

This Service Letter reidentified as
 Service Bulletin M 20-114
 per Service Instruction M20-15.

SUBJECT: Arens Controls for '62 and '63 aircraft

MODELS AFFECTED: M20C, Serials 1852, 1940 thru 2622 M20D, Serials 1, 101 thru 200

TIME OF COMPLIANCE: At Owner's Discretion

INTRODUCTION

For the 1964 model aircraft, the engine controls have been replaced with Arens controls. We feel these controls are superior to the controls used in the '62 and '63 aircraft and can be installed in their place with a minimum of difficulty.

INSTRUCTIONS

In all cases, remove the necessary cowlings.

1. Throttle Control

- a. Loosen the set screw in the control knob, then remove the knob by unscrewing it counterclockwise.
- b. File the brad from the nut securing pin at the instrument panel, then remove the securing nut and pull the throttle control forward and out of the instrument panel.
- c. Remove the 660007 swivel joint from the carburetor end of the throttle control. Next, remove the AN742-6 clamp used to support the control between the firewall and the engine.
- d. Remove the nut from the firewall fitting and pull the throttle control toward the rear of the aircraft until the control is free.
- e. Install the new Arens control by first inserting the throttle end of the control through the hole in the instrument panel for the throttle; next, install the locking nut on the control and insert the control through the firewall where the old control was removed.
- f. Install the 660051-3 swivel joint on the control. Clamp the control in the same manner as the original control.
- g. Install the 660052-1 and -5 Micro Switch mounting plate and insulator using the Adel 750-F6 or AN760F-6 clips (2), AN526-832R7 (4) screw, AN960-8 (4) washer, and the AN365-832 (4) nut. Install the mounting pin in the mounting plate into the holes in the throttle sleeve, then install the clips and hardware.
- h. Adjust the swivel end of the throttle control at the carburetor throttle arm so that the knob is 1/16" to 1/8" from the mounting nut when the throttle is in the fully closed position. Check the control travel to ascertain that the throttle arm has full travel between the closed and the fully open position.
- i. Install the Micro Switch and adjust the switch so that the gear warning horn blows when the throttle is 3/8" from the fully closed position at the instrument panel.

2A. Propeller Governor Control (Woodward)

- a. Remove the original propeller governor control from the aircraft.
- b. Remove the original 660019 support from the governor housing and replace with the 660019 support furnished.
- c. Install the Arens Part No. 345-001-104 propeller governor control in the same manner as the original control was removed.
- d. Clamp the metal sleeve on the end of the control housing to the support, using the two AN742-6 clamps in place of the original AN742-5 clamps.
- e. Install the AN315-3R nut and HF-3M ball joint on the end of the control shaft. Replace the existing AN3-11 bolt running through the ball joint and control arm with the AN3-10 bolt furnished. Adjust the control at the propeller governor so that the control knob is 1/16" to 1/8" from the mounting nut when the prop governor arm is against the stop in the high RPM position. Check the control travel to ascertain that the governor arm has full travel between the high and low RPM stops.

2B. Propeller Governor Control (Hartzell)

- a. Remove the original propeller governor control from the aircraft.
- b. Remove the original 660006 support from the governor housing and replace with the 660006 support furnished.
- c. Install the Arens Part No. 345-001-104 propeller governor control in the same manner as the original control was removed.
- d. Clamp the metal sleeve on the end of the control housing to the support, using the two AN742-6 clamps in place of the original AN742-5 clamps.
- e. Install the AN315-3R lock nut and 660051-3 swivel joint on the end of the control shaft. Adjust so that the control knob is 1/16" to 1/8" from the mounting nut when the propeller governor arm is against the stop in the high RPM position. Check the control travel to ascertain that the governor arm has full travel between the high and low RPM stop.

3. Mixture Control

- a. Remove the original mixture control from the aircraft.
- b. Install the Arens 21-006-89 mixture control in the same manner as the original.
- c. Install Spirap on control where it passes near the prop governor well and tubular structure aft of the firewall. Tape ends of Spirap to control.

