

CHAPTER

27

FLIGHT CONTROLS

CONTENT

Name of item	Chapter Section/Subsection Subject	Page
GENERAL	27-00-00	27-1
AILERON CONTROL	27-10-00	27-2
DESCRIPTION AND OPERATION		27-2
MAINTENANCE		27-11
REMOVAL / INSTALLATION		27-11
Removal of aileron bell cranks in wing		27-11
Installation of aileron bell cranks in wing		27-13
ADJUSTMENT / TESTING		27-14
Adjustment of aileron control		27-14
APPROVED REPAIRS		27-17
Repair of aileron bell cranks in wing		27-17
RUDDER CONTROL	27-20-00	27-18
DESCRIPTION AND OPERATION		27-18
MAINTENANCE		27-23
REMOVAL / INSTALLATION		27-23
Removal of rudder control cables		27-23
Installation of rudder control cables		27-23
ADJUSTMENT / TESTING		27-25
Adjustment of rudder control		27-25
APPROVED REPAIRS		27-26
Reaming of holes in break pedal hinges		27-26
RUDDER TRIM TAB CONTROL	27-21-00	27-28
DESCRIPTION AND OPERATION		27-28
ELEVATOR CONTROL	27-30-00	27-29
DESCRIPTION AND OPERATION		27-29
MAINTENANCE		27-37
ADJUSTMENT / TESTING		27-37
Adjustment of elevator control		27-37
PITCH TRIM TAB CONTROL	27-31-00	27-38
DESCRIPTION AND OPERATION		27-38
MAINTENANCE		27-43
REMOVAL / INSTALLATION		27-43
Removal of cables of pitch trim tab		27-43
Installation of cables of pitch trim tab		27-46
ADJUSTMENT / TESTING		27-48
Adjustment of pitch trimmning		27-48

EFFECTIVITY: All

27 - CONTENTS

page 1
2011-02-02

Name of item	Chapter Section/Subsection Subject	Page
WING FLAP CONTROL	27-50-00	27-49
DESCRIPTION AND OPERATION		27-49
MAINTENANCE		27-57
REMOVAL / INSTALLATION		27-57
Removal of bell cranks of flap control in wing		27-57
Installation of bell cranks of flap control in wing		27-58
Removal of flap control cables		27-60
Installation of flaps control cables		27-60
ADJUSTMENT / TESTING		27-61
Adjustment of wing flap control		27-61
APPROVED REPAIRS		27-62
Repair of flap control bell cranks in wing		27-62
LOCKING OF CONTROLS	27-70-00	27-63
DESCRIPTION AND OPERATION		27-63

27 - CONTENTS

page 2
2011-02-02

EFFECTIVITY: All

GENERAL

The airplane is provided with twin controls that enable air training. The airplane is equipped with manual (lockable) and pedal controls.

The airplane control incorporates ailerons, rudder, elevator, nose wheel steering and wing flap control.

The airplane is equipped with rudder and elevator trim tab control.

Survey of permissible allowances in airplane flight controls

1. Permissible allowance, measured at the end of control stick with ailerons and elevator locked are issued in section 27-10-00, ADJUSTMENT / TESTING (Fig. 27-6).
2. Permissible allowance, measured at the end of pedal controls with rudder locked are issued in section 27-20-00, ADJUSTMENT / TESTING.
3. Minimum between moving parts of flight controls and other airplane structure elements and minimum distance between movable parts of airplane controls are issued in sections 27-10-00, 27-20-00, 27-30-00 and 27-50-00 ADJUSTMENT / TESTING and further on in section 27-31-00 ADJUSTMENT / TESTING.

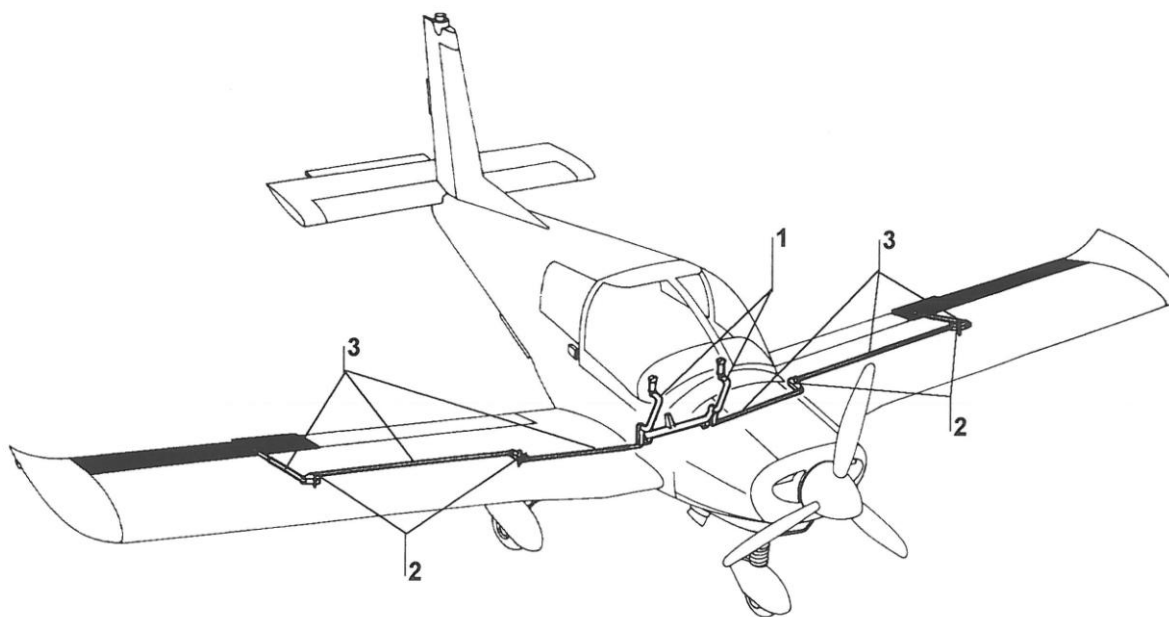
The issued distances are valid and the same for all flight control subassemblies.

AILERON CONTROL

DESCRIPTION AND OPERATION

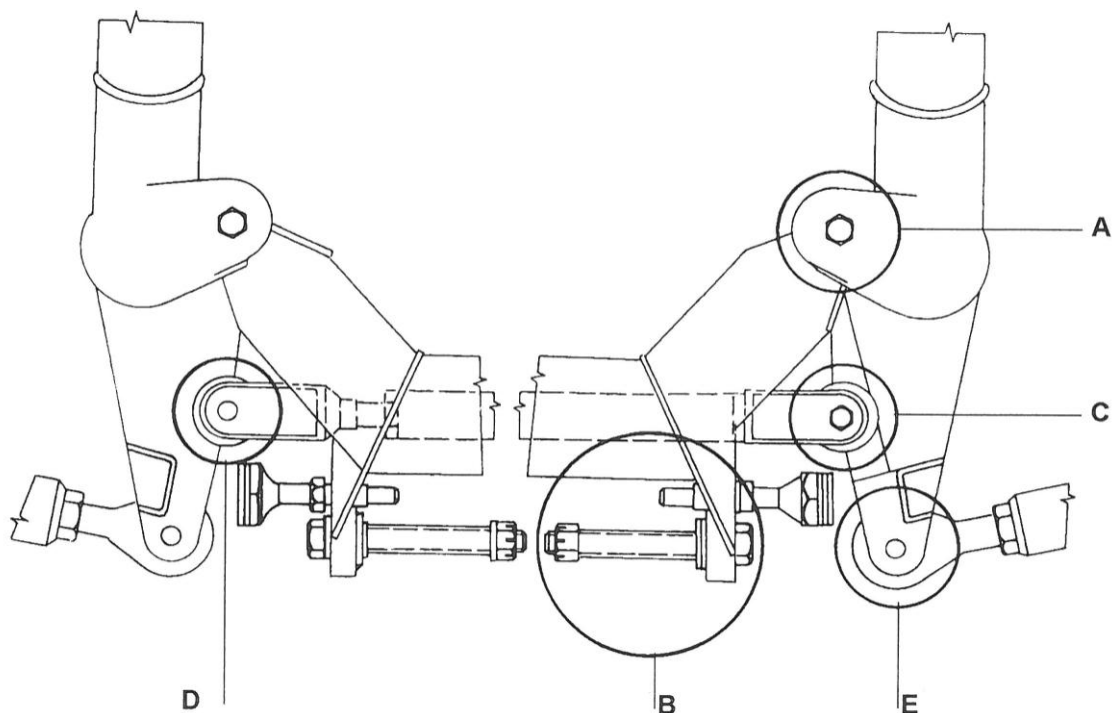
The ailerons are controlled by control sticks (Fig. 27-1, item 1) via bell cranks (2) and pushrods (3). The aileron control bell cranks are located upon main spars of wings.

The aileron deflects differentially.



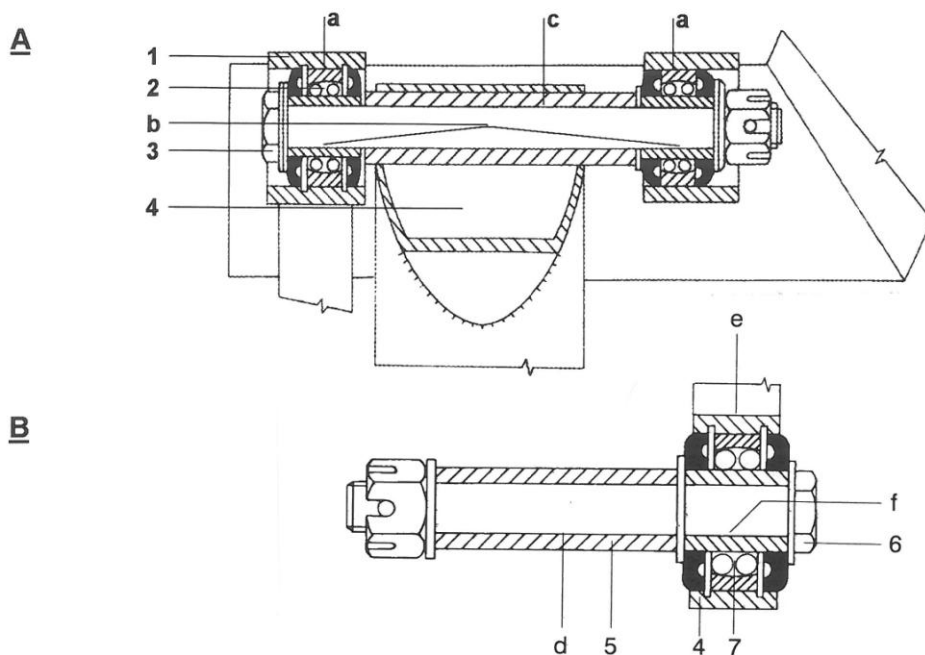
- 1 ... control sticks
- 2 ... bell crank
- 3 ... pushrod

Fig. 27-1 Aileron control



- A ... fitting of control stick in control stick mechanism
- B ... fitting of control stick mechanism in airframe structure
- C ... pushrod joint with control stick fixed bell crank
- D ... pushrod joint with control stick resettable bell crank
- E ... joining the control stick with aileron pushrod

*Fig. 27-2 Dimensions, allowances and play in control stick fitting
(page 1 of 4)*

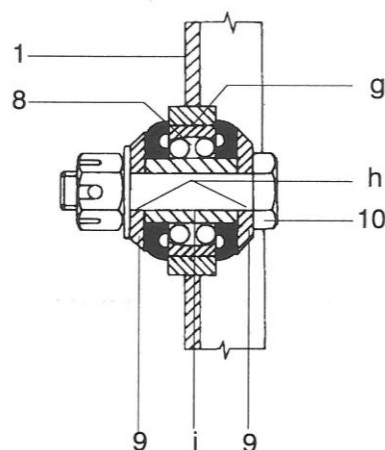


Joint	Item	Name	Dimensions (mm)			
			Original			Operation
			D1	T1	V min./max.	T2 max.
a	1	Control stick (L; R)	Ø 22 K6	+ 0,002 - 0,011	$\frac{P}{0,013}$	+ 0,005
	2	Bearing	Ø 22	+ 0,002 - 0,011		- 0,020
b	2	Bearing	Ø 8	+ 0,002 - 0,010	$\frac{P}{0,016}$	+ 0,005
	3	Fitted bolt	Ø 8 g6	- 0,005 - 0,014		- 0,020
c	4	Control stick mechanism	Ø 8 H7	+ 0,015 0	$\frac{0,005}{0,029}$	+ 0,020
	3	Fitted bolt	Ø 8 g6	- 0,005 - 0,014		- 0,020
d	5	Tube	Ø 8 H8	+ 0,022 0	$\frac{0,013}{0,057}$	+ 0,030
	6	Fitted bolt	Ø 8 f8	- 0,013 - 0,035		- 0,045
e	4	Control stick mechanism	Ø 22 K6	+ 0,002 - 0,011	$\frac{P}{0,013}$	+ 0,005
	7	Bearing	Ø 22	+ 0,002 - 0,011		- 0,020
f	7	Bearing	Ø 8	+ 0,002 - 0,010	$\frac{0,003}{0,037}$	+ 0,005
	6	Fitted bolt	Ø 8 f8	- 0,013 - 0,035		- 0,045

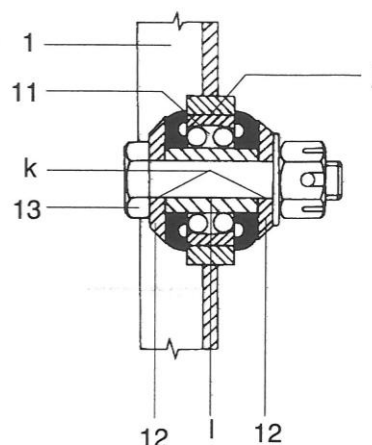
Fig. 27-2 Dimensions, allowances and play in control stick fitting
(page 2 of 4)

EFFECTIVITY: All

C



D



Joint	Item	Name	Dimensions (mm)			
			Original			Operation
			D1	T1	V min./max.	T2 max.
g	1	Control stick (L)	Ø 19 K6	+ 0,002 - 0,011	R	
	8	Bearing	Ø 19	+ 0,002 - 0,011		
h	9	Fork	Ø 6 H8	+ 0,018 0	$\frac{0,010}{0,046}$	+ 0,025
	10	Fitted bolt	Ø 6 f8	- 0,010 - 0,028		- 0,035
i	8	Bearing	Ø 6	+ 0,002 - 0,010	$\frac{0}{0,030}$	+ 0,005
	10	Fitted bolt	Ø 6 f8	- 0,010 - 0,028		- 0,035
j	1	Control stick (R)	Ø 19 K6	+ 0,002 - 0,011	R	
	11	Bearing	Ø 19	- 0,013 - 0,035		
k	12	Fork	Ø 6 H8	+ 0,018 0	$\frac{0,010}{0,046}$	+ 0,025
	13	Fitted bolt	Ø 6 f8	- 0,010 - 0,028		- 0,035
l	11	Bearing	Ø 6	+ 0,002 - 0,010	$\frac{0}{0,030}$	+ 0,005
	13	Fitted bolt	Ø 6 f8	- 0,010 - 0,028		- 0,035

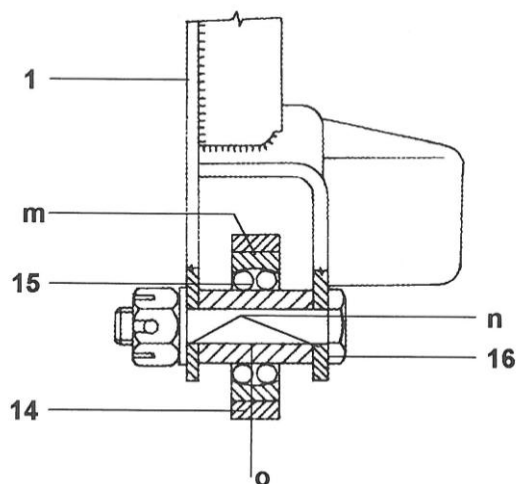
Fig. 27-2 Dimensions, allowances and play in control stick fitting
(page 3 of 4)

EFFECTIVITY: All

27-10-00

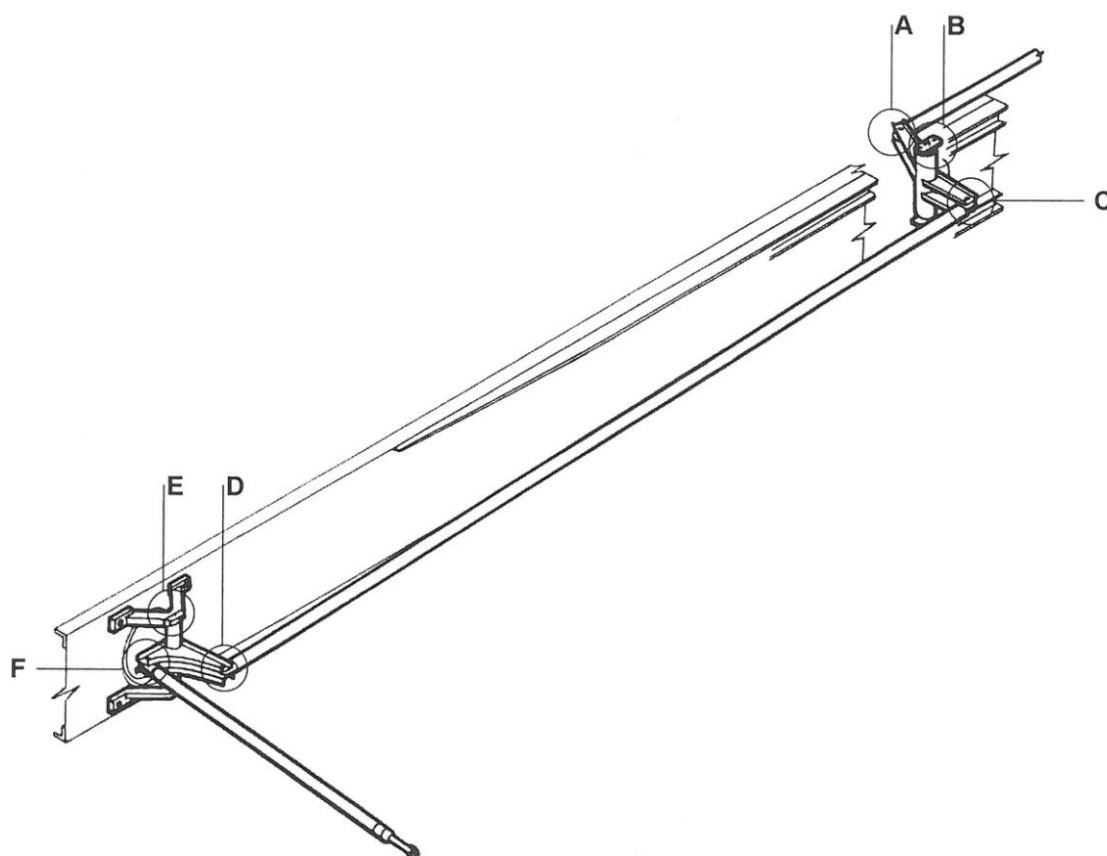
page 27 - 5
2011-02-02

E



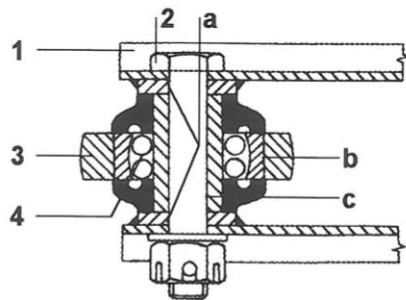
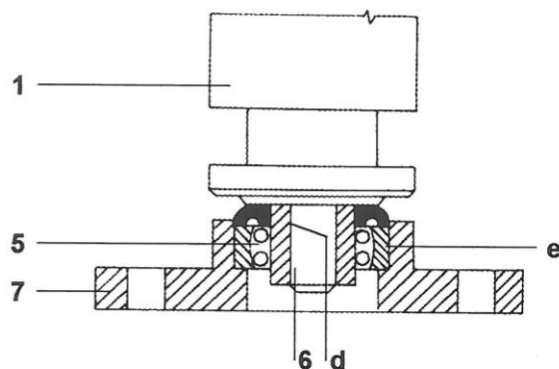
Joint	Item	Name	Dimensions (mm)			
			Original			Operation
			D1	T1	V min./max.	T2 max.
m	14	Eye	Ø 19 K6	+ 0,002 - 0,011	R	
	15	Bearing	Ø 19	+ 0,002 - 0,011		
n	1	Control stick (L, R)	Ø 6 H8	+ 0,018 0	$\frac{0,010}{0,046}$	+ 0,025
	16	Fitted bolt	Ø 6 f8	- 0,010 - 0,028		- 0,035
o	15	Bearing	Ø 6	+ 0,002 - 0,010	$\frac{0}{0,030}$	+ 0,005
	16	Fitted bolt	Ø 6 f8	- 0,010 - 0,028		- 0,035

