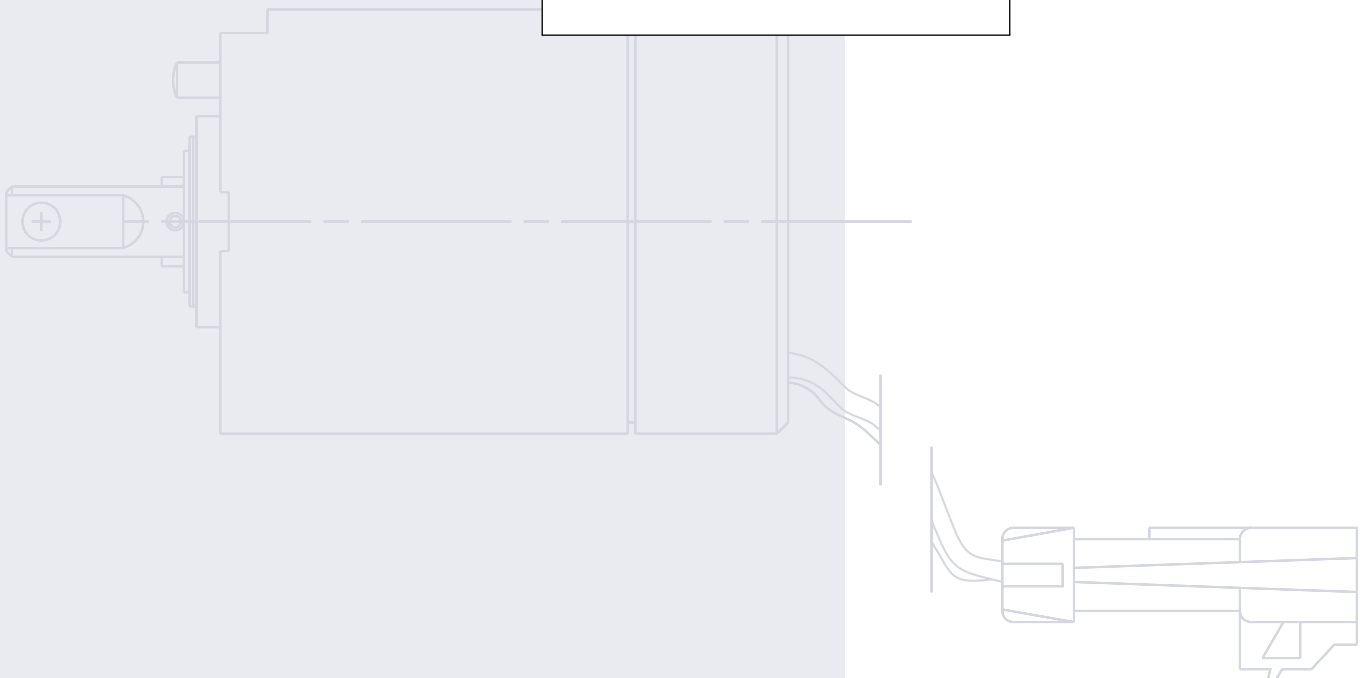
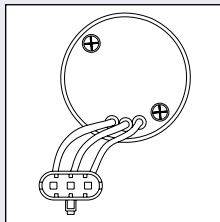
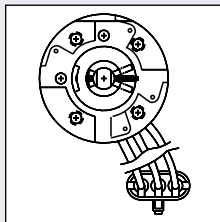
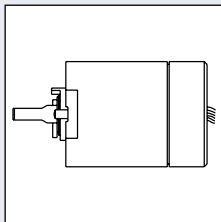


MCX103B,D  
Hall Effect Rotary  
Position Sensor

Technical  
Information





# Technical Information

## MCX103B,D Hall Effect Rotary Position Sensor

### Contents

#### PRODUCT OVERVIEW

Description .....	3
Features .....	3
Ordering information.....	3
Specify .....	3
Part number quick reference .....	3
Technical data.....	4
Electrical.....	4
Electrical data .....	4
Environmental.....	4
Theory of operation.....	4
Sensor supply voltage.....	4
Dimensions.....	5
MCX103B with 45° sensor range .....	5
MCX103B with 90° sensor range .....	6
MCX103D .....	6

#### PRODUCT INSTALLATION

Installation .....	7
Mounting .....	7
Wiring.....	7

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Front cover illustrations: 2229;2230 2231;2232;2233

## DESCRIPTION

The MCX103 Hall Effect Rotary Position Sensor serves as either a command (when connected to a control handle, foot pedal, throttle, steering wheel, etc.) or feedback source.

