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Measuring Hub RoaDyn S220

Type 9289A103

To reduce CO2 emissions from cars with combustion engines or to extend the range of electrical vehicles, hybrids or NEVs

The multi component measuring hub RoaDyn S220 is the ideal instrument to measure rolling resistance on passenger car tire test machines. The measuring hub focusses on the longitudinal and vertical forces F_x and F_z, acting at the tire contact area respectively tire footprint. Furthermore also the lateral force F_y is measured.

- High precision rolling resistance measurements for passenger car tires by using force method
- Suitable for tires of ICE vehicles, EVs, hybrids, NEVs, BEVs and FCEVs
- Based on the rolling resistance regulations ISO 28580, SAE J1269 and ECE R117
- Strain gage load cell technology for static measurements, combined with high sensitivity in longitudinal (F_x) direction
- Static measurement of vertical force F_z can be used for tire test machine controlling (no additional force sensors necessary)
- Modular design
- High rigidity
- Compatible with analog and digital measuring chains
- Factory calibrated
- Prepared for oil lubrication
- Analog, CAN, EtherCAT and Ethernet output available with the corresponding electronics

Description

RoaDyn measuring hub S220 is a rigid and high precision measuring tool, instrumented with three strain gage load cells which are mounted between a base and top plate. The instrumentation itself is stationary, i.e. top plate, base plate and load cells are mounted non rotating. The tire/rim combination will be mounted to the rotating spindle (shaft). This build up guarantees an optimization of flux respectively application of force. The measurement of rolling resistance basically takes place by using the force method, described in corresponding ISO and SAE regulations. In that case the reaction force is measured as close as possible at the tire contact area/ footprint. The force method increases measuring accuracy and reduces parasitic losses compared with the common approach based on "torque, deceleration or power method"!

Furthermore the force method allows to check two tires simultaneously, which is compared with the other methods a significant increase in efficiency.

Based on the current rolling resistance standards ISO 28580, SAE J1269, ECE R117 for passenger cars up to tire load index 121

Measuring range	F_x	N	–400 ... 400
	F_z	N	0 ... 15,000
Instrumentation accuracy	F_x	N	±0.5 N or ±0.5 % [1]
	F_z	N	±10 N or ±0.5 % [1]

[1] Whichever value is greater

Technical data

Max. load	F_x	N	±1,500
	F_y	N	±500
	F_z	N	0 ... 20,000
Calibrated range	F_{x1}	N	0 ... –400
	F_{x2}	N	0 ... –1,500
	F_y	N	0 ... 1,500
	F_z	N	0 ... 15,000
Natural frequency	F_n (x)	Hz	≈650
	F_n (y)	Hz	≈2,200
	F_n (z)	Hz	≈1,750

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Technical data (continuation)

Rotational speed	n	min⁻¹	≤3,000
Operating temperature range		°C	5 ... 80
Degree of protection (DIN40050)			IP65
Size			
Diameter		mm	312
Length		mm	349.5
Weight		kg	55

