

Hydrastart Couplings



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Superior Coupling Technology

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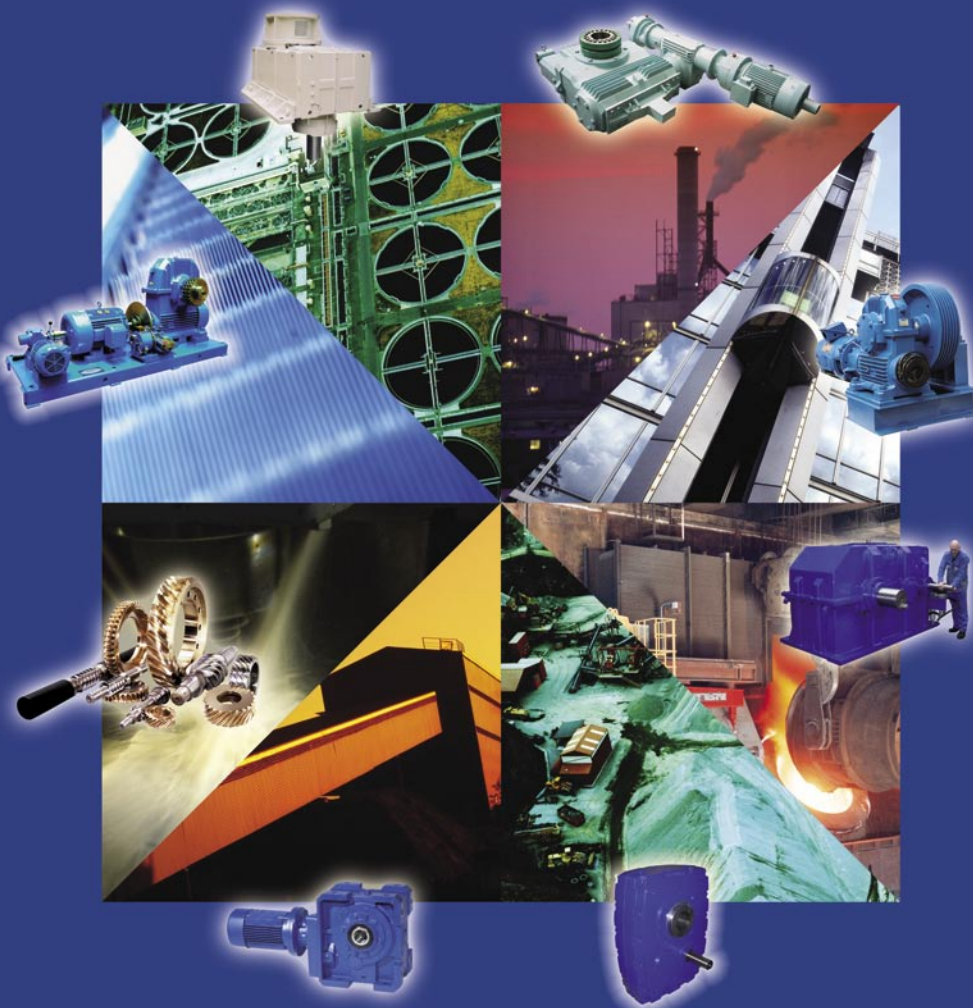
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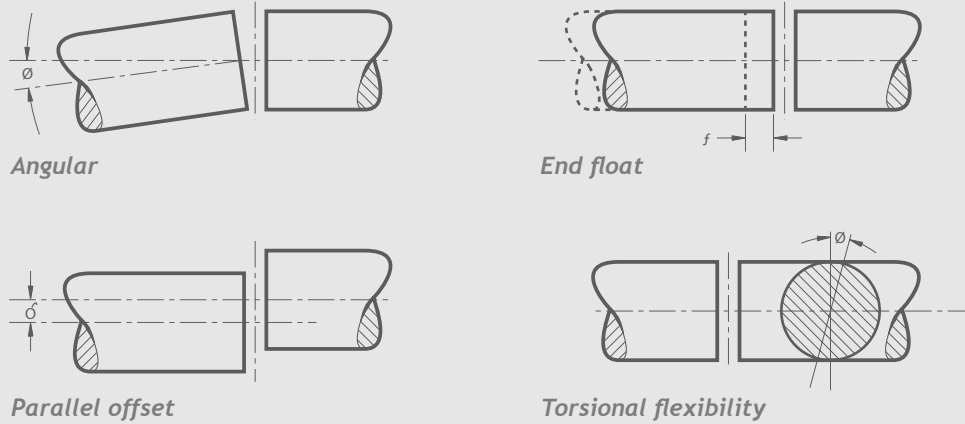
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Coupling Selection Guide



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

Axial 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

- Normal.
- Maximum.
- Whether continuous or intermittent.

Characteristics of the drive

- Type of prime mover and associated equipment.
- Degree of impulsiveness of driven load.

Speed in revolutions per minute

- At which normal power is transmitted.
- At which maximum power is transmitted.
- Maximum speed.

Dimensions of shafts to be connected

- Actual diameter.
- Length of shaft extension.
- 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

