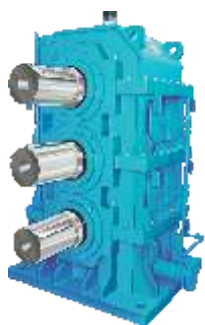




PREMIUM



HELICAL GEAR UNITS



Information

Description

Horizontal or vertical, right angle or parallel, foot mounted or shaft mounted gear units

Premium Helical Gear units are fully metric and are suitable for most applications in both horizontal and vertical drives.

Based on a modular design and construction, the high degree of interchangeability of parts and sub-assemblies among all variants effect considerably economies of production, whilst maintaining the highest standard of component and unit elements. A wide choice of ratio is available based on recommendations laid down in AGMA standards with additional half ratio steps.

Profile ground helical gears together with spiral bevel gears lapped in pairs, ensure high standards of accuracy, surface finish and quiet running characteristics. Helical gears are fitted in parallel shaft units whilst units with shaft at right angle incorporate spiral bevel and helical gears. High quality alloy case hardening material provide long life wear resistance and fatigue strength.

The high power to weight ratio of all units combines with low volume to enable installation in the most difficult situations. Each of the two variants contains unique features suited to their own operating conditions.

Horizontal units feature optional right or left hand shaft arrangements from the same sub-assemblies and are available as foot mounted or foot / shaft mounted types.

Vertical units are available in three versions : Standard units, heavy duty stirrer types and cooling tower drivers.

Units for heavy duty stirrer and cooling tower drives are derivatives of the standard unit by addition of housing on the output shaft line to increase the size of the shaft and the bearings.

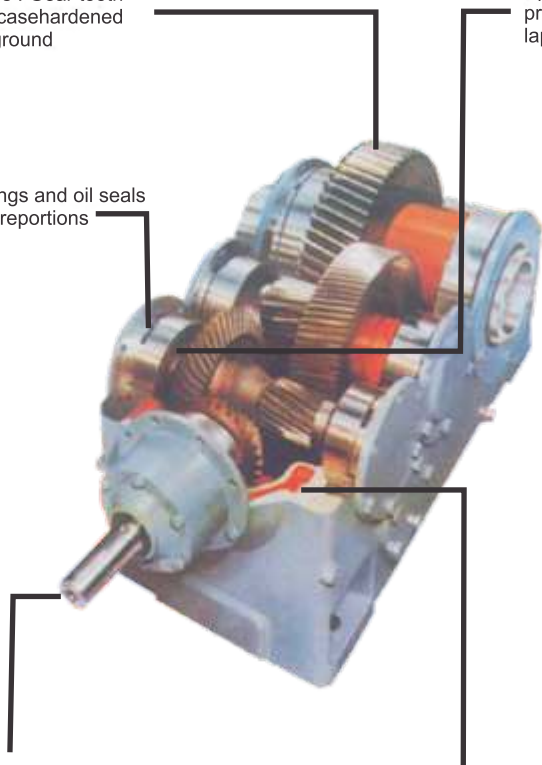
All types include the following features to provide the best solution to the needs of the vertical application and the high reliability which is most important in modern plant :

- Vertical case joints which allows easy maintenance and fitment of lubrication pipe work in one half of the gear case so that lubrication system is not disturbed when dismantling
- Drive and construction ensure freedom from leakage down output shaft.
- Forced lubrication of all top bearings.
- Taper roller bearings fitted to output shaft for high overhung load and axial thrust load capacities.

Helical Gears : Gear tooth profiles are casehardened and profile ground

Spiral Bevel Gears : Gears tooth profiles are casehardened and lapped

Roller Bearings and oil seals are to ISO proportions

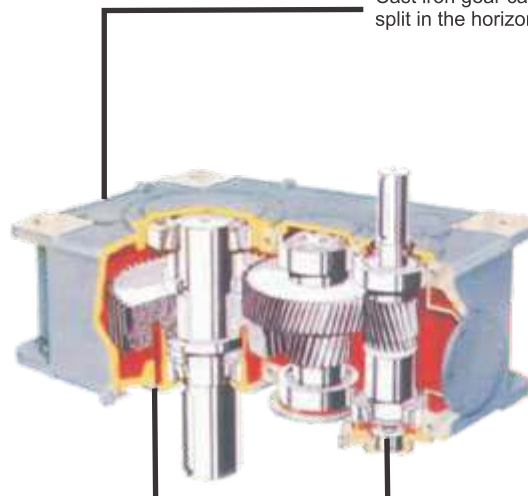


Tapped holes in all shaft extensions - couplings etc. are easily fitted or removed.

Cast iron gear case of rigid design split in the vertical plane

Type B-3 SF, horizontal right angle, foot/shaft mounted riple reduction gear unit

Cast iron gear case of rigid design split in the horizontal plane



Drywell - prevents oil leakage down the outputshaft

Oil pump - providing forced lubrication to all too bearings. All pipework is fitted in one half of the gear case only

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Description

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RATINGS - Mechanical & Thermal Capacities kW

Type	Reduction	Shafts		
H1	Single	Parallel	HR-115	13
H2, VH2	Double	Parallel	HR-215	15
H3, VH3	Triple	Parallel	HR-315	17
H4	Quadruple	Parallel	HR-415	19
B2, VB2	Double	Right Angle	HR-225	21
B3, VB3	Triple	Right Angle	HR-325	23
B4	Quadruple	Right Angle	HR-425	25

DIMENSIONS - Principal, Shaft & Keyway (mm)
1. Horizontal Units

Type	Reduction	Shafts	Mounting		
H1	Single	Parallel	Foot	HD-110	27
H2	Double	Parallel	Foot	HD-210	29
H2SF	Double	Parallel	Foot/Shaft	HD-212	31
H3	Triple	Parallel	Foot	HD-310	33
H3SF	Triple	Parallel	Foot/Shaft	HD-312	35
H4	Quadruple	Parallel	Foot	HD-410	37
H4SF	Quadruple	Parallel	Foot/Shaft	HD-412	39
B2	Double	Right Angle	Foot	HD-220	41
B2SF	Double	Right Angle	Foot/Shaft	HD-222	43
B3	Triple	Right Angle	Foot	HD-320	45
B3SF	Triple	Right Angle	Foot/Shaft	HD-322	47
B4	Quadruple	Right Angle	Foot	HD-420	49
B4SF	Quadruple	Right Angle	Foot/Shaft	HD-422	51
Motorised	All	Parallel/Right	Foot/Shaft	HD-M01	53

2. Vertical Units

VH2, VH2SA, VH2CT	Double	Parallel	Foot	HD-214	55
VH3, VH3SA, VH3CT	Triple	Parallel	Foot	HD-314	57
VB2, VB2SA, VB2CT	Double	Right Angle	Foot	HD-224	59
VB3, VB3SA, VB3CT	Triple	Right Angle	Foot	HD-324	61

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Design Features

All Types

Design Features

GEARS: High quality alloy case hardening materials provide long life wear resistance and fatigue strength.

Profile ground single helical gears and spiral bevel gears lapped in pairs ensure high standards of accuracy, surface finish and quiet running characteristics. Helical gears are fitted in parallel shaft units whilst units with shafts at right angles incorporate spiral bevel and helical gears.

BEARINGS: Roller bearings are used throughout.

GEAR CASES: Gear cases are of rigid cast iron construction with modern styling. MS Fabricated gear cases are available as optional.

Inspection covers are provided for viewing gear contacts. Oil level dipsticks, ventilators and drain plugs are fitted. Cases are split in horizontal plain for horizontal gearboxes and in the vertical plain for vertical gearboxes.

Gearcase Finish: Internal and external surfaces are painted with linear epoxy primer.

External surfaces are finished with alkyde semi-gloss blue paint. These paints are resistant to dilute acids and alkalis, oils and solvents, sea water and temperatures upto 140° C.

External Dimensions: Centre distances are chosen from ISO preferred number series.

Shafts extensions and hollow wheelshaft bores are to ISO metric standards.

Fastners are metric.

Lubrication: In horizontal units, lubrication in most instances is by transfer of oil by gears dipping in the sumps of gear unit bases. Where high pitch line speeds could cause churning of the lubricant, case baffles are fitted as indicated on rating tables. Forced lubrication is necessary where shown and complete systems can be supplied when required.

In vertical units, lubrication in most instances is provided by a pump driven from the bottom of the high speed or second motion shaft. The low speed gears dip in the oil bath. In some cases, it is necessary to use a forced lubrication system with a separate oil tank. These are marked in the rating tables.

All units are provided with combined dipsticks and ventilators and drain plugs. Oil capacity are shown on HE-508. These are approximate as exact quantities vary with ratio.

COOLING: Depending on the application, standard gear units are cooled by:

Normal heat dissipation by convection from external surfaces.

Fans fitted to high speed shafts.

Cooling water coil fitted in gear unit base.

Fan and cooling coil.

Separate oil cooler incorporated in forced lubrication system.

SHAFT MOUNTED UNITS: Shaft mounted units are of two designs, the first of which is mounted on the driven machine shaft extension and connected to the foundation by torque arm. Additionally foot/ shaft design is available for mounting on a base plate with motor and coupling, the complete assembly being mounted on the driven machine shaft extension and connected to the foundation by a torque arm.

MOTORISED GEAR UNITS: Gear units of double and triple reduction types are available as standard assemblies with flanged motors directly mounted on gear case input shaft housing by adaptors. Motor and gear unit shafts are connected by flexible coupling.

HOLD BACKS: Hold backs can be fitted to all horizontal, two and three stage gear units, where required to operate in non-reversing drives. They are located on horizontal pinion shaft and have adequate capacities to deal with full rated torque. Lubrication is provided automatically from the oil in the gear unit. Changing the direction of locking rotation is a simple operation.

PRESERVATION/ PROTECTION: Premium helical gear units are despatched without oil. Prior to despatch they are test run with a rust preventative oil giving adequate protection to internal parts for a period of 6 months, covering normal transport and covered storage.

NOTE: Where gear units are to operate in abnormal condition or where they are to stand for long period without running for e.g. in plant installation, Premium must be notified so that suitable protective arrangements can be made.

As improvements in design being made, this specification is not to be regarded as binding in detail and drawings and capacities are subject to alterations without notice. Certified drawings would be sent on request.

Selection

Selection Procedure - Horizontal Units

Gearbox Selection for Horizontal Units

1. Select Gearbox Type

1.1 Parallel Shafts (helical) or right angle drive (bevel/helical), foot mount, shaft mount with or without foot.

1.2 Calculate gearbox ratio =
$$\frac{\text{Input Speed}}{\text{Output Speed}}$$

2. Select Gearbox Size from Mechanical Capacity

2.1 Determine type of load from table 3 on page 10 (uniform, moderate shock or heavy shock).

2.2 Determine mechanical service factor from table 1.

2.3 Calculate the required mechanical power capacity (P_m)
 $P_m = \text{absorbed power (kW)} \times \text{mechanical service factor}$

2.4 Select gearbox size from rating tables.
 P_m must be equal to or less than the mechanical rating of the gearbox.

3. Thermal Rating Check

3.1 Thermal ratings are given for the following four cases :

- Gearbox without additional cooling.
- Gearbox fitted with fan.
- Gearbox fitted with cooling water coil.
- Gearbox fitted with fan and coil.

3.2 Determine the thermal service factor from table 2.

3.3 Calculate the required thermal power capacity (P_t)
 $P_t = \text{absorbed power (kW)} \div \text{thermal service factor.}$

3.4 Specify the type of cooling required by referring to thermal rating tables.

P_t must be equal to or less than the thermal capacity of the gearbox.

Additional Catalogue Information

1. Gearbox overload capacity at start.
 2.5 x mechanical rating, 5 times per day or,
 2 x mechanical rating, 5 times per hour.
2. Intermittent duty.
 Higher power than catalogue mechanical ratings can be transmitted on very intermittent operation within the finite life of the gears. Consult us with specific application details.

Table 1: Mechanical Service Factors (Horizontal & Vertical)

Prime Mover	Duration of service Hrs.per day	Load Classifications-Driven			Machine Heavy Shock
		Uniform	Moderate Shock		
Electric Motor Steam Turbine, or Hydraulic Motor	Under 3	0.80	1.00	1.50	
	3 to 10	1.00	1.25	1.75	
	Over 10	1.25	1.50	2.00	
Multi-Cylinder Internal Combustion Engine	Under 3	1.00	1.25	1.75	
	3 to 10	1.25	1.50	2.00	
	Over 10	1.50	1.75	2.25	
Single Cylinder Internal Combustion Engine	Under 3	1.25	1.50	2.00	
	3 to 10	1.50	1.75	2.25	
	Over 10	1.75	2.00	2.50	

Table 2 : Thermal Service Factors (Horizontal & Vertical)
for ambient temperature and duration of operation.

Type of Cooling	Ambient Temperature °C	Running Time in any hour				
		100%	80%	60%	40%	20%
Gearboxes without additional Cooling	10	1.12	1.34	1.57	1.79	2.05
	20	1.00	1.2	1.4	1.6	1.8
	30	0.88	1.06	1.23	1.41	1.58
	40	0.75	0.9	1.05	1.2	1.35
	50	0.63	0.76	0.88	1.01	1.13
Gearboxes with Fans	10	1.15	1.38	1.61	1.84	2.07
	20	1.0	1.2	1.4	1.6	1.8
	30	0.9	1.08	1.26	1.44	1.62
	40	0.8	0.96	1.12	1.29	1.44
	50	0.7	0.84	0.98	1.12	1.26
Gearboxes with Cooling Coils(1)	10	1.1	1.32	1.54	1.76	1.98
	20	1.0	1.2	1.4	1.6	1.8
	30	0.9	1.08	1.26	1.44	1.62
	40	0.85	1.02	1.19	1.36	1.53
	50	0.80	0.96	1.12	1.29	1.44
Gearboxes with Fans and Cooling Coils (1)	10	1.12	1.34	1.57	1.79	2.05
	20	1.0	1.2	1.4	1.6	1.8
	30	0.92	1.1	1.29	1.47	1.66
	40	0.83	1.0	1.16	1.33	1.5
	50	0.78	0.94	1.09	1.25	1.4

(1) Based on Cooling -Water Temperature 20°C.

Selection

How to Order, Selection Examples

How to order-Information required when ordering standard gear units.

Prime Mover

1. Type - electric motor or engine, for example 4 cylinder internal combustion engine.
2. Power rating in kW.
3. Output speed. If variable, indicate speed range and frequency of variation.
4. Dimensions of prime mover.

Driven Machine.

1. Type, for example, kiln, conveyor, etc.
2. Power rating in kW.
3. Speed.
4. Service - hours per day, running time in any hour, details of reversals if applicable, type of loading, ambient temperature, etc.

Gear Unit

1. Type, for example, H2.
2. Size, for example, 315.
3. Ratio.

4. Shaft handing. Refer to dimension pages and quote reference.
5. Direction of rotation (for units with right angle shafts refer to handing diagrams on dimension pages). If holdback arrangement is to be fitted, please indicate the direction of rotation of low speed shaft looking towards it.

Shaft Connections

1. Couplings. Quote shaft diameters with tolerances or coupling bores.
2. Details of overhung loads, including diameter and type of sheave, sprocket or pinion and any thrust loads.

Shaft mounted units for High Inertia Drive

When used on Traverse drives with high inertia driven loads, e.g. crane drives (slewing, long travel and cross travel) bogie drives and selected high inertia load roller table drives, it is recommended that shaft mounted units should be fitted with shock absorbing Torque Arms. Consult us with specific application details.

Selection Examples:

Example 1

A foot mounted parallel shaft reducer is to be directly coupled to a 750kW, 1500 rpm motor. The output shaft is to rotate at 365 rpm and is coupled to a large industrial fan which absorbs 725 kW on 24 hours/ day service. The maximum ambient temperature is 30°C.

Selection

1. Gearbox Type

- 1.1. Parallel shaft type is specified - type H.
- 1.2. Ratio = $\frac{1500}{365} = 4.11$, type H1 (single reduction)

2. Mechanical Capacity

- 2.1 From table 3 on page 10 the application is moderate shock.
- 2.2 From table 1 on page 3 the service factor is 1.5.
- 2.3 The required mechanical capacity = $1.5 \times 725 = 1088$ kW.
- 2.4 Under mechanical rating a unit size 315, normal ratio 4.13, has a capacity of 1293 kW

3. Thermal Rating Check

- 3.1 From table 2 on page 3 the thermal service factor for 30°C ambient temperature and 100% running time is 0.9 for a unit with fan cooling (reference to the thermal ratings shows that at least fan cooling is required.)
- 3.2 The required thermal capacity = $725 \div 0.9 = 806$.
- 3.3 Under thermal ratings, fan cooled, a size 315 has a capacity of 918 kW at 1500 rpm, ratio 4.15.
4. Check that the exact ratio is satisfactory from HE-506.
5. Order a gearbox type H1-315 exact ratio 4.15 with cooling fans fitted.

Example 2

A shaft mounted gear unit with right angle shafts is required to drive a belt conveyor running 24 hours/day at 80rpm. The unit must have feet for the attachment of a motor mounting baseplate. The motor is 500 kW at 1500 rpm and the absorbed power at the conveyor headshaft is 465 kW. The ambient temperature on site is 20°C.

Selection

1. Gearbox Type

- 1.1 Foot shaft mounted unit with right angle shafts.
- 1.2 Ratio = $\frac{1500}{80} = 18.8$, type B2SF or B3SF could be used.

2. Mechanical Capacity

- 2.1 From table 3 on page 10 the application is uniform load.
- 2.2 From table 1 on page 3 the service factor is 1.25.
- 2.3 The required mechanical capacity = $1.25 \times 465 = 581$ kW.
- 2.4 Under mechanical ratings a unit size B3SF - 400, nominal ratio 18.9, has a capacity of 620 kW. The double reduction type B2SF - 400 ratio 18.9 has insufficient mechanical capacity.

3. Thermal Rating Check

- 3.1 From table 2 on page 3 the thermal service factor for 20°C ambient temperature and 100% running time is 1.0
- 3.2 The required thermal capacity = $465 \div 1.0 = 465$ kW.
- 3.3 Under thermal ratings, fan cooled, a size 400 at 1500 rpm has a capacity of 484 kW.
4. Check that the exact ratio is satisfactory from HE-506.
5. Order a gearbox type B3SF - 400, exact ratio 19.218 with cooling fans fitted.

Selection

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Overhung Loads / Axial Thrust Loads - Horizontal Units

Whenever a sprocket, gear, sheave or pulley is mounted on the shaft, a calculation should be made to determine the overhung load in kN on the shaft, using the formula :

$$P = \frac{kW \times 9545 \times K}{N \times R}$$

Where P = equivalent overhung load in kN.
kW = power carried by the shaft,
N = rpm of the shaft
R = pitch radius of sprocket, pinion, sheave or pulley (mm).
K = factor.

Overhung member	K factor
Sprocket for chain	1
Spur gear	1.25
V belt sheave	1.5
Flat belt pulley	3.0

Notes :

1. Values are calculated for the most unfavourable direction of rotation. Consult us with specific application details.
2. Overhung load values are for loads applied midway along shaft extension.
3. For overhung load and axial thrust values for larger sizes consult us.

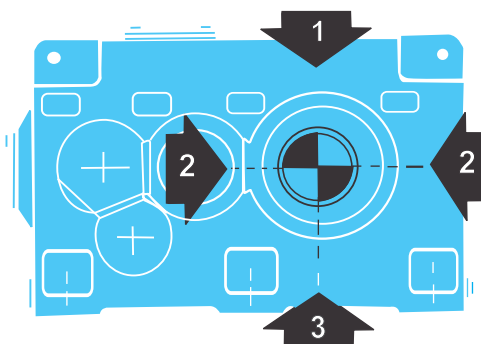


Table 4 : Permissible Overhung Load on Low Speed Shaft (kN)
(Horizontal Units)

Direction of Load	Output Speed (rpm)	Types H2-H3-B2-B3 Unit Size							
		200	225	250	280	315	355	400	450
1.	315	35	42	47	56	78	100	109	172
	200	40	48	57	68	87	118	126	190
	125	48	55	62	85	103	132	150	228
	80	52	68	78	97	130	162	190	280
	50	52	68	90	112	148	182	228	320
2.	31.5 ≥	52	68	90	126	148	182	230	320
	315	35	42	47	56	78	100	109	172
	200	40	48	57	68	87	118	126	190
	125 ≥	41	48	62	85	99	120	150	215
	315 ≥	18	23	30	42	49	61	78	107

Table 5 : Permissible Overhung Load on High Speed Shaft at 1500rpm (kN)
(Horizontal Units)

Type of Unit	200	225	250	280	315	355	400	450
H2-H2SF	8.45	10.5	13.0	19.5	26.5	32.2	38.7	45.8
H3-H3SF	3.03	4.58	6.45	8.4	10.5	13.0	20.0	28.9
B2-B2SF	12.0	15.6	19.6	25.4	30.6	36.0	41.3	49.8
B3-B3SF	3.03	7.12	8.90	12.0	15.6	19.6	25.4	30.6

Table 6 : Permissible Axial Thrust on Low Speed Shaft (kN)
(Horizontal Units)

Output Speed (rpm)	Types H2-H3-B2-B3 Unit Size							
	200	225	250	280	315	355	400	450
315	12.0	12.5	13.4	11.8	18.3	30.3	28.8	53.4
200	13.4	14.2	15.2	13.3	20.8	34.3	32.6	60.5
125	17.1	17.3	18.0	18.4	25.3	40.0	40.9	70.8
80	18.2	20.5	21.8	23.8	35.6	63.6	55.4	80.5
50	19.4	25.8	25.3	32.1	43.5	66.3	68.5	94.3
31.5 and Below	19.4	25.8	25.3	34.3	55.6	66.3	88.6	94.3

Selection

Selection Procedure & Examples - Vertical Units

Gearbox Selection for Vertical Units

1. Select Gearbox Type

- 1.1 Parallel shafts (helical) or right angle drive (bevel/helical), foot mount, shaft mount with or without foot.
- 1.2 Calculate gearbox ratio =
$$\frac{\text{Input speed}}{\text{Output speed}}$$

2. Select Gearbox Size from Mechanical Capacity

- 2.1 Determine type of load from table 3 on page 10. (Uniform, moderate shock or heavy shock).
- 2.2 Determine mechanical service factor from table 1 on page 3
- 2.3 Calculate the required mechanical power capacity (P_m)
 $P_m = \text{absorbed power (kW)} \times \text{mechanical service factor}$
- 2.4 Select gearbox size from rating tables
 P_m must be equal to or less than the mechanical rating of the gearbox.

3. Thermal Rating Check

- 3.1 Thermal ratings are given for the following two cases:
 Gearbox without additional cooling.
 Gearbox fitted with fan
- 3.2 Determine the thermal service factor from table 2 on page 3
- 3.3 Calculate the required thermal power capacity (P_t).
 $(P_t) = \text{absorbed power (kW)} \div \text{thermal service factor.}$
- 3.4 Specify the type of cooling required by referring to thermal rating tables.
 P_t must be equal to or less than the thermal capacity of the gearbox.

4. Axial Thrust Capacity Check

Values are given in tables 7 and 8, page 7 for Standard Units, Heavy Duty Stirrer Drives type SA and Cooling Tower Drives type CT

5. Overhung Load Capacity Check

Values are given in table 9 and 10, page 8 for Standard Units and Heavy Duty Stirrer Drives.

6. Bending Moment Capacity Check

Values are given in tables 12 and 13, page 9 for Standard Units and Heavy Duty Stirrer Drives, type SA.

Additional Catalogue Information

1. Gearbox overload capacity at start.
 2.5 x mechanical rating, 5 times per day, or
 2 x mechanical rating, 5 times per hour.
2. Intermittent duty.
 Higher power than catalogue mechanical ratings can be transmitted on very intermittent operation within the finite life of the gears. Consult us with specific application details.

Example 1

A gearbox is required to transmit power continuously from a horizontal foot mounted motor to a cooling tower fan, which is to be mounted directly on the output shaft and above the gearbox. The motor power is 250 kW and 1450 rpm and the fan speed is 191 rpm. The maximum ambient temperature is 30°C. The fan imparts an axial thrust of 17 kN to the gearbox output shaft. It is necessary to have added clearance for the fan, so a CT type is preferred.

Selection

1. Gearbox Type

- 1.1 Right angle shafts - type VB
- 1.2 Ratio = $\frac{1450}{191} = 7.59$ type VB2 CT
 (double reduction)

2. Mechanical Capacity

- 2.1 From table 1 on page 3 the required service factor is 1.75.
- 2.2 The required mechanical capacity
 $= 1.75 \times 250 = 437.5 \text{ kW}$
- 2.3 On page 21, under mechanical ratings, a unit size 315, nominal ratio 7.59 has a capacity of 713 kW at 1450 rpm input

3. Thermal Rating Check

- 3.1 From table 2 on page 3 the thermal service factor for 30°C ambient temperature and 100% running time is 0.9.
- 3.2 The required thermal capacity = $250 \div 0.9 = 277.8 \text{ kW}$.
- 3.3 On page 21, under thermal ratings, fan cooled, a size 315 unit has a capacity of 402 kW at 1450 rpm, ratio 7.59.

4. Axial Thrust Capacity Check

- 4.1 From table 7 on page 7 the allowable axial thrust limited by the cover bolts is 47.7 kN
- 4.2 From table 8 on page 7 the allowable axial thrust limited by bearing life is 39.3 kN at 200 rpm output shaft speed. The bearing life is more than 1,00,000 hours L 10.

5. Check exact ratio on page 79.
6. Order a gearbox type VB2-315 CT, exact ratio 7.685 with cooling fan fitted.

Selection

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Axial Thrust Loads - Vertical Units

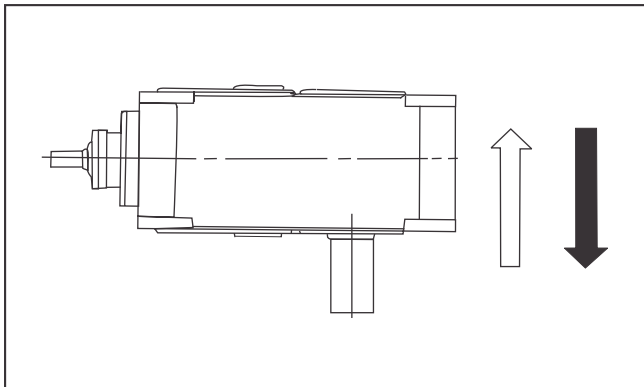


Table 7 Axial Thrust Capacity (kN)
Allowable thrust on output shaft, limited by
COVER BOLT STRESS

Standard Units		VH1-VH2-VH3-VB2-VB3						
200	225	250	Unit Size		355	400	450	
			280	315				
18.6	25.9	24.8	32.6	47.7	64.2	99.4	94.0	

Heavy Duty Stirrer Drives		VH1 SA - VH2 SA - VH3 SA - VB2 SA - VB3 SA						
200	225	250	Unit Size		355	400	450	
			280	315				
25.6	25.9	34.8	53.6	68.2	82.9	99.4	94.0	

Cooling Tower Drives		VH1 CT - VH2 CT - VH3 CT - VB2 CT - VB3 CT						
200	225	250	Unit Size		355	400	450	
			280	315				
18.6	25.9	24.8	32.6	47.7	64.2	99.4	94.0	

Note : The values in table 7 are calculated for the most adverse direction of rotation. For the opposite rotation they can be increased by at least 50%. Consult PREMIUM for an analysis where necessary.

Table 8 : Axial Thrust Capacity (kN)
Allowable thrust on output shaft, limited by
BEARING LIFE (10000 HRS L10)*

Standard Units Output Speed rpm	VH1-VH2-VH3-VB2-VB3							
	200	225	250	Unit Size		355	400	450
				280	315			
315	14.5	17.5	19.2	22.2	30.6	47.7	46.7	67.0
200	18.3	22.3	24.8	28.8	39.3	59.8	59.3	84.0
125	22.4	27.5	31.0	36.1	48.8	73.4	74.3	103
80	27.8	34.3	38.9	45.6	61.2	90.4	92.3	128
50	34.3	40.4	46.6	57.0	76.5	111	114	158
≤ 31.5	40.9	50.8	58.4	68.7	91.5	132	137	189

Heavy Duty Stirrer Drives Output Speed rpm	VH1 SA - VH2 SA - VH3 SA - VB2 SA - VB3 SA							
	200	225	250	Unit Size		355	400	450
				280	315			
315	14.5	17.5	19.2	22.2	30.6	47.7	46.7	67.0
200	18.3	22.3	24.8	28.8	39.3	59.8	59.3	84.0
125	22.4	27.5	31.0	36.1	48.8	73.4	74.3	103
80	27.8	34.3	38.9	45.6	61.2	90.4	92.3	128
50	34.3	40.4	46.6	57.0	76.5	111	114	158
≤ 31.5	40.9	50.8	58.4	68.7	91.5	132	137	189

Cooling Tower Drives Output Speed rpm	VH1 CT - VH2 CT - VH3 CT - VB2 CT - VB3 CT							
	200	225	250	Unit Size		355	400	450
				280	315			
315	14.5	17.5	19.2	22.2	30.6	47.7	46.7	67.0
200	18.3	22.3	24.8	28.8	39.3	59.8	59.3	84.0
125	22.4	27.5	31.0	36.1	48.8	73.4	74.3	103
80	27.8	34.3	38.9	45.6	61.2	90.4	92.3	128
50	34.3	40.4	46.6	57.0	76.5	111	114	158
≤ 31.5	40.9	50.8	58.4	68.7	91.5	132	137	189

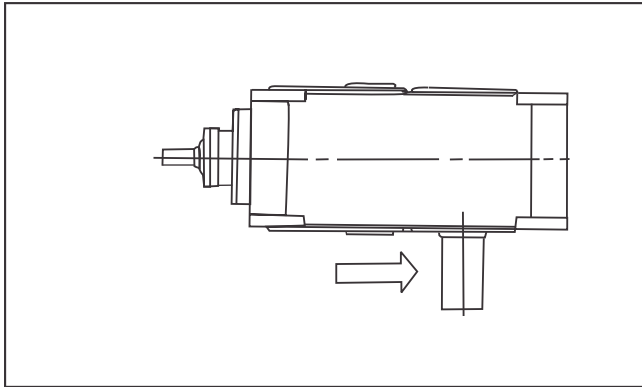
* For other lives multiply values by the factors in table 11 page 9

Note : Values are based on the most unfavourable direction of rotation. Higher values may be permitted after analysis by PREMIUM.

Selection

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Overhung Loads - Vertical Units



Overhung Member	K Factor
Sprocket for Chain	1
Spur Gear	1.25
V belt sheave	1.5
Flat belt pulley	3.0

Whenever a sprocket, gear, sheave or pulley is mounted on the shaft, a calculation should be made to determine the overhung load in kN on the shaft, using the formula:

$$P = \frac{kW \times 9545 \times K}{N \times R}$$

Where P = equivalent overhung load in kN,
kW = power carried by the shaft,
N = rpm of the shaft,
R = pitch radius of sprocket, pinion, sheave or pulley(mm)
K = factor.

Notes :

1. Values are calculated for the most unfavourable direction of rotation. Consult PREMIUM for a detailed analysis in critical selections.
2. Overhung load values are for loads applied midway along shaft extension.

**Table 9 : Permissible Overhung Loads
On High Speed Shaft at 1450 rpm (kN)**

Unit Types		VH2-VH2 SA-VH2 CT Size of Unit					
200	225	250	280	315	355	400	450
8.45	10.5	13.0	19.5	26.5	32.2	38.7	45.8

Unit Types		VH3-VH3 SA-VH3 CT Size of Unit					
200	225	250	280	315	355	400	450
3.03	4.58	6.45	8.4	10.5	13.0	20.0	28.9

Unit Types		VB2-VB2 SA-VB2 CT Size of Unit					
200	225	250	280	315	355	400	450
12.0	15.6	19.6	25.4	30.6	36.0	41.3	49.8

Unit Types		VB3-VB3 SA-VB3 CT Size of Unit					
200	225	250	280	315	355	400	450
3.03	7.12	8.9	12.0	15.6	19.6	25.4	30.6

**Table 10 : Permissible Overhung Loads
On Low Speed Shafts (kN)**

Standard Units Output Speed rpm	VH1 - VH2 - VH3 - VB2 - VB3 Size of Unit							
	200	225	250	280	315	355	400	450
315	23.2	24.4	27.3	25.9	42.7	61.9	54.9	84.5
200	30.4	33.3	38.5	39.0	60.1	84.8	80.5	119
125	39.2	44.2	51.0	55.2	79.8	112	111	160
80	48.4	56.5	65.3	72.3	102	142	144	206
50	52.0	70.1	82.1	93.4	129	175	185	260
≤ 31.5	52.0	70.1	102	118	159	218	230	320

Heavy Duty Stirrer Drives Output Speed rpm	VH1 SA - VH2 SA - VH3 SA - VB2 SA - VB3 SA Size of Unit							
	200	225	250	280	315	355	400	450
315	27.1	28.9	32.4	29.5	48.5	73.3	64.8	100
200	35.5	39.7	45.9	44.2	68.4	100	93.4	140
125	46.0	52.6	60.9	62.6	90.7	133	129	190
80	56.7	67.3	77.8	82.1	116	168	167	243
50	70.0	83.5	98.0	106	146	206	215	308
≤ 31.5	85.1	103	122	134	181	258	267	380

Selection

Standard and Heavy Duty - Vertical Units

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To calculate the Bending Moment on the gearbox output shaft using the method recommended in The Engineering Equipment Users' Association Handbook No.9 :

$$\text{Bending Moment} = \frac{\text{Absorbed Power (kW)} \times 9.5 \times L}{\text{Shaft Speed} \times 0.75 R} = \text{kNm}$$

The above information is given for guidance. Where more precise bending moment values are available they should be used.

Check the Bending Moment Capacity of the Gearbox

Standard units and the Heavy Duty SA type are both suitable for supporting a paddle directly coupled to the gearbox output shaft and for accepting the bending moments and axial thrusts generated from the forces at the paddle. The SA type unit has an enlarged output shaft, extended bearing span and bigger bearings to accept higher loads than the standard unit. Check the standard unit first and, if this has insufficient capacity, use the SA type.

Check the Bending Moment Capacity limited by shaft stress, using Table 12.

Check the Bending Moment Capacity limited by bearing life, using Table 13.

Note : Bearing Capacities are based on 10,000 hours, L10 life. For other bearing lives multiply the values in Table 13 by the factors in Table 11.

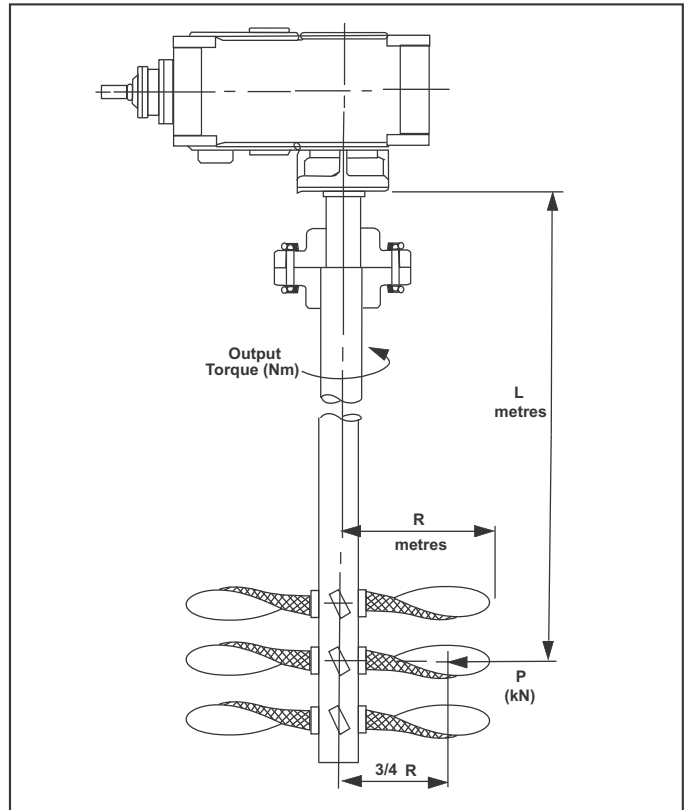


Table 12 : Bending Moment Capacity (kNm)
Allowable Bending Moment at output shaft lower bearing, limited by SHAFT STRESS.

Standard Units	VH1-VH2-VH3-VB2-VB3							
	Size of Unit							
	200	225	250	280	315	355	400	450
	12.0	16.8	22.0	28.3	44.2	65.0	92.7	120

Heavy Duty Stirrer Drives	VH1 SA-VH2 SA-VH3 SA-VB2 SA-VB3 SA							
	Size of Unit							
	200	225	250	280	315	355	400	450
	16.0	21.0	27.0	51.0	75.4	99.0	143	162

Table 11 Bearing Life Factors

Factor	Required Life (Hours)				
	5000	10000	25000	50000	100000
	1.23	1	0.76	0.62	0.50

Table 13 : Bending Moment Capacity (kNm)
Allowable Bending Moment at output shaft lower bearing, limited by BEARING LIFE (10,000 Hrs L10)*

Standard Units	VH1 - VH2 - VH3 - VB2 - VB3							
	Size of Unit							
Output Speed rpm	200	225	250	280	315	355	400	450
315	6.56	7.89	9.36	9.57	17.4	28.4	27.7	48.5
200	8.61	10.8	13.2	14.4	24.5	38.9	40.6	68.2
125	11.1	14.3	17.5	20.4	32.5	51.5	55.9	92.1
80	13.7	18.3	22.4	26.7	41.5	65.1	72.8	118
50	16.9	22.7	28.2	34.5	52.5	80.2	93.3	149
≤ 31.5	20.6	28.0	35.0	43.5	65.0	100	116	184

Heavy Duty Stirrer Drives	VH1 SA - VH2 SA - VH3 SA - VB2 SA - VB3 SA							
	Size of Unit							
Output Speed rpm	200	225	250	280	315	355	400	450
315	9.84	11.8	14.0	14.4	26.1	42.6	41.6	72.8
200	12.9	16.2	19.8	21.6	36.8	58.4	60.9	102
125	16.7	21.5	26.3	30.6	48.8	77.3	83.9	138
80	20.6	27.5	33.6	40.1	62.3	97.7	109	177
50	25.4	34.1	42.3	51.8	78.8	120	140	224
≤ 31.5	30.9	42.0	52.5	65.3	97.5	150	174	276

* For other lives multiply values by the factors in table 11.

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Load Classification by Application

Table 3

Driven machine	Type of Load	Driven machine	Type of Load	Driven machine	Type of Load
Agitators		fight	M	Food industry	
pure liquids	U	live roll	†	beef slicer	M
liquids and solids	M	oven	M	cereal cooker	U
liquids-variable density	M	reciprocating	H	dough mixer	M
Blowers		screw	M	meat grinders	M
centrifugal	U	shaker	H	Generators-not welding	U
lobe	M	Cranes		Hammer mills	H
vane	U	main hoists	U	Hoists	
Brewing and distilling		bridge travel	†	heavy duty	H
bottling machinery	U	trolley travel	†	medium duty	M
brew kettles-continuous duty	U	Dredges		Skip hoist	M
cookers-continuous duty	U	cable reels	M	Laundry washers	
mash tubes-continuous duty	U	conveyors	M	reversing	M
scale hopper-frequent starts	M	cutter head drives	H	Laundry tumblers	M
Can filling machines	U	jig drives	H	Line shafts	
Cane knives	M	manoeuvring winches	M	driving processing equipment	M
Car dumpers	H	pumps	M	light	U
Car pullers	M	screen drive	H	other line shafts	U
Clarifiers	U	stackers	M	Lumber Industry	
Clay working machinery		utility winches	M	barkers-hydraulic mechanical	M
brick press	H	Dry dock cranes		burner conveyor	M
briquette machine	H	main hoist	**	chain saw and drag saw	H
clay working machinery	M	auxillary hoist	**	chain transfer	H
pug mill	M	boom, luffing	**	craneway transfer	H
Compressors		rotating, swing or slew	+	de-barking drum	H
centrifugal	U	tracking, drive wheels	++	edger feed	M
lobe	M	Elevators/		gang feed	M
reciprocating		bucket-uniform load	U	green chain	M
multi-cylinder	M	bucket-heavy load	M	live rolls	H
Single-cylinder	H	bucket-continuous	U	log deck	H
Conveyors uniformly		centrifugal discharge	U	log haul-incline	H
loaded or fed		escalators	U	log haul-well type	H
apron	U	freight	M	log turning device	H
assembly	U	gravity discharge	U	main log conveyor	H
belt	U	man lifts	†	off bearing rolls	M
bucket	U	passenger	†	planer feed chains	M
chain	U	Fans		planer floor chains	M
flight	U	centrifugal	U	planer tilting hoist	M
oven	U	cooling towers		re-saw merry-go-round	
screw	U	induced draft	†	conveyor	M
Conveyors-heavy duty		forced draft	†	roll cases	H
not uniformly led		induced draft	M	slab conveyor	H
apron	M	large, mine, etc.	M		
assembly	M	large, industrial	M		
belt	M	light, small diameter	U		
bucket	M	Feeders			
chain	M	apron	M		
flight	M	belt	M		
live roll	†	disc	U		
Oven	M	reciprocating	H		
		Screw	M		

Selection

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Load Classification by Application

Driven Machine	Type of Load	Driven Machine	Type of Load	Driven Machine	Type of Load
Small waste conveyor-belt	U	Pager mills		Tire and tube press openers	†
Small waste conveyor-chain	M	Agitators, (mixer)	M	tubers and stainers*	M
Sorting table	M	Barker-auxiliaries-hydraulic	M	Warming mills*	M
Triple hoist conveyor	M	Barker-mechanical	H	Sand muller	M
Triple hoist drive	M	Barker drum	H	Sewage disposal equipment	
Transfer conveyor	M	Beater and pulper	M	Bar screens	U
Transfer rolls	M	Bleacher	U	Chemical feeders	U
Tray drive	M	Calenders	M	Collectors	U
Trimmer feed	M	Calendars-super converting		Dewatering screws	M
Waste conveyor	M	Machine except cutters, platers	M	Scrum breakers	M
Machine tools		Conveyors	U	Slow or rapid mixers	M
Bending roll	M	Couch	M	Thickeners	M
Punch press-gear driven	H	Cutters-plates	H	Vacuum filters	M
Notching press-belt driven	†	Cylinders	M	Screen	
Plate planners	H	Dryers	M	Air washing	U
Tapping machine	H	Felt stretcher	M	Rotary-stone or gravel	M
Other machine tools		Felt whipper	H	Travelling water intake	U
Main drives	M	Jordans	M	Slab pushers	M
Auxiliary drives	U	Log haul	H	Steering gear	†
Metal mills		Presses	M	Stokers	U
Draw bench carriage and main drive	M	Pulp machine reel	M	Sugar industry	
Pinch, dryer and scrubber		Stock chest	M	Cane knives	M
Roll-reversing	†	Suction roll	M	Crushers	M
Slitters	M	Washers and thickeners	M	Mills*	M
Table conveyors non-reversing		Winders	M	Textile industry	
Group drives	M	Printing presses		Batchers	M
Individual drives	H	Pullers		Calenders	M
Reversing	†	Barge haul	H	Cards	M
Wire drawing and flattening machine	M	Pumps		Dry cans	M
Wire winding machine	M	Centrifugal	U	Dryers	M
Mills-rotary type		Proportioning	M	Dyeing machinery	M
Ball*	M	Reciprocating		Knitting machines	†
Cement kilns*	M	Single acting: 3 or more cylinders	M	Looms	M
Dryers and coolers*	M	Double acting : 2 or more cylinders	M	Mangles	M
Kilns, other than cement	M	Single acting : 1 or 2 cylinders	†	Nappers	M
Pebble*		Doubling acting : single cylinders	†	Pads	M
Rod*		Rotary		Range drives	†
Plain	M	Gear type	U	Slashers	M
Wedge bar	M	Lobe, vane	U	Soapers	M
Tumbling barrels	H	Rubber and plastics industries		Spinners	M
Mixer		Crackers	H	Tenter frames	M
Concrete mixers-continuous	M	Laboratory equipment	M	Washers	M
Concrete mixers-intemittent	M	Mixed mills*	H	Winders	M
Constant density	U	Refiners*	M	Windlass	†
Variable density	M	Rubber calenders*	M	U = Uniform load	
Oil Industry		Rubber mill 2 on line*	M	M = Moderate shock load	
Chillers	M	Rubber mill 3 on line*	U	H = Heavy shock load	
Oil well pumping	†	Sheeter**	M	† = Refer to PREMIUM	
Paraffin filter press	M	Tire building machines	†	* 24 hours / day Service Factor Only	
Rotary kilns	M			** Use 1.00 Service Factor	
				+ Use 1.25 Service Factor	
				++ Use 1.50 Service Factor	

Type H1

Single Reduction Units - Parallel Shafts - Mechanical & Thermal Capacities kW

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MECHANICAL CAPACITIES (kW)

Nominal Ratio	Input Speed rpm	Nominal Output Speed rpm	Unit Size												
			125	140	160	180	200	225	250	280	315	355	400	450	500
1.22	1750	1430	280	343	495	597	763	1030	1280	1750	2570*	-	-	-	-
	1500	1230	238	284	410	495	669	905	1120	1530	2250	3420*	4390*	-	-
	1000	820	159	186	273	326	478	679	843	1150	1690	2560	3290	5290	5573
	750	615	119	146	210	249	361	558	693	943	1390	2100	2700	4340	4209
1.35	1750	1290	270	322	476	597	720	1010	1250	1680	2500*	-	-	-	-
	1500	1111	226	267	394	495	631	882	1090	1470	2190	3330	4270*	-	-
	1000	740	151	180	268	326	473	662	821	1100	1640	2490	3200	5150	5573
	750	556	113	138	204	249	361	544	675	904	1350	2050	2630	4230	4209
1.50	1750	1170	252	308	452	584	694	978	1240	1670	2440	3590*	-	-	-
	1500	1000	214	255	374	483	608	858	1090	1460	2140	3150	4220*	-	-
	1000	667	143	174	259	335	456	643	817	1100	1600	2360	3160	5010	5573
	750	500	107	132	197	251	361	529	672	901	1320	1940	2600	4120	4209
1.66	1750	1050	235	293	400	531	649	911	1200	1620	2290	3380*	-	-	-
	1500	904	199	243	332	440	569	799	1050	1420	2000	2970	4080	-	-
	1000	602	133	172	234	314	427	599	790	1060	1500	2220	3060	4710	5573
	750	452	100	138	188	253	350	492	649	874	1230	1830	2510	3870	4209
1.84	1750	952	215	276	388	509	605	856	1130	1540	2180	3300	-	-	-
	1500	815	183	229	322	422	530	751	992	1350	1910	2890	3920	-	-
	1000	543	122	182	229	300	397	563	744	1010	1430	2160	2940	4420	5573
	750	408	92	149	181	238	326	462	612	830	1180	1780	2420	3630	4209
2.03	1750	861	200	257	365	485	554	801	1070	1480	2020	2980	-	-	-
	1500	739	170	213	303	402	486	703	938	1300	1770	2610	3680	-	-
	1000	493	113	169	209	277	364	526	703	975	1330	1950	2750	4140	5320
	750	369	85	139	171	229	299	417	577	801	1090	1610	2260	3400	4371
2.25	1750	777	195	239	350	460	524	746	1020	1390	1910	2770	-	-	-
	1500	667	165	198	290	381	460	654	890	1220	1670	2430	3490	-	-
	1000	444	110	137	201	260	344	490	667	915	1250	1820	2610	3850	4972
	750	333	83	111	162	213	283	403	548	752	1030	1500	2150	3170	4085
2.49	1750	703	190	223	324	441	493	691	957	1290	1740	2630	-	-	-
	1500	602	160	185	268	365	432	606	839	1130	1520	2300	3280	-	-
	1000	402	107	128	185	252	324	454	629	850	1140	1720	2460	3570	4552
	750	301	80	101	146	202	266	373	517	698	936	1420	2020	2930	3740

For Higher Size Units - REFER TO PREMIUM

Nominal Ratios are shown.

