Message Terminal

TT-3606E

Installation and Service Manual

Thrane & Thrane

Message Terminal

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Safety Summary

The following general safety precautions must be observed during all phases of operation, service and repair of this equipment. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture and intended use of the equipment. Thrane & Thrane A/S assumes no liability for the customers failure to comply with these requirements.

GROUND THE EQUIPMENT

To minimise shock hazard, the equipment chassis and cabinet must be connected to an electrical ground and the cable instuctions must be followed.

DO NOT OPERATE IN AN EXPLOSIVE ATMOSPHERE

Do not operate the equipment in the presence of flammable gases or fumes. Operation of any electrical equipment in such an environment constitutes a definite safety hazard.

KEEP AWAY FROM LIVE CIRCUITS

Operating personnel must not remove equipment covers. Component replacement and internal adjustment must be made by qualified maintenance personnel. Do not replace components with the power cable connected. Under certain conditions, dangerous voltages may exist even with the power cable removed. To avoid injuries, always disconnect power and discharge circuits before touching them.

DO NOT SERVICE OR ADJUST ALONE

Do not attempt internal service or adjustments unless another person, capable of rendering first aid resuscitation, is present.

DO NOT SUBSTITUTE PARTS OR MODIFY EQUIPMENT

Because of the danger of introducing additional hazards, do not substitute parts or perform any unauthorized modification to the equipment.

COMPASS SAFE DISTANCE

Minimum safety distance of 50 cm from the TT-3606E Message Terminal

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Table of Contents

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1 Installation

This chapter provides specific information about installation of the TT-3606E Message Terminal and information about initial inspection, storage and repacking for shipment.

Figure 1 TT-3606E Message Terminal

1.1 Quick system connect and checkout

The following brief outline may be used to get the TT-3606E Message terminal up and running

- Unpack system components
- Connect the keyboard to the TT-3606E
- Connect a DC power source to the TT-3606E

The TT-3606E should then start the actual application program. Please refer the manual for the specific application program.

1.2 Initial inspection

WARNING

To avoid hazardous electrical shock, do not perform electrical tests if there is any sign of shipping damage to any portion of the front or rear panel or the outer cover. Read the safety summary at the front of this manual before installing or operating the 3606E Message Terminal.

Inspect the shipping carton immediately upon receipt for evidence of mishandling during the transit. If the shipping carton is severely damaged or water stained, request that the carrier's agent be present when opening the carton. Save the carton packing material for future use.

Contents of the shipment should be as listed in the enclosed packing list. If the contents are incomplete, if there is mechanical damage or defect, or if the 3606E Message Terminal does not work properly, notify your dealer.

After you unpack the 3606E Message Terminal, inspect it thoroughly for hidden damage and loose components or fittings.

- ✧ Inspect the cable harness for stress, loose or broken wires, or broken cable tires.
- ✧ Examine all the components for loose or missing hardware. Tighten all loose hardware.

1.3 Storage

The 3606E may be stored or shipped in temperatures within the limits -40° C to +80° C. It is advisable to protect 3606E from extreme temperature variation which can cause excessive condensation. It is recommended that the 3606E is unpacked immediately on delivery.

1.4 Repacking for shipment

The shipping carton for the 3606E has been carefully designed to protect the Message Terminal and its accessories during shipment. This carton and its associated packing material should be used when repacking for shipment. Attach a tag indicating the type of service required, return address, model number and full serial number. Mark the carton FRAGILE to ensure careful handling.

If the original shipping carton is not available, the following general instructions should be used for repacking with commercially available material.

1. Wrap the 3606E in heavy paper or plastic. Attach a tag indicating the type of service required, return address, model number and full serial number.

2. Use a strong shipping container, e.g. a double walled carton of 160 kg test material.

3. Protect the front- and rear panel with cardboard and insert a 7 cm to 10 cm layer of shock absorbing material between all surfaces of the equipment and the sides of the container.

