Hydrastart Couplings

RENOLD
Superior Coupling Technology

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RENOLD

Strength through Service

Renold Gears has been manufacturing high quality, high specification gear units for over 100 years and has always been at the leading edge of gear technology with innovative products and power transmission solutions.

Interchangeability

Many of the products from Renold Gears are dimensionally interchangeable with other manufacturers gear units, allowing a trouble free replacement of gearboxes, in most cases upgrading the capacity through state of the art technology and materials.

Custom Made

Renold Gears is unique in it's ability to offer custom made products designed to meet customers exacting requirements without compromise on availability and cost. From complete package solutions to individual precision replacement gears, all can be tailor made to meet specific applicational requirements.

Available

The most popular ranges of gearboxes are available from local distribution stock, backed up by extensive stocks from our manufacturing plant in the UK.

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Superior Gear Technology

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Contents

The RENOLD Collection

Spiderflex Coupling

Max power / 100 rpm (kW)	33 kW
Max weight	63 kg
Max shaft size	115 mm
Max speed (rpm)	7,700 rpm
Max outer diameter	275 mm
Max torque (Nm)	3,150 Nm

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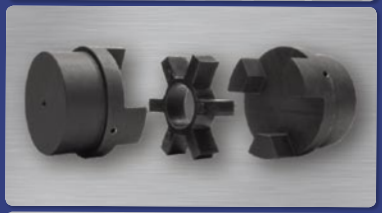
SpiderJaw Coupling



Max power / 100 rpm (kW)	45 kW
Max weight	84 kg
Max shaft size	115 mm
Max speed (rpm)	31,000 rpm
Max outer diameter	305 mm
Max torque (Nm)	4,308 Nm

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SpiderWrap Coupling

Max power / 100 rpm (kW)	45 kW
Max weight	84 kg
Max shaft size	115 mm
Max speed (rpm)	9,000 rpm
Max outer diameter	323 mm
Max torque (Nm)	4,308 Nm

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Pinflex Coupling

Max power / 100 rpm (kW)	340 kW
Max weight	423 kg
Max shaft size	260 mm
Max speed (rpm)	6,800 rpm
Max outer diameter	490 mm
Max torque (Nm)	32,500 Nm

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Crownpin Coupling

Max power / 100 rpm (kW)	2,607 kW
Max weight	2,250 kg
Max shaft size	300 mm
Max speed (rpm)	6,210 rpm
Max outer diameter	1,220 mm
Max torque (Nm)	249,400 Nm

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Tyreflex Coupling

Max power / 100 rpm (kW)	66 kW
Max weight	49 kg
Max shaft size	150 mm
Max speed (rpm)	4,500 rpm
Max outer diameter	470 mm
Max torque (Nm)	6,270 Nm

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Discflex Coupling

Max power / 100 rpm (kW)	45 kW
Max weight	67 kg
Max shaft size	110 mm
Max speed (rpm)	2,900 rpm
Max outer diameter	324 mm
Max torque (Nm)	4,298 Nm

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Chainflex Coupling

Max power / 100 rpm (kW)	90 kW
Max weight	85 kg
Max shaft size	140 mm
Max speed (rpm)	3,500 rpm
Max outer diameter	357 mm
Max torque (Nm)	8,595 Nm

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The RENOLD Collection

Rigid Coupling

Max power / 100 rpm (kW)	1,640 kW
Max weight	501 kg
Max shaft size	290 mm
Max speed (rpm)	7,100 rpm
Max outer diameter	527 mm
Max torque (Nm)	156,620 Nm

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Renoldflex

Max power / 100 rpm (kW)	482 kW
Max weight	N/A
Max shaft size	180 mm
Max speed (rpm)	1,2000 rpm
Max outer diameter	345 mm
Max torque (Nm)	46,000 Nm

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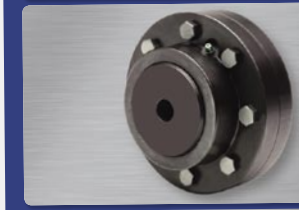
A Series Gear Coupling



Max power / 100 rpm (kW)	1,640 kW
Max weight	443 kg
Max shaft size	260 mm
Max speed (rpm)	7,100 rpm
Max outer diameter	527 mm
Max torque (Nm)	156,620 Nm

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D Series Gear Coupling

Max power / 100 rpm (kW)	2,209 kW
Max weight	374 kg
Max shaft size	197 mm
Max speed (rpm)	N/A
Max outer diameter	518 mm
Max torque (Nm)	211,000 Nm

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Croft MB Gear Coupling

Max power / 100 rpm (kW)	565 kW
Max weight	560 kg
Max shaft size	220 mm
Max speed (rpm)	3,730 rpm
Max outer diameter	930 mm
Max torque (Nm)	54,000 Nm

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Hydrastart Coupling

Max power / 100 rpm (kW)	39.1 kW
Max weight	207 kg
Max shaft size	127 mm
Max speed (rpm)	3,500 rpm
Max outer diameter	751 mm
Max torque (Nm)	N/A

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Hydrastart Drop-in Coupling

Max power / 100 rpm (kW)	39.1 kW
Max weight	N/A
Max shaft size	110 mm
Max speed (rpm)	2,500 rpm
Max outer diameter	751 mm
Max torque (Nm)	N/A

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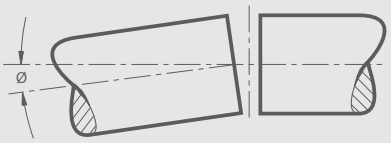
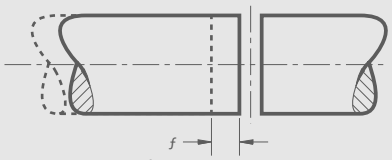
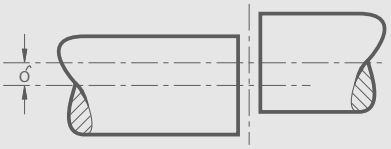
Coupling Selection Guide



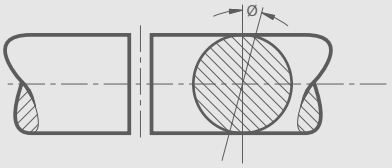
Angular



End float axial



Parallel offset



Torsional flexibility

Flexible Couplings should be used to accommodate any combination of misalignment conditions described below.

At installation all couplings should be aligned as near to perfect as possible.

1. Angular
Angular misalignment is present when the shaft axes are inclined one to the other. Its magnitude can be measured at the coupling faces.

2. Parallel Offset
Parallel misalignment is present when the axes of the driving and driven shafts are parallel but laterally displaced.

3. End float (axial)
End float is the ability to accommodate a relative axial displacement of the connected shafts; achieved by sliding members or flexing of resilient components.

4. Torsional flexibility
Torsional flexibility is a design feature necessary to permit shock and impulsive loadings to be suitably dampened. It is achieved by the provision of a flexible medium such as rubber, springs, etc., between the two halves of the coupling.

Selection
In order to select the correct type and size of coupling, the following basic information should be known:

Power to be transmitted
(a) Normal.
(b) Maximum.
(c) Whether continuous or intermittent.

Characteristics of the drive
(a) Type of prime mover and associated equipment.
(b) Degree of impulsiveness of driven load.

Speed in revolutions per minute
(a) At which normal power is transmitted.
(b) At which maximum power is transmitted.
(c) Maximum speed.

Dimensions of shafts to be connected
(a) Actual diameter.
(b) Length of shaft extension.
(c) Full keyway particulars.

Selection
When the input drive is not steady (i.e. not from an electric motor), and/or the driven load is impulsive, the actual power is multiplied by a Service Factor from the Table 2 (page 13).

Selection Procedure
1. Nominal power in kW to be transmitted = K.

2. Select appropriate load classification from Table 1, denoted as either S, M or H.

3. From Table 2, establish Service Factor(s) to be applied, taking into account hours of operation/day and prime mover = fD.

4. From Table 3 select factor for the required frequency of starts/hr = fS.

5. Selection Power Ks = K x fD x fS

6. Equivalent power at 100 RPM = $\frac{Ks \times 100}{RPM}$

7. Check that coupling selected will accept the required shaft diameters. Should shaft diameter exceed maximum permissible, then re-select using next larger size of coupling.

