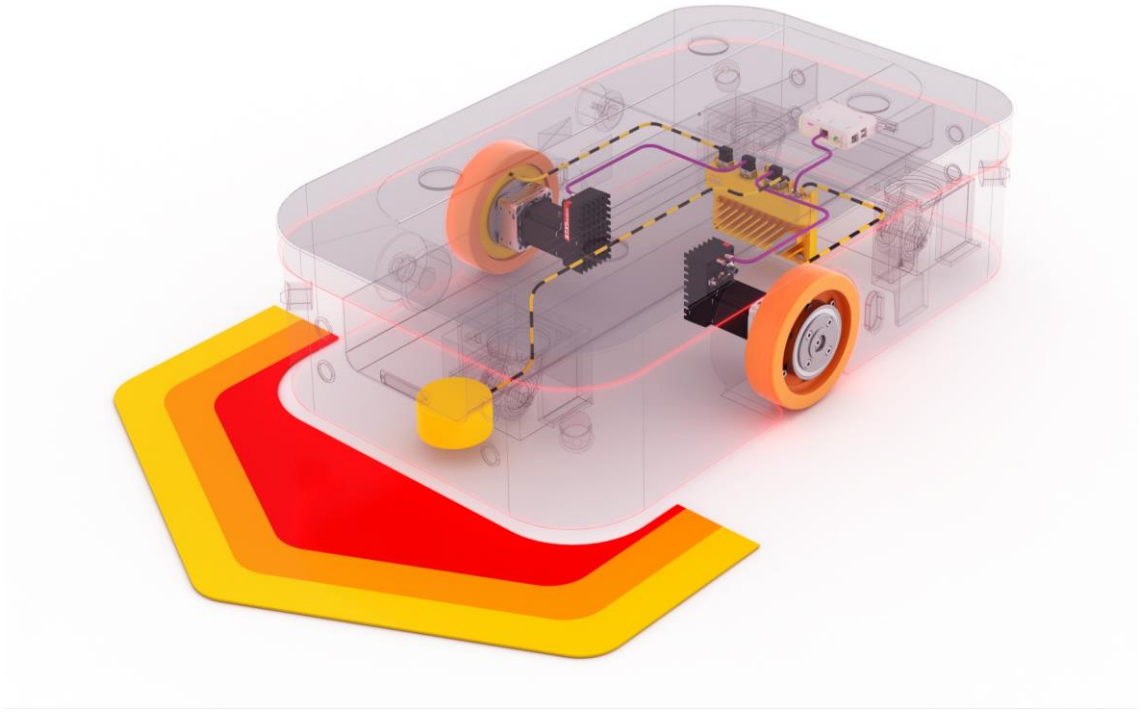
CATALOG Rev.4.1

# Design Your Mobile Robots Without Boundaries.

## Optimized wheel-drive systems for AGVs and AMRs



STXiMotion

www.stxim.com | contact@stxim.com

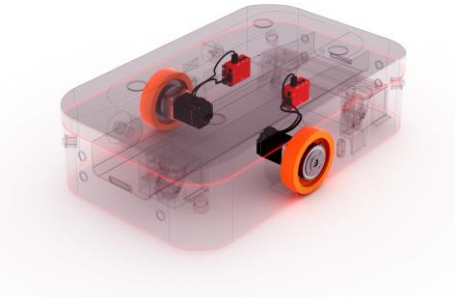
# Optimized wheel-drive systems

STXI's Mobile Motion Systems are a complete and ready-to-use wheel-drive system designed and optimized specifically for the requirements of automated guided vehicles and autonomous mobile robots:

- **Compact** dimensions for an easy fit within mobile robot size constraints.
- **Robust** design for durability in tough environmental conditions.
- **Safe** STO function ensures safe operation and prevents workplace injuries.
- **Efficient** energy consumption for a greater range of non-stop mobility.

## Compact drives and gear motors

The system includes the **MOT-GM** high torque density, brushless servo motor, with planetary gearbox, spring-loaded brake, encoder, and the **ZED** servo drive. This compact wheel-drive system maximizes space savings and simplifies the cabling and mechanical design of the mobile vehicle.



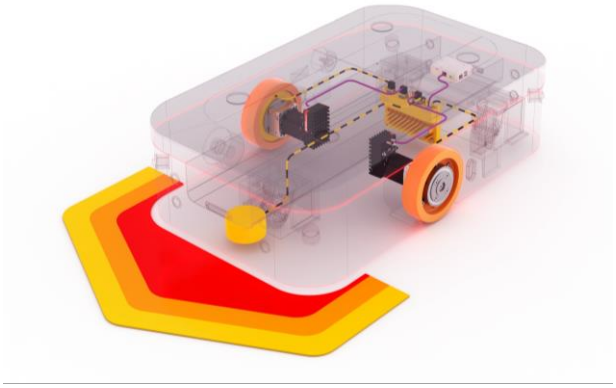


**Motor and gear options**

- All motors include a brake, but can be ordered without a brake.
- Can be ordered with or without a mounted wheel.
- All motors are rated IP40/IP54.
- Gears with standard ratios – 10, 16, and 22.5. Other ratios are available upon request.

## Integrated wheel-hub motor

The new TIM integrated servo motor series, with a power range spanning from 200W to 900W, is ideal for mobile robots with limited design space. TIM also supports absolute single-turn and multi-turn encoders, which, together with functional safety, meet the full range of resolution and safe operation requirements of diverse applications.




## Safe motion using a standard incremental encoder

### According to ISO 3691-4, PL d

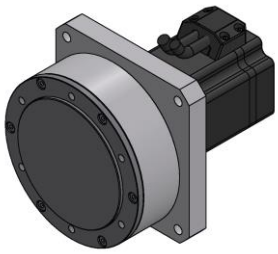
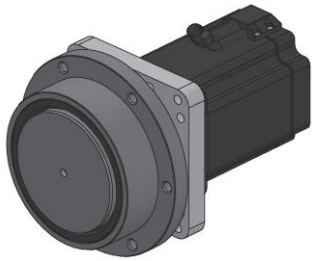
An STO SIL3, Cat 3, PL 3 safety function can be connected to a PLC/motion controller and/or safety controller. Two additional non-safe encoders can be connected from the motor to the safety controller (such as a Flexi Mobile from SICK) for safe motion monitoring, thereby minimizing the complexity of the AGV design.

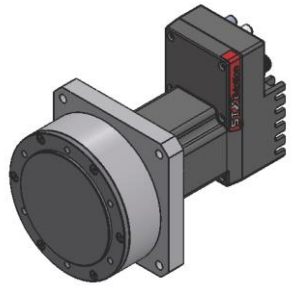
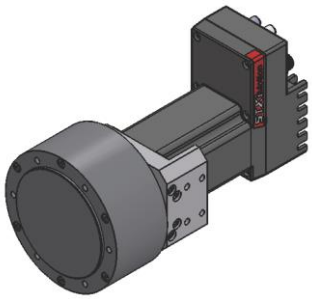
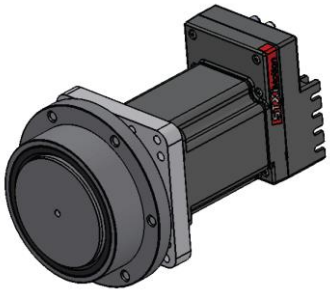
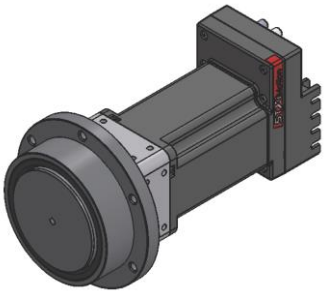
# MOT-GM and TIM-GT Gearmotors

A number of gearmotors are available for various AGV/AMR sizes and maximum payload requirements. Every MOT-GM and TIM-GT can provide a different combination of gear size, ratio, mounting orientation, and motor with either a 24V or 48V supply.

Also available are various wheels capable of carrying and moving the maximum rated payload at speeds of up to 5 m/s.