4. Seal the shipping container securely.

5. Mark the shipping container **FRAGILE** to ensure careful handling.

1.5 Cabling

For any installation it is required that all attached cables are shielded and equipped with shielded connectors, which are properly connected to the shield of the cable. Furthermore every shield should have a low impedance connection to an electrical ground.

Before using the TT-3606E Message Terminal for the first time check out that all cables are correctly wired and fastened.

Please notice that the DC-input range applies to the DC voltage measured at the pin's on the power connector on the 3606E. This means that the power cable characteristic should be taken into account. The cable should allow the DC, measured at the input pin's on the 3606E power connector, to stay within limits even though it has to carry a current of 3 A.

Please notice, that the wires must be properly connected in the connector and all pin’s for each power input must be connected to the respective wire.

A cable using 2 mm2 (AWG 14) wire's of length 4 m fulfils the requirements.

Please notice, that the cable connections must be properly installed.

1.6 Mounting

The TT-3606E Message Terminal may be mounted in several ways.

If the mounting bracket is not used, the TT-3606E Message Terminal may be flush mounted in a consol by using the 4 screw holes on the rear.

The mounting bracket may be used either to mount the TT-3606E Message Terminal on a horizontal surface or a vertical surface. In both cases the angle can be adjusted in steps of 7.5°. This is done by loosening the hand wheels slightly and then move the upper part of the TT-3606E Message Terminal into the wanted angle. Please remember to tighten the handwheels again.

When assembling the mounting bracket together with the TT-3606E Message Terminal it is important that the small indications on the cylinders are in-line with the indications on the rear of TT-3606E Message Terminal.

When installing the TT-3606E on a vertical surface it is necessary to mount the mounting bracket opposite the way it is mounted for horizontal installation.

Please refer to the chapter describing the detailed mechanical outlines of the TT-3606E Message Terminal and mounting bracket.

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2 Description

This chapter describes the TT-3606E Message Terminal. This encompasses specifications as well as provides specific information about the available features and interfaces.

2.1 Specifications

Processor	386SX-40MHz
RAM	2 MB
Flash DISK	2 MB
Display	10.4” Color TFT flatpanel, 640x480
Floppy drive	3.5”
Keyboard i/f	5-pin mini-DIN
Parallel printer port	25 pin SubD female connector
Serial port COM1	9 pin SubD male connector, DTE type
Serial port COM2	9 pin SubD male connector, DTE type
Environmental	Meets or exceeds all INMARSAT specifications for the Inmarsat-C Network for SOLAS with distress call functions. (CN114 and IEC 945 requirements). Meets CE-marking requirements. Wheelmark approved.
Power Source	10 to 32 V floating DC, 15 pin SubD female
Power Consumption	App. 20 Watts, maximum App. 13 Watts, typical
Fuse	Internal automatic recovering poly fuse
Ambient Temperature	-20°C to 55°C operating -40°C to 80°C storage.
Compass safe distance	50 cm (measured in accordance with the standards specified in ISO/R 694, Method B)
Dimensions H x W x D	221x 297 x 114.5 mm w/o bracket 256 x 297 x 114.5 mm w bracket at vertical position
Weight	3.1 kg (including mounting bracket)

Table 1 TT-3606E Message Terminal

2.2 Connectors

This section describes the functions and pin assignments of connectors found on the rear of the TT-3606E. Figure 2 shows the connector part of the TT-3606E Message Terminal.

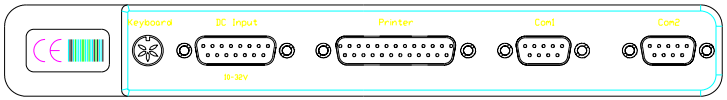

Figure 2 Rear connectors

2.2.1 Keyboard connector

The figure below indicates the pin assignment of the keyboard connector as seen from the rear of the TT-3606E Message Terminal.

