KISTLER

measure. analyze. innovate.

Vehicle Dynamics & Durability

Measurement Systems for Vehicle Dynamics, Tire- and Durability Testing

Kistler – Measuring with added value

Kistler's added value: Helping you measure more quickly, more efficiently and more effectively. As a global market leader, we offer you a comprehensive one-stop solution with our reliable measuring systems which have proved their worth around the world, even in extreme operating conditions.

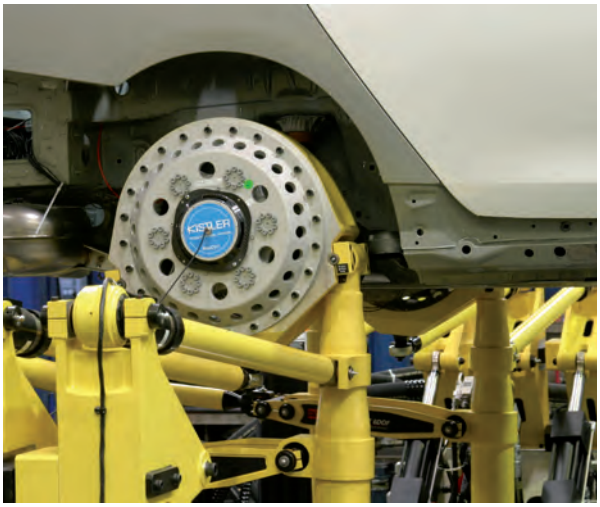
The combination of Kistler wheel force measuring technology and sensors/sensor systems designed to measure vehicle dynamics makes it possible to take complex, high-precision measurements of a large number of vehicle-related parameters. By employing sophisticated combinations of sensors, all wheel forces and loads can be measured together with vehicle dynamics parameters such as the slip angle and camber angle. In addition to taking measurements relating to wheel and bodywork movements, Kistler also provides the measuring technology required to conduct comprehensive and integrated vehicle tests.

Kistler measuring technology is therefore ideally suited to conduct numerous tests in accordance with DIN-ISO:

- ISO lane change test
- VDA obstacle avoidance test
- Steady-state circular test
- Load change from steady-state circular driving
- Braking from steady-state circular driving
- ABS and ESP tests

Kistler wheel force transducers and measuring hubs are employed around the world – both as mobile devices and on operational stability test benches, tire test rigs and special customer-specific applications. Our comprehensive range of services also includes high-precision calibration on the unique Kistler hexapod calibration rig, ensuring that your wheel force transducers offer the highest possible level of accuracy throughout their entire life cycle.

Kistler provides you with an integrated measurement solution, from sensor technology through signal conditioning with all interfaces currently used in the automotive industry to the corresponding configuration and operating software. Furthermore, the



Kistler wheel force transducers are used in axial test rigs (Source: Fraunhofer LBF)

Kistler portfolio includes individually manufactured components such as wheel rims and vehicle-specific adaptations, including the necessary attachments enabling sensors to be fitted accurately to the test vehicle as quickly as possible.

Above all, however, we provide you with a level of know-how, experience and commitment which is perfectly adapted to your tasks and goals. This is our benchmark.

The RoaDyn P1HT wheel torque transducer with optimum handling for tractive resistance measurements

The outstanding ability to combine Kistler sensors makes it possible to take a wide range of measurements while conducting simple, integrated vehicle tests.

Application chart

		On-road testing														Test stand operation					
		Longitudinal dynamics					Transversal dynamics				Tire development				Durability		Tire development				Durability
		Brakes, e.g. ABS	Acceleration	Coast-Down-Test	Consumption	Driving resistance	Slip / sideslip angle	Wheel movements	ESP	ISO-Tests	Traction	Aquaplaning	ISO-Tests	Tire characteristics	Misuse tests	Load data record	HSU-Test	Endurance run	Tire characteristics	Rolling resistance	Physical simulation on axle- and tire-mounted test stands
Wheel force transducers	6-component wheel force transducers S6… sp								●	●			●	●	●	●					
	Wheel torque transducers P1…	●	●	●		●			●		●										
Measuring hubs	S2…																		●	●	
	S5…																	●	●		
	P530																●				
	S6… nsp																				●
Non-contact sensors	LFII-P	●	●	●																	
	L-350	●	●	●	●						●	●									
	HF	●	●						●	●			●								
	DCA-System							●					●	●							
	S-350						●		●	●			●								
	SFII-P						●		●					●							
	S-HR						●		●	●				●							
Mechanical sensors	MSW	●							●	●			●								
	RV-4							●	●	●				●							
	WPT	●		●					●												
	PFT	●							●												
Other sensors	DFL				●																
	Acceleration	●	●						●	●	●	●	●		●	●					●
	GPS	●													●	●					

Selection table wheel force measurement

			On-road testing										Test stand operation									
			6-component wheel force transducers								Wheel torque transducers		6-component measuring hubs					Measuring hubs for tire-/ wheel / tire test stands				
			S625 CFK	S630 CFK	S635	S650	S660	S6ST	S6MT	S6xT	P106	P1HT	S625 nsp	S635 nsp	S650 nsp	S660 nsp	S6XT nsp	S220	S260	P530	S5ST	S5MT
Cars	Light		●								●		●					●		●		
	Medium to heavy		●	●	●						●		●	●				●		●		
	SUV			●	●	●	●				●			●	●	●		●		●	●	
Race	Nascar						●									●						
Trucks	Light					●	●	●				●			●	●			●		●	●
	Medium								●			●					●		●			●
	Heavy									●		●					●		●			
	Special									●		●					●		●			

