



VHF Ground Station

TG 560 - (X)-(XX)

Installation and Operation

Manual DV 68410.03
Issue 1 July 2004

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FIRST ISSUE AND CHANGES

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Article No: 0578.711-071

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Section 1 GENERAL INFORMATION

1.1 Introduction

This manual DV 68410.03 describes the VHF Ground Station TG 560 - (X)-(XX).

The manual DV 68410.03 "Installation and Operation" contains the following sections :

	Section	Installation and Operation DV 68410.03	Maintenance and Repair DV 68410.04
1	General Information	X	X
2	Installation	X	X
3	Operation	X	X
4	Theory of Operation		X
5	Maintenance and Repair		X
6	Parts List		X
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1.2 Purpose of equipment

The station is a fixed station for voice communications in the VHF frequency range of 118.000 MHz to 136.980 MHz with 25 kHz/ 8.33 kHz channel spacing in the standard version. In the extended frequency range version it operates in the frequency range from 118.000 MHz to 155.975 MHz.

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

The station operates in a AC supply voltage range from 90 V ... 230 V 10% / 50 . . 60 Hz. The nominal supply voltage in DC operation is 24 V.

If the AC voltage supply fails, a control circuit switches over to external DC voltage.

The station is capable of delivering up to 20W power (RF-carrier) to an external antenna via 50- coaxial RF-cable

The station has simple user-friendly HMI, the main components are the dot-matrix liquid-crystal display (LCD) and controls (rotating knob and buttons). The information about current operating mode, active selected operating frequency and operating status of the equipment are displayed on the LCD. Control elements (knob, buttons) enable user to change operating modes, select operating frequency or channel and a stand by switch for switching on and off.

1.3.1 Short description

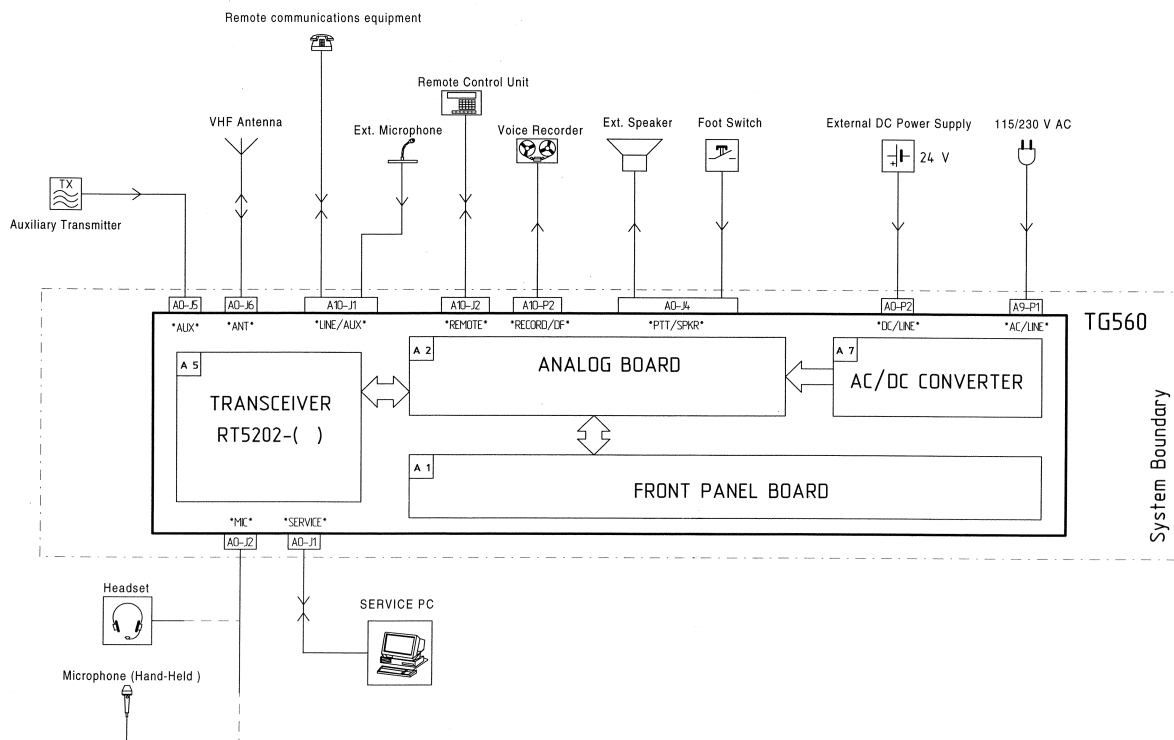


Fig. 1-1 -System diagram

1.3.1.1 Remote control VHF transceiver

The transceiver core module inside the TG 560 - (X)-(XX) is called RT 5202 - (). The RT 5202 - () is a remote controlled VHF transceiver. The RT 5202 - () is controlled from the microprocessor on the front panel board of the station via a RS 232 interface.

The rear of the VHF transceiver contains the main connector "male" for connection to the analog board and the antenna jack "female".

The VHF transceiver is equipped with a 20 W output power transmitter.

During transmission, the transmitter provides a natural sidetone signal.

If a 4:1 mismatch is applied to the transmitter output terminal, then the output power is reduced automatically to 40 % of the manufacturers declared nominal output power.

The VHF transceiver is fitted with a protective circuit to protect against jamming of the transmit button or a short circuit on the PTT line. The time limit setting for "stuck PTT" is 3 minutes.

The nominal RX audio output voltgate of the transceiver is 1 V rms.

The sidetone level is - 3 dB related to nominal RX audio output voltage.

1.3.1.2 Analog board

Primary functions of the analog board are :

- ❑ Providing interface for input audio signals from microphones and two-wire line, amplification and filtering of those signals switching the inputs to the TX modulation input of the transceiver RT5202.
- ❑ Providing interface for output audio signals coming from RX-part of RT5202, amplification, filtering and switching of those signals. Internal and external speaker, headphones, voice recorder and two-wire line can be connected to the equipment.
- ❑ Providing electrical interfaces for external discrete control lines (PTT's, RF-Switch-over and so on).
- ❑ Power management and providing low-voltage power supply for the components of the system.
- ❑ Feed-through of the control signals from microcontroller on the front panel board to the transceiver RT5202. RS-232, the PTT and some other signals are passed directly to RT5202 from microcontroller via analog board. The analog board provides all analog and discrete-signal external interfaces of the equipment. It also contains low-voltage power supplies for analog and digital processing.

Microphone inputs

The microphone inputs are designed for standard microphones unbalanced, dc coupled, provide the power supply for the mike. A dynamic mike input balanced and symmetrical line input . The inputs are connected to a dynamic volume compressor inside of the remote controlled transceiver which keeps the modulation voltage constant over a wide input voltage range.

The type of microphone – dynamic or standard can be selected by switches on the analog board. The mike input on the front panel (mike) is dynamic mike only.

Audio outputs

The station has four different outputs:

- Phone output
- Speaker output (speaker is switched off in transmit mode)
- Line out
- Voice recorder

The phone output is greater than 100 mW @ 600 . The rated output power loudspeaker is 2W/4 . The LINE_OUT – AF output nominal output level is 0 dBm 600 . The output level phone output and speaker output is adjustable with a potentiometer within the range –20...+10 dBm. The voice recorder output is -12 dBm to 0 dBm 600 balanced (adjustable with internal potentiometer).

Sidetone output

The sidetone signal is switched to the line output and phone output in transmit mode.

1.3.1.3 Front panel board

The front panel board is the human-machine interface and controls all other subsystems of the station. The microcontroller placed on the front panel board exchanges control information with the remote control transceiver via RS-232 interface, enabling change of operating frequency and other operating parameters of the equipment. Another task of the microcontroller is the processing of all discrete control signals which come from outside (PTT etc.) and providing the corresponding control signals to the subsystems and components inside the station. The microcontroller realises serial communication interfaces with remote control unit and Service PC which can be connected to the equipment. Service PC is a computer with service software running on it, which enables setting of operating parameters of the station, read out the list of failures etc.

The speaker is placed on the front panel. The speaker is switched off during TX transmitting. This avoids acoustic coupling between speaker and the microphone, which can cause oscillation.

1.3.1.4 Optional coaxial relay

An auxiliary transmitter can be connected to the equipment. In this case **optional coaxial relay and coaxial jack** must be installed. Auxiliary TX with higher power as provided by station is needed at some ATC facilities. The station operates as receiver in this configuration. VHF antenna is switched to the auxiliary TX if it is transmitting or it is connected to the remote control receiver operating as receiver.

1.3.1.5 Rear panel

The following are mounted on the rear panel:

The equipment connectors for connecting to the AC/DC power supply, voice recorder, remote control, record/DF, external speaker/PTT and line aux.

The antenna socket for connecting the antenna.

A cooling **fan is switched on** if the heat-sink temperature at remote control transceiver exceeds 80°C. Cooling fan is switched off if the heat-sink temperature decreases to 75° C.

1.3.1.6 Filter board (A10)

The primary function of the filter board is suppression of electro-magnetic interference by filtering of all signal lines coming from outside into the station. ESD protection elements are also placed on this board as well.

1.3.1.7 In-band control board

The in-band control board **is** provided as **option**. It receives(sends) pilot-signals on the 600-Ohm line from (to) remote communication equipment, realising control interface between the station and remote control equipment. Control pilot-signals are transmitted within voice frequency band thus eliminating the necessity of addition control lines (PTT and CALL) between the remote control transceiver and the station. Remote control transceiver looks like a handset with a PTT-button and a call indication signal lamp, lighting when RX signal is present on the 600- Ohm Line, as well as a control circuitry complementary to the one on the in-band control board.

1.3.2 Self test

The self test consists of three different test routines.

- PBIT is automatically initialized when the station is switched on.
- CBIT runs permanently in the background during the station is switched on.
- IBIT The IBIT is started by pressing "TEST" button.

The self test is described in detail in section 3 and 4.

