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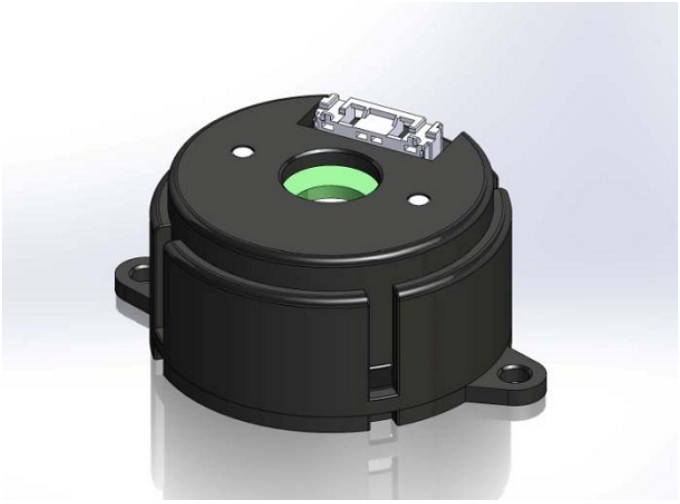
TMCS-40 Hardware Manual

Hardware Version V1.00 | Document Revision V1.00 • 2017-Mar-01

TMCS-40 is a low-cost and small-size optical incremental encoder for use with stepper motors and 3-phase PMSM/BLDC motors. It comes with high resolution optical code wheels with a resolution of up to 10K lines.



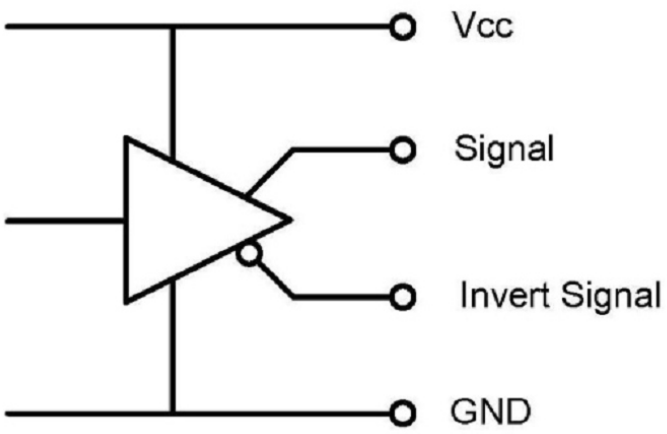
Features

- Low Cost
- High Resolution
- Small Dimension
- Easy Mounting

Applications

- Stepper Motor FOC
- Servo Motors
- Precision Motion Control
- Automated Equipment
- Robotics

Simplified Block Diagram



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TRINAMIC
MOTION CONTROL

Contents

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1 Order Codes

Order Code	Description	Size (LxWxH)
TMCS-40-6.35-10000-AT-01	Encoder Module 40mmm diameter, Resolution of 10K lines (40K increments), ABN, 6.35mm shaft diameter, TTL	40mm x 40mm x 22.60mm
TMCS-40-KIT	TRINAMIC TMCS-40 encoder kit including encoder housing, all code wheel options, cable loom and assembly tools	100mm x 150mm x 30mm

Table 1: Order codes

Other encoder resolutions, signal output types, and shaft diameters on request.

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2 Technical Specifications

2.1 Mechanical and Electrical Parameters

Parameter	Min	Typ	Max	Unit
Supply voltage	4.5	5	5.5	V
Supply current			100	mA
Rise/fall time			100	ns
Frequency			500	kHz
Output Voltage "'H"'	VCC-2V			V
Input Voltage "'L"'			0.5	V
Max. output current	20		100	mA
Resolution		32.768 (32k)		increments

Table 2: Electrical Characteristics

Parameter	Min	Typ	Max	Unit
Hollow Diameter		6.35		mm
Starting Torque			0.8	Ncm
Shaft Loading Axial			50	N
Shaft Loading Radial			80	N
Max. RPM			7500	rpm
Net weight		60		g

Table 3: Mechanical Specifications

Parameter	Description
Operating Temperature	-20 – +85°C
Storage Temperature	-20 – +85°C
Operating Humidityl	RH 85% max, non collecting
Shock	490 m/s^2, 3Dx2 times
Vibration	1.2mm, 10-55kHz, 3Dx30min
Protection	IP40

Table 4: Environmental Specifications

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2.2 Signals and Connection

Pin Number	Color	Signal Name
1	Red	VCC
2	Black	GND
3	White	A+
4	White/Black	A-
5	Green	B+
6	Green/Black	B-
7	Yellow	Z+
8	Yellow/Black	Z-
9	Blue	Shield

Table 5: Connector and cable pinning and signals

The required encoder cable connector is a Molex type 5023800900 or type 510210900 CLIK-MATE™ crimp housing using Molex type 5023810000 CLIK-MATE™ crimp terminals.

