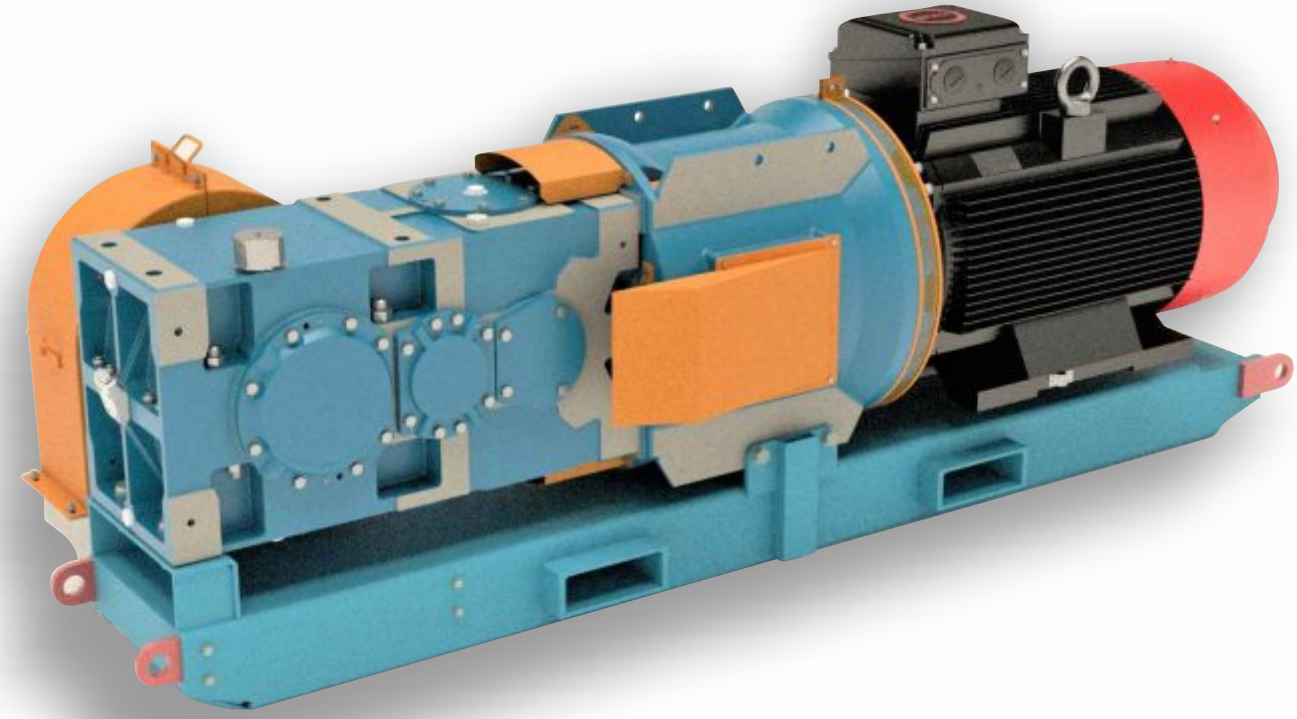
BMG



Hansen® industrial gearboxes

Sumitomo Drive Technologies

HANSEN TRANSMISSION (I4)

Product Overview

BEE 4
EMPOWERING SUPPLIER

ISO 9001	Certified
ISO 14001	Certified
ISO 45001	Certified

ABOUT US

Established in 1974 as a single bearing shop in Durban, South Africa; BMG's aggressive growth strategy has included acquisitions, supplemented by a steady organic growth discipline. BMG attracts best-of-breed talent resulting in technical expertise that differentiates BMG in the industry. Staff are truly part of the BMG family and its success.

BMG boasts an accredited in-house technical and commercial training academy which fosters a culture of staff development and career advancement; it's all about sustainability.

The net result, is a company that reliably supplies and supports 70 000 customers in 15 countries with the widest range of industrial engineered products and expert services in Africa via 105 branches.

BMG is positioned to deliver bespoke 360 degree solutions to its customers, and subsequently return on investment to its investors and shareholders. BMG plays a pivotal role in supporting the productivity and production targets of all Industrial, Manufacturing, Mining and Agricultural sectors of the economies in the countries it serves. With an enviable reputation as Africa's largest distributor, manufacturer and service provider of the highest quality engineering consumables and components; including

- Bearings & Seals
- Power Transmission Components
- Drives, Motors and Controllers
- Hydraulics, Pneumatics and Filtration
- Heavy and Light Duty Materials Handling
- Valves and Lubrication
- Fasteners, Gaskets and Tools

BMG is a level 4 BEE contributor with ISO 9001 Quality Assurance certification. Health and safety of its employees and customers is a paramount focus and the company adheres to ISO 45001. BMG is also committed to environmental care and sustainability and strictly follows the ISO 14001 charter.

As a key contributor to the Invicta Holdings stable, BMG has played a major part in Invicta's unique achievement of being rated in South Africa's Top 100 Companies for 21 consecutive years.

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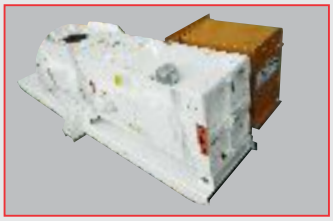
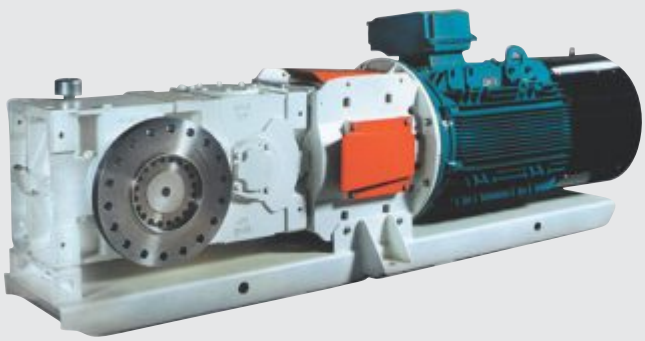
FEATURES AND BENEFITS



Benefits

Fitness for Use, Installation, Service and Maintenance	
Features	**Benefits**
The invertability allows for a right or left hand speed shaft.	Eliminates the use of a double extended, low speed shaft and reduces the cost for spare units where dual handling is required.
The drive unit self-aligns from the rigid coupling to the gearbox, and from the lantern housing to the motor.	Easy installation and maintenance of the drive unit components.
The drive unit is compact, robust and rigid.	Strong, reliable and long lasting for arduous conditions.
Standard internal gears are used, for example, the P4 range of standard gears.	All standard gear components are available worldwide.
The housing has a large surface area.	Allows for good heat transfer and easy gearbox cooling.
Labyrinth seals are available for low and high speed shafts.	Prevents the ingress of dirt and moisture, and protects the lip seal.
The housing and bearing construction are designed to take overhung loads.	The gear unit supports the complete drive load.
The housings have a horizontal split.	Easy to open for inspection and on-the-spot service.
The inspection covers are easy to remove.	Quick and easy inspection without oil drainage.
Identical two and three stage housings are used for the top and the bottom.	Reduces costs and improves availability.
Drive units can be mounted onto a skid plate.	Allows for easy transportation on site.

