Cessna Single Engine High Wing Maintenance

Flight Controls

Revision Record

Rev Year	Rev Number	Rev Date	Revision Details	Reference	Revised by
2016	00	5/13/2016	Original Issue	172S Maintenance Manual, Rev 21, 01OCT15	Klimek
2016	01	8/12/2016	Model 182/206 Differences added	182 & 206 Maintenance Manual Rev 19, 01OCT15	Klimek

Contents

ATA27 Flight Controls

Overview

LESSON OBJECTIVES

- Describe the general layout of the flight control system.
- Identify safety precautions related to the flight control system.
- Identify maintenance practices important to the flight control system.

FLIGHT CONTROL SYSTEM OVERVIEW - AILERONS (27-00-00)

The airplane's flight control system consists of conventional aileron, rudder, and elevator control surfaces. The control surfaces operate by cables and mechanical linkage using a control wheel for the ailerons and elevator, and rudder/brake pedals for the rudder. The first flight control surface we will discuss is the ailerons. The ailerons receive input from the pilot or copilot control wheel through a series of sprockets, chains, pulleys, cables, bell cranks, and pushrods.

FLIGHT CONTROL SYSTEM OVERVIEW - RUDDER (27-00-00)

Rudder control movement operates by the use of conventional rudder pedals, which also control nose wheel steering.

The system is comprised of rudder pedals, cables and pulleys, all of which link the pedals to the rudder and nose wheel steering.

FLIGHT CONTROL SYSTEM OVERVIEW - ELEVATORS (27-00-00)

The elevators operate by power transmitted through forward and aft movement of the control yoke. A manually operated elevator trim system is on this airplane. To trim the elevation of the aircraft using the elevator trim tab, rotate the vertically mounted trim control wheel on the center pedestal. Forward rotation of the trim wheel will trim nose down, aft rotation will trim nose up.

FLIGHT CONTROL SYSTEM OVERVIEW - FLAPS (27-00-00)

The Fowler-type wing flaps, are extended or retracted by positioning the wing flap control lever on the instrument panel to the desired flap deflection position.

The wing flap control lever moves up or down in a slotted panel that provides mechanical stops at the 10°, 20° and FULL positions.

To change flap setting, the wing flap control lever moves to the right to clear mechanical stops at the 10° and 20° positions.

A scale and pointer to the left of the wing flap control lever indicates flap travel in degrees.

A 10-ampere circuit breaker protects the wing flap system circuit, labeled FLAP, on the left side of the circuit breaker panel.

Description and Operation

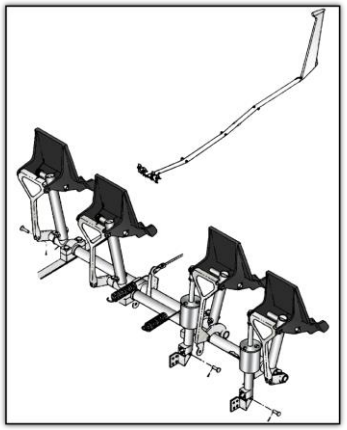
AILERONS (27-00-00)

The ailerons receive input from the pilot or copilot control wheel through a series of sprockets, chains, pulleys, cables, bell cranks, and pushrods.

Conventional hinged ailerons and single slot type flaps attach to the trailing edge of the wings.

Ailerons constructed of a forward spar containing balance weights, formed sheet metal ribs and V type corrugated aluminum skin join together at the trailing edge.

RUDDER (27-00-00)



The empennage (tail assembly) consists of a conventional vertical stabilizer, rudder, horizontal stabilizer, and elevator.

Rudder construction is a formed leading edge skin and spar with attached hinge brackets and ribs, a center spar, a wraparound skin, and a ground adjustable trim tab at the base of the trailing edge.

The top of the rudder incorporates a leading edge extension, which contains a balance weight. Rudder control operates using conventional rudder pedals that also controls nose wheel steering.

The system is comprised of rudder pedals, cables and pulleys, all of which link the pedals to the rudder and nose wheel steering.

Effective ground control while taxiing is accomplished through nosewheel steering by using the rudder pedals; left rudder pedal to steer left and right rudder pedal to steer right.

When a rudder pedal is depressed, a spring-loaded steering bungee connected to the nose gear and to the rudder bars, will turn the nosewheel through an arc of approximately 10° each side of center.

By applying either left or right brake, the degree of turn may be increased up to 30° each side of center.

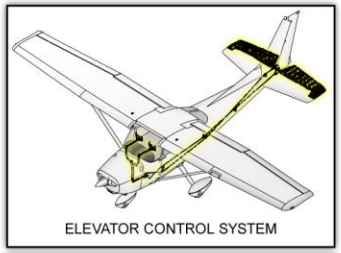
SAFETY: The easiest way to move the airplane by hand is to attach a tow-bar to the nose gear strut.

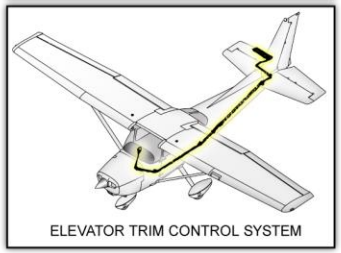
If a tow-bar is not available, or pushing is required, use the wing struts as push points.

Do not use the vertical or horizontal surfaces to move the airplane.

If a vehicle tows the aircraft, never turn the nosewheel more than 30° either side of center or structural damage to the nose gear could result.

ELEVATOR (27-00-00)


ELEVATOR CONTROL SYSTEM


ELEVATOR TRIM CONTROL SYSTEM

The elevators operate by power transmitted through forward and aft movement of the control yoke. Movement of the control yoke goes to the elevators through a system that incorporates a push-pull tube, cables, and bell cranks.

The elevator control cables, at their aft ends, attach directly to a bell crank that installs between the elevators.

The bell crank connects the elevators, and is a bearing point for the travel stop bolts. A trim tab mounts to the right elevator.

Construction of the elevator consists of formed leading edge skins, a forward spar, aft channel, ribs, torque tube and bellcrank, left upper and lower "V" type corrugated skins, and right upper and lower "V" type corrugated skins incorporating a trailing edge cutout for the trim tab. The elevator tip leading edge extensions incorporate balance weights.

The elevator trim tab consists of a spar, rib, and upper and lower "V“-type corrugated skins.

A trim wheel in the pedestal controls the elevator trim tab on the right elevator.

Movement to operate the tab goes from the trim control wheel with chains, cables, and an actuator. A mechanical pointer adjacent to the trim wheel shows the tab position.

A nose up setting on the trim wheel gives a tab down position.

FLAPS (27-00-00)

The wing flap control system consist of an electric motor and transmission assembly, drive pulleys, push-pull rods, cables, and a follow-up control.

Power from the motor and the transmission assembly goes to the flaps by a system of drive pulleys, cables, and push-pull rods.

Two micro-switches mounted on a floating arm assembly, a cam lever, and a follow-up control provide electrical power to the motor.

As the flap control lever moves to the necessary flap setting, the attached cam activates one of the micro-switches, and that activates the flap motor.

As the flaps move to the necessary position, the follow-up control turns the floating arm until the active microswitch clears the cam.

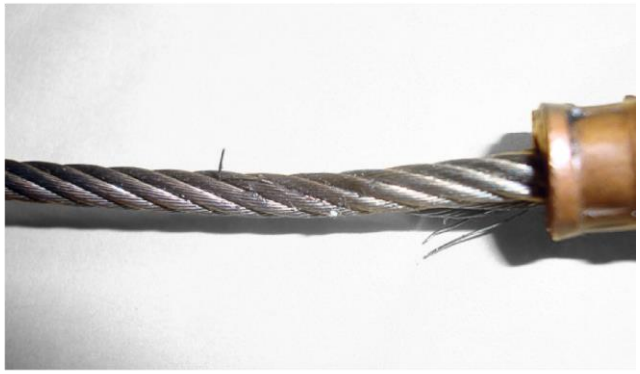
The circuit breaks and the motor stops. To move the flap in the opposite direction, move the control lever in the opposite direction.

This causes the cam to activate the second microswitch, which changes the direction of the flap motor.

The follow-up control moves the cam until it is clear of the second switch, which stops the flap motor.

Flap actuator assembly limit switches control flap travel as they get to the full UP or DOWN position.

MAINTENANCE PRACTICES - CABLE WIRE BREAKAGE LIMITATIONS (27-00-01)



Control cable assemblies are subject to a variety of environmental conditions and forms of deterioration.

Some deterioration, such as wire or strand breakage, is easy to recognize. Other deterioration, such as internal corrosion or cable distortion, is harder to identify.

The following information will aid in detecting these cable conditions.

Wire breakage criteria for cables in flap, aileron, rudder, and elevator systems are as follows:

Individual broken wires at random locations are acceptable in primary and secondary control cables when there are **no more than six broken wires in any given ten-inch cable length**.

Broken Wire Examination

Examine cables for broken wires by passing a cloth along length of cable. This will detect broken wires if the cloth snags on the cable. Critical areas for wire breakage are those sections of cable that pass through fairleads, across rub blocks, and around pulleys. If no snags are found, then no further inspection is required. If snags are found or broken wires are suspected, then a more detailed inspection is necessary which requires that the cable be bent in a loop to confirm broken wires.

Loosen or remove the cable to allow it to bend in a loop as shown. While rotating cable, inspect bent area for broken wires.

MAINTENANCE PRACTICES - CABLE WIRE CORROSION LIMITATIONS (27-00-01)

For IN-DEPTH explanations of cable wire breakage and corrosion limits, refer to the flight control system maintenance practices maintenance manual.

Corrosion on Cables

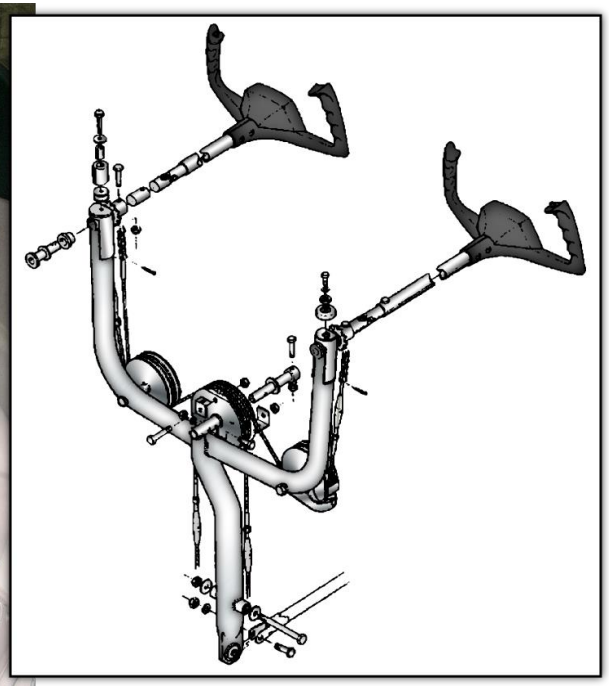
Carefully examine any cable for corrosion that has a broken wire in a section not in contact with wear-producing airframe components, such as pulleys, fairleads, rub blocks, etc. It may be necessary to remove and bend cable to inspect it for internal strand corrosion, as this condition is usually not evident on outer surface of cable.

Replace cable if you find internal corrosion. If a cable has been wiped clean of its corrosion-preventive lubricant and metal-brightened, examine the cable closely for corrosion.

For description of control cable corrosion, refer to Chapter 51, Corrosion and Corrosion Control - Maintenance Practices.

Aileron Maintenance Practices

CONTROL YOKE (27-10-00)

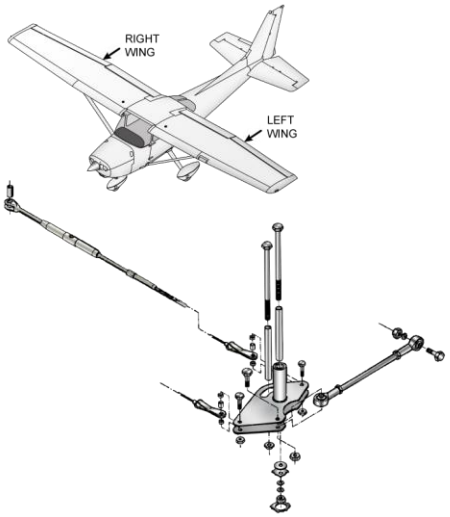


The ailerons receive input from the pilot or copilot control wheel through a series of sprockets, chains, pulleys, cables, bell cranks, and pushrods.

