# TMCS-40 Hardware Manual

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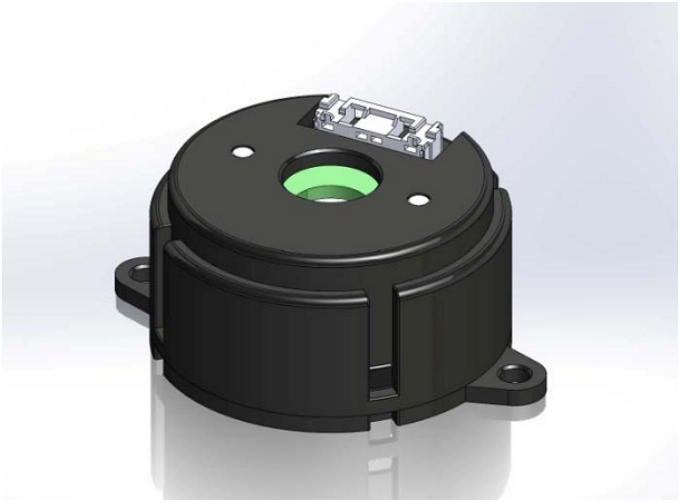
**TMCS-40 is a low-cost and small-size optical incremental encoder for use with stepper motors and 3-phase PMSM/BLDC motors. It comes with high resolution optical code wheels with a resolution of 10.000 lines (40.000 counts).**



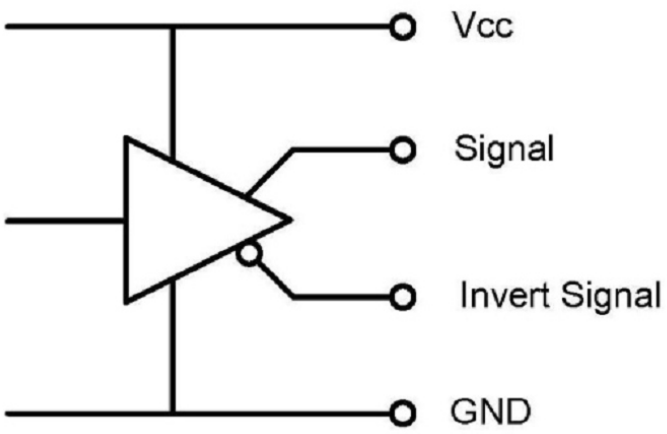
## Features

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

## Applications

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

## Simplified Block Diagram






Read entire documentation.

TRINAMIC
MOTION CONTROL

# Contents

# 1 Order Codes

| Order Code | Description | Size (LxWxH) |
|---|---|---|
| TMCS-40-6.35-10000-AT-01 | Encoder Module 40mmm 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 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*

