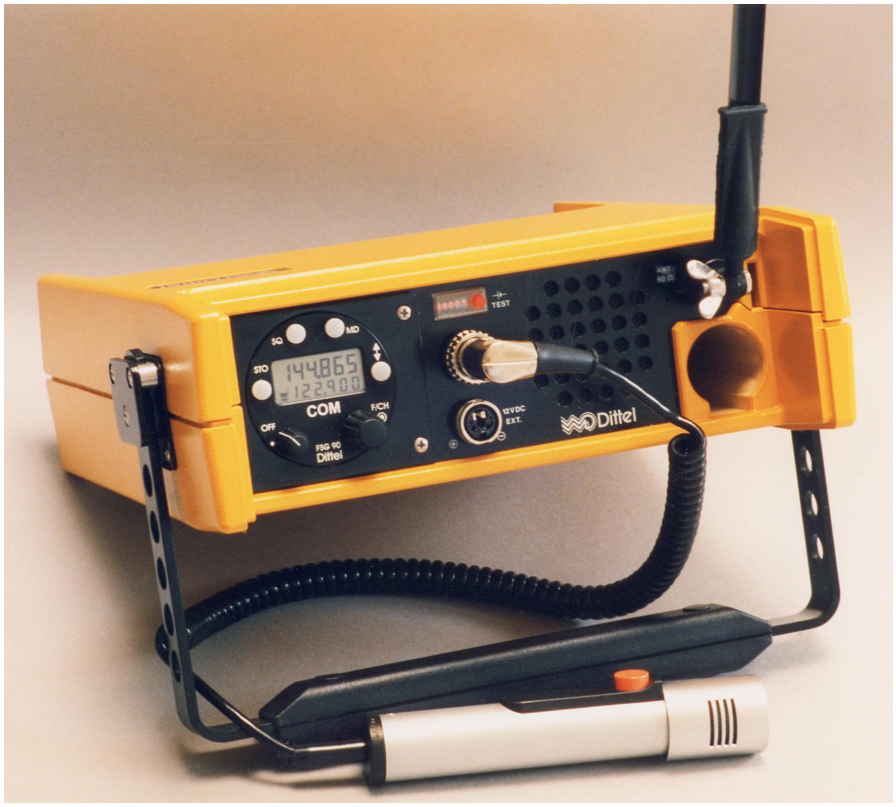

CE A132 947J

No. LBA.O.10.911/98 JTSO
DFS-Nr.: B-7851/97

FSG 90E PC

Dual Mode VHF/AM FIXED/PORTABLE/MOBILE AIRBAND TRANSCEIVER

OPERATOR'S MANUAL

This radio equipment may only be used by Authorities!

Before operating the Transceiver, please read this manual thoroughly!

Please observe the Safety Information!

Keep for further use!

Date of Issue December 2000
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Certified ISO 9001 Zertifiziert

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Warranty - Copyright - Service

Warranty

The details and data in this operator's manual correspond to the respective state of technology on the day of printing. We reserve our right to change without prior notice due to new technological design or corresponding new production technology.

Walter Dittel GmbH takes no guarantee for these documents with respect to application and interpretation.

Walter Dittel GmbH ("Warrantor") warrants to the purchaser of new radio equipment of the warrantor's manufacture that such equipment shall be free from defects in material and workmanship for a period of 24 month from the date of delivery. Equipment and accessory items not manufactured by the Warrantor carry the standard warranty (12 month) of the manufacturer thereof.

This warranty does not cover equipment which has been

1. **damaged or not maintained as reasonable and necessary,**
2. **modified in any way,**
3. **improperly installed,**
4. **repaired by someone other than the warrantor or an authorized warranty avionics workshop, or**
5. **used in a manner or purpose for which the equipment was not intended.**

This warranty shall not extend to incidental or consequential damages arising from operation of the equipment or from any claimed breach of this warranty.

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Service

Should any unusual problem arise or further information be desired, please contact your nearest Walter Dittel representative or the Walter Dittel GmbH, Measurement Technique Department, Erpftinger Strasse 36, D-86899 Landsberg am Lech, Germany.

We welcome your comments concerning this Operator's Manual. Although every effort has been made to keep it free of errors, some may occur. When reporting a specific problem, please describe it briefly and include the Operator's Manual article number, paragraph or figure number, and the page number.

Send your comments to

Publications Department
Walter Dittel GmbH
Erpftinger Strasse 36
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or via e-mail to guggenmos@dittel.com

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SAFETY INFORMATION

Every radio, when transmitting, radiates energy into the atmosphere that may, under certain conditions, cause the generation of sparks. All users of our radios should be aware of the following warning:

Do not operate this radio in an explosive atmosphere (gas, petroleum fuels, solvents, dust, etc.)!

During normal use, the radio will subject you to radio energy substantially below the level where any kind of harm is reported.

