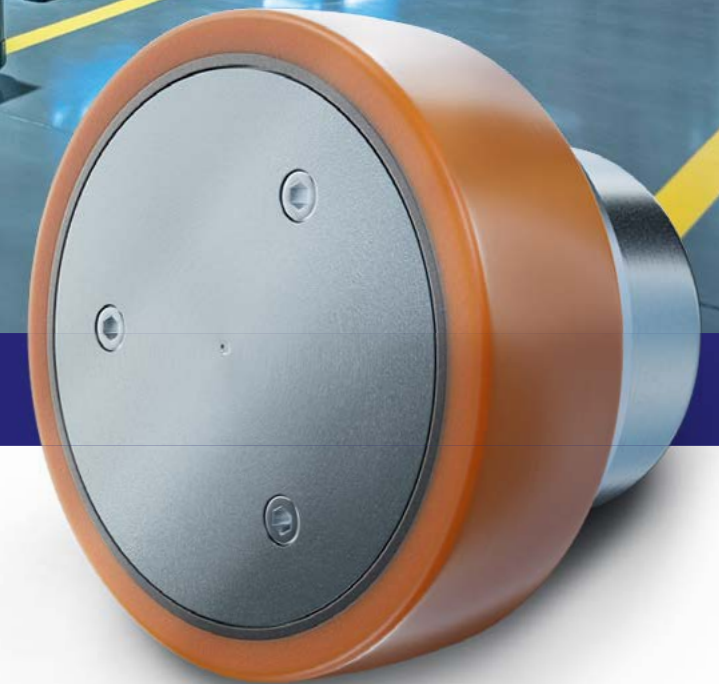


eWheel. Your modular AGV drive kit.



compact.
complete.
eWheel.

The eWheel modular drive kit

Our modular eWheel drive system enables you to select exactly what you need to achieve the maximum drive performance for your AGV or AMR.

Based on your application data you can easily select the right version to match your required speed, torque, braking torque and encoder options. The eWheel is designed and tested to reach highest quality expectations in terms of performance, efficiency and life time.

Get in touch with us if you want the best drive solution for your AGV: the eWheel!



02 Driven by passion
What b-drives stands for

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All the way to success

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compact - flexible - cost efficient

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throw out the anchor

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successful together

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the best solution for your AGV

Driven by passion

What b-drives stands for

Our motivation and our know-how is what makes b-drives such a strong partner. We put in our highly specialized knowledge, experience and solid innovations to offer the drive solution thats best for you.

We accompany your AGV project from the very beginning. By taking your requirements regarding technical, logistical, economical and safety matters and factoring in our years of experience and competence in calculating drives, programming controllers and designing drive systems into applications we will find the best wheel solutions together with you.

Modular standard kit

Your eWheel for every application

With our latest additions to the eWheel family there is a perfect fit for your every AGV drive.

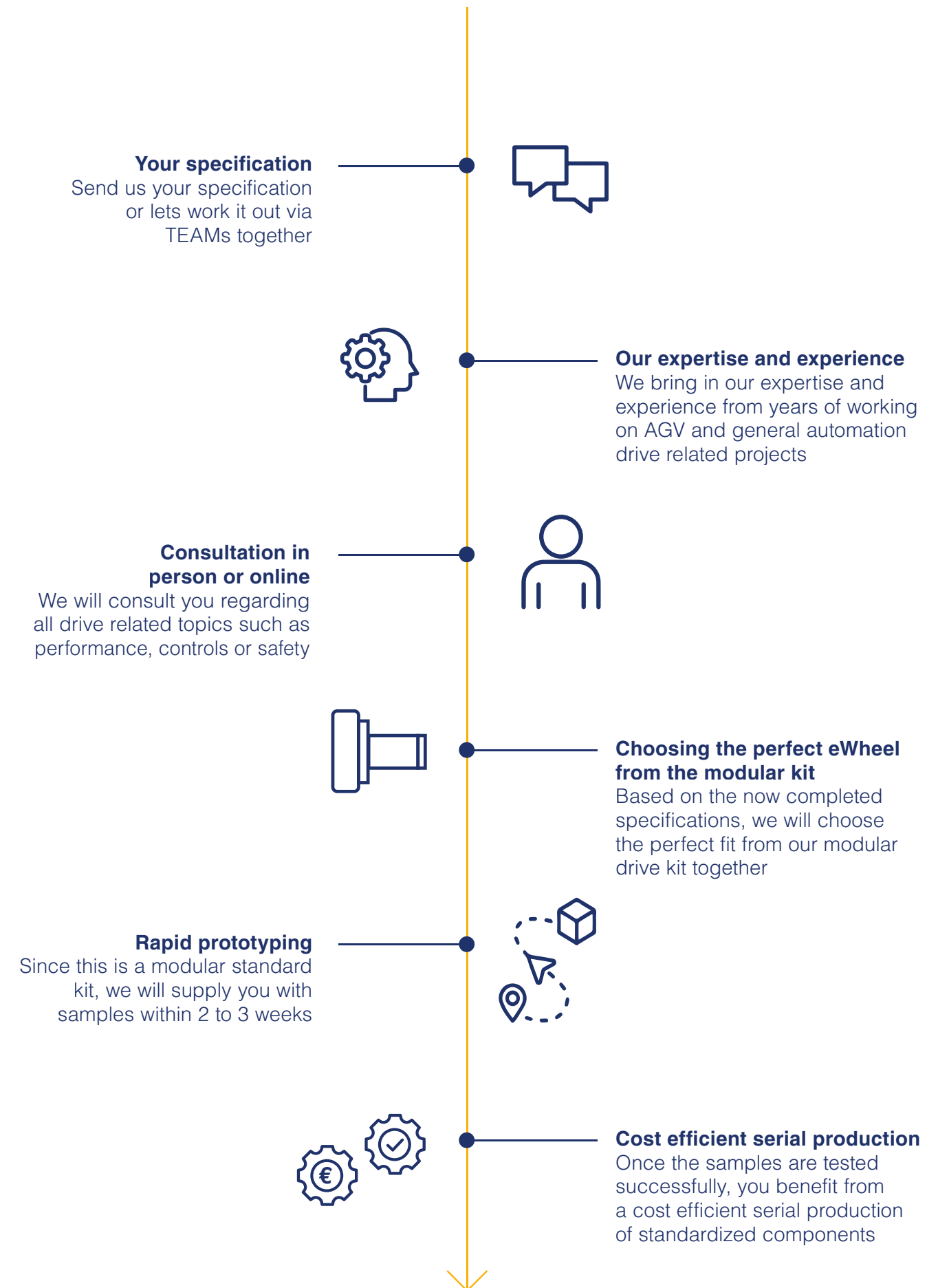
Our modular standard kit enables us to choose the best drive for your AGV/AMR application. With speed ranging from 0.8 to 3.8 m/s and starting torque between 9 Nm and 200 Nm, plus numerous options regarding wheel diameter, brake torque or feedback systems, you will most likely find the best fit for your AGV.