Load Classification by Application

Table 1

Agitators	
Pure liquids	S
Liquids and solids	M
Liquids - variable density	M
Blowers	
Centrifugal	S
Lobe	M
Vane	S
Brewing and distilling	
Bottling machinery	S
Brew kettles - continuous duty	S
Cookers - continuous duty	S
Mash tubs - continuous duty	S
Scale hopper - frequent starts	M
Can filling machines	S
Cane knives (1)	M
Car dumpers	H
Car pullers	M
Clarifiers	S
Classifiers	M
Clay working machinery	
Brick press	H
Briquette machine	H
Clay working machinery	M
Pug mill	M
Compressors	
Centrifugal	S
Lobe	M
Reciprocating - multi-cylinder	M
Reciprocating - single cylinder	H
Conveyors - uniformly loaded or fed	
Apron	S
Assembly	S
Belt	S
Bucket	S
Chain	S
Flight	S
Oven	S
Screw	S
Conveyors - heavy duty not uniformly fed	
Apron	M
Assembly	M
Belt	M
Bucket	M
Chain	M
Flight	M
Live roll	*
Oven	M
Reciprocating	H
Screw	M
Shaker	H
Crane Drives - not dry dock	
Main hoists	S
Bridge travel	*
Trolley travel	*
Crushers	
Ore	H
Stone	H
Sugar (1)	M
Dredges	
Cable reels	M
Conveyors	M
Cutter head drives	H
Jig drives	H
Manoeuvring winches	M
Pumps	M
Screen drive	H
Stackers	M
Utility winches	M
Dry dock cranes	
Main hoist	(2)
Auxiliary hoist	(2)
Boom, luffing	(2)
Rotating, swing or slew	(3)
Tracking, drive wheels	(4)
Elevators	
Bucket - uniform load	S
Bucket - heavy load	M
Bucket - continuous	S
Centrifugal discharge	S
Escalators	S
Freight	M
Gravity discharge	S
Man lifts	*
Passenger	*
Extruders (plastic)	
Film	S
Sheet	S
Coating	S
Rods	S
Tubing	S
Blow moulders	M
Pre-plasticiers	M
Fans	
Centrifugal	S
Cooling towers	
Induced draft	*
Forced draft	*
Induced draft	M
Large, mine etc.	M
Large, industrial	M
Light, small diameter	S
Feeders	
Apron	M
Belt	M
Disc	S
Reciprocating	H
Screw	M
Food industry	
Beef slicer	M
Cereal cooker	S
Dough mixer	M
Meat grinder	M
Generators - not welding	S
Hammer mills	H
Hoists	
Heavy duty	H
Medium duty	M
Skip hoist	M
Laundry	
Washers - reversing	M
Tumblers	M
Line shafts	
Driving processing equipment	M
Light	S
Other line shafts	S
Lumber industry	
Barkers, hydraulic, mechanical	M
Burner conveyor	M
Chain saw and drag saw	H
Chain transfer	H
Craneway transfer	H
De-barking drum	H
Edger feed	M
Gang feed	M
Green chain	M
Live rolls	H
Log deck	H
Log haul - incline	H
Log haul - well type	H
Log turning device	H
Main log conveyor	H
Off bearing rolls	M
Planer feed chains	M
Planer floor chains	M
Planer tilting hoist	M
Re-saw merry-go-round conveyor	M
Roll cases	H
Slab conveyor	H
Small waste conveyor-belt	S
Small waste conveyor-chain	M
Sorting table	M
Tipple hoist conveyor	M
Tipple hoist drive	M
Transfer conveyors	M
Transfer rolls	M
Tray drive	M
Trimmer feed	M
Waste conveyor	M
Machine tools	
Bending roll	M
Punch press - gear driven	H
Notching press - belt drive	*
Plate planners	H
Tapping machine	H
Other machine tools	
Main drives	M
Auxiliary drives	S
Metal mills	
Drawn bench carriage and main drive	M
Pinch, dryer and scrubber rolls, reversing	*
Slitters	M
Table conveyors nonreversing group drives	M
Individual drives	H
Reversing	*
Wire drawing and flattening machine	M
Wire winding machine	M
Mills, rotary type	
Ball (1)	M
Cement kilns (1)	M
Dryers and coolers (1)	M
Kilns other than cement	M
Pebble (1)	M
Rod, plain & wedge bar (1)	M
Tumbling barrels	H
Mixers	
Concrete mixers continuous	M
Concrete mixers intermittent	M
Constant density	S
Variable density	M
Oil industry	
Chillers	M
Oil well pumping	*
Paraffin filter press	M
Rotary kilns	M
Paper mills	
Agitators (mixers)	M
Barker - auxiliaries hydraulic	M
Barker - mechanical	H
Barking drum	H
Beater and pulper	M
Bleacher	S
Calenders	M
Calenders - super	H
Converting machine except cutters, platers	M
Conveyors	S
Couch	M
Cutters, platers	H
Cylinders	M
Dryers	M
Fell stretcher	M
Fell whipper	H
Jordans	M
Log haul	H
Presses	M
Pulp machine reel	M
Stock chest	M
Suction roll	M
Washers and thickeners	M
Winders	M
Printing presses	*
Pullers	
Barge haul	H
Pumps	
Centrifugal	S
Proportioning	M
Reciprocating	
single acting: 3 or more cylinders	M
double acting: 2 or more cylinders	M
single acting: 1 or 2 cylinders	*
double acting: single cylinder	*
Rotary - gear type	S
Rotary - lobe, vane	S
Rubber and plastics industries	
Crackers (1)	H
Laboratory equipment	M
Mixed mills (1)	H
Refiners (1)	M
Rubber calenders (1)	M
Rubber mill, 2 on line (1)	M
Rubber mill, 3 on line (1)	S
Sheeter (1)	M
Tyre building machines	*
Tyre and tube press openers	*
Tubers and strainers (1)	M
Warming mills (1)	M
Sand muller	M
Screens	
Air washing	S
Rotary, stone or gravel	M
Travelling water intake	S
Sewage disposal equipment	
Bar screens	S
Chemical feeders	S
Collectors	S
Dewatering screws	M
Scum breakers	M
Slow or rapid mixers	M
Thickeners	M
Vacuum filters	M
Slab pushers	M
Steering gear	*
Stokers	S
Sugar industry	
Cane knives (1)	M
Crushers (1)	M
Mills (1)	M
Textile industry	
Batchers	M
Calenders	M
Cards	M
Dry cans	M
Dryers	M
Dyeing machinery	M
Looms	M
Mangles	M
Nappers	M
Pads	M
Range drives	*
Slashers	M
Soapers	M
Spinners	M
Tenter frames	M
Washers	M
Winders	M
Windlass	*

Key

S = Steady
M = Medium Impulsive
H = Highly Impulsive
* = Refer to Renold

(1) = Select on 24 hours per day service factor only.
(2) = Use service factor of 1.00 for any duration of service.
(3) = Use service factor of 1.25 for any duration of service.
(4) = Use service factor of 1.50 for any duration of service.

Note

Machinery characteristics and service factors listed in this catalogue are a guide only. Some applications (e.g. constant power) may require special considerations. Please consult Renold.

Service Factors and Selection

Table 2 Service Factor (f_D)

Prime mover (Drive input)	Driven machinery characteristics			
	Duration service hours/day	Steady load	Medium impulsive	Highly impulsive
Electric, air & hydraulic Motors or steam turbine (Steady input)	Intermittent - 3hrs/day max	0.90	1.00	1.50
	3 - 10	1.00	1.25	1.75
	over 10	1.25	1.50	2.00
Multi-cylinder I.C. engine (Medium impulsive input)	Intermittent - 3hrs/day max	1.00	1.25	1.75
	3 - 10	1.25	1.50	2.00
	over 10	1.50	1.75	2.25
Single-cylinder I.C. engine (Highly impulsive input)	Intermittent - 3hrs/day max	1.25	1.50	2.00
	3 - 10	1.50	1.75	2.25
	over 10	1.75	2.00	2.50

Table 3 Factor for Starts/Hour(f_S)

No of starts per hour	0-1	1-30	30-60	60-
Factor	1,0	1,2	1,3	1,5

Example of Selection

Coupling is required to transmit 7.5kW at 1440 RPM to connect an electric motor to a gear box driving a chain conveyor running for 18 hours/day and starting 15 times/hour. Shaft diameters /55mm respectively.

K = 7.5kW

From Table 1 Load Classification = M (medium impulsive)

From Table 2 Service Factor f_D = 1.5

From Table 3 f_S = 1.2

Therefore selection kW is:-

$Ks = K \times f_D \times fS$
$= 7.5 \times 1.5 \times 1.2$
$= 13.5$ kW

Equivalent power at 100 RPM $= \frac{Ks \times 100}{RPM}$

$= \frac{13.5 \times 100}{1440}$

$= 0.9375$kW @ 100RPM

From page 17 selection is RSC110 (644911) (maximum bore 55 mm).

