

Correvit S-Motion DTI

Non-contact optical sensors

Type 2055A... (standard),
2053A... (small)

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

Due to their properties, the high-resolution variants (S-Motion DTI HR) are particularly suitable for low speeds (e.g. industrial trucks, parking tests).

- Reduced signal noise of speed and 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
- Optional: high-resolution variants with improved optical resolution

Description

Correvit S-Motion DTI sensors use the proven Correvit technology. 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 DTI 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)
- side-slip angle
- acceleration and angular rates
- GPS position data and time
- pitch and roll angle

DTI technology

End-to-end bus wiring system to take the measurement signals from every sensor to the data recorder. DTI converts each signal into a unique, time stamped digital output either directly in the DTI sensors, or via suitable DTI converters for use with any existing sensors. The sensor data is collected at the central DTI logger and is transmitted via Ethernet to the computer 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: installation position, calibration values and relevant physical parameters are detected automatically by the measuring software (KiCenter) and can be configured using the GUI.

Technical data

Performance specifications		Type 2055A (standard)	Type 2053A (small)
Speed ¹⁾			
S-Motion DTI	km/h	±250 (400)	
S-Motion DTI HR	km/h	±125 (200)	
Measurement accuracy ²⁾	%FSO	<±0.2	
Distance resolution	mm	≤1	
Angle	°	±30	
Angle resolution	°	<±0.01	
Meas. accuracy angle ²⁾			
Typical	°	<±0.1	
Guaranteed	°	<±0.2	
Angular speed	°/s	±300	
Acceleration	g	±18	
Non-linearity			
Angle speed	%FSO	±0.15	
Acceleration	%FSO	±0.15	
Measurement frequency	Hz	500	
Working distance / range	mm	350 ±100	

Signal outputs

Digital output 1 Vel	pulses/m	1 ... 1,000/TTL	no
Digital output 2 Vel _x	pulses/m	1 ... 1,000/TTL	no
Digital output 3 Vely	Hz/km/h	2 ... 200/TTL	no
Digital output 4 angle	Hz/°	6 ... 900/TTL	no
Analog output 1, Vel ³⁾	V	-10 ... 10	no
Analog output 2, Vel _x ³⁾	V	-10 ... 10	no
Analog output 3, Vely ³⁾	V	-10 ... 10	no
Analog output 4, angle ³⁾	V	-10 ... 10	no

Signal inputs

Trigger		TTL	no
Analog 1+2 (16 Bit)	V	-10 ... 10	no
Counter	kHz	0 ... 100/TTL	no

Interfaces

CAN (Motorola/Intel)		2.0B	no
USB (Full Speed)		2.0	
Ethernet		yes	
DTI		yes	

System specifications		Type 2055A (standard)	Type 2053A (small)
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		IP40	
Dimensions (LxWxH)			
Sensor head	mm	118x70x45	
Electronics	mm	175x125x95	175x125x65
Weight			
Sensor head	grams	600	
Electronics	grams	1,100	890
Shock			
g		50 half-sine	
ms		6	
Vibration			
g		10	
Hz		10 ... 150	
Illumination		halogen	

¹⁾ S-Motion DTI: optionally calibrated up to 400 km/h

S-Motion DTI HR: optionally calibrated up to 200 km/h

²⁾ Determined on test surface with distance >200 m

³⁾ Default setting; in KiCenter, you can freely assign the analog outputs by activating the checkbox "Individual Output Enable"

Dimensions

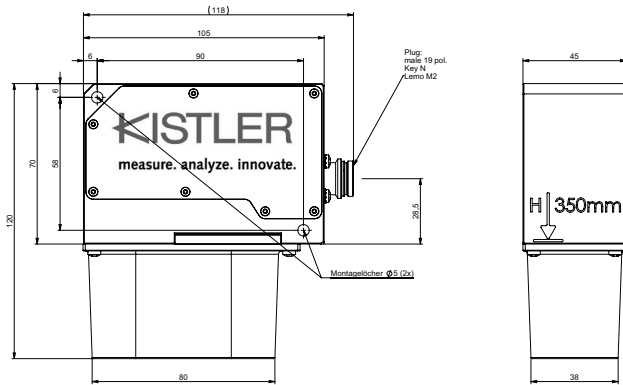


Fig. 1: Correvit S-Motion DTI sensor dimensions

Mounting

With Kistler mounting equipment (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 350 ± 100 mm.

