TECDIS
BY TELKO

Installation Manual

Software edition: 4.8.3.x
Manual edition: 3.12

SAFETY INSTRUCTIONS

WARNING

ELECTRICAL SHOCK HAZARD

Do not open the equipment unless totally familiar with electrical circuits and the installation manual.

Only qualified personnel should work inside the equipment.

Turn off the power at the mains switchboard before beginning the installation.

Fire, electrical shock or serious injury can result if the power is left on or is applied while the equipment is being installed.

Do not install the monitor unit, processor unit or control unit where they may get wet from rain or water splash.

Water in the units can result in fire, electrical shock, or damage the equipment.

Be sure that the power supply is compatible with the voltage rating of the equipment.

Connection of an incorrect power supply can cause fire or damage the equipment.

Use only the specified power cable.

Fire or damage to the equipment can result if a different cable is used.

WARNING

The PC Main board is equipped with a lithium battery. The lithium battery should be replaced only in the factory.

There is a danger of explosion if the wrong type of battery is used for replacement.

CAUTION

Attach the earth connector safely to the ship's body. The protection earth (grounding) is required to the AC power supply to prevent electrical shock.

COMPASS SAFE DISTANCE

Model	Standard compass	Steering compass
Standalone units		
HT C02HJ TEC	1.40m	0.90m
HT B30GI TEC	0.3m	0.25m
HTC03-i5-MP	2.6m	1.7m
Panelpc units		
HD 24T22 DEC-M62	1.40m	0.85m
HD 27T22 DEC-M53	0.85m	0.5m
HD 27T22 EEC-M53	0.85m	0.5m
Currently available monitors		
HD27T22 TID / FUD	1.9m	1.1m
HD26T22 TID / FUD	1.9m	1.1m
HD24T22 TID / FUD	1.4m	0.85m
HD19T22 TID / FUD	0.9m	0.45m
HD32T22 TID / FUD	2.4m	1.45m
HD55T22 TID / FUD	5.0m	2.3m
Other equipment		
Trackman Marble ELK	0.45m	0.25m
G84-4100LCMGB-2	0.8m	0.6m
Cursor Controls TKB08025A	0.2m	0.1m
NSI TBE38NO	0.4m	0.25m
NSI RKCT92S	0.05m	0.05m
NSI RKTE85B	0.56m	0.41m
Keytouch panel	0.2m	0.25m
DNH HP-6 speaker	1.5m	1.0m
DHN HPS-6 speaker	1.5m	1.0m
Furuno RCU-018	0.3m	0.3m
IE-SW-BL08-8TX	0.6m	0.7m
Moxa 308	0.6m	0.4m
HT 00262 OPT-A1	0.15m	0.1m

NOMINAL VIEWING DISTANCE

Most TECDIS displays and panelpc unit share a **1 meter nominal viewing distance**. Exceptions are listed below:

Model	Distance
HD 27T22 DEC-M53	1.1m
HD 27T22 EEC-M53	1.1m
HD 32T22 TID/FUD	1.3m
HD 55T22 TID/FUD	2.2m

Content

1 General introduction

This manual is describing the procedure to ensure a proper and safe installation of our TECDIS onboard a vessel. Please read carefully this manual before you start up the commissioning of the TECDIS.

The installation and commissioning of the TECDIS must be performed by an authorized service engineer, with training and/or required skills to perform an authorized installation of a TECDIS system onboard a vessel.

To ensure a professional after-sale service and a personal track-record of TECDIS installations, we recommend a TSZ file is created (see 7.3.1)

Please note the following:

- **All position inputs to TECDIS from all external sensors must be in WGS-84 datum.**
- **If connected to internet to provide C-Map Update Service functionality, a switch must be made available to disconnect TECDIS from internet when C-Map Update Service functionality is not in use.**
- **Checklist to verify the proper installation of the TECDIS shall be filled in and filed onboard. For TECDIS TCS and TECDIS AW, a copy of this checklist shall be sent to Telko AS for full type approval compliance. For all versions of TECDIS, it is strongly recommended that a copy is stored in the installer's archives and that a copy is sent to Telko AS.**
- **Refer to Chapter 4 and Chapter 5 for installation requirements and/or limitations for specific hardware components.**

It is recommended that each TECDIS is supplied by a dedicated UPS (uninterrupted power supply) 220VAC or emergency power, this should also include TECDIS backup units (if installed) and other hardware related to the TECDIS installation.

The UPS or emergency power should have sufficient capacity to supply all required equipment for a period of at least 60 seconds.

1.1 Standards Compliance

TECDIS version 4.8.3.x conforms to the following standard(s) or other normative documents:

Regulation (EU) 2017/306:	Item No. MED/4.30
SOLAS 74 as amended	Regulations V/18, V/19 & X/3
IMO Resolutions	A.694(17) MSC.36(63) MSC.97(73) MSC.191(79) MSC.232(82) MSC.302(87) SN.1/Circ.266

For a current overview of software versions, standards compliance and instructions for updating TECDIS software to comply with new standards and regulations, refer to the following web site: **http://www.telko.no/support/tecdis/compliance**

2 Equipment lists

2.1 Standard Supply

Name	Type	Qty	Remarks
Computer (AC)	HT C02HJ TEC-C44-AA00	1	1,9 m power cable
Keyboard	Cherry G84-4100LCMGB-2	1	1,3 m USB cable with PS/2 adapter
Trackball	Logitech TrackMan Marble ELK	1	1.9 m USB cable

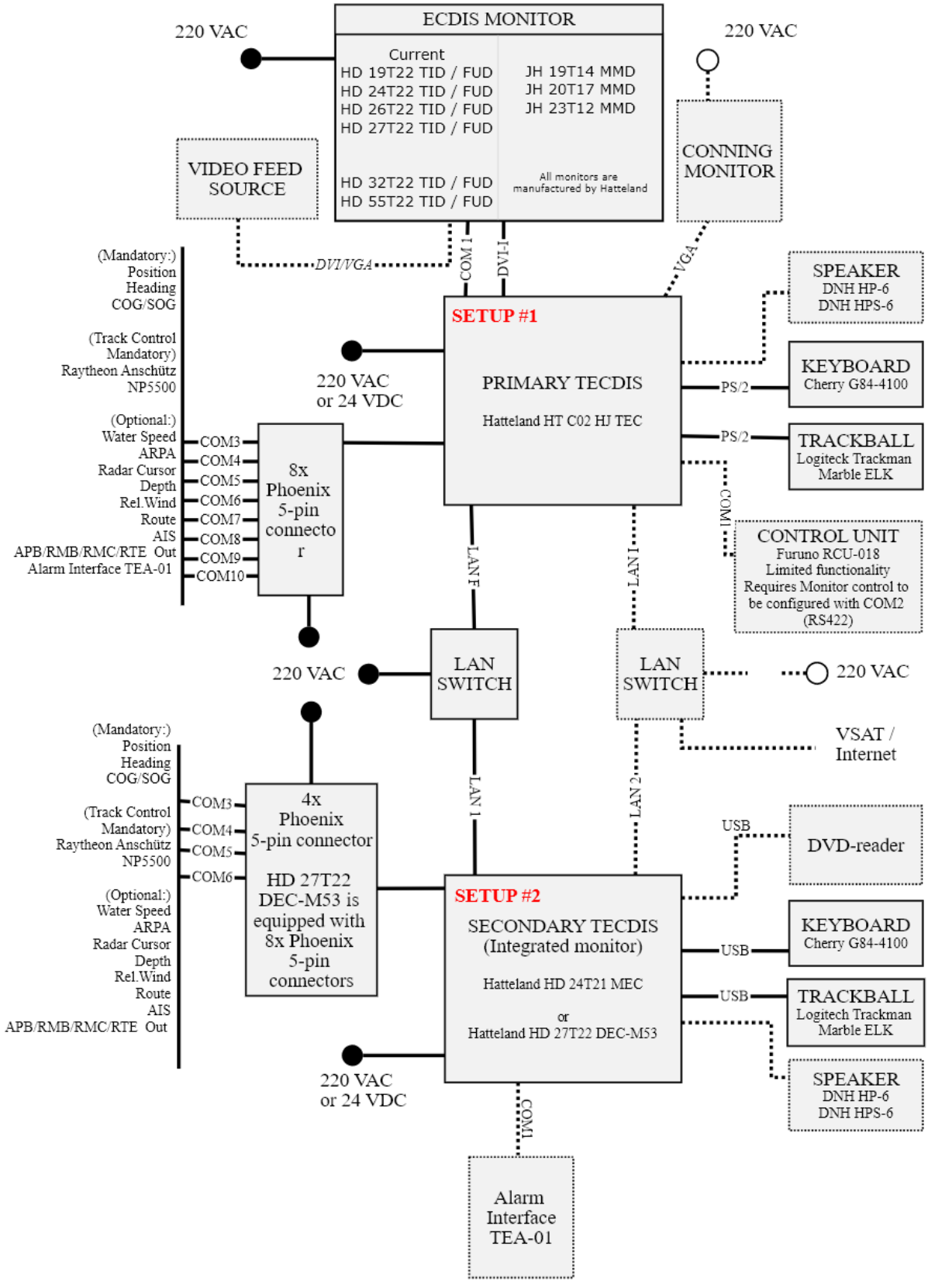
2.2 Optional Supply

Name	Type	Qty	Remarks
Computer (multipower)	HTC03-i5-MP C732836-2139C	1	1,9 m power cable
Computer (DC)	HT C02HJ TEC-C44-DA00	1	1,9 m power cable
Computer (multipower)	HT B30GI TEC	1	1,9 m power cable
Computer (with monitor)	HD 24T22 DEC-M62	1	1,9 m power cable
Computer (with monitor)	HD 27T22 DEC-M53	1	1,9 m power cable
Keyboard and trackball	NSI RKCT92S	1	1,9 m USB cable
Keyboard and trackball	NSI RKTE85B	1	1,9 m USB cable
Keypad and trackball	Cursor controls TKB08025A (FK2020)	1	1,9 m USB cable
Trackball	NSI TBE38NO	1	1,9 m USB cable
Trackball	Mouse-trak B-USBID-XROHS	1	1,9 m USB cable
Monitor	HD 19T22	1	2,0 m video cable 1,9 m power cable
Monitor	HD 24T22	1	2,0 m video cable 1,9 m power cable
Monitor	HD 26T22	1	2,0 m video cable 1,9 m power cable
Monitor	HD 27T22	1	2,0 m video cable 1,9 m power cable
Monitor	HD 32T22	1	2,0 m video cable 1,9 m power cable
Monitor	HD 55T22	1	2,0 m video cable 1,9 m power cable
Telko Alarm Interface	TEA-01	1	1,4 m cable
19” rack kit	HT 00223 OPT-A1	1	For HT C02
Audio amplifier PCI card	HT 00072 OPT-A1	1	For HT C02
Speaker (bracket mount)	DNH HP-6[1]	1	0,5 m cable
Speaker (flush mount)	DNH HPS-6[1]	1	0,5 m cable
Control Unit	Furuno RCU-018	1	For HT C02; limited functionality
Desk mount bracket kit		1	For HD 24T22
Desk mount bracket kit		1	For HD 27T22
Additional RS-422 ports	HT 00262 OPT-A1	1	For Hatteland computers

[1] Loudspeaker required when display unit or control unit does not contain a buzzer

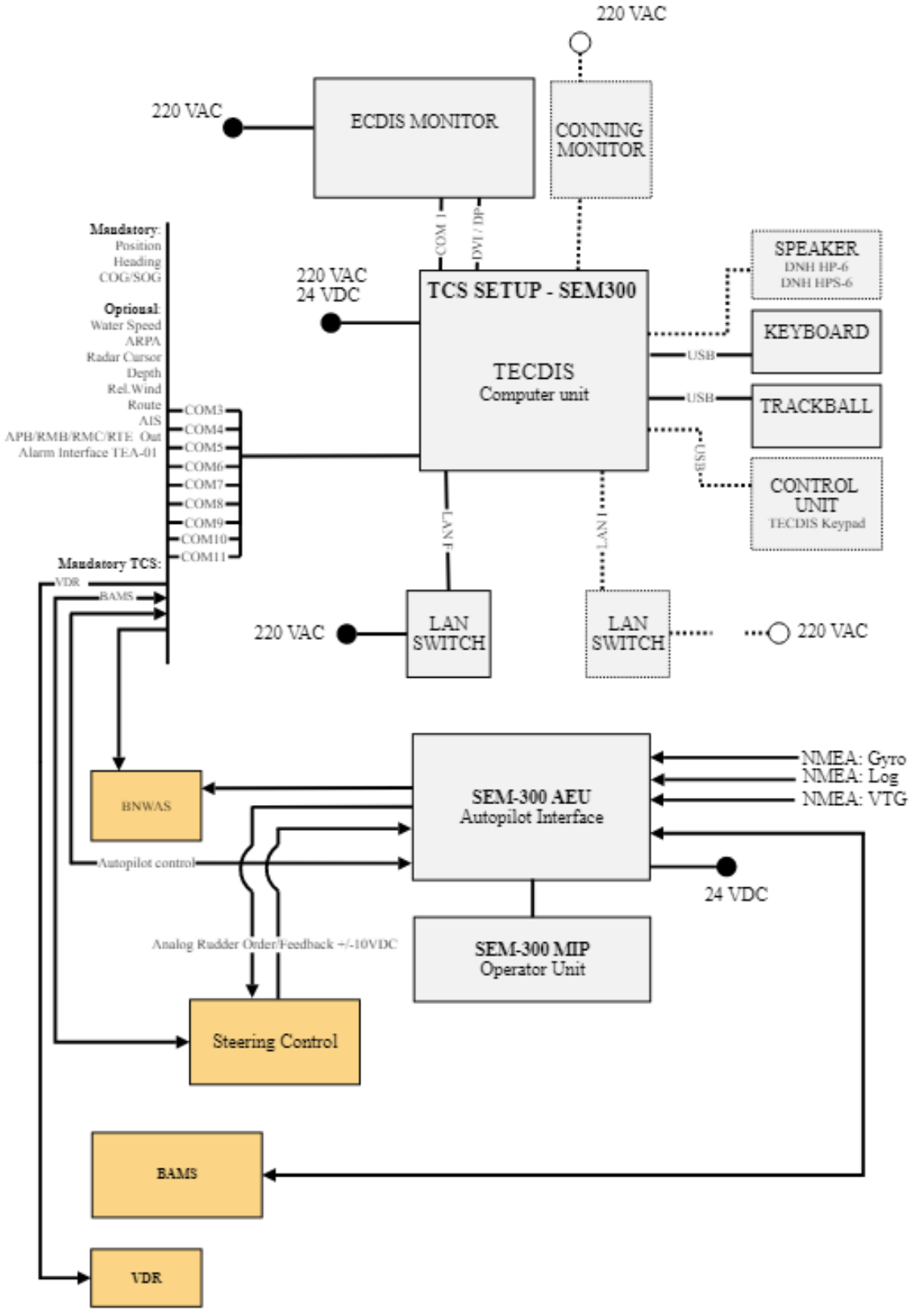
3 Installation Overview

3.1 General



3.2 TECDIS Track control system

(with EMRI SEM-300 / FURUNO FAP-300)



4 Specifications

4.1 Computer units

All standalone computers have TEC in their model name for identification.
The difference between MEC, DEC and EEC models for panel computers, are in logo use:
MEC= no logo DEC= *TECDIS* logo EEC= *Furuno Norway* logo

HT C02HJ TEC-C44-AA00
Compact high end industrial AC computer

- Microsoft Windows 7 – 32 bit
- Intel Core i5-4570S – 2.9 GHz
- Intel HD Graphics
- 4GB RAM
- Intel SSD 150GB 2,5" Hard drive
- DVD/CD-R/W Dual (48x/16x/6x/8x)
- 4x 10/100/1000Mbps Ethernet LAN
- 1x RS-232 Serial Port
- 1x RS-422/RS-485 Serial port
- 8 ports optoisolated RS-422/485 serial interface via 5-pin Phoenix ports
- 4x USB 2.0 ports
- 2x USB 3.0 ports
- Dim: 345 (W) x 133 (H) x 390 (D) mm
- Power: 110/230V (330W) (70W typical)
- Weight: 9 kg
- HW rev no is part of model no

HD 24T22 MEC / EEC / DEC
Compact high end industrial panelpc

- Microsoft Windows 10 IoT Ent. - 64 bit
- Intel Celeron G3900TE – 2.3 GHz
- Intel HD Graphics
- 8GB RAM
- Intel SSD 240GB 2,5" Hard drive
- 4x USB (2x USB 2.0, 2x USB 3.0) ports[2]
- 4 ports optoisolated RS-422/485 serial interface (Phoenix 5pin ports)
- 1x RS-232 & 1x RS-422/485 serial port
- *Monitor characteristics are identical to HD 24T22 MMD*
- Multi-power supply – 115/230 VAC, 50/60 Hz + 24 VDC (125 W max)
- Weight: 11.2 kg
- Dim: 593 (W) x 384 (H) x 76.40 (D) mm
- HW rev no is part of model no

HT C02HJ TEC-C44-DA00
Compact high end industrial DC computer

- Microsoft Windows 7 – 32 bit
- Intel Core i5-4570S – 2.9 GHz
- Intel HD Graphics
- 4GB RAM
- Intel DECSSD 150GB 2,5" Hard drive
- DVD/CD-R/W Dual (48x/16x/6x/8x)
- 4x 10/100/1000Mbps Ethernet LAN
- 1x RS-232 Serial Port
- 1x RS-422/RS-485 Serial port
- 8 ports optoisolated RS-422/485 serial interface (5-pin Phoenix ports)
- 4x USB 2.0 ports
- 2x USB 3.0 ports
- Dim: 345 (W) x 133 (H) x 390 (D) mm
- Power: 24 VDC (220W) (70W typical)
- Weight: 9 kg
- HW rev no is part of model no

HD 27T22 DEC-M53 / EEC-M53
Compact high end industrial panelpc

- Microsoft Windows 7 – 32 bit
- Intel Core i5
- Intel HD Graphics
- 8GB RAM
- Intel SSD 150GB 2,5" Hard drive
- 2x USB 2.0 ports
- 2x USB 3.0 ports
- 8 ports optoisolated RS-422/485 serial interface (Phoenix 5pin ports)
- 1x RS-232/422/485 serial port
- *Monitor characteristics are identical to HD 27T22 TID*
- Multi-power supply – 115/230 VAC, 50/60 Hz + 24 VDC (106 W max)
- Weight: 12.1 kg
- Dim: 650 (W) x 437 (H) x 73 (D) mm
- HW rev no is part of model no

HT B30GI TEC-021-M10000
Compact fanless industrial computer

- Microsoft Windows 7 – 32bit
- Intel Celeron 3955U – 2GHz
- Intel HD 510
- 4GB RAM
- 150GB 2,5" SSD in removable bay
- 4x 10/100/1000Mbps Ethernet LAN
- 2x RS-232 Serial Port
- 8 ports optoisolated RS-422/485 serial interface (5-pin Phoenix ports)
- 4x USB 2.0 ports
- 4x USB 3.0 ports
- Dim: 220 (W) x 83 (H) x 300 (D) mm
- Multi-power supply – 100-240 VAC, 50/60 Hz + 24 VDC (39 W typical, 50 W max)[3]
- Weight: 3.7 kg
- HW rev no is part of model no

HTC03-i5-MP C732836-2139C
Compact high end industrial computer

- Microsoft Windows 10 IoT Ent. - 64 bit
- 4x USB 3.1 ports (rear)

[2] The USB 1.1 port is locked at 12Mbps, and should only be used for the eToken.
[3] Maximum allowed external USB power load is 11 W

• Intel Core i5-9500TE 6-core – 2.2 GHz • Intel HD UHD 630 • 8GB RAM • Intel SSD s4510 240Gb 2,5'' Hard drive • 4x 10/100/1000Mbps Ethernet LAN • 2x RS-232 Serial Port • 12 ports optoisolated RS-422/485 serial interface via 5-pin Phoenix ports	• 2x USB 3.1 ports (front) • 1x USB-C port • Dim: 345 (W) x 133 (H) x 390 (D) mm • Power: 100-240 VAC + 24VDC (160W) (70W typical) • Weight: 9.5 kg HW rev no is part of model no

4.2 Monitors

For all monitors, the hardware revision number is part of the model number.

Current Series X displays

Monitor HD 19T22 TID/FUD

- 19.0-inch viewable image size
- Active matrix, MVA, LED backlight
- Pixel number: 1280 x 1024
- Pixel pitch (RGB): 0,294 mm H/V
- Response time: 20 ms
- Contrast ratio: 1500:1
- Light intensity: 350 cd/m2
- Viewable angle: +- 85 deg. H/V/L/R
- Display area: 376.32x301.056 mm H/V
- Input signal: 2x DVI-D, 24pin
- Input signal: 1x 20pin DisplayPort 1.2
- Input signal: 2x Comp. video (BNC)
- Monitor control: RS-232 D-sub 9pin and 2x 5pin Phoenix RS-422/485
- Multi-power supply: 115 & 230 VAC 50/60 Hz + 24 VDC (32 W max)
- Weight: 7.5 kg
- TID unit is equipped with TECDIS logo
- FUD unit is equipped with Furuno logo

Monitor HD 24T22 TID/FUD

- 24.0-inch widescreen
- Active matrix, MVA, LED backlight
- Pixel number: 1920 x 1080 (Full HD)
- Pixel pitch (RGB): 0.276 mm H/V
- Response time: 25 ms
- Contrast ratio: 3000:1
- Light intensity: 300 cd/m2
- Viewable angle: +-89 deg. H/V/L/R
- Display area: 531.36x298.89 mm H/V
- Input signal: 2x DVI-D, 24pin
- Input signal: 1x 20pin DisplayPort 1.2
- Input signal: 2x Comp. video (BNC)
- Monitor control: RS-232 D-sub 9pin and 2x 5pin Phoenix RS-422/485
- Multi-power supply: 115 & 230 VAC 50/60 Hz + 24 VDC (51 W max)
- Weight: 8.6 kg
- TID unit is equipped with TECDIS logo
- FUD unit is equipped with Furuno logo

Monitor HD 26T22 TID/FUD

- 25.54-inch widescreen
- Active matrix, S-MVA, LED backlight
- Pixel number: 1920 x 1200
- Pixel pitch (RGB): 0,2865 mm H/V
- Response time: 20 ms
- Contrast ratio: 1500:1
- Light intensity: 350 cd/m2
- Viewable angle: +- 88 deg. H/V/L/R
- Display area: 550.08x343.8 mm H/V
- Input signal: 2x DVI-D, 24pin
- Input signal: 1x 20pin DisplayPort 1.2
- Input signal: 2x Comp. video (BNC)
- Monitor control: RS-232 D-sub 9pin and 2x 5pin Phoenix RS-422/485
- Multi-power supply: 115 & 230 VAC 50/60 Hz + 24 VDC (59 W max)
- Weight: 15.0 kg
- TID unit is equipped with TECDIS logo
- FUD unit is equipped with Furuno logo

Monitor HD 27T22 TID/FUD

- 27.0-inch widescreen
- Active matrix, a-SI, LED backlight
- Pixel number: 1920 x 1080
- Pixel pitch (RGB): 0,31125 mm H/V
- Response time: 12 ms
- Contrast ratio: 3000:1
- Light intensity: 300 cd/m2
- Viewable angle: +- 89 deg. H/V/L/R
- Display area: 597.6x336.15 mm H/V
- Input signal: 2x DVI-D, 24pin
- Input signal: 1x 20pin DisplayPort 1.2
- Input signal: 2x Comp. video (BNC)
- Monitor control: RS-232 D-sub 9pin and 2x 5pin Phoenix RS-422/485
- Multi-power supply: 115 & 230 VAC 50/60 Hz + 24 VDC (44 W max)
- Weight: 12.0 kg
- TID unit is equipped with TECDIS logo
- FUD unit is equipped with Furuno logo

Monitor HD 32T22 TID/FUD

- 32.0-inch widescreen
- Active matrix, AHVA, LED backlight
- Pixel number: 3840 x 2160
- Pixel pitch (RGB): 0,1845 mm H/V
- Response time: 12 ms
- Contrast ratio: 1000:1
- Light intensity: 350 cd/m2
- Viewable angle: +- 89 deg. H/V/L/R
- Display area: 708.48x398.52 mm H/V
- Input signal: 2x HDMI 1.4, 19pin
- Input signal: 1x 19pin HDMI 2.0
- Input signal: 1x 20pin DP 1.2
- Monitor control: RS-232 D-sub 9pin and 2x 5pin Phoenix RS-422/485
- Multi-power supply: 115 & 230 VAC 50/60 Hz + 24 VDC (70 W max)
- Weight: 17.0 kg
- TID unit is equipped with TECDIS logo
- FUD unit is equipped with Furuno logo

Only to be used at 1920 x 1080 resolution with TECDIS

Monitor HD 55T22 TID/FUD

- 55.0-inch widescreen
- Active matrix, MVA TFT, LED backlight
- Pixel number: 3840 x 2160
- Pixel pitch (RGB): 0,315 mm H/V
- Response time: 6.5 ms
- Contrast ratio: 4000:1
- Light intensity: 450 cd/m2
- Viewable angle: +- 89 deg. H/V/L/R
- Display area: 1209.60x680.40 mm H/V
- Input signal: 2x HDMI 1.4, 19pin
- Input signal: 1x 19pin HDMI 2.0
- Input signal: 1x 20pin DP 1.2
- Monitor control: RS-232 D-sub 9pin and 2x 5pin Phoenix RS-422/485
- Multi-power supply: 115 & 230 VAC 50/60 Hz + 24 VDC (312 W max)
- Weight: 70.0 kg
- TID unit is equipped with TECDIS logo
- FUD unit is equipped with Furuno logo

Only to be used at 1920 x 1080 resolution with TECDIS

Generation 1 of Series X displays, current Series 1 displays

Monitor HD 19T21 MMD

- 19.0-inch viewable image size
- Active matrix, MVA
- Pixel number: 1280 x 1024
- Pixel pitch (RGB): 0,294 mm H/V
- Response time: 20 ms
- Contrast ratio: 1000:1
- Light intensity: 300 cd/m2
- Viewable angle: +- 89 deg. H/V/L/R
- Display area: 376.32x301.056 mm H/V
- Input signal: 2x DVI-D, 24pin
- Input signal: 2x RGB 15pin HD D-sub
- Input signal: 3x Comp. video (BNC)
- Monitor control: RS-232 D-sub 9pin
- Multi-power supply: 115 & 230 VAC 50/60 Hz + 24 VDC (42 W typical)
- Weight: 8.2 kg

Monitor HD 24T21 MMD

- 24.0-inch widescreen
- Active matrix, MVA, TFT, LED backlight
- Pixel number: 1920 x 1080 (Full HD)
- Pixel pitch (RGB): 0.276 mm H/V
- Response time: 25 ms
- Contrast ratio: 3000:1
- Light intensity: 300 cd/m2
- Viewable angle: +-89 deg. H/V/L/R
- Display area: 531.36x298.89 mm H/V
- Input signal: 2x DVI-D, 24pin
- Input signal: 2x RGB 15pin HD D-sub
- Input signal: 3x Comp. video (BNC)
- Monitor control: RS-232 D-sub 9pin
- Multi-power supply: 115 & 230 VAC 50/60 Hz + 24 VDC (49 W typical)
- Weight: 11.0 kg

Monitor HD 26T21 MMD

- 25,54-inch widescreen
- Active matrix, S-MVA, CCFL backlight
- Pixel number: 1920 x 1200
- Pixel pitch (RGB): 0,2865 mm H/V
- Response time: 8 ms
- Contrast ratio: 1500:1
- Light intensity: 350 cd/m2
- Viewable angle: +- 88 deg. H/V/L/R
- Display area: 550.08x343.8 mm H/V
- Input signal: 2x DVI-D, 24pin
- Input signal: 2x RGB 15pin HD D-sub
- Input signal: 3x Comp. video (BNC)
- Monitor control: RS-232 D-sub 9pin
- Multi-power supply: 115 & 230 VAC 50/60 Hz + 24 VDC (107 W typical)
- Weight: 14.8 kg

Monitor JH 19T14 MMD

- 19,0-inch viewable image size
- Active matrix, TFT
- Pixel number: 1280 x 1024
- Pixel pitch (RGB): 0,294 mm H/V
- Response time: 12 ms
- Contrast ratio: 900:1
- Light intensity: 300 cd/m2
- Viewable angle: +- 85 deg. H/V/L/R
- Display area: 376.32x301.056 mm H/V
- Input signal: DVI-D, DVI-D input 24pin
- Input signal: RGB, 15pin HD D-sub
- Monitor control: Multifunction cable
- AC power: 115 VAC/60 Hz 230 VAC/50 Hz (100W max)
- Weight: 11,5 kg

Monitor JH 20T17 MMD

- 20,1-inch viewable image size
- A-Si (Thin Film Transistor) Active matrix,
- Pixel number: 1600x1200
- Pixel pitch (RGB): 0,255 mm H/V
- Response time: 20 ms
- Contrast ratio: 700:1
- Light intensity: 300 cd/m2
- Viewable angle: +- 85 deg. H/V/L/R
- Active display area: 408x306 mm H/V
- Input signal: DVI-D, DVI-D input 24pin
- Input signal: RGB, 15pin mini D-sub
- Monitor control: Multifunction cable
- AC power: 115 VAC/ 60 Hz 230 VAC/ 50 Hz (100 W max)
- Weight: 13,5 kg

Monitor JH 23T14 MMD

- 23,1-inch viewable image size
- Active matrix, TFT
- Pixel number: 1600x1200
- Pixel pitch (RGB): 0,294 mm H/V
- Response time: 12 ms
- Contrast ratio: 600:1
- Light intensity: 400 cd/m2
- Viewable angle: +- 85 deg. H/V/L/R
- Display area: 470.4x352.8 mm H/V
- Input signal: DVI-I, DVI-I input 29pin
- Input signal: RGB, 15pin mini D-sub
- Monitor control: Multifunction cable
- AC power: 115 VAC/60 Hz 230 VAC/50 Hz + 24 VDC (95W typical – 125W max)
- Weight: 20 kg

4.3 Accessories

Logitech Trackman Marble ELK:

- Desktop-placed trackball
- Connection: USB (PS/2 adapter included)
- Ball diameter: 38mm
- Ball reading: Optical
- 4 switches (programmable)
- Dimensions: 96 (W) x 160 (H) mm

Cherry G84-4100LCMGB-2 keyboard:

