

BlazeCut Automatic Fire Suppression System

System Manual

Specification, Installation and Operation

C Series Indirect Low Pressure Clean Agent Systems

CEA200

CEA210

CFK200

CFK210



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1 INTRODUCTION

1.1.1 MANUFACTURER INFORMATION

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1.1.2 INSTRUCTIONS FOR USE OF THE MANUAL

This manual is intended to supply technical information for trained and authorized personnel by BlazeCut. Any personnel performing installation, inspection, maintenance or replacement of components with the BlazeCut system shall have this manual available and proceed solely in accordance with it. Failure to follow the instructions in this manual and any other BlazeCut manuals may result in loss of warranty, a system malfunction, causing damage to the protected equipment and may present serious danger to the life and health of others.

1.1.3 SAFETY FIRST

Please read this manual in its entirety. Operation and installation instructions need to be fully understood before this BlazeCut product is installed. Failure to do so may void warranty. Your local governing regulations for safety and compliance must be followed.

1.1.4 WARNINGS AND CAUTIONS



This symbol within the manual represents warning of specific risks, dangers, or warning of described procedures. Failure to follow the instructions in the text marked with this symbol may result in loss of warranty, damage to property, threat to safety or life of persons performing the operation on the system or persons in the vicinity. Do not proceed without following the instructions marked with such symbols.

1.1.5 FURTHER INFORMATION

BlazeCut® is a registered trademark of BlazeCut and is recorded in the Register of Community Trade Marks.

If any of the instructions in this manual are unclear or in case of further questions, contact the BlazeCut Team.

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WARNING

Please ensure that the safety instructions are fully understood before the equipment is put into service.

Do not modify any part of the BlazeCut components as this may cause serious injury or a failure of the system.

Always wear the appropriate protective equipment and clothing whilst installing or servicing.

2 BASIC INFORMATION ABOUT THE SYSTEM

2.1 EXPLANATION OF TYPE NAME CAPTION

C FK 211-30-4-2-S-M

Product line

C – Cylinder Series systems

Extinguishing agent

EA – HFC-227ea gaseous agent

FK – FK-5-1-12 gaseous agent

Valve series

201 – pneumatic with BlazeTube push-in connector straight
202 – pneumatic with BlazeTube push-in connector 90° elbow
203 – pneumatic with BlazeTube push-in connector Tee
204 – pneumatic with LOP Hose fitting straight
205 – pneumatic with LOP Hose fitting 90° elbow
206 – pneumatic with LOP Hose fitting Tee
207 – pneumatic with plugged top port
211 – electric valve with 12 V solenoid
212 – electric valve with 24 V solenoid

Top G1/8" port left and right on the valve

0 – plug
1 – ball valve with BlazeTube push-in connector
2 – ball valve with LOP hose fitting
3 – M10x1 adapter with a plug

Examples of extinguishing agent quantity

4 – 4 kg of agent
7.5 – 7.5 kg of agent
12 – 12 kg of agent

Examples of nozzle quantity

1 – 1 discharge nozzle
2 – 2 discharge nozzles
4 – 4 discharge nozzles

Type of distribution network

B – braided feed hose
H – red fire hose
S – stainless steel tube
BS – braided feed hose and stainless steel tube
SH – stainless steel tube and red fire hose

Application variant

C – customised kit
M – mobile application
MC – mobile application customised
ME – mobile equipment
MB – mobile bus
MA – mobile agricultural

Example 1: CFK202-30-5-2-G-M – includes system BlazeCut with one cylinder (C) with the extinguishing agent used FK-5-1-12 with the valve type 202 (202), M10x1 adapter on the left and plug on the right (-30), total amount of extinguishing agent 5 kg (-5), 2 nozzles (-2), galvanised tube (-G), mobile application (-M).

Example 2: CEA211-31/203-00/202-00-30-12-G-M – includes system BlazeCut with three cylinders (C) with the extinguishing agent used HFC-227ea (EA), with the valve 211 with a M10x1 adapter on the left and a BlazeTube push-in connector on the right (211-31), valve 203 with plug on the left and plug on the right (/203-00) and valve 202 with plug on the left and plug on the right (/202-00), total amount of extinguishing agent 3x10 kg (-30), 3x4 nozzles (-12), galvanised tube (-G), mobile application (-M).

2.1.1 ASSOCIATED NAMES

In certain parts of this manual, it is needed to state use of multiple valves or cylinders. In these cases, associated naming is used.

Table 1: Naming explanation

Designation	Meaning
valves 20x	all the following: 201, 202, 203, 207
valves 21x	all the following: 211, 212
systems Cxx (201, 202, 211)	all the following: Cxx201, Cxx202 and Cxx211

2.1.2 DESCRIPTION OF THE SYSTEM

Commercial name: BlazeCut

Characteristics: Clean Agent Automatic Fire Suppression System

Type: Cylinder Series (C Series), Indirect Low Pressure (ILP)

Functionality: BlazeCut system is designed to protect closed and semi closed spaces. Some examples are electrical switchboards, fuse boxes, electrical supply sources, battery spaces, engine compartments of trucks, buses, vehicles, marine, machines and spaces with increased risk of fire where clean extinguishing agent can be used.

Both the pneumatic and electric systems are referred to as indirect low pressure or ILP systems for short. The system can be activated by pneumatic detection or electric detection and the agent is distributed via discharge lines using distribution hoses/tubes, fittings and nozzles.

The pneumatic fire suppression system operates by detecting fire using a BlazeTube detection connected to the cylinder valve. The BlazeTube detection is placed in the protected enclosure and is under constant pressure whereby keeping the valve piston closed. When a fire occurs, the BlazeTube detection degrades by the effect of fire or high temperature and ruptures, releasing the pressure in the detection circuit. The cylinder valve's piston opens, allowing the extinguishing agent in the cylinder to be released via the discharge outlet(s) on the valve. The agent is dispersed to the protected enclosure through a network to nozzles. The detection system is independent of any electrical supply and operates solely on physical principles and is fully automatic.

Alternatively, the electric system can detect the fire using electric devices such as a Linear Heat Detection (LHD) BlazeWire, smoke/heat detectors, heat probes or others. These electric devices must be used in conjunction with the integrated solenoid valves – types 211 (12 V), 212 (24 V).

The BlazeCut systems C(EA, FK)(211, 212) have an integrated solenoid valve, which allows the activation of a system by receiving a signal from an external device. These can include an alarm panel, fire panel, detector etc.

2.1.3 OPTIONAL COMPONENTS

The BlazeCut ILP systems can have optional components added to the system which increase the features of the system. Installation, use, function and service of selected optional components is described in annexes of this manual or supplied as a separate component manual. For more information contact the supplier.

