DTM
Distributed Transmitter-Monitor

kmo turbo GmbH • Friedrichstr. 59 • 88045 Friedrichshafen • Germany
Phone: +49 7541 95289-0 • Fax: +49 7541 95289-20 • info@kmo-turbo.de • www.**kmo-vibro**.com

DTM-CATALOG-E-A-1-KMO20130601

Table of Contents

DTM Series Distributed Transmitter Monitor Introduction

Fully Digital

The DTM series digital transmitter monitor is ProvibTech'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.

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.

ProvibTech's DTM Selection Guide

Model Number	DTM10	DTM20	DTM30	DTM96	DTM-CFG
	Radial Shaft Vibration, Thrust & Speed	Case Vibration	Temperature, Dual Channels	Accessory: Communication Module	Accessory: Configuration Software
Available as Pre- Configured or Field Programmable *1	●	●	●		●
Vibration Measurements					
Radial Vibration	●				
Axial Position	●				
Speed/ Phase Reference	●				
Case Vibration		●			
Temperature			●		
Sensor Interfaces					
Accelerometer		●			
Velocity Transducer		●			
Proximity Probe	●				
Works With or Without Probe Driver	●				
Thermocouple, RTD			●		
Outputs/ Communications					
Redundant 4-20mA Output	●	●	S		
Relay Output	●	●	●		
Redundant Power Supply Input	●	●	S		
Modbus Output	●	●		● (isolation)	
Buffered Output	●	●			
Features					
Push Button Setup (Limited Settings)	●	●	●		
Power-Up Inhibit	●	●	●		
System OK Checking	●	●	●		
Hazardous Rating (CSA, ATEX, GOST R) II3GExnAIIT4 Class I, Div.2; Grps A, B, C & D, T4 2ExnAIIT4X	●	●		●	
Network DTMs via Modbus *2	●	●		●	
Warranty- 2 years	●	●	●	●	

● = 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

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

Electrical specifications continued

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.

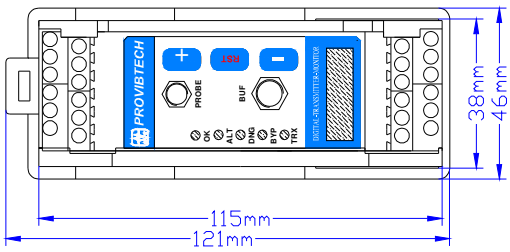
Alarm Data:

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)



Rail Mounting

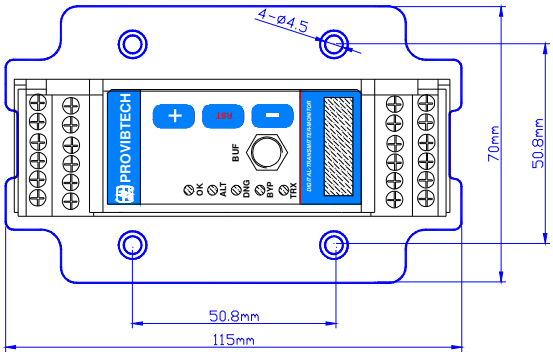


Plate Mounting

Environmental

Temperature:

Operation:	-40℃ ~ +85℃
Storage:	-50℃ ~ +100 ℃
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

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 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 ~ 100um pk-pk
A3: 0 ~ 10mil pk-pk
A4: 0 ~ 50mil pk-pk
A5: 0 ~ 5.0mil pk-pk
A6: 0 ~ 200um pk-pk (0.5 ~ 100Hz)
A7: 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

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 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

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

Factory configured for vibration (built-in probe driver)

AX: Full Scale

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

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 IIT4X

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 T4X

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

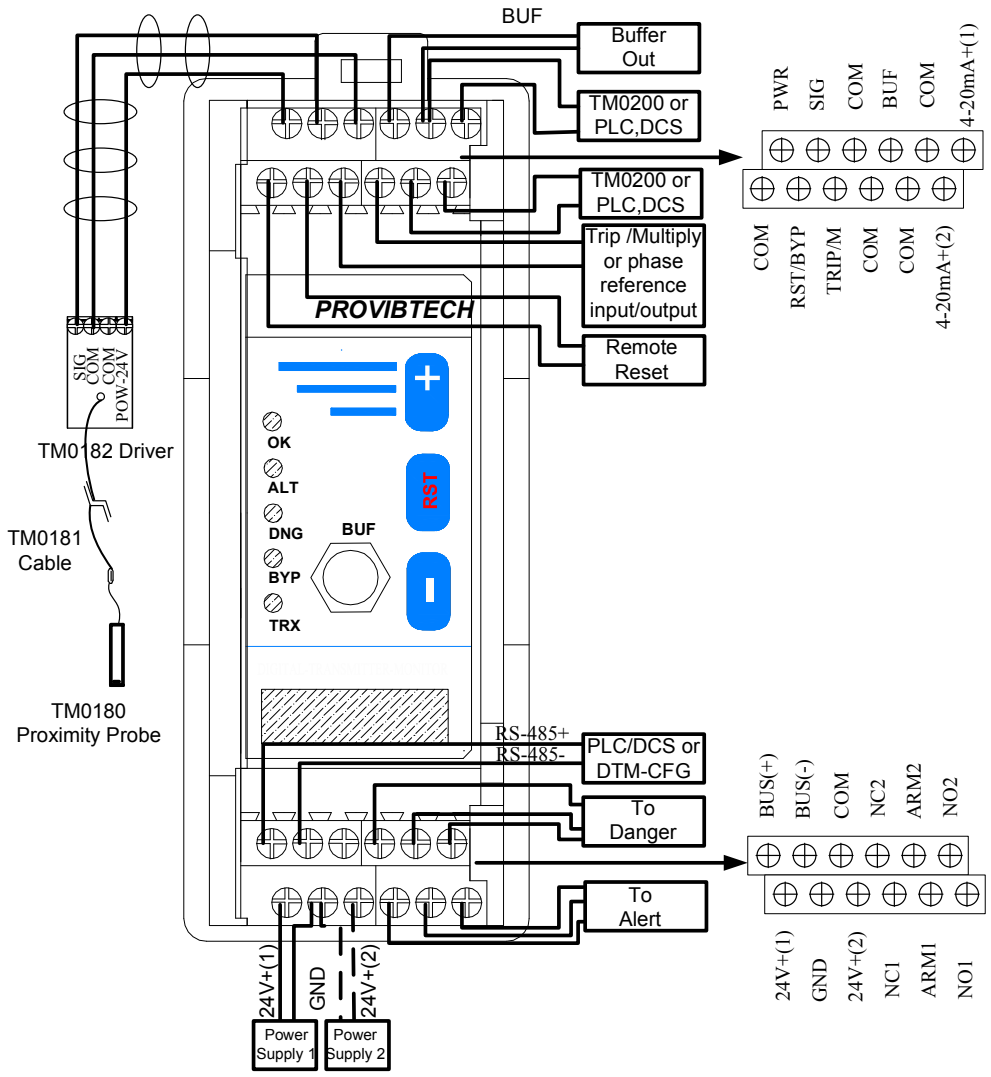
Power converter with isolation. Converts 95-250 VAC into 24VDC and is capable of powering up to five DTM modules.

