Data sheet

ArgoDrive

ebmpapst

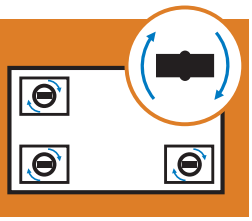
engineering a better life

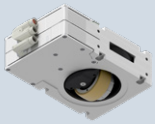
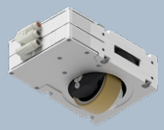
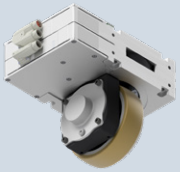
Equip your transport vehicle with *omnidirectional mobility.*

The innovative ArgoDrive driving/steering system can be used as a drive unit for automated guided vehicles (AGVs) and autonomous mobile robots (AMRs). It is a complete unit, consisting of a motor, transmission, omnidirectional steering, sensors, and all the necessary connections. With the superposition gear, the two integrated motors contribute simultaneously to steering, acceleration, movement and braking, depending on requirements. The infinite steering angle enables space-saving, free-range vehicle movement – even from a stationary position.

Advantages:

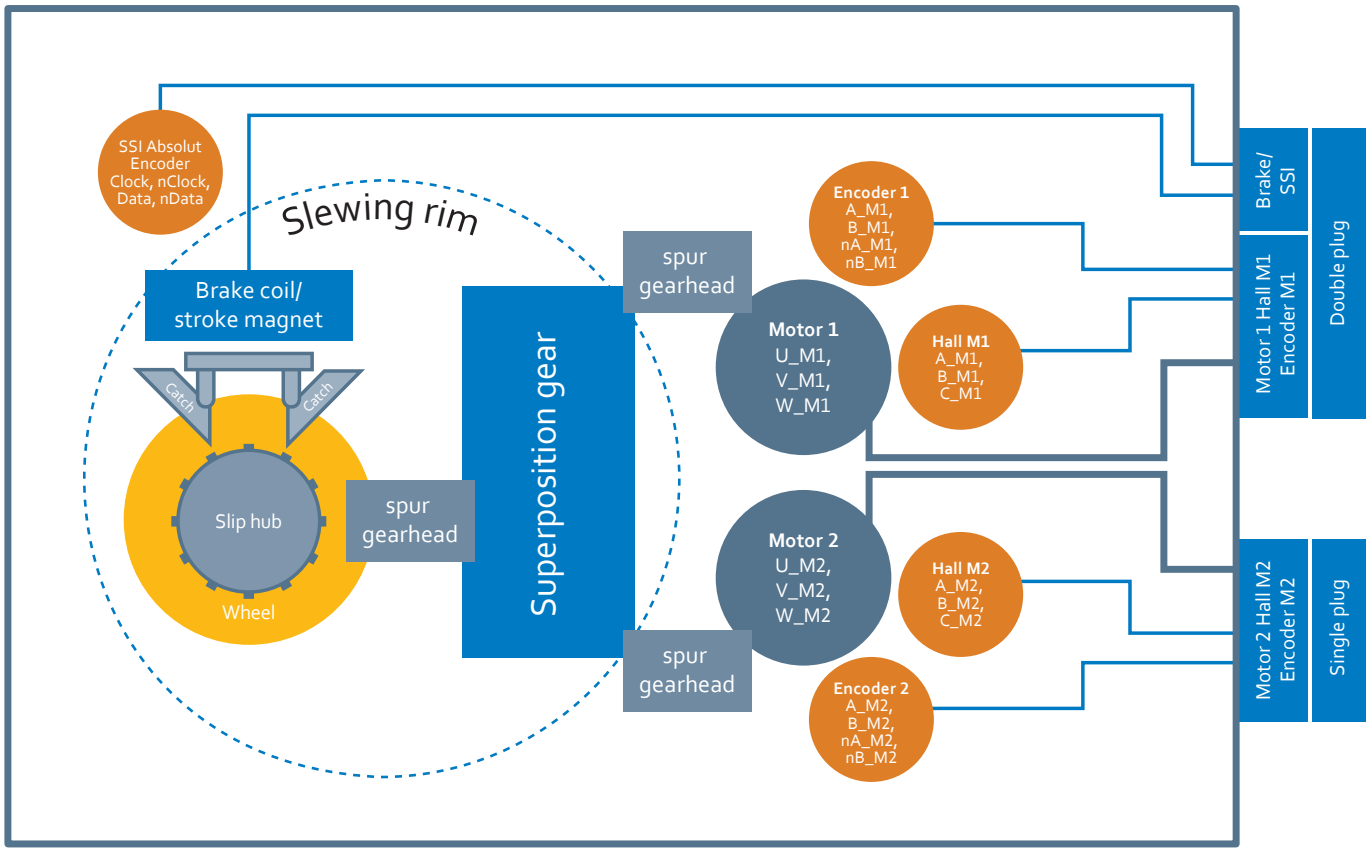
- Maneuverability
- Compact design
- Modular principle
- Service life



