“Marine inventions have been in Norwegian genes for a very long time!”
How is Hydradrive constructed?

The idea is based on a simple principle. The engine mounts can be very soft and thereby isolate well against noise and vibrations. For optimal result the thrust forces from the propeller must be transferred directly to the hull via the thrust bearing, independent of the gearbox and engine. Normally the propeller thrust is transferred to the hull via the engine mounts. With Hydradrive the thrust forces goes directly to the hull via the thrust bearing on the propeller shaft. The rotation movement is transferred thru a CV shaft (Constant Velocity shaft).

A complete Hydradrive installation includes CV shaft, thrust bearing, adapter between gearbox and CV shaft and engine mounts.

The CV shaft is the main component in the installation and functions like the drive shaft on a car. In a boat this means that the torsional power is transferred via balls, and the shaft absorbs axial movements in the system. This leads to practically no resistance in any direction when the boat moves through the waves. The result is strongly reduced noise, and vibration levels in the boat.

For work boats, with high running hours and higher workloads than pleasure crafts, we have chosen to deliver the system with normal cardan shafts instead of CV shafts. The reason for this is two important facts: The life expectancy is much longer and the dimensions are smaller. But for smaller vessels, however, with moderate power (less than 500 BHP) we recommend CV shafts. Smaller dimensions are of importance since normally there is limited space for the joints at the gearbox.

The Thrust Bearing
The thrust bearing is mounted directly in the hull. All sizes up to HD 130 (approx. 280 Bhp) are supplied with spherical bearings that absorb small angular displacements in the installations. All our thrust bearings for CV shafts have clamping units built in. This saves space. For work boats with power over 500 hp we use ordinary flanges.

Adaptors for gearbox mounts
All CV shafts require an adaptor for connection to the gearbox. We have a large variety of flanges that enables us to connect our CV shafts to all well-known gearboxes. Bolts and nuts are supplied with each flange.

Engine mounts
Engine mounts might be the most difficult part of the installation. We recommend using the original mounts if possible to begin with. For those who would like new mounts you can contact our customer service, or contact closest dealer. We supply engine mounts that are adapted to our system. They are chosen due to their stiffness of the rubber. We supply premium quality engine mounts with a built in safety device, this enables you to a certain degree to operate the vessel even if the mounts should break.

The complete unit

Engine mounts
A system giving an outstanding technology that brings the vibration and noise level to a minimum. It simplifies the installation considerably. We recommend especially the system for people who are going to re-power with another type of engine with other brackets, etc. A professional company saves a lot of time if installing new engines, a private handyman would save a lot more. Alignment can be done by visual estimate.

What is the reason for noise and vibrations? A traditional installation without Hydradrive brings high levels of vibration to the hull, even when perfectly aligned. The propeller is pushing on the engine mounts. The engine is moving forwards, and the tension between the propellershaft and the transmission increases. The engine has then a tendency to bend upwards. This is the case particularly if the transmission has a dropdown. The noise and the vibration from the propeller itself will be transmitted to the hull, and will often be an extra disturbing noise.

Hydradrive means softer engine mounts. If using extra soft engine mounts, the result of isolation from the source of noise will be considerably improved.

The thrust bearing unit is also mounted with rubber pads. It is supposed to take the thrust forces from the propeller. The CV-shaft is transmitting the torque. The unique construction of the CV-shaft isolates the engine from the propellershaft. The flexibility in the CV-joints is a fantastic solution. It’s such a unique solution for use in boats, that one could think they are invented for this purpose alone! (The construction was meant for use in cars, and done by a Ford engineer with the name Rzeppa around 1925)

Simpler Installation
Both the CV-joints can take up to 8°. This simplifies the installation dramatically. The alignment can be done by visual estimate.

Torsional Vibration.
In traditional installations with a gearbox (Transmission), there will normally be a rubber based torsional damper between the gearbox and the engine. In systems without transmission, a torsional damper can be done in two different ways. As a resilient tubing on longer shafts, or as damper directly on the flywheel. We please ask you to contact Customer service.

Dimensioning of Hydradrive
To decide a correct dimension is dependant of many factors influencing each other. To feel safe with your Hydradrive, we recommend to ask Customer service. Some of the factors can still be assumed. Please remember that all given information for performance and angles are approximate. Next page has tables on many of the important numbers for selection of size. If the numbers are close to next size, we please ask you to oversize.

