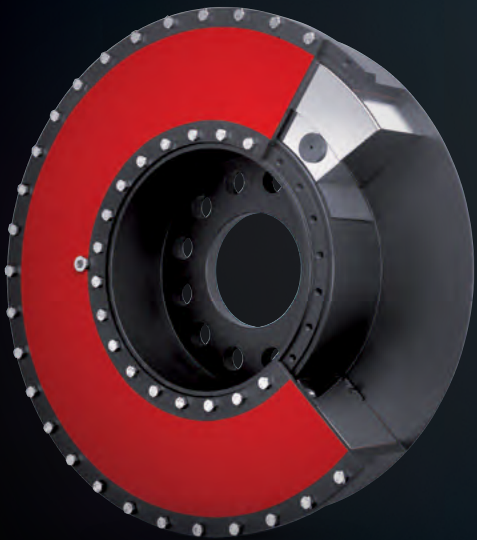
GEISLINGER
VDAMP®



LONGEVITY

TORSIONAL VIBRATION CENTER

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POWERTRAIN SOLUTIONS. BUILT TO LAST.

GEISLINGER VDAMP®

The Geislinger Vdamp® damper utilizes viscous (silicone oil) technology. Its improved calculation method enables Geislinger to adjust the Vdamp® perfectly to a torsional system.

The Geislinger Vdamp® is designed to deliver maximum performance under all conditions. With the arrival of the revolutionary Vdamp®XT, a damper concept is now available which extends service life while reducing service costs. Geislinger Vdamps® are only available in bolted versions, making an overhaul easy to accomplish.

DESCRIPTION

The Geislinger Vdamp® and Vdamp®XT protect engine camshafts and crankshafts from damage caused by torsional vibrations and help to avoid barred speed ranges. The Vdamp consists of two main elements: the housing, and the inertia ring. These parts are connected elastically by silicone oil and by high-tech polymer elements. In the event of excess vibration, the housing accelerates in relation to the inertia ring. This process shears the silicone oil, and damping occurs. Vibrational energy is transformed into heat and dissipated through the damper surface into the ambient air.

It is also possible to improve your propulsion system performance with a retrofit solution. In-house oil sampling at Geislinger ensures a rapid response and an extremely accurate lifetime forecast.

Sophisticated calculation methods, high endurance graphite bearings, and the unique lifetime extension system XT, make the Geislinger Vdamp® a proud member of the "Built to Last" family.

ADVANTAGES

- Precise calculations
- In-house oil sampling
- Easy to overhaul
- Geislinger quality

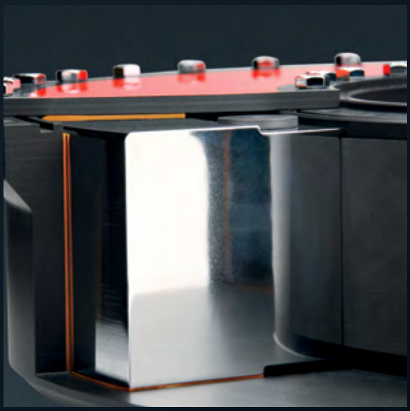
Precision and reliability

APPLICATIONS

- 2- and 4-stroke engines
- Marine propulsion
- Reciprocating compressors
- Power generation
- Industrial applications

TECHNICAL DATA

- Diameter: 300 mm to 4 m
- Various oil viscosities available



Use of high-grade materials

Vdamp with a high heat dissipation

Preamble

This catalog replaces all old catalog versions.

The content of this catalog is indicative and - based on new developments - Geislinger reserves the right to change the content without prior notice.

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The latest version of all Geislinger catalogs can be found on our website Geislinger.com.

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Description

Application

The Vdamp is a viscous torsional vibration damper consisting of an outer housing and an inner inertia ring, which is guided by bearing elements. They create a tight shearing gap, which is filled with high viscous silicone oil, mechanically coupling the ring to the housing.

The main advantages of the Vdamp are:

- Cost effective damping principle
- Selection of the most effective damper with Geislinger's torsional vibration calculation software
- Broadband damping effect
- Wear resistant bearing material
- Monitoring of oil condition
- Geislinger Monitoring provides torsional vibration measurement
- No connection to engine lubrication system necessary
- Geislinger Quality
- Geislinger After Sales Service

Due to continuing progress in engine design, special attention must be paid to the problems of torsional vibrations. Thus, it proves necessary to reduce the torsional vibrations by detuning and damping them. These tasks can be solved by the Geislinger viscous damper Vdamp.

Through tests on prototypes as well as installed dampers data referring to damping and elasticity have been gathered and used for torsional models. This guarantees correct calculation; not only of the critical speeds but also of the amplitudes and loads in all parts of the driveline. Damping and elasticity can be adapted within a wide range to meet the needs of every installation.

In propulsion systems with two-stroke-crosshead engines the propeller is in most cases directly driven by the low speed engine. A simple intermediate shaft is used instead of a flexible coupling and a main gear. Engine and propeller run at the same speed. The system engine–shaft–propeller is torsionally excited by the cyclic forces of the diesel engine. Continuous increase of engine power results in higher exciting torques and, therefore, in increased torsional vibrations of the system. A Geislinger Vdamp at the free end of the crankshaft can protect the crank-, intermediate- and propeller shaft and allows for a cost efficient design of the propulsion installation.

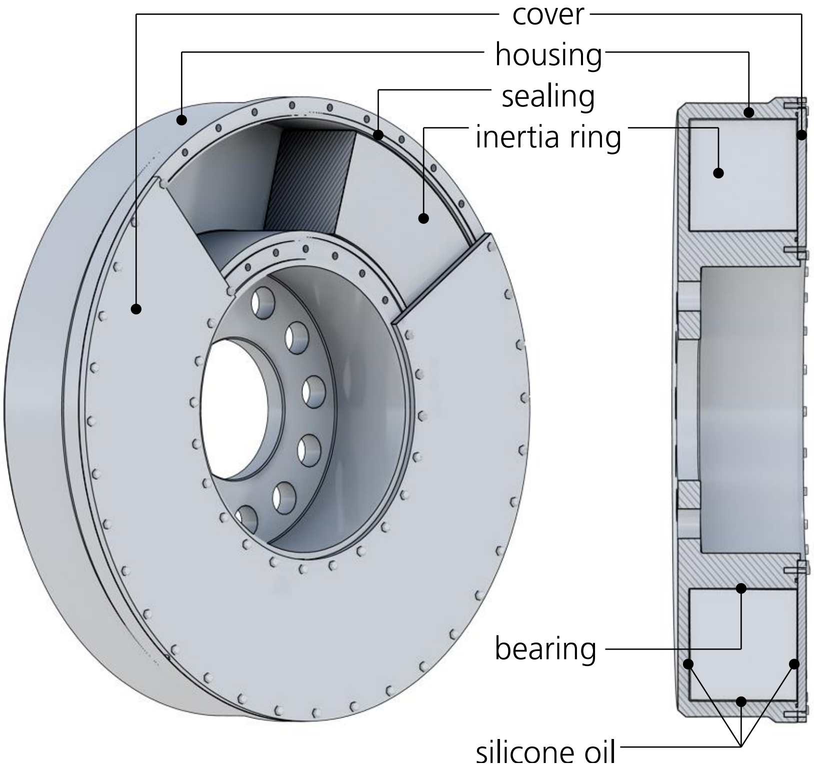
A Geislinger Vdamp is a torsional vibration damper with a wide damping range. Technical data regarding important parameters such as inertia, torsional stiffness and damping can be varied to adjust the damper to an engine system. The selection of a Geislinger Vdamp is based on a torsional vibration calculation. Torsional stress limits of the shaft line according to the classification society are considered.