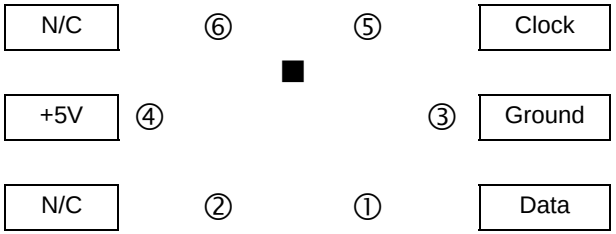

Figure 3 Keyboard connector

2.2.2 Power connector

The power input connector is a standard 15 pin SubD male connector, located on the rear panel of the TT-3606E and the pin assignments are as indicated below. The Remote ON/OFF input makes it possible to place an eventual on/off switch at any location.

Pin	Name	Signal Description
1,2,9,10	+ supply	10-32 VDC (Battery Positive input)
4,5,12,13	- supply	DC Return (Battery Negative input)
6	Remote ON/OFF	ON if connected to “- supply” OFF if floating
7,8	SGND	Chassis (Secondary GND)
Ground	GND	Shield
3,11,14,15		NC

Table 2 Power connector

2.2.3 Parallel printer port

The parallel printer port is a standard 25 pin SubD female connector, located on the rear panel of the TT-3606E and the pin assignments are as indicated below.

Pin	Name	Signal Description
1	STRB	Strobe
2	DAT0	Data Bit 0
3	DAT1	Data Bit 1
4	DAT2	Data Bit 2
5	DAT3	Data Bit 3
6	DAT4	Data Bit 4
7	DAT5	Data Bit 5
8	DAT6	Data Bit 6
9	DAT7	Data Bit 7
10	ACKN	Acknowledge
11	BUSY	Printer Busy
12	PE	Paper End (out of paper)
13	SEL	Printer Selected
14	ALFD	Auto Line Feed
15	ERR	Printer Error
16	INIT	Initialise Printer
17	SLCT	Select Printer
18	GND	Ground
19	GND	Ground
20	GND	Ground
21	GND	Ground
22	GND	Ground
23	GND	Ground
24	GND	Ground
25	GND	Ground

Table 3 Parallel port

2.2.4 Serial ports

The serial ports are standard 9 pin SubD male connectors, located on the rear panel of the TT-3606E and the pin assignments are as indicated below.

Pin	Name	Direction	Signal Description
1	DCD	input	Data Carrier Detect
2	RxD	input	Received Data
3	TxD	output	Transmitted Data
4	DTR	output	Data Terminal Ready
5	GND		Ground
6	DSR	input	Data Set Ready
7	RTS	output	Request To Send
8	CTS	input	Clear To Send
9	RI	input	Ring Indicator

Table 4 Serial ports

The serial ports comply with the EIA/TIA-232 standard.

For full operating specifications for the serial interface, you are kindly requested to refer to the CCITT Rec. V24 and the EIA/TIA-232 specifications.

To interface the TT-3606E to any DCE type of device such as for example the TT-3020C Transceiver or TT-3616C Interconnection box using a 1:1 RS-232 cable.

3 Service

This chapter describes how to disassemble and to service to a level of changing boards/parts.

3.1 Disassembling

If you have to disassemble the TT-3606E Message Terminal it is important, that you follow the procedure described in this section. Otherwise you will find it very difficult and you risk to permanently damage the Message Terminal.

WARNING
Do not try to disassemble the TT-3606E Message Terminal yourself.

This operation must only be performed by qualified service personnel.

The unit is assembled out of three parts:

1. Rear plate holding the floppy drive
2. Intermediate plate holding the different PCB's on the rear side and the flat panel on the front side.
3. Plastic front holding the display window.

To get access to the main PCB, backlight PCB (piggy bag on the main PCB) and computer board the following steps should be followed:

WARNING
To avoid hazardous electrical shock, do not touch the two high voltage outputs of the backlight inverter.

1. Make sure the mounting bracket is removed
2. Unscrew the 12 counter sunk screws on the rear and the 8 Sub-D stays.
3. Gently divide the front part and rear part from each other so that the flex cable connecting the floppy with the main PCB on the intermediate plate can be removed by releasing the zero-insertion force cable connector mounted on the main PCB (J15).

