



Instructions for Continued Airworthiness
McFarlane Aviation, LLC. FAA-PMA Part Number MC14064-102 CABLE, MC14064-103 CABLE,
MC14065-101 CABLE, MC27050-101 CABLE.
FAA PMA Number: PQ3732CE

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www.McFarlaneAviation.com/ICA

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Revisions

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INTRODUCTION

This document is intended to provide for the continued airworthiness of McFarlane Aviation, LLC. FAA-PMA approved engine control cables eligible for installation on Cirrus model SR22 & SR22T aircraft. The McFarlane parts are conventional push-pull controls, attached to quadrant or mixture control levers on one end and engine appliance control levers on the other. The control cables transfer motion from pilot input at the quadrant or mixture control lever to throttle, propeller governor, or mixture appliances.

For all items not related to the installation of the McFarlane Aviation, LLC. cables, refer to the basic airplane model service and parts manuals.

SYSTEM DESCRIPTION

The control cables are installed so that moving the quadrant or mixture lever creates a corresponding movement in the control arm of the appliance. The control cables are constructed of an inner wire with a push rod swaged to each end. The inner wire moves through a conduit which is attached to the aircraft with terminals swaged to each end, to which guide tubes are mounted. The interface created between conduit terminals and guide tubes is called a swivel joint, which allows the push rod and guide tube to swivel relative to the conduit terminal so the push rod can follow the control arm or quadrant lever through its arc of travel. The guide tube constrains the path along which the push rod can translate, and supports the inner wire against buckling when the push rod is extended and pushed. The interfaces of the push rod, guide tube, and conduit terminal are fitted with boots which dampen vibrations and protect against entry of contaminants. Vernacular terms for components of aircraft controls are shown in Figure 2 for reference.

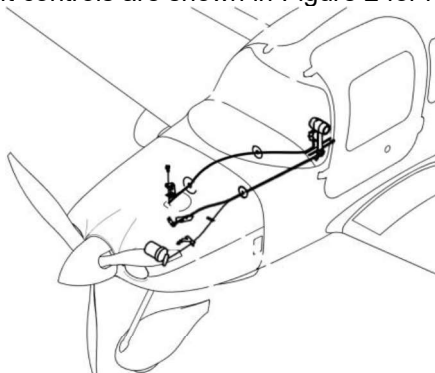


Figure 1: Controls overlayed on aircraft

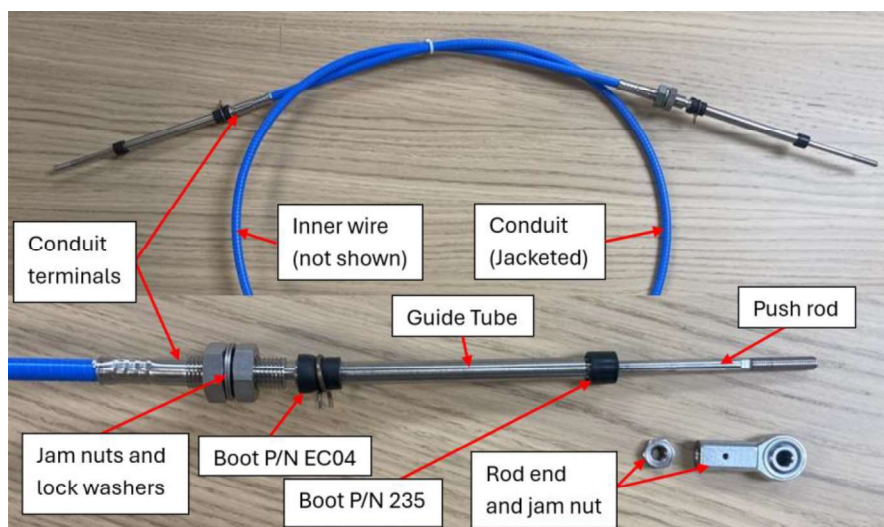


Figure 2: Engine control cable component vernacular

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SPECIAL OPERATING INFORMATION

Use and operation of the engine controls does not change with the installation of the McFarlane engine control cables; see applicable Cirrus SR22 & SR22T Service Manual and Pilot's Operating Handbook for use and operation of these systems.

