



SGR570 SERIES | PTO TORQUE TRANSDUCER

Accurate measurement of torque and speed

PTO Torque Transducer

Torqsense Digital rotary strain gauge series (SGR) Transducers use non contact technology eliminating the need for noisy slip rings. They are suitable for torque measuring, testing, feedback control of drive mechanisms and process control applications.

The SGR series transducers use modern strain gauge signal conditioning techniques to provide a high bandwidth low cost torque measuring solution with high overrange and overload capabilities.



FEATURES

- Transducers up to 2000Nm
- Large fully functional overrange capability of 250%
- Low linearity deviation of ± 0.05 % FSD
- Low hysteresis error of ± 0.05 % FSD
- Zero variation in torque signal with rotation (cyclic variation)
- Non contact signal transmission, no slip rings to wear out
- High digital sample rate of 4000 samples per second
- Adjustable torque data smoothness, low pass filter
- Speed measurement / Power computation
- High digital sample rate of 4000 samples per second
- Wide power supply range 12-32 VDC
- Compatible with ethernet gateway module

TECHNOLOGY

The SGR series torque transducers use a full four element strain gauge bridge to measure the torsion present on a shaft. The full bridge helps to diminish errors from any off-axis forces that are sometimes unintentionally applied to the transducer in some test setups. The full bridge also increases the sensitivity and the temperature performance of strain measurement.

A rotor mounted ultra-miniature microcontroller measures the strain gauge bridge and transfers the information back to the stator digitally eliminating any noise pickup usually associated with slip ring and other analog methods of transferring torque data from rotor to stator. External noise pickup into the gauge wiring is virtually eliminated due to the short distance between the strain gauge elements and the rotors measuring circuits.

A multipoint calibration method reduces any linearity errors within the sensor. A large functional overrange capability allows the peaks of a torque signal to be captured more faithfully without any clipping when operating the sensor close to its full scale rating.

All this combined with a mechanical overload capability of over 400% make the SGR series torque sensors a very robust and accurate torque measuring solution.





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PTO TRANSDUCERS OFFER:

- Compatible with all PTO spline types
- Accurate measurement of torque and speed for testing equipment that use the PTO shafts.
- Power calculation
- Simple installation
- IP 65 for robust application where environmental issues may be a problem.
- Transducer configuration software to allow user to change transducer variables
- Connect straight to a PC for data viewing and logging
- Anti rotation eye hook, to stop transducer spinning around with the shaft.
- User configurable limits outputs.
- Wide range input voltage 11V 32V
- Analog and digital outputs available
- Contactless measurement system (not slip ring)
- Temperature monitoring

SOFTWARE

TorqView is an easy to use advanced torque monitoring software, available to assist data recording and instrumentation displays that interface with Windows based PCs.

Features include: 3 types of display, text files compatible with Matlab and Excel and Real time chart plotting. See TorgView datasheet for more details.

LabView VI's are available for users to design their own process control applications. DLLs are also available for users to write their own custom software. Get data from across your network using the ethernet module.



