Searching Light *)
Type: Sunshin
HR1012-24V

Horn *)

Wing Port

AHD-WOP
AHD-DACP
AHD-EST
AHD-DEOP
AHD-EST
(Option)
AHD-TP 2

NAVNET 3D *)

AHD-CUC

DVI-Splitter
DVI-Splitter

RPU-013 *)
EC-1000C *)

(Option)
AHD-TP 2
AHD-WOP
AHD-DACP
AHD-EST
AHD-DEOP
AHD-EST

Wing Stbd.

Searching Light *)
Type: Sunshin
HR1012-24V

Termination resistor
CAN

5m
5m
10m
10m
25m
25m
25m
25m
25m
5m
5m
5m
5m

AHD-1019 #1
AHD-1019 #2
AHD-919
AHD-1019 #3
AHD-1019 #4
AHD-919

10m

Video
CAN5
CAN3
CAN2
CAN1
VGA
Termination resistor
2m
2m
2m
2m

Bridge Desk

Bridge

(Option)
AHD-SLP
AHD-DC
AHD-DRM T
AHD-WOP
AHD-DACP
AHD-DPS 02 B21
AHD-EST
AHD-EOP
AHD-EOP
AHD-EST
AHD-DC
AHD-DRM T
(Option)
AHD-SLP
(Option)
AHD-TP 2

DPS02 Switch

2m
2 X 15m
2m
2m
2m
2m
10m

Binary Data Station AHD-PS 30
Data Station AHD-SAS 15
(Sea Fire)
Seafire System *)

Extension Module
AHD-DPS02 A07
Position and Signal Lights Control
AHD-DPS02 G14

AHD-UCC
AHD-UCC
AHD-UCC

FURUNO
NMEA 2000 *)

CAN
Terminal
Termination resistor

2m
2m
2m
4 X 10m
4 X 50m

8 X 2m

Video Recorder
AHD-VC VR8

VGA Signal

Interface Converter
BNC
RJ45

AFT Station

AHD-WOP
AHD-DACP
(Option)
AHD-TP 2
AHD-EST
AHD-DEOP
AHD-EST

Termination resistor
40m
40m

Data Station AHD-SAS 15
(Monitoring)
2X
Level sensor
AHD-S 201
2m
serial data

Data Station AHD-PS 15

Video Distribution Unit AHD-VDCU 16/16

4 X 30m
5 X 50m

2m
2m
25m

AHD-VCS QC
BNC
RJ45
VGA
F-BUS
DVI
VGA
Option

Furuno
Chart +
Navigation
DVI Signal

AHD-VCS CF
BNC
RJ45
Night Vision
Camera (Option) *)

AHD-VC
751 #1
AHD-VC
751 #2
AHD-VC
751 #3
AHD-VC
751 #4
AHD-VC
751 #6
AHD-VC
751 #5

AHD-VC 740 #2
Camera in Stbd
Anchor Pocket
24VDC **)
AHD-VC 740 #1
Camera in Port
Anchor Pocket
24VDC **)

Data Station AHD-SAS 15
(Monitoring)
Data Station AHD-SAS 15
(Monitoring)
5x
Level sensor
AHD-S 201
2m
Binary Data Station AHD-PS 30
serial data
15m

AHD-1015 MTC (Engine Room)
AHD-1015 MTC (Crew)
AHD-1015 MTC (Captain)
Master TV *)
AHD-VCP

Termination resistor
Termination resistor
55m
55m
25m
25m
25m
25m
25m
55m
25m
25m
25m

Engine Room

Adaptor
40m
Main Engine Port *)

Modbus Converter
AHD-UIC
Modbus Converter
AHD-UIC
Main Switchboard
2m
MODBUS RTU
MODBUS RTU
GenSets *)
Power Management System *)

Adaptor
40m
Main Engine Stbd *)

Outside
Spill Warning AHD-SW II
Horn *)