1.4 Variants

Part-No.:	Description	Drawing N	Article-No.:
TG 560-(1)-(00)	Frequency range 118.000 - 136.980 MHz	684101-0000.000	0572.330-926
TG 560-(1)-(01)	Frequency range 118.000 - 136.980 MHz Remote control (pilot tone)	684102-0000.000	0573.671-926
TG 560-(1)-(10)	Frequency range 118.000 - 136.980 Mhz RF switch over	684103-0000.000	0573.681-926
TG 560-(1)-(11)	Frequency range 118.000 - 136.980 MHz Remote control (pilot tone) RF switch over	684104-0000.000	0573.698-926
TG 560-(2)-(00)	Frequency range 118.000 - 155.975 MHz	684105-0000.000	0573.701.926
TG 560-(2)-(01)	Frequency range 118.000 - 155.975 MHz Remote control (pilot tone)	684106-0000.000	0573.711-926
TG 560-(2)-(10)	Frequency range 118.000 - 155.975 MHz RF switch over	684107-0000.000	0573.736-926
TG 560-(2)-(11)	Frequency range 118.000 - 155.975 MHz Remote control (pilot tone) RF switch over	684108-0000.000	0573.744-926

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

1.5 Technical data**1.5.1 Technical data general, power supply**

AC-operating voltage	115 / 230 V 50/60 Hz
DC-operating voltage	24 V nominal
Current consumption at 115 V AC	typ. I _{RX} = 320 mA typ. I _{TX} = 1.3 A
Current consumption at 230 V AC	typ. I _{RX} = 330 mA typ. I _{TX} = 700 mA
Current consumption at 26 V DC	typ. I _{RX} = 680 mA typ. I _{TX} = 5.3 A
Fuse	
AC voltage	2 AT
DC extern voltage	8 AT
Protection against wrong polarity	at DC external voltage
Standard frequency range	118.000 MHz - 136.980 MHz
Extended frequency range	118.000 MHz - 155.975 MHz
Channel spacing	25 kHz/8.33 kHz automatically selected
Number of channel memories	20
Modulation type	AM; A3EJN
Warm up time	120 sec.
Antenna impedance	50
External / Internal speaker power	2 W sinus @ adjustable with volume control at the front panel
Headphone output level	100 mW @ 600 unbalanced adjustable with volume control at the front panel

AF-line input level	- 20 dBm to 10 dBm, adjustable with internal potentiometer
Dynamic mike sensitivity	2 mV to 10 mV @ 200 balanced
Standard mike sensitivity	75 mV 250 mV @ 150 unbalanced DC supply 12 V/470
AF-line input impedance	600 10 %
AF-line output level	- 20 dBm to 10 dBm, adjustable with internal potentiometer
AF-line output impedance	600 10 %
Distortion	10%
Voice recorder output	- 12 dBm to + 0 dBm 600 balanced adjustable with internal potentiometer

1.5.2 Technical data environmental

Operating temperature range	- 20° C . . . + 55° C
Storage temperature range	- 55° C . . . + 85° C
Humidity (operating)	48h 50°C 95% RH without condensation
Vibration	1 Hz to 14 Hz const. amplitude 0.1 inch 14 Hz to 24 Hz 1g const. 24 Hz to 40 Hz const. amplitude 0.036 inch 40 Hz to 767Hz 3g const.

1.5.3 Technical data receiver

Sensitivity m = 30 % / 1 kHz	-101 dBm for 12 dB SINAD
Bandwidth	2.8 kHz for 8.33 kHz 8.5 kHz for 25 kHz
Adjacent channel rejection	60 dB
Spurious reponse rejection	70 dB
Intermodulation reponse rejection	70 dB
Blocking or desensitisation	80 dB
Cross modulation rejection	80 dB

Squelch operation	6 dB (S+N)/N 12dB software adjustable
Override level	-85 dBm
Hysteresis	6 dB
Audio noise	40 dB (S+N)/N @ -13 dBm
AF response 8.33 kHz channel spacing	350 Hz 2500 Hz 2 dB ripple -4dB reference 0dB @ 1 kHz
AF response 25 kHz channel spacing	300 Hz 3400 Hz 2 dB ripple -4dB reference 0dB @ 1 kHz
RF-input level range	-101 dBm RFLEVEL 10 dBm
RF dynamic range	6 dB AF variation for 100 dB RF variation
AF-AGC for 30% m 90%	AF level variation 1.5 dB
Conducted spurious emissions	
9 kHz to 150 kHz	-57 dBm (RBW 1 kHz)
150 kHz to 30 MHz	-57 dBm (RBW 9 kHz to 10 kHz)
30 MHz to 1GHz	-57 dBm (RBW 100 kHz to 120 kHz)
1 GHz to 4 GHz	-47 dBm (RBW 1 MHz)
118.000 MHz to 136.975 MHz	-81 dBm (RBW 10 kHz)

1.5.4 Technical data transmitter

Transmitter power output VSWR 1:1 standard	20 W 1.5 dB
setable by software	9.5 W
Protection of the transmitter	VSWR = ; without any damage
Tolerable VSWR	4 : 1
Frequency stability	1 ppm
Modulation factor	85% m 90 %
Modulation compression	linear up to 85%; 2 dB
Modulation distortion	10%

AF response 8.33 kHz channel spacing	350 Hz 2500 Hz - 4 dB ripple 2 dB, reference 0dB @ 1 kHz
AF response 25 kHz channel spacing	300 Hz 3400 Hz - 4 dB ripple 2 dB reference 0dB @ 1 kHz
Duty cycle	1 minute transmit- and 4 minutes receive mode
Adjacent channel power 8.33 kHz channel spacing	50 dB
25 kHz channel spacing	60 dB
Broadband noise	-130 dBc/Hz
Conducted spurious emissions	TX active (exclusion band carrier 1 MHz)
9 kHz to 150 kHz	-46 dBm (RBW 1 kHz)
150 kHz to 30 MHz	-46 dBm (RBW 9 kHz to 10 kHz)
30 MHz to 1GHz	-36 dBm (RBW 100 kHz to 120 kHz) harmonics -46 dBm (RBW 100 kHz to 120 kHz) non-harmonics
1 GHz to 4 GHz	-30 dBm (RBW 10 kHz) harmonics -40 dBm (RBW 10 kHz) non-harmonics
Intermodulation attenuation	40 d c 118.000 MHz to 136.975 MHz) 35 dBc (> 136.975 MHz)
RF power attack and release time	$t_{al} = 20 \text{ ms}; t_{rl} = 10 \text{ ms}$
Keying transient frequency behaviour of the transmitter	30 dB

1.5.5 Technical data mechanical

Dimensions	
Case	428.4 x 367.9 x 88.1 mm
19 inch unit	482,6 x 367.9 x 88.1 mm
Antenna connector	N-female
Weight (without options)	7.7 kg
Front panel color	grey (according RAL 7032)

1.5.6 Approvals

DFS

D-0012/2005

1.5.7 Scope of delivery

TG 560 - (X)-(XX)

see para 1.4 variants in section 1

Fuse 1.25 AF

Article no.:0499.031-392

Fuse 2 AT (2 pieces)

Article no.:0253.766-392

Fuse 8 AT

Article no.: 0710.652-392

Cable connector (DC connection)

Article no.:0724.890-277

Mains cord (AC connection)

Article no.:0295.728-277

1.6 Accessories

Antenna connector RG 213/214

Article no.: 0716.502-277

Cabel connector (soldering)

CK 560-(01)-S 9 pol male

Article no.: 0584.924-954

CK 560-(02)-S 9 pol female

Article no.: 0584.932-954

CK 560-(03)-S 25 pol male

Article no.: 0584.940-954

Cabel connector (crimp)

CK 560-(01)-C 9 pol male

Article no.: 0584.967-954

CK 560-(02)-C 9 pol female

Article no.: 0584.975-954

CK 560-(03)-C 25 pol male

Article no.: 0584.983-954

Hand mike dyn. with
cable with 5-pole DIN connector 1PM012

Article no.: 0344.214-951

1PH028 Headset, mike dyn. 200 ,
Headphone 300 , 5-pole DIN connector

Article no.: 0860.557-951

Lightning protection, overvoltage protection

Article no.: 0887.870-277

Antenna 1 A 049

Article no.: 0812.064-952

Manuals

Installation and Operation DV 68410.03	Article no.: 0578.711-071
Maintenance and Repair DV 68410.04	Article no.: 0578.703-071
Operating Instructions	Article no.: 0582.921-071

1.7 Service software tool set / SST560

Service software tool set / SST560 Article- No.: 0587.631-919

consist of:

Service software tool SST560	Article- No.. 0587.095-909
Antistatic Plastic Bag 200x300x0,05	Article- No.: 0734.314-183
Serial cable RS-232, 1,5m long	Article- No.: 0587.621-276

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Section 2 INSTALLATION

2.1 Installation in a ATC desk

2.1.1 General

The station can be incorporated in an Air Traffic Control (ATC) desk depending on the type of the latter. The following instructions thus apply only in a general way.

Caution

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

2.1.2 Pre-installation check

Inspect the unit prior to installing the 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.

2.2 Mechanical installation of the station in an 19-inch equipment rack

The station is designed for mounting in a standard 19-inch rack or in an ATC desk at any time.

2.3 Thermal considerations

Convection cooling is improved by following measures: vent openings in the cover of the station, thermal contact between side panel and transceiver unit, by switching on the fan, if convection cooling is not sufficient to hold the temperature of transceiver heat-sink below 80°C.

Going out from the construction measures taken in order to improve thermal mode, following provisions should be made when installing the equipment:

- Don't close the openings on the cover of equipment.
- Maintain minimum 5 mm clearance between side panel of equipment and the side panel of equipment rack.
- Provide the free way for the fan air flow streaming out of equipment.

Temperature controlled fan, mounted on the rear panel is activated if the temperature of the TX heat-sink exceeds 80 °C.

2.4 Electrical installation of the station

High Voltage

The station is supplied from 115 or 230 V AC network. Dangerous voltages are present in the area of AC Inlet, EMI filter and AC/DC converter.

Warning

The maintenance and repair of the equipment is to be carried out by qualified personal only !

Disconnect the AC voltage before opening the cover !

2.4.1 Grounding the station

The grounding terminal (M 5 screw with nut) which is clearly marked with the grounding symbol is located on the back. The 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.

2.4.2 Radio-frequency radiation

The station must be correctly installed, mounted and grounded according to instructions given in this manual. The station shall be used only with antenna systems which are qualified for operation in ATC mobile communications service and for which the radio frequency radiation hazard awareness for operations and maintenance personnel is provided.