## Product Models

| Gearmotor | Product Model | Main Features |
|---|---|---|
|  | **GM-1811-00**<br>MOT-GM servo gearmotor | **Motor power: 200 W**<br>Gear ratio: 10<br>Motor voltage: 48 V<br>Brake: 24 VDC |
|  | **GM-1913-00**<br>MOT-GM servo gearmotor | **Motor power: 400 W**<br>Gear ratio: 16<br>Motor voltage: 48 V<br>Brake: 24 VDC |
|  | **GM-0807-00**<br>MOT-GM servo gearmotor | **Motor power: 500 W**<br>Gear ratio: 22.5<br>Motor voltage: 24 VDC<br>Brake: 24 VDC |
|  | **GM-0808-00**<br>MOT-GM servo gearmotor | **Motor power: 900 W**<br>Gear ratio: 22.5<br>Motor voltage: 48 VDC<br>Brake: 24 VDC |

| Gearmotor | Product Model | Main Features |
|---|---|---|
|  | **GT-1836-00**<br>TIM-GT integrated servo gearmotor | **Motor power: 200 W**<br>Gear ratio: 10<br>Motor voltage: 24V/48 V<br>Brake: 24 VDC |
|  | **GT-1932-00**<br>TIM-GT integrated servo gearmotor | **Motor power: 400 W**<br>Gear ratio: 16<br>Motor voltage: 24V/48 V<br>Brake: 24 VDC |
|  | **GT-0840-00**<br>TIM-GT integrated servo gearmotor | **Motor power: 480 W**<br>Gear ratio: 22.5<br>Motor voltage: 48 VDC<br>Brake: 24 VDC |
|  | **GT-2544-00**<br>TIM-GT integrated servo gearmotor | **Motor power: 800 W**<br>Gear ratio: 22.5<br>Motor voltage: 48 VDC<br>Brake: 24 VDC |

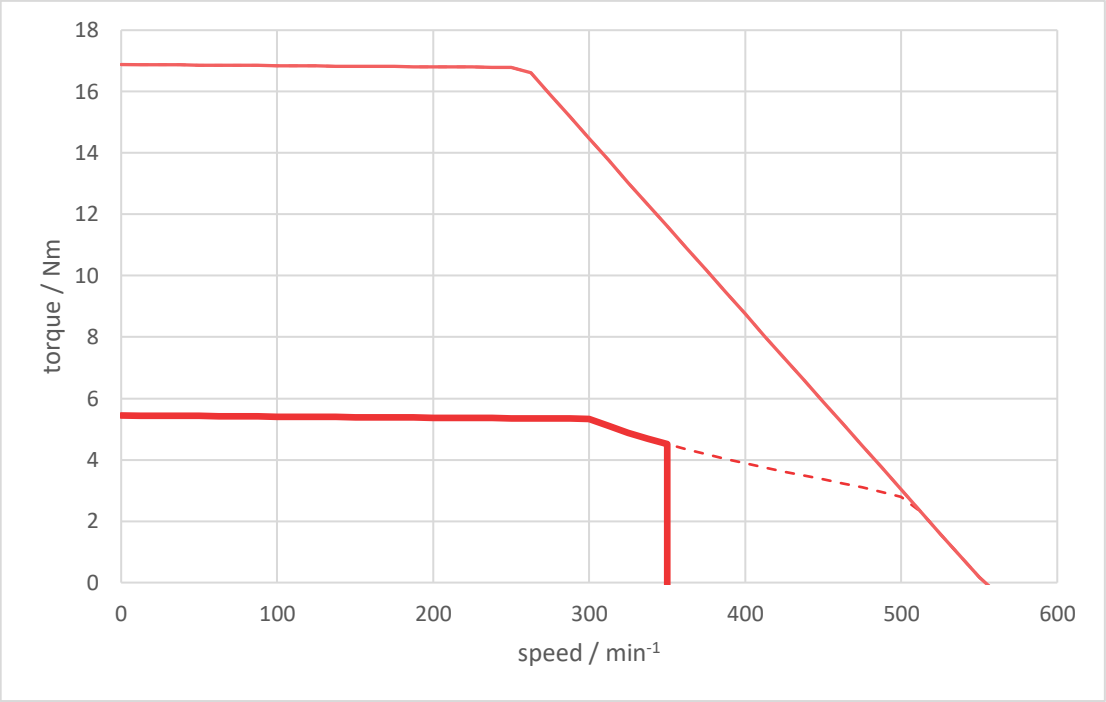
## Gearmotor 200W and 400W Specifications

| Feature | Units | GM-1811-00<br>GT-1836-00 | GM-1913-00<br>GT-1932-00 |
|---|---|---|---|
| Motor rated power | W | 200 | 400 |
| Motor voltage | VDC | 48 | 48 |
| Motor rated current | Arms | 6.5 | 12 |
| Feedback | | AqB, index, Halls, RS422 | AqB, index, Halls, RS422 |
| Motor temperature sensor | | PTC (NXP KTY-150) | PTC (NXP KTY-150) |
| Brake voltage | VDC | 24 ±10% | 24 ±10% |
| Brake power | W | 7.4 | 7.4 |
| Holding torque | Nm | 1.3 | 1.3 |
| Insulation class | | B (130°C) | B (130°C) |
| Brake switching cycles B10 @ 0 rpm | | 500,000 | 500,000 |
| Gear nom. torque | Nm | 5.5 | 17 |
| Gear max. torque | Nm | 17 | 54 |
| Gear level of efficiency | | 0.95 | 0.95 |
| Gear ratio | i | 10 | 16 |
| Gear rated speed | rpm | 300 | 187 |
| Gear rated speed with ∅150 mm wheel | m/sec (km/h) | 2.35 (8.48) | 1.47 (5.3) |
| Torque of motor mechanical brake at gear output | Nm | 13 | 20 |
| Gear max. radial force dynamic | N | 2,250 | 4,500 |
| Gear max. axial force | N | 1,000 | 2,500 |
| Gear lifespan at nominal torque | hr | 20,000 | 20,000 |
| Emergency stop torque | Nm | 62 | 84 |
| Weight | kg | 3.2 | 4.7 |
| Operating temperature | °C | -10–40 | -10–40 |
| Protection class | | IP54 | IP54 |

