STANDARD SERIES 62000

NON-CONTACT, ROTARY TORQUE SENSOR

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1. INTRODUCTION

SENSY's 62000 sensor has been designed to measure the torque acting on static or rotating shafts bidirectional and in real time. The sensor is delivered as a set including the connecting cable, shaft keys (if appropriate) and user manual. The torque sensing shaft, the noncontact signal detector, and analog signal conditioning electronics are integrated into the sensor housing. The torque sensor is characterized by very low power consumption, internally amplified output voltage signal, long-term stability and a very good price performance ratio.

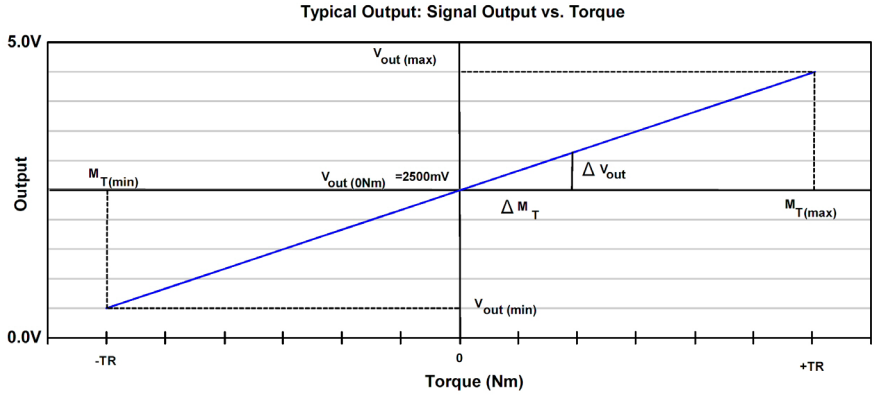
2. CHARACTERISTICS

Model No. 62x00		Max rated Torque [Nm (ft-lb)]	Max Overload [Nm (ft-lb)]	Max Rotational [rpm]
Round (Rd) Drive	Square (Sq) Drive	bidirectional (+/-)	bidirectional (+/-)	Rd/Sq
62200-2.5	62100-2.5	2.5 (1.8)	5 (3.6)	5000 / 1000
62200-5.0	62100-5.0	5.0 (3.7)	10 (7.4)	5000 / 1000
62200-7.5	62100-7.5	7.5 (5 .5)	15 (11)	5000 / 1000
62200-17.5	62100-17.5	17.5 (12.9)	35 (25.8)	5000 / 1000
62200-75	62100-75	75 (55.3)	150 (110.6)	5000 / 1000
62200-175	62100-175	175 (129)	350 (258)	5000 / 1000
62200-250	62100-250	250 (184.3)	350 (258)	5000 / 1000
62200-500	62100-500	500 (368.6)	750 (552.9)	5000 / 1000

3. TECHNICAL FEATURES

Description	Symbol	62x00-2.5	62x00-5.0	62x00-7.5	62x00-17.5	62x00-75	62x00-175	62x00-250	62x00-500	Units	Remarks
Maximum rated torque - bi-directional	M	2.5	5.0	7.5	17.5	75	175	250	500	Nm	Full Scale (FS) = 0 to maximum rated torque
Analog signal output	Vout	0.5 - 4,5								Vdc	
Degree of protection		IP 50									Per EN60529
Supply voltage	Vcc	9.0..12.0 VDC									
Current consumption	Iin	< 10mA									
Signal output at 0 Nm (adj. via offset Pot.	Vout (0)	2.5								V	Adjustable via potentiometer
Signal output resistance		50								&	
Signal bandwidth	BW	1000								Hz	
Rotational speed (Rd or 62200: round shaft Sq or 62100: square shaft)	n	0...5000 (Rd/62200) 0...1000 (Sq/62100)								rpm	Over 3000 RPM non-continuous
Repeatability		< ± 0.1								%FS	DKD-R 3-5
Hysteresis and linearity failure		< 1							<2	%FS	
Signal variation during rotation		< 1							<2	%FS	
Operating temperature range	Top	0 ...70								°C	Temperature de reference: 21°C
Maximum longitudinal force between shaft and housing	Fl	40								N	Influence on meas. Signal <1%FS
Maximal lateral force	Fq	50								N	Influence on meas. Signal <1%FS
Zero drift (temperature-related)		< ± 0.1								%FS/ K	
Resistance to magnetic fields		4000								Oe	Minimal distance from sensor housing: 70m
		318								kA/m	
Electromagnetic compatibility											EN 55011, EN 6100-4-3, EN 6100-4-6, EN 6100-4-4, EN 6100-4-2, EN 50204, EN 50081-3, EN 50082-2.
Storage temperature	T	-20...100								°C	
Weight	Round	383	386	392	400	685	856	861	1655	g	
	Square	395	397	401	386	652	754	749	1385		

