

TRP 9500 - Dawn of a New Era



The SKANTI TRP 9500 series is a new advanced professional radio communication system, which complies with the latest requirements within maritime MF/HF communication.

General Description

The SKANTI TRP 9500 is a powerful 500 Watt simplex/semiduplex MF/HF SSB radio system with optional built-in DSC and Radiotelex. It is designed to fulfil the GMDSS requirements including the recommendations and specifications of the IMO, CEPT and ETSI as well as

relevant national specifications including all relevant CE-marking standards.

3-Unit Concept

SKANTI TRP 9500 consists of 3 units:

- The Transceiver Control Unit with integrated keyboard, display, loudspeaker and handset.
- The efficient 500 Watt Transceiver Unit with integrated Radiotelex and DSC modem.
- The ruggedized weather-proof automatic Antenna Tuning Unit.

Innovative Design

The TRP 9500 fulfils the GMDSS idea of integration and the customer requirement of system simplicity.

- Both DSC and Radiotelex are integrated in the TRP 9500 (optional).
- The PC for Radiotelex operation, the Transceiver Control Unit and the DSC Control Unit are all linked together with single-cable connections.
- Only one single coax cable connects the Transceiver Unit to the Antenna Tuning Unit providing fast and flexible installation.

New Era in HF



TRP 9500 Features

- The integrated DSC/Radiotelex option ensures a compact and economical solution with regard to installation.
- Only one single coax cable connecting the Transceiver Unit to the Antenna Tuning Unit, thus providing flexible and cost-conscious installation.
- The Transceiver Unit can be placed up to 100 metres from the Control Unit and 100 metres from the Antenna Tuning Unit.
- Flexible and cost-conscious maintenance by fast and simple change of modules.
- Up to 5 Transceiver Control Units with Priority System and Intercom Facility.
- A Sweep function enabling the operator to activate scanning of specific frequency bands.
- The Scanning function which acts as an additional function scanning user-selectable channels.
- The Sleep function which automatically starts up the Transceiver via a timer function.
- The built-in selftest programme which automatically checks the performance of the system. This facilitates fault finding and reduces maintenance costs.
- New technology in design secures low power consumption.

User-friendly

Transceiver Control Unit

The large and back-lit LCD display and the logically arranged keyboard with graphics and text-legends make the operation of the TRP 9500 very simple. Each key is marked with its function and the display will show the settings. The Transceiver Control Unit has a built-in loudspeaker and socket for an extra loudspeaker. The handset is specially designed for high sound quality. The Transceiver Control Unit is built to withstand the rough environmental conditions at sea. It is protected against corrosion.

The display and keyboard of the Transceiver Control Unit have dimmable green backlight.



caused by high humidity and salt. The cabinet is made of virtually unbreakable polycarbonate and has splash-proof, sealed membrane keyboard.

Powerful Transceiver Unit

The rugged Transceiver Unit cabinet is made of aluminium and fits into a 19" rack, it has an independent cable mounting compartment with connectors for a wide range of optional equipment. The advanced and powerful 500 watt P.E.P. Transceiver delivers 400 watt continuous power in all bands. The Transceiver has a transmitter frequency range of 1.6 MHz to 30 MHz, whereas the receiver covers the frequency range 150 kHz to 30 MHz.

The basic MF/HF Transceiver series comprises several maritime versions to fulfil national requirements and operator's certificate limitations concerning transmitter frequency



Transceiver Unit

selection, which is controlled by preprogramming of the equipment firmware.

The DSC and Radiotelex functions are all carried out by an optional built-in module mounted in the Transceiver Unit, where installation of software and a DSC receiver sub-system provides the GMDSS functionality.

The high sensitivity of the receiver ensures reception of very weak signals, and at the same time the large signal performance prevents disturbance from unwanted signals.

Ruggedized Antenna Tuning Unit

The new ruggedized heavy-duty weather-proof Antenna Tuning Unit is made of die-cast silumin and thus constructed in accordance with the harsh environment in which it has to operate for years without



Antenna Tuning Unit

maintenance. The white colour secures optimum thermal emission/absorption ratio. Connection from the Antenna Tuning Unit to the Transceiver Unit for RX/TX signals, data communication and DC supply is made by one single coax cable. The operator will not feel the change in antenna characteristics normally taking place during changing weather conditions, as the microprocessor technology ensures extremely fast tuning under all conditions and the accurate tuning ensures optimum transmission of power through the antenna.

