

VARIABLE SPEED COUPLING

TK-V
KWN 29010



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Product | Engineering Services
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Technical Characteristics

Variable Speed coupling is a kind of coupling which uses liquid oil as a medium to transfer power to working machinery. It can coordinate the load distribution of multi-machine drive and the output shaft speed of constant transmission motor. It can realize the stepless adjustment of output speed under the condition of constant motor speed. It can improve the starting ability of motor, reduce impact and vibration, coordinate the load distribution of multi-machine drive, easy to realize remote control and automatic control, and saves a lot of electric energy.

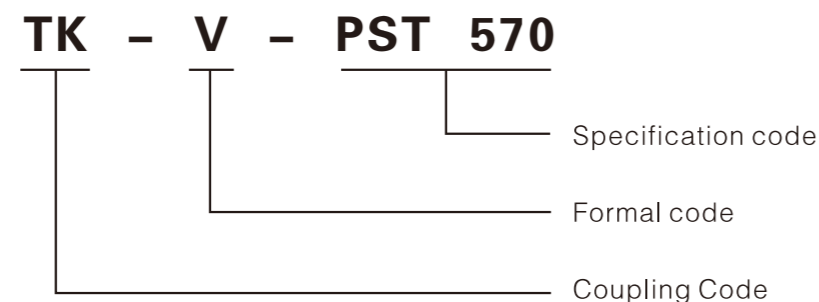
Features

1. The variable speed coupling can continuously and steplessly adjust the speed of the driven machinery without changing the speed of the prime mover. When it is matched with centrifugal fan and water pump, its speed governing range is 1-1/4, and when it is matched with piston-type machinery, its speed governing range is 1-1/3.
2. The variable speed coupling can start the motor without load. It does not need to select the motor with excessive power margin capacity and other prime movers, and can reduce the fluctuation of the load of the power grid.
3. The variable speed coupling has the performance of overload protection.
4. Isolate vibration and reduce shock.
5. There is no direct mechanical contact between the transmission parts of the variable speed coupling, and the service life is long.
6. The variable speed coupling has higher transmission efficiency under rated load.
7. The variable speed coupling has hydraulic control variable speed device and two half-axes, which is easy to realize long-distance automatic operation.

Application

Electricity, such as fans and pumps; material handling, such as mud pumps and conveyor belts; chemical pumps, fans, mixers, centrifuges; heating, such as circulating pumps; cement, such as fans and material conveyors; smelting, such as fans, pumps and crushers.

Designation



PST type

The type PST Fluid Coupling, give the engineer an efficient, simple and reliable mechanical means of controlling the speed of the driven machine. At the same time the coupling allows the use of comparatively low cost constant speed squirrel cage motors. In addition, this offers the advantage of no load start, smooth and progressive acceleration and protection from shock loads. PST Fluid Couplings are suitable for the wide range of power transmission (15 KW to 11000 KW).

The rotating components, are contained in a steel fabricated box and are well supported in anti-friction bearings. e.g. ball, roller, angular contact ball bearings etc. The fabricated box is of robust design and manufactured from structural steel duly stress relieved, which is leak tight and capable to withstand extreme temperatures, enables this type of fluid coupling to be used in open installations.

Movement of the external controls varies the position of scoop tube controlling the speed of the output shaft. Automatic or remote controls can be readily applied.

PST Fluid Couplings are suitable to drive centrifugal machines (fans, pumps etc.) in which output speed may vary over a range of 5:1 ratio. For positive displacement and constant torque drives like pumps, compressors, rotary dryer's conveyors and crushers etc. can be used for constant speed or speed can be varied in the range of 3:1 ratio.

Standard Accessories

- Temperature & Pressure Gauges
- Temperature & Pressure Switches
- Self driven oil circulation pump or simplex type motor driven oil pump

Optional Accessories

1. Actuator

- Rotary electrical actuator
- Pneumatic actuator with position transmitter, (I to P converter can be supplied as an option)

2. Heat Exchanger

- Shell & Tube type heat exchanger (simplex or duplex).
- Air radiator type Heat exchanger

3. Oil Circulation Pump

- Motor driven oil circulation pump can be supplied in duplex form, alternatively.
- Self driven oil circulation pump along with motor driven oil circulation pump

4. Local push button panel with provision for remote station

5. Transmitter for Temp., Pressure, Flow & Speed Signal communication for PLC operation

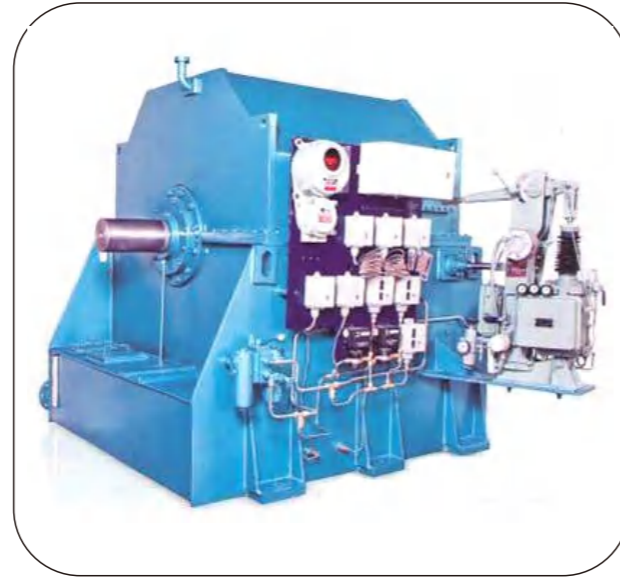
6. Connecting couplings of various types