*) shipyard supply

BNC Signal *)
CAN Bus Engine
CAN Bus Monitoring System
CAN Bus Device Control
CAN Bus Anchor Control
Composite Video Cable with BNC Connector
CAT 5 Cable with RJ45 Connector
8-pole preconfigured Cable
Wiring *)
Ribbon Cable
Wiring *)
VGA Signal *)
DVI Signal

Power Supply 24VDC +30% / -25%

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			Geprüft/Checked	Datum/Date
		Dateiname / Filename: 0012_Schema_Web_en_20100611.tcw	Lg.Nr./Art.no.: #####	Seite/Page: 1 / 1

Description „BIBS Integrated Bridge System with Alarm and Monitoring System“

The scheme presents a system application for a larger mega yacht with approval of a classification society, where a BIBS Integrated Bridge System is combined with a decentralized designed ship alarm and monitoring system as well as various additional control systems of Böning Automationstechnologie GmbH.

BIBS Integrated Bridge System

The BIBS Integrated Bridge System is designed as the central control and presentation platform, where all data existing in the system are processed and visualized. Therefore, 19” AHD 1019 colour displays with integrated PC (Panel Computer) are installed in bridge control console, which are controlled by a novel operation concept. By means of a control CAN bus, each AHD 1019 colour display (max. 8 displays) can be selected and operated centrally by an operating panel AHD-DC. Additionally, each AHD-DC unit is combined with an operating panel AHD-DRM T, which allows comfortable control of system menus and operating elements in graphical visualization by means of a trackball. AHD-DC and AHD-DRM T are installed as operating stations within the bridge control console. Anyhow, the units may also be fitted i.e. into the arm rest of the pilot chair.

The data of all connected systems are graphically formatted and visualized individually on colour displays with inclusion of ships graphics and general arrangement plans. Following functions are displayed and controlled:

- Furuno NAVNET 3D for navigation with sea charts and Radar (via DVI interface and integration of the Furuno control via CAN-USB converter AHD-CUC)
- Data visualization of main engines port and starboard (via separated engine CAN bus per engine)
- Interconnection with ship alarm and monitoring system
- Tank monitoring system with continuous tank content measurement with hydrostatic tank level probes
- Door monitoring of all relevant doors, hatches and flaps, alarm signaling depending of ship speed
- Integration of CCTV camera control (video signal via video input of displays)
- Display and control of navigation and signal lights
- Visualization of generator data and power management system from foreign manufacturers
- Monitoring of fuse automats with remotely operated re-engagement
- Interfacing of the fire detection system
- Conning page with convenient presentation of all relevant information like depth sounding progress and indication of roll and pitch movement of the ship
- Visualization of windlass data with chain link counter and alarm function
- Control of pumps and valves

In order to comply with equipment requirements of classification societies, the BIBS Integrated Bridge System is completed by two additional 19“ colour displays AHD 919. These monitors are approved and certified by classification societies and by national German authority „Bundesamt für Seeschifffahrt und Hydrographie (BSH)” for presentation of Radar and ECDIS sea charts. For each function, Radar and ECDIS sea chart presentation, one monitor is applied. The presentation control is performed directly from the appropriate external system (Furuno).

Ship Alarm and Monitoring System

The ship alarm and monitoring system is designed decentralized with components for monitoring of ship alarms and status messages. The complete system performance (delay timing, blockings, display texts etc.) is defined by means of a PC based configuration tool. The data communication for transmission of acquired data to the connected operating and display units as well as the system control is performed via three individual CAN bus systems (one engine CAN bus per engine and one CAN bus monitoring system for further ships data).

Operating and display units

Beside the colour displays of the BIBS Integrated Bridge System, the data of the ship alarm and monitoring system are transmitted via the three CAN bus systems to further colour displays AHD 1015 MTC with touchscreen operation. The units are distributed in different areas of the yacht (engine room, in crew area and in captain´s cabin). The colour displays present all information of the ship alarm and monitoring system on multiple visualization pages with appropriate menu control. A separate alarm table is applied for indication of currently existing alarms, with automatic call at occurrence of a new alarm.