Kistler –
Your partner for all vehicle-related measuring tasks

With its unique range of sensors and sensor systems, Kistler provides you with the right tool for your individual measuring task, whether it is in the field of operational stability, longitudinal and lateral dynamics or tire development and testing. In chassis development and testing, sensors used to record momentum-related parameters of a vehicle are combined with sensors which measure driver stimuli, while in operational stability applications the primary task is to record load collectives and reproduce them on test tracks and street simulators. In this case, wheel force sensors are combined with other sensors such as wheel alignment sensors, accelerometers and sensors serving the recording of driver stimuli.
Due to the need to improve the effectiveness of the entire power train (including the power unit) in order to reduce fuel consumption and pollutant emissions, combinations of sensors for measuring tractive resistance are used in conjunction

Non-contact sensors

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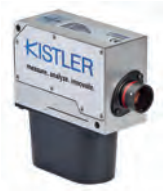
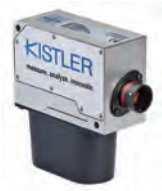


S350



L350


SFII

SHR


SHF

Mechanical sensors

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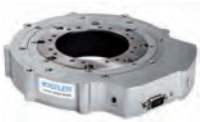
RV-4


Kistler MSW


DFL


WPT

DAQ

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DAS-3


CDS-Logger

Wheel torque transducers

Page 8


P106


P1HT

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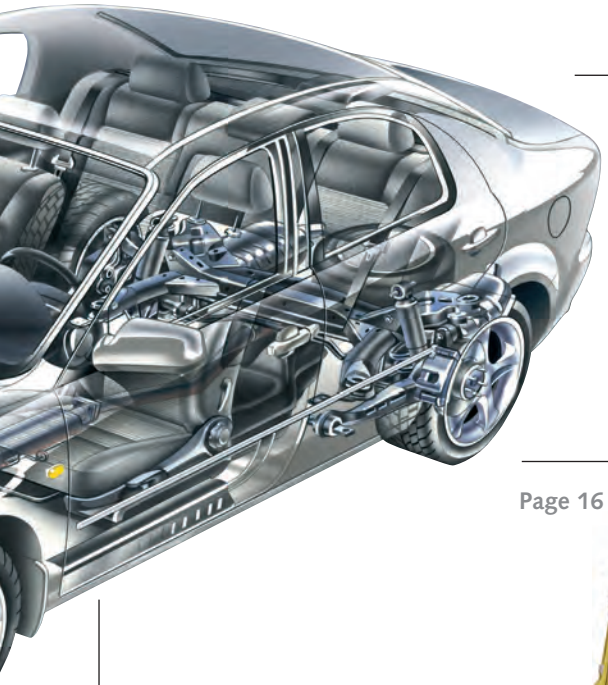
with consumption measurement systems or pressure sensors to analyze the combustion process.
Kistler also provides sensors adapted to the field of tire development and testing for both mobile use and stationary use on tire test rigs. These can be combined with further sensors where necessary.

Furthermore, we are committed to ensuring that preparing your measuring task costs you as little as possible. In line with our commitment, we offer not only advice in selecting and integrating the most appropriate measuring equipment; our range of services also includes the adaptation of this equipment to the specific test piece or test bench, provision of suitable fastenings and installation components and competent service from calibration through the inspection of measuring equipment to troubleshooting and repairs.



6-component wheel force transducers for cars

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S625 CFR

S630 CFK

S635

S660

6-component wheel force transducers for trucks

Page 7

S6ST

S6MT

S6XT

6-component measuring hubs

Page 16

S625-nsp

S635-nsp

S660-nsp

S6XT-nsp

Measuring hubs for tire-/wheel / tire test stands

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P530

S220

S260

S5ST

S5MT

RoaDyn® S: Multi-Component Wheel Force Transducers

For Durability and Vehicle Dynamics Measurements

RoaDyn S625 sp CFRP: Light 6-Component Wheel Force Transducer (WFT) for Cars

Technical Data			Type 9266A...
Measuring range	F_x	kN	–20 ... 20
	F_y	kN	–15 ... 15
	F_z	kN	–20 ... 20
	M_x	kN·m	–4 ... 4
	M_y	kN·m	–4 ... 4
	M_z	kN·m	–4 ... 4
Rim sizes		Inch	14 ... 18
Data sheet		No.	9266A_000-495

Description For research into vehicle dynamics, tire testing and capturing road load data for virtual and experimental simulation with cars. With inboard or outboard near field telemetry transmission. Available in two versions: CFRP for rim sizes of 14 ... 18" or aluminum for rim sizes of 12 ... 19".

RoaDyn S630 sp CFRP: Light 6-Component Wheel Force Transducer (WFT) for Large Cars and Light SUVs

Technical Data			Type 9279A...
Measuring range	F_x	kN	–30 ... 30
	F_y	kN	–18 ... 18
	F_z	kN	–30 ... 30
	M_x	kN·m	–5 ... 5
	M_y	kN·m	–5 ... 5
	M_z	kN·m	–5 ... 5
Rim sizes		Inch	17 ... 22
Data sheet		No.	9279A_000-692

Description For research into vehicle dynamics, tire testing and capturing road load data for virtual and experimental simulation with large cars and light SUVs. With inboard or outboard near field telemetry transmission.

RoaDyn S635 sp Aluminum: 6-Component Wheel Force Transducer (WFT) for Large Cars and Light SUVs

Technical Data			Type 9267A...
Measuring range	F_x	kN	–35 ... 35
	F_y	kN	–20 ... 20
	F_z	kN	–35 ... 35
	M_x	kN·m	–5 ... 5
	M_y	kN·m	–5 ... 5
	M_z	kN·m	–5 ... 5
Rim sizes		Inch	15 ... 22
Data sheet		No.	9267A_000-559

Description For research into vehicle dynamics, tire testing and capturing road load data for virtual and experimental simulation with large cars and light SUVs. With inboard or outboard near field telemetry transmission.

