



SERVICE BULLETIN NO. OSB 817-47

I. TECHNICAL DETAILS

1.1 Category:

Optional

1.2 Aircraft affected:

TCDS: 817

FAA TCDS: G34EU

G 109

all S/N

G 109B

all S/N

1.3 Time of Compliance:

optional, according to LBA/ EASA or other national regulations

1.4 Subject:

ATA-Code:

34-50

Mode-S - Transponder

1.5 Reason:

Aircraft which are operated in the German air space must be equipped with the required flight safety equipment for the safe flight operation.

In Germany the installation and the use of Mode S transponder is regulated in the FSVA (Verordnung über die Flugsicherungs-ausrüstung der Luftfahrzeuge).

In foreign airspace the corresponding national regulations are mandatory.

GROB offers with this Service Bulletin the installation of all LBA approved or Mode S transponder with an valid TSO, JTSO, ETSO.

(for further information refer to www.lba.de/englisch/technical/avionik/modes.htm)

G 109
G 109B



1.6 Concurrent documents:

“Installation and User Manual” of the corresponding OEM

1.7 Approval Note:

The technical information contained in this document has been approved under the authority of EASA Design Organisation Approval No. EASA.21J.030.

1.8 Accomplishment / Instructions (see Fig. 1 and 2):

WARNING: During accomplishment of para 1.8.2 and 1.8.3 the XPDR manufacturer’s instructions are mandatory !

1.8.1 Apply for the secondary radar code at the LBA or the corresponding national authority

1.8.2 If a transponder is already installed:

- remove transponder
- check antenna cable and antenna for condition, correct and tight fit, if necessary repair or replace concerned item
- check installed circuit breaker for adequate value, replace if necessary
- check compatibility of the blind encoder/ encoding altimeter, replace if necessary
- check the pitot – static system
- if applicable use new cover plates and panels
- amend the aircraft equipment list
- check the transponder system during a check flight

NOTE: Instruction for the approval of transponder installation in sailplanes and powered sailplanes are given in the LBA Note T402-TDR-02/05, see attached copy !

1.8.3 If no transponder was already installed:

- determine the transponder installation position, preferable in the center of the instrument panel and fix transponder using screws (item 12, P/N DIN965-M3x10)
- if required use modified cover plate (item 15) or blind cover (item 17)
- install wiring loom (item 20) from the transponder to the circuit breaker (item 30, P/N W58XC4C12A-X, for amperage refer to manufacturers instructions) and install wiring loom (item 40) from transponder to the antenna
- install blind encoder and connect to the pitot – static system
- install antenna
- amend aircraft equipment list
- check pitot – static system
- check the transponder system during a check flight

NOTE: Instruction for the approval of transponder installation in sailplanes and powered sailplanes are given in the LBA Note T402-TDR-02/05, see attached copy !