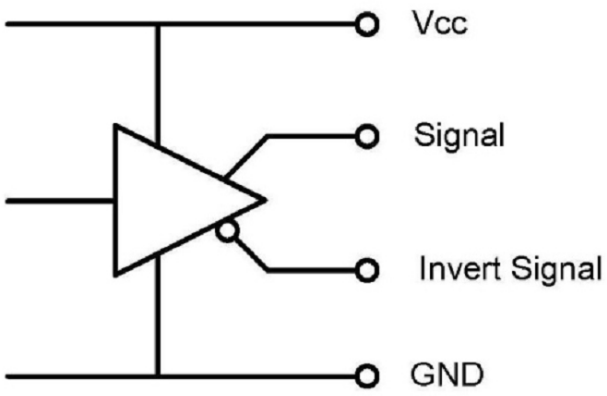

Figure 1: Connection and circuit diagram for the line driver outputs

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2.3 Wave Form

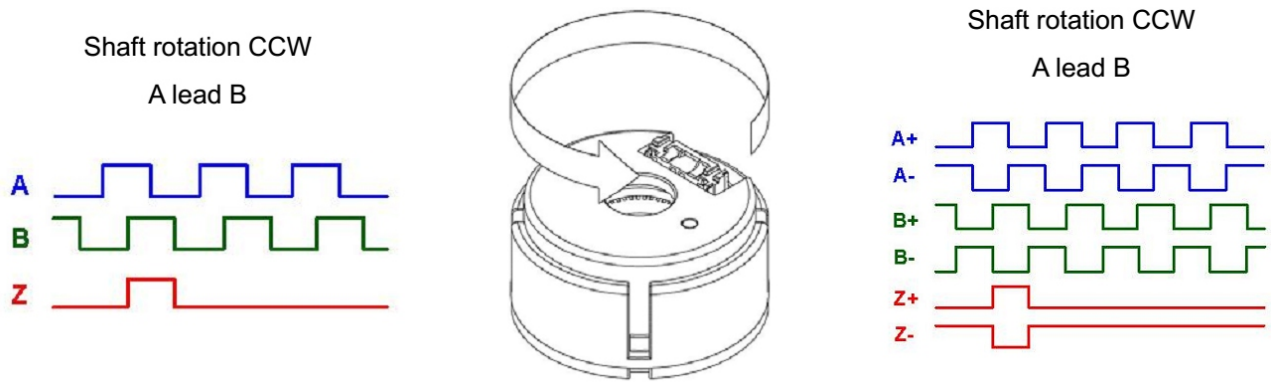

Figure 2: Wave form for CCW and CW rotation

2.4 Mechanical Drawings

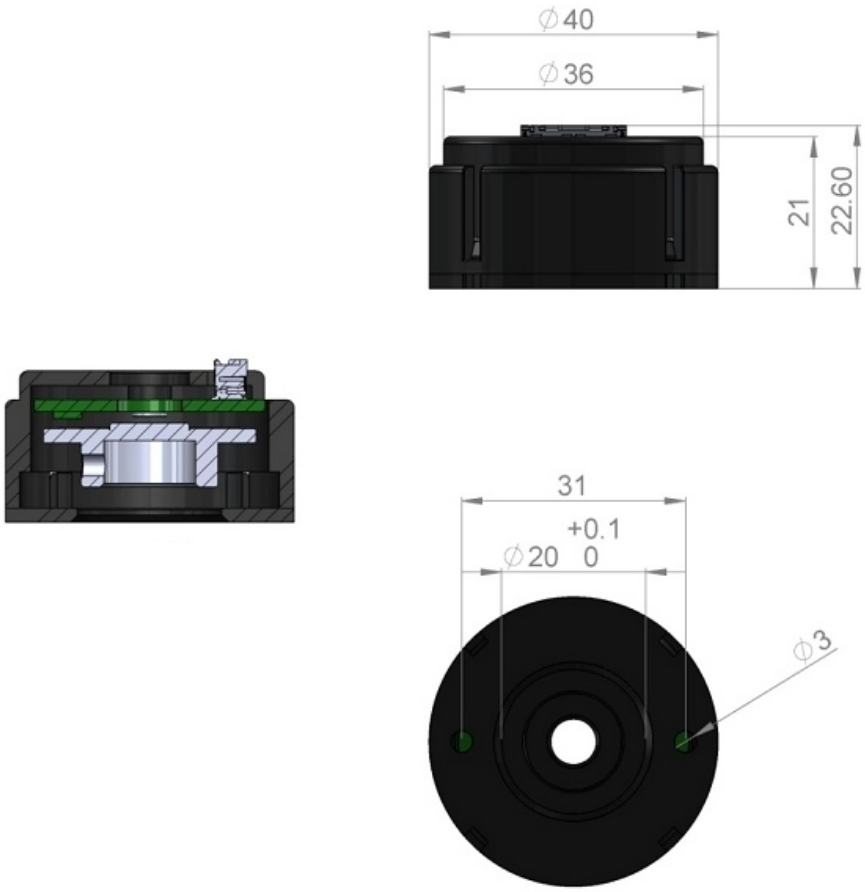

Figure 3: Bottom view, top view, side view, and cut view (units = mm)

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The housing connector is of Type Molex 5023860970.

