

## TM016 Velocity/ Acceleration Vibration Transmitter

### Introduction

The TM016 is a solid state loop powered transmitter which provides a 4-20mA output proportional to the machine case vibration level. The 4-20mA output interfaces directly to any PLC or DCS for shutdown, alarm or trending. The TM016 is easy to install on the machine case.

Applications :

- ✓ **Motors**
- ✓ **Pumps**
- ✓ **Fans**
- ✓ **Blowers**
- ✓ **Engines**
- ✓ **Compressors**
- ✓ **Centrifuges**
- ✓ **Generators**
- ✓ **Turbochargers**
- ✓ **Gear Boxes**



### Features

- ✓ Loop powered 4-20mA velocity or acceleration (peak or RMS) output
- ✓ Wide operating temperature range -50°C to +120°C (-58°F to +248°F)
- ✓ Stainless steel housing
- ✓ NEMA4X, IP65 or IP67 environmental rating
- ✓ Multiple hazardous area approvals
- ✓ Frequency filter options
- ✓ Wide selection of mounting studs



## Electrical

Overall vibration output:

4-20mA, load (loop powered)

Accuracy: 5%

Frequency response ( $\pm 3$ db):

Acceleration: 2~3,000 Hz

Velocity: 2~3,000 Hz

Transverse sensitivity:

< 5%

Power supply:

12VDC - 30VDC

Maximum load resistance:

At least 500 ohms @ 24VDC power supply

Isolation:

500Vrms, circuit to case

Case material:

316L stainless steel

Output connection:

Flying leads:

2 cables for 4-20mA

2 cables for buffered output

Mil connector:

2 pins for 4-20mA

Buffered output:

100mV/g nominal

Maximum cable length 3m (10ft)

Filter option:

12dB/oct for hi-pass filter

12dB/oct for low-pass filter

Intrinsically Safe:

ATEX:II 1G Ex ia IIC T4 Ga@Ta=-50°C to+100°C

(Ui=30V,Li=110mA,Pi=825mW,Ci=11nF,Li=84uH)

KEMA06ATEX0228

EN60079-0:2012,EN60079-11:2012,EN60079-26:200

7

IECEX:EX ia IIC T4 Ga

IECEX DEK13.0021

IEC60079-0:2011,Ed.6,IEC60079-11:2011,Ed.6.

IEC60079-26:2006,Ed.2

TR CU: 0Ex ia IIC T4 Ga X

№ TC RU C-US. AA87.B.01245

ГОСТ 31610.0-2014 (IEC 60079-0:2011)

ГОСТ 31610.11-2014 (IEC 60079-11:2011)

Ex d Standards:

ATEX: II 2G Ex db IIC T4 Gb@Ta=-40°C to+120°C

KEMA06ATEX0275

ATEX: EN60079-0:2012+A11:2013, EN60079-1:2014

IECEX: Ex db IIC T4 Gb

IECEX DEK13.0073

IECEX: IEC60079-0: 2011, IEC 60079-1:2014

## Physical

Temperature:

Operation:

Normal (G=0): -50°C ~ + 100°C (-58°F ~ +212°F)

High (G=1): -50°C ~ + 120°C (-58°F ~ +248°F)

Storage: -50°C ~ + 125°C (-58°F ~ +257°F)

Dimensions:

Diameter: 38mm (1.5")

Height: Flying leads: 87mm (3.4");

Mil connectors: 87mm (3.4")

Weight:

420g (0.875lb)

Output Connections:

2-pin MIL-C-5015

Flying leads: 2 or 4 wires (Default lead length is 5m.

