PROGRAMMABLE ABSOLUTE ROTARY ENCODER

"Single Turn Absolute Encoder, Magnetic Measurement"

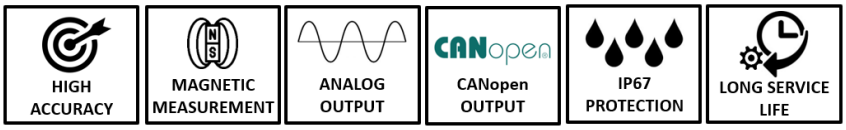
SAS 37

SAS-S (SHAFT)	SAS- B (SEMI HOLLOW SHAFT)	SAS-K (SLEEVED)
		

GENERAL FEATURES

The SAS series encoders operate absolute. In other words, unlike the incremental systems, they do not lose their positions in power outages and continue to measure from where they left off.
The SAS series single turn absolute rotary encoders offer highly flexible solutions in use, with different output signals, shaft types and user-adjustable measuring range. The SAS single turn absolute rotary encoder with integrated reference provides high quality feedback.

- Absolute measurement with magnetic principle
- 37 mm body diameter
- Shaft, semi hollow shaft and sleeved options
- 14 bit angular resolution
- Analog or CANopen output options
- Redundant output
- Analogue output signal forms can be selected according to 3 selected points
- High sensitivity
- IP67 Protection class



APPLICATION AREAS

Speed and position accuracy in one application; If it is more important than fault tolerance and system simplicity, absolute encoders should be used. Absolute encoders provide precise operation in applications.

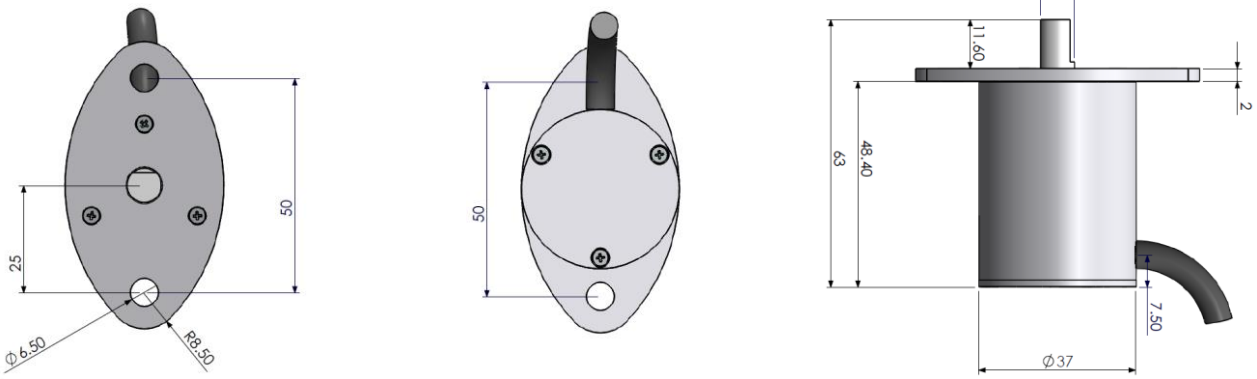
- Identifying multi-axis orientation in CNC machines used in component manufacturing
- Automatically determine the height of the scissor bearings used in hospitals
- Correct placement of multiple stabilizers for large vehicles such as cranes or air lifts
- Automatic doors or slots to move without limiting key
- Continue robotic movement even after a power failure