TO ENSURE PERSONAL SAFETY, please observe the following simple rules:

- Only persons entitled may operate the **FSG 90E PC**!
- **DO NOT** lean over the equipment when opening the cover! If not properly tightened the spring steel band antenna may bounce out**!**
- **DO NOT** transmit when the antenna is very close to, or touching, exposed parts of the body, especially the face and eyes.
- **DO NOT** transmit on a busy channel!
- **DO NOT** transmit in closed vehicles, aircraft or inside buildings with the spring steel band antenna! This may cause malfunction of the avionics, trigger the airbag or mix up domestic electronic equipment! Always operate the radio with a suitable external antenna! Assure appropriate lightning protection where elevated outdoor antennas are used.
- **DO NOT** press the transmit (PTT) key when not actually desiring to transmit.
- **DO NOT** allow children to play with any radio equipment containing a transmitter.
- **DO NOT** operate the radio whilst driving. It should also be noticed that the use of a hand held microphone while driving could constitute an offence under the Road Traffic Regulations in certain countries.
- **DO NOT** dispose worn out lead batteries with the household garbage.
- Always switch OFF the radio when installing or removing the unit!
- Always switch OFF the radio first when starting an engine or vehicle!
- When operating the **FSG 90E PC** on an external 24 Vdc source a suitable Voltage Converter 24 Vdc to 12 Vdc of at least 4 Amps must be used!
- The **FSG 90E PC** may be used exclusively for communication on the airband frequencies.
- Unauthorized modifications and changes of the system **are forbidden**.
- When replacing defective parts use only original spare parts or standard parts recommended by the manufacturer!

Used Symbols

In this manual the following symbols are used:

DANGER!
describes an immediate threatening danger! Failing to observe the note may cause death or heaviest injuries.

CAUTION!
describes a special note for operation. Failing to observe the note may cause damage of the transceiver and/or stored data may be deleted!

IMPORTANT!
describes explanations and other useful hints. Failing to observe the note may cause degraded performance and/or unsatisfying operation!

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SECTION 1 GENERAL DESCRIPTION

1.1 Introduction

This operator's manual contains operating instructions for the fixed/ portable/ mobile VHF/AM Airband Transceiver **FSG 90E PC** of Walter Dittel GmbH, D-86899 Landsberg am Lech, Germany.

1.2 Application & Description of the FSG 90E PC

The portable VHF/AM Airband Transceiver **FSG 90E PC** allows independent operation as an airborne or ground radio. Stationary, portable or mobile applications are possible. It consists of a portable case **70 PC** and a Dual Mode VHF/AM COM Transceiver **FSG 90E**, which can be simply inserted and positioned.

This radio is working within the extended airband frequency range of 118.000 MHz to 149.975 MHz in either combined 8.33 kHz/25 kHz increments (3,838 channels) or "25 kHz only" increments (1,280 channels). The operating mode is Simplex, i.e. transmitting or receiving only in turns.

The built-in rechargeable battery allows an independent operation of up to 85 hours (refer to paragraph 4.15, Battery Operating Time). Continuous operation is possible by the built-in charging unit or, externally, from a vehicle or aircraft DC supply. Microphone and antenna are retractable. External antennas, too, can be advantageously used.

The unit features 99 non-volatile channel memories each in combined 8.33/25 kHz and in '25 kHz only' operation, 3 display modes, true Sidetone via headphone, TX and supply voltage indicator at the back-lit display, TX time-out timer (2 minutes), a battery supply test, and a built-in loudspeaker. The lock-in type carrying handle and a protecting hood completes our **70 PC** unit.

1.3 Scope of Delivery

A complete Portable VHF/AM Airband Base Station **FSG 90E PC** consists of:

- A portable case **70 PC**, containing 12 Vdc/6.5 Ah lead calcium battery, charger for 115 Vac/230 Vac, 50 - 60 Hz, DC supply indicator, DC supply socket, microphone socket, antenna socket, loudspeaker, Snap-On cover - fits on top or bottom, and a Operator's Manual.
- a Dual Mode VHF/AM COM Transceiver **FSG 90E** and adapter 90-70/71M.
- a suitable vertically polarized VHF airband antenna, frequency range 118 to 150 MHz minimum, 50 Ohm, e.g., spring steel band antenna F10345, and
- a microphone, e.g., hand-held dynamic microphone with PTT-switch F10041.
- **When operating on 24 Vdc sources a suitable 24 Vdc/12 Vdc Converter of at least 4 Amps must be used!**

1.4 Operating License

IMPORTANT!

- ***THESE VHF/AM RADIOS ARE FOR OFFICIAL USE ONLY! Private use of these radios is strictly forbidden!***
- ***If required, state radio type, Serial number, JTSO number LBA.O.10.911/98 JTSO, and Reg Tp number A132947J.***

1.5 System and Type Approval Information

The Dual Mode VHF/AM Airband Transceiver **FSG 90E** complies for both the combined 8.33 kHz/25 kHz as well as 25 kHz channel spacing with all applicable National and International Type Approval requirements, for any airborne and ground operations.

- JTSO Authorization LBA.O.10.911/98 JTSO (LBA Luftfahrt-Bundesamt), based on *EUROCAE ED-23B Airborne requirement, is met besides 8.33 kHz requirements also for the 25 kHz ONLY channel spacing.
  This also includes Immunity according to ICAO ANNEX 10 against FM Broadcast Interference.
  This also includes fulfillment of specific audio filtering required in areas with CLIMAX operation in 25 kHz channel spacing.
  * Associated EUROCAE ED-14C / RTCA DO-160C Environmental requirements.
  * Associated EUROCAE ED-12B Software requirements based on ED-23B.
- Reg TP No. A132947J, stringent German Type Approval requirements Reg TP 321 ZV 034 (airborne) and Reg TP 321 ZV 039 (ground).
- DFS (Deutsche Flugsicherung) No. B-7851/97 (ground) German Type Approval requirements.
- BZT No. B132705J, CE Conformity,
  * Associated with DIN/ISO 7637-1 DC supply in 12 V vehicle.

IMPORTANT!

