SECTION 4 OPERATION

4.1 Introduction

This section contains a basic operation procedure for the **FSG 90E PC** transceivers. This instruction is only applicable for a radio which is already optimized by the set-up procedure (refer to Section 3, SET-UP PROCEDURE).

DANGER!

- ***DO NOT OPERATE THIS RADIO IN AN EXPLOSIVE ATMOSPHERE (PETROLEUM FUELS, SOLVENTS, DUST, ETC.).***
- ***DO NOT lean over the equipment when opening the cover! If not properly tightened the spring steel band antenna may bounce out!***

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.

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 operation instructions.

4.2 Battery Check

- If applicable, disconnect built-in charger from mains first, before checking the battery supply.
- Press the red test button of the battery indicator (8).
- The LED indicators (8) will light up.
  - ➔ 5 LEDs ON = battery fully charged, supply OK!
  - ➔ 3 to 4 LEDs ON = battery partially discharged; reduced operation time when powered only from the battery.
  - ➔ 2 or less LEDs ON = battery discharged. The battery should be recharged or the radio should be powered by an external 12 Vdc source of adequate capacity (e.g. automobile battery).

Additionally the supply is permanently monitored when the radio **FSG 90E** is switched ON:

 3 segments	≥ 12.7 Vdc	Battery fully charged
 2 segments	≥ 12.0 Vdc	Battery charged approx. ½, reduced operating time
 1 segment	≥ 11.0 Vdc	Battery almost empty, cease transmitting!
 3 segments flashing	10 - 11 Vdc	**Emergency operation**

IMPORTANT!

- *If the **Supply Indicator** even blinks continuously in STANDBY mode it indicates a discharged battery. The radio should then be switched OFF at once and the battery recharged as soon as possible.*
- *The battery must always be recharged immediately after an extensive discharge because this incurs the risk of deterioration and permanent damage - this risk is increased if a discharged battery is stored in that state.*

4.3 Battery Charging

- Charging should be done within the ambient temperature range of +10°C to +40°C.
- First check the line voltage and set it with the voltage selector switch (19) on the back, if necessary.
- Take out the mains cord from its compartment (16) and connect it to a wall socket.
- The transceiver may be operated while charging.
- Charging lasts up to 30 hours depending on the state of the battery.
- Overcharging the battery is not possible due to automatic controlled charging function. For trickle charging or buffer operation the charger can be left unattended continuously connected to mains. A fully charged battery can be stored for several month.

4.4 Antenna - Antenna Jack SO 239

DANGER!

- ***NEVER 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 confuse electronic equipment! Always operate the radio with a suitable external antenna!***
- ***NEVER OPERATE the radio without any antenna!***

The spring steel band antenna (Article-No. F10345), connected to the SO 239 antenna jack (10), can be replaced by any other 50 Ω antenna with UHF type PL-259 cable plug and a frequency range of 118 … 150 MHz minimum. For long range operation a base station folded top antenna, grounded for lightning protection, is recommended. To operate the radio in aircraft or ground vehicles a suitable external antenna should always be used.

- Ensure the plug of your antenna or antenna cable is securely tightened.
- If the spring steel band antenna is used, pull it out of its compartment (11) and adjust it in a **vertical** position by tightening the screwed cap and wing screw.

4.5 Microphone

The hand-held dynamic microphone with push-to-talk switch (Article-No. F10041) can be replaced by any other dynamic microphone (200 to 600 Ohms) with PTT switch or a head-set for dynamic type systems with additional PTT switch (mating 5pole plug: Article-No. E08834, wiring to station, refer to Section 6, Circuit Diagram **70 PC**).

- Connect microphone, ensure the plug is secured by twist-lock cap.

4.6 Switching ON - Selecting Frequency/Channel Name - Volume

CAUTION!

- ***The* FSG 90E PC *should be turned on after engine start-up. This is a simple precaution which helps to protect the solid state circuitry and extends the operating life of your avionics equipment.***

IMPORTANT!

- ***»Frequency« (25 kHz spacing) and »Channel Name« (combined 8.33/25 kHz spacing) are ICAO terms!***
- ***Frequent transmissions as well as large receiving volume reduce the operating time when radio is only powered by the built-in battery!***

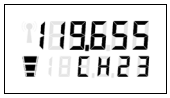
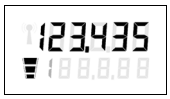
Turn the radio **FSG 90E** ON by rotating the **ON/OFF-VOL** knob (1) clockwise. Momentarily all segments of the display are visible. Last used display mode and frequency are displayed.

A warm-up period for the transmitter is not required. However, at temperatures of -20°C, the LC display needs approximately one second until it is fully visible when the frequency or display mode is changed.

To change the display mode: Push once or twice the **MD** button (4).

Selecting the appropriate active frequency/channel name depends on display mode:

EXAMPLE:	**STANDARD: USE/STBY (Standby) Mode**
	Upper line: USE/active frequency/channel name Lower line: Standby frequency/channel name **Selecting another frequency/channel name than indicated:** At the lower line select appropriate **kHz** portion by **rotating F/CH**-knob (6). A clockwise rotation will increment the previous frequency while a counterclockwise rotation will decrement the previous frequency with rollover at each band edge. **Push F/CH** knob (6); this changes the access to MHz. At the lower line select appropriate **MHz** portion by **rotating F/CH**-knob (6). A clockwise rotation will increment the previous frequency while a counterclockwise rotation will decrement the previous frequency with rollover at each band edge. **Push** the Transfer Button ⇳ (5). The last standby frequency/channel name (lower line) will become the new active frequency/channel name (upper line) and the last active frequency/ channel name will become the new STBY frequency/channel name (lower line). **IMPORTANT: If there is no activity for 30 seconds the F/CH knob will return to the kHz access.**

EXAMPLE: 	**Channel Mode:** Upper line: USE/active frequency/channel name Lower line: Channel memory number, associated **Selecting another frequency/channel name than indicated:** **IMPORTANT:** The appropriate USE frequency/channel name must be stored already in a channel memory (refer to paragraph 4.9, **STORING A NEW FREQUENCY/ CHANNEL NAME**). Select appropriate channel memory number together with the associated frequency/channel name by **rotating** the **F/CH** knob.
EXAMPLE: 	**Direct tune Mode:** Upper line: USE/active frequency/channel name Lower line: blank **Selecting another frequency/channel name than indicated:** Select appropriate kHz portion by **rotating F/CH**-knob. A clockwise rotation will increment the previous frequency while a counterclockwise rotation will decrement the previous frequency with rollover at each band edge. **Push F/CH** knob; this changes the access to MHz. Select appropriate MHz portion by **rotating F/CH**-knob. A clockwise rotation will increment the previous frequency while a counterclockwise rotation will decrement the previous frequency with rollover at each band edge. The setting is the new active frequency/channel name. **IMPORTANT: If there is no activity for 30 seconds the F/CH knob will return to the kHz access.**

- Rotate **ON/OFF-VOL** knob (1) clockwise, about half way.

Continue with either Receive or Transmit Operation

4.7 Receive (Listen) Operation

- After switching ON the radio the automatic squelch is always ON.
- If the display mode shall be changed: Push once or twice the **MD**-button (4).
- If the active frequency shall be changed: refer to paragraph 4.6, **SWITCHING ON - SELECTING FREQUENCY/ CHANNEL NAME - VOLUME**
- **DO NOT** press the PTT (push to talk) key if you want to receive! Transmit Indicator at the display **must not** appear!
- Normal signals are received, weak signals and interfering pulses are disabled. Set the volume of the built-in loudspeaker or headphone to a comfortable level by rotating **ON/OFF-VOL** knob (1) in 15 steps.
- Weak signals can be received if the squelch circuit is switched OFF by pressing the **SQ** button (3). Then typical RX noise is heard during communication breaks. Pressing the **SQ** button (3) switches the squelch circuit ON again.

IMPORTANT!

