



INSTALLATION MANUAL

for installation of
Fogmaker fire suppression systems according to
FIA Standard for Plumbed-in Fire Extinguisher Systems
in Competition Cars (14.12.98)

EX.047.18 & EX.048.18

Fogmaker International AB

Installation manual for installation of
Fogmaker fire suppression systems according to
FIA Standard for Plumbed-in Fire Extinguisher Systems in Competition Cars
(Part no. 8046-002) ed. 1.

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Introduction

Fogmaker International AB develops, manufactures and markets fire suppression systems using high pressure water mist to combat fires in engine rooms and enclosed spaces. Fogmaker International AB is the market leader in fire suppression systems for buses in Europe, the Middle East and Australia with over 150,000 installed systems since 1995, including sport cars.

This installation manual contains indicative information required for the installation of Fogmaker fire protection systems in automotive vehicles and is a support for the installer. For all supplementary information, refer to the Installation Manual (Art. 8010-002). This installation manual is part of Step 2 training package belonging to Fogmaker. The information herein is correct at the time it was released.

Item numbers for all products in this document can be found in our Product Catalog. Contact Fogmaker International AB if you have any questions!

NOTE

Installation shall be performed, alternatively inspected, by Fogmaker certified personnel.

Fogmaker can not be held liable for any unserviceable fire suppression system if the instructions of the manual are not followed.

Technical specifications and appearance are subject to change without notice.

Certain regulations that concern car racing and fire suppression systems indicate that it is the owner / driver of the car who is ultimately responsible for all safety equipment and how it is used - always check what is applicable to your vehicle!

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Protective measures

All persons responsible for installation of the Fogmaker fire suppression system must: *

- be certified for installation.
- follow the national requirements for pressurised containers
- follow the instructions in this manual and keep it accessible, if needed, during installation
- take into account that this manual is part of the Fogmaker fire suppression system.
- continuously service all tools and calibrate all measuring equipment used for installation.



The warning triangle marks the instructions that are important for your personal safety and/or affect the system's basic function. Accompanying text is highlighted in bold, next to the warning triangle.



The NOTE box draws attention to instructions that could affect system performance. Accompanying text is highlighted in bold, next to the NOTE box.



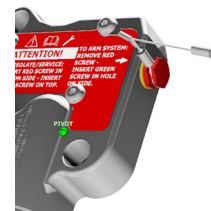
WARNING pressurised components!
Safety glasses must be used during all work on Fogmaker fire suppression systems.



WARNING!

When transporting/servicing the Fogmaker fire detection and suppression systems, the safety screw must always be mounted in the valve as otherwise the system may deploy accidentally.

The valve must not be removed when the piston accumulator is pressurised. If the valve or any other part on the cylinder cover is removed when the piston accumulator is pressurised, a powerful jet of liquid may flow out and cause serious personal injury.



Mounted safety screw

* In the case of non-compliance with the above instructions, Fogmaker cannot be held accountable for any non-functioning fire suppression system or personal injury caused by improper handling.

A. System description

General description of the Fogmaker system, see Installation manual (Part no. 8010-002).

B. Component description

Part B of the installation manual describes all components included in Fogmaker fire suppression System. See the Installation manual (Part no. 8010-002).



Figure 1. Cross-sectional view of a piston accumulator



Figure 2. Piston Accumulator for homologation EX.047.18: 3.3 liters (Part no. 1032-020)



Figure 4. Piston Accumulator for homologation EX.048.18: 8 liter (Part no. 1242-020)



Figure 3. Weight in kg:s on the bottom of the extinguishers

C. Theory and documentation

This section of the installation manual describes the theory of fire extinguishing and a complete overview of installation procedures and documentation.

C.1 Installation theory

See Installation manual (Part no. 8010-002).

C.2 Installation procedures

See Installation manual (Part no. 8010-002).

C.3 Installation documentation

All installations must be documented. Installation checklist and risk analysis, see Installation manual (Part no. 8010-002) for more information.

D. Protected area – risk areas

This part of the installation manual describes how a Fogmaker fire suppression system is designed to achieve the best possible protection. See the Installation Manual (Part no. 8010-002).

D.1 Protected area volume

The protected area's volume must always be determined. See the Installation Manual (Part no. 8010-002).

D.2 Identifying risk areas

See Installation manual (Part no. 8010-002).

A

B

C

D

E. Installation instructions

This chapter describes an example of the practical installation of Fogmaker fire protection systems in a motor vehicle. For complete guidance on installing Fogmaker's system, refer to the Installation Manual (Part no. 8010-002).

