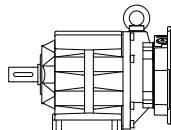


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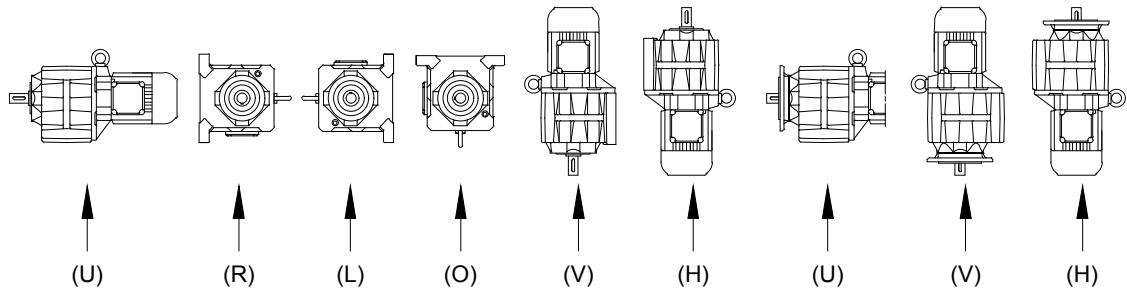


	Page
<b>Gearboxes and Lubrication</b>	<b>49-72</b>
<b>Standard mounting</b>	
- BG and BF	
- BK and BS	
<b>Position of the terminal box and the cable entry</b>	
- BG and BF	
- BK and BS	
<b>Radial and axial forces at the output shaft</b>	
<b>Dimensions and fits of output shafts and keyways</b>	
<b>Installing transmission elements</b>	
<b>Gear with solid shaft</b>	
<b>Gear with hollow shaft</b>	
<b>Shrink disc coupling</b>	
<b>Torque restraint</b>	
<b>Notes for installing shaft mount gears with hollow shaft and keyway</b>	
<b>Gear ventilation</b>	
<b>Output shaft seals</b>	
<b>Lubricants</b>	
<b>Lubricant quantities</b>	
- Lubricant quantities, BG-series gears	
- Lubricant quantities, BG-20-01R	
- Lubricant quantities, BF-series gears	
- Lubricant quantities, BK-series gears	
- Lubricant quantities, BS-series gears	
- Lubricant quantities, pre-stage gears (Z)	
- Lubricant quantities, intermediate gears	
<b>Position of threaded plugs</b>	
- BG-series gears	
- BG-20-01R	
- BF-series gears	
- BK-series gears	
- BS-series gears	
- pre-stage gears (Z)	
<b>Position of the drain plugs in the System Cover</b>	

# Gearboxes & Lubrication

## Standard mounting positions

BG Series



Mounting position (foot housing)  
cast foot with clearance holes (Code -1.)

B3      B6      B7      B8      V5      V6

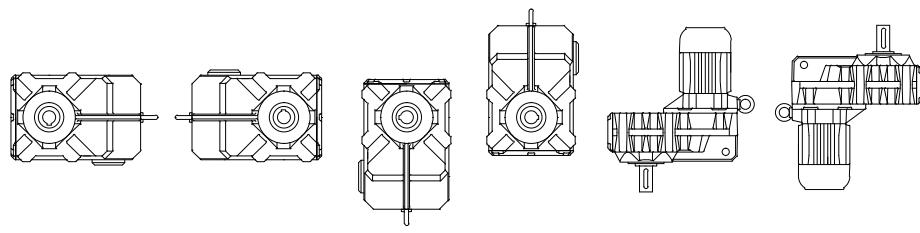
Mounting position

(attachment housing with flange or foot mounting)  
flange with threaded holes (Code -2./Code -3./Code -4./Code -7.)

foot with threaded holes (Code -6.)  
foot with clearance holes (Code -9.)

H4      H1      H2      H3      H5      H6      B5      V1      V3

BF series



Gear side

(R)      (L)      (O)      (U)      (V)      (H)

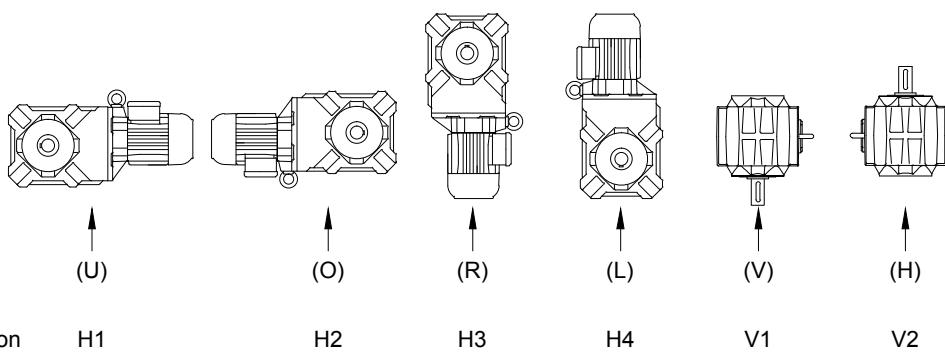
Mounting position

H1      H2      H3      H4      V1      V2

# Gearboxes & Lubrication

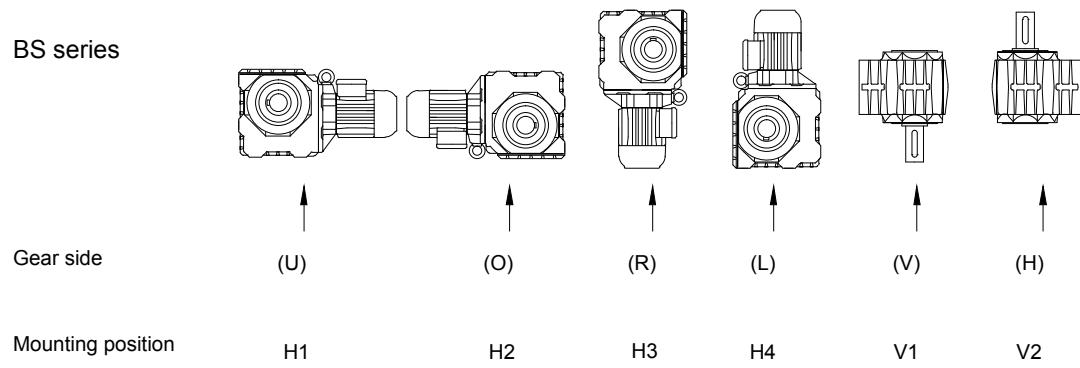
## Standard mounting positions

BK series



5

BS series

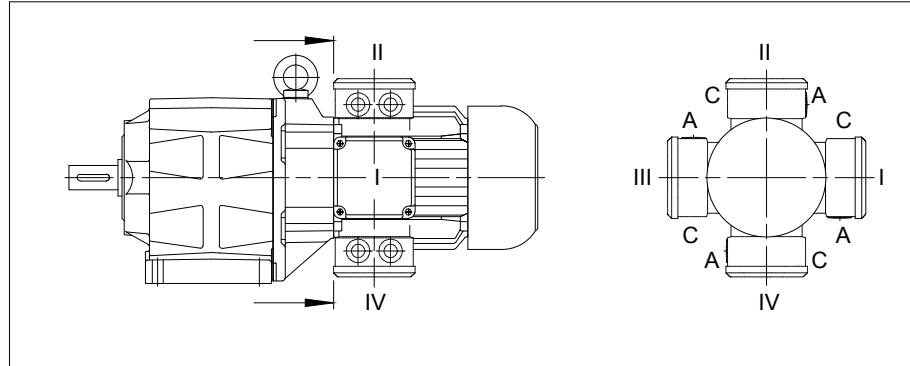


# Gearboxes & Lubrication

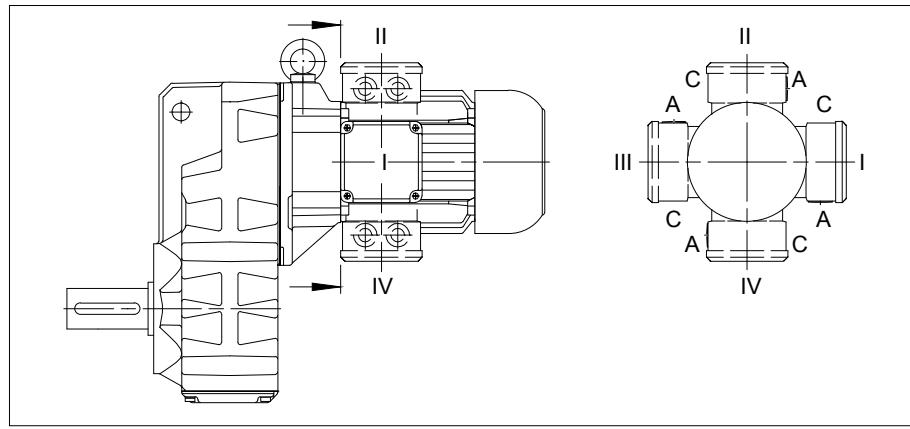
## Position of the terminal box

### Position of the terminal box and the cable entry points (BG and BF)

The standard position of the terminal box for helical-gear and shaft-mounted geared motors is position I. Cables may be introduced from side A or C.



