

CHAPTER

76

ENGINE CONTROLS

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GENERAL

The engine power is controlled (increased or decreased) by throttle lever. The engine mixture is controlled (made lean or rich) by mixture control.

THROTTLE AND MIXTURE CONTROL

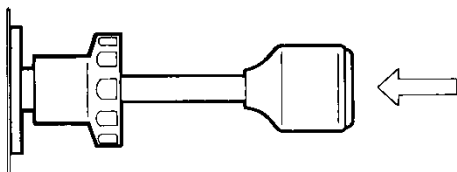
DESCRIPTION AND OPERATION

Z 143 L / Z 143 LSi

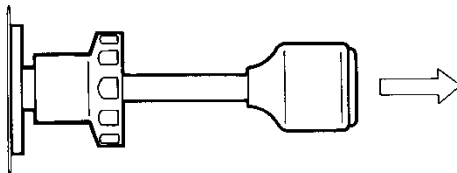
The engine power is increased / decreased by controlled of throttle lever (black) (Fig. 76-1, item 1).

The movement of throttle lever in cockpit is transferred to the lever of throttle control (2) by teleflex cable. Pushing the throttle lever in cockpit increases the engine power while pulling decreases the power. The friction of throttle lever is adjustable by tightening/releasing the nut (3) upon the throttle lever.

Position of throttle lever:



- engine power increases

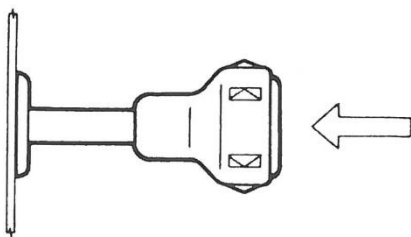


- engine power decreases

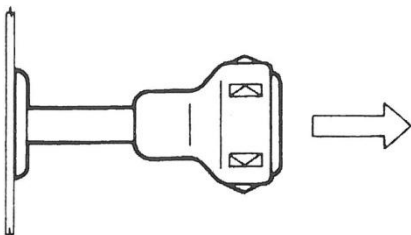
Z 143 L

The fuel mixture is controlled by the mixture controlled of mixture lever (red) (Fig. 76-1, item 4).

The movement of mixture controller is transferred to engine mixture control (5) by teleflex cable. Pushing the mixture controller causes the engine mixture richer while pulling leans the mixture. The fuel supply is at the last phase of mixture leaning turned off.



- mixture is getting rich



- mixture is getting lean

EFFECTIVITY: All

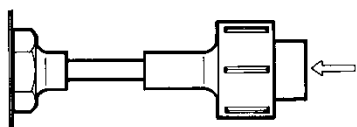
Z 143 LSi

The fuel mixture is controlled by the mixture controlled of mixture lever (red) (Fig. 76-1A, item 4).

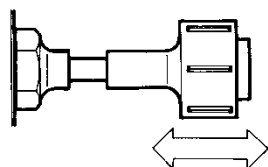
The movement of mixture controller is transferred to engine mixture control (5) by bowden cable. By pushing the controlled the mixture is enriched, by pulling the controlled the mixture is weakened. During the last stage of leaning, the fuel supply to the engine is stopped. The connecting rod must be first unlocked. It is necessary to press and hold the button in the centre of the controller to be able to enrich or weak the mixture.

Mixture fine-tuning is done by rotating the controller by rotating the controller clockwise the mixture is enriched by rotating the controller anticlockwise the mixture is weakened.

Position of mixture control:

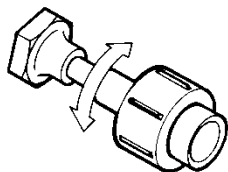


- unlocking the controller



← mixture is getting rich

→ mixture is getting weak

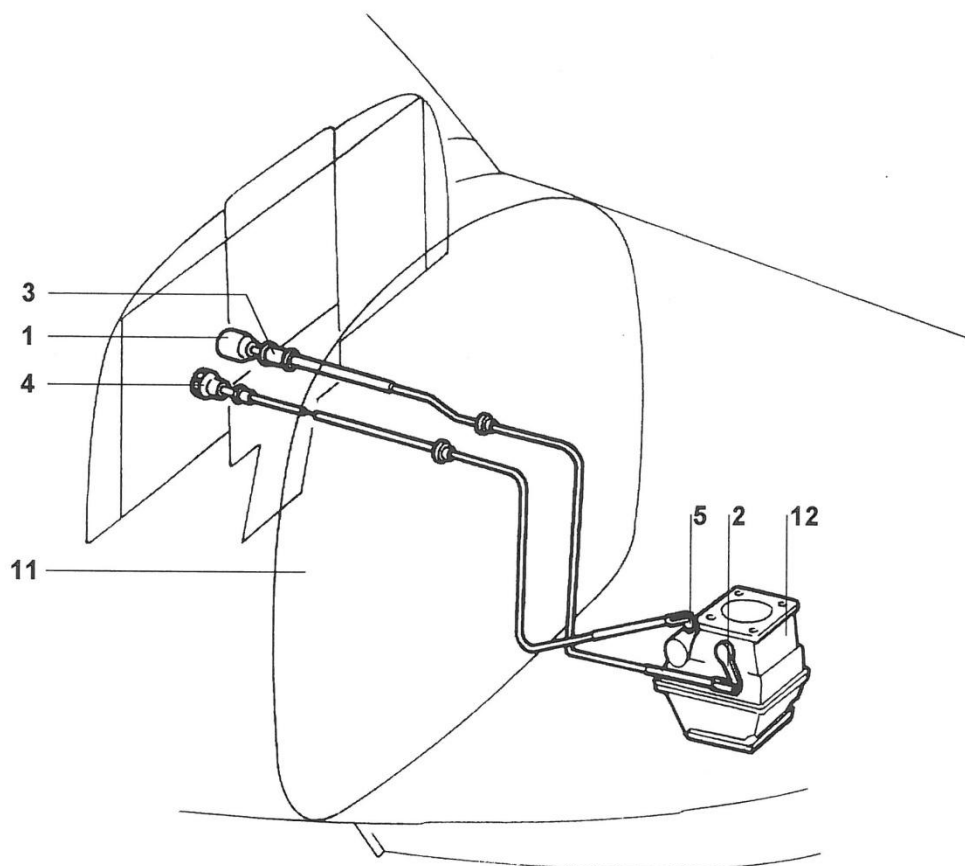


- mixture fine-tuning

EFFECTIVITY: All

76-10-00

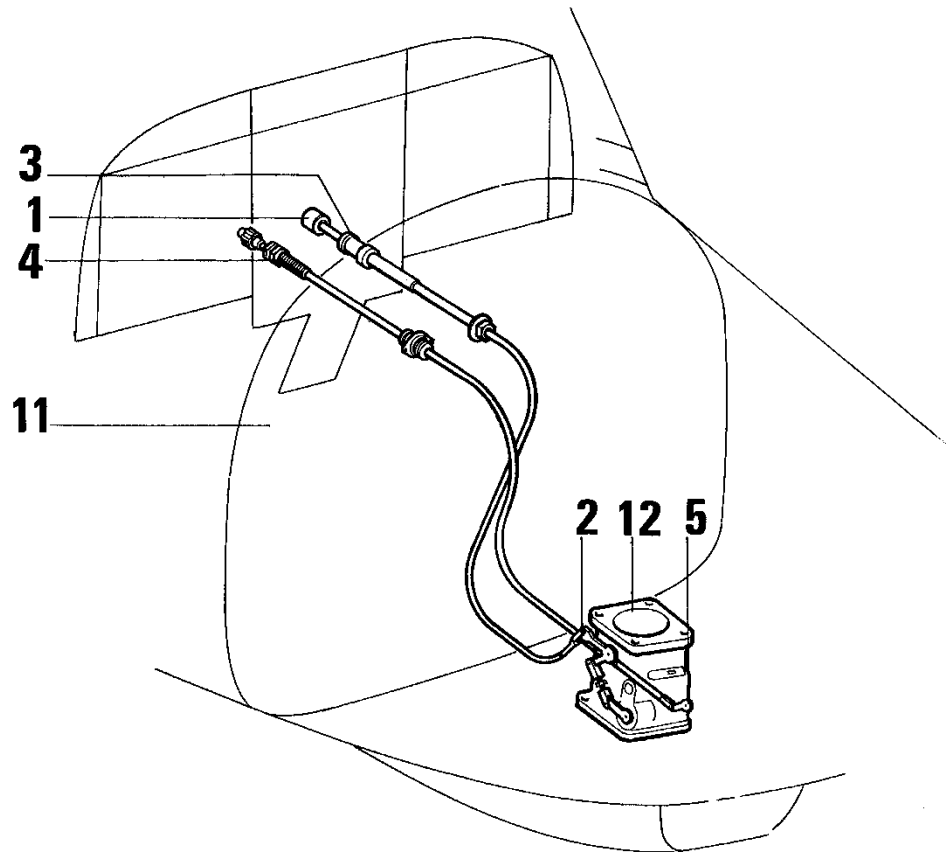
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- 1 ... throttle lever
- 2 ... throttle control lever
- 3 ... nut
- 4 ... mixture lever
- 5 ... mixture control lever

