SUBJECT: Mooney M20TN Aircraft Heater Enhancement for Extreme Cold Weather Operations

MODELS/ SN AFFECTED:
Mooney M20TN Acclaim and Type-S Aircraft (31-0001 thru 31-0127)

TIME OF COMPLIANCE:
At Owners Discretion

INTRODUCTION: Mooney Airplane Company and Teledyne Continental Motors (TCM) have enhanced the design of the heater for M20TN Acclaim and S-Type models. The enhanced design balances the heater performance more evenly across the engine power band and is targeted at aircraft operating in extreme cold weather conditions. Mooney Airplane has developed a retrofit kit for such operation.

INSTRUCTIONS: Read entire procedures before beginning work.

The purpose of this retrofit is to install an upgrade to the M20TN cabin heat system developed for aircraft operating in extreme cold weather conditions. The incorporation of this heater upgrade does not affect engine operation. The POH/AFM will require a revised Section VII to be inserted as part of this installation.

STEP 1 - Duct Modification (only for Serial Numbers 31-0001 thru 31-0029)

NOTE:
The pilot seat and rear passenger seat need to be removed to allow access to side panel.

1.1. Turn master switch - OFF.
1.2. Remove pilot side lower interior panel retaining screws, and lower panel.
1.3. Remove pilot side upper interior panel mounting screws and slide upper panel towards rear to access 640328-505 duct assembly.
1.4. Locate 640328-505 duct assembly under and forward of instrument panel on left hand side of fuselage skin.
1.5. Locate and cut a 0.75” hole in the 640328-505 duct assembly as depicted in Figure M20-308-1.
1.6. Install 640328-11 deflector with (3) 1691-0410 Avex rivets on bottom as depicted in Figure M20-308-1.
1.7. Re-install pilot side upper and lower interior panels and hardware.

STEP 2 - Heater Retrofit

NOTE:
The M20TN Type-S may skip steps 2.19, 2.20, 2.21 and 2.22, 640326-511 butterfly assembly is already installed.

2.1. Turn master switch - OFF.
2.2. Remove cowling per instructions provided in Chapter 71-10-00 of applicable MAC aircraft Service & Maintenance Manual.
2.3. Modify AFT baffle by locating, marking and cutting a 1.65" diameter hole as depicted in Figure M20-308-2.

2.4. Clean and debur edges on 1.65" diameter hole as required.

2.5. Match drill and use 1/8" rivets thru 912052-1 flange and AFT baffle (typ 3 places) (refer to Figure M20-308-2).

2.6. Remove existing heater box assembly by removing the (4) AN3-4A mounting bolts, remove and clean old sealant from surface of firewall area (refer to Figure M20-308-3).

2.7. Remove scat tubing and clamps from engine/firewall.

2.8. Remove existing exhaust crossover tube: (this may require 2 people)
   a.) Remove Right hand side retaining hardware (see Figure M20-308-4).
   Note: When removing RH side retaining hardware, keep tie rod bushing for re-assembly.
   b.) Remove upper and lower wastegate mounting hardware hardware (refer to Figure M20-308-4).
   c.) Remove LH transfer tube assembly from crossover tube, pull aft from turbo transition assembly and pull to out of crossover tube.
   d.) Remove crossover tube from RH transfer assembly aft and toward the right hand side.

2.9. Cover existing exhaust transfer tubes to prevent any foreign object debris (FOD) contamination into the exhaust system.

2.10. Remove any transfer tube covers to prevent (FOD), clean slip joints with scotchbrite and apply a high temp anti-seize lubricant before installation.

NOTE:
Before installing new crossover tube, make sure the (2) welded tabs have adequate clearance for inserting the tie rod and bushing assembly to slide into (refer to Figure M20-308-4).

2.11. Install new TCM P/N 657586 crossover tube and heater shroud in reverse order as described in steps 2.8.
   a.) Before installing the LH transfer tube assembly, replace both upper and lower wastegate gaskets P/N 652456 into recessed area of wastegate (refer to Figure M20-308-4).

2.12. Install new retention hardware P/N AN3-4A Bolt and MS21043-3 locknut and previously removed bushing, torque hardware in accordance with TCM engine maintenance instructions (75-80 in. lbs.).

2.13. Install new lower wastegate mounting hardware (4) P/N MS20034-5 bolts, (4) NAS1587-4 washers, (4) MS20500-428 locknuts, do not torque, but leave allowable movement for upper hardware to be installed.