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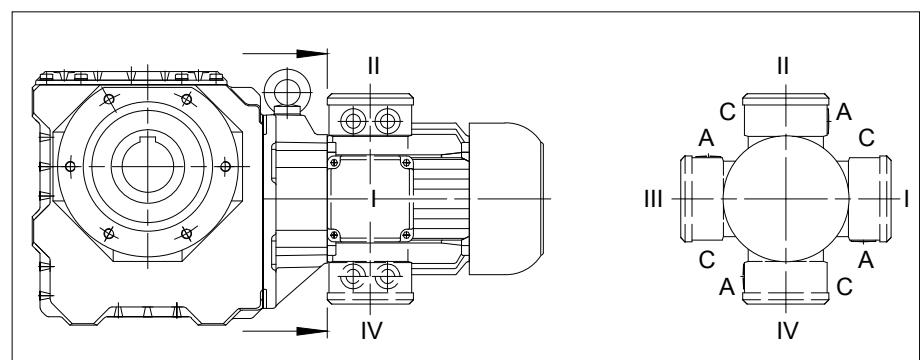
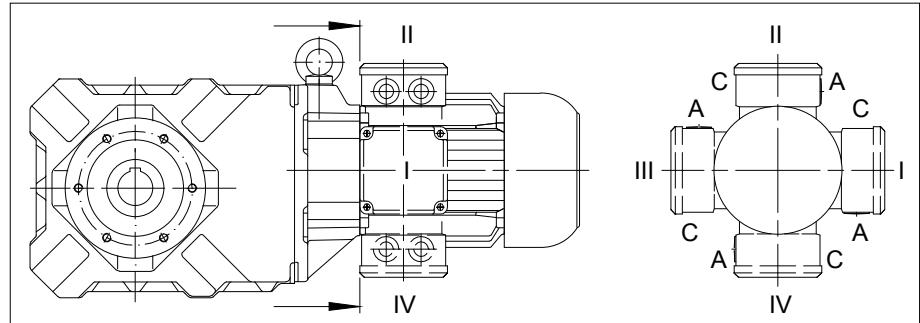


Turning or rotating the gearbox in space in the different mounting positions according to DIN 42950 does not influence the marking as shown. The details of the terminal box always show the position of the terminal box and the cable entry in relation to the gearbox and not in space. The mounting according to DIN 42950 is to be given separately.

### Position of the terminal box and the cable entry points (BK and BS)

The standard position of the terminal box for bevel-gearred and worm-geared motors is position II.

Cable entry through side A or side C is possible



Turning or rotating the gearbox in space in the different mounting positions according to DIN 42950 does not influence the marking as shown. The details of the terminal box always show the position of the terminal box and the cable entry in relation to the gearbox and not in space. The mounting according to DIN 42950 is to be given separately.

# Gearboxes & Lubrication

## Gearboxes

### Radial and axial forces at the output shaft

The output shafts and output-shaft bearings are matched to the motor torques. It is advisable to locate the drive-transmission element's point of application as close as possible to the shaft collar to ensure that the load imposed by external radial forces is not unnecessarily high. Permissible values for radial forces referred to the output shaft centreline are listed in the selection tables. Please consult us if your application involves extra-high axial loading.

### Dimensions and fits of output shafts and keyways

Output shaft and second shaft stub, keyway and key are in compliance with the DIN standards and ISO fits listed below:

#### Solid shaft

Shaft diameter	to D = 50 mm in ISO k6 (DIN 748 Page1) as of D = 50 mm in ISO m6 (DIN 748 Page 1)
Keyway	ISO P9 (DIN 6885 Page 1)
Key, height	ISO h9 (DIN 6885 Page 1 and DIN 6880)
Bore - customer	ISO H7

#### Hollow shaft with keyway

Bore diameter	ISO H7 (DIN 748)
Keyway	ISO JS9 (DIN 6885 Page 1)
Key, height	ISO h9 (DIN 6885 Page 1 and DIN 6880)
Customer shaft	ISO h6

#### Hollow shaft for shrink-on disc coupling (SSV)

Outside diameter	ISO f7
Inside diameter	ISO H7
Customer shaft	ISO h6

#### Note:

Gearboxes using torque reaction by means of a flange (Code 2.; 3; 4.; 7.; 8.) or torque arm (Code 5.), must have the side for the torque reaction the same as where the radial force on the output shaft occurs (see rubber buffers for torque arms)! Please consult the factory for other designs.

### Gear with solid shaft

Always exercise meticulous care when fitting transmission elements onto output shafts and, whenever possible, use the DIN 332 tapped bore provided for this purpose. Fitting is usually easier if the transmission element can be heated to approximately 100° C for installation. Dimension the locating bore to ISO H7.

Gears with solid shaft at each end (gear code -.3/): alignment of the two keys is subject to the DIN 7168 tolerances, the degree of accuracy is "fine".

### Gear with hollow shaft

Hollow shafts usually engage solid shafts of the driven machinery. The gear unit must be mounted such as to be free of constraint and be fixed axially (e.g. by means of assembly help acc. following description "notes for installing shaft mount gears with hollow shaft and keyway"). Special contract provision must be made if the hollow shaft has to guide the solid shaft or, for any other reason, close out-of-round tolerance referenced to a point on the gear housing (such as a flange, for instance) is required.

### Shrink disc coupling

A shrink disc coupling (SSV) can transmit high torque from the non-grooved hub to the smooth shaft. The SSV is easily secured and released, using commercially available bolts. SSVs are the ideal supplement for shaft mount gears. The maximum transmittable torque for the selected shrink discs when fitted and mounted according to instructions is above the breakaway torque of the respective motors classified as standard (for classification of shrink disc sizes see chapter 11, 12, 13 "Additional dimensional drawings for Shrink disc coupling")

### Torque restraint

Shaft-mounted geared motors require a suitable torque restraint to resist the reaction torque. Shaft-mounted gears have cast torque arms as standard. Bevel gears and worm gears are available with bolt-on torque arms on request. The torque arm is screwed onto the front "V" on the side of the gear unit. It is always important to ensure that the torque arm does not create excessive constraining forces due to the driven shaft running untrue, for example. Excessive play can result in excessive shock torques in switching or reversing operations. Consequently, we recommend the use of pre-tensioned rubber damping elements. These rubber buffers are part of the scope of supply for designs with a torque arm (see chapter 11, 12, 13 dimensional drawings "Rubber buffer for torque restraint")

### Notes for installing shaft mount gears with hollow shaft and keyway

#### (1) Attaching the hollow shaft to the customer shaft

Threaded bolt (d) is screwed into the end thread of the shaft to be driven. By tightening the nut, apply force to thrust plate (b) and locating ring (c) to draw the gear unit onto the shaft.

