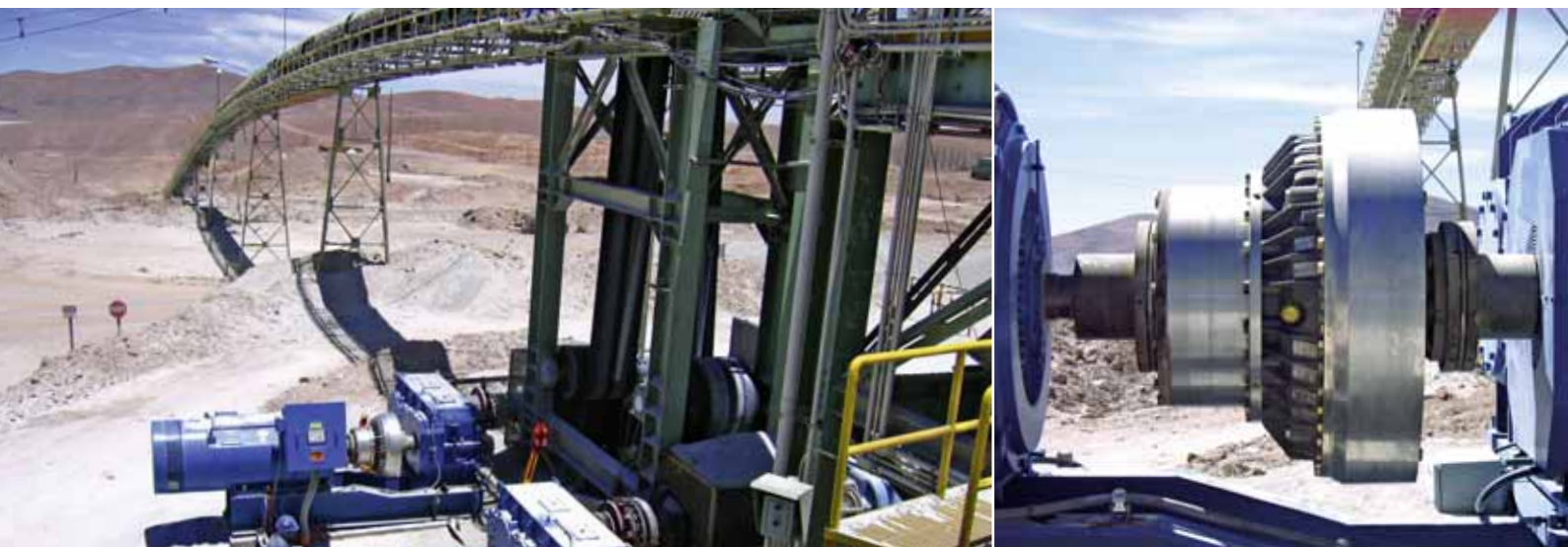


A Sophisticated Soft-start System. Constant-fill Fluid Couplings Type TVVS



Fluid couplings from Voith Turbo have proven themselves in millions of applications. They are operating reliably all over the world. Based on our comprehensive experience and close co-operation with our customers, the TVVS coupling was developed: a genuine “soft-start” device, highly suitable for demanding drives in the material handling and processing industry.

The Voith Turbo TVVS fluid coupling provides outstanding characteristics, such as excellent limitation of start-up torques, as well as automatic adaptation of the maximum transmittable torque to the prevailing load. For belt conveyors, the stresses on the belt are significantly reduced. Other benefits: higher service life of the system, as well as low maintenance costs and downtime.

