

The all-inclusive powerhouse

Highly integrated wheel hub drive with Plug & Play function

Franz Morat Group

 FMORAT-CO

 FramoMorat



Wheel hub drive - Features

- Maximum power density
- Smart drive system
- Long service life
- High level of integration
- Low level of maintenance
- Comprehensive communication



Framo Morat wheel hub drive.

Product features at a glance.

Maximum power density

High radial loads and constantly high acceleration and speed

Smart drive system

Plug & Play function and a central parameter check using an optional sensor system

Long service life

Drive system designed for efficiency with a long-lasting PUR wheel

High level of integration

All functional elements housed in a compact space with minimal weight



Low level of maintenance

Components can be replaced individually thanks to the modular design

Comprehensive communication

Interdisciplinary drive control system as an e-axle thanks to standard interfaces (e.g. RS485 or CAN)

What can we do for you?

We are glad to be personally there for you and we look forward to common challenges and projects.



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From **wheel hub drives** used in AGVs, AMRs or warehouse shuttles and **planetary gears** for conveyor belts or robot handling systems, to gear motors for safety gate drives, or high-precision **gear components** for industrial trucks or electric cargo bikes, the Franz Morat Group has been a reliable partner of the most notable global players in the intralogistics sector for generations.

You benefit from:

- 110 years of expertise in designing and developing custom drive components & complete systems
- Project specific choice of materials (metals, thermoplastics or combinations of both) according to your requirements regarding quality, weight, smooth operation or lifetime
- All process steps from a single source



The all-inclusive powerhouse

All functional elements in one compact system.

Framo Morat has developed a **highly integrated** wheel hub drive that combines all functional elements, such as the wheel, a high-precision planetary gear, a powerful electric motor and a brake and electronics, into one all-inclusive solution. This modular and scalable system boasts high performance in a compact design and lets users make adaptations to the load capacity, torque, interfaces, sensor system and control profiles.

A high level of vertical integration in the component production, motor winding and assembly helps achieve short delivery times. When providing service and consultation, Framo Morat draws upon 110 years of experience in gear technology and drive engineering and many years of industry expertise. Due to the fact that all quality-critical parameters come from a single source, complex machining tasks can be precisely carried out in the highest quality according to the customers requirement.

Modular design with powerful components

- Powerful, replaceable PUR wheel
- Efficient planetary gear (1- or 2-stage)
- Separate wheel bearing
- Universal customer interface
- High-performance BLDC motor
- Integrated holding brake
- Integrated secondary motor encoder (RS422)
- Industrial standard serial interfaces (RS485 / CAN)
- Integrated primary motor-encoder (SPI (internal) / SSI (external))
- Complete sealed system



All in one – one for all: The wheel hub drive in use in a variety of industries...

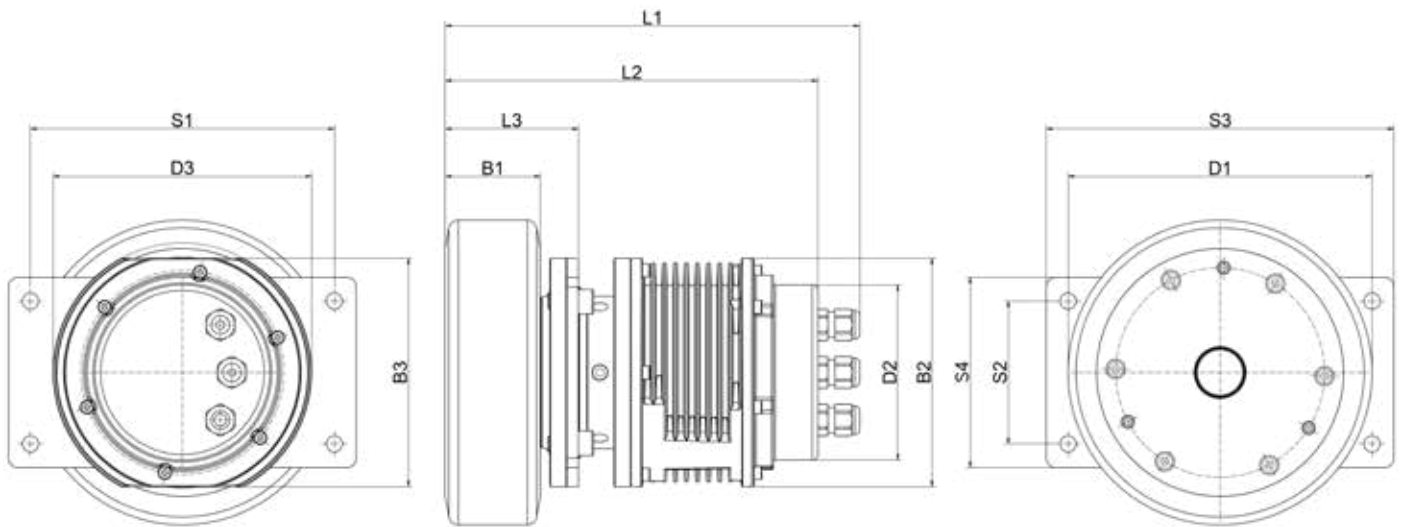


Intralogistics - wheel hub drives for AGVs & AMRs

Thanks to unmanned operation around the clock, automated guided vehicles (AGVs) in warehouses, package distribution centers and production halls ensure maximum efficiency and reliability in the distribution of goods, packages and components.

