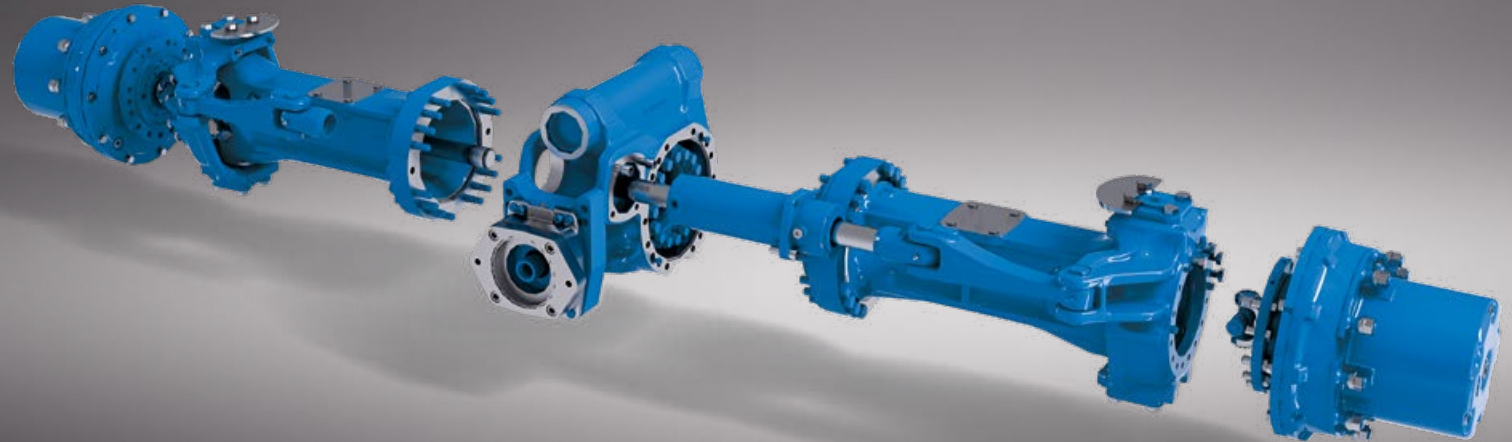
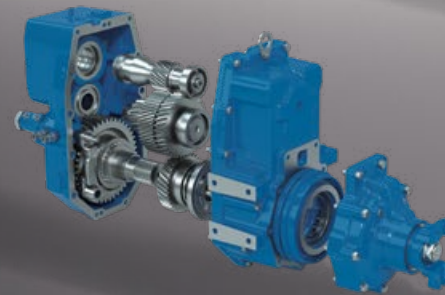


