

AGV/AMR Driving Solution



Leadshine
Reliable Motion Control Products

x



FramoMorat
Franz Morat Group



1. Essential components for AGV by Motor114 & Servostar



SIGMATEK

1. Compact, High Reliable Controller

- Ultra Slim style Control & Safety module
- SLAM Navigation supported
- CANopen & EtherCAT communication.

Distributed by  **SERVOSTAR**
Passion for motion



Leadshine

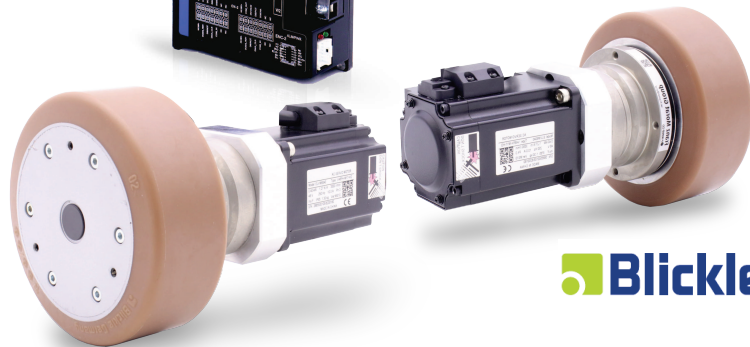
FramoMorat
 Franz Morat Group

2. Dual axis servo drive:

- Leadshine's low voltage servo drive: 2ELD2 series
- CANopen, RS485, EtherCAT
- Safety function: STO
- Support Maximum rated 30A & peak 90A (1kW Motor)
- ※ Single axis driver offers rated 90A & peak 180A (2kW motor)

3. Driving Module

- Leadshine's low voltage servo motor: ELVM series
 - ▶ From 200W to 1kW, prefer spec is 400W & 750W
 - ▶ Maximum motor power is 2kW (□130mm frame)
- Framo Morat's Hub gears: NG250 & NG500 series
 - ▶ NG250 for 400W, 600W (Wheel diameter Ø125*50mm)
 - ▶ NG500 for 750W, 1kW (Wheel diameter Ø160*50mm)
- ※ PU wheel is from Blickle's Besthane series (Shore 92A)
- ※ Vulkollan wheel is available on request.



Blickle

Distributed by  **motor 114**
Simple Motion - Customer Spec - Precision Marketing

1. Essential components for AGV: Solution overview

Customer's Benefits: Why this solution?

1. 성능은 높이고, 단가는 낮추고.

- AGV 시장에서 검증된 리드샤인 저전압서보 솔루션과 독일 110년 전통의 웜 기어 및 유성감속기 제조사 프라모 모랏의 조합으로, 높은 신뢰성의 AGV를 합리적인 금액으로 제안합니다. 빠른 납기와 정확한 기술지원은 물론입니다.

2. 더 컴팩트하게, 더 튼튼하게.

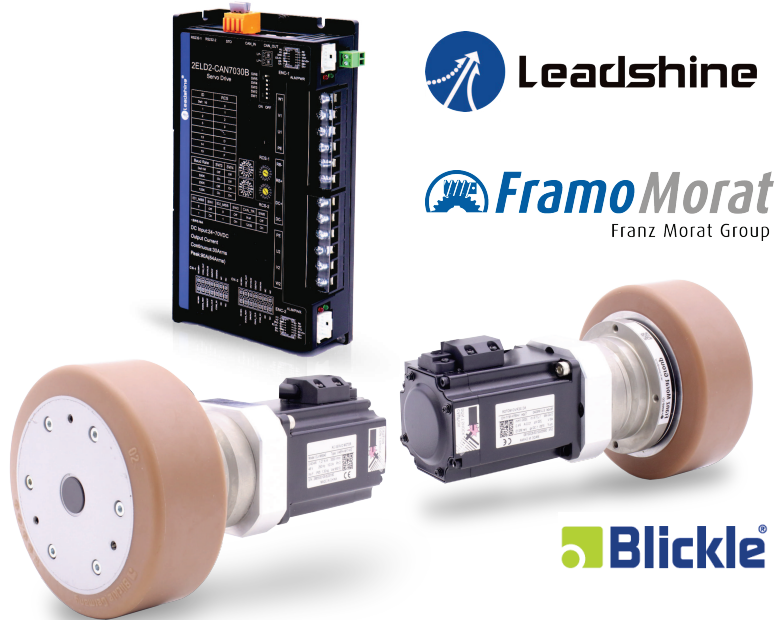
- AGV 설계시 플랫폼 내부는 언제나 좁고, 배치할 부품은 많습니다. A4 용지의 세로길이보다 짧게, 서보 모터+휠 일체형 감속기를 배치하면 최대 1.2ton까지 1.25m/s 속도로 안전하게 이송할 수 있습니다.