*Fig. 27-2 Dimensions, allowances and play in control stick fitting
(page 4 of 4)*



- A ... joint of pushrod with bell crank at the wing root
- B ... bell crank suspension in bearing at the wing root
- C ... joint of bell crank with pushrod at the wing root
- D ... joint of pushrod with bell crank between ribs No. 8 and 9
- E ... bell crank suspension in consoles between ribs No. 8 and 9
- F ... joint of bell crank with pushrod between ribs No. 8 and 9

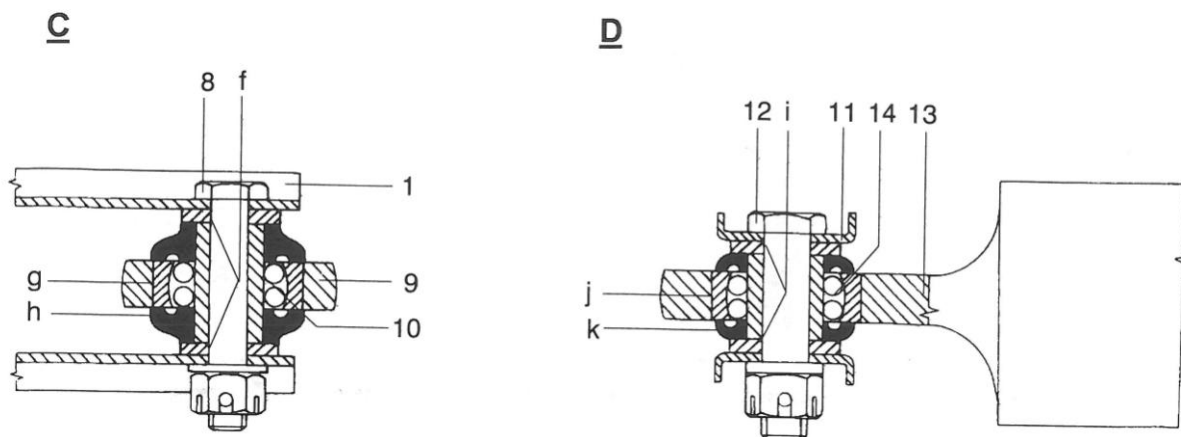
*Fig. 27-3 Dimensions, allowances and play in aileron control suspension
(page 1 of 4)*

A

B


Joint	Item	Name	Dimensions (mm)			
			Original			Operation
			D1	T1	V min./max.	T2 max.
a	1	Bell crank (L, R)	∅ 6 H8	+ 0,018 0	$\frac{0,010}{0,046}$	+ 0,025
	2	Fitted bolt	∅ 6 f8	- 0,010 - 0,028		- 0,035
b	3	Eye	∅ 19 K6	+ 0,002 - 0,011	R	
	4	Bearing	∅ 19	+ 0,002 - 0,011		
c	4	Bearing	∅ 6	+ 0,002 - 0,010	$\frac{0}{0,030}$	+ 0,005
	2	Fitted bolt	∅ 6 f8	- 0,010 - 0,028		- 0,035
d	5	Bearing	∅ 6	+ 0,002 - 0,010	$\frac{0}{0,020}$	+ 0,005
	6	Centering pin	∅ 6 h8	0 - 0,018		- 0,025
e	7	Bushing	∅ 19 K6	+ 0,002 - 0,011	R	
	5	Bearing	∅ 19	+ 0,002 - 0,011		

Fig. 27-3 Dimensions, allowances and play in aileron control suspension
(page 2 of 4)

EFFECTIVITY: All



Joint	Item	Name	Dimensions (mm)			
			Original			Operation
			D1	T1	V min./max.	T2 max.
f	1	Bell crank (L, R)	Ø 6 H8	+ 0,018 0	$\frac{0,010}{0,046}$	+ 0,025
	8	Fitted bolt	Ø 6 f8	- 0,010 - 0,028		- 0,035
g	9	Eye	Ø 19 K6	+ 0,002 - 0,011	R	
	10	Bearing	Ø 19	+ 0,002 - 0,011		
h	10	Bearing	Ø 6	+ 0,002 - 0,010	$\frac{0}{0,030}$	+ 0,005
	8	Fitted bolt	Ø 6 f8	- 0,010 - 0,028		- 0,035
i	11	Bell crank (L, R)	Ø 6 H8	+ 0,018 0	$\frac{0,010}{0,046}$	+ 0,025
	12	Fitted bolt	Ø 6 f8	- 0,010 - 0,028		- 0,035
j	13	Eye	Ø 19 K6	+ 0,002 - 0,011	R	
	14	Bearing	Ø 19	+ 0,002 - 0,011		
k	14	Bearing	Ø 6	+ 0,002 - 0,010	$\frac{0}{0,030}$	+ 0,090
	12	Fitted bolt	Ø 6 f8	- 0,010 - 0,028		- 0,035

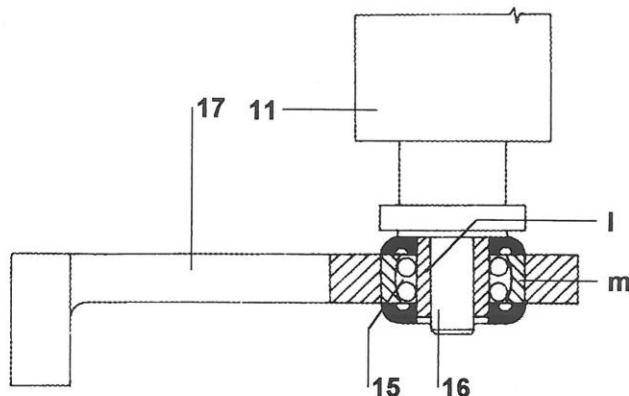
*Fig. 27-3 Dimensions, allowances and play in aileron control suspension
(page 3 of 4)*

EFFECTIVITY: All

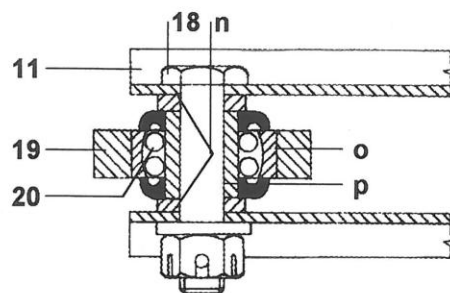
27-10-00

page 27 - 9
2011-02-02

E



F



Joint	Item	Name	Dimensions (mm)			
			Original			Operation
			D1	T1	V min./max.	T2 max.
I	15	Bearing	Ø 6	+ 0,002 - 0,010	0 0,020	+ 0,005
	16	Centering pin	Ø 6 h8	0 - 0,018		- 0,025
m	17	Console	Ø 19 K6	+ 0,002 - 0,011	R	
	15	Bearing	Ø 19	+ 0,002 - 0,011		
n	11	Bell crank (L, R)	Ø 6 H8	+ 0,018 0	0,010 0,046	+ 0,025
	18	Fitter bolt	Ø 6 f8	- 0,010 - 0,028		- 0,035
o	19	Eye	Ø 19 K6	+ 0,002 - 0,011	R	
	20	Bearing	Ø 19	+ 0,002 - 0,011		
p	20	Bearing	Ø 6	+ 0,002 - 0,010	0 0,030	+ 0,005
	18	Fitted bolt	Ø 6 f8	- 0,010 - 0,028		- 0,035

*Fig. 27-3 Dimensions, allowances and play in aileron control suspension
(page 4 of 4)*

MAINTENANCE

REMOVAL / INSTALLATION

REMOVAL OF AILERON BELL CRANKS IN WING

CAUTION

STORE SPACERS REMOVED DURING BELL CRANK REMOVAL TO ASSURE THEIR PROPER POSITIONING DURING BELL CRANK INSTALLATION TO WING AND PREVENTING THEIR MIX UP.

NOTE

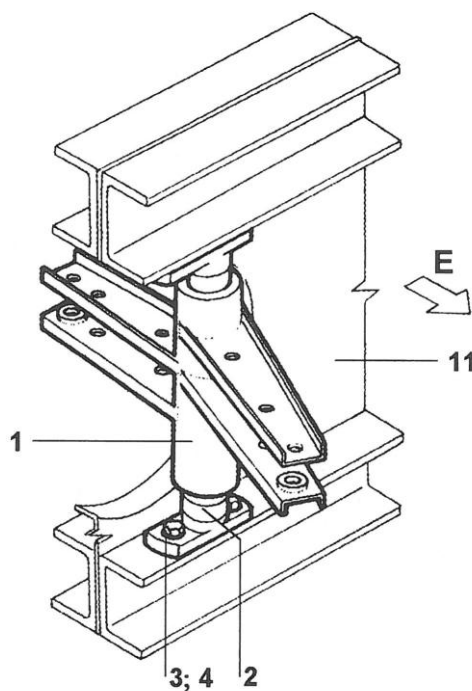
The bell crank (Fig. 27-4, item 1) is upon fwd side of main wing spar. The bell crank (Fig. 27-5, item 1) is located upon backward side of main wing spar.

Removal of bell cranks in port and starboard wings is similar.

The bell cranks are accessible after opening the access port doors in the bottom of wing.

1. Removal of aileron bell cranks at wing roots

- a) Remove bondings and pushrods from the bell crank (Fig. 27-4, item 1).
- b) Unscrew fitted bolts (3) and remove bell crank (1) with bearings (2) from the wing.



E ... direction of flight

1 ... bell crank (L; R)

2 ... bearing

3 ... fitted bolt

4 ... washer

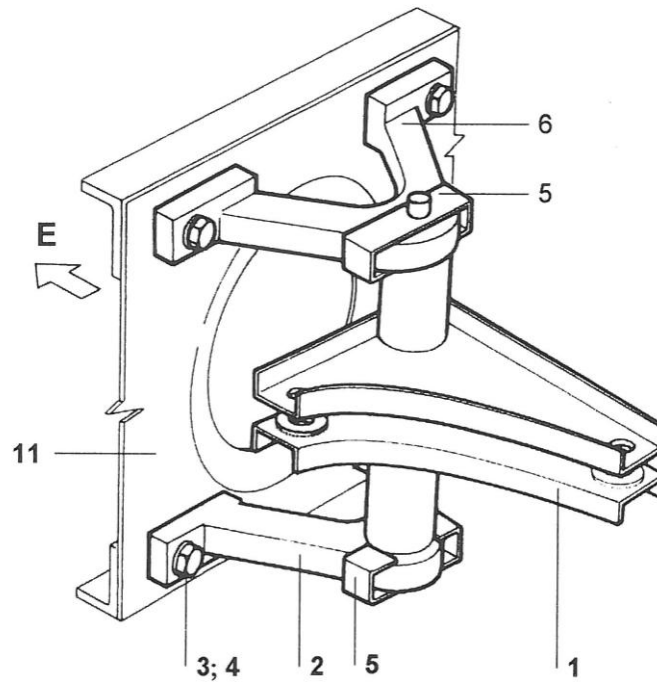
For information only:

11 ... main wing spar

*Fig. 27-4 Aileron control bell crank at wing root
(bell crank in left wing)*

2. Removal of aileron bell cranks between ribs No. 8 and 9

- Remove bondings and pushrods from the bell crank (Fig. 27-5, item 1).
- Unscrew fitted bolts (3) of bottom console (2) and remove bell crank with bottom console from wing.



E ... direction of flight

1 ... bell crank (L, R)

2 ... bottom console

3 ... fitted bolts

4 ... washer

5 ... clip

6 ... upper console

For information only:

11 ... main wing spar

*Fig. 27-5 Aileron control bell crank between ribs No. 8 and 9
(bell crank in left wing)*

EFFECTIVITY: All

INSTALLATION OF AILERON BELL CRANKS IN WING

CAUTION

INSERT, IF THE AILERON BELL CRANKS HAS BEEN PROVIDED WITH SPACERS TO LIMIT PLAY, THESE SPACER IN THE SAME NUMBER AND ORDER UPON BELL CRANK PINS.

GREASE CONSOLE BEARINGS BEFORE INSTALLATION WITH GREASE (subsection 05-21-00).

CHECK PROPER OPERATION AND SERVICEABILITY INCLUDING THEIR DEFLECTION OF AILERON CONTROL AFTER BELL CRANK INSTALLATION.

1. Installation of aileron control bell cranks at wing root

- a) Fit spacers and dust protection upon bell crank pins (Fig. 27-4, item 1).
- b) Fit bearings (2) upon bell crank pins (1).
- c) Insert bell crank (1) with bearings (2) between flange plates of main spar (11) with bolt holes (3).
- d) Screw bearings (2) by screws (3) to the main spar flange plates (11).
- e) Join pushrods and bonds to bell crank (1).

NOTE

The bell crank (1) having been installed, should be without axial play and move without seizing. Adapt, if necessary, the thickness and number of spacers upon bell crank lever.

2. Installation of aileron control bell cranks between No. 8 and 9

- a) Insert internal dust closures upon crank bell pin (Fig. 27-5, item 1).
- b) Insert bell crank (1) with its pin into the bearing of upper console (6) so taht they enable insertion of upper dust closure and clip (5).
- c) Insert bottom console (2) upon lower pin of bell crank (1).
- d) Insert lower external dust closure upon lower bell crank pin (1).
- e) Fit clip (5) upon lower console (2).
- f) Fit the lower console to enable protruding of bell crank pins (1) from the holes of upper and lower clips.
- g) Screw bolts (3), fixing lower console (2), into the nuts of main spar (11).
- h) Join bondings and pushrods to bell crank (1).

NOTE

The bell crank (1) should not exhibit any axial play and should not seize during revolving. Adapt thickness and number of spacers of bell crank pins if necessary.

ADJUSTMENT / TESTING

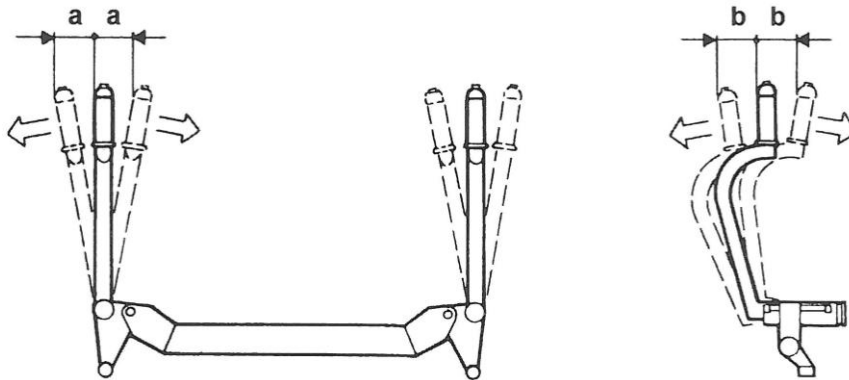
ADJUSTMENT OF AILERON CONTROL

Requirements

- a) The distance between fixed and movable part of flight controls should be at least 3 mm (0,12 in) and distance between movable parts in all positions should be at least 5 mm (0,2 in).
- b) The pushrods and bell cranks should move lightly and continuously.
- c) The aileron deflections should correspond to data issued in Fig. 08-4.

Play in manual controls

- a) The play in control stick should be measured at the tip of control stick with ailerons and elevator locked.
- b) Permissible play in control stick:
 - In transversal direction ± 2 mm ($\pm 0,08$ in); (Fig. 27-6, dimension a)
 - In longitudinal direction $\pm 2,5$ mm ($\pm 0,10$ in) (dimension b).



a ... play in transversal direction; a = max. 2 mm (0,08 in)
 b ... play in longitudinal direction; b = max. 2,5 mm (0,10 in)

Fig. 27-6 Play in control stick

- c) Remove excessive play as follows:
 - Check control stick play (Fig. 27-2) and determine joint with excessive play
 - Remove defect – roll in loose external bearing ring, replace faulty parts as bearings, pins, forks, and/or pushrod eye.

EFFECTIVITY: All

Control stick suspension

Position of Control Stick	Measurement	Adjustment
LEFT deflection	Distance between left control stick and left port side of fuselage: minimum 180 mm (7.1 in).	Two stops upon control stick mechanism
RIGHT deflection	Distance between right control stick and right port side of fuselage: minimum 180 mm (7.1 in).	
PUSHED	Distance between control stick and instrument panel: minimum 40 mm (1.6 in).	One stop upon the pushrod under fwd seats; one stop upon main fuselage beam.
PULLED	Distance of control stick from the front seat in very fwd position: minimum 5 mm (0,2 in).	

NOTE

Divide control stick deflections symmetrically between both limit positions maintaining the required aileron and elevator deflections.