Proximity Sensor Systems

- ✓ **TM0180:** 8mm probe
- ✓ **TM0105:** 5mm probe
- ✓ **TM0110:** 11mm probe
- ✓ **TM0181:** Extension cable
- ✓ **TM0182:** Probe driver
- ✓ **TM0120:** 25mm probe system

DTM10 System Installation

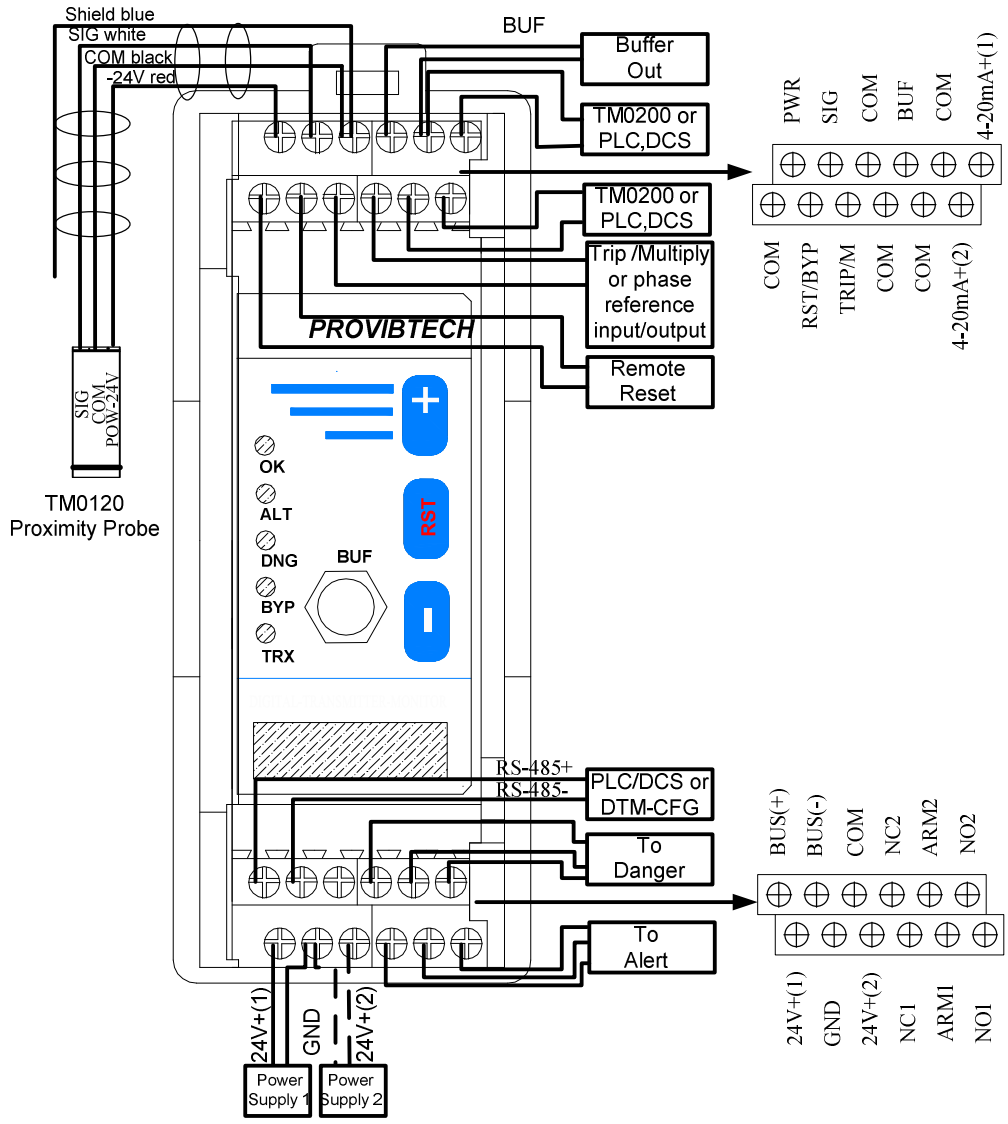
DTM10-201/202/501 Field-Wiring Diagram



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.

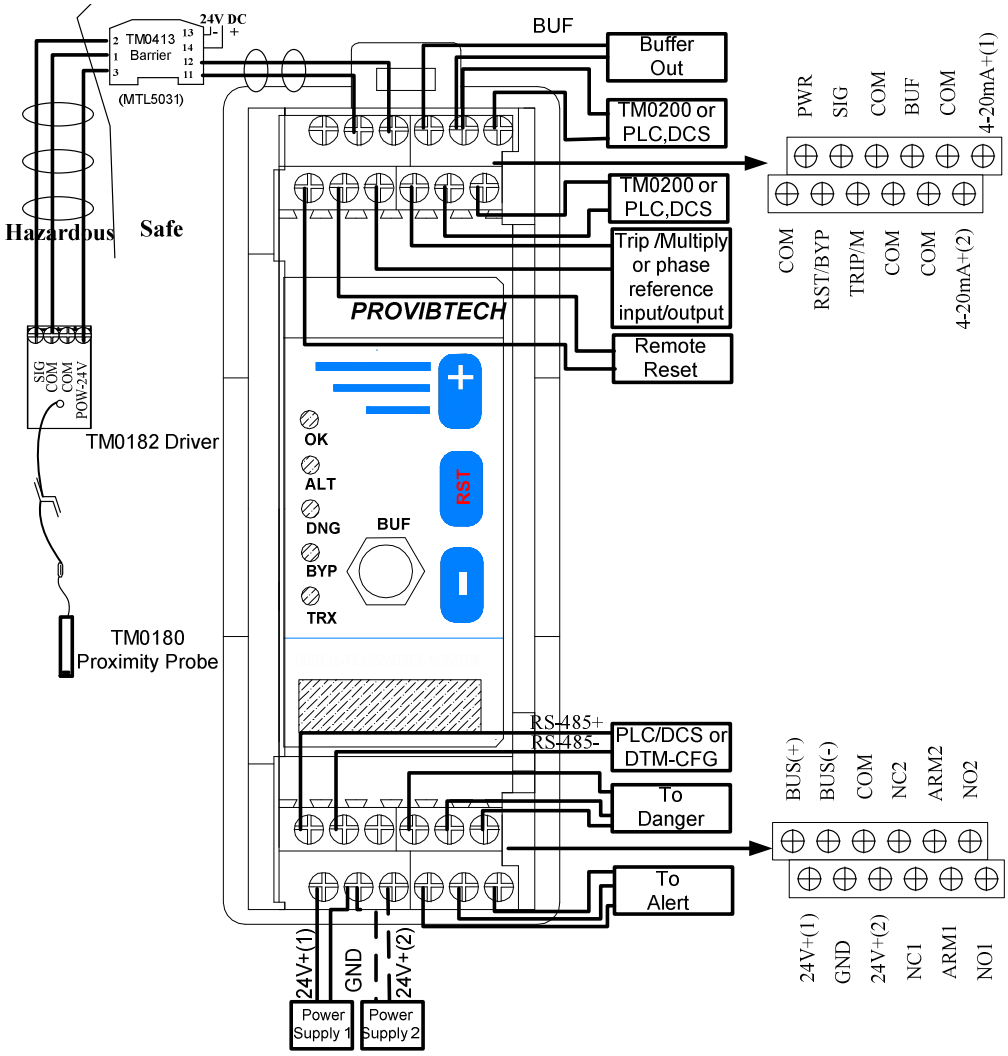
DTM10-201/202/501 Field-Wiring Diagram (Probe is TM0120)



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.