Power and Reliability	
Features	**Benefits**
Rigid, standardized pinion shafts and housings.	Better lateral load distribution, lower noise and vibration levels.
Full-scale application of: • High torque geometry in low speed gear sets. • Low noise geometry in high speed gear sets. • Profile-controlled gas carburising. • Protuberance hobbing of helicals and root filled grinding of bevels. • Precision grinding with sophisticated tooth contact analysis.	• Better strength/surface durability rating balance. • Lower noise and vibration levels. • Optimal load capacity. • Improved tooth strength. • Optimal transverse and lateral load distribution, lower noise and vibration levels.
Assured oil circulation through the bearings.	Long, trouble-free working life solution.
Product Range Consists of Two Models:	
D C R▶▶23Q L H	D C R▶▶33Q L H



The Gear Unit

The invertible Hansen unit is available in a horizontal right angle, two or three stage configuration.

The Invertible gear unit alleviates the past requirement of separate drives for the left and right hand orientation of the gearbox drives on multiple drive conveyors. This innovative gearbox can be inverted for either left or right handed handling. As a result the reduction in the number of the spare gearboxes held in stock for possible breakdowns leads to significant cost and space savings.

Coding

R 1 2 3 3 Q 4 - 5 6 7 - 8

1: Low Speed Shaft Type

D: Centerline split gear unit, solid low speed shaft.
L: Centerline split gear unit, hollow low speed shaft.

2: Gearbox Size

C: Size 'C' Hansen I4 gearbox
↕
H: Size 'H' Hansen I4 gearbox

3: Number of Stages

2: Two stage gearing
3: Three stage gearing

4: Additional Executions

·: No lantern
K: Lantern

5: High Speed Shaft Extension

C: Right angle
K: Inverted right angle (inverted internals)

6: Low speed Shaft Extension

L: Low speed - left
R: Low speed - right
T: Low speed with two extensions

7: Low Speed Shaft Type

N: Standard solid shaft
D: Hollow shaft for shrink disc connection
K: Hollow shaft for keyway connection

8: Ratio

XYZ: Ratio $6.3 \leq I \leq 20$ (2 stage), $20 \leq I \leq 90$ (3 stage)

Basic Components

Helical and spiral bevel gears are designed and rated:

- Based on AGMA, ISO and long term field experience.
- For maximum load capacity, minimum loss and quiet operation.

The rating tables in this brochure show the mechanical power ratings 'P' expressed in kW, i.e. the power in which the gear unit can transmit 10h/day, at uniform load, whereby 5 peak torques up to 200% of the nominal torque and lasting not more than 5 seconds each, are allowed.

The mechanical power ratings shown in the tables relate respective to input speeds of 1800, 1500, 1200, 1000, 900 and 750 RPM at the high speed shaft. They are also valid for full speeds which are 3% lower than the power rating and is linier to the speed. Interpolation will yield power rating values for intermediate speeds. The power rating for speeds lower than 750 RPM is based on a continuous torque rating of that speed. For input speeds exceeding 1800 RPM, please contact BMG. All geared components are manufactured from alloy steel, gas carburized, hardened and ground. The same applies to all intermediate and high speed shafts which are generally designed as pinion shafts.

Low Speed Shafts

Standard lengths of solid and hollow shafts are shown. The diameter, length and keyway can be changed to suit the application.

Bearings

Heavy-duty roller bearings (tapered, cylindrical or spherical). The bearing life is calculated in compliance with AGMA, ISO and renowned bearing manufacturers.

Housing, Bearing Housings and Covers

Made from grey pearlitic Cast Iron. Designed to ensure strength and rigidity, machined to stringent specifications.

Systems

Lubrication

Mineral oils are used. Lubricants should always contain adequate EP-additives (refer to the Service Manual). Splash lubrication is standard and the gear unit housing acts as a large oil sump.

Sealing

Static: In general sealing compound is used.
Rotary: All shafts have a dust lip oil seal. Grease purged labyrinth seals are optional.

Cooling

Heat generated in the gear unit while running can be dissipated by:

- Natural cooling through the housing.
- Fan cooling.

One standard fan may be mounted on to the high speed shaft. Free air entry at the fan suction side should be guaranteed.

Accessories

Motor Lantern

To suit IEC flange motors and to accommodate both flexible and hyrodynamic (fluid) couplings.

Base-Plates

Floor mount, swing base and skid plate.

Torque Arm Mountings

Rigid Flange Couplings

Backstop

Sprags are a centrifugal lift-off type lubricated by gear unit oil, mounted for easy service access.

Shipping Conditions

Inspection prior to shipment consists of:

- Conformance check to the acknowledgement of order.
- No-load test.

Protection

- Painting of the outer side housing: gear units are standard provided with a quick dry enamel paint. Improved surface protection: good corrosion protection for many years in a non-aggressive atomsphere. The dry film thickness is an average of 100um (primer included). Excellent base for all kinds of special paints. These can also be applied on site after a longer period of time. Suitable to apply humidity resistant paint, if required.

Inner Side Housing: Oil resistant paint.
Inner Components: Sprayed with an anti-rust oil.
Shaft Extensions: Greased and projected with waxed waterproof paper and tectyl.

Lubricants

- Units are shipped without oil.
- Grease lubrication points are factory filled.

For more information relating to storage, handling, installation, start-up and maintenance, refer to the Service Manual, which is supplied with each unit.

Selection

Mechanical Power Rating

$P \geq P_a \times SF$ or $P \geq P_m \times SF$

Where:

P_a = Absorbed power (kW).

P_m = Motor or installed power (kW).

P = Mechanical power rating of the gear unit according to AGMA (kW).

SF = Service factor specified or recommended.

Application	SF min.					
	3h / 24h		10h / 24h		24h / 24h	
	on P_a	on P_m	on P_a	on P_m	on P_a	on P_m
Conveyors						
Uniformly loaded or fed	1.15	1.15	1.15	1.15	1.25	1.15
Moderate load, multi drives	1.15	1.15	1.25	1.15	1.5	1.25
Heavy-duty, independent drives	1.3	1.15	1.6	1.3	1.8	1.5
Reciprocating, shaking	1.5	1.25	1.75	1.5	2	1.75
Apron feeder, belt feeder	1.15	1.15	1.25	1.15	1.5	1.25
Screw feeder	1.15	1.15	1.25	1.15	1.5	1.25
Cranes and Hoists*						
Hoist (non-reversing torque)						
Light-duty	1.15		1.15		1.3	
Medium-duty	1.15		1.25		1.45	
Heavy-duty	1.25		1.45		1.85	
Travel drive or slewing						
Peak torque/nominal motor torque						
1.5		1.4		1.7		1.9
1.75		1.65		2		2.2
2.0		1.85		2.35		2.5
Luffing: non-reversing torque	1.15		1.25		1.45	
reversing torque	1.4		1.7		1.9	
Boom hoist	1.25		1.25		1.5	
Crushers						
Stone or ore		1.75		2		2.25
Dredges						
Cable reels	1.25		1.25		1.5	
cutter head or bucket chain drives	2		2		2.25	
Jig drives	2		2		2.25	
Winches	1.25		1.25		1.5	
Elevators						
Bucket elevator	1.15	1.15	1.25	1.15	1.5	1.25
Mining						
Bucket wheel drives						
Excavation					2.25	
Reclaimer medium-duty					1.5	
Reclaimer heavy-duty					2	

- Selection according to FEM 1.001 specification is available upon request.
- Special document for selection of gear units for cranes is available.
- Hoists for the transportation of people: Refer to BMG.