- ***Switching OFF the squelch only makes sense if long range reception shall take place. Thus the radio is noisy during Standby operation, but no weak signals are suppressed and the full receiving range is available!***
- ***Notice increased current consumption when Squelch is switched OFF!***

4.8 Transmit (Talk) Operation

DANGER!

Every radio, when transmitting, radiates energy into the atmosphere, therefore:

- ***Do not operate this radio in an explosive atmosphere (petroleum fuels, solvents, dust, etc.)! Danger by generation of sparks.***
- ***NEVER TRANSMIT in 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!***
- ***Never place the radio such as the antenna gets very close to, or touching, exposed parts of the body, especially the face, shoulder or the eyes.***

IMPORTANT!

- *Please keep radio discipline!*
- *Transmit only on a clear channel.*
- *Care for an all-round obstacle free location of your antenna; the called station should be within "line-of-sight" distance.*
- *Volume is very important. Increasing speaking levels while the lips are facing the microphone (distance 1 to 2 inches) will increase clarity. Talk slow, make each word a precise and individual entity.*
- *The radio is equipped with a TX time-out-timer (2 minutes). This is used to limit the duration of calls and to guard against accidental PTT locking.*

1. If the display mode shall be changed: Push once or twice the **MD**-button (4).
2. If the active frequency shall be changed: refer to paragraph 4.6, **SWITCHING ON - SELECTING FREQUENCY/CHANNEL NAME - VOLUME.**
3. Transmitting is only possible on a free channel (no communication audible).
4. If you have to transmit (e.g. in case of emergency) although the channel is busy, the Transmit Disabled circuit may be turned OFF by pressing the **SQ** button (3).
5. When the Walter Dittel GmbH hand-held microphone, article-no. F10041 is used, take it out of its compartment (12). Press and hold the orange colored PTT (push to talk) key.
6. Talk in a loud, clear voice with the microphone one or two inches from your lips. Make each transmission as brief as possible. As long as the PTT key is pressed the **Transmit Indicator** at the display appears!
7. Release the PTT key to end the transmission and to open the channel for reception; the Transmit Indicator must disappear. Switch Squelch ON again, if applicable.
8. The radio is equipped with a TX time-out-timer. This is used to limit the duration of transmissions to two minutes. When the transmitter is keyed continuously longer than 2 minutes the display of the **FSG 90E** starts flashing and transmission is disabled. If you have to make calls longer than 2 minutes momentarily release the PTT key and press again. The TX time-out-timer starts for another 2 minutes.

4.9 Storing a new Frequency/Channel Name

In each active operating mode (8.33/25 kHz mode or '25 kHz only' mode) up to 99 non-volatile channel memories can be user programmed. Channel memories of the **non-active** mode remain stored in the background. They are accessible after calling up the respective mode.

IMPORTANT!

- *Free selection of frequencies/channel names and new storing may be restricted due to Set-Up adjustment (refer to paragraph 3.4.9)!*
- ***Channel memories 1 to 4 are always pre-set** and may be used when called. They can only be changed but not deleted. Ex works and after Master Reset channel memories 1 to 4 are pre-set with either **118.00 MHz or 118.005 MHz!***
- *Storing can be initialized in all three display modes.*
- *The USE frequency/channel name in the upper line of the display can be stored to any of the 99 channel memories.*

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 (2).
3. The last used channel memory number appears, "**CH**" flashes.
4. Select appropriate channel memory number (1 to 99) by turning the **F/CH** knob (6). On a free memory channel an "**F**" appears before "**CH**" and the memory number.
5. To enter the new frequency/channel name press the **STO**-button (2). The frequency/channel name will be stored under the selected channel memory number. A previously stored frequency/ channel name will be overwritten.

4.10 Recall of stored frequencies/channel names:

1. By pushing once or twice the **MD**-button (4) select the CHANNEL mode.
2. By rotating the **F/CH** knob (6) set appropriate channel memory number with its associated frequency/channel name at the display. Only channel numbers that have been programmed before will appear.
3. Now the radio operates on that frequency/channel name indicated at the display.

4.11 Lighting the Frequency Display

Lighting of the frequency display (7) is activated by pressing the red test button of the battery indicator (8).

4.12 Turning OFF the radio

Always turn OFF the radio after use by rotating the **ON/OFF-VOL** switch (1) to the fully ccw position to prevent unnecessary discharge of the battery. Place the microphone in its compartment (12). Loosen screwed cap and wing screw of the spring steel band antenna and push the upper part into its compartment (11). Bend the remaining portion so, that the Snap-On cover can be placed in position.

DANGER!

Always tighten the antenna's screwed cap and wing screw before closing the cover, otherwise the spring steel band antenna will bounce out, when the cover is lifted again!

4.13 External Power Supply

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). Mating plug: article No. E08833.

4.14 Removing & Installing the Transceiver

IMPORTANT!

- ***Switch OFF the radio first! This is a simple precaution which helps protect the solid state circuitry and extends the operating life of your avionics equipment.***

To dismount the transceiver **FSG 90E** from its case, remove the three cross-recessed screws (15) and lift off the matching plate. Eject the transceiver from the rear connector of the case by pressing ejector knob (20) on the rear. Pull out transceiver.

To install the transceiver, carefully insert it into the case. The plugs mate automatically to the case's wiring. Put on the matching plate and fix it by the three cross-recessed screws (15). Check fixing and function.

4.15 Battery Operating Times

Prerequisite: Maximum RX audio volume

Max. current drain	.11 A	2.5 A	1.0 A	.11 A	2.5 A	1.0 A	.11 A	2.5 A	1.0 A	.11 A
Lead Accumulator 12 Volts **6.5 Ah**	**STBY, w/out RX**	5% TX	5% RX	90% STBY	10% TX	20% RX	70% STBY	20% TX	40% RX	40% STBY
Temperature **- 20°C**	38 h	12.30 h			6.00 h			3.10 h		
Temperature **+20°C**	62 h	20.10 h			10.00 h			5.20 h		
Temperature **+50°C**	66 h	22.10 h			11.10 h			6.00 h		

Prerequisite: Minimum RX audio volume

Max. current drain	.08 A	2.5 A	.25 A	.08 A	2.5 A	.25 A	.08 A	2.5 A	.25 A	.08 A
Lead Accumulator 12 Volts **6.5 Ah**	**STBY, w/out RX**	5% TX	5% RX	90% STBY	10% TX	20% RX	70% STBY	20% TX	40% RX	40% STBY
Temperature **-20°C**	57 h	15.50 h			8.50 h			4.40 h		
Temperature **+20°C**	85 h	26.10 h			14.30 h			7.50 h		
Temperature **+50°C**	90 h	28.40 h			16.20 h			8.40 h		

4.16 Siting

The radio operates in the VHF frequency band, this is a Line-Of-Sight (LOS) frequency; therefore, siting of the radio greatly affects its operating range. The longest range is normally obtained when a direct LOS is maintained between the radios. Use of hilltop, roof or tower locations will increase the LOS range. Location in valleys with intervening hills, behind vehicles or buildings or in dense woods may reduce or prevent communications. If possible, avoid antenna locations near electrical interference sources, such as computers, power and telephone lines, radar, welders and electrical generators.

4.17 Base Operation

To operate the radio as a base station, a weather-proof anti static and lightning protected folded-top antenna is ideally suited. The antenna should be mounted vertically and elevated as high as possible on a roof, horizontally free of obstacles. The antenna mast has to be grounded and anchored, as necessary. For a distance of up to 15 meters the antenna cable may be a RG-58 C/U type, for longer distances always use the cable type RG-213/U (low loss).

In general, the antenna cable should not be longer than necessary.