Performance data		Light	Standard	Heavy
				
Type		AD-80.7	AD-100.12	AD-145.25
Partnumber		446.92 002	446.92 102	446.92 202
Wheel diameter	mm	80	100	145
max. load capacity per wheel	kg	100	300	500
Overall length	mm	250	250	250
Overall width	mm	170	170	170
Overall height	mm	103	123	205
Ground clearance to transmission	mm	26	45.5	128
Ground clearance to brake disc	mm	11	12	14
Nominal speed	m/s	3	2	1.5
Acceleration (completely loaded)	m/s²	2	0.8	0.6
Motor-driven brake delay (completely loaded)	m/s²	2.6	2	1.5
Rated input power	W	190	199	178
Nominal output power at wheel hub*	W	115	128	109
Overall efficiency in nominal operation**	%	60	64	61
iTotal		6.85	11.88	24.97
iSteer			32	
Steering speed	°/s		180	
Steering angle			unlimited	
Nominal wheel speed	1/min	716	382	198
Nominal torque on the wheel	Nm	1.10	2.21	5.30
Rated current per motor	A	2.0	2.0	2.0
Nominal voltage motors	V		48	
Max. acceleration torque	Nm	9.4	16.0	31.4
Max. braking torque (motor-driven)	Nm	10.7	28.4	54.6
Wheel and brake replacement option			ja	
Weight	kg	ca. 10.5	ca. 11.5	ca. 18
Wheel material			Vulkollan	
Wheel material hardness	Shore A		95 (±3)	
nominal voltage	V DC		48	

Subject to changes; * The calculation basis for the torque was calculated with a coefficient of friction of 1.5% on a flat track;
** Overall efficiency without losses from the flexing work of the wheel covering and without losses arising between the wheel covering and the floor covering

Block diagram



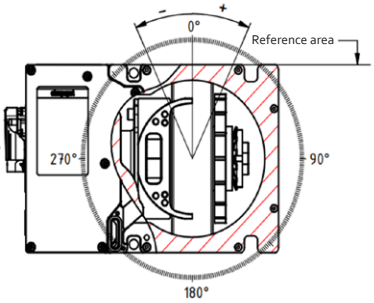
Motor feedback Hall

Feedback type		digital Hall
Supply voltage range of the Halls	V	5 – 24
Design		Open Drain
Commutation sequence	PPR	3 x 4
MTTF values Hall	Years	12972

Motor feedback encoder

Encoder type		Magnetic incremental
Encoder power supply	V	4.8 – 5.5
Voltage level of the outputs		RS422 compatible, push-pull, output 5V
Maximum resolution	PPR	1024
Square evaluation	CPR	4096
Signals at the ArgoDrive plug		A, B, nA and nB
MTTF value encoder	Years	266

Steering angle sensor

Encoder type		magnetic incremental (absolute)
Power supply		24 V internally is regulated to 5 V
Output signal level	V	5
Zero position		
Zero position accuracy	°	±1
Resolution	Bit	12
Protocol		Standard SSI protocol
Coding		Gray
Data frame	Bit	13
Transmission frequency	MHz	10
MTTF value	Years	242.7

Brake

The ArgoDrive has a holding brake with emergency stop function. The brake is de-energized and prevents a stationary vehicle from rolling away. To a limited extent, the brake can perform emergency braking on the ArgoDrive at full load and full speed. The braking system acts directly on the wheel without burdening the transmission or the motors. The signal processing time until the coil drops can last up to 160ms. The brake catches' mechanical engagement time must also be taken into account (varies depending on the wheel module).

			Light	Standard	Heavy
Nominal voltage	V DC			24V	
Nominal current (ventilation/holding)	mA			700 / 310 after 1 second	
Brake actuation				PWM not permitted	
Braking torque, mechanical slip hub	Nm	Tolerance 10 %	13.4	35.5	68.3
Tolerance for slip hub braking torque with environmental influences (internal calculated value)*				20%	
Typical electric drop-in time for brake	ms			30	
Drop-in time of latch	ms		9.3	12.1	19
Permissible number of emergency brakings	Amount			500	
Brake module replacement				possible	
B10 value	number of cycles			2×10^6	

*Further environmental influences lead to extended tolerances and increase the risk of slipping clutch seizing.

