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Instructions for Continued Airworthiness

7002-IC-002

Revision --

For P178 Failsafe Audio Mixer

Installed in Airbus Helicopters Deutschland GmbH

Model BK-117 (EC145) Helicopters

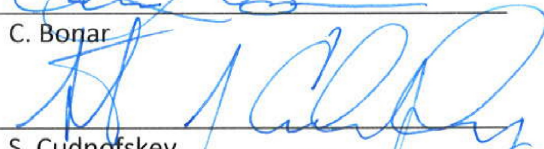
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1. Introduction

1.1 Scope

This manual provides description, operation, removal, inspection, and installation, for the P178 Failsafe Audio Mixer.

1.2 Purpose

The purpose of this manual is to maintain the P178 Failsafe Audio Mixer in peak operating efficiency with the greatest service life.

1.3 Revision Control

All revisions to this document shall be identified in the Record of Revisions.

1.4 Service Difficulty Reporting

A record of sales shall be maintained by Eagle Copters USA. Any changes to these instructions resulting from service difficulties (ref: 14 CFR § 21.3) shall be distributed to all previous recipients.

1.5 Applicability

This manual shall be used to maintain the P178 Failsafe Audio Mixer for Airbus Helicopters Deutschland GmbH BK-117 (EC145) Series Helicopters.

1.6 Abbreviations and Units of Measure

in	=	inches
lbs	=	pounds
P/N	=	part number
I/N	=	item number
LH	=	left hand
RH	=	right hand

1.7 Orientation

All references to direction, such as left, right, up, down, forward and aft, are in reference to the airframe. Forward is toward the nose of the aircraft, etc.

1.8 Precautions

The following precaution definitions will be used to indicate the seriousness of the hazard or condition.

WARNING: May be a maintenance procedure, practice, condition, etc., which could result in personal injury or loss of life.

CAUTION: May be a maintenance procedure, practice, condition, etc., which could result in damage or destruction of equipment.

NOTE: May be a maintenance procedure, practice, condition, etc., or a statement that needs to be highlighted

1.9 Distribution

This manual will be distributed to end users (or their mechanics or maintenance departments). A copy of this ICA shall be provided by Eagle Copters USA with each kit sold.

1.10 Description

The P178 Failsafe Audio Mixer provides 3 composite outputs from up to 8 input signals. Channel 1 and Channel 2 composite outputs are failsafe relay protected for Master Caution or Essential Tones to ensure that no fault in the system or an electrical bus failure can prevent pass through of Essential Warnings or Tones. Channels 3 through 8 are for non-essential tones and will drop off line in case of fault or Avionics Bus failure.

The P178 Failsafe Audio Mixer removes the need for external relays to ensure Essential Tones are passed to unswitched inputs on any audio system. The mixer also has internal fault detection. Upon fault, the relays go to their normally closed (Failsafe) position.

There are no restrictions as to the quantity of P178 Failsafe Audio Mixers that are installed. However, it is the installer's responsibility to verify that the installation of this device does not interfere with other installed equipment and to perform an electrical load analysis to verify that the aircraft electrical buss can support the installation of the P178 Failsafe Audio Mixer.

2. Airworthiness Limitations

There are no Airworthiness Limitations associated with the STC.

The Airworthiness Limitation Section is FAA approved and specifies inspections required under Part 43.16 and 91.403 of Federal Regulations unless an alternate program has been FAA approved.

3. Inspection Requirements and Overhaul Schedule

3.1 Inspection Requirements

500 Hour Inspection

Inspect all cable connectors, fasteners and hardware for security and condition.

2 year / 2000 hour Inspection

- a.** Remove the P178 Failsafe Audio Mixer from the aircraft. See Section 4.
- b.** Inspect all metal components for damage and corrosion. If damage or excessive corrosion is found, replace the affected parts per Section 4. Corrosion that has penetrated more than 0.01" is cause for replacement of sheet metal components.
- c.** Inspect system cabling for damage, loose connectors and chafing. If damaged refer to 5 for instructions for repairing cabling.

3.2 Overhaul Schedule

There is no Overhaul Schedule for this kit.

4. P178 Failsafe Audio Mixer Removal, Inspection and Re-Installation

4.1 P178 Failsafe Audio Mixer Removal

- a. Disconnect cable connector from the P178 Failsafe Audio Mixer.
- b. Disconnect (4) #8-32 screws securing the P178 Failsafe Audio Mixer to the mounting structure.