For information only:
11 ... firewall
12 ... carburetor

Fig. 76-1 Throttle and mixture control



- 1 ... throttle lever
- 2 ... throttle control lever
- 3 ... nut
- 4 ... mixture lever Vernier
- 5 ... mixture control lever

For information only:

- 11 ... firewall
- 12 ... injector

Fig. 76-1A Throttle and mixture control

MAINTENANCE

REMOVAL / INSTALLATION

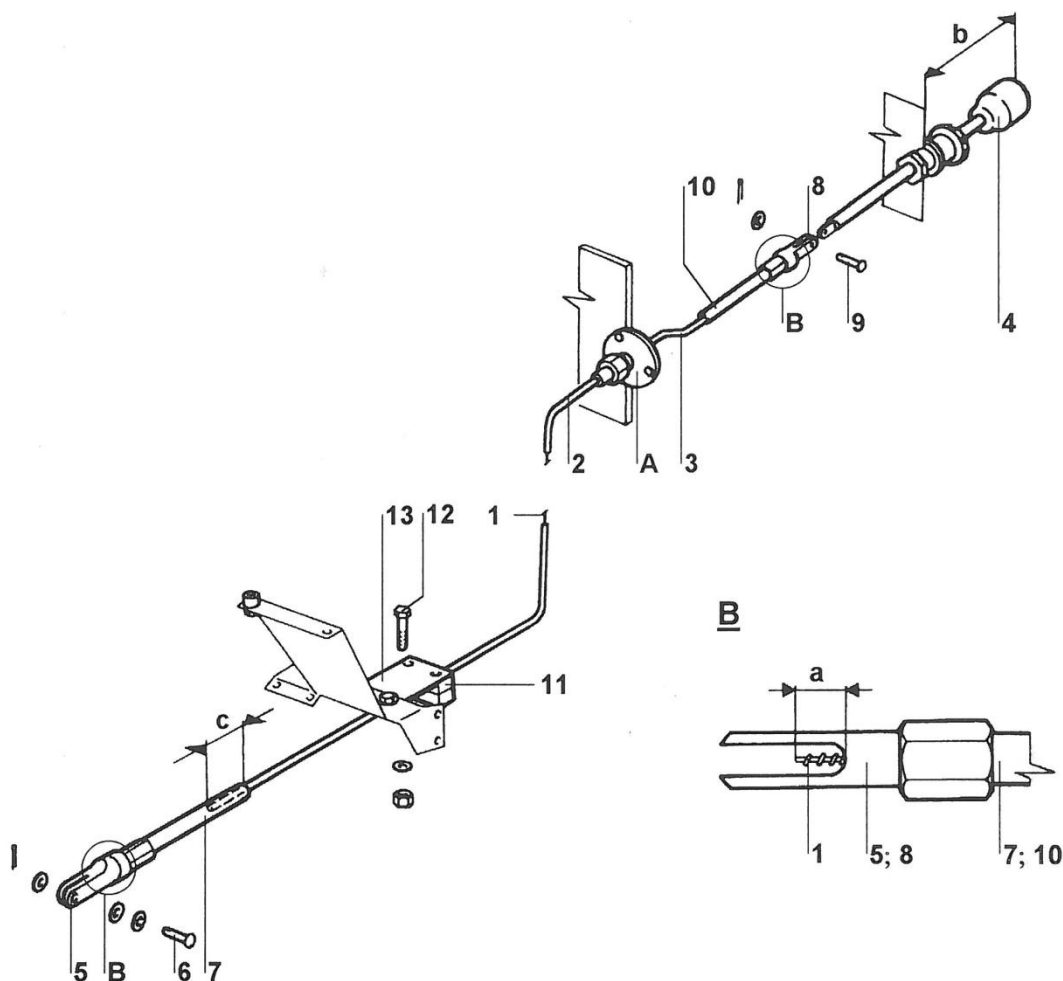
REMOVAL OF THROTTLE CONTROL

Preparatory works

- a) Open side cowlings (Fig. 71-1 or 71-1A, item 4).
- b) Set the fwd seats to very rear position.

