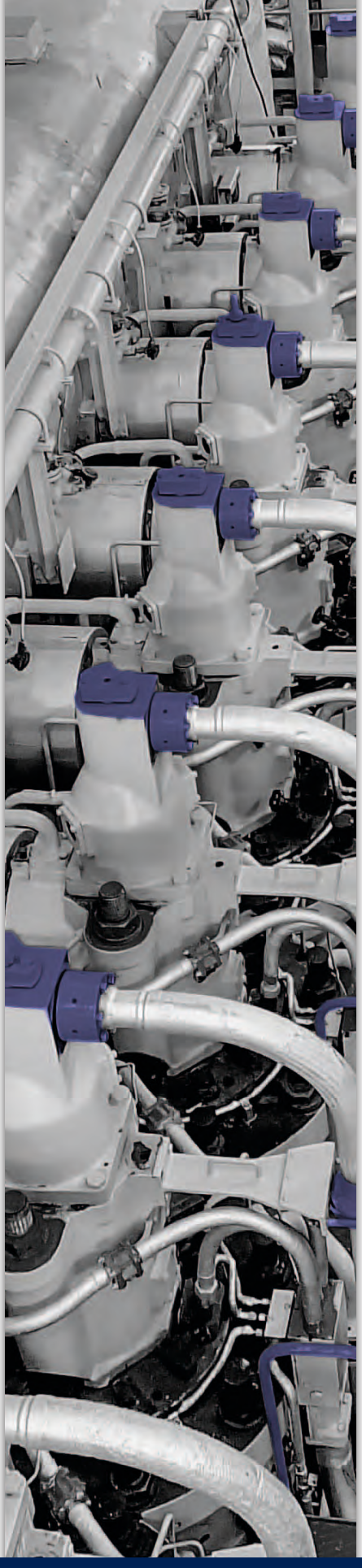


Complete maintenance solutions

for 2-stroke & 4-stroke Diesel and Gas Engines

Innovative engineering since 1962

CHRIS-MARINE®



Ensure reliable engine performance

We care for your engine!

For more than five decades, Chris-Marine® has designed engine maintenance solutions for 2-stroke & 4-stroke diesel and gas engines. These engine care solutions are world-renowned and well known both within the marine and the industrial markets.

We grow constantly and have sales offices in Sweden, Denmark, Germany, Singapore, China, India, Japan, Ecuador and USA. Close cooperation with local agents around the world helps us serve our customers independent of their location.

In addition, we have well-equipped workshops in Denmark, Germany, Sweden, Singapore, Shanghai and USA, which makes us an ideal partner in engine care maintenance.

Solutions for the future

In parallel with the increasing market shares, the product range is growing to meet our customers' demands for more advanced machines and tools for an ever-wider range of applications.

We design, develop, manufacture and market our equipment under three strong brands; Chris-Marine®, Obel-P® and LEMAG®.

We offer six portfolios to our customers;
Monitoring, Cleaning, Grinding & Machining, Fuel System Maintenance, Power Packs, Accessories & Consumables.
In addition, we provide Mobile Workshop Solutions as well as Technical Support & Aftersales (TSA).

Our customers are mainly engine builders, ship owners, shipyards, workshops and power plants. Our mission is to provide them with state-of-the-art engine care solutions to optimize the running of their engines in order to save time and money with minimum environmental impact.

Well educated and dedicated staff

Worldwide, around 100 well educated men and women strive to improve our products and services. We continuously work to increase quality and usability in order to realize our mission.

Five value words - purposeful, innovative, exceptional, learner and caring - guide us in everything we do and are the essence of our company culture and way forward.

Monitoring portfolio ____ 4

Cleaning portfolio ____ 8

Grinding & Machining portfolio

- CYLINDER HEADS ____ 10
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Fuel System Maintenance portfolio ____ 18

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Accessories & Consumables portfolio ____ 24

Mobile Workshop Solutions ____ 26

Technical Support & Aftersales (TSA) ____ 27

Product portfolio summary tables ____ 28

CHRIS-MARINE®

Innovative engineering since 1962

Monitoring

Monitor and test your diesel and gas engine's condition to ensure reliable engine performance and determine the optimum time for overhaul.

2-stroke

These products are designed for use on 2-stroke diesel and gas engines.

LEMAG®
LDM



LINER DIAMETER MEASUREMENT

Instrument for measuring of liner diameter without removal of cylinder head or valve housing.

- For 2-stroke liners 500–980 mm bore
- Accurate measurement of cylinder wear and clover leafing without removing the cylinder cover
- Ideal when preparing for docking, for condition-based liner maintenance or in continual liner wear monitoring
- Up to 26 measurement levels in about one hour per cylinder
- Easy-to-use onboard version without need for calibration
- Workshop version including rugged casing, traditional micrometer kit and calibration rig
- User-friendly hand-held tablet with remote technical support and software upgrades

LEMAG®
LCC



LINER CONDITION CAMERA

Scans / documents the condition of cylinder liner surface, exhaust valve, piston rings and piston crown.

- Liner time scale: ~100 Rh
- Measurement time: ~15 mins /liner

CHRIS-MARINE®
CTM



COATING THICKNESS MEASUREMENT

High precision coating thickness measurement on magnetic and non-magnetic base materials.

- Easy-to-use condition-based maintenance and wear monitoring of piston rings in 2-stroke engines
- Measures non-magnetic coatings on magnetic or non-magnetic base materials
- Automatically detects whether the base material is magnetic or non-magnetic
- Compatible with LDM, trend-plotting software included
- Reliable and non-destructive measurements

CHRIS-MARINE®
REPLICA TEST



REPLICA TEST KIT

Detect cat fines, clogged graphites, micro cracks and other microscopic details on cylinder liner

- No need to remove cylinder cover prior to replicating ranges
- Reusable dispensing gun for silicon rubber
- The silicon rubber is hardened after only five minutes on the cylinder liner wall
- Analysis performed by Chris-Marine

2-stroke & 4-stroke

These products are designed for use on 2-stroke and 4-stroke diesel and gas engines.

LEMAG®
SPEAT



SHAFT POWER EFFICIENCY ANALYSING TOOL

Monitors vessel efficiency and fuel efficiency allowing for cost-efficient maintenance and operating strategy of fuel consuming equipment such as hull, propellers, engines and boilers.

