



DTM20 Seismic Vibration Distributed Transmitter-Monitor

(Acceleration, Velocity, Displacement)

The DTM20 distributed Seismic vibration transmitter-monitor provides a simple and cost-effective solution for monitoring “balance-of-plant” equipment. The DTM’s smart design is extremely reliable with redundancy in power supply inputs, 4-20mA outputs and relay outputs, as well as, a Modbus communication port. The DTM20 monitor can interface with almost any vibration sensor (accelerometer or velocity transducer). The DTM is fully digital and may be configured in the field or come pre-configured from the factory.

DTM20 Features

Designed with reliability

- Redundant power supplies
- Redundant 4-20mA outputs
- Dual dry-contact relay outputs
- Trip multiply and Bypass

Galvanic isolation for solid signal processing

- Power input isolation
- Sensor signal conditioning isolation
- Transmission 4-20mA output isolation
- Relay output isolation

Band-pass filter to further isolate unwanted noise

- Programmable sharp 8th-pole low-pass filter further eliminate high frequency band noise, thus obtains reliable vibration signal.

Fully field programmable by CFG software

- DTM20-CFG can easily change any configuration of the monitor.
- Calibration of the system is available with CFG software



Condition Monitoring by digital link

- Static (trend, overall, alarms, GAP, system OK)
- Dynamic (waveform, spectrum, phase reference, waterfall)
- Data will be directly transferred into server with no needs of additional interface hardware

MODBUS digital communication

- Build-in Modbus RTU digital communication
- More information from Modbus line

Work with variety of vibration sensors

- Accelerometer
- Velocity sensor
- Low frequency sensor
- Electro-magnetic velocity sensor

Backward compatible with TM101

- Field adjustment with on-monitor push button (without software)
- ZERO calibration
- Alert set point
- Danger set point



Specifications

Electrical

Power:

Redundant. Accept dual power input
20-30VDC @150mA
Isolation: 1000VDC power to signal conditioner

circuit

Frequency Response (-3dB):

Nominal Frequency:

2 ~ 3KHz

Low Frequency:

0.5 ~ 100Hz

High Frequency:

10 – 20KHz (peak)

Filters:

Low-pass filter (field programmable):
8-pole (160 dB per decade, 48 dB per octave)
100Hz to 10kHz, field programmed by CFG
High-pass filter (factory setting):
2-pole (40 dB per decade, 12 dB per octave)
4 options (0.5Hz,2Hz,10Hz,100Hz) or custom

Piezo Sensor Interface:

Sensitivity:

100mV/g
100mV/in/sec
4mV/um
or any sensitivity specified

Current Source

Nominal 4mA@24VDC

Seismic Velocity Sensor Interface:

Sensitivity:

User specified for any vibration sensor
Software programmable

Accuracy:

Typical +/-1% FS

Maximum +/-2% FS

Buffered Output:

Original vibration, un-filtered
Impedance: 150Ω
Maximum cable distance: 300m (1000ft)
Sensitivity: same as the sensor
Local BNC connector
On line CM terminals

Overall Vibration output:

Up to two 4-20mA output
4-20mA(1):
Source. Output to controller.
Sharing signal ground
Maximum load resistance 500Ω
4-20mA(2):
Loop. Loop powered by controller.
Galvanic isolation, 1000VDC
Power supply range: 16-30VDC
Maximum load resistance: 50*(Vs-16)
Where Vs is the loop power supply

Alarm Set point:

5 ~ 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

Push Buttons:

SET: System on-site calibration and alarm setting
+ : Adjustment increment
- : Adjustment decrement



DTM Distributed Transmitter Monitor

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

Up to 100 alarms can be stored in DTM20.

Trend:

Up to 1000 trend data can be stored in DTM20.

Spectrum:

Up to 800 lines of resolution.

