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VHF Ground Station

TG 460 - ()

Installation and Operation

Manual	DV 46005.03
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Section 1 GENERAL INFORMATION

1.1 Introduction

This manual DV 46005.03 describes the VHF ground station TG 460 - ().

The manual DV 46005.03 "Installation and Operation" contains the following sections :

Section		DV 46005.03
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2	Installation	X
3	Operation	X

1.2 Purpose of equipment

The VHF ground station TG 460 - () is a fixed ground station for speech communications in the VHF frequency range of 118.000 MHz to 136.975 MHz.

The ground station is designed for airport and airfield use and can be used as a main transceiver on landing fields and as a standby unit on airports and for special tasks within the scope of air traffic control.

1.3 General description

The VHF ground station is designed for mounting in 19-inch rack systems or in an ATC desk.

The VHF ground station is designed to operate on a AC supply voltage of 115 V or 230 V $\pm 10\%$ /50 . . 60 Hz. In DC operation, the VHF ground station is designed to operate on a voltage of 13.75 V (TG 460 - (05) or 24V (TG 460 - (10), TG 460 -(20)).

The control circuit switches over to external DC voltage if the AC voltage supply fails. If an internal battery is fitted to provide an emergency power supply, it will still be possible to maintain T/R communication for several hours if the AC and external DC supplies fail. The necessary charging circuit for the battery is located inside the TG 460 - ().

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1.3.1 Short description CORE Module

The CORE Module is a remote control VHF transceiver. It consists of a receiver board, a transmitter board and an audio board. The boards are connected by means of plug-in modules. The remote control VHF transceiver is controlled from the distribution board via a RS 232 interface.

The equipment connector for connecting the power supply, audio outputs etc. and the antenna socket are mounted on the back of the unit.

The remote control VHF transceiver is fitted with a single superheterodyne receiver. A squelch (muting) circuit suppresses transmitters or disturbances below a certain field strength. The switching threshold can be set. The squelch function can also be switched off.

The transmitter is designed to be wideband over the 118.000 MHz to 136.975 MHz range. The transmitter output power is $\geq 5/10$ Watt. The sidetone is automatically switched to the headphone output during transmission.

The oscillator frequency of the receiver and the transmitting frequency of the transmitter are generated by a VCO (voltage controlled oscillator). This is monitored by a digital frequency evaluation circuit. This digital frequency processing operates in conjunction with a microprocessor.

In the scan function the active frequency is shown in the top line of the display and the bottom line shows the associated storage channel with the preset CS. In the scanning mode the stored frequencies in the storage channels are scanned in succession at 200 ms intervals. When an evaluable reception signal is found, the remote control VHF transceiver remains on this frequency until an evaluable reception frequency is no longer present. It the remote control VHF transceiver then begins to scan all the stored frequencies again in 200 ms intervals. In the service mode, the hold time between the end of an evaluable signal and the continuation of the scanning of the next channels can be set to between 0 and 60 seconds.

1.4 Options

Options	Description	Stock-No.:
101	Battery 12V/2.2 Ah	883.158-391
102	2-wire remote control	879.800-918
103	Multi wire remote control	0884.456-918
104	Tape recorder control	886.904-277

The options can only be fitted at the manufacturer's premises.

1.5 Variants survey

Description	Drawing no.:	Stock no.:
TG 460 - (05) 5 Watt Transmitter rated output power	52100-0000.000	881.902-926
TG 460 - (10) 10 Watt Transmitter rated output power	52110-0000.000	881.910-926
TG 460 - (20) 20 Watt Transmitter rated output power	52120-0000.000	881.929-926

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1.6 Technical data

1.6.1 Technical data general, power supply

AC-Operating voltage 115 V or 230 V \pm 10% 50/60 Hz

DC-Operating voltage

TG 460 - (05)

12 V ... 16 V

TG 460 - (10), TG 460 - (20)

24 V +20% -10%

Current consumption at 115 V AC

TG 460 - (05)

max. Rx = 65 mA

max. Tx = 300 mA

TG 460 - (10)

max. Rx = 250 mA

max. Tx = 1,5 A

TG 460 - (20)

max. Rx = 250 mA

max. Tx = 1,8 A

Current consumption at 230 V AC

TG 460 - (05)

max. Rx = 50 mA

max. Tx = 170 mA

TG 460 - (10)

max. Rx = 170 mA

max. Tx = 0,9 A

TG 460 - (20)

max. Rx = 170 mA

max. Tx = 1,1A

Current consumption at 13,75 V DC

TG 460 - (05)

max. Rx = 200 mA

max. Tx = 1800 mA

Current consumption at 24 V DC

TG 460 - (10)

max. Rx = 200 mA

max. Tx = 3,5 A

TG 460 - (20)

max. Rx = 200 mA

max. Tx = 4,5 A

Battery int./U = 12.0 V (optional)

max. Rx = 240 mA

max. Tx = 1800 mA

Fuse

AC voltage

3,15 AT

DC extern voltage TG 460 - (05),(10)

4,00 AT

DC intern voltage TG 460 - (05),(10)

4,00 AT

DC extern voltage TG 460 - (20)

6,30 AT

DC intern voltage TG 460 - (20))

6,30 AT

Battery internal

4,00 AT

Protection against wrong polarity

at DC external voltage

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Frequency range	118.000 MHz - 136.975 MHz
Frequency tolerance	≤ 15 ppm
Channel spacing	25 kHz
Number of channels	760
Number of channel memories	20
Antenna impedance	50 Ω

1.6.2 Technical data environmental

Operating temperature range	- 15° C ... + 50° C
Storage temperature range	- 40° C ... + 70° C
Humidity (operating)	$\leq 95\%$ / 40° C without condensation
Humidity (storage)	$\leq 95\%$ / 40° C
Operating altitude	
Operating	- 200 ... 3500 m
Transport	- 200 ... 10000 m

