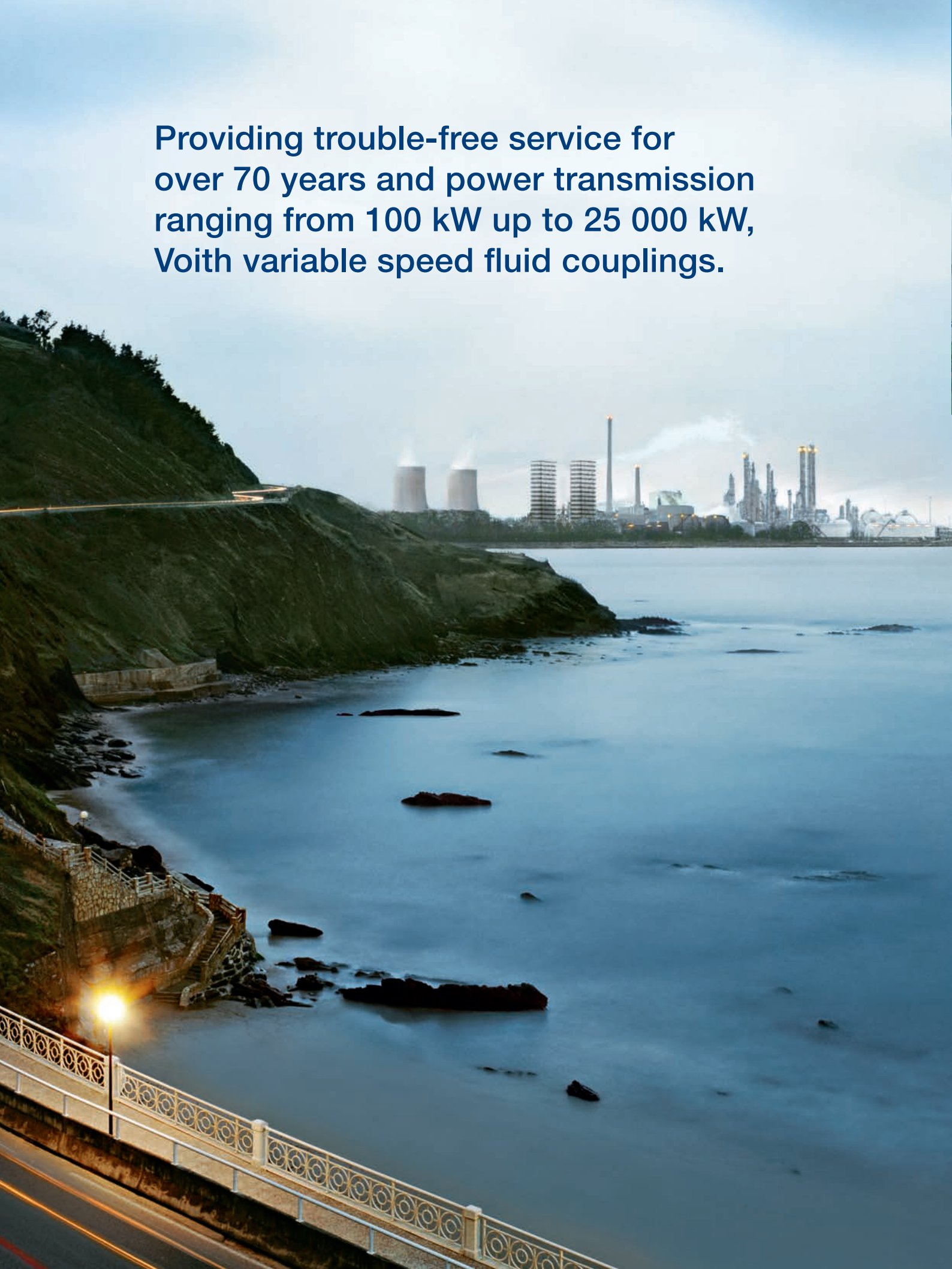
voith.com

VOITH

# The right speed
## Variable speed fluid couplings

Providing trouble-free service for over 70 years and power transmission ranging from 100 kW up to 25 000 kW, Voith variable speed fluid couplings.



# Proven and reliable speed control

**Controlling drive line speed and ensuring consistency, Voith variable speed couplings are proven in the field and are particularly well suited for pump, fan and compressor applications.**

Typical applications

- Power plants
- Oil and gas industry
- Chemical industry
- District heating plants
- Iron and steel industry
- Water management

# Increasing system availability

**Increasing system availability in your power plant, refinery, oil platform or other industrial drive line is of paramount importance. Successful operation ensures continuous production, this is what we specialize in.**

### Increase reliability

Whether it's in the desert, a tropical rainforest, withstanding coastal conditions, or in a potentially explosive environment, Voith variable speed fluid couplings operate with peerless reliability. They are impervious to external influences thanks to their compact and robust design.

### Reduce energy consumption

Save energy and reduce operating costs! Drive motor power consumption is lower when compared to a fixed speed unit, with throttle control.

### Reduce costs

Wear-free hydrodynamic power transmission keeps maintenance costs low by allowing long intervals between scheduled maintenance. Unlike systems with power electronics, no additional investment is needed.

