

Installation Instruction

For WMT MPT 1 hose assemblies in
powered sailplanes acc. to AML CS 22

Table of Content

1. PURPOSE OF THIS INSTALLATION INSTRUCTION	2
2. USED MATERIAL	3
3. ACCOMPLISHMENT INSTRUCTIONS	3
3.1 WORKMANSHIP TO CHANGE THE HOSE ASSEMBLIES	3
3.1.1 GENERAL INSTALLATION INSTRUCTION	3
3.2.2 WORKING ON THE AIRCRAFT	7
4. MAINTENANCE INSTRUCTIONS	8
5. REMARKS	8
APPENDIX VI	9

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For WMT MPT 1 hose assemblies in powered sailplanes acc. to AML CS 22

1. Purpose of this Installation instruction

The aim was to replace the original hose assemblies of various powered sailplanes by a product with comparable dimensions such as the assembly length, diameter, fitting size and style.

The hose assemblies to be replaced are all fuel-, oil- and brake hose assemblies of the powered sailplane.

The procedure for installing the hose line is always the same. Only the installation work on the aircraft itself to access the hose lines varies depending on the aircraft type. For this reason, the accomplishment of hose assemblies in aircraft is structured in 2 terms.

3.1.1 General instructions for hose assemblies

3.1.2 Work on the aircraft

1.1. Subject

WMT MPT 1 () (S/P) (F) () hose assemblies are approved for fire resistance. These hose assemblies may only be installed in the firewall forward area of the respective aircraft when equipped with a fire sleeve.

With the MPT1 hose assembly system WMT offers state of the art polytetrafluoroethylene (PTFE) hose assemblies with approved data, conform to European Technical Standard Orders (ETSO) for the hose assemblies to be used in aircraft.

The MPT1 design hose assemblies are medium pressure PTFE hose assemblies, conform to ETSO-C53a (fuel and engine oil system hose assembly) and ETSO-2C75 IIIa (hydraulic hose assembly).

PTFE hose assemblies outperform rubber hose assemblies in many properties such as chemical resistance with oil and fuel, hardening and cracking due to ageing and heat.

Operators have the opportunity to install modern hose assemblies in their aircraft.

1.2. References to applied documents

- AIR1569 handling & installation practice for aerospace hose assemblies
(The applicable content of this standard can be found in 3.3.1)
- ARP1658 visual inspection guide for installed hose assemblies
(The applicable content of this standard can be found in checklist for annual inspection Appendix I)
- OMMM MPT1 Operating, Mounting and Maintenance Manual for MPT 1 hose assemblies

Installation Instruction

For WMT MPT 1 hose assemblies in powered sailplanes acc. to AML CS 22

2. Used material

MPT1 PTFE hose assemblies with an appropriate length of the hose material, fitting type, fitting arrangement and size according to different models are designed as specified by the aircraft or engine type certificate holder.

Approved fire-resistant hose assemblies are intended for installation in the firewall forward area.

3. Accomplishment instructions

3.1 Workmanship to change the hose assemblies

3.1.1 General Installation instruction

When installing hose lines, it is important to follow best practices to ensure safety, reliability, and longevity. The following general guidelines apply to most hose line installations, regardless of specific conditions such as location, bends, or temperature range.

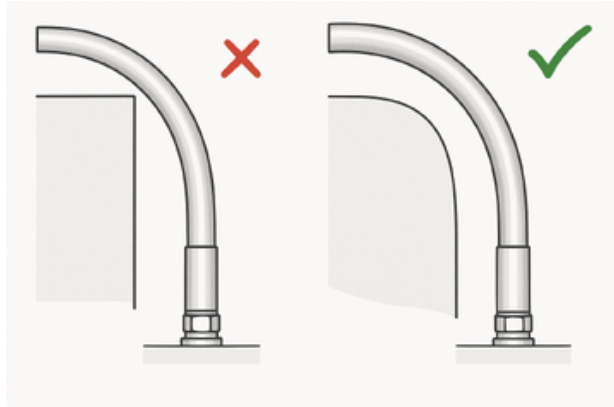
1. Pre-Installation Inspection

- Check the Hose and Fittings: Ensure the hose and fittings are free from defects, damage, or contamination before installation.
- Verify Specifications: Confirm that the hose meets the required pressure, temperature, and media compatibility for the application. The main specifications of hose assembly you will find in the in accompanying documents noted in Field 12 of EASA Form 1.
- Inspect the Routing Path: Identify potential obstructions, sharp edges, or sources of excessive heat that could damage the hose. Example for good and bad routing Pats see Figure 1