For a new Geislinger Vdamp the predicted vibrations have to be confirmed by a torsional measurement. The Geislinger Monitoring can permanently verify the correct function of a Geislinger Vdamp.

Design

The Geislinger Vdamp is a viscous coupled damper, consisting of an outer housing and an inner inertia ring, which is guided by bearing elements. Housing and inertia ring create a tight shearing gap, which is filled with high viscous silicone oil. The major components for a standard design are shown in Fig. 1.

Fig. 1



The housing is mounted rigidly to the free end of the crankshaft.

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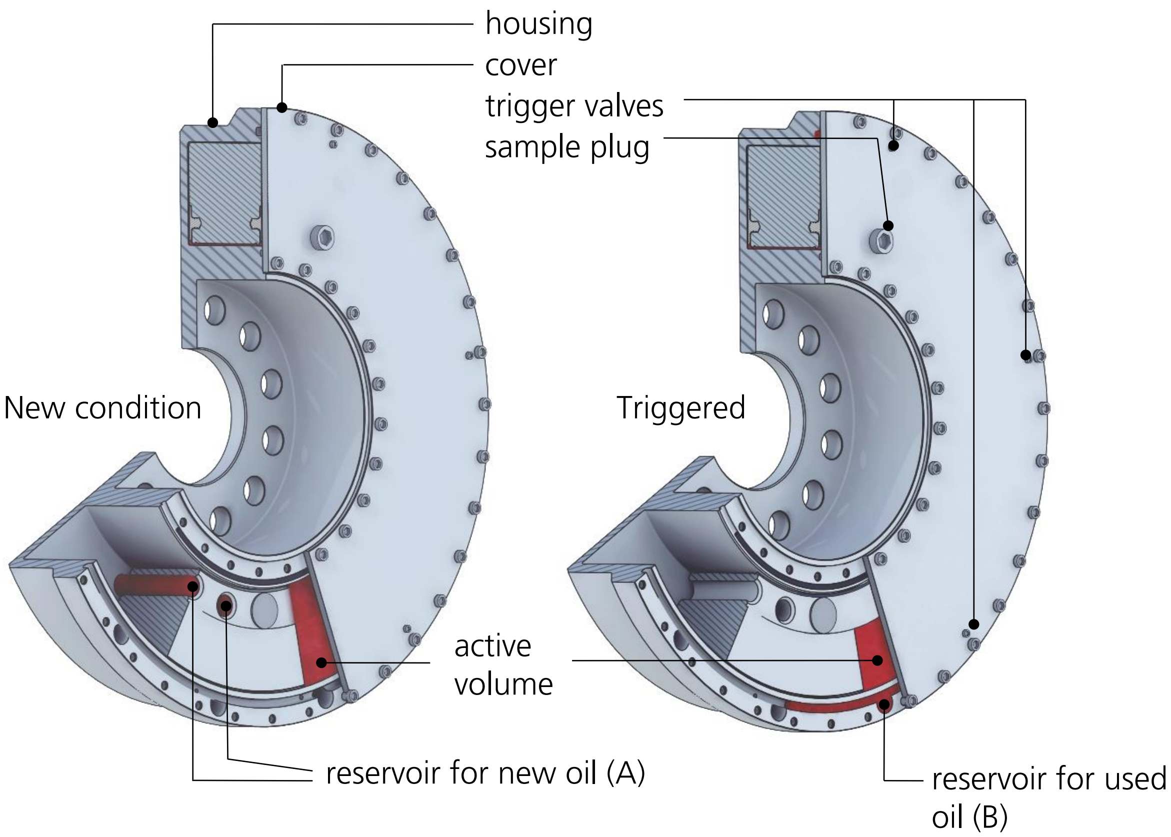
When the housing oscillates versus the inertia ring, an intense shear of the silicone oil in the gap occurs. This retards the relative movement of the two parts and as a consequence dampens the torsional vibration. The vibration energy is converted to heat which the damper conveys to the ambient air. Installation of this damper results in lower vibratory torque of the crankshaft.

Vdamp XT

The patented Geislinger Vdamp XT is an evolution of the standard Geislinger Vdamp. It is based on the same function principle, but to extend its lifetime, it implements some unique features shown in Fig. 2.

Fig. 2



By integrating an additional inner reservoir with new oil (A) into the inertia ring, the damper contains from twice the usual amount of silicone oil. During operation, only the oil in the shear gap is loaded and thus subject to wear, while the oil in the inner reservoir (A) remains unloaded and therefore in new condition.

When a sample analysis of the silicone oil in the gap signals the end of the first lifetime, an internal oil exchange in the damper can be "triggered" by the customer. This means that the trigger valves separating the shear gap from the outer reservoir for used oil (B) are manually opened, thus letting the worn oil flow from the shear gap to the outside, while it is simultaneously replaced by the unused oil from the inner reservoir (A). After a certain time of operation (approx. 24 hours) the oil exchange has been completed and the damper is fit for a second lifetime.

This unique system helps to save operation costs by significantly increasing the damper lifetime and avoiding the need to disassemble the damper from the engine.

The Vdamp XT can also be used to increase the lifetime of highly loaded dampers. This is especially interesting for engine upratings and engine free-ends with limited access.

Damping and Stiffness

The mechanical connection between primary (housing and cover) and secondary (inertia ring) inertia is established by the silicone oil in the gap. When housing and ring move in different rotational directions, the oil is sheared intensively in the gap; leading to a damping and an elastic moment. Selection of silicone oil viscosity and variation of shear gap geometry are used to tune the Vdamp in a wide range, thus optimizing the engine system.