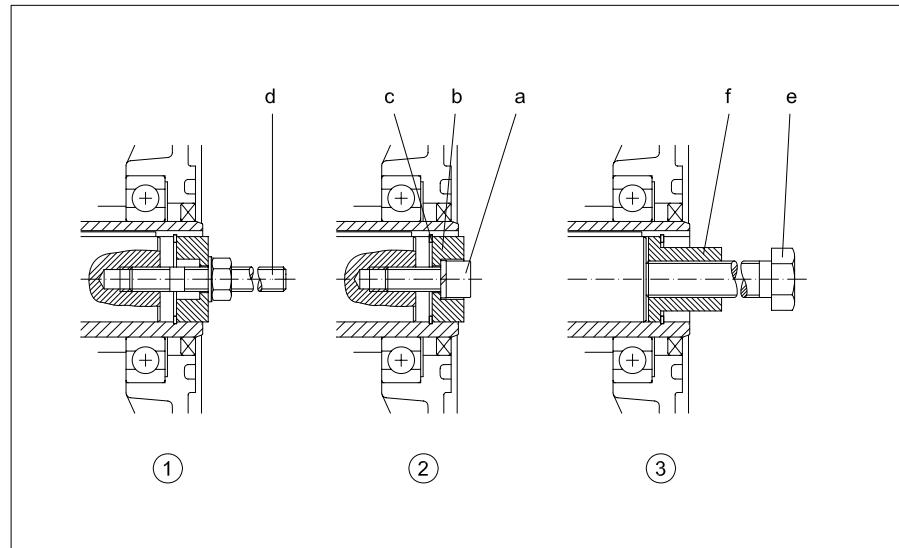
#### (2) Axial fastening

Pressure piece (b) is rotated and fitted against retaining ring (c) using fixing screw (a).

#### (3) Removing

Extractor (f) is fitted between the end face of the shaft and retainer ring (c). Tighten press-off screw (e) against the end of the shaft and pull the gear unit off the shaft.

Manufacturing drawings for the required parts are available on request. These parts are not included in the scope of supply.



Detailed information on shaft-mounted gear units, bevel-gear units and worm-gear units is available (see chapter 11, 12, 13 dimensional drawings "Tools for fitting shaft-mounted gear with hollow shaft and keyway").

### Gear ventilation

The lifetime of the gearbox lubricant increases the better it is protected from negative environmental influences. Should the oil level or the gearbox ratio cause a very high lubricant temperature, the gearbox will be supplied as standard with a breather plug. Either on request or for corresponding high ambient temperatures, all gearboxes from size 10 can be supplied with a breather plug.

For the position of the threaded plugs see chapter 5 theraded plugs.

### Output shaft seals

All size 10 and larger gears are available with double seals for the output shaft on request and at extra cost. Double seals are particularly effective if the output shaft points down and as protection against external influences

# Gearboxes & Lubrication

## Lubricants

### Lubricants

The drives are shipped ready-filled with gear lubricant. Lubricated in this way, the gear units are suitable for ambient temperatures in the range -20° C to + 40° C. The quantity of lubricant is optimised for the desired installed position as is stated on the nameplate. The type of lubricant is stated in the Operating Instructions. Lubricants for other temperature ranges or special applications available on request.

Wear-protective EP gear oils as indicated in the following table have proven particularly effective:

	Lubricant type					
	Mineral Oil	Synthetic Oil			USDA H1 Oil	
	ISO VG 220	ISO VG 68		ISO VG 220	ISO VG 460	ISO VG 220
Disposal No.	ASN13 02 05	ASN 13 02 06	ASN 13 02 06	ASN 13 02 06	ASN 13 02 06	ASN 13 02 06
Lubricant Manufacturer	Standard oil for gearboxes in the series <b>BF06-BF90</b> <b>BG04-BG100</b> <b>BK60-BK90</b>	Low temperature oil for gearboxes in the series <b>BF06-BF90</b> <b>BG04-BG100</b> <b>BM09-BM40</b> <b>BS02-BS40</b>	Standard oil for gearboxes in the series <b>BK06-BK90</b> <b>BM09-BM40</b> <b>BS02-BS40</b>	Standard oil for gearboxes in the series <b>BS02-BS10</b> <b>BK06-BK10</b> <b>BM09-BM40</b> High temperature oil for gearboxes in the series <b>BS02-BS10</b> <b>BK06-BK10</b> <b>BF06-BF90</b> <b>BG04-BG100</b> <b>BK60-BK90</b> <b>BM09-BM10</b>	Standard oil for gearboxes in the series <b>BS20-BS40</b> <b>BK17-BK50</b> <b>BM20-BM40</b> High temperature oil for gearboxes <b>BS20-BS40</b> <b>BK17-BK50</b> <b>BM20-BM40</b>	Food and Beverage Industry Oil for gearboxes in the series <b>BF06-BF90</b> <b>BG04-BG100</b> <b>BK06-BK90</b> <b>BM09-BM40</b> <b>BS02-BS40</b>
AGIP		BLASIA 220		BLASIA S 220	BLASIA S 460	
BECHER RHUS		STAROIL G 220		BERUSYNTH EP 68	BERUSYNTH EP 220	BERUSYNTH EP 460
CASTROL		ALPHA EP 220 ALPHA SP 220 ALPHA BMB 220 OPTIGEAR BM 220 OPTIGEAR EP 220 OPTIGEAR 1100/220	Alphasyn T68	ALPHASYN PG 220 OPTIGEAR 800/220 OPTIGEAR 1300/220 ALPHASYN GS 220	ALPHASYN PG 460 OPTIGEAR 800/460 OPTIGEAR 1300/460 ALPHASYN GS 460	OPTILEB GT 220 (CLP-HC) OPTILEB GT 1800/220 (CLP-PG)
CHEVRON		GEARTEX EP-A SAE 85W-90 Meropa 220		SYNLUBE WS 68	SYNLUBE WS 220	SYNLUBE WS 460
FUCHS		RENOLIN CLP 220 RENOLIN CLPF 220 SUPER RENOLIN CLPF 220 PLUS	RENOLIN UNISYN CLP 68	RENOLIN PG 68	RENOLIN PG 220	RENOLIN PG 460
KLÜBER		KLÜBEROIL GEM 1-220 N		KLÜBER-SYNT GH6-80	KLÜBERSYNTH GH 6-220	KLÜBEROIL 4UH1-220 N KLÜBERSYNTH UH1 6-220
MOBIL		MOBILGEAR 600 XP 220	MOBIL SHC 626			MOBIL SHC CIBUS 220
OEST		Gearol C-LP 220				
SHELL		OMALA S2 GX220			OMALA S4 WE 220	OMALA S4 WE 460
TOTAL		CARTER EP 220 CARTER XEP 220			CARTER SY 220	CARTER SY 460
WINTERSHALL		SRS ERSOLAN 220				
						NEVASTANE SL220 NEVASTANE EP 220 NEVASTANE SY 220

**Important:**

Synthetic gear oils of a Polyglykol base (e.g. PGLP...) must be disposed of separately to mineral oil as **Special Waste**.

So long as the ambient temperature does not fall below – 20° C the international definition of the viscosity class at 40° C according to ISO 3448 and DIN 51519 ISO the viscosity class VG220 (SAE90) is recommended according, in North America AGMA 5EP.

For lower temperatures it is recommended to use oils of a lower nominal viscosity with a corresponding better starting characteristic, for instance a PGLP with a nominal viscosity VG68 (SAE80) or AGMA 2EP respectively. These types of oil can already be necessary at a temperature around the freezing point, if the break away torque of a drive is reduced by some smooth starting device or if the motor has a relatively low power

**Lubricant quantities**

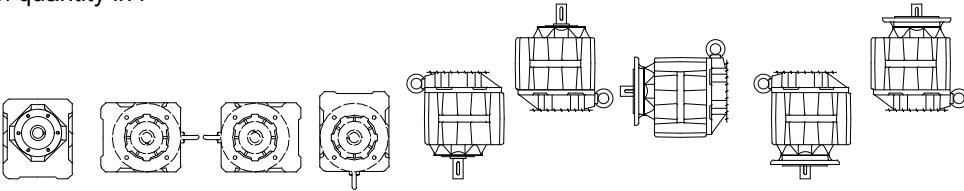
The preferred quantity of lubricant for the planned type of installation is stated on the motor's rating plate (symbol "oil can"). When topping up care should be taken to ensure that, depending on the fitting position, gearwheels and rolling contact bearings positioned at the top are also properly oiled. In special versions the oil level mark should be noted. Information about the quantity of lubricant required for other types of installation can be obtained from the factory

