



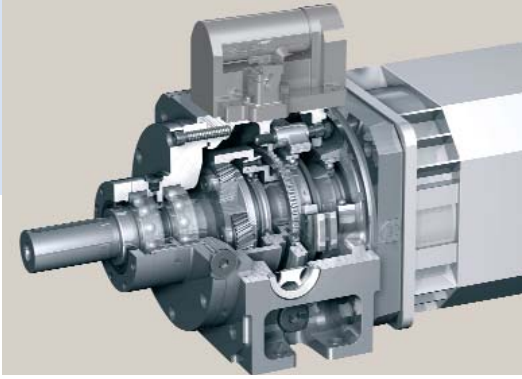
Power and Dynamics



Two-Speed Gearbox
for Machine Tools



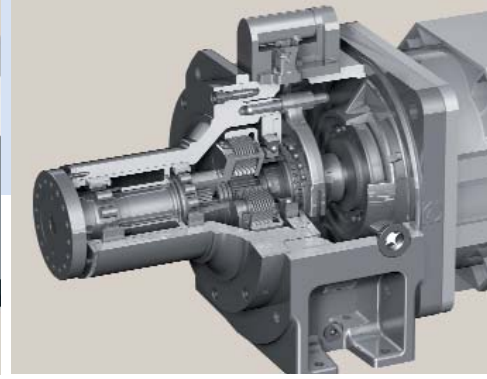
ZF-Duoplan 2K120 INLINE
Direct Mounting to Spindle



ZF-Duoplan 2K250 Standard
for Belt Drives

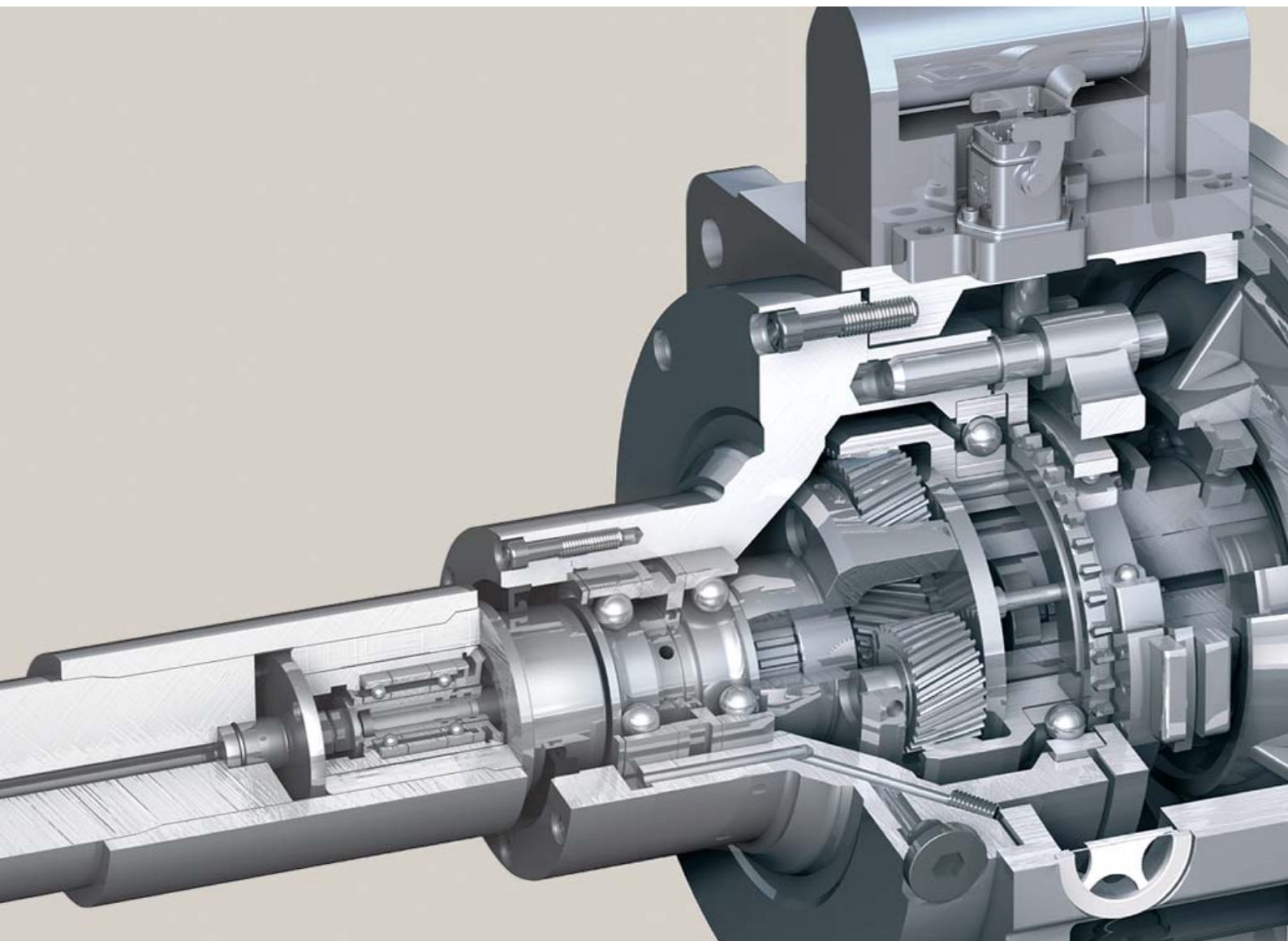


ZF-Duoplan 2K600 Standard
for Belt Drives

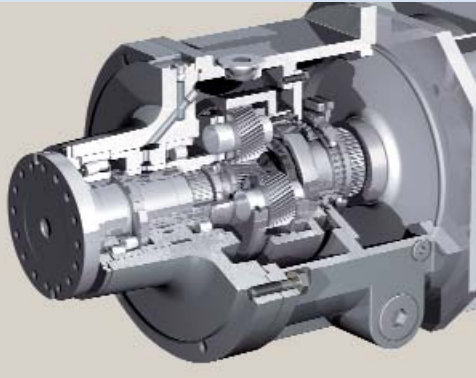
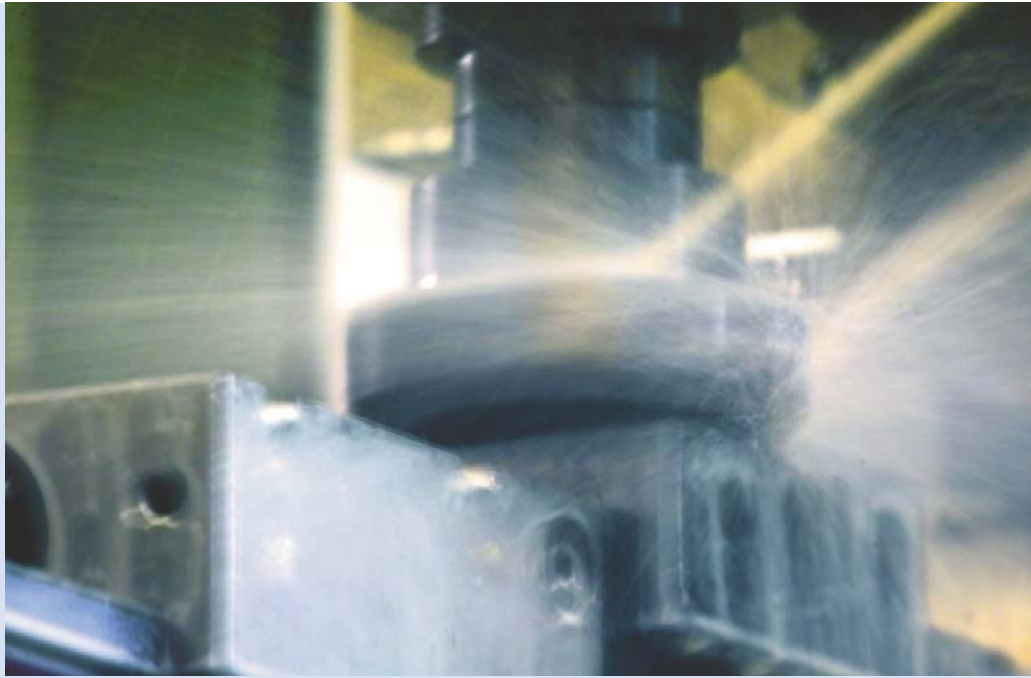


ZF-Duoplan 2K250 TSC (Through-Spindle-Cooling)

Allows cutting liquids like emulsions, hydraulic oils and air-oil mixtures to be passed through the gearbox and spindle, directly to the tool



ZF-Duoplan 2K800 Standard
for Belt Drives



Precision in movement

The ZF Friedrichshafen division Special Driveline Technology is able to offer you a wide range of machine drives, brakes and clutches for applications in engineering as well as customer specific drive solutions.

Our development and production activities are focused on servo-assisted drives for automation engineering, two-speed drive gearboxes for machine tools as well as customer-specific drives, such as for printing machines, robot applications and elevator gearboxes.

Our innovative standard products range from low backlash servogearboxes (ZF-Servoplan), and high precision robust two-speed gearboxes (ZF-Duoplan) to hysteresis clutches and brakes for non-contact web control (ZF-Tiratron).

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ZF Duoplan - Two-speed gearboxes

Application

The ZF Duoplan two-speed gearbox is mainly used in machine tool main-spindle drives, test-benches and applications where high torque is needed.

By way of example, the gearbox can be used in turning machines (horizontal B3/B5), machining centers (vertical V1/V3) thanks to its variable installation position (see page 10). The gearbox is also suitable for use in many systems in which torque increase and/or speed reduction is required.

Benefits

Machine tools are designed to be universal so that they can process different materials. This requires both high cutting speeds for soft materials as well as high cutting forces for hard materials requirements which a two-speed gearbox can fulfill, since it can either retain high motor speeds ($i = 1:1$) or multiply the motor torque (e.g. ratio $i = 4.00$) and reduce the speeds, both by the same factor.

ZF-Duoplan Standard

Wide bearing base for high cantilever force

Flexible

The cutting power is therefore constant and remains available across a wide speed range. This flexibility can only be economically achieved by using a gearbox.

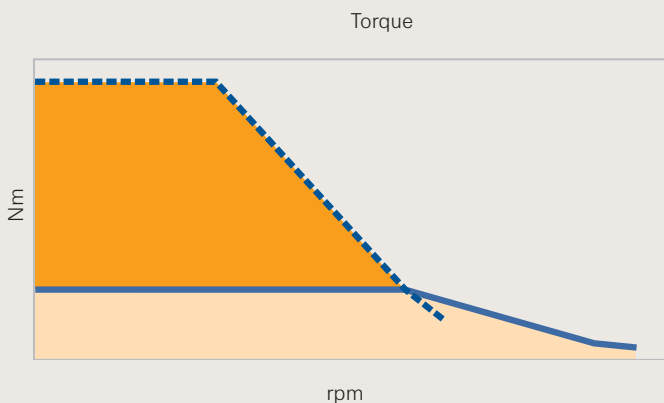
Direct Mounting to Spindle (INLINE + TSC)

This gearbox is mounted directly to the spindle. No more belt drives are used. The gearbox is dedicated for today's high speed requirements in machine tools.

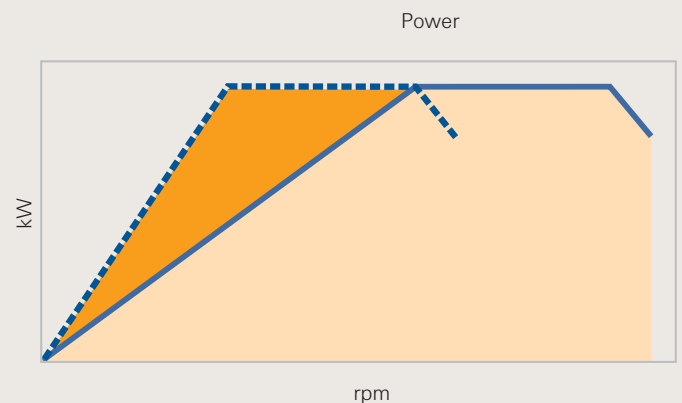
Torque-power curve

Speed ranges with constant power of up to 1:20 can be achieved for the spindle with the gearbox, depending on the controllable range of the motor. This provides high torque at low speeds on the one hand and high power at high speeds on the other, allowing the cutting power of modern tools to be fully utilized.

Torque - Power Curve - e.g. ZF-Duoplan 2K250



400% increased motor torque.



Doubled constant power range.

- 1) Motor-gearbox in $i_2 = 1.00$
or motor without gearbox
- - - 2) Motor-gearbox in $i_2 = 4.00$



Machining Center

ZF-Duoplan - Design

Design

ZF developed the ZF-Duoplan gearbox as a single-stage planetary design with a shift mechanism, hereby meeting today's high demands of low noise operation.

In contrast to conventional spur gearboxes in lay-shaft design, this planetary gearbox has the distinct advantage of allowing an extremely compact and space-saving design since the power is distributed among 4 or 5 planetary gears.

In addition, the four resp five simultaneously meshing planetary gears with helical gearing also assure low-noise operation at high speeds.

Misalignments and concentricity issues are ideally concentrated by the floating design of the sun gear. Thus such a planetary gearbox is much less sensitive to tolerances.

The motor-gearbox unit is commonly fixed to the machine frame or bed by using the gearbox foot mount.
(Available for 2K120, 2K250, 2K300, 2K450, 2K600 only).

Each gearbox also has available an output side pilot for flange mounts.

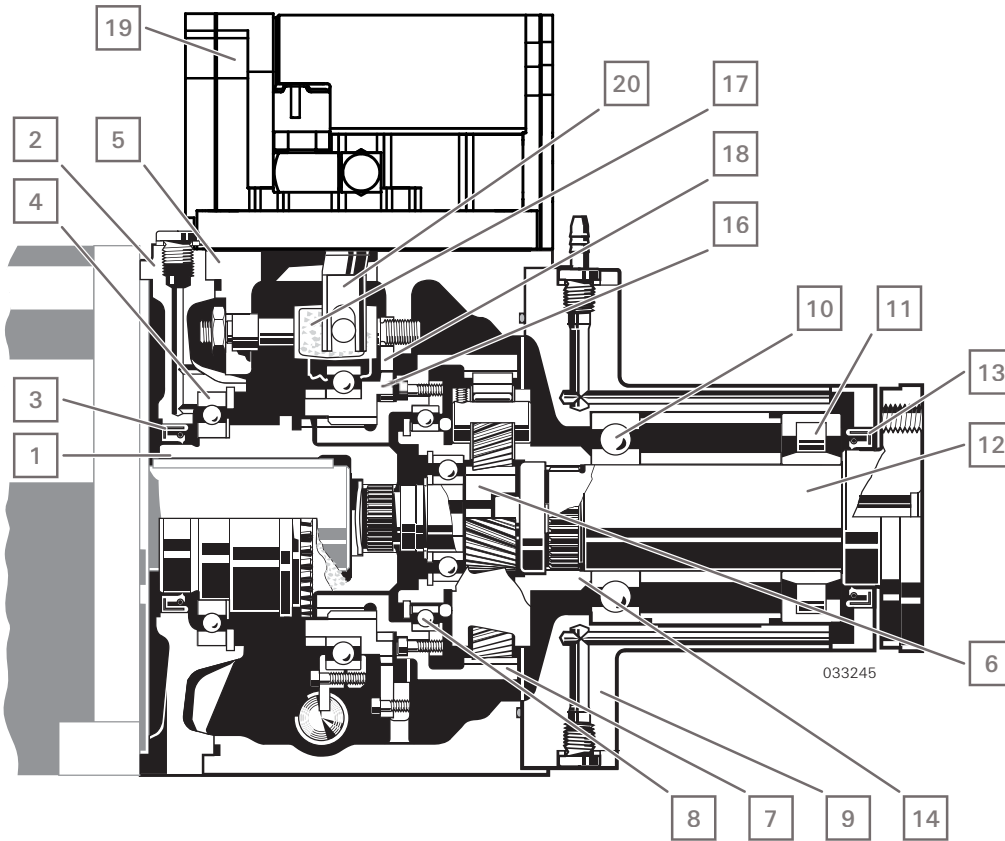
For each application there is an ideal choice of output bearings with a wide bearing base.

A range of output housing variants cater to different spindle drive designs: e.g. ZF-Duoplan STANDARD with wide bearing base for belt drives with high cantilever forces, ZF-Duoplan INLINE with short output housing and angular contact bearings for direct drive and ZF-Duoplan TSC (Through-Spindle-Cooling) to facilitate the transfer of cutting liquids like emulsions, hydraulic oils and air-oil mixtures with up to 140 bars of pressure at a flow rate of 35 l/min through the gearbox and spindle, directly to the tool.