If it is necessary to remove/replace the main PCB it is necessary to remove the backlight inverter first in order to get access to two of the screws holding the main PCB.

3.2 Configuration

The main PCB, which is shown in figure 4, contains the following jumpers, measurement points and adjustment possibilities:

Reference	Factory setting or value/range	Function
W1	Open	If closed the computer is reset
W2	Closed	Connecting/disconnecting power supply from rest of circuitry
W3	120 kHz, ± 2 kHz	Switch frequency of switch mode power supply
W4	Pin 2 and 3 closed	Select 3606 XP/E backlight
TP1	0 - 3.6 V DC	Output of light sensor
R38	120 kHz, ± 2 kHz	Adjustment of switch frequency

Table 5 Configuration

The jumper W2 can be used to remove the connection between the switch mode power supply and the rest of the circuitry including computer as well as backlight inverter. The pin assignments for W2 are as follows. Please notice that ground connection can only be disconnected when the PCB is NOT mounted on the intermediate plate.

W2 pin	no	Function
1	2	+ 12 V DC, ± 20 %
3	4	
5	6	Ground
7	8	
9	10	
11	12	
13	14	+ 5 V DC, ± 10 %
15	16	
17	18	No Connection
19	20	

Table 6 Jumper W2

The CMOS-setup in the computer may be reset to default by moving the jumper marked “CLEAR CMOS” on the computer board from position 1-2 to position 2-3 and then back to position 1-2.

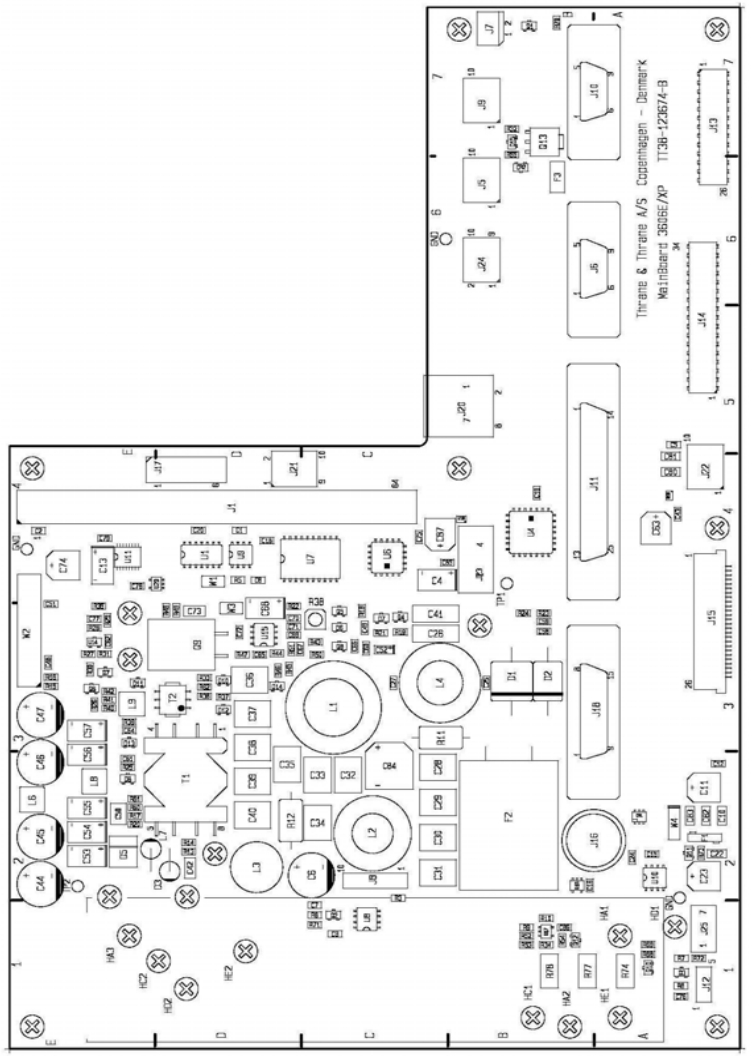

Figure 4 Main PCB

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4 Technical description

This chapter gives a detailed description of the TT-3606E Message Terminal.