P_a = Absorbed power.

P_m= Nameplate rating of electric drive motor (or generator) at the motor (or generator) rated base speed.

The service factors 'SF' are empirical values based on AGMA, ISO specifications and our experience. They apply for 'State-of-the-art' driven machines, normal operating conditions, and for electric motors as the prime movers. If the prime motor is a multicylinder combustion motor, 0.25 has to be added to the 'SF'. For multiple drives, consider the actual load sharing. Refer to BMG for specially designed applications or special operating conditions.

For other applications not listed, contact BMG.

Thermal Power Ratings

$P_a \leq P_{tn} \times a \times b \times c$ No forced cooling is needed

$P_a \leq P_{tf} \times d \times b$ Use a fan on the high speed shaft

Where:

P_a = Absorbed power (kW).
P_{tn} = Thermal power without a fan (kW).
P_{tf} = Thermal power with a fan (kW).
a, b, c, d = Thermal factors as tabulated.

Thermal Factors Reference Data

Reduction Ratio	Ambient Temperature in °C			
	15°C - 25°C	25°C - 35°C	35°C - 45°C	
6.3 - 11.2	1	0.81	0.68	0.55
12.5 - 18	1	0.85	0.71	0.66
≥ 20	1	0.87	0.75	0.74
Size	C - H	C - H	C - D	E - H

Factor 'a' for ambient temperature without forced cooling.

h/year	h/day (max.)				
	3	3	10	10	> 16
1000	1.2	1.3	1.2	1.2	1.2
2000	-	-	1.1	1.1	1.1
≥ 4000	-	-	-	-	1.0
Size	C - D	E - H	C - D	E - H	C - H

Factor 'b' for duration of service.

Mounting	Airflow (m/s)		
Indoors - small enclosure	≥ 0.5m/s	0.73	0.70
Indoors - normal working area	≥ 1.4m/s	1.00	1.00
Outdoors - protected against the sun	≥ 3.0m/s	1.33	1.36
Size		C - D	E - H

Factor 'c' for air circulation (without a fan).

	Number of Stages	Ambient Temperature in °C			
		15°C - 25°C	25°C - 35°C	35°C - 45°C	45°C - 55°C
Forced cooling	2	1	0.86	0.72	0.59
	3	1	0.86	0.72	0.62

Factor 'd' for ambient temperature with forced cooling.

2 STAGE UNITS - MECHANICAL RATINGS, THERMAL RATINGS & EXACT RATIOS

R	D → L / C → H	2	3	Q

Mechanical and Thermal Power Ratings
Two Stage
Right Angle

Mechanical Power Ratings (kW)

i_N	RPM		Gearbox Size					
	n_1	n_2	C	D	E	F	G	H
6.3	1800	285	353	520	779	1106	1770	
	1500	240	311	457	649	922	1568	
	1200	190	255	391	519	737	1351	
	1000	160	214	333	433	614	1166	-
	900	145	193	303	389	553	1052	
	750	120	162	258	324	461	882	
7.1	1800	255	321	477	779	1106	1770	
	1500	210	282	419	649	922	1525	
	1200	170	235	356	519	737	1229	
	1000	140	198	298	433	614	1030	-
	900	125	179	269	389	553	930	
	750	105	150	225	324	461	779	
8	1800	225	301	440	758	995	1506	1770
	1500	190	258	387	636	876	1334	1568
	1200	150	212	318	512	710	1129	1351
	1000	125	180	271	429	592	945	1196
	900	115	164	247	387	533	853	1105
	750	94	140	206	324	444	715	926
9	1800	200	273	404	656	943	1477	
	1500	165	234	354	550	803	1238	
	1200	135	189	285	443	647	998	
	1000	110	158	238	371	542	836	-
	900	100	143	215	334	489	754	
	750	83	119	180	280	409	631	
10	1800	180	249	365	602	782	1293	1506
	1500	150	212	311	502	689	1084	1334
	1200	120	174	256	401	561	872	1150
	1000	100	148	217	334	468	731	980
	900	90	135	196	301	421	659	882
	750	75	115	164	251	351	552	735
11.2	1800	160	226	335	529	745	1143	
	1500	135	191	281	443	654	958	
	1200	105	154	226	356	527	771	
	1000	89	129	189	298	441	646	-
	900	80	116	171	269	398	582	
	750	67	97	143	225	333	487	
12.5	1800	145	198	295	470	606	983	1337
	1500	120	168	247	392	516	826	1124
	1200	96	136	199	313	424	667	908
	1000	80	114	167	261	361	559	758
	900	72	103	151	235	329	505	682
	750	60	86	126	196	277	424	568
14	1800	130	180	273	419	579	924	
	1500	105	151	228	355	494	774	
	1200	86	122	184	286	406	622	
	1000	71	102	153	239	346	521	-
	900	64	92	138	215	315	470	
	750	54	77	116	180	265	393	
16	1800	115	144	210	333	466	735	983
	1500	94	121	176	280	391	617	826
	1200	75	97	142	225	316	498	667
	1000	63	82	119	189	265	417	559
	900	56	74	107	171	239	377	505
	750	47	62	90	143	200	316	424
18	1800	100	143	210	324	451	735	
	1500	83	119	176	276	384	617	
	1200	67	96	142	225	315	498	
	1000	56	80	119	188	265	417	-
	900	50	72	107	170	239	377	
	750	42	60	90	142	200	316	
20	1800	90						735
	1500	75						617
	1200	60						498
	1000	50	-	-	-	-	-	417
	900	45						377
	750	38						316

Thermal Power Ratings (kW)

i_N	RPM i_N	✤	Gearbox Size					
			C	D	E	F	G	H
6.3 to 11.2	1800	-	76	85	115	120	79	66
		1	170	240	330	470	710	780
	1500	-	84	100	140	165	185	205
		1	160	230	320	450	680	760
	1200	-	88	110	155	195	260	295
		1	145	210	295	410	640	720
	1000	-	88	115	160	205	285	330
		1	135	195	270	380	590	670
	900	-	88	115	160	205	295	340
		1	130	185	260	360	570	650
	750	-	86	115	160	205	300	350
		1	120	170	240	330	520	600
12.5 to 20	1800	-	61	75	105	130	165	190
		1	125	180	255	370	560	650
	1500	-	64	81	155	145	200	235
		1	115	165	235	340	520	600
	1200	-	64	85	120	155	220	260
		1	105	150	215	310	470	550
	1000	-	63	84	120	155	225	265
		1	95	135	195	280	430	500
	900	-	62	83	120	155	225	270
		1	90	130	185	265	410	480
	750	-	59	81	115	155	225	265
		1	81	120	170	240	370	440