a) Removal of teleflex cable with tubes of throttle control

- a) Push the throttle lever (Fig. 76-2, item 4) to the console.
- b) Pull cotter pin out and slide pin (6) off the suspension to disjoin the fork (5) from the throttle control lever.
- c) Unlock and unscrew for (5) from the guide (7) and remove guide from the fwd tube (2).
- d) Remove screws (12) from the support (11) to release fwd tube (2).
- e) Unlock and unscrew cap nut (Fig. 61-4, item 5).
- f) Pull cotter pin out remove washer, and slide pin (9) off the suspension to disjoin fork (Fig. 76-2, item 8) from the shaft of power control (4).
- g) Unlock and unscrew fork (8) from the guide (10). Remove guide from the aft tube (3).
- h) Pull the teleflex cable (1) from the tube. Pull the fwd (2) and rear (3) tubes from the bushing (A) in firewall to the space of engine compartment.



A ... bushing in firewall

B ... overhanging of teleflex cable to fork (5; 8)

a ... overhanging of teleflex cable to the forks; a = 10 mm (0,4 in)

b ... distance between face of throttle lever and console; b = 120 mm (4,72 in)

c ... length of insertion of tube to guide; c = 35 mm (1,4 in)

1 ... teleflex cable

2 ... fwd tube

3 ... rear tube

4 ... throttle lever

5 ... fork

6 ... pin

7 ... guide

8 ... fork

9 ... pin

10 ... guide

11 ... support

12 ... screw

13 ... flat spring

Fig. 76-2 Guidance of teleflex cable of throttle control

INSTALLATION OF THROTTLE CONTROL

- a) Insert rear insertion piece and rear tube (3) into bushing body from the front side.
- b) Insert teleflex cable (1) greased with Aero Shell Grease 22 + 3 % MOLYKOTE grease into rear tube (3).
- c) Provide bushing body from fwd side with ring, fwd insertion piece. Screw and tighten the cap nut with 20 Nm (14.8 lbft) torque.
- d) Make sure the center punches of tubes (2, 3) are about 5 to 7 mm (dimension a) from the face of insertion pieces.
- e) Lock the cap nut with safety wire (A).
- f) Join teleflex cable (Fig. 76-2, item 1) with the shaft of power control:
 - insert guide (10) upon the aft tube (3) and insert fork (8) upon teleflex cable (1) to overhang for about 100 mm, i. e. 0,4 in (dimension a).
 - screw the guide (10) upon the fork (8) and lock it after tightening with safety wire
 - join fork (8) by means of pin (9) with shaft of throttle control (4). Provide pin with washers and lock the joint with cotter pin.
- g) Join the fwd tube (2) to engine console:
 - provide fwd tube with support (11) and join it to two flat springs by screws (12) with washers and nuts.
- h) Set the throttle lever (4) to be with its face 120 mm, i. e. 4,72 in (dimension b) from the console.
- i) Insert guide (7) upon fwd tube (2) and fork (5) upon teleflex cable (1).
- j) Join the fork (5) by pin (6) provided with washers to the power control lever set to TAKE-OFF POWER. Lock the joining pin with washers by stainless steel cotter pin.
- k) Screw the guide (7) upon the fork (5) and lock it after tightening with safety wire.

NOTE

The teleflex cable should overhand into the fork (5) for about 10 mm, i. e. 0,4 in (dimension a). The fwd tube (2) should be inserted into the guide (7) for about 35 mm, i. e. 1,4 in (dimension c).

Final works

- a) Adjust power control at idle run, i. e. at 600 RPM after engine warm-up:
 - push the propeller controller to the very end to maximum propeller speed and set prescribed
 - switch off the engine. Set the throttle lever end stop at the injector for the current throttle control position.
- b) Start up the engine and check correct setting of power control.
- c) Shut side engine cowlings (Fig. 71-1, item 4).

