RE 95151/2019-06-24
Replaces: --

rexroth
A Bosch Company

Hall-effect swivel angle sensor SWS55 Series 10

- Sensor for contactless swivel angle detection
- For installation in Rexroth axial piston units

Features

- Sensor for contactless detection of the swivel angle of axial piston units using a Hall-effect based sensor IC
- High type of protection IP67 / IP69K
- Compatible with BODAS controllers
- Sealing for pressure to maximum 10 bar
- Redundant version with 2 measuring systems

Contents

Type code

01	02	03		04	05
SWS	**55**	**RA05**	**/**	**10**	**P**

Type

01	Swivel angle sensor	**SWS**

Sensor angle

02	±55°	**55**

Supply voltage

03	5 V DC ± 0.5 V DC	**RA05**

Series

04	Series 1, index 0	**10**

Seal

05	HNBR (nitrile rubber)	**P**

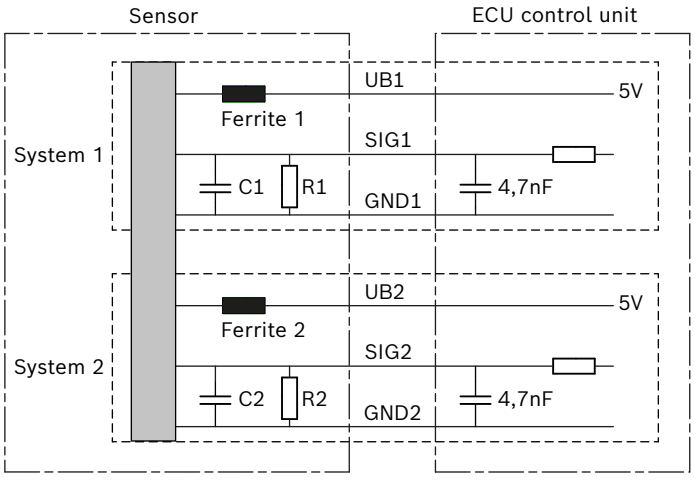
Available variants

Type
SWS55RA05/10P

Description

The swivel angle sensor is used for contactless detection of the swivel angle of axial piston units and thus the displacement using a Hall-effect based sensor IC.
The determined measurement value is converted into an analog ratiometric signal. The sensor is intended for monitoring tasks (e.g. condition monitoring, fault detection...). Please observe the project planning notes.

Block diagram with recommended input circuitry of ECU control unit



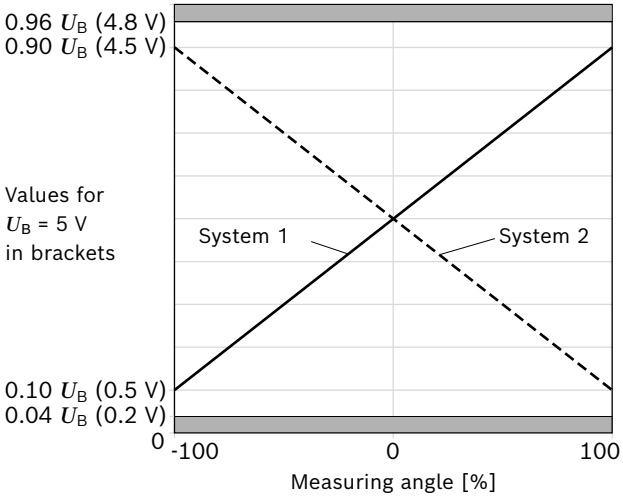
Technical data

Type		SWS55 nominal voltage 5
Supply voltage U_B		4.5 V to 5.5 V DC
Current consumption		Maximum 16 mA/system
Output signal		0.5 V to 4.5 V, ratiometric
Load resistance		Minimum 5 kΩ
Operation and storage temperature		–40 °C to +125 °C
Supply overvoltage resistance		20 V DC (max. 200 s at 25 °C)
EMC	Strip line (ISO 11452-5) Free field (ISO 11452-2) BCI (ISO 11452-4)	0.01 MHz to 1000 MHz, 300 V/m 80 MHz to 3200 MHz, 200 V/m 0.15 MHz to 200 MHz, 100 mA
Measuring range		±55°
Electrical connection		Deutsch DT04-6P
Pressure resistance (loading of measuring surface)		3 bar nominal, 10 bar maximum (momentary pressure peaks)
Type of protection (EN 60529) with plugged mating connector and cable		IP67 and IP69k