Table 2: Installation characteristics for BlazeCut ILP clean agent systems

Description	Value
Test pressure of pressure equipment	30 bar
Amount of agent	1 to 16.8 kg
Type of extinguishing agent	HFC-227ea or FK-5-1-12
Expellant gas	nitrogen
Connection to a fire alarm or other warning device	with AAP210, AAP211
Display, monitor and provide a low-pressure alarm	with APS001/ATA100 + AAP210/AAP211; APS001 + custom panel
Connection to a sounder or other alarm activation system	with APS001 + signalling unit
Isolating power supplies and auxiliary equipment such as fan units to the enclosure upon system activation	with APS001, AAP210 or AAP211

2.2 TECHNICAL SPECIFICATION AND TYPES

Table 3: Types of BlazeCut C Series ILP systems with HFC-227ea

Model number	Pre-installed BlazeTube outlet	Pneumatic activation	Electrical activation (Solenoid)	Activation method
CEA201	yes	yes	-	Automatic and/or manual
CEA202	yes	yes	-	Automatic and/or manual
CEA203	yes	yes	-	Automatic and/or manual
CEA207	yes	yes	-	Automatic and/or manual
CEA211	optional	optional	yes	Automatic and/or manual
CEA212	optional	optional	yes	Automatic and/or manual

NOTE

Operating temperature refers to temperature in the protected enclosure as well as pressure cylinder location.

Table 4: Types of BlazeCut C Series ILP systems with FK-5-1-12

Model number	Pre-installed BlazeTube outlet	Pneumatic activation	Electrical activation (Solenoid)	Activation method
CFK201	yes	yes	-	Automatic and/or manual
CFK202	yes	yes	-	Automatic and/or manual
CFK203	yes	yes	-	Automatic and/or manual
CFK207	yes	yes	-	Automatic and/or manual
CFK211	optional	optional	yes	Automatic and/or manual
CFK212	optional	optional	yes	Automatic and/or manual

NOTE

Operating temperature refers to temperature in the protected enclosure as well as pressure cylinder location.

2.3 USE OF THE SYSTEM

The BlazeCut system is designed for protection of areas from fire using local fire suppression with clean extinguishing agent.

The fire suppressing performance depends on many factors, including the size of the protected enclosure, the type of the flammable substances, shape and venting of the enclosure, the restriction on placement of extinguishing nozzles, air circulation etc. In order to reach the desired extinguishing concentrations, effectiveness of the system, the choice on the type and amount of agent and what installation method to use, please discuss with the supplier of the system.

The automatic option can be achieved by using LHD BlazeWire or an electrical detection device without any delay programmed. This will deliver an instant actuation upon detection of fire or there is an option to delay discharge that can be achieved with programming an alarm panel output to the solenoid on the cylinder valve.

The automatic/manual option usually consists of a combination of an electric actuation device and an electrical detection device. If a fire is noticed before it is detected, a manual activation device can be used to achieve a quicker discharge.

The valves 211 and 212 with the integrated solenoid are supplied in BlazeCut kits with a M10x1 adapter on one of the detection ports to assist with a piston reset or a system refill. Different configurations are available on request.



Never untighten a plug or fitting that closes the detection ports on the cylinder valve. If removed, this can cause the immediate opening of the cylinder valve piston and will release the extinguishing agent.

With electric detection it is still possible to install a pneumatic remote actuator ARA010 or ARA020 directly to the cylinder valves 211 and 212. This can be done by changing the detection port options on the valves before the cylinder has been filled and charged.

2.3.2 BLAZETUBE USED OUTSIDE THE PROTECTED ENCLOSURE

In some non-harsh environments, use of the BlazeTube can be useful to connect two or more cylinder valves together or to supply a detection circuit directly to a pneumatic remote actuator ARA010 or ARA020 from a cylinder valve. In this case the BlazeTube detection is not installed in the protected enclosure and is not used for fire detection.

2.3.3 WARNINGS



The BlazeCut system is a suppression system only and is not designed or intended to extinguish all fires. Where there are high airflows and a high accumulation of combustible materials, this will dramatically alter the systems performance. Always consider supplementary firefighting equipment be available in case the system does not totally extinguish a fire. For more information about the use of the system in an area occupied by persons, please contact your supplier.



The use of the system in vehicles must be done with additional considerations of air flow and agent concentrations. In vehicles with high ventilation or airflow the suppression ability will be impaired.



Install and use the BlazeCut C Series with originally supplied components. Do not replace anything in the system. The use of external components not approved by the manufacturer, for example beacons and alarms, will not be the responsibility of BlazeCut and no warranty or claim will be acknowledged in this regard.



Each BlazeCut system cylinder is designed as an independently operating unit (also in case of a multiple cylinder connection). It is not possible to connect several independent systems into one discharging unit. Each cylinder must have separate feedlines.



BlazeCut system is not compatible with other fire suppression systems, do not try to connect the system to any other equipment.



The system may be installed, maintained and repaired only by persons trained or authorized by the manufacturer and should have relevant professional qualifications depending on the procedure. Incorrect interference with the system may cause malfunction of the system and may threaten the safety and health of people.



The system is not designed to be used as portable fire extinguisher. Do not try to suppress fire by holding the system in hands or sprinkling the extinguishing agent directly into the fire. Do not use the system in any other way than described in this manual.

3 SYSTEM DESIGN LIMITATIONS

3.1 GENERAL RULES FOR DESIGN

The BlazeCut pre-engineered systems minimise the amount of engineering required in the application design. No hydraulic calculations are required to determine pressure drop, agent flow, or discharge time. The feed lines and nozzles need to be installed within the limitations in this manual.



The BlazeCut fire system is a pre-engineered fire suppression system and must not be designed outside any limits mentioned in this manual. If unsure of what application type and application rates are required, please contact a BlazeCut representative.

All application rates for the BlazeCut clean agent systems in total flooding applications meet the recommendations in NFPA 2001 (2022) and FM 4-9 (2018). BlazeCut systems do not cover fully open applications and are only suited to fully enclosed or semi enclosed applications.