Power Supply

The power requirement of the TRP 9500 series is 12 - 32 V DC. When the TRP 9500 has to be supplied from AC, an optional power unit for 2-phase or 3-phase operation is available.

GMDSS Distress and Safety Frequencies		
Mode	Frequency	Hz
SSB	2182.0kHz	100
TLX	2174.0kHz	101
DSC	2187.5kHz	102
SSB	4125.0kHz	103
TLX	4127.0kHz	104
DSC	4127.5kHz	105
SSB	6215.0kHz	106
TLX	6218.0kHz	107
DSC	6217.5kHz	108
SSB	8275.0kHz	109
TLX	8278.0kHz	110
DSC	8278.5kHz	111
SSB	12288.0kHz	112
TLX	12290.0kHz	113
DSC	12297.5kHz	114
SSB	16420.0kHz	115
TLX	16425.0kHz	116
DSC	16428.5kHz	117
Rescue:		
DSC	4050.0kHz	118
DSC	4050.5kHz	119
DSC	4051.0kHz	120

GMDSS Frequencies
The GMDSS distress and safety frequencies are easily selected by using the corresponding recall number. The correct mode is selected automatically. A label with the frequencies, modes and recall numbers is supplied with the TRP 9500.



Fitting Module with TRP 9500 Transceiver Control Unit, DSC 9000 and Alarm Panel connected to PC 9000 for Radiotelex operation.

Integrated DSC/Radio Radiotelex Option

The DSC option consists of a separate DSC Control Unit and the DSC controller/modem, usually in combination with a DSC receiver

sub-system. According to the ship's carriage requirements three different DSC options can be installed: A single channel (2187.5 kHz) DSC watch receiver system, a 6-channel scanning DSC watch receiver

system, or the DSC controller/modem alone. In all the mentioned options the receiver of the TRP 9500 can also be used for scanning 6 freely selectable DSC channels for commercial traffic.



Technical Specifications

GENERAL

Complies with the relevant IMO performance standards, the ITU Radio Regulations, the relevant ITU-R recommendations and meets the performance specifications of ETSI and CEPT. Complies with the relevant CE-marking standards.

Frequency Range:

1.6 - 30 MHz

Frequency Generation:

True digital synthesis

Frequency Selection:

Direct by keyboard.
Up to 896 single pre-programmed frequencies with direct recall of the first 200.
All relevant ITU frequencies.
GMDSS Safety and Distress frequencies.
100 user-programmable channels (RX/TX frequency pairs).
Single key selection of 2182 kHz.
Scanning facility.
Sweep facility.

Frequency Presentation:

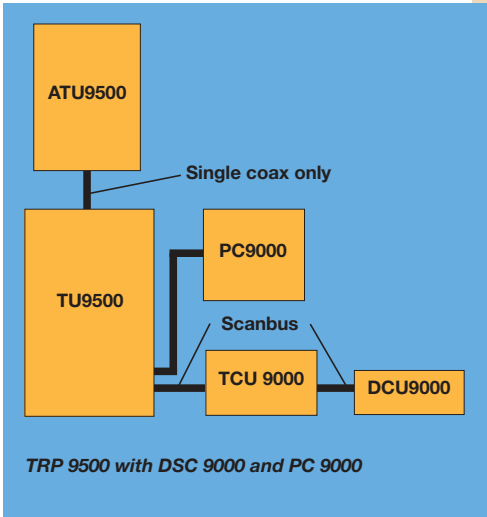
Backlit LCD display with simultaneous presentation of receive and transmit frequencies.

Frequency Stability:

0.35 ppm.

0.1 ppm (optional).

Ageing less than 1 ppm/year.



Operating Modes:

Simplex and semiduplex.
SSB: Upper sideband suppressed carrier (J3E, USB). Same as USB.
LSB: Lower sideband suppressed carrier (J3E, LSB).
R3E: Upper sideband reduced carrier (R3E).
AM: *Reception/Transmission:* Compatible single sideband full carrier (H3E).

Reception:

Double sideband full carrier (A3E).

TLX: *Reception/Transmission:*

Single sideband suppressed carrier with modulating sub-carrier (J2B). Sub-carrier user-programmable from 1500 Hz to 2950 Hz, default 1700 Hz.

Reception:

Frequency shift keyed carrier (F1B).

CW: Morse telegraphy keyed carrier (A1).

