Temporary Maintenance Instruction
TMI 189-055

Pitch and Roll actuators - Install procedure

All AW189 Helicopters

The technical content of this document is approved under the authority of DOA nr. EASA.21J.005.

The present TMI will be evaluated for its introduction in the standard set of Technical Publication.
If no further notice is received, the present document expires on: December 23rd 2023.

2022-12-23

Introduction

The purpose of this Temporary Maintenance Instruction is to provide evidence of the updated maintenance procedures found in DM 89-A-22-11-02-00A-720A-A - Pitch actuator - Install procedure & 89-A-22-11-05-00A-720A-A - Roll actuator - Install procedure

The procedures contained in this TMI update and supersede the contents of the following Data Modules:

ANNEX	DATA MODULE CODE	DATA MODULE TITLE
Annex 1	89-A-22-11-02-00A-720A-A	Pitch actuator - Install procedure
Annex 2	89-A-22-11-05-00A-720A-A	Roll actuator - Install procedure

The content of this TMI will be endorsed within the applicable Maintenance Manual at the earliest opportunity.

Pitch actuator - Install procedure

Table of contents

List of tables

List of figures

References

Table 1 References

Data Module	Title
89-A-00-20-00-00A-120A-A	Helicopter safety - Pre-operation (make helicopter safe for maintenance)
89-A-12-41-00-00A-510A-A	External electrical power - Disconnect procedure
89-A-12-41-00-00A-730A-A	External electrical power - Connect procedure
89-A-12-42-00-00A-510A-A	External hydraulic power - Disconnect procedure

Table 1 References

Data Module	Title
89-A-12-42-00-00A-730A-A	External hydraulic power - Connect procedure
89-A-22-11-00-00A-320A-A	Automatic flight control system - Operation test
89-A-67-00-00-00A-520A-A	Rotor flight controls - Rigging tools - Remove procedure
89-A-67-00-00-00A-720A-A	Rotor flight controls - Rigging tools - Install procedure

Table 2 Access points

Access Panel / Door Id	Data Module
None	

Table 3 Zones

Zone ID	Data Module
170	89-A-06-30-00-00A-010A-A

Preliminary Requirements

Required Conditions

Table 4 Required Conditions

Conditions	Data Module/Technical Publication
The helicopter must be safe for maintenance.	89-A-00-20-00-00A-120A-A

Support Equipment

Table 5 Support Equipment

Nomenclature	Identification No.	Qty
Torque wrench	ZZ-00-00	1

Supplies

Table 6 Supplies

Nomenclature	Identification No.	Qty
Corrosion preventive compound	C001	AR
Corrosion inhibitor	C002	AR
Cleaning solvent	C010	AR
Lint-free cloth	C011	AR
Safety wire	C014	AR

Spares

Table 7 Spares

Nomenclature	Identification No.	Qty
Pitch actuator	22-11-01-01 -007	AR
Cotter pin	22-11-01-01 -006	1
Cotter pin	22-11-01-01 -012	2
Washer	22-11-01-01 -026	AR

Safety Conditions

WARNINGS

- **The materials that follow are dangerous. Before you do this procedure, make sure that you know all the safety precautions and first aid instructions for these materials:**
  - **The Corrosion preventive compound (C001)**
  - **The Corrosion inhibitor (C002)**
  - **The Cleaning solvent (C010) .**
- **This installation includes Vital Points (VP). During the procedure, you must obey the Local Regulations applicable to the Vital Points.**

Procedure

WARNING

Before you do this procedure, make sure that the P/N marked on the label installed on the pitch actuators (1M, Figure 1) is 8486-3 as shown in Detail F of Figure 1 Sheet 3. If the above condition is not verified, restore the correct pitch actuator configuration.

1 During this procedure you must remove all the caps from the electrical connectors. Do this immediately before you connect each electrical connector.

2 Carefully clean the parts that follow with the Lint-free cloth (C011) and the Cleaning solvent (C010) :

- The special pin (23, Figure 1), the washer (11) and the nut (13)
- The bolt (22), the countersunk washer (21) the washer (19) and the nut (**17**) (**VP**)
- The bolt (8), the countersunk washer (9), the washer (3) and the nut (**5**). (**VP**)

WARNING

Be careful when you use the compressed air. Dust and particles can cause injury to your eyes. Always use applicable protective goggles.

3 Dry the cleaned parts with the compressed air until you remove all the solvent.

4 Put and hold the pitch actuator (1) in its position between the pitch actuator lever (10) and the support (2).

5 Apply the Corrosion preventive compound (C001) to the shank and below the head of the special pin (23) and the washer (11).

6 Put the eye end (15) in its position on the pitch actuator lever (10).

Note

To get a better pin grip length and a correct cotter pin installation, you can install one more washer (12).

7 Install these parts that attach the eye end (15) to the pitch actuator lever (10):

- The spacial pin (23)
- The washer (11)
- If necessary, the new Washer (22-11-01-01 -026) (12)
- The nut (13).

8 Make sure that the head of the special pin (23) correctly engages the fork of the spring (30). Refer also to Detail E of Figure 1.

9 Torque the nut (13) to 2.8 thru 3.9 N m (25 thru 35 lbf in) with the Torque wrench (ZZ-00-00) .

10 Install the new Cotter pin (22-11-01-01 -012) (14).

11 Apply the Corrosion inhibitor (C002) to the parts that follow:

- The exposed threads of the special pin (23), the nut (13) and the cotter pin (14).

12 Apply the Corrosion preventive compound (C001) to the parts that follow:

- The shank and below the head of the bolt (22)
- The flat side of the countersunk washer (21)

- The washer (19).

13 Put the pitch actuator rod (20) in its position on the eye end (15).

Note
To get a better bolt grip length and a correct cotter pin installation, you can install one more washer (18).

14 Install these parts that attach the pitch actuator rod (20) to the eye end (15):
- The countersunk washer (21)
- The bolt (22)
- The washer (19)
- If necessary, the new Washer (22-11-01-01 -026) (18)
- The nut (**17**). (**VP**)

Make sure that the countersunk side of the washer (21) is adjacent to the head of the bolt (22).