Housed in aluminum, the MCX103 contains a non-contacting linear hall effect sensor with an input shaft supported by a sleeve bearing.

## FEATURES

- Non-contact sensor withstands high shock and vibration
- Input voltage adapted for microprocessor circuits
- Infinite resolution
- Long life
- Designed to withstand the mobile environment
  - -40° to 85° C operating range
  - 95% relative humidity
  - Meets off-highway vibration standards
  - Protected against static discharge, EMI and RFI

## ORDERING INFORMATION

### Specify

1. Part number MCX103B or MCX103D. See *Part number quick reference*.
2. Flange mount.
3. Rotation angle.

### *Part number quick reference*

Part Number	Supply Voltage	Total Mechanical Rotation	Total Electrical Rotation	Body Style	Flats on shaft	Connection Type	Cable Length
MCX103B1043	5 Volt	300°	45°	Round housing	15,75 (.62) Dual	Metri-Pack	12 ± 1
MCX103B1050	5 Volt	300°	90°	Round housing	15,75 (.62) Dual	Metri-Pack	12 ± 1
MCX103B1076	5 Volt	300°	45°	Round housing	15,75 (.62) Dual	Weather Pack	12 ± 1
MCX103B1084	5 Volt	300°	90°	Round housing	15,75 (.62) Dual	Weather Pack	12 ± 1
MCX103B1145	5 Volt	300°	45°	Round housing	11,94 (.47) Dual	Weather Pack	12 ± 1
MCX103B1153	5 Volt	300°	90°	Round housing	11,94 (.47) Dual	Weather Pack	12 ± 1
MCX103B1161	5 Volt	300°	45°	Round housing	15,75 (.62) Dual	Metri-Pack	3 ± 1
MCX103D1017	8 Volt	360°	90°	Round housing w/flange	12,7 (.50) Single	Weather Pack	12 ± 1
MCX103D1025	8 Volt	360°	90°	Round housing w/flange	12,7 (.50) Single	Deutsch	12 ± 1
MCX103D1033	8 Volt	360°	90°	Round housing w/flange	12,7 (.50) Single	Deutsch w/gold contacts	12 ± 1

**TECHNICAL DATA**

**Electrical**

*Electrical data*

<b>Input voltage</b>
5.0 to 8.0V DC
<b>Hall effect electromagnetic sensor</b>
Life is not limited by the number of cycles
<b>Maximum output load current</b>
1 mA sourcing or sinking
<b>Maximum current draw</b>
20 mA
<b>Output impedance</b>
0
<b>Input torque</b>
Not to exceed 25 oz·in
<b>Side loading</b>
One million cycles with 5 pound side load
<b>Hysteresis</b>
Negligible
<b>Linearity</b>
Approximately $\pm 3\%$ over the rated angle. Since the output is proportional to the sine of the input angle, greater linearity can be achieved by reducing the angle employed.
<b>Temperature rating</b>
-40° to 85° C (-40° to 185° F) operating
-55° to 125° C (-67° to 257° F) storage
<b>Temperature stability</b>
Null shift of $\pm 0.028\%$ per °C from -40° to 85° C
Gain shift of $\pm 0.025\%$ per °C from -40° to 85° C