## Speed/Torque Curves

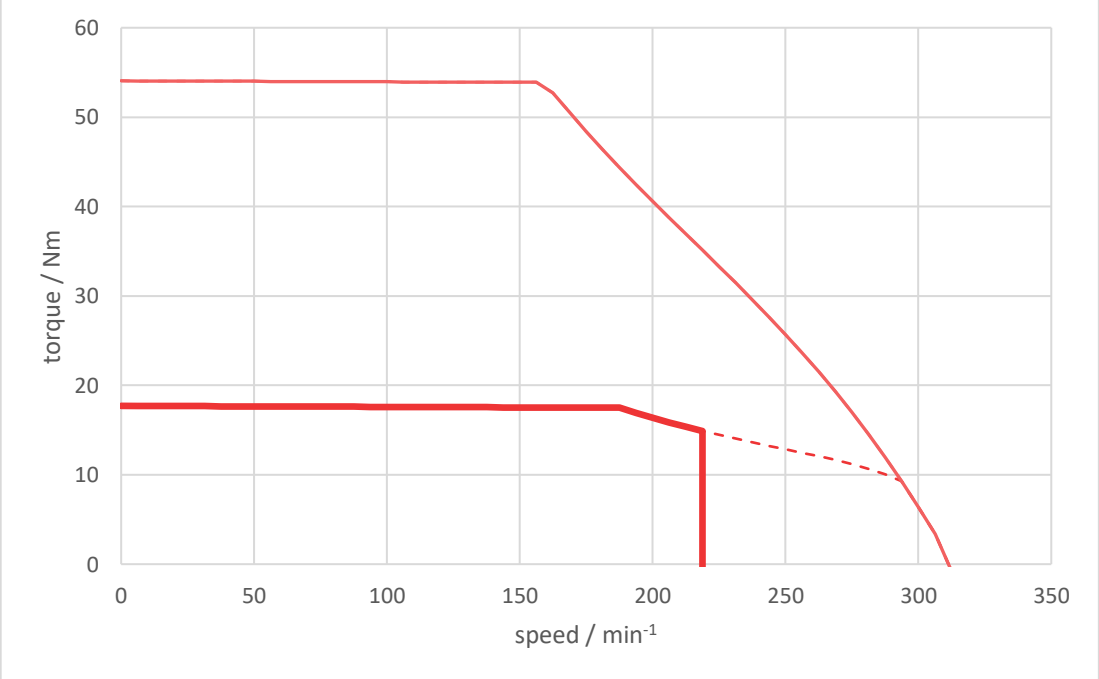
### GM-1811-00 / 200W

Gear output nom./max. torque: 5.5/17 Nm



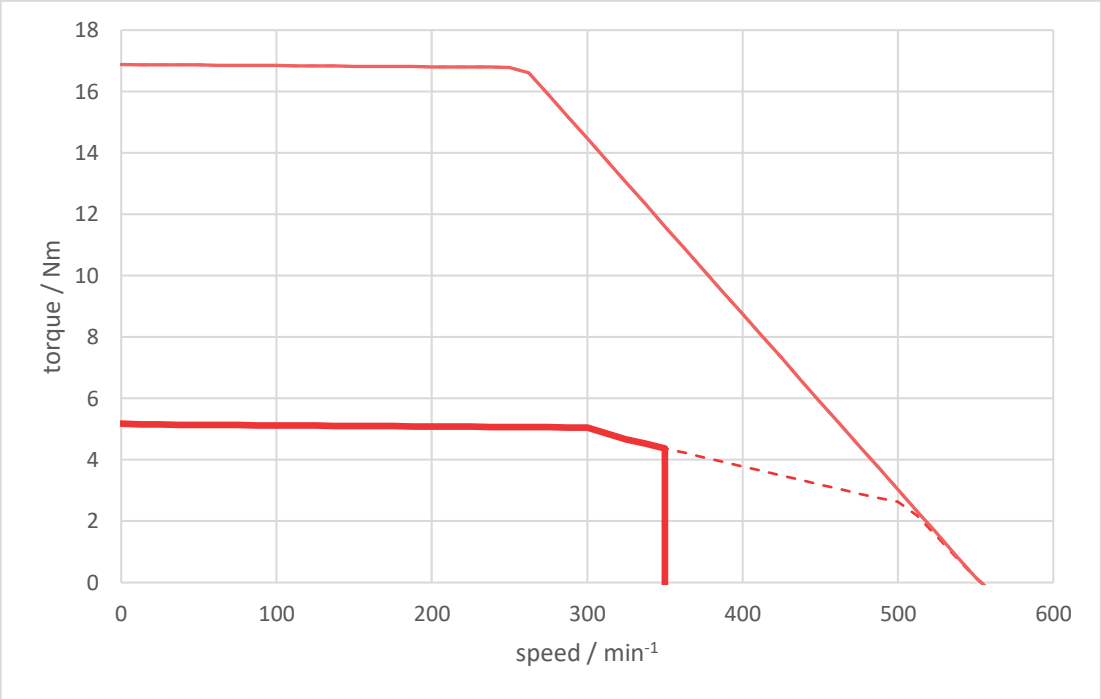

### GM-1913-00 / 400W

Gear output nom./max. torque: 17/54 Nm



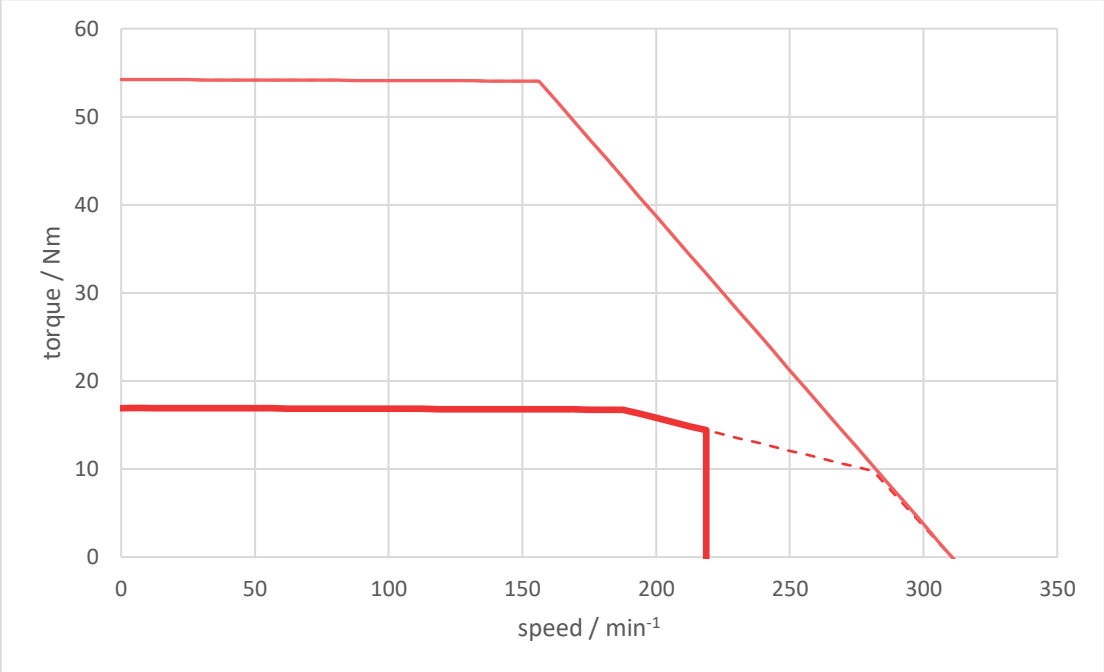
## GT-1836-00 / TIM 200W

Gear output nom./max. torque: 5.5/17 Nm




## GT-1932-00 / TIM-400W

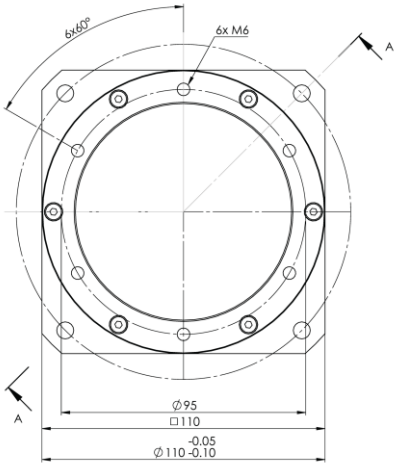
Gear output nom./max. torque: 17/54 Nm

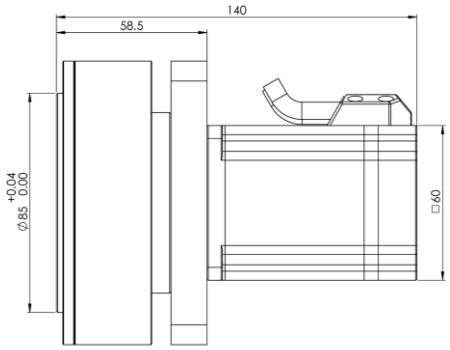


## Gearmotor Dimensions

### GM-1811-00 – Axial Mounting

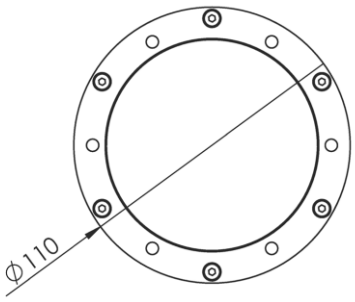
Nom./Max. torque: 6/17 Nm, with motor 200W