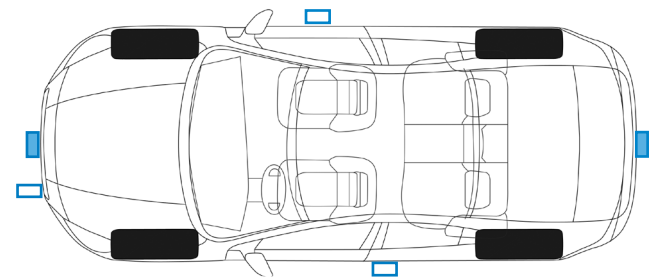
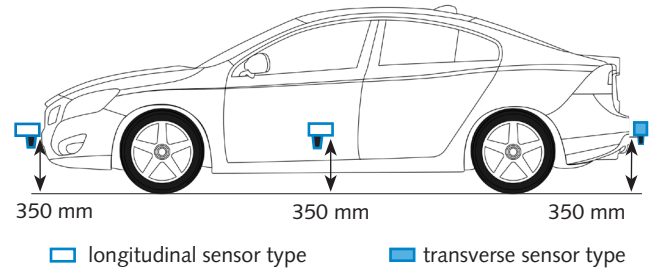


Fig. 4: Possible mounting options

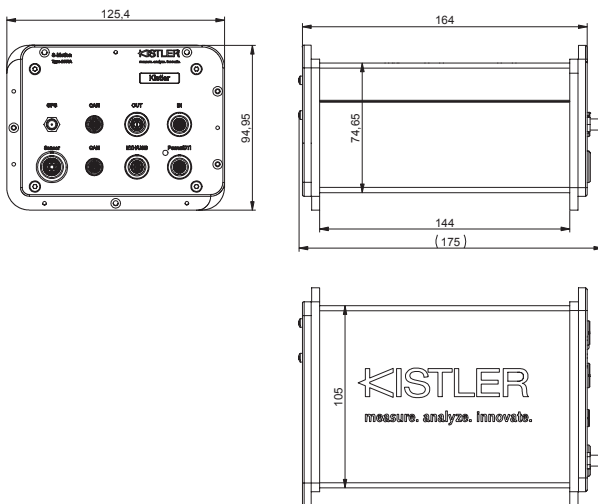


Fig. 2: Correvit S-Motion DTI electronics (standard), Type 2055A dimensions

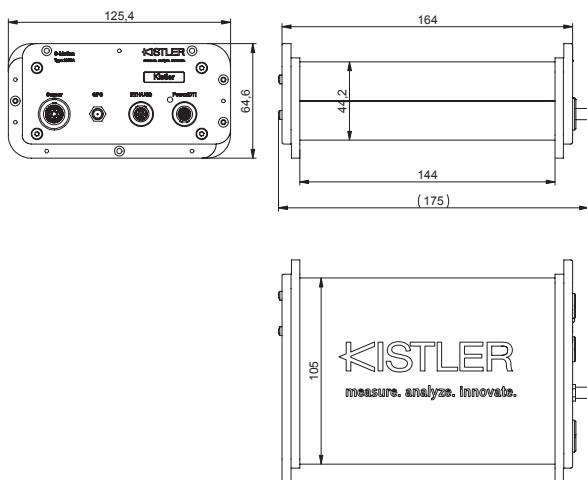


Fig. 3: Correvit S-Motion DTI electronics (small), Type 2053A, dimensions

2053A_003-395e-10.20

Included accessories Type 2055A... (standard) 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
• Distributor cables	
IN ANA/CNT, 8 pin LEMO, l = 1 m	55159202
OUT ANA, 10 pin LEMO, l = 1 m	55159203
OUT DIG, 10 pin LEMO, l = 1 m	55175071
• USB stick software + manuals	55158846
• Halogen lamp, cold light	18012531
• Tool to exchange the sensor halogen lamp	55064735
• Angled pin spanner Torx	55065040
• Hexagon wrench key, 6 kt	55063983
• Angled pin spanner Torx	55065078
• Mini folding rule	55064207
• Screw set	55082183
• Transport case complete	55066876
• GPS antenna	55137560

Included accessories Type 2053A... (small)

• Connecting cables	
USB, l = 1.8 m	55155609
DTI, l = 0.5 m	55155607
ETH, l = 2 m	55155608
• Power cable DTI sensors, l = 2 m	55155612
• USB stick software + manuals	55158846
• Halogen lamp, cold light	18012531
• Tool to exchange the sensor halogen lamp	55064735
• Angled pin spanner Torx	55065040
• Hexagon wrench key, 6 kt	55063983
• Angled pin spanner Torx	55065078
• Mini folding rule	55064207
• Screw set	55082183
• Transport case complete	55066876
• GPS antenna	55137560

Optional accessories

Type 2053A.../Type 2055A...	Type/Art. No.
• Suction holder	18012551
• Magnet holder	18012545

Ordering key

Art. No. 18034450	Type 2055A	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Art. No. 18034449	Type 2053A	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Sensor head

Halogen *	1
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Sensor cable

5 m *	1
10 m	2
15 m	3

Electronics

250 km/h*	1
400 km/h	2
High-resolution 125 km/h	3
High-resolution 200 km/h	4

Interface outputs

±10 V *	1
0 ... 5 V	2

Mounting direction

Longitudinal *	1
Transverse	2

Interface inputs

±10 V *	1
0 ... 5 V	2

GPS

With GPS function *	1
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³⁾ Not configurable with Type 2053A

Ordering example

Type 2055A1111111

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

* Standard configuration