# Gearboxes & Lubrication

## Lubricants

### Lubricant quantities, BG-series gears

Lubrication quantity in l



**Gearbox type**

BG04-BG100	(gear-housing with flange or foot)	Flange (Code-2./Code-3./Code-4./Code-7.)	Foot with clearance holes (Code-9.) [Completely machined (Code -8.)]						
H4	H1	H2	H3	H5	H6	B5	V1	V3	
<b>BG04-BG100</b>									
(Gearbox housing)									
cast-on-foot with clearance holes (Code -1.)									
	B3	B6	B7	B8	V5	V6			
BG04	*	-	0.03	0.03	0.03	-	0.03	0.05	0.05
	**	0.05	0.05	0.05	0.05	0.1	0.05	-	-
BG05	*	-	0.05	0.05	0.05	-	0.05	0.08	0.08
	**	0.08	0.08	0.08	0.08	0.16	0.08	-	-
BG06	*	-	0.08	0.08	0.08	-	0.08	0.15	0.15
	**	0.12	0.12	0.12	0.12	0.24	0.15	-	-
BG10	*	0.65	0.65	0.65	0.85	1.05	0.85	0.65	1.05
	**	0.45	0.45	0.45	0.6	0.75	0.6	-	-
BG15	**	0.4	0.4	0.4	0.35	0.62	0.55	-	-
BG20	*	0.8	0.8	0.8	1.1	1.4	1.1	0.8	1.4
	**	0.6	0.6	0.6	1.0	1.15	0.9	-	-
BG30	*	1.0	1.0	1.0	1.7	2.4	1.6	1.0	2.4
	**	1.0	1.0	1.0	1.7	2.3	1.7	-	-
BG40	*	1.7	1.7	1.7	2.5	3.5	2.1	1.7	3.5
	**	1.7	1.7	1.7	2.5	3.5	2.1	-	-
BG50	*	3.0	3.0	3.0	4.5	5.5	3.3	3.0	5.5
	**	3.0	3.0	3.0	4.5	5.5	3.3	-	-
BG60	*	5.5	5.5	5.5	7.0	10.9	6.4	5.5	10.9
	**	5.5	5.5	5.5	7.0	10.9	6.4	-	-
BG70		6.5	6.5	6.5	8.0	13.5	9.0	6.5	13.5
BG80		11.0	11.0	11.0	11.0	22.5	15.0	11.0	22.5
BG90		19.0	19.0	19.0	19.0	40.0	26.0	19.0	40.0
BG100		35.0	35.0	55.0	50.0	66.0	50.0	35.0	66.0
* Attachment housing					** Gearbox housing				

### Lubricant quantities, BG20-01R

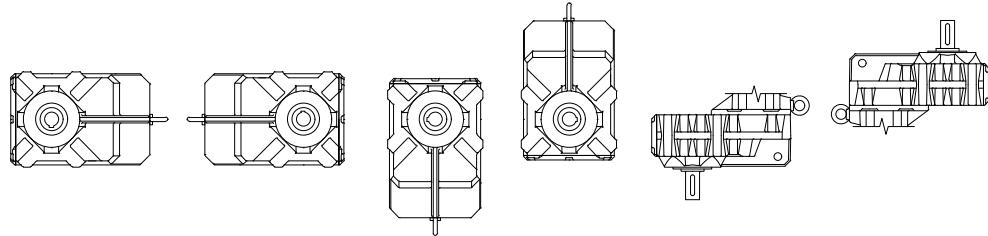
Lubrication quantity in l						
Gear type	H4	H1	H2	H3	V5	V6
BG20R	0.8	1.0	0.8	1.4	1.65	1.0

# Gearboxes & Lubrication

## Lubricants

Lubricant quantities, BF-series gears

Lubrication quantity in l

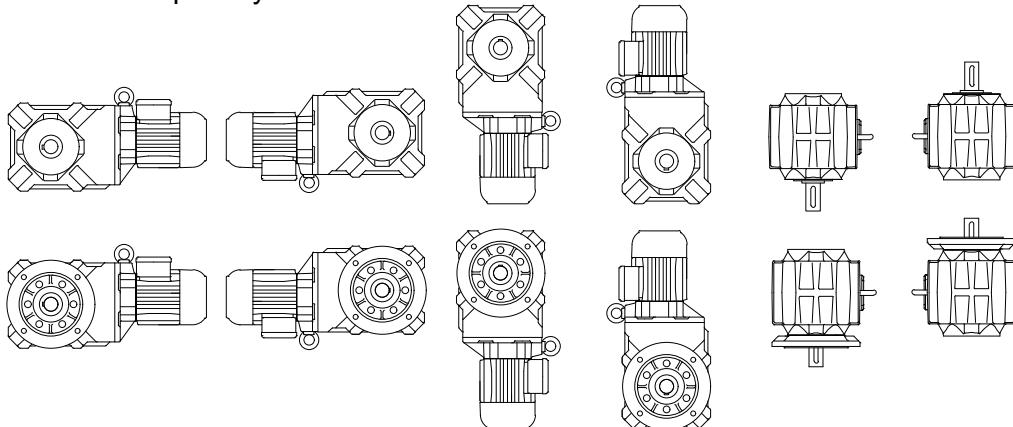


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Gear type	H1	H2	H3	H4	V1	V2
BF06	0.25	0.25	0.25	0.37	0.35	0.3
BF10	0.85	0.85	0.85	1.1	1.45	1.5
BF20	1.3	1.3	1.3	1.7	2.2	2.25
BF30	1.7	1.7	1.7	2.2	3.2	3.0
BF40	2.7	2.7	2.7	3.5	4.9	4.8
BF50	3.8	3.8	3.8	5.0	6.7	6.7
BF60	6.7	6.7	6.7	9.0	12.3	12.0
BF70	12.2	12.2	12.2	16.0	24.2	21.8
BF80	17.0	17.0	17.0	21.0	32.2	27.5
BF90	32.0	32.0	32.0	41.0	62.0	53.0

### Lubricant quantities, BK-series gears

Lubrication quantity in l



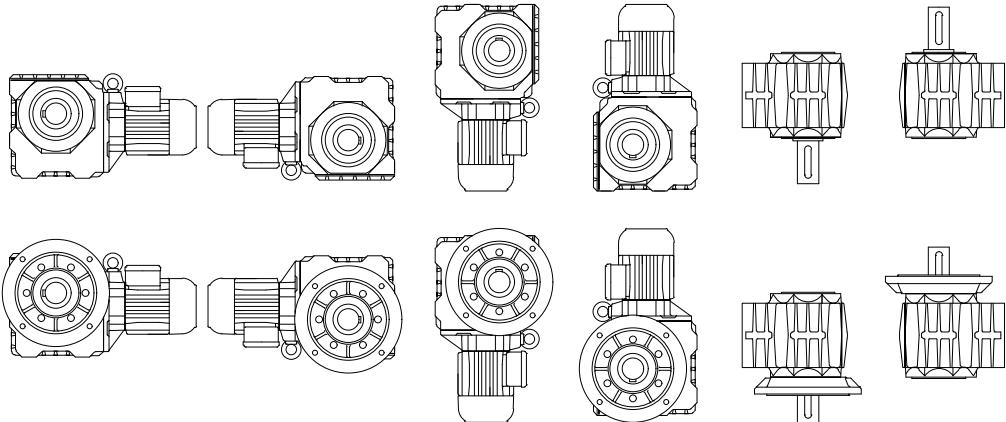
Gear box type	H1	H2	H3	H4	V1	V2
BK06	0.15	0.23	0.29	0.31	0.18	0.23
BK10	0.83	0.83	0.92	1.75	0.92	0.92
BK17	1.0	1.7	1.8	2.6	1.3	1.8
BK20	1.5	1.5	1.6	2.9	1.65	1.65
BK30	2.2	2.2	2.3	4.4	2.4	2.4
BK40	3.5	3.5	3.5	6.7	3.7	3.7
BK50	5.8	5.8	5.8	11.5	6.0	6.0
BK60	6.0	8.7	6.9	12.0	8.6	8.6
BK70	10.2	15.0	11.5	20.5	13.5	14.5
BK80	18.0	25.5	19.0	37.0	23.5	25.5
BK90	33.0	48.0	36.0	69.0	45.0	48.0