Invented and made in Norway
Hydradrive - General View

Dimensions – All numbers in mm – All lengths are shortest version

<table>
<thead>
<tr>
<th>Type</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J</th>
</tr>
</thead>
<tbody>
<tr>
<td>CV 105</td>
<td>1</td>
<td>130</td>
<td>80</td>
<td>152</td>
<td>86</td>
<td>143</td>
<td>175</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CV 108</td>
<td>1</td>
<td>155</td>
<td>80</td>
<td>187</td>
<td>100</td>
<td>143</td>
<td>175</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CV 113</td>
<td>1</td>
<td>155</td>
<td>110</td>
<td>195</td>
<td>100</td>
<td>184</td>
<td>224</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CV 115</td>
<td>1</td>
<td>170</td>
<td>145</td>
<td>232</td>
<td>110</td>
<td>202</td>
<td>250</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CV 121</td>
<td>1</td>
<td>210</td>
<td>197</td>
<td>280</td>
<td>130</td>
<td>216</td>
<td>265</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CV 130</td>
<td>1</td>
<td>245</td>
<td>197</td>
<td>315</td>
<td>150</td>
<td>233</td>
<td>290</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CV 142</td>
<td>2</td>
<td>270</td>
<td>205</td>
<td>371</td>
<td>195</td>
<td>300</td>
<td>370</td>
<td>85</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cardan 150</td>
<td>2</td>
<td>300</td>
<td>205</td>
<td>400</td>
<td>205</td>
<td>300</td>
<td>370</td>
<td>85</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cardan 160</td>
<td>3</td>
<td>420</td>
<td>285</td>
<td>x</td>
<td>287</td>
<td>340</td>
<td>432</td>
<td>x</td>
<td>250</td>
<td>69</td>
</tr>
<tr>
<td>Cardan 180</td>
<td>3</td>
<td>560</td>
<td>285</td>
<td>x</td>
<td>287</td>
<td>340</td>
<td>432</td>
<td>x</td>
<td>250</td>
<td>69</td>
</tr>
<tr>
<td>Cardan 200</td>
<td>3</td>
<td>640</td>
<td>285</td>
<td>x</td>
<td>287</td>
<td>400</td>
<td>432</td>
<td>x</td>
<td>250</td>
<td>75</td>
</tr>
</tbody>
</table>

Hydradrive - Performance

<table>
<thead>
<tr>
<th>Max practical tourque in Nm</th>
<th>Expected normal propeller rpm</th>
<th>Thrust in Newton ( Kg )</th>
<th>Engine power</th>
<th>Shortest length CV-shaft/ Cardanshaft</th>
<th>Min. length at special lengths ( Max. 2 m )</th>
</tr>
</thead>
<tbody>
<tr>
<td>CV 105</td>
<td>180 Nm</td>
<td>1000 - 1500</td>
<td>3000 N ( 290 Kg )</td>
<td>10 - 40 Hp</td>
<td>130mm</td>
</tr>
<tr>
<td>CV 108</td>
<td>240 Nm</td>
<td>1000 - 1500</td>
<td>3600 N ( 350 Kg )</td>
<td>30 - 60 Hp</td>
<td>155mm</td>
</tr>
<tr>
<td>CV 113</td>
<td>300 Nm</td>
<td>1000 - 1500</td>
<td>5750 N ( 570 Kg )</td>
<td>40 - 75 Hp</td>
<td>155mm</td>
</tr>
<tr>
<td>CV 115</td>
<td>580 Nm</td>
<td>1000 - 1500</td>
<td>8500 N ( 840 Kg )</td>
<td>60 - 115 Hp</td>
<td>170mm</td>
</tr>
<tr>
<td>CV 121</td>
<td>750 Nm</td>
<td>1000 - 1500</td>
<td>17000N ( 1650 Kg )</td>
<td>100 - 235 Hp</td>
<td>210mm</td>
</tr>
<tr>
<td>CV 130</td>
<td>1300 Nm</td>
<td>1000 - 1500</td>
<td>20000N ( 1950Kg )</td>
<td>180 - 270 Hp</td>
<td>245mm</td>
</tr>
<tr>
<td>CV 142</td>
<td>2000 Nm</td>
<td>1000 - 1500</td>
<td>32000N ( 3100Kg )</td>
<td>270 - 420 Hp</td>
<td>270mm</td>
</tr>
<tr>
<td>Cardan 150</td>
<td>3500 Nm</td>
<td>1000 - 1500</td>
<td>32000N ( 3100Kg )</td>
<td>350 - 480 Hp</td>
<td>300mm</td>
</tr>
<tr>
<td>Cardan 160</td>
<td>4700 Nm</td>
<td>1000 - 1500</td>
<td>50000N ( 4850Kg )</td>
<td>450 - 600 Hp</td>
<td>420mm</td>
</tr>
<tr>
<td>Cardan 180</td>
<td>6000 Nm</td>
<td>1000 - 1500</td>
<td>50000N ( 4850Kg )</td>
<td>550 - 800 Hp</td>
<td>560mm</td>
</tr>
<tr>
<td>Cardan 200</td>
<td>9000 Nm</td>
<td>1000 - 1500</td>
<td>100000N ( 9600Kg )</td>
<td>700 - 1400 Hp</td>
<td>640mm</td>
</tr>
</tbody>
</table>
The 105 to 115 Series are designed mainly for pleasure craft.
The specifications given are for pleasure boats (used less than 200 hours per year). For commercial applications, we recommend going up one size. Thrust bearings for all models have bearings which allow misalignment, which greatly simplifies installation. The maximum allowable misalignment is around 4°. All models are made for shaft diameters indicated in the specifications. Any diameter can be supplied. The shafts must be cut to a length 2 – 5 mm longer than the distance to the end of the clamp unit. CAD drawings for all models are available on our homepage, www.powertrain.no.
Drive shafts can be supplied in any length. The shortest standard is shown in the specifications. Drive shafts with a center bearing are also available for extra long shafts. Adapters for most gearboxes are available, and are specified in the pricelist. Custom adapters can be made for all models.