- Measures, records and monitors performance and navigational data
- Constant KPI visualisation to inform about energy efficiency
- Helps to reduce fuel consumption and emissions
- Data download and transfer function
- Supports ISO 19030-2 ships and marine technology - measurement of changes in hull and propeller performance

LEMAG®
SHAFTPOWER



PERMANENT SHAFT POWER MEASURING SYSTEM

Monitors vessel efficiency in relation to design propeller curve, allowing for cost-efficient maintenance of hull and propeller.

- Helps to improve efficiency
- Protects from overload and breakdown
- Optimises fuel consumption
- Controls the effect of energy saving devices
- Robust and maintenance free design

LEMAG®
ECI



ELECTRONIC CYLINDER PRESSURE INDICATOR

Improves engine uptime and lowers operating costs by allowing technicians to balance, fine-tune and monitor main and auxiliary engines.

- Enables fine tuning of engine performance
- Lowers operating costs
- Designed to withstand harsh conditions
- Takes continuous engine readings
- Detects problems before downtime occurs
- Safe, innovative and precise crank angle sensor

LEMAG®
PEAKmag® & LS



BALANCE PEAK PRESSURES

Pressure indicators that measure the maximum firing pressure of internal combustion engines. Designed to protect its user in case of excessive cylinder pressure.

- Pressure range up to 250 bar (3000 psi)
- Optimise engine performance
- Prevent unbalanced engine operation
- Prevent loss of efficiency
- Optimise fuel consumption
- Helps to avoid uncontrolled vibration
- For all speed ranges

2-stroke & 4-stroke

- continued from previous page.

LEMAG®
TEMPmag



TEMPERATURE CALIBRATORS

Designed to maintain high accuracy and stability during the most severe conditions.

- Interchangeable insert adapters
- No liquids - safe and dry calibration
- Low weight and compact design
- Easy to use - 2 buttons only
- Electric connection for test of temperature switches

TEMPmag 65M temperature range 30–650°C
TEMPmag 15M temperature range -40°C to +150°C

LEMAG®
PRESSOTEST



PRESSURE CALIBRATORS

A range of pumps and precision instruments for calibration and testing of pressure transmitters, switches and gauges.

- Pneumatic: -1 .. +30 bar (optional 60 bar)
- Hydraulic: 0 .. 300 bar, 0 .. 700 bar, 0 .. 1000 bar
- Digital read-out with automatic max./min. memory
- Accuracy classes 0.1% FS or 0.2% FS
- One-hand operation
- Robust, lightweight and reliable

OBEL-P®
CAL GAUGE



DIGITAL REFERENCE GAUGE

High-precision reference pressure indicator for verification and calibration of onboard and workshop gauges. Can also be used as a stand-alone gauge for pressure measurement.

- Pressure range: 0–2500 bar
- Accuracy: ±0.2 % FS
- Unit selector (bar/psi/MPa etc.)
- CEJN 116 or 125 series coupling at outlet
- Microprocessor digital pressure gauge with internal battery
- Optional coupling adapter kit available

LEMAG®
CALIBRATION



CALIBRATION KITS AND SERVICES

Complete sets of onboard calibration and testing equipment combined with services, ensuring your equipment is available and ready when you need it.

- Sets can be combined from the full range of our PRESSOTEST, TEMPmag calibrators and CAL GAUGES
- All instruments and accessories delivered in a heavy duty transport and storage case
- Factory calibration and exchange sets
- Full service offering including service agreements

CHRIS-MARINE®
SRM



SURFACE ROUGHNESS MEASURING

Device for standard-compliant roughness measurements.

- Document roughness prior to, during and after honing
- To be used on any surface
- Easy to use - switch on and measure
- Possible to separate drive unit from display unit
- Calibration standard included
- 2.4 inch colour graphic LCD screen
- Memory card and PC software for generation of reports included

LEMAG®
DI-5 & DI-5C



ELECTRONIC CRANKSHAFT DEFLECTION INDICATOR

A time saving device for checking crankshaft deflection.

- Safe and user friendly - no need to enter crank case to record readings
- Large measuring range
- Invar extension bars for minimum heat expansion
- Backlit display
- Rechargeable lithium ion batteries
- Complete set with transducer, cable, extension bars and case
- Optional ovality kit for measuring cylinder wear available

LEMAG®
CONTROLmag® I & II



CRANKSHAFT DEFLECTION GAUGE

A mechanical deflection gauge for checking distortion of crankshafts. Enables the user to check the bearing alignment and deflection of the crankshaft on all types of engines.

- Measure and indicate cylinder wear
- Two measuring ranges: 60–300 mm, 60–500 mm
- Easy adjustment of gauge position
- Compact and robust construction
- Precision technology
- Hardened measuring tips

4-stroke

This product is designed for use on 4-stroke diesel and gas engines

CHRIS-MARINE®
DEC-TESTER



DIESEL ENGINE COMBUSTION CHAMBER TESTER

Reliable and efficient condition monitoring of the combustion chamber.

- Bore size 160–460 mm
- Monitors current condition of piston ring pack, cylinder liner and inlet/exhaust valves
- Only air needed to control leakage
- To be used when engine is not running

Cleaning

A wide range of superior water-based cleaning systems in variety of sizes, offering solutions to meet the cleaning requirements for professional engine care.
These products are designed for both onboard and workshop use.

ULTRASONIC CLEANING

These products are designed for time and cost saving thanks to quick and efficient cleaning using environmentally friendly cleaning products.

CHRIS-MARINE®
UCS 4600



ULTRASONIC CLEANING SYSTEM

Offers a solution to larger industrious cleaning requirements, including the cleaning of engine parts.

- High-quality transducers and generators provide ultrasonic efficiency and reduced cleaning time
- Internal dimensions: 2150 x 1200 x 1200 mm
- Generators feature automatic constant stabilization of the adjusted output power
- Integrated filtration unit including oil separator to increase the lifetime of costly chemicals
- User-friendly operation of the thanks to color touch panel

CHRIS-MARINE®
UCS 1000 / 1500



ULTRASONIC CLEANING SYSTEM

A smart solution for cleaning of engine parts.
Two versions available.

- Surrounding transducer set-up ensures high effectivity compared to submersible solutions
- Internal dimensions: 1000 x 1000 / 1500 x 1000 mm
- The powerful generator system offers a patented frequency sweep for uniform and intense cavitation
- Transducers made of high quality phosphor-bronze/ silver construction in order to minimise heat build up
- Oil skimmer available as option

CHRIS-MARINE®
UCS SMALL



ULTRASONIC CLEANING SYSTEM

Our range of small compact Ultrasonic cleaning systems can fit in anywhere and ensure highly effective onboard cleaning of smaller engine parts. Four versions available.