EFFECTIVITY: All

REMOVAL OF MIXTURE CONTROL - Z 143 L

Preparatory works

- a) Open side engine cowlings (Fig. 71-1, item 4).
- b) Set fwd seats to very rear position.

Removal of teleflex cable of mixture control with tubes

- a) Push the mixture controller (Fig. 76-3, item 4) to the console.
- b) Disjoin removing cotter pin, washer and pin (6) from the suspension the fork of mixture control.
- c) Unlock and unscrew the fork (5) from the guide (8). Remove guide from the fwd tube (2).
- d) Release removing the screws (10) from the support (9), the fwd tube (2) from the holder.
- e) Unlock and unscrew the cap nut (Fig. 61-4, item 5).
- f) Unlock and release the nut (Fig. 76-3, item 11), the mixture controller pushrod is provided with milled flats for wrench to enable releasing the nut/cable. Unscrew threaded end of teleflex cable (1) from the pushrod of mixture controller (4).
- g) Pull the teleflex cable (1) from the tubes into the cockpit.
- h) Pull fwd (2) and rear (3) tubes from the bushing (A) in firewall into the engine compartment.

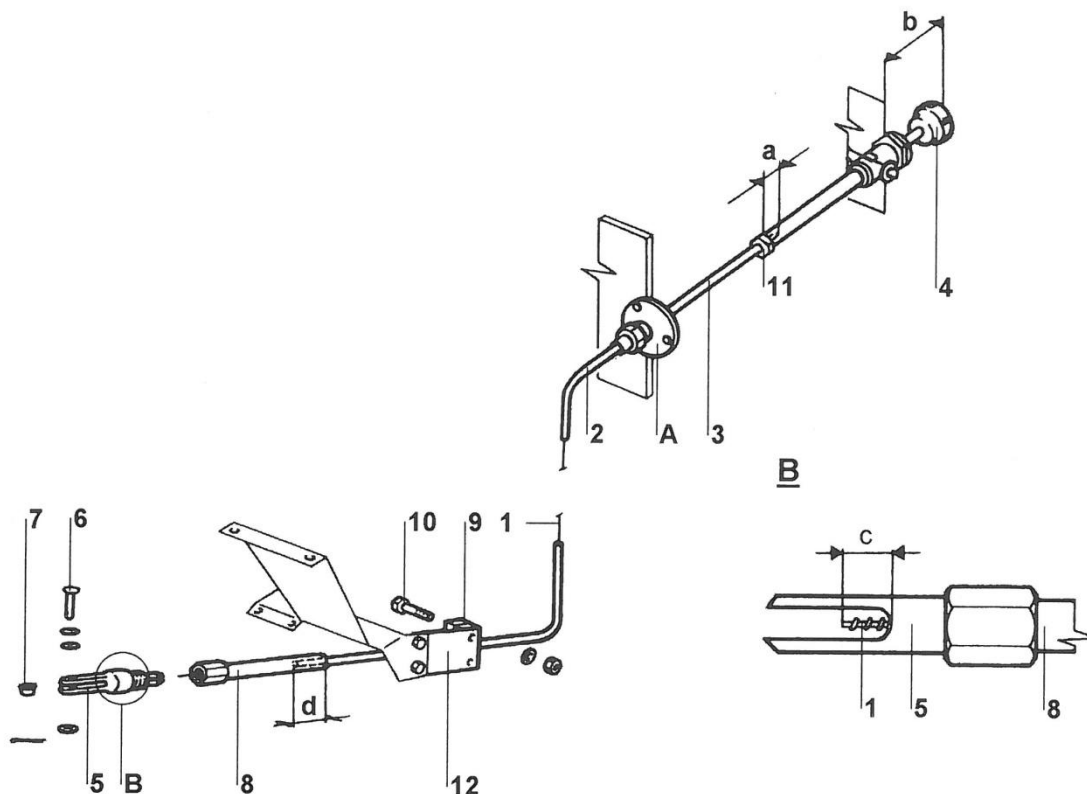
REMOVAL OF MIXTURE CONTROL - Z 143 LSi

Preparatory works

- a) Open side engine cowlings (Fig. 71-1A, item 4).
- b) Set fwd seats to very rear position.

