SERVOTRONIX
always in motion™

sensAR

The innovative sensAR™ magnetic absolute encoder combines high resolution and accuracy with robustness, durability and compact size, all at a competitive price.

Simplicity

The sensAR™ magnetic absolute encoder features a simple mechanical design that provides the same level of resolution and accuracy as optical absolute encoders without the complexity or expense.

Single track magnetic system

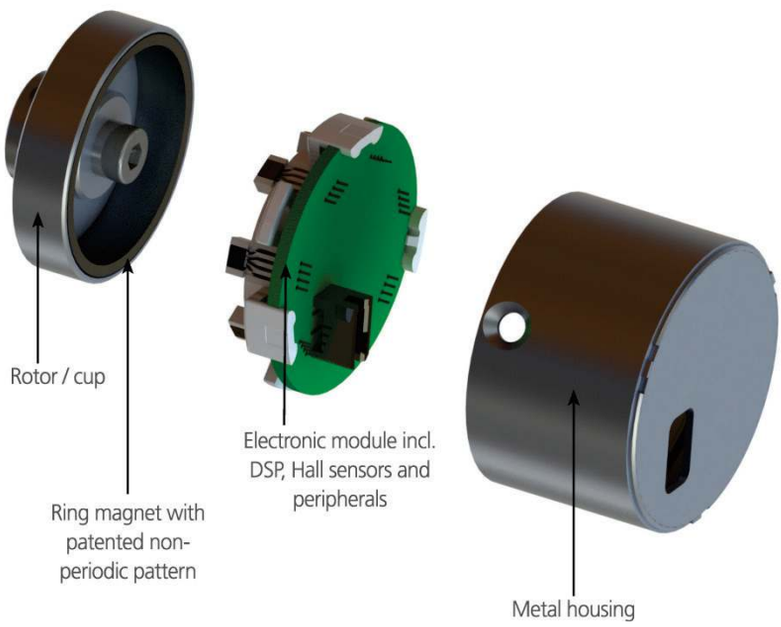
The Gray code is obtained on a single track as opposed to other encoders that tend to use at least two tracks (absolute and incremental) along with an array of sensors.

High resolution and accuracy

The sensAR™ offers a resolution of up to 20-bit* single-turn and an accuracy of ±60 arc/sec. The multi-turn version has an additional count of 16-bit (65,536) turns. Advanced signal processing applies a unique, patented method where a digital position code is associated with a set of analog signals that represent a high resolution and accurate, absolute angular position.

Robustness

Requiring few mechanical components and no optical elements, sensAR™ is less sensitive to contamination, shock, vibration and mechanical tolerance deviations. It is also more durable (no component degradation over time) than optical encoders. Life expectancy is greater due to the elimination of both optical components and bearings.



Key benefits

- Simple and compact mechanical design
- Absolute up to 20 bit single-turn resolution
- Additional 16 bit multi-turn (battery powered)
- Operating temperature range of -20...+120°C
- Robustness to contamination, shock and vibration
- Less sensitive to mechanical deviation
- Position / velocity feedback
- Four wire serial communication interface
- Electronic type-plate
- Fully digital
- Built-in thermal sensor
- Complete in-house technology
- Condition monitoring

Customization options

- Form factor
- Communication protocols
- Extended temperature range
- Mechanical mounting options compatible with resolver dimensions

The sensAR™ Absolute Motor Feedback System is a key component of PRO2 dynamic servo motors

TECHNICAL DATA

Primary Encoder Specifications	SE36E-S20	SE36E-M36
Resolution single-turn [1]	up to 20 bit	up to 20 bit
Multi-turn counts		65,536 (16-bit)
Accuracy [2]	±0.016° / 14.4 bit / 60"	
Repeatability [3]	±0.015° / 14.5 bit / 54"	
Maximum rotational speed	12,000 rpm	
Maximum angular acceleration	100,000 rad/s^2	
Data storage EEPROM [1]	up to 2040 bytes	

Mechanical Specifications	
Dimensions	Diameter: 36 mm, Height: 21.3 mm
Mass	57 g
Moment of inertia	2.3 x 10^{-6} kg·m^2
Allowed shaft movement [5] (mounting)	Axial ±0.7 mm, radial ±0.1
Protection	IP20 (after encoder assembly)

Communication Interface		
Communication protocol	ServoSense [7]	BiSS/SSi [8]
Electrical interface	RS485 (UART)	RS422
Transmission rate	2.5 Mbps, ½ duplex	500 kbps
Access rate and synchronization	<16 kHz	<16 kHz
Data availability	Bi-directional, real-time	Uni-directional
Number of wires (total)	4	6

Ambient Conditions	
Operating temperature range	-20°C to 120°C
Storage temperature range	-30°C to 120°C
Humidity	90% RH
Vibration resistance 4 (EN 60 068-2-6)	30 g (10–2000 Hz)
Shock resistance 4 (EN 60 068-2-27)	200 g (6 ms)

Electrical Specifications	
Nominal voltage	4 – 5.25 VDC
Current consumption	80 mA
Insulation resistance	Greater than 1 MΩ
Lifetime [6]	786,401 hours / 90 years
Standby period at power-on	500 ms
Maximum cable length	80 m

ORDER INFORMATION

			SE36E	S20	A	1	00
	SE36E Rotary Encoder						
	Absolute Servo Motor Feedback						
	Resolution						
S20	Single turn absolute 20-bit/revolution						
M36	Multi-turn absolute 20-bit/revolution and 16-bit number of turns						
	Communication Interface						
A	ServoSense proprietary asynchronous protocol with 4 wires (free license)						
B	BiSS Safety serial protocol (free license)						
	Mechanical Interface						
	Encoder Body	Rotor Shaft					
1	Set screw	Blind 6 mm hollow shaft with M3 axial screw					
2	Set screw	Blind 8 mm hollow shaft with M4 axial screw					
3	Resolver size 15 compatible	Blind 6 mm hollow shaft with M3 axial screw					
4	Resolver size 15 compatible	Blind 8 mm hollow shaft with M4 axial screw					
5	Resolver size 15 compatible	Blind 9.52 mm hollow shaft with M4 axial screw					
6	Resolver size 21 compatible	Blind 9.52 mm hollow shaft with M4 axial screw					
7	Resolver size 21 compatible	Blind 12.7 mm hollow shaft with M5 axial screw					
S	Customer-specific	Customer-specific					
	Options						
00	Customization code						

Notes

1. Maximum value depends upon the communication protocol. Refer to the datasheet ServoSense and Optional Protocols.
2. Achieved after ¼ revolution, at 25°C after motor calibration. 12 bit within the initial 1⁄4 turn.
3. The white noise as control ripple and electrical spikes is reduced by factor √1999.
4. Test performed by independent certification body Carmel Environmental Test Laboratories (Israel).
5. Accuracy reduced when axial play is in the range +0.2 mm/(-1 bit) > shaft movement > +0.7mm/(-2 bit)
6. fiXtress Analysis performed by BQR Reliability Engineering Ltd (Israel). MTBF at 80°C. The failure rate prediction is based on Parts Stress method of MILHDBK- 217F. This MTBF assumes the system is operated all the time, which is the worst case scenario.
7. Proprietary protocol. Free user licenses.
8. On request.

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