- ***For the first time after one year, then every 2nd year, ground applications using 8.33 kHz channel spacing require checking of the high precision reference frequency (tolerance less than ± 1.5 ppm) and recalibration, if necessary!***
- ***Every 4th year, airborne applications using 8.33 kHz channel spacing require checking of the high precision reference frequency (tolerance less than ± 5 ppm) and recalibration, if necessary!***
- ***All applications in the 25 kHz channel spacing require no recalibration (frequency accuracy tolerance less than ± 20 ppm).***
- ***All tolerances include the full operating temperature range of -20°C ... +55°C / -4°F ... +131°F.***
- ***Checking and recalibration must be performed by the equipment manufacturer or through authorized and approved avionics services. This requires use of specified test equipment as well as applicable test procedures (software) released by the manufacturer.***

1.6 Optional Accessories

Article-No.	Description
F10345	Spring steel band antenna, swivel type, UHF connector PL-259
W00043	Magnet mount vehicle rod antenna, incl. 4 m/13 ft cable, and UHF connector PL-259
W00066	Mobile Whip Antenna, 118 - 137 MHz, incl. 5 m/16.5 ft cable, and UHF connector PL-259
F10314	Balloon antenna, 118-137 MHz, weatherproof - flexible - high efficiency, including 3 m/10 ft cable and UHF connector PL-259
W00013	Roof mounted weatherproof folded-top fiberglass antenna, UHF-connector, anti static, 1" mount
E08943	UHF antenna connector PL-259 for antenna cable RG-213/U
B01116	Antenna cable RG-213/U, low loss, for roof antenna W00013, please state length (in meters)
F10041	Dyn. hand-held microphone incl. PTT-switch, coiled cord and 5-pole plug
F10042	Dyn. hand-microphone/loudspeaker with PTT-switch, coiled cord and 5-pole plug
F10125	Inline PTT-switch (U-94 A/U), coiled cord, 5-pole plug, to connect headset W00048, clip allows attaching to clothing
W00048	Dynamic headset with PJ-plug, fits inline PTT-switch
F10026	Cigar Lighter Cable, coiled cord, incl. 2-pole plug to supply station from 12 Vdc car battery (fits cigar lighter socket, minus = ground)
S20000	Converter 24 Vdc to 12 Vdc, 4 Amps, to operate the base Station from 24 Vdc sources like truck batteries etc.
E08833	2-pole twist-lock Connector, to fit into "12 V DC EXT." socket of carrying case **70 PC**.
E08834	5-pole twist-lock Connector, to fit into "MIC" socket of carrying case **70 PC**.

SECTION 2 FUNCTIONAL DESCRIPTION

2.1 Introduction

This section includes a functional description of each switch, push button, knob, socket, indicator and display located on the front or rear panel of the **FSG 90E PC**, together with operating instructions.
After removing the Snap-On cover all controls to operate the transceiver are accessible. The cover can be pushed onto the rear side of the carrying case.

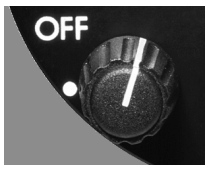
DANGER!

- ***DO NOT lean over the equipment when opening the cover! If not properly tightened the spring steel band antenna may bounce out!***

2.2 Operator's Controls and Indicators

A front and back view of the **FSG 90E PC** is given on the last page of this manual. Please fold out the back flap when reading the operating instructions. Each position number of a control, knob, switch, etc., corresponds to the number of control, knob, switch, etc., given below.

(1) **ON/OFF-VOL**



Rotary step switch
To turn ON the radio, rotate the **ON/OFF-VOL** knob clockwise from the OFF position (dot). When power is activated,

- all segments of the display are momentarily visible,
- the automatic squelch is activated,
- the display shows the frequency/ channel name in that operating mode, which was used before last turning OFF.

Rotating the **ON/OFF-VOL** knob clockwise increases - turning counterclockwise decreases the audio volume audible in the built-in loudspeaker (receive only) or connected headphone (TX Sidetone and receive).
To turn OFF the radio rotate the **ON/OFF-VOL** knob fully counter-clockwise (ccw) to the OFF position (dot). Blank display.

(2) **STO**

Push button
With the VHF/AM COM Transceiver **FSG 90E**, article-no. F10192, up to 99 frequencies/channel names in each operating mode (combined 8.33/25 kHz mode or '25 kHz only' mode) may be stored in a non-volatile memory. The channel memory numbers (1 …99) are user programmable.
Programming a frequency:

1. Set the frequency or channel name to be stored in the upper line at the display!
2. Initialize storing by pressing the **STO** button.
3. The last used channel memory number is displayed in the lower line.
4. A flashing "**CH**" shows "ready to store".
5. Select appropriate (new) channel memory number (1 to 99) by rotating the **F/CH** knob.
6. On a free channel memory an additional "**F**" (free) is displayed.

(2) **STO** continued

7. To enter the new frequency/channel name press the **STO**-button. The frequency/channel name will be stored under the adjusted channel memory number.
8. A previously stored frequency/ channel name will be overwritten.
9. The last used display mode is displayed.

Programming in the SET-UP mode:
In the SET-UP mode all settings must individually be confirmed by pressing the **STO** button. Otherwise the settings are not permanently stored.

(3) **SQ (SQUELCH)**

Push button
After turning ON the radio the automatic squelch is always active.
Momentarily pressing the **SQ**-Button

- puts the radio in the SQ-OFF mode (overrides the automatic squelch). Basic receiving noise is also audible during standby. Maximum receiving range. Increased current consumption.
- 'TX Disabled' is inactive, i.e. transmitting is possible even if the channel is busy.

Momentarily pressing the **SQ**-Button once more

- puts the radio in the standard display mode, automatic squelch is active. No receiving noise during standby. Only reception of signals above SQ threshold to be heard.
- When the squelch is active 'TX Disabled' is active, i.e. transmitting is only possible if the channel is not busy.