Removal of bowden cable of mixture control

- a) Push the mixture controller (Fig. 76-3A, item 1) to the console.
- b) Disjoin removing cotter pin, washer, and pin (6) from the suspension the fork of mixture control (5).
- c) Unscrew the fork (5) from the connecting rod (12).
- d) Release the bowden cable from its attachment:
 - remove the screw (10) from the supporting (9)
 - remove the strip (4) from the hose (3) on the firewall, remove the strips from the airframe
 - remove the hoses (3) from the bushing.
- e) Loosen the nut (11).
- f) Pull the mixture controller toward yourself.



A ... bushing in firewall

B ... overhanging of teleflex cable to fork

a ... length of screwed in teleflex cable in the mixture control pushrod; a = 12 mm (0,5 in)

b ... distance between face of mixture controller and console; b = 47,5 mm (1,9 in)

c ... overhanging of teleflex cable into fork; c = 10 mm (0,4 in)

d ... insertion of fwd tube into guide; d = 35 mm (1,4 in)

1 ... teleflex cable

7 ... insertion piece

2 ... fwd tube

8 ... guide

3 ... rear tube

9 ... support

4 ... mixture controller

10 ... screw

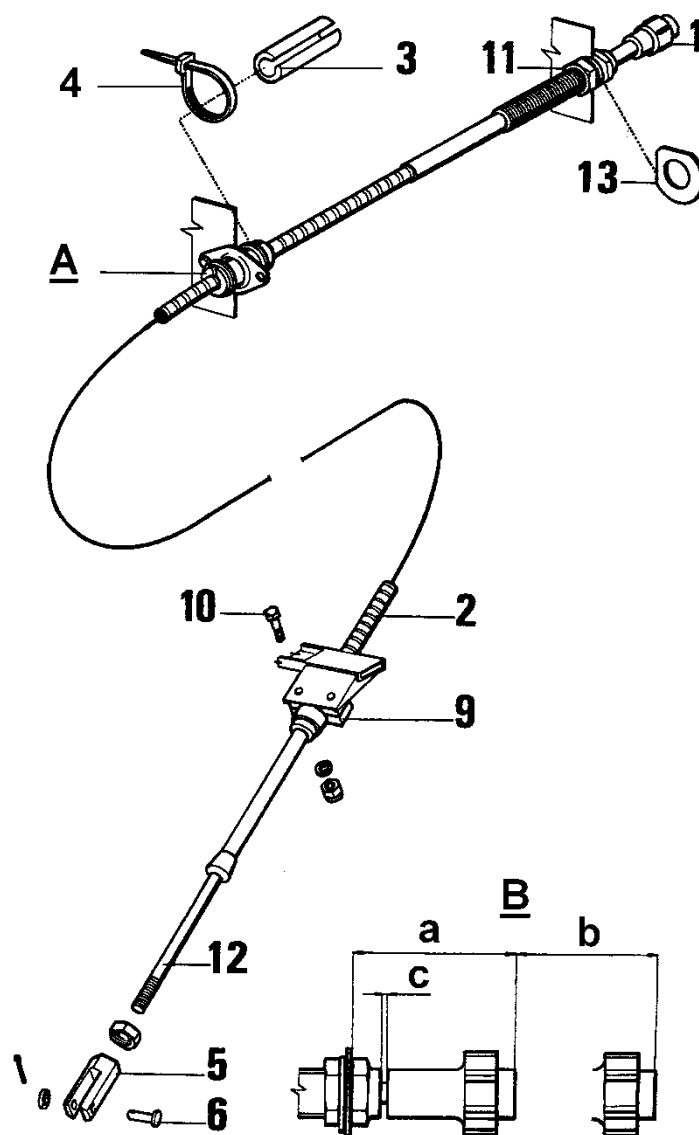
5 ... fork

11 ... nut

6 ... pin

12 ... flat springs

Fig. 76-3 Guidance of teleflex cable of mixture control



A ... bushing in firewall

B ... description of the controller

a ... length between end of mixture controller and panel (rich mixture), a = 66 mm

b ... length between end of mixture controller and panel (weak mixture)= a+b; b = 55 mm

