

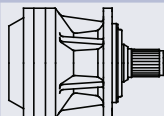
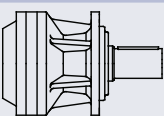
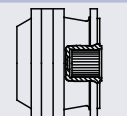
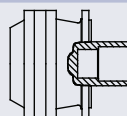
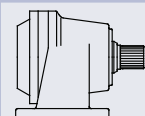
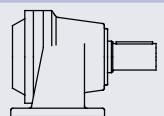
PLANETARY GEARBOXES - RES SERIES

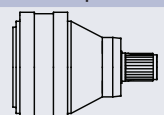
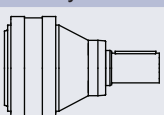
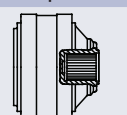
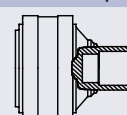
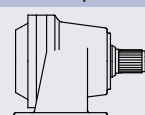
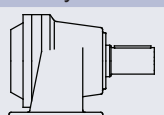
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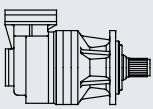
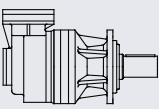
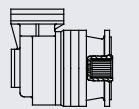
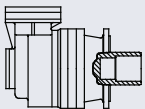
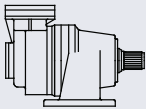
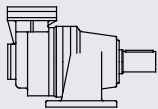


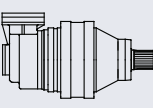
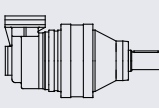
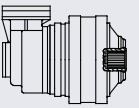
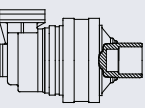
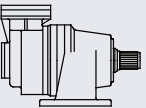
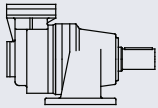
IN LINE GEARBOXES

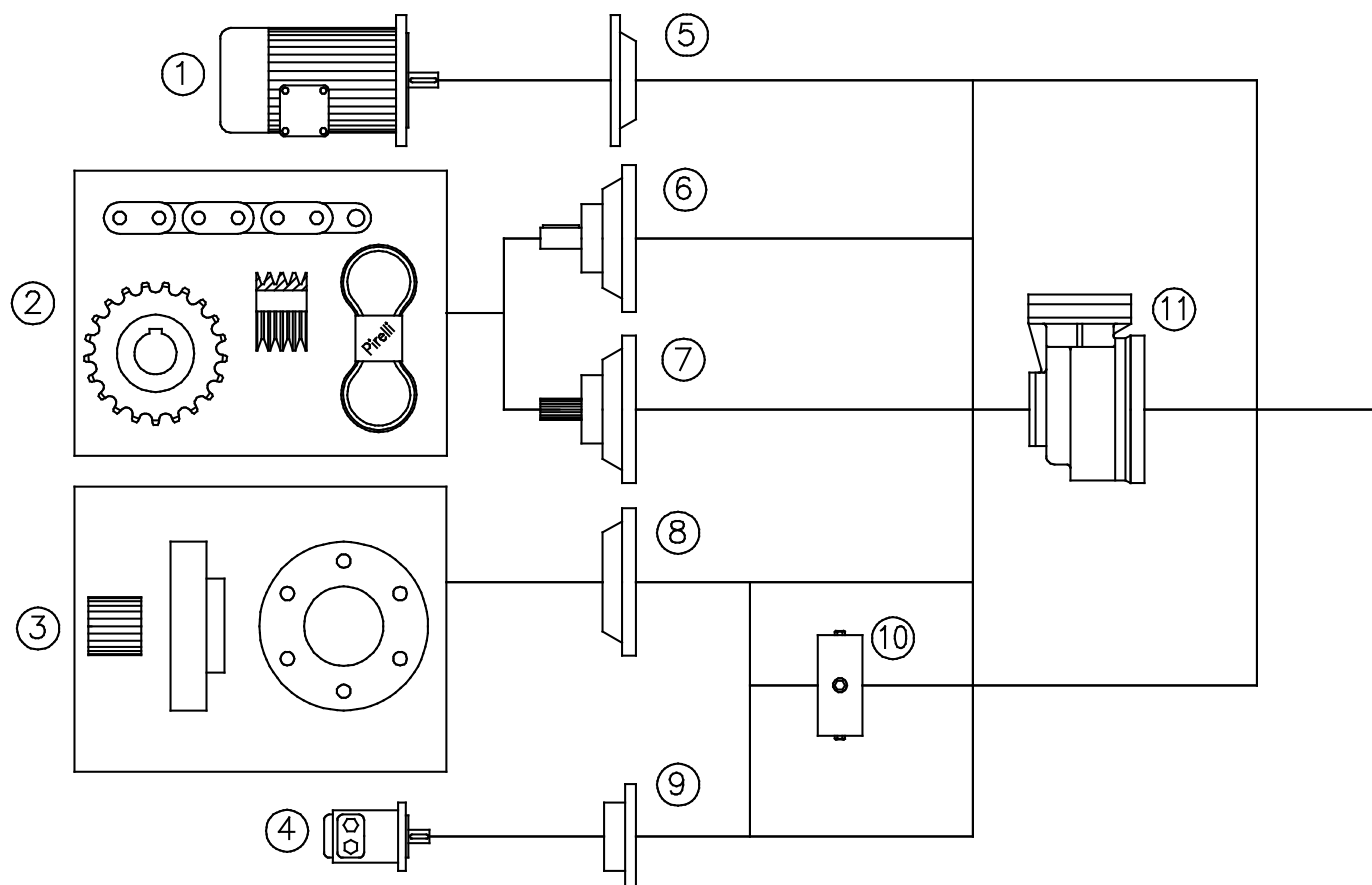
	GEARBOX MOUNTING CONFIGURATION					
	Ext. Splined	Ext. Cylindrical	Int. Splined	Shrink Coupling	Ext. Splined	Ext. Cylindrical
	 Code: M...X	 Code: M...C	 Code: F...	 Code: F...P	 Code: P...X	 Code: P...C
Catalog Page	pg. 12	pg. 12	pg. 20	pg. 20	pg. 12	pg. 12
Nominal Torque LB-FT	RES	RES	RES	RES	RES	RES
Up to 1160	100-M...X	100-M...C	100-F...	100-F...P	100-P...X	100-P...C
Up to 2100	200-M...X	200-M...C	200-F...	200-F...P	200-P...X	200-P...C
Up to 2820	300-M...X	300-M...C	300-F...	300-F...P	300-P...X	300-P...C
Up to 4130	400-M...X	400-M...C	400-F...	400-F...P	400-P...X	400-P...C
Up to 4780	500-M...X	500-M...C	500-F...	500-F...P	500-P...X	500-P...C
Up to 7960	800-M...X	800-M...C	800-F...	800-F...P	800-P...X	800-P...C
Up to 9410	1000-M...X	1000-M...C	1000-F...	1000-F...P	1000-P...X	1000-P...C
Up to 13020	1300-M...X	1300-M...C	1300-F...	1300-F...P	1300-P...X	1300-P...C

	GEARBOX MOUNTING CONFIGURATION					
	Ext. Splined	Ext. Cylindrical	Int. Splined	Shrink Coupling	Ext. Splined	Ext. Cylindrical
	 Code: M...X	 Code: M...C	 Code: F...	 Code: F...P	 Code: P...X	 Code: P...C
Catalog Page	pg. 14	pg. 14	pg. 22	pg. 22	pg. 14	pg. 14
Nominal Torque LB-FT	RES	RES	RES	RES	RES	RES
Up to 15200	1800-M...X	1800-M...C	1800-F...	1800-F...P	1800-P...X	1800-P...C
Up to 20980	2000-M...X	2000-M...C	2000-F...	2000-F...P	2000-P...X	2000-P...C
Up to 28210	3000-M...X	3000-M...C	3000-F...	3000-F...P	3000-P...X	3000-P...C
Up to 39060	4000-M...X	4000-M...C	4000-F...	4000-F...P	4000-P...X	4000-P...C
Up to 50630	6000-M...X	6000-M...C	6000-F...	6000-F...P	6000-P...X	6000-P...C
Up to 94030	8000-M...X	8000-M...C	8000-F...	8000-F...P	8000-P...X	8000-P...C
Up to 112840	10000-M...X	10000-M...C	10000-F...	10000-F...P	10000-P...X	10000-P...C
Up to 155510	15000-M...X	15000-M...C	15000-F...	15000-F...P	15000-P...X	15000-P...C

RIGHT ANGLE GEARBOXES

	GEARBOX MOUNTING CONFIGURATION					
	Ext. Splined	Ext. Cylindrical	Int. Splined	Shrink Coupling	Ext. Splined	Ext. Cylindrical
	 Code: M...AX	 Code: M...AC	 Code: F...A	 Code: F...AP	 Code: P...AX	 Code: P...AC
Catalog Page	pg. 16	pg. 16	pg. 24	pg. 24	pg. 16	pg. 16
Nominal Torque LB-FT	RES	RES	RES	RES	RES	RES
Up to 2820	300-M...AX	300-M...AC	300-F...A	300-F...AP	300-P...AX	300-P...AC
Up to 4780	500-M...AX	500-M...AC	500-F...A	500-F...AP	500-P...AX	500-P...AC
Up to 7960	800-M...AX	800-M...AC	800-F...A	800-F...AP	800-P...AX	800-P...AC
Up to 13020	1300-M...AX	1300-M...AC	1300-F...A	1300-F...AP	1300-P...AX	1300-P...AC

	GEARBOX MOUNTING CONFIGURATION					
	Ext. Splined	Ext. Cylindrical	Int. Splined	Shrink Coupling	Ext. Splined	Ext. Cylindrical
	 Code: M...AX	 Code: M...AC	 Code: F...A	 Code: F...AP	 Code: P...AX	 Code: P...AC
Catalog Page	pg. 18	pg. 18	pg. 26	pg. 26	pg. 18	pg. 18
Nominal Torque LB-FT	RES	RES	RES	RES	RES	RES
Up to 15200	1800-M...AX	1800-M...AC	1800-F...A	1800-F...AP	1800-P...AX	1800-P...AC
Up to 20980	2000-M...AX	2000-M...AC	2000-F...A	2000-F...AP	2000-P...AX	2000-P...AC
Up to 28210	3000-M...AX	3000-M...AC	3000-F...A	3000-F...AP	3000-P...AX	3000-P...AC
Up to 39060	4000-M...AX	4000-M...AC	4000-F...A	4000-F...AP	4000-P...AX	4000-P...AC
Up to 50630	6000-M...AX	6000-M...AC	6000-F...A	6000-F...AP	6000-P...AX	6000-P...AC
Up to 94030	8000-M...AX	8000-M...AC	8000-F...A	8000-F...AP	8000-P...AX	8000-P...AC
Up to 112840	10000-M...AX	10000-M...AC	10000-F...A	10000-F...AP	10000-P...AX	10000-P...AC



Input Side

- ① Electric Motor
- ② VeeBelt or Chain Drive
- ③ Customer Provided Flange or Adaptor
- ④ Hydraulic Motor
- ⑤ Flange for Electric Motor
- ⑥ Cylindrical Keyed Input Shaft
- ⑦ External Splined Input Shaft
- ⑧ Universal Input Flange
- ⑨ Adaptor for Hydraulic Motor

Brake

- ⑩ Hydraulic Multiple Disk Brake

Reduction Stages

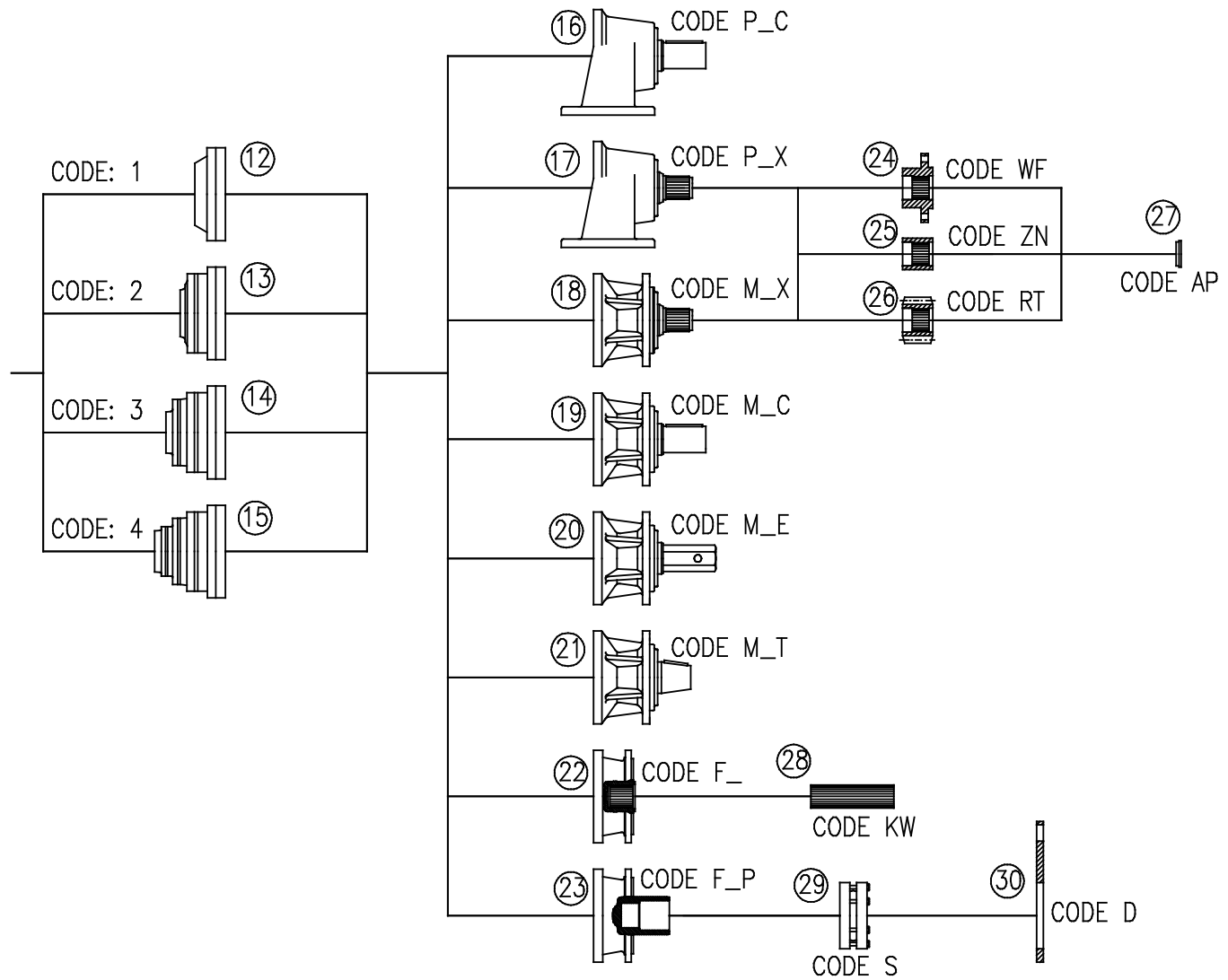
- ⑪ Right Angle with Bevel Gears
- ⑫ Single Planetary Stage
- ⑬ Double Planetary Stage
- ⑭ Triple Planetary Stage
- ⑮ Quadruple Planetary Stage

Output Side

- ⑯ Foot Mounted Housing with Cylindrical Shaft
- ⑰ Foot Mounted Housing with Splined Shaft
- ⑱ Flanged Housing with External Splined Shaft
- ⑲ Flanged Housing with Cylindrical Shaft
- ⑳ Flanged Housing with Hexagonal Shaft
- ㉑ Flanged Housing with Tapered Shaft
- ㉒ Flanged Housing with Internal Splined Shaft
- ㉓ Flanged Housing with Internal Shaft - Shrink Disc

Accessories - Output Side

- ㉔ Wheel Flange
- ㉕ Splined Bush
- ㉖ Pinion
- ㉗ End Plate
- ㉘ Splined Rod
- ㉙ Shrink Disc
- ㉚ Torque Arm



ORDERING CODE

RES	800	M	3	R	A	X	I	227	N*	FS*	WF
Planetary Gear Unit	Nominal Torque 100-15000		Number of Stages	R Reinforced Housing - Standard Housing	A Right Angle - In Line	Inches Key Shaft for RES 300 thru 500 Only	Ratio without Decimals		Accessories Input: See pgs.38-39 Hydraulic Motor Flanges: See pgs.40-41 Electric Motor Flanges: See pgs.42-43	Accessories Output: See pgs. 38-39	
Housing-Shaft Version: M Flange-Ext. Shaft F Flange-Internal Shaft		P	Flange-Ext. Shaft Foot-Ext. Shaft			Output Shaft Version: - Internal Splined C Cylindrical E Hexagonal X External Splined K Tapered			Brakes - See pgs. 32-35 FS* Brake - Without Brake		

SPEED

Input RPM

The admissible input speed for continuous duty.

Output RPM

The admissible output speed.

Transmission Ratio

The quotient of input speed divided by output speed. See Fig. 1.

$$\text{Input RPM} \div \text{Output RPM} = \text{Ratio}$$

Fig. 1

TORQUE

Nominal Torque LB-FT (Nominal)

Industry standard denomination to indicate gearbox size.

Peak Torque LB-FT (Peak)

The absolute maximum torque that can be transmitted. This value must not be exceeded. See Tab. 1.

Continuous Torque LB-FT (Continuous)

Can be continuous transmitted for a limited life. It refers to a nominal life of 15,000 RPM x Hours and a service factor of 1.0. For other operating conditions, the transmittible torque has to be determined as described in Dia. 1.

Tab. 1 Peak Torque LB-FT (Peak)

RES	100	200	300	400	500	800	1000	1300	1800	2000	3000	4000	6000	8000	10000	15000
LB-FT	1375	2170	3255	4700	5790	9405	11575	15915	18085	21700	32550	41950	61480	115730	137430	188060

POWER MECHANICAL

Mechanical Power HP

Results from calculation of torque and relative speed

Maximum Mechanical Power HP (Max)

The maximum power that can be transmitted in case of intermitten duty. Values in Tab. 2 must not be exceeded. The torque calculation from mechanical power and speed must not exceed values in Tab. 1.

Tab. 2 Maximum Mechanical Power HP (Max)

RES	100	200	300	400	500	800	1000	1300	1800	2000	3000	4000	6000	8000	10000	15000
1 Stage	33.5	40	80.5	-	121	177	-	268	-	322	375	442	509	670	804	1005
2 Stage	20	23	33.5	33.5	40	80	80	121	121	177	177	268	322	442	442	509
3 Stage	9.5	13.5	20	33.5	33.5	33.5	33.5	40	40	80	80	121	177	268	268	322
4 Stage	3	4	7	8	11	16	20	33.5	33.5	33.5	33.5	40	80	121	121	177

POWER THERMAL

Thermal Power Limit HP (Thermal)

The maximum power that can be transmitted before applying a cooling system. Factors that influence the thermal capacity are: input speed, duty, mounting position, lubricant, ambient temperature, air circulation, sun exposure, final paint color, installation. The values in Tab. 4 are valid for: constant duty, horiz. mounting pos., free air circulation, oil ISO VG 150, ambient temp. 70° F (20° C), input RPM = 1500 RPM. For operation under different conditions, the thermal limit has to be corrected by means of the correction factors for temp. and speed. These consider also the actual running time and the mounting position. For adjusted limit HP (Adjusted) see Fig. 2.

$$\begin{matrix} \text{Speed Factor} & \times & \text{Temp. Factor} & \times & \text{HP (Thermal)} & = & \text{HP (Adjusted)} \\ \text{(See Tab. 4)} & & \text{(See Tab. 5)} & & \text{(See Tab. 3)} & & \end{matrix}$$

Fig. 2

SELECTION CRITERIA

Basic Selection Steps:

1) Determine Service Factor	See pg. 8, Tab. 6
2) Calculate required Ratio	See pg. 6, Fig. 1
3) Calculate required Torque LB-FT (Adjusted)	See pg. 8, Fig. 4
4) Select appropriate Gearbox with reference to Ratio & Torque	See pgs. 12 thru 27
5) Check Radial and/or Axial Load	See pg. 11, Dia. 3
6) Check Mechanical & Thermal Capacity	See pgs. 6 & 7, Tab. 2 & 3

Example: Selected Gearbox RES 1300 M2C-14-SA4 Ratio 13.47

APPLICATION:	Compost mixer driven by a hydraulic motor
OUTPUT TORQUE:	5200 lb-ft (running torque - 2 hours each = 6 hours)
OUTPUT SPEED:	49 rpm
INPUT SPEED:	660 rpm
RADIAL/AXIAL LOAD:	none (coupled to supported drive shaft)
MINIMUM LIFE OF UNIT:	4000 hours

DETERMINING REQUIRED GEARBOX TORQUE

Output Torque LB-FT (Output)

The actual torque applied to the output shaft.

Adjusted Torque LB-FT (Adjusted)

The modified output torque valid for gearbox selection. Adjusted torque considers the service factor.

Service Factor SF

SF considers the load variations which exist from the drive and the driven machine. The load variation appear as shocks, torque oscillations and peak loads. SF can be taken from Tab. 6 if other calculated values are not available.

Gear Life RPM x Hours

The product of output speed in RPM and Hours of service results in the number of cycles.

Life Factor LF (Gearing)

The LF is required for the determination of the service life. LF (Gearing) can be obtained from Dia. 1.

Tab. 6 Service Factor SF

DRIVEN MACHINE LOADING	DRIVE		
	Uniform Electric & Hyd. Motor	Light Shock Int.-Comb. Engine (+Cyl.)	Moderate Shock Int.-Comb. Engine (1 Cyl.)
Uniform Generators, Mixers & Agitators for uniform density, Small Winches, Conveyers	1.0	1.5	1.75
Moderate Shock Crane Slewing Gears, Concrete Mixers & Pumps, Calenders, Piston Pumps	1.25...1.5	1.75	2.0
Heavy Shock Excavators, Rolling Mills, Mills, Presses, Crushing Machines, Foundry Equip., Rotary Boring-Tools	1.75...2.0	2.75	2.75

Output Torque LB-FT (Output)	X	Service Factor SF (Tab. 6)	=	Adjusted Torque LB-FT (Adjusted)
Example: 5200 LB-FT (Output torque req'd at shaft)	X	1.25 (Drive Machine Crane Slew. Gear)	=	6500 LB-FT (Adjusted)

Fig. 4

DETERMINING REQUIRED GEARBOX TORQUE

Determine min. torque rating of gearbox when required, life expectancy is given: LF ①

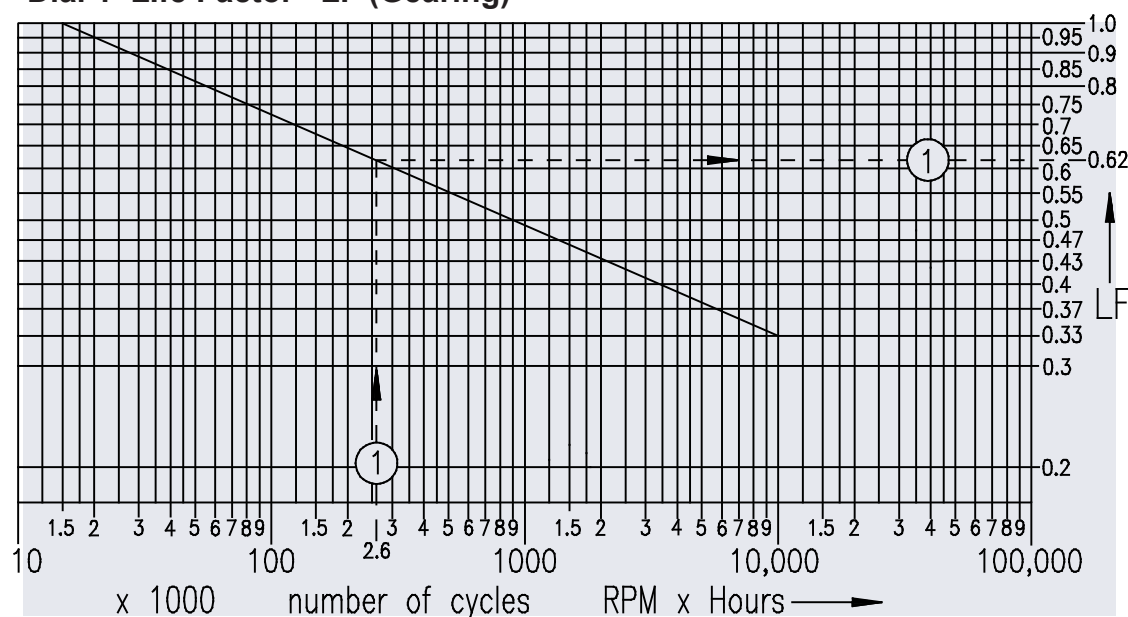
$$4000 \text{ Hours} \times 49 \text{ RPM} = 196,000 \text{ cycles} \quad \text{Using Dia. 1, LF ①} = 0.62$$

$$\frac{6500 \text{ LB-FT}}{0.62 \text{ LF}} = 10,484 \text{ LB-FT Gearbox Minimum Torque Rating}$$

Fig. 5

GEARBOX SELECTION

Dia. 1 Life Factor LF (Gearing)



$$196,000 \text{ cycles} \div 49 \text{ RPM} = 4000 \text{ Hours}$$

Fig. 6

Determine Gear Life of a selected gearbox:

$$\frac{\text{Adjusted Output Torque}}{\text{Gearbox Torque Rating}} = \text{Gear Life} \quad \frac{6500 \text{ LB-FT (Adjusted)}}{10,484 \text{ LB-FT}} = 0.62 \text{ LF}$$

Fig. 7

Using Dia. 1, determine the number of cycles related to LF ①

VERIFY MECHANICAL-THERMAL POWER

Check Maximum Mechanical Power HP (Max) on Pg. 6, Tab. 2.

Check Thermal Power Limit HP (Thermal) on Pg. 7, Tab. 3.

$$\begin{aligned} \text{LB-FT (Output)} \times \text{Output RPM} \div 5252 &= \text{HP} \\ 5200 \text{ LB-FT} \times 49 \text{ RPM} \div 5252 &= 48.5 \text{ HP} \end{aligned}$$

Find Series 1300, 2 Stage, 121 HP Maximum Mechanical, 25 HP Thermal.

Application is acceptable since duty is intermittent.

BEARING LIFE CALCULATION

Shaft Loads: Radial Load & Axial Load RL & AL

The values given are the absolute maximum the output shaft can handle which must never be exceeded. In some cases with combination of torque and radial load near the maximum admissible values, a fatigue calculation may be necessary. If heavy thrust loads and radial loads occur simultaneously, contact the Technical Service Department. Gearboxes with internal splined output shaft can not bear any shaft loads but can transmit torque only.

$$RL \times LF(\text{Bearing}) \times \frac{1}{SF} = RL(\text{Adjusted})$$

Fig. 8

Service Factor SF

Considers the increased load caused by shocks. Approximate values can be obtained from Tab. 7.

Life Factor LF (Bearing)

Required for determining bearing life. LF (Bearing) can be obtained from Dia. 2.

Tab. 7 Service Factor SF

Load Nature	Service Factor
Uniform	1.0
Moderate Shock	1.25...1.5
Heavy Shock	1.75...3.0

To find Bearing Life for a specific gearbox:

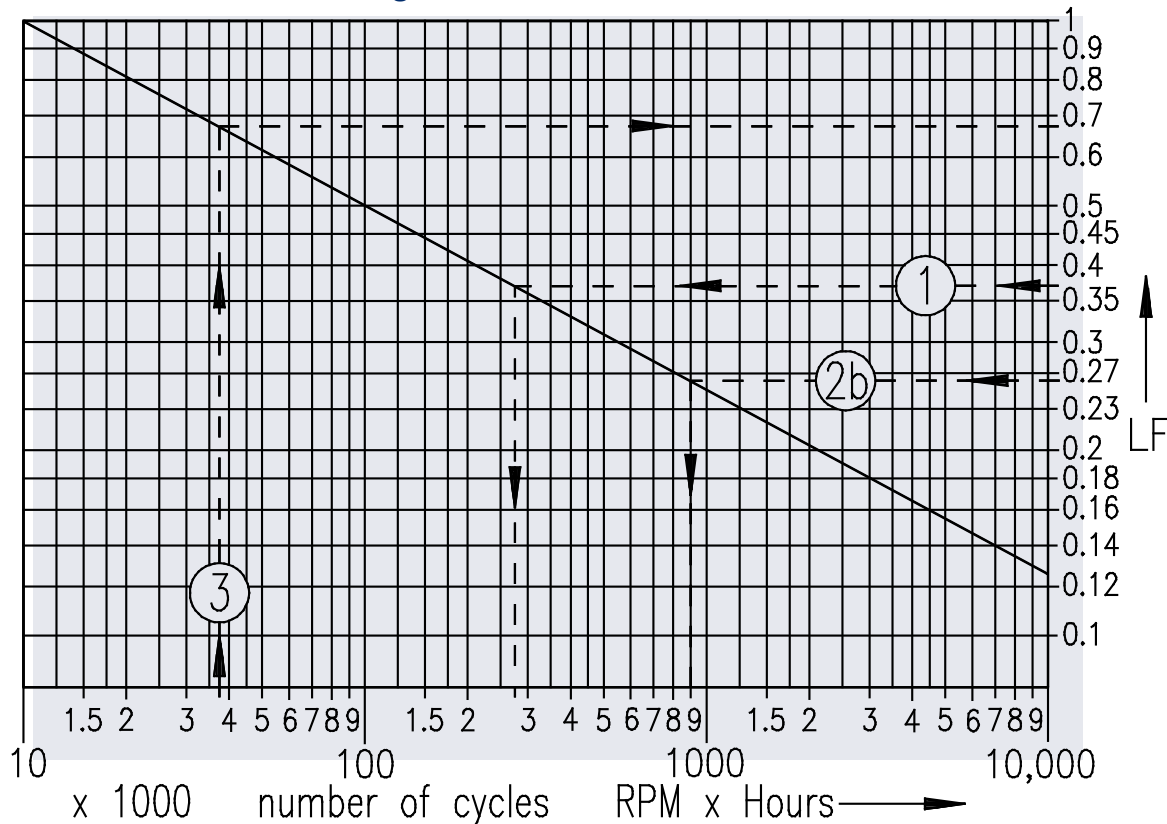
$$\frac{SF \times RL}{RL(\text{Rated})} = LF(\text{Bearing}) = \frac{\text{Cycles (RPM} \times \text{Hours)}}{RPM}$$