15 Torque the nut (**17**) to 3.9 thru 4.5 N m (35 thru 40 lbf in) with the Torque wrench (ZZ-00-00) . (**VP**)

16 Install the new Cotter pin (22-11-01-01 -006) (16).

17 Apply the Corrosion inhibitor (C002) to the parts that follow:
- The head and the exposed threads of the bolt (22), the nut (**17**) and the cotter pin (16). (**VP**)

CAUTION

Make sure that you put the electrical connectors in the same position you recorded at the removal. This is to prevent interferences with the actuators.

18 Connect the electrical connector HP2P1 (27) to the electrical socket HP2J1 (25).

19 Connect the electrical connector HP15P1 (26) to the electrical socket HP15J1 (24).

20 Connect the external electrical power to the helicopter. Refer to 89-A-12-41-00-00A-730A-A.

21 Connect the external hydraulic power. Refer to 89-A-12-42-00-00A-730A-A.

22 Set the external hydraulic power to ON. Then, increase the external hydraulic pressure to 207 bar (3000 psi).

23 Install the applicable rigging pin through the bellcrank F4/5-L5/6 and the four levers. Refer to the applicable steps of Data Module 89-A-67-00-00-00A-720A-A.

24 Get access to the cockpit

25 On the Number 1 multifunction display (MFD1) (1, Figure 2) push the T7 bezel key. Then, push the B8 bezel key until the “AFCS ATP” page is in view on the MFD1 (1).

26 On the Number 2 multifunction display (MFD2) (2), push the T7 bezel key. Then, push the B8 bezel key until the “AFCS PFT” page is in view on the MFD2 (2).

27 On the autopilot control panel, push the AP1 button (4). Make sure that the light of the AP1 button (4) comes on. This shows that the AP1 is engaged.

28 On the autopilot control panel, push the AP2 button (3). Make sure that the light of the AP2 button (3) comes on. This shows that the AP2 is engaged.

29 Make sure that the two actuators of the pitch actuator (1, Figure 1) are at the middle stroke position.

30 If necessary, adjust the length of the pitch actuator (1) as follows:

30.1 If installed, cut and remove the safety wire from the check nut (29) and the lock washer (28).

30.2 Loosen the check nut (29).

30.3 Adjust the length of the fork end (7) as necessary to attach it to the support (2) with the bolt (8).

30.4 Torque the check nut (29) to 18.1 thru 21.4 N m (160 thru 190 lbf in) with the Torque wrench (ZZ-00-00) .

30.5 Make sure that the extension of the fork end (7) (Dimension X) is less or equal to 14.0 mm (0.55 in). Refer to Detail D of Figure 1 . (**VP**)

30.6 Safety the check nut (29) to the lock washer (28) with the Safety wire (C014) .

30.7 Apply the Corrosion inhibitor (C002) to the check nut (29) and the exposed threads of the fork end (7).

31 Apply the Corrosion preventive compound (C001) to the parts that follow:

- The shank and below the head of the bolt (8)
- The flat side of the countersunk washer (9)
- The nut (**5**). (**VP**)

32 Put the fork end (7) in its position on the support (2).

Note

To get a better bolt grip length and a correct cotter pin installation, you can install one more washer (4).

33 Install these parts that attach the fork end (7) to the support (2):

- The countersunk washer (9)
- The bolt (8)
- The washer (3)
- If necessary, the washer (4)
- The nut (**5**). (**VP**)

Make sure that the countersunk side of the washer (9) is adjacent to the head of the bolt (8).

34 Torque the nut (**5**) to 3.9 thru 4.5 N m (35 thru 40 lbf in) with the Torque wrench (ZZ-00-00) . (**VP**)

35 Install the new Cotter pin (22-11-01-01 -012) (6).

36 Apply the Corrosion inhibitor (C002) to the parts that follow:

- The head and the exposed threads of the bolt (8), the nut (**5**) and the cotter pin (6). (**VP**)

37 Remove the rigging pin from the bellcrank F4/5-L5/6 and the four levers. Refer to the applicable steps of Data Module 89-A-67-00-00-00A-520A-A.

38 On the autopilot control panel, push the AP1 button (4, Figure 2). Make sure that the light of the AP1 button (4) goes off. This shows that the AP1 is disengaged.

39 On the autopilot control panel, push the AP2 button (3). Make sure that the light of the AP2 button (3) goes off. This shows that the AP2 is disengaged.

40 Disconnect the external electrical power from the helicopter. Refer to 89-A-12-41-00-00A-510A-A.

41 Decrease the external hydraulic pressure to zero. Then, set the external hydraulic power to OFF.

42 Disconnect the external hydraulic power. Refer to 89-A-12-42-00-00A-510A-A.

CAUTION

Make sure that you put the electrical connectors in the same position you recorded at the removal. This is to prevent interferences with the actuators.

43 Connect the electrical connector HP2P1 (27) to the electrical socket HP2J1 (25).

44 Connect the electrical connector HP15P1 (26) to the electrical socket HP15J1 (24).

CAUTION

Check two times that the P/N marked on the label installed on the pitch actuators (1M) is 8486-3 as shown in Detail F of Figure 1 Sheet 3.