ZF-Duoplan INLINE

Short output housing
for direct mounting
to spindle

ZF-DUOPLAN 2K120 Standard



Main components of the gearbox:

Adapter parts:

- 1: Drive hub
- 2: Adapter plate
- 3: with radial shaft seal
- 4: and hub bearing

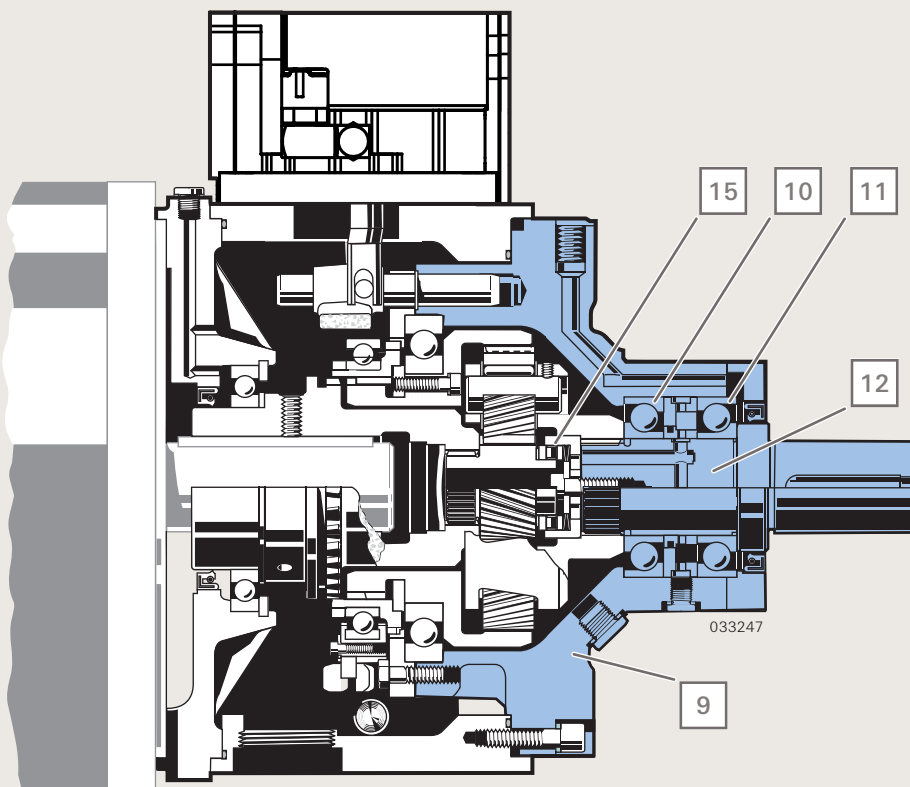
Housing:

- 5: Gearbox housing

Input:

- 6: Sun gear
- 7: Ring gear
- 8: Ring gear bearing

ZF-DUOPLAN 2K250 INLINE



Output:

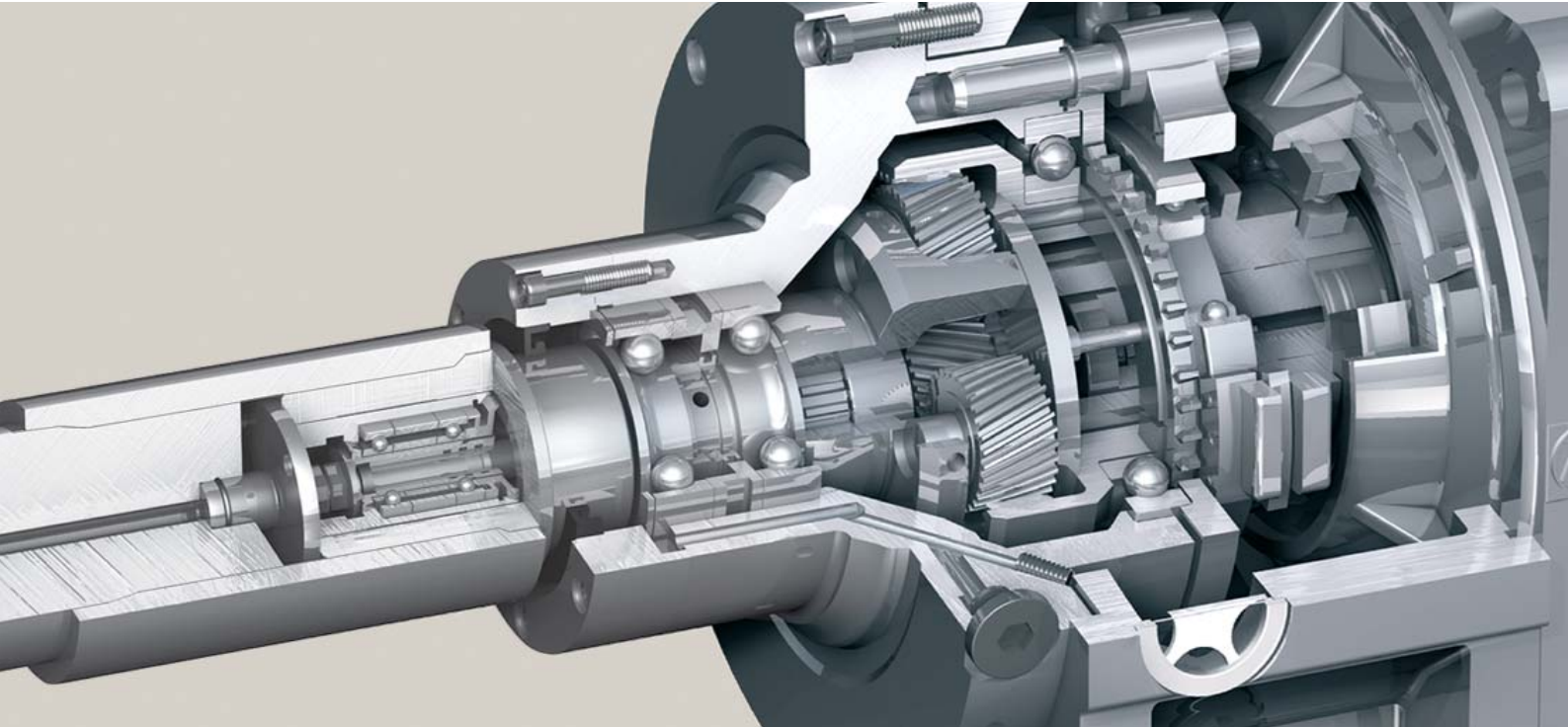
- 9: Output housing
- 10: Output bearings
- 11: Output bearings
- 12: Output shaft
- 13: Radial shaft seal
- 14: Planetary carrier
- 15: Axial bearing with cup springs

Gear shift mechanism:

- 16: Sliding sleeve
- 17: Gear shift fork
- 18: Brake disc

Shift unit:

- 19: Switch unit
- 20: Gear shift finger



Adapter parts:

- 1: Keyless hub
- 6: Sun gear
- 22: Counter holder
- 23: Clampig rings
- 24: Pressure piece with bushing

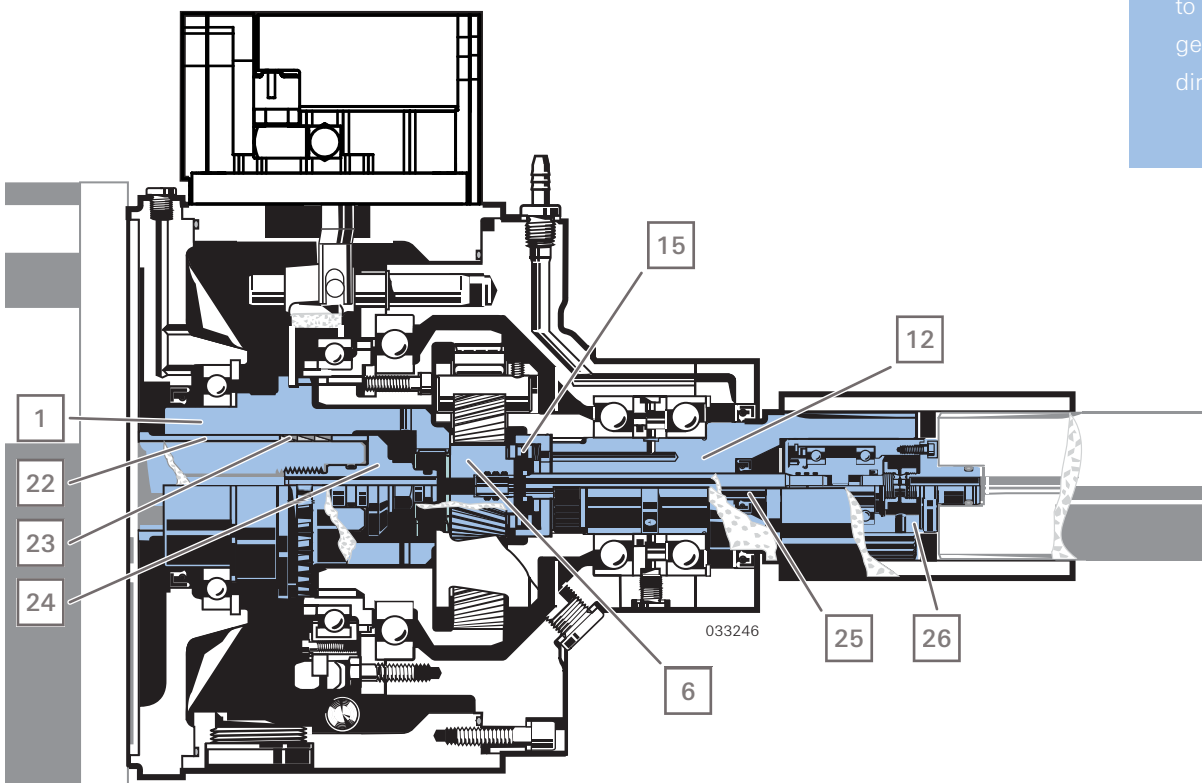
Output:

- 12: Output shaft
- TSC:
- 25: Pipe
- 26: Rotary union joint

ZF-DUOPLAN 2K250 TSC

ZF-Duoplan TSC

Through-Spindle-Cooling: Allows cutting liquids like emulsions, hydraulic oils and air-oil mixtures with up to 140 bars of pressure at a flow rate of 35 l/min to be passed through the gearbox and spindle, directly to the tool.



Technical Data

Gearbox Sizes:

		i	2K120 2K 121	2K250	2K300	2K450	2K600
Nominal data:							
Motor frame size			100/112	132	160	160/180	180
Nominal power	(kW)		19	39	47	47	63
Nominal speed	(min ⁻¹)		1 500	1 500	1 500	1 000	1 000
Nominal input torque (continuous operation S1)	(Nm)		120	250	300/250***	450	600
Output torque	(Nm)	1.00	120	250	300/-	450	600
	(Nm)	3.16	379	-	-	-	-
	(Nm)	3.17	-	792	951/-	-	-
	(Nm)	4.00	480	1 000	1 200/-	1 800	2 400
	(Nm)	4.91	589	-	- / -	-	-
	(Nm)	5.00	-	-	-	2 250	3 000
	(Nm)	5.50	-	1 375	- / 1 375	-	-
Maximum data:							
Maximum torque in Nm (intermittent loading S6 cycle duration 10 min, ED, max. 60 %)							
Input	(Nm)		140	400	400	630	840
Output (max. accelerating torque)	(Nm)	1.00	140	400	400	630	840
	(Nm)	3.16	442	-	-	-	-
	(Nm)	3.17	-	1 268	1 268	-	-
	(Nm)	4.00	560	1 600	1 600	2520	3360
	(Nm)	4.91	687	-	-	-	-
	(Nm)	5.00	-	-	-	3150	4200
	(Nm)	5.50	-	2 200	2 200	-	-
Maximum permitted input speed	(min ⁻¹)		-	-	-	-	-
in reduction ratio $i \neq 1$	(min ⁻¹)	$\neq 1$	8 000	6 300	6 300	5000	5000
for direct drive $i = 1^{2)}$	(min ⁻¹)	1 ²⁾	12 000 ³⁾	10 000 ³⁾⁴⁾	10 000 ³⁾⁴⁾	8000	5000
Maximum vibration value	(mm/s)		2.0	1.4	1.4	≤2.0	≤2.5
reduced	(mm/s)		1.2	1.0	1.0		
INLINE	(mm/s)		1.0	1.0	1.0		
reduced	(mm/s)		0.7	0.7	0.7		
at reference speed	(min ⁻¹)		6 000	5 000	5 000	4 000	4 000
Max. axial force in reduction ratio in counter clockwise (ccw) operation running and max. input torque see permissible	(N)	3.16	-	-	-	-	-
	(N)	3.17	-	3 090	3 710	-	-
	(N)	4.00	-	3 964	4 756	5 439	7 253
	(N)	4.91	-	-	-	-	-
	(N)	5.00	-	-	-	7 139	9 519
	(N)	5.50	-	5 288	5 288	-	-
Mass moment of inertia ¹⁾	(J in kgcm ²)	1.00	110	270	270	tbd	tbd
Output		4.00	144	570	570	tbd	tbd
Input			9	36	36	tbd	tbd
Operating data:							
Oil fill volume in dm ³	Horizontal (B5)		1.0/1.4	1.5	2.8	5,1	5,4
Approx. oil fill in dm ³ . Oil level in middle of oil sight glass is most accurate reading	Vertical (V1/V3)		recirculation lubrication				
Oil grade for:							
splash lubrication			HPL 68 as per ISO VG 68				
recirculating lubrication			HPL 46 as per ISO VG 46				
recirculating lubrication with heat exchanger			HPL 32 as per ISO VG 32				
recirculating lubrication with DSL**			HPL 22 as per ISO VG 22				
			for V1 and V3 installation positions oil recirculating system is mandatory				
Oil change interval			5 000 hours				
Oil temperature			max. 120° C permitted depending on application , installation position, lubrication and cooling				
Weight:							
Standard	(approx. kg)		42/52	68	86	155	165
Electrical Connection:							
for shift unit:							
power consumption	W		60	60	60	60	60
Supply voltage (at shift unit)	V		24±10%	24±10%	24±10%	24±10%	24±10%
current supply at 24V	A		2,5	2,5	2,5	2,5	2,5

Operator is free to define bearing load and lifetime. See installation drawings or page 14 - 15 for bearing data.

- 1) Mass moments of inertia for other ratios on request.
 - 2) admissible with oil cooler, otherwise n_{max} for reduction ratio.
 - 3) max. speed only permitted with oil connection at port K+ T (see pages 18/19 for oil recirculation systems connections).
 - 4) max. speed only permitted with integrated oil channel versions
- * on request
 ** DSL = Dry Sump Lubrication
 *** $i=5,5$ = reduced input torque

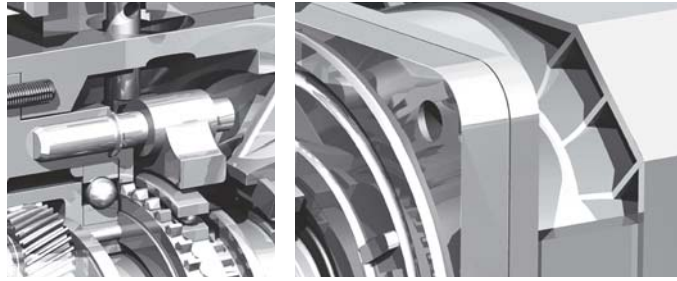
Technical Data

Gearbox Sizes:

		i	2K800 2K801/2K802 standard	2K800 2K801/2K802 mit STW	2K2100 standard ohne Abtrieb	2K2100 mit STW
Nominal data:						
Motor frame size			180/200/225	180/200/225	225/280	225/280
Nominal power	(kW)		84	84	120	120
Nominal speed	(min ⁻¹)		1 000	1 000	500	500
Nominal input torque (continuous operation S1)	(Nm)		800	800	2 100	2 100
Output torque	(Nm)	1.00	800	989	2 100	2 932
	(Nm)	3.16	-	-	-	-
	(Nm)	3.17	-	-	-	-
	(Nm)	3.19	2 552	3 154	-	-
	(Nm)	4.00	3 200	3 955	8 400	11 726
	(Nm)	4.91	-	-	-	-
	(Nm)	5.50	-	-	-	-
Maximum data:						
Maximum torque in Nm (intermittent loading S6 cycle duration 10 min, ED.max. ED. max. 60%)						
Input	(Nm)		900	900	*	*
Output (max. accelerating torque)	(Nm)	1.00	900	1 112	-	-
	(Nm)	3.16	-	-	-	-
	(Nm)	3.17	-	-	-	-
	(Nm)	3.19	2 871	3 549	-	-
	(Nm)	4.00	3 600	4 450	-	-
	(Nm)	4.91	-	-	-	-
	(Nm)	5.50	-	-	-	-
Max. permitted input speeds	(min ⁻¹)		5 000	5 000	3 500	3 500
in reduction ratio $i \neq 1$	(min ⁻¹)	$\neq 1$	-	-	-	-
for direct drive $i = 1^{2)}$	(min ⁻¹)	1 ²⁾	-	-	3 000	-
Max. vibration value	(mm/s)		3,0	3,0	5,0	*
reduced	(mm/s)					
INLINE	(mm/s)					
reduced	(mm/s)					
at reference speed	(min ⁻¹)		4 000	4 000	*	*
Max. axial force in reduction	(N)	3.16	-	-	-	-
ratio in counter clockwise (ccw) operation running and max. input torque See permissible axial force for motor shaft	(N)	3.17	-	-	-	-
	(N)	3.19	-	-	-	-
	(N)	4.00	-	-	-	-
	(N)	4.91	-	-	-	-
	(N)	5.50	-	-	-	-
Mass moments of inertia ¹⁾	(J in kgcm ²)	1.00	1 956	*	*	*
Output		4.00	1 766	*	*	*
Input			110	*	*	*
Operating data:						
Oil fill volume dm ³	Horizontal (B5)				recirculation lubrication	
Approx. oil fill in dm ³ . Oil level in middle of oil sight glass is most accurate reading	Vertical (V1/V3)				recirculation lubrication	
Oil grade for:						
splash lubrication			HLP 68 as per ISO VG 68			
recirculating lubrication			HLP 46 as per ISO VG 46			
recirculation lubrication with heat exchanger			HLP 32 as per ISO VG 32			
recirculating lubrication with DSL**			HLP 22 as per ISO VG 22			
			for V1 oder V3 installation positions oil recirculating system is mandatory			
Oil change interval			5 000 hours			
Oil temperature			max. 120° C permitted depending on application, installation position, lubrication and cooling			
Weight:						
Standard	(approx. kg)		175	325	180	400
Electrical connection:						
for shift unit:						
Power consumption	W		60	60	85	85
Supply voltage (at shift unit)	V		24±10%	24±10%	24±10%	24±10%
Current supply at 24V	A		2,5	2,5	5,0	5,0

Operator is free to define bearing load and lifetime. See installation drawings or page 14 - 15 for bearing data.

