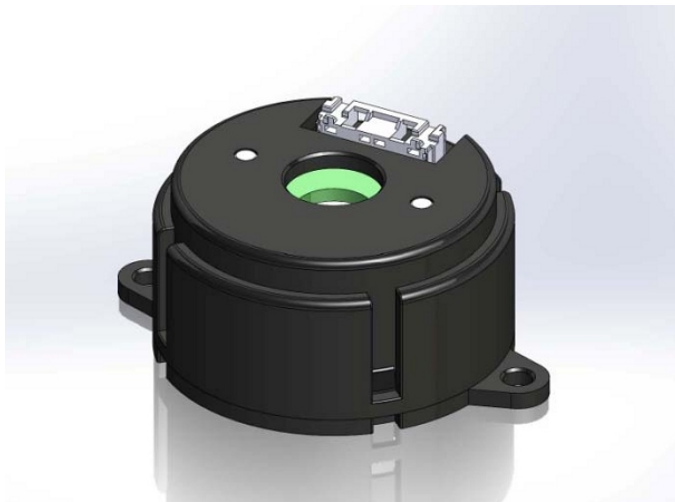


## TMCS-40 Hardware Manual

Hardware Version V1.00 | Document Revision V1.20 • 2019-JUL-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 10.000 lines (40.000 counts).**



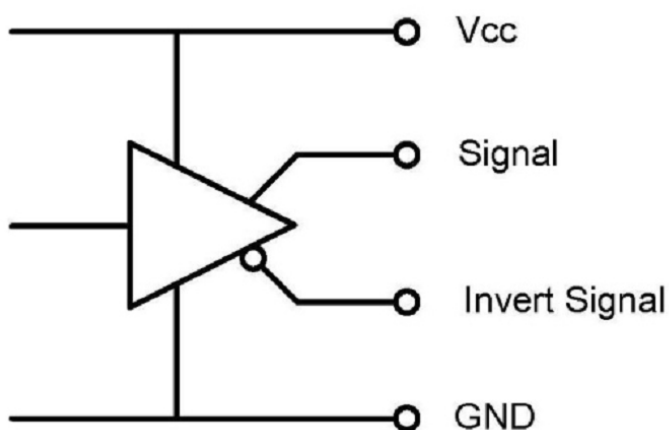
### Features

- 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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## 1 Order Codes

Order Code	Description	Size (LxWxH)
TMCS-40-6.35-10000-AT-01	Encoder Module 40mm diameter, Resolution of 10.000lpr (40.000cpr), 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.



## 2 Technical Specifications

### 2.1 Mechanical and Electrical Parameters

Parameter	Min	Typ	Max	Unit
Supply voltage	4.5	5	5.5	V
Supply current			110	mA
Rise/fall time			10	ns
Frequency			1500	kHz
Output Voltage "H"	VCC-2V			V
Input Voltage "L"			0.5	V
Max. output current			20	mA
Resolution lpr		10.000		lpr (lines per rotation)
Resolution cpr		40.000		cpr (increments per rotation)

Table 2: Electrical Characteristics

Parameter	Min	Typ	Max	Unit
Hollow Diameter (Symbol D in drawings)		6.35		mm
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 Humidity	RH 85% max, non collecting
Shock	490 $m/s^2$ , 3Dx2 times
Vibration	1.2mm, 10-55kHz, 3Dx30min
Protection	IP40