1.6.3 Technical data receiver

Sensitivity	
m = 60 % / 1 kHz	$\leq 5 \mu\text{V (EMF)} \frac{S+N}{N} \geq 10 \text{ dB}$
Selectivity	
$\pm 17 \text{ kHz}$	$\geq 40 \text{ dB}$
$\pm 25 \text{ kHz}$	$\geq 60 \text{ dB}$
Intermodulation	$\geq 65 \text{ dB}$
IF frequency	21.4 MHz
IF bandwidth	$\geq \pm 8 \text{ kHz}$
Squelch	adjustable (dependant on carrier)
AF output power asym. (Speaker)	$\geq 2 \text{ W } 4 \Omega$ (adjustable)
AF output power sym. (Headphone)	$\geq 0.1 \text{ W } 600 \Omega$ (adjustable)
Distortion	$\leq 10 \%$
Spurious emission	- 57 dBm (2 nW)

Section 2 INSTALLATION

2.1 Installation in a tower ATC desk

2.1.1 General

The VHF ground station can be incorporated in a tower air traffic control desk depending on the type of the latter. The following instructions thus apply only in a general way.

Caution

Installation and cabling of the VHF ground station shall only be done by skilled avionics personnel.

Removal of the covers of the VHF ground station and repairs of this equipment shall only be done by skilled avionics personnel.

2.1.2 Pre-installation check

Inspect the unit prior to installing the VHF ground station in an ATC desk, to establish whether it has suffered damage during transportation.

2.1.3 Visual inspection


Before commencing operation visually examine the unit paying particular attention to the following defects:

1. Dirt, dents, scratches, corrosion or broken attaching parts, damaged paintwork on housing, parts of the housing and panel.
2. Dirt or scratches on the identification plate, front panel, LCD or inscriptions.
3. Dirt, bent or broken pins, displaced inserts of plugs and sockets.
4. Dirt and mechanical damage to pushbuttons and operating knobs.

2.1.4 Setting up the VHF ground station

The VHF ground station can be set up either flat or in a slant plane (using the collapsible legs) on a table.

After setting up the equipment shall be connected to a potential equalization bar via an earthing lead having cross-section of 10 square millimeters. The earthing connection is located on the rear panel of the equipment.

 Before connecting the antenna to the equipment statically discharge the antenna and the antenna feeder line by connecting both the connector housing and the inner conductor of the antenna line to the earthing connection on the rear panel of the equipment.



Connect the microphone to the microphone jack.



If the equipment has option 101 incorporated, the attached fuse has to be installed in the battery fuse holder (Refer to Installation of fuse for battery).



Connect the cable plug "DC extern" to the jack "DC extern" on the rear panel of the VHF ground station. Connect the other end of the DC supply voltage.

CAUTION

Do not confuse the polarity!

An adequately dimensioned cable of 1,5 mm² and higher shall be used for this purpose.



Connect the supplied power cord first to the VHF ground station and then to AC power outlet.

NOTE

There is no ON/OFF switch provided on the VHF ground station. If an external supply voltage, either AC or DC is applied, the VHF ground station is in the standby mode. By means of the ON/STANDBY switch on the front panel the equipment can be switched ON or in the standby mode. If a battery is installed in the VHF ground station and the AC- and DC-external supply voltages are switching off and by mistake the ON/STANDBY switch in the ON position, the equipment is running on the internal battery.

2.1.5 Installation of fuse for battery (option 101)

To prevent unintended switching ON of the VHF ground station during transport and thus discharging the battery the fuse will be removed before shipping. Please insert the enclosed 4 amperes fuse into the fuse holder no. 2 on the back panel of the VHF ground station.

2.1.6 Mechanical Installation of the VHF ground station in an ATC desk

The 19-inch table model may be installed in an Air traffic control desk at any time. By means of a 4 mm Allen-type wrench remove the four screws (1) and the handles (4). Refer to Figure 2-1. Remove the two adaptors "FRONT" (3) and replace them by the 19-inch adaptors (5). The 19-inch adaptors are supplied with each unit.

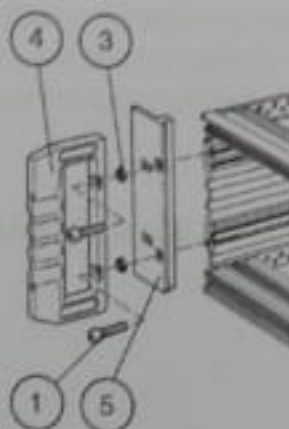
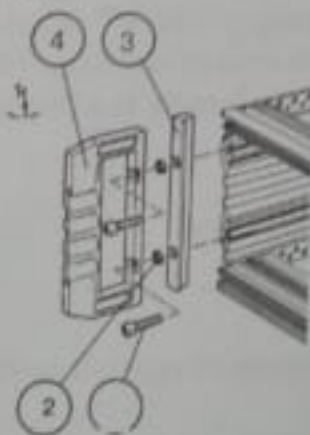


Fig. 2-1 Mechanical Installation 19-inch adaptors

2.1.7 Hints for installation of the VHF ground station in an ATC desk

Refer to 2.1.4.

2.1.8 Connection of external PTT switch or PTT foot switch

The PTT key can be connected either to the microphone jack on the front panel or to the terminal block on the rear panel.

Microphone jack	Pin 5 Pin1	PTT GND
PTT Terminal block	red black	PTT GND

2.1.9 Installation of antenna system

For safety reasons the antenna system should be installed only by specialist personnel or a specialist firm. The correct installation and grounding of the antenna system is an essential precondition for trouble free functioning of the VHF ground station.