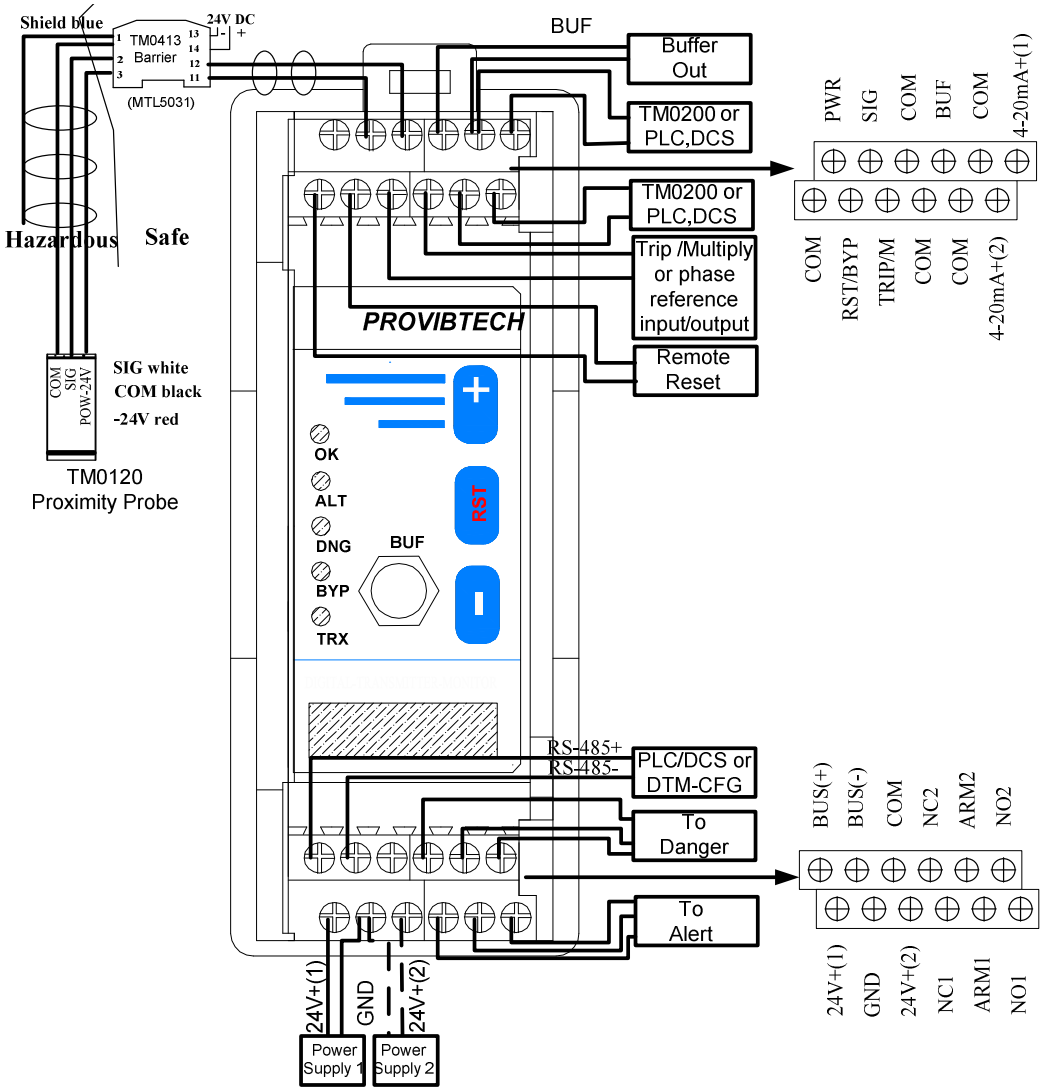
DTM10-201/202/501 Hazardous Area Field-Wiring Diagram



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.

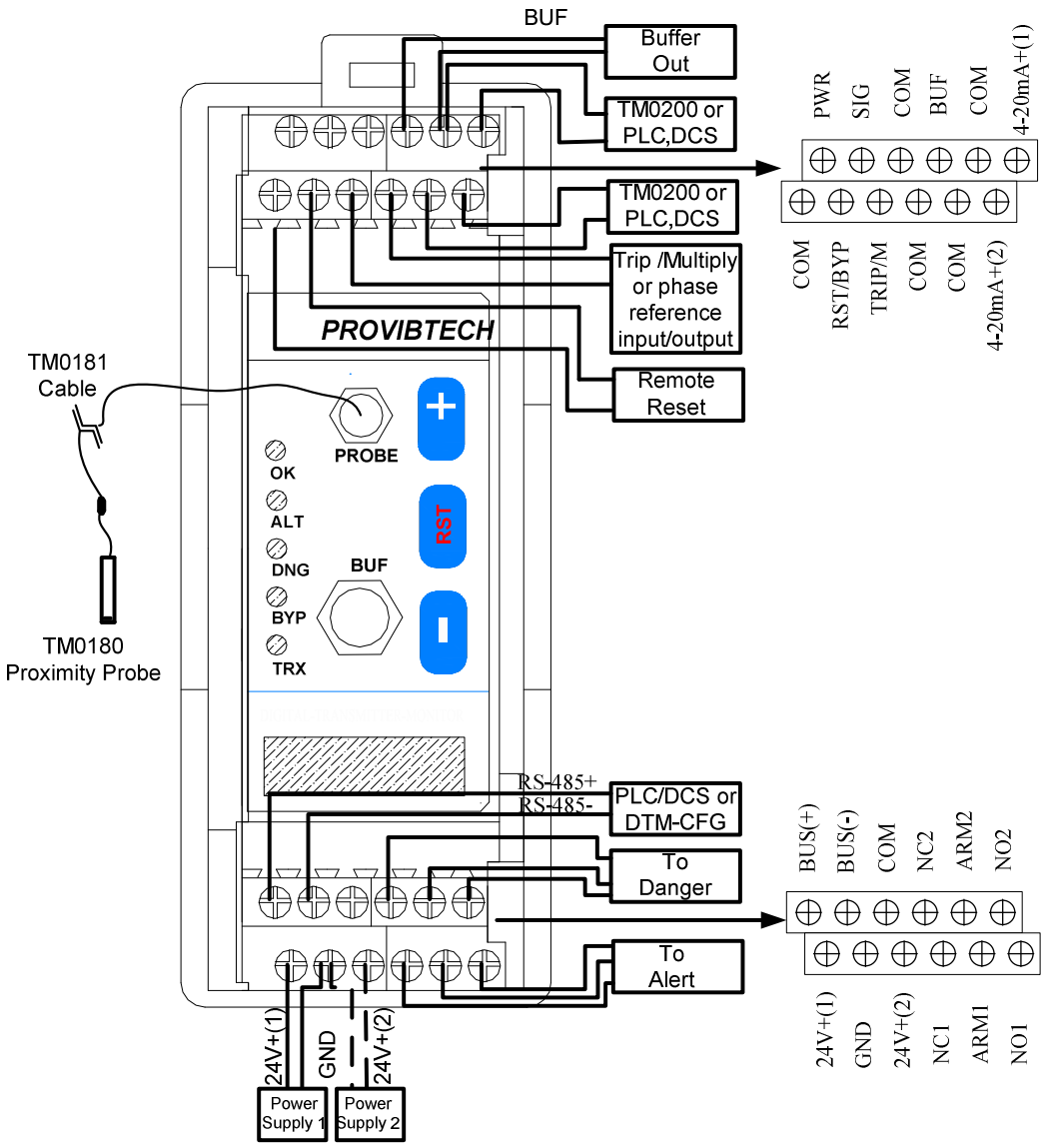
DTM10-201/202/501 Hazardous Area Field-Wiring Diagram (Probe is TM0120)