Interpolate for other input speeds.

A case baffle is fitted where rating is shown in colour.

* Forced lubrication is necessary.

THERMAL CAPACITIES (kW)

Nominal Ratio	Input Speed rpm	Unit Size												
		125	140	160	180	200	225	250	280	315	355	400	450	500
Units without fan														
1.22	1750	--	51	68	87	110	165	201	310	399	614	-	-	-
	1500	46	48	64	82	103	176	228	337	397	629	773	-	-
To	1000	42	50	66	85	107	167	210	318	430	676	854	1160	1470
1.84	750	39	51	68	87	110	173	219	334	406	624	833	1250	1440
2.03	1750	--	35	47	60	74.3	122	174	264	340	492	-	-	-
	1500	44	38	51	65	81.1	124	160	259	336	525	660	-	-
To	1000	41	42	56	72	90.1	132	172	255	323	483	637	1010	1280
3.05	750	37	44	59	76	94.9	134	171	253	322	485	623	953	1200
3.38	1750	--	34	46	59	74.8	98.9	117	167	235	375	-	-	-
	1500	42	36	49	63	79.4	104	121	171	232	348	480	-	-
To	1000	38	38	52	68	85.6	113	129	173	230	349	471	648	830
5.06	750	35	40	54	70	88.1	116	133	174	224	336	455	631	800
Units with Fan Cooling														
1.22	1750	--	214	292	382	488	719	886	1240	1390	1870	-	-	-
	1500	58	179	244	319	407	626	783	1120	1280	1720	1990	-	-
To	1000	52	130	177	232	296	448	554	809	1020	1470	1720	2270	2810
1.84	750	47	108	147	192	246	376	467	694	826	1230	1540	2100	2630
2.03	1750	--	150	203	266	339	519	674	967	1200	1610	-	-	-
	1500	55	131	178	233	296	444	561	829	1030	1480	1740	-	-
To	1000	51	96	131	171	218	331	424	610	753	1100	1380	1980	2460
3.05	750	45	81	111	145	185	273	351	508	632	928	1160	1720	2150
3.38	1750	--	109	149	195	249	354	431	604	801	1190	-	-	-
	1500	53	97	132	173	220	306	372	524	689	1000	1320	-	-
To	1000	49	80	109	143	182	237	277	388	514	758	995	1340	1690
5.06	750	44	72	98	128	164	212	239	324	423	631	833	1120	1410

Full Load Efficiency - 98.5% (approx.)

Type H1

Single Reduction Units - Parallel Shafts - Mechanical & Thermal Capacities kW

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MECHANICAL CAPACITIES (kW)

Nominal Ratio	Input Speed rpm	Nominal Output Speed rpm	Unit Size												
			125	140	160	180	200	225	250	280	315	355	400	450	500
2.76	1750	634	170	202	293	412	448	666	866	1220	1620	2470	-	-	-
	1500	543	144	167	242	341	392	583	759	1070	1420	2170	2980	-	-
	1000	362	96	118	170	239	294	437	569	802	1060	1620	2230	3440	4188
	750	272	72	93.1	137	192	242	359	467	659	873	1330	1830	2820	3441
3.05	1750	574	151	191	271	351	426	595	813	1140	1500	2260	-	-	-
	1500	492	128	159	224	291	373	522	713	1000	1310	1980	2840	-	-
	1000	328	85	108	155	200	280	391	534	752	985	1480	2120	3070	3880
	750	246	64	87	124	156	230	321	439	617	809	1220	1750	2520	3188
3.38	1750	518	142	168	248	334	384	553	750	1050	1380	2100	-	-	-
	1500	444	119	140	206	277	336	485	658	916	1210	1840	2550	-	-
	1000	296	79	99.7	146	197	252	361	493	687	910	1380	1910	2860	3596
	750	222	60	75.2	111	150	205	299	405	564	747	1130	1560	2350	2955
3.73	1750	469	131	150	218	321	361	521	708	967	1260	1960	-	-	-
	1500	402	111	124	181	266	316	457	621	847	1110	1720	2400	-	-
	1000	268	74	88.0	127	185	237	342	465	635	829	1290	1800	2690	3400
	750	201	56	67.0	97.6	142	182	266	379	522	681	993	1480	2180	2793
4.13	1750	423	95	126	196	276	329	473	633	896	1180	1790	-	-	-
	1500	363	78	104	162	229	288	410	555	785	1030	1570	2190	-	-
	1000	242	52	73.1	113	158	194	269	373	563	762	1130	1600	2440	3200
	750	182	39	54.9	85.1	120	145	202	280	422	571	847	1200	1830	2692
4.57	1750	383	81	115	172	250	311	416	595	832	1100	1680	-	-	-
	1500	328	67	95	142	207	256	343	491	730	965	1410	1980	-	-
	1000	219	45	65.3	98.6	144	168	225	322	481	662	924	1310	2000	2925
	750	164	34	51.8	77.3	111	126	169	242	360	496	694	982	1500	2404
5.06	1750	346	77	96.6	151	206	256	364	504	690	970	1410	-	-	-
	1500	296	65	80.0	125	171	211	301	416	570	801	1170	1720	-	-
	1000	198	43	55.9	86.3	118	138	197	272	373	524	766	1130	1600	2671
	750	148	33	41.6	65.4	88.6	103	147	204	280	393	574	845	1200	2195

For Higher Size Units - REFER TO PREMIUM

Nominal Ratios are shown.

Interpolate for other input speeds.

A case baffle is fitted where rating is shown in colour.

THERMAL CAPACITIES (kW)

Nominal Ratio	Input Speed rpm	Unit Size												
		125	140	160	180	200	225	250	280	315	355	400	450	500
Units with Cooling Coils †														
1.22	1750		211	262	317	378	487	1670	1880	3120	3510	-	-	-
	1500		199	248	301	357	486	1690	1930	3130	3530	4410	-	-
To	1000		186	231	280	333	440	1530	1860	3210	3620	4510	5090	5700
1.84	750		178	222	269	320	428	1460	1790	3200	3600	4530	5180	5620
2.03	1750		148	184	223	266	357	1340	1580	2830	3080	-	-	-
	1500		145	181	219	261	345	1260	1520	2820	3140	3910	-	-
To	1000		140	171	207	247	331	1170	1390	2680	3080	3950	4500	5090
3.05	750	REFER TO PREMIUM	131	165	199	237	315	1100	1320	2520	3000	3940	4510	5010
3.38	1750		112	140	170	202	249	868	1010	2100	2500	-	-	-
	1500		113	140	169	202	245	835	979	2010	2380	3370	-	-
To	1000		114	142	171	205	240	757	894	1830	2200	3150	3460	3900
5.06	750		115	143	173	207	241	704	834	1710	2060	2960	3290	3710
Units with Fan and Cooling Coils †														
1.22	1750	--	447	556	673	800	1090	2360	2750	4070	4750	-	-	-
	1500	205	390	485	587	697	977	2300	2670	3950	4600	5620	-	-
To	1000	202	307	382	462	549	753	1970	2430	3790	4370	5350	6190	6980
1.84	750	198	266	331	401	476	656	1770	2230	3660	4190	5190	6040	6810
2.03	1750	--	315	392	474	564	789	1960	2360	3680	4150	-	-	-
	1500	203	283	352	426	506	698	1790	2190	3560	4050	4950	-	-
To	1000	199	227	278	336	400	554	1490	1830	3220	3740	4670	5450	6150
3.05	750	195	192	240	290	345	476	1330	1630	2930	3530	4520	5240	5910
3.38	1750	--	225	280	339	404	537	1260	1540	2820	3420	-	-	-
	1500	200	203	252	305	363	477	1160	1410	2600	3190	4310	-	-
To	1000	196	169	210	254	303	378	959	1170	2200	2710	3810	4250	4800
5.06	750	193	158	196	237	283	340	850	1030	1970	2430	3440	3900	4400

Full Load Efficiency - 98.5% (approx.)

† Based on cooling water temperature 20° C

Type H2-H2SF-VH2-VH2 SA-VH2 CT

RATINGS
HR-215
1 of 2

Double Reduction Units - Parallel Shafts - Mechanical and Thermal Capacities kW

MECHANICAL CAPACITIES (kW)

Nominal Ratio	Input Speed rpm	Nominal Output Speed rpm	Unit Size															
			125	140	160	180	200	225	250	280	315	355	400	450	500	560	630	710
5.6	1750	312	93	98	145	185	249	364	482	795	1060	1345	1875	2860*	3590			
	1500	268	90	92	124	156	213	310	383	677	905	1148	1428	2328*	3630			
	1000	179	54	55.1	82.7	104	142	207	274	452	605	766	1073	1635	2050			
	750	134	41	41.3	62.1	78.1	107	156	223	339	455	663	872	1334	1890			
6.2	1750	282	90	92	138	174	235	334	550	725	960	1265	1735	2585*	3285			
	1500	242	76.5	76.6	117	148	199	283	420	618	822	1055	1314	2131*	2970			
	1000	161	51	51.0	78.0	98.6	132	190	314	413	550	722	993	1479	1880			
	750	121	38	38.3	58.6	74.0	99.4	142	235	310	422	589	810	1210	1740			
6.86	1750	255	82	90	137	173	232	320	530	695	920	1260	1730	2580*	3260			
	1500	219	69	76.6	117	148	199	273	400	592	785	991	1314	2007*	2700			
	1000	146	46	51.0	78.0	98.6	132	182	300	395	525	722	993	1479	1860			
	750	109	35	38.3	58.6	74.0	99.4	140	224	299	422	589	810	1210	1700			
7.59	1750	231	74	94	131	173	221	295	475	632	875	1145	1628	2420*	3152			
	1500	198	62.5	76.3	108	143	189	248	381	539	730	896	1241	1831*	2640			
	1000	132	42	53.2	74.8	99.1	126	166	270	360	498	652	933	1385	1800			
	750	98.8	31	38.2	53.8	71.4	94.7	127	204	272	407	533	762	1086	1650			
8.4	1750	208	67	78	114	154	210	318	460	640	820	1162	1529	2320*	3082			
	1500	179	57	66.3	97.6	131	177	247	333	498	622	913	1138	1676*	2610			
	1000	119	38	44.2	65.1	87.6	120	181	260	365	468	667	871	1323	1760			
	750	89.3	29	33.1	48.8	65.7	97.4	140	202	287	380	544	714	1107	1610			
9.3	1750	188	60	74	107	139	199	273	435	585	765	1085	1395	2095	3050			
	1500	161	51.1	62.2	91.4	119	162	226	323	458	601	834	1045	1609	2600			
	1000	108	34	41.5	60.9	79.3	113	155	247	333	439	621	799	1198	1740			
	750	80.7	26	31.0	45.7	59.5	89.9	127	187	261	350	503	669	1010	1460			
10.3	1750	170	55	63	98	133	178	264	415	540	740	930	1255	1890	2978			
	1500	146	46.4	53.9	83.1	113	151	212	293	394	529	707	917	1376	2450			
	1000	97.1	31	35.9	55.4	75.2	101	149	235	307	420	531	719	1083	1700			
	750	72.8	23	27.0	41.6	56.4	80.0	117	180	231	321	400	604	910	1360			
11.4	1750	154	50	60	86	125	173	234	360	496	659	920	1210	1865	2592			
	1500	132	42	50.6	73.2	105	137	187	280	408	519	684	881	1346	2200			
	1000	87.7	28	33.8	48.9	69.7	97.4	133	204	283	376	524	694	1063	1480			
	750	65.8	21	25.3	36.6	52.2	76.1	101	155	212	282	407	579	860	1140			

REFER
TO
HEAVY
DUTY
HELICAL
GEAR
UNIT
CATALOGUE
PUBLICATION
NO.
PTL/HDHG/204

For capacities higher than above - REFER TO PREMIUM

For sizes 500 & above Higher rating possible with spl. Design - refer PREMIUM

Nominal ratios are shown.

Interpolate for other input speeds.

* Forced lubrication system required for Vertical Units.

THERMAL CAPACITIES (kW)

Nominal Ratio	Input Speed rpm	Unit Size															
		125	140	160	180	200	225	250	280	315	355	400	450	500	560	630	710
Units Without Fan Cooling (Horizontal & Vertical)																	
5.60	1750	22.3	29.5	36.4	47	85	104	129	166	223	304	392	486	620			
	To 1500	21	28.8	35.8	45.7	82	102	125	160	220	300	388	480	615			
11.4	1000	20	27.2	34.2	44.2	82	100	121	156	220	300	388	480	610			
	To 750	19	27.0	33.1	43.1	76	96	115	150	203	278	359	444	600			
12.6	1750	21.2	28.5	34.4	45	84	99	124	161	200	254	327	384	600			
	To 1500	20	27.8	33.8	43.6	77	97	120	156	196	250	324	382	595			
25.6	1000	19	27.1	32.2	42.2	81	97	115	151	193	250	324	382	590			
	To 750	18	26.1	31.1	41.1	76	82	111	148	185	232	299	353	580			
Units With Fan Cooling (Horizontal)																	
5.60	1750	52	79	100	134	159	193	241	320	395	555	725	980	1200			
	To 1500	47	76.5	95.7	127	152	185	232	302	367	490	642	884	1080			
11.4	1000	37	65.1	81.2	108	128	168	202	265	342	420	523	703	860			
	To 750	30	57.7	72.0	96.2	115	147	187	243	310	374	466	604	740			
12.6	1750	45	73	99.3	128	150	189	225	291	390	480	621	752	1150			
	To 1500	40	71.7	95.7	119	142	178	216	275	360	445	582	706	1040			
25.6	1000	36	60.9	75.1	102	120	147	184	244	316	404	508	603	830			
	To 750	27	52.0	64.2	85.7	102	129	169	216	275	360	462	577	720			
Units With Fan Cooling (Vertical)																	
5.60	1750					124	154	189	251	305	410	518	733				
	To 1500					117	145	179	232	287	376	487	650				
11.40	1000					104	135	163	213	270	336	423	558				
	To 750					96	123	152	199	250	311	390	502				
12.6	1750					118	147	178	232	298	374	480	602				
	To 1500					110	139	168	217	281	346	450	548				
25.6	1000					98	123	151	200	257	321	412	496				
	To 750					88	112	141	184	233	299	386	477				

REFER
TO
HEAVY
DUTY
HELICAL
GEAR
UNIT
CATALOGUE
PUBLICATION
NO.
PTL/HDHG/204

REFER
TO
PREMIUM

Full Load Efficiency - 98% (approx.)

Type H2-H2SF-VH2-VH2 SA-VH2 CT

RATINGS
HR-215
2 of 2

Double Reduction Units - Parallel Shafts - Mechanical and Thermal Capacities kW

MECHANICAL CAPACITIES (kW)

Nominal Ratio	Input Speed rpm	Nominal Output Speed rpm	Unit Size															
			125	140	160	180	200	225	250	280	315	355	400	450	500	560	630	710
12.6	1750	139	36	51	76	108	154	220	310	445	595	865	1100	1665	2200			
	1500	119	30	43.5	64.5	92.5	123	171	264	367	468	639	804	1252	1900			
	1000	79.4	20	29.1	43.0	61.5	86.9	125	177	253	339	496	632	950	1255			
	750	59.5	15	21.8	32.8	46.1	64.7	94.0	137	188	256	379	527	756	980			
14.0	1750	125	42	48	62	100	139	210	300	402	545	705	1005	1500	2185			
	1500	107	34.1	40.2	52.7	84.0	112	160	243	322	443	598	734	1097	1800			
	1000	71.4	23	26.9	35.1	56.0	79.0	116	171	229	311	400	572	861	1250			
	750	53.6	11.5	20.2	26.4	42.0	61.9	90.4	130	175	246	301	473	723	935			
15.4	1750	114	36	42	61	92	145	227	307	465	585	875	1210	1860				
	1500	97.4	31.1	35.1	51.3	77.7	92.9	140	200	265	393	511	692	1045	1600			
	1000	64.9	20.73	23.8	34.5	51.7	61.1	82.7	129	175	264	335	501	690	1060			
	750	48.7	10.36	17.6	25.7	38.9	45.7	69.2	98.6	130	198	251	372	515	830			
17.1	1750	102	25.8	38	56	80	105	143	226	306	460	575	865	1205	1720			
	1500	87.7	22.1	32.2	47.5	68.3	91.7	133	200	266	395	487	628	968	1480			
	1000	58.5	14.73	21.5	31.7	45.5	61.1	82.7	129	175	264	326	494	691	980			
	750	43.9	11.04	16.1	23.8	34.1	45.7	66.8	98.6	130	198	245	372	513	760			
18.9	1750	92.6	23.5	33.4	49.9	73	83.3	122	175	254	355	500	682	985	1579			
	1500	79.4	20.1	28.7	42.8	61.5	72.2	108	152	218	310	433	590	870	1340			
	1000	52.9	13.4	19.1	28.5	41.0	47.6	70.6	100	144	204	283	389	563	900			
	750	39.7	8.93	14.4	21.4	30.7	35.5	53.0	74.5	107	152	213	308	427	730			
20.9	1750	83.7	16.8	29.1	46.6	65	81.4	106.8	154	232	320	445	580	944	1453			
	1500	71.8	16.8	24.8	39.8	54.1	65.2	87.8	126	186	253	357	501	739	1230			
	1000	47.8	9.6	16.6	26.6	36.0	46.5	61.0	87.5	132	181	252	334	540	830			
	750	35.9	7.2	12.4	19.9	27.0	36.1	45.8	65.7	103	142	189	252	422	700			
23.2	1750	75.4	17.5	26.1	38.5	57	74.4	95.7	135	212	295	400	528	874				
	1500	64.7	15.1	22.3	33.0	48.7	59.7	80.2	114	170	235	328	452	700				
	1000	43.1	10	14.9	22.0	32.5	42.5	54.7	77.0	121	167	227	303	499				
	750	32.3	7.5	11.2	16.5	24.4	32.6	41.1	57.8	94.8	130	171	228	391				
25.6	1750	68.4	17.9	20.3	30.5	43.4	61.1	87.0	120	165	235	335	495	704				
	1500	58.6	15.4	17.4	26.6	37.1	49.0	69.7	95.4	132	185	271	397	565				
	1000	39.1	10.2	11.6	17.4	24.8	34.9	49.7	67.9	94.2	132	193	282	402				
	750	29.3	7.6	8.7	13.0	20.4	27.3	38.9	53.2	73.8	103	151	221	314				

REFER TO
HEAVY
DUTY
HELICAL
GEAR
UNIT
CATALOGUE
PUBLICATION
NO.
PTL/HDHG/204

For capacities higher than above - REFER TO PREMIUM
Nominal ratios are shown.
Interpolate for other input speeds.

THERMAL CAPACITIES (kW)

Nominal Ratio	Input Speed rpm	Unit Size															
		125	140	160	180	200	225	250	280	315	355	400	450	500	560	630	710
Units With Cooling Coils (Horizontal) †																	
5.60 To 11.4	1750	94	134	142	160	172	197	455	532	1125	1305	1813	2140	2478			
	1500	92	130	139	157	170	192	435	490	1040	1210	1770	2010	2320			
	1000	90	129	139	155	168	188	403	447	940	1110	1620	1860	2190			
12.6 To 25.6	750	90	127	136	152	165	185	385	422	877	1030	1510	1740	2040			
	1750	86	118	126	145	153	182	328	365	745	891	1317	1413	1675			
	1500	83	116	123	140	150	177	323	358	701	824	1200	1340	1590			
12.6 To 25.6	1000	82	116	122	138	147	174	325	353	647	749	1080	1210	1480			
	750	82	113	120	135	145	170	326	354	627	705	1000	1110	1400			
	Units With Fan and Cooling Coils (Horizontal) †																
5.60 To 11.4	1750	192	235	249	276	305	338	670	784	1450	1715	2405	2932	3241			
	1500	185	222	238	265	286	318	592	695	1330	1610	2280	2660	3080			
	1000	178	207	221	246	266	295	500	573	1120	1360	1940	2280	2790			
12.6 To 25.6	750	168	200	213	224	257	282	453	510	1000	1200	1740	2030	2560			
	1750	188	203	215	238	265	287	432	515	950	1140	1802	2037	2385			
	1500	182	191	204	228	246	271	417	484	882	1070	1540	1750	2320			
12.6 To 25.6	1000	173	182	194	216	233	259	388	435	760	900	1290	1450	2060			
	750	165	172	184	205	222	251	374	415	705	813	1140	1290	1910			

REFER TO
HEAVY DUTY
HELICAL
GEAR UNIT
CATALOGUE
PUBLICATION
NO.
PTL/HDHG/204

Full Load Efficiency - 98% (approx.)
† Based on cooling water temperature 20° C
Cooling Coil not available for vertical units.

Type H3-H3SF-VH3-VH3 SA-VH3 CT

RATINGS
HR-315
1 of 2
Triple Reduction Units - Parallel Shafts - Mechanical and Thermal Capacities kW
MECHANICAL CAPACITIES (kW)

Nominal Ratio	Input Speed rpm	Nominal Output Speed rpm	Unit Size																												
			125	140	160	180	200	225	250	280	315	355	400	450	500	560	630	710													
20.9	1750	83.7	REFER TO HR-215 TYPES H2 - H2SF														1410														
	1500	71.8															1080														
	1000	47.8															810														
	750	35.9															660														
23.2	1750	75.4															REFER TO HEAVY DUTY HELICAL GEAR UNIT CATALOGUE PUBLICATION NO. PTL/HDHG/204														1400
	1500	64.7																													1090
	1000	43.1																													820
	750	32.4																													650
25.6	1750	68.4	17.9	25.9	40	58.1	84.2	108	165	225	302	430	640	895	1360																
	1500	58.6	15.4	22.1	34.1	49.8	63.8	86.9	125	192	260	336	513	707	1076																
	1000	39.1	10.2	14.8	22.8	33.2	48.1	63.0	93.5	128	174	248	368	513	782																
	750	29.3	7.6	11.1	17.1	24.9	37.8	47.3	76.2	96.3	130	186	276	386	589																
28.4	1750	61.6	16.5	24.5	35	54	78	103	150	205	268	389	578	822	1230																
	1500	52.8	14.2	20.9	29.8	45.4	62.3	84.0	123	173	229	330	482	702	1055																
	1000	35.2	9.4	14.0	19.9	30.3	44.5	58.2	85.0	116	152	221	330	471	705																
	750	26.4	7.05	10.5	14.9	22.8	33.8	43.7	69.3	86.9	115	166	248	354	530																
31.4	1750	55.7	13.9	20.1	33	49	72	92	144	184	248	356	520	721	1130																
	1500	47.8	11.9	17.1	26.5	41.2	53.1	74.5	109	157	210	295	426	611	966																
	1000	31.8	7.93	11.5	17.7	27.5	40.0	51.5	82.2	105	141	203	297	415	648																
	750	23.9	5.94	8.60	13.2	20.6	30.4	38.6	64.8	78.6	106	152	223	311	488																
34.7	1750	50.4	12.4	19.4	29	45	62	83	127	164	222	323	478	672	1000																
	1500	43.2	10.7	16.7	24.5	38.1	49.4	69.7	102	140	189	278	406	588	852																
	1000	28.8	7.1	11.1	16.4	25.4	35.3	46.6	71.6	93.4	126	186	272	383	571																
	750	21.6	5.32	8.30	12.2	19.0	27.7	35.0	56.2	70.0	95.0	140	204	288	429																
38.4	1750	45.6	11.2	17.3	26.5	40	59	75	124	151	200	290	432	595	930																
	1500	39.1	9.6	14.8	22.4	33.5	48.5	63.0	93.9	128	170	245	367	509	793																
	1000	26.0	6.4	9.91	14.9	22.3	33.4	42.0	69.7	85.6	114	164	246	341	531																
	750	19.5	4.8	7.42	11.2	16.8	25.1	31.6	52.2	64.2	85.0	123	185	256	399																
42.5	1750	41.2	10.0	15.6	23.3	37	52	67	108	133	179	267	386	542	830																
	1500	35.3	8.6	13.2	20.0	30.8	41.2	57.0	85.4	114	153	228	329	462	705																
	1000	23.5	5.73	8.89	13.3	20.6	29.4	38.0	60.9	76.3	102	152	220	309	472																
	750	17.6	4.29	6.66	10.0	15.4	22.4	28.6	47.1	57.2	76.7	115	166	233	355																
47.1	1750	37.2	9.1	14.6	23.3	36.5	44	67	102	129	175	233	335	498	765																
	1500	31.8	7.8	12.5	18.4	26.7	36.9	58.0	84.1	111	153	200	283	423	649																
	1000	21.2	5.2	8.35	13.3	20.6	24.6	39.0	58.0	73.5	102	133	190	283	434																
	750	15.9	3.9	6.26	9.21	13.3	18.4	29.3	43.6	55.1	76.7	100	142	213	327																
52.1	1750	33.6	8.3	12.9	19.4	27.5	39	64	92	118	163	210	300	465	675																
	1500	28.8	7.1	11.0	16.7	23.8	33.3	54.3	76.3	99.8	139	178	256	393	579																
	1000	19.2	4.73	7.38	11.1	15.9	22.2	36.3	51.9	66.6	92.3	119	171	264	387																
	750	14.4	3.54	5.51	8.33	11.9	16.7	27.2	38.9	50.0	69.2	89.1	128	198	291																

For higher SIZES -- REFER TO PREMIUM
 Nominal ratios are shown.
 Interpolate for other input speeds.

THERMAL CAPACITIES (kW)

Nominal Ratio	Input Speed rpm	Unit Size															
		125	140	160	180	200	225	250	280	315	355	400	450	500	560	630	710
Units without Fan (Horizontal & Vertical)																	
25.6 To 42.5	1750	17	28.1	36.2	44.7	56	67	82	99	128	159	197	247	402	REFER TO HEAVY DUTY HELICAL GEAR UNIT CATALOGUE PUBLICATION NO. PTL/HDHG/204		
	1500	15	25.2	33.3	42.3	50	63	75	95	121	151	188	238	395			
	1000	13	23.2	30.3	38.4	46	59	69	91	116	145	180	229	390			
47.1 To 130	1750	10	21.2	28.2	36.2	43	56	67	88	112	141	173	224	385			
	1500	REFER TO PREMIUM	24.4	31.2	39.1	52	65	79	94	124	151	192	241	390			
	1000	22.2	29.0	37.2	49	62	74	92	120	144	184	233	384				
70.6	1000	20.2	27.2	34.3	44	58	69	87	112	138	175	228	375				
	750	19.1	25.2	32.2	42	54	66	80	105	132	169	220	362				
	Units With Fan Cooling (Horizontal)																
25.6 To 70.6	1750	--	-	-	-	85	102	116	154	187	228	279	351	779			
	1500	31	-	-	-	77	94	111	141	180	215	268	340	720			
	1000	29	-	-	-	70	89	105	135	174	207	257	328	650			
	750	26	-	-	-	65	84	100	131	167	201	248	320	590			

Full Load Efficiency - 97.5% (approx.)

Type H3-H3SF-VH3-VH3 SA-VH3 CT

Triple Reduction Units - Parallel Shafts - Mechanical and Thermal Capacities kW

RATINGS
HR-315
2 of 2

MECHANICAL CAPACITIES (kW)

Nominal Ratio	Input Speed rpm	Nominal Output Speed rpm	Unit Size														
			125	140	160	180	200	225	250	280	315	355	400	450	500	560	630
57.7	1750	30.3	7.2	11.5	18.4	24.9	37	58	84	108	152	187	282	405	630		
	1500	26.0	6.2	9.91	15.7	21.2	30.9	49.4	70.6	92.1	129	159	240	347	538		
	1000	17.3	4.13	6.59	10.5	14.2	20.6	32.9	47.2	61.5	85.9	106	160	231	359		
	750	13.0	3.09	4.95	7.93	10.6	15.5	24.7	35.4	46.0	64.4	80.0	120	174	270		
63.8	1750	27.4	6.8	9.8	15.8	20.7	33	53	76	96	138	175	255	369	562		
	1500	23.5	5.8	8.31	13.6	17.7	27.6	44.7	63.9	82.0	116	149	215	314	478		
	1000	15.7	3.86	5.61	9.03	11.8	18.4	29.8	42.6	54.7	77.4	99.2	144	210	320		
	750	11.8	2.89	4.19	6.78	8.83	13.9	22.3	32.0	41.1	58.0	74.4	108	158	240		
70.6	1750	24.8	4.8	9.0	14.4	20.3	25.7	41	56	84	108	165	230	320	520		
	1500	21.2	4.1	7.75	12.3	17.4	22.0	34.2	45.6	67.3	91.8	130	194	272	438		
	1000	14.2	2.73	5.16	8.21	11.6	14.7	23.3	31.4	47.7	61.1	92.2	130	182	294		
	750	10.6	2.04	3.87	6.16	8.69	11.0	17.6	23.5	36.3	45.9	71.0	97.9	137	220		
78.2	1750	22.4	4.4	8.0	12.5	19.1	26.4	40	59	81	115	139	210	300	454		
	1500	19.2	3.8	6.85	10.8	16.5	22.7	31.9	50.3	65.2	94.6	119	177	252	388		
	1000	12.8	2.53	4.56	7.17	10.9	15.1	22.7	33.5	45.7	65.1	79.1	118	171	259		
	750	9.59	1.89	3.42	5.38	8.22	11.4	17.8	25.8	34.2	48.8	59.3	88.6	128	194		
86.5	1750	20.2	4.1	7.5	11.2	17.3	20.7	34	45	69	86	137	185	265	372		
	1500	17.3	3.5	6.40	9.61	14.8	17.7	28.2	38.3	55.9	72.7	112	155	228	316		
	1000	11.6	2.33	4.27	6.41	9.86	11.8	18.9	25.5	38.9	48.5	79.3	103	152	211		
	750	8.67	1.75	3.21	4.81	7.40	8.86	14.2	19.1	29.2	36.4	59.5	77.6	114	158		
95.7	1750	18.3	3.6	6.8	9.6	14.1	18.7	31	42	64	83	123	170	235	328		
	1500	15.7	3.1	5.78	8.26	12.1	16.1	26.1	35.6	52.3	69.5	101	143	202	279		
	1000	10.4	2.06	3.86	5.51	8.05	10.7	17.4	23.8	36.0	46.4	70.2	95.6	134	186		
	750	7.84	1.54	2.90	4.14	6.13	8.07	13.0	17.8	27.0	34.8	52.7	71.4	101	139		
106	1750	16.5	3.3	6.1	9.0	12.6	17.0	27.1	38	57	74	111	150	220	305		
	1500	14.2	2.8	5.24	7.70	10.77	14.6	23.3	32.1	47.9	61.1	92.4	127	185	257		
	1000	9.43	1.86	3.49	5.13	7.18	9.70	15.5	21.4	32.5	40.7	63.2	85.0	124	172		
	750	7.08	1.39	2.63	3.86	5.38	7.27	11.6	16.0	24.4	30.6	47.4	63.7	92.8	129		
117	1750	15.0	3.2	5.5	7.8	11.5	15.3	24.5	34	52	64	103	135	195			
	1500	12.8	2.7	4.71	6.73	9.86	13.1	20.9	28.2	43.9	54.4	85.9	115	169			
	1000	8.55	1.8	3.14	4.48	6.58	8.74	14.0	18.9	29.3	36.3	58.1	76.6	113			
	750	6.41	1.35	2.37	3.37	4.93	6.55	10.4	14.1	21.9	27.2	43.6	57.4	84.6			
130	1750	13.5	2.8	4.4	7.0	9.7	14.9	19.4	29	36.5	55	74	117	155			
	1500	11.5	2.4	3.74	6.01	8.28	12.7	16.8	24.5	31.6	45.5	61.8	99.0	130			
	1000	7.69	1.6	2.49	4.01	5.52	8.54	11.1	16.4	21.0	30.3	41.1	66.0	86.9			
	750	5.77	1.2	1.89	3.01	4.14	6.40	8.39	12.3	15.7	22.8	30.9	49.6	65.2			

REFER TO HEAVY DUTY HELICAL GEAR UNIT CATALOGUE PUBLICATION NO. PTL/HDHG/204

For higher sizes -- REFER TO PREMIUM

Nominal ratios are shown.
Interpolate for other input speeds.

THERMAL CAPACITIES (kW)

Nominal Ratio	Input Speed rpm	Unit Size															
		125	140	160	180	200	225	250	280	315	355	400	450	500	560	630	710
Units with Cooling Coils †																	
25.6 To 70.6	1750	--	44	56	61	84	93	231	248	443	508	771	830	1248			
	1500	58	42	54	60	79	91	228	244	439	490	722	782	1240			
	1000	56	42	53	60	70	90	229	245	430	474	674	720	1230			
	750	52	41	53	59	78	89	230	246	426	466	653	685	1220			
78.2 To 130	1750	REFER TO PREMIUM	40	52	56	77	91	222	233	424	429	626	633	1099			
	1500	REFER TO PREMIUM	39	50	55	74	90	218	229	420	427	608	626	1090			
	1000	REFER TO PREMIUM	39	49	55	74	89	219	230	422	425	592	611	1080			
	750	REFER TO PREMIUM	39	48	54	73	88	219	231	422	426	587	599	1070			
Units with Fan and Cooling Coils †																	
25.6 To 70.6	1750	--	-	-	-	96	127	245	264	467	535	810	890	1251			
	1500	102	-	-	-	93	121	240	260	459	518	760	830	1240			
	1000	98	-	-	-	94	123	238	255	442	490	696	745	1230			
	750	96	-	-	-	96	126	236	253	435	478	668	703	1220			

REFER TO PREMIUM

REFER TO PREMIUM

Full Load Efficiency - 97.5% (approx.)
† Based on cooling water temperature 20° C
Cooling Coil not available for vertical units.

Type H4-H4SF

RATINGS
HR - 415
1 of 2

Quadruple Reduction Units - Parallel Shafts - Mechanical and Thermal Capacities kW

MECHANICAL CAPACITIES (kW)

Nominal Ratio	Input Speed rpm	Nominal Output Speed rpm	Unit Size														
			140	160	180	200	225	250	280	315	355	400	450	500	560	630	710
106	1750	16.5	6.13	9.80	14.7	17.5	23.3	41.5	52.0	73.0	88.0	110	178.5	310	441	590	REFER TO PREMIUM
	1500	14.15	5.3	8.5	12.6	15.	20.0	35.6	44.6	62.7	75.3	95.0	153	267	378	505	
	1000	9.43	3.5	5.6	8.4	10	13.3	23.7	29.7	41.8	50.2	63.3	102	178	252	337	
	750	7.08	2.65	4.25	6.3	7.5	10	17.8	22.3	31.35	37.7	47.5	76.5	134	189	253	
117	1750	15.0	5.60	8.93	13.13	15.6	21.5	36.1	47.6	63.0	83.0	104	164.5	284	392	524	
	1500	12.82	4.8	7.7	11.3	13.3	18.5	31.0	40.8	53.9	70.8	88.3	141	243	336	449	
	1000	8.55	3.2	5.1	7.5	8.9	12.3	20.6	27.2	35.9	47.2	58.9	94	162	224	299	
	750	6.41	2.4	3.85	5.65	6.65	9.25	15.5	20.4	26.9	35.4	44.2	70.5	122	168	225	
130	1750	13.5	4.90	8.05	11.73	14.2	19.3	32.6	43.1	57.0	71.0	92.0	148.2	252	359	468	
	1500	11.54	4.3	6.9	10.1	12.2	16.5	28.0	36.9	49.0	60.8	78.6	127	218	308	400	
	1000	7.69	2.8	4.6	6.7	8.13	11.0	18.6	24.6	32.6	40.5	52.4	84.7	145	205	267	
	750	5.77	2.15	3.45	5.05	6.1	8.25	14.0	18.5	24.5	30.4	39.3	63.5	109	154	200	
144	1750	12.2	4.55	7.18	10.5	12.8	17.7	30.5	39.0	54.0	68.0	83.0	130.7	228	326	440	
	1500	10.42	3.9	6.2	9.0	11.0	15.2	26.1	33.4	46.1	58.0	71.1	112	196	279	376	
	1000	6.94	2.6	4.1	6.0	7.3	10.1	17.4	22.3	30.7	38.7	47.4	74.7	131	186	251	
	750	5.21	1.95	3.1	4.5	5.5	7.6	13.0	16.7	23.0	29.	35.6	56	98	140	188	
159	1750	11.0	4.03	6.48	9.45	12.1	16.6	27.7	36.2	48.7	62.8	77.2	122.5	210	300	400	
	1500	9.43	3.5	5.6	8.1	10.3	14.2	23.7	31.0	41.8	53.9	66.1	105	182	257	342	
	1000	6.29	2.3	3.7	5.4	6.9	9.5	15.8	20.7	27.8	35.9	44.1	70	121	171	228	
	750	4.72	1.75	2.8	4.05	5.15	7.1	11.85	15.5	20.9	27	33.1	52.5	91	129	171	
176	1750	9.94	3.68	5.78	8.4	10.9	15.4	24.9	32.7	43.9	56.2	71.9	114.3	192	268	350	
	1500	8.52	3.2	5.0	7.2	9.3	13.2	21.4	28.1	37.7	48.1	61.6	98	163	229	300	
	1000	5.68	2.1	3.3	4.8	6.2	8.8	14.2	18.7	25.1	32.1	41.1	65.3	109	153	200	
	750	4.26	1.6	2.5	3.6	4.7	6.6	10.7	14.1	18.85	24.1	30.8	49	82	115	150	
195	1750	8.97	3.15	5.25	7.53	10.0	13.8	22.4	29.8	39.7	50.2	64.1	102.7	174	245	322	
	1500	7.69	2.8	4.5	6.5	8.6	11.9	19.3	25.5	34.1	43.0	54.9	88	148	210	276	
	1000	5.13	1.8	3.0	4.3	5.7	7.9	12.8	17	22.7	28.7	36.6	58.7	99	140	184	
	750	3.85	1.4	2.25	3.25	4.3	6.0	9.65	12.8	17.0	21.5	27.5	44.	74	105	138	
215	1750	8.14	2.80	4.55	6.65	8.9	12.8	20.1	27.0	35.7	45.7	59.0	93.3	158	224	291	
	1500	6.97	2.5	4.0	5.8	7.7	10.9	17.3	23.1	30.7	39.1	50.5	80	135	192	249	
	1000	4.65	1.6	2.6	3.8	5.1	7.3	11.5	15.4	20.4	26.1	33.7	53.3	90	128	166.	
	750	3.48	1.25	2.0	2.9	3.9	5.5	8.65	11.6	15.35	19.6	25.3	40	68	96	125	
238	1750	7.35	2.63	4.20	5.95	7.9	11.4	18.4	24.2	32.6	41.5	51.6	84.4	142	202	263	
	1500	6.30	2.3	3.7	5.2	6.8	9.8	15.8	20.7	27.9	35.6	44.2	72.3	121	173	225	
	1000	4.20	1.5	2.4	3.4	4.5	6.5	10.5	13.8	18.6	23.7	29.5	48.2	81	115	150	
	750	3.15	1.15	1.85	2.6	3.4	4.9	7.9	10.35	13.95	17.8	22.1	36.1	61	87	113	
264	1750	6.63	2.43	3.85	5.25	7.4	10.2	16.6	22.1	29.4	37.1	47.4	75.6	121	177	234	
	1500	5.68	2.09	3.3	4.6	6.3	8.8	14.3	18.9	25.3	31.8	40.7	64.8	104	152	200	
	1000	3.78	1.39	2.2	3.0	4.2	5.8	9.5	12.6	16.8	21.2	27.1	43.2	69	101	133	
	750	2.84	1.04	1.65	2.3	3.1	4.4	7.15	9.4	12.6	15.9	20.3	32.4	52	76	100	

For higher SIZES -- REFER TO PREMIUM
Nominal ratios are shown.
Interpolate for other input speeds.

THERMAL CAPACITIES (kW)

Nominal Ratio	Input Speed rpm	Unit Size															
		140	160	180	200	225	250	280	315	355	400	450	500	560	630	710	
106	1750	16.3	21.7	27.0	34.0	42	62	95.0	98	112	175	243.0	251	320	415	REFER TO PREMIUM	
	1500	15.2	20.3	25.3	32.0	40	58	86.7	90	105	150	221.9	246	311	407		
	To	1000	14.1	18.2	23.2	32.3	39.6	51.4	61.7	82.3	98.4	127.8	158.7	242	308		400
	657	750	13.1	17.1	21.2	26.4	32.3	41.1	49.9	64.6	79.3	102.9	127.8	238	304		392

Full Load Efficiency - 96.5% (approx.)