- 1) Mass moments of inertia for other ratios on request.
 - 2) admissible with oil cooler, otherwise n_{max} for reduction ratio.
- * on request

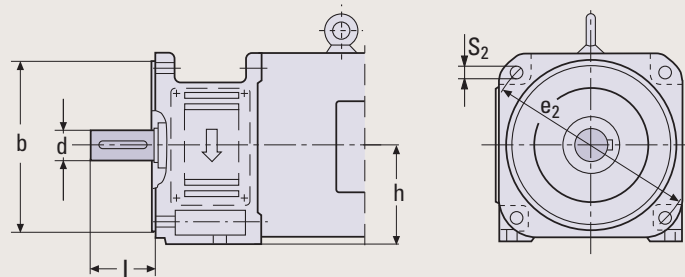


Standard Motor Connection Dimensions

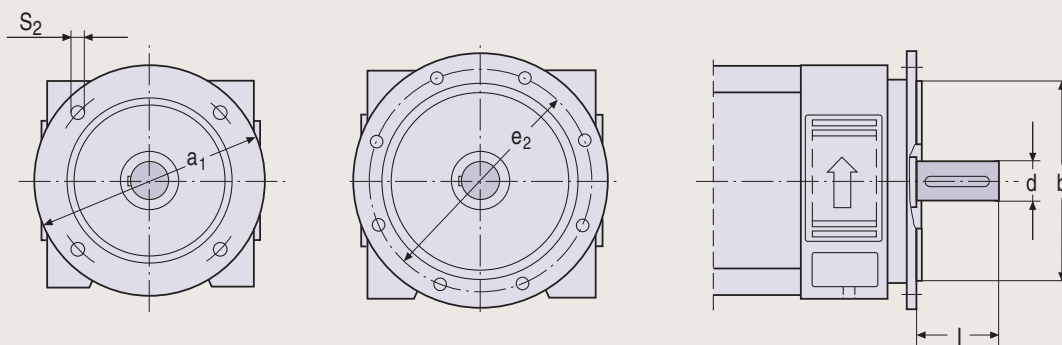
Gearbox sizes:

	2K120	2K121	2K250	2K300	2K450	2K600	2K801	2K802	2K2100	2K2100
Motor frame size:	100	112	132	160	160/180	180	200	225	225	280
Standard motor- motor connection dimension	EN 50347: 2001									
h	100	112	132	160	160/180	180	200	225	225	280
d	38	48	42	55	55/60	65	65	75	75	90
l	80±0.1	110±0.1	110-0.2	110-0.2	110-0.2 140-0.2	140-0.2	140±0.2	140±0.2	140±0.2	170±0.2
b	180	230	250	300	300	300	350	450	450	550
e₂	215	265	300	350	350	400	400	500	500	600
a₁	-	-	-	-	400	450	450	550	550	660
s₂	14	15	18	18	18	18	19	19	19	24

2K120 / 2K121 / 2K250 / 2K300 / 2K450 / 2K600



2K800 / 2K801 / 2K802 / 2K2100



Motor output shafts with standard fitted key

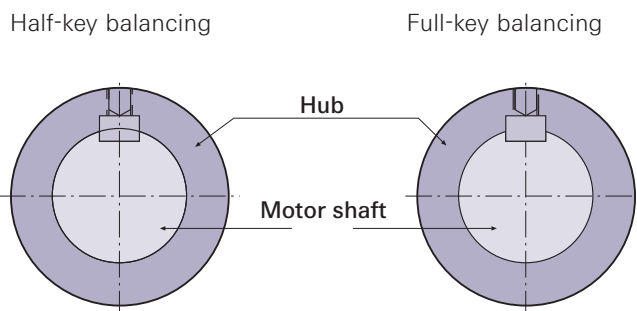
Gearbox sizes ZF-Duoplan	Shaft diameter [mm]	Fitted key b x h [mm]	Fitted key length [mm]
2K120/121	38	10x8	70
	32	10x8	70
	42	12x8	90
2K250	42	12x8	90
	48	14x9	90
	55	16x10	90
2K300	55	16x10	90
	48	14x9	90
	42	12x8	90
	60	18x11	125
2K450	60	18x11	125
	55	16x10	90
2K600	65	18x11	125
2K800/801	60/65	18x11	125
2K802/2K2100	75	20x12	125
	80	22x14	150

See DIN ISO 8821

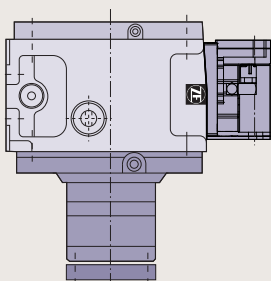
For half-key balancing the key type B is standard.

For a full-key balanced motorshaft both types can be used.

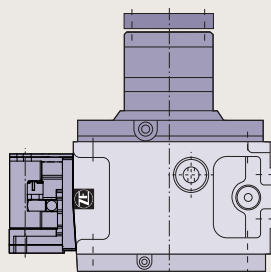
Application with smooth motorshaft without keyway on request.



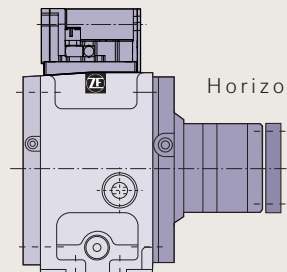
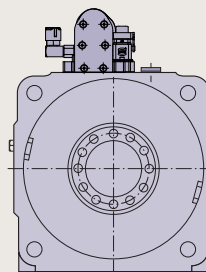
Installation positions



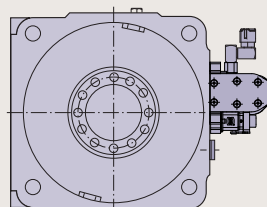
Vertikal V1



Vertikal V3



Horizontal B5



Horizontal B5
Shift unit on right side
(view from output)
Gearbox rotated along
longitudinal axis
(for 2K120/2K250/
2K300/2K450/2K600)

Output / Motor interface

Gearbox sizes:

ZF Duoplan	2K120	2K121	2K250	2K300	2K450	2K600	2K800	2K801	2K802	2K2100
Gearbox Output										
Ø 100	+	+								
Ø 118			+	0						
Ø 130			0	+						
Ø 140					+					
Ø 150						+				
Ø 38	0	0								
Ø 42			0	0						
Ø 55			0	0						
Ø 60					0					
Ø 65							0	0	0	
Ø 90										0
Ø 180							+	+	+	
Ø with STW							0	0	0	+
Ø without Output							0	0	0	0
Ø 38 INLINE	0	0								
Ø 42 INLINE			0	0						
Ø 70 TSC *	0	0	0	0						

+ = Standard * Version for Through-Spindle-Cooling to facilitate the transfer of cutting liquids like emulsions, hydraulic oils and air-oil mixtures without dissolving or abrasive additives, with up to 140 bars of pressure at a flow rate of 35 l/min through the gearbox and spindle, directly to the tool.
 0 = Option

Output

There is a choice of two different output variants. The standard long bearing base output flange version is used for belt drives, allowing high cantilever forces. For the 2K300 an extended output version is optional for even higher belt forces. Further options include short output housings as ZF-Duoplan INLINE for space saving direct drives. This version is supplied as a standard with angular contact bearings. ZF-Duoplan TSC (Through-Spindle-Cooling) allows cutting liquids like emulsions, hydraulic oils and air-oil mixtures with up to 140 bars of pressure at a flow rate of 35 l/min through the gearbox and spindle, directly to the tool. The STW (spur gearbox with fixed ratio as spindle drive) option is used for high output torque drives in conjunction with 2K800 and 2K2100.

There are two output variants to choose from. Output flanges are standard. Output shafts or STW (spur gearbox with fixed ratio directly onto spindle) are available as an option.

Motor connection

The hubs are generally fitted with a keyway for power transmission. It should be noted that the hub must be balanced in the same way as the motor.

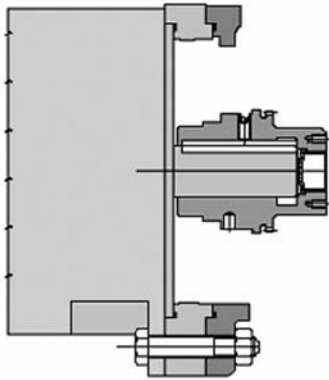
There are two types of balancing: Half-key and full-key. In the case of full-key balancing, the motor shaft is balanced with a fitted key, the hub without. The length of the fitted key is unimportant in this instance. In the case of half-key balance, however, the keyway is filled out with a balance compensator. The shape, length, and position of the keyway must be adapted. For this reason, it is necessary to provide ZF with details of the motor – including the relevant dimensions and balancing type – when ordering.

For straight motor shaft a keyless hub with clamping ring is mandatory. To this end and in accordance with DIN 332-2, the motor shaft must feature a centering bore with a thread. If the motor connection dimensions do not permit direct mounting to the ZF-Duoplan, an adapter plate or adapter ring is required. These adapter parts can be included in the supply on request, depending to motor manufacturer.

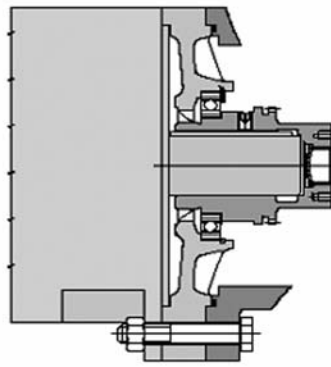
Note

For motor-gearbox units that are fixed in the machine with the gearbox output housing/flange only, no preload support on motor B-side is permitted.

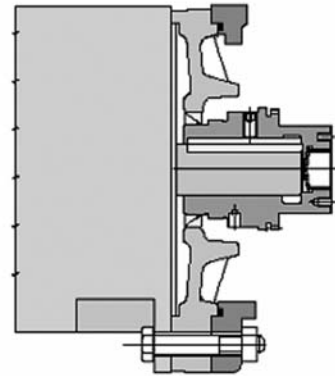
Possible Connections



Open Design
(with/without adapter ring)



Closed Design
(with hub bearing and shaft seal)



Closed Design
(with shaft seal)

Gearbox interface:

Open design

The open version gearbox is without adapter plate. Sealing with motor shaft seal.

Closed design (with hub bearing and shaft seal)

There is a version with ball bearing available for certain motors. The hub in this version is also fixed by the bearing to prevent axial hub movement, resp. present axial forces from the helical gearing onto the motor shaft (see technical data page 8). Assembly onto spindle motor is made easier due to a fixed hub position as supplied by the factory.

Closed Version (with shaft seal)

This version incorporates an adapter plate with shaft seal, which means that the gearbox forms a compact, closed unit.

Adapter Ring

The adapter ring allows adaptation to different dimensions. A shaft seal is required on the motor shaft.

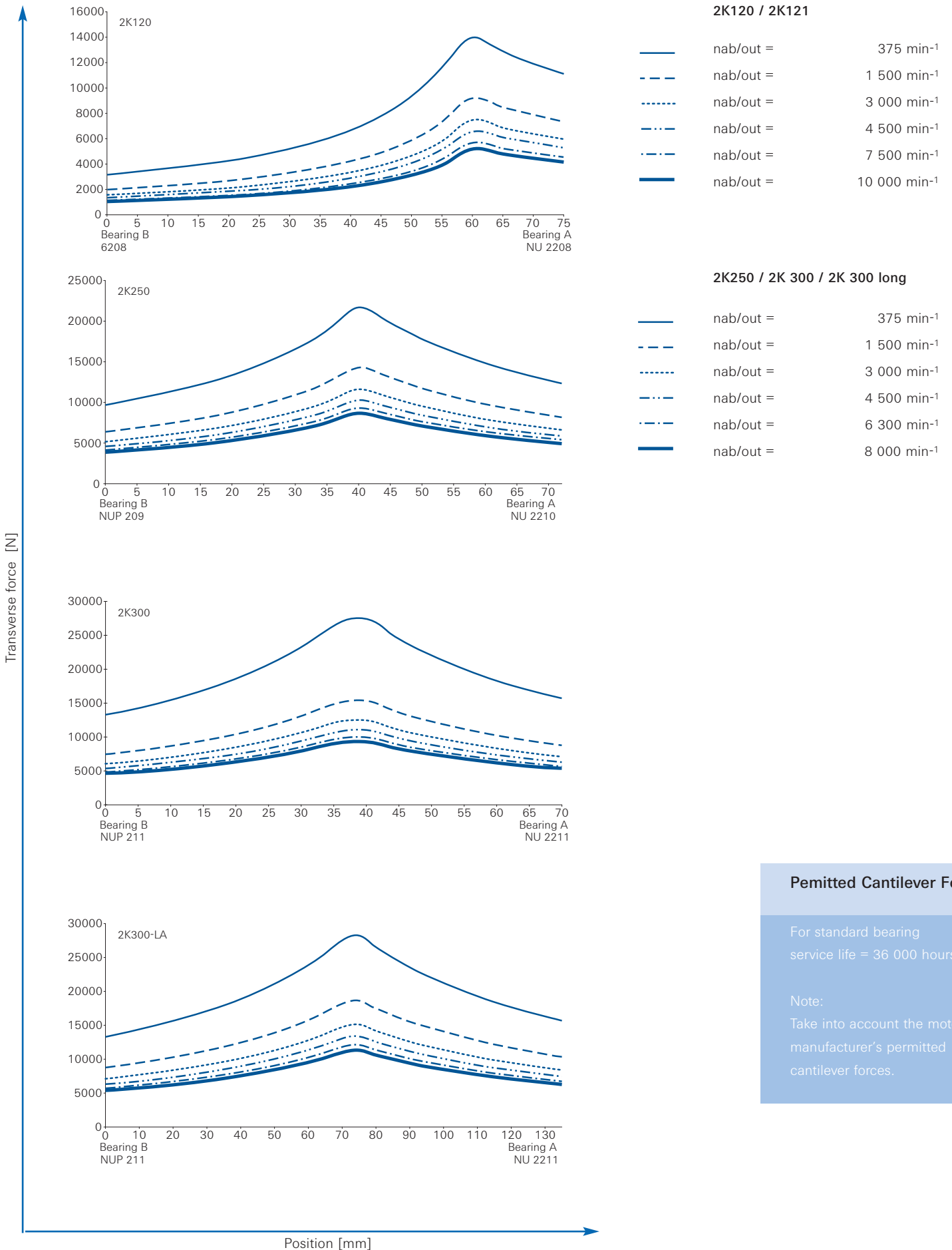
Input flange: (2K250 / 2K450 / 2K600 / 2K800 / 2K2100)

Besides the classic motor - gearbox - adaptation (motor shaft, key way, hub) we offer - on request - a gearbox with input flange to mount a pulley, clutch or similar (as shown on page 33).

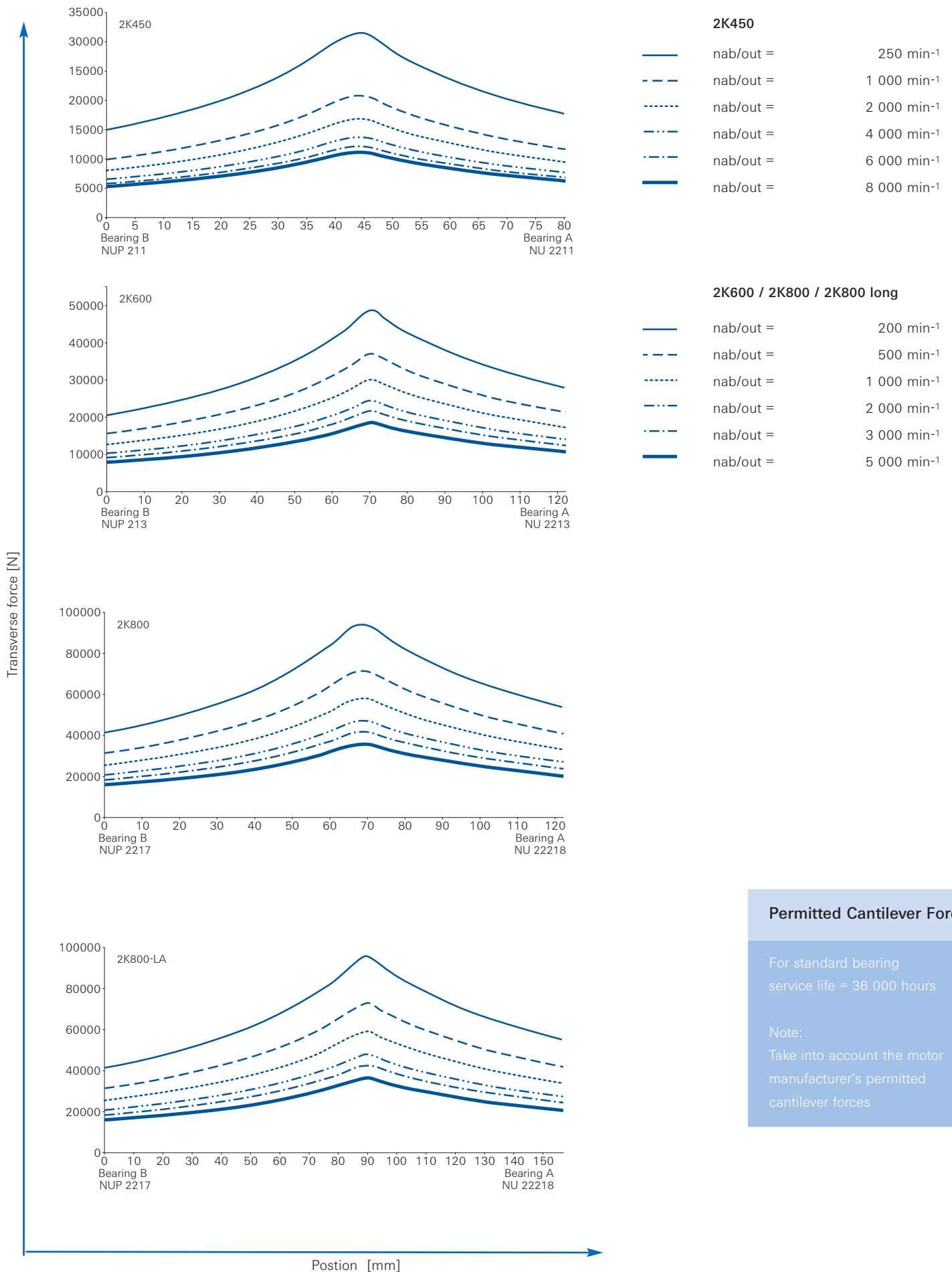
Output bearings

The output bearings vary depending on the type and level of load on the output shaft. Cylindrical roller bearings are used to cope with high radial forces, e.g. in belt pulley drives. In contrast, angular-contact ball bearings are suitable for coaxial drives, low radial backlash or axial forces. The flexible design of the output housings and shafts allows a range of selections.

