

KiTorq Stator

Type 4541A...

Torque Evaluation Unit (Stator) for a Torque Measuring Flange

KiTorq Stator Type 4541A... for supplying power to and capturing measurement data from torque measuring units in the KiTorq System, such as the Type 4550A... rotor.

- Combinations of various rotors and stators
- High precision
- Low installation height
- Digital interface for measurement data capture and parameterization
- Freely scalable voltage and frequency outputs

Description

The KiTorq Stator Type 4541A... and KiTorq Rotor Type 455xA... make up the torque measuring flange KiTorq System. The stator supplies power to the rotor, receives and processes the measurement data, and provides voltage and frequency outputs. The outputs can be tared via the digital interface or by pressing a button. The outputs can be configured via the digital interface. This makes it possible, for instance, to use the output for measuring the torque with a different low-pass filter than a second torque output used for control purposes. It is also possible to convert the speed into a voltage signal. Different scaling factors can also be applied to different plugs.

The KiTorq Stator Type 4541A... can be used together with a rotor from the KiTorq system. Using the ordering key, the stator can be purchased individually or as a calibrated torque measurement chain, together with a Type 455xA... rotor.

The standard torque evaluation unit (stator) is shipped calibrated.

Calibration of the entire measurement chain, consisting of the KiTorq Rotor and a KiTorq Stator, can be ordered using the rotor ordering key (such as the Type 4550A...).

Application

Applications for the KiTorq Stator are found in test bench engineering, such as electric motor, gear, pump, and combustion engine test stands. Special applications for the individual components of the KiTorq System can be found on their corresponding data sheets.



General Technical Data

The accuracy class is determined by the KiTorq Rotor 455xA...

Temperature influence on the zero point TK0	% FSO/10 K	0,01
Temperature influence on the nominal value TKC	% FSO/10 K	0,01
Linearity error	% FSO	0,01
Rel. standard deviation of repeatability	% FSO	0,003
Zero point stability (48 h)	% FSO	0,003
Limit frequency -3 dB	kHz	10
Operating temperature range (Rated temperature range)	°C	10 ... 60
Service temperature range	°C	0 ... 70
Storage temperature range	°C	-25 ... 80
Protection class		IP54

Technical Data

Noise Immunity (EN 61326-1, Table 2)

Electromagnetic field (AM)	V/m	10
Magnetic field	A/m	100
Electrostatic discharge (ESD)		
Contact discharge	kV	8
Air discharge	kV	4
Fast transients (burst)	kV	1
Impulse voltage (surge)	kV	1
Conducted emissions (AM)	V	10

Mechanical Shock (EN 60068-2-27)

Quantity	n	1 000
Duration	ms	3
Acceleration	m/s ²	650

Vibrational Loads in 3 Directions (EN 60068-2-6)

Frequency range	Hz	10 ... 2 000
Duration	h	2,5
Acceleration (amplitude)	m/s ²	200

Speed Measuring

Pulses/revolution		1x60
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Dimensions