- 11" black ultra slim QWERTY keyboard.
- Space reduced 86 key layout
- Mechanical keyswitches with lasered keycaps
- Key switch lifetime 20 mill. operations
- Connection: USB or PS/2(Adaptor)
- Dim: 282 (W) x 132 (H) mm

Mouse-Trak B-MPIND-XROHS

- Desktop-placed trackball
- Connection: PS/2
- 3 switches
- 192 to 576 pulses per revolution
- 2,4 m connection cable
- Thermoplastic composite body, resin ball
- Operation temperature: 0°C~50°C
- Dimensions: 100 (W) x 200 (H) mm

Mouse-Trak B-USBID-XROHS

- Desktop-placed trackball
- Connection: USB 2.0
- 3 switches
- 192 to 576 pulses per revolution
- 2,4 m connection cable
- Thermoplastic composite body, resin ball
- Operation temperature: 0°C~50°C
- Dimensions: 100 (W) x 200 (H) mm

Weidmuller IE-SW-BL08-8TX

- Unmanaged network switch
- Aluminium housing
- IP30 rating
- 4-pin terminal block for power, 12/24/48 V DC, 18 to 30 V AC, 47 to 63 Hz, redundant dual input
- Operating temperature: -10°C to 60°C
- 8 RJ45 ports; 10/100 Mbps
- Rail mounting
- Size: 50 x 115 x 70mm, 275g

Moxa EDS 308

- Unmanaged network switch
- Metal housing
- IP30 rating
- 24 V DC redundant dual input, on 1x 6pin terminal block
- Operating temperature: 0°C to 60°C
- 8 RJ45 ports; 10/100 Mbps
- Rail mounting
- Size: 53.6 x 135 x 105mm, 790g

Telchart Alarm interface, TEA-01:

- Output: solid state relay LCA110E, max 50VDC/200mA
- Input: current limited (6.8 Kohm resistor) opto coupler MCT5211. 10-30VDC reset in
- All input and outputs are electrically isolated
- 1.5 m connection cable (Dsub mini 9pF to 7 screw terminal box)

Wiring info:
(1)> Alarm Out - (NO)
(2)> Alarm Out + (NO)
(3)> Sound Alarm out reset - (NO)
(4)> Sound Alarm out reset + (NO)
(5)< Sound Alarm input Reset – (NO)
(6)< Sound Alarm input Reset + (NO)
(7)- Cable shield

Speaker HP-6/HPS-6

- Polyamide body
- 0,5 m connection cable
- IP67 rating
- Operation temperature: -40°C ~ 90°C
- Rated power output: 6W
- Max power output: 15W
- SPL 1W/1m: 101 dB
- SPL rated power: 108 dB
- Eff. frequency range: 500-7500 Hz
- Dispersion(-6dB) 1kHz/4kHz: 170°/70°
- Directivity factor, Q: 4,3

TECDIS Keypad:

- 20 short travel switches
- 19 indicator lights
- Key switch lifetime: 200.000 operations
- IP22 Protection level
- Connection: USB
- Auto-dimmable key backlight
- Light sensor for key backlight dimming
- Operation temperature: -15°C ~ 55°C
- Size: 124 (W) x 196 (H) mm
- Cutout size: 114 (W) x 186 (H) mm

NSI RKCT92S Keyboard and trackball

- 92 full travel rubber keys
- Silicone rubber
- 25 mm optical trackball
- IP67 sealing
- Connection: USB
- Dimmable backlighting
- Operating temperature: 0◦C~60◦C
- Dimensions 354,5 (W) x 163,5 (H) mm

NSI TBE38NO Trackball

- 38mm optical ball
- IP68 sealing
- Connection: USB
- 2 switches and scroll wheel
- Infra-red optical navigation technology
- PC/ABS housing
- Aluminum base plate
- Operation temperature: 0◦C~55◦C
- Dimensions 110 (W) x 165,8 (H) mm

NSI RKTE85B Keyboard and trackball

- 85 full travel rubber keys
- Silicone rubber
- 38 mm ergonomic trackball
- IP67 sealed keyboard
- Connection: USB
- Dimmable backlighting
- Operating temperature: 0◦C~70◦C
- Dimensions 415 (W) x 145 (H) mm

Cursor controls TKB08025A (FK 2020)

- 13 full travel rubber keys
- Silicone rubber
- 25 mm optical trackball
- IP66 sealed (not including USB port)
- Connection: USB
- Dimmable backlighting
- Operating temperature: 0◦C~60◦C
- Dimensions 160 (W) x 80 (H) mm

Hatteland HT 00262 OPT-A1

- 4x optoisolated RS-422/485 serial ports
- 5-pin Terminal Block 3.81 Connectors
- Connects through 1x USB cable

5 Mounting

5.1 Monitor Unit

The monitor unit can be flush mounted in a console panel, or mounted on desktop using optional accessories.
Technical drawings with outline dimensions for the different monitors are available in chapter

When selecting a mounting location, keep in mind the following points:

1. Select a location where the display unit can be viewed conveniently and where the screen can be viewed while facing towards the bow.
2. Select a location where vibrations are down to a minimum, try to avoid vibrations by adding strength to console where monitor is about to be installed.
3. Locate the unit out of direct sunlight and away from heat sources because of heat that can build up inside the cabinet.
4. Locate the equipment away from places subject to water splash and rain.
5. Leave sufficient space on the sides and rear of the unit to facilitate maintenance.
6. A magnetic compass will be affected if the monitor unit is placed too close to the magnetic compass. Observe the compass safe distances to prevent deviation of a magnetic compass. The distances are listed on page 3.
7. An optional monitor bracket can be supplied for tabletop installations.

Screws for mounting the monitor to the console are supplied. When bracket is used screws for attaching bracket and monitor together is supplied. Screws for mounting bracket to table are not supplied.

The buzzer in monitor HD19T03 is only approved for ECDIS alarm sound when the monitor is not flush mounted.

Special considerations for HD 24T22 and HD 27T22 panel pc's

- Attach a USB extension cable (included) to a USB port for service key/external CD/DVD-reader, to allow easy access.
- The unit can be either flush mounted(accessories included) or desk mounted(optional brackets needed)

Special considerations for HD 32T22 and HD55T22 monitors

- These monitors are only approved for use with TECDIS when display is configured to 1920 x 1080 (Full HD) resolution.

5.2 Processor Unit

The processor unit can be mounted inside on bridge console or other suitable space on the bridge. Technical drawings with outline dimensions for the different units are available in chapter

When selecting a mounting location, keep in mind the following points:

1. Select a location where vibrations are down to a minimum, try to avoid vibrations by adding strength to console where the processor is about to be installed.
2. Locate the unit away from heat sources because of heat that can build up inside the cabinet.
3. Locate the equipment away from places subject to water splash and rain.
4. Leave sufficient space on the sides and rear of the unit to facilitate maintenance and interconnection cabling.
5. A magnetic compass will be affected if the processor unit is placed too close to the magnetic compass. Observe the compass safe distances to prevent deviation of a magnetic compass. The distances are listed on page 3.
6. Navigator shall update charts in the processor weekly. Mount the processor at a location that enables the navigator easy access to front doors of the processor. It must be possible to open CD/DVD drawer of processor without obstructions or access an available USB 2.0 port. More on updating charts in chapter 7.5.1
7. The power switch shall be easily to access, front of processor may be flush mounted in the console to enable access or other means to be provided for easy access.
8. Service key dongle must be possible to remove and insert to enable service technician to enter service mode. For the HD 24T22 and HD 27T22 Panel pc units a USB extension cable (included) should be used to allow this.

Do not protrude the housing with screws to fasten the processor. Straps should be used to fasten the processor at its location, without protruding the housing. Straps are not supplied and must be arranged locally. Check that front doors of processor can easily be opened and that cables can be easily arranged in the back of the processor.

5.2.1 Special considerations for HT C02HJ TEC

The processor is suitable for 19” rack-mounting with optional rack mounting kit. Height is 4U.

5.2.2 Special considerations for HT B30GI TEC

The processor is suitable for 19” rack-mounting with optional rack mounting kit. Height is 3U. Two units can be mounted side by side in the rack with optional rack mounting kit.

5.2.3 Special considerations for HTC03-i5-MP C732836-2139C

The processor is suitable for 19” rack-mounting with optional rack mounting kit. Height is 4U.

5.3 Keyboard and trackball

Keyboard and trackball must be mounted close together, such that both can be operated simultaneously by one person.

When selecting a mounting location, keep in mind the following points:

1. Select a location where the control unit can be operated conveniently.
2. Locate the unit away from heat sources because of heat that can build up inside the cabinet.
3. Locate the equipment away from places subject to water splash and rain.
4. Determine the mounting location considering the length of the signal cable between the keyboard unit and the processor unit. (The length of the signal cable is 1,3 m).
5. Determine the mounting location considering the length of the signal cable between the trackball unit and the processor unit. (The length of the signal cable is 1,9 m).

5.4 Additional units

When mounting additional units such as loudspeaker, analogue alarm units, MOXA interface and other peripheral equipment, general considerations should be taken to ensure proper functions of respective equipment.

When selecting a mounting location, keep in mind the following points:

1. Select a location where vibrations are down to a minimum, try to avoid vibrations by adding strength to console where the processor is about to be installed.
2. Locate the unit away from heat sources because of heat that can build up inside the cabinet.
3. Locate the equipment away from places subject to water splash and rain.
4. Leave sufficient space on the sides and rear of the unit to facilitate maintenance and interconnection cabling.
5. Mount the loudspeaker such that audible sound level is not seriously degraded.

Do not protrude the housing with screws to fasten the units. Straps should be used to fasten the units at its location, without protruding the housing. Straps are not supplied and must be arranged locally.

5.5 Track Control mounting

5.5.1 Approved Autopilots:

For an updated list of the available autopilots for TECDIS TCS, please refer to a valid TECDIS TCS certificate. The following autopilots are currently certified with TECDIS TCS:

- EMRI SEM-300 / FURUNO FAP-3000

5.5.2 General mounting regulations

For valid installation and operation of Track Control functionality, TECDIS must be as a minimum be connected to the following:

- Two Independent position sensors
- Two Independent heading sensors
- Speed sensor
- Alarm System for transfer of back-up navigator alarm

TECDIS and the Autopilot must be supplied with the same set of heading, log, COG and SOG sensor inputs.

On vessels where the steering system does not provide a “freeze rudder function” and maintained voltage is required for maintaining rudder angle, provisions must be made on installation of Autopilot to maintain steering voltage output on power loss to the Autopilot.

On vessels where the steering system provides a “freeze rudder function”, provisions must be made on installation of Autopilot so that this function is activated on Autopilot failure.

5.5.3 Location of change over controls

The steering mode selector switch or override facility, if installed, shall be located at or in the immediate vicinity of the main conning position.

5.5.4 Connection to TECDIS

The AEU Autopilot Interface Unit must be connected to a TECDIS serial port and configured in TECDIS SETUP (See chapter 7.7).

5.5.5 Special considerations for EMRI SEM-300 / FURUNO FAP-3000

Refer to *Instruction Manual for SEM300 (8488-2) and FAP-3000 (8487-2) Autopilot* for installation of the autopilot. All applicable procedures and guidelines are to be followed.

Both TECDIS and the Autopilot must be configured with the same LOW SPEED LIMIT value.

5.5.5.1 Autopilot installation settings

Some settings for the EMRI SEM-300 / FURUNO FAP-3000 Autopilot will be needed for proper setup of Track control. These are listed in the table below:

Autopilot Instruction Manual chapter number	Setting name	Configuration description/important notices
3.8 / 6.5.1.4	e2Kp	Track control proportional gain
3.8 / 6.5.1.4	e2KIci	Track control integral gain
3.8	u_relMin	Low speed warning limit

5.6 NAUT AW: Gyro Sensor Input Requirements

For vessels with class notation NAUT AW, the gyro sensor input to TECDIS AW must satisfy the following requirements:

1. The GAS must be supplied with a redundant gyro system including:
1.1. Heading monitoring function
1.2. Automatic correction for speed and latitude error
1.3. Automatic switching to back-up gyro when selected gyro fails
1.4. Compliance with requirements to gyro system information, “system in use” as stated in DNV rules Pt.6 Ch.8 Sec.6 H 600
1.4.1. Scope of paragraph 1.4 is to enable conning system to display which gyro is presently in use.

2. All equipment with gyro input must be supplied by the same gyro at any given time to ensure a common reference point regarding heading information.

5.7 Conning installation for fall-back arrangements

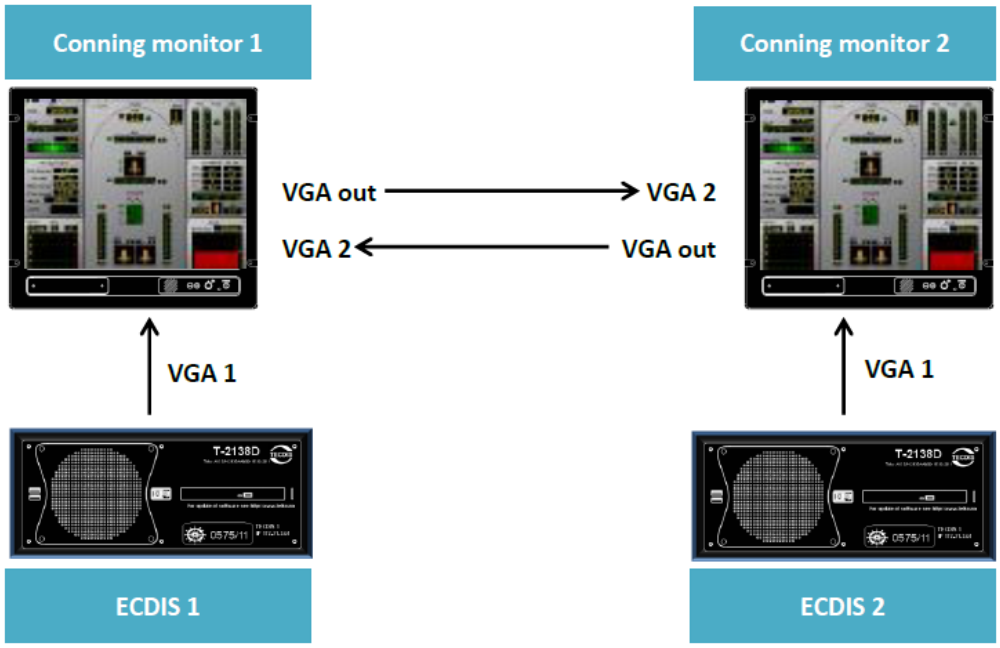
In order to comply with fall-back requirements in DNV rules for ships, it is necessary to ensure conning display in the case of ECDIS failure. Since the Conning software operates on the ECDIS hardware, proper fall-back behavior depends on setting up the installation in preparation for this scenario.

There are two main alternative solutions available to installers:

5.7.1 Solution 1 – Cross connection of video signals

When the monitors used for Conning display have the capability of forwarding the video signal from the VGA 1 input, continuous Conning display on ECDIS failure may be ensured by connecting the VGA out output from each Conning monitor to the VGA 2 input on the other Conning monitor. See diagram 1.

Diagram 1



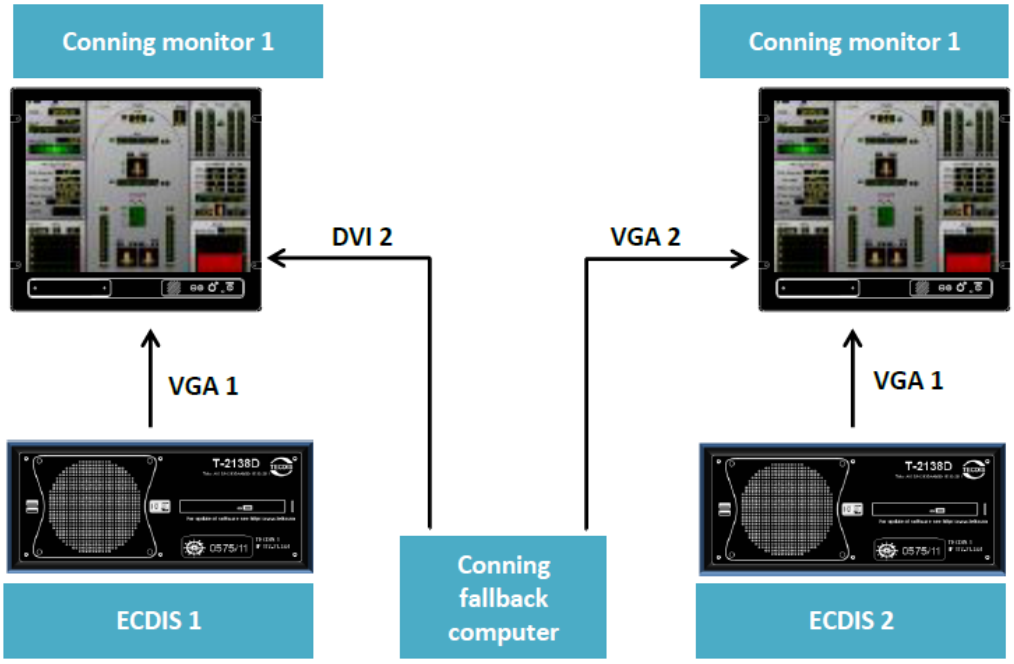
In the case of an ECDIS failure, the Conning monitor will fall back to the Conning display image supplied by the other ECDIS.

5.7.2 Solution 2 – Use of a dedicated processor unit for Conning fall-back

Another alternative when setting up the installation is to install a dedicated processor unit for Conning fall-back arrangements.

In this solution, the primary conning display is still provided by each ECDIS processor, while the Conning fall-back processor is in operation without the generated Conning display image being shown.

Diagram 2



In the case of an ECDIS failure, the conning display falls back to the conning image provided by the Conning fall-back computer.

6 Wiring and signal distribution

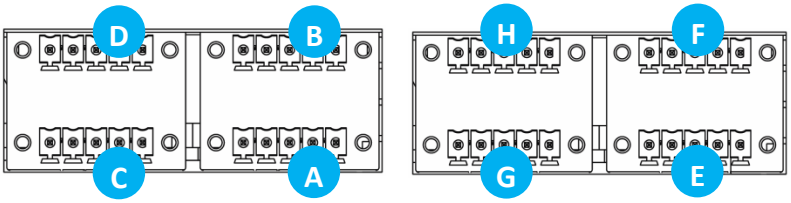
On the following pages wiring and signal distribution diagrams are shown. The signal distribution diagrams are an indication of possible means of signal distribution. During installation actual need for signal distribution must be verified by installer, depending on signals available and actual hardware installation on the specific vessel.

6.1 NMEA data connectors

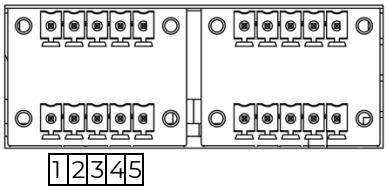
Unit	NMEA sensor connections	NMEA sensor numbering	Connection type	Other serial connections
HT C02HJ TEC	8 (+8 optional)	COM 3-10	Phoenix 5-pin	RS-232, RS-422/485
HD 24T22 DEC	4	COM 3-6	Phoenix 5-pin	RS-232, RS-422/485
HD 27T22 DEC	8	COM 3-10	Phoenix 5-pin	RS-232/422/485

6.1.1 Serial connections with Phoenix 5-pin

The ordering of the Phoenix ports are as follows:



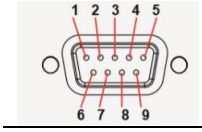
The pin assignments for the Phoenix ports are as follows:



Pin 1	TxD-	Transmit Data Negative
Pin 2	TxD+	Transmit Data Positive
Pin 3	GnD	Isolated Ground
Pin 4	RxD-	Receive Data Negative
Pin 5	RxD+	Receive Data Positive

6.2 Serial connections with 9 pin D-sub

These connectors are not designed for NMEA signal distribution, but for Monitor control, TEA-01 Alarm Control or other connections.

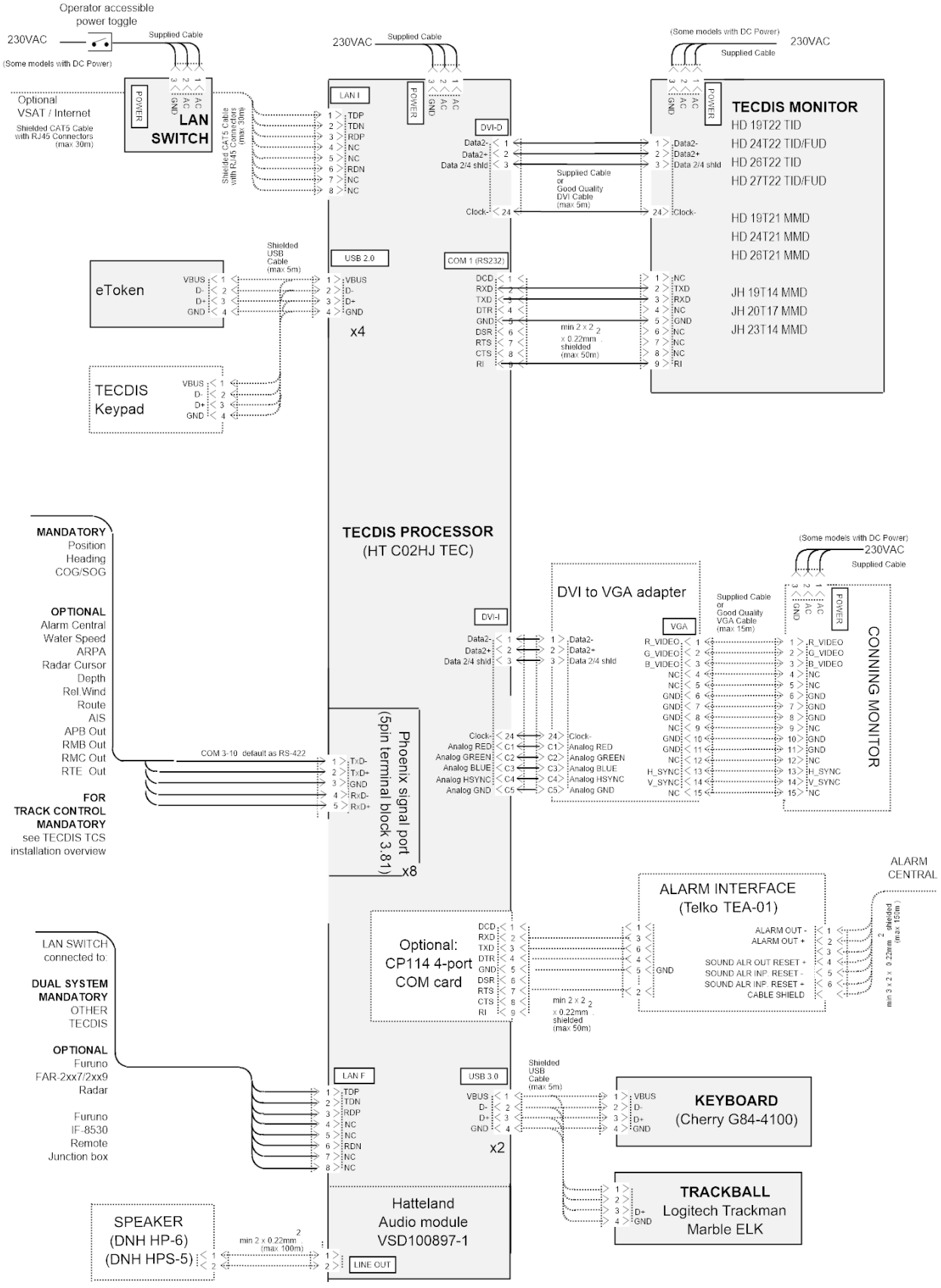


	RS-232	RS-422/485 Full duplex	RS-422/485 Half duplex
Pin 1	DCD (Data Carrier Detect)	TxD- (Transmit Data Negative)	Res (reserved, do not connect)
Pin 2	RxD (Receive Data)	TxD+ (Transmit Data Positive)	Res (reserved, do not connect)
Pin 3	TxD (Transmit Data)	RxD+ (Receive Data Positive)	Data+
Pin 4	DTR (Data Terminal Ready)	RxD- (Receive Data Negative)	Data-
Pin 5	GND (Signal Ground)		
Pin 6	DSR (Data Set Ready)	N/C (No Internal Connection)	
Pin 7	RTS (Request To Send)	N/C (No Internal Connection)	
Pin 8	CTS (Clear To Send)	N/C (No Internal Connection)	
Pin 9	RI (Ring Indicator)	N/C (No Internal Connection)	

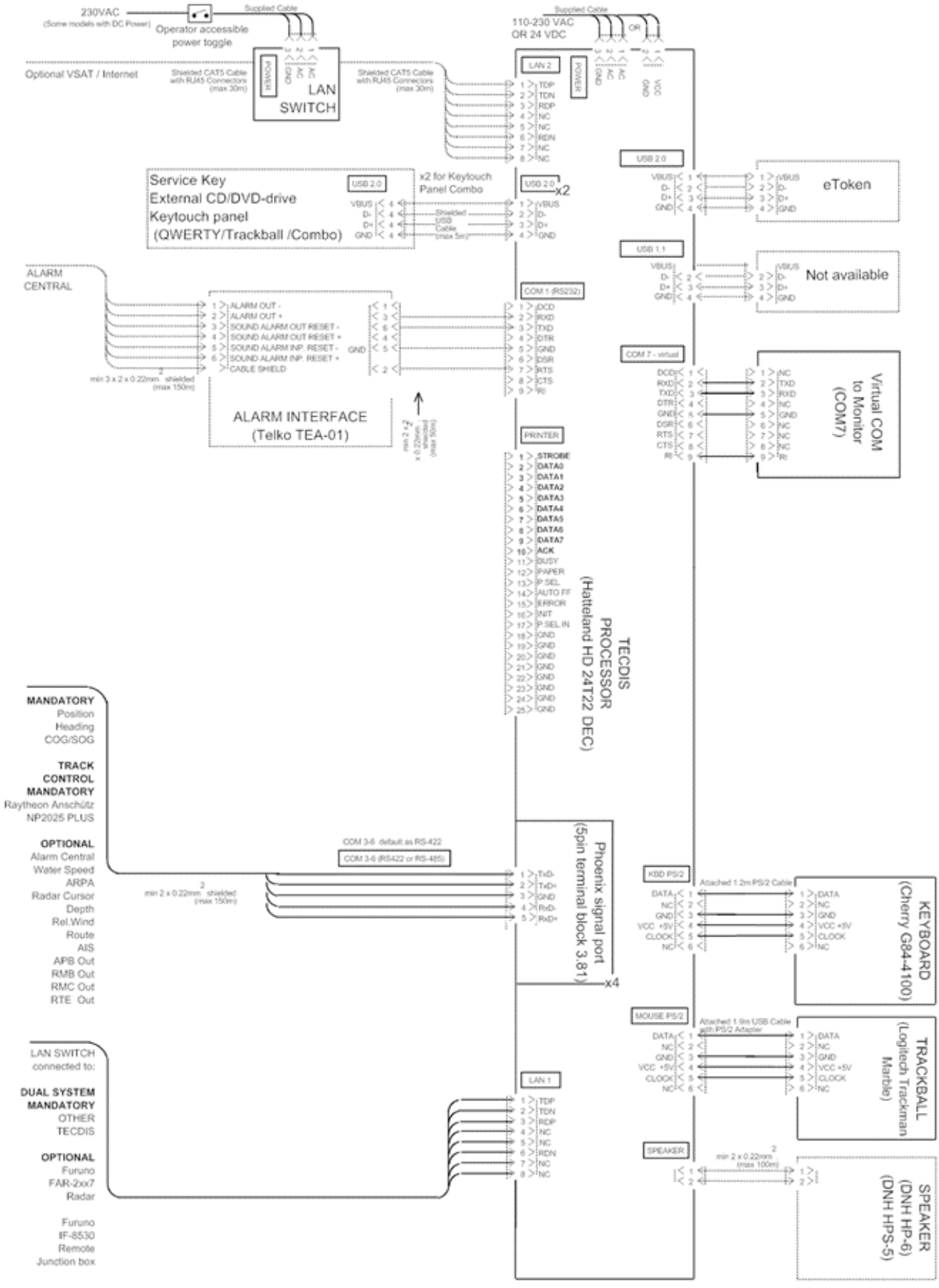
6.3 Wiring diagrams

- For HT C02HJ processor, continue to next subchapter.
- For HD 24T22 DEC processor, continue to page 27.
- For HD 27T22 DEC-M53 or EEC-M53 processor, continue to page 28.