RoaDyn S650 sp: 6-Component Wheel Force Transducer (WFT) for SUVs and Light Trucks

Technical Data			Type 9268A...
Measuring range	F_x	kN	–50 ... 50
	F_y	kN	–30 ... 30
	F_z	kN	–50 ... 50
	M_x	kN·m	–6 ... 6
	M_y	kN·m	–6 ... 6
	M_z	kN·m	–6 ... 6
Rim sizes		Inch	15 ... 22
Data sheet		No.	9268A_000-497

Description For research into vehicle dynamics, tire testing and capturing road load data for virtual and experimental simulation with SUVs and light trucks. With inboard or outboard near field telemetry transmission. Available as single wheel, twin wheel and super single wheel.

RoaDyn® S: Multi-Component Wheel Force Transducers

For Durability and Vehicle Dynamics Measurements

RoaDyn S660 sp: 6-Component Wheel Force Transducer (WFT) for SUVs, NASCAR and Light Trucks

Technical Data			Type 9248A...
Measuring range	F_x	kN	–60 ... 60
	F_y	kN	–36 ... 36
	F_z	kN	–60 ... 60
	M_x	kN·m	–7,5 ... 7,5
	M_y	kN·m	–8,5 ... 8,5
	M_z	kN·m	–7,5 ... 7,5
Rim sizes		Inch	15 ... 22
Data sheet		No.	9248A1_000-970

Description For research into vehicle dynamics, tire testing and capturing road load data for virtual and experimental simulation with SUVs, NASCAR and light trucks. With inboard or outboard near field telemetry transmission. Available as single wheel, twin wheel and super single wheel.

RoaDyn S6ST sp: 6-Component Wheel Force Transducer (WFT) for Light Commercial Vehicles

Technical Data			Type 9282A...
Measuring range	F_x	kN	–80 ... 80
	F_y	kN	–50 ... 50
	F_z	kN	–80 ... 80
	M_x	kN·m	–15 ... 15
	M_y	kN·m	–25 ... 25
	M_z	kN·m	–15 ... 15
Rim sizes		Inch	16 ... 24
Data sheet		No.	9282A_000-696

Description For research into vehicle dynamics, tire testing and capturing road load data for virtual and experimental simulation with light commercial vehicles. With inboard or outboard near field telemetry transmission. Available as single wheel, twin wheel and super single wheel.

RoaDyn S6MT sp: 6-Component Wheel Force Transducer (WFT) for Medium Size Commercial Vehicles

Technical Data			Type 9270A...
Measuring range	F_x	kN	–120 ... 120
	F_y	kN	–70 ... 70
	F_z	kN	–120 ... 120
	M_x	kN·m	–18 ... 18
	M_y	kN·m	–30 ... 30
	M_z	kN·m	–18 ... 18
Rim sizes		Inch	17,5 ... 24
Data sheet		No.	9270A_000-858

Description For research into vehicle dynamics, tire testing and capturing road load data for virtual and experimental simulation with medium size commercial vehicles. With inboard or outboard near field telemetry transmission. Available as single wheel, twin wheel and super single wheel.

RoaDyn S6HT sp: 6-Component Wheel Force Transducer (WFT) for Heavy and Special Commercial Vehicles

Technical Data			Type 9262A...
Measuring range	F_x	kN	–220 ... 220
	F_y	kN	–100 ... 100
	F_z	kN	–220 ... 220
	M_x	kN·m	–40 ... 40
	M_y	kN·m	–60 ... 60
	M_z	kN·m	–40 ... 40
Rim sizes		Inch	≥19,5
Data sheet		No.	9262A_000-862

Description For research into vehicle dynamics, tire testing and capturing road load data for virtual and experimental simulation with heavy agricultural and off-highway vehicles. With inboard or outboard near field telemetry transmission. Available as single wheel, twin wheel and super single wheel.

RoaDyn® P: 1-Component Wheel Torque Transducers

For Rolling Resistance Measurement

RoaDyn P106: Wheel Torque Transducer for Cars and SUVs

Technical Data				Type 9294B...
Measuring range	high	M_y	kN·m	–6 ... 6
(switchable)	low	M_y	kN·m	–0,6 ... 0,6
Max. load		F_z	kN	–24 ... 24
Rim sizes			Inch	14 ... 20
Data sheet			No.	9294B_000-634

Description

For measuring the torque and braking force of cars and SUVs in the fields of driving stability, traction control, ABS systems, force distribution, costing moment. Customized measuring ranges on request. Available with slip ring transmission BaseLine or PremiumLine and telemetry transmission.

RoaDyn P1HT: Wheel Torque Transducer for Trucks and Special Commercial Vehicles

Technical Data				Type 9299A
Measuring range	high	M_y	kN·m	–50 ... 50
(switchable)	low	M_y	kN·m	–5 ... 5
Max. load		F_z	kN	–120 ... 120
Rim sizes			Inch	≥19,5
Data sheet			No.	9299A_000-993

Description

For measuring the torque and braking force of cars and SUVs in the fields of driving stability, traction control, ABS systems, force distribution, costing moment. Customized measuring ranges on request.
The P1HT can be retrofit into a S6XT by exchanging the load cells.

Data Acquisition and Evaluation

For RoaDyn Wheel Force Transducers

System 2000

Technical Data		Type 9891A...
Weight (without ANI modules)	kg	8,4
Dimensions (LxWxH)	mm	450x275x139
Power supply	VDC	10,5 ... 40
Power consumption	W	<150
Operating temperature range	°C	5 ... 50
Data sheet	No.	9891A_000-563

Description High-end, digital measurement transmission and electronics system for use with Kistler 6-component wheel force transducers. Designed to consistently reflect customer requirements. Preferably used for on-road testing.