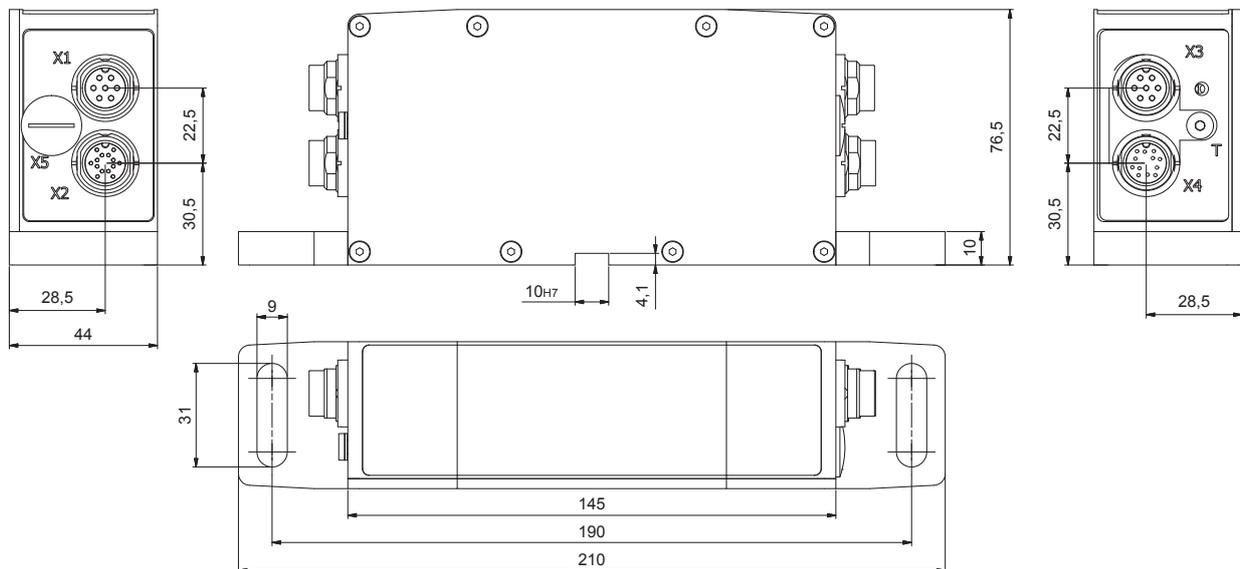
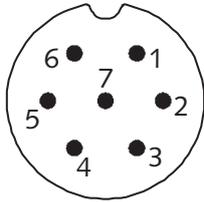


Fig. 1: Dimensions of Type 4541A... KiTorq Stator torque evaluation unit (stator) (dimensions in mm)

Electrical Connections

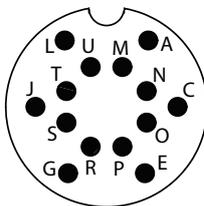
Pin Allocation of the 7 Pin Built-in Connector X1

Function	PIN	Description	
Supply	3	+U _B	18 ... 30 VDC, power consumption <20 W
	2	GND	Ground for +U _B
Torque output	4	F _{A+}	Frequency signal RS-422
	1	F _{A-}	Frequency signal RS-422
	5	DGND	Ground for F _{A+} and F _{A-}
100 % control (Floating input)	6	Control	Off: 0 ... 2 VDC On: 3,5 ... 30 VDC
	7	GND	Opto isolated ground for control



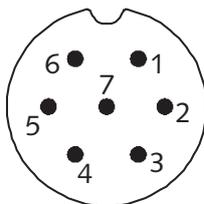
Pin Allocation of the 14 Pin Built-in Connector X2

Function	PIN	Description	
Speed impulse	A	Track A+	Active, TTL level (at speed option N1, N2, N3)
	C	Track A-	Active, TTL level (at speed option N1, N2, N3)
	E	Track B+	Active, TTL level (at speed option N3)
	G	Track B-	Active, TTL level (at speed option N3)
	J	Track Z+	Active, TTL level (at speed option N2, N3)
	L	Track Z-	Active, TTL level (at speed option N2, N3)
	U		Normal (1:1) with 0 ... 2 VDC Extended (1:5/1:10) with 3,5 ... 30 VDC
Scaling selector switch (Floating input)	M	VDC	0 VDC for Normal (1:1) 24 VDC for extended (1:5 / 1:10)
Scaling selector switch Acknowledgment output	N	Tara	Taring at 3,5 ... 30 VDC for 1 second
Taring (Floating input)	T	TXD	Serial transmission cable
RS-232C interface	R	RXD	Serial receiving cable
	P	DGND	Ground for RS-232C interface/speed pulses
	S	Control	Off: 0 ... 2 VDC On: 3,5 ... 30 VDC
Input for 100 % control (Floating input)	O	GND	Opto isolated ground for taring, control input, scaling selector switch, and acknowledgment

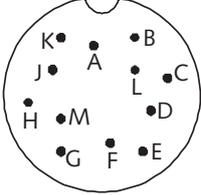


Pin Allocation of the 7 Pin Built-in Connector X3

Function	PIN	Description	
Power supply	3	+U _B	18 ... 30 VDC, power consumption <20 W
	2	GND	Ground for +U _B
Torque output	4	U _A	Voltage output ±10 VDC at ±M _{Nom} at >2 kΩ 10 VDC at control signal activation R _{s,c} = 10 Ω, output short circuit proof
	1	AGND	Ground for U _A
	5		Not connected
100 % control (Floating input)	6	Control	Off: 0 ... 2 VDC On: 3,5 ... 30 VDC
	7	GND	Opto isolated ground for control