RESET/BYPASS:

Front panel push-button
Remote RESET/BYPASS terminals

Trip-Multiply

Double or Triple Multiply set by DTM-CFG. This feature is not available with (M2,M4 and M6 option)

Modbus RTU

RS485 Modbus RTU (Non-isolated. Use DTM96 for isolation)

Software programming (DTM-CFG):

Measurement Units A, V, D
Alert and danger set-point, time delay
ZERO and Full-Scale calibration
Low-pass filter corner frequency setup
Alarm latching/ non-latching, energized/ de-energized
Relay programmable with alert, danger or system OK
Sensor selection, sensitivity setup
System calibration
Digital communication setup
Trip-multiply setup
Real-time bar-graph and alarms
3 layers of password protection

Digital Condition Monitoring

Terminals
RS485 for both Modbus RTU and condition monitoring
Software PCM360-LT
Work with PCM360-LT plant condition management software
Dynamic waveform:
Real-time vibration data, 2000 sets per data acquisition.
Alarms:

Physical

Dimension:

Height: 75mm (2.95")
see figure below

Weight: 0.9lb (0.4kg)

Environmental

Temperature:

Operation: -40°C ~ +85°C.

Storage: -50°C ~ +100°C.

Humidity: 90% non-condensing.

Case: Aluminum cast (copper free)

Certification

CE certified with EMI compliance

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

ATEX: II 3 G Ex nA II T4

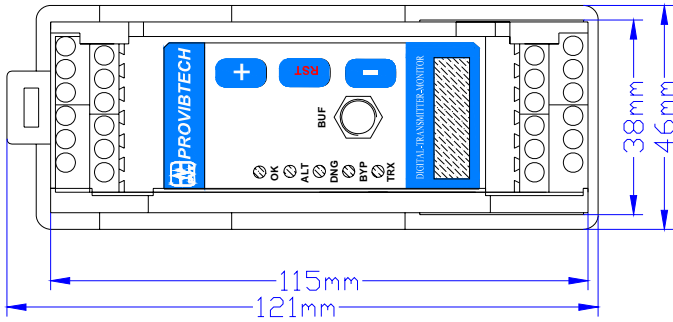
TR CU: 2Ex nA II T4 X

№ TC RU C- US.ГБ05.B.00476

NANIO CCVE



DTM Distributed Transmitter Monitor



Rail Mounting

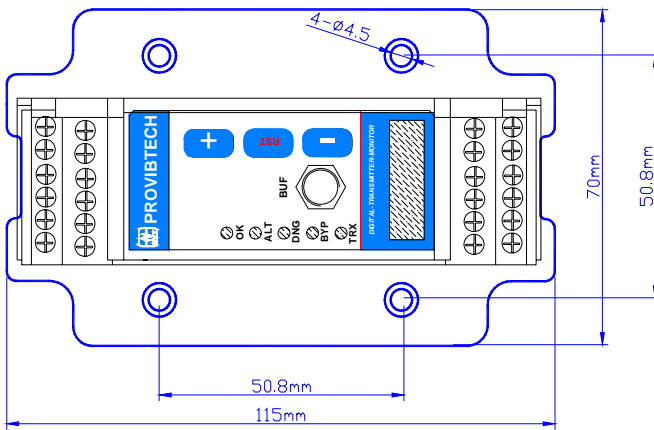


Plate Mounting

Hazardous area

Marking:

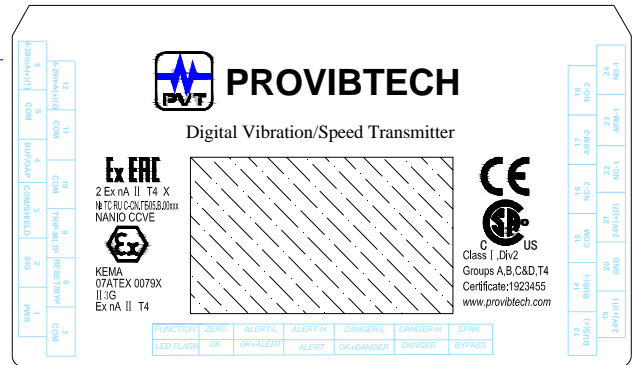
ATEX Standards:

EN 60079-0

EN 60079-15

Special condition in hazardous area:

- The ambient temperature range is: $-40^{\circ}\text{C} \leq T_a \leq 70^{\circ}\text{C}$
- 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 %.