Silicone oil shows a dependency of its mechanical parameters (stiffness and damping) both on temperature and shear frequency. This is described by a Stiffness/Damping-(CD-)Diagram. These data together with a thermal calculation routine to establish steady-state damper temperatures is the basis for our torsional vibration calculation of Vdamps.

Approval

All dampers are produced and certified in accordance with the quality assurance requirements of DIN/ISO 9001 and DIN/ISO 14001. Geislinger's Quality Assurance system has been certified by all major classification societies.

On request, dampers can be provided with certificates of all major classification authorities (e.g. ABS, DNV, Germanischer Lloyd, etc.)

For the survey by a classification society Geislinger requests the following data:

- Name of Classification Society
- Name of installation
- Shipyard
- Hull number

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Designation

Designation Code

Example one: **VB 70 / 9 / 2 / 1/ M**

VB: Vdamp, bolted

70: Outer diameter in cm

9: Outer width in cm

2: Version number of a specified type

1: Subversion

M: Damper with machined gear for GMS signal pick up

Example two: **VD 230 / 22 / AB**

VD: Vdamp, bolted, multipart housing

230: Outer diameter in cm

22: Outer width in cm

AB: Project designation – will be substituted by a version number when a Vdamp is ordered

Selection

Selection Procedure

The sizes given in the technical data describe a possible range of Geislinger Vdamps only. Inertia, stiffness, and damping factor of a Geislinger Vdamp can be optimised to specific requirements within design limits.

We ask you to fill out the enclosed questionnaire and send it to us, so we can evaluate the optimum damper size for your application.

When a Geislinger Vdamp for a particular engine is produced the first time, the calculations have to be confirmed by torsional vibration measurements. As the damper characteristics and lifetime depend on the damper temperature, confirmation of the thermal load calculation by measuring ambient air together with oil temperature in situ is necessary.

Damping

Conversion table for different damping values.

	k	κ	ψ	M
$k =$	--	$\frac{\kappa \cdot C}{\omega}$	$\frac{\psi \cdot C}{2 \cdot \pi \cdot \omega}$	$\frac{C}{\omega} \cdot \sqrt{\frac{1}{M^2 - 1}}$
$\kappa =$	$\frac{k \cdot \omega}{C}$	-	$\frac{\psi}{2 \cdot \pi}$	$\sqrt{\frac{1}{M^2 - 1}}$
$\psi =$	$\frac{2 \cdot \pi \cdot \omega \cdot k}{C}$	$2 \cdot \pi \cdot \kappa$	-	$\frac{2 \cdot \pi}{\sqrt{M^2 - 1}}$
$M =$	$\frac{\sqrt{C^2 + k^2 \cdot \omega^2}}{k \cdot \omega}$	$\frac{\sqrt{1 + \kappa^2}}{\kappa}$	$\frac{\sqrt{4 \cdot \pi^2 + \psi^2}}{\psi}$	-

k	linear viscous damping	Nms/rad	C	dynamic stiffness	Nm/rad
κ	undimensioned damping factor		ω	phase velocity of vibration	rad/s
ψ	ratio of damping energy		M	magnifier	

Geislinger uses linear viscous damping k and dynamic stiffness C for calculating the Vdamp.

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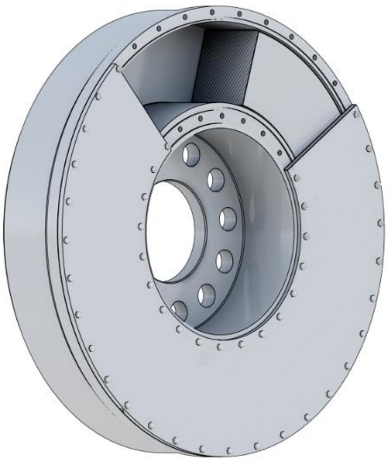
Thermal Load

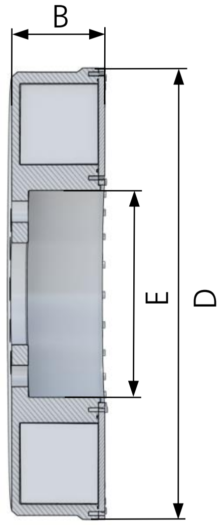
When the Vdamp is in use, mechanical vibration is damped via shearing the high viscous silicone oil between housing and inertia ring and thus converted to heat. This thermal load leads to a temperature rise of the Vdamp, which again influences the oil properties. This effect is calculated by the Geislinger TVC. To ensure correct results, it is necessary to have correct information from the customer about thermal ambient conditions, like maximum air temperature and mounting situation in the engine housing.

Oil temperature has an influence on oil wear. To ensure the expected lifetime, it is necessary to keep the oil below the temperature limit. This makes it important, to calculate thermal load with values, that reflect the real situation on the engine accurately.

Additional cooling measures like cooling fins on the Vdamp surface, oil mist or oil spray cooling can be installed to improve the thermal situation.

Technical Data





Technical data for each Geislinger Vdamp will be tuned individually according to the requirements of each installation.

The following tables and installation examples can only be a guideline for your damper selection. Ideally you should fill out and send us our questionnaire. We would then be glad to select the optimal Geislinger Vdamp for your application.

Size	Outer diameter	Inner diameter	Width	Housing inertia	Ring inertia	Effective inertia	Ring surface	Weight
	D mm	E mm	B mm	I_H kgm²	I_R kgm²	I_{eff} kgm²	A_R m²	m kg
VB 31/4	310	158	40	0.11	0.11	0.17	0.105	17
VB 33/3	330	84	30	0.12	0.14	0.19	0.164	21
VB 36/6	360	140	60	0.3	0.34	0.46	0.243	38
VB 38/5	380	198	50	0.31	0.37	0.49	0.190	32
VB 41/6	410	170	60	0.44	0.48	0.68	0.238	40
VB 42/7	420	210	70	0.56	0.72	0.92	0.258	52
VB 43/6	430	228	60	0.47	0.65	0.8	0.236	41
VB 43/7	430	220	70	0.61	0.9	1.06	0.262	57
VB 43/8	430	246	80	0.64	0.88	1.08	0.255	55
VB 43/9	430	228	90	0.66	1.23	1.28	0.309	69
VB 44/4	440	210	40	0.51	0.52	0.77	0.243	38
VB 50/7	500	250	70	1.12	2.05	2.15	0.374	86
VB 52/7	520	250	70	1.31	2.63	2.62	0.418	100
VB 55/8	550	270	80	1.67	3.63	3.49	0.474	120
VB 58/9	580	300	90	2.2	5.25	4.83	0.542	148