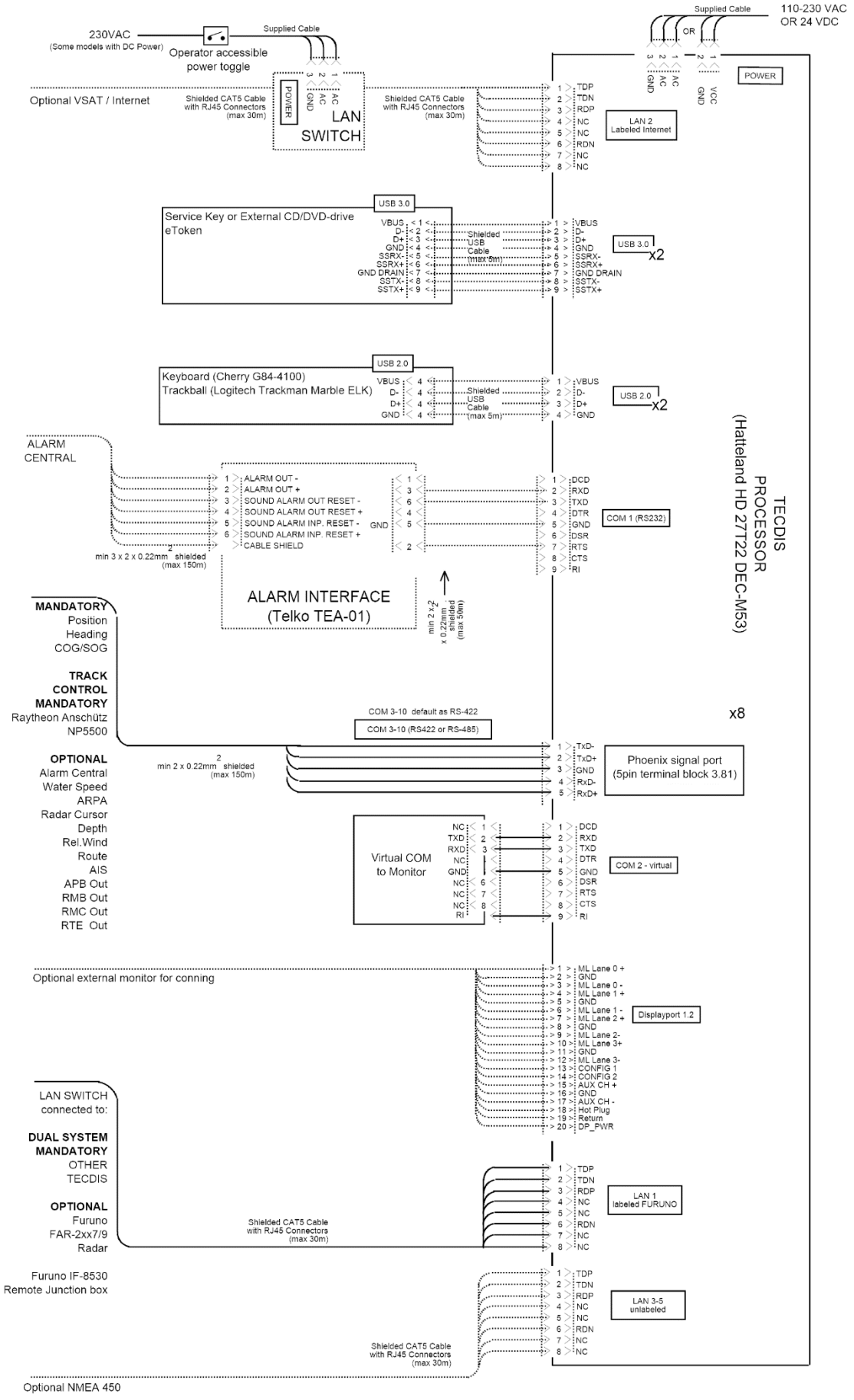
6.3.1 HT C02HJ TEC:



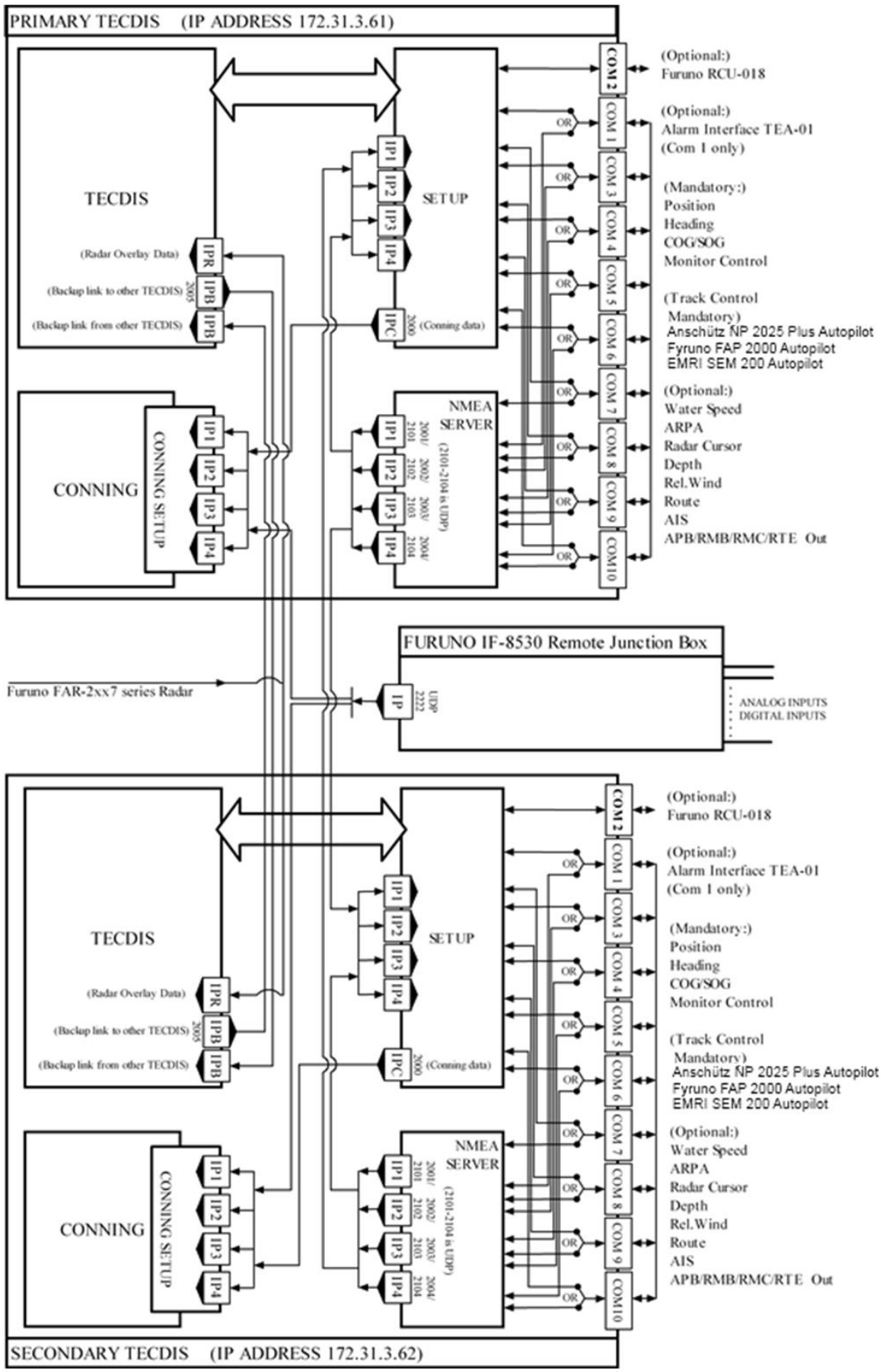
6.3.2 HD 24T22 DEC-M62:



6.3.3 HD 27T22 DEC-M53 / EEC-M53:



6.4 Signal distribution diagram (internal data flow)

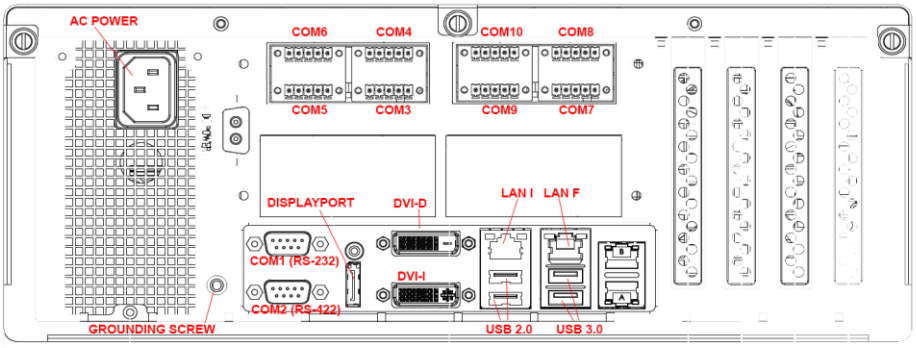


Processor connectors

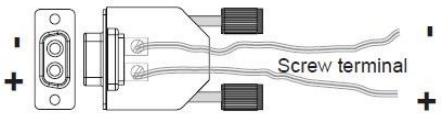
Select the appropriate installation procedure for your chosen processing unit.

- For **HT C02HJ TEC**, see below.
- For **HT B30GI TEC**, see below.
- For **HD 24T22 DEC**, continue to page 31.
- For **HD 27T22 MEC**, continue to page 32.

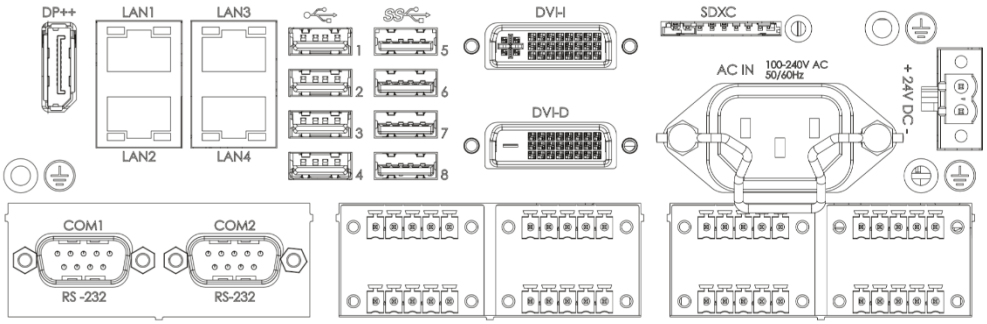
6.4.1 HT C02HJ TEC



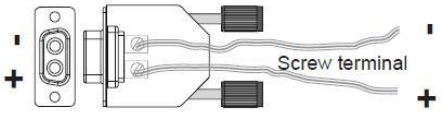
- COM1 is to be used for TEA-01 Alarm central interface. ECDIS monitor control may be connected to COM 1 directly. Other sensors may be connected to COM1 via an RS232/RS422 interface (such as AD400).
- Connect ECDIS monitor using the DVI-D connector.
- LAN connector LAN “TECDIS” is to be used when connecting the TECDIS unit to other TECDIS units, Furuno VDR Adapter or Furuno FAR-2xx7/2xx9 series radar.
- LAN connector LAN “Internet” can optionally be used for connecting to other networks or internet. To fully comply with type approvals, a switch must be available to disconnect TECDIS from internet when the connection is not used.
- Wiring for DC power connector:



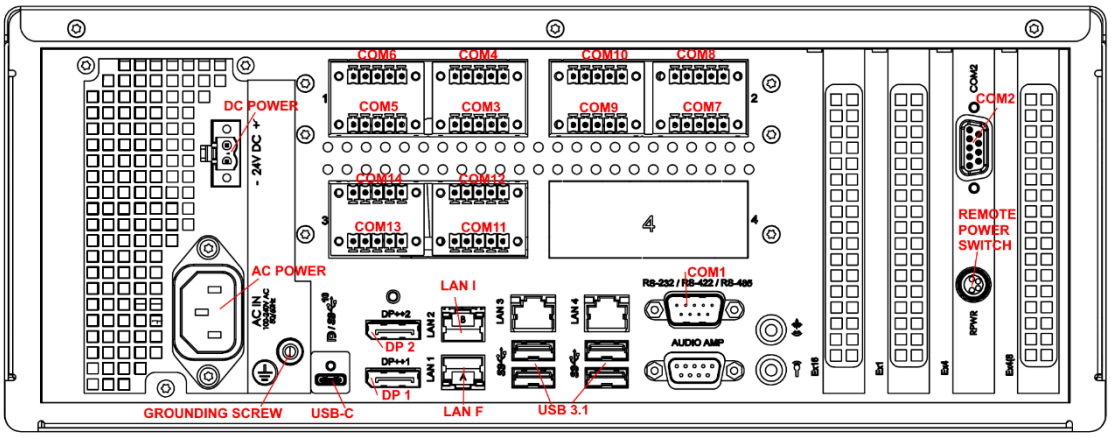
6.4.2 HT B30GI TEC



- COM1 is to be used for ECDIS monitor control.
- COM2 is to be used for TEA-01 Alarm central interface.
- Connect ECDIS monitor using the DVI-D connector.
- LAN “TECDIS” is to be used when connecting the TECDIS unit to other TECDIS units or to the navigation network.
- LAN “Internet” can optionally be used for connecting to other networks or internet. There has to be means installed for this connection to be mechanically disconnected when not in use.
- Wiring for DC power connector:

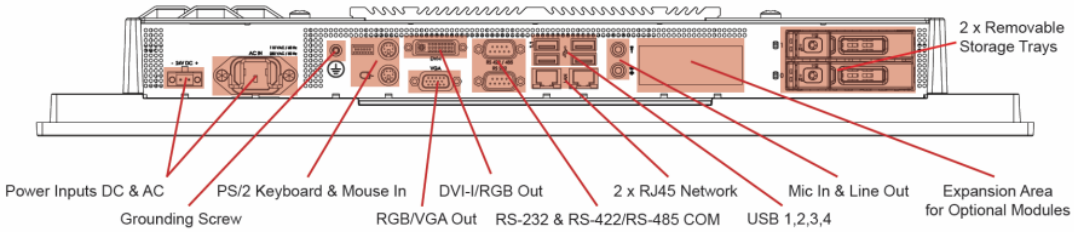


6.4.3 HTC03-i5-MP C732836-2139C

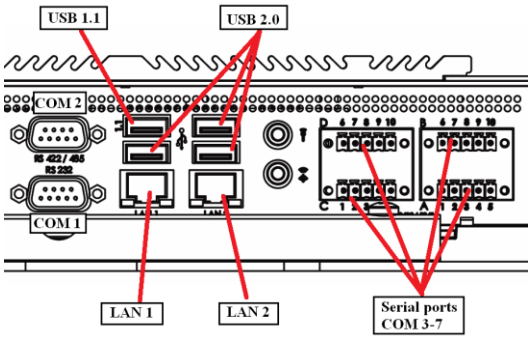


- COM1 and COM2 are to be used for TEA-01 Alarm central interface and ECDIS monitor control. Other sensors may be connected to COM1 and COM2 via an RS232/RS422 interface (such as AD400).
- LAN connector LAN "TECDIS" is to be used when connecting the TECDIS unit to other TECDIS units, Furuno VDR Adapter or Furuno FAR-2xx7/2xx9 series radar.
- LAN connector LAN "Internet" can optionally be used for connecting to other networks or internet. To fully comply with type approvals, a switch must be available to disconnect TECDIS from internet when the connection is not used.

6.4.4 HD 24T22 DEC

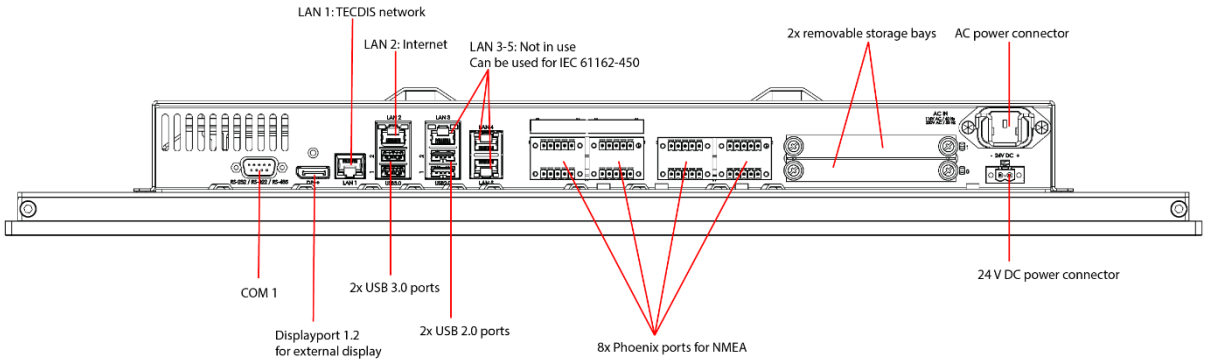


- COM 1 is to be used for TEA-01 Alarm central interface.
- The USB 1.1 port is sealed and unavailable.
- Connect a USB extension cable (included) to a USB 2.0 port for easy access when connecting an external DVD-drive or Service key
- LAN connector LAN 1(TECDIS) is to be used when connecting the TECDIS unit to other TECDIS units, Furuno VDR Adapter or Furuno FAR-2xx7 series radar.



- LAN connector LAN 2 (Internet) can optionally be used for connecting the TECDIS unit to other networks or internet. To fully comply with type approvals when connected to internet, a switch must be made available to disconnect TECDIS from internet when the connection is not in use.
- NOTE: This unit has a multi-power supply where power input can be selected between 110-230 VAC or 24 VDC.

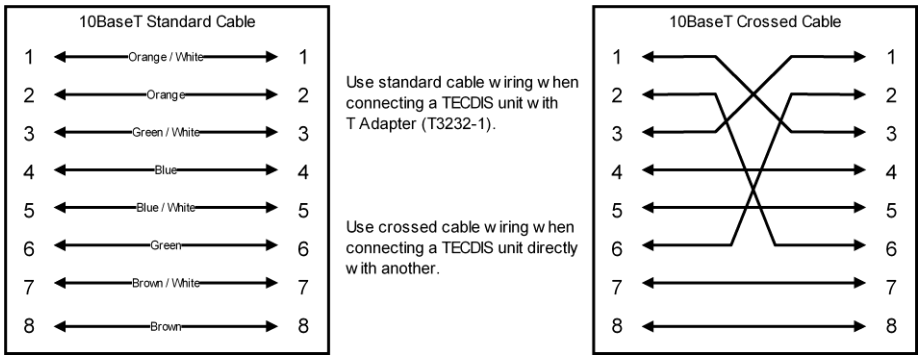
6.4.5 HD 27T22 DEC



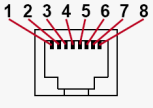
- COM 1 is to be used for TEA-01 Alarm central interface.
- Connect a USB extension cable (included) to a USB port for easy access when connecting an external DVD-drive or Service key
- LAN connector LAN 1(TECDIS) is to be used when connecting the TECDIS unit to other TECDIS units, Furuno VDR Adapter or Furuno FAR-2xx7 series radar.
- LAN connector LAN 2 (Internet) can optionally be used for connecting the TECDIS unit to other networks or internet. To fully comply with type approvals when connected to internet, a switch must be made available to disconnect TECDIS from internet when the connection is not in use.
- NOTE: This unit has a multi-power supply where power input can be selected between 110-230 VAC or 24 VDC.

6.5 Other notes regarding connectors and wiring

Ethernet connectors and cable:

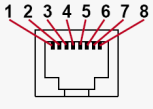


Pin Assignments - RJ45 10/100 LAN



Pin 01 - TDP	Transmit Differential Pair (Positive)
Pin 02 - TDN	Transmit Differential Pair (Negative)
Pin 03 - RDP	Receive Differential Pair (Positive)
Pin 04 - NC	Not Connected
Pin 05 - NC	Not Connected
Pin 06 - RDN	Receive Differential Pair (Negative)
Pin 07 - NC	Not Connected
Pin 08 - NC	Not Connected

Pin Assignments - RJ45 10/100/1000 LAN

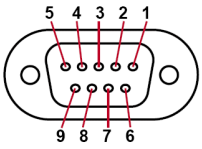


Pin 01 - D0P	Differential Pair 0 (Positive)
Pin 02 - D0N	Differential Pair 0 (Negative)
Pin 03 - D1P	Differential Pair 1 (Positive)
Pin 04 - D2P	Differential Pair 2 (Positive)
Pin 05 - D2N	Differential Pair 2 (Negative)
Pin 06 - D1N	Differential Pair 1 (Negative)
Pin 07 - D3P	Differential Pair 3 (Positive)
Pin 08 - D3N	Differential Pair 3 (Negative)

Use category 5 - twisted pair cable

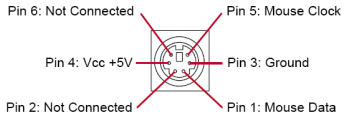
Other connectors

Pin Assignments - 9P Serial COM

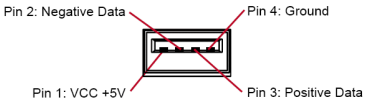


Pin 01 - DCD	Data Carry Detect
Pin 02 - SIN	Serial In or Receive Data
Pin 03 - SOUT	Serial Out or Transmit Data
Pin 04 - DTR	Data Terminal Ready
Pin 05 - GND	Ground
Pin 06 - DSR	Data Set Ready
Pin 07 - RTS	Request To Send
Pin 08 - CTS	Clear To Send
Pin 09 - RI	Ring Indicate

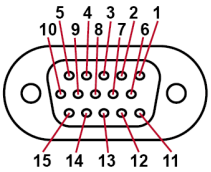
Pin Assignments - 5P PS/2 MOUSE



Pin Assignments - USB

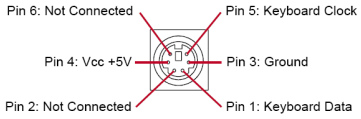


Pin Assignments - 15P HD RGB VGA



Pin 01	Red, analog
Pin 02	Green, analog
Pin 03	Blue, analog
Pin 04	Reserved for monitor ID bit 2 (grounded)
Pin 05	Digital ground
Pin 06	Analog ground red
Pin 07	Analog ground green
Pin 08	Analog ground blue
Pin 09	+5V power supply for DDC (optional)
Pin 10	Digital ground
Pin 11	Reserved for monitor ID bit 0 (grounded)
Pin 12	DDC serial data
Pin 13	Horizontal sync or composite sync, input
Pin 14	Vertical sync, input
Pin 15	DDC serial clock

Pin Assignments - 5P PS/2 KEYBOARD



7 System settings in TECDIS Setup

When you first start the TECDIS computer it will automatically start up and enter the TECDIS program. *TECDIS* and *TECDIS Setup* software are pre-installed. To exit TECDIS program for commissioning and installation procedures using *TECDIS Setup* software, you have to enter *Service Mode*.

7.1 Service mode (Access to Windows)

When you exit TECDIS (using the *STOP*-button at the upper left corner), the computer will automatically be turned off after you confirm that you want to exit. In order to exit TECDIS without turning the computer off, you must insert the USB Service Key (memory dongle), *before* you exit TECDIS. When service mode is available, a text indication is shown in the lower right corner of the chart.

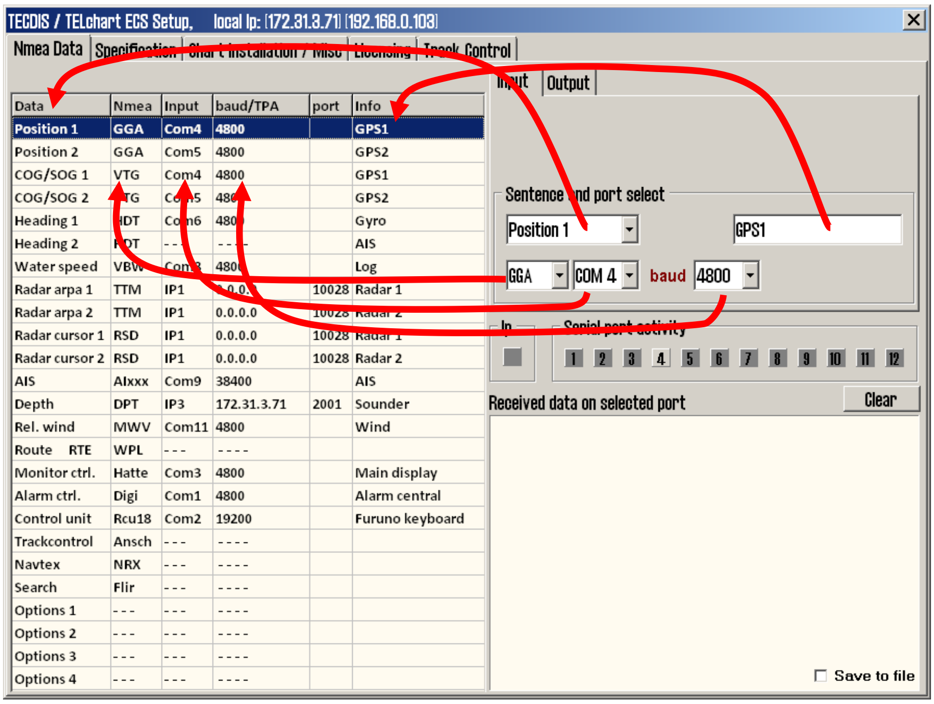
Now when you exit TECDIS, you will get access to Windows desktop, and there you will find shortcuts to TECDIS, TECDIS Setup and NMEA Server.

7.2 NMEA data setup

The “*NMEA Data*”-folder in the TECDIS Setup is where all settings for inputs and outputs to/from TECDIS are configured.
The table to the left (*information field*), shows the current settings and is instantly updated if changes are made by using the “*Input*”- and “*Output*”-folders at the upper right part of the window. The pull-down menu for “*Input*”-selection will open/close for other options to be selected as required, to assist in making correct settings.

7.2.1 The “*Input*”-folder

All position inputs to TECDIS from all external sensors must be in WGS-84 format.



Use this tab of the setup program to configure input signals, by selecting the “*Data*”-type either by activating the desired line in the table to the left, or by selecting the “*Data*”-type from the pull-down menu in the “*Input*”-folder to the right. When “*Data*”-type is selected, the corresponding line in the information field to the left is shown as active in blue background color.

7.2.2 Info text

Then, type in a text description in the “*Info*”-field to identify the source instrument for the selected “*Data*”-type. This could be brand name for the sensor connected, as this field text will be visible in warnings and alerts in the TECDIS program.

7.2.3 NMEA sentence

In the pull-down menu for "*NMEA*"-sentence; select the type of "*NMEA*"-sentence for this input. For more information about the different NMEA sentences, see the table below. Available "*NMEA*"-sentences in the pull-down menu will change according to which "*Data*"-type is selected. When a given sensor provides more than one of the supported "*NMEA*"-sentences, the highest ranking option from the following lists (as applicable) should be used:

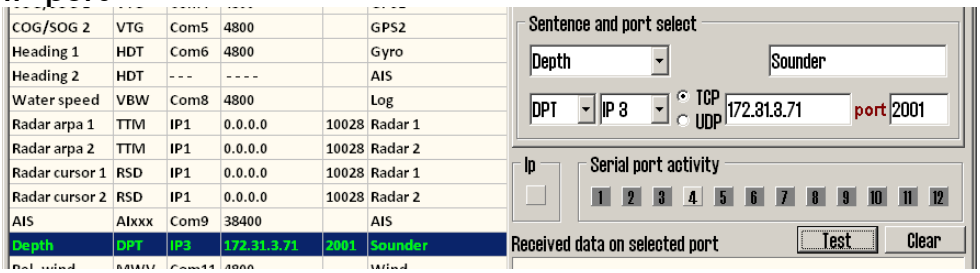
Priority	NMEA ID	Description
Position 1 and Position 2		
1	$??GNS	GNSS fix data
2	$??GGA	GPS fix data
3	$??GLL	Geographic position lat/long
4	$??RMC	Recommended minimum specific GNSS data
5	!AIVDO[4]	AIS own ship position. UAIS VHF Data link own-vessel report
COG/SOG 1 and COG/SOG 2		
1	$??VTG	Course and speed over ground
2	$??RMC	Recommended minimum specific GNSS data
3	$??OSD	Own ship data
4	!AIVDO	AIS own ship position. UAIS VHF Data link own-vessel report
Heading 1 and Heading 2		
1	$??THS	True heading and status
2	$??HDT	Heading true
3	$??OSD	Own ship data
4	$??VHW	Water Speed and Heading
5	!AIVDO	AIS own ship position. UAIS VHF Data link own-vessel report
Radar ARPA 1 and Radar ARPA 2		
	$??TTM	Tracked Target Message
Radar Cursor 1 and Radar Cursor 2		
	$??RSD	Radar System Data
AIS		
	!AI???	AIS UAIS VHF Data Link
Depth		
1	$??DPT	Depth
2	$??DBT	Depth below transducer

[4] Position: !AIVDO may be used as a secondary position source whenever primary source is missing. AIVDO is not available for Position 1.

7.2.4 Input port

In the pull-down menu "*Input*"-port, select the physical serial port the selected sensor "*Data*"-type should be read from. If the "*Input*"-port field is set to same value as already set for; "*Monitor ctrl.*", "*Alarm ctrl.*" or "*Control unit*", the text of the corresponding lines in the information field will turn red. This indicates that the port selection is invalid, and that another COM port must be selected either for the sensor or the conflicting equipment.
The text of the corresponding line in the information field will turn green when valid "*NMEA*"-sentences is received on the specified "Input"-port.

7.2.5 IP-port



IP ports: TECDIS has 12 COM ports and 4 IP ports. For each IP port, the IP address and "*IP*"-port number must be entered. The "*Test*"-button establishes a connection to the IP server with the selected address/port number and the "*Received data on selected port*"-area will show any data that is received. The "log"-button allows you to create a log of the NMEA-sentences read by the TECDIS Unit.

7.2.6 The "*Baud/TPA*"-field

In the "*Baud/TPA*"-field the data speed to be used for the COM are set. The NMEA standard is 4800 (low speed). Be aware though that some instruments require a different data speed selection. ISIC monitors use 19200 baud. There is also a NMEA high speed standard (38400). AIS units typically use high speed. (Select AIS in the "*Data*"-type field and check that the "*Baud/TPA*"-field indicates the high-speed setting). The speed is set by selection from this field's drop-down menu.

7.2.7 Serial port activity

In the "*Serial port activity*"-field the ports that are receiving data are shown. Whenever data is received on a COM port, the corresponding indicator in this area will flash green. The indicators are for COM ports 1-12.

7.2.8 Received data on selected port

This field displays the data being received from the selected COM port (marked with green in the *Information*-field). By changing the selected port in the *Data* field, the data shown in the *Received data on selected port* field will change accordingly.

7.2.9 Other COM port connections

All *Input*-ports settings that is not used should be set to "----".
Additionally there are some predefined in-/outputs that may have non-NMEA protocol. On the *HT C01 TEL-D-596* computer the serial ports COM 1 and 3 are set as RS232, COM 2 is proprietary and remaining COM-ports are RS 422 serial ports.

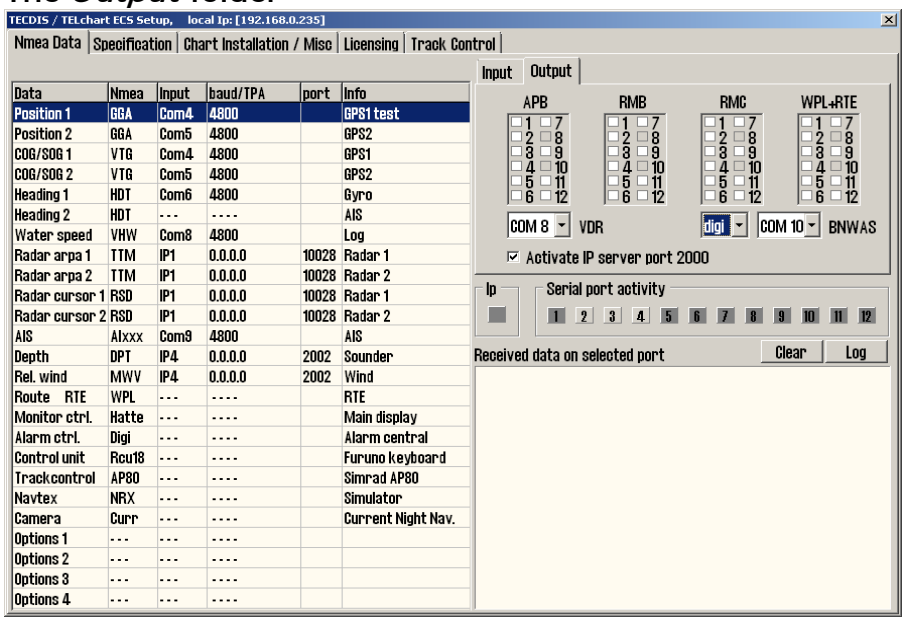
Monitor Ctrl: Select the COM port that the monitor is connected to. This connection will control the monitor background light and calibration settings, as well as the alarm sounder in the screen unit (if used). Ensure that the power supplied to the monitor is from the same source (UPS, mains etc.) as for the TECDIS.