When working with TM016-11 or TM016-02, the lead length is 20cm)

1 NPT

Environmental:

Flying leads: NEMA 4X, IP65

2-pin connector: IP67



**Order Information**

\* Factory default

**TM016-AAA-BCD-EF-G**

\*Factory Recommendation:  
TM016-AAA-BCD-12-0

**AAA: Full Scale**

- AAA=000: 20mm/s (0.8ips), pk
- AAA=001: 20mm/s (0.8ips), rms
- AAA=121: 25mm/s (1.0ips), pk
- AAA=122: 12.5mm/s (0.5ips), pk
- AAA=123: 50mm/s (2.0ips), pk
- AAA=124: 125mm/s (5.0ips), pk
- AAA=132: 75mm/s (3.0ips), pk
- AAA=151: 25mm/s (1.0ips), rms
- AAA=152: 12.5mm/s (0.5ips), rms
- AAA=153: 50mm/s (2.0ips), rms
- AAA=154: 125mm/s (5.0ips), rms
- AAA=162: 75mm/s (3.0ips), rms
- AAA=200: 5.0g, pk
- AAA=201: 10g, pk
- AAA=202: 20g, pk

**B: Mounting Adaptor**

- B=0: 1/4" NPT
- B=1: 1/2" NPT
- B=2: 3/8-24UNF X 1/2"
- B=3: 1/2-20UNF X 1/2"
- B=4: M8x1-12
- B=5: M10x1.25-12
- B=6: M10x1.5-12

**C: Hazardous Area and Approvals**

- C=1: CE
- C=2\*: CE
  - CSA: Class I, Div. 1&2, Groups A, B, C & D
    - T4,Ta=-40°C to+100°C
    - Class I, Div. 2, Groups A, B, C & D
    - Class II, Groups E, F, & G
    - T4,Ta=-40°C to+120°C
  - ATEX: II 2G Ex db IIC T4 Gb@Ta=-40°C to+120°C
    - KEMA06ATEX0275
  - ATEX: II 1G Ex ia IIC T4 Ga @Ta=-50°C to+100°C
    - KEMA06ATEX0228
  - IECEX:Ex ia IIC T4 Ga
    - IECEX DEK13.0021
  - IECEX: Ex db IIC T4 Gb
    - IECEX DEK13.0073
  - TR CU: 0Ex ia IIC T4 Ga X
    - № TC RU C-US. AA87.B.01245
  - TR CU: 1Ex db IIC T4 Gb X
    - № TC RU C-US. AA87.B.01245

- C=3: CE
  - ATEX: II 1G Ex ia IIC T4 Ga@Ta=-50°C to+100°C
    - KEMA06ATEX0228
  - IECEX:Ex ia IIC T4 Ga
    - IECEX DEK13.0021
  - CSA:I.S.Class I,Div.2,Groups A,B,C,D
  - TR CU: 0Ex ia IIC T4 Ga X

- C=4: CE
  - Non-Incendive
  - CSA:Class I,Div.2,Groups A,B,C,D

**D: Connection**

- D=0: 4-20mA, flying leads (C1 or C2)
- D=1: 4-20mA, flying leads with buffered output (C1 or C2)
- D=4: 4-20mA, 2-PIN MIL connector (C1 or C3)

**E: High-pass Filter**

- E=0: None
- E=1: 5Hz
- E=2: 10Hz
- E=3: 20Hz
- E=4: 50Hz
- E=5: 100Hz
- E=6: 200Hz

