

***Minebea***

***DIGITAL TRANSMITTER  
CANopen Interface  
OPT-564-71***

**Instruction Manual**



## Introduction

Thank you for purchasing the OPT-564-71 Digital Transmitter for flange type torque transducers using optical transmission with CANopen interface.

This instruction manual describes how to operate the device, as well as noteworthy points.

Note that handling or operating the device incorrectly may result in malfunctions. Read this manual thoroughly before use for safety and optimal results.

Keep this instruction manual in a location where it is readily accessible to end users.

Please note that this instruction manual is intended for use by engineers.

Readers of this manual must have a basic understanding of CANopen compatible PLC programs and the CANopen interface.

## Pictograms and Conventions Used in This Manual

This manual uses the following pictograms to indicate actions to avoid at all times, aspects requiring caution, and other noteworthy matters.

Be sure to read the descriptions provided alongside these pictograms.



### **WARNING**

This indicates circumstances in which incorrect handling may result in death or serious injury to users.  
Avoid the actions described here at all times.



### **CAUTION**

This indicates circumstances in which incorrect handling may result in injury to users or damage to property.



This indicates operating or procedural precautions or restrictions.  
Always read the details included here to avoid malfunctioning.

## **Positioning of This Document**

This instruction manual describes connection and usage with the optional CANopen interface specifications for the OPT-564.

For information on other product functions, basic handling instructions, and precautions, refer to the OPT-564 instruction manual.

OPT-564 Instruction Manual (DRW No. EN294-1924\*)

# Revision History

Date	Manual No.	Revision reason (details)
February 2021	DRW. No. EN294-1926	First edition, Ver. 1.000

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# 1. Overview

This device is a CANopen slave device.  
The CANopen interface can be added to the OPT-564 to provide support for CANopen communication functions (CiA DS301).

## 1-1. Features

The main features of the OPT-564-71 are as follows:

### (1) PDO transfer

Supports PDO transmission. Receiving is not supported.

- Torque + rotation speed
- Torque status + rotation speed status

### (2) SDO transfer

Supports SDO transfer

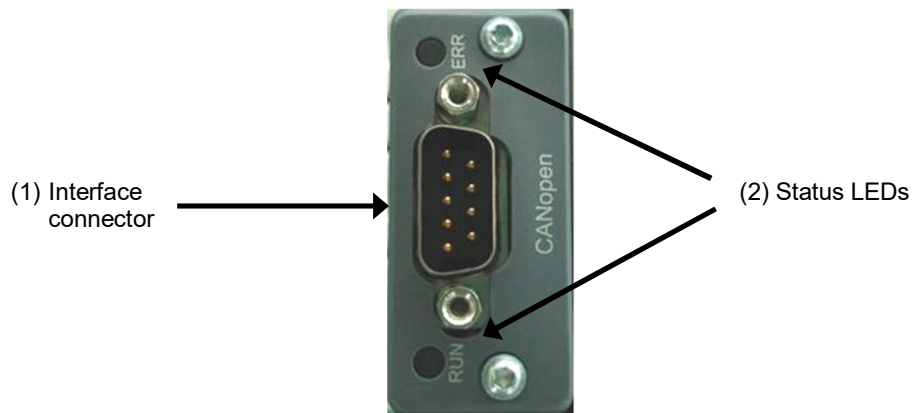
- Torque (reading only)
- Rotation speed (reading only)
- Torque status (reading only)
- Rotation speed status (reading only)
- Torque units/decimal place/polarity (reading/writing possible)
- Rotation speed units/decimal place (reading only)
- Rotation speed polarity (reading/writing possible)
- Manufacturer Device Name (reading only)
- Manufacturer Hardware Version (reading only)
- Manufacturer Software Version (reading only)
- PDO transmission interval

### (3) CANopen parameter settings

CAN bus address and baud rate can be set.

## 2. Part Names and Functions

### 2-1. Rear Panel CANopen Interface



#### (1) Interface connector

This is the CANopen interface connector.