4.18 Functional Checks

If the transceiver **FSG 90E PC** does not operate correctly, check the following:

- Is the required frequency/channel name visible in the upper line? Adjust required frequency/channel name!
- Is battery supply sufficient? Observe onboard supply indicator particularly during transmit, at least one segment must be shown!
- Weak RX signal? Press SQ button = switch OFF squelch circuit!
- Weak TX signal? Check microphone, mic SET-UP, radio, or antenna system! Is the voice volume too low? Speak loud and clear while the lips are facing the microphone! Try another location!
- Make sure that transceiver's antenna is vertically positioned and is not screened by nearby placed metallic objects or buildings.
- Singing during transmit? Adjust Sidetone more quietly; put on headset; keep microphone in other position!
- Rattles when receiving? Metal propellers between transmitting airborne radio and ground station antenna!
- Called station hears carrier, but no voice? Check microphone and contacts on microphone jack!
- Noisy - distorted - garbled? Suppress electrical interference of motorized aircraft or vehicle (generator, regulator), check antenna system; check antenna-, microphone- and radio- connector for proper seat! Change location!
- Flashing display, transmitter switches off itself? PTT key sticks! Check PTT key and cables. Transmitter was keyed longer than 2 minutes. Release PTT key, normal operating is possible again.
  In case of emergency turn radio OFF and switch ON again, permits another two minutes to transmit.

In case of doubt, compare operation of the transceiver with another transceiver on the same location or call another station. If service is necessary please consult your authorized dealer or an approved avionics workshop.

SECTION 5 ICAO FREQUENCY / CHANNEL NAME ASSIGNMENT IN THE COMBINED 8.33 KHZ / 25 KHZ OPERATION

The following table shows transmit and receive frequency, the respective channel spacing and the associated display of the DUAL MODE TRANSCEIVER **FSG 90E** in the range from 118.000 MHz to 118.1000 MHz.
This assignment also applies of course to all other frequencies between 118.1000 MHz and 149.9750 MHz.

Transmit and Receive frequency (MHz)	Channel spacing	**8.33/25 kHz Mode** Channel Name = Display at **FSG 90E**	**25 kHz Mode** Frequency = Display at **FSG 90E**
118.0000	**25**	**118.000**	**118.00**
118.0000	8.33	118.005	
118.0083	8.33	118.010	
118.0166	8.33	118.015	
118.0250	**25**	**118.025**	**118.02**
118.0250	8.33	118.030	
118.0333	8.33	118.035	
118.0416	8.33	118.040	
118.0500	**25**	**118.050**	**118.05**
118.0500	8.33	118.055	
118.0583	8.33	118.060	
118.0666	8.33	118.065	
118.0750	**25**	**118.075**	**118.07**
118.0750	8.33	118.080	
118.0833	8.33	118.085	
118.0916	8.33	118.090	
118.1000	**25**	**118.100**	**118.10**
118.1000	8.33	118.105	
and so on		etc	etc

SECTION 6 TECHNICAL SUMMARY FSG 90E PC

6.1 General

Frequency Range	:	118.000 MHz ... 149.975 MHz, 8.33 and/or 25 kHz increments
Number of Channels	:	3,838 in the combined 8.33 kHz/25 kHz channel spacing, free selectable or 1,280 in the '25 kHz only' channel spacing, free selectable
Transmitter Output	:	≥ 6 Watt / 50 Ω; ca 20 W PEP at 13.75 Vdc
Receiver Sensitivity, m = 30%/ 1 kHz	:	≤ 2.0 µV EMF /≤ 107 dBm / 50 Ohms for 6 dB (S+N/N)
Frequency Accuracy	:	< ± 1 ppm at 0°C … +40°C, < ± 1.5 ppm at -20°C … +55°C
AF Output (K ≤ 10%)	:	≥ 2 Watts into 8 Ohms and ≥ 100 mW into 600 Ohms
Nominal Voltage Battery Charger	:	115 Vac / 230 Vac, 50 … 60 Hz
Nominal Voltage Transceiver	:	11 … 16.5 Vdc, Emergency 10 … 11 Vdc less 9 Vdc automatic disabling
Built-in Battery	:	Sealed lead accumulator, 12 Vdc / 6.5 Ah
Power Consumption Charger	:	9 VA / 39 mA
Power Consumption	:	Stand-by: 80 mA (typical) Receive (Voice): less than 1 A Transmit (Voice): less than 2.5 A Lighting and Supply Check: 20 mA additional
Duty Cycle	:	2 min Transmit (time-out-timer)
Operating Temperature	:	-20°C ... +55°C / +70°C
Dimensions	:	277 mm × 86 mm × 345 mm (incl. handle)
Weight	:	6.1 kg incl. mic & spring steel band antenna

ADDITIONAL FEATURES

99 user-programmable, non-volatile memory channels each in combined 8.33/25 kHz and in "25 kHz only" operation; true sidetone via headphone; TX time-out-timer; TX disabled when channel busy

Sockets to connect	:	External DC Supply, Dynamic Microphone, Push-to-talk Switch, Headphone, Headset, 50 Ohms Antenna,
Lighting of frequency display	:	By two LEDs, built-in
Fusing	:	DC: 1 x **4.0** amps, medium time lag AC: 2 × 0.04 amps, time-lag

IMPORTANT!
The portable ground station FSG 90E PC may only be used by the respective Authorities.

6.2 Approvals, applies for Transceiver FSG 90E

Ground Operation (Regulatory Authority For Telecommunications and Posts)	"EC Type-Examination Certificate" no. B132705J, and " "TYPE-EXAMINATION CERTIFICATE" no. A132947J"
Ground Operation (DFS)	No. B-7851/97
Requirements for **ground operated** radios	Reg TP 321 ZV 039 (issue March 1998) ETSI ETS 300 676 (8.33 kHz CH spacing, ground operation) DIN / ISO 6737-1 (12 V Vehicle Power System)
Airborne Radio (Regulatory Authority For Telecommunications and Posts)	"EC Type-Examination Certificate" no. B132705J, and "TYPE-EXAMINATION CERTIFICATE" no. A132947J
Airborne Radio (Regulatory Authority For Telecommunications and Posts, and LBA)	Reg TP 321 ZV 034 (issue July 1998) EUROCAE ED-23B: Receiver Class C 25 kHz spacing CLIMAX operation, and Receiver Class E 8,33 kHz spacing Transmitter Class 4 100 NM with 25 kHz spacing, and Transmitter Class 6 100 NM with 8.33 kHz spacing Environmental Requirements EUROCAE ED-14C / RTCA DO-160C: Categories D1-AA(BMN)XXXXXXZBBBATZXXXX
JTSO-Authorization (LBA, airborne)	JTSO-2C37e and JTSO-2C38e No. LBA.O.10.911/98 JTSO
Software	EUROCAE ED-12B / RTCA DO-178B, Level D

6.3 Detailed Receiver Characteristics

Receiver Type	Dual Superhet
IF Frequencies	First IF 10.0 MHz, second IF 455 kHz, high injection
Sensitivity (m = 30% / 1,000 Hz)	≤ 2 µV EMF (≤ -107 dBm/50 Ω) for 6 dB S+N/N
Selectivity a) Reference level m = 60%/1,000 Hz for 12 dB SINAD b) Interference level m = 60%/400 Hz (additional)	Condition: 1 kHz SINAD decreased from 12 dB to 6 dB ≤ 6 dB for ± 8 kHz (25 kHz CH spacing) ≥ 60 dB for ± 17 kHz (25 kHz CH spacing) ≥ 70 dB for ± 25 kHz (25 kHz CH spacing) ≤ 6 dB for ± 3 kHz (8,33 kHz CH spacing) ≥ 60 dB for ± 7.37 kHz (8,33 kHz CH spacing)
Squelch Type	Automatic (FM/AM), adjustable (SETUP); manual override.
AGC Characteristic	≤ 6 dB, 2 µV EMF (-107 dBm) ... 2 V EMF (+13 dBm/50 Ω), m = 30%/1,000 Hz
AGC Delay (RX)	≤ 0.1 sec, 200 mV EMF (-1 dBm) … 2 µV EMF (-107 dBm / 50 Ω), m = 30%/1,000 Hz)
AGC Recovery after TX	≤ 0.1 sec at 10 µV EMF (-93 dBm / 50 Ω), after TX end
Transfer time TX / RX	≤ 50 msec
Modulation distortion (AF Processor OFF)	≤ 10%, 350 ... 2,500 Hz (m = 85%)

