

Sumitomo Drive Technologies



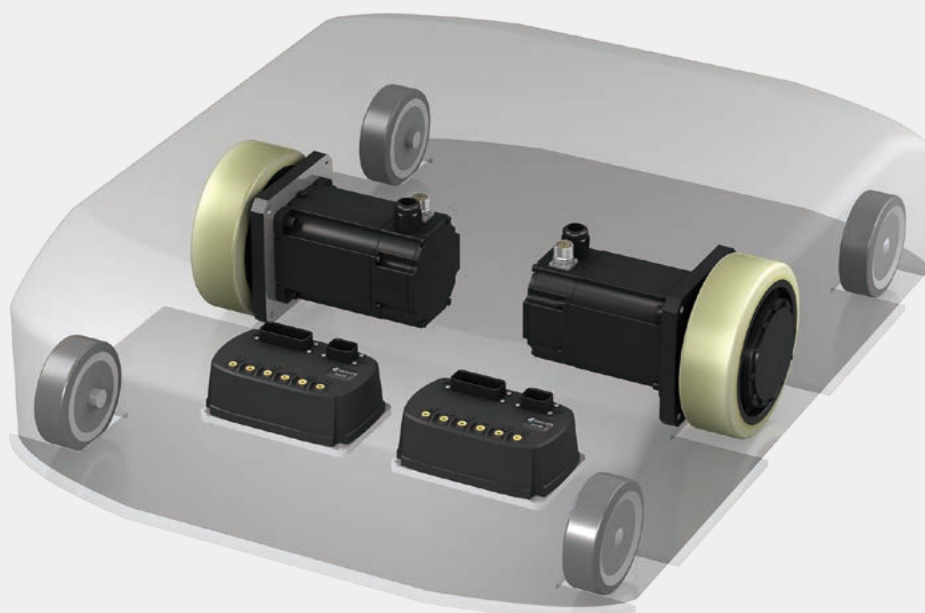
Drive Solution for AGV/AMR



Combination of three smart components.

**Creating a compact, integrated and intelligent solution of:
Gear + Servo Motor + Drive for AGV/AMRs in one package!**

The necessary components are packaged together, making it easy to design and manufacture AGV/AMRs.



Features

Compact

The in-wheel structure realizes space-saving in AGV/AMRs. It contributes to lower the height of AGV/AMRs and more effective use of internal space.

Capable of supporting a wide range of payloads

Multiple sizes and reduction ratios are available, allowing you to design AGVs and AMRs that support a wide range of payloads.

High performance servo control

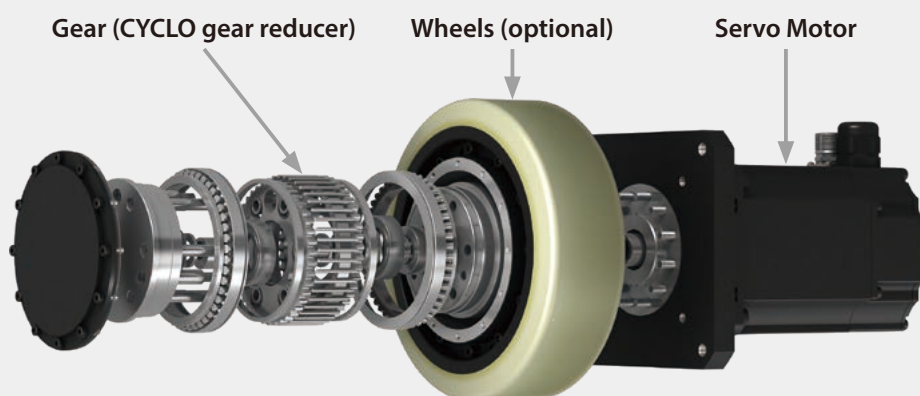
High speed, high precision, and high responsiveness are achieved by high-resolution servo control (the drive's internal control resolution is 16384 inc/rev).

The system can operate at an industry-leading max speed of 2.0m/s and max acceleration of 1.0m/s².

Superior safety

The CYCLO gear reducer principle with excellent impact resistance is used for the gear part.

With a focus on compliance with "ISO 3691-4: 2020 Industrial Trucks - Safety Requirements and Verification" and "JIS D 6802: 2022 Automated Guided Vehicles and Automated Guided Vehicle Systems - Safety Requirements and Verification", an optional version with STO (Safe Torque Off) capabilities is also available.



Example of AGV/AMR Configuration

This is an example configuration of an AGV/AMR drive system. Depending on configuration conditions, it is possible to support a payload of over 3,000 kg.

We will propose the optimal smartris to maximize AGV/AMR performance.