# AXLES AND GEARBOXES

 **MADE IN GERMANY**



## FOR YOUR HEAVY DUTY PLAYGROUNDS

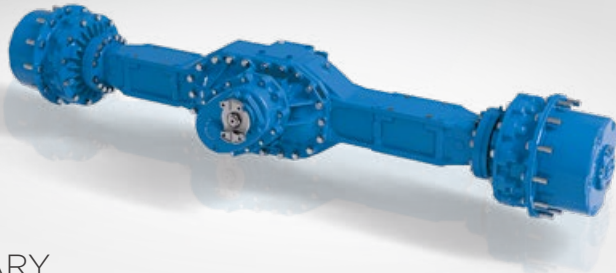


**NAF • MODULAR-MINDED AXLES**

**NAFAXLES.COM**

# 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 60 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



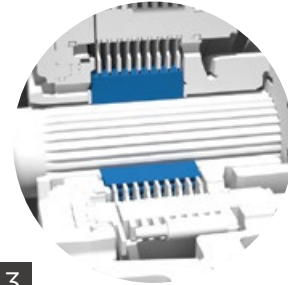
1

CAST DESIGN



2

PATENTED SELF-COOLED  
TURBO BRAKE



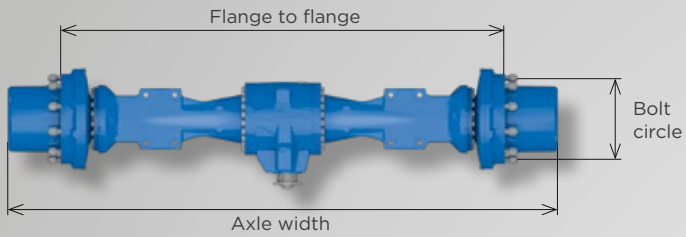
3

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

TYPE	SAP 54	SAP 55	SAP 75	SAP 76	SAP 77	SAP 87	SAP 88	SAP 89	SAP 99*
Ratio	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	17.18 – 27.06
Static axle load up to [kN]	280	400	440	220	300	340	400	450	450
Dynamic axle load [kN]	120	200	300	170	180	250	250	300	191
Max. speed [kph]	40	40	50	55	55	30	60	60	43
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]	2700	3200	3300	4100	5000	6000	6600	7000	8500
Input RPM	3500	3600	3600	3600	3600	3200	4200	3300	3000
Axle width [mm]	2243 – 2530	2100 – 2755	1485 – 2780	2408 – 2850	2408 – 2850	2430 – 3031	3252	2500 – 3300	2891 – 3192
Flange-to-flange [mm]	1850 – 2090	1742 – 2285	1107 – 2240	2030 – 2424	2028 – 2370	2030 – 2541	2756	2000 – 2800	2320 – 2620
Bolt circle [mm]	335	335	425	425	425	500	500	500	605
Drive flange	DIN/MECHANICS/SPICER in different sizes								
Differential locks	MDDL/NoSpin*/dog clutch/limited slip								

\* Optional: use of twin-tyres





**PLANETARY RIGID AXLES**

**Product features:**

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



Fig. SAP 99

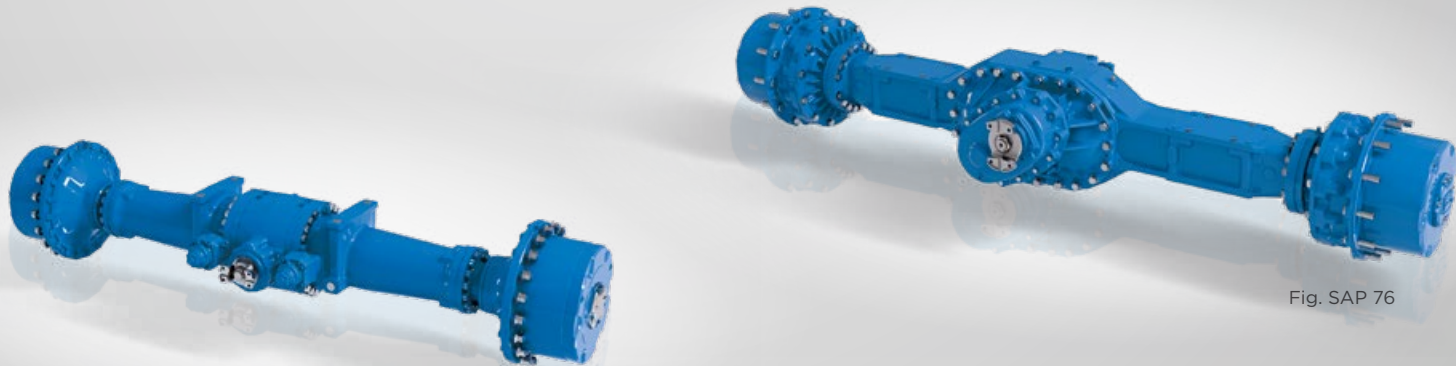


Fig. SAP 87

Fig. SAP 76



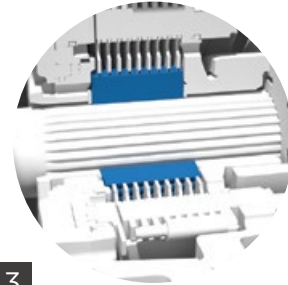
# DIRECTLY DRIVEN PLANETARY RIGID AXLES



**1**  
CAST DESIGN



**2**  
PATENTED SELF-COOLED  
TURBO BRAKE



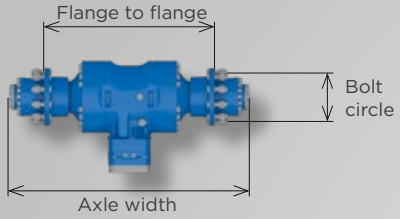
**3**  
DIFFERENTIAL LOCKS  
MDDL  
OR NOSPIN®  
OR DOG CLUTCH  
OR LIMITED SLIP



