

CHAPTER

73

ENGINE FUEL AND CONTROL

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SPECIAL NOTE

WITHIN THIS MANUAL ALL REFERENCES TO LEFT AND RIGHT, CLOCKWISE AND COUNTERCLOCKWISE, FRONT AND REAR, ARE AS VIEWED FROM THE REAR OF THE AIRPLANE.

WITHIN THE ENGINE/PROPELLER MANUALS ALL SUCH REFERENCES ARE AS VIEWED FROM THE ACCESSORY GEARBOX/SPINNER BULKHEAD.

BECAUSE THE PIAGGIO P180 AVANTI IS CONFIGURED WITH "PUSHER" PROPELLERS, THE ENGINES ARE INSTALLED WITH THE ACCESSORY GEARBOX TOWARDS THE FRONT OF THE AIRPLANE; THEREFORE, IN THIS MANUAL ALL REFERENCES TO LEFT AND RIGHT, CLOCKWISE AND COUNTERCLOCKWISE, FRONT AND REAR (WHEN APPLIED TO ENGINE AND PROPELLER COMPONENTS) WILL BE THE OPPOSITE TO THE SAME REFERENCES IN THE ENGINE/PROPELLER MANUALS.

FOR EXAMPLE, ACCORDING TO THIS MANUAL, THE ENGINE ACCESSORY GEARBOX IS AT THE FRONT OF THE ENGINE; THE ENGINE MANUALS CONSIDER THE ACCESSORY GEARBOX TO BE THE REAR OF THE ENGINE.

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ENGINE FUEL CONTROL - DESCRIPTION AND OPERATION

1. General

The full description and operation and maintenance practices for the engine fuel and control will be issued later.

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DISTRIBUTION - MAINTENANCE PRACTICES

1. General

WARNING: DO NOT TOUCH THE ENGINE COMPONENTS FOR A SHORT TIME AFTER THE ENGINE IS SHUTDOWN. THE ENGINE COMPONENTS CAN STAY HOT FOR UP TO ONE HOUR.

WARNING: DO NOT LET ENGINE FUEL STAY ON YOUR SKIN FOR A LONG TIME. THE FUEL IS POISONOUS AND CAN GO THROUGH YOUR SKIN AND IN TO YOUR BODY.

CAUTION: DO NOT LET ENGINE FUEL FALL ON THE ENGINE. UNWANTED FUEL MUST BE REMOVED IMMEDIATELY WITH A CLEAN LINT-FREE CLOTH. THE FUEL CAN CAUSE DAMAGE TO THE SURFACE PROTECTION AND TO SOME PARTS.

A. This procedure gives the engine fuel and control - distribution - maintenance practices that follow:

- The fuel pump inlet screen
- The fuel pump outlet filter
- The fuel purge system - accumulator
- The fuel purge filters
- P3 air filters.

2. Fuel Pump-Inlet Screen - Removal

A. Fixtures, Test and Support Equipment

Covers/Caps/Plugs	Not Specified
Clean container/drip pan	Minimum capacity 1 US gal
Access Platform	3.3 ft (1 m)

B. Referenced Information

Maintenance Manual Chapter [54-00-00](#)
P&WC Engine Maintenance Manual Chapter 73-16-32

C. Procedures

NOTE: This procedure is applicable to both the left hand and right hand installation. Data for the right hand procedure is given between parentheses.

(1) Open, tag and safety these circuit breakers:

Pilot CB panel:

L FUEL
FLOW

L ENG
START

R ENG
START

Copilot CB panel:

R FUEL
FLOW

(2) Remove the access panels that follow (Refer to [54-00-00](#)):

410AB (420AB)
410AT (420AT)

(3) Put a clean container/drip pan below the fuel pump.

(4) Get access to the fuel pump-inlet screen.

(5) Remove the fuel pump-inlet screen (Refer to P&WC 73-16-32).

(6) Put caps on all line ends and electrical connectors.

3. Fuel Pump-Inlet Screen - Installation

A. Fixtures, Test and Support Equipment

Lint-free cloth

Not specified

B. Materials

Methyl-Ethyl-ketone (MEK)

02-009

C. Referenced Information

Maintenance Manual Chapter [54-00-00](#)

P&WC Engine Maintenance Manual Chapter 73-16-32

D. Procedures

(1) Make sure, as necessary that:

- The applicable circuit breakers are open, tagged and safetied
- The system is safe
- Access is available
(Refer to the Removal Procedure).

- (2) Remove the caps from all openings, line ends and electrical connectors.

WARNING: BE CAREFUL WHEN YOU USE MEK:

- PUT ON SAFETY GOGGLES AND PROTECTIVE CLOTHING
- DO NOT BREATHE THE GAS
- DO THE WORK IN AN AREA WHICH HAS A GOOD FLOW OF AIR

IF YOU GET MEK IN YOUR EYES OR ON YOUR SKIN:

- FLUSH YOUR EYES OR SKIN WITH WATER FOR AT LEAST 15 MINUTES
- GET MEDICAL HELP

IF YOU ACCIDENTLY DRINK OR EAT MEK:

- DRINK WATER AND MAKE YOURSELF VOMIT
- GET MEDICAL HELP

THE MEK IS POISONOUS AND HIGHLY FLAMMABLE.

- (3) Use a clean lint-free cloth, made moist with the MEK, to clean the replacement parts and their interfaces. Wipe the components with a clean piece of lint-free cloth before the MEK dries.
- (4) Install the fuel pump-inlet screen (Refer to P&WC 73-16-32).
- (5) Install the access panels that follow (Refer to [54-00-00](#)):
410AB (420AB)
410AT (420AT)

- (6) Remove the safety tags and close these circuit breakers:

Pilot CB panel:

L FUEL
FLOW

L ENG
START

R ENG
START

Copilot CB panel:

R FUEL
FLOW

- (7) Remove all tools, materials and equipment from the work area. Make sure that the area is clean.