Audio Frequency Response / AF Fidelity	≤ +2 dB and -4 dB, 350 ... 2,500 Hz, 25 kHz and 8.33 kHz CH spacing ≥ -20 dB, 4,000 Hz, 25 kHz CH spacing (Climax Offset Operation)
Audio Frequency AGC	≤ 1.5 dB, m = 30% ... 90%
Nominal AF Output (Speaker)	≥ 4 Watt / 4 Ω, or ≥ 8 Watt / 2 Ω (at 13.75 Vdc) ≥ 1.5 Watt / 4 Ω (at 10 Vdc)
Nominal AF Output (Phone)	≥ 100 mW / 600 Ω (at 13.75 Vdc) ≥ 50 mW / 600 Ω (at 10 Vdc)
AF Noise Level	≥ 40 dB, m = 30%/1,000 Hz 200 µV EMF (-67 dBm/50 Ω) ... 10 mV EMF (-33 dBm/ 50 Ω)
AF External Input	≤ 1 Volt into 600 Ω for rated AF output (13.75 Vdc supply)
Spurious Response	≥ 10 mV EMF (-33 dBm), m = 30%/1 kHz, for S+N/N ≤ 6 dB a) 108 - 156 MHz (of any Test Channel ≤ ± 8 kHz), at other than the assigned channel and the adjacent channels b) 50 kHz – 1,215 MHz (except 108 - 156 MHz)
Cross Modulation (AF Processor OFF)	Max. AF output level ≥ 10 dB <u>below</u> nominal AF output level: a) Wanted signal 20 µV EMF (-87 dBm) ... 500 µV EMF (-59 dBm/50 Ω), unmodulated at RX frequency, additional b) Unwanted signal 10 mV EMF (-33 dBm), m = 30%/1,000 Hz, frequency 100 - 156 MHz (frequency ≤ ± 2 RX channels)
Intermodulation (AF Processor OFF)	≤ 6 dB AF Quieting (-5 dBm/50 Ω, 87.5 – 107.9 MHz), 2 signals
Desensitization	Wanted signal 20 µV EMF (-87 dBm), m = 30%/1,000 Hz, at RX frequency, for S+N/N ≥ 6 dB, in the presence of Unwanted signal **<u>A</u>** 10 mV EMF (-33 dBm/50 Ω), unmodulated, frequency 108 ... 156 MHz, except used CH, but includes ≥ 1 RX CH, or Unwanted signal **<u>B</u>** 200 mV EMF (-7 dBm/50 Ω); minimum 10 mV EMF (-87 dBm), unmodulated, frequency 50 kHz – 1,215 MHz, except 87.5 MHz ... 156 MHz, or Unwanted signal **<u>C</u>** 250 mV EMF (-5 dBm), unmodulated, frequency 87.5 ... 107.9 MHz
Receiver Spurious Emission	≤ 400 pW / -64 dBm (50 kHz ... 1,215 MHz)
Channel Selection Time	≤ 0.4 sec, AF level within 3 dB, max. 99 Channel memories
Receiver Muting, Squelch (CLIMAX)	Simultaneous input at RX frequency: a) Wanted Signal **A**: 10 µV EMF (-93 dBm) +8 kHz (m = 30%/1,000 Hz), Squelch is open. b) Unwanted Signal **B**: More than 24 µV EMF (-85 dBm), m = 30% / 1,000 Hz, vary this frequency slowly from -8 kHz to +4 kHz. Squelch must remain open.

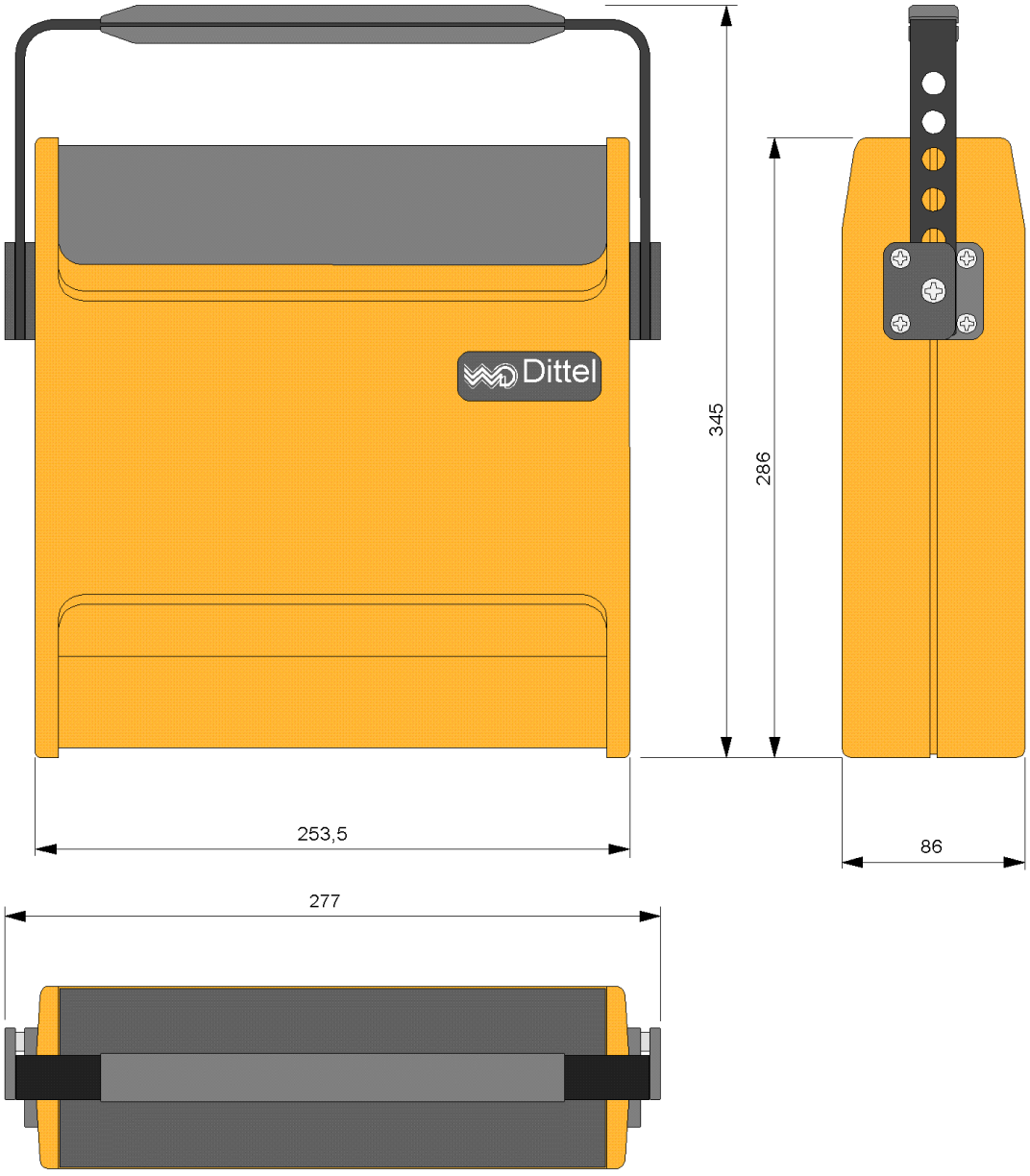
6.4 Detailed Transmitter Characteristics

