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DRIVING THE FUTURE

FORGE AHEAD, KEEPING INNOVATION

Hypoid Gear Reducer

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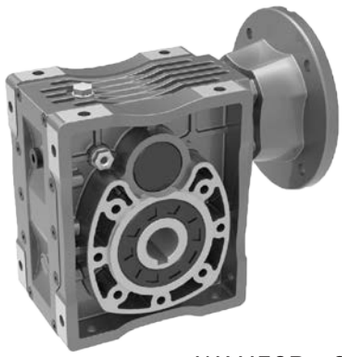
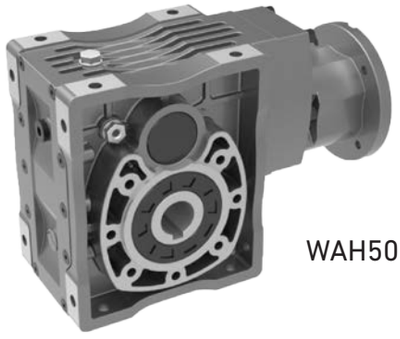


WAH50B - 90B



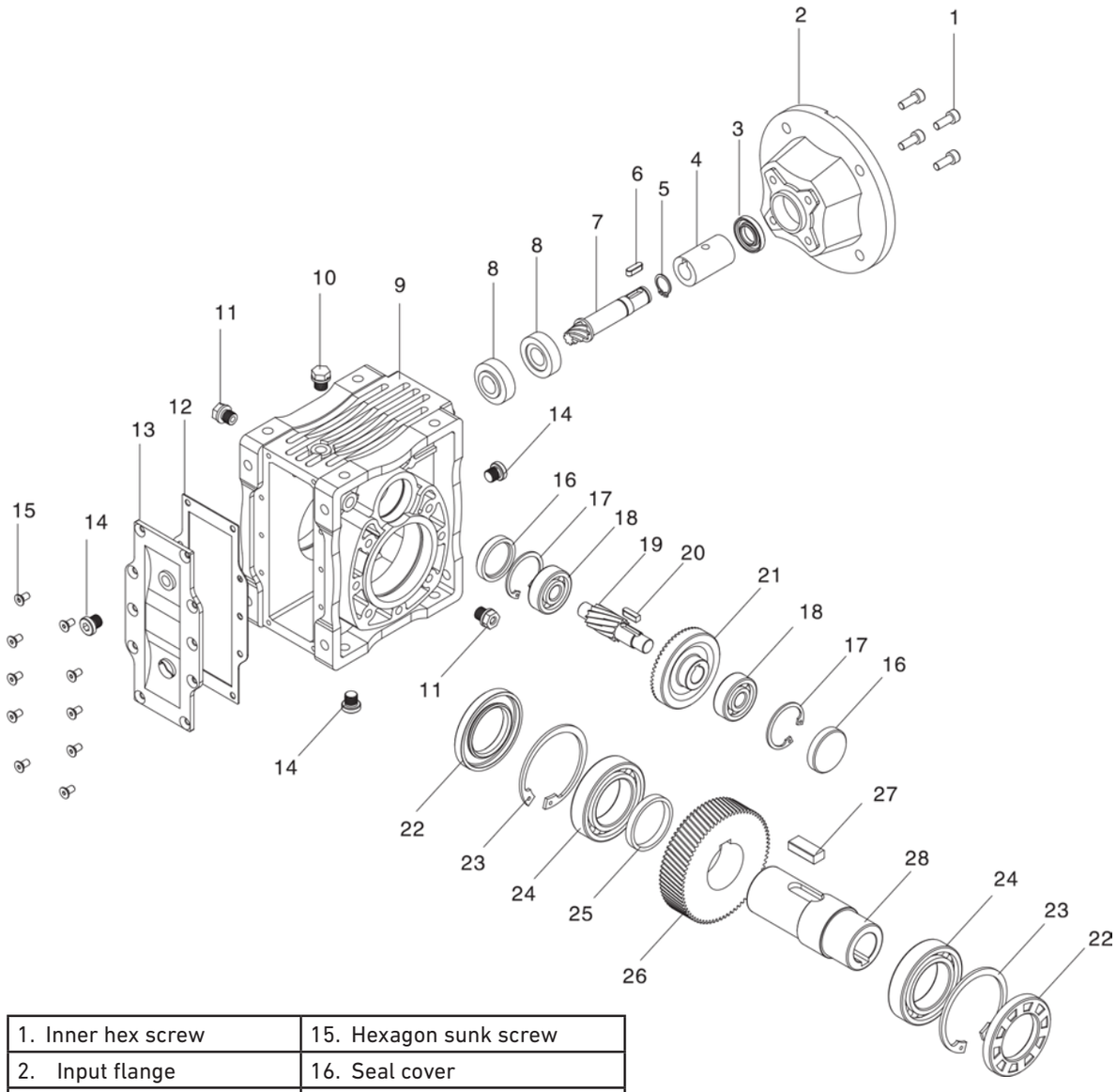
WAH50C - 90C

Hypoid Gear Reducer

- High Efficiency
- Low Noise
- Low Temperature
- Long Life
- 4 Sizes
- 0.12kW to 4kW
- Large Ratio Range 7.5 - 300
- Universal Mounting - Interchangeable with most worm gearboxes
- Standard IEC motor flanges
- Light weight Aluminium frame
- Range of hollow shaft sizes avaliable to special order
- Standard viton seals & synthectic lubricant

2. BASIC STRUCTURE

2.1. WAH B / Basic Structure



1. Inner hex screw	15. Hexagon sunk screw
2. Input flange	16. Seal cover
3. Oil seal	17. Hole circlip
4. Input adapter	18. Bearing
5. Shaft circlip	19. Gear shaft
6. Key	20. Key
7. Gear shaft	21. Gear
8. Bearing	22. Oil Seal
9. Housing	23. Hole circlip
10. Breather	24. Bearing
11. Oil Plug	25. Distance collar
12. Rubber gasket	26. Gear
13. Cover	27. Key
14. Oil drain plug	28. Hollow shaft

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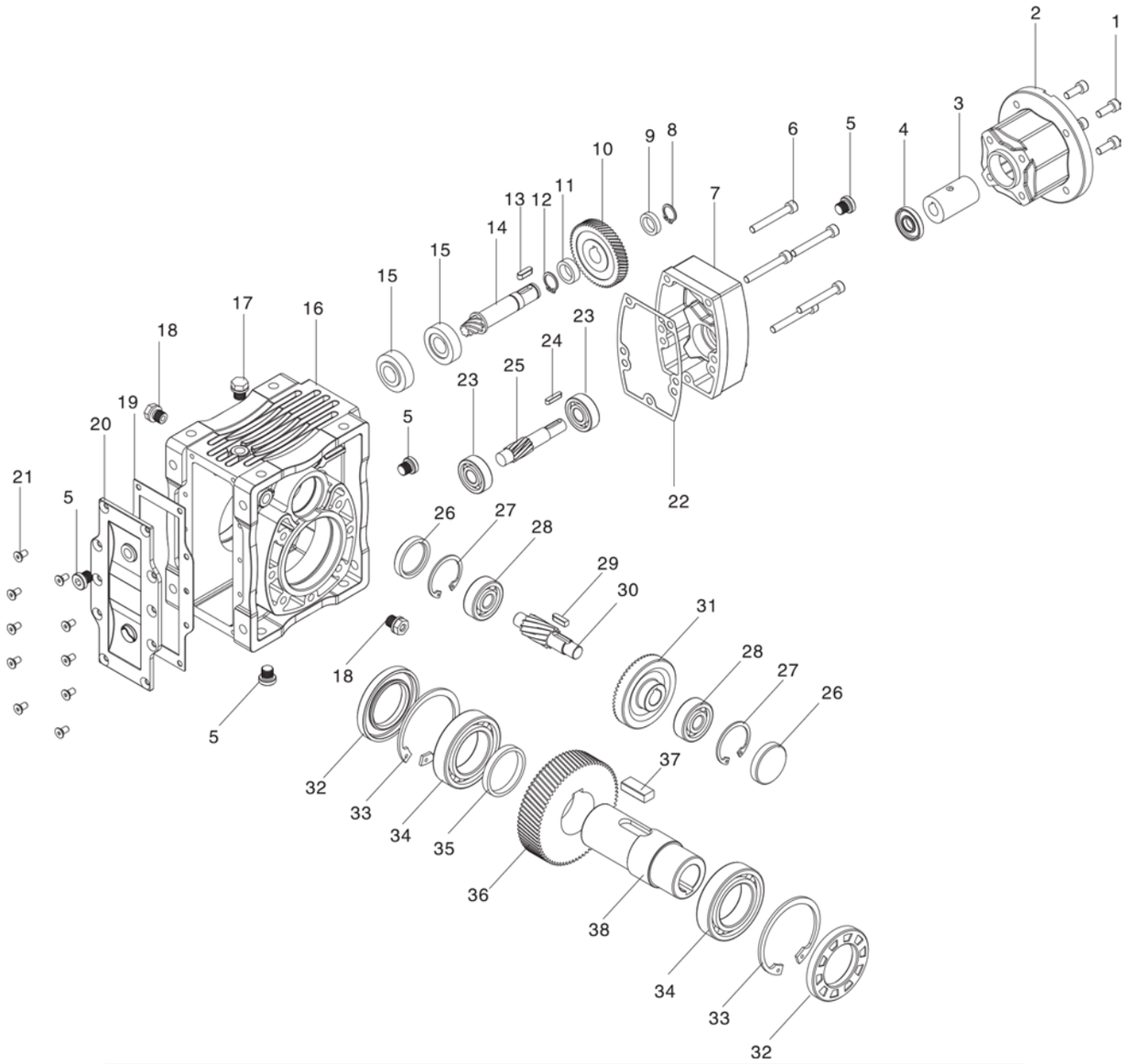
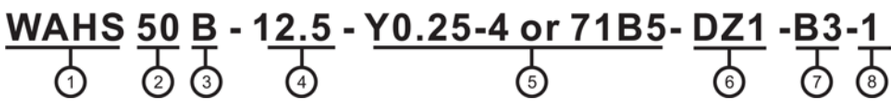
2.2. WAH C / Basic Structure



1. Inner hex screw	14. Gear shaft	27. Hole circlip
2. Input flange	15. Bearing	28. Bearing
3. Input adapter	16. Housing	29. Key
4. Oil seal	17. Breather	30. Gear shaft
5. Oil drain plug	18. Oil level plug	31. Gear
6. Inner hex screw	19. Rubber gasket	32. Oil Seal
7. Input flange holder	20. Cover	33. Hole circlip
8. Shaft circlip	21. Hexagon sunk screw	34. Bearing
9. Distance collar	22. Housing gasket	35. Distance collar
10. Gear	23. Bearing	36. Gear
11. Distance collar	24. Key	37. Key
12. Shaft circlip	25. Gear shaft	38. Hollow shaft
13. Key	26. Seal cover	

3. MODEL DESIGNATION

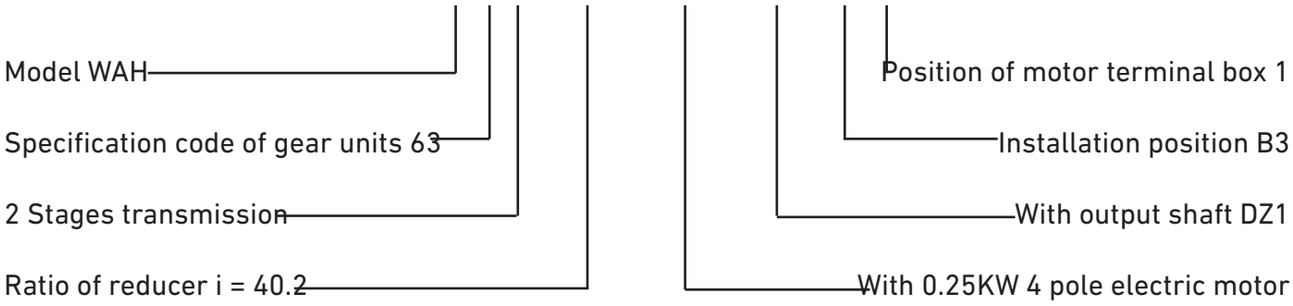


No	Comments
1	1. WAH: With input flange 2. WAH: With input shaft
2	Size code of gear units 50, 63, 75, 90
3	1. B: Means 2 stages 2. C: Means 3 stages
4	Reducer Ratio: i
5	1. With input flange and electric motor: Y 0.25kw-4pole 2. With input flange, without electric motor: 71B5 (Flange size)
6	1. With output shaft: DZ1, DZ2, SZ 2. With output flange: FA1, FA2 3. With torque arm: T1, T2
7	Installation position code
8	Position of motor terminal box

When ordering, you should show whether the reducers are equippedwith motors. otherwise reducers aren't supplied with motors.

EXAMPLE:

WAH63B - 40.2 - Y0.25-4 -DZ1- B3-1



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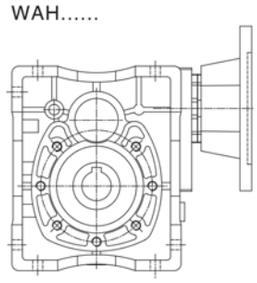
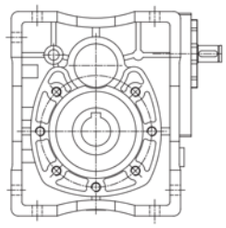
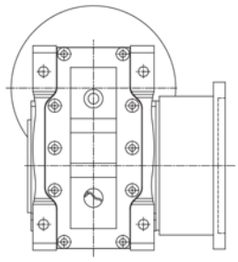
WAH.....



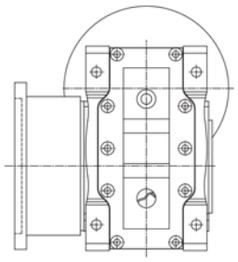
WAHS.....



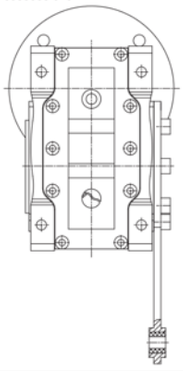
WAH.....FA1



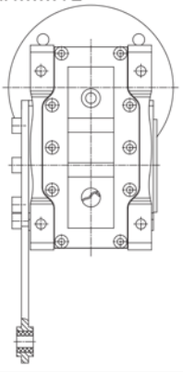
WAH.....FA2



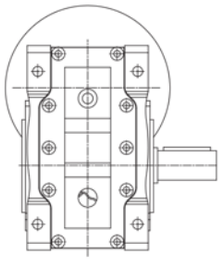
WAH.....T1



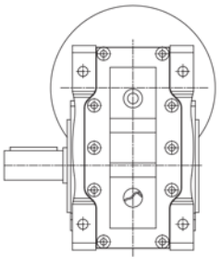
WAH.....T2



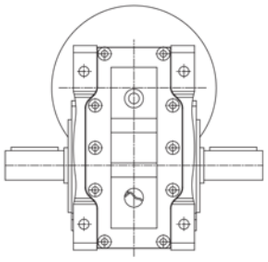
WAH.....DZ1



WAH.....DZ2



WAH.....SZ



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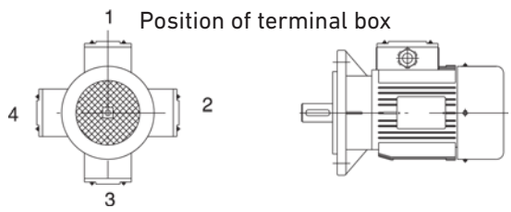
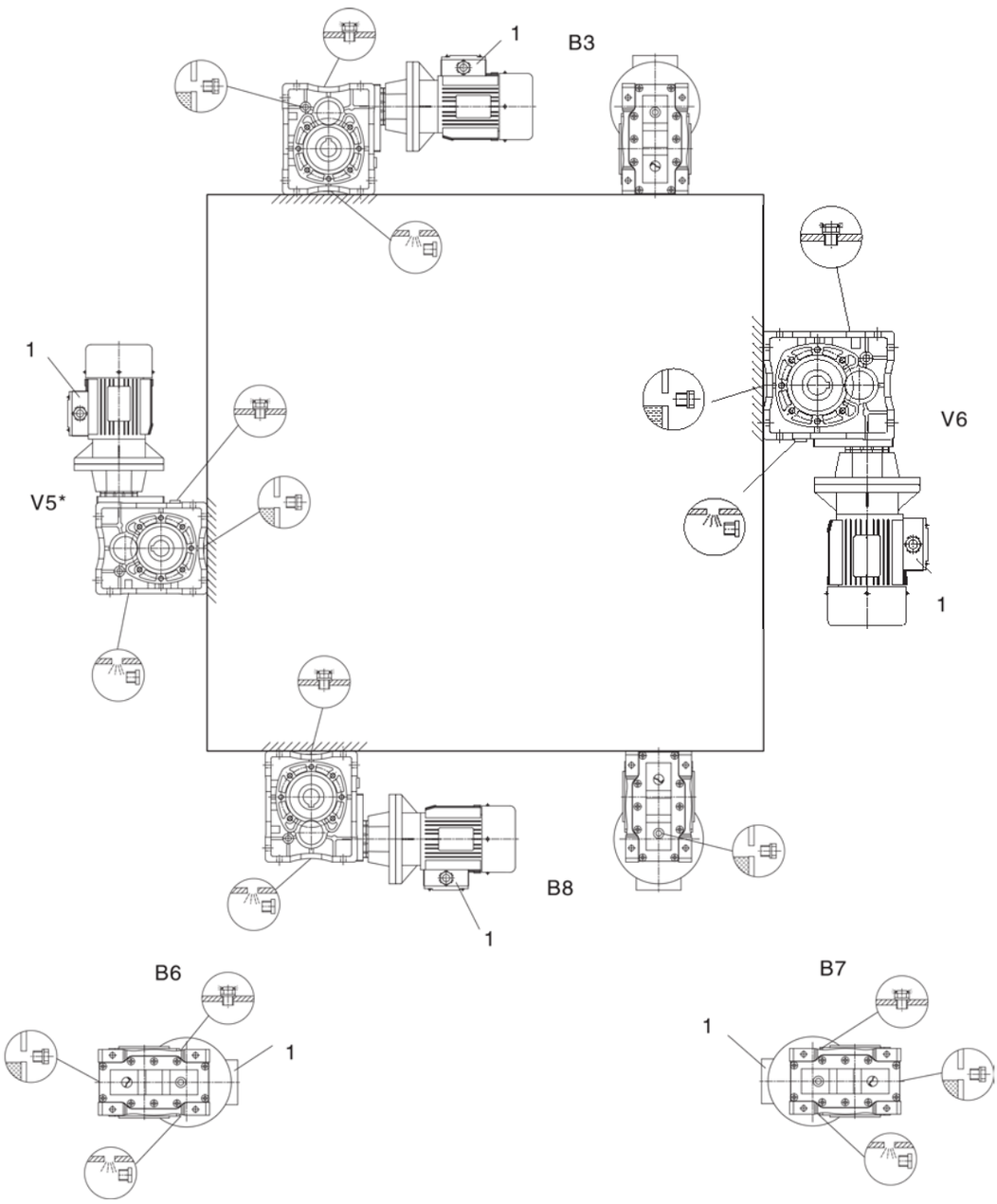
Symbol	Meaning
	Breather
	Oil mirror
	Oil drain plug





* Means lubricant can't be added only according to the oil level of mirror, also higher than it, the fill quantity as shown in the table.

