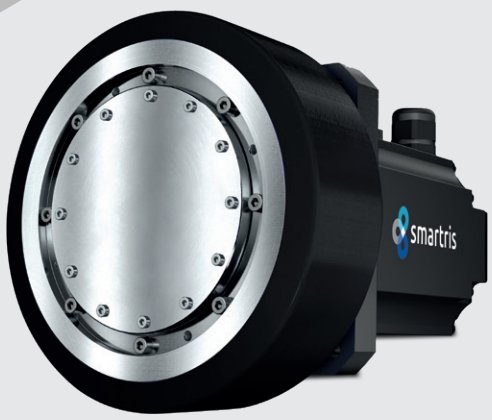
smartris

Scalable Drive System Solution

www.smartris.com



Shaping the future together

Sumitomo Drive Technologies

LAFERTGROUP

smartris
solutions for AGV/AMR

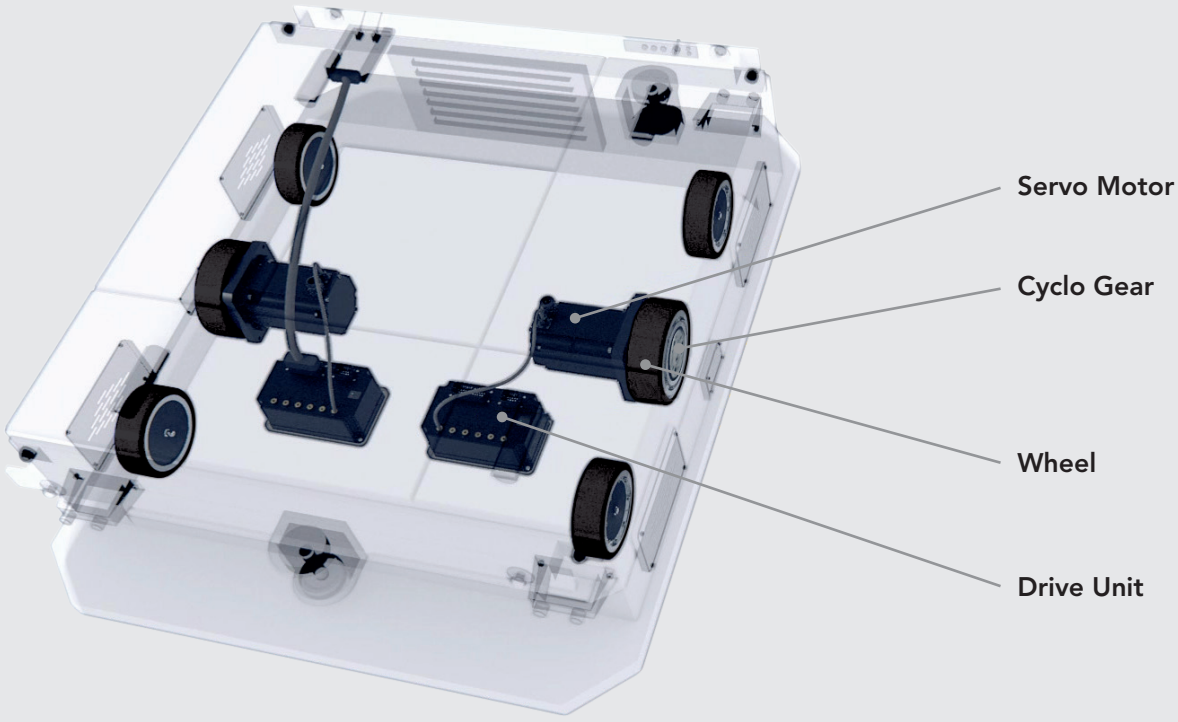
Combination of three smart components.
Creating a compact, integrated and intelligent solution of: GEAR + SERVO MOTOR + DRIVE

Smartris is the **Complete Package Solution** including Gear, Servo Motor and Drive for AGV systems, and combines the extensive technological competences of two world-class companies.

The integration of Lafert's customized solutions for Electric Motors and Drives with Sumitomo's expertise in Gears and Gearboxes has created an industry-leading product, offering opportunity to any AGV manufactures to make the difference through the relevant market.