Variable Speed Fluid Couplings Type 'PST' Size 370 to 1320

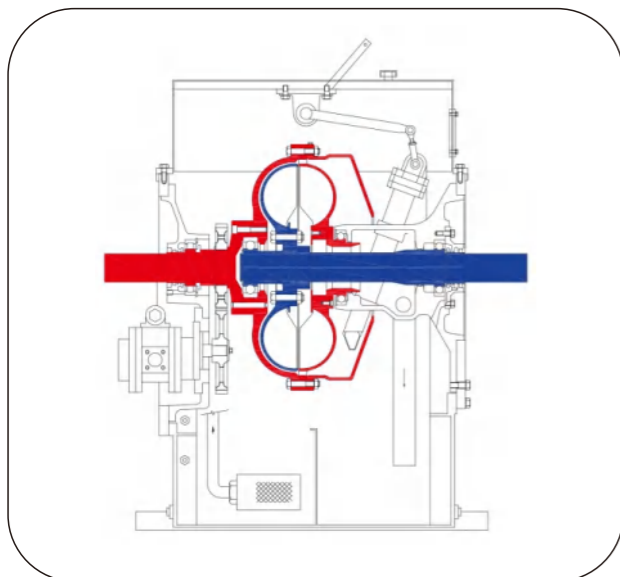
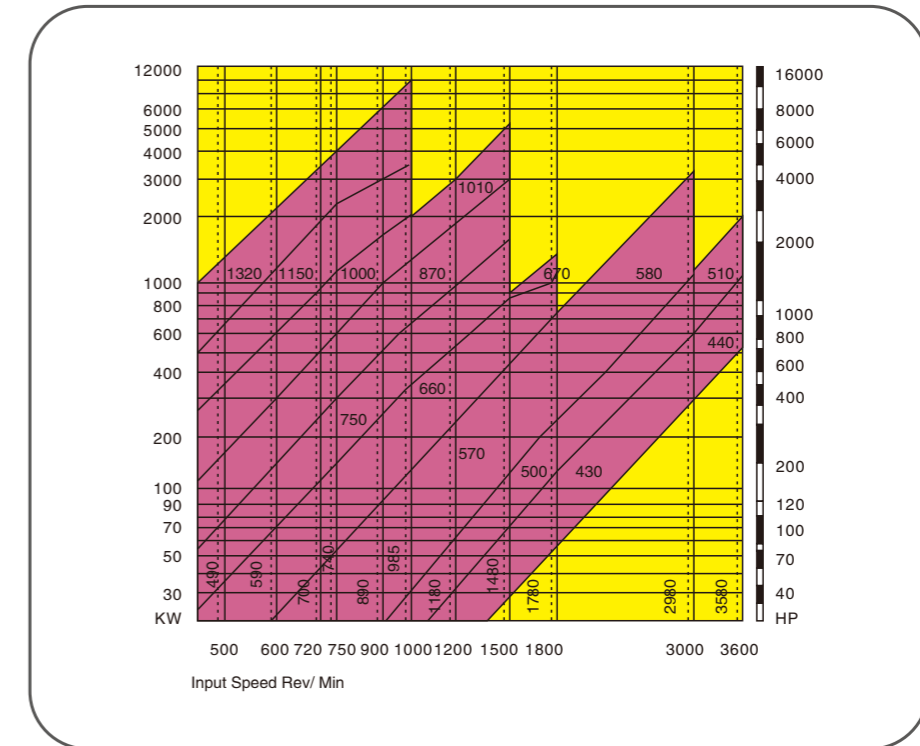
Selection Curve