Key Stress

1. Permissible key stress = 70N/mm^2
2. Nominal torque T_{KM} = K x 9550 / RPM Nm
3. Force at key F = T_{KM} /r
4. Shaft Rad r. metres
5. Key area A = J x HUB length mm
   (Obtain from relevant catalogue page).
6. Key stress fk = F/A N/mm^2
7. If resultant stress is less than 70 N/mm^2 key stress is acceptable.
   If resultant fk is greater than 70, consider either two keyways or extending hub length.
8. Example:

   T_{KM} = 7.5 x 9550/1440 = 49.7Nm

   r = 55/2 = 27.5mm ÷ 1000 = 0.0275m

   F = 49.7/0.0275 = 1741N

   A = 16 x 45 = 720mm^2

   fk = 1741/720 = N/mm2

   Selection is therefore good.

For operation above 80% of the declared maximum coupling speed it is recommended that the coupling is dynamically balanced.

WARNING

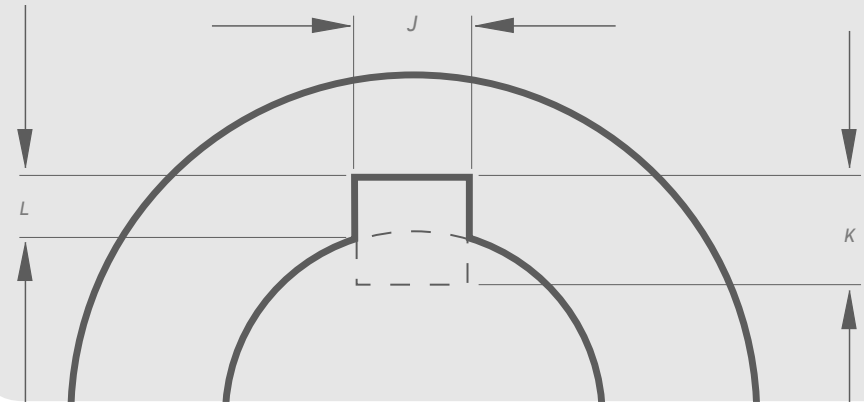
It is the responsibility of the system designer to ensure that the application of the coupling does not endanger the other constituent components in the system. Service factors given are an initial selection guide.

WARNING

Rotating equipment must be provided with a suitable guard before operating or injury may result.

Key and Keyway Dimensions

[*fig 01*]



Metric (mm)

Keyways comply with BS4235: Part 1: 1972

Shaft dia.		Key & keyway		
Over	Incl.	J	K	L
6	8	2	2	1.0
8	10	3	3	1.4
10	12	4	4	1.8
12	17	5	5	2.3
17	22	6	6	2.8
22	30	8	7	3.3
30	38	10	8	3.3
38	44	12	8	3.3
44	50	14	9	3.8
50	58	16	10	4.3
58	65	18	11	4.4
65	75	20	12	4.9
75	85	22	14	5.4
85	95	25	14	5.4
95	110	28	16	6.4
110	130	32	18	7.4
130	150	36	20	8.4
150	170	40	22	9.4
170	200	45	25	10.4
200	230	50	28	11.4

Imperial (inches)

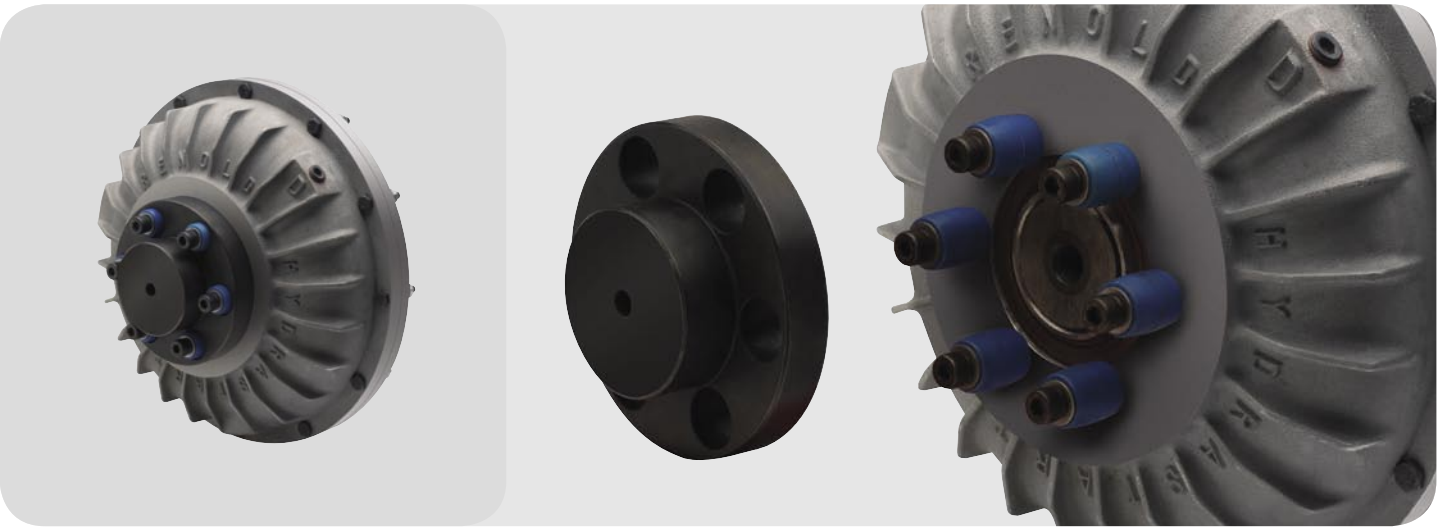
Keyways comply with BS46: Part 1: 1958

Shaft dia.		Key & keyway		
Over	Incl.	J	K	L
0.25	0.05	0.125	0.125	0.060
0.50	0.75	0.187	0.187	0.088
0.75	1.00	0.250	0.250	0.115
1.00	1.25	0.312	0.250	0.112
1.25	1.50	0.375	0.250	0.108
1.50	1.75	0.437	0.312	0.135
1.75	2.00	0.500	0.312	0.131
2.00	2.50	0.625	0.437	0.185
2.50	3.00	0.750	0.500	0.209
3.00	3.50	0.875	0.625	0.264
3.50	4.00	1.000	0.750	0.318
4.00	5.00	1.250	0.875	0.366
5.00	6.00	1.500	1.000	0.412

Keyway dimensions [*fig 01*]

Parallel keyways are supplied unless customer states otherwise.

Hydrastart Fluid Coupling



A fluid coupling suitable for soft starting high inertia machinery with reduced current demand, controlled acceleration and torque with motor overload protection.

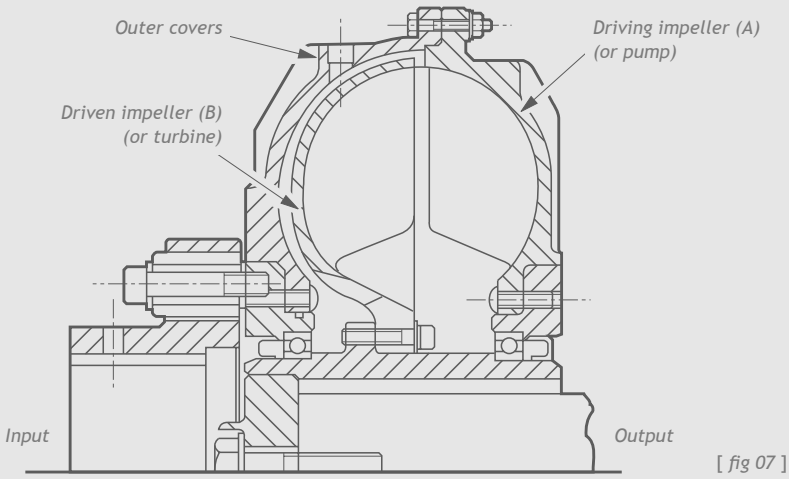
Coupling capacity

- Maximum power @ 1500RPM 600kW
- Maximum torque: 3500RPM

Features and benefits

- High inertia controlled torque to 700 kW.
- Soft start - motor starts on low load.
- Allows use of standard squirrel cage motors.
- Overload protection - fusible plug safeguards equipment.
- Dampens torsional vibration, reducing mechanical stress - extends machine life.
- Delay fill version - extends acceleration time and reduces start-up torque.
- Can match load and speed on multi drives.
- Energy saving through reduced current demand at start-up.
- Coupling and V pulley types - design flexibility.

Operating Principles



[fig 07]

The coupling is partially filled with hydraulic oil to a level suitable for the absorbed power of the application and the acceleration characteristics of the driven machinery. The optimum oil fill is that which just allows the driven machine to accelerate from rest, thus providing the best drive overload protection.