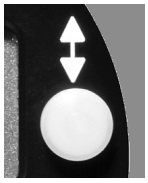
Note: For certain purposes 'TX Disabled' may be permanently switched OFF during SET-UP procedure.

(4) **MD**

Push button
Repeatedly pressing the **MD** (mode)-button alters the display mode:

Use/STBY Mode:	upper line	USE frequency
	lower line	STBY frequency
Channel Mode:	upper line	USE frequency
	lower line	channel memory number
Direct Tune Mode:	upper line	USE frequency
	lower line	blank

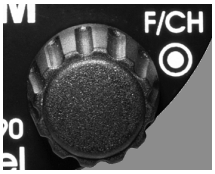
(5) **TRANSFER**



Push button
Momentarily pressing the Transfer button

- while in CHANNEL or DIRECT TUNE mode will return the radio to USE/STBY mode, **or**
- while in USE/STBY mode the last USE frequency will become the new STBY frequency and the last STBY frequency will become the new USE frequency, **or**
- while in the SET-UP mode will return the radio to the operation mode used before without power down. Only programmed settings stored previously by pressing the STO-button will be active.

(6) **F/CH**



Rotary control and push-button = dual function

Momentarily pressing the F/CH knob

- while in the USE/STBY or DIRECT TUNE mode changes the access from **kHz** to **MHz** or vice versa.
- If there is no activity for 30 seconds the F/CH knob will return to the kHz access.
- While in the CHANNEL mode pressing the F/CH knob is without function.

Rotating the F/CH knob

- while in the **USE/STBY** mode will increment or decrement the MHz or kHz portion of the STBY frequency with rollover at each band edge,
- while in the **CHANNEL** mode changes the channel memory number and corresponding frequency. Only channel numbers which were programmed before will appear,
- while in the **DIRECT TUNE** mode will increment or decrement the MHz or kHz portion of the USE frequency with rollover at each band edge.

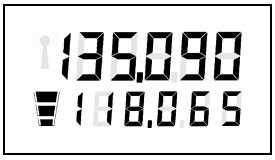
(7) Frequency Display

5-digit or 6-digit liquid crystal display (LCD), two lines, may be back-lit by pressing the "Test" button.

IMPORTANT!

- ***When the* FSG 90E *is operating in the combined 8.33/25 kHz mode the channel name is displayed with 6 digits.***
- ***When the* FSG 90E *is operating in the '25 kHz only' mode the frequency is displayed with 5 digits.***
- ***Display of frequency and channel name corresponds to ICAO recommendations!***

Examples:



Transceiver operates in the combined
8.33/25 kHz mode (6-digit display)

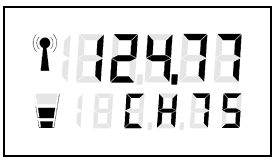
Upper line:	USE channel name (display 135.090 = 135.0916 MHz transmit and receive frequency)
Lower line:	STBY channel name (display 118.065 = 118.0666 MHz transmit and receive frequency)
Supply indicator:	3 segments: ≥ 12.7 Vdc, supply OK
TX indicator:	OFF, radio receives.

Transceiver operates in the **'25 kHz only' mode (5-digit display)**

Upper line:	USE frequency (display 135.87 = 135.875 MHz transmit and receive frequency)
Lower line:	STBY frequency (display 118.02 = 118.025 MHz transmit and receive frequency)
Supply indicator:	3 segments: ≥ 12.7 Vdc, supply OK
TX indicator:	OFF, radio receives.

Transceiver operates in the combined
8.33/25 kHz mode (6-digit display)

Upper line:	USE channel name (display 127.460 = 127.4583 MHz transmit and receive frequency)
Lower line:	Channel memory number (19) associated with the above USE channel name
Supply indicator:	2 segments: ≥ 12.0 Vdc, battery ½ charged
TX indicator:	**ON**, radio transmits.



Transceiver operates in the **'25 kHz only' mode (5-digit display)**

Upper line:	USE frequency (display 124.77 = 124.775 MHz transmit and receive frequency)
Lower line:	Channel memory number (75) associated with the above USE frequency
Supply indicator:	2 segments: ≥ 12.0 Vdc, battery ½ charged
TX indicator:	**ON**, radio transmits.

STO button got pressed.

Upper line:	Channel name to be stored
Lower line:	Free channel memory number **07** (**CH** is flashing)

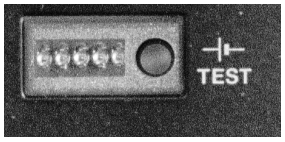
After pressing the **STO** button once more the channel name 121.875 (= 121.875 MHz) will be stored in the channel memory **07**.
The last used display mode is displayed.

STO button got pressed.

Upper line:	Channel name to be stored
Lower line:	Channel memory number **17** (**CH** is flashing)

After pressing the **STO** button once more the channel name 121.375 (= 121.375 MHz) will be stored in the channel memory **17**. A previously stored channel name will be overwritten.
The last used display mode is displayed.

(8) DC supply Indicator



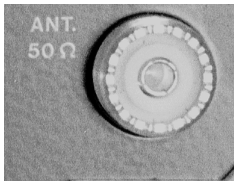
LED indicator to check the capacity of the built-in battery or external DC supply.
When the red push-button is pressed

- at least 3 LEDs should light up to indicate sufficient capacity of the battery or DC supply.
- and only two or less LEDs light up either the battery should be recharged or the station should be powered by an external DC source of sufficient capacity (e.g. vehicle battery).
- the display of the transceiver is back-lit.

