreover, the DTM10-201 won’t provide Multiply Alarm function anymore, so you should set Multiply Alarm property to “None” by DTM-CFG software.
- If Full Scale of DTM10-501 is phase reference output (A6), Buffer output terminal will provide phase reference signal.
- If Full Scale of DTM10-501 is phase reference output for digital condition monitoring (A7), Trip/Multi terminal provides the phase reference signal for the DTM10-201, DTM10-301 or DM200. A DTM10-501 can provide the phase reference signal for up to 6 DTMs or DM200s.

kmo turbo GmbH  •  Phone: +49 7541 95289-0  •  Fax: +49 7541 95289-20  •  info@kmo-turbo.de  •  www.kmo-vibro.com
DTM20 Seismic Vibration Distributed Transmitter-Monitor
(Acceleration, Velocity and Displacement)

The DTM20 distributed vibration transmitter-monitor provides a simple and cost-effective solution for monitoring “balance-of-plant” equipment. The DTM20 monitor can interface with almost any seismic vibration sensor and can be fully field-configurable. In addition to this it also improves system reliability with redundant power supplies and redundant 4-20mA transmissions.

Applications include:
- Motors
- Pumps
- Fans
- Blowers
- Engines
- Compressors
- Centrifuges
- Generators
- Turbines
- Turbochargers

DTM20 Features
- Measures acceleration, velocity or displacement
- Direct Modbus RTU interface
- Redundant 4-20mA outputs (pk or RMS)
- Redundant power supplies
- Fully digital field-configuration
- Dual relay output with Alert and Danger (SPDT)
- LED indication of system OK, alert, and danger
- Local and remote RESET / BYPASS and trip-multiply
- Buffered Output for condition monitoring
- Aluminum case for RFI/EMI
- Epoxy potted for better environmental protection
- Signal filtering
- Digital condition monitoring (optional)

DTM20 Fully Configurable via Software
- Acceleration Monitor
- Velocity Monitor
- Displacement Monitor
Specifications

**Electrical**

**Power Supply:**
- 22-30VDC, 150mA.
- Accepts dual power supply inputs

**Galvanic isolation:**
- Among power, circuits and alarms

**Frequency Response (-3dB):**
- **Nominal Frequency:**
  - Acceleration: 4 ~ 3KHz
  - Velocity: 4 ~ 3KHz
  - Displacement: 4 ~ 3KHz
- **Low Frequency:**
  - Acceleration: 0.5 ~ 100Hz
  - Velocity: 0.5 ~ 100Hz (TM079VD)
  - Displacement: 0.5 ~ 100Hz (TM079VD)
- **High Frequency:**
  - Acceleration: 10 – 20KHz (peak)

**Filtering:**
- 8 pole 160dB/ Dec. Low-pass
- 1 pole 20dB/ Dec. High-pass
- Factory setting
- Customer specifiable

**ICP Sensor Interface:**
- Sensitivity:
  - 100mV/g
  - 100mV/in/sec
  - 4mV/um
- Specified sensitivity of any vibration sensor
- Current Source
  - Nominal: 4mA@24VDC

**Seismic Velocity Sensor Interface:**
- Sensitivity:
  - User specified for any vibration sensor
  - Software programmable

**Buffered Output:**
- Original vibration, un-filtered
- Impedance: 150Ω
- Maximum cable distance: 300m (1000ft)
- Sensitivity: same as the sensor

**4-20mA Output:**
- Dual 4-20mA, sourced (loop power not required)
- Maximum load resistance: 500Ω

**Alarm Setup:**
- 0 ~ 100% FS
- Accuracy: ±0.1%.

**Relays:**
- Seal: Epoxy
- Capacity: 0.2A/240VAC, 0.4A/110VAC, 2.0A/24VDC, resistive load
- Relay type: SPTD
- Isolation: 1000VDC