Control Yoke Removal/Installation

- Remove control yoke Install control yoke

BELL CRANK (27-10-00)



Aileron Removal/Installation

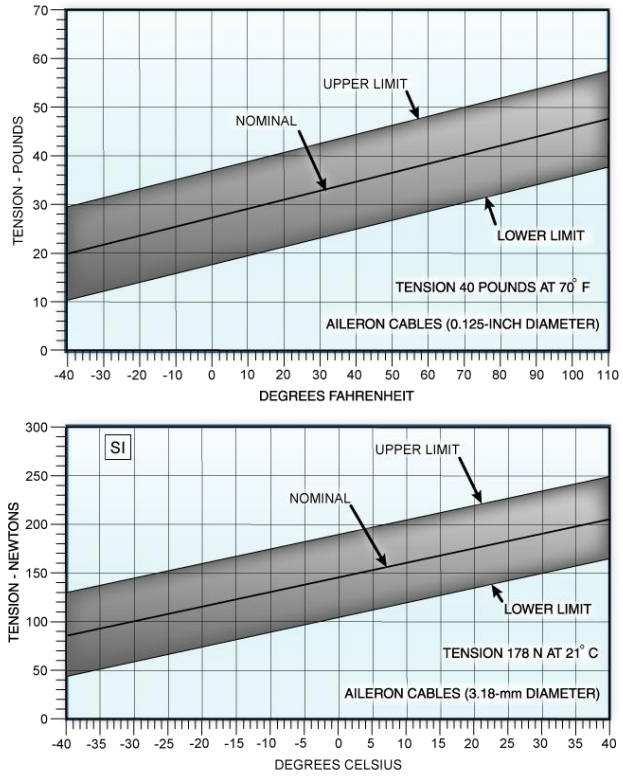
- Aileron removal
- Aileron installation

Aileron Bell Crank Removal/Installation

- Aileron removal
- Aileron installation

NOTE	**BELL CRANK** The right aileron bell crank removal/installation is similar to the left aileron bell crank, but two roll servo cables are also attached to the right aileron bell crank.

AILERON CABLES AND PULLEYS - ADJUSTMENT/TEST (27-10-00)



Aileron Adjustment/Test

- Rig aileron cables

AILERON CABLES AND PULLEYS - ADJUSTMENT/TEST (27-10-00)

CABLE LOCKS

The primary cable lock installs at the bottom of the drum and the direct cable lock is installs at the top.

For More Information

CABLE LOCKS

For aileron rigging specifications, refer to Chapter 6, Airplane Dimensions and Specifications - description and operation

AILERON CABLES AND PULLEYS - ADJUSTMENT/TEST (27-10-00)

RIGGING CHECK

Make sure that the ailerons move in the correct direction when you move the control wheel.

Cables and Pulleys Removal/Installation

- Cables and pulleys removal
- Cables and pulleys installation

CABLE/PULLEY SEATING

Make sure that the cable is in the correct position in the pulley groove before you install the guard.

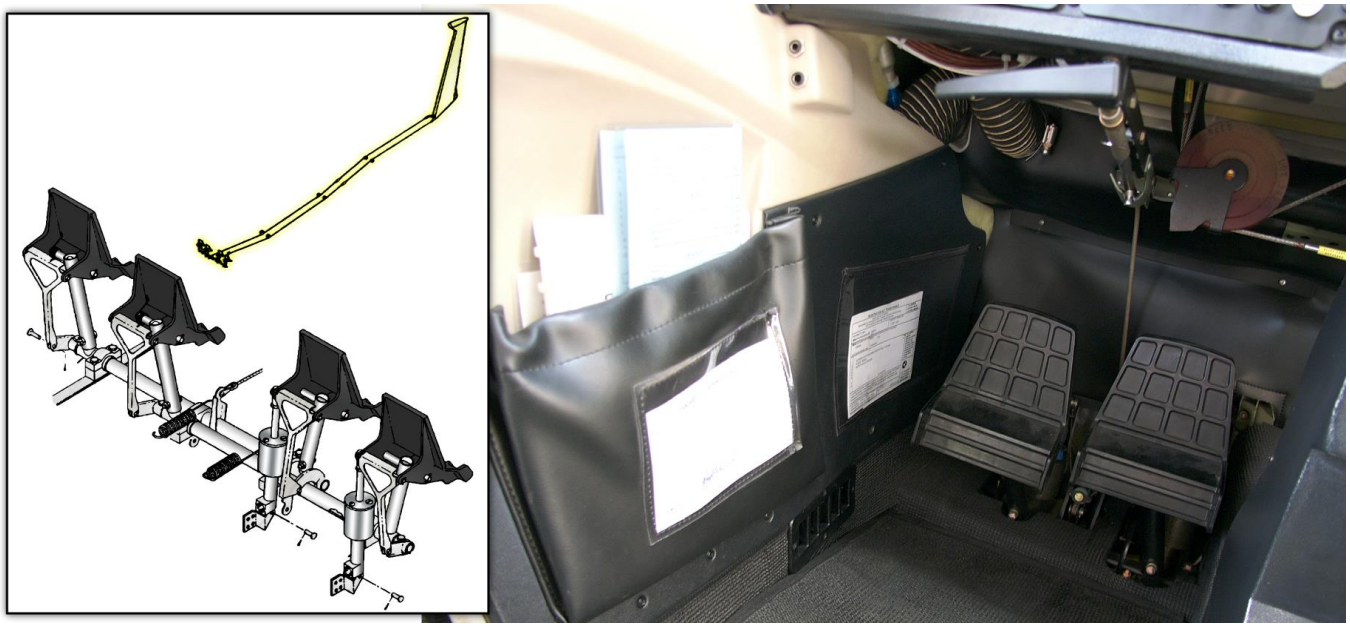
AILERON CONTROL SYSTEM - TROUBLESHOOTING (27-10-00)

Troubleshooting tables in the Cessna Model 172 AMM include:

- Lost Motion In Control Wheels
- Resistance To Control Wheel Movement
- Control Wheels Not Level With Ailerons Neutral
- Dual Control Wheels Not Coordinated
- Incorrect Aileron Travel

Rudder Maintenance

RUDDER PEDAL ASSEMBLY (27-20-00)



Rudder control operates using conventional rudder pedals that also controls nose wheel steering.

The system is comprised of rudder pedals, cables and pulleys, all of which link the pedals to the rudder and nose wheel steering.

Rudder Pedal Assembly Removal/Installation

- Remove rudder pedal assembly.
- Install rudder pedal assembly.

RUDDER PEDAL ASSEMBLY (27-20-00)

RUDDER BAR ASSEMBLIES

Check the rudder bar assemblies for excessive wear before installation. The bearing blocks are nylon and require no lubrication unless binding occurs. A few drops of general purpose oil should eliminate such binding.

RUDDER / RUDDER CONTROL CABLE (27-20-00)

Rudder Removal/Installation

- Remove rudder
- Install rudder

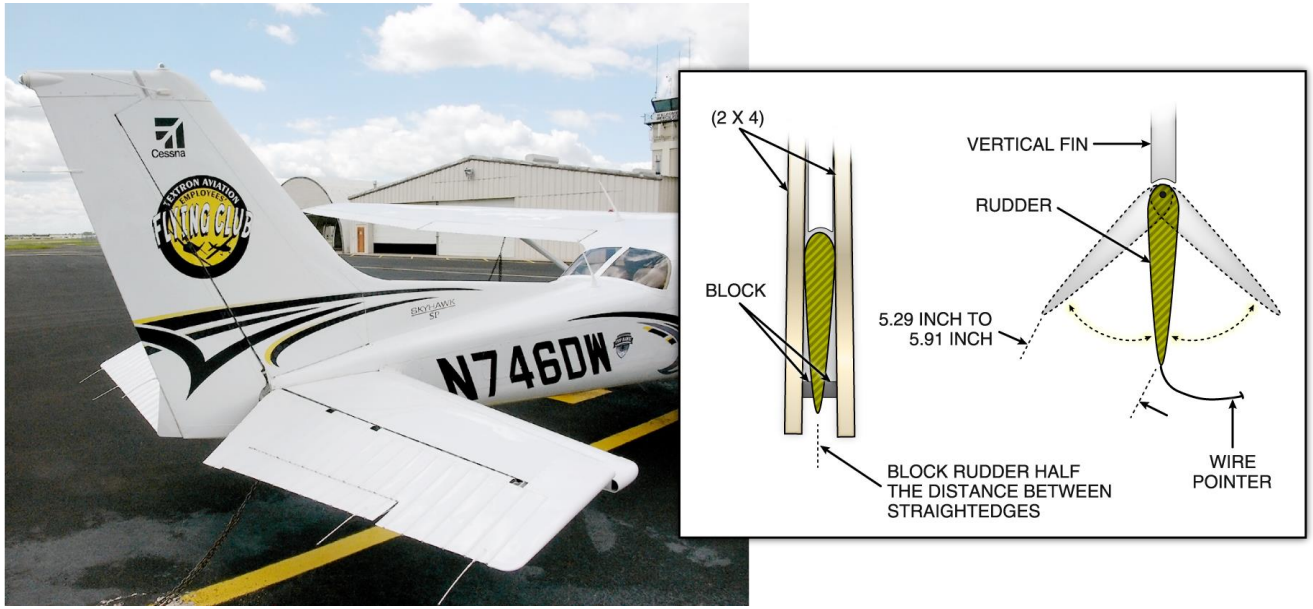
Rudder Control Cable Removal and Installation

- Rudder control cable removal
- Rudder control cable installation

RUDDER CABLE/PULLEY

Make sure that the cable is in the correct position in the pulley groove before you install the cable guard.

RUDDER CONTROL CABLE REMOVAL AND INSTALLATION



For More Information

REFERENCE

For rudder travel angles, refer to Chapter 6, Airplane Dimensions and Specifications - Description and operation.

RUDDER CONTROL CABLE REMOVAL AND INSTALLATION

FIREWALL INSULATION

Due to the thickness of the insulation at the firewall, grind a piece of 0.0625 inch welding rod to a sharp point and notch at the 6.50 inch dimension. Pierce the insulation on firewall and use notch to measure proper dimension.

STEERING TUBE SPRINGS

Do not compress springs when extending steering tubes.

Extend steering tubes to seat rods against internal springs, but do not attempt to preload these springs by shortening rod end clevises after alignment. The steering tubes are preloaded.

RUDDER CONTROL CABLE REMOVAL AND INSTALLATION

RUDDER RIGGING CHECK

Ensure that rudder moves in the correct direction when operated by the rudder pedals.

RUDDER RIGGING

Do not rig rudder off-center unless trim tab does not provide adequate correction.

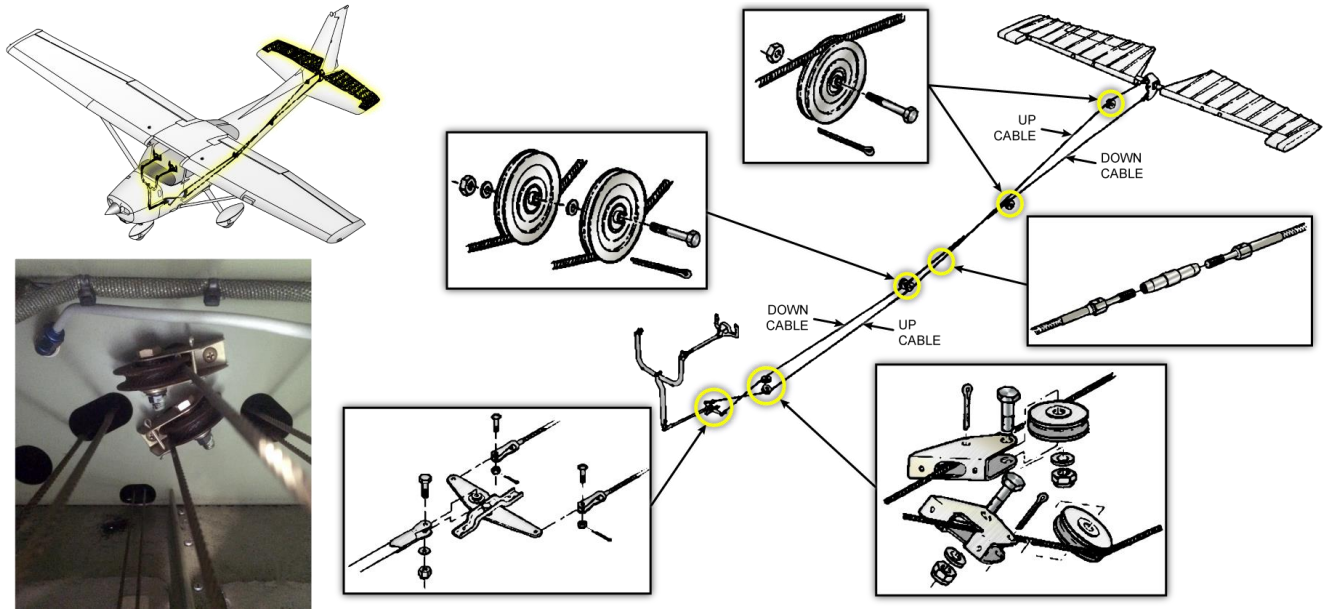
RUDDER CONTROL SYSTEM - TROUBLESHOOTING (27-20-00)

Troubleshooting tables in the Cessna Model 172 AMM include:

- Rudder does not respond to pedal movement.
- Binding or jumpy movement of rudder pedals.
- Lost motion between rudder pedals and rudder.
- Incorrect rudder travel.