DTM Distributed Transmitter Monitor

Ordering Information

DTM20-101-AXX-CX-GX-HX-IX-JX-MX-SX

Factory pre-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
- A36: 0 - 20g pk
- A37: 0 - 50g pk

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, 36, 37 not applicable)
- H2: TM079VD (A12, 13, 36, 37 not available)
- HXXX: Seismic velocity sensor, Sensitivity = XXX mV/in/sec (A12, 13, 36, 37 not available)

IX: Frequency Response

- I0*: Normal Frequency (2 ~ 3KHz, H2 not available)
- I1: Low Frequency (0.5~100Hz)
- I2: High frequency (10 - 20KHz, A12, 13, 36, 37 only with accelerometer)
- IXXX-YYYY**:
 - XXX: Hi-pass filter;
 - YYYY: low pass filter

MX: Condition Monitoring,

4-20mA with Galvanic Isolation***

- M1*: 4-20mA without isolation. No CM
- M2: 4-20mA without isolation . With CM
- M3: 4-20mA with isolation. No CM
- M4: 4-20mA with isolation. With CM
- M5: Dual 4-20mA, No CM
- M6: Dual 4-20mA, with CM

SX: Approvals

- S0*: CE
- S1: CE
 - CSA: Class I, Div. 2, Grps A,B,C&D,T4
 - ATEX: II 3 G Ex nA II T4
 - TR CU: 2Ex nA II T4 X
 - № TC RU C- US.ГБ05.B.00476
 - NANIO CCVE

* Denotes factory default.

** Low pass has to be 5X more than hi pass filter.

** Galvanic isolation requires loop powered configuration.



DTM20-AX-BX-IX-MX-SX

Field programmable seismic monitor

AX: Sensor and Alarm

- A0: ICP sensor, Dual alarms
- A1: ICP sensor, No alarm
- A2: Seismic velocity, Dual alarms
- A3: Seismic velocity, No alarm
- A4: Looseness monitoring, Dual alarms

BX: Mounting.

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

IX: Frequency Response

- I0*: Normal Frequency (2 ~ 3KHz, H2 not available)
- I1: Low Frequency (0.5~100Hz)
- I2: High frequency (10 – 20KHz,
A12, 13, 36, 37 only with accelerometer)

IXXX-YYYY**:

- XXX: Hi-pass filter;
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- M3: 4-20mA with isolation. No CM
- M4: 4-20mA with isolation. With CM
- M5: Dual 4-20mA, No CM
- M6: Dual 4-20mA, with CM

SX: Approvals.

- S0*: CE
- S1: CE
- CSA: Class I, Div. 2, Grps A,B,C&D,T4
- ATEX: II 3 G Ex nA II T4
- TR CU: 2Ex nA II T4X
- № TC RU C- US.ГБ05.B.00476
- NANIO CCVE

