



Installation Instructions

ACD Multi-Function-Display



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However, a registration has to be sent to Garrecht Avionik after completion of installation in accordance with the installation instructions written in this document.

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Record of Revisions

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System Overview

ACD is a small multi-function control display intended for controlling Mode-S Transponders (ATC radar beacon system, ATCRBS) and Aircraft Radios (Airborne VHF Transceivers). Furthermore the system is capable of measuring and displaying a precise pressure altitude. The system can be connected to transponder and radio devices using standardized interfaces.

ACD marks the heart of a new avionics platform with advanced component redundancy. The small outline and multifunctional software of the device allow for better system integration in space constrained environments. The pilot-centered user interface aims at reducing crew workload, increasing crew efficiency and improving flight safety.



1. General

This instructions describes the procedures, conditions and limitations for installation and approval of all components of an ACD. The system provides advanced control capability for COMM and Mode-S SSR transponders and integral altimeter capability.

This installation instructions applies to the modification of an aircraft to support the installation of an ACD Multi-function-display.

The procedures described herein are approved by EASA under **60061561**. This minor change approval applies to all aircraft listed in the Aircraft Model Lists (AML), doc # GAV-MC004-AML_CS22 and GAV-MC004-AML_CS23.

2. Technical Specifications

For all technical specification of equipment to be installed, always refer to the appropriate manuals and documentation supplied by the equipment's manufacturer.

2.1. *Physical characteristics*

Refer to the appropriate manuals and documentation supplied by the equipment's manufacturer.

2.2. *Power requirements*

Refer to the appropriate manuals and documentation supplied by the equipment's manufacturer.

2.3. *Certifications*

An ETSO authorization has been issued for ACD by EASA under EASA.21O.10063331.



3. Installation Overview

This chapter gives an overview for the steps required for a proper installation of the device in accordance with the Minor Change Approval.

Post installation procedures required for setting up the system and performing the final tests are described in chapter 6 to 9.

3.1. Pre Installation information

All work has to be carried out by skilled workers in accordance with applicable standards following the installation manuals provided by the system manufacturer and the procedures for installation described in this instruction.

Additionally, the following practices described in FAA AC 43.13-1B and FAA AC 43.13-2B need to be considered:

- Avionics installation (FAA AC 43.13-1B, chapter 12)
- Antenna installation (FAA AC 43.13-2B, chapter 3)
- Structural integrity (FAA AC 43.13-2B, chapter 1)
- Electrical load analysis (FAA AC 43.13-2B, chapter 2 and FAA AC 43.13-2B, chapter 11)

3.2. Available equipment

The system to be installed is supplied by the manufacturer with the parts described in the appropriate manuals and documentation.

3.3. Installation Materials

For specific installation information and instruction, such as dimensions, mounting, electrical connection and data interfaces, follow the installation manual provided with the system.

3.4. Materials required but not supplied with the system

Use standard aviation accessories for installation as shown below:

- Wire (Mil-W-22759/22 or equivalent)
- shielded wire (MIL-C-27500 or equivalent)
- Circuit breaker
- Switch
- Tie wraps
- Connectors according to equipment manufacturer's requirements for interfacing to third party devices
- Adaptor for installation of ACD in 80mm panel cut out, if required.



4. Installation consideration

4.1. Minimum System configuration

If not otherwise stated, a minimum installation of the system requires the following items:

- System unit
- Wiring harness

4.2. Mounting consideration

Generally, the installation may not affect any certification and flight safety relevant equipment.

So a unit installed in the instrument panel may not cover the view to any primary instrument, which is essential for safe flight and landing, nor may it impede the operation of such instruments or equipment.

The T arrangement of the basic flight instruments must be preserved.

In case of replacing a mechanical barometric altimeter by ACD, verify that the installation does not collide with the limitations listed in 4.8 of this document.

If at least one of the items listed herein cannot be met, ACD is not suitable for replacement of the existing mechanical barometric altimeter, but it may be installed in addition.

4.3. Power Distribution

The system needs to be connected to the Avionics master bus. Circuit protecting devices have to be used.

An electrical load analysis before installation should be performed to verify that the aircraft's electrical bus is capable to support the connected device (see FAA AC 43.13-2B, chapter 2 and FAA AC 43.13-2B, chapter 11).

4.4. Connection to External Displays

ACD is suitable to be connected to other ACD (i.e. for tandem two seater) in order to provide control of connected systems as VHF-COMM and Mode-S transponders or altimeter capability to both pilots. Refer to the installation manual provided with the system for detailed information.

4.5. Connection to Audio Panels

N/A

4.6. New Labels

N/A



4.7.Limitations

1. Using the alticoder of ACD is limited to 40,000ft (FL400).
2. Using the altimeter of ACD is limited to 40,000ft (FL400).
3. Use of the device is limited to class II aircraft (MRE, MTE and STE), which includes class I aircraft (SRE), both with MTOW of 6000 pounds or less as per definition of AC23.1309-1E.
4. Use of ACD as primary and only altitude measurement device of the aircraft is excluded, if loss of functions or misleading information is assessed higher than Minor.