Alarm ctrl: Select the COM port that should be used for the alarm central interface (if used). In the "*NMEA*"-sentence pull-down menu there are two choices; "*Digi*" and "*ALR*". "*ALR*" will set the port up to serial NMEA communication with the alarm central. "*Digi*" option should be used when connected to a proprietary alarm interface TEA-01, which is an open/close relay contact.

Control unit (RCU-018): Set "*Input*"-port to "*COM 2*" if the Furuno RCU-018 is connected to the TECDIS.

Search Flir: Select the COM port where gyro-stabilized camera (if used) is connected. Default setting is FLIR, but that can be hanged to Curr for Current.

7.2.10 The *Output*-folder



Data	Nmea	Input	baud/TPA	port	Info
Position 1	GGA	Com4	4800		GPS1 test
Position 2	GGA	Com5	4800		GPS2
COG/SOG 1	VTG	Com4	4800		GPS1
COG/SOG 2	VTG	Com5	4800		GPS2
Heading 1	HDT	Com6	4800		Gyro
Heading 2	HDT	---	----		AIS
Water speed	VHW	Com8	4800		Log
Radar arpa 1	TTM	IP1	0.0.0.0	10028	Radar 1
Radar arpa 2	TTM	IP1	0.0.0.0	10028	Radar 2
Radar cursor 1	RSD	IP1	0.0.0.0	10028	Radar 1
Radar cursor 2	RSD	IP1	0.0.0.0	10028	Radar 2
AIS	AIxxx	Com9	4800		AIS
Depth	DPT	IP4	0.0.0.0	2002	Sounder
Rel. wind	MWV	IP4	0.0.0.0	2002	Wind
Route RTE	WPL	---	----		RTE
Monitor ctrl.	Hatte	---	----		Main display
Alarm ctrl.	Digi	---	----		Alarm central
Control unit	Rcu18	---	----		Furuno keyboard
Trackcontrol	AP80	---	----		Simrad AP80
Navtex	NRX	---	----		Simulator
Camera	Curr	---	----		Current Night Nav.
Options 1	---	---	----		
Options 2	---	---	----		
Options 3	---	---	----		
Options 4	---	---	----		

The *Output*-folder in the upper right corner of the *NMEA Data*-folder has settings for the following outputs:

- APB,
- RMB,
- RMC and
- WPL+RTE

For each of the outputs, there are choices of which of the physical COM-ports the output should be directed trough.

The output folder is also where you configure the connection from TECDIS to **VDR** and **BNWAS**. Note that for BNWAS you can select between Digi and EVE NMEA sentences.

There is also a tick-box for activating **IP-server on port 2000** in this folder.

7.2.11 Supported NMEA Sentences

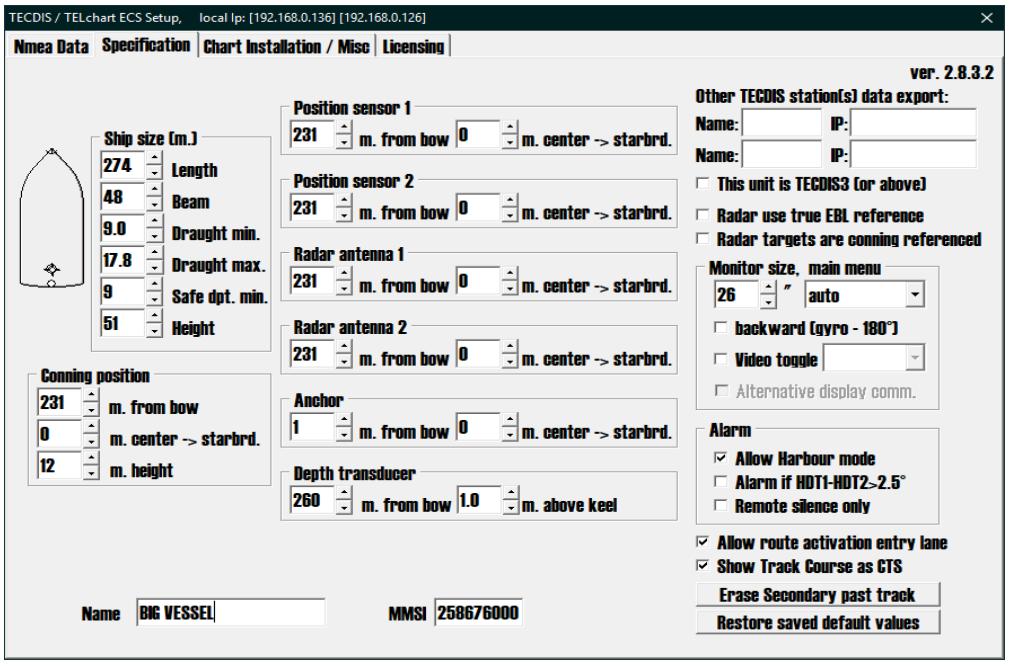
TECDIS supports communication with external equipment using the following NMEA sentences, as specified by the NMEA standard and IEC 61162-1 (Ed. 3.0):

NMEA sentence	Description	Send / Receive
ABK	(AIS) AIS addressed and binary broadcast acknowledgment	Receive
ABM	(AIS) AIS Addressed Binary and Safety Related Message	Send
ACK	Acknowledge Alarm	Send / Receive
ACN	Acknowledge Alarm	Send/ Receive
ALC	Alarm control	Send
ALF	Details of a new alert	Send
ALR	Set Alarm State	Send / Receive
APB	Heading/Track Controller (Autopilot) Sentence ”B”	Send
ARC	Alert command not accepted	Send
BBM	(AIS) AIS Broadcast binary message	Send
DBT	Depth Below Transducer	Receive
DPT	Depth	Receive
DTM	Datum reference	Receive
EVE	Optional interface to reset dormant period of the BNWAS	Send
GGA	Global Positioning System (GPS) Fix Data	Receive
GLL	Geographic Position – Latitude / Longitude	Receive
GNS	GNSS Fix Data	Receive
HBT	Heartbeat for BAM	Send/ Receive
HDT	Heading, True	Receive
MTW	Water temperature	Receive
MWV	Wind Speed and Angle	Receive
OSD	Own Ship Data	Receive
RMB	Recommended Minimum Navigation Information	Send
RMC	Recommended Minimum Specific GNSS Data	Send / Receive
ROT	Rate of Turn	Receive
RSA	Rudder Sensor Angle	Receive
RSD	Radar System Data	Receive
RTE	Routes	Send / Receive
THS	True Heading and Status	Receive
TTM	Tracked Target Message	Receive
VDM	(AIS) AIS VHF Data-link Message	Receive
VDO	(AIS) AIS VHF Data-link Own-vessel Report	Receive
VBW	Dual Ground/Water Speed	Receive
VHW	Water Speed and Heading	Receive
VSD	(AIS) AIS voyage static data	Send
VTG	Course Over Ground and Ground Speed	Receive
VWR	Relative (Apparent) Wind Speed and Angle	Receive
WPL	Waypoint Location	Send / Receive
ZDA	Time and date	Receive

NOTE: TECDIS also supports a number of proprietary protocols for specific application areas. Contact your TECDIS supplier for details.

7.3 Specification

On this tab, the dimensions of the vessel and the placement of sensors on the vessel are specified. Specifying the position of the sensors is important in order to get the highest possible accuracy in position (GPS antenna) and other data.



Ship size: enter the length, beam, draught and height of the vessel in meters.

NOTE: All values should be the most extreme values possible/allowed (the draught should for example use the biggest draught possible for the vessel at maximum load).

Other TECDIS station(s): The IP address of the second and third TECDIS unit should be entered in the *Other TECDIS station(s)* field (if applicable). It is required for transfer of data (objects, tracks, routes) to the second and third unit, and it is required for route synchronization(separate setup)

NOTE: If the TECDIS unit is not to be connected to a second or third TECDIS unit, this value should be cleared. TECDIS will generate an alarm if unable to connect to the other TECDIS unit.

***Radar use true EBL reference*:** When this checkbox is marked, it is assumed that bearings lines received from the radar(s) are true referenced. If this option is not marked, TECDIS will perform the necessary adjustments.

Arpa is conning referenced: When this checkbox is marked, it is assumed that target information from Arpa radar is already adjusted to the navigator position. If it is not marked, TECDIS will perform the necessary adjustments.

Monitor size, Main menu:

- *Monitor inch diagonal*: Specify the diagonal size of the monitor here
- *Backward (gyro-180°)"*: Check this box if monitor is facing the stern.
- *Main menu:* Select placement of the main toolbar
- Video toggle: Required for switching from ECDIS to video feed. Select the connection used for the alternative video feed.

NOTE: If TECDIS is set up with a video feed, the monitor has to be labeled "ECDIS" on the front of the bezel for the installation to comply with type approvals. If the TECDIS monitor is of the xxT1x (ie 19T14) generation, the **alternative display communication box** must be ticked.

Allow Harbour Mode: When this option is activated, it will be possible to set TECDIS in "Harbour Mode". In this mode, a Crossing Safety Contour alarm will be activated and remain active as long as the vessel is in waters shallower than 1000m. When this alarm is acknowledged, no other Crossing Safety Contour alarms will

appear on the system.
NOTE: A prominent warning is displayed whenever the “Harbour Mode” is active.
Alarm if HDT1-HDT2 > 2.5°: When this box is checked, an alarm will be given if the heading from the two sensors ”Heading 1” and ”Heading 2” deviates with more than 2.5 degrees.

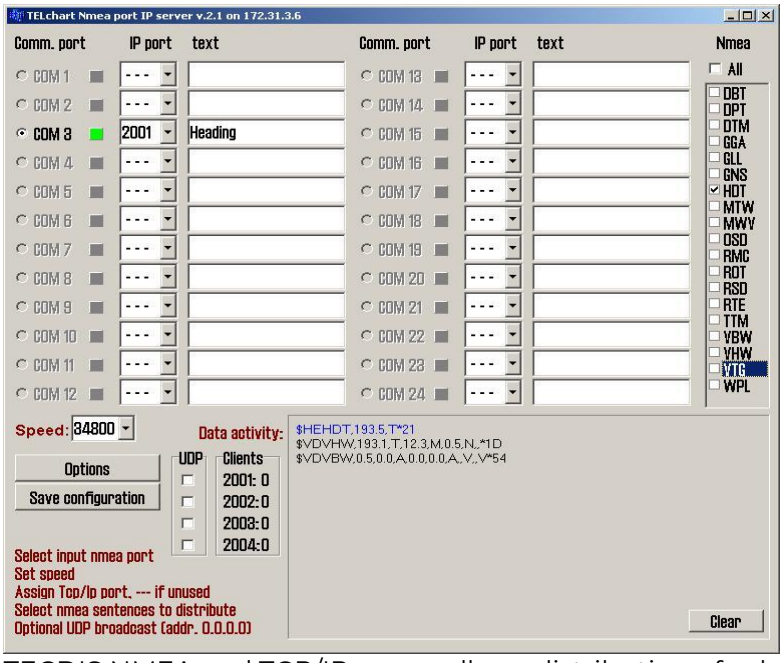
Note: If the TECDIS system has the option “*Track Control*” enabled, this box is inactivated as control for this alarm is set up in the “*Track Control*”-folder.
When selecting the “*Remote silence only*”-checkbox an acknowledgement made on an TECDIS alarm in an Alarm Central (not part of TECDIS system), only turns off the audible alarm signal. The TECDIS alarm situation must be solved in TECDIS.

Erase Secondary past track: If two positioning methods are in use, the button *“Erase Secondary past track”* allows you to remove the past track line from the secondary position sensor.
NAME: The vessel name should be specified in this field.
MMSI: The MMSI number should be specified in this field
Restore saved default values: -button allows you to retrieve all settings made in the NMEA Server, Conning and TECDIS setup from the backup file that was saved in the “*Service key*” last time TECDIS Setup was closed.

- When “*Restore saved default values*”-button is clicked, a dialog window called “*Restore to xxxxx (eToken #): Locate the setup file to restore from, and click OPEN*” appears. Locate the file that contains all the settings, called “*T-setup xxxxx.tsz*” where xxxxx represents eToken serial number.

TSZ analysis file
A “*T-setup xxxx.tsz*”-file is generated by TECDIS Setup every timer TECDIS Setup is started and stopped again.
The file is created by setting the “*Service Key*” into the computer, stop TECDIS and start TECDIS Setup, stop TECDIS Setup, remove the “*Service Key*”. “*T-setup xxxx.tsz*”-file is saved to the “*Service Key*” automatically, where “*xxxxx*” represents the unit’s eToken serial number.
“*T-setup xxxx.tsz*”-file can be used by TELKO for an analysis of the setup, installation and other settings.

7.4 TECDIS NMEA and TCP/IP server



TECDIS NMEA and TCP/IP server allows distribution of selected comport data out through a TCP/IP network. This way one sensor can be shared by multiple users in a TCP/IP network.

NmeaServer is the provided software for administration these settings. A shortcut should be present on Windows desktop.

As shown above, “HDT sentence”, is received on comport 3 and is retransmitted on port 2001 through TCP/IP address 172.31.3.61. This means that backup ECDIS (or other connected computers to the LAN network) can receive “HDT” data through TCP/IP by selecting correct IP address (172.31.3.61 port 2001).

Setup procedure:

1. Select appropriate comport with desired data
2. Select appropriate baud rate on receiving comport, by using “**Speed**” dialog box
3. Select to which TCP/IP ”port” it shall retransmit data (from the selected comport), for example 2001
4. Describe with text connected device to TCP/IP port (backup station, conning PC etc.)
5. Select which NMEA sentences you which to send (you may select one, multiple or all on one TDP/IP port)

UDP	Switches to UDP broadcast. Only one client per computer is possible.
Data activity	Shows activity on selected (monitored) comport. HDT is marked in blue due to it is selected for output to TCP/IP.
Clients	Shows how many listeners (connections) there are on each connected TCP/IP port.

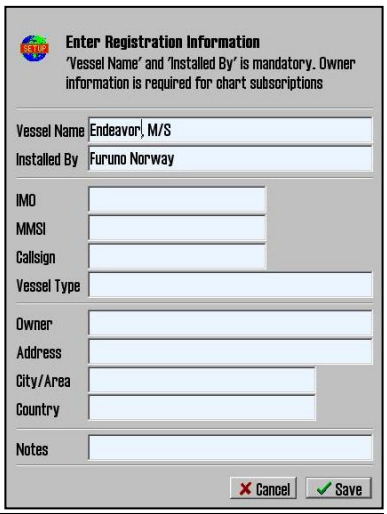
7.5 Chart Installation/Misc

7.5.1 Install, update or remove chart databases

This subject is covered extensively in chapter 6 of the TECDIS User Manual (version 3.23 and above). There you will find step by step guides to installing charts from Jeppesen, Navtor, Nautisk Forlag and all S63/S57 formatted charts.

7.5.2 Enter vessel information:

In this area, information about the vessel owner should be entered. This information needed for chart licensing and warranty purposes.



and is

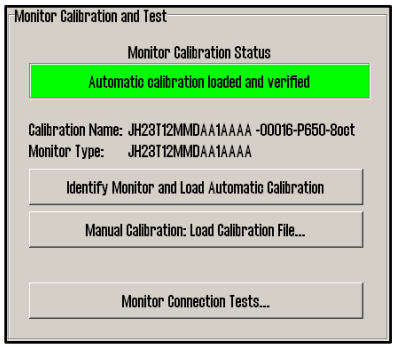
7.5.3 Send registration

When the vessel information has been entered and stored, the option to send registration will be enabled on the main this part of the Setup program. Select *Send Manually* to save the information, and the program will tell you the file name and location. Send this file to support@telko.no whenever the *Vessel information data* is changed.

area of

7.5.4 Monitor Calibration and Test

This area provides information on the current monitor calibration status, means update the monitor calibration and diagnostics for testing the serial connection to the monitor.



to

Proper monitor calibration is needed to correct chart colors and symbols.

ensure

To calibrate the monitor first attempt automatic calibration by pressing the "Identify Monitor and Load Automatic Calibration" button. If this is not successful, calibrate manually by pressing the "Manual Calibration: Load Calibration File..." button and selecting the correct calibration file matching the monitor. If such a file cannot be located, this can be obtained from your TECDIS support provider.

Monitor Calibration Status:

Indicates the current status of monitor calibration. The possible values seen here and steps to rectify any problems are as follows:

Value	Solution
No serial line to monitor!	Connect the monitor to a serial port
Calibration not performed!	Perform automatic or manual calibration as outlined below.
Wrong manual calibration file loaded!	The manual calibration file loaded does not match the connected monitor. Obtain the correct calibration file from your TECDIS support provider and repeat manual calibration.
Monitor contains wrong automatic calibration!	The monitor does not contain the correct monitor calibration files. Contact your TECDIS support provider.
Automatic calibration loaded but not verified	Calibration has been successfully performed. Verify correct calibration manually by comparing the monitor model specified in "*Calibration Name*" to the monitor model label.
Manual calibration loaded but not verified	
Automatic calibration loaded and verified	Calibration has been successfully performed and verified.
Manual calibration loaded and verified	

Calibration Name:

This field displays the name of the currently loaded calibration file.

Monitor Type:

This field displays the monitor model name as reported by the monitor during the last automatic calibration process.

Identify Monitor and Load Automatic Calibration:

Initiates automatic identification of monitor type and attempts to load automatic calibration data from the monitor. The possible values seen here are:

Value	Solution
No monitor on COM:1	Connect the monitor to a serial port in accordance with 6 and 7.2.9.
Retry reading profile. Aborting profile read!	The monitor is not recognized, and manual calibration is needed.
Monitor on COM:2 identified! Manual calibration needed!	The monitor is recognized, but a manual calibration is needed. The monitor ID is shown.
Monitor on COM:2 identified! Executing calibration!	The monitor is recognized, and automatic calibration is performed.

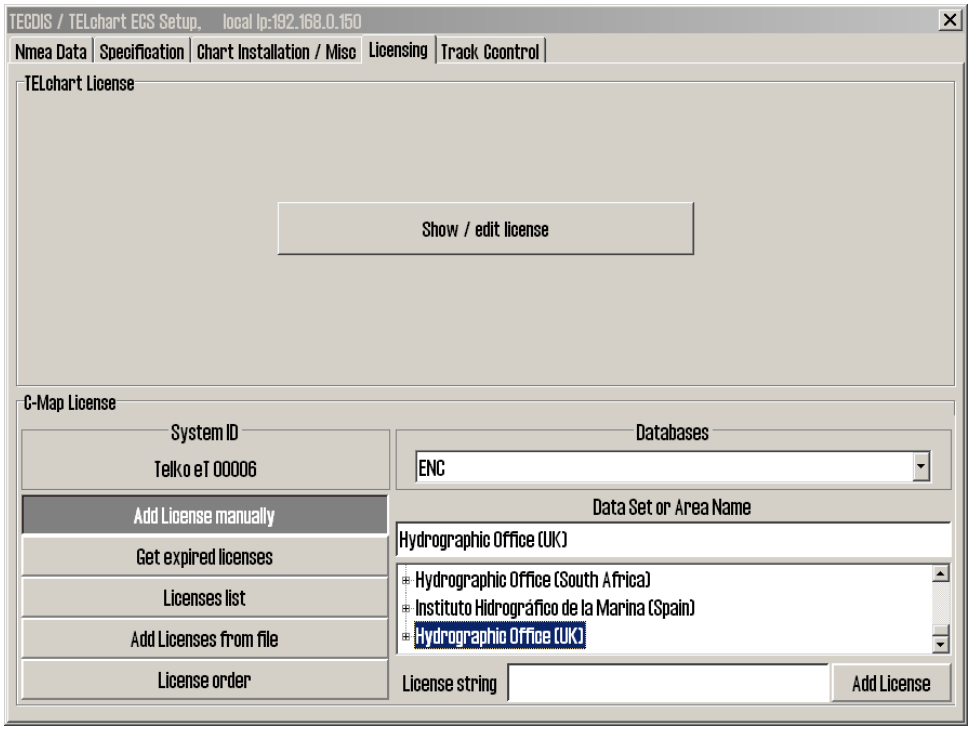
Manual Calibration: Load Calibration File...:

This button allows the operator to manually load a monitor calibration file.

Monitor Connection Tests...:

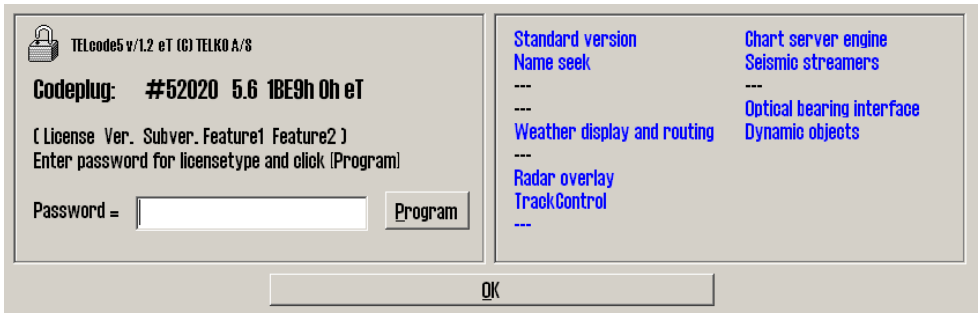
This button provides access to tests to verify correct monitor serial connection (buzzer test, backlighting adjustment tests and monitor identification test).

7.6 Licensing



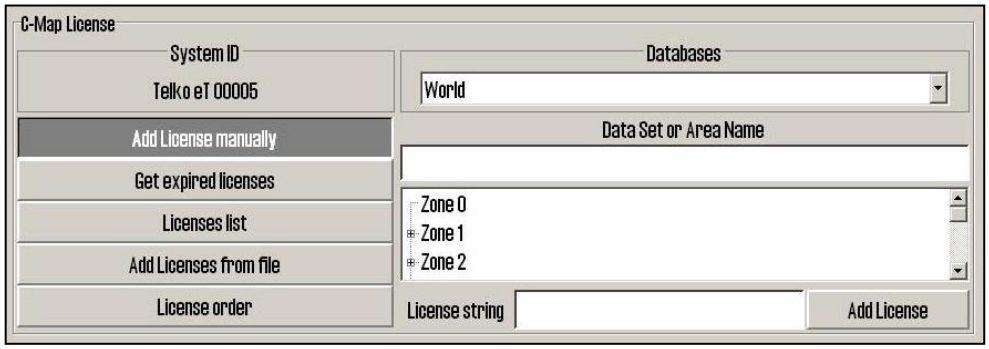
7.6.1 TECDIS license

By clicking “Show / edit license” information about the current system license is shown as illustrated below. This information includes the license number and version information, and a list of installed optional components in blue in the right part of the area. In order to activate additional optional components, a password for this should be entered in the “Password” field and the “Program” button should be clicked.

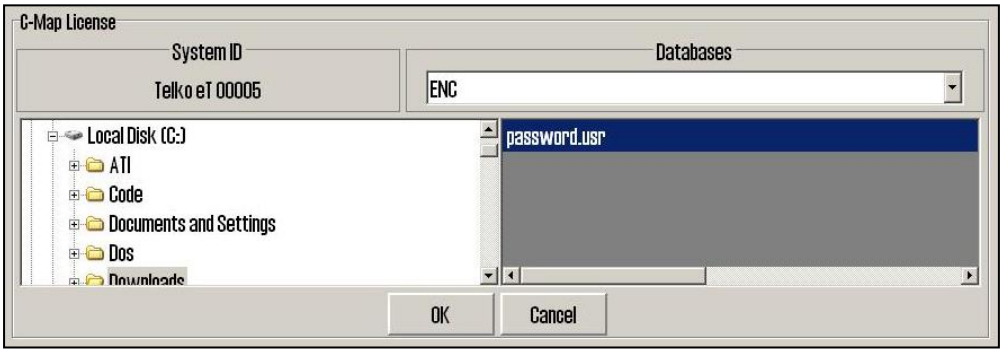


7.6.2 C-MAP License

Add licenses manually: Select the zone or area you have received a license for in the window to the right (under “Data set or Area name”). The 16-character license code is entered in the “License string” field. Finally, click on “Add License” to activate the license.



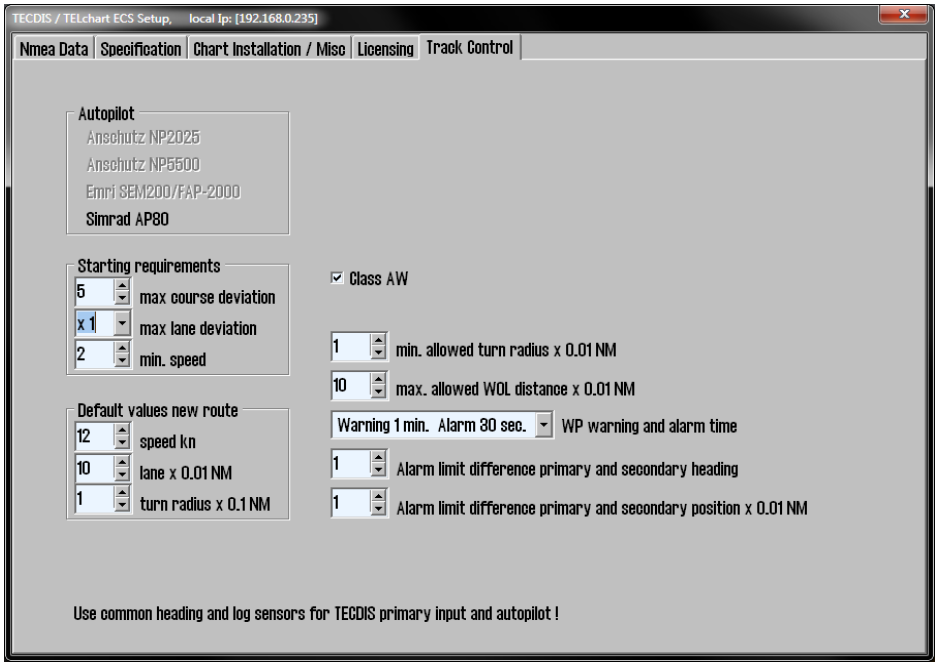
Add license from file: Use this option if you want to use a supplied password.usr file to activate chart licenses, browse to the location of this file and select it and press “OK”. The licenses contained in the file will be automatically activated.
In this area, it is also possible to get a list of licenses that are expired and no longer valid (“Get expired licenses”), to see a list of all valid licenses (“Licenses list”) and to generate an order file for new licenses (“License order”).



7.6.3 Dynamic Licensing

TECDIS includes full support of Jeppesen Marine’s Dynamic Licensing solution for ENC charts in C-MAP SENC format. Dynamic Licensing provides a cost-effective method for ensuring continual vessel ENC coverage with minimal overhead and administrative costs. Read the full description of enabling and using Dynamic licensing in the TECDIS User Manual.

7.7 Track Control



On this tab, settings for connection to autopilots and Track Control can be set.

Refer to *chapter 4 Autopilot Configuration* and the *OEM Installation Manual* for installation and configuration of the autopilot. NB: The autopilot and TECDIS must be supplied with the same heading and log sensor inputs!

7.7.1 Starting Requirements

The values in this area specify the conditions needed before Track Control mode can be activated.

Max course deviation	The maximum number of degrees the course over ground (COG) of the vessel can differ from the planned course.
Max lane deviation	The maximum distance of the vessel position from the planned route leg, expressed as a multiplier of the planned route leg lane width. (For example, if the lane setting for the initial planned route leg is 100m, and 'max lane deviation' is set to x2, the vessel position can be up to 200m from the planned route leg when Track Control is activated.)
Min. speed	The minimum speed of the vessel in knots.

7.7.2 Default values new route

The values in this area will be used as the default values for the parameters specified when planning a new route.

Speed kn	The default planned speed in knots for new route legs.
Lane x 0.01 NM	The default planned lane width for new route legs, expressed as hundredths of a nautical mile. (I.e., if the value specified is 10, the default lane width would be 0.1 NM.)
Turn radius x 0.1 NM	The default planned turn radius for new route legs, expressed as tenths of a nautical mile. (I.e., if the value specified is 5, the default turn radius would be 0.5 NM.)

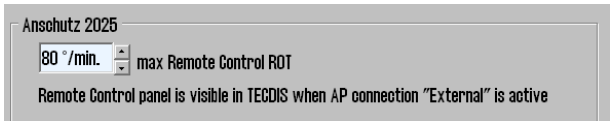
7.7.3 Other settings

Autopilot	This field shows which autopilot is selected. Autopilot is

	selected in the NMEA Data tab, where further configurations should be made. Only the type approved autopilots according to the certificate, should be installed and configured to work with the TECDIS.
Min. allowed turn radius x 0.01 NM	This setting specifies the minimum turn radius allowed, expressed as hundredths of a nautical mile. This value should be determined during vessel sea trials.
Max. allowed WOL distance x 0.01 NM	This setting specifies the maximum value allowed for operator selected Wheelover Line (WOL) distance, expressed as hundredths of a nautical mile.
WP warning and alarm time	This setting controls how long before a waypoint warnings and alarms are generated.
Alarm limit difference primary and secondary heading	This setting controls the number of degrees the primary and secondary heading sensor values can differ before an alarm is generated. If the two heading sensors differ by more than this value, an alarm is generated in TECDIS. We recommend that the sum of 3xRMS (route mean square) is used.
Alarm limit difference primary and secondary position x 0.01 NM	This setting controls the distance allowed between the two position sensors before an alarm is generated, expressed in hundredths of a nautical mile. If the distance between the positions reported by the two position sensors is larger than this value, an alarm is generated in TECDIS. We recommend that the sum of 3xRMS (route mean square) is used.