(9) Loudspeaker

8 Ohm, 3 Watt, tropics-proof.
To make received signals audible; volume adjustable with **ON/OFF-VOL** control (1). Is not switched OFF when using a headset connected to (13).

(10) Antenna socket



DANGER!

- ***NEVER TRANSMIT inside airplanes, vehicles or buildings without external antenna! Otherwise electronic equipment can be interfered.***

CAUTION!

- ***NEVER operate the radio without any antenna!***

UHF type antenna socket SO 239, 50 Ω.
Any 50 Ohms antenna with UHF type cable plug PL-259 and a frequency range of 118 … 150 MHz minimum may be connected to this antenna jack.

- For portable use in the open field we recommend our spring steel band antenna.
- In aircraft or ground vehicles, an external antenna must always be used.
- For long range operation a base station folded top antenna, grounded for lightning protection, is recommended.

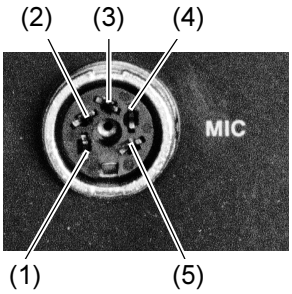
(11) Antenna compartment

When using our spring steel band antenna, A/N F10345, this antenna can kept there without disconnecting.

(12) Microphone compartment

When using our hand-hold microphone with built-in push-to-talk switch, A/N F10041, this microphone can kept there without disconnecting.

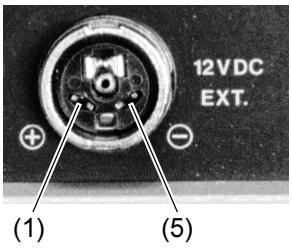
(13) Microphone socket



5-pole twist-lock socket to connect microphone, headphone and PTT-switch.
Mating plug: article No. E08834
Any dynamic microphone (200 to 600 Ω), headphone (ca. 300 Ω), push-to-talk-switch, or dynamic type head-set can be connected to this socket. Wiring refer to Section 6, "**70 PC**, Circuit Diagram".

1 Common Ground (PTT switch/Headphone)
2 Dynamic microphone
3 Headphone
4 Microphone Ground
5 Push-to-talk switch

(14) External Supply



2-pole twist-lock socket to supply the radio by external 12 Vdc sources.
Mating plug: article No. E08833
The capacity of the built-in battery may not be adequate due to frequent transmitting operations or very long operating times without possibility to recharge. Radio operation can be enabled through an external 12 Vdc power source such as an automobile battery via our Cigar Lighter Cable F10026 which fits into the cigar lighter socket of most cars (minus on common ground).

1 Plus 12 Vdc
5 Minus 12 Vdc (Ground)

(15) Fixing screws

Three cross recessed screws, M 3 × 8, to fix the transceiver in the case.

Rear panel:

DANGER!

- ***Risk of electric shock!***
- ***DO NOT OPEN!***

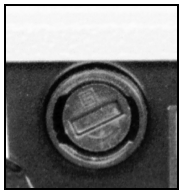
(16) Mains cable compartment

CAUTION!

- ***Changing the plug may only carried out by a trained specialist -electrician-! Please observe national safety regulations!***

Contains the mains cable of the built-in battery charger, length of cable: ca. 1.2 m.

(17) DC Fuse

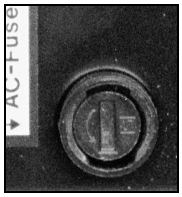


CAUTION!

- ***Always turn OFF radio and disconnect mains plug when replacing fuses!***

Fuse to protect the transceiver in case of heavy current.
Contains 1 glass cartridge fuse, ∅ 5 × 20 mm,
4.0 Amps, medium time lag.

(18) Mains Fuses

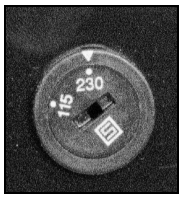


CAUTION!

- ***Always turn OFF radio and disconnect mains plug when replacing fuses!***

Fuses to protect the charging unit.
Contains 1 glass cartridge fuse each, ∅ 5 × 20 mm, 0.04 A time-lag.
The fuses fit for both mains voltages, no change required.

(19) Mains selector switch



CAUTION!

- ***Always turn OFF radio and disconnect mains plug when changing the mains voltage!***

The charging unit is factory set to 230 Vac mains voltage (position ”230”).
When 110 … 115 Vac mains is available, set the mains selector switch by means of a coin or screwdriver to the ”115” position.

(20) Ejector knob

CAUTION!

- ***Always turn OFF radio first when removing from its case!***

After removing three cross-recessed screws (15) and the matching plate on the front, the transceiver may be dismounted from its case by pressing this ejector knob.

SECTION 3 SET-UP PROCEDURE

This section contains a description of the set-up procedure.

DANGER!

- ***NEVER carry out a SET-UP during flight, important missions or applications!***
- ***During SET-UP procedure the radio can neither receive nor transmit!***

IMPORTANT!

- *The* **FSG 90E PC** *is factory pre-set for check and testing purposes. To achieve maximum performance it is therefore absolutely necessary to optimize the radio and to adapt the accessories used.*
- *Set-up should be performed only by an experienced technician.*
- *To carry out the set-up the radio must be ready for operation (antenna connected, power supply OK, operational microphone).*
- *If headsets are used turn volume control to maximum, if applicable.*
- *All frequencies, channel names, channel memory numbers etc., shown in the following illustrations, are* ***examples****!*

The following settings can be selected or adjusted (order):

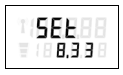
1. 