- Nominal power in kW to be transmitted = K .
- Select appropriate load classification from Table 1, denoted as either S, M or H.
- From Table 2, establish Service Factor(s) to be applied, taking into account hours of operation/day and prime mover = fD .
- From Table 3 select factor for the required frequency of starts/hr = fS .
- Selection Power $K_s = K \times fD \times fS$
- Equivalent power at 100 RPM = $\frac{K_s \times 100}{\text{RPM}}$
- 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		Dry dock cranes		Planer feed chains	M	Presses	M
Pure liquids	S	Main hoist	(2)	Planer floor chains	M	Pulp machine reel	M
Liquids and solids	M	Auxiliary hoist	(2)	Planer tilting hoist	M	Stock chest	M
Liquids - variable density	M	Boom, luffing	(2)	Re-saw merry-go-round conveyor	M	Suction roll	M
Blowers		Rotating, swing or slew	(3)	Roll cases	H	Washers and thickeners	M
Centrifugal	S	Tracking, drive wheels	(4)	Slab conveyor	H	Winders	M
Lobe	M	Elevators		Small waste conveyor-belt	S	Printing presses	*
Vane	S	Bucket - uniform load	S	Small waste conveyor-chain	M	Pullers	
Brewing and distilling		Bucket - heavy load	M	Sorting table	M	Barge haul	H
Bottling machinery	S	Bucket - continuous	S	Tipple hoist conveyor	M	Pumps	
Brew kettles - continuous duty	S	Centrifugal discharge	S	Tipple hoist drive	M	Centrifugal	S
Cookers - continuous duty	S	Escalators	S	Transfer conveyors	M	Proportioning	M
Mash tubs - continuous duty	S	Freight	M	Transfer rolls	M	Reciprocating	
Scale hopper - frequent starts	M	Gravity discharge	S	Tray drive	M	single acting: 3 or more cylinders	M
Can filling machines	S	Man lifts	*	Trimmer feed	M	double acting: 2 or more cylinders	M
Cane knives (1)	M	Passenger	*	Waste conveyor	M	single acting: 1 or 2 cylinders	*
Car dumpers	H	Extruders (plastic)		Machine tools		double acting: single cylinder	*
Car pullers	M	Film	S	Bending roll	M	Rotary - gear type	S
Clarifiers	S	Sheet	S	Punch press - gear driven	H	Rotary - lobe, vane	S
Classifiers	M	Coating	S	Notching press - belt drive	*	Rubber and plastics industries	
Clay working machinery		Rods	S	Plate planners	H	Crackers (1)	H
Brick press	H	Tubing	S	Tapping machine	H	Laboratory equipment	M
Briquette machine	H	Blow moulders	M	Other machine tools		Mixed mills (1)	H
Clay working machinery	M	Pre-plasticiers	M	Main drives	M	Refiners (1)	M
Pug mill	M	Fans		Auxiliary drives	S	Rubber calenders (1)	M
Compressors		Centrifugal	S	Metal mills		Rubber mill, 2 on line (1)	M
Centrifugal	S	Cooling towers		Drawn bench carriage and main drive	M	Rubber mill, 3 on line (1)	S
Lobe	M	Induced draft	*	Pinch, dryer and scrubber rolls, reversing	*	Sheeter (1)	M
Reciprocating - multi-cylinder	M	Forced draft	*	Slitters	M	Tyre building machines	*
Reciprocating - single cylinder	H	Induced draft	M	Table conveyors nonreversing group drives	M	Tyre and tube press openers	*
Conveyors - uniformly loaded or fed		Large, mine etc.	M	Individual drives	H	Tubers and strainers (1)	M
Apron	S	Large, industrial	M	Reversing	*	Warming mills (1)	M
Assembly	S	Light, small diameter	S	Wire drawing and flattening machine	M	Sand muller	M
Belt	S	Feeders		Wire winding machine	M	Screens	
Bucket	S	Apron	M	Mills, rotary type		Air washing	S
Chain	S	Belt	M	Ball (1)	M	Rotary, stone or gravel	M
Flight	S	Disc	S	Cement kilns (1)	M	Travelling water intake	S
Oven	S	Reciprocating	H	Dryers and coolers (1)	M	Sewage disposal equipment	
Screw	S	Screw	M	Kilns other than cement	M	Bar screens	S
Conveyors - heavy duty not uniformly fed		Food industry		Pebble (1)	M	Chemical feeders	S
Apron	M	Beef slicer	M	Rod, plain & wedge bar (1)	M	Collectors	S
Assembly	M	Cereal cooker	S	Tumbling barrels	H	Dewatering screws	M
Belt	M	Dough mixer	M	Mixers		Scum breakers	M
Bucket	M	Meat grinder	M	Concrete mixers continuous	M	Slow or rapid mixers	M
Chain	M	Generators - not welding	S	Concrete mixers intermittent	M	Thickeners	M
Flight	M	Hammer mills	H	Constant density	S	Vacuum filters	M
Live roll	*	Hoists		Variable density	M	Slab pushers	M
Oven	M	Heavy duty	H	Oil industry		Steering gear	*
Reciprocating	H	Medium duty	M	Chillers	M	Stokers	S
Screw	M	Skip hoist	M	Oil well pumping	*	Sugar industry	
Shaker	H	Laundry		Paraffin filter press	M	Cane knives (1)	M
Crane Drives - not dry dock		Washers - reversing	M	Rotary kilns	M	Crushers (1)	M
Main hoists	S	Tumblers	M	Paper mills		Mills (1)	M
Bridge travel	*	Line shafts		Agitators (mixers)	M	Textile industry	
Trolley travel	*	Driving processing equipment	M	Barker - auxiliaries hydraulic	M	Batchers	M
Crushers		Light	S	Barker - mechanical	H	Calenders	M
Ore	H	Other line shafts	S	Barking drum	H	Cards	M
Stone	H	Lumber industry		Beater and pulper	M	Dry cans	M
Sugar (1)	M	Barkers, hydraulic, mechanical	M	Bleacher	S	Dryers	M
Dredges		Burner conveyor	M	Calenders	M	Dyeing machinery	M
Cable reels	M	Chain saw and drag saw	H	Calenders - super	H	Looms	M
Conveyors	M	Chain transfer	H	Converting machine except cutters, platers	M	Mangles	M
Cutter head drives	H	Craneway transfer	H	Conveyors	S	Nappers	M
Jig drives	H	De-barking drum	H	Couch	M	Pads	M
Manoeuvring winches	M	Edger feed	M	Cutters, platers	H	Range drives	*
Pumps	M	Gang feed	M	Cylinders	M	Slashers	M
Screen drive	H	Green chain	M	Dryers	M	Soapers	M
Stackers	M	Live rolls	H	Fell stretchers	M	Spinners	M
Utility winches	M	Log deck	H	Fell whipper	H	Tenter frames	M
		Log haul - incline	H	Jordans	M	Washers	M
		Log haul - well type	H	Log haul	H	Winders	M
		Log turning device	H			Windlass	*
		Main log conveyor	H				
		Off bearing rolls	M				

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.

$$K = 7.5\text{kW}$$

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:-

$$\begin{aligned} K_s &= K \times f_D \times f_S \\ &= 7.5 \times 1.5 \times 1.2 \\ &= 13.5 \text{ kW} \end{aligned}$$

$$\begin{aligned} \text{Equivalent power at 100 RPM} &= \frac{K_s \times 100}{\text{RPM}} \\ &= \frac{13.5 \times 100}{1440} \\ &= 0.9375\text{kW @ 100RPM} \end{aligned}$$

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

Key Stress

1. Permissible key stress = 70N/mm²
2. Nominal torque $T_{KM} = K \times 9550 / \text{RPM Nm}$
3. Force at key $F = T_{KM} / r$
4. Shaft Rad r. metres
5. Key area $A = J \times \text{HUB length mm}$
(Obtain from relevant catalogue page).
6. Key stress $f_k = F/A \text{ N/mm}^2$
7. If resultant stress is less than 70 N/mm² key stress is acceptable.
If resultant f_k is greater than 70, consider either two keyways or extending hub length.
8. Example:

$$T_{KM} = 7.5 \times 9550 / 1440 = 49.7\text{Nm}$$

$$r = 55/2 = 27.5\text{mm} \div 1000 = 0.0275\text{m}$$

$$F = 49.7 / 0.0275 = 1741\text{N}$$

$$A = 16 \times 45 = 720\text{mm}^2$$

$$f_k = 1741 / 720 = 2.4\text{M/mm}^2$$

Selection is therefore good.