And even though you can choose between various options we are talking about standard products that are easily available, so we can get straight to prototyping.

b-drives key facts

- member of Breuell & Hilgenfeldt Holding GmbH with more than **120** highly motivated and qualified employees
- in house research and development
- we deliver **more than 40k drives** into industries such as medical solutions, robotics, intralogistics, pharmacy and general automation

All the way to success Together



eWheel drive system

compact – flexible – cost efficient

The b-drives eWheel drive system probably is the most compact drive system especially designed for AGVs/AMRs on the market.

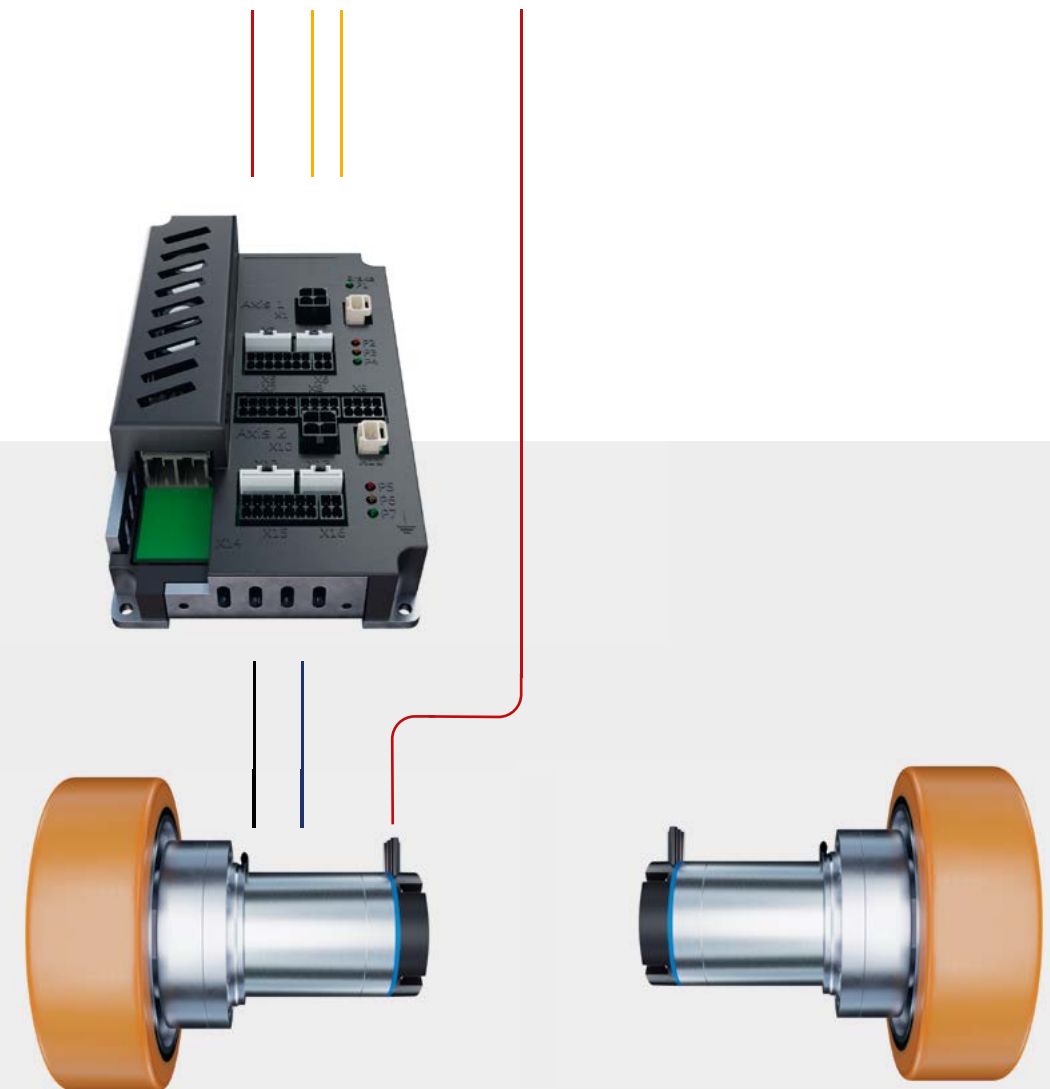
With wheel diameters ranging from 140 mm to 250 mm and gear ratios between 11:1 and 50:1 your AGV will be able to drive up 3.8 and 0.8 m/s with peak torque ranging from 9 Nm to astonishing 200 Nm.

Each eWheel system always contains a bldc motor with hall sensors, a encoder system, a safety/parking brake, a gearbox and a wheel all combined in the most compact way.

With different encoder options the eWheel will work fine with any motor controller, including our own double axis controller. The system as a whole works fine with any PLC.



Your PLC



The eWheel drive system –
designed to power your AGV.

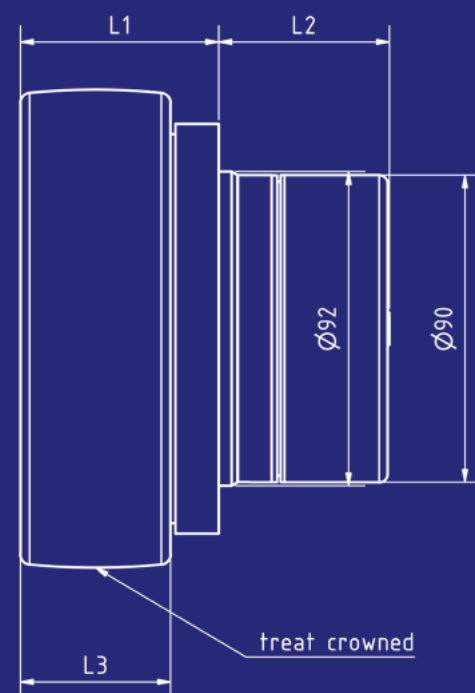
eWheel S

compactness at its best

The “S” is the most compact member of our eWheel family. With only 50 mm in length the “S” leaves a lot of space inside your AGV that you can fill with other components like larger batteries. Or you can just build a smaller vehicle.