Pin Allocation of the 12 Pin Built-in Connector X4

	Function	PIN	Description
	Supply	F A	+U _B GND
	Shield	M	In the sensor, on the housing
Torque output		C	U _A Voltage output ±10 VDC at ±M _{Nom} at >2 kΩ 10 VDC at control signal activation R _{i,c} = 10 Ω, Output short circuit proof
		D	AGND Ground for U _A
Speed pulses	H	Track A	Active, TTL level (at speed option N1, N2, N3)
	G	Track B	Active, TTL level (at speed option N3)
	J	Track Z	Active, TTL level (at speed option N2, N3)
Input 100 % control	K	Control	Off: 0 ... 2 VDC On: 3,5 ... 30 VDC
RS-232C interface to the CoMo Torque	B	TXD	Serial transmission cable
	L	RXD	Serial receiving cable
Digital mass potential	E	DGND	Ground for speed impulses, calibration/control input and RS-232C interface

Application Examples

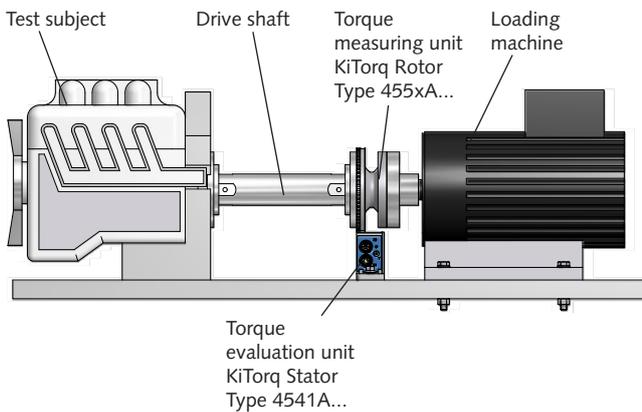


Fig. 2: Combustion engine test stand

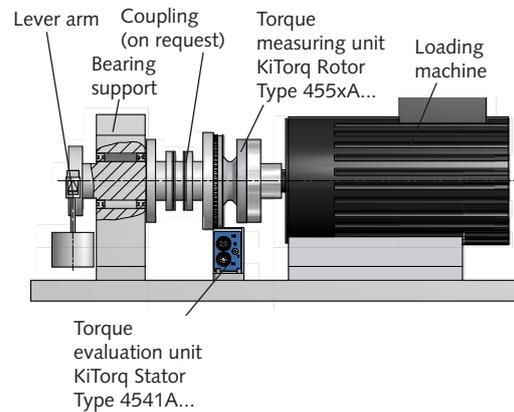


Fig. 3: Possibility for calibration

Calibration

Standard Calibration: The stator is calibrated as a standard. When a torque measurement chain with a KiTorq Rotor, the rotor and stator are calibrated to WKS 1 as a measurement chain. The measurement chain calibration is specified solely by the ordering key of the KiTorq Rotor.

The following signals are set as standard:

- Frequency: 240 kHz \pm 120 kHz
- Analog: \pm 10 V

The following signals are calibrated as standard:

- Analog \pm 10 V at output X4

When a second scaling factor is selected (1:5 or 1:10), both ranges are calibrated at output X4 and can be selected there.

Special Calibration: Upon request, additional calibrations can be ordered (e.g. second scaling factor, another frequency, ...).

The torque measurement chain, consisting of the KiTorq Rotor and KiTorq Stator, has its own separate calibration certificate and a serial number.