AGV/AMR

| Payload (AGV/AMR body + cargo) | kg | 800 | 1100 | 1800 | 3000 |
|--------------------------------|------------------|------|------|------|------|
| Number of Driving Wheels | | 2 | 2 | 2 | 2 |
| Number of Supporting Wheels | | 4 | 4 | 4 | 4 |
| Load per Supporting Wheel | kg | 125 | 125 | 125 | 250 |
| Max AGV/AMRs Speed | m/s | 2.00 | 2.00 | 2.00 | 1.78 |
| Max AGV/AMRs Acceleration | m/s ² | 1.0 | 1.0 | 1.0 | 1.0 |
| Wheel Diameter | mm | 180 | 200 | 200 | 250 |
| Rated Wheel Torque | N·m | 15.8 | 24.0 | 39.3 | 80.9 |
| Rated Wheel Output | W | 392 | 537 | 878 | 1320 |

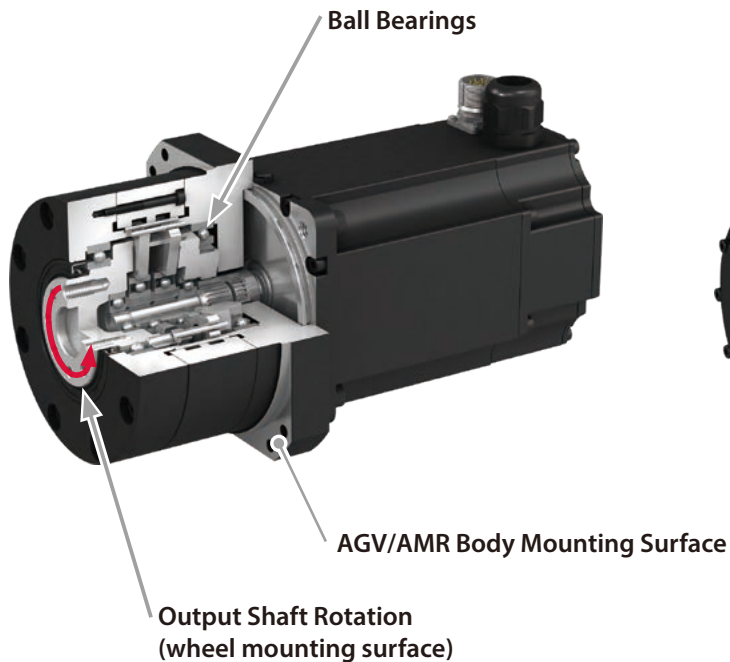
smartris

| Type | ECO | | PRO | |
|----------------------|-------|-------|-------|-------|
| Size | S | M | M | L |
| Gearmotor Frame Size | 5087E | 5097E | 5097P | 5107P |
| Reduction Ratio | 21 | 21 | 22 | 22 |

Gearmotor (Gear + Servo Motor) Specifications

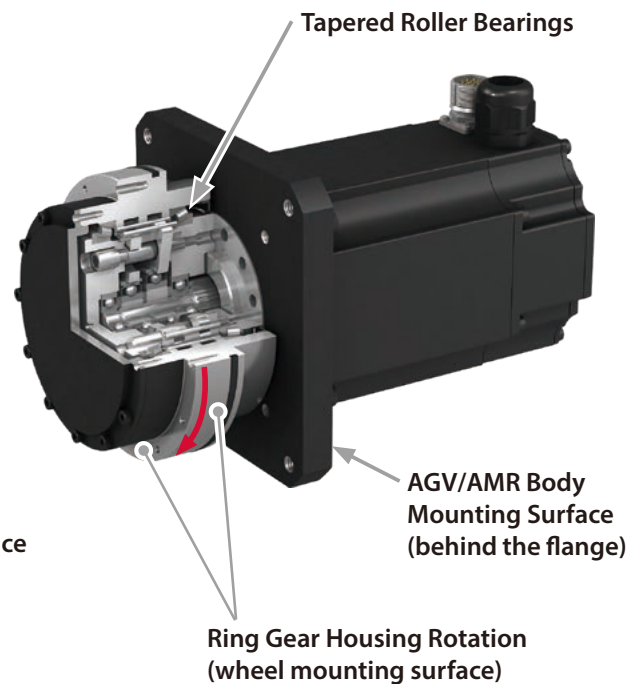
ECO Type

- Output Shaft Rotation
- For Light Payload Machines



PRO Type

- Ring Gear Housing Rotation
- High Radial Payload



| Type | | ECO | | | | | | PRO | | | | | |
|---|-------|--|------|------|-------|------|------|--|------|-------|------|------|--|
| Size | | S | | | M | | | M | | L | | | |
| Gearmotor Frame Size | | 5087E | | | 5097E | | | 5097P | | 5107P | | | |
| Voltage | VDC | 48 | | | | | | 48 | | | | | |
| Allowable Radial Load per Driving Wheel | N | 1500 | | | 3000 | | | 6500 | | 10000 | | | |
| Reduction Ratio | | 21 | 25 | 29 | 21 | 25 | 29 | 22 | 26 | 22 | 26 | 30 | |
| Max Motor Speed | r/min | 4500 | | | 4500 | | | 4500 | | 3000 | | | |
| Max Wheel Speed | r/min | 214 | 180 | 155 | 214 | 180 | 155 | 205 | 173 | 136 | 115 | 100 | |
| Rated Wheel Torque | N·m | 16.0 | 18.9 | 18.9 | 39.3 | 40.4 | 40.5 | 39.3 | 40.4 | 84.7 | 87.5 | 80.3 | |
| Peak Wheel Torque (2s) | N·m | 61.9 | 73.7 | 84.8 | 145 | 179 | 207 | 145 | 179 | 294 | 360 | 246 | |
| Ambient Temperature | °C | -10 to +40 (0 to +40 if fitted with optional wheels) | | | | | | -10 to +40 (0 to +40 if fitted with optional wheels) | | | | | |
| Ambient Humidity | %RH | 85 or less (20 to 80 if fitted with optional wheels) with no condensation | | | | | | 85 or less (20 to 80 if fitted with optional wheels) with no condensation | | | | | |
| Protection Class | | IP54 | | | | | | IP54 | | | | | |
| Thermal Class | | Motor: 155 (F), Brake: F | | | | | | Motor: 155 (F), Brake: F | | | | | |
| Output Type | | Output Shaft Rotation | | | | | | Ring Gear Housing Rotation | | | | | |

Note) 1. Allowable radial load of ECO type is a value at the position inside the output shaft end face.