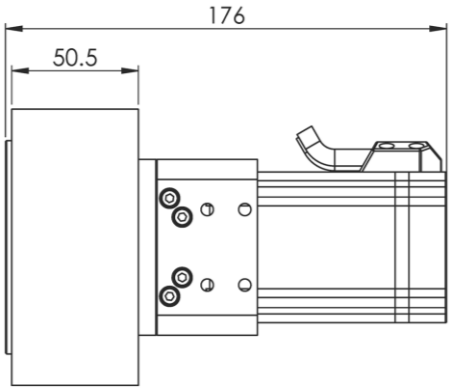



### GM-1913-00 – Radial Mounting

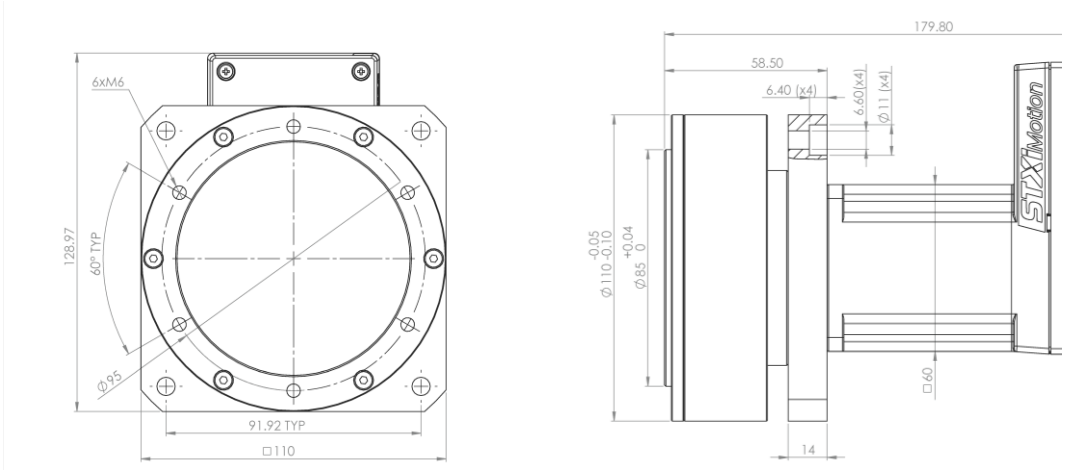
Nom./Max. torque: 18/56 Nm, with motor 400W



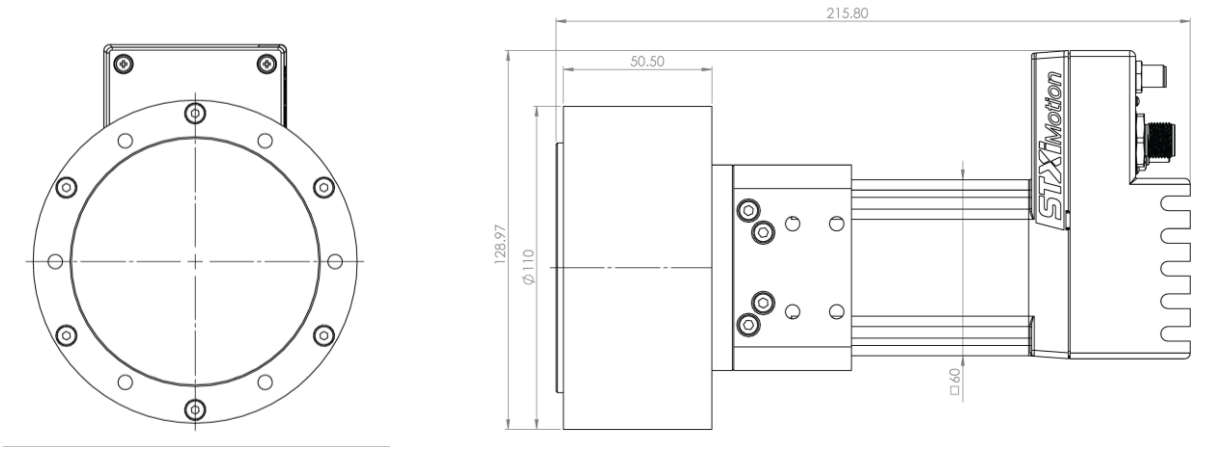
## GT-1836-00 – Axial Mounting / TIM integrated motor

Nom./Max. torque: 6/17 Nm, with motor 200W




## GT-1932-00 – Radial Mounting / TIM integrated motor

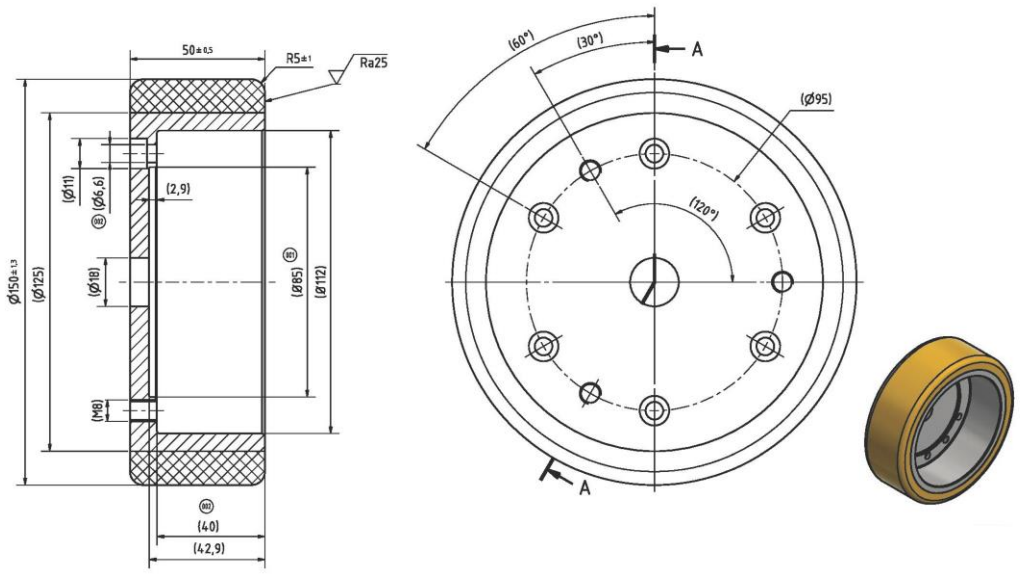
Nom./Max. torque: 18/56 Nm, with motor 400W



## Wheel Specifications

### WHL-RAD50X150MM

| | |
|---|---|
| Size | ∅ 150 mm |
| Material | High-quality polyurethane elastomer |
| Hardness | 93 Shore A |
| Weight | 1.8 kg |




Additional wheels are available in various diameters and materials.
If you have a specific requirement, contact STXI Motion.

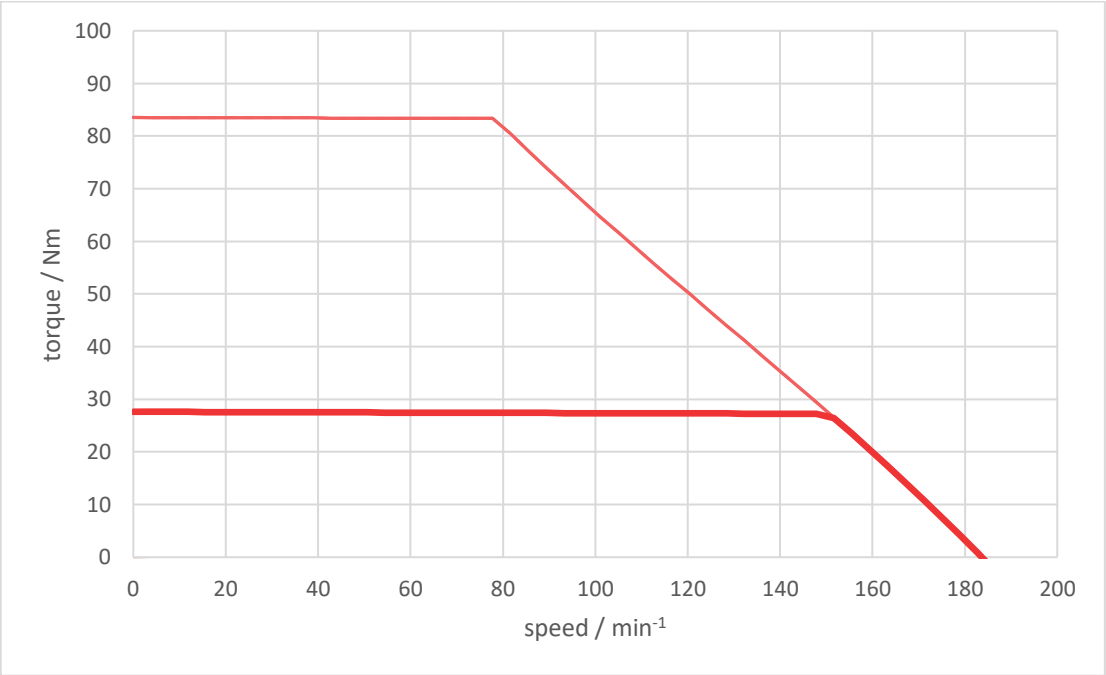
## Gearmotor 500W and 900W Specifications