### Extend service life

Load-free motor start-up and smooth acceleration of the driven machine reduces the overall load on the driveline. The hydrodynamic variable speed fluid coupling also dampens torsional vibrations and shocks, protecting the motor and the driven machine. This increases the service life of your entire driveline.

### Save space — with an integrated lube oil system

The lube oil system, which is integral to the Voith variable speed coupling, supplies oil to the motor and driven machine, if needed. This saves spaces and money.

Currently in use in more than

# 15 000

drives around the world

Service life up to

# 4x

longer than a variable frequency drive

More than

# 70 years

of use

Power ratings up to

# 25 000 kW

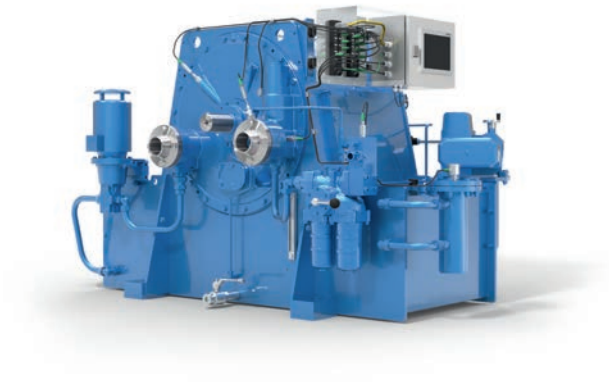
Operating temperatures from

# -40 °C to +50 °C

(ambient temperature)

# New digital measurement system for variable speed couplings OnCare.Health IOLIS

OnCare.Health IOLIS for variable speed fluid couplings



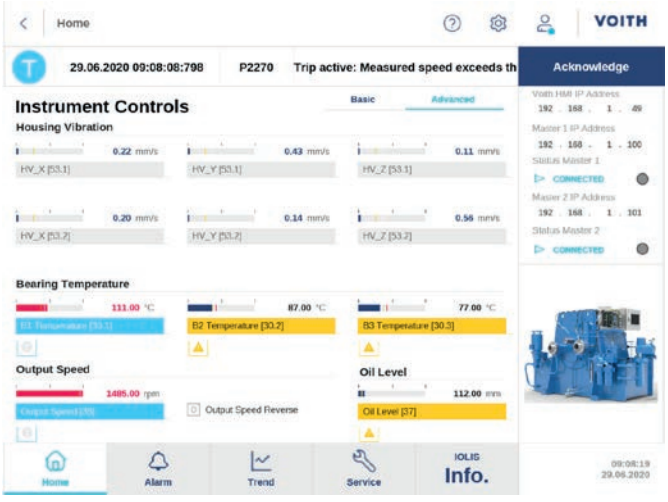
Enabling easy monitoring of operating data, OnCare.Health IOLIS is a compact measurement system for variable speed couplings. It transmits process data from the coupling digitally to the control room via bus protocols such as ProfiNet, ModBus TCP, and Ethernet IP. This system can be seamlessly integrated into both existing and new couplings.

The home screen clearly displays temperature, pressure, scoop tube position, trends, and irregularities, allowing early identification of anomalies. This early detection facilitates corrective action before potential failures occur.

## Benefits

+ Smart and simple sensor system
+ Minimal wiring
+ Easy maintenance and handling
+ Quick and precise data transfer
+ Fast replacement

## Real time process data: OnCare.Health IOLIS home screen




All components and sensors are easy to install and widely available due to the standardized IO-Link system design. The digital monitoring system consists of IO-Link measurement components and a visualization unit.

### Platform for IoT Future

Preparing your operation for the IoT future, OnCare.Health IOLIS can be integrated into network systems via an Ethernet connection.

### This enables:

- Condition monitoring
- Trend indications
- Secure remote access
- Predictive maintenance
- Remote monitoring

### Core functions:

- Real-time monitoring and overview of process data
- Chronological visualization
- Remote screen access via web browser
- Warning and trip display / memory
- Diagnostic interface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# Our range

## Working together with you, we establish the best fluid coupling for your drive line.

| Type | Features |
|---|---|
| **SVTL** | Comprises of a tunnel housing and shafts with anti-friction bearings. |
| **SVNL**<br>**SVNL G** | The SVNL features a housing that is split horizontally. Shafts in the SVNL have anti-friction bearings and the SVNL G is equipped with sleeve bearings. |
| **SVL M** | The SVL M features an especially high power density and has a cast iron housing split horizontally. Furthermore, the shafts are equipped with sleeve bearings. |