c ... play between controller and nut, c = 1,5 mm

1 ... Vernier controller

2 ... bowden cable

3 ... hose

4 ... strip

5 ... fork

6 ... pin

7 ... -

8 ... -

9 ... support

10 ... screw

11 ... nut

12 ... guide

13 ... washer

Fig. 76-3A Guidance of bowden cable of mixture control

INSTALLATION OF MIXTURE CONTROL - Z 143 L

- a) Insert from front side rear insertion piece and rear tube (3) into the bushing body.
- b) Insert teleflex cable (1) greased with Aero Shell Grease 22 + 3% MOLYKOTE grease into the rear tube (3) with the threaded end to the mixture controller.
- c) Provide bushing body from the fwd side with ring, fwd tube (2) and insertion piece. Screw in the cap nut and tighten it with 20 Nm (14,8 lbft) torque.
- d) Make sure if the center punches upon the tubes (2, 3) are 5 to 7 mm, i.e. 0,20 to 0,28 in (dimension a) from the faces of insertion pieces.
- e) Lock the cap nut with safety wire (A).
- f) Join teleflex cable (Fig. 76-3, item 1) with the pushrod of mixture controller (4):
 - screw the nut (11) and insert tab washer upon threaded part of teleflex cable (1)
 - screw 12 mm, i.e. 0,5 in (dimension a) of threaded part of teleflex cable into pushrod of mixture controller (4)
 - tighten the nut (11) with recommended 6 to 7,2 Nm (4,4 to 5,3 lbft) torque to the pushrod of mixture controller and lock it with tab washer.
- g) Join the fwd tube (2) to the engine console:
 - provide fwd tube with support (9) and join it to two flat springs with screws (10) provided with washers and nuts.
- h) Adjust mixture controller (4) to maintain distance between face of controller and console at 47,5 mm, i.e. 1,9 in (dimension b).
- i) Insert the guide (8) upon fwd tube (2) and the fork (5) upon teleflex cable (1).
- j) Join fork (5) with insertion piece (7) by pin (6) with washers to the lever of mixture control set to „RICH“ position. Lock the pin with washers by stainless steels cotter pin.
- k) Screw the guide (8) upon the fork (5) and lock it as soon as it is tightened with safety wire.

NOTE

The teleflex cable should overhang into the fork (5) for about 10 mm, i.e. 0,4 in (dimension c). 35 mm, i.e. 1,4 in (dimension d) of fwd tube (2) should be inserted into the guide (8).

Final works

- a) Check serviceability of engine mixture control.
- b) Shut side engine cowlings (Fig. 71-1, item 4).

EFFECTIVITY: All

INSTALLATION OF MIXTURE CONTROL - Z 143 LSi

- a) Grease the contact surfaces of all mobile parts with Aero Shell Grease 22 with MOLYKOTE.
- b) Thread the mixture control through the hole in the console under the instrument panel and put on the washer (13) and the nut (11).
- c) Thread the control assembly through the bushing in the firewall.
- d) Tighten the nut (11) so that the position of mixture controller corresponds to the Detail B. Secure the nut with paint (threadlocker) (C 2001/8140).

NOTE

Set the washer (13) according the Fig. 76-3A.

- e) Attachment of the bowden cable (2):
 - insert the hose (3) into the firewall bushing and secure it by the strip (4)
 - set the supporting part (9) and use the screw (10) attach it to the engine console
 - use the strips to fasten the bowden cable to the frame.
- f) Screw the fork (5) on the guide (12) and use the pin (6) to attach it to the mixture control lever. The lever should be set to "RICH" position. Put the washer on the pin and secure it with a stainless cotter.

Final works

- a) Check serviceability of engine mixture control.
- b) Shut side engine cowlings (Fig. 71-1A, poz. 4).

APPROVED REPAIRS

REPAIRS OF THROTTLE AND MIXTURE CONTROLS

Fault	Remedy
1) Faulty flap springs (Fig. 76-2, item 13; Fig. 76-3, 3A item 12): cracks, deformation.	Replace faulty springs
2) Faulty tubes of control being worn out and/or deformed at the spot of tube joining.	Replace faulty tube.
3) Faulty forks with cracks, deformations, and dented holes.	Replace faulty fork.
4) Cracks in pins.	Replace cracked pins.
5) Increased distance of center punches upon tubes from the faces of insertion piece	Remove shifted tube, repair roller end or replace faulty tube.
6) Faulty bowden cable (Fig. 76-3A, item 2).	Replace the mixture control.