High Speed

TRANSFLUID
industrial & marine
Transfluid has always been a point of reference in the world of industrial transmission equipment and the standard that its competitors measure themselves. Fluid couplings, variable speed drives, brakes, clutches, couplings and hydraulic transmissions constitute the core of the product line, while ultra-modern technology, careful selection of materials and meticulous assembly are the key ingredients in the recipe that has placed those products at the forefront of the market. Thousands of customers continue to choose Transfluid to the most diverse and demanding applications, knowing they can rely on Transfluid’s technical department, where design, engineering and planning experts are always on hand to quickly resolve client’s problems. Italian dynamic innovation, coupled with ongoing staff development and more than fifty years of hard-earned expertise, are the foundation of the company’s success. Transfluid’s unique approach has sparked small company’s success, hard-earned expertise, are the foundation of the design, engineering and planning experts are always on hand to quickly resolve client’s problems. Italian dynamic innovation, coupled with ongoing staff development and more than fifty years of hard-earned expertise, are the foundation of the company’s success. Transfluid’s unique approach has sparked small company’s success, hard-earned expertise, are the foundation of the company’s success.

Founded in Milan Italy in 1957, Transfluid has developed two new lines of variable, high-speed hydraulic couplings, the KSL-HS and the KPTB-HS. Capable of input speeds of 3600 rpm the HS family of couplings has already found demands in the power, steel, paper, cement, petrochemical and petrochemical industries. The high-speed products are finding applications in boiler feed pumps, fans, blowers, pumps, compressors. With more than half a century of experience in the field of variable speed drives, Transfluid is using its expertise to expand into the high-speed markets with the KSL-HS and KPTB-HS series of variable high-speed drives.

The speed variation

To meet the energy savings and reliability demands modern industry expects, Transfluid has developed two new lines of variable, high-speed hydraulic couplings, the KSL-HS and the KPTB-HS. Capable of input speeds of 3600 rpm the HS family of couplings has already found demands in the power, steel, paper, cement, chemical and petrochemical industries. The high-speed products are finding applications in boiler feed pumps, fans, blowers, pumps, compressors.

How it works

In centrifugal machines, such as pumps, compressors and fans, the speed control plays a crucial role in saving energy. As an example, by decreasing the driving speed of a centrifugal machine to 50% of its normal operating speed, the current draw of the driving electric motors is reduced to one eighth of its normal draw. Therefore, in application or processes that do not require the centrifugal machine maximum output, the benefit of a variable speed drive is easily realized through significant power savings. This important variable speed function can be accomplished by installing a variable fill hydrodynamic coupling in the drive train. By controlling the volume of oil that circulates inside a variable speed coupling the output speed can be continuously changed to optimize the driven machines performance. Traditionally controlling the oil volume is accomplished via scoop tube, however, Transfluid has pioneered a solution based upon the most current technology called flow control. The flow control variable speed hydrodynamic coupling is based on a very simple principle. The power media (oil) is withdrawn from the tank by an electric feed pump and fed to the driving and driven impellers of the coupling circuit. The oil is removed by centrifugal force through calibrated orifices on the perimeter of the circuit. The oil then returns to the tank by gravity. By varying the feed pump oil flow, the volume of oil between the driving and driven impellers can be changed. The end result is accurate control of driven machines acceleration time and precise speed variation. As an additional feature, TF developed the JRP a device capable of drastically reduce the fixed losses and noise. Simple operation, standard and externally accessible maintenance components, make the KSL-HS and KPTB-HS a simple, reliable, low maintenance, variable speed solution.

Benefits

It is well known that speed control of centrifugal machines provides significant economic advantages compared to the use of valves or dampers. In applications that require a broad speed range, valves and dampers drastically reduce the overall efficiency of the system. The features of KSL-HS and KPTB-HS high-speed couplings combine a simple design with the high efficiency of a hydraulic coupling to provide an optimal solution for centrifugal machine design. Among existing variable speed technologies the two most common are the Frequency Inverter and the Hydrodynamic Couplings. Although inverter technology has made some significant advances, the Hydrodynamic Coupling offers key advantages that cannot be replaced by any other technology. • A variable speed hydrodynamic coupling allows a motor to be powered directly from the main electrical circuit and operate at its nominal speed. This allows for the use of standard motors that are more economical to purchase than those designed for use with variable frequency drives.