Power is supplied to the input side of the coupling by either an electric motor or diesel engine. This causes the driving impeller *(A)* [*fig 07*] to be rotated at motor speed, oil is thrown outwards by centrifugal force. The flow of oil is directed across the blades of the impeller towards the opposing turbine *(B)*. Kinetic energy is absorbed by the turbine and translated into torque, which is always equal to the input torque and produces rotation of the output member (in the same direction as the driver).

The low resistance of the impeller at start up allows the motor to quickly accelerate to full speed. The driven load accelerates smoothly to within a small percentage of the motor speed.

This speed difference is referred to as slip and must always be present for the successful operation of a fluid coupling.

Typical values of slip will vary between 2% (large power) and 6% (small power).

All hydraulic couplings can be driven in either directions of rotation.

The input and output positions shown are standard, but the input can be from either side of the coupling.

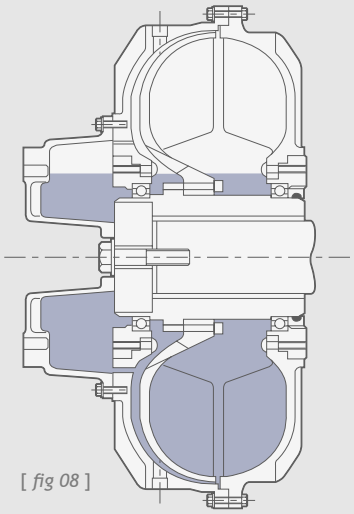
The standard drive arrangement allows the outer cover to be rotated whilst at rest to facilitate oil filling.

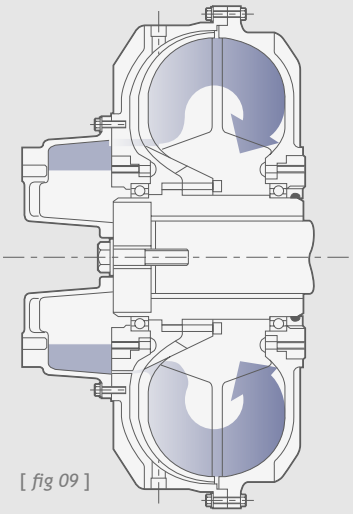
However, if a brake drum or disc brake is fitted, the brake should be at the coupling output. See page 67.

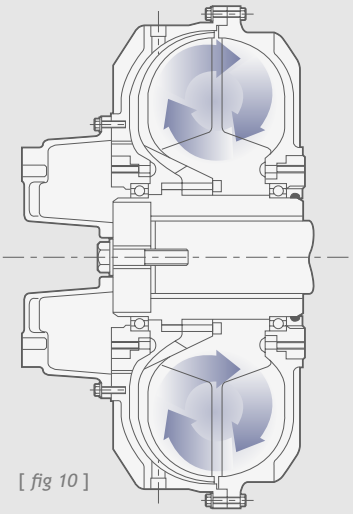
To calculate slip %

$$\frac{\text{(Input speed - output speed) x 100}}{\text{Input speed}}$$

Delayed Fill


[fig 08]


[fig 09]


[fig 10]

Hydrastart Delayed Fill Chamber (Type HS...R)

HydraStart (constant fill) hydraulic couplings having a maximum oil fill will limit the starting torque to approximately 200% of nominal torque. It is possible to reduce this figure by reducing the quantity of oil in the circuit.

The disadvantage of this method is that it produces increased slip and higher operating temperatures. To overcome these problems a delay fill chamber is available on sizes HS8 and above.

This chamber is a modular option and allows a calibrated oil feed into the working circuit. In this way, starting torque can be reduced whilst minimising slip under normal running.

At rest [*fig 08*]

With the drive at rest, oil drains from the working circuit into the delay chamber.

Accelerating [*fig 09*]

At start up the coupling will transmit limited torque, allowing the motor to reach rated speed quickly. Oil flows from the chamber to the working circuit proportionally to the speed.

Running [*fig 10*]

When the coupling achieves its rated speed, almost all of the oil is in the working circuit and the torque is transmitted at the minimum slip value.

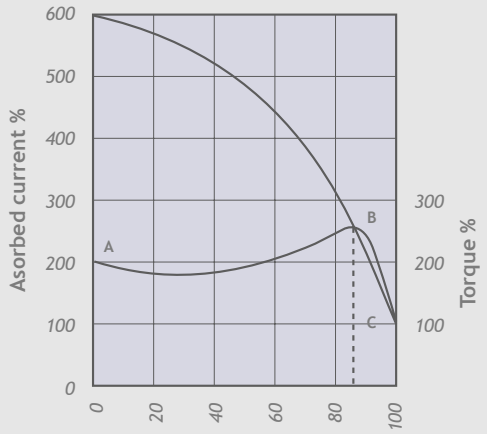
CAUTION

The outer case of the Hydrastart coupling can become hot during operation. Do not touch the coupling or a burn may result.

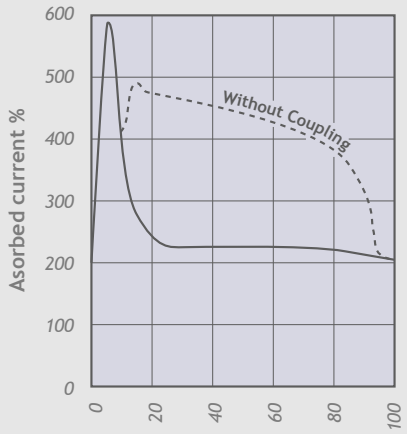
CAUTION

Do not attempt to change the coupling oil during or soon after operation has ceased, as the oil may be hot and could cause burns.

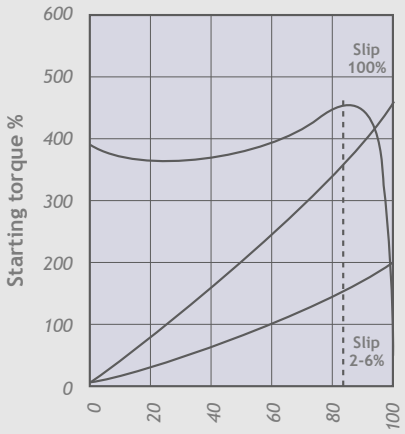
‘Soft’ Starting



[*fig 11*]



[*fig 12*]



[*fig 13*]

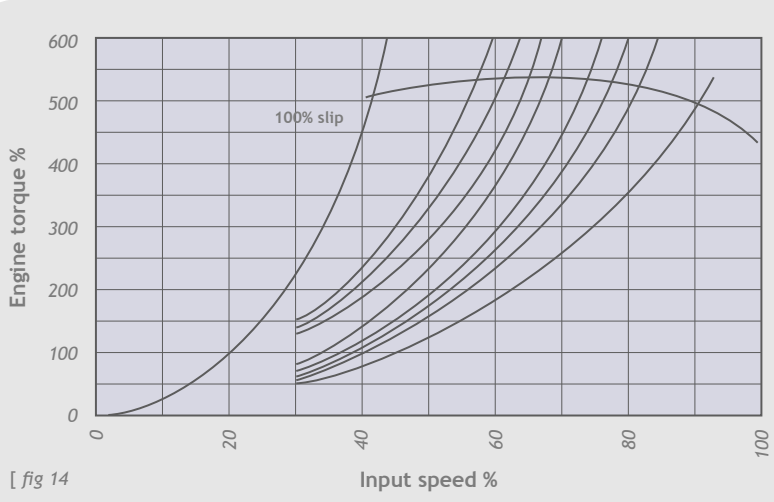
Effect of starting on electric motors

If a machine is driven by a squirrel cage motor without the use of a HydraStart fluid coupling, the following conditions arise [*fig 11*].

1. Motor will pull out 250/280% FLT.
2. Motor will consume 6 times FL amps.
3. Increase in motor temperature.

Star-delta starting reduces overheating. However, the starting torque in star is only 30% that in delta and it is often necessary to use larger or more complicated wound motors, particularly with high inertia machinery.

A = Locked rotor torque
B = Stall torque 250/280%
C = Normal torque 100%
I = Amperage



[*fig 14*

Effect of starting of electric motors when fitted with HydraStart Couplings

When a drive includes a HydraStart coupling the motor starts on low load, with only an instantaneous current peak at switch on [*fig 12*]. At start up all the motor torque is available to accelerate the motor rotor and coupling impeller (pump).

The driven impeller (turbine) increases speed smoothly from zero rpm until the 100% slip curve intersects the motor torque curve at approximately 85% motor speed [*fig 13*]. When the torque developed by the HydraStart coupling matches the resisting torque of the driven machine, acceleration of the load commences and continues up to running speed which will be between 94% and 98% of the driving speed depending on the coupling size.