MECHANICAL SPECIFICATIONS

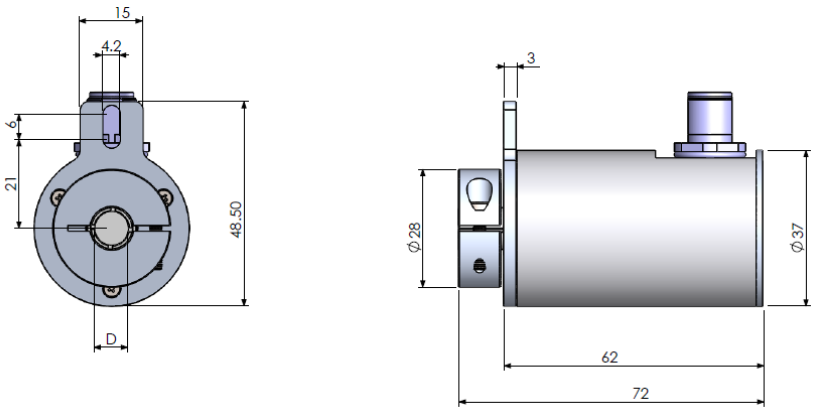
Maximum Speed	3000 rpm
Body Diameter	37 mm
	Shaft and Semi Hollow Shaft: 6 mm, 8 mm, 10 mm
	Sleeved: 8 mm
Weight	≈150 gr
Protection Class	IP 67
Operating Temperature	-20 … +70 °C
Relative Humidity	%10 and %90
Material	Shaft: Stainless Steel
	Body: Aluminium

MECHANICAL DIMENSIONS (mm)

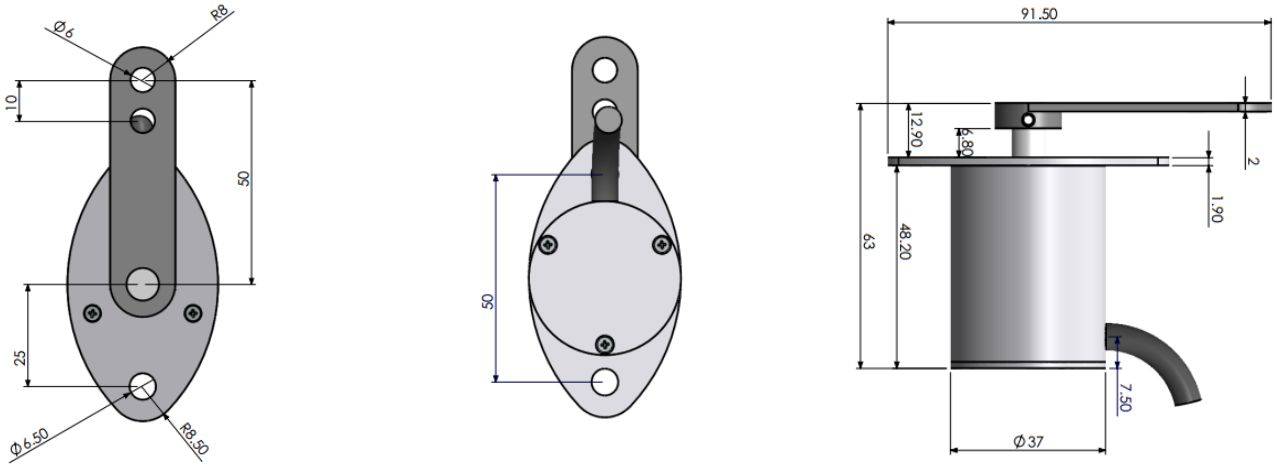
SAS-S (SHAFT)



SAS- B (SEMI HOLLOW SHAFT)



SAS- K (SLEEVED)

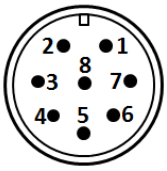


ANALOG VERSION

Electrical Specifications	
Working Principle	Hall Effect
Supply Voltage	15 … 26 VDC
Current Consumption	40 mA
Reverse Polarity Protection	Yes
Measuring Range	0° ... 360°
Accuracy	±0,1°
Repeatability	0,1°
Angular Resolution	14 Bit
Response Frequency	333 Hz
Electrical Interface	4-20 mA, 0-10 V, 0.5- 4.5 V, 0-5 V 20-4 mA, 10-0 V, 4.5-0.5 V, 5-0 V
Electrical Connection	8 x 0,14 mm^2 shielded cable or M12 connector
Output Load	For current output model; min 250 Ω For voltage output model; min 1 KΩ