- d. Attach the end of the control to the control arm using: 914038-5 bolt, 914037-3 bushing, AN960-10 washer, AN960-10L washer, AN320-3 nut, and an AN380-2-2 cotter pin. Install with the head of 914038-5 bolt out-board. See diagram on Page 3 of this service letter.
4. Cowl Flap Control
- Remove the cowl flap control from the aircraft, drill a 5/16" dia. hole at an angle to match the control routing in the firewall stiffener where the old control came through.
 - Install the Arens cowl flap control Part No. 21-006-91 in the same manner as the original control using AN742-4 clamps used on the original control.
 - Attach the end of the control to the control arm using: 914038-3 bolts, 914037-3 bushing, AN960-416 washer, AN960-10 washers (2), AN320-3 nut, and an AN380-2-2 cotter pin. See diagram on Page 3 this service letter.
5. Parking Brake
- Remove the parking brake control from the aircraft.
 - Install the Arens control Part No. 653-032-10 in the same manner as the original control using AN742-3 clamps in place of the AN742-2 clamps used on the original control.
6. Cabin Heat Control
- Remove the cabin heat control from the aircraft.
 - Install the Arens control Part No. 653-032-11 in the same manner as the original control using AN742-3 clamp in place of AN742-2 clamp and MS21919DG3 clamps in place of the MS21919DG2 clamps used with the original control.
7. Cabin Vent Control
- Remove the original control from the aircraft.
 - Install the Arens control Part No. 653-032-12 in the same manner as the original control.
 - Use AN742-3 clamp in place of the AN742-2 clamp and MS21919DG3 clamp in place of the MS21919 DG2 clamp used on the original control.
8. Carburetor Air Control
- Remove the original carburetor air control from the aircraft.
 - Drill a 5/16" dia. hole at an angle to match the control routing in the firewall stiffener where the old control came through the firewall.
 - Install the Arens control Part No. 21-006-90 in the same manner as the original control.
 - Install Spirap on control in areas of carburetor and left hand footwell. Tape ends of Spirap to control.
 - Replace the original AN742-2 clamps with the MS21919DG4 clamps furnished.
Note: Some installations use only 2 clamps.
 - Attach the end of the control to the air box control arm using: 914038-3 bolt, 914037-3 bushing, AN960-416 washers (2), AN960-10 washers (2), AN320-3 nut, and an AN380-2-2 cotter pin. See the diagram in this service letter.
9. Final Check
- After all controls have been installed, make the following checks for each control:
- Movement of knob produces desired movement at item to be controlled.
 - Controls operate smoothly and do not bind.
 - Controls are protected from chafing against surrounding structure and parts.
 - All nuts and bolts have been secured and safety wire replaced where required.
- Note 1: This kit can be purchased through your Mooney dealer.
2: Be sure to state if the kit will be used with the Hartzell or Woodward propeller governor.

PARTS LIST

ITEM	REQ'D	ITEM	REQ'D
Throttle Kit, 20-114-1		Cowl Flap Control Kit, 20-114-4	
1. 253-001-1 Throttle Control	1	1. 21-006-91 Cowl Flap Control	1
2. 660052-1 Plate	1	2. AN742-4 Clamp	4
3. 660052-5 Insulator	1	3. 914038-3 Bolt	1
4. AN750F-6 or Adel 750-F6	2	4. 914037-3 Bushing	1
5. AN526-832R7 Screw	4	5. AN960-416 Washer	1
6. AN960-8 Washer	4	6. AN960-10 Washer	2
7. AN365-832 Nut	4	7. AN320-3 Nut	1
8. 660051-3 Swivel Joint	1	8. AN380-2-2 Cotter Pin	1
Propeller Governor Kit, 20-114-2-A (Woodward governor)		Parking Brake Kit, 20-114-5	
1. 345-001-104 Prop Governor Control	1	1. 653-032-10 Parking Brake Control	1
2. 660019 Support	1	2. AN742-3 Clamp	2
3. AN742-6 Clamp	2	Cabin Heat Kit, 20-114-6	
4. AN315-3R Nut	1	1. 653-032-11 Cabin Heat Control	1
5. HF-3M Ball Joint	1	2. AN742-3 Clamp	1
6. AN3-10 Bolt	1	3. MS21919DG3 Clamp	1
Propeller Governor Kit, 20-114-2-B (Hartzell governor)		Cabin Vent Kit, 20-114-7	
1. 345-001-104 Prop Governor Control	1	1. 653-032-12 Cabin Vent Control	1
2. 660006-7 Support	1	2. AN742-3 Clamp	1
3. AN742-6 Clamp	2	3. MS21919DG3 Clamp	1
4. AN315-3R Nut	1	Carburetor Air Kit, 20-114-8	
5. 660051-3 Swivel Joint	1	1. 21-006-90 Carburetor Air Control	1
Mixture Kit, 20-114-3		2. 500000-2-1/8 Spirap	12"
1. 21-006-89 Mixture Control	1	3. MS21919DG4 Clamp	3
2. 500000-2-1/8 Spirap	6"	4. 914038-3 Bolt	1
3. 914038-5 Bolt	1	5. 914037-3 Bushing	1
4. 914037-3 Bushing	1	6. AN960-416 Washer	2
5. AN960-10 Washer	1	7. AN960-10 Washer	2
6. AN960-10L Washer	1	8. AN320-3 Nut	1
7. AN320-3 Nut	1	9. AN380-2-2 Cotter Pin	1
8. AN380-2-2 Cotter Pin	1		

COMPLIANCE

After installation of the controls, please fill out the enclosed compliance card and return it to Mooney Aircraft for our records.