2.1.10 Lightning protection

To protect the VHF ground station from lightning strike or static discharge at the antenna, a lightning protection element is to be fitted in the supply cable. The housing of the lightning protection element is to be connected at the grounding terminals via an adequately sized cable to the potential equalisation rail of the building or other ground.

Lightning protection element with N standard terminal and replaceable gas discharge cartridge.

Order No. 887.870-277

Replacement cartridge up to 40 W transmitter power

Order No. 887.889-277

2.1.11 Grounding the VHF ground station

The grounding terminal (M 5 screw with nut) which is clearly marked with the grounding symbol is located on the back. The VHF ground station is to be connected via this terminal to the potential equalisation rail of the building or system to provide a low ohmic and low inductive connection. An adequately dimensioned cable of 10mm² coloured green/yellow shall be used for this purpose.

Note:

The relevant safety precautions shall be observed.

2.1.12 Over Voltage Protection

There is an over-voltage protection function built-in. After over-voltage protection activates, a minimum time lapse of 1 min. from the moment of switching off the input is required before any input can turn on the supply again. Over-voltage protection setting is fixed at 115% - 135% nominal.

2.2 Pin connection frontplate

2.2.1 Pin connection mike connector J 25 (MIC)

Pin	Description
1	GND
2	MIKE HI
3	HEADPHONE
4	MIKE LO
5	PTT



2.3 Pin connection rear side

2.3.1 Pin connection remote control J 19 (REMOTE CONTROL)

Pin	Description
1	SPK HI
2	PTT
3	PTT GND
4	RMC Mod. In.
5	RMC Mod. In.
6	PTT OUT 1
7	PTT OUT 2
8	RXD
9	SPK LO
10	MUTE
11	Audio OUT RC
12	Audio LO
13	DATA GND
14	PTT OUT 3
15	TXD



2.3.2 Pin connection J 24 (two wires) (PTT,A,B)

Pin	Description
1	B
2	A
3	PTT
4	PTT

2.3.3 Pin connection tape recorder connector J 23 (TAPE RECORDER)

Pin	Description
1	Audio Tape
2	GND
3	PTT 2
4	PTT 1
5	PTT 3

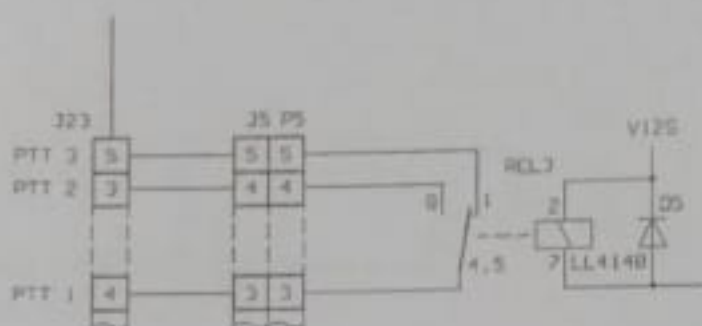


Fig 2-2 Installation wiring diagram tape recorder

Receive mode without adequate RF carrier (CALL-LED off).
Pin 4 (PTT 1) is connected to Pin 5 (PTT 3).

Receive mode with adequate RF carrier (CALL-LED on).
Pin 3 (PTT2) is connected to Pin 4 (PTT 1).

Transmit mode with PTT-Key pressed (TX-LED on).
Pin 3 (PTT 2) is connected to Pin 4 (PTT 1).

Load capacity of contacts is 24V d.c. ,100 mA.

2.3.4 DC EXT. INPUT connector wiring

Pin	Description
1	+ 12V
2	+ 24V
	- 12/24V GND



2.3.5 Switching output on remote control connector J 19 for direction finder tuning out.

The switching output can be used so that no direction finder takes place during transmission (direction finder tuning out).

Receive mode Pin 6 (PTT OUT 1) is connected to Pin 14 (PTT OUT 3).

Transmit mode Pin 6 (PTT OUT 1) is connected to Pin 7 (PTT OUT 2).

Load capacity of contacts is 24V d.c. ,100 mA.

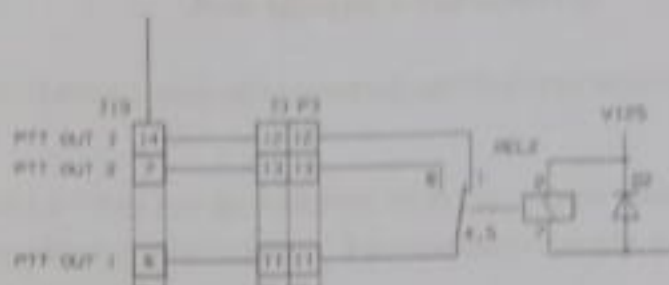


Fig 2-3 Installation wiring diagram direction finder tuning out

2.4 Muting

Two VHF-ground-station operated close to one another may cause interferences during transmission when there are existing unfavourable antenna positions. Via the mute input it is possible to mute the VHF-ground station operated in the receive mode. See the following fig 2-4.

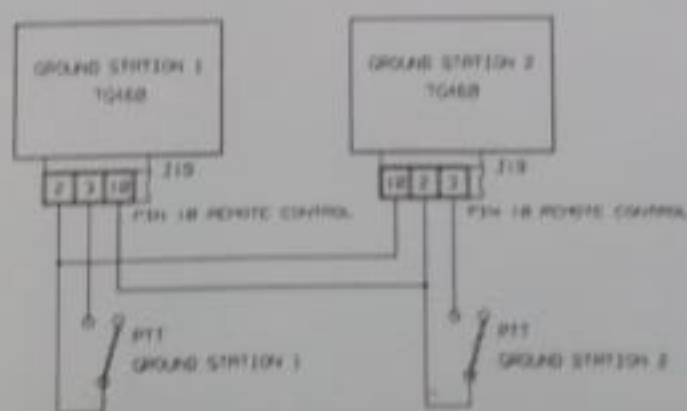


Fig. 2-4 Installation wiring diagram muting

2.5 Connection of an external speaker

The VHF ground station is designed to allow the connection of an external loudspeaker. The external speaker must be connected to pins 1 SPK HI (+) and 9 SPK LO (-) of the remote control plug J 19. The power output of the audio amplifier is 2 Watts at 4 Ω .