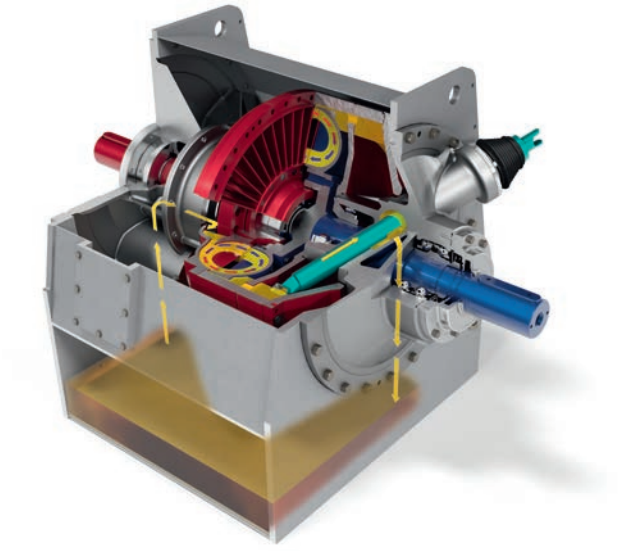
# Compact, simple, robust

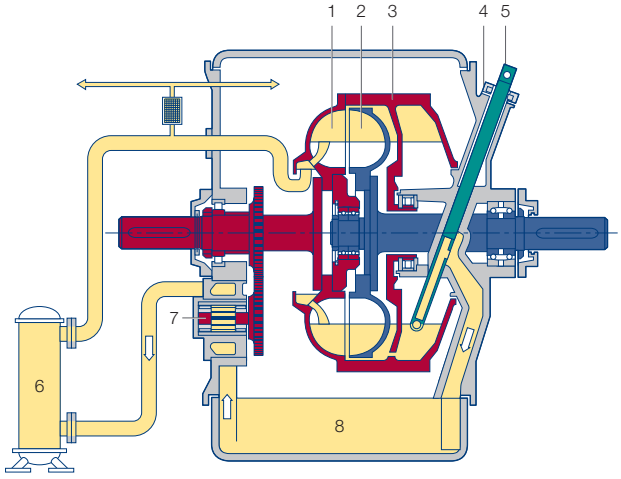
## How it works

Voith variable speed couplings are fluid couplings. They link the drive machine — generally an electric motor — with the corresponding driven machine. The power is transferred through the fluid energy of the working fluid. This fluid flows in an enclosed working chamber between the pump wheel (linked to the input shaft) and the turbine wheel (linked to the output shaft).

The coupling fill level can be adjusted between 0 % and 100 % during operation, enabling precise and continuously variable driven machine speed control. The control range depends on the load characteristic (torque to speed ratio).

**Variable speed fluid coupling – 3D sectional diagram and simplified longitudinal section**





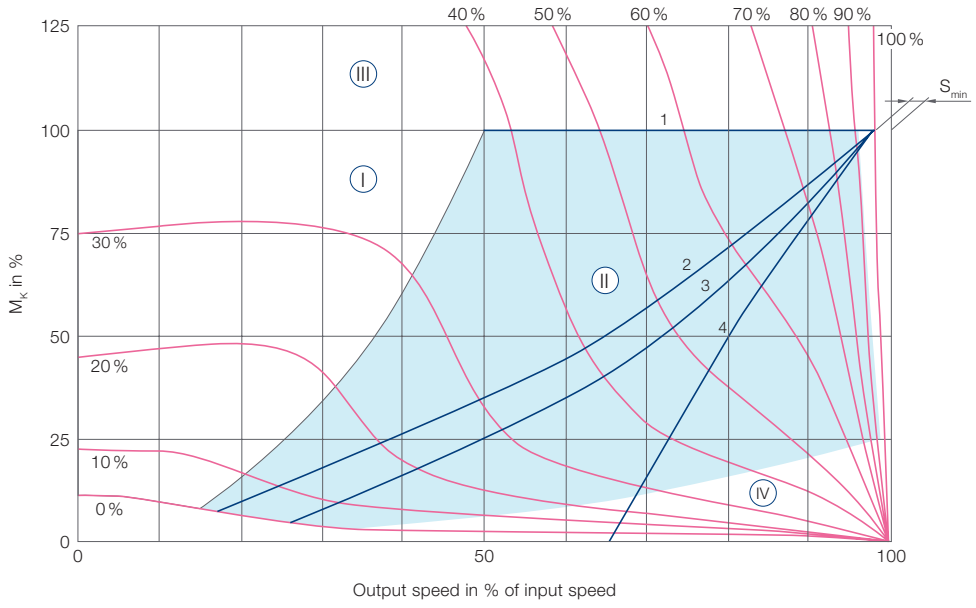

1 Pump wheel
2 Turbine wheel
3 Shell
4 Scoop tube housing
5 Scoop tube
6 Cooler
7 Oil pump
8 Oil tank

# Torque curves

### Operating range

The performance diagram shows the transmittable coupling torques $M_K$ for various scoop tube positions versus the output speed. The desired output speed is the result of a stable intersection point of the coupling torque $M_K$ and the load torque (load characteristic).

## Torque curves for different driven machines in the variable speed fluid coupling characteristic diagram




### Operating ranges

The exact characteristic curve is dependent on the size of the coupling, the amount circulating, and the oil viscosity.

