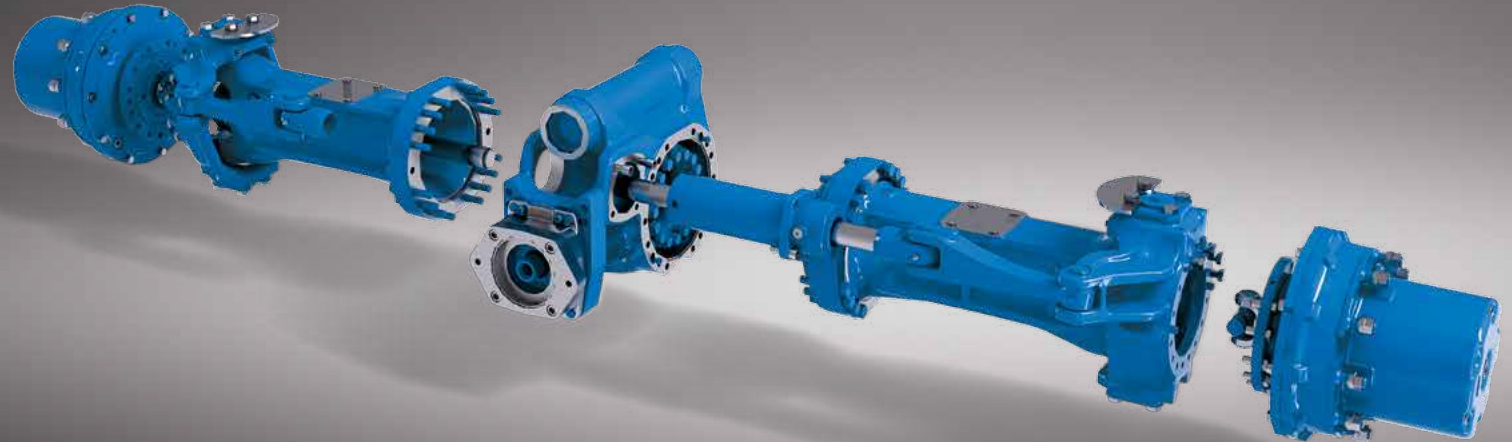


AXLES AND GEARBOXES

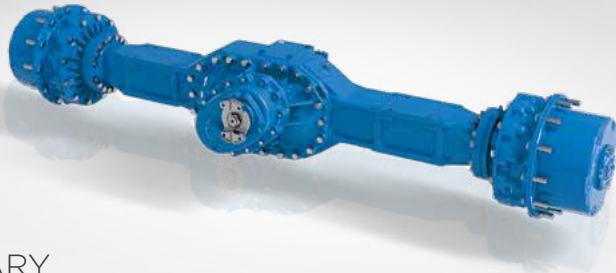


**FOR YOUR
HEAVY DUTY
PLAYGROUNDS**



STEERING AND RIGID AXLES FAMILY

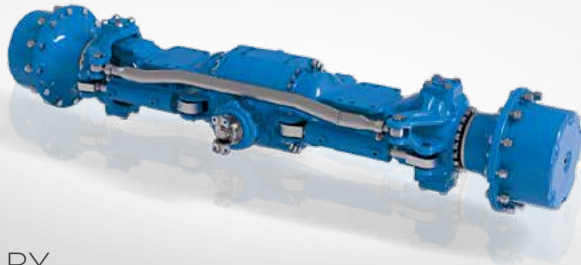
NAF'S MODULAR AXLES AND GEARBOXES COVERING THE WIDEST RANGE IN OFFROAD APPLICATIONS WITH PROVEN RELIABLE DESIGN FOR MORE THAN 55 YEARS.