E.1 Required tools and supplies

When installing a Fogmaker system use well-serviced and calibrated tools from your standard toolbox. Use the overview shown in Table 1 and 2 for information on the extra tools and supplies you may require during installation:

Table 1. Overview of required tools

Part no	Name	Description/usage
1807	Cutting tool - pipe	Used to cut distribution pipes
1808	Pipe bending tool R8	Used to bend the distribution pipes
	Allen keys 2-6 mm	Removing protection plugs
	Cable tie gun	Tightening of cable ties
	Torque wrench	Tightening fittings with correct torque
	6-8 mm socket for screwdriver	

Table 2. Required supplies

Part no	Name	Description/usage
7904	Loctite 577	Thread seal used on all threads
7920	Loctite 8009	Lubricate stainless steel fittings
	Compressed air	Cleaning distribution pipes

E.2 Installation example

In Figure 5 and 6 you can see the Fogmaker system for FIA Homologation EX.047.18 and EX.048.18

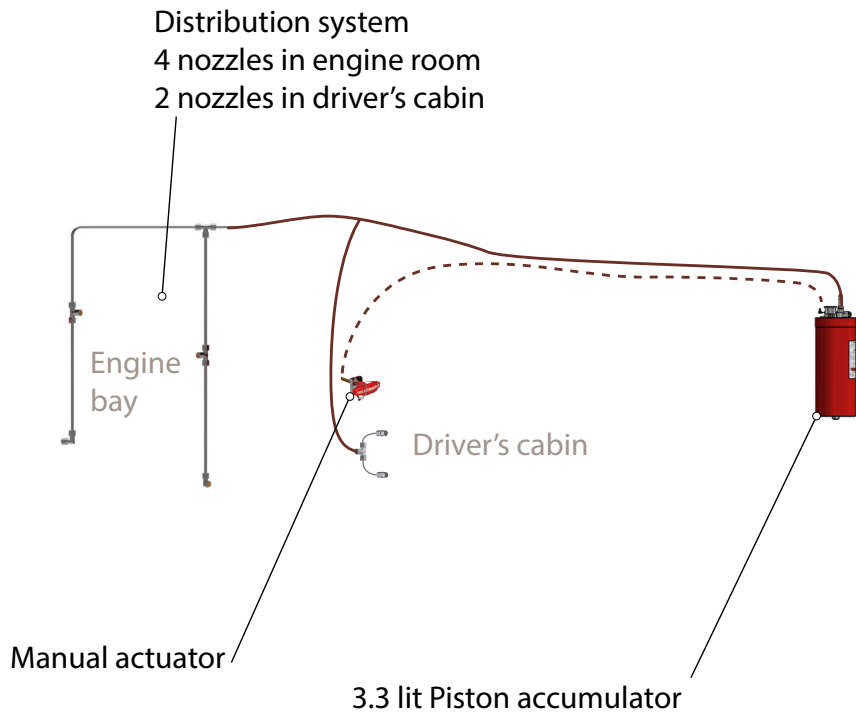


Figure 5. FIA Homologation EX.047.47, 3.3liter cylinder and 4+2 nozzles

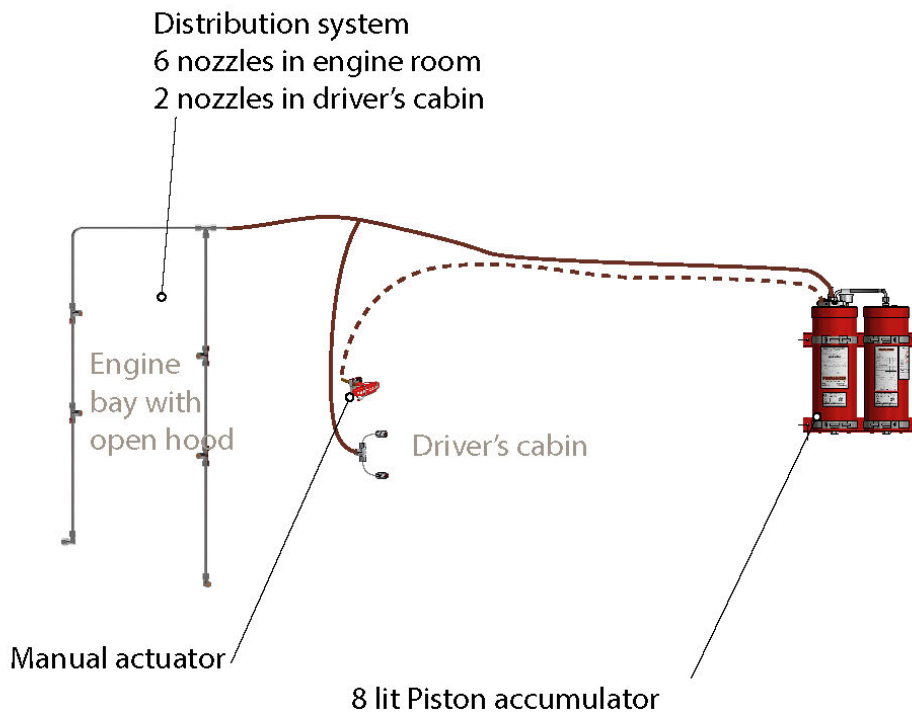


Figure 6. FIA Homologation EX.048.18, 8liter cylinder and 6+2 nozzles

E.3 Installation of piston accumulator

For complete guidance, see Installation manual (Part no. 8010-002).