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



WARNING

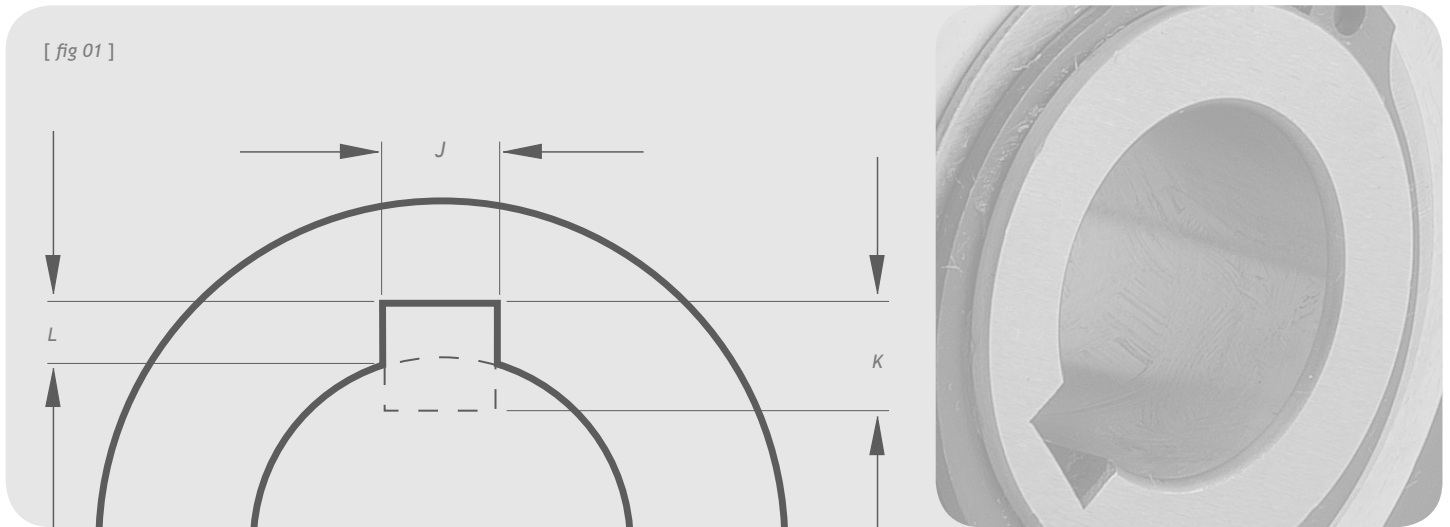
It is the responsibility of the system designer to ensure that the application of the coupling does not endanger the other constituent components in the system. Service factors given are an initial selection guide.



WARNING

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

Key and Keyway Dimensions



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)

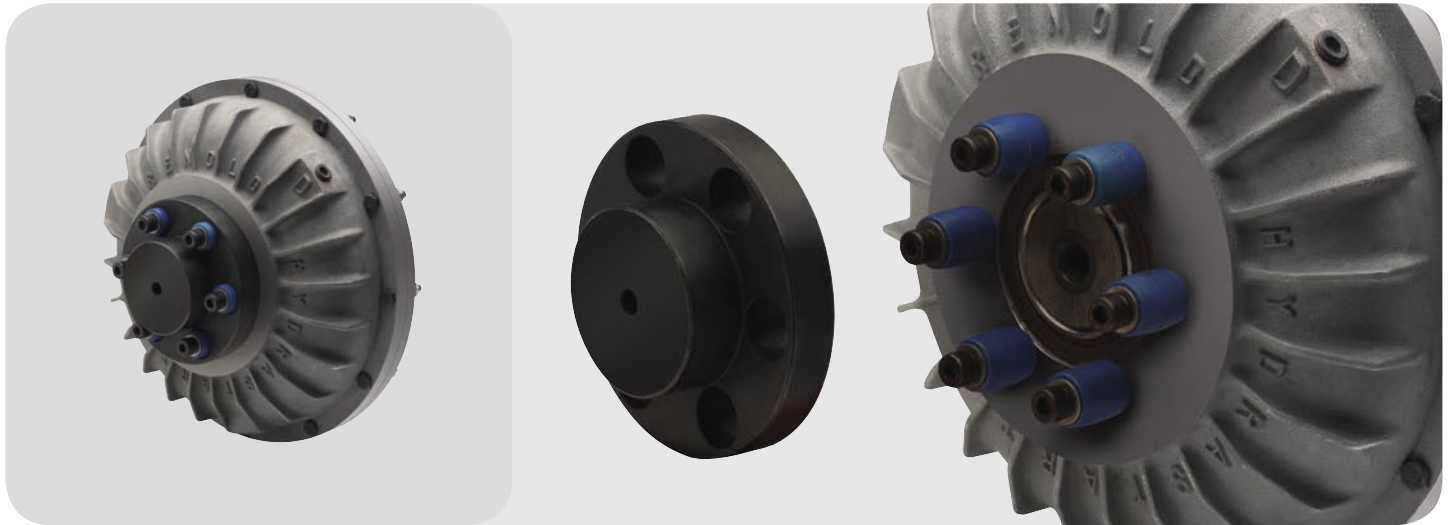
Keyways comply with BS46: Part 1: 1958

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	0.090
1.25	1.50	0.375	0.250	0.085
1.50	1.75	0.437	0.312	0.112
1.75	2.00	0.500	0.312	0.108
2.00	2.50	0.625	0.437	0.162
2.50	3.00	0.750	0.500	0.185
3.00	3.50	0.875	0.625	0.245
3.50	4.00	1.000	0.750	0.293
4.00	5.00	1.250	0.875	0.340
5.00	6.00	1.500	1.000	0.384

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

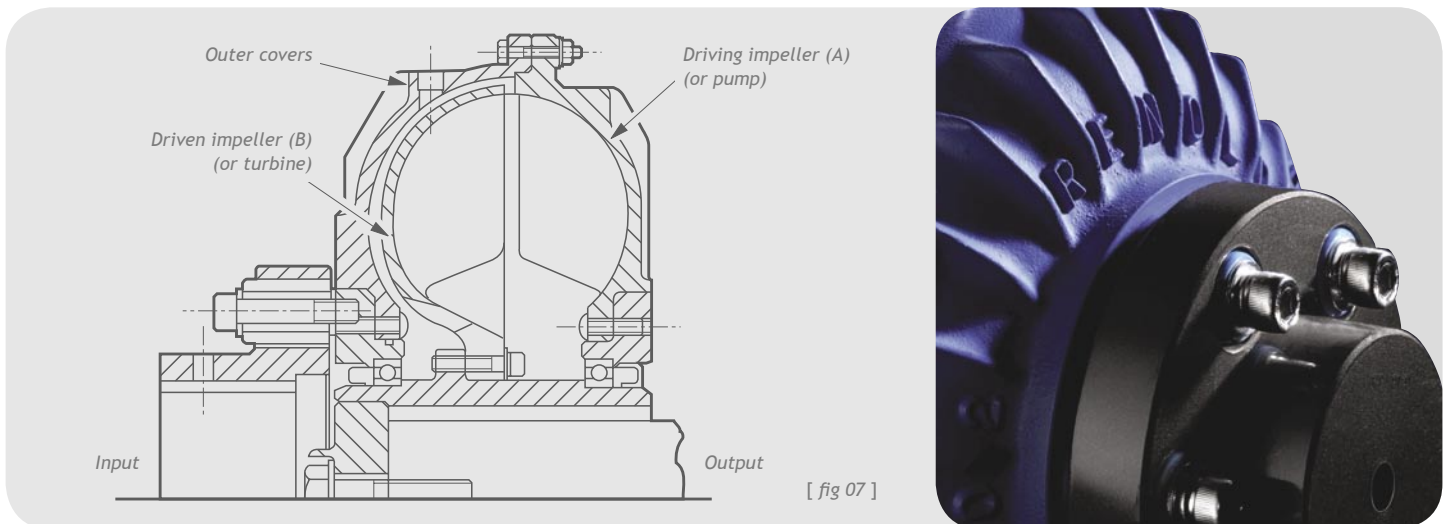
Features and benefits

- 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



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.