Output characteristic curve of the sensor without application-specific kinematics

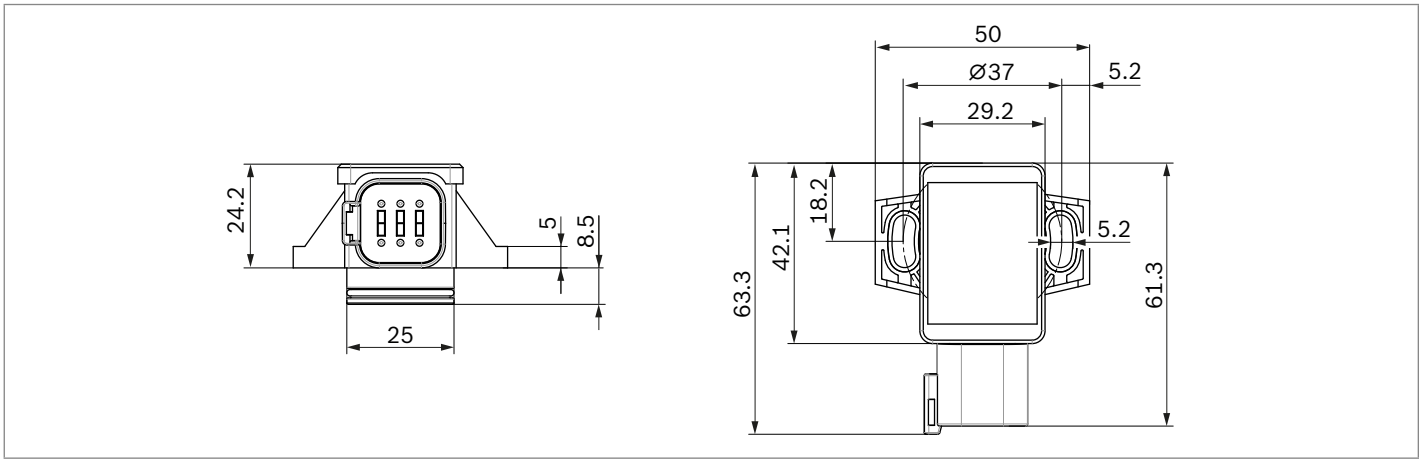
Sensor signal (system 1 and system 2) at 5 V supply voltage (U_B). The output characteristic curve is proportional to the supply voltage (ratiometric). System 2 is used to check plausibility.

The real output characteristic curve of the sensor, applied in the respective axial piston unit, can be found in the project planning note.

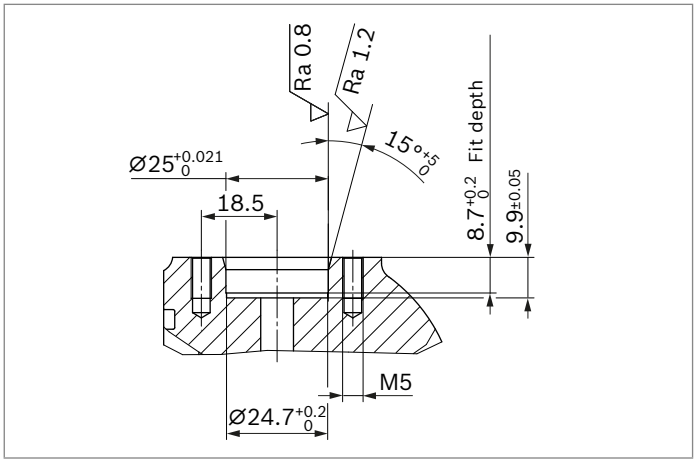


Notice
Characteristic curve applies to operation within technical data

Dimensions

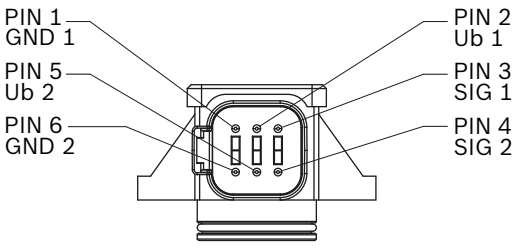


Installation bore



DEUTSCH connector DT04-6P

Sensor pin assignment



1 Ground system 1
2 Supply system 1
3 Signal system 1
4 Signal system 2
5 Supply system 2
6 Ground system 2

Mating connector

Designation	Number	Material number
Housing	1	DT06-6S
Wedge	1	W6S
Sockets	4	0462-209-16