4.1 Detailed specification

The hardware platform of TT-3606E Message Terminal is PC - compatible. The table below gives a more detailed specification of the computer part. Whether or not these hardware features are used dependents on the installed application program.

Processor	386SX-40MHz
Data bus	16-bit
Processing ability	32-bit
Shadow RAM	Support for system and video BIOS up to 256 kB in 32 kB blocks
Display memory	512 kB DRAM
IDE HDD interface	Supports up to two IDE (AT bus) HDD's
FDD interface	Supports up to two FDDs
Parallel port	Bi-directional (SPP/ECP/EPP modes)
Serial ports	Two RS-232 (both use 16C550 UART with 16-byte FIFO). Up to 115.200 baud.
Real time clock	ALI M6117B internal RTC, battery for up to 10 years data retention
DMA channels	7
Interrupt levels	15
Keyboard interface	PS/2
Bus speed	8 MHz
Flash DISK	DiskOnChip2000 from M-Systems. Address: DC000-DDFFF

Table 7 Detailed specification

Figure 5 shows the physical outline of the computer board:

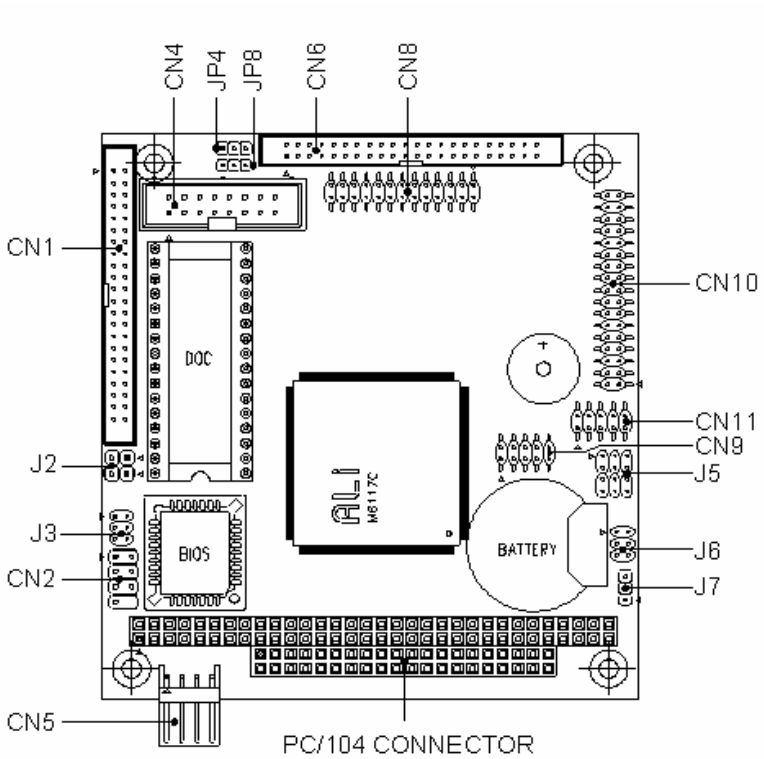

Figure 5 Computer board

4.2 Special I/O

Special I/O ports have been implemented in the TT-3606E Message Terminal in order to be able to support some extra features compared to a standard PC. These are

- Disk change signal from floppy
- Backlight control of TFT flat-panel
- Watchdog
- Light sensor
- Reset of external keyboard

The table below indicates the diffent I/O ports

Address	Direction	Function
302h	output	light sensor sample and hold
302h	input	light sensor output
303h	output	control of display backlight level watch dog keyboard reset

Table 8 Special I/O ports

The light level surrounding the equipment is determined by the light sensor circuitry. A sample/hold of the light level is done by writing to this port two times. The sampled value can then be determined by reading this port afterwards.

