MARINE CLOCKS
SHIPS TIME SYSTEMS
2010 - 2011
The Chronometerwerke, established in 1905 in Hamburg by a group of German shipping companies, were taken over by Wempe in 1938 and have been specialising since then in the manufacture of marine chronometers, ship’s clocks and meteorological instruments of highest precision and quality. In 1970 we expanded our product line by Master and secondary clock systems.

WEMPE Master Clocks are specially designed to meet the needs on board a ship. They stand out due to their state of the art technology and their functional and compact design. Furthermore, they are easy to mount and to operate and only need minimal maintenance. Our standard programme includes special built-in secondary clocks of 96x96mm and 144x144mm in different versions, prestigious high quality wall clocks as well as clocks for every location aboard a ship.

The technology of the secondary clocks fulfills the same requirements. Being an exclusive licensee of the MOBALine Technology, we are able to offer you secondary clocks that can be installed and put into operation in a considerably reduced time. The MOBALine Technology works on the basis of an intelligent secondary movement that adjusts itself automatically to the correct time once it has been connected to the MOBALine System controlled by the Master clock. The usual setting of the time by hand is hence not necessary anymore, which is also of great advantage after a power failure and service.

WEMPE Chronometerwerke has more than 30 years of experience in fitting all types of vessels with Master and secondary clock systems.

Our clock systems are used on several leading cruise like MV EUROPA, QUEEN VICTORIA, ARCADIA, COSTA LUMINOUSA, PRIDE OF AMERICA and all actual cruise vessels of Holland America line and merchant ships, mega yachts as well as aboard the entire German research and navy fleet.

We hope this short presentation may arouse your interest in our products and we are sure that you will find clocks that exactly meet your expectations and demands on the following pages.
THE MOST PRECISE PORTABLE MECHANICAL TIMEPIECES THAT HAVE EVER BEEN MANUFACTURED ARE SHIP’S CHRONOMETERS. TOGETHER WITH THE Sextant, THEY ENABLED SEAFARERS TO DETERMINE THEIR EXACT POSITION AT SEA. THE SEAFARING NATIONS INVESTED A LOT OF MONEY IN THE DEVELOPMENT OF THESE PRECISION INSTRUMENTS, BECAUSE THOSE WHO WOULD BE ABLE TO DETERMINE THEIR POSITION AT SEA WOULD RULE THE SEVEN SEAS.

WITH HIS H1 TERMINATED IN 1735, A SIMPLE ENGLISH CARPENTER NAMED JOHN HARRISON (BORN 1693) BECAME THE FIRST PERSON TO BUILD A CHRONOMETER WITH A RATE ACCURACY NEARLY ACCOMPLISHING THE PERFORMANCE REQUIRED BY THE BOARD OF LONGITUDE. A TEST VOYAGE ABOARD THE SHIP CENTURION FROM SPITHEAD TO LISBON IN MAY 1736 HOWEVER DID NOT YET SATISFY HARRISON. IT TURNED OUT SOME TIME LATER THAT THE TABLES THAT WERE USED TO CHECK THE CLOCK CONTAINED ERRORS. HARRISON WAS ABLE TO CONVINCE KING GEORGE III WITH THE H5 (COPY OF THE H4) IN 1771 AND FINALLY RECEIVED THE PROMISED PRIZE OF APPROX. 20,000 POUNDS IN 1773.

WITH THE DEVELOPMENT OF QUARTZ TECHNOLOGY IN THE WATCH AND CLOCK INDUSTRY, SHIP’S CHRONOMETERS HAVE BEEN MASTERLY MANUFACTURED AND SUPPLIED WITH QUARTZ ELECTRONICS SINCE 1970.

OUR CURRENT MODELS DO NOT ONLY DISTINGUISH THEMSELVES FOR THEIR PRECISION AND RELIABILITY, BUT THEY ARE AS WELL THE RESULT OF CONTINUOUS DEVELOPMENT AND ENHANCEMENT. NAVIGATORS HAVE BEEN RELYING FOR MORE THAN 100 YEARS ON THE EXPERIENCE AND PRECISE CRAFTSMANSHIP OF HAMBURG CHRONOMETRY.

**TECHNICAL DATA**

**DIMENSION:** 185x185x130mm

**DIAL:** 95mm Ø, white with black Arabic numerals

**MOVEMENT:** Stepping motor with an angular step of 60°, stepping frequency 0.5 Hz. The second hand moves forward in successive jumps of 1/sec.

**ELECTRONICS:** MOS-IC’s and semi-conductors with gold cap on a printed wiring board 55x135mm, all electronic parts are housed in the base of the chronometer’s case. The oscillating frequency is temperature stabilised.

**QUARTZ:** Frequency 4.194.304 Hz

**HELIUM LEAKAGE RATE:** 1.10⁻¹¹ Pa m³/s

**BATTERIES:** 2 alkaline batteries type mono size D / LR20

**LIFE:** 1 year if alkaline batteries are used

**ACCURACY:** Medium daily rate 0.01 sec/24h at 22°C (+ 1°C)

**SECURITY DISTANCE:** The security distance to the magnetic compass is 0.90m.

**WEIGHT:** 2.4kg

The chronometer passes before delivery a work shop test that fulfils DIN 8319 standard according to the requirements of the Federal Office for maritime shipping and hydrograph (BSH) in Hamburg formerly known as DHI.
Our Master clock 20020 is the most favourably-priced WEMPE Master clock. It distinguishes itself by its excellent cost-performance ratio.

Despite its simple concept, the important marks of quality of this Master clock are of course on the well known high level. A large and clear display together with a plain and complete foil keyboard guarantee an excellent operation.

A solid plastic case with Acryl glass-cover protects the electronic system and keyboard against dust, water and mechanical influences. A valuable exterior has been achieved by using an aluminium front panel. The high quality level is realized even in details such as the connectors. All connectors will be delivered in a sturdy industrial version and guarantee secure contact.

**TECHNICAL DESCRIPTION**

The purpose of the Master clock is to provide a uniform indication of time and date. The Master clock generates impulses controlling the analogue secondary clocks.

**TECHNICAL DATA**

**Housing:** Plastic housing RAL 7035, protection type IP 54, wall-mounting model with protection cover made of acryl glass, anodised aluminium front plate.