3. 작업 공수를 줄이고, 생산성을 올리고.

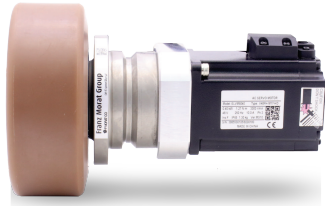
- 기존에는 유성감속기 출력축에 맞춰 휠을 설계·가공·조립해야 했습니다. 이제는 Blicke의 PU휠이 기본 부착된 AGV 전용 제품을 경험해보세요. 유지보수가 필요할 경우, 전면의 볼트를 풀면 휠을 쉽게 교체할 수 있습니다.

4. 혁신적인 리드샤인, 전통적인 프라모 모랏.

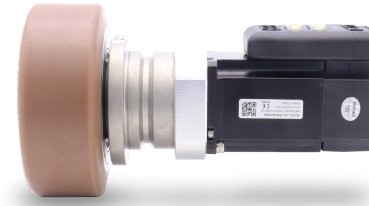
- 리드샤인(Leadshine)은 중국 심천에 위치한 제조사로, 1997년 설립 이후 시장 요구에 알맞은 신제품을 개발하여 2020년 심천 증시에 상장된 업체입니다. 미국과 서유럽에 지사와 대리점을 두고 있으며, 탁월한 기술력과 가격 경쟁력을 선보이는 모션 컨트롤 부품 전문 제조사입니다.
- 프라모 모랏(Framo Morat)은 독일 Eisenbach에 위치한 제조사로, 1910년 설립된 이후 유럽 내 선도적인 기어 설계/분석/가공 기술을 보유한 업체입니다. 높은 품질의 웜 기어 세트 및 유성감속기를 전문으로 생산하고 있습니다.



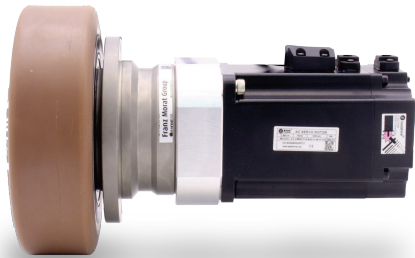
2. Leadshine & Framo Morat: Compact driving module

**1. AGV 500kg Solution:**

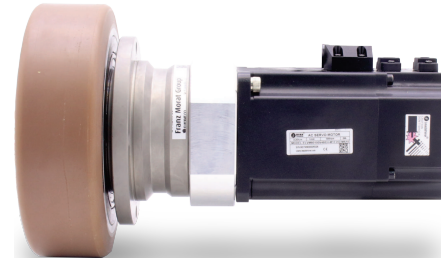
- NG250 (1/16) + ELVM 400W 24/48V
- Length: 113.5 + 88.6 = **202.1mm**
- Rated speed: 1.2m/s (i=16, 3000rpm)
- Rated torque: Input 1.27Nm & Output 17.3Nm (Eff 85%)
- Servo Motor + 17Bit Abs encoder + hub gears (+Brake optional)

**2. AGV 500kg All-in-One Solution:**

- NG250 (1/16) + iSV2 400W 48V
- Length: 113.5 + 112.7 = **226,2mm**
- Rated speed: 1.2m/s (i=16, 3000rpm)
- Rated torque: Input 1.27Nm & Output 17.3Nm (Eff 85%)
- Servo Motor + Drive(CANopen/RS485) + 17Bit incremental encoder + hub gears (+Brake optional)