4. Fuel Pump-Inlet Screen - Inspection

A. Fixtures, Test and Support Equipment

Access platform

3.3 ft (1 m)

B. Referenced Information

Maintenance Manual Chapter [54-00-00](#)
P&WC Engine Maintenance Manual Chapter 73-16-32

C. Procedures

NOTE: This procedure is applicable to both the left hand and right hand installation. Data for the right hand procedure is given between parentheses.

- (1) Open, tag and safety these circuit breakers:

Pilot CB panel:

L FUEL
FLOW

L ENG
START

R ENG
START

Copilot CB panel:

R FUEL
FLOW

- (2) Remove the access panels that follow (Refer to [54-00-00](#)):

410AB (420AB)
410AT (420AT)

- (3) Remove the fuel pump-inlet screen (Ref. Para. [2](#)).

- (4) Examine the inlet screen for damage and/or breaks in the screen mesh. No break, cracks or dents in the mesh permitted. Replace the defective parts as necessary.

- (5) Install the fuel pump-inlet screen (Ref. Para. [3](#)).

- (6) Examine the inlet screen for general condition and security of installation.

- (7) Install the access panels that follow (Refer to [54-00-00](#)):

410AB (420AB)
410AT (420AT)

- (8) Remove the safety tags and close these circuit breakers:

Pilot CB panel:

L FUEL
FLOW

L ENG
START

R ENG
START

Copilot CB panel:

R FUEL
FLOW

- (9) Remove all tools, materials and equipment from the work area. Make sure that the area is clean.

5. Fuel Pump-Outlet Filter - Removal

A. Fixtures, Test and Support Equipment

Covers/Caps/Plugs	Not Specified
Clean container/drip pan	Minimum capacity 1 US gal
Access platform	3.3 ft (1 m)

B. Referenced Information

Maintenance Manual Chapter [54-00-00](#)
P&WC Engine Maintenance Manual Chapter 73-16-32

C. Procedures

NOTE: This procedure is applicable to both the left hand and right hand installation. Data for the right hand procedure is given between parentheses.

(1) Open, tag and safety these circuit breakers:

Pilot CB panel:	Copilot CB panel:
L FUEL	R FUEL
FLOW	FLOW
L ENG	
START	
R ENG	
START	

(2) Remove the access panels that follow (Refer to [54-00-00](#)):

410AB (420AB)
410AT (420AT)

- (3) Put a clean container/drip pan below the fuel pump.
- (4) Get access to the fuel pump-outlet filter.
- (5) Remove the fuel pump-outlet filter (Refer to P&WC 73-16-32).
- (6) Put caps on all line ends.

6. Fuel Pump-Outlet Filter - Installation

A. Fixtures, Test and Support Equipment

Lint-free cloth Not Specified

B. Materials

Methyl-Ethyl-Ketone (MEK) 02-009

C. Referenced Information

Maintenance Manual Chapter [54-00-00](#)
 P&WC Engine Maintenance Manual Chapter 73-16-32

D. Procedures

(1) Make sure, as necessary that:

- The applicable circuit breakers are open, tagged and safetied
- The system is safe
- Access is available
 (Refer to the Removal Procedure).

(2) Remove the caps from all line ends and openings.

WARNING: BE CAREFUL WHEN YOU USE MEK:

- PUT ON SAFETY GOGGLES AND PROTECTIVE CLOTHING
- DO NOT BREATHE THE GAS
- DO THE WORK IN AN AREA WHICH HAS A GOOD FLOW OF AIR

IF YOU GET MEK IN YOUR EYES OR ON YOUR SKIN:

- FLUSH YOUR EYES OR SKIN WITH WATER FOR AT LEAST 15 MINUTES
- GET MEDICAL HELP

IF YOU ACCIDENTLY DRINK OR EAT MEK:

- DRINK WATER AND MAKE YOURSELF VOMIT
- GET MEDICAL HELP

THE MEK IS POISONOUS AND HIGHLY FLAMMABLE.

(3) Use a clean lint-free cloth, made moist with the MEK, to clean the replacement parts and their interfaces. Wipe the components with a clean piece of lint-free cloth before the MEK dries.

(4) Install the fuel pump-outlet filter (Refer to P&WC 73-16-32).

(5) Install the access panels that follow (Refer to [54-00-00](#)):

410AB (420AB)
 410AT (420AT)

- (6) Remove the safety tags and close these circuit breakers:

Pilot CB panel:

L FUEL
FLOW

L ENG
START

R ENG
START

Copilot CB panel:

R FUEL
FLOW

- (7) Remove all tools, materials and equipment from the work area. Make sure that the area is clean.

7. Fuel Pump-Outlet Filter - Inspection

A. Fixtures, Test and Support Equipment

Access platform 3.3 ft (1 m)

B. Referenced Information

Maintenance Manual Chapter [54-00-00](#)

C. Procedures

NOTE: This procedure is applicable to both the left hand and right hand installation. Data for the right hand procedure is given between parentheses.

- (1) Open, tag and safety these circuit breakers:

Pilot CB panel:

L FUEL
FLOW

L ENG
START

R ENG
START

Copilot CB panel:

R FUEL
FLOW

- (2) Remove the access panels that follow (Refer to [54-00-00](#)):

410AB (420AB)
410AT (420AT)

- (3) Remove the fuel pump-outlet filter (Ref. Para. [5](#)).

- (4) Examine the outlet filter for damage and/or breaks in the filter mesh. No cracks, break or dents in the mesh permitted. Replace the defective part as necessary.

- (5) Install the fuel pump-outlet filter (Ref. Para. [6](#)).

- (6) Examine the outlet filter for general condition and security of installation.

(7) Install the access panels that follow (Refer to [54-00-00](#)):

410AB (420AB)
410AT (420AT)

(8) Remove the safety tags and close these circuit breakers:

Pilot CB panel:

L FUEL
FLOW

L ENG
START

R ENG
START

Copilot CB panel:

R FUEL
FLOW

(9) Remove all tools, materials and equipment from the work area. Make sure that the area is clean.