Aircraft Category Use of ACD as	CS-22	CS-LSA	CS-23 < 6000 pounds (SRE, MRE, STE, MTE)
Primary and only altimeter	++	++	--
Supplementary altimeter	++	++	++
Control unit for COMM and XPDR	++	++	++

++ = accepted
 -- = not accepted

In case of any doubt, the use is limited to supplementary altitude measuring and control unit for COMM and XPDR.

5. The operator must verify that the installation meets the airspace requirements where the flights are intended.
6. The device does not provide static error correction. Therefore installation is limited to aircraft where static error correction is not required.



5. Equipment installation

5.1. System Unit Location and Mounting

For installing the system unit, follow the steps shown below:

5.1.1. Replacement of existing mechanical altimeter

- Locate the mechanical altimeter in your instrument panel
- Disconnect static pressure line from altimeter
- Unfasten and remove the panel screws of the altimeter
- Remove altimeter from instrument panel
- In case of 80 mm panel cutout, install the 80mm to 57mm adaptor on the ACD
- Consider an appropriate clearance behind the instrument panel for wiring harness and connectors
- Mount the system unit as described in installation manual
- Connect the static pressure line to the static pressure connector of the ACD

5.1.2. Additional installation to existing mechanical altimeter

- Find a proper location for the device as specified in 4.2.
- Consider an appropriate clearance behind the instrument panel for wiring harness and connectors
- Mount the system unit as described in installation manual



5.2. Construction and validation of structures

5.2.1. Static Test Loads

After mounting of the system, a structural validation of the mounting position has to be performed successfully, if the mass of the removed mechanical altimeter is less the mass of the ACD.

If the ACD is installed in addition to an existing altimeter, the structural validation is obligated

ACD mass is: 0,143 kg

Static loads to simulate forces of inertia need to be applied as follows:

Direction of Force	Load Factor [g]	Static test load = (Load Factor x system weight) [N]
Vertical (upward/downward)	7.5 / 9.0	11 / 13
Horizontal (Forward)	18	26
Sideward (L/R)	6.5	10

5.3. Cabling and Wiring

5.3.1. Power Supply

Follow the instructions of the ACD installation manual for proper connection to the avionic master bus. Use cables and wires specified in this manual for connection only.

Install a circuit breaker with the specified current in the circuit breaker area:

All work has to be carried out carefully and in accordance with practices shown FAA AC 43.13-1B, chapter 12.

5.3.2. Interfacing with VHF-COMM and/or Mode-S SSR Transponder

Follow the instructions of the ACD installation manual for proper connection to subsystems. Use cables and wires specified in this manual for connection only.



5.3.3. Weight and Balance

After completing installation, perform a weight and balance calculation following the appropriate guidelines. Complete the equipment list adding the new installed devices and include it into the aircraft records. Add a reference to the WnB sheet and updated equipment list in the attached checkout log.

5.4. Electrical Load Analysis

Perform an electrical load analysis according to FAA AC 43.13-2B, chapter 2 and FAA AC 43.13-2B, chapter 11. Add A reference to the electrical load analysis in the attached checkout log.

5.5. Equipment Bonding

Installed system units need to be connected to aircraft common ground reference. Connect the dedicated ground terminal of the device using appropriate materials (such as tubular or flat braid) for establishing a low resistance connection to the airframe.. Remove sealing or paint if required. When measured from the system chassis to the airframe, the resistance must be 20 mOhms or less.

5.6. Placing Labels

N/A



6. System Configuration

After completing physical installation, a system configuration is required. Follow the instructions of the user manual of the installed device and perform the required setup.

- Complete the Configuration and check out logs as well as the settings log forms (appendix F to H of the ACD installation manual)
NOTE: Complete configuration and checkout logs are part of a complete fulfilment of the requirements of this minor change approval

7. Periodic maintenance

The maintenance of the ACD is on condition only.

8. Aircraft Log

Update your aircraft log with the following documents:

1. Updated Equipment list
2. Weight & Balance calculation and report
3. Electrical load analysis
4. ACD Configuration and Checkout Log
5. Final Test / Checkout Form including EMI Test report

9. Minor Change data

9.1. MC information

A copy of the MC approval document will be provided with the complete set of MCA documents required for installation on approval holder's website.

9.2. Permission to use this MC

Using this MC does not require a written permission letter

9.3. Continued Airworthiness instructions

N/A

9.4. MC Approved Model List (AML)

The AML related to this MC approval document will be provided with the complete set of MCA documents required for installation on approval holder's website.

The installation of an ACD device is approved for all aircraft listed on the AML following the instructions and limitations published in this document.