• The important difference is that an inverter drive line has a permanent mechanical connection between the motor and the driven machine. A hydrodynamic coupling eliminates this connection allowing torque to be transmitted without damaging other mechanical parts from the torque spikes and torsional vibrations. This extends the overall operational life of the entire drive line.

• Hydrodynamic couplings are robust and reliable machines. Service can be done by a qualified mechanic. In contrast, the maintenance of a frequency inverter is expensive due to the rapid and random failure of its components and its rapid obsolescence of parts. Additionally, inverter repair requires highly skilled, specialized technicians and extended service times.

• A hydrodynamic coupling is installed in the drive line, while a frequency inverter requires a dedicated pressurized and air conditioned room.

• Hydrodynamic Couplings are less expensive than inverters. Additionally inverters require special motors and at times the selection of higher rated motors.

Transfluid HS couplings also offer advantages compared to the traditional scoop tube system. The scoop tube is a stationary element that is an obstacle to the oil in rotation, inducing a significant hydrodynamic resistance and decreased efficiency. A closed loop “feedback” is required to control the linear position of the scoop as it relates to the output speed. When ordering, application rotation direction must be specified. Furthermore, major components such as the scoop and oil pump are integrated inside the coupling housing making repairs difficult and time consuming.

The Transfluid control flow system:

• is self-adjusting, since the draining of oil from the calibrated orifices depends on the rotation speed of the outer impeller which is directly connected to the driven machine. This allows the coupling to stabilize its speed in the presence of load variations without the need for corrective actions and “loop” control

• eliminates the stationary element (the scoop) and hydrodynamic resistance in the working circuit

• operates in forward and reverse

• has all key accessories mounted externally, allowing for simple and inexpensive maintenance.
The series

KPTB-HS
This high-speed speed drive is used primarily in medium and low power applications, and is available in size 17 (this number represent the nominal diameters of the working circuit in inches). These units are also available in Low Temperature and Explosion Proof versions. A simple design combined with great reliability and performance makes this coupling a product with exceptional value. In addition, the KPTB-HS’s versatile design allows to configure a machine according to customer’s needs but still keep it within a tight budget. Features such as Viton® seals used throughout the drive and all main maintenance components externally mounted for easy access add even more to this unit’s value.

KSL-HS
This high-speed drive is used primarily in medium and high power applications, and is available in size 21 and D21. These units can be purchased with an optional auxiliary lubrication system that supplies oil to the motor and driven machine bearings. Low Temperature and Explosion Proof versions are available as well. Features on these units that provide durability and ease of maintenance are labyrinth seals, steel piping, externally accessible maintenance components, and horizontally split exterior housing (allows maintenance & repair without disturbing alignment).

Today, KSL and KPTB couplings are installed in hundreds of applications worldwide providing its user with unsurpassed performance and reliability. Profiting from these experiences, the new HS series of hydrodynamic couplings have been designed to work in most extreme conditions to ensure decades of reliable, economical and efficient service.
Working scheme

**STANDARD INSTRUMENTATION**

1. Variable flow feed pump with variable frequency converter
2. Lubrication oil pump
3. Heat exchanger oil pump
4. Fluid coupling pressure gauge
5. Differential pressure transducer
7. Heat exchanger
8. Oil level switch and gauge
9. Max temperature switch
10. Feed oil filter
11. Lubrication oil filter
12. Vacuum switch
13. Pressure gauge
14. Temperature switch
15. Thermoresistance PT100
16. Speed sensor
17. Heat exchanger pump control temperature switch
18. Manual flow control valve
19. Min pressure switch

**INSTRUMENTATION (CAN BUS version) UPON REQUEST**

1. Variable flow feed pump with variable frequency converter
2. Lubrication oil pump
3. Heat exchanger oil pump
4. Fluid coupling pressure gauge
5. Differential pressure transducer
7. Heat exchanger
8. Oil level switch and gauge
9. Max temperature switch
10. Feed oil filter
11. Lubrication oil filter
12. Vacuum transducer
13. Pressure gauge
14. Temperature switch
15. Thermoresistance PT100
16. Speed sensor
17. Heat exchanger pump control temperature switch
18. Manual flow control valve
19. Min/max pressure transducer

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Without integrated auxiliary lubrication system

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With integrated auxiliary lubrication system upon request