Allowable radial load of PRO type is a value at the center of the gear part.

2. The motor/brake power cable brakes will be shipped attached to the motor via a cable gland. (with cable length: 1 m)

Standard Specifications

| | |
|---------------------------------|--|
| Rotation Feedback | Resolver with a resolution of 4096 ^{Note) 1} (provided with a 1 m cable) |
| Brake ^{Note) 2} | PM brake (for holding) |
| Wheel | The wheels are to be prepared by the customer, but they can also be provided by the manufacturer as an option. |

Options

| Rotation Feedback ^{Note) 3} | Absolute encoder with a resolution 4096 ^{Note) 1} (provided with a 1 m cable), or absolute encoder with optional safety features with a resolution of 4096 ^{Note) 1} (provided with a 1 m cable) | | | |
|---|--|---------|---|---------|
| Wheels ^{Note) 4} | Wheels with urethane tires | | | |
| Type | ECO | | PRO | |
| Size | S | M | M | L |
| Gearmotor Frame Size | 5087E | 5097E | 5097P | 5107P |
| Wheel Size | Ø180×65 | Ø200×65 | Ø200×66 | Ø250×75 |
| Allowable Radial Load per Driving Wheel | N | 1500 | 3000 | 6500 |
| Wheel | | | | |
| Allowable Speed | m/s | 2.00 | 2.00 | 2.00 |
| Tire Material | Urethane hardness 90 (JIS A) | | Urethane hardness 90 (JIS A) | |
| Accessories | M6 bolts 10pcs M6 washers 10pcs | | M5 bolts 12pcs M5 washers 12pcs O-ring G-140 1pcs | |
| | M8 bolts 8pcs M8 washers 8pcs | | M6 bolts 12pcs M6 washers 12pcs O-ring AS568-261 1pcs | |

Note) 1. The control resolution inside the drive is 16384 inc/rev.

2. The brake is for holding when parked and cannot be used for braking. Contact us if you wish to use the product for braking, such as an emergency stop.

3. Select an absolute encoder-compatible drive.

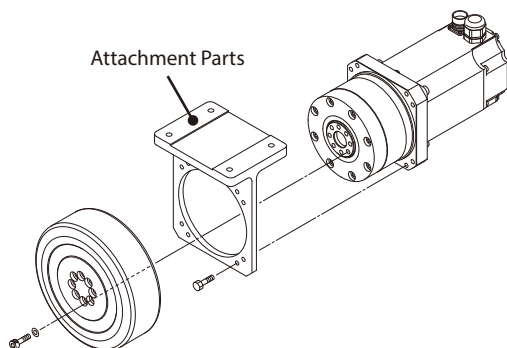
4. Intended for use in indoor area with smooth concrete surface and good electrical discharge properties. Cannot be used on wet, oily or dirty surfaces.

5. The allowable radial load is the same as for the standard specification (without wheels).

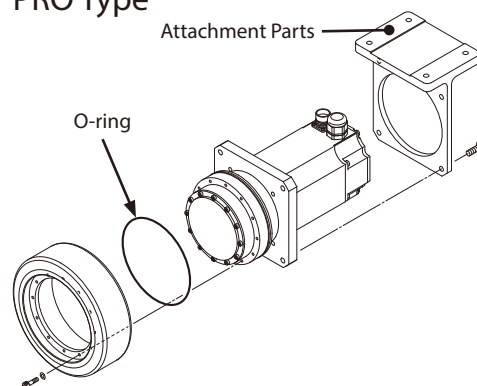
6. Wheels and accessories are shipped together with but not assembled to the gearmotor.