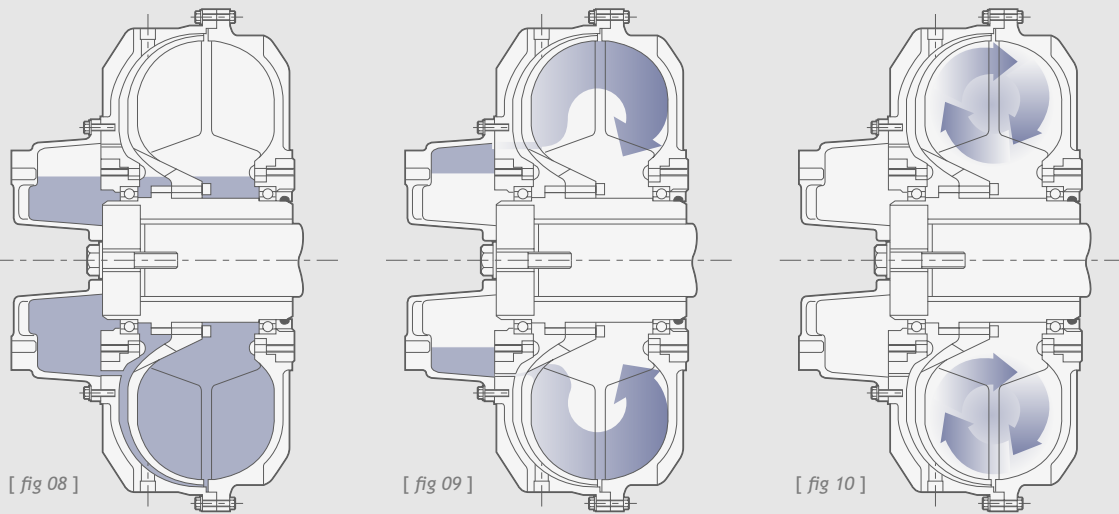
The standard drive arrangement allows the outer cover to be rotated whilst at rest to facilitate oil filling.

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

To calculate slip %

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

Delayed Fill



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

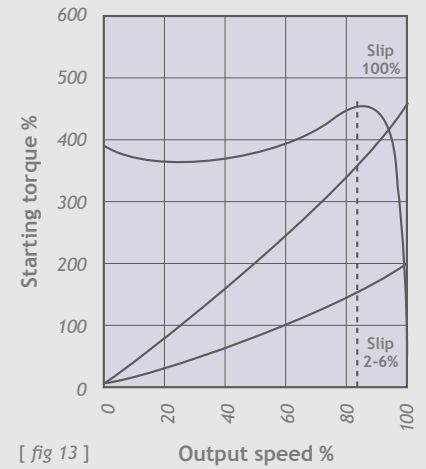
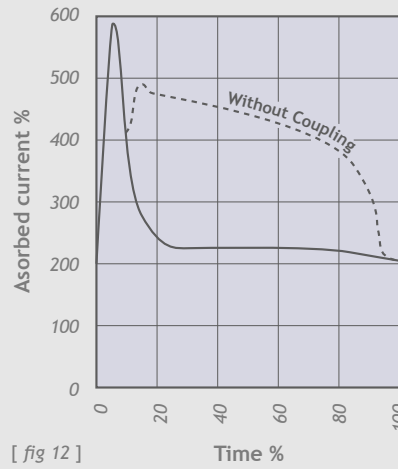
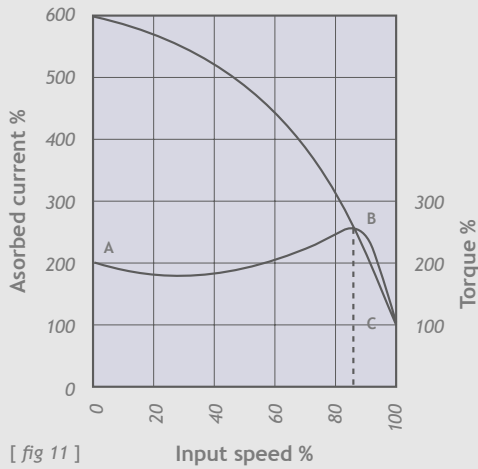
The outer case of the Hydrastart coupling can become hot during operation. Do not touch the coupling or a burn may result.



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



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

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.

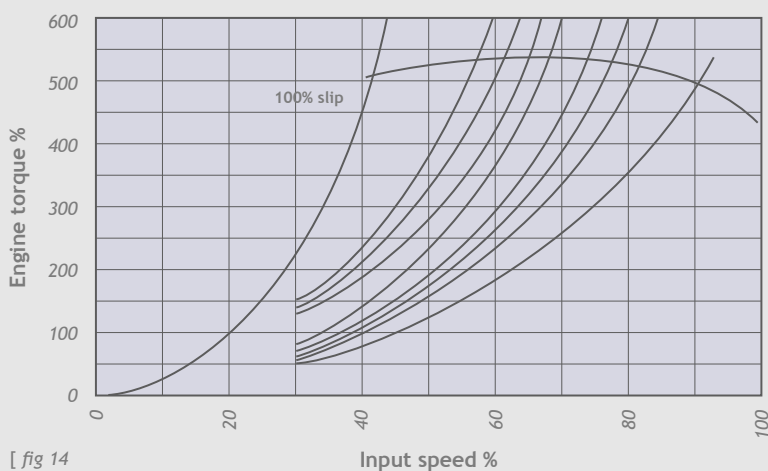
HydraStart couplings fitted on diesel engines

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.

