

Vibration equipment division

TR-27 TRANSMITTER

USE AND MAINTENANCE INSTRUCTION

MANUAL



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**Translation of the original instructions*



CEMB

BALANCING MACHINES



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1. DEVICE INSTALLATION



The TR-27 transmitter must be positioned on the point where vibration must be monitored, typically on the bearing support of pumps, motors, fans. etc.

In order to assure a good mechanical coupling between transmitter and support it is suggested to foresee:

- In case of cylindrical thread M8 or 1/4" 28 UNF:
 - > smoothing of the fixing surface
 - > a threaded hole orthogonal to the surface of 12 mm depth
 - > a thin film of grease
- In case of conical thread:
 - > a threaded hole 1/4" 18 NPT
- Mounting torque: 5÷10 Nm

1.1 MAINTENANCE AND PRESERVATION

The device is designed to be permanently installed.

It is calibrated in factory and it doesn't require maintenance nor periodic calibration.

In case of failure the device cannot be repaired and need to be replaced.

1.2 SHIPPING AND STORAGE

Temperature: - 60 : 120 degC with non condensing humidity

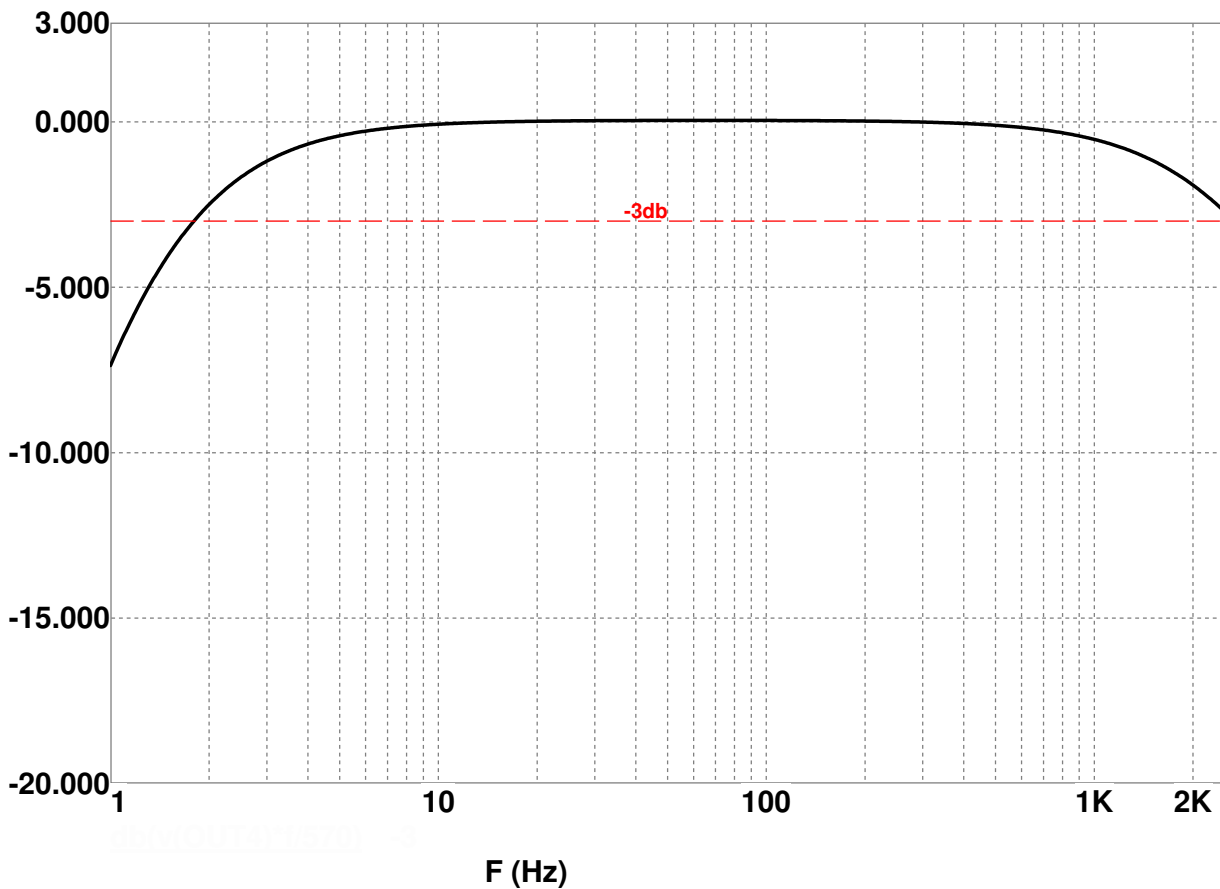
Do not remove from its original shipping package during shipping and storage