- Features our patented energy frequency sweeping system to maximise ultrasonic efficiency
- Internal dimensions; UCS 60: 500 x 300 x 400 mm
  USC 75: 600 x 500 x 250 mm
  USC 90: 600 x 500 x 300 mm
  UCS 126: 700 x 600 x 300 mm

CHRIS-MARINE®
UCS130 TWIN



ULTRASONIC CLEANING SYSTEM

For aqueous cleaning of small and medium sized components.

- Patented energy frequency sweeping system to maximise ultrasonic efficiency
- Two-tank set-up for diverse cleaning enabling separate washing methods
- Internal dimensions; Tank 1: 650 x 400 x 350 mm
  Tank 2: 650 x 200 x 350 mm

SPRAY CLEANING

This product is designed for time and cost saving thanks to quick and efficient cleaning using environmentally friendly cleaning products.

CHRIS-MARINE®
SWM



SPRAY WASHING MACHINE

For cleaning of small and medium sized components.

- Pre-cleaning of workshop engine parts
- Rotating spray system
- Cleaning of parts with max dimension of 1.4 or 2.0 meters in diameter
- Stainless steel construction
- Insulated tank and washing chamber
- Full flow coarse filtration via round filter baskets

Grinding & Machining for cylinder heads

Complete solutions for diesel and gas engine maintenance in order to cut downtime and save costs. Top-of-the-line high quality tools for overhaul and restoration of 2-stroke and 4-stroke diesel and gas engine parts.

2-stroke

These products are designed for use on 2-stroke diesel and gas engines.

CHRIS-MARINE®
VGT



VALVE SPINDLE AND SEAT GRINDING MACHINE

Designed and developed for grinding of valves and valve seats on 2-stroke diesel engines.

- Up to 96 mm valve stem diameter
- Anti-vibration dampers
- Self-centering of valve and seat
- Grinding angles set according to customer's requirement
- Diamond dresser for grinding wheel and full set of tools included
- Electrically driven

CHRIS-MARINE®
LBD



VALVE SPINDLE AND SEAT GRINDING MACHINE

Designed and developed for grinding of valves and valve seats on large bore 2-stroke diesel engines.

- Up to 650 mm valve and seat diameter
- Anti-vibration dampers
- Self-centering of valve and seat
- Grinding angles set according to customer's requirement
- Pneumatically driven

2-stroke & 4-stroke

This product is designed for use on 2-stroke and 4-stroke diesel and gas engines.

CHRIS-MARINE®
WR



WORKING RIG

A range of working rigs for safe maintenance of 2-stroke and 4-stroke engine parts.

- Ranging in capacity from 300 kg up to 4000 kg
- Comes in 10 configurations
- Safe and efficient with self-locking turning gear
- For easy handling and overhaul of cylinder covers, exhaust valves and fuel pumps
- Adjustable length and height
- Anti-vibration dampers
- Turning capacity: 0-360˚ (depending on engine part)

4-stroke

These products are designed for use on 4-stroke diesel and gas engines.

CHRIS-MARINE®
BSP30



VALVE SPINDLE GRINDING MACHINE

For grinding of valve spindles on medium and high speed diesel engines.

- Operating range 6–50 mm stem diameter
- Up to 250 mm valve disc diameter
- For all 4-stroke medium speed engines
- Automatic grinding machine
- Electronically controlled angle settings
- Colour touch screen display
- Electrically driven
- Anti-vibration dampers

CHRIS-MARINE®
BSP2

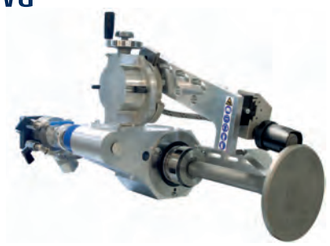


VALVE SPINDLE GRINDING MACHINE

For grinding of valve spindles on medium and high speed diesel engines.

- Operating range 6–50 mm stem diameter
- Up to 250 mm valve disc diameter
- For all 4-stroke medium speed engines
- Semi-automatic grinding machine
- Grinding angles set according to customer's requirement
- Electrically driven
- Anti-vibration dampers

CHRIS-MARINE®
PVG



PORTABLE VALVE SPINDLE GRINDING MACHINE

Grinding of valve spindles on medium and high speed engines.

- Operating range 6–40 mm stem diameter
- For all 4-stroke medium and high speed engines
- Portable and easy to handle for on-site machining of all types of cylinder valve spindles
- Designed to be mounted either horizontally or vertically for optimal performance
- Vice-mounted
- Pneumatically driven

CHRIS-MARINE®
75H



VALVE SPINDLE GRINDING MACHINE

For grinding of valves on high and medium speed diesel engines, and valves and valve seats on smaller 2-stroke diesel engines, in existing lathes.

- For valve disc diameters smaller than 180 mm
- Used together with an existing standard lathe
- Designed for precision grinding of valve spindle seat face for medium speed and auxiliary diesel engines
- Template for correct setting of grinding angles
- Diamond dresser for grinding wheel tuning
- Pneumatically driven grinding motor

4-stroke

- continued from previous page.

OBEL-P®
MPI



VALVE SEAT REMOVER

Designed for easy removal of worn valve seats from cylinder heads. The equipment consists of an induction generator which generates a high frequency current to an insulated water-cooled induction coil.

- Valve seat removal
- Very fast and easy process
- Minimises damage to the cylinder cover seat recess
- No welding or force needed

CHRIS-MARINE®
VRL



VALVE SEAT AND RECESS LATHE

A combined machine for in-situ machining of valve seats and seat recesses on 4-stroke medium speed diesel engines.

- Valve seats from 55–230 mm diameter
- Recesses from 74–200 mm diameter
- Machining angles set according to customer's requirement
- Stepless adjustable rotation speed
- Self-centring pilot spindle
- Machining horizontally, vertically and chamfering
- Pilot spindle with recess measurement slot for very easy handling
- Diameter measuring tool
- Automatic feed mechanism
- Electrically driven
- Superior to grinding alternatives

CHRIS-MARINE®
VSL



VALVE SEAT LATHE

Portable lathe for in-situ machining of valve seats on 4-stroke diesel engines.