Engine CAN Bus

The data of main engines port and starboard are transmitted with SAE J1939 protocol via engine CAN bus from the engine electronics of the corresponding engine to the CAN-to-CAN data converter AHD-UCC, which converts the data protocol with required engine data into the Böning AHD-SAS protocol.

CAN Bus Monitoring System

The remaining data acquisition is performed with components connected to the CAN bus of the monitoring system. Signal data of analog and binary sensors are acquired either directly by connection to data stations or by importing via data communication with data converter units with conversion into the Böning AHD-SAS protocol.

The data stations AHD-SAS 15 with CAN bus connection consists of 15 input channels for analog and binary sensors, prepared for connection of sensors with different signal types (current, voltage, resistance, contacts etc.). All input channels can be monitored for sensor failure. Pluggable terminal lists are provided for the connection of sensors.

Binary data stations AHD-PS 15 / 30 or 47 consist of 15, 30 resp. 47 input channels for connection of potential free contacts, contacts with single-sided ground connection or contacts, which are switching voltage potentials. The input status is acquired via optocouplers, transformed into a serial output signal and transmitted via a serial interface to a AHD-SAS 15 unit. Each input is provided with an individual status-LED, activated at shorted input. By operation of the TEST push button, each channel can be easily checked for short circuit to earth or ground.

A data station AHD-SAS 15 combined with a binary data station AHD-PS 30 is used here especially for integration of the Seafire fire detection system, in order to allow i.e. quick localization of fire alarms of detectors by graphical visualization in deck arrangement plans.
Two spill warning gauges AHD-SW II are installed in outdoor deck area for level monitoring of fuel tanks. Each unit consists of LED-scales for level monitoring of two tanks with audible and visual warning at 95% resp. alarm at 100% tank content. Connection and control of the gauge is applied by serial communication with data station AHD-SAS 15.

The data converter AHD-UIC consists of two galvanically isolated RS485 interfaces for acquisition of data from external systems via ModBus RTU data protocol. Two of these units are integrated in this system for import of data from generators and from the power management system into the ship alarm and monitoring system.

A further CAN-to-CAN data converter AHD-UCC is connected to the CAN bus for monitoring system for data import via CAN bus with NMEA 2000® data protocol from further Furuno devices applied on board of the yacht. The AHD-UCC unit is approved by the NMEA as a „Listen Only NMEA 2000® Certified Product“.

Navigation and Signal Light Control and Monitoring AHD-DPS02

For connection, control and monitoring of the navigation and signal lights of the yacht, the AHD-DPS02 system is integrated in the CAN bus monitoring system. The system consists of the basic module AHD-DPS02 G14 for monitoring and control of max. 14 lamps resp. LED-lanterns as well as monitoring of main and emergency power supply (source selectable via separate toggle switch in bridge control console). A further extension module AHD-DPS02 A07 is connected with the basic module via internal bus for extension of the system by additional max. 7 lamps resp. LED-lanterns. The operation of the system is as a standard performed via separate visualization page of connected colour displays. The basic and the extension module are internally connected with an additional operating panel AHD-DPS02 BS2, which also allows monitoring of all 21 navigation and signal light including operation by individual on/off-switches.

Video System AHD-VCS

The Böning video system AHD-VCS is also applied to the ship alarm and monitoring system via CAN bus monitoring system. The video distribution and control unit AHD-VDCU 16/16 (video cross bar) is provided as the central unit of the system, consisting of each 16 video in- and output channels. In this application, six high resolution Motor Dome cameras AHD-VC 751 with remote controllable pan/tilt/zoom and focus function as well as two anchor pocket cameras AHD-VC 740 for fixed image monitoring of ship anchors are connected to the input channels with RJ45 sockets via a single CAT5 network cable, which includes transmission of video signal, camera control commands and the 12 V DC power supply for the cameras. Each camera is therefore provided with a signal converter unit AHD-VSC C. The anchor pocket cameras are supplied in a set with an additional LED spot light for illumination. The 24 V DC power supply including on/off-switch for the spot light has to be provided by the shipyard. The camera as well as the LED spot light is installed in a submersible IP68 special housing.

