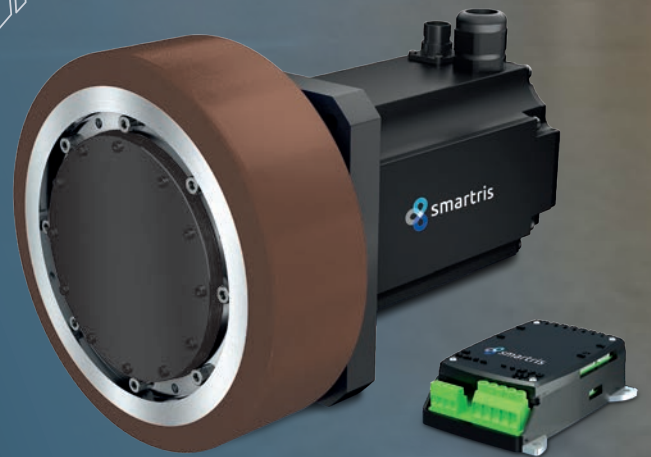
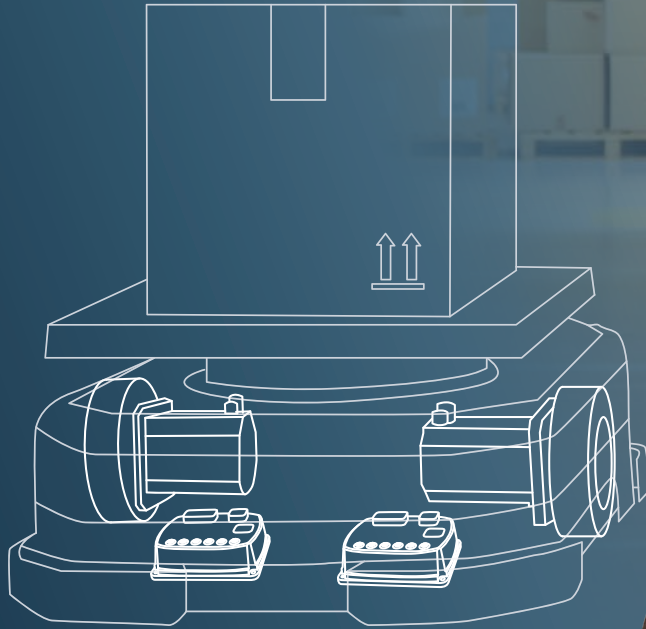




**smartris**  
solutions for AGV/AMR

# Packaged-Drive System Solution



**Sumitomo Drive Technologies**

**LAFERTGROUP**  
Member of Sumitomo Drive Technologies

[www.smartris.com](http://www.smartris.com)

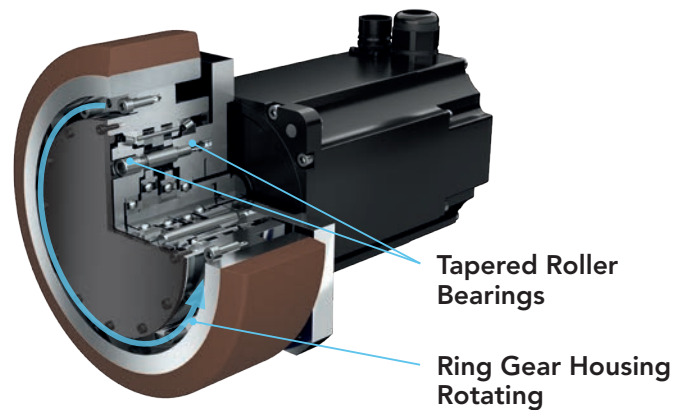
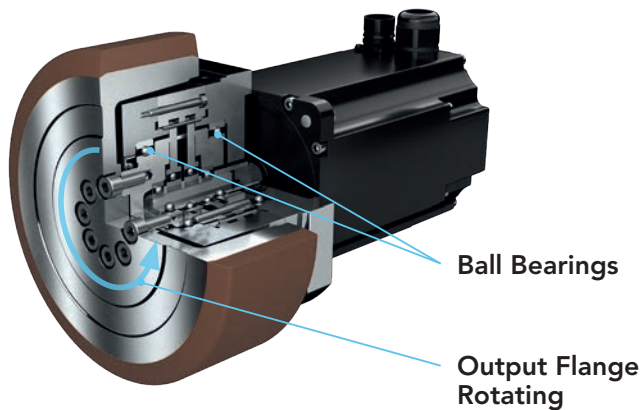
## Two Product Lines to satisfy Customer Needs