**4**  
DIRECT MOTOR ATTACHMENT  
WITH GEAR DRIVE

TYPE	SAP 34	SAP 55	SAP 75	SAP 85
Ratio	49.54	23.98	49.48 - 96.35	75.62
Static axle load up to [kN]	310	320	420	579
Dynamic axle load [kN]	260	200	300	579
Max. speed [kph]	6	20	15	8
Parking brake	Optional	Optional	Optional	Optional
Service brake	Optional	Optional	Optional	Optional
Max. input torque [Nm]	800	1300	700	360
Input RPM	2000	3400	3500	1780
Axle width [mm]	1123	2570	1485 - 2084	1676
Flange-to-flange [mm]	800	2100	1107 - 1826	1186
Bolt circle [mm]	225	335	425	500
Driven by	Directly attached gearbox/hydrostatic, hydrodynamic or electric 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

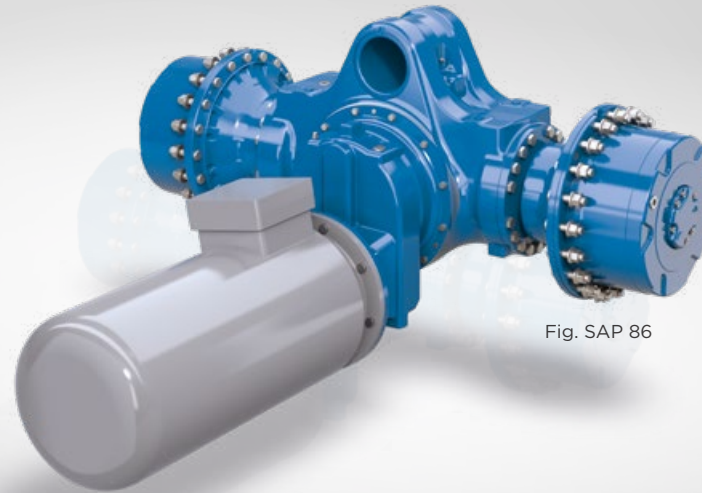


Fig. SAP 86

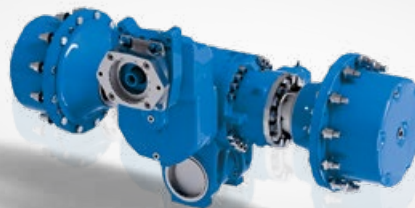


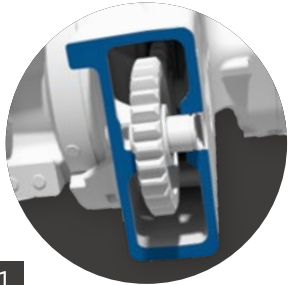
Fig. SAP 75



Fig. SAP 43



# PLANETARY STEERING AXLES



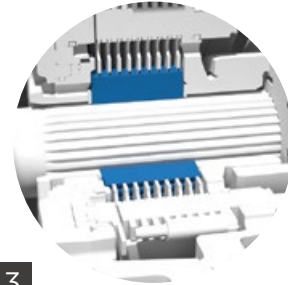
1

CAST DESIGN



2

PATENTED SELF-COOLED  
TURBO BRAKE



3

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

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