45 Remove the warning flag from the cockpit.

Requirements After Job Completion

1 Remove all the tools and the other items from the work area. Make sure that the work area is clean.

2 If you install a new pitch actuator, do the operation test of the pitch actuator. Refer to 89-A-22-11-00-00A-320A-A

3 Install the access panels 226F and 226B. Refer to 89-A-06-41-00-00A-010A-A

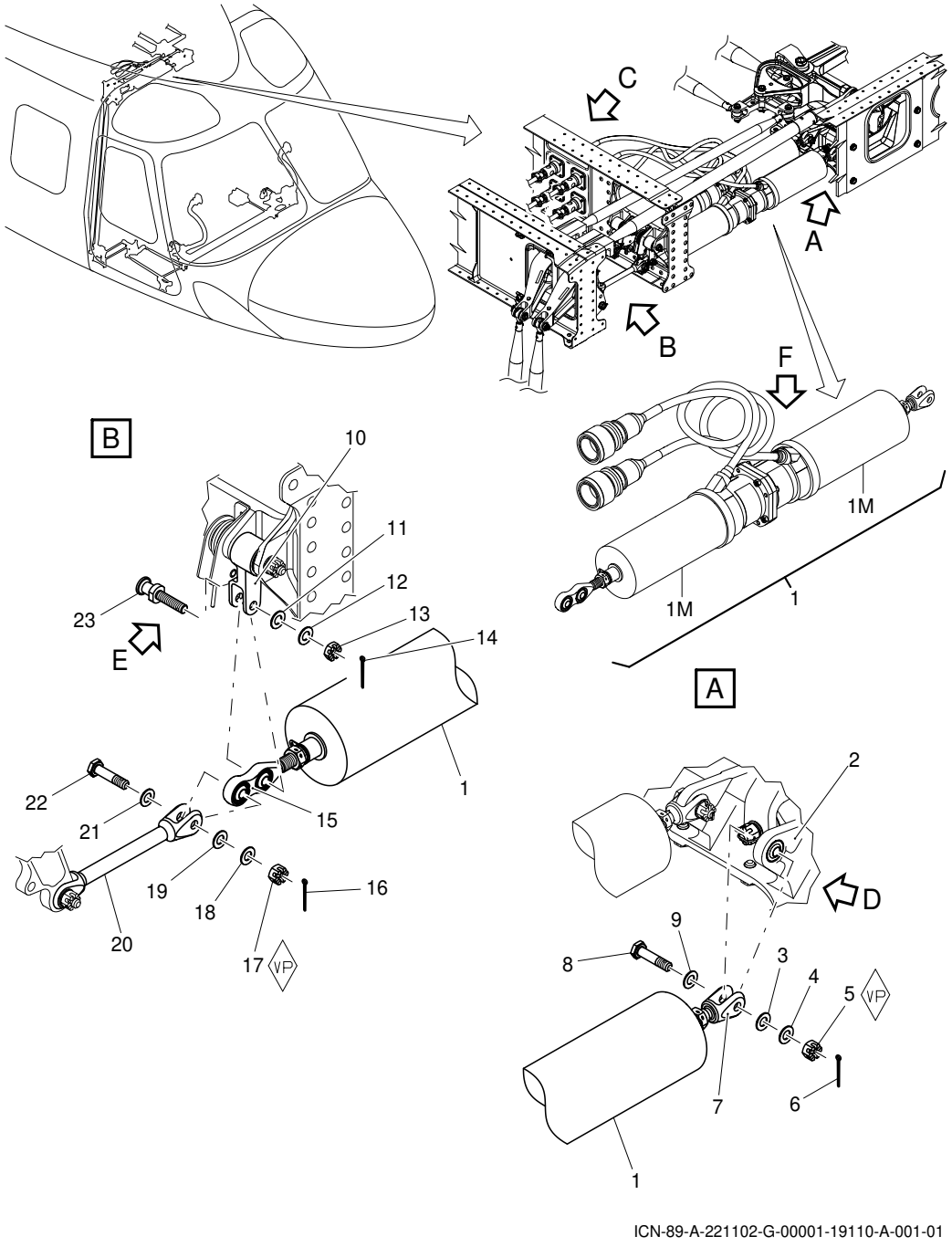


Figure 1 (Sheet 1 of 3) Pitch actuator - Install procedure

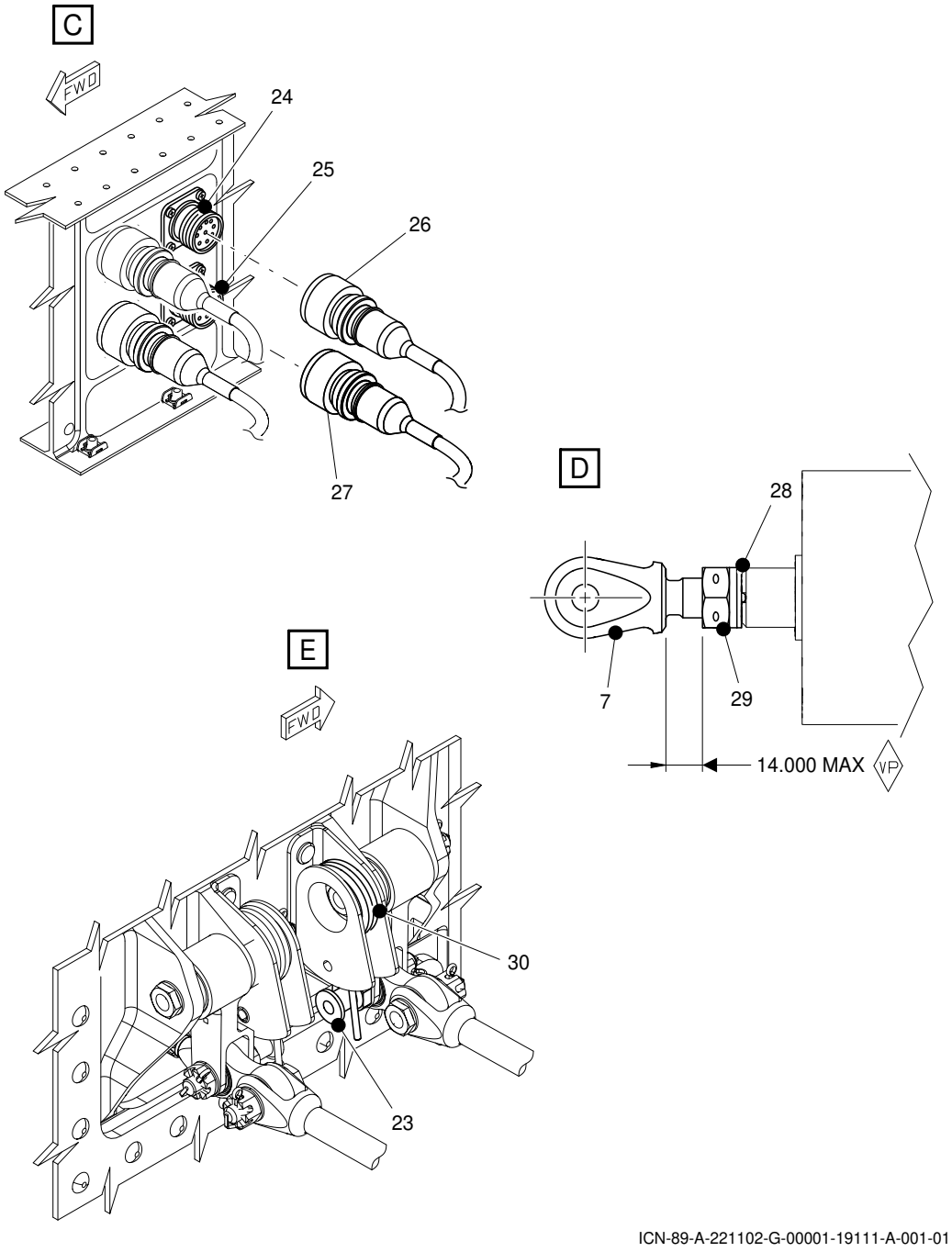


Figure 1 (Sheet 2 of 3) Pitch actuator - Install procedure

F

TYPICAL

ICN-89-A-221102-G-00001-19156-A-001-01

Figure 1 (Sheet 3 of 3) Pitch actuator - Install procedure

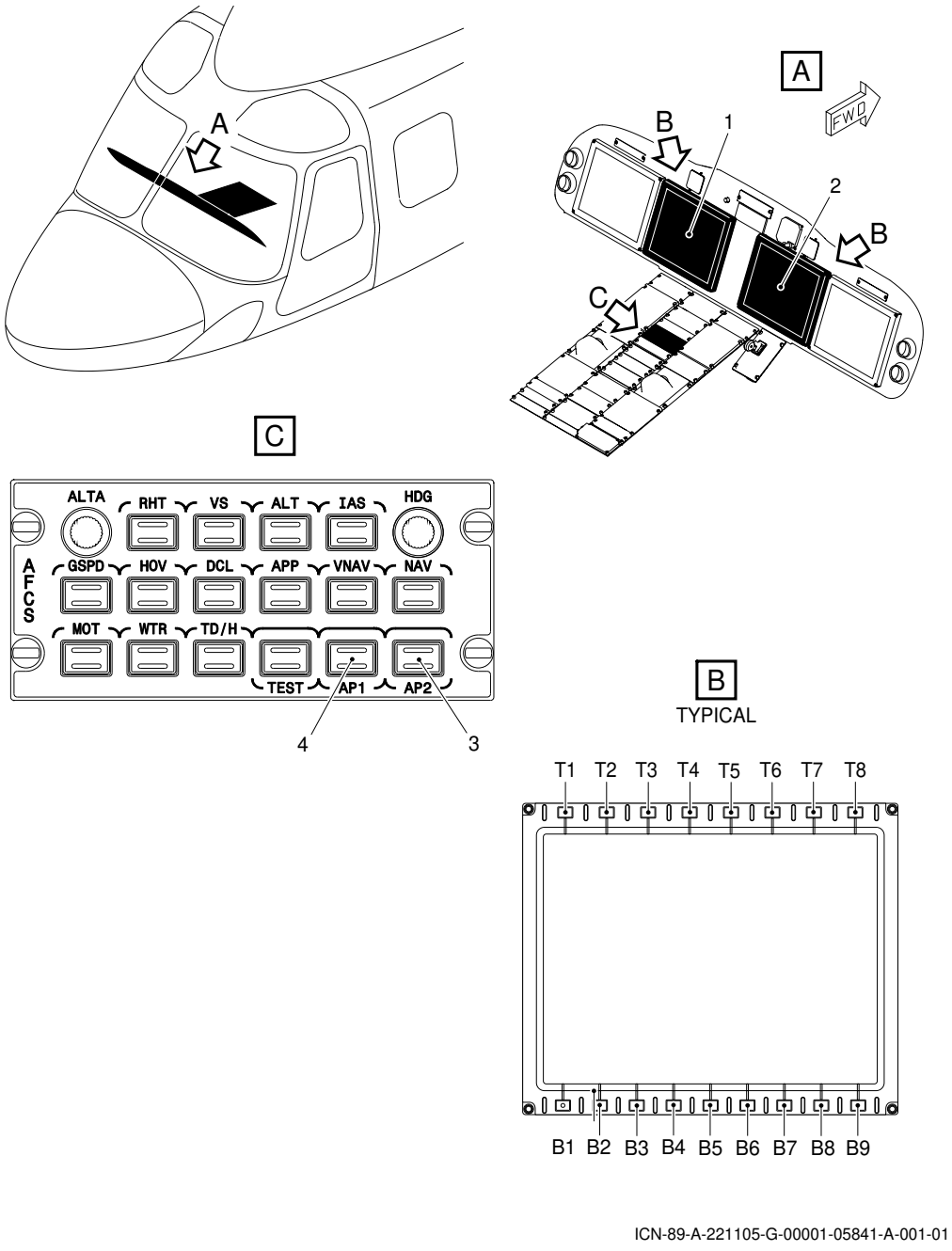


Figure 2 Pitch actuator - Install procedure

THIS PAGE INTENTIONALLY LEFT BLANK

Roll actuator - Install procedure

Table of contents

List of tables

List of figures

References

Table 1 References

Data Module	Title
89-A-00-20-00-00A-120A-A	Helicopter safety - Pre-operation (make helicopter safe for maintenance)
89-A-12-41-00-00A-510A-A	External electrical power - Disconnect procedure
89-A-12-41-00-00A-730A-A	External electrical power - Connect procedure
89-A-12-42-00-00A-510A-A	External hydraulic power - Disconnect procedure

Table 1 References

Data Module	Title
89-A-12-42-00-00A-730A-A	External hydraulic power - Connect procedure
89-A-22-11-00-00A-320A-A	Automatic flight control system - Operation test
89-A-67-00-00-00A-520A-A	Rotor flight controls - Rigging tools - Remove procedure
89-A-67-00-00-00A-720A-A	Rotor flight controls - Rigging tools - Install procedure

Table 2 Access points

Access Panel / Door Id	Data Module
None	

Table 3 Zones

Zone ID	Data Module
170	89-A-06-30-00-00A-010A-A

Preliminary Requirements

Required Conditions

Table 4 Required Conditions

Conditions	Data Module/Technical Publication
The helicopter must be safe for maintenance.	89-A-00-20-00-00A-120A-A