| Feature | Units | GM-0807-00 | GM-0808-00 |
|---|---|---|---|
| Motor rated power | W | 500 | 900 |
| Motor voltage | VDC | 24 | 48 |
| Motor rated current | Arms | 23 | 22 |
| Feedback | | AqB, index, Halls, RS422 | AqB, index, Halls, RS422 |
| Motor temperature sensor | | PTC (NXP KTY-150) | PTC (NXP KTY-150) |
| Brake voltage | VDC | 24 ± 10% | 24 ± 10% |
| Brake power | W | 13.5 | 13.5 |
| Holding torque | Nm | 4 | 4 |
| Insulation class | | B (130°C) | B (130°C) |
| Brake switching cycles B10 @ 0 rpm | | 500,000 | 500,000 |
| Gear nom. torque | Nm | 28 | 36 |
| Gear max. torque | Nm | 84 | 120 |
| Gear level of efficiency | | 0.95 | 0.95 |
| Gear ratio | i | 22.5 | 22.5 |
| Gear rated speed | rpm | 151 | 191 |
| Gear rated speed with ∅200 mm wheel | m/sec (km/h) | 1.58 (5.7) | 2.0 (7.2) |
| Gear brake static torque | Nm | 78 | 78 |
| Gear max. radial force dynamic | N | 8,000 | 8,000 |
| Gear max. axial force | N | 500 | 500 |
| Gear lifespan at nominal torque | hr | 20,000 | 20,000 |
| Emergency stop torque | Nm | 120 | 120 |
| Weight | kg | 7.3 | 8 |
| Operating temperature | °C | -10–40 | -10–40 |
| Protection class | | IP54 | IP54 |