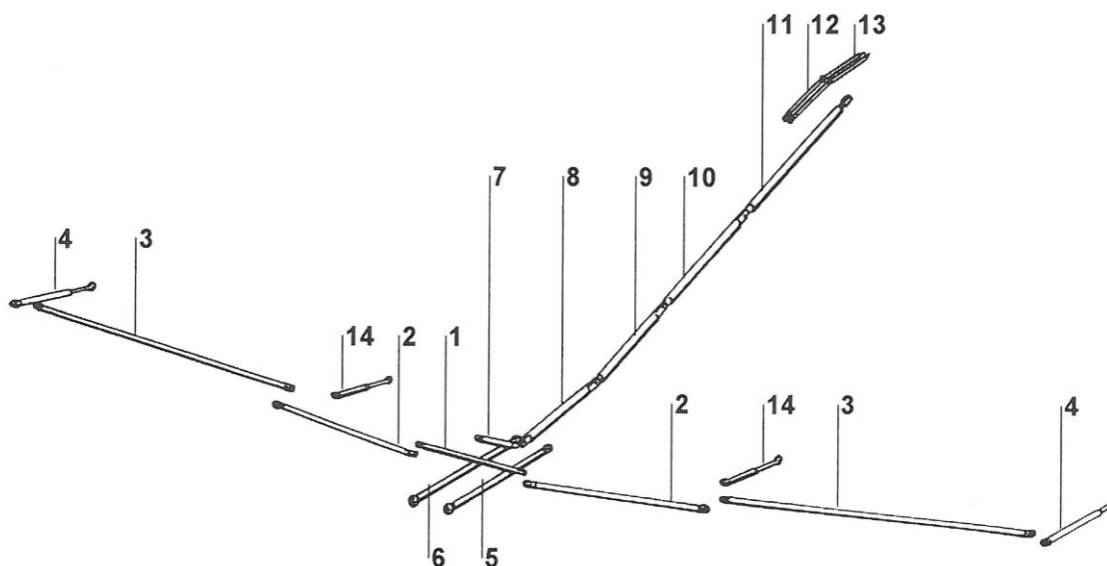
Check if both ailerons are in the middle position when the control stick is in neutral position.

EFFECTIVITY: All

27-10-00

page 27 - 15
2011-02-02

Length of control pushrods



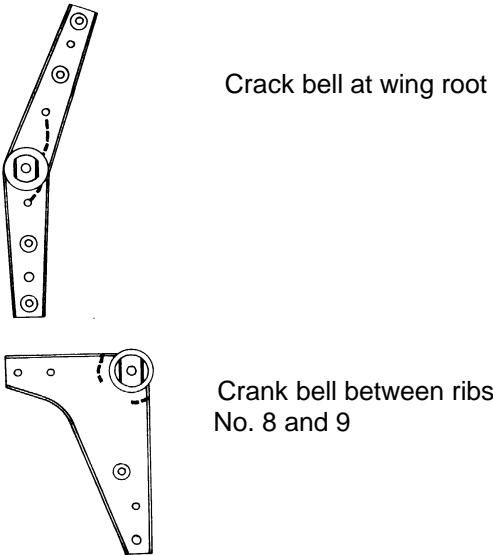
Item	Length of push (mm)		Adjustable range of pushrods		Recommended tightening torque				Note
					Lock nut of adjustable fork		Joining nut of pushrod		
	mm	in	mm	in	Nm	lbft	Nm	lbft	
1	520	20,472	± 8	± 0,32	20	14,8	9,5 to 11,5	7 to 8,5	Aileron control
2	1208	47,590	± 8	± 0,32	20	14,8			
3	1579	62,165	-----	-----	-----				
4	581	22,874	-----	-----	-----				
5	765	30,118	± 8	± 0,32	20	14,8			Rudder control (subsection 27-20-00)
6	725	28,543	± 8	± 0,32	20	14,8			
7	203	7,992	-----	-----	-----				Elevator control (subsection 27-30-00)
8	795	31,300	± 8	± 0,32	20	14,8			
9	1187	46,732	-----	-----	-----				
10	1306	51,417	-----	-----	-----				
11	1200	47,244	± 8	± 0,32	20	14,8	6 to 7,2	4,43 to 5,31	Pitch trim (subject 27-31-00)
12	334	13,150	-----	-----	-----				
13	355,5	14,000	+ 13,5 - 2,5	+ 5,32 - 0,10	6 to 7,2	4,4 to 5,3			
14	559	22,008	-----	-----	-----		9,5 to 11,5	7 to 8,5	Wing flap control (subsection 27-50-00)

Fig. 27-7 Control pushrods

EFFECTIVITY: All

APPROVED REPAIRS

REPAIRS OF AILERON BELL CRANKS IN WING

Fault	Remedy
1) Corrosion, faulty paint.	Remove corrosion with emery paper, repair defective paint (subject 51-72-00).
2) Cracks - spots of probable crack occurrence are marked by dashed line: 	Weld cracks.

Crack welding:

NOTE

Use 10x power magnifying glass to detect cracks in crank bells.
The crack welding of bell cranks may be carried out by authorized welder only.

- Remove paint in the vicinity of crack to have it metal clean there.
- Grind-off the crack to be flush; do not grind the crack vicinity.
- Weld crack by TIG method; use 1,5 or 1,6 mm Böhler DCMS – IG filler material or their equivalent for welding. Maintain the instructions issued in section 53-10-00, APPROVED REPAIRS, point c), TIG method during welding.
- Make check to detect cracks visually and by magnetic flaw detection.
- Repair faulty paint according to subsection 51-72-00.

EFFECTIVITY: All

27-10-00

page 27 - 17
2011-02-02

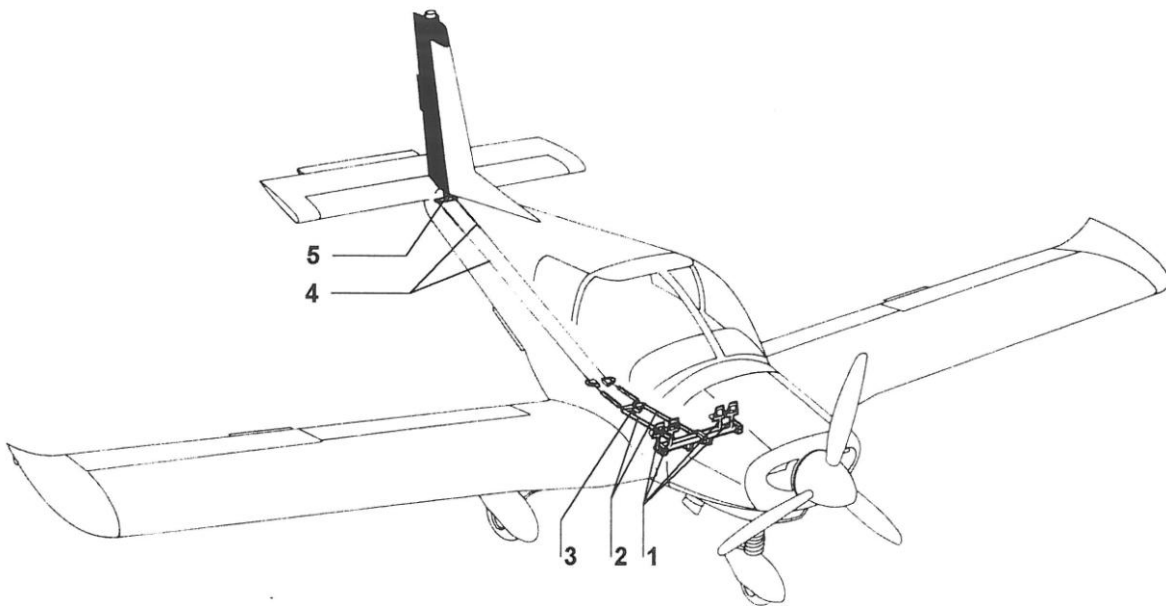
RUDDER CONTROL

DESCRIPTION AND OPERATION

The rudder is controlled by pedals (Fig. 27-8, item 1) via pushrods (2) intermediate bell crank (3), cables (4) and bell crank (5) upon rudder.

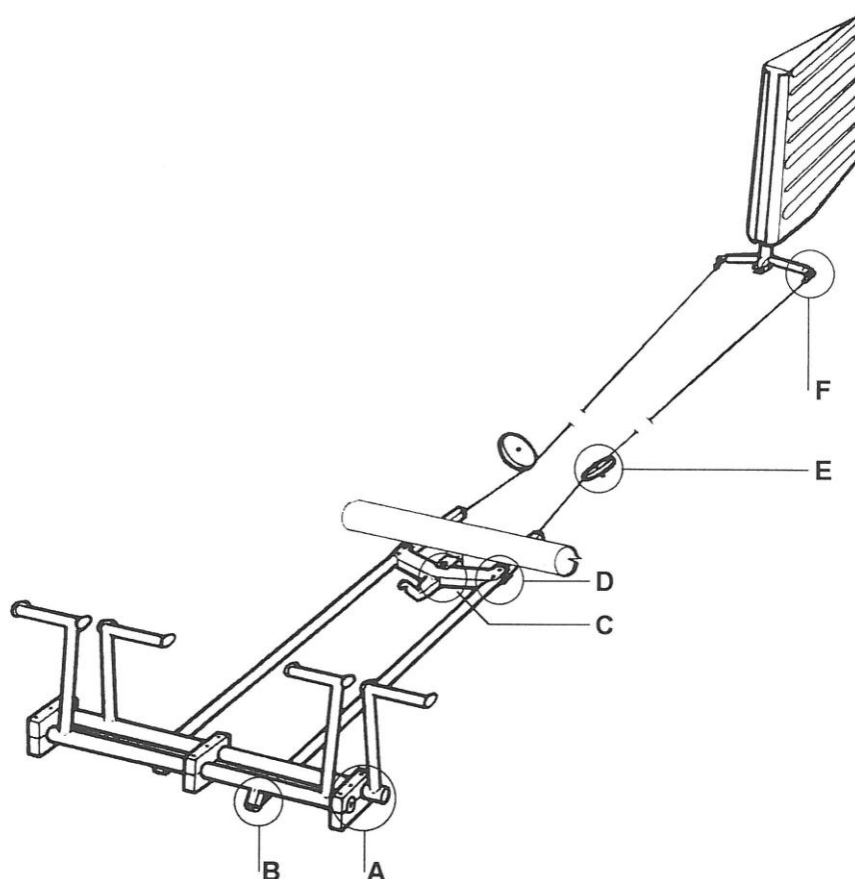
The intermediate bell cranks (3) are provided with springs of rudder trim (subject 27-21-00).

The rudder control system is interconnected with nose landing gear steering (subsection 32-50-00).



- 1 ... control pedal
- 2 ... pushrod
- 3 ... intermediate bell crank
- 4 ... cables
- 5 ... bell crank

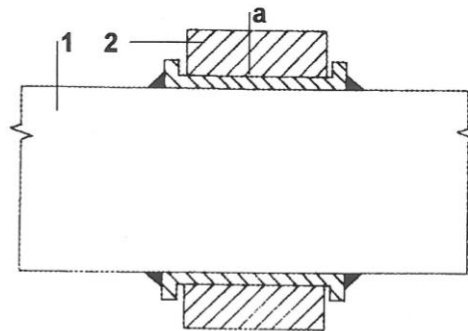
Fig. 27-8 Rudder control



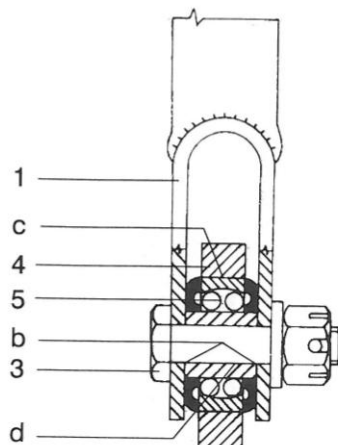
- A ... fitting of rear and fwd mechanism in bushings
- B ... joining of fwd and rear mechanism
- C ... fitting of intermediate bell crank in main airframe beam
- D ... coupling of intermediate bell crank with pushrods and cables
- E ... fitting of pulleys in airframe braces
- F ... coupling of cables to rudder bell crank

*Fig. 27-9 Dimensions, allowances and plays in rudder control
(page 1 of 4)*

A



B

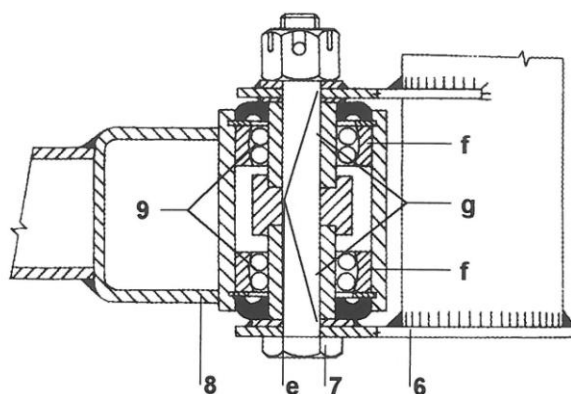


Joint	Item	Name	Dimensions (mm)			
			Original			Operation
			D1	T1	V min./max.	T2 max.
a	2	Bushing	Ø 32 H11	+ 0,160 0	$\frac{0,080}{0,400}$	+ 0,250
	1	Fwd, rear mechanism	Ø 32 d11	- 0,080 - 0,240		- 0,300
b	1	Fwd, rear mechanism	Ø 6 H8	+ 0,018 0	$\frac{0,010}{0,046}$	+ 0,025
	3	Fitted bolt	Ø 6 f8	- 0,010 - 0,028		- 0,035
c	4	Eye	Ø 19 K6	+ 0,002 - 0,011	R	
	5	Bearing	Ø 19	+ 0,002 - 0,011		
d	5	Bearing	Ø 6	+ 0,002 - 0,010	$\frac{0}{0,030}$	+ 0,005
	3	Fitted bolt	Ø 6 f8	- 0,010 - 0,028		- 0,035

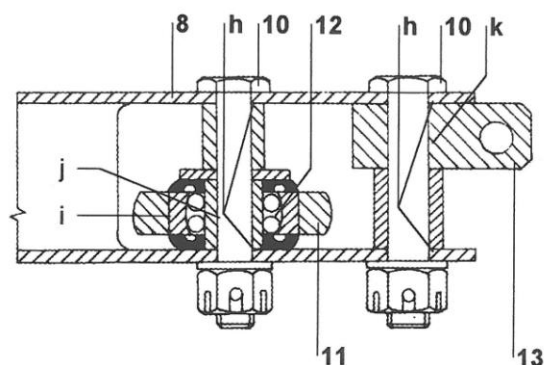
*Fig. 27-9 Dimensions, allowances and plays in rudder control
(page 2 of 4)*

EFFECTIVITY: All

C



D



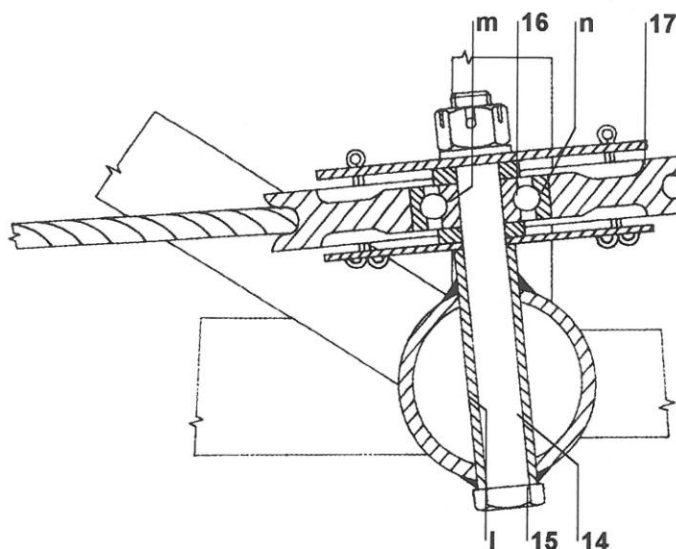
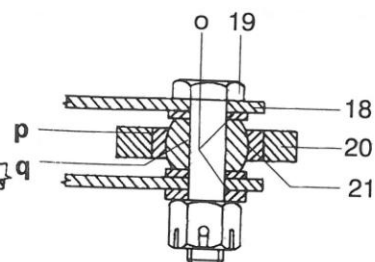
Joint	Item	Name	Dimension (mm)			
			Original			Operation
			D1	T1	V min./max.	T2 max.
e	6	Support	Ø 6 H8	+ 0,018 0	<u>0,010</u> 0,046	+ 0,025
	7	Fitted bolt	Ø 6 f8	- 0,010 - 0,028		- 0,035
f	8	Intermediate bell crank	Ø 19 K6	+ 0,002 - 0,011	<u>0</u> 0,013	+ 0,005
	9	Bearing	Ø 19	+ 0,002 - 0,011		- 0,020
g	9	Bearing	Ø 6	+ 0,002 - 0,010	<u>0</u> 0,030	+ 0,005
	7	Fitted bolt	Ø 6 f8	- 0,010 - 0,028		- 0,035
h	8	Intermediate bell crank	Ø 6 H8	+ 0,018 0	<u>0,010</u> 0,046	+ 0,025
	10	Fitted bolt	Ø 6 f8	- 0,010 - 0,028		- 0,035
i	11	Eye	Ø 19 K6	+ 0,002 - 0,010	R	
	12	Bearing	Ø 19	+ 0,002 - 0,011		
j	12	Bearing	Ø 6	+ 0,002 - 0,010	<u>0</u> 0,030	+ 0,005
	10	Fitted bolt	Ø 6 f8	- 0,010 - 0,028		- 0,035
k	13	Block	Ø 6 H8	+ 0,018 0	<u>0,010</u> 0,046	+ 0,025
	10	Fitted bolt	Ø 6 f8	- 0,010 - 0,028		- 0,035

Fig. 27-9 Dimensions, allowances and plays in rudder control
(page 3 of 4)

EFFECTIVITY: All

27-20-00

page 27 - 21
2011-02-02

E

F


Joint	Item	Name	Dimensions (mm)			
			Original			Operation
			D1	T1	V min./max.	T2 max.
I	14	Tube	∅ 6 H8	+ 0,018 0	$\frac{0,010}{0,046}$	+ 0,025
	15	Fitted bolt	∅ 6 f8	- 0,010 - 0,028		- 0,035
m	16	Bearing	∅ 6	+ 0,002 - 0,010	$\frac{0}{0,030}$	+ 0,005
	15	Fitted bolt	∅ 6 f8	- 0,010 - 0,028		- 0,035
n	17	Pulley	∅ 19 K6	+ 0,002 - 0,010	R	
	16	Bearing	∅ 19	+ 0,002 - 0,011		
o	18	Shaped sheet	∅ 6	+ 0,200 0	$\frac{0,010}{0,228}$	+ 0,300
	19	Fitted bolt	∅ 6 f8	- 0,010 - 0,028		- 0,035
p	20	Suspension	∅ 14 K6	+ 0,002 - 0,010	R	
	21	Articulated bearing	∅ 14	+ 0,004 - 0,008		
q	21	Articulated bearing	∅ 6 J8	+ 0,009 - 0,009	$\frac{0,001}{0,037}$	+ 0,015
	19	Fitted bolt	∅ 6 f8	- 0,010 - 0,028		- 0,035

Fig. 27-9 Dimensions, allowances and plays in rudder control
(page 4 of 4)

EFFECTIVITY: All

MAINTENANCE

REMOVAL / INSTALLATION

REMOVAL OF RUDDER CONTROL CABLES

Preparatory works

- a) Remove rear seats (section 25-20-00) and unlace partition shield.
- b) Remove bottom fuselage panel (Fig. 52-5, item 24), rear upper fuselage panel (19) and rear fuselage panel (13).