Versions and Lifetime Calculation based on XY-method



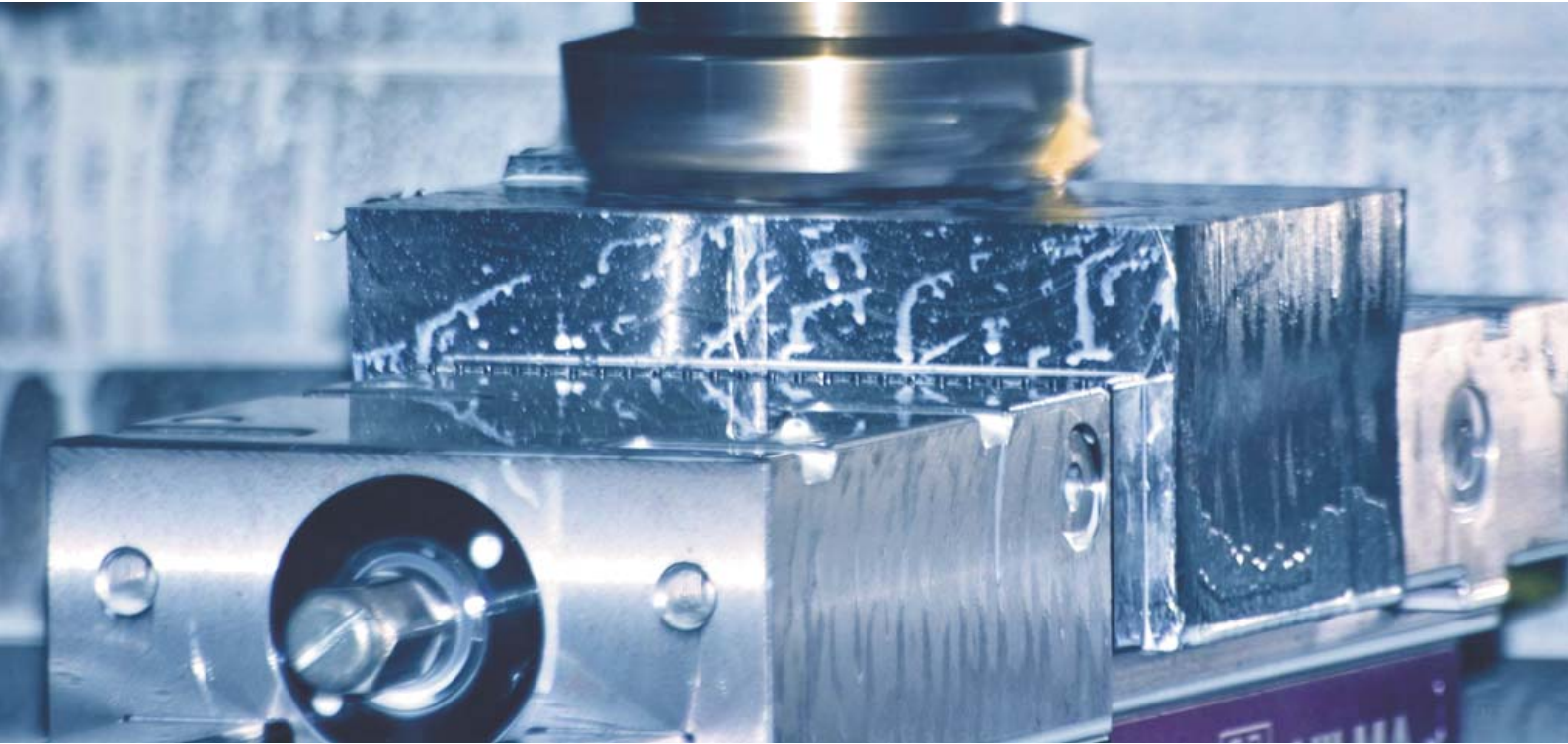
Versions and Lifetime Calculation based on XY-method



Permitted Cantilever Forces

For standard bearing service life = 36 000 hours

Note:
Take into account the motor manufacturer's permitted cantilever forces



Torsional backlash

Three backlash classes in reduction mode are available:

Class 3*:
Normal torsional
backlash < 30 arcmin

Class 2:
Reduced torsional
backlash < 20 arcmin

Class 1:
Especially reduced torsional
backlash < 15 arcmin

*Torsional backlash in
2K800 / 801 / 802 / 2100
Class 3: Normal torsional
backlash < 40 arcmin

Application and Examples

Workpiece Processing with Constant Cutting Force

Class 3*: Normal torsional backlash < 30 arcmin

Only for turning machine drives involving workpiece processing with constant cutting force.

- a) For turning machine drives when cutting is uninterrupted while the workpiece is being processed or in the case of predominant facing involving cutting speed adjustment.
- b) Boring mills
- c) Milling machines and machining centres

Extreme Milling Work

Class 2: Reduced torsional backlash < 20 arcmin

For milling machines and machining centres used to execute extreme milling work, e.g. tool side milling cutters with very coarse index/division (interrupted cutting), workpieces made from tough material, milling of ribbed workpieces.

Highly-dynamic Machine Tools

Class 1: Especially reduced torsional backlash < 15 arcmin

As class 2; except in lightweight highly-dynamic machine tools incorporating components with high internal elasticity; designed to prevent resonance vibration.

Lubrication

Splash type lubrication

The standard gearbox version B5 has splash type lubrication. Splash type lubrication is suitable for intermittent operation. In this instance, frequent gear changes, varying speeds and idle time (e.g. due to retooling) are a prerequisite.

Recirculating lubrication

The 2K120/2K121/2K250/2K300/2K450/2K600 gearboxes (vertical V1 and V3 installation positions) require recirculating lubrication. In this instance, the type of recirculating lubrication depends on the operating temperature levels required. The 2K800/2K801/2K802 and 2K2100 gearboxes must always be operated with recirculating lubrication (refer also to installation drawings).

Forced recirculating lubrication

Some applications require a very low operating temperature level. Forced recirculating lubrication is recommended in such instances. Figures on page 18/19 show the possible oil inlet and outlet positions on the gearbox. Please refer to the relevant installation drawings for detailed dimensions.

Standard recirculating lubrication in V1/B5 with oil tank installation

The oil inlet is attached in place of the oil drain plug. The oil flow rate is approx. 1.5 l/min. (only for 2K120/2K121/2K250/2K300); approx. 2,0 l/min. (only for 2K450/2K600); approx. 2,5 l/min. (only for 2K800). In the case of V3 vertical installation position, the lubrication oil can be supplied in either radial direction or centrally.

The tank of the pump unit must be ventilated. Oil back pressure in the return pipe to the gearbox must be avoided (\varnothing min. 20 mm). The tank capacity should be at least ten times the recirculating oil quantity. A 60 μ m filter and a pressure limitation valve should also be used as a safeguard.

Recirculating lubrication with heat exchanger

A heat exchanger is installed in the recirculating lubrication system to assure additional temperature reduction. For best cooling results without any influence on lubrication, various connection parts for different installation positions and operating modes are provided.

In order to achieve an optimal temperature development of the gearbox and to enable the max. speeds, an integrated oil channel version is offered (oil port connection see pages 18/19, ordering code see pages 35 - 39).

In addition, it is possible to operate the 2K250/300 without oil level (dry sump lubrication).

Note

For continuous operation in direct drive one gear change per hour is mandatory with a short turn in reduction ratio. If this is impossible please request special solution.



Connections for recirculating lubrication

2K120 / 2K121

Installation position:	Oil inlet*	Max. pressure	Oil outlet*
V1 (closed version)	M (0.5 dm ³ /min)	0.5 bar	D/E
	K/R and/or L/S (1.0 dm ³ /min)	0.5 bar	
V1 (open version)	K/R and/or L/S (1.5 dm ³ /min)	0.5 bar	D/E
B5	G (1.5 dm ³ /min)	1.5 bar	D/E
	F (1.5 dm ³ /min)	1.5 bar	
B5 turned, right*	I or F (1.5 dm ³ /min)	1.5 bar	H
V3	P (1.5 dm ³ /min)	1.5 bar	H
	or K/R and/or L/S (1.5 dm ³ /min)	0.5 bar	

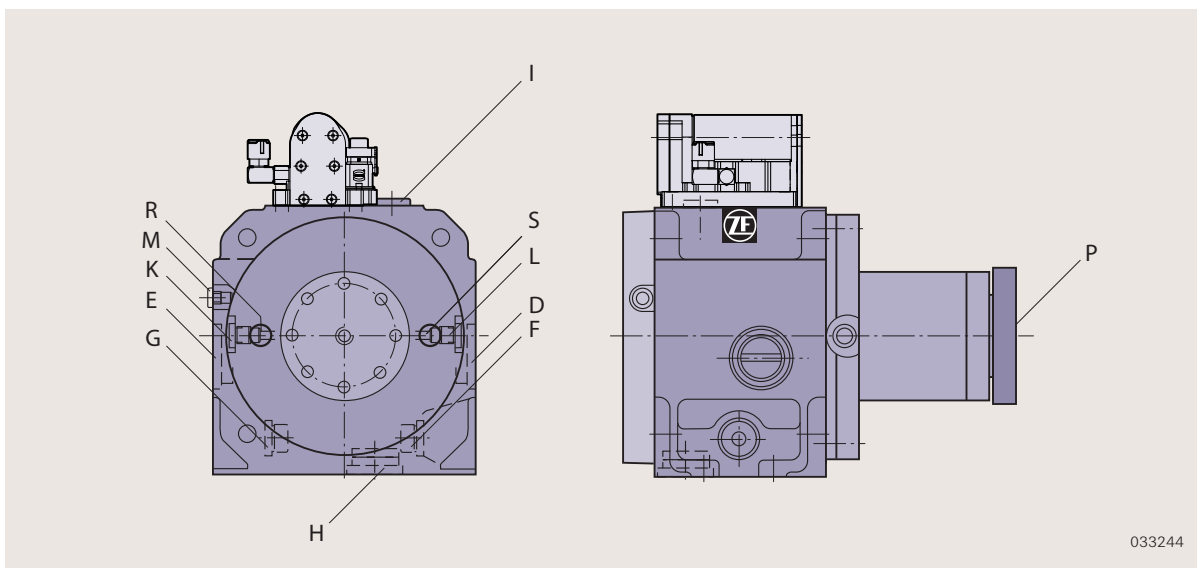
*View toward gearbox output:

D/G = Mainly counter clockwise rotation

E/F = Mainly clockwise rotation

Note:

For applications using max. speeds of 12 000 rpm, it is mandatory to use port K and/or L with 1.5 dm³/min. In addition an oil recirculating system using an oil chiller with > 0.3 kW capacity and oil volume >15 litres is necessary.



033244

Connections for recirculating lubrication

Installation position:	2K250 / 2K300			2K450 / 2K600		
	Oil inlet*	Max. pressure	Oil outlet*	Oil inlet*	Max. pressure	Oil Outlet*
V1, V3 (closed version)	M (0.5 dm ³ /min)	0.5 bar	D/E	M (0.5 dm ³ /min)	0.5 bar	D/E
	K or R (1.0 dm ³ /min)	0.5 bar		T (1.5 dm ³ /min)	0.5 bar	
	L additional possible	1.5 bar		L additional possible	1.5 bar	
V1, V3 (open version)	K or R (1.5 dm ³ /min)	0.5 bar	D/E	T (2.0 dm ³ /min)	0.5 bar	D/E
	L additional possible	1.5 bar			1.5 bar	
B5	G (1.5 dm ³ /min)	1.5 bar	D/E	G (2.0 dm ³ /min)	1.5 bar	D/E
	F (1.5 dm ³ /min)	1.5 bar		or F (2.0 dm ³ /min)	1.5 bar	
B5 turned right*	I or F	1.5 bar	H	I or F	1.5 bar	H
V3	P (1.5 dm ³ /min)	1.5 bar	H	T (2.0 dm ³ /min)	1.5 bar	H
	K or R (1.5 dm ³ /min)	0.5 bar				
	L additional possible	1.5 bar				

*View toward gearbox output:

D/G = Mainly anti-clockwise rotation

E/F = Mainly clockwise rotation

In V1/V3 recirculation lubrication necessary for 2K250/300.

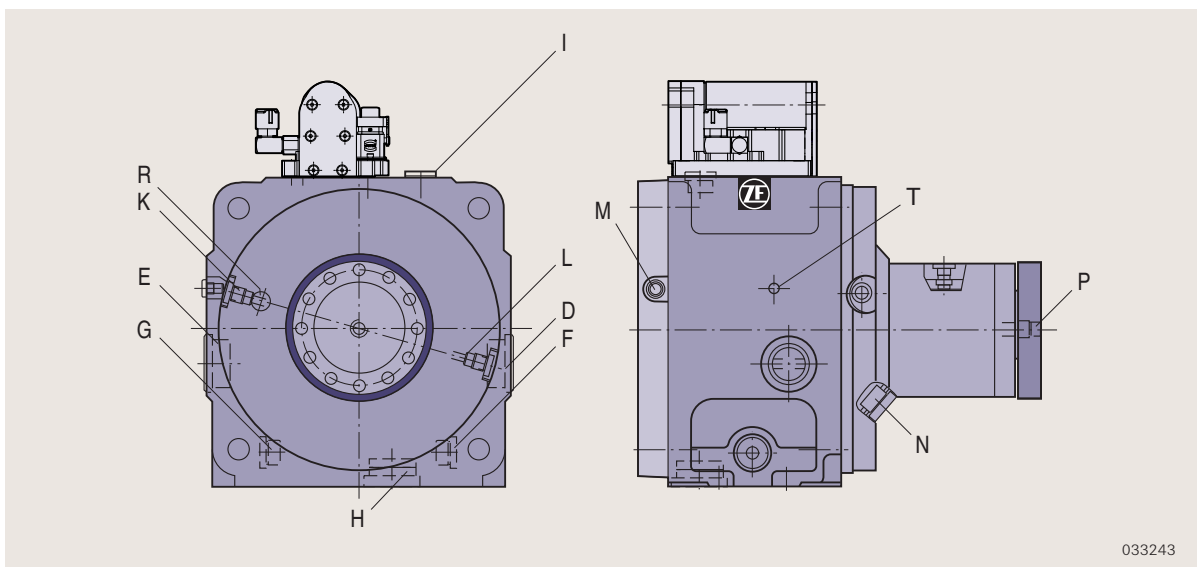
Note:

For applications using max. speeds of 10 000 rpm port K or R is mandatory.

In addition an oil recirculating system using an oil chiller > 0.3 kW and oil volume >15 litres is necessary.

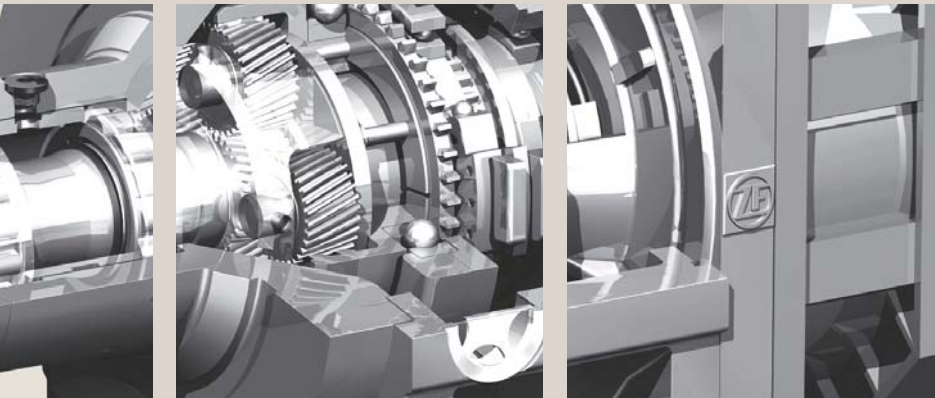
The integrate oil channe version is available for 2K250/300/450/600 (see note page 36/37).

This permits a gearbox operation without oil level, however a safety check of oil supply needs to be included in the oil system.