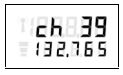
Adjusting the automatic squelch threshold
2. 

Adjusting the microphone sensitivity
3. 

Adjusting the Intercom volume (headset)
4. 

Adjusting the Transmit Sidetone volume (headset)
5. 

Adjusting the headset volume (during receive independent from speaker volume)
6. 

Selecting '25 kHz only' channel spacing or combined 8.33/25 kHz channel spacing. Confirmation with **STO** starts new mode at once!
7. 

Deleting occupied channel memories (one after the other)
8. 

Selecting AF External via speaker ON = 1 or OFF = 0.
9. 

Selecting 'CHANNEL MODE' only = 1 or 'FREE FREQUENCY SELECTION' = 0
10. 

Selecting 'TX disabled' during receive ON = 1 or OFF = 0
11. 

Service, ON = 1 or OFF = 0
12. 

Optional module, ON = 1 or OFF = 0
13. 

Entering a password: protects against unauthorized changes of the radio parameters.

3.1 Calling SET-UP without password

Calling the SET-UP procedure without password is possible:

a) at factory-new radios **FSG 90E,** or

b) at radios which are reset to a factory basic setting (refer to paragraph 3.4.14, **RESET**), or

c) at radios which are not protected by a password against unauthorized changes of the set-up adjustments.

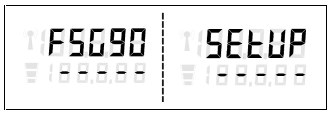
- Turn OFF the radio (**ON/OFF-VOL** knob fully ccw).
- **PRESS AND HOLD both MD and STO buttons**, then turn **ON** the radio (rotate **ON/OFF-VOL** knob clockwise, approximately mid position).
- All segments of the display appear for a short moment then the display gets blank.
- Release the buttons.

- After releasing the buttons the display shows in the upper line alternately **»FSG90«** and **»SET-UP«.**
- If there is no activity for 60 seconds the radio will return to the mode used before.
- Momentarily pressing the **MD** button once will open the set-up menu to adjust the squelch threshold.
- Repeatedly pressing the **MD** button will open all other set-up menus in the order described before.

3.2 Calling SET-UP with password

Calling the SET-UP procedure with password must be carried out at radios which are protected by a password against unauthorized changes of the set-up adjustments.

- Turn OFF the radio (**ON/OFF-VOL** knob fully ccw).
- **PRESS AND HOLD both MD and STO buttons**, then turn **ON** the radio (rotate **ON/OFF-VOL** knob clockwise, approximately mid position).
- All segments of the display appear for a short moment then the display gets blank.
- Release the buttons.



- After releasing the buttons the display shows in the upper line alternately **»FSG90«** and **»SET-UP«**, in the lower line **5 dashes.**
- If there is no activity for 60 seconds the radio will return to the mode used before.
- With the **F/CH** knob set the first digit of your password (the first dash changes to digit). Confirm the first digit by pressing the **F/CH** knob. The second digit is ready to be adjusted.
- With the **F/CH** knob set the second digit of your password (the second dash changes to digit). Confirm the second digit by pressing the **F/CH** knob.
- Continue till all five digits of your password are entered.
- Confirm the last digit input by pressing the **STO** button. This

will open the set-up menu to adjust the squelch threshold. Repeatedly pressing the **MD** button will open all other set-up menus in the order described before.

- Entering a wrong password will return the set-up to the initial status (5 dashes).
- After the fourth attempt to open the set-up with a wrong password the radio returns to the operation mode used before trying to open the set-up. The **FSG 90E** is operational.

3.3 Interrupt the SET-UP procedure

The SET-UP procedure may be interrupted any time:

- Usually by turning OFF the power (**ON/OFF-VOL** knob fully ccw). All changed and individually stored adjustments (by pressing the STO button) are permanently stored and effective after turning ON the radio again.
- or by pressing the **Transfer button** (⇳). The radio returns to the operation mode used before. All changed and individually stored adjustments up to now (by pressing the STO button) are permanently stored and effective.

3.4 SET-UP procedure

IMPORTANT!

- *The settings can be done in any order!*
- *Repeatedly pressing the **MD** button opens the menus step by step.*
- *Only settings confirmed by finally pressing the **STO** key are permanently stored and effective.*
- *When pressing the **STO** button the upper segment of the Onboard supply indicator will light up to confirm storing visually.*

3.4.1 Adjusting the automatic squelch threshold

The display shows in the upper line alternately **»SET«** and **»SQUEL«**, in the lower line **»LO«**, **»MED1«**, **»MED2«** or **»HI«**.

Adjust by rotating the **F/CH** knob the squelch threshold as required. The lower line shows:

LO ca. 1,0 µV / -107 dBm (Standard setting)

MED1 ca. 2,5 µV / -99 dBm

MED2 ca. 5,0 µV / -93 dBm

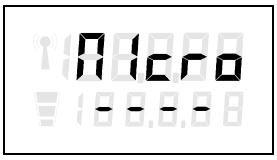
HI ca. 8,0 µV / -89 dBm (this setting exceeds the required minimum sensitivity, adjust only for test purposes at very strong interference levels!)

- Confirm your adjustment by pressing the **STO** button!
- If you want to carry on with the SET-UP procedure press once or repeatedly the **MD** button till the desired menu appears.

3.4.2 Adjusting the microphone sensitivity

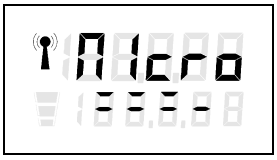
IMPORTANT!