Installation Instruction

For WMT MPT 1 hose assemblies in
powered sailplanes acc. to AML CS 22

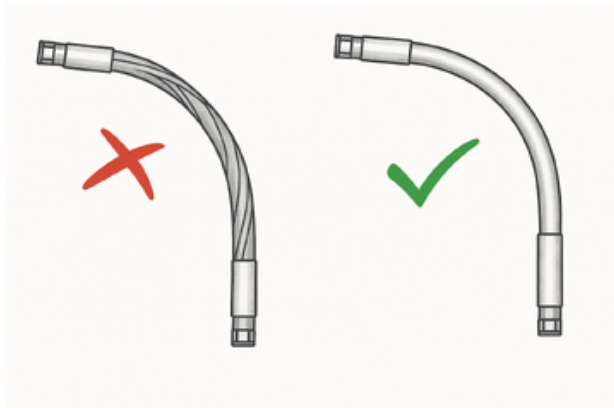
Figure 1



2. Proper Hose Handling

- Avoid Twisting: Do not twist the hose during installation. Twisting can weaken the hose structure and reduce performance. See Figure 2

Figure 2 Avoid twisting during installation



- Do Not Exceed Minimum Bend Radius: Ensure that bends conform to the recommended minimum bend radius to prevent kinking and flow restrictions. The minimum bent radius you will find in Table1

Table 1 Recommended bend radius for MPT 1 hose assemblies

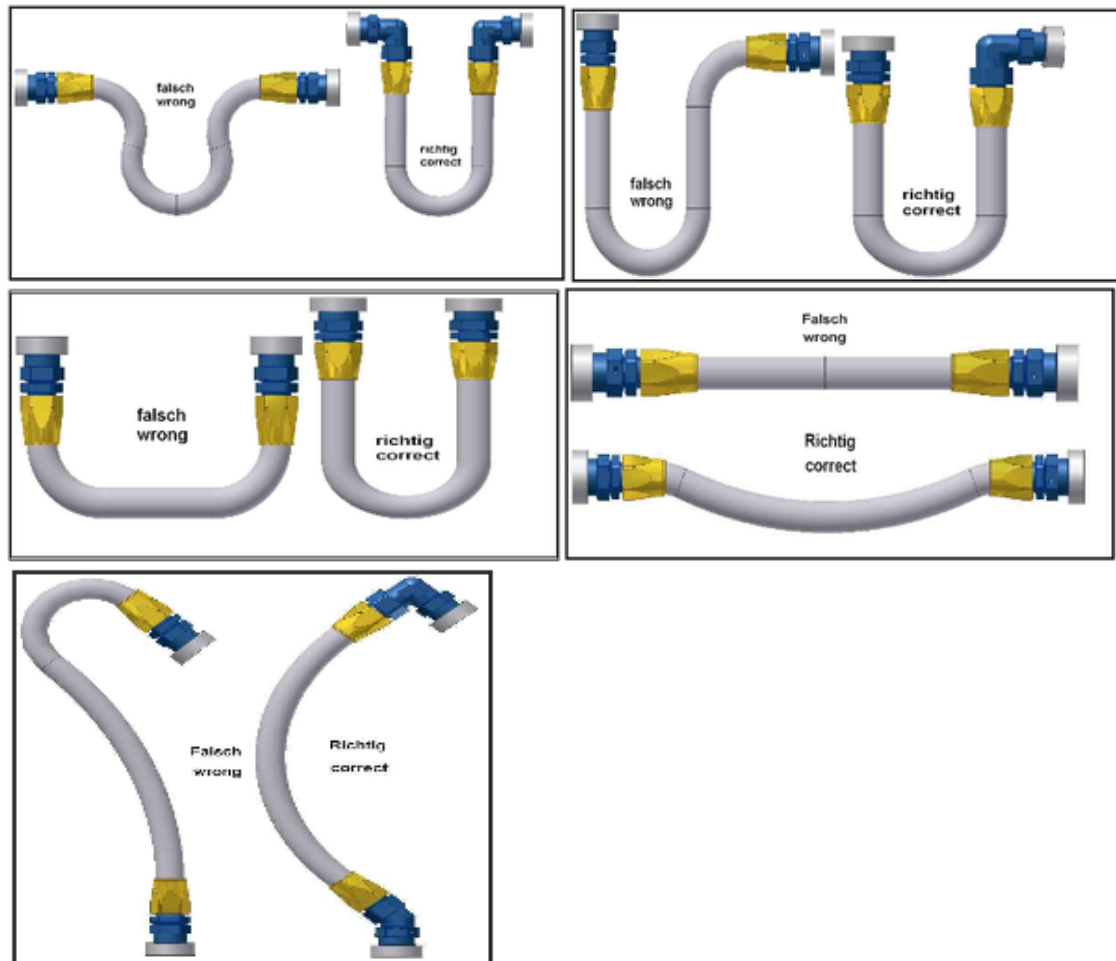
Hose Type: MPT 1										
Size	3	4	5	6	8	10	12	16	20	24
inch	2	2	2	4	4,62	5,5	6,5	7,38	11	14
mm	50,8	50,8	50,8	101,6	117,35	139,7	165,1	187,45	279,4	355,6