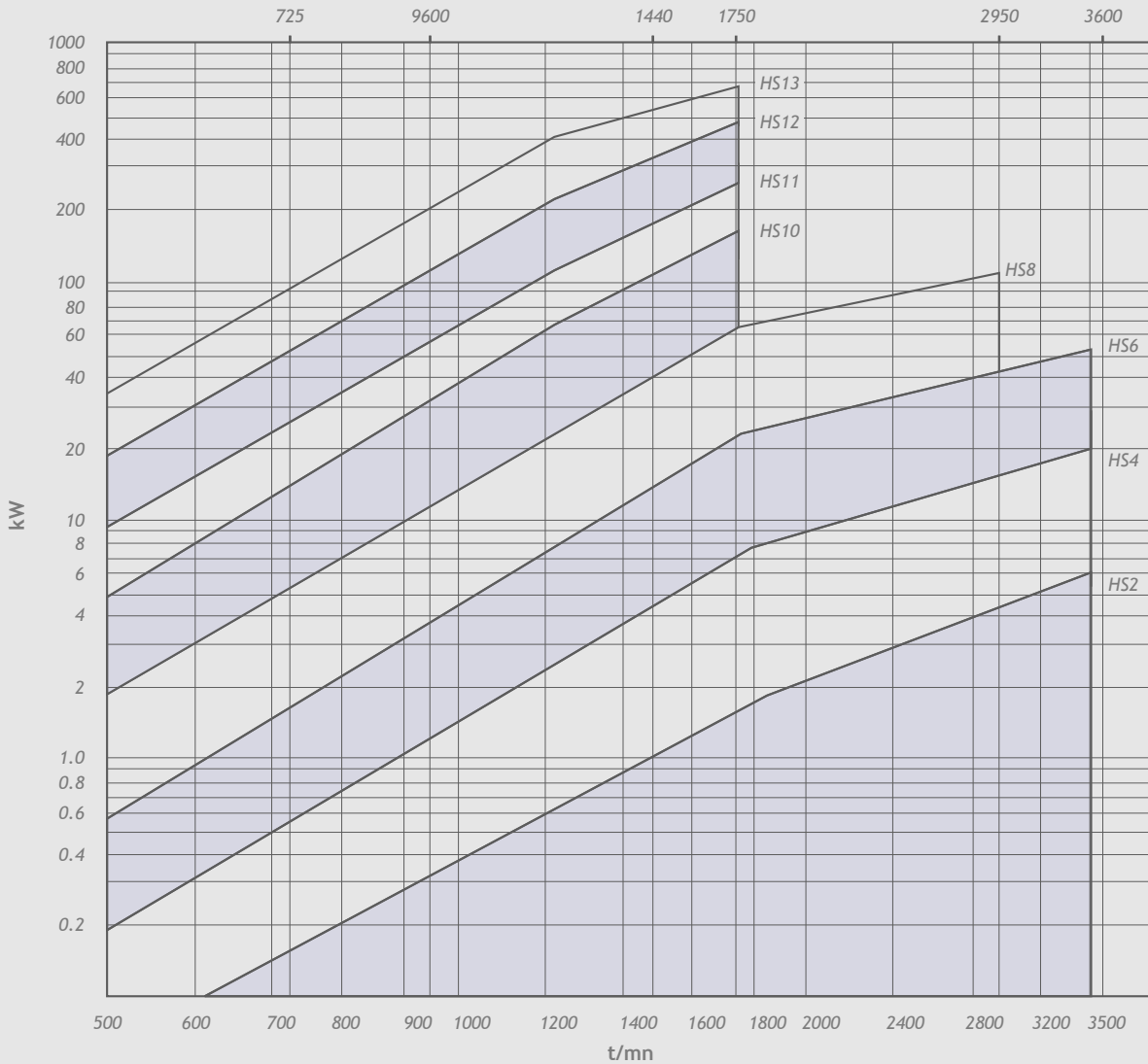
The horizontal curve represents the engine's torque curve whilst the vertical shows the torque capacity of the coupling for different slip values and speeds. As load on the driven shaft increases it demands torque, causing the coupling to slip at higher level.

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

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WARNING

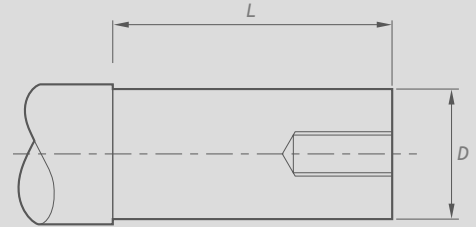
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Coupling Rating Tables

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

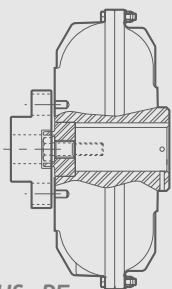
Motor			750 rpm			1000 rpm			1500 rpm			3000 rpm		
Frame Size	Shaft details		Power		Hydrastart Size	Power		Hydrastart Size	Power		Hydrastart Size	Power		Hydrastart Size
	D (mm)	L (mm)	kW	HP		kW	HP		kW	HP		kW	HP	
80	19	40												
80	19	40												
80	19	40												
90S	24	50												
90L	24	90												
100L	28	60	0.75	1										
100L	28	60	1.1	1.5	HS6									
112M	28	60	1.5	2										
132S	38	80	2.2	3										
132S	38	80												
132M	38	80	3	4	HSA									
132M	38	80												
160M	42	110	4	5.5										
160M	42	110	5.5	7.5										
160L	42	110	7.5	10										
180M	48	110												
180L	48	110	11	15										
200L	65	110	15	20										
200L	55	110												
225S	60	140	18.5	25	HS10									
225M	65	110												
225M	60	140	22	30										
250S	60	140												
250S	70	140	30	40										
250M	60	140												
250M	70	140	37	50	HS12									
280S	65	140												
280S	80	170	45	60										
280M	65	140												
280M	80	170	55	75										
315S	85	170	75	100										
315M	85	170	90	125	HS13									
315L	85	170												
315L	85	170												
315L	85	170												
355S	100	210												
355S	100	210												
355M	100	210												
355L	100	210												
355L	100	210												
355L	100	210												

Standard Available Options

Non delay fill

Description

Delay fill

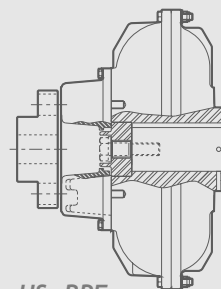


Type: HS..PF

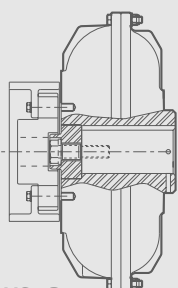
Basic coupling

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

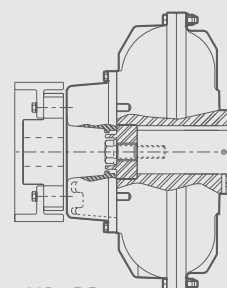


Type: HS..B

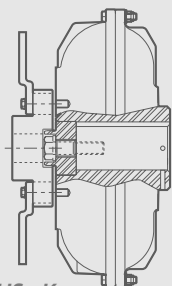
Brake drum options

Basic Pinflex coupling with the addition of a brake drum, metric or inch sizes.

Page 67



Type: HS..RB

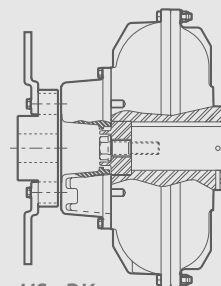


Type: HS..K

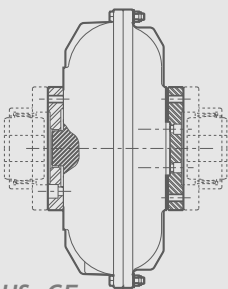
Brake disc options

Basic Pinflex coupling with the addition of a brake disc, metric or inch sizes.

Page 67



Type: HS..RK

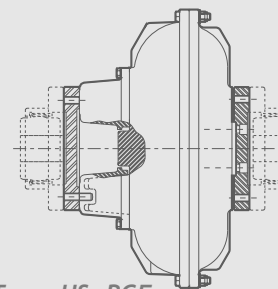


Type: HS..GF

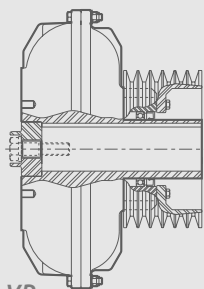
Basic coupling incorporating two Flexible Gear half couplings

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

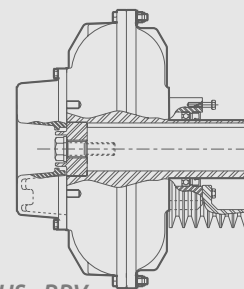


Type: HS..VP

Vee Pulley Mounting

Sleeve bored to suit motor shaft. Pulley is attached using external bolts and may easily be replaced.