How to Install the Product on an AGV/AMR

ECO Type



PRO Type

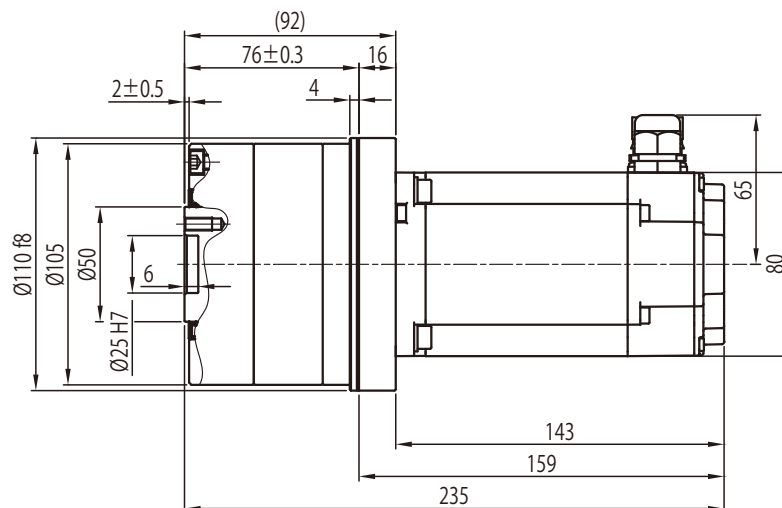
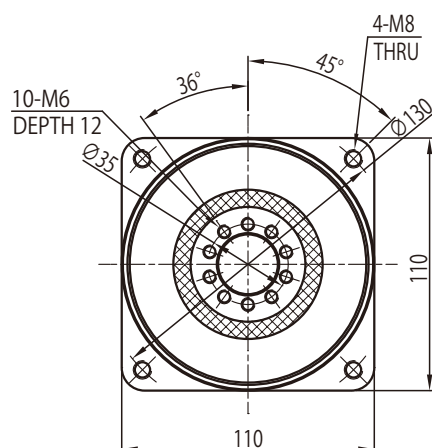


- For the ECO type, the gearmotor must be installed on the AGV/AMR body before the wheels are installed.
- Attachment parts are not included.
- If the wheels are prepared by the customer, please prepare the bolts, washers, and O-rings by yourself. Optional wheels will be provided with all the wheel accessories listed in the option column.
- For details such as the tightening torque, refer to the instruction manual.

Dimensional Drawing of ECO Type

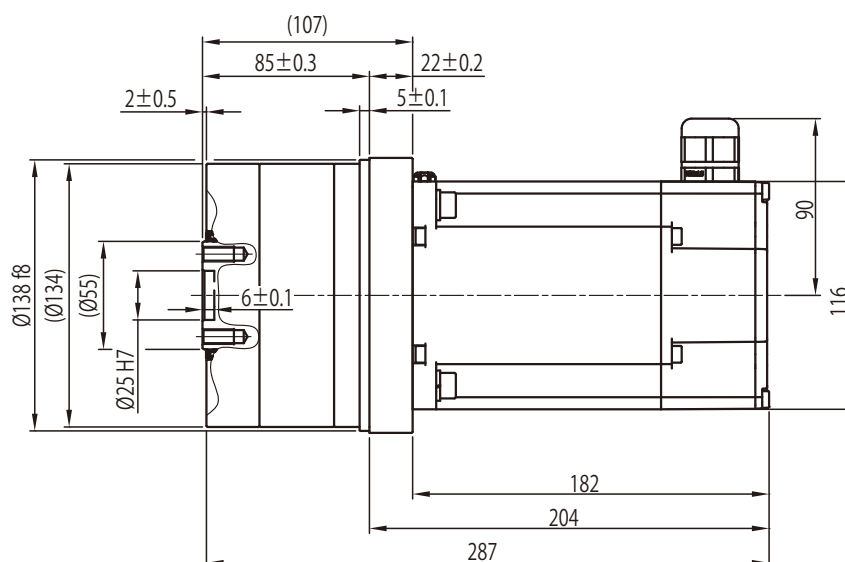
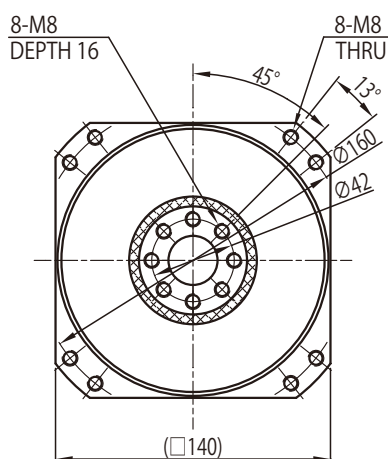


ECO S/5087E



Mass: 5.6kg

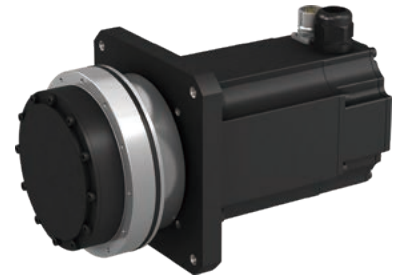
ECO M/5097E



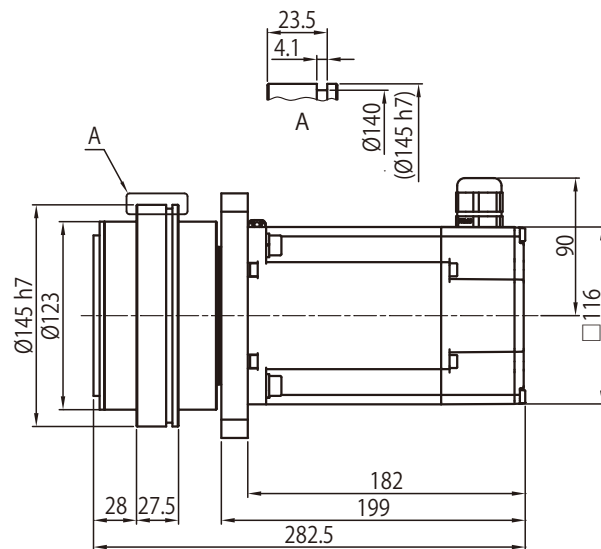
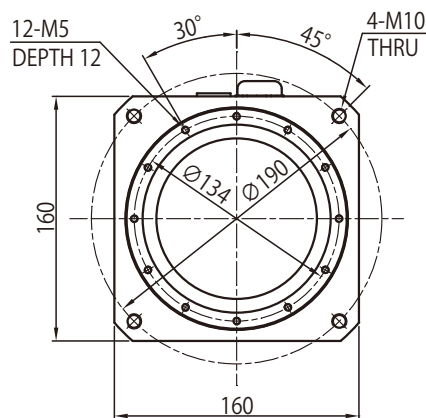
Mass: 11.3kg