2.14. Install new upper wastegate mounting hardware (4) P/N MS20034-5 bolts, (4) NAS1587-4 washers, (4) MS20500-428 locknuts in place. Make sure there is no binding, then snug mounting hardware. Torque all lower and upper mounting hardware evenly in accordance with TCM engine maintenance instructions (240-280 in lbs.) (refer to Figure M20-308-4).

2.15. Install P/N 640335-511 cabin heater box assembly with existing hardware and gasket. If necessary replace heater box gasket with new P/N 640224-000 gasket. Seal edges against firewall with Pro Seal 700.

2.16. Install P/N 640231-501 silencer assembly using FLX770112000100 sleeve and (2) 20024 clamps.

2.17. Install remaining scat tube and clamps as depicted in Figure M20-308-5.
2.18. Check heater box cable rigging limits as depicted in Figure M20-308-6.

**NOTE:**

Type-S Acclaims may skip steps 2.19, 2.20, 2.21 and 2.22, 640326-511 butterfly assembly is already installed.

2.19. Inside of cabin, remove one end of 912007-503 flexible duct as location “A” as depicted in Figure M20-308-6.

2.20. Locate 640326-505 butterfly assembly in 640326 J-Box assembly. Remove (2) screws and butterfly assembly (see Figure M20-308-6).

2.21. Use existing screws to install 640326-511 butterfly assembly.

2.22. Re-install 912007-503 flexible duct with existing clamp.

2.23. Perform ground run-up check (Check for leaks, security of new components) see Figure M20-308-7.

2.24. Re-install cowling per instructions provided in Chapter 71-10-00 of applicable MAC aircraft Service & Maintenance Manual.

2.25. Insert new pages into POH/AFM (included in the kit).


**NOTE:**

Upon completion of this Service Bulletin, you must reference in both (Aircraft and Engine) log books, the engine configuration has changed from a Standard Engine G1 to a (G3) or a Platinum Engine G2 to a (G4). TCM customer service should be contacted with a list of serial numbers that have undertaken this change.

2.27. Return aircraft to service.

2.28. Procedure complete

**WARRANTY:** N/A

**REFERENCE** 1. MAC Maintenance Manual (applicable A/C)

**DATA:** 2. MAC POH/AFM Manual (applicable A/C)

3. TCM Engine Maintenance Instructions

**PARTS LIST:** Mooney Airplane Company, Inc., Parts Kits:

**Kit - M20TN - Acclaim**

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<th>P/N</th>
<th>Description</th>
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<td>940177-9501</td>
<td>M20TN Heater Retrofit kit (Acclaim) (AFM Supplement Included)</td>
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**Kit - M20TN - Type-S**

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PROCEDURE FOR 31-0001 THRU 31-0029

VIEW LOOKING OUTBOARD ON LHS OF CABIN 640328-505 DUCT ASSY ACCESSIBLE UNDER PILOT SIDE LOWER INTERIOR PANEL

INSTALL
DEFLECTOR 640328-11
WITH (3 QTY)
1691-0410 RIVETS
(LOCATE APPROX AS SHOWN)

CUT
0.75" HOLE IN
640328-505
DUCT ASSY

640328-505
DUCT ASSY

640328-11
DEFLECTOR

SIDE VIEW

CUT 3.3"

1.2" 1.2"

Figure SB M20-308-1 - DUCT MODIFICATION (only Serial Numbers 31-0001 thru 31-0029)
VIEW LOOKING AFT ON RHS OF AFT BAFFLE ASSY

Figure SB M20-308-2 - BAFFLE MODIFICATION

CUT 1.65 DIAMETER HOLE - DEBUR AS REQUIRED

MATCH DRILL FOR 1/8" RIVETS THRU 912052-1 FLANGE AND AFT BAFFLE (3 PLACES) AND RIVET FLANGE TO BAFFLE

REF: AFT BAFFLE ASSEMBLY

1.54"

.30"

Figure SB M20-308-3 - EXISTING HEATER BOX

REMOVE SCAT TUBING AND CLAMPS

REMOVE HEATER BOX ASSEMBLY
Figure SB M20-308-4 - EXHAUST SYSTEM - M20TN ACCLAIM AND TYPE-S
Figure SB M20-308-5 - HEATER INSTALLATION
Figure SB M20-308-6 - BUTTERFLY MODIFICATION
Figure SB M20-308-7 - MODIFICATION COMPLETED