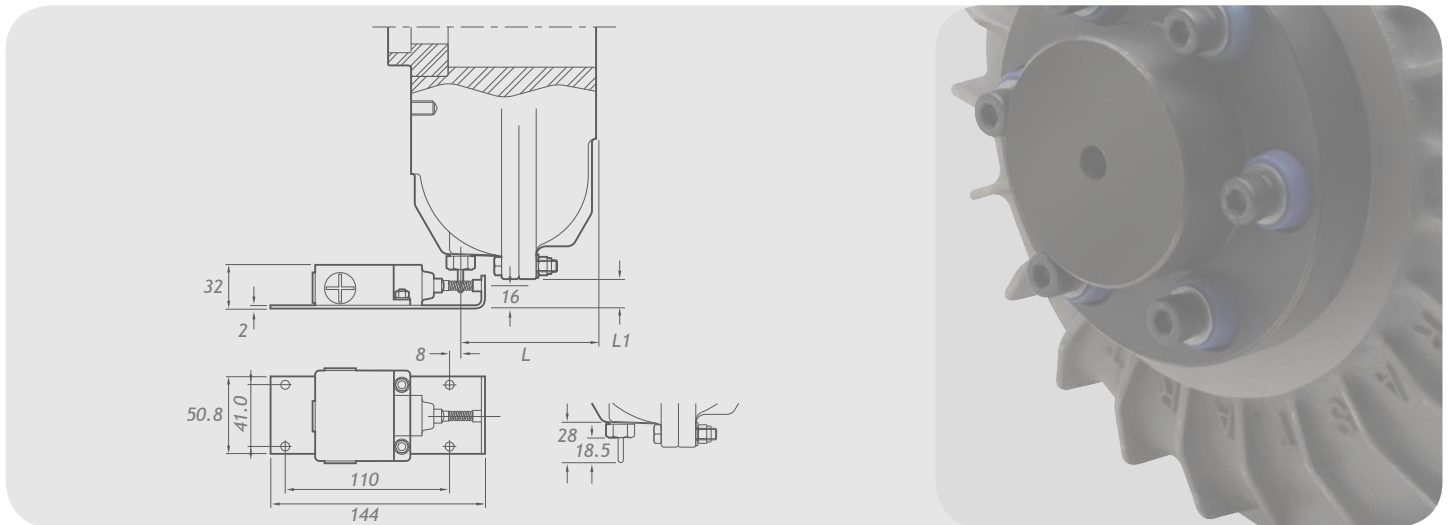
Page 69



Type: HS..RPV

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	Li
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

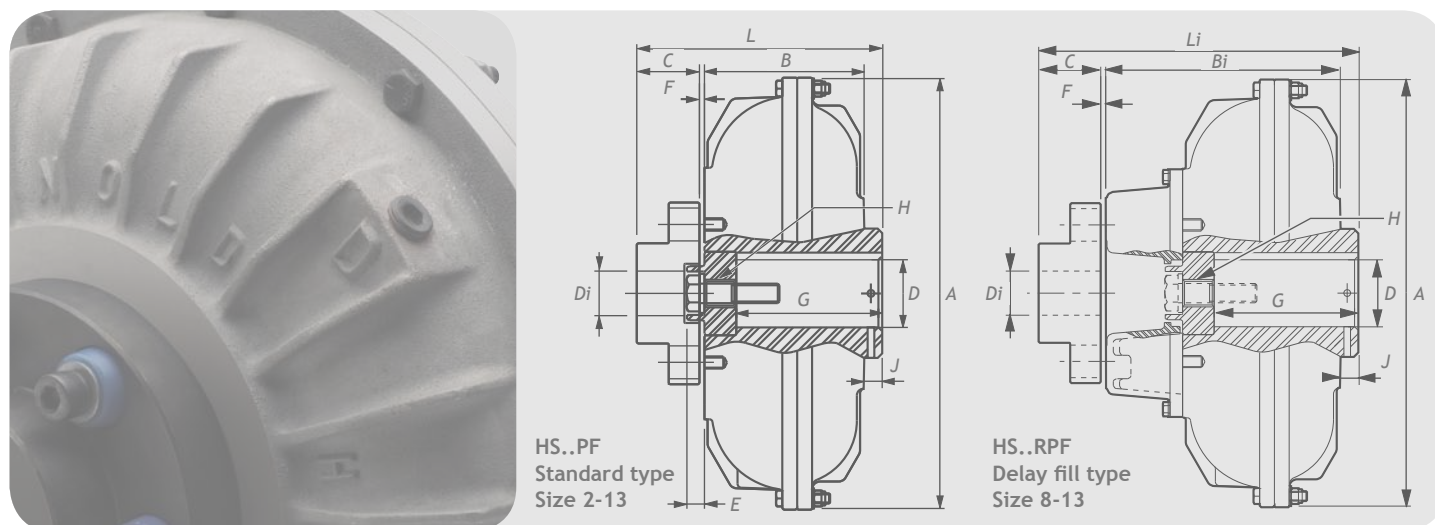
This device will trigger the limit switch if the oil temperature reaches a predetermined level without loss of oil from the coupling. Fusible trigger plug 117°C alternatively 138°C.

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)

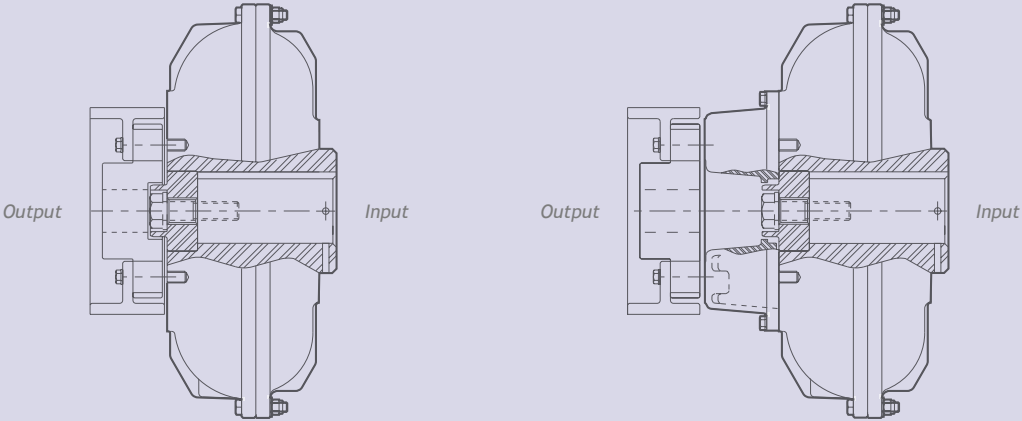


Size	A	B	Bi	C	D Max	Di Max	E	F	G*	H	J	L	Li	Pinflex Cplg Size	Weight kgs	WR ² kgm ²
HS2	229	90	-	44	29	50	13	4	80	0.625" 11 UNC	8	146	-	1	6.7	0.02
HS4	286	107	-	44	42	50	13	4	95	0.625" 11 UNC	7	162	-	1	10.9	0.06
HS6	345	130	-	50	52	55	16	5	114	0.75" 10 UNC	10	195	-	2	20.8	0.16
HS8	422	161	238	75	75	80	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