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4. RELEVANT PARAMETER

4.1. Power P

$$P_1 = \frac{P_2}{\eta} \text{ [KW]}$$

$$P_{1n} \geq P1 \text{ [kW]}$$

P_1 Input power
P_2 Output power
P_{1n} Rated power of motor
η Transmission efficiency

The efficiency of WAH gear units varies with the number of gear stages, between 92 % (2-stage), 90%(3-stage).

4.2. Rotation speed n

n_1 Input speed of reducer
n_2 Output speed of reducer

If driven by the external equipment,1400r/min or lower rotation speed is suggested to be used in order to optimize the working conditions and prolong the service life. Higher input rotation speed is permitted, but in this case,the rated torque M2 will be reduced.

4.3. Transmission ratio i

$$i = \frac{n_1}{n_2}$$

Usually transmission ratio is decimal fraction with 2 radix point tagged in selection tables.

4.4. Torque M

$$M_2 = \frac{9550 \bullet P_1 \bullet \eta}{n_2} \text{ [Nm]}$$

$$M_{2n} \geq M_2 \bullet f_s \text{ [Nm]}$$

M_2 Output torque
M_{2MAX} Max. permissible output torque [Nm]
P_1 Input power
η Transmission efficiency
f_s Service factor

4.5. Service factor

We must take service factor into consideration when we use reducer .
f_s service factor is determined according to the daily operating and the starting frequency Z.
f_B service factor is determined gear unit output torque.

Please meet below requirement when choose product:

$$f_b \geq f_s$$

Three load classifications are considered depending on the inertia coefficient. You can read off the service factor applicable to your application in following Figure.
The service factor selected using this diagram must be less than or equal to the service factor as given in the performance parameter table.

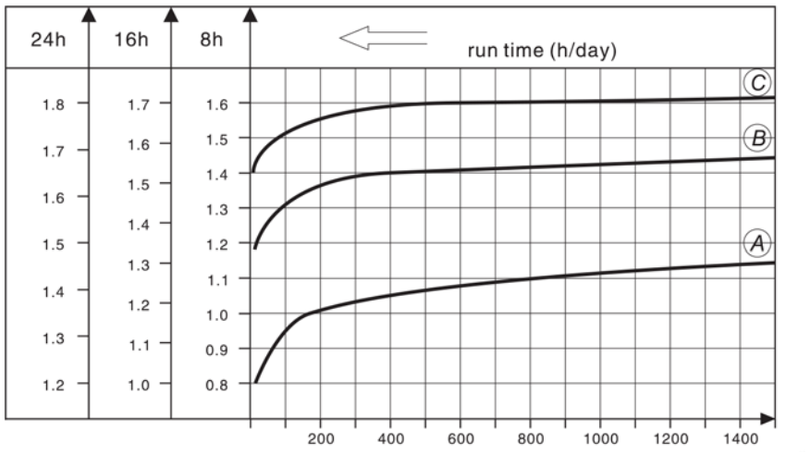

Fig:Service factor (f_s)

4.5.1 Load Classifications

A Uniform shock load, permitted mass acceleration factor fa ≥ 0.2
B Moderate shock load.permitted mass acceleration factor fa ≥ 3
C Heavy shock load.permitted mass acceleration factor fa ≥ 10

Load classifications:

A Screw feeders, fans, assembly lines, conveyor belts, small mixers, lifts, cleaning machines, fillers, control machines.
B Winding devices, woodworking machine feeders, goods lifts, balancers, threading machines, medium mixers, conveyor belts for heavy materials, winches, sliding doors, fertilizer scrapers, packing machines, concrete mixers, crane mechanisms, milling cutters, folding machines, gear pumps.
C Mixers for heavy materials, shears, presses, centrifuges, rotating supports, winches and lifts for heavy materials, grinding lathes, stone mills, bucket elevators, drilling machines, hammer mills, cam presses, folding machines, turntables, tumbling barrels, vibrators, shredders.

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4.5.2 Interial co-efficient

The interial coefficient is calculated as follows:

$$f_a = \frac{J_c}{J_m}$$

f_a Coefficient of inertia
J_c All external moments of inertia(kgm2)
J_m Moment of inertia of the motor (kgm2)
If coefficient of inertia $f_a > 10$

To keep the lifetime of reducer, the use factor feselected from the catalogue must be equal or slightly higher than actual application service factor f_s.

Example:
Inertial coefficient of 2.5(1oad classification *B*), 14 hours/day operating time (read off at 16 h/d) and 200 stop/hour result in a service factor f_s = 1.48. According to the parameter sheet, we choose the service factor $f_B \geq 1.48$

4.6. Radial loads and axial forces

When determining the resulting radial loads, the type of transmission elements, mounted on the shaft end must be considered. Various transmission elements are corresponding with following transmission element factors f_z:

Transmission element	Additional transmission facter f_z	Comments
Gears	1.15	< 17 teeth
Chain Sprockets	1.40	< 13 teeth
	1.25	< 20 teeth
Narrow V-belt pulleys	1.75	Influence of the tensile force
Flat belt pulleys	2.50	Influence of the tensile force
Toothed belt pulleys	2.50	Influence of the tensile force

The radial loads exerted on the motor or gear shaft is then calculated as follows:

$$F_r = \frac{M \bullet 2000 \bullet f_z}{d_o} \quad [N]$$

F_r Resulting radial load [N]
M Torque on the shaft [Nm]
d_o Mean diameter of transmission element mounted on shaft [mm]
f_z Additional transmission factor

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The basis for determining the permitted radial loads is based on the rated service life L_{10th} of the bearings (according to 150281). Function point is placed in the middle of exposed part of output shaft.

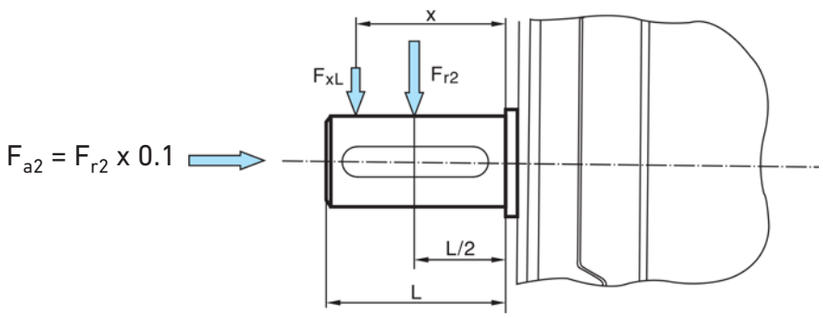
The permitted radial loads given in the selection tables must be calculated using the following formula in the event of force application not in the center of the shaft end. The smaller of the two calues F_{xL}(according to bearing service life)

F_{xL} according to bearing service life:

$$F_{xL} = F_{r2} \cdot \frac{a}{b + x} \quad [N]$$

F_{r2} = Permitted radial load (x=L/2) according to he selection tables in [N]
x = Distance from the shaft shoulder to the force application point in [mm]
a,b = Constant conversion of radial load [mm]

Radial loads of output shaft F_{r2}



F_{a2} = Output axial loads

Constants conversion of radial load of WAH reducer:

	WAH50B	WAH50C	WAH63B	WAH63C	WAH75B	WAH75C	WAH90B	WAH90C
a	105.5	105.5	120	120	133	133	163	163
b	80.5	80.5	95	95	103	103	123	123

Note: Thls reducer Is not suitable to connect with gear, pulley and so on. Which have big radlal force
as input. If it has special requests, please contact our technical department.

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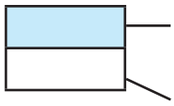
4.7. Selection tables comments



Combination with the motor in the header row is possible

Combination with the motor in the header row is not possible

•	Means ratio is divisible
P_{1n}	Rated power of motor [kW];
P_{1Max}	Max. motor power [kW];
n_2	Output speed [r/min];
M_2	Output torque [Nm];
M_{2max}	Max. allowed output torque [Nm];
F_{r2}	Radial load of output shaft [N];
i	Nominal ratio of reducer;
i_a	Actual ratio of reducer;
f_B	Service factor;

Gear unit type;

Motor type;

5 SELECTION EXAMPLE

5.1. Gear motor

Example: Required power 0.66kW on driven machine, work for 16 h/day, moderate shock load, start up frequency 50(1/h), n2=28r/min, 83 mounted, So:

1. Check the service factor table.choose f_s=1.4

2. Ratio: $i = \frac{n_1}{n_2} = \frac{1400}{28} = 50$

3. Power of Motor: $P_{1n} \geq P_1 = \frac{P_1}{\eta} = \frac{0.66}{0.92} = 0.72$ [kW]

$$f_B \geq f_s$$

Choose type:
WAH75B - 48.18 - Y0.75 - 4 - B3

$f_B = 1.5 \geq f_s = 1.4$

Must meet requirement when $f_B \geq f_s$

5.2. Gear Units

Example: Required torque is 260Nm on driven machine, work 16 h/day, uniform load, start up frequency 200(1/h), FA1 mounted, n_1 1400 r/min, n_2=12 r/min, please choose suitable reducer:

1. Check the service factor table, choose f_s = 1.47

2. Ratio: $i = \frac{n_1}{n_2} = \frac{1400}{12} \approx 125$ (the only section is 3 stage)

3. MAX Torque: $M_{2MAX} \geq M_2 \bullet f_s = 260 \times 1.47 = 382$ [Nm]

4. Power of Motor: $P_{1n} \geq P_1 = \frac{M_2 \bullet n_1}{9550 \bullet \eta \bullet i} = \frac{260 \times 1400}{9550 \times 0.90 \times 125} \approx 0.34$ [kW]

$$f_B \geq f_s$$

Choose type:
WAHS90C - 125.95 - FA1 Shaft input reducer

$f_B = 1.7 \geq f_s = 1.47$

Must meet requirement when $f_B \geq f_s$
Advice to take 0.37KW, 1400r/min motor as drive, we use coupling to connect reducer and motor.

6. GEAR UNIT SELECTION TABLES

6.1. Possible geometrical combinations

WAH 50... n_1 = 1400 r/min 130Nm

Gear units	(i) Nominal	(i) Actual	n_2 [r/min]	M_{2MAX} [Nm]	f_{r2} [N]	63B5	71B5/ 71B14	80B5 /80B14	90B5 /90B14
3 Stage									
WAH50C	300	291.79	4.8	130	4100				
WAH50C	250	244.29	5.7	130	4100				
WAH50C	200	200.44	7.0	130	4100				
WAH50C	150	146.67	9.5	130	4000				
WAH50C	125	120.34	11.6	100	3770				
WAH50C	100	101.04	13.9	80	3560				
WAH50C	75	74.62	18.8	130	3220				
WAH50C	60	62.36	22	100	3030				
WAH50C	50	52.36	27	110	2860				
2 Stage									
WAH50B	60	58.36	24	130	2960				
WAH50B	50	48.88	29	130	2790				
WAH50B	40	40.09	35	130	2610				
WAH50B	30	29.33	48	130	2350				
WAH50B	25	24.07	59	130	2200				
WAH50B	20	20.21	70	100	2080				
WAH50B	15	14.92	94	80	1880				
WAH50B	12.5	12.47	113	130	1770				
WAH50B	10	10.47	134	100	1670				
WAH50B	7.5	7.73	182	80	1510				

WAH 63... n_1 = 1400 r/min 200Nm

Gear units	(i) Nominal	(i) Actual	n_2 [r/min]	M_{2MAX} [Nm]	f_{r2} [N]	63B5	71B5/ 71B14	80B5 /80B14	90B5 /90B14
3 Stage									
WAH63C	300	302.50	4.7	200	4800				
WAH63C	250	243.57	5.8	200	4800				
WAH63C	200	196.43	7.2	160	4800				
WAH63C	150	151.56	9.3	200	4650				
WAH63C	125	122.22	12	180	4330				
WAH63C	100	101.27	14	150	4070				
WAH63C	75	73.33	20	110	3650				
WAH63C	80	63.33	23	160	3480				
WAH63C	50	52.48	27	150	3270				
2 Stage									
WAH83B	80	80.50	24	200	3430				
WAH83B	50	48.71	29	200	3190				
WAH63B	40	39.29	36	180	2970				
WAH83B	30	30.31	47	200	2720				
WAH63B	25	24.44	58	180	2530				
WAH63B	20	20.25	70	150	2380				
WAH83B	15	14.87	96	110	2130				
WAH63B	12.5	12.67	111	180	2030				
WAH83B	10	10.50	134	150	1910				
WAH638	**7.5**	**7.60**	**185**	**110**	**1710**				

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WAH 75... n_1 = 1400 r/min — 350Nm

Gear units	(i) Nominal	(i) Actual	n_2 [r/min]	M_{2MAX} [Nm]	f_{r2} [N]	63B5	71B5	80B5 80B14	90B5 90B14	100B5 100B14	112B5 112B14
3 Stage											
WAH75C	300	297.21	4.8	350	6500	■	■				
WAH75C	250	240.89	5.9	350	6500	■	■				
WAH75C	200	200.66	7.0	300	6500	■	■				
WAH75C	150	151.20	9.3	350	6500	■	■	■			
WAH75C	125	125.95	12	300	5980	■	■	■			
WAH75C	100	99.22	15	240	5520	■	■	■			
WAH75C	75	75.45	19	200	5040	■	■	■			
WAH75C	60	62.43	23	300	4730		■	■	■		
WAH75C	50	49.18	29	240	4370		■	■	■		
2 Stage											
WAH75B	60	59.44	24	350	4660		■	■	■		
WAH75B	50	48.18	30	350	4340		■	■	■		
WAH758	40	40.13	35	300	4080		■	■	■		
WAH758	30	30.24	47	350	3720			■	■		
WAH75B	25	25.19	56	300	3500			■	■	■	
WAH75B	20	19.84	71	240	3230			■	■	■	
WAH75B	15	15.09	93	200	2950			■	■	■	
WAH75B	12.5	12.49	113	300	2770			■	■	■	■
WAH75B	10	9.84	143	240	2550			■	■	■	■
WAH758	7.5	7.48	188	200	2330			■	■	■	■

WAH 90... n_1 = 1400 r/min — 500Nm

Gear units	(i) Nominal	(i) Actual	n_2 [r/min]	M_{2MAX} [Nm]	f_{r2} [N]	63B5	71B5	80B5 80B14	90B5 90B14	100B5 100B14	112B5 112B14
3 Stage											
WAH90C	300	295. 18	4.8	500	8300	■	■				
WAH90C	250	240.89	5.9	500	8300	■	■	■			
WAH90C	200	200.66	7.0	480	8300	■	■	■			
WAH90C	150	151.20	9.3	500	8050	■	■	■			
WAH90C	125	125.95	12	480	7580	■	■	■	■		
WAH90C	100	99.22	15	380	7000	■	■	■	■		
WAH90C	75	75.45	19	300	6390	■	■	■	■		
WAH90C	60	62.43	23	480	6000		■	■	■		
WAH90C	50	49. 18	29	380	5540		■	■	■		
2 Stage											
WAH90B	60	59.04	24	500	5890		■	■	■		
WAH90B	50	48. 18	30	500	5500		■	■	■		
WAH90B	40	40. 13	35	480	5170			■	■	■	
WAH90B	30	30.24	47	500	4710			■	■	■	
WAH90B	25	25. 19	56	480	4430			■	■	■	■
WAH908	20	19.84	71	380	4090			■	■	■	■
WAH90B	15	15.09	93	300	3730			■	■	■	■
WAH90B	12.5	12.49	113	480	3510				■	■	■
WAH90B	10	9.84	143	380	3240				■	■	■
WAH90B	7.5	7.48	188	300	2950				■	■	■