Type H4-H4SF

Quadruple Reduction Units - Parallel Shafts - Mechanical and Thermal Capacities kW

RATINGS
HR - 415
2 of 2

MECHANICAL CAPACITIES (kW)

Nominal Ratio	Input Speed rpm	Nominal Output Speed rpm	Unit Size														
			140	160	180	200	225	250	280	315	355	400	450	500	560	630	710
292	1750		2.19	3.47	4.87	6.7	9.3	15.1	20.1	26.6	34.7	43.1	69.0	112	163	209	REFER TO PREMIUM
	1500	5.13	1.88	2.98	4.18	5.7	8.0	13.0	17.3	22.9	29.8	37.0	59.2	96	139	179	
	1000	3.42	1.25	1.98	2.78	3.8	5.3	8.6	11.5	15.2	19.8	24.6	39.4	64	93	119	
	750	2.56	0.94	1.49	2.09	2.8	4.0	6.5	8.65	11.45	14.9	18.5	29.6	48	70	90	
323	1750		1.96	3.12	4.31	6.0	8.4	10.5	18.4	24.7	31.5	39.2	63.0	105	147	198	
	1500	4.64	1.69	2.68	3.70	5.2	7.3	9.0	15.8	21.1	27.1	33.6	54.1	90	126	170	
	1000	3.09	1.12	1.78	2.46	3.4	4.8	6.0	10.5	14.1	18.0	22.4	36.0	60	84	113	
	750	2.32	0.84	1.34	1.35	2.6	3.65	4.5	7.9	10.5	13.5	16.8	27.0	45	63	85	
358	1750		1.77	2.80	3.90	5.4	7.7	9.6	16.6	22.2	28.5	35.7	56.9	97.0	125	175	
	1500	4.19	1.52	2.41	3.35	4.7	6.6	8.2	14.3	19.2	24.5	30.6	48.8	83	107	148	
	1000	2.79	1.01	1.60	2.23	3.1	4.4	5.46	9.5	12.7	16.3	20.4	32.5	55	71	99	
	750	2.09	0.76	1.20	1.67	2.35	3.3	4.1	7.15	9.6	12.2	15.3	24.4	42	54	74	
396	1750		1.58	2.45	3.50	4.9	6.8	8.6	14.9	20.1	25.7	32.0	51.5	84.0	117	160	
	1500	3.78	1.37	2.17	3.0	4.3	5.9	7.4	12.8	17.4	22.1	27.5	44.2	72	101	136	
	1000	2.52	0.9	1.4	2.0	2.8	3.9	4.92	8.5	11.5	14.7	18.3	29.4	48	67	91	
	750	1.89	0.685	1.08	1.50	2.15	2.95	3.69	6.4	8.7	11.0	13.7	22.1	36	51	68	
438	1750		1.44	2.28	3.13	3.7	4.4	5.3	8.8	12.3	15.4	21.5	29.8	80.0	112.0	142.0	
	1500	3.42	1.23	1.95	2.69	3.15	3.8	4.50	7.6	10.5	13.3	18.5	25.6	67	95	122	
	1000	2.28	0.82	1.30	1.79	2.1	2.5	3.00	5.0	7.0	8.8	12.3	17.0	45	63	81	
	750	1.71	0.61	0.97	1.34	1.6	2.9	2.25	3.8	5.25	6.6	9.2	12.8	34	48	61	
485	1750		1.28	2.05	2.80	3.5	4.2	4.9	8.1	11.2	13.7	19.6	27.0	70.0	100.0		
	1500	3.09	1.10	1.76	2.41	2.9	3.6	4.23	7.0	9.7	11.7	16.9	23.1	60	85		
	1000	2.06	0.73	1.17	1.60	2.0	2.4	2.82	4.6	6.4	7.8	11.2	15.4	40	57		
	750	1.54	0.55	0.88	1.20	1.5	1.8	2.11	3.5	4.85	5.8	8.4	11.5	30	43		
536	1750		1.05	1.84	2.50	2.8	3.5	4.7	7.4	9.8	12.6	17.5	24.5	59.5	90.0		
	1500	2.79	1.0	1.58	2.15	2.5	3.1	4.0	6.3	8.4	10.9	15.1	21.0	51	77		
	1000	1.86	0.6	1.05	1.43	1.6	2.0	2.66	4.2	5.6	7.2	10.0	14	34	51.3		
	750	1.39	0.5	0.52	1.07	1.2	1.55	2.0	3.1	4.2	5.4	7.5	10.5	26	39		
594	1750		1.05	1.65	2.24	2.5	2.8	4.6	6.7	8.8	11.6	15.8	22.1	56.0	80.0		
	1500	2.52	0.9	1.42	1.93	2.2	2.5	3.9	5.7	7.6	9.9	13.6	19.0	48	68		
	1000	1.68	0.6	0.94	1.28	1.4	1.6	2.6	3.8	5.0	6.6	9.0	12.6	32	45.3		
	750	1.26	0.45	0.71	0.96	1.1	1.25	1.95	2.85	3.8	4.9	6.8	9.5	24	34		
657	1750		0.88	1.49	2.00	2.3	2.8	4.2	6.3	8.2	10.7	14.9	20.7	54.3	79		
	1500	2.28	0.8	1.28	1.72	1.8	2.4	3.7	5.4	7.1	9.2	12.8	17.8	47	67		
	1000	1.52	0.5	0.85	1.14	1.3	1.6	2.4	3.6	4.7	6.1	8.5	11.8	31	45		
	750	1.14	0.4	0.64	0.86	0.9	1.2	1.85	2.7	3.55	4.6	6.4	8.9	24	34		

For higher sizes -- **REFER TO PREMIUM**
Full Load Efficiency - 96.5% (approx.)

Type B2-B2SF-VB2-VB2 SA-VB2 CT

RATINGS
HR-225
1 of 2

Double Reduction Units - Right Angle Shafts - Mechanical and Thermal Capacities kW

MECHANICAL CAPACITIES (kW)

Nominal Ratio	Input Speed rpm	Nominal Output Speed	Unit Size											
			140	160	180	200	225	250	280	315	355	400	450	
5.06	1750	346	90.0	135	195	265	380	527	720	970*	1304*	1990*	2690*	REFER TO PREMIUM
	1500	296	75.9	114	150	224	322	450	618	830*	1117*	1666*	2048*	
	1000	198	50.6	75.6	111	150	215	300	411	553	744	1135	1542	
	750	148	38.0	56.7	84.7	113	161	224	308	415	558	854	1179	
5.60	1750	312	87.0	130	190	264	375	525	718	966*	1300*	1980*	2690*	
	1500	268	72.5	112	148	224	306	450	618	830*	1117*	1614*	2048*	
	1000	179	50.4	75.4	108	150	215	300	411	553	744	1135	1542	
	750	134	38.0	56.7	84.3	113	161	224	308	415	558	854	1179	
6.20	1750	282	86.0	130	184	263	372	524	717	965*	1297*	1955*	2691*	
	1500	242	71.6	107	143	224	288	450	618	830*	1117*	1479*	2048*	
	1000	161	50.3	75.0	105	150	215	300	411	553	744	1115	1542	
	750	121	38.0	56.7	82.6	113	161	224	308	415	558	854	1179	
6.86	1750	255	86.0	128	176	254	330	495	716	965	1295*	1875*	2692*	
	1500	219	67.4	100	137	212	277	415	618	830	1066*	1417*	2048*	
	1000	146	49.4	73.7	100	145	190	282	411	553	744	1073	1542	
	750	109	37.9	56.6	78.3	111	143	215	308	415	558	834	1179	
7.59	1750	231	82.0	120	162	215	305	440	585	832	1122	1640*	2295*	
	1500	198	63.0	93.6	125	181	252	378	502	713	965	1314*	1862*	
	1000	132	46.1	68.6	91.4	121	173	253	334	475	643	939	1313	
	750	98.8	36.0	53.4	71.3	90.5	129	190	250	357	482	704	984	
8.40	1750	208	68.0	103	142	190	272	375	514	708	991	1440	2020*	
	1500	179	55.7	85.0	118	162	231	320	440	606	848	1210	1676*	
	1000	119	38.4	58.7	80.8	108	157	213	293	404	566	821	1156	
	750	89.3	29.5	45.3	62.3	81.1	118	159	219	303	424	616	869	
9.30	1750	188	64.0	93.0	127	162	245	320	445	634	835	1242*	1730	
	1500	161	51.2	76.9	105	139	209	278	381	542	714	1066	1490	
	1000	108	35.4	53.1	72.1	92.4	140	185	254	361	476	709	993	
	750	80.6	27.1	40.6	55.0	69.3	104	139	190	271	357	532	745	
10.3	1750	170	55.0	84.0	120	146	210	285	395	565	755	1141*	1530	
	1500	146	46.8	69.9	97.2	117	169	228	326	434	647	897	1345	
	1000	97.1	31.3	46.9	65.3	83	120	163	227	320	431	652	899	
	750	72.8	23.7	35.4	49.3	62.9	93.1	126	171	240	324	489	674	

For higher SIZES -- REFER TO PREMIUM

Nominal ratios are shown.

Interpolate for other input speeds.

* Forced lubrication is necessary.

THERMAL CAPACITIES (kW)

Nominal Ratio	Input Speed rpm	Unit Size												
		140	160	180	200	225	250	280	315	355	400	450		500
Units Without Fan (Horizontal & Vertical types)														
5.06 To 9.30	1750	43	54	66	82	108	126	193	263	285	375	439	REFER TO PREMIUM	
	1500	42	53	65	81	106	125	189	258	280	362	428		
	1000	41	52	64	80	100	124	177	241	275	355	419		
	750	40	52	64	79	99	122	153	201	270	350	407		
10.3 To 18.9	1750	41	52	63	80	100	121	177	241	276	360	424		
	1500	41	51	62	79	99	120	174	236	271	356	418		
	1000	40	51	62	78	97	118	163	222	260	345	409		
	750	39	51	62	77	96	116	146	193	253	338	401		
Units With Fan Cooling (Horizontal)														
5.06 To 9.30	1750	94	120	152	190	230	295	395	500	715	920	1100		REFER TO PREMIUM
	1500	85	111	140	173	214	272	368	449	661	864	1092		
	1000	73	95	120	149	191	238	320	389	575	751	976		
	750	63	83	105	130	173	209	290	355	522	682	955		
10.3 To 18.9	1750	93	114	145	185	225	285	350	422	603	808	885		
	1500	84	109	137	171	212	275	331	389	548	701	860		
	1000	71	92	117	146	189	233	285	353	470	612	871		
	750	63	81	102	128	170	204	240	323	425	546	793		
Units With Fan Cooling (Vertical)														
5.06 To 9.30	1750	-	-	-	195	235	290	388	453	602	812	1040	REFER TO PREMIUM	
	1500	-	-	-	173	215	273	341	412	553	764	950		
	1000	-	-	-	149	192	238	298	371	480	598	790		
	750	-	-	-	130	173	210	252	333	417	542	690		
10.3 To 18.9	1750	-	-	-	185	225	285	372	426	590	730	945		
	1500	-	-	-	171	212	275	332	391	545	695	860		
	1000	-	-	-	146	189	233	285	354	464	608	745		
	750	-	-	-	128	170	205	240	328	421	540	675		

Full Load Efficiency - 97.5% (approx.)

Type B2-B2SF-VB2-VB2 SA-VB2 CT

Double Reduction Units - Right Angle Shafts - Mechanical and Thermal Capacities kW
MECHANICAL CAPACITIES (kW)

Nominal Ratio	Input Speed rpm	Nominal Output Speed	Unit Size											
			140	160	180	200	225	250	280	315	355	400	450	
11.4	1750	154	50.0	79.0	110	127	185	250	352	484	675	975	1360	REFER TO PREMIUM
	1500	132	40.1	64.5	88.6	108	155	209	300	401	577	827	1169	
	1000	87.7	28.0	45.0	61.9	71.7	105	144	200	276	385	556	780	
	750	65.8	21.1	33.9	46.8	53.8	78.8	108	150	207	289	418	586	
12.6	1750	139	44.0	71.0	96.0	110	157	215	300	410	578	852	1155	
	1500	119	35.5	57.5	78.1	93.4	134	187	257	351	493	729	1009	
	1000	79.4	24.7	40.2	54.5	62.6	89.6	125	171	234	329	486	673	
	750	59.5	18.5	29.9	40.5	47.0	67.2	93.5	128	176	246	364	505	
14.0	1750	125	38.0	58.0	80.0	102	146	200	275	385	559	820	1162	
	1500	107	30.9	46.7	65.2	80.7	115	158	217	305	446	656	933	
	1000	71.4	21.6	32.6	45.5	57.6	82.1	114	155	219	319	468	666	
	750	53.6	16.2	24.3	33.8	38.0	64.3	88.9	122	171	246	364	504	
15.4	1750	114	35.0	53.0	72.0	93.0	133	181	253	352	496	723	1002	
	1500	97.4	28.6	42.9	57.2	74.3	106	146	207	298	411	604	860	
	1000	64.9	20.0	30.0	40.0	52.3	75.5	104	143	200	283	413	573	
	750	48.7	14.8	22.3	29.8	39.2	58.4	80.7	109	150	212	309	430	
17.1	1750	102	29.4	47.0	64.0	74.0	116	138	205	280	379	540	770	
	1500	87.7	24.0	37.9	52.0	62.4	96.4	119	178	242	323	462	663	
	1000	58.5	16.8	26.5	36.2	41.6	64.3	79.2	119	161	215	308	443	
	750	43.9	12.5	19.7	27.0	31.1	48.2	59.4	88.8	121	160	232	332	
18.9	1750	92.6	28.7	43.0	60.0	73.0	103	137	202	278	370	538	765	
	1500	79.4	23.4	35.2	48.6	62.4	87.5	119	170	242	316	462	663	
	1000	52.9	16.4	24.5	33.9	41.6	58.3	79.2	116	161	210	308	443	
	750	39.7	12.2	18.2	25.2	31.1	43.8	59.4	86.5	121	157	232	332	

For higher SIZES -- REFER TO PREMIUM

Nominal ratios are shown.

Interpolate for other input speeds.

THERMAL CAPACITIES (kW)

Nominal Ratio	Input Speed rpm	Unit Size												
		140	160	180	200	225	250	280	315	355	400	450	500	
Units With Cooling Coils † (Horizontal)														
5.06 To 9.30	1750	107	136	154	171	245	595	710	1590	1640	1850	2050	REFER TO PREMIUM	
	1500	106	135	152	169	242	588	679	1420	1590	1772	1960		
	1000	106	135	151	169	238	533	611	1270	1440	1653	1860		
10.3 To 18.9	1750	102	130	146	163	240	445	499	1070	1202	1375	1546		
	1500	101	129	145	161	238	437	471	990	1110	1281	1450		
	1000	100	128	145	161	235	423	449	896	998	1155	1310		
18.9	750	100	127	144	160	233	414	440	849	629	922	1210		
Units With Fan Cooling and Cooling Coils † (Horizontal)														
5.06 To 9.30	1750	172	220	244	270	331	845	1095	1985	2184	2490	2801		REFER TO PREMIUM
	1500	161	206	231	257	317	755	899	1720	1980	2255	2540		
	1000	148	189	212	236	286	636	751	1470	1700	1970	2240		
10.3 To 18.9	1750	150	189	211	235	312	590	663	1285	1540	1815	2103		
	1500	141	180	202	224	288	545	608	1190	1380	1632	1890		
	1000	133	169	190	211	263	495	537	1020	1160	1371	1580		
18.9	750	124	159	115	199	242	468	505	940	1050	1220	1400		

Full Load Efficiency - 97.5% (approx.)

† Based on cooling water temperature 20° C

Cooling Coil not available for vertical units.

Type B3-B3 SF-VB3-VB3 SA-VB3 CT

Triple Reduction Units - Right Angle Shafts - Mechanical and Thermal Capacities kW

RATINGS
HR-325
1 of 2

MECHANICAL CAPACITIES (kW)

Nominal Ratio	Input Speed rpm	Nominal Output Speed	Unit Size														
			140	160	180	200	225	250	280	315	355	400	450	500	560	630	710
14.0	1750	125	32.2	62.0	90.0	110	151	226	300	405	616	805	1127	1730*	2510*	3440*	-
	1500	107	27.6	45.9	69.8	93.7	127	191	256	332	529	688	965	2162	2165*	2958*	-
	1000	71.4	18.4	34.3	50.0	62.5	84.9	128	171	231	352	459	643	987	1448*	1968*	2541*
	750	53.6	13.9	26.1	38.0	46.9	63.7	106*	127	174	264	344	482	740	1086	1479*	1903
15.4	1750	114	32.2	61.0	88.0	108	149	222	298	390	602	751	1124	1728*	2505*	3430*	-
	1500	97.4	27.6	45.9	68.3	93.7	127	191	256	332	515	643	965	1479*	2162*	2958*	-
	1000	64.9	18.4	34.3	50.0	62.6	85.0	128	171	222	344	429	643	987	1448*	1968*	2541*
	750	48.7	13.9	26.1	38.0	47.0	75.7	106	127	174	258	323	482	740	1086	1479	1903
17.1	1750	102	32.2	60.0	82.0	89.0	137	212	295	402	550	746	1061	1725*	2500*	3420*	-
	1500	87.7	27.6	44.5	68.3	75.9	117	178	254	332	451	620	909	1479*	2162*	2958*	-
	1000	58.5	18.4	33.9	46.0	50.6	78.1	120	170	231	314	426	606	987	1448*	1968*	2541*
	750	43.9	13.9	25.9	35.0	38.0	69.7	94.9	127	174	236	320	455	740	1086	1479	1903
18.9	1750	92.6	32.2	60.0	85.0	88.0	136	210	292	402	548	744	1035	1722*	2500*	3420*	-
	1500	79.4	27.6	44.5	64.3	75.9	116	178	251	332	437	620	852	1479*	2110*	2958*	-
	1000	52.9	18.4	33.9	48.4	50.6	77.3	120	168	231	314	426	591	987	1448*	1968*	2541*
	750	39.7	13.9	25.9	37.8	38	69.7	94.9	126	174	236	320	443	740	1086	1479	1903
20.9	1750	83.7	32.2	49.0	70.0	87.0	121	184	235	353	500	695	890	1450*	2220*	2900*	-
	1500	71.8	27.6	41.3	59.4	65.9	95.3	148	209	294	385	537	749	1241*	1903*	2545*	-
	1000	47.8	18.4	27.5	39.6	49.7	68.6	105	134	201	285.6	396	508	830	1271	1698*	2250*
	750	35.9	13.9	20.7	29.7	38.0	56.0	84.5	104	151	204	276	381	623	950	1272	1686
23.2	1750	75.4	29.9	46.0	64.0	87.0	120	182	242	350	497	694	885	1320	1920*	2600*	-
	1500	64.7	25.7	39.1	54.7	65.9	95.3	148	205	281	385	537	749	1075	1582	2212	-
	1000	43.1	17.1	26.0	36.5	49.5	68.6	105	138	203	285.6	396	508	754	1114	1489*	2145*
	750	32.3	12.8	19.5	27.4	37.1	56.0	82.8	103	151	200	276	381	568	843	1117	1613
25.6	1750	68.4	27.3	43.0	58.0	75.0	112	168	212	296	396	536	755	1220	1750*	2575*	-
	1500	58.6	23.5	35.9	49.5	60.8	86.0	131	181	252	339	459	647	980*	1417*	2069*	-
	1000	39.1	15.6	24.0	32.9	43.0	63.3	96.1	121	169	226	306	431	699	1008	1479*	1979*
	750	29.3	11.8	18.0	24.7	32.3	50.2	72.1	90.5	126	170	230	324	548	791	1127	1541
28.4	1750	61.6	23.5	34.0	52.0	65.0	93.0	158	200	275	362	530	730	1127	1610*	2365*	-
	1500	52.8	20.2	28.9	43.8	55.0	79.6	131	166	236	305	450	620	901*	1303*	1903*	-
	1000	35.2	13.4	19.3	29.2	37.1	53.1	89.8	114	157	206	302	417	643	926	1354	1823*
	750	26.4	10.1	14.5	21.8	29.2	40.6	67.9	86.6	120	159	234	328	504	726	1018	1386
31.4	1750	55.7	21.5	32.0	47.0	60.0	85.0	141	184	252	334	489	674	1025	1485*	2100*	-
	1500	47.8	18.4	26.5	39.5	49.8	72.2	120	151	214	276	407	561	830*	1200*	1748*	-
	1000	31.8	12.3	17.6	26.4	34.2	48.1	80.5	104	143	190	279	385	587	853	1219	1614
	750	23.9	9.21	13.2	19.8	26.9	37.3	60.4	78.5	111	145	212	302	440	661	911	1210
34.7	1750	50.4	20.1	23.5	42.0	52.0	75.0	122	175	235	320	430	670	884	1320*	1785*	-
	1500	43.2	17.2	23.2	36.3	44.3	63.4	103	151	201	257	366	553	752*	1127*	1531*	-
	1000	28.8	11.5	13.4	23.7	29.6	42.3	69.7	101	134	182	245	384	504	756	1028	1406
	750	21.6	8.60	11.6	18.1	22.1	31.8	52.3	75.7	101	139	184	290	378	569	774	1055

For higher sizes -- REFER TO PREMIUM
Nominal ratios are shown.

Interpolate for other input speeds.
* Forced lubrication is necessary

THERMAL CAPACITIES (kW)

Nominal Ratio	Input Speed rpm	Unit Size															
		140	160	180	200	225	250	280	315	355	400	450	500	560	630	710	
Units without Fan (Horizontal & Vertical)																	
14.0	1750	32	41	50	62	80	101	131	163	192	230	288	367	460	600	741	
	1500	30	39	48	59	76	95	122	154	185	225	279	355	440	580	720	
	To	1000	29	37	46	55	71	89	112	148	178	220	270	340	420	560	700
	95.7	750	27	32	43	52	67	86	109	142	170	217	270	330	410	555	690
Units With Fan Cooling (Horizontal)																	
14.0	1750	58	91	121	154	198	238	310	377	480	630	850	960	1200	1520	1610	
	1500	56	86	110	138	173	216	276	347	424	536	712	905	1165	1440	1520	
	To	1000	53	71	91	114	147	180	230	294	355	436	555	790	995	1305	1410
	63.8	750	45	60	78	97	128	158	200	260	311	394	490	705	930	1207	1300
Units with Fan Cooling (Vertical)																	
14.0	1750	-	-	-	115	137	171	225	290	345	398	530	REFER TO PREMIUM				
	1500	-	-	-	96	122	151	194	244	297	359	465					
	To	1000	-	-	-	80	104	127	162	206	249	305					385*
	63.8	750	-	-	-	68	90	110	140	182	218	276					344

Full Load Efficiency - 97% (approx)

Type B3-B3SF-VB3-VB3 SA-VB3 CT

RATINGS
HR-325
2 of 2

Triple Reduction Units - Right Angle Shafts - Mechanical and Thermal Capacities kW

MECHANICAL CAPACITIES (kW)

Nominal Ratio	Input Speed rpm	Nominal Output Speed	Unit Size														
			140	160	180	200	225	250	280	315	355	400	450	500	560	630	710
38.4	1750	45.6	17.9	25.2	39.0	47.0	68.0	111	162	214	295	391	615	802	1201*	1630*	-
	1500	39.1	15.3	21.5	32.9	40.2	57.6	94.2	138	182	237	333	507	685	1027*	1396*	-
	1000	26.0	10.2	14.4	22.0	26.9	38.4	63.3	91.7	122	168	223	350	458	687	935	1281
	750	19.5	7.66	10.8	16.5	20.2	28.9	47.5	68.8	91.4	126	168	264	343	517	703	963
42.5	1750	41.2	15.9	22.8	34.0	43.0	62.0	102	145	195	268	356	565	735	1095	1490*	-
	1500	35.3	13.7	19.6	28.9	36.6	52.6	86.5	125	167	218	303	460	624	936	1272*	-
	1000	23.5	9.10	13.0	19.3	24.5	35.0	57.7	83.4	111	153	203	320	418	627	852	1166
	750	17.6	6.83	9.77	14.5	18.3	26.3	43.2	62.6	83.3	115	152	240	313	471	641	878
47.1	1750	37.2	14.2	20.7	31.0	39.0	56.0	92.0	133	175	245	322	485	620	930	1200	-
	1500	31.8	12.2	17.7	26.1	33.1	47.5	78.2	113	150	201	274	414	529	801	1028	-
	1000	21.2	8.13	11.8	17.7	22.1	31.7	52.5	75.4	100	139	183	276	354	536	689	1033
	750	15.9	6.10	8.84	13.3	16.6	23.8	39.1	56.6	75.3	104	138	207	266	402	518	777
52.1	1750	33.6	12.4	18.0	28.0	35.0	50.0	82.0	120	160	220	290	410	565	845	1085	-
	1500	28.8	10.7	15.5	24.0	29.8	42.6	70.1	102	134	183	247	351	479	724	931	-
	1000	19.2	7.09	10.3	16.0	19.9	28.4	46.8	67.7	90.0	125	165	234	320	485	624	935
	750	14.4	5.31	7.76	12.0	14.9	21.3	35.1	50.8	67.6	93.5	124	176	240	364	469	703.
57.7	1750	30.3	10.9	17.1	25.2	32.0	45.0	75.0	102	145	188	254	356	510	762	975	-
	1500	26.0	9.36	14.7	21.5	27.0	38.6	63.5	87.4	122	161	217	305	430	652	837	-
	1000	17.3	6.25	9.79	14.4	18.0	25.7	42.4	58.2	81.6	107	145	203	287	435	561	840
	750	13.0	4.66	7.34	10.8	13.4	19.3	31.9	43.7	61.1	80.7	109	152	216	327	422	632
63.8	1750	27.4	10.3	15.4	21.5	27.8	44.6	62.0	91.0	120	176	246	350	460	690	885	-
	1500	23.5	8.84	13.2	18.5	24.0	36.8	50.4	73.2	101	141	207	297	390	590	759	-
	1000	15.7	5.91	8.82	12.3	15.9	25.5	35.3	51.9	67.5	100	140	200	260	395	508	753
	750	11.8	4.43	6.62	9.24	12.0	19.1	26.5	39.2	50.7	78.1	103	150	195	297	382	565
70.6	1750	24.8	9.6	12.0	19.6	25.9	36.9	49.0	77.0	113	143	205	282	422	630	785	-
	1500	21.2	8.18	10.2	16.8	22.2	31.7	41.3	65.8	96.4	122	173	242	359	543	676	-
	1000	14.2	5.46	6.83	11.2	14.8	21.1	27.6	43.9	64.3	81.3	116	161	240	362	452	701
	750	10.6	4.10	5.13	8.38	11.2	15.8	20.7	32.9	48.2	60.9	86.5	121	180	272	339	526
78.2	1750	22.4	7.8	11.3	16.8	22.9	36.6	51.0	73.0	98	140	200	262	369	520	725	-
	1500	19.2	6.69	9.71	14.4	19.7	31.1	42.5	61.9	83.1	119	172	223	315	462	624	-
	1000	12.8	4.47	6.48	9.58	13.1	20.9	28.6	41.6	55.4	79.2	114	149	210	308	418	584
	750	9.59	3.35	4.86	7.19	9.83	15.7	21.5	31.1	41.6	59.4	85.0	112	157	232	313	438
86.5	1750	20.2	7.1	10.7	14.5	20.7	33.1	45.0	70.0	87	138	181	260	REFER TO PREMIUM			
	1500	17.3	6.09	9.14	12.4	17.7	28.2	38.2	56.4	74.0	111	155	223				
	1000	11.6	4.06	6.09	8.27	11.8	18.9	25.5	39.5	49.4	78.4	103	149				
	750	8.67	3.05	4.57	6.21	8.87	14.2	18.9	29.6	37.0	58.9	77.6	112				
95.7	1750	18.3	6.6	9.5	11.9	20.1	26.4	39.0	50.0	74	98	156	205	REFER TO PREMIUM			
	1500	15.7	5.63	8.15	10.2	16.2	22.6	31.7	42.4	61.6	83.2	131	175				
	1000	10.4	3.75	5.45	6.78	11.5	15.1	22.1	28.3	41.4	55.5	89.1	117				
	750	7.84	2.81	4.08	5.08	8.63	11.3	16.6	21.2	31.0	41.6	66.8	87.8				

For higher sizes -- REFER TO PREMIUM
Nominal ratios are shown.
Interpolate for other input speeds.
* Forced Lubrication is necessary.

THERMAL CAPACITIES (kW)

Nominal Ratio	Input Speed rpm	Unit Size														
		140	160	180	200	225	250	280	315	355	400	450	500	560	630	710
Units with Cooling Coils †																
14.0	1750	65	89	116	132	150	300	330	641	712	1059	910	1250	1390	1640	2160
	1500	64	88	115	131	148	295	324	619	698	995	860	1240	1380	1630	2150
To	1000	64	87	114	129	146	289	318	590	651	912	788	1230	1370	1620	2130
78.2	750	63	85	111	127	145	287	314	576	627	866	749	1220	1360	1810	2110
86.5	1750	59	79	104	118	133	272	275	511	537	751	635	-	-	-	-
	1500	58	78	103	117	131	270	273	506	524	737	622	-	-	-	-
To	1000	58	76	99	117	129	269	272	500	509	718	607	-	-	-	-
95.7	750	57	73	98	115	128	268	271	499	508	699	596	-	-	-	-
Units With Fan Cooling and Cooling Coils †																
14.0	1750	74	106	140	155	202	337	380	708	813	1160	1050	1550	1760	2140	2771
	1500	72	102	133	151	193	322	360	669	764	1080	968	1540	1750	2130	2750
To	1000	71	97	127	145	181	308	341	621	693	967	856	1530	1740	2120	2730
63.8	750	69	94	123	140	171	301	332	599	656	905	795	1520	1730	2130	2730

Full Load Efficiency - 97% (approx.)
† Based on cooling water temperature 20° C
Cooling Coil not available for vertical units.

Type B4-B4SF

Quadruple Reduction Units - Right Angle Shafts - Mechanical & Thermal Capacities kW

RATINGS
HR-425
1 of 2

MECHANICAL CAPACITIES (kW)

Nominal Ratio	Input Speed rpm	Nominal Output Speed rpm	Unit Size													
			140	160	180	200	225	250	280	315	355	400	450	500	560	630
86.5	1750	20.2	7.8	12.3	18.3	21.4	29.9	50.0	65.0	87.0	110	139	223	385	520	709
	1500	17.34	6.65	10.55	15.70	18.34	25.65	42.93	55.22	74.73	94.55	119	191	330	445	608
	1000	11.56	4.43	7.03	10.46	12.22	17.10	28.62	36.81	49.82	63.0	79.3	127.3	220	297	405
	750	8.67	3.32	5.27	7.85	9.17	12.82	21.46	27.61	37.36	47.3	59.5	95.5	165	222	304
95.7	1750		7.0	11.1	16.3	19.5	27.4	45.5	60.0	80.0	100	126	203	354	483	656
	1500	15.67	5.98	9.49	14.0	16.75	23.53	39.00	50.67	68.16	85.75	108	174	303	414	562
	1000	10.45	3.98	6.32	9.33	11.16	15.68	26.00	33.78	45.44	57.16	72	116	202	276	375
	750	7.83	2.99	4.74	7.0	8.37	11.76	19.5	25.33	34.8	42.8	54	87	151	207	281
106	1750		6.3	10.0	14.7	18.6	25.7	42.5	56.0	75.0	96.0	120	192	312	445	590
	1500	14.15	5.39	8.54	12.62	15.90	22.05	36.46	47.80	64.23	81.62	102	163	267	379	505
	1000	9.43	3.59	5.69	8.41	10.61	14.70	24.31	31.86	42.82	54.4	68	109	178	253	337
	750	7.08	2.69	4.27	6.31	7.95	11.02	18.23	23.90	32.11	40.8	51	82	133	190	252
117	1750		5.7	9.0	13.1	15.8	22.1	37.1	48.0	65.0	82.0	102	166	285	392	525
	1500	12.82	4.85	7.68	11.27	13.57	18.97	31.80	40.81	55.22	69.85	87.5	142	243	336	449
	1000	8.55	3.23	5.12	7.51	9.05	12.65	21.20	27.20	36.81	46.56	58.3	94.6	162	224	300
	750	6.41	2.42	3.84	5.63	6.78	9.48	15.90	20.40	27.61	34.9	43.7	71	121	168	225
130	1750		5.1	8.1	11.8	14.5	20.3	33.5	44.0	59.0	74.0	93.0	148	254	359	468
	1500	11.54	4.36	6.92	10.10	12.40	17.38	28.72	37.31	50.24	63.17	79.6	127	218	308	400
	1000	7.69	2.90	4.61	6.73	8.27	11.58	19.15	24.87	33.50	42.11	53.0	85	145	205	267
	750	5.77	2.18	3.46	5.05	6.20	8.69	14.36	18.65	25.12	31.5	39.8	63.5	109	154	200
144	1750		4.6	7.2	10.6	13.6	18.9	31.3	42.0	56.0	70.0	88.0	142	230	326	442
	1500	10.42	3.93	6.22	9.05	11.66	16.22	26.82	35.19	47.27	60.0	75.2	121	196	279	376
	1000	6.94	2.62	4.14	6.03	7.77	10.81	17.88	23.46	31.51	40.0	50.1	81	131	186	251
	750	5.21	1.96	3.11	4.52	5.83	8.11	13.41	17.73	23.63	30.0	37.6	60.5	98	140	188
159	1750		4.1	6.5	9.5	12.3	17.2	28.3	37.0	50.0	63.0	80.0	128	212	300	402
	1500	9.43	3.53	5.60	8.11	10.57	14.73	24.27	31.69	42.82	54.38	68.1	109	181	257	342
	1000	6.29	2.35	3.73	5.40	7.05	9.82	16.18	21.12	28.55	36.0	45.4	73	121	171	228
	750	4.72	1.76	2.80	4.05	5.28	7.36	12.13	15.84	21.41	27.19	34.0	54.5	91	128	171
176	1750		3.7	5.9	8.5	11.1	15.5	25.6	33.5	46.0	58.0	72.0	114	192	269	350
	1500	8.52	3.18	5.05	7.26	9.56	13.25	21.94	28.72	38.69	49.08	61.6	98	163	229	300
	1000	5.68	2.12	3.36	4.84	6.37	8.83	14.62	19.15	25.79	32.72	41.05	65	109	153	200
	750	4.26	1.59	2.52	3.63	4.78	6.62	10.97	14.36	19.35	24.54	30.8	49	82	115	150
195	1750		3.3	5.3	7.6	10.0	14.0	23.1	30.2	41.0	52.0	65.0	104	174	245	322
	1500	7.69	2.86	4.54	6.49	8.61	11.98	19.82	25.86	34.98	44.31	55.5	89	148	209	276
	1000	5.13	1.90	3.02	4.32	5.74	7.98	13.21	17.24	23.32	29.5	37.0	59	99	139	184
	750	3.85	1.43	2.27	3.24	4.30	5.99	9.91	12.93	17.49	22.1	27.7	44.5	74	105	138

REFER TO PREMIUM

For higher sizes -- REFER TO PREMIUM

Nominal ratios are shown.
Interpolate for other input speeds.

THERMAL CAPACITIES (kW)

Nominal Ratio	Input Speed rpm	Unit Size															
		140	160	180	200	225	250	280	315	355	400	450	500	560	630	710	
Units without Fan																	
86.5	1750	15	19	25	56	71	91	119	147	173	207	262	332	422	541	REFER TO PREMIUM	
	1500	14	18	23	53	69	86	111	140	168	204	253	323	400	527		
	To	1000	13	17	21	50	64	81	101	134	162	200	241	309	382		509
	438	750	12	15	19	47	61	78	99	129	153	197	235	300	373		504

Full Load Efficiency - 96.5% (approx.)

Type B4-B4SF

Quadruple Reduction Units - Right Angle Shafts - Mechanical & Thermal Capacities kW

RATINGS
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MECHANICAL CAPACITIES (kW)

Nominal Ratio	Input Speed rpm	Nominal Output Speed	Unit Size														
			140	160	180	200	225	250	280	315	355	400	450	500	560	630	710
215	1750		3.0	4.8	6.8	9.0	12.6	20.8	27.1	36.5	47.0	61.0	93.0	159	224	292	REFER TO PREMIUM
	1500	6.97	2.57	4.08	5.82	7.75	10.81	17.81	23.21	31.48	40.07	51.9	80	135	192	249	
	1000	4.65	1.71	2.72	3.88	5.16	7.20	11.87	15.47	20.98	26.71	34.6	53	90	128	166	
	750	3.48	1.28	2.04	2.91	3.87	5.40	8.90	11.60	15.74	20.03	26.0	40	67.5	96	125	
238	1750		2.7	4.3	6.1	8.2	11.4	18.9	24.9	33.4	43.0	53.0	86.0	142	203	264	
	1500	6.30	2.32	3.68	5.21	7.00	9.82	16.22	21.30	28.62	36.36	45.5	73	121	173	225	
	1000	4.20	1.54	2.45	3.47	4.66	6.54	10.81	14.20	19.08	24.24	30.3	49	81	115	150	
	750	3.15	1.16	1.84	2.60	3.50	4.91	8.11	10.65	14.31	18.18	22.7	36.5	60.5	87	113	
264	1750		2.4	3.9	5.4	7.5	10.4	17.2	22.5	30.3	39.0	48.3	78.0	122	178	234	
	1500	5.68	2.09	3.31	4.66	6.43	8.92	14.73	19.29	25.97	33.18	41.5	66	104	152	200	
	1000	3.78	1.39	2.20	3.10	4.28	5.95	9.82	12.86	17.31	22.12	27.6	44	69	101	133	
	750	2.84	1.04	1.65	2.33	3.21	4.46	7.36	9.64	12.98	16.59	20.7	33	52	76	100	
292	1750		2.2	3.5	4.9	6.8	9.4	15.6	20.4	27.4	35.0	43.6	72.0	112	165	210	
	1500	5.13	1.88	2.98	4.18	5.82	8.06	13.35	17.49	23.53	30.0	37.4	60.0	96	139	179	
	1000	3.42	1.25	1.98	2.78	3.88	5.37	8.90	11.66	15.68	20.0	24.9	40	64	93	119	
	750	2.56	0.94	1.49	2.10	2.91	4.03	6.67	8.74	11.76	15.0	18.7	30.0	48	70	90	
323	1750		2.0	3.1	4.4	5.5	6.0	7.2	12.1	16.9	21.0	29.1	40.0	105	147	REFER TO PREMIUM	
	1500	4.64	1.69	2.68	3.74	4.70	5.18	6.19	10.36	14.52	18.0	24.9	34.3	90	126		
	1000	3.09	1.12	1.78	2.49	3.13	3.45	4.12	6.90	9.68	12.0	16.6	22.8	60	84		
	750	2.32	0.84	1.34	1.87	2.35	2.59	3.9	5.18	7.26	9.0	12.5	17.1	45	63		
358	1750		1.8	2.8	3.9	5.0	5.5	6.5	11.0	15.3	20.0	26.4	36.8	98.0	130		
	1500	4.19	1.52	2.41	3.35	4.3	4.69	5.59	9.40	13.14	16.43	22.7	31.4	83	110		
	1000	2.79	1.01	1.60	2.23	2.86	3.12	3.72	6.26	8.76	10.95	15.1	21.0	55	73		
	750	2.09	0.76	1.20	1.67	2.15	2.35	2.80	4.70	6.57	8.21	11.3	15.7	41.5	55		
396	1750		1.6	2.5	3.5	4.4	5.0	5.9	9.9	13.8	17.3	24.0	32.9	84.0	118		
	1500	3.78	1.37	2.17	3.00	3.80	4.25	5.05	8.50	11.87	14.84	20.6	28.3	72	101		
	1000	2.52	0.91	1.44	2.00	2.53	2.83	3.36	5.66	7.91	9.89	13.7	18.8	48	67		
	750	1.89	0.68	1.08	1.50	1.90	2.12	2.52	4.25	5.93	7.41	10.3	14.1	36	51		
438	1750		1.4	2.3	3.1	4.0	4.5	5.4	9.0	12.6	15.7	21.5	29.9	70.0	108		
	1500	3.42	1.23	1.95	2.69	3.5	3.88	4.61	7.71	10.81	13.46	18.5	25.7	60	92		
	1000	2.28	0.82	1.30	1.79	2.3	2.58	3.07	5.14	7.20	8.97	12.3	17.1	40	61		
	750	1.71	0.61	0.97	1.34	1.75	1.94	2.30	3.85	5.40	6.73	9.25	12.85	30	46		

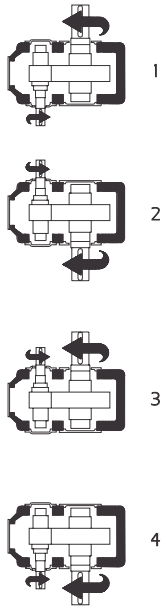
For higher sizes -- **REFER TO PREMIUM**
Full Load Efficiency - 96.5% (approx.)

Type H1-Foot Mounted Units

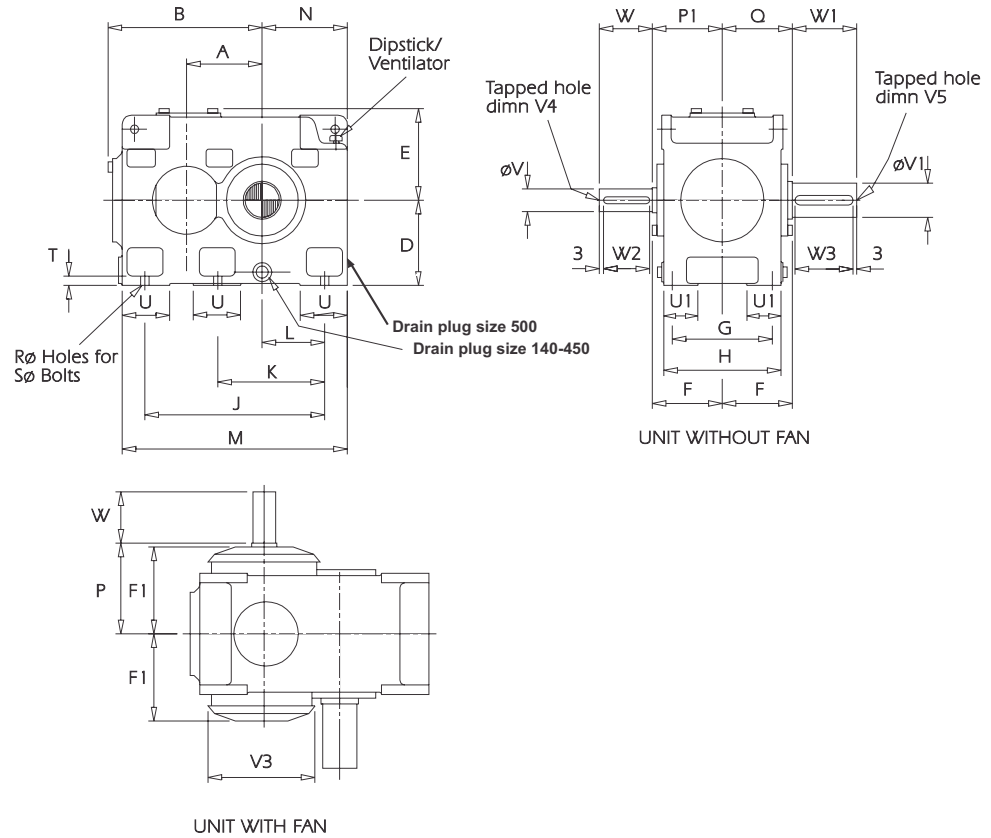
Single Reduction - Parallel Shafts - Principal Dimensions (mm)

DIMENSIONS
HD-110
1 of 2

SHAFT
HANDING / ROTATION



OPPOSITE ROTATION
AVAILABLE



Unit Size	A	B	D	E	F	F1	G	H	J	K	L	M	N	P
125	125	238	140	160	115	157	155	184	290	-	105	380	150	165
140	140	299	160	174	135	180	190	224	335	-	120	425	165	185
160	160	342	180	194	155	200	225	260	375	-	135	475	185	205
180	180	382	200	214	170	220	250	290	425	-	147.5	530	200	225
200	200	408	225	239	180	230	265	310	475	-	165	595	225	235
225	225	465	250	267	203	255	280	340	530	-	185	660	250	260
250	250	515	280	298	215	275	300	370	600	-	210	740	280	280
280	280	570	315	327	235	300	335	410	670	-	240	820	315	305
315	315	651	355	350	256	325	375	450	750	-	270	920	355	330
355	355	711	400	405	286	360	425	500	865	530	305	1055	400	365
400	400	808	450	456	320	400	475	560	1000	600	350	1200	450	405
450	450	908	500	497	360	445	530	640	1120	670	395	1330	500	450
500	500	1015	560	624	410	505	630	720	1250	750	440	1490	560	515

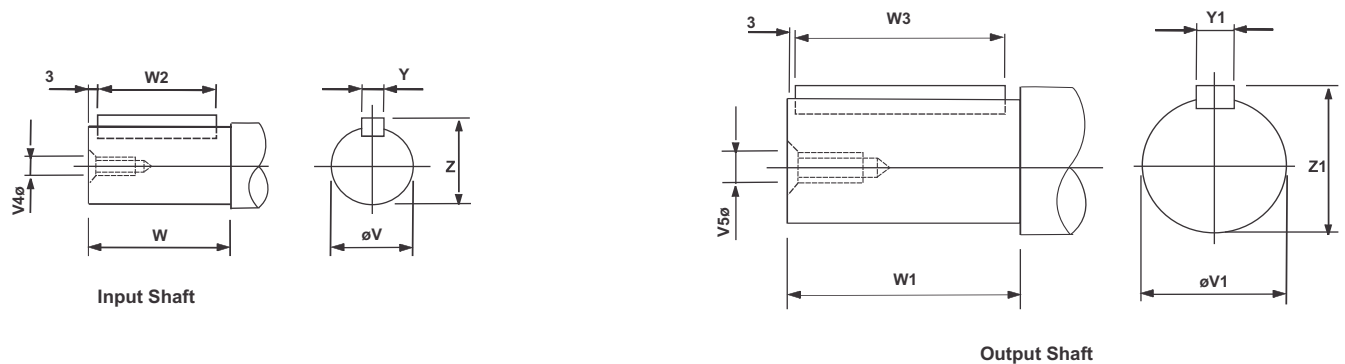
Unit Size	P1	Q	R	S	T	U	U1	V	V1	V3	W	W1
125	120	120	14	4X12	20	90	55	40	60	-	80	110
140	140	140	14	4X12	20	100	60	45	70	120	110	140
160	160	160	18	4x16	20	110	70	50	75	125	110	140
180	175	175	18	4x16	25	120	85	55	85	135	110	170
200	185	185	22	4x20	25	125	90	60	90	296	140	170
225	205	205	22	4x20	30	130	95	70	100	320	140	210
250	220	220	26	4x24	30	140	115	80	110	350	170	210
280	240	240	26	4x24	35	160	125	90	125	400	170	210
315	260	260	33	4x30	40	180	130	100	140	440	210	250
355	290	290	33	6x30	50	200	155	110	160	500	210	300
400	325	325	39	6x36	55	220	175	125	180	550	210	300
450	365	365	39	6x36	60	250	195	140	200	606	250	350
500	420	420	45	6x42	65	280	220	160	220	660	300	350

See sheet 2 of HD-110 for shaft and keyway details.