WARNING.

The station may become a cause of radio frequency radiation hazard if incorrectly installed, mounted and grounded, or if used with non approved antenna systems.

2.4.3 Lightning protection

To protect the station from lightning strike or static discharge at the antenna, a lightning protection element has to be fitted in the antenna coaxial cable. The housing of the lightning protection element has 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.

Article No. 887.870-277

Replacement cartridge up to 40 W transmitter power.

Article No. 887.889-277

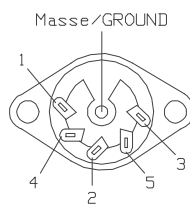
2.4.4 Installation of antenna system

For safety reasons the antenna system should be installed only by trained personnel. The correct installation and grounding of the antenna system is an essential precondition for trouble free operation of the station.

2.5 Pin connection frontplate

2.5.1 Pin connection mike connector (MIC)

Pin	Signal	Description
1	GND	Signal Ground and Return for PTT
2	MIKE HI	Microphone AF Signal
3	HEADPHONE	Headphones AF Signal
4	MIKE LO	Microphone AF Signal
5	PTT	PTT Switch Input



2.5.2 Pin connection service connector (Service)

Pin	Signal	Description
1	NC	No Connection
2	TXD	TX Data, RS232 Interface Data Line
3	RXD	RX Data, RS232 Interface Data Line
4	NC	No Connection
5	GND	Common Return Line for RS232
6	NC	No Connection
7	NC	No Connection
8	NC	No Connection
9	NC	No Connection

2.6 Pin connection rear side

2.6.1 Pin connection remote control (REMOTE)

Pin	Signal	Description
1	RX-	RS422 Data Line
2	TX-(TXD)	TX Data, RS232 or RS422 Data Line
3	RX-(RXD)	RX Data, RS232 or RS422 Data Line
4	TX-	RS422 Data Line
5	GND	Common Return Line for RS232
6	NC	No Connection
7	NC	No Connection
8	NC	No Connection
9	NC	No Connection

2.6.2 Pin connection RECORD/DF

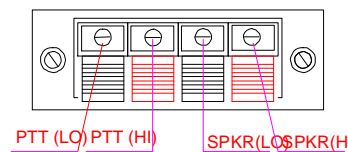
Pin	Signal	Description
1	DF_BL (HI)	DF Blanking Signal
2	DF_BL (LO)	DF Blanking Signal
3	Common	TG 560 Internal Ground
4	VR_OUT (HI).	Audio to Voice Recorder
5	VR_OUT (LO)	Audio to Voice Recorder
6	Common	TG 560 Internal Ground
7	NC	No Connection
8	VR_ACT (HI)	Voice Recorder Activation Control
9	VR_ACT (LO)	Voice Recorder Activation Control

2.6.3 Pin connection Line/AUX)

Pin	Signal	Description
1	DC-INT	28V DC to Supply Ext. Equipment
2	DC-RETURN	28 DC Return Line
3	LINE_OUT (HI)	AF Signal to Communication Equipment
4	LINE_OUT (LO)	AF Signal to Communication Equipment
5	PTT-LINE (HI)	LINE PTT
6	CALL-LINE (HI)	CALL indicator
7	LINE_IN (HI)	AF Signal from Communication Equipment
8	LINE_IN (LO)	AF Signal from Communication Equipment
9	LINE_IN (C)	Central Tap of LINE IN Input
10	RF_SO (HI)	RF-Switchover Control Input
11	MIKE_EXT (HI)	Ext. Microphone Input
12	MIKE_EXT (LO)	Ext. Microphone Input
13	CHASSIS	Internal Ground (Housing)
14	TX_ACT (HI)	TX active Indicator
15	TX_ACT (LO)	TX active Indicator
16	LINE-OUT(C)	Central Tap of LINE OUT Output
17	PTT-LINE (LO)	PTT
18	CALL-LINE (LO)	CALL Indicator
19	RF_SO (LO)	RF-Switchover Control Input
20	COMMON	Analog Ground
21	NC	No Connection (Spare)
22	PTT_AUX (HI)	PTT for Auxiliary TX
23	PTT_AUX (LO)	PTT for Auxiliary TX
24	NC	No Connection (Spare)
25	CHASSIS	Internal Ground (Housing)

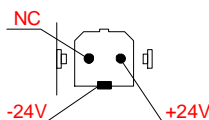
2.6.4 Pin connection J 4PTT/SPKR (PTT speaker terminal block)

Pin	Description
1	PTT_EXT (LO)
2	PTT_EXT (HI)
3	SPKR (LO)
4	SPKR (HI)



2.6.5 DC EXT. INPUT connector P 2

Pin	Description	
1	NC	Not Connected (Reserved)
2	+ 24 V	+24V DC
PE	-24 V	Return Line for +24 V DC



2.6.6 Connection AC mains power supply

To connect the standard cable IEC 60-320-1 for the AC mains power supply between the main connector 230V/115V on the rear side and the AC network.

With the ON/OFF switch on the rear side to switch off the 220V/115 AC supply voltage from the mains supply only.

Note

The equipment is operating with AC-power as standard. If the AC-power fails, an automatic switch over to DC-power is performed. If AC-power becomes available again, automatic switch over back to AC-power is performed.

2.6.7 Connection DC-extern power supply

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

CAUTION

Do not mix up the polarity!

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

NOTE

The 24 V DC supply voltage can not be switched off from the the external 24V DC power supply.

2.6.8 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 PTT/SPKR or the line/AUX jack on the rear panel .

Microphone jack

Microphone jack	Pin 5	PTT
	Pin1	GND

Terminal block PTT/SPKR

PTT /SPKR jack	Pin 1	PTT_EXT (LO)
	Pin 2	PTT_EXT (HI)

Note

If the PTT switch input (microphone jack and terminal block PTT/SPKR) is tied to ground, TX is activated. The inputs are tolerant to input voltages in the range from -35 to +35 V DC. PTT is active in the range from -35 to + 1,2V. The cable length between PTT foot switch and terminal block shall be ≤ 3 m.

Connector LINE/AUX

PTT-LINE (HI)	Pin 5	PTT-LINE (HI)
PTT-LINE (LO)	Pin 17	PTT-LINE (LO)

Note

PTT-LINE (HI/LO) –optically decoupled PTT input. Active level 28+/-3 V. If 28 V signal is present on this input TX is activated and TX modulation input of remote controlled transceiver is switched internally to LINE-IN input of equipment.

2.6.9 Connection of an external speaker

The station is designed to allow the connection of an external loudspeaker. The external speaker must be connected to pins 3 SPK HI (+) and 4 SPK LO (-) of the terminal block. The cable length between speaker and terminal block shall be ≤ 3 m.

The output **is not galvanically decoupled**. The lead SPKR (LO) is internally connected to signal ground. The output SPKR (HI) has coupling capacitor connected internally in series. The rated power output of the audio amplifier is 2 watts at 4 Ω .The max output power is 4 watt at 4 Ω

The external and internal speakers can switched ON/OFF by pressing the SPKR key on the front panel together with the internal speaker. The internal and external speaker can also be switched ON/OFF by software command via RS 232 serial data line.

2.6.10 Internal speaker

The internal speaker can additionally be enabled / disabled with an internal switch (see Fig. 2-1) of the analog board independent from ON/OFF Key LSP.

2.6.11 Headphone connection

Headphone output front plate

Only headphones with an impedance of 600 Ohm and nominal output power 100 mW can be connected to the headphone output on the frontplate. The output **is not galvanical decoupled**.

The loudness is controlled with the "VOLUME" rotating knob on the front panel.

Phone	Pin 3	Headphones AF signal
GND	Pin 1	Signal ground

2.6.12 Microphone connection

Mike connector (MIC) front plate

The signals MIKE (HI) and MIKE (LO) built up balanced AF input of the station. Input impedance 200 Ω , nominal input voltage 10mV. Adjustable with internal potentiometer (see Fig. 2-1) in the range from 2 to 10 mV. The microphone connection on the front plate is built up for dynamic mike only.

MIKE (HI)	Pin 2	Microphones AF signal
MIKE (LO)	Pin 4	Microphones AF signal

Connector LINE/AUX rear side

The station is designed to allow the connection of an external microphone. The microphone amplifier can be configured for operation with both standard (carbon) and dynamic microphones by setting jumpers (see Fig. 2-1) on analog board in corresponding position.

Standard (carbon) microphone

For standard (carbon) microphone operation mode the station has a balanced input with a input resistance 150Ω and a nominal sensitivity 250 mV, adjustable within the range from 75 to 250 mV (see Fig. 2-1). The power supply for standard microphone is dc supply voltage (open circuit) 12V, feed resistance 470Ω .

MIKE EXT (HI)	Pin 11	Microphone Input
MIKE EXT (LO)	Pin 12	Microphone Input

Dynamic microphone

For dynamic microphone operation mode the station has a balanced input with an impedance of 200 Ohm input resistance and a nominal sensitivity of 2 mV, adjustable within the range from 2 to 10 mV with internal potentiometers (see Fig. 2-1).