Support Equipment

Table 5 Support Equipment

Nomenclature	Identification No.	Qty
Torque wrench	ZZ-00-00	1

Supplies

Table 6 Supplies

Nomenclature	Identification No.	Qty
Corrosion preventive compound	C001	AR
Corrosion inhibitor	C002	AR
Cleaning solvent	C010	AR
Lint-free cloth	C011	AR
Safety wire	C014	AR

Spares

Table 7 Spares

Nomenclature	Identification No.	Qty
Roll actuator	22-11-02-01 -007	AR
Cotter pin	22-11-02-01 -006	1
Cotter pin	22-11-02-01 -012	2
Washer	22-11-02-01 -027	AR

Safety Conditions

WARNINGS

- **The materials that follow are dangerous. Before you do this procedure, make sure that you know all the safety precautions and first aid instructions for these materials:**
  - **The Corrosion preventive compound (C001)**
  - **The Corrosion inhibitor (C002)**
  - **The Cleaning solvent (C010) .**
- **This installation includes Vital Points (VP). During the procedure, you must obey the Local Regulations applicable to the Vital Points.**

Procedure

WARNING

Before you do this procedure, make sure that the P/N marked on the label installed on the roll actuators (1M, Figure 1) is 1-8486-3 as shown in Detail F of Figure 1 Sheet 3. If the above condition is not verified, restore the correct roll actuator configuration.

1 During this procedure you must remove all the caps from the electrical connectors. Do this immediately before you connect each electrical connector.

2 Carefully clean the parts that follow with the Lint-free cloth (C011) and the Cleaning solvent (C010) :

- The special pin (23), the washer (18) and the nut (21)
- The bolt (11), the countersunk washer (12) the washer (14) and the nut (**16**). (**VP**)
- The bolt (8), the countersunk washer (9), the washer (3) and the nut (**5**). (**VP**)

WARNING

Be careful when you use the compressed air. Dust and particles can cause injury to your eyes. Always use applicable protective goggles.

3 Dry the cleaned parts with the compressed air until you remove all the solvent.

4 Put and hold the roll actuator (1) in its position between the roll actuator lever (22) and the support (2).

5 Apply the Corrosion preventive compound (C001) to the shank and below the head of the special pin (23) and the washer (18).

6 Put the eye end (10) in its position on the roll actuator lever (22).

Note

To get a better pin grip length and a correct cotter pin installation, you can install one more washer (19).

7 Install these parts that attach the eye end (10) to the roll actuator lever (22):

- The spacial pin (23)
- The washer (18)
- If necessary, the new Washer (22-11-02-01 -027) (19).
- The nut (21).

8 Make sure that the head of the special pin (23) correctly engages the fork of the spring (30). Refer also to Detail E of Figure 1.

9 Torque the nut (21) to 2.8 thru 3.9 N m (25 thru 35 lbf in) with the Torque wrench (ZZ-00-00) .

10 Install the new Cotter pin (22-11-02-01 -012) (20).

11 Apply the Corrosion inhibitor (C002) to the parts that follow:

- The exposed threads of the special pin (23), the nut (21) and the cotter pin (20).

12 Apply the Corrosion preventive compound (C001) to the parts that follow:

- The shank and below the head of the bolt (11)
- The flat side of the countersunk washer (12)

- The washer (14).

13 Put the roll actuator rod (13) in its position on the eye end (10).

Note
To get a better bolt grip length and a correct cotter pin installation, you can install one more washer (15).

14 Install these parts that attach the roll actuator rod (13) to the eye end (10):
- The countersunk washer (12)
- The bolt (11)
- The washer (14)
- If necessary, the new Washer (22-11-02-01 -027) (15)
- The nut (**16**). (**VP**)

Make sure that the countersunk side of the washer (12) is adjacent to the head of the bolt (11).

15 Torque the nut (**16**) to 3.9 thru 4.5 N m (35 thru 40 lbf in) with the Torque wrench (ZZ-00-00) . (**VP**)

16 Install the new Cotter pin (22-11-02-01 -006) (11).

17 Apply the Corrosion inhibitor (C002) to the parts that follow:
- The head and the exposed threads of the bolt (11)
- The nut (**16**). (**VP**)
- The cotter pin (11).

CAUTION

Make sure that you put the electrical connectors in the same position you recorded at the removal. This is to prevent interferences with the actuators.

18 Connect the electrical connector HP1P1 (25) to the electrical socket HP1J1 (26).

19 Connect the electrical connector HP14P1 (24) to the electrical socket HP14J1 (27).

20 Connect the external electrical power to the helicopter. Refer to 89-A-12-41-00-00A-730A-A.

21 Connect the external hydraulic power. Refer to 89-A-12-42-00-00A-730A-A.

22 Set the external hydraulic power to ON. Then, increase the external hydraulic pressure to 207 bar (3000 psi).

23 Install the applicable rigging pin through the bellcrank F4/5-L5/6 and the four levers. Refer to the applicable steps of Data Module 89-A-67-00-00-00A-720A-A.

24 Get access to the cockpit

25 On the Number 1 multifunction display (MFD1) (1, Figure 2) push the T7 bezel key. Then, push the B8 bezel key until the “AFCS ATP” page is in view on the MFD1 (1).

26 On the Number 2 multifunction display (MFD2) (2), push the T7 bezel key. Then, push the B8 bezel key until the “AFCS PFT” page is in view on the MFD2 (2).

27 On the autopilot control panel, push the AP1 button (4). Make sure that the light of the AP1 button (4) comes on. This shows that the AP1 is engaged.

28 On the autopilot control panel, push the AP2 button (3). Make sure that the light of the AP2 button (3) comes on. This shows that the AP2 is engaged.