7.7.4 Autopilot specific settings for Anschutz 2025

(only shown when available):

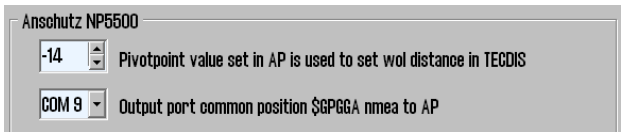


Max Remote Control ROT

This setting specifies the maximum rate of turn (ROT) value allowed in the autopilot remote control panel in TECDIS, expressed as degrees per minute.

7.7.5 Autopilot specific settings for Anschutz NP5500

(only shown when available):



Output port

This specifies the output port on the TECDIS unit that sends $GPGGA to the autopilot. Any COM-port with available output capacity can be set up for this purpose.

7.8 Route Synchronization[5]

TECDIS provides two alternative ways of transferring routes between the primary and secondary TECDIS units. Both solutions allow the operator to retrieve the planned route for the current voyage on the secondary TECDIS unit if the primary unit fails.

For this function to work correctly, the following must be observed:

1. The Specification tab in TECDIS Setup must contain the correct address to the other TECDIS unit.
2. The TECDIS units must be connected using the specified LAN adapter ports.
3. The LAN adapter port used for connection between the TECDIS units should not be reconfigured to use an IP address outside the subnet (172.31.3).
4. (Replication) The TECDIS units must use unique license dongles (Telko eToken ID numbers must be different).

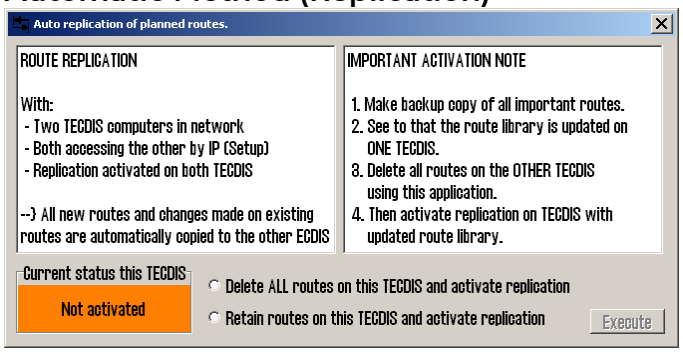
7.8.1 Basic Method

When the basic route synchronization method is in use and a route is activated on either of the TECDIS units, a backup copy of the route is transferred to the other TECDIS. This backup is not automatically included in the route list on the receiving TECDIS unit, but it can be imported when needed.

The route is available for import from the following files in the ***Data*** subdirectory of the ***TECDIS*** directory *(C:\Program Files\TECDIS\Data*):

- Primary Route
- Secondary Route
- ReceivedPrimaryRoute.lst
- ReceivedSecondaryRoute.lst

7.8.2 Automatic Method (Replication)



When ***Replication*** is activated, all new routes entered, changes to existing routes and removal of routes is automatically reflected at the other TECDIS unit. In effect, the two TECDIS units will contain identical route databases.

7.8.2.1 Activating Replication

Follow these steps to activate Replication:

1. Verify that the requirements for this feature listed above are met.
2. If routes are present on the TECDIS units, select one unit where all routes will be kept and one TECDIS unit where all routes will be removed.
3. On both TECDIS units, insert the Service Key and exit to Windows.
4. On both TECDIS units, run C:\Program Files\TECDIS\Replication.exe.
5. On the TECDIS unit where all routes should be kept, select ***"Retain routes on this TECDIS and activate replication"*** and press *Execute*.
6. On the TECDIS unit where all routes should be removed, select "***Delete ALL routes on this TECDIS and activate replication"*** and press *Execute*.
7. On both TECDIS units, remove the service dongle and reboot the system.

[5] The automatic method is activated by default in all TECDIS units produced after 1.November 2008

After both TECDIS units are again operational, all routes from the unit where routes were kept will be automatically transmitted to the other TECDIS. All further route changes are automatically reflected on the other TECDIS.

7.8.2.2 Deactivating Replication

If the replication feature needs to be deactivated, follow these steps:

1. On both TECDIS units, insert the Service Key and exit to Windows.
2. On both TECDIS units, **delete** the file C:\Program Files\TECDIS\SetRtReplicateActive.txt.
3. On both TECDIS units, remove the service dongle and reboot the system.

7.9 Alarm source setting

Contact your TECDIS support provider for information on changing alarm source settings. All alarm sources are activated by default, and they are:

- pc (loudspeaker connected to the computers audio amplifier)
- monitor (buzzer in the screen)

8 System settings configured in TECDIS

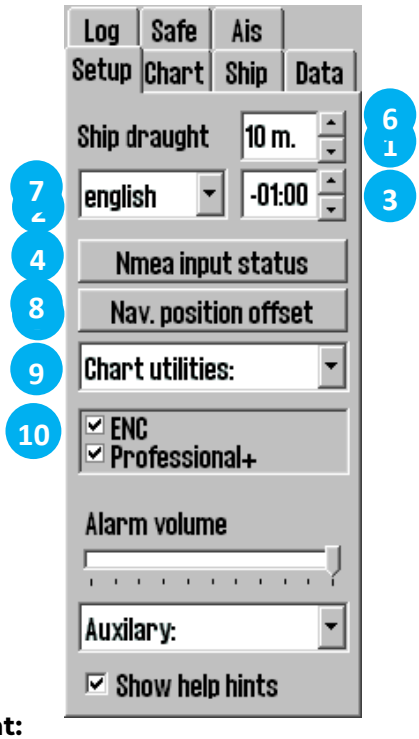
When you press the menu folder button in the top menu bar, menu folders will open in the lower part of the side menu field. There are 7 different menu folders:

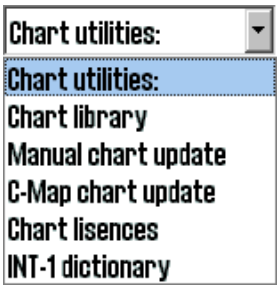
8.1 Setup menu settings

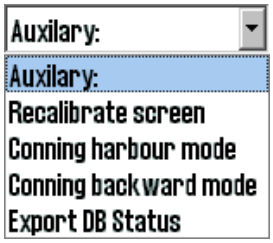
- Setup
- Chart
- Ship
- Data
- Log
- Safe
- TGT

This folder contains:

1. Ship draught
2. Language selection
3. Time zone selection
4. NMEA input status
5. Nav. Position offset
6. Chart utilities
7. Chart selection
8. Alarm volume
9. Auxiliary
10. Show/hide help hints

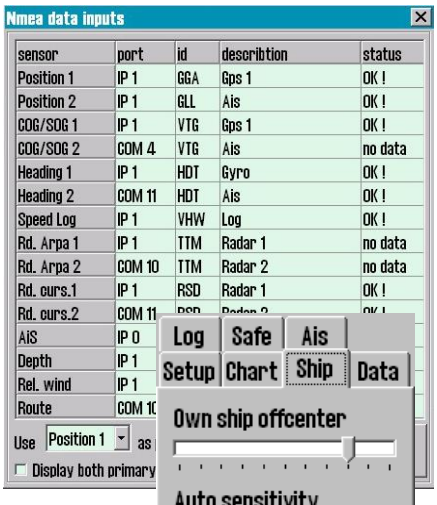






Ship draught: minimum and maximum ship draught is defined in the setup program. When TECDIS starts, the maximum draught is used as default, but this can changed in the setup menu folder.

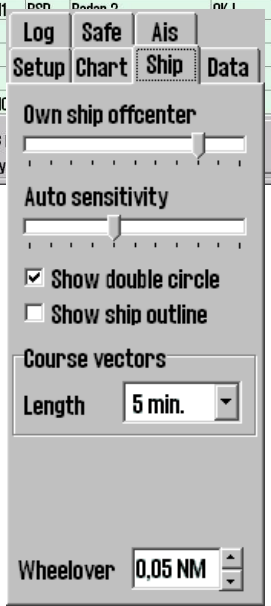
NMEA data inputs:
Displaying a list describing which ports the different sensor information is received from. Also displaying which NMEA sentences are used and the data communication status. This is only an information window. Changes have to be made in TECDIS Setup (see chapter 3).



Position fixing:
This setting allows you to select between 2 sources for positioning. Primary and secondary can be selected. Primary and secondary can be displayed simultaneously on the chart display. If primary position fixing system falls out, the system automatically uses secondary. If both positioning systems drop out, changeover to dead reckoning is executed. (Log + Gyro)

8.2 Ship menu settings

Own ship offcenter: Location of own ship on the screen. High value: Vessel is placed more offcenter. Low value: vessel is placed closer to screen center. This function is only active when auto function is enabled.



Auto sensitivity: How often chart to be centered/shifted in Auto mode.

Show double circle: The boat symbol can be displayed with or without circles.

Show ship outline: This option allows the true vessel outline to be displayed in the chart.

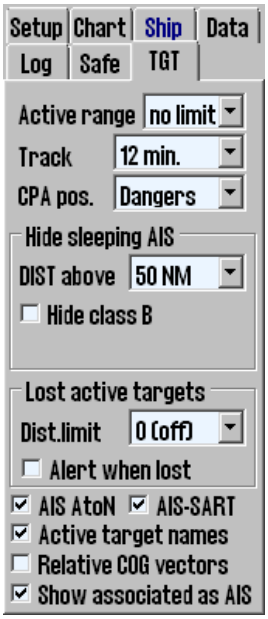
Course vectors: Sets vector length on own ship and targets. (One cross line on vector is one minute).

Wheelover: Wheeloverline distance from Waypoint. New command to track pilot and route monitoring.

Please verify these values with the vessel's **Master** before finalizing the installation. These parameters are not part of the setup program, but are included in the normal program.

8.3 TGT (target) menu settings

Active range: Filters which targets are shown as active based on the distance to own vessel. This makes it possible to view all targets with course, COG-vector and past track line. To remove the distance limit and display all targets as active, select No limit. To remove the active range and display no AIS targets select Off. When targets are outside the distance limit, they will change to sleeping mode. This can be overridden by selecting Activate.



Track: Track specifies the length of the past track lines for the targets. It is specified in minutes of travel.

CPA pos.: Manual: Displays CPA positions manually for each target from the target window. If the target window is open, the CPA position will be displayed regardless if the CPA is in the past or future. When it is closed, only future CPA will cause CAP position to be displayed. Dangers: Same as above, but in addition CPA position will be displayed for all targets the radar classifies as dangerous. All active: CPA position is displayed for all active targets with CPA in the future. If you open a target window, only the CPA for that vessel will be displayed, and CPA positions will be displayed even if CPA is in the past.

Hide sleeping AIS

DIST above: Hides sleeping AIS targets beyond this radius

Hide class B: Removes the display of all class B targets beyond the active range distance setting

Lost active targets

Dist. Limit: Select if the function should be on or off. AIS targets within the range specified are marked with a black cross when the target data ends.

AISAtoN: Turns on the display of Aids to Navigation (AtoN) symbols

AIS SAR Aircraft: Turns on the display of AIS SAR aircraft symbols

AIS-SART: Turns on the display of Search And Rescue Transmitter(SART) symbols

Active target names: When selected, displays target names on all active targets

Relative COG vector: Sets all AIS target COG vectors to be relative to own vessel movement. If not selected, targets use true course and speed. When used, a notice will be displayed at the top of the chart view, reading "Relative vectors". The notice can be clicked to unselect Relative COG vectors in this menu (click to fix).

Show associated as AIS: This displays targets associated with both AIS and radar as AIS targets

8.4 Chart library

Chart library displays an overview of all charts in a database. By selecting a database from the drop down menu, a list with all charts in the database appears, sorted by publisher. Highlight a chart in the list to display further information (middle field). When double clicking on a chart in the list, it will appear if license is present. When vessel is sailing, vessel is automatically centered. (if not auto function is disabled).

NB: Chart library only displays databases selected in setup menu folder.

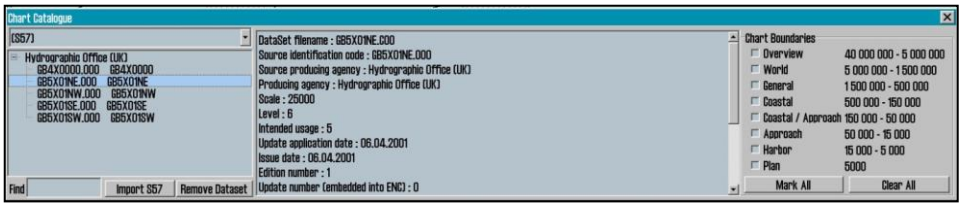
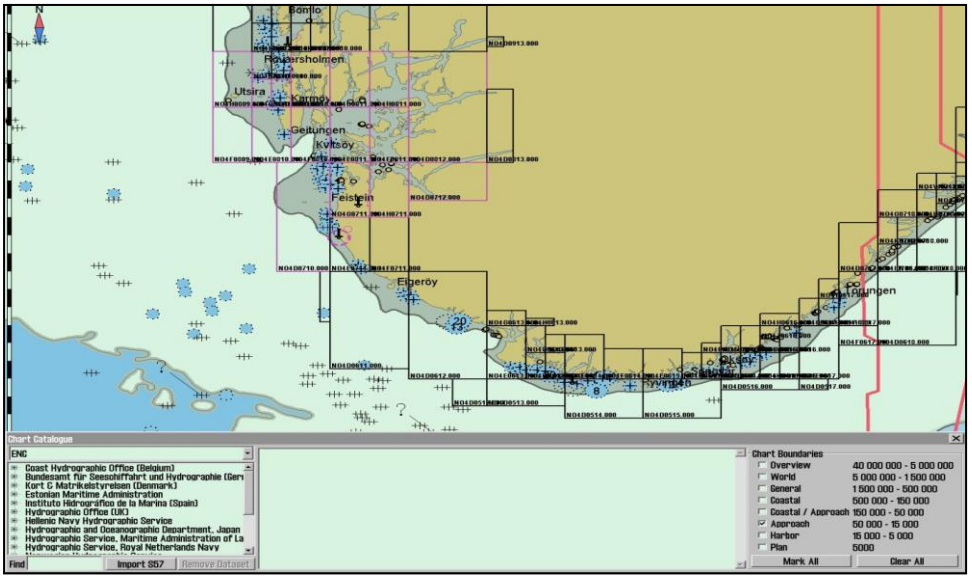


Chart boundaries: graphically presents coverage of all charts in the database at present level. (Levels comply with scale selected on the top menu bar) Licensed charts are displayed with magenta, non-licensed charts are marked with black boundary. Chart names are presented in the bottom left hand corner of the square.



Remove dataset: If a database contains imported S57 data is selected in the drop down menu, the button" Remove Dataset" will delete selected chart.

9 Miscellaneous

9.1 Error Messages

TECDIS includes automatic error detection in most functions. If it is possible, corrective measures will be taken without requiring operator intervention. In case of critical errors, the operator is notified. In addition to the possible error situations listed here, both the Windows operating system and support routines may in some instances display error messages not listed.

Common to these error messages is that corrective measures are initiated by restarting the ECDIS. In the case of a system failure any error messages should therefore be noted. If the ECDIS appear to be malfunctioning, try restarting the ECDIS. If this does not correct the error situation, notify your support contact.

10=Init required too much space	Memory full or error. Try restarting ECDIS.
11=Bad init parameters	System error, should not normally occur.
12=Data files not found	Old data file has been erased or destroyed. New (empty) data file is auto-generated.
13=Open db cannot determine type of file	Installation error, use of invalid data.
14=Data files appear to be corrupted	Restart ECDIS to generate new data file.
16=Could not create index file	Hard drive error or full, erase old user data.
17=Could not create data file	Hard drive error or full, erase old user data.
18=Tried to create existing index file	System error, should not normally occur.
19=Tried to create existing data file	System error, should not normally occur.
24=Could not close file	System error, probably memory error.
46=File number already in use	System error, should not normally occur.
47=c-tree has not been initialized	System error, should not normally occur.
101=C-Map system files not installed	Incorrect or incomplete installation.
102=No C-Map charts installed!	Incorrect or incomplete installation.
103=No chart database set as default!	Incorrect or incomplete installation.
104=g_manager->Init() failed	System error, should not normally occur.
105=g_map->Init() failed	System error, should not normally occur.
106=g_mini->Init() failed	System error, should not normally occur.
107=Update successfully completed	Update confirmation.
108=g_map->SetZoom() failed	System error, should not normally occur.
109=g_map->SetScale() failed	System error, should not normally occur.
110=g_mini->SetScale() failed	System error, should not normally occur.
111=g_map->SetRotation() failed	System error, should not normally occur.
112=g_mini->SetRotation() failed	System error, should not normally occur.
113=g_map->AddBase() failed	System error, should not normally occur.
177=Not TECDIS dongle	License dongle found but not approved.
188=Error in periodic ID check	No license dongle found or approved.
189=File read failed	Error in license dongle.
190=Read of file length failed	Error in license dongle.
191=File number out of bounds	Error in license dongle.
192=Cmap init error	License dongle not C-Map approved.
193=Init has not been called	License dongle communication error
194=Error parsing system ID	License dongle communication error
195=Cmap registry error	License dongle communication error
196=Dongle is not Telko dongle	License dongle not approved.
197=No eToken dongle present	No license dongle found.
198=Cmap init error	Error in license dongle.
199=Init has not been called	License dongle communication error
200=Unknown error	Remove then reinsert the license dongle, or move it to another USB port, or restart TECDIS.

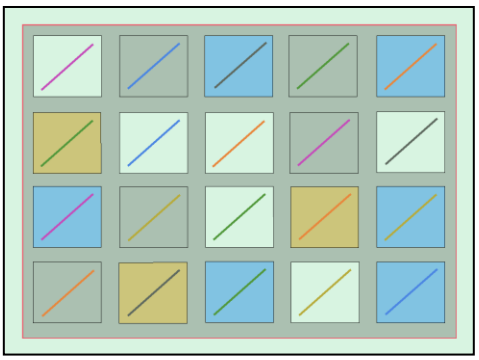
9.2 Monitor Calibration

All information in electronic chart displays must be highly visible. To ensure this monitor must be calibrated to display correct colors. This is very important, especially for night palettes, when monitor is dimmed.

ECDIS color test for monitor calibration is also placed in IHO presentation library. Open library by pressing Control + alt + shift + T, and select test diagram by pressing A – B – C- D- E or T on the keyboard.

Brightness check: Open test diagram E and verify that the grey box is clearly visible.

Check colors: Open test diagram T. All diagonal lines to clearly separate from background:



- 3 Yellow diagonal lines
- 4 orange diagonal lines
- 3 magenta diagonal lines
- 4 green diagonal lines
- 3 blue diagonal lines
- 3 grey diagonal lines

Check visibility of each color in the diagrams (A-E). If the monitor fails the test, it no longer meets the minimum requirements for display performance. It should be evaluated by a qualified engineer and be repaired or replaced as necessary. This test must be performed with all color palettes on the system (day/dusk/night).

NB. If monitor settings has been changed manually in the monitor menu, or to make sure correct settings are used, go to ”setup” menu folder, press ”Auxiliary” and select ”recalibrate screen”

9.3 Internet/VSAT connection troubleshooting

For all problems with downloading weather data or chart updates, regardless of connection type used, your TECDIS supplier and/or C-Map will be able to provide very useful assistance in tracking down the cause of weather download problems. Logs kept by Jeppesen Marine will show whether your weather download attempts reach the weather data servers and whether the requests are successful. They will also be able to verify that there are no problems with your subscriptions.
In order for C-Map or your chart system supplier to help you, they will need your System ID number.

Before contacting anyone, at least some of the tests on the next page should be attempted.[6]

[6] Tests applicable to only weather overlay features are marked (Weather). Tests applicable to only chart updates are marked (Updates).

9.3.1 GENERAL TESTS

A. **Check your subscription**. Make sure that your subscription has not expired. Weather Overlay: Expiry information can be seen by opening the weather overlay, pressing 'Data', 'Download New' and then 'Show Subscription'.
B. **(Weather) Update your subscription.** Jeppesen Marine may make changes to the weather service that isn't automatically reflected in your subscription.
C. **Try another connection method.** If you use an internet connection, try downloading by email. If you use email already, try using another email account/system. If this is successful, you have verified that the problem is with your connection, not your chart system/update function/weather service
D. **(Weather) Try a smaller download size.** The problem may be connected to downloading large files, especially if the connection is noisy/error prone.
E. **(Weather) Try another model.** The problem may be connected to downloading a specific forecast method. If a download of similar size using a different model is successful, the list of potential causes for the problem is significantly reduced.
F. **Try updating the chart software.** Telko AS provides software updates containing both bug fixes and new features free of charges at our website http://www.telko.no.

9.3.2 INTERNET CONNECTION

G. **Make sure that the internet connection is not turned off.** In a valid TECDIS installation with a direct internet connection, a switch has been installed so that the internet connection can be turned off when not in use.
H. **(Weather) Try setting a higher Connection Timeout.** The download attempt may be timing out before the request can be completed. Refer to weather overlay documentation section 1.2 step 6 for details.
I. **Verify that you can reach the servers.** Exit the chart system (For TECIDS: insert the TECDIS Service Key first), open Internet Explorer and try the following addresses. If the reply does not match what is indicated in this table, you are not reaching the weather service servers.

http://datacenter.c-map.com	Should show: Connection OK

J. **If test I failed, see if you can reach the servers using IP addresses.** Continue where you left off in the previous test. Try the following addresses and see if the replies match what is specified in the table.

http://80.239.21.103	Should show: Connection OK

If these tests succeed, the problem is with your DNS Settings. If you have not performed test F, do so now, then run the following file and see if the problem is fixed: C:\Program Files\TECDIS\AddCMapHosts.exe.

K. **If test J failed, have your network administrators check the firewall.** Make sure that the firewall is not blocking your weather data requests.

E-MAIL CONNECTION

L. **Check your spam folder.** Make sure that the replies to your request email from Jeppesen Marine are not being marked as spam.
M. **Try setting a lower Max Attachment Size.** Your email service may be having problems with the weather data attachments. Try lowering the Max Attachment Size value in the Configure Connection window.
N. **Make sure you are not using old request / reply files.** Delete all request and reply files from the USB memory stick so that you are sure you are not using the request or reply files from a previous download (or from the other TECDIS).
O. **Update only one TECDIS at a time.** If you send weather / update requests from both TECDIS systems at the same time, it is very easy to get the reply files mixed up.

10 Checklists regarding installation

10.1 Checklist prior to completion of TECDIS installation

#	Task to be performed:	OK:	Comments
1	Verify that all selected ports are receiving/transmitting data, and that ports have been given names on both main and back-up TECDIS. Names shall be according to the data they are receiving/transmitting.		
2	Verify that sensor data is correctly distributed between main and back-up TECDIS (NMEA server program).		
3	Verify that one single action do not result in loss of position on both main and back-up TECDIS.		
4	Verify that main and back-up TECDIS and respective equipment are connected to a proper UPS.		
5	Verify that boat size are correct compared to chart on both main and back-up TECDIS.		
6	Perform monitor color calibration on main and back-up TECDIS.		
7	Verify that alarm function on both main and back-up TECDIS is working properly.		
8	Check that TECDIS transmits alarm to external systems.		
9	If installed, verify generation of conning picture and correct display of sensor data on conning monitor (check against engine telegraph, speed repeaters, gyro repeaters etc)		
10	Verify audible signal from alarm speaker on TECDIS		
11	Verify sensor data (correct size of vessel etc) is filled in on main and back-up TECDIS.		
12	Verify that back-up of default setup values have been performed (save setup default values) on main and back-up TECDIS.		
13	Verify that installed charts have been correctly installed on both main and backup TECDIS (if installed), and that charts license matches.		
14	Unplug TECDIS Service Key, restart TECDIS to verify it starts up in normal mode (chart program starts automatically) and boat symbol and sensor data are displayed.		
15	If *video source switching* is activated, verify that an ECDIS-label has been placed on the front bezel of the ECDIS monitor.		
16	If connected to internet, verify that a switch is available to disconnect TECDIS from internet when the connection is not in use.		
17	Verify that Monitor Main and Monitor Back-up comply with issued certificate and that hardware revision numbers comply with specification on page 11-14 in the TECDIS Installation Manual (ver 2.7 and above).		
18	Fill in hardware/software fact sheet and file it in ships documents, in technician personal files and send a copy to Telko AS.		

#	Hardware	Model/type:	Serial no.
19	Keyboard Main		
20	Keyboard Back-up		
21	Processor Main		
22	Processor Back-up		
23	TELchart alarm interface		
24	Trackball Main		
25	Trackball Back-up		
26	Analog signal collector		
27	Monitor Main[7]		
28	Monitor Back-up[10]		
29	Conning monitor		
30	Conning monitor Back-Up		
31	Alarm loudspeaker		
32	MOXA interface		
33	AUTOPILOT		
34	Additional units		
35	Additional units		
#	**Software**	**Version:**	**Comments:**
36	TECDIS Main		
37	TECDIS Back-up		
38	AUTOPILOT		
39	Additional software		
40	Additional software		
#	**License**	**Number:**	**Comments:**
41	TECDIS license # Main		
42	TECDIS license # Back-up		

Vessel Name / ID: Date of installation:

Name of technician:

Checklist performed(Sign):

This checklist shall be filled in and signed for all TECDIS installations, to verify proper installation of the ECDIS system onboard.

10: Make sure the **hardware revision number** match the specification (see page 11-14) in TECDIS Installation Manual (ver. 2.7 and newer)

10.2 Checklist prior to completion of TECDIS TCS and TECDIS AW installation

If installation includes Track Control functionality, the following tests must be performed.

10.2.1 Tests for TECDIS 1 & 2

			TECDIS #	
No.	Function	Requirement	1	2
Harbor Acceptance Test (15 minutes)				
1	External data	Go to setup menu and verify NMEA inputs are valid. Check input values for position and course.	▫Good ▫NG ▫N/A	▫Good ▫NG ▫N/A
2	External data	Verify that TECDIS receives valid sensor data from a minimum of: • Two independent positioning sensors • Two independent heading sensors • A speed sensor	▫Good ▫NG ▫N/A	▫Good ▫NG ▫N/A
3	Alarm system	Verify that TECDIS is connected to a separate alarm system.	▫Good ▫NG ▫N/A	▫Good ▫NG ▫N/A
4	System status	Check that no alarms/warnings are pending in alarm window.	▫Good ▫NG ▫N/A	▫Good ▫NG ▫N/A
5	Chart database	1. Select setup menu, chart utilities, chart licenses 2. Verify that licenses are valid for intended voyage 3. Click C-Map chart update 4. Verify that charts are updated in update log	▫Good ▫NG ▫N/A	▫Good ▫NG ▫N/A
Sea Trial Test (15 minutes)				
6	AIS and ARPA Targets (If present)	1) Activate ARPA on radar and select a target. 2) Click the symbol button of [ARPA Targets]. 3) Click the symbol button of [AIS Targets]. AIS and ARPA Targets are displayed on the top of charts.	▫Good ▫NG ▫N/A	▫Good ▫NG ▫N/A
7	Conning display (If present)	Correct indication is shown at the each configured window on the Conning Display. Verify that selected sensors used by heading, position is correctly indicated.	▫Good ▫NG ▫N/A	▫Good ▫NG ▫N/A
8	Route Monitoring	Before start TEST, routes must be created or transferred from other TECDIS: 1. Press the [Plan] key, icon with number 1 indicated is active. This means primary route will be selected. Choose a route with boathook icon. 2. Press [YES] icon to activate route. 3. Route is then shown on displayed charts. 4. To display secondary route choose icon with button 2 indicated. Repeat procedure as for primary route. 5. To exchange primary and secondary route, press icon with 1⇔2 indicated. 6. Observe that correct warnings is activated as appropriate. 7. Click alarm icon for display of alarms and warnings on route. 8. Test that activating track steering is successful.	▫Good ▫NG ▫N/A	▫Good ▫NG ▫N/A
9	Radar overlay (If present)	Check that radar overlay from radar is displayed on display after pressing radar overlay icon.	▫Good ▫NG ▫N/A	▫Good ▫NG ▫N/A

10	Aids to navigation	Verify that TECDIS handle different functions like; 1. Disconnect position sensors and observe dead reckoning performance, verify that alarm is given: pos sensor ½ lost. 2. Activate track dialog and set past tracks visible by clicking on “show” icon. 3. Enter manual fix, by activating “bearing” icon. Click on center button on mouse when mouse is in position of visual object. Use observed gyro bearing to make a red line in chart towards estimated position. Repeat procedure to make two lines resulting in a cross bearing. 4. Update charts, enter chart utilities menu, choose C-Map charts update. Use semi-auto update. Create a update request file on memory stick. Send file to updates@c-map.no and load received file into TECDIS. Update loaded successfully shall be presented when update Is completed. 5. Activate a route in route menu. To alter at route underway, click on “Edit” icon in route menu. Modify route and click on “OK” icon. Route is now altered. When at track steering mode, 3 waypoints are not allowed to alter, last waypoint, next waypoint and waypoint after next. 6. Manual adjustment for position is available in setup menu, click on “nav. position offset” icon and a dialog box appear in top right corner of map. Enter offset values as appropriate.	▫Good ▫NG ▫N/A	▫Good ▫NG ▫N/A