In fact, both brands have strong reputations in the motor and gear market, including the AGV sector. With this **New Integrated Package**, we can offer a compact, reliable and intelligent drive system solution that provides AGV manufacturers and end users worldwide with an **extended range of customized configurations and alternative options** to satisfy any kind of AGV units.

AGV Unit (with 4 supporting wheels)



Packaged-Drive Solution for AGV

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

Target Applications

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

Target Product

- Total weight up to approx. 3000 kg
- Max speed 2.0 m/s
- Max acceleration 1.0 m/s^2

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^2]	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

Up-to-date data, along with dimensional drawings and 3D models, available at **www.smartris.com**

Options

	FEATURE	STANDARD CONFIGURATION	OPTIONS
MOTOR	Transducer	SKS36S	SKS36
			Resolver
	Brake	Dynamic brake	Holding brake
	Signal connection	IP64 signal connector	Cable for resolver (1m)
			Cable for SKS36S (1m)
	Power connection	IP54 cable (1m)	IP64 power connector + power cable (1m)
DRIVE	Safety function	With STO	Without STO
	Fieldbus	CANOpen (DS402)	Modbus RTU
			Analog mode

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
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	

Packaged-Drive Solution
Smart-wheel-drive solution for Automated Guided Vehicle (AGV) consisting of **gear, servo motor, drive & wheel**. Developed for various types of AGV solutions to deliver highest performance, maximum precision at every speed and reliability.

Performance
The integration of a Servo Motor and Drive provides high performance with energy efficiency.
Speed up to 2m/s and 1,0m/s² acceleration.
Rated output torques up to 90Nm, max acceleration torque > 300Nm.
The **Cyclo principle** provides highest shock load capacity.

Dimensions
The packaged solution provides space-saving integration into the AGV. Our solution is one of the smallest on the market. This means the AGV can be much lower to the ground as well as creating more effective space within it.

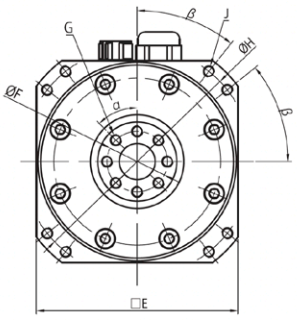
Payload
Depending on product specification, the AGV can carry a wide range of payloads. **Radial load from 1.500N to 10.000N** per driven wheel.

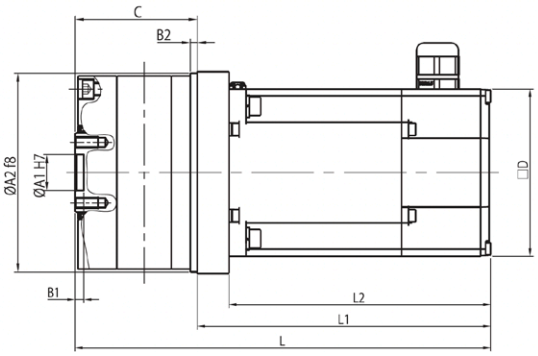
Safety
Safely operates using Cyclo technology with **high overload capacity**. Leak-proof design for environmental safety and protection. Certified STO (Safe Torque Off) function included.