### ECO LINE

- Gear Output Shaft Rotation Design
- Cost efficient solution
- Ideal for light payloads and high-speed AGV

### PRO LINE

- Ring Gear Housing Rotation Design
- High radial loads
- Reduced overall dimension



## Gearmotor Performances

|                                         |       | ECO                        |                    | PRO                        |                    |
|-----------------------------------------|-------|----------------------------|--------------------|----------------------------|--------------------|
|                                         |       | S                          | M                  | M                          | L                  |
| Voltage                                 | [Vdc] | 48                         | 48                 | 48                         | 48                 |
| Max Radial Load per Driving Wheel       | [N]   | 1500                       | 3000               | 6500                       | 10000              |
| Gear Ratio                              |       | 21 - 25 - 29               | 21 - 25 - 29       | 22 - 26                    | 22 - 26 - 30       |
| Max Motor Speed                         | [rpm] | 4500                       | 4500               | 4500                       | 3000               |
| Max Wheel Speed                         | [rpm] | 214 - 180 - 155            | 214 - 180 - 155    | 205 - 173                  | 136 - 115 - 100    |
| Nominal Wheel Torque                    | [Nm]  | 16 - 18.9 - 18.9           | 39.3 - 40.4 - 40.5 | 39.3 - 40.4                | 84.7 - 87.5 - 80.3 |
| Max Acceleration Wheel Torque for 2 sec | [Nm]  | 61.9 - 73.7 - 84.8         | 145 - 179 - 207    | 145 - 179                  | 312 - 365 - 246    |
| Minimum Holding Torque (Static Brake)   | [Nm]  | 76 - 91 - 105              | 191 - 227 - 264    | 200 - 236                  | 200 - 236 - 276    |
| Minimum Holding Torque (Dynamic Brake)  | [Nm]  | 33 - 40 - 46               | 191 - 227 - 264    | 200 - 236                  | 200 - 236 - 276    |
| Ambient Temperature                     | [°C]  | -10 ÷ 40                   |                    | -10 ÷ 40                   |                    |
| Protection Class                        |       | IP54                       |                    | IP54                       |                    |
| Thermal Motor Class                     |       | F                          |                    | F                          |                    |
| Rotation Type                           |       | Gear Output Shaft Rotation |                    | Ring Gear Housing Rotation |                    |

## Example of AGV Configuration

|                                     |                     | ECO  |      | PRO  |      |
|-------------------------------------|---------------------|------|------|------|------|
|                                     |                     | S    | M    | M    | L    |
| Max Tot Weight (AGV mass + payload) | [kg]                | 800  | 1100 | 1800 | 2700 |
| No. of Driving Wheels               |                     | 2    | 2    | 2    | 2    |
| No. of Supporting Wheels            |                     | 4    | 4    | 4    | 4    |
| Max AGV Speed                       | [m/s]               | 2    | 2    | 2    | 1.8  |
| Max AGV Acceleration                | [m/s <sup>2</sup> ] | 1    | 1    | 1    | 1    |
| Wheel Diameter                      | [mm]                | 180  | 200  | 200  | 250  |
| Gear Ratio                          |                     | 21   | 21   | 22   | 22   |
| Nominal Wheel Speed                 | [rpm]               | 212  | 191  | 191  | 136  |
| Average Wheel Torque                | [Nm]                | 14.1 | 21.6 | 35.3 | 66.2 |
| Average Wheel Power                 | [W]                 | 314  | 432  | 706  | 943  |
| Load Bearing per Supporting Wheel   | [kg]                | 125  | 125  | 125  | 175  |