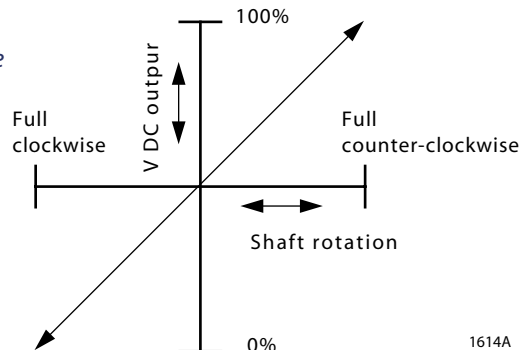
**Environmental**

The MCX103 has been tested and qualified to Sauer-Danfoss environmental specifications, designed for mobile equipment applications. The test includes vibration, shock, EMI/RFI, short circuit, over voltage, humidity, high pressure wash down, and chemical resistance.

**THEORY OF OPERATION**

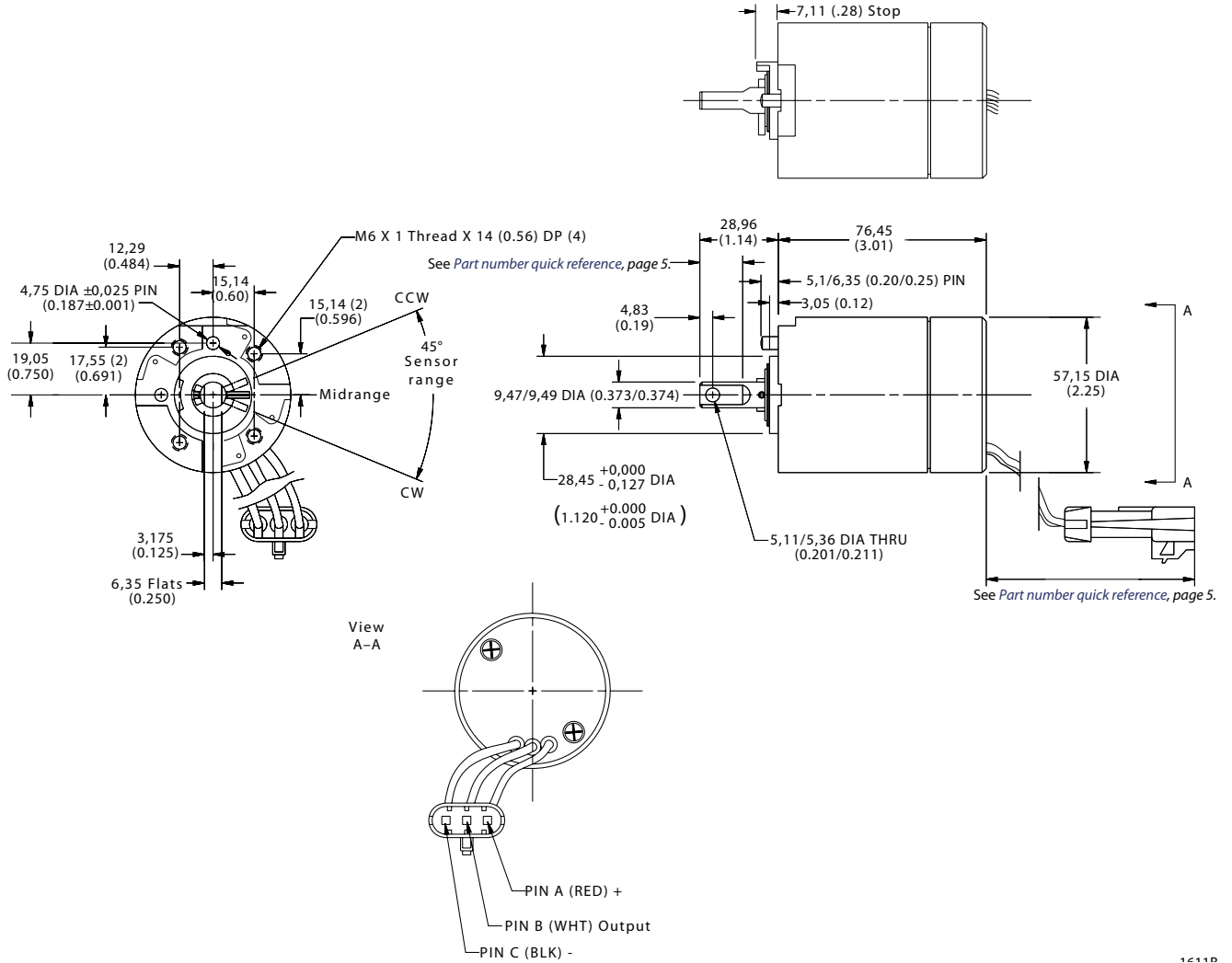
A "U" shaped magnet is mounted to the input shaft of the MCX103. Mounted in a fixed position between the north and south poles of the magnet is a linear hall effect sensor. As the "U" shaped magnet is rotated, the changing magnetic flux lines cutting through the hall effect sensor cause the output to change linearly from 25 to 75% of supply voltage for 90° Sensors. The output changes from 30 to 70% of supply voltage for 45° sensors.