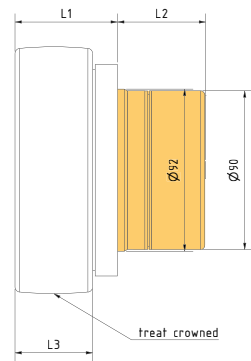
Anyways, if high performance in as little space as possible is needed the “S” is for you!

extremely compact
external rotor motor
IP00



eWheel S

MOTOR DESIGN



S^{24 V}

L2 = 50 mm

24V Nominal voltage
GA-05: L1 = 59 mm | L3 = 44 mm
GA-08: L1 = 99 mm | L3 = 60 mm

S^{48 V}

L2 = 50 mm

48V Nominal voltage
GA-05: L1 = 59 mm | L3 = 44 mm
GA-08: L1 = 99 mm | L3 = 60 mm

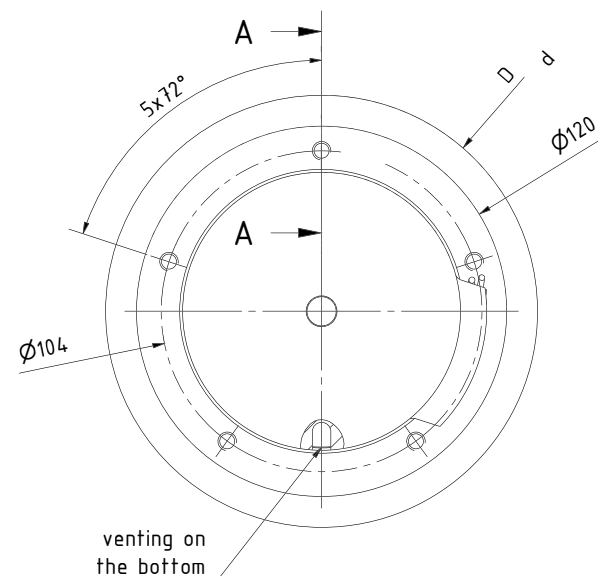
Vehicle speed [m/s] in relation to wheel diameter	d = Ø 140 mm	1.4	1	0.8	0.5			1.7	1.2	0.9	0.6		
	d = Ø 150 mm	1.5	1.1	0.8	0.6			1.8	1.3	1	0.7		
	d = Ø 160 mm	1.6	1.1	0.9	0.6			1.9	1.3	1.1	0.7		
	d = Ø 180 mm	1.9	1.3	1	0.7	0.5	0.4	2.2	1.5	1.2	0.8	0.6	0.5
	d = Ø 200 mm	2.1	1.4	1.1	0.8	0.6	0.5	2.4	1.7	1.3	0.9	0.7	0.5
	d = Ø 250 mm					0.7	0.6					0.8	0.7
Gear ratio		11	16	20	30	40	50	11	16	20	30	40	50
Exact gear ratio		160/14	160/10	160/8	7.360/247	400/10	500/10	160/14	160/10	160/8	7.360/247	400/10	500/10
Gear box type	GA05 = 500 kg load GA08 = 800 kg load	GA-05	GA-05	GA-05	GA-05	GA-08	GA-08	GA-05	GA-05	GA-05	GA-05	GA-08	GA-08
Nominal torque [Nm]		13	18	23	34	46	57	13	18	23	34	46	57
Peak torque [Nm]		38	55	68	103	137	171	38	55	68	103	137	171
Mechanical braking torque [Nm]		33	48	60	90	120	150	33	48	60	90	120	150
Nominal power [W]		260						400					
Nominal current (24V 48V) [Arms]		10.2 –						– 7.6					
Torque constant (24V 48V) [Nm/Arms]		0.099 –						– 0.167					
Peak current (24V 48V) [Arms]		30.6 –						– 22.7					