4. TYPICAL SENSOR OUTPUT



TR: Torque range
Note: Graph displays measurement with V_{ref} as reference (not 0V) !
Calibration based on 0Nm to +FS
See "Calibration" on the sensor label

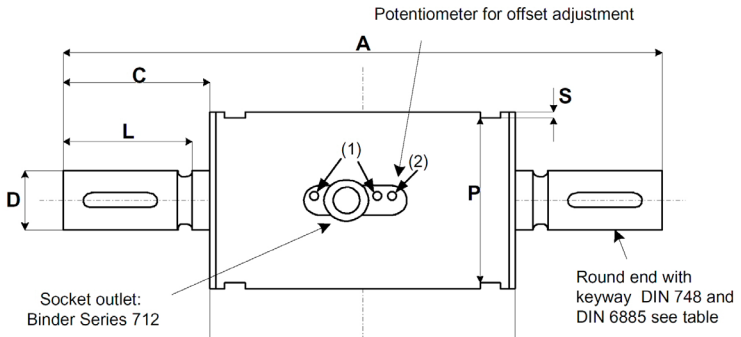
Slope (S)

$$\frac{\Delta V_{out}}{\Delta M_T} = \frac{V_{out(\max)} - 2500mV}{M_{T(\max)}}$$

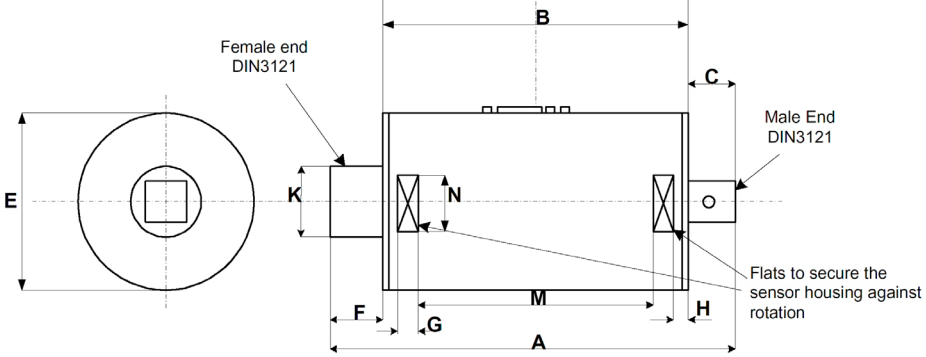
Vout(max) and Vout(min) are defined by the slope of each sensor. This means that the output signal may vary between 0.5V and 4.5V; the actual signal output range depends on the calibration value and the torque range.