- Use Proper Length: Allow sufficient slack for movement, but avoid excessive hose length that could cause unnecessary sagging or chafing. Example of slacks you will find in Figure 3

Installation Instruction

For WMT MPT 1 hose assemblies in
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Figure 3 Examples of good and bad slacks



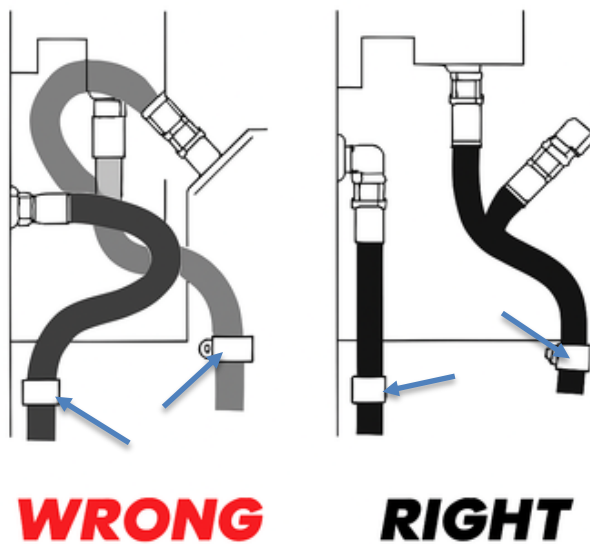
Installation Instruction

For WMT MPT 1 hose assemblies in
powered sailplanes acc. to AML CS 22

3. Secure and Protect the Hose

- Use Proper Clamps and Supports: Secure hoses with appropriate brackets or clamps to prevent movement, vibration, or abrasion. See Figure 4 for wrong or Right Positions.
- Prevent Chafing and Abrasion: Use protective sleeves or guards when routing hoses near sharp edges, metal surfaces, or high-traffic areas.
- Allow for Expansion and Movement: Account for possible thermal expansion or machine movement by ensuring hoses have enough flexibility.

Figure 4 Examples for wrong or right clamp positions



4. Connection and Assembly

- Ensure Clean Connections: Keep fittings and hose ends clean to prevent contamination and premature failure.
- Tighten Fittings Properly: Follow manufacturer torque specifications for threaded connections to avoid leaks or overtightening.

5. Testing and Final Checks

- Pressure Test the System: Before full operation, conduct a pressure test at the required safety level to check for leaks.
- Inspect for Leaks and Kinks: Observe the hose during pressurization for any abnormalities or leaks.
- Monitor Initial Operation: Run the system at normal operating conditions and inspect the hose for proper function and stability.

Conclusion

Following these general installation guidelines will help ensure the reliability and safety of hose lines in various applications. Always refer to manufacturer recommendations and specific system requirements for additional guidance

Installation Instruction

For WMT MPT 1 hose assemblies in powered sailplanes acc. to AML CS 22

3.2.2 Working on the aircraft

The following steps must be carried out on the aircraft in accordance with the general installation instructions above

Step 1: Remove the cowlings and/or other components to gain access to the hose assembly connection. The maintenance manual of the aircraft must be complied with.

Step 2: If necessary, open any holding devices (e.g. clamps). The instructions of the maintenance manual of the aircraft must be complied with.

Step 3: Prior to unscrewing the component, pay attention to the routing of the hose assembly, unless the routing is specified in the aircraft or engine manual, then the general installation instructions described above must be followed.

Step 4: Unscrew the old hose assembly with appropriate wrenches

Step 5: Send the used hose assembly to WMT Production Organisation and wait for the delivery of the new hose assembly. The old hose assemblies are used to compare the hose length, hose size, connector types, fitting angles etc.

Justification for the procedure described in step 5

The original hose assemblies of these powered sailplanes are rubber hose assemblies. Those hose assemblies, especially in firewall forward area, cannot be supplied by part number, which is a requirement of the currently applicable legislation by the European Commission and European Aviation Safety Agency (EASA).