- Ⅰ, Ⅳ Starting range
- Ⅱ Control range
- Ⅲ Overload range

### Parameters

Scoop tube position in % of scoop tube stroke.

| | |
|---|---|
| $M_K$ | Coupling torque |
| $S_{min}$ | Nominal slip at design point |
| $S =$ | $(1 - n_2/n_1) \cdot 100$ [%] |
| $n_1$ | Input speed |
| $n_2$ | Output speed |

### Typical load characteristics

1 Constant torque
(e.g., volumetric pumps with constant backpressure and compressors)

2 Decreasing torque
(e.g., boiler feed pumps with floating pressure operation)

3 Parabolic torque
(resistance parabola, pumps with no backpressure, fans)

4 Decreasing torque
(e.g., boiler feed pumps operating with fixed pressures)

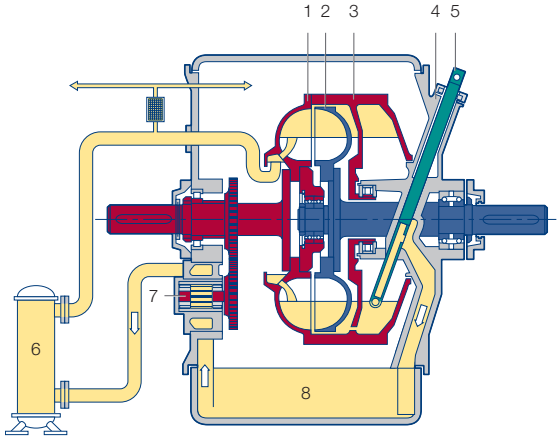
# SVTL

The SVTL coupling is a self-supported design featuring a tunnel housing. The rotating parts are encased in an enclosed oil-proof housing. Connecting couplings link the electric motor and driven machine with the variable speed fluid coupling. The oil tank is built into the housing and the oil pump is driven by the input shaft. The shafts are equipped with anti-friction bearings lubricated by a mechanically driven lubricating oil pump in the variable speed fluid coupling.

The standard design of the SVTL requires a mixed-oil cooler for the working oil and the lubricating oil. For machines in the higher performance classes, two separate circuits are necessary, with one cooler for the working oil and one for the lubricating oil.

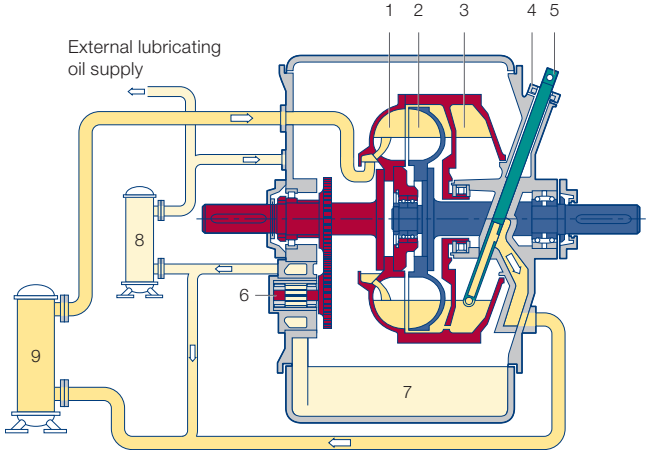
## SVTL variable speed fluid coupling

## SVTL simplified longitudinal section – Standard design




1 Pump wheel
2 Turbine wheel
3 Shell
4 Scoop tube housing
5 Scoop tube
6 Cooler
7 Oil pump
8 Oil tank

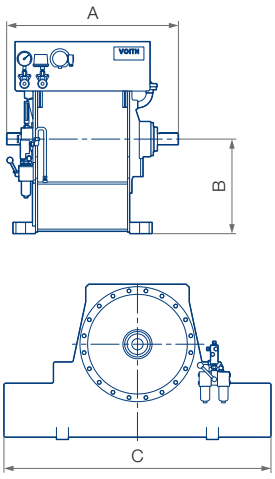
## SVTL simplified longitudinal section – Design with two oil circuits



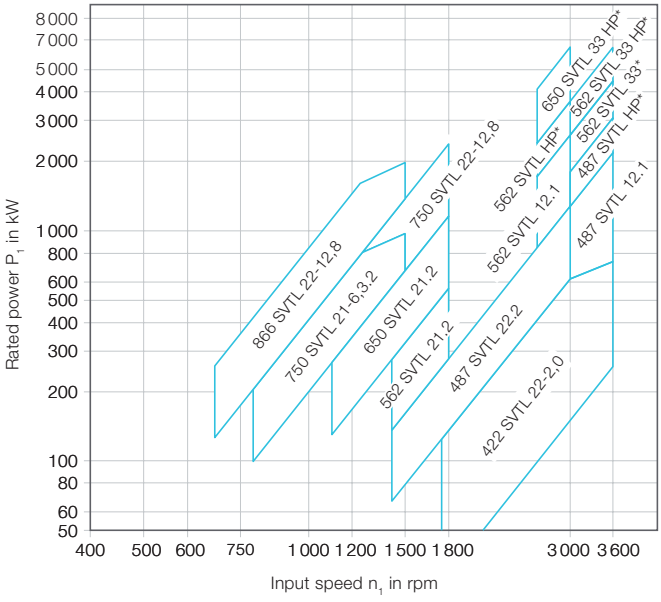

1 Pump wheel
2 Turbine wheel
3 Shell
4 Scoop tube housing
5 Scoop tube
6 Oil pump
7 Oil tank
8 Lubricating oil cooler
9 Working oil cooler