** Low pass has to be 4X more than hi pass filter.

** Galvanic isolation requires loop powered configuration.

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

PCM-TCP

Modbus RTU-TCP Converter

TM900

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

Seismic Sensor Systems

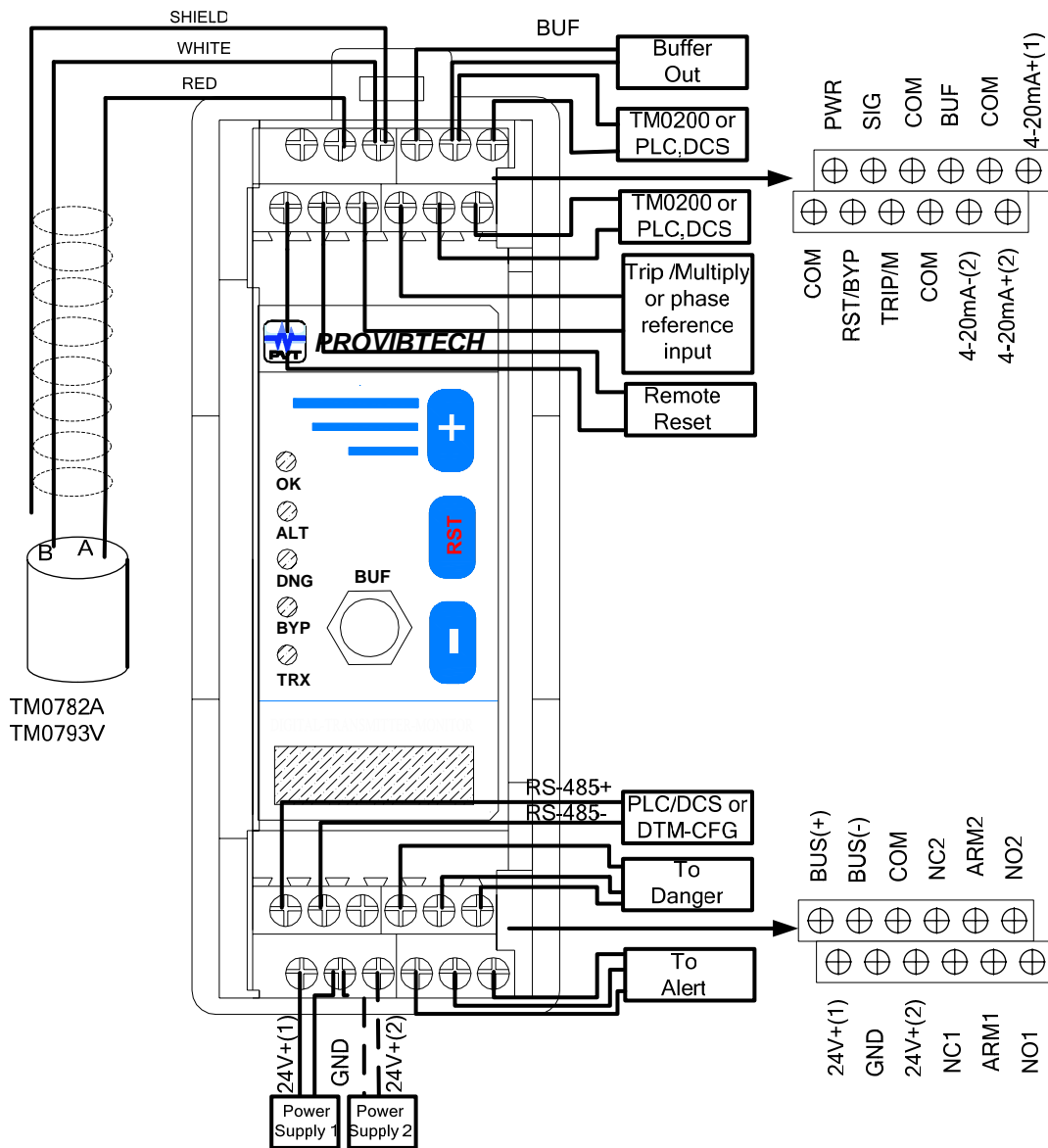
- ✓ **TM0782A-K-M:** Accelerometer kit
- ✓ **TM0783A-K-M:** Accelerometer with cable
- ✓ **TM0793V-K-M:** Velocity sensor kit
- ✓ **TM079VD-V/H-K:** Low frequency sensor