MIKE EXT (HI)	Pin 11	Microphone Input
MIKE EXT (LO)	Pin 12	Microphone Input

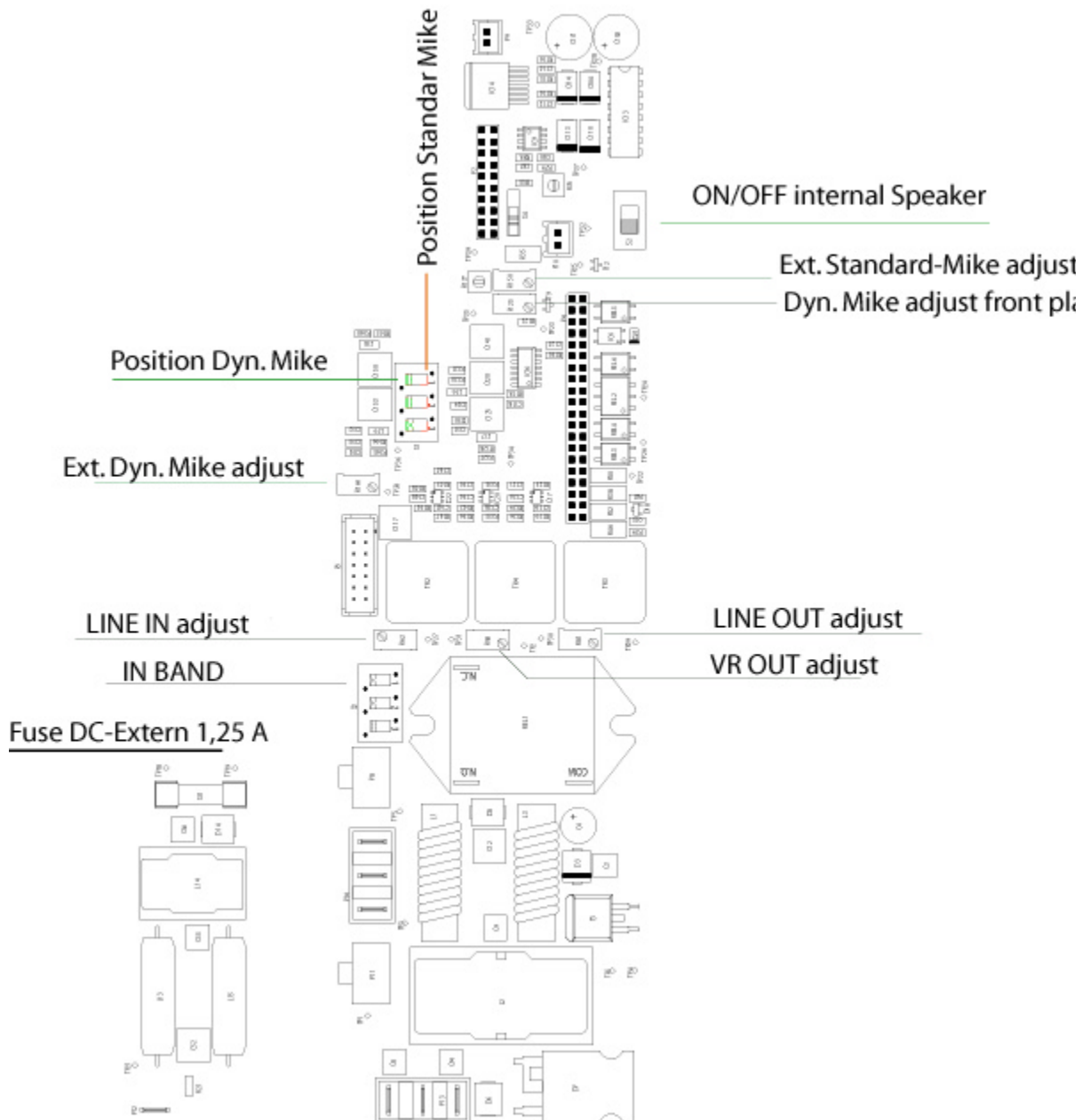


Fig. 2-1 Location of components analog board

2.6.13 Connection voice recorder (connector "Record/DF")

AF output to the external voice recorder

TX sidetone and RX AF signals from the ground station are present at this output for recording the information. The output is galvanically decoupled from housing and internal signal ground. Nominal load resistance 600Ω, nominal output level - 0 dBm @600Ω, adjustable with internal potentiometer (see Fig. 2-1 "VR OUT adj.").

VR_OUT (HI)	Pin 4	Audio to Voice Recorder
VR_OUT (LO)	Pin 5	Audio to Voice Recorder

Control external voice recorder

This signal is provided to control external voice recorder. Maximum switching current is 20 mA. Voltage drop at 20 mA not more than 1V. Maximum switching voltage 65V (Opto-isolated switching contact).

The switch is closed either if TX is active or if RX squelch is open. It means that both transmitted and received signals are recorded if voice recorder is connected to the station.

VR_ACT (HI)	Pin 8	Voice Recorder Activation Control
VR_ACT (LO)	Pin 9	Voice Recorder Activation Control

2.6.14 Switching output for direction finder blanking (connector "Record/DF").

The switching output is provided to control external automatic direction finder (direction finder tuning out during transmission).

The switch (Opto-isolated switching contact) is closed if TX is active. Maximum switching current is 20 mA. Voltage drop at 20 mA not more than 1V. Maximum switching voltage 65V.

DF_BL (HI)	Pin 1	DF Blanking Signal
DF_BL (LO)	Pin 2	DF Blanking Signal

2.6.15 Connection DC-INT / DC RETURN (connector "LINE/AUX")

This output is 28V DC power supply voltage provided to supply auxiliary external equipment. DC-INT Line is short-circuit protected by means of 1.25 AT Fuse (Fuse is placed on analog board refer to fig. 2-1). Nominal output current 0.5 A. DC-RETURN Line is internally connected with signal ground.

DC-INT	Pin 1	28V DC to Supply Ext. Equipment
DC-RETURN	Pin 2	28V DC Return Line

2.6.16 Connection LINE IN / LINE OUT (connector "LINE/AUX")

The LINE IN input is a balanced AF input.

The LINE IN input is galvanically decoupled from housing and internal signal ground by an AF transformer. The AF Transformer has center tap which is connected to pin 9 LINE_IN (C). Nominal load resistance 600Ω, nominal output level 0 dBm @600Ω, adjustable with internal potentiometer (see Fig. 2-1 "LINE IN adj.") within the range from – 20dBm to +10 dBm. Center tap can be used to provide PTT control and CALL indication without additional control lines.

LINE_IN (HI)	Pin 7	AF Signal from Communication Equipment
LINE_IN (LO)	Pin 8	AF Signal from Communication Equipment
LINE_IN (C)	Pin 9	Center Tap of LINE IN Input

The LINE OUT output is a balanced AF output

The RX AF signal from the station is present at this output. The output is galvanically decoupled from housing and internal signal ground by an AF transformer. The AF transformer has central tap which is connected to pin 16 – LINE_OUT (C). Nominal load resistance 600Ω, nominal output level 0 dBm @600Ω, adjustable with internal potentiometer (see Fig. 2-1 "LINE OUT adj.") within the range from 20dBm to +10 dBm. Center tap can be used to provide PTT control and CALL indication without additional control lines.

LINE_OUT (HI)	Pin 3	AF Signal from Communication Equipment
LINE_OUT (LO)	Pin 4	AF Signal from Communication Equipment
LINE_OUT (C)	Pin 16	Center Tap of LINE OUT Output

2.6.17 Connection CALL- LINE (connector "LINE/AUX")

The CALL-LINE (HI/LO) is an opto-isolated switching control line. The signal HI/LO indicates the presence of received RF signal.

The switch is closed if RX squelch is open. This signal is provided to indicate call at remote communication equipment. Maximum switching current is 20 mA. Voltage drop at 20 mA not more than 1V. Maximum switching voltage 65V.

CALL_LINE (HI)	Pin 6	CALL Indicator
CALL_LINE (LO)	Pin 18	CALL Indicator

2.6.18 Connection TX_ACT LINE (HI/LO) (connector "LINE/AUX")

TX_ACT LINE (HI/LO) is an opto-isolated switching control line. The switch is closed if TX is active. Maximum switching current is 20 mA. Voltage drop at 20 mA not more than 1V. Maximum switching voltage 65V.

TX_ACT (HI)	Pin 14	TX ACTIVE Indicator
TX_ACT (LO)	Pin 15	TX ACTIVE Indicator

2.6.19 Connection PTT_AUX LINE (HI/LO) (connector "LINE/AUX")

PTT_AUX LINE (HI/LO) is an opto-isolated switching control line. This control line switch an auxiliary transmitter ON/OFF, if RF_SO signal is activated. Maximum switching current is 20 mA. Voltage drop at 20 mA not more than 1V. Maximum switching voltage 65V.

PTT_AUX (HI)	Pin 22	PTT for Auxiliary TX
PTT_AUX (LO)	Pin 23	PTT for Auxiliary TX

2.6.20 Connection RF_SO LINE (HI/LO) (connector "LINE/AUX") (optional coaxial relay)

This signal of the RF_SO line controls the RF signal path if the optional RF- switchover coax relay is installed. An external key connected on the control line RF_SO is activated by pressing to ground. The RF- switchover coax relay connects the external auxiliary transmitter ("RF-AUX"-Jack) and VHF antenna, which is connected to the "ANTENNA" Jack of the station. Simultaneously the auxiliary transmitter is activated over the control line /PTT_AUX.

The RF_SO control line is tolerant to input voltages in the range from -35 to +35 V. RF Switch over is active in the range from -35 to 1.2V. It is sufficient to short-circuit the both lines HI and LO to activate the signal, so any normally-open switch can be used.

RF_SO (HI)	Pin 10	RF-Switchover Control Input
RF_SO (LO)	Pin 19	RF-Switchover Control Input

2.7 Installation options

2.7.1 Installation in-band control board

- a. Switch off the VHF ground station.

Caution

Disconnect the AC and DC voltage before opening the cover !

- b. Using a phillips screwdriver, remove the 4 phillipshead screws and 2 countersunk screws from the top cover. Remove the top cover.
- c. Using a phillips screwdriver, remove the 4 phillipshead screws and 1 countersunk screws from the bottom cover. Remove the bottem cover.
- d. Insert the Inband Control Board to placment on the analog board (see fig.2-2)
- e. Check for proper mating of electrical connector.
- f. Set the switch S3 on the analog board into position INBAND.