Exact Ratio / Inertia ($kg.m^2$)

i_N	Shaft	C	D	E	F	G	H
6.3	iex	6.2701	6.4572	6.1765	6.4323	6.4063	-
	J	0.0554	0.117	0.213	0.406	1.03	
7.1	iex	7.2059	7.2995	7.1061	6.9667	7.0498	-
	J	0.0522	0.111	0.2	0.391	0.992	
8	iex	7.8824	8.1176	7.7647	8.3097	7.9484	8.0817
	J	0.0426	0.0872	0.175	0.303	0.697	1.18
9	iex	9.0588	9.1765	8.9333	9	8.7468	-
	J	0.0406	0.0837	0.167	0.293	0.675	
10	iex	9.737	10.266	9.7059	10.263	10.359	10.027
	J	0.0305	0.0576	0.112	0.201	0.433	0.798
11.2	iex	11.19	11.606	11.167	11.116	11.4	-
	J	0.0292	0.0554	0.106	0.195	0.42	
12.5	iex	12.387	12.718	12.165	12.949	12.904	13.069
	J	0.0212	0.0419	0.0742	0.133	0.301	0.492
14	iex	14.235	14.376	13.996	14.025	14.201	-
	J	0.0203	0.0405	0.0707	0.129	0.293	
16	iex	15.765	16.235	15.529	16.25	15.96	16.279
	J	0.0164	0.0324	0.0535	0.0971	0.233	0.34
18	iex	18.118	18.353	17.867	17.6	17.563	-
	J	0.0159	0.0316	0.0513	0.0947	0.227	
20	iex	-	-	-	-	-	20.134
	J						0.258

i_N = Nominal ratio
J = Related to the high speed shaft
n1 = Input speed
n2 = Output speed
✤ = Number of fans

3 STAGE UNITS - MECHANICAL RATINGS, THERMAL RATINGS & EXACT RATIOS

R	D → L	C → H	3	3	Q	Three Stage Right Angle

Mechanical Power Ratings (kW)

i_N	RPM		Gearbox Size					
	n_1	n_2	C	D	E	F	G	H
20	1800	90	144	227	353	511	740	-
	1500	75	122	191	300	426	631	
	1200	60	99	154	240	341	518	
	1000	50	83	129	200	284	433	
	900	45	75	117	180	255	389	
	750	38	63	98	150	213	324	
22.4	1800	80	133	213	313	452	655	-
	1500	67	114	178	261	377	558	
	1200	54	94	143	209	301	458	
	1000	45	79	119	174	251	396	
	900	40	71	108	157	226	357	
	750	33	59	90	130	188	298	
25	1800	72	117	187	286	406	605	779
	1500	60	100	156	238	339	516	649
	1200	48	82	126	191	271	429	519
	1000	40	70	105	159	226	363	433
	900	36	64	95	143	203	327	389
	750	30	54	79	119	169	276	324
28	1800	64	109	168	249	359	535	712
	1500	54	93	140	208	300	456	593
	1200	43	75	113	166	240	378	474
	1000	36	63	94	138	200	316	395
	900	32	56	85	125	180	285	356
	750	27	47	71	104	150	238	296
31.5	1800	57	95	150	232	321	497	651
	1500	48	81	126	193	268	429	543
	1200	38	66	101	154	214	348	434
	1000	32	56	84	129	178	291	362
	900	28.5	51	76	116	161	262	326
	750	24	43	63	97	134	219	271
35.5	1800	51	88	135	202	284	442	566
	1500	42	74	113	168	237	378	472
	1200	34	59	90	134	189	303	377
	1000	28	50	75	112	158	254	314
	900	25.5	45	68	101	142	229	283
	750	21	37	57	84	118	191	236
40	1800	45	77	120	182	259	416	521
	1500	38	66	100	152	216	347	434
	1200	30	54	80	121	173	279	347
	1000	25	46	67	101	144	233	289
	900	22.5	41	61	91	130	210	260
	750	19	35	51	76	108	176	217
45	1800	40	72	108	158	229	362	453
	1500	33	60	90	132	191	303	377
	1200	26.5	48	72	106	153	243	302
	1000	22	40	60	88	127	203	252
	900	20	36	54	79	115	183	226
	750	16.5	30	45	66	96	153	189
50	1800	36	63	93	143	203	327	416
	1500	30	54	78	119	169	273	346
	1200	24	43	63	95	135	219	277
	1000	20	36	53	79	113	183	231
	900	18	33	48	72	102	165	208
	750	15	27	40	60	85	138	173
56	1800	32	58	85	125	180	285	361
	1500	27	48	71	104	150	238	301
	1200	21.5	39	57	83	120	191	241
	1000	18	32	47	69	100	160	201
	900	16	29	43	62	90	144	181
	750	13.5	24	36	52	75	120	151
63	1800	28.5	46	62	98	149	218	326
	1500	24	38	52	82	124	182	271
	1200	19	31	42	66	100	146	217
	1000	16	26	35	55	83	122	181
	900	14.5	23	31	49	75	110	163
	750	12	19.2	26	41	63	92	136
71	1800	25.5	38	54	85	130	192	283
	1500	21	32	45	71	109	160	236
	1200	17.2	25	36	57	87	129	189
	1000	14	21	30	47	73	108	157
	900	12.5	19	27	43	65	97	142
	750	10.5	15.9	23	36	55	81	118

Mechanical and Thermal Power Ratings

i_N	RPM		Gearbox Size					
	1	2	C	D	E	F	G	H
80	1800	22.5	36	51	79	119	170	-
	1500	19	30	43	66	100	142	
	1200	15	24	34	53	80	114	
	1000	12.5	19.9	29	44	67	95	
	900	11.5	17.9	26	40	60	86	
	750	9.4	15	22	33	50	72	
90	1800	20	29	45	68	104	150	-
	1500	16.5	25	37	57	87	126	
	1200	13.5	19.7	30	45	70	101	
	1000	11	16.5	25	38	58	84	
	900	10	14.8	22	34	52	76	
	750	8.3	12.4	18.7	29	44	63	