Find a suitable position to mount the piston accumulator and if needed, the protection box. This is a flat and stiff surface in a location where the operating temperature of the piston accumulator is not exceeded, see Figure 7.

NOTE

Install the piston accumulator where the surrounding temperature stays between min. -30°C /max. $+65^{\circ}\text{C}$. Be aware that temperatures inside the engine compartment or in direct sunlight may be higher than 65°C .

- Drill holes to fit the hole pattern on mounting brackets.
- Place brace clamps in slots on mounting brackets and mount bracket(s) and clamps.
- Open brace clamps and carefully slide the piston accumulator into place, see Figure 8.
- Tighten the brace clamps to fix the piston accumulator(s) in place.

NOTE

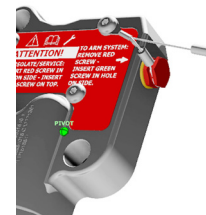
Check that the gauge and service labels are readable once the piston accumulator has been mounted into position.

WARNING!

Do not remove the valve if the cylinder is pressurised. The pressurised liquid can be released with great power and cause serious injuries.

The safety screw prevents unintentional deployment of the piston accumulator and must be in position during any form of service or transport.

Installation brackets are already mounted on double piston accumulators. Do not remove them or the metal hose that connects them at any time.



Mounted safety screw



8 liter = 4x2 liter double cylinder



Figure 7. 3.3 liter cylinder installed in racing car

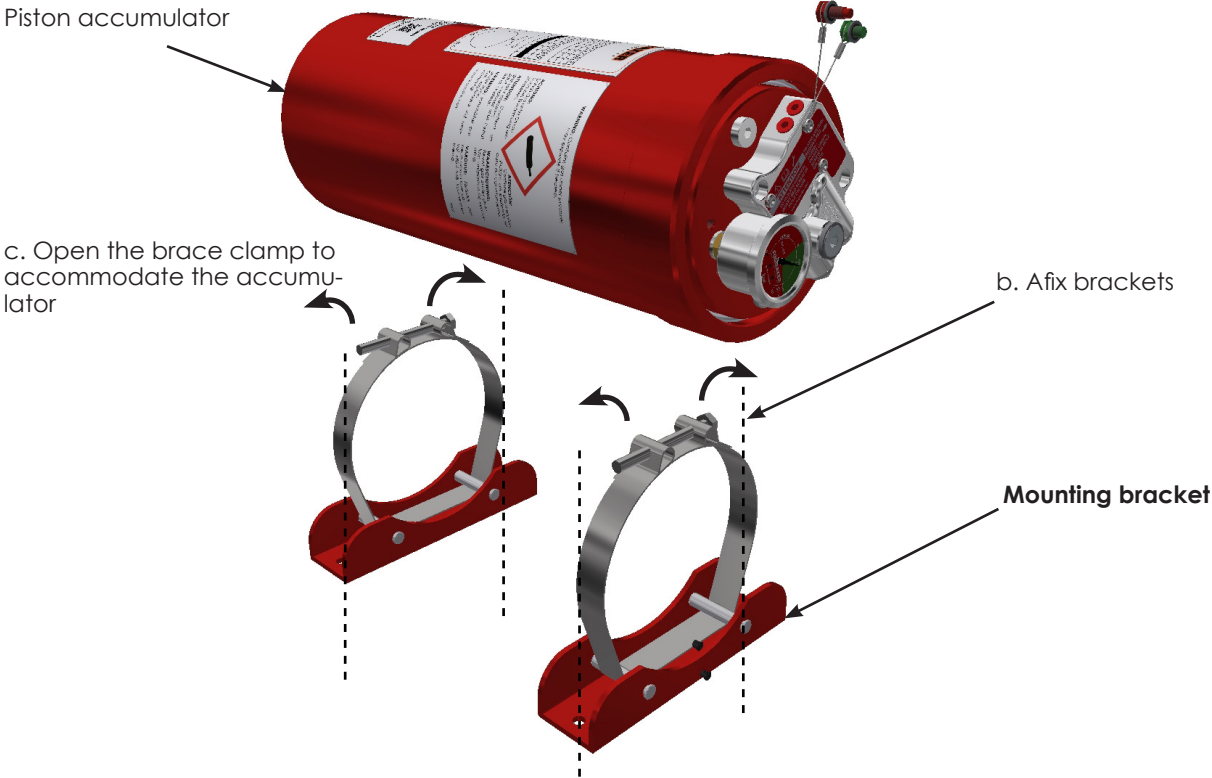


Figure 8. Installation of Piston Accumulator - in this case a 3.3-liter extinguisher that has two brackets, the 8-liter extinguisher is delivered with affixed mounting brackets, see image on opposite page.