033243

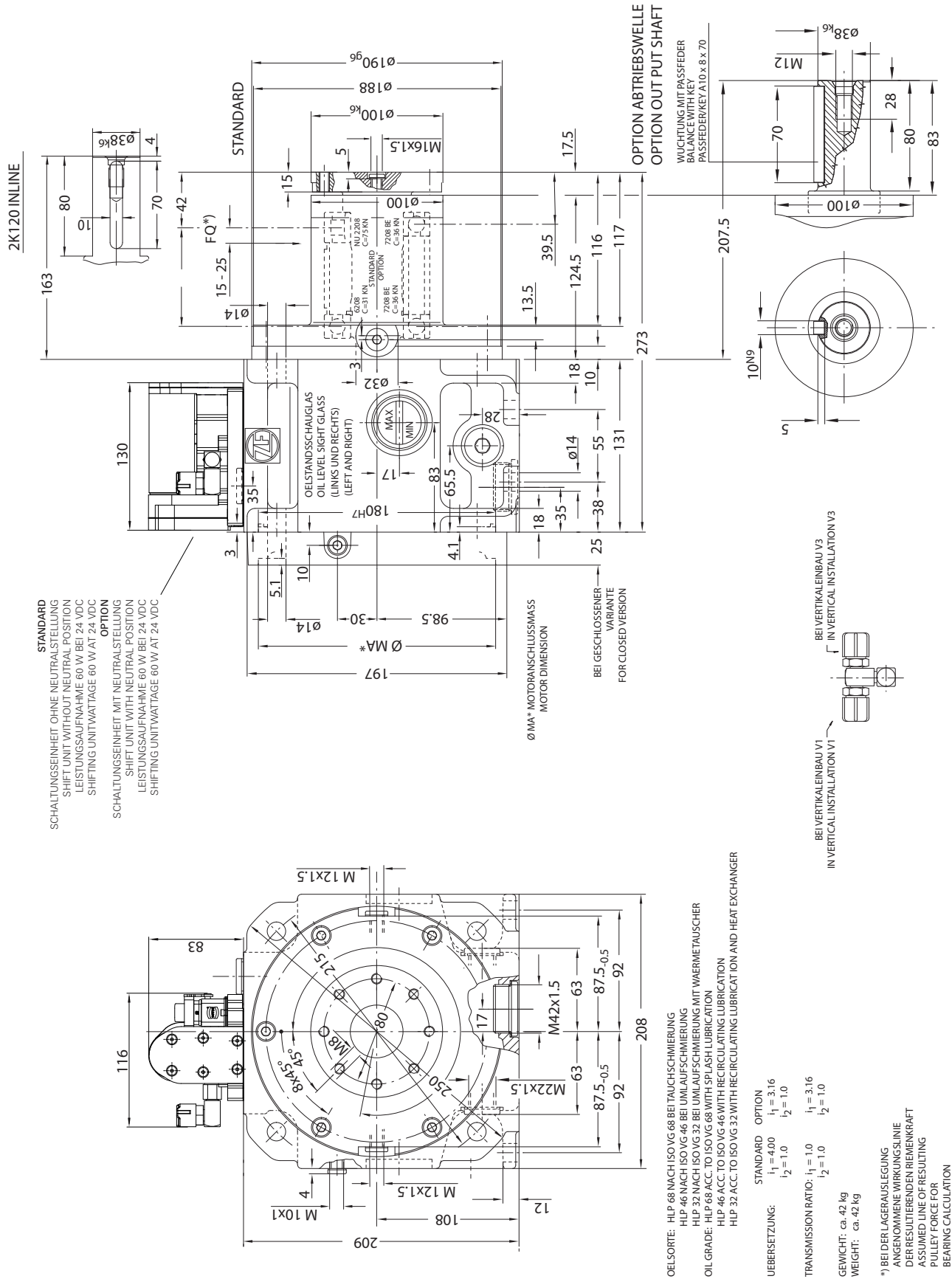




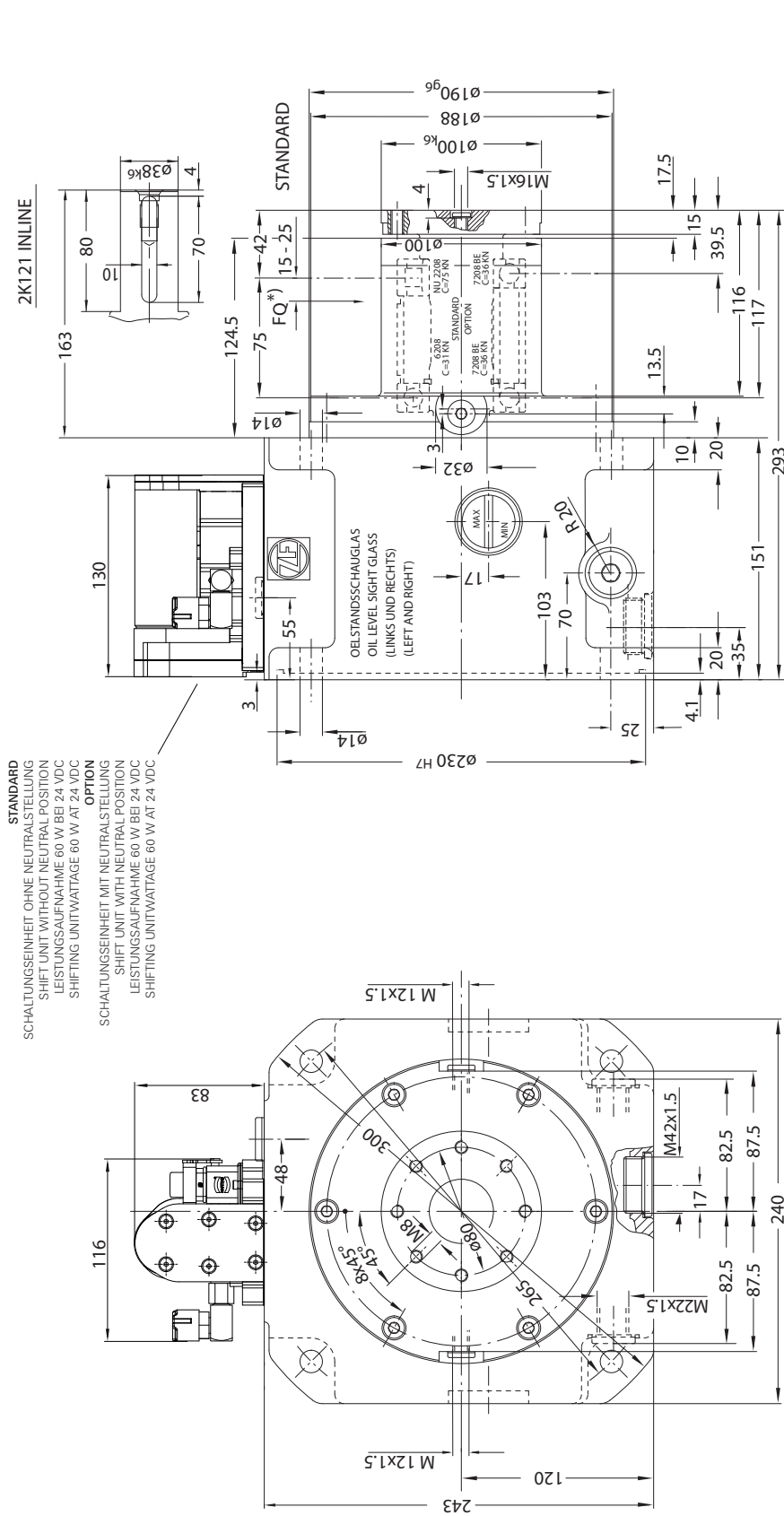
Installation Drawings

2K120	page 22
2K121	page 23
2K120/121 INLINE TSC	page 24
2K250	page 25
2K300	page 26
2K250/300 INLINE TSC	page 27
2K450	page 28
2K600	page 29
2K800	page 30
2K801	page 31
2K802	page 32
Options 2K800/801/802	page 33
2K2100	page 34

Installation Drawing: 2K120



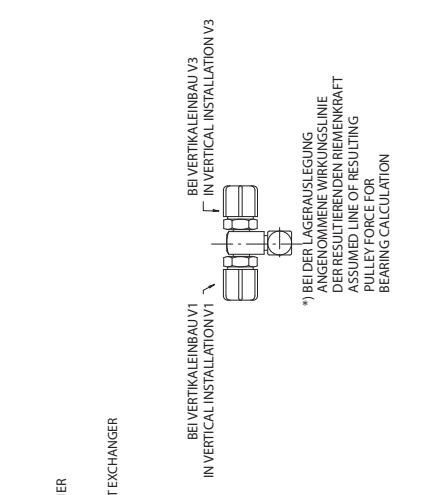
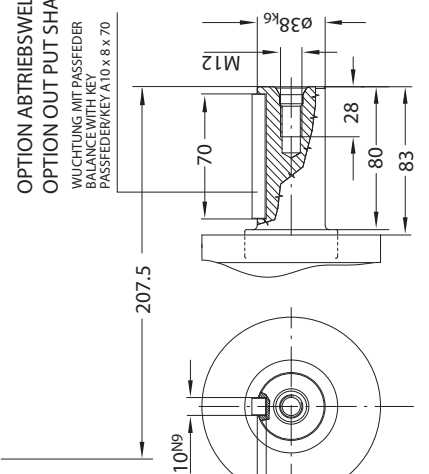
Installation Drawing: 2K121



STANDARD
SCHALTUNGSEINHEIT OHNE NEUTRALSTELLUNG
SHIFT UNIT WITHOUT NEUTRAL POSITION
LEISTUNGS-AUFNAHME 60 W BEI 24 VDC
SHIFTING UNIT WATTAGE 60 W AT 24 VDC

OPTION
SCHALTUNGSEINHEIT MIT NEUTRALSTELLUNG
SHIFT UNIT WITH NEUTRAL POSITION
LEISTUNGS-AUFNAHME 60 W BEI 24 VDC
SHIFTING UNIT WATTAGE 60 W AT 24 VDC

OPTION ABTRIEBSWELLE
OPTION OUT PUT SHAFT
WÜCHTUNG MIT PASSFEDER
BALANCE WITH KEY
PASSFEDER/KEY A10 x 8 x 70



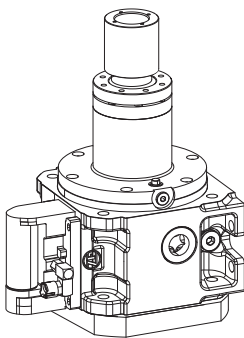
OELSORTE: HLP 68 NACH ISO VG 68 BEI TAUCHSCHMIERUNG
HLP 46 NACH ISO VG 46 BEI UMLAUF-SCHMIERUNG
HLP 46 NACH ISO VG 46 BEI UMLAUF-SCHMIERUNG
HLP 32 NACH ISO VG 32 BEI UMLAUF-SCHMIERUNG MIT WÄRMETAUSCHER
HLP 68 ACC. TO ISO VG 68 WITH SPLASH LUBRICATION
HLP 46 ACC. TO ISO VG 46 WITH RECIRCULATING LUBRICATION
HLP 32 ACC. TO ISO VG 32 WITH RECIRCULATING LUBRICATION AND HEAT EXCHANGER

ÜBERSETZUNG: STANDARD OPTION
i₁ = 4.00 i₁ = 3.16
i₂ = 1.0 i₂ = 1.0
i₂ = 1.0 i₂ = 1.0

TRANSMISSION RATIO: i₁ = 4.00 i₁ = 3.16
i₂ = 1.0 i₂ = 1.0

GEWICHT: ca. 52 kg
WEIGHT: ca. 52 kg

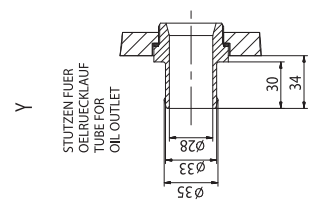
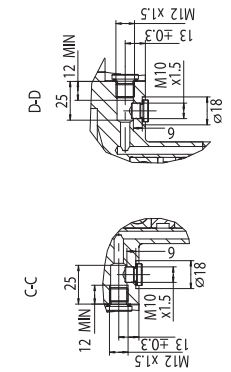
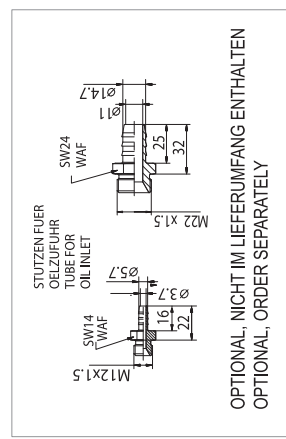
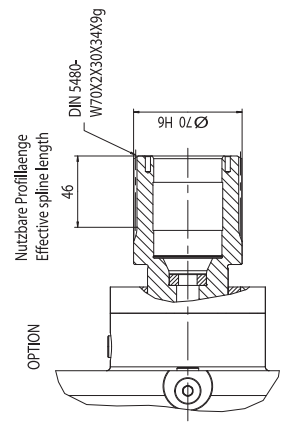
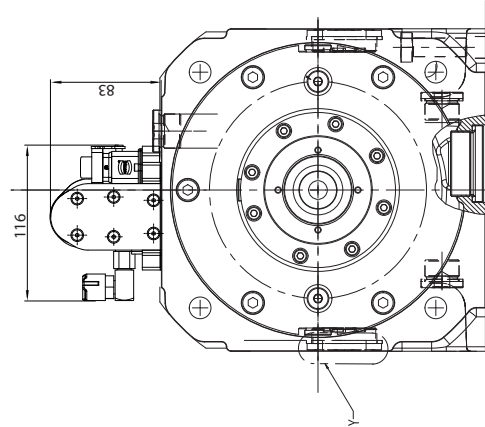
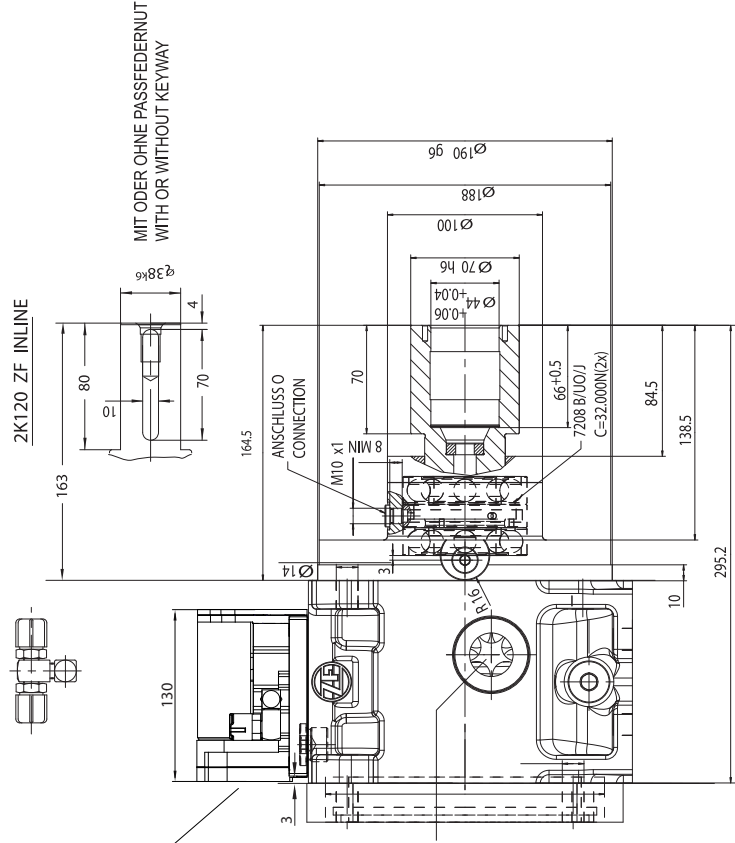
Installation Drawing: 2K120/121 INLINE + TSC



Dimensions of basic gearbox see installation drawing p. 22/23

STANDARD
SCHALTUNGSEINHEIT OHNE NEUTRALSTELLUNG
SHIFT UNIT WITHOUT NEUTRAL POSITION
LEISTUNGS-AUFNAHME 60 W BEI 24 VDC
SHIFTING UNIT WATTAGE 60 W AT 24 VDC

OPTION
SCHALTUNGSEINHEIT MIT NEUTRALSTELLUNG
SHIFT UNIT WITH NEUTRAL POSITION
LEISTUNGS-AUFNAHME 60 W BEI 24 VDC
SHIFTING UNIT WATTAGE 60 W AT 24 VDC

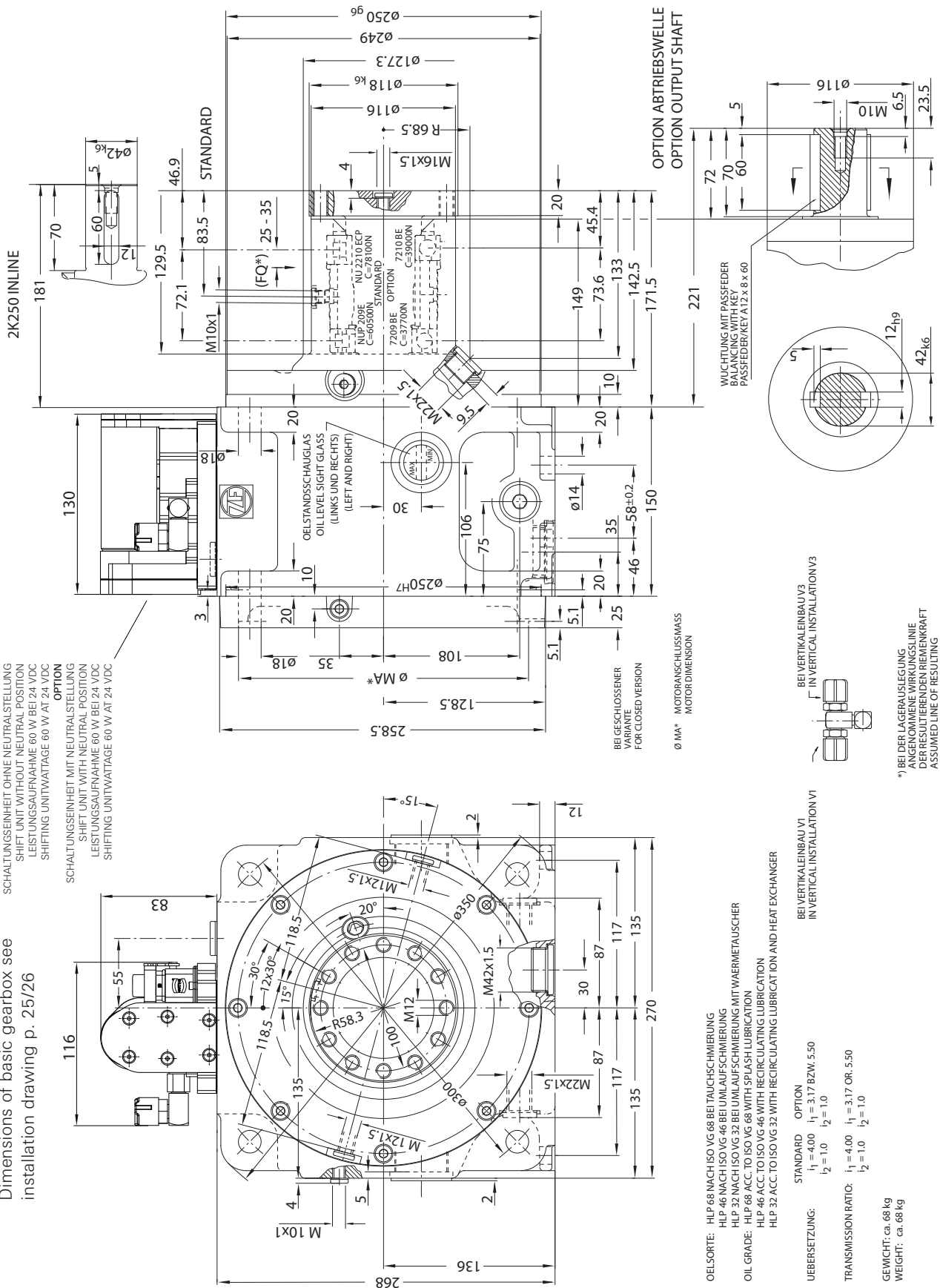


Installation Drawing: 2K250

STANDARD
SCHALTUNGSEINHEIT OHNE NEUTRALSTELLUNG
SHIFT UNIT WITHOUT NEUTRAL POSITION
LEISTUNGS-AUFNAHME 60 W BEI 24 VDC
SHIFTING UNIT WATTAGE 60 W AT 24 VDC

OPTION
SCHALTUNGSEINHEIT MIT NEUTRALSTELLUNG
SHIFT UNIT WITH NEUTRAL POSITION
LEISTUNGS-AUFNAHME 60 W BEI 24 VDC
SHIFTING UNIT WATTAGE 60 W AT 24 VDC

Dimensions of basic gearbox see
installation drawing p. 25/26



ø MA* MOTORANSCHLUSSMASS
MOTOR DIMENSION

BEI GESCHLOSSENER
VARIANTE
FOR CLOSED VERSION

OPTION ABTRIEBSWELLE
OPTION OUTPUT SHAFT

OELSORTE: HLP 68 NACH ISO VG 68 BEI TAUSCHSCHMIERUNG
HLP 46 NACH ISO VG 46 BEI UMLAUF-SCHMIERUNG
HLP 32 NACH ISO VG 32 BEI UMLAUF-SCHMIERUNG MIT WÄRMETAUSCHER
OIL GRADE: HLP 68 ACC. TO ISO VG 68 WITH SPLASH LUBRICATION
HLP 46 ACC. TO ISO VG 46 WITH RECIRCULATING LUBRICATION
HLP 32 ACC. TO ISO VG 32 WITH RECIRCULATING LUBRICATION AND HEAT EXCHANGER