Table 5: Clean agents system limitations

Type	HFC-227ea	FK-5-1-12
Operation pressure at 20 °C	12 bar	15 bar
Operating pressure range	8 – 20 bar	12 – 20 bar
Operating temperature range of the system	-20 °C to +55 °C	-20 °C to +60 °C
Maximum vertical distance between the cylinder valve and distribution hose/tube	2 m	
Maximum length of distribution network from cylinder valve to nozzle	5 m	
Maximum length of distribution network from T fitting to nozzle	0.5 m (1 kg system) 1 m (2, 4, 6, 10 and 12 kg systems)	0.5 m (1.25 kg system) 1 m (1.25, 2.5, 5, 7.5, 11, 12 kg systems)
Number of nozzles per one cylinder	1 (1, 2 and 4 kg systems) 2 (1, 2, 4, 6, 10, 12 kg systems) 4 (6, 10 and 12 kg systems)	1 (1.25, 2.5 and 5 kg systems) 2 (1.25, 2.5, 5, 7.5, 11, 12 kg systems) 4 (7.5, 11 and 12 kg systems)
Number of discharge outlets used	1 (1, 2 and 4 kg systems) 2 (6, 10 and 12 kg systems)	1 (1.25, 2.5 and 5 kg systems) 2 (7.5, 11 and 12 kg systems)
Maximum number of cylinders connected in series	6	
Maximum length of BlazeTube for one or multiple cylinder configurations	40 m	
Maximum number of fittings per discharge outlet*	1 kg system: elbows = 3, Tees = 1 2 kg system: elbows = 3, Tees = 1 4 kg system: elbows = 3, Tees = 1 6 kg system: elbows = 6, Tees = 2 10 kg system: elbows = 6, Tees = 2 12 kg system: elbows = 6, Tees = 2	1.25 kg system: elbows = 3, Tees = 1 2.5 kg system: elbows = 3, Tees = 1 5 kg system: elbows = 3, Tees = 1 7.5 kg system: elbows = 6, Tees = 2 11 kg system: elbows = 6, Tees = 2 12 kg system: elbows = 6, Tees = 2
Maximum coverage	see Chapter 3.2	see Chapter 3.2

*** Only one elbow fitting is allowed after branching of the distribution line with Tee fitting.**

The maximum of two nozzles on one discharge port is allowed to ensure an equal dispersant of clean agent between each nozzle.

All parts of the system must be placed into the protected enclosure so that they are not in direct contact with parts of the protected equipment or in the immediate vicinity of the equipment parts that reach high temperatures during operation (transformers, engine block, exhaust pipes, etc.), not exposed to aggressive chemical substances (caustic, acids, solvents, corrosive substances etc.) and it is not exposed to direct atmospheric influences.

All components of the BlazeCut system must be firmly secured by using the recommended fixings to avoid movement and vibration. Do not secure any components to parts, which may move when the protected equipment is in operation.

Choose mountings so that fastening components are not damaged when the device is in operation. Accidental displacement of any part of BlazeCut system from the place of installation may result in reduction of the extinguishing effect of the system, its damage or device damage.

When fastening the system, make sure not to damage other parts of the device.

The system has to be positioned so that it is possible to perform future maintenance, component replacement, inspections and optimising safety of the pressurised equipment. Do not secure any components that will interfere with future inspection and maintenance of the equipment.

Ensure that no part is damaged after closing off the protected enclosure (e.g., after closing the covers/doors of the installation, engine etc.) and that no part is affected by moving parts of the equipment (fans etc.).

When fastening the system, make sure not to damage other parts of the equipment.

Do not overload the threads on the components, do not tighten or release the threads on the components forcibly, use the correct tightening torque. Make sure not to damage the components of the system by tools. Always check that the thread is clean and undamaged before installation.

In the event of subsequent changes in the protected enclosure during operation of BlazeCut system, always check whether changes are or not necessary in the installation of the system, relocation of networks, nozzles etc. to secure the functionality and efficiency of the system.

3.1.1 WARNINGS



Installation of the system, its activation and repair and maintenance is governed by specific legislation and these activities may only be performed by persons with relevant professional qualification subject to applicable legislation.



After the installation of the system the configuration is under constant pressure. Never tamper with the system under pressure.



In the case of work in the vicinity of electrical equipment observe corresponding safety rules and instructions. Do not perform installation and maintenance of the system when the equipment is in operation. In the case of work in the vicinity of electrical equipment observe corresponding safety rules and instructions. Work on electrical installations may be performed only by qualified persons.



Install and use BlazeCut system only with original supplied components. Do not replace anything in the system; use only original component and spare components. Using components not approved by the manufacturer causes loss of warranty, may cause malfunction of the system and presents danger to life and health of persons.



Do not install the cylinder to configuration if non-corresponding pressure is detected in the cylinder during inspection.



The system may be installed, maintained and repaired only by persons trained or authorized by the manufacturer and depending on procedure also with relevant professional qualification. Unprofessional interference with the system may cause malfunction of the system and provides danger to safety and health of people.



If leak of liquid extinguishing agent occurs, always prevent contact with skin. Use suitable impermeable protective work gloves.



When handling parts of the system under pressure (cylinder, valves, pressure switch, BlazeTube detection) always wear appropriate protective glasses with side-shields. Eyes may be seriously damaged when coming into contact with extinguishing agent in case of sudden leak.



During installation and maintenance of systems with HFC-227ea have appropriate detection device for inspection of HFC-227ea used in BlazeCut system leak available at all times.



Refrain from handling the system, if it was exposed high temperature (as a result of operation of the protected device or after exposure to fire etc.). If the system is hot, temperature of extinguishing agent increases and pressure in the system increases. In this case the BlazeTube detection cannot be put under mechanical stress. Splashing of hot extinguishing agent under high pressure may cause serious injury. Wait until the system cools off naturally.

3.2 TOTAL FLOODING APPLICATIONS



BlazeCut system is designed to protect equipment in closed spaces. Use in partially or completely open spaces or spaces with strong air circulation may significantly decrease the efficiency of the system. For more information about use of the system if people are constantly present in the protected area contact your supplier.

Total flooding clean agent fire extinguishing systems shall be used to protect hazards that are in enclosures. A total flooding application is defined by a closed area with maximum unclosable openings not exceeding 0.2 % of the total area of all four sides, top, and bottom of the enclosure.

Where the flooding system is being provided for the protection of a room with raised or sunken floor, both have to be simultaneously protected. Each volume, room and sunken or raised floor to be protected shall be provided with detectors, piping network and nozzles.

To guide which system to select below tables list the maximum volume coverage for each agent weight in certain design concentration. The design concentrations in tables are to cover most of standard applications for respective agent. For HFC-227ea and FK-5-1-12 the design concentration is to cover most of fixed applications with Class A and electrical fires.

Table 6: Design Concentrations of HFC-227ea

Class A Fires		6.7*	
Energized Electrical Fires <480 V		7.0*	
Energized Electrical Fires ≥480 V		12.0*	
Class B and C Fires			
1-Propane	10.0	Isopropanol	9.8
2-butoxyethanol	9.0	JP 4	9.0
Acetone	10.0	JP 5	9.0
Acetonitrile	7.0	Kerosene	9.6
Benzene	9.5	Methane	7.2
Commercial Heptane	8.7	Methanol	15.2
Commercial Hexanes	9.0	Methyl Ethyl Ketone	9.6
Crude Oil	8.5	Methyl Isobutyl Ketone	9.1
Cyclohexane	9.4	Methyl Tert Butyl Ether	8.8
Cyclopentanone	9.6	n-Heptane	9.6
Denatured Alcohol	9.8	n-Pentane	8.8
Diesel fuel	8.7	Propane	8.7
Diethyl Ether	9.8	Pyrrolidine	9.5
Ethanol	12.6	Tetrahydrofuran	9.6
Ethyl Acetate	8.9	Toluene	7.6
Gasoline-87 Octane Unleaded	9.0	Transformer Oil	9.5
Hexene	7.6	1-Butane	8.6
Hydraulic Fluid	8.5	Xylene	7.8
Hydraulic Oils	7.7		

**Minimum design concentration according to NFPA 2001 (2022) and FM 4-9 (2018)*

Table 7: Design concentrations of HFC-227ea according to BS EN 15004-2:2020

Fire Class	Concentration
Class A Standard	7.9 %
Class A Higher	8.5 %
Class B	9 %

The standard BS EN 15004-5:2020 for Fixed firefighting systems refers to Gas extinguishing systems extract below:

Section 13.220.20 Fire protection

This document contains specific requirements for gaseous fire-extinguishing systems, with respect to the HFC-227ea extinguishant. It includes details of physical properties, specification, usage and safety aspects.