*Sensor supply voltage*



**DIMENSIONS**

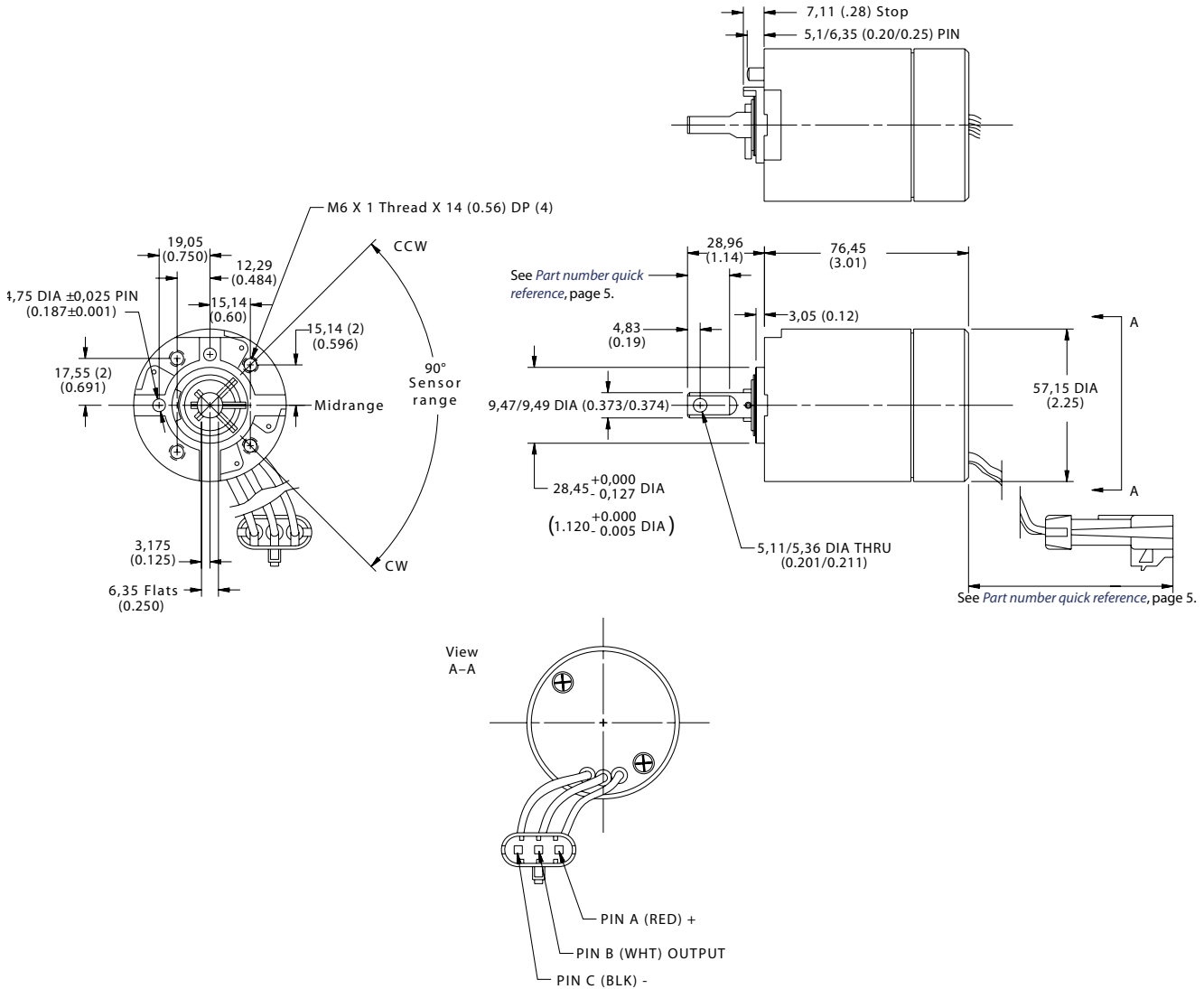
Dimensions of the MCX103B with 45° sensor range in millimeters [inches].