An 8-bit A/D-converter is used with a reference level of 5V (corresponds to A/D value FFh). The linear light sensor gives an output in the range from 0V to 3,60V, thus the light level is in the range from 00h to approximately C0h (255*5V/3,75V).

The tables below indicate the precise function of each bit in the remaining ports.

The “disk change signal “ is a hardware signal from the floppy drive which during access to the floppy indicates (goes to 0) whether or not the floppy has been changed. Can be used in the application software to only read the FAT-table, when the floppy has actual changed.

303h	Function
0 (LSB)	If 0 display backlight off else on
1	N/A
2	N/A
3	If toggled from 1 to 0 to 1 the light level of the selected backlight(s) is(are) changed 1 unit (out of 100), /INC. Direction depends on bit 4
4	If 0 the light level is decreased when toggeling bit 3 (/DWN) else increased
5	Watch dog toggled when changing this bit
6	If 0 watchdog is disabled else enabled
7 (MSB)	External keyboard enabled if 0 and disabled/reset if 1

Table 9 Control port (all 0 except bit 1,2 after power up)

The control port is used to set/reset the different bits in the connected register. After power up all bits in this register defaults to “0” except bit 1 and 2 which set to 1. This implies that the the display backlight is turned on, the watchdog is disabled and the external keyboard is enabled.

After the unit has booted, the application can enable the watchdog, if the application program supports a watchdog surveillance circuitry. If enabled it must be toggled every 0,5 second by changing the appropriate bit as indicated above otherwise the unit will reset and reboot.

The reset possibility of the external keyboard can be used by the application software for keyboard surveillance purposes.

The display backlight is controlled using electronic potentiometers controlled using three signals:

CS : Chip Select
/INC: Increment
/DWN: Up/down selection

If CS is “1” the electronic potentiometer is selected and the /INC and /DWN signals can be used to adjust the electronic potentiometer and thus the light level. If CS is “0” these two signals will not imply any change. Every time the /INC-bit is toggled the potentiometer is adjusted 1/100 of its maximum value. The direction is controlled by the /DWN-bit. If it is 0 the light level is decreased where as a 1 will imply an increase when the /INC bit is toggled.

In this way the application can control the potentiometers to obtain any of its 100 different positions/levels.

The /INC bit may not be changed more often than every 4 μsec.

Both potentiometers can be adjusted simultaneously in the same direction by setting both CS bits to “1”.

To make sure that the position of the potentiometers are known by the application software after power up both potentiometers should be initialised with 100 pulses in either up or down. It is recommended to decrease both backlights to the minimum level at power up.

With respect to the display backlight there is a 1:1 relation from potentiometer position 100 (maximum light) down to approximately 60. Below 60 the display backlight level will not change.

In order to completely turn off the backlight it is necessary to use the display backlight on/off bit and set it to 1.

A way to cope with the display backlight characteristic is to have two display setups/styles: one used during daylight (bright colors, but not red) and one used during night (red characters and graphics on a black background).

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5 Mechanical outlines

This chapter shows the dimensions of the TT-3606E Message Terminal as well as the mounting stencils for the different ways of mounting the TT-3606E Message Terminal.

5.1 TT-3606E

Figure 6 and 7 shows the dimensions of the TT-3606E Message Terminal.