The highly integrated Framo Morat wheel hub drive combines all the functional elements in a compact design and is ideal for use in AGVs and AMRs thanks to its high power density.

Dimensional drawing



Dimensions	Values
L1	218 mm
L2	196 mm
L3	70 mm
D1	Ø 160 mm
D2	Ø 92 mm
D3	Ø 136 mm
B1	50 mm
B2	120 mm
B3	120 mm
S1	160 mm
S2	75 mm
S3	183 mm
S4	100 mm



Medical technology - wheel hub drives in hospitals

The highly integrated Framo Morat wheel hub drive is an all-rounder in hospital logistics.

This applies to all situations, whether it is used as a traction drive in the newly developed system for comfortably moving bedridden patients, in autonomous UV disinfection robots that quietly and reliably kill off germs and viruses, or in AGVs and AMRs that provide automated transport of goods to medical facilities

Performance data

	1-stage drive	2-stage drive
Power continuous operation (S1) [W]	360	
Power intermittent operation (S3) [W]	660	
Max. power ^{*1} [W]	1.300	
Nominal voltage [VDC]	48	
Nominal current [A]	20	
Max. power consumption ^{*2} [A]	35	
Brake holding torque ^{*3} [Nm]	2,2	
Brake nominal voltage [VDC]	48	
Encoder	Contactless, absolute angle sensor (up to 14-bit)	
Encoder communication	Serial SPI, incremental ABZ interface (12-bit) and SSI output (14-bit)	
Max. speed ^{*4} [km/h]	8	
Max. acceleration ^{*5} [m/s ²]	1	
Acceleration (80% of the load capacity) [m/s ²]	0,75	
Max. system speed ^{*6} [rpm]	265	
Nominal torque ^{*7} [Nm]	18	21
Acceleration torque ^{*8} [Nm]	36	42
Emergency torque ^{*9} [Nm]	54	63
Protection class	IP54	
Ambient temperature [°C]	0 - 40	
Load capacity per wheel ^{*10} [kg]	500	
Max. radial force per wheel [N]	5.000	
Max. axial force per wheel [N]	1.700	
Wheel diameter [mm]	Ø 160	
Wheel width [mm]	50	
Hardness of tread [°shore]	92	
Rolling resistance [N]	65	
Friction coefficient	> 0,25	
Drive weight ^{*11} [kg]	9	10

Deviating values must be observed and evaluated separately

- *1 Maximum electrical power at stall torque
 *2 Maximum current consumption during the test cycle
 *3 Holding torque based on input side
 *4 Recommended maximum speed
 *5 Max. acceleration based on empty run
 *6 Corresponds to 8 km/h at Ø 160 mm

- *7 Nominal values are based on a service life of 30,000 h
 *8 Max. 250 cycles per h, T2B proportion < 5 % of the total running time
 *9 Max. 1000 cycles during the entire service life
 *10 The load capacity specifications of the wheel manufacturer may vary
 *11 Drive weight based on condition upon delivery



E-mobility - E-axle for micromobility

In smart cities, Framo Morat wheel hub drives act as drives for the final mile in electric mini cars.

The powerful and ultra-compact drive unit with integrated brake, ECU and encoder was designed for use in electronic axles. Thanks to its modular design and scalability, it can be flexibly adapted to a variety of vehicle types, such as cargo bikes and small electric cars.

The best of both worlds.

Gear technology and drive solutions of both metals & plastics.



Combining local expertise & global presence.

Since the founding of Franz Morat GmbH in 1912, gear and drive engineering has been in a continuous state of development at the company's headquarters in Eisenbach, Black Forest. Today, the Franz Morat Group is a globally operating manufacturer of high-quality drive solutions for many industries and applications. The company counts approx. 700 employees and runs subsidiaries in the United States, Turkey, Poland and México.



Uniting metals & plastics.

Our core competencies lie in the production of high-precision gears, rotor shafts and worm gear sets made from various metals as well as technically advanced injection-molded parts from thermoplastics. This results in solutions that incorporate the technical advantages of both material groups depending on the required specifications. You benefit from 110 years of expertise and an experienced partner who offers all process steps from a single source.



Metal machining:

Turning, Milling, Gear Hobbing, Gear Shaping, Broaching, Hardening, Cylindrical Grinding, Honing, Profile & Hob Grinding



Plastic injection molding:

Mold Design & Tool Making, Over 70 injection molding machines, All technical thermoplastics (incl. PEEK™), Subsequent processing



Pioneering research & development.

In developing custom engineered drive solutions, Framo Morat and F. Morat cooperate closely under the umbrella of the Franz Morat Group. Our many years of experience make us your ideal partner, from development and design engineering to prototyping and testing all the way to series production and assembly. Numerous highly respected companies from a wide variety of industries rely on our development services and the resulting drive solutions.



Drive technology:

Specification, Development & Design, Prototyping, Testing & Quality Control, Serial Production, Assembly & Use

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