

## Correvit S-Motion

### Non-contact optical sensors

Type CSMOTA...

Patent Nr. DE 43 13 497 C2

Correvit S-Motion sensors enable direct, slip-free measurement of longitudinal and transverse speed in vehicle driving dynamics tests.

- New technique reduces signal noise of speed and slip angle
- Low signal delay of 6 ms
- Determination of pitch and roll angle
- Measurement of GPS position data and time
- Measurement of acceleration and angular rates
- Conversion of measurands to any point of the vehicle
- Capable of detecting driving direction – forward or backward – throughout the entire speed range
- Low adjustment effort at the vehicle, shorter setup time, no running-in procedure

#### Description

Correvit S-Motion sensors use the proven Correvit technology for non-contact measurement of speed and slip angle.

A new algorithm significantly reduces the signal noise. This algorithm and the high measurement frequency of 500 Hz enable a minimal signal delay of 6 ms.

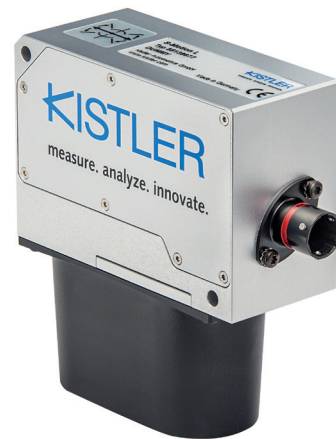
A built-in 5 Hz GPS receiver enables determination of position data and time. The external magnetic antenna allows flexible and quick mounting on the vehicle.

Integrated accelerometers enable the determination of additional measurands like longitudinal and transverse acceleration of the vehicle. Integrated angular rate sensors enable measurement of the pitch and roll angle as well as the rotation around the vertical axis of the vehicle.

Moreover, further signals such as leveled acceleration or curve radius are already calculated inside the sensor. A conversion of speed to any point of the vehicle, e.g. center of gravity or rear axis is possible.

The output of these additional signals provides the option to perform a large number of measurands required for driving dynamics standard tests. This simplifies the instrumentation of the vehicle and minimizes application errors.

Correvit S-Motion sensors produce unparalleled accuracy on all standard testing surfaces, even under the most challenging conditions. They feature high-quality optical elements, the newest optoelectronic components and state-of-the-art



high-performance signal processing based on DSP and FPGA's. Speed and distance information is updated at 500 Hz to track every highly dynamic maneuver.

The delivered KiCenter software allows easy configuration. Programmable, standardized signal outputs and interfaces provide direct connection to PC and virtually all data acquisition systems, making all measured values directly available.

#### Application

High-precision, slip-free measurement of distance, speed (absolute, longitudinal, transverse) and angle for dynamic vehicle testing, e.g. steady-state circular-course driving (ISO 4138).

#### Technical Data

##### Performance Specifications

Speed <sup>1)</sup>	km/h	±0,1 ... 250
Distance resolution	mm	≤1
Measurement accuracy <sup>2)</sup>	%FSO	<±0,2
Angle	°	±30
Angle resolution	°	<±0,01
Measurement accuracy angle <sup>2)</sup>		
Typical	°	<±0,1
Guaranteed	°	<±0,2
Angle speed	°/s	±300

<sup>1)</sup> optional: calibrated up to 400 km/h

<sup>2)</sup> determined on test surface with distance >200 m

**Technical Data (Continuation)**

Acceleration	g	±18
Non-linearity angle speed	%FSO	±0,15
Non-linearity acceleration	%FSO	±0,15
Measurement frequency	Hz	500
Working distance and range	mm	350 ±100

**Signal Outputs**

Digital output 1, 2, 3, 4	pulses/m kHz	1 ... 1 000/TTL 0 ... 100/TTL
Analog output 1, 2, 3, 4 <sup>3)</sup> (16 Bit)	V	-10 ... 10

**Signal Inputs**

Trigger input		TTL
Analog input 1, 2 (16 Bit)	V	-10 ... 10
Counter input	kHz	0 ... 100/TTL

**Interfaces**

CAN (Motorola/Intel)		2.0B
USB (Full speed)		2.0
LAN		yes

**System specifications**

Power supply	V	10 ... 28
Power consumption max. (at 12 V)	W	35
Temperature range		
Operation	°C	-25 ... 50
Storage	°C	-40 ... 85
Relative humidity (non-condensing)	%	5 ... 80
Degree of protection (cable mounted)		
Sensor head		IP67
Electronics		IP30
Dimensions (LxBxH)		
Sensor head	mm	125x70x45
Electronics	mm	180x125x95
Weight		
Sensor head	grams	600
Electronics	grams	1 100
Shock	g ms	50 half-sine 6
Vibration	g Hz	10 10 ... 150
Illumination		Halogen

<sup>3)</sup> switching-over between the respective measured variables via KiCenter possible