The connector pin configuration is as follows:

Pin No.	Signal	Details
1	N.C.	Not used
2	CAN_L	CAN signal Low
3	CAN_GND	CAN ground
4	N.C.	Not used
5	CAN_SHLD	Shield
6	N.C.	Not used
7	CAN_H	CAN signal High
8	N.C.	Not used
9	N.C.	Not used
Housing	SHIELD	Shield

\* The connector is not included. Compatible plug: Dedicated CANopen connector  
Select a CIA DR-303-1 standard connector.

\* Do not connect wires to the N.C. pins.

\* Insulated by photocoupler from internal circuit.

#### (2) Status LEDs

Communication status is indicated by two LEDs.

Defined by DR303-3 (CiA) standard.

RUN LED (green)

Status	Description
Off	Off
Lit	Operation
Continuous flashing	Before operation
Flashes once	Stopped
Flickering	Automatically detecting baud rate
Lit red	Shift to exception status



ERR LED (red)

Status	Description
Off	Off or operating
Flashes once	Error counter has reached or exceeded preset value
Flickering	Automatically detecting baud rate
Flashes twice	NMT slave or NMT master is detecting Heartbeat event (Heartbeat consumer)
On	Bus off

## 3. Connections

### 3-1. Interface Connector Pin Configuration

See "2-1. Rear Panel Interface Connector".

### 3-2. Cable Length

The correlation between baud rate and total distance is as follows:

Baud rate	Total distance
10 kbps	Up to 1,000 m
20 kbps	Up to 1,000 m
50 kbps	Up to 1,000 m
100 kbps	Up to 600 m
125 kbps	Up to 500 m
250 kbps	Up to 250 m
500 kbps	Up to 100 m
800 kbps	Up to 50 m
1 Mbps	Up to 25 m

### 3-3. Wiring precautions

- Always turn off power before connecting or disconnecting the equipment.
- Do not turn on the AC power until all installation work is complete. There is no power ON/OFF switch on the unit itself.
- Keep cables connected to the unit as far away as possible from sources of noise such as power lines or control interfaces.
- Always ground the equipment. Use Type D single grounding. Do not share a ground with the power supply system.





- Turn on the terminal resistance on the CANopen connector farthest from the PLC.
- Use a dedicated CANopen cable as the connecting cable.  
Select a CiA DR-303-1 compliant connecting cable.

## 4. CANopen Communication Settings

When using the CANopen interface, configure the following items:

### 4-1. Switching to Function Mode

Function mode can be selected as follows:

- 1) Hold down the  key for 2 seconds.
- 2) [FUNC] is displayed. Press the  key.
- 3) Confirm the function number to be set.

For details of Function mode settings and operations, see "9. Function Mode" in the OPT-564 Instruction Manual (DRW No. EN294-1924).

### 4-2. CANopen Setting Items

Function No.	Item	Setting value	Details
F-42	Node ID	001 to 127	
		●001	
F-43	Baud Rate	0	10 kbps
		1	20 kbps
		2	50 kbps
		3	100 kbps
		4	125 kbps
		5	250 kbps
		6	500 kbps
		7	800 kbps
		●8	1 Mbps
F-45	PDO output interval	0 to 100	0: Off Units: 1 ms
		●100	

#### (1) Node ID

Sets the node ID number.  
Set in the range 001 to 127.  
The default setting is 001.

#### (2) Baud rate

Sets the baud rate (units: bps).  
Select 10 k, 20 k, 50 k, 100 k, 125 k, 250 k, 500 k, 800 k, or 1 M.  
The default setting is 1 M.

#### (3) PDO output interval

Set the PDO output interval (units: 1 msec).  
Set in the range 0 to 100. (0: OFF)  
The default setting is 100.