The advantages of TVVS soft-start couplings in belt conveyor drives:

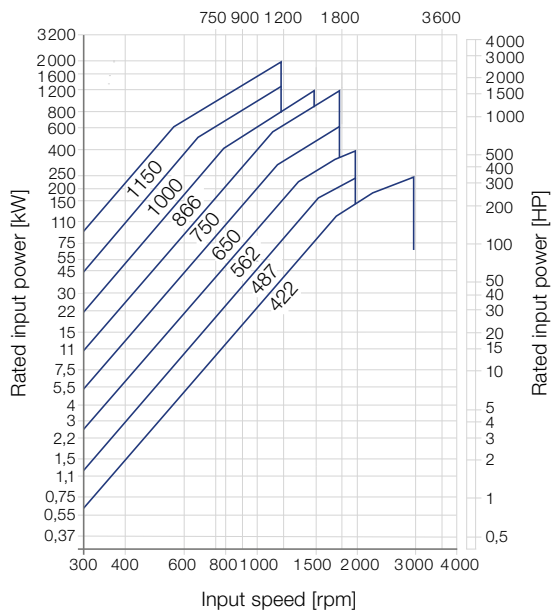
- + Load-free run-up of motor
- + Smooth acceleration
- + Alleviation of undesirable start-up conditions (such as lifting of belt, longitudinal vibrations, etc.)
- + Automatic adaptation of starting torque to prevailing load situation
- + Limitation of starting torque
- + Higher service life of belt and other conveyor drive components
- + Utilization of economically priced, low-maintenance squirrel-cage asynchronous motors
- + Load sharing and step starting for multi-motor drives

Function and performance

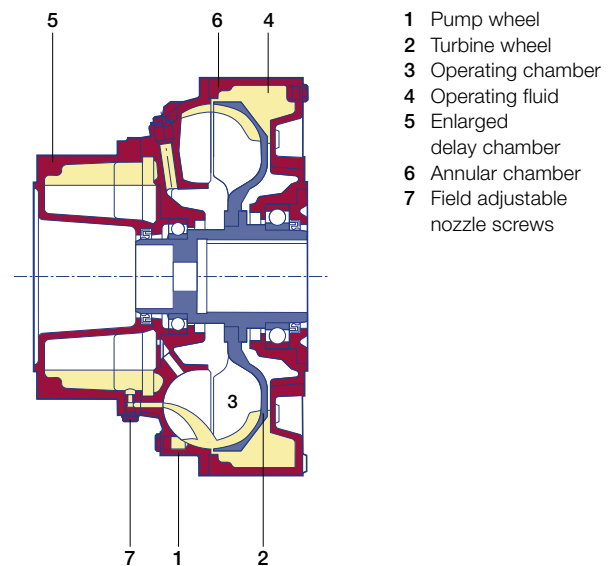
- The precisely adapted synergy of delay chamber, annular chamber and nozzle screws is the basis of the outstanding soft-start characteristics.
- Apart from the delay chamber, the annular chamber offers additional space to accommodate operating fluid.
- At the beginning of the start-up sequence, the operating fluid is partly drained from the operating chamber into the annular chamber as a result of centrifugal forces.

- The torque transmitted during the start-up sequence is therefore considerably lower than with a coupling without annular chamber.
- The thermal capacity of the system is increased due to the higher quantity of fluid and additional surface area. As a result, more start-ups can be accomplished.

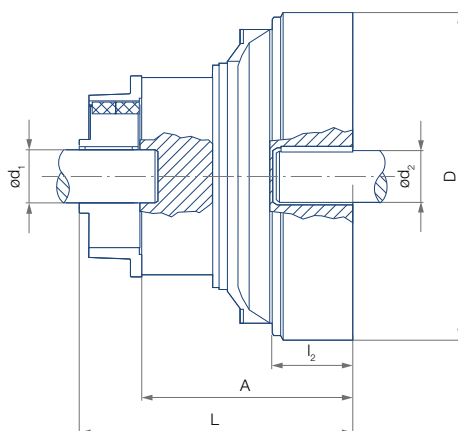
Performance diagram



Design / Function



Dimensions (example)