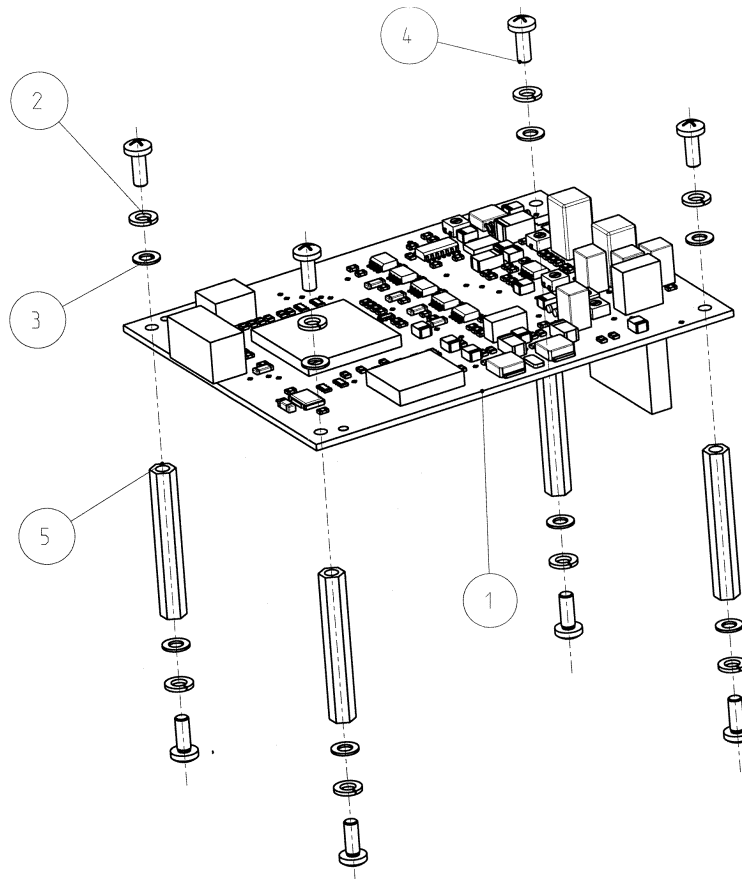


Fig. 2-2 Installation in-band control board (option)

2.7.2 Installation coaxial relay

- a. Switch off the VHF ground station.

Caution

Disconnect the AC and DC voltage before opening the cover !

- b. Using a phillips screwdriver, remove the 4 phillipshead screws and 2 countersunk screws from the top cover. Remove the top cover.
- c. Using a phillips screwdriver, remove the 4 phillipshead screws and 1 countersunk screws from the bottom cover. Remove the bottom cover.
- d. Unscrew the rear panel from the housing assembly.
- e. Disconnect fan cable.
- f. Remove KL4 with RF-jack. ANT
- g. Mounting jack J6 with cable KL1

- h. Mount jack J5 with cable KL2
- i. Slide coaxial relay assembly into the rail in the side panel of VHF ground station. Place mounting screws and tighten down (see fig. 2-3).
- j. Connect coaxial relay cable KV20 to analog board.
- k. Connect coaxial cables KL1, KL2, KL3 as shown in the figure 2-4.
- l. Mount the rear panel to the housing assembly.
- m. Connect fan cable
- n. Mount the top and bottom covers.

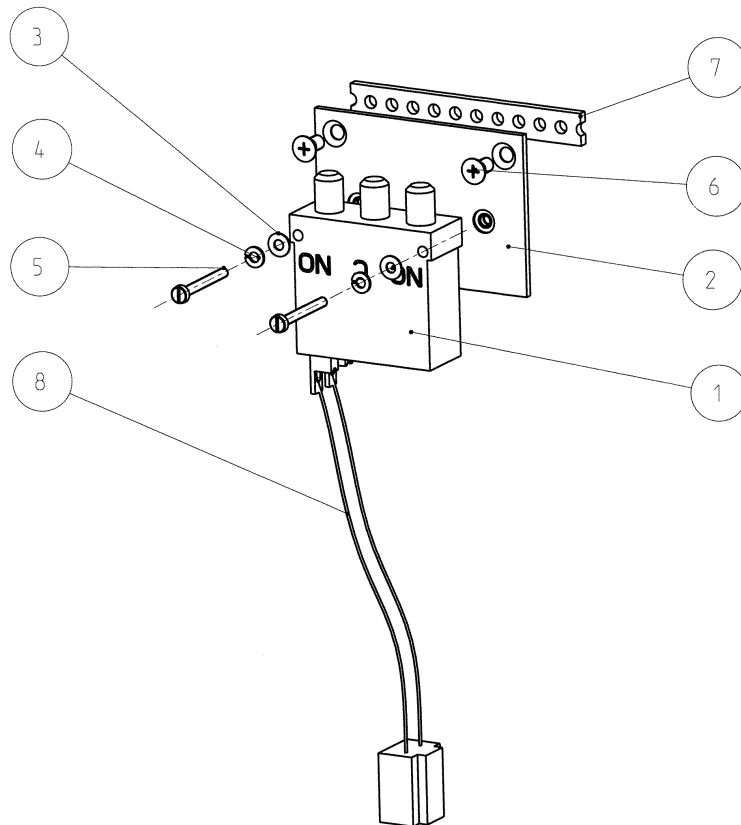


Fig. 2-3 Mounting view coaxial relay

Software Configuration

Start the service software on PC. Use the service software operator's manual for guidance.
Using service software switch coax relay option on.
Press the TEST-button.
Check that IBIT is accomplished successfully

REAR PANEL FOLDED OUT

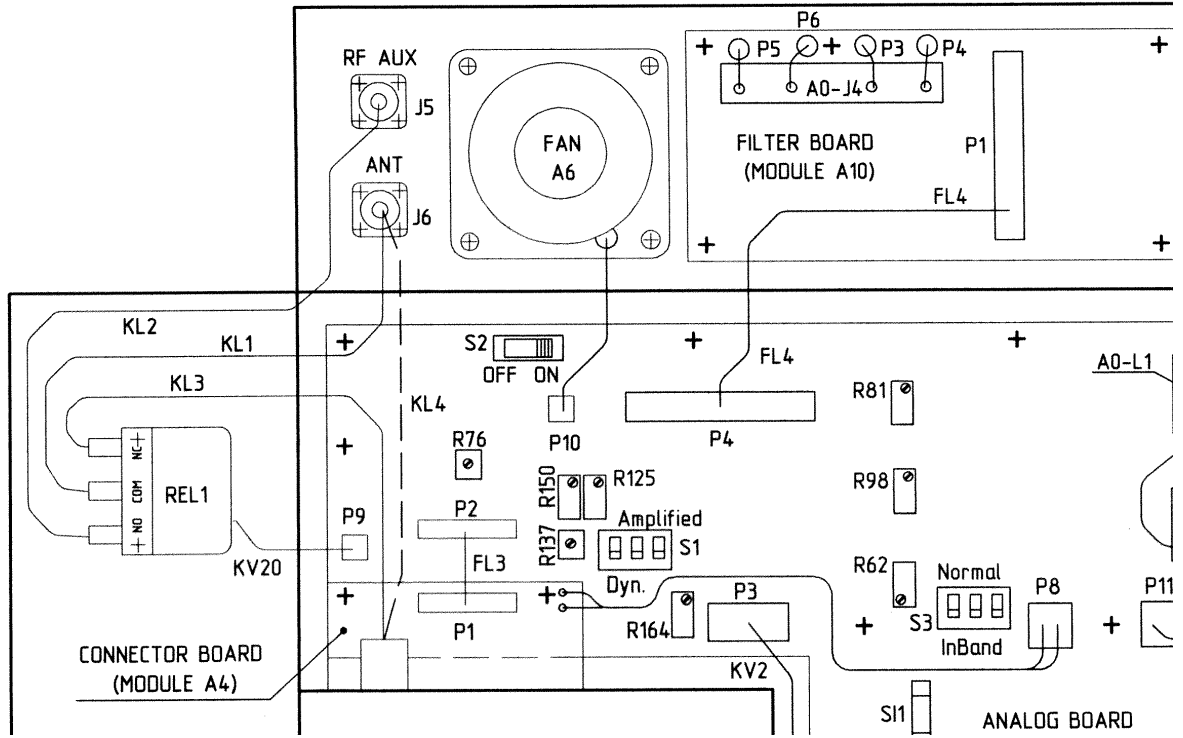


Fig. 2-4 -Wiring diagram coaxial relay

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TG 560 - (X)-(XX)

