Marine propulsion

HUWI
HNWI
HCWI
HUWI/HNWI/HCWI SERIES

Features

Compact design
Series HUWI vertical shaft arrangement
Series HNWI horizontal shaft arrangement
Series HCWI coaxial shaft arrangement
Case-hardened and ground gearing
Amply dimensioned roller bearings and accessories
Conventionally dimensioned and, therefore, heavy duty hydraulically operated multiple-disc clutches
High rigidity of housing
Approved by all classification societies
Easy to service and maintain
Optimal cost/output ratio
Optional features:
PTO drives
Condition Monitoring
Marine reverse reduction gearboxes with incorporated hydraulically actuated multi-disc clutches. The features of these clutches, designed to work under very severe operating conditions with most favourable results, make them particularly suitable to be used by manufacturers of transmissions all over the world.

Our high quality and proven experience in the production of industrial reduction gears, marine reduction gears and marine reverse-reduction gears for over 50 years, together with its most modern production techniques, qualified production personnel, most modern production facilities and highest possible machining accuracy, guarantee the utmost reliability of the products supplied by its factory located in Mungia.

This series of modern marine reversing gears has been developed by experienced engineers using proven design principles and reliable basic elements of the marine gear field, together with the latest developments in material and production techniques, to be applied in the manufacturing of Tacke-Olalde marine reverse-reduction gears.

Our experience together with the new technology applied, has resulted in marine reverse-reduction gears with appropriate weight, compact construction, easy access to all important parts and, therefore, easy maintenance, with the constant aim of achieving long life and optimum reliability.

**Special characteristics**

- Amply dimensioned casings, strongly ribbed, vibration and torsion resistant, especially reinforced in the support area of the bearings and the thrust bearing to absorb, safely, all forces especially at start of propeller thrust.

- Computer-calculated gearing, according to the rules of the classification bodies, of single-helical design and cut with protuberance. They are made of alloyed and forged steel, high strength, case-hardened, and tooth flanks precision ground on the latest up-to-date machine-tools. The external hardness of the gear tooth flank is 60±2 HRC. Thereby achieving the best possible gear mesh, ensuring low noise and vibration operation and so long life.

- All shafts have amply dimensioned with standard roller bearings (FAG/SKF) calculated for long life under full load conditions.

- Amply dimensioned hydraulically operated multiple-disc clutches, with hardened internal and external teeth, and equipped with extremely wear resistant clutch discs.

- Designed for easy servicing - For instance, clutch discs can be replaced without removal of the gearbox and without complete dismantling of the whole gearbox.

- Design, material, technical calculations of bearings, gears and shafts, etc., are in full accordance with the rules of all major classification bodies (Lloyd's Register, Bureau Veritas, Germanischer Lloyd's, etc.).
HUWI-HNWI Standard Series

Description: See page 5.

The HNWI marine reverse reduction gearboxes with adjacent shaft arrangement are of identical construction with respect to gear assembly.

- Gearbox marine reverse reduction gearboxes
- Standard series
- HUWI/HNWI/HCWI (roller bearings)
- Input shaft: Hydraulically operated multiple disc clutches with highly wear resistant clutch discs
- All pinions and gear wheels with single helical toothing case-hardened and ground. Reductions ratios 1:1 to 7:1
- Twin thrust bearings to absorb the full propeller thrust in both directions
- Oil pump for sufficient oil supply even at low speeds
- Oil cooler is seawater resistant
- Oil filter with renewable insert (single or duplex filter)
- Cast or machined mounting brackets
- Lower part of casing designed as the oil sump with baffle plates
- Oil drain plug
- Oil feed to the clutches
- Control valve for hydraulic clutches with adjustable control for automatic pressure build-up to achieve soft engagement
- Gearbox complete with pipes
- Oil dip stick
- Clutch housing with hardened teeth
- Forged output shaft flange coupling
- Hydraulically operated multiple disc clutches with highly wear resistant clutch discs
- Clutch housing with hardened teeth
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- Hydraulically operated multiple disc clutches with highly wear resistant clutch discs
General
Marine reverse reduction gearboxes with two incorporated hydraulically operated multiple-disc clutches for engaging or disengaging the propeller for ahead or astern movement.