This document covers systems operating at nominal pressures of 25 bar, 42 bar and 50 bar with nitrogen propellant. This does not preclude the use of other systems.

Table 8: HFC-227ea 6.7 % Design Concentration for Class A Fires

Temperature [°C]	Maximum volume coverage in m ³ with 6.7 % design concentration										
	1 kg	2 kg	4 kg	6 kg	10 kg	11 kg	12 kg	13.6 kg	20 kg	22 kg	24 kg
-20	1.63	3.26	6.51	9.77	16.28	17.91	19.53	22.14	32.56	35.81	39.07
-15	1.66	3.33	6.65	9.98	16.63	18.29	19.95	22.61	33.25	36.58	39.90
-10	1.69	3.38	6.77	10.15	16.92	18.61	20.30	23.01	33.84	37.22	40.61
-5	1.73	3.46	6.91	10.37	17.28	19.01	20.74	23.50	34.56	38.02	41.48
0	1.77	3.53	7.06	10.59	17.66	19.42	21.19	24.01	35.31	38.85	42.38
5	1.80	3.60	7.21	10.81	18.02	19.82	21.62	24.51	36.04	39.64	43.25
10	1.84	3.68	7.35	11.03	18.38	20.22	22.06	25.00	36.76	40.44	44.12
15	1.88	3.75	7.50	11.25	18.76	20.63	22.51	25.51	37.51	41.27	45.02
20	1.91	3.82	7.65	11.47	19.12	21.03	22.94	26.00	38.24	42.06	45.89
25	1.95	3.90	7.79	11.69	19.48	21.43	23.38	26.49	38.96	42.86	46.76
30	1.98	3.97	7.94	11.91	19.84	21.83	23.81	26.99	39.69	43.66	47.62
35	2.02	4.04	8.08	12.12	20.19	22.21	24.23	27.46	40.38	44.42	48.46
40	2.06	4.11	8.22	12.33	20.55	22.61	24.66	27.95	41.11	45.22	49.33
45	2.09	4.18	8.37	12.55	20.92	23.01	25.10	28.45	41.83	46.02	50.20
50	2.13	4.25	8.51	12.76	21.26	23.39	25.52	28.92	42.53	46.78	51.03
55	2.16	4.33	8.65	12.98	21.63	23.79	25.95	29.41	43.25	47.58	51.90

Table 9: HFC-227ea 7.0 % Design Concentration for Electrical Fires

Temperature [°C]	Maximum volume coverage in m ³ with 7.0 % design concentration										
	1 kg	2 kg	4 kg	6 kg	10 kg	11 kg	12 kg	13.6 kg	20 kg	22 kg	24 kg
-20	1.55	3.11	6.21	9.32	15.53	17.08	18.64	21.12	31.06	34.17	37.27
-15	1.59	3.17	6.35	9.52	15.86	17.45	19.04	21.57	31.73	34.90	38.07
-10	1.61	3.23	6.46	9.69	16.14	17.76	19.37	21.95	32.28	35.51	38.74
-5	1.65	3.30	6.60	9.89	16.49	18.14	19.79	22.42	32.98	36.27	39.57
0	1.68	3.37	6.74	10.11	16.85	18.53	20.22	22.91	33.69	37.06	40.43
5	1.72	3.44	6.88	10.32	17.19	18.91	20.63	23.38	34.38	37.82	41.26
10	1.75	3.51	7.01	10.52	17.54	19.29	21.04	23.85	35.07	38.58	42.09
15	1.79	3.58	7.16	10.74	17.90	19.69	21.48	24.34	35.79	39.37	42.95
20	1.82	3.65	7.30	10.94	18.24	20.07	21.89	24.81	36.48	40.13	43.78
25	1.86	3.72	7.43	11.15	18.59	20.45	22.30	25.28	37.17	40.89	44.61
30	1.89	3.79	7.57	11.36	18.93	20.83	22.72	25.75	37.86	41.65	45.44
35	1.93	3.85	7.71	11.56	19.26	21.19	23.12	26.20	38.53	42.38	46.23
40	1.96	3.92	7.84	11.77	19.61	21.57	23.53	26.67	39.22	43.14	47.06
45	2.00	3.99	7.98	11.97	19.96	21.95	23.95	27.14	39.91	43.90	47.89
50	2.03	4.06	8.11	12.17	20.29	22.32	24.34	27.59	40.57	44.63	48.69
55	2.06	4.13	8.25	12.38	20.63	22.70	24.76	28.06	41.27	45.39	49.52

Table 10: HFC-227ea 9.0 % Design Concentration for Gasoline & Diesel Engine Fires

Temperature [°C]	Maximum volume coverage in m ³ with 9.0 % design concentration											
	1 kg	2 kg	4 kg	6 kg	10 kg	11 kg	12 kg	13.6 kg	20 kg	22 kg	24 kg	28 kg
-20	1.18	2.36	4.73	7.09	11.82	13.00	14.18	16.08	23.64	26.00	28.37	
-15	1.21	2.41	4.83	7.24	12.07	13.28	14.49	16.42	24.15	26.56	28.97	
-10	1.23	2.46	4.91	7.37	12.29	13.51	14.74	16.71	24.57	27.03	29.48	
-5	1.25	2.51	5.02	7.53	12.55	13.80	15.06	17.07	25.10	27.61	30.11	
0	1.28	2.56	5.13	7.69	12.82	14.10	15.39	17.44	25.64	28.21	30.77	
5	1.31	2.62	5.23	7.85	13.08	14.39	15.70	17.79	26.17	28.78	31.40	
10	1.33	2.67	5.34	8.01	13.35	14.68	16.02	18.15	26.69	29.36	32.03	
15	1.36	2.72	5.45	8.17	13.62	14.98	16.34	18.52	27.24	29.96	32.69	
20	1.39	2.78	5.55	8.33	13.88	15.27	16.66	18.88	27.77	30.54	33.32	
25	1.41	2.83	5.66	8.49	14.15	15.56	16.97	19.24	28.29	31.12	33.95	
30	1.44	2.88	5.76	8.65	14.41	15.85	17.29	19.60	28.82	31.70	34.58	
35	1.47	2.93	5.86	8.80	14.66	16.13	17.59	19.94	29.32	32.25	35.19	
40	1.49	2.98	5.97	8.95	14.92	16.42	17.91	20.30	29.85	32.83	35.82	
45	1.52	3.04	6.07	9.11	15.19	16.71	18.22	20.65	30.37	33.41	36.45	
50	1.54	3.09	6.18	9.26	15.44	16.98	18.53	21.00	30.88	33.97	37.06	
55	1.57	3.14	6.28	9.42	15.70	17.27	18.84	21.36	31.41	34.55	37.69	

