

Varstrom TSDZ16

Varstrom TSDZ16 48V 1000W Torque Sensor Mid Drive Kit User Manual

1. INTRODUCTION

This manual provides essential information for the installation, operation, maintenance, and troubleshooting of your Varstrom TSDZ16 48V 1000W Torque Sensor Mid Drive Kit. Please read this manual thoroughly before attempting installation or operation to ensure safe and correct usage of the product.

2. SAFETY INFORMATION

Always prioritize safety when working with electrical components and bicycles. Failure to follow safety instructions may result in injury or damage to the product.

- Ensure the battery is disconnected before performing any installation, maintenance, or repair work on the motor or wiring.
- Wear appropriate safety gear, including gloves and eye protection, during installation.
- Verify all connections are secure and properly insulated to prevent short circuits.
- Do not modify the motor or any electrical components. Unauthorized modifications can lead to malfunction and void the warranty.
- Keep children and pets away from the work area during installation.
- Regularly inspect all components for wear, damage, or loose connections.
- Adhere to local regulations regarding e-bike usage and speed limits.

3. PRODUCT OVERVIEW

The Varstrom TSDZ16 is a 48V 1000W torque sensor mid-drive motor kit designed for converting standard bicycles into electric bikes. It features a 160N.m torque output, IPX6 waterproof rating, and compatibility with 68-73mm bottom brackets.

Key Features:

- **High Torque and Power:** Delivers 160N.m of torque and 1000W power for effective acceleration and hill climbing.
- **Advanced Torque Sensor:** Provides a natural and responsive pedaling experience by proportionally adjusting motor assistance based on pedaling force.
- **IPX6 Waterproof Rating:** Equipped with dual oil seals for enhanced protection against water and dust, suitable for various weather conditions.
- **Wide Bottom Bracket Compatibility:** Supports 68-73mm bottom brackets with an improved mounting design for stability.
- **High Efficiency:** Operates at over 83% efficiency, optimizing battery usage.
- **Integrated Wiring:** Includes wiring for a gear shift sensor and connections for front and rear lights.

Components Included (Standard Kit):

- Varstrom TSDZ16 48V 1000W Mid Drive Motor
- Display (DZ40, SW2-M58, or EKD01 - Optional)
- Battery (Optional)
- Brake Lever (Default) or Brake Sensors
- Thumb Throttle
- Cranks
- 46T Chainwheel with Guard
- Speed Sensor & Magnets
- 1T4 Wiring Harness
- Lock Nuts and Fixed Bracket Accessories
- Wrench
- Cable Ties
- Washers

WHAT'S IN THE BOX?



TSDZ16



Display (Optional)



Battery (Optional)



Brake Levers



1T4 Cable



Speed Sensor



Thumb Throttle



Wrench



Ebike Crank Arm



Cable Ties



Protection board



**Headlight
(Optional)**



**Rear Lamp
(Optional)**



Washers



Fixed bracket accessories

Figure 3.1: Contents of the Varstrom TSDZ16 Mid Drive Kit box. Includes the TSDZ16 motor, optional display and battery, brake levers or sensors, 1T4 cable, speed sensor, thumb throttle, wrench, crank arms, cable ties, protection board, and various mounting hardware.