Nominal TX RF Output Power (normal operation)	≥ 6 Watt / 50 Ω (carrier), ≥ 20 Watt PEP, at 13.75 Vdc
Nominal TX RF Output Power (emergency operation)	≥ 1.5 Watt / 50 Ω (carrier) at 10 Vdc supply
TX Duty Cycle	1 : 4 (1 minute TX / 4 minutes RX)
TX Time Out Timer	After 2 minutes continuous TX. Transmitter is unkeyed automatically and the radio display flashes as a warning.
Modulation	Amplitude modulation, AM (A3E)
Depth of Modulation	≥ 75% (Voice processor with dynamic compression)
Modulation Distortion	≤ 10% (m = 70% / 1,000 Hz) ≤ 15% (m = 70% / 350 ... 2,500 Hz)
Modulation Audio Frequency Response	≤ +2 dB and -4 dB (350 ... 2,500 Hz)
Modulation AF Input for m = 70%	Dynamic Microphone: ≤ 0.5 ... 10 mV symmetrical, sensitivity adjustable in SETUP. Amplified/Carbon Microphone: ≤ 80 ... 500 mV unsymmetrical, sensitivity adjustable in SETUP.
True Transmit Sidetone (derived from modulated TX RF signal)	≥ 100 mW / 600 Ω (at 13.75 Vdc supply), ≥ 50 mW / 600 Ω (at 10 Vdc), volume adjustable in SETUP, independent from speaker volume
Carrier Noise Level	≥ 45 dB (m = 70%/1,000 Hz)
Emission of RF Energy (≤ 1000 MHz)	≤ 0,25 µW (-36 dBm) / 71 dB µV / 3.54 mV / 50 Ω ≤ 4 nW (-54 dBm) / 53 dB µV / 446 µV / 50 Ω, from 47 ... 68, 87.5 ... 137, 162 ... 244, 328 ... 336, 470 ... 862 MHz
Emission of RF Energy (≥ 1000 MHz)	≪ 1 µW / ≪ -30 dBm / ≪ 77 dB µV / ≪ 7 mV / 50 Ω
Transmitter Spectrum Mask	Max. +2 / -4 dB at 350 … 2,500 Hz modulation (8.33 kHz spacing) ≥ 45 dB at 3,200 Hz modulation (8.33 kHz spacing) ≥ 60 dB at ≥ 5,000 Hz modulation (8,33 kHz spacing)
Channel Selection Time	≤ 0.5 sec
Frequency Tolerance	≤ 1 ppm (0°C ... + 40°C / 32°F ... 104°F), ≤ 1.5 ppm (-20°C ... + 55°C / -4°F ... + 131°F)
Unwanted FM (Frequency modulation)	≤ 1.0 kHz at m = 70% / 1,000 Hz
TX Intermodulation	≥ 45 dB
Antenna Mismatching	VSWR ≤ 3 : 1, normal operation At VSWR 3 : 1 the requirements for modulation distortion, spurious and harmonics output as well as frequency stability are met. In addition, the RF output is ≥ 40 % / ≥ 2.4 Watt into 50 Ω at 13.75 Vdc. At VSWR ≤ 5 : 1 still functional.

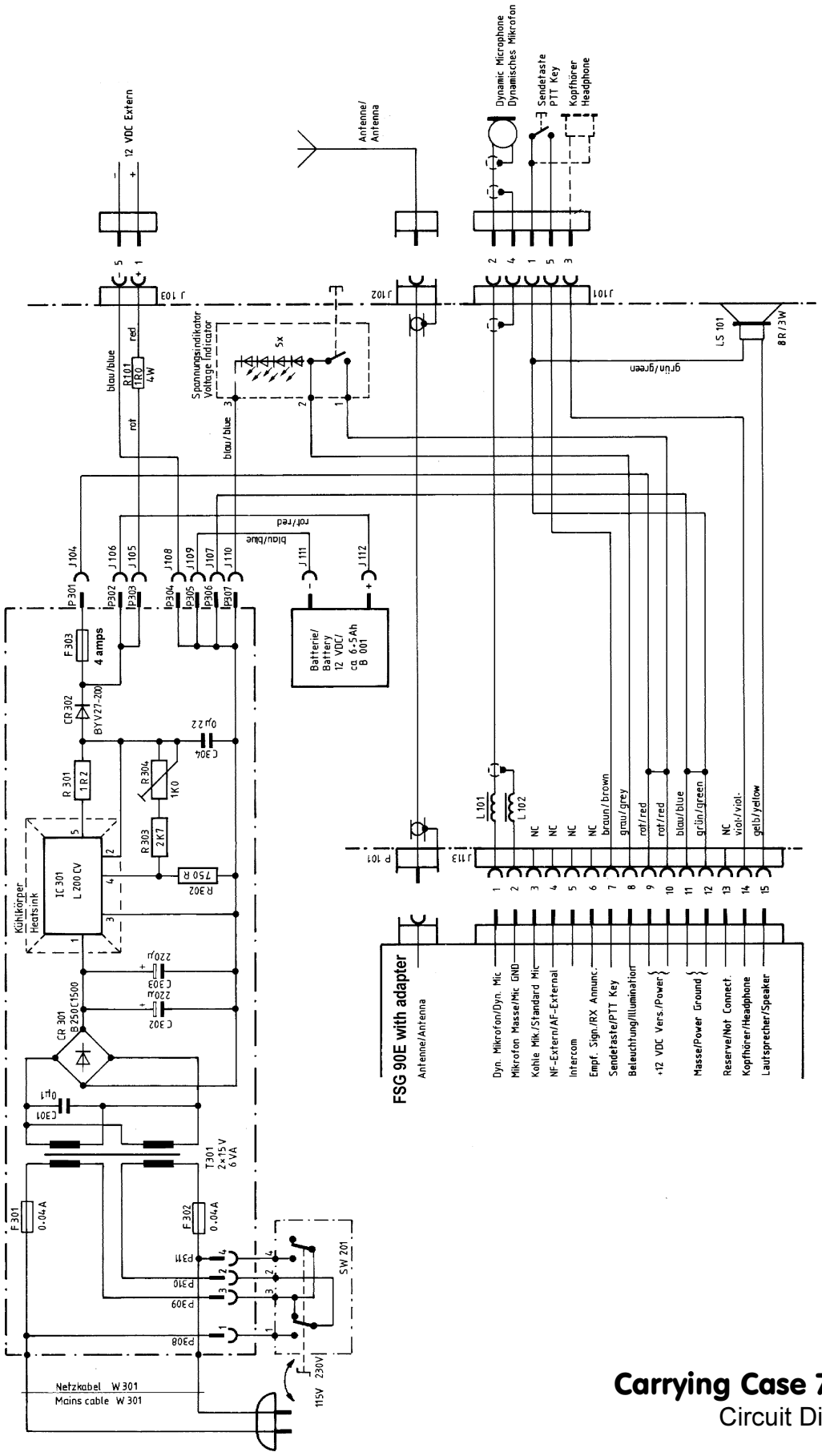
6.5 Environmental Performance Classification

Compliance measurements according to EUROCAE ED-14C / RTCA DO-160 C were performed and the following Environmental Categories fulfilled.