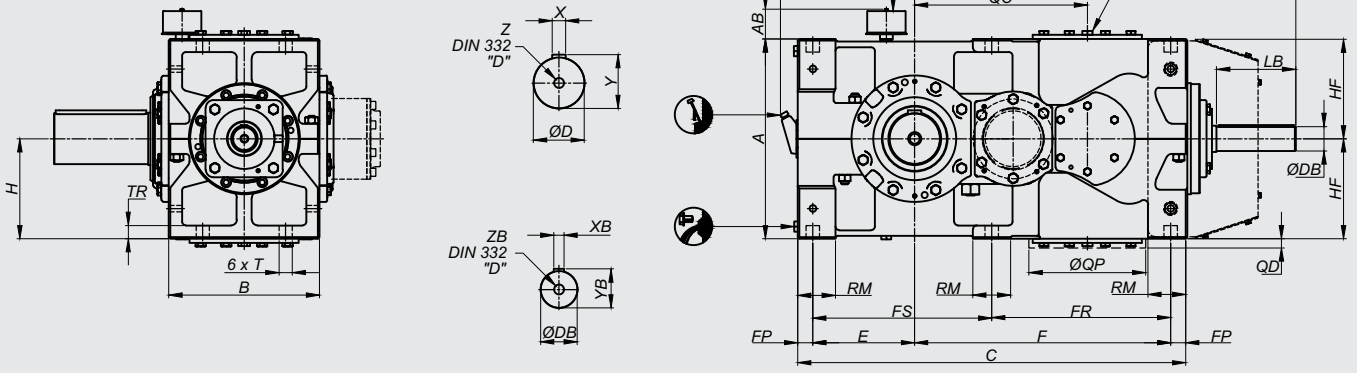
Thermal Power Ratings (kW)

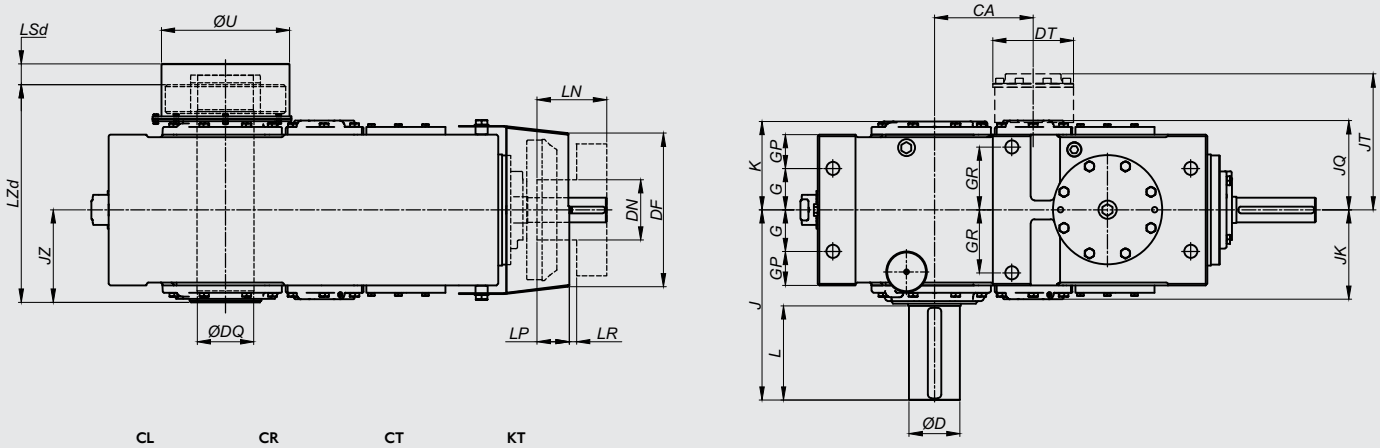
i_N	RPM	✤	Gearbox Size					
			C	D	E	F	G	H
20 to 28	1800	-	56	70	92	115	180	205
		1	105	135	185	270	480	530
	1500	-	56	71	95	125	190	215
		1	96	125	170	250	440	490
	1200	-	54	70	95	130	195	220
		1	85	110	155	225	390	430
	1000	-	52	68	93	125	190	215
		1	77	100	140	205	350	390
	900	-	51	66	91	125	190	215
		1	72	96	130	195	330	370
	750	-	48	64	88	120	185	205
		1	65	87	120	180	300	330
31.5 to 90	1800	-	41	52	71	93	145	180
		1	74	97	130	195	350	430
	1500	-	40	52	70	95	145	180
		1	67	88	120	175	310	390
	1200	-	38	50	68	93	145	180
		1	59	78	105	155	275	340
	1000	-	36	48	66	90	140	175
		1	53	70	97	140	250	310
	900	-	35	47	64	88	135	170
		1	49	66	91	135	235	290
	750	-	33	44	61	84	130	165
		1	44	60	82	120	210	260

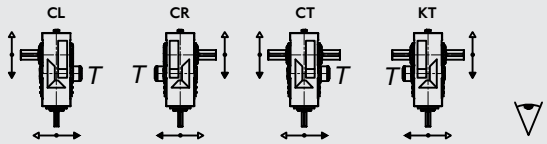
Exact Ratio / Inertia ($kg.m^2$)

i_N		C	D	E	F	G	H
20	iex	19.342	19.597	19.548	20.131	19.619	-
	J	0.0137	0.0296	0.06	0.128	0.234	
22.4	iex	22.25	21.902	22.465	22.757	22.572	-
	J	0.0126	0.0278	0.0555	0.12	0.215	
25	iex	24.5	24.941	24.574	25.308	24.664	25.069
	J	0.0104	0.0218	0.0455	0.094	0.188	0.247
28	iex	28.183	27.875	28.242	28.609	28.376	28.842
	J	0.0097	0.0207	0.0427	0.0891	0.177	0.225
31.5	iex	31.033	31.176	30.357	32.007	30.83	31.516
	J	0.0076	0.0167	0.0324	0.0618	0.12	0.197
35.5	iex	35.698	34.844	34.887	36.182	35.471	36.259
	J	0.0072	0.016	0.0306	0.0588	0.112	0.183
40	iex	38.5	39.193	38.617	39.649	38.641	39.394
	J	0.0055	0.0122	0.0223	0.0446	0.0794	0.125
45	iex	44.288	43.804	44.381	44.821	44.456	45.324
	J	0.0052	0.0117	0.0212	0.0427	0.0747	0.116
50	iex	47.979	49.882	49.149	50.616	49.329	49.374
	J	0.0043	0.0097	0.0171	0.0341	0.0567	0.0829
56	iex	55.192	55.751	56.484	57.218	56.753	56.805
	J	0.0042	0.0094	0.0164	0.0329	0.0538	0.0773
63	iex	60.933	65.843	62.98	64.145	64.188	63.031
	J	0.0042	0.0094	0.0165	0.0333	0.054	0.0588
71	iex	70.027	74.431	72.459	69.474	70.635	72.518
	J	0.0042	0.0094	0.0163	0.0332	0.0537	0.00554
80	iex	78.21	80.275	78.682	80.234	82.266	-
	J	0.0039	0.009	0.0156	0.0314	0.0501	
90	iex	89.884	90.745	90.524	86.9	90.529	-
	J	0.0039	0.009	0.0155	0.0313	0.0499	

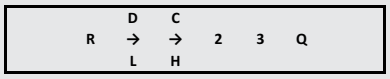
Dimensions: Two Stage Right Angle







Shaft Arrangement (Top View)



