# **SMART ARC**

# SMART Position Sensor, 100° and 180° Arc Configurations Superior Measurement. Accurate. Reliable. Thinking.



## DESCRIPTION

The Honeywell SMART Arc Position Sensor is one of the most durable, adaptable, lightweight, and non-contact position sensors available, enabling absolute position sensing with enhanced accuracy. This simple, robust, arc position sensor offers an IP69K sealed package, eliminating mechanical failure mechanisms, reducing wear and tear, improving reliability and durability, and minimizing downtime.

The SMART Arc Position Sensor is a non-contact sensing solution, providing highly accurate motion control and improving operation efficiency and safety. This Honeywell position sensor utilizes magnetoresistive technology to detect the position of a magnet relative to the sensor in one of two available sensing ranges: 0° to 100°, 0° to 180°.

Why is the SMART Position Sensor smart? SMART means that this is a sensor that can essentially think for itself. SMART Position Sensors provide a selfdiagnostics feature and data gathering for enhanced reliability and closed-loop feedback control.

These devices use a patented combination of an ASIC (Application-Specific Integrated Circuit) and an array of MR (magnetoresistive) sensors to accurately and reliably determine the position of a magnet attached to a moving object so that the object's position can be determined or controlled.

The MR array measures the output of the MR sensors mounted along the magnet's direction of travel. The output and the MR sensor sequence determine the nearest pair of MR sensors to the center of the magnet location. The output of these two MR sensors is then used to determine the position of the magnet between them.

With this sensor, Honeywell has utilized MR technology through the ASIC at a level never before accomplished.

## **POTENTIAL APPLICATIONS**

## Transportation

- Aerial work lift platform, front end loader and digger/excavator boom position
- Scissor lift position
- Refuse truck lift and automatic reach arm position
- Mobile crane steering
- Timber harvester/processor equipment cutter arm angle
- On-board loader weighing system position

## Industrial

- Telescoping conveyor elevation
- Power generation contact angle
- Rail-road crossing arms position

# Military

- Remote weapon systems elevation
- Chassis suspension systems position height
- Military vehicle door position

## Aerospace:

- Ground-based solar panels elevation and azimuth
- Ground-based satellite dish elevation and azimuth

## Medical:

- Robotically-assisted surgery equipment position
- Patient bed elevation

# FEATURES

- **Reliable, durable:** Non-contact design reduces wear and tear, minimizing downtime
- Easy to install: Installation takes four steps (1: position device; 2: drill holes; 3: mount sensor; 4: locate magnet/ connect sensor) vs. up to 14 steps some competitive products require
- **Rugged:** Utilizes unique package materials with no moving parts within the sensor, making it resistant to vibration, shock, and extreme temps
- Flexible: Air gap tolerance of 7,8 mm ±2,5 mm [0.307 in ±0.098 in] or 9,2 mm ±2,5 mm [0.36 in ±0.09 in] (100°) and 8,5 mm ±2,5 mm [0.338 in ±0.098 in] (180°) between sensor and magnet expands application use
- **Cost effective:** Adaptable, noncontacting design allows customers to eliminate unnecessary connections for installation, reducing installation steps/time and components
- Accurate: 100° configuration accurately measures values down to 0.06° while the 180° configuration accurately measures values down to 0.11°
- **Adaptable:** Electronics on board allow for flexible packaging and component compatibility with existing systems
- Lightweight: Lighter in weight than optical encoders
- **Self-diagnostics** feature can reduce equipment downtime by providing predictive maintenance input
- Combined patented MR sensor and ASIC technology provide enhanced differentiation and performance
- **IP67, IP69K sealing** allow use in many harsh applications
- RoHS-compliant materials meet Directive 2002/95/EC