**Benefits**

- Complete Package Solution:  
**Gear + Servo Motor + Drive + Wheel**
- High integration of all components
- One single supplier with global presence
- **Compact solution**
- Safety features
- Easy installation and commissioning
- Maintenance free
- **Customizations** available on request

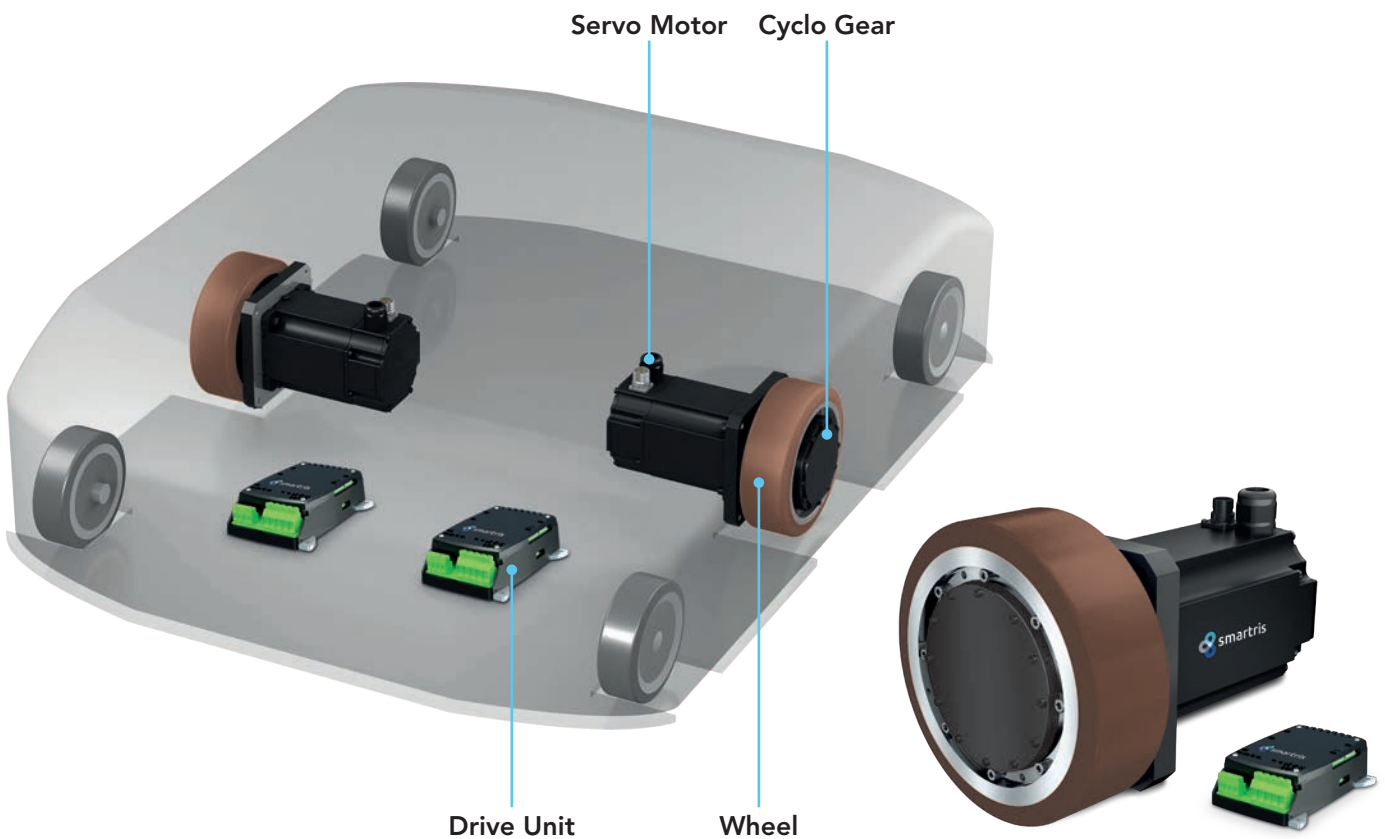
**The range**

- Total weight up to approx. 3.000 kg
- Max speed 2.0 m/s
- Max acceleration 1.0 m/s<sup>2</sup>

**Target Applications**

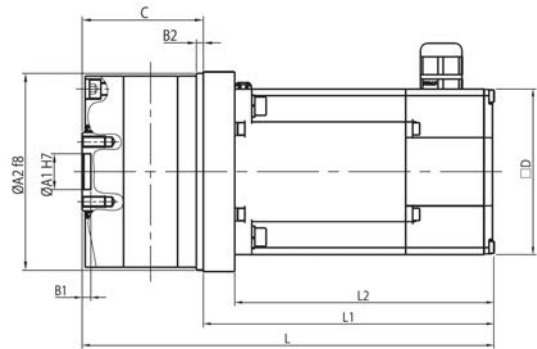
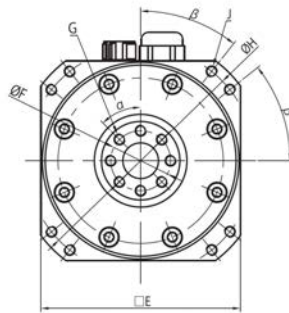
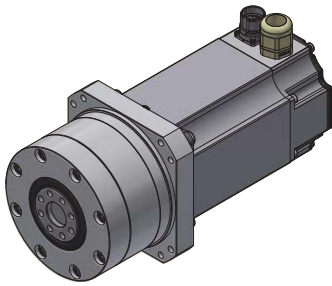
- Unit Load Carriers
- Tow Vehicles
- Assembly Line Trucks
- Mobile Robots

Suitable for shuttle horizontal AGV configuration with electronic differential drive system.