On-Board Electronics Telemetry for RoaDyn P1xy with Telemetry module

Technical Data		Type 9813A2
Weight (approx.)	kg	2,5
Dimensions (LxWxH)	mm	207x182x125
Power supply	VDC	9 ... 36
Power consumption	W	5
Operating temperature range	°C	–40 ... 80
Data sheet	No.	9813A2_000-771

Description on 2,4 GHz ISM-band transmits the signals to the on-board electronics, which may serve up to four wireless transmission modules; self-identification of all sensors; CAN data output for all channels; analog data ouput for 6 selectable channels; online display of the measurement signals; configuration via USB, Ethernet and Click-Wheel.

Control Box BaseLine/PremiumLine for RoaDyn P1xy

Technical Data		Type 5693	Type 5683
Weight	kg	0,5	0,5
Dimensions (LxBxH)	mm	185,5x64x35	184x64x35
Power supply	VDC	9 ... 18	9 ... 18
Power consumption	W	5	3
Signal output		M_y	M_y; C1 ... C3, A, B, Z T1 ... T4, Tc
Output noise	mVpp	<10	<10
Data sheet	No.	5693_000-631	5683_000-576

Description Interface between wheel torque sensor RoaDyn P1xy with slip ring module and the user's data acquisition equipment.

Non-Contact Sensors

For Vehicle Dynamics Testing

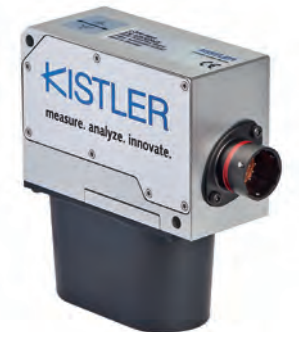
Correvit® LFII-P: 1-Axis Optical Sensor for Measuring Longitudinal Dynamics

Technical Data		Type CLFA...
Speed range	km/h	0,3 ... 250
Measurement accuracy[1)]	%	<±0,5
Measurement frequency	Hz	250
Working distance and range	mm	200 ±70
Data sheet	No.	CLFA_000-809

Description High-precision, slip-free measurement of distance and longitudinal speed, e.g. ISO 70028 brake path measurement with straightforward ABS braking, ISO 14512 braking on one-sided slippery track surface when driving straight-ahead.

[1)] determined on test surface with distance >200 m

Correvit® L-350 Aqua: 1-Axis Optical Sensor for Measuring Longitudinal Dynamics



Technical Data		Type CL350A...
Speed range	km/h	0,3 ... 250
Measurement accuracy[1)]	%	<±0,2
Measurement frequency	Hz	250
Working distance and range	mm	350 ±130
Data sheet	No.	CL350A_000-808

Description High-precision, slip-free measurement of distance, longitudinal speed and acceleration, e.g. ISO 70028 brake path measurement with straightforward ABS braking, ISO 14512 braking on one-sided slippery track surface when driving straight-ahead.

[1)] determined on test surface with distance >200 m

Microstar II: Microwave Sensor for Measuring Longitudinal Dynamics

Technical Data		Type CMSTRA...
Speed range	km/h	0,5 ... 400
Measurement accuracy [1)]	%	<±0,5
Measurement frequency	Hz	250
Working distance and range	mm	300 ... 1 200
Data sheet	No.	CMSTRA_000-894

Description Microstar II sensors are designed for longitudinal vehicle dynamics tests that require a large working range, making them ideally suited for off-road applications.

[1)] determined on test surface with distance >200 m

HF Sensors: Optical Laser Height-Sensors for Distance Measurement

Technical Data		Type CHFA1...	Type CHFA2...	Type CHFA3...
Measuring range	mm	100 ... 350	125 ... 625	150 ... 900
Resolution	mm	0,1	0,2	0,3
Linearity	mm	±0,2	±0,2	±0,3
Sampling rate[1)]	kHz	0,3 ... 8	0,3 ... 8	0,3 ... 8
Data sheet	No.	CHFA_000-815	CHFA_000-815	CHFA_000-815

Description Height sensors for measuring pitch and roll angle, for example, according to ISO 4138 (steady-state circular-course drive). Further fields of application include instance tire lift-off, spring deflection, dynamic tire flat spotting. The Kistler DCA System (see data sheet 000-884e) comprising two HF sensors, can also measure the dynamic camber angle.

[1)] a sampling rate of up to 8 kHz is possible on surfaces with high reflection

Non-Contact Sensors

For Vehicle Dynamics Testing

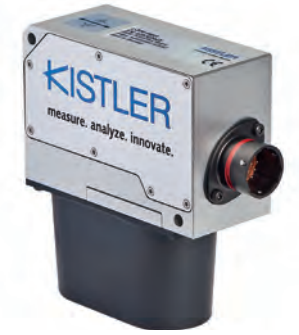
Correvit® SFII-P: 2-Axis Optical Sensor for Measuring Longitudinal and Transversal Dynamics

Technical Data		Type CSF2A...
Speed range	km/h	0,3 ... 250
Measurement accuracy[1)]	%	<±0,5
Angle range / angle resolution[2)]	°	±40 / <±0,1
Measurement accuracy angle[1)]	°	<±0,5
Measurement frequency	Hz	250
Working distance and range	mm	180 ±50
Data sheet	No.	CSF2A_000-812

Description High-precision, slip-free measurement of distance, longitudinal and transversal speed as well as angle. With or without protection glass. Optionally available as racing version calibrated up to 400 km/h.