- From 50–230 mm diameter
- Machining angles set according to customer's requirement
- Superior to grinding alternatives
- Stepless adjustable rotation speed
- Adjustable machining diameters
- Self-centering pilot spindle
- Pre-set angles
- Automatic feed mechanism
- Electrically driven
- Superior to grinding alternatives

Grinding & Machining for cylinder liners

Complete solutions for diesel and gas engine maintenance in order to cut downtime and save costs. Top-of-the-line reliable high quality tools for overhaul and restoration of 2-stroke and 4-stroke diesel and gas engine parts.

2-stroke

These products are designed for use on 2-stroke diesel and gas engines.

CHRIS-MARINE®
HON 2A



AUTOMATIC HONING AND DEGLAZING MACHINE

Fully automatic electric honing and deglazing machine for restoration of slow speed engine cylinder liner geometry and surface structure. For workshop and in-situ use.

- For liners with 500 to 1000 mm bore
- Rectifies the shape of the liner
- Removes scuffing marks and restores surface cross pattern
- Fully automatic operation
- Powerful electric driving unit and hoist
- Adjustable stone pressure
- Pre-assembled rig
- System for continuous supply of honing liquid
- Automatic stroke control
- Ability to specify exact cross pattern angle
- Cannot go beyond set turning points
- Speed and stroke length adjusted during operation
- Electrically driven

CHRIS-MARINE®
WGM



WAVECUT GRINDING MACHINE

Portable machine for in-situ wavecut grinding.

- For cylinder liners 350–980 mm diameter bore
- Overhauling of MAN B&W 2-stroke diesel engine liners
- Self-centering, highly stable and accurate
- PLC-controlled grinding depth feeding system
- Cooling water system for liquid supply
- Automatic stop after completed operation
- Pneumatically driven motors

2-stroke & 4-stroke

These products are designed for use on 2-stroke and 4-stroke diesel and gas engines.

CHRIS-MARINE®
HON A



AUTOMATIC HONING AND DEGLAZING MACHINE

Fully automatic electric honing and deglazing machine for restoration of medium speed engine cylinder liner geometry and surface structure. For workshop and in-situ use.

- For honing of liners 140–670 mm bore
- Adjustable stone pressure
- Removes scuffing marks and restores surface cross pattern
- Fully automatic operation
- Automatic stroke control
- Ability to specify exact cross pattern angle
- Cannot go beyond set turning points
- Speed and stroke length adjusted during operation
- Electrically driven

CHRIS-MARINE®
HON S



HONING AND DEGLAZING MACHINE

Honing machine for restoration of medium speed engine cylinder liner geometry and surface structure. For workshop and in-situ use.

- For liners 140– 670 mm bore
- Rectifies the circular shape of the liner
- Removes scuffing marks and restores surface cross pattern
- Easily operated directly on the engine or in honing rig
- Variable hoisting speed
- Adjustable stone pressure
- Pneumatically driven

CHRIS-MARINE®
HR



HONING RIG

Honing rig for workshop and other non-in-situ applications.

- Optimal platform for honing of cylinder liners
- For liners from 200–800 mm outer diameter
- Robust and compact design
- Capacities up to 400 mm for HR40
- Capacities up to 800 mm for HR800
- Fits all service workshops
- Smaller and bigger sizes available on request

CHRIS-MARINE®
VKS



WEAR EDGE MILLING MACHINE

Portable machine for safe removal of wear edges in cylinder liners.

- For liners 250–1000 mm diameter
- Easily adjustable for different wear edge positions
- Reduces piston pulling time
- Preserves piston rings and liners
- Complete removal of a wear edge within less than 15 min
- Down to 250 mm diameter depending on engine type
- Pneumatically driven
- Workop and onboard versions available
- Version not requiring a "Hot Work Permit" is available

4-stroke

These products are designed for use on 4-stroke diesel and gas engines.

CHRIS-MARINE®
UPRE



UNISTRESS PISTON RING EXPANDER

For 4-stroke engines with straight-cut piston rings.

- Lowest stress possible for a desired opening of the ring
- Provided with a stop, limiting deformation of the ring
- Delivered adjusted and ready for use
- Suits any type of piston ring and diameter upward of 130 mm
- Type 1: piston rings 100–250 mm
- Type 2: piston rings 250–380 mm
- Type 3: piston rings 380–600 mm
- Type 4: piston rings 600–980 mm

CHRIS-MARINE®
DGL



DEGLAZING MACHINE

Portable machine designed for in-situ precision deglazing of cylinder liners.

- For liners 320–500 mm bore
- Easily mounted on stud bolts
- Self-centering on the cylinder liner
- Equipped with interchangeable stone holders
- Pneumatically adjustable stone pressure
- Restores liner surface
- Electrically driven

Grinding & Machining for sealing surfaces

Complete solutions for diesel and gas engine maintenance in order to cut downtime and save costs. Top-of-the-line reliable high quality tools for overhaul and restoration of 2-stroke and 4-stroke diesel and gas engine parts.

2-stroke & 4-stroke

These products are designed for use on 2-stroke and 4-stroke diesel and gas engines.

CHRIS-MARINE®

CPM



SURFACE GRINDING MACHINE

For grinding of sealing surfaces between cylinder head and cylinder liner, and between cylinder liner and engine frame on medium bore diesel engines.

- Standard operating range diameter 320–700 mm
- Eliminates and prevents water and gas leakages
- Great savings from in-situ grinding and milling
- Easily operated by a single operator
- Optional milling equipment available
- Pneumatically driven

CHRIS-MARINE®

CPL



SURFACE GRINDING MACHINE

For grinding of sealing surfaces between cylinder head and cylinder liner, and between cylinder liner and engine frame on medium bore diesel engines.

- Operating range radially 200–650 mm diameter
- For workshops onboard and ashore
- Easily operated
- Versatile optional milling equipment
- Eliminates and prevents water and gas leakages
- Pneumatically driven

CHRIS-MARINE®

PTL



PORTABLE LATHE

For in-situ machining of engine frame sealing surfaces on medium speed diesel engines.

- Operating range radially 300–700 mm
- Operating range axially down to 900 mm
- Stepless feed for vertical and horizontal movements
- Substantial savings due to high quality work in-situ
- Specific mounting adapters designed for individual engine types
- Restores all sealing surfaces in the engine frame
- Extremely robust precision machine
- Electrically driven

Grinding & Machining — SEALING SURFACE

Fuel system maintenance

Testing and maintenance equipment used to avoid serious and costly engine damage and to keep diesel and gas engines at top performance.

2-stroke

These products are designed for use on 2-stroke diesel and gas engines.