DTM Distributed Transmitter Monitor

DTM20 System Installation

DTM20 Field-Wiring Diagram



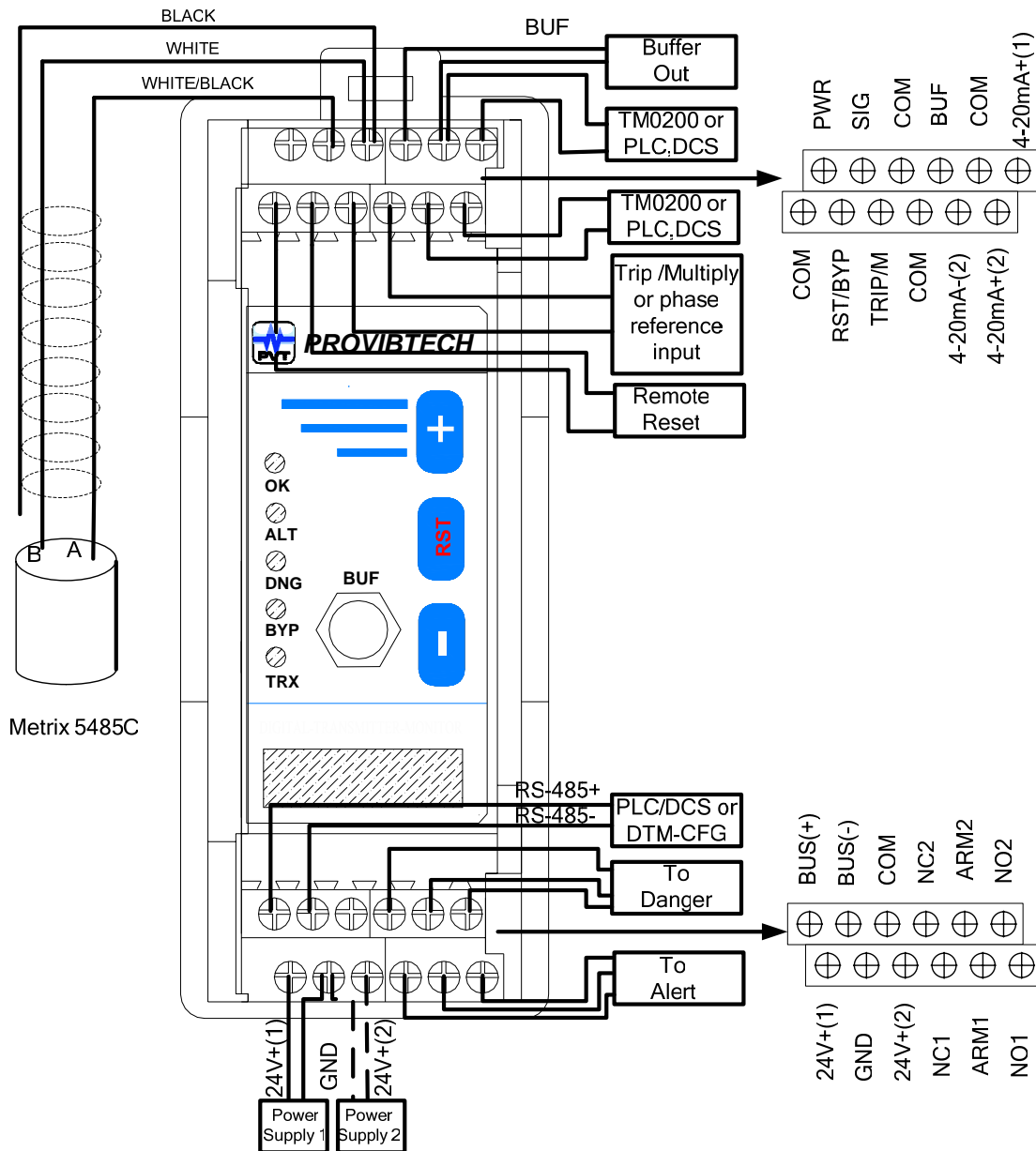
Note:

- ✓ 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.