VARSTROM TORQUE MID DRIVE KIT

TSDZ16 48V 1000W



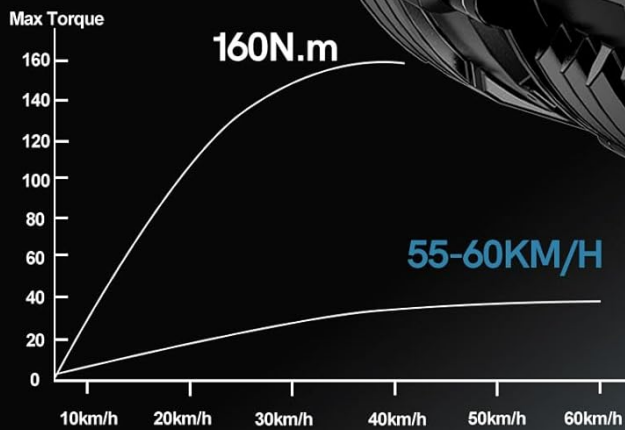
Electrical
Throttle mode



Pedal
assist mode



Walk
assist mode



IPX6

6KG

Figure 3.2: Overview of the Varstrom TSDZ16 Mid Drive Motor Kit, highlighting electrical throttle, pedal assist, and walk assist modes, along with a torque curve showing 160N.m maximum torque and IPX6 waterproof rating.

MOTOR SPECIFICATION

• RATED POWER:
1000W

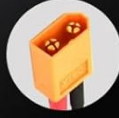
• MAX TORQUE:
160Nm

• WEIGHT:
6KG

• MAX SPEED
55-60KM/H



Headlights and taillights



Battery



Speed sensor



EB-Bus



Gear Sensor

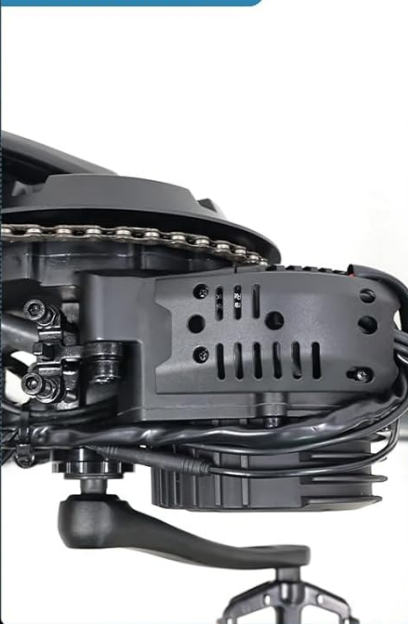


Figure 3.3: Detailed motor specifications including 1000W rated power, 160Nm max torque, 6KG weight, and 55-60KM/H max speed. Also shows connection points for headlights/taillights, battery, speed sensor, EB-Bus, and gear sensor.

CHAINRING & BRAKE SYSTEM



Protection board



● Shift integrated brake handle



● Hydraulic Disc Brake



● Mechanical disc brakes



● Rim V brake

Figure 3.4: Components of the chainring and brake system, including the 46T chainwheel with protection board, shift integrated brake handle, hydraulic disc brake, mechanical disc brakes, and rim V brake options.