Type H1-Foot Mounted Units

Single Reduction - Parallel Shafts - Principal Dimensions (mm)

DIMENSIONS
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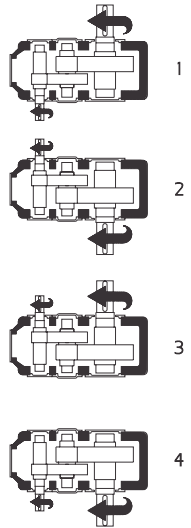
Unit Size	Input Shafts						Output Shafts					
	V	V4	W	W2	Y	Z	V1	V5	W1	W3	Y1	Z1
125	40.014	M16x36	80	73	12	43	60.03	M20x42	110	102	18	64
	40.002				11.957	48.2	60.011					17.957
140	45.018	M16x36	110	102	14.000	48.5	70.030	M20x42	140	130	20.000	74.5
	45.002				13.957	48.3	70.011				19.948	74.3
160	50.018	M16x36	110	102	14.000	53.5	75.030	M20x42	140	130	20.000	79.5
	50.002				13.957	53.3	75.011				19.948	79.3
180	55.030	M20x42	110	102	16.000	59.0	85.035	M20x42	170	160	22.000	90.0
	55.011				15.957	58.8	85.013				21.948	89.8
200	60.030	M20x42	140	130	18.000	64.0	90.035	M24x50	170	160	25.000	95.0
	60.011				17.957	63.8	90.013				24.948	94.8
225	70.030	M20x42	140	130	20.000	74.5	100.035	M24x50	210	200	28.000	106.0
	70.011				19.948	74.3	100.013				27.948	105.8
250	80.030	M20x42	170	160	22.000	85.0	110.035	M24x50	210	200	28.000	116.0
	80.011				21.948	84.8	110.013				27.948	115.8
280	90.035	M24x50	170	160	25.000	95.0	125.040	M24x50	210	200	32.000	132.0
	90.013				24.948	94.8	125.015				31.938	131.8
315	100.035	M24x50	210	200	28.000	106.0	140.040	M30x60	250	240	36.000	148.0
	100.013				27.948	105.8	140.015				35.938	147.7
355	110.035	M24x50	210	200	28.000	116.0	160.040	M30x60	300	290	40.000	169.0
	110.013				27.948	115.8	160.015				39.938	168.7
400	125.040	M24x50	210	200	32.000	132.0	180.040	M30x60	300	290	45.000	190.0
	125.015				31.938	131.8	180.015				44.938	189.7
450	140.040	M30x60	250	240	36.000	148.0	200.046	M30x60	350	340	45.000	210.0
	140.015				35.938	147.7	200.017				44.938	209.7
500	160.040	M30x60	300	290	40.000	169.0	220.046	M30x60	350	340	50.000	231.0
	160.015				39.938	168.7	220.017				49.938	230.7

Type H2-Foot Mounted Units

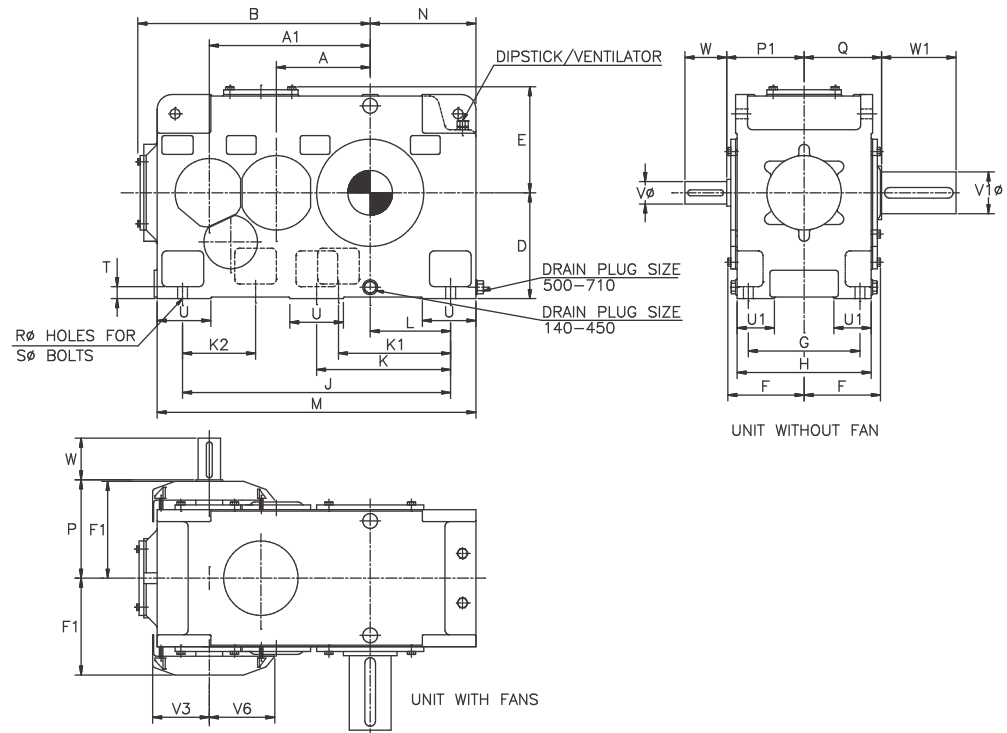
DIMENSIONS
HD-210
1 of 2

Double Reduction - Parallel Shafts - Principal Dimensions (mm)

SHAFT
HANDING / ROTATION



OPPOSITE ROTATION
AVAILABLE



Unit Size	A	A1	B	D	E	F	F1	G	H	J	K	K1	K2	L	M	N	P
125	125	225	346	140	154	120	165	160	194	375	-	-	-	105	465	150	170
140	140	240	364	160	174	135	180	190	224	405	-	-	-	120	495	165	185
160	160	272	406	180	194	155	200	225	260	450	-	-	-	135	550	185	205
180	180	305	449	200	214	173	220	250	290	505	-	-	-	147.5	610	200	225
200	200	340	499	225	239	180	230	265	310	560	-	-	-	165	680	225	235
225	225	385	567	250	267	203	255	280	340	630	-	-	-	185	760	250	260
250	250	430	632	280	298	215	275	300	370	710	-	-	-	210	850	280	280
280	280	480	687	315	327	237	300	335	410	800	-	-	-	240	950	315	305
315	315	540	780	355	350	256	325	375	450	900	-	-	-	270	1070	355	330
355	355	605	870	400	405	286	360	425	500	1005	530	-	-	305	1195	400	365
400	400	680	972	450	456	320	400	475	560	1160	600	-	-	350	1360	450	405
450	450	765	1101	500	497	360	445	530	640	1300	670	-	-	395	1510	500	450
500	500	855	1225	560	552	410	500	630	720	1460	750	-	-	440	1700	560	510

Unit Size	P1	Q	R	S	T	U	U1	V	V1	V3	V6	W	W1
125	125	125	14	4X12	20	100	60	25	55	105	110	60	110
140	140	140	14	4x12	20	100	60		70	105	110		140
160	160	160	18	4x16	20	110	70		75	108	115		140
180	175	175	18	4x16	25	120	85		85	120	125		
200	185	185	22	4x20	25	125	90	Refer sheet 2 of HD-210	90	130	148	Refer sheet 2 of HD-210	170
225	205	205	22	4x20	30	130	95		100	140	160		210
250	220	220	26	4x24	30	140	115		110	155	175		210
280	240	240	26	4x24	35	160	125		125	170	200		210
315	260	260	33	4x30	40	180	130		140	190	220		250
355	290	290	33	6x30	50	200	155		160	214	250		300
400	325	325	39	6x36	55	220	175		180	245	275		300
450	365	365	39	6x36	60	250	195		200	265	303		350
500	420	420	45	6x42	65	280	220		220	250	250		350

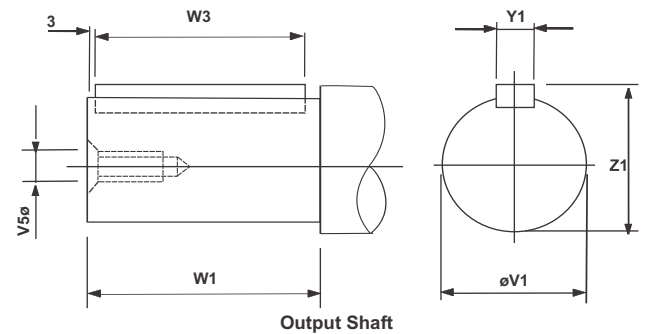
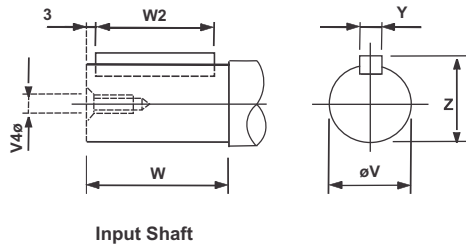
See Sheet 2 of HD-210 for shaft and keyway details.

Sizes 200 to 315 have 4 facings. U sizes 355 to 500 have 6 facings and sizes 560 to 710 have 8. Ventilator is located on top cover, sizes 500 to 710 E is over ventilator on these sizes and dipstick position is as shown.

Type H2-Foot Mounted Units

Double Reduction - Parallel Shafts - Principal Dimensions (mm)

DIMENSIONS
HD-210
2 of 2



Unit Size	Input Shafts Detail-Ratios 11.4/1 to 25.6/1					
	V	V4	W	W2	Y	Z
125	25.009 24.996	M10x22	60	53	8 7.964	28 27.8
140	32.018 32.002	M12x28	80	73	10.000 9.964	35.0 34.8
160	35.018 35.002	M12x28	80	73	10.000 9.964	38.0 37.8
180	38.018 38.002	M12x28	80	73	10.000 9.964	41.0 40.8
200	38.018 38.002	M12x28	80	73	10.000 9.964	41.0 40.8
225	45.018 45.002	M16x36	110	102	14.000 13.957	48.5 48.3
250	55.030 55.011	M20x42	110	102	16.000 15.957	59.0 58.8
280	65.030 65.011	M20x42	140	130	18.000 17.957	69.0 68.8
315	75.030 75.011	M20x42	140	130	20.000 19.948	79.5 79.3
355	85.035 85.013	M20x42	170	160	22.000 21.948	90.0 89.8
400	90.035 90.013	M24x50	170	160	25.000 24.948	95.0 94.8
450	100.035 100.013	M24x50	210	200	28.000 27.948	106.0 105.8
500	110.035 110.013	M24x50	210	200	28.000 27.948	116.0 115.8

Output Shafts					
V1	V5	W1	W3	Y1	Z1
55.03 55.011	M20x42	110	102	16 15.957	59 58.8
70.030 70.011	M20x42	140	130	20.000 19.948	74.5 74.3
75.030 75.011	M20x42	140	130	20.000 19.948	79.5 79.3
85.035 85.013	M20x42	170	160	22.000 21.948	90.0 89.8
90.035 90.013	M24x50	170	160	25.000 24.948	95.0 94.8
100.035 100.013	M24x50	210	200	28.000 27.948	106.0 105.8
110.035 110.013	M24x50	210	200	28.000 27.948	116.0 115.8
125.040 125.015	M24x50	210	200	32.000 31.938	132.0 131.8
140.040 140.015	M30x60	250	240	36.000 35.938	148.0 147.7
160.040 160.015	M30x60	300	290	40.000 39.938	169.0 168.7
180.040 180.015	M30x60	300	290	45.000 44.938	190.0 189.7
200.046 200.017	M30x60	350	340	45.000 44.938	210.0 209.7
220.046 220.017	M30x60	350	340	50.000 49.938	231.0 230.7

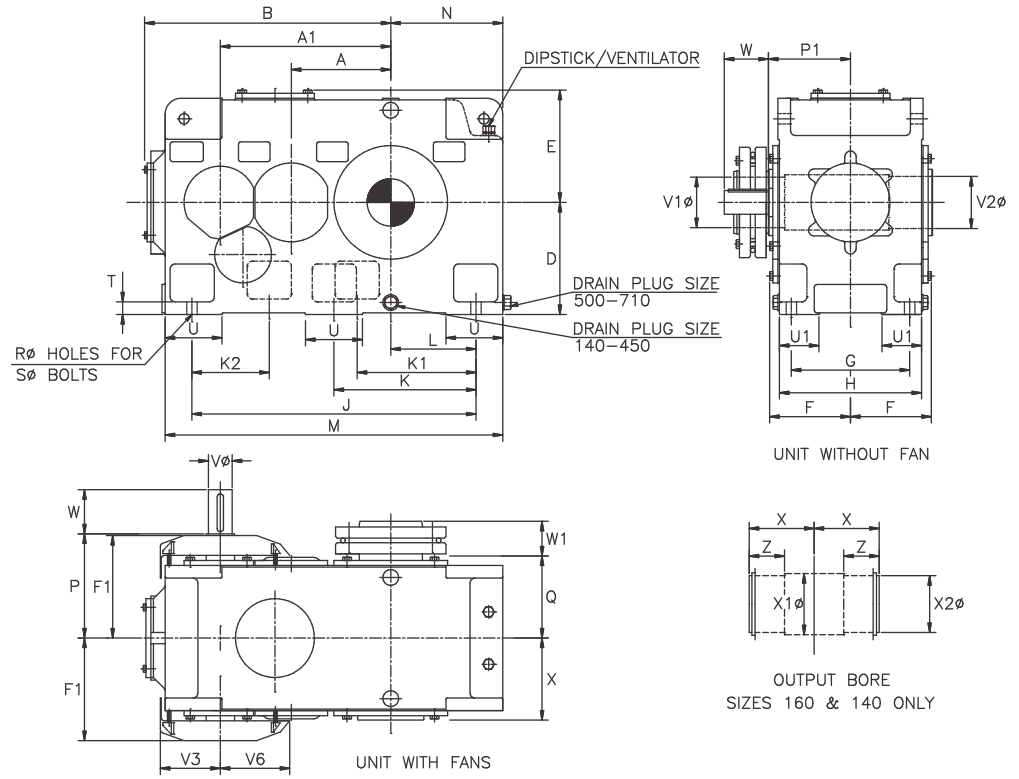
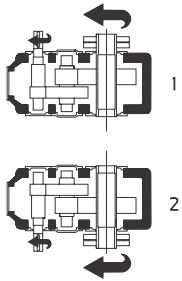
Unit Size	Input Shaft Details - Ratios 5.6/1 to 10.3/1					
	V	V4	W	W2	Y	Z
125	25.009 24.996	M10x22	60	53	8 7.964	28 27.8
140	32.018 32.002	M12x28	80	73	10.000 9.964	35.0 34.8
160	38.018 38.002	M12x28	80	73	10.000 9.964	41.0 40.8
180	45.018 45.002	M16x36	110	102	14.000 13.957	48.5 48.3
200	50.018 50.002	M16x36	110	102	14.000 13.957	53.5 53.3
225	55.030 55.011	M20x42	110	102	16.000 15.957	59.0 58.8
250	65.030 65.011	M20x42	140	130	18.000 17.957	69.0 68.8
280	75.030 75.011	M20x42	140	130	20.000 19.948	79.5 79.3

Type H2SF-Foot/Shaft Mounted Units

DIMENSIONS
HD-212
1 of 2

Double Reduction - Parallel Shafts - Principal Dimensions (mm)

SHAFT
HANDING / ROTATION



Unit Size	A	A1	B	D	E	F	F1	G	H	J	K	K1	K2	L	M	N	P
140	140	240	364	160	174	135	180	190	224	405	-	-	-	120	495	165	185
160	160	272	406	180	194	155	200	225	260	450	-	-	-	135	550	185	205
180	180	305	449	200	214	173	220	250	290	505	-	-	-	147.5	610	200	225
200	200	340	499	225	239	180	230	265	310	560	-	-	-	165	680	225	235
225	225	385	567	250	267	203	255	280	340	630	-	-	-	185	760	250	260
250	250	430	632	280	298	215	275	300	370	710	-	-	-	210	850	280	280
280	280	480	687	315	327	237	300	335	410	800	-	-	-	240	950	315	305
315	315	540	780	355	350	256	325	375	450	900	-	-	-	270	1070	355	330
355	355	605	870	400	405	286	360	425	500	1005	530	-	-	305	1195	400	365
400	400	680	972	450	456	320	400	475	560	1160	600	-	-	350	1360	450	405
450	450	765	1101	500	497	360	445	530	640	1300	670	-	-	395	1510	500	450
500	500	855	1225	560	552	410	500	630	720	1460	750	-	-	440	1700	560	510

Unit Size	P1	Q	R	S	T	U	U1	V	V1	V2	V3	V6	W	W1	X	X1	X2	Z
140	140	-	14	4x12	20	100	60	-	-	-	105	110	-	-	140	76	75	75
160	160	-	18	4x16	20	110	70	-	-	-	108	115	-	-	160	86	85	85
180	175	175	18	4x16	25	120	85	85	90	120	125	125	65	175	-	-	-	
200	185	185	22	4x20	25	125	90	95	100	130	148	160	70	185	-	-	-	
225	205	205	22	4x20	30	130	95	115	120	140	160	175	80	205	-	-	-	
250	220	220	26	4x24	30	140	115	125	130	155	175	200	90	220	-	-	-	
280	240	240	26	4x24	35	160	125	140	145	170	200	220	105	240	-	-	-	
315	260	260	33	4x30	40	180	130	160	165	190	220	250	110	260	-	-	-	
355	290	290	33	6x30	50	200	155	170	175	214	250	280	130	290	-	-	-	
400	325	325	39	6x36	55	220	175	190	200	245	275	300	150	325	-	-	-	
450	365	365	39	6x36	60	250	195	220	230	265	303	330	160	365	-	-	-	
500	420	420	45	6x42	65	280	220	250	260	250	250	280	185	420	-	-	-	

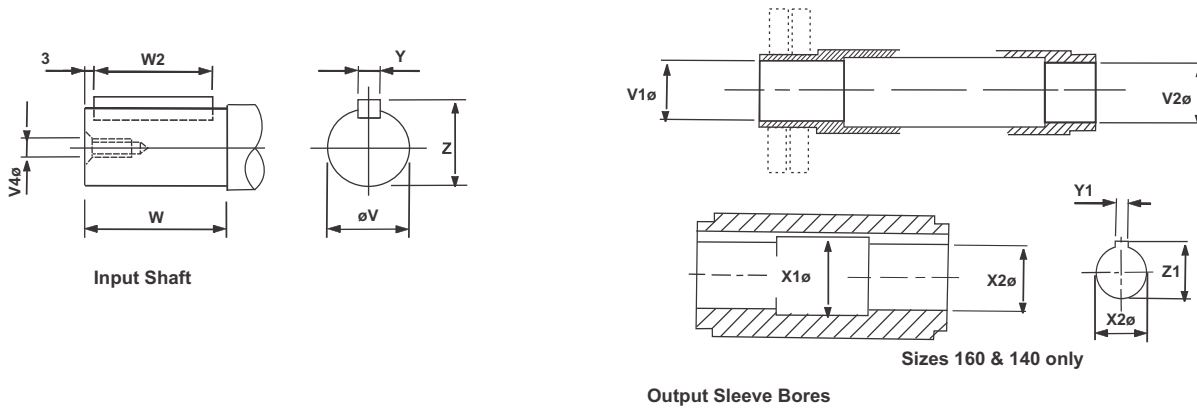
See Sheet 2 of HD-212 for shaft and keyway details.

Sizes 200 to 315 have 4 facings. Sizes 355 to 500 have 6 facings and sizes 560 to 710 have 8. Ventilator is located on top cover for sizes 500 to 710. 'E' is over ventilator these sizes and dipstick position is as shown.

Type H2SF-Foot/Shaft Mounted Units

DIMENSIONS
HD-212
2 of 2

Double Reduction - Parallel Shafts - Principal Dimensions (mm)



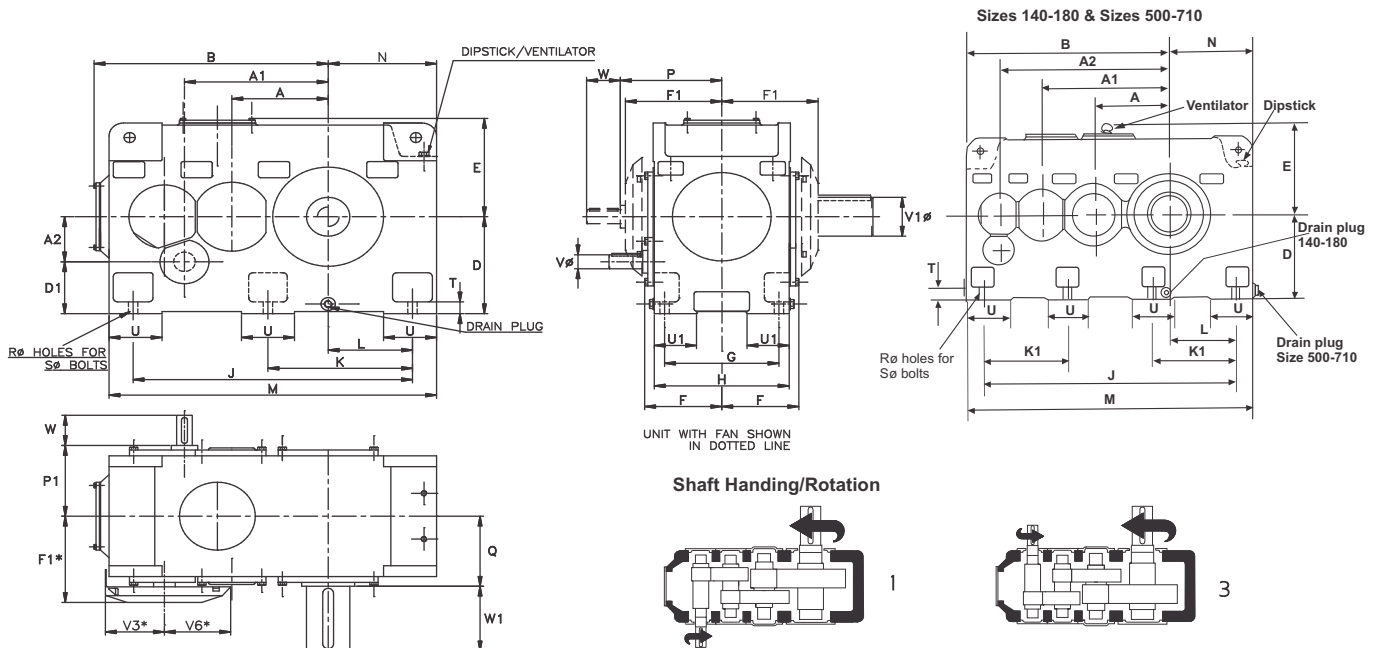
Unit Size	Input Shaft Details - Ratios 11.4/1 to 25.6/1						Output Sleeve Bores					
	V	V4	W	W2	Y	Z	V1	V2	X1	X2	Z1	Y1
140	32.018	M12x28	80	73	10.000	35.0	-	-	76	75.060	80.1	20.026
	32.002				9.964	34.8						
160	35.018	M12x28	80	73	10.000	38.0	-	-	86	85.071	90.6	22.026
	35.002				9.964	37.8						
180	38.018	M12x28	80	73	10.000	41.0	85.035	90.047	-	-	-	-
	38.002				9.964	40.8	85.000	90.012				
200	38.018	M12x28	80	73	10.000	41.0	95.035	100.047	-	-	-	-
	38.002				9.964	40.8	95.000	100.012				
225	45.018	M16x36	110	102	14.000	48.5	115.035	120.047	-	-	-	-
	45.002				13.957	48.3	115.000	120.012				
250	55.030	M20x42	110	102	16.000	59.0	125.040	130.054	-	-	-	-
	55.011				15.957	58.8	125.000	130.014				
280	65.030	M20x42	140	130	18.000	69.0	140.040	145.054	-	-	-	-
	65.011				17.957	68.8	140.000	145.014				
315	75.030	M20x42	140	130	20.000	79.5	160.040	165.054	-	-	-	-
	75.011				19.948	79.3	160.000	165.014				
355	85.035	M20x42	170	160	22.000	90.0	170.040	175.054	-	-	-	-
	85.013				21.948	89.8	170.000	175.014				
400	90.035	M24x50	170	160	25.000	95.0	190.046	200.061	-	-	-	-
	90.013				24.948	94.8	190.000	200.015				
450	100.035	M24x50	210	200	28.000	106.0	220.046	230.061	-	-	-	-
	100.013				27.948	105.8	220.000	230.015				
500	110.035	M24x50	210	200	28.000	116.0	250.046	260.069	-	-	-	-
	110.013				27.948	115.8	250.000	260.017				

Input Shaft Details - Ratios 5.6/1 to 10.3/1 only						
Unit Size	V	V4	W	W2	Y	Z
140	32.018	M12x28	80	73	10.000	35.0
	32.002				9.964	34.8
160	38.018	M12x28	80	73	10.000	41.0
	38.002				9.964	40.8
180	45.018	M16x36	110	102	14.000	48.5
	45.002				13.957	48.3
200	50.018	M16x36	110	102	14.000	53.5
	50.002				13.957	53.3
225	55.030	M20x42	110	102	16.000	59.0
	55.011				15.957	58.8
250	65.030	M20x42	140	130	18.000	69.0
	65.011				17.957	68.8
280	75.030	M20x42	140	130	20.000	79.5
	75.011				19.948	79.3

Type H3-Foot Mounted Units

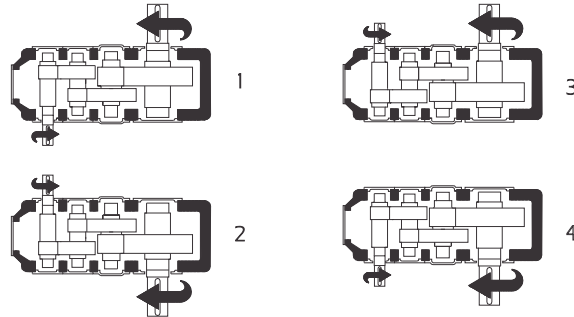
Triple Reduction - Parallel Shafts - Principal Dimensions (mm)

DIMENSIONS
HD-310
1 of 2



* SIZES 140-180 UNIT WITHOUT FAN
* SIZES 200-450 UNIT WITH ONE FAN
* SIZES 500-800 UNIT WITH TWO FAN

Shaft Handling/Rotation



Unit Size	A	A1	A2	B	D	D1	E	F	F1*	G	H	J	K	K1	L	M
125	125	215	286	366	140	-	154	120	-	160	194	426	-	-	105	516
140	140	240	320	434	160	-	174	135	-	190	224	490	-	-	120	580
160	160	272	362	481	180	-	194	155	-	225	260	540	-	-	135	640
180	180	305	405	529	200	-	214	173	-	250	290	600	-	-	147.5	705
200	200	296	103	499	225	122	239	180	230	265	310	560	-	-	165	680
225	225	343.8	118	567	250	132	267	203	255	280	340	630	-	-	185	760
250	250	378	130	632	280	150	298	215	275	300	370	710	-	-	210	850
280	280	419.2	148	687	315	167	327	237	300	335	410	800	-	-	240	950
315	315	468	165	780	355	190	350	256	325	375	450	900	-	-	270	1070
355	355	536.8	188	870	400	212	405	286	360	425	500	1005	530	-	305	1195
400	400	596.7	209	972	450	241	456	320	400	475	560	1160	600	-	350	1360
450	450	679.7	235	1101	500	265	497	360	445	530	640	1300	670	-	395	1510
500	500	855	1135	1360	560	-	552	410	495	630	720	1680	-	560	440	1920

Unit Size	N	P	P1	Q	R	S	T	U	U1	V	V1	V3*	V6*	W	W1
125	150	-	125	125	14	4x12	20	100	60	19	58	-	-	40	110
140	165	-	140	140	14	4x12	20	100	60		70	-	-		140
160	185	-	160	160	18	4x16	20	110	70	Refer sheet 2 of HD-310	75	-	-		140
180	200	-	175	175	18	4x16	25	120	85		85	-	-		170
200	225	-	185	185	22	4x20	25	125	90		90	130	148		170
225	250	-	205	205	22	4x20	30	130	95		100	140	160		210
250	280	-	220	220	26	4x24	30	140	115		110	155	175		210
280	315	-	240	240	26	4x24	35	160	125		125	170	200		210
315	355	-	260	260	33	4x30	40	180	130		140	190	220		250
355	400	-	290	290	33	6x30	50	200	155		160	214	250		300
400	450	-	325	325	39	6x36	55	220	175		180	245	275		300
450	500	-	365	365	39	6x36	60	250	195		200	265	303		350
500	560	505	420	420	45	8x42	65	280	220	220	200	200		350	

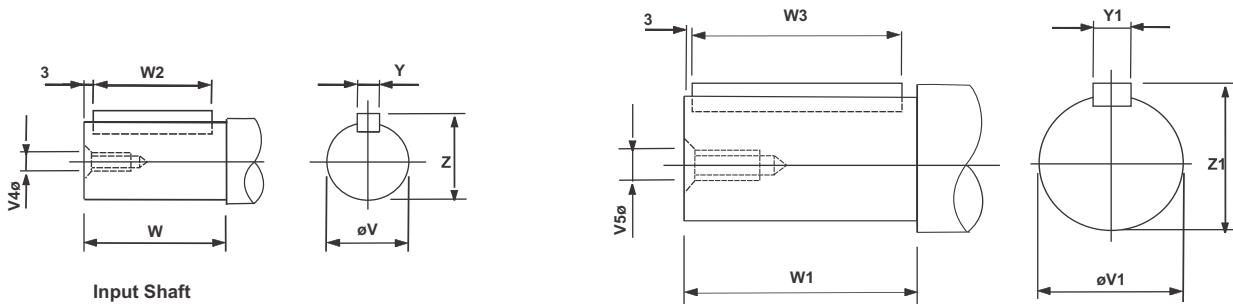
* Fan can be fitted for ratios 20.9 to 70.6 only.
See Sheet 2 of HD-310 for shaft and keyway details.
Ventilator is located on top cover, sizes 500 to 710. E is over ventilator on these sizes

Sizes 140 to 315 have 4 facings.
U sizes 355 to 450 have 6 facings and sizes 500 to 710 have 8

Type H3-Foot Mounted Units

DIMENSIONS
HD-310
2 of 2

Triple Reduction - Parallel Shafts - Principal Dimensions (mm)



Input Shaft

Output Shaft

Input Shaft Details - Ratios 52.1 to 130						
Unit Size	V	V4	W	W2	Y	Z
125	19.009	M6x16	40	34	6.000	21.5
	18.996				5.970	21.4
140	19.009	M6x16	40	34	6.000	21.5
	18.996				5.970	21.4
160	22.009	M8x19	50	43	6.000	24.5
	21.996				5.970	24.4
180	25.009	M10x22	60	53	8.000	28.0
	24.996				7.964	27.8
200	28.009	M10x22	60	53	8.000	31.0
	27.996				7.964	30.8
225	32.018	M12x28	80	73	10.000	35.0
	32.002				9.964	34.8
250	38.018	M12x28	80	73	10.000	41.0
	38.002				9.964	40.8
280	45.018	M16x36	110	102	14.000	48.5
	45.002				13.957	48.3
315	50.018	M16x36	110	102	14.000	53.5
	50.002				13.957	53.3
355	55.030	M20x42	110	102	16.000	59.0
	55.011				15.957	58.8
400	65.030	M20x42	140	130	18.000	69.0
	65.011				17.957	68.8
450	75.030	M20x42	140	130	20.000	79.5
	75.011				19.948	79.3
500	90.035	M24x50	170	160	25.000	95.0
	90.013				24.948	94.8

Output Shafts					
V1	V5	W1	W3	Y1	Z1
55.03	M20x42	110	102	16.000	59.0
55.011				15.957	58.8
70.030	M20x42	140	130	20.000	74.5
70.011				19.948	74.3
75.030	M20x42	140	130	20.000	79.5
75.011				19.948	79.3
85.035	M20x42	170	160	22.000	90.0
85.013				21.948	89.8
90.035	M24x50	170	160	25.000	95.0
90.013				24.948	94.8
100.035	M24x50	210	200	28.000	106.0
100.013				27.948	105.8
110.035	M24x50	210	200	28.000	116.0
110.013				27.948	115.8
125.040	M24x50	210	200	32.000	132.0
125.015				31.938	131.8
140.040	M30x60	250	240	36.000	148.0
140.015				35.938	147.7
160.040	M30x60	300	290	40.000	169.0
160.015				39.938	168.7
180.040	M30x60	300	290	45.000	190.0
180.015				44.938	189.7
200.046	M30x60	350	340	45.000	210.0
200.017				44.938	209.7
220.046	M30x60	350	340	50.000	231.0
220.017				49.938	230.7

Input Shaft Details - Ratios 25.6 to 47.1

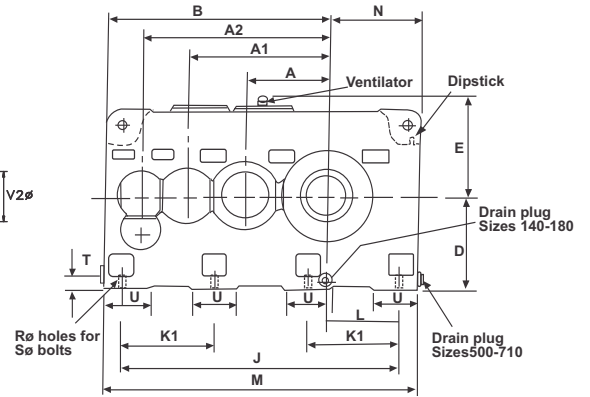
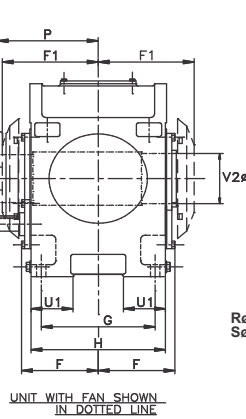
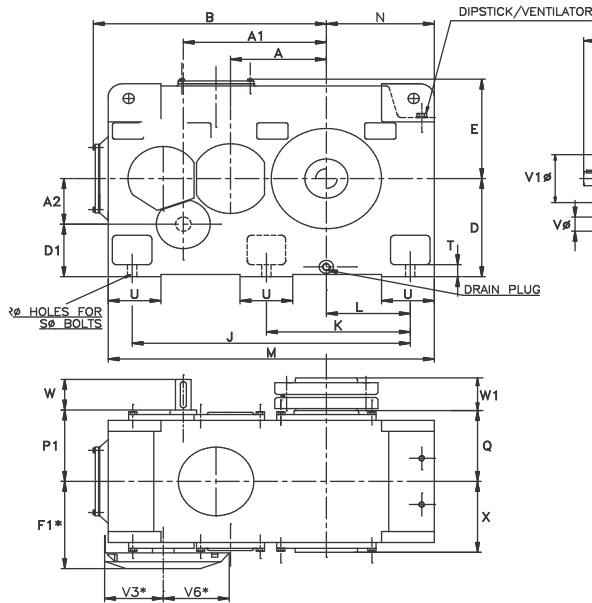
Unit Size	V	V4	W	W2	Y	Z
125	19.009	M6x16	40	34	6.000	21.5
	18.996				5.970	21.4
140	19.009	M6x16	40	34	6.000	21.5
	18.996				5.970	21.4
160	28.009	M10x22	60	53	8.000	31.0
	27.996				7.964	30.8
180	28.009	M10x22	60	53	8.000	31.0
	27.996				7.964	30.8
200	32.018	M12x28	60	53	10.000	35.0
	32.002				9.964	34.8
225	38.018	M12x28	80	73	10.000	41.0
	38.002				9.964	40.8
250	50.018	M16x36	110	102	14.000	53.5
	50.002				13.957	53.3
280	55.030	M20x42	110	102	16.000	59.0
	55.011				15.957	58.8
315	55.030	M20x42	110	102	16.000	59.0
	55.011				15.957	58.8
355	65.030	M20x42	140	130	18.000	69.0
	65.011				17.957	68.8

Type H3SF-Foot/Shaft Mounted Units

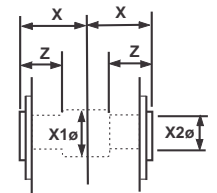
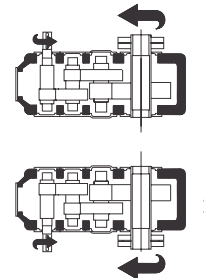
Triple Reduction - Parallel Shafts - Principal Dimensions (mm)

DIMENSIONS
HD-312
1 of 2

Sizes 140-180 & 500-710



Shaft Handing/Rotation



Output Bore
Sizes 160 & 140 only

- * SIZES 140-180 UNIT WITHOUT FAN
- * SIZES 200-450 UNIT WITH ONE FAN
- * SIZES 500-710 UNIT WITH TWO FANS

Unit Size	A	A1	A2	B	D	D1	E	F	F1*	G	H	J	K	K1	L	M	N
140	140	240	320	434	160	-	174	135	-	190	224	490	-	-	120	580	165
160	160	272	362	481	180	-	194	155	-	225	260	540	-	-	135	640	185
180	180	305	405	529	200	-	214	173	-	250	290	600	-	-	147.5	705	200
200	200	296	103	499	225	122	239	180	230	265	310	560	-	-	165	680	225
225	225	343.8	118	567	250	132	267	203	255	280	340	630	-	-	185	760	250
250	250	378	130	632	280	150	298	215	275	300	370	710	-	-	210	850	280
280	280	419.2	148	687	315	167	327	237	300	335	410	800	-	-	240	950	315
315	315	468	165	780	355	190	350	256	325	375	450	900	-	-	270	1070	355
355	355	536.8	188	870	400	212	405	286	360	425	500	1005	530	-	305	1195	400
400	400	596.7	209	972	450	241	456	320	400	475	560	1160	600	-	350	1360	450
450	450	679.7	235	1101	500	265	497	360	445	530	640	1300	670	-	395	1510	500
500	500	855	1135	1360	560	-	552	410	495	630	720	1680	-	560	440	1920	560

Unit Size	P	P1	Q	R	S	T	U	U1	V	V1	V2	V3*	V6*	W	W1	X	X1	X2	Z
140	-	140	-	14	4x12	20	100	60	-	-	-	-	-	-	-	140	76	75	75
160	-	160	-	18	4x16	20	110	70	-	-	-	-	-	-	-	160	86	85	85
180	-	175	175	18	4x16	25	120	85	-	85	90	-	-	-	65	175	-	-	-
200	-	185	185	22	4x20	25	125	90	-	95	100	130	148	-	70	185	-	-	-
225	-	205	205	22	4x20	30	130	95	Refer sheet 2 of HD-312	115	120	140	160	Refer sheet 2 of HD-312	80	205	-	-	-
250	-	220	220	26	4x24	30	140	115	-	125	130	155	175	-	90	220	-	-	-
280	-	240	240	26	4x24	35	160	125	-	140	145	170	200	-	105	240	-	-	-
315	-	260	260	33	4x30	40	180	130	-	160	165	190	220	-	110	260	-	-	-
355	-	290	290	33	6x30	50	200	155	-	170	175	214	250	-	130	290	-	-	-
400	-	325	325	39	6x36	55	220	175	-	190	200	245	275	-	150	325	-	-	-
450	-	365	365	39	6x36	60	250	195	-	220	230	265	303	-	160	365	-	-	-
500	505	420	420	45	8x42	65	280	220	-	250	260	200	200	-	185	420	-	-	-

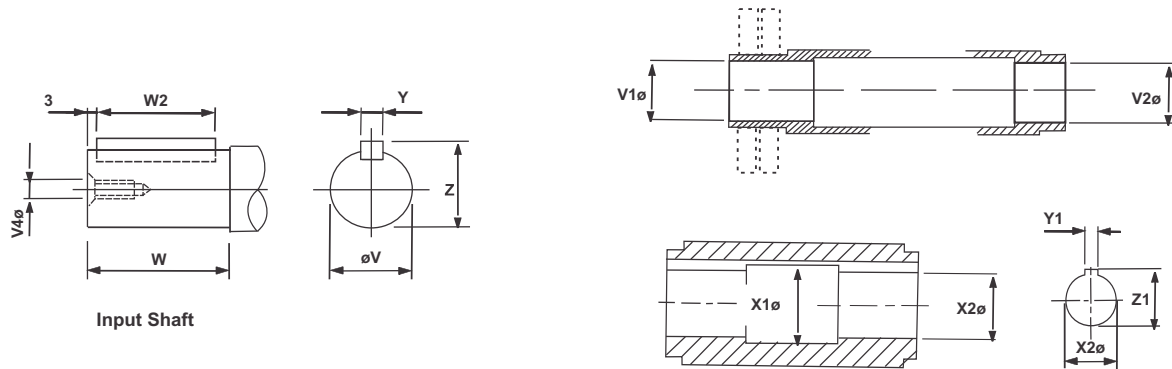
* Fan can be fitted for ratios 20.9 to 70.6 only.
See Sheet 2 of HD-312 for shaft and keyway details.
Ventilator is located on top cover, sizes 500 to 710. E is over ventilator on these sizes

Sizes 140 to 315 have 4 facings.
U sizes 355 to 450 have 6 facings and sizes 500 to 710 have 8

Type H3SF-Foot/Shaft Mounted Units

DIMENSIONS
HD-312
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Triple Reduction - Parallel Shafts - Principal Dimensions (mm)



Output Sleeve Bores Sizes 160 & 140 only

Unit Size	Input Shafts Details - 52.1 to 130						Output Sleeve Bores					
	V	V4	W	W2	Y	Z	V1	V2	X1	X2	M	N
140	19.009 18.996	M6x16	40	34	6.000 5.970	21.5 21.4	-	-	76	75.060 75.030	80.1 79.9	20.026 19.974
160	22.009 21.996	M8x19	50	43	6.000 5.970	24.5 24.4	-	-	86	85.071 85.036	90.6 90.4	22.026 21.974
180	25.009 24.996	M10x22	60	53	8.000 7.964	28.0 27.8	85.035 85.000	90.047 90.012	-	-	-	-
200	28.009 27.996	M10x22	60	53	8.000 7.964	31.0 30.8	95.035 95.000	100.047 100.012	-	-	-	-
225	32.018 32.002	M12x28	80	73	10.000 9.964	35.0 34.8	115.035 115.000	120.047 120.012	-	-	-	-
250	38.018 38.002	M12x28	80	73	10.000 9.964	41.0 40.8	125.040 125.000	130.054 130.014	-	-	-	-
280	45.018 45.002	M16x36	110	102	14.000 13.957	48.5 48.3	140.040 140.000	145.054 145.014	-	-	-	-
315	50.018 50.002	M16x36	110	102	14.000 13.957	53.5 53.3	160.040 160.000	165.054 165.014	-	-	-	-
355	55.030 55.011	M20x42	110	102	16.000 15.957	59.0 58.8	170.040 170.000	175.054 175.014	-	-	-	-
400	65.030 65.011	M20x42	140	130	18.000 17.957	69.0 68.8	190.046 190.000	200.061 200.015	-	-	-	-
450	75.030 75.011	M20x42	140	130	20.000 19.948	79.5 79.3	220.046 220.000	230.061 230.015	-	-	-	-
500	90.035 90.013	M24x50	170	160	25.000 24.948	95.0 94.8	250.046 250.000	260.069 260.017	-	-	-	-

Input Shaft Details - Ratios 25.6 to 47.1

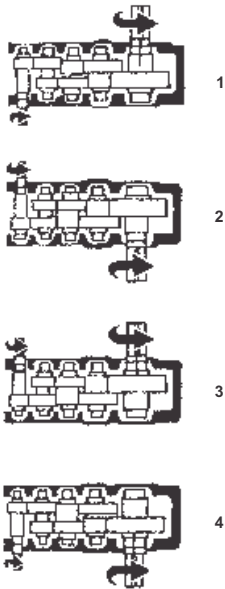
Unit Size	V	V4	W	W2	Y	Z
140	19.009 18.996	M6x16	40	34	6.000 5.970	21.5 21.4
160	28.009 27.996	M10x22	60	53	8.000 7.964	31.0 30.8
180	28.009 27.996	M10x22	60	53	8.000 7.964	31.0 30.8
200	32.018 32.002	M12x28	60	53	10.000 9.964	35.0 34.8
225	38.018 38.002	M12x28	80	73	10.000 9.964	41.0 40.8
250	50.018 50.002	M16x36	110	102	14.000 13.957	53.5 53.3
280	55.030 55.011	M20x42	110	102	16.000 15.957	59.0 58.8
315	55.030 55.011	M20x42	110	102	16.000 15.957	59.0 58.8
355	65.030 65.011	M20x42	140	130	18.000 17.957	69.0 68.8

Type H4-Foot Mounted Units

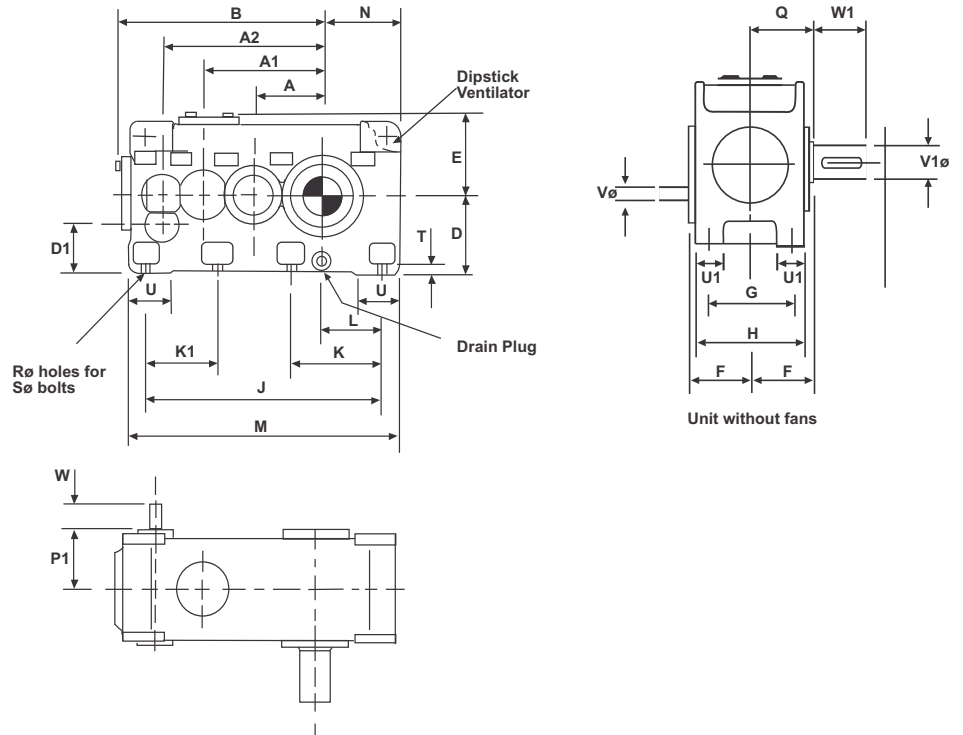
DIMENSIONS
HD-410
1 of 2

Quadruple Reduction - Parallel Shafts - Principal Dimensions (mm)

Shaft Handing/Rotation



Opposite Rotation Available



Unit Size	A	A1	A2	B	D	D1	E	F	G	H	J	K	K1	L
140	140	240	320	434	160	89	174	135	190	224	490	-	-	120
160	160	272	362	481	180	109	194	155	225	260	540	-	-	135
180	180	305	405	529	200	120	214	173	250	290	600	-	-	147.5
200	200	340	452	586	225	135	239	180	265	310	670	-	-	165
225	225	385	510	654	250	150	267	203	280	340	750	-	-	185
250	250	430	570	729	280	168	298	215	300	370	850	-	-	210
280	280	480	640	822	315	190	327	237	335	410	950	475	-	240
315	315	540	720	922	355	215	350	256	375	450	1060	530	-	270
355	355	605	805	1012	400	240	405	286	425	500	1180	600	-	305
400	400	680	905	1145	450	270	456	320	475	560	1340	670	-	350
450	450	765	1015	1280	500	300	497	360	530	640	1500	750	-	395
500	500	855	1135	1427	560	335	552	410	630	720	1680	560	560	440
560	560	960	1275	1611	630	380	679	435	670	770	1890	630	630	505
630	630	1080	1435	1805	710	430	754	480	750	860	2130	710	710	575
710	710	1210	1610	2025	800	485	850	550	850	980	2400	800	800	655

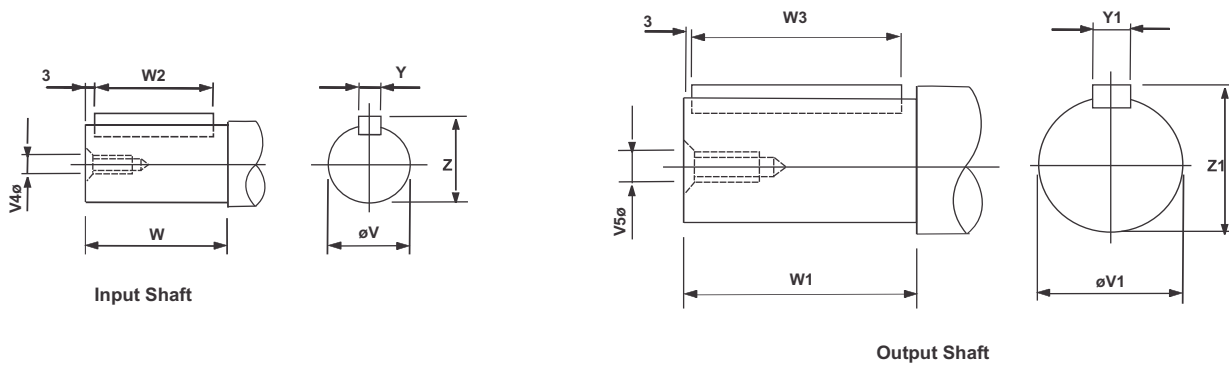
Unit Size	M	N	P1	Q	R	S	T	U	U1	V	V1	W	W1
140	580	165	140	140	14	4x12	20	100	60	18	70	40	140
160	640	185	160	160	18	4x16	20	110	70	18	75	40	140
180	705	200	175	175	18	4x16	25	120	85	18	85	40	170
200	790	225	185	185	22	4x20	25	125	90	22	90	50	170
225	880	250	205	205	22	4x20	30	130	95	25	100	60	210
250	990	280	220	220	26	4x24	30	140	115	28	110	60	210
280	1100	315	240	240	26	6x24	35	160	125	32	125	80	210
315	1230	355	260	260	33	6x30	40	180	130	38	140	80	250
355	1370	400	290	290	33	6x30	50	200	155	45	160	110	300
400	1540	450	325	325	39	6x36	55	220	175	50	180	110	300
450	1710	500	365	365	39	6x36	60	250	195	55	200	110	350
500	1920	560	420	420	45	8x42	65	280	220	65	220	140	350
560	2140	630	445	445	45	8x42	70	320	240	75	240	140	410
630	2400	710	490	490	52	8x48	75	350	280	90	280	170	470
710	2690	800	560	560	52	8x48	80	370	320	100	320	210	470

See Sheet 2 of HD-410 for shaft and keyway details.