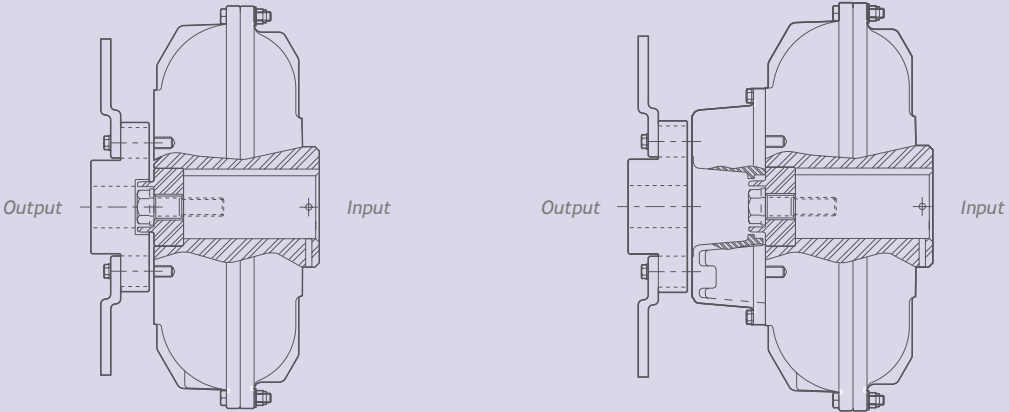
Figures in blue type relate to delay fill coupling only (sizes 8 and above).

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

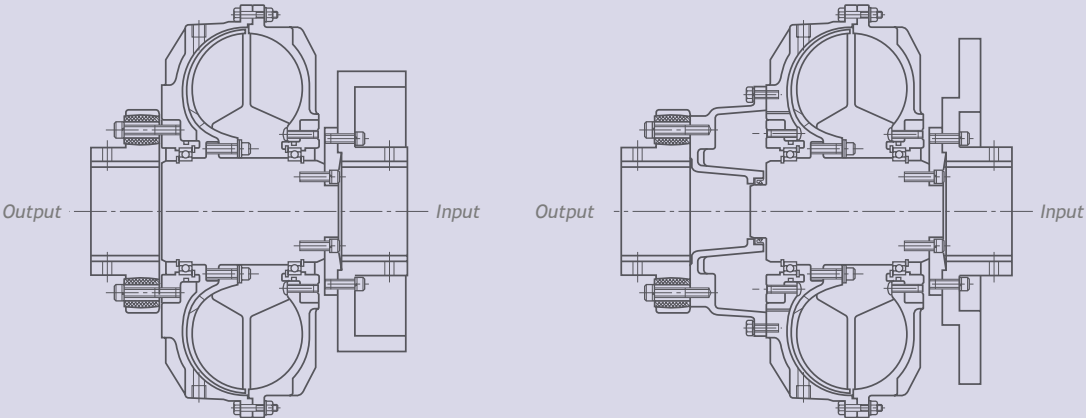
Hydrastart Pinflex Coupling - With Brake Attachment



Hydrastart Pinflex Coupling and brake drum

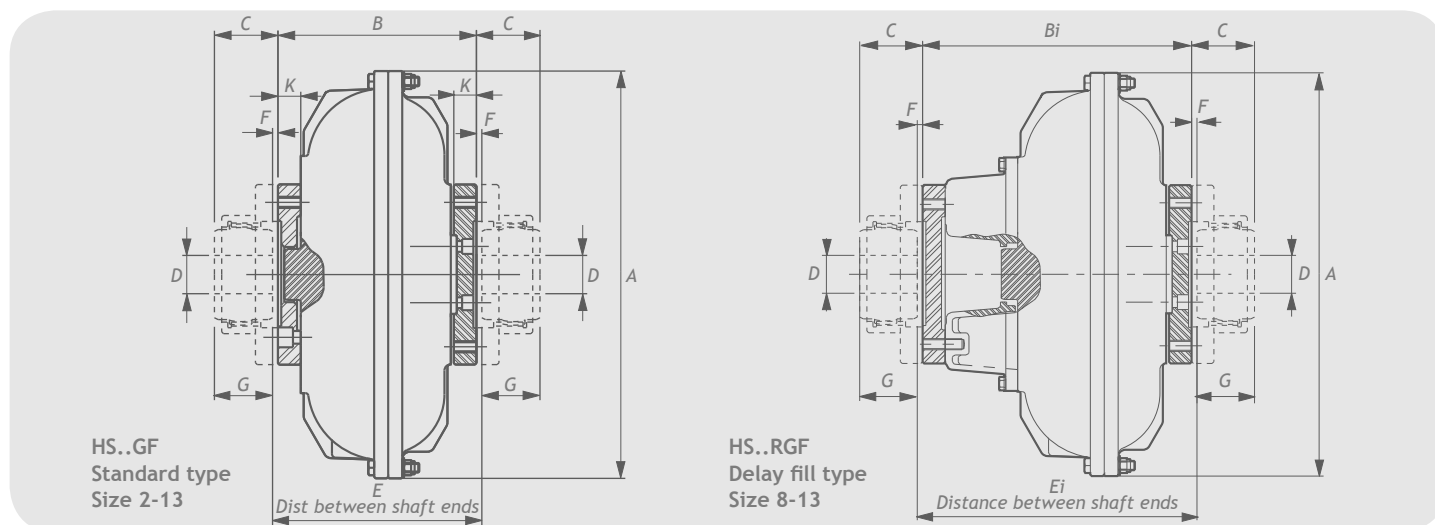


Hydrastart Pinflex Coupling and brake disc



Hydrastart Pinflex/Rigid Coupling and brake drum/disc

Hydrastart Gearflex Coupling - Dimensions (mm)