If an external speaker is connected, this can only be switched on by switching off the front speaker (LSP key). Changeover from the front speaker to an external speaker is achieved by pressing the LSP key on the front panel.

Note

If the VHF ground station is switched off it automatically switches back to the front speaker after switch on.

Note upwards > 100 serial no.

1. The setting selected before switch off is automatically restored when the VHF ground station is switched on.
2. The function of the LSP key can be switched off in the service mode and the most recent setting (front or external speaker) is then effective. If subsequent changes are necessary the LSP key must first be set to ON in the service mode.

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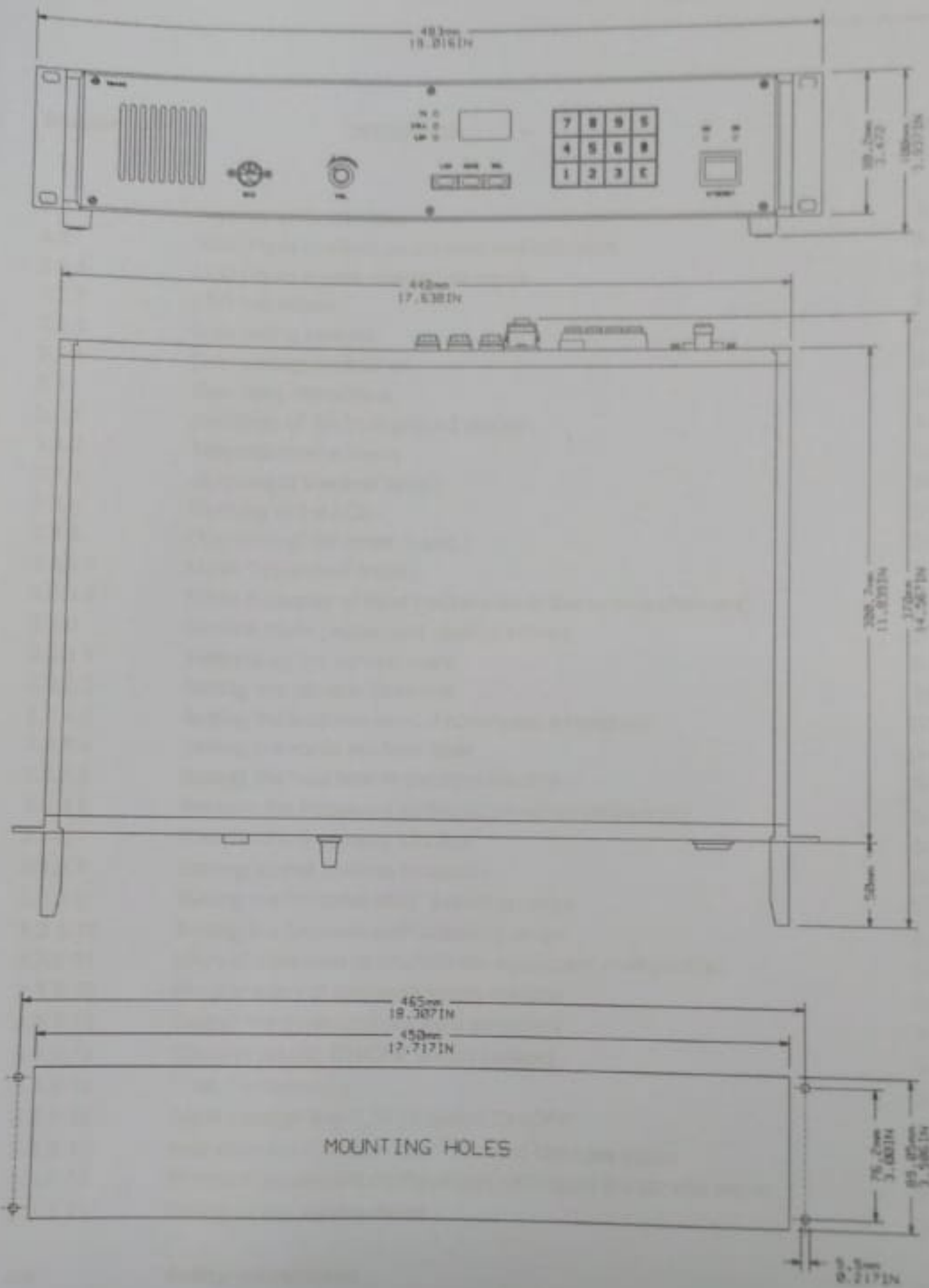


Fig. 2-5 Dimensions TG 460 - ()