Extremely high overload capacity

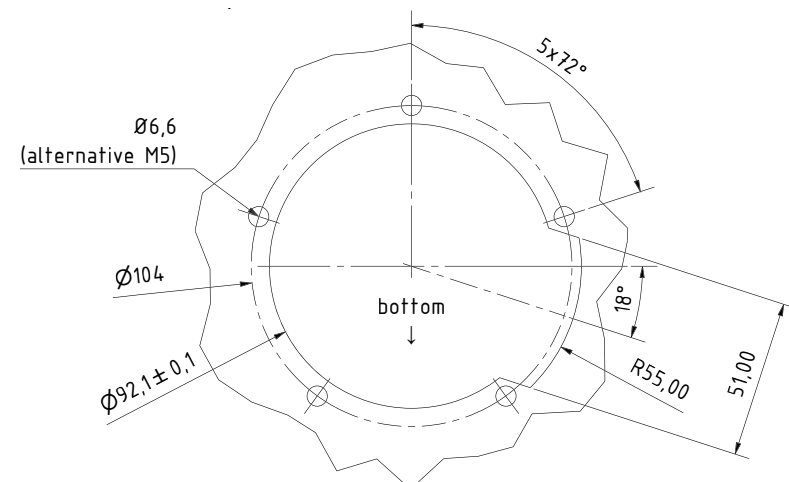
Hall sensors

Protection class IP00

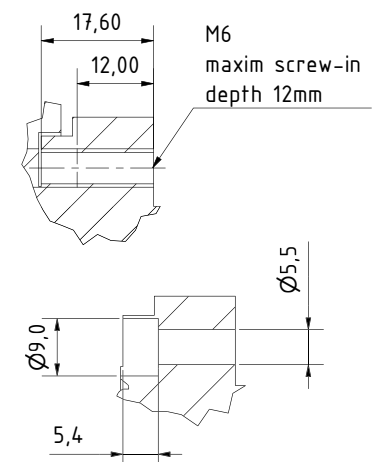
Incremental encoder



AGV-side hole pattern



section A-A
M6, alternative counter sink M5 DIN4762



eWheel M/L/X

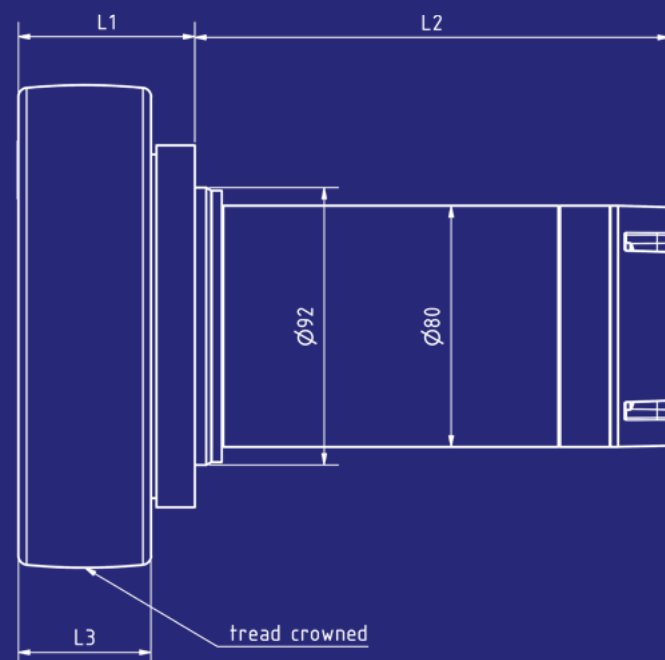
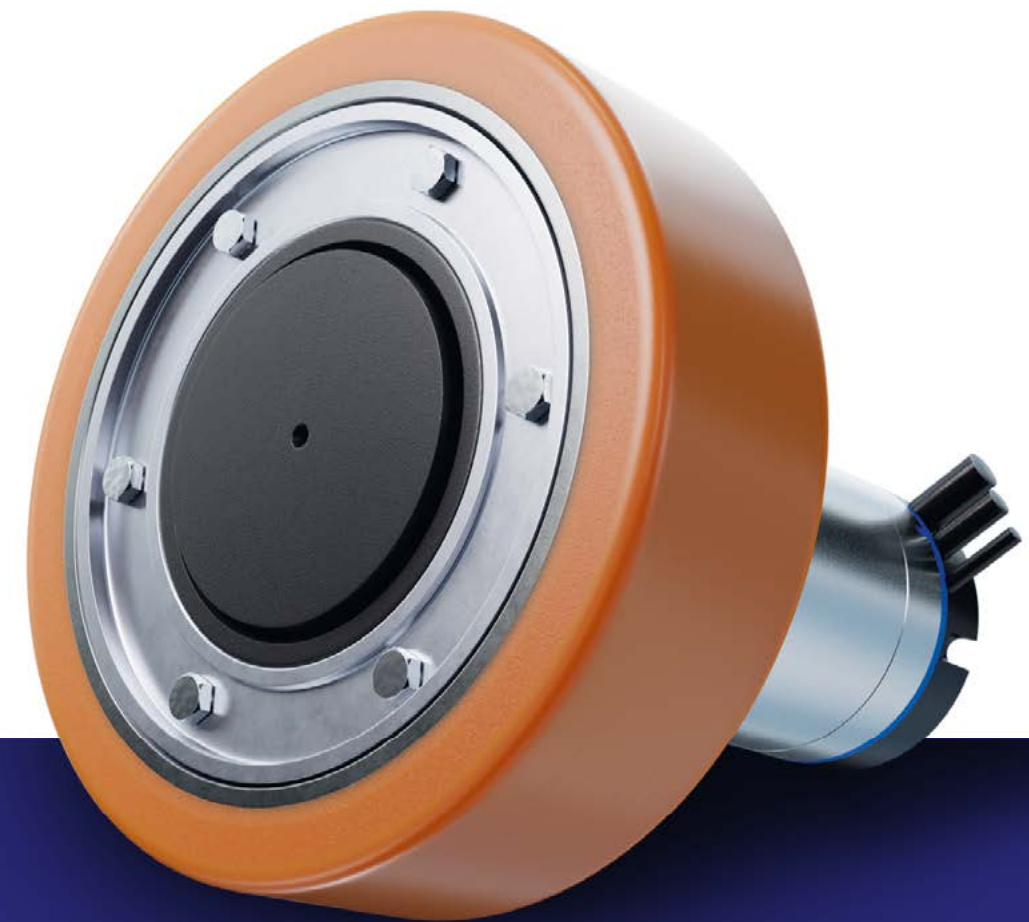
strength beyond strength

At the top of the food chain you find the eWheel M/L/X series.

With power ranging from 290 W to 750 W and peak torque of up to 200 Nm these eWheels are pure strength.

And with our integrated redundant encoder system it gives you hall signals, high resolution encoder signals AND a redundant low resolution encoder signal to enhance your safety architecture at minimum costs using minimum space.

up to 750 W
bd encoder system
IP54



eWheel

M/L/X

MOTOR DESIGN		M						L						X					
		<div>L2 = 119 mm</div> <div>24 V 48 V Nominal voltage</div> <div>GA-05: L1 = 59 mm L3 = 44 mm</div> <div>GA-08: L1 = 99 mm L3 = 60 mm</div>						<div>L2 = 139 mm</div> <div>24 V 48 V Nominal voltage</div> <div>GA-05: L1 = 59 mm L3 = 44 mm</div> <div>GA-08: L1 = 99 mm L3 = 60 mm</div>						<div>L2 = 159 mm</div> <div>48 V Nominal voltage</div> <div>GA-05: L1 = 59 mm L3 = 44 mm</div> <div>GA-08: L1 = 99 mm L3 = 60 mm</div>					
Vehicle speed [m/s] in relation to wheel diameter	d = Ø 140 mm	2.7	1.8	1.5	1			2.7	1.8	1.5	1			2.7	1.8	1.5	1		
	d = Ø 150 mm	2.9	2	1.6	1			2.9	2	1.6	1			2.9	2	1.6	1		
	d = Ø 160 mm	3	2.1	1.7	1.1			3	2.1	1.7	1.1			3	2.1	1.7	1.1		
	d = Ø 180 mm	3.4	2.4	1.9	1.3	0.9	0.8	3.4	2.4	1.9	1.3	0.9	0.8	3.4	2.4	1.9	1.3	0.9	0.8
	d = Ø 200 mm	3.8	2.6	2.1	1.4	1	0.8	3.8	2.6	2.1	1.4	1	0.8	3.8	2.6	2.1	1.4	1	0.8
	d = Ø 250 mm					1.3	1					1.3	1					1.3	1
Gear ratio		11	16	20	30	40	50	11	16	20	30	40	50	11	16	20	30	40	50
Exact gear ratio		160/14	160/10	160/8	7.360/247	400/10	500/10	160/14	160/10	160/8	7.360/247	400/10	500/10	160/14	160/10	160/8	7.360/247	400/10	500/10
Gear box type <small>GA05 = 500 kg load GA08 = 800 kg load</small>		GA-05	GA-05	GA-05	GA-05	GA-08	GA-08	GA-05	GA-05	GA-05	GA-05	GA-08	GA-08	GA-05	GA-05	GA-05	GA-05	GA-08	GA-08
Nominal torque [Nm]		7	11	13	20	27	33	13	18	23	34	46	57	19	27	34	51	68	86
Peak torque [Nm]		22	32	40	60	80	100	38	55	68	103	137	171	56	82	90	100	200	200
Mechanical braking torque		33	48	60	90	120	150	33	48	60	90	120	150	33	48	60	90	120	150
Nominal power [W]		293						503						754					
Nominal current (24V 48V) [Arms]		12.1 6.1						20.3 10.2						– 20.4					
Torque constant (24V 48V) [Nm/Arms]		0.0578 0.1152						0.059 0.1176						– 0.0884					
Peak current (24V 48V) [Arms]		36.3 18.2						61 30.6						– 61.1					