# Dimensions - ECO LINE

## GEARMOTOR

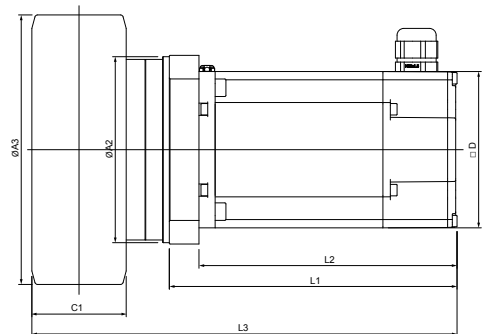
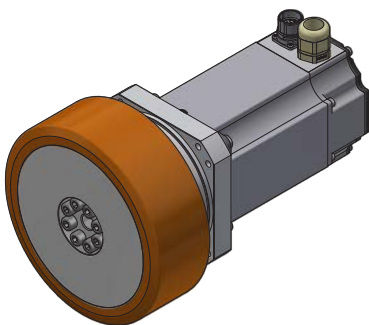


| Line | Size | ØA1 [mm] | ØA2 [mm] | B1 [mm] | B2 [mm] | C [mm] | □D [mm] | □E [mm] | ØF [mm] | G [mm] | ØH [mm] | J [mm] | α° | β°   | Mass [Kg] |
|------|------|----------|----------|---------|---------|--------|---------|---------|---------|--------|---------|--------|----|------|-----------|
| ECO  | S    | 25       | 110      | 6       | 4       | 76     | 80      | 110     | 35      | 10-M6  | 130     | 4-M8   | 36 | 45   | 5.6       |
| ECO  | M    | 25       | 138      | 6       | 5       | 85     | 116     | 140     | 42      | 8-M8   | 160     | 8-M8   | 45 | 38.5 | 11.3      |