Step 6: Route the hose assembly accordingly with the disassembled hose assembly. If the routing is specified in the aircraft or engine manual, the instructions of the manual must be complied with.

Step 7: If necessary, attach the new hose assembly to the clamps back to the place of the previously removed hose assembly. Allow the hose assembly to move in longitudinal direction as long as the fitting is not screwed on.

Installation Instruction

For WMT MPT 1 hose assemblies in powered sailplanes acc. to AML CS 22

Step 8: Screw the fittings of the new hose assembly with appropriate wrenches. While screwing in the fittings, hold the socket with a second wrench on the hexagon of the socket. This should prevent torsional stress on the hose assembly as shown in Figure 2 . Use a torque specified by the type certificate holder of the aircraft or engine. If the tightening torques are not specified in the maintenance documents, the torque values in the SAE ARP 908 recommended practises can be used.

Step 9: If applicable, attach the clamps or other device to secure the hose assembly.

Step 10: Carry out the final checks as described in chapter 3.1.1.

Step 11: Reassemble the aircraft according to the maintenance manual of aircraft.

Step 12: Check the final assembly of aircraft or have the assembly checked.

Step 13: Carry out a test run on ground. The operating manual of the aircraft or engine must be complied with.

Step 14: Open the cowlings and if necessary any other access points to check the tightness of hose assemblies and their connections. The instructions of the maintenance manual of the aircraft must be complied with.

Step 15: If tight, reassemble the aircraft into a ready to fly condition

End of works

4. Maintenance instructions

Basically, in any case the specifications of TC holder regarding to maintenance tasks and intervals have to be adhered.

WMT purposes an annual Inspection according to checklist for **annual Inspection of** hose assemblies. **See appendix I**

WMT MPT 1 hose assemblies has a service Life time of 10 years

5. Remarks

All hose assemblies for fuel, oil and hydraulic are to be installed in accordance with this installation instruction that serves as a supplement to the WMT OMMM. OMMM is the Operating, Mounting and Maintenance Manual for MPT1 hose assemblies which is a general technical description for MPT1 hose assemblies only. This instruction is created additional to the OMMM to guide the maintenance organization or operator of the aircraft to install the hose assemblies in the aircraft.

Installation Instruction

For WMT MPT 1 hose assemblies in powered sailplanes acc. to AML CS 22

Appendix I

Checklist for annual inspection of hose assemblies

No.	Item	Ok ?	Required Action
1 Check connection to counterpart			
1.1	Connection Tight		Retightening
1.2	Traces of corrosion		Cleaning If extensive - change the connected counterpart = use aircraft manual
2 Check Fitting			
2.1	Deformations which have influence to stability		Replace Hose assembly
2.1.1	Socket deformed Diameter not circular		Replace hose assembly
2.1.2	Nipple passage between nut and socket bent in an unnatural manner		Replace hose assembly If applicable rectify cause of bending
2.1.3	Nut deformed		Replace Hose assembly
2.1.4	Indication that the hose move out of socket		Replace hose assembly Eliminate the cause see figure 28 of OMMM
3 Check Hose			
3.1	Chafe marks at outer surface of hose (braid)		If extensive replace hose assembly. Eliminate the cause of chaffing
3.2	Cuts		Replace hose assembly If applicable eliminate sharp edges.
3.3	Fissure		Replace hose assembly
3.4	Shift of braid		Replace hose assembly
3.5	Kinking		Replace hose assembly Allow greater bent radius
3.6	Leaky area		Replace hose assembly
3.7	Preforms abbreviate from the natural shape of hose		Replace hose assembly
3.8	Settlement of hose		If the hose is stiff - replace
4 Check fire protection (if hose is fire protected)			
4.1	Cuts		Type F - Firesleeve have to replaced trough WMT Integral – Replace hose assembly
4.2	Chaffing		Type F – Firesleeve have to replaced trough WMT If integral fire protection is worn at surface – do nothing If a integral fire protection is worn extensive - replace hose assembly In all 3 cases prevent further chaffing
4.3	Etching		If it is only on the surface – clean the surface If etching is extensive. Replace hose assembly in case of integral fire protection Replace fire sleeve trough WMT in case of type F
4.4	Embrittlement of silicone layer		Replace hose assembly.
4.5	Indication of extensive impact of heat		Replace hose assembly.
4.6	In case of type F, are the ends of protecting sleeve treated with protecting lacquer		Remove fire sleeve trough WMT

If fire sleeve has to replaced please send hose assembly to WMT.

Do not mount fire sleeve by yourself.