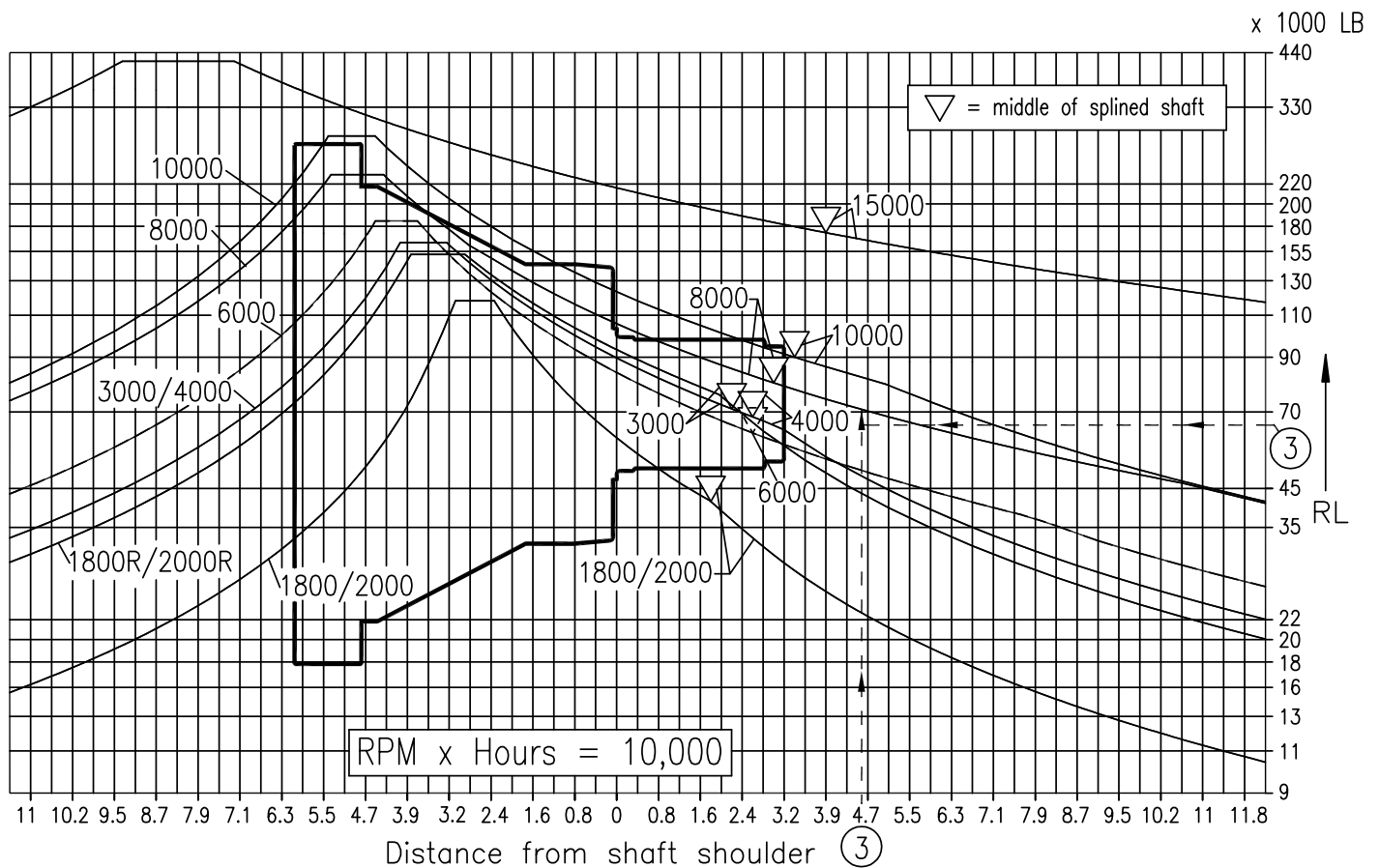
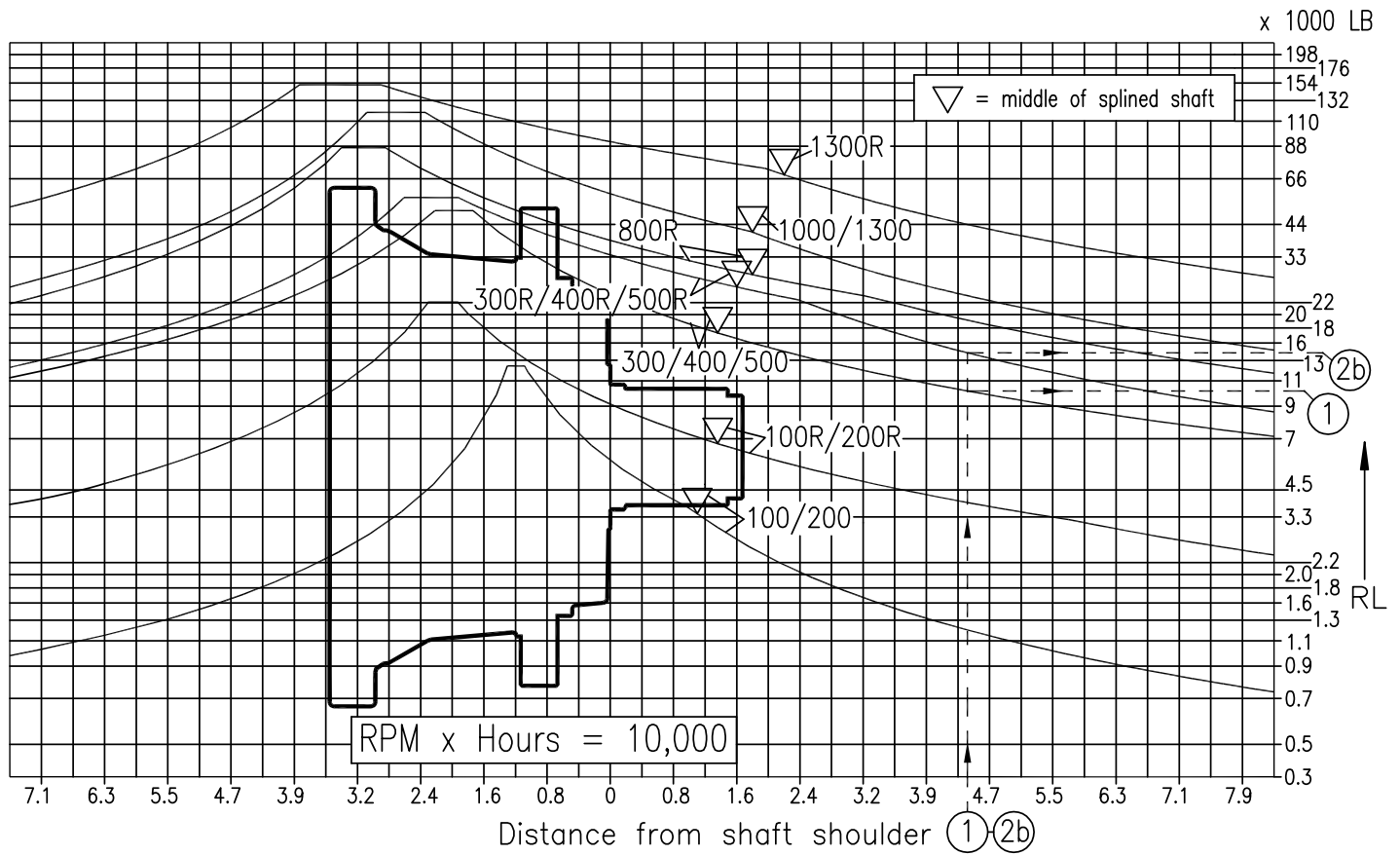
To find gearbox size for a specific application:

$$\text{Find LF (Bearing) from Dia. 2} \quad \frac{RL(\text{Actual}) \times SF}{LF(\text{Bearing})} = RL(\text{Rated})$$

Fig. 9

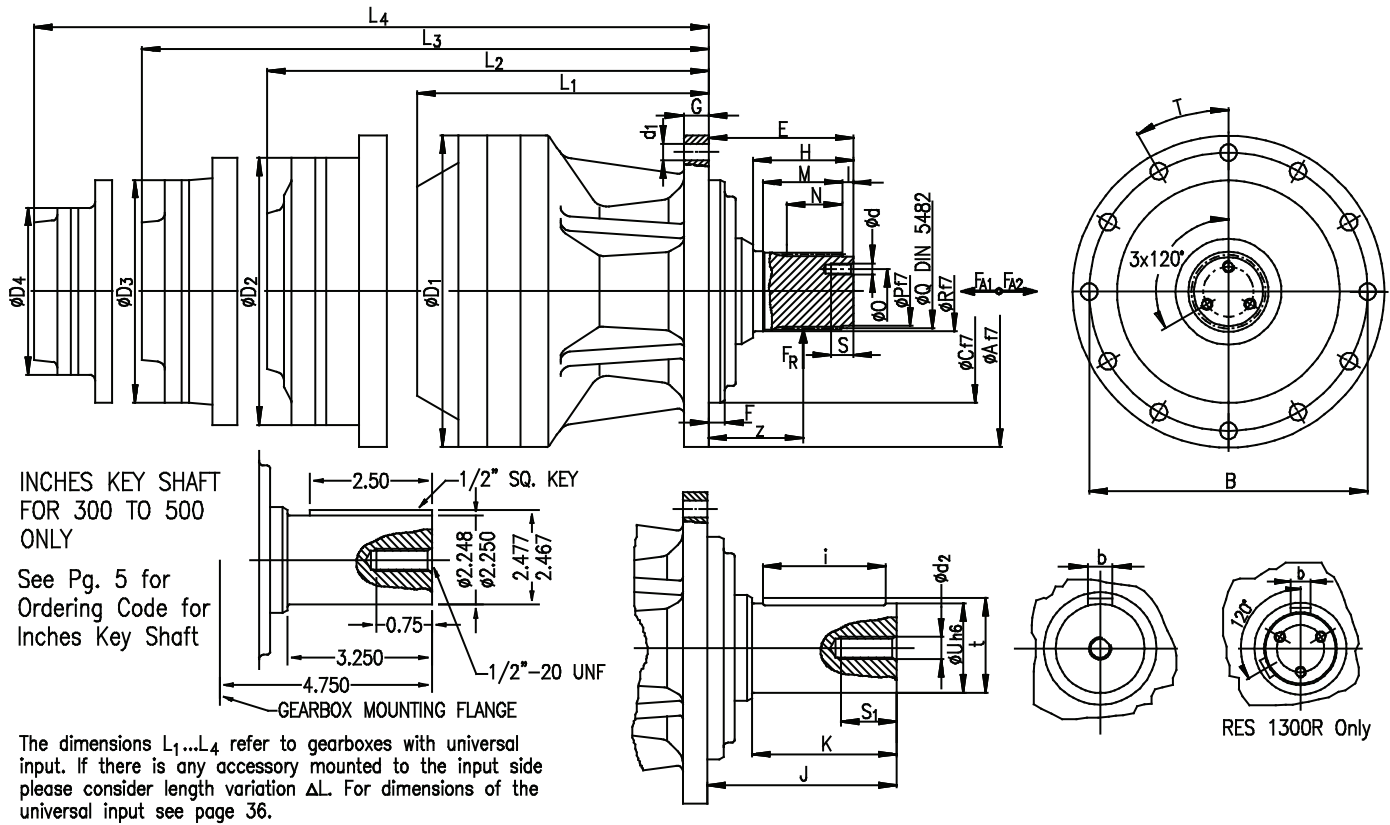
Dia. 2 Life Factor LF (Bearing)





RES SERIES 100 - 1300

IN LINE GEARBOXES EXTERNAL OUTPUT



RES	A	B	C	D ₁	D ₂	D ₃	D ₄	E	F	G	H	I	J	K	L ₁	L ₂	L ₃	L ₄	M
100	7.283	6.50	4.331	7.87	7.87	7.87	7.87	2.40	0.20	0.47	2.17	0.20	2.52	2.28	4.84	6.81	8.78	10.75	1.69
100R	8.661	7.68	5.906	7.87	7.87	7.87	7.87	3.27	0.55	0.71	2.68	0.32	4.72	4.13	6.38	8.35	10.32	12.28	1.97
200	7.283	6.50	4.331	7.87	7.87	7.87	7.87	2.40	0.20	0.47	2.17	0.20	2.52	2.28	5.32	7.28	9.25	11.22	1.69
200R	8.661	7.68	5.906	7.87	7.87	7.87	7.87	3.27	0.55	0.71	2.68	0.32	4.72	4.13	6.85	8.82	10.79	12.76	1.97
300	8.661	7.68	5.906	9.45	7.87	7.87	7.87	3.27	0.55	0.71	2.68	0.32	4.72	4.13	6.79	8.47	10.43	12.40	1.97
300R	10.709	9.65	6.890	9.45	7.87	7.87	7.87	4.69	0.39	0.71	3.15	0.32	5.67	4.13	7.32	9.00	10.97	12.93	2.56
400	8.661	7.68	5.906	9.45	7.87	7.87	7.87	3.27	0.55	0.71	2.68	0.32	4.72	4.13	-	9.06	11.02	12.99	1.97
400R	10.709	9.65	6.890	9.45	7.87	7.87	7.87	4.69	0.39	0.71	3.15	0.32	5.67	4.13	-	9.59	11.56	13.52	2.56
500	8.661	7.68	5.906	9.45	7.87	7.87	7.87	3.27	0.55	0.71	2.68	0.32	4.72	4.13	7.38	9.53	11.50	13.47	1.97
500R	10.709	9.65	6.890	9.45	7.87	7.87	7.87	4.69	0.39	0.71	3.15	0.32	5.67	4.13	7.91	10.06	12.03	14.00	2.56
800R	11.024	9.84	7.874	11.02	6.89	7.87	7.87	5.12	0.59	0.87	3.54	0.39	6.69	5.12	9.98	12.07	13.74	15.71	2.76
1000	12.795	11.61	9.055	13.90	6.89	7.87	7.87	4.96	0.39	0.98	3.54	0.39	8.11	6.69	-	11.38	13.05	15.02	2.76
1300	12.795	11.61	9.055	13.90	6.89	7.87	7.87	4.96	0.39	0.98	3.54	0.39	8.11	6.69	9.29	11.97	14.11	16.08	2.76
1300R	12.795	11.61	9.843	13.90	6.89	7.87	7.87	6.57	0.82	1.18	4.33	0.47	8.74	6.50	11.26	13.94	16.08	18.05	3.39

RES	N	O	P	Q*	R	S	S ₁	T	U	b	d*	d ₁	d ₂ *	i	t	z	FR [lb]	FA ₁ [lb]	FA ₂ [lb]
100	1.18	0.95	1.378	40x36	1.654	0.51	1.26	8x45°	1.496	0.39	M6	0.41	M12	1.97	1.61	1.32	3520	2420	1760
100R	1.50	1.26	1.969	58x53	2.362	1.79	1.97	10x36°	2.362	0.71	M10	0.49	M20	3.54	2.52	1.93	6600	4400	3300
200	1.18	0.95	1.378	40x36	1.654	0.51	1.26	8x45°	1.496	0.71	M6	0.41	M12	1.97	1.61	1.32	3520	2420	1760
200R	1.50	1.26	1.969	58x53	2.362	0.79	1.97	10x36°	2.362	0.71	M10	0.49	M20	3.54	2.52	1.93	6600	4400	3300
300	1.50	1.26	1.969	58x53	2.362	0.79	1.97	10x36°	2.362	0.71	M10	0.49	M20	3.54	2.52	1.93	16720	12100	12100
300R	1.97	1.26	1.969	58x53	2.362	0.79	1.97	10x36°	2.559	0.71	M10	0.49	M20	3.54	2.72	3.11	22440	18040	18040
400	1.50	1.26	1.969	58x53	2.362	0.79	1.97	10x36°	2.362	0.71	M10	0.49	M20	3.54	2.52	1.93	16720	12100	12100
400R	1.97	1.26	1.969	58x53	2.362	0.79	1.97	10x36°	2.559	0.71	M10	0.49	M20	3.54	2.72	3.11	22440	18040	18040
500	1.50	1.26	1.969	58x53	2.362	0.79	1.97	10x36°	2.362	0.71	M10	0.49	M20	3.54	2.52	1.93	16720	12100	12100
500R	1.97	1.26	1.969	58x53	2.362	0.79	1.97	10x36°	2.559	0.71	M10	0.49	M20	3.54	2.72	3.11	22440	18040	18040
800R	1.97	1.58	2.441	70x64	2.835	0.79	1.97	12x30°	3.150	0.87	M10	0.59	M20	4.33	3.35	3.35	28160	21120	21120
1000	1.97	1.77	2.756	80x74	3.347	0.98	1.97	10x36°	3.543	0.98	M12	0.65	M20	5.91	3.74	3.19	37400	33000	33000
1300	1.97	1.77	2.756	80x74	3.347	0.98	1.97	10x36°	3.543	0.98	M12	0.65	M20	5.91	3.74	3.19	37400	33000	33000
1300R	2.60	2.56	3.347 h6	100x94	4.134 g6	1.18	1.18	20x18°	3.937	1.10	M14	0.65	M14(3)	5.51	4.17	4.41	66000	46200	46200

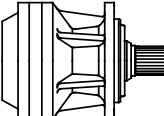
* measurements in metric

RES SERIES 100 - 1300

IN LINE GEARBOXES EXTERNAL OUTPUT

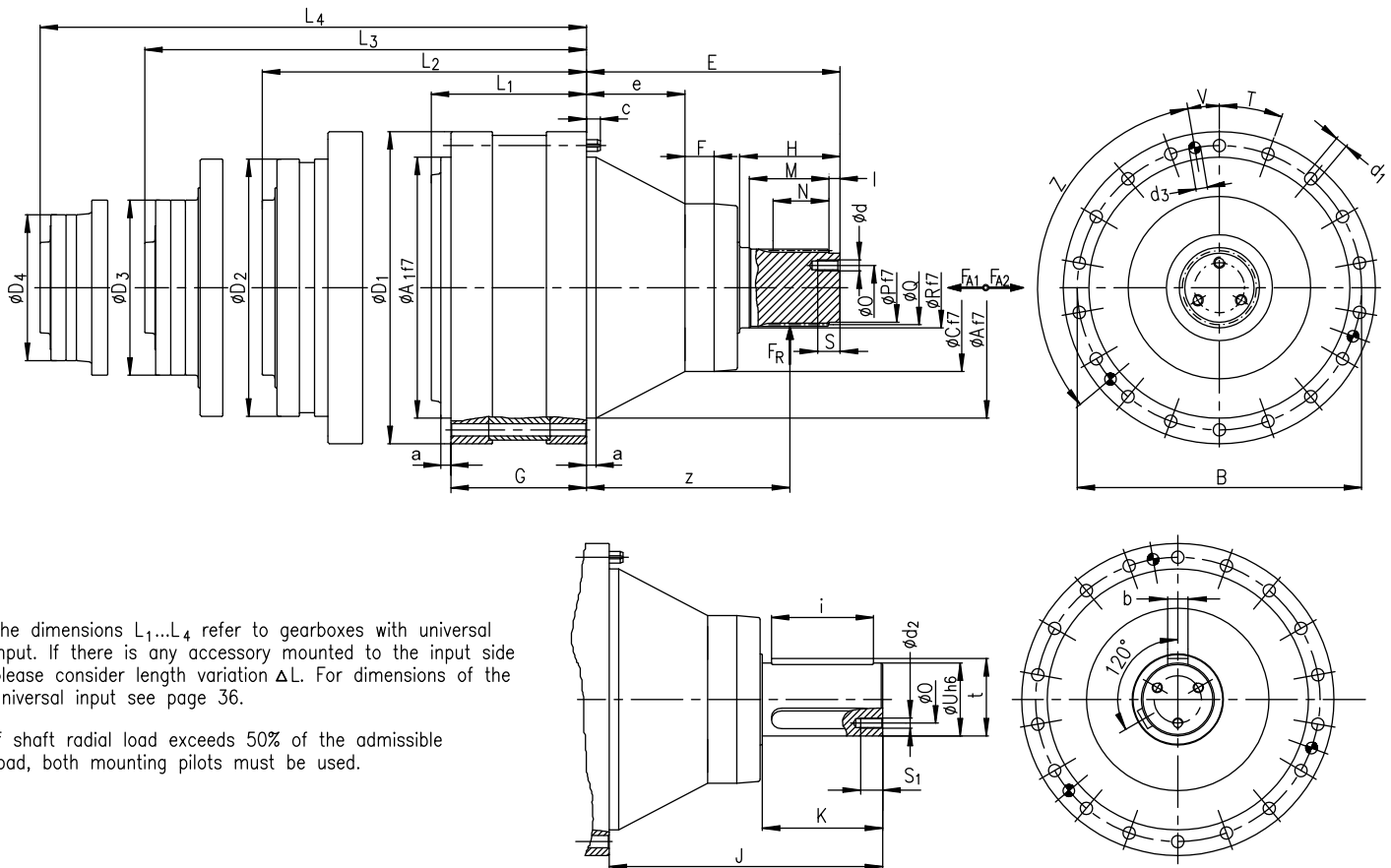
Ratios & Torque Ratings



	100		200		300		400		500		800		1000		1300	
	Ratio	Torque LB-FT	Ratio	Torque LB-FT	Ratio	Torque LB-FT	Ratio	Torque LB-FT	Ratio	Torque LB-FT	Ratio	Torque LB-FT	Ratio	Torque LB-FT	Ratio	Torque LB-FT
M1/M1R Stage 1	3.500	B	3.500	B	3.500	C			3.500	C	3.857	B			3.429	B
	4.125	A	4.125	A	4.125	A			4.125	A	4.333	A			4.091	A
	5.167	B	5.167	B	5.167	B			5.167	B	5.000	B			5.250	B
	6.000	C	6.000	C	6.000	C			6.000	C	6.000	C			6.231	C
	7.250	D	7.250	D	7.250	D			7.250	D						
	8.538	E	8.538	E												
Input Speed/Cont.-Max	3000/4000		3000/4000		2800/3800				2800/3800		2000/3000				1800/2500	
Weight lbs.	34		38		74				84		152				215	
M2/M2R Stage 2	12.25	B	12.25	B	12.25	C	14.44	D	12.25	C	13.50	B	12.00	D	12.00	B
	14.44	A	14.44	A	14.44	A	17.02	C	14.44	A	15.17	A	14.14	A	14.32	A
	17.02	A	17.02	A	17.02	A	21.31	A	17.02	A	17.88	A	16.88	A	16.88	A
	21.31	A	21.31	A	21.31	A	24.75	B	21.31	A	20.63	B	18.38	A	21.14	A
	24.75	A	24.75	A	24.75	A	26.69	E	24.75	A	22.39	A	21.66	A	24.55	A
	29.91	A	29.91	A	29.91	A	31.00	E	29.91	A	26.00	A	27.12	A	29.66	A
	35.22	B	35.22	B	35.22	B	36.00	F	35.22	B	27.96	B	31.50	B	31.50	B
	44.12	B	44.12	B	44.12	C	43.50	G	44.12	C	31.42	A	38.06	C	38.06	B
	51.23	C	51.23	C	51.23	D	52.56	H	51.23	D	36.25	B	45.17	D	45.17	C
	61.90	D	61.90	D	61.90	C	61.90	H	61.90	C	43.50	C				
	72.91	E	72.91	E												
Input Speed/Cont.-Max	3000/4000		3000/4000		3000/4000		3000/4000		3000/4000		2800/3800		2800/3800		2800/3800	
Weight lbs.	49		56		89		112		102		188		258		253	
M3/M3R Stage 3	50.5	A	50.5	A	50.5	A	50.5	A	50.5	A	47.2	B	50.1	B	42.1	B
	59.6	A	59.6	A	59.6	A	59.6	A	59.6	A	53.1	A	59.1	A	50.1	A
	70.2	A	70.2	A	70.2	A	70.2	A	70.2	A	62.6	A	64.3	A	59.1	A
	74.6	A	74.6	A	74.6	A	74.6	A	74.6	A	73.8	A	75.8	A	69.6	A
	86.6	A	86.6	A	86.6	A	86.6	A	86.6	A	78.4	A	87.2	A	74.0	A
	102.1	A	102.1	A	102.1	A	102.1	A	102.1	A	91.0	A	94.9	A	85.9	A
	110.1	A	110.1	A	110.1	A	110.1	A	110.1	A	92.4	A	111.9	A	101.3	A
	127.9	A	127.9	A	127.9	A	127.9	A	127.9	A	107.3	A	129.9	A	109.2	A
	148.5	A	148.5	A	148.5	A	148.5	A	148.5	A	115.7	A	140.1	A	122.3	A
	179.4	A	179.4	A	179.4	A	179.4	A	179.4	A	129.6	A	147.3	A	147.3	A
	193.5	A	193.5	A	193.5	B	193.5	B	193.5	B	134.3	A	162.8	A	178.0	A
	216.8	A	216.8	A	216.8	A	216.8	A	216.8	A	156.0	A	189.0	B	196.7	B
	255.4	A	255.4	A	255.4	A	255.4	A	255.4	A	188.5	A	196.7	B	215.0	A
	300.7	A	319.8	A	319.8	B	319.8	B	319.8	B	222.0	A	228.4	B	228.4	B
	376.7	B	376.7	B	371.4	C	371.4	C	371.4	C	262.8	B	269.0	B	276.0	B
	437.4	C	437.4	C	437.4	C	437.4	C	437.4	C	309.6	B	327.5	D	325.0	B
	528.6	D	528.6	D	528.6	D	528.6	D	528.6	D	371.4	C	385.7	D	385.7	C
	622.5	E	622.5	E												
Input Speed/Cont.-Max	3000/4000		3000/4000		3000/4000		3000/4000		3000/4000		3000/4000		3000/4000		3000/4000	
Weight lbs.	64		72		106		140		119		203		285		279	
M4/M4R Stage 4	357	A	357	A	290	A	290	C	290	A	258	A	225	A	259	A
	421	A	421	A	357	A	357	B	357	A	304	A	244	A	301	A
	454	A	454	A	421	A	421	B	421	A	375	A	305	A	363	A
	528	A	528	A	454	A	454	A	454	A	442	A	332	A	428	A
	613	A	613	A	528	A	528	A	528	A	535	A	392	A	536	A
	740	A	740	A	613	A	637	A	637	A	598	A	491	A	623	A
	894	A	894	A	740	A	751	A	751	A	670	A	578	A	753	A
	1120	A	1120	A	894	A	940	A	940	A	778	A	724	A	887	A
	1301	A	1301	A	1120	A	1092	A	1092	A	839	A	841	A	1111	A
	1572	A	1572	A	1301	A	1319	A	1319	A	940	A	1016	A	1290	A
	1851	A	1851	A	1572	A	1554	A	1554	A	1177	A	1180	A	1559	A
	2180	A	2180	A	1851	A	1804	B	1804	A	1367	A	1426	A	1790	A
	2568	A	2731	B	2180	A	2260	E	2260	A	1651	A	1656	B	2001	B
	3216	B	3216	B	2731	B	2625	E	2625	B	1896	A	1950	B	2297	B
	3735	C	3735	C	3171	C	3171	G	3171	C	2187	B	2297	B	2775	B
	4513	D	4513	D	3735	D	3832	G	3832	C	2643	B	2775	C	3293	C
	5315	E	5315	E	4513	D	4513	H	4513	D	3171	C	3293	D		
Input Speed/Cont.-Max	3000/4000		3000/4000		3000/4000		3000/4000		3000/4000		3000/4000		3000/4000		3000/4000	
Weight lbs.	91		99		134		167		146		230		313		306	
MAXIMUM TORQUE RATINGS LB-FT	1160 = A		2100 = A		2820 = A		4130 = A		4780 = A		7960 = A		9400 = A		13020 = A	
	870 = B		1600 = B		2320 = B		3550 = B		4200 = B		6870 = B		8680 = B		9400 = B	
	760 = C		1380 = C		2100 = C		3400 = C		3550 = C		4990 = C		7960 = C		7960 = C	
	650 = D		1160 = D		1600 = D		3260 = D		2600 = D				7230 = D			
	510 = E		940 = E				3100 = E									

RES SERIES 1800 - 15000

IN LINE GEARBOXES EXTERNAL OUTPUT



The dimensions L₁...L₄ refer to gearboxes with universal input. If there is any accessory mounted to the input side please consider length variation ΔL. For dimensions of the universal input see page 36.

If shaft radial load exceeds 50% of the admissible load, both mounting pilots must be used.

RES	A	A ₁	B	C	D ₁	D ₂	D ₃	D ₄	E	F	G	H	I	J	K	L ₁	L ₂	L ₃	L ₄	M	N
1800•	10.945	-	12.36	8.858	13.90	9.45	7.87	7.87	9.10	0.98	5.43	3.54	0.39	12.24	6.69	-	9.02	11.16	13.13	2.76	1.97
1800R	11.417	-	12.36	9.843	13.90	9.45	7.87	7.87	13.50	2.82	4.61	4.33	0.47	15.67	6.50	-	8.19	10.34	12.30	3.39	2.60
2000•	10.945	-	12.36	8.858	13.90	11.02	7.87	7.87	9.10	0.98	5.47	3.54	0.39	12.24	6.69	6.34	10.59	12.68	14.35	2.76	1.97
2000R	11.417	-	12.36	9.843	13.90	11.02	7.87	7.87	13.50	2.82	4.47	4.33	0.47	15.67	6.50	5.51	9.76	11.85	13.52	3.39	2.60
3000	14.095	14.095	15.35	9.055	16.85	11.02	9.45	7.87	12.60	1.58	5.51	4.33	0.47	14.76	6.50	7.68	11.00	13.09	14.76	3.39	2.60
4000	14.095	14.095	15.35	9.055	16.85	13.90	9.45	7.87	13.39	1.58	7.24	5.12	0.39	14.76	6.50	7.85	11.24	13.92	16.06	4.13	3.47
6000	15.158	15.158	16.34	10.236	17.52	13.90	11.02	9.45	14.06	1.58	6.89	5.12	0.39	15.43	6.50	8.27	12.84	17.09	19.17	4.13	3.47
8000	18.110	18.110	19.80	11.810	21.34	16.85	13.90	9.45	16.89	1.18	7.84	5.91	0.47	18.86	7.87	9.69	15.57	18.96	21.63	4.84	4.21
10000	18.110	18.110	19.80	11.810	21.34	16.85	13.90	9.45	17.68	1.18	8.62	6.69	0.47	18.86	7.87	10.47	16.36	19.74	22.42	5.43	4.72
15000	22.047	22.047	25.00	-	27.36	17.52	13.90	11.02	13.86	-	7.87	7.87	0.79	16.22	10.24	12.13	18.58	23.15	27.40	5.91	5.12

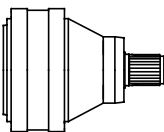
RES	O	P	Q*	R	S	S ₁	T	U	V	Z	a	b	c	d ₁	d ₁ *	d ₂	d ₃ *	e	i	t	z	F _R [lb]	F _{A1} [lb]	F _{A2} [lb]
1800•	1.77	2.756	80x74 DIN5482	3.346	0.98	0.98	12X30°	3.543	15°	3X120°	0.32	0.98	0.59	M12 3X120°	0.65	M20	0.47	2.87	5.91	3.74	7.32	37400	33000	33000
1800R	2.56	3.347	100X94 DIN5482	4.134 96	1.18	1.18	12X30°	3.937	15°	3X120°	0.59	1.10	0.59	M14 3X120°	0.65	M14 3X120°	0.47	5.67	5.51	4.17	11.34	66000	46200	46200
2000•	1.77	2.756	80x74 DIN5482	3.346	0.98	0.98	12X30°	3.543	15°	3X120°	0.32	0.98	0.59	M12 3X120°	0.65	M20	0.47	2.87	5.91	3.74	7.32	37400	33000	33000
2000R	2.56	3.347	100X94 DIN5482	4.134 96	1.18	1.18	12X30°	3.937	15°	3X120°	0.59	1.10	0.59	M14 3X120°	0.65	M14 3X120°	0.47	5.67	5.51	4.17	11.34	66000	46200	46200
3000	2.56	3.347	100X94 DIN5482	4.134	1.18	1.18	18X20°	3.937	10°	3X120°	0.51	1.10	0.75	M14 3X120°	0.67	M14 3X120°	0.63	5.32	5.51	4.17	10.43	66000	46200	46200
4000	2.76	3.937	W120X3 DIN5480	4.803	1.38	1.38	18X20°	4.724	10°	3X120°	0.51	1.26	0.75	M16 3X120°	0.67	M16 3X120°	0.63	5.32	5.51	5.00	10.83	66000	46200	46200
6000	2.76	3.937	W120X3 DIN5480	4.803	1.38	1.38	18X20°	4.724	10°	3X120°	0.51	1.26	0.79	M16 3X120°	0.67	M16 3X120°	0.63	5.98	5.51	5.00	11.50	59400	48400	48400
8000	2.76	4.922	W150X5 DIN5480	5.945	1.18	1.18	20X15°	5.906	0°	3X120°	0.51	1.42	0.98	M16 3X120°	0.83	M16 3X120°	0.79	8.82	7.09	6.22	13.94	77000	55000	55000
10000	3.54	5.709	W170X5 DIN5480	6.732	1.18	1.18	20X15°	6.693	0°	4X90°	0.51	1.58	0.98	M16 3X120°	0.83	M16 3X120°	0.79	8.82	7.09	7.05	14.33	88000	55000	55000
15000	5.51	6.693	W200X5 DIN5480	7.874	1.38	1.38	24X15°	7.874	22.5°	4X90°	0.79	1.77	1.38	M16 6X60°	1.26	M16 6X60°	0.98	-	9.84	8.27	9.92	169400	66000	66000