Extremely high overload capacity

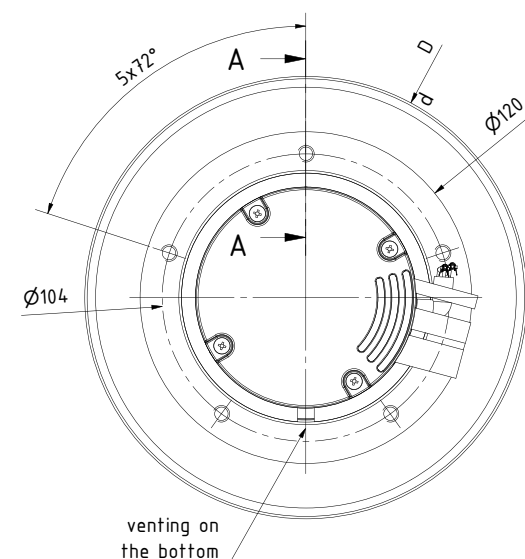
Siemens PDC (F) compatible

b-drives redundant encoder system available
(Hallsensoren + TTL + redundant HTL encoder signal)

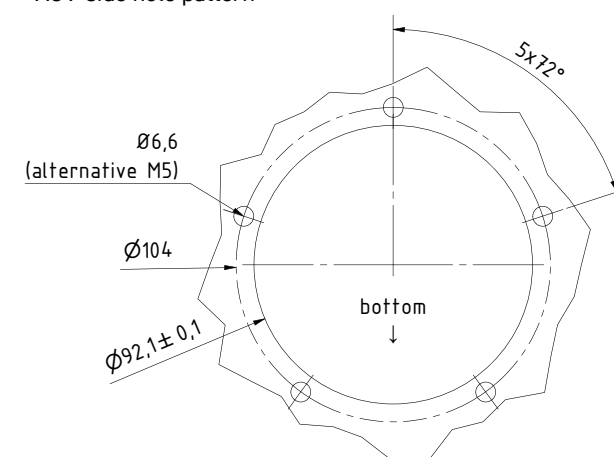
Hall sensors

Compatible to SICK

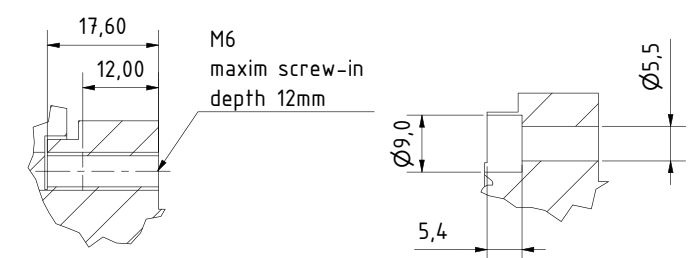
Protection class IP54



AGV-side hole pattern



section A-A
M6, alternative counter sink M5 DIN4762



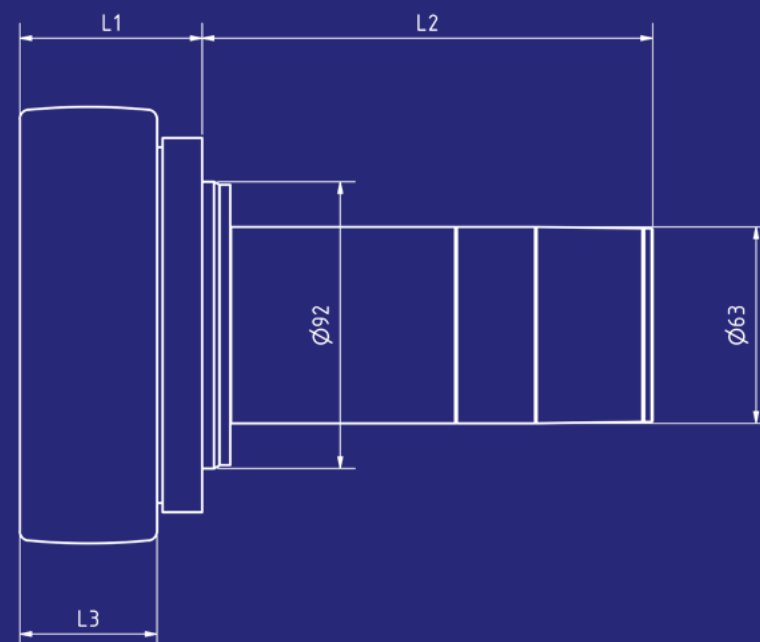
eWheel E/F/G the SIEMENS choice

You are living in a SIEMENS world using SIEMENS technology for drive controls in your AGV?

Then the E/F/G series might be your choice.