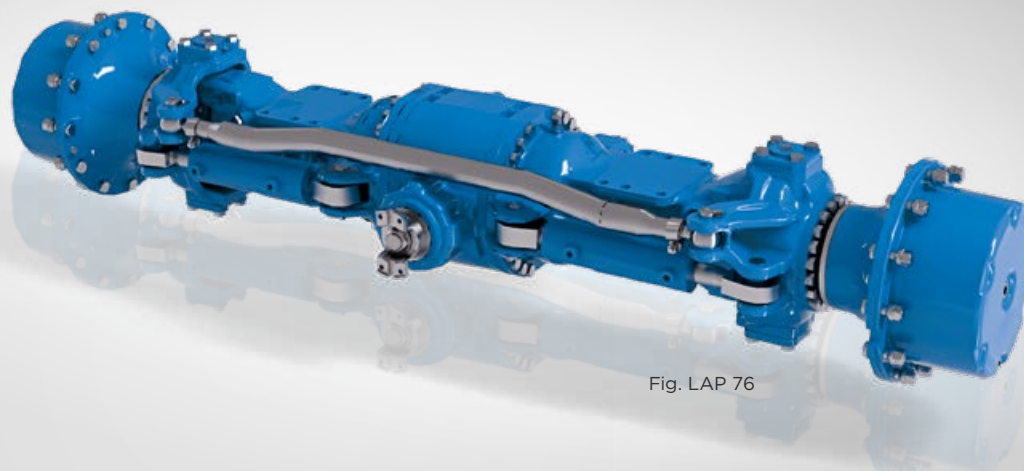
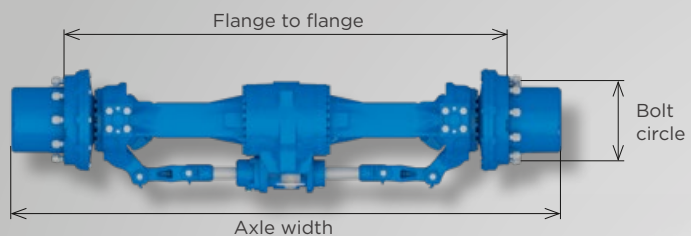


Fig. LAP 76

## 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

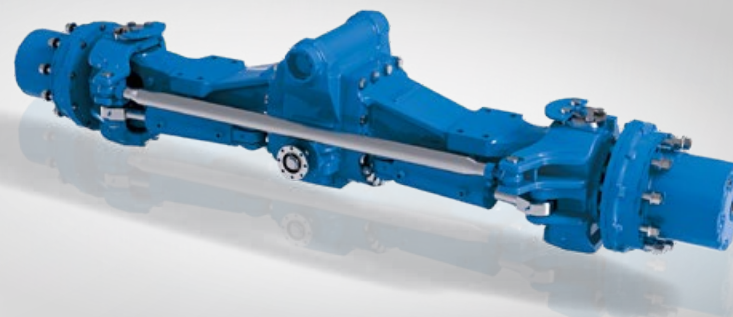


Fig. LAP 55



# DIRECTLY DRIVEN PLANETARY STEERING AXLES



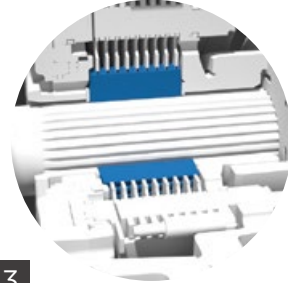
1

CAST DESIGN



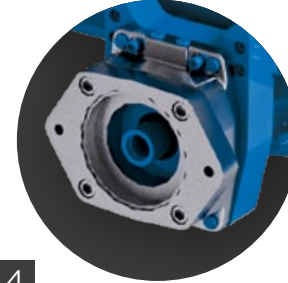
2

PATENTED SELF-COOLED  
TURBO BRAKE



3

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

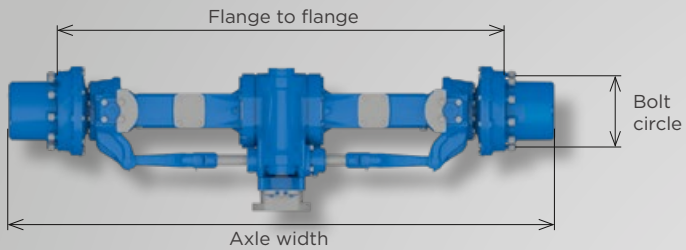


4

DIRECT MOTOR ATTACHMENT  
WITH GEAR DRIVE

TYPE	LAP 44	LAP 54	LAP 55
Ratio	39.16 - 58.75	55.3 - 68.1	19.32 - 23.98
Static axle load up to [kN]	110	140	320
Dynamic axle load [kN]	110	140	190
Max. speed [kph]	40	40	25
Parking brake	Optional	Optional	Optional
Service brake	Optional	Optional	Optional
Input torque [Nm]	900	1050	max. 3500
Input RPM	3800	4500	3400
Axle width [mm]	2704 - 3510	3050 - 3569	2570
Flange-to-flange [mm]	2470 - 3270	2770 - 3270	2100
Bolt circle [mm]	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
- > FlexTrac Axle® with adjustable track width to fit different tyre sizes