**LED Machine Condition Indicator:**
- OK: System OK indication
- ALT: Vibration over Alert level
- DNG: Vibration over Danger level
- BYP: System in BYPASS
- TRX: Digital transmission active

**RESET/BYPASS:**
- Front panel push-button
- Remote RESET/BYPASS terminals

**Trip-Multiply**
- Double Multiply or Triple Multiply set in DTM-CFG
- Short Trip/Multi terminal to COM terminal
- System alarm level will increase by a factor of 2 or 3

**Modbus:**
- RS485 Modbus RTU
- Non-isolated (use DTM96 for isolation)

**Software programming (DTM-CFG):**
- Alert and danger set-point, time delay
- ZERO and Full-Scale calibration
- Full-scale high and low setup
- Alarm latching/ non-latching, energized/ de-energized
- Alarms programmable with alert, danger or system ok
- Sensor selection and system calibration
- Measurand / Integration changes: A, V, D
- Modbus communication setup
- Trip-multiply setup
**Electrical specifications continued**

Real-time bar-graph and alarms

3 layers of password protection

**Digital condition monitoring (optional)**

Condition management software or portable vibration data collector of ProviTech could collect, store, and analyze machine health condition based on vibration via the bus communication of the DTM20.

Dynamic waveform data:

Real-time vibration data could be uploaded and the waveform and spectrum plot could be view by Condition management software or portable vibration data collector.

Trend Data:

The vibration data could be periodically stored by the DTM20 when it's powered on. User could collect trend data and view trend plots by Condition management software or portable vibration data collector. The trend sampling interval is configured by the related DTM-CFG software. DTM20's factory default is 10 hours. Every DTM20 could store maximum 1024 trend data.

Alarm Data:

The dynamic alarm data could be stored by the DTM20 when it's powered on. The DTM20 only stores one alarm data with highest measured value. User could view waveform and spectrum plot of alarm data by Condition management software or portable vibration data collector.

**Physical**

**Dimension:**

- **Height:** 75mm (2.95")
  - see figure below
- **Weight:** 2.0lb (1.0kg)
- **Case:** Aluminum cast (copper free)

**Environmental**

**Temperature:**

- **Operation:** -40°C ~ +85°C.
- **Storage:** -50°C ~ +100°C.
- **Humidity:** 90% non-condensing.

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Certification

CE certified with EMI compliance

CSA: Class I, Div. 2, Grps A,B,C&D,T4

ATEX: II 3G Ex nA II T4

GOST R: 2Ex nA II T4X
# Ordering Information

**DTM20-AX-BX-IX-MX-SX**  
Customer configurable seismic distributed transmitter-monitor

Distributed vibration monitor, fully field configurable, with Modbus RTU.

**AX:** Alarm and sensors  
- **A0:** With Epoxy sealed relays, ICP sensors  
- **A1:** No Alarm, ICP sensors  
- **A2:** Dual epoxy sealed relay alarms, seismic velocity  
- **A3:** No Alarm, seismic velocity  

**BX:** Mounting  
- **B0:** DIN rail mounting.  
- **B1:** Plate mounting.

**IX:** Frequency response  
- **I0:** Normal/ High frequency  
- **I1:** Low frequency

**MX:** Digital Communication  
- **M1:** With Modbus

**SX:** Approvals  
- **S0:** CE
- **S1:** CE

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**DTM20-101-AXX-CX-GX-HX-IX-MX-SX**  
Factory configured seismic monitor