Casings
Rugged, strongly ribbed, vibration and torsion resistant design with special reinforcements in the support area of the bearings and the thrust bearing to absorb, safely, all forces during the operation, especially at propeller start up.

Pinions and gears
Made of high strength alloyed steel in single helical design, cut with protuberance on the most modern and accurate machine tools. The gear teeth values are computer-calculated with consideration of optimum load factors based on the rules of the classification bodies.

The gear tooth flanks are generally case hardened with a surface hardness of 60±2 HRC, and precision ground on the most accurate machine tools to achieve a low-noise, vibration-free operation and so long life.

Shafts
Made of high strength alloyed steel. The input shaft has a cylindrical shaft extension with keyway and key to adapt a very flexible coupling which is essential for diesel engine drive.

The output shaft a one piece alloy steel forging with integral coupling with accurately positioned bolt-holes. Coupling bolts are not supplied.

Bearings
Reverse reduction gearboxes are equipped in their standard form with roller bearings of two rows. Special care has been taken to avoid axial and radial loads on the same bearing. In such cases, the radial loads are supported by roller bearings, and the axial loads by ball bearings with four rolling paths r by roller bearings of the series 294 or 293.

The thrust bearing consists of two roller bearings to safely withstand the axial forces generated by the propeller, both for ahead and astern movements.

The calculated life of all bearings used, considerably exceeds average values.

Lubrication system
The lower part of the gear casing serves as the oil reservoir with amply dimensioned capacity. Baffle plates are provided, as well as a special sheet metal trough around the lower part of the main wheel to prevent foaming of the lubricating oil.

All bearings are lubricated via separate pipes with nozzles to feed the oil.

The clutch discs are lubricated with pressurised oil fed through the bored shafts.

The seawater resistant oil cooler is mounted on the upper part of the gear casing. Usually it is sized for a cooling water inlet temperature of 32°C and it is adequate for the cooling of the oil during all modes of operation of reverse reduction gearboxes.

The oil pressure for lubricating the hydraulic clutches is generated by a directly driven precision gear pump. A filter with renewable insert(s) is installed in the oil circuit, for constant cleaning of the oil. All parts of the lubrication system are fully piped. The connections for cooling water are provisionally sealed until the reverse reduction gearboxes are final installation.

Instruments
Provided as standard
1 pressure gauge for lubricating oil
1 pressure gauge for hydraulic pressure
1 thermometer for oil temperature

If required by classification rules, all necessary additional instruments as well as pressostats and thermostats shall be provided as optional extras, i.e. for unmanned (condition monitored) engine rooms.

This instrumentation is mounted on a common base plate and all the electrical wiring on the gearbox is connected to a terminal box.

Rotation directions
The reverse reduction gearbox series HUWI-HNWI and HCWI can be supplied for various input and output rotation directions.

a) Standard

HUWI and HNWI
The output shaft rotates in the opposite direction to the input shaft.

HCWI
Both output and input shafts are rotating in the same direction.

b) Special

HUWI and HNWI
Both output and input shafts rotate in the same direction.

HCWI
The output shaft rotates in the opposite direction to the input shaft. With twin screw installations and engines operating in the same direction of rotation, one "Standard" gearbox and one "Special" gearbox must be applied.
Hydraulically operated clutches

The operational safety, with reference to the life of a marine reverse reduction gearbox, is widely influenced by the type of clutches and their dimensions. This is because the clutches are the "heart" of the gearboxes and are their most heavily stressed parts.

Hydraulic clutches have been proven in many years of heavy duty operation in marine gearboxes and have been found to be absolutely reliable, even under the severest working conditions.