PART REMOVAL, REPLACEMENT, AND SERVICE INFORMATION

Except where specified below, refer to the applicable Cirrus Model Service Manual for installation/maintenance instructions and the applicable Cirrus Illustrated Parts Catalog for component part numbers.

Remove the existing cable and install the McFarlane cable per the applicable Cirrus Model Service Manual.

The following instructions, specific to the McFarlane parts, supersede those provided by Cirrus Aircraft Maintenance Manuals wherever applicable:

1. The McFarlane engine control cables are lubricated for the life of the control and must not be lubricated in the field. If McFarlane controls exhibit excessive resistance to motion, additional lubrication may mask underlying issues without resolving them. If McFarlane controls exhibit excessive resistance to motion, see the "Troubleshooting" section below.

Note: Cirrus maintenance instructions for lubrication of the rod ends are not changed by this document. Lubrication of the rod ends must continue in accordance with Cirrus Aircraft Maintenance Manual instructions.

Instructions for replacement of vibration damping boots

Directions are provided below for the replacement of the boots P/N EC04 and 235 as seen in Figure 2. The directions are written for a control installed in an aircraft, the procedure may also be followed for a control which is not installed in an aircraft:

To replace Boot P/N 235:

Removal:

- Refer to the applicable Cirrus Aircraft Maintenance Manual for instructions on accessing the quadrant or engine end of each control.
- Remove rod end and push rod from appliance control arm or quadrant as applicable. Do not allow push rod to twist to avoid damage to the inner wire.
- Remove the rod end from the push rod. Do not allow the push rod to twist.
- Remove P/N 235 boot from the guide tube by pulling it toward the end of the push rod from the base. The boot must be pulled over a lip to be released from the guide tube. Remove the boot from the control.

Installation:

- Slide P/N 235 boot on the push rod, up to the guide tube.
- Guide tube must be inserted and seated into the groove inside the boot.
 - The boot will bulge until the guide tube lip is seated in the boot groove, indicating correct installation has been achieved. See Figure 3 for appearance of correct installation.
- After correct installation of the boot has been achieved, install the rod end on the push rod. Secure the rod end with the jam nut.
- Attach the rod end to the appropriate appliance arm or quadrant linkage. Secure the rod end with the jam nut.
- When the control is completely reinstalled, ensure the quadrant and appliance control arm have full travel. If not, rig control so full travel is achieved. Refer to applicable Cirrus Aircraft Maintenance Manual for rigging instructions.

To replace Boot P/N EC04

Removal:

- Execute "Removal" process above for boot P/N 235.
- Remove the spring clamp from P/N EC04 boot, and slide it off the end of the push rod.
- Remove the rubber tube component of EC04 boot from the conduit terminal, sliding it off the guide tube and push rod.

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Installation:

- Slide the rubber tube component of EC04 boot over the push rod and guide tube.
- Work the tube component of EC04 boot over the end of the conduit terminal. The tube is in correct position when one of its ends is flush with the mounting groove on the conduit terminal, as shown in Figure 4.
- Slide the spring clamp component of EC04 boot over the push rod and guide tube.
- Install the spring clamp on the transition in the tube between the conduit terminal and guide tube. The spring clamp should be over the guide tube, but as close to the conduit terminal as possible.
- Install P/N 235 boot per "Installation" process above.
- When the control is completely reinstalled, ensure the quadrant and appliance control arm have full travel. If not, rig control so full travel is achieved. Refer to applicable Cirrus Aircraft Maintenance Manual for rigging instructions.