Type H4-Foot Mounted Units

Quadruple Reduction - Parallel Shafts - Principal Dimensions (mm)

DIMENSIONS
HD-410
2 of 2



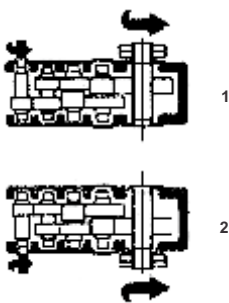
Unit Size	Input Shafts						Output Shafts					
	V	V4	W	W2	Y	Z	V1	V5	W1	W3	Y1	Z1
140	18.008 17.997	M6x16	40	34	6.000 5.970	20.5 20.4	70.030 70.011	M20x42	140	130	20.000 19.948	74.5 74.3
160	18.008 17.997	M6x16	40	34	6.000 5.970	20.5 20.4	75.030 75.011	M20x42	140	130	20.000 19.948	79.5 79.3
180	18.008 17.997	M6x16	40	34	6.000 5.970	20.5 20.4	85.035 85.013	M20x42	170	160	22.000 21.948	90.0 89.8
200	22.009 21.996	M8x19	50	43	6.000 5.970	24.5 24.4	90.035 90.013	M24x50	170	160	25.000 24.948	95.0 94.8
225	25.009 24.996	M10x22	60	43	8.000 7.964	28.0 27.8	100.035 100.013	M24x50	210	200	28.000 27.948	106.0 105.8
250	28.009 27.996	M10x22	60	53	8.000 7.964	31.0 30.8	110.035 110.013	M24x50	210	200	28.000 27.948	116.0 115.8
280	32.018 32.002	M12x28	80	73	10.000 9.964	35.0 34.8	125.040 125.015	M24x50	210	200	32.000 31.938	132.0 131.8
315	38.018 38.002	M12x28	80	73	10.000 9.964	41.0 40.8	140.040 140.015	M30x60	250	240	36.000 35.938	148.0 147.7
355	45.018 45.002	M16x36	110	102	14.000 13.957	48.5 48.3	160.040 160.015	M30x60	300	290	40.000 39.938	169.0 168.7
400	50.018 50.002	M16x36	110	102	14.000 13.957	53.5 53.3	180.040 180.015	M30x60	300	290	45.000 44.938	190.0 189.7
450	55.030 55.011	M20x42	110	102	16.000 15.957	59.0 58.8	200.046 200.017	M30x60	350	340	45.000 44.938	210.0 209.7
500	65.030 65.011	M20x42	140	130	18.000 17.957	69.0 68.8	220.046 220.017	M30x60	350	340	50.000 49.938	231.0 230.7
560	75.030 75.011	M20x42	140	130	20.000 19.948	79.5 79.3	240.046 240.017	M36x74	410	400	56.000 55.926	252.0 251.7
630	90.035 90.013	M24x50	170	160	25.000 24.948	95.0 94.8	280.052 280.020	M36x74	470	460	63.000 62.926	292.0 291.7
710	100.035 100.013	M24x50	210	200	28.000 27.948	106.0 105.8	320.057 320.021	M36x74	470	460	70.000 69.926	334.0 333.7

Type H4SF-Foot/Shaft Mounted Units

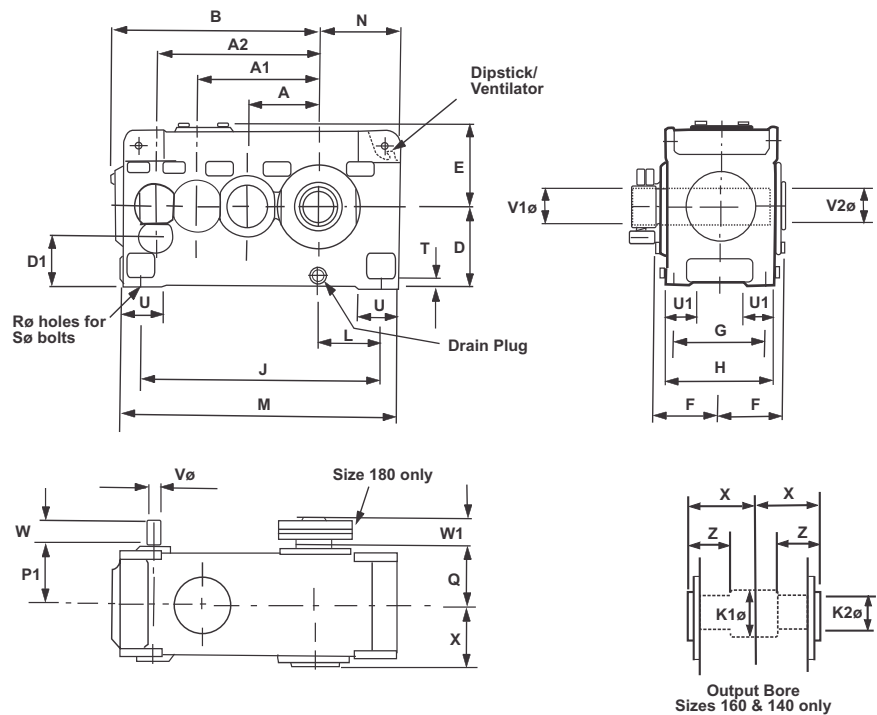
DIMENSIONS
HD-412
1 of 2

Quadruple Reduction - Parallel Shafts - Principal Dimensions (mm)

Shafts Handing/Rotation



Opposite Rotation Available



Unit Size	A	A1	A2	B	D	D1	E	F	G	H	J	L	M	N	P1	Q
140	140	240	320	434	160	89	174	135	190	224	490	120	580	165	140	-
160	160	272	362	481	180	109	194	155	225	260	540	135	640	185	160	-
180	180	305	405	529	200	120	214	173	250	290	600	147.5	705	200	175	175

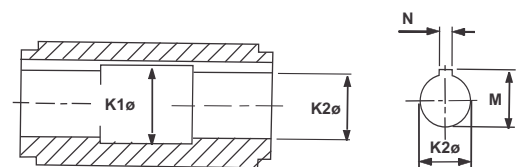
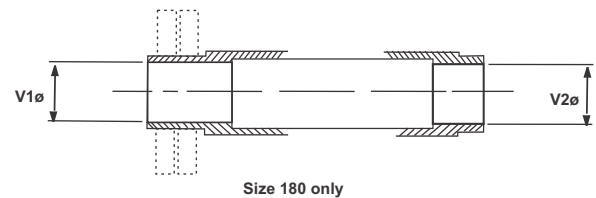
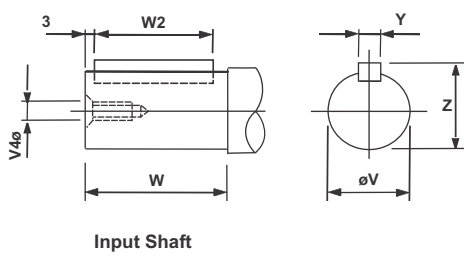
Unit Size	R	S	T	U	U1	V	V1	V2	W	W1	X	Z	K1	K2
140	14	4x12	20	100	60	18	-	-	40	-	140	75	76	75
160	18	4x16	20	110	70	18	-	-	40	-	160	85	86	85
180	18	4x16	25	120	85	18	85	90	40	65	175	-	-	-

For higher sizes — REFER TO PREMIUM
See Sheet 2 of HD-412 for shaft and keyway details.

Type H4SF-Foot/Shaft Mounted Units

DIMENSIONS
HD-412
2 of 2

Quadruple Reduction - Parallel Shafts - Principal Dimensions(mm)



Output Sleeve Bores

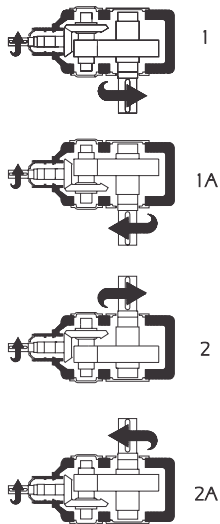
Unit Size	Input Shafts						Output Sleeve Bores					
	V	V4	W	W2	Y	Z	V1	V2	K1	K2	M	N
140	18.008	M6x16	40	34	6.000	20.5	-	-	76	75.060	80.1	20.026
	17.997				5.970	20.4				75.030	79.9	19.974
160	18.008	M6x16	40	34	6.000	20.5	-	-	86	85.071	90.6	22.026
	17.997				5.970	20.4				85.036	90.4	21.974
180	18.008	M6x16	40	34	6.000	20.5	85.035	90.047	-	-	-	-
	17.997				5.970	20.4	85.000	90.012				

Type B2-Foot Mounted Units

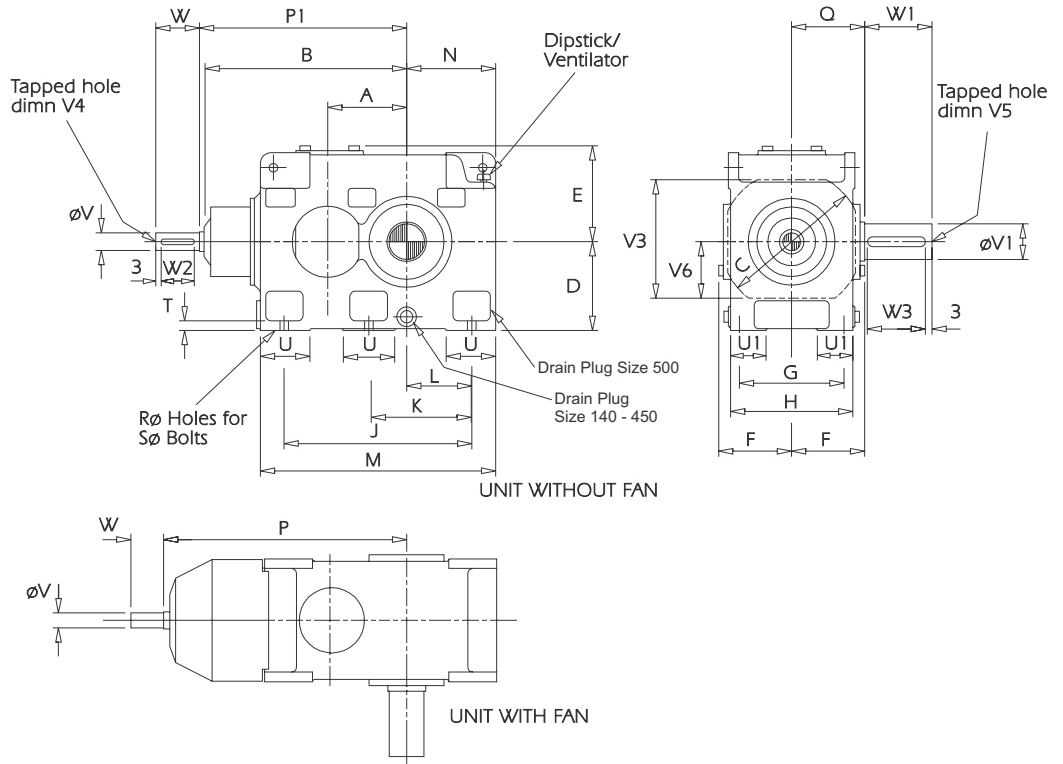
Double Reduction - Right Angle Shafts - Principal Dimensions (mm)

DIMENSIONS
HD-220
1 of 2

SHAFT
HANDING / ROTATION



OPPOSITE ROTATION
AVAILABLE



Unit Size	A	B	C	D	E	F	G	H	J	K	L	M	N	P	P1
140	140	390	300	160	174	135	190	224	335	-	120	425	165	435	395
160	160	430	350	180	194	155	225	260	375	-	135	475	185	475	435
180	180	480	375	200	214	170	250	290	425	-	147.5	530	200	530	485
200	200	520	400	225	239	180	265	310	475	-	165	595	225	575	525
225	225	575	445	250	267	203	280	340	530	-	185	660	250	635	580
250	250	630	480	280	298	215	300	370	600	-	210	740	280	695	635
280	280	715	520	315	327	237	335	410	670	-	240	820	315	785	720
315	315	800	560	355	350	256	375	450	750	-	270	920	355	875	805
355	355	870	630	400	405	286	425	500	865	530	305	1055	400	950	875
400	400	990	700	450	456	320	475	560	1000	600	350	1200	450	1075	995
450	450	1100	780	500	497	360	530	640	1120	670	395	1330	500	1190	1105
500	500	1270	850	560	552	410	630	720	1250	750	440	1490	560	1375	1280

Unit Size	Q	R	S	T	U	U1	V	V1	V3	V6	W	W1
140	140	14	4x12	20	100	60	28	70	230	105	60	140
160	160	18	4x16	20	110	70	32	75	263	125	80	140
180	175	18	4x16	25	120	85	38	85	295	145	80	170
200	185	22	4x20	25	125	90	45	90	305	140	110	170
225	205	22	4x20	30	130	95	50	100	356	171	110	210
250	220	26	4x24	30	140	115	55	110	402	190	110	210
280	240	26	4x24	35	160	125	65	125	450	225	140	210
315	260	33	4x30	40	180	130	75	140	480	230	140	250
355	290	33	6x30	50	200	155	85	160	540	270	170	300
400	325	39	6x36	55	220	175	90	180	618	300	170	300
450	365	39	6x36	60	250	195	100	200	650	320	210	350
500	420	45	6x42	65	280	220	125	220	700	340	210	350

See Sheet 2 of HD-220 for shaft and keyway details.

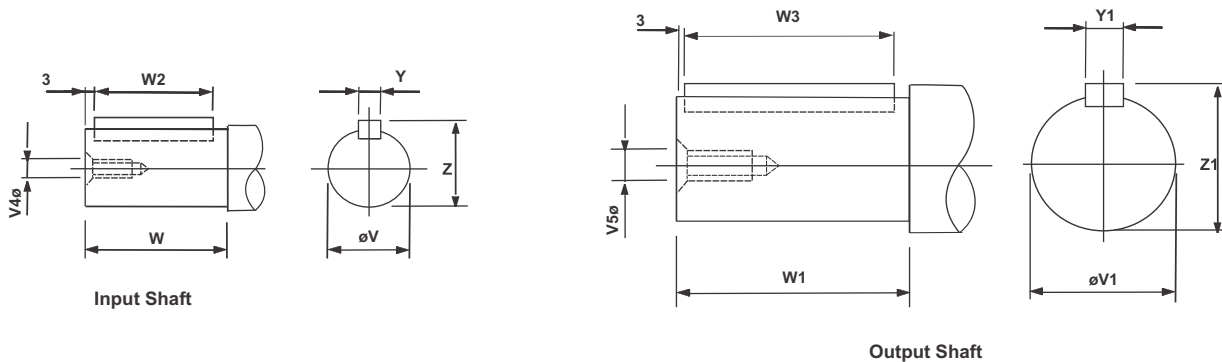
Ventilator is located on top cover, for size 500

'E' is over ventilator and dipstick position is as shown.

Type B2-Foot Mounted Units

Double Reduction - Right Angle Shaft - Principal Dimensions(mm)

DIMENSIONS
HD-220
2 of 2



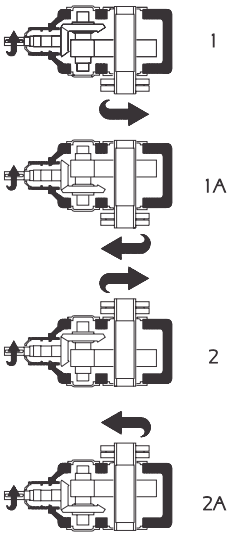
Unit Size	Input Shafts						Output Shafts					
	V	V4	W	W2	Y	Z	V1	V5	W1	W3	Y1	Z1
140	28.009 27.996	M10x22	60	53	8.000 7.964	31.0 30.8	70.030 70.011	M20x42	140	130	20.000 19.948	74.5 74.3
160	32.018 32.002	M12x28	80	73	10.000 9.964	35.0 34.8	75.030 75.011	M20x42	140	130	20.000 19.948	79.5 79.3
180	38.018 38.002	M12x28	80	73	10.000 9.964	41.0 40.8	85.035 85.013	M20x42	170	160	22.000 21.948	90.0 89.8
200	45.018 45.002	M16x36	110	102	14.000 13.957	48.5 48.3	90.035 90.013	M24x50	170	160	25.000 24.948	95.0 94.8
225	50.018 50.002	M16x36	110	102	14.000 13.957	53.5 53.3	100.035 100.013	M24x50	210	200	28.000 27.948	106.0 105.8
250	55.030 55.011	M20x42	110	102	16.000 15.957	59.0 58.8	110.035 110.013	M24x50	210	200	28.000 27.948	116.0 115.8
280	65.030 65.011	M20x42	140	130	18.000 17.957	69.0 68.8	125.040 125.015	M24x50	210	200	32.000 31.938	132.0 131.8
315	75.030 75.011	M20x42	140	130	20.000 19.948	79.5 79.3	140.040 140.015	M30x60	250	240	36.000 35.938	148.0 147.7
355	85.035 85.013	M20x42	170	160	22.000 21.948	90.0 89.8	160.040 160.015	M30x60	300	290	40.000 39.938	169.0 168.7
400	90.035 90.013	M24x50	170	160	25.000 24.948	95.0 94.8	180.040 180.015	M30x60	300	290	45.000 44.938	190.0 189.7
450	100.035 100.013	M24x50	210	200	28.000 27.948	106.0 105.8	200.046 200.017	M30x60	350	340	45.000 44.938	210.0 209.7
500	125.040 125.015	M24x50	210	200	32.000 31.938	132.0 131.8	220.046 220.017	M30x60	350	340	50.000 49.938	231.0 230.7

Type B2SF-Foot/Shaft Mounted Units

Double Reduction - Right Angle Shafts - Principal Dimensions (mm)

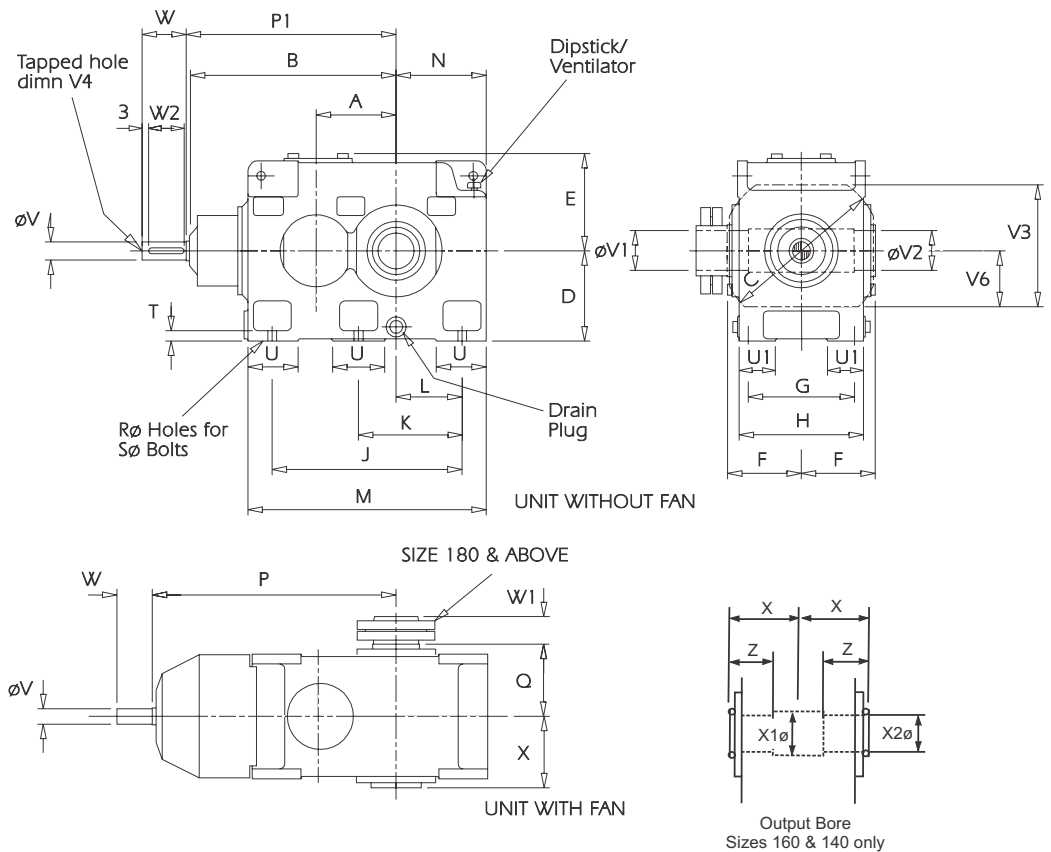
DIMENSIONS
HD-222
1 of 2

SHAFT
HANDING / ROTATION



SIZE 180 SHOWN

OPPOSITE ROTATION
AVAILABLE



Unit Size	A	B	C	D	E	F	G	H	J	K	L	M	N	P	P1	Q
140	140	390	300	160	174	135	190	224	335	-	120	425	165	435	395	-
160	160	430	350	180	194	155	225	260	375	-	135	475	185	475	435	-
180	180	480	375	200	214	170	250	290	425	-	147.5	530	200	530	485	175
200	200	520	400	225	239	180	265	310	475	-	165	595	225	575	525	185
225	225	575	445	250	267	203	280	340	530	-	185	660	250	635	580	205
250	250	630	480	280	298	215	300	370	600	-	210	740	280	695	635	220
280	280	715	520	315	327	237	335	410	670	-	240	820	315	785	720	240
315	315	800	560	355	350	256	375	450	750	-	270	920	355	875	805	260
355	355	870	630	400	405	286	425	500	865	530	305	1055	400	950	875	290
400	400	990	700	450	456	320	475	560	1000	600	350	1200	450	1075	995	325
450	450	1100	780	500	497	360	530	640	1120	670	395	1330	500	1190	1105	365
500	500	1270	850	560	552	410	630	720	1250	750	440	1490	560	1375	1280	420

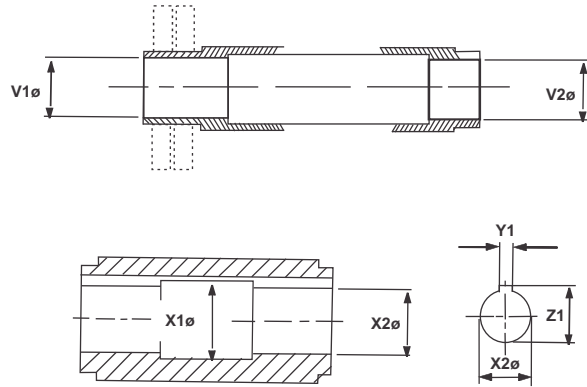
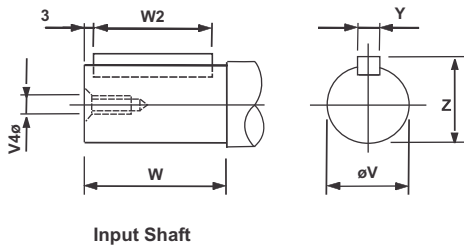
Unit Size	R	S	T	U	U1	V	V1	V2	V3	V4	W	W1	X	X1	X2	Z
140	14	4x12	20	100	60	28	-	-	230	105	60	-	140	75	75	75
160	18	4x16	20	110	70	32	-	-	263	125	80	-	160	86	85	85
180	18	4x16	25	120	85	38	85	90	295	145	80	65	175	-	-	-
200	22	4x20	25	125	90	45	95	100	305	140	110	70	185	-	-	-
225	22	4x20	30	130	95	50	115	120	356	171	110	80	205	-	-	-
250	26	4x24	30	140	115	55	125	130	402	190	110	90	220	-	-	-
280	26	4x24	35	160	125	65	140	145	450	225	140	105	240	-	-	-
315	33	4x30	40	180	130	75	160	165	480	230	140	110	260	-	-	-
355	33	6x30	50	200	155	85	170	175	540	270	170	130	290	-	-	-
400	39	6x36	55	220	175	90	190	200	618	300	170	150	325	-	-	-
450	39	6x36	60	250	195	100	220	230	650	320	210	160	365	-	-	-
500	45	6x42	65	280	220	125	250	260	700	340	210	185	420	-	-	-

See Sheet 2 of HD-222 for shaft and keyway details.
Ventilator is located on top cover for size 500 and dipstick position is as shown.

Type B2SF-Foot/Shaft Mounted Units

Double Reduction - Right Angle Shafts - Principal Dimensions (mm)

DIMENSIONS
HD-222
2 of 2



Sizes 160 & 140 only

Output Sleeve Bores

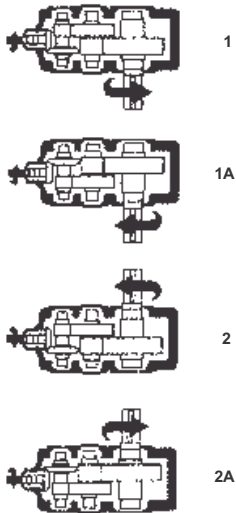
Unit Size	Input Shafts						Output Sleeve Bores					
	V	V4	W	W2	Y	Z	V1	V2	X1	X2	M	N
140	28.009	M10x22	60	53	8.000	31.0	-	-	76	75.060	80.1	20.026
	27.996				7.964	30.8						
160	32.018	M12x28	80	73	10.000	35.0	-	-	86	85.071	90.6	22.026
	32.002				9.964	34.8						
180	38.018	M12x28	80	73	10.000	41.0	85.035	90.047	-	-	-	-
	38.002				9.964	40.8	85.000	90.012				
200	45.018	M16x36	110	102	14.000	48.5	95.035	100.047	-	-	-	-
	45.002				13.957	48.3	95.000	100.012				
225	50.018	M16x36	110	102	14.000	53.5	115.035	120.047	-	-	-	-
	50.002				13.957	53.3	115.000	120.012				
250	55.030	M20x42	110	102	16.000	59.0	125.040	130.054	-	-	-	-
	55.011				15.957	58.8	125.000	130.014				
280	65.030	M20x42	140	130	18.000	69.0	140.040	145.054	-	-	-	-
	65.011				17.957	68.8	140.000	145.014				
315	75.030	M20x42	140	130	20.000	79.5	160.040	165.054	-	-	-	-
	75.011				19.948	79.3	160.000	165.014				
355	85.035	M20x42	170	160	22.000	90.0	170.040	175.054	-	-	-	-
	85.013				21.948	89.8	170.000	175.014				
400	90.035	M24x50	170	160	25.000	95.0	190.046	200.061	-	-	-	-
	90.013				24.948	94.8	190.000	200.015				
450	100.035	M24x50	210	200	28.000	106.0	220.046	230.061	-	-	-	-
	100.013				27.948	105.8	220.000	230.015				
500	125.040	M24x50	210	200	32.000	132.0	250.046	260.069	-	-	-	-
	125.015				31.938	131.8	250.000	260.017				

Type B3-Foot Mounted Units

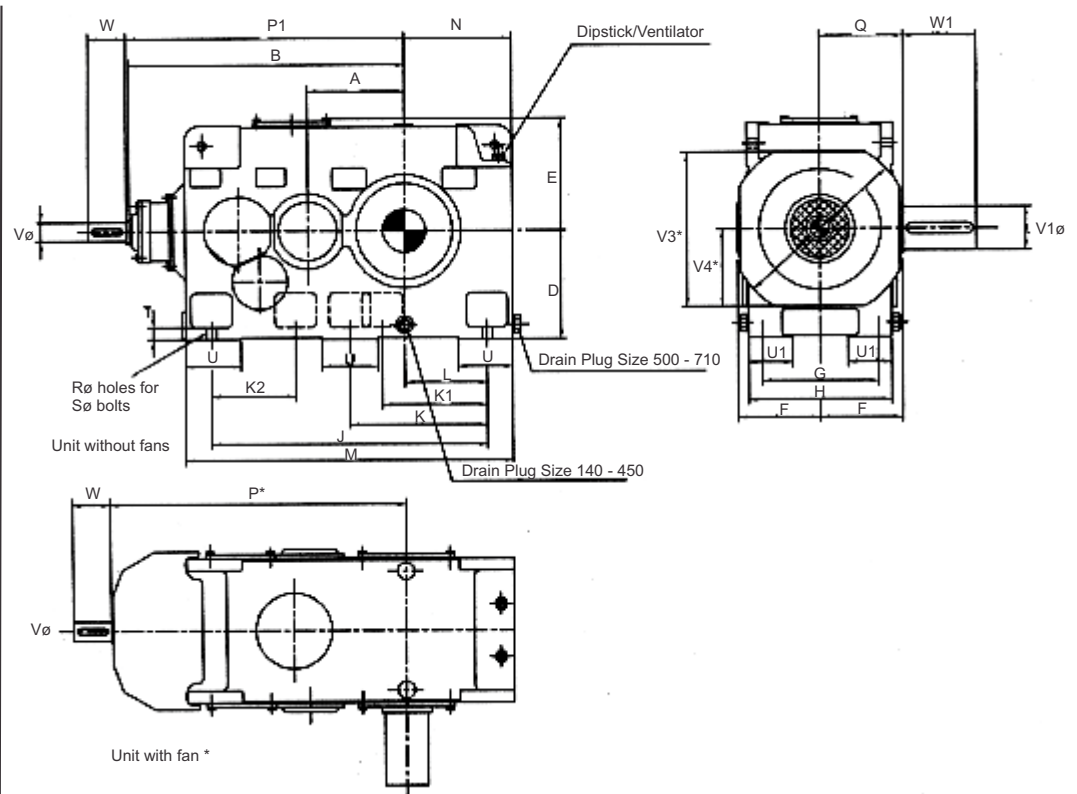
Triple Reduction - Right Angle Shafts - Principle Dimensions (mm)

DIMENSIONS
HD-320
1 of 2

Shaft Handling/Rotation



Opposite Rotation Available



Unit Size	A	B	C	D	E	F	G	H	J	K	K1	K2	L	M	N	P
140	140	430	305	160	174	135	190	224	405	-	-	-	120	495	165	470
160	160	477	350	180	194	155	225	260	450	-	-	-	135	550	185	520
180	180	530	375	200	214	173	250	290	505	-	-	-	147.5	610	200	570
200	200	590	400	225	239	180	265	310	560	-	-	-	165	680	225	630
225	225	655	445	250	267	203	280	340	630	-	-	-	185	760	250	700
250	250	730	480	280	298	215	300	370	710	-	-	-	210	850	280	780
280	280	800	520	315	327	237	335	410	800	-	-	-	240	950	315	855
315	315	890	560	355	350	256	375	450	900	-	-	-	270	1070	355	950
355	355	985	630	400	405	286	425	500	1005	530	-	-	305	1195	400	1050
400	400	1115	700	450	456	320	475	560	1160	600	-	-	350	1360	450	1185
450	450	1250	780	500	497	360	530	640	1300	670	-	-	395	1510	500	1325
500	500	1370	850	560	552	410	630	720	1460	750	-	-	440	1700	560	1445
560	560	1550	900	630	679	435	670	770	1650	-	560	530	505	1900	630	1630
630	630	1729	1020	710	754	480	750	860	1860	-	630	600	575	2130	710	1815
710	710	1980	1060	800	850	550	850	980	2090	-	710	670	655	2380	800	2070

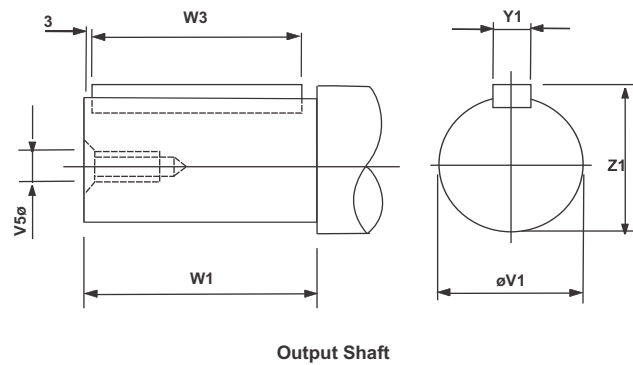
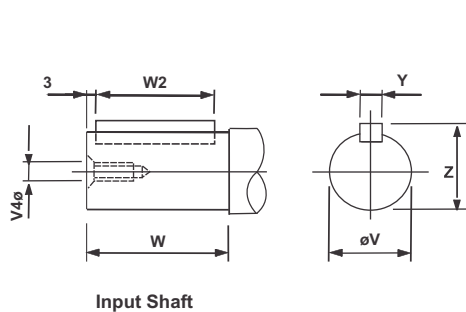
Unit Size	P1	Q	R	S	T	U	U1	V	V1	V3	V4	W	W1
140	435	140	14	4x12	20	100	60	20	70	220	95	50	140
160	480	160	18	4x16	20	110	70	25	75	248	110	60	140
180	535	175	18	4x16	25	120	85	28	85	280	130	60	170
200	595	185	22	4x20	25	125	90	28	90	305	140	60	170
225	660	205	22	4x20	30	130	95	32	100	356	171	80	210
250	735	220	26	4x24	30	140	115	38	110	390	190	80	210
280	805	240	26	4x24	35	160	125	45	125	450	225	110	210
315	895	260	33	4x30	40	180	130	50	140	460	230	110	250
355	990	290	33	6x30	50	200	155	55	160	540	270	110	300
400	1120	325	39	6x36	55	220	175	65	180	600	300	140	300
450	1255	365	39	6x36	60	250	195	75	200	640	320	140	350
500	1380	420	45	6x42	65	280	220	85	220	700	340	170	350
560	1560	445	45	8x42	70	320	240	90	240	740	370	170	410
630	1740	490	52	8x48	75	350	280	100	280	820	410	210	470
710	1990	560	52	8x48	80	370	320	125	320	900	450	210	470

* Fan can be fitted for ratios 14.0 to 63.8 only. Sizes 140 to 315 have 4 facings U. Sizes 355 to 500 have 6 facings and sizes 560 to 710 have 8. Ventilator is located on top cover, sizes 500 to 710. E is over ventilator on these sizes, and dipstick position is as shown.

Type B3-Foot Mounted Units

Triple Reduction - Right Angle Shafts - Shaft & Keyway Dimensions (mm)

DIMENSIONS
HD-320
2 of 2



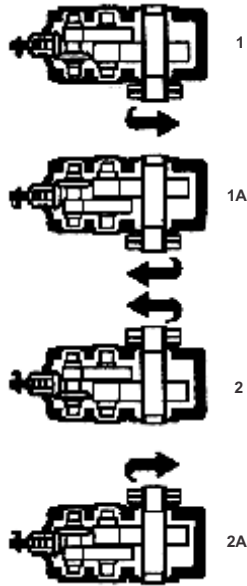
Unit Size	Input Shafts						Output Shafts					
	V	V4	W	W2	Y	Z	V1	V5	W1	W3	Y1	Z1
140	20.009	M6x16	50	43	6.000	22.5	70.030	M20x42	140	130	20.000	74.5
	19.996				5.970	22.4	70.011					
160	25.009	M10x22	60	53	8.000	28.0	75.030	M20x42	140	130	20.000	79.5
	24.996				7.964	27.8	75.011				19.948	79.3
180	28.009	M10x22	60	53	8.000	31.0	85.035	M20x42	170	160	22.000	90.0
	27.996				7.964	30.8	85.013				21.948	89.8
200	28.009	M10x22	60	53	8.000	31.0	90.035	M24x50	170	160	25.000	95.0
	27.996				7.964	30.8	90.013				24.948	94.8
225	32.018	M12x28	80	73	10.000	35.0	100.035	M24x50	210	200	28.000	106.0
	32.002				9.964	34.8	100.013				27.948	105.8
250	38.018	M12x28	80	73	10.000	41.0	110.035	M24x50	210	200	28.000	116.0
	38.002				9.964	40.8	110.013				27.948	115.8
280	45.018	M16x36	110	102	14.000	48.5	125.040	M24x50	210	200	32.000	132.0
	45.002				13.957	48.3	125.015				31.938	131.8
315	50.018	M16x36	110	102	14.000	53.5	140.040	M30x60	250	240	36.000	148.0
	50.002				13.957	53.3	140.015				35.938	147.7
355	55.030	M20x42	110	102	16.000	59.0	160.040	M30x60	300	290	40.000	169.0
	55.011				15.957	58.8	160.015				39.938	168.7
400	65.030	M20x42	140	130	18.000	69.0	180.040	M30x60	300	290	45.000	190.0
	65.011				17.957	68.8	180.015				44.938	189.7
450	75.030	M20x42	140	130	20.000	79.5	200.046	M30x60	350	340	45.000	210.0
	75.011				19.948	79.3	200.017				44.938	209.7
500	85.035	M20x42	170	160	22.000	90.0	220.046	M30x60	350	340	50.000	231.0
	85.013				21.948	89.8	220.017				49.938	230.7
560	90.035	M24x50	170	160	25.000	95.0	240.046	M36x74	410	400	56.000	252.0
	90.013				24.948	94.8	240.017				55.926	251.7
630	100.035	M24x50	210	200	28.000	106.0	280.052	M36x74	470	460	63.000	292.0
	100.013				27.948	105.8	280.020				62.926	291.7
710	125.040	M30x60	210	200	32.000	132.0	320.057	M36x74	470	460	70.000	334.0
	125.015				31.938	131.8	320.021				69.926	330.7

Type B3SF-Foot/Shaft Mounted Units

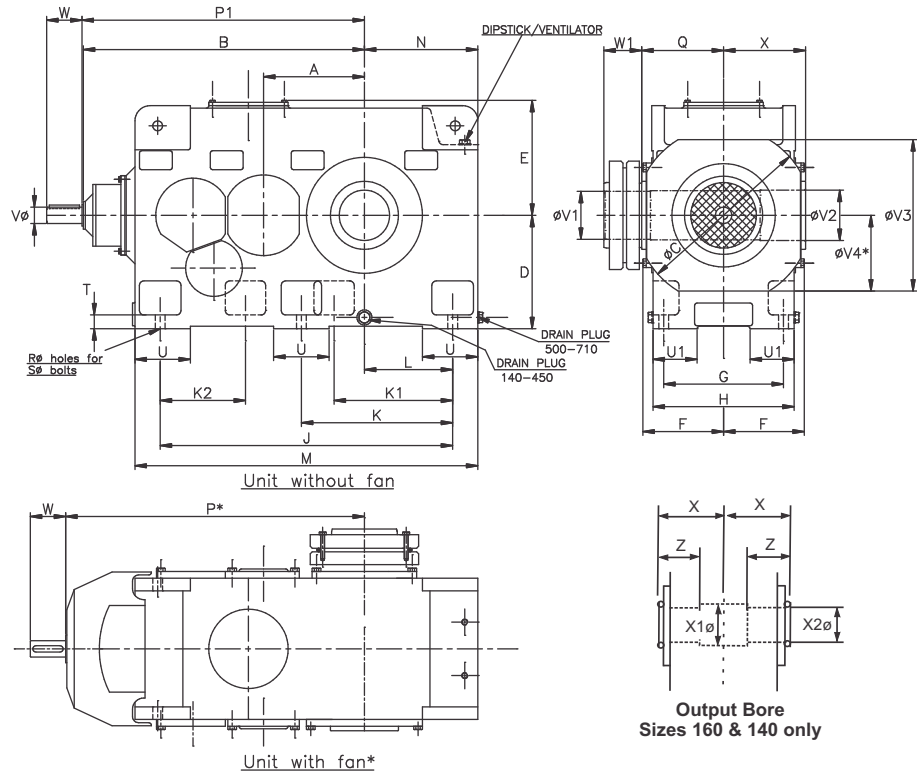
DIMENSIONS
HD-322
1 of 2

Triple Reduction - Right Angle Shafts - Principal Dimensions (mm)

Shaft Handling/Rotation



Opposite Rotation Available



Output Bore
Sizes 160 & 140 only

Units Size	A	B	C*	D	E	F	G	H	J	K	K1	K2	L	M	N	P*	P1	Q
140	140	430	305	160	174	135	190	224	405	-	-	-	120	495	165	470	435	140
160	160	477	350	180	194	155	225	260	450	-	-	-	135	550	185	520	480	160
180	180	530	375	200	214	173	250	290	505	-	-	-	147.5	610	200	570	535	175
200	200	590	400	225	239	180	265	310	560	-	-	-	165	680	225	630	595	185
225	225	655	445	250	267	203	280	340	630	-	-	-	185	760	250	700	660	205
250	250	730	480	280	298	215	300	370	710	-	-	-	210	850	280	780	735	220
280	280	800	520	315	327	237	335	410	800	-	-	-	240	950	315	855	805	240
315	315	890	560	355	350	256	375	450	900	-	-	-	270	1070	355	950	895	260
355	355	985	630	400	405	286	425	500	1005	530	-	-	305	1195	400	1050	990	290
400	400	1115	700	450	456	320	475	560	1160	600	-	-	350	1360	450	1185	1120	325
450	450	1250	780	500	497	360	530	640	1300	670	-	-	395	1510	500	1325	1255	365
500	500	1370	850	560	552	410	630	720	1460	750	-	-	440	1700	560	1445	1380	420
560	560	1550	900	630	679	435	670	770	1650	-	560	530	505	1900	630	1630	1560	445
630	630	1729	1020	710	754	480	750	860	1860	-	630	600	575	2130	710	1815	1739	490
710	710	1980	1060	800	850	550	850	980	2090	-	710	670	655	2380	800	2070	1990	560

Units Size	R	S	T	U	U1	V	V1	V2	V3	V4*	W	W1	X	X1	X2	Z
140	14	4x12	20	100	60	20	-	-	220	95	50	-	140	76	75	75
160	18	4x16	20	110	70	25	-	-	248	110	60	-	160	86	85	85
180	18	4x16	25	120	85	28	85	90	280	130	60	65	175	-	-	-
200	22	4x20	25	125	90	28	95	100	305	140	60	70	185	-	-	-
225	22	4x20	30	130	95	32	115	120	356	171	80	80	205	-	-	-
250	26	4x24	30	140	115	38	125	130	390	190	80	90	220	-	-	-
280	26	4x24	35	160	125	45	140	145	450	225	110	105	240	-	-	-
315	33	4x30	40	180	130	50	160	165	460	230	110	110	260	-	-	-
355	33	6x30	50	200	155	55	170	175	540	270	110	130	290	-	-	-
400	39	6x36	55	220	175	65	190	200	600	300	140	150	325	-	-	-
450	39	6x36	60	250	195	75	220	230	640	320	140	160	365	-	-	-
500	45	6x42	65	280	220	85	250	260	700	340	170	185	420	-	-	-
560	45	8x42	70	320	240	90	290	300	740	370	170	200	445	-	-	-
630	52	8x48	75	350	280	100	330	340	820	410	210	220	490	-	-	-
710	52	8x48	80	370	320	125	360	370	900	450	210	230	560	-	-	-

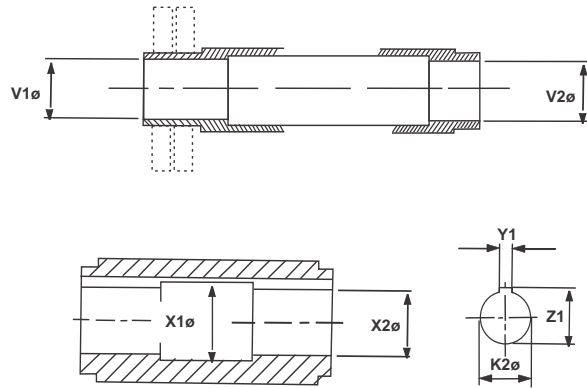
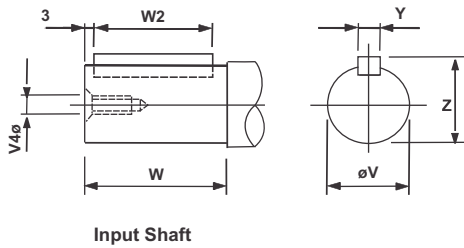
* Fan can be fitted for ratios 14.0 to 63.8 only.
See Sheet 2 of HD-322 for shaft and keyway details.
Sizes 140 to 315 have 4 facings U.