5. MECHANICAL DIMENSIONS

62200/ TM-HR-Rd
Round drive shaft



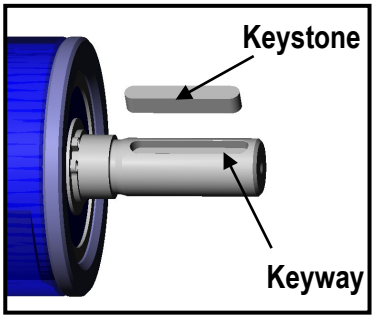
62100/ TM-HR-Sq
Square drive shaft



(1)Do not loosen or tighten the assembly screws
(2) See 8.4 – Offset adjustment

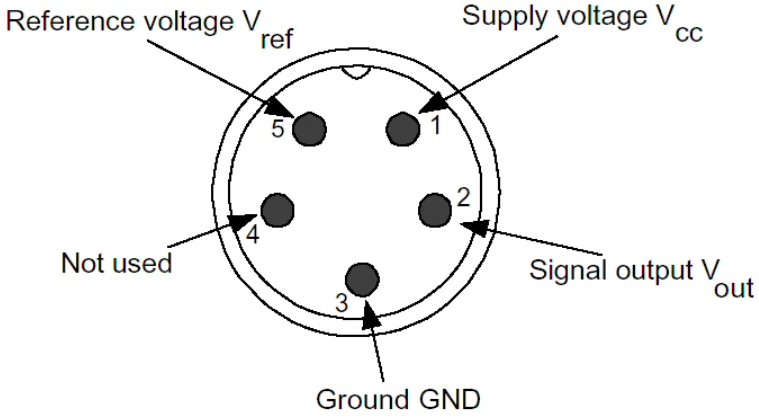
Dimensions in mm	Nominal Torque Capacity (Nm)	A	B	C	D	E	F	G	H	K	L	M	N	P	S
Square drive shaft	**(62100)**														
1/4 Inch	2.5 - 5.0 - 7.5 - 17.5	95.5	70	9.5	-	40	16	8	5	12	-	43.9	15	37	1.5
3/8 Inch	75	107	70	13	-	50	24	8	5	18	-	43.9	18	47	1.5
1/2 Inch	175 – 250	123.5	70	18.5	-	50	35	8	5	24	-	43.9	18	47	1.5
3/4 Inch	500	146	87	29.6	-	60	29.6	10.5	2	33.5	-	61.4	19	57	1.5
Round drive shaft	**(62200)**														
Ø 9 mm	2.5 - 5.0 - 7.5 - 17.5	125	70	27.5	9	40	-	8	5	-	23	43.9	15	37	1.5
Ø 14 mm	75	139	70	34.5	14	50	-	8	5	-	30	43.9	18	47	1.5
Ø 19 mm	175 – 250	179	70	54.5	19	50	-	8	5	-	50	43.9	18	47	1.5
Ø 25 mm	500	220	87	66.6	25	60	-	10.5	2	-	-	61.4	19	57	1.5

Dimensions Keyway (mm)				Keystones	
Round drive	Width	Depth	Length	Height	Length
Ø 9 mm	3	1.8	18.5	3	18
Ø 14 mm	5	3	25.5	5	25
Ø 19 mm	6	3.5	45.5	6	45
Ø 25 mm	8	4	50.5	8	50



6. TERMINAL DIAGRAM

Terminal diagram of socket outlet (View looking at sensor socket)