Dimensions above refer to standard design. For special design, please contact us.

| Line | Size | TRANSDUCER | BRAKE   | L [mm] | L1 [mm] | L2 [mm] |
|------|------|------------|---------|--------|---------|---------|
| ECO  | S    | RESOLVER   | STATIC  | 235    | 159     | 143     |
|      |      | RESOLVER   | DYNAMIC | 234    | 158     | 142     |
|      |      | SKS36S     | STATIC  | 249    | 173     | 157     |
|      |      | SKS36S     | DYNAMIC | 248    | 172     | 156     |
| ECO  | M    | RESOLVER   | STATIC  | 288.5  | 203.5   | 181.5   |
|      |      | RESOLVER   | DYNAMIC | 298.5  | 213.5   | 191.5   |
|      |      | SKS36S     | STATIC  | 288.5  | 203.5   | 181.5   |
|      |      | SKS36S     | DYNAMIC | 298.5  | 213.5   | 191.5   |

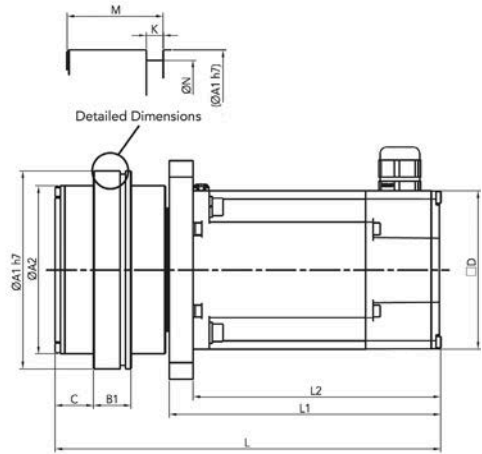
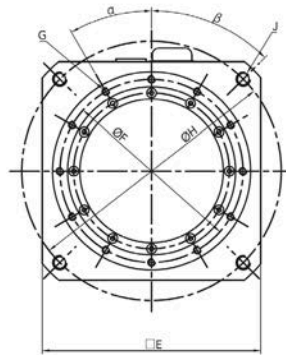
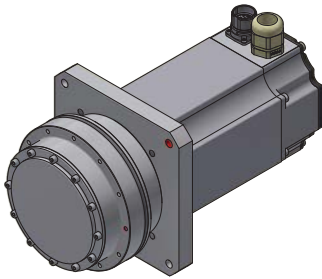
## WHEEL MOTOR



| Line | Size | L3 [mm]  | WHEEL DIAMETER ØA3 [mm] | WHEEL WIDTH C1 [mm] |
|------|------|----------|-------------------------|---------------------|
| ECO  | S    | L + 14.5 | 180                     | 65                  |
| ECO  | M    | L + 17   | 200                     | 70                  |

# Dimensions – PRO Line

## GEARMOTOR



| Line | Size | ØA1 [mm] | ØA2 [mm] | B1 [mm] | C [mm] | □D [mm] | □E [mm] | ØF [mm] | G [mm] | ØH [mm] | J [mm] | K [mm] | ØN [mm] | M [mm] | α° | β° | Mass [Kg] |
|------|------|----------|----------|---------|--------|---------|---------|---------|--------|---------|--------|--------|---------|--------|----|----|-----------|
| PRO  | M    | 145      | 123      | 27.5    | 28     | 116     | 160     | 134     | 12-M5  | 190     | 4-M10  | 4.1    | 140     | 23.5   | 30 | 45 | 14.5      |
| PRO  | L    | 182      | 155      | 38      | 30     | 142     | 196     | 170     | 12-M6  | 230     | 4-M12  | 4.78   | 175.8   | 32.8   | 30 | 45 | 24.5      |