16119

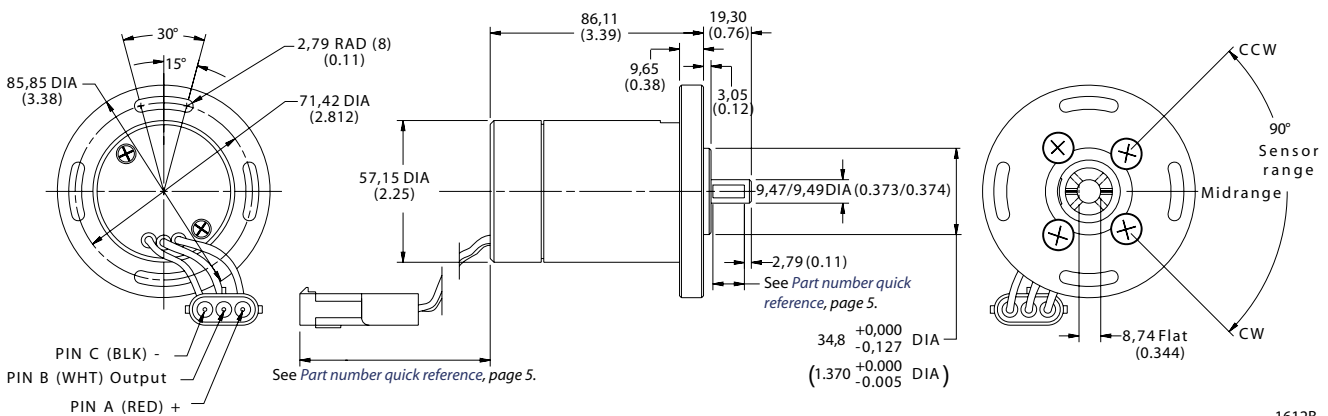
**DIMENSIONS**

Dimensions of the MCX103B with 90° sensor range in millimeters [inches].



1644A

Dimensions of the MCX103D in millimeters [inches].



1612B

**INSTALLATION****Mounting**

The MCX103B has four 6M x 1M threaded holes on the face of the input shaft end of the sensor.

The MCX103D has a mounting flange, with four slotted holes.

See *Dimensions*, pages 5 and 6.

**Wiring**

Electromagnetic and radio frequency interference (EMI/RFI) will be present in varying degrees in any environment that has static electricity, power lines, radio equipment, solenoid switching, etc. To avoid the harmful effects of EMI/RFI, use braided (not foil) shield cables with a minimum of 75% shielding. Terminate the shield at both ends to the connector shell with as short a length as possible. All electrical connections are made to the sensor through a three-pin sealed connector: Pin A (supply voltage), Pin B (output), and Pin C (ground). See *Dimensions*, pages 5 and 6.

**ⓘ Caution**

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Reverse polarity may damage the sensor.

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Mating connectors can be ordered from Sauer-Danfoss, part number K10309 (Metri-Pack) or part number K08620 (Weather Pack). Part number K22335 (Deutsch) or part number 10103018 (Deutsch w/gold contacts).



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