4.2 P178 Failsafe Audio Mixer Inspection

- a. Carefully inspect the P178 Failsafe Audio Mixer for signs of damage, cracks, or corrosion. Any corrosion that has penetrated the base metal by more than .01 inches is cause for replacement.
- b. The P178 Failsafe Audio Mixer contains no user serviceable internal components. Do not disassemble Audio Mixer or the factory warranty will be voided. Return the unit to Eagle Copters USA for service.

4.3 P178 Failsafe Audio Mixer Re-Installation

- a. The P178 Failsafe Audio Mixer is designed to be mounted in a variety of locations within the airframe, provided it is protected from the environment. It may be mounted to a deck, bulkhead, tray, avionics shelf or other structure rated to carry a 0.50 lb load. The exact mounting location is left to the installer's discretion provided that the installation of the P178 Failsafe Audio Mixer does not interfere with other equipment installed.
- b. Mount the P178 Failsafe Audio Mixer using (4) #8-32 screws, washers and locknuts or nutplates. When mounting into composite structure, #8-32 potted inserts should be used.
- c. Unless otherwise specified, follow aircraft manufacturer's standard practices and maintenance manuals for installation of all hardware.
- d. Maintain a minimum 2 e/d edge margin for all installed fasteners.
- e. Refer to Figure 1 for P178 Failsafe Audio Mixer reference dimensions that may be used when planning the installation.