**3. AGV 1t Solution:**

- NG500 (1/20) + ELVM 750W 48V + Brake
- Length: 127.5 + 121.9 = **249.4mm**
- Rated speed: 1.25m/s (i=20, 3000rpm)
- Rated torque: Input 2.39Nm & Output 40.6Nm (Eff 85%)
- Servo Motor + 17Bit Abs encoder + Brake + hub gears

**4. AGV 1.2t Solution:**

- NG500 (1/20) + ELVM 1000W 48V + Brake
- Length: 127.5 + 134.9 = **262.4mm**
- Rated speed: 1.25m/s (i=20, 3000rpm)
- Rated torque: Input 3.2Nm & Output 54.4Nm (Eff 85%)
- Servo Motor + 17Bit Abs encoder + Brake + hub gears

※ Vulkollan is available on request

3. Leadshine driver: Supports wide range of the current



1. Dual Axis Drive for max 1.5ton AGV

- Parts number: 2ELD2-CAN/RS70□□B
- Rated Current: 30A (Peak 90A) [*per axis*]
- Rated voltage: 24V – 70V
- Command method: CANopen, RS485, Pulse/Direction
- I/O spec: Input 4point & Output 3point [*per axis*]
- Safety function: STO
- Matched motor: 50W – 1kW [*per axis*]



2. Drive for max 1ton AGV

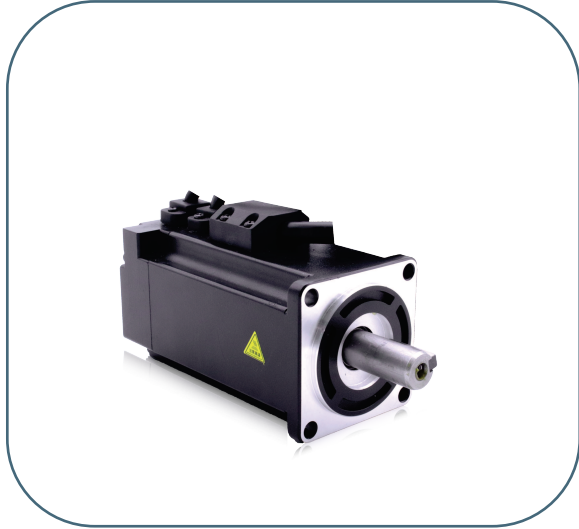
- Parts number: ELD2-CAN/RS70□□B
- Rated Current: 30A (Peak 90A)
- Rated voltage: 24V – 70V
- Command method: CANopen, RS485, Pulse/Direction & Analog
- I/O spec: Input 6point / Output 3point
- Matched motor: 50W – 1kW



3. Drive for 1.5ton – 2.5ton AGV

- Parts number: ELD2-CAN/RS7060B
- Rated Current: 60A (Peak 180A)
- Rated voltage: 48V – 70V
- Command method: CANopen, RS485, Pulse/Direction & Analog
- I/O spec: Input 6point / Output 3point
- Safety function: STO
- Matched motor: 1.5kW, 2kW

4. Leadshine Low voltage servo motor (PMSM type, not BLDC)



1. □60mm / 400W (24V or 48V)

- Parts#: ELVM6040V48FH-M17-HD
- Rated Torque: 1.27Nm (Peak 3.81Nm)
- Rated Speed: 3,000rpm (Peak 4,000rpm)
- Rated Current: 19.9A (24V) or 10A (48V)
- Encoder specification:
 - 17bit Multi-turn Absolute (*Standard*)
 - 2,500line Incremental (*Optional*)
- Matched Drive: ELD2-**7020B (Single Ch.)
: 2ELD2-**7020B (Dual Ch.)



2. □80mm, 750W (48V), Brake type

- Parts#: ELVM8075V48EH-M17-HD
- Rated Torque: 2.39Nm (Peak 7.17Nm)
- Rated Speed: 3,000rpm (Peak 4,000rpm)
- Rated Current: 19A (48V)
- Encoder specification:
 - 17bit Multi-turn Absolute (*Standard*)
 - 2,500line Incremental (*Optional*)
- Matched Drive: ELD2-**7030B (Single Ch.)
: 2ELD2-**7030B (Dual Ch.)



