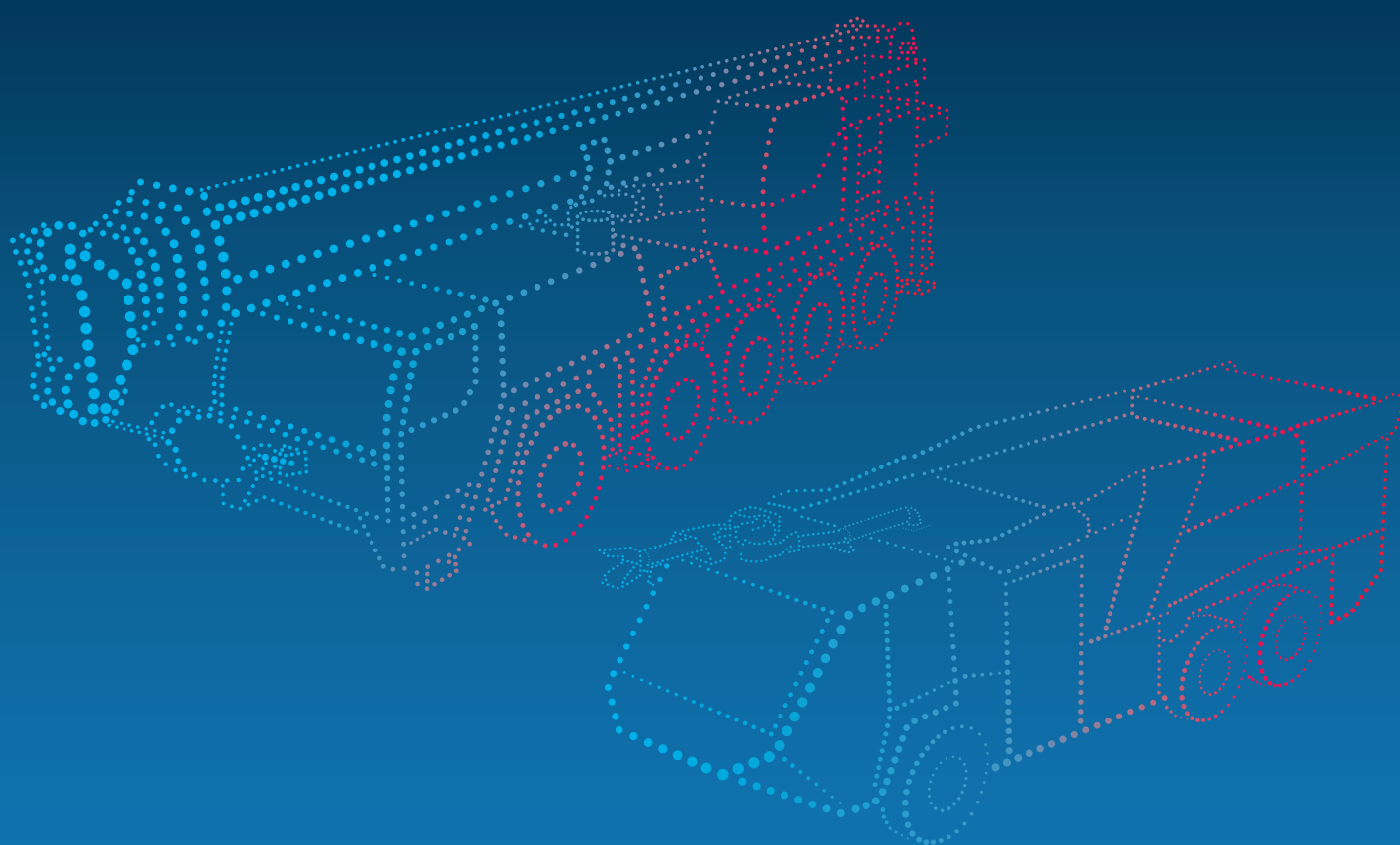


Product Overview

Drive Systems for Mobile Cranes and Special Vehicles



Content

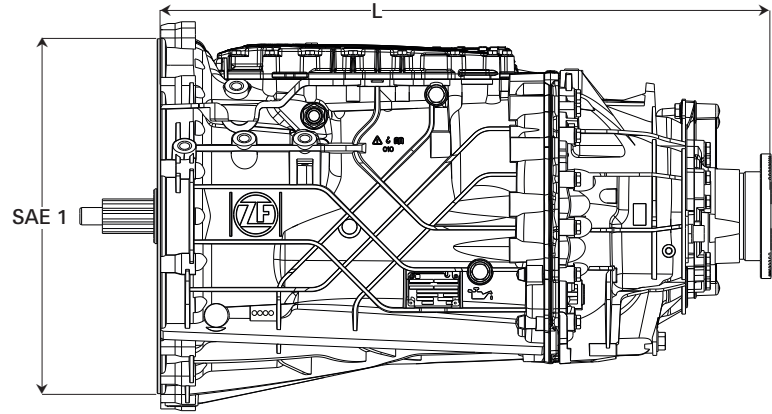
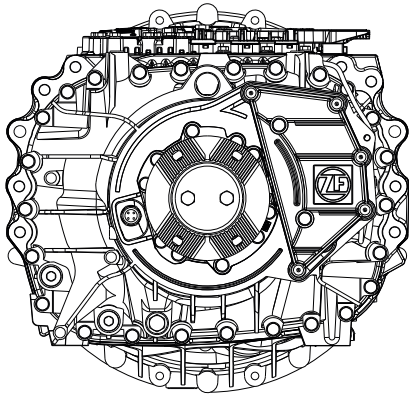
04	TraXon
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Moving the big things!

Our enthusiasm for innovative products and processes and our uncompromising pursuit of quality have made us a global technology company. We are contributing towards a sustainable future by producing advanced technology solutions with the goal of improving mobility, increasing the efficiency of our products and systems, and conserving resources.

ZF offers system-based solutions from a single source, ranging from mechanical basic transmissions, intelligent automatically shifting transmission systems to electric all-in-one solutions. True to our claim, “See. Think. Act.”, we offer innovative solution approaches and ideas for the market of special vehicles.

TraXon



Transmission type	Input torque	Weight without auxiliaries	Oil capacity for initial fill w/o heat exchanger	Oil grade	Length „L“
Version	[Nm]	[kg]	[l]	ZF list of lubricants	[mm]
12 TX 2610 SO	max. 2,600	≈ 254	≈ 12.5	TE-ML 02	from 866
12 TX 3420 SO	max. 3,400	≈ 268	≈ 13.5	TE-ML 02	from 898