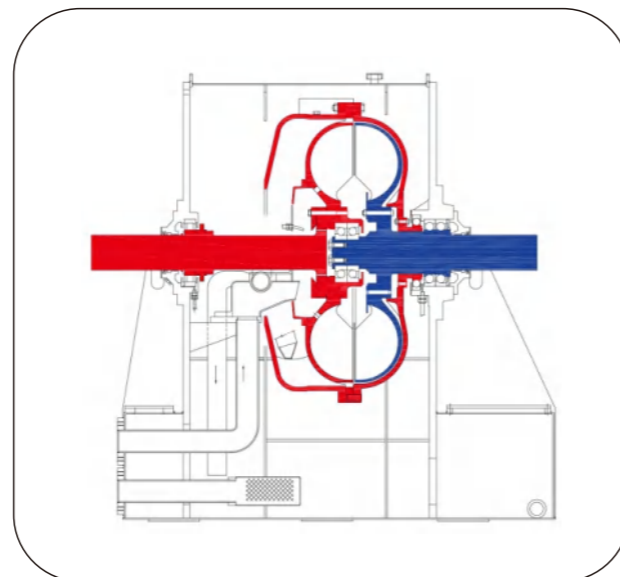
Size 370-750



Size 870-1320



Size 370-750

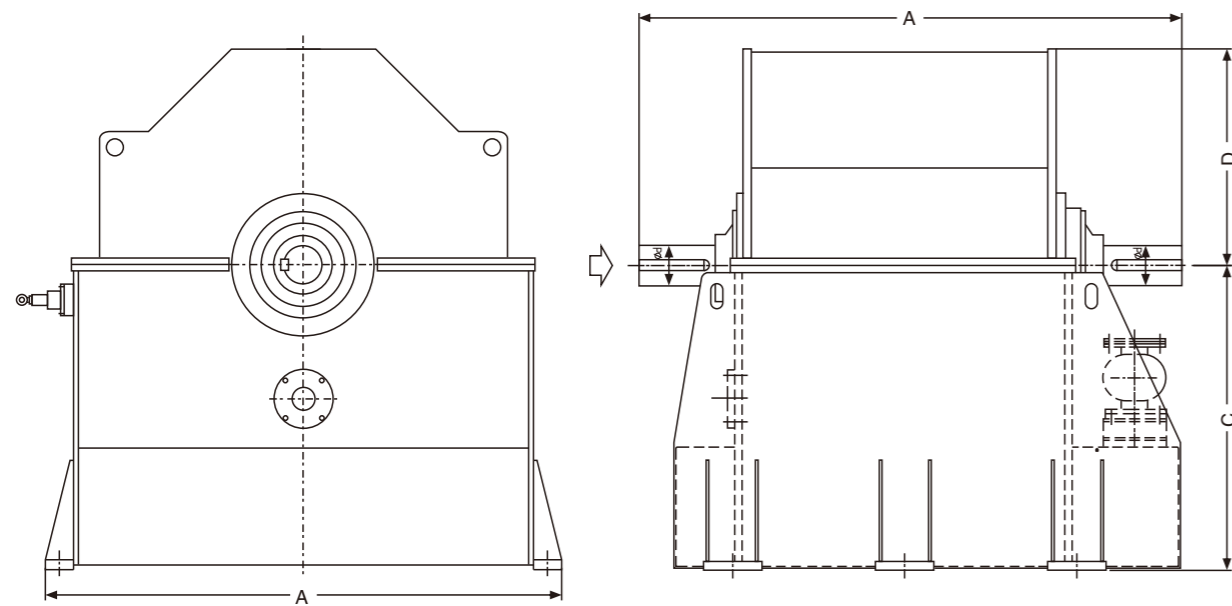


Size 870-1320

Selection Data

| Size | Maximum power(KW) under the speed | | | | | | | | |
|------|-----------------------------------|------|------|------|-------|------|------|------|------|
| | 500 | 600 | 750 | 900 | 1000 | 1200 | 1500 | 1800 | 3000 |
| 370 | | | | | | | 80 | 130 | 465 |
| 430 | | | | | | | 140 | 235 | 800 |
| 500 | | | | | | 140 | 275 | 450 | 1600 |
| 530 | | | | | | 185 | 380 | 570 | 2050 |
| 570 | | | | | 160 | 275 | 505 | 680 | 3190 |
| 660 | | | | 225 | 310 | 510 | 975 | 1340 | |
| 750 | | 140 | 260 | 445 | 615 | 960 | 1650 | | |
| 870 | 160 | 280 | 650 | 885 | 1250 | 1735 | 2725 | | |
| 1000 | 315 | 555 | 1210 | 1575 | 1975 | 2850 | 5570 | | |
| 1150 | 635 | 1105 | 2090 | 2750 | 3700 | | | | |
| 1320 | 1380 | 2305 | 4230 | 7165 | 11000 | | | | |

PST Major Dimensions



PST Technical Parameter Table

All sizes in mm are shown in the table below.

| Size | A | B | C | D | d | W | Q | GD ² (in kg m ²) | |
|------|------|------|------|-----|-----|------|------|--|------|
| | | | | | | | | 1 | 2 |
| 370 | 810 | 925 | 485 | 350 | 55 | 470 | 105 | 12.9 | 5.8 |
| 430 | 900 | 1020 | 560 | 400 | 63 | 545 | 140 | 13.6 | 6.3 |
| 500 | 1020 | 1240 | 635 | 470 | 75 | 685 | 270 | 14.7 | 7.3 |
| 530 | 1020 | 1240 | 635 | 470 | 75 | 765 | 270 | 27.1 | 7.3 |
| 570 | 1085 | 1200 | 740 | 490 | 75 | 820 | 270 | 34.4 | 7.5 |
| 660 | 1085 | 1200 | 740 | 490 | 75 | 920 | 270 | 43.5 | 7.9 |
| 750 | 1270 | 1250 | 810 | 544 | 95 | 1100 | 355 | 73.5 | 14.4 |
| 870 | 1600 | 1440 | 850 | 575 | 130 | 2250 | 500 | 268 | 38.5 |
| 1000 | 1890 | 1800 | 1060 | 750 | 140 | 3500 | 950 | 455 | 46 |
| 1150 | 1990 | 1800 | 1060 | 750 | 160 | 4150 | 950 | 807 | 101 |
| 1320 | 2440 | 2020 | 1400 | 830 | 190 | 7550 | 1600 | 920 | 140 |

W – Approx total dry weight of unit (kgs)
d – Diameter of input & output shaft
2 – Of secondary part (output side)

Q – Approximate max.Oil quantity (liters)
1 – Of primary parts (input side)

PSV Type

The Premium fluid coupling type PSV is electrically Solenoid valve Operated drain type coupling. These couplings are suitable for flange mounting on internal combustion engine which has Inbuilt SAE housing & flywheel.

Engine power is transmitted smoothly through the flowing oil from input elements to output elements. PSV coupling is act as soft starter when oil is progressively filled into working circuit thereby System in " Drive Engage" condition for power transmission. When oil is drained out of the peripheral fitted controlled Nozzles and Oil flow diverted to Sump, then system act as"Drive Dis Engage" condition & No power transmission takes place.

Hence Fluid coupling acts as Non wearing type hydraulic clutch.

Operation

PSV coupling is fitted between Engine & driven machine in which the input & output are fully supported with antifriction bearings. The rectangular housing is of simple design of sufficient capacity to contain oil with rotating parts. Oil in the systems is filled by oil feed pump & controlled by Solenoid valve which are mounted on stationary housing.

Main rotating component are as below.

Input: flexible coupling, Impeller, Casing, Input shaft.

Output: Runner, Output shaft, Output Hub.

The Impeller, Runner & Casing are of high tensile aluminum castings. Both the runner & impeller have large number of straight radial vanes. Input side is provided with elastic coupling for flange connection with engine in order to take care of misalignment of drive system and cylinder to cylinder fluctuation from the Engine.

