Yacht Devices
User Manual

Text Display YDTD-20N
with
Instrument Display Firmware
version 1.00i

2016

Contents

Insets

Package Contents

Device	1 pc.
This Manual	1 pc.
Mounting template (in addition to inset)	1 pc.
Fixing bolts M3x25, stainless steel A2	4 pc.
MicroSD card	not supplied
Drop cable or adapter cable	not supplied

Introduction

This Manual contains information on how to install, configure and operate the YDTD-20N Text Display (hereinafter Display or Device) intended for use on pleasure crafts.

The Display is an informational display intended to show data from the boat's network. It does not contain any sensors, real time clock or other information sources. It can only display various network data depending on the firmware.

With Instrument Display Firmware, it can show the vessel's position, course and speed, wind and weather data, water depth, log and trip distance, engine revolutions, batteries voltage, etc. Our Display is a reasonable choice as an additional instrumental display, mounted in a cabin or near a chart table. You will not be able to configure wind or depth sensors from our Display, but you will get the same readings as from displays that cost four times more.

We plan to release additional firmware products which will allow engine monitoring via the display with extended engine information like oil temperature and fuel pressure, a product to monitor chargers and DC sources (including wind generators and solar panels), and firmware to monitor fluid levels in water, fuel, black water and other tanks.

You will be able to download this specialized firmware from our web site, copy it to the MicroSD card, and change the type of your display in a minute! So it is not just a simple instrument display, it is an affordable platform for specialized displays too.

This Manual describes the Display with Instrument Display Firmware. Other firmware will have the same general principles for its user interface and Device settings, but may differ in some details. Please refer to documentation supplied with each specialized firmware product.

The Display is designed for operation in a NMEA 2000 network and is compatible with a wide range of equipment supporting this protocol. Raymarine SeaTalk NG, Simrad SimNet and Furuno CAN networks are branded versions of NMEA 2000 and differ only in the type of connectors. In its devices, Garmin uses the NMEA 2000 Micro connector that is compatible with the DeviceNet Micro connector.

Our Display is equipped with a NMEA 2000 Micro male connector (see Appendix D). A drop cable or cable adapter is required to connect the Display to the network backbone; this is not supplied with the Device and must be purchased separately.

We thank you for purchasing our Devices and wish you happy voyages!

Warranty and Technical Support

1. The Device warranty is valid for two years from the date of purchase. If your Device was purchased in a retail store, the sale receipt may be requested when making a warranty claim.

2. The Device warranty is terminated in case of violation of the instructions in this Manual, case integrity breach, or repair or modification of the Device without manufacturer's written permission.

3. If a warranty request is accepted, the defective Device must be sent to the manufacturer.

4. The warranty liabilities include repair and replacement of the goods and do not include the cost of equipment installation and configuration, or shipping the defective Device to the manufacturer.

5. The responsibility of the manufacturer in case of any damage as a consequence of the Device operation or installation is limited to the Device cost.

6. The manufacturer is not responsible for any errors and inaccuracies in guides and instructions of other companies.

7. The Device requires no maintenance. The Device's case is non-dismountable.

8. In the event of a failure, please refer to Appendix A before contacting technical support.

9. The manufacturer accepts applications under the warranty and provides technical support only via e-mail or from authorized dealers.

10. Contact details of the manufacturer and a list of the authorized dealers are published on the website: http://www.yachtd.com/.