Note) 1. The wheels need to be prepared by the customer, but they can also be provided by the manufacturer as an option.
2. Shown are the dimensions where a resolver is used for rotation feedback. Inquire for dimensions with an absolute encoder.

Dimensional Drawing of PRO Type

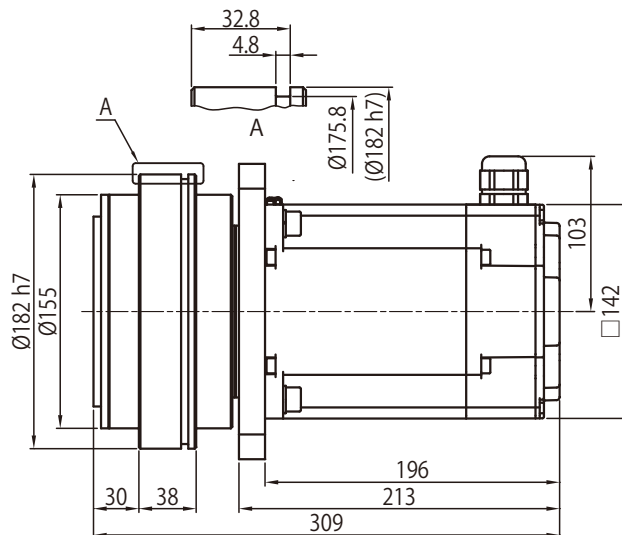
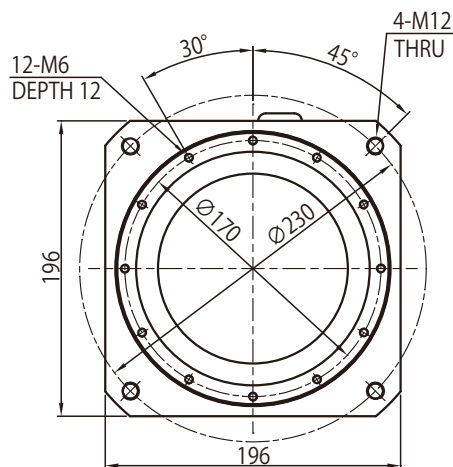


PRO M/5097P



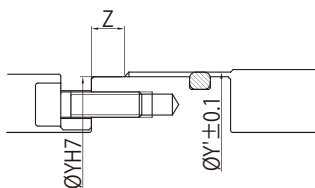
Mass: 14.5kg

PRO L/5107P



Mass: 24.5kg

Recommended Inner Dimensions of Processed Wheel for Mounting



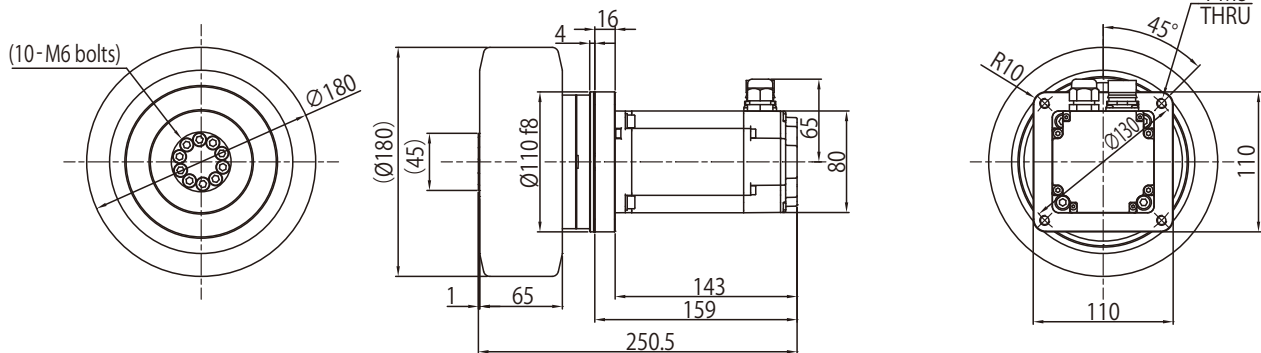
| Size | Frame Size | Spigot Width | Spigot Inner Diameter Y | O-ring Inner Diameter Y' | O-ring (Nitrile Rubber) | |
|------|------------|--------------|-------------------------|--------------------------|-------------------------|--------------------------------|
| | | | | | Part Number | Wire Diameter × Inner Diameter |
| M | 5097P | 6 | 145 | 145.5 | G-140 | 3.1×139.4 |
| L | 5107P | 8 | 182 | 182.5 | AS568-261 | 3.53×171.04 |

- Note) 1. The wheels need to be prepared by the customer, but they can also be provided by the manufacturer as an option.
 2. Shown are the dimensions where a resolver is used for rotation feedback. Inquire for dimensions with an absolute encoder.
 3. Mount O-ring (to be prepared by the customer) to prevent molybdenum disulfide grease (an anti-fretting agent) applied to the spigot part from leaking outside through any gaps.

