

## Features

- Multiturn
- True power-on system
- Output over CAN bus

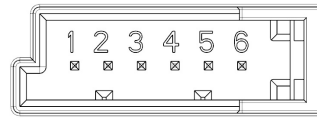
## Non-Contacting Steering Angle Sensor Type 6004-007

### Specifications

Angular Position	
Range .....	±780 °
Resolution .....	0.1 °
Accuracy .....	±2 °
Angular Speed	
Range .....	±1016 °/s
Resolution .....	8 °/s
Data and Control Interface	
CAN 2.0B .....	500 kbit/s
Data Rate .....	10 ms
OEM Specific CAN Handlers .....	Optional
Zero Position	
..... Adjustable at every position through CAN command	
Diagnostic and Error Handling..... Via CAN bus	
Optional secure version with 2nd microcontroller)	
Firmware Upgrade..... Via CAN bus	
(Optional OBD programmable)	
Power Supply	
Voltage Range .....	7-18 V
Current Consumption.....	50 mA (no idle current required)
Temperature Range.....	-40 °C to +85 °C
Rel. Humidity .....	85 % max.

### Connector

The mating connector's pin layout is shown below:



Tyco 1488529

PIN NO.	SIGNAL
1	Vdd (12 V)
2	CAN_H2
3	CAN_H
4	CAN_L
5	CAN_L2
6	GND

### CAN Protocol

The device sends a CAN message with the measurement data every 10 msec. An example of a message layout is shown below. OEM-specific CAN handler is optional.

#### CAN Transmit Message

CAN-ID Kind of Message	Byte	Bits	Signal Destination	Unit	Measure Range	Measure Range (Digit)	Offset	Resolution (Unit/Digit)	Comments
0 x 321 transmit	0-1	00-15	Absolute angle position	Degree	-780...+780	57735...7800	0	0,1	Error = 0x8000 (Motorola format)
	2	16-23	Angle speed	Degree/s	-1016...+1016	0...254	0	8	Error = 0x80
1	3	24	SAS_failure status 0 - Failure 1 - Not failure					1	
1	0-1	25	SAS_calibration status 0 - Not calibrated 1 - Calibrated					1	
1	0-1	26	SAS_trimming status 0 - Not trimmed 1 - Trimmed					1	
	3	27-31	Reserved					N/A	Internal use only
	4	32-35	Message counter		0...15			1	Should be incremented by each message
	4	36-39	Check sum		0...15			1	Check sum: see below
	5-7	40-63	Reserved					N/A	

Absolute Angle Position:

- Signed (integer)
- Angle position [degree] =  $N \cdot 0.1$ , for  $0 < N \leq 32767$  ( $N$  - digital value of the message) =  $(N-65536) \cdot 0.1$ , for  $N > 32767$

Angle Speed:

- Signed (integer)
- Rotation speed [degree/s] =  $N \cdot 8$

Specifications are subject to change without notice.

The device characteristics and parameters in this data sheet can and do vary in different applications and actual device performance may vary over time. Users should verify actual device performance in their specific applications.

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## CAN Protocol (Continued)

Rule to build the check sum:

Temp\_result = lower byte

(Angle position) XOR higher byte

(Angle position) XOR (Angle speed) XOR (Internal status)

Check sum = higher nibble

(Temp\_result) XOR lower nibble

(Temp\_result) XOR (Message counter)

## Automatic Self-Test

The device checks the angular speed value, which is limited to 1016 degrees per second. If this limit exceeded, the device sends an error message according to the CAN Transmit Message (page 1).

An example of the message layout for a receive message is shown below.