Elevator Maintenance Practices

ELEVATOR CONTROL SYSTEM (27-30-00)



The elevators operate by power transmitted through forward and aft movement of the control yoke.

This movement goes to the elevators through a system that has a push-pull tube, cables, and bell cranks.

The elevator control cables, at their aft ends, are attach directly to a bell crank that installs between the elevators.

This bell crank connects the elevators, and is a bearing point for the travel stop bolts. The trim tab mounts on the right elevator.

ELEVATOR CONTROL SYSTEM (27-30-00)

Elevator Damage and Repair Criteria

- For elevator damage and repair criteria, refer to the Single Engine Structural Repair Manual Chapter 55, Elevator.

Forward Elevator Bell Crank Removal/Installation

- Forward elevator bell crank removal
- Forward elevator bell crank installation

Aft Elevator Bell Crank Removal Installation

- Aft elevator bell crank removal
- Aft elevator bell crank installation

Elevator Removal/Installation

- Elevator removal
- Elevator installation

Good Points

REMOVE AND INSTALL

The procedures in the maintenance manual are for the right elevator with the attached trim tab. The left elevator removal/installation is almost the same, but without the trim tab.

ELEVATOR CONTROL CABLES (27-30-00)

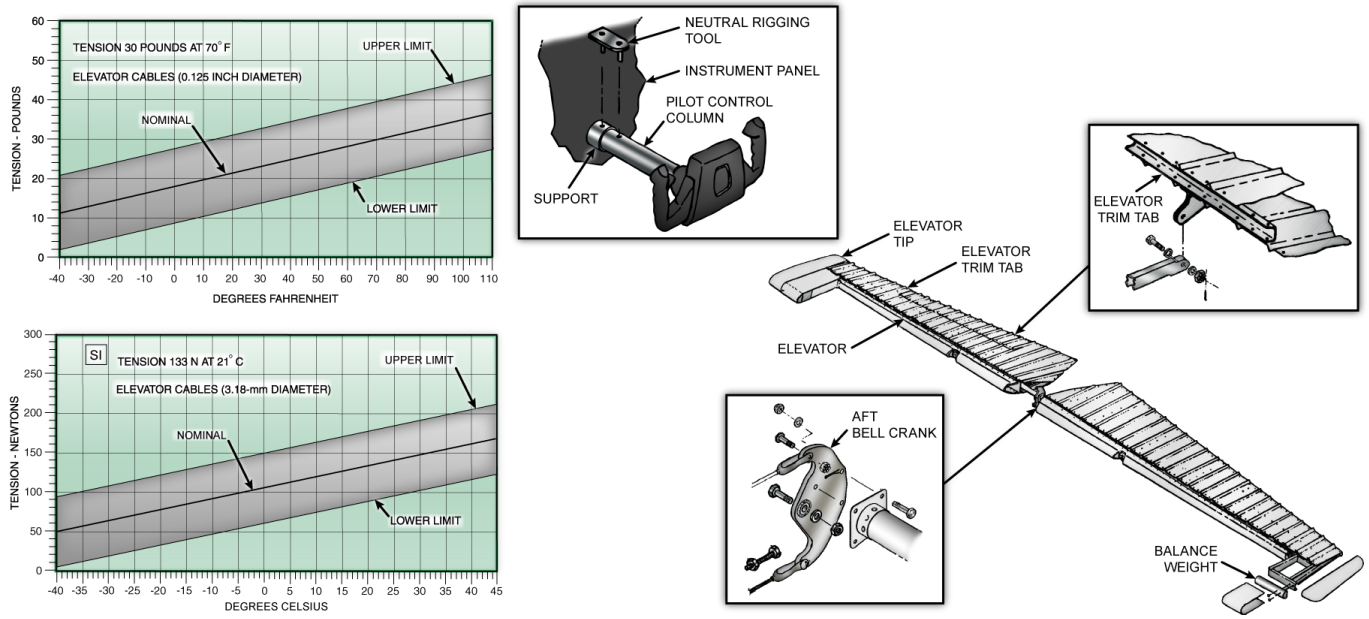
Elevator Control Cable Removal and Installation

- Elevator control cable removal
- Elevator control cable installation

ELEVATOR CABLES

- Make sure the wire is longer than the cable.
- Make sure that the cable is in the correct position in the pulley groove before you install the cable guard.

ELEVATOR CONTROL ADJUSTMENT/TEST (27-30-00)



Elevator Rigging

NOTE

CONTROL SURFACE POSITION MEASURMENT

Neutral position is measured with the bottom of the elevator balance area flush with the bottom of the stabilizer.

ELEVATOR CONTROL ADJUSTMENT/TEST (27-30-00)

Elevator Control Adjustment/Test

RIGGING CHECK

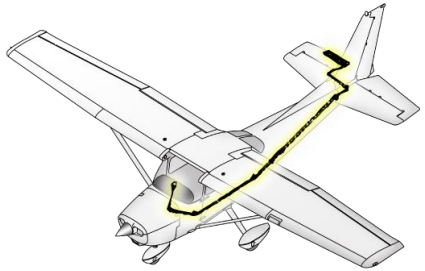
Make sure that the elevators move in the correct direction when operated by the controls.

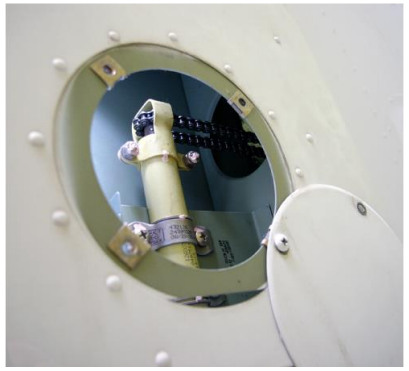
For More Information

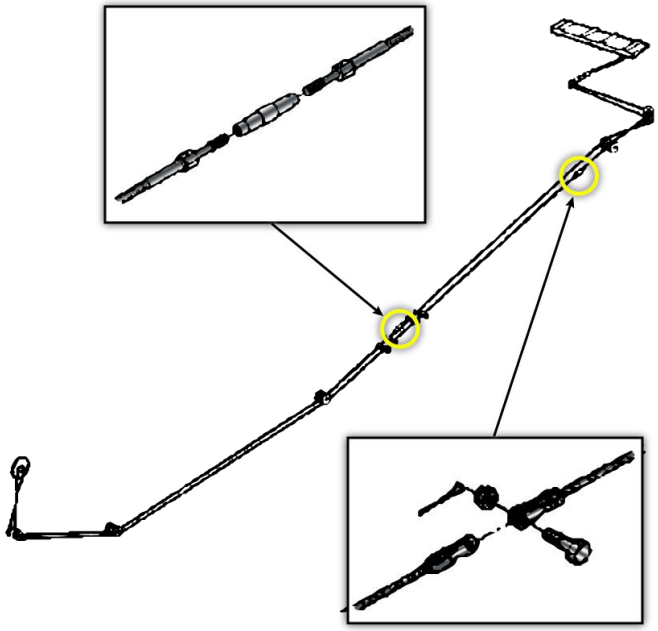
REFERENCE

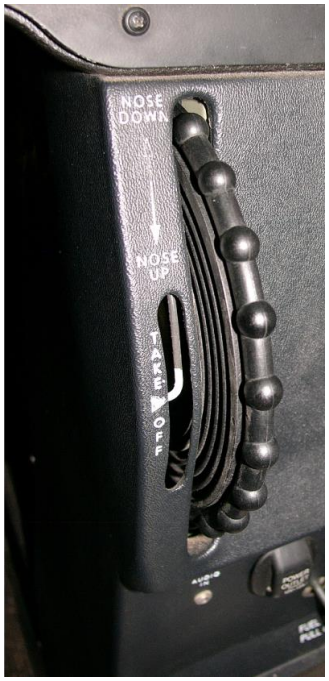
For **IN-DEPTH** explanations of the elevator adjustment and test maintenance practices refer to the flight control maintenance manual.

ELEVATOR TRIM CONTROL (27-31-00)









The trim wheel in the pedestal controls the elevator trim tab on the right elevator.

Movement to operate the tab goes from the trim control wheel with chains, cables, and an actuator.

A mechanical pointer adjacent to the trim wheel shows the tab position.

A nose up setting on the trim wheel gives a tab down position.

ELEVATOR TRIM CONTROL (27-31-00)

Trim Tab Actuator Removal/Installation

- Trim tab actuator removal
- Trim tab actuator installation

Trim Tab Actuator Removal/Installation

- Trim tab actuator removal.
- Trim tab actuator installation

For More Information

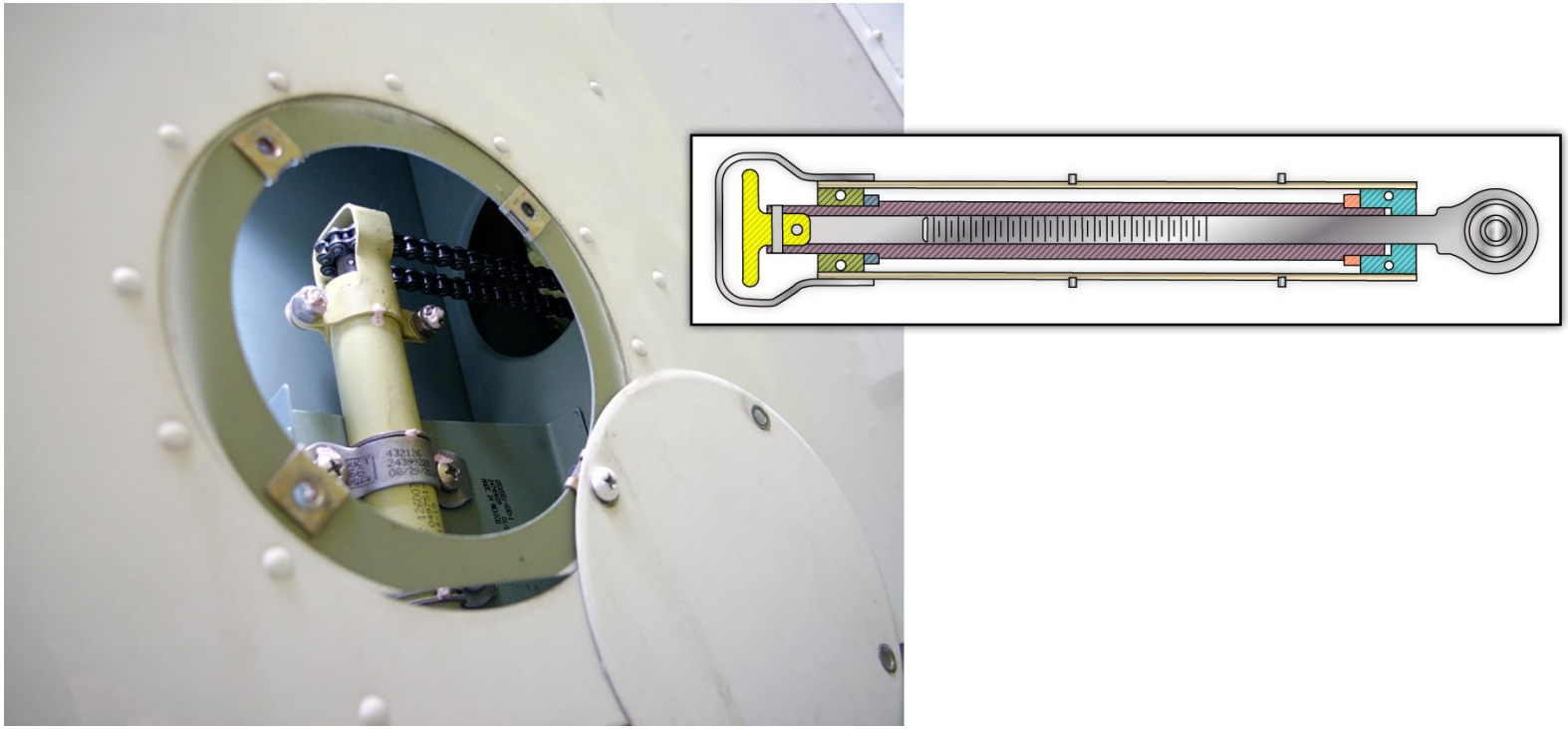
REFERENCE

For **IN-DEPTH** explanations of the elevator trim tab actuator maintenance practices, refer to the flight control maintenance manual.

