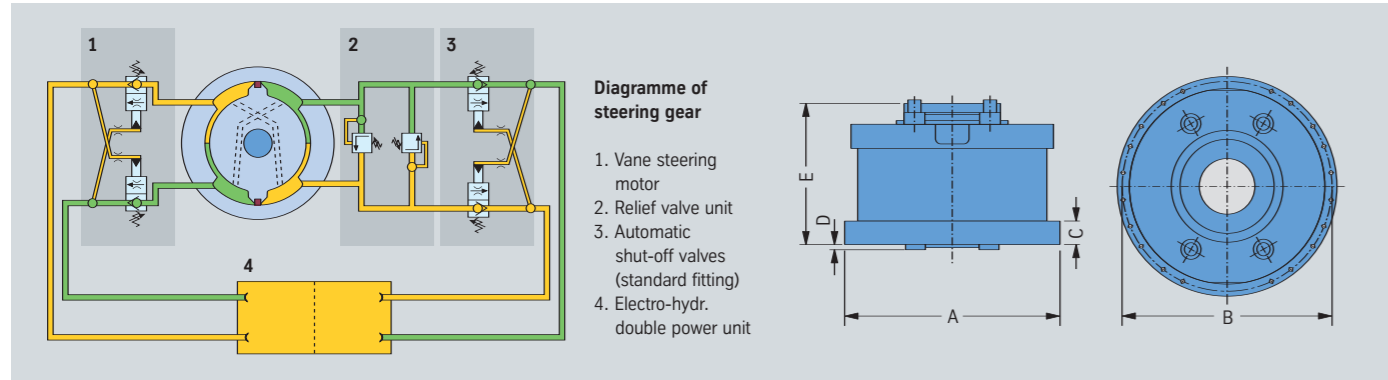


Simplex-Compact® Steering Gear Simplex-Turbulo-Systems



SIMPLEX-COMPACT® - Steering Gear Motor - Type VSM

Type VSM	Dia. of rudderstock [mm]	Max. torque [kNm]	Dimensions [mm]					Weight [t]	Standard load [kN]	
			A	B	C	D	E		Radial	Axial
300	286 - 300	375.3	1100	1040	120	40	750	3.1	417.7	246
315	301 - 315	434.5	1100	1040	120	40	773	3.3	417.7	246
335	316 - 335	522.6	1264	1194	120	40	800	4.4	527.8	343
355	336 - 355	621.9	1264	1194	120	40	855	4.5	527.8	343
375	356 - 375	733.1	1350	1274	140	40	859	5.2	663.0	441
400	376 - 400	889.7	1350	1274	140	40	905	5.6	663.0	441
425	401 - 425	1067.1	1606	1526	164	60	1053	7.5	883.2	588
450	426 - 450	1266.8	1606	1526	164	60	1080	7.9	883.2	588
475	451 - 475	1489.8	1756	1656	180	60	1085	10.8	1107.8	883
505	476 - 505	1790.3	1756	1656	180	60	1180	11.6	1107.8	883
535	506 - 535	2128.7	2020	1920	200	60	1190	15.0	1416.8	1079
565	536 - 565	2507.3	2020	1920	200	60	1290	15.5	1416.8	1079
605	566 - 605	3078.5	2140	2040	210	80	1350	19.0	1721.0	1293
635	606 - 635	3559.5	2140	2040	210	80	1454	19.9	1721.0	1293
675	636 - 675	4275.5	2368	2268	252	80	1730	33.0	1890.0	1471
715	676 - 715	5081.5	2368	2268	252	80	1805	34.5	1890.0	1471