DTM Distributed Transmitter Monitor

DTM20 Field-Wiring Diagram (Interfacing with 5485C)



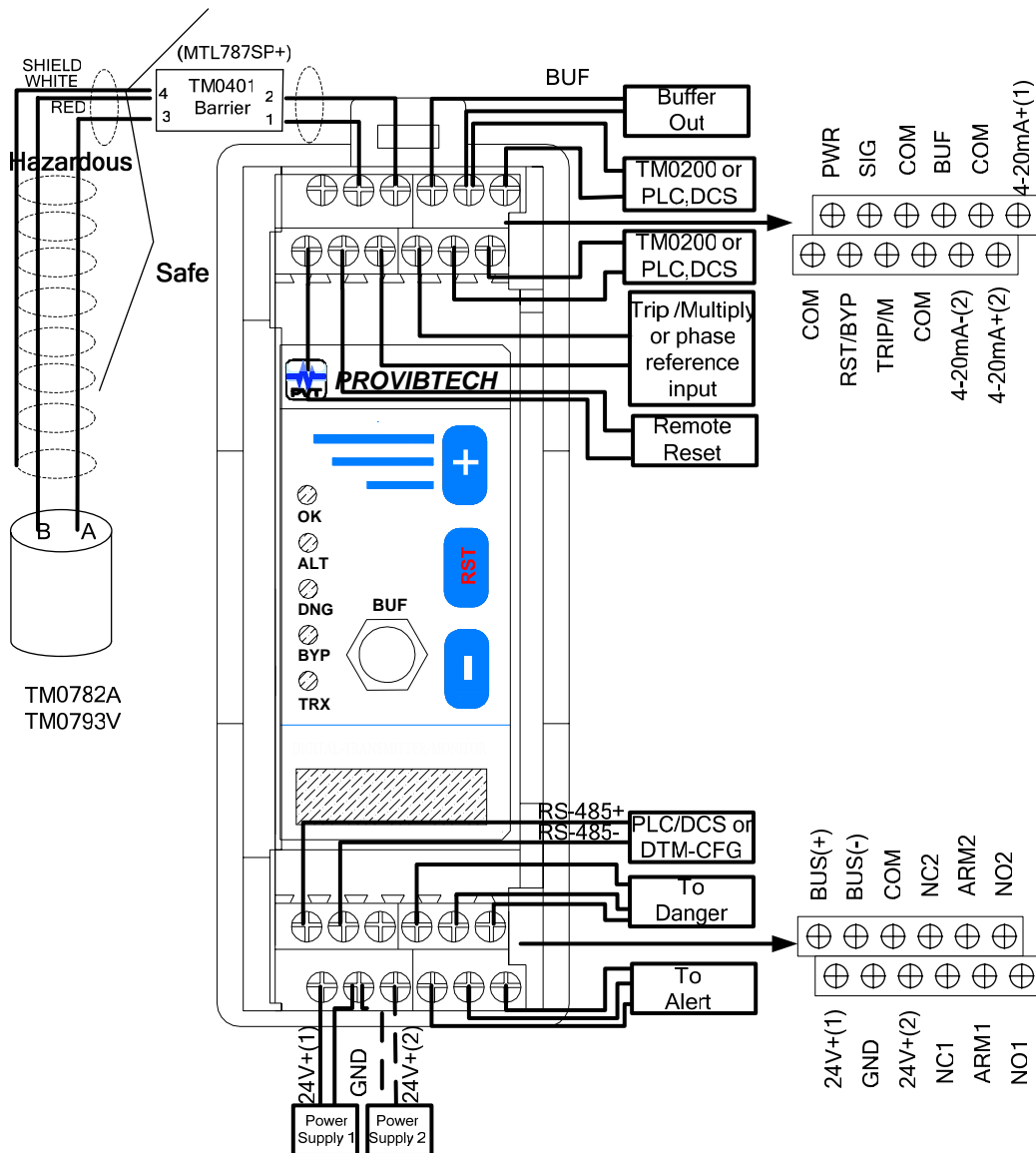
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DTM Distributed Transmitter Monitor

DTM20 Hazardous Area Field-Wiring Diagram



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- ✓ 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.
- ✓ Other barriers available:
 TM0402: (STAHL 9001/51-280-091-141)
 TM0407: (STAHL 9160/13-11-11)