

**VR - Electromagnetic Speed Sensors with integral Cable**  
**E38S - E12S - E58S**

**Operating Instruction**  
**385E-64669**

**General Description**

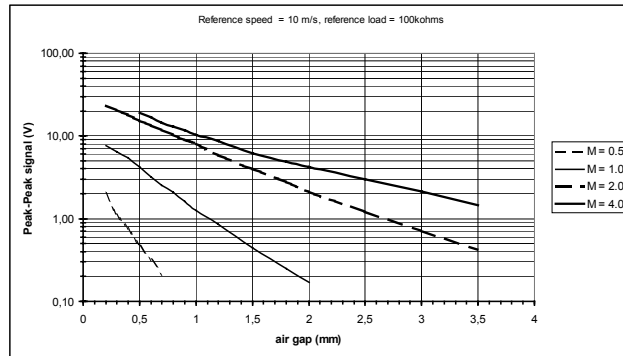
The **E38**, **E12** and **E58** series of electromagnetic sensors consist of an iron core, an inductive coil, and a permanent magnet. A ferromagnetic gear or pole wheel passing the sensor face changes the magnetic field strength, resulting in an AC voltage being induced in the coil. The amplitude and frequency of the output signal are proportional to the speed of the moving target, the air gap setting, target material and composition, and the driven load. Electromagnetic sensors, also known as passive or VR sensors, do not require an external supply.

**Sensor Characteristics**

Inductance: 170 mH @ 1kHz Resistance: 850 Ohm Magnet Polarity: North Pole Piece Diameter: 2.7 mm

**Signal Output**

The signal frequency is proportional to the target speed.  
The signal amplitude is defined with a load of 100 kOhm, and is affected by the air gap, the target geometry and material. It's also proportional to the linear speed of the teeth.



Typical signal amplitude with ferromagnetic gear.

Surface Speed =

10m/sec (393.7 IPS)

Load = 100 kOhm

Module 0.5 = DP 50.8

Module 1.0 = DP 25.4

Module 2.0 = DP 12.7

Module 4.0 = DP 6.35

**Signal Polarity**

With the approach of ferrous metal, Pin 4 and Black lead are positive with respect to Pin 3 and Blue lead.

**Frequency Range**

10 Hz...20 kHz

**Insulation**

Housing, cable shield and coils galvanically isolated. (500V/50Hz/1Min.)

**Operating Temperature**

- 20 ...+100°C.

**Housing**

Stainless steel 1.4305. Dimensions per below drawings.

**Cable**

PUR cable, two conductor 0.34 mm<sup>2</sup>, AWG 22

**Protection Class**

Sensor head IP 68, cable exit IP 67, connector IP68 (mated)

**Vibration Immunity**

30 g from 5...2000 Hz.

**Shock Immunity**

50 g for 20 ms, half-sine wave

**Weight**

~ 120 g , including 1m cable.

**Gear or Pole Wheel**

Ferromagnetic toothed wheel, i.e. B. Ust37-2, type 1018 CRS, preferred involute gear form Module ≥1 (DP 25.4), min. tooth width 6 mm, side offset with min. tooth width: < 0.2 mm, eccentricity <0.2mm

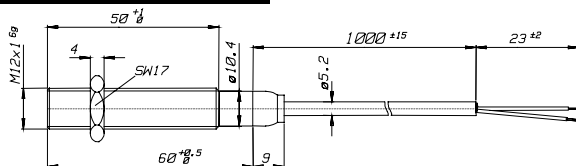
**Installation**

The sensor wires must be laid as far as possible from electrical motors, relays, solenoids etc. and must not be run parallel with power cables. The maximum recommended cable length is 20 meters (65 feet). Using radial or axial mounting, the sensor should be mounted with the center of the sensor face over the center of the gear teeth or targets. Using radial sensor mounting, some axial movement is permissible when using a sufficiently thick target.

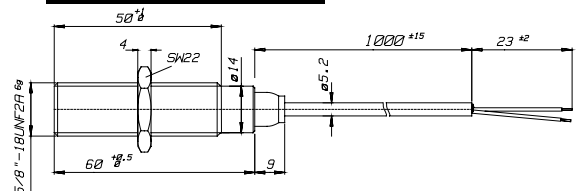


**A solid and vibration free mounting of the sensor is important.**

**E12S : 385Z-05226**



**E58S : 385Z-05227**



**E38S : 385Z-05355**

