RoboWheel™ RW170

Hub Motor with Integral Encoder
www.skysedge.us

Specifications

Operating voltage range: 7-42V
Recommended voltage range: 30-40V
Kv rating: 10 (yes ten) RPM/V
Diameter: 170mm (of tread, approximate)
Motor type: Permanent magnet brushless
Pole count: 27
Winding resistance: 1.7Ω
Encoder resolution: 3200 pulses per revolution
Encoder type: Optical, quadrature
Encoder voltage: 5V
Recommended controller: NearZero NZ1

Overview

The RoboWheel is a large brushless hub motor (powered wheel) with a high-resolution internal quadrature encoder and exceptionally low cogging, intended to serve as the drive system for large domestic robots or similar projects needing mobility. This high-quality (yet affordable) alternative to more common gearmotor-style robot drives brings the silence and reliability of brushless wheels to the robotics community for the first time, and exists to enable the coming generations of dexterous helper robots. Whatever software platform you're using, whether it be a new or pre-existing ROS platform, or an entirely homespun system, controlling the RoboWheel with the NearZero brushless motor controller and example python scripts makes software integration easy, and the built-in high resolution optical encoder will satisfy the most demanding odometry requirements.

Connecting to NearZero

The NearZero (NZ) controller was designed specifically for smoothly driving brushless motors and hub motors like the RoboWheel. Figure 1 diagrams the connections for a two-channel RoboWheel system with the NearZero, including encoders. Step-by-step instructions follow:
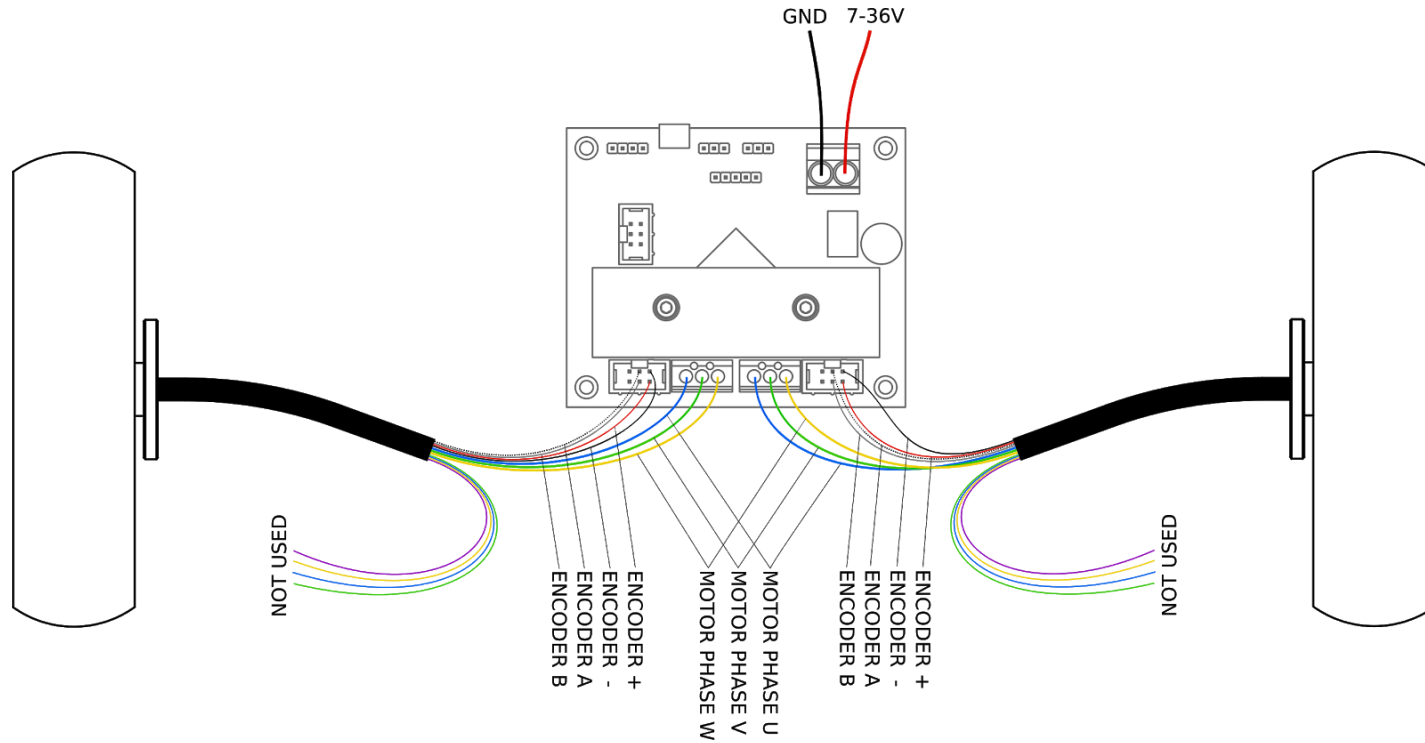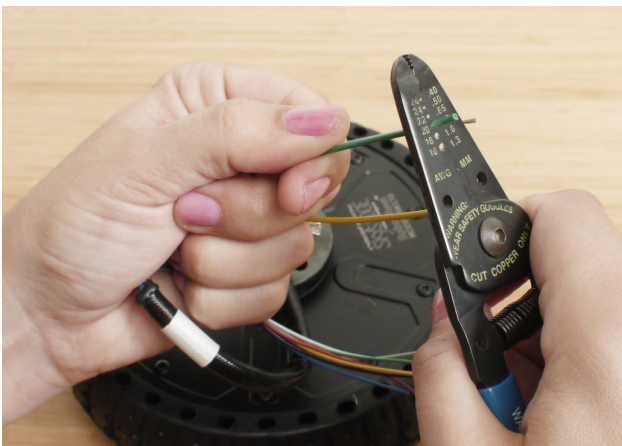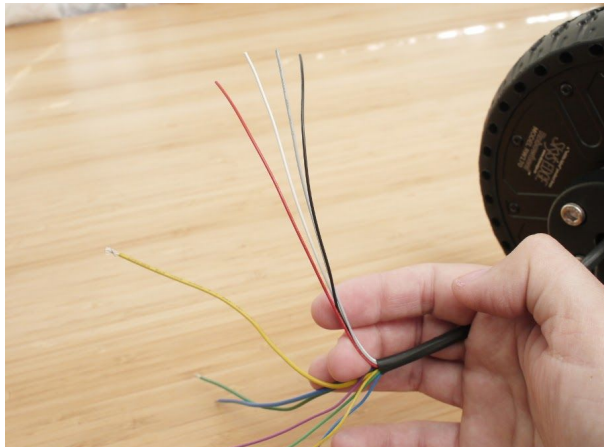