3. □130mm, 2kW, Brake type

- Parts#: ELVM130200V48EH-M17-HD
- Rated Torque: 6.4Nm (Peak 16Nm)
- Rated Speed: 3,000rpm (Peak 4,000rpm)
- Rated Current: 48.5A (48V)
- Encoder specification:
 - 17bit Multi-turn Absolute (*Standard*)
 - 2,500line Incremental (*Optional*)
- Matched Drive: ELD2-**7060B (Single Ch.)

5. Framo Morat: Hub gears – Gearbox specification

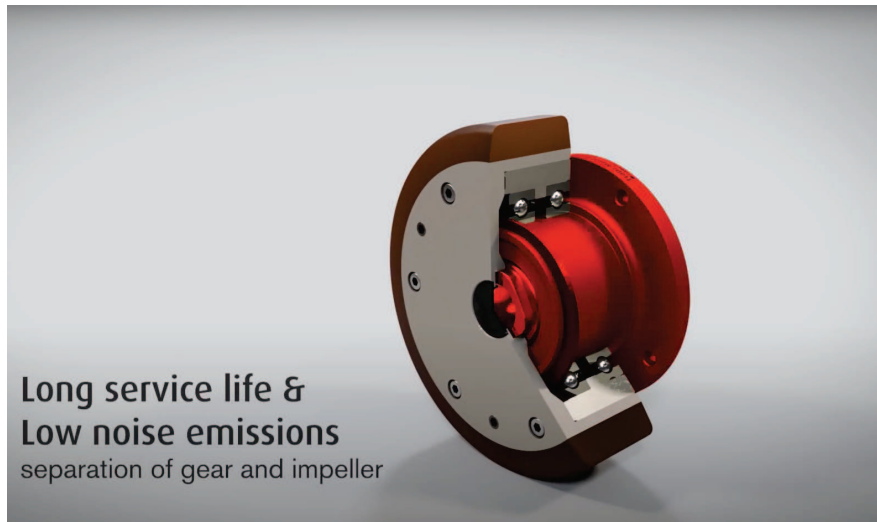
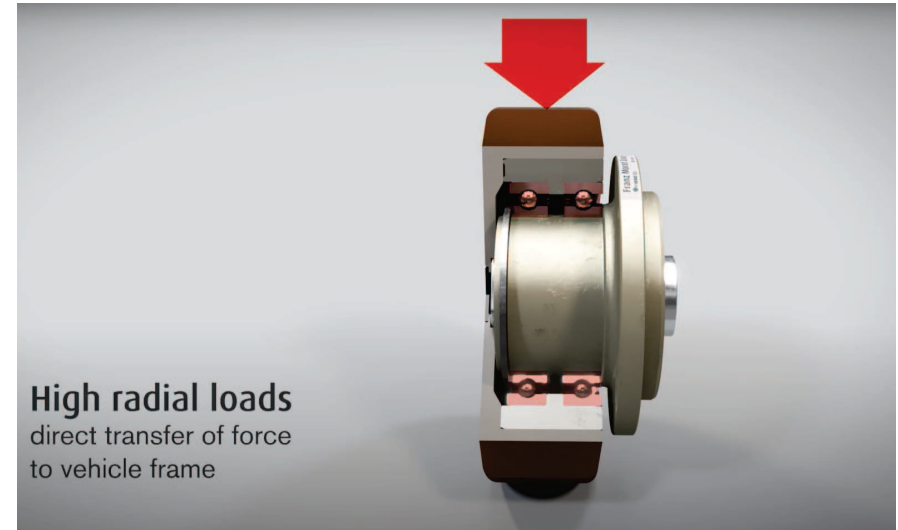
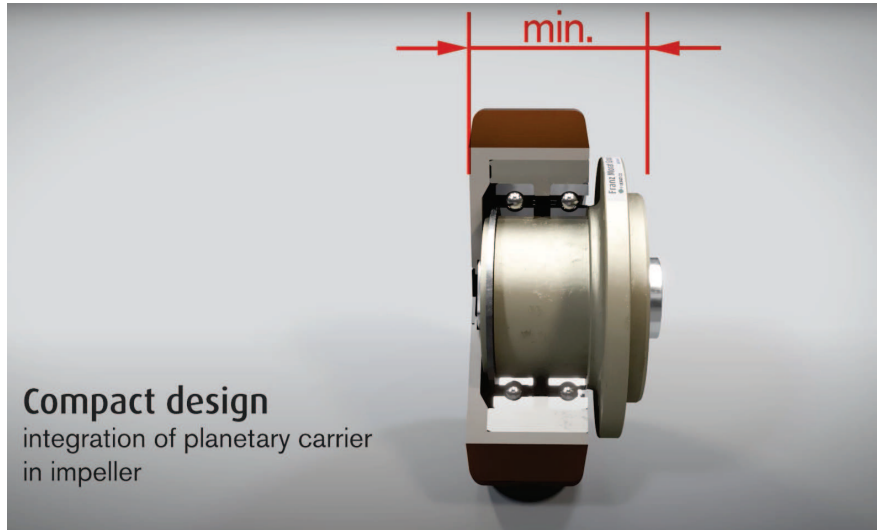
**1. NG250: Hub gears for max 500kg AGV**