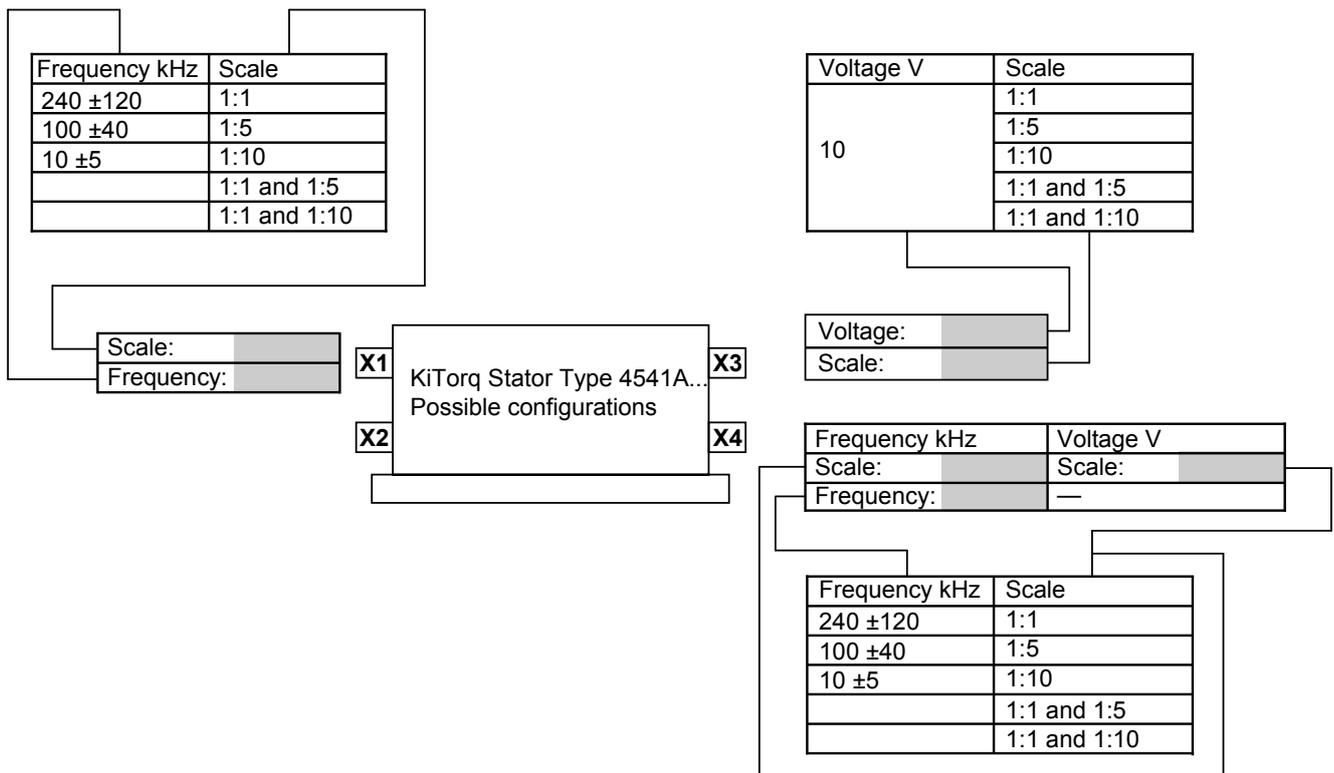
If one of the components is replaced (e.g. with a KiTorq Rotor with a different nominal torque), then the virtual calibration values for the new measurement chain can be calculated from the individual calibration certificate for the rotor and stator.

All output settings can be changed afterward by the customer. The calibration certificates apply only to the settings at delivery, according to the order.

Definition of Calibration Terms:

- **WKS 1:** Works calibration at 5 points right, 3 points left
- **WKS 2:** Works calibration at 5 points right and left, and repeat series
- **DAkks:** Calibration per DIN 51309