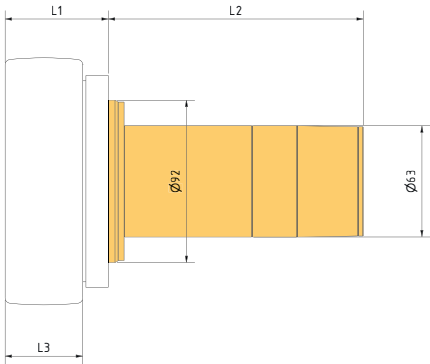
With integrated SIEMENS iQ Encoders, these motors are plug-and-play compatible to SIEMENS PDC and F-TM controllers and with power ranging from 150 W to 370 W there will surely be a perfect fit for you.

plug-and-play with SIEMENS PDC
150–370 W
IP54



eWheel E/F/G

MOTOR DESIGN



E

L2 = 145 mm

24 V | 48 V Nominal voltage
GA-05: L1 = 59 mm | L3 = 44 mm
GA-08: L1 = 99 mm | L3 = 60 mm

F

L2 = 165 mm

24 V | 48 V Nominal voltage
GA-05: L1 = 59 mm | L3 = 44 mm
GA-08: L1 = 99 mm | L3 = 60 mm

G

L2 = 185 mm

48 V Nominal voltage
GA-05: L1 = 59 mm | L3 = 44 mm
GA-08: L1 = 99 mm | L3 = 60 mm

Vehicle speed [m/s] in relation to wheel diameter	d = Ø 140 mm	2.7	1.8	1.5	1			2.7	1.8	1.5	1			2.7	1.8	1.5	1		
	d = Ø 150 mm	2.9	2	1.6	1			2.9	2	1.6	1			2.9	2	1.6	1		
	d = Ø 160 mm	3	2.1	1.7	1.1			3	2.1	1.7	1.1			3	2.1	1.7	1.1		
	d = Ø 180 mm	3.4	2.4	1.9	1.3	0.9	0.8	3.4	2.4	1.9	1.3	0.9	0.8	3.4	2.4	1.9	1.3	0.9	0.8
	d = Ø 200 mm	3.8	2.6	2.1	1.4	1	0.8	3.8	2.6	2.1	1.4	1	0.8	3.8	2.6	2.1	1.4	1	0.8
	d = Ø 250 mm					1.3	1					1.3	1					1.3	1
Gear ratio		11	16	20	30	40	50	11	16	20	30	40	50	11	16	20	30	40	50
Exact gear ratio		160/14	160/10	160/8	7.360/247	400/10	500/10	160/14	160/10	160/8	7.360/247	400/10	500/10	160/14	160/10	160/8	7.360/247	400/10	500/10
Gear box type	GA05 = 500 kg load GA08 = 800 kg load	GA-05	GA-05	GA-05	GA-05	GA-08	GA-08	GA-05	GA-05	GA-05	GA-05	GA-08	GA-08	GA-05	GA-05	GA-05	GA-05	GA-08	GA-08
Nominal torque [Nm]		3	4	6	8	11	14	6	8	10	16	21	26	9	13	17	25	33	42
Peak torque [Nm]		9	13	17	25	34	42	17	25	31	47	62	78	28	40	50	75	100	125
Mechanical braking torque [Nm]		33	48	60	90	120	150	33	48	60	90	120	150	33	48	60	90	120	150
Nominal power [W]		150						280						370					
Nominal current (24V 48V) [Arms]		7.1 4						13.5 6.5						– 8.6					
Torque constant (24V 48V) [Nm/Arms]		0.0507 0.0898						0.0495 0.1026						– 0.1026					
Peak current (24V 48V) [Arms]		21.3 12						40.6 19.6						– 25.7					

Extremely high overload capacity

Plug-and-play compatible with
SIEMENS MicroDrive PDC (F)
and F-TM

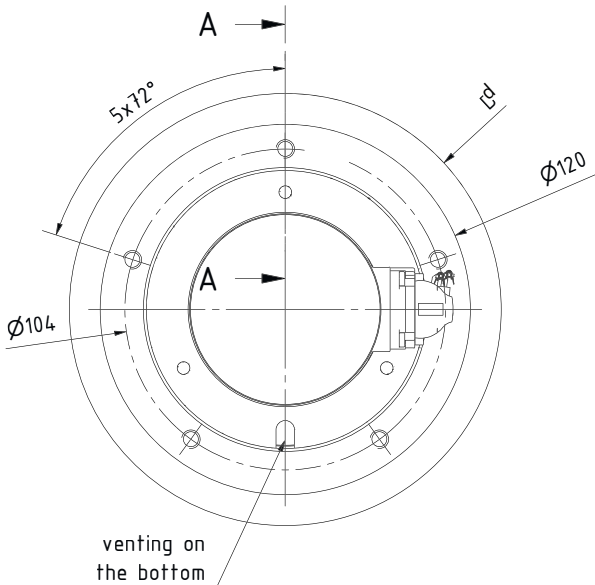
Integrated iQ Encoder with
100 increments

Safety features STO, SS1, SLS,
SBC, SSM via PROFIsafe when
combined with PDC (F)

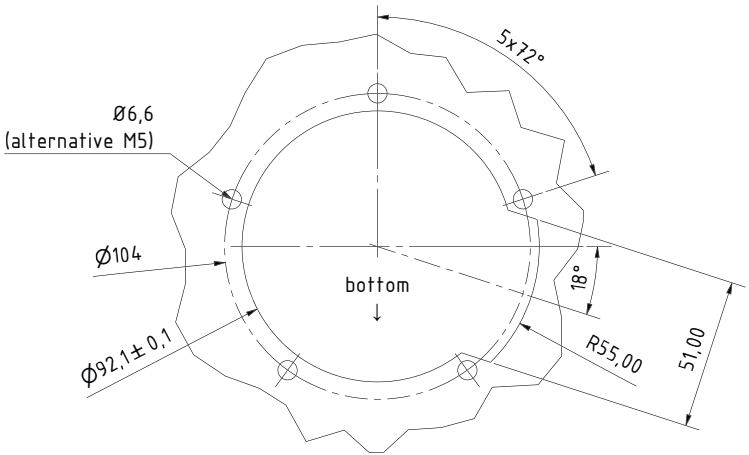
Hall sensors

Protection class IP54

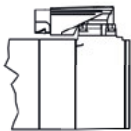
UL and CE



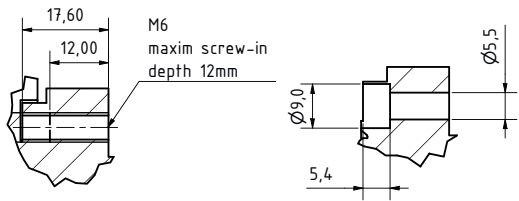
AGV-side hole pattern



Side view with connector



section A-A
M6, alternative counter sink M5 DIN4762



Double axis controller

E-2D-F3

Product Information

CAN-Open dual-axis controller for two BLDC-Motors Safe Torque Off (STO) function, SIL 3, PL e Kat. 3