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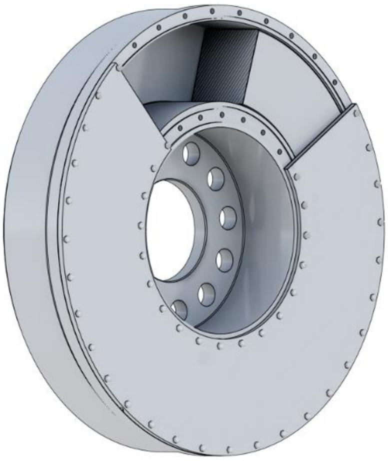
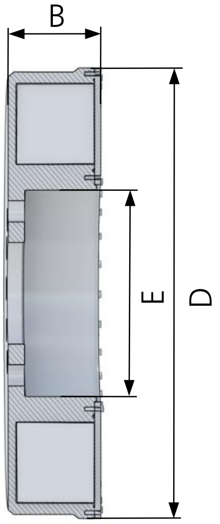

Size	Outer diameter	Inner diameter	Width	Housing inertia	Ring inertia	Effective inertia	Ring surface	Weight
	D mm	E mm	B mm	I_H kgm²	I_R kgm²	I_{eff} kgm²	A_R m²	m kg
VB 60/7	600	362	70	2.5	2.91	3.96	0.403	97
VB 61/9	610	310	90	2.84	6.52	6.1	0.594	168
VB 63/10	630	325	100	3.33	7.06	6.86	0.604	182
VB 65/10	650	310	100	3.68	8.28	7.82	0.659	199
VB 65/14	650	270	140	5.82	11.71	11.67	0.823	293
VB 65/7	650	362	70	3.7	4.43	5.92	0.495	126
VB 65/9	650	340	90	4.12	6.02	7.13	0.574	165
VB 68/11	680	384	110	5.09	9.79	9.99	0.675	213
VB 69/13	690	355	130	6.83	12.13	12.9	0.760	267
VB 69/9	690	432	90	5.85	5.88	8.79	0.537	158
VB 70/8	700	370	80	4.85	8.4	9.06	0.655	187
VB 70/9	700	374	90	5.95	8.8	10.35	0.672	198
VB 73/11	730	400	110	8.08	13.56	14.86	0.779	266
VB 73/12	730	420	120	7.89	14.41	15.1	0.785	274
VB 77/12	770	457	120	11.53	15.75	19.41	0.799	298
VB 77/13	770	460	130	10.7	18.38	19.9	0.859	320
VB 79/7	790	540	70	10.43	7.04	13.95	0.549	180
VB 80/12	800	350	120	12.34	17.71	21.19	0.888	371
VB 80/13	800	455	130	19.96	13.36	26.64	0.723	330
VB 81/12	810	472	120	13.81	19.24	23.43	0.881	327
VB 81/13	810	498	130	15.26	19.88	25.2	0.879	337
VB 82/15	820	410	150	14.37	29.91	29.3	1.090	454
VB 84/15	840	430	150	16.21	34.76	33.59	1.154	493
VB 87/17	870	460	170	21.44	47.29	45.1	1.307	598
VB 89/16	890	450	160	21.92	48.12	45.98	1.321	593

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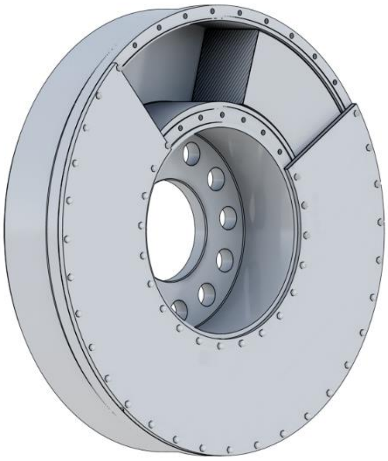

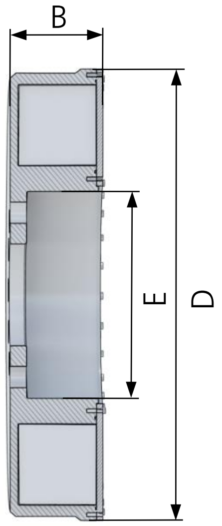

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	D mm	E mm	B mm	I_H kgm²	I_R kgm²	I_{eff} kgm²	A_R m²	m kg
VB 91/13	910	505	130	21.4	37.8	40.3	1.163	495
VB 92/9	920	500	90	17.1	22.2	28.2	1.016	308
VB 94/12	940	486	120	22.2	38.6	41.5	1.209	478
VB 98/16	980	520	160	32.8	65.1	65.4	1.467	690
VB 102/20	1020	520	200	42.9	97.8	91.8	1.755	924
VB 105/17	1050	642	170	56.1	66.8	89.5	1.440	705
VB 108/21	1080	590	210	59.2	127	122.8	1.928	1062
VB 110/20	1100	594	200	61.3	129.1	125.8	1.934	1052
VB 114/21	1140	440	210	69.5	172.6	155.8	2.304	1373
VB 117/14	1170	650	140	83	89.9	127.9	1.674	905
VB 117/15	1170	420	150	88.8	98.9	138.2	1.718	984
VB 120/21	1200	622	210	96.1	201.7	197	2.332	1397
VB 127/21	1270	628	210	117.5	242.7	238.9	2.536	1544
VB 130/26	1250	672	260	11.4	402.5	212.6	3.171	1895
VB 135/20	1350	800	200	163.7	264.6	296	2.495	1488
VB 148/22	1480	830	220	248.9	451.5	473.6	3.156	2070
VB 150/15	1500	651	150	236.6	268.5	370.9	2.783	1777
VB 150/30	1500	609	300	335.7	679.2	675.3	3.883	3439
VB 153/24	1530	900	240	305.2	550.7	580.6	3.369	2305
VD 160/23	1600	860	230	430	574	717	3.600	2532
VD 169/28	1690	930	280	478.6	1054.4	1005.8	4.470	3468
VD 181/31	1810	980	310	675.8	1525.2	1438.4	5.210	4395
VD 185/16	1850	1020	160	537	751	912.5	3.966	2473
VD 190/15	1900	1100	150	608.5	718.5	967.8	3.960	2431
VD 190/26	1900	910	260	796	1601	1596.5	5.708	4511
VD 190/34	1900	1050	340	921.6	2061.2	1952.2	5.860	5291