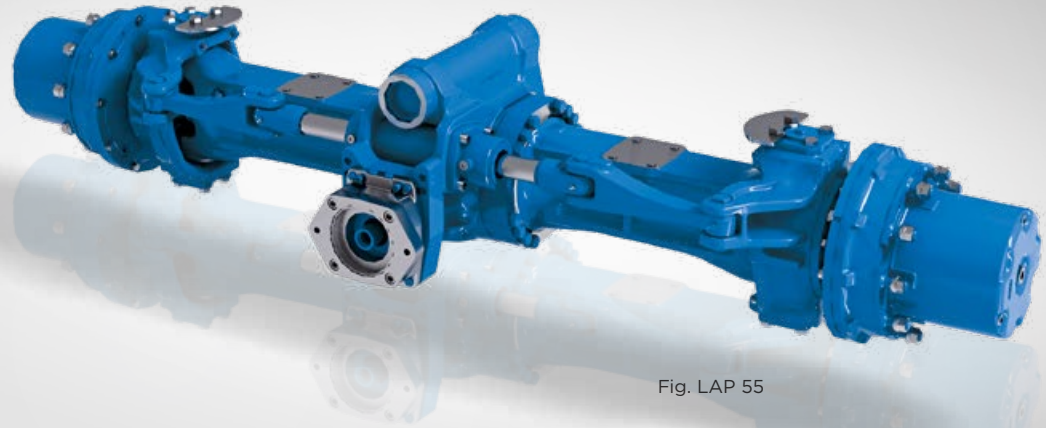


Fig. LAP 55

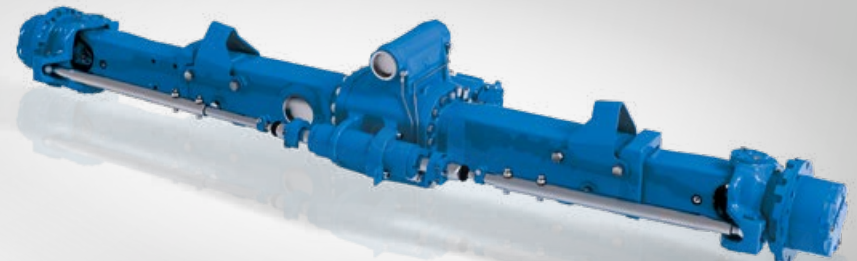


Fig. FlexTrac Axle®

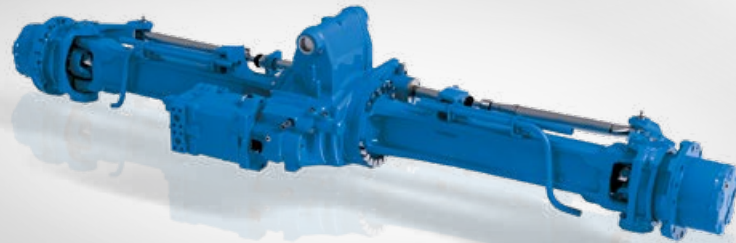


Fig. LAP 44



An aerial photograph of a construction site. A yellow dump truck is driving on a dirt path, carrying a load of dark material. The surrounding area is a mix of dirt and sand, with some large, light-colored mounds. The text "FOR YOUR HEAVY DUTY PLAYGROUNDS" is overlaid in large, white, bold, sans-serif capital letters across the center of the image.