**AXX:** Full Scale  
- **A00:** 0 - 200um pk-pk  
- **A01:** 0 - 500um pk-pk  
- **A02:** 0 - 100um pk-pk  
- **A03:** 0 - 250um pk-pk  
- **A05:** 0 - 125um pk-pk  
- **A06**: 0 - 50mm/s pk  
- **A07:** 0 - 100mm/s pk  
- **A08:** 0 - 20mm/s pk  
- **A11:** 0 - 25mm/s pk  
- **A12:** 0 - 5.0g pk  
- **A13:** 0 – 8mil pk-pk  
- **A14:** 0 – 8mil pk-pk  
- **A15:** 0 – 20mil pk-pk  
- **A16:** 0 – 4mil pk-pk  
- **A17:** 0 – 10mil pk-pk  
- **A18:** 0 – 5mil pk-pk  
- **A19:** 0 – 2.0 ips pk  
- **A20:** 0 – 4.0 ips pk  
- **A21:** 0 – 0.8 ips pk  
- **A22:** 0 – 1.0 ips pk  
- **A26:** 0 - 50mm/s rms  
- **A27:** 0 - 100mm/s rms  
- **A28:** 0 - 20mm/s rms  
- **A31:** 0 - 25mm/s rms  
- **A32:** 0 - 2.0 ips rms  
- **A33:** 0 - 4.0 ips rms  
- **A34:** 0 - 0.8 ips rms  
- **A35:** 0 - 1.0 ips rms

**CX:** Alarms  
- **C0:** Dual alarms with epoxy sealed relays  
- **C1:** No Alarm

**GX:** Mounting  
- **G0:** DIN rail mounting.  
- **G1:** Plate mounting.

**HX:** Sensor (not include)  
- **H0:** TM0782A or any ICP accelerometer with 100mV/g (A00-A05 not available)  
- **H1:** TM0793V or any ICP velocity sensor with 4mV/mm/s (A12, 13 not applicable)  
- **H2:** TM079VD (A12, 13 not available)  
- **HXXX:** Seismic velocity sensor, Sensitivity = XXX mV/in/sec (A12, 13 not available)

**IX:** Frequency Response  
- **I0:** Normal Frequency (4 ~ 3KHz, H2 not available)  
- **I1:** Low Frequency (0.5~100Hz)  
- **I2:** High frequency (10 – 20KHz, A12, A13 only with accelerometer)

**MX:** Digital Communication  
- **M1:** With Modbus

**SX:** Approvals  
- **S0:** CE
- **S1:** CE

* Denotes factory default.
DTM Distributed Transmitter Monitor

Optional Accessories

**DTM-CFG-K**
The DTM configuration and calibration software kit includes:

- DTM-CFG configuration and calibration software CD
- RS485-USB converter with cable

**Seismic Sensor Systems**

- **TM0782A-K-M:** Accelerometer kit
- **TM0783A-K-M:** Accelerometer with cable
- **TM0793V-K-M:** Velocity sensor kit
- **TM079VD-V/H-K:** Low frequency sensor

**TM900**
Power converter with isolation. Converts 95-250 VAC into 24VDC and is capable of powering up to five DTM modules.
DTM20 System Installation

DTM20 Field-Wiring Diagram

Note:
- Power supply 2 and 4-20mA(2) are optional connections used for redundancy.
- Alert and Danger relays are shown connected as normally open. Connect ARM and NC for normally closed.
- Connecting COM and RST/BYP with an external continuous or momentary closed switch will initiate a remote reset. Temporarily closing the switch will result in a system reset, continuous close will result in a system bypass.
- If DTM20 has the digital condition monitoring function, the Trip/Multi and COM pins are used for phase reference input. Thus, the DTM20 won’t provide the Trip Multiply and the Trip Multiply property should be set to “None” in the DTM-CFG software.
DTM20 Hazardous Area Field-Wiring Diagram

Note:
- Power supply 2 and 4-20mA(2) are optional connections used for redundancy.
- Alert and Danger relays are shown connected as normally open. Connect ARM and NC for normally closed.
- Connecting COM and RST/BYP with an external continuous or momentary closed switch will initiate a remote reset. Temporarily closing the switch will result in a system reset, continuous close will result in a system bypass.
- If DTM20 has the digital condition monitoring function, the Trip/Multi and COM pins are used for phase reference input. Thus, the DTM20 won’t provide the Trip Multiply and the Trip Multiply property should be set to “None” in the DTM-CFG software.
The DTM30 temperature module is a single channel temperature signal conditioner and processing unit. DTM30 accepts resistance temperature detector (RTD) and thermocouple signal input and has a choice of output options including an isolated (0 or 4 to 20) mA re-transmission signal, change over trip relay, twin normally open relays or various combinations. DTM30 has a high degree of functionality and configurability. For systems that require more local input, DTM30 with an in-built keypad and digital display are available where functions can be accessed via the front panel keys.