Total power:

1000 W per Motor rated power

4000 W per Motor peak power

Hall sensor inputs

RS422 encoder inputs

HTL encoder inputs

5 V encoder auxiliary voltage

SIN/COS encoder inputs

10 digital inputs

6 digital outputs

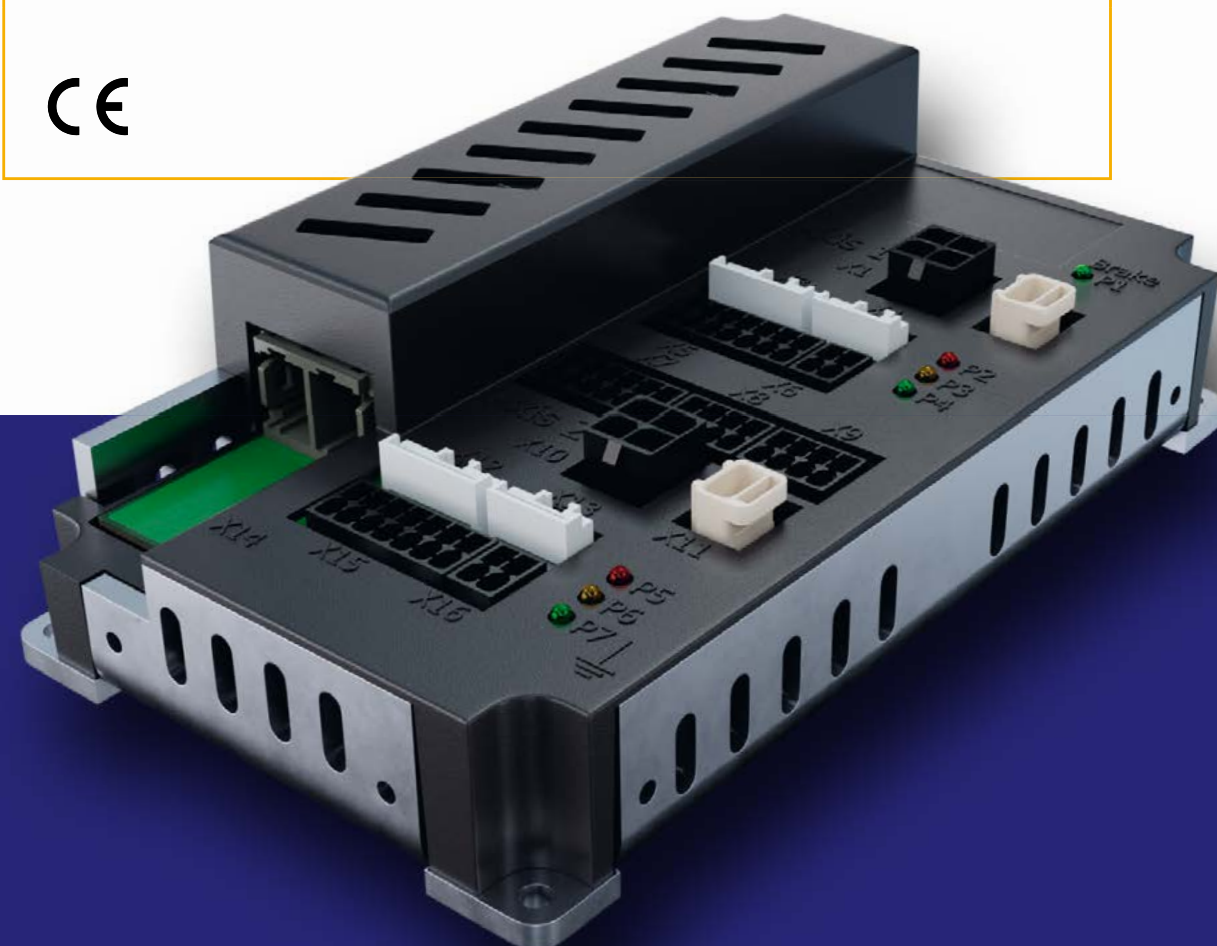
4 analog inputs

Peak current per motor up to 85 Arms

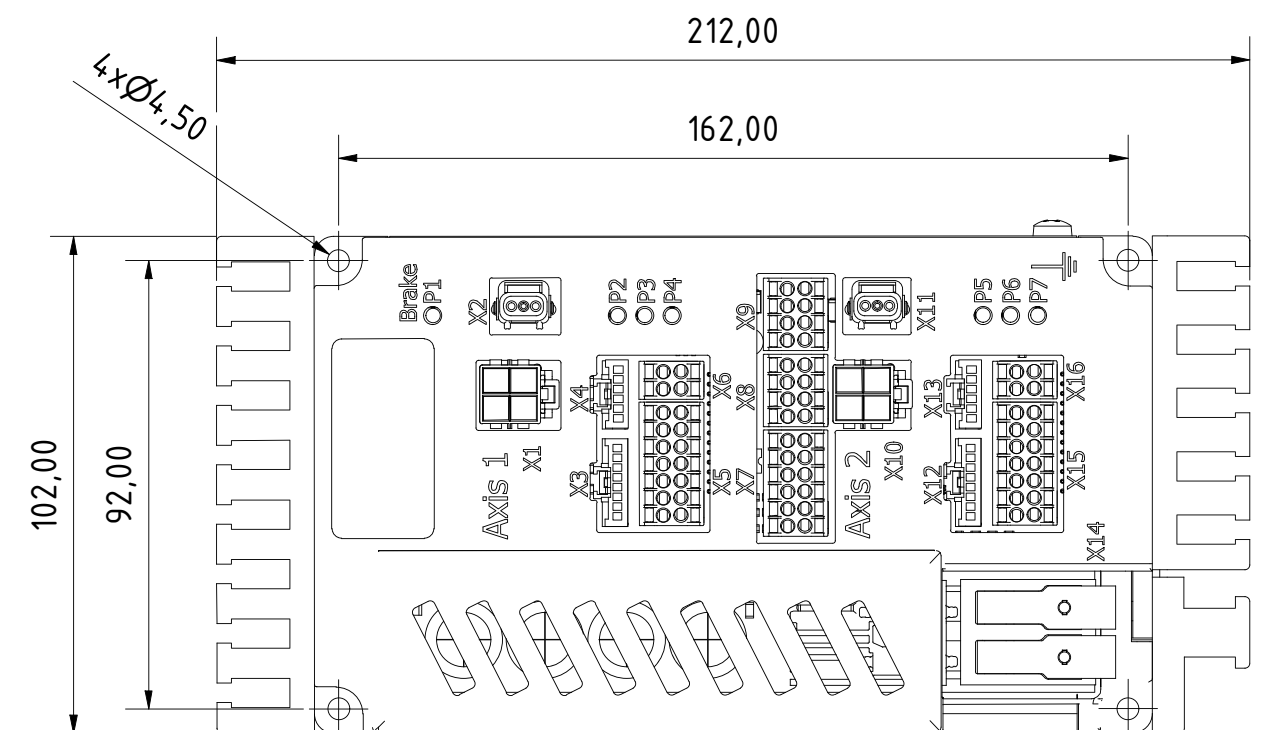
Rated current per motor 21 Arms

SBC compatible brake output with current reduction and demagnetization

Programmable controller (PLC functionality)



- originally designed as a controller for wheel drives for AGVs
- extremely compact
- reduced costs for wiring
- perfect fit for b-drives motors and encoder systems
- compatible to almost all common wheel drives and bldc motors on the market



b-drives redundant encoder system

compact and cost efficient

b-drives' redundant encoder system provides you with two redundant encoders - fully integrated and highly compact.

For your motor controller you get a high res encoder signal with 1024 inc/r with A, /A, B, /B, I and /I channels. For your safety control, you get a second, HTL low res encoder signal with channels A and B and 4 inc/r per channel.



b-drives redundant encoder system

high res encoder:
Resolution: 1024 inc/r
Signal: RS422 / TTL
Channel A, /A, B, /B, I, /I

Low res encoder:
Resolution: 4 inc/r
Signal: HTL
Channel A, B

Alternative encoders

endless possibilities

No matter if you are looking for **an external safety encoder, a multiturn encoder or any other external encoder system** – get in touch with us and we can most likely integrate it.



b-drives external encoder systems

- functional safety encoders
- multiturn encoders

Anything else?
Get in touch with us!

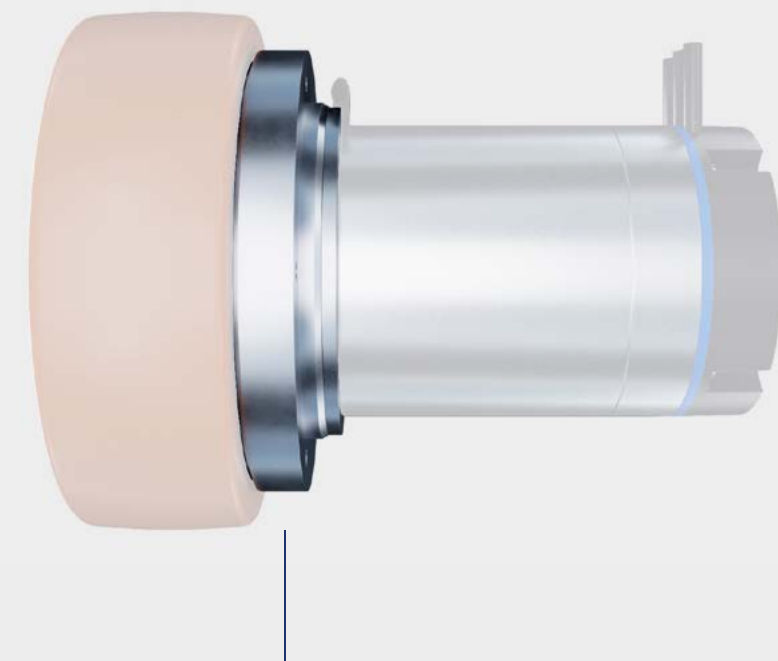


eWheel integrated parking brake

highly compact
emergency stop
up to 3 Nm



eWheel integrated safety/parking brake throw out the anchor



High endurance emergency brake:

500 emergency stops of a 1000 kg load from a speed of 2m/s

b-drives & DEXORY:
Together from the idea to
serial production