**Dimensions**

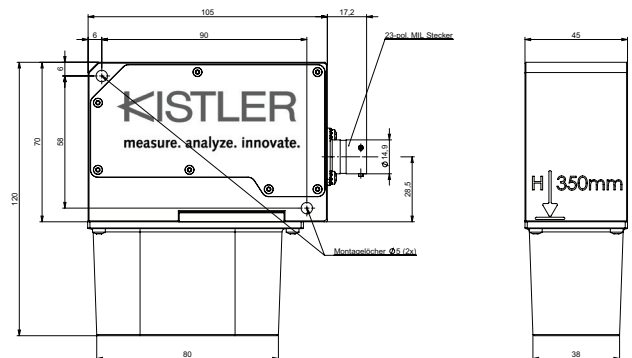


Fig. 1: Correxit S-Motion sensor dimensions

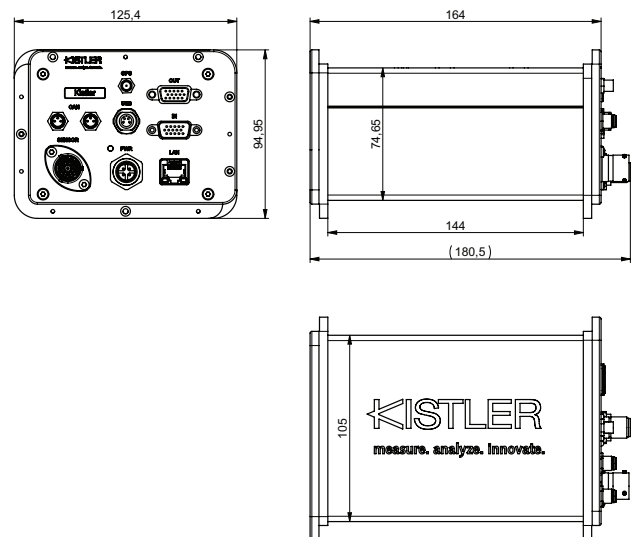


Fig. 2: Correxit S-Motion electronics dimensions

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## Mounting

With Kistler mounting equipment S-350 (see optional accessories). When mounting the sensor at the vehicle, the mounting distance from the lower surface of the sensor body (not including the spray guard) to the road must be within the specified range (see technical data, page 1).

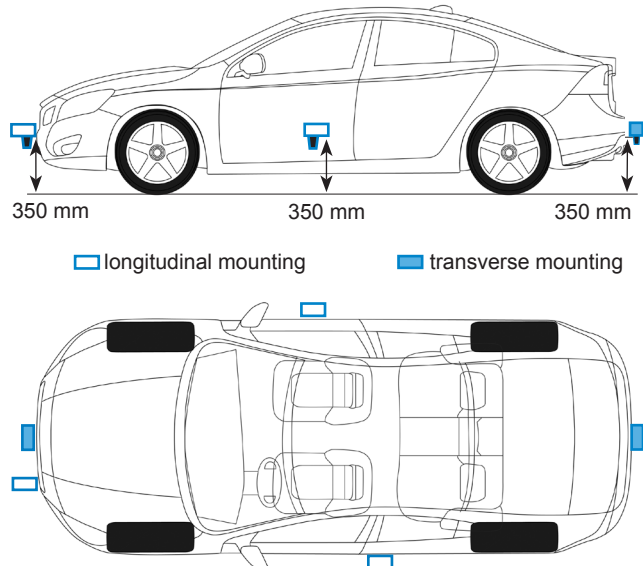


Fig. 1: Possible mounting options

## Included accessories

• Connection cable CAN, l = 2 m	18012482
• Connection cable USB, l = 2 m	18012483
• Distribution cable IN ANA/CNT, l = 1 m	55135149
• Distribution cable OUT ANA, l = 1 m	55135147
• Distribution cable OUT DIG, l = 1 m	55135148
• Ethernet cable RJ45 1:1 blue, l = 2 m	55135351
• Power cable B-coded, l = 2 m	18012367
• USB stick software + manuals	55158846
• Halogen lamp cold light	18012531
• Tool to exchange the sensor halogen lamp	55064735
• Cranked wrench key	55065040
• Hexagon wrench key, 6 kt 5 mm	55063983
• Cranked wrench key	55065078
• Minifolding rule	55064207
• Screw set for L-350, S-350, S-50 Racing	55082183
• Transport case complete L-/S-350	55066876
• GPS antenna Navilock NL-202AA	55137560

## Optional Accessories

• Suction holder S-350	18012551
• Magnet holder S-350	18012545
• IR Temperature Sensor 100 °C tarmac, 5 m	18031593

## Ordering Key

Type CSMOTA	□ □ □ □ □ □ □
<b>Sensor Head</b>	
Halogen *	1
<b>Sensor Cable</b>	
5 m *	1
10 m	2
15 m	3
<b>Electronics</b>	
250 km/h *	1
400 km/h	2
<b>Interface Outputs</b>	
±10 V *	1
0 ... 5 V	2
<b>Mounting Direction</b>	
Longitudinal *	1
Transverse	2
<b>Interface Inputs</b>	
±10 V *	1
0 ... 5 V	2
<b>GPS</b>	
With GPS function *	1

## Ordering Example

Type CSMOTA1111111

S-Motion sensor, 5 m cable, standard electronics, ±10 V interface outputs, longitudinal mounting direction, ±10 V interface inputs, with GPS function

\* Standard configuration