Cable removal

- a) Slacken the cables (Fig. 27-10, item 1) by releasing the turnbuckles.
- b) Disconnect the bondings (13).
- c) Uncouple the cables (1) from rudder bell crank (5) by removing the bolts (8).
- d) Release pulleys (16) from consoles (4) by removing the bolts (7).
- e) Remove bolts (9) from turnbuckles (2) and uncouple cables (1).
- f) Pull the cables from the fuselage through the hole in the last fuselage bulkhead.

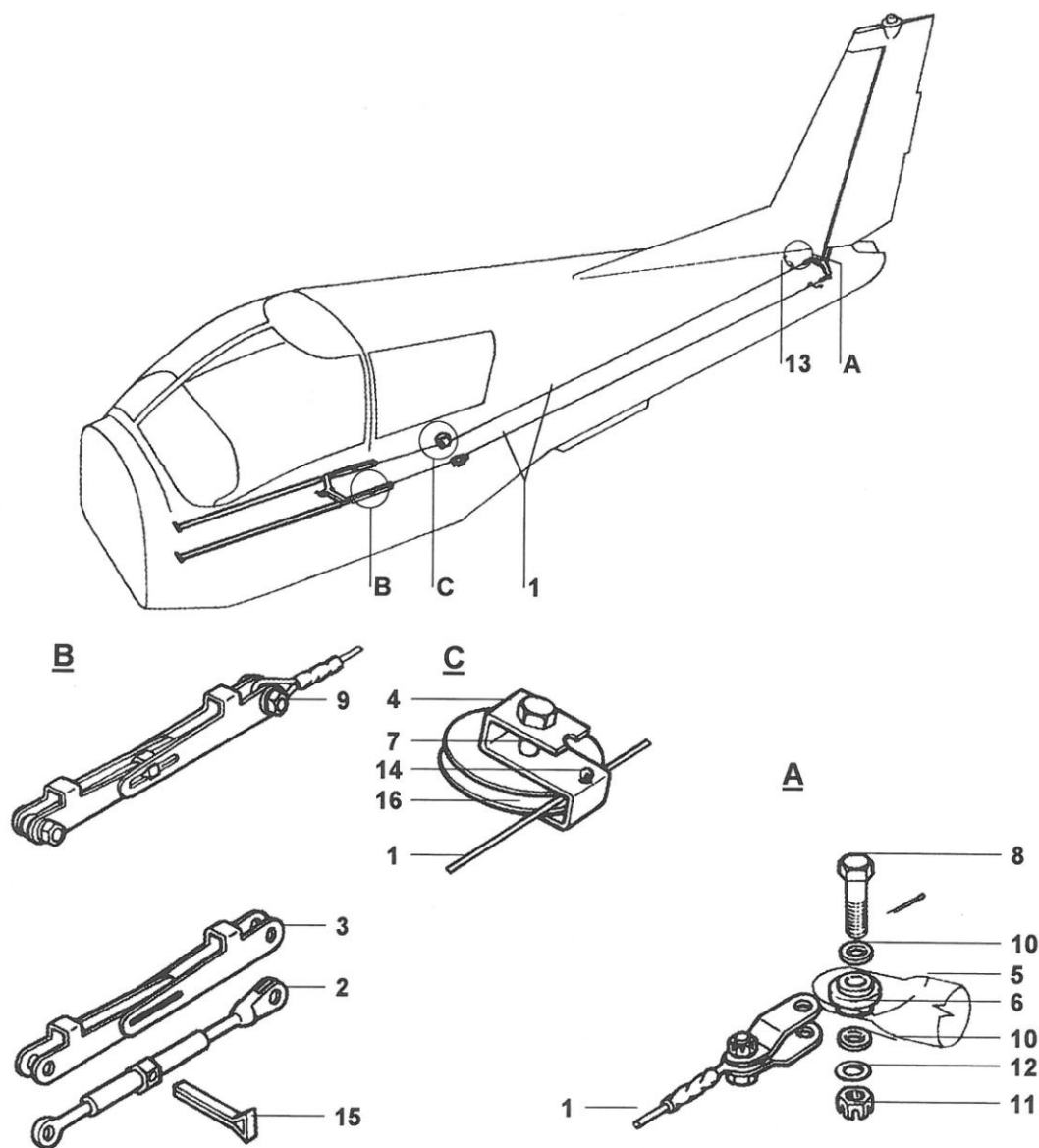
INSTALLATION OF RUDDER CONTROL CABLES

- a) Stretch the cables (Fig. 27-10, item 1) from turnbuckles (2) up to rudder bell crank (5).
- b) Join fwd ends of cables (1) by bolts (9) to the turnbuckles (2) and tighten the nuts with 6 to 7,2 Nm (4,43 to 5,31 lbft) torque.
- c) Fit the cables (1) into the pulleys (16) grooves and fix the pulleys by bolts (7) to the consoles (4).
- d) Join the rear ends of cables (1) by bolts (8) to the rudder bell crank (5) and tighten the nuts with 6 to 7,2 Nm (4,43 to 5,31 lbft) torque.
- e) Tension the cable (1) by means of turnbuckles (2) to 350 až 450 N (79-100 lbft). Make sure the pedals in both sides of cockpit and rudder are, after cable tightening, in neutral position (0°).
- f) Lock turnbuckles (2) after cable (1) tightening by cotter pin (15).
- g) Connect bondings (13) between cables (1) and fuselage.
- h) Grease cables (1) in contact area with pulleys (16) with grease (subsection 05-21-00).

Final works

- a) Check serviceability and adjustment of rudder control and locking of nuts and turnbuckles.
- b) Lace the partition shield and install rear seats (section 25-10-00).
- c) Install bottom fuselage panel (Fig. 52-5, item 24), rear upper fuselage panel (19) and rear fuselage panel (13).

EFFECTIVITY: All



- A ... coupling of cable (1) to rudder bell crank (5)
 B ... coupling of cable (1) to turnbuckles (2)
 C ... passage of cable (1) along pulley (16)

- | | |
|----------------------------|-------------------|
| 1 ... rudder control cable | 10 ... spacers |
| 2 ... cable turnbuckles | 11 ... nut |
| 3 ... fuse | 12 ... washer |
| 4 ... pulley console | 13 ... bonding |
| 5 ... rudder bell crank | 14 ... cotter pin |
| 6 ... articulated bearing | 15 ... cotter pin |
| 7 ... fitted bolt | 16 ... pulley |
| 8 ... fitted bolt | |
| 9 ... fitted bolt | |

Fig. 27-10 Rudder control cable

EFFECTIVITY: All

ADJUSTMENT / TESTING

ADJUSTMENT OF RUDDER CONTROL

Requirements

- The distance of movable parts from airplane fixed parts should be at least 3 mm (0,12 in), the distance between movable parts at all positions should be mutually at least 5 mm (0,20 in).
- The movement of pushrods, bell cracks and pulleys should be light and continuous.
- The pulley positioning to the plane of cable bent should be set with $\pm 2^\circ$ allowance.
- The rudder deflection should meet data issued in Fig. 08-4.

Play in pedal control

- Measure the play in pedals at the end of them with rudder locked.
- The permitted pedal play should be within ± 2 mm (0,08 in).
- Remove excessive pedal play:
 - Check pedal play in pedal fittings (Fig. 27-9) and determine the joint with excessive play.
 - Replace faulty parts.

Fitting of pedal controls

Pedal position	Measurement	Adjustment
MIDDLE position	Distance between pedal axis and firewall: 175 ± 2 mm (6,9 \pm 0,08 in). Pedals: in-line. Intermediate bell crank (Fig. 27-8, item 3): perpendicular fuselage axis.	Adjustment of pushrods length with respect to intermediate bell crank (Fig. 27-8, item 3); setting fixture 33-Z 42-2679.
END position	The pedal deflection should ensure maximum rudder displacement.	Two stops upon main airframe beam.

Length of rudder control pushrods

The length of rudder control pushrods are issued in Fig. 27-7.

EFFECTIVITY: All

27-20-00

page 27 - 25
2011-02-02

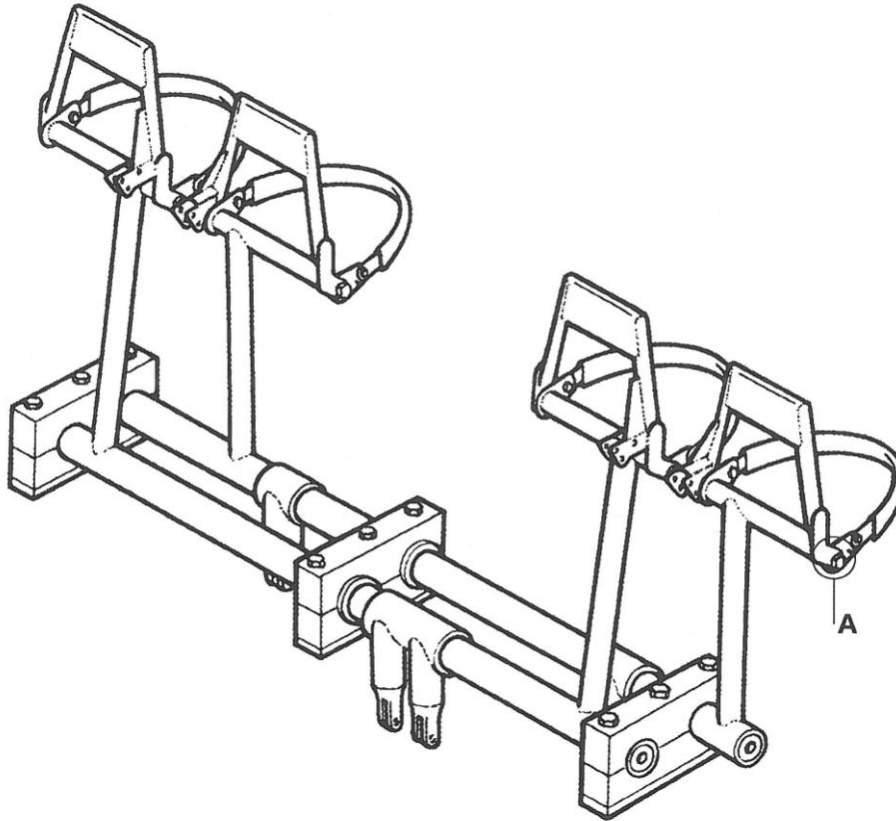
APPROVED REPAIRS

REAMING OF HOLES IN BREAK PEDAL HINGES

General instructions for hole reaming are issued in subsection 20-21-00.

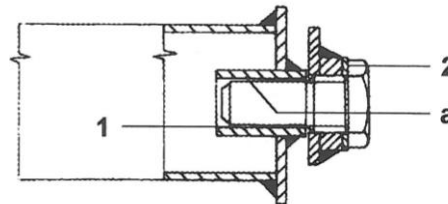
Hinge hole (Fig. 27-11, item 1)		Recommended reamer	Recommended caliper
Original dimension	Ø 6 H8	-----	-----
Dimension after repair	Ø 6,1 H8	Ø 6,1 H7 000-224-5030	Ø 6,1 H7 000-511-1042
	Ø 6,2 H8	Ø 6,2 H7 000-224-5031	Ø 6,2 H8 000-511-1125
	Ø 6,3 H8	Ø 6,3 H7 000-224-5032	Ø 6,3 H8 000-511-1119
	Ø 6,4 H8	Ø 6,4 H7 000-224-5033	Ø 6,4 H8 000-511-1095

Hinge bolt (Fig. 27-11, item 2)		Bolt number
Original dimension	Ø 6 f8	Z 42.4210-00.16
Dimension after repair	Ø 6,1 f8	Z 42.4210-00.15
	Ø 6,2 f8	Z 42.4210-00.14
	Ø 6,3 f8	Z 42.4210-00.13
	Ø 6,4 f8	Z 42.4210-00.12



A ... fitting of brake pedals in fwd and rear mechanism

A



Joint	Item	Name	Dimensions (mm)				
			Original			Operation	Repair
			D1	T1	V min./max.	T2 max.	D2 max.
a	1	Fwd, rear mechanism	Ø 6 H8	+ 0,018 0	0,010 0,046	+ 0,025	Ø 6,4 H8
	2	Bolts	Ø 6 f8	- 0,010 - 0,028		- 0,035	Ø 6,4 f8

Fig. 27-11 Dimensions, allowances and plays in brake pedal hinges

EFFECTIVITY: All

27-20-00

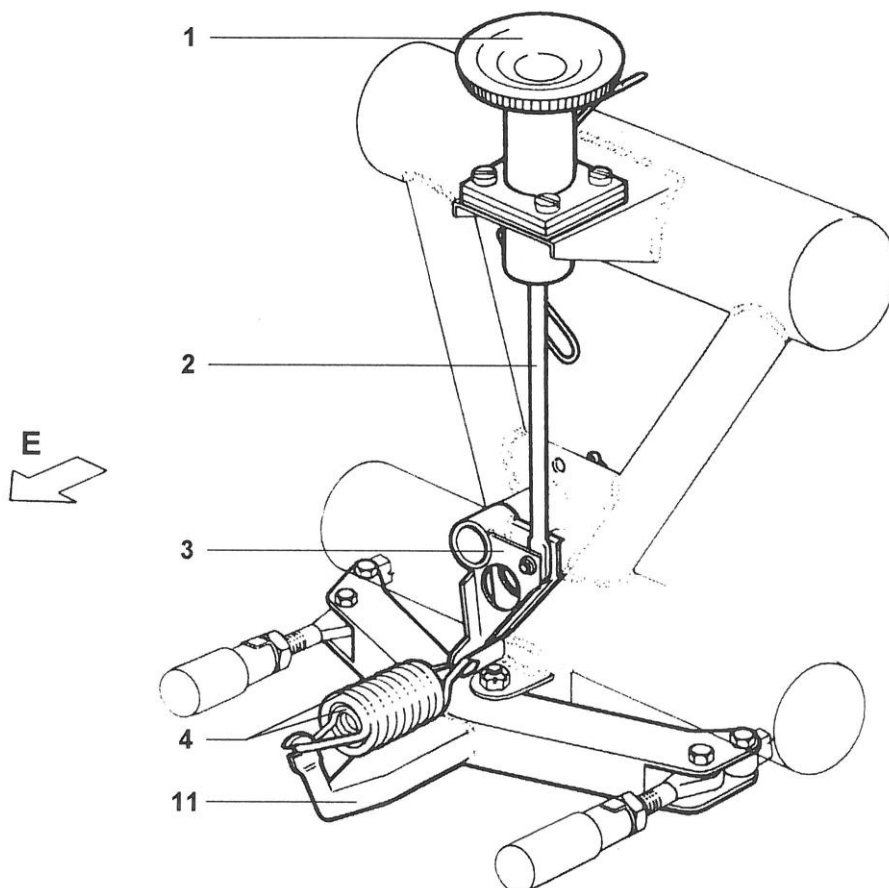
page 27 - 27
2011-02-02

RUDDER TRIM TAB CONTROL

DESCRIPTION AND OPERATION

The rudder trim tab control is of mechanical design. The control wheel of rudder trim tab (Fig. 27-12, item. 1) controls via pushrod (2) and bell crank (3) the tension of springs (4) influencing the forces in pedal controls.

The rudder trim tab control wheel is located in the panel between fwd seats.



E ... direction of flight

1 ... control wheel of rudder trim tab

2 ... pushrod

3 ... bell crank

4 ... springs

For information only:

11 ... intermediate rudder bell crank

Fig. 27-12 Rudder trim tab

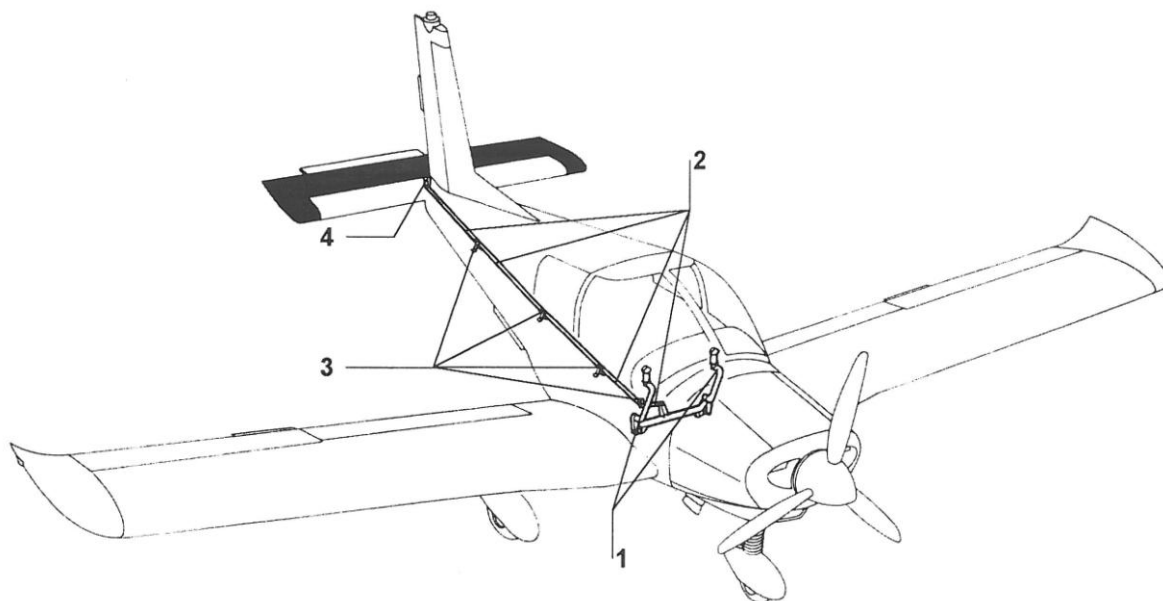
EFFECTIVITY: All

ELEVATOR CONTROL

DESCRIPTION AND OPERATION

The elevator is controlled by control stick (Fig. 27-13, item 1) via pushrods (2), bell cranks (3) and elevator bell crank (4).

The elevator trim tab is controlled mechanically (subsection 27-31-00).