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6.2. Performance Parameter

P_{1n} [kW]	n_2 [r/min]	M_2 [Nm]	(i) Nominal	(i) Actual	f_{r2} [N]	f_a		
0.12	5.7 7.0 9.5 11.8 13.9 18.8 22.5 28.7	180 148 108 89 74 55 46 39	250 200 150 125 100 75 60 50	244.29 200.44 146.67 120.34 101.04 74.62 62.36 52.38	4100 4100 4000 3770 3560 3220 3030 2880	0.7 0.9 1.2 1.1 1.0 2.3 2.1 2.8	WAH50C	63B5-4
	24.0 28.7 35 48 58 69 94 112 134 181	44 37 30 22 18 15.2 11.2 9.4 7.9 5.8	60 50 40 30 25 20 15 12.5 10 7.5	58.36 48.86 40.09 29.33 24.07 20.21 14.92 12.47 10.47 7.73	2960 2790 2610 2350 2200 2080 1880 1770 1670 1510	3.0 3.5 4.2 5.8 7.0 6.6 7.1 13.5 12.7 13.7	WAH50B	63B5-4
	5.7 7.1 9.2 11.5 13.8 19.1 22.1 26.7	179 145 112 90 75 54 47 39	250 200 150 125 100 75 60 50	243.57 196.43 151.56 122.22 101.27 73.33 63.33 52.48	4800 4800 4650 4330 4070 3650 3480 3270	1.1 1.2 1.8 2.0 2.0 2.0 3.9 3.9	WAH63C	63B5-4
	23.1 28.7 36 46	46 37 30 23	60 50 40 30	60.50 48.71 39.29 30.31	3430 3190 2970 2720	4.4 5.5 6.1 8.8	WAH75C	63B5-4
	4.7 5.B 7.0 9.3 11.1	219 177 148 111 93	300 250 200 150 125	297.21 240.89 200.66 151.20 125.95	6500 6500 6500 6500 5980	1.6 2.0 2.0 3.1 3.2	WAH75C	63B5-4
	4.7 5.8 7.0 9	217 177 148 111	300 250 200 150	295.18 240.89 200.66 151.20	8300 8300 8300 8050	2.3 2.8 3.2 4.5	WAH90C	63B5-4
0.18	9.6 11.5 14.0 19.1 23.3 27.7 38 45 53	181 135 111 81 66 56 41 34 29	300 250 200 150 125 100 75 60 50	291.79 244.29 200.44 146.67 120.34 101.04 74.62 62.36 52.36	4000 3790 3550 3200 2990 2820 2550 2400 2270	0.8 0.9 1.2 1.6 2.0 1.8 1.9 3.8 3.5	WAH50C	63B5-2
	48 57 70 95 116	33 27 22 16 13	60 50 40 30 25	58.36 48.86 40.09 29.33 24.07	2350 2220 2070 1870 1750	3.8 4.6 5.6 7.7 9.4	WAH50B	63B5-2

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P_{1n} [kW]	n_2 [r/min]	M_2 [Nm]	(i) Nominal	(i) Actual	f_{r2} [N]	f_B		
0.18	11.6	133	125	120.34	3770	1.0	WAH50C	63B5-4
	13.9	112	100	101.04	3560	0.9		
	18.8	82	75	74.62	3220	1.0		
	22.5	69	60	62.36	3030	1.9		
	26.7	58	50	52.36	2860	1.7		
	24.0	66	60	58.36	2960	2.0	WAH50B	63B5-4
	28.7	55	50	48.86	2790	2.4		
	35	45	40	40.09	2810	2.9		
	48	33	30	29.33	2350	3.9		
	58	27	25	24.07	2200	4.7		
	69	23	20	20.21	2080	4.4		
	94	16.9	15	14.92	1880	4.7		
	112	14.1	12.5	12.47	1770	9.0		
	134	11.8	10	10.47	1670	8.3		
	181	8.7	7.5	7.73	1510	9.0		
	12.1	128	75	74.62	3730	1.0	WAH50C	71B5/B14-6
	14.4	107	60	62.36	3510	0.9		
	17.2	90	50	52.36	3310	1.2		
	15.4	103	60	58.36	3430	1.3	WAH50B	71B5/B14-6
	18.4	86	50	48.86	3240	1.5		
	22.4	70	40	40.09	3030	1.8		
	31	52	30	29.33	2730	2.5		
	37	42	25	24.07	2550	3.1		
	45	36	20	20.21	2410	2.8		
	60	26	15	14.92	2180	3.1		
	72	22	12.5	12.47	2050	5.9		
	9.3	167	300	302.50	4650	1.2	WAH63C	63B5-2
	11.5	135	250	243.57	4330	1.5		
	14.3	109	200	196.43	4030	1.7		
	18.5	84	150	151.56	3690	2.4		
	22.9	68	125	122.22	3440	2.7		
	27.6	56	100	101.27	3230	2.7		
	38	41	75	73.33	2900	2.7		
	44	35	60	63.33	2780	5.1		
	53	29	50	52.48	2590	5.2		
	7.1	217	200	196.43	4800	0.8	WAH63C	63B5-4
	9.2	167	150	151.56	4650	1.2		
	11.5	135	125	122.22	4330	1.3		
	13.8	112	100	101.27	4070	1.3		
	19.1	81	75	73.33	3650	1.4		
	22.1	70	80	83.33	3480	2.8		
	26.7	58	50	52.48	3270	2.6		
	23.1	68	60	60.50	3430	2.9	WAH63B	63B5-4
	28.7	55	50	48.71	3190	3.6		
	36	44	40	39.29	2970	4.1		
	7.4	210	125	122.22	4800	0.9	WAH63C	71B5/B14-6
	8.9	174	100	101.27	4720	0.9		
	12.3	128	75	73.33	4230	0.9		
	14.2	109	60	63.33	4030	1.7		
	17.1	90	50	52.48	3790	1.7		
	14.9	106	60	60.50	3970	1.9	WAH63B	71B5/B14-6
	16.5	86	50	48.71	3690	2.3		
	22.9	69	40	39.29	3440	2.6		
	29.7	53	30	30.31	3150	3.8		
	9.4	164	300	297.21	6320	2.1	WAH75C	63B5-2
	11.6	133	250	240.89	5890	2.6		
	14.0	111	200	200.66	5540	2.7		
	18.5	84	150	151.20	5040	4.2		

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P_{1n} [kW]	n_2 [r/min]	M_2 [Nm]	(i) Nominal	(i) Actual	f_{r2} [N]	f_B		
0.18	4.7	328	300	297.21	6500	1.1	WAH75C	63B5-4
	5.8	266	250	240.89	6500	1.3		
	7.0	222	200	200.66	6500	1.4		
	9.3	167	150	151.20	6500	2.1		
	11.1	139	125	125.95	5980	2.2		
	14.1	110	100	99.22	5520	2.2		
	18.8	83	75	75.45	5040	2.4		
	4.5	345	200	200.66	6500	0.87	WAH75C	71B5-6
	6.0	260	150	151.20	6500	1.3		
	7.1	217	125	125.95	6500	1.4		
	9.1	171	100	99.22	6400	1.4		
	11.9	130	75	75.45	5840	1.5		
	14.4	107	60	62.43	5480	2.8		
	18.3	85	50	49.18	5060	2.8		
	15.1	104	60	59.44	5390	3.4	WAH75B	71B5-6
	18.7	85	50	48.18	5030	4.1		
	9.5	163	300	295.18	7990	3.1	WAH90C	63B5-2
	11.6	133	250	240.99	7470	3.8		
	4.7	326	300	295.18	8300	1.5	WAH90C	63B5-4
	5.8	266	250	240.89	8300	1.9		
	7.0	222	200	200.66	8300	2.2		
	9.3	187	150	151.20	8050	3.0		
	11.1	139	125	125.95	7580	3.4		
	3.7	414	250	240.89	8300	1.2	WAH63C	71B5-6
	4.5	345	200	200.66	8300	1.4		
	6.0	260	150	151.20	8300	1.9		
	7.1	217	125	125.95	8300	2.2		
	9.1	171	100	99.22	8110	2.2		
	11.9	130	75	75.45	7400	2.3		
	14.4	107	60	62.43	6950	4.5		
0.25	19.1	113	150	146.67	3200	1.2	WAH50C	63B5-2
	23.3	92	125	120.34	2990	1.4		
	27.7	78	100	101.04	2820	1.3		
	38	57	75	74.62	2550	1.4		
	45	48	80	62.36	2400	2.7		
	53	40	50	52.36	2270	2.4		
	48	46	60	58.36	2350	2.7	WAH50B	63B5-2
	57	38	50	48.86	2220	3.3		
	70	31	40	40.09	2070	4.0		
	18.8	114	75	74.62	3220	0.94	WAH50C	71B5/B14-4
	22.5	96	60	62.36	3030	1.4		
	26.7	80	50	52.36	2860	1.2		
	24.0	92	60	58.36	2960	1.4	WAH50B	71B5/B14-4
	28.7	77	50	48.86	2790	1.7		
	35	63	40	40.09	2610	2.1		
	48	46	30	29.33	2350	2.8		
	58	38	25	24.07	2200	3.4		
	69	32	20	20.21	2080	3.2		
	94	23	15	14.92	1880	3.4		
	18.4	119	50	48.86	3240	1.1	WAH50B	71B5/B14-6
	22.4	98	40	40.09	3030	1.3		
	31	72	30	29.33	2730	1.8		
	37	59	25	24.07	2550	2.2		
	45	49	20	20.21	2410	2.0		
	60	36	15	14.92	2180	2.2		
	72	30	12.5	12.47	2050	4.3		
	86	26	10	10.47	1930	3.9		
	116	19	7.5	7.73	1750	4.2		

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P_{1n} [kW]	n_2 [r/min]	M_2 [Nm]	(i) Nominal	(i) Actual	f_{r2} [N]	f_B		
0.25	11.5	187	250	243.57	4330	1.1	WAH63C	63B5-2
	14.3	151	200	196.43	4030	1.2		
	18.5	116	150	151.56	3690	1.7		
	22.9	94	125	122.22	3440	1.9		
	27.6	78	100	101.27	3230	1.9		
	38	56	75	73.33	2900	2.0		
	44	49	60	63.33	2760	3.7		
	53	40	50	52.48	2590	3.7		
	11.5	188	125	122.22	4330	1.0	WAH63C	71B5/B14-4
	13.8	155	100	101.27	4070	1.0		
	19.1	113	75	73.33	3650	1.0		
	22.1	97	60	63.33	3480	1.9		
	26.7	81	50	52.48	3270	1.9		
	23.1	95	60	60.50	3430	2.1	WAH63B	71B5/B14-4
	28.7	76	50	48.71	3190	2.6		
	36	62	40	39.29	2970	2.9		
	46	48	30	30.31	2720	4.2		
	14.2	151	60	63.33	4030	1.2	WAH63C	71B5/B14-6
	17.1	125	50	52.48	3790	1.2		
	14.9	148	60	60.50	3970	1.4	WAH63B	71B5/B14-6
	18.5	119	50	48.71	3690	1.7		
	22.9	96	40	39.29	3440	1.9		
	29.7	74	30	30.31	3150	2.7		
	37	60	25	24.44	2930	3.0		
	44	49	20	20.25	2760	3.0		
	9.4	228	300	297.21	6320	1.5	WAH75C	63B5-2
	11.6	185	250	240.89	5890	1.9		
	14.0	154	200	200.66	5540	1.9		
	18.5	116	150	151.20	5040	3.0		
	22.2	97	125	125.95	4750	3.1		
	5.8	370	250	240.89	6500	0.95	WAH75B	71B5-4
	7.0	308	200	200.66	6500	0.97		
	9.3	232	150	151.20	6500	1.5		
	11.1	193	125	125.95	5980	1.6		
	14.1	152	100	99.22	5520	1.6		
	18.6	116	75	75.45	5040	1.7		
	22.4	96	60	62.43	4730	3.1		
	6.0	361	150	151.20	6500	0.97	WAH75C	71B5-6
	7.1	301	125	125.95	6500	1.0		
	9.1	237	100	99.22	6400	1.0		
	11.9	180	75	75.45	5840	1.1		
	14.4	149	60	62.43	5480	2.0		
	18.3	117	50	49.18	5060	2.0		
	15.1	145	60	59.44	5390	2.4	WAH75B	71B5-6
	18.7	118	50	48.18	5030	3.0		
	22.4	98	40	40.13	4730	3.1		
	9.5	227	300	295.18	7990	2.2	WAH90C	63B5-2
	11.6	185	250	240.89	7470	2.7		
	14.0	154	200	200.86	7030	3.1		
	18.5	116	150	151.20	6390	4.3		
	4.7	453	300	295.18	8300	1.1	WAH90C	71B5-4
	5.8	370	250	240.89	8300	1.4		
	7.0	308	200	200.66	8300	1.6		
	9.3	232	150	151.20	8050	2.2		
	11.1	193	125	125.95	7580	2.5		
	14.1	152	100	99.22	7000	2.5		
	18.6	116	75	75.45	6390	2.6		

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P_{1n} [kW]	n_2 [r/min]	M_2 [Nm]	(i) Nominal	(i) Actual	f_{r2} [N]	f_B		
0.25	4.5 6.0 7.1 9.1 11.9 14.4 18.3	479 361 301 237 180 149 117	200 150 125 100 75 60 50	200.66 151.20 125.95 99.22 75.45 62.43 49.18	8300 8300 8300 8110 7400 6950 6420	1.0 1.4 1.6 1.6 1.7 3.2 3.2	WAH90C	71B5-6
	15.2 18.7	144 118	60 50	59.04 48.18	6820 6370	3.5 4.3	WAH90B	71B5-6
0.37	23.3 27.7 38 45 53	137 115 85 71 59	125 100 75 60 50	120.34 101.04 74.62 62.36 52.36	2990 2820 2550 2400 2270	0.95 0.87 0.94 1.8 1.7	WAH50C	71B5/B14-4
	48 57 70 95	67 57 47 34	60 50 40 30	58.36 48.86 40.09 29.33	2350 2220 2070 1870	1.9 2.2 2.7 3.7	WAH50B	71B5/B14-2
	28.7 35 48 58 69 94 112 134 181	113 93 68 56 47 35 29 24 18	50 40 30 25 20 15 12.5 10 7.5	48.86 40.09 29.33 24.07 20.21 14.92 12.47 10.47 7.73	2790 2610 2350 2200 2080 1880 1770 1670 1510	1.1 1.4 1.9 2.3 2.1 2.3 4.5 4.1 4.5	WAH50B	71B5/B14-4
	31 37 45 60 72 86 116	106 87 73 54 45 38 28	30 25 20 15 12.5 10 7.5	29.33 24.07 20.21 14.92 12.47 10.47 7.73	2730 2550 2410 2180 2050 1930 1750	1.2 1.5 1.4 1.5 2.9 2.6 2.9	WAH50B	80B5/B14-6
	14.3 18.5 22.9 27.6 38 44 53	223 172 139 115 83 72 60	200 150 125 100 75 60 50	196.43 151.56 122.22 101.27 73.33 63.33 52.48	4030 3690 3440 3230 2900 2760 2590	0.78 1.2 1.3 1.3 1.3 2.5 2.5	WAH63C	71B5/B14-2
	46 57 71	70.5 57 48	60 50 40	60.50 46.71 39.29	2720 2530 2350	2.7 3.5 3.8	WAH63B	71B5/B14-2
	22.1 26.7	144 119	60 50	63.33 52.48	3480 3270	1.3 1.3	WAH63C	71B5/B14-4
	23.1 28.7 36 46 57 69	140 113 91 70 57 47	60 50 40 30 25 20	60.50 48.71 39.29 30.31 24.44 20.25	3430 3190 2970 2720 2530 2380	1.4 1.8 2.0 2.8 3.2 3.2	WAH63B	71B5/B14-4
	18.5 22.9 29.7	176 142 109	50 40 30	48.71 39.29 30.31	3690 3440 3150	1.1 1.3 1.8	WAH63B	80B5/B14-6