**Dimensions:** Width 240 mm, height 185 mm, depth 115 mm

**Weight:** 1.5 kg

**Connections:** All connections are in the lower part of the Master clock. Cable entry by V-groove screw fittings, clamp board 1 for 230 V AC current supply voltage, clamp board 2 for low voltage entries and exits.

**Technology:** processor controlled C-MOS

**Display:** Alphanumeric display, numbers of 6 mm height and with 14 digits. The indication of date and time alternates every 6 seconds. All available functions can be programmed through the system setting menu.

**Oscillator:** Quartz controlled, average daily rate 0,05 seconds/ 24 hours.

**Current supply:** 230 V AC 50 Hz (optional 24V DC)

**Power reserve:** In the event of a power failure the digital display of time and date turn off and the secondary clocks stop running. An internal lithium battery stores the data. When the power failure is over the secondary clocks are adjusted to the current time. In order to Maintain all functions after a power failure an additional 6V 1Ah battery can be connected providing approx. 2 hours of power reserve.

**Secondary clocks:** All common analogue secondary clock systems for 12V or 24V can be connected. 2 analogue secondary clock lines are available which alternatively can be set to minute or second impulses. Up to 20 secondary clocks can be operated by one line.

**Digital sec. clocks:** are controlled by an internal BCD-code. 5 digital secondary clocks can maximally be connected.

**Time adjustment:** Direct adjustment in preset steps from 1-99 minutes by pressing the function keys. The backward adjustment of the analogue secondary clocks is carried out by a fast-forward setting.

**Security:** All system settings are only possible with an admission code

**DELIVERABLE VERSIONS:**

<table>
<thead>
<tr>
<th>Model</th>
<th>Dimensions</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>20020/W</td>
<td>Master clock Basic unit with wall mounting case</td>
<td>240 (W) x 185 (H) x 115mm (D)</td>
</tr>
</tbody>
</table>
**Digital Master Clock Pro - Model 20097**

The Master clock 20097 has a very compact design allowing mounting and usage even in small places. Its functionality and ergonomic design has improved thanks to a modern matrix LC-display and a flat foil keyboard.

It comes in a modern plastic housing with a metal cage to protect the unit from electromagnetic disturbances. Different versions of housings are available, for wall or control panel mounting. Its modular construction makes it possible to install different options step by step. Many necessary functions are implemented in the standard already.

- Max. 6 hours of protection against power failure
- Interfaces for all current secondary clock systems
- Serial RS485 interface with 1 standard protocol
- GPS-synchronization
- Relay-output for external error indicators

As options, up to 3 additional cards can be installed:

- For additional analogue secondary clocks
- For digital secondary clocks
- For self-adjusting analogue secondary clocks (MOBALINE-system)
- For additional serial interfaces
- DCF77-synchronization
- An additional power supply may be used for extra protection against power failure (up to 12 hours for internal and external functions).

**Deliverable Versions:**

<table>
<thead>
<tr>
<th>Model</th>
<th>Dimensions</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>20097/W</td>
<td>Master clock Basic unit with wall mounting case</td>
<td>257 (W) x 217 (H) x 125MM (D)</td>
</tr>
<tr>
<td>20097/P</td>
<td>Master clock Basic unit flush mounting case</td>
<td>257 (W) x 156 (H) x 142MM (D)</td>
</tr>
<tr>
<td>20097/R</td>
<td>Master clock Basic unit 19&quot; rack unit (4RU)</td>
<td>482,6 (W) x 176,5 (H) x 142MM (D)</td>
</tr>
</tbody>
</table>

**System Overview**
GENERAL DESCRIPTION

The Master clock was designed for displaying integrated time and date (UTC and LT). The Master clock controls analogue or digital secondary clocks using precise impulses and signals. Internal interfaces with various standards facilitate the communication with all common computer systems.

<table>
<thead>
<tr>
<th>TECHNICAL DATA</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Housing:</strong></td>
<td>Plastic RAL 7035 (optionally any other type of lacquering in RAL colours possible), IP54, for wall- or flush-mounting and as 19&quot; rack unit.</td>
</tr>
<tr>
<td><strong>Dimensions:</strong></td>
<td>Wall-mounting housing incl. terminal strip: width 257 mm, height 217 mm, depth 125 mm. Flush-mounting housing incl. front panel: width 257 mm, height 155 mm, total depth incl. terminal strip 142 mm.</td>
</tr>
<tr>
<td><strong>Weight:</strong></td>
<td>Wall-mounting housing: 2.7 kg. Flush-mounting housing: 2.2 kg.</td>
</tr>
<tr>
<td><strong>Connectors:</strong></td>
<td>48-pole terminal-strip in the lower part of the housing, cable-inlet with VG-Technology</td>
</tr>
<tr>
<td><strong>Technology:</strong></td>
<td>Processor controlled C-MOS</td>
</tr>
<tr>
<td><strong>Display:</strong></td>
<td>Alphanumeric LC-display, 12 mm digit height, 20 digits. Local time and date or UTC can be chosen to be displayed. All other functions for setting and configuration of the clock are operated by a menu-system. The display illumination can be switched on/off.</td>
</tr>
<tr>
<td><strong>Oscillator:</strong></td>
<td>Quartz controlled, temperature compensated quartz, 0.05 sec/24 hours</td>
</tr>
<tr>
<td><strong>Power supply:</strong></td>
<td>24 V DC, power consumption 300 mA (without secondary clocks), max. 6 hours emergency backup protection of internal functions. A 12V (0.7 Ah) battery provides 4 hours of continuous operation. When the power returns, the analogue and digital clocks are adjusted automatically.</td>
</tr>
<tr>
<td><strong>Error:</strong></td>
<td>Occurrence of errors, such as power failure, low voltage or messages relating to other defects are shown on the display.</td>
</tr>
<tr>
<td><strong>Secondary clocks:</strong></td>
<td>All current 12/24V secondary clock-systems, running forward and forward/backward can be connected. The Master clock can supply 100 forwards or 50 forwards/backwards analogue secondary clocks. Digital secondary clocks can be run via an internal BCD-code.</td>
</tr>
<tr>
<td><strong>Interfaces:</strong></td>
<td>Serial interface RS 485 with a standard-protocol or other individual protocols. GPS-interface RS 422 and PPS-input for synchronization by means of an external GPS-receiver. 2 relay outputs max. 125V / 0.5A for the alarm. The system can be monitored for power failure, false or missing signal inputs, low voltage etc. The required type of monitoring can be selected by using the menu system.</td>
</tr>
<tr>
<td><strong>Time setting:</strong></td>
<td>Can be done using steps of one minute or programmed steps between 1 - 99 minutes. Direct time setting is protected by the menu safety options. All system settings are accessible only by using a numerical code.</td>
</tr>
<tr>
<td><strong>Digital Secondary clocks:</strong></td>
<td>Digital secondary clocks run with an internal BCD-code. These secondary clocks require 24 V power.</td>
</tr>
<tr>
<td><strong>Additional Interfaces:</strong></td>
<td>Interfaces other than standard can be made using new cards.</td>
</tr>
<tr>
<td><strong>MOBALINE:</strong></td>
<td>Is a new time bus-system for self adjusting secondary clocks. Power supply and data transfer is provided by two-core wire by means of an amplitude/frequency modulation with a very low frequency, the transmission is safe and free of interference. Every secondary clock decodes the received time signal and adjusts it accordingly. Time settings are recognized and adapted immediately. Installation and Maintenance time is reduced to a minimum and the secondary clocks are promptly synchronized. The installation of additional secondary clocks is very easy due to the bus-wire system and the automatic adjustment.</td>
</tr>
</tbody>
</table>