29 Make sure that the two actuators of the roll actuator (1, Figure 1) are at the middle stroke position.

30 If necessary, adjust the length of the roll actuator (1) as follows:

30.1 If installed, cut and remove the safety wire from the check nut (29) and the lock washer (28).

30.2 Loosen the check nut (29).

30.3 Adjust the length of the fork end (7) as necessary to attach it to the support (2) with the bolt (8).

30.4 Torque the check nut (29) to 18.1 thru 21.4 N m (160 thru 190 lbf in) with the Torque wrench (ZZ-00-00) .

30.5 Make sure that the extension of the fork end (7) (Dimension X) is less or equal to 14.0 mm (0.55 in). See Detail D of Figure 1.. (**VP**)

30.6 Safety the check nut (29) to the lock washer (28) with the Safety wire (C014) .

30.7 Apply the Corrosion inhibitor (C002) to the check nut (29) and the exposed threads of the fork end (7).

31 Apply the Corrosion preventive compound (C001) to the parts that follow:

- The shank and below the head of the bolt (8)
- The flat side of the countersunk washer (9)
- The washer (3).

32 Put the fork end (7) in its position on the support (2).

Note

To get a better bolt grip length and a correct cotter pin installation, you can install one more washer (4).

33 Install these parts that attach the fork end (7) to the support (2):

- The countersunk washer (9)
- The bolt (8)
- The washer (3)
- If necessary, the new Washer (22-11-02-01 -027) (4)

- The nut (**5**). (**VP**)

Make sure that the countersunk side of the washer (9) is adjacent to the head of the bolt (8).

34 Torque the nut (**5**) to 3.9 thru 4.5 N m (35 thru 40 lbf in) with the Torque wrench (ZZ-00-00) . (**VP**)

35 Install the new Cotter pin (22-11-02-01 -012) (6).

36 Apply the Corrosion inhibitor (C002) to the parts that follow:

- The head and the exposed threads of the bolt (8)
- The nut (**5**) (**VP**)
- The cotter pin (6).

37 Remove the rigging pin from the bellcrank F4/5-L5/6 and the four levers. Refer to the applicable steps of Data Module 89-A-67-00-00-00A-520A-A.

38 On the autopilot control panel, push the AP1 button (4, Figure 2). Make sure that the light of the AP1 button (4) goes off. This shows that the AP1 is disengaged.

39 On the autopilot control panel, push the AP2 button (3). Make sure that the light of the AP2 button (3) goes off. This shows that the AP2 is disengaged.

40 Disconnect the external electrical power from the helicopter. Refer to 89-A-12-41-00-00A-510A-A.

41 Decrease the external hydraulic pressure to zero. Then, set the external hydraulic power to OFF.

42 Disconnect the external hydraulic power. Refer to 89-A-12-42-00-00A-510A-A.

CAUTION

Check two times that the P/N marked on the label installed on the roll actuators (1M) is 1-8486-3 as shown in Detail F of Figure 1 Sheet 3.