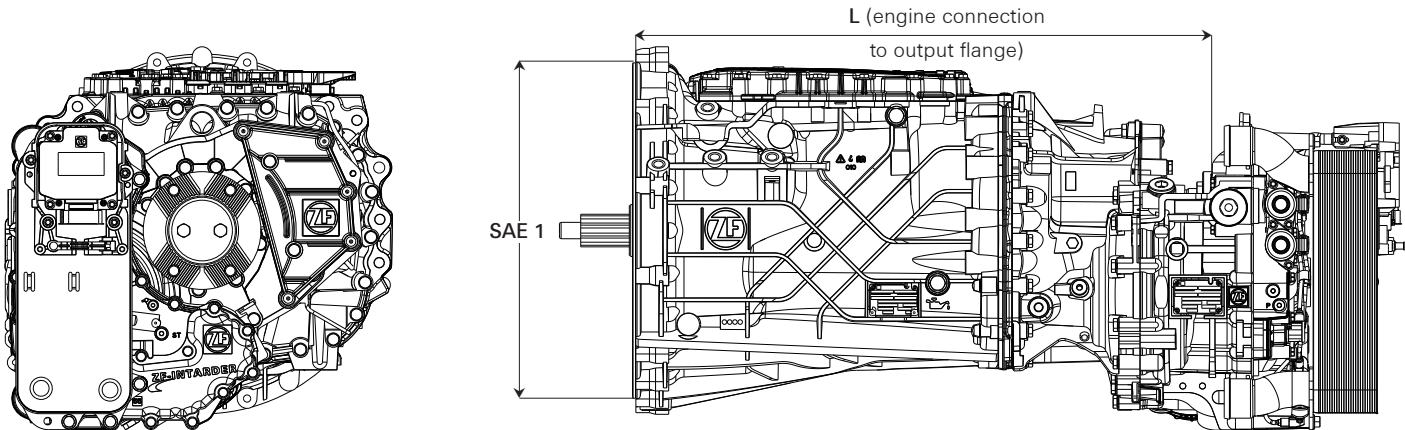
Standard ratios in gear

	1	2	3	4	5	6	7	8	9	10	11	12	R1	R2	R3	R4
2610	12.92	9.98	7.69	5.94	4.57	3.53	2.83	2.19	1.68	1.30	1.00	0.77	12.03	9.29	2.64	2.04
3420	12.92	9.98	7.69	5.94	4.57	3.53	2.83	2.19	1.68	1.30	1.00	0.77	12.03	9.29	2.64	2.04

Features / Function

- Automatic transmission system for heavy duty special vehicles and applications
- PreVision GPS driving strategy
- New software functions for enhanced comfort
- Optional clutch-dependent PTO and emergency steering pump available

TraXon (with Intarder)



Transmission type	Input torque	Weight without auxiliaries	Oil capacity for initial fill w/o heat exchanger	Oil grade	Length „L“
Version	[Nm]	[kg]	[l]	ZF list of lubricants	[mm]
12 TX 2611 SO	max. 2,600	≈ 333	≈ 22.5	TE-ML 02	from 866
12 TX 3421 SO	max. 3,400	≈ 359	≈ 23.5	TE-ML 02	from 898

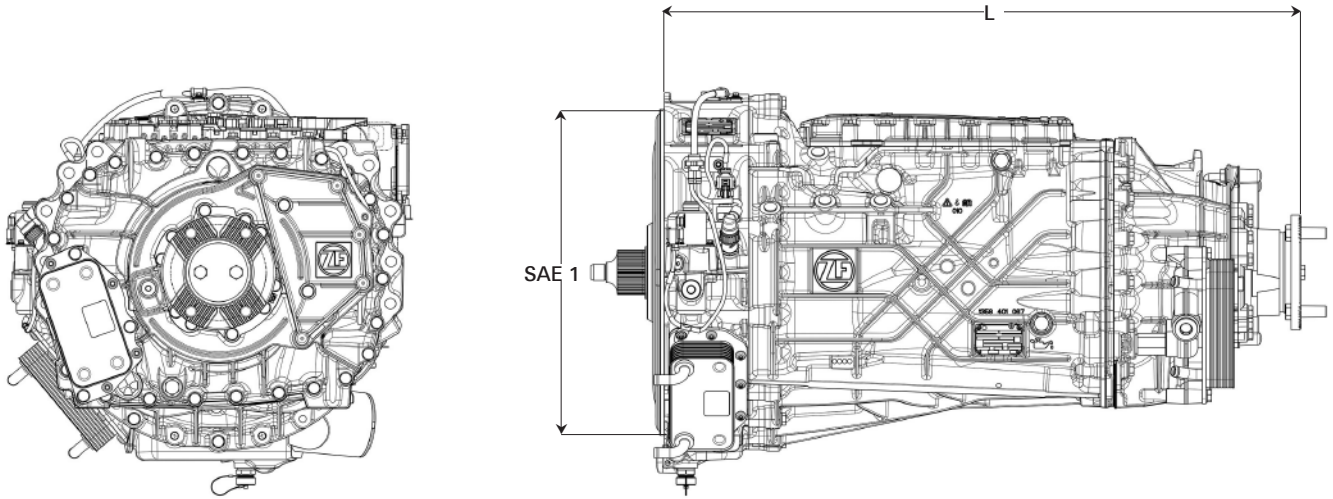
Standard ratios in gear

	1	2	3	4	5	6	7	8	9	10	11	12	R1	R2	R3	R4
2611	12.92	9.98	7.69	5.94	4.57	3.53	2.83	2.19	1.68	1.30	1.00	0.77	12.03	9.29	2.64	2.04
3421	12.92	9.98	7.69	5.94	4.57	3.53	2.83	2.19	1.68	1.30	1.00	0.77	12.03	9.29	2.64	2.04

Features / Function

- Automatic transmission system for heavy duty special vehicles and applications
- PreVision GPS driving strategy
- New software functions for enhanced comfort
- Optional clutch-dependent PTO and emergency steering pump available
- ZF-Intarder with up to 4,000 Nm/600 kW braking torque/power is fully integrated as wear-free auxiliary brake

TraXon DynamicPerform



Transmission type	Input torque	Weight without auxiliaries	Oil capacity for initial fill w/o heat exchanger	Oil grade	Length „L“
Version	[Nm]	[kg]	[l]	ZF list of lubricants	[mm]
12 DX 2610 SO	max. 2,600	362	DynamicPerform ≈ 7.0	TE-ML 25	from 998
			Transmission ≈ 12.5	TE-ML 02	
12 DX 3020 SO	max. 3,000	376	DynamicPerform ≈ 7.0	TE-ML 25	from 998
			Transmission ≈ 13.5	TE-ML 02	

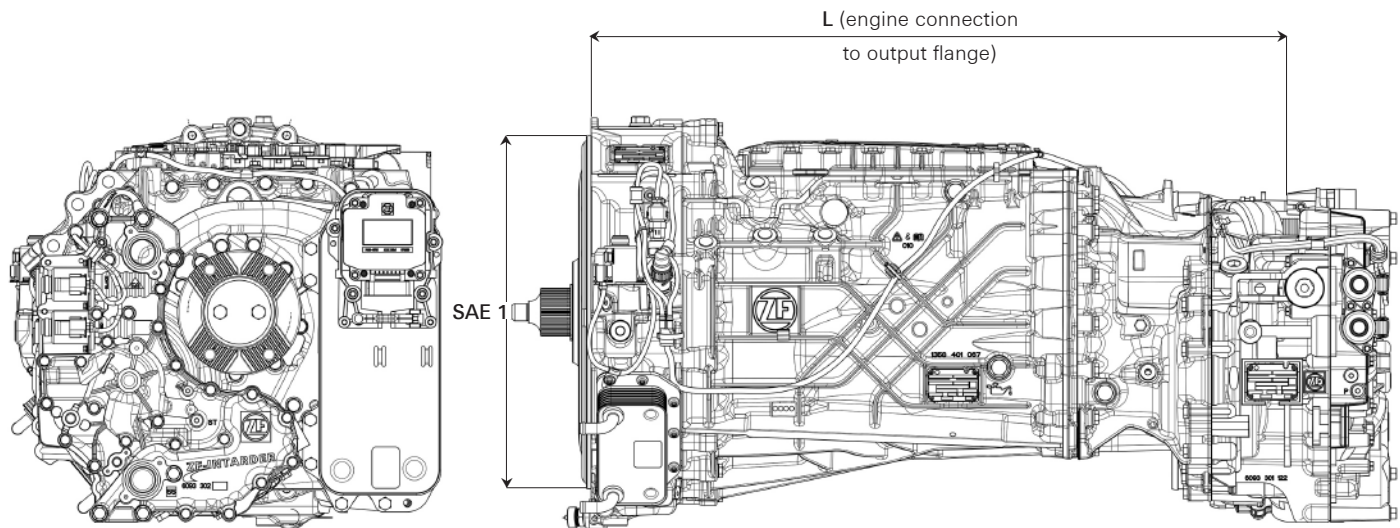
Standard ratios in gear

	1	2	3	4	5	6	7	8	9	10	11	12	R1	R2	R3	R4
2610	12.92	9.98	7.69	5.94	4.57	3.53	2.83	2.19	1.68	1.30	1.00	0.77	12.03	9.29	2.64	2.04
3020	12.92	9.98	7.69	5.94	4.57	3.53	2.83	2.19	1.68	1.30	1.00	0.77	12.03	9.29	2.64	2.04