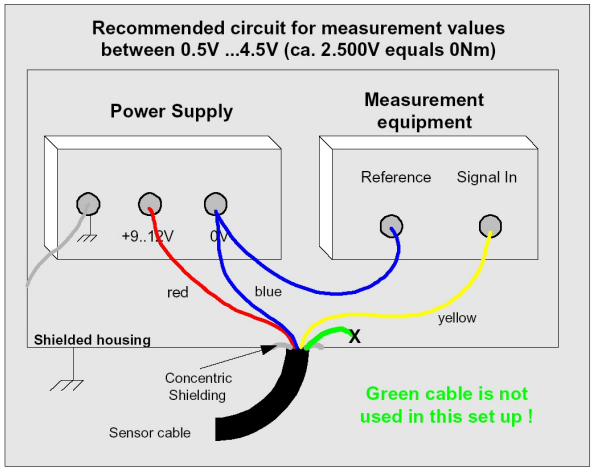


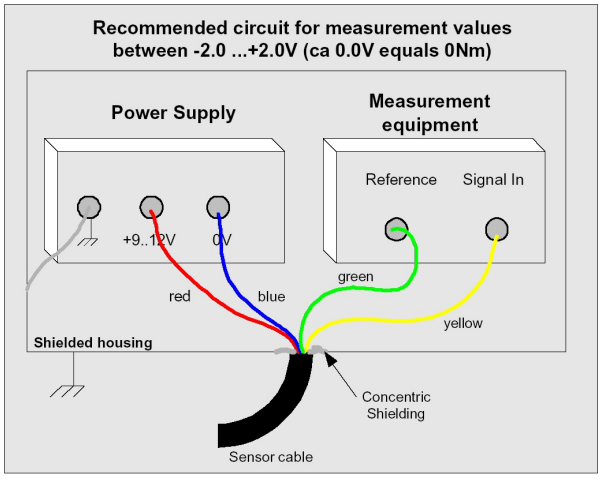
Available Cable		
Model	Mod2	Mod3
Pin 1	Red	White
Pin 2	Yellow	Brown
Pin 3	Blue	Black
Pin 4	-	Blue (not used)
Pin 5	Green	Grey

The output Vref is a constant 2.5V output and represents the virtual zero point for direct +/- torque measurement (See below "Sensor cable connection" section B).

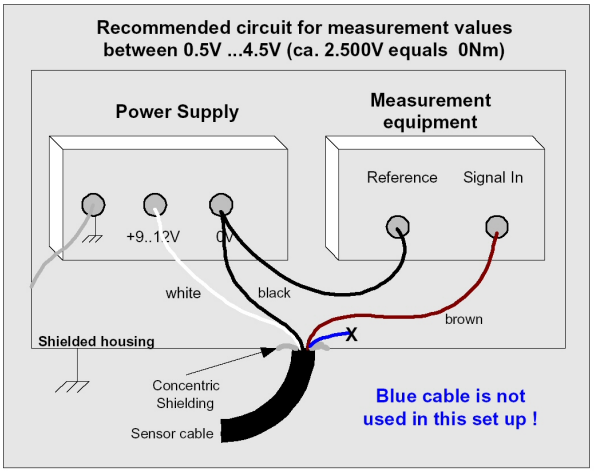
***Attention**: Use connector with proper shielding termination (360 deg). Otherwise maintain shield as close to cable ends as possible and connect to earth ground.*

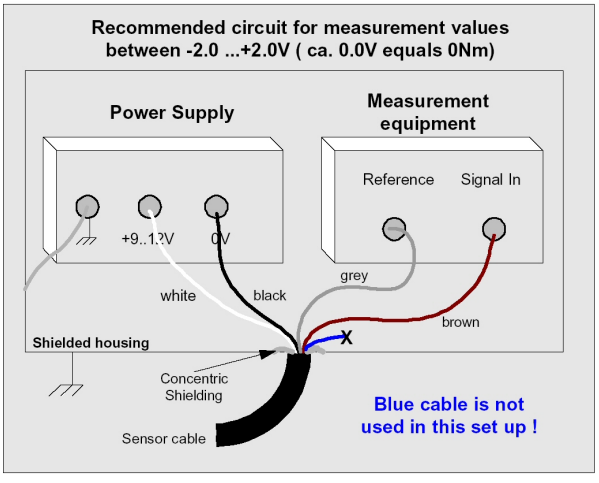
6.1. Sensor cable connection Mod. 2





6.2. Sensor cable connection Mod. 3





7. OPERATING INSTRUCTIONS

7.1. Field of Application

The torque sensor is intended for use in an industrial environment (e. g. in test stands).

7.2. Scope of Delivery

The torque sensor set consists of the sensor unit (signal detector head and signal conditioning electronics integrated into sensor housing), one connecting cable (length: 1.5 m) with a soldered-on plug connector, and one installation and instruction manual.

