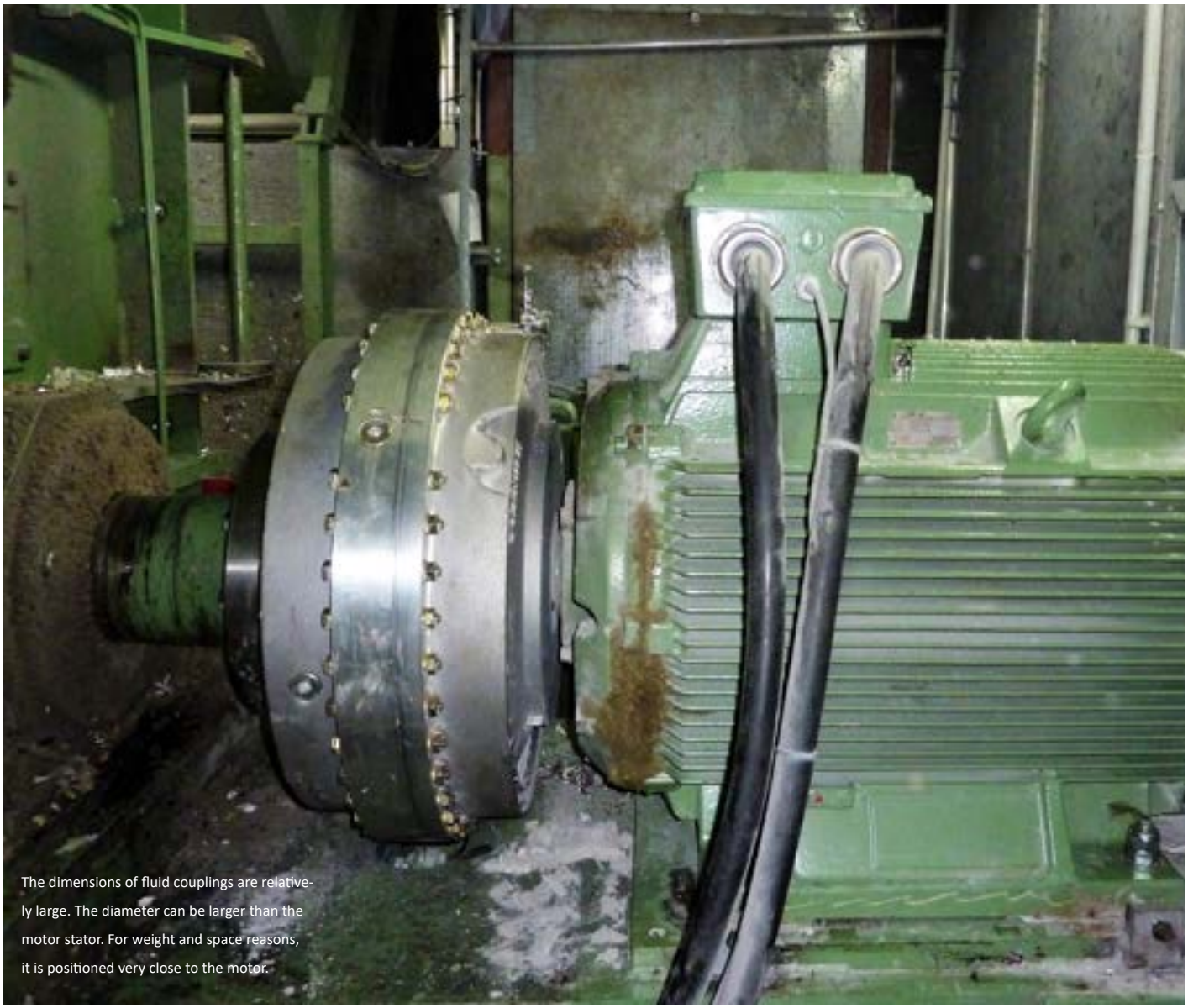
WHITE PAPER

PRÜFTECHNIK

ALIGNING LARGE DIMENSION COUPLINGS

How to use the right equipment and know-how to align fluid couplings



The dimensions of fluid couplings are relatively large. The diameter can be larger than the motor stator. For weight and space reasons, it is positioned very close to the motor.