E.4 Installation of Distribution system

For complete guidance, see Installation manual (Part no. 8010-002).

E.4.1 Installation of distribution hose

NOTE

Distribution hoses have a restricted working temperature of -30°C to 150°C . Fix the distribution hose with steel rubber clamps every 300 mm (in the same way as the distribution pipe), see Figure 9 and 10.

NOTE

This is how the distribution hose connects to the release valve, see Figure 11 and 13:

- a. Check that the red safety screw is mounted.
- b. Remove the T-handle.
- c. Mount a steel rubber washer on nipple
- d. Mount the nipple
- e. Mount the distribution hose to the nipple

E.4.2 Installation of the distribution pipe

For complete guidance, see Installation manual (Part no. 8010-002).

Mount distribution pipes with max 300 mm between clamps to the chassis/frame of the vehicle/machine and max 100 mm to end fittings, see Figure 10, 13 and next spread.



Ensure that the clamps are properly attached to the chassis/frame of the car and that the distribution pipes are also mounted on a fixed component.



Figure 9. Distribution hose out of the engine compartment (arrow) and connected pipes with nozzles below the center console. Note that the two copper lines are fuel lines.

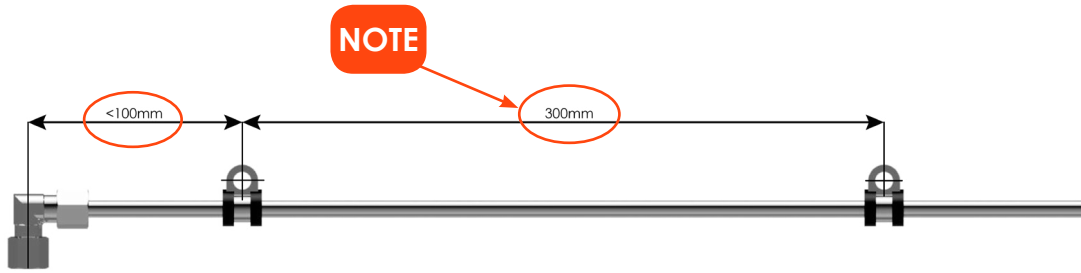


Figure 10. Mounting distance between clamps

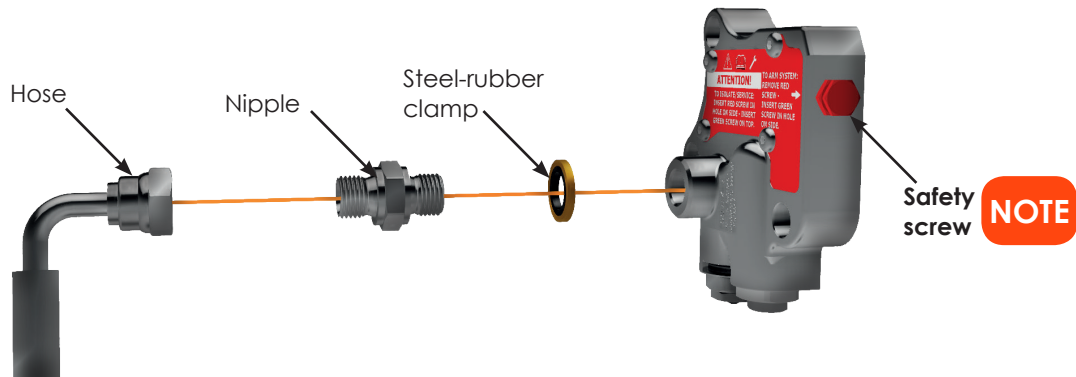


Figure 11. Connection of distribution hose to release valve



Figure 12. Connection of distribution hose to release valve

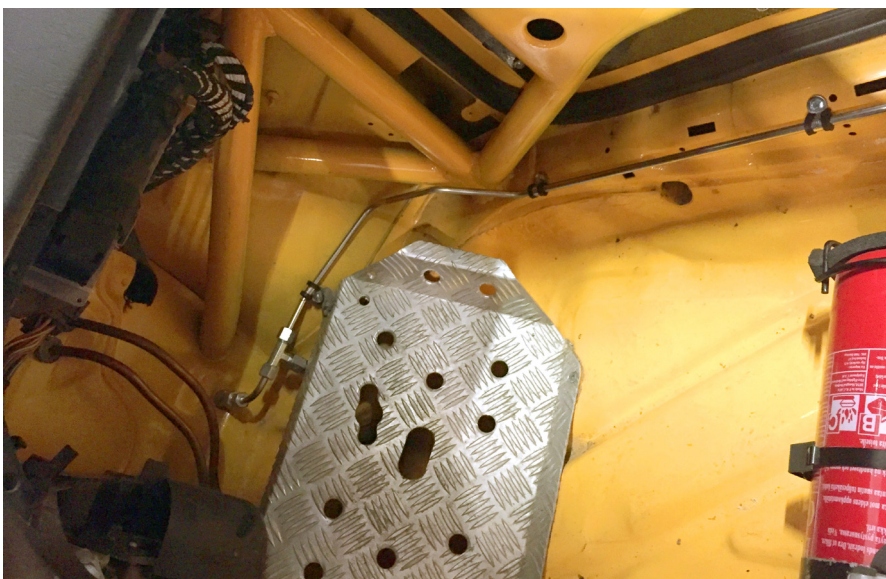


Figure 13. The distribution pipe going along the right side and into the engine compartment

E.4.3 Installation of cutting ring fitting

For complete guidance, see Installation manual (Part no. 8010-002).

NOTE

It is the responsibility of the installer to ensure that the pipe system is properly fixed in place and that all fittings are tightened according to instructions, see Figure 14.

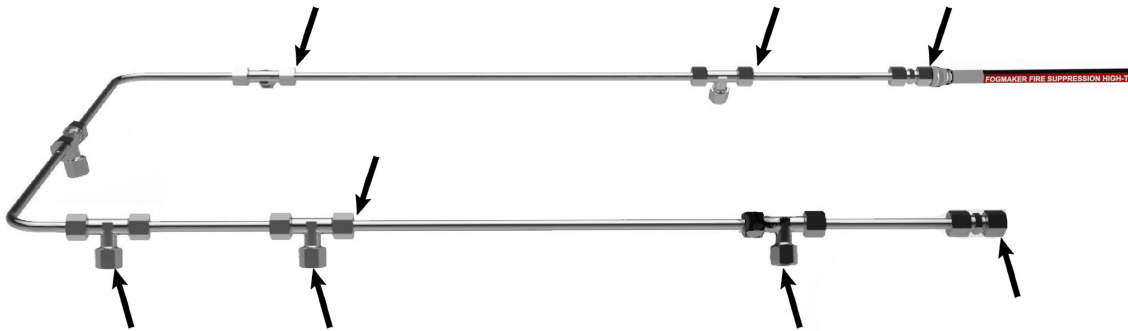


Figure 14. Make sure all connections are tightened and all nozzles are fitted (example pipe system).

E.4.4 Installation of nozzles

Aim spray nozzles at risk areas, according to the risk assessment, for complete guidance, see Installation manual (Part no. 8010-002), p 36.



Keep a distance of 400-700 mm between the spray nozzle and the protected surface, see Figure 15. A longer range is generally preferable, but an exception is large airflows for which the distance should be reduced. Make sure that no spray nozzle is obstructed.