MOTOR CONNECTOR & WIRING

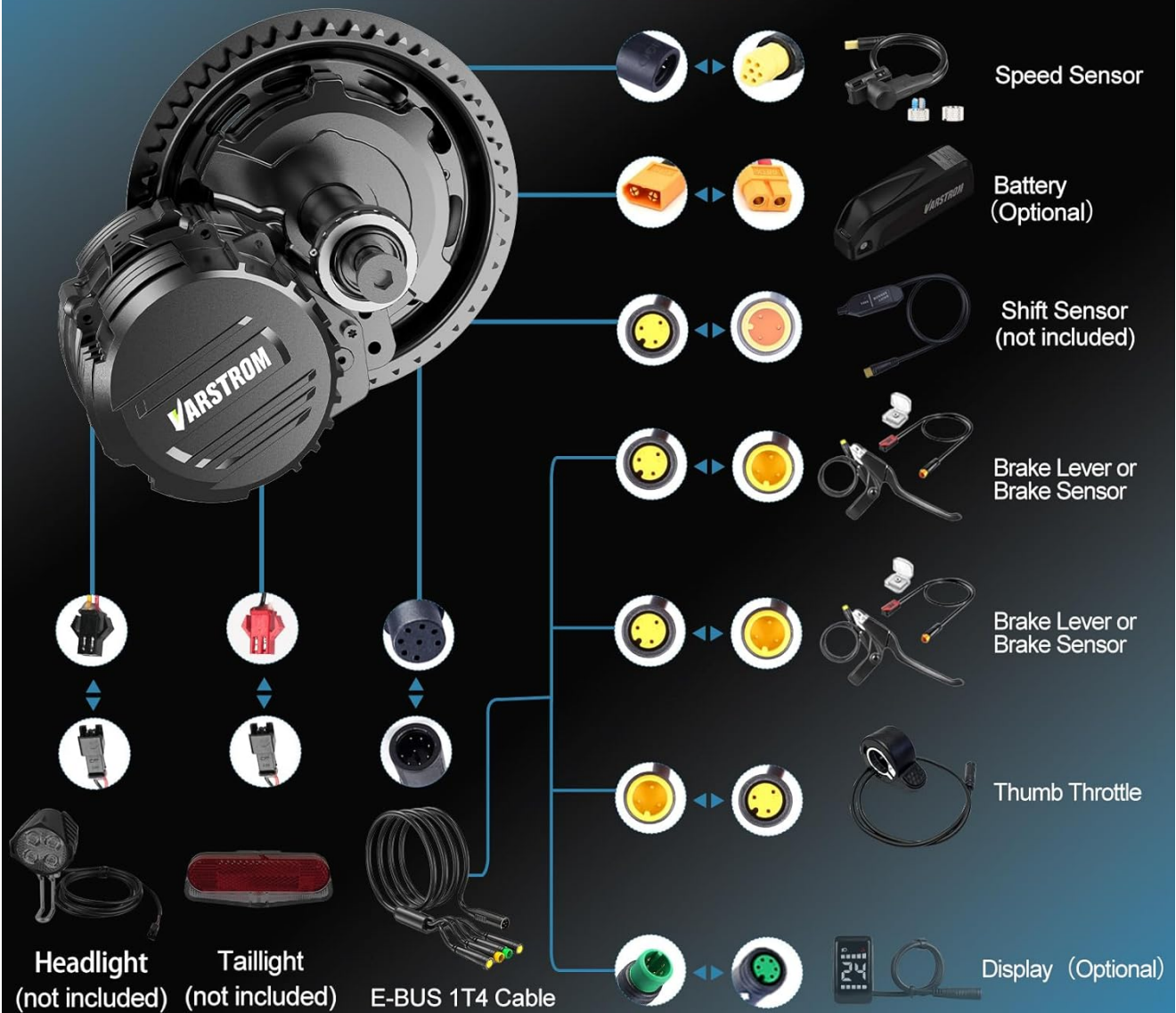


Figure 3.5: Wiring diagram for the TSDZ16 motor, showing connections for speed sensor, battery (optional), shift sensor (not included), brake lever/sensors, thumb throttle, E-BUS 1T4 cable, headlight (not included), taillight (not included), and display (optional).

4. SETUP AND INSTALLATION

This section outlines the general steps for installing the TSDZ16 mid-drive motor kit onto your bicycle. Ensure your bicycle's bottom bracket is compatible (68-73mm).

Installation Steps:


- 1. Prepare the Bicycle:** Remove the existing crankset, bottom bracket, and chain. Clean the bottom bracket shell.
- 2. Install the Motor:** Carefully insert the TSDZ16 motor into the bottom bracket shell. Ensure proper alignment and clearance.
- 3. Secure the Motor:** Install the fixing nut and bracket to secure the motor to the frame. Tighten the fixing nut to 40Nm.
- 4. Install Speed Sensor:** Mount the speed sensor on the chainstay and attach the magnet to a spoke, ensuring a 10-15mm gap between the sensor and magnet.