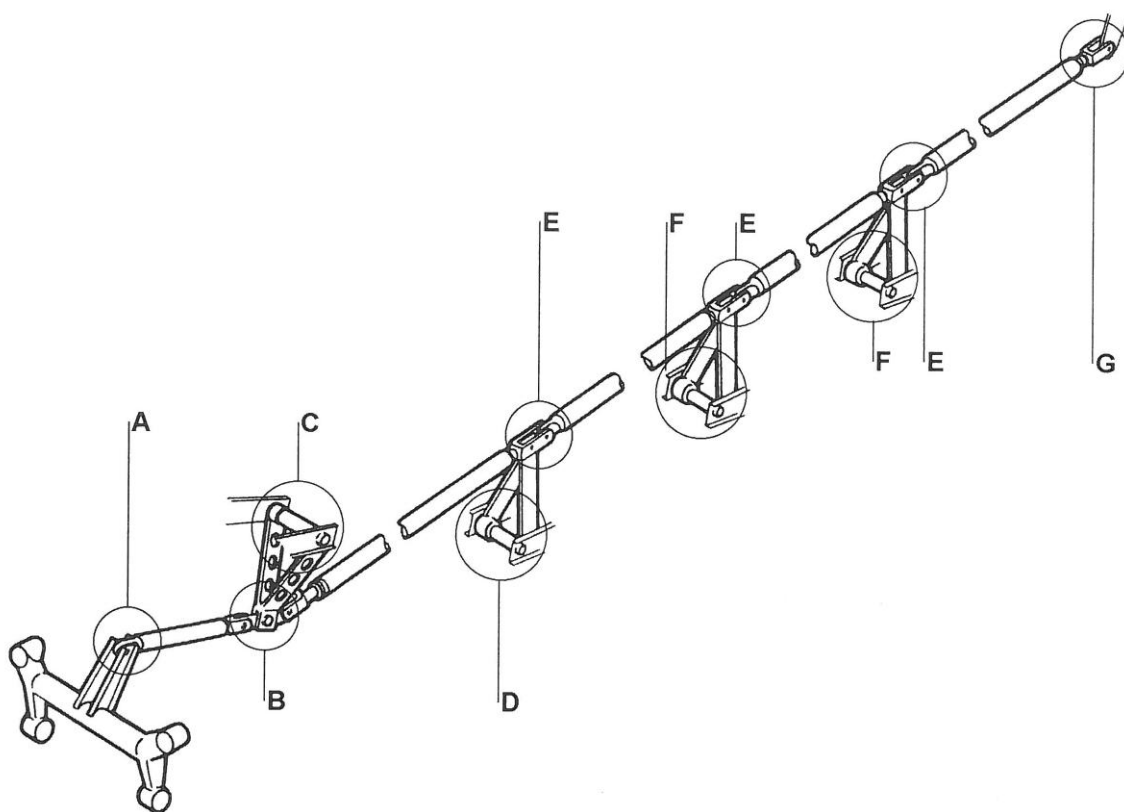
- 1 ... control stick
- 2 ... pushrods
- 3 ... bell cranks
- 4 ... elevator bell crank

Fig. 27-13 Elevator control

EFFECTIVITY: All

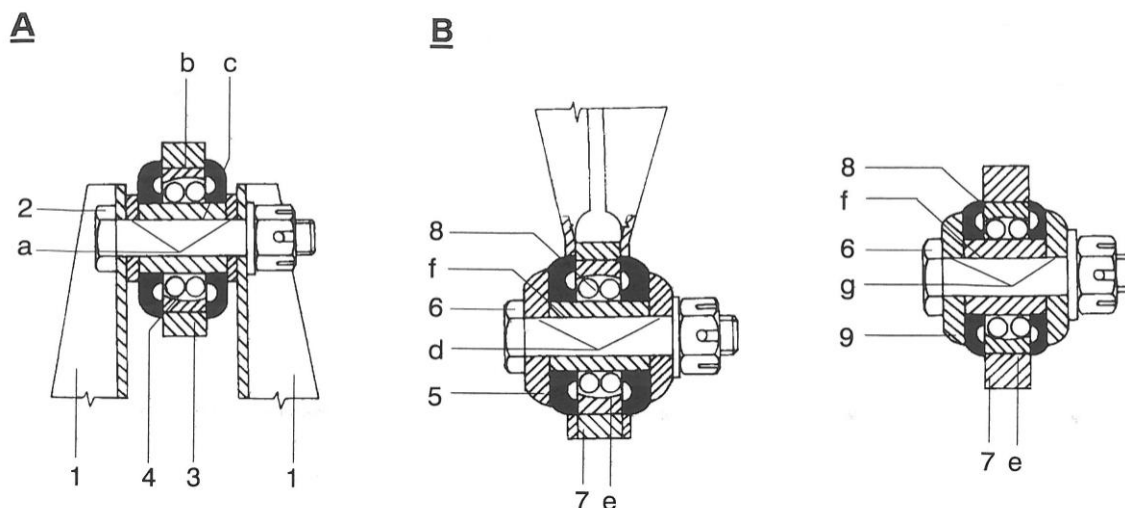
27-30-00

page 27 - 29
2011-02-02



- A ... coupling of control stick mechanism with pushrod
- B ... coupling of bell crank with pushrod
- C ... bell crank fitting in main airframe beam
- D ... bell crank fitting in airframe
- E ... coupling of bell crank with pushrods
- F ... suspension of bell crank in rear fuselage section
- G ... coupling of pushrod with elevator bell crank

*Fig. 27-14 Dimensions, allowances and plays in elevator control fittings
(page 1 of 7)*



Joint	Item	Name	Dimensions (mm)			
			Original			Operation
			D1	T1	V min./max.	T2 max.
a	1	Control stick mechanism	Ø 6 H8	+ 0,018 0	$\frac{0,010}{0,046}$	+ 0,025
	2	Fitted bolt	Ø 6 f8	- 0,010 - 0,028		- 0,035
b	3	Eye	Ø 19 K6	+ 0,002 - 0,011	R	
	4	Bearing	Ø 19	+ 0,002 - 0,011		
c	4	Bearing	Ø 6	+ 0,002 - 0,010	$\frac{0}{0,030}$	+ 0,005
	2	Fitted bolt	Ø 6 f8	- 0,010 - 0,028		- 0,035
d	5	Fork	Ø 6 H8	+ 0,018 0	$\frac{0,010}{0,046}$	+ 0,025
	6	Fitted bolt	Ø 6 f8	- 0,010 - 0,028		- 0,035
e	7	Sheet	Ø 19 K6	+ 0,002 - 0,011	R	
	8	Bearing	Ø 19	+ 0,002 - 0,011		
f	8	Bearing	Ø 6	+ 0,002 - 0,010	$\frac{0}{0,030}$	+ 0,005
	6	Fitted bolt	Ø 6 f8	- 0,010 - 0,028		- 0,035
g	9	Fork	Ø 6 H8	+ 0,018 0	$\frac{0,010}{0,046}$	+ 0,025
	6	Fitted bolt	Ø 6 f8	- 0,010 - 0,028		- 0,035

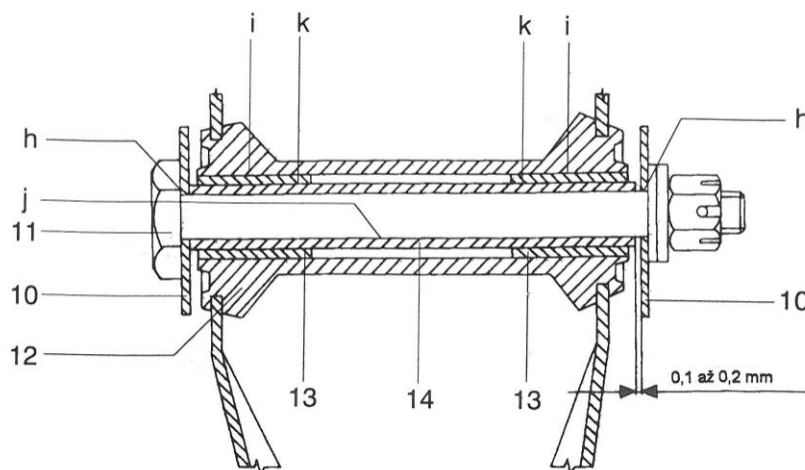
Fig. 27-14 Dimensions, allowances and plays in elevator control fittings
(page 2 of 7)

EFFECTIVITY: All

27-30-00

page 27 - 31
2011-02-02

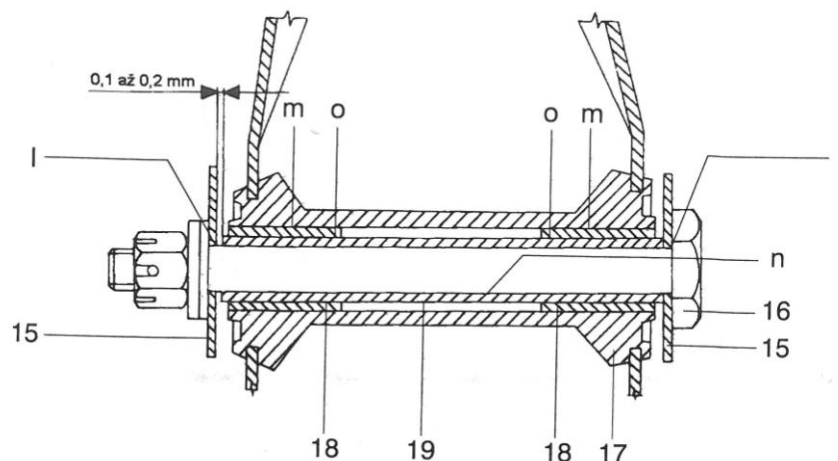
C



Joint	Item	Name	Dimensions (mm)			
			Original			Operation
			D1	T1	V min./max.	T2 max.
h	10	Console (L; R)	Ø 6 H7	+ 0,012 0	$\frac{0,010}{0,040}$	+ 0,020
	11	Fitted bolt	Ø 6 f8	- 0,010 - 0,028		- 0,035
i	12	Bushing	Ø 10 H7	+ 0,015 0	P	
	13	Bushing	Ø 10			
j	14	Spacer	Ø 6 H11	+ 0,075 0	$\frac{0,010}{0,103}$	+ 0,090
	11	Fitted bolt	Ø 6 f8	- 0,010 - 0,028		- 0,035
k	14	Spacer	Ø 8 f8	- 0,013 - 0,028	P	
	13	Bushing	Ø 8			

Obr. 27-14 Dimensions, allowances and plays in elevator control fittings
(page 3 of 7)

D



Joint	Item	Name	Dimensions (mm)			
			Original			Operation
			D1	T1	V min./max.	T2 max.
I	15	Console (L; R)	Ø 6 H7	+ 0,012 0	$\frac{0,010}{0,040}$	+ 0,020
	16	Fitted bolt	Ø 6 f8	- 0,010 - 0,028		- 0,035
m	17	Bushing	Ø 10 H7	+ 0,015 0	P	
	18	Bushing	Ø 10			
n	19	Spacer	Ø 6 H11	+ 0,075 0	$\frac{0,010}{0,103}$	+ 0,090
	16	Fitted bolt	Ø 6 f8	- 0,010 - 0,028		- 0,035
o	19	Spacer	Ø 8 f8	- 0,013 - 0,028	P	
	18	Bushing	Ø 8			

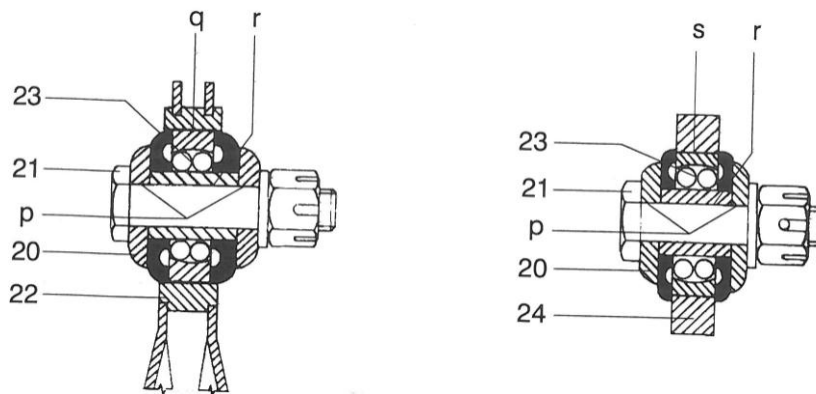
Fig. 27-14 Dimensions, allowances and plays in elevator control fittings
(page 4 of 7)

EFFECTIVITY: All

27-30-00

page 27 - 33
2011-02-02

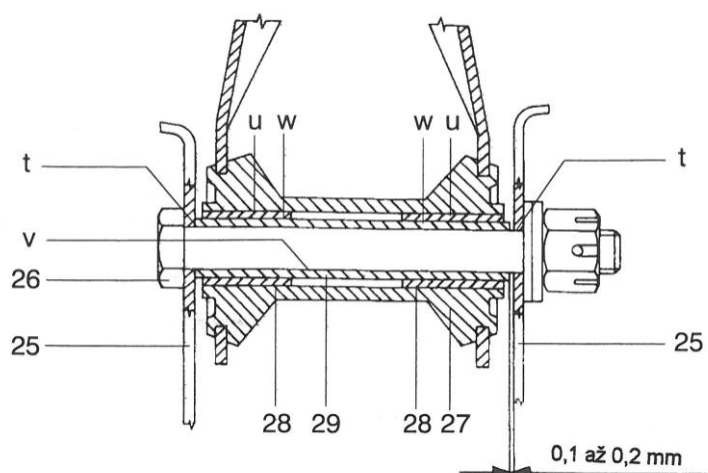
E



Joint	Item	Name	Dimensions (mm)			
			Original			Operation
			D1	T1	V min./max.	T2 max.
p	20	Fork	Ø 6 H8	+ 0,018 0	$\frac{0,010}{0,046}$	+ 0,025
	21	Fitted bolt	Ø 6 f8	- 0,010 - 0,028		- 0,035
q	22	Ring	Ø 19 K6	+ 0,002 - 0,010	R	
	23	Bearing	Ø 19	+ 0,002 - 0,011		
r	23	Bearing	Ø 6	+ 0,002 - 0,010	$\frac{0}{0,030}$	+ 0,005
	21	Fitted bolt	Ø 6 f8	- 0,010 - 0,028		- 0,035
s	24	Eye	Ø 19 K6	+ 0,002 - 0,010	R	
	23	Bearing	Ø 19	+ 0,002 - 0,011		

*Fig. 27-14 Dimensions, allowances and plays in elevator control fittings
(page 5 of 7)*

E



Joint	Item	Name	Dimensions (mm)			
			Original			Operation
			D1	T1	V min./max.	T2 max.
t	25	Hinge	Ø 6 H7	+ 0,012 0	$\frac{0,010}{0,040}$	+ 0,020
	26	Fitted bolt	Ø 6 f8	- 0,010 - 0,028		- 0,035
u	27	Bushing	Ø 10 H7	+ 0,015 0	P	
	28	Bushing	Ø 10			
v	29	Spacer	Ø 6 H11	+ 0,075 0	$\frac{0,010}{0,103}$	+ 0,090
	26	Fitted bolt	Ø 6 f8	- 0,010 - 0,028		- 0,035
w	29	Spacer	Ø 8 f8	- 0,013 - 0,028	P	
	28	Bushing	Ø 8			

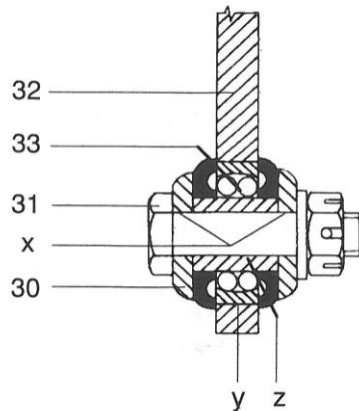
*Fig. 27-14 Dimensions, allowances and plays in elevator control fittings
(page 6 of 7)*

EFFECTIVITY: All

27-30-00

page 27 - 35
2011-02-02

G



Joint	Item	Name	Dimensions (mm)			
			Original			Operation
			D1	T1	V min./max.	T2 max.
x	30	Fork	Ø 6 H8	+ 0,018 0	$\frac{0,010}{0,046}$	+ 0,025
	31	Fitted bolt	Ø 6 f8	- 0,010 - 0,028		- 0,035
y	32	Hinge	Ø 19 K6	+ 0,002 - 0,010	R	
	33	Bearing	Ø 19	+ 0,002 - 0,011		
z	33	Bearing	Ø 6	+ 0,002 - 0,010	$\frac{0}{0,030}$	+ 0,005
	31	Fitted bolt	Ø 6 f8	- 0,010 - 0,028		- 0,035

*Fig. 27-14 Dimensions, allowances and plays in elevator control fittings
(page 7 of 7)*

MAINTENANCE

ADJUSTMENT / TESTING

ADJUSTMENT OF ELEVATOR CONTROL

Requirements

- a) The distance of movable parts from airplane fixed parts should be at least 3 mm (0,12 in), the distance between movable parts at all positions should be mutually at least 5 mm (0,20 in).
- b) The movement of pushrods and bell cranks should be light and continuous.
- c) The levator deflection should meet dataa issued in Fig. 08-4.

Play in control stick

The play in control stick is issued in section 27-10-00, ADJUSTMENT / TESTING.

Control stick setting

The control stick setting is issued in section 27-10-00, ADJUSTMENT / TESTING.

Length of pushrods of elevator control

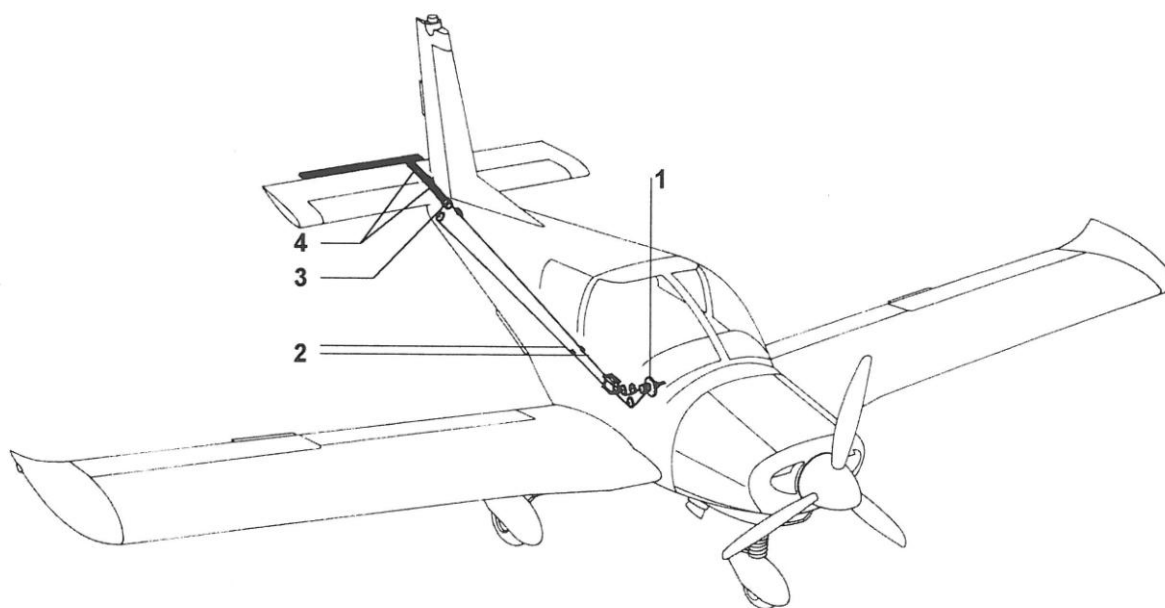
The length of pushrods of elevator control Fig. 27-7.

