

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.

Measuring Hub RoaDyn® S220

Type 9289A103

to Measure Tire Rolling Resistance of Passenger Car Tires on Tire Test Machines

The 2 component measuring hub RoaDyn S220 is the ideal instrument to measure rolling resistance on passenger car tire test machines. The measuring hub measures the longitudinal and vertical forces F_x and F_z , acting at the tire contact area respectively tire footprint.

- High precision rolling resistance measurements for passenger car tires by using force method
- Based on the rolling resistance regulations ISO 28580, SAE J1269 and ETRTO 117
- 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

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 rolling resistance regulations

ISO 28580, SAE J1269, ETRTO 117 for passenger cars respectively up to tire load index 121

Measuring range	F_x	N	-400 ... 400
	F_z	N	0 ... 15 000
Instrumentation accuracy	F_x	$\pm 0,5 \text{ N}$ or $\pm 0,5 \%^{1)}$	
	F_z	$\pm 10 \text{ N}$ or $\pm 0,5 \%^{1)}$	

¹⁾ whichever value is the greater

Technical Data

Max. Load	F_x	N	$\pm 1 500$
	F_y	N	± 500
	F_z	N	0 ... 20 000
Calibrated range	F_x	N	0 ... 400
	F_z	N	0 ... 15 000
Natural frequency	$f_n(x)$	Hz	≈ 650
	$f_n(y)$	Hz	$\approx 2 200$
	$f_n(z)$	Hz	$\approx 1 750$

Technical Data (Continuation)

Speed	n	min ⁻¹	≤3 000
Operating temperature range		°C	5 ... 80
Degree of protection acc. DIN40050			IP65
Dimension			
Diameter		mm	312
Length		mm	349,5
Weight		kg	55

Requirements for Oil Lubrication

Pump type			non-pulsating
Oil type		ISO VG	68
Kinematical viscosity (@40 °)	v	mm ² /s	65 ... 75
Inlet pipes		number	3
	di/da	mm	8/10
Oil pressure	p	bar	≤0,5
Flow rate	\dot{V}	l/min	1 ... 2
Outlet pipes		number	2
	di/da	mm	8/10
Oil pressure	p	bar	pressureless