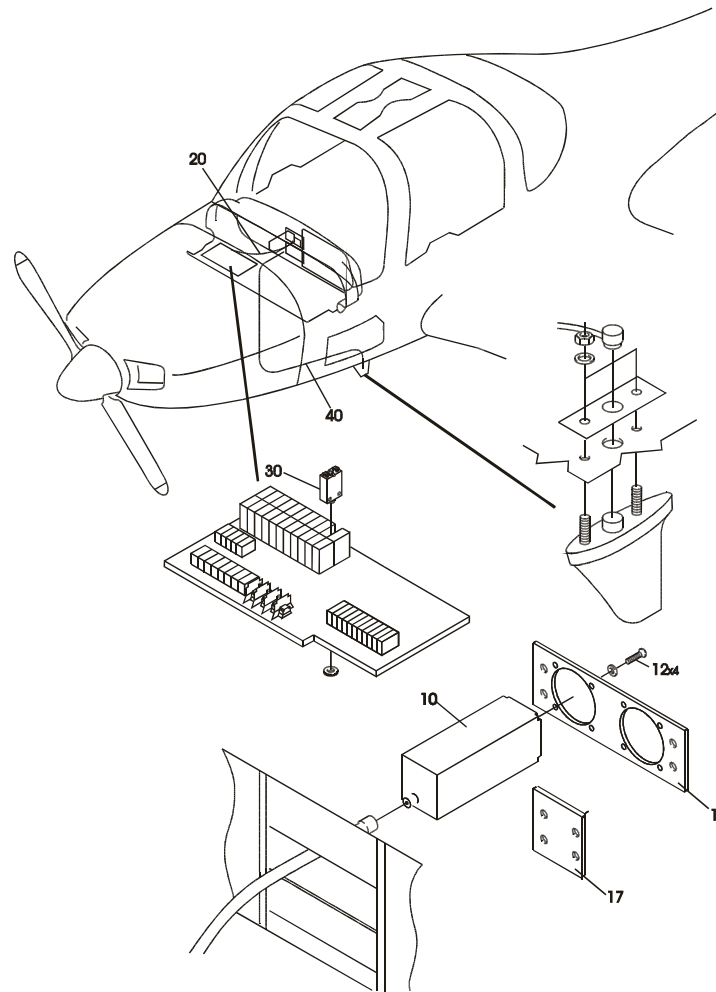
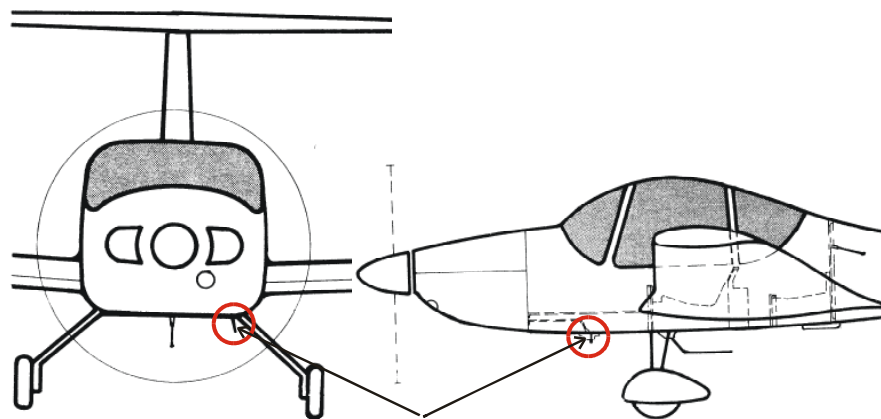


Fig. 1



XPDR Antenne Einbauort
 XPDR antenna location

Fig. 2



1.9 Repetitive Actions:

N/A

1.10 Mass (Weight) and CG:

Additional weight must be included by calculation or weighing

II. PLANNING INFORMATION

2.1 Material & Availability:

material needed for modification may be ordered from GROB.

2.2 Special Tools:

adequate test bench for check of antenna output and signal quality

2.3 Labour costs:

approx. 6 hours

2.4 Reference documents:

N/A

2.5 Credit:

N/A



III. REMARKS

- 3.1** The installation may be performed by an authorised aviation workshop and has to be certified by an authorised inspector and a Inspection Certificate has to be issued.
- 3.2** If you have sold your aircraft in the meantime, would you kindly pass this information on to the new owner and forward his address and aircraft S/N to us.
- 3.3** For questions and assistance please contact:

Rudolf Vodermeier, Head of Product Support
phone: +49 8268 998 139
fax: +49 8268 998 200
e-mail: productsupport@grob-aerospace.de

Luftfahrt-Bundesamt

Division T 4

T402-TDR-02/05

February 14th, 2005

1) Note:

Instruction for the approval of transponder installation in sailplanes and powered sailplanes

Relating to the certification of transponder installation in sailplanes and powered sailplanes, the LBA Division T 4 proposes the following procedure for the proof of compliance:

Attention: The procedures proposed here do not exempt from the obligation to comply with the applicable air traffic regulations!

Proofs of compliance with individual items of the airworthiness requirements:

- § 22.301, 22.597 – Loads from single masses
- § 22.1301 – Function and installation
- § 22.777 – Cockpit controls
- § 22.786 – Protection from injury
- § 22.1321 – Arrangement and visibility
- § 22.1327 – Magnetic direction indicator
- § 22.1365 – Electric cables and equipment
- § 22.1431 – ATC airborne equipment
- § 22.883 – Ground clearance (for antenna, if applicable)

§ 22.301, 22.597 – Loads from single masses

Mechanic attachment means with aircraft components
Maximum mass in the instrument panel to be indicated in the flight manual.
If necessary load test by means of a spring scale

§ 22.1301 - Function and installation

Conduct test flight applying the following procedures:
Allow for heat dissipation, protection from moisture

This procedure includes a flight test during which the transmission to a ground station is assessed by ATC on the ground. For this purpose the following factors should be accounted for:

- different flight directions of the aircraft to the ground station and
- the influence of potential sources of interference (e.g. engine running, additional electric equipment; it is to be assumed that flights with the engine running will be the critical operational condition).

Description of the procedure

Remarks relating to range:

The position of the antenna receiving the signals on the ground is normally not known to the pilot or to the controller. Example: Position is Braunschweig, addressee is Bremen information, antennas in question are located at Nordholz, Deister, Berlin-Tegel etc.