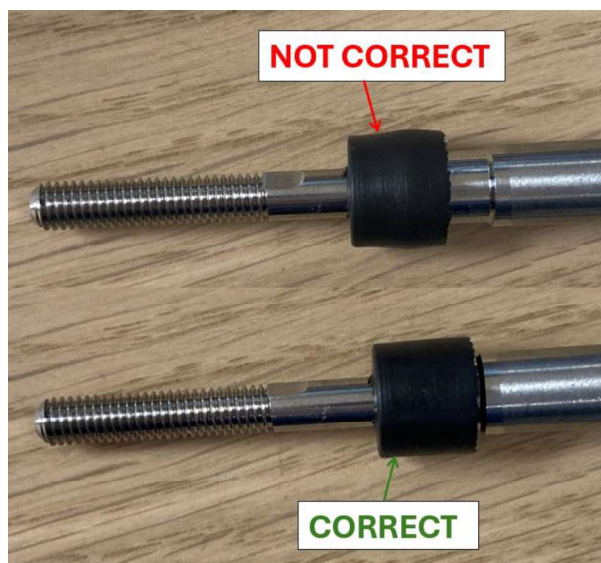


Figure 3: Correct and incorrect installed positions of P/N 235 boot



Figure 4: Correct installed position of P/N EC04 boot

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TROUBLESHOOTING

Refer to the applicable Cirrus Model Service Manual for troubleshooting instructions and the applicable Cirrus Illustrated Parts Catalog for component part numbers. See document listings in "Data" section below.

In case of excessive resistance when operating McFarlane controls, inspect for atypical conditions along the control's route, including kinks in the conduit, melted portions of the conduit's outer jacket, or oil on or near the control's ends. Additionally, separate and independently test the functionality of mating components per Cirrus publications to determine the root of the issue.

- **Kinks in the conduit** are typically a result of improper handling or incorrect routing. A control with a kinked conduit is not airworthy, as a damaged conduit may damage the inner wire, which may reduce a pilot's capacity to safely operate the aircraft.
- **Melted portions of the conduit jacket** indicate incorrect routing in the vicinity of excessive heat. Controls with melted jackets are not airworthy. If the outer jacket has melted, the inner conduit liner may have melted as well, causing increased binding of the inner wire. Damage to the inner liner may reduce the capacity of the flight crew to safely operate the aircraft. Controls should not be routed in such proximity to hot components, like exhaust components and turbochargers, that the jacket melts. Consult the relevant Cirrus Aircraft Maintenance Manual for correct routing of the control.
- **Oil on or near the ends of a control** may be wicked inside it when the push rod is actuated. Exposed to heat and abrasion, oil inside the control may turn to varnish, causing binding in the control. If oil is noted in proximity to a control's ends, correct the condition causing the presence of the oil. Lubricating a control so afflicted may temporarily reduce its resistance to motion, but will not keep the absorbed oil from continuing to deteriorate the control's functionality.

In case of a control which "catches" when in extended position and pushed, check that the guide tube of the extended push rod is keeping the push rod aligned. If the guide tube is damaged such that the push rod is not aligning with and sliding through the guide tube (end has ceased circularity and become elliptical), the part is no longer airworthy.

When troubleshooting, ensure control is rigged to achieve full travel of the appliance control lever and quadrant or mixture lever. See additional details on rigging in the "Inspection" section of this document, and the applicable Cirrus Aircraft Maintenance Manual.

To report service difficulties or obtain further support for McFarlane parts, fill out the contact form available at the bottom of most pages of the website www.McFarlaneaviation.com, or call 1-800-544-8594 (within the US) or 1-785-594-2741.

PLACARDS

None applicable.