OBEL-P®
VPU 500F



FUEL VALVE TEST RIG

For testing of fast fuel injectors for Wärtsilä RT flex engines.

- Pneumatic/Hydraulic test rig with an oil flow up to 7.5 l/min.
- Scalable pump technology developed for correct testing of Wärtsilä RT flex/W-X FAST fuel injectors
- Gauges for air and oil pressure
- Hydraulic dis-/re-assembly tool support
- Optional safety valve test adapters
- Test aux. engine fuel injectors with optional adapters

OBEL-P®
VPU 500GI



FUEL INJECTOR TEST UNIT

Designed for effective testing of MAN B&W gas valves & window, resume and blow off valve in MAN B&W 2–stroke marine engines running on natural gas.

- The test unit features a robust design as a professional tool for fuel valve testing on board ships and in offshore sites.
- Pneumatic fuel valve test unit, designed for testing of gas fuel-injectors from 2-stroke engines.
- Air powered test rig up to 450 bar
- High-precision pressure control
- Nozzle Seal test with up to 400 bar of Nitrogen
- Working test with up to 400 bar of Nitrogen
- Valve holders for injector, window, resume and blow-off valve

OBEL-P®
VPU 500 LGIP



FUEL INJECTOR TEST UNIT

Designed for effective testing of the main gas injection valve and blow-off valve in MAN B&W 2–stroke marine gas engines running on LPG.

- The test unit is robust and suitable for testing on board ships and offshore.
- The following tests can be executed:
- Non return valve seal test
  - Nozzle leakage test
  - Function test
  - Blow-off valve test

Fuel System Maintenance

OBEL-P®
PPMI 1000



TEST RIG ADAPTOR

The PPMI 1000 is a fuel injector test rig adapter. Verify the performance of MAN Diesel & Turbo slide fuel valves without any risk of performing “multiple openings”.

- Operator Guiding System:
  - Injector prefill
  - Opening pressure test
  - Nozzle leakage test
  - Venting / Non-return valve test
  - O-Ring sealing test
- Separate display for data collection
- Stores data for easy evaluation and further use
- Precise digital display

2-stroke & 4-stroke

These products are designed for use on 2-stroke and 4-stroke diesel and gas engines.

OBEL-P®
VPA 1100-6



FUEL INJECTOR TEST RIG

Top-of-the line VPA series for testing of fuel valves for all 2-stroke and 4-stroke engines, including fuel injectors with slide valves.

- PLC-controlled test device
- Built-in test program including step-by-step procedure
- Touch panel for easy and fast operation
- Pre-set required values
- Built-in printer
- Test reports stored in permanent memory or transferred to PC via USB
- Optionally prepared for testing of common rail injector systems
- Pneumatically driven

OBEL-P®
VPUD



FUEL INJECTOR TEST RIG

Fuel valve test unit with digital read-out for test of fuel injectors for 2-stroke and 4-stroke engines.

- Scalable pump technology for Wärtsilä 2-stroke fuel injectors
- Allowing fast and precise adjustment of opening pressure second to none
- Activators for electronically controlled injectors and pilot valves
- Adapters for injectors with integrated fuel pump
- Systems for test of combined gas-diesel injectors
- Optionally prepared for testing of common rail injector systems
- Pneumatically driven

2-stroke & 4-stroke

- continued from previous page.

OBEL-P®
OIL MIST SEPARATOR



IMPROVED WORKING ENVIRONMENT AND VISUAL INSPECTION

Unhealthy oil mist is produced when injectors are tested. With this separator, the oil mist is extracted from the plastic container and condensed in the filter.

- Filter for periodical replacement

OBEL-P®
TEST FLUID



FOR FUEL INJECTOR TESTERS

Test fluid based on mineral oil designed to meet the requirements of high tolerance fuel injectors and ensure optimal calibration of fuel injectors.

- Preserves the fuel injectors
- No cleaning needed after test procedure
- Protects the core parts of pump unit
- Extends the lifetime of the test rig

OBEL-P®
IGT



FUEL INJECTOR GRINDING TOOL

For reconditioning of fuel injector pipe sealing surfaces on 4-stroke medium speed diesel engines.

- Portable with a low weight
- For workshops on board and ashore
- Easily operated by one man
- Easily adapted to different engine types

CHRIS-MARINE®
FPG



FUEL PUMP AND FUEL VALVE GRINDING MACHINE

For precision grinding of fuel pump and fuel valve components for diesel engines.

- Wide operating range
- Replaces lapping
- Fine feed adjustment for grinding
- Electrically driven with pneumatically driven grinding head

4-stroke

These products are designed for use on 4-stroke diesel and gas engines.

OBEL-P®
VPU 700-2/900-2/1500-2

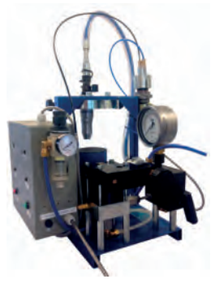


INJECTOR TEST RIG

For test of fuel injectors on 4-stroke engines

- For test of leakage, opening pressure and spray pattern

OBEL-P®
VPU 900 CAT





FUEL VALVE TEST RIG

Fuel valve test rig for troubleshooting of electronic Caterpillar unit injectors.

- Small test rig comprised of two systems
- Pneumatic-hydraulic system:
  - Test of nozzle spray pattern
  - Verification of nozzle tightness
- Pneumatic-electronic system:
  - Test of solenoid coil
  - Test of solenoid activation

OBEL-P®
UITA



UNIT INJECTOR TESTER ADVANCED

Advanced test unit with variable stroke for test of various types of unit injectors and pumps.

- Flushing/Test preparation
- Fuel delivery check
- Timing inlet valve & plunger condition check
- Touch screen
- User friendly control software
- Adaptor kit for specific types of unit injectors

4-stroke

- continued from previous page.

OBEL-P®
UVH



UNIVERSAL VALVE HOLDER

Freestanding universal valve holder

- Locks the injectors in place
- Adapters that enable the user to test all common fuel injectors
- Set of 4 standard injector adapters included
- Closed spray chamber and integrated air purifier
- Secures optimal working environment

OBEL-P®
STB



SINGLE TRIGGER BOX

Stand-alone trigger box for activation of the solenoid valve inside electronic fuel/pilot injectors at pre-set test parameters.