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Section 3 OPERATION

3.1 Controls and Indicators

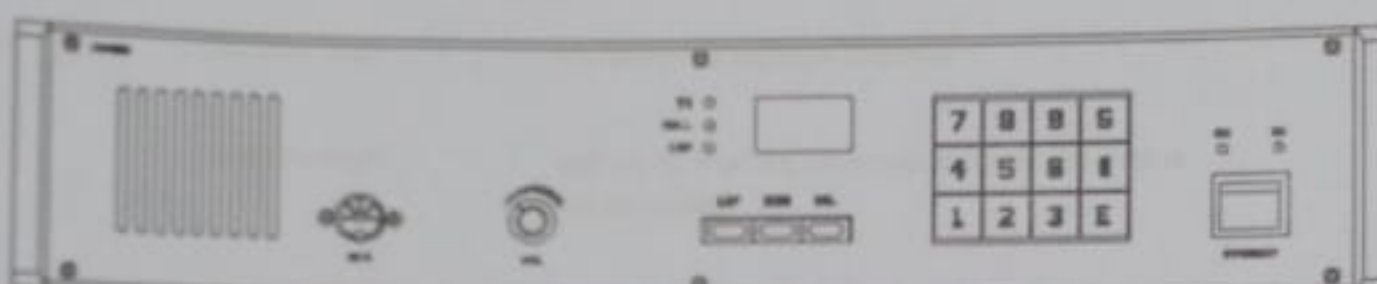







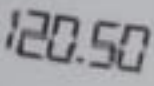
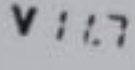
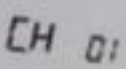

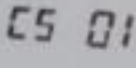




Fig. 3-1 Controls and indicators

3.2 Meaning of symbols on controls and indicators

	ON/standby switch	Switching the ground station ON/OFF
	Speaker key	Switching the speaker from frontplatte to remote control plug and return
	Function key	Selection of mode
	Squelch key	Switching the squelch ON/OFF
	Store key	Storage of set frequency or, in Mode 2 change between the channel selection mode and scan mode.
	Enter key	Inputs to acknowledge
	Keys 0 - 9	Keyboard
	Volume control	Adjustment of volume

3.2.1 LCD (liquid crystal display) elements

	(top line)	Indication of active transmission/reception frequency (active frequency)
	(bottom line)	Indication of supply voltage
	(bottom line)	Indication of storage channel
	(bottom line)	Indication that the selected storage channel is not occupied
	(bottom line)	Indication of scan function
	Indication flashes	The indicated storage operation is not completed by pressing the store key
	Indication flashes	Supply voltage ≤ 10.5 V

3.2.2 LED indications

TX	Comes on during transmission (red)
CALL	Comes on when there is an evaluatable reception signal (green)
LSP	Comes on when the front panel speaker is switched on (yellow)
AC	Comes on when AC supply voltage is applied (yellow)
DC	Comes on when the external DC supply voltage is applied (yellow)

3.2.3 Connecting sockets

MIC	Microphone socket, Head set
-----	-----------------------------

3.2.4 Over-voltage protection

There is an over-voltage protection function built-in. After over-voltage protection activates, a minimum time lapse of 1 min. from the moment of switching off the input is required before any input can turn on the supply again. Over-voltage protection setting is fixed at 115% - 135% nominal.

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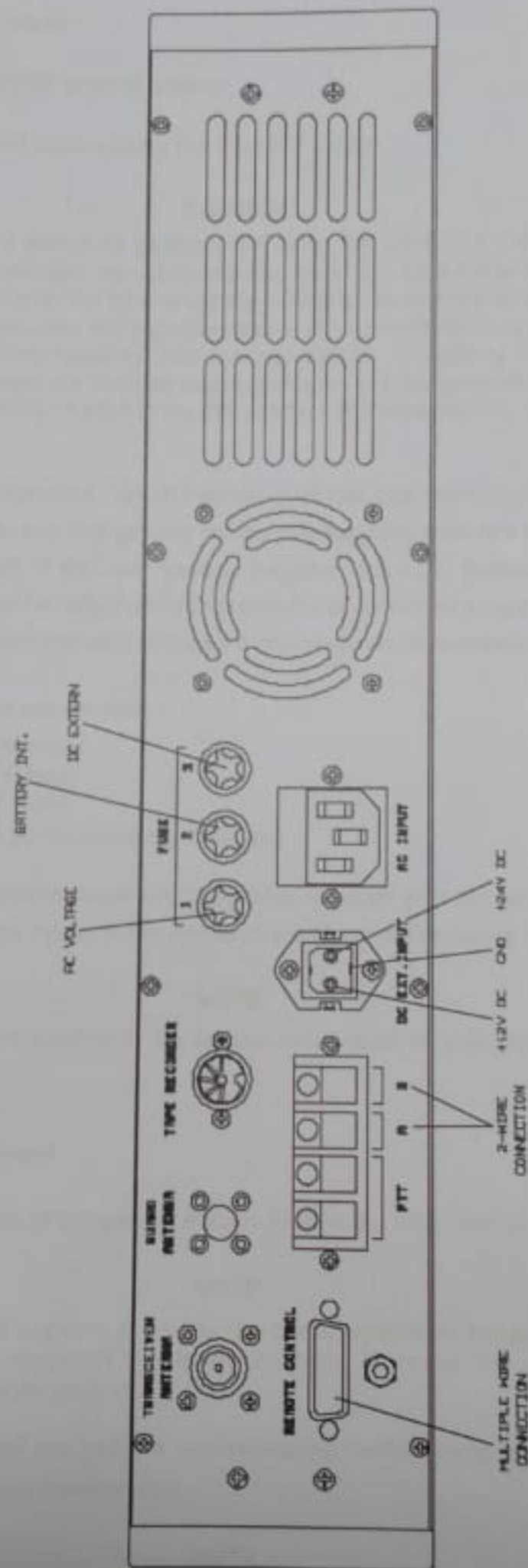


Fig. 3-2 Rear side

3.3 Operating instructions

3.3.1 Switching on the VHF ground station

1. Switch on the VHF ground station using the ON/OFF switch.

CAUTION

After the VHF ground station is switched off using the On/STBY switch it goes into standby mode. All indicators go out except the AC or DC LED diode which continues to remain on depending on the type of supply voltage. To remove all current from the VHF ground station requires the supply voltages to be switched off externally and the fuse of the built in battery removed from the fuse holder. If a battery is installed in the VHF Ground Station and the external supply voltages are disconnected and switch by mistake the ON/STANDBY switch in the ON position, the equipment is discharging the internal battery

2. LCD line must show the numbers 188.88 flashing (unit test approximately 2 seconds). If the test is completed successfully, the VHF ground station automatically switches to the mode which was selected before switch-off. If the test result is negative, the LCD flashes for approximately 5 seconds. A fault report can be called up by pressing the store key. After approximately 5 seconds the VHF ground station automatically switches to the mode which was selected before switch-off.

