# Compact, flexible and powerful.

The wheel hub gear for Automated Guided Vehicles (AGVs).

Franz Morat Group

F-MORAT-CO FramoMorat

## Hub gear NG250 / NG500

- Compact design
- High radial loads
- Long service life
- Low noise emissions
- Maintenance-friendly design

# Compact, flexible and powerful.

Product features at a glance.

## Standard equipment

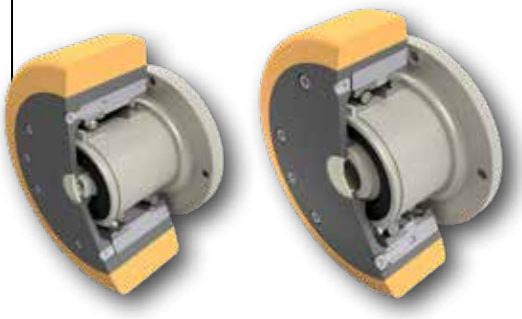
**Compact design**
thanks to integration of planetary carrier in impeller

**High radial loads**
thanks to direct transfer of force to vehicle frame

**Long service life and low noise emissions**
thanks to separation of gear and impeller

**Short delivery times and high efficiency**
with geared platform (NG250/500):
- Single or two-stage planetary gear (i = 4, 5, 8, 16, 20 and 32:1)
- Polyurethan wheel, Ø160x50 mm (NG500) or Ø125x50 mm (NG250)

**Maintenance-friendly design,**
e.g. thanks to the option to easily change wheels



## Optional equipment

**Drive systems fully developed in line with customer specifications** incl. motor, brake, encoder and controller

**Individual motor adaptation,** through specially adapted stub shaft and motor bolt circle

**Protection against intake of debris,**
e.g. thanks to brush seal

**Adaptation of the polyurethan impeller**
- Individual materials (better floor preservation and rolling performance, antistatic tread, etc.)
- Further sizes (Ø140 - Ø200x50mm)
- Special wheels and profiles (pneumatic tire, outdoor profile, etc.)

**Compliance with international standards**
- Protection class IP67, UL-certification, ATEX-certification

**Excellent flexibility**
for custom adaptations based on the modular principle:
- Individually configured radial loads
- Custom sizes
- Helically toothed planetary carriers
- Individual materials, e.g. thermoplastics
- Other ratios (e.g. i = 25, 40 and 64:1)

Providing expertise & innovative ideas for the intralogistics industry.

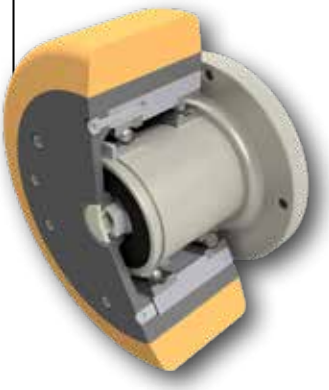
From individually adaptable wheel hub drives used in warehouse shuttle systems or Automated Guided Vehicles (AGVs) to planetary gearboxes for materials handling technology or robotized handling systems to gearing components for industrial trucks or electric cargo bicycles – the Franz Morat Group has been a reliable partner of the most notable global players in the intralogistics sector for generations.

# Wheel hub gears from Framo Morat.

Standard sizes and custom versions.

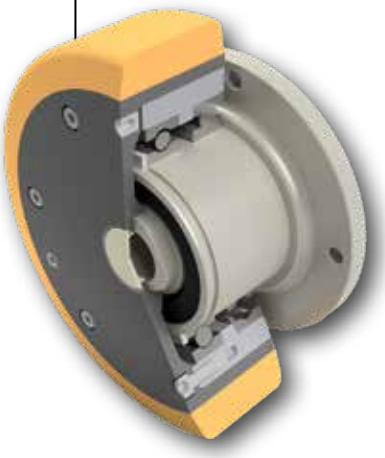
### Hub gearbox NG250

- Max. load capacity 250 kg
- Standard wheel size 125 mm
- Total gear length 64 mm