Figure 1: Two RoboWheels connected to a NearZero

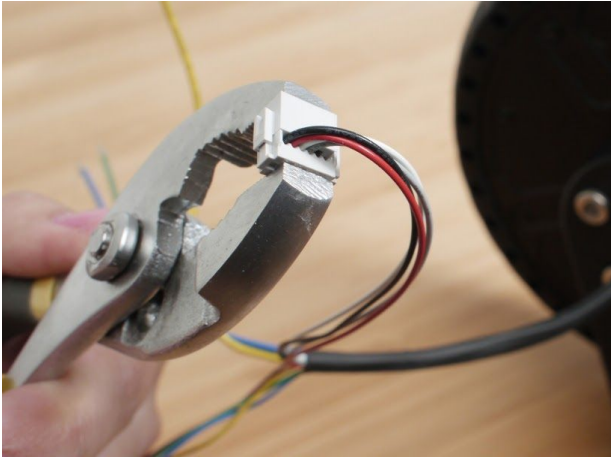1. Strip main power wire (phase U, V, W) ends:

2. Separate out encoder wires:

3. Slip wires into included IDC connector as shown:

INCLUDED 6-PIN IDC CONNECTOR
(Amphenol P/N 71600-006LF)
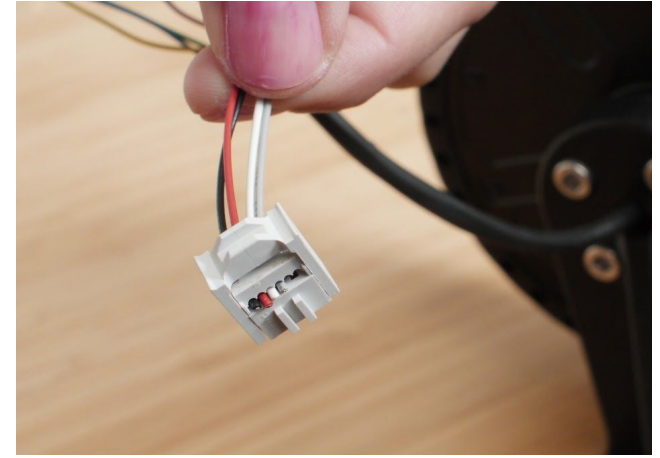
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4.   Compress connector onto wires:

5.   Fit locking shroud over connector:

7. The connectorized encoder wires:

8.   Tighten the U, V, W main power wires into the screw terminals for either channel 1 or 2, and insert the IDC connector into the associated encoder socket. If the motor turns opposite the desired direction, swap any two of the U, V, or W power wires:

Figure 2: RoboWheel connected to Channel 1 of the NearZero

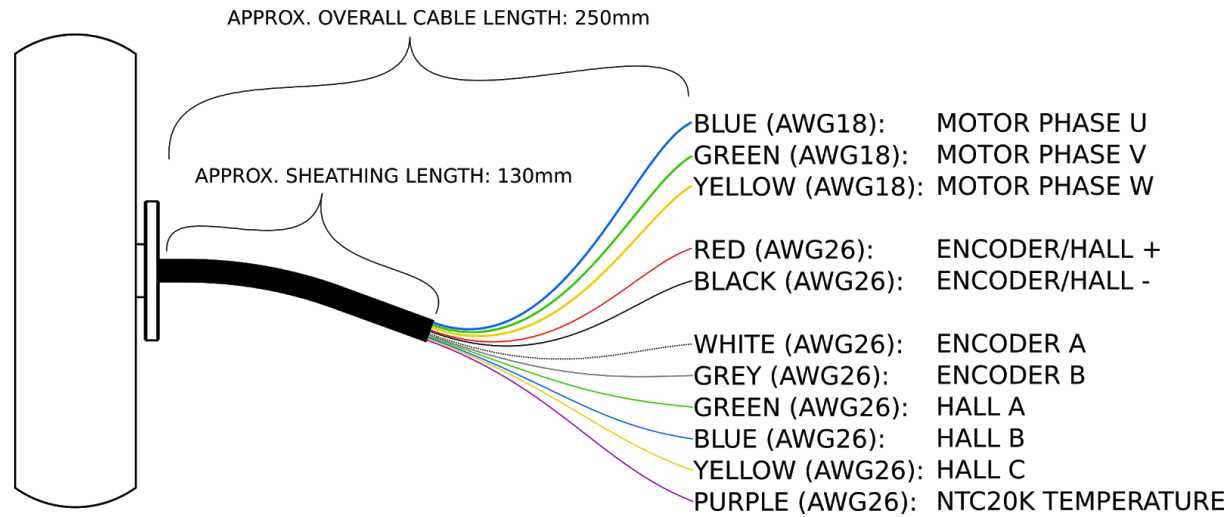For the latest version of this manual visit **www.skysedge.us/robotics/robowheel170**

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Electrical (Pinout)

APPROX. OVERALL CABLE LENGTH: 250mm

APPROX. SHEATHING LENGTH: 130mm

BLUE (AWG18):   MOTOR PHASE U
GREEN (AWG18):   MOTOR PHASE V
YELLOW (AWG18):   MOTOR PHASE W

RED (AWG26):   ENCODER/HALL +
BLACK (AWG26):   ENCODER/HALL -

WHITE (AWG26):   ENCODER A
GREY (AWG26):   ENCODER B
GREEN (AWG26):   HALL A
BLUE (AWG26):   HALL B
YELLOW (AWG26):   HALL C
PURPLE (AWG26):   NTC20K TEMPERATURE

Figure 3: Pinout

Mechanical (Dimensions)

All dimensions are "reference". All units are mm. STEP files available:

Ø7.8

Ø170

2X Ø138

Ø50

5

10

8.3

1.7

1.7

43.5

26
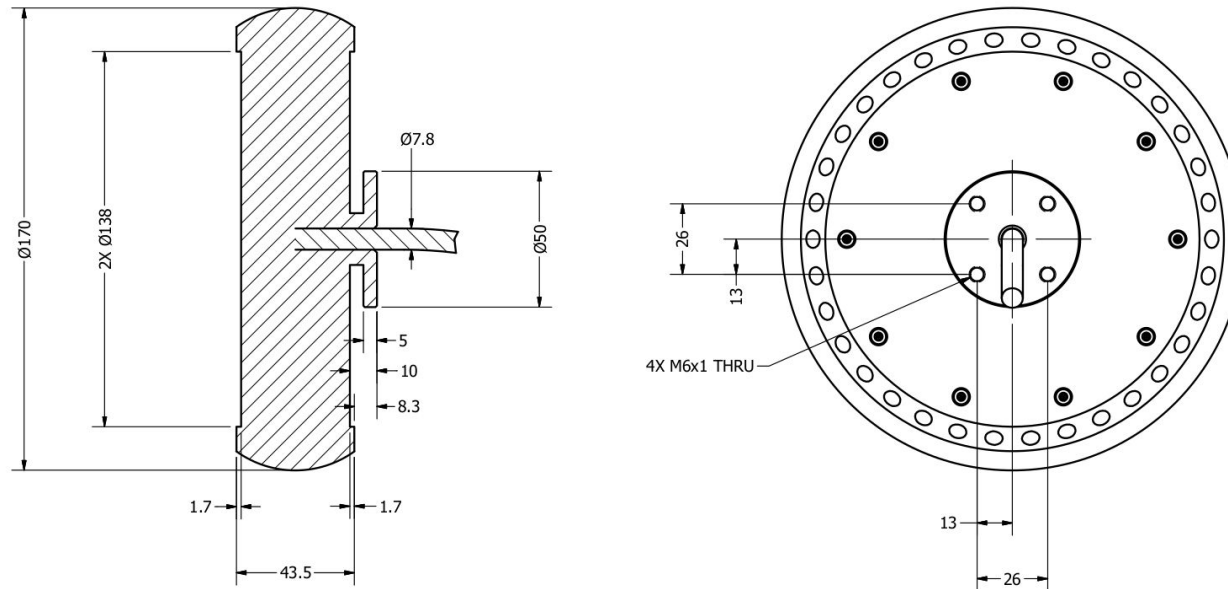
13

13

26

4X M6x1 THRU

Figure 4: Dimensions

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Mounting

The bolt pattern on the RoboWheel's circular mounting flange comprises 4 M6 threaded holes on 26mm centers, as shown in Figure 6 below. As the cable harness extends from the center of this flange, a clearance hole or slot is required to accommodate its passage. An example mounting pattern is depicted to the right in Figure 5

Alternatively, an STL file of left- and right-handed mounting brackets are available for 3D printing. This mounting bracket is also available from Sky's Edge as pre-printed from super-tough carbon-filled PETG, and is linked from the RoboWheel product page:
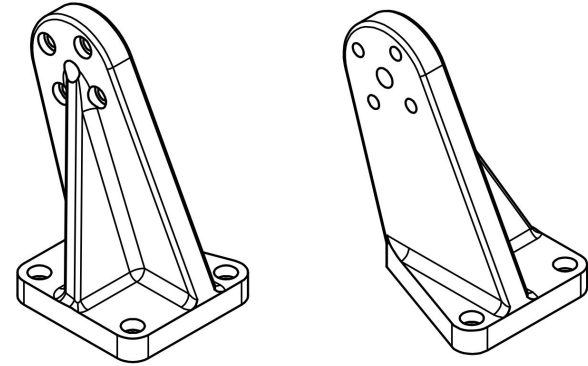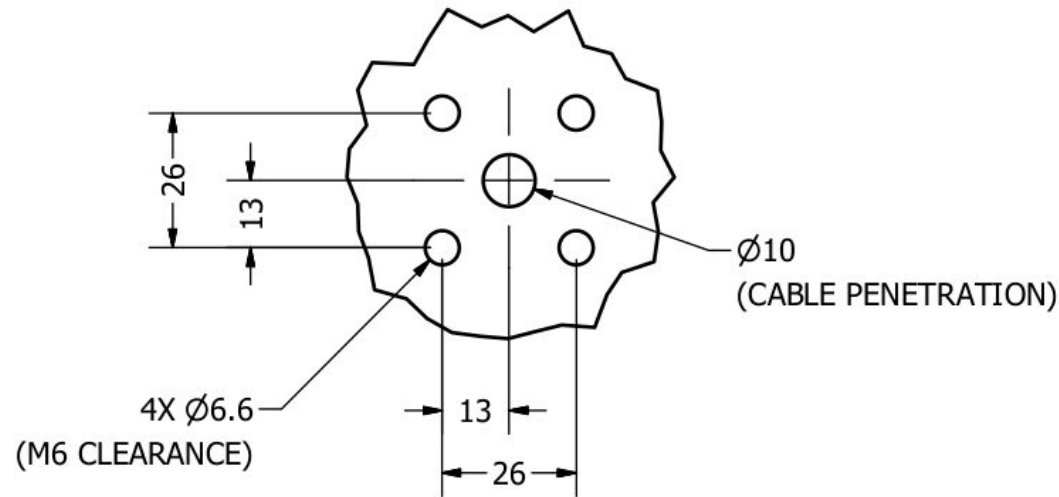

Figure 5: Optional mounting brackets

Figure 6: Bolt pattern for mounting

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