[1)] determined on test surface with distance >200 m
[2)] determined at 50 km/h and standard settings

Correvit® S-350: 2-Axis Optical Sensor for Measuring Longitudinal and Transversal Dynamics



Technical Data		Type CS350A2...	Type CS350A1...	Type CS350A253...
Speed range	km/h	0,5 ... 250	0,5 ... 400	0,5 ... 250
Measurement accuracy[1)]	%	<±0,2	<±0,2	<±0,25
Angle range / angle resolution[2)]	°	±40 / <±0,1	±40 / <±0,1	±30 / <±0,1
Measurement accuracy angle[1)]	°	<±0,2	<±0,2	<±0,2
Measurement frequency	Hz	250	250	250
Working distance and range	mm	350 ±100	350 ±50	350 ±100
Data sheet	No.	CS350A_000-807	CS350A_000-807	CS350A_000-807

Description High-precision, slip-free measurement of distance, longitudinal and transversal speed as well as angle.

[1)] determined on test surface with distance >200 m
[2)] determined at 50 km/h and standard settings

Correvit® S-HR: 2-Axis Optical Sensor for Measuring Longitudinal and Transversal Dynamics

Technical Data		Type CSHRA...
Speed range	km/h	0,5 ... 250
Measurement accuracy[1)]	%FSO	<±0,2
Angle measurement range	°	±40, high-resoluition ±15 °
High-resolution angle output	km/h	10 ... 250, angle resolution[2)] <±0,01 °
Measurement accuracy angle[1)]	°	<±0,1
Measurement frequency	Hz	250
Working distance and range	mm	250 ±50
Data sheet	No.	CSHRA_000-806

Description High-precision, slip-free measurement of distance, longitudinal/transversal speed and angle (high-resolution), e.g. ISO 4138 steady-state circular-course driving, ISO 7401 sudden steering-angle change, tire research.

[1)] determined on test surface with distance >200 m
[2)] determined at 50 km/h and standard settings

Kistler GPS Sensor: For Measurement of Speed, Position and Distance via GPS

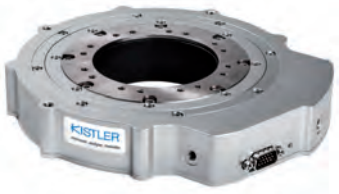
Technical Data		Type CGPSSA...	
Speed range	km/h	0,1 ... 1 600	
Measurement frequency		Hz	100, 20, 10
Signal outputs			
Analog	V	0 ... 10	
Digital	Pulses/m	1 ... 1 000 TTL	
Interfaces		CAN, USB	
Data sheet	N0.	CGPSSA_003-080	

Description High-precision, slip-free measurement of distance, longitudinal speed and acceleration, e.g. ISO 70028 brake path measurement with straightforward ABS braking, ISO 14512 braking on one-sided slippery track surface when driving straight-ahead.

Mechanical Sensors

for Vehicle Dynamics Testing

Kistler MSW: Measurement Steering Wheel for Non-Contact Measurement of Steering Moment, Steering Angle and Steering Speed



Technical Data		Type CMSWB1...	Type CMSWB2...
Data-update rate	Hz	1 000	1 000
Steering moment			
Measuring range	N·m	±50	±250
Accuracy	%FSO	±0,15	±0,15
Linearity deviation	%FSO	±0,15	±0,15
Steering angle			
Measuring range[1)]	°	≥±1 250	≥±1 250
Steering speed	°/s	≤2 000	≤2 000
Resolution	°	±0,015	±0,015
Accuracy	°	±0,1	±0,1
Data sheet	No.	CMSWB_003-026	CMSWB_003-026

Description Measurement steering wheel for capturing the steering moment, steering angle and steering speed. For use with modern steering wheels of cars and commercial vehicles. No impairment of steering wheel functions (Airbag) and control elements. Available signal outputs and interfaces: Analog/Digital, CAN 2.0B (Motorola/Intel), USB 1.1 (Full Speed), Ethernet.

[1)] absolute principle

RV-4: Wheel Vector Sensor for Simultaneous Measurement of Wheel Position and Orientation in 5 Axes

Technical Data			Type CRV4A...
Measuring range	x-, y-axis	mm	±150
	z-axis	mm	±200
	Camber	°	±10
	Steer	°	±60
Accuracy	x-, y-, z-axis	mm	±1
	Camber	°	±0,2
	Steer	°	0,1
Data sheet		No.	CRV4A_000-816

Description For various measurement tasks such as weight shift and wheel travel when braking, for example, changes in camber angle when cornering, dynamic self-steering behavior, tire strain, rear wheel tracking.

WPT: Wheel Incremental Transducer for Measurement of Wheel Rotation and Calculation of Speed and Distance Traveled

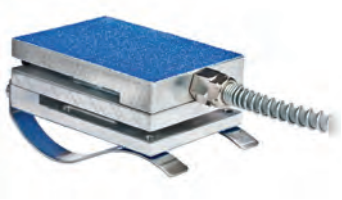
Technical Data		Type CWPTA...
Permissible rotational speed		
Maximum	min^{-1}	6 000
Permanent operation	min^{-1}	3 000
Available pulse values		
Standard	Pulses/R	1 000
On request	Pulses/R	10 ... 3 600
Pulse frequency	kHz	300
Data sheet	No.	CWPTA_000-811

Description Measurement of wheel rotation, speed, distance and wheel speed for e.g. wheel slip measurement, acceleration and braking tests, ABS testing, measurement of the difference between wheel speeds (e.g. testing of all-wheel drive vehicles).

Mechanical Sensors

For Vehicle Dynamics Testing

PFT: Pedal Force Transducer



Technical Data		Type CPFTA...	Type CPFTB...
Measuring range	N	0 ... 1 500/0 ... 250	0 ... 1 500/0 ... 500 (hand lever)
Linearity	%FSO	±0,7	±0,5
Output range	V	0 ... 1,5	0 ... 2
Power supply	V	12	12
Temperature range	°C	0 ... 60	–10 ... 50
Data sheet	Nr.	CPFTA_000-818	CPFTB_000-978

Description Measurement of the forces exerted on the brake pedal by the driver during brake tests (image shows Type CPFTB...).