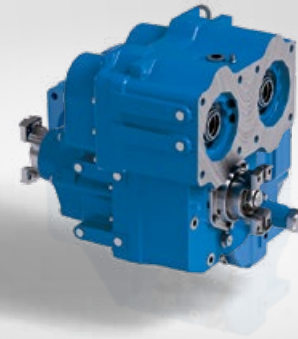
# FOR YOUR HEAVY DUTY PLAYGROUNDS

# GEARBOX FAMILY

GEARBOXES COVERING THE WIDEST RANGE IN OFFROAD APPLICATIONS  
WITH PROVEN RELIABLE DESIGN FOR MORE THAN 60 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	HydroSync®
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 or electric 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

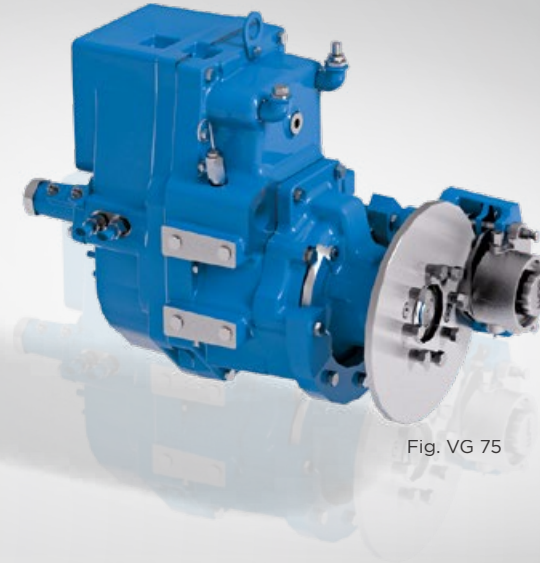


Fig. VG 75

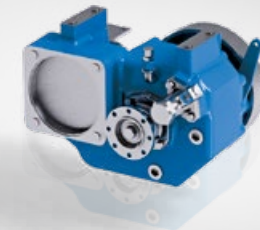


Fig. VG 250



Fig. VGD 35



# DUAL MOTOR HYDROSTATIC GEARBOX / DualSync®



**1**  
PARKING BRAKE



**2**  
REAR AXLE DISCONNECT



**3**  
DUAL MOTOR DRIVELINE

TYPE	VGZ 75	VGZ 86	DualSync®
Ratio i1	1.72 - 4.04	4.35 - 5.02	1.20 - 1.88
Ratio i2	1.33 - 2.36	1.81 - 2.09	4.00 - 5.92
Parking brake	Optional	Optional	Optional
Declutch system	Optional	Optional	Optional
Input torque [Nm]	Max. 2000	Max. 2200	Max. 1430
Input RPM	Max. 4500	Max. 4500	Max. 4750
Output torque [Nm]	Max. 6000	Max. 10500	Max. 8900
Hydraulic motor 1 [max. ccm]	Up to 160	Up to 210	Up to 210
Hydraulic motor 2 [max. ccm]	Up to 160	Up to 210	Up to 210
Output flange	DIN/MECHANICS/SPICER in different sizes		





## VGZ 75/VGZ 86

### 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

## 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 over the entire speed range
- > Diesel engine operates at most efficient rpm range