5. **Install Cranks and Chainwheel:** Attach the crank arms and the 46T chainwheel to the motor spindle.
6. **Install Chain:** Reinstall or install a new chain, ensuring it is properly routed and tensioned.
7. **Connect Wiring:** Connect the display, throttle, brake levers/sensors, and optional lights to the main wiring harness (1T4 cable) and then to the motor.
8. **Install Battery:** Mount the battery securely to the bicycle frame and connect it to the motor's power cable.
9. **Final Checks:** Double-check all connections, ensure no wires are pinched, and test the motor's functionality before riding.

Your browser does not support the video tag.

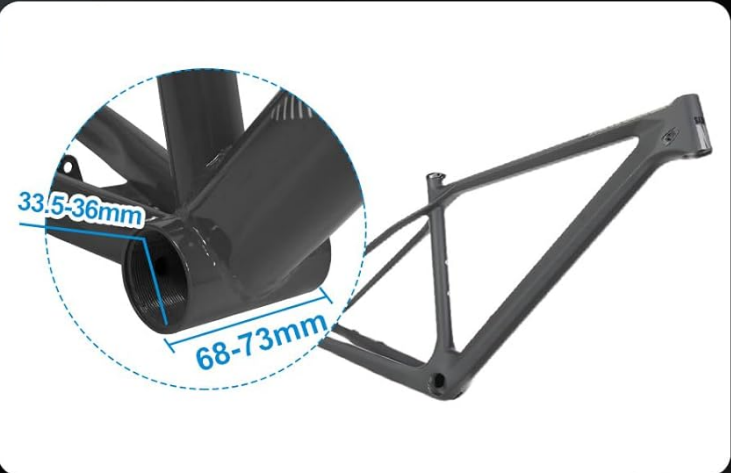
Video 4.1: Installation guide for a Tongsheng mid-drive motor kit. This video demonstrates the steps for mounting the motor, installing the speed sensor, attaching cranks, and connecting the chain. Note: While the video may show a TSDZ2B, the installation principles are largely similar for the TSDZ16.

MOTOR COMPATIBILITY AND SPECIFICATIONS



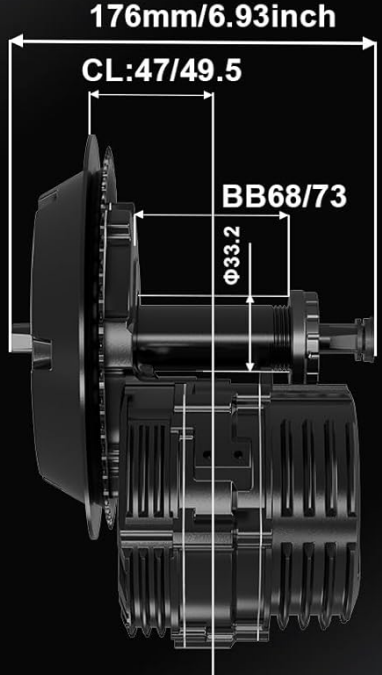
225mm/8.86inch

145mm/5.71inch



33.5-36mm

68-73mm



176mm/6.93inch

CL: 47/49.5

BB68/73

33.2

● Rated Voltage :	48V
● Rated Power :	1000W
● Max Torque :	160N.m
● Max Speed :	55-60km/h
● Pedal Sensor :	Speed and Torque Integrated
● Shaft Standard :	JIS
● Size (L*W*H) :	TSDZ16: 8.86*6.93*5.71inch
● Weight :	6kg
● n0(Rpm) :	125r/min
● Efficiency :	>82%
● Noise Grade :	≤60dB
● Bike Recommendation :	E-city / E-tour

Figure 4.2: Motor compatibility and dimensions for the TSDZ16, showing measurements and bottom bracket compatibility (68-73mm). This helps ensure your bike frame is suitable for installation.

5. OPERATING INSTRUCTIONS

Once installed, operating your Varstrom TSDZ16 kit is straightforward. The system offers pedal assist and, if equipped, a throttle mode.