**F: Low-pass Filter**

- F=0: none
- F=1: 500Hz
- F=2: 1000Hz
- F=3: 2000Hz

**G: Temperature**

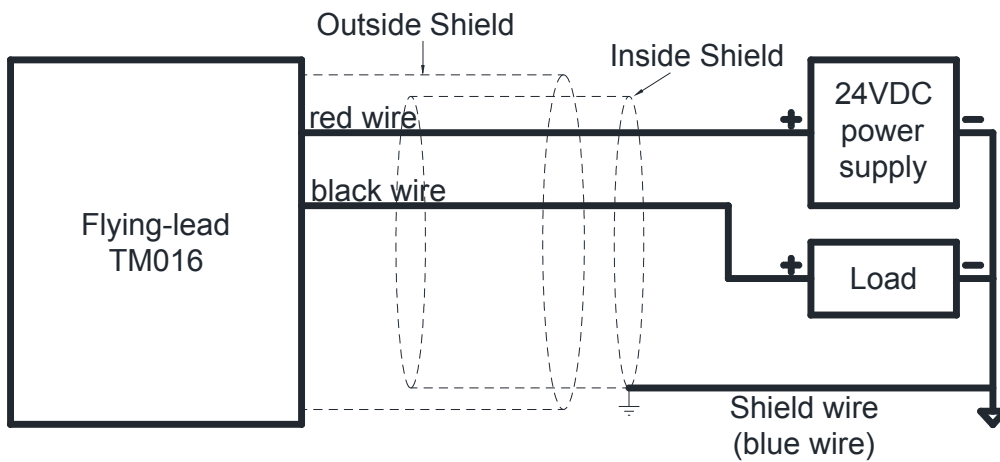
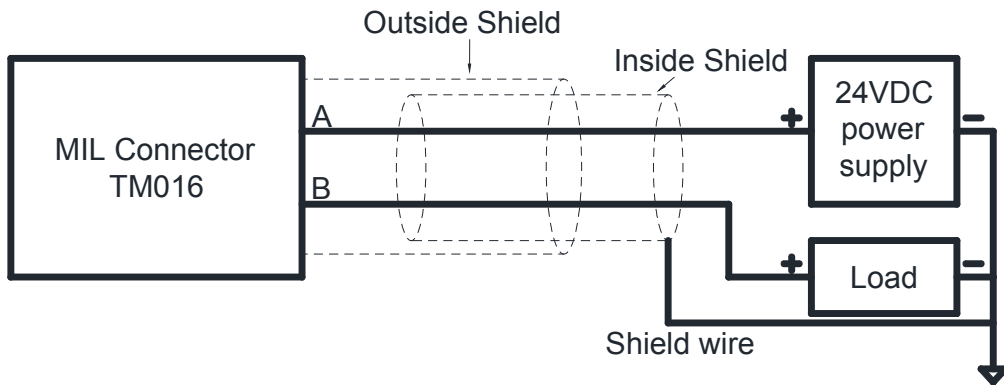
- G=0: Normal temperature (-50°C to + 100°C)
- G=1: High temperature (-50°C to + 120°C)

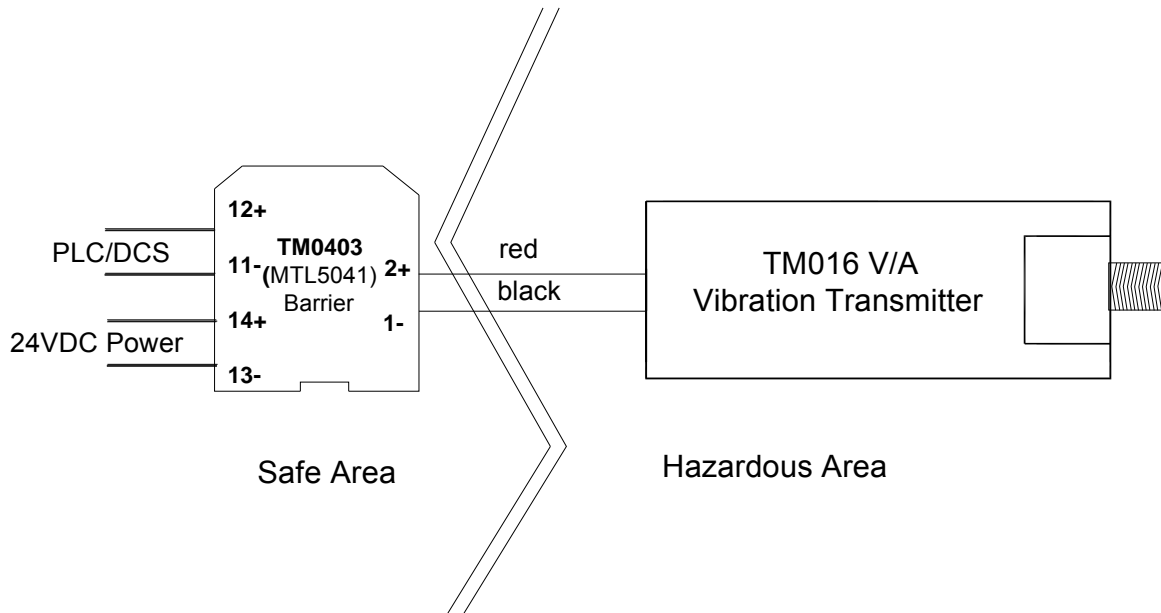
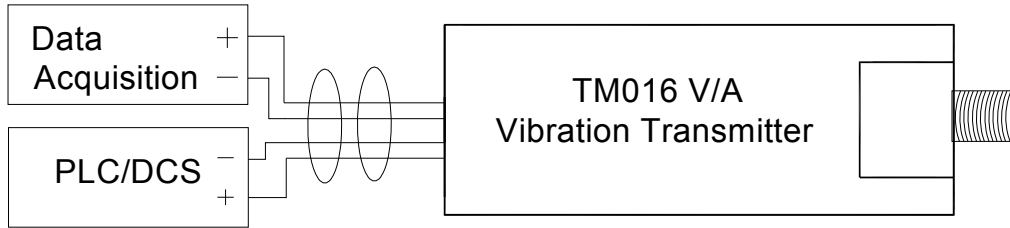
**TM016-K1**