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.

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.
- ✓

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 Fully Configurable via Software

- ✓ **Acceleration Monitor**
- ✓ **Velocity Monitor**
- ✓ **Displacement Monitor**

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)**

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

Local BNC connection and remote terminal connection

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 ProvibTech 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

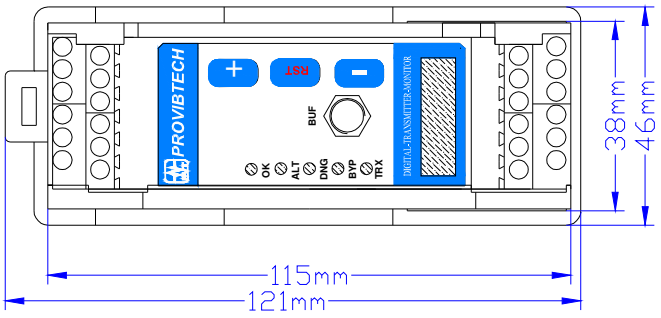
Temperature:

Operation:	-40℃ ~ +85℃.
Storage:	-50℃ ~ +100℃.
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



Rail Mounting

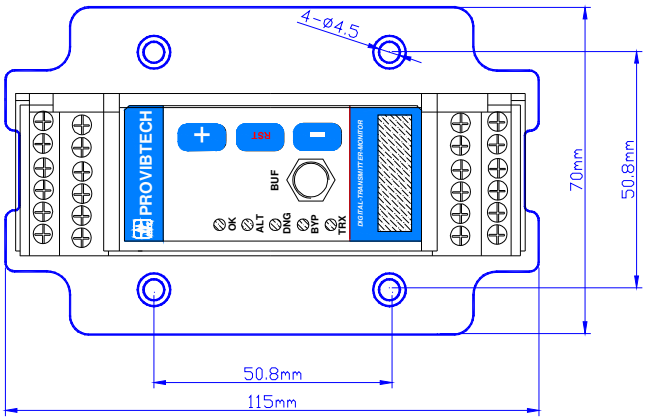


Plate Mounting

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

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 ExnA II T4
GOST R: 2Ex nA II T4X

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 - 10g 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 - 25 mm/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

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 ExnA II T4
GOST R: 2ExnAIIT4X

* Denotes factory default.

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

TM900

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

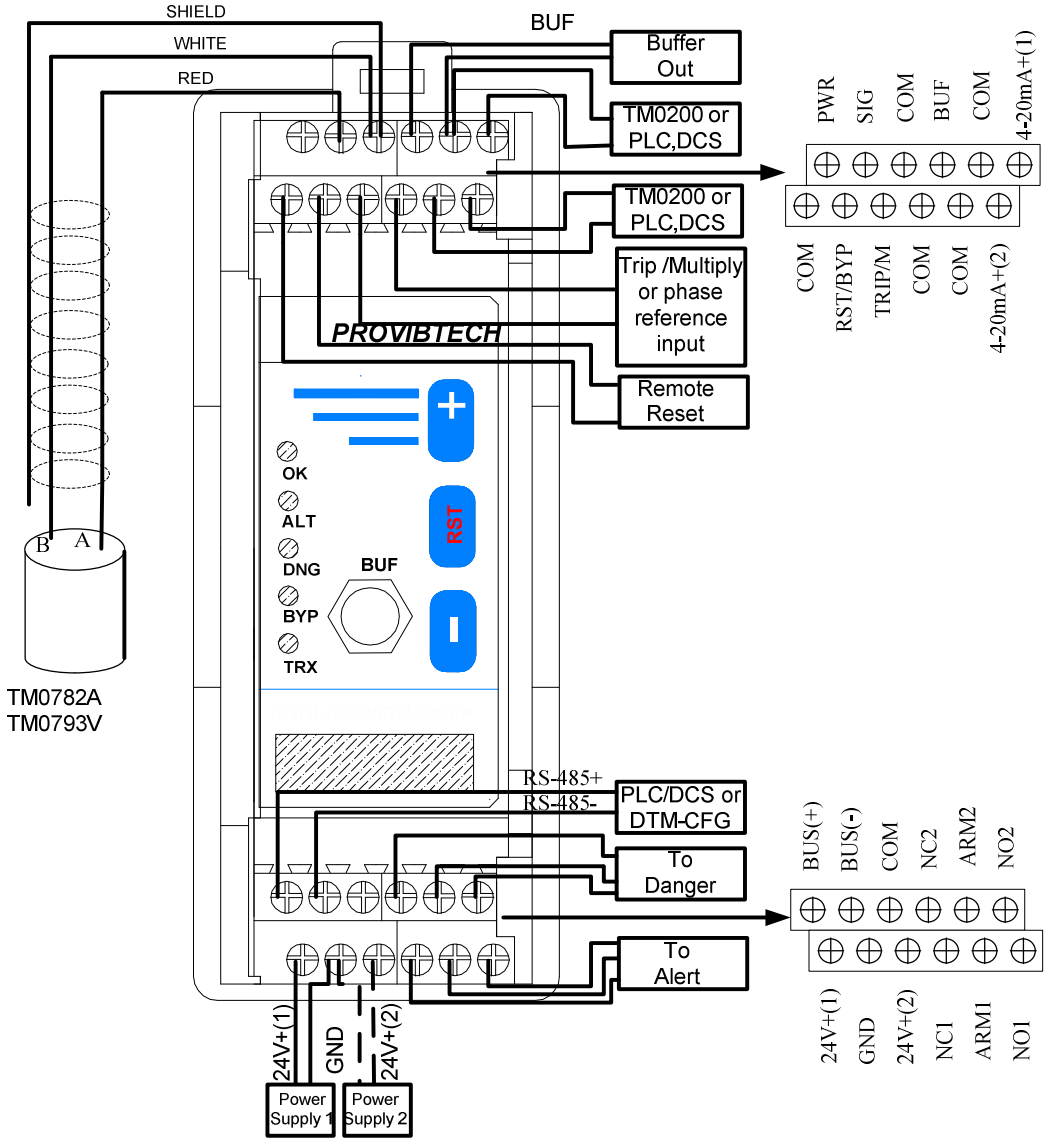
.