PLANETARY RIGID AXLES



DIRECTLY DRIVEN PLANETARY RIGID AXLES



PLANETARY STEERING AXLES



DIRECTLY DRIVEN PLANETARY STEERING AXLES

FOR YOUR HEAVY DUTY PLAYGROUNDS

PLANETARY RIGID AXLES



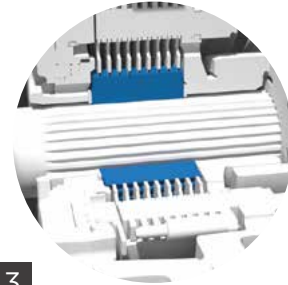
1

CAST DESIGN



2

PATENTED SELF-COOLED
TURBO BRAKE

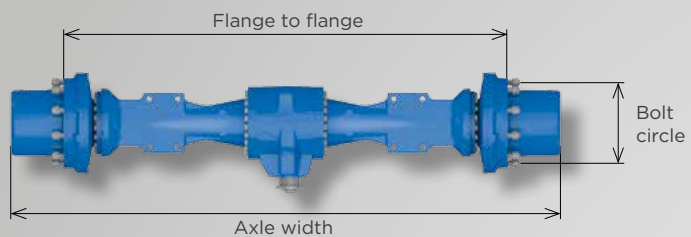


3

DIFFERENTIAL LOCKS
MDDL
OR NOSPIN®
OR DOG CLUTCH
OR LIMITED SLIP

| TYPE | SAP 43 | SAP 54 | SAP 55 | SAP 75 | SAP 76 | SAP 77 | SAP 87 | SAP 88 | SAP 89 |
|-----------------------------|--|---------------|---------------|---------------|---------------|---------------|---------------|-------------|-------------|
| Ratio | 17.81 | 16.50 - 25.76 | 15.29 - 29.32 | 10.87 - 31.79 | 11.33 - 34.87 | 10.87 - 29.39 | 13.33 - 30.86 | 16.9 - 23.4 | 19.38 |
| Static axle load up to [kN] | 145 | 280 | 400 | 440 | 220 | 300 | 340 | 400 | 450 |
| Dynamic axle load [kN] | 80 | 120 | 200 | 300 | 170 | 180 | 250 | 250 | 300 |
| Max. speed [kph] | 30 | 40 | 40 | 50 | 55 | 55 | 30 | 60 | 60 |
| Parking brake | Optional | Optional | Optional | Optional | Optional | Optional | Optional | Optional | Optional |
| Service brake | Optional | Optional | Optional | Optional | Optional | Optional | Optional | Optional | Optional |
| Input torque [Nm] | 1450 | 2700 | 3200 | 3300 | 4100 | 5000 | 6000 | 6600 | 7000 |
| Input RPM | 3400 | 3500 | 3600 | 3600 | 3600 | 3600 | 3200 | 4200 | 3300 |
| Axle width [mm] | 860 - 2345 | 2243 - 2530 | 2100 - 2755 | 1485 - 2780 | 2408 - 2850 | 2408 - 2850 | 2430 - 3031 | 3252 | 2500 - 3300 |
| Flange-to-flange [mm] | 586 - 1995 | 1850 - 2090 | 1742 - 2285 | 1107 - 2240 | 2030 - 2424 | 2028 - 2370 | 2030 - 2541 | 2756 | 2000 - 2800 |
| Bolt circle [mm] | 275 | 335 | 335 | 425 | 425 | 425 | 500 | 500 | 500 |
| Drive flange | DIN/ MECHANICS/ SPICER/ in different sizes | | | | | | | | |
| Differential locks | MDDL / NoSpin® / dog clutch / limited slip | | | | | | | | |





PLANETARY RIGID AXLES

Product features:

- > Modular configuration of track-proven components to meet customer needs
- > Mounting options: fixed or oscillating