43 Remove the warning flag from the cockpit.

Requirements After Job Completion

1 Remove all the tools and the other items from the work area. Make sure that the work area is clean.

2 Do the operation test of the roll actuator. Refer to 89-A-22-11-00-00A-320A-A

3 Install the access panels 226F and 226B. Refer to 89-A-06-41-00-00A-010A-A

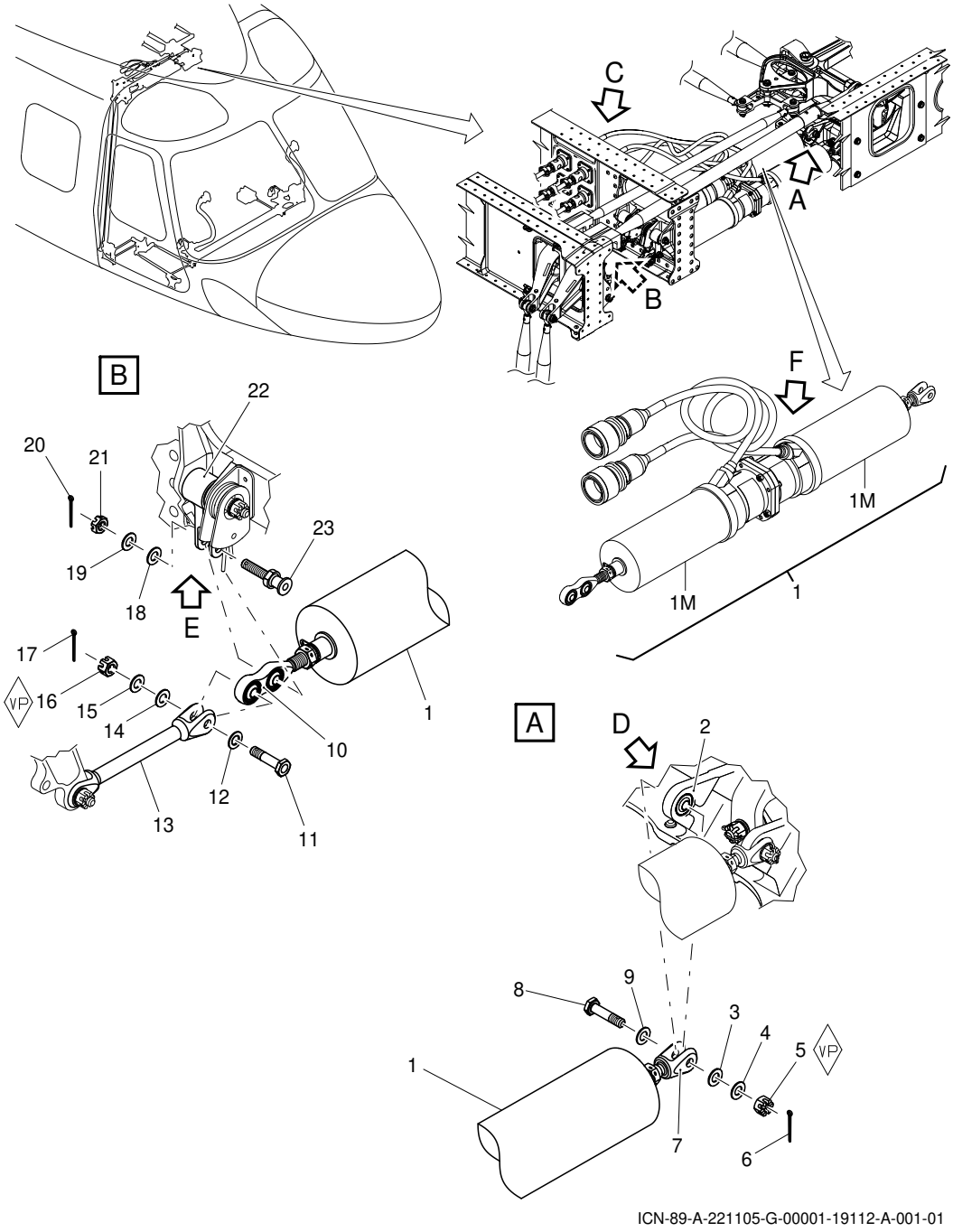
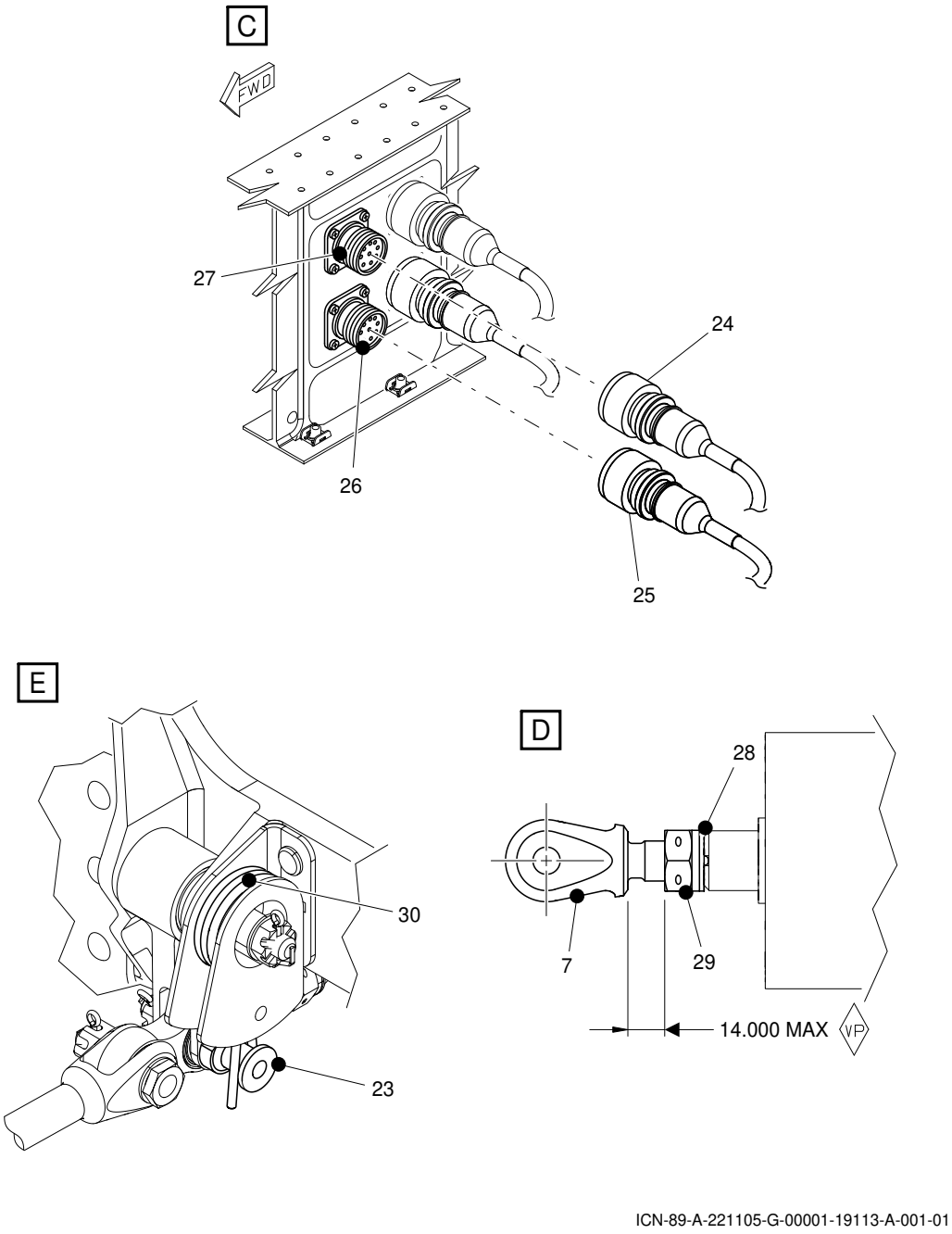