TAILCONE SUPPORT

Place a support stand under the tail tiedown ring when you work in the tail of the airplane or the tailcone can fall.

ELEVATOR TRIM CONTROL (27-31-00)



Trim Tab Actuator Disassembly/Assembly

- Trim tab actuator disassembly
- Trim tab actuator assembly

ELEVATOR TRIM TAB ACTUATOR CLEANING AND INSPECTION (27-31-00)

- Do a trim tab actuator cleaning and inspection

For More Information

REFERENCE

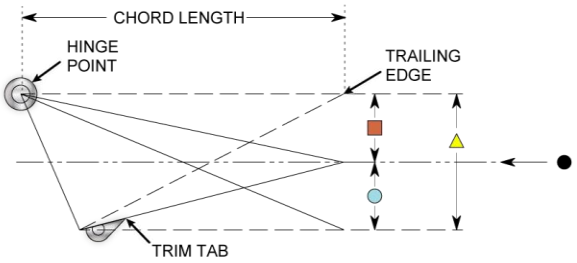
For **IN-DEPTH** explanations of the elevator trim tab actuator maintenance practices refer to the flight control maintenance manual.

TAILCONE SUPPORT

Place a support stand under the tail tiedown ring when you work in the tail of the airplane or the tailcone can fall.

TRIM TAB FREE PLAY INSPECTION (27-31-00)

Put the elevator and trim tab in the neutral position and keep the elevator from moving with the elevator gust lock.



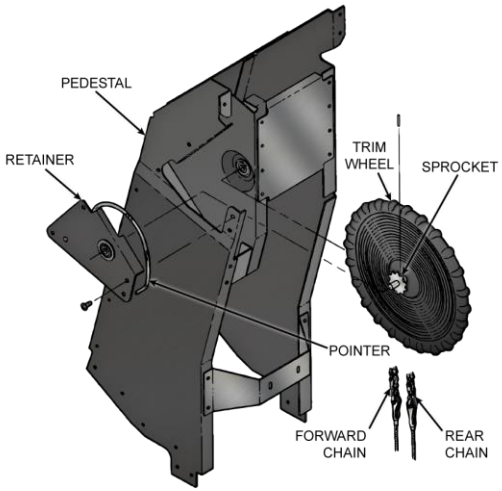
SYMBOL	DESCRIPTION
■	FREE PLAY UP
●	NEUTRAL POSITION
○	FREE PLAY DOWN
△	TOTAL FREE PLAY

For More Information

REFERENCE

For **IN-DEPTH** explanations of the elevator trim tab actuator maintenance practices refer to the flight control maintenance manual.

ELEVATOR TRIM CONTROL (27-31-00)



Trim Tab Control Wheel Removal/Installation

- Trim tab control wheel removal
- Trim tab control wheel installation

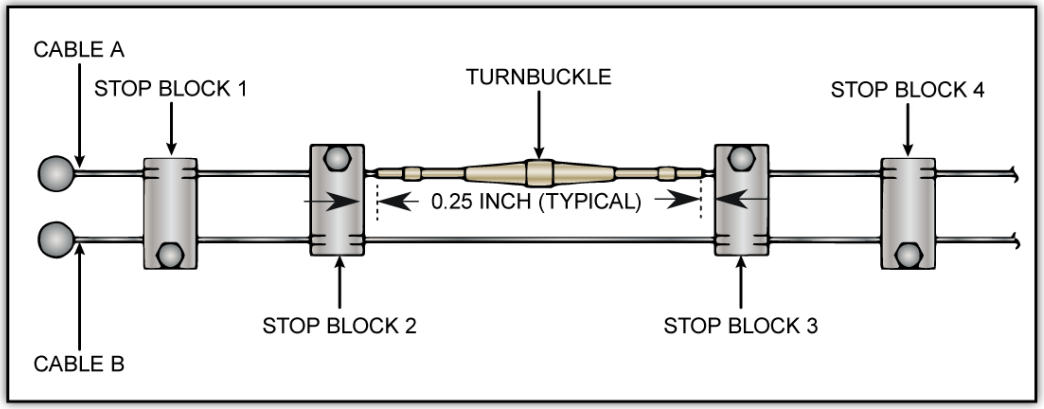
Elevator Trim Tab Control Cable Removal/Installation

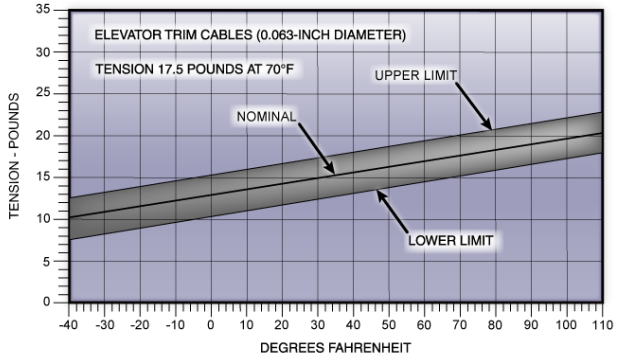
- Elevator trim tab control cable removal
- Elevator trim tab control cable installation

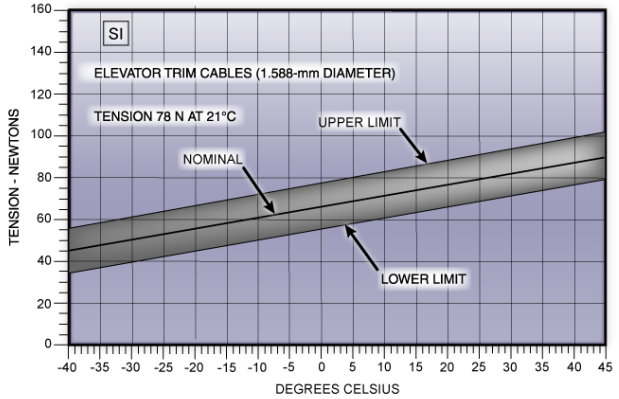
Four cables are a part of the elevator trim tab control system. The trim cables connect together by forward and aft chains, a turnbuckle, and a bolt and nut disconnect. The bolt and nut connector link connects the left forward and left aft trim control cables.

ELEVATOR TRIM CONTROL (27-31-00)

Trim Tab Control Adjustment/Test







ELEVATOR TRIM CONTROL (27-31-00)

Trim Tab Control Adjustment/Test

RIGGING CHECK

Make sure that the trim tab moves in the correct direction when you operate it with the trim wheel. The nose down trim corresponds to the tab up position.

TAILCONE SUPPORT

Place a support stand under the tail tiedown ring when you work in the tail of the airplane or the tailcone can fall.

NOTE

CHAINS AND CABLES INSTALLATION

For the installation of chains or cables, let the actuator screw turn freely, as chains and cables are connected.

ELEVATOR CONTROL SYSTEM - TROUBLESHOOTING (27-30-00)

Troubleshooting tables in the Cessna Model 172 AMM include:

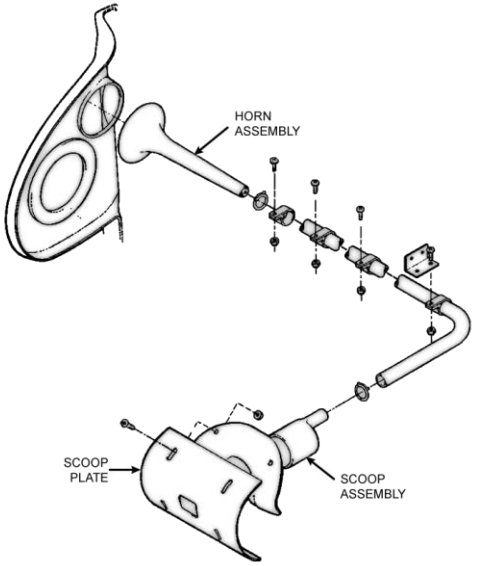
- No response to control wheel fore and aft movement
- Binding or jumpy motion felt in movement of the elevator system
- Elevators fail to attain prescribed travel

ELEVATOR TRIM CONTROL SYSTEM - TROUBLESHOOTING (27-31-00)

Troubleshooting tables in the Cessna Model 172 AMM include:

- Trim control wheel moves with excessive force
- Lost motion between control wheel and trim tab
- Trim indicator fails to indicate correct trim position
- Incorrect trim tab travel

STALL WARNING SYSTEM - MAINTENANCE PRACTICES (27-32-00)



The stall warning system includes a stall warning horn and a scoop assembly.

The stall warning horn mounts on the inside of the cabin, behind the door post molding and to the outboard side of the pilot, on the fuselage rib.

The scoop assembly mounts on the leading edge of the left wing at WS 91.25.

Scoop Assembly Removal/Installation

- Remove the scoop assembly.
- Install the scoop assembly.

STALL WARNING SYSTEM (27-32-00)

Stall Warning Horn Removal/Installation

- Remove the stall warning horn
- Install the stall warning horn

Stall Warning System Operational Check

- Perform stall warning system operational check

APPROACH RATE

An approach rate of 1 knot per second is a much slower entry rate then is used on a normal training stall.

PITCH AND ROLL RATE

Up to the time the airplane pitches, it must be possible to produce and correct both roll and yaw by normal use of the controls.

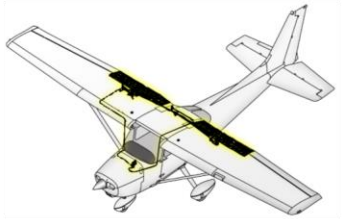
During recovery, with normal use of the controls, it must be possible to prevent: more than 15 degrees roll, more than 15 degrees yaw, and more than 30 degrees pitch below level flight.

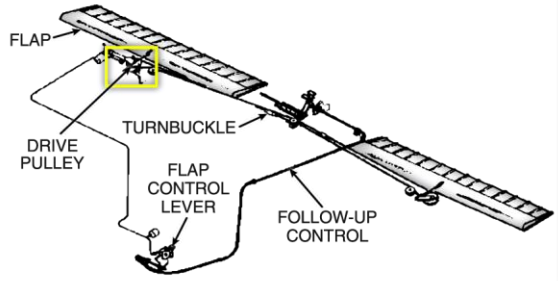
Flap Maintenance Practices

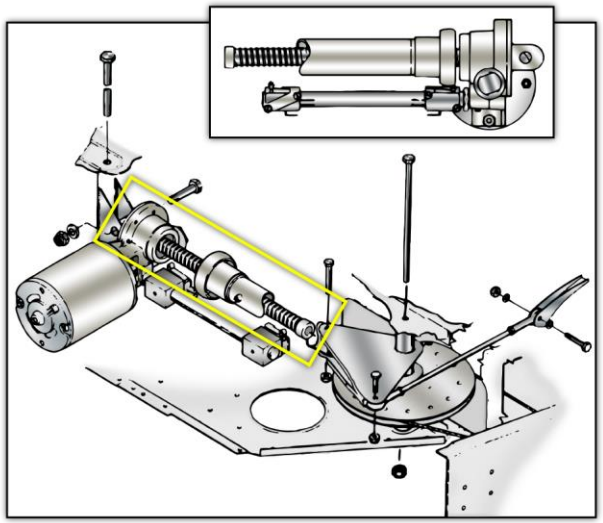
FLAP CONTROL SYSTEM (27-50-00)

Flap Motor and Transmission Assembly Removal/Installation

- Flap motor and transmission assembly removal
- Flap motor and transmission assembly installation





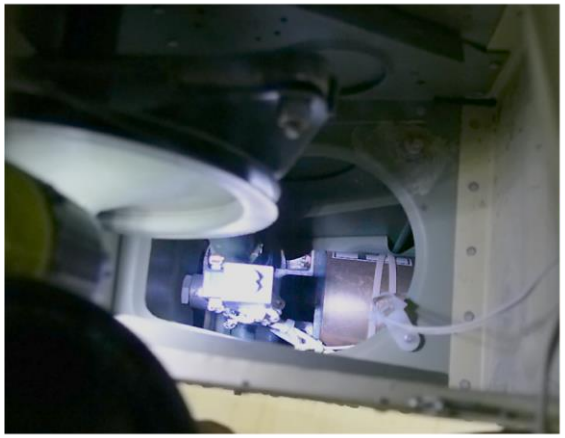


NOTE

HINGE ASSEMBLY

If the hinge assembly was removed from the transmission, make sure that the short end of the hinge is installed toward the top.