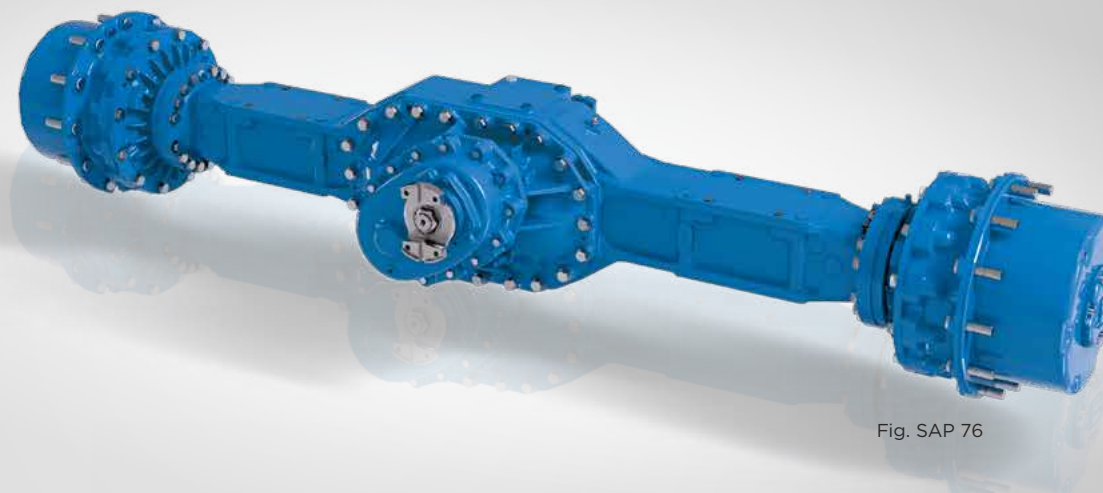


Fig. SAP 76



Fig. SAP 54

Fig. SAP 87



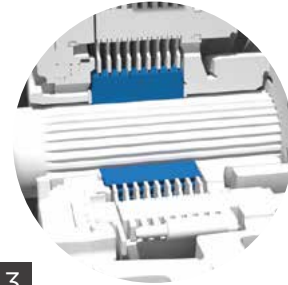
DIRECTLY DRIVEN PLANETARY RIGID AXLES



1
CAST DESIGN



2
PATENTED SELF-COOLED
TURBO BRAKE



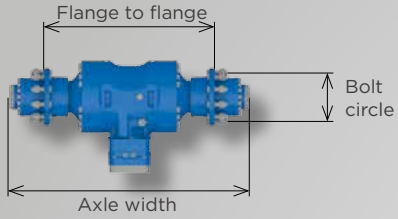
3
DIFFERENTIAL LOCKS
MDDL
OR NOSPIN®
OR DOG CLUTCH
OR LIMITED SLIP



4
DIRECT MOTOR ATTACHMENT
WITH GEAR DRIVE

| TYPE | SAP 43 | SAP 55 | SAP 75 | SAP 85 |
|-----------------------------|---|----------|---------------|----------|
| Ratio | 17.81 - 51.12 | 23.98 | 49.48 - 96.35 | 75.62 |
| Static axle load up to [kN] | 180 | 320 | 420 | 579 |
| Dynamic axle load [kN] | 100 | 200 | 300 | 579 |
| Max. speed [kph] | 15 | 20 | 15 | 8 |
| Parking brake | Optional | Optional | Optional | Optional |
| Service brake | Optional | Optional | Optional | Optional |
| Max. input torque [Nm] | 750 | 1300 | 700 | 360 |
| Input RPM | 3400 | 3400 | 3500 | 1780 |
| Axle width [mm] | 950 - 2250 | 2570 | 1485 - 2084 | 1676 |
| Flange-to-flange [mm] | 676 - 1900 | 2100 | 1107 - 1826 | 1186 |
| Bolt circle [mm] | 275 | 335 | 425 | 500 |
| Driven by | Directly attached gearbox / hydrostatic or hydrodynamic driveline | | | |
| Differential locks | MDDL / NoSpin® / dog clutch / limited slip | | | |





**DIRECTLY DRIVEN
PLANETARY RIGID AXLES**

Product features:

- > Very compact design
- > Mounting options: fixed or oscillating
- > Various hydraulic or electric motor sizes and models can be attached

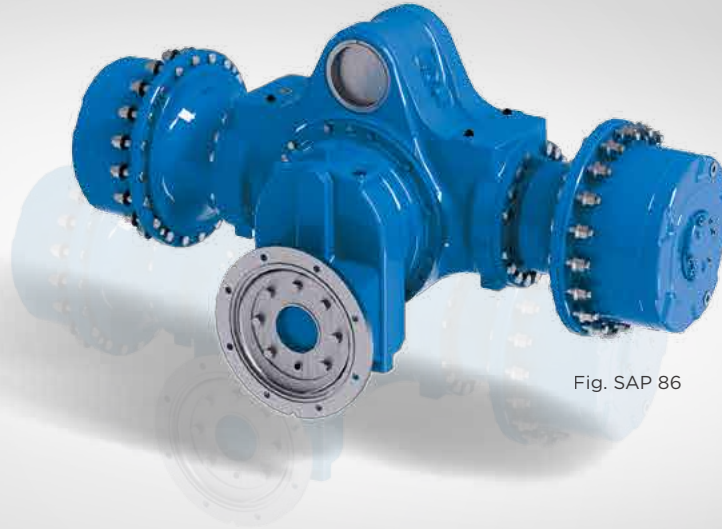


Fig. SAP 86

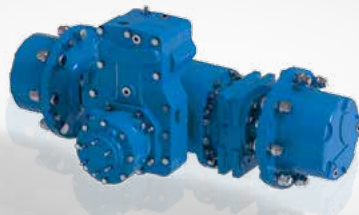


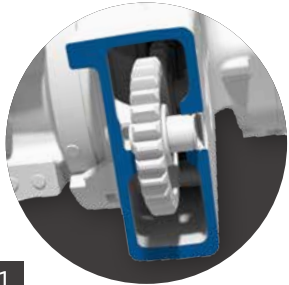
Fig. SAP 43



Fig. SAP 43



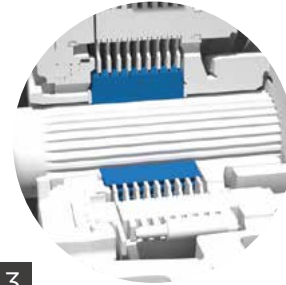
PLANETARY STEERING AXLES



1
CAST DESIGN



2
PATENTED SELF-COOLED
TURBO BRAKE



3
DIFFERENTIAL LOCKS
MDDL
OR NOSPIN®
OR DOG CLUTCH
OR LIMITED SLIP

| TYPE | LAP 43 | LAP 54 | LAP 55 | LAP 75 | LAP 76 |
|-----------------------------|---|-------------|-------------|------------|------------|
| Ratio | 17.81-19.95 | 16.48-22.76 | 19.32-23.98 | 16.09-22.3 | 16.18-32.3 |
| Static axle load up to [kN] | 140 | 280 | 300 | 280 | 340 |
| Dynamic axle load [kN] | 70 | 125 | 160 | 140 | 170 |
| Max. speed [kph] | 40 | 40 | 40 | 40 | 40 |
| Parking brake | Optional | Optional | Optional | Optional | Optional |
| Service brake | Optional | Optional | Optional | Optional | Optional |
| Input torque [Nm] | 1600 | 2400 | 3500 | 4000 | 5000 |
| Input RPM | 2800 | 3200 | 3200 | 3500 | 3600 |
| Axle width [mm] | 2250-2700 | 2290-2531 | 2100-755 | 2740-2990 | 2500 |
| Flange-to-flange [mm] | 1900-2470 | 1850-2091 | 1742-2285 | 2362-2612 | 2122 |
| Bolt circle [mm] | 275 | 335 | 335 | 425 | 425 |
| Drive flange | DIN / MECHANICS / SPICER / in different sizes | | | | |
| Differential locks | Various solutions available | | | | |