For practical purposes suitable for enginepower up to approx. 40 Hp

Max continuous thrust: 3000 N
For shaft diameters: 19/20/25mm - ¾”, 1”
Max continuous torque: 180 Nm
Breakage torque: 600 Nm
Max rpm: 5000
Max angular displacement pr joint 8°
Max Hp at 1000 rpm: 27 Hp
Max continuous thrust: 3600 N
For shaft diameters: 20/25/30mm – 1”/1.25”
Max continuous torque: 240 Nm
Breakage torque: 1600 Nm
Max rpm: 5000
Max angular displacement per joint: 8°
Max Hp at 1000 rpm: 40 Hp

For practical purposes, suitable for enginepower up to approx. 50 Hp
Max continuous thrust: 9500 N
For shaft diameters: 30/35mm – 1.25”/1.375”/1.5”
Max continuous torque: 300 Nm
Breakage torque: 1600 Nm
Max rpm: 5000
Max angular displacement pr joint: 8°
Max Hp at 1000 rpm: 55 Hp

For practical purposes suitable for engine power up to approx. 65 Hp
HD115

Max continuous thrust: 12500 N
For shaft diameters: 35/40/45/50mm
1,25”/1,375”/1,5”/1,75”
Max continuous torque: 580 Nm
Breakage torque: 2100 Nm
Max rpm: 5000
Max angular displacement pr joint 8°
Max Hp at 1000 rpm: 75 Hp

For practical purposes suitable for enginepower up to approx. 90 Hp.

For full planing vessels 135 Hp
The numbers given are for pleasure boats which are used less than 200 hours per year. If one intends to use these sizes for commercial boats, the numbers must be reduced by 25%. Models 121 and 130 have spherical bearings. That makes the installation a lot easier. Max angle is around 4°. Type 142 and 150 have non-spherical bearings.

Need of a lifetime calculation? Call customer service.

All models are made for one specific shaft diameter. Principally any diameter can be supplied. The shafts have to be cut for a length 2 – 5 mm longer than to the end of the clamp unit. All models are available as CAD drawings on our homepage www.powertrain.no

The driveshafts can be supplied in any length. The type given is the standard shortest version. Driveshafts with center bearing are also available for extra long shafts.

Adapters for all types of gearboxes are available. All types are specified in the pricelist. Specials can be custom made for all models.

The practical difference to the smaller versions (105-115) is the clamp cylinder for higher torques.

The model 150 is equipped with a cardan style driveshaft. This solution can transmit a much higher torque than a CV shaft. It has to be installed with two equal angles. The CV shafts can take two different angles. The CV shaft is a technically better solution, but the cardan type is more reliable. To achieve a very long lifetime (thousands of hours) the CV style is not a good solution, as the sizes then have to be very large, and very impractical (and very expensive!)

HD121 – 130 Thrust Bearing Unit
HD121

Max continuous thrust: 18000 N
Shafts: 35/40/45/50mm
1,25”/1,375”/1,5”/1,75”/2”
Max continuous torque: 1080 Nm
Breakage torque: 4000 Nm
Max rpm: 5000
Max angular displacement pr joint: 8°
Max Hp at 1000 rpm: 150 Hp

For practical purposes suitable for enginepower up to approx. 170 Hp.