3. The following fault signals are possible :

E1	Processor defective
E2	Synthesizer failure
E3	Fault in EE-PROM
E4	Controller in audio assembly defective

4. The various modes are comprehensively described, together with the setting of the equipment configuration in the service mode, in the Annex to the General Operating Instructions.

NOTE

Setting of the equipment configuration in the service mode shall only be done by skilled avionics personnel.

3.3.2 Transmit/receive mode

1. Set the operation frequency of the ground station. Rotate the VOL control to the centre position.

NOTE

If the error message E2 appears in the top line during operation, the synthesizer is not locking and further T/R operation is no longer possible. Then the VHF ground station is to be send the next service station.

2. Operate the transmit button and call the corresponding station. Hold the microphone close to your lips for optimum speech transmission.

NOTE

The red "TX" LED on the front panel indicates transmit mode. During transmission a protective circuit prevents a frequency change or frequency channel change or mode change.

3. Using the VOL volume control set the correct reception volume whilst the called station is answering. If an external speaker is connected, this can only be switched on by switching off the front speaker (LSP key). If the VHF ground station is switched off it automatically switches back to the front speaker after switch on.

Note upwards > 100 serial no.

The setting selected before switch off is automatically restored when the VHF ground station is switched on. The function of the LSP key can be switched off in the service mode and the most recent setting (front or external speaker) is then effective. If subsequent changes are necessary the LSP key must first be set to ON in the service mode.

4. Switch on the squelch (press SQL key). Weak reception signals and reception noise are suppressed. The squelch threshold can be set in the service mode. If a signal is present to exceed the threshold, the "CALL" LED lights up.

3.3.3 Jamming of transmit button

1. The VHF ground station is fitted with a protective circuit to protect against jamming of the transmit button or a short circuit on the key line. For continuous transmissions exceeding two minutes the protective circuit automatically switches from transmission to reception. This avoids the selected channel being blocked.
2. It is possible to activate the transmitter again immediately by re-pressing the transmit button. In the event of a fault, this is only possible after the short circuit has been cleared or the transmit button released.

CAUTION

In order to be able to continue transmitting even with the transmit button stucked, the VHF ground station must be switched off and then back on again. After that the VHF ground station then continues to operate in the transmit mode for a further two minutes.

3.3.4 Flashing of the LCD

If the operating voltage for the VHF ground station drops below 10.5 V, the entire display begins to flash. This flashing indicates, when operating on battery for example, that the battery requires recharging. In practice the display begins to flash in the transmit mode because this is when the power consumption is greatest. If the operating voltage increases above 10.5 V again, the flashing ceases.

3.3.5 Operation of the mode 1 and 2

The VHF ground station performs various functions which are covered by two operating modes. The mode is selected by briefly pressing the MODE key.

NOTE

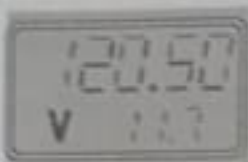
The VHF ground station automatically stores changes within two seconds, such as a mode or frequency change. This means that changes made immediately before switch off sometimes cannot be stored. Exceptions are selective storage operations which are

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stored using the S key. The automatic storage means that the previous mode is again displayed after switch on.

3.3.5.1 Mode 1 (standard mode)

1. The last displayed active frequency is shown in the top line of the LCD in each case. The internal operating voltage is shown in the lower line of the LCD. During battery operation, this is the battery voltage.



2. The active frequencies in the top line are changed using keys 0 to 9. Immediately when a numeric key (0 to 9) is pressed, the active display goes out and the digit of the pressed key appears in the right hand display field. The digits move from right to left on each further input. If more than five digits are input, these are no longer accepted. Each correct input is acknowledged by a short audible signal. If an incorrect input is made or a frequency which is not permissible within the frequency range, or one which is above or below the range is input, a longer audible signal is sounded. When the E key is pressed, the input is acknowledged and stored.

NOTES

- 1. If the input frequency is within the valid frequency range, but not in the 25 kHz spacing, it is automatically rounded to the next valid frequency.
- 1. If the input (pressing the E key) is not acknowledged within 10 seconds of the last key operation, the microprocessor automatically reverts to the previously-set frequency.
- 1. If there is an incorrect input (frequency outside the reception range) the set frequency is not accepted when the E key is pressed and the previous frequency is displayed again. Repeat the input.
- 1. The long and short audible signals can be separately switched off in the service mode.

3. Storage procedure

When the S key is pressed a storage operation is activated in mode 1. CH and the last storage channel which was called up appear in the bottom line. Select the required storage channel using keys 0 to 9. This causes the frequency indication in the top line to go out. After completion of the channel selection, press the E key to acknowledge the input. The frequency to be stored then appears again in the top line. If a free channel is selected, in which no frequency has yet been stored, the letter F (free channel) additionally appears in the bottom line before CH. The storage operation is ended by pressing the S key. The internal operating voltage is then displayed again in the bottom line.

