Strain sensor DA54-mag, DA54-tiewrap

Measurement range: 0.1 µm/m to 1300 µm/m

	DA54-mag	DA54-tiewrap
Figure		
Applications	railway lines, bridges, HEA/HEB profiles	cylindrical silo legs

Description

The strain sensors DA54-mag, DA54-tiewrap are suitable for high-resolution detection of forces and deformation of structural works such as bridges, silo legs, offshore wind farms, railway lines, etc.

With these models in an anodised aluminium housing, the same performance features are achieved as when applying strain gauges (DMS) directly. These features include a high resolution, very low drift effects and the options for both static and dynamic measurement.

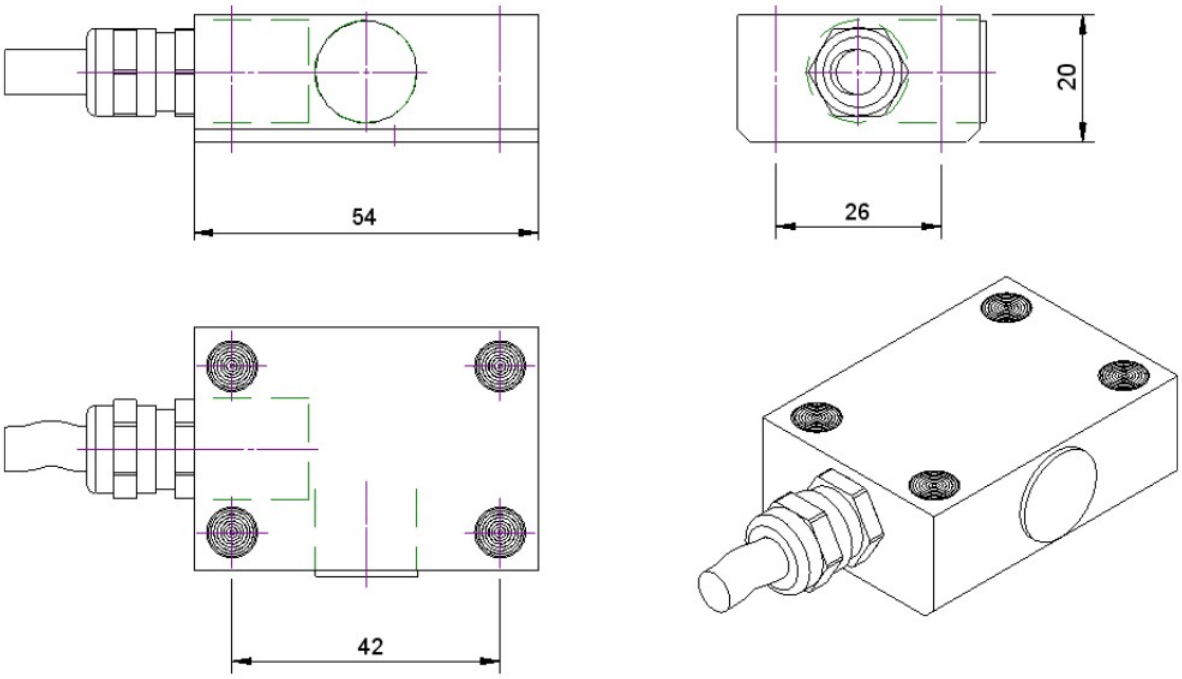
The strain sensor includes a completely wired DMS that is pressed onto the component by a specially formed pressing mechanism when screwing on the extension sensor. An integrated seal provides an initial layer of protection against dust and damp. Depending on the planned duration of use, measures to protect against damp, such as waterproofing the joints with silicone, encapsulation with additional surrounding hoods, etc. are applied after installation.

Unlike strain sensors DA40 and DA54, the pressure strength is generated by integrated high-performance magnets or cable ties. Time-consuming drilling of threads is not required as a result.

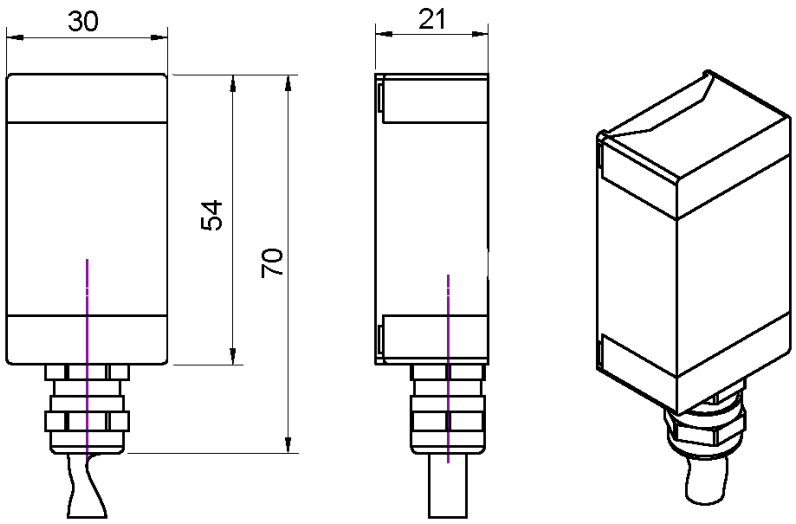
The strain sensors are equipped with different strain gauges depending on the application. Type FAE4 and FAED4 full bridges and FAET and FAED half bridges or FAE single grids are used.