Table 11: Design Concentrations of FK-5-1-12

Class A Fires		4.5*	
Energized Electrical Fires <480 V		4.5*	
Energized Electrical Fires ≥480 V		10.0*	
Class B and C Fires			
1-Butane	6.4	Isopropanol Alcohol	6.4
1-Propanol	7.0	Methane	7.3
2-butoxyethanol	6.8	Methanol	8.5
Acetone	5.6	Methyl Ethyl Ketone	5.9
Acetonitrile	4.2	Methyl Isobutyl Ketone	5.7
Commercial Heptane	5.7	Methyl Tert Butyl Ether	6.0
Commercial Hexanes	5.6	n-Heptane	5.9
Cyclohexane	5.9	n-Pentane	6.1
Cyclopentanone	6.0	Propane	7.5
Denatured Alcohol	6.9	Pyrrolidine	6.1
Diesel fuel	4.4	Tetrahydrofuran	6.5
Diethyl Ether	6.4	Toluene	4.6
Ethanol	7.2	Transformer Oil	5.9
Ethyl Acetate	6.1	2,2,4-trimethylpentane	6.1
Gasoline-87 Octane Unleaded	5.9	Isooctane	6.1
Hexene	6.0		

**Minimum design concentration according to NFPA 2001 (2022) and FM 4-9 (2018)*

Table 12: Design concentrations of FK-5-1-12 according to BS EN 15004-2:2020

Fire Class	Concentration
Class A Standard	5.3 %
Class A Higher	5.6 %
Class B	5.9 %

Table 13: FK-5-1-12 4.5 % Design Concentration for Class A

Temperature [°C]	Maximum volume coverage in m³ with 4.5 % design concentration										
	1 kg	1.25 kg	2 kg	2.5 kg	3 kg	5 kg	7.5 kg	11 kg	12 kg	15 kg	22 kg
-20	1.29	1.62	2.59	3.23	3.88	6.46	9.70	14.22	15.51	19.39	28.44
-15	1.32	1.65	2.64	3.30	3.97	6.61	9.91	14.54	15.86	19.83	29.08
-10	1.35	1.69	2.70	3.38	4.05	6.75	10.13	14.86	16.21	20.26	29.72
-5	1.38	1.73	2.76	3.45	4.14	6.90	10.35	15.18	16.56	20.70	30.36
0	1.41	1.76	2.82	3.52	4.23	7.05	10.57	15.50	16.91	21.14	31.00
5	1.44	1.80	2.88	3.60	4.31	7.19	10.79	15.82	17.26	21.57	31.64
10	1.47	1.83	2.93	3.67	4.40	7.34	11.01	16.14	17.61	22.01	32.28
15	1.50	1.87	2.99	3.74	4.49	7.48	11.22	16.46	17.96	22.45	32.92
20	1.53	1.91	3.05	3.81	4.58	7.63	11.44	16.78	18.31	22.88	33.56
25	1.55	1.94	3.11	3.89	4.66	7.77	11.66	17.10	18.66	23.32	34.20
30	1.58	1.98	3.17	3.96	4.75	7.92	11.88	17.42	19.01	23.76	34.84
35	1.61	2.02	3.23	4.03	4.84	8.06	12.10	17.74	19.35	24.19	35.48
40	1.64	2.05	3.28	4.11	4.93	8.21	12.32	18.06	19.70	24.63	36.12
45	1.67	2.09	3.34	4.18	5.01	8.36	12.53	18.38	20.05	25.07	36.76
50	1.70	2.13	3.40	4.25	5.10	8.50	12.75	18.70	20.40	25.50	37.40
55	1.73	2.16	3.46	4.32	5.19	8.65	12.97	19.02	20.75	25.94	38.05
60	1.76	2.20	3.52	4.40	5.28	8.79	13.19	19.34	21.10	26.38	38.69

3.3 MAXIMUM VOLTAGE APPLICATIONS

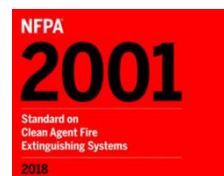


BlazeCut recommends where the system is installed into applications above 480 V, a risk assessment must be completed and that the application is immediately de-energized via the use of a pressure switch.

Metal components (e.g., pressure gauge, fittings) shall be kept clear from the protected electrical equipment. Any BlazeCut system electrical components (e.g., pressure switch) in close vicinity to high voltage equipment shall be grounded. This must be carried out by a qualified electrical contractor.

Referencing below the NFPA 2001:2018 Standards Article 5.4.2.5.1 (Article 7.2.2.4.2 in 2022 revision)

The minimum design concentration for spaces containing energized electrical hazards supplied at greater than 480 volts that remain powered during and after discharge shall be determined by a hazard analysis and testing, as necessary.



For applications above 480 V, as each application is unique and requires a hazard analysis/risk assessment, the user/installer is responsible for any testing, if required.

Please contact BlazeCut for a copy of our hazard analysis/risk assessment form.

Referencing below FM Global Data sheet 4-9 (OCT 2018) Article 2.2.2.2.B

When the electrical equipment is not de-energized upon activation of the clean agent extinguishing system or has a time-delayed power disconnect, provide the minimum design concentration for an energized electrical fire (Class C – US classification) in accordance with Table 1 for the applicable equipment voltage. If the electrical equipment is not de-energized before the clean agent concentration falls below the minimum design value shown in Table 1 (



[Table 14](#)), reignition is expected.

Table 14: Minimum Design Concentrations according to FM Global 4-9

Agent	Minimum Design Concentration, %			
	Class A	Class B ¹	Class C, <480 V	Class C, ≥480 V ^{2,3}
FK-5-1-12	4.5	5.9	4.5	10
HFC-125	9.7	11.3	9.0	20
HFC-227ea	6.7	8.7	7.0	12
HFC-23	18	19.5	20.3	Not tested ³
IG-01	38.0	52.5	42.8	Not tested ³
IG-55	37.9	39.1	42.7	Not tested ³
IG-100	37.2	43.7	41.9	Not tested ³
IG-541	34.2	40.6	38.5	57

¹ Class B values are for hydrocarbon fuels similar to n-Heptane. Class B minimum design concentrations will vary for other ignitable liquid fuels, based on the information provided in the manufacturer's design, installation, operation, and maintenance manual.