They have the highest safety in operation, are extremely wear resistant and require no maintenance. They form a closed and compact system within the gearbox. No leaks, nor sealing problems arise.

The heat, which develops naturally during engagement, is absorbed by the cooling oil being fed under pressure through the bored shafts directly to the clutch discs, and will be quickly and safely dissipated during operation. This allows for rapid sequences of engagements of the clutches, and a long life for the clutch discs.

It is possible to change the clutch discs without dismantling the whole gearbox and so means easy maintenance.

The HUWI reverse reduction gearboxes, up to size 45, allow clutch discs to be changed without dismantling the flexible coupling.

Clutch control is achieved via a hydraulic 4/3-valve, which is assembled together with other parts to a hydraulic unit mounted on the upper part of the gearbox casing. Control valve operation is normally by electric remote control (optionally pneumatic). With smaller size HUWI reverse reduction gearboxes, a mechanical clutch control is also available.

As an important feature, the hydraulic system for the control of the clutches includes an adjustable pressure build-up circuit. This can be adjusted to the mode of operation of the vessel to achieve smooth and shock-free engagements of the clutches, and so ensure short engagement times.

Clutch control is possible by an emergency manual device fitted to the hydraulic unit, ensuring clutch engagement/disengagement is possible even if a break-down in the electric or pneumatic circuit of the vessel should occur.

The teeth of the clutch housing and of the clutch hub are hardened to transmit the loads of clutch engagement without wear.

The clutches are equipped with the clutch discs of a leading manufacturer, which have been tested in thousands of gearboxes. The sinusoidal inner discs made of specially heat treated alloy steel guarantee the idle running clutch of the reverse reduction gearboxes, good disengagement and ample lubrication. The steel outer discs are coated with a thick layer of sintered bronze.

These features ensure the low wear and long life of the hydraulic clutches.
**HUWI Series**

**Vertical shaft arrangement**

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## HUWI/S Series
### Vertical shaft arrangement

![Gearbox marine reverse reduction gearboxes](image)

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## HCWI Series

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Gearbox marine reverse reduction gearboxes

Standard series

HUWI/HNWI/HCWI (roller bearings)
Standard Construction
HUWI-HNWI-HCWI (vertical, horizontal and coaxial shaft arrangement).

Casing quality cast iron or welded steel with machined foundation faces and alignment screws. Integral forged output coupling flange.

Control valve for clutch control, with complete lubrication system, fully piped with directly driven lubrication oil pump, seawater resistant oil cooler, usually configured for 32°C water inlet temperature and oil filter with renewable insert(s). Pressure and temperature gauges.

Special equipment
» Bell housing for the input shaft.
» Tachometer for speed measurement.
» Instruments for unmanned engine room (condition monitoring).
» Pneumatic or hydraulic shaft brake.

PTO’s
Power take-off running with engine speed, without clutch.
Power take-off with incorporated hydraulic clutch, with or without speed increasing stage.

Comments
Usually all reverse reduction gearbox casings up to size 40 are made of cast iron and those from size 45 and upwards are made of welded steel.
Remote control operation can be optionally, electric, pneumatic or mechanical.
Gearbox marine reverse reduction gearboxes
Standard series

HUWI/HNWI/HCWI (roller bearings)
Elevate the tradition

La tradición de la industria naval en la fachada atlántica ha dejado históricamente su huella en toda la geografía peninsular, colocando a Bilbao y a Gamesa gearbox en el epicentro del desarrollo marítimo del último siglo.

Nuestra tradición industrial ligada al mar nos ha permitido fabricar gearboxes que propulsan con orgullo a día de hoy a más de 300 buques en un sector de alto valor añadido.

En Gamesa Gearbox disponemos de un equipo con la experiencia transmitida de generación en generación de una mano de obra especializada y cualificada para alcanzar la excelencia en el diseño y fabricación de gearboxes para propulsión marina.

| 300+ gearbox fabricados | 1+ millón CV de potencia | Portfolio hasta 12k CV |