I. Product Specification
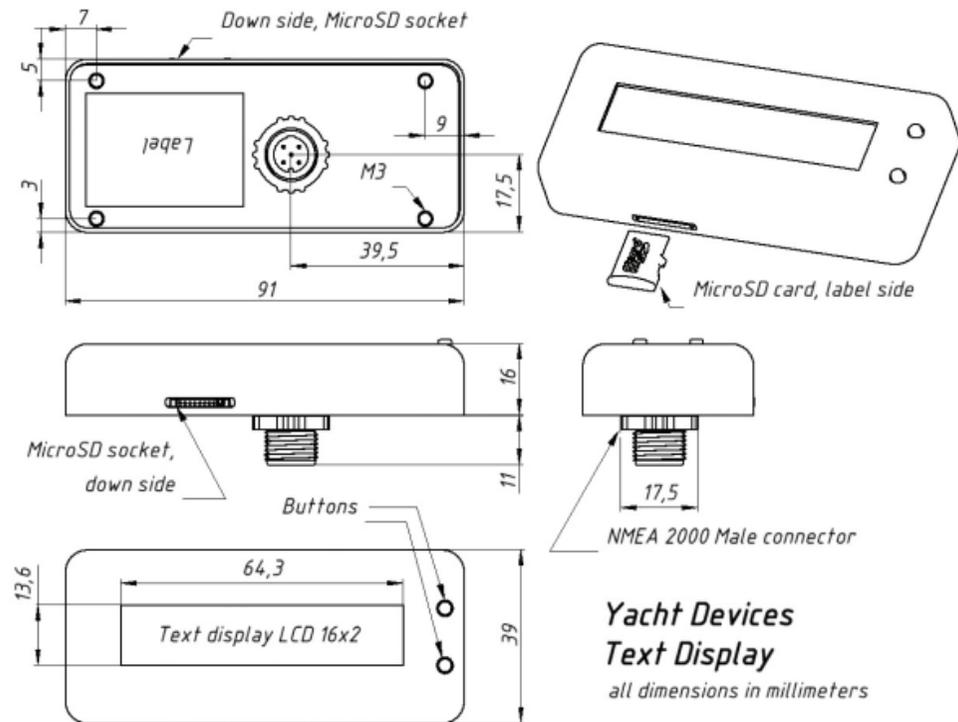
Figure 1. Drawing of Text Display YDTD-20N

Device parameter	Value	Unit
Operating voltage (from an NMEA 2000 network)	7..16	V
Protection against reverse polarity	Yes	—
Current consumption in energy-saving mode	20	mA
Current consumption with full display brightness	28	mA
Load Equivalency Number	1	LEN
Operating temperature range (1)	-25..+85	°C
Weight without MicroSD card	59	g
Dimensions without connector	91 x 39 x 16	mm
Display area (2)	64.3 x 13.6	mm
Compatibility of MicroSD card (3)	Unlimited	—

Notes:

(1) Screen refresh will be slow at temperatures below 0°C owing to LCD technology.
(2) Display is equipped with a black case and blue screen unless otherwise noted
(3) The Device can work with MicroSD cards of any size and class with FAT (FAT12, FAT16 or FAT32) file system.

II. Device Installation and Connection

The Device requires no maintenance. When deciding where to install the Device, choose a dry mounting location. Avoid places where the Device can be flooded with water, the Device is not waterproof and this can damage it.

The Device can be installed horizontally or vertically. It is recommended to leave 20mm of free space below the MicroSD card socket to freely insert a card.

The Device is connecting to the network backbone with a drop cable or adaptor cable. A cable is not supplied with the Device and must be purchased separately:

1. cables with Raymarine part numbers A06045 (0.4m / 15.7in) and A06075 (1.0m / 39.4in) are recommended for Raymarine SeaTalk NG network;
2. for Garmin networks and other networks with NMEA 2000 Micro and DeviceNet Micro connectors, Garmin cables with part numbers 010-11076-00 .. 010-11076-04 (0.3m..5.8m / 1..19 feet) are recommended.

For other networks, please refer to the manufacturer's documentation to obtain the appropriate adaptor cable.

If you have no free connector for a cable in the network backbone, you may need to purchase an additional T-connector:

1. for a Raymarine SeaTalk NG network, see the part number A06028;
2. for Garmin networks and other networks with NMEA 2000 Micro and DeviceNet Micro connectors, see Garmin part number 010-11078-00.

If you are mounting the Device in a place with a limited space on the backside, you can choose a cable with right-angle connector.

To mount the Device on a bulkhead, the following tools are required:

1. power drill;
2. 20mm hole cutter;
3. 4mm drill bit;
4. adhesive tape;
5. screwdriver.

Please note that the 20mm hole is not placed in the center of the template. Instead of M3 bolts, you may fix the Display on a bulkhead with double-sided adhesive tape or Velcro (not supplied with Display).

Fix the mounting template supplied with the Device on the front side of the bulkhead with an adhesive tape, drill four holes with a 4mm drill bit and one with 20mm hole cutter. Check the length of the fixing bolts (supplied with Display, M3x25). You can reduce the depth using a nut if necessary.