- Allows inspection of injector spray pattern through single pulling of solenoid
- Optionally available for 110V and 24V versions

OBEL-P®
MPT



MULTI-PURPOSE TRIGGER BOX

Electronic fuel injector test rig accessory that enables testing and activation of electronic fuel injectors/pilot valves in larger 2-stroke and 4-stroke engines.

- Allows inspection of injector spray pattern through single or repetitive pulling of solenoid
- Solenoid valve resistance test
- Compatible with electronic pilot/injection valves from Wärtsilä, Caterpillar and others
- Pre-set any hydraulic test pressure with traditional test rig
- Set output voltage, pull/hold current and pull/hold time to reproduce actual electric injection pulse

CHRIS-MARINE®
FPT



FUEL PUMP TESTER

Determine wear condition of medium speed engine fuel pumps and compare it with existing performance data.

- Pneumatic test method
- Accurate, reproducible and well documented determination of pump condition
- Automated test sequence for each pump type
- Controls the sealing between pluncher and barrel
- Tests the non-return valve function and sealing of the o-rings
- No disassembly necessary before testing
- No cleaning necessary after testing

Power packs

In cooperation with MAN Diesel, Wärtsilä and 2-stroke engine owners worldwide, we have developed a range of mobile Hydraulic Power Units delivering up to 5 times the normal speed when needed, while fulfilling the requirement for pressures above 3000 bar. The HPU can loosen a cylinder cover for the world's largest diesel engines in less than five minutes.

2-stroke & 4-stroke

These products are designed for use on 2-stroke and 4-stroke diesel and gas engines.

OBEL-P®
HPU



HYDRAULIC POWER UNIT SERIES

Portable Hydraulic Power Units for all hydraulic tools.

- Hydraulic pressure up to 3.500 bar at 7 bar air inlet pressure
- Flow rates up to 1.9 l/min
- Adjustable maximum outlet pressure for tool protection
- Back-up hand power optional
- Hoses and couplings available as an option

OBEL-P®
MPU



HYDRAULIC POWER UNITS

Two-speed Hydraulic Power Units, powered by hand.

- Automatic switch between two flow capacities for fast and easy pumping at both low and high pressure
- Long handle and automatic flow switch ensures continuous easy pumping
- Robust, with special gauge protection system
- Precise Class 1 Gauge
- CEJN series coupling at outlet

Accessories & Consumables

CHRIS-MARINE®
ULTRA RINSE



ULTRASONIC CLEANING CHEMICALS

Specifically designed and developed for ultrasonic cleaning methods, enabling rapid penetration and removal of deposits.

- Concentrated powder products
- Highly effective even at low concentration mixtures with water
- Can be customized to the specific needs of the customer
- Excellent wetting and penetration properties

Ultra Rinse Engine Ideal for cleaning steel, stainless steel and cast iron components highly exposed to heavy fuel oil or where removal of fuel, coke, soot or paint is needed.

Ultra Rinse Intercooler Suitable for all types of metals including aluminum, titanium, brass and copper, thus enabling efficient cleaning of intercoolers and turbo parts.

Ultra Rinse Descale Ideal for removal of lime scale as well as iron-, carbon- and oil carbon deposits from engine parts.

CHRIS-MARINE®
HON LIQ



HONING LIQUID

To ensure a smooth and efficient honing process.

- Water mixable honing fluid based on mineral oil
- Ensures shortest possible honing time
- Prevents residues from clogging the stones
- Provides corrosion resistance for the cylinder liner
- Tested and approved by leading engine designers

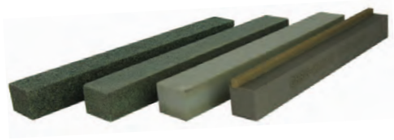
CHRIS-MARINE®
GRINDING WHEELS



Choosing the right grinding wheels for a specific job is the key aspect for achieving superior grinding results.

The Chris-Marine grinding wheels have been carefully selected, tested and proven for each type of metal alloy, surface finish and workload.

CHRIS-MARINE®
HONING STONES



Honing time and stone consumption increase with cylinder diameter and stroke length. It is therefore important to choose the right honing stones.

Diamond stones have superior endurance and remove material faster than ceramic stones. They are therefore suitable for coarse honing of large engines or highly worn smaller engines.

Ceramic stones provide superior oil retaining properties for the cylinder liner and are therefore mandatory when finishing the running surface structure.

CHRIS-MARINE®
TURNING BITS



Turning bits for our portable lathes are supplied in different shapes and qualities. Each type has been carefully tested to give the best result when it comes to performance, lifetime and surface roughness.

OBEL-P®
HOSES & COUPLINGS



HIGH PRESSURE HOSES AND COUPLINGS

Fulfilling all requirements and specifications required by engine designers such as MAN Diesel & Wärtsilä.

- Ultra-high working pressures
- Maintain flexibility through entire service life
- Low volumetric expansion
- Kink-resistant steel-reinforced construction
- Abrasion-resistant covers

CHRIS-MARINE®
DIAL GAUGE



PRECISION INSTRUMENTS

Instruments used to balance and align Chris-Marine machines and equipment.

- Dial gauges to align several of our machines and machine accessories
- Facilitates adjustment when setting angles
- Minimises vibrations when centering grinding wheels
- Different reading scales to optimize accuracy
- Analogue reading

Accessories & Consumables

Mobile Workshop Solutions - Mobile, Semi-Permanent or Add-On

The mobile workshop concept from Chris-Marine entails fully equipped mobile workshops with state-of-the-art maintenance equipment uniquely designed for flexible operation in various applications, locations and conditions.

The workshops are custom-made and can contain any equipment - Chris-Marine®, Obel-P®, LEMAG® or other - requested by the customer. The workshop solutions are quick and easy to set up, and ready to use right away.



Flexible and tailor-made workshops

The mobile workshops are built in Sweden and come in two different container sizes; 20 and 40 feet. We deliver 2 different types of custom-made workshops:

1. Standard heavy duty container

- Heavy duty aluminum on wall, floor and ceiling
- Fire safe insulation (class E)
- 500 kg roof mounted crane solution(s)
- Entrance door integrated in back doors
- Heavy duty flexible tables, drawers and cabinet
- Advanced, integrated and safe electrical installation
- Roof access solution
- Standard AC
- Standard personal safety items (fire/first aid/ emergency light etc.)

2. Light heavy duty container

Similar to no. 1 but with the following adjustments:

- Light heavy duty wall, floor and ceiling
- Standard electrical installation
- Crane (option)
- Tables, drawers and cabinets (option)

The workshop units can be rented or purchased. As an option we offer technical support from one of our Chris-Marine super-users.