ELECTRICAL CONNECTION

Signal	Cable	M12 / 8 Pin Male Connector
U+ (+15…26 VDC)	Red	Pin 1
Output 1: 0.5-4.5 / 0-10VDC / 0-5VDC / 4-20mA	Gray	Pin 2
GND (0V)	Black	Pin 3
Output 2: 0.5-4.5 / 0-10VDC / 0-5VDC / 4-20mA (optional)	White	Pin 4
Direction Change	Pink	Pin 5
Reset	Green	Pin 6
Programming Tips (these ends should not touch each other and should not be connected anywhere)	Yellow, Blue	Pin 7 (Empty)
-	-	Pin 8 (Empty)

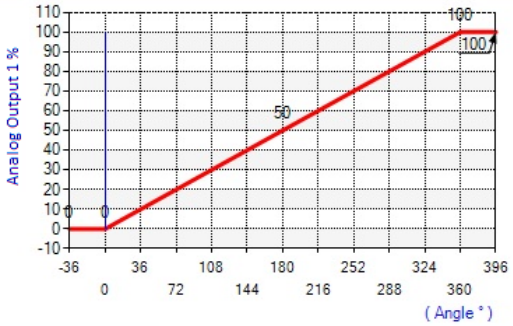


RESET: With the reset function you can set the desired location to 0. The reset terminal and GND are short-circuited for about 5 seconds and then disconnected. The sensor then accepts the current position as zero.
DIRECTION CHANGE: You can change the angle increase direction with the direction change function. The direction changing terminal and GND are short-circuited for about 5 seconds and then disconnected.Thus, the sensor reverses the angle direction (CW is CCW and CCW is CW).

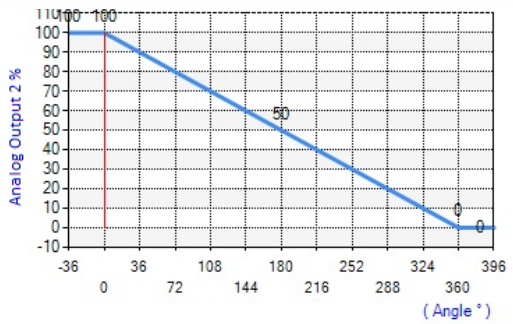
DETERMINATION OF OUTPUT SIGNAL FORM

Analog output signal forms can be specified according to request for 3 points as low point, middle point and high point. The requested signal form must be specified at the order stage. Examples of output signal forms are shown below.
Note: The diagrams shown below are for illustrative purposes. Scale value can be selected between 0 ° - 360 ° and Output value between 0% and 100%.

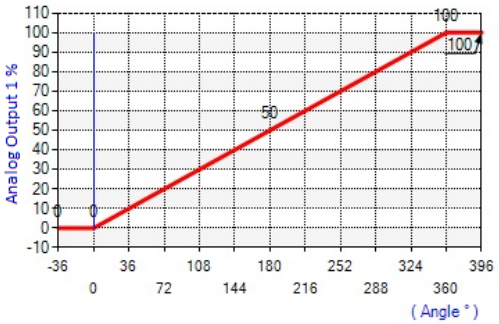
Analog Output 1		
Point	**Scale**	**Output**
Low Point	0°	%0
Middle Point	180°	%50
High Point	360°	%100



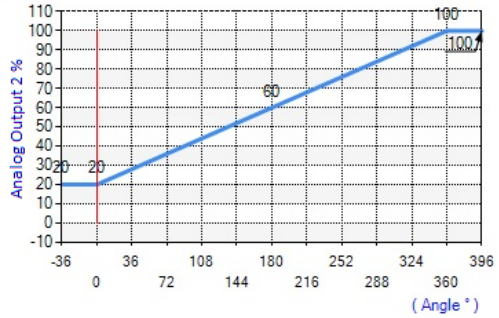
Analog Output 2		
Point	**Scale**	**Output**
Low Point	360°	%0
Middle Point	180°	%50
High Point	0°	%100