## Speed/Torque Curves

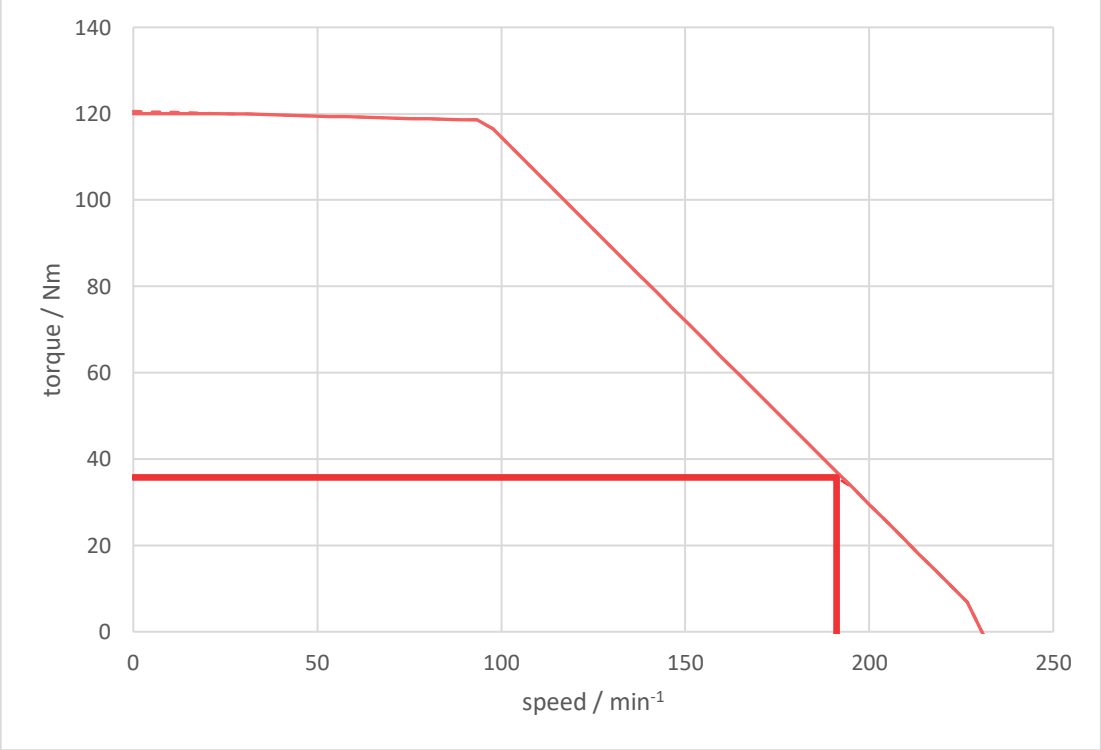
### GM-0807-00 / 500W

Gear output nom./max. torque: 28/84 Nm




### GM-0808-00 / 900W

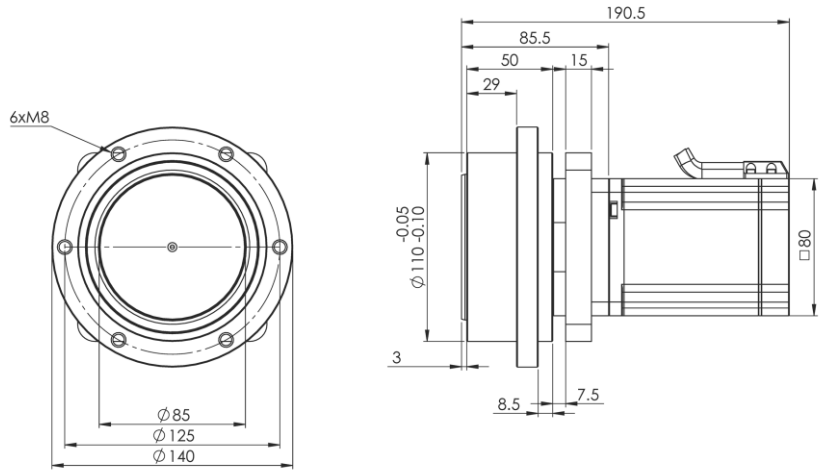
Gear output nom./max. torque: 36/120 Nm



## Gearmotor Dimensions

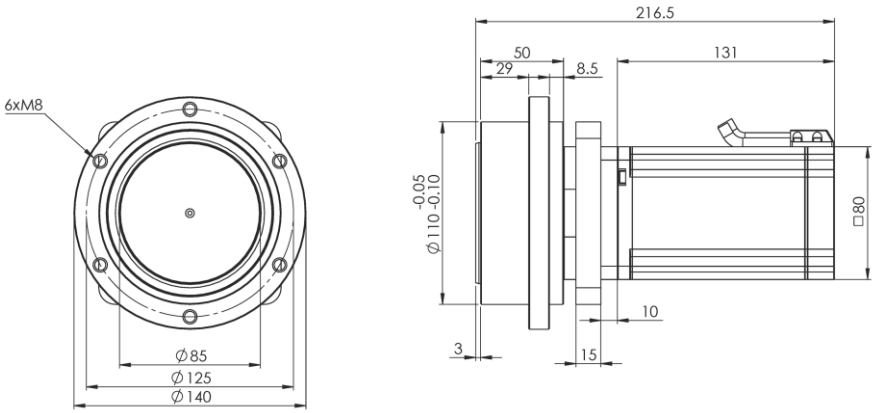
### GM-0807-00 – Axial Mounting

Nom./Max. torque: 28/84 Nm, with motor 500W




### GM-0808-00 – Axial Mounting

Nom./Max. torque: 36/119 Nm, with motor 900W




## Wheel Specifications

**Note**: *Gearmotors 500W and 900W use the same wheel as gearmotors 480W and 800W. See below for wheel specifications.*

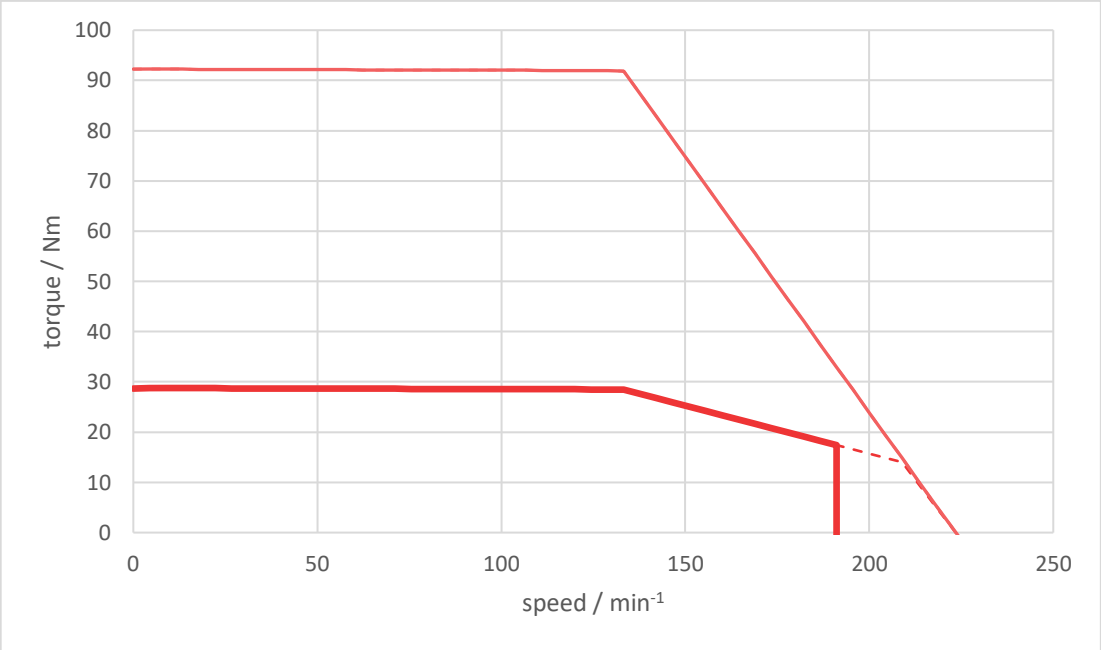
## Gearmotor 480W and 800W Specifications / TIM Integrated Motor

| Feature | Units | GT-0840-00 | GT-2544-00 |
|---|---|---|---|
| Motor rated power | W | 480 | 800 |
| Motor voltage | VDC | 48 | 48 |
| Motor rated current | Arms | 14.60 | 22 |
| Feedback | | AqB, index, Halls, RS422 | AqB, index, Halls, RS422 |
| Motor temperature sensor | | PTC (NXP KTY-150) | PTC (NXP KTY-150) |
| Brake voltage | VDC | 24 ± 10% | 24 ± 10% |
| Brake power | W | 13.5 | 13.5 |
| Holding torque | Nm | 4 | 4 |
| Insulation class | | B (130°C) | B (130°C) |
| Brake switching cycles B10 @ 0 rpm | | 500,000 | 500,000 |
| Gear nom. torque | Nm | 29 | 45 |
| Gear max. torque | Nm | 92 | 120 |
| Gear level of efficiency | | 0.95 | 0.95 |
| Gear ratio | i | 22.5 | 22.5 |
| Gear rated speed | rpm | 133 | 133 |
| Gear rated speed with ∅200 mm wheel | m/sec (km/h) | 1.39 (5.0) | 1.39 (5.0) |
| Gear brake static torque | Nm | 78 | 78 |
| Gear max. radial force dynamic | N | 8,000 | 8,000 |
| Gear max. axial force | N | 500 | 500 |
| Gear lifespan at nominal torque | hr | 20,000 | 20,000 |
| Emergency stop torque | Nm | 120 | 120 |
| Weight | kg | 4.2+TIM | 4.2+TIM |
| Operating temperature | °C | -10–40 | -10–40 |
| Protection class | | IP54 | IP54 |

## Speed/Torque Curves

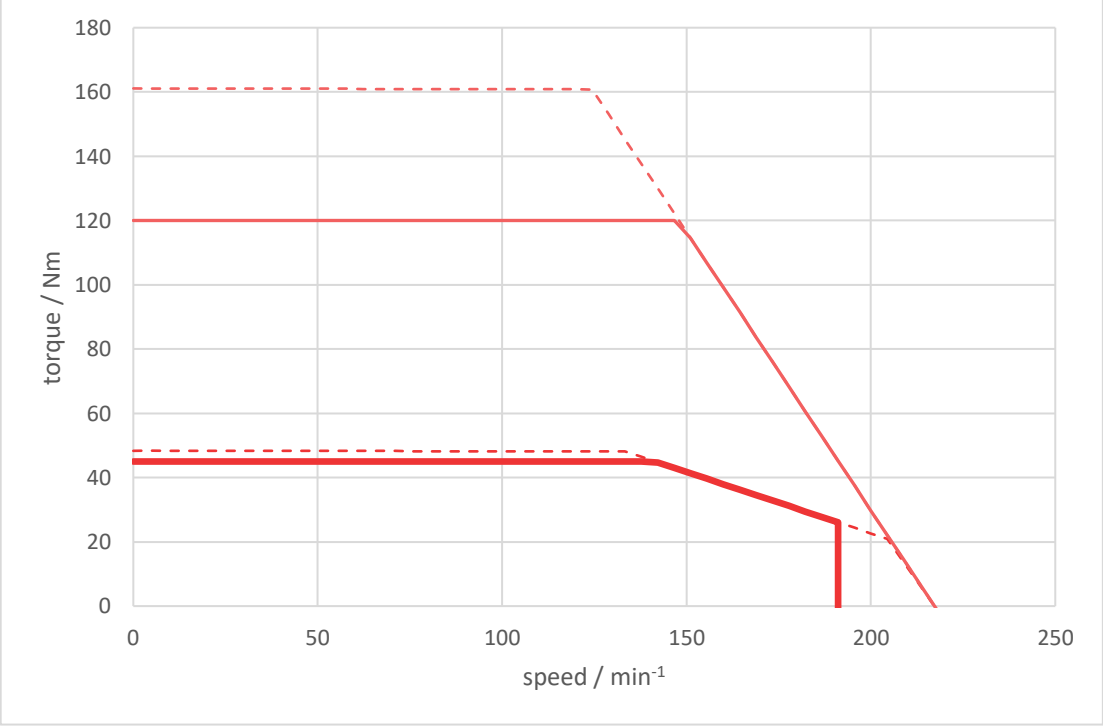
### GT-0840-00 / TIM-480W

Gear output nom./max. torque: 29/92Nm




### GT-2544-00 / TIM-800W

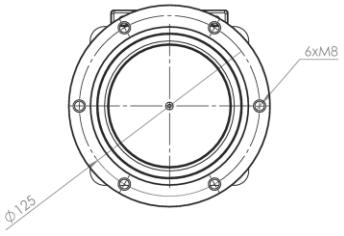
Gear output nom./max. torque: 45/120 Nm

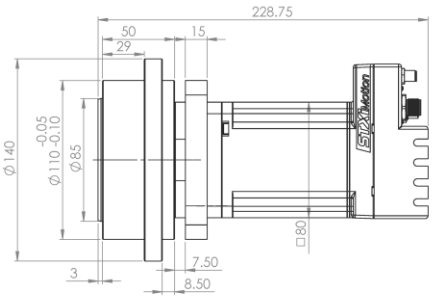


## Gearmotor Dimensions

### GT-0840-00 – Axial Mounting

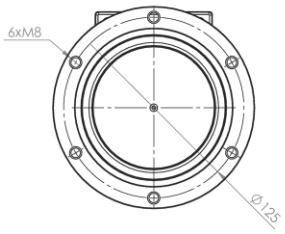
Nom./Max. torque: 32/98 Nm, with TIM 480W

