



HRO(F), HRA, HRB, HRC

Helical Gear Reducers

Design

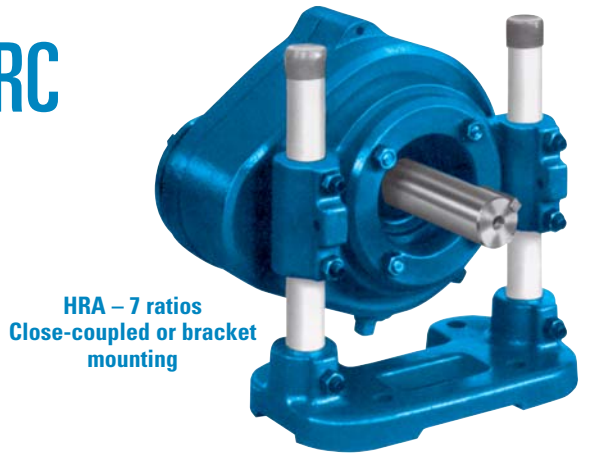
Blackmer helical gear reducers are designed for use with 1750, 1150, 1450 and 950 rpm motors up to 30 hp. A full range of standard reduction ratios are available from 2.24:1 to 9.08:1 to provide standard operation speeds for Blackmer pumps as well as other brands of positive displacement pumps.

Blackmer gear reducers are rated in accordance with practices of ANSI/AGMA 6010. They are manufactured in four sizes (HRO[F], HRA, HRB, and HRC) to accommodate a variety of pump speeds for low to high-viscosity transfer applications.

Gear reducers are available in either close-coupled, head-mounted configuration for Blackmer GX pump models (allowing reducer's shaft height to swivel easily into alignment with driver), fixed bracket mounted (HROF), or adjustable bracket mounted versions (HRA, HRB, and HRC) for fast, accurate alignment of pumps/reducers and prime movers.

Benefit

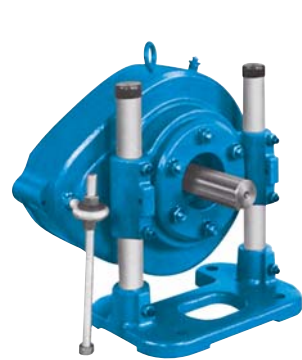
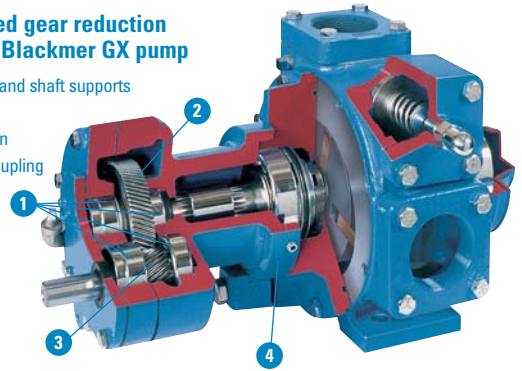
Blackmer gear reducers are constructed on hardened, heat-treated, precision helical gears and pinions to provide years of trouble-free operation. For smooth, quiet running, the gears and pinions are immersed in oil while shafts are supported at both ends by large ball bearings for added strength and reliability.