SAG, DAG, TAG: Angular Rate Gyro Modules for Dynamic Yaw Rate Measurement

Technical Data		Type KCD16008, Type KCD16922
Axes	Number	1 (Type KCD16008) oder 3 (Type KCD16922), 2 on request
Sensitivity	°/s	±150
	mV/°/s	20
Zero rate bias output	VDC	±2,5
Full scale span	VDC	±2,0
Power supply	VDC	6 ... 42
Shock (operation)	g	1 000
Weight	Grams	45
Data sheet	No.	KCD16008_000-917

Description Gyro modules for dynamic raw-rate measurement, roll-rate measurement, slip-angle correction, position and motion sensing.

CDFL1x-5bar/CDFL3x-5bar: Fuel Flow Meters for Fuel Consumption Measurement in Mobile Vehicle Instrumentation

Technical Data		Type CDFL1A...	Type CDFL3A...
Measuring range	l/h	0,5 ... 250	1,5 ... 250
Measurement accuracy	%FSO	±0,5	±0,5
Reproducibility	%	±0,2	±0,2
Max. operating pressure	bar	5	5
Pressure drop	bar	0 ... 0,5	0 ... 0,5
Data sheet	No.	CDFLA_000-814	CDFLA_000-814

Description CDFL1A... for fuel consumption measurements of vehicles without fuel return flow. CDFL3A... for fuel consumption measurements of vehicles with fuel return flow.

Acceleration

Piezotron®, Piezoresistive and Capacitive Accelerometers

For Durability Testing (Triaxial Sensors)

Technical Data		Type 8766A...	Type M348AC0G...
Range	g	±50/500	±50/250/750
Sensitivity ±5 %	mV/g	100/10	40/8/2,8
Frequency response ±5 %	Hz	0,5 ... 5 000/10 000	850/2 300/3 500
Transverse sensitivity	%	1,5	2/3
Temp. coefficient of sensitivity	%/°C	0,004/0,005	0,066
Weight	grams	16/3,7	13
Data sheet	No.	8766A_000-607/-841	M348AC0G_000-753

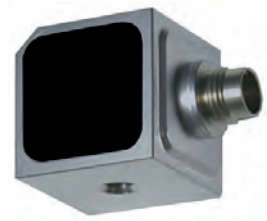
Description Triaxial accelerometer for durability testing with vehicles on handling courses and hydropulse shaker systems in the range of 50/250/500 g with IEPE or bridge signal conditioning without (IEPE) or with DC-response. Splash-waterproof Microtech connector available. Waterproofed cable for Type 8766A... available.

For Longitudinal Dynamics Testing (Single Axis Sensors)

Technical Data		Type 8315A2D0	Type 8315A010
Range	g	±2	±10
Sensitivity ±5 %	mV/g	4 000 (max.)	800 (max.)
Frequency response ±5 %	Hz	0 ... 250	0 ... 1 000
Transverse sensitivity	%	1	1
Temp. coefficient of sensitivity	%/°C	0,01	0,01
Operating temperature range	°C	–55 ... 125	–55 ... 125
Data sheet	No.	8315A_000-859	8315A_000-859

Description High sensitivity, low noise single axis accelerometer for vehicle dynamics applications.

For Transversal Dynamics (Triaxial Sensors)



Technical Data		Type 8395A2D0	Type 8395A010
Range	g	±2	±10
Sensitivity ±5 %	mV/g	2 000	400
Frequency response ±5 %	Hz	0 ... 250	0 ... 1 000
Transverse sensitivity	%	1	1
Temp. coefficient of sensitivity	%/°C	0,01	0,01
Operating temperature range	°C	–55 ... 125	–55 ... 125
Data sheet	No.	8395A_000-860	8395A_000-860

Description High sensitivity, low noise triaxial accelerometer for vehicle dynamics applications.

For Ride-Quality and NVH Testing (Triaxial Sensors)

Technical Data		Type 8781A50
Range	g	±50
Sensitivity ±5 %	mV/g	100 ±10
Frequency response ±5 %	Hz	0,5 ... 2 000
Transverse sensitivity	%	≤3
Temp. coefficient of sensitivity	%/°C	–0,008
Operating temperature range	°C	–54 ... 120
Data sheet	No.	8781A_000-856

Description Triaxial IEPE PiezoStar accelerometer with centre hole mounting capability for NVH testing of vehicle power train. Measuring range 50/500 g. Frequency range of 0,5 ... 2 000 Hz with true phase response. Extremely low thermal sensitivity shift. Waterproofed cable IP68 available.

Data Acquisition and Evaluation

For Vehicle Dynamics Testing

DAS-3: Data Acquisition and Evaluation for Mobile Vehicle Testing, particularly Longitudinal Dynamics

Technical Data		Type CDAS3A...
Power supply	V	9 ... 26
Inputs		
Input for Correvit Sensor	number	1 TTL
Counter inputs	number	6
Analog inputs	number	8/16
Sampling rate (max. per channel)	kHz	1
Compact Flash memory card up to	GB	8
Data sheet	No.	CDAS3A_000-817

Description Vehicle dynamics measurement, for e.g. brake path measurements, acceleration measurement, Coast-Down-Test, fuel consumption measurement, determination of V_{max}.

CDS Logger: Data Acquisition and Evaluation for Mobile Vehicle Testing, particularly Longitudinal Dynamics

Technical Data		Type CLOGMA
Power supply	V	10 ... 26
CAN		
independent CAN lines	number	2
CAN channels	number	64
Sampling rate (max.)	kHz	1
Compact Flash memory card (max.)	GB	8
Data sheet	No.	CLOGMA_000-886

Description Easy-to-use, lightweight data logger for various vehicle testing applications. Its compatible design and high protection class of IP67 make this data logger especially suited for motorcyle and motor-scooter applications.