Requirements for oil lubrication

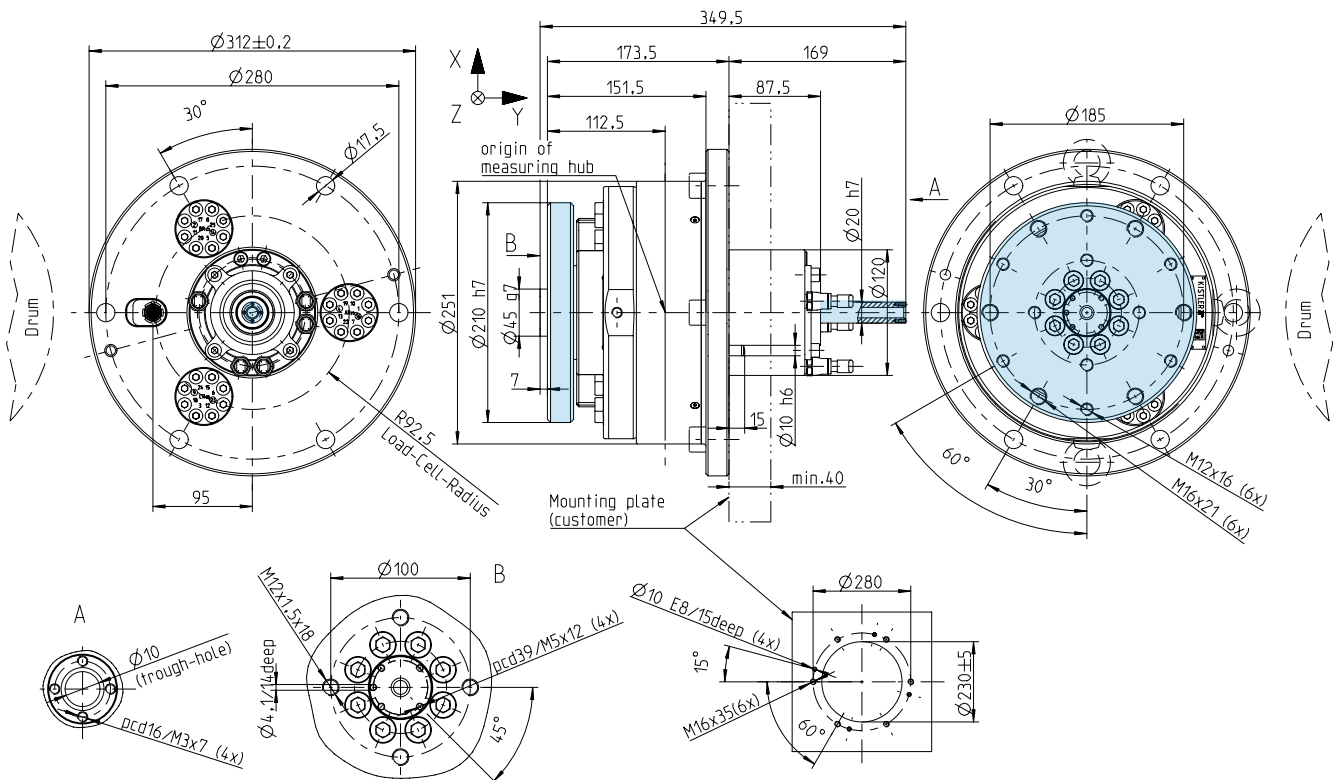| Pump type			non-pulsating
Oil type		ISO VG	68
Kinematic viscosity (@40 °)	ν	mm²/s	65 ... 75
Supply pipe		number	3
	di/da	mm	8/10
Oil pressure supply pipe	p	bar	≤0.5
Rate of flow	V̇	l/min	1 ... 2
Return pipe		number	2
	di/da	mm	8/10
Oil pressure return pipe		bar	pressureless

Dimensions

Fig. 1: Assembly drawing RoaDyn S220;
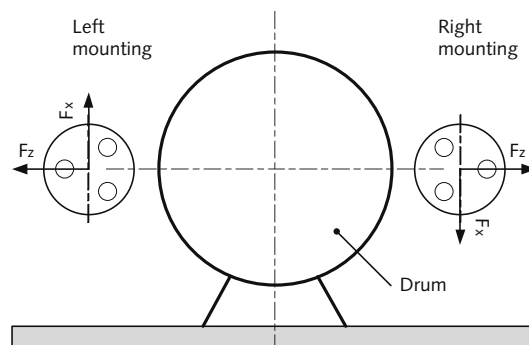rotating parts are highlighted in blue

Mounting position

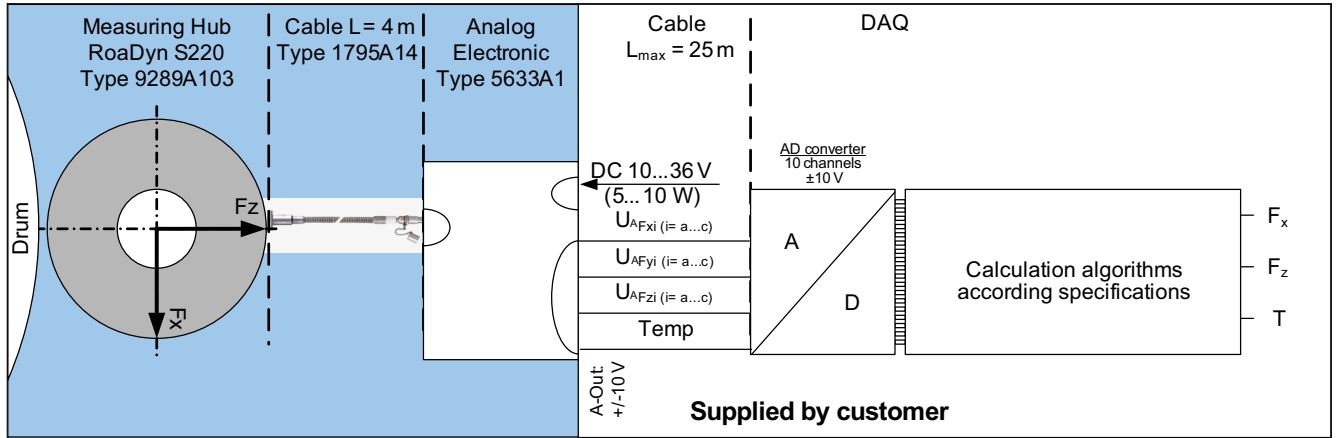Fig. 2: Scheme of load cell positioning at the tire test machine