2.5 Motor Assembly

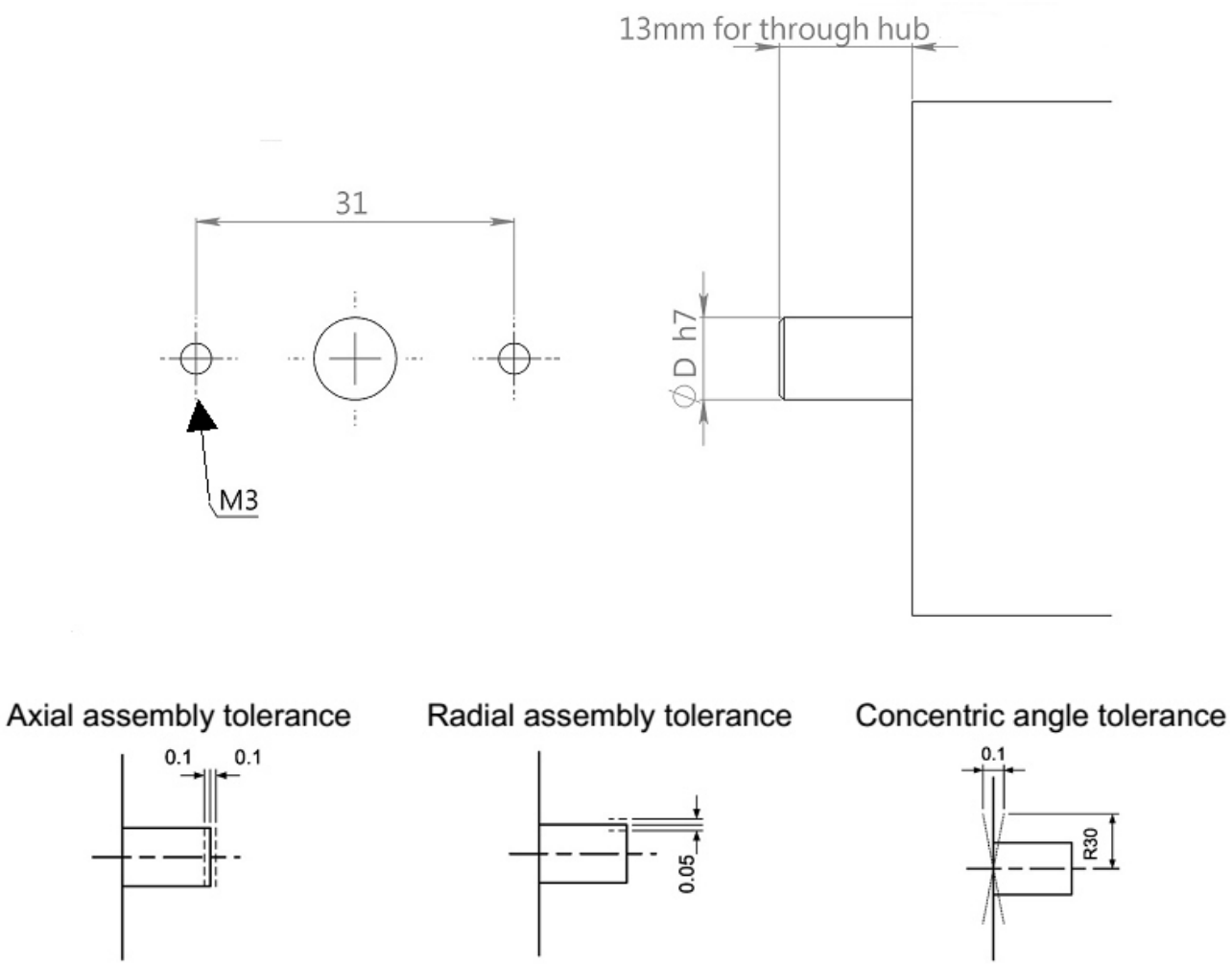

Figure 4: Required dimensions for motor assembly (units = mm)

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3 Figures Index

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4 Tables Index

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5 Supplemental Directives

5.1 Producer Information

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The documentation provided here, is for programmers and engineers only, who are equipped with the necessary skills and have been trained to work with this type of product.

The Target User knows how to responsibly make use of this product without causing harm to himself or others, and without causing damage to systems or devices, in which the user incorporates the product.

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6 Revision History

6.1 Hardware Revision

Version	Date	Author	Description
1.00	01.03.2017	TMC	Initial release

Table 6: Hardware Revision

6.2 Document Revision

Version	Date	Author	Description
1.00	24.02.2017	SK	Initial release

Table 7: Document Revision

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