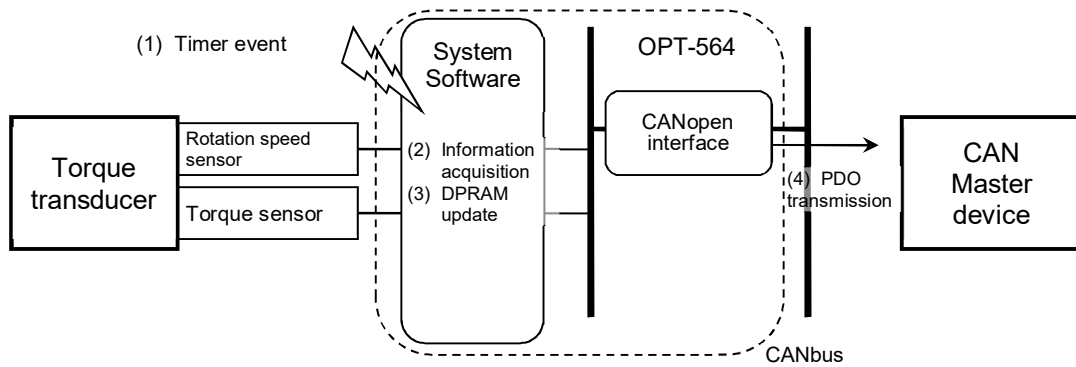


- The settings take effect only after the power is turned off and then back on again. Turn the power off and then back on again after the settings have been altered.
- To set CANopen objects, load an EDS file.  
This can be downloaded from our website (<http://www.minebea-mcd.com/>) if necessary.

## 5. Access Sequence

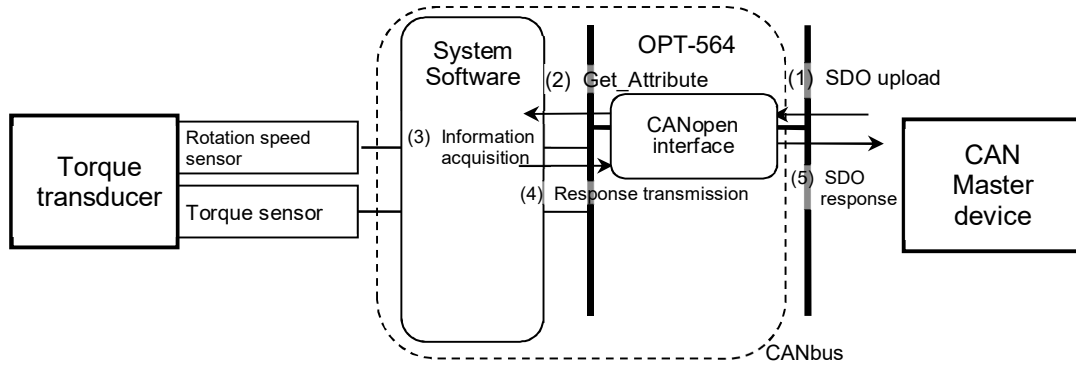
CANopen access is as shown below:

(1) PDO transmission

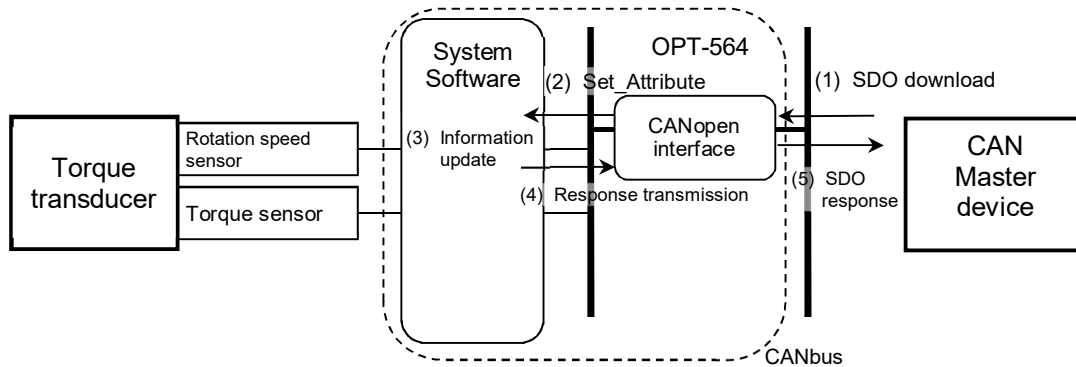


\* (4) PDO transmission is performed only if the data values updated in (2) and (3) have changed.