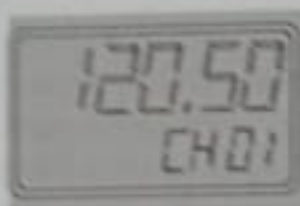
NOTE

If the storage operation is not completed using S key or a different mode is selected using the MODE key, storage of the selected frequency in the desired channel does not take place.

3.3.5.2 Mode 2 (display of fixed frequencies in the various channels)

Channel selection mode

1. Select mode 2 using the MODE key. The last displayed storage channel appears in the bottom line of the LCD and the stored frequency is shown in the top line. If there is no frequency stored in the displayed storage channel, the active frequency from mode 1 is shown in the top line and the letter F (for free channel) is shown in the bottom line before CH. The VHF ground station is ready to transmit and receive on this frequency.



2. The required channel can be selected using the keys 0 - 9. If a free channel is selected in which no frequency has as yet been stored, the letter F (free channel) appears in the bottom line before CH. The storage operation is ended by pressing the E key.
3. Exit from mode 2 is achieved by pressing the MODE key.

Scan function

1. Pressing the S key changes from the channel selection mode to the scan function. In the scan function, the frequency appears in the top line of the display and the associated channel with the preset CS is shown in the bottom line.
2. In the scan function, either all the occupied storage channels or a required range of storage channels can be scanned. The scanning range is specified in the service mode. The various storage channels are scanned at 200 ms intervals. If the microprocessor finds a carrier in one of the channels, it holds another 400 ms on this channel and checks whether an evaluatable signal is present. If no evaluatable signal is present, it switches to the next channel and then reverts to the 200 ms intervals. In the event of an evaluatable reception signal being received the VHF ground station remains on the storage channel until an evaluatable reception signal is no longer present. After a hold time 0 to 60 seconds (can be set in the service mode) the scanning of the storage channels at 200 ms intervals begins again. The set squelch level is the criterium for an evaluatable reception signal, regardless of whether the squelch is activated or not.
3. If the VHF ground station is equipped with channel priority, this function can be switched ON or OFF in service mode SF 13

NOTE

If an adequate signal is required on the priority channel with option channel priority switched ON, the VHF ground station automatically leaves the SCAN mode and is ready for transmission and receive on this channel. For return to the SCAN mode, again press the S key.

4. The scan function is terminated by pressing the S key. The VHF ground station then begins to operate again in the channel selection mode the CS in the bottom line goes out and CH appears. To exit from mode 2 it is necessary to press the MODE key.

3.3.6 Service mode (equipment configuration)

The service mode is meant to enable to set the equipment configuration. The following settings can be changed or set:

SQL	Setting the squelch threshold
Slde	Setting the sidetone volume, if connected a headset
AU	Setting the Acknowledgement signal volume
SF4	Setting the hold time after completion of a call in the scan mode
SF5	Release the frequency setting (channel selection only)
SF6	Release the frequency storage
SF7	Erase of stored frequencies
SF8	Setting the "channel start" of the scanning range
SF9	Setting the "channel end" of the scanning range
COdE	Entering a password to secure the equipment configuration.
SF11	Acknowledgement signal ON/OFF
SF12	Dynamic mike input sensitivity
SF13	Channel priority ON/OFF switch (option) upwards serial no.: 46
FSqL	No function
SF 15	Block speaker key (LSP) function ON/OFF (upwards serial no.: 100)
- . -	Indication the software version and change status

3.3.6.1 Entering up the service mode

Switch off the VHF ground station. Hold the mode key (MODE) pressed and at the same time switch on the station. The VHF ground station switches to the service mode without a unit test. SQL appears in the top line and the switch on threshold of the squelch is shown on the bottom line.

NOTES

- | The settings are selected in steps by briefly pressing the MODE key in the service mode. If the MDE key is pressed at the end of the setting, the setting SQL then appears.
- | All values in the individual steps are set using keys 0 to 9 and are then acknowledged using the E input key and stored using the S storage key.
- | In the service mode the VHF ground station operates independently of the settings on the control panel, on the frequency which was last set as the active frequency. When the PTT-Key is pressed in the service mode, the display indicates in the top line the active frequency.
- | The user can secure his equipment configuration settings with the aid of a password. The VHF ground station is delivered from the factory without a password. Section COdE "Entry of password to secure the equipment configuration" describes how to enter a password.
- | If an option is not part of scope of delivery (e.g. SF 13), this setting is skipped when the mode key is pressed

3.3.6.2 Setting the squelch threshold

If function SQL is called up, the following displays appear.

Top line	SQL
Bottom line	00 to 200 Standard value 100 (HI sensitivity LO)

By means of the keys 0 - 9, the squelch threshold can be altered upwards or downwards. The set value is acknowledged by pressing the E key and stored by pressing the S key.

3.3.6.3 Setting the sidetone level, if connected a Head set

Call up the SIdE function using the MODE key. The following displays appears.

Top line	SIdE
Bottom line	00 to 63 Standard value 32 (LO level HI)

Using the keys 0 - 9, the sidetone level can be altered upwards or downwards. The set value is acknowledged by pressing the E key and stored by pressing the S key.

3.3.6.4 Setting the acknowledgement signal level

Call up the AU function using the MODE key. The following displays appears :

Top line	AU
Bottom line	00 to 63 Standard value 63 (LO level HI)

Using the keys 0 - 9, alter the acknowledgement signal level upwards or downwards. The set value is acknowledged by pressing the E key and stored by pressing the S key.

3.3.6.5 Setting the hold time in the scan function (if function SF4 is installed)

Call up function SF 4 using MODE key. The following displays appears :

Top line	SF 4
Bottom line	0.0 to 60.0

The hold time can be set as required between 0 and 60 seconds using the keys 0 - 9. The set value is acknowledged by pressing the E key and stored by pressing the S key.