Standard rudder angles: 2 x 35°, 2 x 45°, 2 x 65°

Standard components

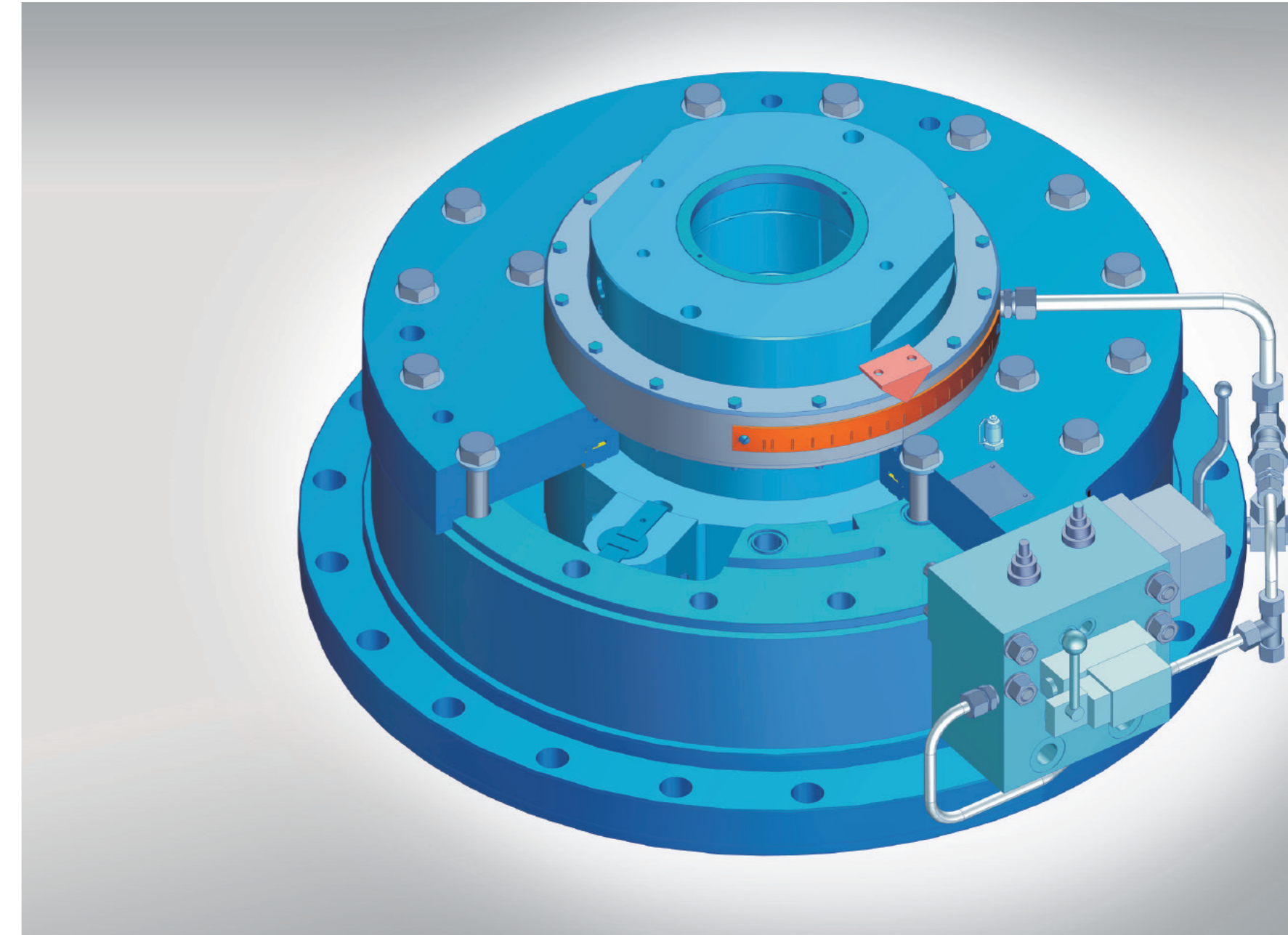
- Simplex-Compact vane steering motor (type VSM) with integrated rudder carrier and radial bearing
- Electro-hydraulic double power unit (type HPU)
- Automatic shut-off valves
- Mechanical rudder angle indicator
- Motor starter boxes for the hydraulic double power unit

Optional components

- Rudder angle indicator system
- Rudder control system
- Autopilot
- Rudder, incl. rudderstock, foundation and trunk
- Synchronization (for mechanically synchronized twin rudder units)
- Hydraulic oil storage tank

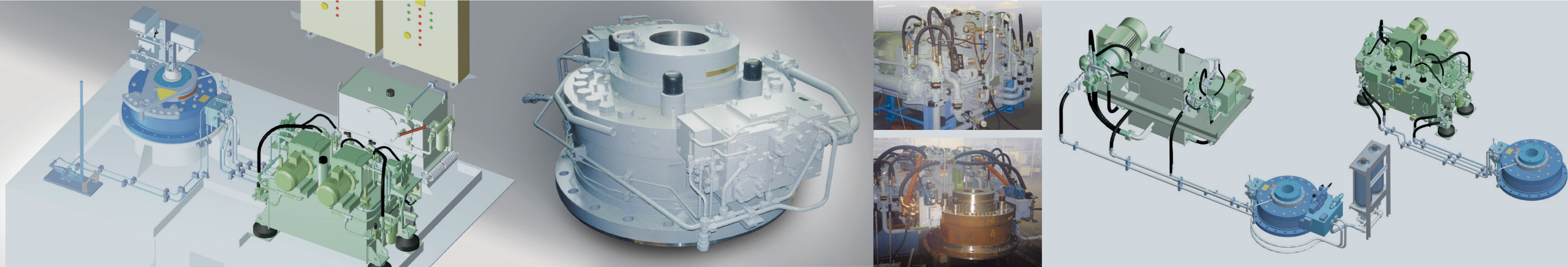
The Simplex-Compact vane steering motor (type VSM) is designed for max. rudder angles of up to 2 x 65° (up to 2 x 90° in case of twin rudder systems with asymmetrical rudder angle). The steering motor can be used to power all types of rudder units (including high-performance rudders).