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

DTM20 System Installation

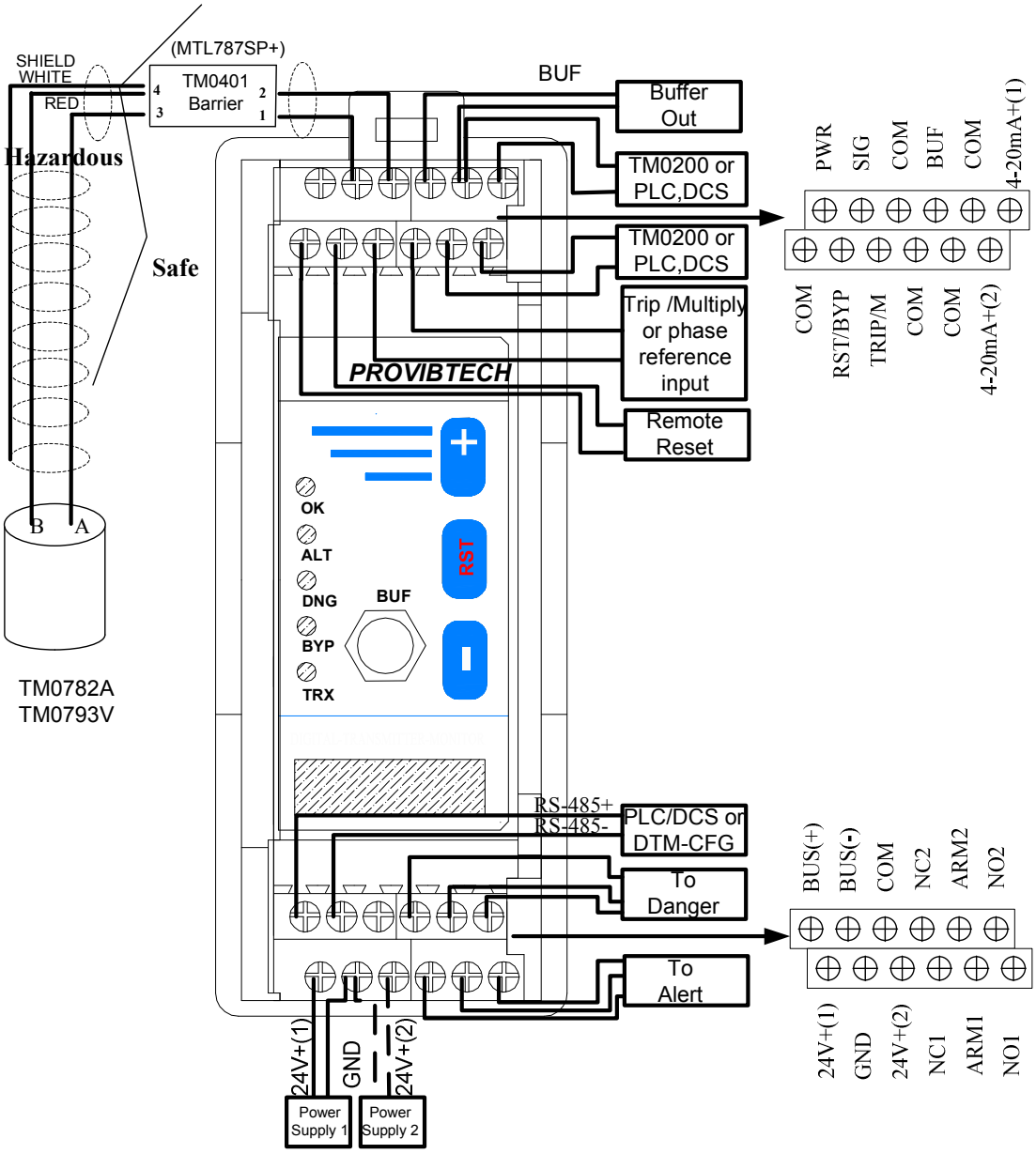
DTM20 Field-Wiring Diagram



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.
- ✓ When using the signal condition monitoring function the DTM20 works with DTM10-501/502 to provide a phase reference output. In this case connect Trip/Multi of DTM20 with Trip/Multi of DTM10-501/502 and connect COM of DTM20 with COM of DTM10-501/502.

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.
- ✓ When using the signal condition monitoring function the DTM20 works with DTM10-501/502 to provide a phase reference output. In this case connect Trip/Multi of DTM20 with Trip/Multi of DTM10-501/502 and connect COM of DTM20 with COM of DTM10-501/502.

DTM30 Temperature Module

The DTM30 temperature module is a single channel temperature signal conditioner and pro
cessing 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℃
Linearization:	Pt100 (BS EN 60751/JISC 1604)/Ni120/Custom
Basic accuracy:	0.1℃ ± 0.05% of reading
Thermal drift (zero):	±0.004Ω/℃
Thermal drift (span):	100ppm/℃
Excitation current:	1mA
Lead resistance effect:	0.002 ℃/Ω
Max lead resistance:	50Ω/leg

Thermocouple:

Sensor range:

Type	Range(℃)
K	-200 to 1370
J	-200 to 1200
T	-210 to 400
R	-10 to 1760
S	-10 to 1760
E	-200 to 1000
F	-100 to 600
N	-180 to 1300
B	-10 to 1650
Custom	user defined

Basic accuracy:

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

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

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

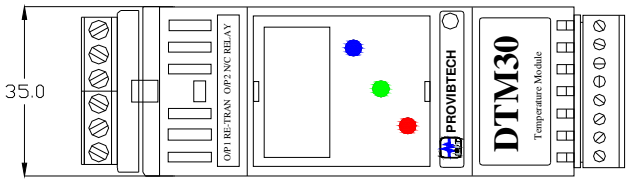
Current Retransmission:

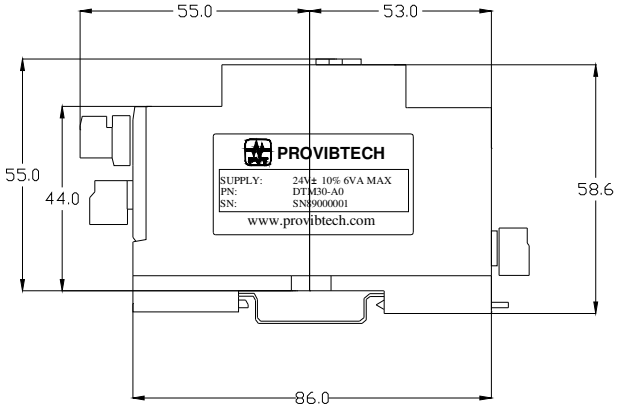
Output Range:	0-10, 0-20, 4-20 mA source or sink
Maximum current output:	<23mA
Accuracy:	0.07%
Max power supply:	30V (In sink mode)