PITCH TRIM TAB CONTROL

DESCRIPTION AND OPERATION

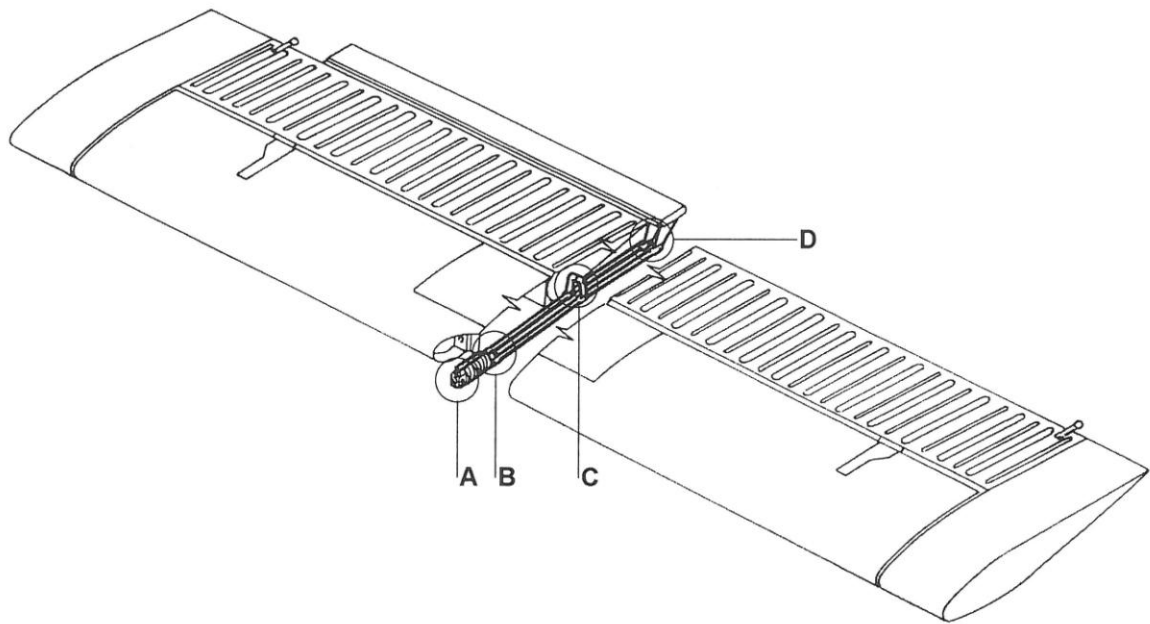
The elevator trim tab is controlled mechanically. The movement of pitch trim tab control wheel (Fig. 27-15, item 1) is transferred by means of cables (2) to self-locking worm drive (3) and from there by doubled pushrods (4) to elevator trim tab.

The pitch trim control wheel is located in panel between fwd seats. The worm mechanism (3) is located upon rear bulkhead of rear fuselage section.



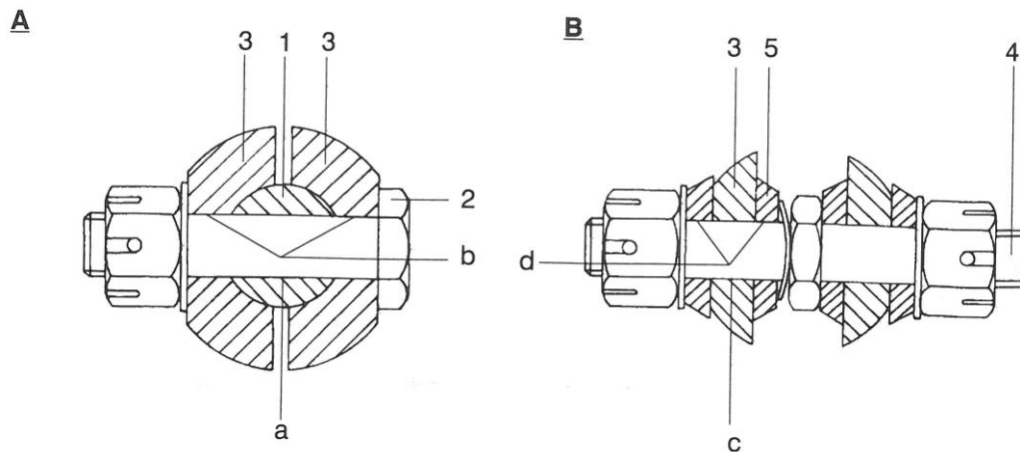
- 1 ... pitch trim control wheel
- 2 ... cables
- 3 ... worm mechanism
- 4 ... pushrods

Fig. 27-15 Pitch trim tab control



- A ... ending of divided screw of worm mechanism
- B ... joining of divided screw with pushrods
- C ... joining of pushrods with bell crank upon elevator
- D ... joining of pushrods with trim tab bell cranks

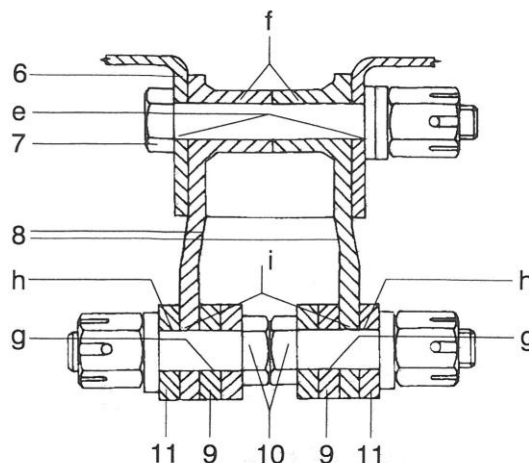
*Fig. 27-16 Dimensions, allowances and plays in trim tab control fitting
(page 1 of 4)*



Joint	Item	Name	Dimensions (mm)			
			Original			Operation
			D1	T1	V min./max.	T2 max.
a	1	Spacer	Ø 5 H7	+ 0,012 0	0,010 0,040	+ 0,020
	2	Fitted bolt	Ø 5 f8	+ 0,010 - 0,028		- 0,035
b	3	Divided screw	Ø 5 H7	+ 0,012 0	0,010 0,040	+ 0,020
	2	Fitted bolt	Ø 5 f8	- 0,010 - 0,028		- 0,035
c	3	Divided screw	Ø 5 H8	+ 0,018 0	0,010 0,046	+ 0,025
	4	Bolt	Ø 5 f8	- 0,010 - 0,028		- 0,035
d	5	Fork	Ø 5 H8	+ 0,018 0	0,010 0,046	+ 0,025
	4	Bolt	Ø 5 f8	- 0,010 - 0,028		- 0,035

Fig. 27-16 Dimensions, allowances and plays in trim tab control fitting
(page 2 of 4)

C

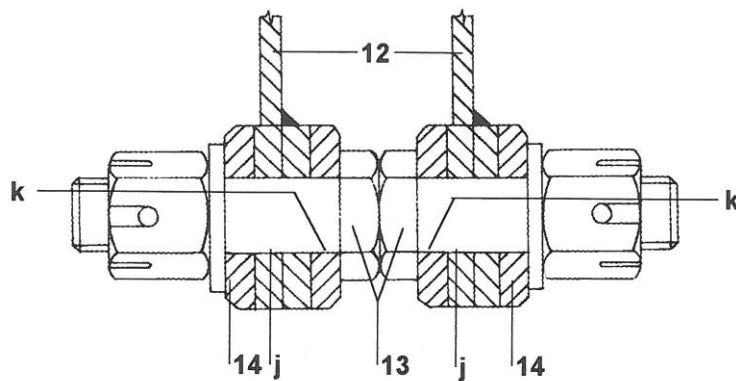


Joint	Item	Name	Dimensions (mm)			
			Original			Operation
			D1	T1	V min./max.	T2 max.
e	6	Console	Ø 5 H8	+ 0,018 0	0,010 0,046	+ 0,025
	7	Fitted bolt	Ø 5 f8	- 0,010 - 0,028		- 0,035
f	8	Bell crank	Ø 5 H8	+ 0,018 0	0,010 0,046	+ 0,025
	7	Fited bolt	Ø 5 f8	- 0,010 - 0,028		- 0,035
g	9	Eye	Ø 5 H8	+ 0,018 0	0,010 0,046	+ 0,025
	10	Fitted bolt	Ø 5 f8	- 0,010 - 0,028		- 0,035
h	11	Fork	Ø 5 H8	+ 0,018 0	0,010 0,046	+ 0,025
	10	Fitter bolt	Ø 5 f8	- 0,010 - 0,028		- 0,035
i	8	Bell crank	Ø 5 H8	+ 0,018 0	0,010 0,046	+ 0,025
	10	Fitted bolt	Ø 5 f8	- 0,010 - 0,028		- 0,035

Fig. 27-16 Dimensions, allowances and plays in trim tab control fitting
(page 3 of 4)

EFFECTIVITY: All

D



Joint	Item	Name	Dimensions (mm)			
			Original			Operation
			D1	T1	V min./max.	T2 max.
j	12	Bell crank	Ø 5 H7	+ 0,012 0	$\frac{0,010}{0,040}$	+ 0,020
	13	Fitted bolt	Ø 5 f8	- 0,010 - 0,028		- 0,035
k	14	Fork	Ø 5 H7	+ 0,012 0	$\frac{0,010}{0,040}$	+ 0,020
	13	Fitted bolt	Ø 5 f8	- 0,010 - 0,028		- 0,035

*Fig. 27-16 Dimensions, allowances and plays in trim tab control fitting
(page 4 of 4)*

MAINTENANCE

REMOVAL / INSTALLATION

REMOVAL OF CABLES OF PITCH TRIM TAB

Preparatory works

- a) Remove access port lid (Fig. 27-17, item 32) and cover of controls (33) in cockpit.
- b) Remove fuselage bottom panel (Fig. 52-5, item 24).
- c) Remove left fwd seat (section 25-10-00) and both rear seats (section 25-20-00). Unlace the partition shields in fuselage.
- d) Remove upper rear fuselage panel (Fig. 52-5, item 19) and rear fuselage panel (13).
- e) Unscrew front screw of left seat carrier (Fig. 27-17, item 31).

Cable removal

- a) Release turnbuckle (3) in rear fuselage section to release tension of cable loop.
- b) Remove turnbuckle (3) pins in rear fuselage section and disconnect cables (1, 2).
- c) Unscrew bolts (10) and release holders (11).
- d) Having removed cotter pins (4) remove shaft (8) with control wheel (6) and drum (7) front the seat carriers (31) Tilt left seat carriers (31).
- e) Remove pulleys (26) and release thus the cable (1). Remove pins (27) and release thus the rollers (19).
- f) Unwind the cable (1) from the drum (7) of trim tab control wheel (6) and remove it from fuselage.
- g) Disconnect pushrod (28) joined to bolt of drum (12) and screw it in backward direction.
- h) Remove flange (15) after unscrewing the bolts (13) from the rear side of drum.
- i) Remove drum (12) from jacket (16).
- j) Unwind cable (2) from drum (12).
- k) Remove stop screws (20) from the cable.

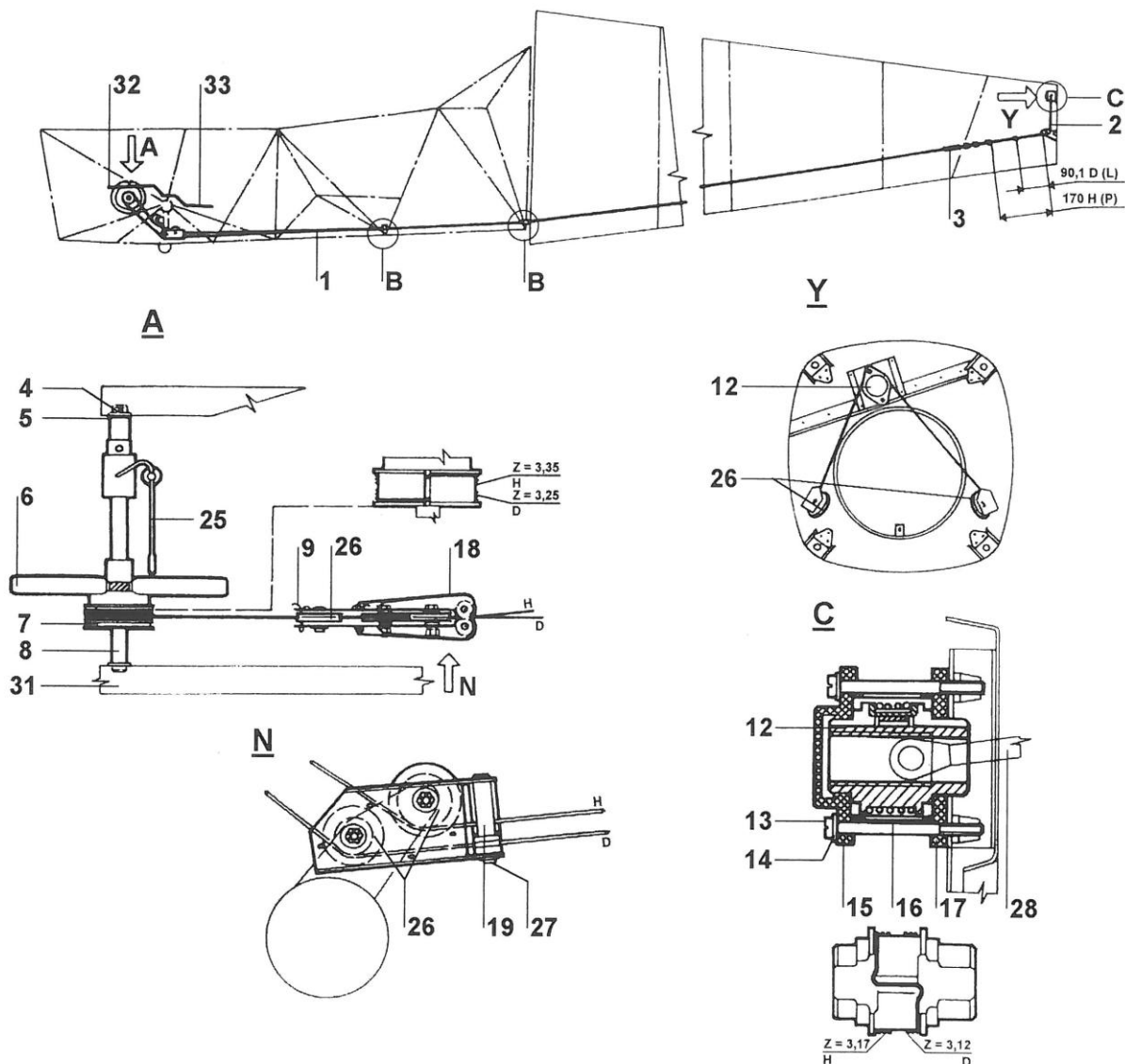
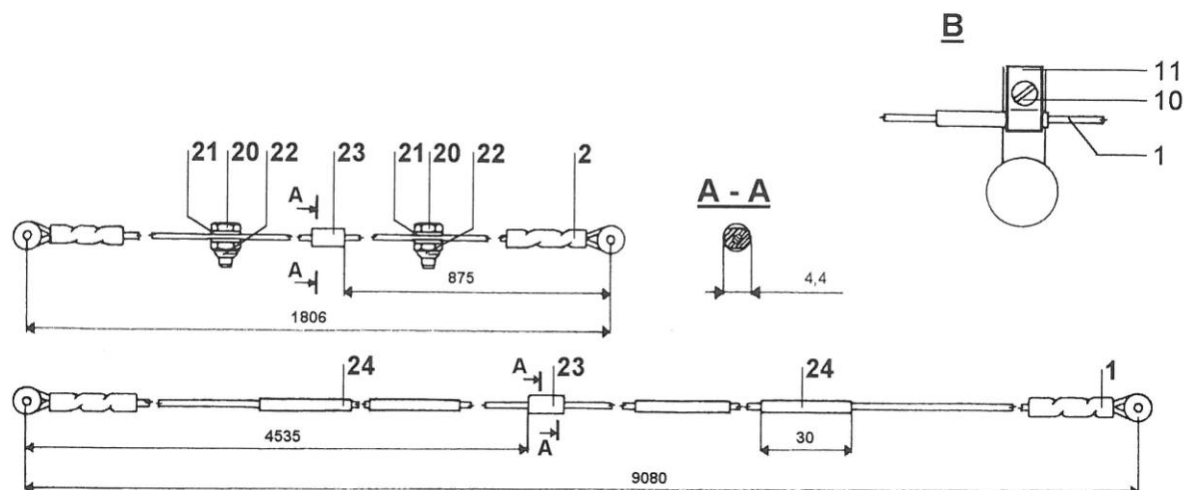


Fig. 27-17 Pitch trim control elements in fuselage
(page 1 of 2)



A-A ... cut-away view of clip (23) after fixing

A ... control cable with drum

B ... joining cable (2) to airframe

C ... drum holding (12) to bulkhead

N ... consoles with drum and rollers

D ... lower cable part

H ... upper cable section upon rear fuselage section

L ... left side

P ... right side

Y ... drum (12) and pulleys

Z ... number of threads

1 ... fwd cable

2 ... rear cable

3 ... turnbuckle

4 ... cotter pin

5 ... washer

6 ... control wheel

7 ... drum (upon control wheel)

8 ... shaft

9 ... cotter pin

10 ... screw

11 ... holder

12 ... drum (upon rear bulkhead)

13 ... screw

14 ... washer

15 ... flange

16 ... jacket

17 ... flange

18 ... console

19 ... roller

20 ... screw

21 ... washer

22 ... self-locking nut

23 ... clip

24 ... hose

25 ... trimming indicator

26 ... pulley

27 ... pin

28 ... pushrod + divided screw

For information only

31 ... seat carrier

32 ... lid

33 ... cover of controls

Fig. 27-17 Pitch trim control elements in fuselage
(page 2 of 2)

EFFECTIVITY: ALL

27-31-00

page 27 - 45
2011-02-02

INSTALLATION OF CABLES OF PITCH TRIM TAB

CAUTION

JACKET (Fig. 27-17, item. 16) UPON THE REAR FUSELAGE BULKHEAD SHOULD BE TURNED TO ENSURE THE ENDS OF CABLE THREADS (2) NEVER SEIZE WITH EDGES OF JACKET CUTOUTS.