## SVTL dimensions

| Type | A [mm] | B [mm] | C [mm] | Oil capacity [l] | Weight [kg] |
|---|---|---|---|---|---|
| **422 SVTL 22-2,0** | 1 120 | 630 | 1 780 | 250 | 850 |
| **487 SVTL 22.2** | 1 145 | 630 | 1 780 | 250 | 900 |
| **487 SVTL 12.1** | 1 255 | 800 | 1 780 | 500 | 1 200 |
| **487 SVTL HP*** | 1 255 | 800 | 1 780 | 500 | 1 200 |
| **562 SVTL 21.2** | 1 145 | 630 | 1 780 | 250 | 970 |
| **562 SVTL 12.1** | 1 255 | 800 | 1 780 | 500 | 1 260 |
| **562 SVTL HP*** | 1 358 | 800 | 1 350 | 450 | 2 200 |
| **562 SVTL 33*** | 1 358 | 800 | 1 350 | 450 | 2 200 |
| **562 SVTL 33 HP*** | 1 358 | 800 | 1 350 | 450 | 2 200 |
| **650 SVTL 21.2** | 1 310 | 750 | 2 000 | 300 | 1 200 |
| **650 SVTL 33 HP*** | 1 580 | 800 | 1 530 | 470 | 3 000 |
| **750 SVTL 21.2-6,3.2** | 1 310 | 750 | 2 000 | 300 | 1 300 |
| **750 SVTL 22-12,8** | 1 469 | 725 | 1 400 | 400 | 1 750 |
| **866 SVTL 22-12,8** | 1 469 | 725 | 1 400 | 400 | 1 800 |




## SVTL selection diagram




* Design with two oil circuits

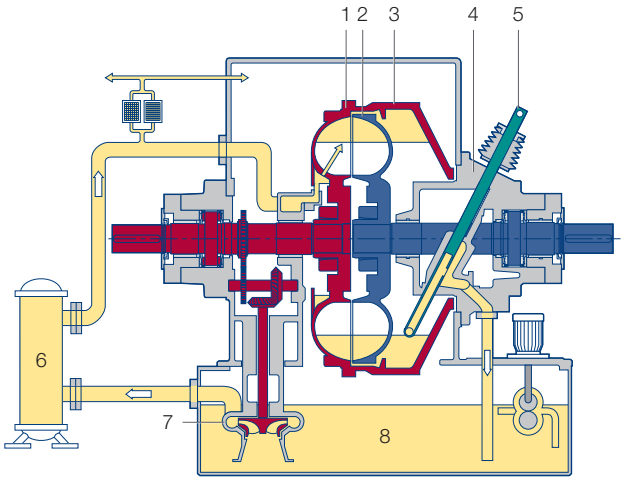
# SVNL and SVNL G

The SVNL and SVNL G models are self-supported designs with horizontally split housings. The rotating parts are encased in an enclosed oil-tight housing. Connecting couplings link the main motor and driven machine with the variable speed fluid coupling.

The oil tank is built into the housing and a centrifugal pump serves as the oil pump (some models feature a gear wheel pump) and is driven directly by the input shaft. SVNL coupling main shafts are equipped with anti-friction bearings. The bearings are lubricated with pressurized oil.

SVNL G coupling main shafts are equipped with sleeve bearings. The bearings are force lubricated using pressurized oil. An electrically driven auxiliary lubricating pump is attached for priming lubrication prior to startup.

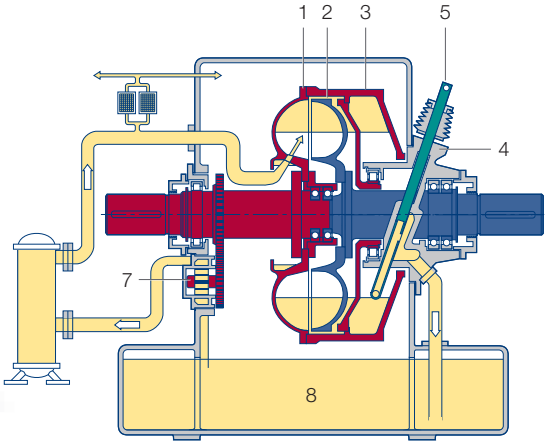
## SVNL G simplified longitudinal section