TT-Line – Nils Holgersson

BC Ferries - Coastal Celebration
**WEMPE MASTER CLOCKS**

WEMPE Master Clocks are specially designed to meet the needs on board a ship. They stand out due to their state of the art technology and their functional and compact design. Furthermore, they are easy to mount and to operate and only need minimal maintenance.

**WEMPE MASTER CLOCK PRO – TYPE 20100 AND ETHERNET SECONDARY CLOCKS**

**WEMPE DIGITAL MASTER CLOCK – TYPE 20100**

The Master clock 20100 controls analogue and digital secondary clocks. The analogue clocks can be connected to the four available secondary clock lines. The digital clocks can be connected to the two available serial interfaces. A pulse is generated every second on the analogue lines for the control of the analogue clocks. The current time is transmitted to the digital clocks via a serial protocol. The system supports various serial protocols.

In addition to the directly connected secondary clocks, the Master clock can also control secondary clocks that are connected to the Master clock via a network connection. Such a secondary clock is connected to the Master clock via a so-called Ethernet Secondary Clocks Interface (ENI). One ENI can control exactly one analogue and (or) one digital clock. The voltage supply of the ENI is provided by Power over Ethernet (PoE) so that no additional voltage supply is necessary or via stabilised 24V DC.

The Master clock is configured by means of a separate operating monitor (BEMO) or a web interface. It is also possible to connect a second BEMO in order to configure the Master clock as well from another room.

Furthermore, the Master clock provides an NTP Server on the Ethernet making it possible to synchronize the time of LAN computers. A high-precision, quartz-controlled oscillator with an average rate accuracy of ± 0.05 s / 24 h provides the control pulse for the Master clock’s UTC. Or if a GPS receiver is connected its receiver signal provides the control pulse.

When travelling through different time zone, the LT of the Master clock has to be adjusted manually. Analogue secondary clocks are readjusted automatically after the preset interval. Digital secondary clocks adopt the modified LT without time delay.

**BEMO**

**GENERAL DATA:**

<table>
<thead>
<tr>
<th>CASE</th>
<th>MATERIAL: ALUMINIUM PROTECTION TYPE: FRONT IP54, BACK SIDE IP40</th>
</tr>
</thead>
<tbody>
<tr>
<td>TEMPERATURE RANGE</td>
<td>0 to 40°C</td>
</tr>
<tr>
<td>DIMENSIONS (WITHOUT WALL-MOUNTING HOLDER)</td>
<td>144 (W) X 144 (H) X 62MM (D)</td>
</tr>
<tr>
<td>WEIGHT</td>
<td>0.75kg</td>
</tr>
<tr>
<td>CONTROL</td>
<td>MICRO CONTROLLER AND DISPLAY CONTROLLER</td>
</tr>
<tr>
<td>DISPLAY</td>
<td>2 LINES WITH 20 DIGIT PER LINE</td>
</tr>
<tr>
<td>OPERATION</td>
<td>8 KEYS AND 1 JOG DIAL FOR MENU PROMPTING</td>
</tr>
</tbody>
</table>

**ELECTRICAL DATA:**

| POWER SUPPLY | 9-36VDC FROM HEDI; MAX. 100mA DEPENDING ON BRIGHTNESS |
| POWER RESERVE MAIN CLOCK | CAN BE OPERATED FOR 10 MIN. WITHOUT SEC. CLOCK LINES |
| CONNECTIONS | PHOENIX MS1B TERMINAL BLOCKS |
| INTERFACES | RS485 TO HEDI |
| CONNECTIONS | TRIM 1X10 PLUG-IN CONNECTOR TO HEDI |
SYSTEM OVERVIEW

1. Digital Master clock 20100
2. External dimmer
3. External Masters adaptor
4. Digital secondary clocks
5. Analogue secondary clocks
6. PoE enabling switch
7. ENIs
8. BEMO
9. Serial interface to GPS
10. PPS interface to GPS
WEMPE NTP-SERVER

The NTP-Server provides a service for time synchronisation on the Ethernet. Unlike usual time protocols the Local Time Server does not emit UTC, but LT.

The server itself gets its time from a main clock that provides the time format LT or the difference to UTC. The server is intended to be connected to a HU20097 main clock or as an extension for the UTC-related NTP of the HU20100 main clock. Connected computers can thus get the current local time set on the main clock from the Local Time Server via NTP service.

The server is connected to the main clock by means of a serial interface. After the server has been put into operation or following a Power-UP, a programme starts running on the server that analyses and further processes the time protocol. The system supports two main clock protocols (itron und itron2000).

As delivered, the Local Time Server tries to retrieve its IP address assignment dynamically (DHCP). It is however recommended to assign a static IP address to the Local Time Server.