FLAP CONTROL SYSTEM (27-50-00)




Flap motor and transmission with up and down limit switches.

Flap Removal/Installation

- Flap assembly removal.
- Flap assembly installation

Flap Drive Pulley Removal/Installation

- Flap drive pulley removal
- Flap drive pulley installation

FLAP CONTROL SYSTEM (27-50-00)

Flap Control Cable Removal and Installation

- Flap control cable removal
- Flap control cable installation

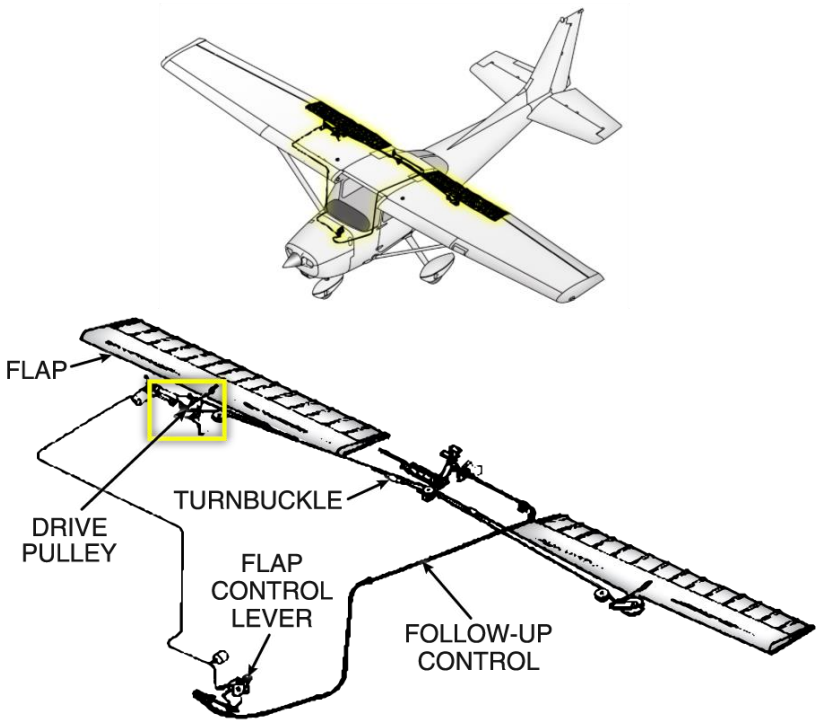
FLAP CONTROL CABLE REMOVE AND INSTALL

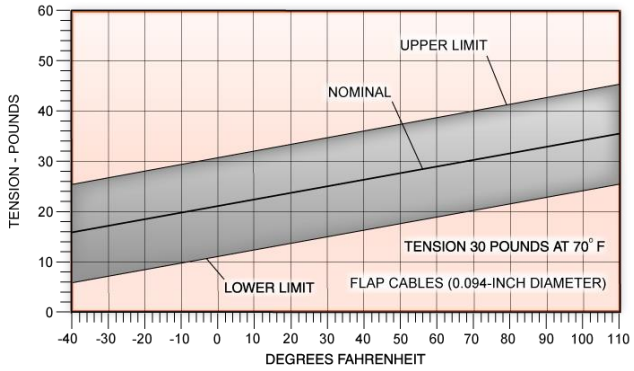
- Make sure the wire is longer than the cable removed.
- Make sure that the cable is in the correct position in the pulley groove before you install the cable guard.
- If the right flap is in the up position, make sure the left flap is in the up position before installing the flap control cable to the turnbuckle.
- Make sure the flap cable routing and installation prevents the cables from touching each other and that the flaps move in the same direction when the flaps are deployed.

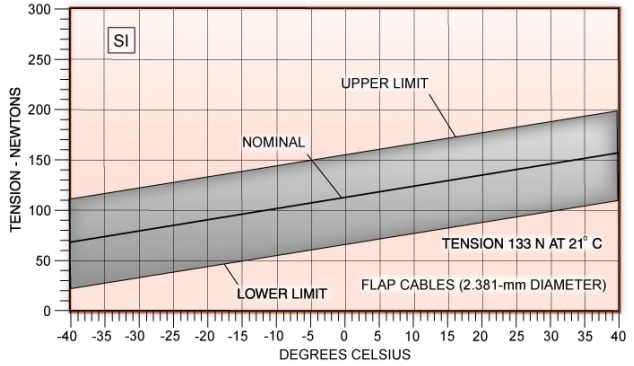
FLAPS/TRACKS - INSPECTION (27-50-00)

FLAP CONTROL SYSTEM ADJUSTMENT/TEST(27-50-00)

Rigging of the Flap Control System



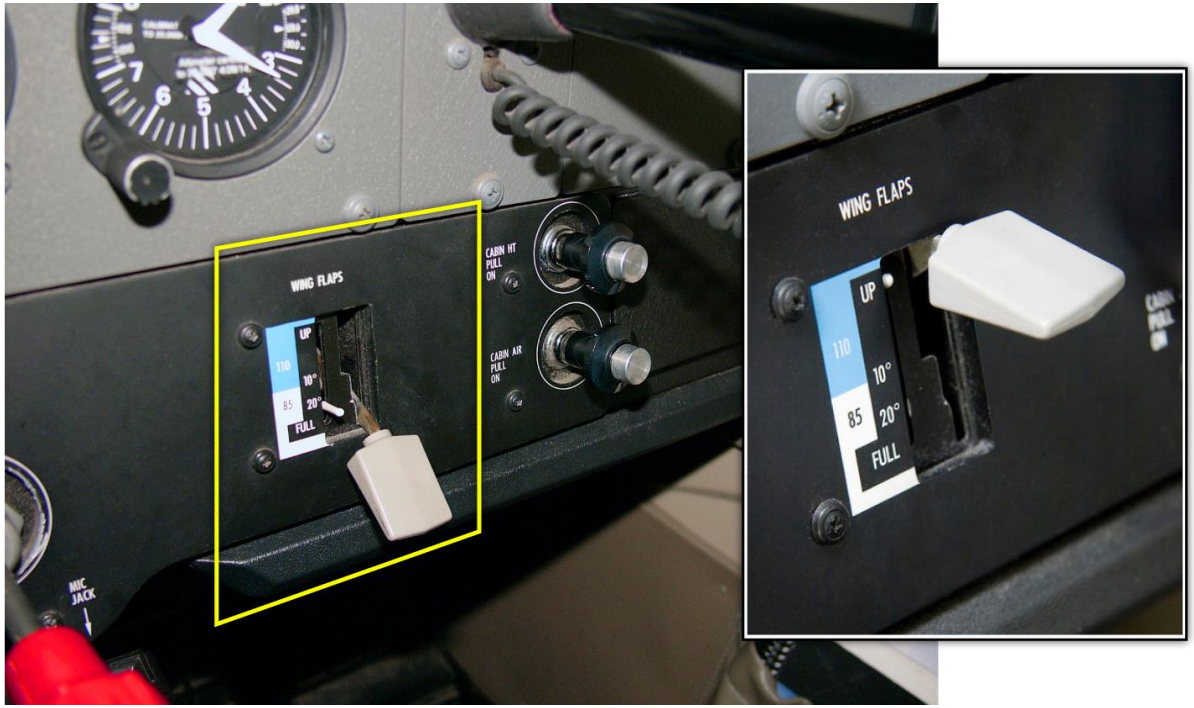




Operational Check

- Do operational check procedures

FLAP CONTROL SYSTEM - TROUBLESHOOTING (27-50-00)

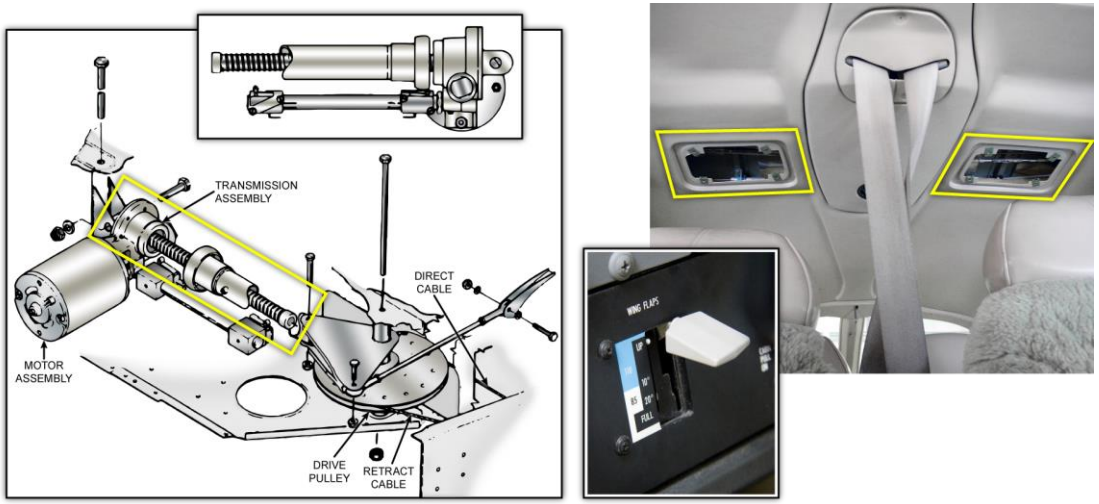


Troubleshooting tables in the Cessna Model 172 AMM include:

- Both flaps fail to move
- Binding in system as flaps are raised and lowered
- Left flap fails to move
- Incorrect flap travel
- Flaps fail to retract
- Flaps fail to extend

FLAP FOLLOW UP AND INDICATING SYSTEM (27-51-00)

Description And Operation



The flap follow up and indicating system consists of a sheathed cable assembly, pointers and micro switches.

One end of the cable attaches to the flap operating switch arm.

The other end is clamps to the flap direct cable, above the headliner in the rear cabin area.

Motion of the flap cable transmits through the follow up control to the pointer, attached to the switch mounting arm.

The pointer moves along a scale as the flaps extend or retract.

When the motion of the switch mounting arm with the attached operating switches positions the "active" operating switch to clear the cam on flap lever, flap motor circuit is broken and flaps stop at selected position.

FLAP FOLLOW UP AND INDICATING SYSTEM - MAINTENANCE PRACTICES (27-51-00)

Follow Up and Indicating System Removal/Installation

See instructions in aircraft maintenance manual for procedures on removal/installation.

FLAP FOLLOW UP AND INDICATING SYSTEM ADJUSTMENT/TEST (27-51-00)

System Rigging

Do flap rigging procedures.

FLAP SELECTOR LEVER

If the knob on the flap selector lever becomes loose, remove knob and clean threads on lever with methyl n-propyl ketone or equivalent. After threads have thoroughly dried, prime threads and allow drying. Secure knob to lever using Loctite (MIL-S-22473) or equivalent. Allow Loctite to cure for approximately 30 minutes before returning to service.

