

# Correvit SF-Motion

Type 2059A...

## Non-contact optical sensors

Patent No. DE 43 13 497 C2

Correvit SF-Motion sensors are designed for motor sports applications to measure longitudinal and transverse vehicle dynamics.

- Reduced signal noise of speed and side-slip angle
- Low signal delay of 6 ms
- Conversion of measurands to any point of the vehicle
- Capable of detecting driving direction – forward or backward
- Low adjustment effort at the vehicle, shorter setup time, no running-in procedure
- Small and light-weight - optimized for motor sports applications

### Description

Correvit SF-Motion sensors use the proven Correvit technology. A special algorithm significantly reduces the signal noise. This algorithm and the high measurement frequency of 500 Hz enable a minimal signal delay of 6 ms.

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.

Correvit SF-Motion sensors are specially designed for motor sport applications but the output of the a.m. additional signals provides the option to perform also a large number of measurands required for driving dynamics standard tests. In any case, these versatile sensors simplify the instrumentation of the vehicle and minimize application errors.

Correvit SF-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 (x, y)
- acceleration and angular rates
- side-slip angle
- pitch and roll angle

### DTI technology

The DTI technology provides a single end-to-end bus wiring system for complete applications. DTI converts each signal into a unique, time stamped digital output either directly in the DTI sensors from Kistler, or via suitable DTI converters for use with any other existing sensors. The sensor data is collected at the central DTI logger and is transmitted via Ethernet to your laptop for evaluation. A single cable is all that is needed to configure the sensors, to transmit and synchronize the measurement data and to supply power. The automated sensor detection simplifies the test setup. The installation position, calibration values and relevant physical parameters are detected automatically by the measuring software (KiCenter) and can be configured using the GUI.

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**Technical data**

**Performance specifications**

Speed <sup>1)</sup>	km/h	±0.1 ... 400
Distance resolution	mm	≤1
Measurement accuracy <sup>2)</sup>	%FSO	<±0.2
Angle	°	±30
Angle resolution	°	<±0.01
Meas. accuracy angle <sup>2)</sup>		
Typical	°	<±0.1
Guaranteed	°	<±0.2
Angular speed	°/s	±2,000
Acceleration	g	±16
Non-linearity		
Angle speed	%FSO	±0.15
Acceleration	%FSO	±0.15
Measurement frequency	Hz	500
Working distance / range <sup>3)</sup>	mm	180 ±50

**Interfaces**

CAN (Motorola/Intel)		2.0B
USB (Full Speed)		2.0
Ethernet		yes
DTI		yes

**System specifications**

Power supply	V	10 ... 28
Power consumption max. (at 12 V)	W	30
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		IP40
Dimensions (LxWxH)		
Sensor head	mm	88x76x28
Electronics	mm	168x125x95
Weight		
Sensor head	grams	175
Electronics	grams	890
Shock	g ms	50 half-sine 6
Vibration	g Hz	10 10 ... 150
Illumination		LED-IR 850 nm laser class 1

<sup>1)</sup> Optional: calibrated to 250 km/h  
<sup>2)</sup> Determined on test surface with distance >200 m  
<sup>3)</sup> Range ±80 mm on request

**Dimensions**

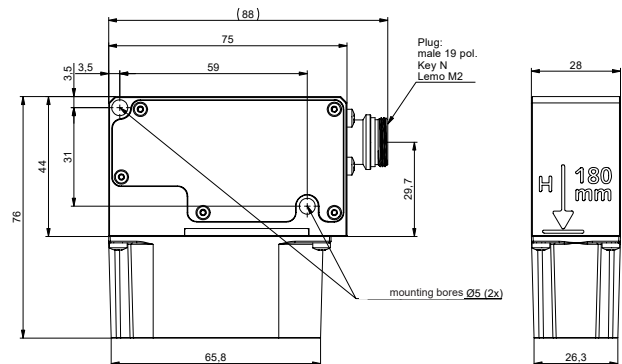


Fig. 1: Correxit SF-Motion sensor dimensions

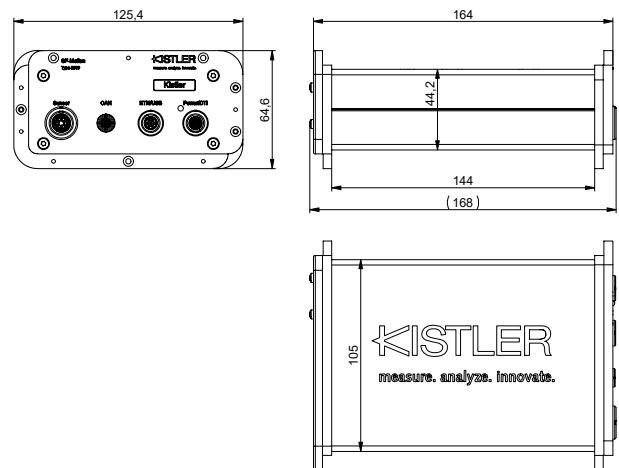


Fig. 2: Correxit SF-Motion electronics

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### Mounting

With Kistler mounting equipment (see below: 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  $180 \pm 50$  mm.

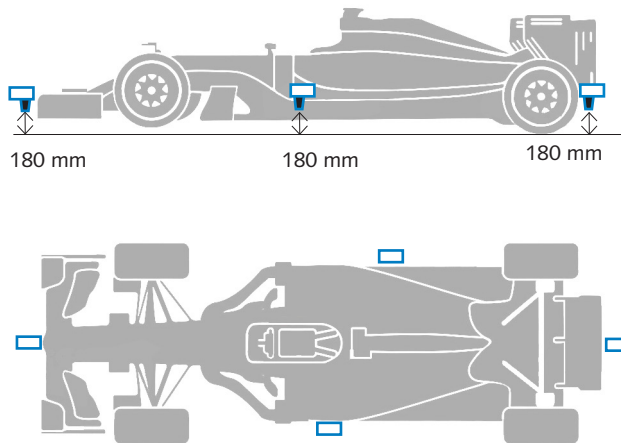


Illustration: for internal use only

Fig. 3: Possible mounting options

### Included accessories

	Type/Art. No.
• Connecting cables	
USB, l = 1.8 m	55155609
CAN, l = 2 m	55155606
DTI, l = 0.5 m	55155607
ETH, l = 2 m	55155608
• Power cable DTI sensors, l = 2 m	55155612
• USB stick software + manuals	55158846
• Cranked wrench key	55065040
• Hexagon wrench key, 6 kt	55063983
• Cranked wrench key	55065078
• Mini folding rule	55064207
• Screw set	55082183
• Transport case complete	55066876

### Optional accessories

	Type/Art. No.
• Suction holder	18012551
• Magnet holder	18012545

### Ordering key

		Type 2059A
<b>Sensor head</b>		□ □ □ □
Infrared without protection glass	1	↑
<b>Sensor cable</b>		
Without sensor cable	0	↑
2 m	1	↑
5 m	2	↑
10 m	3	↑
<b>Electronics</b>		
250 km/h	1	↑
400 km/h	2	↑
<b>Mounting direction</b>		
Longitudinal	1	↑

### Ordering example

**Type 2059A1021**

SF-Motion Sensor, infrared without protection glass, without sensor cable, 400 km/h, longitudinal mounting direction