Available Customer-Specific Special Settings/Calibrations

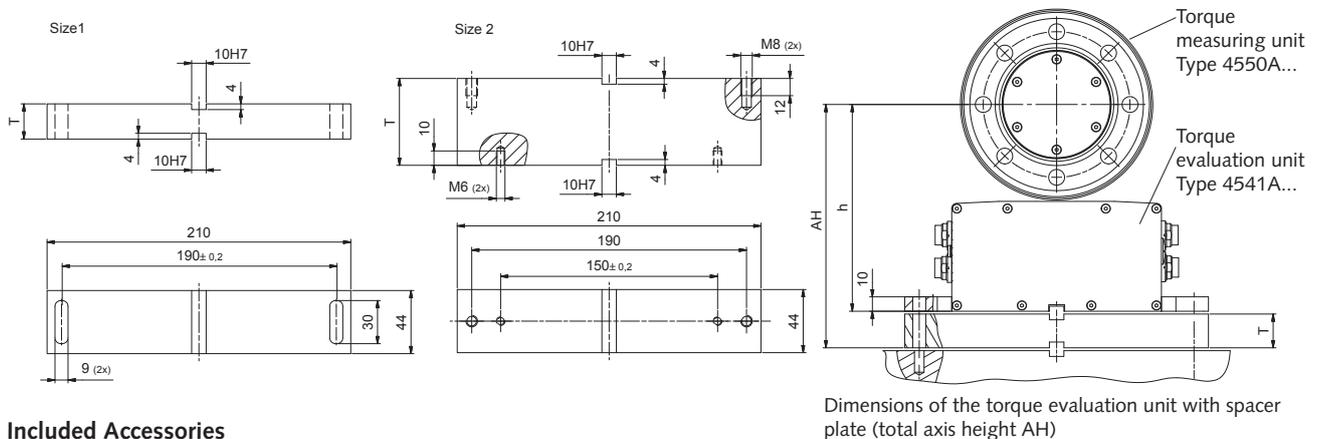


Our calibration service D-K-15127-02-00 provides traceable calibrations for torque sensors from all manufacturers.

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Dimensions of the spacer plate

Spacer Axis height	100 N·m/ 200 N·m h= 133 mm	Size	500 N·m/ 1 000 N·m h= 144 mm	Size	2 000 N·m/ 3 000 N·m h= 161 mm	Size	5 000 N·m h= 175,5 mm	Size				
AH	Type KSM	T [mm]	Size	Type KSM	T [mm]	Size	Type KSM	T [mm]	Size	Type KSM	T [mm]	Size
157,5	038460	24,5	1									
167,5				036872	23,5	1						
185,5				036874	41,5	1	038460	24,5	1			
194,5	038459	61,5	2									
202,5							036874	41,5	1	039694	27	1
204,5				036876	60,5	2						
222,5							038459	61,5	2			
226,5												
239,5										039693	64	2
263,5												



Included Accessories

- Calibration certificate

Optional Accessories

- Connection cable, length 5 m, 7 pin – open ends
- Connection cable, length 5 m, 12 pin – open ends
- Connection cable, length 2,5 m, 12 pin – to CoMo Torque
- Connection cable, length 5 m, 14 pin – open ends
- Cable socket 7 pin (plug X1/X2)
- Cable socket 12 pin (plug X4)
- Cable socket 14 pin (plug X2)
- Spacer plate 13,5 mm, AH 157,5
- Spacer plate 24,5 mm, AH 167,5
- Spacer plate 41,5 mm, AH 185,5
- Spacer plate 60,5 mm, AH 204,5
- ControlMonitor CoMo Torque Evaluation instrument for torque sensors
- Adapter flanges (on request)
- Couplings (on request)
- SensorTool

Type/Art. No.

- KSM219710-5
- KSM124970-5
- KSM186420-2.5
- KSM385370-5
- KSM000517
- KSM000703
- KSM038290
- KSM036870
- KSM036872
- KSM036874
- KSM036876
- 4700B...
- 2305A...
- 2305A...
- 4706...

Ordering Key

Speed

Speed measuring with 1x60 Imp./Rev.	N1¹⁾
1x60 pulses per revolution + Z-pulse	N2
Rotational speed or angle measurement up to 8 192 pulses per revolution + Z-pulse	N3

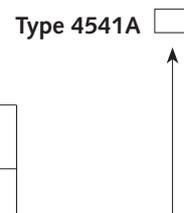
¹⁾ Option N1 only with KiTorq Rotor Type 4550A... possible.

Please note: Only use rotors and stators with the same speed option.

Order Example:

Type 4541AN1

Torque evaluation unit Type **4541A**, speed measuring 60 impulses/revolution: **N1**



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