Analog: SPS-A100D-HAN	NS)			
	Min.	Тур.	Max.	Units
Sensor Charactertistics				
Sensing range	0	-	100	Degree
Sensing location	Inside	-	-	
Supply voltage	6	-	24	Vdc
Supply current	-	-	45	mA
Output type	Regulated voltage			
Output at min. pos	-	0.5	-	Vdc*
Output at max. pos	-	4.5	-	Vdc*
Full scale span	-	4	-	Vdc
Sensitivity	38.4	40	41.6	mV/Degree
Linearity	±0.4 %			Full scale output
Resolution	0.06			Degree
Measurement frequency	-	312	-	Hz
Reverse polarity	-26.4			Vdc
Startup time	5	mS		
Connector				
Termination	4-pin M12 connec	tor		
Operating Environment				
Operating temperature	-40°C to 85°C [-40°F to 185°F]			
Storage temperature	-40°C to 150°C [-40°F to 302°F]			
Air gap	7,8 mm ±2,5 mm [0.307 in ±0.098 in]			
Ingress protection	IP67, IP69K			
Mechanical shock	50 G half sine wave with 11 ms duration			
Vibration	20 G from 10 Hz to	2000 Hz		
Certification				
Certification/approval	CE, UKCA			
Mounting				
Housing	Thermoplastic			
Mounting screws	1/4-20 or M6			
Mounting torque	6 Nm to 8 Nm [53.1 in-lb to 70.8 in-lb]			
Magnetic Actuator				
Material	Neodymium Iron Boron			
Field strength	10000			

Device used to read analog output must have input impedance greater than 100 KOhm.

Sensor is able to output two diagnostic values as follows: Magnet out of range - Output <95 % of power rail. PIN 2 > 4.55 & PIN 4 < 0.45

FERROUS MATERIAL WITHIN 100 mm (3.9 in) RADIUS OF MAGNET MAY IMPACT SENSOR PERFORMANCE

Analog: SPS-A100D-HAW	VS)			
	Min.	Тур.	Max.	Units
Sensor Charactertistics				
Sensing range	0	-	100	Degree
Sensing location	Inside	-	-	
Supply voltage	6	-	24	Vdc
Supply current	-	-	45	mA
Output type	Regulated voltage			
Output at min. pos	-	0.5	-	Vdc*
Output at max. pos	-	4.5	-	Vdc*
Full scale span	-	4	-	Vdc
Sensitivity	38.4	40	41.6	mV/Degree
Linearity	±0.4 %			Full scale output
Resolution	0.06			Degree
Measurement frequency	-	312	-	Hz
Reverse polarity	-26.4			Vdc
Startup time	5	mS		
Connector				
Termination	18 AWG flying lead	ds		
Operating Environment				
Operating temperature	-40°C to 85°C [-40°F to 185°F]			
Storage temperature	-40°C to 150°C [-40°F to 302°F]			
Air gap	7,8 mm ±2,5 mm [0.307 in ±0.098 in]			
Ingress protection	IP67, IP69K			
Mechanical shock	50 G half sine wave with 11 ms duration			
Vibration	20 G from 10 Hz t	o 2000 Hz		
Certification				
Certification/approval	CE, UKCA			
Mounting				
Housing	Thermoplastic			
Mounting screws	1/4-20 or M6			
Mounting torque	6 Nm to 8 Nm [53.1 in-lb to 70.8 in-lb]			
Magnetic Actuator				
Material	Neodymium Iron Boron			
Field strength	10000			

Device used to read analog output must have input impedance greater than 100 KOhm.

Sensor is able to output two diagnostic values as follows: Magnet out of range - Output <95 % of power rail. PIN 2 > 4.55 & PIN 4 < 0.45

FERROUS MATERIAL WITHIN 100 mm (3.9 in) RADIUS OF MAGNET MAY IMPACT SENSOR PERFORMANCE

	MS)			
	Min.	Тур.	Max.	Units
Sensor Charactertistics				
Sensing range	0	-	100	Degree
Sensing location	Inside	-	-	
Supply voltage	18	-	40	Vdc
Supply current	-	-	45	mA
Output type	Regulated voltag	e		
Output at min. pos	-	0.5	-	Vdc*
Output at max. pos	-	4.5	-	Vdc*
Full scale span	-	4	-	Vdc
Sensitivity	38.4	40	41.6	mV/Degree
Linearity	±0.4 %			Full scale output
Resolution	0.06			Degree
Measurement frequency	-	312	-	Hz
Reverse polarity	-40			Vdc
Startup time	5	mS		
Connector				
Termination	18 AWG flying lea	ads		
Operating Environment				
Operating temperature	-40°C to 85°C [-40°F to 185°F]			
Storage temperature	-40°C to 150°C [-40°F to 302°F]			
Air gap	7,8 mm ±2,5 mm [0.307 in ±0.098 in]			
Ingress protection	IP67, IP69К			
Mechanical shock	50 G half sine wave with 11 ms duration			
Vibration	20 G from 10 Hz to 2000 Hz			
Certification				
Certification/approval	CE, UKCA			
Mounting				
Housing	Thermoplastic			
Mounting screws	1/4-20 or M6			
Mounting torque	6 Nm to 8 Nm [53.1 in-lb to 70.8 in-lb]			
Magnetic Actuator				
Material	Neodymium Iron	Boron		

Device used to read analog output must have input impedance greater than 100 KOhm.