8. Fuel Purge System - Accumulator - Removal (Ref. Fig. [201](#))

A. Fixtures, Test and Support Equipment

Covers/Caps/Plugs

Not Specified

Clean container/drip pan

Minimum capacity 1 US gal

Access platform

3.3 ft (1 m)

B. Referenced Information

Maintenance Manual Chapter [54-00-00](#)

C. Procedures

NOTE: This procedure is applicable to both the left hand and right hand installation. Data for the right hand procedure is given between parentheses.

(1) Open, tag and safety these circuit breakers:

Pilot CB panel:

L FUEL
FLOW

L ENG
START

R ENG
START

Copilot CB panel:

R FUEL
FLOW

(2) Remove the access panels that follow (Refer to [54-00-00](#)):

410AB (420AB)
410AT (420AT)

- (3) Put a clean container/drip pan below the accumulator (3).
- (4) Cut and remove the lockwire from the tubes (1) and (9).
- (5) Disconnect the coupling nuts (2) and (8). Remove the tube assemblies from the accumulator (3).
- (6) Remove the bolts (5) and (7), washers (10) and (13) and nuts (11) and (12) that attach the clamps (4) and (6) to the rear firewall (14).
- (7) Remove the accumulator assembly.
- (8) Put caps on all line ends and openings.

9. Fuel Purge System - Accumulator - Installation (Ref. Fig. 201)

A. Fixtures, Test and Support Equipment

Lint-free cloth	Not specified
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B. Materials

Methyl-Ethyl-Ketone	02-009
Lockwire	04-008

C. Referenced Information

Maintenance Manual Chapter [54-00-00](#)

D. Procedures

- (1) Make sure, as necessary that:
 - The applicable circuit breakers are open, tagged and safetied
 - The system is safe
 - Access is available
(Refer to the Removal Procedure).
- (2) Remove the caps from all line ends and openings.

WARNING: BE CAREFUL WHEN YOU USE MEK:

- PUT ON SAFETY GOGGLES AND PROTECTIVE CLOTHING
- DO NOT BREATHE THE GAS
- DO THE WORK IN AN AREA WHICH HAS A GOOD FLOW OF AIR

IF YOU GET MEK IN YOUR EYES OR ON YOUR SKIN:

- FLUSH YOUR EYES OR SKIN WITH WATER FOR AT LEAST 15 MINUTES
- GET MEDICAL HELP

IF YOU ACCIDENTLY DRINK OR EAT MEK:

- DRINK WATER AND MAKE YOURSELF VOMIT
- GET MEDICAL HELP

THE MEK IS POISONOUS AND HIGHLY FLAMMABLE.

- (3) Use a clean lint-free cloth, made moist with the MEK, to clean the replacement parts and their interfaces. Wipe the components with a clean piece of lint-free cloth before the MEK dries.
- (4) Put the clamps (4) and (6) around the accumulator (3).
- (5) Install the accumulator assembly on to the rear firewall (14) and safety with the bolts (5) and (7), washers (10) and (13) and nuts (11) and (12).
- (6) Install the tubes (1) and (9) on to the accumulator assembly.
- (7) Tighten the coupling nuts (2) and (8).
- (8) Safety the coupling nuts and the collector assembly with lockwire (MS 20995C32).
- (9) Install the access panels that follow (Refer to [54-00-00](#)):
410AB (420AB)
410AT (420AT)
- (10) Remove the safety tags and close these circuit breakers:

Pilot CB panel:	Copilot CB panel:
L FUEL	R FUEL
FLOW	FLOW
L ENG	
START	
R ENG	
START	
- (11) Remove all tools, materials and equipment from the work area. Make sure that the area is clean.