HydraStart couplings fitted on diesel engines

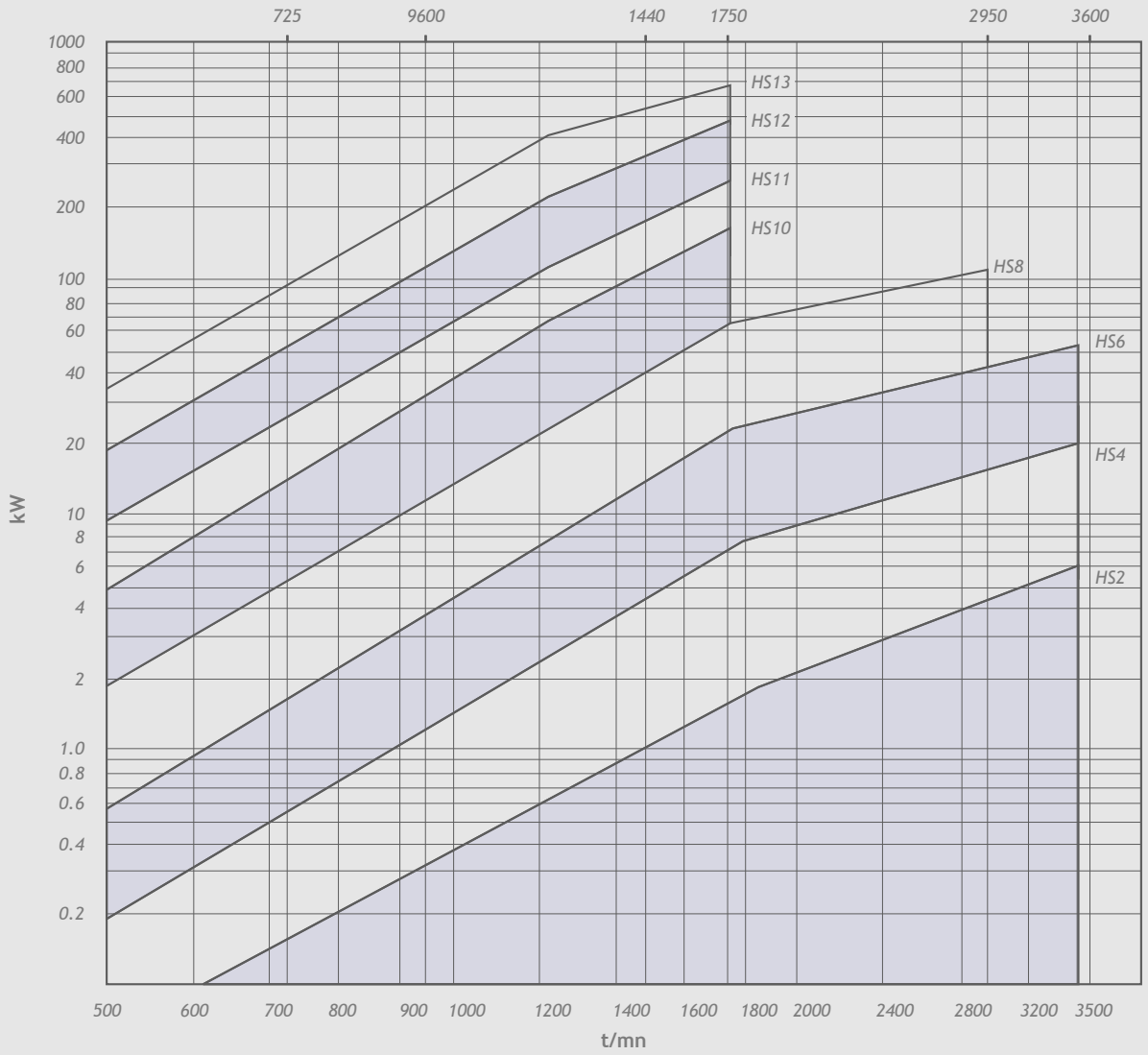
HydraStart fluid couplings can be used with all types of industrial machinery driven by internal combustion engines. [*fig 14*] shows typical engine and coupling performance curves.

The horizontal curve represents the engine’s torque curve whilst the vertical shows the torque capacity of the coupling for different slip values and speeds. As load on the driven shaft increases it demands torque, causing the coupling to slip at higher level.

If still greater loads are demanded then the coupling will eventually slip at 100%. Note this does not happen until the engine has developed peak torque.

Thus by using a fluid coupling, it permits an engine to develop maximum torque without stalling under load and promotes rapid acceleration to normal load speed.

Hydrastart Selection Chart



Larger coupling sizes are available up to 2000kW at 1400 RPM

This chart may be used for the selection of coupling size. If your selection falls on a dividing line, always select the next largest size and use reduced oil fill.

Hydrastart couplings can be used for up to five equi-spaced starts per hour.

Applications requiring more than five starts an hour should always be referred to Renold.

NOTE: Hydraulic couplings will not compensate for an under-sized electric motor.

WARNING

Rotating equipment must be provided with a suitable guard before operating or injury may result.

WARNING

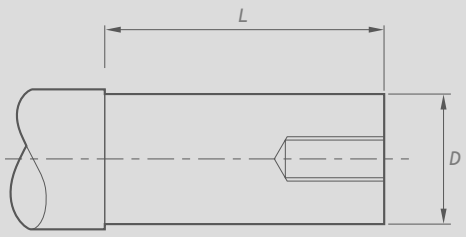
It is the responsibility of the system designer to ensure that the application of the coupling does not endanger the other constituent components in the system. Service factors given are an initial selection guide.

Coupling Rating Tables

Maximum rating table

Coupling ref	Motor speed / kW				
	750	1000	1200	1500	1800
HS2	0.13	0.37	0.56	1.1	1.7
HS4	0.56	1.34	2.4	4.5	7.4
HS6	1.7	4.0	7.5	15	24
HS8	5.5	13	23	45	65
HS10	15	37	65	110	155
HS11	27	63	116	200	273
HS12	54	125	234	400	502
HS13	97	200	350	587	694

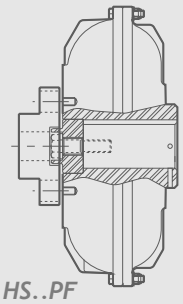
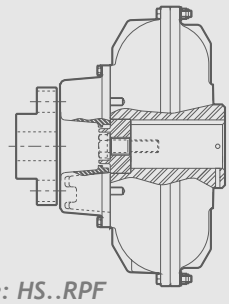
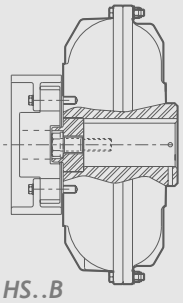
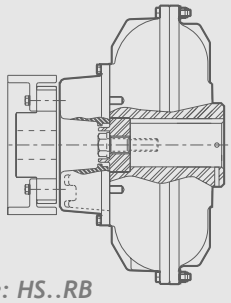
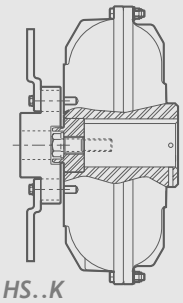
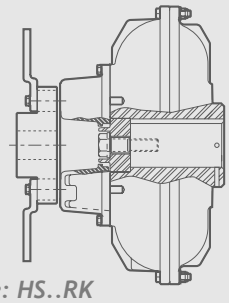
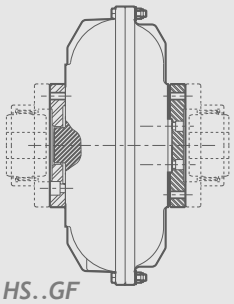
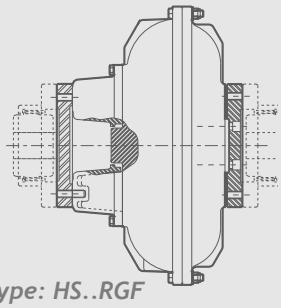
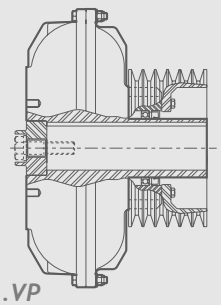
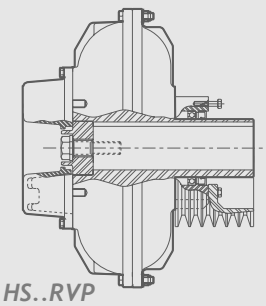
For selection requiring larger powers contact Renold.