Two Stage Right Angle

Type	Size (mm)																								
	A	B	C	CU	E	F	FP	FR	FS	G	GP	GR	H	IB	J	JK	JQ	JZ	K	RM	QP	QD	QC	T	TR	AB
RDC23Q	400	310	780	285	205	505	35	355	355	80	75	129	200	812	405	183	183	195	187	80	225	25	245	28	30	80
RDD23Q	450	350	895	320	240	580	35	410	410	95	80	149	225	916	435	205	205	220	210	90	270	25	395	28	32	80
RDE23Q	530	400	1030	355	270	680	40	475	475	110	90	167	265	1012	505	237	237	245	235	100	310	25	459	35	35	80
RDF23Q	610	460	1169	395	305	775	45	540	540	120	110	187	305	1119	540	269	269	275	273	110	320	30	525	35	40	72
RDG23Q	800	560	1428	480	378	943	57	695	626	160	120	240	400	1241	635	340	317	-	323	140	-	-	-	39	55	68
RDH23Q	800	560	1500	480	380	1015	57	695	700	160	120	240	400	1313	685	340	317	-	323	140	-	-	-	42	55	68

Type	Size (mm)																					Mass (kg)	Oil (Litres)
	Shafts and Keys													Fan						Backstop			
	Solid Low Speed					Hollow Low Speed				High Speed					DF	DN max.	LN	LP	LR min.	HF	CA	DT	JT		
	D-m6	L	X	Y	Z	DQ	LSd	LZd	U max.	DB	LB	XB	YB	ZB											
RDC23Q	105	210	28	111	M24	115	30	474	250	50k6	180	14	53.5	M16	358	120	155	50	20	181	197	175	304	360	20
RDD23Q	115	210	32	122	M24	130	30	531	310	60m6	210	18	64	M20	394	150	175	70	20	226	226	188	333	550	25
RDE23Q	135	250	36	143	M30	150	30	603	340	65m6	210	18	69	M20	407	160	185	85	20	265	262	214	361	850	40
RDF23Q	155	250	40	164	M30	170	30	688	390	75m6	210	20	79.5	M20	616	250	180	16	20	305	299	245	392	1210	60
RDG23Q	180	290	45	190	M30	-	-	-	-	100m6	210	28	106	M24	616	260	161	55	20	401	341	260	495	2000	110
RDH23Q	190	340	45	200	M30	-	-	-	-	100m6	210	28	106	M24	616	260	161	55	20	401	413	260	495	2300	120

Please Note:

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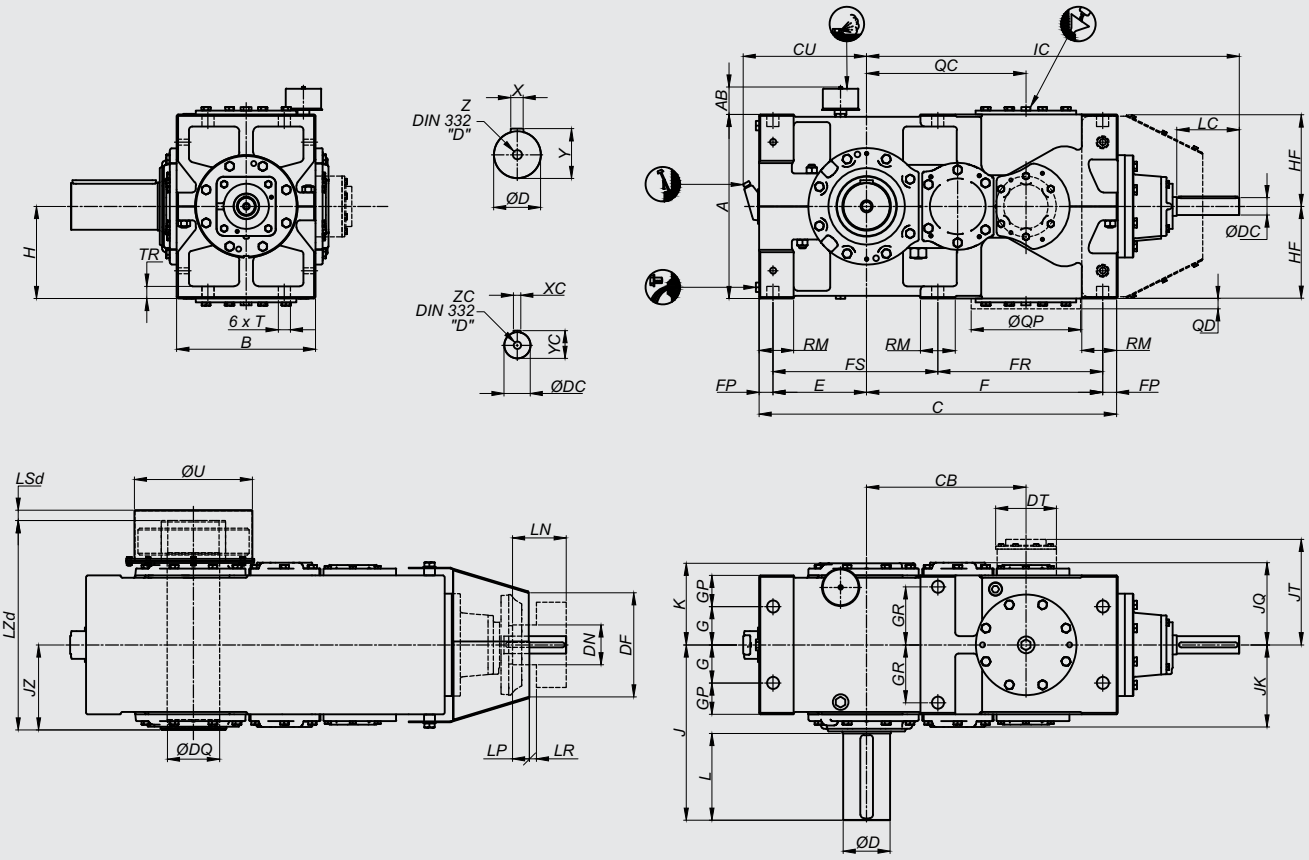
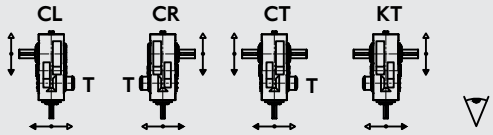
3 STAGE UNITS - DIMENSIONS





Shaft Arrangement (Top View)

D	C				
R → L	→ H	3	3	Q	

Three Stage
Right Angle

Type	Size (mm)																							
	A	B	C	CU	E	F	FP	FR	FS	G	GP	GR	H	IC	J	JK	JQ	JZ	K	RM	QP	QD	QC	T	TR	AB
RDC33Q	400	310	780	285	205	505	35	355	355	80	75	129	200	865	405	183	183	195	187	80	225	25	245	28	30	80
RDD33Q	450	350	895	320	240	580	35	410	410	95	80	149	225	992	435	205	205	220	210	90	270	25	395	28	32	80
RDE33Q	530	400	1030	355	270	680	40	475	475	110	90	167	265	1074	505	237	237	245	235	100	310	25	459	35	35	80
RDF33Q	610	460	1169	395	305	775	45	540	540	120	110	187	305	1215	540	269	269	275	273	110	320	30	525	35	40	72
RDG33Q	800	560	1428	480	378	943	57	695	626	160	120	240	400	1353	635	317	317	-	323	140	-	-	-	39	55	68
RDH33Q	800	560	1500	480	380	1015	57	695	700	160	120	240	400	1425	685	317	317	-	323	140	-	-	-	42	55	68