SYSTEM OVERVIEW

Figure 1: System overview

1 main clock 20100 (or main clock 20097)
2 RS232 connection
3 Local Time Server
4 LAN cable on the Ethernet
5 Client
### General Data

**NTP-Server as add-on for Wempe time systems**

| **Timeserver function** | NTP-server version 3, port 123 UDP  
UTC or Local time (LT) |
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td><strong>User interface/management</strong></td>
<td>Program surface via VGA-monitor</td>
</tr>
</tbody>
</table>
| **System** | OS: Windows XP embedded  
CPU/Mainboard: Intel Core Duo / Core 2 Duo, Intel 945GME + ICH7M (82801GBM)  
Memory: 1 DDR2 SODIMM  
LAN: 4* Realtek RTL8101E 10/100 Mbps LAN  
LC - Display 2 x 20 figures, 5 x 8 dots, backlight blue  
Special long life elements for extend life circle (fanless and without HDD) |
| **Case** | Aluminium profile  
19" rack unit, 1 RU  
44.3H x 440W x 360D mm (Chassis)  
Weight: 5.2 |
| **Ambient temperature** | Operating Temperature: 0 to 40 °C  
Operating Humidity: 5 to 95%, non-condensing |
| **Description** | Windows XP embedded for simple LAN-configuration  
NTP-Network-timer, time synchronisation for NTP-Clients |
| **Circuit points** | USB-keyboard and mouse  
VGA-Standard-Monitor, 15-pin  
4x Ethernet 10/100Base-T, RJ45  
1x RS 232 |
| **Power supply** | 230 VAC, 84watt, power pack unit external |
PRECISE, DURABLE AND STATE-OF-THE-ART CLOCK MOVEMENT TECHNOLOGY!

1.5V BATTERY-POWERED QUARTZ CLOCKS – TYPE B:

The accuracy of quartz movements is provided by a quartz oscillator (frequency 32.768 KHz). A possible deviation of rate would be less than 1 second per day. Analogue quartz clocks have to be set and adjusted manually to the current time. Analogue quartz clocks run on standard batteries.

Advantages:
- Sturdy and durable movement
- Masters-independent power supply
- Interference-resistant
- Most economically priced movement type

QUARTZ CLOCKS FOR 24 VDC – TYPE Q:

These clocks do not run on standard batteries as usual for quartz movements, but are connected to the ship’s 24V DC Masters power supply. This does not at all affect their accuracy.

Advantages:
- Sturdy and durable movement
- No battery change necessary
- Economically priced movement type

ANALOGUE SECONDARY CLOCKS, 12-24V DC MINUTE IMPULSE – TYPE T:

Secondary clocks are always controlled by a Master clock. The switchable 12 – 24V DC alternate polarity minute impulse is transmitted via a 2 or 4-core wire (secondary clock line). All secondary clocks are connected in parallel to the secondary clock line or via junction boxes. The minute impulse is at the same time the operating voltage of the analogue clocks. The total power consumption of all secondary clocks, which may not exceed the total output power of the Master clock, results from the number of connected secondary clocks, the cable length and the wire diameter. The advantage of secondary clocks is that all these clocks display an identical, uniform time since they are all controlled by the same Master clock. If the Master clock is equipped with a GPS module the system is always synchronised to the most precise time. Secondary clocks with a minute impulse movement do not have a second hand. If the Master clock is fitted with batteries for power supply backup, all connected analogue clocks will stop running in case of blackout, but they adjust automatically to the correct time once the Masters supply is back again.

Advantages:
- Stable, reliable and time-tested clock technology
- Sturdy and very durable
- Uniform time display
- Cost-effective clock technology

ANALOGUE SECONDARY CLOCKS, MINUTE AND SECOND IMPULSE 12-24V DC – TYPE T:

To control secondary clocks with a minute and second impulse movement it is necessary to have a Master clock featuring at least two secondary clock outputs/secondary clock lines, i.e. one for the minute impulse and one for the second impulse. Minute and second impulse secondary clocks are driven via a 4-core wire.

Advantages:
- As for the a.m. secondary clocks with minute impulse, but additionally with second hand.
ANALOGUE SECONDARY CLOCKS ADVANCE AND REVERSE RUNNING,
1/2 MINUTE AND SECOND IMPULSE 24V DC – TYPE S:

To control secondary clocks with a minute and second impulse movement it is necessary to have a Master clock featuring at least two secondary clock outputs/secondary clock lines, i.e. one for the minute impulse and one for the second impulse. Minute and second impulse secondary clocks are driven via a 4-core wire.

Advantages:
As for the a.m. secondary clocks with minute impulse, but advance and reverse running.

SELF-SETTING INTELLIGENT MOBALINE SECONDARY CLOCKS - TYPE M:

MOBALINE the new intelligent self-setting secondary clock movement technology is radio synchronised by MOBALINE. This guarantees always the absolute correct time. A simple, 2-wire transmission system, designed for interference protected data transmission with simultaneous power supply of connected secondary clocks. MOBALINE is safe! No more transmission errors, thanks to interference protected modulation mode, self-correcting code and clever decoding. MOBALINE is easy to install and to service! Maintenance-free thanks to self-setting! No re-setting problems for clocks with difficult access. Battery change not necessary. Power supply of secondary clocks through the MOBALINE. Use of already installed 2-wire lines, low voltage.

ETHERNET SECONDARY CLOCKS - TYPE IP

The Ethernet data switch/hub directly supplies the Ethernet secondary clocks with the necessary operating voltage via PoE (Power over Ethernet). Every secondary clock is equipped with a small µC. The Ethernet segment provides UTC and Local Time as time information. Each secondary clock module saves the actual position of the hands and determines automatically the difference between that time and the current system time. In case of a power-down, the current position of the hands is stored (non-volatile storage) so that the clocks show automatically the current time once the system has been rebooted. A special broadcast address facilitates the data exchange with the Master clock so that any requested number of clocks can be fed by the Master clock.

Master advantages of the Ethernet secondary clocks:

- Easy to put into operation: secondary clocks automatically log on the system via DHCP.
- "Intelligent" control providing automatic import of time data and automatic setting of secondary clocks.
- Saving of cables because of use of existing network.
- The clock system can easily be expanded on every network switch.
- Automatic re-synchronisation after failure of a system part or of the entire system.
- Fast troubleshooting via a network computer.

Short description of the network component of the Master clock 20100:

The Master clock is equipped with a standard Ethernet interface for data output. The basic version comes with Wempe's own broadcast protocol. It is also possible to activate additional services, as for example a SNTP Server.
**WEMPE MARINE CLOCKS**

WEMPE marine clocks are specially designed to meet the needs on board a ship. They stand out due to their state of the art technology and their functional and compact design. Furthermore, they are durable, easy to mount and to operate and only need minimal maintenance. Our standard programme includes special built-in secondary clocks of 96x96mm and 144x144mm in different versions, prestigious high quality wall clocks as well as clocks for every location aboard a ship.