Motor shaft details

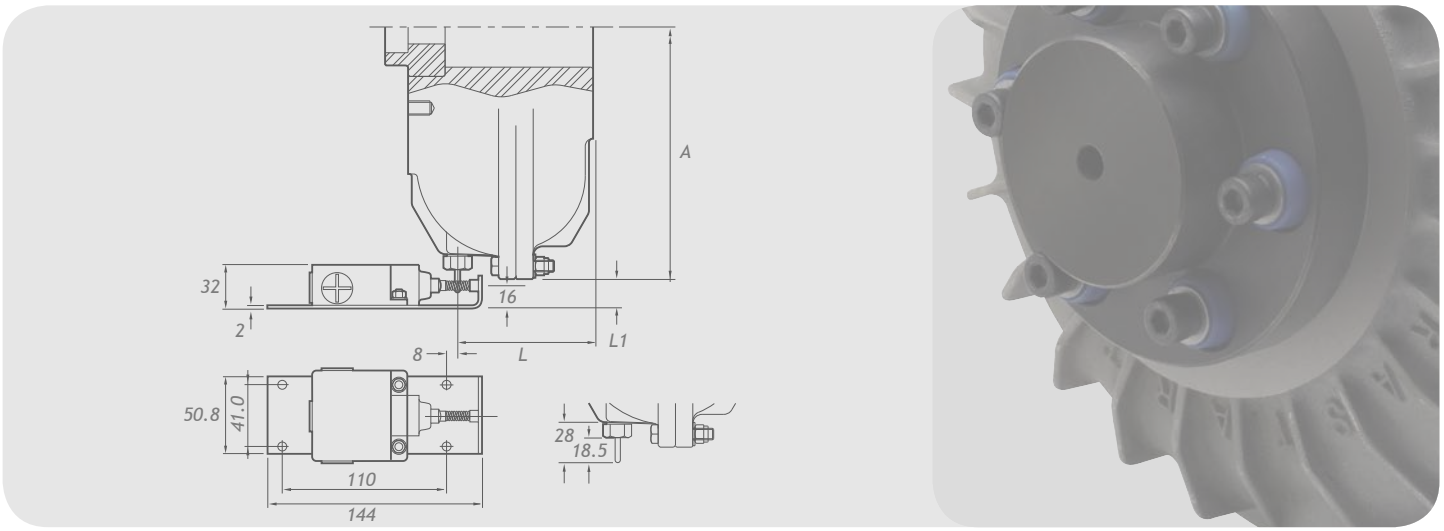
Motor			750 rpm			1000 rpm			1500 rpm			3000 rpm		
Frame Size	Shaft details		Power		Hydrastart Size	Power		Hydrastart Size	Power		Hydrastart Size	Power		Hydrastart Size
	D (mm)	L (mm)	kW	HP		kW	HP		kW	HP		kW	HP	
80	19	40				0.25	0.33	HS2						
80	19	40				0.37	0.5		0.55	0.75		0.75	1	
80	19	40				0.55	0.75		0.75	1	HS2	1.1	1.5	
90S	24	50				0.75	1	HS4	1.1	1.5		1.5	2	HS2
90L	24	90				1.1	1.5		1.5	2		2.2	3	
100L	28	60	0.75	1		1.5	2		2.2	3	HS4	3	4	
100L	28	60	1.1	1.5	HS6				3	4				
112M	28	60	1.5	2		2.2	3	HS6	4	5.5		4	5.5	
132S	38	80	2.2	3		3	4		5.5	7.5		5.5	7.5	
132S	38	80										7.5	10	
132M	38	80	3	4	HS8	4	5.5		7.5	10	HS6			HS4
132M	38	80				5.5	7.5							
160M	42	110	4	5.5		7.5	10	HS8	11	15		11	15	
160M	42	110	5.5	7.5								15	20	
160L	42	110	7.5	10		11	15		15	20		18.5	25	
180M	48	110							18.5	25		22	30	
180L	48	110	11	15		15	20		22	30				
200L	65	110	15	20		18.5	25		30	40	HS8	30	40	HS6
200L	55	110				22	30	HS10				37	50	
225S	60	140	18.5	25	HS10				37	50				
225M	65	110										45	60	
225M	60	140	22	30		30	40		45	60				
250S	60	140										55	75	
250S	70	140	30	40		37	50		55	75				HS8
250M	60	140									HS10	75	100	
250M	70	140	37	50	HS12	45	60	HS11	75	100				
280S	65	140										90	125	
280S	80	170	45	60		55	75		90	125				
280M	65	140										110	150	
280M	80	170	55	75		75	100		110	150				
315S	85	170	75	100		90	125	HS12	132	175	HS11			
315M	85	170	90	125	HS13	110	150		150	200				
315L	85	170				132	175		185	250				
315L	85	170				150	200	HS13	200	270				
315L	85	170							225	300				
355S	100	210				185	250		250	335	HS12			
355S	100	210				200	270		280	375				
355M	100	210							315	420				
355L	100	210							355	475				
355L	100	210							375	503				
355L	100	210							400	536				

Standard Available Options

Non delay fill	Description	Delay fill
 Type: HS..PF	**Basic coupling** Sleeve bored to suit motor shaft and incorporating Pinflex output coupling. Capable of accepting some misalignment. Flexible buffers can be replaced in situ. Page 66	 Type: HS..RPF
 Type: HS..B	**Brake drum options** Basic Pinflex coupling with the addition of a brake drum, metric or inch sizes. Page 67	 Type: HS..RB
 Type: HS..K	**Brake disc options** Basic Pinflex coupling with the addition of a brake disc, metric or inch sizes. Page 67	 Type: HS..RK
 Type: HS..GF	**Basic coupling incorporating two Flexible Gear half couplings** Capable of accepting some misalignment and allowing removal of HydraStart coupling without displacing either motor or driven shaft. Brake drum or disc options available. Page 68	 Type: HS..RGF
 Type: HS..VP	**Vee Pulley Mounting** Sleeve bored to suit motor shaft. Pulley is attached using external bolts and may easily be replaced. Page 69	 Type: HS..RVP

Type HSPF, HSB, HSK and HSVP may be used for vertical applications. Please contact Renold for details.

Overload Protection



When a hydraulic coupling experiences overload there is a correspondingly high slip value accompanied by a rise in the oil temperature. To prevent damage to the drive there are three options available.

1. Fusible plug

This is fitted as standard on all HydraStart couplings sizes 4 and above. The standard plug is set to fuse at 138°C. Another option available allows fusing at 183°C. Because oil is discharged when the plug fuses it is advisable to correctly guard couplings using this type of device.

2. Thermal trigger

Fitted as an option on HydraStart couplings sizes 6 and above, this device prevents oil being discharged from the coupling at overload. As with the fusible plug, two melt temperatures are offered. When melt point is reached a pin is released which engages with a limit switch. The signal from this switch can operate an alarm or switch off the electric motor to protect the drive. After the cause of the overload has been removed the drive can be restarted after replacing the thermal trigger.

3. Non-contact sensor

Non-contact speed and heat sensors can be supplied which shut down the drive in the event of overload. Please contact Renold for more information.

HydraStart thermal trigger

Size	A	L	L1
HS6	345	93.7	21.5
HS8	422	123.2	20.0
HS10	511	146.1	16.0
HS11	580	144.5	10.5
HS12	669	173.3	10.5

Operating principles

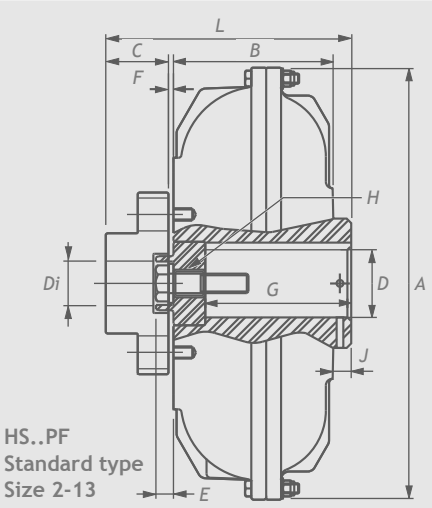
This device will trigger the limit switch if the oil temperature reaches a predetermined level without loss of oil from the coupling. Thermal trigger plug 117°C alternatively 138°C.

Electrical characteristics

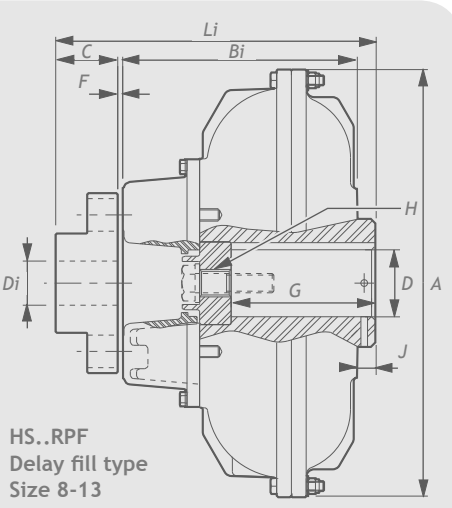
2-Pole 1N/C + 1N/O, conforms to IEC 529 IP 66, contact type XCK rating 500V AC-15

3-20mm ISO Cable Entries.