Type	Size (mm)																					Mass (kg)	Oil (Litres)
	Shafts and Keys									Fan					Backstop								
	Solid Low Speed					Hollow Low Speed				High Speed													
	D-m6	L	X	Y	Z	DQ	LSd	LZd	U max.	DC	LC	XC	YC	ZC	DF	DN max.	LN	LP	LR min.	HF	CB	DT	JT		
RDC33Q	105	210	28	111	M24	115	30	474	250	35k6	150	10	38	M12	358	125	115	32	20	181	345	132	233	400	20
RDD33Q	115	210	32	122	M24	130	30	531	310	45k6	180	14	48,5	M16	324	155	145	47	20	225	397	152	252	575	25
RDE33Q	135	250	36	143	M30	150	30	603	340	50k6	180	14	53,5	M16	308	155	145	40	20	265	459	175	304	870	40
RDF33Q	155	250	40	164	M30	170	30	688	390	60m6	210	18	64	M20	406	195	175	74	20	311	525	188	333	1265	60
RDG33Q	180	290	45	190	M30	-	-	-	-	65m6	210	18	69	M20	420	205	180	70	20	402	603	214	441	2100	120
RDH33Q	190	340	45	200	M30	-	-	-	-	65m6	210	18	69	M20	420	205	180	70	20	402	675	214	441	2400	130

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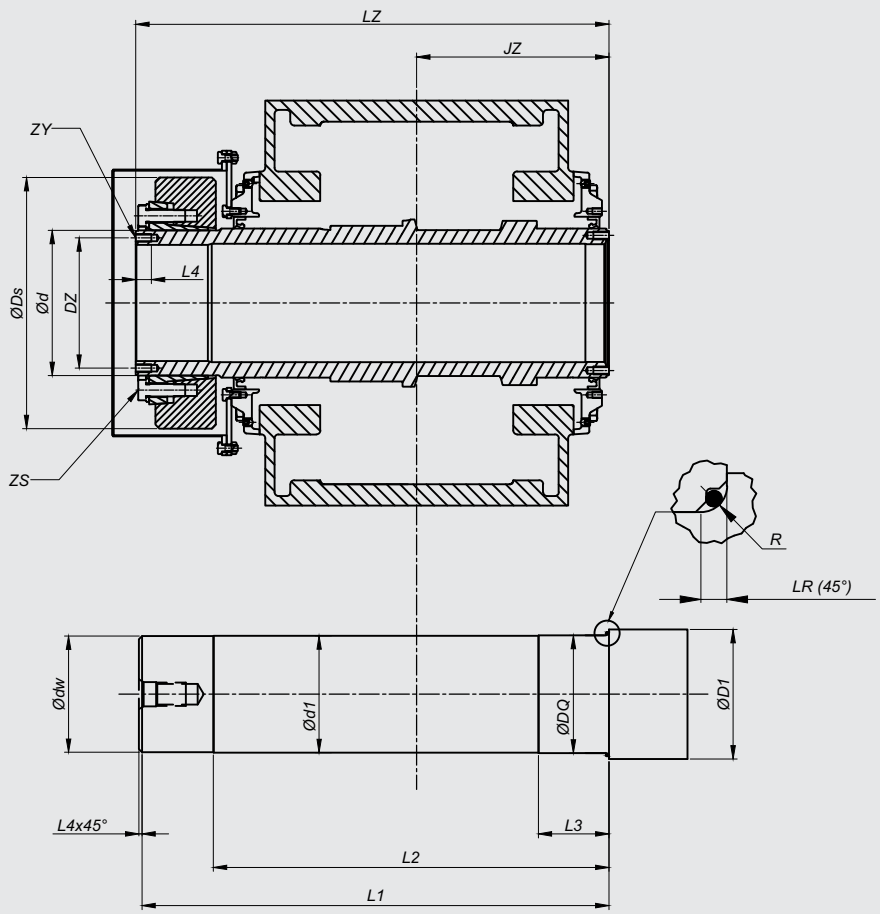
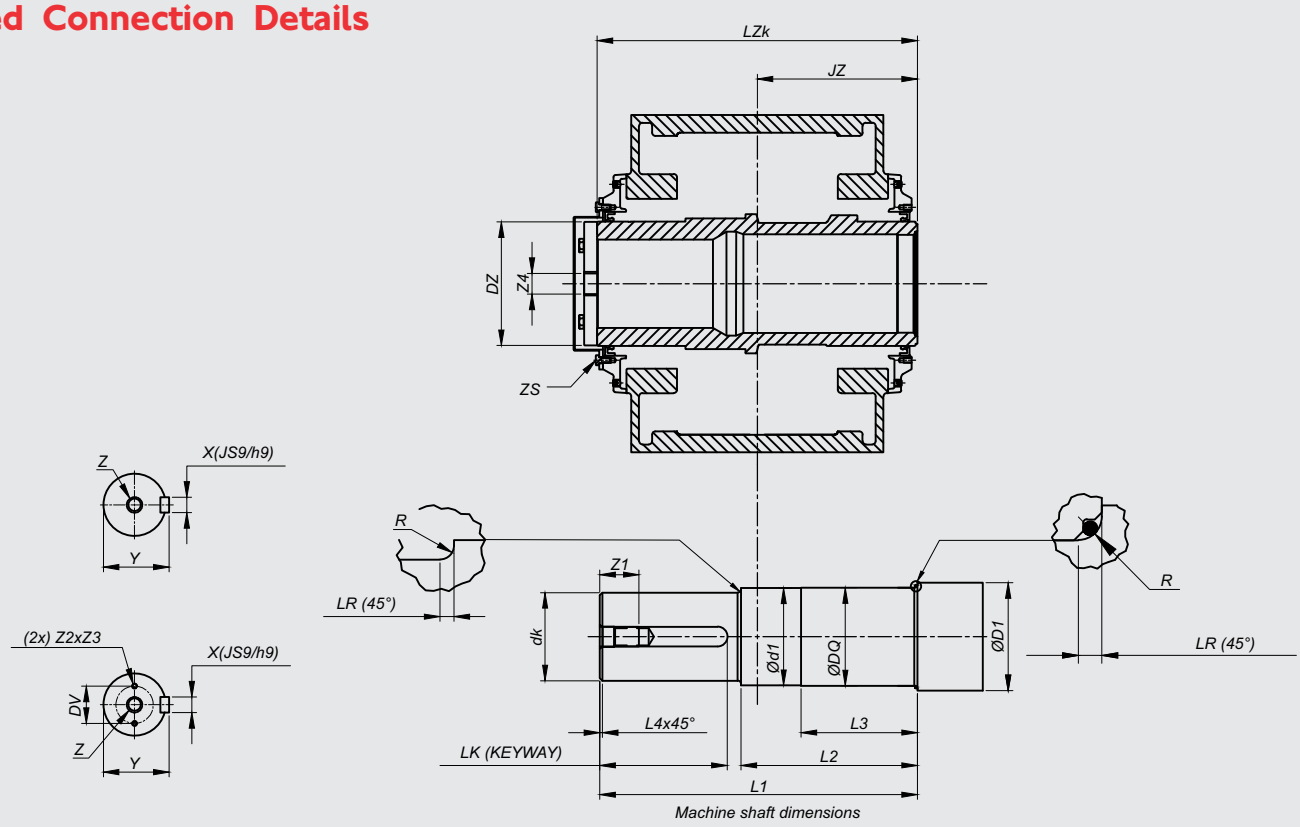
Shrink Disc