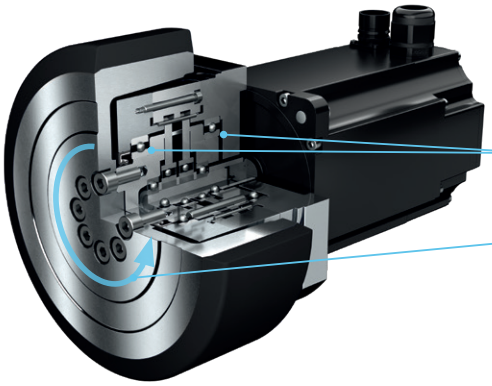
Servo Motor & Gear

ECO LINE

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





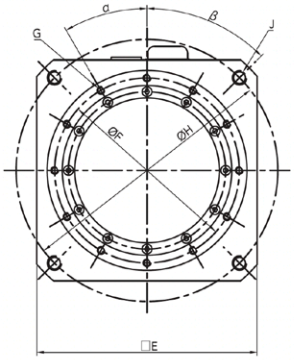


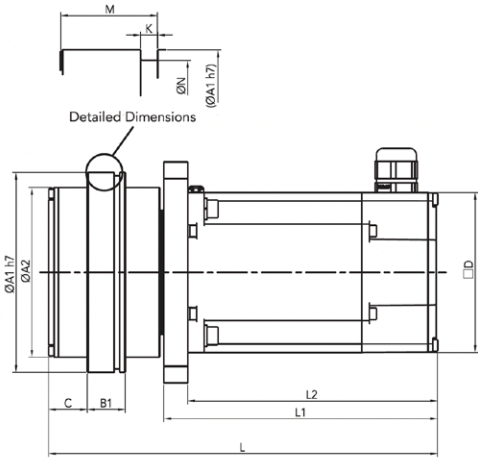
Ball Bearings

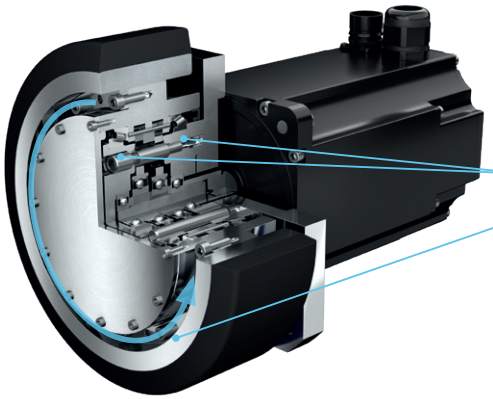
Output Flange Rotating

PRO LINE

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







Tapered Roller Bearings

Ring Gear Housing Rotating

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

To prevent fretting corrosion on wheel rim and ring gear housing (just for PRO gears), is reccomended to apply molybdenum disulfide grease (or similar agent). Customer needs to apply this agent.

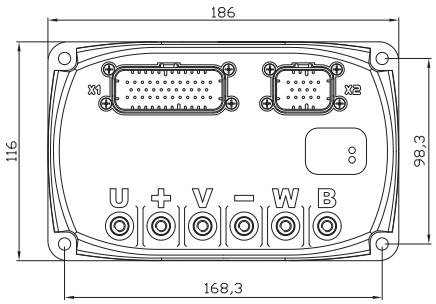
To prevent anti corrosion grease leakeage, is reccomended to apply O-Ring on proper ring gear housing (just on PRO gears). Customer needs to provide and apply O-Ring.

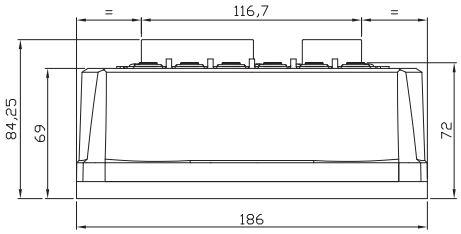
Line	Size	L	L1	L2	ΔL	ØA1	ØA2	B1	B2	C	□D	□E	ØF	G	ØH	J	K	ØN	M	α°	β°	Mass (Kg)
ECO	S	234	158	142	+14	25	110	6	4	76	80	110	35	10-M6	130	4-M8	-	-	-	36	45	5.6
	M	298	213	191	0	25	138	6	5	85	116	140	42	8-M8	160	8-M8	-	-	-	45	38.5	11.3
PRO	M	292	209	191	0	145	123	27.5	-	28	116	160	134	12-M5	190	4-M10	4.1	140	23.5	30	45	14.5
	L	305	208	191	+11	182	155	38	-	30	142	196	170	12-M6	230	4-M12	4.78	175.8	32.8	30	45	24.5

L, L1, L2 refer to the configuration with dynamic brake and resolver.
The ΔL column is to be added to L,L1,L2 in the case of configuration with dynamic brake and SKS36 encoder.
Dimensions above refer to standard design. For special design, please contact us.