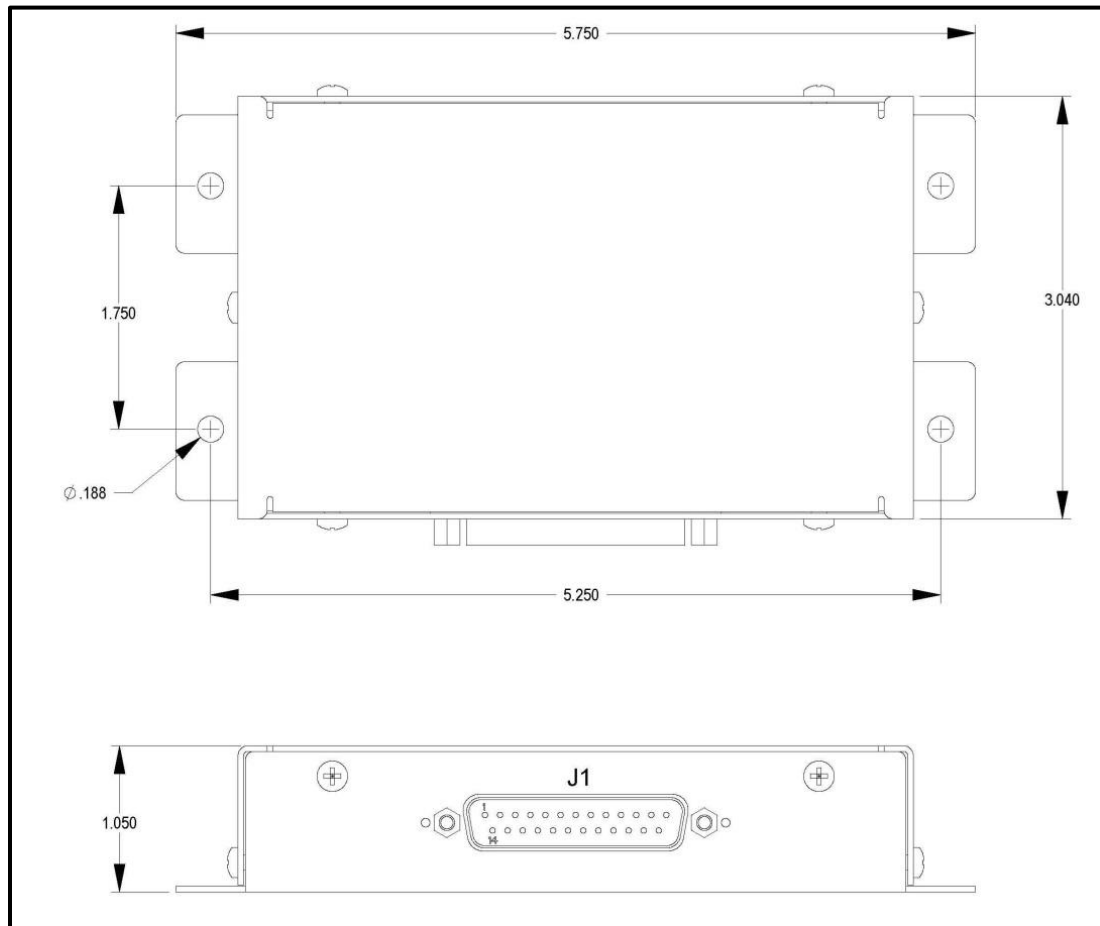


Figure 1: P178 Failsafe Audio Mixer Dimensions

5. Cable Harness Maintenance

- a. Unless otherwise specified, follow the aircraft manufacturer's electrical wiring practices and maintenance manuals for installation of all system wiring.
- b. Refer to Figure 2 for cable harness fabrication instructions.
- c. Ground Audio Shields at ONE end only.
- d. Unless otherwise noted, all shielded wire is M27500-(ga)TG(n)T14 and all unshielded wire is M22759/16-(ga)-9, where (ga) is the wire gauge and (n) is the number of wires inside the shield.
- e. Unless otherwise noted, all wire is 22 GA.
- f. Route all system cabling through existing cable runs.
- g. Secure all cabling using nylon cable ties and/or cable clamps using standard practices.
- h. Notes for Figure 2:



Power to be supplied by either Avionics or Essential Bus 1 if equipped. Circuit Breaker to be MS26574-1 1 Amp or equivalent part number appropriate for the bus the mixer is being connected to.



This pin may optionally be used as a pull low for a remote fail indicator for the mixer. Power would be supplied to the desired indicator and this pin would supply a ground to the indicator if a fault occurred. This is optional and not a requirement for installation.



Audio Source 1D and 2D are the relay protected inputs. When connected to a Master Caution System with a single Output the two Inputs may be connected in parallel. If two Outputs are available from the Device use both independently for redundancy. The Setup Instructions on this document must be followed exactly to ensure proper operation.



Audio Output 1 Direct and 2 Direct are Relay Protected Outputs from Audio Sources 1D and 2D. Connect these Outputs to the Pilot's and Co-Pilot's Unswitched or Alert Tone Inputs of the installed audio system. Do Not connect Outputs 1 and 2 Direct in parallel. The Setup Instructions on this document must be followed exactly to ensure proper operation.