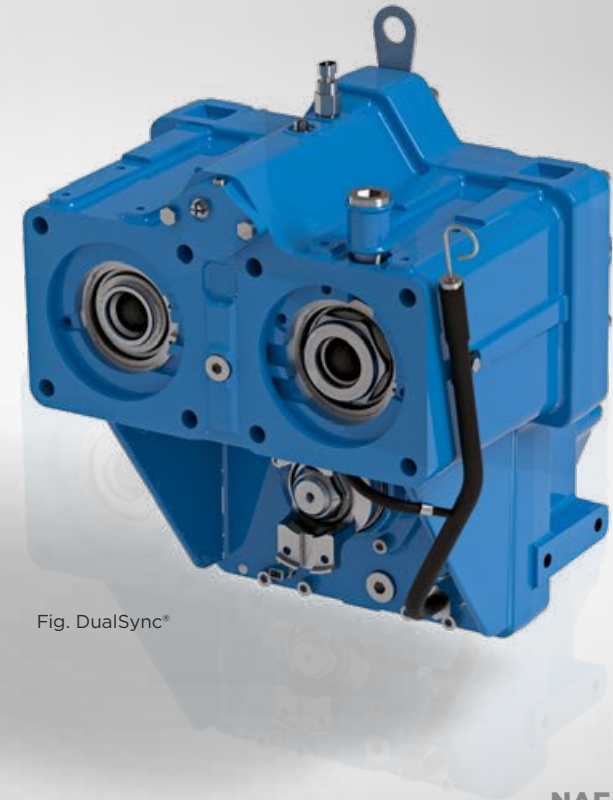
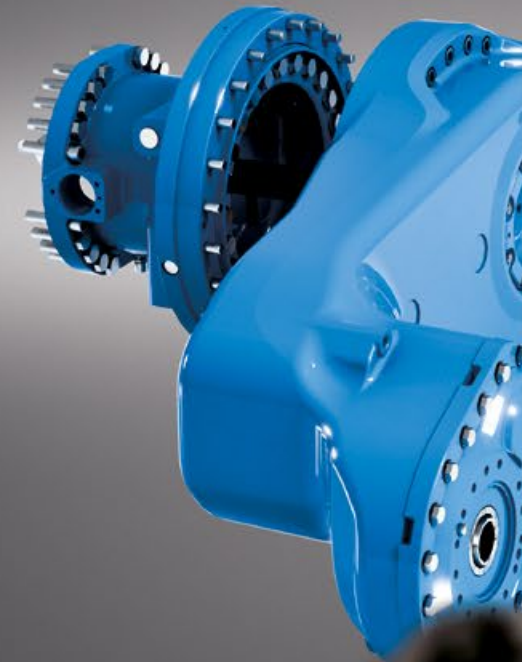


Fig. DualSync®



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

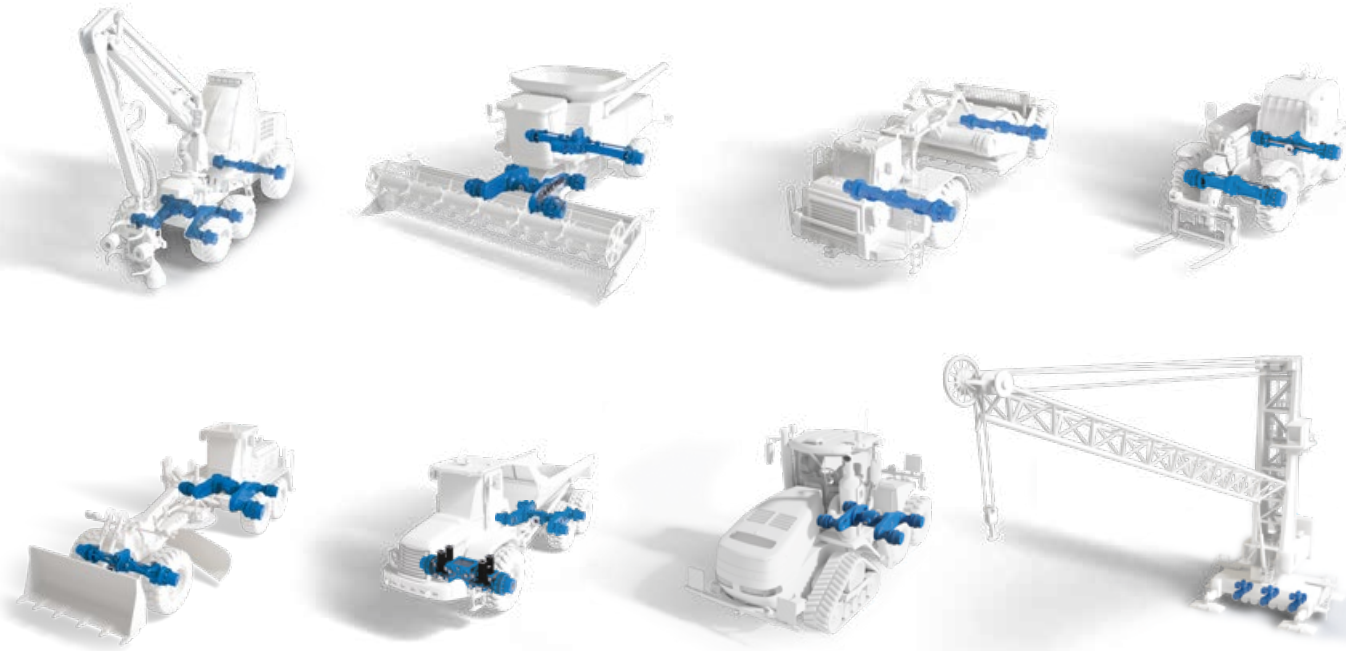


## 6 SUCCESS FACTORS FOR YOUR AUTOMOTIVE CONCEPT OF THE FUTURE:

- 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.