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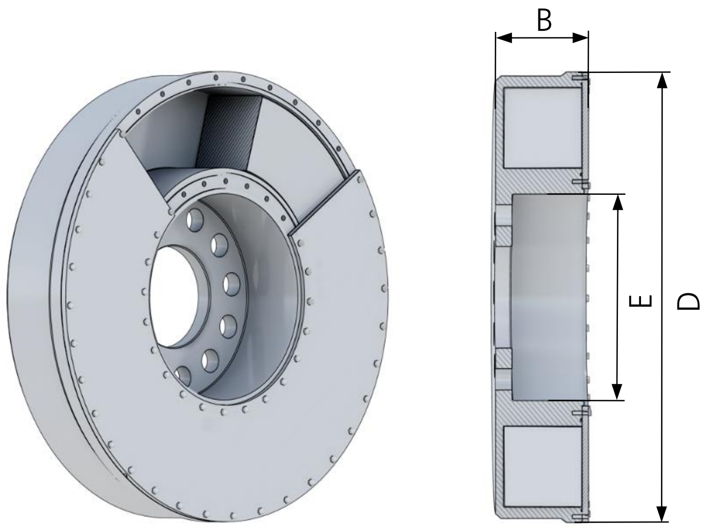

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	D mm	E mm	B mm	I_H kgm²	I_R kgm²	I_{eff} kgm²	A_R m²	m kg
VD 200/20	2000	1100	200	726	1232	1342	5.220	3567
VD 200/40	2000	1033	400	1238.6	3003.7	2740.4	6.888	7570
VD 201/35	2010	1180	350	1232	2488	2476	6.210	5764
VD 210/21	2100	1200	210	1068.1	1625.6	1880.9	5.640	3938
VD 210/35	2100	1150	350	1444	3102	2995	6.870	6689
VD 220/34	2200	1200	340	1780	3568	3564	7.270	7141
VD 225/29	2250	1390	290	2059	2831	3474.5	6.270	6116
VD 230/22	2300	1360	220	1665	2450	2890	6.060	5065
VD 230/46	2250	1082	460	2849.6	5096.5	5397.9	8.535	11398
VD 240/25	2400	1378	250	2234	3501	3984.5	7.500	6595
VD 240/37	2400	1470	370	3335	4870	5770	7.810	9180
VD 248/23	2480	1550	230	2567	3086	4110	7.000	5796
VD 250/24	2500	1400	240	2723	3763	4604.5	7.910	6827
VD 250/50	2500	1304	500	4506.7	8518.1	8765.7	10.381	14694
VD 255/36	2550	1280	360	3611	6801	7012	9.620	10775
VD 265/37	2650	1260	370	4248	8425	8460	10.610	12403
VD 270/40	2700	1520	400	5185	8911	9641	10.280	12592
VD 295/37	2950	1756	370	8058	11329	6522.5	11.190	14225
VD 295/46	2950	1820	460	8868	13078	17207	11.620	15939
VD 300/30	3000	1787	300	7047.8	8949.3	11522.4	10.119	12733
VD 300/45	3000	1767	450	8617.3	15085.8	16160.2	12.499	18035
VD 300/60	3000	1758	600	10197.4	21225	20809.9	14.811	23355
VD 310/37	3100	1960	370	10135	12462	16366	11.860	14665
VD 320/40	3200	1960	400	10952	18224	10065	13.390	17970

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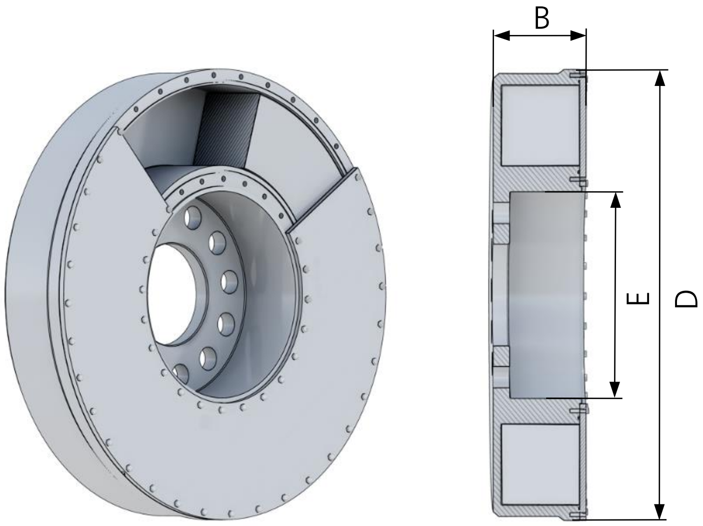

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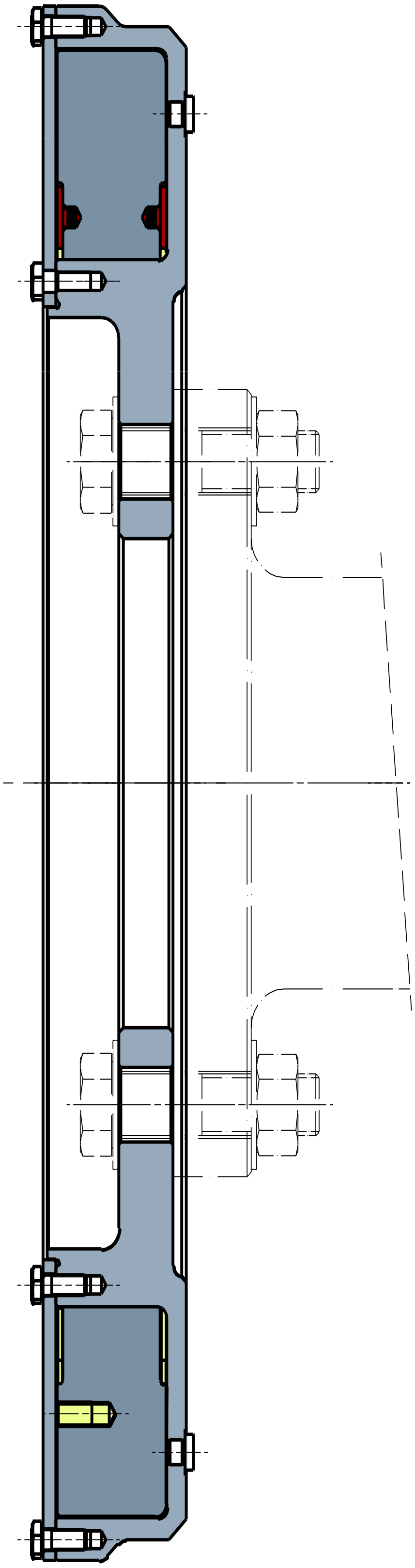
	D mm	E mm	B mm	I_H kgm²	I_R kgm²	I_{eff} kgm²	A_R m²	m kg
VD 330/33	3250	2016	330	10130.5	13725.4	16993.2	11.798	15813
VD 330/35	3300	2080	350	12188	15542	19959	12.980	16250
VD 330/37	3300	2140	370	12009	15858	19938	12.906	15279
VD 330/50	3250	1997	500	12491.2	23132	24057.2	14.744	22543
VD 330/66	3250	1990	660	14732.9	31967.7	30716.7	17.443	28881
VD 340/50	3400	2100	500	17928	24702	30279	14.850	23536
VD 350/35	3500	2249	350	13983.9	19505.8	23736.8	13.390	18817
VD 350/53	3500	2232	530	17235.2	32606	33538.1	16.776	26697
VD 350/55	3500	2200	550	23079	29224	37690	15.870	27061
VD 350/70	3500	2225	700	20325.2	44973.7	42812.1	19.905	34152
VD 354/44	3540	2200	440	22650	23976	34638	14.720	23861
VD 380/38	3750	2483	380	19108.3	27911.4	33064	15.258	22574
VD 380/57	3750	2468	570	23485.4	45720.7	46345.8	19.112	31700
VD 380/76	3750	2461	760	27883	63539.3	59652.6	22.899	40847
VD 396/49	3960	2440	486	38975	37261	57606	17.710	29700
VD 400/40	4000	2720	400	25281.8	37629.8	44096.7	17.005	26171
VD 400/60	4000	2706	600	31058.2	61326.6	61721.5	21.365	36633
VD 400/80	4000	2699	800	36854.1	85058.7	79383.4	25.659	47126
VD 410/41	4090	2806	410	27934.8	42034.1	48951.8	17.709	27678
VD 410/62	4090	2791	620	34479.2	69040.7	68999.5	22.409	39005
VD 410/82	4090	2785	820	40749.7	94731.2	88115.3	26.807	49798