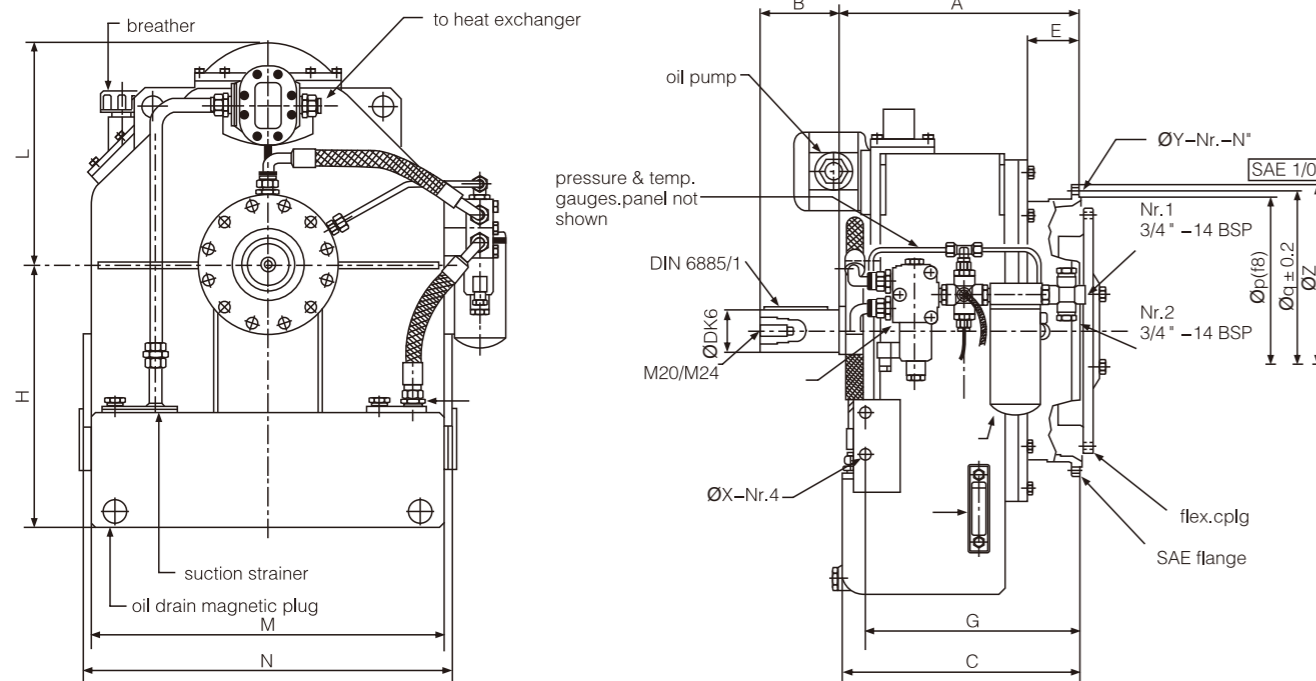
Output shaft is provided with parallel straight form with key for mounting of "V" pulley when right angle drive is required. Or Inline transmission thro flexible coupling.

Inline filter is provided of spin-off type or Cartridge type having 25 micron filtering capacity. Level gauge is provided on housing for indication of oil level in coupling. Solenoid valve assembly is fitted on coupling body to feed/drain the oil in close loop system. These valves can be mounted on Left side or Right side of Fluid cplg Sump. Orifice nozzles are fitted on impeller flange to escape oil from working circuit. When 24 VDC single solenoid valve is operated, then pump oil flow is diverted to oil pump. In this condition, working circuit of fluid coupling is empty thereby drive is in Disengage condition Necessary provision has been kept for bearings lubrication. When power supply is off, oil is fed to working circuit & cplg is in "Engage Condition". Based on application requirement, Coupling output side can be Connected in two types.

1)Directly to driven machine by using suitable connecting flexible coupling for Inline power transmission OR.

2)To transmit power in 90 deg orientation from output, Incorporate suitable "V" pulley with belt drive. The radial forces are not to exceed than specified values. Connect Heat exchanger by using suitable hose pipes. Heat Exchanger's inlet to be connected to oil circulation pump delivery line and outlet to valve adaptor .Instruments for Temp, Pressure & solenoid valve are to be connected with required supply.

PSV Major Dimensions



PSV Technical Parameter Table

All dimensions in the following table are in mm

| Size | A | B | C | ΦD | E | G | H | L | M | N | W1 | W2 | Q | ΦX | ΦY | N" | ΦP | ΦQ | ΦZ | SAE | Flexible Coupling Model |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|----|----|----|--------|--------|-------|-----|-------------------------|
| 480 | 455 | 150 | 450 | 80 | 98 | 406 | 500 | 420 | 670 | 700 | 310 | 340 | 35 | 20 | 12 | 12 | 511.17 | 530.22 | 552.0 | 14 | AC 5 |
| 530 | 517 | 180 | 512 | 100 | 105 | 458 | 600 | 480 | 820 | 860 | 475 | 540 | 65 | 21 | 12 | 12 | 511.17 | 530.22 | 552.0 | 14 | AC 6 |
| 610 | 583 | 180 | 502 | 100 | 95 | 448 | 600 | 526 | 820 | 860 | 560 | 695 | 70 | 24 | 12 | 12 | 511.17 | 530.22 | 552.0 | 14 | AC 7 |
| 710 | 710 | 220 | 605 | 115 | 123 | 550 | 675 | 610 | 890 | 940 | 830 | 920 | 93 | 27 | 13 | 16 | 647.7 | 679.0 | 710.0 | 18 | AC 7 |

| Size | 960 | 1170 | 1440 | 1750 | 1950 | 2200 | 2600 |
|------|-----|------|------|------|------|------|------|
| 480 | 80 | 105 | 180 | 290 | 320 | 350 | 415 |
| 530 | 115 | 165 | 250 | 415 | 450 | 495 | — |
| 610 | 180 | 245 | 330 | 575 | 630 | 680 | — |
| 710 | 245 | 330 | 627 | 1080 | — | — | — |

W1- dry weight (kg)
W2- total weight (kg)
Q- Roughly oil amount (L)
Standard supply scope:
Two position two way solenoid valve
Oil cleaner
Oil pump (with suction tubing)
Valve connection & lubrication hose

SCR Type

There are three types of SCR hydraulic couplings: 25B, 24X and 25W. When it is installed between the constant speed motor and the driven equipment, it can be used in many different ways according to the needs of special applications.