ÜBERSETZUNG: **STANDARD** **OPTION**
i₁ = 4.00 i₁ = 3.17 BZW. 5.50
i₂ = 1.0 i₂ = 1.0

TRANSMISSION RATIO: i₁ = 4.00 i₁ = 3.17 OR 5.50
i₂ = 1.0 i₂ = 1.0

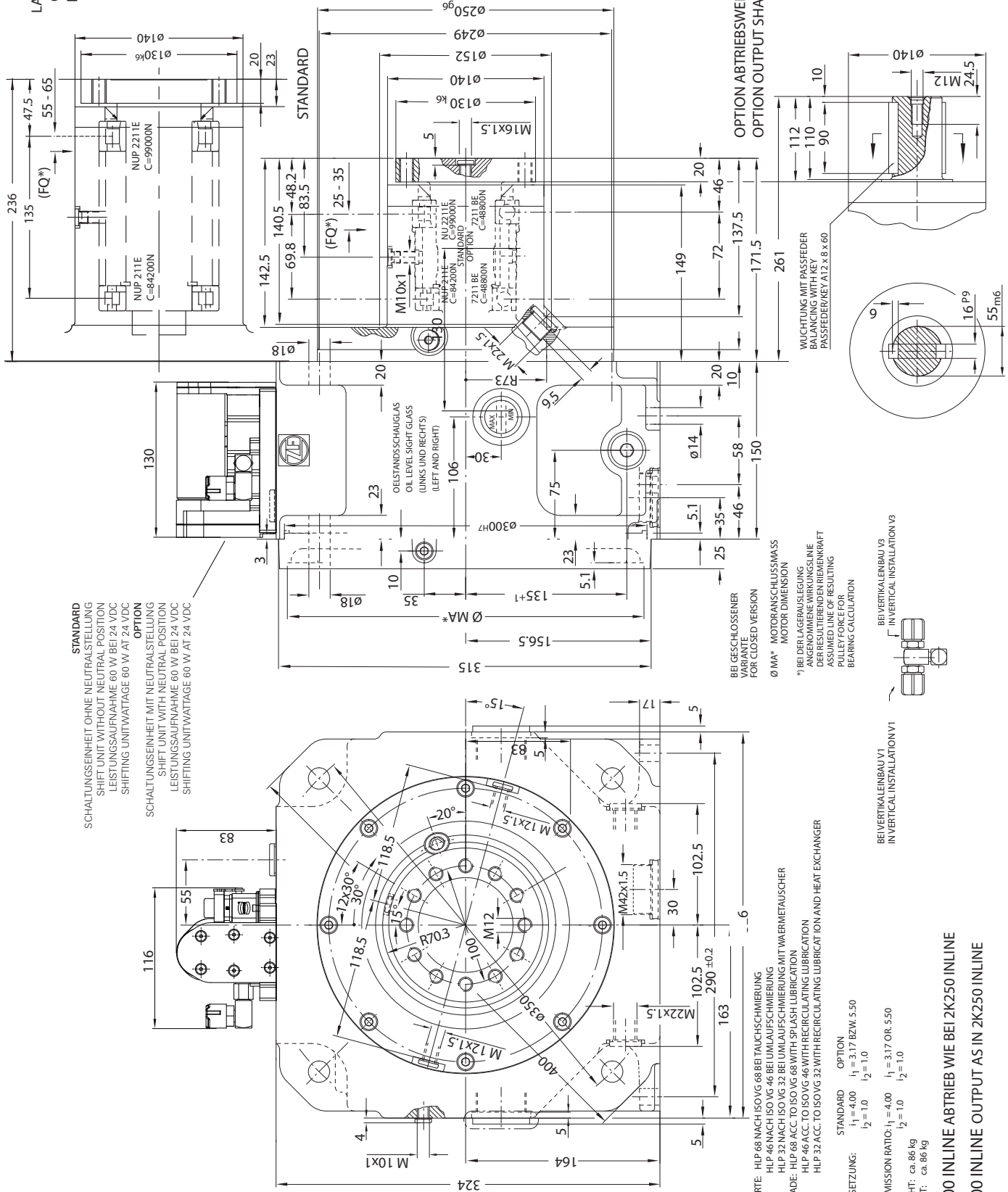
GEWICHT: ca. 68 kg
WEIGHT: ca. 68 kg



*) BEI DER LAGERAUFLAGEUNG
ANGENOMMENE WIRKUNGSLEISTUNG
ASSUMED LINE OF RESULTING
PULLY FORCE FOR
BEARING CALCULATION

Installation Drawing: 2K300

OPTION
LANGER ABTRIEB
OPTIONALLY,
LONG OUTPUT
VERSION



STANDARD
SCHALTUNGSEINHEIT OHNE NEUTRALSTELLUNG
SHIFT UNIT WITHOUT NEUTRAL POSITION
LEISTUNGS-AUFNAHME 60 W BEI 24 VDC
SHIFTING UNIT WATTAGE 60 W AT 24 VDC

OPTION
SCHALTUNGSEINHEIT MIT NEUTRALSTELLUNG
SHIFT UNIT WITH NEUTRAL POSITION
LEISTUNGS-AUFNAHME 60 W BEI 24 VDC
SHIFTING UNIT WATTAGE 60 W AT 24 VDC

OELSORTE: HLP 68 NACH ISO VG 68 BEI TAUCHSCHMIERUNG
HLP 46 NACH ISO VG 46 BEI UMLAUF-SCHMIERUNG
HLP 32 NACH ISO VG 32 BEI UMLAUF-SCHMIERUNG MIT WÄRMETAUSCHER
OIL GRADE: HLP 68 ACC. TO ISO VG 68 WITH SPLASH LUBRICATION
HLP 46 ACC. TO ISO VG 46 WITH RECIRCULATING LUBRICATION
HLP 32 ACC. TO ISO VG 32 WITH RECIRCULATING LUBRICATION AND HEAT EXCHANGER

STANDARD OPTION
UEBERSETZUNG: $i_1 = 4.00$ $i_2 = 1.0$ $i_1 = 3.17$ BZW. 5.50
TRANSMISSION RATIO: $i_1 = 4.00$ $i_2 = 1.0$ $i_1 = 3.17$ OR 5.50
GEWICHT: ca. 86 kg
WEICHT: ca. 86 kg

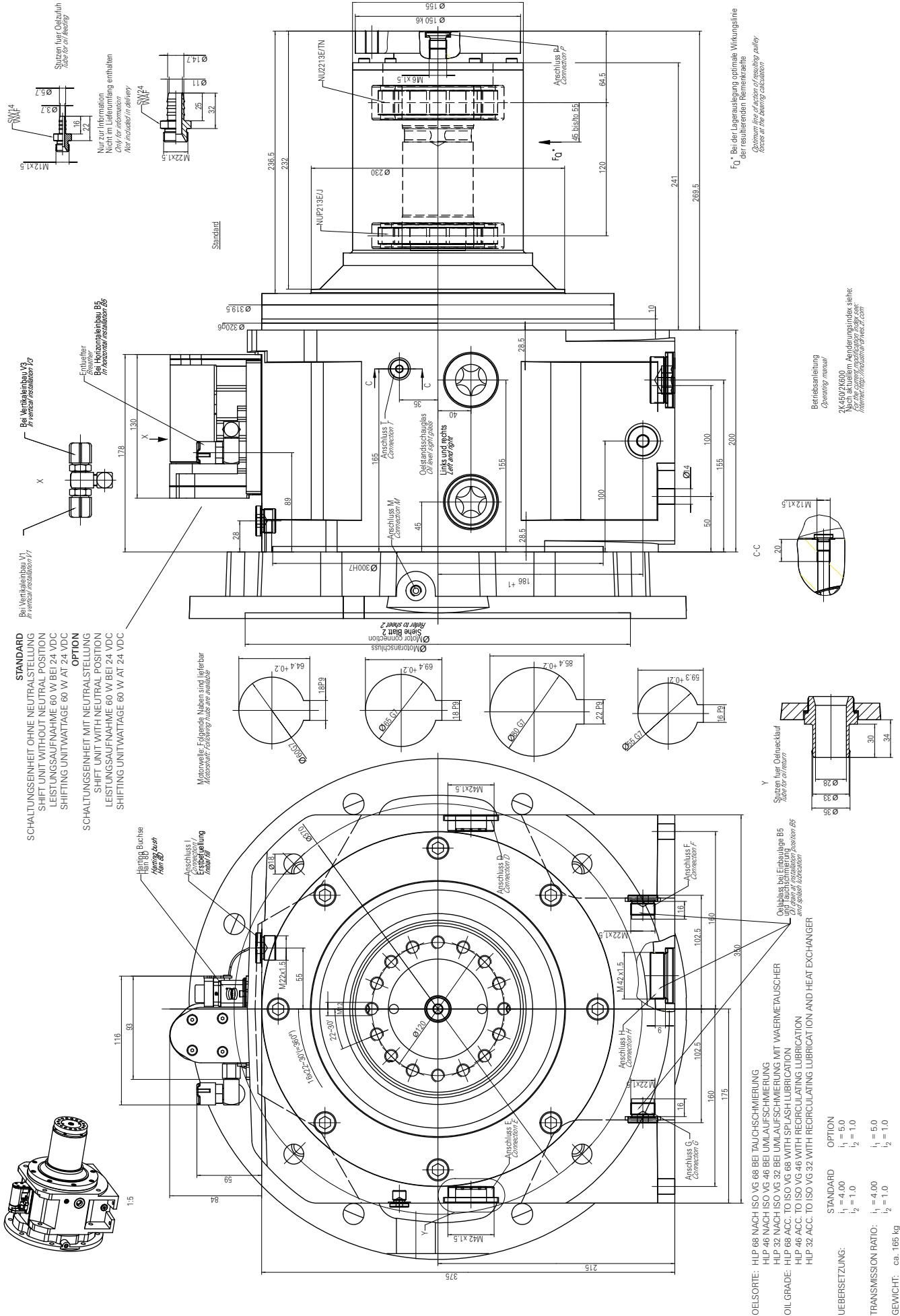
BEI GESCHLOSSENER VARIANTE FÜR GESAMTE VERBUNDEN
Ø MA* MOTORANSCHLUSSMASS MOTOR DIMENSION
*) BEI DER LAGERAUSLEGGUNG ANGENOMMENE WIRKUNGSLINIE DER RESULTIERENDEN REINHEINKRAFT ASSUMED LINE OF RESULTING BEARING CALCULATION

BE VERTIKALEINBAU V1 INVERTICAL INSTALLATION V1
BE VERTIKALEINBAU V3 INVERTICAL INSTALLATION V3

WUCHTLUNG MIT PASSEFEDER BALANCING WITH KEY PASSEFEDER/KEY A 12 x 8 x 60

2K300 INLINE ABTRIEB WIE BEI 2K250 INLINE
2K300 INLINE OUTPUT AS IN 2K250 INLINE

Installation Drawing: 2K600

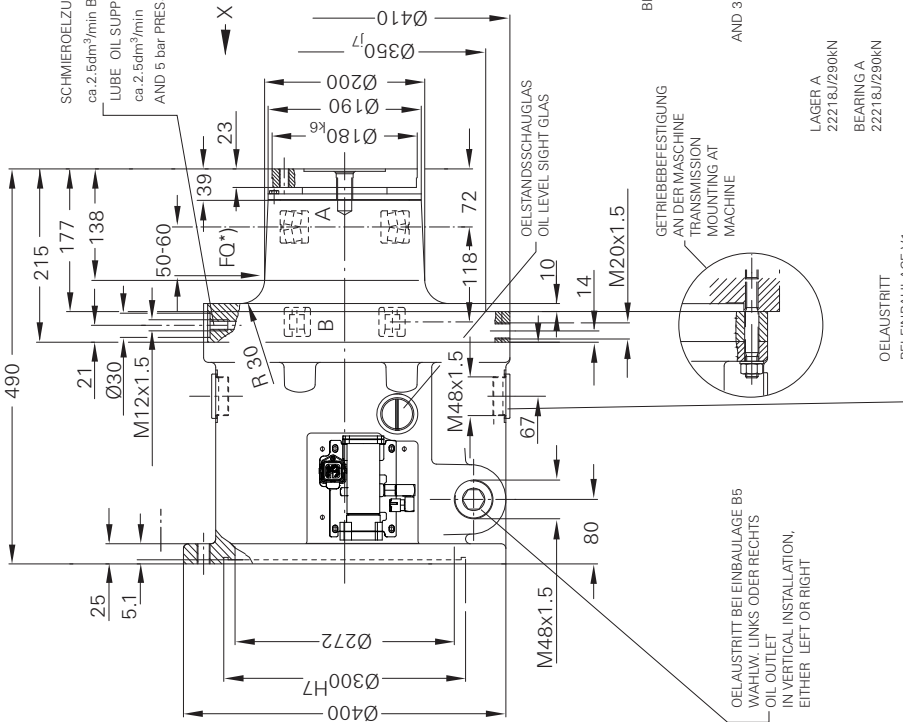
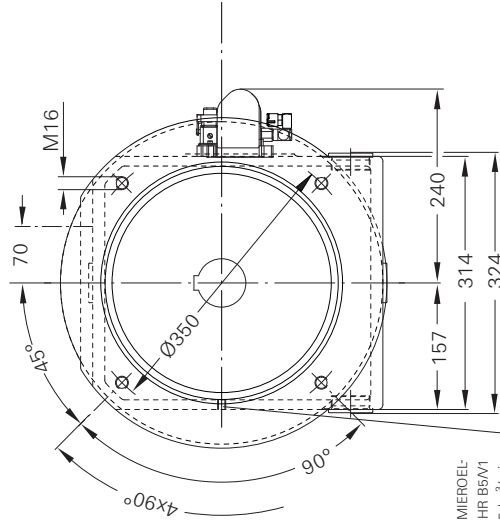
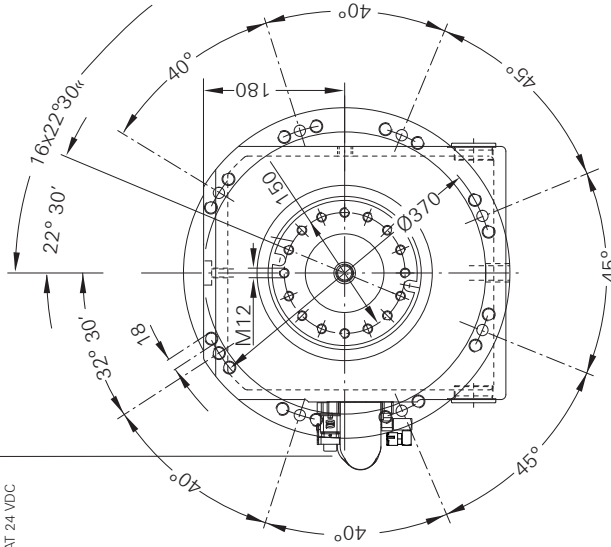


Installation Drawing: 2K800

STANDARD
SCHALTUNGSEINHEIT OHNE NEUTRALSTELLUNG
SHIFT UNIT WITHOUT NEUTRAL POSITION
LEISTUNGS-AUFNAHME 60 W BEI 24 VDC
SHIFTING UNIT WATTAGE 60 W AT 24 VDC

OPTION
SCHALTUNGSEINHEIT MIT NEUTRALSTELLUNG
SHIFT UNIT WITH NEUTRAL POSITION
LEISTUNGS-AUFNAHME 60 W BEI 24 VDC
SHIFTING UNIT WATTAGE 60 W AT 24 VDC

ANSICHT X
VIEW



2K800

OELSORTE: HLP 46 NACH ISO VG 46 BEI UMLAUFSCHEMUNG
HLP 32 NACH ISO VG 32 BEI UMLAUFSCHEMUNG
MIT WAERMETAUSCHER

OIL GRADE: HLP 46 ACC. TO ISO VG 46 WITH RECIRCULATING LUBRICATION
HLP 32 ACC. TO ISO VG 32 WITH RECIRCULATING LUBRICATION
AND HEAT EXCHANGER

STANDARD	OPTION
$i_1 = 4.00$	$i_1 = 3.19$
$i_2 = 1.0$	$i_2 = 1.0$
$i_1 = 4.00$	$i_1 = 3.19$
$i_2 = 1.0$	$i_2 = 1.0$

UEBERSETZUNG:
TRANSMISSION RATIO:

GEWICHT: ca
WEIGHT: ca

LAGER B
NU2217TN/216KN
BEARING B
NU2217TN/216KN

LAGER A
22218J/290KN
BEARING A
22218J/290KN

*1) BEI DER LAGERAUSLEGUNG ANGENOMMENE
WIRKUNGSLINIE DER RESULTIERENDEN
RIEMENKRAFT
*1) ASSUMED LINE OF RESULTING PULLEY
FORCE FOR BEARING CALCULATION

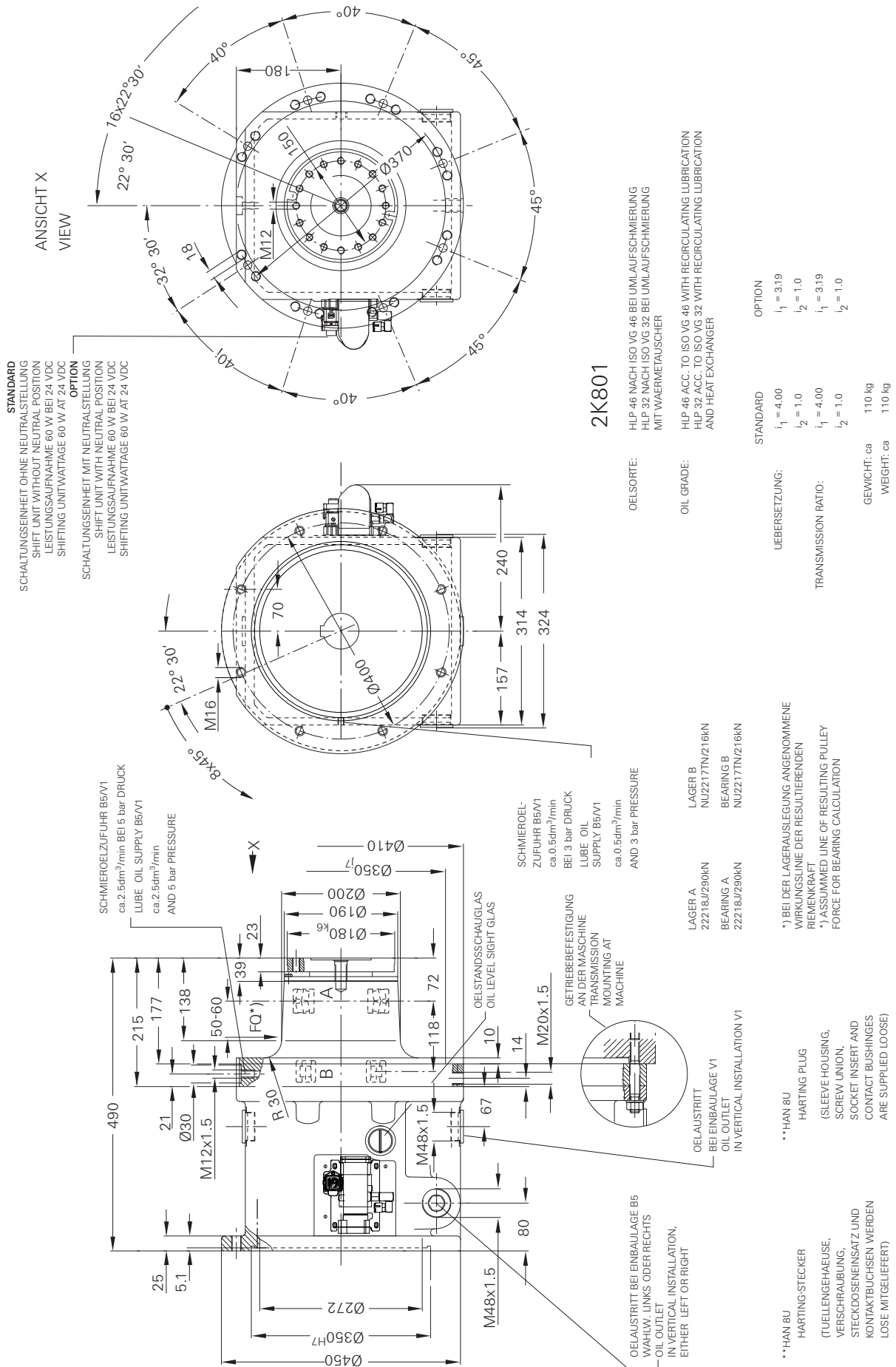
**HAN 8U

HARTING-STECKER
(SLEEVE HOUSING,
SCREW UNION,
STECKDOSENEINSATZ UND
KONTAKTBÜCHSEN WERDEN
LOSE MITGELIEFERT)