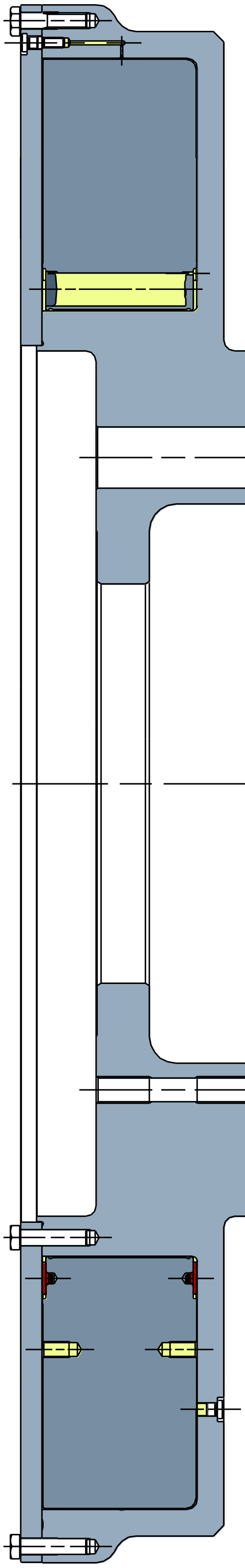
All technical data are without warranty. Modifications of dimensions and design reserved.