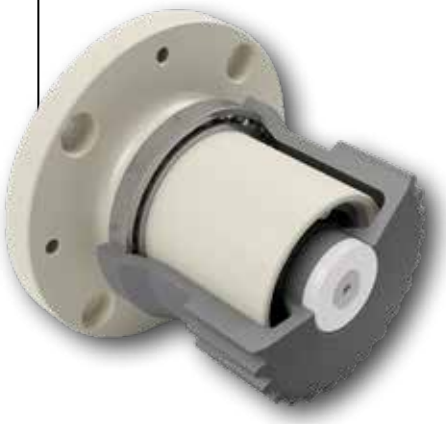
### Hub gearbox NG500

- Max. load capacity 500 kg
- Standard wheel size 160 mm
- Total gear length 64 mm



### Custom engineerd solutions

- Individual radial load
- Application-specific interfaces (motor and impeller)



## What can we do for you?

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

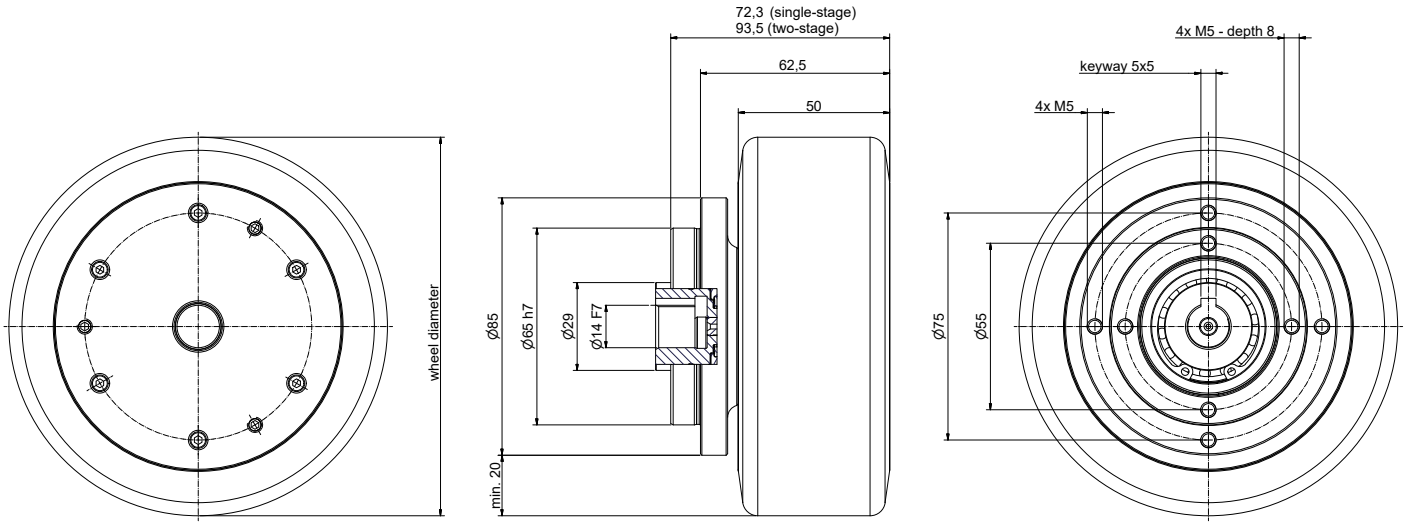

**+49 7657 88 306** **agv@framo-morat.com** **www.wheelhubdrive.com**


With unattended operation around the clock, automated guided vehicles (AGVs) in warehouses, parcel distribution centers and production halls ensure maximum profitability and reliability when distributing goods, packaging materials or components. Hub gears from Framo Morat prove their value as wheel drives for AGVs due to the advantageous arrangement of both the bearings and the drive and output shafts. Furthermore, a compact design in confined spaces is possible. The hub gears are available in the NG250 and NG500 variants, each in single- and double-stage versions with Polyurethan wheels. Moreover, customer-specific adaptations, such as a brush seal for outdoor applications or a toothed belt for use in high-bay warehouses, can be made too.