10.2.2 Autopilot Test

▫ Anschütz NP5000 Autopilot
▫ EMRI SEM-300 / FURUNO FAP-3000 Autopilot

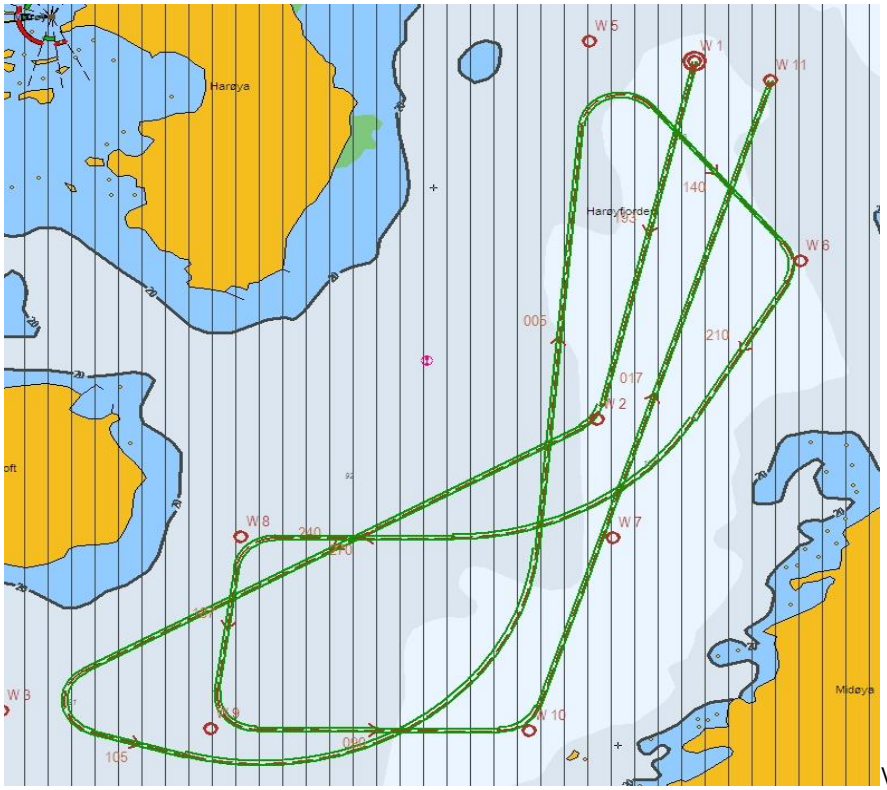
No.	Function	Requirement	Results
Harbor Acceptance Test (15 minutes)			
1	External data	Correct number is shown at each box of below. “Heading”, “Speed”	▫Good ▫NG ▫N/A
2	Heading Control	1. [HEADING CONTROL] is activated when steering mode switch is set to “auto”. Present heading is displayed in heading display and in preset heading display. Present heading is activated as set heading. 2. Verify parameter settings for rudder, yawing, counter rudder, rudder limit, ROT limit and radius value. Verify mode of heading change, radius or R.O.T. mode by observing key lamp. 3. Alter set course by either turn knob or push set button to acknowledge or push and turn knob. Observe correct rudder response. 4. Observe rudder movement. 5. Observe that max rudder limit is not exceeded.	▫Good ▫NG ▫N/A
3	Steering Control	1. Rudder moves to 10 degrees PORT when SET HEADING is set by 20 degrees below Gyro heading. 2. Confirm the actual rudder angle by rudder angle indicator.	▫Good ▫NG ▫N/A
4	Function	1. Change operating mode from hand to heading control at Track Control TECDIS, verify that correct mode is indicated on TECDIS and conning monitor also. 2. Shift from heading control to manual mode by switching steering mode selector. Verify that change to manual mode is possible from all modes with a single operator action.	▫Good ▫NG ▫N/A
5	Function	1. Change set course 50˚ to starboard, off-heading alarm not to be activated during setting of new course. Alarm is de-activated for a time period that is a function of present course and new desired course.	▫Good ▫NG ▫N/A
6	Function	Test override tiller in modes: hand, heading control and track control. Autopilot to go to hand	▫Good ▫NG ▫N/A
Sea trial test (240 minutes)			
1	Heading Control	Response and stability of "Heading Control” steering. 1,Observed overshooting should max 2˚ on 10˚ course change and max 5˚ on 60˚ course change. 2,Repeat another side course change with same value. Starboard 10˚ turn with NAV FULL speed (If available). Port 10˚ turn with NAV FULL speed (If available). Starboard 60˚ turn with NAV FULL speed. Port 60˚ turn with NAV FULL speed. Tests to be repeated with half speed ahead.	▫Good ▫NG ▫N/A
2	EMC	Testing of interference of radio transmissions while in heading control, observe system while: 1. Transmitting a call with FS-2570 2. Transmitting a call with VHF’s 3. Transmitting a message with Felcom-15 1&2 4. Transmitting a call with Felcom-70	▫Good ▫NG ▫N/A
2	Track Control Steering	Steering function test should be performed as follow in the next lists "**Track Control Test** " and **“Fail to Safe Properties”**	▫Good ▫NG ▫N/A

10.2.3 Track Control System Test

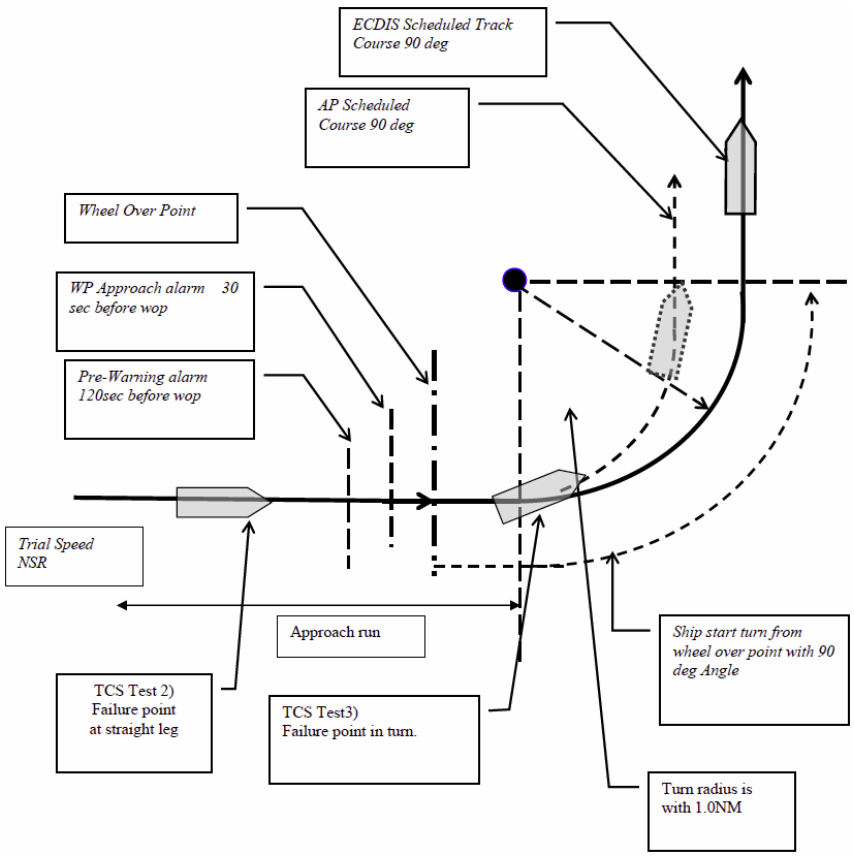
Items to be checked during sea trial

No.	Item	Content	Result/ Remarks
1		The following units have to be tested prior to the Track Control test: • ECDIS • AUTOPILOT • STEERING GEAR	
2	Route	Create a test route for Track Control in keeping with the vessel maneuverability as per shown example attached (or import by file)	
3	Route monitoring	1. Enter route menu, check that icon “1” is activated (primary route). Use boathook to select route from previous test item. Click yes when asked to activate route. 2. Check that route monitoring parameters are shown in right menu (XTE, next waypoint info etc.)	
4	Track keeping (NP5500 only)	1. Check that ship follows the test route selected on ECDIS. *Recommend test speed is normal sea speed. Observe the ship behavior through several turns, and either a) increase the pivotpoint value between turns if the ship turns to late b) decrease the pivotpoint value between turns if the ship turns to early	
5	Track keeping	1. Check that ship follows the test route selected on ECDIS. *Recommend test speed is normal sea speed 2. Check performance according item 1 with speed reduction applied in one turn. 3. Check performance according item 1 with inducing current effect by using bow thruster during turn.	
6	Alarms	1. Set WP pre-warning and WP approach time on the ECDIS as per drawing below. Verify that WP approach Alarm is generated when the ship approaches the WP. 2. Verify that separate Alarm system activates back-up navigator alarm when WP pre-warning and WP alarm on ECDIS is not acknowledged. 3. Set alarm for gyro mismatch to minimum in TECDIS Setup program. Wait for alarm to be raised. 4. Activate route and use “Heading Control” mode on autopilot. Steer outside channel limit to generate XTE alarm. 5. Set “Heading off” alarm low and use bow thruster to provoke a heading drift. Verify that alarm is raised. 6. Set alarm difference limit for position and heading sensors, and verify that no alarms are raised.	

Example of route for Track Control testing



WPT 3: 135 deg turn port, WPT 5: 135 deg turn starboard (both with minimum radius*)
WPT 4: 60 deg turn port, WPT 7: 60 deg turn starboard (both with 2 NM radius)
* Minimum radius to be settled after calculations from yard.



10.2.4 Fail to Safe Properties

#	Fail	Track Control (TCS)	Test	Result
1	Position sensor antennas to be blinded off.	When either of position sensor acquisition stops, TCS emits alert but continues to function utilizing acquired position from other position sensor, LOG, and GYRO. When both position sensor acquisition stops, TCS emits alert but begins navigation utilizing estimated position made available by LOG and GYRO. Then within 10min automatically switches to heading mode and manual maneuver will be in effect.	Remove No.1 position sensor antenna Remove No.2 position sensor antenna	
2	Disconnect position sensor on a straight leg.	Same as above	Remove No.1/2 position sensor	
3	Disconnect position sensor during max radius turn.	Alert will be emitted only from ECDIS which places no influence on TCS function.	Remove position sensor 1 output connector during max radius turn.	
4	Turn Heading Control System rudder limit to min value during min radius turn.	Not available.	Adjustment of rudder limit is not available.	
5	Disconnect serial link to heading controller during straight leg.	Emits alert and stops TCS function simultaneously. It automatically switches to heading mode.	Remove Track Control connection from ECDIS while sailing straight ahead.	
6	Disconnect serial link to heading controller during turn.	Emits alert and stops TCS function simultaneously. Automatically switches to heading mode after turning to the pre-determined maximum degree.	Remove Track Control connection from ECDIS while sailing straight ahead.	
7	Disconnect speed log during straight leg or turn.	Although it emits an alert, input of two position sensor data maintains the normal function.	Remove LOG input outputted to ECDIS while turning.	
8	Simulate failure in ECDIS.	Same as item 5 or 6.	Turn off ECDIS	
9	Simulate failure in conning display.	Not influential	Turn off Conning Display	
10	Disconnect rudder feedback.	Emits an alert. If the deviation between order rudder angle and actual rudder angle is 5° or more, an alert is emitted and freezes the actual rudder angle at this time.	Remove rudder feedback input outputted to Alarm System while turning.[8]	
11	Simulate failure in Autopilot	Emits alert and stops TCS function. Rudder angle is frozen at this time.	Remove power to autopilot while turning.	
12	Simulate failure in No.1 gyro.	Heading sensor difference monitoring will be inactive.	Switches automatically from No.1 to No.2	
13	Check that second gyro is auto- applied in case of failure in the active gyro.	Heading sensor difference monitoring will be inactive.		

[8] This test is dangerous!

10.2.5 Installation signature form

Checklists prior to completion of TECDIS TCS and TECDIS AW installation are completed as specified

Vessel Name / ID:	Date of installation:
Name of technician:	
Checklist performed(Sign):	

The checklists in this section (10.2) shall be filled in and signed for all TECDIS installations where Track Control functionality is present (TECDIS TCS / TECDIS AW), to verify proper installation of the ECDIS system onboard.

10.3 Additional checklist prior to completion of TECDIS AW installation

No.	Item	Content	Result	Remarks
1	Conning	Verify that when one of the ECDIS processors lose sensor data on one serial line, display of sensor data (relevant according to failed serial line) on conning monitor is not affected.		
2	General	Verify that installation is done according to block diagram for TECDIS AW system.		
3	General	Verify that installation is done according to functional description given for TECDIS AW system.		
4	General	Verify that required conning info according to NAUT AW requirements is displayed correctly.		
5	Gyro	Verify that requirements set forth in section 1.7 are fulfilled.		

10.3.1 Installation signature form

Additional checklist prior to completion of TECDIS AW installation completed

Vessel Name / ID:	Date of installation:
Name of technician:	
Checklist performed(Sign):	

The checklist in this section shall be filled in and signed for all TECDIS AW installations, to verify proper installation of the ECDIS system onboard.

10.4Checklist for NAUT-OSV retrofit commissioning.

No	Item	Content	Result	
1.1	Sensor connection	Verify that TECDIS is connected to two separate position sensors.		
1.2	Sensor connection	Verify that TECDIS is connected to two separate heading sensors (AIS is not allowed as heading sensor).		
1.3	Sensor connection	Verify that TECDIS is connected to the AIS. *Output from TECDIS to AIS is not mandatory, but often used.*	Input ▫	Output ▫
1.4	Sensor connection	Verify that all other NMEA sensor connections to the replaced unit have been transferred to the replacement unit. *Any changes must be commented below (see no 7).*		
2	Track Control	Verify that the TECDIS License for the new eToken has **Track Control activated**. If not present, please request it from support@telko.no.		
3	Radar Overlay	Verify that the TECDIS License for the new eToken has **Radar Overlay activated**. If not present, please request it from support@telko.no.		
4.1	Conning	Confirm that the **NautOsv1.exe** file from the replaced unit has been transferred to the replacement unit. The NautOsv1.exe file is unique to each vessel, and the replacement unit may not have the correct file pre-installed.		
4.2	Conning	Confirm that the **conning dongle** from the replaced unit has been transferred to the replacement unit. *if no dongle was connected to the replaced unit, this step is not necessary.		
4.3	Conning	Verify that all sensor data is present on the conning display.		
5	Monitor	Confirm that the ECDIS monitor is present in the current **TECDIS MED-B** certificate. This certificate is available at telko.no/support/TECDIS		
6.1	TSZ file	Confirm that the TECDIS Setup configuration has been transferred to the replacement unit via the **TSZ** file from the **Service Key** of the replaced unit.		
6.2	If TSZ file is not available	Confirm that all **NMEA Data** settings (both input and output) has been transferred to the replacement unit manually. *Any changes must be commented below (see no 7).*	Input ▫	Output ▫
6.3	If TSZ file is not available	Confirm that all **Specification** settings have been transferred to the replacement unit manually. *Any changes must be commented below (see no 7).*		

10.4.1 Installation signature form

Checklist for NAUT-OSV retrofit commissioning completed

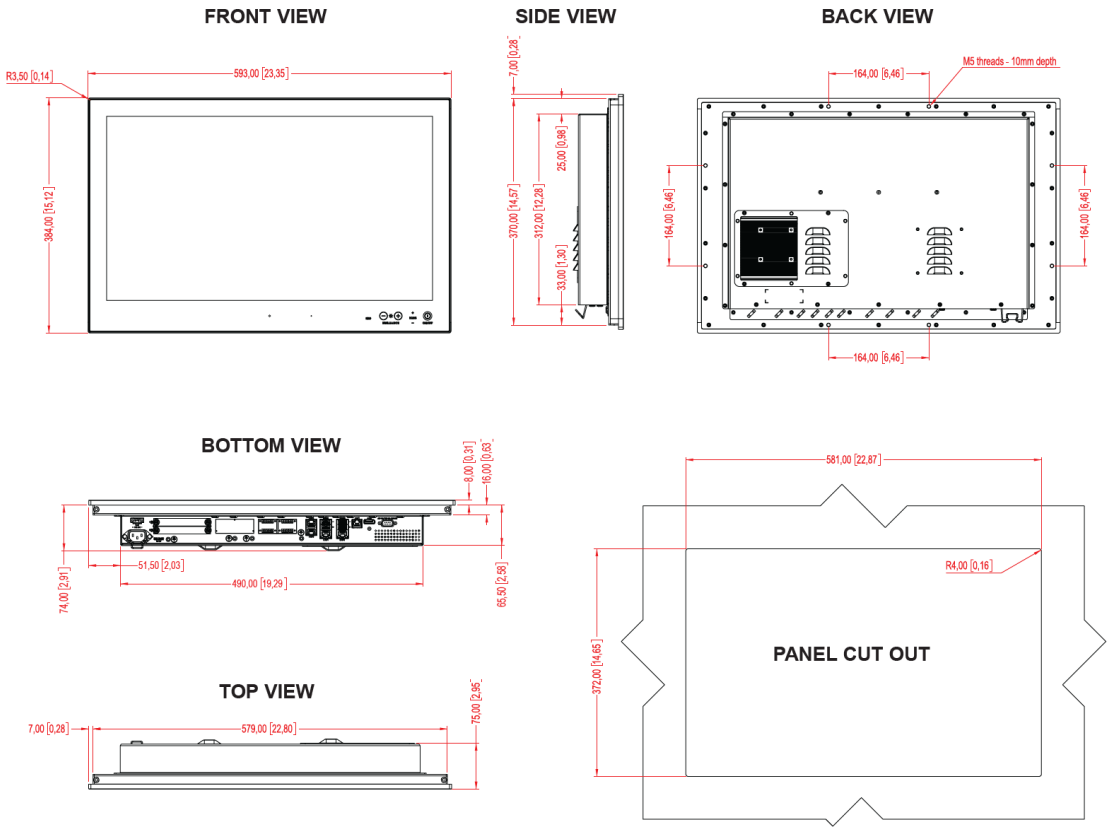
Vessel Name / ID:	Date of installation:
Name of technician:	
Checklist performed(Sign):	

The checklist in this section shall be filled in and signed for all TECDIS AW installations, to verify proper installation of the ECDIS system onboard.

10.5 Installation Notes

11 Technical drawings

11.1 Outline dimensions for HD 24T22 DEC

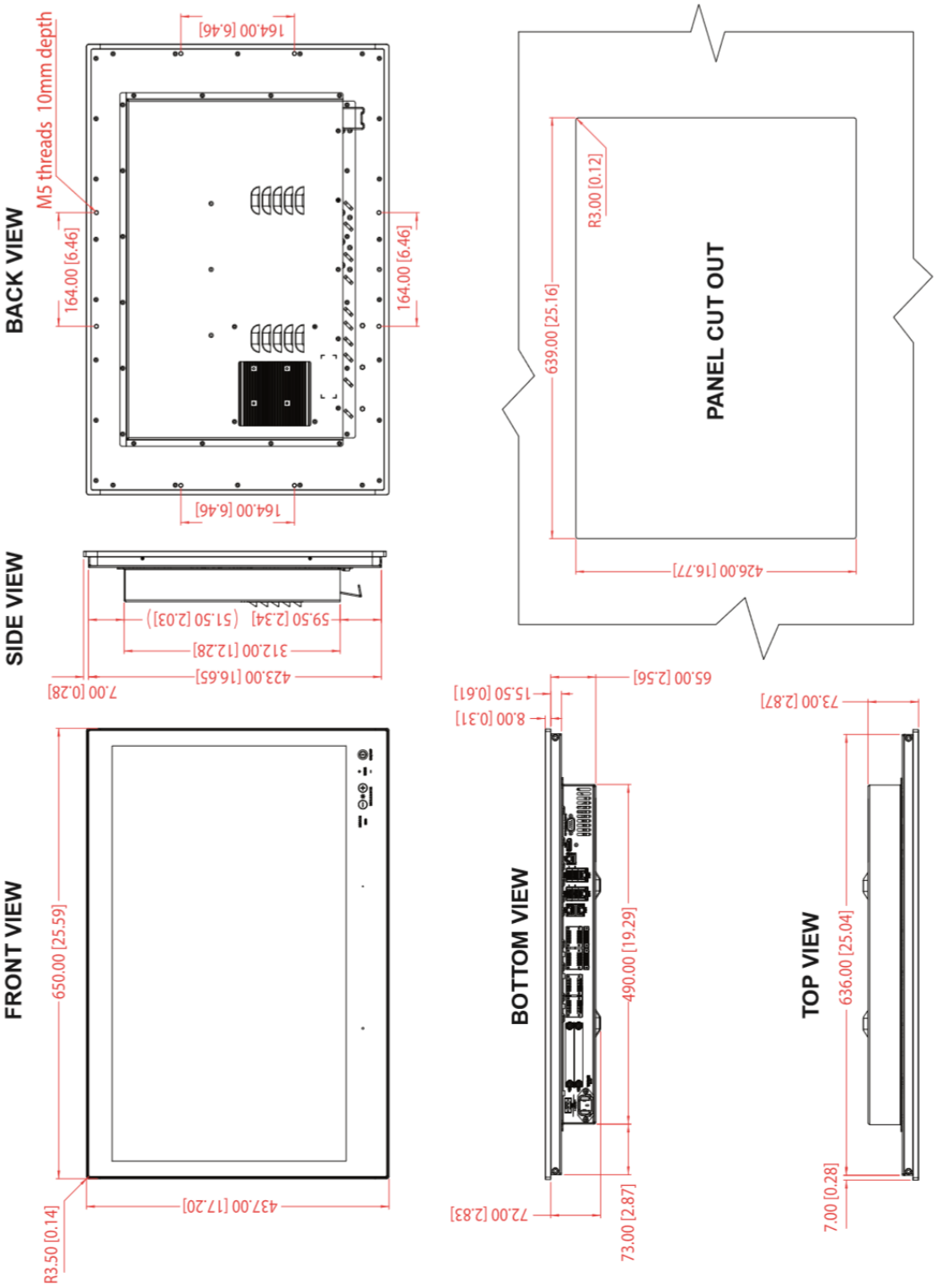


11.1.1 Flush mounting dimensions

Dimensions might be shown with or without decimals and indicated as mm [inches]. Tolerance on drawings is +/- 1mm. Dimensions for flush mounting, along with accurate measurements can be found on the Hatteland website: https://www.hattelandtechnology.com/view_product?id=307%21main_category%3DMarine+&+Offshore=#Downloads

11.2 Outline dimensions for HD 27T22 DEC-M53/ HD 27T22 EEC-M53

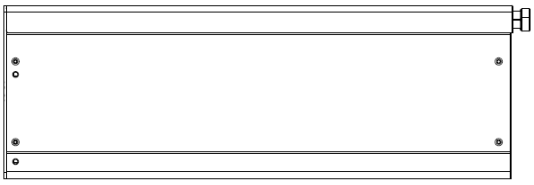
All figures in mm [inches].



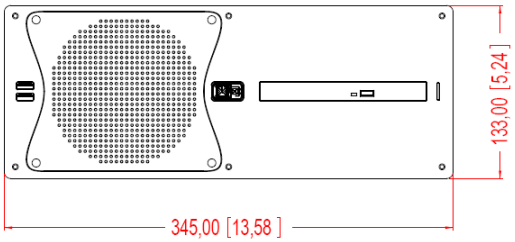
11.3 Outline dimensions for HT C02HJ TEC

All figures in mm [inches].

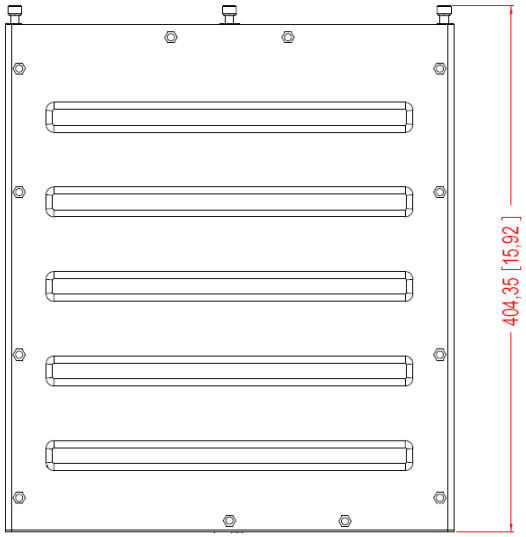
SIDE VIEW



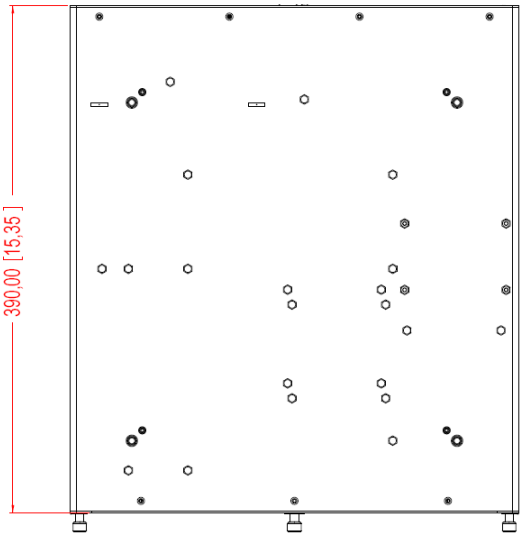
FRONT VIEW



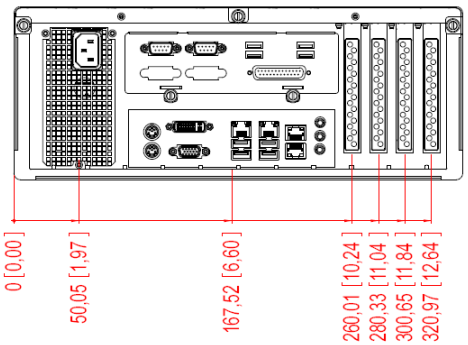
TOP VIEW



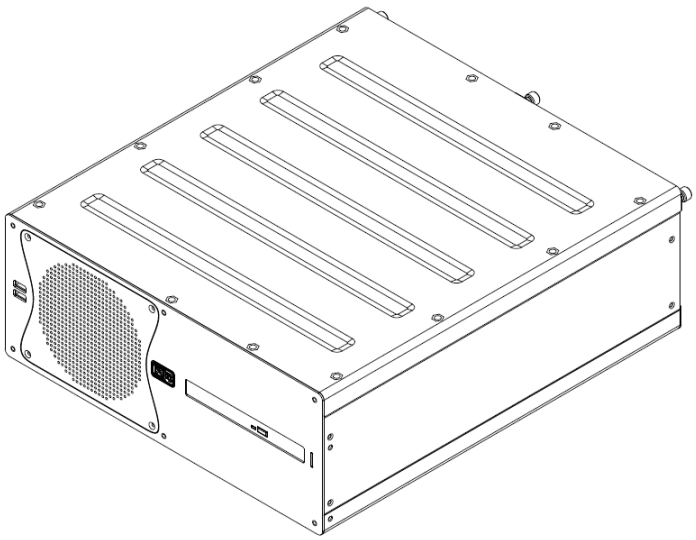
BOTTOM VIEW



BACK VIEW



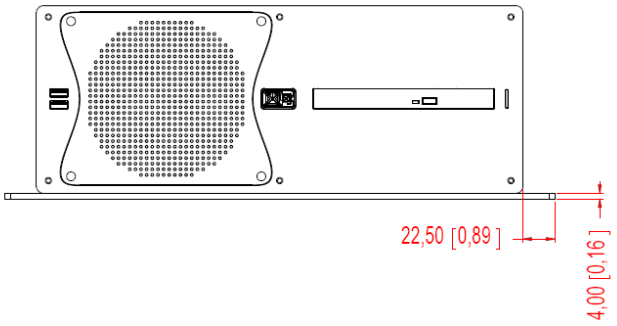
DIMETRIC VIEW



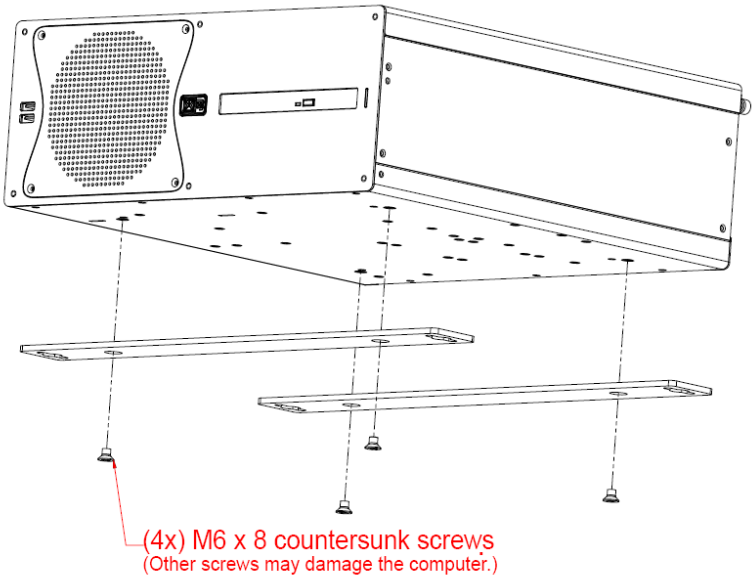
11.3.1 Mounting bracket for HT C02HJ TEC (included):

All figures in mm [inches].

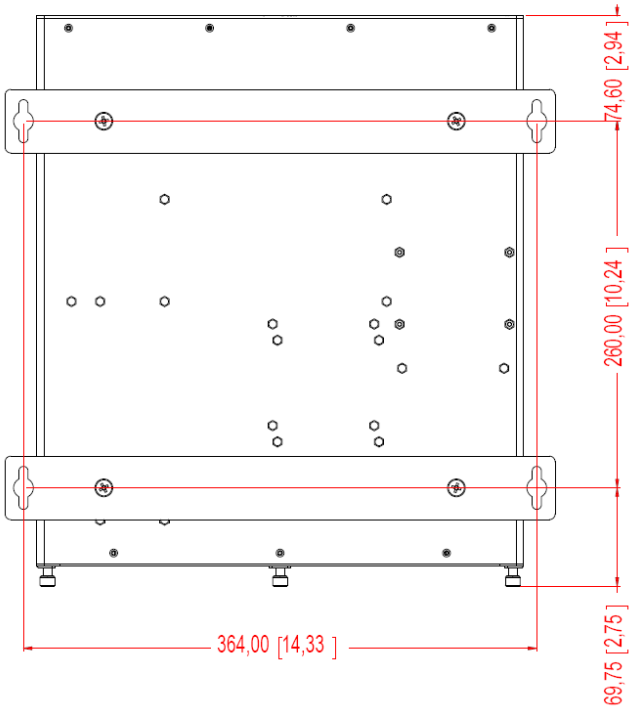
FRONT VIEW

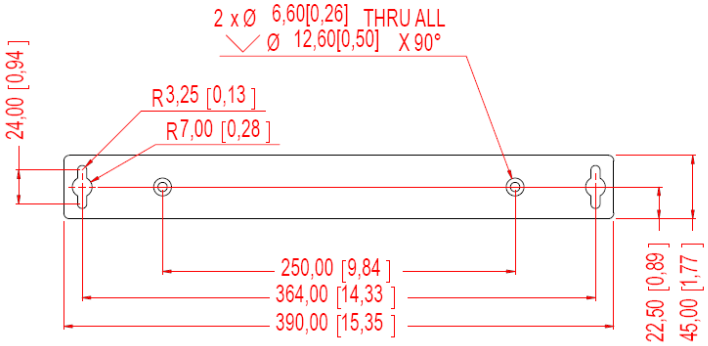


EXPLODED VIEW



BOTTOM VIEW



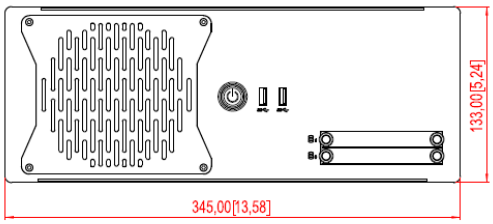


Other drawings, including 19” rack kit 4U (HT 00223 OPT-A1), are available from the following URL: **http://www.hatteland-display.com/computer_htc02hx.php**

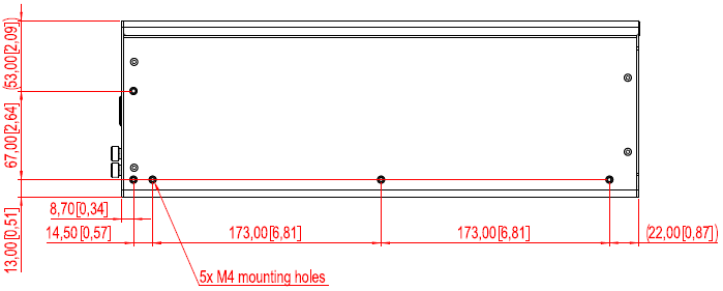
11.4 Outline dimensions for HTC03-i5-MP

All figures in mm [inches].