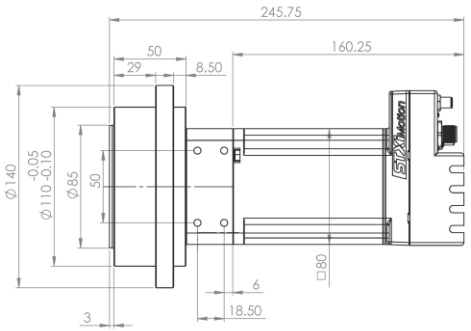



### GT-2544-00 – Radial Mounting

Nom./Max. torque: 45/120 Nm, with TIM 800W



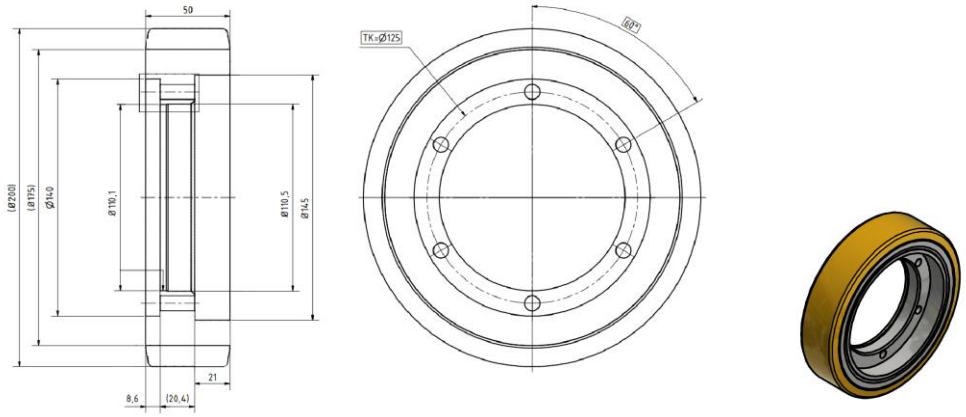



## Wheel Specifications

**Note**: *Gearmotors 500W and 900W also use this wheel.*

### WHL-RADVUL93200

| | |
|---|---|
| Size | ∅ 200 mm |
| Material | VULKOLLAN® |
| Hardness | 93 Shore A |
| Weight | 4.95 kg |




Additional wheels are available in various diameters and materials.
If you have a specific requirement, contact STXI Motion.

# TIM IntegratedTIM Integrated Servo Motors

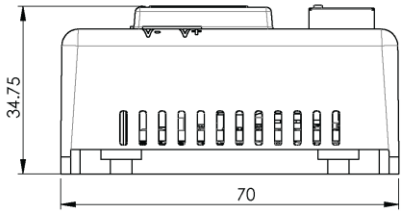
| Servo Drive | Product Model | Main Features |
|---|---|---|
|  | IM1-60S – 200 W | Input bus: 48 VDC<br>Continuous current: 6.50 Arms |
| | IM1-60M – 400 W | Input bus: 48 VDC<br>Continuous current: 12.00 Arms |
| | IM1-80S – 480 W | Input bus: 48 VDC<br>Continuous current: 14.60 Arms |
| | IM1-80M – 800 W | Input bus: 48 VDC<br>Continuous current: 22.00 Arms |
| |  | P1: Power<br>C1: 3x Digital input, 1x Digital output<br>C2: STO, Brake, RS232<br>C3: CANopen / EtherCAT – OUT<br>C4: CANopen / EtherCAT – IN<br><br>Feedback: Absolute single turn encoder<br>Protection: IP54 |
| | *For details, refer to the TIM datasheet* | |

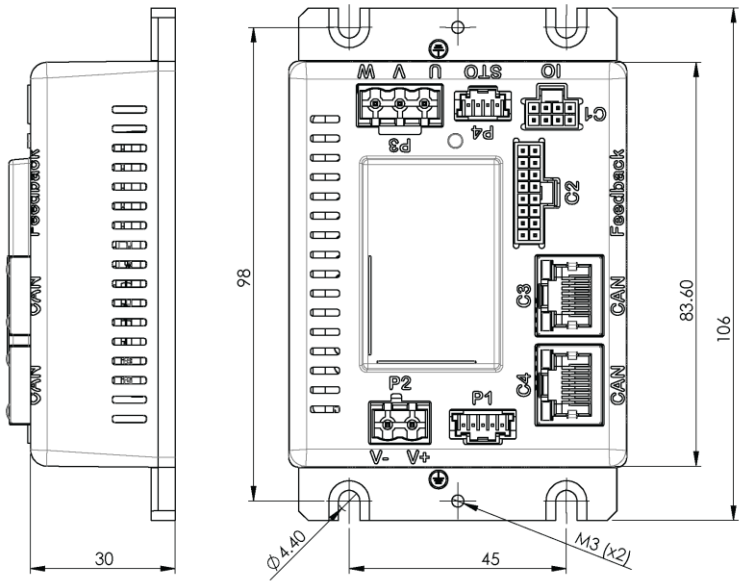
# ZED Servo Drives

## SD01-015

| Servo Drive | Product Model | Main Features |
|---|---|---|
|  | ZED SD01-015 | Input bus: 24 VDC<br>Input logic: 24 VDC<br>Continuous current: 12/14.4(*) Arms<br>Peak current: 40 Arms<br>CANopen<br>Encoder 12-bit incremental, RS422 communication, differential quadrature, index pulse, single-ended Halls<br>STO<br>IP20<br>3x digital input<br>1x digital output<br>1x analog input<br>(*) *with heatsink* |
| Mating connectors | | For details, refer to the *ZED User Manual* |

| Feature | Specification | |
|---|---|---|
| Mounting | | brick |
| Weight | kg | 0.3 |
| Dimensions (LxWxH) | mm | 70 x 106 x 34.75 |