Scoop control hydraulic coupling will provide:

Stepless variable output speed. When using a constant speed motor, the speed range of the centrifugal pump and fan exceeds 5:1 and will reach 3:1 under continuous torque.

Torque controlling during acceleration under high inertia load. The start of a belt conveyor is a good example.

Combination and separation in continuous operation of motor drive, for example: Descaling pump in steel mill.

The 25B type input and output shafts will provide complete support. This structure makes initial installation easy and fast, at the same time, it's suitable for the follow-up substrates placement.

The SCR structure is also suitable for manual control, remote control and automatic control, and can provide a complete range of actuators in most type, such as pneumatic, hydraulic, or electric, while the special controls are suitable for specific applications such as belt conveyor drive, fan, crusher, etc.

Operation

The output speed of the hydraulic coupling must be changed by changing the oil volume in the circuit. It means that when working between the driving wheel and the impeller, the oil in the circuit is spilled through the centrifugal force effect of the small oil discharge nozzle on the hub in the internal housing, and forms a circle in the rotary oil tank cover.

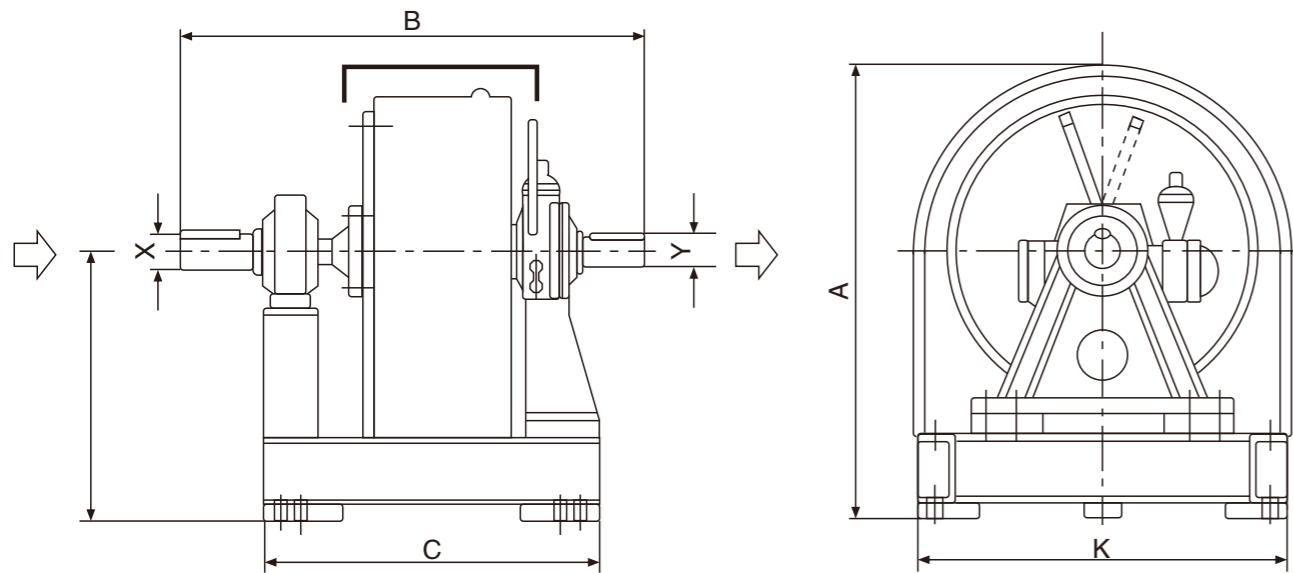
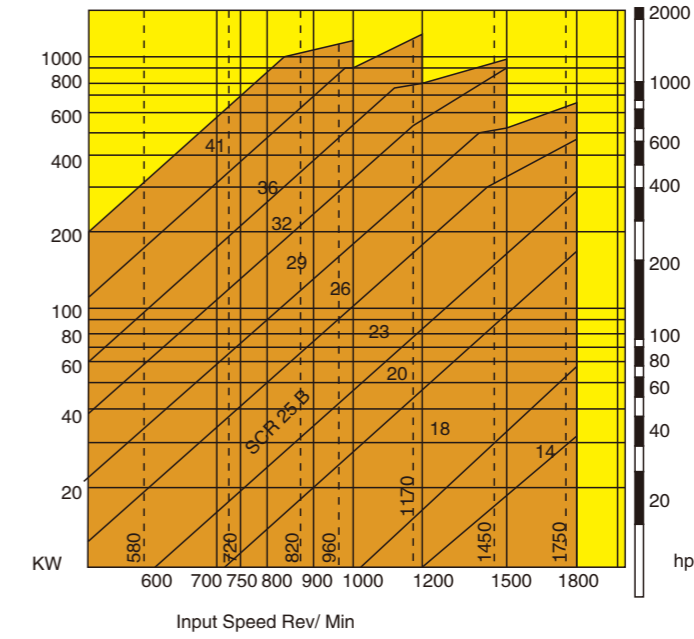
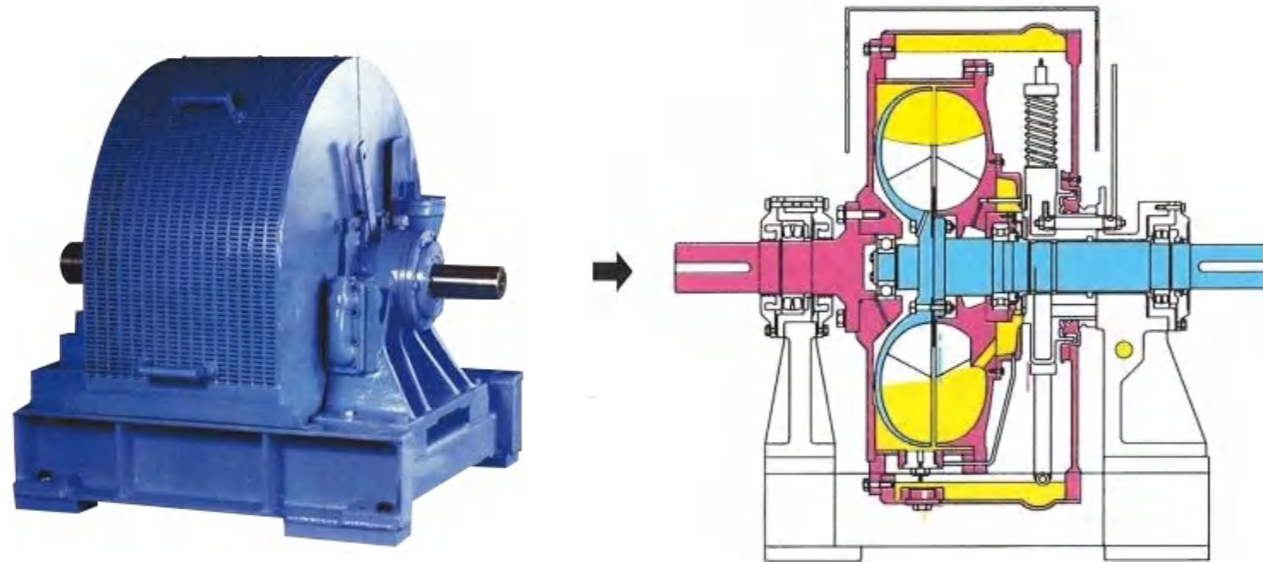
The top of the hollow scoop tube receives the oil from the rotary ring, and after external cooling, it flows back to the circuit. If necessary, the amount of oil retained in the circuit can be adjusted through the radial position of the top of the scoop tube. When the mechanism is in operation, the position of the scoop tube can be adjusted by the external control lever on the scoop housing bracket and then the output speed or transfer torque will be changed.