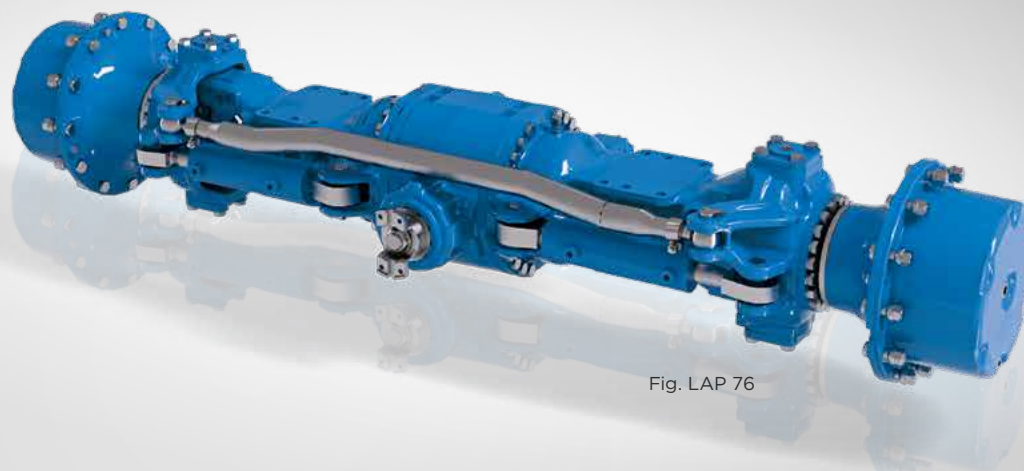
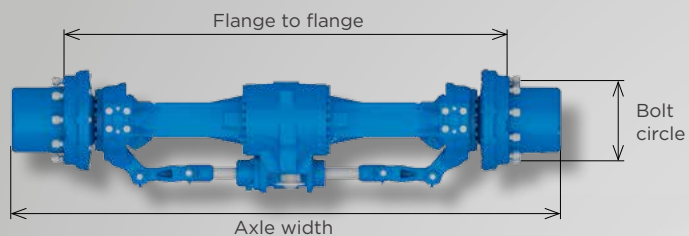


Fig. LAP 76

PLANETARY STEERING AXLES

Product features:

- > Mounting options: fixed or oscillating
- > High wheel load under static and dynamic working conditions
- > Brake acts directly on the wheel hub, providing high stability during on-site operation



Fig. LAP 54

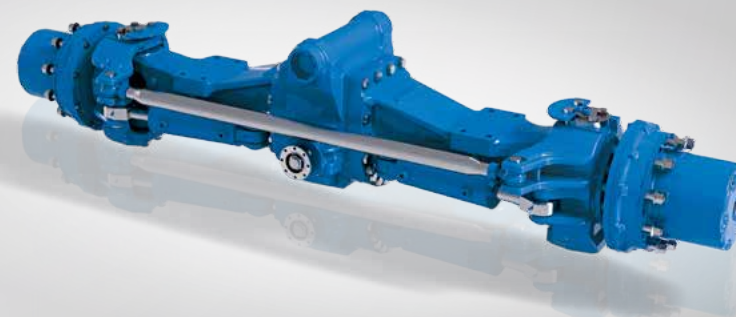


Fig. LAP 55



DIRECTLY DRIVEN PLANETARY STEERING AXLES



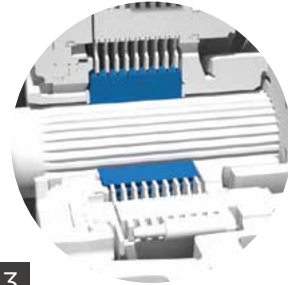
1

CAST DESIGN



2

PATENTED SELF-COOLED
TURBO BRAKE



3

DIFFERENTIAL LOCKS
MDDL
OR NOSPIN®
OR DOG CLUTCH
OR LIMITED SLIP

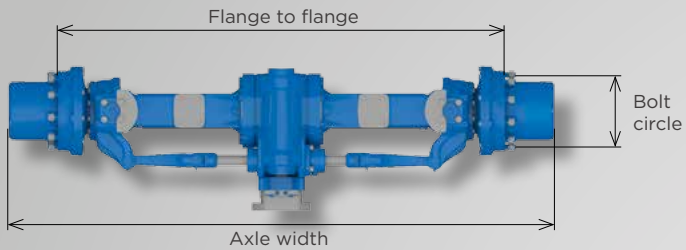


4

DIRECT MOTOR ATTACHMENT
WITH GEAR DRIVE

| TYPE | LAP 43 | LAP 44 | LAP 54 | LAP 55 |
|-----------------------------|---|---------------|-------------|---------------|
| Ratio | 17.81 | 39.16 - 58.75 | 55.3 - 68.1 | 19.32 - 23.98 |
| Static axle load up to [kN] | 140 | 110 | 140 | 320 |
| Dynamic axle load [kN] | 60 | 110 | 140 | 190 |
| Max. speed [kph] | 15 | 40 | 40 | 25 |
| Parking brake | Optional | Optional | Optional | Optional |
| Service brake | Optional | Optional | Optional | Optional |
| Input torque [Nm] | 750 | 900 | 1050 | max. 3500 |
| Input RPM | 3400 | 3800 | 4500 | 3400 |
| Axle width [mm] | 2250 | 2704 - 3510 | 3050 - 3569 | 2570 |
| Flange-to-flange [mm] | 1900 | 2470 - 3270 | 2770 - 3270 | 2100 |
| Bolt circle [mm] | 275 | 275 | 335 | 335 |
| Driven by | Directly attached gearbox / hydrostatic or hydrodynamic driveline | | | |
| Differential locks | Various solutions available | | | |