Sensor is able to output two diagnostic values as follows: Magnet out of range - Output <95 % of power rail. PIN 2 > 4.55 & PIN 4 < 0.45

FERROUS MATERIAL WITHIN 100 mm (3.9 in) RADIUS OF MAGNET MAY IMPACT SENSOR PERFORMANCE

(Analog: SPS-A100X-LAA				
	Min.	Тур.	Max.	Units
Sensor Charactertistics				
Sensing range	0	-	100	Degree
Sensing location	Outside	-	-	
Supply voltage	-	5	-	Vdc
Supply current	-	-	30	mA
Output type	Regulated voltag	е		
Output at min. pos	-	0.5	-	Vdc*
Output at max. pos	-	4.5	-	Vdc*
Full scale span	-	4	-	Vdc
Sensitivity	38.4	40	41.6	mV/Degree
Linearity	±0.4 %			Full scale output
Resolution	0.06			Degree
Measurement frequency	-	312	-	Hz
Reverse polarity	N/A			Vdc
Startup time	5	mS		
Connector				
Termination	Ampseal 16 conr	nector (p/n 776536)		
Operating Environment				
Operating temperature	-40°C to 85°C [-40°F to 185°F]			
Storage temperature	-40°C to 150°C [-40°F to 302°F]			
Air gap	9,2 mm ±2,5 mm [0.36 in ±0.098 in]			
Ingress protection	IP67, IP69K			
Mechanical shock	50 G half sine wave with 11 ms duration			
Vibration	20 G from 10 Hz to 2000 Hz			
Certification				
Certification/approval	CE, UKCA			
Mounting				
Housing	Thermoplastic			
Mounting screws	1/4-20 or M6			
Mounting torque	6 Nm to 8 Nm [53.1 in-lb to 70.8 in-lb]			
Magnetic Actuator				
Material	Neodymium Iron	Boron		
Field strength	10000			
Device wood to read another suit	nut must have input impedance greater than 100 KOhm			

Device used to read analog output must have input impedance greater than 100 KOhm.

Sensor is able to output two diagnostic values as follows: Magnet out of range - Output <95 % of power rail. PIN 2 > 4.55 & PIN 4 < 0.45