Dimensions

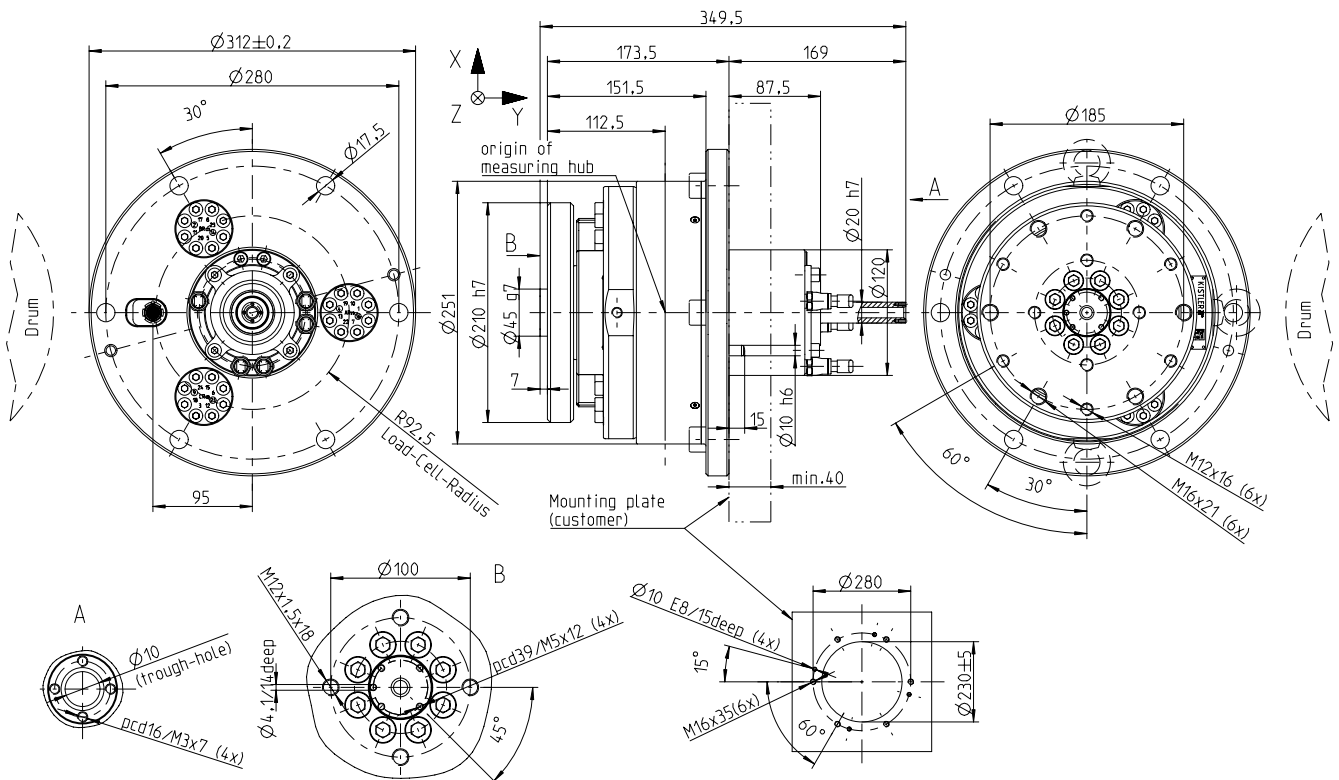


Fig. 1: Assembly drawing RoaDyn® S220

Mounting Position

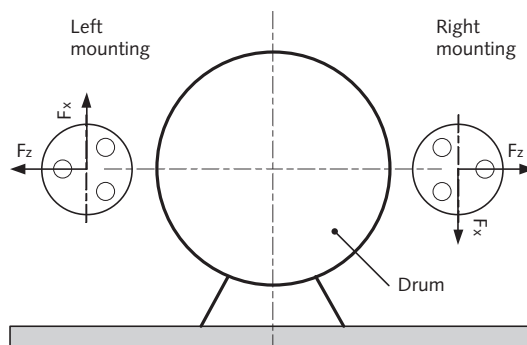


Fig. 2: Scheme of load cell positioning at tire test machine

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Measuring Chain

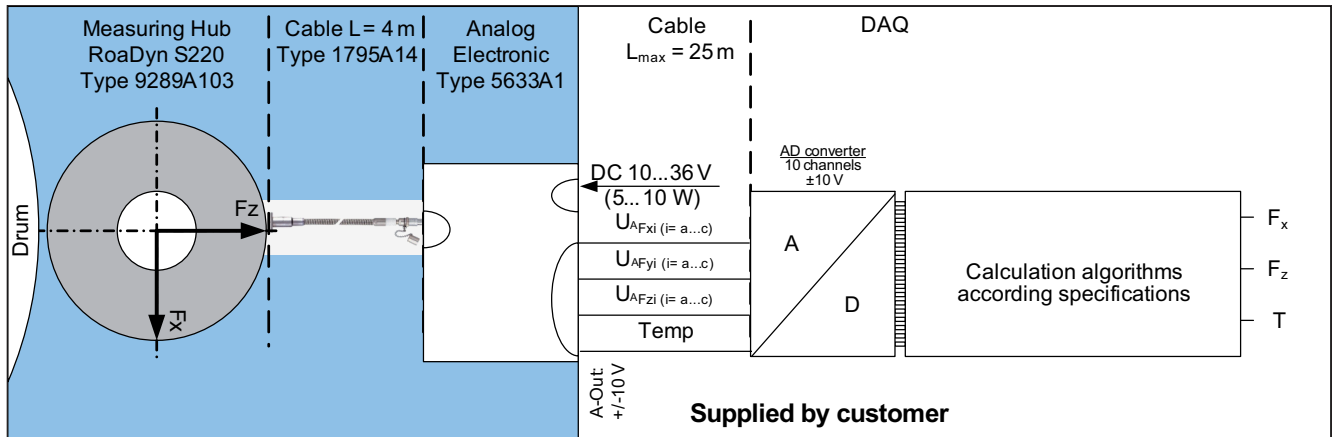


Fig. 3: Analog measuring chain RoaDyn® S220

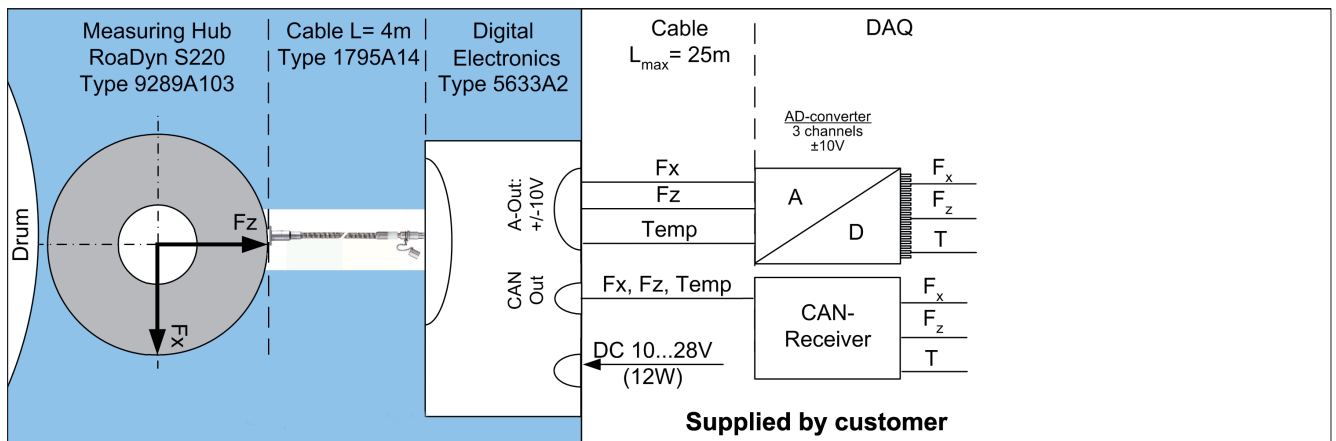


Fig. 4: Digital measuring chain RoaDyn® S220

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Included Accessories

- Mounting material

Optional Accessories

Analog version

- Connecting cable low impedance, length = 4 m
- Analog electronics box, 24 channels

Digital version (on request)

- Connecting cable low impedance, length = 4 m
- Digital electronics box, 16 channels

Calibration equipment

- Set of deadweights (6 pieces, 10 kg each)

Supplied by Customer

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

Type/Art. No.

1795A14

5633A1

1795A14

5633A2

9907A1

Ordering Code

- RoaDyn S220 measuring hub to measure tire rolling resistance of passenger cars on tire test machines

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**

Type

9289A103

Measuring Hub RoaDyn® S260

Type 9289A113

to Measure Tire Rolling Resistance of Commercial Vehicle Tires on Tire Test Machines

The 2 component measuring hub RoaDyn S260 is the ideal instrument to measure rolling resistance on commercial vehicle tire test machines. The measuring hub measures the longitudinal and vertical forces F_x and F_z , acting at the tire contact area respectively tire footprint.