• one key on shaft * measurements in metric

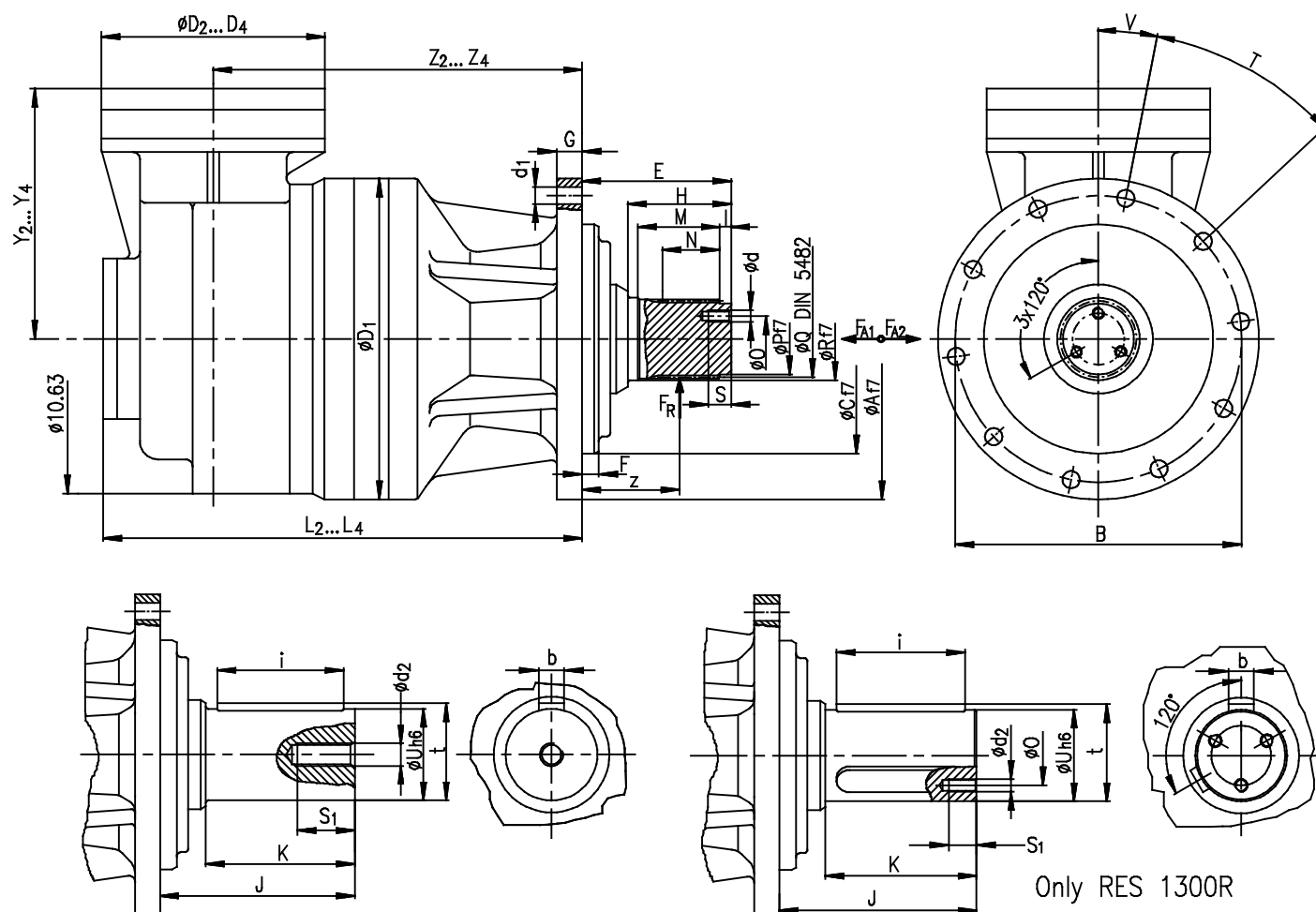
RES SERIES 1800 - 15000



IN LINE GEARBOXES EXTERNAL OUTPUT Ratios & Torque Ratings

	1800		2000		3000		4000		6000		8000		10000		15000	
	Ratio	Torque LB-FT	Ratio	Torque LB-FT	Ratio	Torque LB-FT	Ratio	Torque LB-FT	Ratio	Torque LB-FT	Ratio	Torque LB-FT	Ratio	Torque LB-FT	Ratio	Torque LB-FT
M1/M1R Stage 1			3.429 4.091 5.250 6.231	B A B C	3.429 4.091 5.250 6.231	B A B C	3.429 4.091 5.250 6.231	B A B C	3.281 4.174 5.294 6.214	B A B C	3.429 4.091 5.250 6.231	B A B C	4.091 5.250 6.231	A B	4.091 5.250 6.231	A B C
Input Speed/Cont.-Max Weight lbs.			1800/2500		1800/2500		1500/2000		1000/15000		750/1000		750/1000		500/800	
M2/M2R Stage 2	12.00 14.14 16.88 18.38 21.66 27.13 31.50 37.38 45.17	E B A B A A C D E	13.22 15.78 17.73 20.45 22.75 24.55 26.25 31.50 37.38	B A A A B A B B C	13.22 15.78 17.73 20.45 22.75 24.55 26.25 31.50 37.38	B A A A B B B B C	11.76 14.03 16.74 18.00 21.48 25.49 27.56 32.71 38.82	B A A B A A B B C	11.25 14.31 17.08 18.15 21.91 26.01 27.79 32.99 38.72	B A A B A A B B C	11.76 14.03 16.74 18.00 21.48 25.49 27.56 32.71 38.82	B A A B A A B B C	14.03 16.74 18.00 21.48 27.56 32.71	A A B A B B	13.42 17.08 21.66 25.42 27.79 32.63 38.72	A A A A B B C
Input Speed/Cont.-Max Weight lbs.	2800/3800		2000/3000		2000/3000		2000/3000		1800/2500		1500/2000		1500/2000		1000/1500	
	-		304		537		607		766		1241		-		2376	
M3/M3R Stage 3	50.1 59.1 69.6 75.8 89.3 94.9 101.3 111.9 122.3 129.9 140.1 157.0 196.7 228.4 271.0 319.2 385.7	E A A A A A A A A A A A A C D D E	46.3 55.2 62.0 65.1 73.1 81.5 91.6 106.4 122.7 128.5 135.6 147.3 157.5 178.0 228.4 271.0	B A A A A A A A A A B A B A B C	46.3 55.2 62.0 65.1 73.1 81.5 91.6 106.4 122.7 128.5 135.6 147.3 157.5 178.0 228.4 271.0	B A A A A A A A A A B A B A B C	41.1 49.1 58.6 69.0 72.5 86.5 100.4 111.0 128.9 142.4 152.9 165.4 184.8 196.3 237.2 281.5	B A A A A A A A A A B A B B B C	43.4 55.2 65.9 74.0 85.4 94.9 102.5 109.6 120.4 131.5 138.9 156.1 166.8 197.9 232.3	B A A A A A A A B A B A B C	40.3 48.1 57.4 61.7 61.7 68.5 73.6 87.9 94.5 94.5 104.3 112.8 112.8 133.8 144.7 171.7 241.9	B A A B B A A A B A A A B B C	48.1 57.4 61.7 68.5 73.6 87.9 94.5 104.3 112.8 133.8 144.7 171.7 203.8	A A B A A A A A A A B B B	46.0 54.9 58.5 69.9 74.3 83.6 89.6 104.0 113.7 134.9 145.9 158.4 173.2 203.3 241.3	A A A A A A A A A A B A B B C
Input Speed/Cont.-Max Weight lbs.	3000/4000		2800/3800		2800/3800		2800/3800		2000/3000		2000/3000		2000/3000		1800/2500	
	-		330		578		647		819		1373		-		2535	
M4/M4R Stage 4	265 313 368 418 523 608 734 887 1138 1341 1679 1950 2296 2356 2775 3293	A A A A A A A A A A A C D E D E	193 217 256 302 321 372 439 473 550 638 771 932 1075 1266 1519 1656 1950 2314	A A A A A A A A A A A A A A A B B C	193 217 256 302 321 372 439 473 550 638 771 932 1075 1266 1519 1656 1950 2314	A A A A A A A A A A A A A A A B B C	205 242 285 303 351 414 447 500 603 728 805 934 1129 1340 1578 1719 2025 2403	A A A A A A A A A A A A A A A B B C	193 230 259 305 340 382 444 512 566 615 657 743 953 1131 1435 1684	A A A A A A A A A A A A A B C	201 240 297 354 411 454 527 583 626 677 756 803 970 1152 1478 1754	A A A A A A A A A A A A A B C	201 240 297 354 411 454 527 583 626 677 756 803 970 1152 1478	A A A A A A A A A A A A A B	178 226 269 303 349 419 493 569 638 675 810 950 1016 1220 1448	A A A A A A A A A A A A B B C
Input Speed/Cont.-Max Weight lbs.	3000/4000		3000/4000		3000/4000		3000/4000		2800/3800		2800/3800		2800/3800		2000/3000	
	-		360		618		682		864		1421		-		-	
MAXIMUM TORQUE RATINGS LB-FT	15200 = A 14100 = B 13020 = C 12300 = D 10850 = E		20980 = A 15190 = B 13020 = C		28210 = A 22430 = B 18090 = C		39060 = A 31100 = B 24600 = C		50630 = A 39060 = B 32550 = C		94030 = A 70160 = B 56420 = C		112840 = A 83900 = B		155510 = A 122300 = B 101260 = C	

RIGHT ANGLE GEARBOXES EXTERNAL OUTPUT



The dimension Y refers to gearboxes with universal input. If there is any accessory mounted to the input side please consider length variation ΔY . For dimensions of the universal input see page 36.

RES	A	B	C	D ₁	D ₂	D ₃	D ₄	E	F	G	H	I	J	K	L ₂	L ₃	L ₄	M	N	O	P	Q*
300	8.661	7.68	5.906	9.45	7.68	7.87	7.87	3.27	0.55	0.71	2.68	0.32	4.72	4.13	13.13	13.13	13.13	1.97	1.50	1.26	1.969	58x53
300R	10.709	9.65	6.890	9.45	7.68	7.87	7.87	4.69	0.39	0.71	3.15	0.32	5.67	4.13	13.66	13.66	13.66	2.56	1.97	1.26	1.969	58x53
500	8.661	7.68	5.906	9.45	7.68	7.87	7.87	3.27	0.55	0.71	2.68	0.32	4.72	4.13	13.72	13.72	13.72	1.97	1.50	1.26	1.969	58x53
500R	10.709	9.65	6.890	9.45	7.68	7.87	7.87	4.69	0.39	0.71	3.15	0.32	5.67	4.13	14.25	14.25	14.25	2.56	1.97	1.26	1.969	58x53
800R	11.024	9.84	7.874	11.02	7.68	7.87	7.87	5.12	0.59	0.87	3.54	0.39	6.69	5.12	16.18	16.18	16.18	2.76	1.97	1.58	2.441	70x64
1300	12.795	11.61	9.056	13.90	7.68	7.68	7.87	4.96	0.39	0.98	3.54	0.39	8.11	6.69	15.50	18.31	18.31	2.76	1.97	1.77	2.756	80x74
1300R	12.795	11.61	9.843	13.90	7.68	7.68	7.87	6.58	0.83	1.18	4.33	0.47	8.74	6.50	17.46	20.28	20.28	3.39	2.60	2.56	3.347h6	100x94

RES	R	S	S ₁	T	U	V	Y ₂	Y ₃	Y ₄	Z ₂	Z ₃	Z ₄	b	d*	d ₁	d ₂ *	i	t	z	FR[lb]	FA ₁ [lb]	FA ₂ [lb]
300	2.362	0.79	1.97	10x36°	2.362	0°	9.37	11.40	13.37	9.31	9.31	9.31	0.71	M10	0.49	M20	3.54	2.52	1.93	16720	12100	12100
300R	2.362	0.79	1.97	10x36°	2.559	0°	9.37	11.40	13.37	9.84	9.84	9.84	0.71	M10	0.49	M20	3.54	2.72	3.11	22440	18040	18040
500	2.362	0.79	1.97	10x36°	2.362	0°	9.37	11.40	13.37	9.90	9.90	9.90	0.71	M10	0.49	M20	3.54	2.52	1.93	16720	12100	12100
500R	2.362	0.79	1.97	10x36°	2.559	0°	9.37	11.40	13.37	10.43	10.43	10.43	0.71	M10	0.49	M20	3.54	2.72	3.11	22440	18040	18040
800R	2.835	0.79	1.97	12x30°	3.150	15°	9.37	11.40	13.37	12.36	12.36	12.36	0.87	M10	0.59	M20	4.33	3.35	3.35	28160	21120	21120
1300	3.347	0.98	1.97	10x36°	3.543	0°	9.37	9.37	11.40	11.67	14.49	14.49	0.98	M12	0.65	M20	5.91	3.74	3.19	37400	37400	37400
1300R	4.134g6	1.18	1.18	20x18°	3.937	0°	9.37	9.37	11.40	13.64	16.46	16.46	1.10	M14	0.65	M14 3x120°	5.51	4.17	4.41	66000	46200	46200

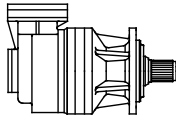
* measurements in metric

RES SERIES 300 - 1300



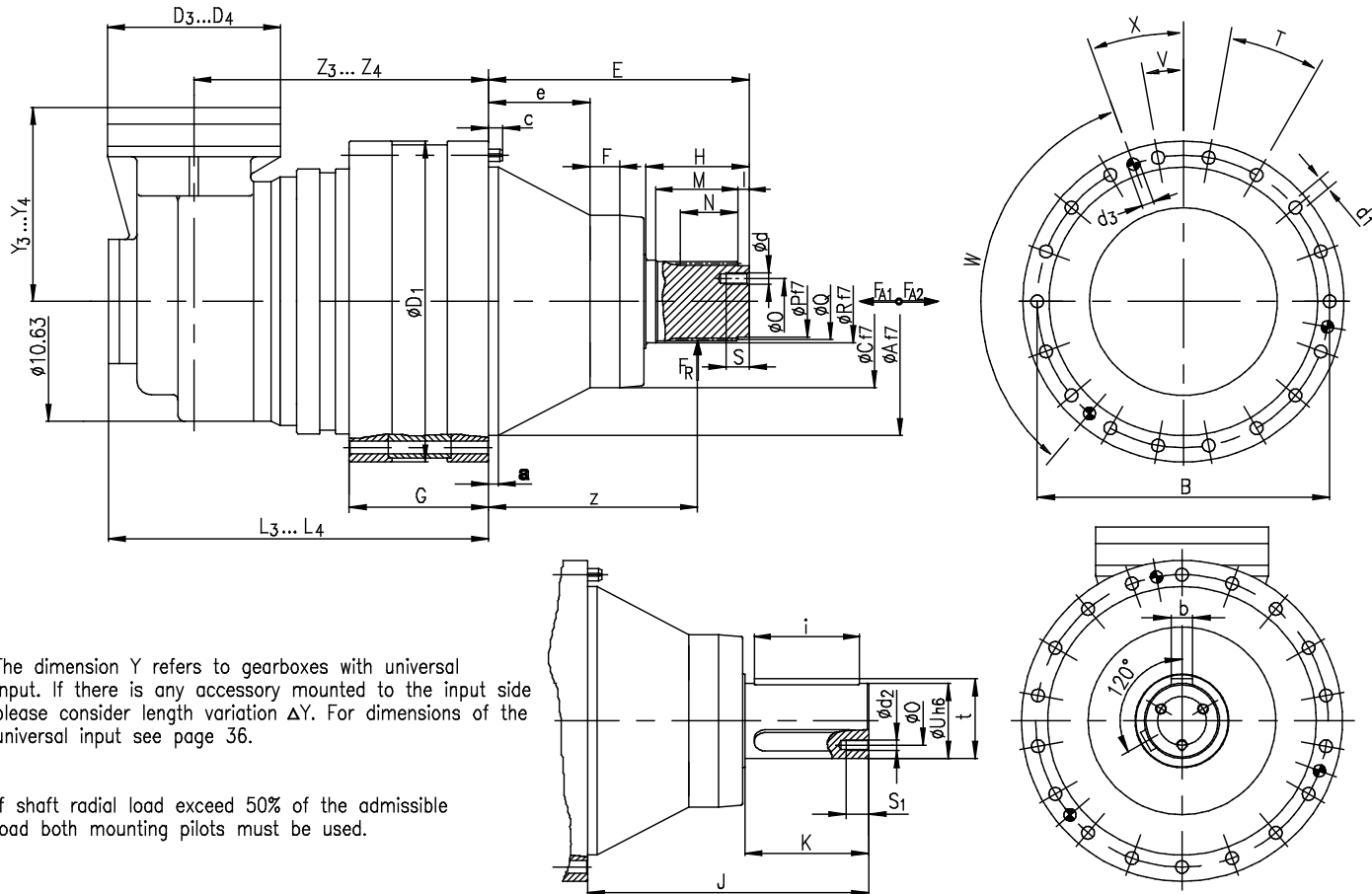
RIGHT ANGLE GEARBOXES EXTERNAL OUTPUT

Ratios & Torque Ratings

	300		500		800		1300	
	Ratio	Torque LB-FT	Ratio	Torque LB-FT	Ratio	Torque LB-FT	Ratio	Torque LB-FT
M2A/M2RA Stage 2	17.00	C	17.00	C	18.73	B	19.87	C
	20.04	A	20.04	A	21.05	A	25.50	B
	25.10	B	25.10	B	24.29	B	30.26	C
	29.14	C	29.14	C	29.14	C		
	35.21	D	35.21	D				
Input Speed/Cont.-Max	3000/3500		3000/3500		3000/3500		3000/3500	
Weight lbs.	141		150		209		264	
M3A/M3RA Stage 3	59.5	C	59.5	C	65.6	B	58.3	B
	70.1	A	70.1	A	73.7	A	69.5	A
	82.6	A	82.6	A	77.3	B	82.0	A
	87.8	B	87.8	B	86.8	A	89.3	B
	102.0	C	102.0	C	96.8	B	102.7	A
	103.5	A	103.5	A	108.7	A	105.2	B
	120.2	A	120.2	A	126.3	A	119.2	A
	129.7	B	129.7	B	135.8	B	131.7	B
	145.3	A	145.3	A	145.7	B	144.1	A
	150.6	B	150.6	B	152.6	A	153.0	B
	171.1	A	171.1	A	160.0	B	184.9	B
	174.9	C	174.9	C	179.7	A	219.4	C
	181.9	B	181.9	B	207.4	B		
	214.3	B	214.3	B	248.8	C		
	248.8	C	248.8	C				
	300.7	D	300.7	D				
Input Speed/Cont.-Max	3000/4000		3000/4000		3000/4000		3000/3500	
Weight lbs.	-		-		242		297	
M4A/M4RA Stage 4	245	A	245	A	230	B	204	B
	289	A	289	A	258	A	243	A
	341	A	341	A	304	A	287	A
	362	A	362	A	358	A	338	A
	427	A	427	A	381	A	359	A
	496	A	496	A	442	A	417	A
	535	A	535	A	521	A	492	A
	599	A	599	A	562	A	530	A
	621	A	621	A	629	A	594	A
	706	A	706	A	758	A	715	A
	721	A	721	A	916	A	744	A
	751	A	751	A	1106	A	864	A
	872	A	872	A	1303	A	1044	A
	884	A	884	A	1503	B	1230	A
	1026	A	1026	A	1804	C	1340	B
	1053	A	1053	A			1578	B
	1240	A	1240	A			1873	C
	1553	B	1553	B				
	1804	C	1804	C				
	2180	D	2180	D				
Input Speed/Cont.-Max	3000/4000		3000/4000		3000/4000		3000/4000	
Weight lbs.	-		-		-		-	
MAXIMUM TORQUE RATINGS LB-FT	2820 = A		4780 = A		7960 = A		13020 = A	
	2320 = B		4120 = B		7090 = B		9400 = B	
	2100 = C		3550 = C		5430 = C		7960 = C	
	1600 = D		2600 = D					

RES SERIES 1800 - 10000

RIGHT ANGLE GEARBOXES EXTERNAL OUTPUT



The dimension Y refers to gearboxes with universal input. If there is any accessory mounted to the input side please consider length variation ΔY . For dimensions of the universal input see page 36.

If shaft radial load exceed 50% of the admissible load both mounting pilots must be used.

RES	A	B	C	D ₁	D ₃	D ₄	E	F	G	H	I	J	K	L ₃	L ₄	M	N	O	P	Q*	R	S	S ₁
1800	10.945	12.36	8.858	13.90	7.68	7.87	9.09	0.98	5.43	3.54	0.39	12.24	6.69	15.35	15.35	2.71	1.97	1.77	2.756	80x74 DIN 5482	3.347	0.98	1.97
1800R	11.417	12.36	9.843	13.90	7.68	7.87	13.50	2.82	4.61	4.33	0.47	15.67	6.50	14.53	14.53	3.39	2.60	2.56	3.347 _{h6}	100x94 DIN 5482	4.134 _{g6}	1.18	1.18
2000	10.945	12.36	8.858	13.90	7.68	7.87	9.09	0.98	5.47	3.54	0.39	12.24	6.69	16.79	16.79	2.71	1.97	1.77	2.756	80x74 DIN 5482	3.347	0.98	1.97
2000R	11.417	12.36	9.843	13.90	7.68	7.87	13.50	2.82	4.65	4.33	0.47	15.67	6.50	15.97	15.97	3.39	2.60	2.56	3.347 _{h6}	100x94 DIN 5482	4.134 _{g6}	1.18	1.18
3000	14.095	15.35	9.055	16.85	7.68	7.87	12.60	1.58	5.51	4.33	0.47	14.76	6.50	17.20	17.20	3.39	2.60	2.56	3.347	100x94 DIN 5482	4.134	1.18	1.18
4000	14.095	15.35	9.055	16.85	7.68	7.68	13.39	1.58	7.24	5.12	0.39	14.76	6.50	17.44	20.26	4.13	3.47	2.76	3.937	W120x3 DIN 5480	4.803	1.38	1.38
6000	15.158	16.34	10.236	17.52	-	7.68	14.06	1.58	6.89	5.12	0.39	15.43	6.50	-	23.29	4.13	3.47	2.76	3.937	W120x3 DIN 5480	4.803	1.38	1.38
8000	18.110	19.80	11.811	21.34	-	7.68	16.89	1.18	7.84	5.91	0.47	18.86	7.87	-	25.16	4.84	4.21	2.76	4.921	W150x5 DIN 5480	5.945	1.18	1.18
10000	18.110	19.80	11.811	21.34	-	7.68	18.23	1.18	8.62	7.24	0.47	18.86	7.87	-	25.95	5.43	4.72	3.54	5.709	W170x5 DIN 5480	6.732	1.18	1.18

RES	T	U	V	W	X	Y ₃	Y ₄	Z ₃	Z ₄	a	b	c	d*	d ₁	d ₂ *	d ₃	e	i	t	z	F _R [lb]	F _{A1} [lb]	F _{A2} [lb]
1800	12x30°	3.543	0°	3x120°	15°	9.37	11.40	11.54	11.54	0.32	0.98	0.59	M12 3x120°	0.65	M20	0.47	2.87	5.91	3.74	7.32	37400	33000	33000
1800R	12x30°	3.937	0°	3x120°	15°	9.37	11.40	10.71	10.71	0.59	1.10	0.59	M14 3x120°	0.65	M14 3x120°	0.47	5.67	5.52	4.17	11.34	66000	46200	46200
2000	12x30°	3.543	15°	3x120°	0°	9.37	11.40	12.97	12.97	0.32	0.98	0.59	M12 3x120°	0.65	M20	0.47	2.87	5.91	3.74	7.32	37400	33000	33000
2000R	12x30°	3.937	15°	3x120°	0°	9.37	11.40	12.15	12.15	0.59	1.10	0.59	M14 3x120°	0.65	M14 3x120°	0.47	5.67	5.52	4.17	11.34	66000	46200	46200
3000	18x20°	3.937	5°	3x120°	115°	9.37	11.40	13.39	13.39	0.51	1.10	0.75	M14 3x120°	0.67	M14 3x120°	0.63	5.32	5.52	4.17	10.43	66000	46200	46200
4000	18x20°	4.724	0°	3x120°	10°	9.37	9.37	13.62	16.44	0.51	1.26	0.75	M16 3x120°	0.67	M16 3x120°	0.63	5.32	5.52	5.00	10.83	66000	46200	46200
6000	18x20°	4.724	5°	3x120°	115°	-	9.37	-	19.47	0.51	1.26	0.79	M16 3x120°	0.67	M16 3x120°	0.63	5.98	5.52	5.00	11.50	59400	48400	48400
8000	20x15°	5.906	15°	4x90°	0°	-	9.37	-	21.34	0.51	1.42	0.98	M16 3x120°	0.83	M16 3x120°	0.79	8.82	7.09	6.22	13.94	77000	55000	55000
10000	20x15°	6.693	15°	4x90°	0°	-	9.37	-	21.34	0.51	1.58	0.98	M16 3x120°	0.83	M16 3x120°	0.79	8.82	7.09	7.05	14.33	88000	55000	55000

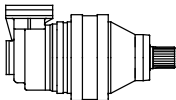
* measurements in metric

RES SERIES 1800 - 10000



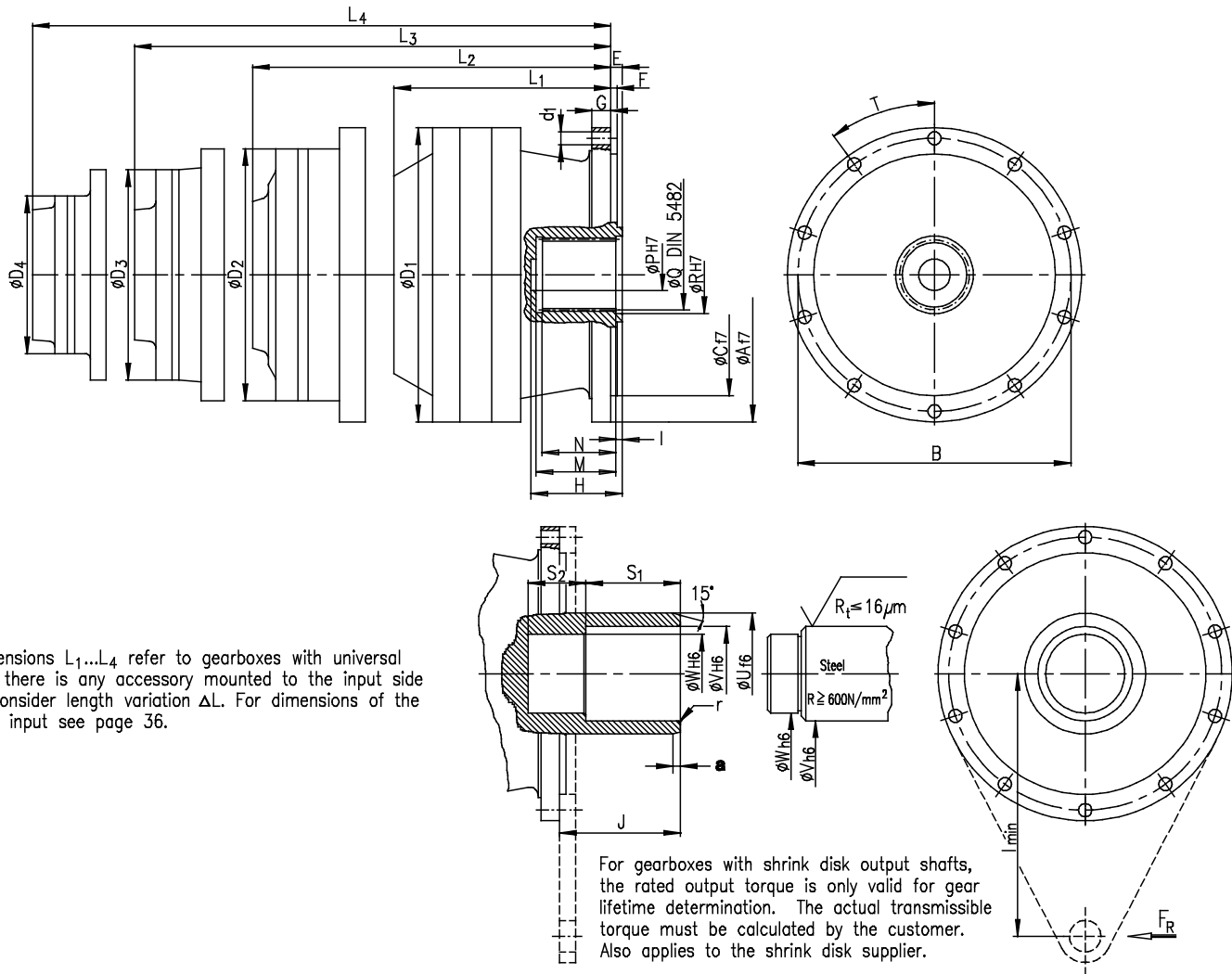
RIGHT ANGLE GEARBOXES EXTERNAL OUTPUT

Ratios & Torque Ratings

	1800		2000		3000		4000		6000		8000		10000	
	Ratio	Torque LB-FT	Ratio	Torque LB-FT	Ratio	Torque LB-FT	Ratio	Torque LB-FT	Ratio	Torque LB-FT	Ratio	Torque LB-FT	Ratio	Torque LB-FT
M2/M2RA														
Stage 2														
Input Speed/Cont.-Max														
Weight lbs.														
M3/M3RA	58.3 69.5 82.0 86.0 89.2 102.7 119.2 131.8 144.1 153.0 184.9 219.4	D B B A A A A B A B C D	64.2 72.2 76.6 83.3 86.1 99.4 110.5 119.2 127.5 153.0 181.6	B B A B A A B A B B C	64.2 72.2 76.6 83.3 86.1 99.4 110.5 119.2 127.5 153.0 181.6	B B A B A A B A B B C	81.3 87.4 104.3 123.8 133.9 158.9 188.6	B B A A B B C						
Stage 3														
Input Speed/Cont.-Max	3000/3500		300/3500		3000/3500		3000/3500							
Weight lbs.	-		396		-		713							
M4/M4RA	204 243 287 312 368 434 498 543 631 763 853 955 1109 1306 1578 1873	B B A A A A A A A A A B A B B D	225 253 268 301 355 410 460 556 624 715 848 924 1018 1109 1306 1550	B B A A A A A A A A A B B B B C	225 253 268 301 355 410 460 556 624 715 848 924 1018 1109 1306 1550	B B A A A A A A A A A B B B B C	200 238 281 335 365 420 488 539 626 756 897 961 1152 1367	B A A A A A A A A A A B B C	211 237 268 301 359 415 461 532 632 694 758 810 961 1128	B B A A A A A A B B A B C	196 234 279 300 333 358 424 459 506 548 650 703 771 990 1175	B B A B A A B A A A A A B C	234 279 300 333 358 424 459 506 548 650 703 771 990	C B D A A D A A A D A D
Stage 4														
Input Speed/Cont.-Max	3000/4000		3000/4000		3000/4000		3000/4000		3000/3500		3000/3500		3000/3500	
Weight lbs.	-		-		-		740		924		1479		-	
MAXIMUM TORQUE RATINGS LB-FT	15200 = A 14100 = B 12300 = C 10850 = D		20980 = A 15200 = B 13020 = C		28210 = A 22430 = B 18090 = C		39060 = A 31100 = B 24600 = C		50630 = A 39060 = B 32550 = C		94030 = A 70160 = B 56420 = C		112840 = A 104160 = B 87520 = C 83900 = D	

RES SERIES 100 - 1300

IN LINE GEARBOXES INTERNAL OUTPUT



RES	A	B	C	D ₁	D ₂	D ₃	D ₄	E	F	G	H	I	J	L ₁	L ₂	L ₃	L ₄
100	7.284	6.50	4.331	7.87	7.87	7.87	7.87	0.24	0.20	0.47	1.67	0.47	1.97	4.84	6.81	8.78	10.75
200	7.284	6.50	4.331	7.87	7.87	7.87	7.87	0.24	0.20	0.47	1.67	0.47	1.97	5.32	7.28	9.25	11.22
300	8.661	7.68	5.906	9.45	7.87	7.87	7.87	0.59	0.55	0.71	2.13	0.59	3.35	6.79	8.47	10.43	12.40
400	8.661	7.68	5.906	9.45	7.87	7.87	7.87	0.59	0.55	0.71	2.13	0.59	3.35	-	9.06	11.02	12.99
500	8.661	7.68	5.906	9.45	7.87	7.87	7.87	0.59	0.55	0.71	2.13	0.59	3.35	7.38	9.53	11.50	13.47
800	11.024	10.24	9.055	11.02	9.45	7.87	7.87	0.43	0.24	0.71	3.43	0.24	-	7.80	9.88	11.56	13.52
800FP	11.024	9.84	7.874	11.02	9.45	7.87	7.87	-	0.59	0.87	-	-	4.53	9.98	12.07	13.74	15.71
1000	12.795	11.61	9.055	13.90	9.45	7.87	7.87	1.42	0.39	0.98	3.43	0.79	4.72	-	11.38	13.05	15.02
1300	12.795	11.61	9.055	13.90	9.45	7.87	7.87	1.42	0.39	0.98	3.43	0.79	4.72	9.29	11.97	14.12	16.08