## CAN Receive Message

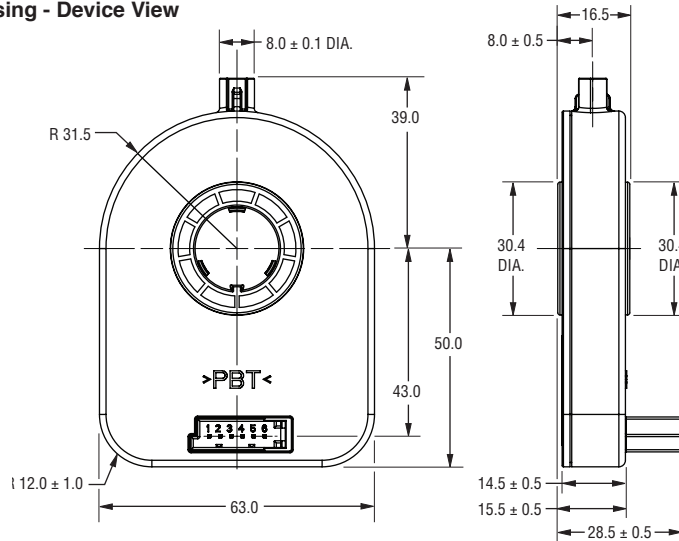
CAN-ID	Kind of Message	Byte	Bits	Size	Signal Destination	Comments
0 x 3F0	0	4-7	4	Command code word		0x03: Set up the zero position 0x05: Clear the old zero position Others: For internal use only

Note:

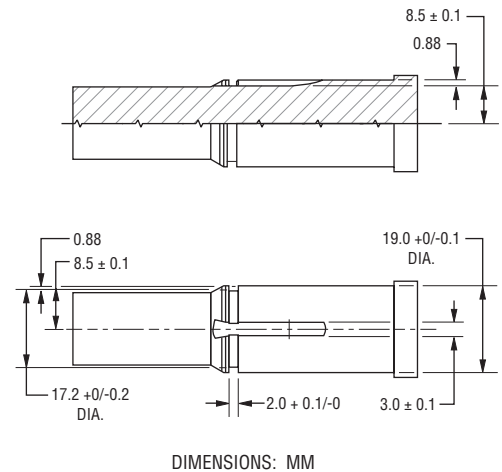
To set up a new zero position, first it is necessary to delete the old zero position.

## Design and Mechanical Interface

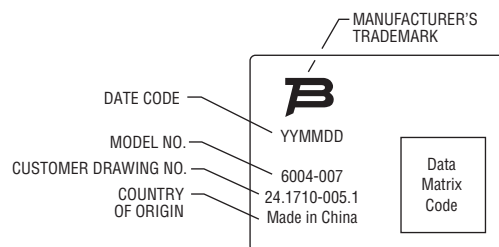
### Housing - Device View



### Interface Recommendation



## Typical Part Marking



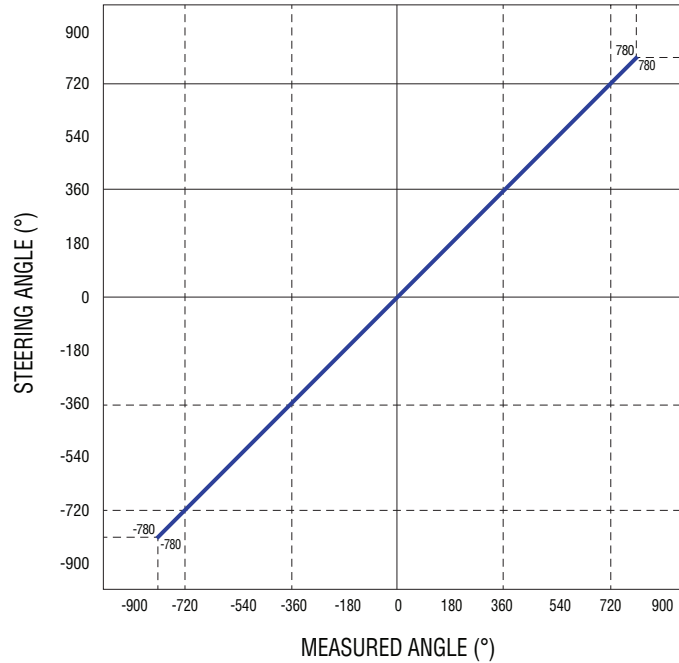
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## Signal Characteristics



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