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P_{1n} [kW]	n_2 [r/min]	M_2 [Nm]	(i) Nominal	(i) Actual	f_{r2} [N]	f_B		
0.37	37 44 61 71 86 118	88 73 53 46 38 27	25 20 15 12.5 10 7.5	24.44 20.25 14.67 12.67 10.50 7.60	2930 2760 2470 2360 2210 1990	2.0 2.1 2.1 3.9 4.0 4.0	WAH63B	80B5/B14-6
	9.4 11.6 14.0 18.5 22.2 28.2 37	338 274 228 172 143 113 86	300 250 200 150 125 100 75	297.21 240.89 200.66 151.20 125.95 99.22 75.45	6320 5890 5540 5040 4750 4380 4000	1.0 1.3 1.3 2.0 2.1 2.1 2.3	WAH75C	71B5-2
	9.3 11.1 14.1 18.6 22.4 28.5	343 286 225 171 142 112	150 125 100 75 60 50	151.20 125.95 99.22 75.45 62.43 49.18	6500 5980 5520 5040 4730 4370	1.0 1.0 1.1 1.2 2.1 2.1	WAH75C	71B5-4
	23.6 29.1 35	138 112 93	60 50 40	59.44 48.18 40.13	4660 4340 4080	2.5 3.1 3.2	WAH75B	71B5-4
	14.4 18.3	221 174	60 50	62.43 49.18	5480 5060	1.4 1.4	WAH75C	80B5/B14-6
	15.1 18.7 22.4 29.8 36	215 174 145 109 91	60 50 40 30 25	59.44 48.18 40.13 30.24 25.19	5390 5030 4730 4310 4050	1.6 2.0 2.1 3.2 3.3	WAH75B	80B5/B14-6
	9.5 11.6 14.0 18.5 22.2	335 274 228 172 143	300 250 200 150 125	295.18 240.89 200.66 151.20 125.95	7990 7470 7030 6390 6010	1.5 1.8 2.1 2.8 3.4	WAH90C	71B5-4
	5.8 7.0 9.3 11.1 14.1 18.6 22.4 28.5	547 456 343 286 225 171 142 112	250 200 150 125 100 75 60 50	240.89 200.66 151.20 125.95 99.22 75.45 62.43 49.18	8300 8300 8050 7580 7000 6390 6000 5540	0.9 1.1 1.5 1.7 1.7 1.8 3.4 3.4	WAH90C	71B5-4
	23.7 29.1	137 112	60 50	59.04 48.18	5890 5500	3.6 4.5	WAH90B	71B5-4
	6.0 7.1 9.1 11.9 14.4 18.3	534 445 351 267 221 174	150 125 100 75 60 50	151.20 125.95 99.22 75.45 62.43 49.18	8300 8300 8110 7400 6950 6420	0.94 1.1 1.1 1.1 2.2 2.2	WAH90B	80B5/B14-6
	15.2 18.7 22.4	213 174 145	60 50 40	59.04 48.18 40.13	6820 6370 6000	2.3 2.9 3.3		
0.55	38 45 53	126 105 88	75 60 50	74.62 62.36 52.36	2550 2400 2270	0.77 1.2 1.1	WAH50C	71B5/B14-2

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P_{1n} [kW]	n_2 [r/min]	M_2 [Nm]	(i) Nominal	(i) Actual	f_{r2} [N]	f_B		
0.55	48	101	60	58.36	2350	1.26	WAH50B	71B5/B14-2
	57	84	50	48.86	2220	1.5		
	70	69	40	40.09	2070	1.8		
	95	51	30	29.33	1870	2.5		
	116	41	25	24.07	1750	3.1		
	139	35	20	20.21	1650	2.7		
	35	138	40	40.09	2610	0.9	WAH50B	80B5/B14-4
	48	101	30	29.33	2350	1.3		
	58	83	25	24.07	2200	1.8		
	69	70	20	20.21	2080	1.4		
	94	51	15	14.92	1880	1.6		
	112	43	12.5	12.47	1770	3.0		
	134	36	10	10.47	1670	2.8		
	181	27	7.5	7.73	1510	3.0		
	37	129	25	24.07	2550	1.0	WAH50B	80B5/B14-6
	45	109	20	20.21	2410	0.92		
	60	80	15	14.92	2180	1.0		
	72	87	12.5	12.47	2050	1.9		
	86	56	10	10.47	1930	1.8		
	116	42	7.5	7.73	1750	1.9		
	22.9	208	125	122.22	3440	0.9	WAH63C	71B5/B14-2
	27.6	171	100	101.27	3230	0.9		
	38	124	75	73.33	2900	0.9		
	44	107	80	83.33	2760	1.7		
	53	89	50	52.48	2590	1.7		
	46	105	60	60.50	2720	1.86	WAH63B	71B5/B14-2
	57	84	50	48.71	2530	2.3		
	71	67.5	40	39.29	2350	2.6		
	92	52	30	30.31	2160	3.7		
	28.7	168	50	48.71	3190	1.2	WAH63B	80B5/B14-4
	36	136	40	39.29	2970	1.3		
	46	105	30	30.31	2720	1.9		
	57	84	25	24.44	2530	2.1		
	69	70	20	20.25	2380	2.1		
	95	51	15	14.67	2130	2.2		
	100	44	12.5	12.67	2030	4.1		
	133	36	10	10.50	1910	4.1		
	184	28	7.5	7.60	1710	4.2		
	22.9	211	40	39.29	3440	0.9	WAH63B	80B5/B14-6
	29.7	163	30	30.31	3150	1.2		
	37	131	25	24.44	2930	1.4		
	44	109	20	20.25	2760	1.4		
	61	79	15	14.67	2470	1.4		
	71	68	12.5	12.67	2360	2.6		
	86	58	10	10.50	2210	2.7		
	118	41	7.5	7.60	1990	2.7		
	14.0	339	200	200.66	5540	0.89	WAH75C	71B5-2
	18.5	255	150	151.20	5040	1.4		
	22.2	213	125	125.95	4750	1.4		
	28.2	168	100	99.22	4380	1.4		
	37	127	75	75.45	4000	1.6		
	45	105	60	62.43	3750	2.8		
	57	83	50	49.18	3470	2.9		
	47	103	60	59.44	3690	3.3	WAH75B	71B5-2
	58	83	50	48.18	3440	4.1		
	14.1	334	100	99.22	5520	0.7	WAH75C	80B5/B14-4
	18.6	255	50	75.45	5040	0.79		

Arhburg Reducer

P_{1n} [kW]	n_2 [r/min]	M_2 [Nm]	(i) Nominal	(i) Actual	f_{r2} [N]	f_B		
0.55	22.4 28.5	211 166	60 50	62.43 49.18	4730 4370	1.4 1.4	WAH75C	80B5/B14-4
	23.6 29.1 35 46 56	205 166 139 104 87	60 50 40 30 25	59.44 48.18 40.13 30.24 25.19	4660 4340 4080 3720 3500	1.7 2.1 2.2 3.4 3.5	WAH75B	80B5/B14-4
	14.4 18.3	328 258	60 50	62.43 49.18	5480 5060	0.91 0.93	WAH75C	80B5/B14-6
	15.1 18.7 22.4 29.8 36 45 60	319 259 215 162 135 107 81	60 50 40 30 25 20 15	59.44 48.18 40.13 30.24 25.19 19.84 15.09	5390 5030 4730 4310 4050 3740 3410	1.1 1.4 1.4 2.2 2.2 2.3 2.5	WAH75B	80B5/B14-6
	9.5 11.6 14.0 16.5 22.2 28.2 37 45 57	498 407 339 255 213 168 127 105 83	300 250 200 150 125 100 75 60 50	295.18 240.89 200.66 151.20 125.95 99.22 75.45 62.43 49.18	7990 7470 7030 6390 6010 5550 5070 4760 4390	1.0 1.2 1.4 2.0 2.3 2.3 2.4 4.6 4.6	WAH90C	71B5-2
	9.3 11.1 14.1 18.6 22.4 28.5	511 425 335 255 211 166	150 125 100 75 60 50	151.20 125.95 99.22 75.45 62.43 49.18	8050 7580 7000 6390 6000 5540	1.0 1.1 1.1 1.2 2.3 2.3	WAH90C	80B5/B14-4
	23.7 29.1 35	204 166 139	60 50 40	59.04 48.18 40.13	5890 5500 5170	2.5 3.0 3.5	WAH90B	80B5/B14-4
	9.1 11.9 14.4 18.3	521 396 328 258	100 75 60 50	99.22 75.45 62.43 49.18	8110 7400 6950 6420	0.71 0.74 1.5 1.5	WAH90C	80B5/B14-6
	15.2 18.7 22.4 29.8 36	317 259 215 162 135	60 50 40 30 25	59.04 48.18 40.13 30.24 25.19	6820 6370 6000 5460 5130	1.6 1.9 2.2 3.1 3.5	WAH90B	80B5/B14-6
0.75	57 70 95 116 139 188	114.5 94 69 57 48 35	50 40 30 25 20 15	48.86 40.09 29.33 24.07 20.21 14.92	2220 2070 1870 1750 1650 1490	1.1 1.3 1.8 2.2 2.0 2.2	WAH50B	80B5/B14-2
	48 58 69 94 112 134 181	138 113 95 70 59 49 36	30 25 20 15 12.5 10 7.5	29.33 24.07 20.21 14.92 12.47 10.47 7.73	2350 2200 2080 1880 1770 1670 1510	0.9 1.1 1.1 1.1 2.2 2.0 2.2	WAH50B	80B5/B14-4

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P_{1n} [kW]	n_2 [r/min]	M_2 [Nm]	(i) Nominal	(i) Actual	f_{r2} [N]	f_B		
0.75	60	110	15	14.92	2180	0.71	WAH50B	90B5/B14-6
	72	91	12.5	12.47	2050	1.4		
	86	77	10	10.47	1930	1.3		
	116	57	7.5	7.73	1750	1.4		
	38	169	75	73.33	2900	0.63	WAH63C	80B5/B14-2
	44	146	60	63.33	2760	1.2		
	53	121	50	52.48	2590	1.2		
	46	142	60	60.50	2720	1.38	WAH63B	80B5/B14-2
	57	114.5	50	48.71	2530	1.7		
	71	92	40	39.29	2350	1.9		
	92	71	30	30.31	2160	2.7		
	115	58	25	24.44	2010	3.0		
	138	48	20	20.25	1890	3.0		
	28.7	229	50	48.71	3190	0.9	WAH63B	80B5/B14-4
	36	185	40	39.29	2970	1.0		
	46	143	30	30.31	2720	1.4		
	57	115	25	24.44	2530	1.6		
	69	95	20	20.25	2360	1.6		
	95	69	15	14.67	2130	1.6		
	110	60	12.5	12.67	2030	3.0		
	133	49	10	10.50	1910	3.0		
	184	36	7.5	7.60	1710	3.1		
	37	179	25	24.44	2930	1.0	WAH63B	90B5/B14-6
	44	148	20	20.25	2760	1.0		
	61	107	15	14.67	2470	1.0		
	71	93	12.5	12.67	2360	1.9		
	86	77	10	10.50	2210	2.0		
	118	56	7.5	7.60	1990	2.0		
	18.5	348	150	151.20	5040	1.0	WAH75C	80B5/B14-2
	22.2	290	125	125.95	4750	1.0		
	28.2	228	100	99.22	4380	1.1		
	37	174	75	75.45	4000	1.2		
	45	144	60	62.43	3750	2.1		
	57	113	50	49.18	3470	2.1		
	47	140	60	59.44	3690	2.4	WAH75B	80B5/B14-2
	58	113.5	50	48.18	3440	3.0		
	70	94	40	40.13	3240	3.1		
	22.4	287	60	62.43	4730	1.0	WAH75C	80B5/B14-4
	28.5	226	50	49.18	4370	1.1		
	23.6	280	60	59.44	4660	1.3	WAH75B	80B5/B14-4
	29.1	227	50	48.18	4340	1.5		
	35	189	40	40.13	4080	1.8		
	46	142	30	30.24	3720	2.5		
	56	119	25	25.19	3500	2.5		
	71	93	20	19.84	3230	2.8		
	18.7	353	50	48.18	5030	1.0	WAH75B	90B5/B14-6
	22.4	294	40	40.13	4730	1.0		
	29.8	221	30	30.24	4310	1.6		
	36	184	25	25.19	4050	1.6		
	45	145	20	19.84	3740	1.7		
	60	110	15	15.09	3410	1.8		
	72	91	12.5	12.49	3210	3.3		
	11.6	555	250	240.89	7470	0.9	WAH90C	80B5/B14-2
	14.0	462	200	200.66	7030	1.0		
	18.5	348	150	151.20	6390	1.4		
	22.2	290	125	125.95	6010	1.7		

Arhburg Reducer

P_{1n} [kW]	n_2 [r/min]	M_2 [Nm]	(i) Nominal	(i) Actual	f_{r2} [N]	f_B		
0.75	28.2	228	100	99.22	5550	1.7	WAH90C	80B5/B14-2
	37	174	75	75.45	5070	1.7		
	45	144	60	62.43	4760	3.3		
	57	113	50	49.18	4390	3.4		
	14.1	457	100	99.22	7000	0.83	WAH90C	80B5/B14-4
	18.6	347	75	75.45	6390	0.86		
	22.4	287	60	62.43	6000	1.7		
	28.5	226	50	49.18	5540	1.7		
	23.7	278	60	59.04	5890	1.8	WAH90B	80B5/B14-4
	29.1	227	50	48.18	5500	2.2		
	35	189	40	40.13	5170	2.5		
	46	142	30	30.24	4710	3.5		
	56	119	25	25.19	4430	4.0		
	14.4	447	60	62.43	6950	1.1	WAH90C	90B5/B14-6
	18.3	352	50	49.18	6420	1.1		
	15.2	432	60	59.04	6820	1.2	WAH90B	90B5/B14-6
	18.7	353	50	48.18	6370	1.4		
	22.4	294	40	40.13	6000	1.6		
	29.8	221	30	30.24	5460	2.3		
	36	184	25	25.19	5130	2.6		
	45	145	20	19.84	4740	2.6		
	60	110	15	15.09	4330	2.7		
1.1	70	138	40	40.09	2070	0.9	WAH50B	80B5/B14-2
	95	101	30	29.33	1870	1.3		
	116	83	25	24.07	1750	1.5		
	139	69	20	20.21	1650	1.4		
	188	52	15	14.92	1490	1.5		
	225	43	12.5	12.47	1400	2.9		
	267	36	10	10.47	1320	2.7		
	362	26	7.5	7.73	1200	2.9		
	69	140	20	20.21	2080	0.7	WAH63B	80B5/B14-6
	94	103	15	14.92	1880	0.76		
	112	86	12.5	12.47	1770	1.5		
	134	72	10	10.47	1670	1.4		
	181	53	7.5	7.73	1510	1.5		
	72	134	12.5	12.47	2050	1.0	WAH50B	90B5/B14-2
	86	112	10	10.47	1930	0.9		
	116	83	7.5	7.73	1750	1.0		
	57	168	50	48.71	2530	1.2	WAH63B	80B5/B14-2
	71	136	40	39.29	2350	1.3		
	92	105	30	30.31	2160	1.9		
	115	84	25	24.44	2010	2.1		
	138	69	20	20.25	1890	2.1		
	191	51	15	14.67	1690	2.1		
	221	44	12.5	12.67	1610	4.0		
	267	36	10	10.50	1510	4.0		
	388	26	7.5	7.60	1360	4.1		
	46	209	30	30.31	2720	1.0	WAH63B	90B5/B14-4
	57	169	25	24.44	2530	1.1		
	69	140	20	20.25	2380	1.1		
	95	101	15	14.67	2130	1.1		
	110	87	12.5	12.67	2030	2.1		
	133	72	10	10.50	1910	2.1		
	184	52	7.5	7.60	1710	2.1		

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P_{1n} [kW]	n_2 [r/min]	M_2 [Nm]	(i) Nominal	(i) Actual	f_{r2} [N]	f_B		
1.1	71	136	12.5	12.67	2360	1.3	WAH63B	90B5/B14-6
	86	113	10	10.50	2210	1.3		
	118	82	7.5	7.60	1990	1.3		
	28.2	334.5	100	99.22	4380	0.58	WAH75C	80B5/B14-2
	37	254	75	75.45	4000	1.15		
	45	211	60	62.43	3750	1.4		
	57	166	50	49.18	3470	1.4		
	47	205.5	60	59.44	3690	1.7	WAH75B	80B5/B14-2
	58	166	50	48.18	3440	2.1		
	70	139	40	40.13	3240	2.1		
	93	105	30	30.24	2950	3.3		
	111	87	25	25.19	2770	3.3		
	29.1	333	50	48.18	4340	1.1	WAH75B	90B5/B14-4
	35	277	40	40.13	4080	1.1		
	46	209	30	30.24	3720	1.7		
	56	174	25	25.19	3500	1.7		
	71	137	20	19.84	3230	1.8		
	93	104	15	15.09	2950	1.9		
	112	86	12.5	12.49	2770	3.5		
	29.8	325	30	30.24	4310	1.1	WAH75B	90B5/B14-6
	36	271	25	25.19	4050	1.1		
	45	213	20	19.84	3740	1.1		
	60	162	15	15.09	3410	1.2		
	72	134	12.5	12.49	3210	2.2		
	91	106	10	9.84	2960	2.3		
	120	80	7.5	7.48	2700	2.5		
	18.5	511	150	151.20	6390	1.0	WAH90C	80B5/B14-2
	22.2	425	125	125.95	6010	1.1		
	28.2	335	100	99.22	5550	1.1		
	37	255	75	75.45	5070	1.2		
	45	211	60	62.43	4760	2.3		
	57	166	50	49.18	4390	2.3		
	47	203.5	60	59.04	4670	2.4	WAH90B	80B5/B14-2
	58	166	50	48.18	4360	2.9		
	70	162	40	40.13	4110	3.3		
	22.4	422	60	62.43	6000	1.1	WAH90C	90B5/B14-4
	28.5	332	50	49.18	5540	1.1		
	23.7	408	60	59.04	5890	1.2	WAH90B	90B5/B14-4
	29.1	333	50	48.18	5500	1.5		
	35	277	40	40.13	5170	1.7		
	46	209	30	30.24	4710	2.4		
	56	174	25	25.19	4430	2.8		
	71	137	20	19.84	4090	2.8		
	18.7	517	50	48.18	6370	1.0	WAH90B	90B5/B14-6
	22.4	431	40	40.13	6000	1.1		
	29.8	325	30	30.24	5460	1.5		
	36	271	25	25.19	5130	1.8		
	45	213	20	19.84	4740	1.8		
	60	162	15	15.09	4330	1.9		
	72	134	12.5	12.49	4060	3.6		
	91	106	10	9.84	3750	3.6		
	120	80	7.5	7.48	3420	3.7		
1.5	116	113.5	25	24.07	1750	1.1	WAH50B	90B5/B14-2
	139	95	20	20.21	1650	1.03		
	188	70	15	14.92	1490	1.1		
	225	59	12.5	12.47	1400	2.2		