Dimensions

DA54-mag



DA54-tiewrap



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Technical data

Measurements / Material		
Design		Strain sensor (push-pull)
Material		Aluminium alloy
IP protection class		IP65
Attachment DA54-mag DA54-tiewrap		 M-bond 30 + magnets M-bond 30 + stainless steel cable binders
Mechanical data		
Nominal strain (F_N)	µm/m	±1300
Working strain	$\%F_N$	±150
Electrical data DMS		
k-factor		2.04
Input sensitivity (with v=0.28)	µm/m @ 1 mV/V	766
Zero signal	mV/V	$< \pm 1.0$
Max. supply voltage	V	10
Input resistance	Ohm	350 ± 7
Output resistance	Ohm	350 ± 7
Insulation resistance	Ohm	$> 5 \cdot 10^9$
Connection DA54 M12L/10s		 4-pin Flange connector 763 09-3431
Accuracy		
Temperature coefficient of the zero signal (typical)	mV/V / 10K	< 0.005
Temperature coefficient of the parameter	% v.S. /10K	< 1
Temperature		
Nominal temperature range	°C	-10…+65
Working temperature range	°C	-20…+85
Storage temperature range	°C	-20…+85

Terminal assignment

		DA54-tiewrap	Pin no. for DA54-mag	“SAC-M12FS” cable
$+U_S$	Positive bridge power supply	brown	1	brown
$-U_S$	Negative bridge power supply	white	2	white

+UD	Positive bridge output	green	3	blue
-UD	Negative bridge output	yellow	4	black

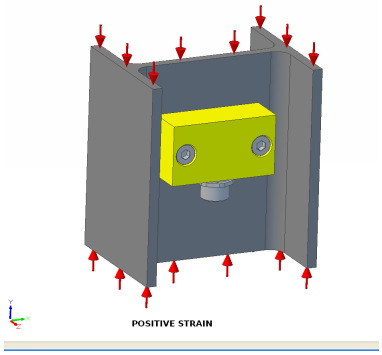
Screen: transparent;

Installation position

A positive output signal is produced in the lateral axis when sensors DA54 and DA54-mag are compressed.

The sensor DA54 can also be installed along the direction of compression. In this case, a negative output signal is received during compression.

When switching the cables +Ud and -Ud, the sign of the output signal can be inverted (recommended for sensor DA54-tiewrap)



Options

•Cable outlet in transverse direction for DA54-mag
•Strain gauge type S120P with 1000 ohm terminal resistance;
•Strain gauge type 125US for shear stress measurements;
•Integrated temperature sensor PT100 or PT1000 for DA54 M12 with 8-pin connector;

Terminal assignment SAC-8P-M12FS

		Pin no. for DA54-mag	“SAC-M12FS” cable
+US	Positive bridge power supply	2	brown
-US	Negative bridge power supply	1	white
+UD	Positive bridge output	3	green
-UD	Negative bridge output	4	yellow
I1-PT100(0)	Input 1 temperature sensor	5	grey
S1-PT100(0)	Sense 1 temperature sensor	6	pink
I2-PT100(0)	Input 2 temperature sensor	7	blue
S2-PT100(0)	Sense 2 temperature sensor	8	red

grey-pink: 0 ohm;
blue-red: 0 ohm;

Installation instructions

The full pressure strength of the magnets is only achieved on a flat surface. If there are small surface irregularities, air gaps occur between the magnet and the component meaning that the pressure strength is potentially insufficient to compress the strain gauge and the seal. Remedy:

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•Remove the black seal or

•Insert an external pressure tool (additional magnet).

Therefore please check whether the pressure strength of the integrated magnets is sufficient before applying the adhesive.

Observe the installation instructions for the strain sensor series DA40 and DA54. For series DA54-mag, the following should be observed in particular:

•The strain gauge AND the housing bottom are coated with adhesive; it is only on the seal that no adhesive is applied.

•The same adhesive, “M-bond 30”, is recommended for the strain gauge AND housing bottom.

•Alternatively, adhesive “M-bond 31” is recommended. This adhesive is characterised by a longer working life and a higher final strength.

•The strain sensor is put down with light pressure. Excessive adhesive is squeezed on the gap by means of a light, oscillating rotation movement.

•Stop the oscillating movement when the metal surface of DA54-mag rubs noticeably on the surface of the component.

•It is recommended that an additional sealing gap with silicone TSE397C or similar silicone is laid around the housing.