Antennas in question for receiving Mode-S in Germany are located at: Nordholz, Deister, Berlin Tegel, Düsseldorf, Schmooksberg, Frankfurt, Neunkirchen, Auersberg, Gosheim, Munich.



(Source: DFS Internet "Surveillance in Air Traffic")

http://www.dfs.de/dfs/internet/deutsch/default/download/ortung_im_luftverkehr_dt.pdf

Furthermore it is possible to contact the DFS (Mr Dzuba, phone: 06103/707-2270) and obtain a measurement record to have a written proof of the transmission; this record is subject to fees.

1. Documentation of the test conditions

Date, persons participating, aircraft
airborne transmission equipment
ground units
etc.

2. Testing

If applicable, engine on/off

The aircraft will fly a square to allow determination of the transmission quality into the directions 0°, 90°, 180° and 270° to the ground station. The transmission into each of these directions will be assessed by the ground station. To improve the line of sight range of the equipment an increased flight level may be taken into account.

The assessment scheme may be as follows, for example:

1) Position:

Distance from the next (assumed) radar station:
Flight altitude: 3300 ft MSL

DFS unit	receivability on the ground			
	direction of the aircraft to the station			
	0°	90°	180°	270°
XYZ radar (see chart)	OK	OK	OK	OK

If applicable, engine on/off

2) Flight altitude: 4500 ft MSL

3) Flight altitude: 6000 ft MSL

4) Flight altitude: 7500 ft MSL

3. Final assessment

The interference effects found are to be indicated.

§ 22.777 – Cockpit controls

§ 22.786 – Protection from injury

22.1321 - Arrangement and visibility

Controllability / accessibility / visibility

§ 22.1327 Magnetic Compass

Adequate distance from the compass

§ 22.1365 – Electric cables and equipment

Pay attention to manufacturer's data
Types of wires (if necessary aviation wires)
Fixed wiring (aircraft manufacturer's data)

§ 22.1431 – ATC airborne equipment

Kind and maximum length of antenna wire (defined by the transponder manufacturer)
Energy balance (how long is it serviceable with the complete equipment used? -> manual)
Use approved antenna
Use "electric counterweight" for the antenna (if applicable TDR manual)
The metal surface connected with the mass of the antenna should be as large as possible
(it may be thin – if applicable, a copper foil to be bonded – attention: for CRP shells it may be necessary to apply the counterweight to the outer surface)

§ 22.883 – Ground clearance (for antenna, if applicable)

Installation location for the antenna and, if necessary, kind of counterweight defined by the aircraft manufacturer

Transponder documentation to be included in aircraft file

Guidance for the elaboration of a Service Bulletin, a change of type certificate or a supplemental type certificate

If an aircraft manufacturer issues a collective Service Bulletin, corresponding flight tests are to be conducted to verify possible installation locations for the antenna.

In case of a type certificate change or a supplemental type certificate for the installation of a transponder by a manufacturer or an aeronautical work shop the following items are to be dealt with among other things:

Inspection:

Inspection of the installation by an inspector "avionic"

Amendment of the equipment list, if necessary, weight and balance report, adjustment of useful load data

Approval of airborne radio station to be supplemented by the Bundesnetzagentur (Federal Network Agency)

Test flight following the installation

5

Note relating to radio frequency exposure (radiation effect on the pilot):

According to information given by the Bundesnetzagentur Münster, there are no limit values for the permitted field strength of mobile radio equipment to which flight crews may be exposed. In accordance with the Verordnung über das Nachweisverfahren zur Begrenzung elektromagnetischer Felder (regulation on the means of compliance for the limitation of electromagnetic fields) (MEMFV) and the Verordnung zur Durchführung des Bundes-Immissionsschutzgesetzes (implementation order to the federal immission protection) (BImSchV) such limit values exist for stationary radio equipment.

Concerning the limit values to be complied with, § 3 section 1 of the BEMFV contains a reference to the 26th BImSchV. For stationary radio equipment, § 2 of the BImSchV prescribes that:

1) according to paragraph 1 the limit values specified (electromagnetic field strength) may not be exceeded.

2) according to paragraph 2, for pulse electromagnetic fields, additionally, the peak value of the electromagnetic field strength may not exceed 32 times the limit values specified.

The safety distances calculated pursuant to the far field formula (VDE 0848, Part 1, section 5.3.1.2) are 7 cm for a 150 Watts transponder (Mode A/C) and 5 cm for an 80 Watts transponder (calculations available with T 402).

Observation of the minimum distances appears to be advisable.