FRONT VIEW

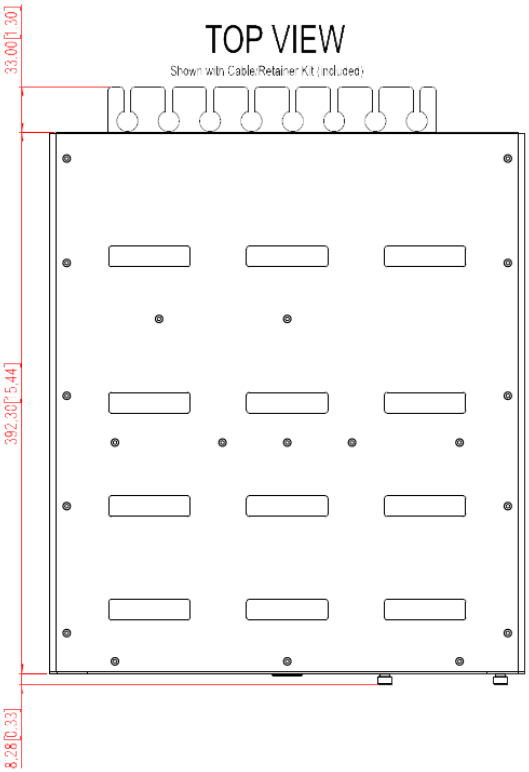


SIDE VIEW

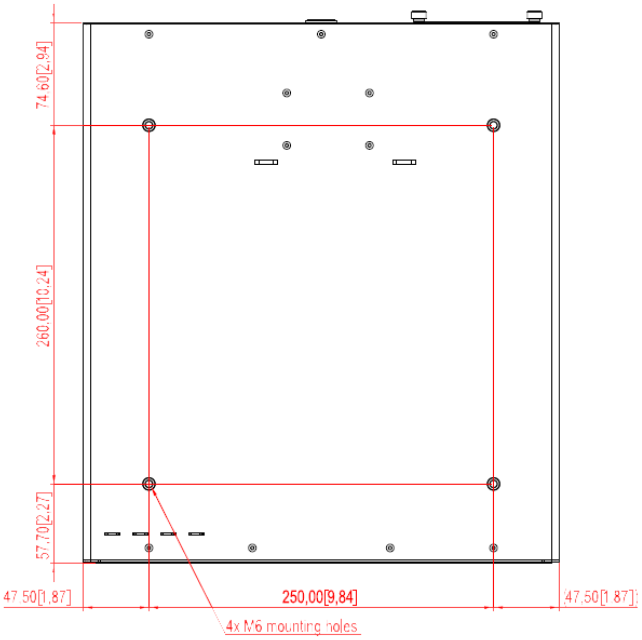


TOP VIEW

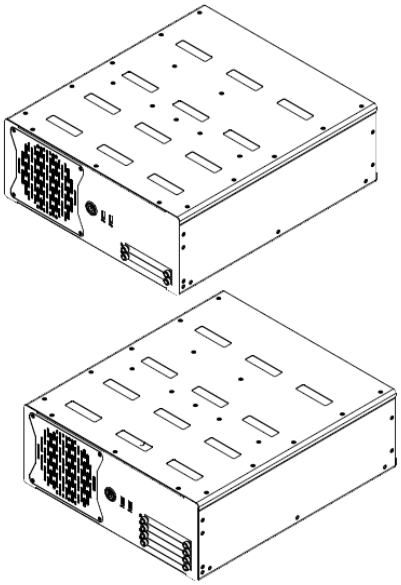
Shown with Cable/Retainer Kit (included)



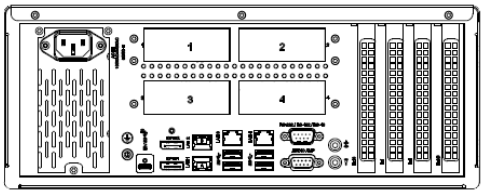
BOTTOM VIEW



DIMETRIC VIEWS

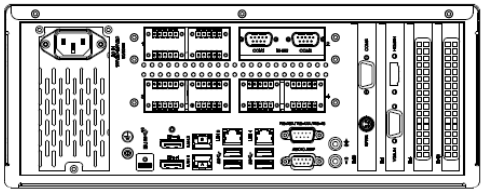


BACK VIEW



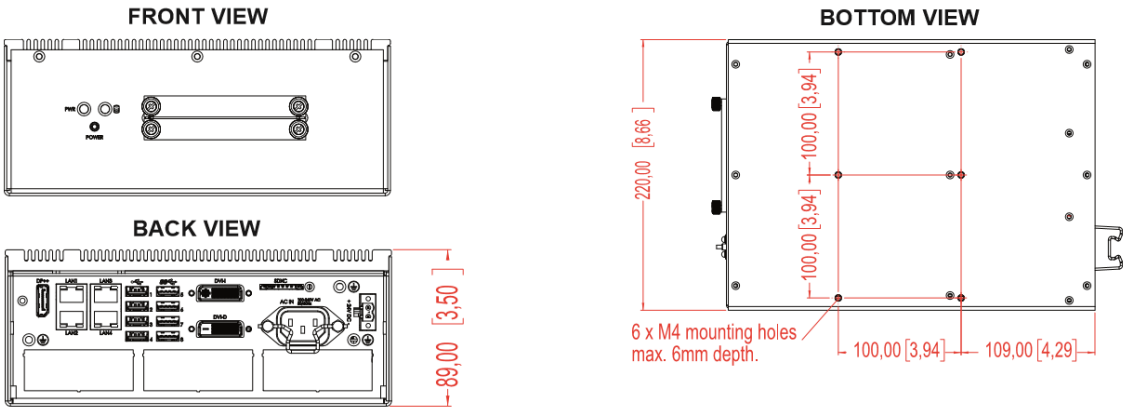
BACK VIEW

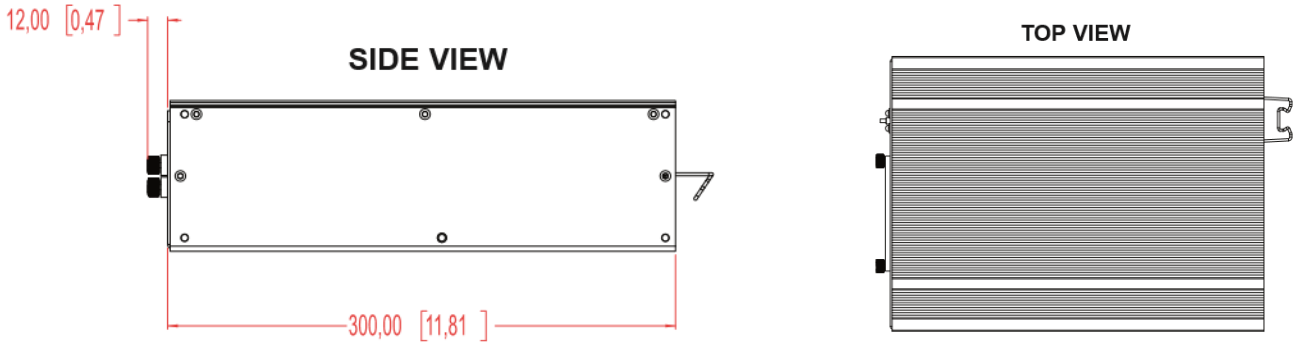
Shown with optional Modules and PCIe cards/options



11.5 Outline dimensions for HT B30GI TEC

All figures in mm [inches].

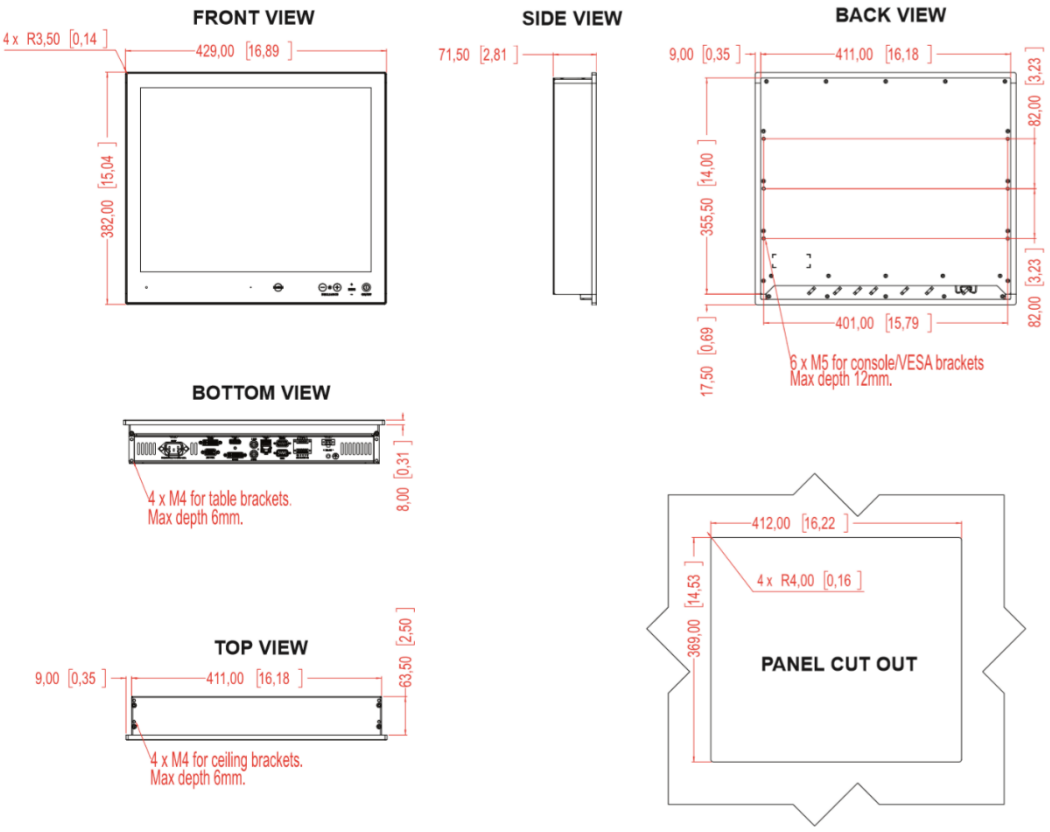




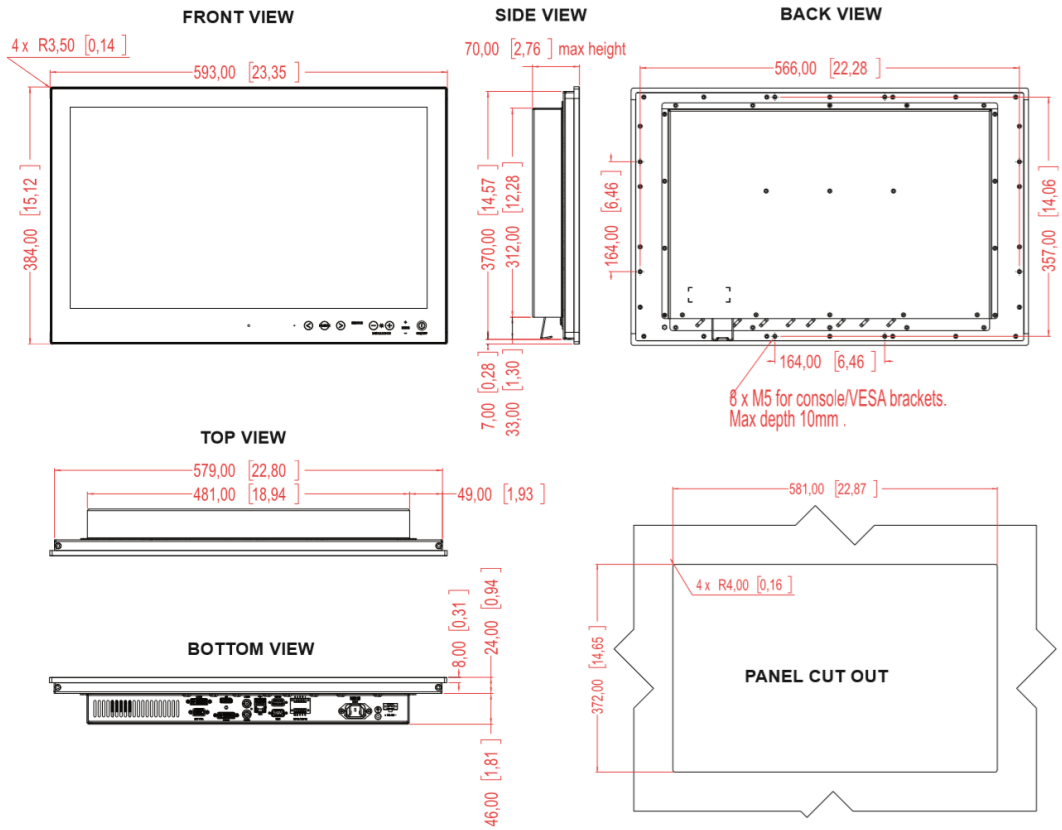
DIMETRIC VIEWS

11.6 Outline dimensions for Hatteland Display monitors

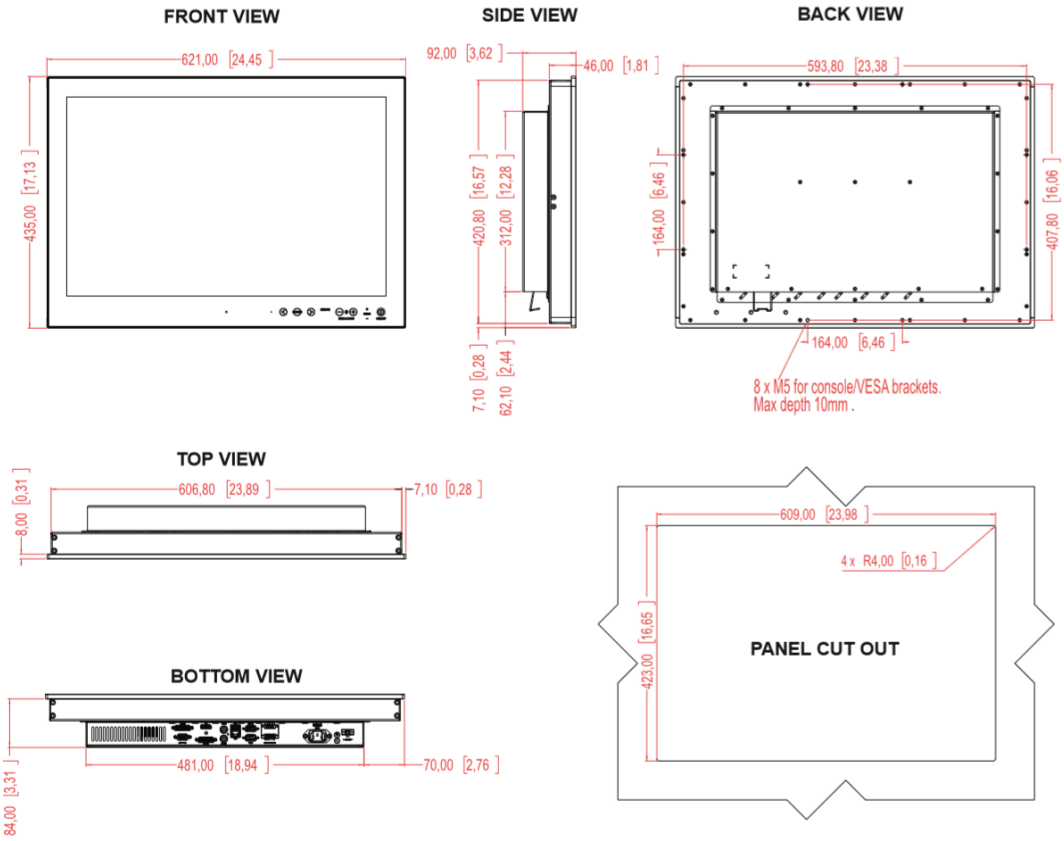
11.6.1 Outline dimensions for HD 19T22 TID / FUD



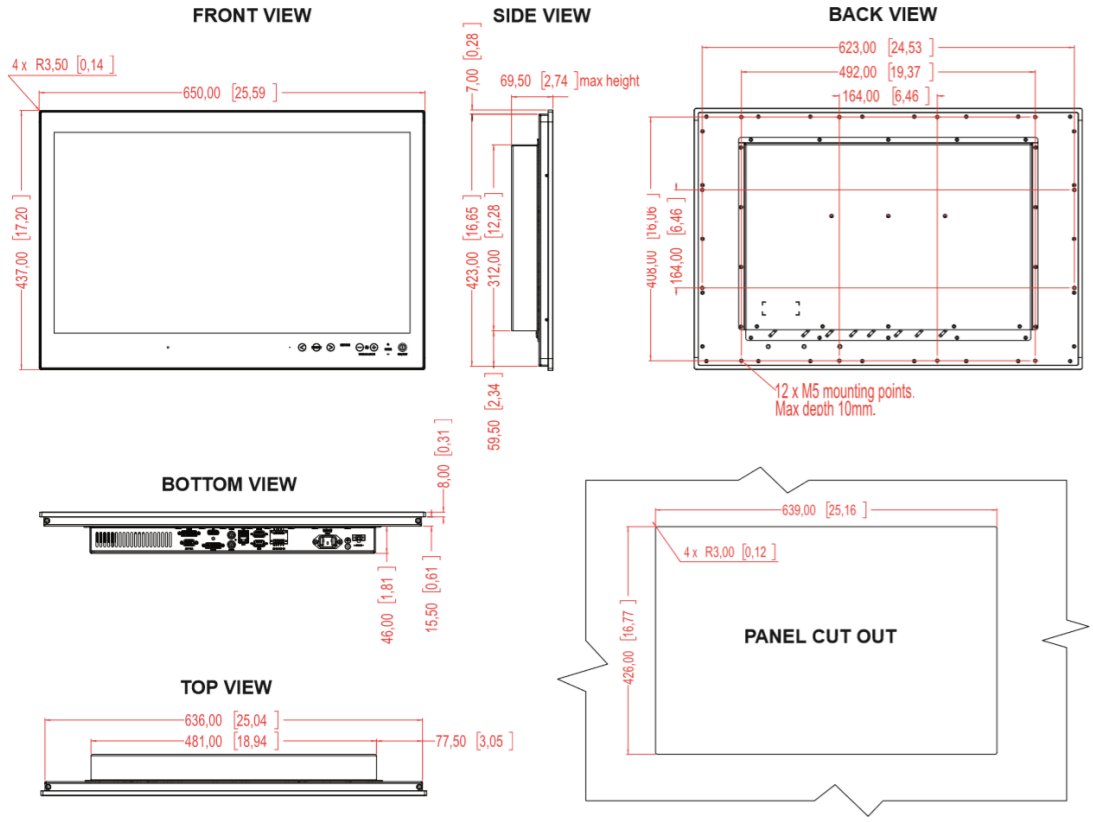
11.6.2 Outline dimensions for HD 24T22 TID / FUD



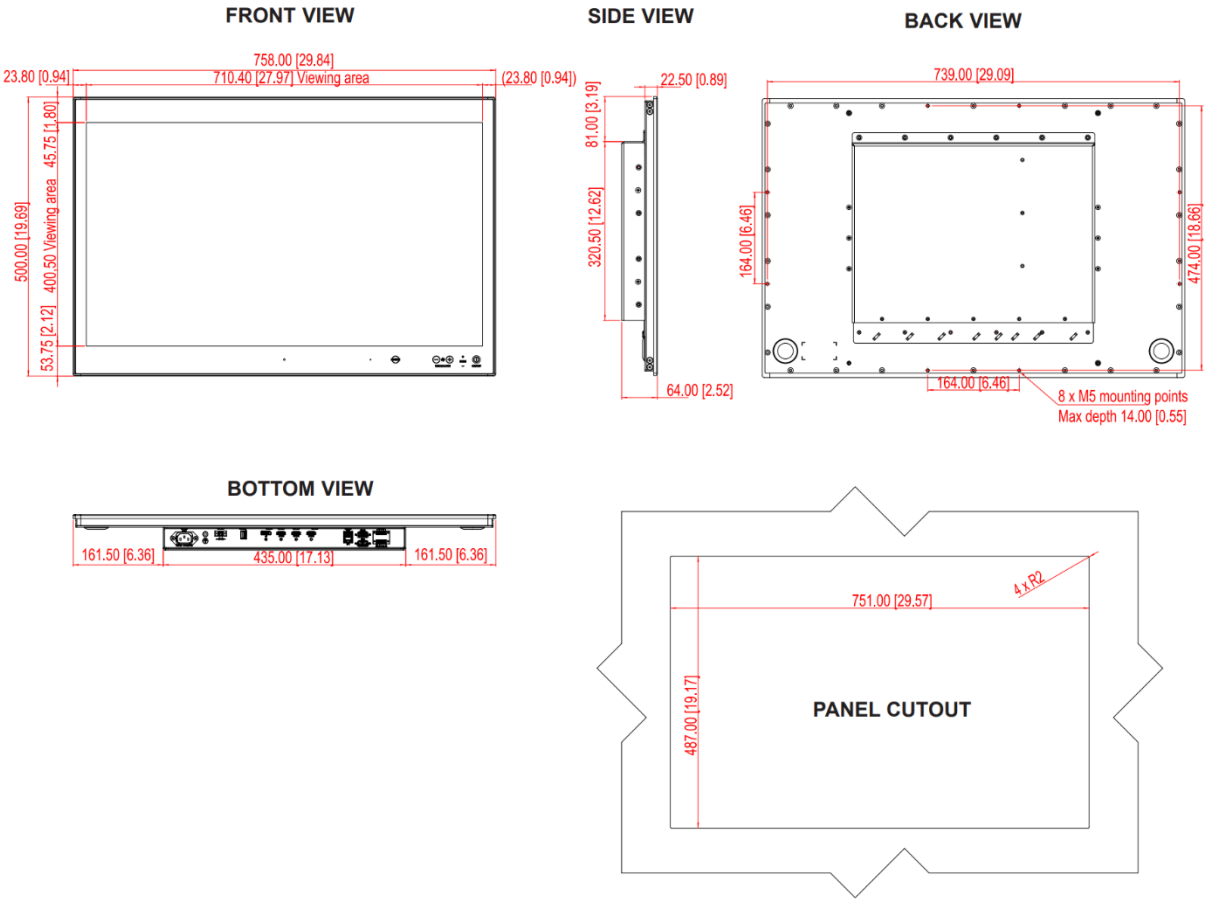
11.6.3 Outline dimensions for HD 26T22 TID / FUD



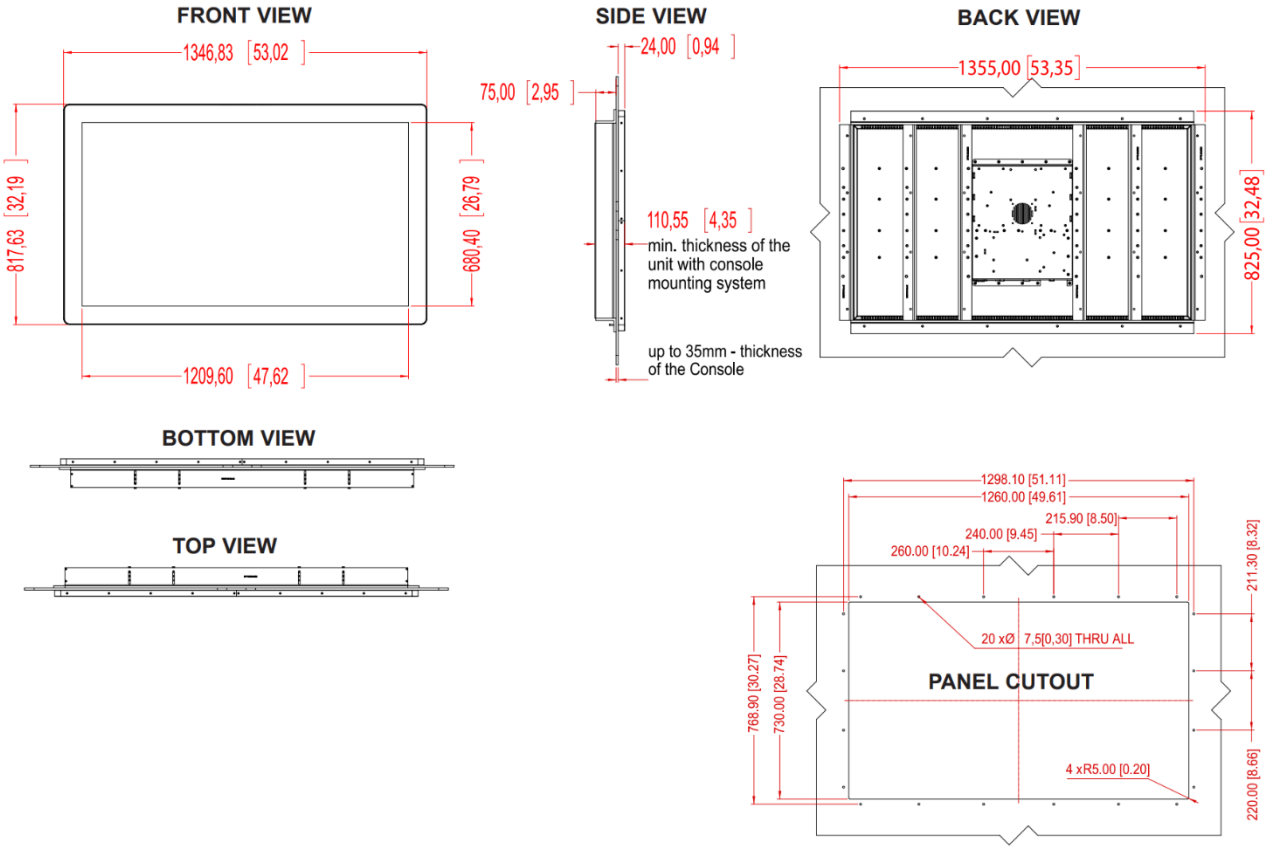
11.6.4 Outline dimensions for HD 27T22 TID / FUD



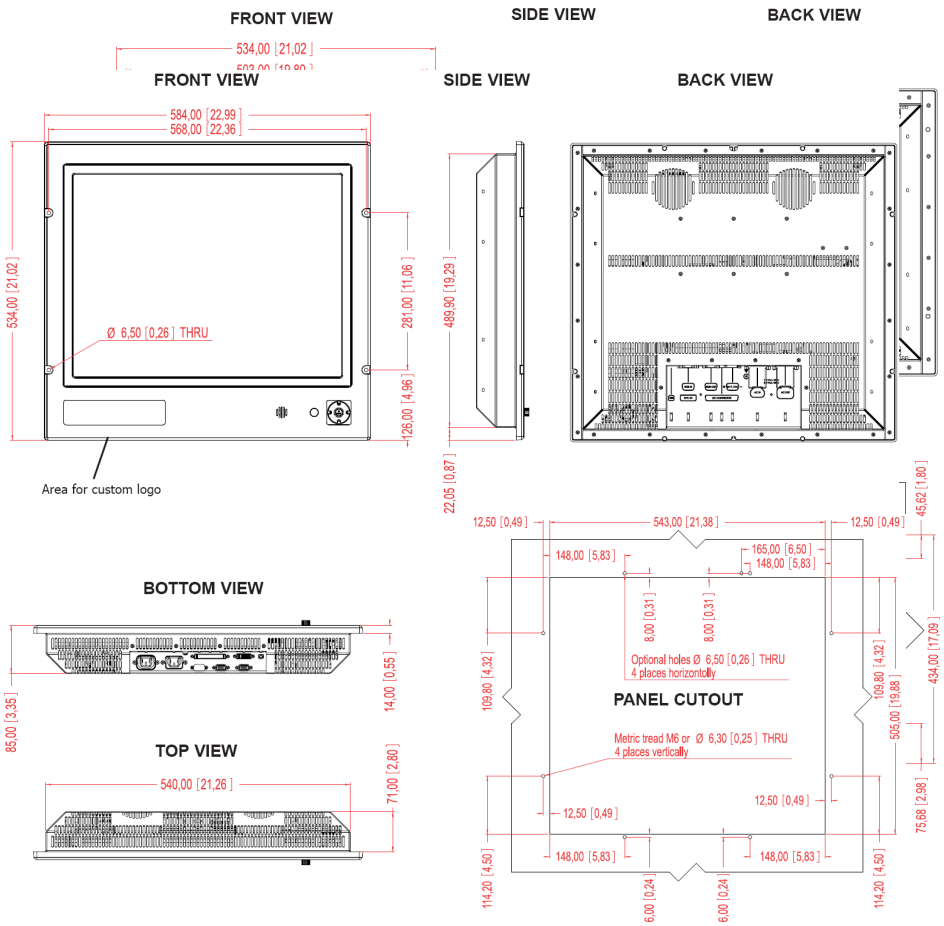
11.6.5 Outline dimensions for HD 32T22 TID / FUD