Being an exclusive licensee of the MOBALine Technology, we are able to offer you secondary clocks that can be installed and put into operation in a considerably reduced time. The MOBALine Technology works on the basis of an intelligent secondary movement that adjusts itself automatically to the correct time once it has been connected to the MOBALine System controlled by the Master clock. The usual setting of the time by hand is hence not necessary anymore, which is also of great advantage after a power failure and service.

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**FLUSH MOUNTING MARINE CLOCKS – INDOOR USE**

**DECORATIVE ANALOGUE MARINE CLOCK Ø 197MM**

*Decorative flush mounting marine clock with front bezel in polished brass, easy to open from the front, white dial Ø 140mm with black hour markers, operating by different Quartz and secondary clock movements*

- **Dimension:** Ø 197mm x 20mm (h)
- **Weight:** ca 0.5kg
- **Deliverable versions:** T / M / S / IP / Q / B

**DECORATIVE FLUSH MOUNTING MARINE CLOCK WITH COVER LID Ø 280MM**

*Decorative flush mounting marine clock, aluminium dial lacquered in RAL 9001 (optional any other type of RAL lacquering possible), hour markers of solid brass, matt finished and colourless lacquered, operating by different Quartz and secondary clock movements*

- **Dimension:** Ø 280mm x 30mm (h)
- **Weight:** ca 1.2kg
- **Deliverable versions:** T / M / S / IP / Q

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**DECORATIVE ANALOGUE MARINE CLOCK MOD. 20759**

*Decorative analogue marine clock, aluminium dial lacquered in RAL 9001 (optional any other type of RAL lacquering possible), hour markers of solid brass, matt finished and colourless lacquered, operating by different Quartz and secondary clock movements*

**DECORATIVE ANALOGUE MARINE CLOCK MOD. 20777**

*Decorative flush mounting marine clock with front bezel in brass chrome plated, easy to open from the font, white dial Ø 140mm with black hour markers, operating by different Quartz and secondary clock movements*

**DECORATIVE FLUSH MOUNTING MARINE CLOCK MOD. 20254**

*Decorative flush mounting marine clock, aluminium dial lacquered in RAL 9001 (optional any other type of RAL lacquering possible), hour markers of solid brass, matt finished and colourless lacquered, operating by different Quartz and secondary clock movements*

**DECORATIVE FLUSH MOUNTING MARINE CLOCK MOD. 20272**

*Decorative flush mounting marine clock, aluminium dial lacquered in RAL 9001 (optional any other type of RAL lacquering possible), hour markers of solid brass, matt finished and colourless lacquered, operating by different Quartz and secondary clock movements*
DECORATIVE ANALOGUE MARINE CLOCK
Ø 290mm
Decorative flush mounting marine clock with stainless steel mask front bezel out of chrome-plated brass Ø 187mm, easy to open from the font, white dial Ø 140mm with black hour markers, operating by different Quartz and secondary clock movements

Dimension:
Weight:
Deliverable versions:

Mod. 20780
Ø 290mm x 23mm (h)
Ca 1.8kg
T / M / S / IP / Q

DECORATIVE ANALOGUE MARINE CLOCK
Ø 250mm
Decorative flush mounting marine clock, Plexiglas dial Ø 250mm, hour markers of solid brass, matt finished and colourless lacquered, operating by different Quartz and secondary clock movements

Dimension:
Weight:
Deliverable versions:

Mod. 20872
Ø 250mm x 40mm (h)
Ca 1.2kg
T / M / S / IP / Q

WALL MOUNTING MARINE CLOCKS - INDOOR USE

DECORATIVE ANALOGUE MARINE CLOCK
Ø 260mm
Decorative wall mounting marine clock with wooden surrounding ring of solid mahogany matt-finish, glass top out of brass, white dial Ø 210mm with black Roman numerals, operating by different Quartz and secondary clock movements

Dimension:
Weight:
Deliverable versions:

Mod. 20036
Ø 260mm x 40mm (h)
Ca 1.0kg
T / M / S / IP / Q / B

DECORATIVE ANALOGUE MARINE CLOCK
Ø 260mm
Decorative wall mounting marine clock, Plexiglas dial Ø 250mm, hour markers of solid brass, matt finished and colourless lacquered, operating by different Quartz and secondary clock movements

Dimension:
Weight:
Deliverable versions:

Mod. 20036
Ø 260mm x 40mm (h)
Ca 1.0kg
T / M / S / IP / Q / B

ANALOGUE MARINE CLOCK
Ø 190mm
Wall mounting marine clock with wooden surrounding ring of solid mahogany matt-finish, front bezel in polished brass, easy to open from the font, white dial Ø 140mm with black hour markers, operating by different Quartz and secondary clock movements

Dimension:
Weight:
Deliverable versions:

Mod. 20308
Ø 190mm x 60mm (h)
Ca 1.0kg
T / M / S / IP / Q / B

ANALOGUE MARINE CLOCK
Ø 190mm
Wall mounting marine clock with wooden surrounding ring of solid mahogany matt-finish, front bezel in brass chrome plated, easy to open from the font, white dial Ø 140mm with black hour markers, operating by different Quartz and secondary clock movements

Dimension:
Weight:
Deliverable versions:

Mod. 20309
Ø 190mm x 60mm (h)
Ca 1.0kg
T / M / S / IP / Q / B
**ANALOGUE MARINE CLOCK**

**STAINLESS STEEL**

**Ø 200MM**

Wall mounting marine clock with polished stainless steel case, dial out of aluminium Ø 180mm white, black hands and scale with Arab. numerals, operating by different quartz and secondary clock movements.

**Dimension:** Ø 200MM x 47MM (H)

**Weight:** CA 1,0KG

**Deliverable versions:** T / M / S / IP / Q / B

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**ANALOGUE MARINE CLOCK**

**STAINLESS STEEL IP54**

**Ø 200MM**

Wall mounting marine clock with polished stainless steel case, vapour proof IP54, easy to open from the font, dial out of aluminium Ø 140mm white, black hands and scale with Arab. numerals, operating by different quartz and secondary clock movements.