FERROUS MATERIAL WITHIN 100 mm (3.9 in) RADIUS OF MAGNET MAY IMPACT SENSOR PERFORMANCE

Sensing range0-180DegreeSensing locationInside<	(Analog: SPS-A180D-HAN	IS)			
Sensing range0-180DegreeSensing locationInside<		Min.	Тур.	Max.	Units
Basing Location Inside – – – – – – – – – – – – – – – – – – –	Sensor Charactertistics				
Supply voltage6-24VdcSupply current-45mAOutput typeRegulated voltage-45mAOutput at min. pos-0.5-Vdc*Output at min. pos-0.5-Vdc*Output at max. pos-4.5-Vdc*Sensitivity21.3322.2223.11mV/DegreeElinearity60.4%-VdcSensitivityResourcent frequency-312-HzReverse polarity-26.4-mSSensitivityStartup time5-mSSensitivityConnector-mSmSSensitivityConnectormSSensitivityConnectormSSensitivityConnectormSSensitivityConnectorMSConnectorSensitivityConnectorSensitivityStorage temperature-40°C to 55°C (-40°F to 302°F)Air gap8.58 mm ±2,5 mm (0.338 in ±0.098 in)Storage temperature-40°C to 150°C (-40°F to 302°F)Air gap8.58 mm ±2,5 mm (0.338 in ±0.098 in)Storage temperature-40°C to 150°C (-40°F to 302°F)Conting temperature-50°C (-40°F to 302°F)<	Sensing range	0	-	180	Degree
Supply current45mADutput typeRegulated voltage <td< td=""><td>Sensing location</td><td>Inside</td><td>-</td><td>-</td><td></td></td<>	Sensing location	Inside	-	-	
Dutput typeRegulated voltageImage: Second se	Supply voltage	6	-	24	Vdc
Dutput at max. pos-0.5-Vdc*Dutput at max. pos-4.5-Vdc*Full scale span-4-VdcSensitivity21.3322.2223.11mV/DegreeLinearity40.4 %-State outputResolution0.11DegreeFull scale outputMeasurement frequency-312-HzReverse polarity-26.4-VdcStartup time5-mSConnectorConnectorUperating EnvironmentOperating Environment-40°C to 85°C [-40°F to 185°F]mSOperating temperature-40°C to 150°C [-40°F to 302°F]Immediate state st	Supply current	-	-	45	mA
Output at max. pos-4.5-Vde*Full scale span-4-VdeSensitivity21.3322.2223.11mV/DegreeLinearity±0.4 %22.2223.11mV/DegreeResolution0.11-DegreeMeasurement frequency-312-HzReverse polarity-26.4-VdeStartup time56.4-VdeMsConnectorMsMsConnectorMsMsConnectorMsOperating EnvironmentOperating EnvironmentStorage temperature-40°C to 85°C (-40°F to 302°F)Air gap8.58 mm ±2,5 mm [0.33 in ±0.098 in]Nechanical shock50 G half sine wave with 1 ms durationVibration2.0 G from 10 Hz to 2000 HzCertification/approvalCE, UKCAMountingThermoplasticMounting screws1/4-20 or M6Mounting Screws	Output type	Regulated voltage			
Full scale span-4-VdcSensitivity21.3322.2223.11mV/DegreeLinearity±0.4 %21.2223.11mV/DegreeResolution0.11DegreeMeasurement frequency-312-HzReverse polarity-26.4-VdcStartup time5-ModModConnectorModModConnectorModModOperating temperature-40°C to 85°C [-40°F to 302°F]Immode to 100°C to 85°C [-40°F to 302°F]Immode to 100°C to 85°C [-40°F to 302°F]Storage temperature-40°C to 150°C [-40°F to 302°F]Immode to 100°C to 85°C [-40°F to 302°F]Immode to 100°C to 85°C [-40°F to 302°F]Air gap8,58 mm ±2,5 mm [0.33 im ±0.098 in]Immode to 100°C to 85°C [-40°F to 302°F]Immode to 100°C to 85°C [-40°F to 302°F]Cartification1P67, IP69KImmode to 100°C [-40°F to 302°F]Immode to 100°C [-40°F to 302°F]Cartification20 G from 10 Hz to 2000 HzImmode to 100°C [-40°F to 100°C [-40°	Output at min. pos	-	0.5	-	Vdc*
Sensitivity21.3322.2223.11mV/DegreeLinearity±0.4 %Full scale outputResolution0.11DegreeMeasurement frequency-312-Reverse polarity-26.4-HzStartup time5VdcStartup time5VdcConnector-MSConnector4-pin M12 connectorWdcConrector4-pin M12 connector-Coperating EnvironmentOperating temperature-40°C to 85°C [-40°F to 155°F]-Storage temperature-40°C to 150°C [-40°F to 302°F]-Air gap8,58 mm ±2,5 mm [0.33 in ±0.098 in]-Ingress protectionIP67, IP69K-Wibration20 G half sine wave with 1 ms duration-VibrationCE, UKCACertification/ Certification/approvalCE, UKCA-Mounting Mounting screws1/4-20 or M6-Mounting screws1/4-20 or M6Magnetic ActuatorMaterialNeodymium Iron BoronMaterialNeodymium Iron Boron	Output at max. pos	-	4.5	-	Vdc*