Displayed

Frequency:

Operating modes SSB (USB), LSB, R3E, AM: Carrier frequency.
Operating mode TLX: Up-converted sub-carrier frequency.
Operating mode CW: Carrier frequency.

Other Facilities:

Real-time clock.
User-programmable Sleep Timer with up to 10 set-ups.
Built-in selftest programme.
Continuously operating Power and Protection Monitor.

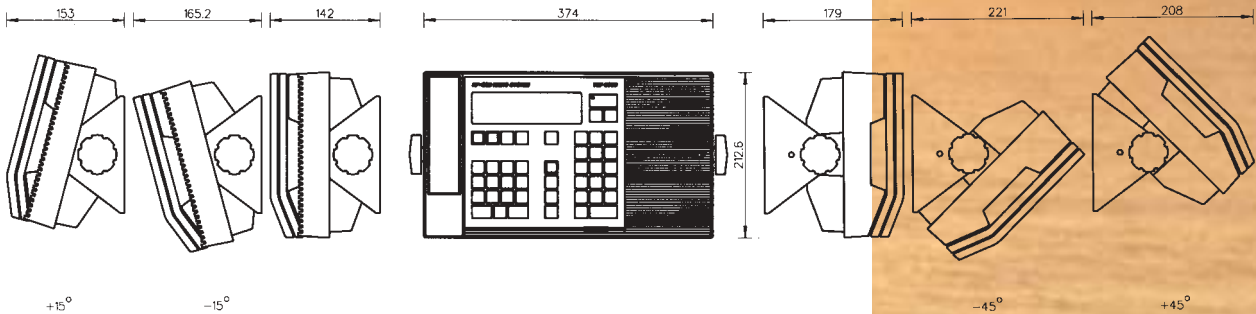
Supply Voltage:

10.8 V to 41.6 V

Operating Temperature Range:

-20 deg. C to +55 deg. C.

Transceiver Control Unit TCU 9000 outline. Adjustable Mounting Bracket for optimum viewing angle.



RECEIVER

Frequency Range:

100 kHz to 30 MHz (100 kHz to 150 kHz with reduced performance)

Frequency Resolution:

100 Hz by keyboard entry. 10 Hz, 100 Hz or 1 kHz with search/fine tune facility

Antenna Impedance:

50 ohm. Automatically matched by the Antenna Tuning Unit

Input Protection:

30 V RMS (EMF) for up to 15 min.

IF Selectivity:

SSB: 350 Hz to 2700 Hz.
AM: +/- 3 kHz.
TLX: +/- 150 Hz. (Optional)

CW: +/- 150 Hz, +/- 1.2 kHz and +/- 3.0 kHz (relevant versions only).

Sensitivity:

Antenna input for 10 dB SINAD, 50 ohm antenna.
SSB: 0.6 uV.
AM: 4 uV.
TLX: 0.25 uV.
CW: 0.25 uV (with +/- 150 Hz bandwidth).

When HiSens is selected the sensitivity is increased by approx. 5 dB.

Out-of-band Intermodulation:

Two 93 dBuV signals more than 30 kHz off tune produce less output than an equivalent input signal of 30 dBuV.

In-band Intermodulation:

Less than -40 dB

Cross Modulation:

Unwanted signal of 105 dBuV / 30% - 400 Hz more than 20 kHz offset from receiver frequency, produces cross modulation less than -30 dB relative to wanted signal of 60 dBuV (SSB).

Blocking:

With a wanted signal of 60 dBuV, an unwanted signal 20 kHz off tune 110 dBuV will affect the output level by less than 3 dB or cause less than 6 dB reduction in SINAD (SSB).

Reciprocal Mixing:

With a wanted signal giving 20 dB SINAD, an unwanted signal 20 kHz off tune and 80 dB above the wanted signal will cause less than 6 dB reduction in SINAD (SSB).

Image Rejection:
Greater than 80 dB

IF Rejection:
Greater than 80 dB

Spurious Response Rejection:
Greater than 80 dB

Internally Generated Spurious Signals:
Less than 5 dB SINAD (SSB)

Spurious Emission:
Less than 20 pW/50 ohm at antenna connector

RF Amplifier:
HiSens selected: Gain 12 dB
HiSens not selected: Gain 0 dB

RF Attenuator:
Att selected: Attenuation 20 dB
Att not selected: Attenuation 0 dB

Squelch:
Voice controlled squelch

Line Output:
-10 dBm to +10 dBm, 600 ohm

Audio Output Power:
Internal speaker: 6 W with less than 10 % distortion
External speaker: 6 W in 8 ohm with less than 10 % distortion

TRANSMITTER

Output Power:
500 W PEP +/-1.4 dB into 50 ohm

Single Tone Max. Power:
500 W CW +/-1.4 dB into 50 ohm for a duty cycle less than 55 % and modulation rate greater than 3 baud.
Reduction to 400 W CW when continuously keyed during 1 min.
Automatic power recovery after 1 min.