**Dimension:** Ø 197MM x 70MM (H)

**Weight:** CA 1,0KG

**Deliverable versions:** T / M / S / IP / Q / B

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**ANALOGUE MARINE CLOCK**

**HIGH-GLOSS CHROME**

**Ø 215MM**

Wall mounting marine clock with brass case high-gloss chrome plated, easy to open from the font, dial Ø 185MM white, black hands and scale with markings, operating by different quartz and secondary clock movements.

**Dimension:** Ø 215MM x 45MM (H)

**Weight:** CA 1,0KG

**Deliverable versions:** T / M / S / IP / Q / B

---

**ANALOGUE MARINE CLOCK**

**STAINLESS STEEL IP54**

**3 HANDS (H/M/S)**

**Ø 200MM**

Wall mounting marine clock with polished stainless steel case, vapour proof IP54, easy to open from the font, dial out of aluminium Ø 140mm white, black hands and scale with Arab. numerals, operating by different quartz and secondary clock movements with second hand.

**Dimension:** Ø 197MM x 70MM (H)

**Weight:** CA 1,0KG

**Deliverable versions:** T / M / S / IP / Q / B

---

**ANALOGUE MARINE CLOCK**

**HIGH-GLOSS CHROME**

**Ø 215MM**

Wall mounting marine clock with brass case high-gloss chrome plated, easy to open from the font, dial Ø 185MM white, and black hands and scale with Arab. numerals, operating by different quartz and secondary clock movements.

**Dimension:** Ø 215MM x 45MM (H)

**Weight:** CA 1,0KG

**Deliverable versions:** T / M / S / IP / Q / B
**ANALOGUE MARINE CLOCK**

**MOD. 20804**

**HIGH-GLOSS CHROME**

Ø 235MM

WALL MOUNTING MARINE CLOCK WITH BRASS CASE HIGH-GLOSS CHROME PLATED, DIAL Ø 210MM WHITE, BLACK HANDS AND SCALE WITH MARKINGS, OPERATING BY DIFFERENT QUARTZ AND SECONDARY CLOCK MOVEMENTS

**Dimension:** Ø 235MM X 55MM (H)

**Weight:** CA 1,2KG

**Deliverable versions:** T / M / S / IP / Q / B

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**DECORATIVE ANALOGUE MARINE CLOCK**

**MOD. 20808**

**HIGH-GLOSS BRASS**

Ø 235MM

WALL MOUNTING MARINE CLOCK WITH BRASS CASE HIGH-GLOSS POLISHED AND COLOURLESS LACQUERED, DIAL Ø 210MM WHITE, BLACK HANDS AND SCALE WITH ROMAN NUMERALS, OPERATING BY DIFFERENT QUARTZ AND SECONDARY CLOCK MOVEMENTS

**Dimension:** Ø 235MM X 55MM (H)

**Weight:** CA 1,2KG

**Deliverable versions:** T / M / S / IP / Q / B

---

**ELEGANT ANALOGUE MARINE CLOCK**

**MOD. 20200/20210**

**WALL MOUNTING SUPPORT**

Ø 315MM

ELEGANT WALL MOUNTING MARINE CLOCK WITH WALL MOUNTING SUPPORT FOR ESPECIALLY SIMPLE MOUNTING, ELEGANT AND SLIM STEEL CASE POWDER COATED RAL 9002, DIAL Ø 300MM WHITE, BLACK HANDS AND SCALE WITH ARAB. NUMERALS (TYPE 20210) OR MARKINGS (TYPE 20200), OPERATING BY DIFFERENT QUARTZ AND SECONDARY CLOCK MOVEMENTS

**Dimension:** Ø 315MM X 68MM (H)

**Weight:** CA 1,2KG

**Deliverable versions:** T / M / S / IP / Q / B

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**ANALOGUE MARINE CLOCK**

**MOD. 20963**

**POLISHED BRASS**

Ø 225MM

WALL MOUNTING MARINE CLOCK WITH BRASS CASE HIGH-GLOSS POLISHED AND COLOURLESS LACQUERED, EASY TO OPEN FROM THE FONT, DIAL Ø 140MM WHITE, BLACK HANDS AND SCALE WITH ARAB. NUMERALS, OPERATING BY DIFFERENT QUARTZ AND SECONDARY CLOCK MOVEMENTS

**Dimension:** Ø 225MM X 70MM (H)

**Weight:** CA 1,0KG

**Deliverable versions:** T / M / S / IP / Q / B

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**ANALOGUE MARINE CLOCK**

**MOD. 20201/20211**

**DOUBLE FACE**

**WITH WALL BRACKET**

Ø 315MM

ELEGANT DOUBLE FACE MARINE CLOCK WITH WALL MOUNTING SUPPORT FOR ESPECIALLY SIMPLE MOUNTING, ELEGANT AND SLIM STEEL CASE POWDER COATED RAL 9002, DIAL Ø 300MM WHITE, BLACK HANDS AND SCALE WITH ARAB. NUMERALS (TYPE 20211) OR MARKINGS (TYPE 20201), OPERATING BY DIFFERENT QUARTZ AND SECONDARY CLOCK MOVEMENTS

**Dimension:** Ø 315MM X 135MM (H)

**Weight:** CA 2,5KG

**Deliverable versions:** T / M / S / IP / Q / B
### Marine Clocks Wall Mounting – Weatherproof for Indoor and Outdoor Use

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
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<th>Weight</th>
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<tr>
<td>Mod. 20886</td>
<td>Analogue Marine Clock with Case Out of Cast Aluminum, Grey Lacquered, Watertight IP66, White Dial Ø 320mm with Black Hour Markers and Hands, Operating by Different Quartz and Secondary Clock Movements</td>
<td>Ø 320mm x 75mm (H)</td>
<td>3.5kg</td>
<td>T / M / S / IP / Q / B</td>
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<tr>
<td>Mod. 1114-40</td>
<td>Analogue Marine Clock with Aluminium Watertight IP66, White Dial Ø 420mm with Black Hands and Hour Markers, Operating by Different Secondary Clock Movements</td>
<td>Ø 260mm x 52mm (H)</td>
<td>6.5kg</td>
<td>T / M / S / IP</td>
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</table>