Features / Function

- New starting module for challenging situations
- Multidisk clutch for mobile cranes with up to 5 axles and 3,000 Nm engine torque
- Constant oil cooling prevents overheating and standstill
- DynamicPerform enables wear-free and durable maneuvering
- Maximum availability of vehicles on construction site
- Customers benefit from greater efficiency and lower maintenance costs

TraXon DynamicPerform (with Intarder)



Transmission type	Input torque	Weight without auxiliaries	Oil capacity for initial fill w/o heat exchanger	Oil grade	Length „L“
Version	[Nm]	[kg]	[l]	ZF list of lubricants	[mm]
12 DX 2611 SO	max. 2,600	448	Dynamic Perform ≈ 7.0	TE-ML 25	from 998
			Transmission ≈ 22.5	TE-ML 02	
12 DX 3021 SO	max. 3,000	474	Dynamic Perform ≈ 7.0	TE-ML 25	from 998
			Transmission ≈ 23.5	TE-ML 02	

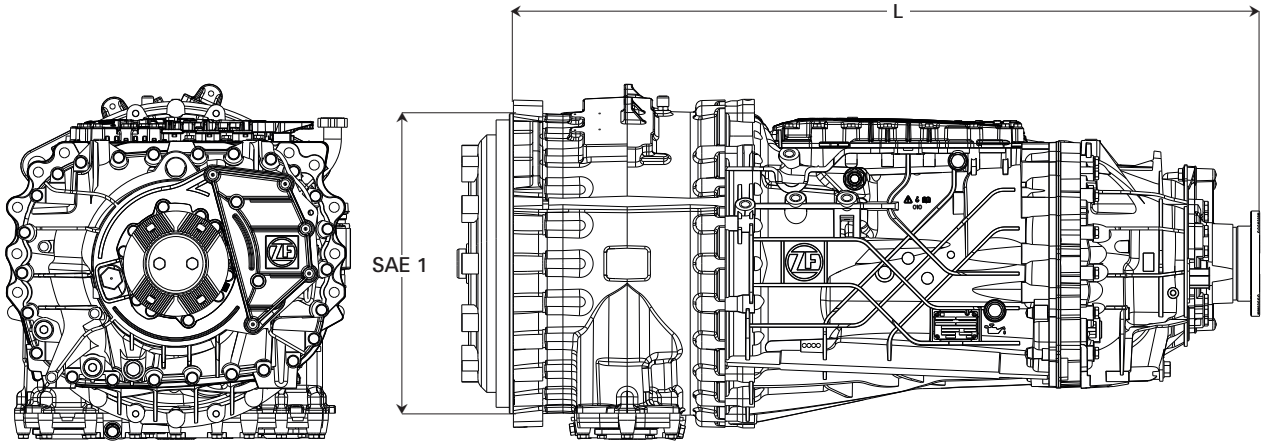
Standard ratios in gear

	1	2	3	4	5	6	7	8	9	10	11	12	R1	R2	R3	R4
2611	12.92	9.98	7.69	5.94	4.57	3.53	2.83	2.19	1.68	1.30	1.00	0.77	12.03	9.29	2.64	2.04
3021	12.92	9.98	7.69	5.94	4.57	3.53	2.83	2.19	1.68	1.30	1.00	0.77	12.03	9.29	2.64	2.04

Features / Function

- New starting module for challenging situations
- Multidisk clutch for mobile cranes with up to 5 axles and 3,000 Nm engine torque
- Constant oil cooling prevents overheating and standstill
- DynamicPerform enables wear-free and durable maneuvering
- Maximum availability of vehicles on construction site
- Customers benefit from greater efficiency and lower maintenance costs

TraXon Torque



Transmission type	Input torque	Weight without auxiliaries	Oil capacity for initial fill w/o heat exchanger	Oil grade	Torque increase converter	Length „L“
Version	[Nm]	[kg]	[l]	ZF list of lubricants		[mm]
12 TT 3020 SO	max. 3,000	≈ 507	TCC: ≈ 26 Transmission: ≈ 13.5	TE-ML 02	1.59	1,272

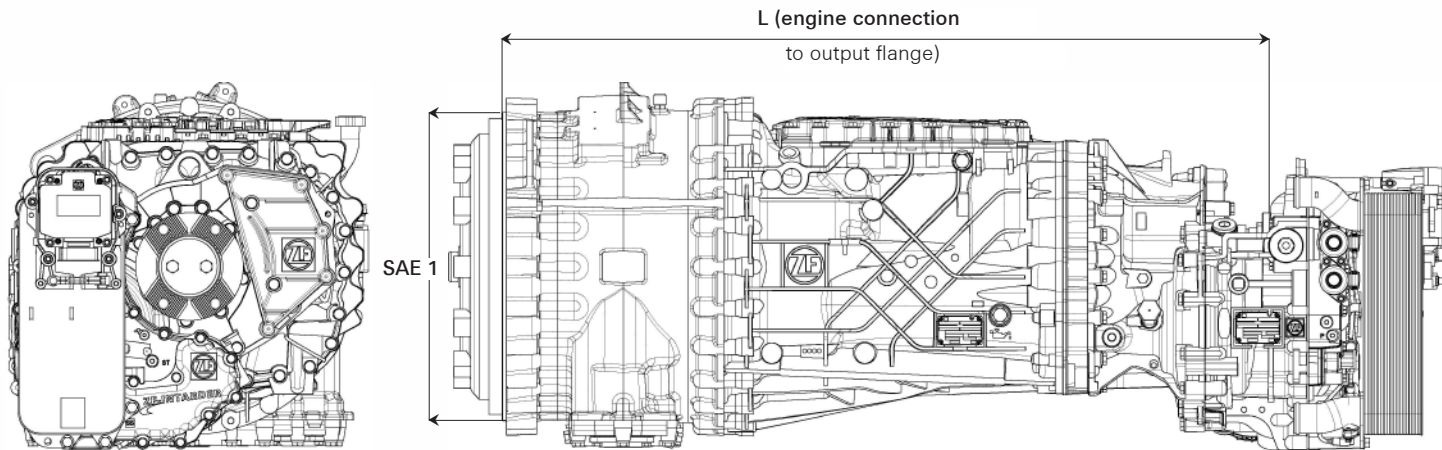
Standard ratios in gear

	1	2	3	4	5	6	7	8	9	10	11	12	R1	R2	R3	R4
3020	12.92	9.98	7.69	5.94	4.57	3.53	2.83	2.19	1.68	1.30	1.00	0.77	12.03	9.29	2.64	2.04

Features / Function

- Combination of the TraXon system with upstream torque converter clutch (TCC)
- Automatic transmission system and starting module for special applications and heavy goods transporters
- Lock-up of torque converter at driving speed thereby shifting without loss
- Common on-site control unit for Intarder and TraXon Torque module
- Clutch slip control and clutch protection
- Optional clutch-dependent PTO and emergency steering pump available
- PreVision GPS driving strategy

TraXon Torque (with Intarder)