Turn off the NMEA network power supply, connect the cable to the Device's connector and fix it to a bulkhead with bolts (see Figure 2).

Turn on the NMEA network, and the Display's welcome screen will appear immediately. Regardless of the Display's brightness setting, the welcome screen is always displayed with the medium brightness.

The Display does not contain any sensors, real time clock or other information sources. It can only display data received from a network. Wait a few minutes while your chart plotter and instruments are initializing. With a short click of the Up or Down button, you may leaf through the Display's data pages.

About 200 network messages are transmitted every second on an average cruising yacht. If the "NO NETWORK DATA" message is displayed, it means that nothing is being received from the network, since the Display is powered on. Usually it indicates a physical connection problem.
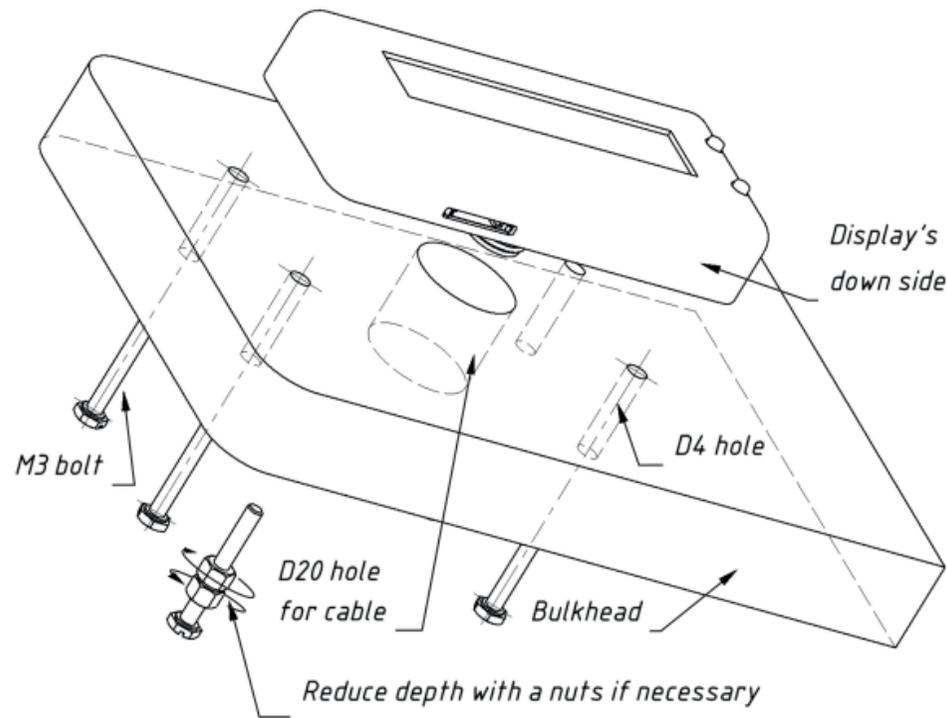
Figure 2. Fixing on a bulkhead

III. Getting Started

This section describes the general principles of the Display's user interface. Some insignificant details may vary depending on a firmware.

After the Display powers on, welcome screen is displayed. Regardless of Display's brightness setting, welcome screen is always displayed with medium brightness. After a few seconds or a button click, the Device enters into the data pages view.

```
54°22'.300N      9:45:56 AM
018°56'.467E     10/19/2015 MON

SOG      5.6kn   STW      ---.-kn
COG    112.3°T   HEADING  102.5°T
```

Figure 3. Data pages

Network data are displayed on several screens, called "data pages". Instrument Display Firmware have eleven data pages, some of them are shown in Figure 3. If the Display has no corresponding network data for the data page item, minus signs are shown in the item's value placeholder (see STW on Figure 3).

The Device's buttons recognize short and long clicks. By default, they have the following functions:

Table III.1

	Short Click	**Long Click**
Up Button	Scroll up, increase the value	Brightness menu on/off
Down Button	Scroll down, decrease the value	Menu, item select, change the value

Users can circularly scroll data pages with the short clicks of the Up or Down buttons. A long click of the Down button in the data pages view calls the Display's menu.

```
MENU:            MENU:
0.Exit menu      1.Unit settings

MENU:            MENU:
2.Date & time    3.Page on/off
```

Figure 4. Menu's screens

Short clicks of Up and Down buttons scroll through the menu items. A long click of the Down button chooses the menu item selection, the selection of "0.Exit menu" item returns from the menu to the data pages view. In addition, the Display automatically switches to the data pages view after 15 seconds of user inactivity.