7.3. Sensor Installation and removal

The shafts connected to the torque sensor must be properly aligned. A shaft coupling should be selected to eliminate or minimize backlash, angular misalignment of the shafts, end-float, or other mechanical situations that would affect the performance or operation of the torque sensor. Secure the sensor utilizing the 8mm guides on the sensor body (optional sensor holder). A maximum cable length of 3 m must not be exceeded. Using a cable or connector other than supplied by SENSY, or a similar cable that is of a different length may affect the overall performance of the sensor. Prior to removing the sensor from operation, remove all lateral forces or torque stored in the mechanical assembly. Remove the keys from the shafts before loosening the mounting screws. DO NOT REMOVE THE SHAFT WITH TORQUE APPLIED TO THE SENSOR.

7.4. Offset Adjustment

The sensor is preset at the factory setting to have an output signal at 0 Nm of 2.5 V. If required, the output signal can be adjusted via a potentiometer (2) (See 5 - Mechanical Dimensions). Remove the headless screw, set the potentiometer to 2.5 V using a plastic screwdriver. Replace the headless screw until flush with the surface of the housing. Factory setting is 2.5V.

7.5. Operation (Normal, Optimization)

For optimal measurement results, do not exceed the rated torque when using the sensor. Do not operate the sensor at the maximum rotational speed for extended periods of time. Observe the prescribed operating conditions to ensure trouble-free and maintenance-free operation of the sensor.

7.6. Operation Outside Specified Conditions, Corrective Action

External magnetic fields may have an adverse effect on the measurement results. Excessive mechanical stress on the sensor (e. g. longitudinal forces / loads outside the specified limits, strong vibrations) may cause damage to the sensor and thus lead to incorrect signal outputs. Should these conditions be experienced readjusting the sensor may improve the performance (see 7.4 – Offset Adjustment). If the problem persists, do not open the sensor housing. Contact the manufacturer for assistance.

7.7. Commissioning

After sensor installation, observe the following procedure:

- Switch on the power supply unit and check the supply voltage. **Peak voltages to the sensor must be avoided! Be sure to verify the power supply voltage prior to connecting the sensor!** Using the supplied sensor cable, connect the sensor to the power supply unit.
- Connect the sensor output to a high-resistance device such as an A/D converter, oscilloscope, PLC analogue board, PC measurement board, etc.
- With the sensor under no mechanical load (zero torque condition) determine the output signal voltage. If required: Adjust the signal output to read 2.5V (0 Nm) (See 7.4 - Offset Adjustment.)

7.8. Interface description

Mechanical interface: For transmission on both ends of the shafts are keyway adapter or square ends (male/female) available.
Electrical interface: On the sensor outside is a 5 pole plug for power supply and signal lines (See 6. Terminal diagram).

7.9. Disposal

Please return the device to the manufacturer for disposal.

7.10. Handling and Transportation

During sensor handling, storage and transportation, it is important to ensure that the sensor is not exposed to any magnetic or electromagnetic fields higher than specified by the electromagnetic compatibility. Static or dynamic loads on the sensor must be avoided.

7.11. Safety Precautions

1. Do not open the sensor housing under any circumstances.
2. Do not remove or loosen the locating rings on the shaft ends.
3. Do not loosen or tighten the nut of the flange-mounting socket-connector (1) (See 5 - Mechanical dimensions).
4. Carrying out any of the above operations (1.- 3.) results in loss of sensor calibration. The sensor does no longer operate regularly and must be returned to SENSY for calibration and certification.
5. Use only power supplies that are properly isolated from the electrical mains.
6. Observe the specifications regarding maximum electrical and mechanical loads on the sensor, as shown on the sensor label and under 3 - Technical Features. **Protect the sensor from exposure to any electric or magnetic fields higher than specified by the electromagnetic compatibility.**

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