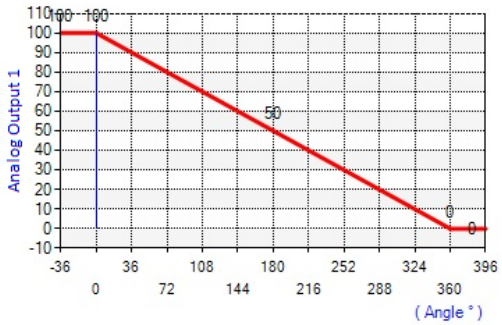
Analog Output 1		
Point	**Scale**	**Output**
Low Point	0°	%0
Middle Point	180°	%50
High Point	360°	%100



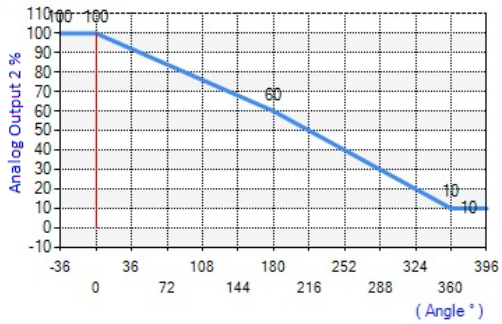
Analog Output 2		
Point	**Scale**	**Output**
Low Point	0°	%20
Middle Point	180°	%60
High Point	360°	%100



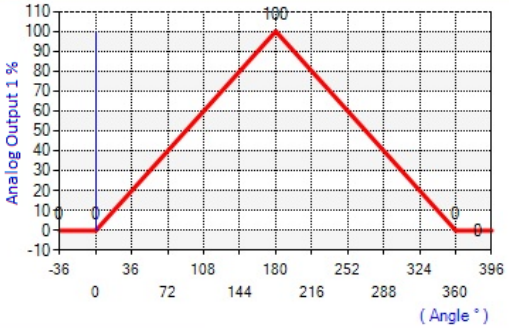
Analog Output 1		
Point	**Scale**	**Output**
Low Point	0°	%100
Middle Point	180°	%50
High Point	360°	%0



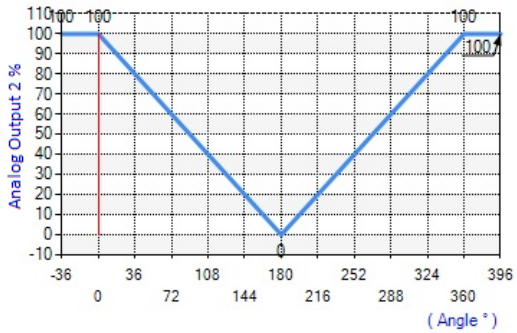
Analog Output 2		
Point	**Scale**	**Output**
Low Point	0°	%100
Middle Point	180°	%60
High Point	360°	%10



Analog Output 1		
Point	**Scale**	**Output**
Low Point	0°	%0
Middle Point	180°	%100
High Point	360°	%0



Analog Output 2		
Point	**Scale**	**Output**
Low Point	0°	%100
Middle Point	180°	%0
High Point	360°	%100



ORDER CODE FOR ANALOG VERSIONS

Model

Body Diameter
037 : 37 mm

Output Signal 2 (Optional) [1]
No code : Output 2 is not used
V : 0-10 VDC
V1 : 0-5 VDC
A : 4-20 mA
V3 : 0.5-4.5 VDC
NV : 10-0 VDC
NV1 : 5-0 VDC
NA : 20-4 mA
NV3 : 4.5-0.5 VDC

Reference Point [2]
S : Start
M : Middle
E : End

Electrical Connection [3]
1.5M : 1.5m cable
S14: M12 8 Pin conn.