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

Physical





Environmental

Temperature:

Operation:	-30℃ ~ +60℃.
Storage:	-50℃ ~ +85℃.
Humidity:	10 to 90% RH

Ordering Information

DTM30-AX

A0：Basic module

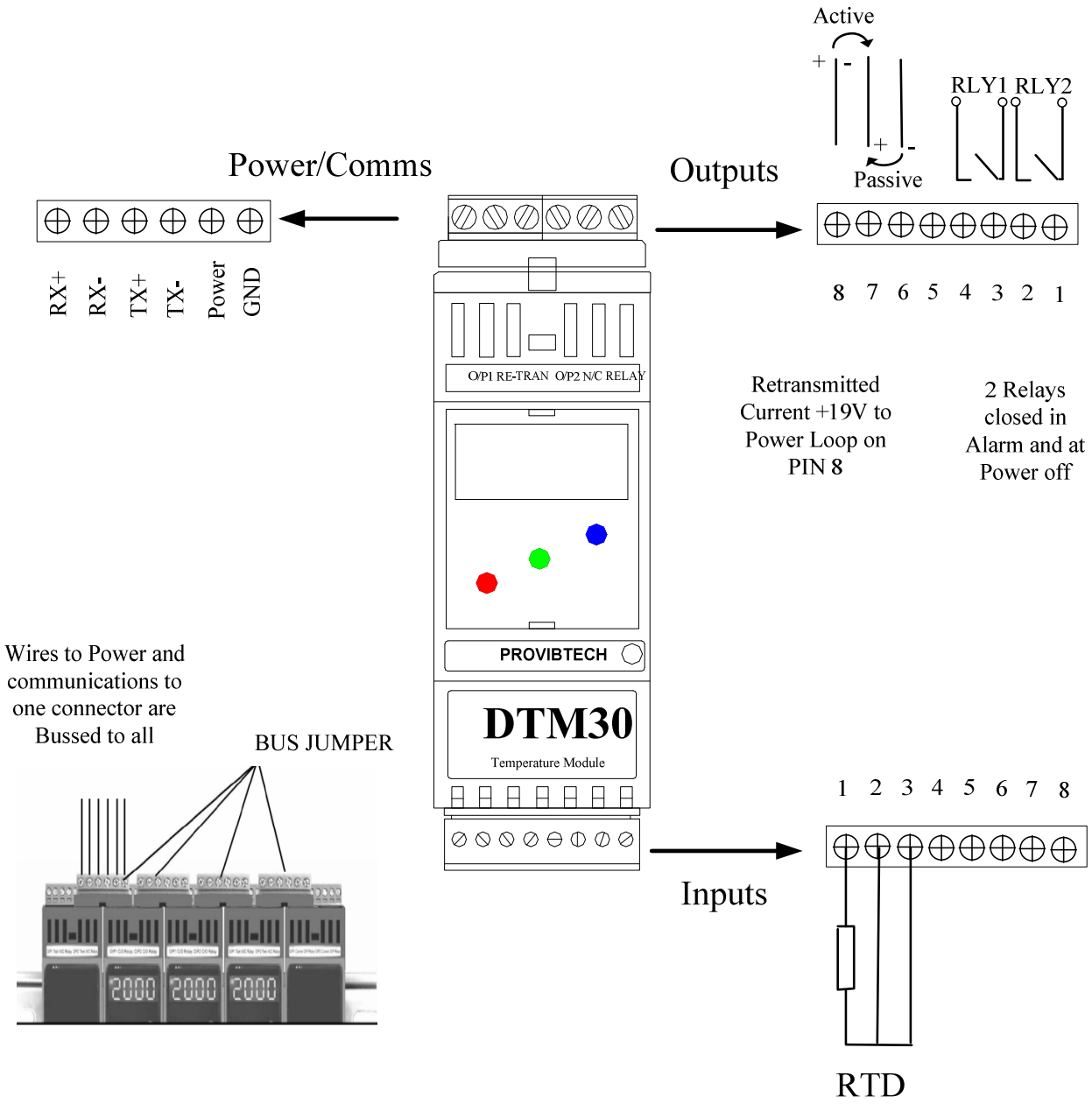
Optional Accessories

TM900

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

DTM30 System Installation

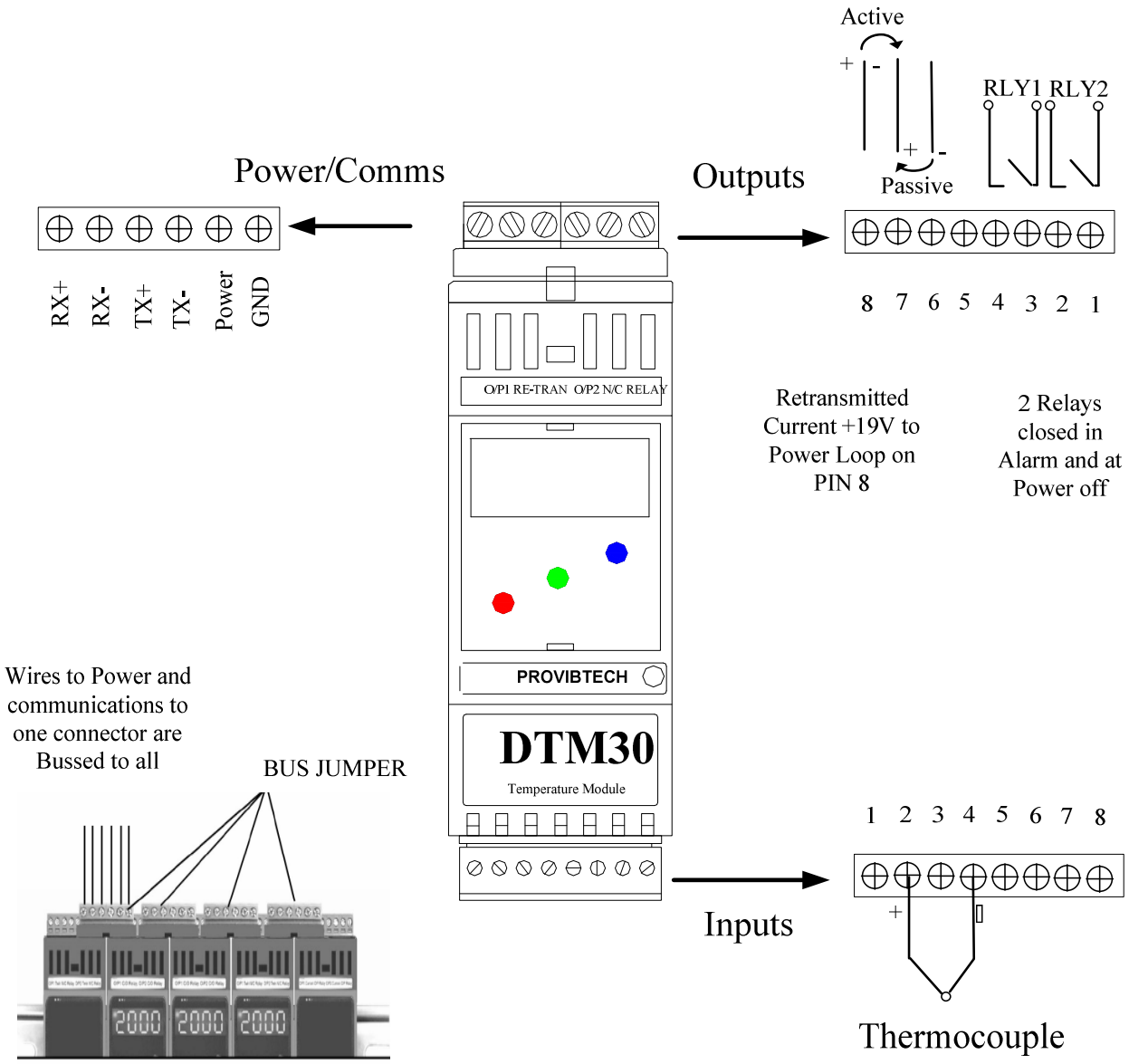
DTM30 Field-Wiring Diagram for RTD



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.

DTM30 Field-Wiring Diagram for Thermocouple



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.

DTM96 Communication Module

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

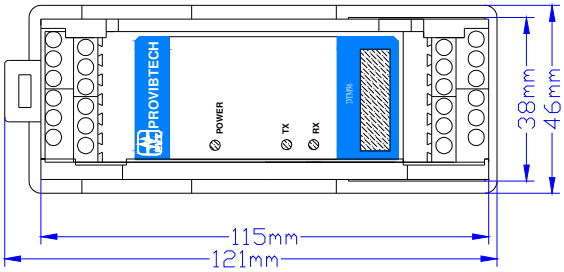
Electrical