11.6.6 Outline dimensions for HD 55T22 TID / FUD

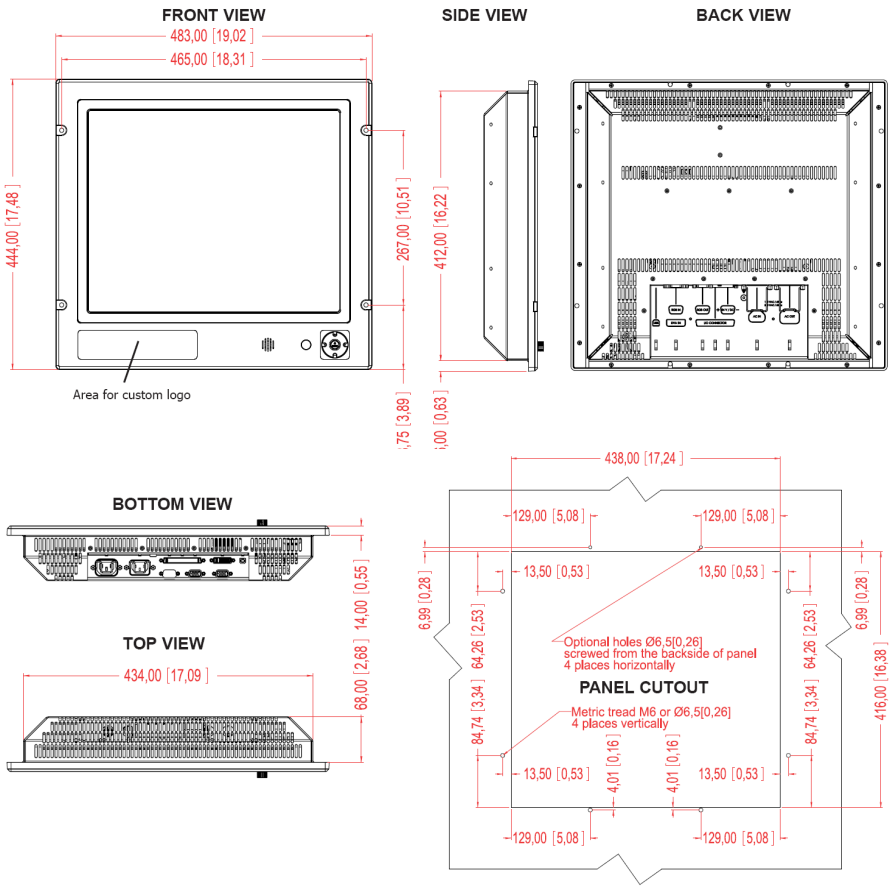


11.6.7 Outline dimensions for JH 20T17 MMD:



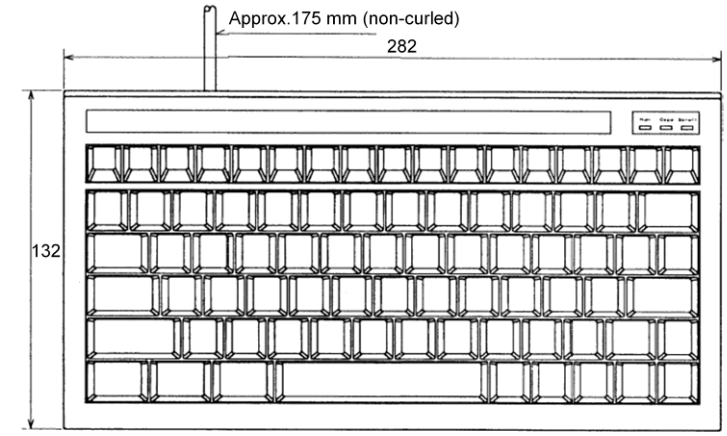
11.6.8 Outline dimensions for JH 19T14 MMD:

11.6.9 Outline dimensions for JH 23T14 MMD:



11.7 Outline dimensions for keyboards and trackballs

11.7.1 Outline dimensions for keyboard Cherry G84-4100:



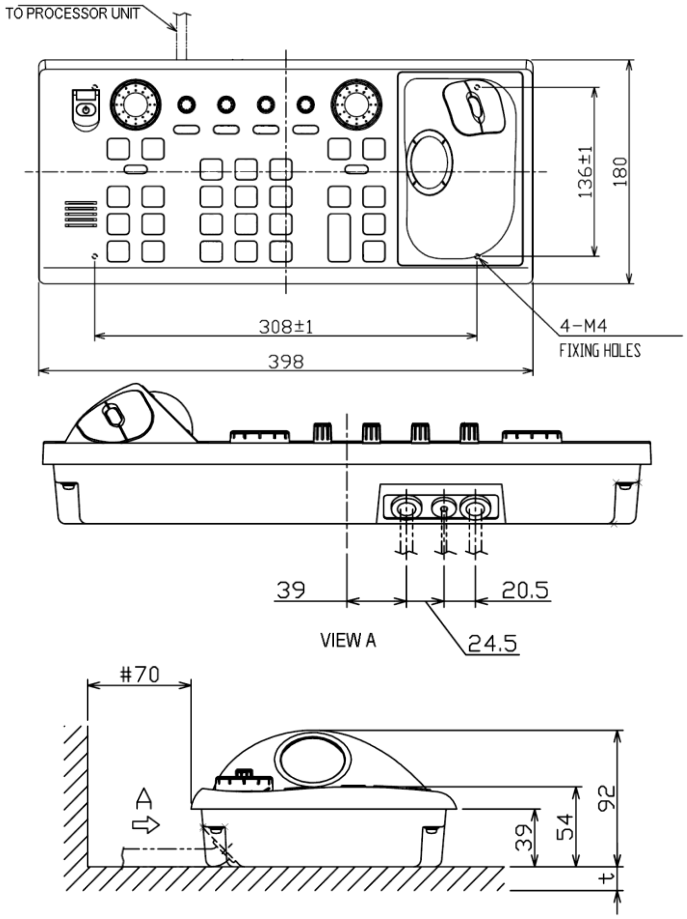
All dimensions in mm.

11.7.2 Outline dimensions for Logitech Trackman Marble ELK

Height	42mm
Width	87mm
Depth	165mm
Weight	198g

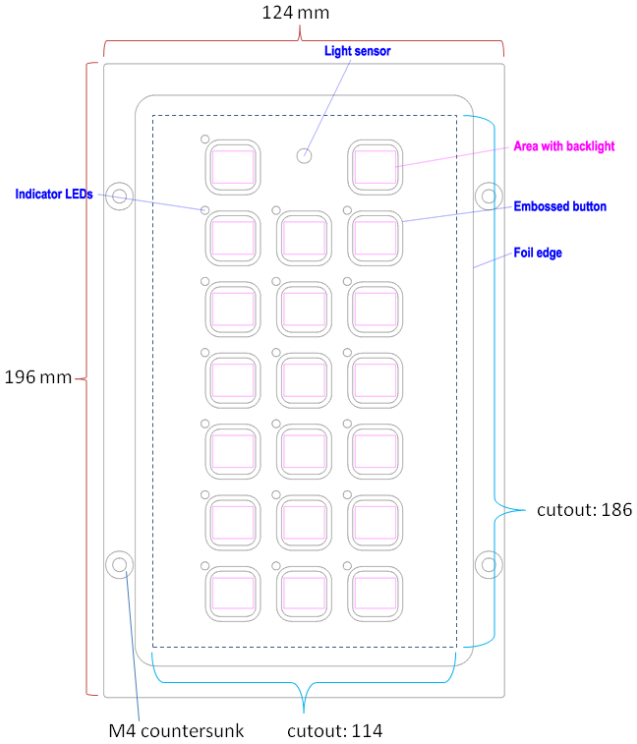
11.7.3 Outline dimensions for Mouse-Trak B-MPIND-XROHS / B-USBID-XROHS

11.7.4 Furuno RCU-018 Control Unit outline (Desktop mount)

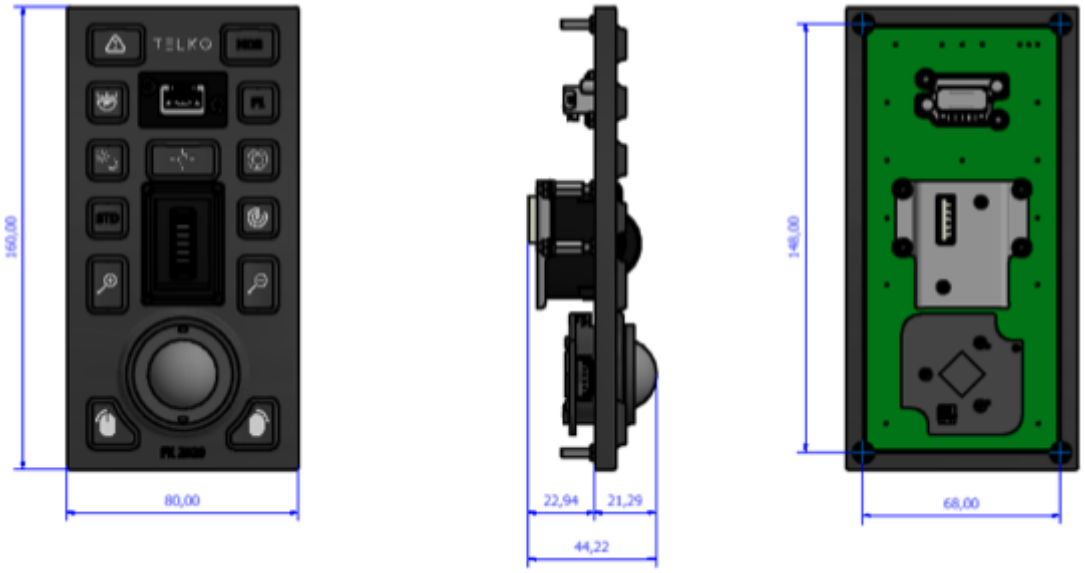


All figures in mm.

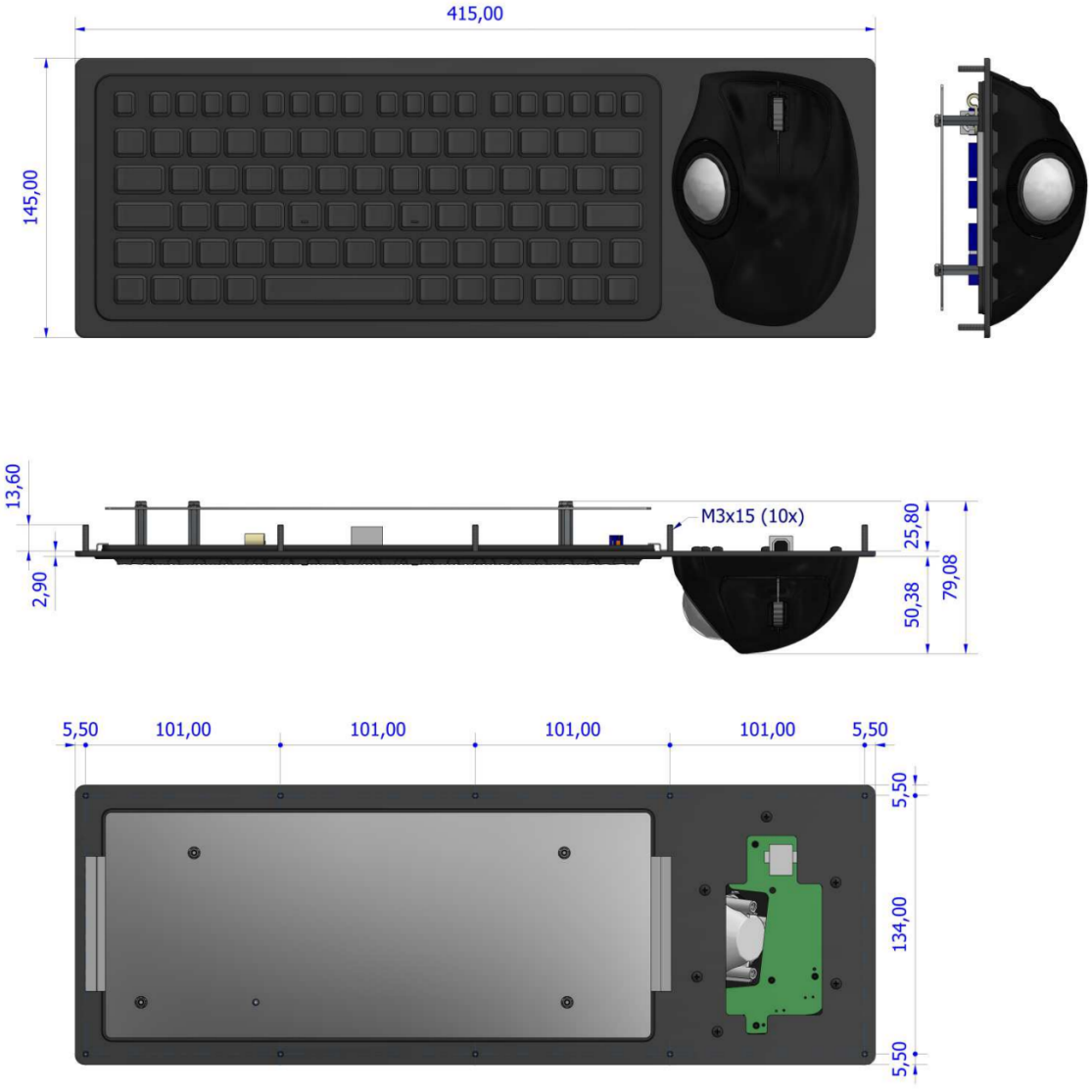
11.7.5 Outline dimensions for TECDIS Keypad:



11.7.6 Outline dimensions for Cursor controls TKB08025A (FK2020)



11.7.7 Outline dimensions for NSI RKTE85



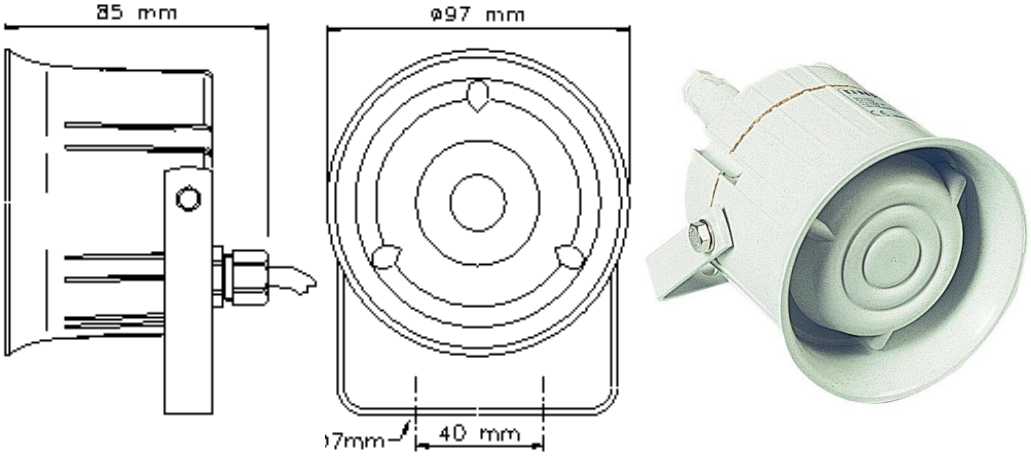
11.8 Outline dimensions for additional units

11.8.1 Outline dimensions for alarm interface TEA-01:

Length: 125 mm
Width: 55 mm
Heigth: 40 mm

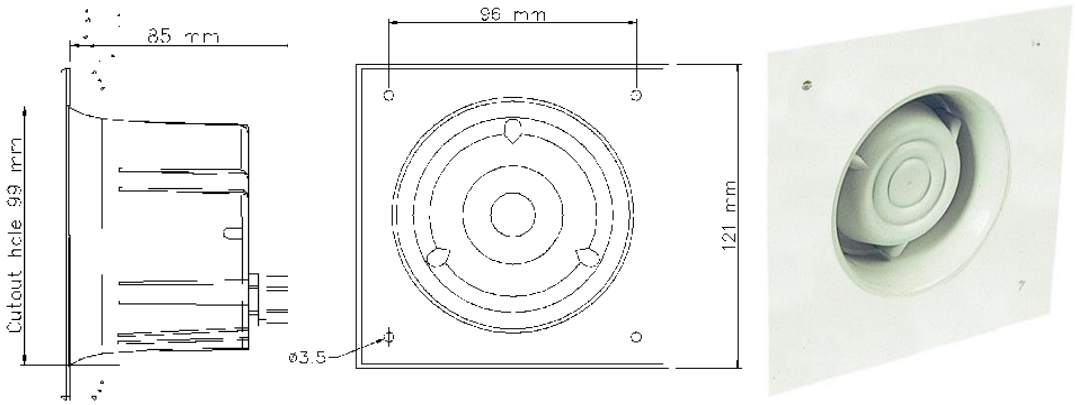
Cable length: 1400 mm

11.8.2 Outline dimensions for loudspeaker DNH HP6, with bracket mount:



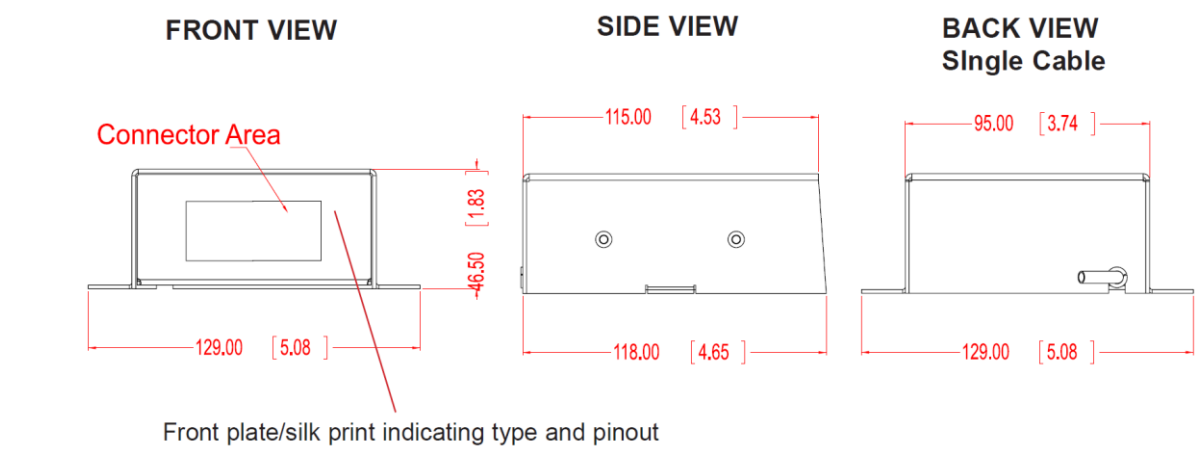
Loudspeaker cable length is 500 mm.

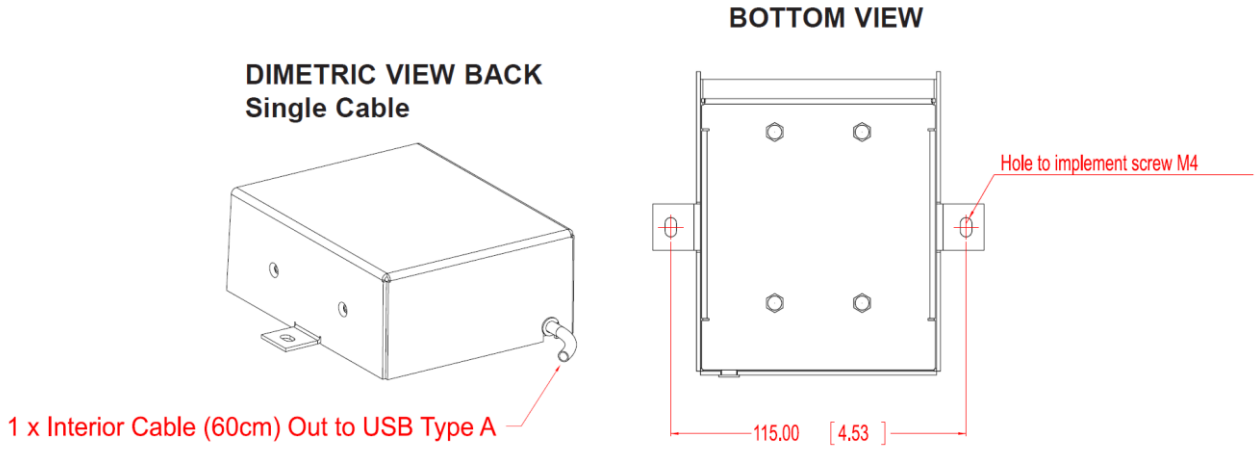
11.8.3 Outline dimensions for loudspeaker DNH HPS6, for flush mount:



Loudspeaker cable length is 500 mm.

11.8.4 Outline dimensions for Hatteland HT 00262 OPT-A1:





Revision History

Revision 1.0 (13.05.2005)
- Initial revision

Revision 1.1 (17.06.2005)
- Illustrations updated
- Wiring and signaling diagrams added
- Hardware installation for auxiliary components added
- Some updates to setup software description

Revision 1.2 (29.08.2005)
- Equipment list updated
- Compass safe distance instructions added

Revision 1.3 (05.01.2006)
- Updated chapter 3.4, size and sensors. New choices: “backward (gyro-180°)” and “Raise alarm if HDT1-HDT2 > 2.5°”
- Updated illustrations in chapter 4.1.

Revision 1.4 (04.08.2006)
- Chapter 3.2.1: Updated text. Port collision warning (case 69, 19.04.06)
- Chapter 3.4: Updated text and illustrations. New function: ship handle mode (case 53, 30.03.06)
- Chapter 4.1: New function: time zone selection (case 98, 22.05.06)

Revision 1.5 (22.10.2006)
- Updated illustrations for chapters 3.2, 3.4, 3.5 and 3.6
- Chapter 3.2.6: Added description of RCU-018 ctrl field.
- New Chapter 3.7 (Track Control)
- Compass Safe Distance table on page 1 updated
- Equipment Lists on page 5 updated
- Installation Overview illustration updated
- Specifications updated
- Updated mounting section
- Added mounting Chapter 1.3 Control Unit Furuno RCU-018
- Added Chapter 2.1, HT405P4 Wiring diagram
- Added Chapter 2.3, Processor connectors, HT405P4 TEL-A1
- Renumbered chapters following 2.1

Revision 1.6 (30.04.2007)
- Compass Safe Distances on page 1 updated
- Equipment List on page 5 updated
- Installation Overview illustration updated
- Specifications for HT 405P4 on page 7 updated
- Specifications for JH 23T02 on page 8 added
- Mounting dimensions for JH23T02 added to chapter 1.1 (page 17 and 18)
- New chapter: 1.6 Track Control: Anschütz NP 2025 PLUS

Revision 1.7 (17.10.2007)
- Section 2.5 Processor connectors, HT405P4 TEL-A1 updated with ferrite placement info.
- Section 3.2. NMEA data setup on page 41-44 updated with new illustration and information about status color coding.
- Section 3.5.1 Install, update or remove chart databases on page 49-50 updated with information about new function ‘Remove Licenses’.

Revision 1.8 (15.11.2007)
- General introduction to the installation manual updated with new configuration data file.
- Section 1.6 updated with minimum sensor and other connection requirements for Track Control functionality, and requirements to ensure “freeze rudder” functionality.
- Section 6: Added checklists for Track Control system and installation notes

Revision 1.9 (16.04.2008)
- Changed heading for section 6.2 to include TECDIS AW
- Added new section 6.3 for additional TECDIS AW requirements checklist
- Old section 6.3 and 6.4 are now section 6.4 and 6.5
- New section 1.7 for NAUT AW gyro sensor input requirements

Revision 2.0 (20.01.2009)

- Updated to reflect changes in new software version 4.7.1
- Deprecated hardware options removed from equipment list, mounting and wiring chapters.

Revision 2.1 (17.11.2009)

- General introduction updated to include internet switch and installation checklist requirements.
- Section 2.3 Processor connectors, HT 405P4 TEL-A1 updated to include requirements for internet switch.
- Chapter 6 “Checklists regarding installation” updated.

Revision 2.2 (07.06.2010)

- General introduction updated to reflect that connection to UPS is no longer mandatory.
- Equipment list, Installation overview, specifications and Chapter 1 - Mounting sections expanded and updated to include new computer HT C01 TEL-A599, new display HD 19T03 and new flush mount keyboard/trackball options from Keytouch.
- Chapter 2 – Wiring and signal distribution updated with instructions for HT C01 TEL-A599.
- Section 3.6.3 Dynamic Licensing expanded
- New section 5.3 Internet/VSAT connection troubleshooting added.
- New section 2.4 Other notes regarding connectors and wiring added.

Revision 2.3 (28.10.2010)

- Compass safe distances for new equipment added to page 1.
- General introduction updated with reference to important instructions in Chapter 1 and 2.
- Equipment list, Installation overview, specifications and Chapter 1 - Mounting sections expanded and updated to include new computers HT C01 TEL-A596 and HT C01 TEL-D596, new displays JH 23T14 MMD, Furuno MU-201CE and Furuno MU-231CE and new keyboard Cherry G84-4100.
- Chapter 2 – Wiring and signal distribution updated with instructions for new computers HT C01 TEL-A596 and HT C01 TEL-D596.
- Section 3.2: NMEA Data updated with information on “Ex. input”, “ALR/ACK” and “FLIR control”.

Revision 2.4 (18.05.2012)

- New chapter 1.7 Track Control: Furuno FAP 2000- and EMRI SEM 200 Autopilot
- Reformatting all heading numbers and new Table of Contents
- Chapter 3.2 NMEA Data setup is rewritten to comply to new version of TECDIS Setup.
- Chapter 3.3 Specification is updated to describe the changes related to the “*Alarm*”-field and changes introduced by the functionality of the TSZ-files.
- Chapter 6.1, Checklist, requirement added for sending in TZS-files and added need for the technician’s company name to be filled in.
- Chapter 6.2, Checklist updated with two new Autopilot types, Furuno and EMRI

Revision 2.5 (17.09.2012)

- Chapter 1.7: Instruction to set same low speed limit value in TECDIS and Autopilot added.
- Chapter 3: Several minor fixes

Revision 2.6 (23.08.2013)

- Compass safe distance, Equipment list, Installation overview, Specifications and Chapter 1 are expanded and updated to include new computer HD 24T21 MEC and new displays HD19T21, HD24T21, HD26T21, ISIC DuraMon 19LED and ISIC MD 26KM05
- Reformatted sub-headings and new Table of Contents
- Specifications: added specifications for Cherry G84-4100 keyboard
- Chapter 1: New subchapters for outline dimensions of monitors and computers
- Chapter 2.1-2.3: New subchapters for computer-specific wiring and signal distribution
- Chapter 2.6.1-2.6.3: New subchapters for computer-specific I/O-connections
- Chapter 3: Several minor fixes
- Chapter 3.5.5: Updated with new monitor calibration feedback messages.
- Chapter 4: Several minor fixes

Revision 2.7 (25.02.2014)

- Compass safe distance, Equipment list, Installation overview, Specifications and Chapter 1 are expanded and updated to include:
  - new computer ENIX-2077
  - new Audio Amplifier and rack kit for ENIX-2077
  - new TECDIS Keypad and Logitech Trackman Marble trackball.
  - new autopilot for TECDIS TCS: NP5500
- Chapter 1: New subchapters for outline dimensions of monitors and computers
- Chapter 1.8 & 1. 9: New subchapters for Autopilots NP5500
- Chapter 2.1-2.3: New subchapters for computer-specific wiring and signal distribution
- Chapter 2.6.1-2.6.3: New subchapters for computer-specific I/O-connections
- Chapter 3.3 Specification is updated with video switch installation procedures.
- Chapter 3.7: Added information for setup of new autopilots
- Chapter 6: Added monitor revision check and video switch ECDIS-label check
- Chapter 6: Added checkpoint for NP5500-specific test of TCS

Revision 2.8 (08.01.2015)

- Change of specification HT C01: 250 GB HDD replaced with 1 TB HDD
- Wiring diagrams corrected for TEA-01 Alarm interface connections
- Information for commissioning and sea trials for NP5500 Autopilot has been added
  - A wiring diagram for NP5500 with its SASS fall-back safety system is inserted in the installation overview section
  - NP5500-specific TCS parameters have been added to chapter 3

Revision 3.01 (17.04.2015)

- Changed layout and chapter numbering.
- Changed revision numbering
- Removed deprecated segments (dynamic licensing, chart installation)
- Added information on HT C02HJ TEC (specifications, compass safe distance, equipment list, installation overview, wiring)

Revision 3.03 (01.06.2018)

- Added information on HD 27T22 DEC-M53 (specifications, compass safe distance, equipment list, installation overview, wiring)
- Compass safe distance, Equipment list, Installation overview, Specifications and Chapter 1 are expanded and updated to include new monitors HD 19T22 TID/FUD, HD 24T22 TID/FUD, HD 26T22 TID/FUD and HD 27T22 TID/FUD.
- Removed obsolete monitors ISIC DuraMon 19LED, ISIC MD 26KM05, Furuno MU-201CE and Furuno MU-231CE
- Removed obsolete computer units HT C01 TEL-A596/D596 and ENIX-2077
- Removed accessories for HT C01 and ENIX-2077

Revision 3.04 (20.06.2018)

- Updated Wiring diagram for HT C02 HJ TEC
- Updated Specifications for HT C02 HJ TEC
- Added description of fall-back setup for conning – see new chapter

Revision 3.05 (24.01.2019)

- Added information on HT B30GI TEC 021-M10000 (specifications, compass safe distance, equipment list, installation overview, wiring)

Revision 3.06 (18.03.2021)

- Added information on HTC03-i5-MP C732836-2139C (specifications, compass safe distance, equipment list, installation overview, connectors).

Revision 3.07 (27.04.2021)

- Added technical drawings for HTC03-i5-MP C732836-2139C

Revision 3.08 (26.06.2021)

- Added information and technical drawings for HD 32T22, HD 43T22 and HD 55T22 monitors, NSI RKTE85B0001-W-MC1 keyboard/trackball and Cursor Controls TKB08025A (FK2020) trackball/function keypad.

Revision 3.09 (28.06.2021)

- Removed monitor HD 43T22.

Revision 3.10 (13.12.2023)

- Removed Panel PC HD 24T21 MEC/EEC/DEC.
- Added Panel PC HD 24T22 DEC.
- Added Hatteland HT 00262 OPT-A1.

Revision 3.11 (25.07.2024)

- Removed Autopilot NP5500.
- Added Autopilot EMRI SEM-300 / FURUNO FAP-3000
- Track control related sections updated.

Revision 3.12 (06.08.2024)

- Track control related sections updated.
- Track control General mounting regulations updated.
- Fail to Safe Properties updated.