Figure 1 (Sheet 1 of 3) Roll actuator - Install procedure

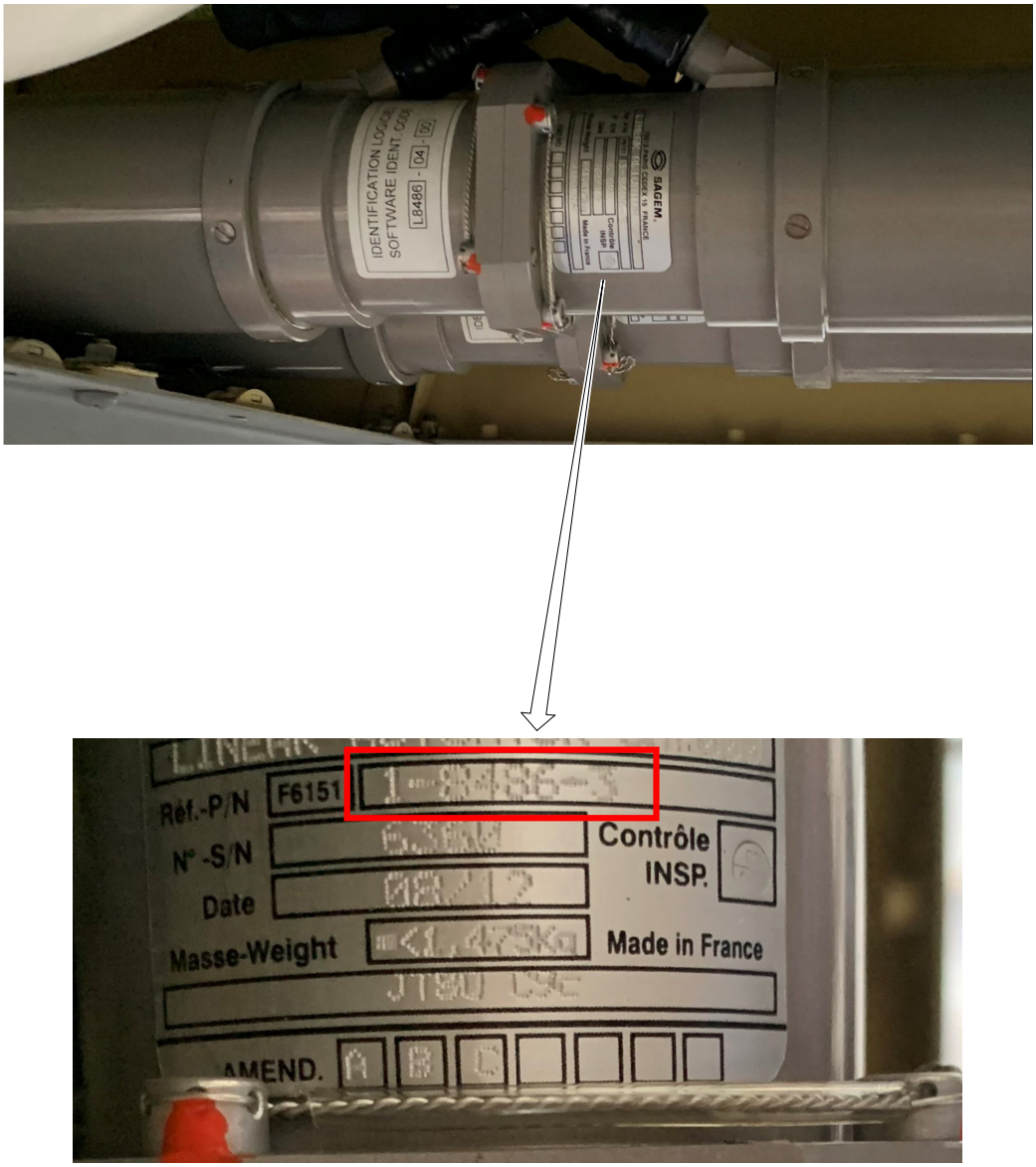


ICN-89-A-221105-G-00001-19113-A-001-01

Figure 1 (Sheet 2 of 3) Roll actuator - Install procedure

F

TYPICAL



ICN-89-A-221105-G-00001-19157-A-001-01

Figure 1 (Sheet 3 of 3) Roll actuator - Install procedure

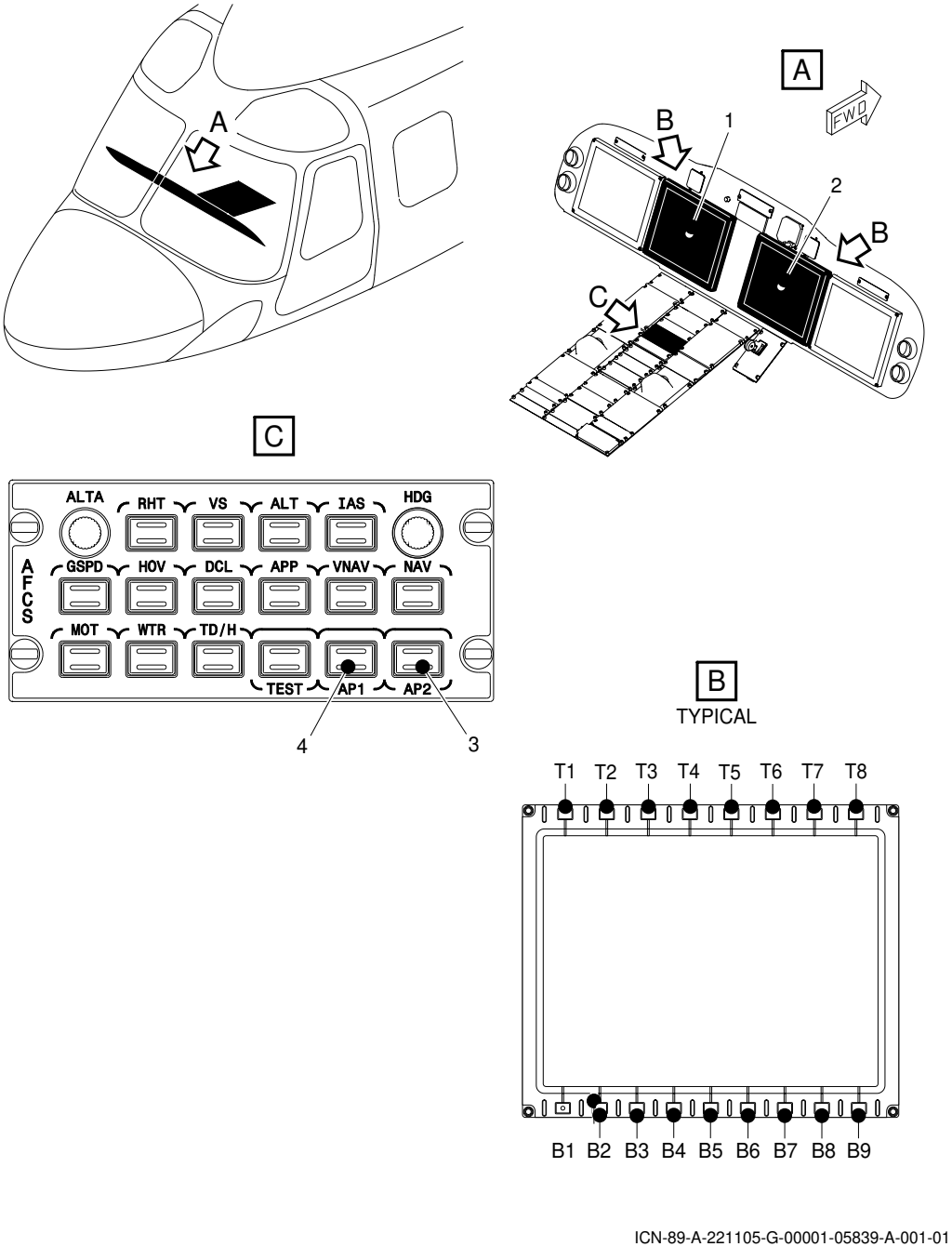


Figure 2 Roll actuator - Install procedure

THIS PAGE INTENTIONALLY LEFT BLANK