Environmental Conditions	ED-14C DO-160C	Description of conducted tests	Category
Temperature and Altitude	4.0	Equipment tested to category	**D1**
• Low Temperature	4.5.1	Operation -20°C (-4°F) Storage -55°C (-67°F)	
• High Temperature	4.5.2	Operation +55°C (131°F) Storage +85°C (185°F)	
• in-flight Loss of Cooling	4.5.3	No auxiliary cooling required	**-**
• Low Pressure (Altitude)	4.6.1	50,000 ft /15,240 m	
• Decompression	4.6.2	No test required in category D1	
• High Pressure	4.6.3	No test required in category D1	
Temperature Variation	5.0	10°C/min (18°F/min), Equipment tested to category	**A**
Humidity	6.0	Equipment tested to category	**A**
Shock	7.0	Equipment tested to	
• Operational shocks	7.2	6 g	
• Crash safety	7.3	15 g	
Vibration	8.0	Equipment tested to category	**BMN**
Explosion	9.0	No test required	**X**
Waterproofness	10.0	No test required	**X**
Fluids Susceptibility	11.0	No test required	**X**
Sand and Dust	12.0	No test required	**X**
Fungus	13.0	No test required	**X**
Salt Spray	14.0	No test required	**X**
Magnetic Effect	15.0	≤ 13 cm/1°, Equipment tested to category	**Z**
Power Input	16.0	Equipment tested to category	**B**
Voltage Spike	17.0	Equipment tested to category	**B**
Audio Frequency Susceptibility	18.0	Equipment tested to category	**B**
Induced Signal Susceptibility	19.0	Equipment tested to category	**A**
Radio Frequency Susceptibility	20.0	Equipment tested to category	**T**
Radio Frequency Emission	21.0	Equipment tested to category	**Z**
Lightning Induced Susceptibility	22.0	No test required	**X**
Lightning effects	23.0	No test required	**X**
Icing	24.0	No test required	**X**
Other Test	---	No test required	**X**



Carrying Case 70 PC
Dimensions



Carrying Case 70 PC
Circuit Diagram

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CERTIFICATES

CETECOM ICT Services GmbH

beliehen nach der Bekanntgabe- und Akkreditierungsverordnung vom 10. Dezember 1997
als Benannte Stelle der Bundesrepublik Deutschland, vertreten durch die
recognized in accordance with the Recognition and Accreditation Ordinance of December 10, 1997
as Notified Body for the Federal Republic of Germany, represented by

Regulierungsbehörde für
Telekommunikation und Post

DEUTSCHE BAUMUSTERPRÜFBESCHEINIGUNG
GERMAN TYPE-EXAMINATION CERTIFICATE

Registriernummer: A132947J
Registration No.:

Bescheinigungsinhaber: Walter Dittel GmbH
Certificate Holder Luftfahrtgerätebau
Erpfinger Str. 36
D-86899 Landsberg

Produktbezeichnung: FSG 90E, FSG 90FE, FSG 90EL, FSG 90FEL
Product Designation: FSG 90E-H1, FSG 90FE-H1, FSG 90EL-H1 , FSG 90FEL-H1

Produktbeschreibung: Funkanlage des beweglichen Flugfunks als Bodenfunkstelle oder an Bord eines Luftfahrzeuges als VHF - Sprechfunkanlage
Product Description:

Produkthersteller: Walter Dittel GmbH
Product Manufacturer: Luftfahrtgerätebau
Erpfinger Str. 36
D-86899 Landsberg

Vorschriften: FTZ 17 TR 2010 , Ausgabe März 1988
Specifications: FTZ 17 TR 2013 , Ausgabe Juni 1989
BAPT 211 ZV 034 (Entwurf) , Ausgabe Januar 1997
BAPT 211 ZV 039 (Entwurf) , Ausgabe Januar 1997
RegTP 321 ZV 034 , Ausgabe Juli 1998
RegTP 321 ZV 039 , Ausgabe März 1998

Prüfergebnis: Das geprüfte Baumuster ist konform zu den genannten Vorschriften.
Examination Result: The examined type meets the requirements of the above mentioned specifications

Diese Bescheinigung ist erteilt in Übereinstimmung mit der Telekommunikationszulassungsverordnung vom 20. August 1997 und gilt nur in Verbindung mit der nachfolgenden Anzahl von Anlagen.
This certificate is issued in accordance with the Telecommunications Approval Ordinance from August 20, 1997 and is only valid in conjunction with its following number of annexes.

Diese Baumusterprüfbescheinigung ersetzt die Baumusterprüfbescheinigung der Benannten Stelle Regulierungsbehörde für Telekommunikation und Post mit der Registriernummer A132947 vom 13.01.1998.
This certificate replaces the certificate with the same registration number dated 13.01.1998 by Notified Body Regulierungsbehörde für Telekommunikation und Post.

Anzahl der Anlagen: 1
Quantity of Annexes:

Saarbrücken, 02.12.1998
Ort, Ausstellungsdatum
Place, Date of Issue

Unterschrift vom / Signed by Michael Klos
Benannte Stelle / Notified Body

CETECOM ICT Services GmbH, Untertürkheimer Straße 6-10, D-66117 Saarbrücken, Germany

Anlage 1 zur Deutschen Baumusterprüfbescheinigung
Registriernummer: A132947J Datum: 02.12.1998
Seite 1 (2)

Annex 1 of the German Type-Examination Certificate
Registration no.: A132947J Date: 02.12.1998
Page 1 of 2

PRODUKT-EIGENSCHAFTEN:
Product characteristics

1.) Produktbestandteile (FSG 90 mit 6 Watt Sender):
- FSG 90E P/N : F10192 oder F10193
- FSG 90FE P/N : F10196 oder F10197
- FSG 90EL P/N : F10209
- FSG 90FEL P/N : F10211

Produktmerkmale:

Sende-/ Empfangsfrequenzbereich	:	118,000 MHz ... 149,975 MHz
Kanalraster	:	25 kHz und/oder 8,33 kHz
Betriebskanäle	:	1280 Kanäle bei 25 kHz - Kanalraster
Betriebskanäle	:	3838 Kanäle bei 8,33 kHz - Kanalraster
RF-Leistung	:	7 W
Sendeart nach VO-Funk	:	A3E
Spannungsversorgung	:	13,75 VDC (Bereich : 10,5 - 16,5 VDC)

2.) Produktbestandteile (FSG 90 mit 10 Watt Sender):
- FSG 90E-H1 P/N : F10304 oder F10305
- FSG 90FE-H1 P/N : F10308 oder F10309
- FSG 90EL-H1 P/N : F10311
- FSG 90FEL-H1 P/N : F10313

Produktmerkmale:

Sende-/ Empfangsfrequenzbereich	:	118,000 MHz ... 149,975 MHz
Kanalraster	:	25 kHz und/oder 8,33 kHz
Betriebskanäle	:	1280 Kanäle bei 25 kHz - Kanalraster
Betriebskanäle	:	3838 Kanäle bei 8,33 kHz - Kanalraster
RF-Leistung	:	10 W
Sendeart nach VO-Funk	:	A3E
Spannungsversorgung	:	14,0 VDC (Bereich : 10,5 - 16,5 VDC)

TECHNISCHE DOKUMENTATION:
Technical Documentation

Prüfberichte:
Test reports

- Nummer : 5234/59632.1/97
Number

Prüflabor: BAPT (BZT) , Untertürkheimer Str. 6-10 , 66117 , Saarbrücken
Test laboratory

Prüfberichte:
Test reports

- Nummer : 2-0539-A/98 Seiten: 24 Datum: 09.09.1998
Number Pages Date

Prüflabor: CETECOM ICT Services GmbH , Untertürkheimer Str. 6-10 , 66117 , Saarbrücken
Test laboratory

Anlage 1 zur Deutschen Baumusterprüfbescheinigung
Registriernummer: A132947J Datum: 02.12.1998
Seite 2 (2)

Annex 1 of the German Type-Examination Certificate
Registration no.: A132947J Date: 02.12.1998
Page 2 of 2

Technische Beschreibungen / Handbücher / Schaltpläne / Stromlaufpläne etc.:
Technical descriptions / manuals / circuit diagrams / wiring diagrams etc.:

- Baumusterprüfbescheinigung der Benannten Stelle Regulierungsbehörde für Telekommunikation und Post, Reg-Nr.: A132947J vom 13.01.1998, mit Verweis auf folgende Dokumente :
  - Handbuch FSG 90 Dual-Mode 8,33 kHz / 25 kHz VHF/AM Flugfunkgerät ; Stand : Februar 1997
  - Declaration of Design and Performance , Document No.: DDP 031.00, Issue : B , Date of Issue : December 01/1997
  - Prüfbericht : 5234/59632.2/97
- Declaration of Design and Performance , Document No.: DDP 031.00, Issue : D , Date of Issue :November 24, 1998

Auflagen(n):
Conditions

Die unter „Produktbestandteile" aufgeführten Funkanlagen sind mit geeigneten technischen Mitteln auf den Frequenzbereich 117,975 MHz bis 137,000 MHz (erste nutzbare Frequenz 118,000 MHz , letzte nutzbare Frequenz 136,975 MHz), entsprechend den Zulassungsvorschriften, zu begrenzen.