Type	Size (mm)																	
	Shrink Disc			Hollow Shaft					Machine Shaft									
	d	Ds	ZS	JZ	LZ	LR	ZY	DZ	dw	d1	DQ h7	D1 min	L1	L2	L3	L4	R	Z (2)
RLC.3Q	140	230	M14	195	474	6	6xM6	127	113h6	114	115	130	471	401	65	3	5	M24
RLD.3Q	165	290	M16	220	531	6	4xM8	145	128h6	129	130	145	528	448	75	3	5	M24
RLE.3Q	185	320	M16	245	603	6	4xM10	166	148h6	149	150	165	599	504	90	4	5	M30
RLF.3Q	220	370	M20	275	688	6	4xM12	195	168g6	169	170	185	684	566	113	4	5	M30

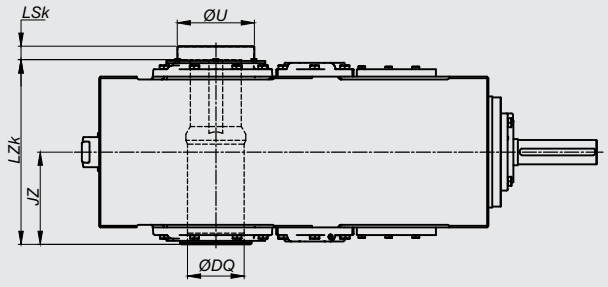
HOLLOW SHAFT KEYED CONNECTION DIMENSIONS

Keyed Connection Details



Type	Size (mm)																						
	Hollow Shaft									Machine Shaft													
	JZ	LZk	LR	ZY	DZ	Z4	dk h6	d1	DQ h7	D1 min	L1	L2	L3	L4	LK	R	Z	Z1	Z2	Z3	DV	X	Y
RLC.3Q	195	390	6	4xM10	120	M30	100	114	115	130	387	220	134	3	145	5	M24	50	-	-	-	28	106
RLD.3Q	220	440	6	4xM12	145	M30	115	129	130	145	437	245	157	3	170	5	M24	50	-	-	-	32	122
RLE.3Q	245	490	6	4xM12	165	M36	135	149	150	165	486	270	178	4	195	5	M30	60	2xM12	25	95	36	143
RLF.3Q	275	550	6	6xM12	190	M36	155	169	170	185	546	295	212	4	230	5	M30	60	2xM16	30	105	40	164

Keyed Connection



Type	Size (mm)				
	DQ	LSk	LZk	JZ	U
RLC.3Q	115	40	390	195	160
RLD.3Q	130	40	440	220	190
RLE.3Q	150	40	490	245	205
RLF.3Q	170	40	550	275	240

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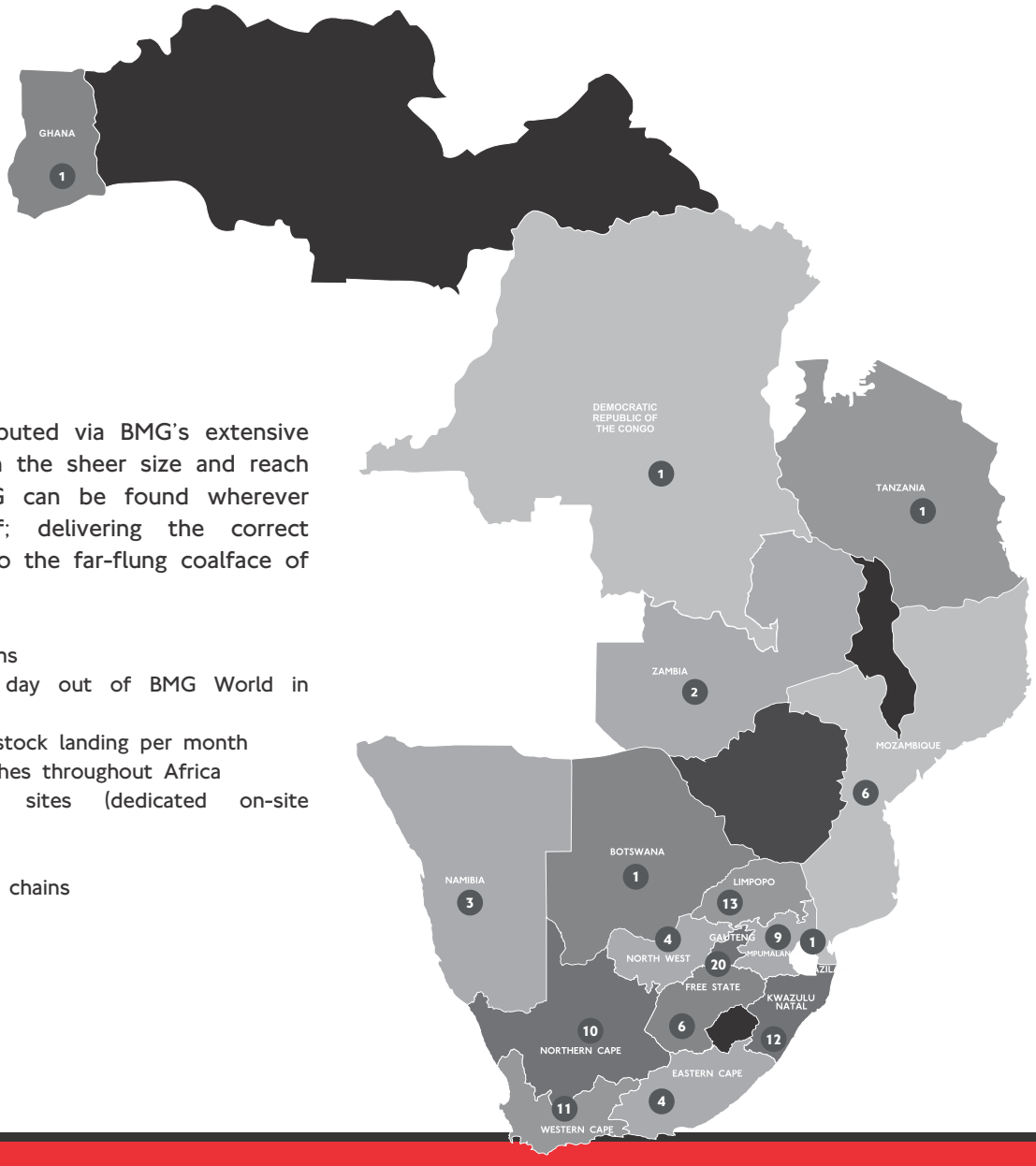

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