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</tr>
</thead>
<tbody>
<tr>
<td>Mod. 2114-40</td>
<td>Analogue Marine Clock with Stainless Steel A4 IP55 with Illumination 468 x 468mm Wall Mounting Single Face Marine Clock for Outdoor Use, Case Out of Stainless Steel A4 According to DIN 17440 1.4571 (X6CrNiMoTi 122), Weather-Proof IP55, Single Panel Safety Cover Glass According to DIN 1249 6mm Thick, Ball Throwing Protected, Dial 400mm Ø Out of White Acryl Glass with Black Hands and Hour Markers According to DIN 41091, with Illumination 230V 50Hz, Operating by Different Secondary Clock Movements</td>
<td>468 x 468mm x 168,5mm</td>
<td>13.5kg</td>
<td>T / M / S / IP</td>
</tr>
<tr>
<td>Mod. 2214-40</td>
<td>Analogue Marine Clock with Stainless Steel A4 IP55 with Illumination 468 x 468mm Wall Mounting Double Face Marine Clock with Wall Bracket for Outdoor Use, Case Out of Stainless Steel A4 According to DIN 17440 1.4571 (X6CrNiMoTi 122), Weather-Proof IP55, Single Panel Safety Cover Glass According to DIN 1249 6mm Thick, Ball Throwing Protected, Dial 400mm Ø Out of White Acryl Glass with Black Hands and Hour Markers According to DIN 41091 with Illumination 230V 50Hz, Operating by Different Secondary Clock Movements</td>
<td>468 x 468mm x 240mm</td>
<td>19kg</td>
<td>T / M / S / IP</td>
</tr>
</tbody>
</table>

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<th>Weight</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Mod. 1215-50</td>
<td>Analogue Marine Clock with Alu. Weatherproof IP54 with Illumination Ø 581mm Wall Mounting Double Face Marine Clock with Wall Bracket for Outdoor Use, Case Out of High Quality Aluminium Profile Weather-Proof IP54, Nature Anodized, Safety Glass Out of ESG-Single Pane Safety Glass, White Dial Ø 500mm with Black Hands and Hour Markers, with Illumination 230V 50Hz, Operating by Different Secondary Clock Movements</td>
<td>Ø 581mm x 248mm (H)</td>
<td>20kg</td>
<td>T / M / S / IP</td>
</tr>
</tbody>
</table>

Norwegian Cruise Line – Norwegian Sky
RADIO ROOM MARINE CLOCKS – FLUSH AND WALL MOUNTING

ANALOGUE RADIO ROOM MARINE CLOCK FLUSH MOUNT.

3 HANDS (H/M/S)
Ø 187MM

Flush mounting marine clock with front bezel out of brass chrome plated, easy to open from the font, white dial Ø 140mm with black hands and scale with Arab numerals and silent sectors in red and green as per international regulations, operating by different Quartz and secondary clock movements with second hand.

Dimension: Ø 187mm x 20mm (H)
Weight: ca 0.5kg
Deliverable versions: T / M / S / IP / Q / B

ANALOGUE RADIO ROOM MARINE CLOCK

3 HANDS (H/M/S)
Ø 190MM

Wall mounting marine clock with wooden surrounding ring of solid mahogany matt-finish, front bezel out of brass chrome plated, easy to open from the font, white dial Ø 140mm with black hands and scale with Arab numerals and silent sectors in red and green as per international regulations, operating by different Quartz and secondary clock movements with second hand.

Dimension: Ø 190mm x 60mm (H)
Weight: ca 1.0kg
Deliverable versions: T / M / S / IP / Q / B

ANALOGUE MARINE CLOCK STAINLESS STEEL IP54

3 HANDS (H/M/S)
Ø 200MM

Wall mounting marine clock with polished stainless steel case, vapour proof IP54, easy to open from the font, dial out of aluminium Ø 140mm white, black hands and scale with Arab numerals and silent sectors in red and green as per international regulations, operating by different Quartz and secondary clock movements with second hand.

Dimension: Ø 197mm x 70mm (H)
Weight: ca 1.0kg
Deliverable versions: T / M / S / IP / Q / B

ANALOGUE RADIO ROOM MARINE CLOCK

3 HANDS (H/M/S)
Ø 200MM

Polished brass

Wall mounting marine clock with brass case high-gloss polished and colour-less lacquered, easy to open from the font, dial out of aluminium Ø 140mm white, black hands and scale with Arab numerals and silent sectors in red and green as per international regulations, operating by different Quartz and secondary clock movements with second hand.

Dimension: Ø 225mm x 70mm (H)
Weight: ca 1.0kg
Deliverable versions: T / M / S / IP / Q / B
DIGITAL SECONDARY CLOCKS – CONSOLE AND WALL MOUNTING

DIGITAL SECONDARY CLOCK
MOD. 20686
INDOOR USE
7 LED DIGITS (HH:MM SS)
144 X 144MM
Flush mounting Digital secondary clock with case out of sheet steel zinc plated, standard size 144x144mm DIN 43700, 7-segment LED-display, height of hour 19mm, min./sec. 13mm, with integrated dimmer, control by BCD-code only possible in combination with WEMPE digital Master clocks, reflection-free cover glass, held into place by clamps, power supply 24V DC via Master clock

Dimension: 144 x 144 x 112mm (H)
Weight: CA 1.2kg
Deliverable versions: D

DIGITAL SECONDARY CLOCK
MOD. 20690
OUTDOOR USE IP66
5 LED DIGITS (HH:MM)
300 X 200 X 100MM
Wall mounting Digital secondary clock with stainless steel case RAL 7032 lacquered watertight IP66, 5-segment LED-display, height of numerals 60mm, with external dimmer, control by BCD-code only possible in combination with WEMPE digital Master clocks, power supply 230 VAC 50 Hz current 100mA (optional 115 VAC 60Hz)

Dimension: 300 x 200 x 100mm
Weight: CA 5.0kg
Deliverable versions: D

DIGITAL SECONDARY CLOCK
MOD. 20686
INDOOR USE
7 LED DIGITS (HH:MM SS)
200 X 160 X 108MM
Wall mounting Digital secondary clock with case out of sheet steel zinc plated standard size 144x144mm DIN 43700, 7-segment LED-display, height of hour 19mm, min./sec. 13mm, with integrated dimmer, control by BCD-code only possible together with WEMPE digital Master clocks, reflection-free cover glass, held into place by clamps, power supply 24V DC via Master clock

Dimension: 200 x 160 x 108mm
Weight: CA 2.8kg
Deliverable versions: D
**DIGITAL CLOCK**

**INDOOR USE**

**4 LED DIGITS (HH:MM)**

200 x 160 x 108mm

Wall mounting Digital clock with extra slim casing aluminium coloured for indoor installations, synchronized and powered by MOBALine or as autonomous battery powered clock, best readability due to the very wide angle LC-Display with excellent contrast.