Table 4: Environmental Specifications



## 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.

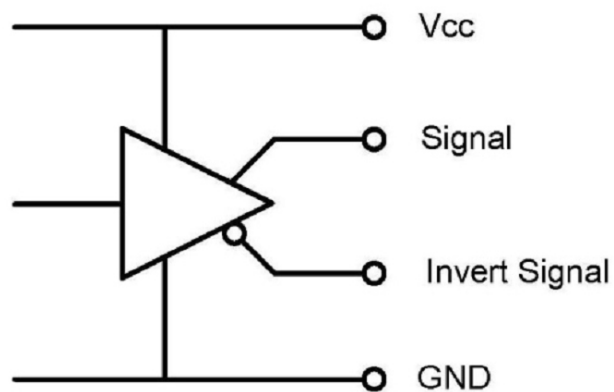


Figure 1: Connection and circuit diagram for the line driver outputs



### 2.3 Wave Form

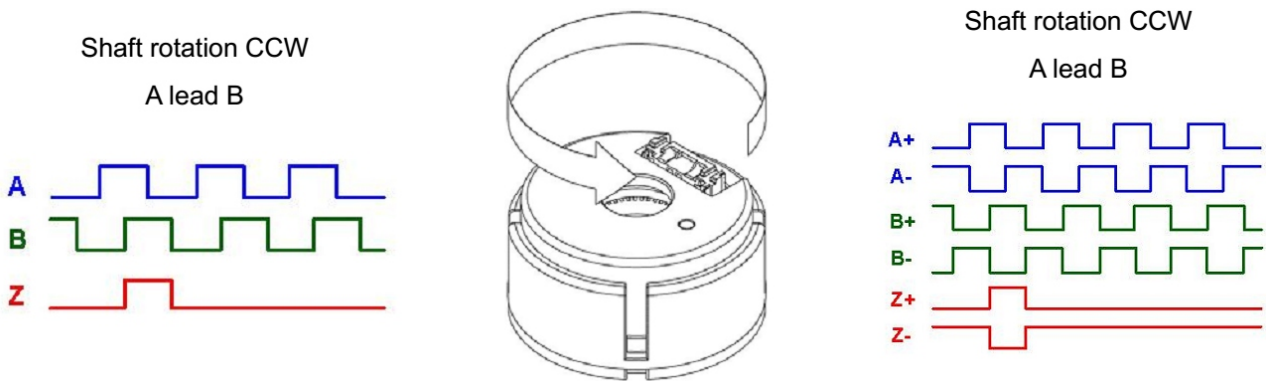


Figure 2: Example wave form for CCW rotation

### 2.4 Mechanical Drawings

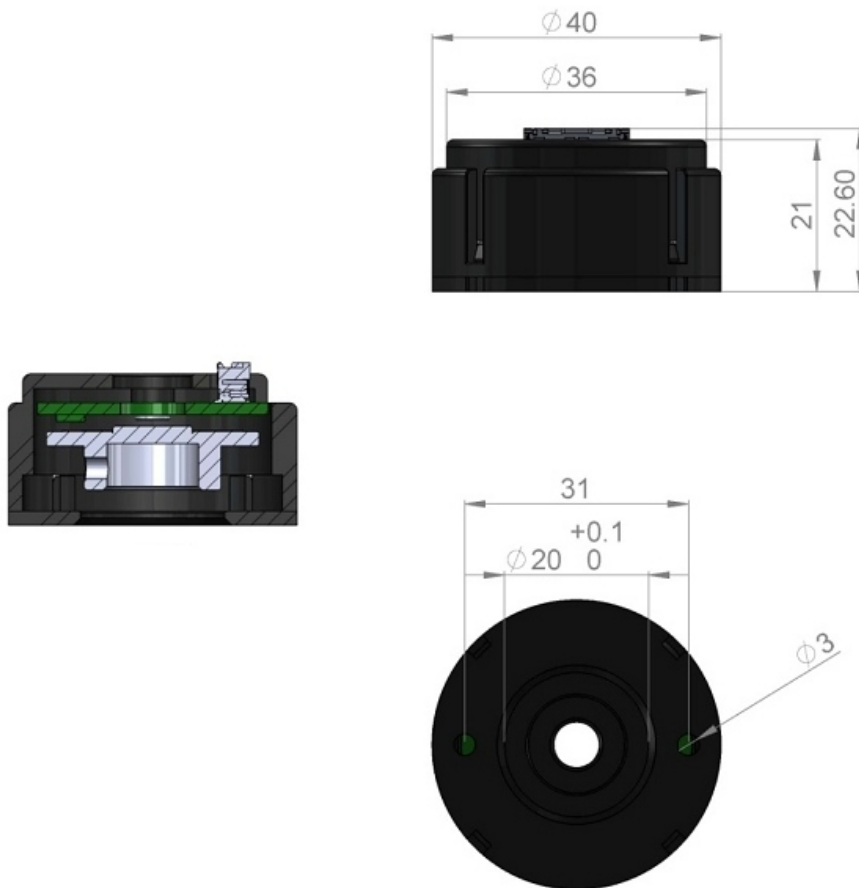


Figure 3: Bottom view, top view, side view, and cut view (units = mm)



The housing connector is of Type Molex 5023860970.