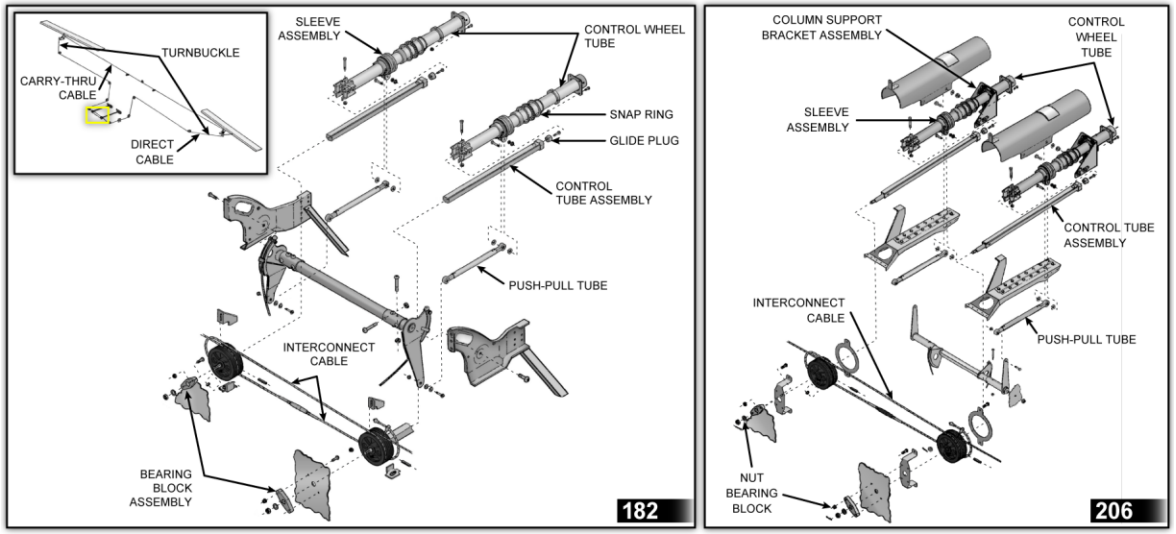
FOLLOW UP SYSTEM RIGGING

Rig flaps before rigging the follow up system.

Model Differences

182 / 206 DIFFERENCES - AILERONS (27-10-00)

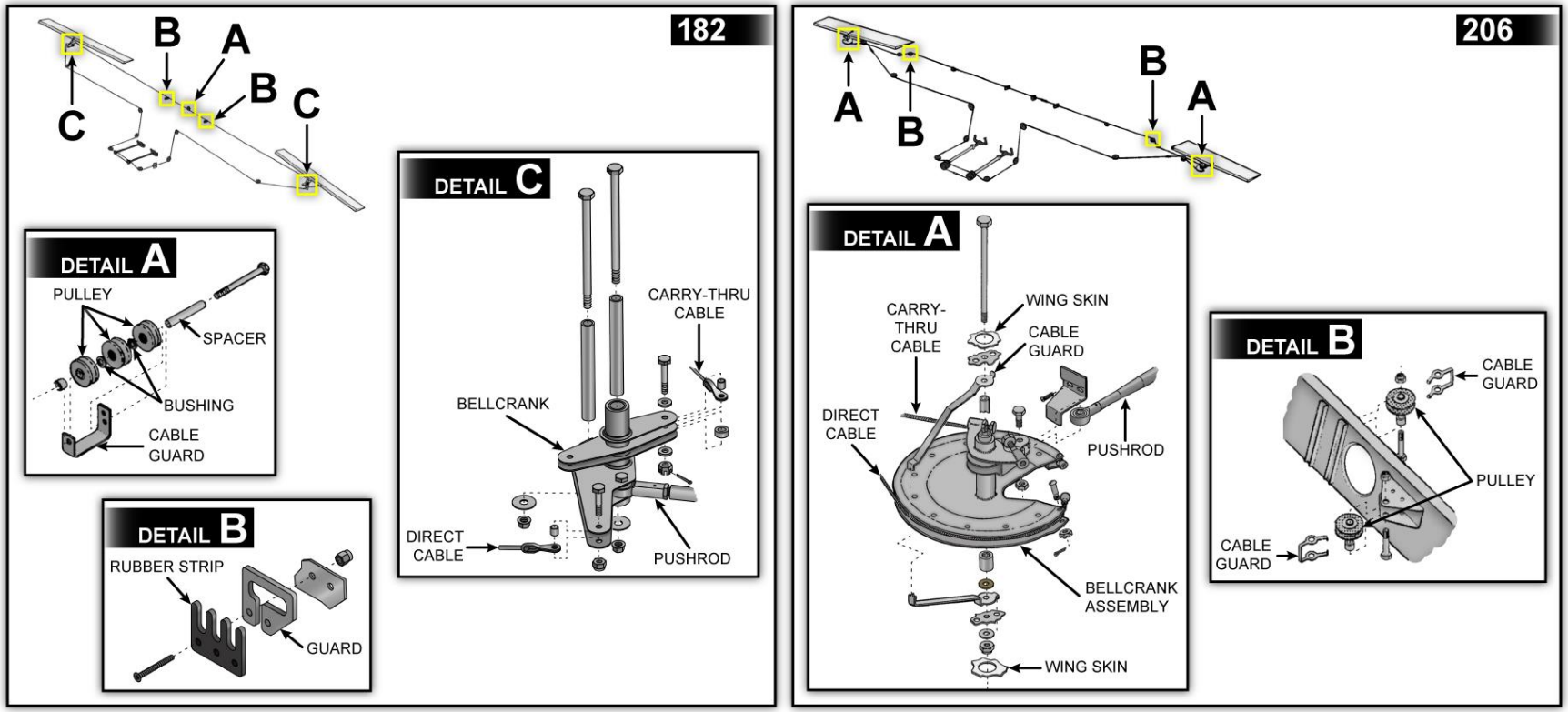
Cables in the control column on the 182 and 206 are located and routed differently from the 172. The control column and control tube are different.



The ailerons receive the input from the pilot or copilot control wheel. The torque tubes, bearings, cable quadrants, pulleys, cables, bell cranks, and pushrods help to supply the input to the ailerons. When you turn the control wheel, the four bearing roller assemblies on the end of the control wheel tube turn. This turns a square control tube assembly inside of and extending from the control wheel tube. Attached to the square tube is a quadrant that operates the aileron system. The two control wheels control the aileron system. The interconnect cables, turnbuckle, and adjustment terminals give synchronized control to the two control wheels. The forward end of the square control tube is in a bearing block on the firewall. It rotates with the control wheel and does not move in a fore-and-aft direction.

As the control wheel moves in a fore-and-aft direction, the four bearing roller assemblies on the end of the control wheel tube decrease the friction. Bearings in the sleeve assembly let the control wheel tube turn. The sleeve assembly connects to the control wheel tube with a sleeve and a retaining ring. The sleeve moves in a fore-and-aft direction with the control wheel tube. The movement lets the push-pull tube attached to the sleeve assembly operate an elevator arm assembly. One elevator cable attaches to the elevator arm assembly. A torque tube connects one arm assembly to the other arm assembly on the opposite end of the torque tube, where the other elevator cable attaches. The pilot and copilot control wheels both link to the aileron and elevator control systems when dual controls are installed.

182 / 206 DIFFERENCES - AILERONS (27-10-00)

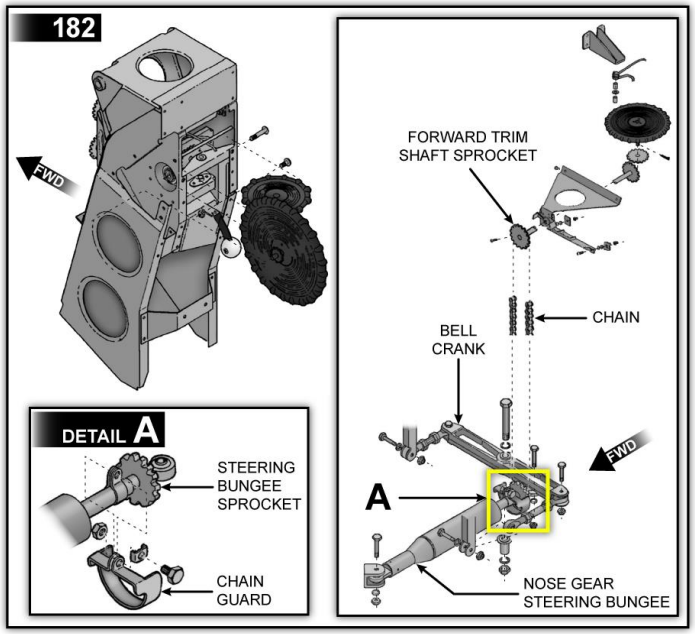


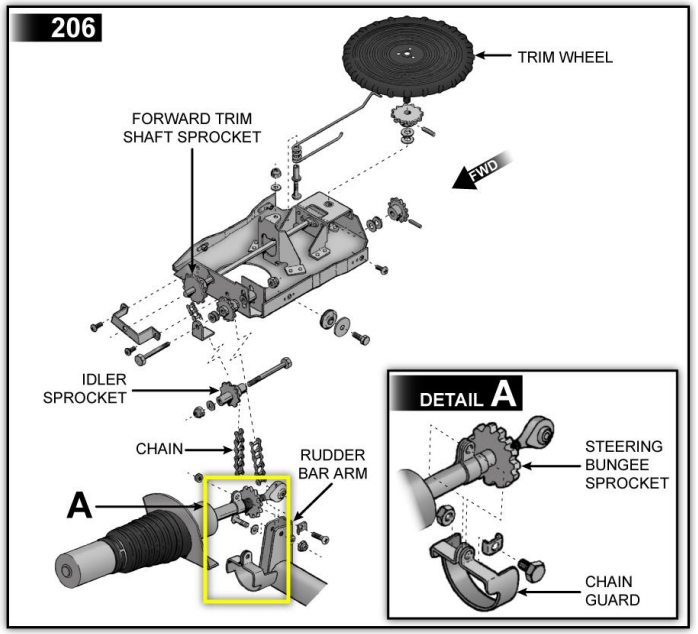
Components for 206 aircraft are designed differently but operate the same, also the mechanical components are built stronger.

182 / 206 DIFFERENCES - RUDDER & RUDDER TRIM (27-20-00) (27-21-00)

172 - Does not have rudder trim.

182 & 206 - The rudder control system, rudder trim system and nosewheel steering system are interconnected. Adjustments to any one of these systems will affect the others.





The rudder control system must be correctly rigged prior to rigging the rudder trim and nosewheel steering system.

182 / 206 – Troubleshooting procedures:

The 182 and 206 will be slightly different but the 172 will not incorporate any rudder trim troubleshooting procedures because of the lack of rudder trim. (27-21-00)

182 & 206 - Rudder trim system maintenance practices consists of rudder trim system removal/installation and rudder trim system rigging.

182 Rudder Trim Adjustment/Test

182 / 206 DIFFERENCES - RUDDER & RUDDER TRIM (27-20-00) (27-21-00)

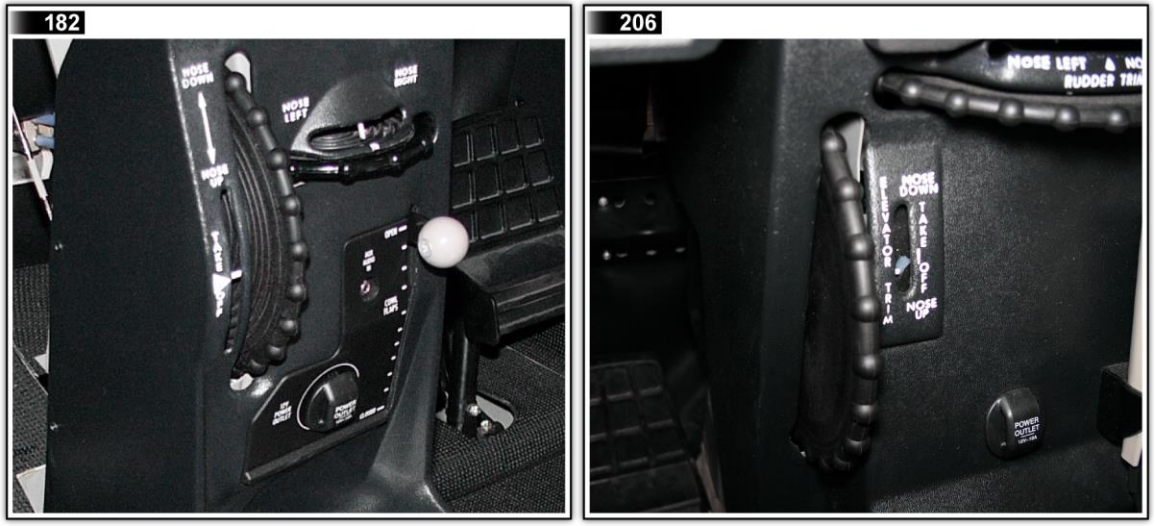
RUDDER CONTROL SYSTEM

Rudder control system must be rigged prior to rigging rudder trim system. The rudder control system, rudder trim control system and nosewheel steering system are interconnected. Adjustments to any one of these systems will affect the others

RUDDER CONTROL SYSTEM

Ensure rudder moves in the correct direction when operated by the rudder pedals and trim control wheel.