RES	M	N	P	Q*	R	S ₁	S ₂	T	U	V	W	a	d ₁	l _{min}	r	F _R [LB]
100	0.87	0.71	1.378	40x36	1.654	1.65	0.71	8x45°	1.969	1.654	1.378	0.16	0.41	7.87	0.04	1760
200	0.87	0.71	1.378	40x36	1.654	1.65	0.71	8x45°	1.969	1.654	1.378	0.16	0.41	7.87	0.04	3300
300	1.14	0.98	1.969	58x53	2.362	2.76	1.18	10x36°	3.937	2.953	2.559	0.24	0.49	9.84	0.08	5940
400	1.14	0.98	1.969	58x53	2.362	2.76	1.18	10x36°	3.937	2.953	2.559	0.24	0.49	9.84	0.08	5940
500	1.14	0.98	1.969	58x53	2.362	2.76	1.18	10x36°	3.937	2.953	2.559	0.24	0.49	9.84	0.08	5940
800	2.99	2.76	1.181	70x64	2.913	-	-	10x36°	-	-	-	-	0.49	-	-	-
800FP	-	-	-	-	-	3.54	2.17	12x30°	4.331	3.347	2.756	0.28	0.59	13.78	0.12	7040
1000	2.17	1.97	2.756	80x74	3.347	3.94	1.58	10x36°	4.921	3.740	3.150	0.28	0.65	15.75	0.12	9900
1300	2.17	1.97	2.756	80x74	3.347	3.94	1.58	10x36°	4.921	3.740	3.150	0.28	0.65	15.75	0.12	9900

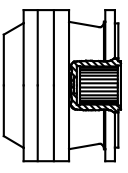
* measurements in metric

RES SERIES 100 - 1300



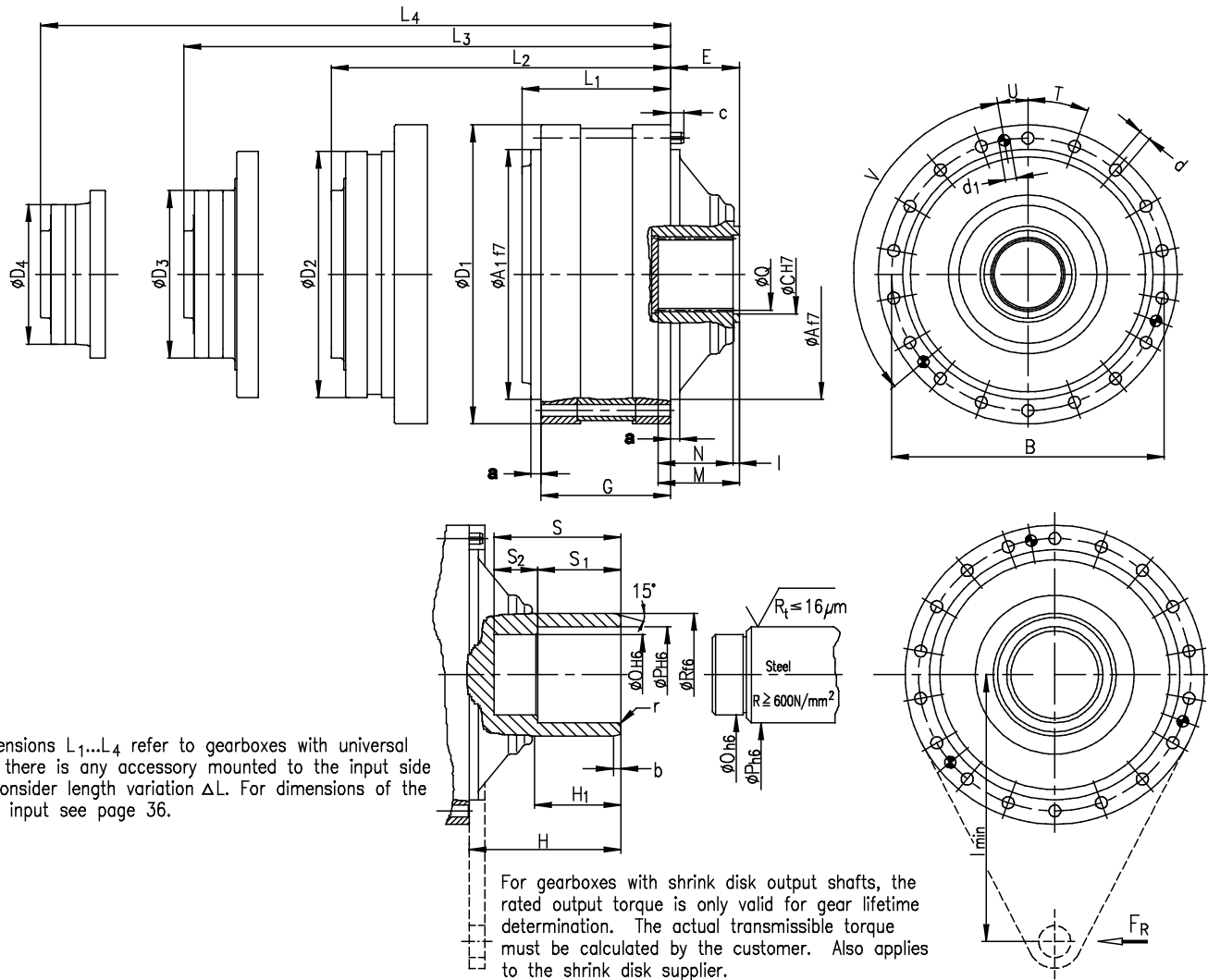
IN LINE GEARBOXES INTERNAL OUTPUT

Ratios & Torque Ratings

	100		200		300		400		500		800		1000		1300	
	Ratio	Torque LB-FT	Ratio	Torque LB-FT	Ratio	Torque LB-FT	Ratio	Torque LB-FT	Ratio	Torque LB-FT	Ratio	Torque LB-FT	Ratio	Torque LB-FT	Ratio	Torque LB-FT
F1/F1P Stage 1	3.500 4.125 5.167 6.000 7.250 8.538	B A B C D E	3.500 4.125 5.167 6.000 7.250 8.538	B A B C D E	3.500 4.125 5.167 6.000 7.250	C A B C D			3.500 4.125 5.167 6.000 7.250	C A B C D	3.857 4.333 5.000 6.000	B A B C			3.429 4.091 5.250 6.231	B A B C
Input Speed/Cont.-Max	3000/4000		3000/4000		2800/3800				2800/3800		2000/3000				1800/2500	
Weight lbs.	26		30		61				72		137				197	
F2/F2P Stage 2	12.25 14.44 17.02 21.31 24.75 29.91 35.22 44.12 51.23 61.90 72.91	B A A A A A B B C D E	12.25 14.44 17.02 21.31 24.75 29.91 35.22 44.12 51.23 61.90 72.91	B A A A A A B B C D E	12.25 14.44 17.02 21.31 24.75 29.91 35.22 44.12 51.23 61.90	C A A A A A B C D C	14.44 17.02 21.31 24.75 26.69 31.00 36.00 43.50 52.56 61.90	D C A B E E F G H J	12.25 14.44 17.02 21.31 24.75 29.91 35.22 44.12 51.23 61.90	C A A A A A B C C D	13.50 15.17 17.88 20.63 22.39 26.00 27.96 31.42 36.25 43.50	B A A B A A B A B C	12.00 14.14 16.88 18.38 21.66 27.12 31.50 38.06 45.17	D A A A A A B C D	12.00 14.32 16.88 21.14 24.55 29.66 31.50 38.06 45.17	B A A A A A B B C
Input Speed/Cont.-Max	3000/4000		3000/4000		3000/4000		3000/4000		3000/4000		2800/3800		2800/3800		2800/3800	
Weight lbs.	41		49		76		82		89		172		210		236	
F3/F3P Stage 3	50.5 59.6 70.2 74.6 86.6 102.1 110.1 127.9 148.5 179.4 193.5 216.8 255.4 300.7 376.7 437.4 528.6 622.5	A A A A A A A A A A B A A A B C D E	50.5 59.6 70.2 74.6 86.6 102.1 110.1 127.9 148.5 179.4 193.5 216.8 255.4 300.7 376.7 437.4 528.6 622.5	A A A A A A A A A A B A A A B C D E	50.5 59.6 70.2 74.6 86.6 102.1 110.1 127.9 148.5 179.4 193.5 216.8 255.4 300.7 376.7 437.4 528.6	A A A A A A A A A A B B B B C C D	50.5 59.6 70.2 74.6 86.6 102.1 110.1 127.9 148.5 179.4 193.5 216.8 255.4 300.7 376.7 437.4 528.6	D D C A A B A A E B B G G J	50.5 59.6 70.2 74.6 86.6 102.1 110.1 127.9 148.5 179.4 193.5 216.8 255.4 300.7 376.7 437.4 528.6	A A A A A A A A A A B A A B C C D	47.2 53.1 62.6 73.8 78.4 91.0 92.4 107.3 115.7 129.6 134.3 156.0 188.5 222.0 262.8 309.6 371.4	B A A A A A A A A A A A A B B B C	50.1 59.1 64.3 75.8 87.2 94.9 111.9 129.9 140.1 147.3 162.8 189.0 196.7 228.4 269.0 327.5 385.7	B A A A A A A A A B A B B B D D	42.0 50.1 59.1 69.6 74.0 85.9 101.3 109.2 122.3 126.8 147.3 178.0 196.7 215.0 228.4 276.0 325.0 385.7	B A A A A A A A A A A A B B B B C
Input Speed/Cont.-Max	3000/4000		3000/4000		3000/4000		3000/4000		3000/4000		3000/4000		3000/4000		3000/4000	
Weight lbs.	55		64		93		-		106		190		240		264	
F4/F4P Stage 4	357 421 454 528 613 740 894 1120 1301 1572 1851 2180 2568 3216 3735 4513 5315	A A A A A A A A A A A A A B C D E	357 421 454 528 613 740 894 1120 1301 1572 1851 2180 2568 3216 3735 4513 5315	A A A A A A A A A A A A A B C D E	290 357 421 454 528 613 740 894 1120 1301 1572 1851 2180 2731 3216 3735 4513	A A A A A A A A A A A A B B C D	290 357 421 454 528 613 740 894 1092 1319 1554 1804 2260 2625 3171 3832 4513	C B B A A A A A A B E E G G J	290 357 421 454 528 613 740 894 1092 1319 1554 1804 2260 2625 3171 3832 4513	A A A A A A A A A A A A A B C D	258 304 375 442 535 598 670 778 839 940 1177 1367 1651 1896 2187 2643 3171	A A A A A A A A A A A A A B B C	225 244 305 332 392 491 578 724 841 1016 1180 1426 1656 1950 2297 2775 3293	A A A A A A A A A A A A B B B C	259 301 363 428 536 623 753 887 1111 1290 1559 1790 2001 2297 2775 3293	A A A A A A A A A A A A B B B C
Input Speed/Cont.-Max	3000/4000		3000/4000		3000/4000		3000/4000		3000/4000		3000/4000		3000/4000		3000/4000	
Weight lbs.	83		92		121		-		134		219		267		291	
MAXIMUM TORQUE RATINGS LB-FT	1160 = A 870 = B 760 = C 650 = D 510 = E		2100 = A 1600 = B 1380 = C 1160 = D 940 = E		2820 = A 2320 = B 2100 = C 1600 = D		4130 = A 3550 = B 3400 = C 3260 = D 3110 = E 2750 = F 2600 = G 2390 = H 2170 = J		4780 = A 4130 = B 3550 = C 2600 = D		7960 = A 7090 = B 5430 = C		9400 = A 8680 = B 7960 = C 7230 = D		13020 = A 9400 = B 7960 = C	

RES SERIES 1800 - 15000

IN LINE GEARBOXES INTERNAL OUTPUT



RES	A	A ₁	B	C	D ₁	D ₂	D ₃	D ₄	E	G	H	H ₁	I	J	K	L ₁	L ₂	L ₃	L ₄	M	N
1800	10.945	-	12.36	3.346	13.90	9.45	7.87	7.87	5.55	5.43	8.86	3.35	0.79	12.24	6.69	-	9.02	11.16	13.13	2.76	1.97
2000	10.945	-	12.36	3.346	13.90	11.02	7.87	7.87	5.55	5.47	8.86	3.35	0.79	12.24	6.69	6.34	10.59	12.68	14.35	2.76	1.97
3000	14.095	14.095	15.35	4.016	16.85	11.02	9.45	7.87	3.47	5.51	7.48	3.94	0.59	14.76	6.50	7.68	11.00	13.09	14.76	3.62	3.03
4000	14.095	14.095	15.35	4.016	16.85	13.90	9.45	7.87	3.47	7.24	7.48	3.94	0.59	14.76	6.50	7.85	11.24	13.92	16.06	3.62	3.03
6000	15.158	15.158	16.34	4.803	17.52	13.90	11.02	9.45	3.19	6.89	17.72	5.51	1.18	15.43	6.50	8.27	12.84	17.09	19.17	4.33	3.15
8000	18.110	18.110	19.80	5.984	21.34	16.85	13.90	9.45	3.86	7.84	16.81	5.79	0.79	18.86	7.87	9.69	15.57	18.96	21.63	4.72	3.94
10000	18.110	18.110	19.80	6.378	21.34	16.85	13.90	9.45	3.86	8.62	17.21	5.79	0.79	18.86	7.87	10.47	16.36	19.74	22.42	4.72	3.94
15000	22.047	22.047	25.00	8.268	27.36	17.52	13.90	11.02	5.98	7.87	12.52	6.69	0.67	16.22	10.24	12.13	18.58	23.15	27.40	5.51	4.84

RES	O	P	Q*	R	S	S ₁	S ₂	T	U	V	a	b	c	d	d ₁	l _{min}	r	FR[lb]
1800	3.150	3.740	80x74 DIN 5482	4.921	5.51	3.94	1.58	12x30°	15°	3x120°	0.32	0.16	0.59	0.65	0.47	22.05	0.12	11440
2000	3.150	3.740	80x74 DIN 5482	4.921	5.51	3.94	1.58	12x30°	15°	3x120°	0.32	0.16	0.59	0.65	0.47	22.05	0.12	11440
3000	-	5.315	100x94 DIN 5482	6.890	6.02	5.91	-	18x20°	10°	3x120°	0.51	0.16	0.75	0.67	0.63	31.50	0.12	14300
4000	-	5.315	100x94 DIN 5482	6.890	6.02	5.91	-	18x20°	10°	3x120°	0.51	0.16	0.75	0.67	0.63	31.50	0.12	14300
6000	5.118	5.512	W120x3 DIN 5480	7.284	8.86	5.91	2.36	18x20°	10°	3x120°	0.51	0.20	0.79	0.67	0.63	35.43	5x30°	16940
8000	-	6.300	W150x5 DIN 5480	7.874	6.46	5.87	-	20x15°	0°	4x90°	0.51	0.20	0.98	0.83	0.79	43.31	5x15°	25960
10000	-	6.693	W160x5 DIN 5480	8.661	6.46	5.87	-	20x15°	0°	4x90°	0.51	0.20	0.98	0.83	0.79	43.31	5x15°	31240
15000	-	7.874	W200x5 DIN 5480	10.236	12.09	11.42	-	24x15°	22.5°	4x90°	0.79	0.20	1.38	1.26	0.98	59.06	5x15°	31680

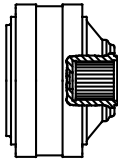
* measurements in metric

RES SERIES 1800 - 15000

IN LINE GEARBOXES INTERNAL OUTPUT

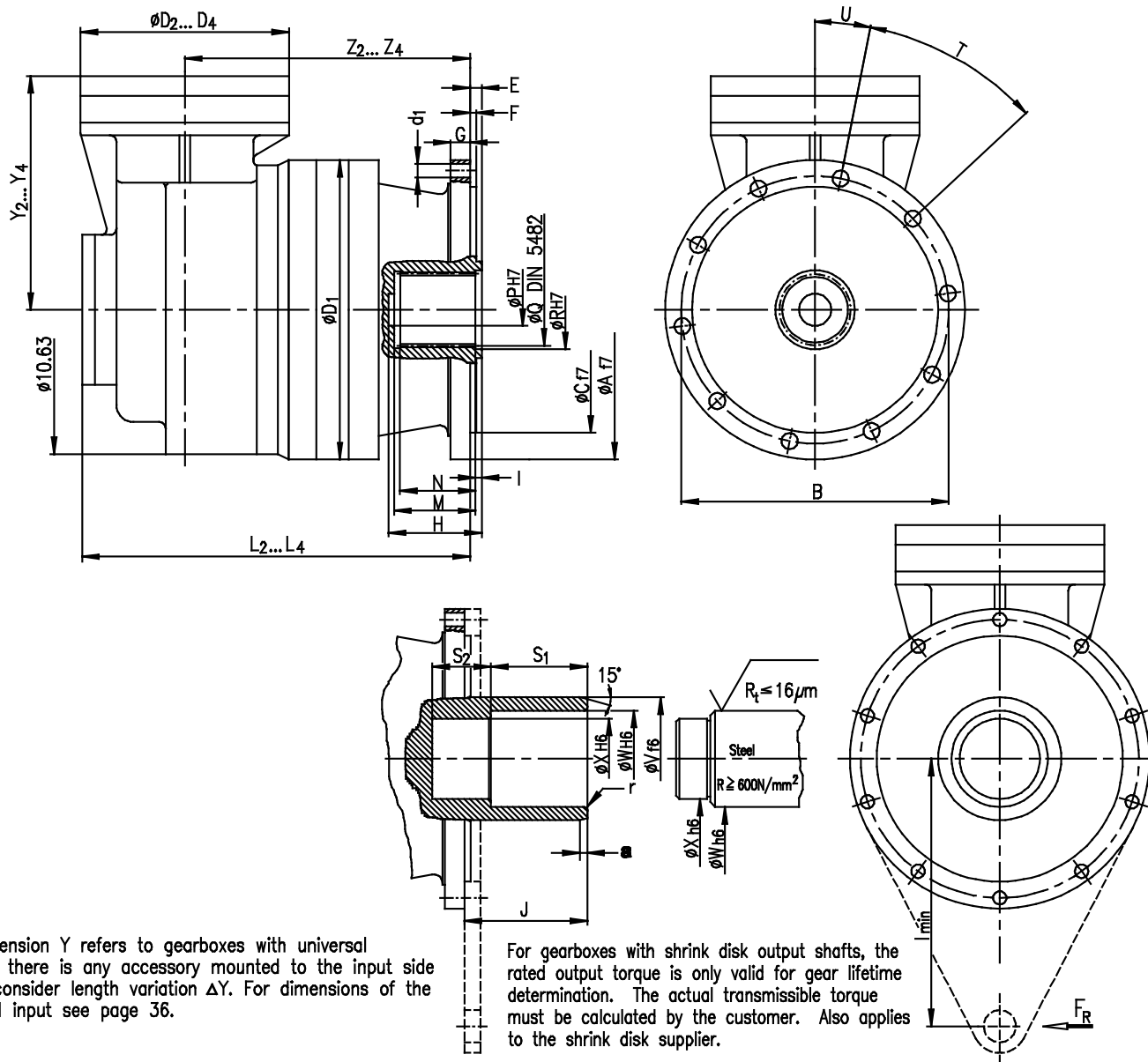
Ratios & Torque Ratings



	1800		2000		3000		4000		6000		8000		10000		15000	
	Ratio	Torque LB-FT	Ratio	Torque LB-FT	Ratio	Torque LB-FT	Ratio	Torque LB-FT	Ratio	Torque LB-FT	Ratio	Torque LB-FT	Ratio	Torque LB-FT	Ratio	Torque LB-FT
F1/F1P Stage 1			3.429 4.091 5.250 6.231	B A B C	3.429 4.091 5.250 6.231	B A B C	3.429 4.091 5.250 6.231	B A B C	3.281 4.174 5.294 6.214	B A B C	3.429 4.091 5.250 6.231	B A B C	4.091 5.250 6.231	A B	4.091 5.250 6.231	A B C
Input Speed/Cont.-Max			1800/2500		1800/2500		1500/2000		1000/15000		750/1000		750/1000		500/800	
Weight lbs.			185		290		357		423		634		720		1769	
F2/F2P Stage 2	12.00 14.14 16.88 18.38 21.66 27.13 31.50 37.38 45.17	E B A B A A C D E	13.22 15.78 17.73 20.45 22.75 24.55 26.25 31.50 37.38	B A A A B A B B C	13.22 15.78 17.73 20.45 22.75 24.55 26.25 31.50 37.38	B A A A B A B B C	11.76 14.03 16.74 18.00 21.48 25.49 27.56 32.71 38.82	B A A B A A B B C	11.25 14.31 17.08 18.15 21.91 26.01 27.79 32.99 38.72	B A A B A A B B C	11.76 14.03 16.74 18.00 21.48 25.49 27.56 32.71 38.82	B A A B A A B B C	14.03 16.74 18.00 21.48 27.56 32.71	A A B A B B	13.42 17.08 21.66 25.42 27.79 32.63 38.72	A A A A B B C
Input Speed/Cont.-Max	2800/3800		2000/3000		2000/3000		2000/3000		1800/2500		1500/2000		1500/2000		1000/1500	
Weight lbs.	-		238		419		489		581		951		1050		2165	
F3/F3P Stage 3	50.1 59.1 69.6 75.8 89.3 94.9 101.3 111.9 122.3 129.9 140.1 157.0 196.7 228.4 271.0 319.2 385.7	E A A A A A A A A A A A A C D D E	46.3 55.2 62.0 65.1 73.1 81.5 91.6 106.4 122.7 128.5 135.6 147.3 157.5 178.0 228.4 271.0	B A A A A A A A A A B A B A B C	46.3 55.2 62.0 65.1 73.1 81.5 91.6 106.4 122.7 128.5 135.6 147.3 157.5 178.0 228.4 271.0	B A A A A A A A A A B A B A B C	41.1 49.1 58.6 69.0 72.5 86.5 100.4 111.0 128.9 142.4 152.9 165.4 184.8 196.3 237.2 281.5	B A A A A A A A A A B A B B B C	43.4 55.2 65.9 74.0 85.4 94.9 102.5 109.6 120.4 131.5 138.9 156.1 166.8 197.9 232.3	B A A A A A A A B A B A B C	40.3 48.1 57.4 61.7 68.5 73.6 87.9 94.5 104.3 112.8 133.8 144.7 158.8 171.7 203.8 241.9	B A A B A A A B A A A B A B	48.1 57.4 61.7 68.5 73.6 87.9 94.5 104.3 112.8 133.8 144.7 171.7 203.8	A A B A A A B A A B B B B	46.0 54.9 58.5 69.9 74.3 83.6 89.6 104.0 113.7 134.9 145.9 158.4 173.2 203.3 241.3	A A A A A A A A A A B A B B C
Input Speed/Cont.-Max	3000/4000		2800/3800		2800/3800		2800/3800		2000/3000		2000/3000		2000/3000		1800/2500	
Weight lbs.	-		264		460		528		634		1083		1150		2323	
F4/F4P Stage 4	265 313 368 418 523 608 734 887 1138 1341 1679 1950 2296 2356 2775 3293	A A A A A A A A A A A C D E D E	193 217 256 302 321 372 439 473 550 638 771 932 1075 1266 1519 1656 1950 2314	A A A A A A A A A A A A A A A B B C	193 217 256 302 321 372 439 473 550 638 771 932 1075 1266 1519 1656 1950 2314	A A A A A A A A A A A A A A A B B C	205 242 285 303 351 414 447 500 603 728 805 934 1129 1340 1578 1719 2025 2403	A A A A A A A A A A A A A A A B B C	193 230 259 305 340 382 444 512 566 615 657 743 953 1131 1435 1684	A A A A A A A A A A A A A B C	201 240 297 354 411 454 527 583 626 677 756 803 970 1152 1478 1754	A A A A A A A A A A A A A B C	201 240 297 354 411 454 527 583 626 677 756 803 970 1152 1478	A A A A A A A A A A A A A B B	178 226 269 303 349 419 493 569 638 675 810 950 1016 1220 1448	A A A A A A A A A A A A B B C
Input Speed/Cont.-Max	3000/4000		3000/4000		3000/4000		3000/4000		2800/3800		2800/3800		2800/3800		2000/3000	
Weight lbs.	-		293		500		563		678		1131		1200		2440	
MAXIMUM TORQUE RATINGS LB-FT	15200 = A 14100 = B 13020 = C 12300 = D 10850 = E		20980 = A 15190 = B 13020 = C		28210 = A 22430 = B 18090 = C		39060 = A 31100 = B 24600 = C		50630 = A 39060 = B 32550 = C		94030 = A 70160 = B 56420 = C		112840 = A 83900 = B		155510 = A 122300 = B 101260 = C	

RES SERIES 300 - 1300

RIGHT ANGLE GEARBOXES INTERNAL OUTPUT



RES	A	B	C	D ₁	D ₂	D ₃	D ₄	E	F	G	H	I	J	L ₂	L ₃	L ₄	M	N	P	Q*
300	8.661	7.68	5.906	9.45	7.68	7.87	7.87	0.59	0.55	0.71	2.13	0.59	3.35	13.13	13.13	13.13	1.14	0.98	1.969	58x53
500	8.661	7.68	5.906	9.45	7.68	7.87	7.87	0.59	0.55	0.71	2.13	0.59	3.35	13.72	13.72	13.72	1.14	0.98	1.969	58x53
800	11.024	10.24	9.056	11.02	7.68	7.87	7.87	0.43	0.24	0.71	3.43	0.24	-	14.00	14.00	14.00	2.99	2.76	1.181	70x64
800FP	11.024	9.84	7.874	11.02	7.68	7.87	7.87	-	0.59	0.87	-	-	4.53	16.18	16.18	16.18	-	-	-	-
1300	12.795	11.61	9.056	13.90	7.68	7.68	7.87	1.42	0.39	0.98	3.43	0.79	4.72	15.50	18.31	18.31	2.17	1.97	2.756	80x74

RES	R	S ₁	S ₂	T	U	V	W	X	Y ₂	Y ₃	Y ₄	Z ₂	Z ₃	Z ₄	a	d ₁	I _{min}	r	F _R [LB]
300	2.362	2.76	1.18	10x36°	0°	3.937	2.953	2.559	9.37	11.40	13.37	9.31	9.31	9.31	0.24	0.49	9.84	0.08	5940
500	2.362	2.76	1.18	10x36°	0°	3.937	2.953	2.559	9.37	11.40	13.37	9.90	9.90	9.90	0.24	0.49	9.84	0.08	5940
800	2.913	-	-	10x36°	0°	-	-	-	9.37	11.40	13.37	10.18	10.18	10.18	-	0.49	-	-	-
800FP	-	3.54	2.17	12x30°	15°	4.33	3.346	2.756	9.37	11.40	13.37	12.36	12.36	12.36	0.28	0.59	13.78	0.12	7040
1300	3.347	3.94	1.57	10x36°	0°	4.92	3.740	3.150	9.37	9.37	11.40	11.67	14.49	14.49	0.28	0.65	15.75	0.12	9900

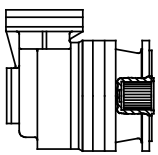
* measurements in metric

RES SERIES 300 - 1300

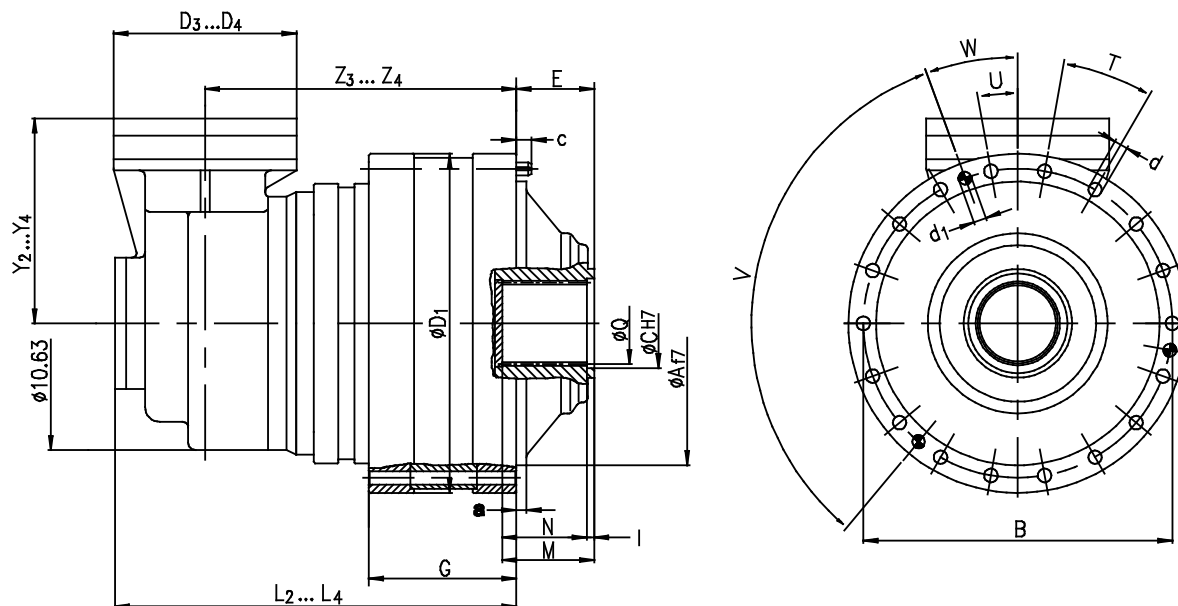
RIGHT ANGLE GEARBOXES INTERNAL OUTPUT

Ratios & Torque Ratings

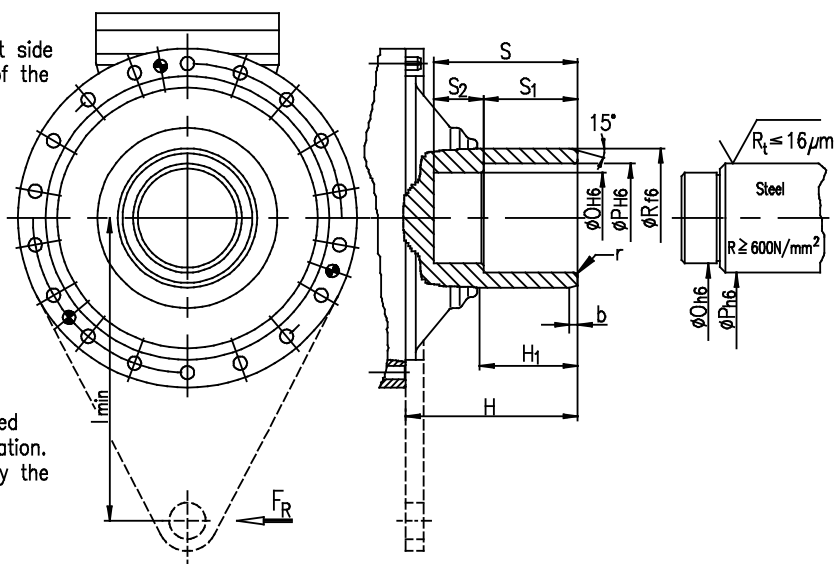


	300		500		800		1300	
	Ratio	Torque LB-FT	Ratio	Torque LB-FT	Ratio	Torque LB-FT	Ratio	Torque LB-FT
F2A/F2AP Stage 2	17.00	C	17.00	C	18.73	B	19.87	C
	20.04	A	20.04	A	21.05	A	25.50	B
	25.10	B	25.10	B	24.29	B	30.26	C
	29.14	C	29.14	C	29.14	C		
	35.21	D	35.21	D				
Input Speed/Cont.-Max	3000/3500		3000/3500		3000/3500		3000/3500	
Weight lbs.	127		140		177		228	
F3A/F3AP Stage 3	59.5	C	59.5	C	65.6	B	58.3	B
	70.1	A	70.1	A	73.7	A	69.5	A
	82.6	A	82.6	A	77.3	B	82.0	A
	87.8	B	87.8	B	86.8	A	89.3	B
	102.0	C	102.0	C	96.8	B	102.7	A
	103.5	A	103.5	A	108.7	A	105.2	B
	120.2	A	120.2	A	126.3	A	119.2	A
	129.7	B	129.7	B	135.8	B	131.7	B
	145.3	A	145.3	A	145.7	B	144.1	A
	150.6	B	150.6	B	152.6	A	153.0	B
	171.1	A	171.1	A	160.0	B	184.9	B
	174.9	C	174.9	C	179.7	A	219.4	C
	181.9	B	181.9	B	207.4	B		
	214.3	B	214.3	B	248.8	C		
	248.8	C	248.8	C				
	300.7	D	300.7	D				
Input Speed/Cont.-Max	3000/4000		3000/4000		3000/4000		3000/3500	
Weight lbs.	142		155		228		274	
F4A/F4AP Stage 4	245	A	245	A	230	B	204	B
	289	A	289	A	258	A	243	A
	341	A	341	A	304	A	287	A
	362	A	362	A	358	A	338	A
	427	A	427	A	381	A	359	A
	496	A	496	A	442	A	417	A
	535	A	535	A	521	A	492	A
	599	A	599	A	562	A	530	A
	621	A	621	A	629	A	594	A
	706	A	706	A	758	A	715	A
	721	A	721	A	916	A	744	A
	751	A	751	A	1106	A	864	A
	872	A	872	A	1303	A	1044	A
	884	A	884	A	1503	B	1230	A
	1026	A	1026	A	1804	C	1340	B
	1053	A	1053	A			1578	B
	1240	A	1240	A			1873	C
	1553	B	1553	B				
	1804	C	1804	C				
	2180	D	2180	D				
Input Speed/Cont.-Max	3000/4000		3000/4000		3000/4000		3000/4000	
Weight lbs.	160		173		245		292	
MAXIMUM TORQUE RATINGS LB-FT	2820 = A		4780 = A		7960 = A		13020 = A	
	2320 = B		4120 = B		7090 = B		9400 = B	
	2100 = C		3550 = C		5430 = C		7960 = C	
	1600 = D		2600 = D					

RES SERIES 1800 - 10000 **RIGHT ANGLE GEARBOXES INTERNAL OUTPUT**



The dimension Y refers to gearboxes with universal input. If there is any accessory mounted to the input side please consider length variation ΔY . For dimensions of the universal input see page 36.