**HAN 8U

HARTING-STECKER
(SLEEVE HOUSING,
SCREW UNION,
STECKDOSENEINSATZ UND
KONTAKTBÜCHSEN WERDEN
LOSE MITGELIEFERT)

Installation Drawing: 2K801

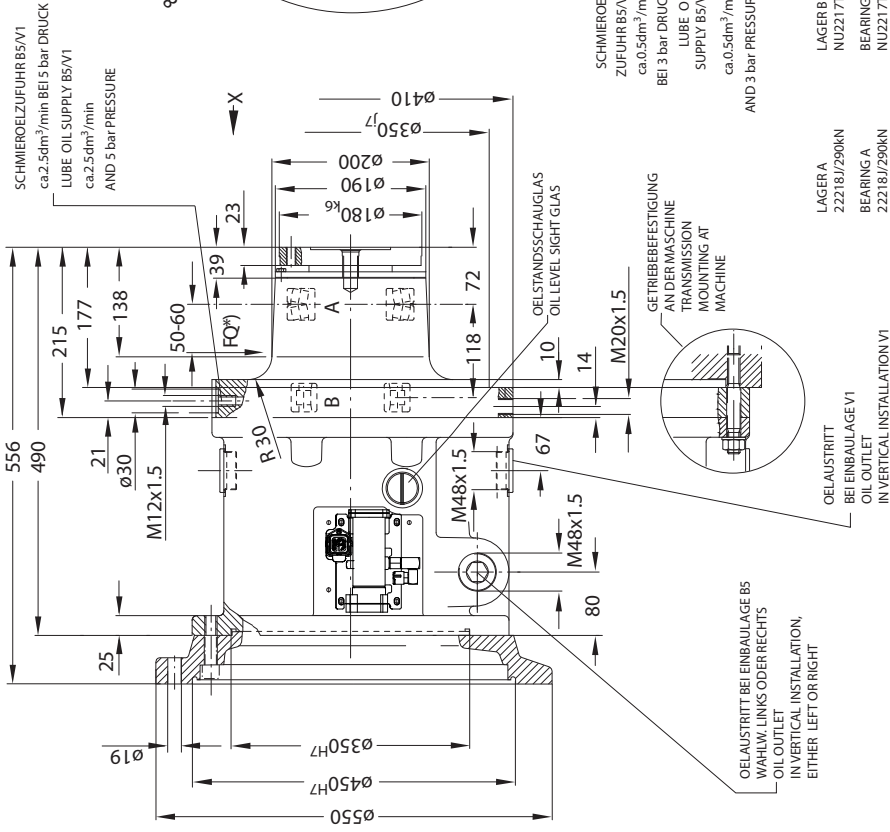
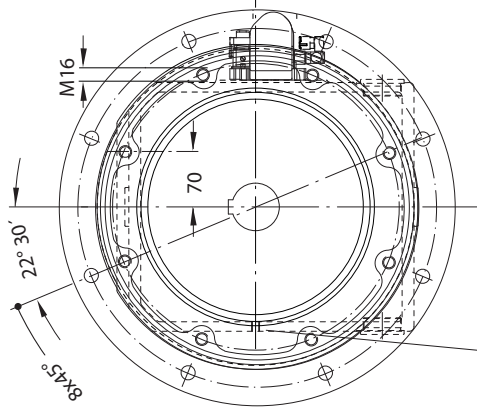
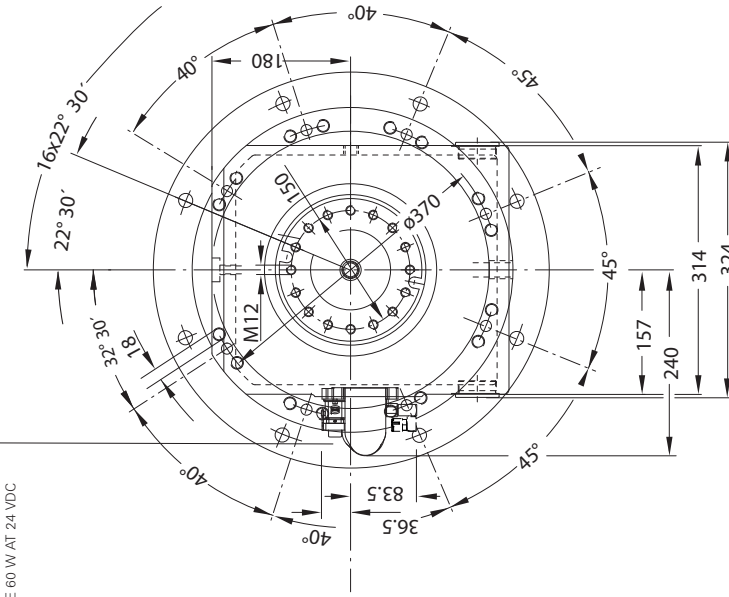


Installation Drawing: 2K802

STANDARD
SCHALTUNGSEINHEIT OHNE NEUTRALSTELLUNG
SHIFT UNIT WITHOUT NEUTRAL POSITION
LEISTUNGS-AUFNAHME 60 W BEI 24 VDC
SHIFTING UNIT WATTAGE 60 W AT 24 VDC

OPTION
SCHALTUNGSEINHEIT MIT NEUTRALSTELLUNG
SHIFT UNIT WITH NEUTRAL POSITION
LEISTUNGS-AUFNAHME 60 W BEI 24 VDC
SHIFTING UNIT WATTAGE 60 W AT 24 VDC

ANSICHT X
VIEW



2K802

OELSORTE: HLP 46 NACH ISO VG 46 BEI UMLAUFSCHMIERUNG
HLP 32 NACH ISO VG 32 BEI UMLAUFSCHMIERUNG
MIT WAERMETAUSCHER

OIL GRADE: HLP 46 ACC. TO ISO VG 46 WITH RECIRCULATING LUBRICATION
HLP 32 ACC. TO ISO VG 32 WITH RECIRCULATING LUBRICATION
AND HEAT EXCHANGER

	STANDARD	OPTION
UEBERSETZUNG:	$i_1 = 4.00$	$i_1 = 3.19$
	$i_2 = 1.0$	$i_2 = 1.0$
TRANSMISSION RATIO:	$i_1 = 4.00$	$i_1 = 3.19$
	$i_2 = 1.0$	$i_2 = 1.0$

GEWICHT: ca 110 kg
WEIGHT: ca 110 kg

LAGER B
NU2217TN/216KN
BEARING B
NU2217TN/216KN

LAGER A
22218J/290KN
BEARING A
22218J/290KN

SCHMIEROEL-
ZUFUHR B5/V1
ca. 0.5 dm³/min
BEI 3 BAR DRUCK
LUBE OIL
SUPPLY B5/V1
ca. 0.5 dm³/min
AND 3 BAR PRESSURE

GETRIEBEBEFESTIGUNG
AN DER MASCHINE
TRANSMISSION
MOUNTING AT
MACHINE

OELAUSTRITT
BEI EINBAULAGE V1
IN VERTICAL INSTALLATION V1

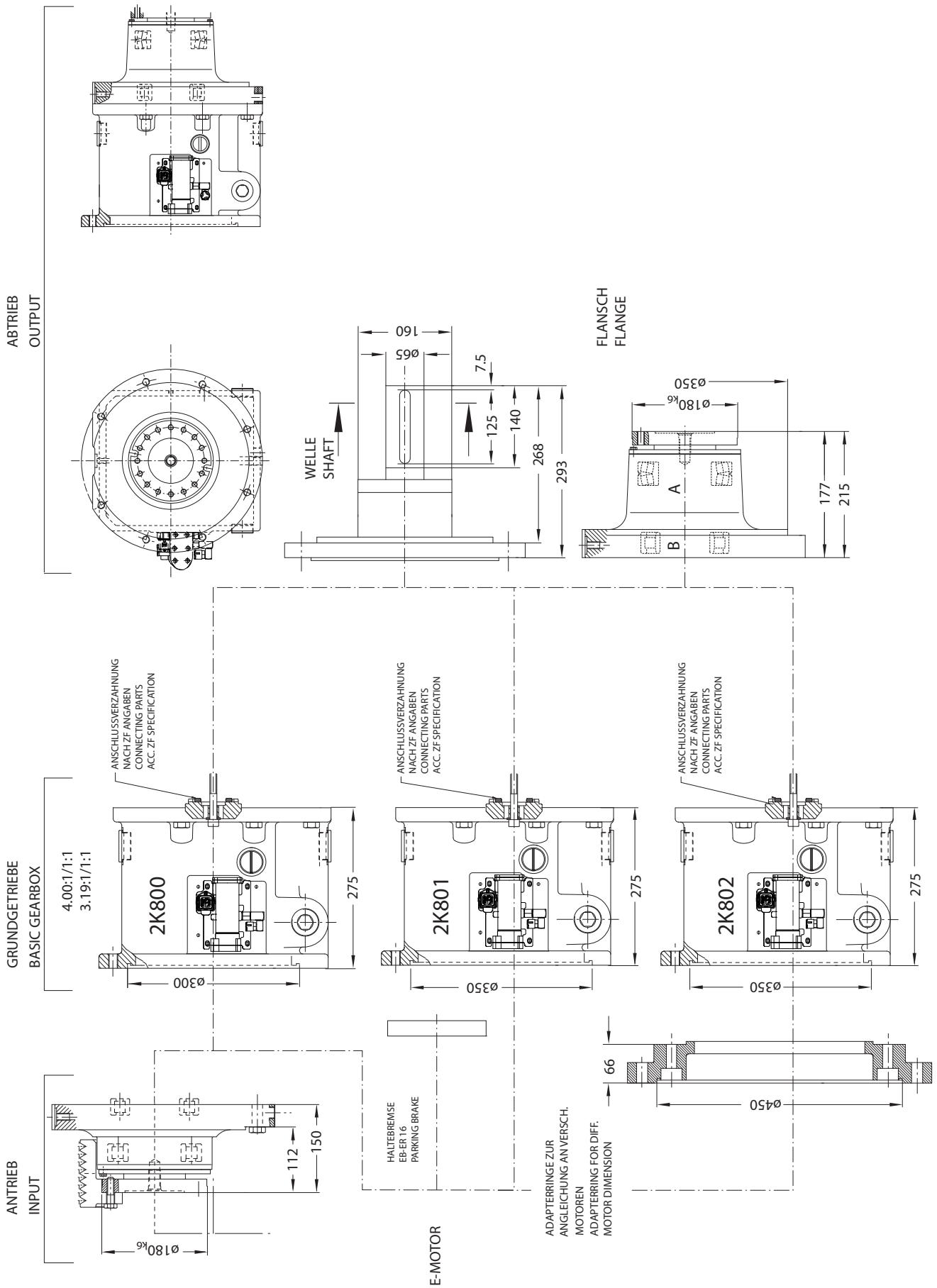
OELAUSTRITT BEI EINBAULAGE B5
WAHLW. LINKS ODER RECHTS
IN VERTICAL INSTALLATION,
EITHER LEFT OR RIGHT

*) BEI DER LAGERAUSLEGGUNG ANGENOMMENE
WIRKUNGSLINIE DER RESULTIERENDEN
REMENEKRAFT
*) ASSUMED LINE OF RESULTING PULLEY
FORCE FOR BEARING CALCULATION

**HAN 8U
HARTING-STECKER
(TUELLENGEHAUSE,
VERSCHRAUBUNG,
STECKDOSENANSATZ UND
KONTAKTBÜCHSEN WERDEN
LOSE MITGELIEFERT)

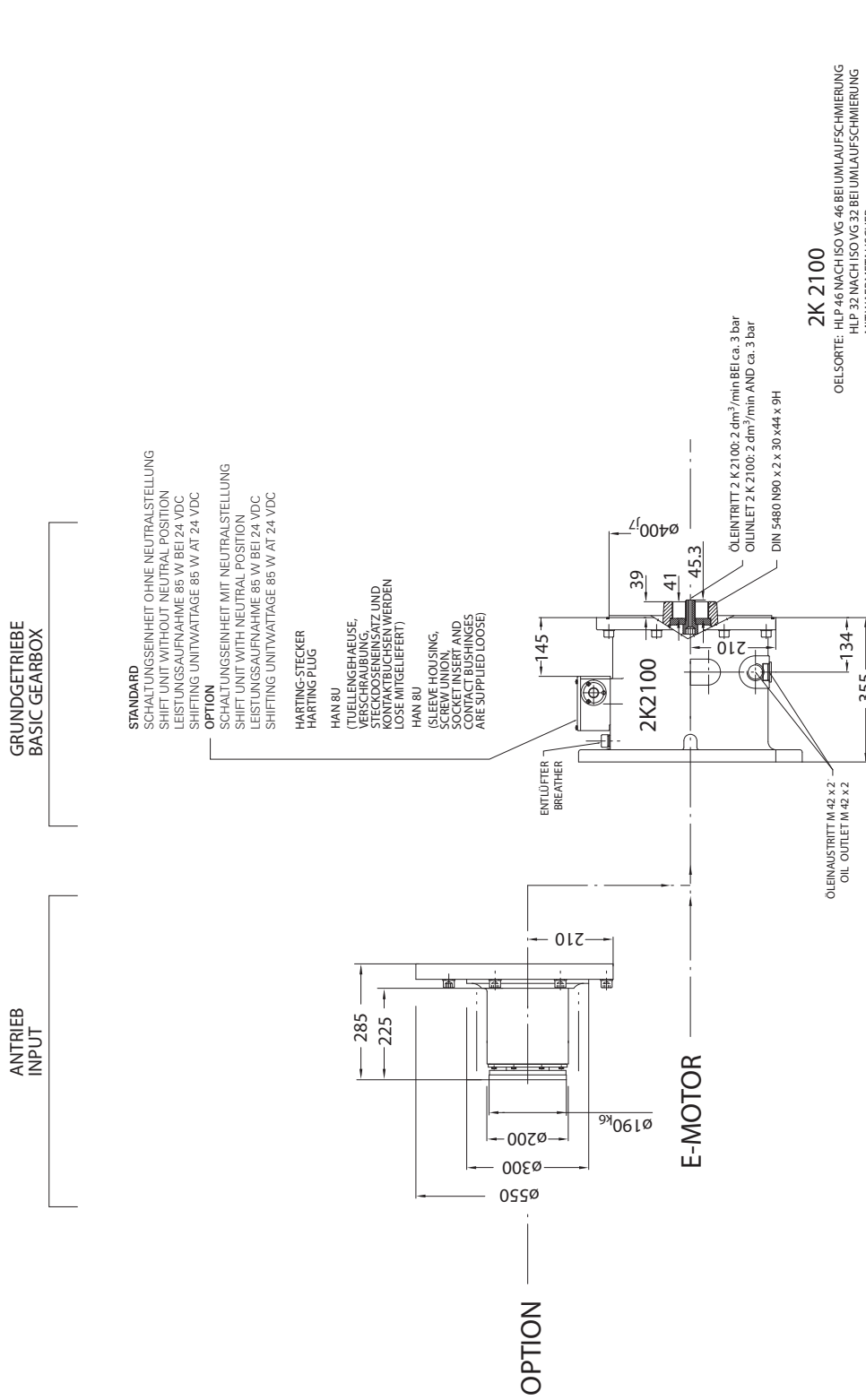
**HAN 8U
HARTING PLUG
(SLEEVE HOUSING,
SCREW UNION,
SOCKET INSERT AND
CONTACT BUSHINGS
ARE SUPPLIED LOOSE)

Installation Drawing: Options for 2K800, 2K801, 2K802



Installation Drawing: 2K2100

Technical Support on request



2K 2100

ÖLSORTE: HLP 46 NACH ISO VG 46 BEI UMLAUFSCHMIERUNG
HLP 32 NACH ISO VG 32 BEI UMLAUFSCHMIERUNG
MIT WAERMETAUSCHER

OIL GRADE: HLP 46 ACC. TO ISO VG 46 WITH RECIRCULATING LUBRICATION
HLP 32 ACC. TO ISO VG 32 WITH RECIRCULATING LUBRICATION
AND HEAT EXCHANGER

STANDARD OPTION

ÜBERSETZUNG: $i_1 = 4.00$
 $i_2 = 1.0$

TRANSMISSION RATIO: $i_1 = 4.00$
 $i_2 = 1.0$

GEWICHT: JE NACH UMFANG
WEIGHT ACC. TO SCOPE OF DELIVERY

ZF-Duoplan Standard, INLINE, TSC

Ordering numbers for gearbox types 2K120/2K121

Special versions



Note:
Standard = Bold type
 Option = Normal type

1) RWDR= Radial shaft seal
 * motor-specific, on request

Two-speed gearbox

<i>Motor balancing:</i>	
without keyway* central thread mandatory	1
Full-key	4
Half-key*	5

<i>Gearbox interface (see page 13):</i>	
Open without hub	0
Open with hub	2
Closed with hub and hub bearing and RWDR ¹⁾ *	3
Closed with hub and RWDR ¹⁾ *	4
Open with hub and adapter ring *	5

<i>Gearbox type:</i>	
for motor frame size/ratio	
100/i₁ = 4.00	12
100/i ₁ = 3.16	13
100/i₁ = 4.91	09
112/i₁ = 4.00	11
112/i ₁ = 3.16	14
112/i ₁ = 4.91	08

<i>Output bearings:</i>	
Cylindrical roller / ball bearings	3
Angular-contact ball bearings	4

<i>Gearbox output:</i>	
a ₁ = 38 mm	B
a₁ = 100 mm	C
a ₁ = 38 mm smooth, without Keyway	L
a ₁ = 38 mm (2K120/2K121) INLINE	P
a ₁ = 38 mm smooth, without Keyway (2K120/2K121) INLINE	G
a ₁ = 70x 70 mm (2K120/2K121) INLINE, TSC	U
a ₁ = 70x 70 mm, DIN5480 INLINE, TSC	W

<i>Installation position:</i>	
V1/ V3 / B5 / B5 (rotated around longitudinal axis to the right side)	C
V3 Central lube oil supply in output shaft/Radial lube oil supply in bearing housing	B

<i>Motor shaft diameter "d"</i>	
without hub	0
28 mm	1
32 mm	2
38 mm	3
42 mm	4
48 mm	9