Transmission type	Input torque	Weight without auxiliaries	Oil capacity for initial fill w/o heat exchanger	Oil grade	Torque increase converter	Length „L“
Version	[Nm]	[kg]	[l]	ZF list of lubricants		[mm]
12 TT 3021 SO	max. 3,000	≈ 580	TCC: ≈ 26 Transmission: ≈ 23,5	TE-ML 02	1.59	from 1,272

Standard ratios in gear

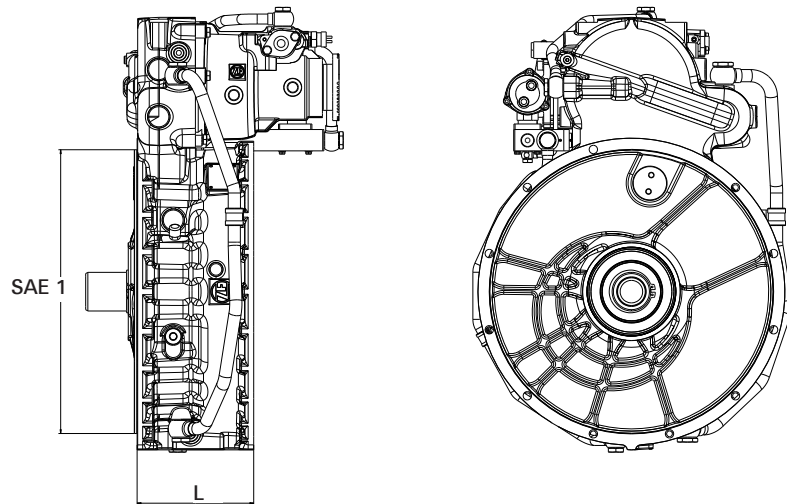
	1	2	3	4	5	6	7	8	9	10	11	12	R1	R2	R3	R4
3021	12.92	9.98	7.69	5.94	4.57	3.53	2.83	2.19	1.68	1.30	1.00	0.77	12.03	9.29	2.64	2.04

Features / Function

- Combination of the TraXon system with upstream torque converter clutch (TCC)
- Automatic transmission system and starting module for special applications and heavy goods transporters
- Lock-up of torque converter at driving speed thereby shifting without loss
- Common on-site control unit for Intarder and TraXon Torque module
- Clutch slip control and clutch protection
- Optional clutch-dependent PTO and emergency steering pump available
- PreVision GPS driving strategy
- ZF-Intarder with up to 4,000 Nm/600 kW braking torque/power is fully integrated as wear-free auxiliary brake

PowerDivide

NMV 1600 L1
NMV 2000 L1
NMV 2003 L1

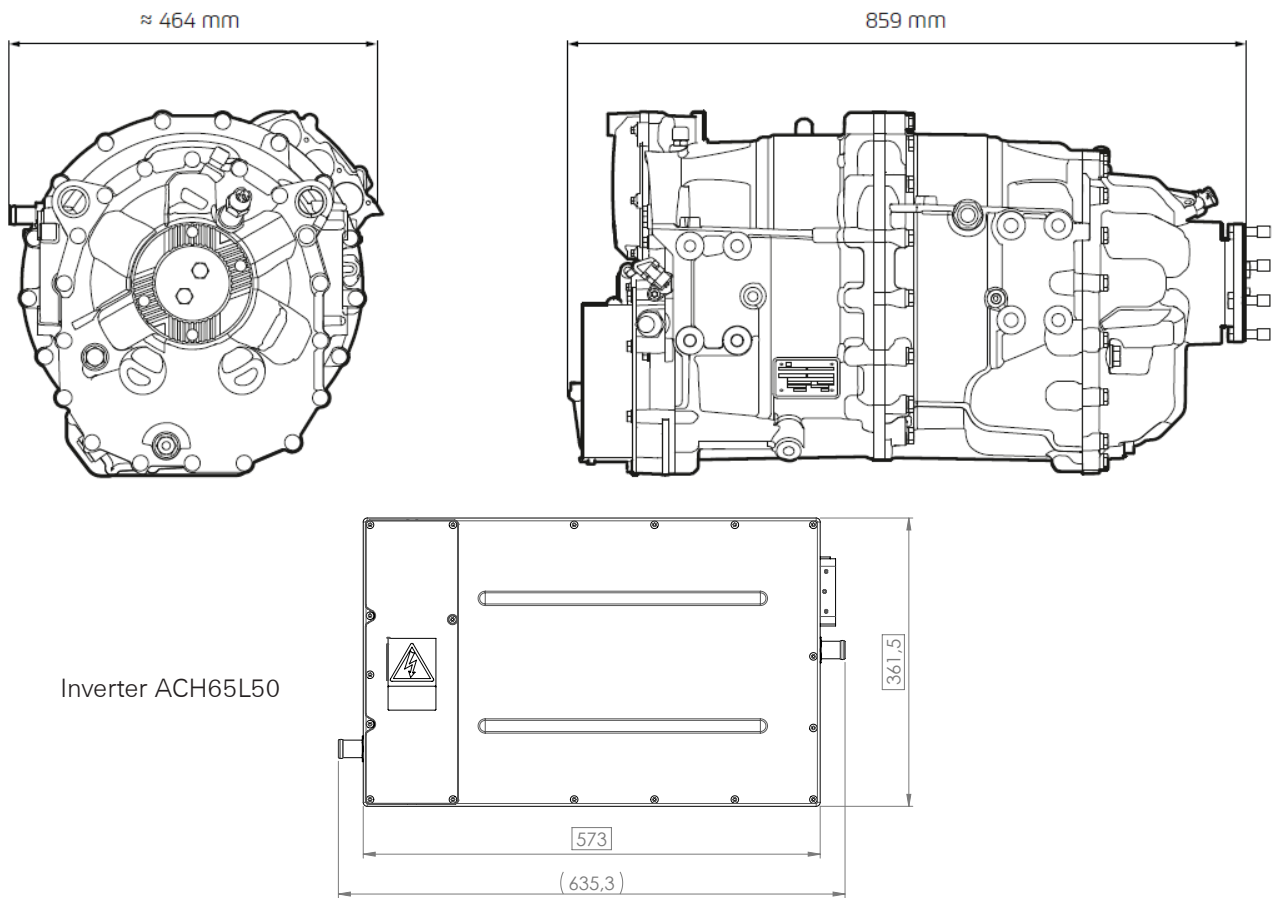


Type	Installation position	PTO power	Output torque	Direction of rotation	Mass (with damper)	Permissible operation temperature	Oil capacity	Oil grade	Speed factor
Version	o'clock	[kW]	[Nm]		[kg]	[°C]	[l]	ZF list of lubricants	
NMV 1600 L1	12	251	1,600	Same as engine	approx. 168	max. 110	approx. 4.7	TE-ML 02	1.54
NMV 2000 L1	12	314	2,000	Same as engine	approx. 168	max. 110	approx. 4.7	TE-ML 02	1.21
NMV 2003 L1	3	314	2,000	Same as engine	approx. 168	max. 110	approx. 4.7	TE-ML 02	1.21

Features / Function

- Engine-dependent PTO for auxiliary power units with high torque, such as concrete pumps, mobile cranes, fire-fighting vehicles, and many more
- Installed like a 'sandwich' between the engine and the transmission (SAE interface)
- 628 kW/3,000 Nm on transmission output
- Multidisc shift system

CeTrax



Inverter ACH65L50

Traction motor

Motor technology	Performance (Peak/30min)*	Speed electric motor	Transmission stage *** el.motor, 1-gear	Output torque (Peak/30min)*
	[kW]	[rpm]	i =	[Nm]
Asynchronous motor 3 x phase	300 / 175	8,500	3.36	4,500 / 2,170