*****

DFS Deutsche Flugsicherung

Zertifikat

Zertifikat

Eine	***Funkanlage des beweglichen Flugfunks in Bodenfunkstellen als VHF-Sprechfunkanlage***
Typen	***FSG 90E, FSG 90FE, FSG 90EL, FSG 90FEL, FSG 90E-H1, FSG 90FE-H1, FSG 90EL-H1, FSG 90FEL-H1***
Frequenzbereich	***118,00 – 136,975 MHz***
der Firma	***Walter Dittel GmbH Postfach 1261 86882 Landsberg/Lech***
bestehend aus	***Sender/Empfänger mit Stromversorgung aus dem Niederspannungsnetz oder Batterien***
für die Betriebsart	***A 3 E***

ist auf Einhaltung der Forderungen der DFS Deutsche Flugsicherung GmbH, die in der technischen Vorschrift der Regulierungsbehörde für Telekommunikation und Post (Reg TP 321 ZV 039 Ausgabe März 1998) niedergelegt ist, geprüft worden. Das Gerät entspricht den Vorschriften, die von der DFS Deutsche Flugsicherung GmbH und der Regulierungsbehörde für Telekommunikation und Post auf Grund der Vollzugsordnung für den Funkdienst (VO Funk) des internationalen Fernmeldevertrages aufgestellt wurden, sowie den Forderungen des Bundesministers für Verkehr (BMV) und den Richtlinien und Empfehlungen der internationalen Zivilluftfahrt-Organisation (ICAO) für den Flugfernmeldeverkehr. Es wird daher mit den umseitig aufgeführten Auflagen als Muster zur Herstellung und zum Vertrieb in der Bundesrepublik Deutschland zugelassen.

Die Gerätetypen haben die Serienprüfnummer ***B-7851/97*** erhalten

Das Zertifikat für o.g. Serienprüfnummer mit Ausstellungsdatum 20.3.1998 wird hiermit ungültig.

Offenbach/Main, den 17.2.1999

i. V. W. Bellen
Leiter Navigation

i. A. H. Günzel

Auflagen

1. Jedes Gerät mit der Bezeichnung FSG 90E, FSG 90FE, FSG 90EL, FSG 90FEL, FSG 90E-H1, FSG 90FE-H1, FSG 90EL-H1 und FSG 90FEL-H1 das mit der umstehenden Serienprüfnummer und mit der Registriernummer der Baumusterprüfbescheinigung der Regulierungsbehörde für Telekommunikation und Post versehen ist, muß mit dem durch die Regulierungsbehörde für Telekommunikation und Post und der DFS Deutsche Flugsicherung GmbH geprüften Mustergerät elektrisch und mechanisch übereinstimmen.

2. Jede Änderung oder Ergänzung des Aufbaues oder der Schaltung des Gerätes gegenüber dem Mustergerät macht eine Nachprüfung dieses Gerätes durch die Regulierungsbehörde für Telekommunikation und Post und die DFS Deutsche Flugsicherung GmbH erforderlich.

3. Bei Herstellung von Seriengeräten die dem Mustergerät entsprechen, bleiben der DFS Deutsche Flugsicherung GmbH Stichproben in Form einer Stückprüfung vorbehalten.

4. Dieses Zertifikat allein berechtigt nicht zum Betrieb eines Gerätes. Einrichten, Errichten und Betreiben einer Funkstelle unter Verwendung dieses Gerätes, auch wenn es sich um eine Vorführung handelt, sind vom Besitz einer Genehmigung der Regulierungsbehörde für Telekommunikation und Post abhängig.

5. Dieses Zertifikat ersetzt keine Zertifizierung nach dem Telekommunikationsgesetz (TKG) oder nach dem Gesetz über die elektromagnetische Verträglichkeit von Geräten (EMVG).

6. Aus der Zertifizierung durch die DFS Deutsche Flugsicherung GmbH können keine Ansprüche auf Zulassung gegenüber anderen Zertifizierungsstellen abgeleitet werden.

7. Aus der Ausstellung des Zertifikates der DFS Deutsche Flugsicherung GmbH können keine Forderungen patentrechtlicher Art hergeleitet werden. Sie befreit in keinem Fall von der Beachtung fremder Schutzrechte und stellt keinen Rechtsschutz, ähnlich dem im Patentgesetz vorgesehen, dar.

8. Für die Einhaltung der Sicherheitsforderungen, die sich aus den Deutschen Normen ergeben und auf das Gerät anzuwenden sind, ist der Hersteller selbst verantwortlich. Die Einhaltung der in Deutschland gültigen Normen ist nicht Gegenstand der Musterprüfung.

BUNDESREPUBLIK DEUTSCHLAND

LUFTFAHRT-BUNDESAMT

a member of

JOINT AVIATION AUTHORITIES

JOINT TECHNICAL STANDARD ORDER (JTSO) AUTHORISATION

Pursuant to the National Regulations for the time being in force and subject to the conditions specified below, the National Aviation Authority Luftfahrt-Bundesamt in accordance with the JAA Procedures for JTSO Authorisation hereby grants

Walter Dittel GmbH

Luftfahrtgerätebau
D-86899 Landsberg/Lech

POA No. LBA.G.0100

a JTSO AUTHORISATION
No. LBA.O.10.911/98 JTSO

according to JAR-21, Subpart O and JAR-TSO,
JTSO-2C37e and JTSO-2C38e

for

8,33kHz and 25kHz 6W/10W VHF Communications Transceiver Families
FSG 90(X) and FSG 90(X)-H1
DDP No. 031.00

CONDITIONS:

1. The JTSO Authorisation Holder is only authorised to identify an article with this JTSO marking whilst remaining in compliance with the conditions for the issue of this Authorisation.

2. This AUTHORISATION shall remain valid until surrendered, withdrawn or otherwise terminated.

Date of issue: 27.10.1999

LUFTFAHRT-BUNDESAMT 10 BRAUNSCHWEIG

Issued:
Hentschel

REGULIERUNGSBEHÖRDE FÜR TELEKOMMUNIKATION UND POST
Regulatory Authority For Telecommunications and Posts

EG-BAUMUSTERBESCHEINIGUNG
EC Type-Examination Certificate

Registriernummer: B132705J **Anlage(n): 1**
Registration no.: Annex(es)

Benannte Stelle: Regulierungsbehörde für Telekommunikation und Post
Notified Body:

Bescheinigungsinhaber: Walter Dittel GmbH
Certificate Holder: Erpftinger Straße 36

D-86899 Landsberg/Lech

Produktbezeichnung: FSG 90(X) oder FSG 90(X)-H1, Modellvarianten siehe Anlage 1
Designation of product:

Produktbeschreibung: VHF/AM Sprechfunkgerätefamilie im beweglichen Flugfunkdienst
Product description: VHF/AM Air Band Communications Transceiver Family

Angewandte Normen: **Störaussendung:** DRAFT prETS 300 339 (01/97), EN 55022
Used Norms: (Emission)

Klasse: B
(Class)

Störfestigkeit: DRAFT prETS 300 339 (01/97)
(Immunity)

Die EG-Baumusterbescheinigung mit Ausstellungsdatum 13.01.98 wird hiermit ungültig.