For gearboxes with shrink disk output shafts, the rated output torque is only valid for gear lifetime determination. The actual transmissible torque must be calculated by the customer. Also applies to the shrink disk supplier.

RES	A	B	C	D ₁	D ₃	D ₄	E	F	G	H	H ₁	I	L ₃	L ₄	M	N	O	P	Q*	R	S	S ₁
1800	10.945	12.36	3.346	13.90	7.68	7.87	5.551	0.98	5.43	8.86	3.35	0.79	15.35	15.35	2.76	1.97	3.150	3.740	80x74 DIN 5482	4.921	5.51	3.94
2000	10.945	12.36	3.346	13.90	7.68	7.87	5.551	0.98	5.47	8.86	3.35	0.79	16.79	16.79	2.76	1.97	3.150	3.740	80x74 DIN 5482	4.921	5.51	3.94
3000	14.095	15.35	4.016	16.85	7.68	7.87	3.465	1.58	5.51	7.48	3.94	0.59	17.20	17.20	3.62	3.03	-	5.315	100x94 DIN 5482	6.890	6.02	5.91
4000	14.095	15.35	4.016	16.85	7.68	7.68	3.465	1.58	7.24	7.48	3.94	0.59	17.44	20.26	3.62	3.03	-	5.315	100x94 DIN 5482	6.890	6.02	5.91
6000	15.158	16.34	4.803	17.52	-	7.68	3.189	1.58	6.89	17.72	5.51	0.59	-	23.29	3.94	3.35	5.118	5.512	N120x3 DIN 5480	7.284	8.86	5.91
8000	18.110	19.80	5.984	21.34	-	7.68	3.858	1.18	7.84	16.81	5.79	0.79	-	25.16	4.72	3.94	-	6.299	N150x5 DIN 5480	7.874	6.46	5.87
10000	18.110	19.80	6.378	21.34	-	7.68	3.858	1.18	8.62	17.20	5.79	0.79	-	25.95	4.72	3.94	-	6.693	N160x5 DIN 5480	8.661	6.46	5.87

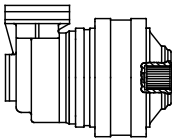
RES	S ₂	T	U	V	W	Y ₃	Y ₄	Z ₃	Z ₄	a	b	c	d	d ₁	l _{min}	r	FR _[L]
1800	1.58	12x30°	0°	3x120°	15°	9.37	11.40	11.54	11.54	0.32	0.16	0.59	0.65	0.47	22.05	0.12	11440
2000	1.58	12x30°	15°	3x120°	0°	9.37	11.40	12.97	12.97	0.32	0.16	0.59	0.65	0.47	22.05	0.12	11440
3000	-	18x20°	5°	3x120°	115°	9.37	11.40	13.39	13.39	0.51	0.16	0.75	0.67	0.63	31.50	0.12	14300
4000	-	18x20°	0°	3x120°	10°	9.37	9.37	13.62	16.44	0.51	0.16	0.75	0.67	0.63	31.50	0.12	14300
6000	2.36	18x20°	5°	3x120°	115°	-	9.37	-	19.47	0.51	0.20	0.79	0.67	0.63	35.43	5x30°	16940
8000	-	20x15°	15°	4x90°	0°	-	9.37	-	21.34	0.51	0.20	0.98	0.83	0.79	43.31	5x15°	25960
10000	-	20x15°	15°	4x90°	0°	-	9.37	-	21.34	0.51	0.20	0.98	0.83	0.79	43.31	5x15°	31240

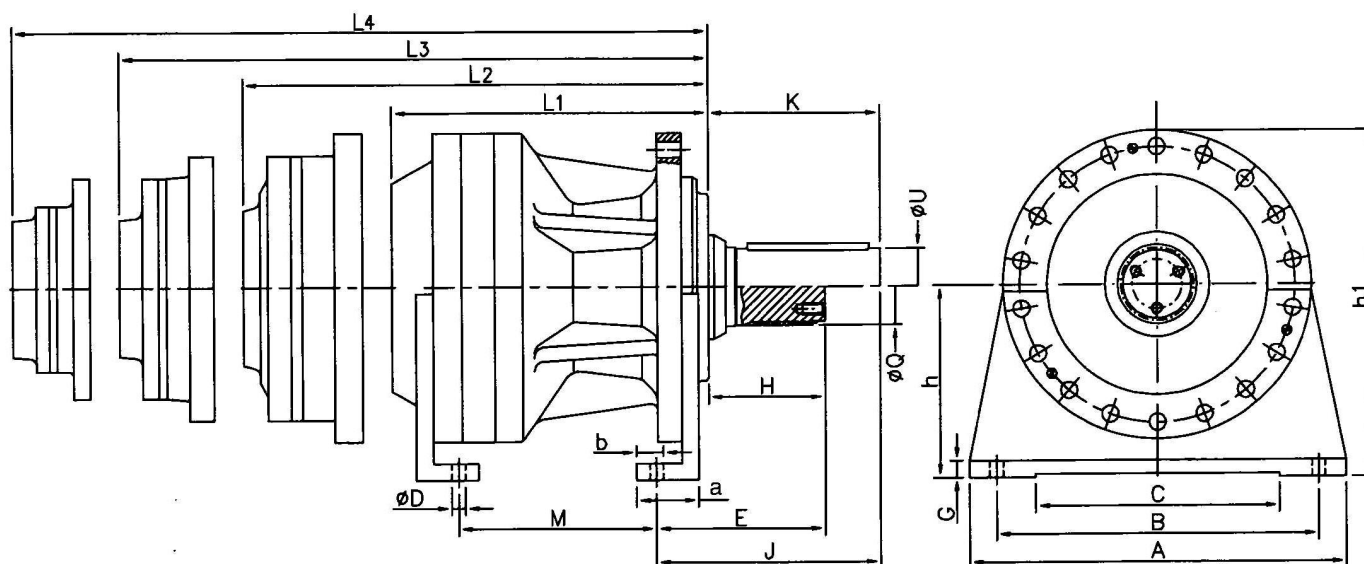
RES SERIES 1800 - 10000



RIGHT ANGLE GEARBOXES INTERNAL OUTPUT

Ratios & Torque Ratings

	1800		2000		3000		4000		6000		8000		10000	
	Ratio	Torque LB-FT	Ratio	Torque LB-FT	Ratio	Torque LB-FT	Ratio	Torque LB-FT	Ratio	Torque LB-FT	Ratio	Torque LB-FT	Ratio	Torque LB-FT
F2/F2AP														
Stage 2														
Input Speed/Cont.-Max														
Weight lbs.														
F3/F3AP	58.3 69.5 82.0 86.0 89.2 102.7 119.2 131.8 144.1 153.0 184.9 219.4	D B B A A A A B A B C D	64.2 72.2 76.6 83.3 86.1 99.4 110.5 119.2 127.5 153.0 181.6	B B A B A A B A B B C	64.2 72.2 76.6 83.3 86.1 99.4 110.5 119.2 127.5 153.0 181.6	B B A B A A B A B B C	81.3 87.4 104.3 123.8 133.9 158.9 188.6	B B A A B B C						
Stage 3														
Input Speed/Cont.-Max	3000/3500		300/3500		3000/3500		3000/3500							
Weight lbs.	-		330		-		581							
F4/F4AP	204 243 287 312 368 434 498 543 631 763 853 955 1109 1306 1578 1873	B B A A A A A A A A A B A B B D	225 253 268 301 355 410 460 556 624 715 848 924 1018 1109 1306 1550	B B A A A A A A A A A B B B B C	225 253 268 301 355 410 460 556 624 715 848 924 1018 1109 1306 1550	B B A A A A A A A A A B B B B C	200 238 281 335 365 420 488 539 626 756 897 961 1152 1367	B A A A A A A A A A A B B B C	211 237 268 301 359 415 461 532 632 694 758 810 961 1128	B B A A A A A A A B A B C	196 234 279 300 333 358 424 459 506 548 650 703 771 990 1175	B B A B A A B B A A A A B C	234 279 300 333 358 424 459 506 548 650 703 771 990	C B D A A D A A A D A A D
Stage 4														
Input Speed/Cont.-Max	3000/4000		3000/4000		3000/4000		3000/4000		3000/3500		3000/3500		3000/3500	
Weight lbs.	-		-		-		621		726		1188		-	
MAXIMUM TORQUE RATINGS LB-FT	15200 = A 14100 = B 12300 = C 10850 = D		20980 = A 15200 = B 13020 = C		28210 = A 22430 = B 18090 = C		39060 = A 31100 = B 24600 = C		50630 = A 39060 = B 32550 = C		94030 = A 70160 = B 56420 = C		112840 = A 104160 = B 87520 = C 83900 = D	

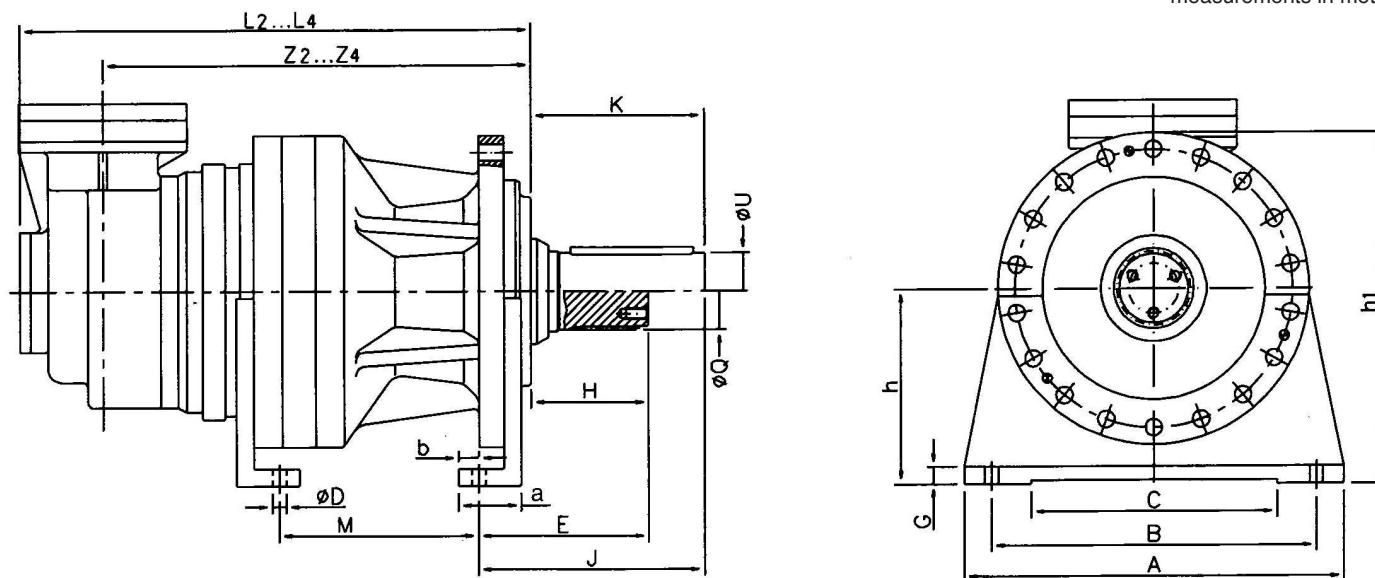


In Line Gears

For other dimensions and technical features, see data sheets for gearboxes.

RES	A	B	C	D	E	G	H	J	K	L ₁	L ₂	L ₃	L ₄	M	Q*	U	a	b	h	h ₁
100	9.45	7.09	-	0.67	1.22	0.51	2.17	1.34	2.28	5.08	7.05	9.02	10.98	4.55	40x36	1.50	2.17	0.79	5.20	9.13
200	9.45	7.09	-	0.67	1.22	0.51	2.17	1.34	2.28	5.55	7.52	9.49	11.46	4.55	40x36	1.50	2.17	0.79	5.20	9.13
300	12.20	10.00	-	0.71	1.93	0.79	2.68	3.39	4.13	7.38	9.06	11.02	12.99	5.59	58x53	2.36	2.17	0.83	6.30	10.63
400	12.20	10.00	-	0.71	1.93	0.79	2.68	3.39	4.13	-	9.65	11.61	13.58	5.59	58x53	2.36	2.17	0.83	6.30	10.63
500	12.20	10.00	-	0.71	1.93	0.79	2.68	3.39	4.13	7.97	10.12	12.09	14.06	5.59	58x53	2.36	2.17	0.83	6.30	10.63
800R	13.78	10.63	-	0.87	6.32	0.91	3.54	7.89	5.12	11.89	13.64	15.31	17.28	6.42	70x64	3.15	3.54	1.46	8.19	13.70
1000	15.04	12.52	10.00	0.98	6.14	0.91	3.54	9.29	6.69	-	12.80	14.47	16.44	9.29	80x74	3.54	3.35	1.26	8.86	15.81
1300	15.01	12.52	10.00	0.98	6.14	0.91	3.54	9.29	6.69	11.06	13.39	15.53	17.50	9.29	80x74	3.54	3.35	1.26	8.86	15.81

*measurements in metric



Right Angle Gearboxes

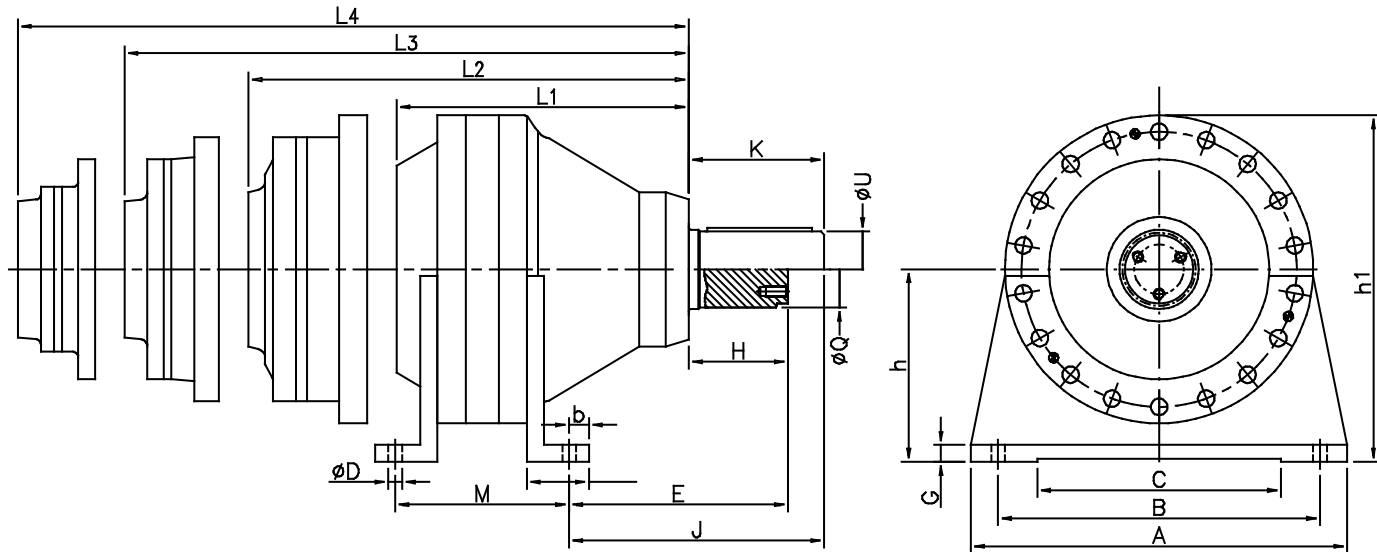
For other dimensions and technical features, see data sheets for gearboxes.

RES	A	B	C	D	E	G	H	J	K	L ₂	L ₃	L ₄	M	Q*	U	Z ₂	Z ₃	Z ₄	a	b	h	h ₁
300	12.20	10.00	-	0.71	1.93	0.79	2.68	3.39	4.13	13.78	16.14	13.72	5.59	58x53	2.36	9.90	9.90	9.90	2.17	0.83	6.30	10.63
500	12.20	10.00	-	0.71	1.93	0.79	2.68	3.39	4.13	14.37	16.73	14.31	5.59	58x53	2.36	10.49	10.49	10.49	2.17	0.83	6.30	10.63
800R	13.78	10.63	-	0.87	6.32	0.91	3.54	7.89	5.12	17.80	20.03	17.76	6.42	70x64	3.15	13.94	13.94	13.94	3.54	1.46	8.19	13.70
1300	15.04	12.52	10.00	0.98	6.14	0.91	3.54	9.29	6.69	18.31	19.76	19.72	9.29	80x74	3.54	14.92	15.91	15.91	3.35	1.26	8.86	15.81

*measurements in metric

FOOT-MOUNTED GEARBOXES

RES SERIES 2000 - 15000

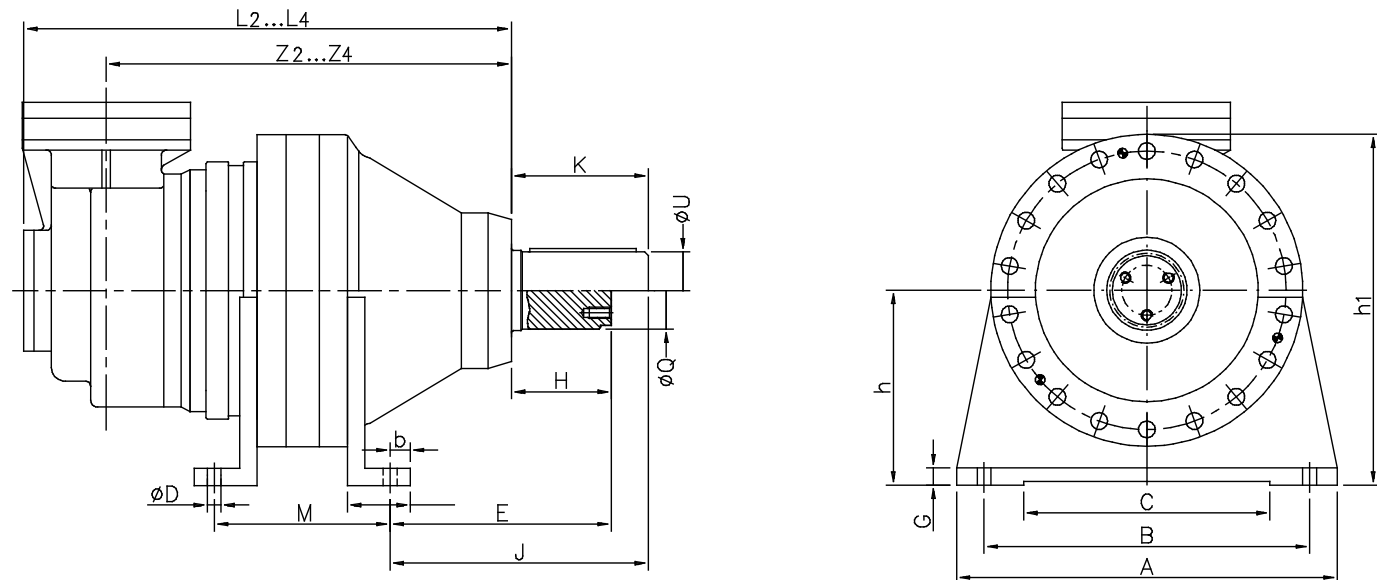


In Line Gearboxes

For other dimensions and technical features, see data sheets for gearboxes.

RES	A	B	C	D	E	G	H	J	K	L ₁	L ₂	L ₃	L ₄	M	Q*	U	a	b	h	h ₁
2000	17.52	14.02	10.43	0.98	5.67	0.87	3.54	8.82	6.69	11.89	16.14	18.23	19.90	12.32	80x74	3.54	4.78	1.30	8.86	15.81
3000	21.65	17.99	12.99	1.30	8.70	1.26	4.33	10.87	6.50	15.95	19.27	21.36	23.03	13.31	100x94	3.94	5.51	1.54	11.02	19.45
4000	21.65	17.99	12.99	1.30	9.49	1.26	5.12	10.87	6.50	16.12	19.51	22.19	24.33	15.04	W120x3	4.72	5.51	1.54	11.02	19.45
6000	21.65	17.99	12.99	1.30	9.55	1.26	5.12	10.93	6.50	17.20	21.77	26.02	28.11	15.91	W120x3	4.72	6.18	1.54	11.02	19.78
8000	24.41	20.00	14.96	1.54	12.56	1.26	5.91	14.53	7.87	20.67	26.56	29.94	32.62	16.50	W150x5	5.91	6.85	2.42	12.40	23.07
10000	24.41	20.00	14.96	1.54	13.35	1.26	6.70	14.53	7.87	21.46	27.34	30.73	33.41	17.28	W170x5	6.69	6.85	2.42	12.40	23.07
15000	33.46	27.56	21.65	1.77	8.94	1.77	7.87	11.30	7.87	15.75	24.57	29.13	33.39	17.72	W200x5	7.87	8.94	3.94	16.34	30.02

* measurements in metric



Right Angle Gearboxes

For other dimensions and technical features, see data sheets for gearboxes.

RES	A	B	C	D	E	G	H	J	K	L ₃	L ₄	M	Q*	U	Z ₃	Z ₄	a	b	h	h ₁
2000	17.52	14.02	10.43	0.98	5.67	0.87	3.54	8.82	6.69	22.40	22.34	12.32	80x74	3.54	18.53	18.52	4.78	1.30	8.86	15.81
3000	21.65	17.99	12.99	1.30	8.70	1.26	4.33	10.87	6.50	27.09	25.47	13.31	100x94	3.94	21.65	21.65	5.51	1.54	11.02	19.45
4000	21.65	17.99	12.99	1.30	9.49	1.26	5.12	10.87	6.50	27.09	28.52	15.04	W120x3	4.72	21.89	24.70	5.51	1.54	11.02	19.45
6000	21.65	17.99	12.99	1.30	9.55	1.26	5.12	10.93	6.50	-	32.22	15.91	W120x3	4.72	-	28.41	6.18	1.54	11.02	19.78
8000	24.41	20.00	14.96	1.54	12.56	1.26	5.91	14.53	7.87	-	36.14	16.50	W150x5	5.91	-	32.32	6.85	2.42	12.40	23.07
10000	24.41	20.00	14.96	1.54	13.35	1.26	6.70	14.53	7.87	-	36.93	17.28	W170x5	6.69	-	33.11	6.85	2.42	12.40	23.07

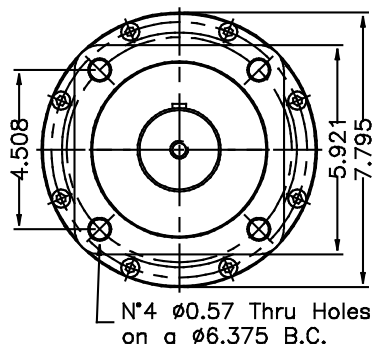
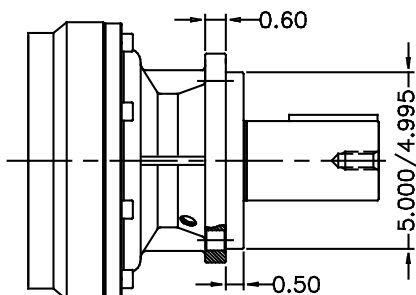
* measurements in metric

RS SERIES GEARBOXES

RS SERIES 100 - 200

RS 200R

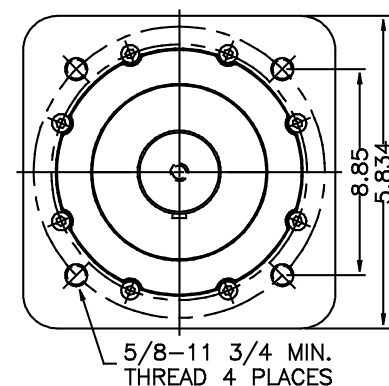
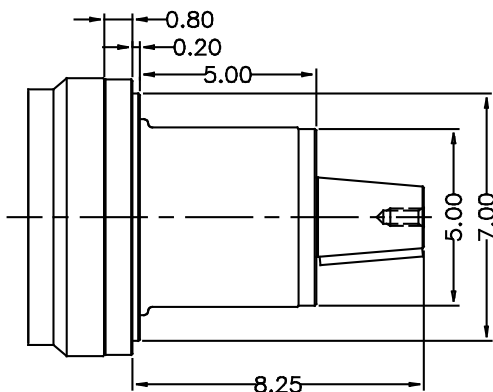
Output same
as GR 200R



OUTPUT TORQUE RATING	
CONTINUOUS	PEAK
1250 LB-FT	2400 LB-FT
Ratio = 4.125 - 5.167	

RS 200W

Output same
as GR 200W



WEIGHT	
RS 200	34 LBS.
RS 200W	48 LBS.

RS SERIES	M1/M1R		M2/M2R		M3/M3R		M4/M4R		Maximum Torque Ratings (LB-FT)		
	Stage 1		Stage 2		Stage 3		Stage 4				
	Ratio	Torque LB-FT	Ratio	Torque LB-FT	Ratio	Torque LB-FT	Ratio	Torque LB-FT			
100	3.500	B	12.25	B	50.5	A	357	A	1160 = A 870 = B 760 = C 650 = D 510 = E		
	4.125	A	14.44	A	59.6	A	421	A			
	5.167	B	17.02	A	70.2	A	454	A			
	6.000	C	21.31	A	74.6	A	528	A			
	7.250	D	24.75	A	86.6	A	613	A			
	8.538	E	29.91	A	102.1	A	740	A			
			35.22	B	110.1	A	894	A			
			44.12	B	127.9	A	1120	A			
			51.23	C	148.5	A	1301	A			
			61.90	D	179.4	A	1572	A			
			72.91	E	193.5	A	1851	A			
					216.8	A	2180	A			
					255.4	A	2568	A			
					300.7	A	3216	B			
					376.7	B	3735	C			
					437.4	C	4513	D			
					528.6	D	5315	E			
					622.5	E					
	Input Speed/Cont.-Max	3000/4000		3000/4000		3000/4000		3000/4000			
	200	3.500	B	12.25	B	50.5	A	357		A	2100 = A 1600 = B 1380 = C 1160 = D 940 = E
4.125		A	14.44	A	59.6	A	421	A			
5.167		B	17.02	A	70.2	A	454	A			
6.000		C	21.31	A	74.6	A	528	A			
7.250		D	24.75	A	86.6	A	613	A			
8.538		E	29.91	A	102.1	A	740	A			
			35.22	B	110.1	A	894	A			
			44.12	B	127.9	A	1120	A			
			51.23	C	148.5	A	1301	A			
			61.90	D	179.4	A	1572	A			
			72.91	E	193.5	A	1851	A			
					216.8	A	2180	A			
					255.4	A	2731	B			
					319.8	A	3216	B			
					376.7	B	3735	C			
					437.4	C	4513	D			
					528.6	D	5315	E			
					622.5	E					
Input Speed/Cont.-Max		3000/4000		3000/4000		3000/4000		3000/4000			

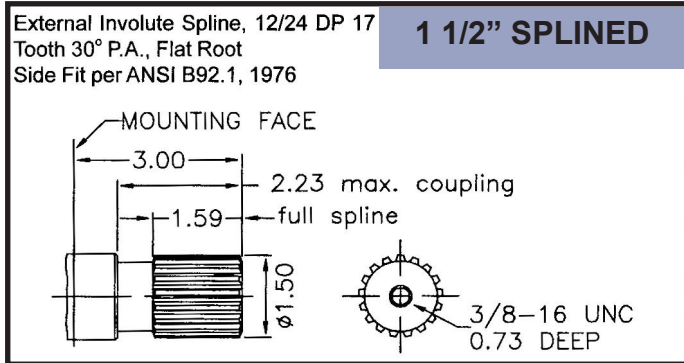
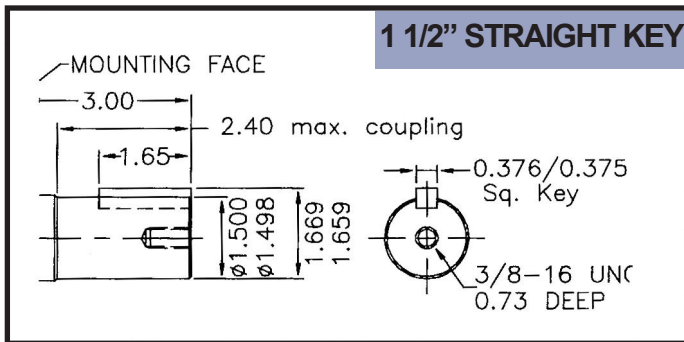
RS SERIES GEARBOXES



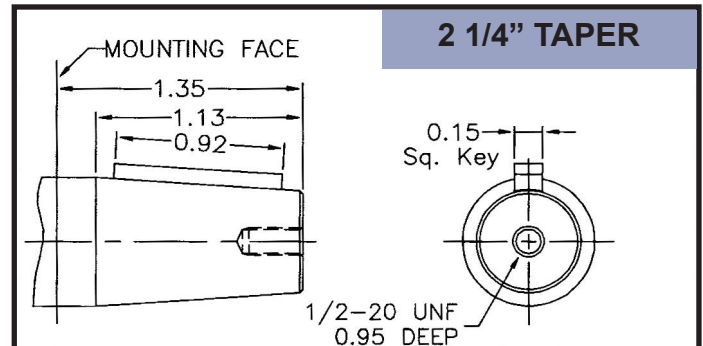
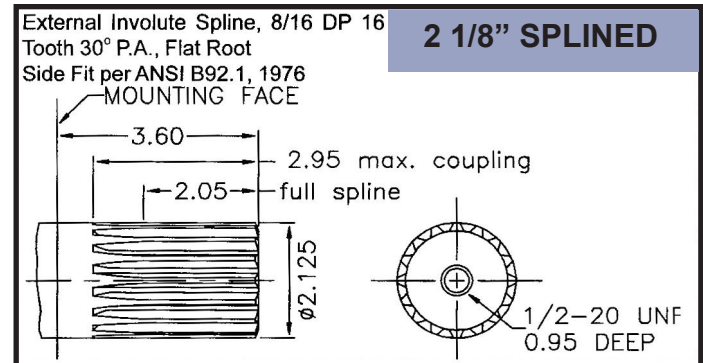
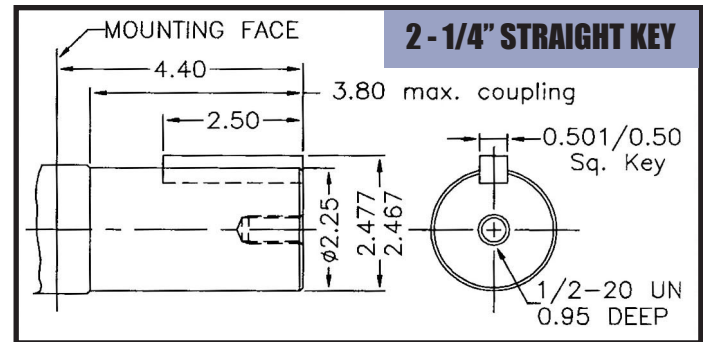
RS SERIS 100-200