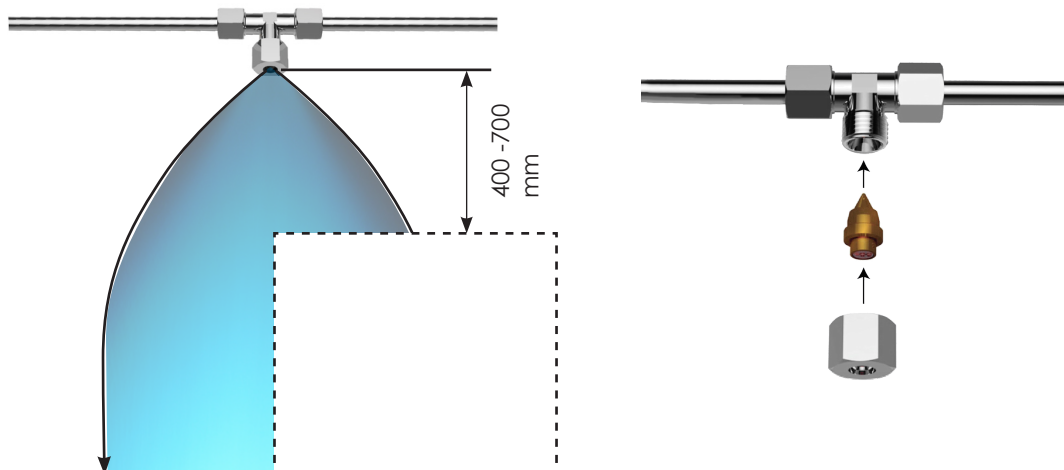


Figure 15. Minimum free distance

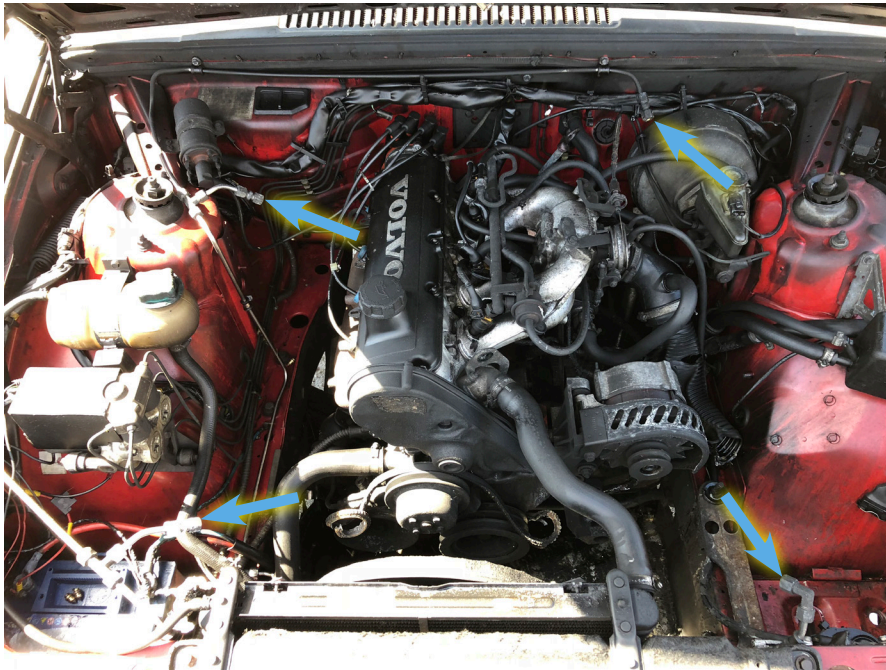


Figure 16. Distribution system in test car for Homologation EX.047.18 - Saloon car

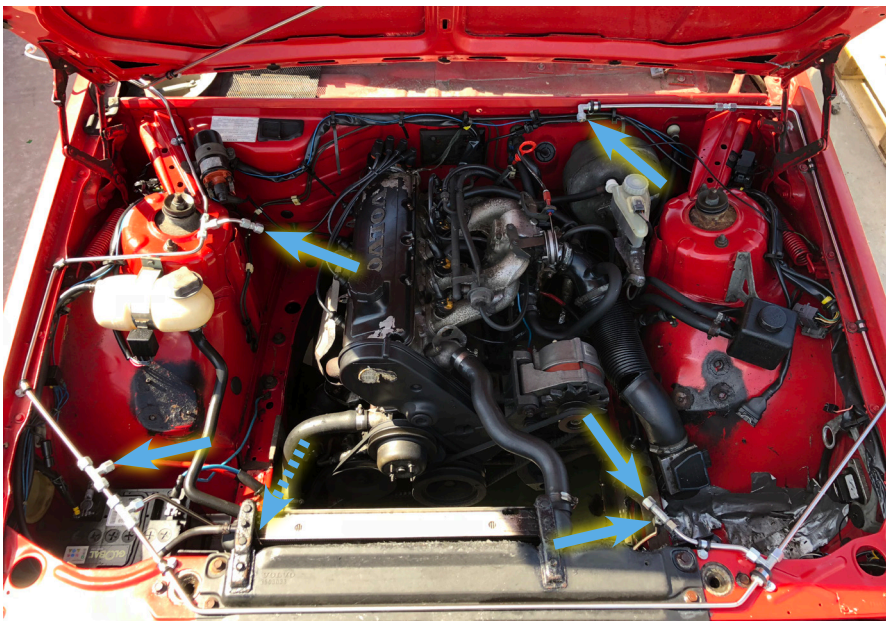


Figure 17. Distribution system in test car for Homologation EX.048.18 - Single seater car

E.5 Mechanical activation

The piston accumulator is deployed through a mechanically activated valve, for complete guidance, see Installation manual (Part no. 8010-002).

E.5.1 Installation of mechanical activation

The mechanical activation wire is mounted between the mechanical release valve and a pulling handle that needs to be clearly visible and easy to reach. Start by mounting the piston accumulator, see page 10.