Inverter ACH65L50

System

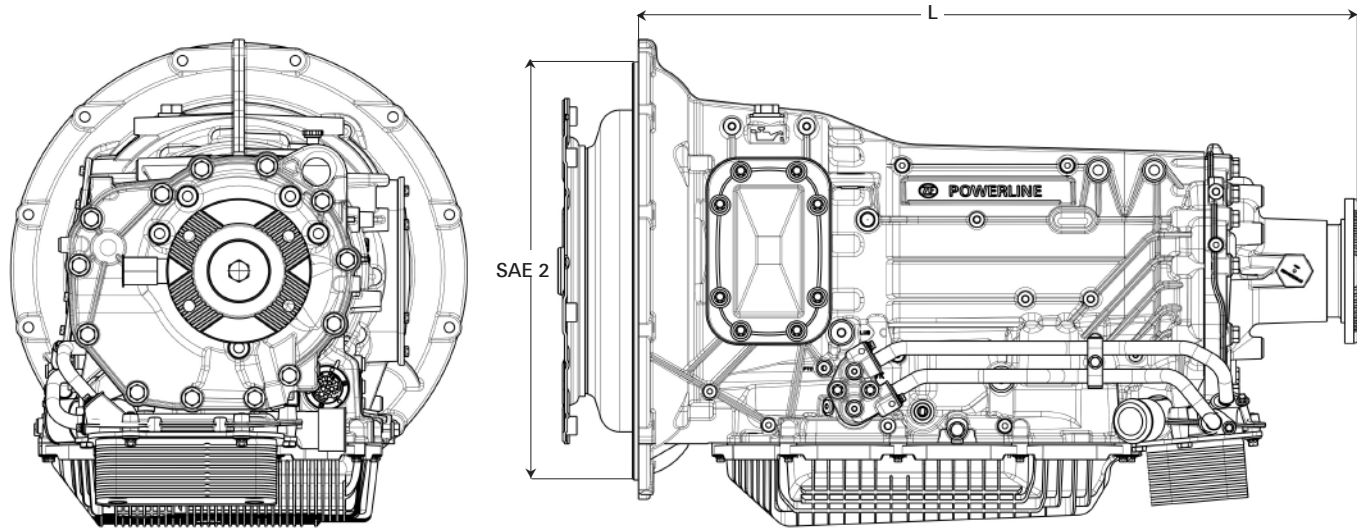
Version	Nominal DC voltage	Current AC (p/c)**	Total vehicle weight	Weight	Control unit	Protection class
	[V]	[A _{rms}]	max. [kg]	[kg]	ECU	
ACH65L50	650	500 / 375	90,000	285	EST 54	IP69K

* Peak / 30 minutes
** Peak / continuous
*** Transmission stage integrated

Features / Function

- Electric drive motor with integrated planetary stage
- Planetary stage and EST 54 proven and tested in the ZF-EcoLife transmission
- Optimal performance as a ZF system with motor, inverter electronic control with EST 54
- Developed for demanding logistics applications
- Water/oil internal cooling system
- Conventional and electric sytems from a single source

PowerLine



PowerLine	Input torque	Ratio spread	Length „L“	Weight (dry)	Engine connection	Torque-weight ratio
Version	[Nm]		[mm]	[kg]	SAE	
8 AP 1200 S	1,200*	7.6	768	149	SAE 2	8

Standard mechanical ratios in gear

Gear	1	2	3	4	5	6	7	8	R
Ratio	4.89	3.12	2.03	1.64	1.25	1.00	0.84	0.64	-4.25

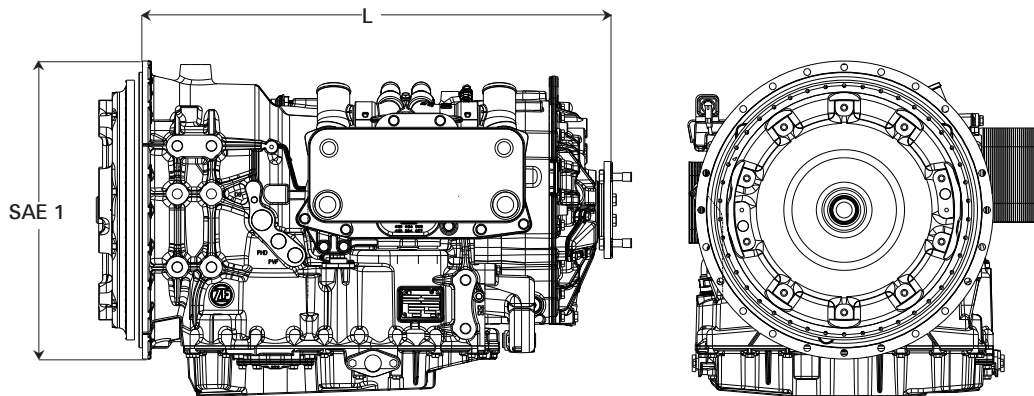
* higher torque on demand

Features / Function

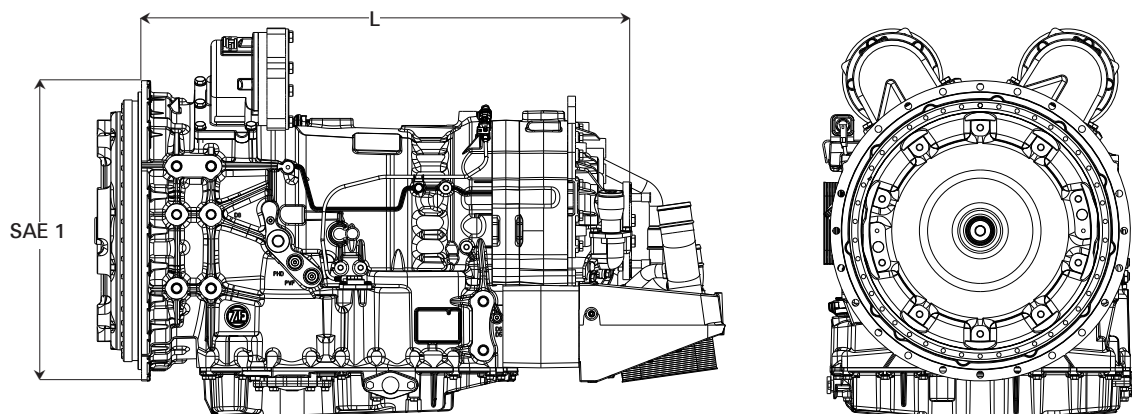
- 8-speed automatic powershift transmission
- Benchmark torque-to-weight ratio: 8 Nm/kg
- Best in class fuel efficiency by using 8HP gear set concept. Fuel savings up to 10%
- On-board transmission control unit
- Converter lock-up clutch with integrated torsional damper
- Dual side engine dependent PTO-option (at 3 and/or 9 o'clock position)
Stationary usage max. PTO power 102 kW. Max. torque for 1 PTO = 700 Nm, for 2 PTOs = 1,000 Nm in sum.
Mobile usage on request.
- Excellent drivability and comfort
- Optional interface for direct mounted transfer case

EcoLife Offroad 2

Example: With side mounted cooler



Example: With PTO and rear mounted cooler



EcoLife Offroad 2 (with PTO)	Input torque	Max. turbine torque Forward	Max. retarder torque	Installation length „L“ (PTO)	Dry weight with cooler (PTO)	Torque conversion
Version	[Nm]	[Nm]	[Nm]	[mm]	[kg]	
7 AP 1620 S (SP)	1,600	2,500	- 1,900	871.1 (901.1)	450 (487)	1.95 ... 2.29
7 AP 1920 S (SP)	1,900	3,130	- 1,900	871.1 (901.1)	452 (489)	1.95 ... 2.29
7 AP 2120 S (SP)	2,100	3,500	- 1,900	871.1 (901.1)	454 (491)	1.95 ... 2.29
7 AP 2620 S (SP)	2,600	3,850	- 1,900	871.1 (901.1)	456 (493)	1.95 ... 2.29
7 AP 3020 S (SP)	3,000	4,000 (4,250)*	- 1,900	871.1 (901.1)	456 (493)	1.95 ... 2.29