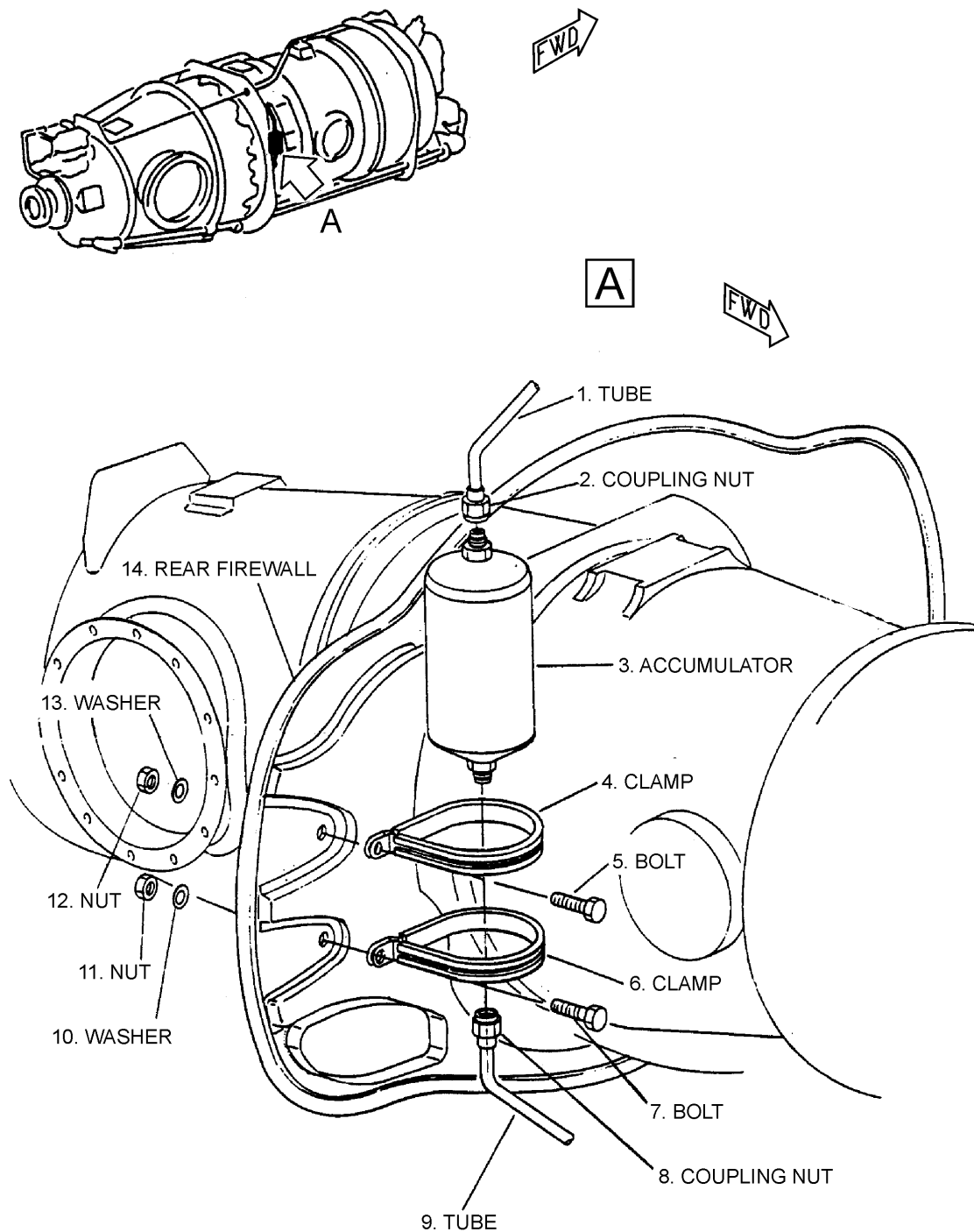


Fig. 201 - Accumulator Assembly - Removal/Installation

10. Fuel Purge System - Accumulator - Inspection

A. Fixtures, Test and Support Equipment

Access platform	3.3 ft (1 m)
Lint-free cloth	Not specified

B. Materials

Methyl-Ethyl-Ketone	02-009
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C. Referenced Information

Maintenance Manual Chapter [54-00-00](#)

D. Procedures

NOTE: This procedure is applicable to both the left hand and right hand installation. Data for the right hand procedure is given between parentheses.

(1) Open, tag and safety these circuit breakers:

Pilot CB panel:

L FUEL
FLOW

L ENG
START

R ENG
START

Copilot CB panel:

R FUEL
FLOW

(2) Remove the access panels that follow (Refer to [54-00-00](#)):

410AB (420AB)
410AT (420AT)

WARNING: BE CAREFUL WHEN YOU USE MEK:

- PUT ON SAFETY GOGGLES AND PROTECTIVE CLOTHING
- DO NOT BREATHE THE GAS
- DO THE WORK IN AN AREA WHICH HAS A GOOD FLOW OF AIR

IF YOU GET MEK IN YOUR EYES OR ON YOUR SKIN:

- FLUSH YOUR EYES OR SKIN WITH WATER FOR AT LEAST 15 MINUTES
- GET MEDICAL HELP

IF YOU ACCIDENTLY DRINK OR EAT MEK:

- DRINK WATER AND MAKE YOURSELF VOMIT
- GET MEDICAL HELP

THE MEK IS POISONOUS AND HIGHLY FLAMMABLE.

- (3) Use a clean lint-free cloth, made moist with the MEK, to clean the accumulator assembly. Wipe the accumulator with a clean piece of lint-free cloth before the MEK dries.
- (4) Visually examine the accumulator of the fuel purge system for cracks, dents or damage. No cracks permitted. Repair or replace the defective parts as necessary.
- (5) Examine the accumulator assembly for general condition and security of installation.
- (6) Install the access panels that follow (Refer to [54-00-00](#)):
410AB (420AB)
410AT (420AT)
- (7) Remove the safety tags and close these circuit breakers:

Pilot CB panel: L FUEL FLOW L ENG START R ENG START	Copilot CB panel: R FUEL FLOW
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- (8) Remove all tools, materials and equipment from the work area. Make sure that the area is clean.

11. Fuel Purge Filter - Removal (Ref. Fig. 202)

A. Fixtures, Test and Support Equipment

Covers/Caps/Plugs
Access platform

Not Specified
3.3 ft (1 m)

B. Referenced Information

Maintenance Manual Chapter [54-00-00](#)

C. Procedures

NOTE: This procedure is applicable to both the left hand and right hand installation. Data for the right hand procedure is given between parentheses.

(1) Open, tag and safety these circuit breakers:

Pilot CB panel:

L FUEL
FLOW

L ENG
START

R ENG
START

Copilot CB panel:

R FUEL
FLOW

(2) Remove the access panels that follow (Refer to [54-00-00](#)):

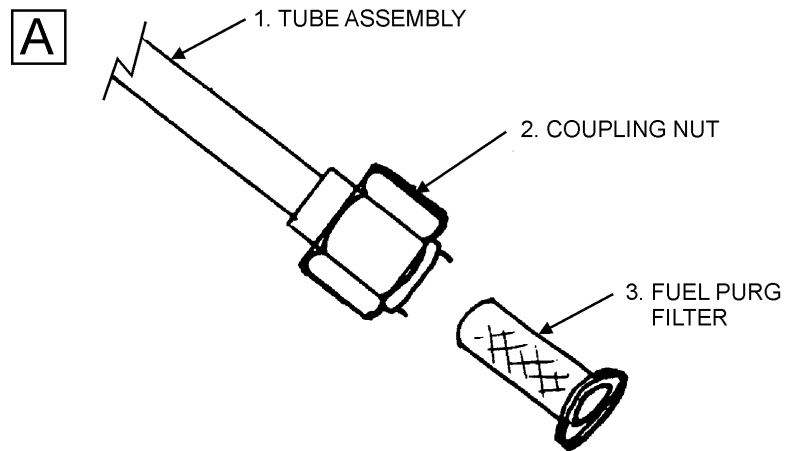
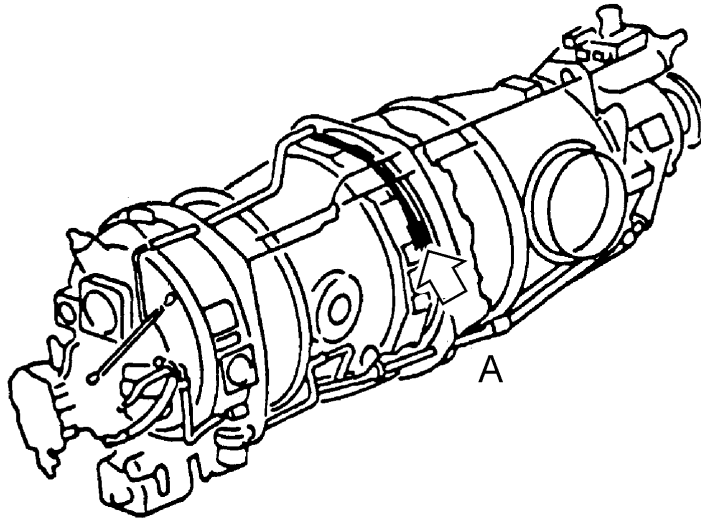
410AB (420AB)
410AT (420AT)