Mechanical Shock: 100 g

2. SPECIFICATIONS

Environmental	Transmitter: - 60°C ÷ + 120°C IP 65 - EN 60529/10.91
Measure type	Omnidirectional seismic (absolute vibration) along the axis of the sensor
Dynamic field	± 18 g
Transverse sensitivity	< 5 %
Linearity	± 2% - 75 Hz
Insulation	≥10 ⁸ Ω between signal and case
Dynamic performances	±3% / 10Hz-1kHz - see figure -3db / 1,5Hz - 2kHz
Mounting torque	5÷10 Nm

TYPICAL FREQUENCY RESPONSE [DB]





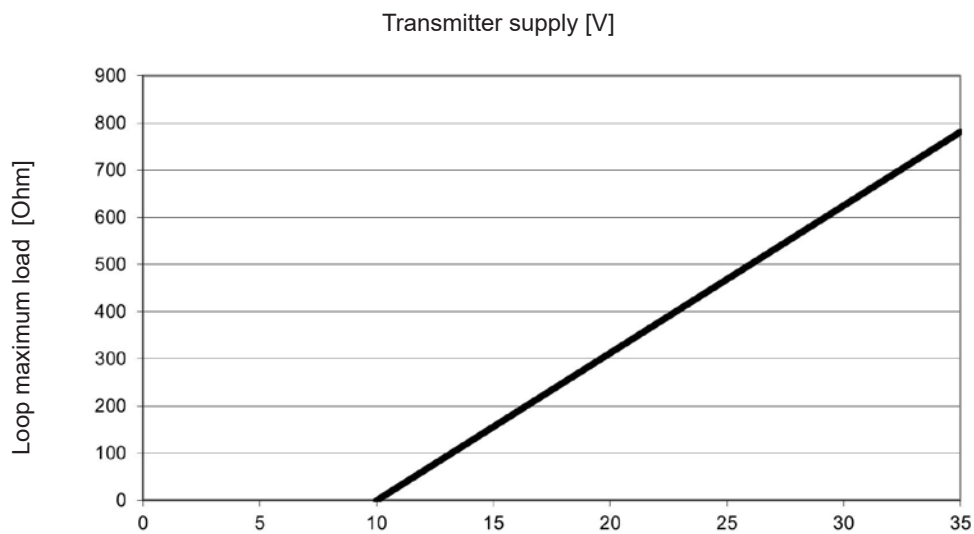
3. TRANSMITTER CALIBRATION AND POWER SUPPLY

Connect the cable terminals with the correct polarity in agreement with the enclosed drawing.

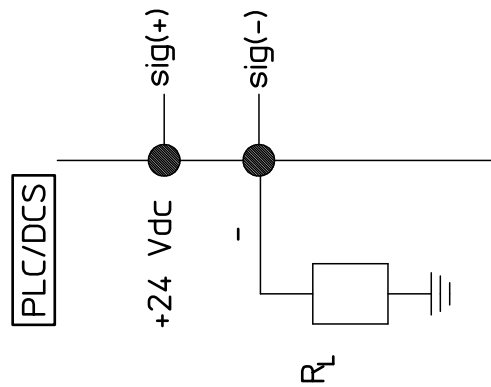
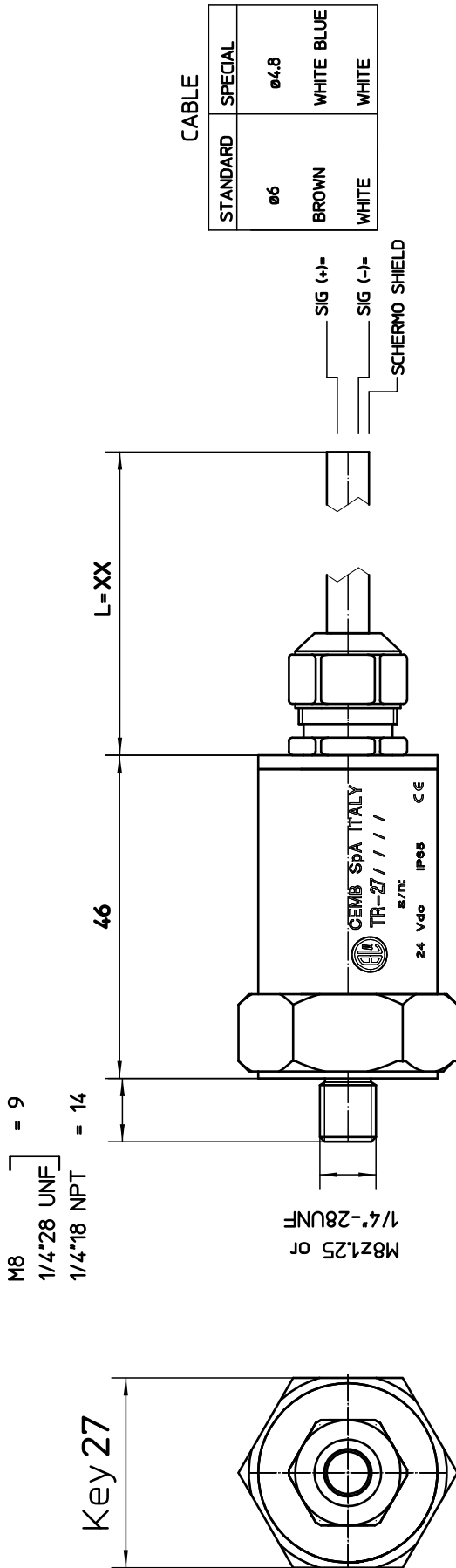
The wire section depends on the distance between transmitter and acquisition system.