### You benefit from:

- More than 100 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

# Hub gearbox • Technical data




## Hub gearbox NG250 • Power table

| Typ | Wheel-Ø*1 [mm] | Wheel width [mm] | Protection class | Max. wheel load*2 [kg] |
|---|---|---|---|---|
| NG250 | 125 | 50 | IP54 | 250 |

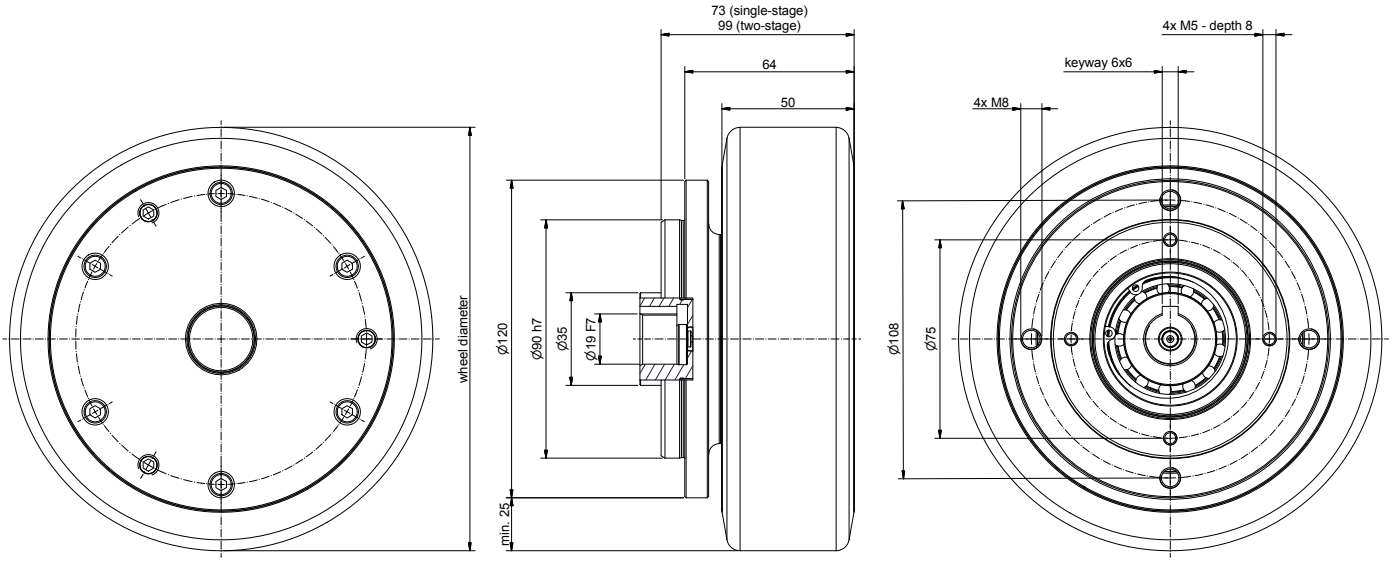
**Differing values must be considered and evaluated separately**

*1 Further wheel sizes > 125 mm available on request
*2 Load specifications of the wheel manufacturers may differ

| Ratio | Stage | Nominal torque*1 output [Nm] | Max. Acceleration torque*2 $T_{2B}$ [Nm] | Emergency stop torque*3 $T_{2NOT}$ [Nm] | Efficiency [%] | Nominal speed*1 output [rpm] - [km/h] | | Nominal torque*1 input [Ncm] | Nominal speed*1 input [rpm] | No-load torque [Nm] | Weigth [kg] | Noise level*4 [db(A)] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4 | 1 | 11 | 22 | 33 | 90 | 250 | 6,9 | 299 | 1000 | <0,45 | 3,8 | <60 |
| 5 | | 9 | 18 | 27 | 90 | 200 | 5,5 | 196 | | | | |
| 8 | | 9 | 18 | 27 | 90 | 125 | 3,5 | 122 | | | | |
| 16 | 2 | 11 | 22 | 33 | 85 | 187,5 | 4,8 | 81 | 3000 | <0,15 | 4,5 | <55 |
| 20 | | 11 | 22 | 33 | 85 | 150 | 3,8 | 65 | | | | |
| 32 | | 11 | 22 | 33 | 85 | 93,8 | 2,4 | 40 | | | | |