Arhburg Reducer

P_{1n} [kW]	n_2 [r/min]	M_2 [Nm]	(i) Nominal	(i) Actual	f_{r2} [N]	f_B		
1.5	267 362	49 36	10 7.5	10.47 7.73	1320 1200	2.0 2.2	WAH50B	90B5/B14-2
	94 112 134 181	141 117 99 73	15 12.5 10 7.5	14.92 12.47 10.47 7.73	1880 1770 1670 1510	0.8 1.1 1.0 1.1	WAH50B	90B5/B14-4
	57 71 92 115 138 191 221 267 368	229 185 143 115 95 69 80 49 36	50 40 30 25 20 15 12.5 10 7.5	48.71 39.29 30.31 24.44 20.25 14.67 12.87 10.50 7.60	2530 2350 2160 2010 1890 1690 1810 1510 1360	0.9 0.95 1.4 1.5 1.5 1.5 3.0 3.0 3.0	WAH63B	90B5/B14-2
	57 69 95 110 133 184	230 191 138 119 99 72	25 20 15 12.5 10 7.5	24.44 20.25 14.87 12.67 10.50 7.60	2530 2380 2130 2030 1910 1710	0.8 0.8 0.8 1.5 1.5 1.5	WAH63B	90B5/B14-4
	37 45 57	347 287 226	75 60 50	75.45 82.43 49.18	4000 3750 3470	0.8 1.0 1.1	WAH75C	90B5/B14-2
	47 58 70 93 111 141	280 227 189 142 118 93	60 50 40 30 25 20	59.44 48.18 40.13 30.24 25.19 19.84	3690 3440 3240 2950 2770 2560	1.2 1.5 1.5 2.4 2.5 2.5	WAH75B	90B5/B14-2
	35 46 56 71 93 112 142 187	378 285 237 187 142 118 93 70	40 30 25 20 15 12.5 10 7.5	40.13 30.24 25.19 19.84 15.09 12.49 9.84 7.48	4080 3720 3500 3230 2950 2770 2550 2330	0.8 1.2 1.3 1.3 1.4 2.6 2.8 2.8	WAH75B	90B5/B14-4
	45 60 72 91 120	291 221 183 144 110	20 15 12.5 10 7.5	19.84 15.09 12.49 9.84 7.48	3740 3410 3210 2980 2700	0.83 0.91 1.8 1.7 1.8	WAH75B	100B5/B14-6
	28.2 37 45 57	457 347 287 226	100 75 60 50	99.22 75.45 62.43 49.18	5550 5070 4760 4390	0.83 0.86 1.7 1.7	WAH90C	90B5/B14-2
	47 58 70 93 111	278 227 189 142 118	60 50 40 30 25	59.04 48.18 40.13 30.24 25.19	4670 4360 4110 3740 3520	1.8 2.2 2.5 3.4 4.0	WAH90B	90B5/B14-2
	29.1 35 46 56	454 378 285 237	50 40 30 25	48.18 40.13 30.24 25.19	5500 5170 4710 4430	1.1 1.3 1.8 2.0	WAH90B	90B5/B14-4

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P_{1n} [kW]	n_2 [r/min]	M_2 [Nm]	(i) Nominal	(i) Actual	f_{r2} [N]	f_B		
1.5	71	187	20	19.84	4090	2.0	WAH90B	90B5/B14-4
	93	142	15	15.09	3730	2.1		
	112	118	12.5	12.49	3510	4.1		
	142	93	10	9.84	3240	4.1		
	187	70	7.5	7.48	2950	4.3		
	30	443	30	30.24	5460	1.1	WAH90B	100B5/B14-6
	36	369	25	25.19	5130	1.3		
	45	291	20	19.84	4740	1.3		
	60	221	15	15.09	4330	1.4		
	72	183	12.5	12.49	4060	2.6		
	91	144	10	9.84	3750	2.6		
	120	110	7.5	7.48	3420	2.7		
2.2	139	140	20	20.21	1650	0.7	WAH50B	90B5/B14-2
	188	103	15	14.92	1490	0.76		
	225	86	12.5	12.47	1400	1.5		
	267	72	10	10.47	1320	1.35		
	362	54	7.5	7.73	1200	1.5		
	92	209	30	30.31	2160	0.9	WAH63B	90B5/B14-2
	115	168	25	24.44	2010	1.0		
	138	140	20	20.25	1890	1.0		
	191	101	15	14.67	1690	1.0		
	221	87	12.5	12.67	1610	2.0		
	267	72	10	10.50	1510	2.0		
	368	53	7.5	7.60	1360	2.0		
	58	333	50	48.18	3440	1.0	WAH75B	90B5/B14-2
	70	277	40	40.13	3240	1.0		
	93	208	30	30.24	2950	1.6		
	111	174	25	25.19	2770	1.7		
	141	137	20	19.84	2560	1.7		
	186	104	15	15.09	2340	1.9		
	224	86	12.5	12.49	2190	3.4		
	56	348	25	25.19	3500	0.86	WAH75B	100B5/B14-4
	71	274	20	19.84	3230	0.9		
	93	208	15	15.09	2950	1.0		
	112	172	12.5	12.49	2770	1.7		
	142	136	10	9.84	2550	1.8		
	187	103	7.5	7.48	2330	1.9		
	60	324	15	15.09	3410	0.6	WAH75B	112B5/B14-6
	72	268	12.5	12.49	3210	1.1		
	91	211	10	9.84	2960	1.1		
	120	161	7.5	7.48	2700	1.2		
	37	510	75	75.45	5070	0.6	WAH90C	90B5/B14-2
	45	422	60	62.43	4760	1.1		
	57	332	50	49.18	4390	1.1		
	47	407	60	59.04	4670	1.2	WAH90B	90B5/B14-2
	58	333	50	48.18	4360	1.5		
	70	277	40	40.13	4110	1.7		
	93	208	30	30.24	3740	2.3		
	111	174	25	25.19	3520	2.7		
	141	137	20	19.84	3250	2.7		
	35	554	40	40.13	5170	0.9	WAH90B	100B5/B14-4
	46	418	30	30.24	4710	1.2		
	56	348	25	25.19	4430	1.4		
	71	274	20	19.84	4090	1.4		
	93	208	15	15.09	3730	1.4		
	112	172	12.5	12.49	3510	2.8		

Arhburg Reducer

P_{1n} [kW]	n_2 [r/min]	M_2 [Nm]	(i) Nominal	(i) Actual	f_{r2} [N]	f_B		
2.2	142 187	136 103	10 7.5	9.84 7.48	3240 2950	2.8 2.9	WAH90B	100B5/B14-4
	36 45 60 72 91 120	541 426 324 268 211 161	25 20 15 12.5 10 7.5	25.19 19.84 15.09 12.49 9.84 7.48	5130 4740 4330 4060 3750 3420	0.9 0.9 0.93 1.8 1.8 1.9	WAH90B	112B5/B14-6
3	70 93 111 141 186 224 285 374	378 285 237 187 142 117 93 70	40 30 25 20 15 12.5 10 7.5	40.13 30.24 25.19 19.84 15.09 12.49 9.84 7.48	3240 2950 2770 2560 2340 2190 2030 1850	0.77 1.2 1.2 1.25 1.4 2.5 2.5 2.7	WAH75B	112B5/B14-2
	9.3 112 142 187	284 235 185 141	15 12.5 10 7.5	15.09 12.49 9.84 7.48	2950 2770 2550 2330	0.7 1.3 1.3 1.4	WAH75B	100B5/B14-4
	47 58 70 93 111 141 186 224 285 374	556 453 378 285 237 187 142 117 93 70	60 50 40 30 25 20 15 12.5 10 7.5	59.04 48.18 40.13 30.24 25.19 19.84 15.09 12.49 9.84 7.48	4670 4360 4110 3740 3520 3250 2980 2780 2570 2340	0.9 1.1 1.24 1.7 2.0 2.0 2.1 4.0 4.0 4.2	WAH90B	100B5/B14-2
	56 71 93 112 142 187	474 374 284 235 185 141	25 20 15 12.5 10 7.5	25.19 19.84 15.09 12.49 9.84 7.48	4430 4090 3730 3510 3240 2950	1.0 1.0 1.1 2.0 2.1 2.1	WAH90B	100B5/B14-4
4	111 141 186 224 285 374	316 248.5 190 156.5 123 94	25 20 15 12.5 10 7.5	25.19 19.84 15.09 12.49 9.84 7.48	2770 2560 2340 2190 2030 1850	0.9 0.9 1.0 1.8 1.9 2.1	WAH75B	112B5/B14-2
	112 142 187	314 247 188	12.5 10 7.5	12.49 9.84 7.48	2770 2550 2330	1.0 1.0 1.1	WAH75B	112B5/B14-4
	70 93 111 141 188 224 285 374	504 380 316 248.5 190 156.5 123 94	40 30 25 20 15 12.5 10 7.5	40.13 30.24 25.19 19.84 15.09 12.49 9.84 7.48	4110 3740 3520 3250 2960 2780 2570 2340	0.9 1.3 1.5 1.5 1.5 3.0 3.0 3.1	WAH90B	112B5/B14-2
	71 93 112 142 187	498 379 314 247 188	20 15 12.5 10 7.5	19.84 15.09 12.49 9.84 7.48	4090 3730 3510 3240 2950	0.74 0.77 1.5 1.5 1.6	WAH90B	112B5/B14-4

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6.3. Performance Parameter

n_1 = 1400r/min n_2 = 1

$M_{2\ MAX}$ [Nm]	n_2 [r/min]	(i) Nominal	(i) Actual	P_{1MAX} [kW]	F_{r2} [N]	F_{r1} [N]	
130	4.8	300	292.64	0.07	4100	400	WAHS50C
130	5.7	250	244.29	0.09	4100	400	
130	7	200	200.44	0.11	4100	400	
130	10	150	146.67	0.14	4000	400	
130	12	125	120.34	0.18	3770	400	
100	14	100	101.04	0.16	3560	400	
80	19	75	74.62	0.17	3220	400	
130	22	60	62.36	0.34	3030	400	
100	27	50	52.36	0.31	2860	400	
130	24	60	58.36	0.35	2960	400	WAHS50B
130	29	50	48.86	0.42	2790	400	
130	35	40	40.09	0.52	210	400	
130	48	30	29.33	0.71	2350	400	
130	58	25	24.07	0.86	2200	400	
100	69	20	20.21	0.79	2080	400	
80	94	15	14.92	0.85	1880	400	
130	112	12.5	12.47	1.7	1770	400	
100	134	10	10.47	1.5	1670	400	
80	181	7.5	7.73	1.6	1510	400	
200	4.6	300	302.50	0.11	4800	400	WAHS63C
200	5.7	250	243.57	0.13	4800	400	
180	7.1	200	196.43	0.15	4800	400	
200	9.2	150	151.56	0.21	4650	400	
180	11	125	122.22	0.24	4330	400	
150	14	100	101.27	0.24	4070	400	
110	19	75	73.33	0.24	3650	400	
180	22	60	63.33	0.46	3480	400	
150	27	50	52.48	0.47	3270	400	
200	23	60	60.50	0.53	3430	530	WAHS63B
200	29	50	48.71	0.65	3190	530	
180	36	40	39.29	0.73	2970	530	
200	46	30	30.31	1.1	2720	530	
180	57	25	24.44	1.2	2530	530	
150	69	20	20.25	1.2	2380	530	
110	95	15	14.67	1.2	2130	530	
180	110	12.5	12.67	2.3	2030	530	
150	133	10	10.50	2.3	1910	530	
110	184	7.5	7.80	2.3	1710	530	
350	4.7	300	297.21	0.19	6500	560	WAHS75C
350	5.8	250	240.89	0.24	6500	580	
300	7	200	200.66	0.24	6500	560	
350	9.3	150	151.20	0.38	6500	560	
300	11	125	125.95	0.39	5980	560	
240	14	100	99.22	0.39	5520	560	
200	19	75	75.45	0.43	5040	560	
300	22	60	62.43	0.78	4730	560	
240	28	50	49.18	0.79	4370	580	
350	24	60	59.44	0.94	4660	860	WAHS75B
350	29	50	48.18	1.2	4340	880	
300	35	40	40.13	1.2	4080	860	
350	46	30	30.24	1.8	3720	860	
300	56	25	25.19	1.9	3500	860	

Arhburg Reducer

n_1 = 1400r/min

$M_{2\ MAX}$ [Nm]	n_2 [r/min]	(i) Nominal	(i) Actual	P_{1MAX} [kW]	F_{r2} [N]	F_{r1} [N]	
240	71	20	19.84	1.9	3230	860	WAHS75B
200	93	15	15.09	2.1	2950	860	
300	112	12.5	12.49	3.8	2770	860	
240	142	10	9.84	3.9	2550	860	
200	187	7.5	7.48	4.3	2330	860	
500	4.7	300	295.18	0.27	8300	560	WAHS90C
500	5.8	250	240.89	0.34	8300	560	
480	7	200	200.66	0.39	8300	560	
500	9.3	150	151.20	0.54	8050	560	
480	11	125	125.95	0.62	7580	560	
380	14	100	99.22	0.62	7000	560	
300	19	75	75.45	0.65	6390	560	
480	22	60	62.43	1.3	6000	560	
380	28	50	49.18	1.3	5540	560	
500	24	60	59.04	1.3	5890	1260	WAHS90B
500	29	50	48.18	1.7	5500	1260	
480	35	40	40.13	1.9	5170	1260	
500	46	30	30.24	2.6	4710	1260	
480	56	25	25.19	3.0	4430	1260	
380	71	20	19.84	3.1	4090	1260	
300	93	15	15.09	3.2	3730	1260	
480	112	12.5	12.49	6.1	3510	1260	
380	148	10	9.84	6.2	3240	1260	
300	187	7.5	7.48	6.4	2950	1260	

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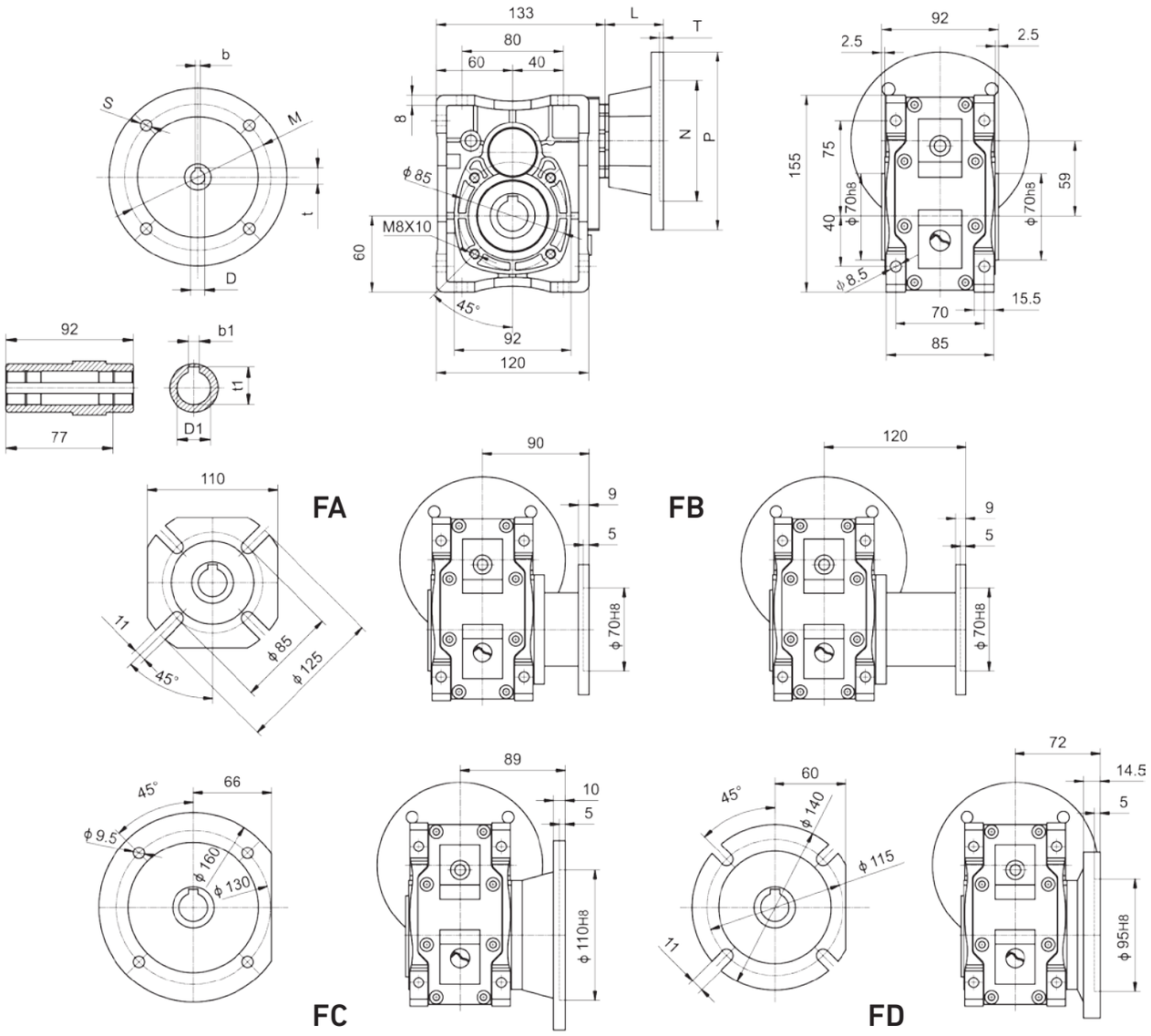
7. OUTLINE DIMENSION SHEET