Dexory and b-drives share a highly productive partnership. Working together from the early stages of Dexory's latest AMR platform, b-drives took the drive requirements, identified the appropriate eWheel from the modular drive kit, and swiftly brought a prototype to life.

Dexory uses two eWheels per robot, enabling these high-performance machines to capture warehouse data in real time. The tower, which is up to 12 meters high, collects all the data on the stored goods using various scanners and cameras, making the information immediately available.

This close partnership has resulted in an innovative solution, with our **eWheels playing a key role in transforming warehouse automation** through real-time data capture.



Andrei Danesu
Dexory CEO

**“You don't
become a market
leader alone.**

b-drives was there at the right time, with the right expertise and commitment, and exactly the right drive to meet our high expectations.”

Dexory		Technical Application data	
Employees:	>150	Total Weight:	1500kg
Located:	UK London & Wallingford	max speed:	1 m/s
Active:	Worldwide	driven wheels:	2 eWheel with 300 Watts
Production:	>3 robots per week		continuous power each

Our modular eWheel drive kit – the best solution for your AGV

With our years of experience and expertise and the wide range of the modular eWheel drive kit, we will most linkely find a perfect fit for your AGV/AMR.

You simply get in touch with us by setting up a TEAMS meeting or sending us your specification and we will work out the details together. We will help you choose the right eWheel and provide guidance and support regarding safety or controller settings.

If you choose to buy our double axis controller or any other controller we offer we will also help you to set the right parameters and support you with commissioning via remote or in person.

b-drives eWheel. Your benefits:

- easy integration
- personal support
- optimized system costs
- wide range of torque and speed
- perfect fit for your AGV



Get in touch with us, and lets start your eWheel project together.
+49 40 / 53 80 92 - 430

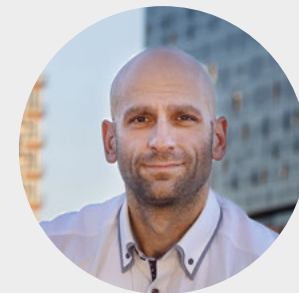
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[b-drives.com](https://www.b-drives.com)