Structure

The main rotating housing of the hydraulic coupling is composed by two parts of steel structure and is bolted to the input end. Its impeller and driving wheels are casted in aluminum alloy, and they transfer power through the oil cycle. The internal bearings are set to ensure that the hydraulic coupling doesn't produce external hydraulic striking. The scoop tube is supported by a fixed cast iron bracket, usually installed on the plate. This design of the hydraulic coupling provides semi-flexible input and output installations, the weight of the rotating parts is supported by the shaft of the motor and the shaft of the device being driven, and the holes and keyways of the input and output semi-couplings are customized. The SCR25B structural unit has 9 sizes that can be used and the power can reach 1550KW. And SCR25W structural unit has 10 sizes available and the power can reach 2760KW. There are 10 sizes of SCR24X structural units, and the power can reach 2780KW.

SCR Type 25B Outline Structure

SCR Type 25B Selection Graph

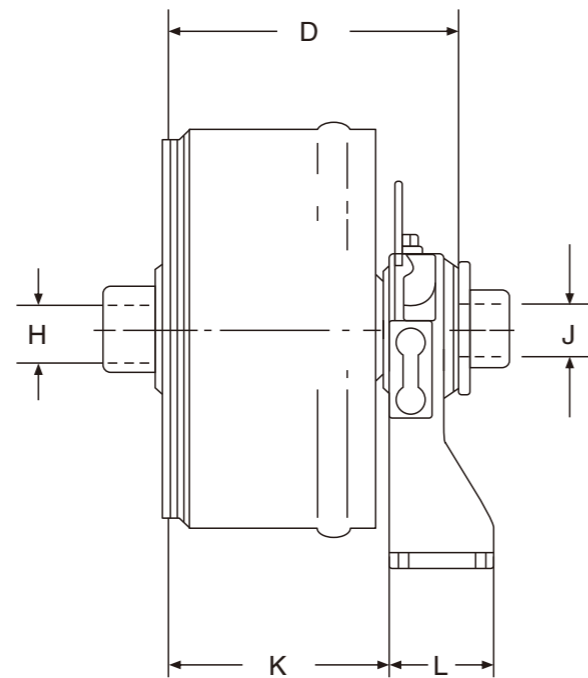
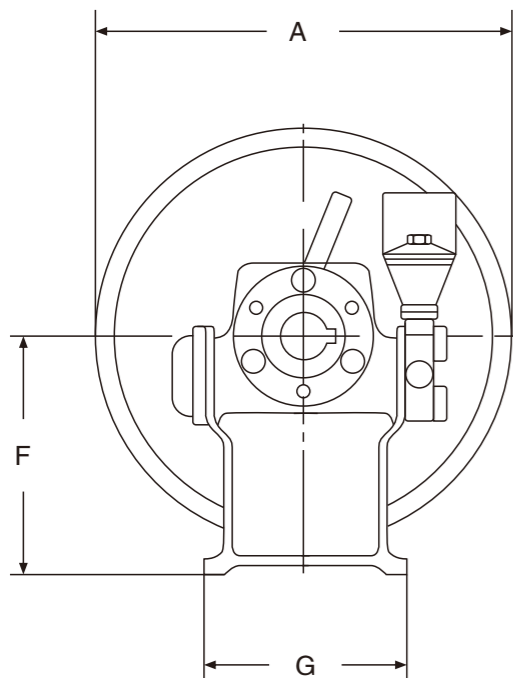
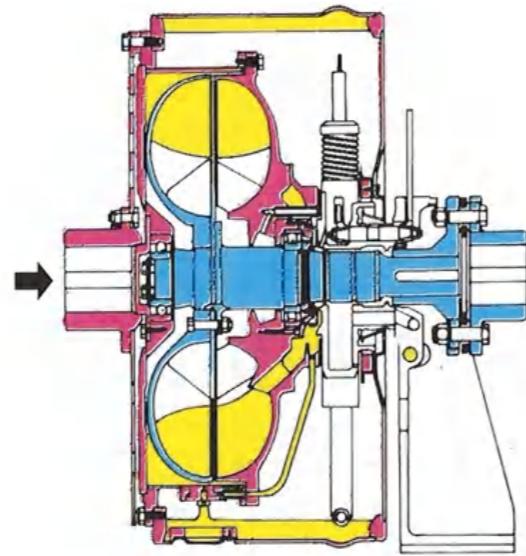