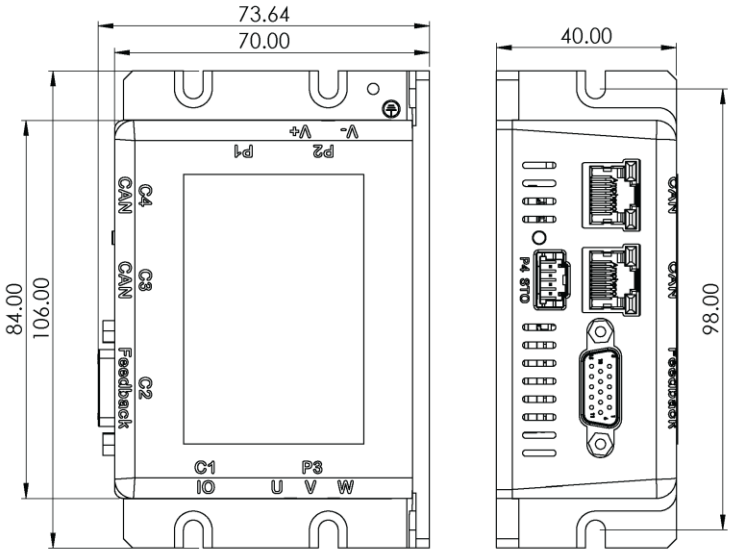


## SD01-025 | SD01-030

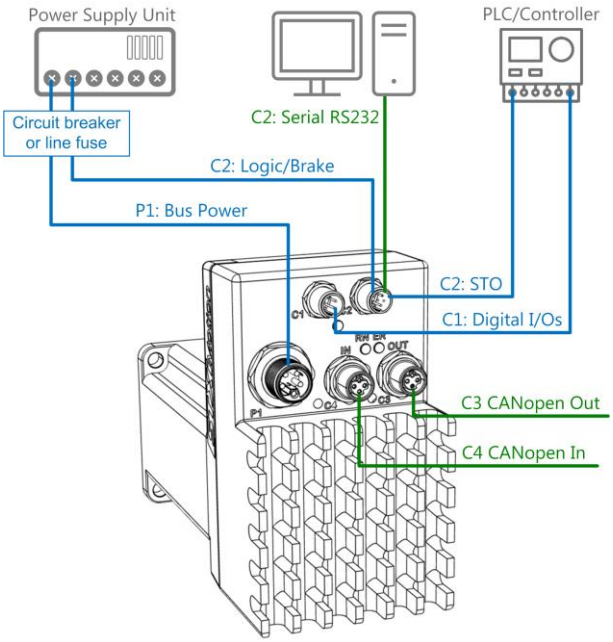
| Servo Drive | Product Model | Main Features |
|---|---|---|
|  | **ZED SD01-025** | Input bus: 48 VDC<br>Input logic: 24 VDC<br>Continuous current: 18/20(*) Arms<br>Peak current: 63 Arms<br>CANopen<br>Encoder 12-bit incremental, RS422 communication, differential quadrature, index pulse, single-ended Halls<br>STO<br>IP20<br>4x digital input<br>2x digital output<br>(*) *with heatsink* |
|  | **ZED SD01-030** | Input bus: 24 VDC<br>Input logic: 24 VDC<br>Continuous current: 20/23(*) Arms<br>Peak current: 70 Arms<br>CANopen<br>Encoder 12-bit incremental, RS422 communication, differential quadrature, index pulse, single-ended Halls<br>STO<br>IP20<br>4x digital input<br>2x digital output<br>(*) *with heatsink* |
| Mating connectors | | For details, refer to the *ZED User Manual* |

| Feature | Specification | |
|---|---|---|
| Mounting | | book, brick |
| Weight | kg | 0.3 |
| Dimensions (LxWxH) | mm | 70 x 102 x 40 |



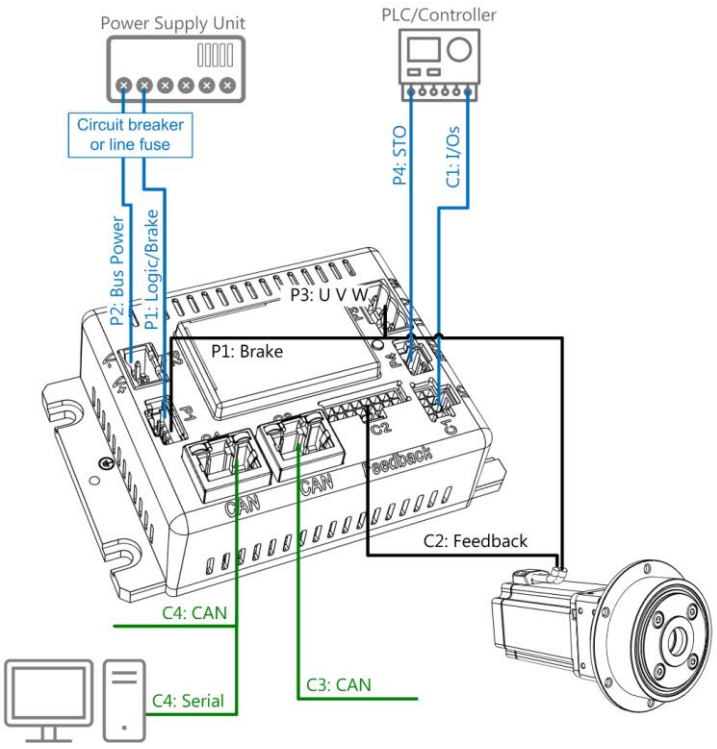
# System Wiring

## TIM-GT Wiring

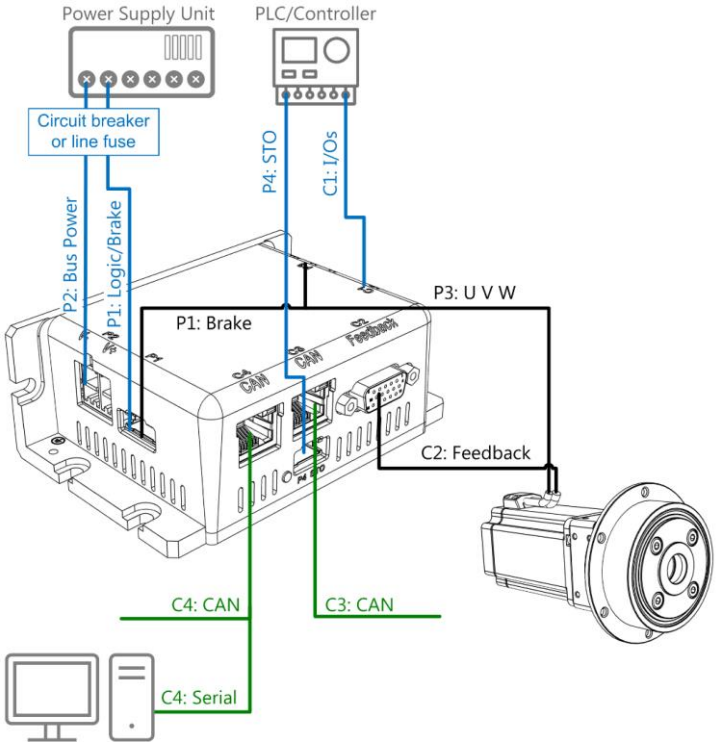


## ZED – MOT-GM Wiring

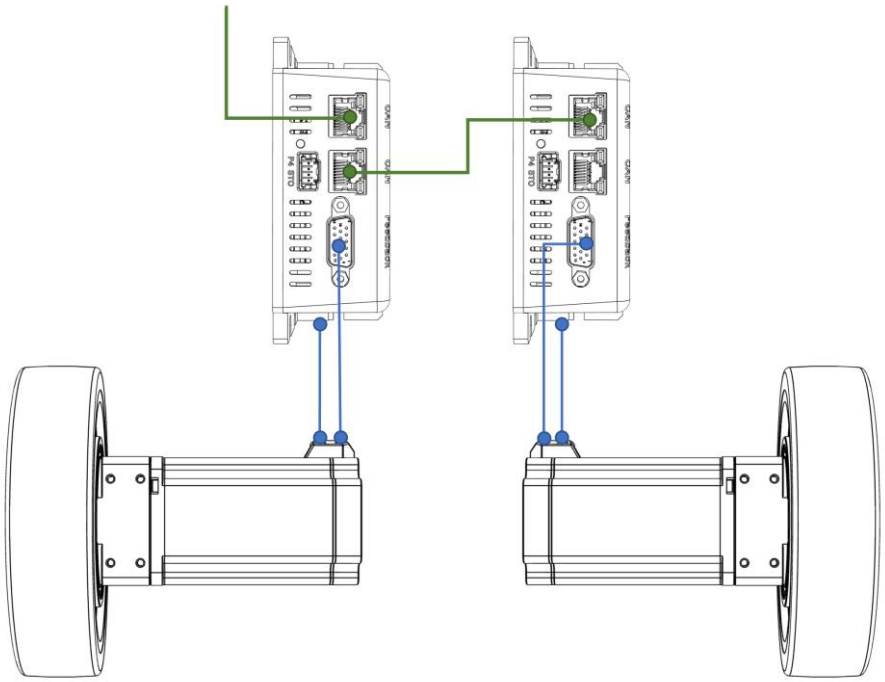
### ZED SD-015




### ZED SD-025 | ZED SD-030



## Wiring Example for Differential AGV/AMR Application



green: CANopen connections
blue: Motor power and feedback connections