DATA

All information to support the continued airworthiness of this replacement part is as defined herein and contained in:

- Relevant Cirrus Model Service Manuals.
 - AIRPLANE MAINTENANCE MANUAL For the CIRRUS SR22 AND SR22T
 - P/N 13773-001
 - Aircraft Serials 22-0002 thru 22-4434, Serials 22T-0001 thru 22T-1459, 22T-1461 thru 22T-1470, 22T-1472
 - AIRPLANE MAINTENANCE MANUAL FOR THE CIRRUS SR22 AND SR22T
 - P/N 13773-002
 - Aircraft Serials 22-4435 & Subsequent, Serials 22T-1460, 22T-1471, 22T-1473 & Subsequent

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- Cirrus Model Illustrated Parts Catalog.
 - ILLUSTRATED PARTS CATALOG For the CIRRUS SR22 AND SR22T
 - P/N 13774-001
 - Aircraft Serials 22-0002 thru 22-4434, Serials 22T-0001 thru 22T-1459, 22T-1461 thru 22T-1470, 22T-1472
 - ILLUSTRATED PARTS CATALOG FOR THE CIRRUS SR22 AND SR22T
 - P/N 13774-002
 - Aircraft Serials 22-4435 & Subsequent, Serials 22T-1460, 22T-1471, 22T-1473 & Subsequent

INSPECTION

When inspecting the controls, check that each boot (P/N EC04, qty 2; P/N 235, qty 2) is intact and installed correctly, including the spring clamp component of P/N EC04. Correct installation is shown in Figure 2 and described in "Instructions for replacement of vibration damping boots". A missing or damaged boot does not provide vibration damping to the control, which is critical for the service life of the control. If a boot is damaged or missing, ensure the swivel joint remains functional (rotates, swivels, push rod actuates) and replace the boot. Replacement parts 235 and EC04 are available for purchase from McFarlane Aviation. Directions for removing and reinstalling boots are provided in the "Part Removal, Replacement, and Service Information" section of this document.

- A swivel joint is functional if:
 - The push rod actuates smoothly,
 - The guide tube can rotate about its own axis (around the push rod),
 - The guide tube can deflect away from the primary axis of the attached conduit terminal in any direction, and
 - The guide tube is retained in the swivel joint, it does not fall out of the joint freely.

When inspecting the controls:

- Ensure the control operates smoothly through its range of motion. This can be achieved by disconnecting both ends of the control and manually pushing and pulling it. If there is a portion of the travel experiencing excess resistance, refer to "Troubleshooting".
- Ensure the control is routed such that it does not chafe anywhere along the length of the conduit. If chafing is identified, confirm the control remains functional and airworthy, and adjust the routing of the control to avoid the chafing.
- Ensure the control's attachments are securely fastened, including Adel clamps, panel pass-throughs, rod end jam nuts, and conduit terminal bracket securements.

Rigging

Ensure the control is rigged to achieve full travel of the appliance control lever and quadrant or mixture control lever. Maximum and minimum positions should correspond between the appliance control levers and quadrant or mixture lever. If they do not, adjust the installed position of the rod ends and panel mounting jam nuts on the quadrant-side conduit terminal to achieve full travel of appliance control levers and quadrant or mixture control lever.

Refer to the applicable Cirrus Model Service Manual for additional inspection instructions. Inspection intervals of the controls are not changed by this document.

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RECOMMENDED OVERHAUL PERIODS

No additional overhaul time limitations exist with the use of these parts.

The McFarlane controls cannot be overhauled. If the control is rendered not airworthy, it must be replaced.

AIRWORTHINESS LIMITATIONS

The Airworthiness Limitations section is FAA approved and specifies maintenance required under Sec. 43.16 and 91.403 of the Federal Aviation Regulations unless an alternative program has been FAA approved. No additional airworthiness limitations exist.

ASSISTANCE & REVISIONS

ICA revisions shall be made available on the McFarlane website, www.mcfarlaneaviation.com/ICA. For questions or assistance regarding these Instructions for Continued Airworthiness (ICA), contact McFarlane Aviation, LLC. via email or phone. Email: engineering@mcfarlaneaviation.com Phone: 1-800-544-8594 (within the US) or 1-785-594-2741.