**Dimension:**

- 286 x 135 x 55mm

**Weight:**

- CA 1.1kg

**Deliverable versions:**

- M/B

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**MOD. CRISTALTIME**

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**MULTIFUNCTIONAL**

**ELEGANT DIGITAL CLOCK**

**INDOOR USE**

**7 LED DIGITS (HH:MM:SS)**

4 different sizes

Multifunctional elegant and very slim digital clock with aluminium case anodized and different mounting solutions, LED-display optional in red, green, yellow or blue, height of between 24-40mm for viewing distance up to max. 25-40m, with integrated automatically or manual dimmer, power supply 115/230 VAC, operating as autonomous clock, secondary clock for polarized impulses or as self-setting MOBALine clock.

**Dimension:**

- 333 x 118 x 39mm (DC.57.4)
- 423 x 118 x 39mm (DC.57.6)
- 510 x 169 x 39mm (DC.100.4)
- 652 x 169 x 39mm (DC.100.6)

**Weight:**

- CA 1.4 – 3.1kg

**Deliverable versions:**

- T/M/B

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**MOD. DC**

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MULTIFUNCTIONAL DIGITAL CLOCK

**INDOOR USE**

7 LED DIGITS (HH:MM:SS)  
3 DIFFERENT SIZES

Multifunctional digital clock with aluminium case anodized and different mounting solutions, LED display optional in red, green, yellow or blue, height of between 14-50mm for viewing distance up to max. 50m, with integrated automatically or manual dimmer, power supply 12-24 VDC or 115/230 VAC, operating as autonomous clock, secondary clock for polarized impulses or as self-setting MOBALine clock.

**Dimension:**
- 112 x 112 x 58mm (490A.01)
- 144 x 144 x 58mm (490A.02)
- 300 x 300 x 58mm (490.A05)

**Weight:**
- CA 0,5 – 2,5KG

**Deliverable versions:**
- T/M/B

**MOD. 490**

MULTIFUNCTIONAL DIGITAL CLOCK

**OUTDOOR USE – IP65**

7 LED DIGITS  
3 DIFFERENT SIZES

Multifunctional digital clock with sheet steel zinc plated and powder-coated silver coloured case IP65, different mounting solutions, LED display with red or yellow ultra-bright high-resolution display characters between 120-220mm height, suitable for viewing in direct sunlight at distances of up to 60m, with integrated automatically or manual dimmer, power supply 115/230 VAC, operating as autonomous clock, secondary clock for polarized impulses or as self-setting MOBALine clock.

**Dimension:**
- 520 x 240 x 90mm (420A.12)
- 785 x 320 x 90mm (490A.17)
- 900 x 370 x 90mm (490.A05)

**Weight:**
- CA 7,5 – 10,5KG
FLUSH MOUNTING MARINE CLOCKS

WEMPE Chronometerwerke offers a wide range of flush mounting clocks in standardised sizes of 96x96 mm and 144x144 mm.

Flush mounting clocks with second hand or/and illumination can be manufactured upon customer’s request as well as all types of different movements. Besides the standard black and white dial design we offer in addition custom-made dials to meet the special requirements of your project.

ANALOGUE MARINE CLOCK
FLUSH MOUNTING
96 x 96MM

Flush mounting marine clock with steel 96x96mm DIN 43700 standard size, dial out of aluminium white or black with black or white hour markers and hands (further designs in RAL colour available upon request), reflection-free cover glass, held into place by clamps, operating by different Quartz and secondary clock movements

Dimension: 96 x 96 x 100mm (H)
Weight: Ca 0,8kg
Deliverable versions: T / Q / QZV / B

ANALOGUE MARINE CLOCK
FLUSH MOUNTING
DIMMABLE ILLUMINATION
96 x 96MM

Flush mounting marine clock with steel 96x96mm DIN 43700 standard size, dial out of aluminium white or black with black or white hour markers and hands (further designs in RAL colour available upon request), reflection-free cover glass, dimmable illumination for 24 VDC, held into place by clamps, operating by different Quartz and secondary clock movements

Dimension: 96 x 96 x 100mm (H)
Weight: Ca 1,0kg
Deliverable versions: T / Q / QZV
**Analogue Marine Clock**

**Flush Mounting**

**144 x 144mm**

Flush mounting marine clock with steel case 144x144mm DIN 43700 standard size, bezel is removable for easy front time setting (not at all models possible) easy to open from the front, dial out of aluminium, white or black with black, white or yellow hour markers and hands (further designs in RAL colour available upon request), reflection-free cover glass, held into place by clamps, operating by different Quartz and secondary clock movements.

**Dimension:** 144 x 144 x 112mm (h)

**Weight:** ca 1.0kg

**Deliverable versions:** T / M / S / IP / Q / QZV / B

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**Analogue Marine Clock**

**Flush Mounting**

**3 Hands (h/m/s)**

**144 x 144mm**

As described before but operating by different Quartz and secondary clock movements with second hand.

**Dimension:** 144 x 144 x 112mm (h)

**Weight:** ca 1.0kg

**Deliverable versions:** T / M / S / IP / Q / QZV / B

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**Analogue Marine Clock**

**Flush Mounting**

**Dimmerable Illumination**

**144 x 144mm**

Flush mounting marine clock with steel case 144x144mm DIN 43700 standard size, bezel is removable for easy front time setting (not at all models possible) easy to open from the front, dial out of aluminium, white or black with black, white or yellow hour markers and hands (further designs in RAL colour available upon request), reflection-free cover glass, dimmerable illumination for 24 VDC, held into place by clamps, operating by different Quartz and secondary clock movements.

**Dimension:** 144 x 144 x 112mm (h)

**Weight:** ca 1.2kg

**Deliverable versions:** T / M / S / IP / Q / QZV / B

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**Analogue Marine Clock**

**Flush Mounting**

**Dimmerable Ill. and Sec.**

**144 x 144mm**

As described before but operating by different Quartz and secondary clock movements with second hand.

**Dimension:** 144 x 144 x 112mm (h)

**Weight:** ca 1.4kg

**Deliverable versions:** T / M / S / IP / Q / QZV / B
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