* Dependant on application, mission and mileage expectations, e.g. ARFF Airport Rescue Fire Fighter

Standard ratios in gear

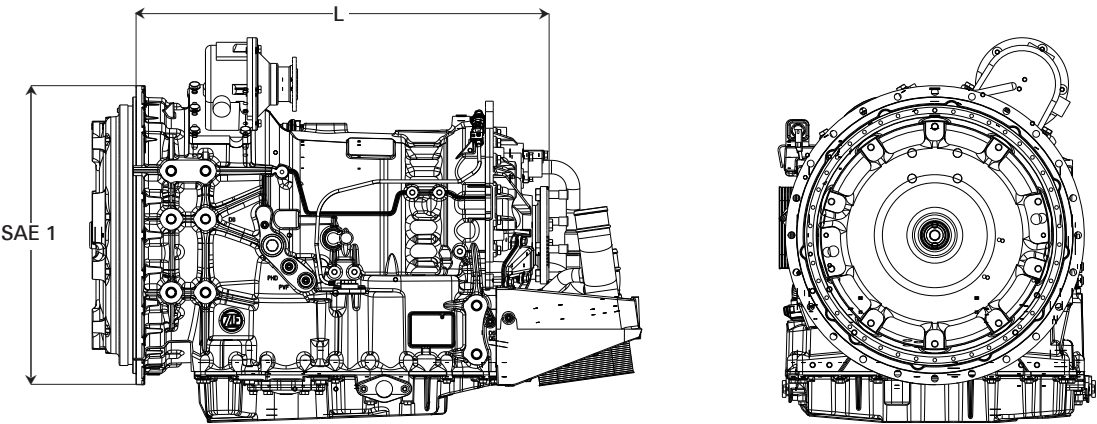
Gears and Ratios	1	2	3	4	5	6	7	R	R _{Cr}	Phi
Ratio 7 AP xxxx S (SP)	5.6	3.36	2.04	1.47	1.0	0.67	0.56	3.36	9.05	10
Max. engine speed [rpm]	2,600	2,600	2,600	2,600	2,600	2,600	2,300	2,600	2,600	-

Features / Function

- High efficiency, high power-to-weight ratio
- Application and mission-specific shift programs (can optionally be selected during operation as well)
- Dual cooling system consisting of transmission oil cooler and separate retarder oil cooler
- Higher admissible cooling water temperature of up to 105°C
- Connections for two PTOs with a maximum of 1,000 Nm available as an option

EcoLife Offroad 2

Example: Compact version with PTO



EcoLife Offroad 2 (with PTO)	Input torque	Max. turbine torque Forward	Max. retarder torque	Installation length „L“ (PTO)	Dry weight with cooler (PTO)	Torque conversion
Version	[Nm]	[Nm]	[Nm]	[mm]	[kg]	
6 AP 1620 SK (SPK)	1,600	2,500	- 1,900	732.2 (762.2)	384 (421)	1.95 ... 2.29
6 AP 1920 SK (SPK)	1,900	3,130	- 1,900	732.2 (762.2)	386 (423)	1.95 ... 2.29
6 AP 2120 SK (SPK)	2,100	3,300	- 1,900	732.2 (762.2)	388 (425)	1.95 ... 2.29
6 AP 2620 SK (SPK)	2,600	3,500	- 1,900	732.2 (762.2)	390 (427)	1.95 ... 2.29

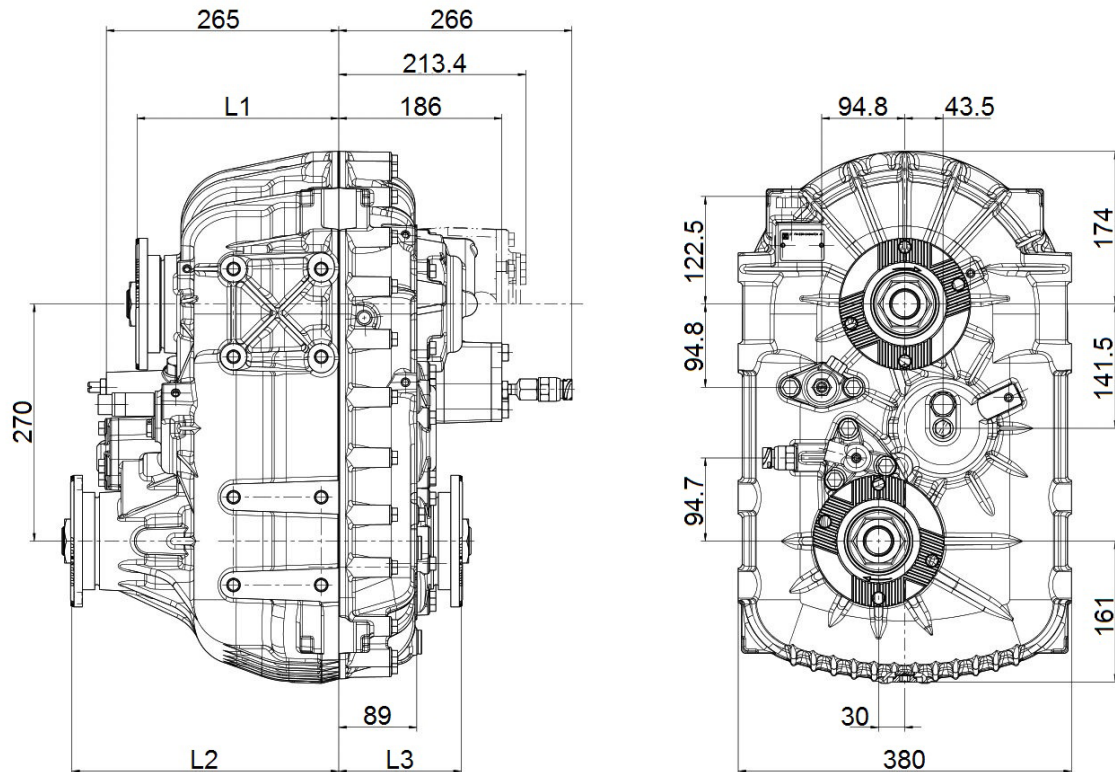
Standard ratios in gear

Gears and Ratios	1	2	3	4	5	6	R	Phi
Ratio 6 AP xxxx SK (SPK)	3.36	2.04	1.47	1.0	0.67	0.56	3.36	6.0
Max. engine speed [rpm]	2,600	2,600	2,600	2,600	2,600	2,300	2,600	-

Features / Function

- High efficiency, high power-to-weight ratio
- Application and mission-specific shift programs (can optionally be selected during operation as well)
- Dual cooling system consisting of transmission oil cooler and separate retarder oil cooler
- Higher admissible cooling water temperature of up to 105°C
- Connections for two PTOs with a maximum of 1,000 Nm available as an option

VG 750I270



Max. Input torque	Max. Input speed	Ratio on-road	Ratio off-road	Shaft center distance	Weight without / with differential	Oil capacity without / with differential	Max. operating temperature
[Nm]	[min ⁻¹] [rpm]			[mm]	[kg]	[l]	[°C]
11 000	3 500	1	2	270	115 / 125	6.4 / 5.5	130