Linearity±0.4 %Full scale outputResolution0.11DegreeMeasurement frequency-312-HzReverse polarity-26.4VdcVdcStartup time5mSmSConnector-startup time5mSConnectorstartup time-Operating Environmentstartup timeOperating temperature-40°C to 85°C [-40°F to 302°F]Air gap8,58 mm ±2,5 mm [0.33 ≥ 1±0.098 in]Ingress protectionIP67, IP69KWibration20 G from 10 Hz to 2000 HzCertification/approvalCE, UKCAMounting screws1/4-20 or M6Mounting screws1/4-20 or M6Magnetic ActuatorNeodymium Iron BoronMaterialNeodymium Iron Boron	Full scale span	-	4	-	Vdc
Resolution0.11DegreeMeasurement frequency-312-HzReverse polarity-26.4VdcVdcStartup time5mSmSConnectorConnectorOperating EnvironmentOperating temperature-40°C to 85°C [-40°F to 15°F]Image 100 (100 (100 (100 (100 (100 (100 (100	Sensitivity	21.33	22.22	23.11	mV/Degree
Measurement frequency – 312 – Hz Measurement frequency – 312 – Hz Reverse polarity -26.4 - Vdc Startup time 5 - Vdc Startup time 5 - Store -	Linearity	±0.4 %			Full scale output
Reverse polarity-26.4VdcStartup time5mSConnectorImage: ConnectorTermination4-pin M12 connectorImage: ConnectorOperating Environment-40°C to 85°C [-40°F to 185°F]Image: ConnectorOperating temperature-40°C to 150°C [-40°F to 302°F]Image: ConnectorStorage temperature-40°C to 150°C [-40°F to 302°F]Image: ConnectorAir gap8,58 mm ±2,5 mm [0.338 in ±0.098 in]Image: ConnectorIngress protectionIP67, IP69KImage: ConnectorWechanical shock50 G half sine wave with 11 ms durationImage: ConnectorCertification20 G from 10 Hz to 2000 HzImage: ConnectorCertificationCE, UKCAImage: CE, UKCAImage: CE, UKCAMountingThermoplasticImage: CE, UKCAImage: CE, UKCAMounting screws1/4-20 or M6Image: CE, UKCAImage: CE, UKCAMounting torque6 Nm to 8 Nm [53.1 in-Ib to 70.8 in-Ib]Image: CE, UKCAMagnetic ActuatorImage: CE, UKCAImage: CE, UKCAMagnetic ActuatorImage: CE, UK	Resolution	0.11			Degree
Startup time5mSConnectorTermination4-pin M12 connectorOperating EnvironmentOperating temperature-40°C to 85°C [-40°F to 185°F]Operating temperature-40°C to 150°C [-40°F to 302°F]Air gap8,58 mm ±2,5 mm [0.338 in ±0.098 in]Bingress protectionIP67, IP69KMechanical shock50 G half sine wave with 11 ms duration20 G from 10 Hz to 2000 Hz1Certification/approvalCE, UKCAMountingCE, UKCAMounting screws1/4-20 or M6Mounting torque6 Nm to 8 Nm [53.1 in-lb to 70.8 in-lb]Magnetic ActuatorMedymium Iron Boron	Measurement frequency	-	312	-	Hz
ConnectorTermination4-pin M12 connectorOperating EnvironmentOperating EnvironmentOperating temperature-40°C to 85°C [-40°F to 185°F]Storage temperature-40°C to 150°C [-40°F to 302°F]Air gap8,58 mm ±2,5 mm [0.338 in ±0.098 in]Ingress protectionIP67, IP69KMechanical shock50 G half sine wave with 11 ms durationVibration20 G from 10 Hz to 2000 HzCertificationCertification/approvalCE, UKCAMountingHousingThermoplasticMounting screws1/4-20 or M6Mounting torque6 Nm to 8 Nm [53.1 in-lb to 70.8 in-lb]Magnetic ActuatorMaterialNeodymium Iron Boron	Reverse polarity	-26.4			Vdc
Termination4-pin M12 connectorOperating EnvironmentOperating temperature-40°C to 85°C [-40°F to 185°F]Storage temperature-40°C to 150°C [-40°F to 302°F]Air gap8,58 mm ±2,5 mm [0.338 in ±0.098 in]Ingress protectionIP67, IP69KMechanical shock50 G half sine wave with 11 ms durationVibration20 G from 10 Hz to 2000 HzCertification/CE, UKCAMountingHousingThermoplasticMounting screws1/4-20 or M6Mounting torque6 Nm to 8 Nm [53.1 in-lb to 70.8 in-lb]Magnetic ActuatorMaterialNeodymium Iron Boron	Startup time	5	mS		
Operating EnvironmentOperating temperature-40°C to 85°C [-40°F to 185°F]Storage temperature-40°C to 150°C [-40°F to 302°F]Air gap8,58 mm ±2,5 mm [0.338 in ±0.098 in]Ingress protectionIP67, IP69KMechanical shock50 G half sine wave with 11 ms duration20 G from 10 Hz to 2000 HzCertificationCertificationTermoplasticMountingHousingThermoplasticMounting torque6 Nm to 8 Nm [53.1 in-lb to 70.8 in-lb]Magnetic ActuatorMaterialNeodymium Iron Boron	Connector				