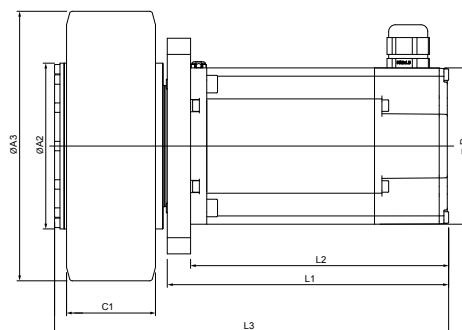
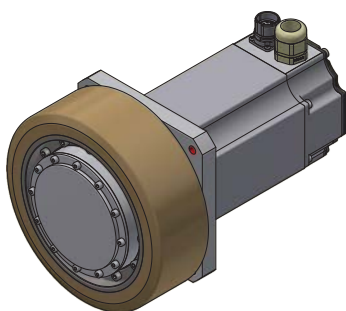
Dimensions above refer to standard design. For special design, please contact us.

To prevent fretting corrosion on wheel rim and ring gear housing (just for PRO gears), is recommended to apply molybdenum disulfide grease (or similar agent). Customer needs to apply this agent.  
To prevent anti corrosion grease leakage, is recommended to apply O-Ring on proper ring gear housing (just on PRO gears). Customer needs to provide and apply O-Ring.

| Size | O-ring (Nitrile Rubber)<br>Wire Diameter x Inner Diameter |
|------|-----------------------------------------------------------|
| M    | 3.1x139.4                                                 |
| L    | 3.53x171.04                                               |

| Line | Size | TRANSDUCER | BRAKE   | L [mm] | L1 [mm] | L2 [mm] |
|------|------|------------|---------|--------|---------|---------|
| PRO  | M    | RESOLVER   | STATIC  | 282.5  | 198.8   | 181.5   |
|      |      | RESOLVER   | DYNAMIC | 292.5  | 208.8   | 191.5   |
|      |      | SKS36S     | STATIC  | 282.5  | 198.8   | 181.5   |
|      |      | SKS36S     | DYNAMIC | 292.5  | 208.8   | 191.5   |
| PRO  | L    | RESOLVER   | STATIC  | 299.1  | 202.6   | 185.3   |
|      |      | RESOLVER   | DYNAMIC | 305.6  | 209.1   | 191.8   |
|      |      | SKS36S     | STATIC  | 309.3  | 212.8   | 195.5   |
|      |      | SKS36S     | DYNAMIC | 315.8  | 219.3   | 202     |

## WHEEL MOTOR



| Line | Size | L3 [mm] | WHEEL DIAMETER ØA3 [mm] | WHEEL WIDTH C1 [mm] |
|------|------|---------|-------------------------|---------------------|
| PRO  | M    | L + 0   | 200                     | 66                  |
| PRO  | L    | L + 0   | 250                     | 75                  |

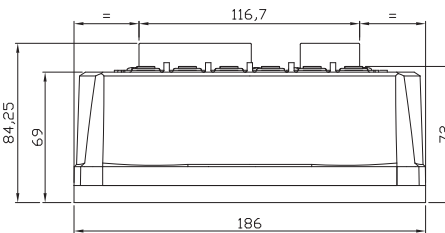
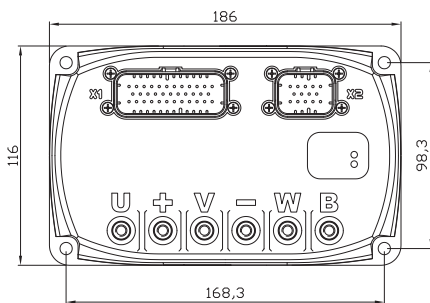
## Drive Performances