SCR Type 25B Technical Parameters

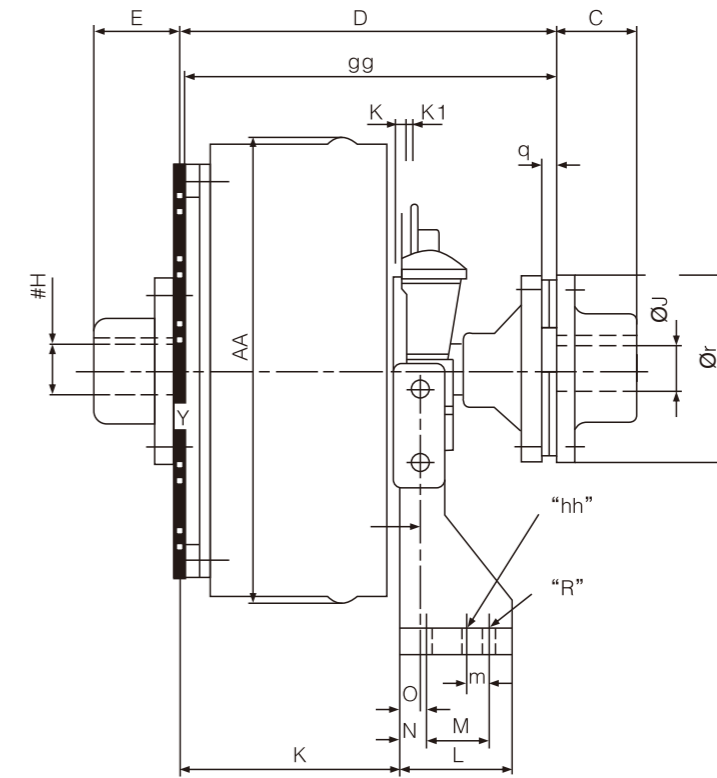
The following units are in mm

| Type | A | B | C | Y | H | X | Total without oil (in kgs) | Oil Quality | K |
|------|------|------|------|-----|-----|-----|----------------------------|-------------|------|
| 14 | 735 | 711 | 641 | 48 | 482 | 55 | 267 | 14 | 735 |
| 18 | 735 | 891 | 648 | 55 | 355 | 70 | 293 | 16 | 745 |
| 20 | 735 | 891 | 648 | 55 | 355 | 70 | 328 | 21.6 | 745 |
| 23 | 948 | 1078 | 818 | 70 | 465 | 85 | 501 | 31.8 | 930 |
| 26 | 948 | 1078 | 818 | 70 | 465 | 85 | 557 | 47.5 | 930 |
| 29 | 1170 | 1377 | 1033 | 85 | 570 | 110 | 1134 | 86 | 1200 |
| 36 | 1321 | 1576 | 1205 | 110 | 636 | 150 | 2147 | 123 | 1270 |
| 41 | 1461 | 1640 | 1270 | 110 | 711 | 150 | 2421 | 184 | 1470 |