- Wheel diameter: $\varnothing 125\text{mm}$ & Wheel width: 50mm
- Wheel material: Polyurethane (*customized: Vulkollan*)
- Recommend wheel load: 250kg/unit
- Redution ratio:
 - One stage: $i = 4, 5, 8$ (Eff 90%)
 - Two stage: $i = 16, 20, 32$ (Eff 85%)
- Noise level: <55dB
- Output speed: 1.2m/s (*input 3000rpm, $i=16$*)
- Matched motor: ELVM 200W, 400W, 600W ($\square 60\text{mm}$)

**2. NG500: Hub gears for max 1t AGV**

- Wheel diameter: $\varnothing 160\text{mm}$ & Wheel width: 50mm
- Wheel material: Polyurethane or Vulkollan
- Recommend wheel load: 500kg/unit
- Redution ratio:
 - One stage: $i = 4, 5, 8$ (Eff 90%)
 - Two stage: $i = 16, 20, 32$ (Eff 85%)
- Noise level: <55dB
- Output speed: 1.25m/s (*input 3000rpm, $i=20$*)
- Matched motor: ELVM 750W, 1kW ($\square 80\text{mm}$)

5. Framo Morat: Hub gears – Gearbox specification



6. Framo Morat: Hub gears – PU wheel from Blicke



Polyurethane material	Blicke Extrathane®	Blicke Softhane®	Blicke Besthane®	Blicke Besthane® Soft	Vulkollan®
Technical data					
Hardness	92 Shore A	75 Shore A	92 Shore A	75 Shore A	92 Shore A
Abrasion resistance	40 mm ³	45 mm ³	40 mm ³	50 mm ³	40 mm ³
Rebound resilience	42 %	57 %	65 %	75 %	52 %
Rolling resistance	0,9 %	1,0 %	0,7 %	0,8 %	0,9 %
Tensile strength	48 N/mm ²	44 N/mm ²	46 N/mm ²	40 N/mm ²	50 N/mm ²
Breaking elongation	510 %	520 %	650 %	700 %	615 %
Maximum speed	16 km/h	16 km/h	25 km/h	25 km/h	25 km/h
Application					
High loads	■■■	■■	■■■	■■	■■■
Dynamic load capacity (high load at high speed)	■■■	■■	■■■	■■	■■■
Continuous use	■■■	■■	■■■	■■■	■■■
Operational comfort/floor surface preservation	■■■	■■■	■■	■■■	■■
Long immobile periods under heavy loads (see compression set)	■■■	■■	■■■	■■■	■■
Flexibility at low temperatures	■	■	■■	■■	■
Resistance to chemical substances and UV radiation	■■■	■■■	■■■	■■■	■■
Hydrolysis resistance	-	-	✓	✓	-
Antistatic versions	✓	✓	-	-	-