# Gearboxes & Lubrication

## Lubricants

Lubricant quantities, BS-series gears

Lubrication quantity in l

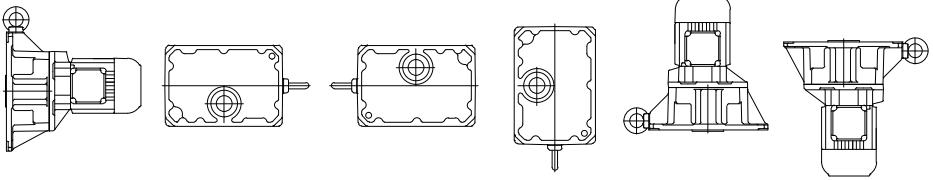


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Gear type	H1	H2	H3	H4	V1	V2
BS02	0.06	0.06	0.06	0.06	0.06	0.06
BS03	0.17	0.17	0.17	0.17	0.17	0.17
BS04	0.11	0.17	0.11	0.2	0.11	0.11
BS06	0.24	0.36	0.24	0.45	0.24	0.24
BS10	0.9	1.3	0.9	1.6	0.9	0.9
BS20	1.5	2.1	1.5	2.7	1.5	1.5
BS30	2.2	3.0	2.2	3.8	2.2	2.2
BS40	3.5	4.7	3.5	6.0	3.5	3.5

### Lubricant quantities, pre-stage gears (Z)

Lubrication quantity in l



BF	H4	H1	H2	H3	V1	V2
BG	H4 B3/B5	H1 B6	H2 B7	H3 B8	V1 V5/H5	V3 V6/H6
BK und BS	H1	V1	V2	H2	H4	H3
Gear type						
BG10Z BF10Z BK10Z BS10Z	0.10	0.05	0.12	0.07	0.16	0.07
BG20Z BF20Z BK20Z BS20Z	0.15	0.07	0.19	0.17	0.27	0.10
BG30Z BF30Z BK30Z BS30Z BM30Z	0.2*	0.10	0.35	0.22	0.35	0.19
BG40Z BF40Z BK40Z BS40Z BM40Z	0.32*	0.17	0.50	0.37	0.6	0.32
BG50Z BF50Z BK50Z	0.5	0.3	0.92	0.7	1.15	0.5
BG60Z BF60Z BK60Z	0.9	0.5	1.55	1.1	2.0	0.7
BG70Z BF70Z BK70Z BF80Z	1.2	0.6	1.8	1.6	2.4	1.4
BG80Z BF90Z BK80Z BG100Z	3.1	1.3	4.0	2.6	5.2	2.0
BG90Z BK90Z	4.2	1.5	5.4	3.5	7.7	3.0

# Gearboxes & Lubrication

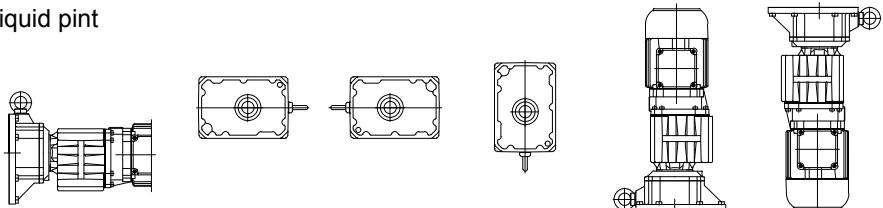
## Threaded plugs

### Lubrication quantity for intermediate gear

#### Definition of the terminal box position

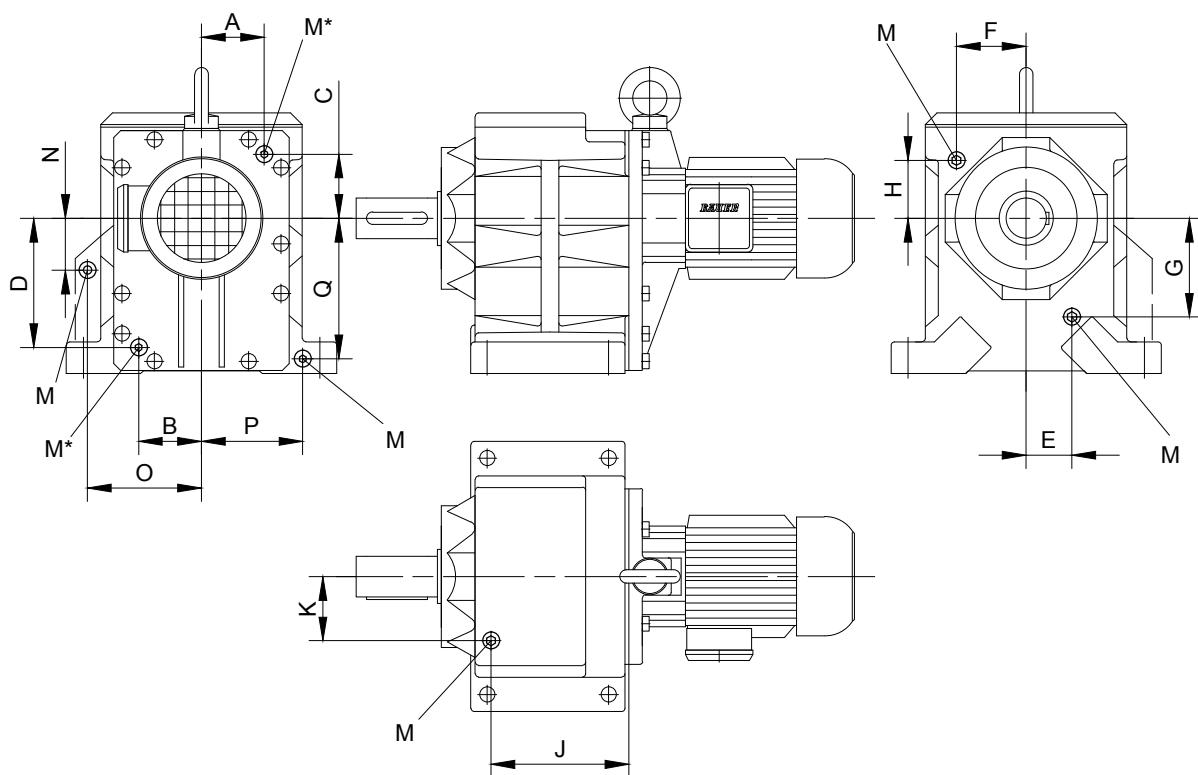
Terminal box position for intermediate gear  
is similar to the main gearbox that means  
Main gearbox BG,BF terminal box pos. I  
-> intermediate gearbox terminal box pos. I  
Main gearbox BK,BS terminal box pos. II  
-> intermediate gearbox terminal box pos. II

Lubrication quantity in liquid pint



Mounting position of main gearbox	BF	H4	H1	H2	H3	V1	V2	
	BG	H4 B3/B5	H1 B6	H2 B7	H3 B8	V1 V5/H5	V3 V6/H6	
	BK und BS	H1	V1	V2	H2	H4	H3	
Standard position of KLK mounting position H1,H2,H3, B5,V1,V3 for mounting with screwed resp. casted flange		B5	H1	H2	H3	V1	V3	
Type designation of double gearbox combination								
BG06G04 BS06G04 BK06G04	0.03	0.03	0.03	0.03	0.03	0.05	0.05	
BG10G06 BF10G06 BK10G06 BS10G06	0.08	0.08	0.08	0.08	0.08	0.15	0.15	
BG20G06 BF20G06 BK20G06 BS20G06	0.08	0.08	0.08	0.08	0.15	0.15		
BG30G06 BF30G06 BK30G06 BS30G06	0.08	0.08	0.08	0.08	0.15	0.15		
BG40G10 BF40G10 BK40G10 BS40G10	0.65	0.65	0.65	0.85	1.05	0.85		
BG50G10 BF50G10 BK50G10	0.65	0.65	0.65	0.85	1.05	0.85		
BG60G20 BF60G20 BK60G20	0.8	0.8	0.8	1.1	1.4	1.1		
BG70G20 BF70G20 BK70G20	0.8	0.8	0.8	1.1	1.4	1.1		
BG80G40 BF80G40 BK80G40	1.7	1.7	1.7	2.5	3.3	2.1		
BG90G50 BF90G50 BK90G50 BG100G50	3.0	3.0	3.0	4.5	5.5	3.3		