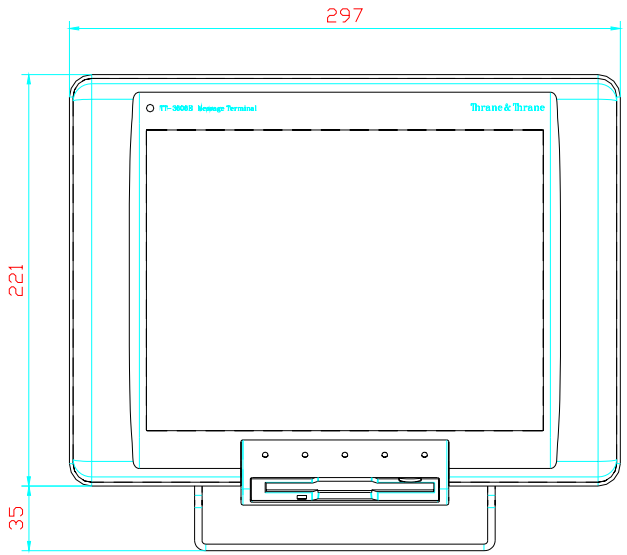

Figure 6 TT-3606E Message Terminal

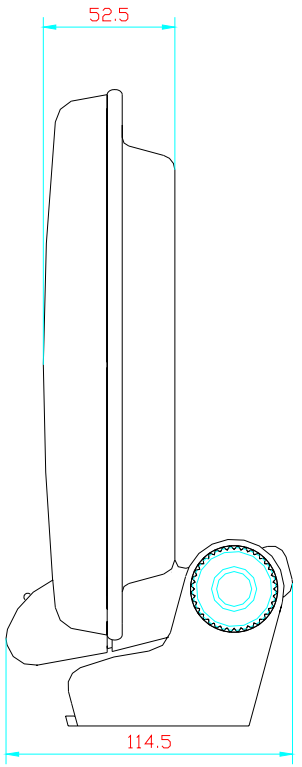

Figure 7 TT-3606E Message Terminal

5.2 Flush mount

Figure 8 indicates the dimension of the panel cut-out and position of mounting holes when mounting the TT-3606E Message Terminal in a consol.

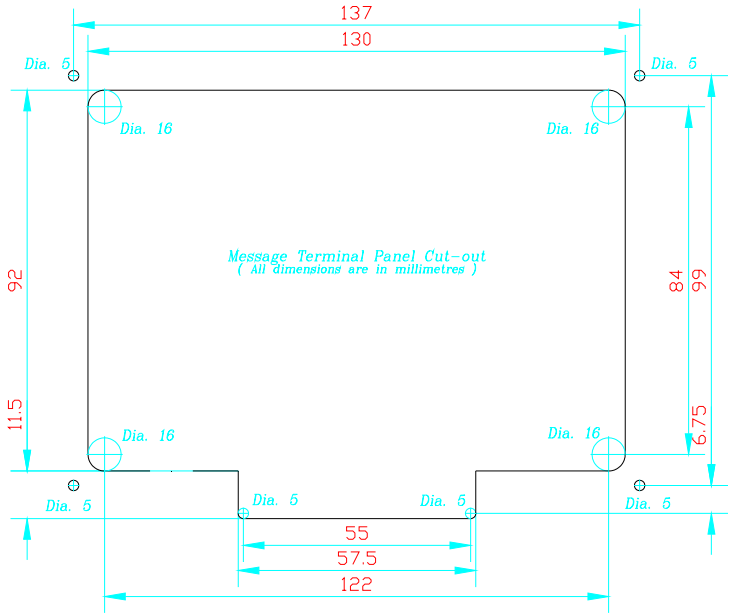

Figure 8 TT-3606E Message Terminal

5.3 Mounting bracket

Figure 9 indicates the position of the mounting holes for the mounting bracket.

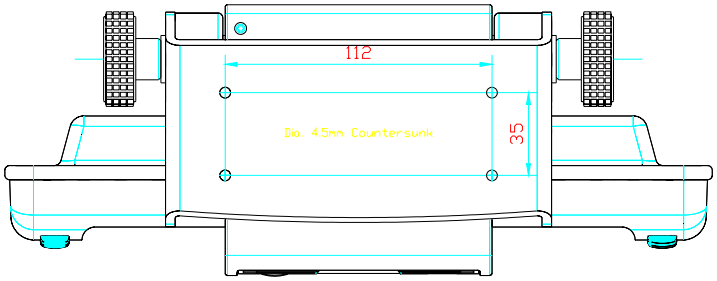

Figure 9 TT-3606E Message Terminal