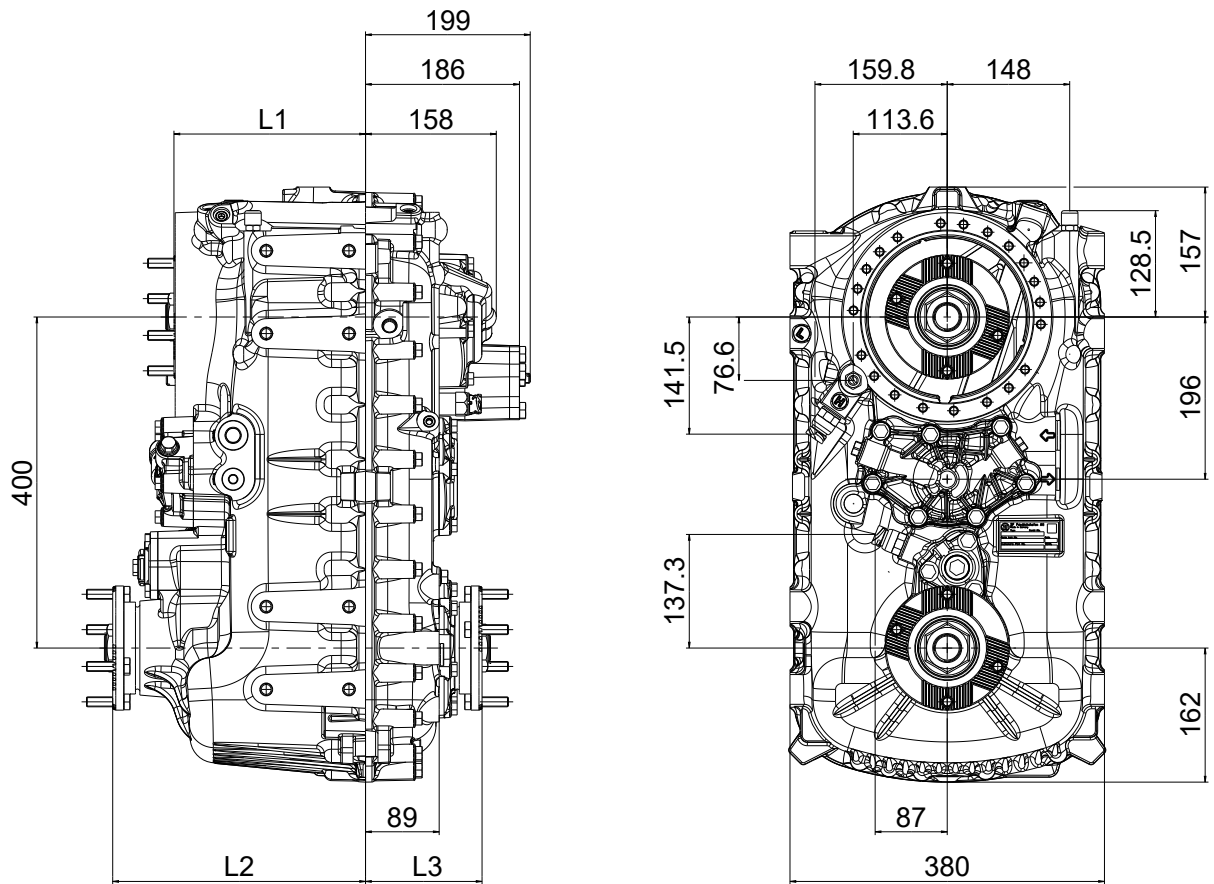
Options

- Automatic Drive-Train Management ADM 2:

Fully automatic engagement of differential locks, pneumatically activated and controlled by a separate electronic module

- Front axle engagement instead of differential
- Preparation for connection of an external oil cooler
- Power Take Off PTO NA200, max. torque 2 000 Nm

VG 750|400

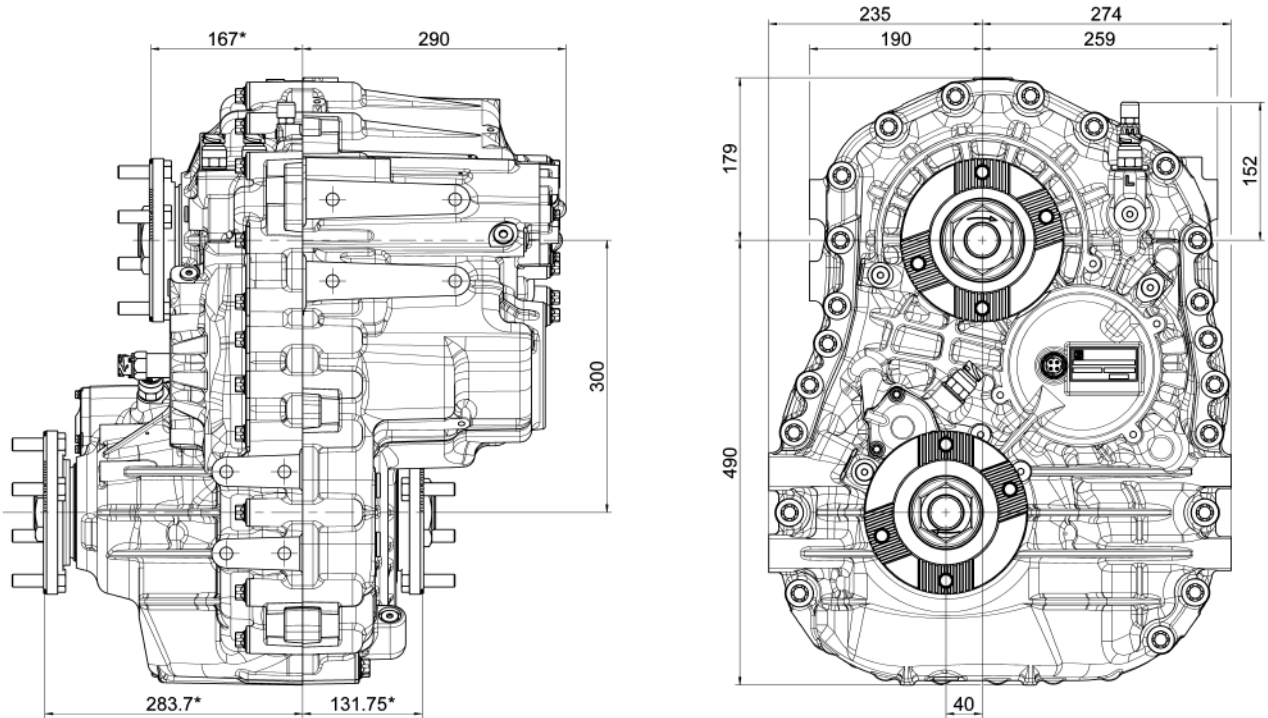


Max. input torque	Max. input speed	Ratio on-road	Ratio off-road	Shaft center distance	Weight without / with differential	Oil capacity without / with differential	Max. operating temperature
[Nm]	[min ⁻¹] [rpm]			[mm]	[kg]	[l]	[°C]
12 500	4 500	1.086	2.1 2.522	400	155 / 165	6.4 / 5.5	130

Options

- Automatic Drive-Train Management ADM 2:
Fully automatic engagement of differential locks, pneumatically activated and controlled by a separate electronic module
- Front axle engagement instead of differential
- Preparation for connection of an external oil cooler
- Installation remote or directly mounted on: ZF 8 HP90SX, ZF PowerLine, third-party transmissions
- Parking brake, emergency steering pump