² These higher concentrations need to be reviewed for restrictions when used in normally occupied areas. See Section 3.2.4 and Table 5 for information regarding No Observed Adverse Effects Limit (NOAEL) and Lowest Observed Adverse Effects Limit (LOAEL).

³ FM Global conducted testing that indicates higher agent concentrations are needed for high-energy arcing faults. Only certain clean agents were tested. Refer to Section 3.3 for additional information on this testing. Where an agent is listed as "not tested," additional testing is necessary if the clean agent system is intended to protect energized electrical hazards greater than 480 volts that remain energized following discharge. Do not use an agent to protect high-energy electrical hazards if this testing has not been conducted.

IMPORTANT!

Please note the recommended increases agent concentration for Application higher than 480 V is by FM Global for Class C (US classification), Electrical applications. Please refer to FM Global for further information.

3.4 APPLICATIONS INVOLVING LITHIUM BATTERIES



The BlazeCut fire suppression system will assist during a fire in enclosures containing lithium batteries, however BlazeCut cannot state that our products will extinguish a lithium battery fire in thermal runaway. BlazeCut fire suppression systems may extend a window of safety to isolate the equipment and for people to evacuate.

The system is designed to prevent lithium-ion battery fires before they reach the thermal runaway stage. It is not intended to extinguish a fire once thermal runaway has occurred. Instead, the suppression system aims to protect other items in the room/enclosure that could ignite, including those affected by leaking electrolyte materials from the batteries. The design concentration for the suppression system must be based on the highest Class B fuel present, typically the specific electrolyte material. Class C (NFPA 2001) or High Hazard (ISO 14520 / EN 15004) design concentrations are intended for electrical hazards and are insufficient for flammable liquid fires.

According to ISO14520-1, 7.5.2

The minimum design concentrations used to inert atmospheres involving inflammable liquids and gases shall be determined by adding a safety factor of 10 %.

FK-5-1-12 Inerting and design concentrations

Methane: Inerting 8.8%, Minimum design: 9.7%

Propane: Inerting 8.1%, Minimum design: 8.9%

According to NFPA2001

The minimum design concentration used to inert the atmosphere of an enclosure where the hazard is a flammable liquid or gas shall be the inerting concentration times a safety factor of 1.1.

Methane: FK-5-1-12 Inerting: 8.8% / HFC-227ea Inerting 8%

Propane: FK-5-1-12 Inerting: 8.1% x1.1= 8.9 % / HFC-227ea Inerting 11.6% x1.1= 12.8 %

BlazeCut Design Concentrations

For lithium-ion battery applications, BlazeCut use the below concentrations

FK-5-1-12 Minimum design concentration: 10 %

HFC-227ea Minimum design concentration: 13 %

Mandatory features

When protecting a space containing lithium batteries, instant shutdown of power supply to the batteries instigated by a BlazeCut Alarm Panel or pressure switch with a relay is required. Choose fastest detection type available.

3.5 APPLICATIONS ACCORDING TO ISO 9094

When protecting a space containing a combustion engine there shall be a device, manual or automatic, that shuts down the engine before or during the discharge or activation.

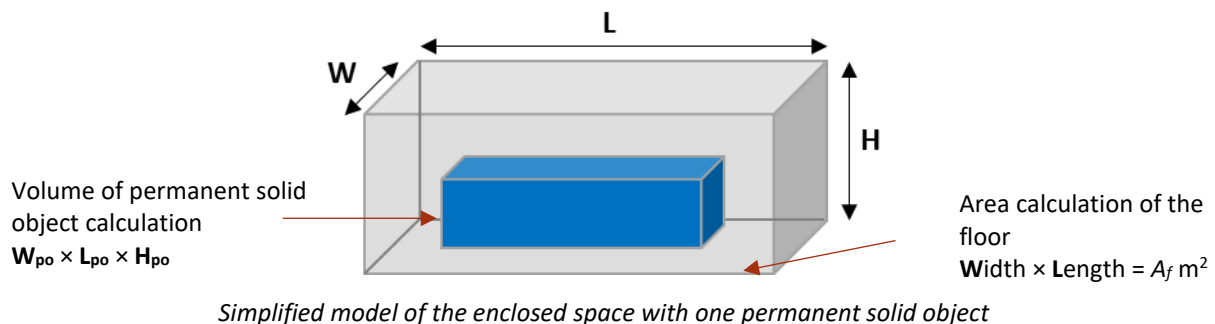
Prior to or during system discharge, the manual and/or automatic shutdown of engines, generators, forced ventilation, or other permanently installed equipment which could compromise the levels of extinguishing medium in the protected area, shall be installed.

Where equipment shutdown as described above cannot guarantee that extinguishing medium design concentration can be maintained, shut-off dampers closing the ventilation ducts shall be installed.

For automatic systems having a single external power source, a means to indicate to the craft occupants that the power supply is active shall be installed.

3.6 HAZARD VOLUME DETERMINATION

The volume calculated is a nett volume with deductions included for permanent objects.



$$V = W \times L \times H \text{ [m}^3\text{]} \quad (1)$$

V – total volume of the enclosed space [m³]

W – width [m]

L – length [m]

H – height [m]

$$V_{po} = W_{po} \times L_{po} \times H_{po} \text{ [m}^3\text{]} * \quad (2)$$

V_{po} – volume of one permanent solid object [m³] W_{po} – width of one permanent solid object [m]

L_{po} – length of one permanent solid object [m] H_{po} – height of one permanent solid object [m]

*if more than one permanent solid object is present, calculate the volume V_{po} for all of them

$$V_t = V - V_{po} \text{ [m}^3\text{]} \quad (3)$$

V_t – compartment volume excluding all permanent objects [m³]

$$A_f = W \times L \text{ [m}^2\text{]} \quad (4)$$

A_f – floor area of the enclosure

Calculation example for an enclosures:

Given values for an enclosure:

$$W = 1.16 \text{ m} \quad L = 5.02 \text{ m} \quad H = 1.38 \text{ m} \quad A_v = 0.72 \text{ m}^2$$

Given values for a permanent solid object:

$$W_{po} = 0.80 \text{ m} \quad L_{po} = 4.50 \text{ m} \quad H_{po} = 1.00 \text{ m}$$

$$V = W \times L \times H = 1.16 \times 5.02 \times 1.38 = 8.04 \text{ m}^3$$

$$V_{po} = W_{po} \times L_{po} \times H_{po} = 0.80 \times 4.50 \times 1.00 = 3.60 \text{ m}^3$$

$$V_t = V - V_{po} = 8.04 - 3.60 = 4.44 \text{ m}^3$$

3.6.1 CALCULATION OF REQUIRED AGENT

Determine the required agent quantity for hazard protection with the desired concentration. The agent amount is dependent on two major factors: lowest ambient temperature in the protected enclosure and design concentration required for the type of hazard.