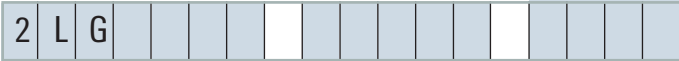
<i>Torsional backlash on gearbox output:</i>	
Normal backlash max. 30 arcmin	1
Reduced backlash max. 20 arcmin	3
Minimal reduced backlash max. 15 arcmin	4

Reduced vibration (1.2 mm/s ZF-Duoplan) (0.7 mm/s INLINE)	S
Rotary union for output shaft	T

ZF-Duoplan Standard, INLINE, TSC

Ordering numbers for gearbox types 2K250/2K300

Special versions



1 2 3 4 5 6 7 - 8 9 10 11 12 - 13 14 15

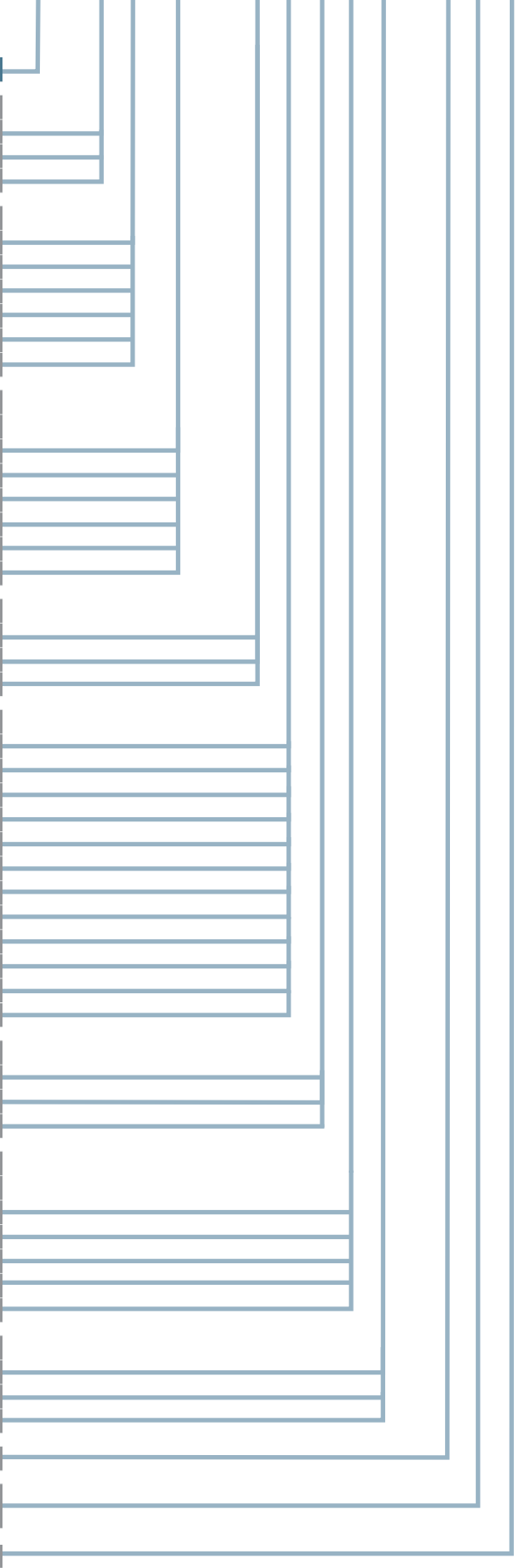
Note:

Standard = Bold type

Option = Normal type

1) RWDR = Radial shaft seal
* motor-specific, on request

Two-speed gearbox		
<i>Motor balancing:</i>		
without keyway*, central thread mandatory, motor shaft Ø max. 55 mm	1	
Full-key	4	
Half-key*	5	
<i>Gearbox interface (see page 13):</i>		
Open without hub	0	
Open with hub	2	
Closed with hub and hub bearing and RWDR ¹⁾ *	3	
Closed with hub and RWDR ¹⁾ *	4	
Open with hub and adapter ring *	5	
Input flange D = 118 (only 2K250 standard)	9	
<i>Gearbox type:</i>		
for motor frame size/ratio		
132/i₁ = 4.00	15	
132/i ₁ = 3.17	16	
132/i ₁ = 5.50 (not for TSC)	17	
160/i₁ = 4.00	20	
160/i ₁ = 3.17	21	
160/i ₁ = 5.50 (not for TSC)	22	
<i>Output bearings:</i>		
Cylindrical roller / ball bearings	3	
Angular-contact ball bearings	4	
Spindle ball bearings	6	
<i>Gearbox output:</i>		
a₁ = 118 mm (2K250)	F	
a₁ = 130 mm (2K300)	J	
a ₁ = 42 mm (2K250)	K	
a ₁ = 42 mm smooth without keyway	L	
a ₁ = 55 mm smooth without keyway	N	
a ₁ = 55 mm smooth without keyway, INLINE	H	
a ₁ = 55 mm (2K300)	M	
a ₁ = 42 mm INLINE	P	
a ₁ = 130 mm wide bearing base	R	
a ₁ = 70x70 mm INLINE, TSC	U	
a ₁ = 70x70 mm, DIN 5480 INLINE, TSC	W	
a ₁ = 42 mm smooth without keyway INLINE	G	
<i>Installation position:</i>		
B5	D	
V1 / V3 / B5 (turned around longitudinal axis to the right side)	C	
V3 Central lube oil supply in output shaft/Radial lube oil supply in bearing housing	B	
<i>Motor shaft diameter "d"</i>		
2K250 2K300		
without hub	0	
42 mm 55 mm	1	
48 mm 48 mm	2	
55 mm 42 mm	3	
60 mm 60 mm	4	
<i>Torsional backlash on gearbox output:</i>		
Normal backlash max. 30 arcmin	1	
Reduced backlash max. 20 arcmin	3	
Minimal reduced backlash max. 15 arcmin	4	
Reduced vibration (1.0 mm/s ZF-Duoplan) (0.7 mm/s INLINE)	S	
Integrated oil channel version for max. speeds and dry sump lubrication (for B5 please order V1 version)	M	
Rotary union for output shaft	T	



ZF-Duoplan Standard

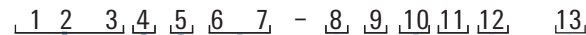
Ordering numbers for gearbox types 2K450/2K600

Special versions

Note:

Standard = Bold type
Option = Normal type

1) RWDR = Radial shaft seal
* motor specific, on request



Two-speed gearbox		
<i>Motor balancing: (motor shaft diameter max. d = 55mm)</i>		
Full key	4	
Half key*	5	
<i>Gearbox interface:</i>		
Open without hub	0	
Open with hub	2	
Closed with hub and hub bearing and RWDR¹)*	3	
<i>Gearbox type:</i>		
for motor frame size/ratio		
160/i₁ = 4.00 spigot Ø 300 mm	30	
160/i₁ = 5.00 spigot Ø 300 mm	31	
180/i₁ = 4.00 spigot Ø 300 mm	40	
180/i₁ = 5.00 spigot Ø 300 mm	41	
200/i₁ = 4.00 spigot Ø 350 mm	42	
200/i₁ = 5.00 spigot Ø 350 mm	43	
<i>Output bearings</i>		
without output	0	
cylindrical roller ball bearings	3	
Angular-contact ball bearings	4	
<i>Gearbox Output:</i>		
without	N	
a₁ = 140 mm (2K450)	F	
a₁ = 150 mm (2K600)	J	
a₁ = 60 mm (2K450)	K	
a₁ = 60 mm - flush (2K450)	L	
a₁ = 60 mm - Inline (2K450)	P	
a₁ = 60 mm - flush - Inline (2K450)	G	
<i>Installation Position:</i>		
B5 / V1 / V3	C	
<i>Motor shaft diameter "d"</i>		
without hub	0	
60x140 (2K450)	1	
65x140 (2K600)	2	
70x140	3	
75x140	4	
80x170	5	
55x110	6	
<i>Torsional backlash on gearbox output:</i>		
Normal backlash max. 30 arcmin	1	
Reduces backlash max. 20 arcmin	3	
Reduces backlash max. 20 arcmin	N	

ZF-Duoplan Standard

Ordering numbers for gearbox types 2K800/2K801/2K802

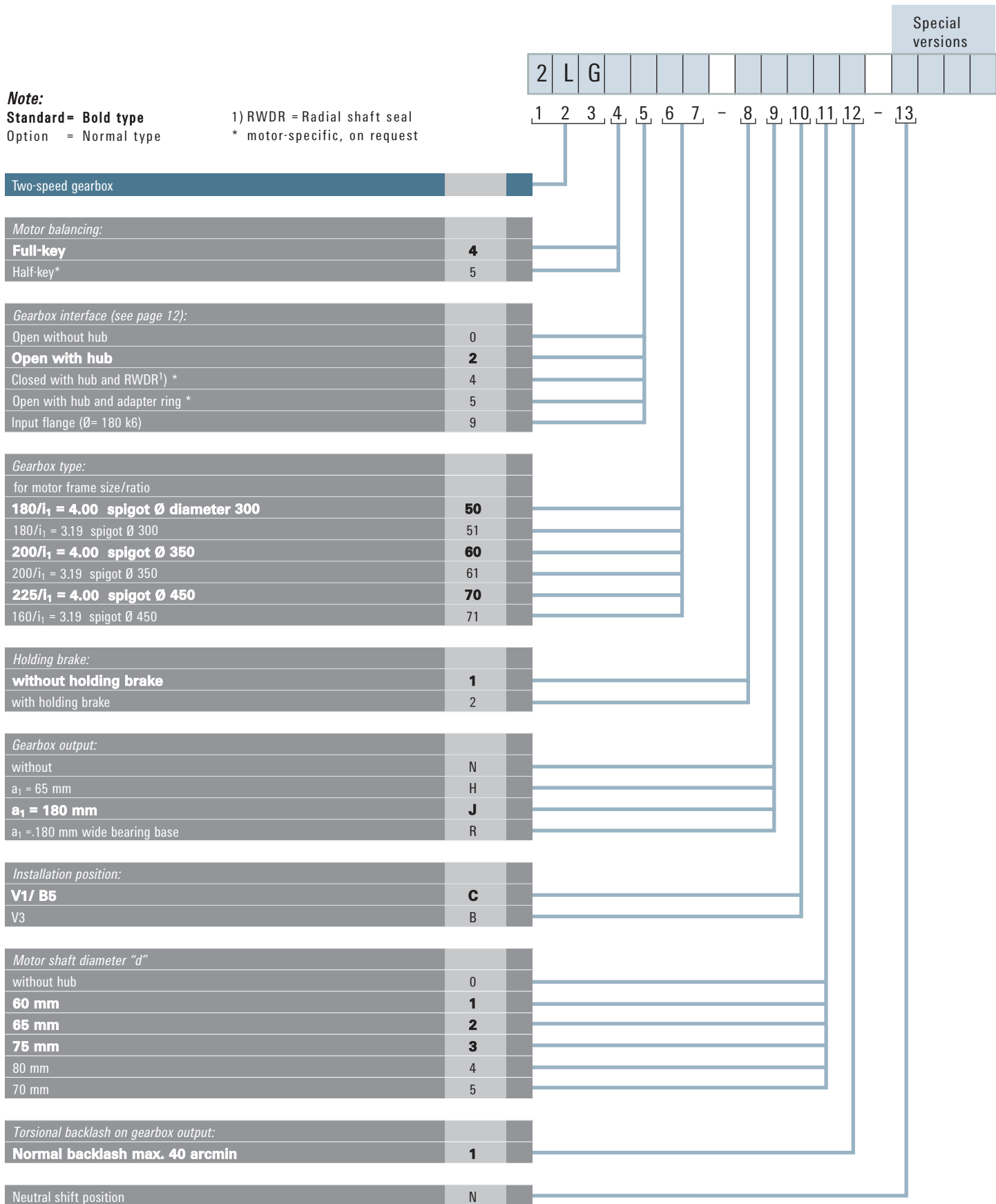
Note:

Standard= Bold type

Option = Normal type

1) RWDR = Radial shaft seal

* motor-specific, on request



ZF-Duoplan Standard

Ordering numbers for gearbox types 2K2100

Special versions



Note:

Standard = Bold type

Option = Normal type

1) RWDR = Radial shaft seal

* motor-specific, on request

Two-speed gearbox

Motor balancing:

Full-key 4

Half-key* 5

Gearbox interface (see page 12):

Open without hub 0

Open with hub 2

Closed with hub and RWDR¹⁾ * 4

Open with hub and adapter ring * 5

Input flange (Ø = 190 k6) 9

Gearbox type:

for motor frame size/ratio

spigot Ø 450; FF500 80

spigot Ø 400; Special motor 82

spigot Ø 350; FF400 84

spigot Ø 550; FF600 86

spigot Ø 680; FF740 88

Holding brake:

without holding brake 1

Gearbox output:

without N

STW S

a1 = spigot Ø 90 x 140; keyway; 2x25x14x125 H

a1 = spigot Ø 90 x 140; smooth G

Installation position:

V1/ B5 C

V3 Central lube oil supply in output shaft B

Torsional backlash on gearbox output "d"

without hub 0

75 mm x 140 1

80 mm x 170 2

90 mm x 170 3

95 mm x 170 4

Torsional backlash on gearbox output:

Normal backlash max. 40 arcmin 1

Neutral shift position N

Request for Quotation

For quickest response please provide the following data to us by:

Fax: ++49/(0)7541/77-2379 or

E-Mail: industrial-drives@zf.com

1. Motor

motor brand: _____

type: _____

size: _____

nominal power (kW): _____

max. torque (Nm): _____

motor operating speed n_1 to n_2 (rpm) at constant power: _____

max. speed (rpm): _____

motor shaft diameter d (mm): _____

motor shaft length l (mm): _____

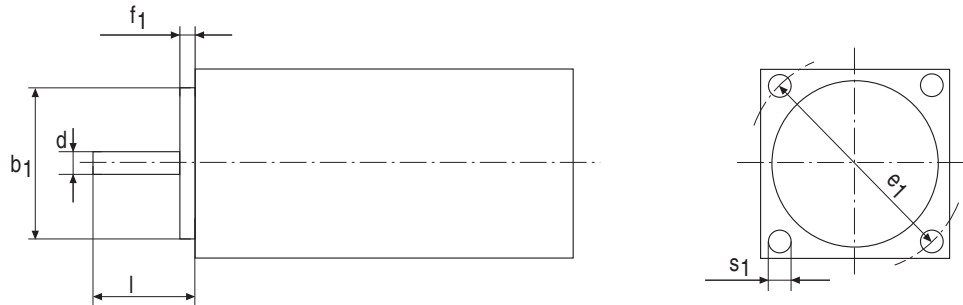
pilot diameter b_1 (mm): _____

pilot width f_1 (mm): _____

pcd e_1 (mm): _____

hole diameter s_1 (mm): _____

fitting key $l \times b \times h$ (mm): _____



- | | |
|--|---|
| <input type="checkbox"/> Motor shaft with keyway | <input type="checkbox"/> Motor shaft without keyway |
| <input type="checkbox"/> Motor shaft with shaft seal | <input type="checkbox"/> Motor shaft without shaft seal |
| <input type="checkbox"/> Full-key balanced motor shaft | <input type="checkbox"/> Half-key balanced motor shaft |

2. ZF-Duoplan type:

- | | | | |
|--------------------------------|--------------------------------|--------------------------------|---------------------------------|
| <input type="checkbox"/> 2K120 | <input type="checkbox"/> 2K300 | <input type="checkbox"/> 2K800 | <input type="checkbox"/> 2K2100 |
| <input type="checkbox"/> 2K121 | <input type="checkbox"/> 2K450 | <input type="checkbox"/> 2K801 | |
| <input type="checkbox"/> 2K250 | <input type="checkbox"/> 2K600 | 2K802 | |

*Standard**Option*

Gearbox interface	<input type="checkbox"/> open	<input type="checkbox"/> with adapter plate, hub bearing and shaft seal <hr/> <input type="checkbox"/> with adapter plate and shaft seal <hr/> <input type="checkbox"/> with adapter ring <hr/> <input type="checkbox"/> with input flange (2K250/300/800/2100)
Ratio i_1	<input type="checkbox"/> 4.00 (Standard)	
	<input type="checkbox"/> 3.1 (2K120/121/250/300/800)	<input type="checkbox"/> 5.0 (2K450/600)
		<input type="checkbox"/> 5.5 (2K250/300)
		<input type="checkbox"/> 4.91 (2K120/121)
Installation position	<input type="checkbox"/> B5 B5 rotated longit.axis to right	<input type="checkbox"/> V1 V3
Holding brake	<input type="checkbox"/> without	<input type="checkbox"/> with (only available for 2K800/801)
Output bearings	<input type="checkbox"/> Cylindrical roller bearings	<input type="checkbox"/> Angular-contact ball bearings <hr/> <input type="checkbox"/> Self aligning- and cylinder ball bearings (2K800/801/802)
Lubrication system	<input type="checkbox"/> Splash type lubrication	<input type="checkbox"/> Recirculating lubrication with oil tank
	<input type="checkbox"/> Integrated oil channel system	<input type="checkbox"/> Recirculating lubrication with heat exchanger
	<input type="checkbox"/> Dry sump lubrication	
Gearbox output	<input type="checkbox"/> Gearbox with output flange	<input type="checkbox"/> Gearbox with output shaft
	<input type="checkbox"/> 100 mm (2K120/2K121)	<input type="checkbox"/> 38 mm (2K120/121) INLINE
	<input type="checkbox"/> 118 mm (2K250)	<input type="checkbox"/> 42 mm (2K250)
	<input type="checkbox"/> 130 mm (2K300)	<input type="checkbox"/> 42 mm (2K250/300) INLINE
	<input type="checkbox"/> 140 mm (2K450)	<input type="checkbox"/> 55 mm (2K300)
	<input type="checkbox"/> 150 mm (2K600)	<input type="checkbox"/> 60 mm (2K450)
	<input type="checkbox"/> 180 mm (2K800/801/802)	<input type="checkbox"/> 70 mm DIN 5480 (2K120 TSC/121 TSC/250 TSC/300 TSC)
	<input type="checkbox"/> STW (2K800/801/802/2100)	<input type="checkbox"/> 90 mm (2K2100)
		<input type="checkbox"/> gearboxes for direct mounting without output (2K800/801/802/2100)
	<input type="checkbox"/> Rotary union for output shaft	<input type="checkbox"/> Rotary union for spindle
Torsional backlash at gearbox output	<input type="checkbox"/> < 30 arcmin	<input type="checkbox"/> < 20 arcmin
		<input type="checkbox"/> < 15 arcmin
	<input type="checkbox"/> < 40 arcmin (2K800/801/802/2100)	

Quantity per year:

Order-No.:

Application:

Subject to technical change without notice. For installation investigation purposes, please request installation drawings; only the data contained therein is binding. Please check out our homepage: www.zf.com/industrial-drives

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