Mounting Template 151x73mm
Fix on the front surface,
drawing is mirrored

1xD20
4xD4

Label

91
3
17,5
39
5
20
7
9
39,5
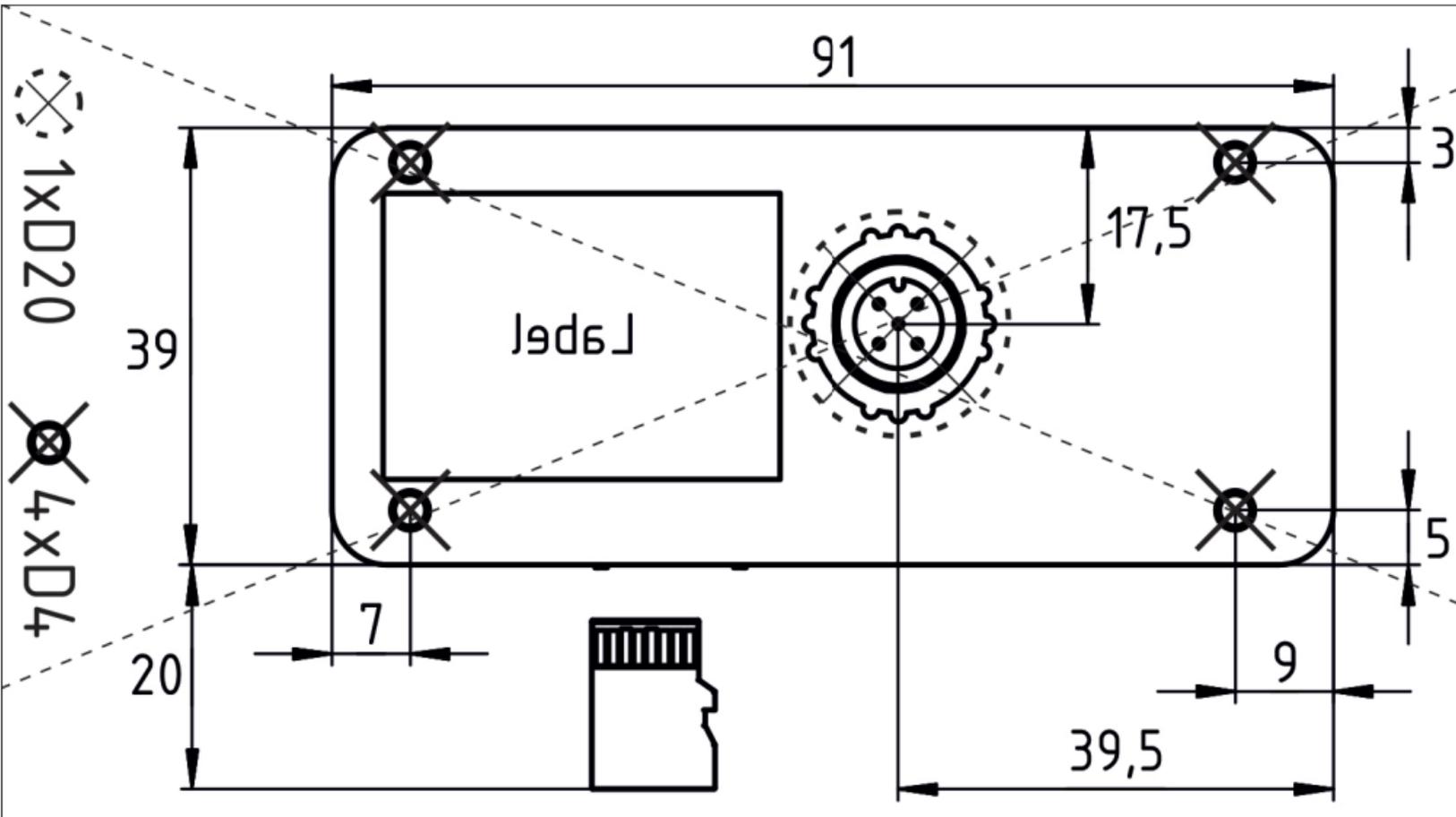
Menu item functions:

1. **Unit settings.** These settings affect the display of data on all data pages. See chapter IV for details.
2. **Date & time.** Select the format for "Date & Time" data page (24H/12H, etc.).
3. **Page on/off.** Select the data pages for data pages view. E.g. if you have no engine data in your network, you can turn off the corresponding data page here. All pages are on by default.
4. **Display.** Sets automatic shutdown of the screen after user inactivity (default setting is never). When the screen is off, Device goes into energy saving mode (may vary in other versions of firmware). Press any button to wake up the Display.
5. **Factory reset.** Returns to the factory's settings.
6. **Version.** Check the firmware version and Device's serial number.
7. **Diagnostics.** List of devices connected to the NMEA 2000 network.

For example, to reset the Display's settings to the initial state:

1. in the data pages view click and hold the Down button until the menu appears on the screen;
2. click Down five times until "5.Factory reset" menu item appears;
3. click and hold the Down button to activate the menu item. "Sure? no" will be displayed;
4. click Up or Down button to switch between yes/no;
5. click and hold Down button to activate your answer.

The following screens will appear after steps 1-4:

MENU:	MENU:
0.Exit menu	5.Factory reset
#5:FACTORY RESET	#5:FACTORY RESET
Sure? no	Sure? yes
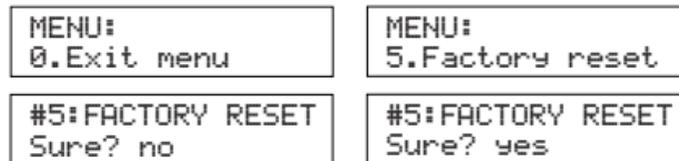
Figure 5. Steps to factory reset

Long click of the Up button always calls the brightness adjustment screen. You can control brightness with short clicks of Up and Down buttons. Long click of Up or Down button closes the brightness adjustment screen. The brightness setting is stored in non-volatile memory.

Brightness:
███████

Figure 6. Brightness adjustment screen

IV. Instrument Display Firmware

Data pages view of Instrument Display Firmware contains eleven data pages. You may turn off data pages from view in the "Page on/off" menu (see chapter III).

Table IV.1

N	Screen sample	Page name	Description
1	54°22'.300N 018°56'.467E	Position	Vessel's position.
2	9:45:56 AM 10/19/2015 MON	Date & Time	System date and time, format may be changed in the settings.
3	SOG 5.6kn COG 112.3°T	COG and SOG	Course Over Ground and Speed Over Ground.
4	STW 4.8kn HEADING 102.5°T	STW/Heading	Speed Through Water and Heading.
5	TWS 6.8kn TWA 204.3°T	TWS and TWA	True Wind Speed and True Wind Angle (1).
6	AWS 7.1kn AWA 61.0°T	AWS and AWA	Apparent Wind Speed and Apparent Wind Angle.
7	WATER 18.5°C DEPTH 3.2m	Water page	Water temperature and depth.
8	AIR TEMP 17.1°C ATM PRS 1019.4mb	Air page	Air temperature and atmospheric pressure.

Table IV continued

N	Screen sample	Page name	Description
9	LOG 1453.54nm TRIP 275.81nm	Log & trip	Log and trip distance.
10	BATTERY1 13.8V BATTERY2 ---.-V	Battery	Battery's voltage.
11	ENGINE PORT/STBD 1255 ----- rpm	Engines	Port and starboard engines revolutions.

Notes:

(1) TWS and TWA are usually calculated using AWS and AWA, STW, heading and variation data.

In the "Unit settings" menu of Display, you may choose units of measurement.

Table IV.2

Unit	Measure
Speed	kn (knots), m/s (meters per second), mph (statue miles per hour), kph (kilometers per hour).
Distance	nm (nautical miles), mi (statue miles), km (kilometers)
Depth	meters, feet
Temperature	°C (Celsius), °F (Fahrenheit)

V. Firmware Updates

In the root folder of the MicroSD card with FAT or FAT32 file system, copy DUPDATE.BIN, which contains the firmware update of the Display. Insert the card into the Device and turn on the power.