**DTM30 Features**

- Input/output/power isolation
- Powerful standard functions which the user can easily configure via front panel keys
- Digital display measurement value
- Isolated (0 or 4 to 20) mA output
- Dual relay output
- 35mm DIN rail mounting

**Specifications**

**Electrical**

**Power Supply:**
24V DC ±10% @200 mA

**Inputs:**
DTM30 units can accept the following input types.

- **RTD:** Pt100, Ni120
- **Thermocouple:** K, J, T, R, S, E, F, N, B

**RTD:**
- Sensor range: -200 to 850°C
- Linearization: Pt100 (BS EN 60751/JISC 1604)/Ni120/Custom
- Basic accuracy: 0.1 °C ± 0.05% of reading
- Thermal drift (zero): ±0.004 Ω/°C
- Thermal drift (span): 100ppm/°C
- Excitation current: 1mA
- Lead resistance effect: 0.002 °C/Ω
- Max lead resistance: 50Ω/leg

**Thermocouple:**

<table>
<thead>
<tr>
<th>Type</th>
<th>Range(°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>K</td>
<td>-200 to 1370</td>
</tr>
<tr>
<td>J</td>
<td>-200 to 1200</td>
</tr>
<tr>
<td>T</td>
<td>-210 to 400</td>
</tr>
<tr>
<td>R</td>
<td>-10 to 1760</td>
</tr>
<tr>
<td>S</td>
<td>-10 to 1760</td>
</tr>
<tr>
<td>E</td>
<td>-200 to 1000</td>
</tr>
<tr>
<td>F</td>
<td>-100 to 600</td>
</tr>
<tr>
<td>N</td>
<td>-180 to 1300</td>
</tr>
<tr>
<td>B</td>
<td>-10 to 1650</td>
</tr>
<tr>
<td>Custom</td>
<td>user defined</td>
</tr>
</tbody>
</table>

Basic accuracy:
± 0.04% FS or ± 0.04% reading or ±0.5°C, whichever is greater (For type R & S, stated accuracy only applies between 800 & 1760°C) (For type B, stated accuracy only applies between 400 & 1650°C)

Linearization: BS4937 / IEC 584-3 / Custom
Cold junction error: ±0.5°C
Cold junction tracking: 0.05°C/°C
Cold junction range: -20 to 70°C
Thermal drift (zero): ±4µV/°C
Thermal drift (span): ±200ppm /°C

Outputs:

Relays
Alarm Action: Off, High, Low, Deviation, Test
Max switching voltage: 48V RMS (AC)/ 48V (DC)
Max current: 1A @48V(AC)/ 1A @ 30V(DC)
Max power: 60VA(AC)/ 30W(DC)
Hysteresis: Programmable 0 to 100%
Delay Time: Programmable (Alarm must be continuously present for this period in order to be recognized)
Start-up Delay: Programmable
Operate time: <5ms
Electrical life @ full load: 100,000 operations
Mechanical life: 10,000,000 operations

Current Retransmission:
Output Range: 0-10, 0-20, 4-20 mA source or sink
Maximum current output: <23mA
Accuracy: 0.07%
Max power supply: 30V (In sink mode)

General:
EMC Approval: EN61326: 1997
Immunity: Annex A Industrial
Response Time: 300mSec typical
Isolation: 500V AC I/P–O/P–PSU
EMC emissions: BS EN50081-1
EMC immunity: BS EN50082-2
Display Range: -1999 to 9999

Environmental
Temperature:
Operation: -30°C ~ +60°C.
Storage: -50°C ~ +85°C.
Humidity: 10 to 90% RH

Ordering Information

DTM30-AX
A0 : Basic module

Optional Accessories

TM900
Power converter with isolation. It converts 95-250 VAC into 24VDC and is capable of powering up to five DTM modules.