Sizes 355 to 500 have 6 facings and sizes 560 to 710 have 8.
Ventilator is located on top cover, sizes 500 to 710.
E is over ventilator on these sizes, and dipstick position is as shown.

Type B3SF-Foot/Shaft Mounted Units

DIMENSIONS
HD-322
2 of 2

Triple Reduction - Right Angle Shafts - Principal Dimensions (mm)



Sizes 160 & 140 only

Output Sleeve Bores

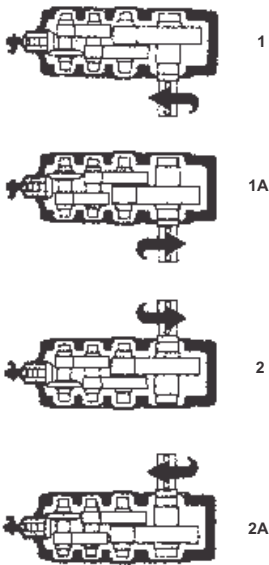
Unit Size	Input Shafts						Output Sleeve Bores					
	V	V4	W	W2	Y	Z	V1	V2	K1	K2	M	N
140	20.009	M6x16	50	43	6.000	22.5	-	-	76	75.060	80.1	20.026
	19.996				5.970	22.4						
160	25.009	M10x22	60	53	8.000	28.0	-	-	86	85.071	90.6	22.026
	24.996				7.964	27.8						
180	28.009	M10x22	60	53	8.000	31.0	85.035	90.047	-	-	-	-
	27.996				7.964	30.8	85.000	90.012				
200	28.009	M10x22	60	53	8.000	31.0	95.035	100.047	-	-	-	-
	27.996				7.964	30.8	95.000	100.012				
225	32.018	M12x28	80	73	10.000	35.0	115.035	120.047	-	-	-	-
	32.002				9.964	34.8	115.000	120.012				
250	38.018	M12x28	80	73	10.000	41.0	125.040	130.054	-	-	-	-
	38.002				9.964	40.8	125.000	130.014				
280	45.018	M16x36	110	102	14.000	48.5	140.040	145.054	-	-	-	-
	45.002				13.957	48.3	140.000	145.014				
315	50.018	M16x36	110	102	14.000	53.5	160.040	165.054	-	-	-	-
	50.002				13.957	53.3	160.000	165.014				
355	55.030	M20x42	110	102	16.000	59.0	170.040	175.054	-	-	-	-
	55.011				15.957	58.8	170.000	175.014				
400	65.030	M20x42	140	130	18.000	69.0	190.046	200.061	-	-	-	-
	65.011				17.957	68.8	190.000	200.015				
450	75.030	M20x42	140	130	20.000	79.5	220.046	230.061	-	-	-	-
	75.011				19.948	79.3	220.000	230.015				
500	85.035	M20x42	170	160	22.000	90.0	250.046	260.069	-	-	-	-
	85.013				21.948	89.8	250.000	260.017				
560	90.035	M24x50	170	160	25.000	95.0	290.052	300.069	-	-	-	-
	90.013				24.948	94.8	290.000	300.017				
630	100.035	M24x50	210	200	28.000	106.0	330.057	340.075	-	-	-	-
	100.013				27.948	105.8	330.000	340.018				
710	125.040	M30x60	210	200	32.000	132.0	360.057	370.075	-	-	-	-
	125.015				31.938	131.8	360.000	370.018				

Type B4- Foot Mounted Units

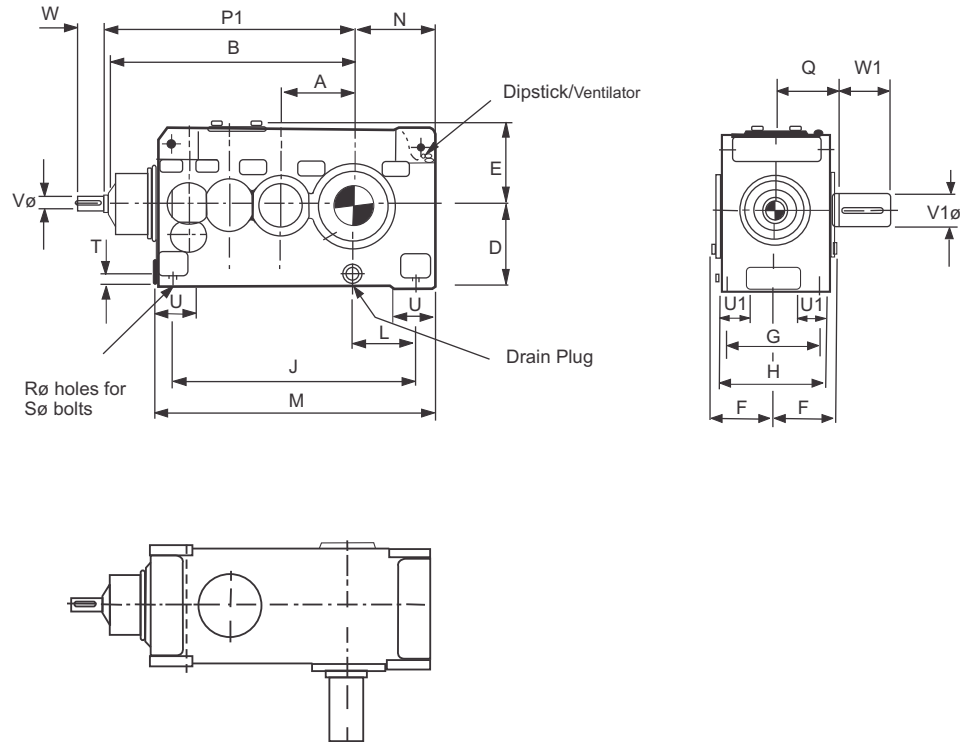
DIMENSIONS
HD-420
1 of 2

Quadruple Reduction - Right Angle Shafts - Principal Dimensions (mm)

Shaft Handing/Rotation



Opposite Rotation Available



Unit Size	A	B	D	E	F	G	H	J	K	K1	L	M	N
140	140	490	160	174	135	190	224	490	-	-	120	580	165
160	160	537	180	194	155	225	260	540	-	-	135	640	185
180	180	595	200	214	173	250	290	600	-	-	147.5	705	200
200	200	657	225	239	180	265	310	670	-	-	165	790	225
225	225	735	250	267	203	280	340	750	-	-	185	880	250
250	250	820	280	298	215	300	370	850	-	-	210	990	280
280	280	910	315	327	237	335	410	950	475	-	240	1100	315
315	315	1020	355	350	256	375	450	1060	530	-	270	1230	355
355	355	1125	400	405	286	425	500	1180	600	-	305	1370	400
400	400	1255	450	456	320	475	560	1340	670	-	350	1540	450
450	450	1395	500	497	360	530	640	1500	750	-	395	1710	500
500	500	1570	560	552	410	630	720	1680	560	560	440	1920	560
560	560	1760	630	679	435	670	770	1890	630	630	505	2140	630
630	630	1950	710	754	480	750	860	2130	710	710	575	2400	710
710	710	2200	800	850	550	850	980	2400	800	800	655	2690	800

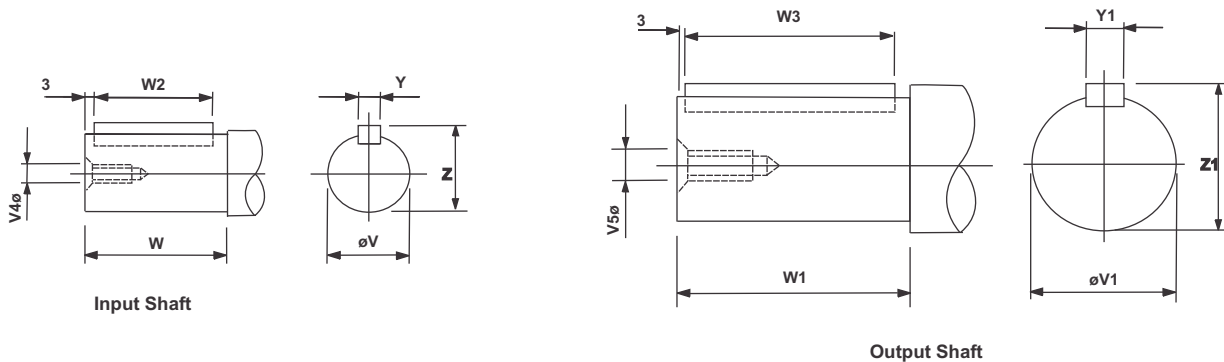
Unit Size	P1	Q	R	S	T	U	U1	V	V1	W	W1
140	495	140	14	4x12	20	100	60	18	70	40	140
160	540	160	18	4x16	20	110	70	18	75	40	140
180	600	175	18	4x16	25	120	85	20	85	50	170
200	660	185	22	4x20	25	125	90	25	90	60	170
225	740	205	22	4x20	30	130	95	28	100	60	210
250	825	220	26	4x24	30	140	115	28	110	60	210
280	915	240	26	6x24	35	160	125	32	125	80	210
315	1025	260	33	6x30	40	180	130	38	140	80	250
355	1130	290	33	6x30	50	200	155	45	160	110	300
400	1260	325	39	6x36	55	220	175	50	180	110	300
450	1400	365	39	6x36	60	250	195	55	200	110	350
500	1575	420	45	8x42	65	280	220	65	220	140	350
560	1765	445	45	8x42	70	320	240	75	240	140	410
630	1960	490	52	8x48	75	350	280	85	280	170	470
710	2210	560	52	8x48	80	370	320	90	320	170	470

See Sheet 2 of HD-420 for shaft and keyway details.

Type B4-Foot Mounted Units

Quadruple Reduction - Right Angle Shafts - Principal Dimensions (mm)

DIMENSIONS
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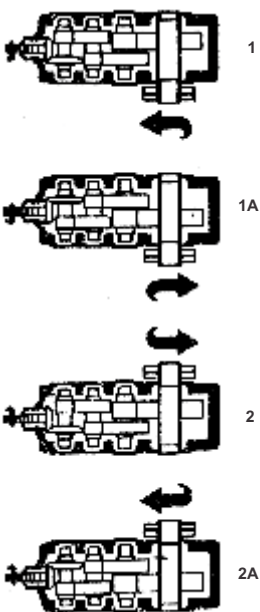
Unit Size	Input Shafts						Output Shafts					
	V	V4	W	W2	Y	Z	V1	V5	W1	W3	Y1	Z1
140	18.008 17.997	M6x16	40	34	6.000 5.970	20.5 20.4	70.030 70.011	M20x42	140	130	20.000 19.948	74.5 74.3
160	18.008 17.997	M6x16	40	34	6.000 5.970	20.5 20.4	75.030 75.011	M20x42	140	130	20.000 19.948	79.5 79.3
180	20.009 19.996	M6x16	50	43	6.000 5.970	22.5 22.4	85.035 85.013	M20x42	170	160	22.000 21.948	90.0 89.8
200	25.009 24.996	M10x22	60	53	8.000 7.964	28.0 27.8	90.035 90.013	M24x50	170	160	25.000 24.948	95.0 94.8
225	28.009 27.996	M10x22	60	53	8.000 7.964	31.0 30.8	100.035 100.013	M24x50	210	200	28.000 27.948	106.0 105.8
250	28.009 27.996	M10x22	60	53	8.000 7.964	31.0 30.8	110.035 110.013	M24x50	210	200	28.000 27.948	116.0 115.8
280	32.018 32.002	M12x28	80	73	10.000 9.964	35.0 34.8	125.040 125.015	M24x50	210	200	32.000 31.938	132.0 131.8
315	38.018 38.002	M12x28	80	73	10.000 9.964	41.0 40.8	140.040 140.015	M30x60	250	240	36.000 35.938	148.0 147.7
355	45.018 45.002	M16x36	110	102	14.000 13.957	48.5 48.3	160.040 160.015	M30x60	300	290	40.000 39.938	169.0 168.7
400	50.018 50.002	M16x36	110	102	14.000 13.957	53.5 53.3	180.040 180.015	M30x60	300	290	45.000 44.938	190.0 189.7
450	55.030 55.011	M20x42	110	102	16.000 15.957	59.0 58.8	200.046 200.017	M30x60	350	340	45.000 44.938	210.0 209.7
500	65.030 65.011	M20x42	140	130	18.000 17.957	69.0 68.8	220.046 220.017	M30x60	350	340	50.000 49.938	231.0 230.7
560	75.030 75.011	M20x42	140	130	20.000 19.948	79.5 79.3	240.046 240.017	M36x74	410	400	56.000 55.926	252.0 251.7
630	85.035 85.013	M20x42	170	160	22.000 21.948	90.0 89.8	280.052 280.020	M36x74	470	460	63.000 62.926	292.0 291.7
710	90.035 90.013	M24x50	170	160	25.000 24.948	95.0 94.8	320.057 320.021	M36x74	470	460	70.000 69.926	334.0 333.7

Type B4SF-Foot/Shaft Mounted Units

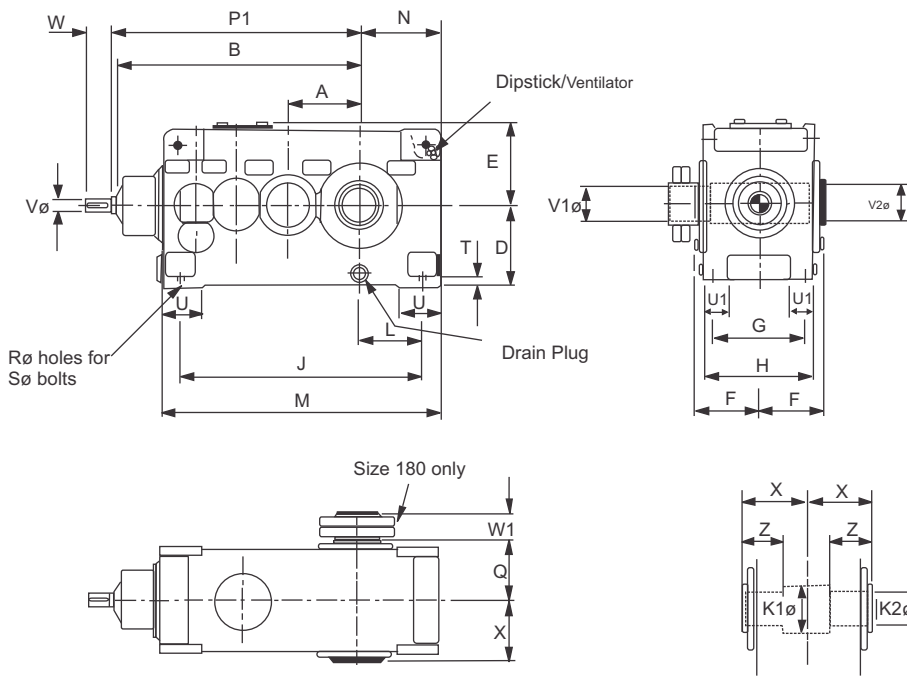
DIMENSIONS
HD-422
1 of 2

Quadruple Reduction - Right Angle Shafts - Principal Dimensions (mm)

Shafts Handing/Rotation



Opposite Rotation Available



Output Bore
Sizes 160 & 40 only

Unit Size	A	B	D	E	F	G	H	J	L	M	N	P1	Q
140	140	490	160	174	135	190	224	490	120	580	165	495	-
160	160	537	180	194	155	225	260	540	135	640	185	540	-
180	180	595	200	214	173	250	290	600	147.5	705	200	600	175

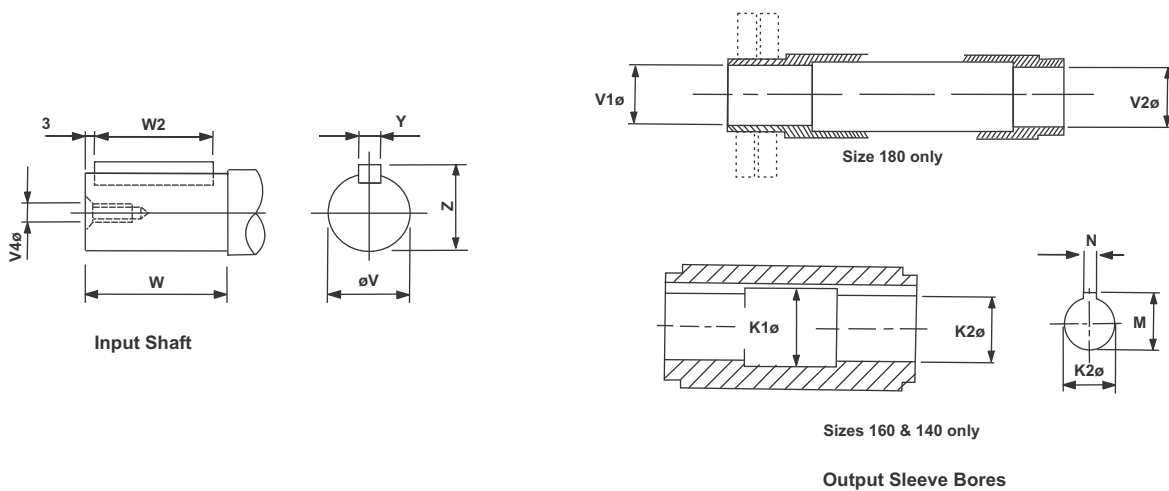
Unit Size	R	S	T	U	U1	V	V1	V2	W	W1	X	Z	K1	K2
140	14	4x12	20	100	60	18	-	-	40	-	140	75	76	75
160	18	4x16	20	110	70	18	-	-	40	-	160	85	86	85
180	18	4x16	25	120	85	20	85	90	50	65	175	-	-	-

For higher sizes — REFER TO PREMIUM
See Sheet 2 of HD-422 for shaft and keyway details.

Type B4SF-Foot/Shaft Mounted Units

Quadruple Reduction - Right Angle Shafts - Shafts, Keyway & Bore Dimensions (mm)

DIMENSIONS
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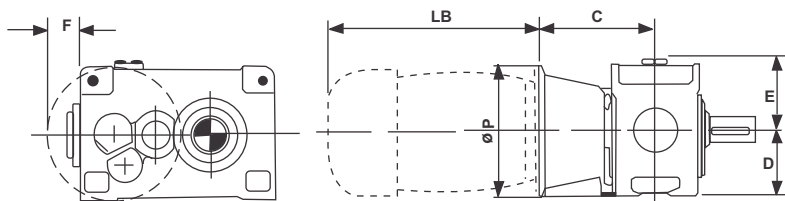


Unit Size	Input Shafts						Output Sleeve Bores					
	V	V4	W	W2	Y	Z	V1	V2	K1	K2	M	N
140	18.008	M6x16	40	34	6.000	20.5	-	-	76	75.060	80.1	20.026
	17.997				5.970	20.4				75.030	79.9	19.974
160	18.008	M6x16	40	34	6.000	20.5	-	-	86	85.071	90.6	22.026
	17.997				5.970	20.4				85.036	90.4	21.974
180	20.009	M6x16	50	43	6.000	22.5	85.035	90.047	-	-	-	-
	19.996				5.970	22.4	85.000	90.012				

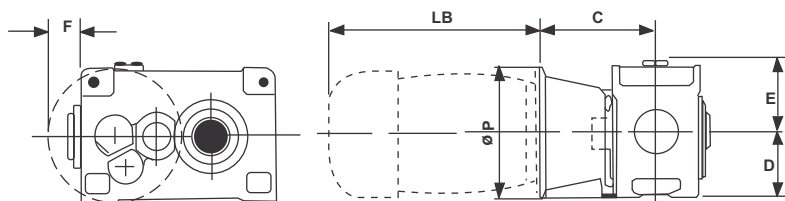
Motorised Units

Horizontal - Parallel Shafts

DIMENSIONS
HD-M01
1 of 2



H2M - Foot mounted



H2SFM - Foot / Shaft mounted

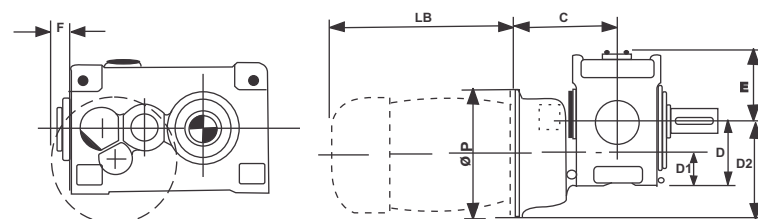
Type H2M-H2SFM Parallel Shafts

Unit Size	Motor Frame Size	C	P	LB (max)	D	E	F
200	D225	408	450	786			110
	D250	408	550	839	225	239	160
225 †	D250	458	550	839			
	D280	488	550	951	250	267	150
250	D250	473	550	839			
	D280	503	550	951	280	298	135
	D315	503	660	1028			190

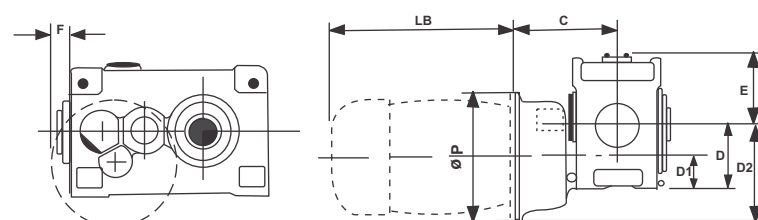
† For type H2M - H2SFM
C = 458 for frame D280 when fitted to units with ratios 12.6 to 25.6.

Types H3M-H3SFM Parallel Shafts

Unit Size	Motor Frame Size	C	P	LB	D (max)	D1	D2	E	F
200	D160	358	350	540			278		16
	D180	358	350	598			278		16
	D200	358	400	651	225	122	303	239	41
	D225	388	450	786			328		66
225	D160	378	350	540			298		9
	D180	378	350	598			293		9
	D200	378	400	651	250	132	318	267	34
	D225	428	450	786			343		59
	D250	428	550	839			393		109
250	D180	413	350	598			305		-
	D200	413	400	651			330		8
	D225	443	450	786	280	150	355	298	33
	D250	443	550	839			405		83
280	D280	473	550	951			405		83
	D200	433	400	651			348		-
	D225	463	450	786			373		9
	D250	493	550	839	315	167	423	327	59
	D280	523	550	951			423		59
315	D315	523	660	1028			478		114
	D225	483	450	786			390		-
	D250	513	550	839	355	190	440	350	28
	D280	543	550	951			440		28
315	D315	543	660	1028			495		83



H3M - Foot mounted



H3SFM - Foot/Shaft mounted

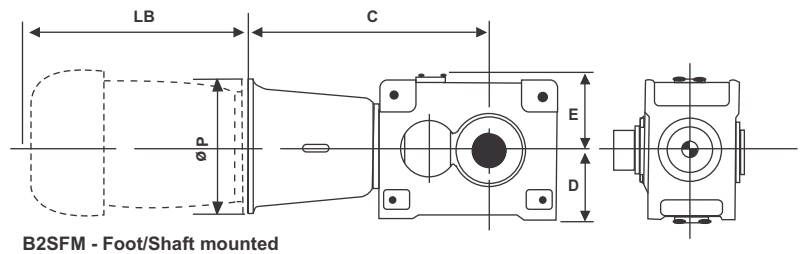
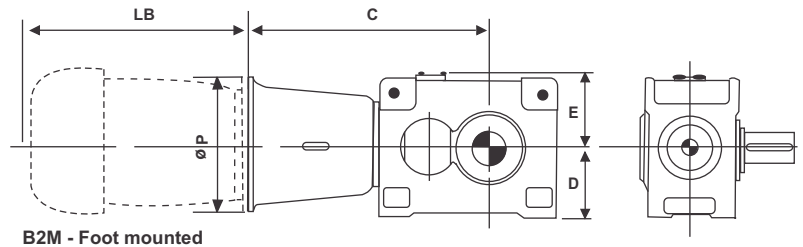
Motorised Units

DIMENSIONS
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Horizontal - Right Angle Shafts

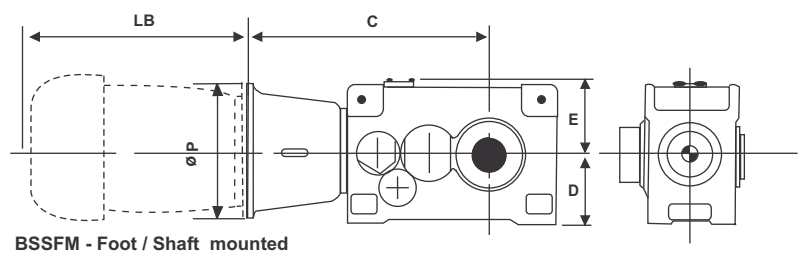
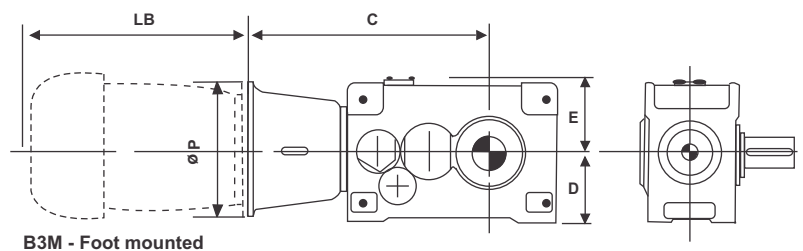
Types B2M-B2SFM Right Angle Shafts

Unit Size	Motor Frame Size	C	P	LB (max)	D	E
200	D225	748	450	786	225	239
	D250	778	550	839		
	D280	808	550	951		
225	D250	833	550	839	250	267
	D280	863	550	951		
	D315	863	660	1028		
250	D280	918	550	951	280	298
	D315	918	660	1028		



Types B3M-B3SFM Right Angle Shafts

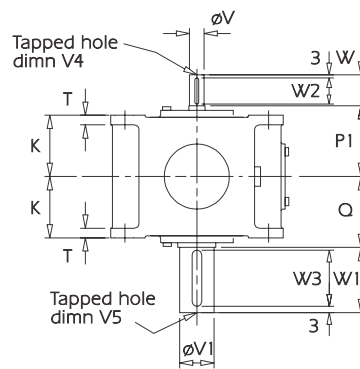
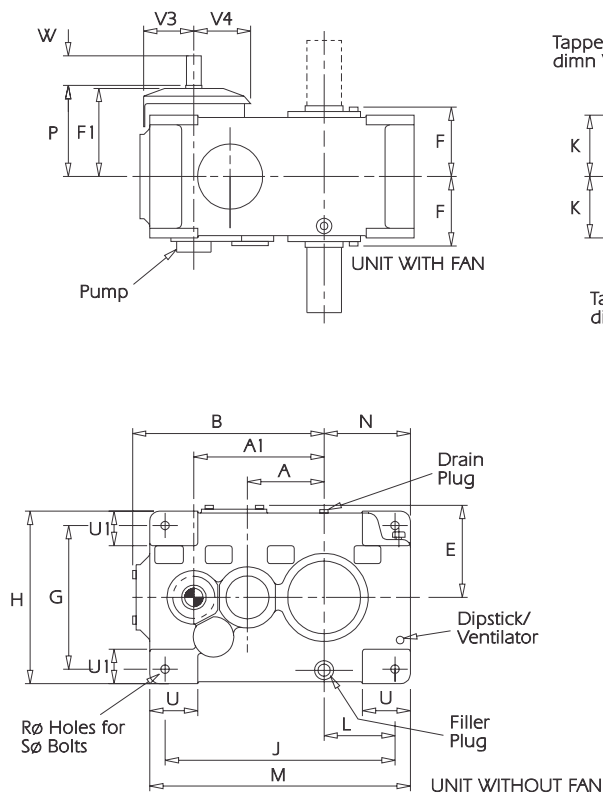
Unit Size	Motor Frame Size	C	P	LB (max)	D	E
200	D132	738	300	418	225	239
	D160	768	350	540		
	D180	768	350	598		
	D200	768	400	651		
	D225	798	450	786		
	D250	798	550	839		
225	D200	833	400	651	250	268
	D225	883	450	786		
	D250	883	550	839		
	D280	913	550	951		
250	D225	958	450	786	280	298
	D250	958	550	839		
	D280	988	550	951		
	D315	988	660	1028		
280	D225	1028	450	786	315	327
	D250	1058	550	839		
	D280	1088	550	951		
	D315	1088	660	1028		
315	D250	1148	550	839	355	350
	D280	1178	550	951		
	D315	1178	660	1028		



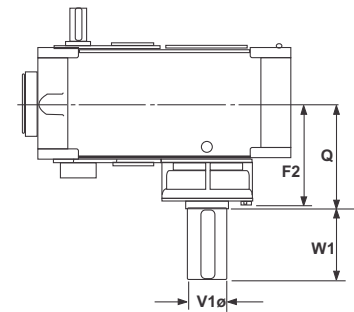
Type VH2-VH2 SA-VH2 CT

Double Reduction - Parallel Shafts - Principal Dimensions (mm)

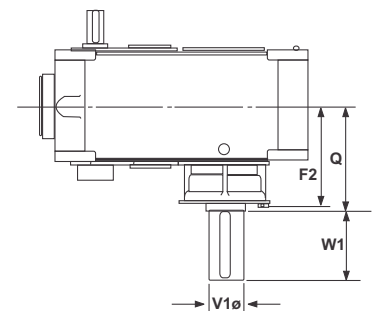
DIMENSIONS
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VH2 SA
Heavy Duty Stirrer Drives



VH2 CT
Cooling Tower Drives



Unit Size	A	A1	B	E	F	F1	G	H	J	K	L	M	N	P	P1	Q	R	S	T
200	200	340	499	244	180	230	375	450	600	160	185	680	225	235	185	185	22	20	25
225	225	385	567	274	203	255	400	500	670	175	205	760	250	260	205	205	22	20	30
250	250	430	632	305	215	275	450	560	750	190	230	850	280	280	220	220	26	24	30
280	280	480	687	334	237	300	500	620	850	210	265	950	315	305	240	240	26	24	35
315	315	540	780	358	256	325	530	660	950	230	295	1070	355	330	260	260	33	30	40
355	355	605	870	413	286	360	630	770	1060	255	332.5	1195	400	365	290	290	33	30	45
400	400	680	972	464	320	400	710	870	1180	285	360	1360	450	405	325	325	39	36	50
450	450	765	1101	507	360	445	750	940	1320	325	405	1510	500	450	365	365	39	36	55

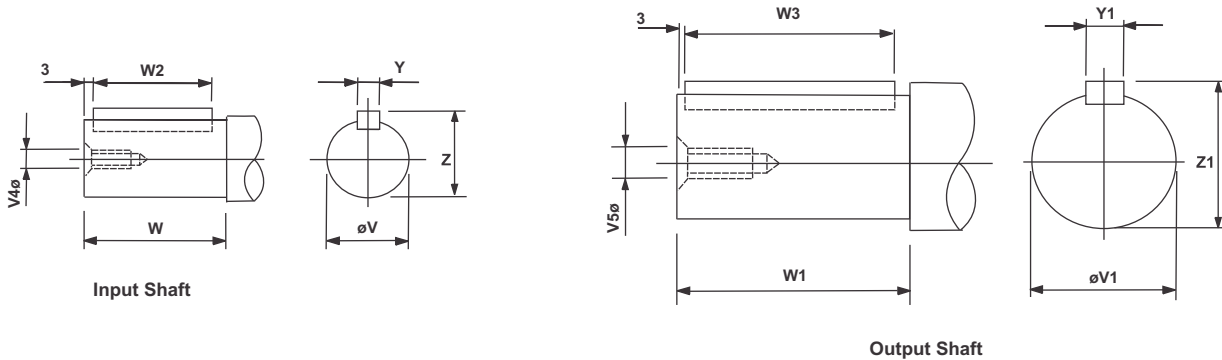
Unit Size	Ratios 5.6 - 14.0 15.4 - 25.6				Ratios 5.6 - 14.0 15.4 - 25.6				VH2 SA Heavy Duty Stirrer Drives				VH2 CT Cooling Tower Drives					
	U	U1	V	V	V1	V3	V4	W	W	W1	F2	Q	V1	W1	F2	Q	V1	W1
200	125	90	38	32	90	130	148	80	80	170	295	300	100	210	290	295	90	170
225	130	95	45	38	100	140	160	110	80	210	330	335	110	210	325	330	100	210
250	140	115	55	45	110	155	175	110	110	210	355	360	125	210	350	355	110	210
280	160	125	65	50	125	170	200	140	110	210	390	395	140	250	385	390	125	210
315	180	130	75	60	140	190	220	140	140	250	435	440	160	300	425	430	140	250
355	200	155	85	65	160	205	250	170	140	300	470	475	180	300	465	470	160	300
400	220	175	90	75	180	245	275	170	140	300	535	540	200	350	525	530	180	300
450	250	195	100	85	200	265	303	210	170	350	600	605	220	350	595	600	200	350

See Sheet 2 of HD-214 for shaft and keyway details.

Type VH2-VH2 SA-VH2 CT

Double Reduction - Parallel Shafts - Principal Dimensions (mm)

DIMENSIONS
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Input Shafts Ratio 5.60-14.0							Input Shafts Ratios 15.4-25.6					
Unit Size	V	V4	W	W2	Y	Z	V	V4	W	W2	Y	Z
200	38.018	M12x28	80	73	10.000	41.0	32.018	M12x28	80	73	10.000	35.0
	38.002						32.002					
225	45.018	M16x36	110	102	14.000	48.5	38.018	M12x28	80	73	10.000	41.0
	45.002						38.002					
250	55.030	M20x42	110	102	16.000	59.0	45.018	M16x36	110	102	14.000	48.5
	55.011						45.002					
280	65.030	M20x42	140	130	18.000	69.0	50.018	M16x36	110	102	14.000	53.5
	65.011						50.002					
315	75.030	M20x42	140	130	20.000	79.5	60.030	M20x42	140	130	18.000	64.0
	75.011						60.011					
355	85.035	M20x42	170	160	22.000	90.0	65.030	M20x42	140	130	18.000	69.0
	85.013						65.011					
400	90.035	M24x50	170	160	25.000	95.0	75.030	M20x42	140	130	20.000	79.5
	90.013						75.011					
450	100.035	M24x50	210	200	28.000	106.0	85.035	M20x42	170	160	22.000	90.0
	100.013						85.013					

Output Shafts - Standard Units and CT Drives							Output Shafts - Heavy Duty Stirrer Drives					
Unit Size	V	V5	W1	W3	Y1	Z1	V1	V5	W1	W3	Y1	Z1
200	90.035	M24x50	170	160	25.000	95.0	100.035	M24x50	210	200	28.000	106.0
	90.013						100.013					
225	100.035	M24x50	210	200	28.000	106.0	110.035	M24x50	210	200	28.000	116.0
	100.013						110.013					
250	110.035	M24x50	210	200	28.000	116.0	125.040	M24x50	210	200	32.000	132.0
	110.013						125.015					
280	125.040	M24x50	210	200	32.000	132.0	140.040	M30x60	250	240	36.000	148.0
	125.015						140.015					
315	140.040	M30x60	250	240	36.000	148.0	160.040	M30x60	300	290	40.000	169.0
	140.015						160.015					
355	160.040	M30x60	300	290	40.000	169.0	180.040	M30x60	300	290	45.000	190.0
	160.015						180.015					
400	180.040	M30x60	300	290	45.000	190.0	200.046	M30x60	350	340	45.000	210.0
	180.015						200.017					
450	200.046	M30x60	350	340	45.000	210.0	220.046	M30x60	350	340	50.000	231.0
	200.017						220.017					

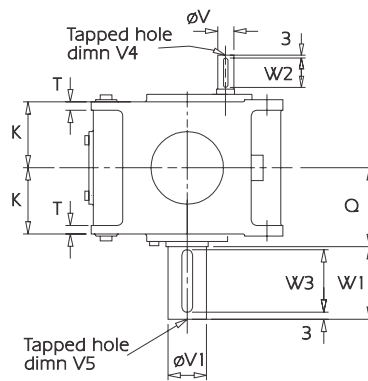
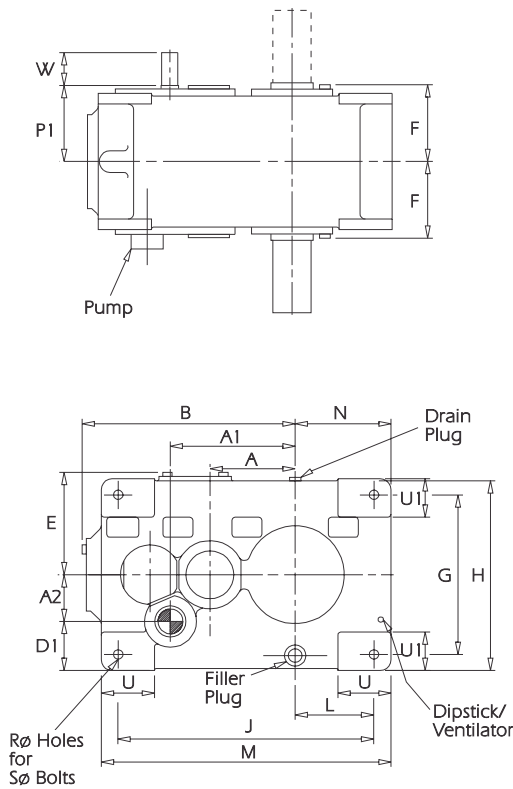
Approximate Net Weights and Oil Capacities

Unit Type/Size		200	225	250	280	315	355	400	450
Net weight (kg)	VH2	360	470	590	810	1090	1445	1970	2690
	VH2 SA-VH2 CT	400	520	650	890	1200	1590	2170	2960
Oil require at 1st filling (lt.)	VH2-VH2 SA-VH2 CT	21	29	40	55	76	105	150	210

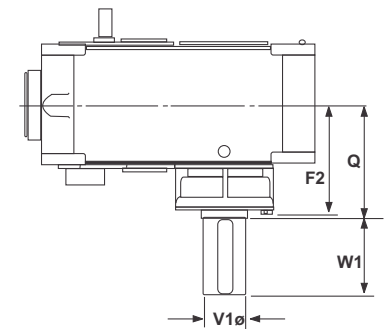
Type VH3-VH3 SA-VH3 CT

Triple Reduction - Parallel Shafts - Principal Dimensions (mm)

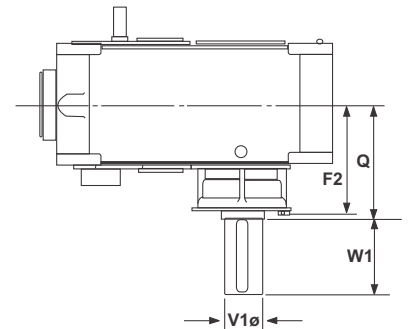
DIMENSIONS
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1 of 2



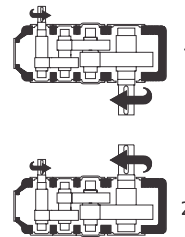
VH3-SA
Heavy Duty Stirrer Drives



VH3 CT
Cooling Tower Drives



SHAFT
HANDING / ROTATION



Unit Size	A	A1	A2	B	D1	E	F	G	H	J	K	L	M	N	P1	Q	R
200	200	296	103	499	122	244	180	375	450	600	160	185	680	225	185	185	22
225	225	343.8	118	567	132	274	203	400	500	670	175	205	760	250	205	205	22
250	250	378	130	632	150	305	215	450	560	750	190	230	850	280	220	220	26
280	280	419.2	148	687	162	334	237	500	620	850	210	265	950	315	240	240	26
315	315	468	165	780	165	358	256	530	660	950	230	295	1070	355	260	260	33
355	355	536.8	188	870	197	413	286	630	770	1060	255	332.5	1195	400	290	290	33
400	400	596.7	209	972	226	464	320	710	870	1180	285	360	1360	450	325	325	39
450	450	679.7	235	1101	235	507	360	750	940	1320	325	405	1510	500	365	365	39

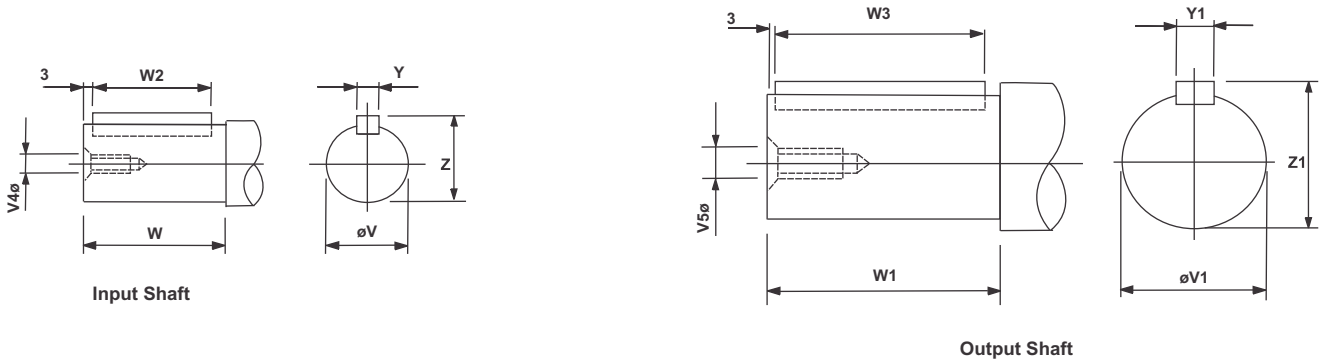
Unit Size	VH3 SA Heavy Duty Stirrer Drives										VH3 CT Cooling Tower Drives					
	S	T	U	U1	V	V1	W	W1	F2	Q	V1	W1	F2	Q	V1	W1
200	20	25	125	90	28	90	60	170	295	300	100	210	290	295	90	170
225	20	30	130	95	32	100	80	210	330	335	110	210	325	330	100	210
250	24	30	140	115	38	110	80	210	355	360	125	210	350	355	110	210
280	24	35	160	125	45	125	110	210	390	395	140	250	385	390	125	210
315	30	40	180	130	50	140	110	250	435	440	160	300	425	430	140	250
355	30	45	200	155	55	160	110	300	470	475	180	300	465	470	160	300
400	36	50	220	175	65	180	140	300	535	540	200	350	525	530	180	300
450	36	55	250	195	75	200	140	350	600	605	220	350	595	600	200	350

See Sheet 2 of HD-314 for shaft and keyway details.