Power Reduction:
Medium: 250W, 125 W or 50 W (user-programmable, default 125 W).
Low: 20 W.

Frequency Range:
1.605 MHz to 30 MHz

Frequency Resolution:
100 Hz step

Intermodulation:
Better than -31 dB PEP in standard two-tone test.

Hum and Noise:
Less than -50 dB PEP (SSB)

Spurious Emissions:
Less than 43 dB PEP, typically better than 60 dB PEP.

Suppression of Unwanted Sideband:
Greater than 60 dB PEP (1 kHz, SSB)

Line Input:
-10 dBm to +10 dBm, 600 ohm

ANTENNA TUNING UNIT

Frequency Range:
1.605 kHz to 30 MHz

Antenna Requirements:
7 to 18 m wire and/or whip antenna

Antenna Tuning:
Fully automatic with no presetting

Tuning Speed:
Typical 0.5 to 2 sec.

Input Impedance:
Nominal 50 ohm

Power Handling Capability:
500 W PEP, voice or ARQ telex.
400 W CW.

POWER REQUIREMENTS

Supply Voltage:
10.8 V to 41.6 V. Output power reduction below 13 V.

Power Consumption (approx. @ 24 V):

RX only (TX off)	62 W
RX	75 W
SSB unmodulated	125 W
SSB 1 tone, FEC Telex, CW	1.35 kW
SSB 1 tone, FEC Telex, CW (after 1 min.)	1.25 kW
SSB 2 tones	925 W
ARQ Telex	700 W
H3E unmodulated	715 W
H3E Alarm	925 W

INTERFACES FOR EXTERNAL EQUIPMENT

The Transceiver Control Unit has separate connectors for ScanBus, remote control, 600 ohm balanced lines/key, external speaker, morse key and headphone.

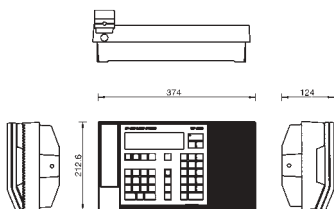
The Transceiver Unit has an independent mounting compartment with connectors for ScanBus, PC RS232 interface (telex), 600 ohm balanced lines/key, remote control/DSC printer, NMEA, alarm and auxiliary input/output.

Specifications subject to change without notice.

SKANTI

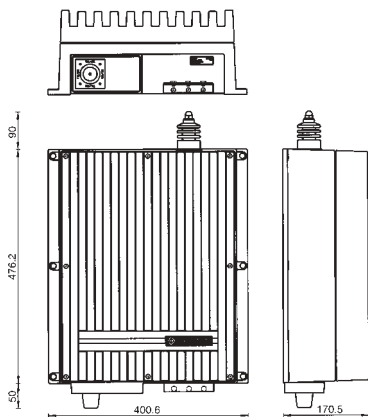
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Transceiver Control Unit TCU 9000 outline



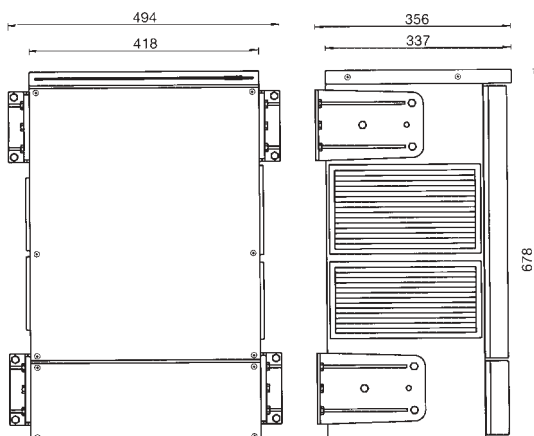
Weight: 3.6 kg (5.2 kg incl. Mounting Bracket)

Antenna Tuning Unit ATU 9000 outline



Weight: 17.8 kg

Transceiver Unit TU 9000 outline bulkhead mounting



Weight: 58.5 kg