- Easy installation without additional PID tuning
- Easy to install with state machine profile suitable for all AGVs
- Specifically designed for prompt reaction in case of AGV emergency quick stop
- NEW Smartris Compact Drive for sizes S - M: a quarter of the size of the Smartris Drive

|                        | ECO |   | PRO |   |
|------------------------|-----|---|-----|---|
|                        | S   | M | M   | L |
| Smartris Drive         | ✓   | ✓ | ✓   | ✓ |
| Smartris Compact Drive | ✓   | ✓ | ✓   | - |

| Size                    |        | ECO           |        | PRO           |       |
|-------------------------|--------|---------------|--------|---------------|-------|
|                         |        | SMALL         | MEDIUM | MEDIUM        | LARGE |
| Voltage                 | [Arms] | 48V (60V Max) |        | 48V (60V Max) |       |
| Rated Current           | [Arms] | 12.5          | 25.8   | 25.8          | 35.8  |
| Peak Current for 2 sec  | [Arms] | 41            | 96.3   | 96.3          | 136.2 |
| Peak Current for 10 sec | [Arms] | 24.9          | 57.5   | 57.5          | 81.3  |

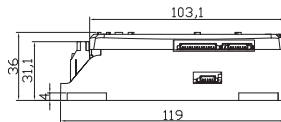
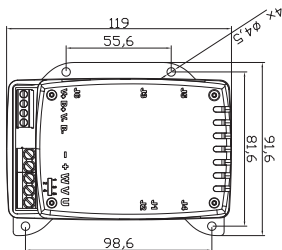
### SMARTRIS DRIVE - IP 54



Weight 1.6 kg



### SMARTRIS COMPACT DRIVE - IP 20



Weight 310 gr



## Drive Specifications

|                                          |                                                                                                                                         |
|------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| Transducer                               | Sin/Cos Encoder - Resolver                                                                                                              |
| Fieldbus                                 | CANOpen (DS402), Modbus RTU                                                                                                             |
| Control Mode                             | Torque, Speed and Position*                                                                                                             |
| Brake Management                         | Manual or Automatic                                                                                                                     |
| Auxiliary power supply for control stage | Available (24 or 48 Vdc)                                                                                                                |
| Digital Output                           | 4 Output Optical Isolated @ 24V - 100mA                                                                                                 |
| Digital Input                            | 4 Input Optical Isolated @ 24V - 7mA (NPN or PNP type)                                                                                  |
| Analog Input                             | 1 Input $\pm$ 10V or Single ended 0-10V (10 K $\Omega$ )                                                                                |
| Analog Output                            | 1 Output 0-10V $R_{LOAD} \geq 1$ K $\Omega$                                                                                             |
| Safety Feature                           | STO (24Vdc - 29mA)<br>Smartris Compact drive SIL2(IEC 61800-5-2)/PLd(EN 13849-1)<br>Smartris drive SIL3(IEC 61800-5-2)//PLe(EN 13849-1) |
| Options                                  | Heatsink                                                                                                                                |
| Certification                            | CE, UL                                                                                                                                  |

\* Position control under development

Up-to-date data, along with dimensional drawings and 3D models, available at [www.smartris.com](http://www.smartris.com)

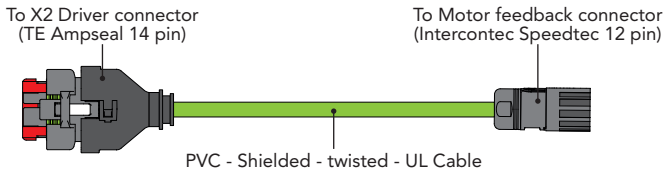
# Feedback Cables

Feedback cables connect motor transducer directly to our Smartris Drives.