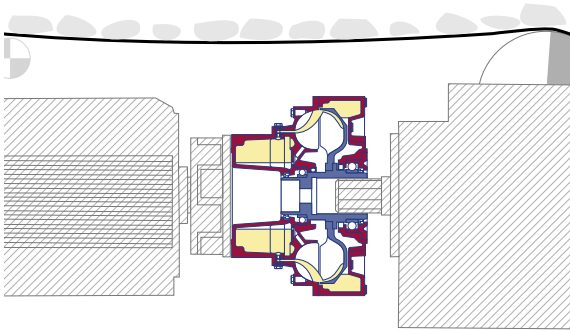
Size	A [mm]	D [mm]	L [mm]	d ₁ max. [mm]	d ₂ max. [mm]	l ₂ [mm]	Weight ¹ [kg]
422	335	470	437	100	80	135	83 kg
487	382	556	488	120	90	155	128 kg
562	428	660	544	130	110	170	185 kg
650	494	761	646	140	120	200	301 kg
750	567	877	730	150	135	240	454 kg
866	641	1017	830	160	150	265	696 kg
1000	686	1165	869	180	160	280	1010 kg
1150	883	1340	1093	180	180	320	1478 kg

¹ Including flexible connecting couplings and maximum oil filling.

Powerful components for demanding drives

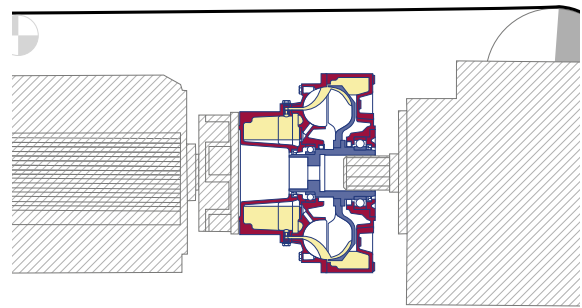
Classic fields of application for the TVVS are the drives of belt conveyors with higher capacities and lengths. During the start-up process, the TVVS soft-start coupling ensures optimum adaptation of the introduced torque to the prevailing load condition. The unique control functions of the TVVS are automatic and require no external intervention or modification of the filling level of the coupling.

Start-up procedure of loaded belt conveyors



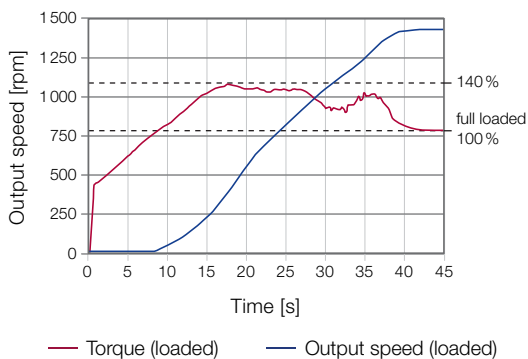
- Load-free run-up of motor
- Pre-tensioning of belt
- Smooth acceleration
- Limitation of starting torque to approximately 1.4 times the full load torque

Start-up procedure of empty belt conveyors

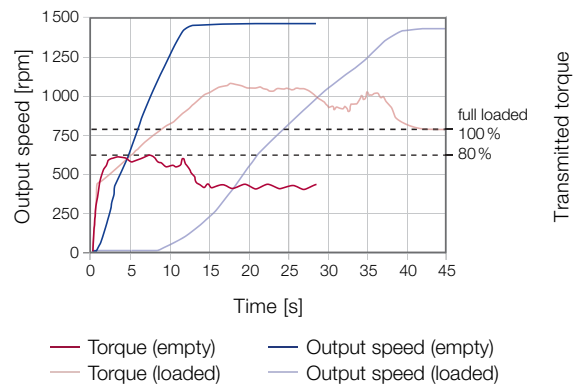


- Load-free run-up of motor
- Initial torque response significantly lower at start-up than normal running condition
- Limitation of starting torque to approximately 0.8 times the full load torque
- No control system or external components required for automatic torque adaptation

Loaded belt conveyor



Comparison between loaded and empty belt conveyor





The right design for your drive

The various designs of Voith soft-start fluid couplings meet even the most stringent operating conditions. The housing consists either of Silumin or spheroidal cast iron. The couplings can be operated with mineral oil, water or fire-retardant fluids.