(2) SDO transmission (SDO reading)



(3) SDO receiving (SDO writing)



## 5-1. CANopen Object Mapping

### Manufacturer Specific Object

Order#	Index (ADI# + 0x2000)	Sub Index (ADI Element#)	Data Type	Data
1	0x2001	0x00	SINT32	Torque (*1)
2	0x2002	0x00	SINT32	Rotation speed (*2)
3	0x2011	0x01	UINT32	Torque status (*3)
		0x02	UINT32	Rotation speed status (*4)
4	0x2333	0x00	UINT16	Torque units (0: N·m/ 1: k N·m/ 2: V)
5	0x2334	0x00	UINT16	Torque decimal point position (0: No decimal point / 1 to 4: Digits after decimal point) * Decimal point position is returned as 3 only when the torque units are V and the decimal point position is 4.
6	0x2335	0x00	UINT16	Torque polarity (135: Counter-clockwise is + / 136: Clockwise is +)
7	0x2343	0x00	UINT16	Rotation speed units (1644: fixed at rpm)
8	0x2344	0x00	UINT16	Rotation speed decimal point position (0: Fixed at no decimal point)
9	0x2345	0x00	UINT16	Rotation speed polarity (135: Counter-clockwise is + / 136: Clockwise is +)
10	0x2350	0x00	UINT16	PDO transmission interval (ms)

### PDO mapping

PDO#	Transmission details	COB-ID (*5)	Tx Type	Inhibit Time	Event Timer	Mapped Objects
1	Torque + rotation speed	0x180	COS(254)	0	0	0x2001 - 0x00
						0x2002 - 0x00
2	Status	0x280	COS(254)	0	0	0x2011 - 0x01
						0x2011 - 0x02



**If used in the shipped state without changing the configuration, data will be output once from the COB-ID 0x380+ Device Address and 0x480+ Device Address when a communication start request is received from the master. This is not output if the configuration has been changed.**

(\*1). Torque format (SINT32)

0x8000\_0000: IN-1 error

0x8000\_0001: +OL error

0x8000\_0002: -OL error

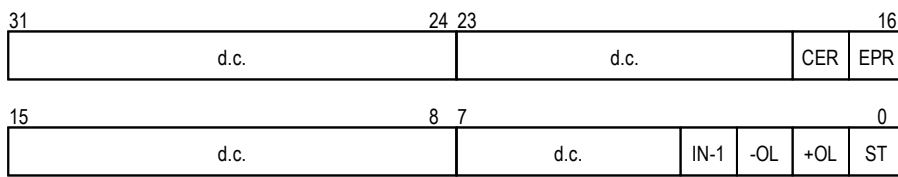
(\*2). Rotation speed format (SINT32)

0x8000\_0000: The function F-24 setting is OFF (rotation speed detection signal is off).

0x8000\_0001: +OS error

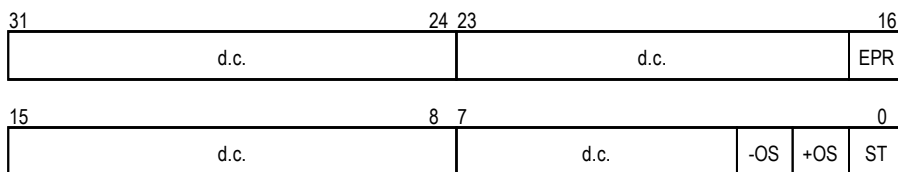
0x8000\_0002: -OS error

(\*3). Torque status format (UINT32)



- bit0 (ST):  
1: Torque value normal  
0: Abnormal value
- bit1 (+OL):  
1: +OL error / 0: Normal
- bit2 (-OL):  
1: -OL error / 0: Normal
- bit3 (IN-1):  
1: IN-1 error / 0: Normal
- bit16 (EPR):  
1: EEPROM error / 0: Normal
- bit17 (CER):  
1: PDO communication error / 0: Normal

(\*4). Rotation speed status format (UINT32)



- bit0 (ST):  
1: Rotation speed value normal  
0: Abnormal value
- bit1 (+OS):  
1: +OS error / 0: Normal
- bit2 (-OS):  
1: -OS error / 0: Normal
- bit16 (EPR):  
1: EEPROM error / 0: Normal

(\*5). The actual COB-ID consists of the value indicated with the device address added.