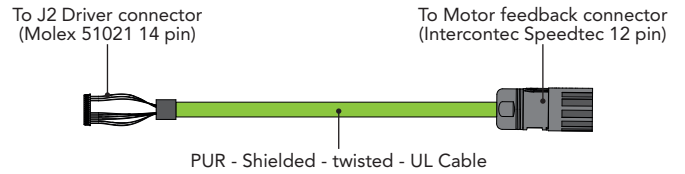
**Main Features:**

- Insulating material: PVC/PUR
- Shielded and Twisted in pair
- Extra flexible

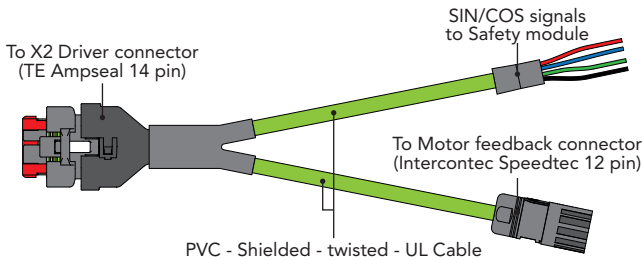
**FOR SMARTRIS DRIVE**



**FOR SMARTRIS COMPACT DRIVE**



**Y-CABLE**



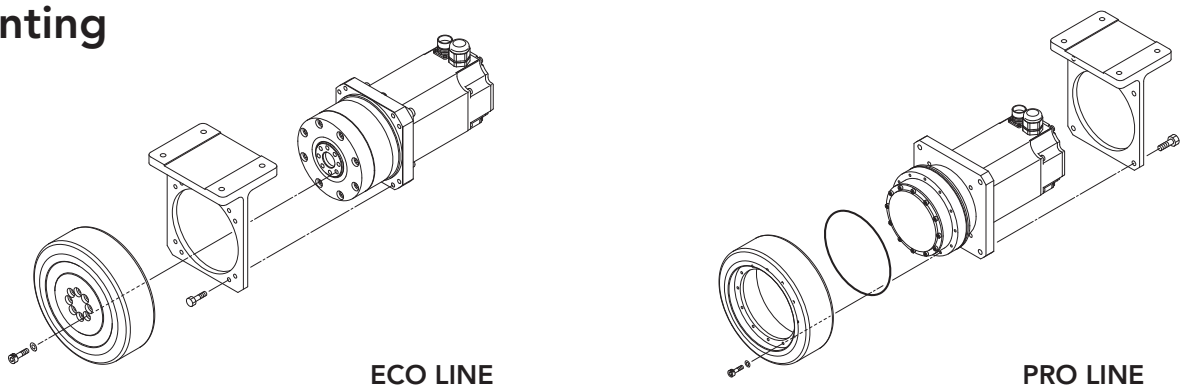
Y-cable is meant to split our safety encoder Sin/Cos signals both to our drive and Safety module in order to achieve highest safety level without using any additional encoder in the vehicle.

# Wheels Specifications

| Line | Size | WHEEL DIMENSION [mm] | TYRE MATERIAL         | RIM MATERIAL | MAX SPEED [Km/h] | MAX RADIAL LOAD [N] | MASS [Kg] |
|------|------|----------------------|-----------------------|--------------|------------------|---------------------|-----------|
| ECO  | S    | 180x65               | Polyurethane 92ShA    | Steel        | 8                | 1500                | 3.7       |
| ECO  | M    | 200x70               | Polyurethane 92ShA    | Steel        | 8                | 3000                | 5.2       |
| PRO  | M    | 200x66               | Polyurethane HP 93ShA | Steel        | 8                | 6500                | 2.7       |
| PRO  | L    | 250x75               | Polyurethane HP 93ShA | Steel        | 6.5              | 10000               | 6.4       |

Wheels are suitable for tiles and cement-resin. Use on other kind of floors has to be confirmed by manufacturer. Wheels are not suitable if large obstacles are present. Operating temperature range 0-40°C. Recommended for use in environments without condensation accumulation.

# Mounting



## Sumitomo Drive Technologies

Sumitomo (SHI) Cyclo Drive Germany GmbH  
Cyclostraße, 92 – 85229 Markt Indersdorf, Germany  
Tel. +49 8136 660  
scg.info@shi-g.com - www.sumitomodrive.com



Lafert S.p.A.  
Via J.F. Kennedy 43 – 30027 – San Donà di Piave (Venice), Italy  
Tel +39 0421 229 611  
lafert.info@shi-g.com - www.lafert.com