Physical
DTM Distributed Transmitter Monitor

DTM30 System Installation

DTM30 Field-Wiring Diagram for RTD

- **Power/Comms**
  - RX+/RX- / TX+/TX- / Power / GND

- **Outputs**
  - Active
  - +
  - -
  - Passive
  - RLY1
  - RLY2

- **Inputs**
  - RTD

Note:
- DTM30 is provided with a unique 'BUS JUMPER' system for quick wiring of communications and power connections. To use the Bus Jumper, disconnect all power supply/communications connectors and place them so that they connect between the two units. Wiring to one connector then connects to all units.
DTM Distributed Transmitter Monitor

DTM30 Field-Wiring Diagram for Thermocouple

Wires to Power and communications to one connector are Bussed to all

BUS JUMPER

DTM30
Temperature Module

Note:

- DTM30 is provided with a unique ‘BUS JUMPER’ system for quick wiring of communications and power connections. To use the Bus Jumper, disconnect all power supply/communications connectors and place them so that they connect between the two units. Wiring to one connector then connects to all units.
The DTM96 functions as an RS232 to RS485 convertor and / or enables (32) DTM modules to be networked together via Modbus. Combined with the DTM-CFG configuration software, the DTM96 truly provides a distributed vibration system. The Modbus interface enables users to remotely monitor, configure, and calibrate the DTMs.

**DTM96 Features**

- Direct Modbus RTU interface
- Optically isolated RS485, RS422, and RS232 communications
- Communicate with the DTM using your computers RS232 connection
- Provides galvanic isolation between PC and DTM

**Specifications**

**Electrical**

- **Power Supply:** 22-30VDC, 150mA
- **Modbus:** Modbus RTU, RS485 and RS232 Galvanically Isolated
- **Modbus TCP:** RJ45 Ethernet connection Galvanically Isolated

**Physical**

- **Dimension:**
  - Height: 75mm (2.95")
  - Weight: 1.0lb (0.5kg).
  - Case: Aluminum cast (copper free)

**Environmental**

- **Temperature:**
  - Operation: -40°C ~ +85°C.
  - Storage: -50°C ~ +100°C.

- **Humidity:** 90% non-condensing.
**Certification**

CE certified with EMI compliance  
CSA: Class I, Div. 2, Grps A, B, C&D, T4  
ATEX: II 3G Ex nA II T4  
GOST R: 2Ex nA II T4X

**Hazardous area**

Marking:

ATEX Standards:
- EN 60079-0
- EN 60079-15

Special condition in hazardous area:
- The ambient temperature range is: -40°C ≤ Ta ≤ 70°C
- DTM modules must be placed inside an enclosure that is in accordance with EN 60079-15:2005.
- Provisions must be made externally to prevent the rated voltage from being exceeded by transient disturbances of more than 40%.

**Ordering Information**

**DTM96-AX-BX-SX**

DTM interface module with RS485 and RS232.

**AX: Output**
- A0*: Modbus RS485, RS232, RS422

**BX: Mounting**
- B0*: DIN rail mounting
- B1: Plate mounting

**SX: Approvals**
- S0*: CE
- S1: CE certified with EMI compliance
  - CSA: Class I, Div. 2, Grps A, B, C&D, T4
  - ATEX: II 3G Ex nA II T4
  - GOST R: 2Ex nA II T4X

* Denotes factory default.

**Optional Accessories**

**TM900**

Power converter with isolation. It converts 95-250 VAC into 24VDC and is capable of powering up to five DTM modules.
The DTM96 has 6 output connections. To wire additional modules the communications should be wired in parallel.