**Differing values must be considered and evaluated separately**

*1 Nominal values refer to 30,000 hours of service life under constant-load conditions
*2 Max. 1000 cycles per hour. Acceleration torque proportion <5% of the total operating time
*3 Max. 1000 cycles over the gear service life
*4 Volume levels were evaluated at a distance of 1 meter on the test bench




# Hub gearbox NG500 · Power table

| Typ | Wheel-Ø*1 [mm] | Wheel width [mm] | Protection class | Max. wheel load*2 [kg] |
|---|---|---|---|---|
| NG500 | 160 | 50 | IP54 | 500 |

**Differing values must be considered and evaluated separately**

*1 Further wheel sizes > 150 mm available on request
*2 Load specifications of the wheel manufacturers may differ

| Ratio | Stage | Nominal torque*1 output [Nm] | Max. Acceleration torque*2 $T_{2B}$ [Nm] | Emergency stop torque*3 $T_{2NOT}$ [Nm] | Efficiency [%] | Nominal speed*1 output [rpm] - [km/h] | | Nominal torque*1 input [Ncm] | Nominal speed*1 input [rpm] | No-load torque [Nm] | Weigth [kg] | Noise level*4 [db(A)] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4 | 1 | 21 | 42 | 63 | 90 | 250 | 6,9 | 571 | 1000 | <0,45 | 5,9 | <60 |
| 5 | | 16 | 32 | 48 | 90 | 200 | 5,5 | 348 | | | | |
| 8 | | 18 | 36 | 54 | 90 | 125 | 3,5 | 245 | | | | |
| 16 | 2 | 21 | 42 | 63 | 85 | 187,5 | 4,8 | 154 | 3000 | <0,15 | 6,9 | <55 |
| 20 | | 21 | 42 | 63 | 85 | 150 | 3,8 | 124 | | | | |
| 32 | | 21 | 42 | 63 | 85 | 93,8 | 2,4 | 77 | | | | |

**Differing values must be considered and evaluated separately**

*1 Nominal values refer to 30,000 hours of service life under constant-load conditions
*2 Max. 1000 cycles per hour. Acceleration torque proportion <5% of the total operating time
*3 Max. 1000 cycles over the gear service life
*4 Volume levels were evaluated at a distance of 1 meter on the test bench

# 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 over 670 employees and runs subsidiaries in the United States, Turkey, Poland and México.

## Uniting metals & plastics.

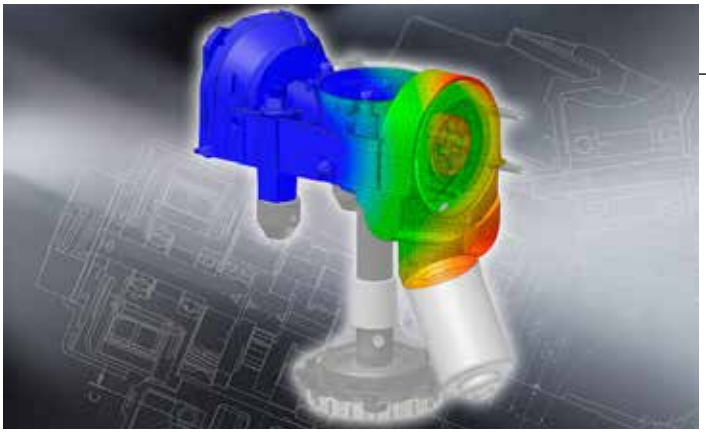
Our core competencies lie in the production of high-precision gears, rotor shafts and worm gear sets made from various metals as well as technically advanced injection-molded parts from thermoplastics. This results in solutions that incorporate the technical advantages of both material groups depending on the required specifications. You benefit from over 100 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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