Connector Direction
Y :Side Connector

SAS	-	X	-	XXX	-	XX	-	XXX	-	XXX	-	X	-	XXX	-	XXX	-	XX	-	X

Shaft Type
S : Shaft
B : Semi Hollow Shaft
K : Sleeved

Output Signal 1 [1]
V : 0-10 VDC
V1 : 0-5 VDC
A : 4-20 mA
V3 : 0.5-4.5 VDC
NV : 10-0 VDC
NV1 : 5-0 VDC
NA : 20-4 mA
NV3 : 4.5-0.5 VDC

Angle Value
The desired value between 0 ° and 360 ° can be selected

Angle Increasing Direction
CW : Clockwise
CCW : Counter clockwise

Shaft or Shaft Hollow Diameter [4]
6 : 6 mm
8 : 8 mm
10 : 10 mm

(1) The direction of the output signals can be changed optionally. In the coding, when 'N' is placed at the beginning of the normal signal, it refers to the opposite. For example; in case of **V:** 0-10 VDC, then **NV:** 10-0 VDC
The Output 2 is optional. If not requested, the code part is left blank.
(2) Reference point; refers to the selection of one of the starting, middle, or end points used for the scale of the analog outputs.
(3) Optionally different cable lengths can be requested.
(4) In SAS-S (shaft) and SAS-B (semi hollow shaft) model, the shaft diameter can be 6 mm, 8 mm or 10 mm;
In SAS-K (sleeved) model, the shaft diameter can be only 8 mm.

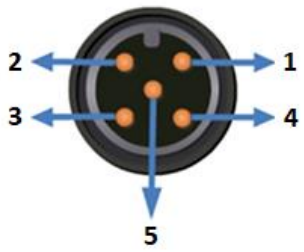
CANOPEN VERSION

Electrical Specifications	
Working Principle	Hall Effect
Supply Voltage	12 … 30 VDC
Current Consumption	40 mA
Reverse Polarity Protection	Yes
Measuring Range	0° ... 360°
Accuracy	±0,1°
Repeatability	0,1°
Angular Resolution	14 Bit
Response Frequency	333 Hz
Electrical Interface	CANopen
Electrical Connection	6x0,34 mm^2 twisted shielded cable or M12 connector

CANopen Specifications	
Communication Profile	CiA 301
Device Type	CANopen, CiA DS406
Node ID	Between 1 and 127, configurable via LSS or SDO.
Baud Rate	10 kBit/s, 20 kBit/s, 50 kBit/s, 100 kBit/s, 125 kBit/s, 250 kBit/s, 500 kBit/s, 800 kBit/s, 1 Mbit/s
PDO Data Rate	100 ms
Error Check	Heartbeat, Emergency Message
PDO	3 Tx PDO
PDO Modes	Event/Time triggered, Synch/Asynch
SDO	1 server
Position data	Object Dictionary 0x6020
Terminating Resistor	Optional

ELECTRICAL CONNECTION

Signal	Cable	M12 / 5 Pin Male Connector
CAN SHIELD	Shield	Pin 1
V+ (12…30 VDC)	Red	Pin 2
GND (0V)	Black	Pin 3
CAN H	Yellow	Pin 4
CAN L	Green	Pin 5



ORDER CODE FOR CANOPEN VERSIONS

Model		Body Diameter		Supply Voltage		Angle Increasing Direction		Shaft or Shaft Hollow Diameter (2)		
		037 : 37 mm		**PP:** 12…30VDC		**CW** : Clockwise **CCW** : Counter clockwise		**6 :** 6 mm **8 :** 8 mm **10 :** 10 mm		
SAS	**X**	**XXX**	**XX**	**XX**	**X**	**XXX**	**XXX**	**XX**		**X**
	Shaft Type **S** : Shaft **B** : Semi Hollow Shaft **K** : Sleeved		**Resolution** Max 14 bit		**Output Signal** **C** : CANopen		**Electrical Connection (1)** **1.5M :** 1.5m cable **S13:** M12 5 Pin conn.		**Connector Direction** **Y** : From side	

(1) Optionally different cable lengths can be requested.
(2) In SAS-S (shaft) and SAS-B (semi hollow shaft) model, the shaft diameter can be 6 mm, 8 mm or 10 mm;
In SAS-K (sleeved) model, the shaft diameter can be only 8 mm.