

RoaDyn[®] S5MT Measuring Hub

Type 9289A263

for Durability and Tire Characteristics Measurements on Tire Test Stands (Truck and Bus)

The 5(6)-component RoaDyn S5MT measuring hub is ideally suited to measure durability and tire characteristics of trucks and busses on tire test stands. It measures the longitudinal, transverse and vertical forces F_x , F_y and F_z and the corresponding moments M_x , M_y ²⁾ and M_z acting at the tire contact area.

- High precision tire characteristics measurements for commercial vehicle tires
- Best suited for rim sizes >17,5" (smaller rims with appropriate adapter possible)
- Strain gage load cell technology for static and dynamic tire measurements
- Static measurement of vertical force F_z enables tire test stand controlling (no additional force sensors necessary)
- Modular design
- High rigidity
- Factory calibrated
- Prepared for oil lubrication

Description

The RoaDyn S5MT measuring hub is a robust, high-precision measuring tool, equipped with four oval strain gage load cells which are mounted between base and top plate. The measuring hub is stationary, i.e. base plate, top plate and load cells are mounted non-rotating at the tire test stand. The measuring hub incorporates a rotary axis (shaft) with predefined hub hole patterns on which the test tire/rim combinations are mounted. This setup guarantees optimum power flow with minimum cross talk between the individual force components and a high natural frequency of the complete measuring system. The shaft end is lead through the back side of the measuring hub and is prepared for installation of a driving or braking device. The inlet and outlet ports for the oil circuit on the back of the measuring hub are intended for lubricating and cooling of the bearings in order to achieve constant heat conditions even with large loads and increased rotational speeds.

Application

Typical areas of use are measurements of tire characteristics on tire test stands in the laboratory as well as on mobile test vehicles in the fields of durability, non-uniformities, vibrations, braking characteristics, adhesion etc.



Technical Data

General Technical Data

Measuring range ¹⁾	F_x	kN	-100 ... 100
	F_y	kN	-50 ... 50
	F_z	kN	0 ... 100
	M_x	kN·m	-40 ... 40
	M_y ²⁾	kN·m	-30 ... 30
	M_z	kN·m	-15 ... 15
Calibration range ³⁾	F_x	kN	0 ... 100
	F_y	kN	0 ... 50
	F_z	kN	0 ... 100
Linearity	F_x, F_z, F_y	%FSO	$\leq \pm 0,5$
Crosstalk ⁴⁾	$F_y \rightarrow F_x, F_z$	%	$\leq \pm 1,0$
	$F_x \leftrightarrow F_z$	%	$\leq \pm 1,0$
	$F_x, F_z \rightarrow F_y$	%	$\leq \pm 1,0$
Natural frequency	$f_n (x, y, z)$	Hz	≈ 700
Maximum rotational speed		min ⁻¹	1 000
Operating temperature range		°C	+5 ... 70
Degree of protection (DIN40050)			IP65

Technical Data (Continuation)

Dimensions

Diameter	mm	480
Length	mm	630
Weight	kg	245
Standard pitch circles		
22 pcs. M16x22	∅	205
16 pcs. M16x22	∅	150
5 pcs. M14x1,5x35	∅	112

Requirements for Oil Lubrication

Feed pipe, 1 x		"	5/8
Oil pressure ³⁾ , feed pipe	p	bar	≤0,5
Flow rate	\dot{V}	l/min	1 ... 2
Return pipe, 1 x		"	1
Oil pressure, return pipe	p	bar	pressureless
Oil specification	Type	ISO VG	68
Kinematical viscosity (@40°)	n	mm ² /s	65 ... 75
Pump type ⁵⁾			non-pulsating

- ¹⁾ It is assumed that the extreme values do not occur simultaneously
- ²⁾ M_y can only be measured when a brake is installed at the test stand, otherwise $M_y = 0$
- ³⁾ Standard force application point at tire radius $R = 500$ mm and press-in depth $e = 0$ mm
- ⁴⁾ In combination with signal post-processing in customer's data acquisition and Kistler supplied algorithm
- ⁵⁾ e.g. gear-wheel pump