Operating temperature-40°C to 85°C [-40°F to 185°F](1)Storage temperature-40°C to 150°C [-40°F to 302°F](1)Air gap8,58 mm ±2,5 mm [0.338 in ±0.098 in](1)Ingress protectionIP67, IP69K(1)Mechanical shock50 G half sine wave with 11 ms duration(1)20 G from 10 Hz to 2000 Hz(1)(1)Certification(2) G from 10 Hz to 2000 Hz(1)Certification/approvalCE, UKCA(1)Mounting(2) or M6(1)Mounting torque6 Nm to 8 Nm [53.1 in-lb to 70.8 in-lb](1)Magnetic Actuator(1)(1)MaterialNeodymium Iron Boron(1)	Termination	4-pin M12 connec	tor		
Storage temperature-40°C to 150°C [-40°F to 302°F]Air gap8,58 mm ±2,5 mm [0.338 in ±0.098 in]Ingress protectionIP67, IP69KMechanical shock50 G half sine wave with 11 ms durationZor fifuation20 G from 10 Hz to 2000 HzCertification/approvalCE, UKCAMountingThermoplasticMounting screws1/4-20 or M6Mounting torque6 Nm to 8 Nm [53.1 in-lb to 70.8 in-lb]Magnetic ActuatorMeodymium Iron Boron	Operating Environment				
Air gap8,58 mm ±2,5 mm [0.338 in ±0.098 in]Ingress protectionIP67, IP69KMechanical shock50 G half sine wave with 11 ms durationVibration20 G from 10 Hz to 2000 HzCertificationCE, UKCAMountingThermoplasticMounting screws1/4-20 or M6Mounting torque6 Nm to 8 Nm [53.1 in-lb to 70.8 in-lb]Magnetic ActuatorNeodymium Iron Boron	Operating temperature	-40°C to 85°C [-40°F to 185°F]			
Ingress protectionIP67, IP69KMechanical shock50 G half sine wave with 11 ms durationVibration20 G from 10 Hz to 2000 HzCertification20 G from 10 Hz to 2000 HzCertification/approvalCE, UKCAMountingCE, UKCAMounting screws1/4-20 or M6Mounting torque6 Nm to 8 Nm [53.1 in-lb to 70.8 in-lb]Magnetic ActuatorNeodymium Iron Boron	Storage temperature	-40°C to 150°C [-40°F to 302°F]			
Mechanical shock50 G half sine wave with 11 ms durationVibration20 G from 10 Hz to 2000 HzCertificationCE, UKCAMountingCE, UKCAHousingThermoplasticMounting screws1/4-20 or M6Mounting torque6 Nm to 8 Nm [53.1 in-lb to 70.8 in-lb]Magnetic ActuatorNeodymium Iron Boron	Air gap	8,58 mm ±2,5 mm [0.338 in ±0.098 in]			
Vibration20 G from 10 Hz to 2000 HzCertificationCertification/approvalCE, UKCAMountingHousingThermoplasticMounting screws1/4-20 or M6Mounting torque6 Nm to 8 Nm [53.1 in-lb to 70.8 in-lb]Magnetic ActuatorMaterialNeodymium Iron Boron	Ingress protection				
Certification       CE, UKCA         Mounting       Thermoplastic         Housing       Thermoplastic         Mounting screws       1/4-20 or M6         Mounting torque       6 Nm to 8 Nm [53.1 in-lb to 70.8 in-lb]         Magnetic Actuator       Meodymium Iron Boron	Mechanical shock				
Certification/approvalCE, UKCAMountingHousingThermoplasticMounting screws1/4-20 or M6Mounting torque6 Nm to 8 Nm [53.1 in-lb to 70.8 in-lb]Magnetic ActuatorMaterialNeodymium Iron Boron	Vibration	20 G from 10 Hz to 2000 Hz			
Mounting       Housing     Thermoplastic       Mounting screws     1/4-20 or M6       Mounting torque     6 Nm to 8 Nm [53.1 in-lb to 70.8 in-lb]       Magnetic Actuator       Material     Neodymium Iron Boron	Certification				
HousingThermoplasticMounting screws1/4-20 or M6Mounting torque6 Nm to 8 Nm [53.1 in-lb to 70.8 in-lb]Magnetic ActuatorKeodymium Iron Boron	Certification/approval	CE, UKCA			
Mounting screws1/4-20 or M6Mounting torque6 Nm to 8 Nm [53.1 in-lb to 70.8 in-lb]Magnetic ActuatorMaterialNeodymium Iron Boron	Mounting				
Mounting screws1/4-20 or M6Mounting torque6 Nm to 8 Nm [53.1 in-lb to 70.8 in-lb]Magnetic ActuatorMaterialNeodymium Iron Boron	Housing	Thermoplastic			
Mounting torque     6 Nm to 8 Nm [53.1 in-lb to 70.8 in-lb]       Magnetic Actuator       Material     Neodymium Iron Boron	Mounting screws				
Magnetic Actuator Material Neodymium Iron Boron	Mounting torque	6 Nm to 8 Nm [53.1 in-lb to 70.8 in-lb]			
Material Neodymium Iron Boron	Magnetic Actuator				
· · ·	Material	Neodymium Iron Boron			
	Field strength	10000			