**DIRECTLY DRIVEN
PLANETARY STEERING AXLES**

Product features:

- > Gear drive integrated in differential housing, compact design
- > Various hydraulic or electric motor sizes and models can be attached
- > Adjustable track width to fit different tyre sizes

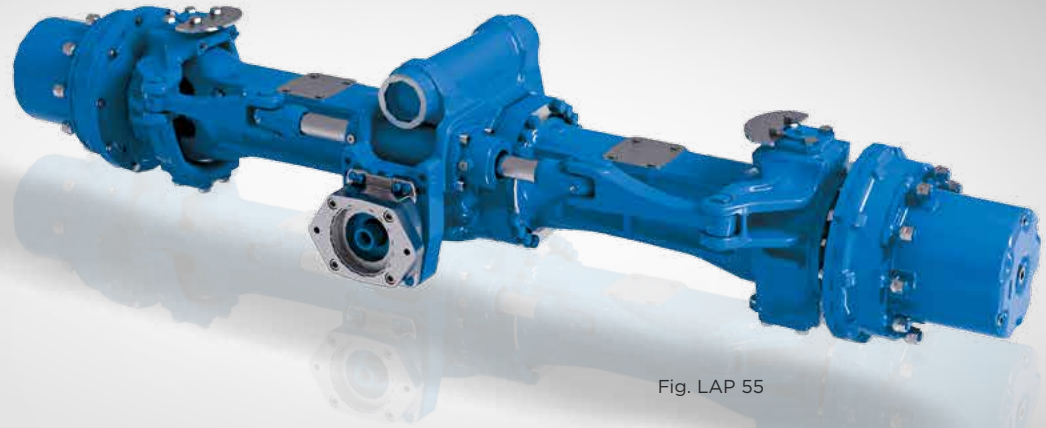


Fig. LAP 55

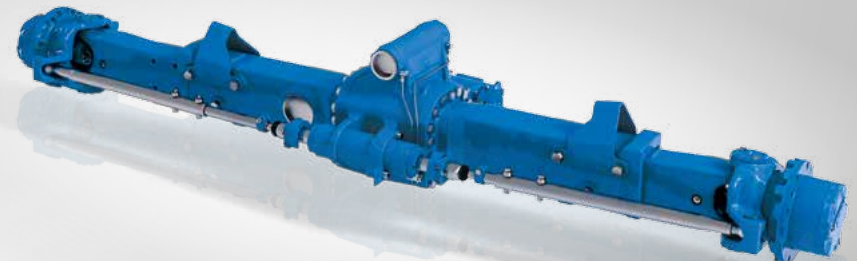


Fig. LAP 44

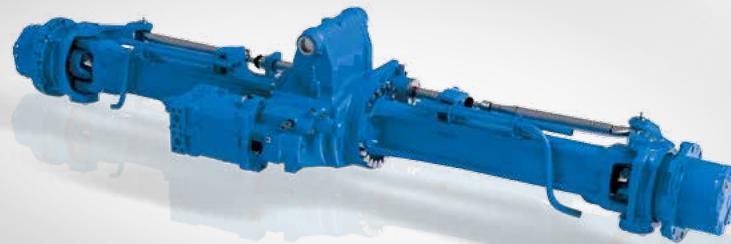


Fig. LAP 44

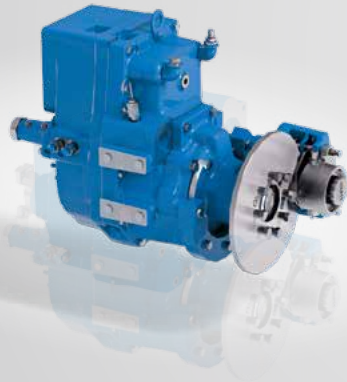


An aerial photograph of a playground under construction. The ground is covered with a light-colored, textured material, likely sand or rubber mulch, which is being laid out in large, curved sections. A yellow dump truck is visible in the lower center, dumping its load. The scene is brightly lit, casting long shadows.

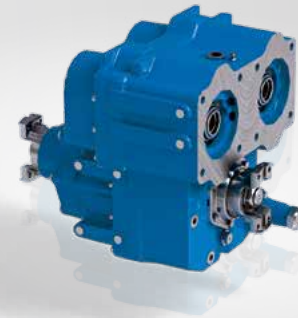
FOR YOUR HEAVY DUTY PLAYGROUNDS

GEARBOX FAMILY

GEARBOXES COVERING THE WIDEST RANGE IN OFFROAD APPLICATIONS WITH PROVEN RELIABLE DESIGN FOR 55 YEARS.