Dimensional Drawing of ECO Type (with optional wheels)

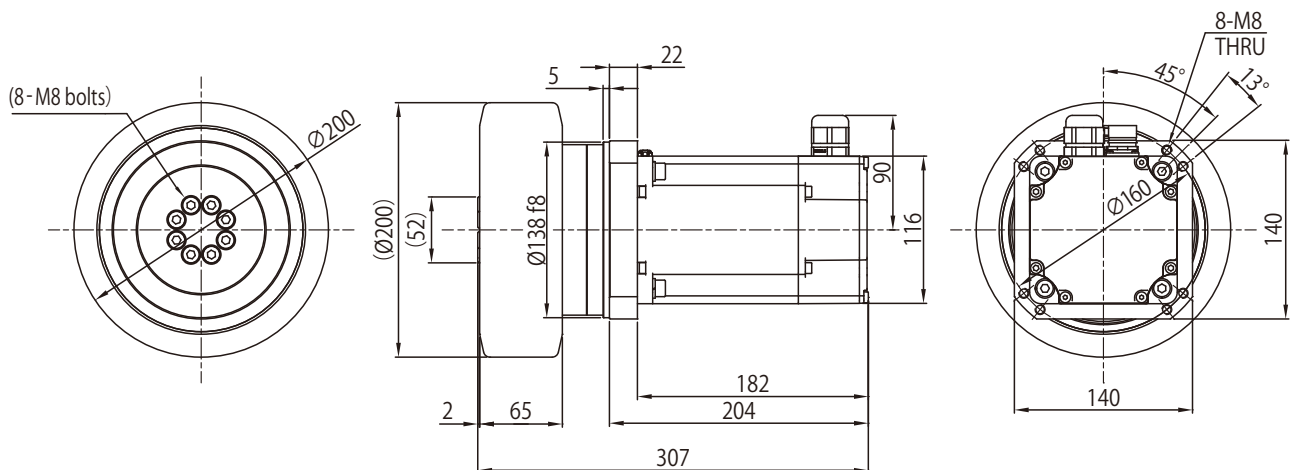


ECO S/5087E



Mass: 9.3kg

ECO M/5097E



Mass: 15.6kg

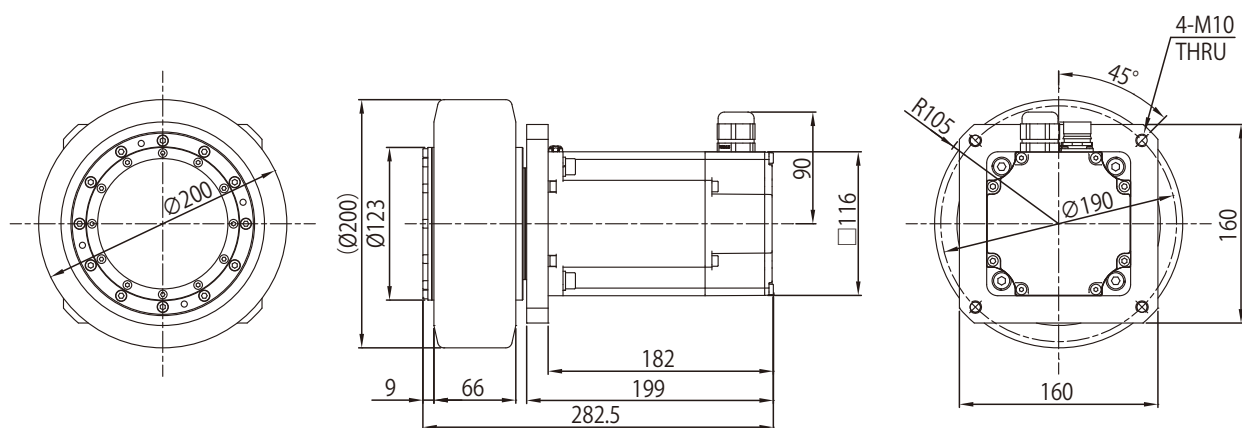
Note) 1. The wheels are shipped together with the tightening bolts and washers without being assembled to the gearmotor.

2. Shown are the dimensions where a resolver is used for rotation feedback. Inquire for dimensions with an absolute encoder.