1 Pump wheel
2 Turbine wheel
3 Shell
4 Scoop tube housing
5 Scoop tube
6 Cooler
7 Oil pump
8 Oil tank

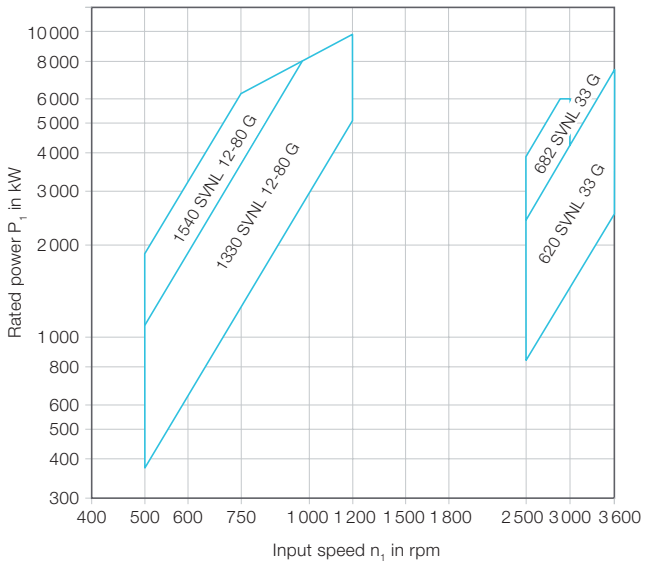
## SVNL variable speed fluid coupling

## SVNL simplified longitudinal section



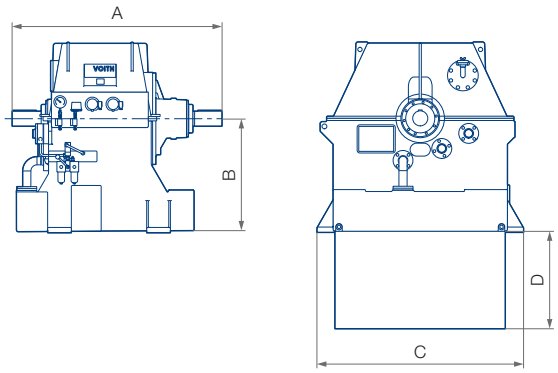

1 Pump wheel
2 Turbine wheel
3 Shell
4 Scoop tube housing
5 Scoop tube
6 Cooler
7 Oil pump
8 Oil tank

## SVNL G selection diagram

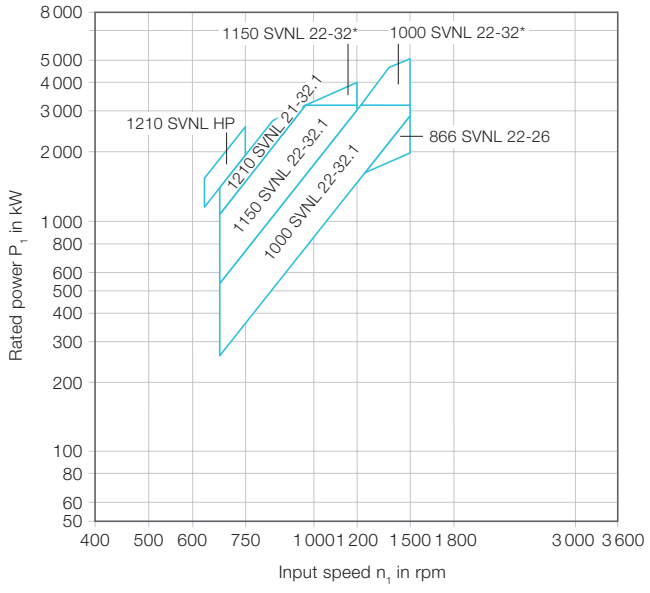



## SVNL G dimensions

| Type | A [mm] | B [mm] | C [mm] | D [mm] | Oil capacity [l] | Weight [kg] |
|---|---|---|---|---|---|---|
| **620 SVNL 33 G** | 1 485 | 900 | 2 160 | – | 430 | 3 800 |
| **682 SVNL 33 G** | 1 485 | 900 | 2 160 | – | 430 | 3 980 |
| **1330 SVNL 12-80 G** | 3 150 | 800 | 2 400 | 1 000 | 2 500 | 12 500 |
| **1540 SVNL 12-80 G** | 3 150 | 800 | 2 400 | 1 000 | 2 500 | 13 800 |



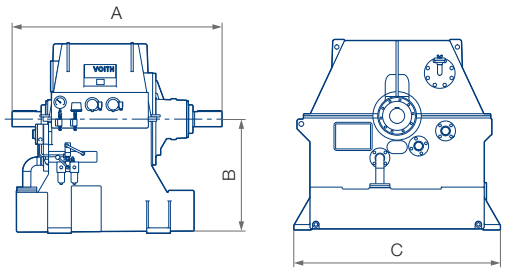

## SVNL selection diagram




* Design with two oil circuits, see the diagram on page 12

## SVNL dimensions

| Type | A [mm] | B [mm] | C [mm] | Oil capacity [l] | Weight [kg] |
|---|---|---|---|---|---|
| **866 SVNL 22-26** | 1 760 | 1 060 | 1 920 | 780 | 3 650 |
| **1000 SVNL 22-32.1** | 1 950 | 1 060 | 1 920 | 780 | 3 650 |
| **1000 SVNL 22-32*** | 1 950 | 1 060 | 1 920 | 780 | 3 650 |
| **1150 SVNL 22-32.1** | 1 950 | 1 060 | 1 920 | 780 | 3 800 |
| **1150 SVNL 22-32*** | 1 950 | 1 060 | 1 920 | 780 | 3 800 |
| **1210 SVNL 21-32.1** | 1 950 | 1 060 | 1 920 | 780 | 4 000 |
| **1210 SVNL HP** | 1 950 | 1 060 | 1 920 | 780 | 4 000 |