Safety instructions

General instructions

- Before finalizing your design, please request a binding installation drawing.
- The proposed circuits do not imply any technical liability for the system on the part of Bosch Rexroth.
- Opening the sensor or carrying out modifications to or repairs on the sensor is prohibited. Modifications or repairs to the wiring could lead to dangerous malfunctions.
- The sensor may only be assembled/disassembled in a deenergized state.
- Only trained and experienced specialists who are adequately familiar with both the components used and the complete system should implement system developments or install and commission electronic systems for controlling hydraulic drives.
- When commissioning the sensor, the machine may pose unforeseen hazards. Before commissioning the system, you must therefore ensure that the vehicle and the hydraulic system are in a safe condition.
- Make sure that nobody is in the machine's danger zone.
- Do not use defective components or components not in proper working order. If the sensor should fail or demonstrate faulty operation, it must be replaced and recalibrated.
- Despite every care being taken when compiling this document, it is not possible to consider all feasible applications. If instructions for your specific application are missing, you can contact Bosch Rexroth.
- The use of sensors by private users is not permitted, since these users do not typically have the required level of expertise.

Notices on installation location and position

- Do not install the sensor close to parts that generate considerable heat (e.g. exhaust).
- Lines are to be routed with sufficient distance from hot or moving vehicle parts.
- A sufficient distance to radio systems must be maintained.
- Before electric welding and painting operations, the sensor must be disconnected from the power supply and the sensor connector must be removed.
- Cables/wires must be sealed individually to prevent water from entering the sensor.

Notices on transport and storage

- Please examine the sensor for any damage which may have occurred during transport. If there are obvious signs of damage, please inform the transport company and Bosch Rexroth immediately.
- If the sensor is dropped, it is not permissible to use it any longer, as invisible damage could have a negative impact on reliability.

Notices on circuitry and wiring

- Lines to the sensors must be designed so that they are as short as possible and shielded. The shielding must be connected to the electronics on one side or to the machine or vehicle ground via a low-resistance connection.
- The sensor mating connector must only be plugged and unplugged when it is in a de-energized state.
- The sensor lines are sensitive to spurious interference. For this reason, the following measures should be taken when operating the sensor:
  - Sensor lines should be attached as far away as possible from large electric machines.
  - If the signal requirements are satisfied, it is possible to extend the sensor cable.
- Lines from the sensor to the electronics must not be routed close to other power-conducting lines in the machine or vehicle.
- The wiring harness should be mechanically secured in the area in which the sensor is installed (spacing < 150 mm). The wiring harness should be secured so that in-phase excitation with the sensor occurs (e.g. at the sensor mounting point).

- If possible, lines should be routed inside the vehicle interior. If the lines are routed outside the vehicle, make sure that they are securely fixed.
- Lines must not be kinked or twisted, must not rub against edges and must not be routed through sharp-edged ducts without protection.

Intended use

- The sensor is designed for use in mobile working machines provided no limitations/restrictions are made to certain application areas in this data sheet.
- The sensor has not been designed for use in industrial applications.
- Operation of the sensor must generally occur within the operating ranges specified and approved in this data sheet, particularly with regard to voltage, temperature, vibration, shock and other described environmental influences.
- Use outside of the specified and approved boundary conditions may result in danger to life and/or cause damage to components which could result in sequential damage to the mobile working machine.
- Serious personal injury and/or damage to property may occur in case of non-compliance with the appropriate regulations.

Improper use

- Any use of the sensor other than that described in chapter "Intended use" is considered to be improper use.
- Use in explosive areas is not permitted.
- Damages which result from improper use and/or from unauthorized, unintended interventions in the device not described in this data sheet render all warranty and liability claims with respect to the manufacturer void.

Use in safety-related functions

- The customer is responsible for performing a risk analysis of the mobile working machine and determining the possible safety-related functions.
- In safety-related applications, the customer is responsible for taking proper measures to ensure safety (sensor redundancy, plausibility check, emergency switch...).
- Product data that is required for a safety assessment of the machine can be provided upon request or is included in this data sheet.

Further information

- Further information about the sensor can be found at www.boschrexroth.com/mobile-electronics.
- Disposal of the sensor must be in accordance with the national regulations of the country in which the sensor is used.

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