Dimensional Drawing of PRO Type (with optional wheels)

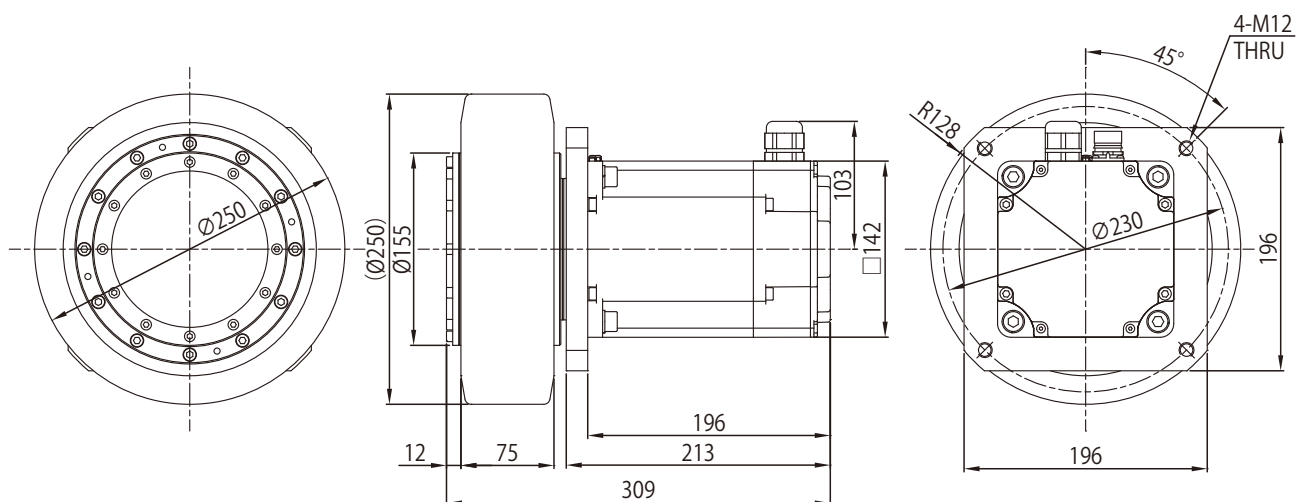


PRO M/5097P



Mass: 17.5kg

PRO L/5107P

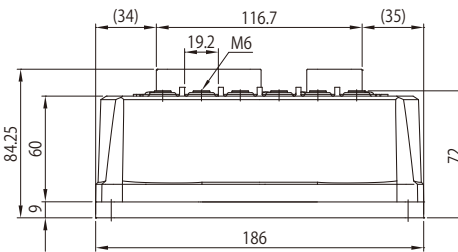
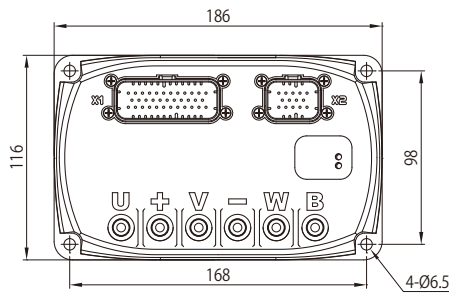


Mass: 29.7kg

Note) 1. The wheels are shipped together with the tightening bolts, O-ring and washers without being assembled to the gearmotor.
2. Shown are the dimensions where a resolver is used for rotation feedback. Inquire for dimensions with an absolute encoder.

Drive Dimensions and Specifications

- Gain control adjusted for common AGV/AMR applications
- Implements CANopen (DS402) or RS-485 Modbus RTU
- Equipped with emergency stop input function



Mass: 1.6kg



| Type | | ECO | | PRO | |
|----------------------|------|---|-------|-------|-------|
| Size | | S | M | M | L |
| Gearmotor Frame Size | | 5087E | 5097E | 5097P | 5107P |
| Drive Nomenclature | | AG110 | AG110 | AG110 | AG120 |
| Rated Current | Arms | 12.5 | 25.8 | 25.8 | 35.8 |
| Peak Current (2s) | Arms | 41.0 | 96.3 | 96.3 | 136.2 |
| Peak Current (10s) | Arms | 24.9 | 57.5 | 57.5 | 81.3 |
| Voltage | | VDC 48 (30-60) | | | |
| Rotation Feedback | | Resolver (absolute encoder is available as an option) | | | |
| Communication Method | | Implements CANopen (DS402) or RS-485 Modbus RTU ^{Note) 1} | | | |
| Control Mode | | Speed control, torque control | | | |
| Digital Input | | Two inputs ^{Note) 2} Photocoupler insulation (24V±20%, 7mA, with an input impedance of 3kΩ) can be used with either sink logic or source logic | | | |
| Digital Output | | Two outputs ^{Note) 2} Photocoupler insulation (24V±20%, 100mA) can be used with sink logic or source logic | | | |
| Safety Function | | Available with or without STO (Safe Torque Off) capabilities | | | |
| Protection Class | | IP54 | | | |
| Certification | | CE, UL, KC ^{Note) 4} | | | |

Note) 1. Contact us about analog mode applications.

2. Four points can be used in analog mode.

3. Power cable and control cable are not attached.

4. If UL or KC compliance is required, be sure to specify when ordering.



Controller

The controller is not included in the smartris package.