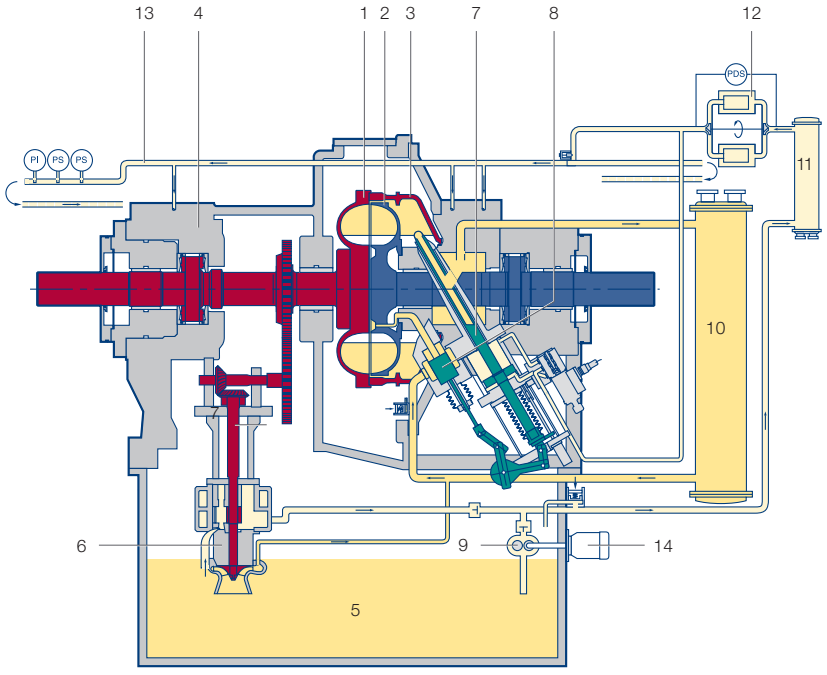
# SVL M

The SVL M variable speed coupling model is a self-supported design with a high power density. The input and output shaft are each individually encased in a cast iron housing. Connecting couplings link the main motor and driven machine with a variable speed fluid coupling.

The oil tank is bolted to the bottom of the housing. The coupling features two oil circuits: a working oil circuit and a lubricating oil circuit.

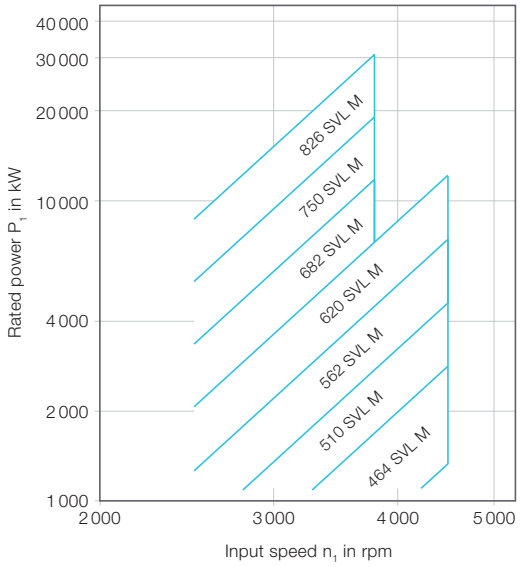
Both circuits are supplied by mechanically driven pumps. An energy-saving flow control valve is used to adjust the circulating oil. The shafts are equipped with sleeve bearings. The bearings are force lubricated using pressurized oil.

## SVL M variable speed fluid coupling – Simplified longitudinal section



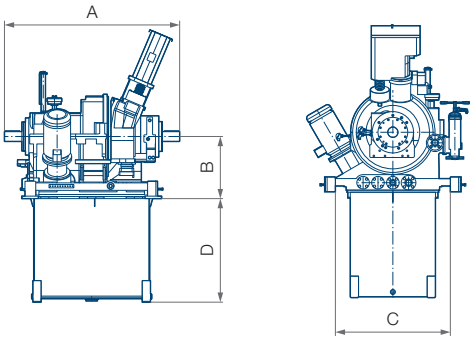

1 Pump wheel
2 Turbine wheel
3 Shell
4 Coupling housing
5 Oil tank
6 Oil pump
7 Scoop tube
8 Circulating control valve
9 Auxiliary lubricating pump
10 Working oil cooler
11 Lube oil cooler
12 Double filter
13 Lubricating oil supply
14 Auxiliary lubricating pump motor