Existing and permanent workshops

We are happy to act as advisors regarding your already existing workshop. With our many years of expertise in engine maintenance as well as our highly skilled staff we have the ability to optimize your workshop.



Chris-Marine TSA - Technical Support & Aftersales

The Chris-Marine Technical Support & Aftersales team is headquartered in Sweden. This highly dedicated team of aftersales representatives and super-users supports you with your enquiries or technical queries, no matter where in the world you are located. Our state-of-the-art workshop facility and equipment offer a great environment for product training and machine repair.

We work closely together with our global network of representatives and have well equipped training facilities, workshops and super-users in Denmark, Germany, Singapore and China as well.

The TSA team will assist you with everything you need in order to use your Chris-Marine, Obel-P and LEMAG equipment.

The TSA offer includes:

- Technical support
- Product training
- Super-users
- Equipment for rent
- Product repair
- Service agreements
- Spares & consumables



Technical support, product trainings, super-users and equipment for rent

By using our equipment in the most efficient way you will reach top quality results while saving time and money. If you recently purchased equipment from us we can assist you remotely, invite you to one of our hubs or dispatch a super-user to your site. Our super-users can work alone or together with your staff anywhere in the world. If you need equipment urgently or temporarily, or you want to evaluate new equipment before a purchase, you can rent equipment from us. We can also assist you with installing and commissioning equipment.

Repair, spares & consumables sales

We have the most common spare parts and consumables on stock for immediate dispatch, or maybe there is even an upgrade available, allowing you to save more time and improve quality.

If you recently upgraded your engine, have any concerns regarding your equipment or plan to do a job on a new engine type for the first time, we can help you. We also offer fixed-price service agreements if you have several of our products and want to make sure that they always operate correctly.

Maintenance of your equipment often means that you will ship your equipment to one of our hubs for repair/service. Once our specialists have inspected your equipment, you will receive a fixed-price quote. Your refurbished equipment will be returned in near-new condition, ready for many more years in service.

Rent equipment from us at favorable conditions while we carry out maintenance on your equipment. Or have a discussion with us if you are considering buying new equipment - it is sometimes a more cost-effective option.

Send your request to aftersales@chris-marine.com.
You will normally get response within hours.
We always find the solution that best suits your needs.

Monitoring _____ page 4

Product	Description	Working range	2-stroke	4-stroke	Portable	Stationary	page
LDM	Liner diameter measurement	500-980 mm bore	X		X		4
LCC	Liner condition camera	Liner time scale: ~100 Rh. Measurement time: ~15 mins /liner	X		X		4
CTM	Coating thickness measurement	Magnetic and non-magnetic base materials	X		X		4
SPEAT	Shaft power efficiency analysing tool	Monitor, evaluate and improve the operational performance	X	X		X	5
REPLICA TEST	Replica test kit	Detect details on cylinder liner	X		X		4
SHAFTPOWER	Permanent shaft power measuring system	Displays the actual engine power output	X	X		X	5
ECI	Electronic cylinder pressure indicator	Enables fine tuning of engine performance	X	X	X		5
PEAKmag & LS	Balance peak pressures	Pressure range up to 250 bar, (3000 psi)	X	X	X		5
TEMPMAG 65 M	Temperature calibrator	Temperature range 30-650°C	X	X	X		6
TEMPMAG 15 M	Temperature calibrator	Temperature range -40°C to +150°C	X	X	X		6
PRESSOTEST	Pressure calibrators	0 .. 300 bar, 0 .. 700 bar, 0 .. 1.000 bar	X	X	X		6
CAL GAUGE	Digital reference gauge	Pressure range 0-2500 bar	X	X		X	6
CALIBRATION	Calibration kits and services	Equipment combined with services	X	X	X		6
SRM	Surface roughness measuring	Document roughness prior to, during and after honing	X	X	X		7
DI-5 & DI-5C	Electronic crankshaft deflection indicator	Large measuring range	X	X	X		7
CONTROLmag I&II	Crankshaft deflection gauge	Measuring ranges: 60-300 mm, 60-500 mm	X	X	X		7
DEC-TESTER	Diesel engine combustion chamber tester	Bore size 160-460 mm		X	X		7

Cleaning _____ page 8

Product	Description	Capacity/Internal dimensions	Portable	Stationary	page
UCS 4600	Ultrasonic cleaning system	2400 x 1300 x 1500 mm		X	8
UCS 1000	Ultrasonic cleaning system	1000 x 1000 x 1000 mm		X	8
UCS 1500	Ultrasonic cleaning system	1000 x 1500 x 1000 mm		X	8
UCS 60	Ultrasonic cleaning system	500 x 300 x 400 mm	X	X	9
UCS 75	Ultrasonic cleaning system	600 x 500 x 250 mm	X	X	9
UCS 90	Ultrasonic cleaning system	600 x 500 x 300 mm	X	X	9
UCS 126	Ultrasonic cleaning system	700 x 600 x 300 mm	X	X	9
UCS 130 Twin	Ultrasonic cleaning system	Tank 1: 650 x 400 x 350 mm Tank 2: 650 x 200 x 350 mm		X	9
SWM	Spray cleaning	Cleaning parts max 1.4 or 2.0 meters in diameter		X	9

Grinding & Machining - Cylinder heads _____ page 10

Product	Description	Working range	2-stroke	4-stroke	Portable	Stationary	page
VGT	Valve spindle and seat grinding	Up to 96 mm valve stem diameter	X			X	10
LBD	Valve spindle and seat grinding	Up to 650 mm valve disc and valve seat diameter	X			X	10
WR	Working rig	Ranging in capacity from 300 kg up to 4000 kg	X	X		X	10
BSP30	Valve spindle grinding	Operating range 6-50 mm stem diameter		X		X	11
BSP2	Valve spindle grinding	Operating range 6-50 mm stem diameter		X		X	11
PVG	Portable Valve spindle grinding machine	Operating range 6-40 mm stem diameter		X	X		11
75H	Valve spindle grinding machine	Valve disc diameters smaller than 180 mm	X	X	X		11
MPI	Valve seat remover	Easy removal of worn valve seats from cylinder heads		X		X	12
VRL	Valve seat and recess lathe	Valve seat 55-230 mm diameter, recesses from 74-200 mm diameter		X	X		12
VSL	Valve seat lathe	From 50-230 mm diameter at 20°- 50° angle		X	X		12