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

Physical

Dimension:

Height:	75mm (2.95″) see figure below.
Weight:	1.0lb (0.5kg).
Case:	Aluminum cast (copper free)



Rail Mounting

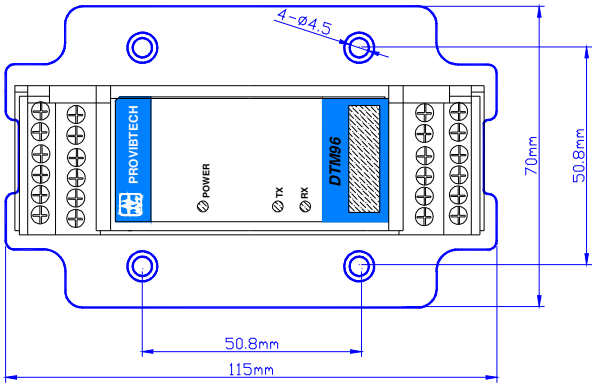


Plate Mounting

Environmental

Temperature:

Operation:	-40℃ ~ +85℃ .
Storage:	-50℃ ~ +100℃ .
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℃≤ Ta≤ 70℃
- DTMs 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.

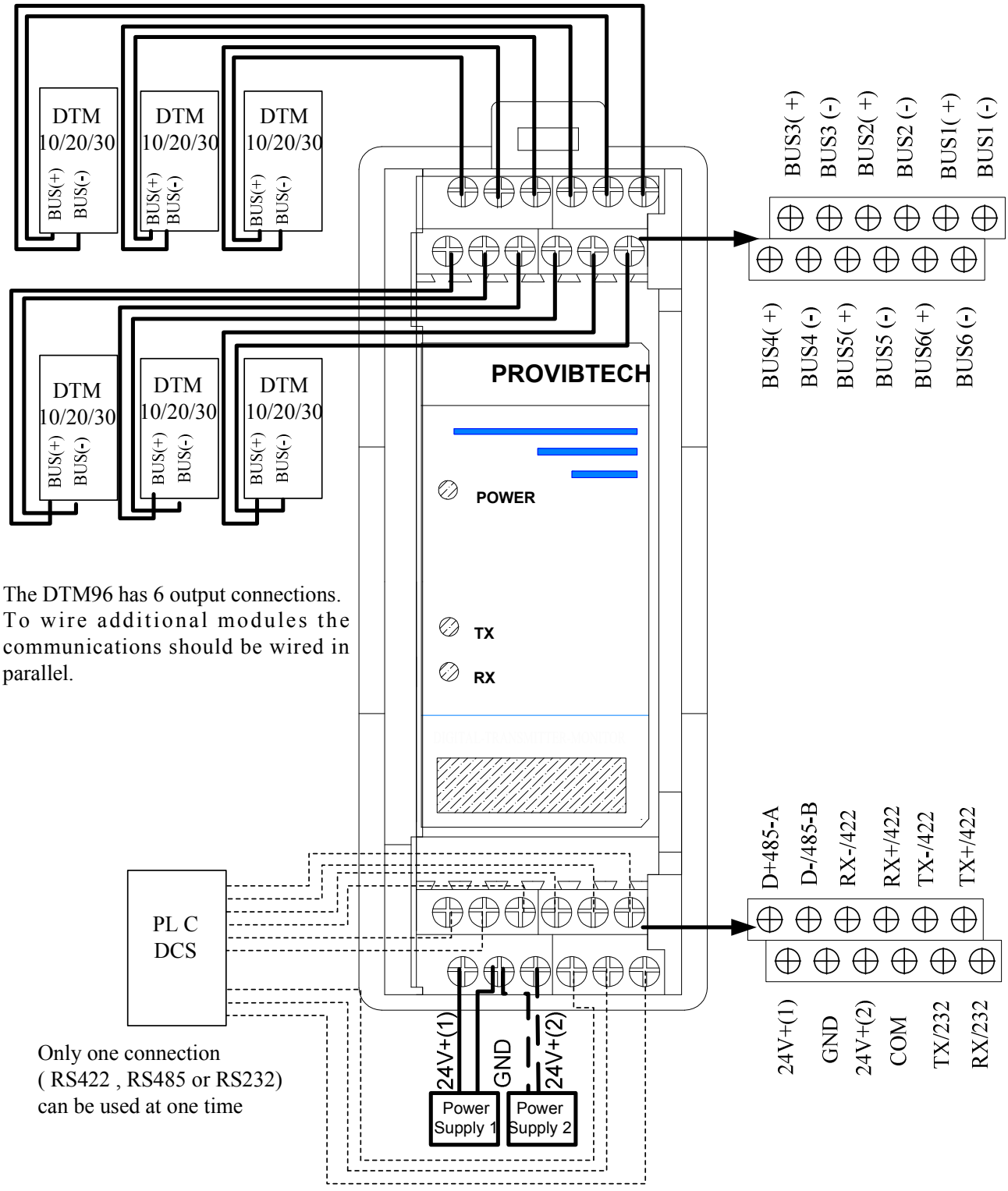
Optional Accessories

TM900

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

DTM96 System Installation

Installation – field-wiring diagram



The DTM96 has 6 output connections. To wire additional modules the communications should be wired in parallel.