SHAFT OPTIONS

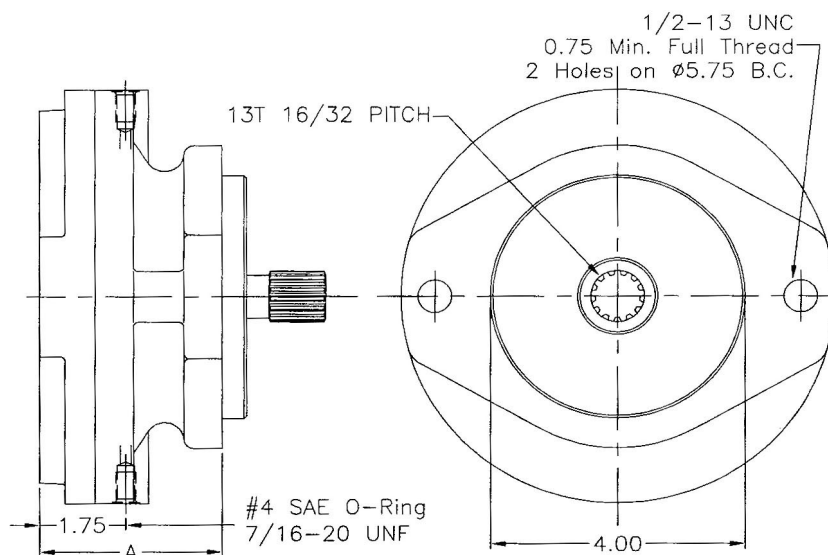
SHAFTS - RS 100



SHAFTS - RS 200



DS SERIES BRAKES

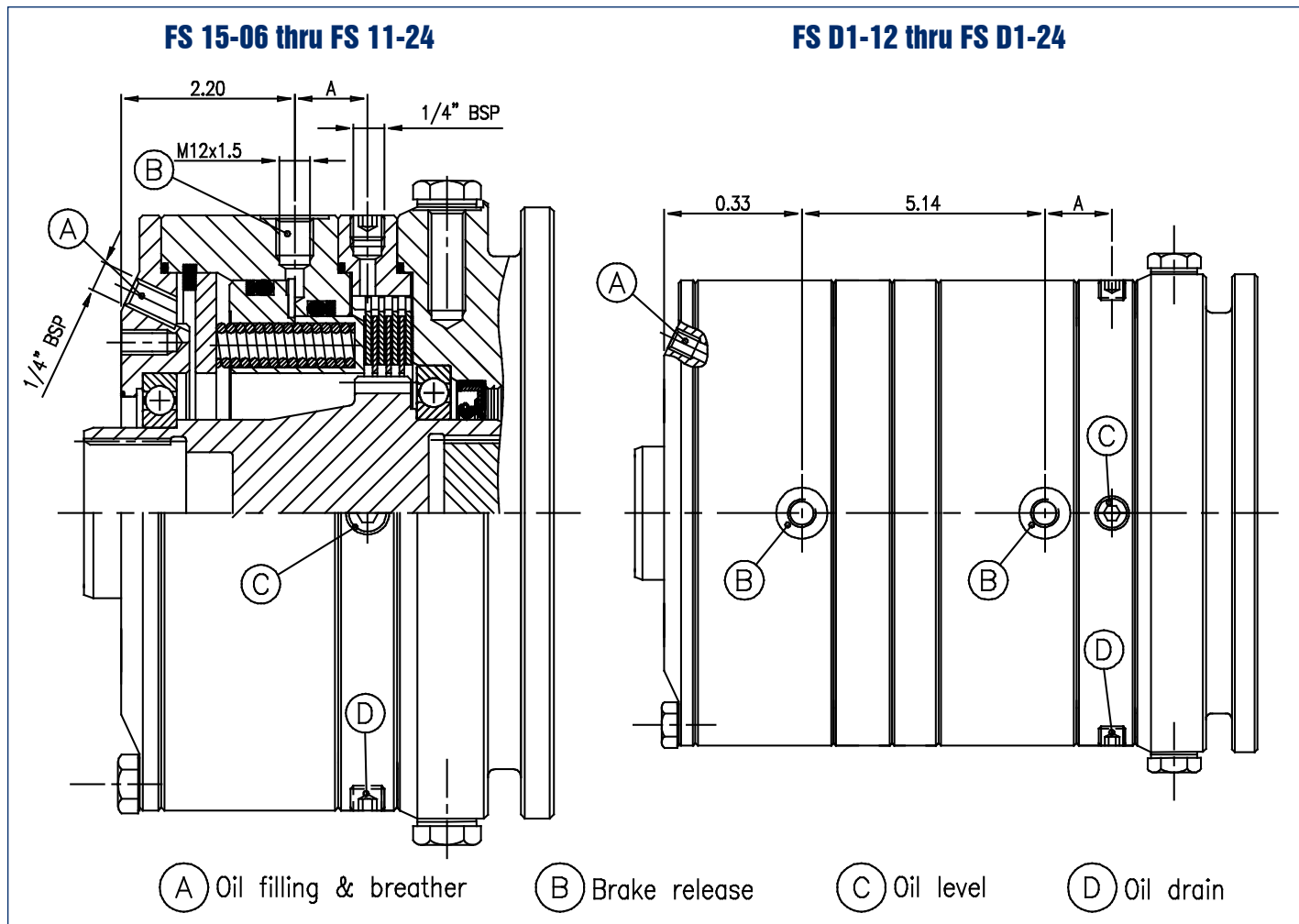


DIMENSIONS/TORQUE RATINGS		
MODEL	DB 80	DB 82
A	2.88	4.50
Release Pressure (PSI)	Initial / Full	Initial / Full
	275 / 370	170 / 320
Max. Torque (LB-FT)	175	400
Max. Brake Pressure (PSI)	3000	4000
Weight	20 LBS.	25 LBS.

The multi-disk brakes of the FS Series are hydraulically released and have fail-safe characteristics. Assembled in a compact unit with a gearbox, they require minimal mounting space. Separate lubrication prevents premature contamination increasing bearing life. If the brake needs to work in dynamic conditions, contact our Technical Service Department for determining the dynamic braking torque. Combined parking and dynamic brakes with independent actuation and common lubrication are available by request. Oil quantity listed in table is not valid for mounting positions O and D (see page 50). In this special case, contact our Technical Service Department.

The FS Series multi-disk brakes Type D1 (D1-12 thru D1-24) are hydraulically controlled with fail-safe features. This series is characterized by two independent braking units which can be activated individually or simultaneously, thus allowing a two-mode use of the device. When the double safety brake is required, the two units are activated in succession. The simultaneous activation of both units allows for a high braking torque, as shown in following example: Type D1-20: LB-FT (Static) = 2255 LB-FT.

The lubrication system is independent. Single lubrication systems are available upon request. The oil quantity shown in the table does not apply to mounting positions O and D (see page 50). For these applications, contact our Technical Service Department.

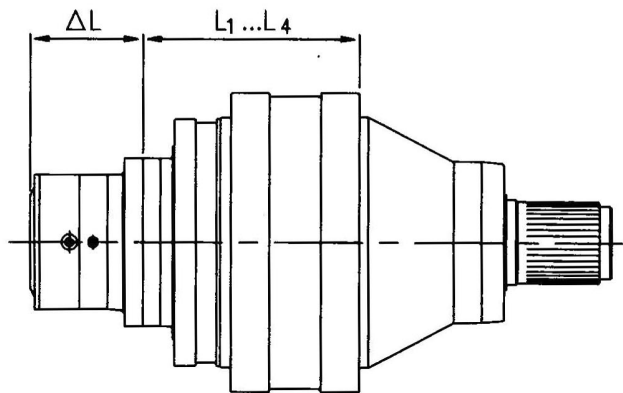


The correct selection of a brake involves the desired braking torque and/or opening pressure. Ensure the Braking Torque LB-FT (Braking) created by the brake will not exceed the Peak Torque shown in Tab. 1, page 6. If these values are exceeded, serious damage could occur. Reviewing the Technical Data section on pages 6-11 is highly recommended. When calculating LB-FT (Braking) with the following formula, the Mechanical Efficiency ME for the brake is 98%.

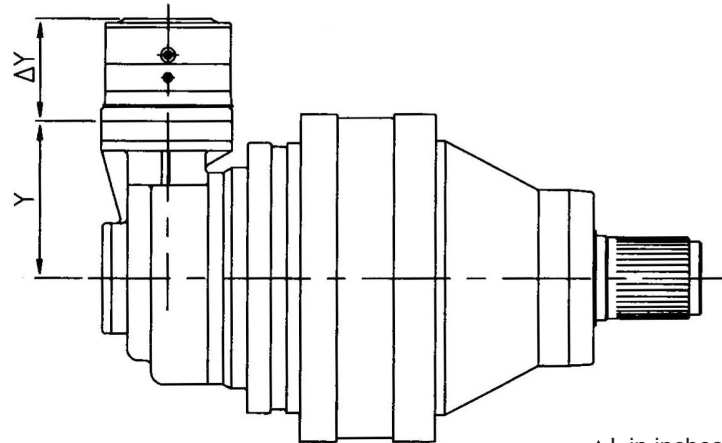
$$ME = 0.98 \quad LB-FT \text{ (Braking)} = LB-FT \text{ (Static)} \times \frac{1}{ME} \times \text{Ratio} \leq LB-FT \text{ (Peak) Peak Torque - See Tab. 1 page 6}$$

TYPE	Static Torque LB-FT (Static)	Opening Pressure PSI	Max. Pressure PSI	A Inches	Oil Volume Qts.	Oil Viscosity	Oil Volume Ozs. For Brake Release	
							New Disks	Worn Out Disks
FS 15-06	31	87	5075	0.93	0.3	ISO VG 32	1.3	1.9
FS 15-09	47	131	5075	0.93	0.3	ISO VG 32	1.3	1.9
FS 15-12	61	174	5075	0.93	0.3	ISO VG 32	1.3	1.9
FS 15-15	77	218	5075	0.93	0.3	ISO VG 32	1.3	1.9
FS 15-18	92	261	5075	0.93	0.3	ISO VG 32	1.3	1.9
FS 35-06	92	87	5075	0.93	0.3	ISO VG 32	1.3	1.9
FS 35-09	140	131	5075	0.93	0.3	ISO VG 32	1.3	1.9
FS 35-12	185	174	5075	0.93	0.3	ISO VG 32	1.3	1.9
FS 35-15	231	218	5075	0.93	0.3	ISO VG 32	1.3	1.9
FS 35-18	277	261	5075	0.93	0.3	ISO VG 32	1.3	1.9
FS 35-20	307	290	5075	0.93	0.3	ISO VG 32	1.3	1.9
FS 35-22	338	319	5075	0.93	0.3	ISO VG 32	1.3	1.9
FS 35-24	370	348	5075	0.93	0.3	ISO VG 32	1.3	1.9
FS 55-12	307	174	5075	1.77	0.5	ISO VG 32	1.3	1.9
FS 55-15	385	218	5075	1.77	0.5	ISO VG 32	1.3	1.9
FS 55-18	461	261	5075	1.77	0.5	ISO VG 32	1.3	1.9
FS 55-20	512	290	5075	1.77	0.5	ISO VG 32	1.3	1.9
FS 55-22	565	319	5075	1.77	0.5	ISO VG 32	1.3	1.9
FS 55-24	615	348	5075	1.77	0.5	ISO VG 32	1.3	1.9
FS 85-12	492	174	5075	1.77	0.5	ISO VG 32	1.3	1.9
FS 85-15	615	218	5075	1.77	0.5	ISO VG 32	1.3	1.9
FS 85-18	737	261	5075	1.77	0.5	ISO VG 32	1.3	1.9
FS 85-20	820	290	5075	1.77	0.5	ISO VG 32	1.3	1.9
FS 85-22	901	319	5075	1.77	0.5	ISO VG 32	1.3	1.9
FS 85-24	985	348	5075	1.77	0.5	ISO VG 32	1.3	1.9
FS 11-12	676	174	5075	2.28	0.5	ISO VG 32	1.3	1.9
FS 11-15	845	218	5075	2.28	0.5	ISO VG 32	1.3	1.9
FS 11-18	1015	261	5075	2.28	0.5	ISO VG 32	1.3	1.9
FS 11-20	1127	290	5075	2.28	0.5	ISO VG 32	1.3	1.9
FS 11-22	1240	319	5075	2.28	0.5	ISO VG 32	1.3	1.9
FS 11-24	1352	348	5075	2.28	0.5	ISO VG 32	1.3	1.9
FS D1-12	1352	174	5075	2.28	1.1	ISO VG 32	2 x 1.3	2 x 1.9
FS D1-15	1690	218	5075	2.28	1.1	ISO VG 32	2 x 1.3	2 x 1.9
FS D1-18	2030	261	5075	2.28	1.1	ISO VG 32	2 x 1.3	2 x 1.9
FS D1-20	2255	290	5075	2.28	1.1	ISO VG 32	2 x 1.3	2 x 1.9
FS D1-22	2480	319	5075	2.28	1.1	ISO VG 32	2 x 1.3	2 x 1.9
FS D1-24	2704	348	5075	2.28	1.1	ISO VG 32	2 x 1.3	2 x 1.9

Brake Mounting on In Line Gearboxes



Brake Mounting on Right Angle Gearboxes



In Line Gearboxes

ΔL in inches

TYPE	Gearbox Type with Brake Type Length Variation																					
	100		200		300			400		500			800			1000			1300			
	1	2	1	2	1	2	3	2	3	1	2	3	1	2	3	2	3	4	1	2	3	4
FS 15-06		4.09		4.09		4.09	4.09	4.09	4.09		4.09	4.09			4.09		4.09	4.09			4.09	4.09
FS 15-09	4.09	4.09		4.09		4.09	4.09	4.09	4.09		4.09	4.09			4.09		4.09	4.09			4.09	4.09
FS 15-12	4.09	4.09		4.09		4.09	4.09	4.09	4.09		4.09	4.09			4.09		4.09				4.09	
FS 15-15	4.09	4.09	4.09	4.09		4.09		4.09	4.09		4.09	4.09			4.09		4.09				4.09	
FS 15-18	4.09	4.09	4.09	4.09		4.09		4.09			4.09	4.09			4.09		4.09				4.09	
FS 35-06	4.09	4.09	4.09	4.09		4.09		4.09			4.09	4.09		3.80	4.09	3.80	4.09				4.09	
FS 35-09	4.09		4.09	4.09	3.80	4.09		4.09			4.09			3.80	4.09	3.80	4.09			3.80	4.09	
FS 35-12	4.09		4.09		3.80	4.09		4.09			4.09			3.80	4.09	3.80	4.09			3.80	4.09	
FS 35-15	4.09		4.09		3.80	4.09		4.09			4.09			3.80		3.80				3.80	4.09	
FS 35-18	4.09		4.09		3.80			4.09			4.09			3.80		3.80				3.80	4.09	
FS 35-20	4.09		4.09		3.80			4.09			4.09			3.80		3.80				3.80	4.09	
FS 35-22	4.09		4.09		3.80						4.09			3.80		3.80				3.80	4.09	
FS 35-24	4.09		4.09		3.80						4.09			3.80		3.80				3.80		
FS 55-12			4.94		4.65					4.65	4.94			4.65		4.65				4.65		
FS 55-15			4.94		4.65					4.65	4.94			4.65		4.65				4.65		
FS 55-18			4.94		4.65					4.65	4.94			4.65		4.65				4.65		
FS 55-20			4.94		4.65					4.65				4.65		4.65				4.65		
FS 55-22			4.94		4.65					4.65				4.65		4.65				4.65		
FS 55-24			4.94		4.65					4.65				4.65		4.65				4.65		
FS 85-12					4.65					4.65				4.65		4.65				4.65		
FS 85-15					4.65					4.65				4.65		4.65				4.65		
FS 85-18					4.65					4.65						4.65				4.65		
FS 85-20					4.65					4.65						4.65				4.65		
FS 85-22					4.65					4.65						4.65				4.65		
FS 85-24										4.65										4.65		
FS 11-12													5.22									
FS 11-15													5.22						5.22			
FS 11-18													5.22						5.22			
FS 11-20													5.22						5.22			
FS 11-22													5.22						5.22			
FS 11-24													5.22						5.22			
FS D1-12																			10.55			
FS D1-15																			10.55			
FS D1-18																			10.55			
FS D1-20																			10.55			
FS D1-22																			10.55			
FS D1-24																			10.55			

MULTI-DISK BRAKES



In Line Gearboxes

△L in inches

TYPE	Gearbox Type with Brake Type Length Variation																							
	1800			2000				3000			4000			6000			8000			10000			15000	
	2	3	4	1	2	3	4	2	3	4	2	3	4	2	3	4	2	3	4	2	3	4	3	4
FS 15-06		4.09	4.09			3.80	4.09			4.09			4.09			3.80			3.80					
FS 15-09		4.09	4.09			3.80	4.09		3.80	4.09			4.09			3.80			3.80			3.80		
FS 15-12		4.09	4.09			3.80	4.09		3.80	4.09		3.80	4.09			3.80			3.80			3.80		
FS 15-15		4.09				3.80	4.09		3.80	4.09		3.80	4.09			3.80			3.80			3.80		
FS 15-18		4.09				3.80	4.09		3.80	4.09		3.80	4.09			3.80			3.80			3.80		
FS 35-06		4.09				3.80	4.09		3.80	4.09		3.80	4.09			3.80			3.80			3.80		
FS 35-09	3.80	4.09				3.80			3.80	4.09		3.80	4.09			3.80			3.80			3.80		
FS 35-12	3.80	4.09				3.80			3.80			3.80	4.09			3.80			3.80			3.80		
FS 35-15	3.80	4.09				3.80			3.80			3.80				3.80			3.80			3.80		
FS 35-18	3.80	4.09				3.80			3.80			3.80				3.80			3.80			3.80		
FS 35-20	3.80	4.09				3.80			3.80			3.80							3.80			3.80		
FS 35-22	3.80	4.09				3.80			3.80			3.80							3.80			3.80		
FS 35-24	3.80					3.80			3.80			3.80							3.80			3.80		
FS 55-12	4.65				4.70	4.65			4.65			4.65			4.70			4.70	4.65		4.70	4.65		4.70
FS 55-15	4.65				4.70	4.65			4.70	4.65			4.65			4.70			4.70	4.65		4.70	4.65	
FS 55-18	4.65				4.70				4.70	4.65			4.65			4.70			4.70	4.65		4.70	4.65	
FS 55-20	4.65				4.70				4.70	4.65			4.65			4.70			4.70	4.65		4.70	4.65	
FS 55-22	4.65				4.70				4.70	4.65			4.65			4.70			4.70			4.70	4.65	
FS 55-24	4.65				4.70				4.70	4.65			4.65			4.70			4.70			4.70	4.65	
FS 85-12	4.65				4.70				4.70	4.65		4.70	4.65			4.70			4.70			4.70	4.65	
FS 85-15	4.65				4.70				4.70	4.65		4.70	4.65			4.70			4.70			4.70	4.65	
FS 85-18	4.65				4.70				4.70			4.70	4.65			4.70			4.70			4.70		
FS 85-20	4.65				4.70				4.70			4.70	4.65			4.70			4.70			4.70		
FS 85-22	4.65				4.70				4.70			4.70	4.65			4.70			4.70			4.70		
FS 85-24	4.65				4.70				4.70			4.70				4.70			4.70			4.70		
FS 11-12					5.22				5.22			5.22						5.22			5.22			
FS 11-15					5.22				5.22			5.22						5.22			5.22			
FS 11-18					5.22				5.22			5.22						5.22			5.22			
FS 11-20					5.22				5.22			5.22						5.22			5.22			
FS 11-22					5.22				5.22			5.22						5.22			5.22			
FS 11-24					5.22				5.22			5.22						5.22			5.22			
FS D1-12				10.55								10.55			10.55			10.55	10.55		10.55		10.55	
FS D1-15				10.55								10.55			10.55			10.55	10.55		10.55	10.55		10.55
FS D1-18				10.55								10.55			10.55			10.55	10.55		10.55	10.55		10.55
FS D1-20				10.55								10.55			10.55			10.55	10.55		10.55	10.55		10.55
FS D1-22				10.55								10.55			10.55			10.55	10.55		10.55	10.55		10.55
FS D1-24				10.55								10.55			10.55			10.55	10.55		10.55	10.55		10.55

Right Angle Gearboxes

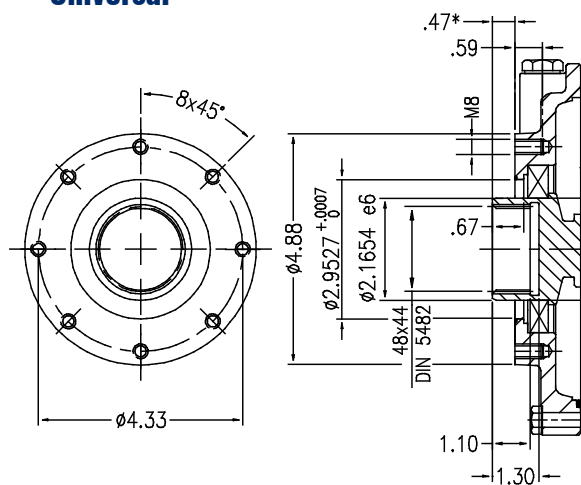
△Y in inches

TYPE	Gearbox Type with Brake Type Length Variation																			
	300		500		800		1300			1800		2000		3000		4000		6000	8000	10000
	2	3	2	3	2	3	2	3	4	2	3	2	3	2	3	2	3	4	4	4
FS 15-06	5.45	4.09		4.09		4.09		5.45	4.09	5.45	4.09		4.09		4.09		5.45	5.45	5.45	
FS 15-09	5.45	4.09	5.45	4.09		4.09		5.45	4.09	5.45	4.09	5.45	4.09	5.45	4.09		5.45	5.45	5.45	
FS 15-12	5.45		5.45	4.09		4.09		5.45	4.09	5.45	4.09	5.45	4.09	5.45	4.09		5.45	5.45	5.45	5.45
FS 15-15	5.45		5.45	4.09		4.09		5.45		5.45	4.09	5.45	4.09	5.45	4.09		5.45	5.45	5.45	5.45
FS 15-18	5.45		5.45	4.09		4.09		5.45		5.45		5.45	4.09	5.45	4.09	5.45	5.45	5.45	5.45	5.45
FS 35-06	5.45		5.45	4.09		4.09		5.45		5.45		5.45	4.09	5.45	4.09	5.45	5.45	5.45	5.45	5.45
FS 35-09	5.45		5.45	4.09	5.45	4.09		5.45		5.45		5.45		5.45	4.09	5.45	5.45	5.45	5.45	5.45
FS 35-12	5.45		5.45		5.45		5.45	5.45		5.45		5.45		5.45		5.45	5.45	5.45	5.45	5.45
FS 35-15			5.45		5.45		5.45	5.45		5.45		5.45		5.45		5.45		5.45	5.45	5.45
FS 35-18			5.45		5.45		5.45			5.45		5.45		5.45		5.45		5.45	5.45	5.45
FS 35-20			5.45		5.45		5.45					5.45		5.45		5.45			5.45	5.45
FS 35-22			5.45		5.45		5.45							5.45		5.45			5.45	5.45
FS 35-24					5.45		5.45							5.45		5.45			5.45	5.45
FS 55-12					6.30		6.30							6.30		6.30			6.30	6.30
FS 55-15					6.30		6.30							6.30		6.30			6.30	6.30
FS 55-18					6.30		6.30							6.30		6.30			6.30	6.30

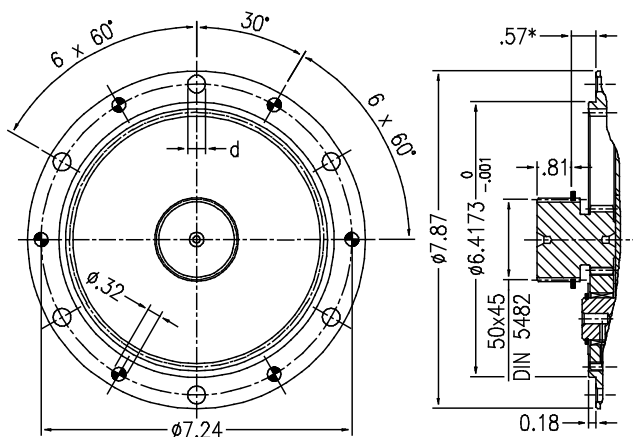
Not available if omitted

INPUT END VIEWS

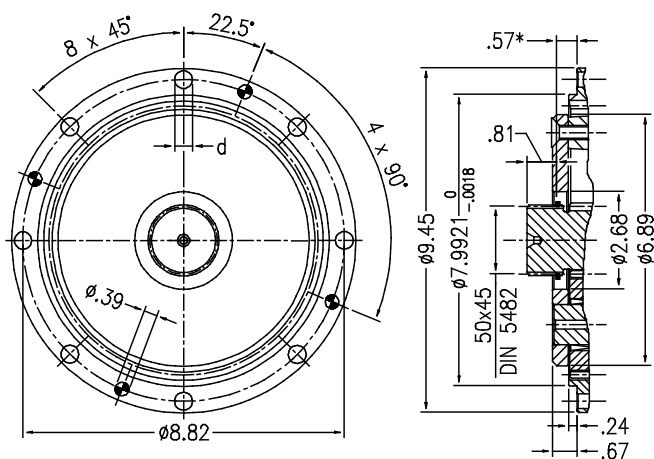
Input Flange Dimension Type U
Universal



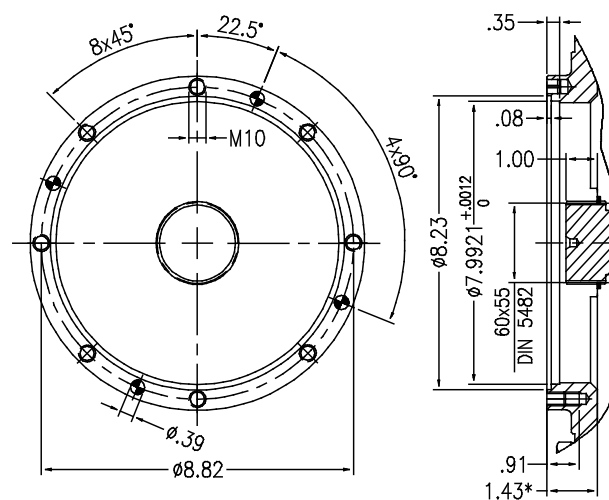
Input Flange Dimension Type A



Input Flange Dimension Type B



Input Flange Dimension Type C



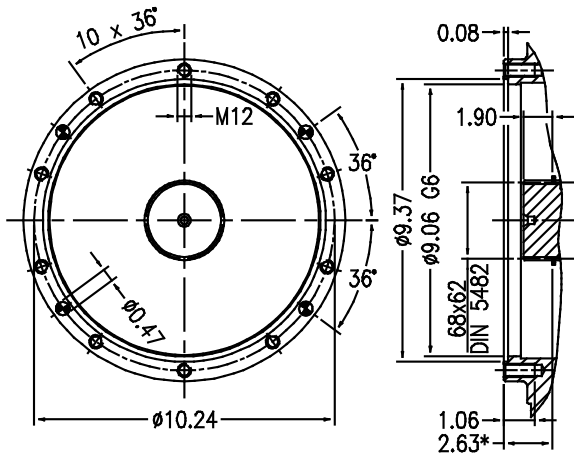
() Option

* Leave .039" [1mm] of axial clearance. Verify at final assembly.

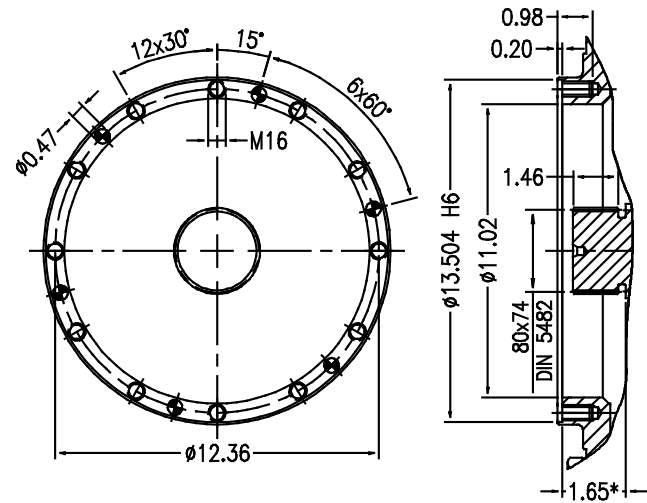
RES SERIES	100	d	200	d	300	d	400	d	500	d	800	d	1000	d	1300	d
Stage 1	U (A)	0.33	U (A)	0.33	U (B)	0.41	-	-	U (B)	0.41	C	-	-	-	C	-
Stage 2	U (A)	0.33	U (A)	0.33	U (A)	M8	U (A)	M8	U (A)	M8	U (B)	M10	U (B)	M10	U (B)	M10
Stage 3	U (A)	0.33	U (A)	0.33	U (A)	M8	U (A)	M8	U (A)	M8	U (A)	M8	U (A)	M8	U (A)	M8
Stage 4	U (A)	0.33	U (A)	0.33	U (A)	M8	U (A)	M8	U (A)	M8	U (A)	M8	U (A)	M8	U (A)	M8
Gearboxes with Brake	U		U		U		U		U		U		U		U	
Right Angle Gearboxes	-		-		U		-		U		U		-		U	

INPUT END VIEWS

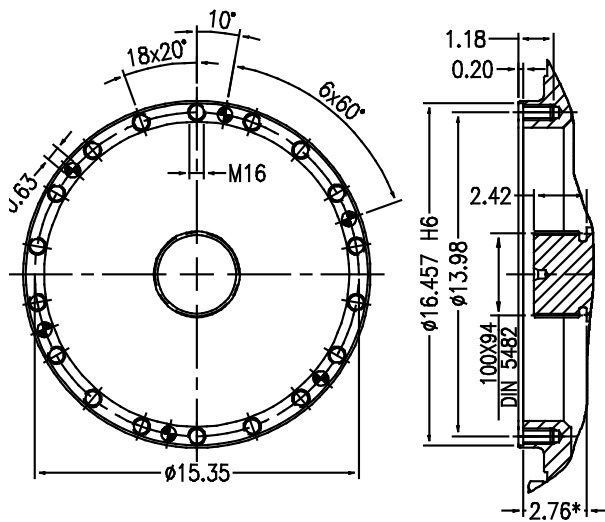
Input Flange Dimension Type C1



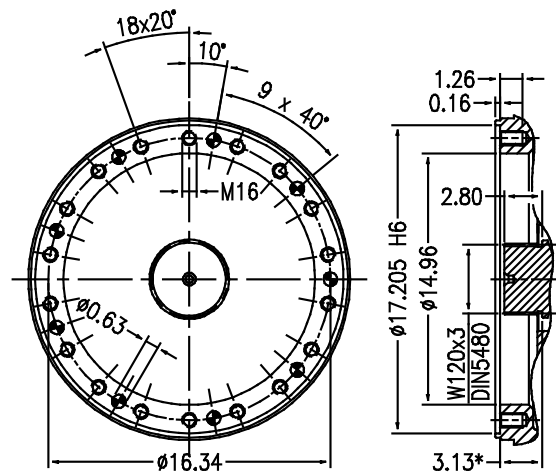
Input Flange Dimension Type D



Input Flange Dimension Type E



Input Flange Dimension Type F



() Option

* Leave .039" [1mm] of axial clearance. Verify at final assembly.

RES SERIES	1800	d	2000	d	3000	d	4000	d	6000	d	8000	d	10000	d	15000	d
Stage 1	-	-	C1	-	C1	-	D	-	D	-	E	-	E	-	F	-
Stage 2	U (B)	M10	C	-	C	-	C	M8	C	-	D	-	D	-	D	-
Stage 3	U (A)	M8	U (B)	M10	U (B)	M10	U (B)	M8	C	-	C	-	C	-	C	-
Stage 4	U (A)	M8	U (A)	M8	U (A)	M8	U (A)	M8	U (B)	M10	U (B)	M10	U (B)	M10	C	-
Gearboxes with Brake	U		U		U		U		U		U		U		U	
Right Angle Gearboxes	U		U		U		U		U		U		U		-	

The input shafts are available in several sizes which can be classified in two groups:

- 1) The normal types (WEC, WUC & WHC) are suitable for the transmission of small* power only.
- 2) The heavy load types (WRC & WRX) with a flange size up to 90, without beginning with size 100, are used especially for the transmission of high* power. The flange can also be used for mounting to a bell housing, etc.

Shaft type WUC can be fitted on all gearboxes with input flange type U universal (see page 36). Other shaft types have to be directly mounted to ring gear.

*Contact technical department for exact power capabilities.