## 2.5 Motor Assembly

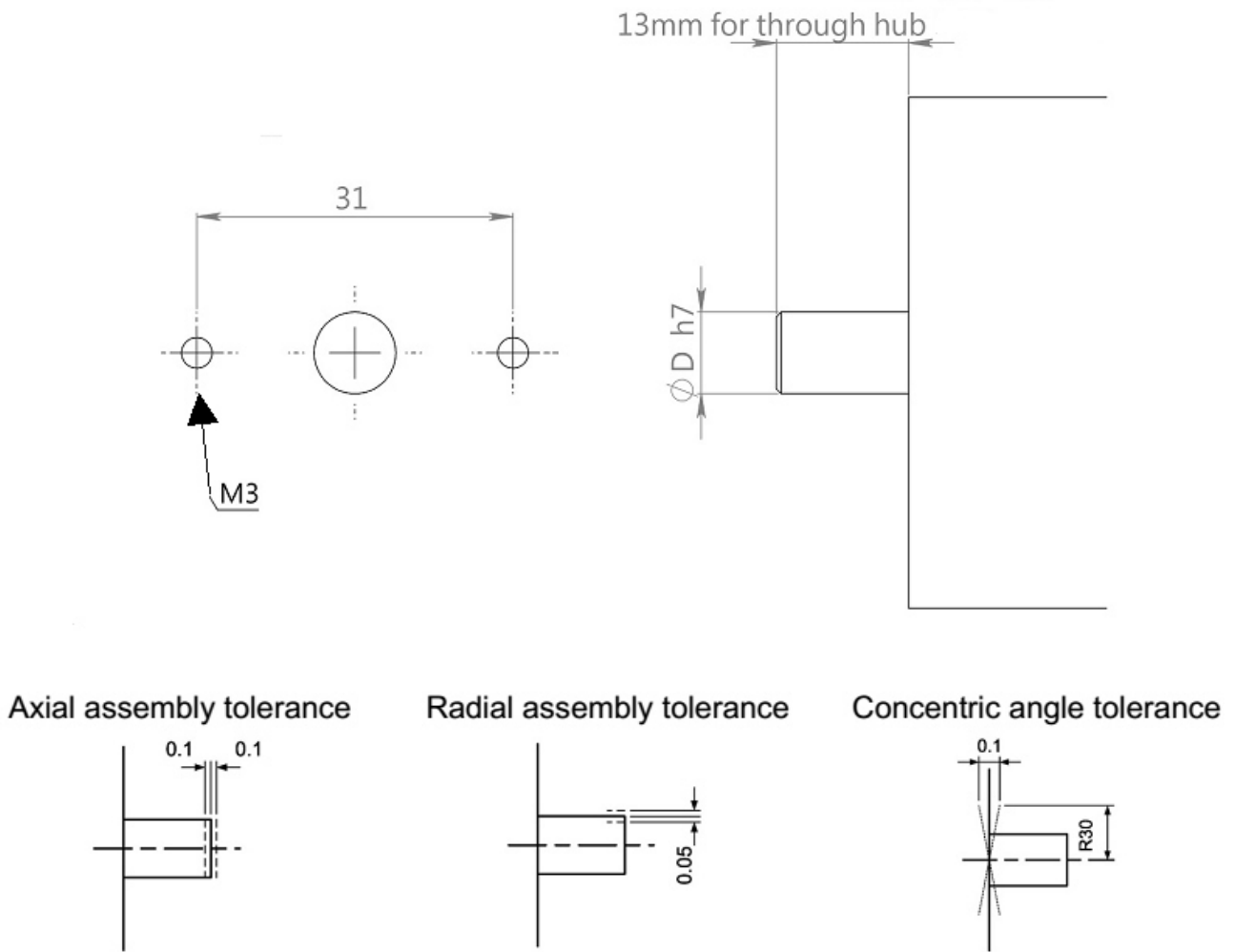


Figure 4: Required dimensions for motor assembly (units = mm) /  $D = 6.35\text{mm}$



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## 5 Supplemental Directives

### 5.1 Producer Information

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