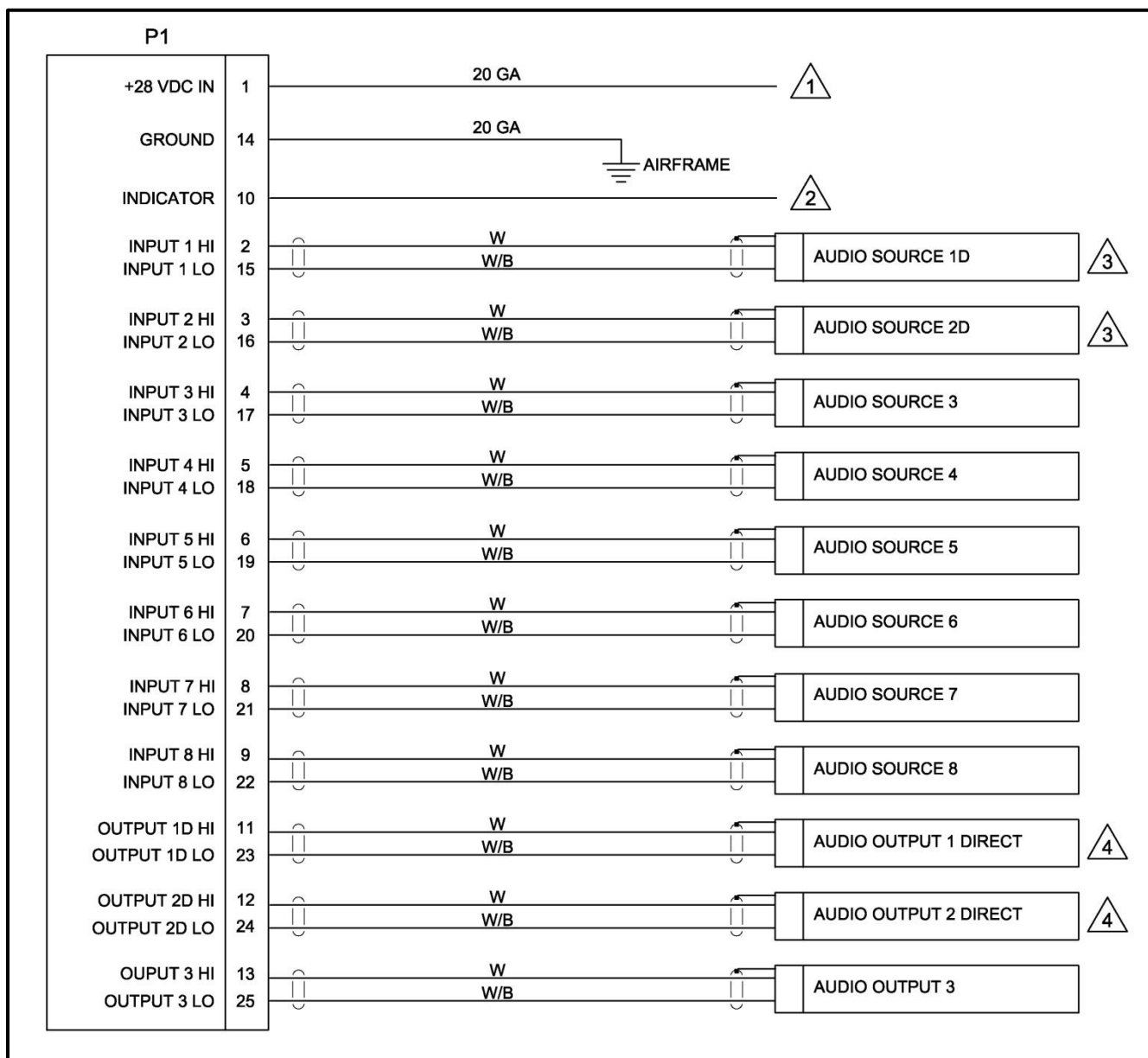


Figure 2: Cable Wiring

Refer to Figure 3 for P178 Failsafe Audio Mixer pin assignments.

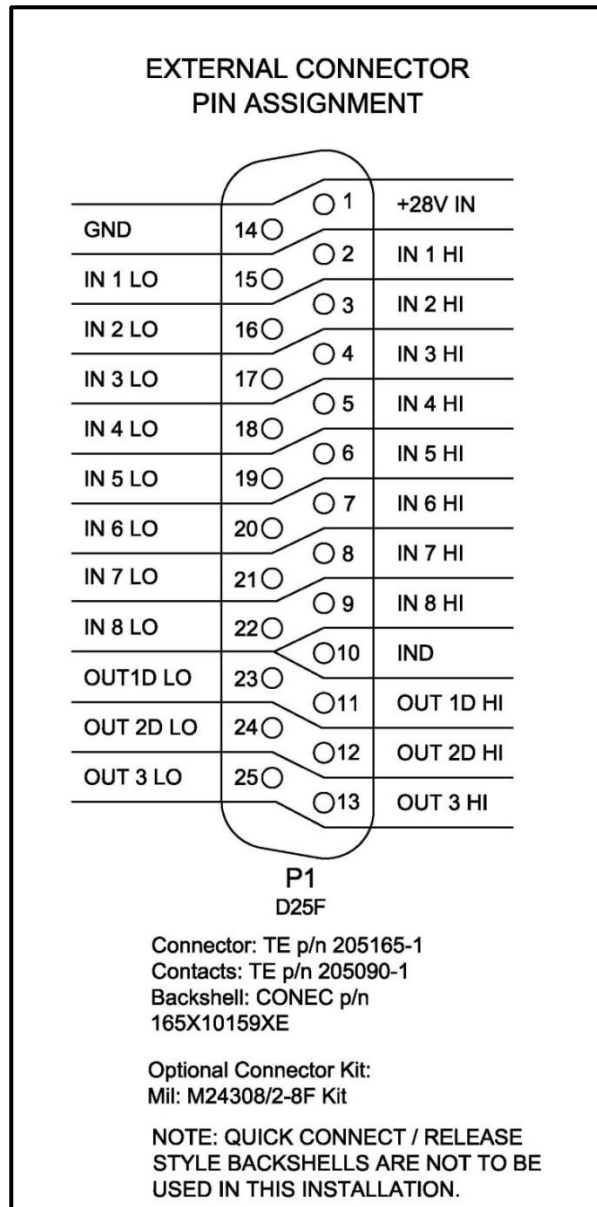
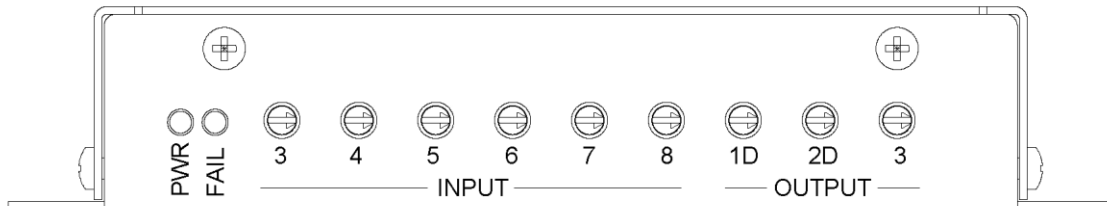