In Line Gearboxes

△L in inches

TYPE	Gearbox Type with Input Shaft Type Length Variation																							
	100				200				300				400				500				800			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
WEC 40	1.50				1.50				1.50				1.50				1.50				1.50			
WUC 40	2.40				2.40				2.40				2.40				2.40				2.40			
WHC 40	2.72				2.72				2.72				2.72				2.72				2.72			
WRC-WRX 60									3.01								3.01				5.10	3.01		
WRC-WRX 65																					5.63			
WRC-WRX 80																								

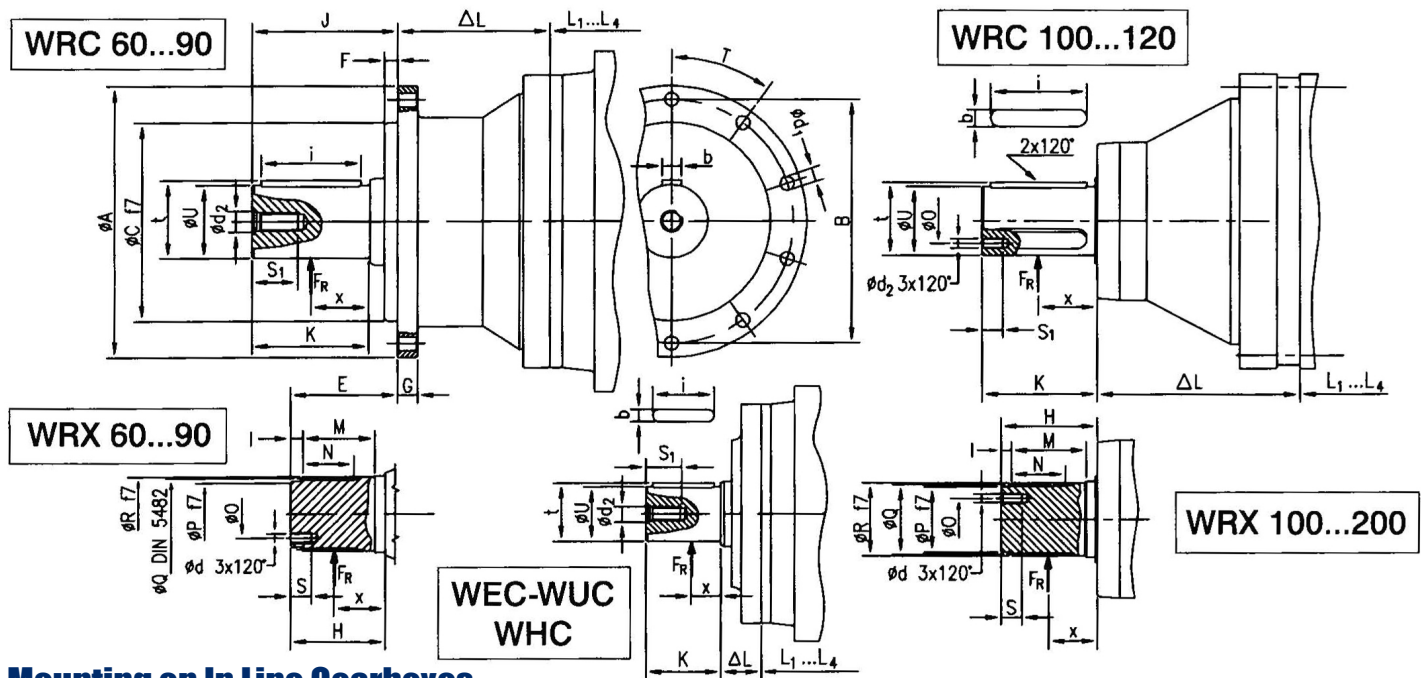
TYPE	Gearbox Type with Input Shaft Type Length Variation																							
	3000				4000				6000				8000				10000				15000			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
WEC 40			1.50	1.50			1.50	1.50				1.50				1.50				1.50				
WUC 40			2.40	2.40			2.40	2.40				2.40				2.40				2.40				
WHC 40			2.72	2.72			2.72	2.72				2.72				2.72				2.72				
WRC-WRX 60		5.10	3.01			5.10	3.01				5.10	3.01			5.10	3.01			5.10	3.01				5.10
WRC-WRX 65		5.63				5.63					5.63			5.63				5.63						5.63
WRC-WRX 80	7.83									8.76														8.76
WRC-WRX 90					7.48				7.48				7.48				7.48				7.48			
WRC-WRX 100													10.8				10.8							
WRC-WRX 120																					11.9			

Right Angle Gearboxes

△Y in inches

TYPE	Gearbox Type with Input Shaft Type Length Variation																			
	300			500			800			1300			1800		2000		3000		4000	
	2	3	4	2	3	4	2	3	4	2	3	4	3	4	3	4	3	4	3	4
WEC 40		1.50		1.50			1.50			1.50			1.50			1.50				
WEC 48	0.47			0.47			0.47			0.47			0.47			0.47			0.47	
WUC 40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40
WHC 40		2.72		2.72			2.72			2.72			2.72			2.72				

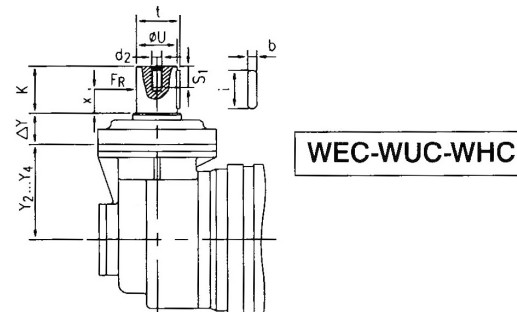
INPUT SIDE SHAFTS



Mounting on In Line Gearboxes

TYPE	A	B	C	F	G	J	K	O	S ₁	T	U	b	d ₁	d ₂ *	i	t	x	F _R [LB]
WEC 40							2.28		0.78		1.575 j6	0.47		M10	1.97	1.69	1.14	308
WUC 40							2.28		0.78		1.575 j6	0.47		M10	1.97	1.69	1.14	462
WHC 40							2.28		0.78		1.575 j6	0.47		M10	1.97	1.69	1.14	550
WRC 60	8.66	7.68	5.906	0.55	0.71	4.72	4.13		1.97	10x36°	2.362 h6	0.71	0.49	M20	3.54	2.52	2.11	1826
WRC 65	10.71	9.65	6.890	0.39	0.79	5.67	4.13		1.97	10x36°	2.559 h6	0.71	0.49	M20	3.54	2.72	2.11	2926
WRC 80	11.02	9.84	7.874	0.59	0.87	6.69	5.12		1.97	12x30°	3.150 h6	0.87	0.59	M20	4.33	3.35	2.56	3300
WRC 90	12.80	11.61	9.055	0.39	0.98	8.11	6.69		1.97	12x30°	3.543 h6	0.98	0.65	M20	5.91	3.74	3.35	3564
WRC 100							6.50	2.56	1.18		3.937 h6	1.10		M14	5.51	4.17	3.25	7040
WRC 120							6.50	2.76	1.18		4.724 h6	1.26		M16	5.51	5.00	3.25	7040

TYPE	A	B	C	E	F	G	H	I	M	N	O	P	Q*	R	S	T	d	d ₁	x	F _R [lb]
WRC 60	8.66	7.68	5.906	3.27	0.55	0.71	2.68	0.31	1.97	1.50	1.26	1.969	58x53	2.362	0.78	10x36°	M10	0.49	2.11	1826
WRC 65	10.71	9.65	6.890	5.69	0.39	0.79	3.15	0.31	2.56	1.97	1.26	1.969	58x53	2.362	0.78	10x36°	M10	0.49	2.11	2926
WRC 80	11.02	9.84	7.874	5.12	0.59	0.87	3.54	0.39	2.76	1.97	1.77	2.441	70x64	2.835	0.78	12x30°	M10	0.59	2.56	3300
WRC 90	12.80	11.61	9.055	4.96	0.39	0.98	3.54	0.39	2.76	1.97	1.77	2.756	80x74	3.346	0.98	12x30°	M12	0.65	3.35	3564
WRC 100							4.33	0.47	3.39	2.60	2.56	3.346	100x94	4.134	1.18		M14		3.25	7040
WRC 120							5.12	0.39	4.13	3.46	2.76	3.937	W120x3	4.803	4.80		M16		3.25	7040



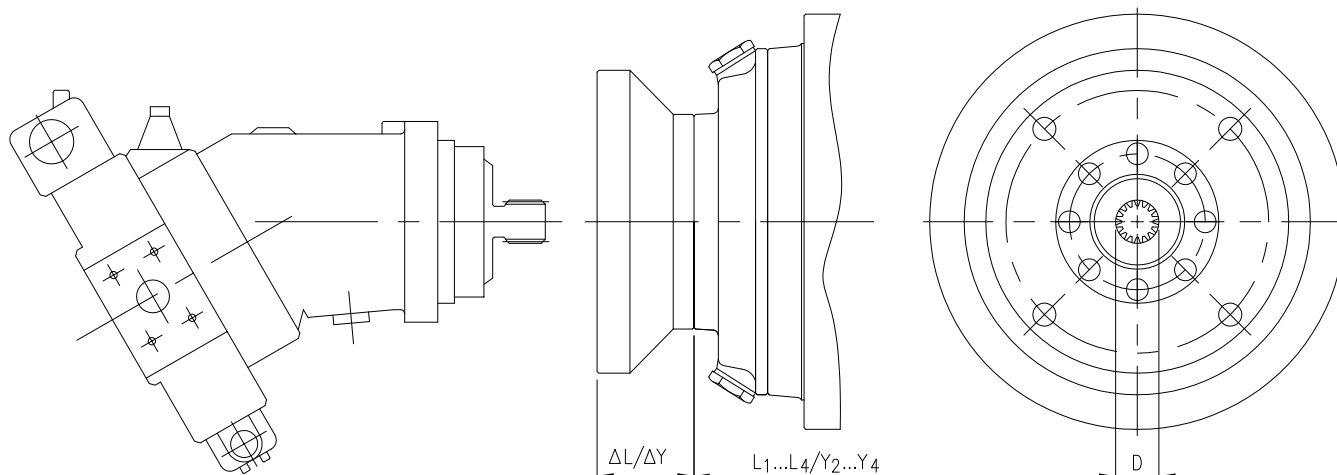
Mounting on Right Angel Gearboxes

TYPE	K	S ₁	U	b	d ₂	i	t	x	F _R [LB]
WEC 40	2.28	0.79	1.57 j6	0.47	M10	1.97	1.69	1.14	308
WEC 48	3.11	1.10	1.89 k5	0.55	M22	2.76	2.05	1.57	352
WUC 40	2.28	0.79	1.57 j6	0.47	M10	1.97	1.69	1.14	462
WHC 40	2.28	0.79	1.57 j6	0.47	M10	1.97	1.69	1.14	550

MOTOR FLANGES

INPUT ADAPTORS

Hydraulic Motors



The letter in the FLANGE column refers to the gearbox input flange. For availability refer to pages 36-37. For motor couplings not shown, contact the Technical Service Department.

CODE	MOTOR TYPE	CHAR-LYNN EATON	D	ΔL/ΔY	FLANGE
SA7	2-080...2-500	SAE-A	Ø1	1.38	U
SA6	2-080...2-500	SAE-A	Ø1.25	1.85	U
SA2	2-080...2-500	SAE-A	1" 6B	1.38	U
SA5	2-080...2-500	SAE-A	Ø1.26	1.85	U
SB3	2-080...2-500	SBE-B	16/32 13T	2.20	U
SB2	2-080...2-500	SBE-B	1" 6B	2.20	U
SB7	2-080...2-500	SBE-B	Ø1	2.20	U

CODE	MOTOR TYPE	DANFOSS	D	ΔL/ΔY	FLANGE
SA1	OMP		Ø0.98	1.38	U
SA7	OMP		Ø1	1.38	U
SA2	OMP		1" 6B	1.38	U
SA1	OMP		Ø0.98	1.38	U
SA5	OMP		Ø1.26	1.85	U
SA7	OMP		Ø1	1.38	U
SA2	OMP		1" 6B	1.38	U
SA5	OMP		Ø1.26	1.85	U
SA4	OMP		12/24 14T	1.85	U
IC3	OMP		Ø1.57	5.31	U
IC4	OMP		12/24 17T	5.31	U
IE3	OMP		Ø1.97	5.63	U

CODE	MOTOR TYPE	HAGGLUNDS ABEX DENISON	D	ΔL/ΔY	FLANGE
SB3	M1 C		16/32 13T	2.20	U
SB3	M4 C		16/32 13T	2.20	U
SC4	M4 D		12/24 14T	1.56	U
SC4	M4 E		12/24 14T	1.56	U
SC4	M3 D		12/24 14T	1.56	U
SB8	M4 C		Ø0.87	2.20	U
SC4	M6-M7		12/24 14T	1.56	U

CODE	MOTOR TYPE	HYDROMATIK REXROTH	D	ΔL/ΔY	FLANGE
IA1	A2FM 10-12		Ø0.79	1.57	U
IA2	A2FM 16		Ø0.98	1.57	U
IA3	A2FM 10-12		W20x1.25x14*	1.57	U
IA4	A2FM 10-12-16		W25x1.25x18*	1.57	U
IB1	A2FM 23-28-32		W30x2x14*	1.65	U
IC1	A2FM 45		W30x2x14*	2.09	U
IC2	A2FM 56-63		W35x2x16*	2.09	U
ID1	A2FM 80		W35x2x16*	2.09	U
IE1	A2FM 107-125		W45x2x21*	4.37	U
IF1	A2FM 160-180		W50x2x30*	4.57	U
IG1	A2FM 200		W50x2x30*	4.57	U

CODE	MOTOR TYPE	VICKERS	D	ΔL/ΔY	FLANGE
SB3	25N-XXX-A11		16/32 13T	2.20	U
SC4	35-45M-XXX-A11X		12/24 14T	1.56	U

CODE	MOTOR TYPE	SAM HYDRAULIK	D	ΔL/ΔY	FLANGE
SA1	AG-AGS 50-400 NC 25		Ø0.98	1.38	U
SA2	AG-AGS 50-400 NS 25		1" 6B	1.38	U
SA1	AR-ARS 80-400 NC 25		Ø0.98	1.38	U
SA2	AR-ARS 80-400 NS 25		1" 6B	1.38	U

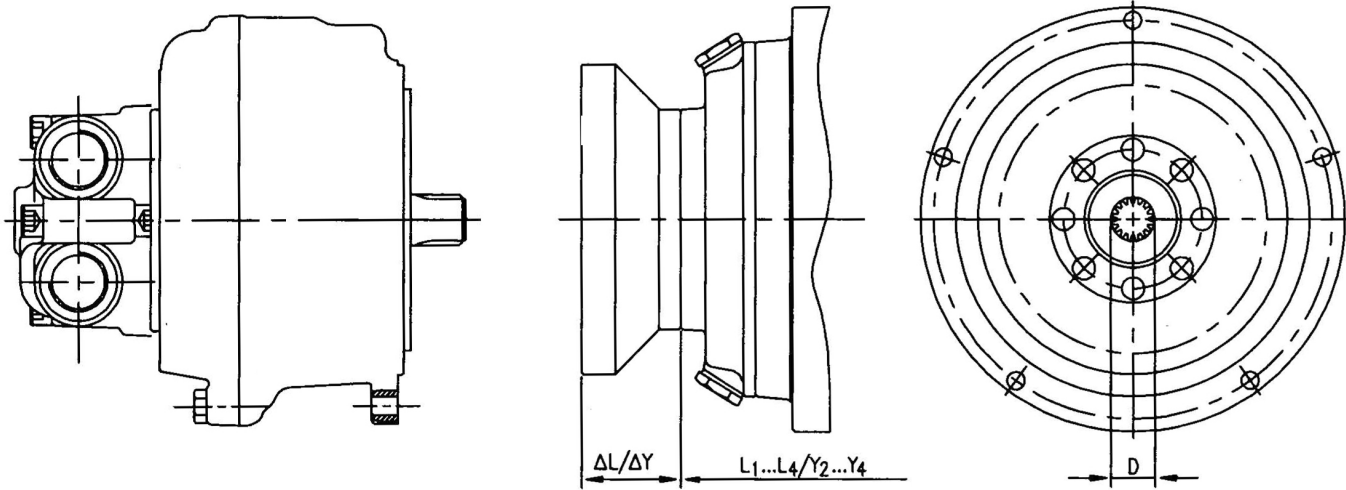
CODE	MOTOR TYPE	VOLVO	D	ΔL/ΔY	FLANGE
IB1	F12-30		W30x2x14*	1.65	U
IC1	F12-40		W30x2x14*	2.09	U
IC2	F12-60		W35x2x14*	2.09	U
ID1	F12-80		W35x2x16*	2.09	U
SB3	F11-19		16/32 13T	2.20	U
SB1	F11-28		Ø0.98	2.20	U
SC4	V11-060/080		12/24 14T	1.56	U

* measurements in metric

MOTOR FLANGES

INPUT ADAPTORS

Hydraulic Motors



CODE	MOTOR TYPE	SAI	D*	□L□Y	FLANGE
M0A	M05/P05	f. 28UN1221 (#3)	0	0	A
M01	M05/GM05	m. 28UN1221 (#1)	1.57	1.57	U
M11	M1/GM1	m. 28UN1221 (#1)	0.86	0.86	U
M23	M2/M3/GM2	f. 36UN1220 (#3)	1.73	1.73	U
M21	M2	m. 36UN1220 (#1)	3.51	3.51	U
M03	M05/GM05	f. 28UN1221 (#3)	-0.26	-0.26	B
M13	M1/GM1	f. 28UN1221 (#3)	-0.12	-0.12	B
M3B	M2/M3/GM2/GM3	f.40-3-12(#9)/m.36UN1220(#1)	0.28	B	Only RES 500
M3C	M2/M3/GM2/GM3	f. 40-30-12 (#9)	-0.43	C	Only RES 800
M1C	M1/GM1	m. 28UN1221 (#1)	-0.51	C	Only RES 800
M39	M2/M3/GM2/GM3	f. 40-30-12 (#9)	0.20	C	Only 1300/2000
M49	M4/GM4	f. 55-3-17 (#9)	-0.16	C	Only 1300/2000
M59	M5/GM5	f. 55-3-17 (#9)	0.04	D	Only RES 4000
L7D	L7/GM6	f. 80-3-25 (#9)	2.28	D	Only 4000/6000
L7E	L7/GM6	f. 80-3-25 (#9)	-0.55	E	Only RES 8000

CODE	MOTOR TYPE	LINDE	D	□L□Y	FLANGE
SC4	MMF 63	12/24 14T	1.56	1.56	U
LA1	BMF-BMV 50	B 30x27	2.17	2.17	U
LB1	BMF-BMV 75	B 35x31	2.28	2.28	U

CODE	MOTOR TYPE	OIL DRIVE	D	□L□Y	FLANGE
SA1	MGL/MGLR-XXX-A-25	Ø0.98	1.38	1.38	U
SA7	MGL/MGLR-XXX-A-25.4	Ø1	1.38	1.38	U
SA2	MGL/MGLR-XXX-A-1" 6B	1" 6B	1.38	1.38	U
SA1	MGT-XXX-A/B-25	Ø0.98	1.38	1.38	U
SA7	MGT-XXX-A/B-25.4	Ø1	1.38	1.38	U
SA2	MGT-XXX-A/B-1" 6B	1" 6B	1.38	1.38	U

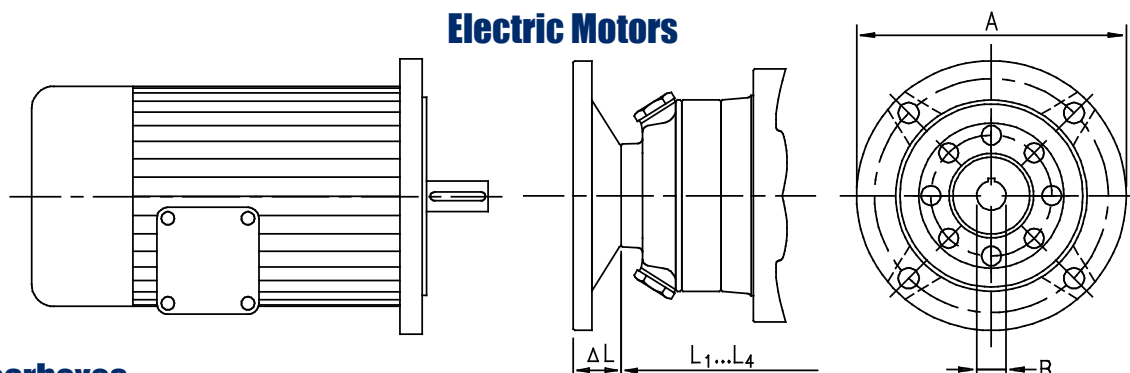
CODE	MOTOR TYPE	TRW TORQMOTOR	D	□L□Y	FLANGE
SA1	MAB 710-xxxx-11X-000	Ø0.98	1.38	1.38	U
SA7	MAB 710-xxxx-12X-000	Ø1	1.38	1.38	U
SA2	MAB 710-xxxx-13X-000	1" 6B	1.38	1.38	U
SA6	MAB 710-xxxx-15X-000	Ø1.25	1.38	1.38	U
SB4	MAE 740-xxxx-14X-000	12/24 14T	1.38	1.38	U
SB6	MAE 740-xxxx-15X-000	Ø1.25	1.38	1.38	U
SB1	MC 700-xxxx-11X-000	Ø0.98	1.38	1.38	U
SA7	MC 700-xxxx-12X-000	Ø1	1.38	1.38	U
SA2	MC 700-xxxx-13X-000	1" 6B	1.38	1.38	U
SA1	MF 760-xxxx-11X-000	Ø0.98	1.38	1.38	U
SA7	MF 760-xxxx-12X-000	Ø1	1.38	1.38	U
SA2	MF 760-xxxx-13X-000	1" 6B	1.38	1.38	U
SA1	MB 730-xxxx-11X-000	Ø0.98	1.38	1.38	U
SA7	MB 730-xxxx-12X-000	Ø1	1.38	1.38	U
SA2	MB 730-xxxx-13X-000	1" 6B	1.38	1.38	U
SA6	MB 730-xxxx-15X-000	Ø1.25	1.85	1.85	U
SA5	MB 730-xxxx-17X-000	Ø1.26	1.85	1.85	U
SA4	ME 780-xxxx-14X-000	12/24 14T	1.85	1.85	U
SA6	ME 780-xxxx-15X-000	Ø1.25	1.85	1.85	U

CODE	MOTOR TYPE	WHITE	D	□L□Y	FLANGE
SA4	RE-XX-19-05	12/24 14T	1.85	1.85	U
SA5	RE-XX-19-09	Ø1.26	1.85	1.85	U
SA6	RE-XX-19-04	Ø1.25	1.85	1.85	U
SA7	RE-XX-19-06	Ø1	1.38	1.38	U
SA2	RE-XX-19-02	1" 6B	1.38	1.38	U
SA3	RE-XX-19-30	16/32 13T	1.38	1.38	U
SA7	HS/RS-XX-03-01	Ø1	1.38	1.38	U
SA2	HS/RS-XX-03-06	1" 6B	1.38	1.38	U
SA3	HS/RS-XX-03...09-07	16/32 13T	1.38	1.38	U
SA1	HS/RS-XX-03...09-08	Ø0.98	1.38	1.38	U

* measurements in metric

MOTOR FLANGES INPUT ADAPTORS

Electric Motors



ΔL in inches

In Line Gearboxes

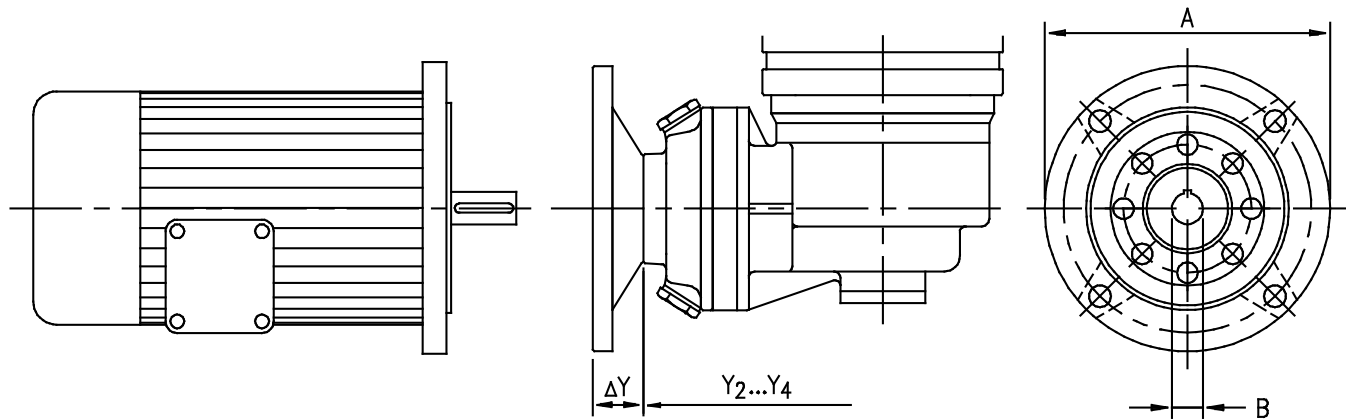
TYPE	CODE	A	B	Gearbox Type with Motor Flange Type Length Variation																			
				100				200				300				400				500			
				1	2	3	4	1	2	3	4	1	2	3	4	2	3	4	1	2	3	4	
NEMA 56C	N56	6.61	0.625			1.34	1.34				1.34				1.34			1.34				1.34	
NEMA 143/145TC	N14	6.61	0.875			1.34	1.34			1.34	1.34				1.34			1.34				1.34	
NEMA 182/184TC	N18	8.98	1.007		1.97	1.97			1.97	1.97				1.97	1.97			1.97				1.97	
NEMA 213/215TC	N21	8.98	1.375	4.59	4.59	4.59			4.59	4.59				4.59	4.59			4.59	4.59				
NEMA 254/256TC	N25	8.98	1.625	4.59	4.59				4.59	4.59				4.59				4.59					
NEMA 284/286TC	N28	10.91	1.875	5.20					5.20	5.20				5.20	5.20			5.20					
NEMA 324/325TC	N32	12.91	2.125											5.50							5.50		
NEMA 364/365TC	N36	12.91	2.375											6.13							6.13		
NEMA 404/405TC	N40	12.91	2.875											7.50							7.50		
NEMA 444/445TC	N44	16.38	3.375											9.00							9.00		

TYPE	CODE	A	B	Gearbox Type with Motor Flange Type Length Variation															
				800				1000			1300			1800			2000		
				1	2	3	4	2	3	4	2	3	4	2	3	4	2	3	4
NEMA 143/145TC	N14	6.61	0.875				1.34									1.34			
NEMA 182/184TC	N18	8.98	1.007			1.97	1.97		1.97	1.97		1.97	1.97			1.97			1.97
NEMA 213/215TC	N21	8.98	1.375			4.59	4.59		4.59	4.59		4.59	4.59		4.59	4.59			4.59
NEMA 254/256TC	N25	8.98	1.625		4.59	4.59			4.59			4.59			4.59			4.59	4.59
NEMA 284/286TC	N28	10.91	1.875		5.20	5.20		5.20	5.20		5.20	5.20			5.20			5.20	
NEMA 324/325TC	N32	12.91	2.125		5.50			5.50			5.50			5.50				5.50	
NEMA 364/365TC	N36	12.91	2.375		6.13			6.13			6.13			6.13				6.13	
NEMA 404/405TC	N40	12.91	2.875	9.59	7.50			7.50			7.50			7.50			9.59		
NEMA 444/445TC	N44	16.38	3.375	11.08				9.00			9.00			9.00			11.08		

TYPE	CODE	A	B	Gearbox Type with Motor Flange Type Length Variation											
				3000			4000		6000		8000		10000		15000
				2	3	4	3	4	3	4	3	4	3	4	4
NEMA 143/145TC	N14	6.61	0.875												
NEMA 182/184TC	N18	8.98	1.007			1.97		1.97							
NEMA 213/215TC	N21	8.98	1.375			4.59		4.59		4.59		4.59			
NEMA 254/256TC	N25	8.98	1.625		4.59	4.59	4.59	4.59		4.59		4.59		4.59	
NEMA 284/286TC	N28	10.91	1.875		5.20	5.20	5.20	5.20		5.20		5.20		5.20	
NEMA 324/325TC	N32	12.91	2.125		5.50		5.50			5.50		5.50		5.50	
NEMA 364/365TC	N36	12.91	2.375		6.13		6.13				6.13		6.13		
NEMA 404/405TC	N40	12.91	2.875		7.50		7.50		9.59		7.50		7.50		9.59
NEMA 444/445TC	N44	16.38	3.375	11.08			9.00		11.08		11.08		11.08	9.00	11.08

MOTOR FLANGES INPUT ADAPTORS

Electric Motors



Right Angel Gearboxes

ΔY in inches

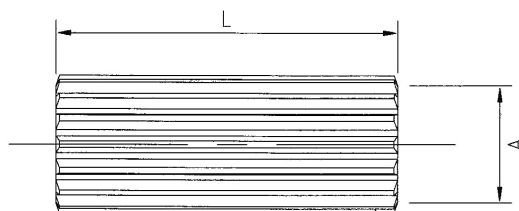
TYPE	CODE	A	B	Gearbox Type with Motor Flange Type Length Variation											
				300			500			800			1300		
				2	3	4	2	3	4	2	3	4	2	3	4
NEMA 56C	N56	6.61	0.625			1.34									
NEMA 143/145TC	N14	6.61	0.875			1.34			1.34						
NEMA 182/184TC	N18	8.98	1.007		1.97	1.97		1.97	1.97			1.97			1.97
NEMA 213/215TC	N21	8.98	1.375	4.59	4.59			4.59			4.59	4.59			4.59
NEMA 254/256TC	N25	8.98	1.625	4.59			4.59	4.59			4.59			4.59	4.59
NEMA 284/286TC	N28	10.91	1.875	5.20			5.20			5.20	5.20		5.20	5.20	
NEMA 324/325TC	N32	12.91	2.125				6.72			6.72			6.72		
NEMA 364/365TC	N36	12.91	2.375							7.35			7.35		
NEMA 404/405TC	N40	12.91	2.875							8.72			8.72		

Right Angel Gearboxes

ΔY in inches

TYPE	CODE	A	B	Gearbox Type with Motor Flange Type Length Variation											
				1800		2000		3000		4000		6000	8000	10000	
				3	4	3	4	3	4	3	4	4	4	4	
NEMA 143/145TC	N14	6.61	0.875		1.34		1.34								
NEMA 182/184TC	N18	8.98	1.007		1.97		1.97								
NEMA 213/215TC	N21	8.98	1.375		4.59		4.59		4.59		4.59				
NEMA 254/256TC	N25	8.98	1.625	4.59	4.59	4.59	4.59		4.59		4.59	4.59	4.59		
NEMA 284/286TC	N28	10.91	1.875	5.20		5.20		5.20	5.20	5.20	5.20	5.20	5.20	5.20	
NEMA 324/325TC	N32	12.91	2.125	6.72		6.72		6.72		6.72		6.72	6.72	6.72	
NEMA 364/365TC	N36	12.91	2.375					7.35		7.35			7.35	7.35	
NEMA 404/405TC	N40	12.91	2.875							8.72				8.72	

Splined Rods

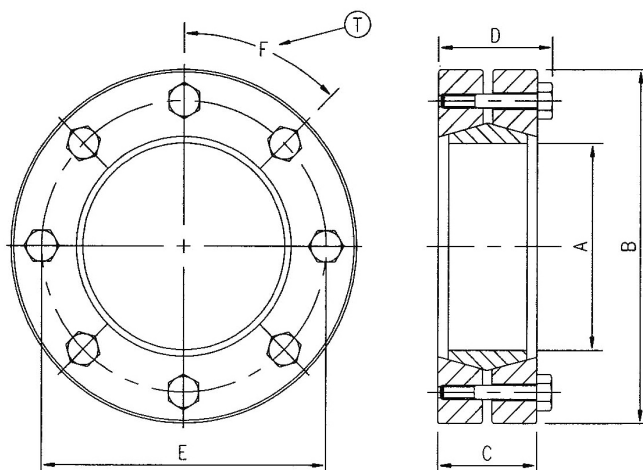


Mat. 18NiCrMo5 Annealed, to be case hardened

TYPE	RES SERIES	A*	L
KW 40	100/200	40 x 36 DIN 5482	9.06
KW 48	Universal Input	48 X 44 DIN 5482	9.06
KW 58	300/400/500	58 X 53 DIN 5482	9.06
KW 70	800	70 X 64 DIN 5482	9.06
KW 80	1000/1300/1800/2000	80 X 74 DIN 5482	9.06
KW10	3000/4000	100 X 94 DIN 5482	9.06
KW 12	6000	W120 X 3 DIN 5480	9.06
KW 15	8000	W150 X 5 DIN 5480	9.06
KW16	10000	W160 X 3 DIN 5480	11.81
KW20	15000	W200 X 5 DIN 5480	11.81

* measurements in metric

Shrink Discs



Tab. Maximum Transmissible Torque LB-FT

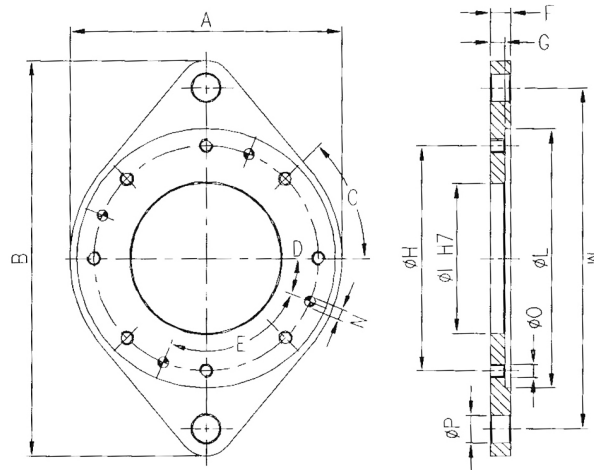
RES	100	200	300	400	500	800	1000	1300	1800	2000	3000	4000	6000	8000	10000	15000
LB-FT	998	998	3255	4702	5425	7812	11572	14466	14466	14466	32549	41228	56418	78117	106325	173592

TYPE	RES SERIES	A	B	C	D	E	F* (DIN 931-10.9)	T (LB-FT) Tightening Torque
S50	100/200	1.97	3.54	1.08	1.24	2.76	M6 - 8x45°	8.85
S100	300/400/500	3.94	6.69	1.73	1.95	4.88	M8 - 12x30°	22.13
S110	800	4.33	7.28	1.97	2.24	5.35	M10 - 9x40°	43.52
S125	1000/1300/1800/2000	4.92	8.46	2.56	2.87	6.30	M12 - 10x36°	73.76
S175	3000/4000	6.89	11.81	3.46	3.86	8.66	M16 - 10x36°	184.40
S185	6000	7.28	13.00	4.41	4.80	9.29	M16 - 14 Eq. Sp.	184.40
S200	8000	7.87	13.78	4.41	4.80	9.69	M16 - 15x24°	184.40
S220	10000	8.66	14.57	5.28	5.67	10.63	M16 - 20x15°	184.40
S260	15000	10.24	16.93	6.30	6.81	12.64	M20 - 18x20°	361.42

* measurements in metric

* measurements in metric

Torque Arms



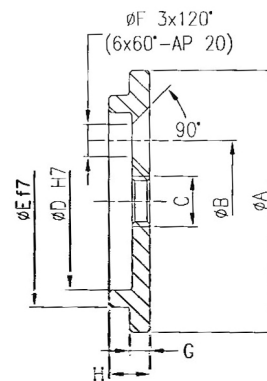
Mat. ST 37

TYPE	RES SERIES	A	B	C	D	E	F	G	H	I	L	M	N	O*	P
D130	100/200	7.87	11.42	8x45°	-	-	0.59	0.08	6.50	4.33	7.48	10.24	-	M10	0.83
D150	300/400/500	9.25	13.78	10x36°	-	-	0.79	0.08	7.68	5.91	8.86	11.81	-	M12	0.98
D180	800F	11.61	16.93	10x36°	-	-	0.79	0.08	10.24	9.06	11.22	14.17	-	M12	1.22
D18P	800FP	11.61	16.93	12x30°	-	-	0.79	0.08	9.84	7.87	11.22	14.17	-	M14	1.22
D210	1000/1300	13.39	19.68	10x36°	-	-	0.98	0.08	11.61	9.06	12.99	16.54	-	M16	1.46
D280	1800/2000	14.57	25.20	12x30°	15°	3x120°	1.18	0.08	12.36	10.94	14.09	22.05	0.47	M16	1.46
D400	3000/4000	17.32	35.24	18x20°	10°	3x120°	1.38	0.08	15.35	14.09	17.05	31.50	0.63	M16	1.69
D450	6000	18.50	39.37	18x20°	10°	3x120°	1.38	0.08	16.34	15.16	17.72	35.43	0.63	M16	1.69
D550	8000/10000	22.05	47.84	20x15°	0°	4x90°	1.57	0.08	19.80	18.11	21.54	43.31	0.79	M20	2.24
D750	15000	28.35	64.25	24x15°	22.5°	4x90°	1.97	0.12	25.00	22.05	27.56	59.06	0.98	M30	2.60

* measurements in metric

End Plates

For use with wheel flanges, splined bushings and pinions.