(3) Cut and remove the lockwire from the coupling nut (2) of the tube (1).

(4) Disconnect the coupling nut (2) and remove the fuel purge filter (3) from the tube assembly.

NOTE: The air filter is manufactured from "Rigimesh". For the cleaning procedure refer to 20-10-04.

(5) Put caps on all line ends.



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Fig. 202 - Fuel Purge Filter - Removal/Installation

12. Fuel Purge Filter - Installation (Ref. Fig. 202)

A. Materials

Lockwire 04-008

B. Referenced Information

Maintenance Manual Chapter [54-00-00](#)

C. Procedures

(1) Make sure, as necessary that:

- The applicable circuit breakers are open, tagged and safetied
- The system is safe
- Access is available
(Refer to the Removal Procedure).

(2) Remove the caps from all line ends.

(3) Install the new or cleaned fuel purge filter (3) in to the tube assembly.

(4) Connect the tube assembly.

(5) Tighten the coupling nut (2) and safety with lockwire.

(6) Install the access panels that follow (Refer to [54-00-00](#)):

410AB (420AB)

410AT (420AT)

(7) Remove the safety tags and close these circuit breakers:

Pilot CB panel:

L FUEL

FLOW

L ENG

START

R ENG

START

Copilot CB panel:

R FUEL

FLOW

(8) Remove all tools, materials and equipment from the work area. Make sure the area is clean.

13. P3 Air Filter - Removal

A. Fixtures, Test and Support Equipment

Covers/Caps/Plugs	Not Specified
Access platform	3.3 ft (1 m)

B. Referenced Information

Maintenance Manual Chapter [54-00-00](#)
P&WC Engine Maintenance Manual Chapter 73-16-37

C. Procedures

NOTE: This procedure is applicable to both the left hand and right hand installation. Data for the right hand procedure is given between parentheses.

(1) Open, tag and safety these circuit breakers:

Pilot CB panel:	Copilot CB panel:
L FUEL	R FUEL
FLOW	FLOW
L ENG	
START	
R ENG	
START	

(2) Remove the access panels that follow (Refer to [54-00-00](#)):

410AB (420AB)
410AT (420AT)

(3) Get access to the P3 air filter.

(4) Remove the P3 air filter from the filter housing (Refer to P&WC 73-16-37).

NOTE: The air filter is manufactured from "Rigimesh". For the cleaning procedure refer to 73-16-37.

(5) Put caps on all line ends and openings.

14. P3 Air Filter - Installation

A. Referenced Information

Maintenance Manual Chapter [54-00-00](#)
P&WC Engine Maintenance Manual Chapter 73-16-37

B. Procedures

- (1) Make sure, as necessary that:
 - The applicable circuit breakers are open, tagged and safetied
 - The system is safe
 - Access is available
(Refer to the Removal Procedure).
- (2) Remove the caps from all line ends and openings.
- (3) Install the P3 air filter in the filter housing (Refer to P&WC 73-16-37).
- (4) Install the access panels that follow (Refer to [54-00-00](#)):
 - 410AB (420AB)
 - 410AT (420AT)
- (5) Remove the safety tags and close these circuit breakers:

Pilot CB panel:	Copilot CB panel:
L FUEL	R FUEL
FLOW	FLOW
L ENG	
START	
R ENG	
START	
- (6) Remove all tools, materials and equipment from the work area. Make sure that the area is clean.

15. P3 Air Filter - Inspection

A. Fixtures, Test and Support Equipment

Access platform 3.3 ft (1 m)

B. Referenced Information

Maintenance Manual Chapter [54-00-00](#)
P&WC Engine Maintenance Manual Chapter 73-16-37

C. Procedures

NOTE: This procedure is applicable to both the left hand and right hand installation. Data for the right hand procedure is given between parentheses.

- (1) Open, tag and safety these circuit breakers:

Pilot CB panel:

L FUEL
FLOW

L ENG
START

R ENG
START

Copilot CB panel:

R FUEL
FLOW

- (2) Remove the access panels that follow (Refer to [54-00-00](#)):

410AB (420AB)
410AT (420AT)

- (3) Remove the P3 air filter (Ref. Para. [13](#)).

- (4) Examine the P3 air filter (Refer to [73-16-37](#)).

- (5) Install the P3 air filter (Ref. Para. [14](#)).

- (6) Examine the P3 air filter and housing assembly for general condition and security of installation.

- (7) Install the access panels that follow (Refer to [54-00-00](#)):

410AB (420AB)
410AT (420AT)

- (8) Remove the safety tags and close these circuit breakers:

Pilot CB panel:

L FUEL
FLOW

L ENG
START

R ENG
START

Copilot CB panel:

R FUEL
FLOW

- (9) Remove all tools, materials and equipment from the work area. Make sure that the area is clean.

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CONTROLLING - MAINTENANCE PRACTICES

1. General

WARNING: DO NOT TOUCH THE ENGINE COMPONENTS FOR A SHORT TIME AFTER THE ENGINE IS SHUTDOWN. THE ENGINE COMPONENTS CAN STAY HOT FOR UP TO ONE HOUR.