$$S = k_1 + k_2 \times t \quad (5)$$

S – specific volume of the superheated agent vapor at 1 atmosphere and the temperature t [m³/kg]

t – minimum anticipated temperature of the protected volume [°C]

for HFC-227ea:

$$k_1 = 0.1269 \quad k_2 = 0.0005$$

for FK-5-1-12:

$$k_1 = 0.0664 \quad k_2 = 0.0002741$$

$$Q = \frac{V_t}{S} \times \frac{C}{100 - C} \quad (6)$$

Q – agent quantity [kg]

V_t – compartment volume excluding all permanent objects [m³]

C – agent volumetric concentration at the given ambient temperature t [%]

$$A_f = W \times L \text{ [m}^2\text{]} \quad (7)$$

A_f – floor area of the enclosure

Calculation example of required agent HFC-227ea:

Given values for an enclosure with Class A fire:

$$V_t = 4.44 \text{ m}^3 \quad t = 10 \text{ °C} \quad C = 6.7 \text{ %}$$

$$Q = \frac{V_t}{S} \times \frac{C}{100 - C} = \frac{4.44}{0.1269 + 0.0005 \times 10} \times \frac{6.7}{100 - 6.7} = 2.42 \text{ kg}$$

$$A_f = W \times L = 1.16 \times 5.02 = 5.82 \text{ m}^2$$

Recommended system: CEA2xx-xx-2.5-x-x

Table 15: Coverage limitations for flooding applications with HFC-227ea systems

Cylinder volume [L]	Total agent [kg]	DP × nozzle*	Number and type of nozzles	Max. total area coverage [m²]	Max nozzle height from the floor [m]	Discharge time under 10 seconds**
1.2	1	1×1	1×ANG014	4	2.5	yes
		1×2	2×ANG014	6	2.5	yes
2.4	2	1×1	1×ANG014	8	3	yes
		1×2	2×ANG014	12	3	yes
5.0	4	1×1	1×ANG038	16	3	yes
		1×2	2×ANG038	24	3	yes
7.8	6	2×1	2×ANG038	32	3	yes
		2×2	4×ANG038	38	3	yes
13	10	2×1	2×ANG012	32	3	yes
		2×2	4×ANG012	48	3	yes
16	12	2×1	2×ANG012	32	3	yes
		2×2	4×ANG012	48	3	yes

*number of discharge ports times number of nozzles per discharge port

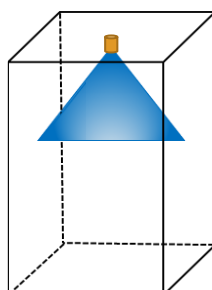
**the discharge time represents values achieved with tube distribution network at ambient temperature 20 °C

Table 16: Coverage limitations for flooding applications with FK-5-1-12 systems

Cylinder volume [L]	Total agent [kg]	DP × nozzle*	Number and type of nozzle	Max. total area coverage [m²]	Max nozzle height from the floor [m]	Discharge time under 10 seconds**
1.2	1.25	1×1	1×ANG014	4	2.5	yes
		1×2	2×ANG014	6	2.5	yes
2.4	2.5	1×1	1×ANG014	8	3	yes
		1×2	2×ANG014	12	3	yes
5.0	5	1×1	1×ANG038	16	3	yes
		1×2	2×ANG038	24	3	yes
7.8	7.5	2×1	2×ANG038	32	3	yes
		2×2	4×ANG038	38	3	yes
13	11	2×1	2×ANG012	32	3	yes
		2×2	4×ANG012	48	3	yes
16	12	2×1	2×ANG012	32	3	yes
		2×2	4×ANG012	48	3	yes

*number of discharge ports times number of nozzles per discharge port

**the discharge time represents values achieved with tube distribution network at ambient temperature 20 °C

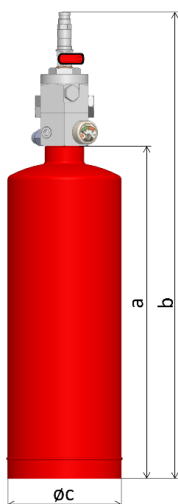


Nozzle orientation downward and centralised for total flooding enclosures

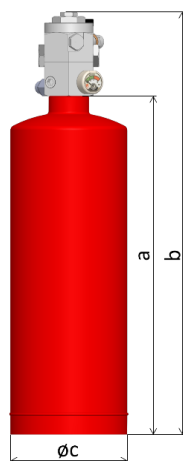
4 COMPONENTS OF THE SYSTEM AND THEIR DESCRIPTION

4.1 CYLINDER S FOR EXTINGUISHING AGENT

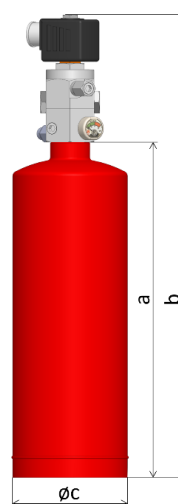
Depending on the system configuration and the necessary amount of the extinguishing agent different size cylinders filled with the necessary amount of extinguishing agent may be used. The set size and selected parameters of normally used cylinders and valves are shown in pictures and Table 17.



Cylinder with the valve 201



Cylinder with the valve 207



Cylinder with the valve 21x

Table 17: Parameters and dimensions of cylinders including a valve

Volume of the cylinder [L]	Valve	M** [kg]	a* [mm]	b* [mm]	Ø c [mm]	Standard agent fill, <10 sec. discharge time [kg]	Agent amount range [kg]**
1.2	201, 202, 203	2.10	245	370	91	HFC-227ea:	HFC-227ea:
	207	2.11		324		1	1
	211, 212	2.39		366		FK-5-1-12: 1.25	FK-5-1-12: 0.7 – 1.3
2.4	201, 202, 203	2.59	320	445	110	HFC-227ea:	HFC-227ea:
	207	2.59		399		2	2
	211, 212	2.87		441		FK-5-1-12: 2.5	FK-5-1-12: 1.4 – 2.7
5.0	201, 202, 203	3.53	348	473	150	HFC-227ea:	HFC-227ea:
	207	3.53		427		4	4 – 4.25
	211, 212	3.82		469		FK-5-1-12: 5	FK-5-1-12: 2.8 – 5.7
7.8	201, 202, 203	4.41	460	585	160	HFC-227ea:	HFC-227ea:
	207	4.41		539		6	6 – 6.6
	211, 212	4.70		581		FK-5-1-12: 7.5	FK-5-1-12: 5.8 – 8.9
13.0	201, 202, 203	6.11	533	658	190	HFC-227ea:	HFC-227ea:
	207	6.12		612		10	10 – 11
	211, 212	6.40		654		FK-5-1-12: 11	FK-5-1-12: 9 – 13
16.0	201, 202, 203	8.17	645	770	190	HFC-227ea:	HFC-227ea:
	207	8.17		724		12	12 – 13.6
	211, 212	8.45		766		FK-5-1-12: 12	FK-5-1-12: 10 – 16