As an option, the system can be extended via signal converter unit AHD-VSC CF by a Night Vision thermal image camera from Flir Systems. Also optionally, the image presentation for Radar and sea chart can be adapted via DVI interface of the Furuno system to input channels of the video crossbar (signal converter unit AHD-VSC QC).

The video output channels of the video crossbar AHD-VDCU 16/16 are equipped with BNC sockets for connection of displays, monitors and television sets with a 75Ω video coaxial cable (i.e. RG-59). The first 8 video outputs are used in this application for free selection and presentation of video signals from input channels. The selection and the control is performed via operating elements on separate video visualization page of connected multifunction colour displays or, for monitors or television sets, by external video operating unit AHD-VCP with data communication via CAN bus with control software of video crossbar.

In this application, the last 8 video outputs are assigned fixed to camera inputs, to ensure a comprehensible video recording with the digital 8-channel video recorder AHD-VC VR8. The video recorder is provided with a 500 GB hard disc for settable recording of video signals (extendable with up to 4 hard discs to max. 2000 GB). The device consists also of monitor outputs for inspection of executed video recordings during running recording operation (VGA interface, resp. CVBS video signal).

Additional Control Systems

Engine Operation System AHD-EOP/AHD-DEOP

Engine operation panels AHD-EOP are installed in bridge control desk per main engine for ignition release as well as for starting and stopping of both main engines. Instead of a conventional starter lock, the AHD-EOP is equipped with a pluggable transponder key for the execution of ignition release. Both AHD-EOP units are connected via internal bus lines with dual operation panels AHD-DEOP. These devices are used for starting and stopping of both main engines, in dependence of inserted transponder key in appropriate AHD-EOP unit. The AHD-DEOP units are cascadable and are installed wing control station port and starboard as well as in AFT station.
In compliance with regulations of classification societies, emergency stop units AHD-EST are installed separately for each main engine in bridge control console, wing control station port and starboard as well as in AFT station. The units are connected in series directly with emergency stop circuit in appropriate engine terminal box. The monitoring of the emergency stop circuit is performed by the corresponding engine electronics.

Windlass Control AHD-DACP

For the up/down control of both windlasses port and starboard, dual windlass control units AHD-DACP are installed in bridge control console, wing control station port and starboard as well as in AFT station. The units are interfaced by a system-own CAN bus and have equal control function. The feedback messages from the anchor system are comfortably visualized on the 19” colour displays.

Whistle Control AHD-WOP

As a further control system, whistle control unit AHD-WOP is also installed in bridge control console, wing control station port and starboard as well as in AFT station. These units are applied for operation and control of the ship whistle of the yacht. The device is provided with preprogrammed controls for execution of sound signals for maneuvering and warning as well as sound signals in restricted visibility according to “Convention on the International Regulations for Preventing Collisions at Sea, 1972 (COLREGs)”. The devices are interconnected by a serial data link and have equal control function.

Search Light Control AHD-SLP (Option)

Search light control units AHD-SLP can be installed as an option in bridge control console for on/off- as well as pan/tilt-control of Sunshin HR1012-24V search lights.

Thruster Control AHD-TP2 (Option)

Also as an option, dual thruster control panels AHD-TP2 can be installed in bridge control console, wing control station port and starboard as well as in AFT station. These units allow comfortable and individual control of two hydraulically and/or VFD (electrically) driven ABT thruster. The devices are interconnected by a serial data link and have equal control function.