WARNING: DO NOT LET ENGINE FUEL STAY ON YOUR SKIN FOR A LONG TIME. THE FUEL IS POISONOUS AND CAN GO THROUGH YOUR SKIN AND IN TO YOUR BODY.

CAUTION: DO NOT LET ENGINE FUEL FALL ON THE ENGINE. UNWANTED FUEL MUST BE REMOVED IMMEDIATELY WITH A CLEAN LINT-FREE CLOTH. THE FUEL CAN CAUSE DAMAGE TO THE SURFACE PROTECTION AND TO SOME PARTS.

- A. This procedure gives the engine fuel and control - controlling - maintenance practices that follow:
 - The fuel-control-unit filter

2. Fuel-Control Unit Filter - Removal

A. Fixtures, Test and Support Equipment

Covers/Caps/Plugs	Not Specified
Clean container/drip pan	Minimum Capacity 1 US gal
Access platform	3.3 ft (1 m)

B. Referenced Information

Maintenance Manual Chapter [54-00-00](#)
P&WC Engine Maintenance Manual Chapter 73-26-31

C. Procedures

NOTE: This procedure is applicable to both the left hand and right hand installation. Data for the right hand procedure is given between parentheses.

- (1) Open, tag and safety these circuit breakers:

Pilot CB panel:	Copilot CB panel:
L FUEL	R FUEL
FLOW	FLOW
L ENG	
START	
R ENG	
START	

- (2) Remove the access panels that follow (Refer to [54-00-00](#)):
 410AB (420AB)
 410AT (420AT)
- (3) Put a clean container/drip pan below the fuel control unit.
- (4) Get access to the FCU filter.
- (5) Remove the FCU filter (Refer to P&WC 73-26-31).
- (6) Put caps on all line ends and electrical connectors.

3. Fuel-Control Unit Filter - Installation

A. Fixtures, Test and Support Equipment

Lint-free cloth Not specified

B. Materials

Methyl-Ethyl-ketone (MEK) 02-009

C. Referenced Information

Maintenance Manual Chapter [54-00-00](#)
 P&WC Engine Maintenance Manual Chapter 73-26-31

D. Procedures

- (1) Make sure, as necessary that:
 - The applicable circuit breakers are open, tagged and safetied
 - The system is safe
 - Access is available (Refer to the Removal Procedure).
- (2) Remove the caps from all openings, line ends and electrical connectors.

WARNING: BE CAREFUL WHEN YOU USE MEK:

- PUT ON SAFETY GOGGLES AND PROTECTIVE CLOTHING
- DO NOT BREATHE THE GAS
- DO THE WORK IN AN AREA WHICH HAS A GOOD FLOW OF AIR

IF YOU GET MEK IN YOUR EYES OR ON YOUR SKIN:

- FLUSH YOUR EYES OR SKIN WITH WATER FOR AT LEAST 15 MINUTES
- GET MEDICAL HELP

IF YOU ACCIDENTLY DRINK OR EAT MEK:

- DRINK WATER AND MAKE YOURSELF VOMIT
- GET MEDICAL HELP

THE MEK IS POISONOUS AND HIGHLY FLAMMABLE.

- (3) Use a lint-free cloth, made moist with the MEK, to clean the replacement parts and their interfaces. Wipe the components with a clean piece of lint-free cloth before the MEK dries.
- (4) Install the fuel-control unit filter (Refer to P&WC 73-26-31).
- (5) Install the access panels that follow (Refer to [54-00-00](#)):
410AB (420AB)
410AT (420AT)
- (6) Remove the safety tags and close these circuit breakers:

Pilot CB panel:	Copilot CB panel:
L FUEL	R FUEL
FLOW	FLOW
L ENG	
START	
R ENG	
START	
- (7) Remove all tools, materials and equipment from the work area. Make sure that the area is clean.

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INDICATING - DESCRIPTION AND OPERATION

1. General

The fuel flow display consist of digital readout for each engine and an associated Fuel Flow (FF) Legend. Fuel Flow is normaly in Pound Per Hour (PPH). Optionally Kilograms Per Hour (KPH) can be displayed (Ref. Fig. 1).

- Annunciations
 - Fuel Flow Digital Readout
 - A grey FLOW Legend is displayed between the left and right digital readouts.
 - A grey FUEL Legend is displayed below the FLOW legend.
 - Fuel Flow is an up to 3 digit readout, with leading zeros suppressed.
 - Left engine readout is left justified.
 - Right engine readout is right justified.
 - 1Readout is in Pounds Per Hour (PPH), optionally Kilograms Per Hour (KPH).
 - 1Three yellow dashed is displayed if Fuel Flow from all sources has data SSM (Sign Status Matrix) or Fail, missing or NCD (No Computer Data).
 - Automatic source selection between data sources is provided.
 - L DCU (Data Concentration Unit) is priority source for left engine.
 - R DCU (Data Concentration Unit) is priority source for right engine.
 - Onside EDC (Engine Data Concentrator) is the secondary source.
- Inputs
 - A single Fuel Flow sensor for each engine is interfaced with its onside DCU and EDC.
- Limits
 - AFD display Range is 0 to 800 PPH (0 to 400 KPH).
 - Resolution is 1 PPH (or 1 KPH).
 - Hysteresys is 0.7 x 1 PPH (or 1 KPH).
 - Fuel Flow has a 2.0 second low pass filter
 - 1Fuel Flow is always in the Normal Limit region and is green or white, as indicated in the Table 1, if valid data is received.
 - If valid input < 0 PPH, Fuel Flow is processed as Failed.
 - If valid input > 800 PPH, Fuel Flow is processed as valid 800 PPH.
 - DCU fuel flow input is from a signal conditioner with a linear output 0.5 to 9.5 VDC for 0 to 800 PPH.
 - If input < 0.2 VDC or > 9.8 VDC, Fuel Flow is set to last valid value, with SSM (Sign Status Matrix) = FAIL.
 - If input voltage >= 0.2 VDC and <= 0.5 VCD, is processed as valid 0.5 VDC.
 - If input voltage >= 9.5 VDC and <= 9.8 VCD, is processed as valid 9.5 VDC.