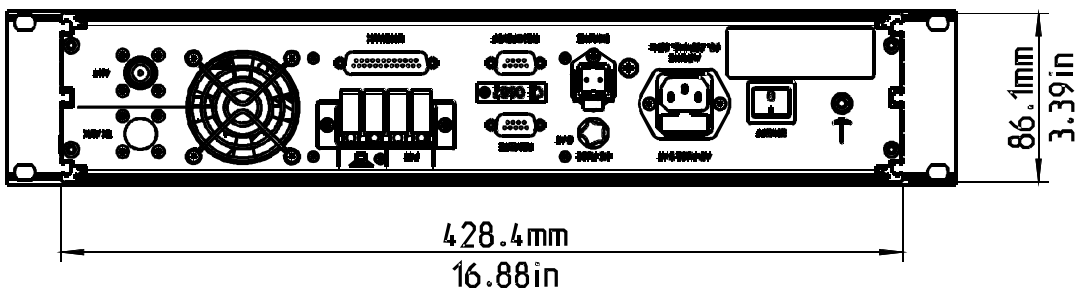
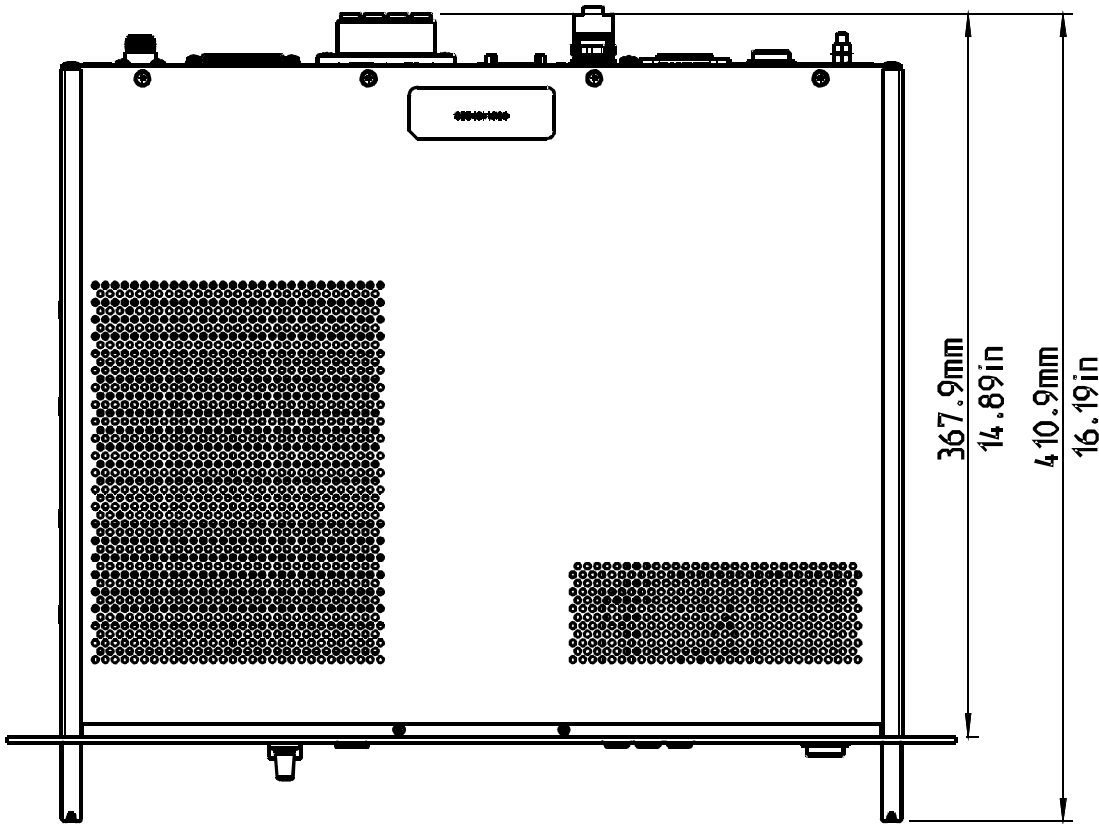
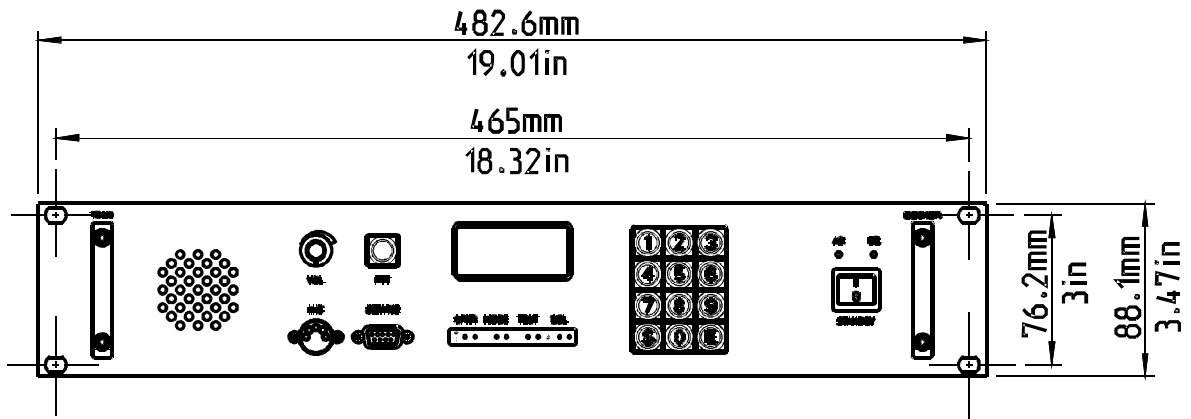


Fig. 2-5 Dimensions TG 560 -(X)-(XX)

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Blank

Section 3 OPERATION

3.1 Controls and indicators

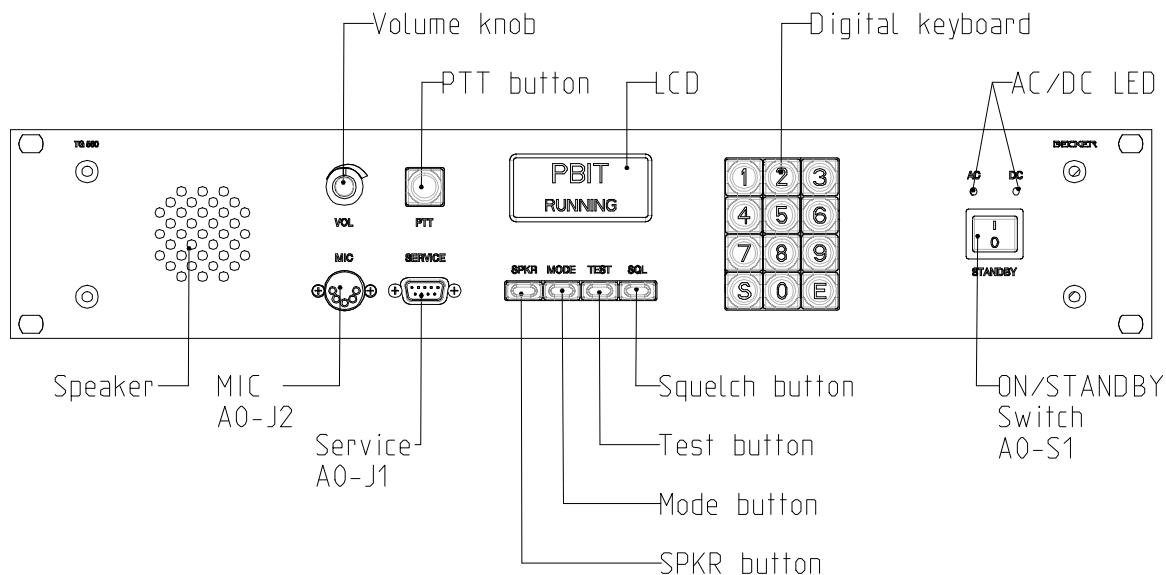


Fig. 3-1 Controls and indicators

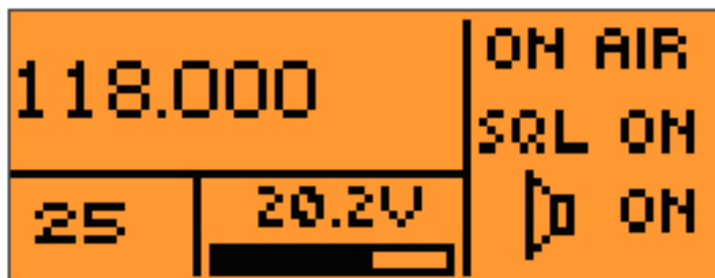
3.2 Meaning of symbols on controls and indicators

Description	Function
ON/standby switch	Switching the station ON/OFF
Speaker key (SPKR)	Switching the internal speaker and external speaker ON or OFF
Mode key	<p>momentary press</p> <p>Selection of mode: Operating mode Channel mode</p> <p>long press</p> <p>Selection of mode: Dimming-mode (change from standard- or channel-mode to Service-mode From Dimming-mode to Service-mode.</p>
TEST key	By pressing the test key the test function IBIT is activated

Description	Function
Squelch key	Switching the squelch ON/OFF. By long pressing the squelch key the threshold setting function is activated. If the squelch key is short pressing, the unit go back to the previously selected mode.
Key (E)	Use to acknowledge inputs
Key (S)	Storage key
Keys 0 - 9	Numerical keyboard
Volume control	Adjustment of volume
AC/DC LED	Indication AC or DC supply voltage
MIC	For connection of a microphone / head set
Service	For connection of a service computer

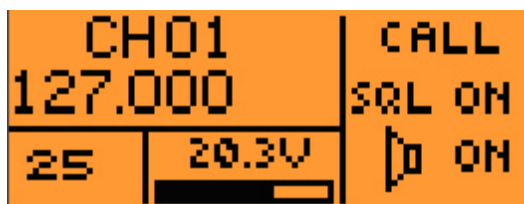
3.3 LCD (liquid crystal display) elements

3.3.1 Standard mode



Description	Function
(top line)	Indication of active transmission/reception frequency (active frequency)
(bottom line 25)	Indication 8.33 or 25 kHz channel spacing
(bottom line 28,0 V)	Indication of DC supply voltage
(top line ON AIR)	Indication of transmitt mode
(bottom line SQL ON)	Indication of squelch ON/OFF (receive mode)
(bottom line speaker symbol ON)	Indication of speaker internal / external is switch ON/OFF

3.3.2 Channel mode



Description	Function
(top line)	Indication the selected storage channel
(top line)	Indication of active transmission/reception frequency (active frequency)
(bottom line 25)	Indication 8.33 or 25 kHz channel spacing
bottom line 28,0 V)	Indication of DC supply voltage
(top line CALL)	Indication of receive mode (only if a correct reception signal is received)
(bottom line SQL ON)	Indication of squelch ON
(bottom line speaker symbol ON)	Indication of speaker internal and external is switch ON/OFF

3.3.3 Display dimming



Description	Function
Press the "S"-key	The backlight intensity is decreased
Press the "E"-key	The backlight intensity is increased.