Only one connection (RS422, RS485 or RS232) can be used at one time.
DTM-CFG Configuration and Calibration Software

DTM-CFG is the configuration and calibration software used to configure all DTM modules. DTM-CFG works with Windows XP or Windows 2000 operating system.

DTM-CFG can be connected to the DTM modules with the interface of a RS485-USB cable kit.

DTM-CFG combined with the DTM96 allows the user to remotely interface with 32 DTMs networked together in the field.

**DTM-CFG Features**

✓ DTM Configuration
✓ DTM Calibration

**Specifications**

**Module Configuration:**
✓ Module type selection
✓ Modbus ID address, Range
✓ Communication baud rate
✓ Auto manual search of communication port
✓ English or metric selection
✓ Password and security

**Operation Configuration:**
✓ Sensor and sensitivity selection
✓ Measurement unit selection
✓ Full-scale
✓ Dual-alarm set-points, time delay, latching
✓ Relay energized/de-energized. Relay programmed to Alert or OK
✓ OK set-points

**Maintenance Calibration:**
✓ ZERO calibration, SPAN calibration
✓ Probe linearization calibration
✓ Real-time overall and status display
✓ Record of overall and status
✓ Configuration parameter save as file

**Order Information**

**DTM-CFG-K**
DTM configuration and calibration software kit includes:
✓ DTM-CFG configuration and calibration software CD
✓ RS485-USB converter with cable
✓ User manual

**DTM-CFG**
DTM configuration and calibration software includes:
✓ DTM-CFG configuration and calibration software CD
✓ User manual

**DTM-CAL**
The DTM field calibration kit with probe calibration capability with any 5mm, 8mm and 11mm probe system. The kit includes:
✓ DTM-CFG configuration and calibration software CD
✓ RS485-USB converter with cable
✓ TM0540 proximity probe field calibration kit
✓ User manual

**Optional Accessories**
- **RS485-USB**: RS485 to USB converter with cable
- **RS232-USB**: RS232 to USB converter with cable
- **DTM96**: Isolated communication module
- **TM0540**: Proximity probe field calibration kit
Reliable Power Converter
The TM900 power converter is designed specifically for the DTM series transmitter-monitor. Each TM900 can supply power for up to five DTM series transmitter-monitors. The 24Vdc output of the power converter is isolated from its input and is short circuit protected.

Specifications
Electrical
AC Power Input: 90–250VAC

Power Output: Voltage: 24VDC±5%.
Current: < 750mA.
Isolation: 1000VAC.

Fuse: 2.0A, 250VAC.

Physical
Dimension:
Height: 75mm (2.95″)
see figure below

Weight: 1.0kg (2.0 lb)

Environmental
Temperature:
Operation: -40°C ~ +85°C.
Storage: -50°C ~ +100°C.

Humidity: 90% non-condensing.

Certifications
CE certified with EMC compliance

Ordering Information
TM900–GX
GX: Mounting.
G0*: 35mm DIN rail mounting.
G1: Plate mounting.
# DTM Distributed Transmitter Monitor

## Accessories II

**DTM-CFG**  
Configuration and calibration software

**DTM RS485-USB**  
Converter from RS485 to USB for configuration with laptop computer

**DTM RS485-RS232**  
Converter from RS485 to RS232 for configuration with desktop computer

**PCM370**  
PCM370 condition monitoring software is ideal for plant wide condition monitoring, and trending of overall vibration levels

**PT2060/98-PC**  
Touch panel PC with IP65 rating. Ideal to work with PCM370 and DTM-CFG
Digital Network Connection Diagram

Note:

- Relay outputs and 4-20mA outputs can be hard wired directly to the PLC/DCS.
- Digital communication via modbus is available to communicate with the Plant Information Network.
- Relay alarms and controls such as Reset, Trip-multiply etc. need to be hardwired to the control system (PLC/DCS)