■■■ very good ■■■ good ■ limited - no ✓ yes Made of VULKOLLAN® VULKOLLAN® is a registered trademark of Covestro Group

Appendix 1. Dunkermotoren collaborated with Framo Morat's hub gears



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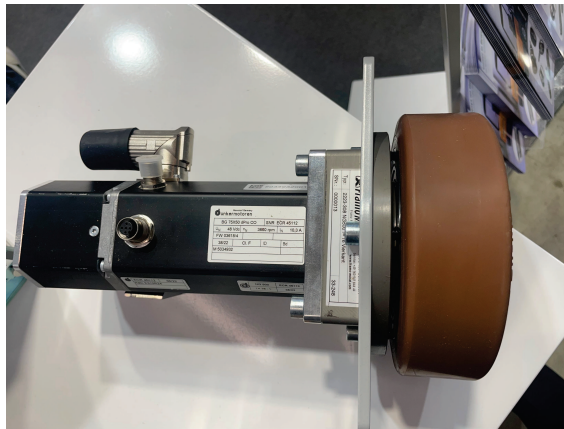
NG 250



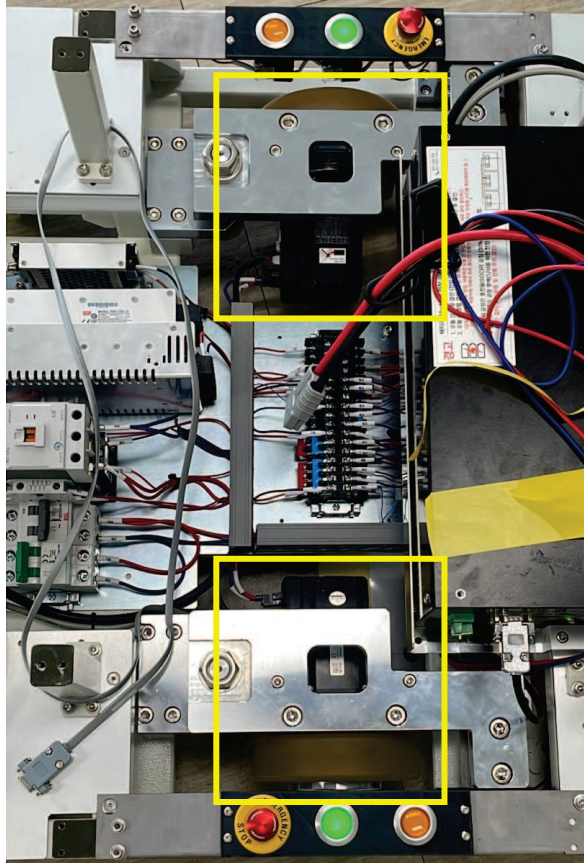
NG 250

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Appendix 2. Compact but powerful solution