SINGLE MOTOR
HYDROSTATIC GEARBOX /
HYDROSYNC®



DUAL MOTOR
HYDROSTATIC GEARBOX /
DUALSYNC®

SINGLE MOTOR HYDROSTATIC GEARBOX / HYDROSYNC®



1

PARKING BRAKE



2

DIFFERENTIAL LOCK



3

REAR AXLE DISCONNECT

| TYPE | VG 250 | VG 35 | VG 75 | SIM |
|---------------------------------|---|-------------|-------------|-----------|
| Ratio i1 | 4.78 | 1.68 - 6.31 | 2.64 - 6.63 | 3.58 |
| Ratio i2 | 1.33 | 0.89 - 2.13 | 1.06 - 2.05 | 1.08 |
| Parking brake | Optional | Optional | Optional | Optional |
| Declutch system | Optional | Optional | Optional | Optional |
| Differential lock | - | Optional | - | - |
| Input torque [Nm] | Max. 700 | Max. 1100 | Max. 1600 | Max. 1180 |
| Input RPM | Max. 4500 | Max. 4500 | Max. 4500 | Max. 3500 |
| Output torque [Nm] | Max. 2500 | Max. 6000 | Max. 8000 | Max. 5000 |
| Hydraulic motor size [max. ccm] | Up to 135 | Up to 170 | Up to 250 | Up to 165 |
| Output flange | DIN / MECHANICS / SPICER / in different sizes | | | |
| Driven by | Directly attached hydraulic motor / flange | | | |



VG 250 / VG 35 / VG 75

Product features:

- > Wide range of standard gearboxes, shiftable in standstill
- > Various single and two speed ratios available
- > Optional parking brake and rear axle disconnect
- > Low space requirements
- > High overall efficiency

HydroSync®

Product features:

- > HydroSync® is an upgrade of the VG 35 standard gearbox
- > Load-free shifting procedure thanks to electro-hydraulically synchronised gears
- > Shifting procedure can be triggered on demand or automatically
- > Drivetrain is brought to no load by adjusting the pump and motor
- > Transmission is disengaged into the neutral position
- > Hydraulic transmission is then adjusted to the new ratio of the selected gear
- > The required gear is selected and the normal drive programme continues
- > Highly cost-efficient HydroSync® solution

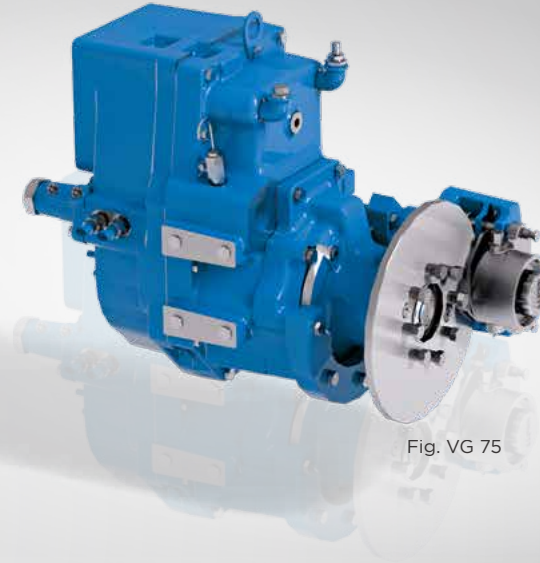


Fig. VG 75

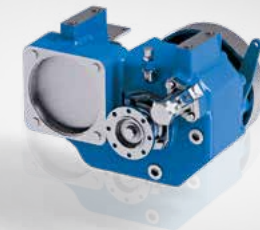


Fig. VG 250



Fig. VGD 35



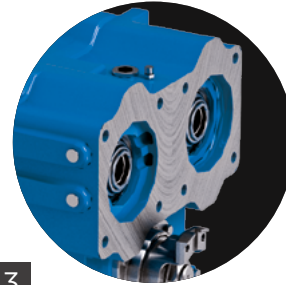
DUAL MOTOR HYDROSTATIC GEARBOX / DUALSYNC®



1
PARKING BRAKE



2
REAR AXLE DISCONNECT



3
DUAL MOTOR DRIVELINE

| TYPE | VGZ 75 | VGZ 76 | VGZ 85 | DUALSYNC® |
|------------------------------|---|-------------|-------------|-------------|
| Ratio i1 | 1.72 - 4.04 | 3.27 - 4.03 | 1.66 - 1.96 | 1.20 - 1.88 |
| Ratio i2 | 1.33 - 2.36 | 1.07 - 1.68 | 4.67 - 6.36 | 4.00 - 5.92 |
| Parking brake | Optional | Optional | Optional | Optional |
| Declutch system | Optional | Optional | Optional | Optional |
| Input torque [Nm] | Max. 2000 | Max. 2060 | Max. 1260 | Max. 1430 |
| Input RPM | Max. 4500 | Max. 4500 | Max. 4500 | Max. 4750 |
| Output torque [Nm] | Max. 6000 | Max. 8200 | Max. 8200 | Max. 8900 |
| Hydraulic motor 1 [max. ccm] | Up to 160 | Up to 170 | Up to 200 | Up to 210 |
| Hydraulic motor 2 [max. ccm] | Up to 160 | Up to 170 | Up to 160 | Up to 160 |
| Output flange | DIN / MECHANICS / SPICER / in different sizes | | | |



VGZ 75 / VGZ 76

Product features:

- > Wide range of standard gearboxes shiftable in standstill
- > Various motor positions possible: side by side, face to face, back to back
- > Various single and two speed ratios available
- > Optional parking brake and rear axle disconnect
- > Well proven and reliable mechanical design