For full planing vessels 225 Hp
Max continuous thrust: 25000 N
Shafts: 35/40/45/50/55mm 1,25”/1,375”/1,5”/1,75”/2”/2,25”
Max continuous torque: 1800 Nm
Breakage torque: 6000 Nm
Max rpm: 5000
Max angular displacement pr joint: 8°
Max Hp at 1000 rpm: 240 Hp

For practical purposes suitable for enginepower up to approx. 270 Hp.
For full planing vessels 320 Hp.
Max continuous thrust: 38000 N
Shafts: 40/45/50/55/60mm
1,375”/1,5”/1,75”/ 2”/2,25”/2,5”
Max continuous torque: 3300 Nm
Breakage torque: 12000 Nm
Max rpm: 4000
Max angular displacement pr joint: 8°
Max Hp at 1000 rpm: 290 Hp

For practical purposes suitable for enginepower up to approx. 350 Hp.

For full planing vessels 470 Hp
HD150 Cardan LOKE

Max continuous thrust: 38000 N
Shafts: 40/45/50/55/60mm, 1,375"/1,5"/1,75"/2"/2,25"/2,5"
Max continuous torque: 5000 Nm
Breakage torque: 17000 Nm
Max rpm: 2700
Max angular displacement pr joint: 5°
Max Hp at 1000 rpm: 400 Hp

For practical purposes suitable for engine power up to approx. 500 Hp.
For full planing vessels 600 Hp.
The Hydradrive Thrust bearings (The Thrust drive system)
These constructions are meant for Work boats or Pleasure boats with engines larger than 500 HP.
We offer this system with old style cardan shaft solutions. A cardan shaft (or driveshaft) can never be an equal solution to the CV – shaft. But it has one very big advantage to the CV solution: It has a reliable construction with much longer lifetime expectancy. If the shaft can be installed in the boat with equal angles on both sides, the construction allows a normal misalignment, and a reasonable movement of both the hull and the engine.
The Thrust bearings are all equipped with DIN 250 Cardan shaft flange on one side, and ZF 280/22/16 on the other side. One other reason for using ordinary cardan shafts, is the size of the joints on large CV joints. On most Transmissions there is a hydraulic pump beside the flange itself. An adapter is possible to make, but sometimes complicated (and expensive). The last 20 years have given us the experience: Use old fashion driveshafts. Align properly, and get a long lifetime!
We have sold CV shafts for large boats over a long time. We can still supply this type of product, but as we have had a lot of lifetime problems, we mainly offer the Cardan style. We of course offer the cardan shafts, but any type of shaft can be used as long as it has the DIN 250 flange.
HD160 Cardan

Max continuous thrust: 55000 N
For flange adapter only ZF 280/22/16
For driveshaft GWB 687.65 or equal.
Compressed length from 520mm (20,5")
Max continuous torque: 6000 Nm
Breakage torque: 35000 Nm
Max rpm: 2700
Max angular displacement pr joint 5°
Max Hp at 1000 rpm: 500 Hp

For practical purposes suitable for engine power up to approx. 600 Hp
For full planing vessels 700 Hp
HD180 Cardan

Max continuous thrust: 75000 N
For flange adapter only ZF 280/22/16
For driveshaft GWB 587.50 or equal.
Compressed length from 540mm (21.3")
Max continuous torque: 7500 Nm
Breakage torque: 43000 Nm
Max rpm: 2700
Max angular displacement pr joint 5°
Max Hp at 1000 rpm: 700 Hp

For practical purposes suitable for enginepower up to approx. 800 Hp
For full planing vessels 1000 Hp
HD200 Cardan

Max continuous thrust: 125000 N
For flange adapter only ZF 280/22/16
For driveshaft GWB 587.55 or equal.
Compressed length from 620mm (24,4”)
Max continuous torque: 10000 Nm
Breakage torque: 52000 Nm
Max rpm: 2700
Max angular displacement pr joint 5°
Max Hp at 1000 rpm: 1200 Hp

For practical purposes suitable for enginepower up to approx. 1350 Hp
For full planing vessels 1600 Hp
A plunging constant velocity (CV) joint is producing heat if used with an angle. The temperature must never be higher than 70 °C. (USA: 160° Fahrenheit) 

A USEFUL RULE OF THUMB IS: RPM (speed) x angle = less than 11000
Example 1: 5° x 1400 rpm = 7000 (Ok)
Example 2: 8° x 1600 rpm = 12800 (Not Ok)

Hydradrive of the Cardan type:
The two angles have to be as equal as possible. A difference of 1° is acceptable.
If the speed is less than 900 rpm the difference may be up to 2°.
The max angle on the cardan type is 5°. If a larger angle is needed we please ask you to contact customer service.