### Position of threaded plugs, BG-series gears



5

M = Plug according to DIN 908

Type	A	B	C	D	E	F	G	H	J	K	N	O	P	Q	M
BG10 Foot housing	see position of the oil drain and filler plugs on the system cover			Tab.I-Tab.III size B10	33	42	48	41.5	-	-	-	-	-	-	M10x1
BG10 Attachment housing				Tab.I-Tab.III size B10	27	-	73	-	-	-	-	-	-	-	M10x1
BG15 Foot housing				Tab.I-Tab.III size B10	-	-	-	-	-	-	-	-	-	-	-
BG20 Foot housing				Tab.I-Tab.III size B20	-	47	-	52.5	-	-	-	-	-	-	M10x1
BG20 Attachment housing				Tab.I-Tab.III size B20	-	28	-	68	-	-	-	-	-	-	M10x1
BG30 Foot housing				Tab.I-Tab.III size B30	-	54	-	58	-	-	-	-	-	-	M10x1
BG30 Attachment housing				Tab.I-Tab.III size B30	-	58	-	48	-	-	-	-	-	-	M10x1
BG40 Foot housing				Tab.I-Tab.III size B40	-	75	-	48	-	-	-	-	-	-	M14x1.5
BG40 Attachment housing				Tab.I-Tab.III size B40	-	75	-	48	-	-	-	-	-	-	M14x1.5
BG50 Foot housing				Tab.I-Tab.III size B50	-	53	-	100	-	-	-	-	-	-	M14x1.5
BG50 Attachment housing				Tab.I-Tab.III size B50	-	53	-	100	-	-	-	-	-	-	M14x1.5
BG60 Foot housing				Tab.I-Tab.III size B60	-	70	-	119	-	-	-	-	-	-	M20x1.5
BG60 Attachment housing				Tab.I-Tab.III size B60	-	70	-	119	-	-	-	-	-	-	M20x1.5
BG70				Tab.I-Tab.III size B70	-	103	-	86	204	95	-	-	-	-	M20x1.5
BG80				Tab.I-Tab.III size B80	-	133	-	110	237	111	-	-	-	-	M20x1.5
BG90				Tab.I-Tab.III size B90	-	165	-	124	297	140	-	-	-	-	M24x1.5
BG100				Tab.I-Tab.III size B80	-	202	-	128	420	165	135	263	202	293	M24x1.5

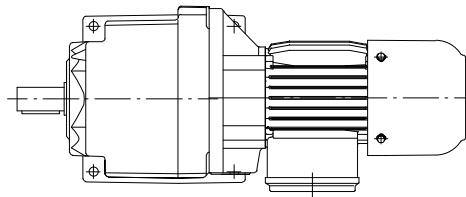
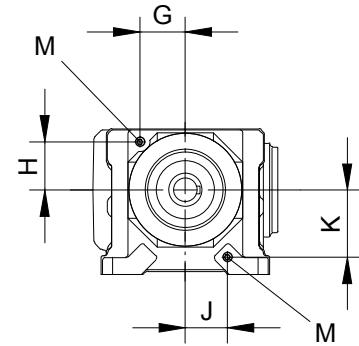
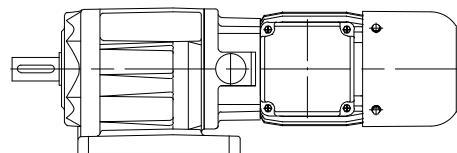
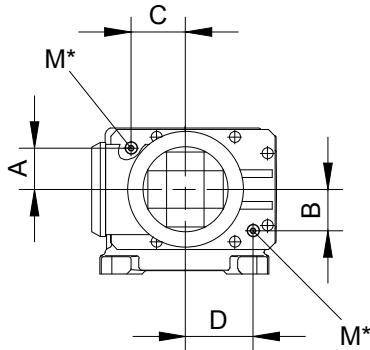
M\* = Factor and position of the drain plug see page 71.

# Gearboxes & Lubrication

## Threaded plugs

Position of threaded plugs, BG-20-01R

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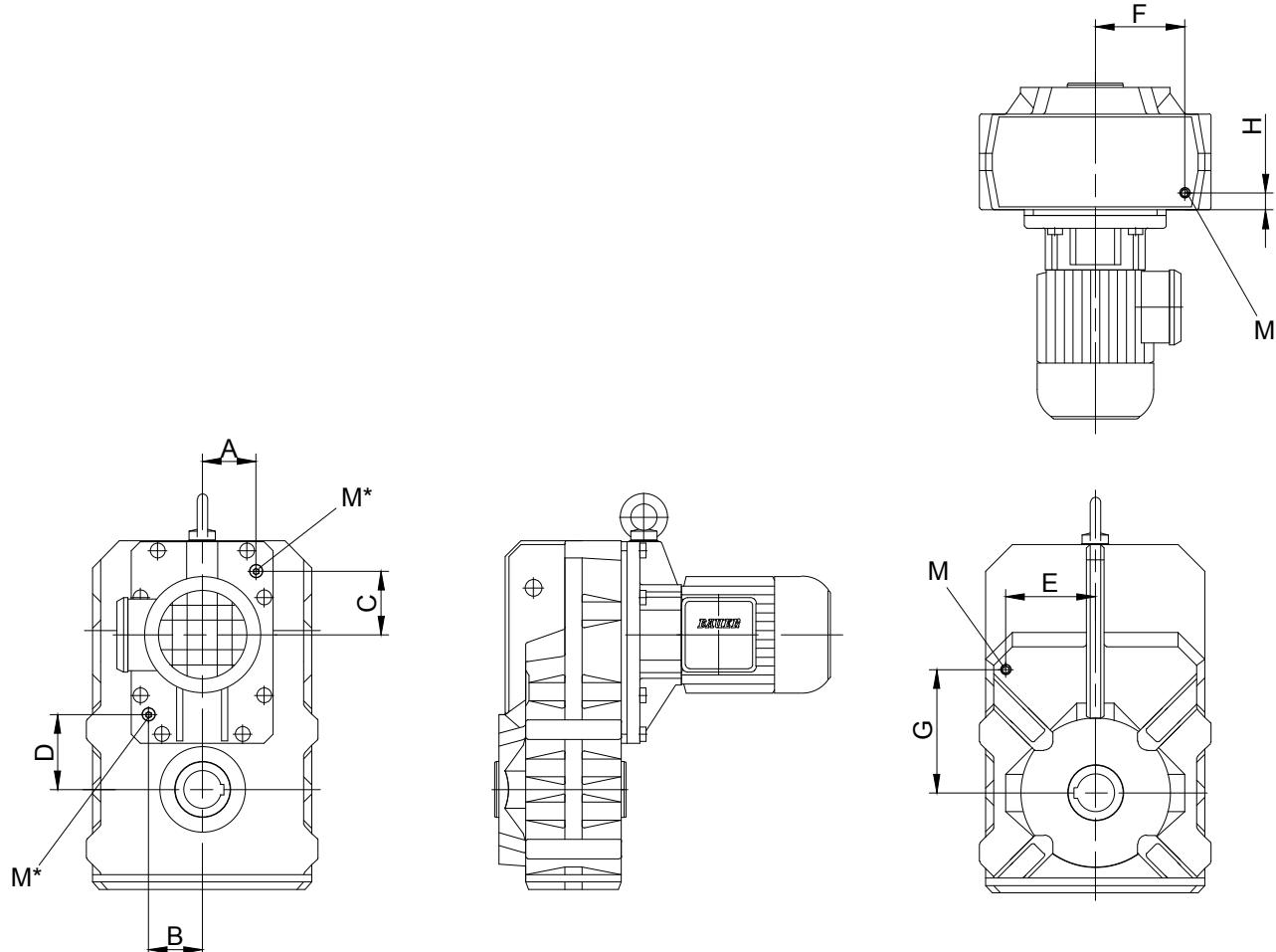


M = Plug according to DIN 908

Type	A	B	C	D	G	H	J	K	M
BG20-01R Rollerbed					48.5	51.5	45	71.5	M10x1

M\* = Factor and position of the drain plug see page 71.