## 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.

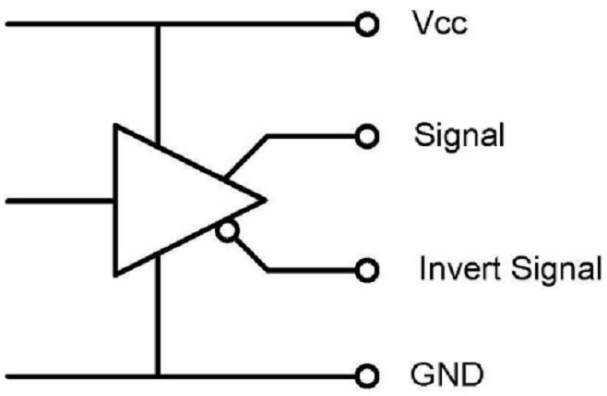



*Figure 1: Connection and circuit diagram for the line driver outputs*

## 2.3 Wave Form

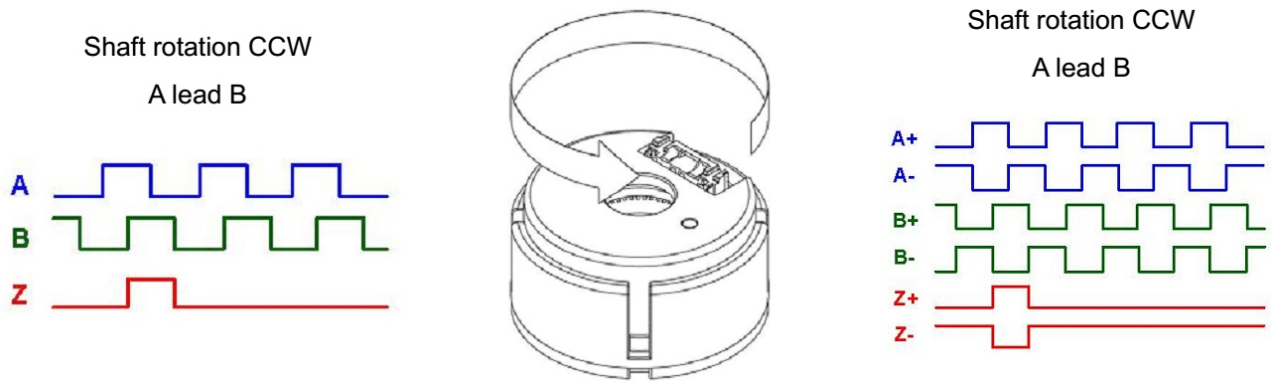



*Figure 2: Example wave form for CCW rotation*

## 2.4 Mechanical Drawings

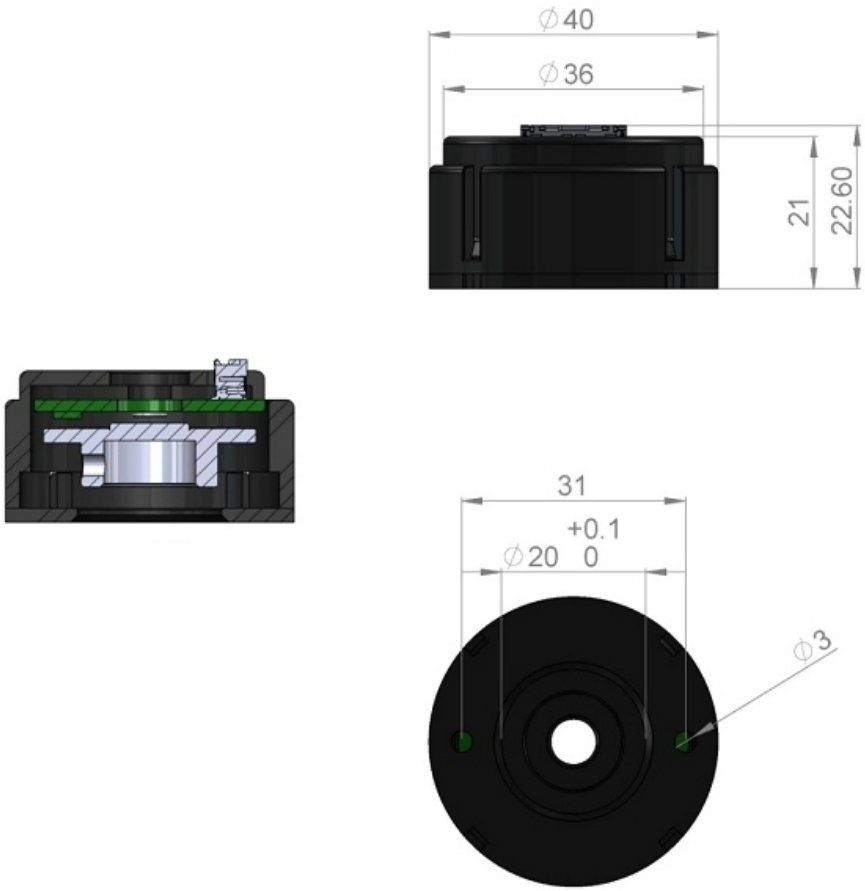



*Figure 3: Bottom view, top view, side view, and cut view (units = mm)*

The housing connector is of Type Molex 5023860970.