GPS Logger: Data Logger for Mobile Vehicle Testing

Technical Data		Type CGPSLA
Power supply	V	10 ... 28
Measurement frequency		
GPS	Hz	100
Logger	Hz	500
CAN		
independent CAN lines	number	2
CAN channels	number	64
Compact Flash memory card (max.)	GB	8
Data sheet	No.	CGPSLA_000-933

Description Easy-to-use, lightweight data logger for various vehicle testing applications; compatible design and high protection class IP67, data logger suited for motorcyle applications, too.

µEEP-12: Data Acquisition and Evaluation for Mobile Vehicle Testing, particularly Transversal Dynamics

Technical Data		Type CMEP1A...
Power supply	V	10 ... 32
Inputs		
Analog	number	8/16
Counter	number	4
Switches	number	4
Digital I/O	number	12
Sampling rate per channel (max.)	kHz	50
Compact Flash memory card (max.)	GB	16
Datenblatt	No.	CMEP1A_000-819

Description High-performance data acquisition and evaluation systems for mobile vehicle testing. Suited for longitudinal and transversal dynamic driving maneuvers. e.g. ISO 4138.

RoaDyn® S: Multi-Component Test Stand Hubs

For Durability Testing

RoaDyn S625 nsp: 6-Component Measuring Hub for Cars

Technical Data			Type 9266A2
Measuring range	F_x	kN	–20 ... 20
	F_y	kN	–15 ... 15
	F_z	kN	–20 ... 20
	M_x	kN·m	–4 ... 4
	M_y	kN·m	–4 ... 4
	M_z	kN·m	–4 ... 4
Data sheet		No.	9266A_000-580

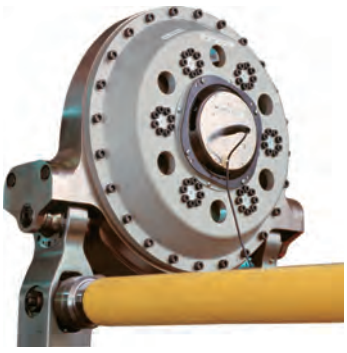
Description Monitoring of loads and determination of transfer functions of road simulators for durability testing of cars.

RoaDyn S635 nsp: 6-Component Measuring Hub for large Cars and light SUVs

Technical Data			Type 9267A2
Measuring range	F_x	kN	–35 ... 35
	F_y	kN	–20 ... 20
	F_z	kN	–35 ... 35
	M_x	kN·m	–5 ... 5
	M_y	kN·m	–5 ... 5
	M_z	kN·m	–5 ... 5
Data sheet		No.	9267A_000-581

Description Monitoring of loads and determination of transfer functions of road simulators for durability testing of large cars and light SUVs.

RoaDyn S650 nsp: 6-Component Measuring Hub for SUVs and Light Trucks



Technical Data			Type 9268A2
Measuring range	F_x	kN	–50 ... 50
	F_y	kN	–30 ... 30
	F_z	kN	–50 ... 50
	M_x	kN·m	–6 ... 6
	M_y	kN·m	–6 ... 6
	M_z	kN·m	–6 ... 6
Data sheet		No.	9268A_000-582

Description Monitoring of loads and determination of transfer functions of road simulators for durability testing of SUVs and light commercial vehicles.

RoaDyn® S: Multi-Component Test Stand Hubs

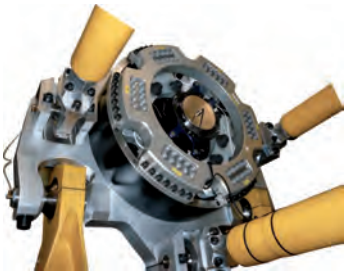
For Durability Testing

RoaDyn S660 nsp: 6-Component Measuring Hub for SUVs, NASCAR and Light Trucks

Technical Data			Type 9248A2
Measuring range	F_x	kN	–60 ... 60
	F_y	kN	–36 ... 36
	F_z	kN	–60 ... 60
	M_x	kN·m	–7,5 ... 7,5
	M_y	kN·m	–8,5 ... 8,5
	M_z	kN·m	–7,5 ... 7,5
Data sheet		No.	9248A2_000-969

Description Monitoring of loads and determination of transfer functions of road simulators for durability testing of SUVs, NASCAR and light trucks.

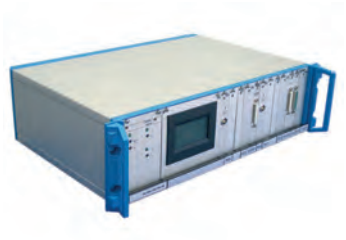
RoaDyn S6XT nsp: 6-Component Measuring Hub for Commercial Vehicles



Technical Data			Type 9262A2
Measuring range	F_x	kN	–220 ... 220
	F_y	kN	–100 ... 100
	F_z	kN	–220 ... 220
	M_x	kN·m	–40 ... 40
	M_y	kN·m	–60 ... 60
	M_z	kN·m	–40 ... 40
Data sheet		No.	9262A_000-864

Description Monitoring of loads and determination of transfer functions of road simulators for durability testing of commercial vehicles.

Control Room System 2000: Digital Electronics for RoaDyn S6xy on Test Stands



Technical Data		Type 9887A...
Dimensions, without handle (LxWxH)	mm	450x315x140
Power supply	VDC	115 ... 230
Operating temperature range	°C	5 ... 50
Data sheet	No.	9891A_000-579

Description Control room electronics for non-spinning 6-component measuring hubs. Specially designed for test stand applications.