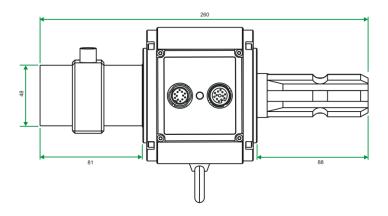


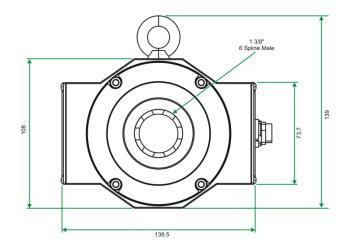
SPECIFICATION

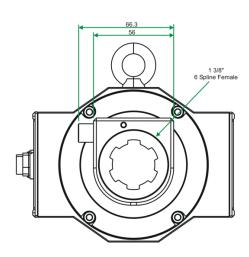
Parameter	Condition	dition Data Uni						Units		
PTO Torque measurement	svstem									
Measurement method	T			ı	-ull bridge stra	ain gauge				
Torque range	(Notes 1 & 2)								Nm	
Shaft type		Male 1 3/8" 6 spline to female 1 3/8" 6 spline ISO500-3 Type 1								
Specifications				, ,						
Combined non-linearity and		±0.1							%FS	
hysteresis										
Resolution Repeatability		0.01 0.05							%FS %FS	
Basic Series Transducers (ONLY				0.	0.5				7013
	20°C, SM	20°C SM								%FS
Accuracy	(Note 4)		±0.2							
3dB Bandwidth	(Notes 5&6)	otes 5%6) 250 (default ave. = 16)							Hz	
Analog output	1	0.11	9.1.1	14/15/	1.40 / 11.5	(CCDE40.0	2 1 6 1	112 2 11	E) (.)	_
Output voltages (Torque/Speed/Power)		Opti	Options available: $\pm 1/\pm 5/\pm 10$ / Unipolar (SGR510 Series default setting is ± 5 Vdc)						Vdc	
Load impedance			(SGR520 Series output voltages are user selectable) Maximum 1						ΚΩ	
Output currents			Maximum 1 Options available: 4-20 / 0-20 / 12±8						1/22	
(Torque/Speed/Power)			(SGR520 Series output currents are user selectable)						mA	
4-20mA Loop resistance			Should not exceed 400						Ω	
Advanced Series Transduc	ers ONLY									
Accuracy	20°C, SM					O 1				%FS
,	(Note 4)				±0.1					
Digital averaging	(Note 5)	2	4	8	16	32	64	128	256	N
Noise Floor	20°C, SM (Note 4)	0.06	0.04	0.03	0.02	0.015	0.01	0.01	0.01	%FS
3dB Bandwidth	(Note 6)	2000	1000	500	250	125	62	31	15	Hz
Digital output (Advanced	Transducers O									
Connections		CAN	CAN Bus Ethernet RS232 USB					SB		
Configuration		CAN 2.0B, 11bit 10B		802.3 ASE-T, ASE-TX	Data Bits: 8, Parity: None, Stop Bits:1		USB 2.0 Full-Speed			
Baud Rate(s)		1Mbps, 500Kbps, 10I			lbps, 115200bps, 12 Mbps 38400bps, 9600bps					
Output Rate	(Note 7)	Up to 4 kHz Up to 1.9 kHz Up to 1.1 kHz Up to 4kHz								
Rotation speed/angle of re	otation measu	rement sys	tem							
Measurement method				Op	to switch thro	ough slotted	disc			
Direct output signal			Pulse	output dire	ect from opto	switch (TTL,	5V square v	wave)		
Accuracy		4			±1rpm up to 30,000rpm					
Rotational speed (max)	(Note 3)	30,000 20,000		,000	15,000 12,000 9,000 6,000				6,000	RPM
Digital Processing		Processing Method			Upda	Update rate for analog and digital outputs				
Techniques	Based on a	Mode 1 (Slow Method)						Hz		
Processing modes run simultaneously and can be	standard	Frequency Count								+
applied to either analog	60-line				0 RPM			1		4
channel or accessed	grating.	Mode 2 (Fast Method)			. 0 DDM			RPM RPM		Hz
individually via a digital	(Note 11)	Period Count $> 0 \text{ RPM}$ $\left\lceil \frac{\text{RPM}}{1000} \right\rceil$								
connection.	(
Temperature Measurement method				Shaft mo	unted platinu	m temperati	ire sensor			T
Temperature accuracy		Shaft mounted platinum temperature sensor						°C		
Reference temperature T _{RT}		±1 20						0€		
Compensated range, ΔT_0		20						0℃		
Usable range, ΔT _S		0 to +90 -40 to +90						0℃		
Temperature		Coefficient of zero 0.002						%		
Temperature		Coefficient of zero 0.002 Coefficient of span 0.01						%		
Power supply					COEITICIETT (or sharr 0.01				70
					11 +0 2	2 (may)				Ιv
Nominal voltage, Vs		11 to 32 (max)						<u> </u>		
Current consumption, Is		250 (max) @ 12 VDC						mA W		
Power consumption, W _s Allowed residual ripple of		3 500						W		
supply voltage, V _{ripple}		(above nominal supply voltage)						mVp-p		
Electromagnetic compatib	ility									
EMC compatibility					EN 6132	26:2006				



DIMENSIONS (0 - 2000NM) 6 SPLINE







Measurement units: Millimetres (mm)