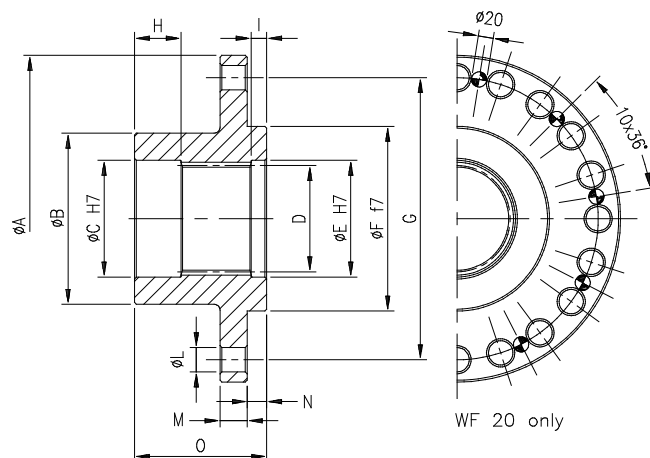


Mat. C45

TYPE	RES SERIES	A	B	C*	D	E	F	G	H
AP 40	100/200	2.05	0.94	M8	1.38	1.65	0.26	0.16	0.32
AP 58	100R/200R	2.76	1.26	M8	1.97	2.36	0.41	0.22	0.51
AP 58	300/400/500	2.76	1.26	M8	1.97	2.36	0.41	0.22	0.51
AP 58	300R/400R/500R	2.76	1.26	M8	1.97	2.36	0.41	0.22	0.51
AP 70	800R	3.11	1.58	M10	2.44	2.83	0.41	0.30	0.63
AP 80	1000/1300/1800/2000	3.62	1.77	M10	2.76	3.23	0.49	0.32	0.63
AP 100	1300R/1800R/2000R/3000	4.49	2.56	M10	3.35	4.13	0.57	0.39	0.79
AP 120	4000/6000	5.28	2.76	M12	3.94	4.80	0.65	0.39	0.79
AP 150	8000	6.46	2.76	M12	4.92	5.95	0.65	0.39	0.87
AP 170	10000	7.24	3.54	M12	5.71	6.73	0.65	0.47	0.93
AP 200	15000	8.90	5.51	M16	6.69	7.87	0.65	0.98	1.73

* measurements in metric

Wheel Flanges

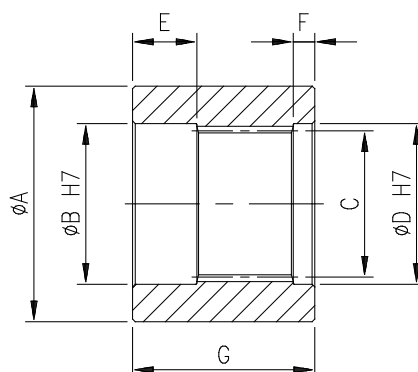


Mat. 39NiCrMo3/42CrMo4 - tempered

TYPE	RES SERIES	A	B	C	D*	E	F	G	H	I	L	M	N	O
WF 40	100/200	5.79	2.36	1.65	40x36 DIN5482	1.65	2.36	4.92	0.79	0.24	10.5 - 6x60°	0.39	0.31	2.16
WF 58	100R/200R/300/400/500	6.50	3.46	2.36	58x53 DIN5482	2.36	3.74	5.71	0.94	0.32	12.5 - 12x30°	0.55	0.39	2.68
WF5R	300R/400R/500R	6.50	3.46	2.36	58x53 DIN5482	2.36	3.74	5.71	0.94	0.32	12.5 - 12x30°	0.55	0.39	3.15
WF 70	800R	8.19	4.72	2.83	70x64 DIN5482	2.84	4.92	6.89	1.18	0.43	19 - 12x30°	0.79	0.55	3.54
WF80	1000/1300/1800/2000	8.19	4.72	3.35	80x74 DIN5482	3.23	4.92	6.89	1.18	0.43	19 - 12x30°	0.79	0.55	3.54
WF 10	1300R/1800R/2000R/3000	10.00	5.71	4.13	100x94 DIN5482	4.13	6.69	8.35	1.30	0.47	21 - 12x30°	0.94	0.79	4.33
WF 12	4000/6000	12.16	7.13	4.80	N120x3 DIN5480	4.80	7.87	10.24	1.30	0.43	25 - 12x30°	1.22	0.75	5.12
WF 15	8000	15.12	8.66	5.94	N150x5 DIN5480	5.94	8.66	12.60	1.22	0.51	32 - 12x30°	1.22	0.75	5.91
WF 17	10000	15.91	9.45	6.73	N170x3 DIN5480	6.73	9.45	13.39	1.50	0.51	32 - 16x22.5°	1.42	0.75	6.69
WF 20	15000	19.69	11.81	7.87	N200x5 DIN5480	7.87	11.81	17.32	2.05	0.79	32 - 12x30°	1.97	1.57	7.87

* measurements in metric

Splined Bushings

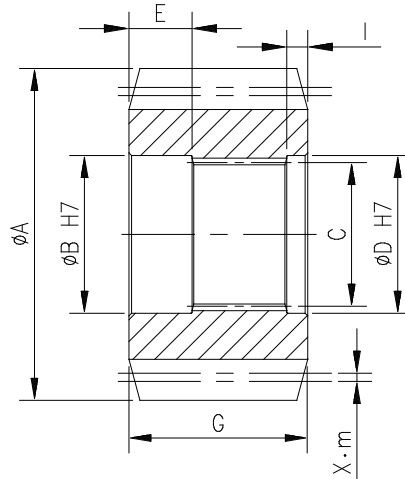


Mat/ ST 52.3 Available in case hardened steel on request

TYPE	RES SERIES	A	B	C*	D	E	F	G
ZN 40	100/200	2.36	1.65	40 x 36 DIN 5482	1.65	0.79	0.24	2.16
ZN 58	100R/200R/300/400/500	3.07	2.36	48 x 44 DIN 5482	2.36	0.94	0.32	2.68
ZN 5R	300R/400R/500R	3.07	2.36	58 x 53 DIN 5482	2.36	0.94	0.32	3.15
ZN 70	800R	3.74	2.84	70 x 64 DIN 5482	2.84	1.18	0.43	3.54
ZN 80	1000/1300/1800/2000	4.25	3.23	80 x 74 DIN 5482	3.23	1.18	0.43	3.54
ZN 10	1300R/1800R/2000R/3000	5.35	4.13	100 x 94 DIN 5482	4.13	1.30	0.47	4.33
ZN 12	4000/6000	6.30	4.80	W120 x 3 DIN 5480	4.80	1.30	0.43	5.12
ZN 15	8000	7.87	5.95	W150 x 5 DIN 5480	5.95	1.22	0.51	5.91
ZN 17	10000	8.66	6.73	W160 x 3 DIN 5480	6.73	1.22	0.51	6.69
ZN 20	15000	11.02	7.87	W200 x 5 DIN 5480	7.87	1.22	0.79	7.87

* measurements in metric

Pinions



Other types available on request

Mat. 39NiCrMo3/42CrMo4 - tempered

TYPE	RES SERIES		Tooth #	X - m	A	B	C*	D	E	F	G
RNE	300/400/500	6	14	0.12	4.00	2.36	58x53 DIN5482	2.36	0.94	0.32	2.68
RNF	300/400/500		15	0.12	4.23	2.36	58x53 DIN5482	2.36	0.94	0.32	2.68
RNG	300/400/500		16	0.12	4.47	2.36	58x53 DIN5482	2.36	0.94	0.32	2.68
RNI	300/400/500		18	0.12	4.94	2.36	58x53 DIN5482	2.36	0.94	0.32	2.68
RNL	300/400/500		20	0.12	5.41	2.36	58x53 DIN5482	2.36	0.94	0.32	2.68
RNM	300/400/500		21	0.12	5.65	2.36	58x53 DIN5482	2.36	0.94	0.32	2.68
RPD	300/400/500	8	13	0.16	5.02	2.36	58x53 DIN5482	2.36	0.94	0.32	2.68
RPD	300R/400R/500R		13	0.16	5.02	2.36	58x53 DIN5482	2.36	0.94	0.32	3.15
RPF	300/400/500		15	0.16	5.63	2.36	58x53 DIN5482	2.36	0.94	0.32	2.68
RPF	300R/400R/500R		15	0.16	5.63	2.36	58x53 DIN5482	2.36	0.94	0.32	3.15
RPG	300/400/500		16	0.16	5.94	2.36	58x53 DIN5482	2.36	0.94	0.32	2.68
RPN	300R/400R/500R		22	0.16	7.85	2.36	58x53 DIN5482	2.36	0.94	0.32	3.15
RRB	300R/400R/500R	10	11	0.20	5.47	2.36	58x53 DIN5482	2.36	0.94	0.32	3.15
RRB	800R		11	0.20	5.47	2.83	70x64 DIN5482	2.83	1.18	0.43	3.54
RRC	800R		12	0.20	5.87	2.83	70x64 DIN5482	2.83	1.18	0.43	3.54
RRD	300R/400R/500R		13	0.20	6.26	2.36	58x53 DIN5482	2.36	0.94	0.32	3.15
RRD	800R		13	0.20	6.26	2.83	70x64 DIN5482	2.83	1.18	0.43	3.54
RRD	1000/1300/1800/2000		13	0.20	6.26	3.35	80x74 DIN5482	3.35	1.18	0.43	3.54
RRE	1000/1300/1800/2000		14	0.20	6.65	3.35	80x74 DIN5482	3.35	1.18	0.43	3.54
RRG	800R		16	0.20	7.44	2.83	70x64 DIN5482	2.83	1.18	0.43	3.54
RRG	1000/1300/1800/2000		16	0.20	7.44	3.35	80x74 DIN5482	3.35	1.18	0.43	3.54
RRH	800R		17	0.20	7.83	2.83	70x64 DIN5482	2.83	1.18	0.32	3.54
RRH	1000/1300/1800/2000		17	0.20	7.83	3.35	80x74 DIN5482	3.35	1.18	0.43	3.54
RRL	800R		20	0.20	9.02	2.83	70x64 DIN5482	2.83	1.18	0.43	3.54
RTB	800R	12	11	0.24	6.57	2.83	70x64 DIN5482	2.83	1.18	0.43	3.54
RTB	1000/1300/1800/2000		11	0.24	6.57	3.35	80x74 DIN5482	3.35	1.18	0.43	3.54
RTC	800R		12	0.24	7.05	2.83	70x64 DIN5482	2.83	1.18	0.43	3.54
RTD	800R		13	0.24	7.52	2.83	70x64 DIN5482	2.83	1.18	0.43	3.54
RTD	1000/1300/1800/2000		13	0.24	7.52	3.35	80x74 DIN5482	3.35	1.18	0.43	3.54
RVA	1300R/1800R/2000R/3000	14	10	0.32	8.11	4.13	100x94 DIN5482	4.13	1.30	0.87	4.72
RVC	1300R/1800R/2000R/3000		12	0.32	9.45	4.13	100x94 DIN5482	4.13	1.30	0.87	4.72

* measurements in metric

In order to guarantee trouble-free operation, it is important to follow some basic principles:

The frame or structure accepting the gearbox must be rigid and of sufficient thickness

The mating surfaces have to be machined, making sure the bearing surface is concentric and perpendicular to gearbox's axis. The bore accepting the gearcase pilot must be machined and toleranced to an H8 metric tolerance. Gears with internal splined output shafts cannot bear any shaft loads and require high accuracy regarding the perpendicularity and concentricity between bearing axis and driven shaft. The driven shaft must be self supported and has to be carefully aligned with the gearbox axis.

For mounting the unit, use bolts of at least 8.8 quality. Tighten with torque wrench to 80% of bolt yield strength. If the unit has to transmit very high torque or if there are inversions or shocks, then use bolts of 10.9 or 12.9 quality tightening to 80% of yield strength. Always use all bolt holes on the flange. Gearboxes with sizes 1800 to 15000 has to be pinned in addition. The required spiral elastic pins are delivered with the unit. These gears have two (2) pilots and both must be used if the shaft load exceeds 50% of admissible load.

The mounting position should guarantee free access to the plugs in order to facilitate oil level checking and oil replacement, see Tab. 2 on page 50. In case of vertical mounting, extension tubes and compensating reservoirs may be needed. See diagrams on following page.

If the unit is driven by belt, chain or coupling, then align carefully.

Shaft seals and breather plugs must not be painted.

Moving parts, such as input and output shafts, pinions, couplings, vee-belts, etc. have to be protected by the customer in a suitable manner and in compliance with all applicable safety rules and regulations. FGP shall not be liable for any damages to persons or things due to lack of observance of these guidelines.

The mounting positions O and P, as well as position D for gearboxes with brake, must be specified when ordering. Refer to Tab. 2 on page 50 for mounting positions.

SETTING IN MOTION

The gearboxes should be started up, if possible, without load and at low speed. If there are no problems, for example, vibrations or excessive noise, the gearbox can be run up to the normal load conditions. Check for oil leaks and oil level after trial run.

The reducers are delivered without oil. Before starting up, the gearcase must be filled with EP-oil. For standard application use viscosity grade 150 (according to ISO). Tab 1 on the following page shows suitable lubricants for a wide range of ambient temperature.

The proper oil level has to be checked with the level plug. For plug and mounting positions, refer to tab. 2 on page 50.

The required oil quantity depends on reduction ratio and the input flange. The quantity necessary for various mounting positions can be gathered from the certificate accompanying the gearbox. It is important that the replacement of the lubricant is carried out according to the changing intervals as described.

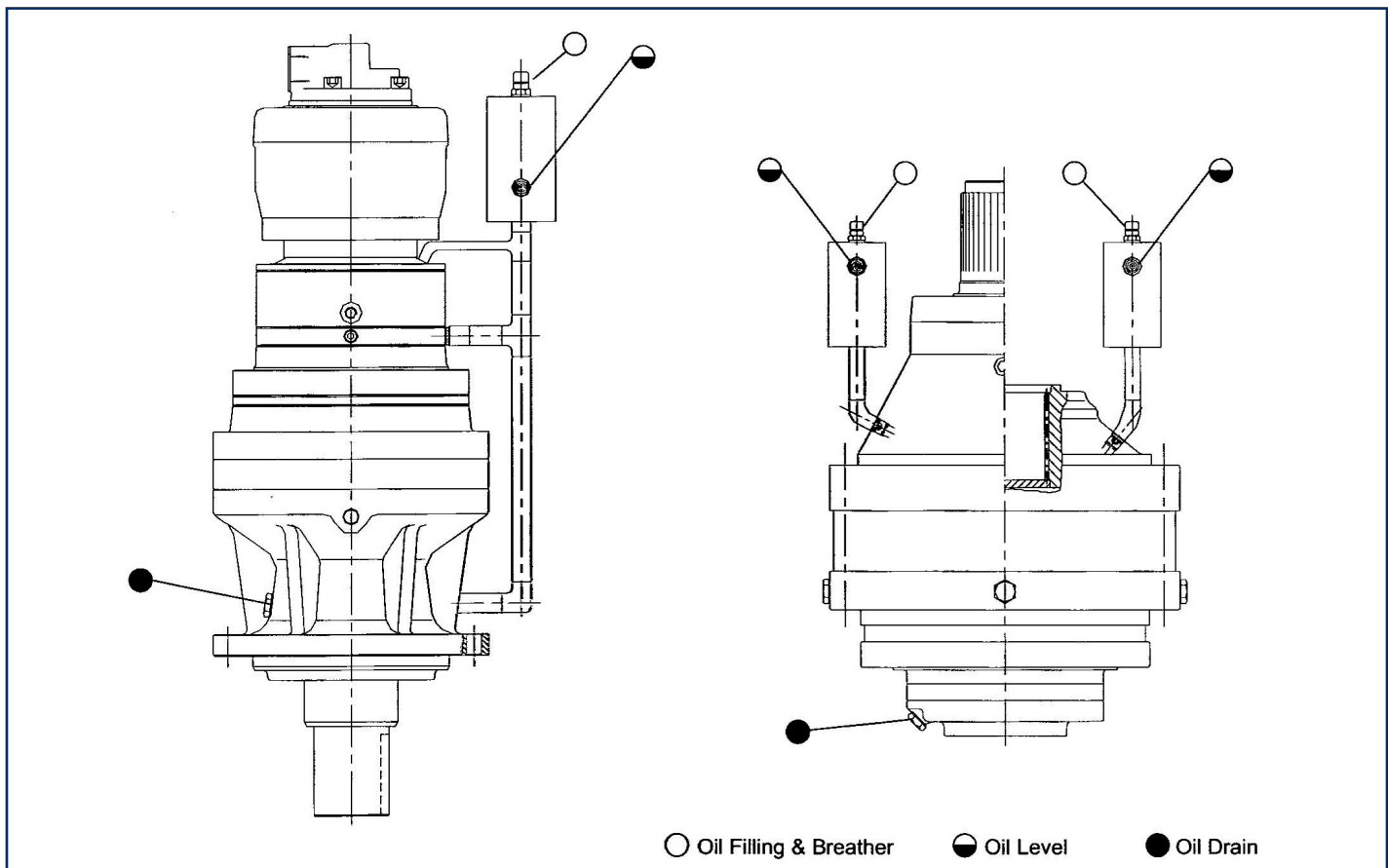
The oil temperature must not exceed 90°C. For continuous duty applications an oil cooling system must be installed if the transmitted power exceeds the thermal power limit - refer to page 6, fig. 2 and page 7, tab 3, 4, & 5. Contact the Technical Departments for information.

MAINTENANCE

The only necessary actions to be taken are to replace the lubricant and to check the oil level. If necessary, fill up with the same type of oil which is in the gearcase. Check for oil leaks.

The first oil replacement is required after 100 running hours and every 2500 running hours thereafter, this must be preformed at least once a year. If synthetic oils are used, changing intervals may be different. Contact Technincal Department for details.

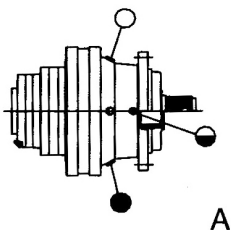
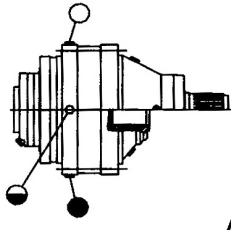
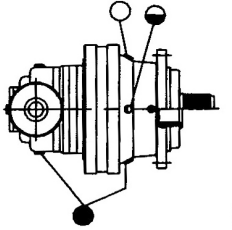
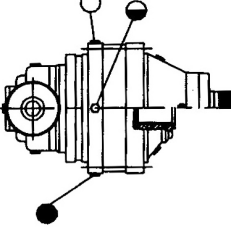
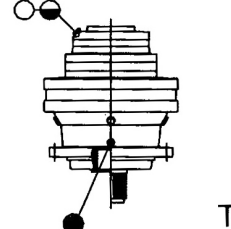
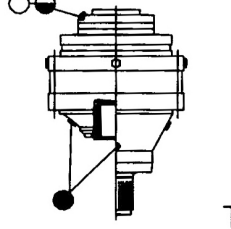
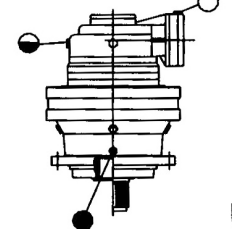
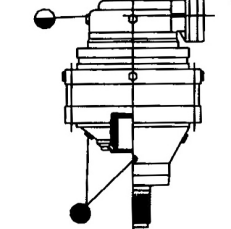
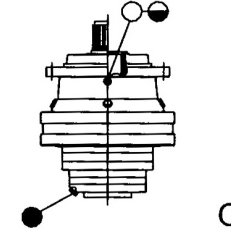
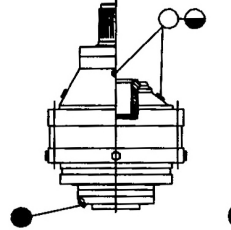
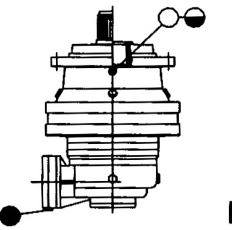
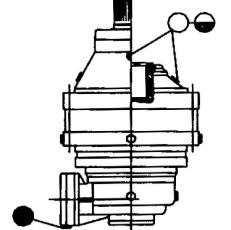
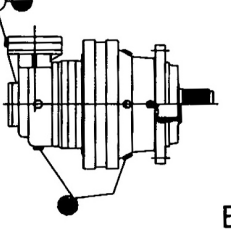
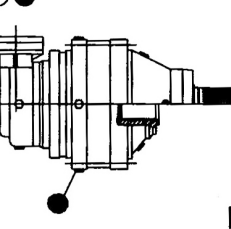
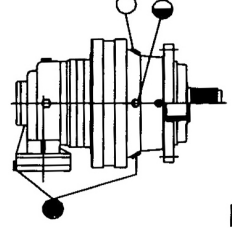
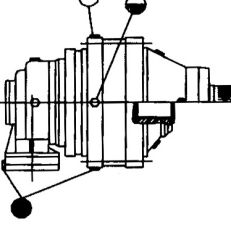
To avoid depositis, we recommened replacing the lubricant when hot. Please wear protective apparel (gloves, goggles, etc.) when changing the lubricant. The surface of the gearbox and the oil could be very hot. Please protect the environment and obey all applicable rules and laws in your area.



Tab. 1 Lubricants

AMBIENT TEMP.		-20°C...+5°	+5°C...+40°	+30°C...+65°	+45°C...+70°
VISCOSITY	°E/50°C	7.3	10.8...12.5	15...18	22...26
	ISO VG	100	150	220	320
AGIP		BLASIA 100	BLASIA 150	BLASIA 220	BLASIA 320
BP		ENERGOL GR-HP 100	ENERGOL GR-HP 150	ENERGOL GR-HP 220	ENERGOL GR-HP 320
CASTROL		ALPHA SP 100	ALPHA SP 150	ALPHA SP 220	ALPHA SP 320
CHEVRON		NL GEAR COMPOUND 100	NL GEAR COMPOUND 150	NL GEAR COMPOUND 220	NL GEAR COMPOUND 320
ELF		REDUCTELF SP 100	REDUCTELF SP 150	REDUCTELF SP 220	REDUCTELF SP 320
ESSO		SPARTAN EP 100	SPARTAN EP 150	SPARTAN EP 220	SPARTAN EP 320
FINA		GIRAN 100	GIRAN 150	GIRAN 220	GIRAN 320
IP		MELLANA 100	MELLANA 150	MELLANA 220	MELLANA 320
MOBIL		-	MOBILEGEAR 629	MOBILEGEAR 630	MOBILEGEAR 632
SHELL		AMALA EP 100	AMALA EP 150	AMALA EP 220	AMALA EP 320
TOTAL		CARTER EP 100	CARTER EP 150	CARTER EP 220	CARTER EP 320

Tab. 2 Plug Positions

	IN LINE GEARBOXES		RIGHT ANGLE GEARBOXES	
	RES 100...RES 1300	RES 2000...RES 8000	RES 300...RES 1300	RES 2000...RES 8000
HORIZONTAL	 A	 A	 C	 C
VERTICAL	 T	 T	 U	 U
	 O	 O	 P	 P
HORIZONTAL	 B	 B	 D	 D

○ Oil Filling & Breather ◐ Oil Level ● Oil Drain

Oil Quantity (Qts.)

GEARBOXES		IN LINE - EXT.			IN LINE - INT.			RIGHT ANGLE - EXT			RIGHT ANGLE - INT		
		Pos. A	Pos. O	Pos. T	Pos. A	Pos. O	Pos. T	Pos. B	Pos. P	Pos. U	Pos. B	Pos. P	Pos. U
100/100R 200/200R	1	0.5	1	1	0.5	1	1	N/A			N/A		
	2	1	2	1.5	1	2	1.5						
	3	1.5	2.5	2	1.5	2.5	2						
	4	2	3	2.5	2	3	2.5						
300/400/500	1	1	2	1.5	1	2	1.5						
	2	1.5	3	2.5	1.5	3	2.5	3.5	7	5.5	3.5	7	5.5
	3	2	3.5	3	2	3.5	3	4	7.5	6	4	7.5	6
	4	2.5	4	3.5	2.5	4	3.5	5.5	8	6.5	5.5	8	6.5
300R/400R 500R	1	1	2	2	1	2	2						
	2	1.5	3	2.5	1.5	3	2.5	3.5	7	5.5	3.5	7	5.5
	3	2	3.5	3.5	2	3.5	3.5	4	7.5	6	4	7.5	6
	4	2.5	4	4	2.4	4	4	5.5	8	6.5	5.5	8	6.5
800R	1	2	3	3.5	2	3	3.5						
	2	3	4	4	3	4	4	7	8	8	7	8	8
	3	3.5	4.5	4.5	3.5	4.5	4.5	5	9.5	9.5	5	9.5	9.5
	4	4	5	5	4	5	5	6	9.5	9.5	6	9.5	9.5
1000 1300/1300R	1	3	4.5	4	3	4.5	4						
	2	4	6	5	4	6	5	7	11	10.5	7	11	10.5
	3	5	9	7	5	9	7	8	13	11.5	8	13	11.5
	4	5.5	9.5	7.5	5.5	9.5	7.5	8.5	13.5	12	8.5	13.5	12
1800/1800R 2000/2000R	1	3	5	4	2.6	4.6	3.6						
	2	4	7	5	3.6	6.5	4.6	7	13	10	6	12	9
	3	5	8.5	7	4.6	8	6.5	8	14	11	7	13	10
	4	5.5	9	7.5	5	8.5	7	8.5	14.5	11.5	8	14	11
3000/4000	1	4.5	8	7	4	7.5	6.5						
	2	6	11	9	5.5	10	8.5	14	26	23	12	25	24
	3	9	16	14	7	13	11	9	18	14	8	16.5	12.5
	4	9.5	16.5	14.5	7.5	13.5	11.5	11	16	22	10	20.5	14.5
6000	1	5.5	10	8	4.5	9	7						
	2	7.5	14	10	6.5	13	9	9	18	13	8	17	12
	3	9	16	14	8	16	13	11	22	16	9.5	20	14
	4	10	17	15	9	17	14	13	25	18	11.5	23	16
8000/10000	1	8	15	12	6.5	13	10						
	2	9	17	14	7.5	15	12	12	21	17	10.5	19	15
	3	11	20	17	9.5	18	15	17	32	29	15	30	27
	4	12	21	18	10.5	19	16	14	27	20	12	25	18
15000	1	20	35	30	20	35	30						
	2	25	40	33	25	40	33	27	44	36	27	44	36
	3	28	45	38	28	45	38	33	55	48	33	55	48
	4	30	47	40	30	47	40	33	55	45	33	55	45



APPLICATION WORKSHEET

CUSTOMER _____

CONTACT _____ PHONE _____ FAX _____

ADDRESS _____

TYPE OF MACHINE _____ INPUT DRIVE _____

FUNCTION _____ SERVICE FACTOR (SF) _____

ESTIMATED ANNUAL PRODUCTION _____

MAX. TORQUE REQUIRED OUT OF GEARBOX (FT/LB) _____ X SF = _____

MAX. OUTPUT RPM OF GEARBOX _____ INPUT RPM _____

CONTINUOUS TORQUE REQUIRED OUT OF GEARBOX (FT/LB) _____

BRAKE TORQUE REQUIRED _____

WORK CYCLE								
	Time Min-Sec	Torque Ft/Lb	Speed RPM	Power HP	Radial Load Distance From Flange	Work Time		
						HR/YEAR		YEARS
1								
2						Install Power:		Hp
3						Bearing Life:		Hours
4								

> PINION GEAR OR SPROCKET DRIVE:

PITCH DIAMETER _____ PRESSURE ANGLE _____

GEAR PITCH _____

LOCATION OF PINION OR SPROCKET CENTER LINE FROM MOUNTING SURFACE _____

> HYDRAULIC MOTOR INPUT:

MOTOR DISPLACEMENT (IN³/REV) _____ RPM _____

CONTINUOUS WORKING PRESSURE (PSI) _____

MAXIMUM PRESSURE (PSI) _____

NOTES: _____