Grinding & Machining - Cylinder liners _____ page 13

Product	Description	Working range	2-stroke	4-stroke	Portable	Stationary	page
HON 2A	Automatic honing machine	500-1000 mm diameter bore	X		X	X	13
WGM	Wavecut grinding machine	350-980 mm diameter bore	X		X	X	13
HON A	Automatic honing machine	140-670 mm diameter bore	X	X	X	X	14
HON S	Deglazing and honing machine	140-670 mm diameter bore	X	X	X	X	14
HR	Honing rig	200-800 mm outer diameter	X	X		X	14
VKS	Wear edge milling machine	250-1000 mm diameter	X	X	X		15
UPRE	Unistress piston ring expander	Subject the piston ring to four forces	X	X	X		15
DGL	Deglazing machine	320-500 mm diameter		X	X		15

Grinding & Machining - Sealing Surfaces page 16

Product	Description	Working range	2-stroke	4-stroke	Portable	Stationary	page
CPM	Surface grinding	320-700 mm diameter	X	X	X		16
CPL	Surface grinding	200-650 mm diameter		X	X		17
PTL	Portable late	Radially 300 – beyond 700 mm, axially down to 900 mm	X	X	X		17

Fuel system maintenance page 18

Product	Description	2-stroke	4-stroke	Onboard	Workshop	Portable	Stationary	page
VPU 500F	Fuel valve test rig	X					X	18
VPU 500GI	Fuel injector test unit	X		X			X	18
VPU 500 LGIP	Fuel injector test unit	X		X			X	18
PPMI 1000	Test rig adaptor	X		X			X	19
VPA 1100-6	Fuel injector test rig	X	X		X		X	19
VPUD	Fuel injector test rig	X	X	X	X		X	19
OIL MIST SEPARATOR	Improved working environment and visual inspection	X	X				X	20
TEST FLUID	For fuel injector testers							20
IGT	Fuel injector grinding tool		X	X		X		20
FPG	Fuel pump and fuel valve grinding	X	X	X	X		X	20
VPU 700-2/ 900-2/1500-2	Injector test rig		X			X		21
VPU 900 CAT	Fuel valve test rig		X	X	X	X		21
UITA	Unit injector texter advanced		X	X	X		X	21
UVH	Universal valve holder		X		X		X	22
STB	Single trigger box		X				X	22
MPT	Multi-purpose trigger box		X				X	22
FPT	Fuel pump tester		X		X		X	22

Power packs page 23

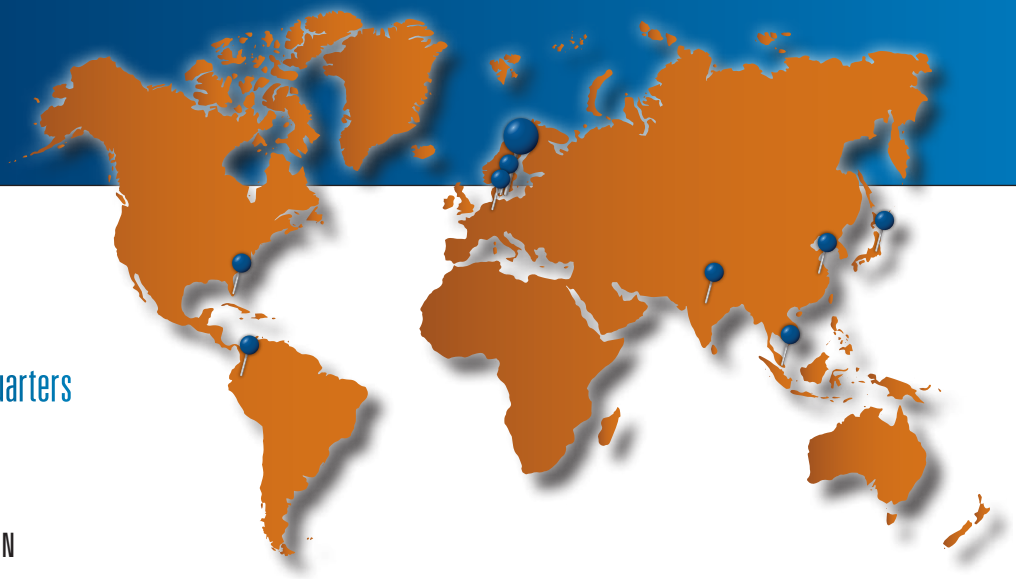
Product	Max. output pressure (bar)	Max. output flow (l/min)	Weight (kg)	Drive medium	Pump technology	Low-pressure mode	Page
HPU 1500 Compact	1500	0.25	8	Air	Single		23
HPU 1500	1050/1450 *	0.3	16	Air/Hand	Single		23
HPU 1500.2	1450	0.45	20	Air/Hand	Single		23
HPU 2250	1750/2050*	0.5	20	Air	Single		23
HPU 2250-2	2050	1.9	28	Air	Twin	X	23
HPU 2250S	2050	0.45	23	Air	Single	X	23
HPU 2250-2S	2050	1.9	28	Air	Twin		23
HPU 2800-2	2650/2800*	2	28	Air	Twin	X	23
HPU 3500-2	2650/2800*	2	28	Air	Twin		23
HPU 3500 W	3000	2	28	Air	Twin		23
MPU 1500	1500	Variable	6 / 8	Hand	2-step		23
MPU 2400	2500	Variable	8	Hand	2-step		23

*) Adjustable

Accessories & Consumables

Product	Description	Portfolio	page
OIL MIST SEPARATOR	Improved working environment and visual inspection	Fuel system maintenance	20
TEST FLUID	For fuel injector testers	Fuel system maintenance	20
ULTRA RINSE ENGINE	Concentrated powder product	Accessories & Consumables	24
ULTRA RINSE INTERCOOLER	Concentrated powder product	Accessories & Consumables	24
ULTRA RINSE DESCALE	Concentrated liquid product	Accessories & Consumables	24
HON LIQ	Water miscible honing fluid	Accessories & Consumables	24
GRINDING WHEELS	Soft and hard	Accessories & Consumables	24
HONING STONES	Ceramic and diamond	Accessories & Consumables	25
TURNING BITS	Various shapes and qualities	Accessories & Consumables	25
HOSES & COUPLINGS	High pressure	Accessories & Consumables	25
DIAL GAUGE	Precision Instrument	Accessories & Consumables	25

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CHRIS-MARINE®

Innovative engineering since 1962

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