182 / 206 DIFFERENCES - ELAVATOR (27-30-00) (27-31-00)



182 / 206 - Each have different procedures in the maintenance manual for their respective components.

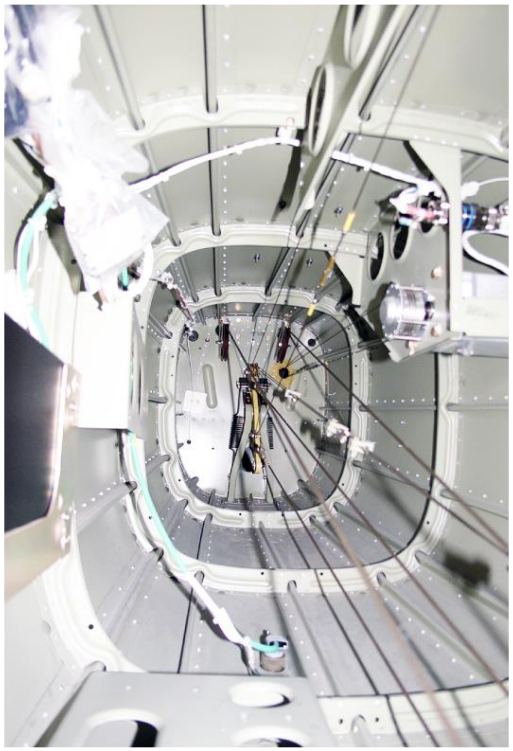
182 / 206 - Very similar to each other in operation. Each has different procedures in the maintenance manual for its components.

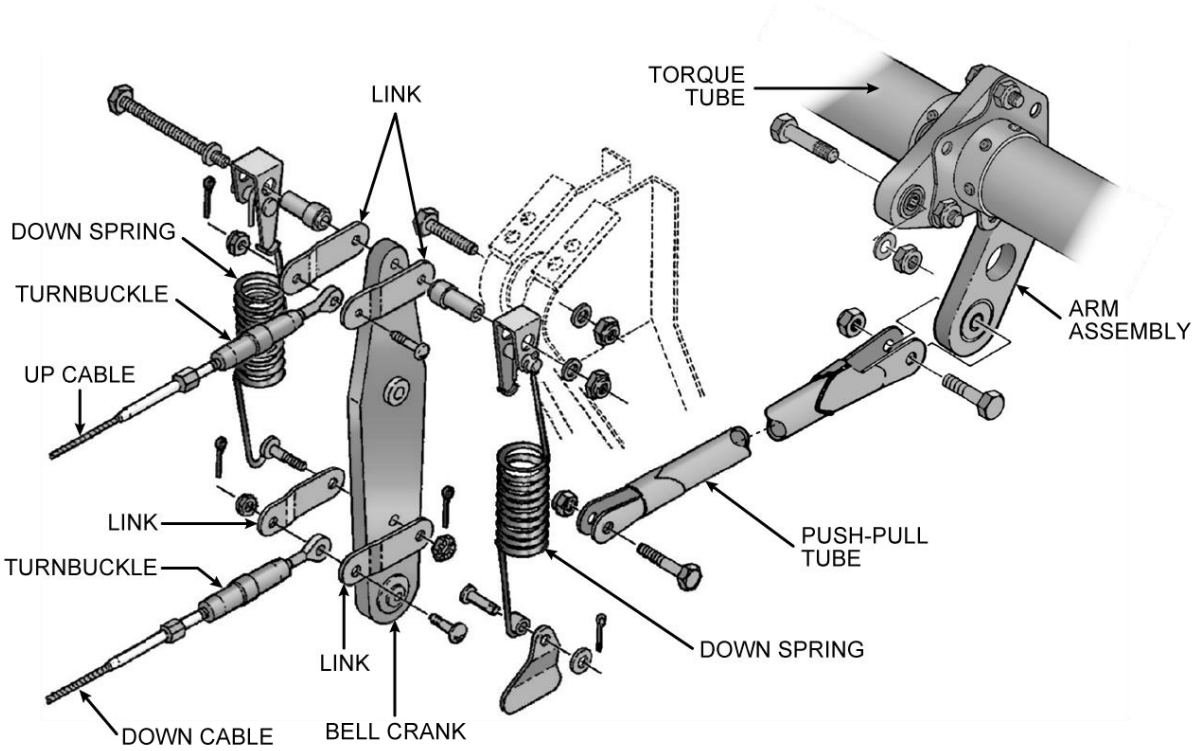
182 / 206 - Elevator Trim system has different procedures.

182 / 206 - Forward and aft movement of the control wheels operates the elevators.

- Movement of the control wheels goes to the elevators through the control yoke and a series of cables, bell cranks, and pushrods.
- The elevator trim tab is on the right elevator. A trim wheel installed in the pedestal controls the trim tab.
- The power to operate the elevator trim tab comes from the trim control wheel through chains, cables, and an actuator.
- A mechanical pointer adjacent to the trim wheel shows elevator trim tab position.
- A nose-up setting causes an elevator trim tab down position.

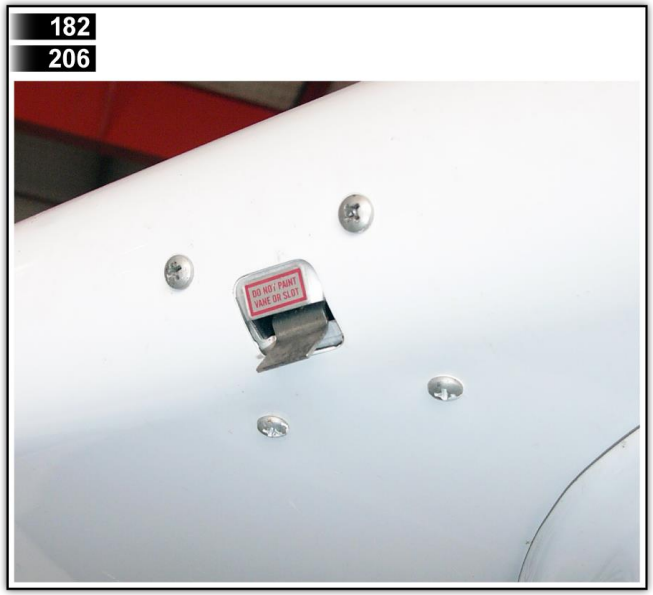
182 / 206 DIFFERENCES - AILERONS (27-30-00)

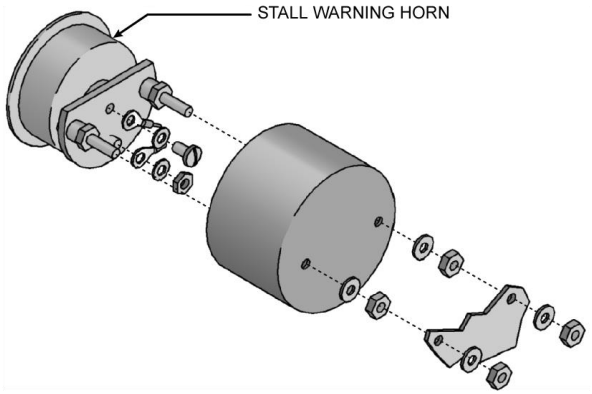




It is very important to lubricate springs, linkage, and cables periodically according to the maintenance manual. If dry and not lubricated, there will be a popping sound when ailerons move.

182 / 206 DIFFERENCES - STALL WARNING (27-32-00)





182 / 206 are the same - The stall warning system includes a stall warning horn and stall detector.

- The stall warning horn is located inside the cabin behind the headliner, overhead and to the outboard side of the pilot, on the fuselage rib.
- The (heated) stall detector mounts on the leading edge of the left wing at WS 91.25. The PITOT HEAT/OFF switch on the circuit panel assembly provides power to the heating element of the stall detector.
- The stall detector actuates by airflow over the surface of the wing.
- The stall detector internal switch closes as a stall condition is approached, actuating the stall warning horn.
- The stall detector actuates the stall warning horn approximately 4.5 to 9.0 knots above airplane stall speed.

182 / 206 DIFFERENCES - STALL WARNING (27-32-00)

206 - Stall Detector Adjustment

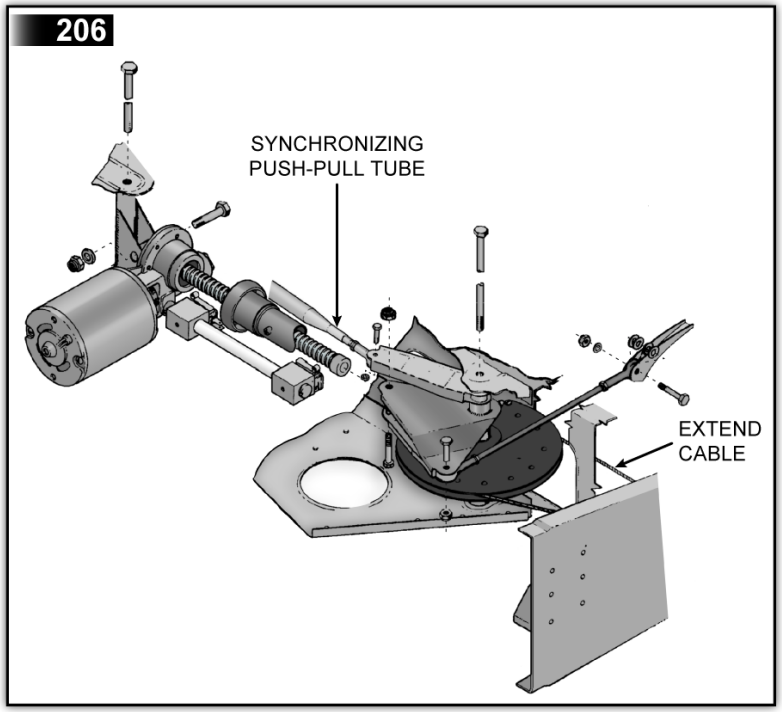
- It is necessary to test fly the airplane to determine if the stall detector actuates the stall warning horn at the desired speed.
- Make the following adjustments to stall detector based on results of test flight.
- If stall warning horn sounds at speeds in excess of 9.0 knots above stall speed, then loosen stall detector mounting screws and move stall detector slightly down.

STALL WARNING

Do not allow airspeed to drop below airplane stall speed.

- If stall warning horn does not sound before reaching stall speed plus 4.5 knots (4.5 knots above stall speed), then loosen stall detector mounting screws and move stall detector slightly up. Refer to Stall Warning System - Maintenance Practices, Stall Detector Removal and Installation.
- A successful test of the stall warning system will cause the stall warning horn to sound at 4.5 to 9.0 knots above airplane stall speed.

182 / 206 DIFFERENCES - FLAP CONTROL SYSTEM (27-50-00)



NOTE

172 AND 182 USE A CABLE OPERATED FLAP SYSTEM

182 / 206 - Operation - The wing flap control system has an electric motor and transmission assembly, drive pulleys, push-pull rods, cables, and a follow-up control. Power from the motor and the transmission assembly goes to the flaps by a system of drive pulleys, cables, and push-pull rods. Two microswitches mounted on a floating arm assembly, a cam lever, and a follow-up control electrical power to the motor. As the flap control lever moves to the necessary flap setting, the attached cam activates one of the microswitches, and that activates the flap motor. As the flaps move to the necessary position, the floating arm is turned by the follow-up control until the active microswitch clears the cam. The circuit breaks and the motor stops. To move the flap in the opposite direction, the control lever is moved in the opposite direction. This causes the cam to activate the second microswitch, which changes the direction of the flap motor. The follow-up control moves the cam until it is clear of the second switch, which stops the flap motor. Limit switches at the flap actuator assembly control flap travel as the flaps get to the full UP or DOWN position.