In case of a considerable distance, one must take into account the sum of the voltage drops on the load and on the cable which must assure the correct power supply to the transmitter. The rated supply voltage is 24 Vdc. The transmitter can correctly monitor even with a voltage from 10 Vdc to 35 Vdc, assuring a loop load maximum value (sum of measure plus cable resistance) according to below graph.

LOOP MAXIMUM LOAD VS POWER SUPPLY (TR-26 TR-27 TR-P)



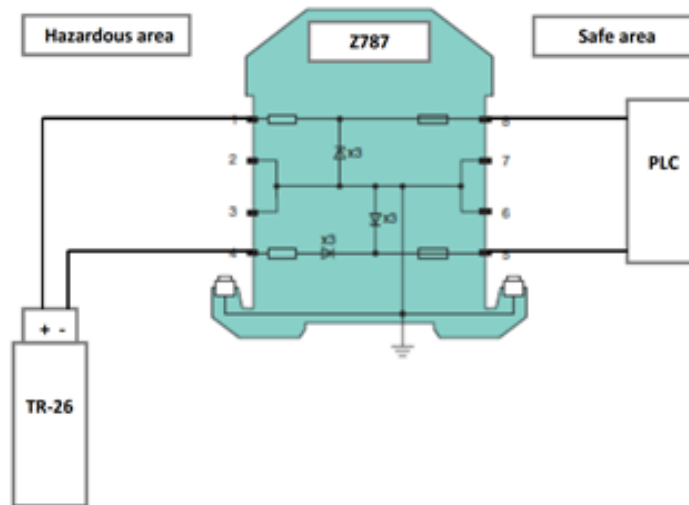
4. CONNECTION DIAGRAM





4.1 CONNECTION DIAGRAM WITH ZENER BARRIER (FOR ATEX AREAS)

Cemb suggests the Z787 P & F barrier. Connection as per following figure:



5. FUNCTIONAL SAFETY

The Vibration Transmitters, (TR26-TR27-TR-I), meets the requirements with regard to the following functions in accordance with IEC 61508.

- **Safety vibration measure:** SIL2

The safety function is to repeat current within $\pm 2\%$ and the logic solver will diagnose currents above 24mA and below 3 mA as faults and take appropriate action.

The failure modes shown above can then be defined as:

Failure mode	Category
Output current $>24\text{mA}$ (upscale)	Dangerous detected, λ_{dd}
Output current $<3\text{ mA}$ (downscale)	Dangerous detected, λ_{dd}
Output current within range but $>2\%$ in error	Dangerous undetected, λ_{du}
Output current correct within $\pm 2\%$	Safe undetected, λ_{su}

The hardware assessment shows that Vibration Transmitters (TR26-TR27-TR-I):

- have a hardware fault tolerance of 0
- are classified as Type A devices ("non-complex" component with well-defined failure modes)
- there are no internal diagnostic elements of these products.

The Vibration Transmitters (TR26-TR27-TR-I) are suitable for the safety related use under continuous supervision of the user.

It fulfils the requirements of the basis of tests, see section 3, in particular the relevant requirements of EN ISO 61508.

Failure mode	Failure rate (FIT) TR 26	Failure rate (FIT) TR 27	Failure rate (FIT) TR-I
Output current $>24\text{mA}$ (upscale)	55	55	55
Output current $<3\text{ mA}$ (downscale)	45	45	45
Output current within range but $>2\%$ in error	790	790	790
Output current correct within $\pm 2\%$	31	31	31

(FITs means failures per 10^9 hours or failures per thousand million hours).