Device used to read analog output must have input impedance greater than 100 KOhm.

Sensor is able to output two diagnostic values as follows: Magnet out of range - Output <95 % of power rail. PIN 2 > 4.55 & PIN 4 < 0.45

FERROUS MATERIAL WITHIN 100 mm (3.9 in) RADIUS OF MAGNET MAY IMPACT SENSOR PERFORMANCE

(Analog: SPS-A180D-VAN				
	Min.	Тур.	Max.	Units
Sensor Charactertistics				
Sensing range	0	-	180	Degree
Sensing location	Inside			
Supply voltage	18	-	40	Vdc
Supply current	-	-	45	mA
Output type	Regulated voltage	9		
Output at min. pos	-	0.5	-	Vdc*
Output at max. pos	-	4.5	-	Vdc*
Full scale span	-	4	-	Vdc
Sensitivity	21.33	22.22	23.11	mV/Degree
Linearity	±0.4 %			Full scale output
Resolution	0.11			Degree
Measurement frequency		312		Hz
Reverse polarity	-40			Vdc
Startup time	5	mS		
Connector				
Termination	4-pin M12 connector			
Operating Environment				
Operating temperature	-40°C to 85°C [-40°F to 185°F]			
Storage temperature	-40°C to 150°C [-40°F to 302°F]			
Air gap	8,58 mm ±2,5 mm [0.338 in ±0.098 in]			
Ingress protection	IP67, IP69K			
Mechanical shock	50 G half sine wave with 11 ms duration			
Vibration	20 G from 10 Hz to 2000 Hz			
Certification				
Certification/approval	CE, UKCA			
Mounting				
Housing	Thermoplastic			
Mounting screws	1/4-20 or M6			
Mounting torque	6 Nm to 8 Nm [53.1 in-lb to 70.8 in-lb]			
Magnetic Actuator				
Material	Neodymium Iron	Boron		
Field strength	10000			
) aviage upped to read angle to suit	tout must have input impedance greater than 100 KOk re			

Device used to read analog output must have input impedance greater than 100 KOhm.

Sensor is able to output two diagnostic values as follows: Magnet out of range - Output <95 % of power rail. PIN 2 > 4.55 & PIN 4 < 0.45

FERROUS MATERIAL WITHIN 100 mm (3.9 in) RADIUS OF MAGNET MAY IMPACT SENSOR PERFORMANCE

Figure 1. Dimensional Drawings (For reference only: mm/[in].)