- High precision rolling resistance measurements for commercial vehicle tires by using force method
- Based on the rolling resistance regulations ISO 28580, SAE J1269 and ETRTO 117
- 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

Description

RoaDyn measuring hub S260 is a rigid and high precision measuring tool, instrumented with four 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 rolling resistance regulations

ISO 28580, SAE J1269, ETRTO 117 for commercial vehicles respectively up to tire load index 170

Measuring range	F_x	N	-1 200 ... 1 200
	F_z	N	±60 000
Instrumentation accuracy	F_x		±1 N or ±0,5 % ¹⁾
	F_z		±30 N or ±0,5 % ¹⁾

¹⁾ whichever value is the greater

Technical Data

Max. Load	F_x	N	±4 500
	F_y	N	±1 500
	F_z	N	±60 000
Calibrated range	F_x	N	0 ... 1 200
	F_z	N	0 ... 60 000
Natural frequency	$f_n(x)$	Hz	≈530
	$f_n(y)$	Hz	≈1 670
	$f_n(z)$	Hz	≈960

Technical Data (Continuation)

Speed	n	min ⁻¹	≤2 000
Operating temperature range		°C	5 ... 80
Degree of protection acc. DIN40050			IP65
Dimension			
Diameter		mm	440
Length		mm	396,5
Weight		kg	117

Requirements for Oil Lubrication

Pump type			non-pulsating
Oil type		ISO VG	100
Kinematical viscosity (@40 °)	v	mm ² /s	95 ... 105
Inlet pipes		number	3
	di/da	mm	8/10
Oil pressure	p	bar	≤0,5
Flow rate	\dot{V}	l/min	1 ... 2
Outlet pipes		number	2
	di/da	mm	8/10
Oil pressure	p	bar	pressureless