Apart from its main field of application, i. e. the smooth acceleration of belt conveyors, the soft-start coupling is primarily intended for drives with demanding and difficult operating conditions. The higher thermal capacity and heat dissipation offers you highest operating safety.

Type TVS

- High frequency of start-ups under load
- Reversing operation
- Frequent overloads in nominal operation

Type TUWVFS

- High frequency of full load starts
- High break-away torque
- Frequent overloads in nominal operation
- Internal centrifugal valve function that responds to motor overload or voltage drop conditions

Type TVVYS

- Long start-up periods up to several minutes
- Acceleration of heaviest masses



Centrifuge with TVVYS coupling



Performance advantages

Are you planning a drive or need to modify an existing one?
Your specification should include requirements such as:

- Relieved run-up of motor
- Utilization of economically-priced, low-maintenance squirrel-cage motors
- Smooth build-up of torque during start-up, soft start
- Limitation of maximum torque during start-up
- Adaptation of starting torque to load torque
- Damping of vibrations and torsional shock loads in driveline
- Multi-motor drive with load sharing
- Multi-motor drive with step starting of individual drives
- High frequency of start-ups
- Overload protection
- Low wear factor and low-maintenance operation
- High plant uptime availability
- Compact design
- Low noise level

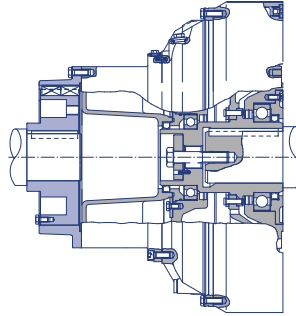
In this case you have come to the right place! A Voith TVVS soft-start coupling will help you to fulfill even the highest demands.

We really care about the seamless integration of our coupling into your drive. In close co-operation with our customers and technical universities, we have devised simulation programs which enables Voith Turbo to calculate all important parameters for the start-up of your drive in advance.

- 1 Crusher with TVS coupling
- 2 Armored-face conveyor with TUWVFS coupling
- 3 Belt conveyor with TVVS coupling
- 4 Calculation in simulation program

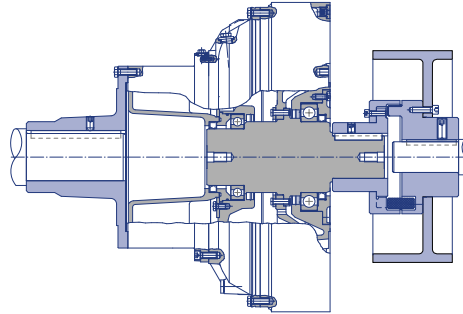
Installation and connecting technology

Gearbox shaft mounted design with flexible connecting coupling



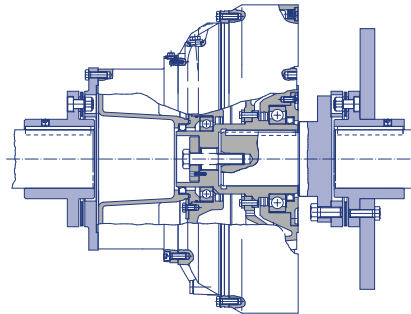
- Compact design for short shaft distances
- Easy aligning

Motor shaft supported design with flexible connecting coupling



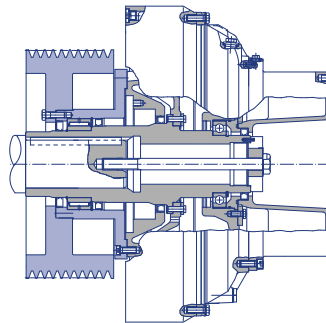
- Coupling on motor shaft
- Radial installation and removal

Load distributed design with multi-disc coupling



- Weight distribution on motor and gearbox shaft
- Easy assembly
- Generous misalignment tolerances
- Radial installation and removal
- Wear and maintenance-free multi-disc connecting couplings with high service life
- Excellently suited for retrofits, easy longitudinal adaptation with existing plants

Belt pulley design



- Coupling on motor shaft
- Increased V-belt lifetime

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VOITH
Engineered Reliability