Hydrastart Pinflex Coupling – Dimensions (mm)



HS..PF
Standard type
Size 2-13



HS..RPF
Delay fill type
Size 8-13

Size	A	B	Bi	C	D Max	Di Max	E	F	G*	H	J	L	Li	Pinflex Cplg Size	Weight kgs	WR² kgm²
HS2	229	90	-	44	29	50	13	4	80	0.625" 11 UNC	8	146	-	1	6.7	0.02
HS4	286	107	-	44	42	50	13	4	95	0.625" 11 UNC	7	162	-	1	10.9	0.06
HS6	345	130	-	50	52	55	16	5	114	0.75" 10 UNC	10	195	-	2	20.8	0.16
HS8	422	161	238	75	75	80	20	6	137	1.00" 8 UNC	19	261	338	4	41.2 **43.9**	0.46 **0.49**
HS10	511	191	268	89	85	110	20	6	178	1.00" 8 UNC	25	311	388	5	65.2 **69.7**	1.05 **1.11**
HS11	580	205	296	110	102	130	20	7	195	1.00" 8 UNC	25	347	438	6	107.4 **113.6**	2.17 **2.26**
HS12	669	231	339	110	115	130	23	7	211	1.25" 7 UNC	25	374	482	6	131.7 **138.9**	3.67 **3.78**
HS13	751	292	402	130	127	150	23	7	267	1.25" 7 UNC	25	454	564	7	199 **207**	6.80 **7.07**

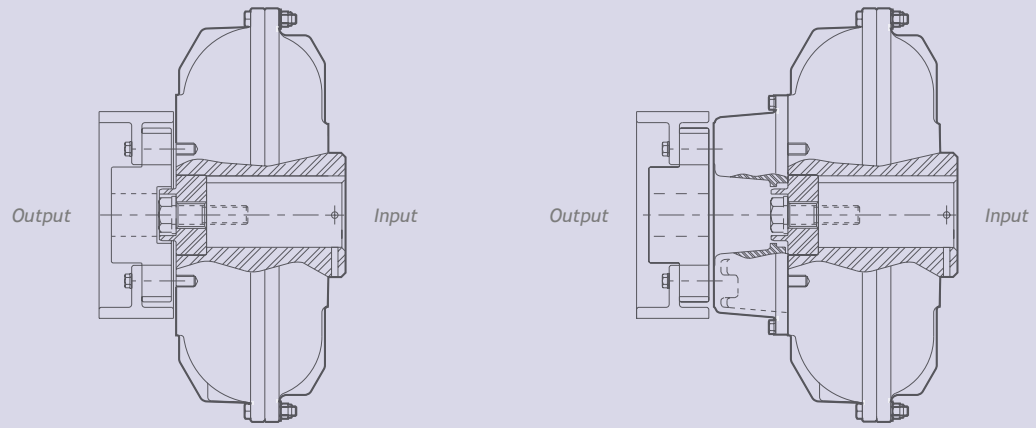
Figures in blue type relate to delay fill coupling only (sizes 8 and above).

* It may be necessary to use a spacer (not supplied by Renold) if shaft length is less than dimension 'G'.

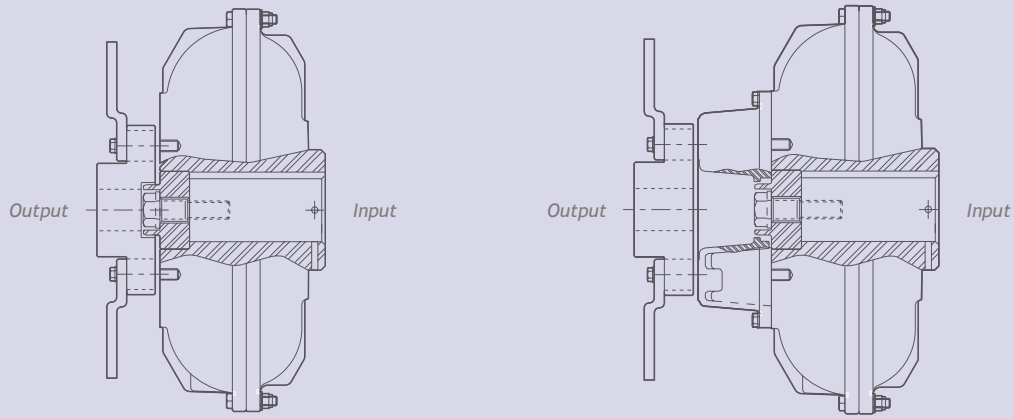
Note: Centre screw fixing bolt not supplied by Renold.

All bore and keyways comply to British Standard as shown on page 14.

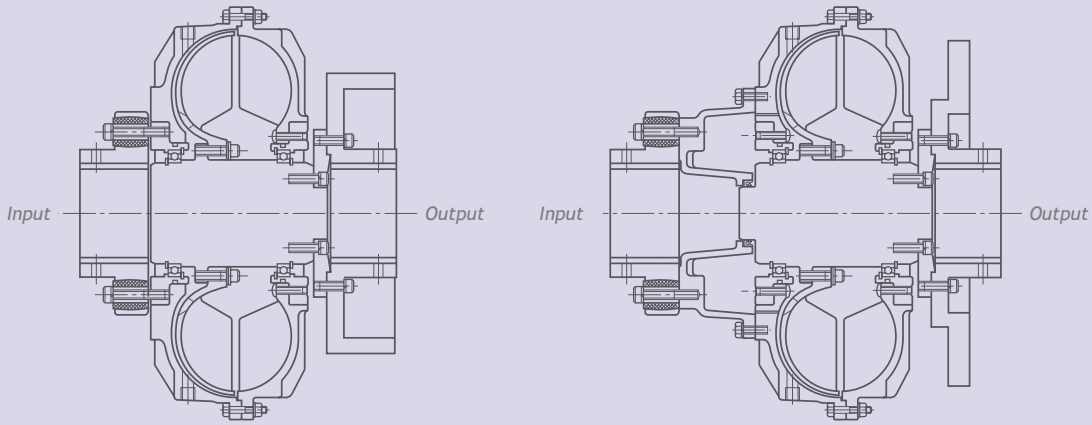
Hydrastart Pinflex Coupling - With Brake Attachment



Hydrastart Pinflex Coupling and brake drum

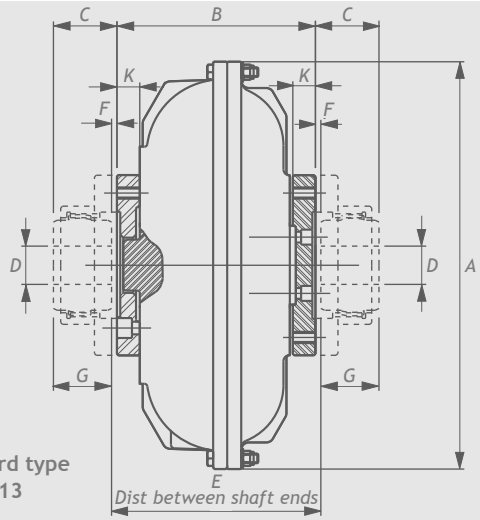


Hydrastart Pinflex Coupling and brake disc

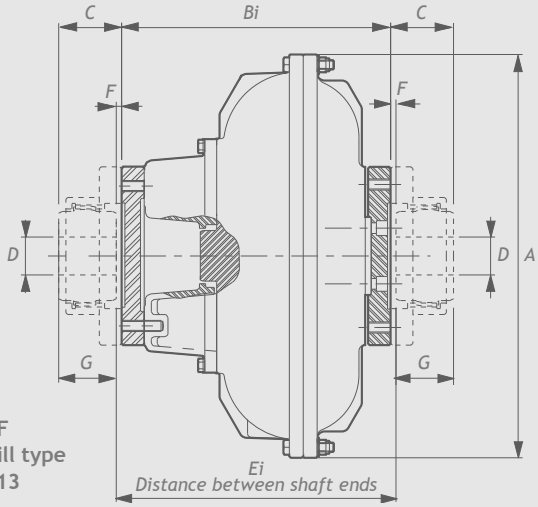


Hydrastart Pinflex/Rigid Coupling and brake drum/disc

Hydrastart Gearflex Coupling - Dimensions (mm)