**If configuration has been performed, the COB-ID will be fixed at the value set in the configuration.**

SDO mapping

Details	CANopen Object	Write	Notes
Manufacturer Device Name	0x1008 - 0x00	×	
Manufacturer Hardware Version	0x1009 - 0x00	×	
Manufacturer Software Version	0x100A - 0x00	×	
Torque, rotation speed, status	See "Manufacturer Specific Object"	×	
Torque units, decimal point position, polarity	See "Manufacturer Specific Object"	○	
Rotation speed units, decimal point position	See "Manufacturer Specific Object"	×	
Rotation speed polarity	See "Manufacturer Specific Object"	○	
PDO transmission interval	See "Manufacturer Specific Object"	○	

\* The COB-ID uses the default value (from server: 0x580+Device Address, from client: 0x600+Device Address).

## 6. Errors

Error	Details
IN-1 error	Indicates when no torque signal is input in measurement mode or monitor mode.
+OL error	Indicates when the input torque value exceeds [+110% of maximum display value] or exceeds 384 kHz in measurement mode. (When 16 kHz is exceeded when F-54 = 0)
-OL error	Indicates when the input torque value is less than [-110% of maximum display value] or is less than 96 kHz in measurement mode. (When less than 4 kHz when F-54 = 0)
+OS error	Indicates when the rotation speed exceeds 27,500 in measurement mode.
-OS error	Indicates when the rotation speed is less than -27,500 in measurement mode.
EEPROM error	Indicates when an EEPROM write or read error is detected.
PDO communication error	Indicates when a PDO communication error is detected.

## 7. Interface Specifications

### 7-1. CANopen Interface Specifications

Specifications	Details																				
Baud Rate	Select 10 kbps, 20 kbps, 50 kbps, 100 kbps, 125 kbps, 250 kbps, 500 kbps, 800 kbps, or 1 Mbps																				
Node ID	Select within the range 001 to 127																				
PDO output interval	Select within the range 000 to 100 (units: 1 ms)																				
Cable length	<table border="1"> <thead> <tr> <th>Baud rate (bps)</th> <th>Total distance (m)</th> </tr> </thead> <tbody> <tr> <td>10 k</td> <td>Up to 1,000</td> </tr> <tr> <td>20 k</td> <td>Up to 1,000</td> </tr> <tr> <td>50 k</td> <td>Up to 1,000</td> </tr> <tr> <td>100 k</td> <td>Up to 600</td> </tr> <tr> <td>125 k</td> <td>Up to 500</td> </tr> <tr> <td>250 k</td> <td>Up to 250</td> </tr> <tr> <td>500 k</td> <td>Up to 100</td> </tr> <tr> <td>800 k</td> <td>Up to 50</td> </tr> <tr> <td>1 M</td> <td>Up to 25</td> </tr> </tbody> </table>	Baud rate (bps)	Total distance (m)	10 k	Up to 1,000	20 k	Up to 1,000	50 k	Up to 1,000	100 k	Up to 600	125 k	Up to 500	250 k	Up to 250	500 k	Up to 100	800 k	Up to 50	1 M	Up to 25
Baud rate (bps)	Total distance (m)																				
10 k	Up to 1,000																				
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500 k	Up to 100																				
800 k	Up to 50																				
1 M	Up to 25																				
Connecting cable	Use a dedicated CANopen cable.																				
Connector	Use a dedicated CANopen connector.																				
Termination	Use a connector with built-in terminal resistance.																				
Status LEDs	[RUN], [ERR]																				

### 7-2. Accessories

CANopen instruction manual	×1
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●The contents of this manual may subject to change without notice.

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