Display Operation:

The specific operation may vary slightly depending on your chosen display (DZ40, SW2-M58, or EKD01). Refer to the individual display manual for detailed instructions.

Display Model	Screen	Handlebar Diameter (mm)	Operating Voltage	USB Port	Language	Speed Limit	Battery Voltage	Battery Percentage	Boot Password	Light Sensor
EKD01 Display	2.4" TFT	22.2/ 25.4	24V/36V/48V/52V	✓ Type C	English, French, German, Spanish, Italian, Polish, Dutch, Czech	✓	✓	✓	✓	✗
M58 Display	3.8" LCD	22.2/ 25.4/ 31.8	24V/36V/48V/52V	✗	English	✓	✓	✓	✓	✗
DZ40 Display	1.68" IPS	22.2	24V/36V/48V/52V	✗	English	✓	✓	✓	✗	✗

Figure 5.1: Comparison of available display options: EKD01 (2.4" TFT), M58 (3.8" LCD), and DZ40 (1.6" IPS). Each display offers different features such as speed limit, battery percentage, boot password, and light sensor functionality.

- **Power On/Off:** Typically, press and hold the power button on the display to turn the system on or off.
- **Assist Levels:** Use the '+' and '-' buttons to cycle through different levels of pedal assistance. Higher levels provide more motor power.
- **Information Display:** The display shows real-time information such as current speed, battery level, assist level, and trip distance.
- **Walk Assist:** Most displays offer a walk assist mode, activated by holding a specific button, which provides low-speed assistance for pushing the bike.
- **Throttle (if installed):** The thumb throttle provides on-demand power, independent of pedaling, up to the set

speed limit.

Riding Tips:

- Start in a low assist level and gradually increase as needed.
- Shift gears smoothly to optimize motor efficiency and prolong drivetrain life.
- Be aware of your surroundings and ride defensively, as e-bikes can reach higher speeds than traditional bicycles.

6. MAINTENANCE

Regular maintenance ensures the longevity and optimal performance of your TSDZ16 mid-drive kit.

- **Cleaning:** While the motor is IPX6 waterproof, avoid high-pressure washing directly on electrical components. Clean the motor and battery with a damp cloth.
- **Connections:** Periodically check all electrical connections for tightness and corrosion. Ensure they are clean and dry.
- **Drivetrain:** Keep your chain, chainwheel, and cassette clean and lubricated. Inspect for wear and replace components as necessary.
- **Brakes:** Regularly check brake pads and cables/hydraulic fluid for proper function and wear. Adjust or replace as needed.
- **Battery Care:** Store the battery in a cool, dry place. Avoid fully discharging the battery and charge it regularly, even during periods of non-use.
- **Motor Inspection:** Listen for unusual noises from the motor. If you detect any, discontinue use and inspect for issues.

7. TROUBLESHOOTING

This section addresses common issues you might encounter. For problems not listed here, contact Varstrom customer support.

Problem	Possible Cause	Solution
Motor not providing assist	Battery low or disconnected; Display off; Loose connections; Speed sensor issue; Brake sensor engaged.	Check battery charge and connection; Turn on display; Inspect all wiring connections; Verify speed sensor alignment (10-15mm gap); Ensure brake levers are not engaged.
Display not turning on	Battery low or disconnected; Loose display cable.	Charge battery; Check battery connection; Ensure display cable is securely plugged in.
Unusual motor noise	Loose motor mounting; Internal motor issue; Drivetrain component interference.	Check motor mounting bolts for tightness; Inspect chainring for debris; If noise persists, contact support.
Inaccurate speed reading	Speed sensor or magnet misaligned or damaged.	Check speed sensor and magnet alignment (10-15mm gap); Ensure magnet is securely attached to spoke.

8. SPECIFICATIONS

Detailed technical specifications for the Varstrom TSDZ16 Mid Drive Motor Kit.