Diese Bescheinigung ist erstellt in Übereinstimmung mit der Richtlinie 89/336/EWG (Amtsblatt der Europäischen Gemeinschaften Nr. L 139 v. 23. Mai 1989)
This certificate is issued according to the directive 89/336/EEC (Office Journal of the European Communities L 139 from 23. May 1989)

Ort, Datum: Saarbrücken, 10.02.99
Place, Date:

Unterschrift:
Signed:

Stefan Bach

Regulierungsbehörde für Telekommunikation und Post, Talstraße 34-42, D-66119 Saarbrücken, Tel.:(06 81) 8830-8, Fax: (06 81) 8830-700

Anlage 1 zur EG-Baumusterbescheinigung Nr. B132705J vom 10.02.99 Seite 1 (2)

Annex 1 to EC Type-Examination Certificate No. B132705J Date: 10.02.99 Page 1 of 2

Modellvarianten:
System variants

FSG 90	Model 90-25/8.33 Model 90-25/000	**FSG 90-H1**	Model 90-25/8.33-H1 Model 90-25/000-H1
FSG 90E	Model 90E-25/8.33 Model 90E-25/000	**FSG 90E-H1**	Model 90E-25/8.33-H1 Model 90E-25/000-H1
FSG 90F	Model 90F-25/8.33 Model 90F-25/000	**FSG 90F-H1**	Model 90F-25/8.33-H1 Model 90F-25/000-H1
FSG 90FE	Model 90FE-25/8.33 Model 90FE-25/000	**FSG 90FE-H1**	Model 90FE-25/8.33-H1 Model 90FE-25/000-H1
FSG 90L	Model 90L-25/000	**FSG 90L-H1**	Model 90L-25/000-H1
FSG 90EL	Model 90EL-25/000	**FSG 90EL-H1**	Model 90EL-25/000-H1
FSG 90FL	Model 90FL-25/000	**FSG 90FL-H1**	Model 90FL-25/000-H1
FSG 90FEL	Model 90FEL-25/000	**FSG 90FEL-H1**	Model 90FEL-25/000-H1

Technische Eigenschaften:
Technical Characteristics

Frequenzbereich: 118,000 - 136,975 MHz [all models without suffix (E)] oder/or
Frequency range
118,000 - 149,975 MHz [all models with suffix (E)]

Kanalabstand: 25 kHz und/oder and/or 8,33 kHz
Channel spacing

Sendeleistung: 6 W [FSG 90(X)] bzw. 10 W [FSG 90(X)-H1]
Transmitter power

Spannungsversorgung: 10,5 - 16,5 V; DC
Power supply

Anlage 1 zur EG-Baumusterbescheinigung Nr. B132705J vom 10.02.99 Seite 2 (2)

Annex 1 to EC Type-Examination Certificate No. B132705J Date: 10.02.99 Page 2 of 2

Wesentliche Teile der technischen Dokumentation:
Relevant parts of the technical documentation

Prüfbericht Nr.: 1388/00089/97 vom: 17.06.1997
Test Report No.: of

Prüfbericht Nr.: 1388/00099/97 vom: 16.07.1997
Test Report No.: of

Prüfbericht Nr.: 2_0539-A/98 vom: 09.09.1998
Test Report No.: of

Declaration of Design and Performance, Document No.: DDP 031.00, Issue D
Date of Issue: November 24, 1998

Bemerkung(en):
Remark(s)

Betrieb in

a) Luftfunkstellen oder

b) Bodenfunkstellen (stationär, portabel oder mobil) des beweglichen Flugfunks

Operation in

a) aircraft stations or

b) ground-based stations (fixed, portable or mobile use) in the aeronautical mobile service

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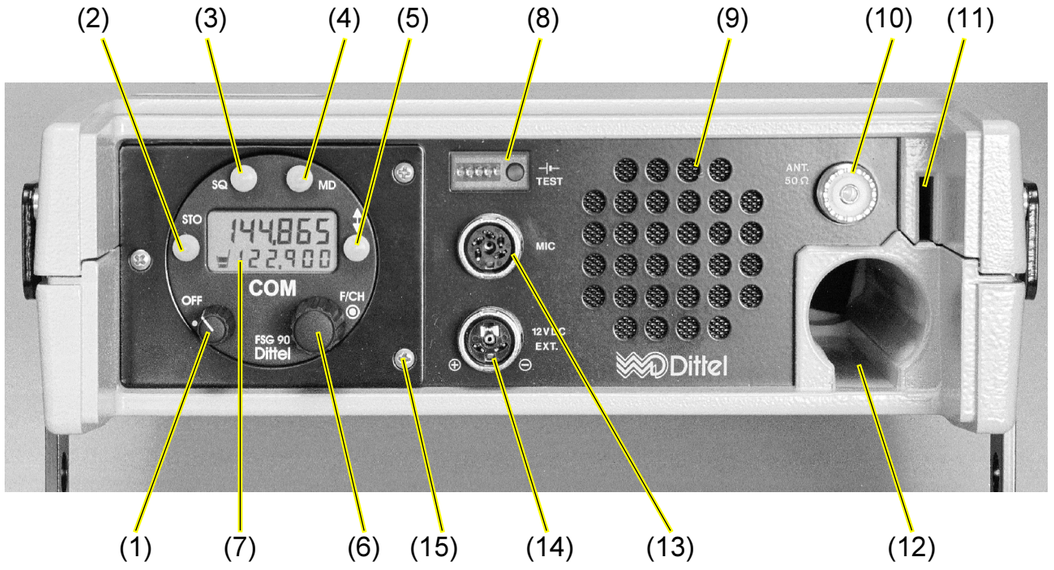
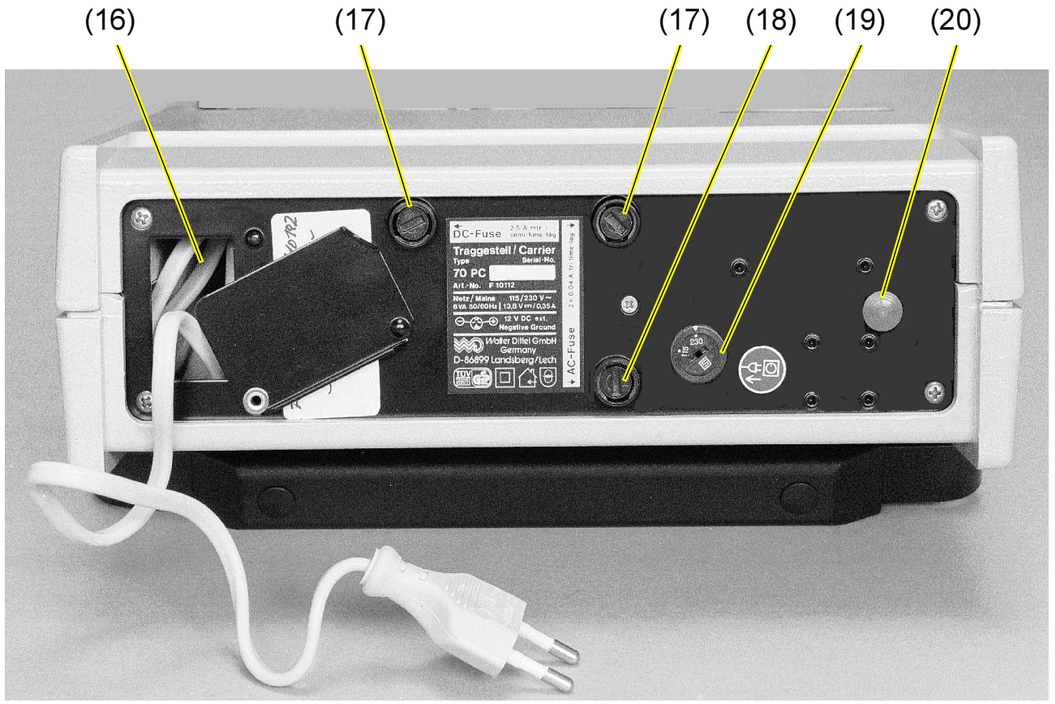


NOTICE: Microphone and antenna not shown!



FSG 90E PC
Operation