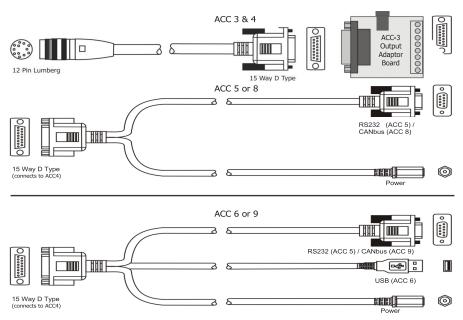


PTO TORQUE TRANSDUCERS – CONNECTOR AND LEAD OPTIONS

			Option Code	Remarks/Purpose
Connectors & Leads	Basic	Advanced		
Analog Connector 12 Pin Lumberg (female)	♦	♦	ACC 1	For user to self wire
Digital Connector 12 Pin Lumberg (male)		♦	ACC 2	For user to self wire
Analog Lead (Length 2.5m) 12 Pin Lumberg (female) to 15 way 'D' type connector (female)	\$	♦	ACC 3	For connecting SGR to user's system via 15 pin 'D' connector
Digital Lead (Length 2.5m) 12 Pin Lumberg (male) to 15 way 'D' type connector (male)		♦	ACC 4	For connecting SGR to user's system via 15 pin 'D' connector
Digital Lead Adapter (Length 1m) 15 Way 'D' type (female) to RS232 and Power Connectors		♦	ACC 5	For connecting SGR to PC via RS232 [Also needs Digital Lead (ACC4) to connect to SGR]
Digital Lead Adapter (Length 1m) 15 Way 'D' type (female) to RS232, USB and Power Connectors		♦	ACC 6	For connecting SGR to PC via USB (Option G) or RS232 [Also needs Digital Lead (ACC4) to connect to SGR]
Digital Lead Adapter (Length 1m) 15 Way 'D' type (female) to CANbus and Power Connectors		♦	ACC 8	For connecting SGR to PC via CANbus (Option H) [Also needs Digital Lead (ACC4) to connect to SGR]
Digital Lead Adapter (Length 1m) 15 Way 'D' type (female) to CANbus, USB and Power Connectors		*	ACC 9	For connecting SGR to PC via USB (Option G) or CANbus (Option H) [Also needs Digital Lead (ACC4) to connect to SGR]

PTO SERIES TORQUE TRANSDUCERS – ADDITIONAL RELATED PRODUCTS

	Code	Remarks/Purpose
Transducer Display ETD	ETD	Display readout
AC Mains Adapter Power Supply	PSU 1	For providing 12-32Vdc
Transducer Signal Breakout Unit	SBU 1	
TorqView	TV	Torque Monitoring Software



Data parameters measured at +20 °C Sensor Technology Ltd reserves the right to change specification and dimensions without notice.





GLOSSARY OF TERMS AND DEFINITIONS USED IN THIS DATASHEET

- Accuracy The degree of conformity of a measured or calculated quantity, which will show the same or similar results. Accuracy of the overall TorqSense system is limited by the combined error of several factors such as linearity, hysteresis, temperature drifts and other parameters affecting measurements. If errors in the system are known or can be estimated, an overall error or uncertainty of measurement can be calculated.
- Digital averaging The application of algorithms to reduce white noise. In any electronic system, electronic white noise is mixed with the signal and this noise usually limits the accuracy. To reduce the influence of white noise and increase the accuracy of the system different averaging algorithms can be applied. In the TorqSense system a flying digital averaging technique is applied to reduce the white noise commensurate with the level of accuracy required. However, as any averaging algorithm works as a low pass filter, the more averaging that is applied the lower the frequency response. Therefore, each Torqsense system should be optimised to the customer's requirements by choosing the right combination of accuracy/frequency response. Please see relevant part of the Datasheet and User Manual.

Note 1: Any torque/FSD is possible between ranges – please specify max rated torque.

Note 2: Max rated torque should not be exceeded.

Note 3: Please consult factory for applications requiring rotational speeds that exceed maximum figures

given. Transducers fitted for IP65 will have running speeds considerably reduced, increased drag

torque and accuracy can be affected.

SM – Static Mode. Dynamic values will depend upon user application and has to be adjusted Note 4:

accordingly.

Note 5: Digital averaging can be configured by user to optimise accuracy/frequency response for specific

user applications. Digital averaging default setting is N=16. For details see User Manual.

Note 6: >5Khz Sample Rate. Up to 10Khz sample rate possible, please consult factory. Digital averaging

also affects the analog output, max analog output 3dB Bandwidth = 5Khz when digital average is

Note 7: Output rate figures are calculated from the time taken to capture 10000 torque readings. Testing

> was conducted with each connection method configured at its maximum baud rate. The maximum output rate available for CAN and USB is dependant on the transducers setup. USB - USB is a host based bus architecture, because of this the output rate achievable will be affected by other bus traffic and host activity. USB has two transfer modes, Single Transfer which requests 1 reading at a time and Bulk Transfer which transfers readings in blocks of 50 Torque/Speed pairs. CAN Bus - to achieve a Torque reading output rate of 10KHz, the Speed reading output rate must be

reduced to 100Hz.

Note 8: 2 x analog channels available. Default settings are Channel 1 (voltage/current) – torque. Channel 2

(voltage/current) – speed or power, if ordered.

Note 9: At very high speeds, for better balance the factory recommend plain or splined shafts.

Note 10: Transducers fitted for IP65 will have running speeds considerably reduced, increased drag torque

and accuracy can be affected.