From 10-15 seconds after powering on, the screen will light up and a confirmation message with the firmware version will be displayed.
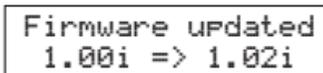
```
Firmware updated
 1.00i => 1.02i
```

Figure 7. Confirmation message

The last character in the firmware version means the type of firmware, "i" means Instrument Display firmware.

If the Display already is using the given version of the firmware, or if the Device cannot open the file or the file is corrupted, the boot loader immediately transfers control to the main program. This is done without visual cues.

To check the firmware version and Device's serial number, please open the "Version" menu of the Display (see chapter III.).

The Device information including the firmware version is also displayed in the list of NMEA 2000 devices (SeaTalk NG, SimNet, Furuno CAN) or in the common list of external devices on the chart plotter. Usually, access to this list is in the Diagnostics, External Interfaces or External devices menu of the chart plotter. Please, refer to your chart plotter documentation.

APPENDIX A. Troubleshooting

Fault	Possible reasons and solution
The Display does not light up after power on	**1. No power supply on the bus.** Check if the bus power is supplied (NMEA 2000 network requires a separate power connection and cannot be powered by a plotter or another Device connected to the network). **2. Loose connection in the power supply circuit.** Treat the Device connector with a spray for cleaning electrical contacts. Plug the Device into another connector.
"NO NETWORK DATA" message is displayed.	**1. Loose connection in the data circuit.** Treat the Device connector with a spray for cleaning electrical con¬tacts. Plug the Device into another connector. **2. Problems in the NMEA 2000 network.** The network segment is not connected to other equipment or there are missing terminators in the network. Plug another de¬vice into the selected connector and make sure it appears in the list of devices on the char plotter and function.
The display turns off after the welcome screen	**1. Brightness is off in the settings.** After the power on, press and hold Up button for 2 seconds. Release Up button and then click it five times to increase the brightness value.

Fault	Possible reasons and solution
The Display's messages appear and disappear very slowly	**1. Display is cold.** This is normal for operation at temperatures below 0°C. Wait until the Display warms up.
---.- displayed instead of a value	**1. No corresponding data is available.** Check the list of NMEA 2000 messages of your equipment against the list of messages in Appendix B.

APPENDIX B. NMEA 2000 Messages

Table B.1. Mandatory messages used by all firmware versions

Message	Receive	Transmit	Comments
ISO Acknowledgment PGN 59392	Yes	Yes	
ISO Request PGN 59904	Yes	—	
ISO Address Claim PGN 60928	Yes	Yes	
PGN List Group Function PGN 126464	—	Yes	
Product Information PGN 126996	Yes	Yes	

Message	Page name	Comments
System Time PGN 126992	Date & Time	
Vessel Heading PGN 127250	STW/Heading, TWS and TWA	Heading also may used for TWA calculations.
Magnetic Variation PGN 127258	STW/Heading	Used for calculations of true bearings from magnetic bearings.
Engine Parameters, Rapid Update. PGN 127488	Engines	
Battery Status PGN 127508	Battery	BATTERY1 is a battery with instance 0, BATTERY2 with instance 1.
Speed, Water Referenced PGN 128259	STW/Heading, TWS and TWA	STW also may used for TWS and TWA calculations.
Water Depth PGN 128267	Water page	
Distance Log PGN 128275	Log & trip	
Position, Rapid Update PGN 129025	Position	
COG & SOG, Rapid Update PGN 129026	COG and SOG	

Message	Page name	Comments
Local Time Offset PGN 129033	Date & Time	
Wind Data PGN 130306	AWS and AWA, TWS and TWA	AWA and AWS also may used for TWA and TWS calculations.
Environmental Parameters PGN 130310	Air page, Water page	Air and water temperature, atmospheric pressure.
Environmental Parameters PGN 130311	Air page, Water page	Air and water temperature, atmospheric pressure.
Temperature PGN 130312	Air page, Water page	Air and water temperature.
Actual Pressure PGN 130314	Air page	Atmospheric pressure.

APPENDIX C. Device Connector

Connector's key

V+

SCREEN

CAN L

V−

CAN H

V+, V− − Power supply 12V.
CAN H, CAN L − NMEA 2000 data.
SCREEN − Not connected in the Device.

Figure D.1. Connector of the Text Display YDTD-20N

This connector (see Fig. D.1) is compatible with NMEA 2000 Micro Male connector
and DeviceNet Micro Male connector.