3.3.6.6 Release the frequency setting (channel selection only)

Call up function SF 5 using the MODE key. The following displays appears :

Top line SF 5

Bottom line OFF or On

OFF = Frequency setting not possible. The VHF ground station can only work on the frequencies stored in the individual channels.

On = Frequency setting possible.

Select the required function using the key 0 and 1. The frequency setting status is acknowledged by pressing the E key and stored by pressing the S key.

3.3.6.7 Release the frequency storage

Call up function SF 6 using the MODE key. The following displays appears :

Top line SF 6

Bottom line OFF or On

OFF = The storage of frequencies in the individual channels is not possible. The VHF ground station can only work on the set frequency.

On = Storage of frequencies in the individual channels is possible.

Select the required function using the key 0 or 1. The frequency storage status is acknowledged by pressing the E key and stored by pressing the S key.

3.3.6.8 Erasing stored channel frequency

Call up function SF 7 using the MODE key. The following displays appears :

Top line SF 7

Bottom line CH channel number

Select the channel to be erased using the keys 0 - 9. The channel to be erased is acknowledged by pressing the E key acknowledge and erased by pressing the S key.

3.3.6.9 Setting the "channel start" of scanning range (if function SF4 is installed)

Call up function SF 8 using the MODE key. The following displays appears :

Top line SF 8

Bottom line CS channel number

Select the first channel, using the keys 0 - 9, at which the scan function is to begin. The set channel is acknowledged by pressing the E key and stored by pressing the S key.

3.3.6.10 Setting the "channel end" of scanning range. (if function SF4 is installed)

Call up function SF 9 using the MODE key. The following displays appears :

Top line	SF 9
Bottom line	CS channel number

Using the keys 0 - 9 select the last channel at which the scan function is to stop. The set channel is acknowledged by pressing the E key and stored by pressing the S key.

3.3.6.11 Entry of password to secure the equipment configuration

Call up the COdE function using the MODE key. The following displays appears :

Top line	COdE
Bottom line	0

Set any 4-digit numerical code using the keys 0 - 9. The set code is acknowledged by pressing the E key and stored by pressing the S key.

NOTE

As soon as a password is given an 0 appears in the bottom line when the service mode is called up. The numerical code must then be input using the keys 0 - 9. If the VHF ground station detects a wrong numerical code, it automatically switches to the last mode. If the password is to be erased or changed, this is done by calling up the service mode using the old password. The COdE function is then chosen and either an 0 is entered everywhere or the changed numerical code is entered.

3.3.6.12 Programming of acknowledgement signal

Call up function SF 11 using the MODE key. The following displays appears :

Top line	SF 11
Bottom line	0 or 1 or 2 or 3

0 =	acknowledgement signal long and short off.
1 =	acknowledgement signal long off and short on.
2 =	acknowledgement signal long on and short off.
3 =	acknowledgement signal long and short on.

Select the function using the keys 0 - 9. The set value is acknowledged by pressing the E key and stored by pressing the S key.

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3.3.6.13 Setting the dynamic mike input sensitivity

Call up function SF 12 using the MODE key. The following displays appears :

Top line	SF 12
Bottom line	00 bis 63 (LO sensitivity HI)

Using the keys 0 - 9 set the sensitivity. The set value is acknowledged by pressing the E key and stored by pressing the S key.

3.3.6.14 Channel priority ON/OFF switch (option upwards serial no.: 46)

Call up function SF 13 using the MODE key. The following displays appears :

Top line	SF 13
Bottom line	CS channel number

Using the keys 0 - 9 set the Channel priority. The set value is acknowledged by pressing the E key and stored by pressing the S key. Several channels can be selected on priority channels.

3.3.6.15 FSqL (no function)

3.3.6.16 Block speaker key (LSP) function ON/OFF (upwards serial no.: 100)

Call up function SF15 using the MDE key. The following displays appears :

Top line	SF15
Bottom line	OFF or On

OFF = Speaker key without function
On = Speaker key with function (Switchover between front speaker and external speaker)

Select the required function using the key 0 or 1. Store the required function by pressing the the E key and stored by pressing the S key. This selection becomes active after ending the service mode.

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3.3.6.17 Indication the software spec. no.: and change status

Call up function using the MDE key. The following displays appear.

Top line	software spec. no.: and change status Microprocessor
Bottom line	software spec. no.: and change status CO-Microprocessor (PIC)

3.3.6.18 Standard equipment configuration settings in service mode

The equipment configuration SQL - AU and SF12 settings given in the service mode are set by the factory as basic settings using standard values. If reversion to the standard values is required, the VHF ground station must be switched off and switched on again by simultaneously pressing the S and MODE keys.

3.3.6.19 Exiting of the service mode

The VHF ground station must be switched off to exit the service mode.

3.4 Safety instructions

The following instructions must be followed for safe operation of the VHF Bodenstation:

- | A speech test is to be performed before startup and it should be noted that if the speech test is carried out close to the ground station the results may be positive even if the antenna cable is broken or short-circuited. At a distance of 5 to 10 km no connection will be made.
- | Use a loud voice for speech communication and hold the microphone close to the lips. Otherwise cabin noise can be intrusive and make understanding difficult.
- | Use only microphones or headsets which are suitable for use in aircraft. Incoming radiation on the equipment antenna can affect the integrated amplifier of the microphone (feedback). This is noticeable in the ground station by whistling and/or heavy distortion. The described disturbances can occur in different ways on the different transmission channels.
- | Transmit buttons can stick and cause continuous transmission. Therefore, when transmitting ensure that the LED display (red) disappears when the transmission button is released.

Warning

- | High voltages inside refer servicing to qualified personal
- | Disconnect power input before servicing