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Measuring chain

Fig. 3: Analog measuring chain RoaDyn S220
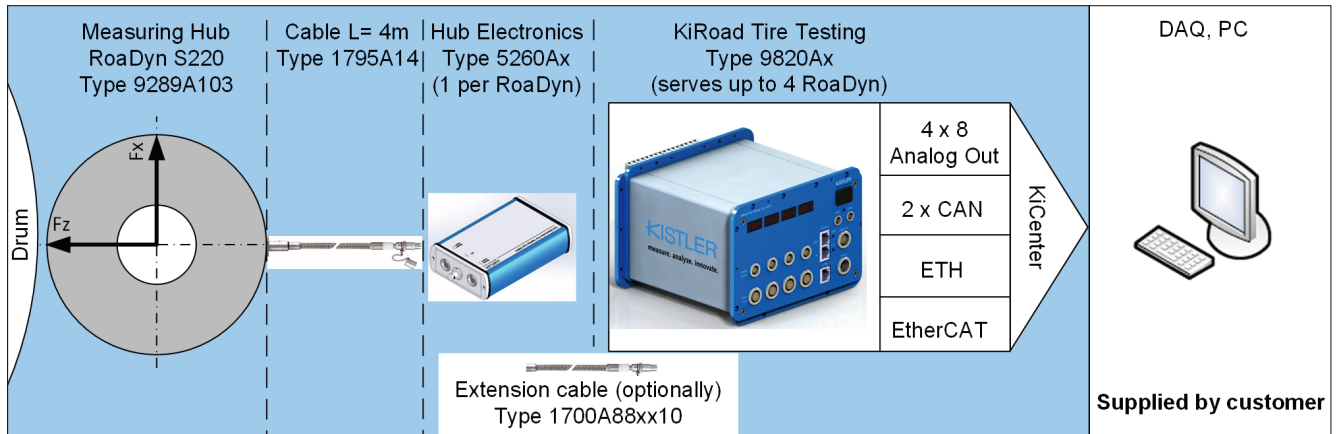
Fig. 4: Digital measuring chain RoaDyn S220

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Included accessories
- Mounting material

Optional accessories | Type/Art. No.
- Connecting cable low impedance, l = 4 m, straight connector — 1795A14
- Connecting cable low impedance, l = 4 m, angle connector — 1795A24
- Analog electronics box, 24 channels — 5633A1
- Digital electronics KiRoad Tire Testing — 9820A...

Calibration equipment
- Set of deadweights (6 pieces, 10 kg each) — 9907A1

Supplied by customer
- Hydraulic oil pump lubrication system (non-pulsating)
- DAQ

Ordering code | Type
- RoaDyn S220 measuring hub to measure tire rolling resistance of passenger cars on tire test machines — **9289A103**

Other Kistler products in this application
- RoaDyn S260 measuring hub to measure tire rolling resistance of commercial vehicles tires on tire test machines — 9289A113
- RoaDyn P530 measuring hub to measure tire characteristics on tire test machines (passenger car) — 9295B...
- RoaDyn S5ST (60 kN) measuring hub for durability and tire characteristics measurement on tire test machines (truck and bus) — 9289A253
- RoaDyn S5MT (100 kN) measuring hub for durability and tire characteristics measurement on tire test machines (truck and bus) — 9289A263
- RoaDyn S530 measuring hub for endurance measurement of passenger car tires on tire test stands — 9289A013