HYDROCHART 3500

The Difference Is In The Image

SHALLOW WATER SWATH BATHYMETRY & SIDE SCAN SONAR

KLEIN MARINE SYSTEMS, INC.
The Klein HydroChart 3500 is a lightweight, low-cost, wide-swath, professional shallow-water underwater survey mapping instrument that supports IHO SP-44 Special Order quality bathymetric survey data collection and co-registered dual frequency with high-resolution side scan sonar imagery for navigational charting, dredging and engineering support, habitat characterization, and various other shallow water mapping applications.

Our HydroChart 3500 is delivered completely pre-calibrated with pitch, roll, heave, heading and sound velocity compensation from sensors mounted within the Sonar Head Unit (SHU).

**APPLICATIONS**
- Shallow water hydrographic survey
- Geophysical survey
- Port and harbor security
- Dredging and salvage operations
- Rapid littoral area assessment
- Shallow water habitat mapping

**OPTIONAL TOWFISH ACCESSORIES**
- Interface to various external third-party motion sensors
- 10 m, 20 m, or 50 m cable option
- SHU-integrated motion sensor
- SHU-integrated heading sensor
- SHU-integrated sound velocity sensor
- Sound velocity profiler
- Semi-rugged laptop
- Rackmount PC
- Rugged and waterproof reusable shipping container with wheels
- On-site training
- Factory training
- Pre-calibration and patch test (when purchased with SVS, MRU and heading sensors)

**KEY FEATURES**
- Co-registered and geo-referenced IHO-quality swath bathymetry with dual frequency high-resolution side scan imagery
- Bathymetry coverage including Nadir up to 12X the water depth or altitude
- Supports an optional sound velocity sensor, providing surface sound velocity measurements
- Supports various Motion Reference Units (MRUs), gyro-heading sensors and navigation equipment, or option to include Klein Motion Sensor (KMS)
- Easy-to-use graphical user interface (GUI) — operates with our SonarPro for enhanced operator control, data acquisition and display of both bathymetry and side scan data
- Output compatible with most third-party post-processing software
- Klein has developed a real-time computed sonar uncertainty for interface with Combined Uncertainty Bathymetric Estimator (CUBE) to provide semi-automatic data processing of soundings
- AC (110/220, 50 to 60 Hz) or 24 VDC input power
- Compact, lightweight and portable
The Klein HydroChart 3500 Side Scan Swath Bathymetry Sonar System comes complete and pre-calibrated with pitch, roll, heave, heading, and sound velocity compensation from sensors mounted within the faired pole-mountable Sonar Head Unit (SHU).

A single polyurethane-jacketed, Kevlar®-reinforced, multi-conductor deck cable connects the pole-mounted SHU to the splashproof Topside Interconnect Unit (TIU).

Through the TIU, data output from the SHU are synchronized by a 1 PPS signal and/or serial National Marine Electronics Association (NMEA) data output from a GPS/GNSS navigation system. All resultant survey data are time-synchronized and combined into a stream of output through one Ethernet cable to a Windows-based laptop/computer for recording in Klein SonarPro® and/or third-party survey software.

This is a portable shallow-water survey system that can be easily deployed from a pole configuration or customized for hull mounting.

The complete system is the only side scan bathymetry sonar that supports IHO SP-44 requirements, for Special Order Surveys, which can be verified using Klein’s real-time computed sonar uncertainty values — Be Certain with Klein. The sonar has proven capable of supporting Special Order survey requirements to more than 6X water depth, per side (port + starboard combined swath of 12X water depth).

SONAR HEAD UNIT (SHU)

The HydroChart 3500 Sonar Head Unit (SHU) is a pole-mounted, lightweight (50 lb) swath bathymetry and side scan acoustic imaging survey package containing all sensors within a rigid-frame assembly and protected within a faired housing.

The SHU includes transducers that are comprised of combined 455 kHz bathymetry and side scan arrays and a dedicated 900 kHz side scan array, together with a sound velocimeter, heading sensor, heave, pitch and roll motion reference unit (MRU).

TOPSIDE INTERCONNECT UNIT (TIU)

The HydroChart 3500 Topside Interconnect Unit (TIU) is a very small and lightweight, IP-67-rated (splashproof) enclosure, which manages all power and data connections from the topside to the SHU. The complete system is powered through 120/240 VAC or 24 VDC, drawing less than 30 Watts of power.

The HydroChart 3500 is operated from a PC or laptop (Klein or customer-provided).

Klein SonarPro software is included with the system and available for download and distribution through Klein’s website. SonarPro provides an intuitive, real-time, easy-to-use, yet powerful system interface for complete survey planning, mapping, data acquisition, targeting, measurement, reprocessing and review.
HYDROCHART 3500 SPECIFICATIONS

GENERAL SPECIFICATIONS

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<tbody>
<tr>
<td>Deployment method</td>
<td>Pole configurations or hull mounting</td>
</tr>
<tr>
<td>Max water depth</td>
<td>150 m</td>
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<tr>
<td>Frequency</td>
<td>455 kHz Bathymetry and Side Scan 900 kHz Side Scan</td>
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<tr>
<td>Pulse technology</td>
<td>Wideband FM Chirp</td>
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<tr>
<td>Bathymetry coverage</td>
<td>10 to 12 times water depth</td>
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<td>Bathymetry across track</td>
<td>5.0 cm</td>
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<tr>
<td>Bathymetry along-track resolution</td>
<td>0.4°</td>
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<tr>
<td>Side Scan swath coverage (2x range)</td>
<td>300 m @ 445 kHz 150 m @ 900 KHZ</td>
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<tr>
<td>Side Scan across-track resolution</td>
<td>1.5 cm</td>
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<tr>
<td>Side Scan along-track resolution</td>
<td>0.21°</td>
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<tr>
<td>Construction</td>
<td>Rugged</td>
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SONAR HEAD UNIT (SHU) SPECIFICATIONS

The HydroChart 3500 Sonar Head Unit (SHU) is a pole-mounted, lightweight, swath bathymetry and side scan acoustic imaging hydrographic survey package containing all sensors within a compact, rigid-frame assembly and protected within a faired housing.

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<tbody>
<tr>
<td>Length</td>
<td>37.2 in. (94.5 cm)</td>
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<tr>
<td>Width</td>
<td>11.0 in. (27.9 cm)</td>
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<tr>
<td>Height</td>
<td>10.9 in. (27.7 cm)</td>
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<tr>
<td>Weight (in air)</td>
<td>50.0 lb. (22.7 kg)</td>
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Front Cover Images:
Left: Bathymetry displayed in Hypack MBMAX 64.
Right: Side Scan displayed in Triton Perspective (image courtesy of GBT Offshore).
Survey data courtesy of SubSea Technologies

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