3.3.4 Service mode



Indication service mode

3.3.5 Connecting sockets rear side

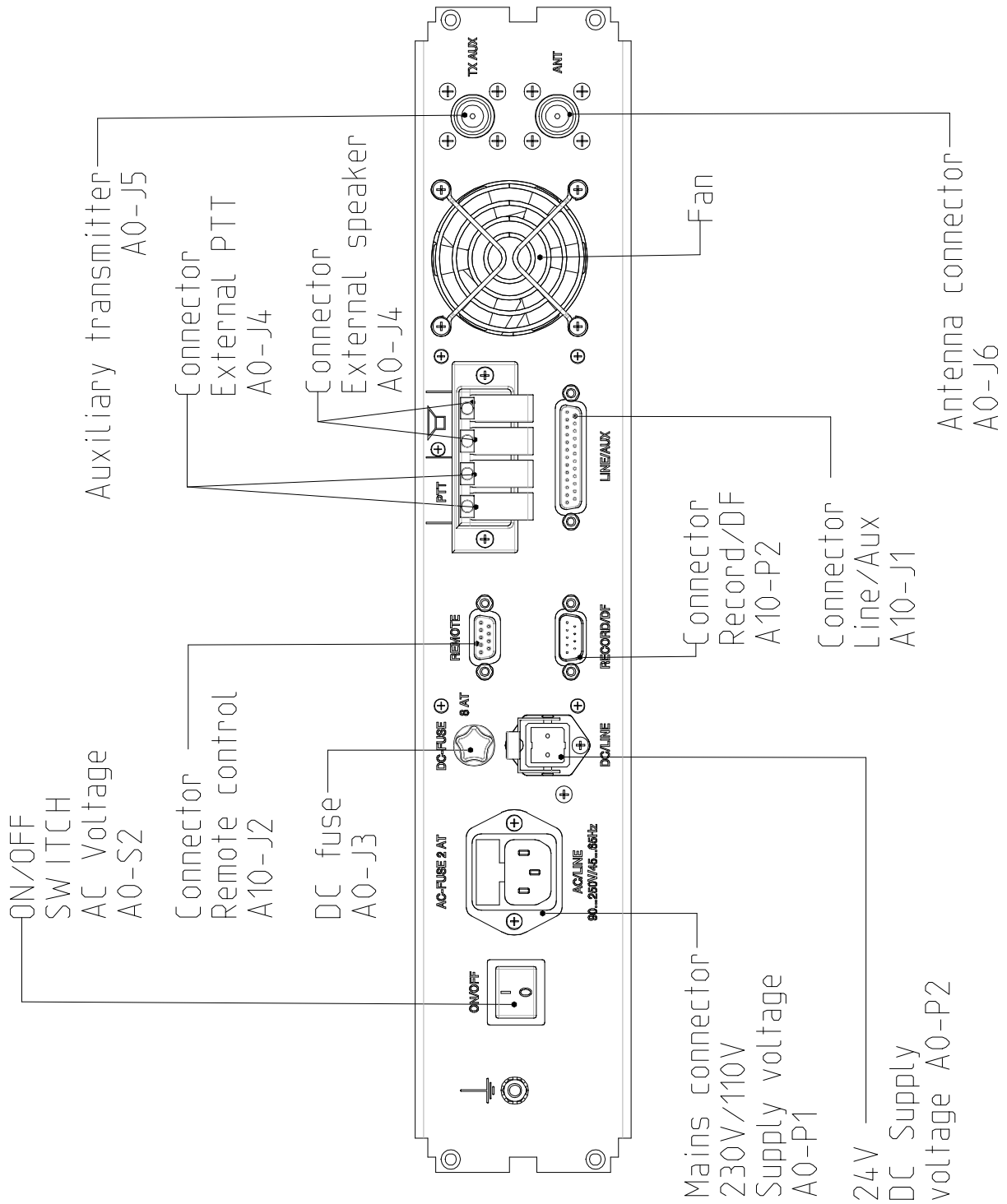


Fig. 3-2 Rear side

3.4 Operating instructions

3.4.1 Switching on the station

1. Switch on the station using the ON/OFF STANDBY switch on the front plate. The “*Becker Logo*” appears for 2 seconds on the LC display

Note

The equipment works with AC-power as standard. If the AC-power fails, an automatic switch over to DC-power is performed. If AC-power becomes available again, automatic switch over back to AC-power is performed.

Depending on which source the station is powered, the associated indication at the front panel (LED green) is illuminated.

If the station switches from AC to DC-power or vice-versa, the station is operable with the same functions and settings as before.

3.4.2 Power on Built in Test (PBIT)

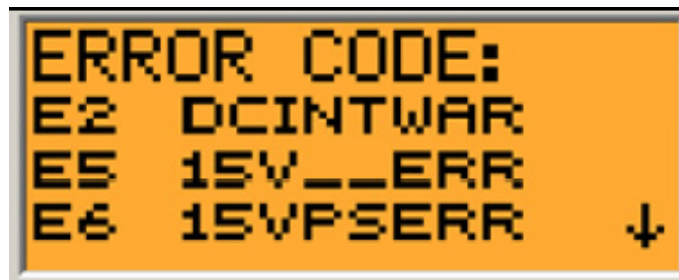
- a. The PBIT is started when the station is switched on. In the LC display appears for 2 seconds “**BECKER Logo**”



Afterwards, the indication changed the indication as shown on and stays until PBIT is finished for minimum 1 second.



2. If the PBIT is completed successfully, the station automatically switches to the mode which was selected before switch-off.
3. If the PBIT **fails and the detected error is non-fatal**, an "ERROR" flashing indication appears in the LC display for 20 seconds. If, during this time, the "E" button on the front panel is pressed, the error list appears in the LC display. Otherwise, the unit switches automatically to the operating mode as selected before the equipment was switched off.



4. If the PBIT **fails and the detected error is fatal**, an "ERROR" appears in the LC display permanently until the "E" button on the front panel is pressed. If "E" is pressed, the error list is displayed. This error event is **stored** in NVRAM.
5. If the PBIT **fails and the detected error is warning**, an "ERROR" flashing indication appears in the LC display for 20 seconds. If, during this time, the "E" button on the front panel is pressed, the error list appears in the LC display. Otherwise, the unit switches automatically to the operating mode as selected before the equipment was switched off. This error event is **not stored** in NVRAM.

If up to three errors are encountered during PBIT, error codes appear in the LC display but without arrow on the right bottom corner of the LCD.

Error codes E01, E02, E03, and so on, are indicated in the LCD with short description.

6. If numerous errors are encountered during PBIT, error codes appear in the LC display. By pressing any key except for "S" and "E" the code of the next error is indicated, for example "ERROR 2 : E03", "ERROR 3 : E56", and so on, until the code of the last error is reached. If the code of the last error encountered is indicated and any key except for "S" is pressed again, the code of the first error "ERROR1: Exx" is indicated and so on.

If the key "S" is pressed during error(s) code(s) indication and there are non-fatal errors only or warnings the station switches to the operating mode as selected before the equipment was switched off.

If the key "S" is pressed during error(s) code(s) output and there were fatal errors flashing indication appears. All controls of the station are disabled. By pressing "E" to go back to the errors list and so on.

3.5 Operation of the standard mode

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

3.5.1 Standard mode

1. The last displayed active frequency is shown upper left part of the LCD. Select standard mode with the "MODE" key.



2. "SQL ON" indication appears in the right middle part of the display if the squelch is switched ON, otherwise "SQL OFF".

The squelch threshold setting function can be activated by long pressing the **SQL** key. The actual digital threshold value is indicated in the top part of LCD between "SQL level" and "dB" indications. The squelch level display format is "XX dB, whereby "X" is a decimal digit. If the "E" key is pressed, the squelch threshold is increased in step of 1 dB. If the "S" key is pressed, the squelch threshold is decreased in step of 1 dB. If the "SQL" key is short pressed or if no key is pressed within 5 seconds the unit goes back to the previously selected mode. The squelch level setting range is from 6 dB to 23 dB



Note

The loudspeaker symbol ON/OFF appears in the right bottom part of the LCD if the speaker (internal or external) is switched on or off.

When the station is working on 28 V DC voltage, a numeric and bargraph indication appears in the left bottom part of the LCD. If the external DC- voltage falls below 20V, the voltage indication flashes.

If the station is supplied from mains power supply (AC) the indication of DC voltage disappears.

The symbol "ON AIR" in the upper right part of the display appears if TX is active, or if RF-SO function is active. The symbol "CALL" in the upper right part of the display appears if receive mode is active, and the squelch is ON and the reception signal is acceptable.

3.5.1.1 Setting operating frequency

Set the operation frequency of the station with the keys 0 - 9. Immediately after key 0-9 is pressed the frequency channel name indication and the channel spacing go out. The digits move from right to left on each further input.

Note

If "E"- button is pressed, the frequency input is acknowledged and stored.

If the "E"-button is not pressed within 10 seconds after pressing numerical key, the unit goes back to the previously set frequency.

If more than six digits are edited no more is accepted and the frequency channel name indication is inverted for 2 second and the station goes back to the previously set frequency.

If less than 6 digits are edited and if the "E"- button is pressed the frequency channel name indication is inverted for 2 second and the station goes back to the previously set frequency .

If an incorrect input is made (for example digit 3 in the first position or the extended channel name) the input of this digit is ignored and frequency channel name indication is inverted for 2 seconds, then the station waits for 10 seconds for correct input. If no correct input is made within 10 seconds the station goes back to the previously set frequency.

3.5.1.2 Storage procedure

When the "S" key is pressed in **standard mode** a storage operation is activated. Immediately after pressing "S" key the frequency channel name in the upper part of the display disappears. "CH" appears in the top of the display. Underneath the operating channel name appears. The required storage channel is selectable by pressing numeric keys 0-9.



Incorrect input is ignored (digits other than 0.1.2 in the first position and channel numbers greater than 20).

If selected channel is FREE, "F" letter appears. If selected channel was used earlier, "F" letter does not appear and user can overwrite previous data.

If incorrect (channel) number is input, the bottom line CHxx must be inverted for 1 seconds and the indication goes back to the previous indication.

The storage is acknowledged by pressing the "E" key. After acknowledgement the indication goes back as described for standard mode.

If the "E" button is not pressed within 10 seconds after pressing digital key, the station goes back to the standard mode indication.

Note

The interdependence of the operating channel name and real operating frequency of the transceiver is shown:

Channel Name	Channel Frequency	Channel Spacing
118.000	118.0000 MHz	25 kHz
118.005	118.0000 MHz	8.33 kHz
118.010	118.0083 MHz	8.33 kHz
118.015	118.0166 MHz	8.33 kHz
118.025	118.0250 MHz	25 kHz
118.030	118.0250 MHz	8.33 kHz
118.035	118.0333 MHz	8.33 kHz
118.040	118.0416 MHz	8.33 kHz
118.050	118.0500 MHz	25 kHz
118.055	118.0500 MHz	8.33 kHz
118.060	118.0583 MHz	8.33 kHz
118.065	118.0666 MHz	8.33 kHz
118.075	118.0750 MHz	25 kHz
118.080	118.0750 MHz	8.33 kHz

Channel Name	Channel Frequency	Channel Spacing
118.085	118.0833 MHz	8.33 kHz
118.090	118.0916 MHz	8.33 kHz
118.100	118.1000 MHz	25 kHz
...
155.975	155.9750 MHz	25 kHz
155.980	155.9750 MHz	8.33 kHz

3.5.1.3 Channel mode

1. Select storage mode using the "MODE" key. The last displayed storage channel appears in the upper left part of the LCD and the stored frequency is shown under the channel number.