Type VH3-VH3 SA-VH3 CT

Triple Reduction - Parallel Shafts - Principal Dimensions (mm)

DIMENSIONS
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Input Shafts						
Unit Size	V	V4	W	W2	Y	Z
200	28.009	M10x22	60	53	8.000	31.0
	27.996				7.964	30.8
225	32.018	M12x28	80	73	10.000	35.0
	32.002				9.964	34.8
250	38.018	M12x28	80	73	10.000	41.0
	38.002				9.964	40.8
280	45.018	M16x36	110	102	14.000	48.5
	45.002				13.957	48.3
315	50.018	M16x36	110	102	14.000	53.5
	50.002				13.957	53.3
355	55.030	M20x42	110	102	16.000	59.0
	55.011				15.957	58.8
400	65.030	M20x42	140	130	18.000	69.0
	65.011				17.957	68.8
450	75.030	M20x42	140	130	20.000	79.5
	75.011				19.948	79.3

Unit Size	Output Shafts - Standard Units and CT Drives						Output Shafts - Heavy Duty Stirrer Drives					
	V1	V5	W1	W3	Y1	Z1	V1	V5	W1	W3	Y1	Z1
200	90.035	M24x50	170	160	25.000	95.0	100.035	M24x50	210	200	28.000	106.0
	90.013				24.948	94.8	100.013				27.948	105.8
225	100.035	M24x50	210	200	28.000	106.0	110.035	M24x50	210	200	28.000	116.0
	100.013				27.948	105.8	110.013				27.948	115.8
250	110.035	M24x50	210	200	28.000	116.0	125.040	M24x50	210	200	32.000	132.0
	110.013				27.948	115.8	125.015				31.938	131.8
280	125.040	M24x50	210	200	32.000	132.0	140.040	M30x60	250	240	36.000	148.0
	125.015				31.938	131.8	140.015				35.938	147.7
315	140.040	M30x60	250	240	36.000	148.0	160.040	M30x60	300	290	40.000	169.0
	140.015				35.938	147.7	160.015				39.938	168.7
355	160.040	M30x60	300	290	40.000	169.0	180.040	M30x60	300	290	45.000	190.0
	160.015				39.938	168.7	180.015				44.938	189.7
400	180.040	M30x60	300	290	45.000	190.0	200.046	M30x60	350	340	45.000	210.0
	180.015				44.938	189.7	200.017				44.938	209.7
450	200.046	M30x60	350	340	45.000	210.0	220.046	M30x60	350	340	50.000	231.0
	200.017				44.938	209.7	220.017				49.938	230.7

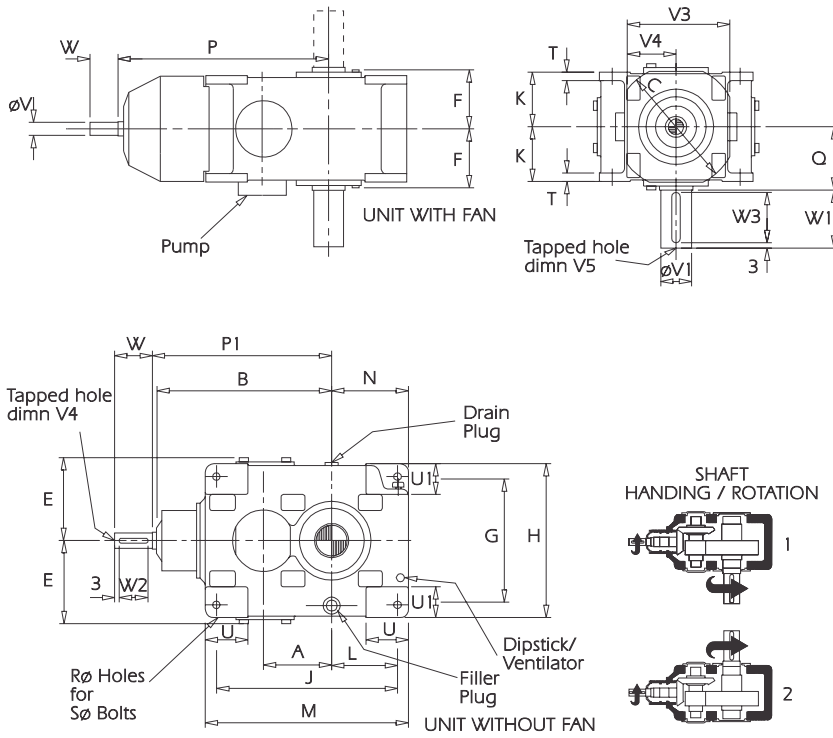
Approximate Net Weights and Oil Capacities

	Unit Type/Size	200	225	250	280	315	355	400	450
Net weight (kg)	VH3	380	490	630	850	1150	1525	2080	2840
	VH3 SA-VH3 CT	420	540	695	935	1265	1680	2290	3125
Oil required at 1st filling (lt)	VH3-VH3 SA-VH3 CT	21	29	40	55	76	105	150	210

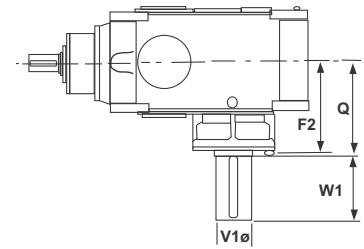
Type VB2-VB2 SA-VB2 CT

Double Reduction - Right Angle Shafts - Principal Dimensions (mm)

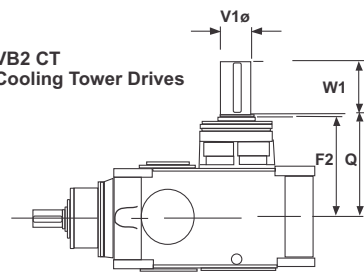
DIMENSIONS
HD-224
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VB2 SA
Heavy Duty Stirrer Drives



VB2 CT
Cooling Tower Drives



Unit Size	A	B	C	E	F	G	H	J	K	L	M	N	P	P1	Q	R	S
200	200	520	400	244	180	375	450	530	160	192.5	595	225	575	525	185	22	20
225	225	575	445	274	203	400	500	560	175	200	660	250	635	580	205	22	20
250	250	630	480	305	215	450	560	630	190	225	740	280	695	635	220	26	24
280	280	715	520	334	237	500	620	710	210	260	820	315	785	720	240	26	24
315	315	800	560	358	256	530	660	800	230	295	920	355	875	805	260	33	30
355	355	870	630	413	286	630	770	900	255	322.5	1055	400	950	875	290	33	30
400	400	990	700	464	320	710	870	1000	285	350	1200	450	1075	995	325	39	36
450	450	1100	780	507	360	750	940	1120	325	395	1330	500	1190	1105	365	39	36

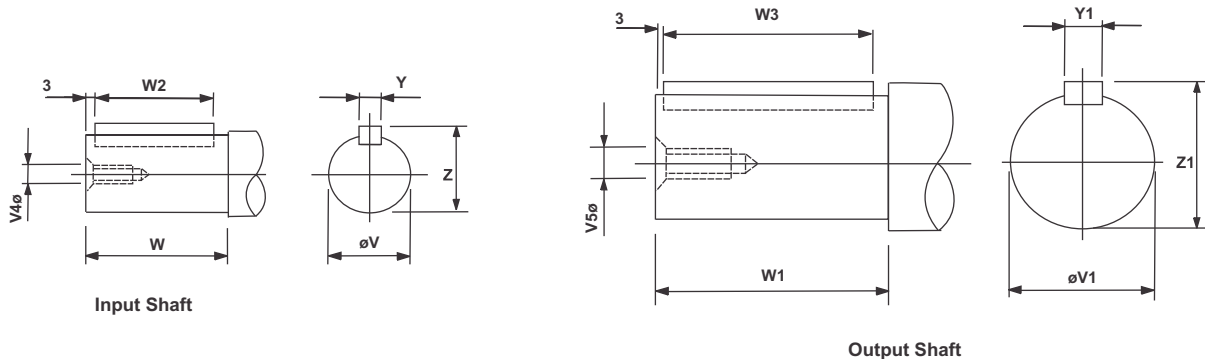
Unit Size	VB2 SA Heavy Duty Stirrer Drives											VB2 CT Cooling Tower Drives					
	T	U	U1	V	V1	V3	V4	W	W1	F2	Q	V1	W1	F2	Q	V1	W1
200	25	125	90	45	90	305	140	110	170	295	300	100	210	330	335	90	170
225	30	130	95	50	100	356	171	110	210	330	335	110	210	370	375	100	210
250	30	140	115	55	110	402	190	110	210	355	360	125	210	395	400	110	210
280	35	160	125	65	125	450	225	140	210	390	395	140	250	430	435	125	210
315	40	180	130	75	140	480	230	140	250	435	440	160	300	465	470	140	250
355	45	200	155	85	160	540	270	170	300	470	475	180	300	510	515	160	300
400	50	220	175	90	180	618	300	170	300	535	540	200	350	575	580	180	300
450	55	250	195	100	200	650	320	210	350	600	605	220	350	645	650	200	350

See Sheet 2 of HD-224 for shaft and keyway details.

Type VB2-VB2 SA-VB2 CT

Double Reduction - Right Angle Shafts - Principal Dimensions (mm)

DIMENSIONS
HD-224
2 of 2



Input Shafts						
Unit Size	V	V4	W	W2	Y	Z
200	45.018	M16x36	110	102	14.000	48.5
	45.002				13.957	48.3
225	50.018	M16x36	110	102	14.000	53.5
	50.002				13.957	53.3
250	55.030	M20x42	110	102	16.000	59.0
	55.011				15.957	58.8
280	65.030	M20x42	140	130	18.000	69.0
	65.011				17.957	68.8
315	75.030	M20x42	140	130	20.000	79.5
	75.011				19.948	79.3
355	85.035	M20x42	170	160	22.000	90.0
	85.013				21.948	89.8
400	90.035	M24x50	170	160	25.000	95.0
	90.013				24.948	94.8
450	100.035	M24x50	210	200	28.000	106.0
	100.013				27.948	105.8

Unit Size	Output Shafts - Standard Units and CT Drives						Output Shafts - Heavy Duty Stirrer Drives					
	V1	V5	W1	W3	Y1	Z1	V1	V5	W1	W3	Y1	Z1
200	90.035	M24x50	170	160	25.000	95.0	100.035	M24x50	210	200	28.000	106.0
	90.013				24.948	94.8	100.013				27.948	105.8
225	100.035	M24x50	210	200	28.000	106.0	110.035	M24x50	210	200	28.000	116.0
	100.013				27.948	105.8	110.013				27.948	115.8
250	110.035	M24x50	210	200	28.000	116.0	125.040	M24x50	210	200	32.000	132.0
	110.013				27.948	115.8	125.015				31.938	131.8
280	125.040	M24x50	210	200	32.000	132.0	140.040	M30x60	250	240	36.000	148.0
	125.015				31.938	131.8	140.015				35.938	147.7
315	140.040	M30x60	250	240	36.000	148.0	160.040	M30x60	300	290	40.000	169.0
	140.015				35.938	147.7	160.015				39.938	168.7
355	160.040	M30x60	300	290	40.000	169.0	180.040	M30x60	300	290	45.000	190.0
	160.015				39.938	168.7	180.015				44.938	189.7
400	180.040	M30x60	300	290	45.000	190.0	200.046	M30x60	350	340	45.000	210.0
	180.015				44.938	189.7	200.017				44.938	209.7
450	200.046	M30x60	350	340	45.000	210.0	220.046	M30x60	350	340	50.000	231.0
	200.017				44.938	209.7	220.017				49.938	230.7

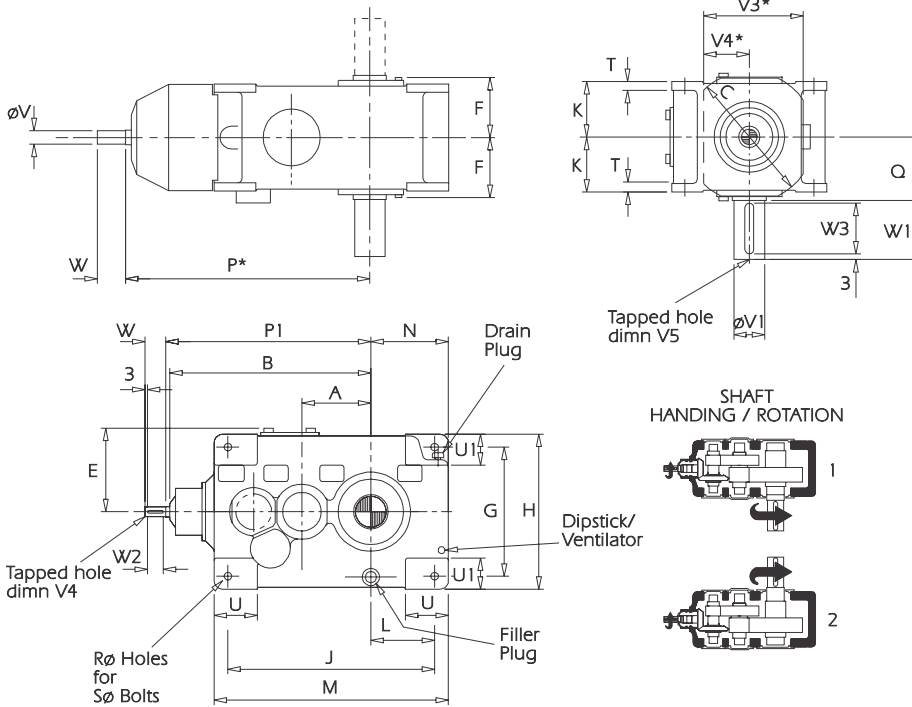
Approximate Net Weights and Oil Capacities

	Unit Type/Size	200	225	250	280	315	355	400	450
Net weight (kg)	VB2	340	455	560	750	1000	1520	2050	2680
	VB2 SA-VB2 CT	375	500	615	825	1100	1670	2255	2950
Oil required at 1st filling (lt.)	VB2-VB2 SA-VB2 CT	18	25	34	47	65	92	130	180

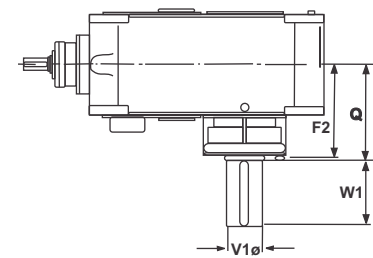
Type VB3-VB3 SA-VB3 CT

Triple Reduction - Principal Dimensions (mm)

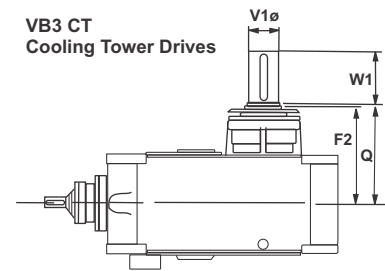
DIMENSIONS
HD-324
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VB3 SA
Heavy Duty Stirrer Drives



VB3 CT
Cooling Tower Drives



Unit Size	A	B	C*	E	F	G	H	J	K	L	M	N	P*	P1	Q	R	S
200	200	590	400	244	180	375	450	600	160	185	680	225	630	595	185	22	20
225	225	655	445	274	203	400	500	670	175	205	760	250	700	660	205	22	20
250	250	730	480	305	215	450	560	750	190	230	850	280	780	735	220	26	24
280	280	800	520	334	237	500	620	850	210	265	950	315	855	805	240	26	24
315	315	890	560	358	256	530	660	950	230	295	1070	355	950	895	260	33	30
355	355	985	630	413	286	630	770	1060	255	332.5	1195	400	1050	990	290	33	30
400	400	1115	700	464	320	710	870	1180	285	360	1360	450	1185	1120	325	39	36
450	450	1250	780	507	360	750	940	1320	325	405	1510	500	1325	1255	365	39	36

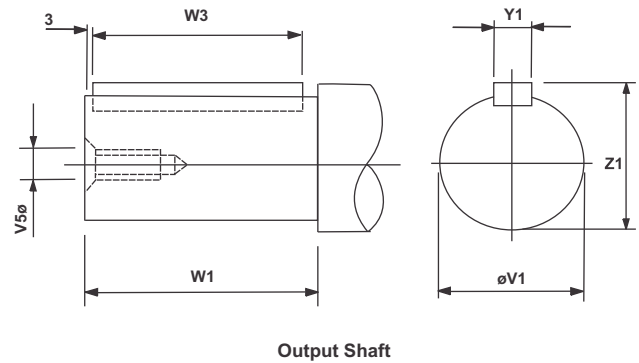
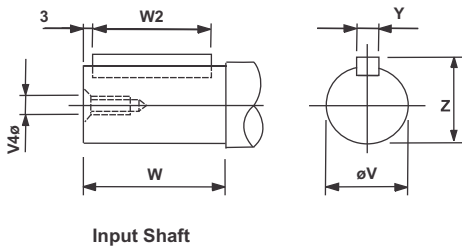
Unit Size	VB3 SA Heavy Duty Stirrer Drives										VB3 CT Cooling Tower Drives						
	T	U	U1	V	V1	V3*	V4*	W	W1	F2	Q	V1	W1	F2	Q	V1	W1
200	25	125	90	28	90	305	140	60	170	295	300	100	210	330	335	90	170
225	30	130	95	32	100	356	171	80	210	330	335	110	210	370	375	100	210
250	30	140	115	38	110	390	190	80	210	355	360	125	210	395	400	110	210
280	35	160	125	45	125	450	225	110	210	390	395	140	250	430	435	125	210
315	40	180	130	50	140	460	230	110	250	435	440	160	300	465	470	140	250
355	45	200	155	55	160	540	270	110	300	470	475	180	300	510	515	160	300
400	50	220	175	65	180	600	300	140	300	535	540	200	350	575	580	180	300
450	55	250	195	75	200	640	320	140	350	600	605	220	350	645	650	200	350

*Fan is fitted for ratio 14.0 to 63.8 only.
See Sheet 2 of HD-324 for shaft and keyway details.

Type VB3-VB3 SA-VB3 CT

Triple Reduction - Principal Dimensions (mm)

DIMENSIONS
HD-324
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Input Shafts

Unit Size	V	V4	W	W2	Y	Z
200	28.009	M10x22	60	53	8.000	31.0
	27.995				7.964	30.8
225	32.018	M12x28	80	73	10.000	35.0
	32.002				9.964	34.8
250	38.018	M12x28	80	73	10.000	41.0
	38.002				9.964	40.8
280	45.018	M16x36	110	102	14.000	48.5
	45.002				13.957	48.3
315	50.018	M16x36	110	102	14.000	53.5
	50.002				13.957	53.3
355	55.030	M20x42	110	102	16.000	59.0
	55.011				15.957	58.8
400	65.030	M20x42	140	130	18.000	69.0
	65.011				17.957	68.8
450	75.030	M20x42	140	130	20.000	79.5
	75.011				19.948	79.3

Output Shafts - Standard Units and CT Drives

Output Shafts - Heavy Duty Stirrer Drives

Unit Size	V1	V5	W1	W3	Y1	Z1	V1	V5	W1	W3	Y1	Z1
200	90.035	M24x50	170	160	25.000	95.0	100.035	M24x50	210	200	28.000	106.0
	90.013				24.948	94.8	100.013				27.948	105.8
225	100.035	M24x50	210	200	28.000	106.0	110.035	M24x50	210	200	28.000	116.0
	100.013				27.948	105.8	110.013				27.948	115.8
250	110.035	M24x50	210	200	28.000	116.0	125.040	M24x50	210	200	32.000	132.0
	110.013				27.948	115.8	125.015				31.938	131.8
280	125.040	M24x50	210	200	32.000	132.0	140.040	M30x60	250	240	36.000	148.0
	125.015				31.938	131.8	140.015				35.938	147.7
315	140.040	M30x60	250	240	36.000	148.0	160.040	M30x60	300	290	40.000	169.0
	140.015				35.938	147.7	160.015				39.938	168.7
355	160.040	M30x60	300	290	40.000	169.0	180.040	M30x60	300	290	45.000	190.0
	160.015				39.938	168.7	180.015				44.938	189.7
400	180.040	M30x60	300	290	45.000	190.0	200.046	M30x60	350	340	45.000	210.0
	180.015				44.938	189.7	200.017				44.938	209.7
450	200.046	M30x60	350	340	45.000	210.0	220.046	M30x60	350	340	50.000	231.0
	200.017				44.938	209.7	220.017				49.938	230.7

Approximate Net Weights and Oil Capacities

	Unit Type/Size	200	225	250	280	315	355	400	450
Net weight (kg)	VB3	380	490	630	850	1150	1525	2080	2840
	VB3 SA - VB3 CT	420	540	695	935	1285	1680	2290	3125
Oil required at 1st filling (lt.)	VB3 - VB3 SA - VB3 CT	21	29	40	55	76	105	150	210

Output Shaft & Shrink Disc Details (mm)

Types H2SF - H3SF - B2SF - B3SF

Each shaft mounted gear unit can be fitted with a 'shrink disc' device located on the hollow output shaft to provide a positive outer locking connection between gear unit and driven shaft. The 'shrink disc' is a friction device, without keys, which exerts an external clamping force on the hollow output shaft, thus establishing a mechanical shrink fit between the gear unit hollow shaft & driven shaft. 'Shrink disc' capacities have ample margins in dealing with transmitted torques and external loading imposed on gear units.

Working Principle

The 'shrink disc' consists of two locking collars, a double tapered inner ring, locking screws and a sealing ring. By tightening the

locking screws, the locking collars are pulled together, exerting radial forces on the inner ring, thus creating a positive friction connection between hollow shaft and driven shaft See fig.2.

As the tapered surfaces of locking collars and inner ring are lubricated with Molykote 321 R or similar and the taper angle is not self locking, locking collars will not seize on the inner ring and can be released easily when removal is necessary.

When the shrink disc is clamped in position the high contact pressures between tapered surfaces and screw heads and their seatings ensure hermetic sealing and eliminate the possibility of fretting corrosion.

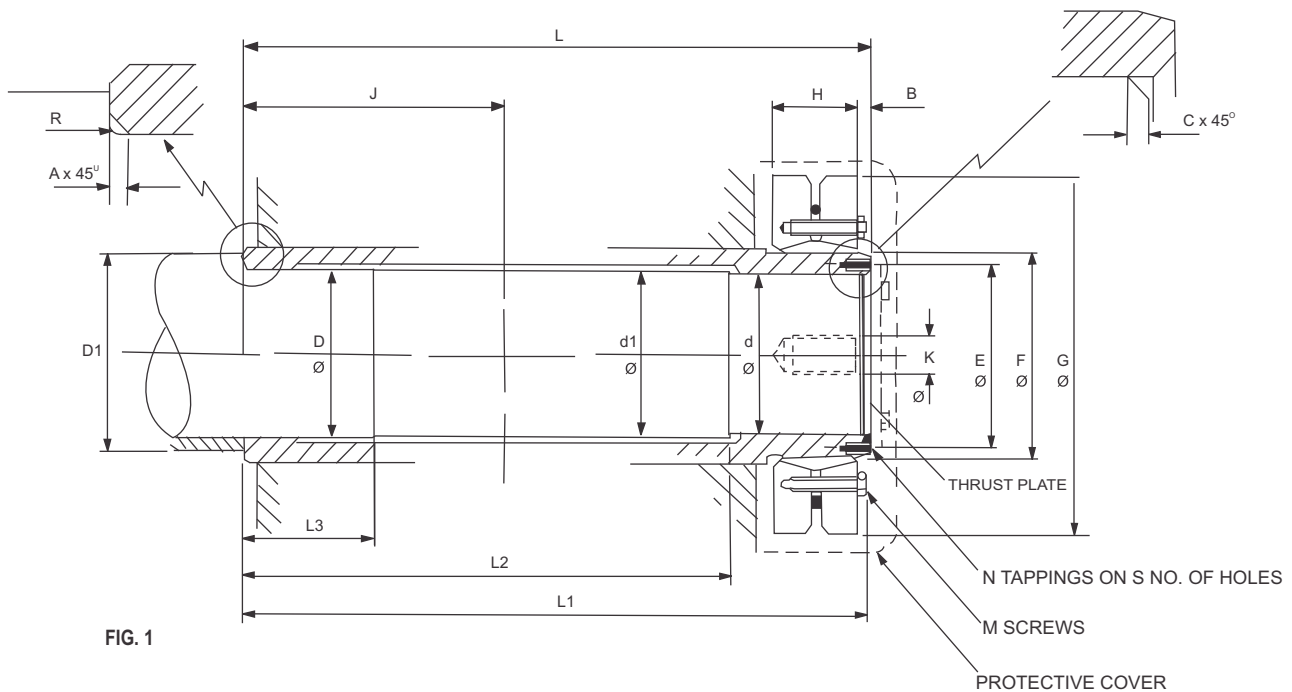


FIG. 1

Unit Size	Shrink Disc				Hollow Shaft								Shaft of Driven Machine										
	Size Rel.	F	G	H	Screws		J	L	A	B	N	S	E	d*	d1	D*	min D1	L1	L2	L3	C	R	K
180	110-72	110	185	49	M10	58	175	415	4.5	12	M5	6	97.5	85	87	90	113	412	327	80	3	2	M24x50
200	125-72	125	215	53	M10	58	185	440	4.5	12	M6	6	110	95	97	100	113	437	347	90	3	2	M24x50
225	155-71	155	263	62	M12	100	205	490	4.5	18	M10	4	135	115	117	120	133	487	377	110	3	2	M24x50
250	165-71	165	290	68	M16	240	220	530	4.5	18	M10	4	145	125	127	130	143	527	407	120	3	2	M24x50
280	185-71	185	330	85	M16	240	240	585	4.5	18	M10	6	160	140	142	145	160	580	445	135	4	2	M30x60
315	200-71	200	350	85	M16	240	260	630	4.5	18	M10	6	180	160	162	165	180	625	475	150	4	2	M30x60
355	220-71	220	370	103	M16	240	290	710	4.5	22	M12	4	195	170	172	175	190	705	540	165	4	2	M30x60
400	260-71	260	430	119	M20	470	325	800	4.5	22	M12	6	225	190	195	200	220	795	615	180	4	2	M30x60
450	280-71	280	460	132	M20	470	365	890	4.5	22	M12	6	250	220	225	230	250	885	695	190	4	2	M30x60
500	320-91	320	520	140	M20	470	420	1010	4	24	M12	6	285	250	255	260	280	1002	790	200	4	2	M48x100

For higher sizes — REFER TO PREMIUM

Shrink disc locking screws M must be tightened to the torque figures Ma shown in Nm.

*Tolerances for shaft diameters D and d are to h6 for diameters 95 to 165 and g6 for 165 and above.

As improvements in design are continually being made, this specification is not to be regarded as binding in detail and dimensions are subject to alteration without notice.

Output Shaft & Shrink Disc Details (mm)

Types H2SF - H3SF - B2SF - B3SF

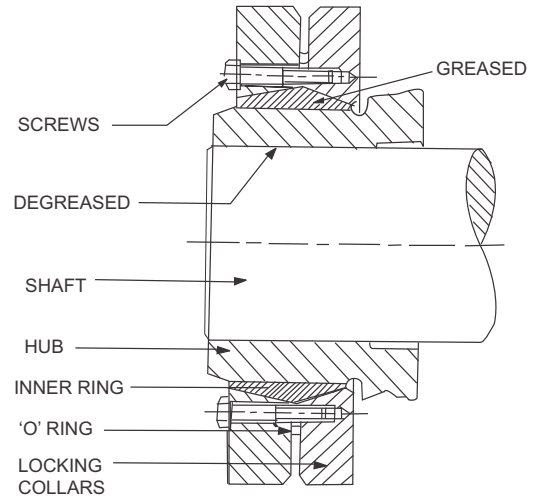
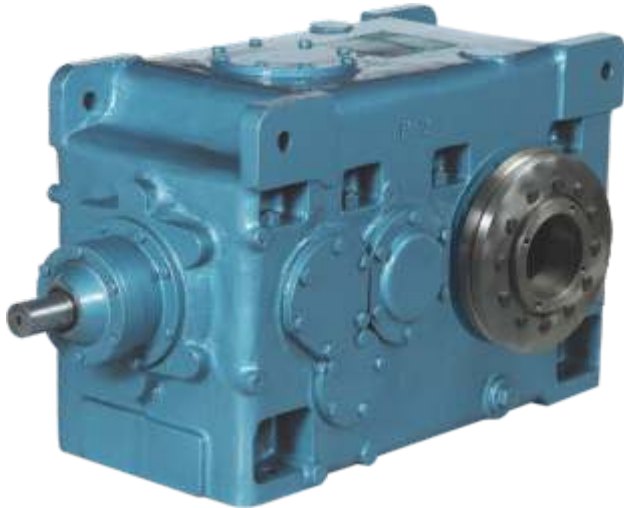


FIG. 2

Installation

'Shrink discs' are optionally supplied with shaft mounted units. The following procedures should be followed when fitting or removing units from driven shafts

1. Release locking screws gradually and in succession. Initially a quarter of a turn on each screw will avoid tilting and jamming of collars.
2. Remove collars and clean 'shrink disc' thoroughly.
- 3.. Clean and degrease locating diameters of gear unit hollow shaft, driven shaft and 'shrink disc' locating diameter on hollow shaft extension.
4. Draw the gear unit onto the driven shaft. See Fig.3
5. Grease tapered surfaces of locking collars and inner ring with Molykote 321 R or similar.
6. Fit 'Shrink Disc' on gear unit hollow shaft to position shown in Fig.1.
7. Tighten all locking screws gradually and in succession. Do not tighten in a diametrically opposite sequences. Several passes are required until all screws are tightened to the torque figures Ma shown in the table opposite in Nm. This is stamped on the inner face of the 'shrink disc.'

Locking collars must remain equidistant over 360°.

Note: When the hollow output shaft is to operate in a vertical position it is essential that the shaft of the driven machine is provided with a shoulder. When the thrust load is not taken by the shoulder on the driven shaft, a thrust plate, as shown in Fig.1 must be fitted.

It is recommended that customers shafts at the non-clamped end of the sleeve should be coated with Molykote 321 R or equivalent.

Removal

1. Removal procedure is similar to the reverse of installation.
Note: Do not remove 'shrink disc' locking screws completely.
2. Remove any rust and dirt from gear unit hollow shaft.
3. Withdraw gear unit from driven shaft. See Fig.4.

Note: 'Shrink disc' should be removed and cleaned thoroughly, and Molykote 321 R or similar applied to the tapered surfaces of inner ring and locking collars before re-use. The 'O' ring should be replaced if worn or damaged.

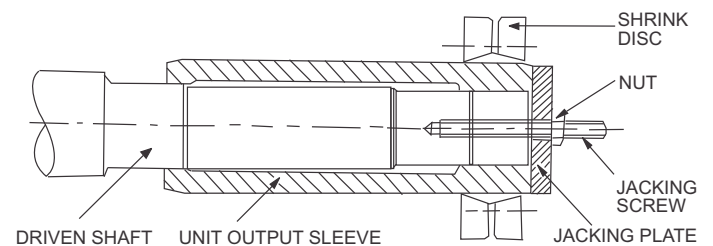


FIG.3 MOUNTING GEAR UNIT

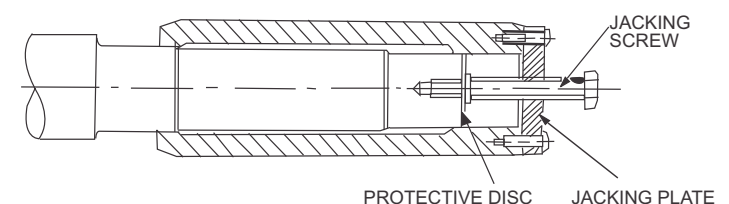


FIG.4 REMOVING GEAR UNIT

As improvements in design are continually being made, this specification is not to be regarded as binding in detail and dimensions are subject to alteration without notice.

Torque Arm Details (mm)

Optional Series - Shaft Mounted Units

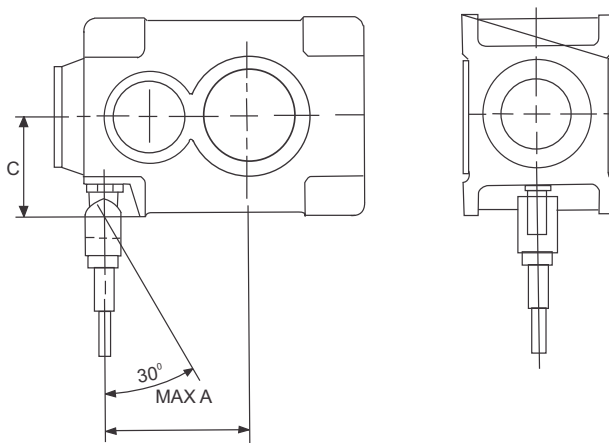
ENGINEERING
HE-502

Torque Arm Dimensions (mm)

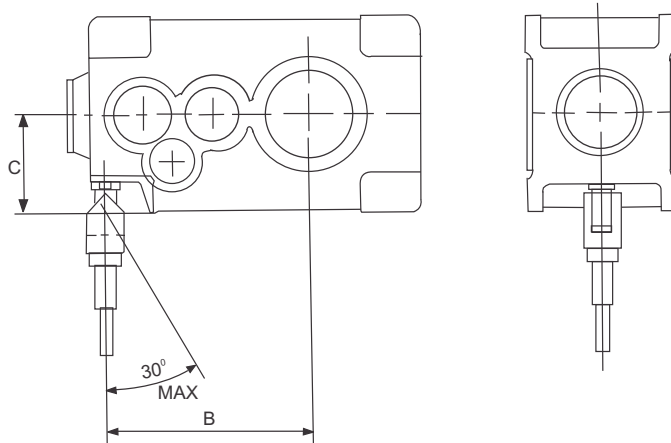
Unit Size	Type H2S-H3S-B2S-B3S								Disc Spring Ref.	X	H
	A	B	C	D	E min	E max	F	G			
200	335	420	187	72	35	52	M24	168	71x36x4	0.8	36
225	370	470	214	76	40	60	M30	188	80x41x4	1.1	41
250	418	528	247	98	50	75	M36	237	100x51x5	1.4	52
280	465	595	260	100	50	75	M36	237	100x51x6	1.1	52
315	517	667	292	108	60	90	M42	270	125x61x6	1.8	62
355	595	735	320	122	70	105	M48	308	125x71x6	1.7	72
400	680	840	371	133	70	105	M52	329	140x72x8	1.6	72
450	750	930	391	149	80	120	M56	364	150x81x8	1.8	82

For higher sizes — REFER TO PREMIUM.

TYPE B2S



TYPES H2S-H3S-B3S



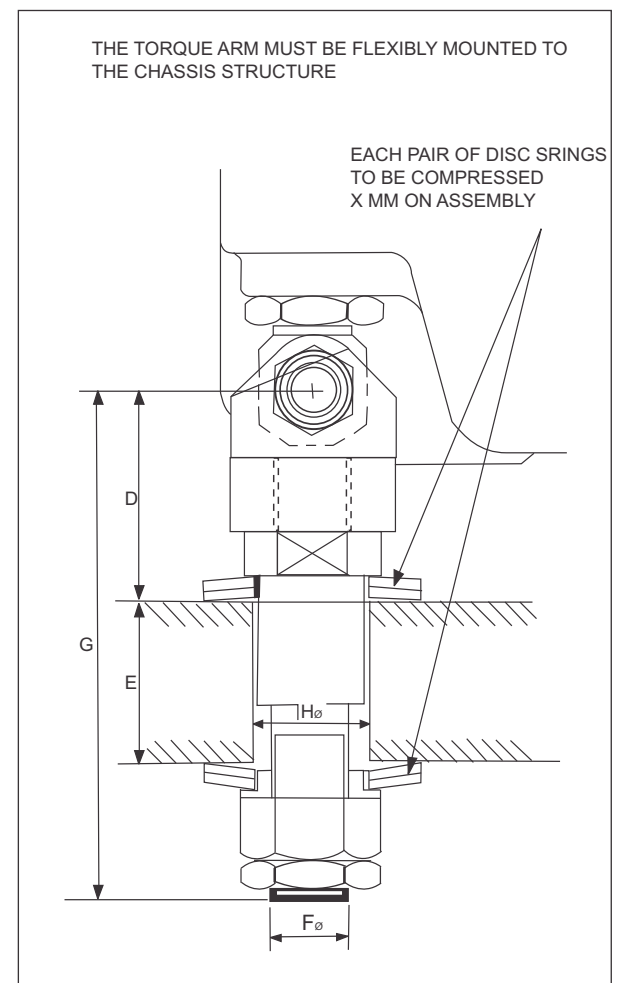
Torque arms are available for double and triple reduction shaft mounted units with parallel or right angle shafts, type H2S, H3S, B2S and B3S. They are supplied as optional extras and are secured to gear cases as shown below.

Torque arms must be secured to the chassis structure in a flexible mounting, as indicated, within a maximum angle of 30° between the vertical plane and a plane towards the gear unit output shaft as illustrated.

Shaft mounted units are designed to operate in the horizontal position. Reference must be made to Premium with full details, where units are required to operate in an inclined position or where torque arm mounting positions exceed the 30° maximum angle of inclination to the vertical plane.

Shaft mounted units for High Inertia Drive

When used on Traverse drives with high inertia driven loads, e.g. crane drives (slewing, long travel and cross travel) boggie drives and selected high inertia load roller table drives, it is recommended that shaft mounted units should be fitted with shock absorbing Torque Arms. Consult Premium with specific application details.



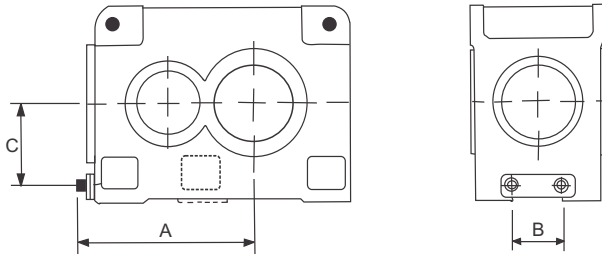
As improvements in design are continually being made, this specification is not to be regarded as binding in detail and dimensions are subject to alteration without notice.

Cooling Coil Connections (mm)

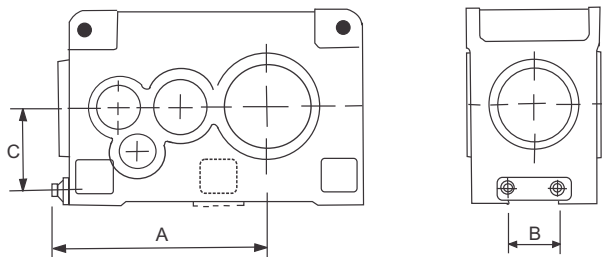
Types H1- H2- H2SF- H3 - H3SF - B2- B2SF- B3- B3SF

ENGINEERING
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H1 - B2 - B2SF



H2 - H2SF - H3 - H3SF B3 B3SF



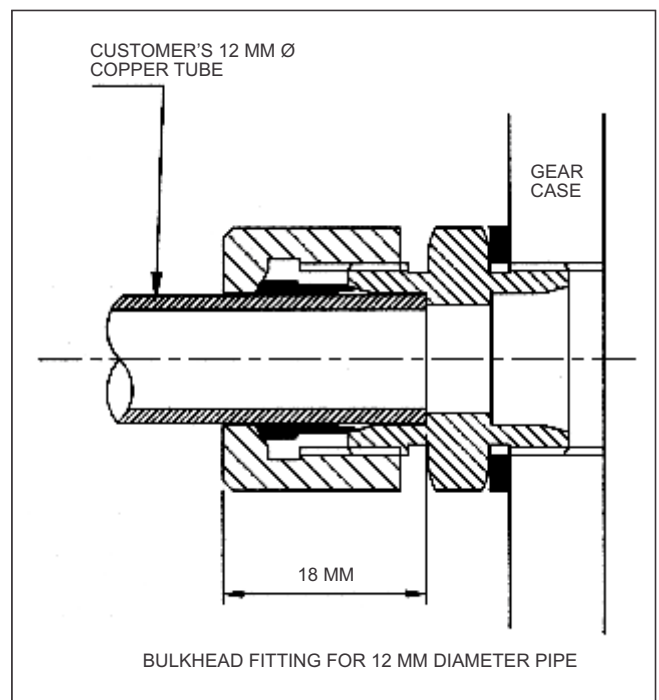
Cooling Coil connections for water inlet and outlet pipes are provided as indicated. One size of fitting is used for all gear unit sizes.

Fittings which are supplied with gear units fitted with cooling coils are to suits 12 mm diameter copper pipe which is provided by customers.

Cooling coils are suitable for fresh, brackish or sea water with flow in either direction. Connections are therefore interchangeable.

Unit Size	H1-B2-B2SF			Type of Unit H2-H2SF-B3-B3SF			H3-H3SF		
	A	B	C	A	B	C	A	B	C
140	301	90	127	371	90	127	456	90	127
160	333	110	145	408	110	145	498	110	145
180	373	110	165	453	110	165	548	110	165
200	415	135	185	500	135	185	500	135	185
225	455	135	210	555	135	210	555	135	210
250	505	150	237	615	150	237	615	150	232
280	550	150	272	680	150	272	680	150	272
315	610	150	305	760	150	305	760	150	305
355	700	150	345	840	150	345	840	150	345
400	795	150	393	955	150	393	955	150	393
450	875	150	442	1055	150	442	1055	150	442
500	975	150	495	1185	150	495	1405	150	495
560	-	-	-	1315	150	562	1555	150	562
630	-	-	-	1465	150	639	1735	150	639

For higher sizes —REFER TO PREMIUM.



As improvement in design are continually being made, this specification is not to be regarded as binding in detail and dimensions are subject to alteration without notice.

Holdbacks

Principle of Operation

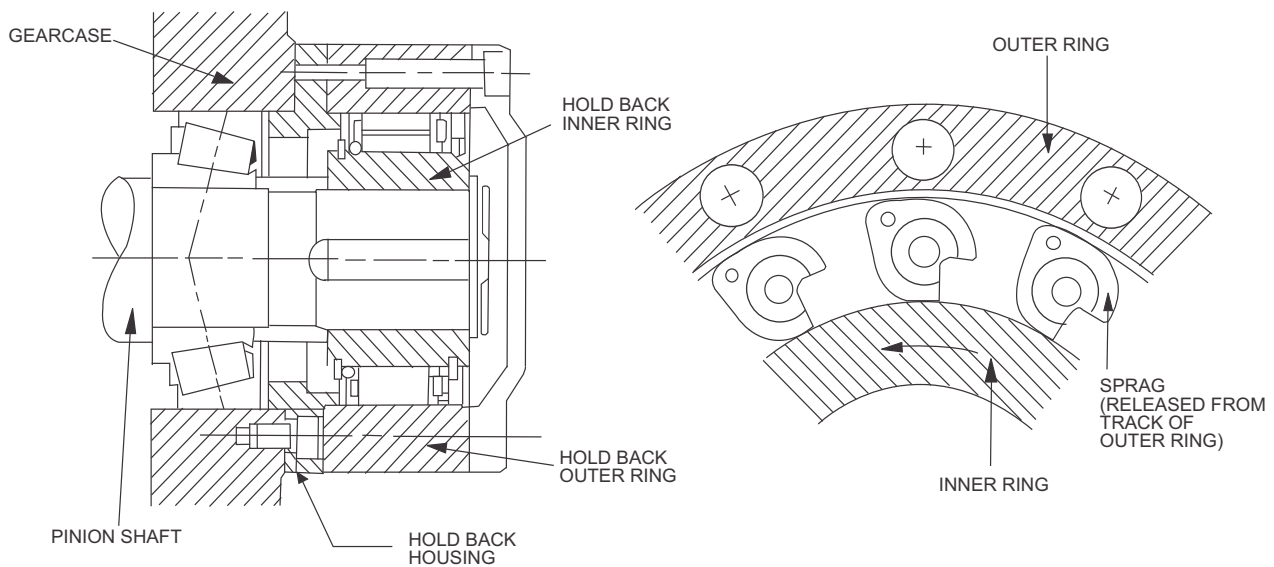


FIG.1

FIG.2

Holdbacks can be fitted to all Helical Units, with the exception of H1 single reduction type, where required to operate in non-reversing drives. They are located on input pinion-shaft in case of H2/H2SF type units and on second reduction pinion-shaft in case of B2/B2SF, H3/H3SF and B2/B3SF type of units.

All the holdbacks have adequate capacities to deal with full rated torque. Lubrication is provided automatically from the oil in the gear unit.

Holdbacks are located externally as shown in *Fig. 1* and are positioned on different units as shown on sheet 2 of HE-504.

Holdbacks fitted on Helical units are of centrifugally released sprag type. In case of these holdbacks the sprags rotate along with cage and inner ring of holdback in free direction of rotation. The sprags are so designed that they get released from track of outer ring of the holdback. (see *fig.2*) due to centrifugal force at normal running speed of gearbox. Contact between the sprag and the stationary outer race therefore takes place only during starting and stopping. Contact-free running during normal operating conditions reduces wear of the sprags and ensures the longer life.

Holdbacks-Double & Triple Reduction Units

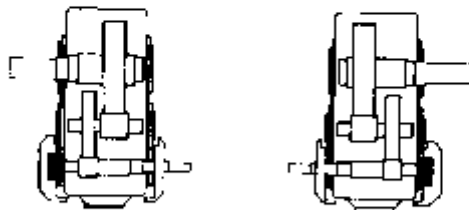
Positions

Holdbacks can be fitted to all PREMIUM Helical gear unit types with the exception of H1 single reduction units. They are located externally on helical pinion shafts, positioned as indicated on the diagrams below.