Environmental conditions

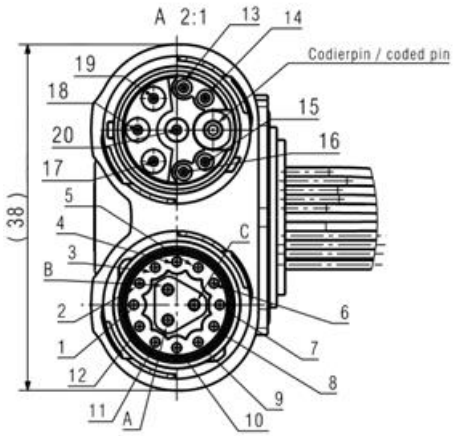
Installation position		wheel orientation down
Protection class motor gearbox EN 60529:2002		IP 54
permissible storage temperature	°C	-40 to +70

Environmental operating conditions

Climatic conditions EN 60721-3-3:1995	Class		3K3	
Ambient temperature	°C		5 up to +50	
Relative humidity	%		5 up to 95	
Max. installation height without derating	m above standard zero		1000	
Derating at 2000 m above sea level	%		18	
Dust and solids content EN 60721-3-3:1995 CDM	Pollution level		2 and clean air according IEC60664-1	
Permissible floor properties			dry/fixed / (asphalt/ screed concrete / industrial floor floors)	
Thresholds / sections (permissible height)	mm	2	2.5	3.6
Maximum pitch	%		5	

Electrical interfaces

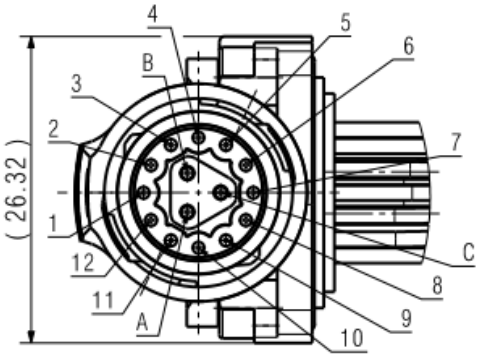
Double plug



Plug connection	B1	Remark	Cable Color	
A	U_M1	Motor winding connection	Brown	Motor cable 1
B	V_M1	Motor winding connection	Black	
C	W_M1	Motor winding connection	Gray	
1	Hall_A_M1	Digital Halls	White	
2	Hall_B_M1	Digital Halls	Brown	
3	Hall_C_M1	Digital Halls	Green	
4	Uhall_M1	Hall supply	Yellow	
5	GND_M1	Hall GND	Gray	
6	Reserve	Reserve	Pink	
7	A_M1	Encoder RS422, push-pull, output 5V	Blue	
8	nA_M1	Encoder RS422, push-pull, output 5V	Red	
9	B_M1	Encoder RS422, push-pull, output 5V	Black	
10	nB_M1	Encoder RS422, push-pull, output 5V	Purple	
11	P5V_M1	Encoder power supply 5 V	Gray Pink	
12	GNDS_M1	Encoder power supply GND	Red Blue	
13	B_LW (nClock SSI)	SSI nClock steering angle	White	Brake cable SSI steering angle
14	A_LW (Clock SSI)	SSI Clock steering angle	Brown	
15	Y_LW (Data SSI)	Data SSI steering angle	Green	
16	Z_LW (nData SSI)	nData SSI steering angle	Yellow	
17 (A)	+24V	Power supply for the LW encoder	Red	
18 (B)	GND	GND for power supply	Blue	
19 (C)	Brake1_GND	GND for brake voltage	Gray	
20	Brake2 +24V	Attention no PWM actuation	Pink	

Subject to changes.

Single plug



Plug connection	B1	Remark	Cable Color	
A	U_M2	Motor winding connection	Brown	Motor cable 2
B	V_M2	Motor winding connection	Black	
C	W_M2	Motor winding connection	Gray	
1	Hall_A_M2	Digital Halls	White	
2	Hall_B_M2	Digital Halls	Brown	
3	Hall_C_M2	Digital Halls	Green	
4	Uhall_M2	Hall supply	Yellow	
5	GND_M2	Hall GND	Gray	
6	Reserve	Reserve	Pink	
7	A_M2	Encoder RS422, push-pull, output 5V	Blue	
8	nA_M2	Encoder RS422, push-pull, output 5V	Red	
9	B_M2	Encoder RS422, push-pull, output 5V	Black	
10	nB_M2	Encoder RS422, push-pull, output 5V	Purple	
11	P5V_M2	Encoder power supply 5 V	Gray Pink	
12	GNDS_M2	Encoder power supply GND	Red Blue	

Subject to changes.

Service life

The service life is up to 12,000 hrs, provided that the defined load and ambient conditions are observed.
This does not include the components subject to maintenance: Wheel, slip hub (of brake) and lubricant.
These are subject to maintenance depending on the load and application.

Accessories

Motor cable 2x	821 7200 072	3m
Brake cable 1x	821 7201 248	3m
Drive controller (CANopen, STO) housing	1513986	VTD-60.19-K5SC-S
Drive controller (CANopen, STO) modul	1513985	VTD-60.21-K5SC-L