## SVL M selection diagram




## SVL M dimensions

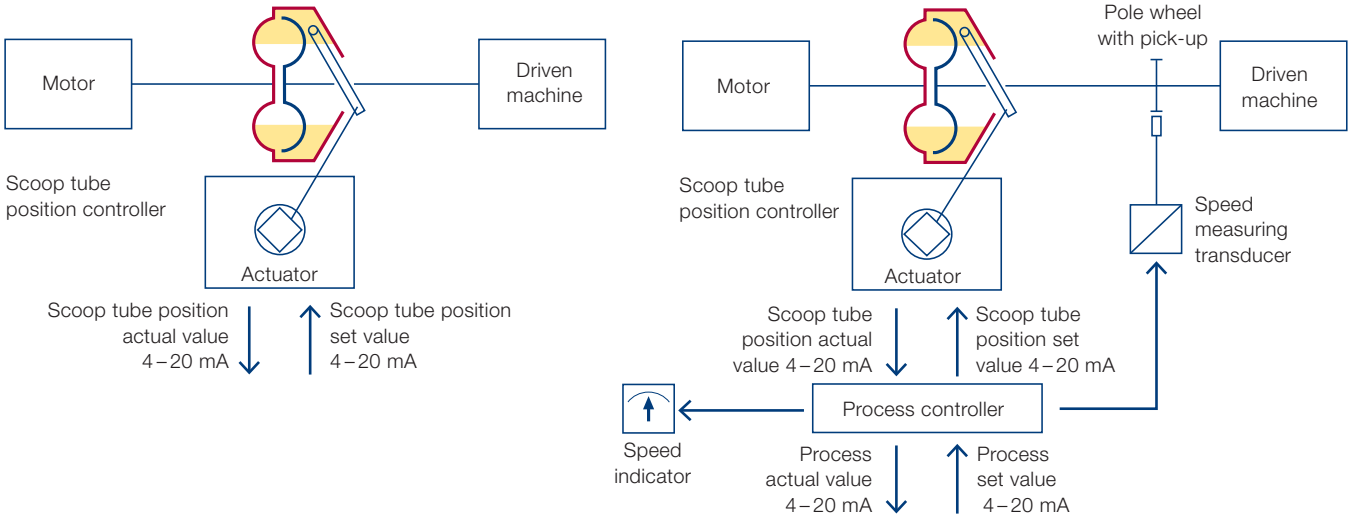
| Type | A [mm] | B [mm] | C [mm] | D [mm] | Oil capacity [l] | Weight [kg] |
|---|---|---|---|---|---|---|
| **464 SVL M** | 1 855 | 720 | 1 540 | 1 280 | 1 460 | 6 700 |
| **510 SVL M** | 1 985 | 720 | 1 540 | 1 280 | 1 460 | 6 800 |
| **562 SVL M** | 2 045 | 720 | 1 540 | 1 280 | 1 460 | 6 900 |
| **620 SVL M** | 2 115 | 720 | 1 540 | 1 280 | 1 460 | 7 000 |
| **682 SVL M** | 2 265 | 720 | 1 540 | 1 280 | 1 460 | 7 100 |
| **750 SVL M** | 2 705 | 920 | 1 610 | 1 130 | 1 700 | 7 600 |
| **826 SVL M** | 2 910 | 920 | 1 610 | 1 130 | 1 700 | 8 000 |



# Control circuit integration

**Variable speed fluid couplings are often integrated into an automatic process.**

## Comparison of position and process control circuit




### Position control circuit

- Scoop tube control drive, including position controller for continuous control

### Process control circuit

- Process controller
- Scoop tube actuator, including position control for continuous control

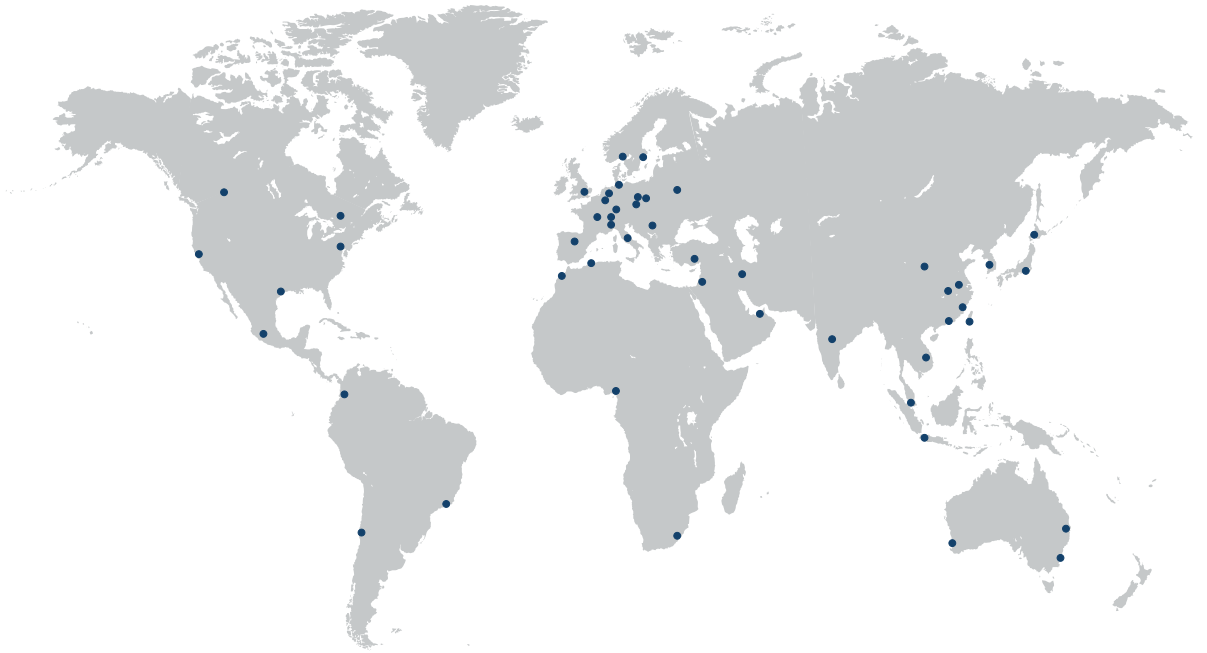
A speed measurement device is required in cases where the speed is to be used, displayed, or fed in as the process value.

As with the speed, a process value (e.g., pressure or flow rate) can be incorporated into a control circuit. This process value is then used as set value.

# Voith Service

**Increasing the efficiency, safety and availability of your system, Voith's worldwide service network of engineers and technicians are here for you.**

## Offices worldwide



## Our services

- Installation and commissioning
- Training
- Maintenance
- Original spare parts
- Modernization, retrofits and upgrades
- Service contracts

## The benefits for your system

**+ Improved operational reliability**
**+ Increased service life**
**+ Assured productivity**
**+ Optimized maintenance costs**
**+ Planned life cycle costs**

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