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Simplex-Compact® Steering Gear

Simplex-Turbulo-Systems



Steering Gear Type SRM

B+V Industrietechnik manufactures a wide range of mechanical engineering and marine components. By virtue of their high quality and reliability, the company's Simplex, Simplex-Compact and Turbulo products have established a leading position in world markets. The BVI range also includes Simplex-Compact steering gear, which has proved highly successful under high-load operating conditions in a large variety of vessels.

General Layout

The main components of the Simplex-Compact steering gear comprise a vane steering motor (type VSM) and an electro-hydraulic power unit (type HPU). The vane steering motor has been designed with an integrated rudder carrier and radial bearing. The steering gear is suitable for all types of vessels and rudder designs. Simplex-Compact steering gear is designed to comply with the following requirements:

- SOLAS Regulations
- SOLAS Amendments
- Amended IMO regulations

Automatic shut-off valves are fitted as standard at the connection points of the hydraulic double power unit.

In the event of ruptured pipes or oil leakages in the power units, the appropriate side of the system is shut off, thus preventing any drop in pressure in the steering motor.

Vane steering motor Type VSM

The design features of the vane steering motor are as follows:

- In order to avoid problems with bolt-on vanes and stops, these parts are cast in/cast on during the manufacturing process. This ensures that the vanes and stops are constructed of the same high-quality material as the main components.
- Small-sized motor for easy integration into the steering gear compartment.
- Integrated rudder carrier and radial bearing.
- Self-adjusting, patented internal sealing system. This sealing system has established a long record of operating reliability.
- The vane steering motor is designed for oil-pressure fitting to the rudderstock cone.
- No additional lubrication system is required for the rudder carrier and radial bearing.
- All channels for the supply and drainage of lubricating oil are either drilled or milled.
- Small friction losses and self-adjusting internal sealing system permit an economical operating pressure in the range of 150 bar.
- Fitted as standard with automatic shut-off valves at the hydraulic connection points (as required by IMO/SOLAS for tankers in excess of 10,000 dwt).

Electro-hydraulic double power unit Type HPU

The design features of the type HPU double power unit:

- Double-chamber tank with two independently driven pump units.
- The pump units are located next to each other on the top of the double-chamber tank. A pump unit is assigned to each oil chamber. All hydraulic components – e.g. return filter and oil level alarm – are likewise located on the top of the tank.
- Oil overflow between the two tank chambers.
- Each chamber fitted with an oil level alarm and an aperture for cleaning purposes.
- Each pump fitted with a return filter.

Hydraulic systems

The following hydraulic systems are available as standard fittings for the Simplex-Compact steering gear:

- Hydraulic system with constant pump supply and rudder rate: binary system with electro-mechanical ON/OFF valves and constant-supply pumps.
- Hydraulic system with variable pump supply (optimum steering characteristics): analogue system with proportionally controlled variable delivery pumps.
- Hydraulic system with variable oil supply (optimum steering characteristics): analogue system with electro-mechanical proportional valves and constant-supply pumps.

Motor starter boxes

BVI supplies motor starter boxes – together with all necessary alarm and safety features – in line with the relevant requirements of IMO/SOLAS, as well as the requirements of the classification societies. The degree of protection can be adapted to suit customer requirements.

Steering gear with additional roll-damping effect (RRS rudder system)

The RRS rudder systems supplied by BVI represent state-of-the-art technology. The RRS principle is based on the fact that the rudder movements required for a ship's steering and the rudder movements required for roll damping can be superimposed.

In order to achieve a significant roll-damping effect the RRS steering gear has to be capable of rudder rates 8 to 10 times higher than the rudder rates of a normal steering gear.

The Simplex-Compact RRS steering gear uses a combination of robust vane steering motors and accumulator-supported hydraulic power units in order to achieve the required rudder rates.

These power units (trademark ECODYN) incorporate nitrogen-bladder hydro-accumulators which provide the required rudder speeds without excessive electric power consumption.

The superimposition of roll-damping signals in combination with higher rudder rates only operates when the rudder angle is within the stall angle limits (approx. 20°-25°), thus avoiding increased drag, rudder cavitation and noise. In the event of steering commands which deflect the rudder beyond the stall angle limits (e.g. up to 35°, 45°, or 65°), no roll-damping signals are transmitted and the rudder rate is automatically reduced to the normal level.