Position of threaded plugs, BF-series gears



5

M = Plug according to DIN 908

Type	A	B	C	D	E	F	G	H	M
BF06	see position of the oil drain and filler plugs on the system cover	on request							
BF10		Tab.I - Tab.III size B.10	64	65	97	28		M10x1	
BF20		Tab.I - Tab.III size B.20	77	70	115	30.5		M10x1	
BF30		Tab.I - Tab.III size B.30	88	82	125	36.5		M10x1	
BF40		Tab.I - Tab.III size B.40	100	86	141	33		M14x1.5	
BF50		Tab.I - Tab.III size B.50	120	105	165	42.5		M14x1.5	
BF60		Tab.I - Tab.III size B.60	140	145	200	50.5		M20x1.5	
BF70		Tab.I - Tab.III size B.70	165	177	235	52.5		M20x1.5	
BF80		Tab.I - Tab.III size B.70	145	148	255	123		M20x1.5	
BF90		Tab.I - Tab.III size B.80	155	176	347.5	260		M24x1.5	

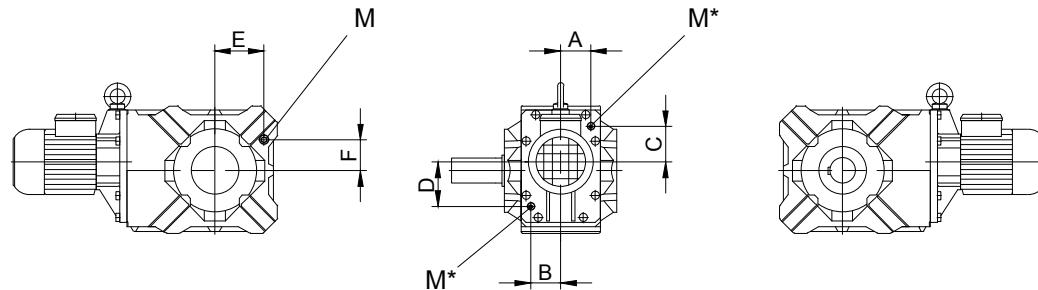
M\* = Factor and position of the drain plug see page 71.

# Gearboxes & Lubrication

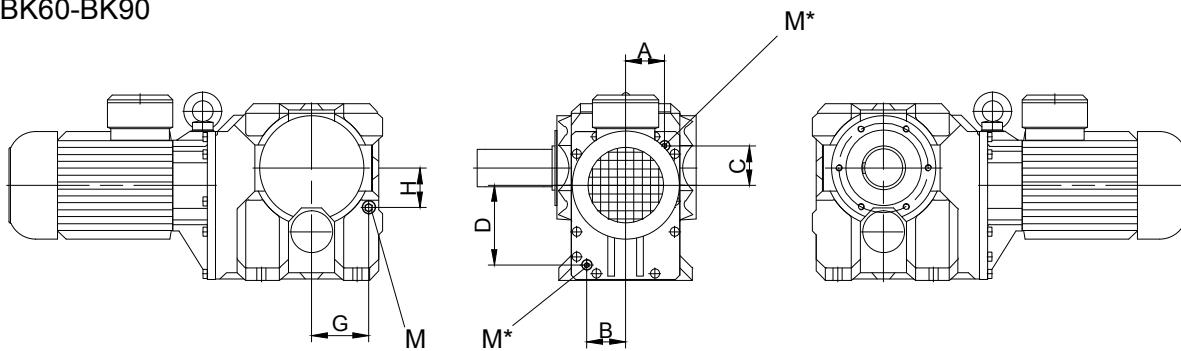
## Threaded plugs

Position of threaded plugs, BK-series gears

BK10-BK50



BK60-BK90



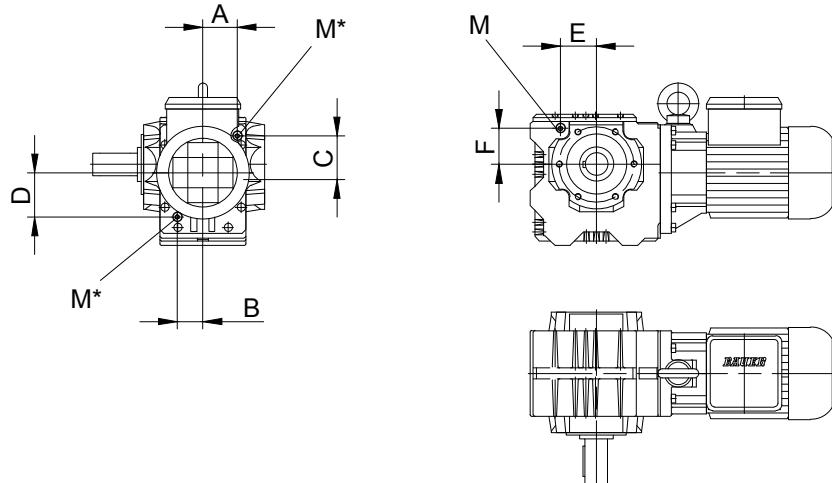
M = Plug according to DIN 908

Type	A	B	C	D	E	F	G	H	M
BK06			on request						
BK10			see position of the oil drain and filler plugs on the system cover	Tab.I- Tab.III size B.10	62	32.5	-	-	M10x1
BK20				Tab.I- Tab.III size B.20	73.5	37.5	-	-	M10x1
BK30				Tab.I- Tab.III size B.30	80	43	-	-	M10x1
BK40				Tab.I- Tab.III size B.40	88	49	-	-	M14x1.5
BK50				Tab.I- Tab.III size B.50	118	74	-	-	M14x1.5
BK60				Tab.I- Tab.III size B.60	-	-	93	87	M20x1.5
BK70				Tab.I- Tab.III size B.70	-	-	137	95	M20x1.5
BK80				Tab.I- Tab.III size B.80	-	-	150	117	M20x1.5
BK90				Tab.I- Tab.III size B.90	-	-	208	135	M24x1.5

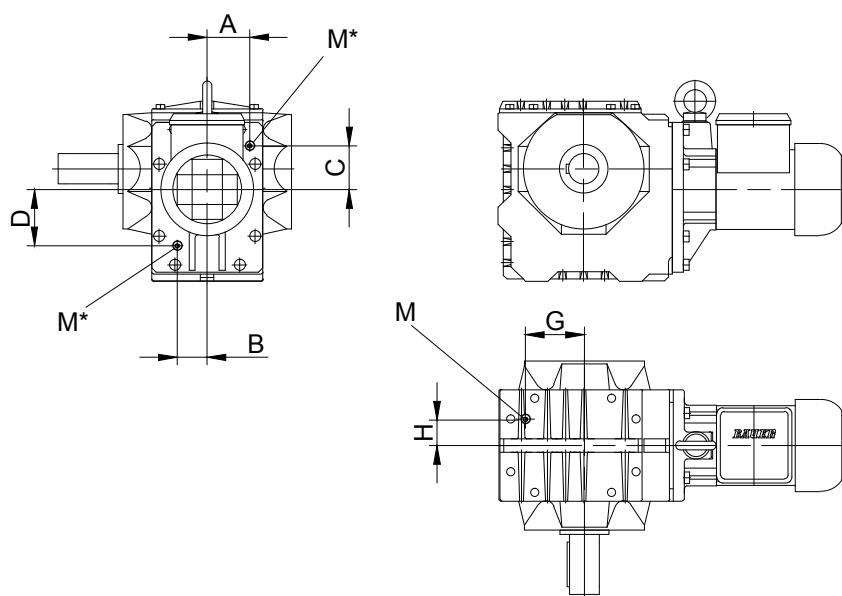
M\* = Factor and position of the drain plug see page 71.