NOTE

Set stop bolts (20) upon rear cable (2) according to dimensions issued in Fig. 27-17.

- a) Set clip (23) of fwd cable (1) into the drum cutout (7).
- b) Wind tightly cable (1) upon the drum (7) maintaining the number of threads and direction of winding according to Fig. 27-17, item A. Join tightly cable ends (1) with clip or with safety wire as near to drum (7) as possible.
- c) Fit shaft to seat carriers (31) and lock them with cotter pin. Screw the left seat carrier (31) to airframe.
- d) Place the cable (1) upon the pulleys (26) and rollers (19). Tighten the pulleys (26) with screws and lock pins (27) of rollers (19). Fit the cotter pins (9) of pulleys (26) in to prevent cable getting out of pulley grooves.
- e) Fit the hoses (24) of cable (1) into the holders (11) and screw bolts (10) in. Pull the cables through rear fuselage section.
- f) Fit the clip (23) of rear end of cable (2) into the drum cutout (12).
- g) Wind tightly cable (2) upon cutout of the drum (12) maintaining the number of threads and direction of winding according to Fig. 27-17, item C. Join tightly cable ends (2) with clip or with safety wire as near to drum (12) as possible.
- h) Fit drum (12) into the flange (17). Set the jacket cutouts (16) to embed cable ends (2) and fix the flange assy (15) to the installation spot. Fix this assembly by screws (13) and nuts to rear fuselage bulkhead.
- i) Insert the cable ends (2) into the pulleys (26) upon the rear fuselage bulkhead and insert cotter pins of pulleys.
- j) Join the cable ends (1, 2) with turnbuckles (3) and release auxiliary clips of drums (7, 12).
- k) Provide drums (7, 12) that are in middle position from both sides of clip (23) with the same number of threads upon cables.
- l) Tighten the cables to exhibit tension of 60 to 80 N (13-18 lbft) and lock the turnbuckles (3).
- m) Set pitch trimming indicator (25) pointer to middle position.
- n) Screw the pushrod with divided bolt (28) into the center of threaded rear part of drum (12).
- o) Set the elevator trim tab to neutral position and join pushrod with bolt (28) with control bell crank. The adjustment, if necessary may be carried out by threaded end of pushrod at trim tab.
- p) Adjust stop screws (20) upon cable (2) to limit required deflection of trim tab.

NOTE

Check serviceability and correct installation before final works are carried out.

The pitch trim control should exhibit continuous movement without seizing. The trim tab adjustment should ensure the tab position indicator (25) is in neutral position when the control wheel (6) is in neutral position.

The elevator (pitch) trim tab deflection should be $\pm 15^\circ$ with $\pm 1^\circ$ allowance.

Grease the pitch trim tab system after adjustment (subsection 05-21-00).

EFFECTIVITY: All

Final works

- a) Install lid (32) and cover (33) of controls in cockpit.
- b) Lace partition shield in fuselage.
- c) Install both rear seats (section 25-20-00) and left fwd seat (section 25-10-00).
- d) Install upper rear fuselage panel (Fig. 52-5, item 19), rear fuselage panel (13) and bottom fuselage panel (24).

ADJUSTMENT / TESTING

ADJUSTMENT OF PITCH TRIMMING

Requirements

- a) The distance of movable parts from airplane fixed parts should be at least 3 mm (0,12 in) the distance between movable parts at all positions should be mutually at least 5 mm (0,20 in).
- b) The movement of pushrods, bell cranks and pulleys should be light and continuous.
- c) The pulley positioning to the plane of cable bent should be set with $\pm 2^\circ$ allowance.
- d) The rudder deflection should meet data issued in Fig. 08-4.

Installation of pitch trim control wheel

Position of control wheel	Setting	Adjustment
TAKE-OFF	Procedure of setting: a) Set the chord of trim tab to be aligned with elevator chord and lock the setting. b) Set the divided bolt (Fig. 55-7, item 1) of drum (21) to middle position by proper adjustment of pushrod (3) length. c) Set the control wheel to TAKE-OFF position and check symmetrical cable winding. d) Set proper tension of pitch trim control cable loop.	Template 33-Z 42-2256 (Fig. 08-4, item 12).
NOSE HEAVY; TAIL HEAVY	The limit positions of pitch trim tab control wheel should enable maximum trim tab deflection.	Two stops upon the control cables at rear bulkhead near rear fuselage section.

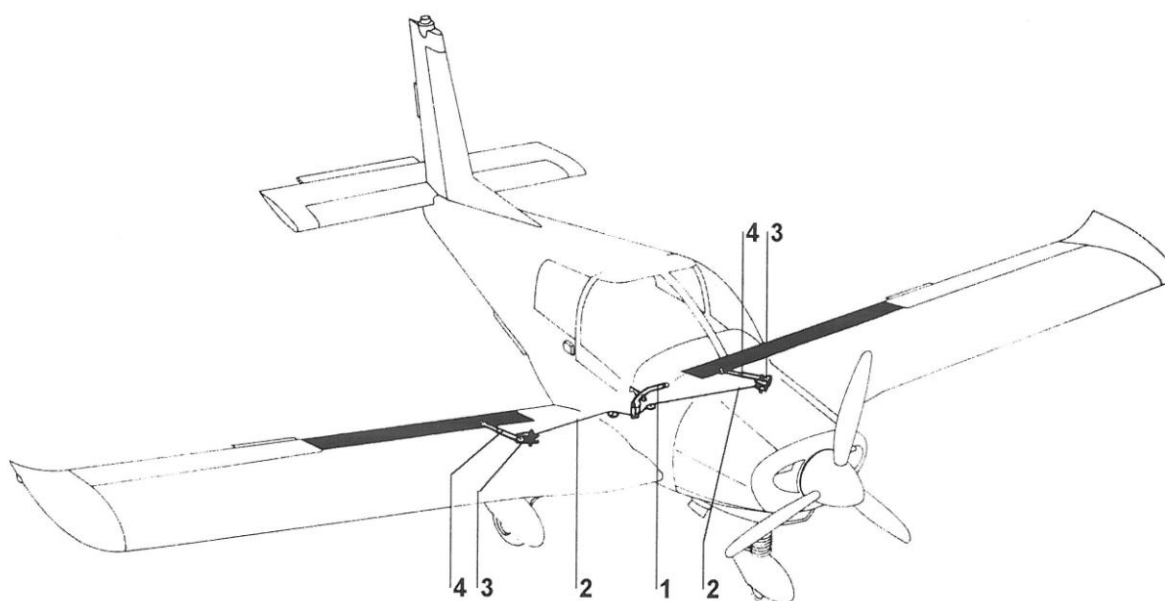
Length of pushrods of pitch trim control

The length of pushrods of pitch trim control are issued in Fig. 27-7.

WING FLAP CONTROL

DESCRIPTION AND OPERATION

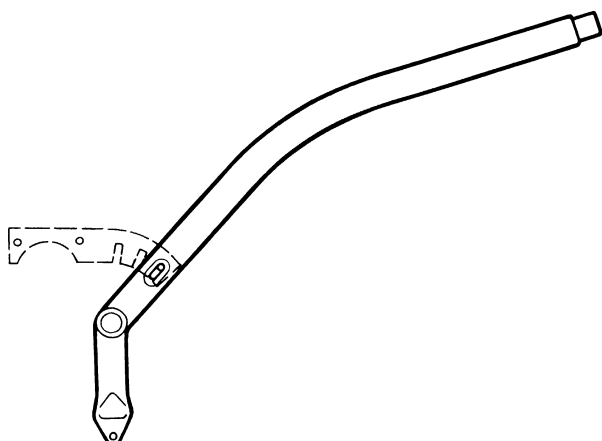
The wing flaps are controlled by flap lever (Fig. 27-18, item 1) by means of cables (2), bell cranks (3) and pushrods (4). The flap control lever is in panel between fwd seats. The wing flap may be set to three locked positions. The locking is controlled by push button in flap control lever. The flap control bell cranks (3) are installed upon main wing spars.



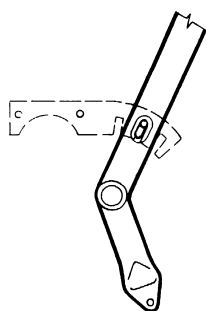
- 1 ... flap control lever
- 2 ... cables
- 3 ... bell cranks
- 4 ... pushrods

Fig. 27-18 Wing flap control

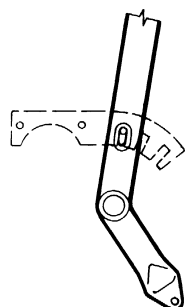
Position of flap control lever:



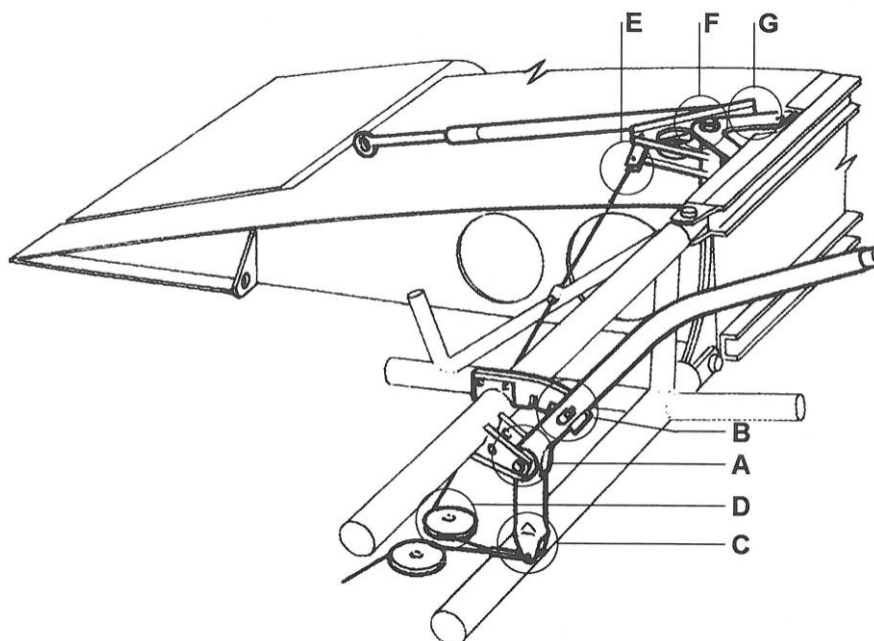
- wing flaps are in **RETRACTED** position



- wing flaps are in **TAKE-OFF** position



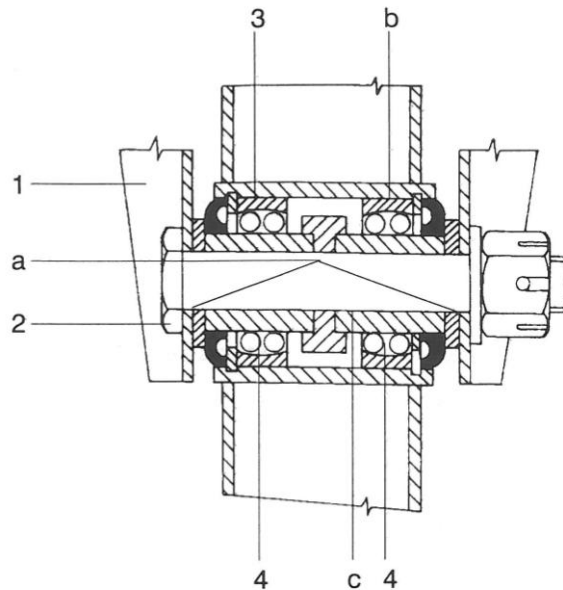
- wing flaps are in **LANDING** position



- A ... fitting of flap control lever in main airframe spar
- B ... locking of flap control lever
- C ... joining the flap control lever with cables
- D ... fitting of pulleys in main airframe spar
- E ... joining the cables to flap control mechanism
- F ... fitting of flap control mechanism into the consoles
- G ... joining flap control mechanism with pushrod

*Fig. 27-19 Dimensions, allowances and plays in wing flap fittings
(page 1 of 6)*

A

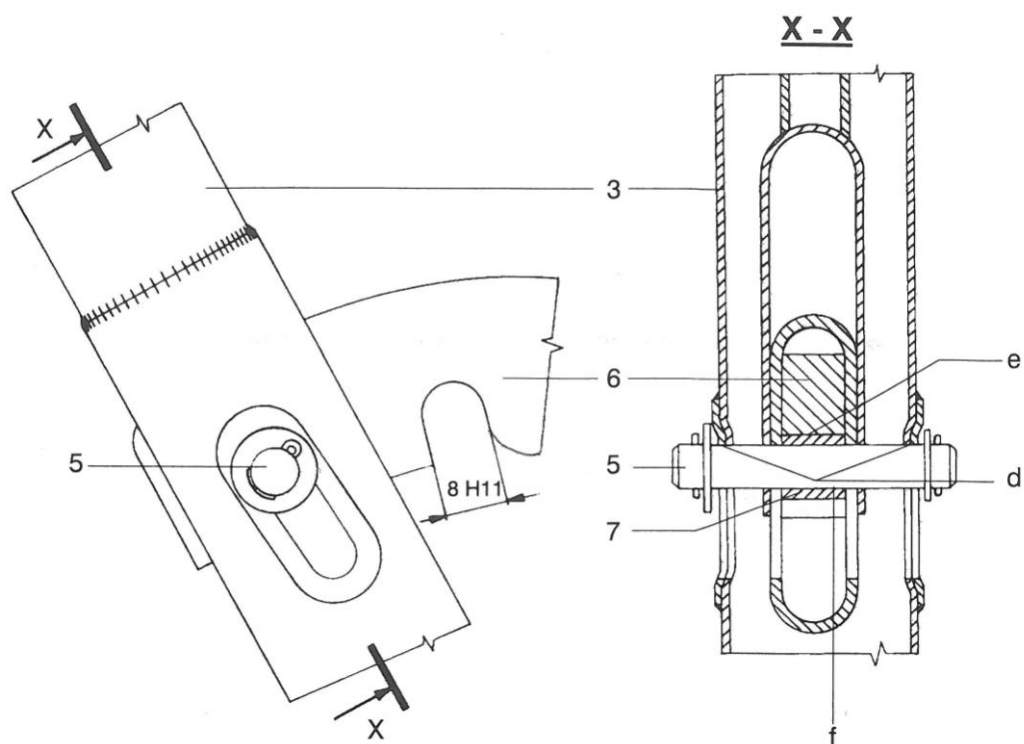


Joint	Item	Name	Dimensions (mm)			
			Original			Operation
			D1	T1	V min./max.	T2 max.
a	1	Console (L; R)	Ø 8 H8	+ 0,022 0	<u>0,013</u> 0,057	+ 0,035
	2	Fitted bolt	Ø 8 f8	- 0,013 - 0,035		- 0,045
b	3	Flap control lever	Ø 22 K6	+ 0,002 - 0,010	<u>0</u> 0,013	+ 0,005
	4	Bearing	Ø 22	+ 0,002 - 0,011		- 0,020
c	4	Bearing	Ø 8	+ 0,002 - 0,010	<u>0,003</u> 0,037	+ 0,005
	2	Fitted bolt	Ø 8 f8	- 0,013 - 0,035		- 0,045

*Fig. 27-19 Dimensions, allowances and plays in wing flap fittings
(page 2 of 6)*

EFFECTIVITY: All

B



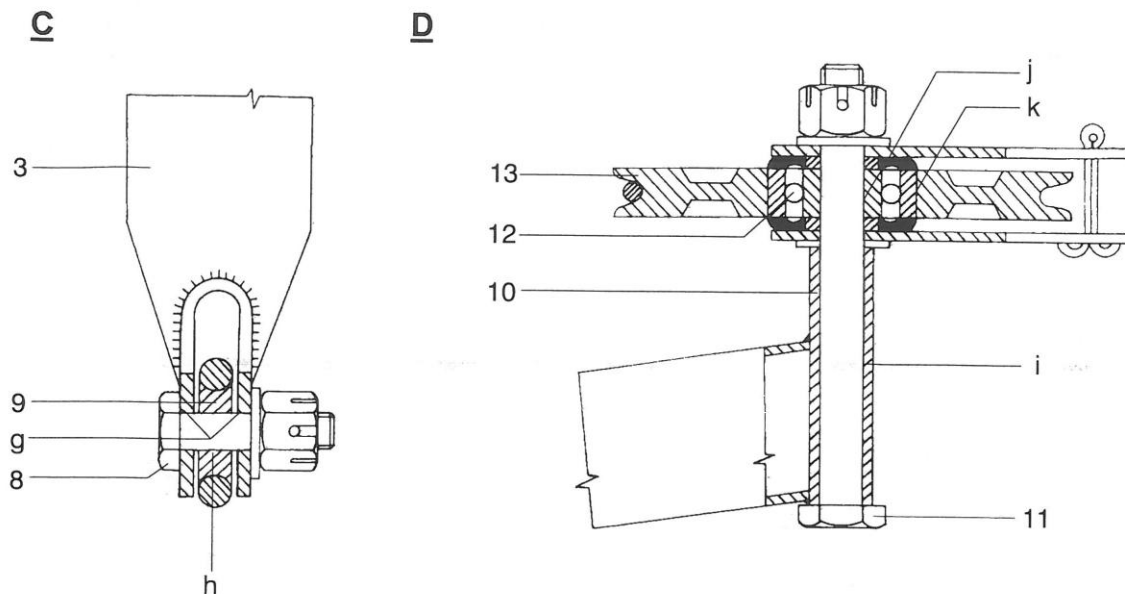
Joint	Item	Name	Dimensions (mm)			
			Original			Operation
			D1	T1	V min./max.	
d	3	Flap control lever	6	+ 0,100 0	$\frac{0,010}{0,128}$	+ 0,150
	5	Pin	Ø 6 f8	- 0,010 - 0,028		- 0,035
e	6	Segment	Ø 8 H11	+ 0,090 0	$\frac{0,013}{0,125}$	+ 0,135
	7	Ring	Ø 8 f8	- 0,013 - 0,035		- 0,045
f	7	Ring	Ø 6 H8	+ 0,018 0	$\frac{0,010}{0,046}$	+ 0,025
	5	Pin	Ø 6 f8	- 0,010 - 0,028		- 0,035

*Fig. 27-19 Dimensions, allowances and plays in wing flap fittings
(page 3 of 6)*