7.1. Outline Dimension

WAH50B



IEC	D_{E8}	b	t	P	M	N	S	T	L
63B5	11	4	12.8	140	115	95	9	3.5	46
71B5	14	5	16.3	160	130	110	9	4	53
71B14	14	5	16.3	105	85	70	7	3	53
80B5	19	6	21.8	200	165	130	11	4	73
80B14	19	6	21.8	120	100	80	7	3.5	63
90B5	24	8	27.3	200	165	130	11	4	73
90B14	24	8	27.3	140	115	95	9	3.5	73

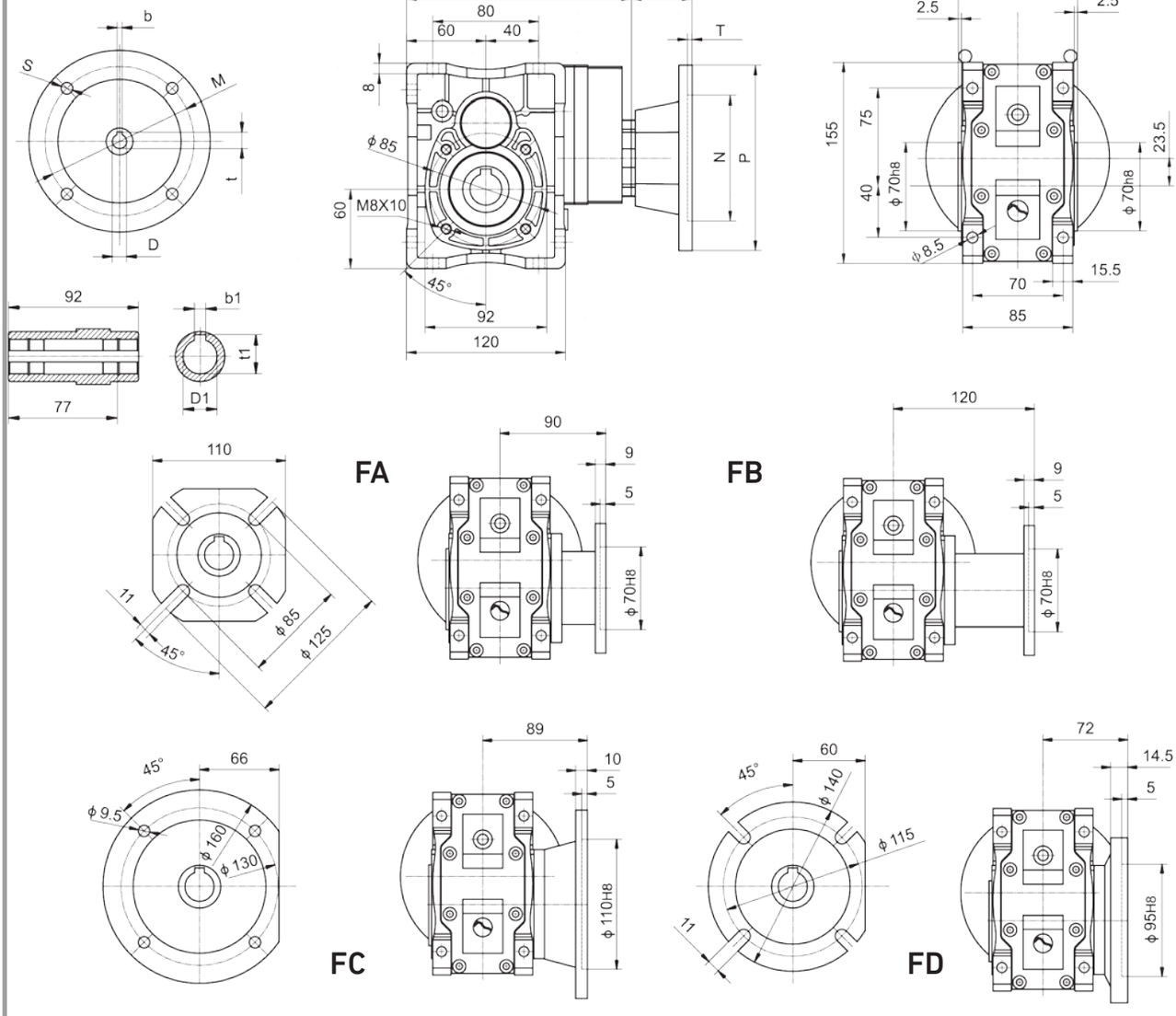
D_{1H7}	b_1	t_1
20*	6*	22.8*
24*	8	27.3
25	8	27.5

*Only on Request

Weight without motor
4.1kg

Arhburg Reducer

WAH 50C



IEC	D_{E8}	b	t	P	M	N	S	T	L
63B5/B14	11	4	12.8	140	115	95	9	3.5	46
71B5	14	5	16.3	160	130	110	9	4	53
71B14	14	5	16.3	105	85	70	7	3	53

$D_{1\ H7}$	b_1	t_1
20*	6*	22.8*
24*	8	27.3
25	8	27.5

*Only on Request

Weight without motor
5kg

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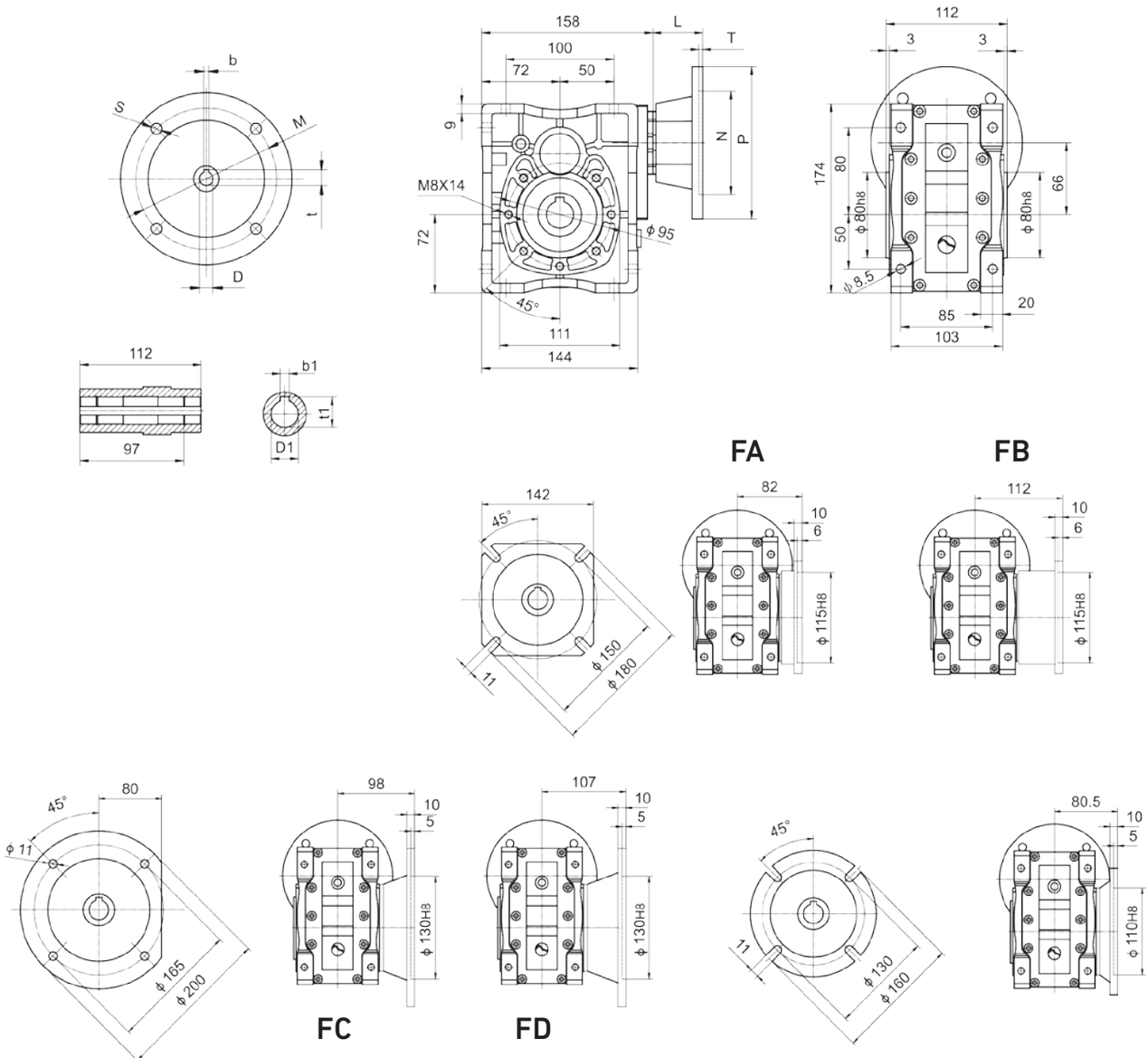
WAH 63B



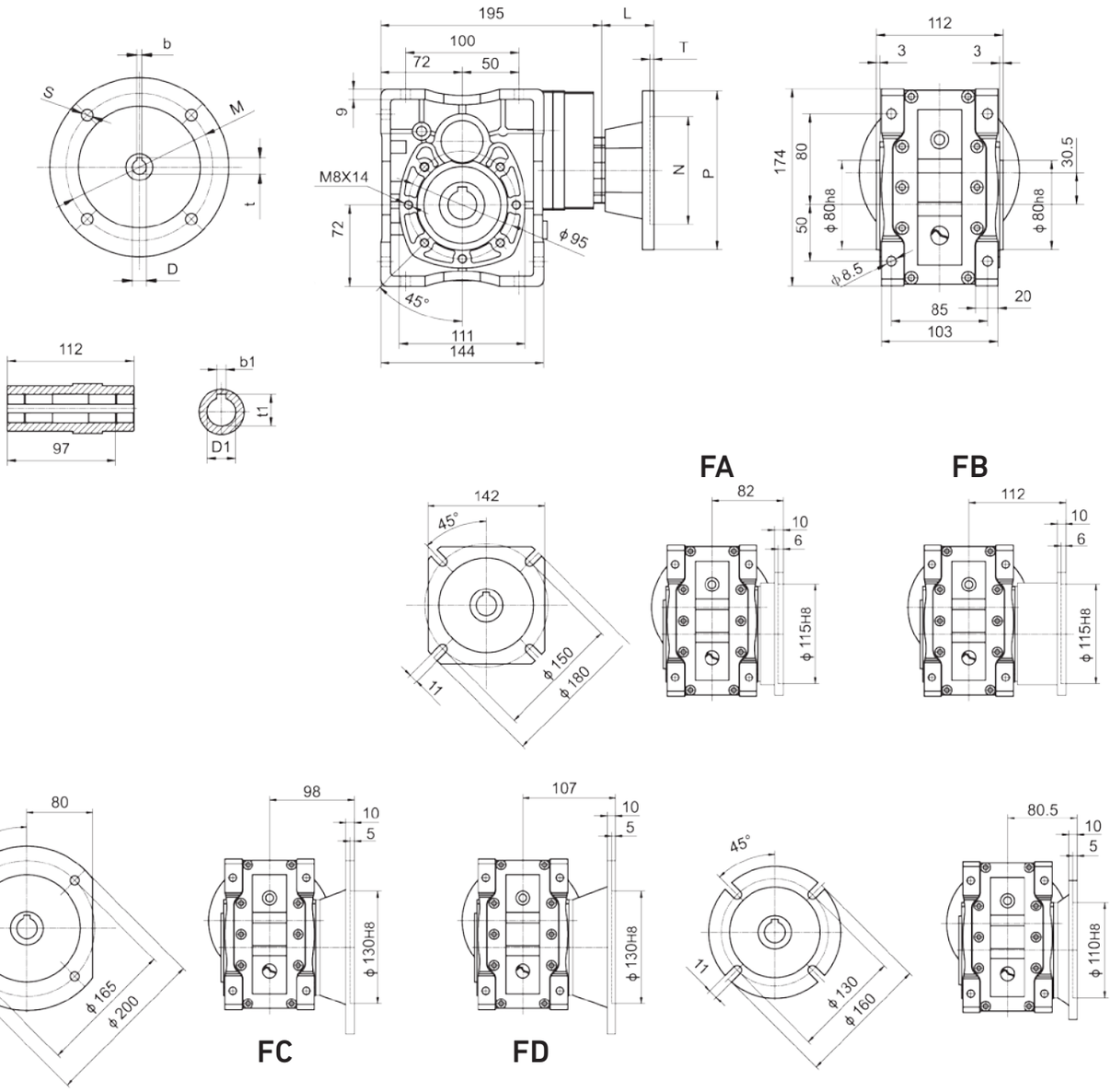
IEC	D_{E8}	b	t	P	M	N	S	T	L
63B5	11	4	12.8	140	115	95	9	3.5	46
71B5	14	5	16.3	160	130	110	9	4	53
71B14	14	5	16.3	105	85	70	7	3	53
80B5	19	6	21.8	200	165	130	11	4	73
80B14	19	6	21.8	120	100	80	7	3.5	63
90B5	24	8	27.3	200	165	130	11	4	73
90B14	24	8	27.3	140	115	95	9	3.5	73

$D_{1\ H7}$	b_1	t_1
25	8	28.3

Weight without motor
6kg

Arhburg Reducer

WAH 63C



IEC	D_{E8}	b	t	P	M	N	S	T	L
63B5	11	4	12.8	140	115	95	9	3.5	46
71B5	14	5	16.3	160	130	110	9	4	53
71B14	14	5	16.3	105	85	70	7	3	53
80B5	19	6	21.8	200	165	130	11	4	73
80B14	19	6	21.8	120	100	80	7	3.5	63

$D_{1\ H7}$	b_1	t_1
25	8	28.3

Weight without motor
6.8kg

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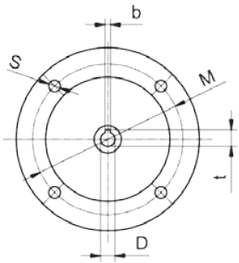
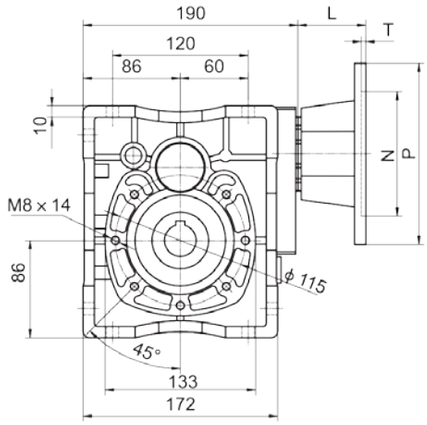
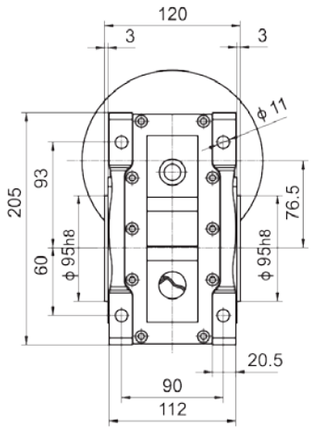
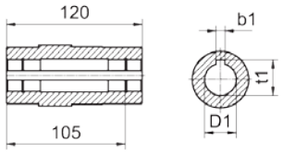
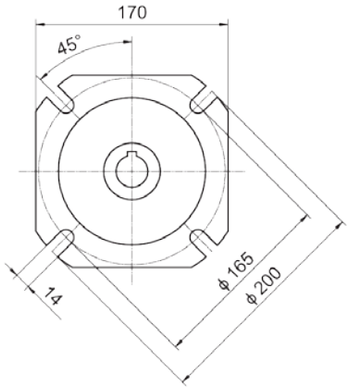
WAH 75B