VGZ 85 / DualSync®

Product features:

- > Different ratios are available for each motor
- > Dual motor gearbox with hydrostatic CVT functionality
- > First motor switches off when reaching its maximum speed
- > Reduced losses and maximised tractive effort
- > 2 operating modes
 - Simultaneous use of both motors for high tractive effort
 - High driving speeds with one motor drive

Advantages of our dual-motor gearboxes:

- > Fuel savings of up to 20 %
- > Jerk-free and precise travel control
- > Diesel engine operates at most efficient rpm range

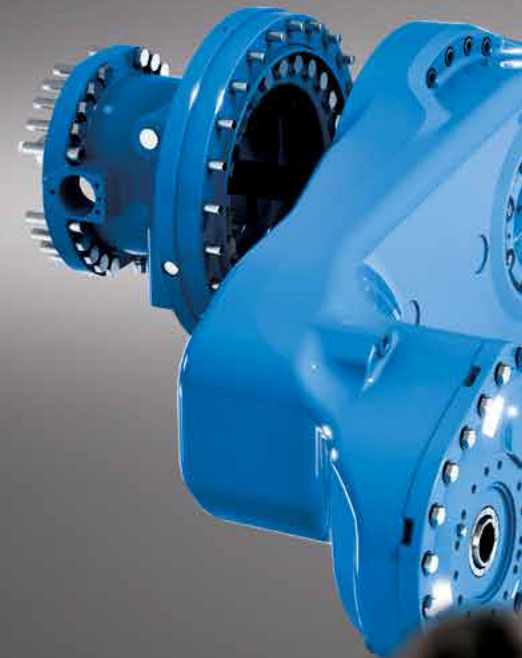


Fig. VGZ 76



MODULAR-MINDED AXLES

With modular thinking, modular processes and modular product configurations, we already provide answers today for the functional, economic and logistic challenges of tomorrow.

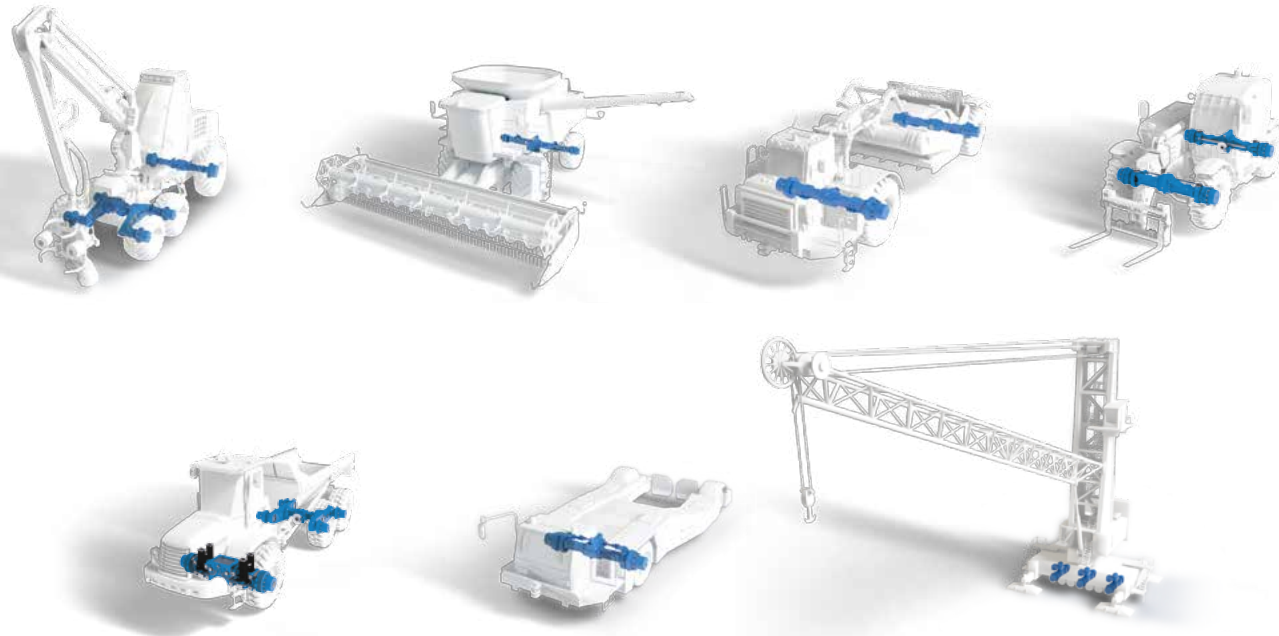


6 SUCCESS FACTORS FOR YOUR AUTOMOTIVE CONCEPT OF THE FUTURE:

- 1 MODULAR AXLE DESIGN**
Proven modular system for complete drive trains – comprising tried-and-tested components.
- 2 MODULAR CUSTOMISATION**
Highly specific, quick and economical customer solutions – with modular development and implementation.
- 3 MODULAR INNOVATION**
All new developments in our customer’s needs is directly integrated into the modular system.
- 4 MODULAR PRODUCTION**
Fluid, customised fabrication based on the modular building block and modular procurement concept.
- 5 MODULAR REPAIR & MAINTENANCE**
Easy repair and spare parts system – by replacing modules, lifetime costs and downtimes are minimised.
- 6 MODULAR SPIRIT**
Corporate culture continually strives to introduce customer-specific competitive advantages.