# 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 621 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

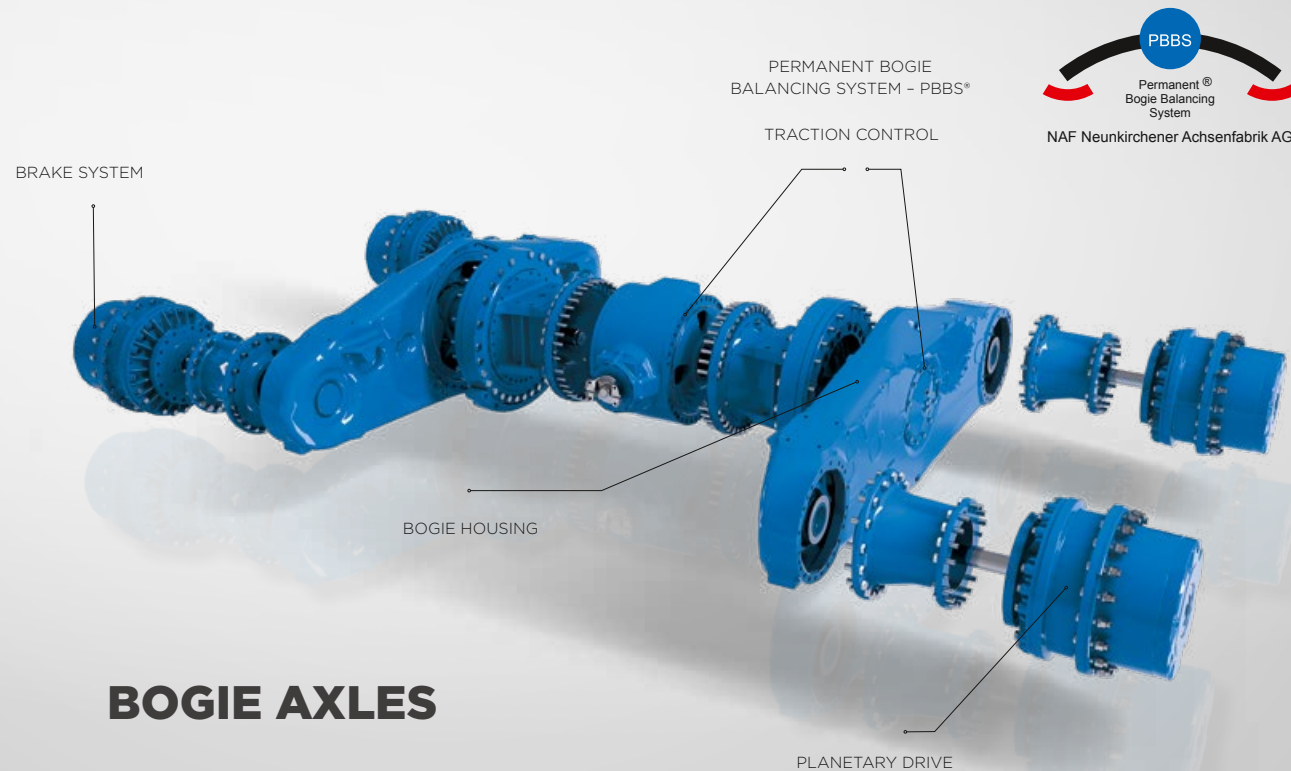
PLANETARY PORTAL BOGIE AXLE

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



**48**

Supplied countries worldwide

**Over 600**

Employees in total

**28.000 m<sup>2</sup>**

of production area

**40.000**

Components sold each year

**18**

Patents and  
protected innovations

**20**

Employees working in  
R&D/PDP

## Headquarters and production

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F: +49 9134 702-653  
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Germany (HQ), Russia & China visit:



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