NOTE

Mount the safety screw in the valve before starting the installation.

First, install the handle, see Figure 18:

- a. Drill a \varnothing 8 mm hole at the position where you want to install the handle.
- b. Carefully remove the handle nut and the outer M8 nut from the wire fixture and insert the wire fixture into the hole and the handle plate, see Figure 20.
- c. Tighten the outer and inner M8 nut to secure the wire fixture to the vehicle.
- d. Mount the handle to the wire fixture. Lock the handle in the innermost position with the handle nut. Push the handle to the bottom.

Install the wire as follows:

- e. Measure the required length of wire by leading the wire and wire housing all the way from the installed handle to the valve on the piston accumulator.



The sharpest allowable bend radius for the wire is 150 mm, see Figure 21.

- f. If needed: cut the wire housing and wire to appropriate length. The wire needs to stick out from the wire housing by 150 mm.
- g. Mount the wire housing to the vehicle with steel rubber clamps. Do not yet fix it within a 0.5 m distance of the release valve.

NOTE

Keep a distance of 300 mm between clamps along the wire housing.

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Figure 18. Installed activation handle with sign



Figure 19. Installed activation handle
Safety lock

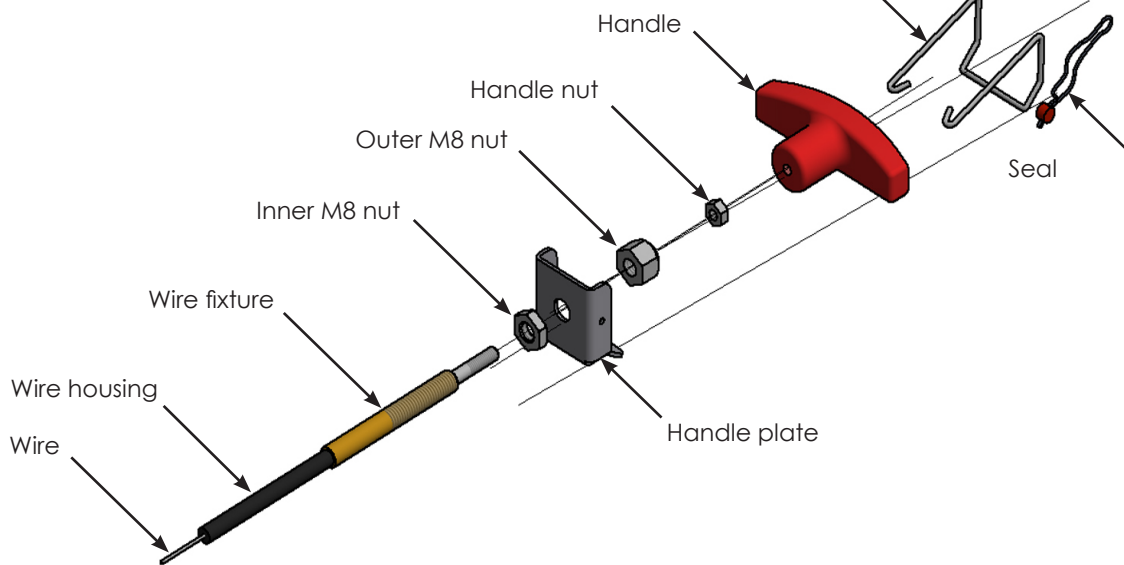


Figure 20. Exploded view of mechanical activation handle with safety lock



Figure 21. Wire secured with steel rubber clamps. Note the distance between clamps and the wire bending radius.

E

Attach the wire to the valve as follows:

- h. Remove the protective cover from the release valve, see Figure 23.
- i. Pull the wire out of the wire housing until 120 to 150 mm of wire is visible.
- j. Install terminals on the wire housing if needed (terminals are pre-installed on uncut wire), see Figure 24.
- k. Pull the wire through the hole in the valve housing and secure terminal to valve (if the area is cramped beside the valve use a 90 degree bend).
- l. Connect a wire stop to the wire end, let the wire stick out by approximately 1 mm, see Figure 25.
- m. Place the wire stop in the cut-out of the valve latch, see Figure 23.
- n. Remount the protection plate on the release valve.

Final installation:

- o. Use a wire split to divide one wire into two wires if necessary, see Figure 26.
- p. Install the last steel rubber clamp to hold the wire housing as close to the release valve as possible.
- q. Place a label near the activation handle so that its function is clear to the user, see page 17.
- r. Seal the activation handle by mounting a plastic seal on the safety lock, see Figure 27.