HRA - 7 ratios
Close-coupled or bracket mounting

Close-coupled gear reduction mounting with Blackmer GX pump

1. Ball bearing gear and shaft supports
2. Heat treated gear
3. Heat treated pinion
4. Spool for close coupling



HRB - 6 ratios
Close-coupled or bracket mountings



HRC - 3 ratios
Bracket mountings



XL3-HR drive



HROF - 5 ratios
Closed coupled or bracket mounting



Gearbox Selection Data

Gearbox	Spool Info	Reduction Ratio	60 Hz Motors								50 Hz Motors							
			1,750 RPM				1,150 RPM				1,450 RPM				960 RPM			
			Approx. Pump RPM	H.P. Rating*			Approx. Pump RPM	H.P. Rating*			Approx. Pump RPM	H.P. Rating*			Approx. Pump RPM	H.P. Rating*		
3 Hr. Duty	3-8 Hr. Duty	8-24 Hr. Duty		3 Hr. Duty	3-8 Hr. Duty	8-24 Hr. Duty		3 Hr. Duty	3-8 Hr. Duty	8-24 Hr. Duty		3 Hr. Duty	3-8 Hr. Duty	8-24 Hr. Duty				
HRO(F)	GX2 GX2.5	2.24	780	9.3	8.3	6.6	510	6.8	5.4	4.3	650	8.6	6.9	5.5	420	5.6	4.5	3.6
HRO(F)		2.72	640	7.8	7.1	5.7	420	5.8	4.7	3.7	520	7.3	5.9	4.7	350	4.8	3.8	3.1
HRO(F)		3.32	520	6.9	5.7	4.6	350	4.7	3.8	3.0	420	5.9	4.7	3.8	280	3.9	3.1	2.5
HRO(F)		4.10	420	5.4	4.3	3.5	280	3.6	2.9	2.3	250	4.5	3.6	2.9	230	2.9	2.4	1.9
HRO(F)		4.94	350	4.1	3.3	2.6	230	2.7	2.2	1.7	280	3.4	2.7	2.2	190	2.2	1.8	1.4
HRA	GX3	2.24	780	30.0	30.0	25.0	520	27.6	22.1	17.7	640	30.0	27.8	22.2	420	22.8	18.3	14.6
HRA		2.76	640	25.0	25.0	19.9	420	20.5	16.4	13.1	520	25.7	20.6	16.5	350	16.9	13.5	10.8
HRA		3.40	520	24.3	19.4	15.5	340	16.4	13.1	10.5	420	20.1	16.1	13.3	280	13.6	10.9	8.7
HRA		4.19	420	17.8	14.3	11.4	280	12.1	9.7	7.7	350	14.8	11.9	9.7	230	10.0	8.0	6.4
HRA		5.06	350	14.4	11.5	9.2	230	10.2	8.2	6.5	290	12.9	10.3	8.3	190	8.4	6.8	5.4
HRA		6.27	280	10.6	8.5	7.3	190	7.5	6.0	4.8	230	9.4	7.5	6.0	155	6.2	4.9	4.0
HRA		7.65	230	8.0	6.9	5.5	150	5.7	4.5	3.6	190	7.1	5.7	4.6	125	4.7	3.7	3.0
HRB	GX4	2.70	640	30.0	30.0	30.0	420	30.0	27.5	22.0	530	30.0	30.0	27.7	355	28.4	22.7	18.1
HRB		3.52	500	30.0	30.0	26.6	330	27.3	21.8	17.5	410	30.0	27.5	22.0	270	22.5	18.0	14.4
HRB		4.36	400	30.0	25.4	20.3	260	20.9	16.7	13.4	330	26.3	21.1	16.8	220	17.2	13.8	11.0
HRB		5.77	300	22.4	17.9	14.3	200	14.7	11.8	9.4	250	18.6	14.8	11.9	160	12.2	9.7	7.8
HRB		7.71	230	15.9	12.7	10.2	150	10.5	8.4	6.7	190	13.2	10.6	8.5	125	8.7	6.9	5.5
HRB		9.18	190	10.9	8.7	7.0	125	7.2	5.7	4.6	160	9.0	7.2	5.8	105	5.9	4.7	3.8
HRC	NA	5.69	300	30.0	30.0	24.5	200	22.1	22.0	17.6	250	25.0	25.0	22.2	165	20.1	18.2	14.5
HRC		7.70	230	25.0	25.0	18.9	150	20.1	17.3	13.9	190	20.8	20.8	17.5	125	17.9	14.3	11.5
HRC		9.08	190	23.1	18.5	15.1	125	15.5	12.4	9.9	155	19.3	15.7	12.5	100	12.8	10.3	8.2

* Rated in accordance with practices of ANSI/AGMA 6010.

The following assumptions apply to the rating tables above:

- Ratings calculated at sea level elevation. Increased elevations will decrease HP ratings.
- Multiply rated HP by 0.67 for single cylinder engines and by 0.80 for multi-cylinder engines.
- Calculations are based on 75°F (24°C) ambient air temperature; **200°F (93°C) max oil temperature using 100% synthetic oil compatible with Buna elastomers. Use synthetic oil AGMA 4 or VG 150 such as Mobil SHC 629, Shell Omala 150 HD, Castrol Isolube EP 150 or equivalent.**
- For applications with air temperature other than 75°F (24°C), multiply the 8-24 Hr Duty limit by the following:

Ambient	Multiplier	Ambient	Multiplier
50°F (10°C)	1.15	100°F (38°C)	0.83
65°F (18°C)	1.07	110°F (43°C)	0.75
85°F (29°C)	0.93	120°F (49°C)	0.67

NOTE: Reducers are shipped from the factory without lubricant. Customer must provide lubricant.

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