- *This adjustment is important particularly when* **FSG 90E PC** *is used in noisy environment like turboprop airplanes or vehicles:*
  *Turn your radio OFF (**ON/OFF-VOL** knob fully ccw).*
  The **FSG 90E** *should be turned ON only after engine or motor start-up.*
  Select a free frequency/channel name (no communication audible).
  Then call the SET-UP procedure.
- *During this adjustment the transmitter is in operation. Carry out adjustment quickly!*
- *Up to two microphones of the same type may be connected parallel to the MIC input (dynamic type).*
- *Parallel operated microphones must have the same specifications.*
- *This adjustment has to be repeated when changing microphones (brand, type or number)*



The display shows in the upper line alternately **»SET«** and **»MICRO«**.

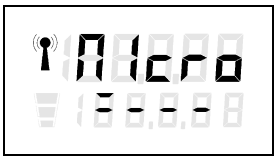
- **ONLY FOR ENGINE POWERED AIRPLANES AND VEHICLES: RUN THE ENGINE IN IDLE.**



Press and hold the PTT key. Talk in a loud, clear voice with the microphone one or two inches from your lips.

While talking the microphone level is measured. By turning the **F/CH** knob left or right set the upper dash line to three to four segments (the lower dash line shows only informative the actual range).

Release the PTT key and stop talking.



- **RUN THE ENGINE IN CRUISING SPEED.**

Press and hold the PTT key for at least 5 seconds, **do not talk!**

The upper dash line should show not more than one segment.

If the display shows more than one segment the mic input is too sensitive. Repeat adjustment with less sensitivity (only two to three segments visible when talking).

- Confirm your adjustment by pressing the **STO** button!
- If you want to carry on with the SET-UP procedure press once or repeatedly the **MD** button till the desired menu appears.

3.4.3 Adjusting the Intercom volume

NOT APPLICABLE WHEN FSG 90E IS OPERATED IN A CARRYING CASE 70 PC!

3.4.4 Adjusting the Sidetone volume

IMPORTANT!

- *Sidetone audible during transmit is only possible via headphones (if applicable set maximum volume at the headset)*
- *During this adjustment the transmitter is in operation. Carry out adjustment quickly!*
- *The microphone(s) sensitivity has to be adjusted properly (refer to paragraph 3.4.2)*

The display shows in the upper line alternately **»SET«** and **»SIDE«**.
Press and hold PTT key, Talk in a loud, clear voice with the microphone one or two inches from your lips.
While talking adjust with the **F/CH** knob a convenient volume in your headphone (the segments show the actual range). If more than four segments are shown overmodulation occurs.
Release PTT key.

- Confirm your adjustment by pressing the **STO** button!
- If you want to carry on with the SET-UP procedure press once or repeatedly the **MD** button till the desired menu appears.

3.4.5 Adjusting the headset volume (receive)

IMPORTANT!

- *Receiving is possible via built-in loudspeaker and headphone.*
- *First set with the **ON/OFF-VOL** knob loudspeaker volume to a convenient level, then adjust with the set-up procedure a suitable headphone volume.*

The display shows in the upper line alternately **»SET«** and **»PHONE«**.
With the speaker noise or communication is audible.
With the **ON/OFF-VOL** knob set speaker output to a convenient level, leave **ON/OFF-VOL** knob as it is.
Put on headphone.
By rotating the **F/CH** knob adjust headphone level to a suitable volume. The dashes show the range.
If the adjustment range is not sufficient increase or decrease with the **ON/OFF-VOL** knob.

- Confirm your adjustment by pressing the **STO** button!
- If you want to carry on with the SET-UP procedure press once or repeatedly the **MD** button till the desired menu appears.

3.4.6 Selecting '25 kHz only' or combined 8.33/25 kHz channel spacing

The display shows flashing in the upper line **»SET«**,
in the lower line either **»25«** or **»8.33«**.

By rotating the **F/CH** knob select the required channel spacing:

»25« = '25 kHz only' channel spacing

»8.33« = combined 8.33 and 25 kHz channel spacing.

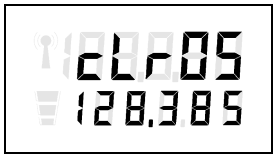
IMPORTANT!

- *Confirm the new channel spacing by pressing the **STO** button! The selected channel spacing becomes active and simultaneously SET-UP procedure will automatically be finished.*
  *The radio returns to the last used display mode and the settings confirmed with the **STO** button became effective.*
- *If you want to carry on with the SET-UP procedure call again SET-UP. Press once or repeatedly the **MD** button till the required menu appears.*

3.4.7 Deleting occupied channel memories

IMPORTANT!

- *Only channel memory numbers from 5 … 99 can be deleted. Channel memories 1 to 4 may only be overwritten.*
- *On an occupied channel memory the channel memory number is displayed in the upper line, the associated frequency/channel name in the lower line.*
- *On a free channel memory the channel memory number is displayed in the upper line, the lower line shows **»FREE«**.*



EXAMPLE:

The display shows in the upper line alternately **»CLR 05«** and **»CH 05«** and in the lower line the associated frequency.

EXAMPLE: Channel memory number **»39«** (with the channel name 132.765) should be deleted.

By rotating the **F/CH** knob adjust the channel memory number **»39«** at the display.

If this channel memory should really be deleted confirm by pressing the **STO** button. In the lower line the frequency/channel name disappears, it appears **»FREE«**.

- If further memory channels should be deleted adjust with the **F/CH** knob the channel memory number concerned and delete each by pressing the **STO** button.
- If you want to carry on with the SET-UP procedure press once or repeatedly the **MD** button till the desired menu appears.