When the proper equipment is used, aligning large dimension couplings such as fluid couplings is in practice relatively easy. PRUFTECHNIK, the world market leader in shaft and machine alignment systems, manufactures alignment equipment for fluid couplings. With fluid couplings, conventional shaft alignment equipment based on chain-type and magnetic brackets have limited to no functionality. The hexagonal clamping bracket from PRUFTECHNIK solves this problem through a proficient connection between measuring device bracket and coupling housing.

The motor “M” is the initiator of a rotational force to drive the machine “X.” Machine “X” must be ramped up carefully with slowly increasing torque but may spontaneously and unintentionally come to an abrupt

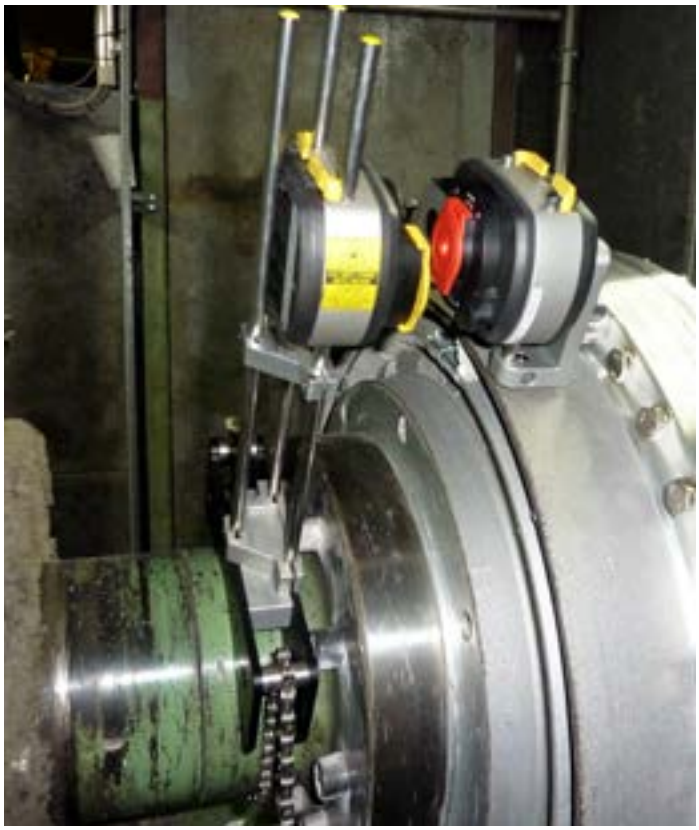
standstill at any time during operation - even at low speeds. If motor “M” is coupled to machine “X” via a fixed connection, e.g., through a ‘multi-plate’ or ‘jaw-clutch’, an abrupt standstill would have severe consequences for motor, coupling, all motor mounts, and possibly even for the motor and machine foundations. To avoid this mechanical damage due to spontaneous, abrupt standstills, and nevertheless to operate the machine “X” effectively, fluid coupling is installed between motor “M” and machine “X.”

Fluid couplings are designed so that the power is transmitted between the input and output via fluid dynamics. Specifically: The motor drives a blade wheel, which conveys a fluid by centrifugal force into an opposite blade wheel. The kinetic energy of the coupling fluid drives the second blade wheel, thus transmitting the power of the motor to the motor drive shaft mounted on the second blade wheel. The fluid in the coupling transmits the power.

If machine “X” stops abruptly, the coupled blade wheel also comes to an abrupt standstill. The blade wheel on the side of the motor shaft is not affected. The energy is absorbed by the coupling fluid to such an extent that the coupling, the motor, and its components cannot be damaged. As soon as the blockage on the machine is removed, the motor “M” can restart and drive the machine “X” via the fluid coupling.

The two-part housing of the large fluid coupling is made of aluminum. Magnetic brackets cannot be fixed to the coupling. Mounting chain type brackets for large diameters is very time consuming .