#### A 2X 6,7 DIA. [0.26] 17.5° E ÷Φ. O $\odot$ [7,8 ±2,5 [0.307 ±0.098] \_6,7 DIA. [0.26] 5,9 [0.23] €Ţ 9,99 DIA. [0.39] <u>1</u>0 128,73 DIA. [5.07] 6 18 52,23 [2.06] 2X 25,11 [0.10] 23,85 144 23,4 [0.92] + 77,27 [3.04] 154,55 [6.08] \_\_\_\_34 [1.34] [0.12] \_\_\_\_3,05 [[0.12] ìØ П Ħ

## SPS-A100D-HAMS, SPS-A100D-VAMS

Figure 2. Dimensional Drawings (For reference only: mm/[in].)



**A** = Cable direction for right angle connector

**B** = Polyethylene conduit

Figure 3. Dimensional Drawings (For reference only: mm/[in].)

## SPS-A100X-LAAS0401



**A** = Magnet pin locating hole

**B** = Partial view

**C** = Rotating axis center

**D** = Magnetic sensitive zone: protect with a non-ferrous metal shield

Figure 4. Dimensional Drawings (For reference only: mm/[in].)

#### 22,5 190.53 [7.50] **A**-2X 6,7 DIA. [0.26] E 10 ð Ó [8,58 ±2,5 [0.338 ±0.098] 5,9 [0.23] ∖6,7 DIA. [0.26] \_9,99 DIA. [0.39] 54,35 [2.14] 79,85 [3.14] 52,23 [2.06] \_23,85 [0.94] ٩n \_130,3 DIA [5.13] $\odot$ 95,26 4,25 [[0.17] 3 [0.12 \_\_\_\_35,4 \_\_[1.40] **A** = Cable direction for right angle connector **B** = Polyethylene conduit

## SPS-A180D-HAMS, SPS-A180D-VAMS

### Figure 5. Connections

4-Pin M12 Connector	Ampseal 16 Connector (p/n 776536)	18 AWG Flying Leads
SPS-A100D-HAMS, SPS-A100D-VAMS SPS-A180D-HAMS, SPS-A180D-VAMS	SPS-A100X-LAAS0401	SPS-A100D-HAWS
20 04 04 04		
Pin 1 = supply voltage (+) Pin 2 = output Pin 3 = ground (-) Pin 4 = inverted output	Pin 1 = supply voltage (+) Pin 2 = output Pin 3 = ground (-) Pin 4 = inverted output	Red wire = supply voltage (+) Green wire = output Black wire = ground (-) Blue wire = inverted output



### Figure 6. Sensor Output Performance Chart Showing Ideal Outputs (Applies to all catalog listings.)

**Note:** Diagnostic for magnet out of range: green wire lead > 4.55 Vdc; blue wire lead < 0.45 Vdc

TABLE 7. ORDER GUIDE	
Part Number	Description
SPS-A100D-HAMS	SMART Position Sensor, 100° arc configuration, 0° to 100° inside sensing range, 6 Vdc to 24 Vdc supply voltage, 0.5 Vdc to 4.5 Vdc analog output, 4-pin M12 connector, magnet actuator included
SPS-A100D-VAMS	SMART Position Sensor, 100° arc configuration, 0° to 100° inside sensing range, 18 Vdc to 40 Vdc supply voltage, 0.5 Vdc to 4.5 Vdc analog output, 4-pin M12 connector, magnet actuator included
SPS-A100D-HAWS	SMART Position Sensor, 100° arc configuration, 0° to 100° inside sensing range, 6 Vdc to 24 Vdc supply voltage, 0.5 Vdc to 4.5 Vdc analog output, 18 AWG flying leads, magnet actuator included
SPS-A100X-LAAS0401	SMART Position Sensor, 100° arc configuration, 0° to 100° outside sensing range, 5 Vdc supply voltage, 0.5 Vdc to 4.5 Vdc analog output, Ampseal 16 connector (p/n 776536), magnet actuator included
SPS-A180D-HAMS	SMART Position Sensor, 180° arc configuration, 0° to 180° inside sensing range, 6 Vdc to 24 Vdc supply voltage, 0.5 Vdc to 4.5 Vdc analog output, 4-pin M12 connector, magnet actuator included
SPS-A180D-VAMS	SMART Position Sensor, 180° arc configuration, 0° to 180° inside sensing range, 18 Vdc to 40 Vdc supply voltage, 0.5 Vdc to 4.5 Vdc analog output, 4-pin M12 connector, magnet actuator included

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