Figure 3: Pin Designation

6. System Testing

Failure to follow these instructions will result in improper operation.



- a. If the mixer is not powered or is in fault mode (Essential), Input 1 will be connected directly via relay closure to Output 1D, and Input 2 will be connected directly to Output 2D. It is important to follow the setup instructions exactly in order for the mixer to work properly in the Essential Mode.
- b. The mixer has internal fault detection. Upon fault, the relays go to their normally closed (Failsafe) position and the FAIL indicator light will illuminate. Optionally, the installer may connect Pin #10 (pull low) to an external fault indicator (see note #2 in Section 5.h). There are no internal adjustments, jumpers or user serviceable parts. If the mixer fails, return it to Eagle Copters USA, Inc. for repair or replacement.
- c. The direct inputs in essential mode are non-adjustable. The level that is present at Inputs 1 and 2 will be present at 1D and 2D respectively.
- d. Output 3 is not relay direct protected and therefore will drop off line in unpowered or fail mode. This output is designed to be a monitor port to a non-critical device.
- e. Before applying power, perform a continuity check of all leads to confirm they are connected properly.

- f.** With the circuit breaker to the mixer pulled (Off) and the audio system on, adjust the source to Audio Source 1D and 2D so that the proper level is heard at both the Pilot and Co-Pilots Headsets when the source is triggered, i.e. Master Caution. DO NOT adjust the 1D or 2D outputs of the mixer; instead, adjust the source to the mixer.
- g.** With all other avionics off, push the mixer's circuit breaker In (On). Verify visually that the power indicator (PWR) is on, and the FAIL indicator is off. The mixer is now in powered mode. Trigger the source for Inputs 1D and 2D. Adjust the mixer Output Adjustments 1D and 2D so that the proper level is heard in the Pilot and Co-Pilot Headsets. It should be the same as in the unpowered mode. Pull the circuit breaker to the mixer in order to verify this operation.
- h.** Once steps **f.** and **g.** are completed, turn on all avionics or other sources connected to Audio Sources 3 through 8. Adjust the levels as required at Inputs 3 through 8 on the mixer. DO NOT change the adjustments on Outputs 1D, 2D or 3.
- i.** After Completion of Steps **f.** through **h.** , adjust Output 3 to the desired level required by the device connected to Output 3.
- j.** Conduct EMI test in accordance with EMI Test Procedure 7002-TP-001.

7. Specifications

P178 FAILSAFE AUDIO MIXER SPECIFICATIONS	
Number of Inputs	8 each Balanced @ 600 Ohm Impedance
Number of Outputs	3 each Composite @ 600 Ohm Transformer Coupled. 2 are Relay Protected Channels
Input Gain Adjustment	-17dB to +10dB
Output Gain Adjustment	-6dB to +6dB
Output Signal	150mW into 600 Ohms Nominal
Output Current Limit	20mA
Voltage (Start)	20 VDC
Voltage (Hold)	12 VDC
Voltage (Max)	32 VDC
Power	250 mA
Temperature	- 40 to 80C
Finish	Gold Iridite per MIL-C-5541 Class 1A
Weight	.50 lbs.
Size	3.04 W x 5.75 L x 1.05 H inches Less protrusion of connector.

8. Weight and Balance

Weight of the P178 Failsafe Audio Mixer and mounting hardware = 0.50 lbs.

The arm will depend on the exact location that it is installed.

The installer will record the location for the P178 Failsafe Audio Mixer along with its installed weight on the aircraft's weight and balance record.