Dimensions

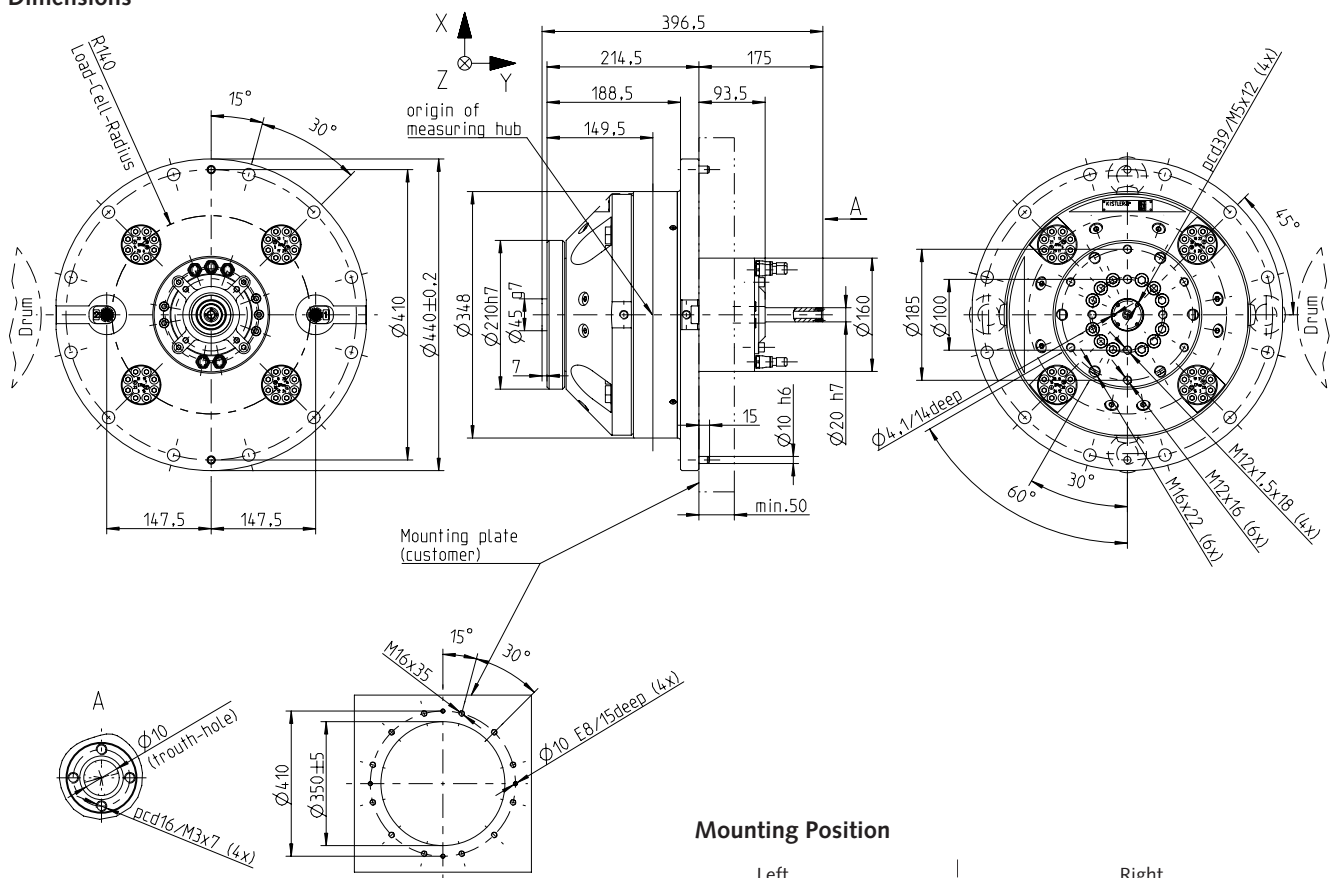


Fig. 1: Assembly drawing RoaDyn® S260

Mounting Position

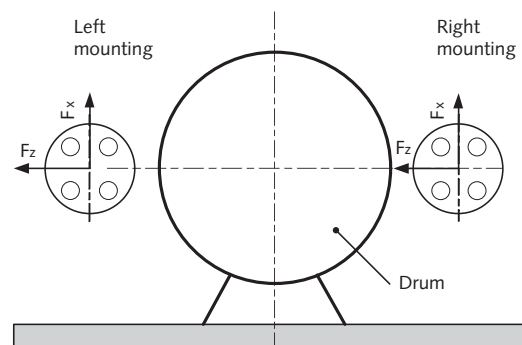


Fig. 2: Scheme of load cell positioning at tire test machine

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Measuring Chain

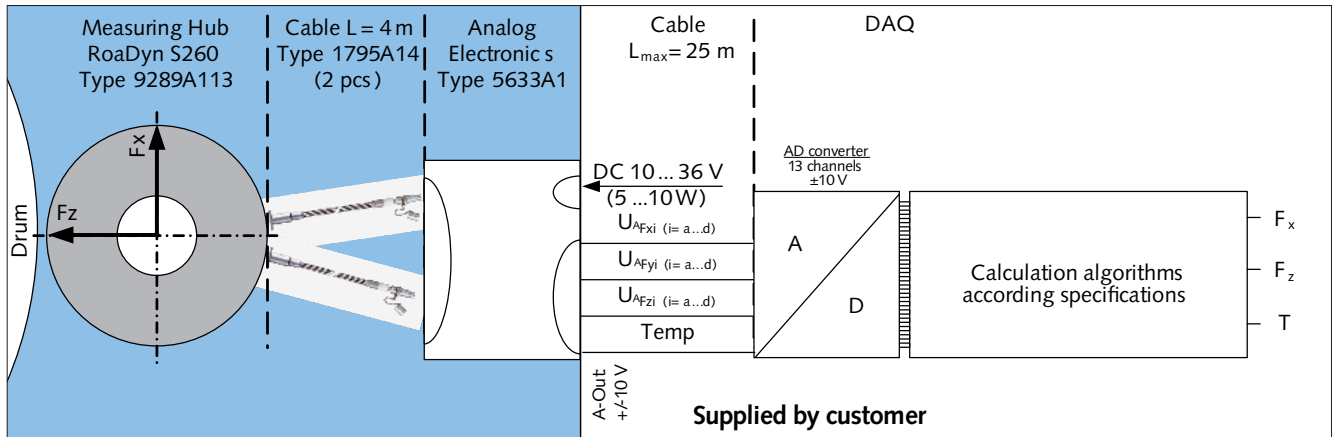


Fig. 3: Analog measuring chain RoaDyn® S260

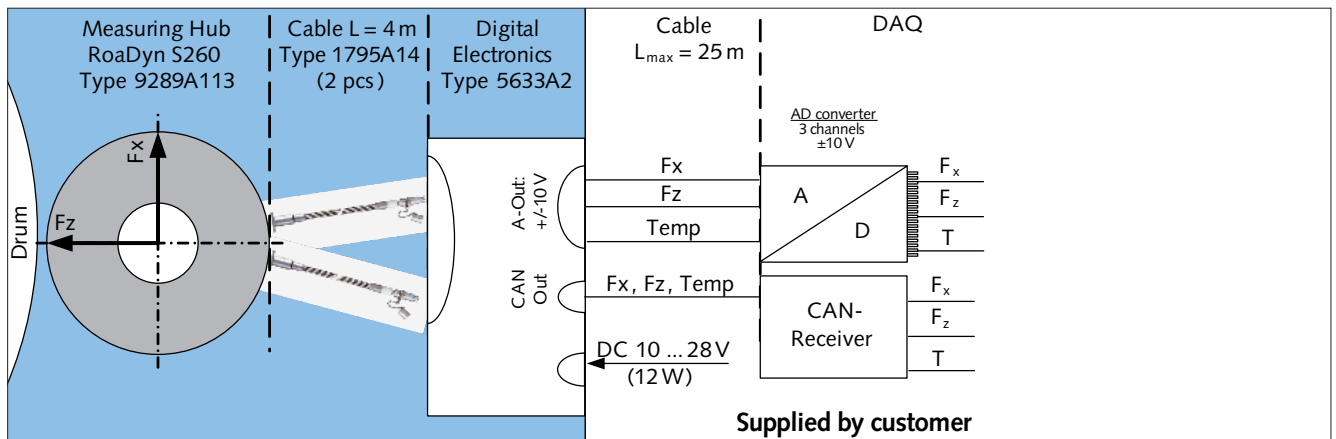


Fig. 4: Digital measuring chain RoaDyn® S260

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Included Accessories

- Mounting material

Optional Accessories

Analog version

- | | Type/Art. No. |
|--|----------------------|
| • Connecting cable low impedance, length = 4 m, straight connector | 1795A14 |
| • Connecting cable low impedance length = 4 m, angle connector | 1795A24 |
| • Analog electronics box, 24 channels | 5633A1 |

Digital version

- | | |
|--|---------|
| • Connecting cable low impedance, length = 4 m, straight connector | 1795A14 |
| • Connecting cable low impedance length = 4 m, angle connector | 1795A24 |
| • Digital electronics box, 16 channels | 5633A2 |

Calibration equipment

- Set of deadweights (11 pieces, 20 kg each) 9907A2

Supplied by Customer

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

Ordering Code

- Measuring hub RoaDyn S260 to measure tire rolling resistance of commercial vehicle tires on tire test machines **Type 9289A113**

Other Kistler Products in this Application

- Measuring hub RoaDyn S220 to measure tire rolling resistance of passenger car tires on tire test machines **9289A103**
- 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**