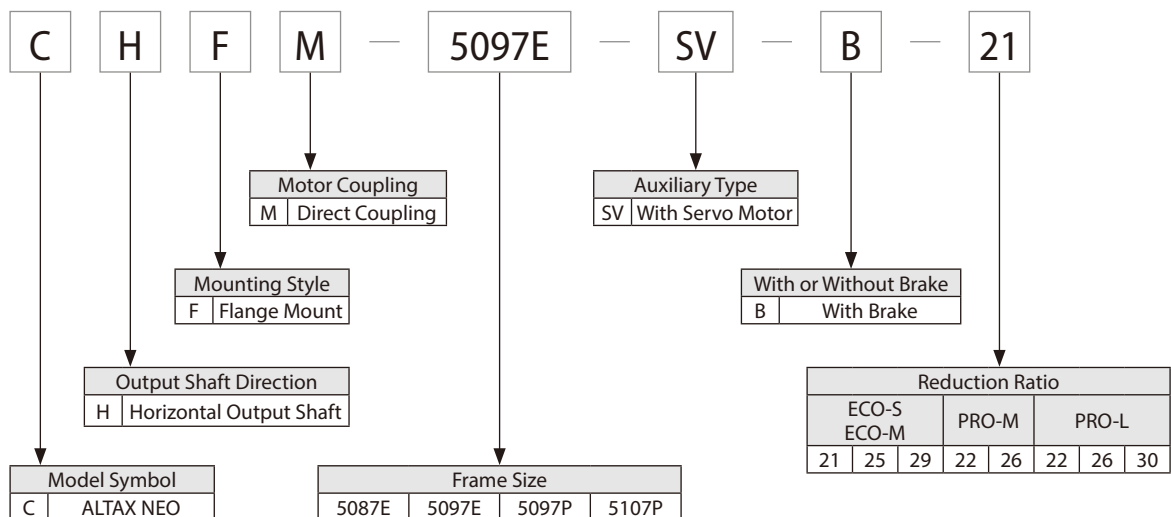
The product has been tested and verified to work with the following controllers in communication mode.

- BlueBotics/Autonomous navigation system ANT lite+ (CANopen)
- Hitachi Industrial Equipment Systems Co., Ltd./Laser positioning system ICHIDAS, industrial controller HX series (RS-485 Modbus RTU)

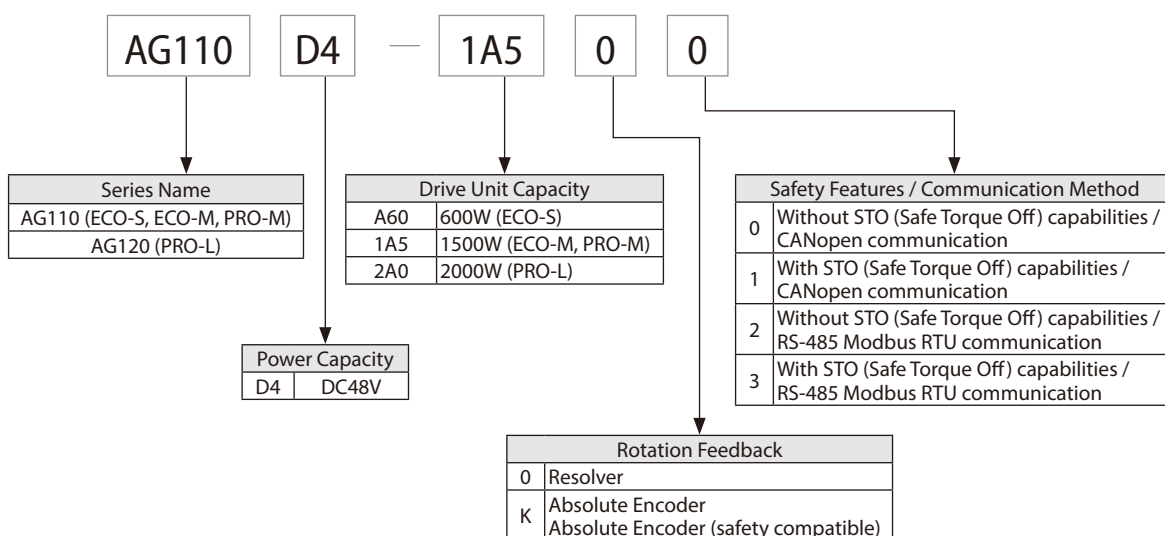
Contact us for further details.

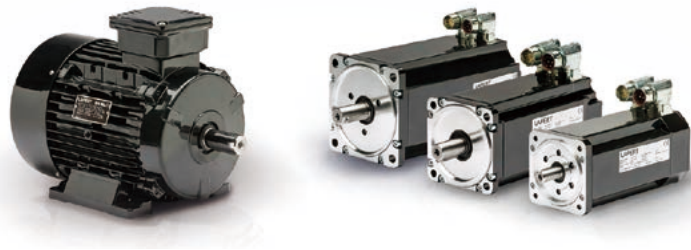
Nomenclature

Gearmotor (Gear + Servo Motor)



Drive





Smartris products use servo motors provided by Lafert S.p.A., an Italian industrial motor manufacturer that became part of the Sumitomo Heavy Industries Group in 2018. Lafert S.p.A. offers a wide range of electronic and control products, including high-efficiency magnet motors, induction motors, and servo motor drives, to meet customer needs in the fields of automation and energy.

Sumitomo Heavy Industries Group will continue to provide drive solutions that meet the sophisticated needs of society by mutually utilizing and integrating the technologies and knowledge of gearmotors, electronics, and control.



Specifications, dimensions, and other items are subject to change without prior notice.