TC 27 S



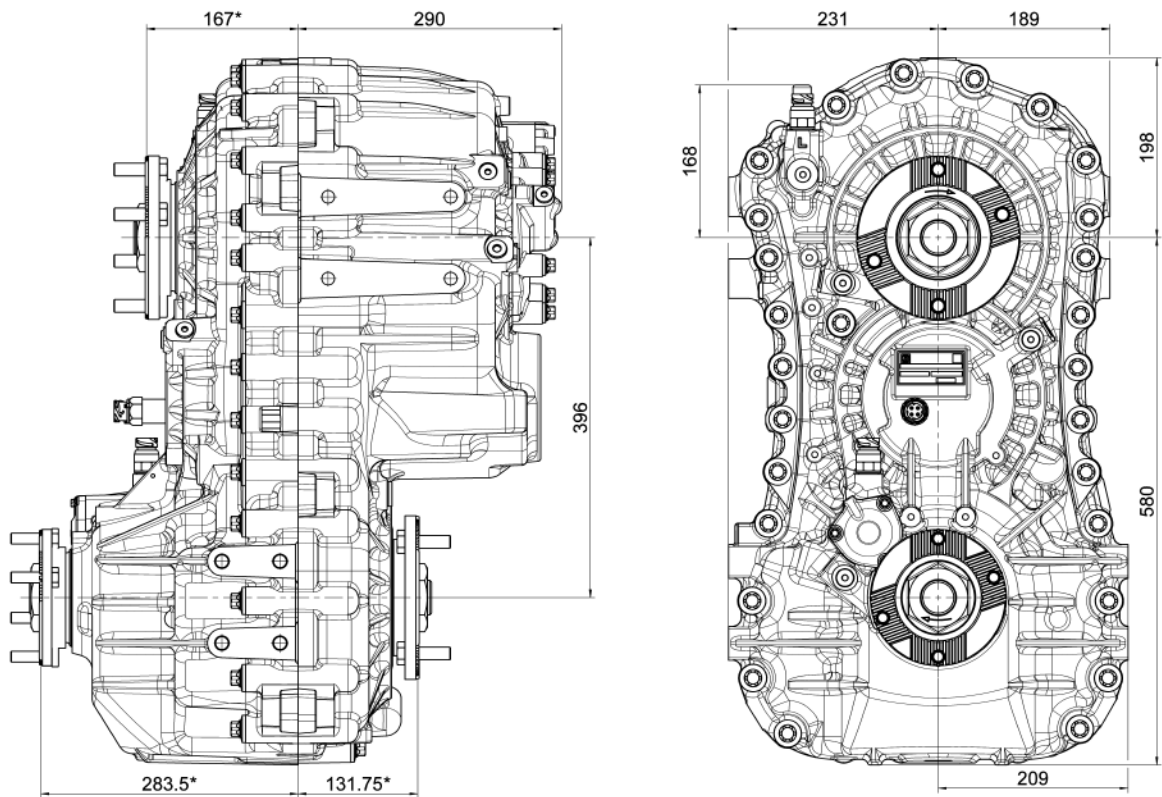
* Depending on flange type

Max. input torque	Max. input speed	Ratio on-road	Ratio off-road	Shaft center distance	Weight without / with differential	Oil capacity without / with differential	Max. operating temperature
[Nm]	[min ⁻¹] [rpm]			[mm]	[kg]	[l]	[°C]
27 000	3 200	0.874	1.536	300	246 / 261	7.1 / 6.5	130

Options

- Automatic Drive-Train Management ADM 2:
Fully automatic engagement of differential locks, pneumatically activated and controlled by a separate electronic module
- Front axle engagement instead of differential
- Preparation for connection of an external oil cooler
- Power Take Off PTO 8.5, max. torque 8 500 Nm
- Single pneumatic and electric interface

TC 27 L



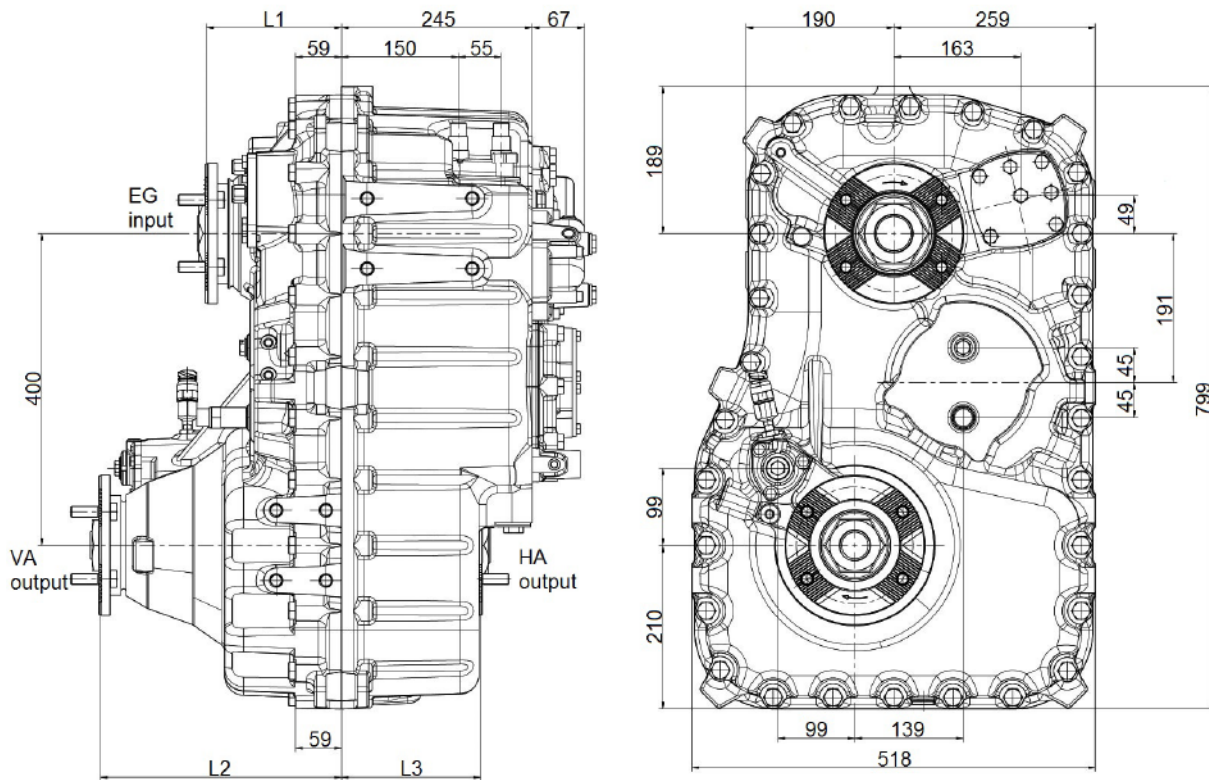
* Depending on flange type

Max. input torque	Max. input speed	Ratio on-road	Ratio off-road	Shaft center distance	Weight without / with differential	Oil capacity without / with differential	Max. operating temperature
[Nm]	[min ⁻¹] [rpm]			[mm]	[kg]	[l]	[°C]
27 000	3 200	0.874	1.536	396	234 / 250	7.1 / 6.5	130

Options

- Automatic Drive-Train Management ADM 2:
Fully automatic engagement of differential locks, pneumatically activated and controlled by a separate electronic module
- Front axle engagement instead of differential
- Preparation for connection of an external oil cooler (ist doppelt enthalten)
- Power Take Off PTO 8.5, max. torque 8 500 Nm
- Single pneumatic and electric interface
- Installation remote or directly mounted on: ZF EcoLife Offroad 2 or third-party transmission

VG 2700|400



Max. input torque	Max. input speed	Ratio on-road	Ratio off-road	Shaft center distance	Weight without / with differential	Oil capacity without / with differential	Max. operating temperature
[Nm]	[min ⁻¹] [rpm]			[mm]	[kg]	[l]	[°C]
35 000	2 800	0.913	1.407	400	435 / 465	12.5 / 10.0	130

Options

- Automatic Drive-Train Management ADM 2:
Fully automatic engagement of differential locks, pneumatically activated and controlled by a separate electronic module
- Front axle engagement instead of differential
- Preparation for connection of an external oil cooler
- Rear engine version VG 2701

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