3.4.8 Selecting AF EXTERNAL (ON/OFF)

- **NOT APPLICABLE IF FSG 90E IS OPERATED IN A CARRYING CASE 70 PC!**

3.4.9 Selecting 'CHANNEL MODE ONLY' or 'NO RESTRICTION'

IMPORTANT!

- *For certain applications (usually ground operation only) selecting all frequencies by the operator may be restricted. Then transmitting and receiving is only possible in the **CHANNEL MODE**, pre-programmed before by authorized personnel.*

The display shows in the upper line alternately **»SET«** and **»FREQ«**, in the lower line **»0«** or **»1«**.

Adjust by rotating the **F/CH** knob lower line to "0" or "1".

0 = Standard operation, free frequency selection, no restriction.

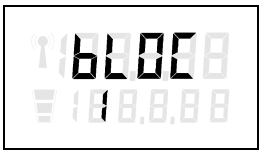
1 = **CHANNEL MODE only**, no other frequencies/channel names adjustable by operator.

- Confirm your adjustment by pressing the **STO** button!
- Carry on with the SET-UP procedure by pressing once or repeatedly the **MD** button till the desired menu appears.

3.4.10 Selecting 'TX disabled' during receive (ON/OFF)

IMPORTANT!

- *Whenever 'TX disabled' is ON and squelch is ON transmitting is disabled as long as the frequency/channel name is busy (communication audible). In addition TX Sidetone is OFF.*
- *Whenever the squelch is OFF the 'TX disabled' is OFF and transmitting is possible even on a busy channel.*



The display shows in the upper line alternately **»SET«** and **»BLOC«**, in the lower line **»0«** or **»1«**.

Adjust by rotating the **F/CH** knob the lower line to **»0«** or **»1«**.

0 = 'TX disabled' is OFF. Transmitting is always possible, even on a busy channel.

1 = 'TX disabled' is ON. With squelch ON transmitting is only possible on a free channel.

- Confirm your adjustment by pressing the **STO** button!
- Carry on with the SET-UP procedure by pressing once or repeatedly the **MD** button till the desired menu appears.

3.4.11 Service (ON/OFF)

IMPORTANT!

- ***For approved Avionics Shops only!***

The display shows in the upper line alternately **»SET«** and **»SERV«**, in the lower line **»0«**.
0 = STANDARD MODE, Service OFF.

- If required, confirm adjustment by pressing the **STO** button!
- Carry on with the SET-UP procedure by pressing the **MD** button.

3.4.12 Optional module (ON/OFF)

IMPORTANT!

- ***In this radio without function.***

The display shows in the upper line alternately **»SET«** and **»OPTI«**, in the lower line **»0«**.

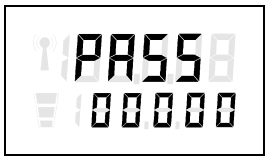
0 = STANDARD MODE, Optional module OFF.

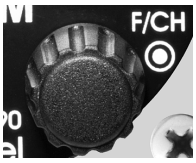
- Carry on with the SET-UP procedure by pressing the **MD** button.

3.4.13 Entering a password

IMPORTANT!

- *When the SET-UP of your radio is protected by a password it cannot be changed by any unauthorized persons without knowledge of the password.*
- *Your password consists of five digits!*





The display shows in the upper line alternately **»SET«** and **»PASS«**, in the lower line **»00000«**.

If you don't want to enter a password and your SET-UP procedure is finished leave the SET-UP menu by pressing the TRANSFER (⇳) button, or turn OFF the radio (**ON/OFF-VOL** knob).

If you want to enter a password proceed as follows:

Rotate the **F/CH** knob. Adjust the first digit (0 …. 9). Confirm the first digit by pressing the **F/CH** knob.

Adjust the second digit of your password by rotating the **F/CH** knob. Confirm again by pressing the **F/CH** knob.

The third digit is ready now. Continue as described above for the third, fourth and fifth digit.

Make sure the complete password corresponds to your idea.

- Confirm the password by pressing the **STO** button!
- **From now on a new SET-UP may be called only after entering the password first!**

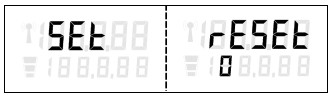
3.4.14 Reset

CAUTION!
Every RESET to the factory setting

- ***deletes all your pre-set memory channels 5 to 99 (in both 8.33/25 kHz and 25 kHz only mode)! Memory channels 1 - 4 get programmed with 118.00 or 118.005 respectively***
- ***deletes your password!***
- ***delete all your individual SET-UP adjustments!***

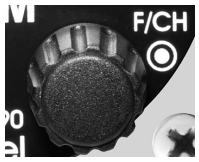
To reset all adjustments proceed as follows:

- Turn OFF the radio (**ON/OFF-VOL** knob fully ccw).
- **PRESS AND HOLD simultaneously the buttons MD, STO and SQ, then turn ON the radio** (rotate **ON/OFF-VOL** knob clockwise, approximately mid position).
- All segments of the display appear for a short moment then the display gets blank.
- Release the buttons.



After releasing the three buttons the display shows in the upper line alternately **»SET«** and **»RESET«**, in the lower line **»0«**.

If there is no activity for 60 seconds the radio will return to the mode used before.



With the **F/CH** knob set lower line to "**1**".

Confirm **RESET** by pressing the **STO** button.

The upper segment of the Onboard Supply Indicator will light up momentarily.

- The VHF radio **FSG 90E** is now operable in the factory setting.

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