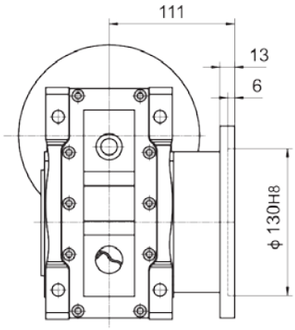












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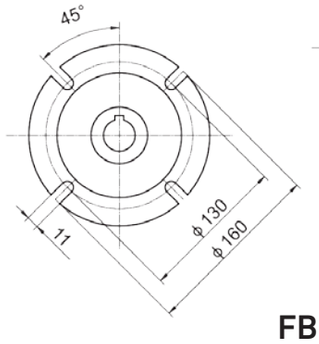
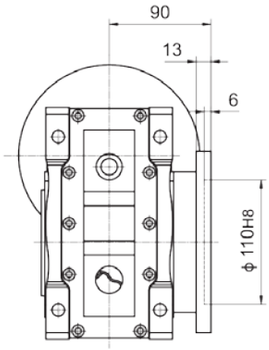




FB

IEC	D_{E8}	b	t	P	M	N	S	T	L
63B5	11	4	12.8	140	115	95	9	3.5	53
71B5	14	5	16.3	160	130	110	9	4	60
80B5	19	6	21.8	200	165	130	11	4	80
80B14	19	6	21.8	120	100	80	6.5	3.5	80
90B5	24	8	27.3	200	165	130	11	4	80
90B14	24	8	27.3	140	115	95	9	3.5	80
100/112B5	28	8	31.3	250	215	180	13.5	4	90
100/112B14	28	8	31.3	160	130	110	9	4.5	90

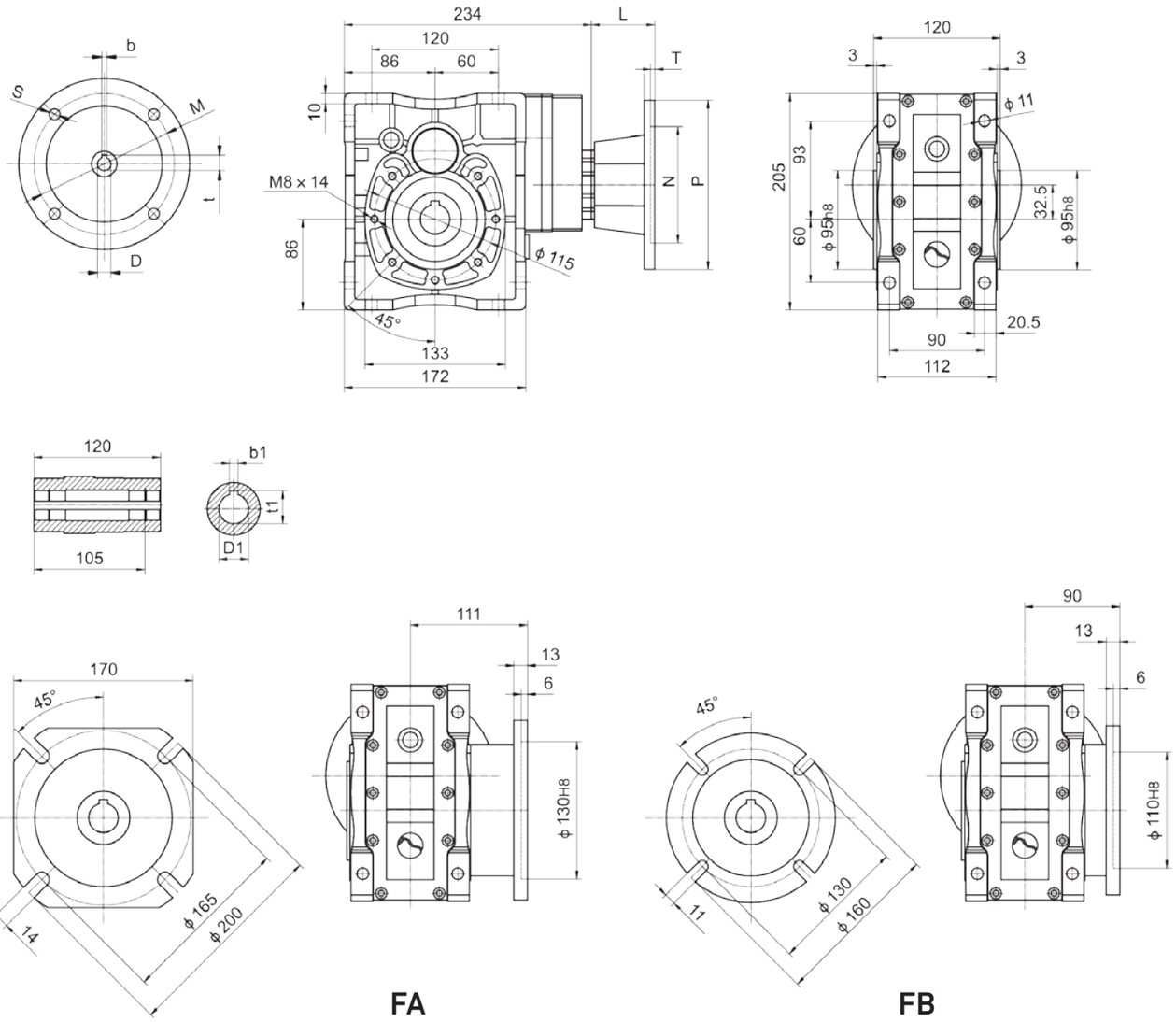
$D_{1\ H7}$	b_1	t_1
28	8	31.3
30*	8*	33.3*
35*	10*	38.3*

*Only on Request

Weight without motor
9.2kg

Arhburg Reducer

WAH 75C



FA

FB

IEC	D_{E8}	b	t	P	M	N	S	T	L
63B5	11	4	12.8	140	115	95	9	3.5	53
71B5	14	5	16.3	160	130	110	9	4	60
80B5	19	6	21.8	200	165	130	11	4	80
80B14	19	6	21.8	120	100	80	6.5	3.5	80
90B5	24	8	27.3	200	165	130	11	4	80
90B14	24	8	27.3	140	115	95	9	3.5	80

$D_{1\ H7}$	b_1	t_1
28	8	31.3
30*	8*	33.3*
35*	10*	38.3*

*Only on Request

Weight without motor
10.8kg

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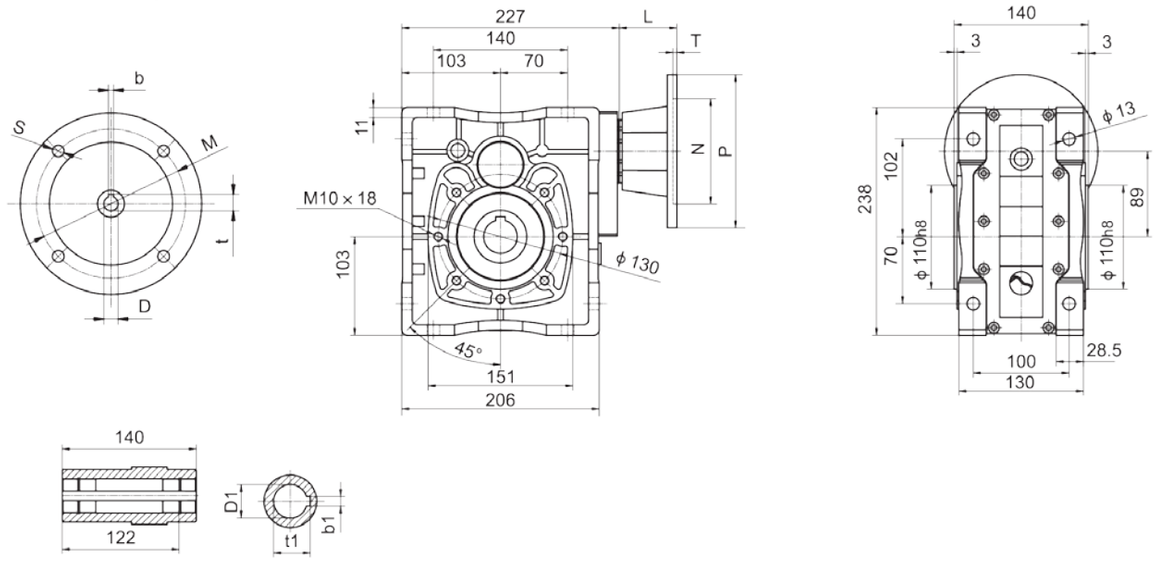
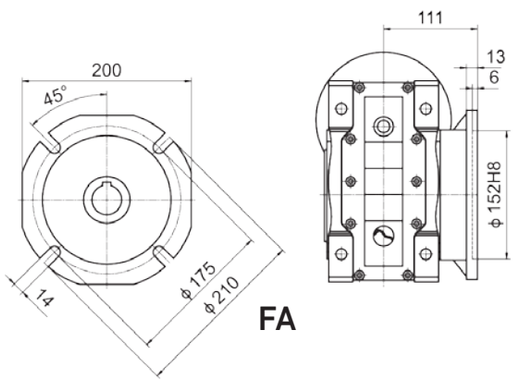
WAH 90B





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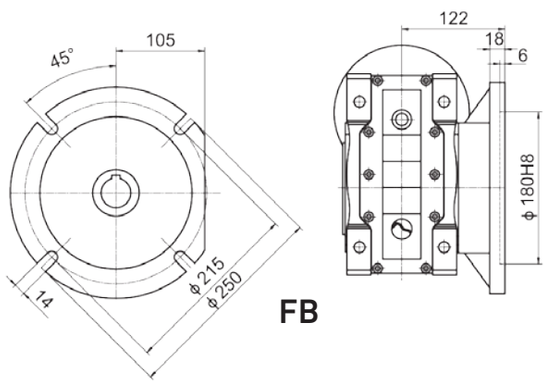

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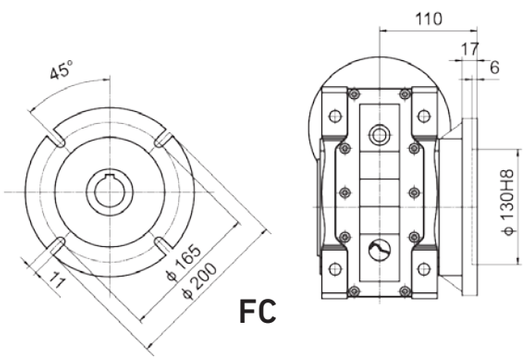

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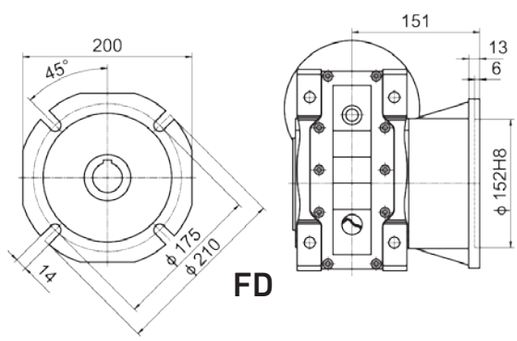


FD

IEC	D_{E8}	b	t	P	M	N	S	T	L
63B5	11	4	12.8	140	115	95	9	3.5	53
71B5	14	5	16.3	160	130	110	9	4	60
80B5	19	6	21.8	200	165	130	11	4	80
80B14	19	6	21.8	120	100	80	6.5	3.5	80
90B5	24	8	27.3	200	165	130	11	4	80
90B14	24	8	27.3	140	115	95	9	3.5	80
100/112B5	28	8	31.3	250	215	180	13.5	4	90
100/112B14	28	8	31.3	160	130	110	9	4.5	90

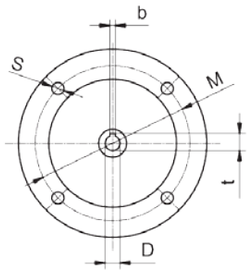
$D_{1\ H7}$	b_1	t_1
35	10	38.3
38*	10*	41.3*

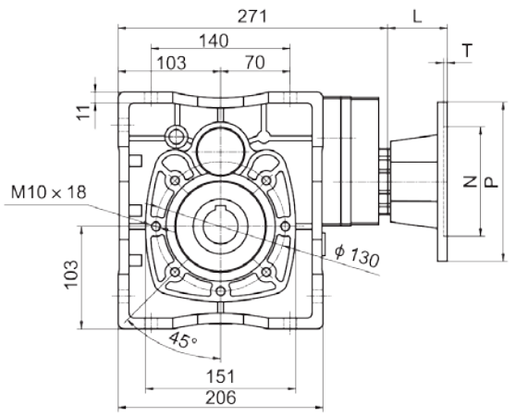
*Only on Request

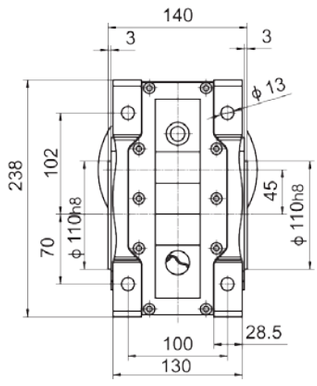
Weight without motor
13.3kg

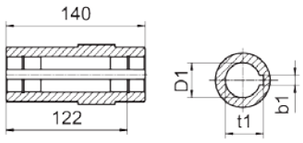
Arhburg Reducer

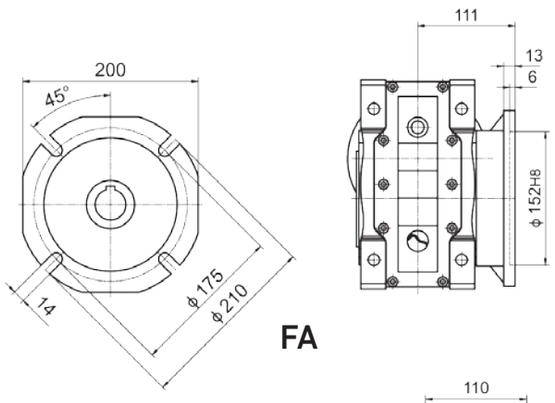
WAH 90C











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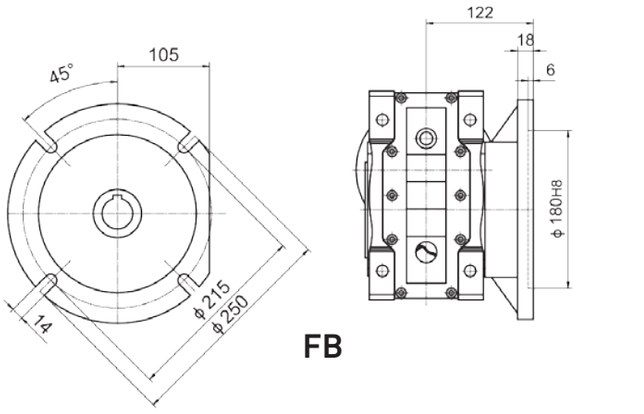

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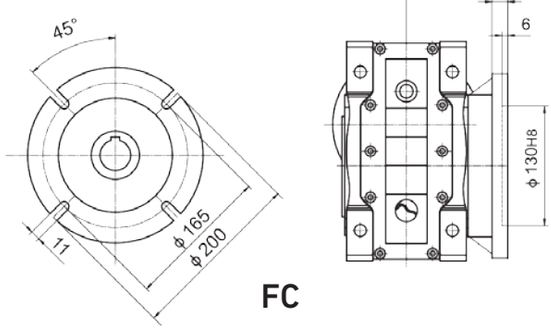

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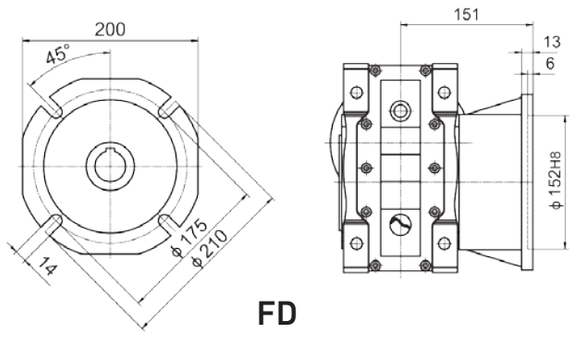

FD

IEC	D_{E8}	b	t	P	M	N	S	T	L
63B5	11	4	12.8	140	115	95	9	3.5	53
71B5	14	5	16.3	160	130	110	9	4	60
80B5	19	6	21.8	200	165	130	11	4	80
80B14	19	6	21.8	120	100	80	6.5	3.5	80
90B5	24	8	27.3	200	165	130	11	4	80
90B14	24	8	27.3	140	115	95	9	3.5	80