SCR Type 24X Outline Structure



SCR Type 24X Outline Structure

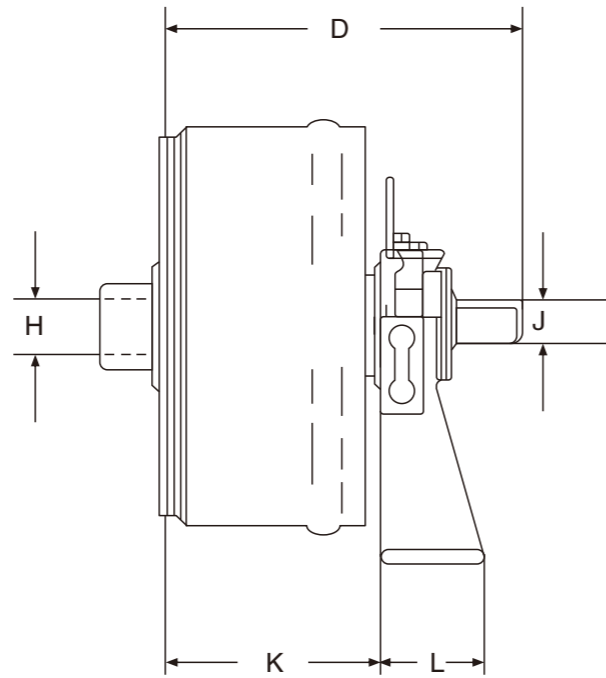
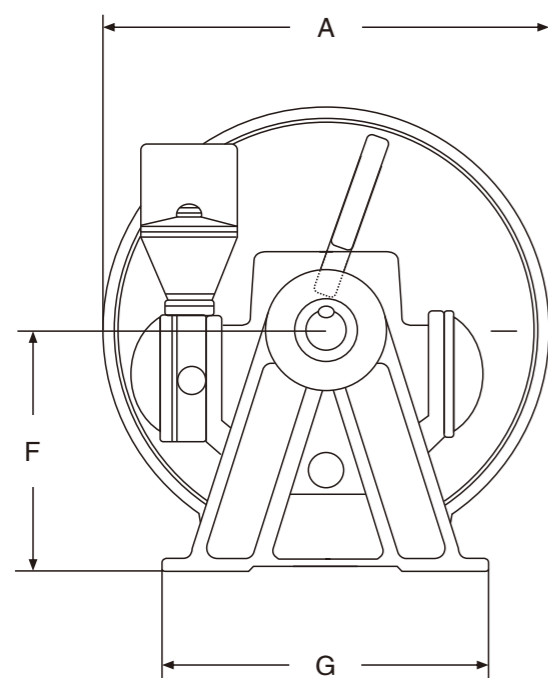
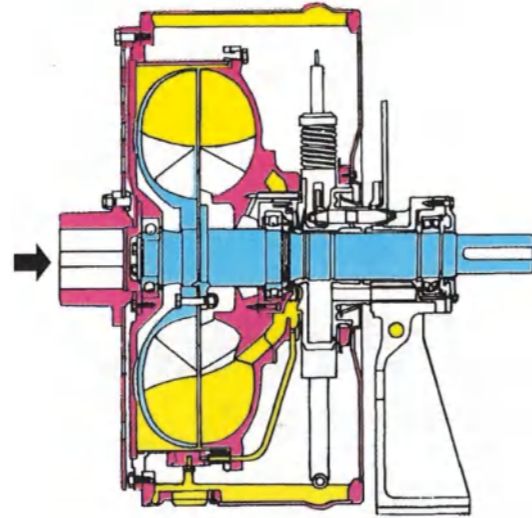


SCR Type 24X Technical Parameters

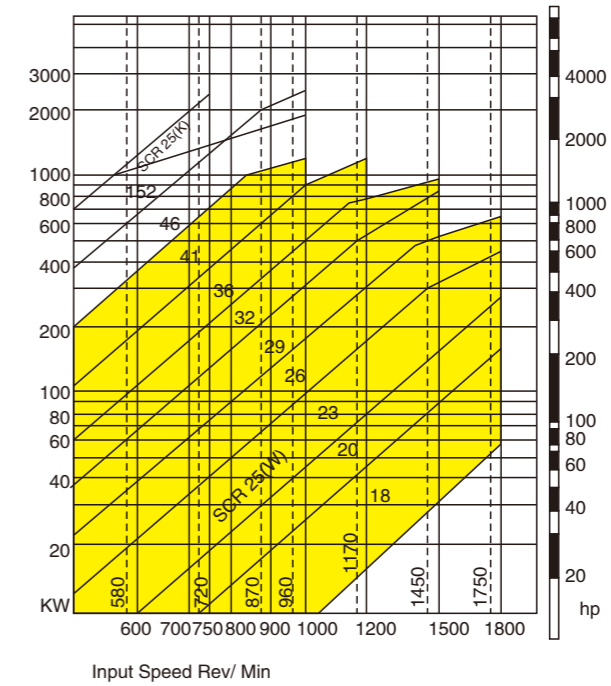
The following units are in mm

| Size | A | C | D | E | F | G | H | J | K | L | Q(L) | ML(kg) |
|------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|--------|
| 18 | 629 | 95 | 492 | 89 | 355 | 324 | 85 | 100 | 321 | 152 | 16 | 215 |
| 20 | 692 | 95 | 508 | 89 | 355 | 324 | 85 | 100 | 337 | 152 | 21.6 | 258 |
| 23 | 789 | 114 | 616 | 114 | 457 | 387 | 110 | 125 | 406 | 190 | 31.8 | 412 |
| 26 | 891 | 114 | 854 | 114 | 457 | 387 | 110 | 125 | 445 | 190 | 47.5 | 479 |
| 29 | 1018 | 140 | 883 | 133 | 559 | 484 | 130 | 150 | 445 | 229 | 83.5 | 758 |
| 32 | 1108 | 140 | 781 | 133 | 559 | 484 | 130 | 150 | 543 | 229 | 86 | 911 |
| 36 | 1254 | 165 | 857 | 165 | 711 | 559 | 150 | 160 | 600 | 276 | 123 | 1356 |
| 41 | 1413 | 165 | 921 | 165 | 711 | 559 | 150 | 160 | 664 | 276 | 184 | 1666 |

SCR Type 25B Outline Structure



SCR Type 25B Selection Graph



SCR type 25B Technical Parameters

The following units are in mm

| Size | A | D | F | G | H | J | K | L | Q(L) | ML(kg) |
|------|------|------|-----|-----|-----|-----|-----|-----|------|--------|
| 18 | 629 | 563 | 355 | 470 | 85 | 55 | 321 | 152 | 16 | 216 |
| 20 | 692 | 578 | 355 | 470 | 85 | 55 | 337 | 152 | 21.6 | 257 |
| 23 | 789 | 702 | 457 | 610 | 110 | 70 | 406 | 190 | 31.8 | 393 |
| 26 | 891 | 740 | 457 | 610 | 110 | 70 | 445 | 190 | 47.5 | 465 |
| 29 | 1018 | 788 | 559 | 711 | 130 | 85 | 445 | 229 | 63.5 | 709 |
| 32 | 1108 | 886 | 559 | 711 | 130 | 85 | 543 | 229 | 86 | 855 |
| 36 | 1254 | 1015 | 711 | 940 | 150 | 110 | 600 | 276 | 123 | 1367 |
| 41 | 1413 | 1080 | 711 | 940 | 150 | 110 | 664 | 276 | 184 | 1640 |