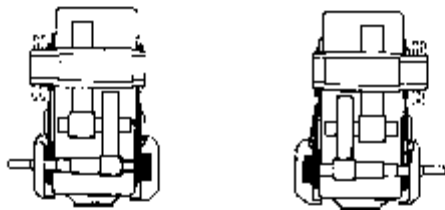
The holdback position for units with right angle shafts, types B2-B2SF-B3-B3SF depends on relative shaft rotations.

Position of holdback on types B2SF, sizes 225, 250, 280 and 315 is on the side opposite to the shrink disc for shaft handings 1 and 2A (see HD - 221 & HD - 222)

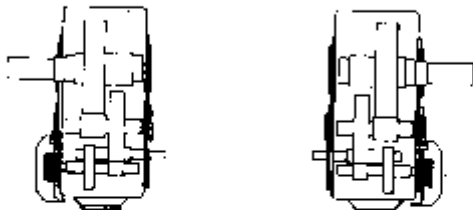
Type H2



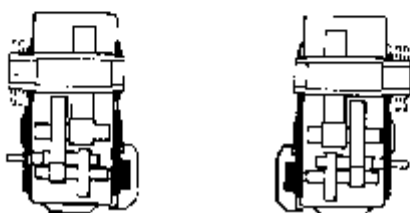
Type H2SF



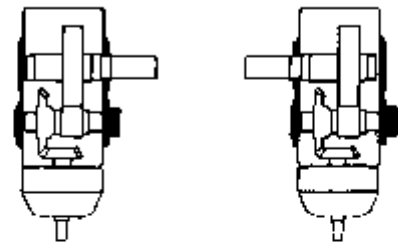
Type H3



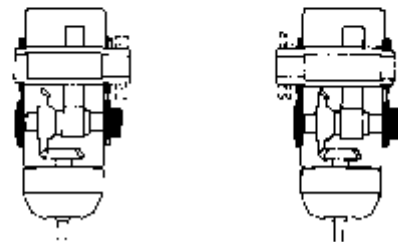
Type H3SF



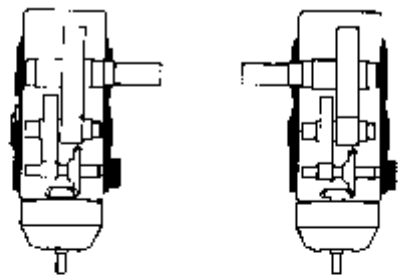
Type B2



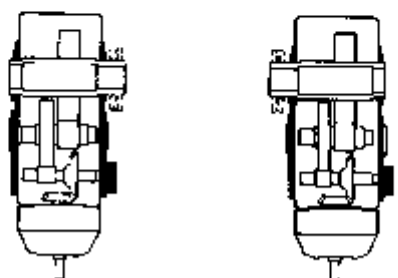
Type -B2SF



Type -B3



Type B3SF



Moments of Inertia-kg m²

Referred to High Speed Shafts

SINGLE REDUCTION UNITS

Nominal Ratio	Type H1			Type H1								Type H1			
	140	160	180	Unit Size								500	560	630	710
				200	225	250	280	315	355	400	450				
1.22	0.037	0.066	0.120	0.19	0.33	0.60	0.98	1.91	3.27	5.87	10.3	19.2	-	-	-
1.35	0.033	0.057	0.107	0.17	0.30	0.54	0.91	1.72	2.96	5.25	9.34	17.3	-	-	-
1.50	0.028	0.053	0.095	0.15	0.27	0.44	0.76	1.51	2.72	4.59	8.43	14.1	-	-	-
1.66	0.025	0.046	0.084	0.13	0.25	0.39	0.69	1.35	2.46	4.08	7.75	12.5	-	-	-
1.84	0.023	0.043	0.074	0.12	0.23	0.39	0.64	1.18	1.97	3.62	6.98	12.5	-	-	-
2.03	0.021	0.038	0.069	0.12	0.20	0.35	0.57	1.04	1.98	3.56	6.26	11.2	-	-	-
2.25	0.019	0.035	0.063	0.10	0.18	0.30	0.52	0.90	1.77	3.06	5.58	9.60	-	-	-
2.49	0.017	0.029	0.056	0.085	0.16	0.26	0.46	0.88	1.54	2.60	4.95	8.32	-	-	-
2.76	0.014	0.028	0.045	0.083	0.14	0.25	0.40	0.76	1.32	2.54	4.18	8.00	-	-	-
3.05	0.013	0.023	0.039	0.067	0.14	0.21	0.34	0.66	1.14	2.07	4.12	6.72	-	-	-
3.38	0.012	0.022	0.038	0.064	0.11	0.18	0.33	0.62	1.08	2.00	3.49	5.76	-	-	-
3.73	0.009	0.017	0.033	0.050	0.092	0.16	0.27	0.50	0.88	1.56	2.82	5.12	-	-	-
4.13	0.009	0.015	0.029	0.048	0.085	0.15	0.25	0.45	0.84	1.50	2.65	4.80	-	-	-
4.57	0.007	0.014	0.026	0.045	0.078	0.14	0.21	0.37	0.76	1.39	2.47	4.48	-	-	-
5.06	0.006	0.012	0.021	0.036	0.065	0.11	0.19	0.35	0.61	1.12	2.02	3.52	-	-	-

DOUBLE REDUCTION UNITS

Nominal Ratio	Type H2-H2SF			Type H2-H2SF-VH2-VH2 SA-VH2 CT								Type H2-H2SF			
	140	160	180	Unit Size								500	560	630	710
				200	225	250	280	315	355	400	450				
5.60	0.0067	0.0109	0.0224	0.032	0.060	0.110	0.19	0.34	0.61	1.02	1.83	3.52	6.08	10.9	REFER TO PREMIUM
6.20	0.0065	0.0108	0.0220	0.028	0.051	0.091	0.16	0.29	0.52	0.88	1.65	2.91	5.12	9.28	
6.86	0.0060	0.0112	0.0205	0.027	0.047	0.089	0.15	0.27	0.48	0.87	1.53	2.85	4.80	8.64	
7.59	0.0053	0.0086	0.0177	0.023	0.043	0.076	0.14	0.23	0.43	0.74	1.30	2.43	4.48	7.36	
8.40	0.0044	0.0071	0.0153	0.024	0.043	0.078	0.14	0.26	0.44	0.78	1.42	2.50	4.48	8.32	
9.30	0.0041	0.0060	0.0131	0.021	0.040	0.067	0.13	0.22	0.40	0.67	1.21	2.14	4.16	7.04	
10.3	0.0036	0.0059	0.0104	0.019	0.037	0.065	0.12	0.20	0.37	0.61	1.13	2.08	3.84	6.40	
11.4	0.0031	0.0054	0.0099	0.016	0.030	0.053	0.098	0.17	0.29	0.53	0.99	1.70	3.14	5.44	
12.6	0.0031	0.0047	0.0078	0.014	0.024	0.044	0.078	0.14	0.26	0.44	0.81	1.41	2.50	4.48	
14.0	0.0023	0.0044	0.0075	0.013	0.023	0.043	0.074	0.14	0.25	0.41	0.77	1.38	2.37	4.48	
15.4	0.0022	0.0039	0.0072	0.0099	0.020	0.036	0.064	0.12	0.20	0.32	0.58	1.15	2.05	3.84	
17.1	0.0022	0.0038	0.0065	0.0092	0.019	0.035	0.061	0.11	0.19	0.30	0.55	1.12	1.95	3.52	
18.9	0.0018	0.0034	0.0059	0.0082	0.015	0.028	0.050	0.091	0.16	0.27	0.51	0.90	1.82	2.91	
20.9	0.0017	0.0033	0.0058	0.0089	0.018	0.034	0.057	0.100	0.19	0.29	0.53	1.09	1.60	3.20	
23.2	0.0014	0.0026	0.0046	0.0080	0.014	0.027	0.047	0.086	0.15	0.26	0.49	-	1.52	-	
25.6	0.0014	0.0025	0.0044	0.0076	0.014	0.026	0.046	0.085	0.15	0.25	0.47	-	-	-	

TRIPLE REDUCTION UNITS

Nominal Ratio	Type H3-H3SF			Type H3-H3SF-VH3-VH3 SA-VH3 CT								Type H3-H3SF			
	140	160	180	Unit Size								500	560	630	710
				200	225	250	280	315	355	400	450				
25.6	0.0014	0.0026	0.0048	0.0064	0.0110	0.021	0.040	0.067	0.13	0.21	0.39	0.67	1.28	2.14	REFER TO PREMIUM
28.4	0.0012	0.0023	0.0046	0.0069	0.0120	0.022	0.039	0.072	0.12	0.23	0.40	0.70	1.25	2.30	
31.4	0.0012	0.0022	0.0042	0.0049	0.0083	0.016	0.030	0.051	0.097	0.17	0.27	0.51	0.96	1.63	
34.7	0.0010	0.0019	0.0038	0.0055	0.0091	0.018	0.034	0.057	0.11	0.18	0.34	0.58	1.09	1.82	
38.4	0.00091	0.0016	0.0034	0.0045	0.0074	0.015	0.027	0.047	0.087	0.15	0.26	0.48	0.86	1.50	
42.5	0.00078	0.0013	0.0029	0.0043	0.0069	0.014	0.026	0.045	0.085	0.15	0.24	0.45	0.83	1.44	
47.1	0.00083	0.0015	0.0025	0.0042	0.0068	0.014	0.025	0.044	0.084	0.14	0.24	0.45	0.80	1.41	
52.1	0.00072	0.0013	0.0021	0.0034	0.0062	0.012	0.020	0.036	0.069	0.12	0.21	0.38	0.64	1.15	
57.7	0.00071	0.0012	0.0020	0.0030	0.0053	0.0091	0.018	0.031	0.058	0.10	0.19	0.29	0.58	0.99	
63.8	0.00068	0.0012	0.0019	0.0028	0.0050	0.0087	0.017	0.030	0.057	0.098	0.18	0.28	0.54	0.96	
70.6	0.00068	0.0011	0.0017	0.0029	0.0052	0.0090	0.018	0.031	0.057	0.100	0.18	0.29	0.58	0.99	
78.2	0.00066	0.00099	0.0019	0.0027	0.0048	0.0084	0.016	0.029	0.055	0.092	0.17	0.27	0.51	0.93	
86.5	0.00059	0.00098	0.0019	0.0024	0.0041	0.0075	0.014	0.024	0.046	0.080	0.14	0.24	0.45	0.77	
95.7	0.00054	0.00097	0.0016	0.0027	0.0048	0.0083	0.016	0.028	0.054	0.092	0.17	0.27	0.51	0.90	
106	0.00043	0.00087	0.0013	0.0022	0.0039	0.0073	0.013	0.023	0.044	0.076	0.14	0.23	0.42	0.74	
117	0.00053	0.00085	0.0013	0.0022	0.0038	0.0070	0.013	0.023	0.043	0.075	0.13	-	-	-	
130	0.00043	0.00085	0.0012	0.0022	0.0038	0.0070	0.013	0.023	0.043	0.075	0.13	-	-	-	

As improvement in design are continually being made, this specification is not to be regarded as binding in detail and dimensions are subject to alteration without notice.

* For H2/H3 models 560 & 630 refer to Heavy Duty Helical Gear Unit catalogue publication no. PTL/ HDHG/204

Moments of Inertia-kg m²

Referred to High Speed Shafts

$$GD^2 \text{ (kg m}^2\text{)} = 4 \times \text{Moment of Inertia (kg m}^2\text{)}$$

DOUBLE REDUCTION UNITS

Nominal Ratio	Type B2-B2SF			Type B2-B2SF-VB2-VH2 SA-VB2 CT								Type B2-B2SF				
	Unit Size															
	140	160	180	200	225	250	280	315	355	400	450	500	560	630	710	
5.06	0.015	0.029	0.057	0.074	0.14	0.25	0.43	0.76	1.31	2.91	4.85	REFER TO PREMIUM				
5.60	0.014	0.029	0.057	0.073	0.13	0.24	0.43	0.75	1.29	2.88	4.63					
6.20	0.014	0.027	0.055	0.069	0.13	0.23	0.41	0.71	1.22	2.73	4.41					
6.86	0.013	0.027	0.054	0.068	0.12	0.23	0.41	0.69	1.21	2.71	4.34					
7.59	0.013	0.026	0.053	0.054	0.097	0.18	0.32	0.55	0.96	2.12	3.54					
8.40	0.0065	0.013	0.026	0.044	0.077	0.14	0.26	0.44	0.80	1.70	2.81					
9.30	0.0064	0.013	0.025	0.033	0.063	0.11	0.21	0.36	0.62	1.36	2.26					
10.30	0.0060	0.012	0.025	0.032	0.062	0.11	0.20	0.34	0.60	1.33	2.21					
11.40	0.0059	0.0072	0.014	0.026	0.045	0.084	0.15	0.26	0.47	1.00	1.67					
12.60	0.0034	0.0071	0.013	0.021	0.036	0.067	0.12	0.20	0.37	0.81	1.34					
14.0	0.0032	0.0070	0.013	0.010	0.034	0.064	0.12	0.20	0.35	0.78	1.28					
15.40	0.0031	0.0067	0.0087	0.016	0.029	0.053	0.099	0.17	0.29	0.63	1.05					
17.10	0.0022	0.0045	0.0085	0.012	0.021	0.038	0.069	0.12	0.21	0.44	0.74					
18.90	0.0021	0.0043	0.0082	0.011	0.020	0.036	0.068	0.12	0.20	0.43	0.71					

TRIPLE REDUCTION UNITS

Nominal Ratio	Type B3-B3SF			Type B3-B3SF-VB3-VB3 SA-VB3 CT								Type B3-B3SF				
	Unit Size															
	140	160	180	200	225	250	280	315	355	400	450	500	560	630	710	
14.0	0.0036	0.0056	0.0098	0.022	0.042	0.077	0.12	0.22	0.39	0.67	1.20	2.46	3.84	7.04	REFER TO PREMIUM	
15.4	0.0034	0.0052	0.0094	0.021	0.041	0.076	0.12	0.21	0.38	0.65	1.17	2.45	3.84	6.72		
17.1	0.0033	0.0052	0.0094	0.020	0.038	0.071	0.11	0.20	0.34	0.61	1.11	2.27	3.52	6.40		
18.9	0.0032	0.0050	0.0092	0.019	0.037	0.070	0.10	0.19	0.34	0.59	1.08	2.24	3.20	6.08		
20.9	0.0031	0.0047	0.0086	0.015	0.027	0.052	0.076	0.15	0.26	0.45	0.80	1.66	2.43	4.80		
23.2	0.0029	0.0046	0.0084	0.014	0.026	0.052	0.075	0.14	0.25	0.44	0.79	1.66	2.40	4.48		
25.6	0.0028	0.0045	0.0081	0.011	0.021	0.041	0.059	0.11	0.20	0.35	0.63	1.31	1.89	3.52		
28.4	0.0028	0.0043	0.0079	0.013	0.025	0.049	0.071	0.14	0.24	0.40	0.72	1.57	2.27	4.48		
31.4	0.0013	0.0023	0.0078	0.010	0.020	0.039	0.056	0.11	0.19	0.31	0.57	1.25	1.79	3.52		
34.7	0.0013	0.0023	0.0037	0.010	0.020	0.039	0.056	0.11	0.19	0.31	0.57	1.25	1.79	3.52		
38.4	0.0013	0.0022	0.0036	0.0083	0.016	0.031	0.046	0.083	0.15	0.25	0.46	0.99	1.47	2.66		
42.5	0.0012	0.0021	0.0036	0.0064	0.012	0.024	0.035	0.069	0.12	0.21	0.37	0.77	1.12	2.21		
47.1	0.00065	0.0021	0.0033	0.0052	0.0099	0.019	0.028	0.051	0.092	0.16	0.28	0.61	0.90	1.63		
52.1	0.00065	0.0012	0.0019	0.0041	0.0079	0.015	0.023	0.041	0.074	0.12	0.22	0.48	0.74	1.31		
57.7	0.00061	0.0012	0.0019	0.0034	0.0065	0.012	0.019	0.034	0.061	0.10	0.18	0.38	0.61	1.09		
63.8	0.00044	0.0012	0.0019	0.0034	0.0064	0.012	0.018	0.033	0.060	0.10	0.18	0.38	0.58	1.06		
70.6	0.00044	0.00076	0.0013	0.0023	0.0044	0.0083	0.013	0.023	0.041	0.070	0.13	0.27	0.42	0.74		
78.2	0.00042	0.00076	0.0013	0.0023	0.0043	0.0082	0.013	0.023	0.041	0.069	0.12	0.26	0.42	0.74		
86.5	0.00043	0.00071	0.0012	0.0022	0.0041	0.0078	0.012	0.022	0.039	0.068	0.12	-	-	-		
95.7	0.00041	0.00070	0.0012	0.0022	0.0041	0.0077	0.012	0.022	0.038	0.067	0.12	-	-	-		

As improvement in design are continually being made, this specification is not to be regarded as binding in detail and dimensions are subject to alteration without notice

Exact Ratios

All Types
SINGLE REDUCTION UNITS

Nominal Ratio	Type H1					Type H1-VH1					Type H1				
	140	160	180	200	225	250	280	Units Size		400	450	500	560	630	710
1.22	1.220	1.234	1.226	1.229	1.231	1.216	1.220	1.229	1.231	1.229	1.231	1.216	FOR HIGHER SIZES REFER TO PREMIUM		
1.35	1.359	1.364	1.360	1.364	1.351	1.343	1.359	1.364	1.351	1.364	1.351	1.343			
1.50	1.500	1.500	1.511	1.484	1.486	1.500	1.500	1.484	1.514	1.484	1.486	1.500			
1.66	1.647	1.667	1.659	1.655	1.667	1.667	1.647	1.655	1.667	1.655	1.667	1.667			
1.84	1.844	1.838	1.829	1.852	1.839	1.828	1.844	1.815	1.833	1.852	1.839	1.828			
2.03	2.033	2.029	2.026	2.038	2.034	2.037	2.033	2.040	2.034	2.038	2.034	2.037			
2.25	2.250	2.250	2.259	2.250	2.259	2.240	2.250	2.261	2.259	2.250	2.259	2.240			
2.49	2.500	2.500	2.520	2.500	2.52	2.478	2.500	2.500	2.480	2.500	2.520	2.478			
2.76	2.750	2.762	2.739	2.762	2.739	2.769	2.750	2.778	2.739	2.762	2.739	2.762			
3.05	3.091	3.053	3.095	3.053	3.045	3.050	3.045	3.053	3.095	3.053	3.045	3.050			
3.38	3.333	3.389	3.400	3.389	3.400	3.444	3.333	3.391	3.350	3.389	3.400	3.444			
3.73	3.737	3.750	3.762	3.800	3.778	3.706	3.750	3.750	3.778	3.800	3.778	3.706			
4.13	4.111	4.176	4.118	4.158	4.190	4.158	4.056	4.150	4.118	4.158	4.118	4.125			
4.57	4.563	4.563	4.500	4.550	4.500	4.647	4.562	4.611	4.667	4.647	4.500	4.647			
5.06	5.056	5.059	5.105	5.063	5.056	5.062	5.056	5.059	5.053	5.062	5.056	5.062			

DOUBLE REDUCTION UNITS

Nominal Ratio	Type H2-H2SF				Type H2-VH2-H2SF-VH2 SA-VH2 CT						Type H2-H2S-H2SF				
	140	160	180	200	225	250	280	Units Size		400	450	500	560	630	710
5.60	5.636	5.648	5.657	5.625	5.670	5.599	5.625	5.648	5.555	5.625	5.697	5.619	FOR HIGHER SIZES REFER TO PREMIUM		
6.20	6.078	6.240	6.214	6.250	6.300	6.245	6.250	6.300	6.146	6.250	6.300	6.240			
6.86	6.814	6.895	6.875	6.905	6.848	6.978	6.875	7.000	6.788	6.905	6.848	6.850			
7.59	7.590	7.693	7.663	7.595	7.565	7.585	7.595	7.609	7.585	7.595	7.609	7.565			
8.40	8.333	8.362	8.472	8.472	8.500	8.680	8.333	8.546	8.302	8.472	8.500	8.542			
9.30	9.342	9.449	9.323	9.319	9.390	9.435	9.206	9.289	9.277	9.319	9.444	9.435			
10.3	10.348	10.489	10.370	10.450	10.434	10.151	10.357	10.272	10.462	10.450	10.494	10.155			
11.4	11.366	11.522	11.474	11.296	11.522	11.711	11.296	11.530	11.539	11.296	11.530	11.545			
12.6	12.505	12.802	12.600	12.664	12.750	12.958	12.667	12.812	12.415	12.708	12.750	13.015			
14.0	14.135	14.167	13.941	14.200	14.167	13.941	14.250	14.167	14.000	14.250	14.167	14.005			
15.4	15.287	15.441	15.260	15.462	15.512	15.500	15.167	15.261	15.568	15.462	15.678	15.265			
17.1	16.818	17.197	17.121	17.337	17.236	16.676	17.062	16.875	17.556	17.337	17.420	16.995			
18.9	18.706	19.003	18.529	19.211	19.111	18.919	18.984	18.958	19.125	19.211	19.111	18.725			
20.9	20.759	20.759	20.250	20.759	20.531	20.912	20.759	20.759	21.686	21.202	20.750	20.845			
23.2	23.319	23.066	22.781	23.003	22.765	23.724	23.098	23.312	23.625	23.493	22.765	-			
25.6	25.840	25.575	25.845	25.594	25.575	25.845	25.594	25.575	25.579	25.594	25.575	-			

TRIPLE REDUCTION UNITS

Nominal Ratio	Type H3-H3SF				Type H3-VH3-H3SF-VH3 SA-VH3 CT						Type H3-H3S-H3SF				
	140	160	180	200	225	250	280	315	355	400	450	500	560	630	710
25.6	25.870	25.502	26.320	25.527	26.383	25.946	25.427	25.444	25.622	25.527	26.154	25.955	FOR HIGHER SIZES REFER TO PREMIUM		
28.4	28.457	28.152	28.318	28.467	28.555	29.278	28.241	29.057	28.847	28.467	28.575	28.855			
31.4	31.257	31.812	31.600	31.686	32.345	31.449	31.199	31.583	31.438	31.686	32.531	31.455			
34.7	34.536	35.286	34.853	34.688	35.821	35.634	34.984	35.093	34.288	34.810	35.308	35.785			
38.4	38.361	39.363	38.606	38.407	39.688	39.037	38.282	39.203	39.104	38.407	39.716	39.465			
42.5	42.365	43.112	42.404	43.057	43.917	43.192	42.926	43.559	42.072	43.208	43.917	43.375			
47.1	47.706	48.043	47.400	48.280	48.796	46.471	48.292	48.167	47.444	48.450	48.796	46.675			
52.1	52.685	52.619	52.734	53.644	52.500	52.096	53.437	53.294	53.200	53.833	52.500	52.505			
57.7	56.979	57.353	57.032	57.633	57.611	57.487	57.982	57.375	59.206	57.000	59.536	56.645			
63.8	63.373	64.020	62.425	64.610	63.750	63.607	65.016	63.750	63.700	64.125	65.833	63.875			
70.6	69.721	72.573	69.431	69.008	68.625	72.087	70.544	70.550	73.137	69.106	70.918	69.625			
78.2	78.319	78.520	75.802	78.886	77.562	76.086	77.848	75.937	79.878	78.019	80.951	78.905			
86.5	87.201	85.584	82.841	85.958	85.430	88.380	87.707	88.932	87.551	88.100	85.430	85.875			
95.7	95.109	94.570	92.138	94.455	92.391	95.410	94.715	93.375	98.672	95.410	96.426	97.325			
106	106.298	102.576	103.500	104.950	103.939	105.721	105.018	105.934	109.787	107.189	105.04	105.405			
117	116.958	113.973	116.438	116.292	115.246	119.940	116.847	119.012	119.602	118.772	115.246	-			
130	130.718	126.371	132.099	129.391	129.474	130.663	129.474	130.568	129.493	129.391	129.474	-			

As improvement in design are continually being made, this specification is not to be regarded as binding in detail and dimensions are subject to alteration without notice.

Exact Ratios

All Types
DOUBLE REDUCTION UNITS

Type B2-B2SF				Type B2-VB2-B2S-B2SF-VB2 SA-VB2 CT								Type B2-B2SF			
Nominal Ratio	Units Size											500	560	630	710
	140	160	180	200	225	250	280	315	355	400	450				
5.06	5.188	5.124	5.196	5.124	5.112	5.120	5.112	5.124	5.196	5.124	5.112				
5.60	5.595	5.688	5.707	5.688	5.707	5.782	5.595	5.693	5.623	5.688	5.707				
6.20	6.273	5.295	6.315	6.379	6.341	6.221	6.295	6.295	6.341	6.379	6.341				
6.86	6.901	7.011	6.912	6.979	7.034	6.979	6.808	6.966	6.912	6.979	6.912				
7.59	7.658	7.658	7.554	7.700	7.760	7.700	7.510	7.685	7.625	7.700	7.625				
8.40	8.400	8.400	8.427	8.476	8.542	8.476	8.267	8.460	8.394	8.476	8.394				
9.30	9.355	9.355	9.224	9.314	9.387	9.314	9.084	9.296	9.224	9.314	9.224				
10.3	10.220	10.220	10.080	10.192	10.080	10.409	10.220	10.329	10.453	10.409	10.080				
11.4	11.438	11.438	11.474	11.276	11.152	11.517	11.307	11.428	11.565	11.517	11.152				
12.6	12.738	12.738	12.559	12.567	12.429	12.835	12.601	12.735	12.889	12.835	12.429				
14.0	13.916	13.916	13.725	13.982	13.963	13.982	13.963	13.972	13.955	13.982	13.963				
15.4	15.429	15.429	15.327	15.441	15.419	15.441	15.419	15.441	15.411	15.441	15.419				
17.1	16.983	16.983	16.750	16.936	16.750	17.297	16.983	17.164	17.370	17.297	16.750				
18.9	18.830	18.830	19.003	18.844	18.818	18.844	18.818	18.830	18.807	18.844	18.818				

REFER TO PREMIUM
TRIPLE REDUCTION UNITS

Type B3-B3SF				Type B3-VB3-BS3-B3SF-VB3 SA-VB3 CT								B3-B3SF			
Nominal Ratio	Units Size											500	560	630	710
	140	160	180	200	225	250	280	315	355	400	450				
14.0	13.988	14.035	14.597	14.140	14.248	14.315	13.968	14.094	14.075	14.140	14.329				
15.4	15.495	15.860	15.847	15.855	15.831	15.401	15.714	15.585	15.873	15.855	15.922				
17.1	17.370	17.607	17.407	17.139	17.482	17.769	17.139	17.494	17.507	17.139	17.494				
18.9	19.079	19.341	19.260	19.218	19.424	19.117	19.282	19.345	19.743	19.218	19.438				
20.9	20.990	21.490	21.750	21.257	21.402	21.750	21.262	21.505	20.839	21.332	21.402				
23.2	23.727	23.780	23.401	23.836	23.780	23.401	23.920	23.780	23.500	23.920	23.780				
25.6	25.660	25.919	26.256	26.296	26.235	25.817	26.389	26.235	25.926	26.389	26.235				
28.4	28.331	28.641	28.416	29.102	28.932	27.993	28.641	28.326	29.468	29.102	29.240				
31.4	31.662	31.733	31.103	32.106	31.919	30.882	31.597	31.250	32.510	32.106	32.259				
34.7	34.243	34.588	35.037	35.130	35.406	34.649	34.172	34.583	35.435	35.130	35.161				
38.4	37.673	38.522	37.920	38.670	38.973	38.141	37.615	38.068	39.006	38.670	38.704				
42.5	41.900	42.567	41.506	42.494	42.827	41.912	41.334	41.882	42.862	42.494	42.531				
47.1	46.626	46.501	45.360	47.014	47.382	46.370	45.731	46.281	47.421	47.014	47.055				
52.1	51.295	52.452	51.632	52.394	52.805	51.677	50.965	51.579	52.849	52.394	52.440				
57.7	57.052	57.300	56.515	57.860	58.313	57.067	56.281	56.959	58.362	57.860	57.910				
63.8	63.288	63.316	61.763	63.316	62.620	63.781	63.316	63.287	66.143	64.667	63.287				
70.6	69.626	70.733	68.971	70.612	71.165	69.645	68.685	69.512	71.224	70.612	70.674				
78.2	78.213	77.271	75.375	77.271	76.422	77.838	77.271	77.236	80.721	78.919	77.236				
86.5	85.621	85.857	84.797	85.621	84.735	88.308	85.975	86.771	87.937	87.448	84.735				
95.7	96.180	95.196	96.202	95.266	95.196	96.202	95.266	95.196	95.210	95.266	95.196				

FOR HIGHER SIZES REFER TO PREMIUM
QUADRUPLE REDUCTION UNITS

Type B4-B4SF				Type H4-H4SF			
Nominal Ratio	Units Size			Nominal Ratio	Units Size		
	140	160	180		140	160	180
86.5	85.817	86.973	85.190	106	105.519	107.667	106.011
95.7	96.205	96.469	94.986	117	117.206	117.716	116.612
106	106.861	107.617	106.176	130	129.440	132.390	128.844
117	116.849	118.423	118.124	144	144.120	146.427	143.115
130	130.994	131.353	129.333	159	160.338	162.904	158.053
144	145.502	146.533	143.334	176	173.406	176.182	175.978
159	160.689	160.488	157.839	195	192.867	195.953	191.936
176	177.163	177.65	176.433	215	215.701	220.119	214.516
195	196.786	198.179	196.288	238	239.907	234.626	236.683
215	217.326	217.054	212.286	264	269.493	260.956	258.145
238	235.039	236.581	238.179	292	288.658	293.137	288.515
264	261.415	261.422	257.776	323	324.256	323.917	314.266
292	293.653	290.469	289.998	358	360.645	359.907	343.422
323	326.958	323.165	308.352	396	405.120	386.879	382.371
358	349.252	357.097	342.956	438	445.695	430.296	417.043
396	390.341	387.325	385.250	485	486.110	466.720	468.474
438	438.478	430.361	433.406	536	543.300	524.276	523.588
				594	597.784	582.529	589.037
				657	668.112	645.898	668.264

FOR HIGHER SIZES REFER TO PREMIUM

As improvements in design are continually being made, this specification is not to be regarded as binding in detail and dimensions are subject to alteration without notice.

Net Weights

All Types
Net Weights for Vertical Units in kg (aprox.)

Unit Type	Units Size							
	200	225	250	280	315	355	400	450
VH2	360	470	590	810	1090	1445	1970	2690
VH2 SA	400	520	650	890	1200	1590	2170	2960
VH2 CT	400	520	650	890	1200	1590	2170	2960
VH3	380	490	630	850	1150	1525	2080	2840
VH3 SA	420	540	695	935	1265	1680	2290	3125
VH3 CT	420	540	695	935	1265	1680	2290	3125
VB2	340	455	560	750	1000	1520	2050	2680
VB2 SA	375	500	615	825	1100	1670	2255	2950
VB2 CT	375	500	615	825	1100	1670	2255	2950
VB3	380	490	630	850	1150	1525	2080	2840
VB3 SA	420	540	695	935	1285	1680	2290	3125
VB3 CT	420	540	695	935	1285	1680	2290	3135

Net Weights for Horizontal Units in kg (aprox.)

Unit Type	Units Size													
	140	160	180	200	225	250	280	315	355	400	450	500	560	630
H1	150	190	240	300	395	495	680	915	1210	1650	2265	2970	-	-
H2	*	*	*	*	*	*	*	*	*	*	*	*	*	*
H2SF	235	265	300	360	470	590	810	1090	1445	1970	2690	3540	4860	6540
H3	*	*	*	*	*	*	*	*	*	*	*	*	*	*
H3SF	290	310	330	380	490	630	850	1150	1525	2080	2840	3780	5100	6900
H4	295	320	345	*	*	*	*	*	*	*	*	-	-	-
H4SF	295	320	345	*	*	*	*	*	*	*	*	-	-	-
B2	270	285	305	340	455	560	750	1000	1520	2050	2680	3530	-	-
B2SF	270	285	305	340	455	560	750	1000	1520	2050	2680	3530	-	-
B3	300	310	330	380	490	630	850	1150	1525	2080	2840	3780	5100	6900
B3SF	300	310	330	380	490	630	850	1150	1525	2080	2840	3780	5100	6900
B4	305	320	345	*	*	*	*	*	*	*	*	-	-	-
B4SF	305	320	345	*	*	*	*	*	*	*	*	-	-	-

***REFER TO PREMIUM**

As improvements in design are continually being made, this specification is not to be regarded as binding in detail and dimensions are subject to alteration without notice.

* For H2/H3 models 560 & 630 refer to Heavy Duty Helical Gear Unit catalogue publication no. PTL/ HDHG/204

Approved Lubricants

Oil Capacities

**ENGINEERING
HE-508**

Premium gear units are supplied without oil. Before operating it is essential to ensure that they are filled to correct oil levels as indicated by markings on dipsticks, with lubricants recommended by Premium. Overfilling can cause overheating and leakage.

Correct lubricant is most important and it should be noted that EP oils are recommended in all instances.

Lubricants listed are suitable for normal ambient temperatures and operating duties. All gear units in this range are designed to operate under full load at a maximum temperature of 110°C. Higher temperature up to a maximum of 120°C are acceptable on the basis of peak periods of short duration only. In certain applications these maximum temperatures may be exceeded by the use of special lubricants. Such cases, or others where extreme conditions, are to be met, e.g. low temperature operation or unusual loading conditions, should be referred, with full details, to Premium for recommendations.















Recommended lubricants are based on information provided by oil suppliers and responsibility cannot be accepted for the quality or suitability of oil supplied, nor to any mechanical defect resulting from unsatisfactory lubrication due to the use of sub-standard oil.

Oil Capacities for Vertical Units in litres (approx.)

Unit Type	Unit Size							
	200	225	250	280	315	355	400	450
VH2-VH2 SA-VH2 CT	21	29	40	55	76	105	150	210
VH3-VH3 SA-VH3 CT	21	29	40	55	76	105	150	210
VB2-VB2 SA-VB2 CT	18	25	34	47	65	92	130	180
VB3-VB3 SA-VB3 CT	21	29	40	55	76	105	150	210

Lubricant specification (CLP DIN 51517)

If the gear drive is started when the ambient temperature is below -7°C (20°F) use a lube oil heater.

Viscosity mm/s (cSt) at 40°C														
	Premium Traxol	Bharat Petroleum	Indian Oil	Hindustan Petroleum	BP Energol	Castrol	SPARAN	Mobilgear	Shell Omala Oil	Cepsa Engranjes	Klüberoil GEM 1	Aral	Chevron Gear Compound	Tribo
VG 460	-	Amocam Oil 460	Servomesh SP 460	Parthan EP-460	GR-XP 460	Alpha MW 460	Spartan EP 460	Mobilgear 634	Omala 460	HP 460	460	Degol BG 460	EP 460	Trebol 1100/460
VG 320	G-32	Amocam Oil 320	Servomesh SP 320	Parthan EP-320	GR-XP 320	Alpha MW 320	Spartan EP 320	Mobilgear 632	Omala 320	HP 320	320	Degol BG 320	EP 320	Trebol 1100/320
VG 220	-	Amocam Oil 220	Servomesh SP 220	Parthan EP-460	GR-XP 220	Alpha MW 220	Spartan EP 220	Mobilgear 930	Omala 220	HP 220	220	Degol BG 220	EP 220	Trebol 1100/220
VG 150	-	Amocam Oil 150	Servomesh SP 150	Parthan EP-460	GR-XP 150	Alpha MW 150	Spartan EP 150	Mobilgear 629	Omala 150	HP 150	150	Degol BG 150	EP 150	Trebol 1100/150
VG 100	-	Amocam Oil 100	Servomesh SP 100	Parthan EP-460	GR-XP 100	Alpha MW 100	Spartan EP 100	Mobilgear 627	Omala 100	HP 100	100	Degol BG 100	EP 100	Trebol 1100/100

Oil Capacities for Horizontal Units in litres (approx.)

Unit Type	Unit Size														
	140	160	180	200	225	250	280	315	355	400	450	500	560	630	710
H1	6	9	13	18	25	35	45	70	95	130	180	245	-	-	-
H2	7	11	15	20	27	35	50	70	100	140	205	320	-	-	-
H2SF	7	11	15	20	27	35	50	70	100	140	205	320	425	650	895
H3	9	13	17	20	27	35	50	70	100	140	205	415	-	-	-
H3SF	9	13	17	20	27	35	50	70	100	140	205	415	550	825	1150
H4	9	13	17	*	*	*	*	*	*	*	*	-	-	-	-
H4SF	9	13	17	*	*	*	*	*	*	*	*	-	-	-	-
B2	6	9	13	18	25	35	45	70	95	130	180	275	-	-	-
B2SF	6	9	13	18	25	35	45	70	95	130	180	275	-	-	-
B3	7	11	15	20	27	35	50	70	100	140	205	410	535	800	1095
B3SF	7	11	15	20	27	35	50	70	100	140	205	410	535	800	1095
B4	9	13	17	*	*	*	*	*	*	*	*	*	-	-	-
B4SF	9	13	17	*	*	*	*	*	*	*	*	*	-	-	-

***REFER TO PREMIUM.**

As improvements in design are continually being made, this specification is not to be regarded as binding in detail and dimensions are subject to alteration without notice.

* For H2/H3 models 560,630 & 710 refer to Heavy Duty Helical Gear Unit catalogue publication no. PTL/ HDHG/204

Approved Lubricants

TABLE 4 APPROVED LUBRICANTS

Type H Polyalphaolefin based synthetic lubricants with Anti-Wear or EP additives. These have a medium to high load carrying capacity.

SUPPLIER	LUBRICANT RANGE	See notes	GRADE NUMBERS		
			5H	6H	7H
			AMBIENT TEMPERATURE RANGE °C		
			-10 to 30	0 to 45	10 to 50
Batoyle Freedom Group	Titan	a	220 (-31)	320 (-28)	
Boxer Services / Millers Oils	Silkgear	a	220 (-35)	320 (-35)	460 (-35)
BP Oil International Limited	Enersyn EPX	a,d		320 (-28)	
Caltex	Pinnacle EP	a	220 (-43)	320 (-43)	460 (-37)
Carl Bechem GmbH	Berusynth GP	a	220 (-38)	320 (-35)	460 (-32)
Castrol International	Alphasyn EP	a,b	220 (-37)	320 (-31)	460 (-31)
	Alphasyn T	a	220 (-31)	320 (-28)	460 (-28)
Chevron Lubricants	Tegra	a	220 (-46)	320 (-33)	460 (-31)
Esso/Exxon	Spartan Synthetic EP	a,d	220 (-46)	320 (-43)	460 (-40)
Fuchs Lubricants	Renogear SG	a	220 (-32)	320 (-30)	
Klüber Lubrication	Klübersynth GEM 4	a	220 (-35)	320 (-35)	460 (-30)
Kuwait Petroleum International	Q8 EL Greco	a	220 (-22)	320 (-19)	460 (-16)
Lubrication Engineers Inc	Synolec Gear Lubricant	a	9920 (-40)		
Mobil Oil Company Limited	Mobilgear SHC	a	220 (-40)	320 (-37)	460 (-32)
	Mobilgear SHC XMP	a,b	220 (-40)	320 (-33)	460 (-31)
Optimol Ölwerke GmbH	Optigear Synthetic A	a	220 (-31)	320 (-31)	
Petro-Canada	Super Gear Fluid	a,d	220 (-43)	320 (-37)	460 (-37)
Shell Oils	Omala HD	a,b	220 (-43)	320 (-40)	460 (-37)
Texaco Limited	Pinnacle EP	a	220 (-43)	320 (-43)	460 (-37)
	Pinnacle WM	a,b	220 (-43)	320 (-40)	
Total	Carter SP	a	220 (-34)	320 (-31)	460 (-28)
Tribol GmbH	Tribol 1510	a	220 (-36)	320 (-33)	460 (-28)

- NOTES:**
- a) These lubricants should not be used in units fitted with trailing sprag or holdback devices without prior agreement with the manufacturer; the additives, or the base fluids may modify the coefficient of friction which these devices depend on.
 - b) These lubricants have been tested for micro-pitting (FZG Type C), test results are available.
 - c) These oils contains solid lubricants (eg MOS₂ or graphite) and must NOT be used in units fitted with any type of hold-back device which relies on friction for its operation.
 - d) These lubricants contain additives which may adversely affect silvered or white metal components; consult oil supplier.
 - e) Minimum operating temperatures of these lubricants are based on worst case values, lower operating temperatures may be available, please check with local stockist.

DANGER

Numbers in brackets indicate recommended minimum operating temperature in °C.
THE UNIT MUST NOT RUN BELOW THIS TEMPERATURE.

Product safety

IMPORTANT

Product Safety Information :

General - The following information is important in ensuring safety. It must be brought to the attention of personnel involved in the selection of Premium Transmission Limited power transmission equipment, those responsible for the design of the machinery in which it is to be incorporated and those involved in its installation, use and maintenance.

PREMIUM power transmission equipment will operate safely provided it is selected, installed, used and maintained properly. As with any power transmission equipment proper precautions must be taken as indicated in the following paragraphs, to ensure safety.

Potential Hazards - these are not necessarily listed in any order of severity as the degree of danger varies in individual circumstances. It is important therefore that the list is studied in its entirety:-

1) Fire/Explosion

- (a) Oil mists and vapour are generated within gear units. It is therefore dangerous to use naked lights in the proximity of gearbox openings, due to the risk of fire or explosion.
- (b) In the event of fire or serious overheating (over 300 °C), certain materials (rubber, plastics, etc.) may decompose and produce fumes. Care should be taken to avoid exposure to the fumes, and the remains of burned or overheated plastic/rubber materials should be handled with rubber gloves.

2) Guards - Rotating shafts and couplings must be guarded to eliminate the possibility of physical contact or entanglement of clothing. It should be of rigid construction and firmly secured.

3) Noise - High speed gearboxes and gearbox driven machinery may produce noise levels which are damaging to the hearing with prolonged exposure. Ear defenders should be provided for personnel in these circumstances. Reference should be made to the Department of Employment Code of Practice for reducing exposure of employed persons to noise.

4) Lifting - Where provided (on larger units) only the lifting points or eyebolts must be used for lifting operations (see maintenance manual or general arrangement drawing for lifting point positions). Failure to use the lifting points provided may result in personal injury and/or damage to the product or surrounding equipment. Keep clear of raised equipment.

5) Lubricants and Lubrication

- (a) Prolonged contact with lubricants can be detrimental to the skin. The manufacturer's instruction must be followed when handling lubricants.
- (b) The lubrication status of the equipment must be checked before commissioning. Read and carry out all instructions on the lubricant plate and in the installation and maintenance literature. Heed all warning tags. Failure to do so could result in mechanical damage and in extreme cases risk of injury to personnel.

6) Electrical Equipment - Observe hazard warnings on electrical equipment and isolate power before working on the gearbox or associated equipment, in order to prevent the machinery being started.

7) Installation, Maintenance and Storage

- (a) In the event that equipment is to be held in storage, for a period exceeding 6 months, prior to installation or commissioning, Premium Transmission Limited must be consulted regarding special preservation requirements. Unless otherwise agreed, equipment must be stored in a building protected from extremes of temperature and humidity to prevent deterioration. The rotating components (gears and shafts) must be turned a few revolutions once a month (to prevent bearings brinelling).
- (b) External gearbox components may be supplied with preservative materials applied, in the form of a "waxed" tape overwrap or wax film preservative. Gloves should be worn when removing these materials. The former can be removed manually, the latter using white spirit as a solvent. Preservatives applied to the internal parts of the gear units do not require removal prior to operation.
- (c) Installation must be performed in accordance with the manufacturer's instructions and be undertaken by suitably qualified personnel.
- (d) Before working on a gearbox or associated equipment, ensure that the load has been removed from the system to eliminate the possibility of any movement of the machinery and isolate power supply. Where necessary, provide mechanical means to ensure the machinery cannot move or rotate. Ensure removal of such devices after work is complete.
- (e) Ensure the proper maintenance of gearboxes in operation. Use only the correct tools and Premium Transmission Limited approved spare parts for repair and maintenance. Consult the Maintenance Manual before dismantling or performing maintenance work.

8) Hot Surfaces and Lubricants

- (a) During operation, gear units may become sufficiently hot to cause skin burns. Care must be taken to avoid accidental contact.
- (b) After extended running the lubricant in gear units and lubrication systems may reach temperatures sufficient to cause burns. Allow equipment to cool before servicing or performing adjustments.

9) Selection and Design

- (a) Where gear units provide a holdback facility, ensure that back-up systems are provided if failure of the holdback device would endanger personnel or result in damage.
- (b) The driving and driven equipment must be correctly selected to ensure that the complete machinery installation will perform satisfactorily, avoiding system critical speeds, system torsional vibration, etc.
- (c) The equipment must not be operated in an environment or at speeds, powers, torques or with external loads beyond those for which it was designed.
- (d) As improvements in design are being made continually the contents of this catalogue are not to be regarded as binding in detail, and drawings and capacities are subject to alterations without notice.

The above guidance is based on the current state of knowledge and our best assessment of the potential hazards in the operation of the gear units. Any further information or clarification required may be obtained by telephoning or writing to:

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Tel. : (91-20) 27488886 / 27488947, Fax : (91-20) 27450287 / 27472384

Website : www.premiumtransmission.com



PREMIUM

Premium Transmission Limited

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