Drive

- 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





		ECO		PRO	
Drive		**SMALL**	**MEDIUM**	**MEDIUM**	**LARGE**
Voltage	**[Arms]**	48V (60V Max)		48V (60V Max)	
Rated Current	**[Arms]**	11.5	25.8	25.8	35.8
Peak Current for 2 sec	**[Arms]**	41.7	96.3	96.3	136.2
Peak Current for 10 sec	**[Arms]**	24.9	57.5	57.5	81.3
Transducer		Sin/Cos Encoder - Resolver (double encoder configuration available on request)			
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 ± 10V or Single ended 0-10V (10 KΩ)			
Analog Output		1 Output 0-10V $R_{LOAD} \geq 1$ KΩ			
Safety Feature		STO (24V typical - 29 mA) certified according to IEC 61800-5-2			
Options		Heatsink - Brake Chopper Management			
Protection		IP54			
Certification		CE, UL			
Weight	**[kg]**	1.6			

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Smartris Codification

eg:	P	L	D	S	K	S	B	C	A	0	0	2	1	0	0	0	1	M	1	1	0
	PACKAGE SECTION		MOTOR SECTION									GEAR SECTION			WHEEL SECTION		CABLE SECTION	DRIVE SECTION			

PACKAGE SECTION		MOTOR SECTION								
P	L	D	S	K	S	B	C	A	0	0

TYPE		SIZE		SPEED		BRAKE		FEEDBACK		VOLTAGE		CONNECTION		OPTIONS		REVISION	
P	PRO	S	small	1	1000 rpm	S	with dynamic brake	05	Resolver	B	48 Vdc	4	2 fixed connectors	A0	2 straight connectors	0	Rev 0
E	ECO	M	medium	2	2000 rpm	P	with holding brake	KS	SKS36			C	custom connection	A1	exiting power cable from the motor winding 1m lenght		
		L	large	3	3000 rpm	T	without brake	KM	SKM36								
				4	4000 rpm			KN	SKS36S (SIL2)								
				A	1500 rpm			KO	SKM36S (SIL2)								
				B	2500 rpm												
				C	3500 rpm												
				D	4500 rpm												

GEAR SECTION			WHEEL SECTION		CABLE SECTION	DRIVE SECTION			
2	1	0	0	0	1	M	1	1	0

RATIO		OPTIONS		DIAMETER		OPTIONS		DRIVE-MOTOR		SIZE		VERSION		SAFETY		OPTIONS	
21	ECO type	0	no option	0	no wheel	0	no option	0	no cable	X	custom	1	Gen 1	0	no safety	0	analog mode
25	ECO type							1	1m signal cable	S	small			1	STO	1	Can Open fieldbus
29	ECO type									M	medium						
22	PRO type									L	large						
26	PRO type																
30	PRO type																

Will engineering innovate the world?

ST-10-211/22

We say yes.
Our shared project and ideals commit to industrial progress and technological development - shaping the future together.

Leaders create outcomes that benefit everyone's future.

Sumitomo Heavy Industries (SHI) is a leading global manufacturer and distributor of power transmission and control ("PTC") equipment, known under the **Sumitomo Drive Technologies** brand. Our current strategy is to further strengthen and expand our business by integrating new technologies in the areas of electric motors and variable frequency drives. Our strategy also includes global growth in target segments such as robotics and positioning, material handling and intralogistics and food & beverages.

As part of this strategy, we entered into a new partnership which not only expanded the SHI family, but also grew our product portfolio and our global reach. **Lafert** is a world leader in the design and manufacture of Super Premium Efficiency Electric Motors for industrial use. With our focus on innovation and customization, we aim to improve performance and reduce environmental impact.

This utilization of Lafert's motor and drive technology allows Sumitomo Drive Technologies to extend its product portfolio in the motor control industry. This has become increasingly important as demand for IoT, automation, labour productivity and energy-saving solutions also increases. Moreover, this partnership will be forged in the technology hub of Europe - while responding to the advanced market needs of our customers in Europe and around the world.

Shaping the future together

Sumitomo Drive Technologies

LAFERTGROUP

www.smartris.com

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