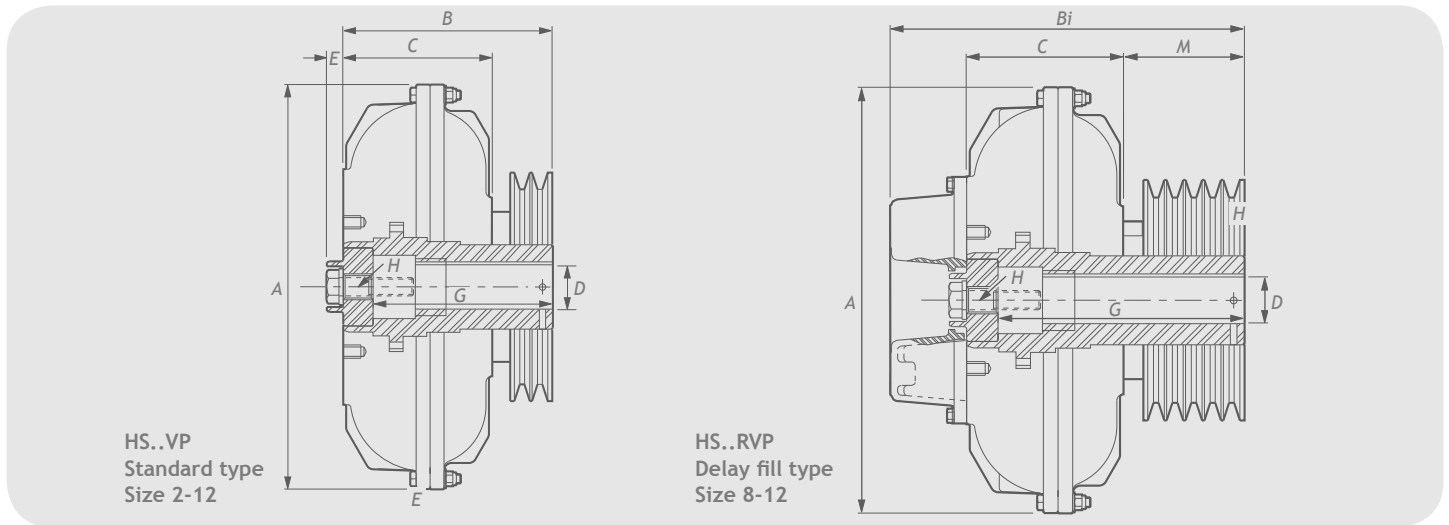


Size	A	B	Bi	C	D Max	E	Ei	F	G	K	Gearflex Cplg Size	Weight kgs	WR ² kgm ²
HS2	229	128		45	44	132		2	43	19	1	7.80	0.03
HS4	286	145		45	44	148		2	43	19	1	12.10	0.06
HS6	345	168		51	58	171		2	49	19	1.5	19.60	0.15
HS8	422	223	300	64	76	226	306	2	62	29	2	44.20	0.49
												47.00	0.51
HS10	511	252	329	94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

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

WR² value does not include gear coupling halves.

Hydrastart Pulley - Dimensions (mm)



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

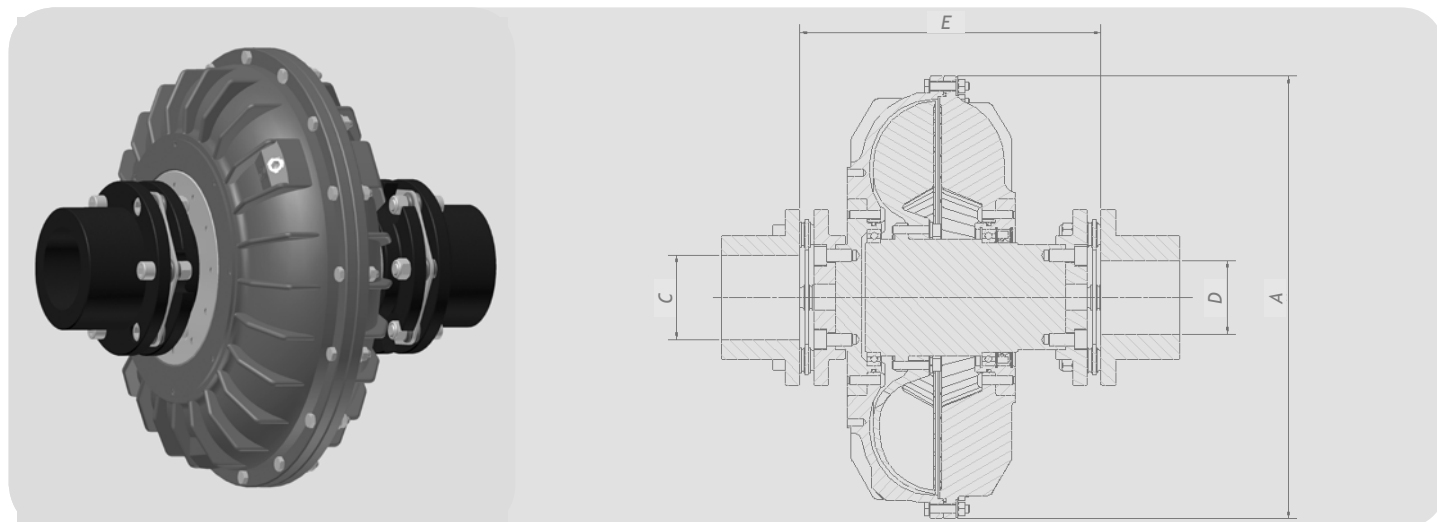
Figures in blue type relate to delay fill coupling only (sizes 8 and above).

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

WR² value does not include the pulley.

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

Hydrastart Drop-in



HS - TRC dimensions in mm

Size	A	C	D	E	Interchanges with Fluid drive FCU
HS2	279	42	35	159	7
HS4	286	42	35	165	8
HS4.5	286	48	48	194	9.25
HS6	345	48	48	210	10.5
HS6.5	345	60	60	232	11.5
HS8	422	60	60	262	12.75
HS8.5	422	80	70	287	14.5
HS10	511	80	70	335	16.25
HS10.5	511	85	83	354	17.75
HS11	580	85	83	390	20
HS12	669	110	100	457	23
HS13	751	110	100	492	26

Hydrastart interchange fluid coupling

- Interchangeable with competitors range.
- 'Drop-in' dimensions, no re-engineering needed.
- Short lead time.
- Renoldflex maintenance free steel membrane coupling.

The best range of solution chain products available anywhere



RENOLD Synergy™

- High performance
- Superior wear life
- Outstanding fatigue resistance



RENOLD Syno™

- Maintenance free
- Self-lubricating chain
- Food industry-approved lubricant



RENOLD

- Best premium chain
- Leading performance
- Solid bush / solid roller / end softened pin



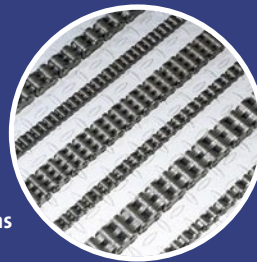
Hydro-Service™

- Superior corrosion resistant coating
- Alternative choice to stainless steel chain
- Will not chip or peel
- Hexavalent chrome-free



Steel Pin Bush Roller Chain

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



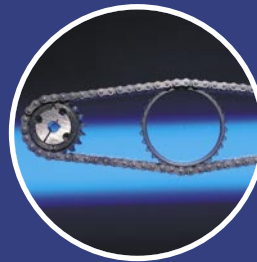
Leaf Chain

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



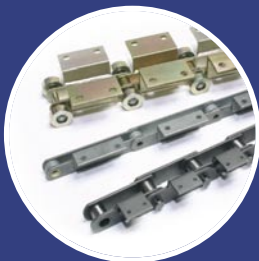
Steel Knuckle Chain

- Heavy duty, detachable elevator chains
- Integral K type attachments
- Breaking loads from 642kN to 1724kN
- Sealed joint to extend chain life



Roll-Ring™

- Revolutionary chain tensioner
- Installed in seconds and self adjusting
- Maintenance free
- Also acts as noise damper



Customised Engineering Chain

- Wide range to suit specialised applications using high specification materials and treatment processes
- Designed in close collaboration with customer



Smartlink™

- Load monitoring technology
- Technical reports & data logging

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Superior Chain Technology

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