### Position of threaded plugs, BS-series gears

BS10 - BS20



BS30 - BS40



M = Plug according to DIN 908

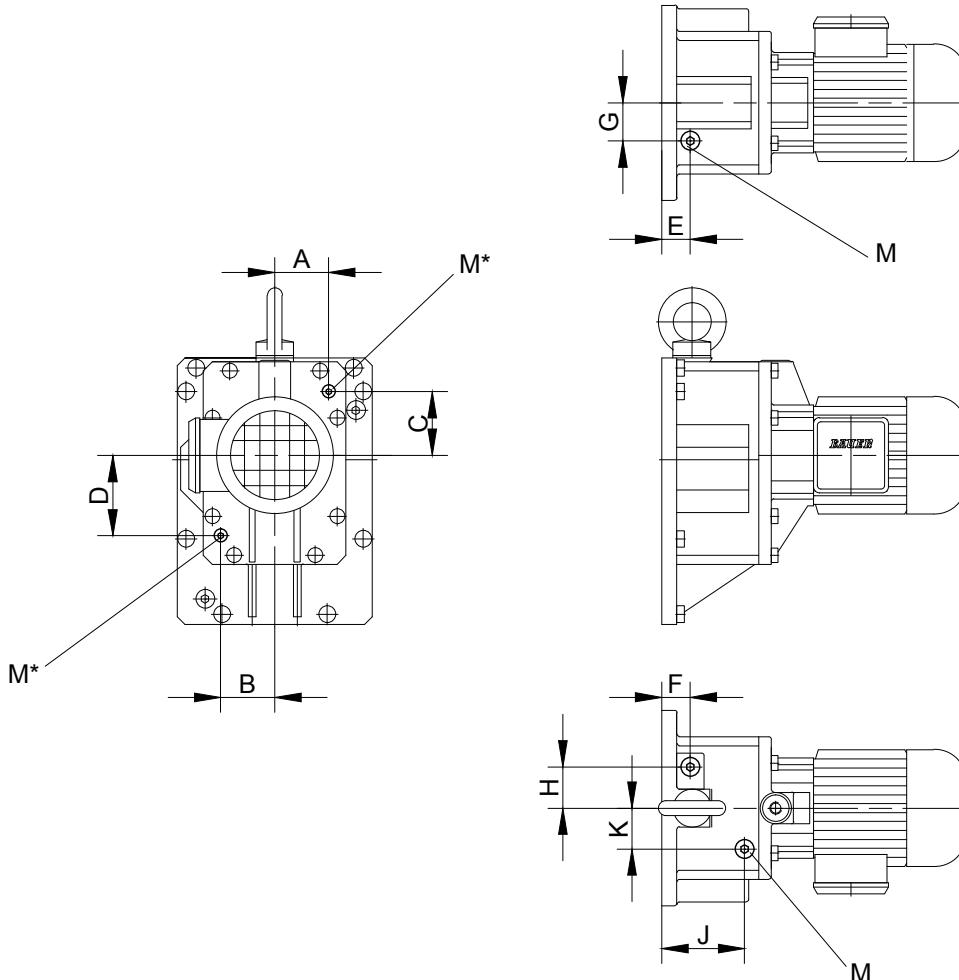
Type	A	B	C	D	E	F	G	H	M
BS10	see position of the oil drain and		Tab.I-Tab.III size B.10		48	50	-	-	M10x1
BS20			Tab.I-Tab.III size B.20		59	63	-	-	M10x1
BS30	filler plugs on the		Tab.I-Tab.III size B.30		-	-	79	35	M10x1
BS40	system cover		Tab.I-Tab.III size B.40		-	-	93.5	41.5	M14x1.5

M\* = Factor and position of the drain plug see page 71.

# Gearboxes & Lubrication

## Threaded plugs

Position of threaded plugs, pre-stage gears (Z)

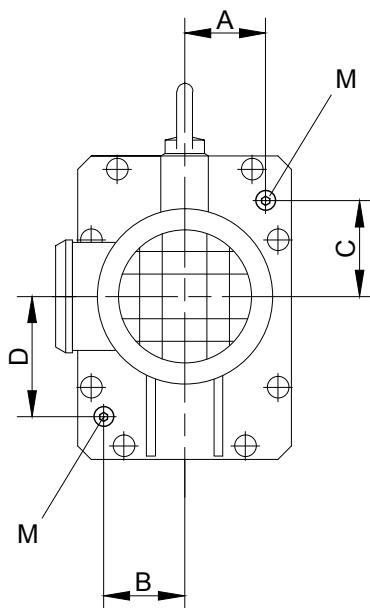


M = Plug according to DIN 908

Gear	A	B	C	D	E	F	G	H	J	K	M
BG10(Z);BK10(Z); BF10(Z);BS10(Z)	-	-	-	-	25	-	17.5	-	44	25	M10x1
BG20(Z);BK20(Z); BF20(Z);BS20(Z)	-	-	-	-	49	-	28.5	-	23.5	28	M10x1
BG30(Z);BK30(Z); BF30(Z);BS30(Z)	see position of the oil drain and filler plugs on the system cover	Tab.I u. II size B.10			-	24	-	30	-	-	M10x1
BG40(Z);BK40(Z); BF40(Z);BS40(Z)		Tab.I u. II size B.20			-	27.5	-	36.5	-	-	M14x1.5
BG50(Z);BK50(Z); BF50(Z)		Tab.I u. II size B.30			-		-	-	29	43	M14x1.5
BG60(Z);BK60(Z); BF60(Z)		Tab.I u. II size B.40			-	33	-	48	-	-	M20x1.5
BG70(Z);BK70(Z); BF70(Z);BF80(Z)		Tab.I u. II size B.50			-	38	-	55	-	-	M20x1.5
BG80(Z);BK80(Z); BF90(Z);BG100(Z)		Tab.I u. II size B.60			-	45	-	73	-	-	M20x1.5
BG90(Z);BK90(Z)		Tab.I u. II size B.70			-	45	-	62	-	-	M24x1.5

M\* = Factor and position of the drain plug see page 71.

Position of the drain plugs in the System Cover  
Design with Standard Geared Motor



5

M = Plug according to DIN 908

**Table I: Design with standard geared motor**

Gear	Size	A	B	C	D	M
BG10(Z); BK10(Z); BF10(Z); BS10(Z)	D05-D..09	36	34	43.5	59	M10x1
BG15	D05-D..09	36	34	43.5	59	M10x1
BG20(Z); BK20(Z); BF20(Z); BS20(Z)	D05-D..09	44	44	58	72.5	M10x1
BG30(Z); BK30(Z); BF30(Z); BS30(Z)	D05-D..09	56.5	40	58.2	75	M10x1
BG40(Z); BK40(Z); BF40(Z); BS40(Z)	D..08-D..11	66	71	71	94	M14x1.5
BG50(Z); BK50(Z); BF50(Z)	D..08-D..11	72	74	85	109	M14x1.5
	D..13-D..16	78	74	82	109	M14x1.5
BG60(Z); BK60(Z); BF60(Z)	D..09-D..13	84	81	120	155	M20x1.5
	D..16	86	81	120	155	M20x1.5
BG70(Z); BK70(Z); BF70(Z); BF80(Z)	D..09-D..18	95	85	97	193	M20x1.5
BG80(Z); BK80(Z); BF90(Z); BG100(Z)	D..11-D..18	118	118	110	245	M20x1.5
BG90(Z); BK90(Z)	D..13-D..18	145	145	116	294	M24x1.5

Position of the drain plugs for BG, BK, BS and BF gear ranges and pre-stages.

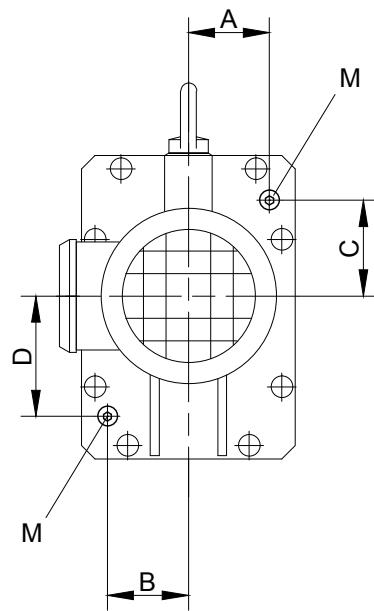
# Gearboxes & Lubrication

## Threaded plugs

Position of the drain plugs in the System Cover

Design with pre-stage Z

5



M = Plug according to DIN 908

**Table III: Design with pre-stage Z**

Gear	A	B	C	D	M
B.10	38	39.5	44	61.5	M10x1
B.20	44	44	58	72	M10x1
B.30	59	42	58.2	77	M10x1
B.40	66	71	71	96	M14x1.5
B.50	72	73	85	111	M14x1.5
B.60	85	81	120	192	M20x1.5
B.70	95	95	97	193	M20x1.5
B.80	118	118	110	245	M20x1.5

Position of the drain plugs for BG, BK, BS and BF gear ranges and pre-stages.