Table 1:

Parameter	Condition	Normal Limit	Transient Limit Cautionary (Yellow)	Redline Limit (Red)
Fuel Flow (FF) PPH	All	$FF < 65$ or $FF > 630$ (White) $65 \geq FF \leq 630$ (Green)	---	---



Fig. 1 - Fuel Flow - Indicating

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INDICATING - MAINTENANCE PRACTICES

1. General

WARNING: DO NOT TOUCH THE ENGINE COMPONENTS FOR A SHORT TIME AFTER THE ENGINE IS SHUTDOWN. THE ENGINE COMPONENTS CAN STAY HOT FOR UP TO ONE HOUR.

WARNING: DO NOT LET ENGINE FUEL STAY ON YOUR SKIN FOR A LONG TIME. THE FUEL IS POISONOUS AND CAN GO THROUGH YOUR SKIN AND IN TO YOUR BODY.

CAUTION: DO NOT LET ENGINE FUEL FALL ON THE ENGINE. UNWANTED FUEL MUST BE REMOVED IMMEDIATELY WITH A CLEAN LINT-FREE CLOTH. THE FUEL CAN CAUSE DAMAGE TO THE SURFACE PROTECTION AND TO SOME PARTS.

A. This procedure gives the engine fuel and control - indicating - maintenance practices that follow:

- Fuel flow transmitters
- Fuel flow indicators and signal conditioning units.

2. Fuel Flow Transmitter - Removal (Ref. Fig. 201)

A. Fixtures, Test and Support Equipment

Covers/Caps/Plugs	Not Specified
Clean container/drip pan	Minimum Capacity 1 US gal
Access platform	3.3 ft (1 m)

B. Referenced Information

Maintenance Manual Chapter [54-00-00](#)

C. Procedures

NOTE: This procedure is applicable to both the left hand and right hand installation. Data for the right hand procedure is given between parentheses.

(1) Open, tag and safety these circuit breakers:

Pilot CB panel:	Copilot CB panel:
L FUEL	R FUEL
FLOW	FLOW
L ENG	
START	
R ENG	
START	

- (2) Remove the access panels that follow (Refer to [54-00-00](#)):
410AB (420AB)
410AT (420AT)

CAUTION: DO NOT USE TOO MUCH FORCE ON THE MAGNETIC SHIELD. DO NOT USE A HAMMER OR BEND THE MAGNETIC SHIELD. THIS WILL DECREASE THE EFFECT OF THE MAGNETIC SHIELD.

- (3) Put a clean container/drip pan below the fuel flow transmitter (1).
(4) Cut and remove the lockwire from the fuel tubes (5) and the transmitter (6).
(5) Remove the electrical connector (4) from the fuel flow transmitter (1).
(6) Disconnect the fuel inlet and outlet pipes (2, 3) from the transmitter. Remove and discard the O-rings.

CAUTION: MAKE A NOTE OF THE FLOW DIRECTION ARROW ON THE TRANSMITTER. THIS WILL PREVENT INCORRECT INSTALLATION.

- (7) Remove the transmitter.
(8) Put caps on all line ends and electrical connectors.

3. Fuel Flow Transmitter - Installation (Ref. Fig. [201](#))

A. Fixtures, Test and Support Equipment

Lint-free cloth	Not specified
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B. Materials

Methyl-Ethyl-Ketone (MEK)	02-009
Lockwire	04-008

C. Expendable Parts

O-rings	Not specified
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D. Referenced Information

Maintenance Manual Chapter [54-00-00](#)

E. Procedures

- (1) Make sure, as necessary that:
- The applicable circuit breakers are open, tagged and safetied
 - The system is safe
 - Access is available
(Refer to the Removal Procedure).

- (2) Remove the caps from all openings, line ends and electrical connectors.

WARNING: BE CAREFUL WHEN YOU USE MEK:

- PUT ON SAFETY GOGGLES AND PROTECTIVE CLOTHING
- DO NOT BREATHE THE GAS
- DO THE WORK IN AN AREA WHICH HAS A GOOD FLOW OF AIR

IF YOU GET MEK IN YOUR EYES OR ON YOUR SKIN:

- FLUSH YOUR EYES OR SKIN WITH WATER FOR AT LEAST 15 MINUTES
- GET MEDICAL HELP

IF YOU ACCIDENTLY DRINK OR EAT MEK:

- DRINK WATER AND MAKE YOURSELF VOMIT
- GET MEDICAL HELP

THE MEK IS POISONOUS AND HIGHLY FLAMMABLE.

- (3) Use a clean lint-free cloth, made moist with the MEK, to clean the replacement parts and their interfaces. Wipe the components with a clean piece of lint-free cloth before the MEK dries.

CAUTION: DO NOT USE TOO MUCH FORCE ON THE MAGNETIC SHIELD. DO NOT USE A HAMMER OR BEND THE MAGNETIC SHIELD. THIS WILL DECREASE THE EFFECT OF THE MAGNETIC SHIELD.

- (4) Put the fuel flow transmitter (1) in position. Make sure that the electrical connection points up.
- (5) Put new O-rings on the fuel inlet and outlet pipes (2, 3).
- (6) Connect the fuel inlet and outlet pipes to the fuel flow transmitter.
- (7) Tighten and torque the pipe coupling nuts to 39.5 - 45.2 Nm (350 - 400 lb.in.).
- (8) Safety the coupling nuts and the fuel flow transmitter with lockwires (5, 6).
- (9) Connect the electrical connector (4) to the fuel flow transmitter. Safety the electrical connector with lockwire.
- (10) Install the access panels that follow (Refer to [54-00-00](#)):
- 410AB (420AB)
 - 410AT (420AT)
- (11) Remove the safety tags and close these circuit breakers:

Pilot CB panel:

L FUEL
FLOW

L ENG
START

R ENG
START

Copilot CB panel:

R FUEL
FLOW

(12) Remove all tools, materials and equipment from the work area. Make sure that the area is clean.