Examples

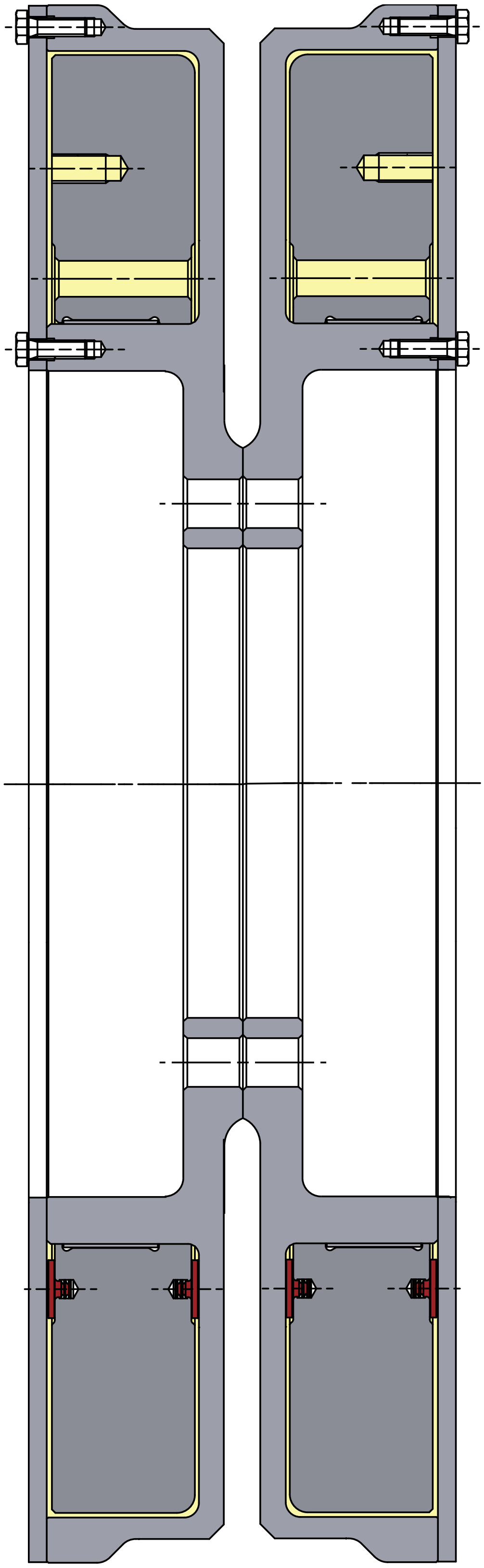
Geislinger Vdamp for 4-stroke engine



Geislinger Vdamp XT for 4-stroke engine



Geislinger Vdamp Twin Arrangement



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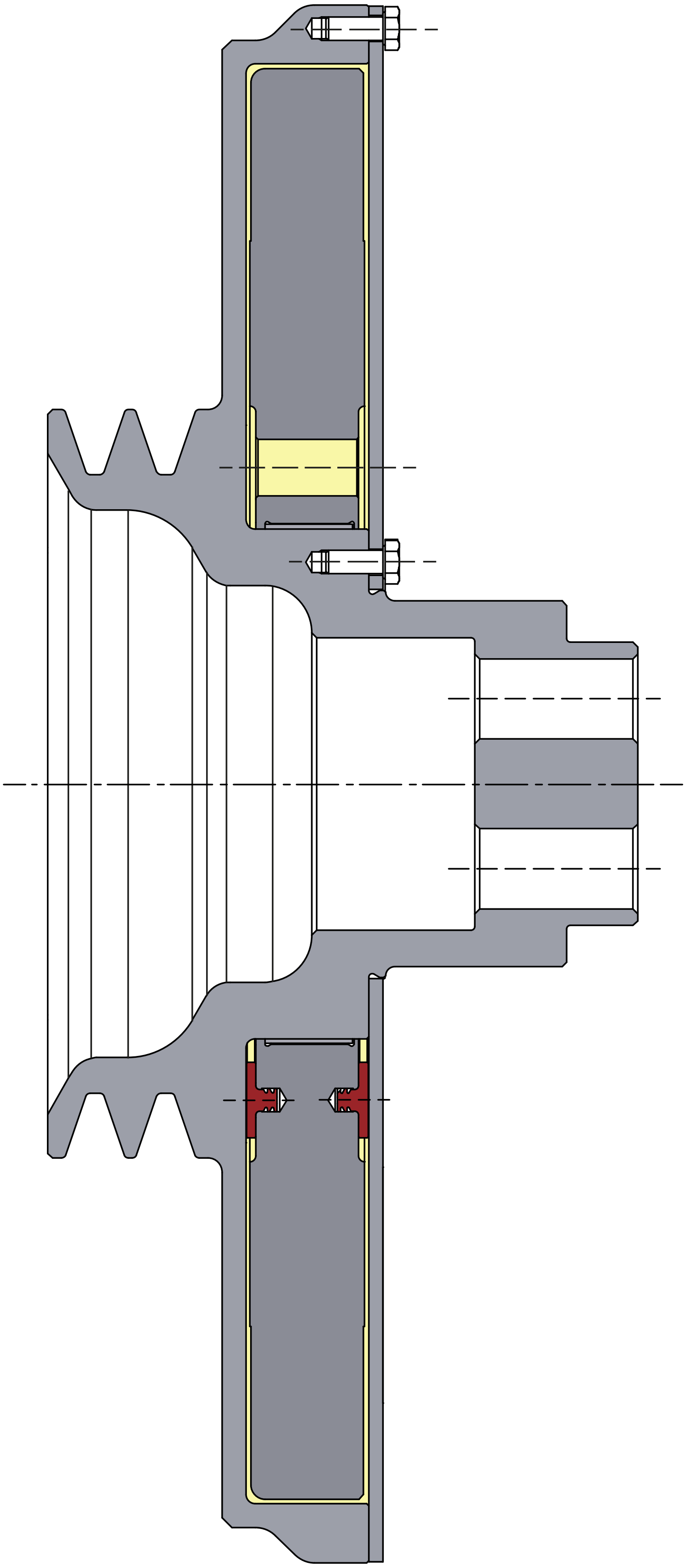
Geislinger Vdamp with integrated belt pulley



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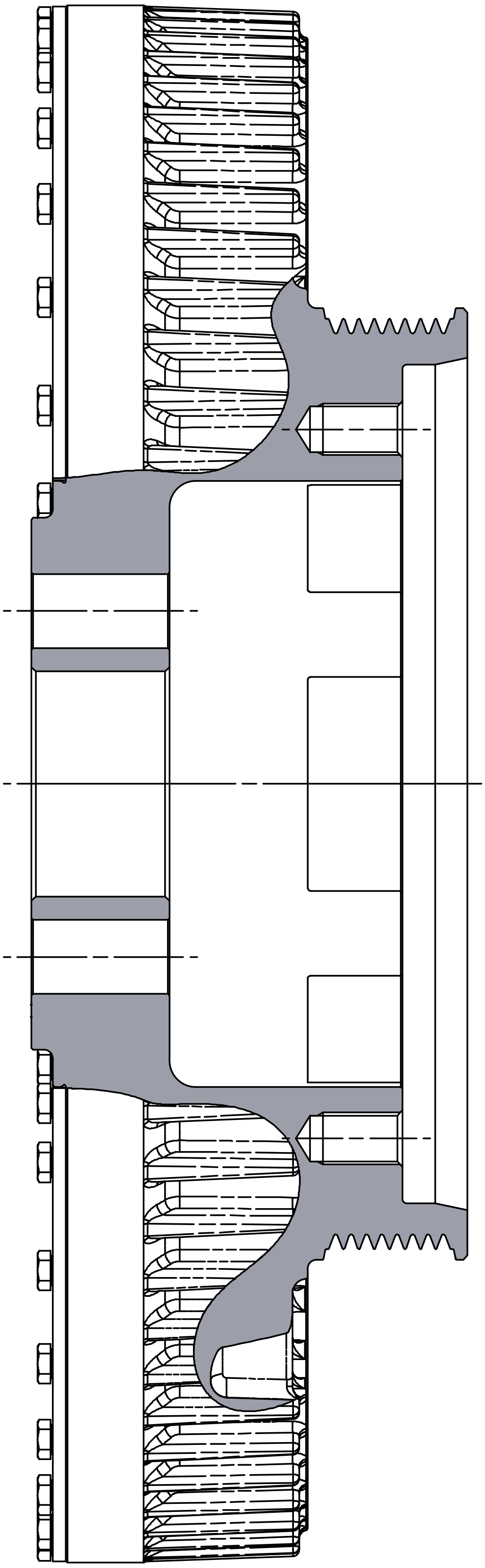
Geislinger Vdamp with different fixed additions (casted fins; PTO; pulley)



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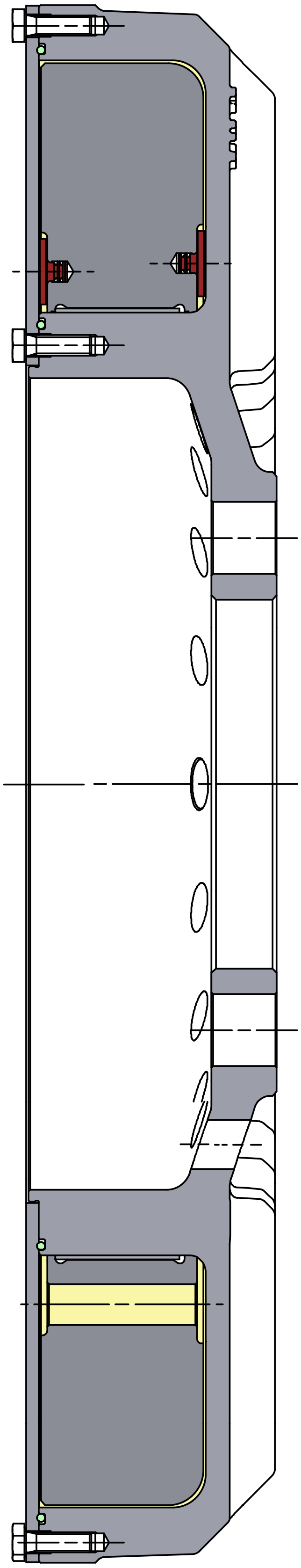
Geislinger Vdamp with casted fins