## 2.5 Motor Assembly

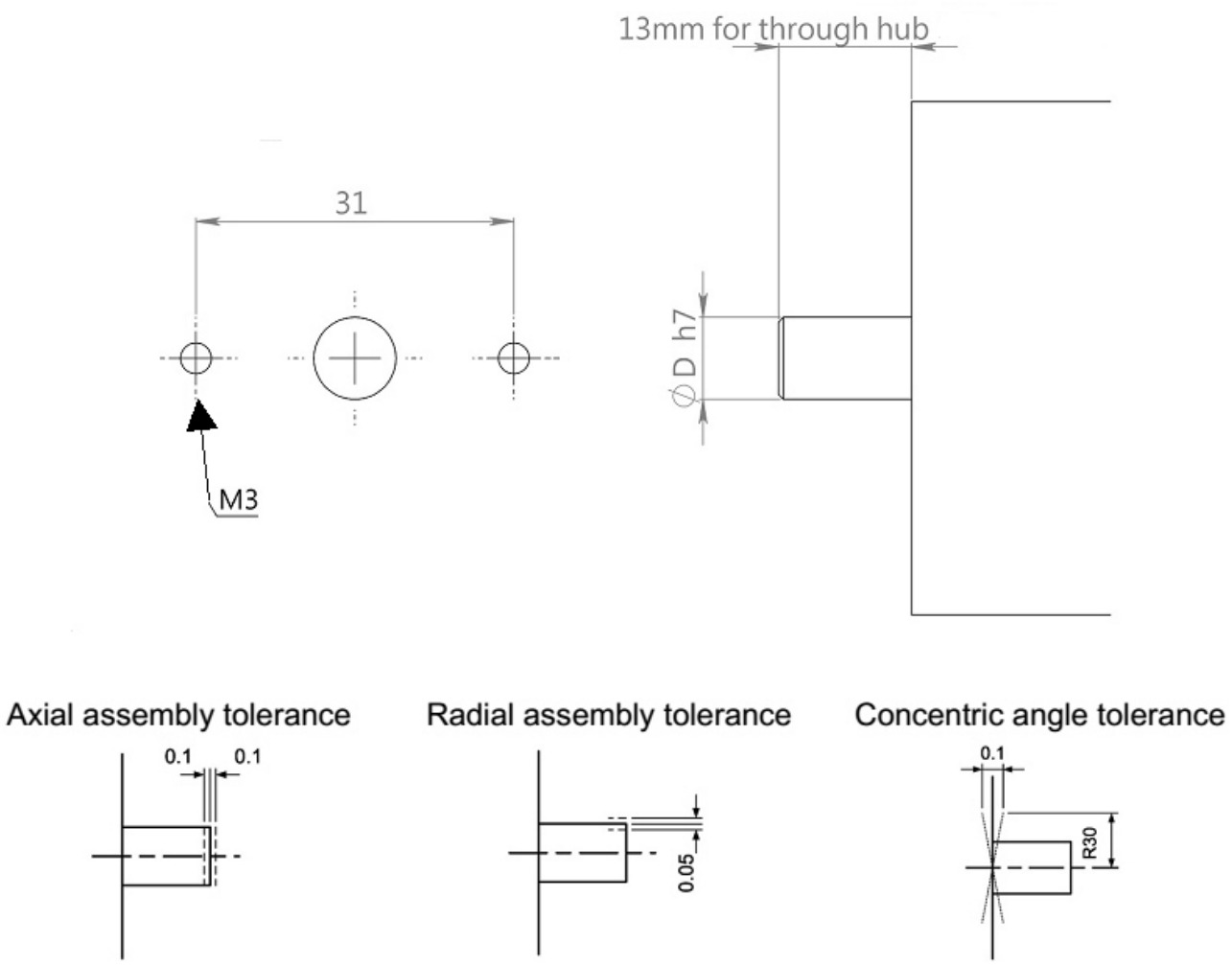



*Figure 4: Required dimensions for motor assembly (units = mm) / D = 6.35mm*

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## 5.1 Producer Information

## 5.2 Copyright



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