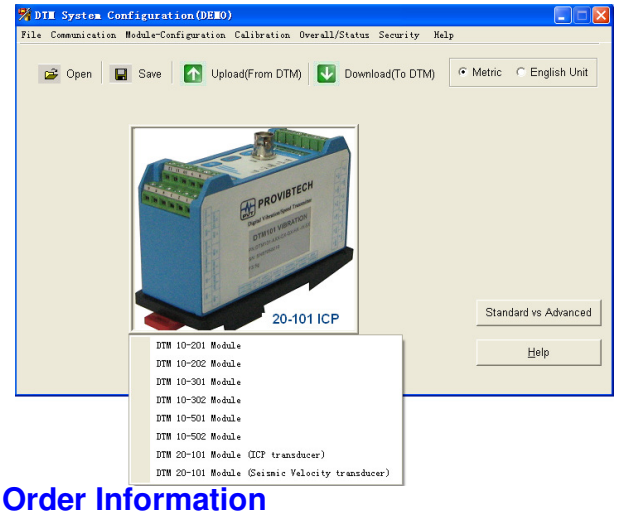
Only one connection (RS422 , RS485 or RS232) can be used at one time

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

Accessories I TM900 Power Converter

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.

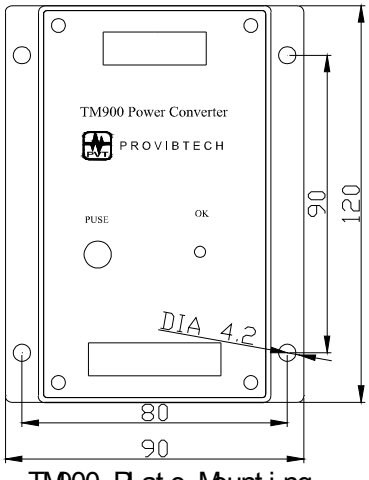
Physical

Dimension:

Height:	75mm (2.95″)
	see figure below
Weight:	1.0kg (2.0 lb)

Environmental

Temperature:	
Operation:	-40℃ ~ +85℃.
Storage:	-50℃ ~ +100℃.
Humidity:	90% non-condensing.



TM900 Plate Mounting

Certifications

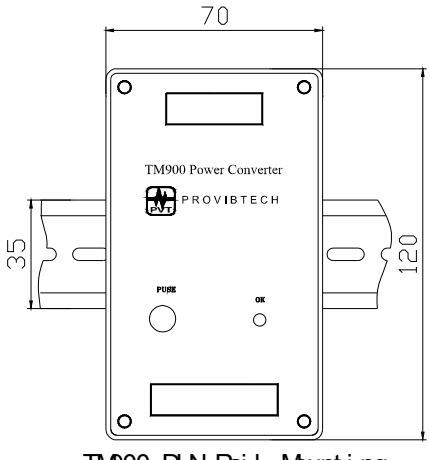
CE certified with EMC compliance

Ordering Information

TM900–GX

GX: Mounting.

G0*: 35mm DIN rail mounting.
G1: Plate mounting.



TM900 DIN Rail Mounting

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

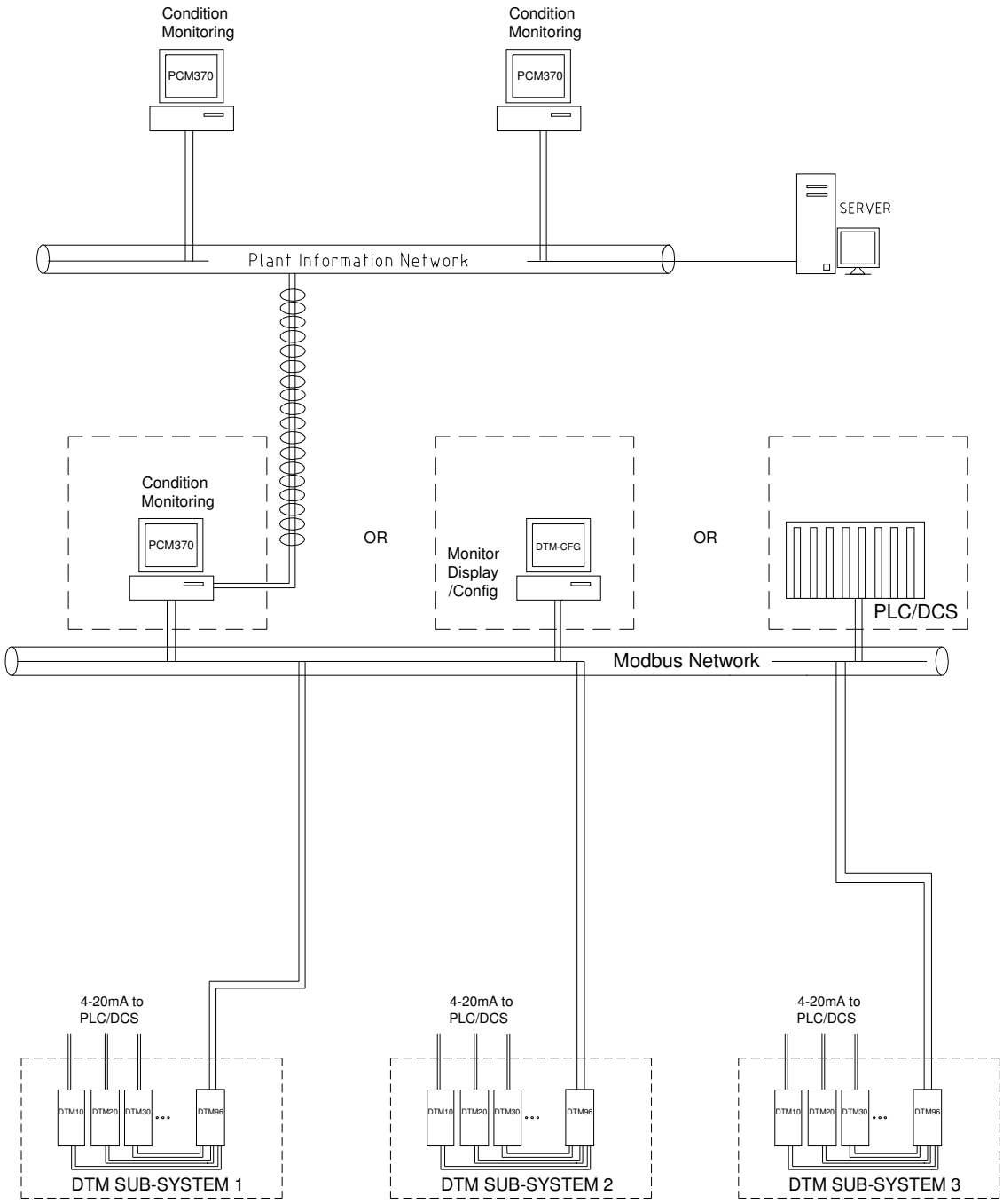
PCM370 condition monitoring software is ideal for plant wide condition monitoring. and trending of overall vibration levels

PT2060/98-PC

Touch panel PC with IP65 rating. Ideal to work with PCM370 and DTM-CFG

s

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)