HS..GF
Standard type
Size 2-13



HS..RGF
Delay fill type
Size 8-13

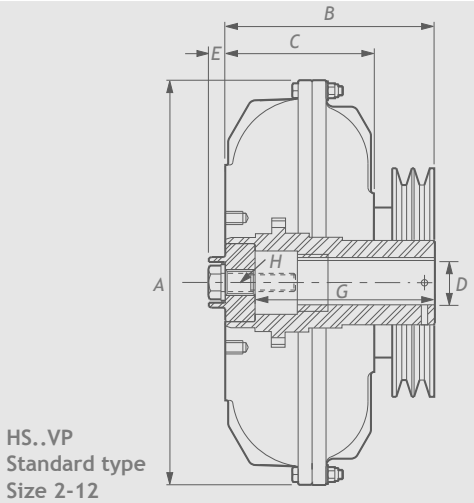
Size	A	B	Bi	C	D Max	E	Ei	F	G	K	Gearflex Cplg Size	Weight kgs	WR² kgm²
HS2	229	128		45	44	132		2	43	19	1	7.80	0.03
HS4	286	145		45	44	148		2	43	19	1	12.10	0.06
HS6	345	168		51	58	171		2	49	19	1.5	19.60	0.15
HS8	422	223	300	64	76	226	306	2	62	29	2	44.20 47.00	0.49 0.51
HS10	511	252	329	94	110	257	335	3	91	29	3	69.00 73.50	1.12 1.18
HS11	580	267	358	94	110	272	363	3	91	29	3	100.70 106.80	2.13 2.22
HS12	669	297	405	110	120	303	408	3	106	31	3.5	130.30 137.50	3.69 3.81
HS13	Details on request												

Figures in blue type relate to delay fill coupling only (sizes 8 and above).

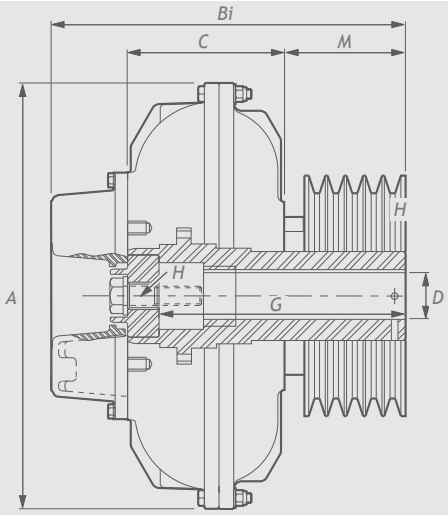
WR^2 value does not include gear coupling halves.

All bore and keyways comply to British Standard as shown on page 14.

Hydrastart Pulley - Dimensions (mm)



HS..VP
Standard type
Size 2-12



HS..RVP
Delay fill type
Size 8-12

Size	A	B	Bi	C	D max	E	G*	H	M	Weight kgs	WR² kgm²	Hydrastart size	Groove profile	Max no grooves	PCD min
												HS2VP	SPZ	3	106
								0.625"					SPA	2	110
HS2	229	141		90	27	13	123	11 UNC	51	4.40	0.02		SPB	1	116
												HS4VP	SPZ	5	140
								0.625"					SPA	4	144
HS4	286	173		107	38	13	154	11 UNC	66	9.30	0.05		SPB	3	150
												HS6VP	SPZ	6	162
													SPA	5	166
								0.75"					SPB	4	172
HS6	345	220		130	49	16	195	10 UNC	90	15.89	0.13		SPC	3	182
												HS8VP	SPZ	11	188
													SPA	9	192
								1.00"		41.40	0.45		SPB	7	198
HS8	422	310	387	161	75	20	267	8 UNC	149	**44.10**	**0.48**		SPC	5	208
												HS10VP	SPZ	13	245
													SPA	10	250
								1.00"		66.70	1.06		SPB	8	255
HS10	511	357	434	191	80	20	319	8 UNC	166	**71.20**	**1.12**		SPC	6	265
												HS11VP	SPZ	17	285
													SPA	13	289
								1.00"		104.10	2.12		SPB	10	295
HS11	580	418	509	205	95	20	382	8 UNC	213	**110.30**	**2.21**		SPC	8	305
												HS12VP	SPZ	17	330
													SPA	13	334
								1.25"	1	37.20	3.71		SPB	10	340
HS12	669	448	556	231	110	23	403	7 UNC	217	**144.40**	**3.83**		SPC	8	350

Figures in blue type relate to delay fill coupling only (sizes 8 and above).

*It may be necessary to use a spacer (not supplied by Renold) if the shaft length is

WR^2 value does not include the pulley.

Pulley details shown are limitations. For alternative options contact Renold.

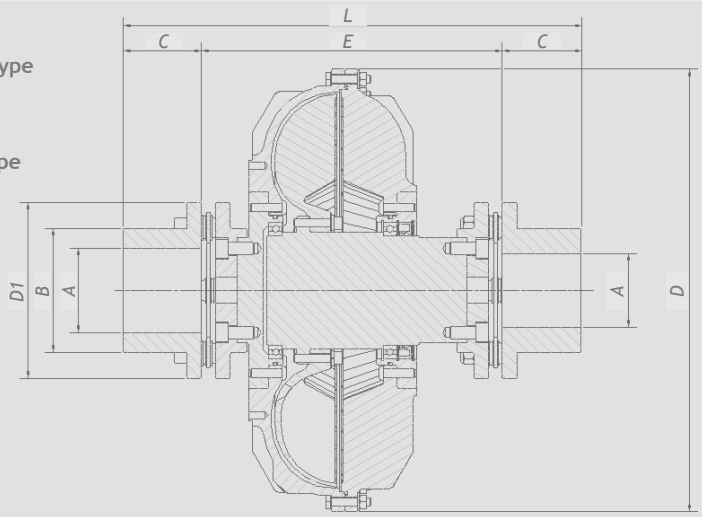
Note: Centre screw fixing bolt not supplied by Renold.

All bore and keyways comply to British Standard as shown on page 14.

Hydrastart Drop-in

HS-RF
Standard type
Size 2-13

HS-RRF
Dely fill type
Size 8-13



Hydrastart Size	Renoldflex Size	A (Max)	B	C	D	D1	E (DBSE)	L	Interchanges with Fluid Drive FCU range
HS2	RF88	45	62.5	45	279	88.3	159	249	FCU 7
HS4	RF88	45	62.5	45	286	88.3	165	255	FCU 8
HS4.5	RF88	45	62.5	45	286	88.3	194	284	FCU 9.25
HS6	RF116	60	82	55	345	116.5	210	320	FCU 10.5
HS6.5	RF116	60	82	55	345	116.5	232	342	FCU 11.5
HS8	RF166	90	118	75	422	166.5	262	412	FCU 12.75
HS8.5	RF166	90	118	75	422	166.5	287	437	FCU 14.5
HS10	RF166	90	118	75	511	166.5	335	485	FCU 16.25
HS10.5	RF166	90	118	75	511	166.5	354	504	FCU 17.75
HS11	RF198	100	141	90	580	198.5	390	570	FCU 20
HS12	RF238	120	169	125	669	238	457	707	FCU 23
HS13	RF238	120	169	125	751	238	492	742	FCU 26

Hydrastart Renoldflex Fluid Coupling

- **Directly Interchangeable** with competitors' ranges.
- Can be designed with **"drop in"** dimensions, no costly re-engineering needed.
- Design allows for Hydrastart section to be easily **"dropped out"** for maintenance.
- Short lead time to manufacture unit.
- Renoldflex **maintenance free** all steel membrane coupling.
- Variable distance between shaft ends (DBSE) dim E to suit application. Consult Renold.
- **Delay fill (twin chamber) type HS..RRF** also available on sizes 8 to 13. Consult Renold.

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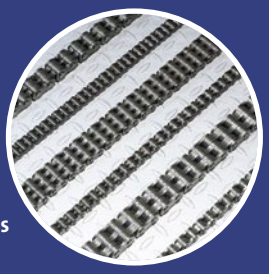
- Manufactured to international stds
- Full range of pitch alternatives
- Breaking loads 13 to 900 kN as std
- Attachments to suit varied applications



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- Comprehensive ranges used worldwide for safety critical lifting applications
- 100 years experience in developing and maintaining lifting chain

Steel Knuckle Chain

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- Integral K type attachments
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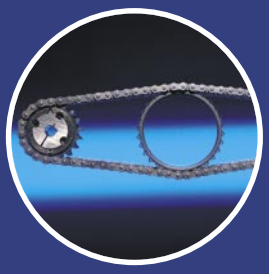
- Sealed joint to extend chain life



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