RoaDyn® P/S: Multi-Component Measuring Hubs

For Tire Characteristics Measurement

RoaDyn P530: 5-/6-Component Measuring Hub for Car Tires

Technical Data			Type 9295B...
Measuring range	F_x	kN	–20 ... 20
	F_y	kN	–20 ... 20
	F_z	kN	0 ... 30
	M_x	kN·m	–7,5 ... 7,5
	M_y	kN·m	–3 ... 3
	M_z	kN·m	–1,3 ... 1,3
Rim sizes		Inch	≥13
Data sheet		No.	9295B_000-991

Description Measurement of wheel forces and moments for cars on tire test stands, measurement of non-uniformities, vibrations and determining tire characteristics.

RoaDyn S5ST: 5-/6-Component Measuring Hub for Heavy Cars and Light Truck Tires

Technical Data			Type 9289A253
Measuring range	F_x	kN	–60 ... 60
	F_y	kN	–40 ... 40
	F_z	kN	0 ... 60
	M_x	kN·m	–29 ... 29
	M_y	kN·m	–15 ... 15
	M_z	kN·m	–9 ... 9
Rim sizes		Inch	≥16
Data sheet		No.	9289A_000-986

Description Measurement of wheel forces and moments for heavy cars and light trucks on tire test stands. Measurement and identification of tire characteristics and specifications. Also available as piezo-electric type.

RoaDyn S5MT: 5-/6-Component Measuring Hub for Light and Medium Weight Truck Tires

Technical Data			Type 9289A263
Measuring range	F_x	kN	–100 ... 100
	F_y	kN	–50 ... 50
	F_z	kN	0 ... 100
	M_x	kN·m	–40 ... 40
	M_y	kN·m	–30 ... 30
	M_z	kN·m	–15 ... 15
Rim sizes		Inch	≥17,5
Data sheet		No.	9289A_000-987

Description Measurement of wheel forces and moments for light and medium weight trucks on tire test stands. Measurement and identification of tire characteristics and specifications. Also available as piezoelectric type.

RoaDyn® S: 2-Component Measuring Hubs

For Rolling Resistance Measurement

RoaDyn S220: 2-Component Measuring Hub for Measurement of Rolling Resistance on Tire Test Stands

Technical Data			Type 9289A103
Measuring range	F_x	kN	–0,4 ... 0,4
	F_z	kN	0 ... 15
Max. load	F_y	kN	–0,5 ... 0,5
Data sheet		No.	9289A_000-761

Description Measurement of rolling resistance force of car tires on tire test stands. Based on rolling resistance regulations ISO 28580; SAE J1269; ETRTO 117.

RoaDyn S260: 2-Component Measuring Hub for Measurement of Rolling Resistance on Tire Test Stands

Technical Data			Type 9289A113
Measuring range	F_x	kN	–1,2 ... 1,2
	F_z	kN	–60 ... 60
Max. load	F_y	kN	–1,5 ... 1,5
Data sheet		No.	9289A_000-891

Description Measurement of rolling resistance force of truck tires on tire test stands. Based on rolling resistance regulations ISO 28580; SAE J1269; ETRTO 117.

Services

Calibration of RoaDyn® Wheel Force Transducers

With the Hexapod test stand Kistler sets a new standard in the calibration of RoaDyn wheel force transducers. All calibration results are stored in a database which enables simple and efficient control and monitoring of measuring devices according to DIN EN ISO 9011:2008. It assures a lasting high quality of the wheel force transducers and reduces follow-up costs.

Calibration of Optical Sensors

Optical sensors are calibrated on a special distance and speed test stand. By default, they are delivered with a works calibration certificate according to DIN EN ISO 9001:2008.

A calibration according to ISO 17025 for measurement steering wheels and data acquisition units is possible; for speed and other sensors on request.

Training – Know-How by Experts

Training courses under the guidance of experienced Kistler engineers are the most efficient way to get first hand information about our sensors and measuring systems. In addition to carefully prepared training documentation, we attach great importance to giving participants an opportunity to use the equipment themselves to practice important operations, such as the correct mounting of sensors.

Further Information

The Kistler brochure "Standard Mounting Units"(Doc. No. 200-695e) presents the most important mounting units for use with Kistler measurement equipment in the field of vehicle dynamics and durability testing.

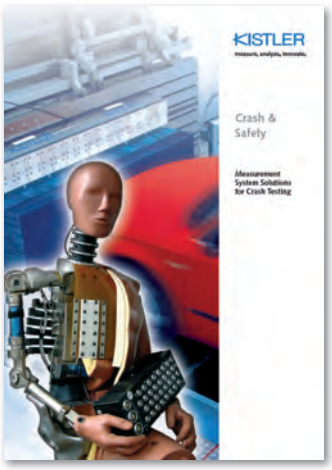
http://www.kistler.com/medias/sys_master/8820277477406/MountingBrochure_200-695e-05.13.pdf

Sensors and systems for measuring cylinder and injection pressures and delivering key data play a major role in the development of internal combustion engines. The brochure "Engine Combustion Analysis" (Doc. No. 100-460e) offers comprehensive information on Kistler's performance in the field of engine measuring technology.

http://www.kistler.com/medias/sys_master/8812119097374/100-460e-12.10.pdf

Kistler offers complete system solutions for the instrumentation of crash centers. The product range comprises instrumentation of crash, material and compontent testing facilities, instrumentation of vehicles with in-dummy and on-board measuring technology and control/data acquisition software as well. Our brochure "Crash & Safety" (Doc. No. 200-650e) presents a selection of the most important sensors and systems in the field of vehicle safety and crash testing.

http://www.kistler.com/medias/sys_master/8815457861662/200-650e-06.12.pdf



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