Figure 22. Ready-made wire to valve

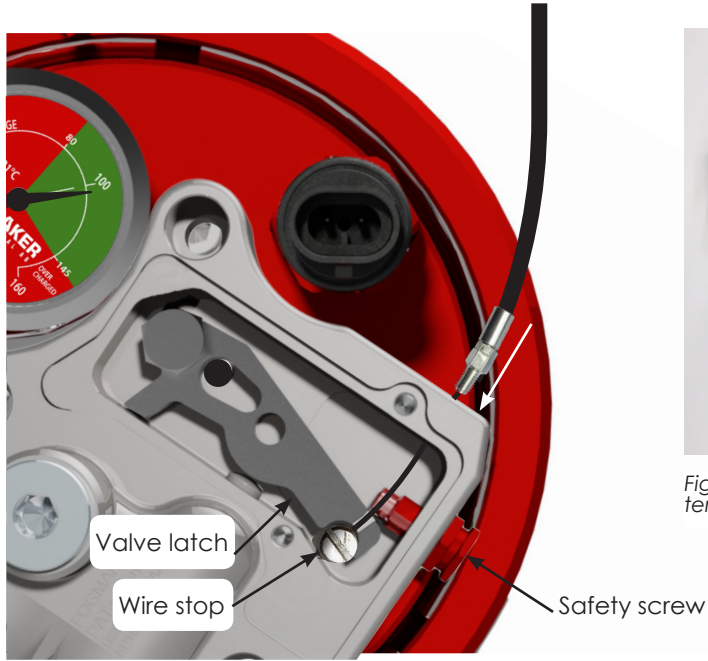


Figure 23. Mechanical valve with dismantled protection plate

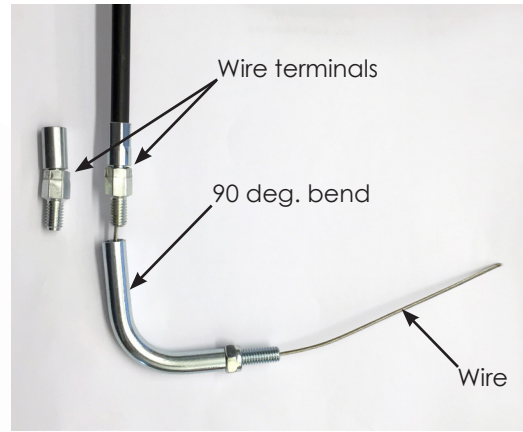


Figure 24. Wire pulled out of wire housing with wire terminals and 90 degree bend



Figure 25. Wire stop

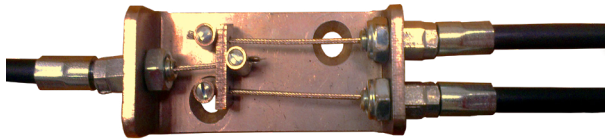


Figure 26. Installed wire split



Figure 27. Installed mechanical activation handle with safety lock

(E.6 Installation of detector bottle)

Not applicable.

(E.7 Installation of detector tube)

Not applicable.

(E.8 Installation of electrical units)

Not applicable.

E.9 Labels and seals

The following labels must be placed on/in the race car after installation of the fire suppression system.

E.9.1 Activation labels

These labels indicate the position of manual actuators (handles), see Figure 28-31. Place these labels/signs close to the actuator while still easily visible.

E.9.2 User information labels

Provides the driver with instructions on what to do in case of fire, see Figure 32. Place this label close to the driver and in a position where it is easily visible.

E.9.3 Service label

Place the service label on piston accumulator label 8100 to mark when the system has to be serviced next time (within a year of installation), see Figure 33.

E.9.5 Other

Make sure that a copy of the user's manual is available for the driver (8013-002). Also install information labels in appropriate places, see Figure 34.

E.9.6 Sealing actuators

All the devices which have the function to manually deploy the piston accumulator need to be sealed.

NOTE

Use a sealing wire on mechanical pull handles, see Figure 28



Figure 28. Label "E" and seal on the handle



Figure 29. Label for releasing device



Figure 30. Activation sign, text



Figure 31. Activation sign, text and symbol

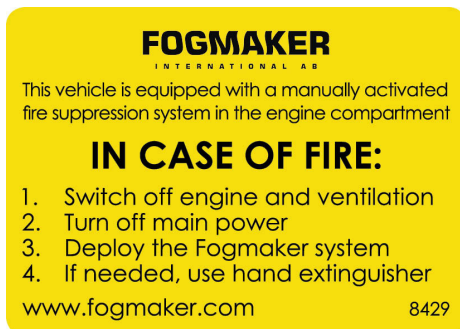


Figure 32. Label for mechanical activation



Figure 33. Service label



Figure 34. Information label



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