Vibration transmitter kit includes:

- TM016-D0 or -D1 with TM016-02
- CE mark
- CSA: Class I, Div. 2, Groups A, B, C & D
  - Class II, Groups E, F, G & T4
- ATEX: II 2G, Ex dIICT4 @Ta=-50°C to+120°C
  - KEMA06ATEX0275

**Field-Wiring Diagram**





Note:

Other Barriers:

TM0406: (STAHL 9160/13-11-10s)

TM0407: (STAHL 9160/13-11-11s)

**Accessories**

(Standard cable length is 5 meters. XX = 05)



**TM0702-XX:** Aluminum MIL connector with XX meters cable, 7.5mm diameter.  
Operating temperature range goes up to 120°C (250°F)



**TM0703-XX:** Sealed tight boot connector with XX meters cable, 6.3mm diameter.  
Operating temperature range goes up to 120°C (250°F)



**TM0704-XX:** Stainless steel MIL connector with Armored XX meters cable,  
7.0mm diameter. Operating temperature range goes up to 150°C (300°F), Maximum Length  
is 10 meters.



**TM0705-XX:** Cornered MIL connector with XX meters cable, 7.0mm diameter.  
Operating temperature range goes up to 120°C (250°F)



**TM016-01:** Aluminum conduit elbow & reducer. 1" to 3/4" NPT

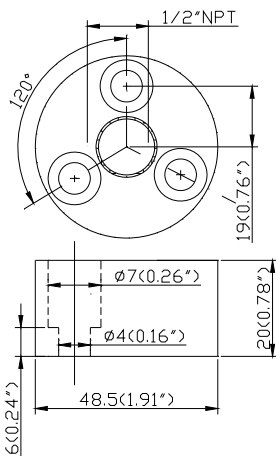
**TM016-11:** Aluminum conduit elbow & reducer with terminal block. 1" to 3/4" NPT  
Class I, Div. 1, Groups B, C & D; Class II, Div. 1, Groups E, F & G and NEMA 4X, IP65



**TM016-02:** Stainless steel conduit elbow with terminal block. 1" to 3/4" NPT  
Class I, Div. 1, Groups A, B, C, D & T4; Class II, Div. 1, Groups E, F & G and NEMA 4X,  
IP65 (works with TM016)

**TM016-03:** Stainless steel flange mounting adaptor with 1/2" NPT mount; 3 holes of 7mm  
on the circle of 38mm (1.5") in diameter

TM016-03:



**TM900A:** Power converter

**TM0200:** 3-1/2 digit display unit