FOR YOUR HEAVY DUTY PLAYGROUNDS

As the leading market manufacturer of drive trains for self-propelled forestry machines, NAF has been tackling a wide variety of the most extreme deployment conditions for many decades. The modular system, which has evolved from this set of requirements, covers the individual assignments that need to be met by heavy-duty vehicle manufacturers across many different sectors. With this passion, which made us the market leader for drives in forestry machines, we create your individual drive solutions.



NAF • MODULAR-MINDED AXLES



FOR YOUR HEAVY DUTY PLAYGROUNDS

NAF's drive solutions are modelled for their special use and application. Our modular designs and the experience from more than 581 projects are the basis to satisfy your requirements in the most efficient way. We are pleased to present our comprehensive product portfolio!



BOGIE AXLES FAMILY:

PLANETARY BOGIE AXLE WITH OFFSET

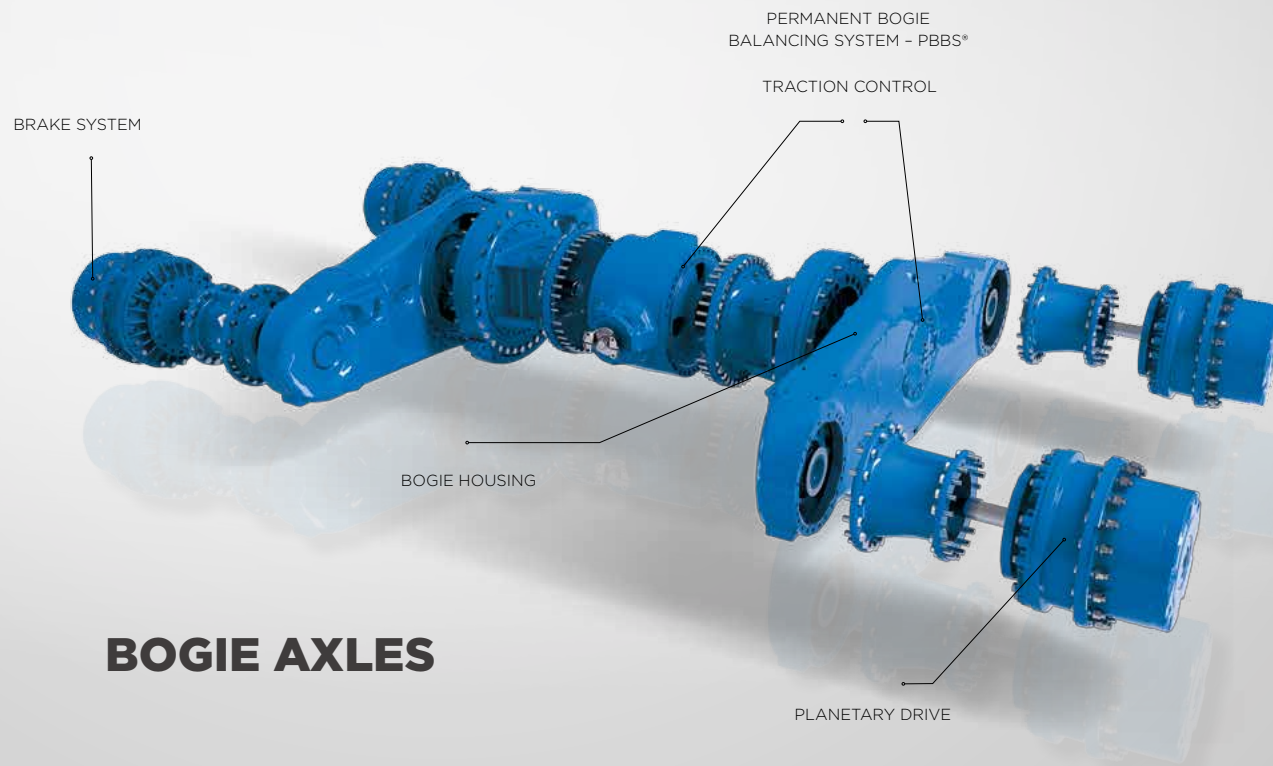
PLANETARY PORTAL BOGIE AXLE

PORTAL BOGIE AXLE

PLANETARY BOGIE AXLE



Please feel free to ask for our brochure which includes all information about our bogie axle family!



BOGIE AXLES



NAF AG is particularly proud of the awards given to us by our customers that honour our outstanding achievements and cooperative partnerships on all levels. This is our benchmark for all customer relations.



NAF is the expert for power transmission, traction and load capacity on mobile working machines. Our gears and axles create a substantial competitive advantage in the heavy-duty off-highway industry. As a system partner we have been mastering the tasks of our market-leading customers since 1960 and invest 5% of our annual turnover into research and development.

As our customer you benefit directly from our passion for innovation that guarantees your success.



AT HOME ON 3 CONTINENTS



46

Supplied countries worldwide

500

Employees in total

30.000 m²

of production space in 17 halls

38.000

Components sold each year

14

Patents and
protected innovations

35

Employees working in
R&D/PDP

Headquarters and production

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F: +49 9134 702-640
info@nafaxles.com

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branches in North America, France,
Germany (HQ), Russia & China visit:



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