Dimensions

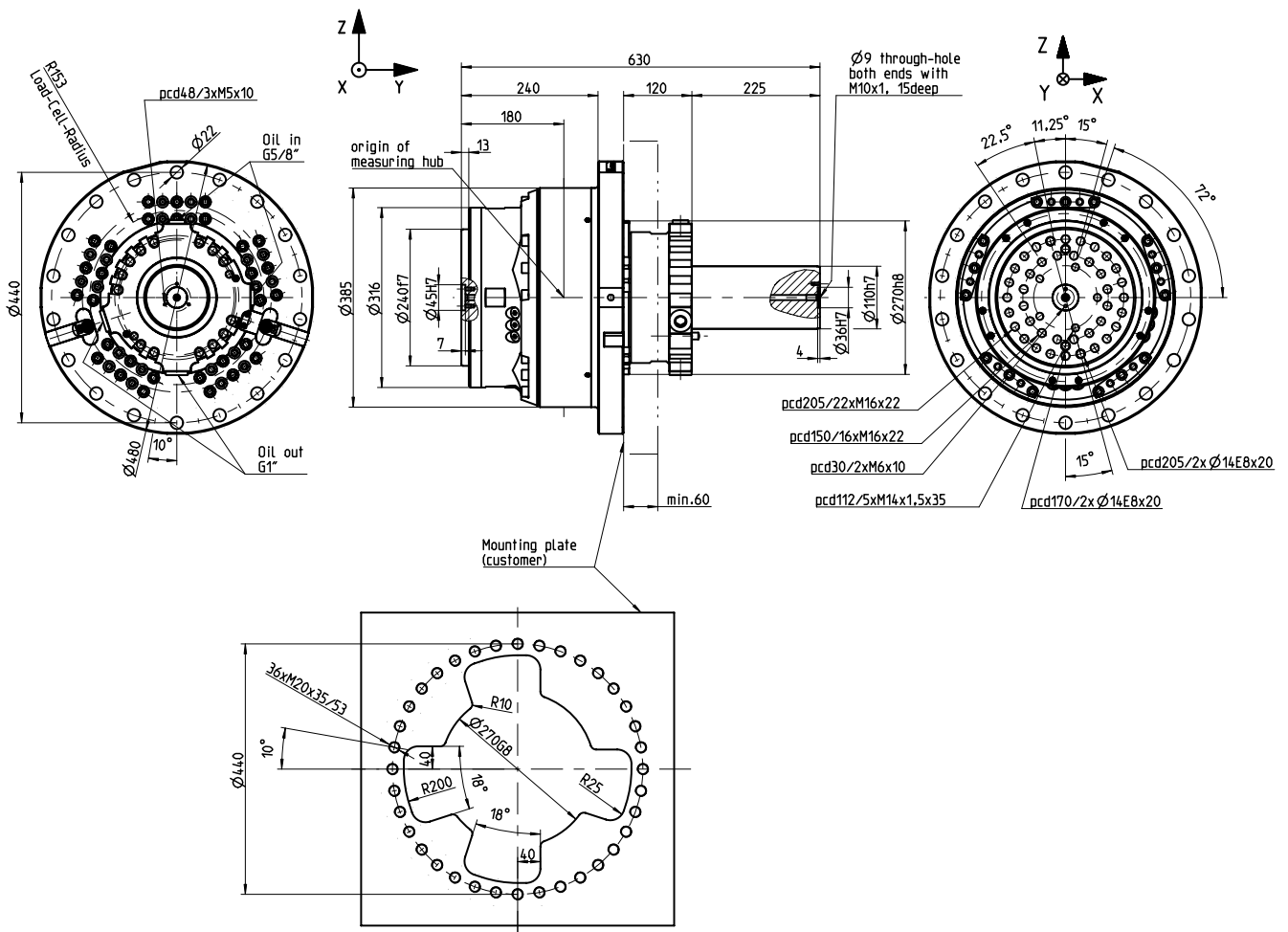


Fig. 1: Assembly drawing RoaDyn® S5MT

Measuring Chain

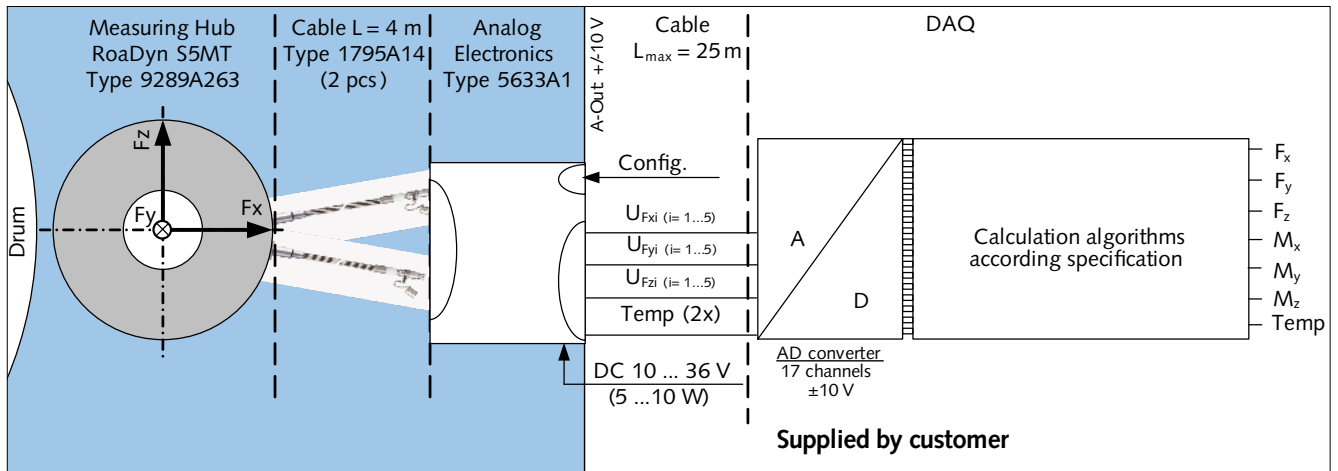


Fig. 2: Analog measuring chain RoaDyn® S5MT

Mounting

The RoaDyn S5MT measuring hub is mounted on the standard pitch circle $\varnothing 440$ mm on the tire test stand using eighteen M20 bolts. The rim/tire combinations are mounted either directly onto the shaft flange with predefined pitch circle diameters or with an adapter flange. Rim centering is done with a customized centering pin (not included in the scope of delivery).

Included Accessories

	Type/Art. No.
• 18 pcs. cylinder head screw with hexagon socket M20x80/53	6.120.287
• 18 pcs. washer D37/M20x8	6.220.074
• 1 pcs. eye bolt	6.170.008
• 2 pcs. allen set screw M20x50	6.160.087
• 1 pcs. lifting tool 292x192x60 mm	3.710.229
• 2 pcs. cylinder head screw with hexagon socket M16x30	6.120.225
• 1 pcs. cylinder head screw with hexagon socket M12x30	6.120.217

Optional Accessories

	Type/Art. No.
• Connecting cable measuring hub, l = 4 m straight connector (2 pcs. required)	1795A14
• Connecting cable measuring hub, l = 4 m angle connector (2 pcs. required)	1795A24
• Analog electronics for tire test stands	5633A1
• Triaxial accelerometer ± 5 g	8762A5

Supplied by Customer

- Hydraulic oil pump lubrication system (non-pulsating)
- DAQ

Ordering Code

- RoaDyn S5MT measuring hub for durability and tire characteristics measurements on tire test stands (truck and bus)

Type

9289A263

Other Kistler Products for this Application

• RoaDyn S220 measuring hub (20 kN) to measure tire rolling resistance of passenger car tires on tire test stands	9289A103
• RoaDyn S260 measuring hub (60 kN) to measure tire rolling resistance of truck tires on tire test stands	9289A113
• RoaDyn P530 measuring hub (30 kN) to measure tire characteristics on tire test stands (passenger car)	9295B...
• RoaDyn S5ST measuring hub (60 kN) for tire characteristics measurement on tire test stands (commercial vehicles)	9289A253

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