Thrust bearings:
All thrust bearings from 105 - 130 are equipped with a spherical type of bearing. The max angle must never be more than 4°. If a larger angle is wanted, please contact customer service.
All Thrust bearings from 142 - 200 do not have a spherical type of bearing. An alignment is therefore an important part of any installation of a Hydradrive. The alignment of a small bearing is a lot easier than the alignment of a complete Engine!
You will find installation manuals on www.powertrain.no
All drawings are available for download in several formats, or can be ordered as a CD-rom.

Spare parts: All parts are available from stock. Contact customer service
Adapters: All adapters for the different gearboxes (Transmissions) to be found in the pricelist. Most adapters have a length of 30mm (1,181”)
Special lengths on request. Some adapters are made to avoid the hydraulic pump on the transmission (special shape). Drawings can be ordered at customer service.
The Marine-type AMC-Mecanocaucho® mounts are ideal for mobile applications thanks to their rugged architecture. Their special design offers different stiffnesses on the three axes, making it possible to offer major flexibility in the direction perpendicular to the crankshaft/shaft of the motor. This provides more effective isolation from vibrations of all types of engines.

### TECHNICAL CHARACTERISTICS

Marine Mounts are specifically designed for marine and land applications, providing fail-safe protection for mobile applications. This device has an interlocking metal component that provides a better interface between the equipment and the mount. The top part protects the elastomer inside from possible damage caused by dripping oil, diesel, ozone, and ultraviolet emissions that may limit the ascending vertical movement when the mounting is submitted to shocks at traction.

### APPLICATIONS

- Marine Propellers
- Ventilators
- Compressors
- Industrial vehicles
- Marine-Land units
- Mobile electrical panels
- Pumps

### DESCRIPTION

- For marine engine applications, contact the AMC-Mecanocaucho® technical department.
- The top part of the hood has a cross-shaped stamp, which improves its stiffness in mobile applications and also improves the evacuation of oils or liquid which splash onto it. The metal parts have an anticorrosive treatment which is suitable for outdoor applications.

### MARINEMOUNT

<table>
<thead>
<tr>
<th>TYPE</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>F</th>
<th>G</th>
<th>J</th>
<th>M</th>
<th>AMC</th>
<th>CODE 35 Sh</th>
<th>CODE 40 Sh</th>
<th>CODE 45 Sh</th>
<th>CODE 50 Sh</th>
<th>CODE 55 Sh</th>
<th>CODE 65 Sh</th>
<th>CODE 75 Sh</th>
<th>WEIGHT (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMALL</td>
<td>120</td>
<td>38.5</td>
<td>60</td>
<td>100</td>
<td>14</td>
<td>11</td>
<td>11</td>
<td>M-12</td>
<td>60-70</td>
<td>136001</td>
<td>136002</td>
<td>136003</td>
<td>136004</td>
<td>136007</td>
<td>*</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>MEDIUM</td>
<td>183</td>
<td>50</td>
<td>75</td>
<td>140</td>
<td>30</td>
<td>13</td>
<td>20</td>
<td>M-16</td>
<td>150-180</td>
<td>136021</td>
<td>136022</td>
<td>136023</td>
<td>136024</td>
<td>136025</td>
<td>*</td>
<td>857</td>
<td></td>
</tr>
<tr>
<td>LARGE</td>
<td>228</td>
<td>68</td>
<td>112</td>
<td>182</td>
<td>34</td>
<td>18</td>
<td>26</td>
<td>M-20</td>
<td>600-700</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>2250</td>
<td></td>
</tr>
<tr>
<td>XL</td>
<td>330</td>
<td>122</td>
<td>190</td>
<td>270</td>
<td>22</td>
<td>22</td>
<td>26</td>
<td>M-24</td>
<td>2000-3000</td>
<td>136061</td>
<td>136062</td>
<td>136063</td>
<td>136064</td>
<td>136065</td>
<td>*</td>
<td>9600</td>
<td></td>
</tr>
</tbody>
</table>

* Manufacture under request.

All marine mounts are listed in the price list.
POWERTRAIN EUROPE AS
Stanseveien 14, N-0975 Oslo.
P.O.Box 5 Leirdal, N-1008 Oslo. NORWAY
Tel. +47 2232 7777 – Fax +47 2232 7100
E-mail: mail@powertrain.no

www.powertrain.no

Made in Norway