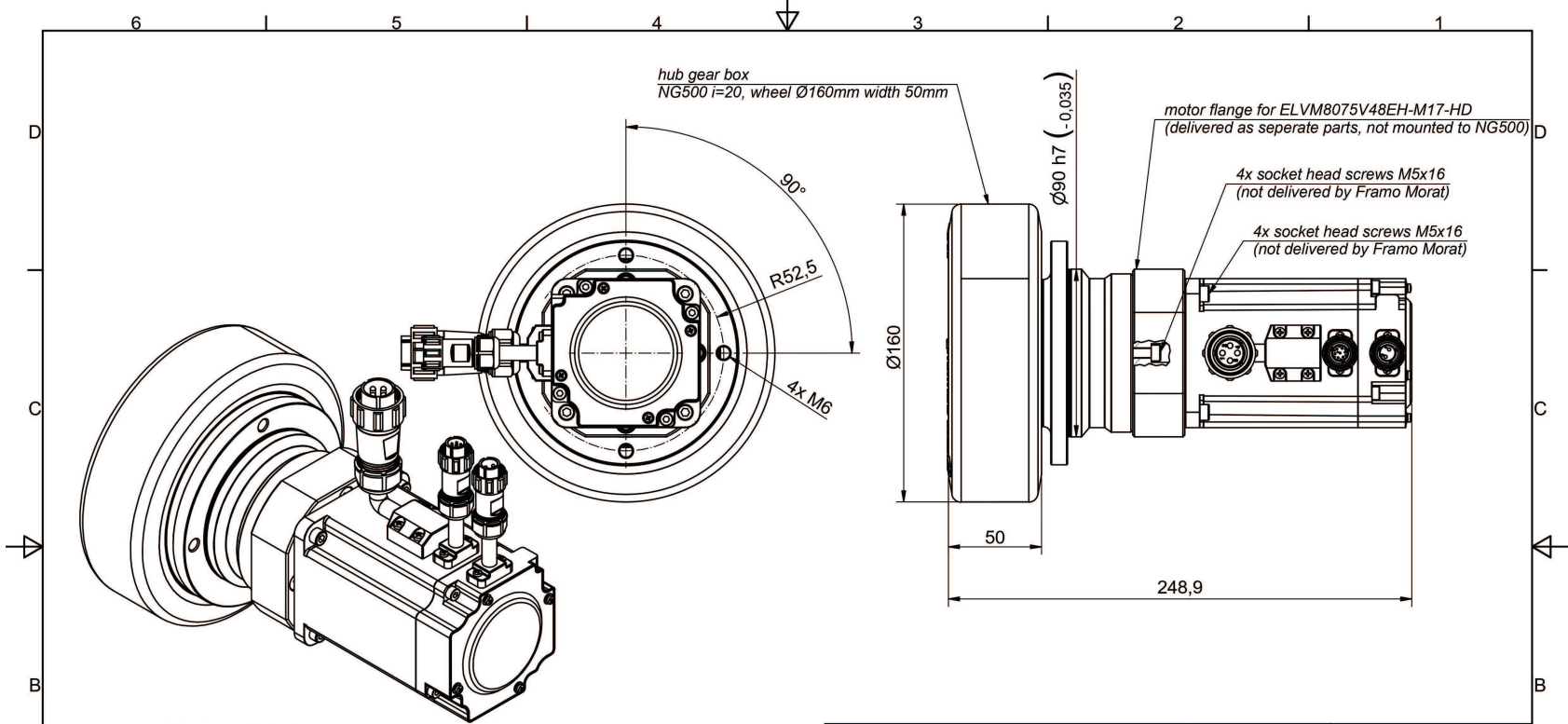
**1. Hub gear + Leadshine iSV2 400W motor**

- AGV layout: 800mm (W) * 700mm (D)
- AGV total weight: 500kg

**2. ZLTECH: Hub motor 800W**

- AGV layout: 800mm (W) * 700mm (D)
- AGV total weight: 250kg

Appendix 3. Drawing Reference (Leadshine + Framo Morat)



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 _{acc} [Nm]	Emergency stop torque ³⁾ T _{stop} [Nm]	Efficiency [%]	Nominal speed ⁴⁾ output [rpm] - [km/h]	Nominal torque ⁵⁾ input [Ncm]	Nominal speed ⁶⁾ input [rpm]	No-load torque [Nm]	Weight [kg]	Noise level ⁷⁾ [dB(A)]
4	1	21	42	63	90	250 7,5	571	1000	<0,45	5,9	<60
5		16	32	48	90	200 6,0	348				
8		18	36	54	90	125 3,8	245				
16	2	21	42	63	85	187,5 5,7	154	3000	<0,15	6,9	<55
20		21	42	63	85	150 4,5	124				
32		21	42	63	85	93,8 2,8	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 over the gear service life

³⁾ Max. 1000 cycles per hour. Acceleration torque proportion < 5% of the total operating time

⁴⁾ Volume levels were evaluated at a distance of 1 meter on the test bench

Stoffverbote laut Bestellung sind zu beachten Banned substances as per purchase order must be observed		DIN ISO 5456-2		Allgemeine Toleranz DIN ISO 2768-mH general tolerances DIN ISO 2768-mH ≙ 0,5 ≙ 0,1
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Artikel-Nr. / Item no.		Werkstoff (Oberfläche) / material		
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