4. Fuel Flow Transmitter - Inspection

A. Fixtures, Test and Support Equipment

Access platform 3.3 ft (1 m)

B. Referenced Information

Maintenance Manual Chapter [54-00-00](#)

C. Procedures

NOTE: This procedure is applicable to both the left hand and right hand installation. Data for the right hand procedure is given between parentheses.

(1) Open, tag and safety these circuit breakers:

Pilot CB panel:

L FUEL
FLOW

L ENG
START

R ENG
START

Copilot CB panel:

R FUEL
FLOW

(2) Remove the access panels that follow (Refer to [54-00-00](#)):

410AB (420AB)
410AT (420AT)

(3) Examine the area around the fuel flow transmitter. Make sure there are no leaks.

(4) Examine the fuel flow transmitter for security of installation. Make sure that the lockwire is secure.

(5) Examine the electrical connector for security of installation. Make sure that the lockwire is secure.

(6) Install the access panels that follow (Refer to [54-00-00](#)):

410AB (420AB)
410AT (420AT)

(7) Remove the safety tags and close these circuit breakers:

Pilot CB panel:

L FUEL
FLOW

L ENG
START

Copilot CB panel:

R FUEL
FLOW

R ENG
START

- (8) Remove all tools, materials and equipment from the work area. Make sure that the area is clean.

5. Fuel Flow Indicator - Operational Test

A. Referenced Information

Maintenance Manual Chapter [24-00-00](#)

B. Procedures

- (1) Make sure that electrical power is available (Refer to [24-00-00](#)).
- (2) Do the test:

Action	Result
<ul style="list-style-type: none"> (a) On the SYS TEST panel in the flight compartment, set the rotary switch to ENG. INSTR. 	
<ul style="list-style-type: none"> (b) Push in and release the momentary hold test button in the center of the test switch. 	<p>For approximately 2 seconds, the indicator dial goes to full scale deflection and the digital read out will be 888.</p>

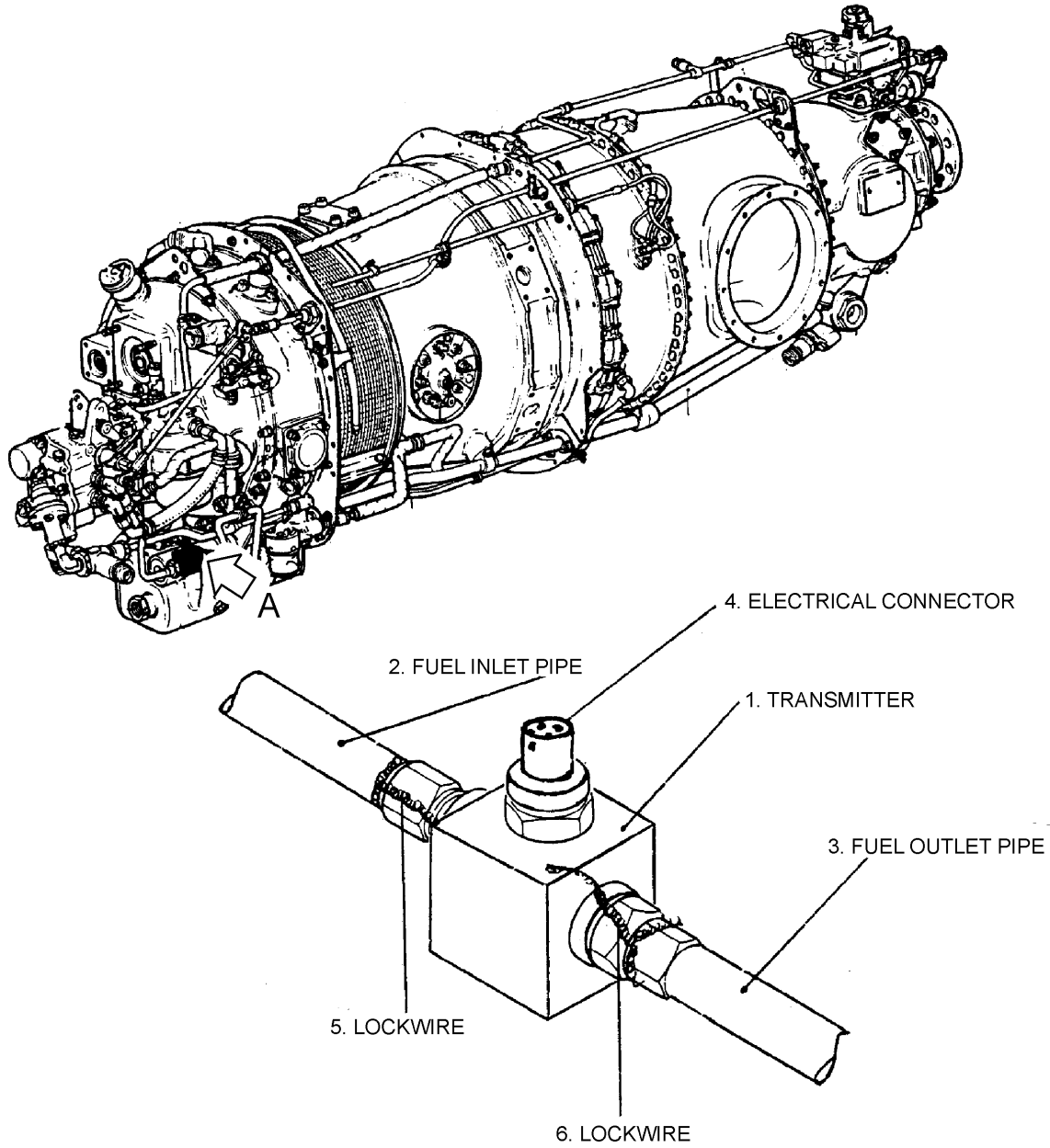


Fig. 201 - Fuel Flow Transmitter - Removal/Installation