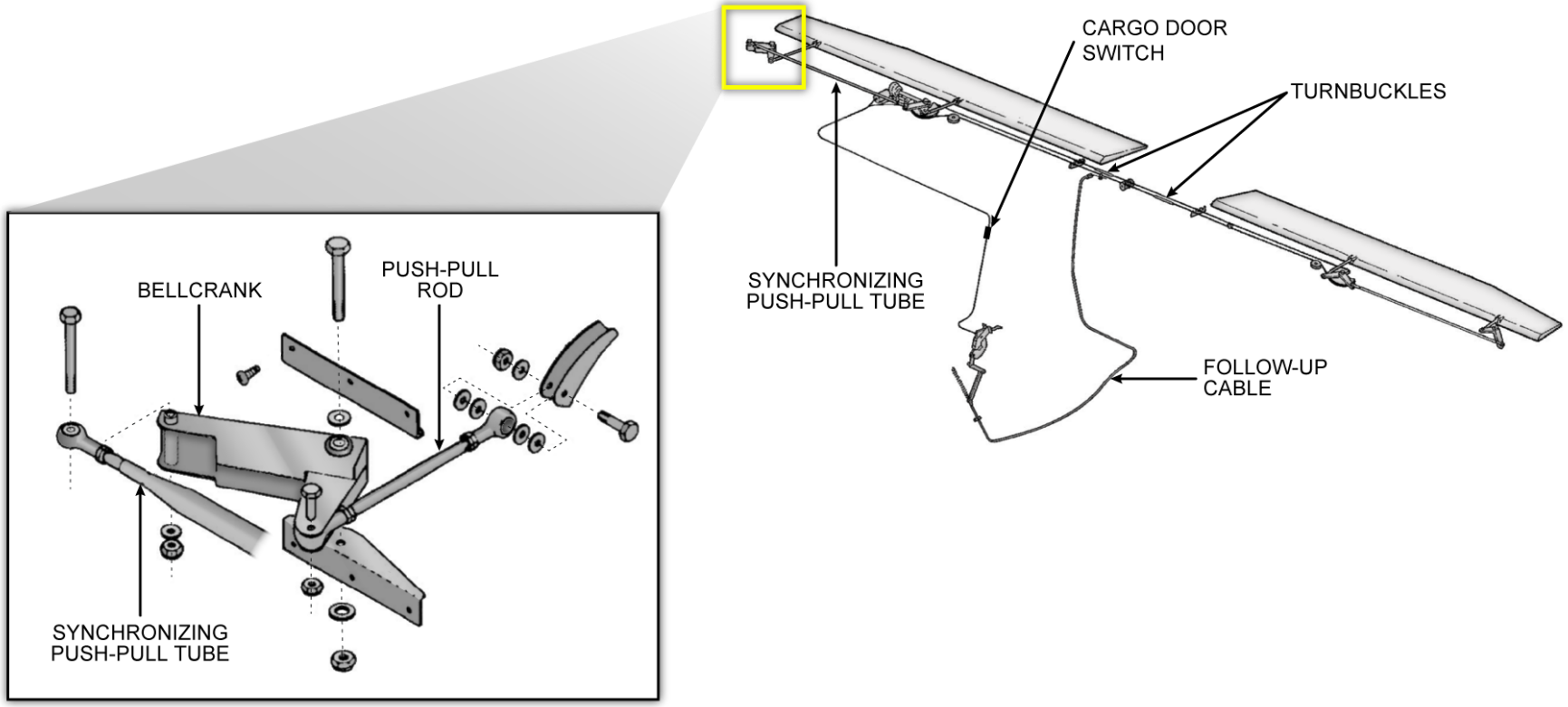
182 / 206 DIFFERENCES - FLAP CONTROL SYSTEM (27-50-00)

- 206 - When open the cargo door switch will electrically disable the flaps down circuit.
- 182 - Flap Motor and Transmission Assembly Removal/Installation.
- 182 - Flap Removal/Installation.
- 182 - Flap Drive Pulley Removal/Installation.
- 182 - Flap Control System Adjustment/Test.
- 206 - Flap Motor and Transmission Assembly Removal/Installation.
- 206 - Flap Removal/Installation.
- 206 - Flap Drive Pulleys Removal/Installation.
- 206 - Cables and Pulleys Removal/Installation.

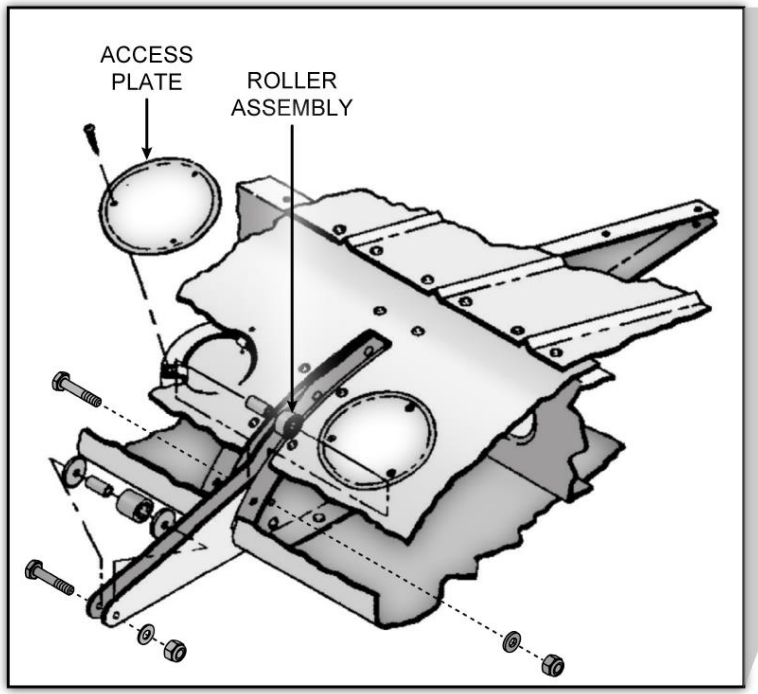
- The actuating tube is only on the right wing flap.
- Airplanes 20608001 thru 20608173, and Airplanes T20608001 thru T20608361 have a 0.094 inch (2.4 mm) diameter cable.
- Airplanes 20608174 and On, and Airplanes T20608362 and On have a 0.125 inch (3.2 mm) diameter cable
- The right flap and actuator must be correctly rigged before cables and left flap can be rigged.

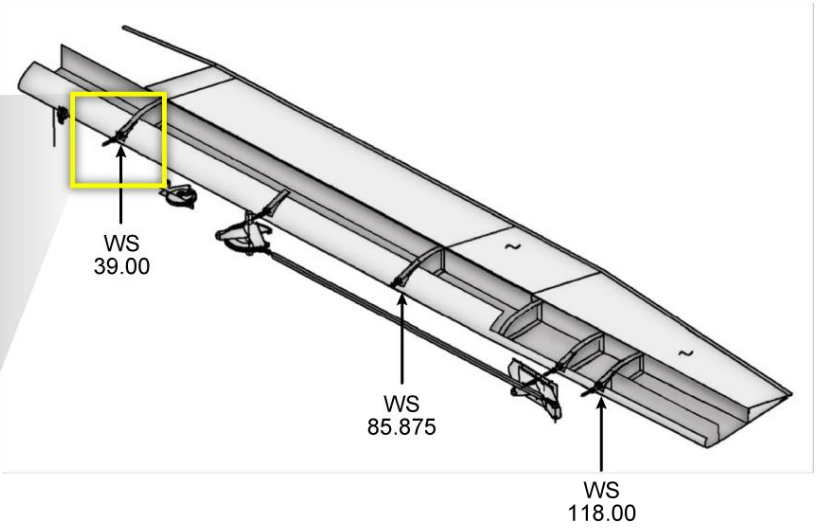
- 206 - Flap Control System Adjustment/Test.

182 / 206 DIFFERENCES - FLAP CONTROL SYSTEM (27-50-00)



182 / 206 DIFFERENCES - FLAP CONTROL SYSTEM (27-50-00)

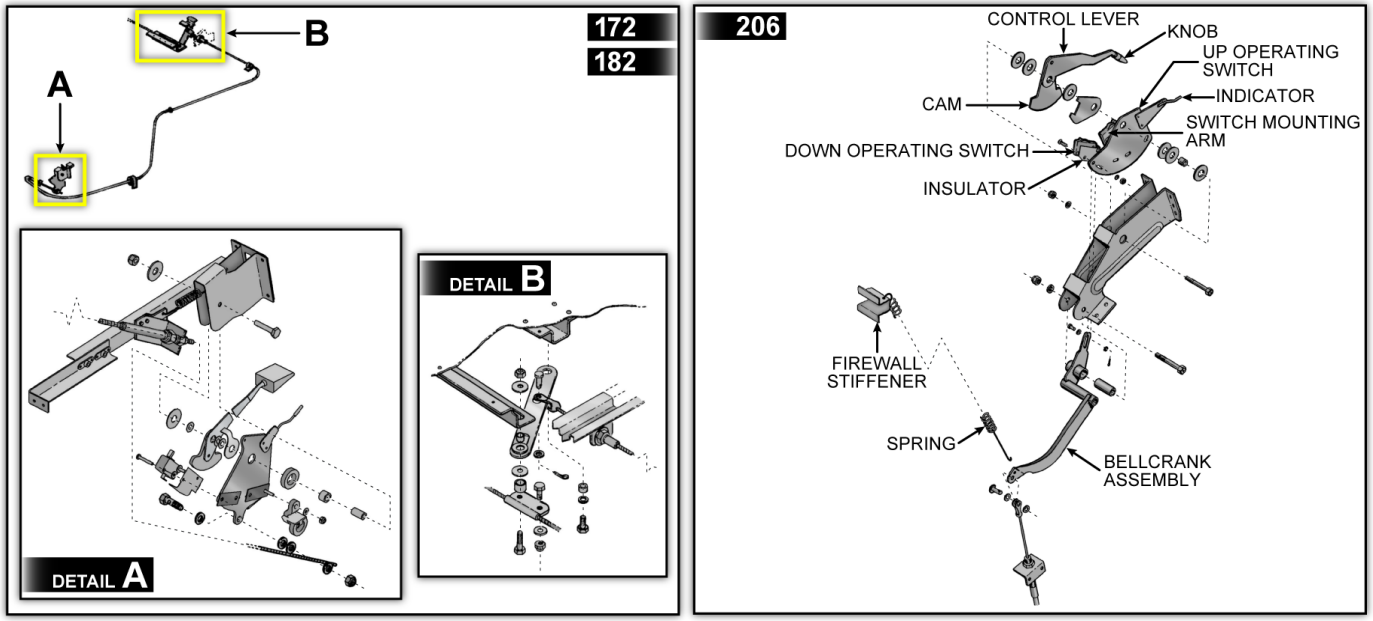




NOTE

LEFT FLAP SHOWN, RIGHT FLAP TYPICAL

182 / 206 DIFFERENCES - FLAP FOLLOW UP AND INDICATING SYSTEM (27-51-00)



172 / 182, Flap follow up operation:

- The flap follow up and indicating system consists of a sheathed cable assembly, pointers and micro switches.
- One end of the cable attaches to the flap operating switch operating arm. The other end clamps to the flap direct cable, above the headliner in the rear cabin area.
- Motion of the flap cable transmits through the follow up control to the pointer attached to the switch mounting arm.
- The pointer moves along a scale as the flaps extend or retract.
- When the motion of the switch mounting arm with the attached operating switches positions the "active" operating switch to clear the cam on the flap lever, the flap motor circuit is broken and flaps stop at selected position.

182 / 206 DIFFERENCES - FLAP FOLLOW UP AND INDICATING SYSTEM (27-51-00)

206 - Flap follow up operation:

- The flap follow-up and indicating system consists of a sheathed cable assembly, pointers and microswitches.
- One end of the cable attaches to the flap operating switch operating arm.
- The other end is clamped to the flap extend cable, above the headliner in the rear cabin area.
- Motion of the flap cable is transmitted through the follow-up control to the pointer, attached to the switch mounting arm.
- The pointer moves along a scale as the flaps extend or retract. When the motion of the switch mounting arm with the attached operating switches positions the "active" operating switch to clear the cam on the flap lever, the flap motor circuit is broken and flaps stop at selected position.