Feature	Specification
Brand	Varstrom
Motor Model	TSDZ16
Voltage	48V
Rated Power	1000W
Max Torque	160N.m
Max Speed	55-60KM/H (approx. 34-37 MPH)
Motor Type	Brushless Geared Motor
Motor Position	Mid Mounted
Controller	Integrated, inside the Motor
Shaft Standard	JIS
Operating Temperature	-10-45°C
Pedal Sensor	Speed and Torque Integrated
Chainwheel	46T
Weight	6KG
Efficiency	>83%
Noise Grade	≤60dB
Waterproof Rating	IPX6
Bottom Bracket Compatibility	68-73mm

MOTOR SPECIFICATION

• RATED POWER:
1000W

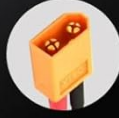
• MAX TORQUE:
160Nm

• WEIGHT:
6KG

• MAX SPEED
55-60KM/H



Headlights and taillights



Battery



Speed sensor



EB-Bus



Gear Sensor



Figure 8.1: Visual representation of the motor's key specifications, including rated power, max torque, weight, and max speed.

BATTERY PARAMETERS

• 48V 13Ah | Shark Battery
• 48V 16Ah



• 48V 19.2Ah | Shark Battery
• 48V 20Ah

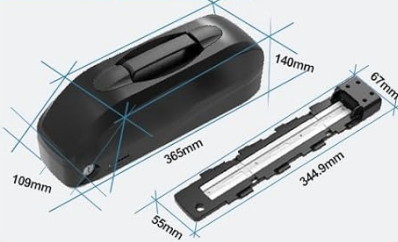


Type	48V 13Ah	48V 16Ah	48V 19.2Ah	48V 20Ah
Watt Hour	624Wh	768Wh	921.6Wh	960Wh
Battery Cell	18650 2600mAh	18650 3200mAh	L*/G 21700 4800mAh	Sam*/sung 21700 5000mAh
BMS	30A	30A	30A	30A
Charge voltage	54.6V	54.6V	54.6V	54.6V
Size (L*W*H)	368*90*111mm	368*90*111mm	367*90*127mm	367*90*127mm
Weight	4.25kg	4.23kg	4.95kg	4.7kg
USB Port	✓	✓	✓	✓
Cycle Life	1000 times			
Protection Function	Over charge, Over discharge, Over current, Short circuit, Balance			

• 52V 20Ah | YingWu Battery



• 48V 20Ah | Voltz X Battery



• 48V 17.5Ah | Rear Rack Battery



Type	52V 20Ah	48V 20Ah	48V 17.5Ah
Watt Hour	1040Wh	960Wh	840Wh
Battery Cell	Sam*/sung 21700 5000mAh	Sam*/sung 21700 5000mAh	18650 2500mAh
BMS	30A	30A	30A
Charge voltage	58.8V	54.6V	54.6V
Size (L*W*H)	368*95*125mm	365*109*140mm	476*165*89mm
Weight	5kg	5.2kg	6kg
USB Port	✗	✓ USB & Type-C Fast Charge	✓
Cycle Life	1000 times		
Protection Function	Over charge, Over discharge, Over current, Short circuit, Balance		

Figure 8.2: Parameters for various optional Varstrom batteries, including voltage, watt-hour, battery cell type, BMS, charge voltage, weight, USB port availability, and cycle life. This information is crucial for selecting and maintaining your battery.

9. WARRANTY AND SUPPORT

Varstrom provides warranty coverage and customer support for its products.

Warranty Information:

- **Return Policy:** 30 days return period.
- **Repair or Replace:** 365 days repair or replacement warranty.

For specific warranty terms, conditions, or to initiate a return or repair, please refer to your purchase documentation or contact Varstrom customer service directly.

Customer Support:

If you have any questions, require technical assistance, or encounter issues not covered in this manual, please contact Varstrom customer support. Provide your product model (TSDZ16) and purchase details for efficient service.