If FREE channel number is selected "F" letter is displayed in the upper left corner of LC display (e.g. for CH01). Under the channel number the operating frequency channel name shall be indicated (e.g. 127.000).



3.5.2 Test IBIT

1. The IBIT is started by pressing "TEST" button.

The indication is displayed during IBIT or at least for 2 seconds, if IBIT duration is shorter than 2 seconds.



If the **IBIT fails and the detected error is non-fatal or warning**, a **flashing indication "ERROR"** appears for 20 seconds. If during this time the "E" button on the front panel is pressed, the error list is displayed, otherwise the station is automatically switched to the operating mode as selected before the equipment was switched off.



If the **IBIT fails and the detected error is fatal**, a **flashing indication "ERROR"** appears permanently until the "E" button on the front panel is pressed. If the "E"-key is pressed, the error list is displayed.

If one error is encountered during IBIT the ERROR CODES appear, but without an arrow on the bottom side of LCD. Error codes E01, E02, E03, and so on, are indicated. For the list of error's codes and their severity level (fatal/non-fatal/warning) see failure identifiers and codes page 3-14.

If the IBIT fails **only active error and warning** list is displayed

If numerous errors are encountered during IBIT the error list is indication. By pressing any key except for "S" the code of the next error is indicated, for example "E3 ANTERROR", "E35 RT5202ER", and so on, until the code of the last error is reached. If the code of the last error encountered is indicated and any key except "S" is pressed again, the code of the first detected error "Exx xxxxxxxx" is displayed and so on.

If the key "S" is pressed during error(s) code(s) output and there were no fatal errors the station is switched to the operating mode as selected before the equipment was switched off.

If the key "S" is pressed during error(s) code(s) output and there were fatal errors **flashing** indication "ERROR" appears, all controls of the station **except "MODE" key** is disabled. By pressing the "E" key the stations goes back to the errors list and so on.

It is possible, to go to service mode by pressing "MODE" key, if fatal error was detected.

3.5.3 CBIT functions

If the **CBIT fails and the detected error is non-fatal or warning**, an “error” flashing indication appears .

If the **CBIT fails and the detected error is fatal**, an “error” flashing indication appears permanently until the ” **E** ” button on the front panel is pressed. If ”**E**” is pressed , the error list is displayed.

If the CBIT fails **only active error and warning** list is displayed.

3.5.4 Display dimming

Display dimming function is activated by a long press of the ”**Mode**” Key.:

The display as shown on:



If the ”**S**”-key is pressed the backlight intensity is decreased. If the ”**E**”-key is pressed the backlight intensity is increased. Display intensity can be changed in 10 steps beginning with backlight switched off up to full backlight intensity.

If the ”**Mode**” key is pressed for a short time, or if no key is pressed, within 5 seconds the station goes back to the previously selected mode.

3.5.5 Service mode

The service-mode can be activated from display dimming mode by a long press of the **"Mode"**-key. The panel software version is indicated in the bottom part of LCD.

The service mode can be deactivated by **momentarily** pressing the **"Mode"**-Key. The station goes back to the previously selected standard or channel mode.



If the serial connection was successfully established between the station and the service PC, "ON LINE" is displayed, otherwise – "OFF LINE" as shown on.



In this mode the service connector, standard RS232 serial data port at the front panel is active for connection of a note-book PC.

For interface data see following table1 (service connector)

Name	Technical data	Connector type / placement	Pin-Name	Source	Destination
Remote-Data Port	Type: serial RS232 or RS422 standard 8 data bit, no parity bit 9600 baud	D-Sub, 9 pol / screw looking device rearside	TX+(TXD) RX+(RXD) TX- RX- Shield	TG560	Test-PC
Service-Data Port	Type: serial RS232 standard 8 data bit, no parity bit 9600 baud	D-Sub, 9 pol / without looking device. Front panel	RXD TXD Shield	TG560	Service PC

The required software tool for the note-book PC is designed and developed. This software is operable with the following software platforms:

Windows 98, 2000, NT or XP version

Together with the connected PC and a special software tool, it is possible to readout, change and store functions parameters and unit data as follows:

- Input operator's name (and details)
- Readout and change channel programming,
- Readout and change squelch level setting,
- Readout and change TX power output,
- Readout and change stuck PTT settings,
- Readout only error history,
- Readout only operating timer,
- Readout only OCXO frequency correction factor,
- Readout only life cycle data (serial numbers and versions),
- Readout only footswitch setting,
- Readout only RF switch setting,

Print out and/or save on disk:

- Operator Name,
- Actual date,
- programmed channels,
- Squelch level setting,
- TX power output setting,
- Stuck PTT settings,
- Error history,
- Operating timer status,
- Life cycle data (serial numbers and versions),
- footswitch setting,
- RF switch setting (installed/not installed)

3.6 Failure identifiers and codes

SSW Failure Identifier	Failure description	Severity (Fatal, Non-Fatal, Warning)	Detected by : (P-PBIT, I-IBIT, C-CBIT)	Error code	TG560 action/status
1	Memory test error	Fatal	P/I	E1 FATALERR	NVRAM & Stop working
2	28V DC_Intern <28V -5% @AC	Non-Fatal	P/I/C	E2 DCINTERR	NVRAM & Limited functionality
2	28V DC_Intern >28V +5% @AC	Non-Fatal	P/I/C	E2 DCINTERR	NVRAM & Limited functionality
9	24V DC_Extetn <20V @DC	Warning	P/I/C	E9 P24VWARN	Limited functionality
3	+5 V PS under-voltage	Non-Fatal	P/I/C	E3 P5VEERROR	NVRAM & Limited functionality
3	+5 V PS over-voltage	Non-Fatal	P/I/C	E3 P5VEERROR	NVRAM & Limited functionality

SSW Failure Identifier	Failure description	Severity (Fatal, Non-Fatal, Warning)	Detected by : (P-PBIT, I-IBIT, C-CBIT)	Error code	TG560 action/status
5	+15 V PS under-voltage	Non-Fatal	P/I/C	E5 P15VP SER	NVRAM & Limited functionality
5	+15 V PS over-voltage	Non-Fatal	P/I/C	E5 P15VP SER	NVRAM & Limited functionality
4	-15 V PS under-voltage	Non-Fatal	P/I/C	E4 N15VP SER	NVRAM & Limited functionality
4	-15 V PS over-voltage	Non-Fatal	P/I/C	E4 N15VP SER	NVRAM & Limited functionality
6	+15 V_PA PS under-voltage	Non-Fatal	P/I/C	E6 P15VPA ER	NVRAM & Limited functionality
6	+15 V_PA PS over-voltage	Non-Fatal	P/I/C	E6 P15VPA ER	NVRAM & Limited functionality
36	RX AGC error	Non-Fatal	P/I/C	E36 RT5202 ER	NVRAM & Limited functionality
40	RT5202 PSB Error	Non-Fatal	P/I/C	E40 RT5202 ER	NVRAM & Limited functionality
7	TG560/RT5202 lost connection error	Fatal	P/I/C	E7 RTCON- NER	NVRAM & Stop working
35	RX synthesizer error	Non-Fatal	P/I/C	E35 RT5202 ER	NVRAM & Limited functionality (possible in TX-mode)
37	TX synthesizer error	Non-Fatal	P/I/C	E37 RT5202 ER	NVRAM & Limited functionality (possible in RX-mode)
38	TX output power error	Non-Fatal	P/I/C	E38 RT5202 ER	NVRAM & Limited functionality
32	TX hot error	Non-Fatal	P/I/C	E32 HOTE- ROR	NVRAM & Limited working with reduced output power
33	TX overtemperature error	Non-Fatal	P/I/C	E33 OVTEM- PER	NVRAM & Limited functionality limited working in RX-mode only,
31	Antenna VSWR error	Non-Fatal	P/I/C	E31 ANTE- ROR	NVRAM & Limited working with reduced output power
10	Stuck PTT error	Warning	P/I/C	E10 STUCKPTT	Limited functionality in RX-mode only
11	IBC error	Non-Fatal	P/I/C	E11 IBCER- ROR	NVRAM & Limited functionality
8	RF coax switch error	Non-Fatal	P/I	E8 RELAYERR	NVRAM & Limited functionality
39	RT5202 internal error	Non-Fatal	P/I/C	E39 RT5202 ER	Limited functionality
34	RT5202 stuck PTT error	Non-Fatal	P/I/C	E34 STUCK PTT	Limited functionality in RX-mode only
41	RT5202 channel error	Non-Fatal	P/I/C	E41 RT5202 ER	Limited functionality

3.7 Transmit/Receive mode of the station

1. Switch on the station using the ON/OFF STANDBY switch on the front plate. The “Becker Logo” appears for 2 seconds in the LC display

Note

The equipment works with AC-power as standard. If the AC-power fails, an automatic switch over to DC-power is performed. If AC-power becomes available again, automatic switch over back to AC-power is performed.

Depending on which power the station is operated, the associated indication at the front panel (LED green) is illuminated

If the station switches from AC to DC-power or vice-versa, the station is operable with the same functions and settings as previously.

The settings selected before switch off is automatically restored when the station is switched on.

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

NOTE

The transmit mode appears in the upper right part of the display “ON AIR”. 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. The external and internal speaker can be switched on or off with the “LSP” key on the front panel.
4. Switch on the squelch (press SQL key). “SQL ON” indication appears in the right middle part of the display. Weak reception signals and reception noise are suppressed.

The squelch threshold setting function can be activated by long pressing the **SQL** key. The actual digital threshold value is indicated in the top part of LCD between “SQL level” and “dB” indications. The squelch level display format is “XX dB, whereby “X” is a decimal digit. If the “**E**” key is pressed, the squelch threshold is increased in step of 1dB. If the “**S**” key is pressed, the squelch threshold is decreased in step of 1 dB. If the “SQL” key is short pressed or if no key is pressed within 5 seconds the unit goes back to the previously selected mode. The squelch level setting range is from 6 dB to 23

3.8 Safety instructions

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

- 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 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 ambient 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 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 display (ON AIR) disappears when the transmission button is released.

WARNING

- High voltages inside. Refer servicing to qualified personnel
- Disconnect mains cable before opening the cover.