$D_{1\ H7}$	b_1	t_1
35	10	38.3
38*	10*	41.3*

*Only on Request

Weight without motor
14.8kg

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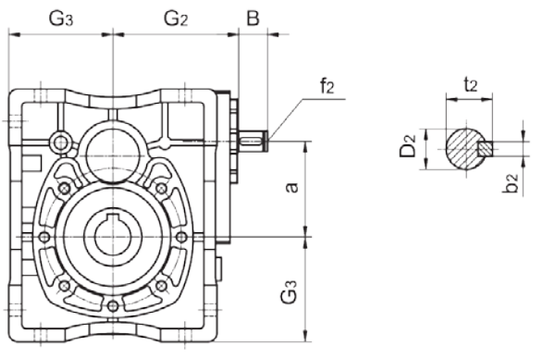
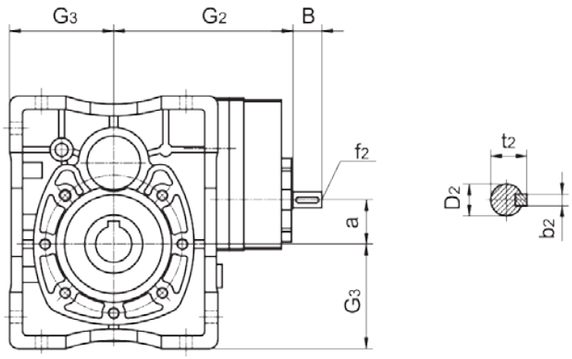
7.2. WAHS Outline Dimension

WAHS... B



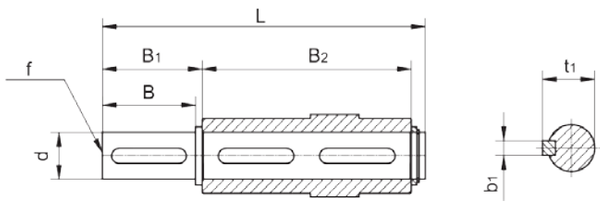
WAHS... C



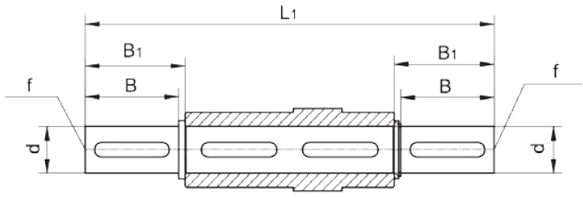
	B	D_{2j6}	G_2	G_3	a	b_2	f_2	t_2
WAH50B	20	14	74	60	59	5	M6	16
WAH50C	20	11	111	60	23.5	4	M6	12.5
WAH63B	20	14	87	72	66	5	M6	16
WAH63C	20	11	124	72	30.5	4	M6	12.5
WAH75B	28	19	105.5	86	76.5	6	M6	21.5
WAH75C	20	14	153	86	32.5	5	M6	16
WAH90B	28	19	125.5	103	89	6	M6	21.5
WAH90C	20	14	173	103	45	5	M6	16

8. ACCESSORIES OUTLINE DIMENSION SHEET

8.1. Output Shafts



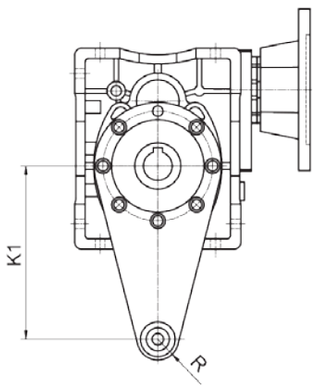
DZ1, DZ2

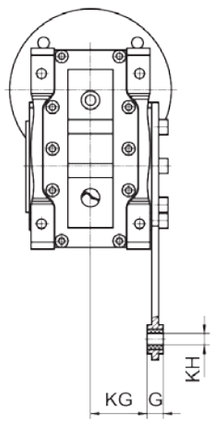


SZ

	d_{h6}	B	B_1	G_1	L	L_1	f	b_1	t_1
WAH50	25	50	53.5	92	153	199	M10	8	28
WAH63	25	50	53.5	112	173	219	M10	8	28
WAH75	28	60	63.5	120	192	247	M10	8	31
WAH90	35	80	84.5	140	234	309	M12	10	38

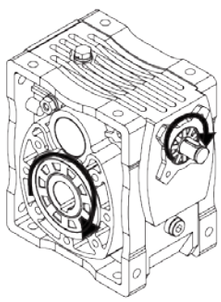
8.2. Torque Arm

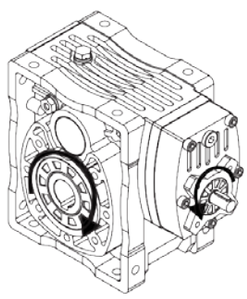




	K1	G	KG	KH	R
WAH50	100	14	38.5	10	18
WAH63	150	14	49	10	18
WAH75	200	25	47.5	20	30
WAH90	200	25	57.5	20	30

9. DIRECTION OF ROTATION





The motor can be run either CW or CCW. When using with gear-box, the direction on the chart is recommended.

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10. INSTALLATION

10.1. Note Recommendations

1. Check whether the rotation direction of output shaft of reducer is correct before fitting to the machine.
2. Before connect with the prime mover and device, please check every axial diameter, aperture, key and key slot, to be sure their dimensions are not deviation, and avoid assembling too tight or too loose, or it could influence the performance.
3. The mounting on the machine must be stable to avoid any vibration.
4. Whenever possible, protect the reduction unit against solar radiation and bad weather.
5. In the case of particularly lengthy periods of storage (4-6 months), if the oil seal is not immersed in the lubricant inside the unit, it is recommended to change it. It is because the rubber could stick to the shaft or may even have lost the elasticity.
6. When connect with hollow or solid shaft, please grease the joint to avoid lock or oxidation.
7. Check the correct level of the lubricant through the oil mirror, if there is one.
8. Starting must take place gradually, without immediately applying the maximum load.
9. Supporting unit is required when using reducer that connects with motor directly, if the weight of motor is comparatively heavy.
10. Ensure the motor cools correctly by assuring good passage of air from the fan side.
11. Standard working temperatures should be between -5˚C to +40˚C, if not, please call the Technical Service.

10.2. Service Restrictions

Specification on this catalogue is organized according to standard of general reducer. It is also necessary to take due consideration of and carefully assess the following applications by calling our Technical Service:

1. As speed increase based on datasheet.
2. Applications with especially high inertia.
3. Use in services that could be hazardous for people if the reduction unit fails.
4. Applications with high dynamic strain on the case of the reduction unit.
5. When working temperature is under - 5˚C or over +40˚C.
6. Use in chemically aggressive environments.
7. Use in a salty environment.
8. Use in radioactive environments.
9. Use in environments pressures other than atmospheric pressure.
10. Mounting positions not mentioned in the catalogue.
    Avoid applications where even partial immersion of the reduction unit is required.
    The maximum torque that the gear reducer can support must not exceed two times the nominal torque (fs=1) stated in the performance tables. Intended for momentary overloads due to starting at full load, braking, shocks or other causes, particularly those that are dynamic.

11. LUBRICATION

11.1. Types of Lubrication

	℃ −50 0 +50 +100	ISO	SHELL	MOBIL	BP	lubrication type
WAH..	Standard −10 +40	VG 220	Shell Omala 220	Mobilgear 630	BP Energol GR-XP 220	Mineral oil
	−20 +25	VG 150 VG 100	Shell Omala 100	Mobilgear 627	BP Energol GR-XP 100	
	-30 +10	VG 68-46 VG 32	Shell Tellus T 32	Mobil D.T.E. 13M		
	-40 −20	VG 22 VG 15	Shell Tellus T 15	Mobil D.T.E. 11M	BP Energol HLP-HM 15	
	-40 +80	VG 220	Shell Omala HD 220	Mobil SHC 630		Synthetic oil
	-40 +40	VG 150		Mobil SHC 629		
	-40 +10	VG 32		Mobil SHC 624		

11.2. Lubricant Volume

The specified fill quantities are recommended values.
The precise values vary depending on the number of stages and gear ratio. When filling, it is essential to check the oil level plug since it indicates the precise oil capacity. The following tables show guide values for lubricant fill quantities in relation to the mounting position (B3, B6, B7····)

WAH... Lubricant fill quantity

Gear Units	Fill quantity in litres : (L)					
	B3	B6	B7	B8	V5	V6
WAH50B	0.33	0.27	0.19	0.23	0.40*	0.22
WAH50C	0.43	0.42	0.31	0.30	0.53*	0.35
WAH63B	0.67	0.45	0.35	0.30	0.80*	0.49
WAH63C	0.77	0.60	0.47	0.37	0.93*	0.62
WAH75B	1.02	0.71	0.58	0.39	1.30*	0.67
WAH75C	1.16	0.81	0.69	0.49	1.52*	0.89
WAH90B	1.80	1.14	0.95	0.62	2.10*	1.05
WAH90C	1.96	1.24	1.06	0.72	2.32*	1.27

*It means the lubricant can't be added according to the oil mirror level, but also higher than the plug. The filled volume is shown in the table.

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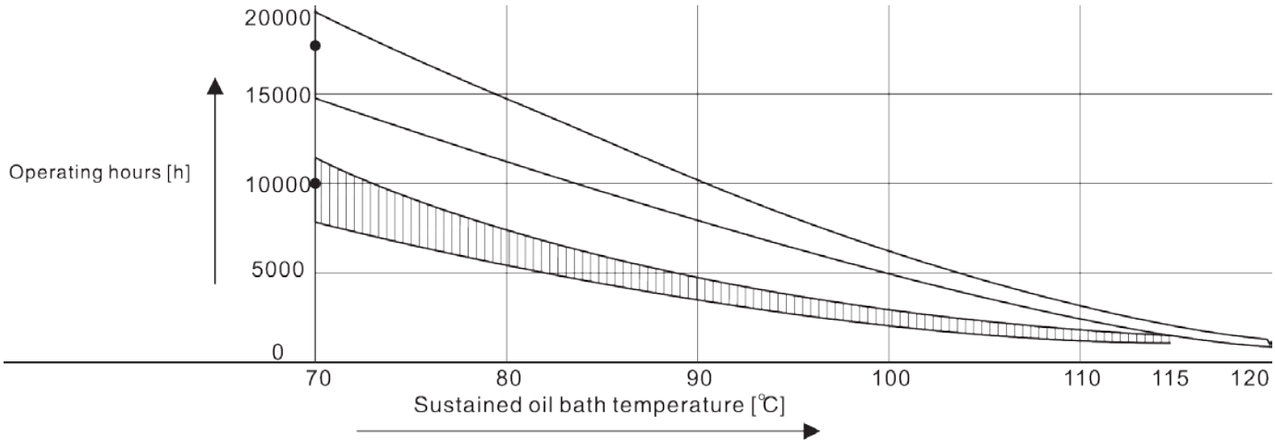
12. MAINTENANCE

1. First oil change should be done after 300 working hours (run-in period) or three months. Never mix the syntheic oil and mineral oil together.
2. Every 3000 working hours, at least every 6 months, check the oil and oil level, the seals visually for leakage.
3. Depending on the operating condition (see chart below), every 3 years.

Oil change intervals for standard gear units under normal environmental conditions



▪ Average value per oil type at 70℃

(1) Synthetic oil

(2) Mineral oil

13. STORAGE

1. Protected against rainand snow, no shock loads.
2. Lay block or other material between the ground and equipment.
3. The opened but not used gear units should have anti-corrosive oil on its surface, and then return to the packing containers.
4. If reducer is storage for 2 years or more, please check cleanliness and mechanical damage, and whether corrosion protection is still there.

14. NOTICE FOR ORDER

Please offer the following information when place the orders:

1. Type of the reducer(type,ratio,power and mounting position
2. Generally the gear units paint in silver
3. Order quantity
4. Other special requirements
5. Company, contact person and telephone number

15. MALFUNCTIONS

15.1. Gear unit malfunctions

Problem	Possible Cause	Remedy
Unusual, regular running noise	A. Meshing/grinding noise: Bearing damage. B. Knocking noise: Irregularity in the gearing	A. Check the oil, change bearings B. Contact customer service
Unusual, irregular running noise	Impurity in the oil	• Check the oil • Stop the drive, contact customer service
Oil leaking • From the gear cover plate • From the motor flange • Fromthe motor oil seal • From the gear unit flange • From the output end oil sea	A. Rubber seal on the gear cover plate is leaking B. Defective seal C. Reducer is not vented	A. Tighten the bolts on the gear cover plate and observe the gear unit. If oil is still leaking, contact customer service B. Contact customer service C. Vent the gear unit (see “Mounting Positions”)
Oil leaking from breather valve.	A. Too much oil B. Drive mounted in wrong mounting position C. Frequent cold starts (oilfoams) and/or high oil level	A. Correct the oil level (see Sec. “Inspection and Maintenance”) B. Mount the breather correctly (see Sec. “Mounting Positions”)and correct the oil level (see “Lubricants”)
Output shaft does not turn although the motor is running or the input shaft is rotated.	Connection between shaft and hub in reducer is cracked	Send reducer to factory for repair

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16. CHARGE CHARACTERISTIC CHART (For Reference)

AIR BLOWERS		Hoist gear assembly	A
Air Blower (axial or radial)	A	Derrick gear assembly	B
Fan of cooling tower	B	Stering gear assembly	B
Induced draught fan	B	Moving gear assembly	C
Rotary piton type fan	B	LAND DREDGER	
Turbo-fan	A	Drum-type conveyor	C
CONSTRUCTION MACHINERY		Drum-type rotation wheel	C
Concrete Mixer	B	Dredger head	C
Hoist	B	Powered crab	B
Road building machinery	B	Pump	B
Boring mill	B	Pump turning gear assembly	B
CHEMICAL MACHINERY		Moving gear assembly (apron wheel)	C
Mixer (liquid)	A	Moving gear assembly (track)	B
Mixer (half liquid)	B	FOODSTUFF PROCESSING MACHINERY	
Centrifuge (heavy)	B	Placer or box filler	A
Centrifuge (light)	A	Cane crusher	A
Cooling rolling drum*	B	Cane cutter*	B
Dry rolling drum*	B	Cane crusher*	C
Mixer	B	Mixer	B
COMPRESSOR		Paste bucket	B
Piston type compressor	C	Packager	A
Turbo-compressor	B	Beet Slicer	B
TRANSMISSION FREIGHTER		Beet washing machine	B
Pan conveyor	B	MOTOR AND CONVERSION EQUIPMENT	
Balance lifter	B	Frequency converter	C
Trough conveyor	B	Motor	C
Ribbon conveyor (large piece)	C	Welding motor	C
Ribbon conveyor (small piece)	B	WASHING MACHINE	
Drum-type flour conveyor	A	Rolling drum	B
Chain conveyor	B	Washing machine	B
Ring type conveyor	B	METAL ROLLER MACHINE	
Lifter	B	Steel cutter*	C
Hoist	B	Chain conveyor*	B
Crank-connecting conveyor	B	Cold mill*	C
Lifter	B	Continuous casting equipments	B
Worm conveyor	B	Cold bed*	B
Steel-band conveyor	B	Cropper*	C
Chain reed-type conveyor	B	Cross steering transmitter*	B
Crab freighter	B	Deruster**	C
HOIST		Heavy and medium steel mill	C
Bracket swing gear assembly	B	Bar mill*	C

Arhburg Reducer

Bar Transmission Equipments	B	PUMPS	
Bar Pusher	B	Centrifugal pump (thin liquid)	A
Push Bed	B	Centrifugal pump (half liquid)	B
Shears*	C	Displacement pump	C
Lumber elevator platform*	B	Plunger pump	C
Roll adjusting equipments	B	Force pump	C
Roller levelling machine	B	PLASTIC EQUIPMENT	
Mill rolling way (heavy)*	C	Glazing press*	B
Mill rolling way (light)*	B	Ejecting press*	B
Sheet rolling mill*	C	Spiral extruding machine*	B
Trimming shears*	B	Mixing machine*	B
Pipe welder	C	RUBBER EQUIPMENT	
Soldering machine (belt material and wire rod)	B	Glazing press*	B
Wire drawbench	B	Ejecting press*	C
METAL PROCESSING MACHINE TOOLS		Mixing stir machine*	B
Power shaft	A	Kneading machine	B
Drop hammer	C	Roller machine*	C
Machine tool and necessary	C	STONE PORCELAIN CLAY PROCESSING EQUIPMENTS	
Machine tool and necessary	A	Ball crusher	B
Machine tool and main driving equipment	B	Ejecting press and breaker*	C
Metal facing machine	C	Breaker	C
Plate-levelling machine tool	C	Brick press	C
Backing-out punch	C	Beating crusher*	C
Press machine tool	C	Converter*	C
Cutting machine	B	Cylinder mill*	C
Sheet bending machine tool	B	TEXTILE MACHINERY	
PETROLEUM PROCESSING MACHINERY		Feeding machine	B
Pump of oil pipe line*	B	loom machine	B
Rotary drilling equipment	C	Dyeing machine	B
PAPERING MACHINE		Purified drum	B
Glazing press*	C	Welon machine	B
Multilayer paper board machine*	C	WASTER TREATMENT EQUIPMENTS	
Drying cylinder*	C	Air blast*	B
Glazing cylinder*	C	Screw Pump	B
Masher*	C	WOOD PROCESSING MACHINE TOOL	
Mashing and breaking machine*	C	Barker	C
Suction roll*	C	Facing machine	B
Wet oaoer roller machine*	C	Saw bench	C
Water absorbing roller machine*	C	Wood processing machine tool	A
Welon machine	C		

KEY:
A - Uniform Bad
B - Moderate Shock Load
C- Heavy Shock Load
* - for 24hr System

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