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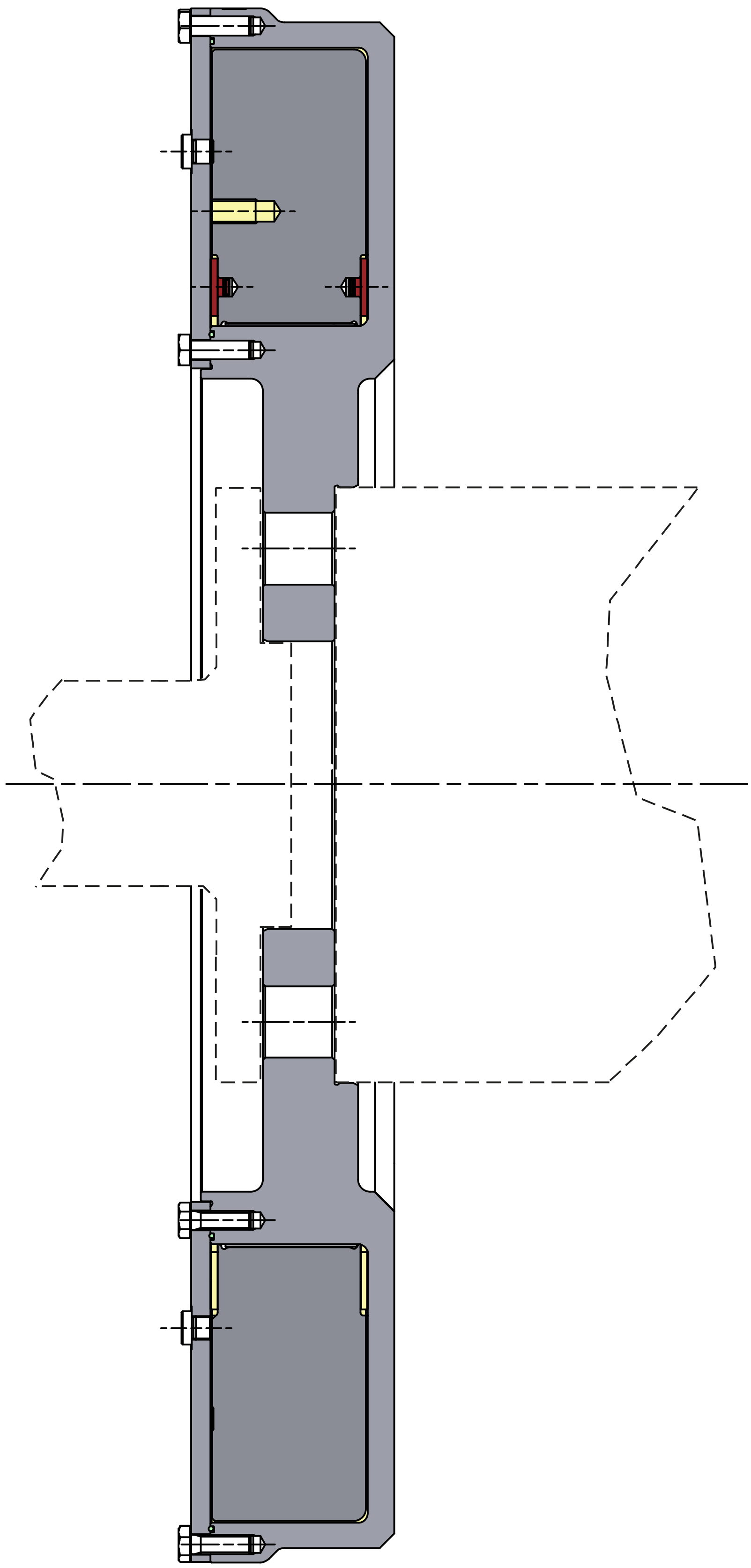
Geislinger Vdamp with front PTO connection



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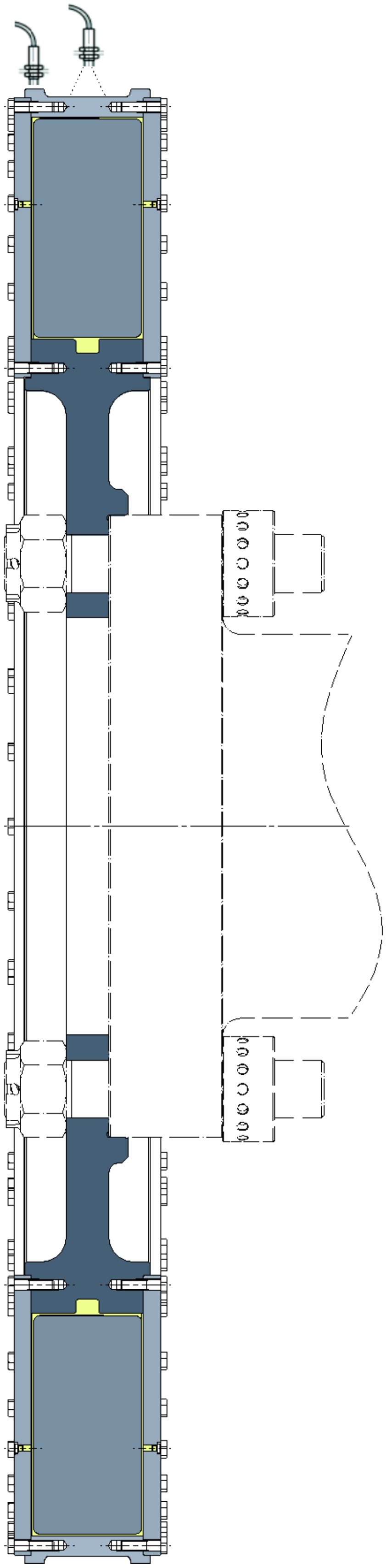
Geislinger Vdamp for 2-stroke engine with sensor pickup for free end signal and temperature



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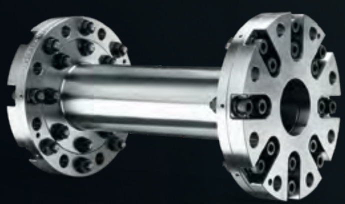
Geislinger Coupling

Geislinger Silenco®

Geislinger Carbotorq®

Geislinger Damper

Geislinger Monitoring



Geislinger Flexlink

Geislinger Vdamp®

Geislinger Gesilco®

Geislinger Gesilco® Shaft

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