Fluid couplings are used in a variety of machines, but due to its design it is complicated to align. Fluid couplings usually have a large diameter (> 40 cm). Conventional laser alignment systems use chain-type brackets. With such a large coupling circumference, many chains quickly reach their limits. The general rule: One-third of the chain length corresponds to the maximum shaft or coupling diameter. Although longer chains could be used, the other side must also be considered: The counterpart of the laser measuring system must also be mounted on the lower-lying input shaft. As a result, long support posts and long chains would have to be used. Apart from the complicated and time-consuming mounting, space problem is inherent.



The complete measuring setup including laser and sensor unit protrudes only a few centimeters beyond the fluid coupling. Thanks to PRUFTECHNIK's single-laser technology, the distance between laser and sensor does not influence the measurement result.

The hexagonal clamp ALI BV 26.x is simply attached to one of the many housing bolts and fastened using a locking pin. The support posts (left) are mounted as usual on the chain-type bracket which is fastened to the shaft.

Fluid couplings have large dimensions, and therefore very limited space for the measuring devices (laser and sensor). Consequently the measuring equipment must be mounted smartly and securely on the coupling housing. PRUFTECHNIK developed a separate procedure for mounting the alignment laser/sensor units for this particular type of coupling.

The front-side coupling area has many bolts in the flange area. The PRUFTECHNIK measuring unit can be securely mounted on the head of a coupling bolt using the hexagonal clamp (ALI BV 26.x). The measuring device bracket (ALI.BV 26) can thus be fastened securely in a space-saving manner to the front side of the fluid coupling. The counterpart of the measuring unit can be mounted as usual on the corresponding shaft using a chain-type bracket. The support posts must be sufficiently long to ensure that the laser and sensor are aligned at the same relative height.

The height of the measuring device bracket on the coupling should be as low as possible, and therefore not widen the diameter of the coupling. Magnetic systems cannot be used as the coupling housing is made of aluminum, which is nonmagnetic. Only the hexagonal clamp (ALI BV 26.x) used in combination with the measuring device bracket (ALI.BV 26) both from PRUFTECHNIK offers all attributes required for secure and custom alignment of fluid couplings. The hexagonal clamp is available in different sizes for the corresponding wrench size of the bolt head: 19, 24, 30, 36, 46, and 55 mm. (The "x" in the product name stands for the respective wrench size).

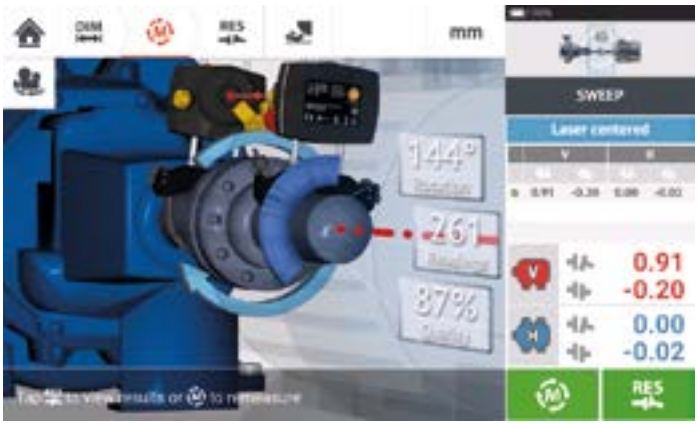
The large fluid coupling between the engine shaft coming from motor “M” and the machine shaft transmitting the power into machine “X” has no frictional connection in idle mode. The measurement mode for this application can be either “Continuous Sweep” or “Multipoint” which is set on the alignment computer system.

The hexagonal clamp ALI BV 26.x is ideal for obtaining reliable alignment measurement data even in confined spaces. The easy-to-install bracketing system can be used on many types of couplings, not only fluid couplings; for example internal combustion engines.

PRUFTECHNIK supplies the necessary accessories for aligning all types of couplings with little effort and maximum accuracy. Information on hexagonal clamp ALI BV 26.x as well as our laser alignment systems can be found here:

Hexagonal clamp ALI BV 26.x
PRUFTECHNIK Laser Alignment Systems

The hexagonal clamp ALI BV 26.x is universally applicable.



PRUFTECHNIK alignment systems offer the “Continuous Sweep”mode to align precisely shafts.

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