EFFECTIVITY: All

27-50-00

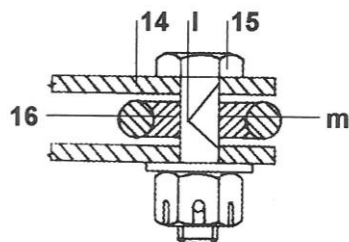
page 27 - 53
2011-02-02



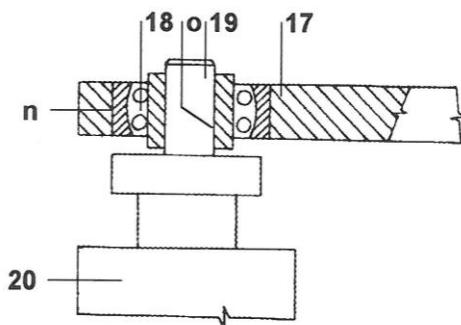
Joint	Item	Name	Dimensions (mm)			
			Original			Operation
			D1	T1	V min./max.	T2 max.
g	3	Flap control lever	Ø 5 H8	+ 0,018 0	$\frac{0,010}{0,046}$	+ 0,025
	8	Fitted bolt	Ø 5 f8	- 0,010 - 0,028		- 0,035
h	9	Pulley	Ø 5 H11	+ 0,075 0	$\frac{0,010}{0,103}$	+ 0,100
	8	Fitted bolt	Ø 5 f8	- 0,010 - 0,028		- 0,035
i	10	Holder (L; R)	Ø 6 H8	+ 0,018 0	$\frac{0,010}{0,046}$	+ 0,025
	11	Fitted bolt	Ø 6 f8	- 0,010 - 0,028		- 0,035
j	12	Bearing	Ø 6	+ 0,002 - 0,010	$\frac{0}{0,030}$	+ 0,005
	11	Fitted bolt	Ø 6 f8	- 0,010 - 0,028		- 0,035
k	13	Pulley	Ø 19 K6	+ 0,002 - 0,010	R	
	12	Bearing	Ø 19	+ 0,002 - 0,011		

Fig. 27-19 Dimensions, allowances and plays in wing flap fittings
(page 4 of 6)

E



F



Joint	Item	Name	Dimensions (mm)			
			Original			Operation
			D1	T1	V min./max.	T2 max.
I	14	Bell crank	Ø 5	+ 0,200 0	$\frac{0,010}{0,228}$	+ 0,003
	15	Fitted bolt	Ø 5 f8	- 0,010 - 0,028		- 0,035
m	16	Pulley	Ø 5 H11	+ 0,075 0	$\frac{0,010}{0,103}$	+ 0,010
	15	Fitted bolt	Ø 5 f8	- 0,010 - 0,028		- 0,035
n	17	Console	Ø 22 K6	+ 0,002 - 0,010	R	
	18	Bearing	Ø 22	+ 0,002 - 0,011		
o	18	Bearing	Ø 6	+ 0,002 - 0,010	$\frac{0}{0,020}$	+ 0,005
	19	Centering pin	Ø 6 h8	0 - 0,018		- 0,025

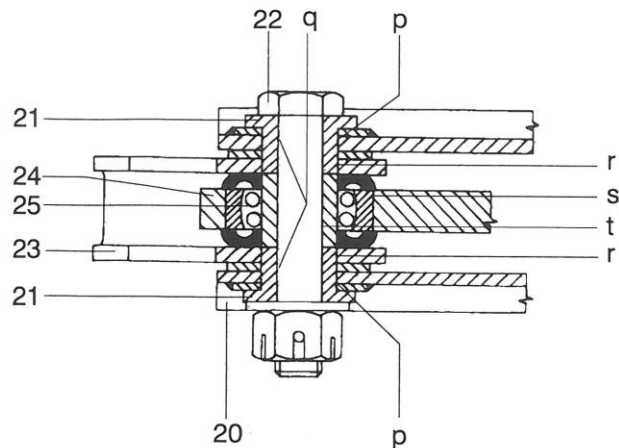
Fig. 27-19 Dimensions, allowances and plays in wing flap fittings
(page 5 of 6)

EFFECTIVITY: All

27-50-00

page 27 - 55
2011-02-02

G



Joint	Item	Name	Dimensions (mm)			
			Original			Operation
			D1	T1	V min./max.	T2 max.
p	20	Bell crank (L; R)	Ø 10	- 0,035 - 0,042	R	
	21	Bushing	Ø 10 f8	- 0,013 - 0,035		
q	21	Bushing	Ø 6 H8	+ 0,018 0	<u>0,010</u> 0,046	+ 0,025
	22	Fitted bolt	Ø 6 f8	- 0,010 - 0,028		- 0,035
r	23	Cam	Ø 10 H8	+ 0,002 0	<u>0,013</u> 0,057	+ 0,035
	21	Bushing	Ø 10 f8	- 0,013 - 0,035		- 0,045
s	24	Eye	Ø 19 K6	+ 0,002 - 0,010	R	
	25	Bearing	Ø 19	+ 0,002 - 0,011		
t	25	Bearing	Ø 6	+ 0,002 - 0,010	<u>0</u> 0,030	+ 0,005
	22	Fitted bolt	Ø 6 f8	- 0,010 - 0,028		- 0,035

Fig. 27-19 Dimensions, allowances and plays in wing flap fittings
(page 6 of 6)

MAINTENANCE

REMOVAL / INSTALLATION

REMOVAL OF BELL CRANKS OF FLAP CONTROL IN WING

CAUTION

STORE REMOVED SPACER DURING FLAP BELL CRANK REMOVAL TO PREVENT THEIR INCORRECT USE DURING THEIR REINSTALLATION.

NOTE

Remove bell cranks with flaps retracted. The bell cranks are accessible after opening the access port door in bottom wing skin and through hole in end wing rib.

Removal of bell cranks of port and starboard wings are the same.

Preparatory works

a) Remove wing center-section panel (Fig. 52-5, item 16).

Recommendation

In order that the flap bell cranks (Fig. 27-20, item 1) may be removed easily it is necessary remove fixing straps of fuel and electric cable protection pipes in the vicinity of access port doors in bottom wing skin.

Bell crank removal

- a) Disconnect cable (Fig. 27-20, item 2, 3) from the bell crank (1) when unscrewing bolt (10) and bonding.
- b) Remove pushrod (22) and disconnect bonding from bell crank (1).
- c) Remove bolt (8) and screws (11) of console (5).

Recommendation

For unscrewing the screws (11) use box wrench 33-Z 42-2611.

- d) Turn console (5) out of flange plate of main wing spar (21) and remove the bell crank from the pin.
- e) Slide the upper bell crank pin (1) from the bearing of upper console (5).
- f) Remove the bell crank (1) from wing, remove bolt (7), spring mechanism, stop bell cranks and cam.

EFFECTIVITY: All

INSTALLATION OF BELL CRANKS OF FLAP CONTROL IN WING**CAUTION**

THE BELL CRANKS WHEN INSTALLED SHOULD NOT EXHIBIT AXIAL PLAY AND SHOULD NOT SEIZE WHEN DEFLECTING. THE AXIAL PLAY MAY BE REMOVED BY SPACERS.

NOTE

Grease according to subsection 05-21-00 the bearings in consoles (5) before bell crank (Fig. 27-20, item 1) installation with grease.

The bell crank installation to port and starboard wings is the same.

- a) Insert washers and dust covers upon pins of bell cranks.
- b) Assemble the mechanism that consists of stop pushrod, spring mechanism, cam and bolt (7) with spacers (13) upon bell crank.

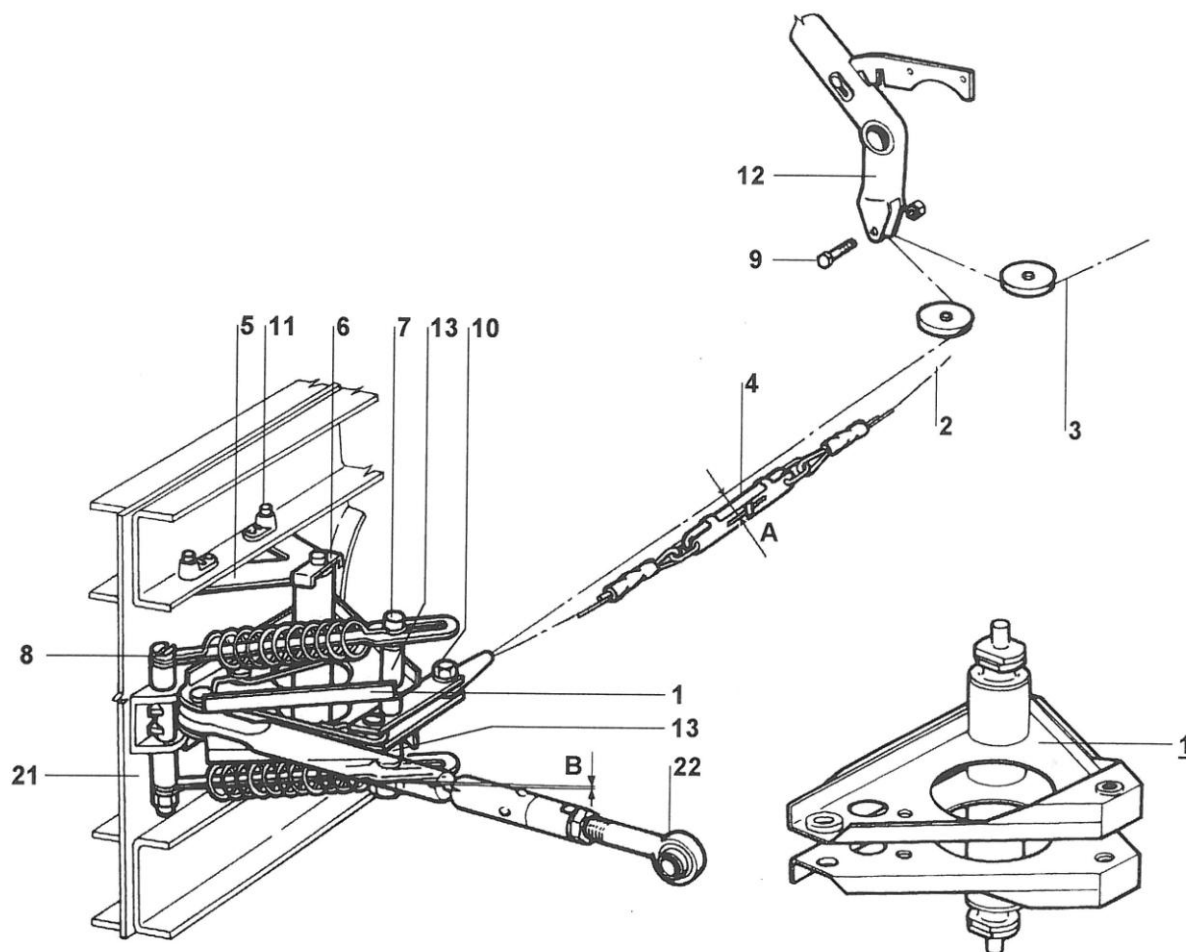
NOTE

In case the reinforced bell cranks (1) are installed the spacer washers instead of spacer tube (13) are used.

- c) Insert assembled bell crank (1) with the upper pin into the upper console bearing (5). Provide upper console bearing with dust cover and clip.
- d) Insert lower console (5) with bearing upon bell crank pin (1). Provide pin with external dust cover and clip (6).
- e) Push the consoles (5) one to the other so that the pins of bell crank shaft (1) protrude through holes in clip (6).
- f) Fix the lower console (5) by screws (11) to flange plate of main wing spar (21).
- g) Join pushrod (22), cables (2, 3) and bondings to bell crank (1).
- h) Check serviceability of wing flap control in all flap positions.

Final works

- a) Install wing center-section panel (Fig. 52-5, item 16).



A ... cable slacking 6 to 10 mm
B ... axial play 0,5 mm

1 ... bell crank (L; R)
1 ... bell crank (L; R) reinforced
2 ... cable
3 ... cable
4 ... turnbuckle
5 ... console (upper; lower)
6 ... clip
7 ... bolt
8 ... bolt
9 ... bolt

10 ... bolt
11 ... bolt
12 ... flap control lever
13 ... spacer tube (NOTE)

For information only:
21 ... main wing spar
22 ... pushrod

NOTE

The spacer tube (13) is used for installation of bell crank (1). The installation of reinforced bell crank (1) the spacer washers are used.

*Fig. 27-20 Flap bell crank
(arrangement in port wing)*

EFFECTIVITY: All

REMOVAL OF FLAP CONTROL CABLES**NOTE**

Remove cables when flaps retracted through access ports in the bottom of wing and in the bottom wing center-section.

Preparatory works

- a) Remove bottom fuselage panel (Fig. 52-5, item 24).
- b) Remove upper locking sheet of a pair of pulleys in the fuselage center section.

Removal of cables

- a) Unscrew bolt (Fig. 27-20, item 9) upon flap bell crank.
- b) Unscrew gradually bolts (10) of port and starboard wing bell crank.
- c) Disconnect bonding and remove both left and right cables from the lower fuselage section.

INSTALLATION OF FLAP CONTROL CABLES**CAUTION**

TIGHTEN THE CABLES OF FLAP CONTROL TO ENSURE RELIABLE FLAP LOCKING IN FLAP RETRACTED POSITION.
THE CABLES THAT ARE TIGHTENED EXCESSIVELY DISABLE THE FLAP LOCKS ENGAGEMENT WHILE EXCESSIVELY SLACKENED CABLES DISABLE THE FLAP EXTENSION TO LANDING POSITION.

NOTE

Install longer cable into port side (Fig. 27-20, item 2) while shorter cable (3) to starboard side.

- a) Fit both left and right cables (2; 3) to pulleys in fuselage center section.
- b) Join eyes of left and right cables to the lower part of flap control lever (12) and screw the bolt (9) into the eye of flap control lever with recommended torque 6 to 7,2 Nm (4,43 to 5,31 lbft) applied for nut tightening.
- c) Insert the cables (2; 3) through bushings in port and starboard side of fuselage into the port and starboard wing root.
- d) Join cables (2, 3) by means of bolts (10) to bell cranks (1) in both port and starboard wings. The recommended torque of nut tightening is 6 to 7,2 Nm (4,43 to 5,31 lbft).
- e) Tighten the cables to be slackened to 6 to 10 mm (0,24 to 0,40 in), dimension A) and lock turnbuckles (4) with cotter pins.
- f) Check serviceability of flap control and flap deflections in all the flap positions after cable installation.
- g) Grease flap control system properly (subsection 05-21-00).

Final works

- a) Install upper locking sheet of pair of pulleys in the fuselage center section.
- b) Install fuselage bottom panel (Fig. 52-5, item 24).

EFFECTIVITY: All

ADJUSTMENT / TESTING

ADJUSTMENT OF WING FLAP CONTROL

Requirements

- a) The distance of movable parts from airplane fixed parts should be at least 3 mm, the distance between movable parts at all positions should be mutually at least 5 mm.
- b) The movement of pushrods, bell cranks and pulleys should be light and continuous.
- c) The pulley positioning to the plane of cable bent should be set with $\pm 2^\circ$ allowance.
- d) The rudder deflection should meet data issued in Fig. 08-4.

Installation of flap control lever

Position of flap control lever	Procedure of adjustment	Adjustment
KLAPKY ZAVŘENY	a) Adjust flaps to be flush with wings.	Stop located upon flap suspension in wing.
	b) Remove play in flap mechanism.	Adjustment of pushrod length (Fig. 27-7, item 14).
	c) Adjust length of cable.	Turnbuckle (Fig. 27-20, item 4).

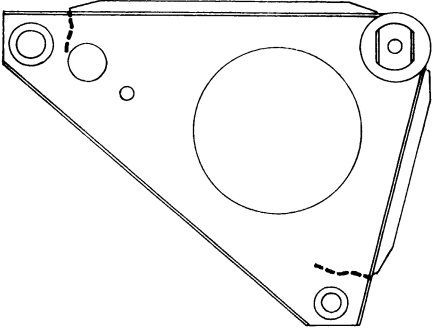
Length of pushrods of flap control

The length of pushrods of flap control are issued in Fig. 27-7.

EFFECTIVITY: All

APPROVED REPAIRS

REPAIR OF FLAP CONTROL BELL CRANKS IN WING

Fault	Remedy
1) Corrosion, faulty paint.	Remove corrosion with emery paper, repair faulty paint according to subsection 51-72-00.
2) Cranks - the spots of probable occurrence is marked dashed line: 	Weld cracks according to procedure in section 27-10-00, APPROVED REPAIRS.

LOCKING OF CONTROLS

DESCRIPTION AND OPERATION

The airplane control stick may be during parking locked with latch located under the left instrument panel.

Procedure of control stick locking:

- turn latch (Fig. 27-21, item 2) upwards
- push left control stick (1) to
- lock the control stick by tilting the latch down.

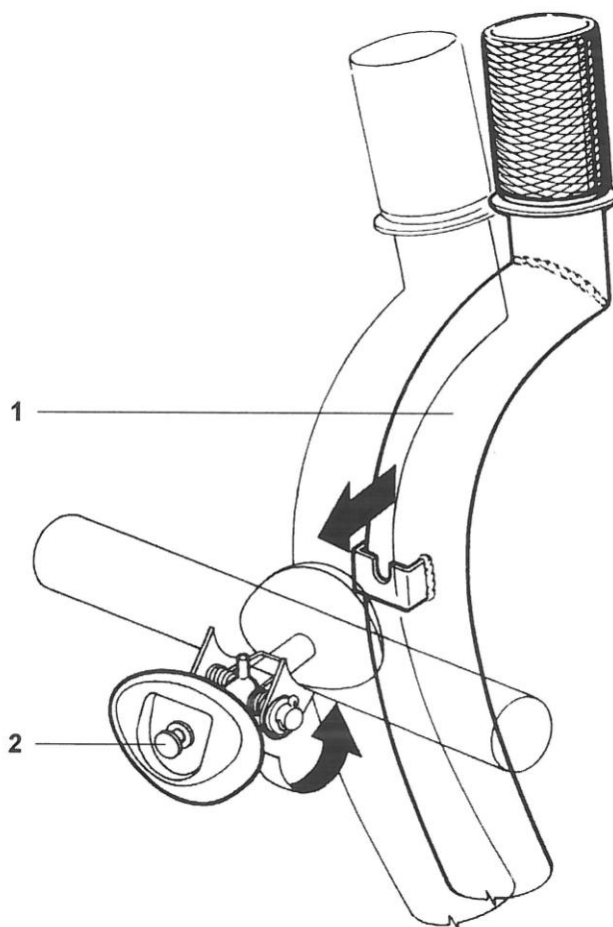


Fig. 27-21 Locking of control stick

EFFECTIVITY: All

27-70-00

page 27 - 63
2011-02-02

INTENTIONALLY LEFT BLANK