*tolerance ±3 mm

**weight of the empty cylinder, dip tube, valve and without the extinguishing agent, valve plugs and pressure gauge, tolerance ± 0.05 kg

***non-standard amount of agent will influence pressure at other than 20 °C and discharge time.

Table 18: Cylinders parameters

Parameter	Description
Certification	2014/68/EU
Material	steel DC04 EN10130
Surface treatment	high resistant powder coating
Neck ring	stainless steel 316L AISI/EN 1.4435/1.4404
Inside surface	polymer coating
Max. working pressure	PS 20 bar at 60 °C
Working temperature	-30 to +60 °C
Testing pressure	PT 30 bar
Colour	red RAL 3000



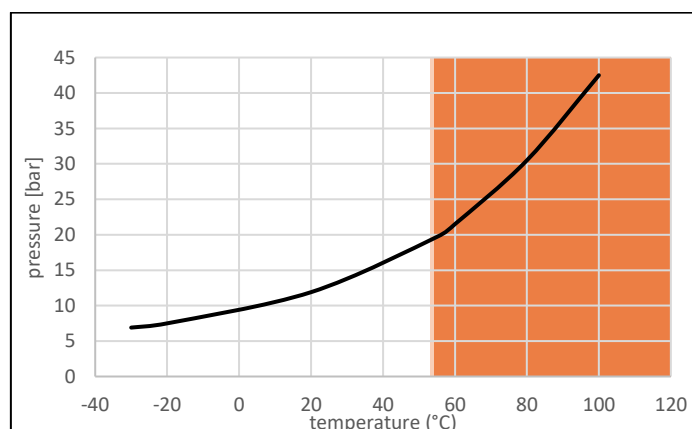
System model: Cxx2xx
System kit: Cxx2xx-xx-2.5-x-x
Cylinder volume: 2.4 L
Amount of agent: 2.5 kg
Serial number: 0000001
Production week: 01-2024

Cylinder label with model designation and production data

The cylinder is used for storage of extinguishing agent and expellant gas. The expellant gas is required to release the agent through the nozzle(s) and also assists in the stabilization of pressure in the cylinder. Pressure in the cylinder will vary depending on the ambient temperature (see graph below). The amount of the extinguishing agent and its fill pressure are indicated on the label of the cylinder. Cylinders with HFC-227ea arrive **pressurised** as standard, while cylinders with FK-5-1-12 are **unpressurised** but can be delivered pressurised at customer's request.

4.1.1 SYSTEMS WITH EXTINGUISHING AGENT HFC-227ea – CEA(20x, 211, 212)

Extinguishing agent in the cylinder is in form of liquefied gas. The cylinder is pressurised with nitrogen gas under pressure of 12 bar at temperature 20 °C.



The relationship between temperature and pressure in the cylinder for HFC-227ea

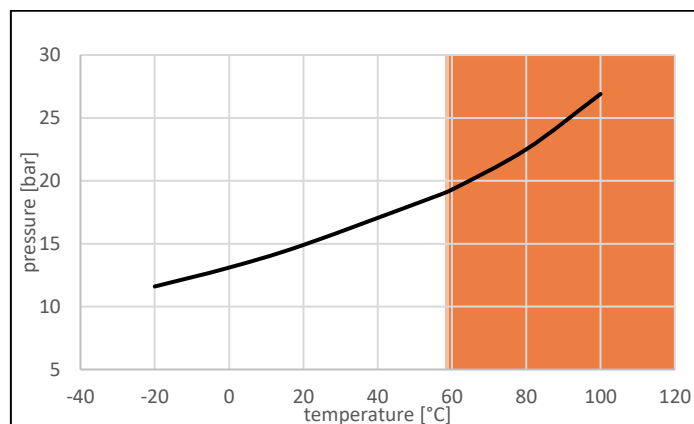
Table 19: Values of pressure in the cylinder at given temperatures

Temperature [°C]	-20	-10	0	10	20	30	40	50	55
Pressure [bar]	8	8.5	9.2	10.4	12.0	13.3	15.3	18.1	20.0

4.1.2

4.1.3 SYSTEMS WITH EXTINGUISHING AGENT FK-5-1-12 – CFK(20x, 211, 212)

Extinguishing agent in the cylinder is in liquid form. The cylinder is pressurised with nitrogen gas under pressure of 15 bar at temperature 20 °C.



The relationship between temperature and pressure in the cylinder for FK-5-1-12

Table 20: Values of pressure in the cylinder at given temperatures

Temperature [°C]	-20	-10	0	10	20	30	40	50	60
Pressure [bar]	12	12.4	12.9	13.9	15.0	16.1	17.3	18.6	20.0

4.1.4 WARNINGS



In case of a significant difference between the actual pressure in the system with the data on the cylinder label, conduct an inspection of the system.



Do not install the cylinder, if the incorrect pressure is detected in the cylinder during inspection (i.e., pressure is significantly different from the values stated on the label).



The cylinder of the system is under constant pressure. Do not damage, puncture or throw the cylinder. During transferring or transporting, secure the cylinder to avoid tipping, rolling or rubbing against other objects or the ground. Do not mend or solder a damaged cylinder, it must be replaced.



During storage, separate empty cylinders from fully charged cylinders and appropriately label their storage area. Do not store, transport in vicinity of strong sources of heat, aggressive chemical (caustic, corrosive) substances, prevent contact with sharp objects, vibrations or loading with other objects. Store in dry and well-ventilated rooms.



Do not expose the cylinder to extreme heat or direct sunlight if possible. Heating the surface of the cylinder may significantly increase pressure in the cylinder.



Always handle the cylinder as if it were under pressure, unless it is directly verified that it is completely empty (e.g., by pressing the Schrader valve in the M10x1 pressure gauge outlet on the cylinder valve; the value of the pressure on the pressure gauge may be incorrect or the pressure gauge may be malfunctioning).



Transportation of equipment under pressure and equipment containing HFC gas by transportation vehicles is governed by specific legislation. Seek information and follow corresponding security requirements during transportation depending on the method of transport.

4.1.5 SIMULTANEOUS CONNECTION OF MULTIPLE CYLINDERS

In case of simultaneous connection of multiple cylinders, the extinguishing agent in all cylinders must be the same and all containers must be under the same pressure before installation.

The amount of extinguishing agent in each cylinder is indicated on the label of the cylinder, the total amount of the extinguishing agent in the system is the sum of the quantities of extinguishing agent in individual cylinders. The cylinders are connected into one pressurised unit after installation of the system, the pressure in all cylinders at steady state is always equal.

4.2 CYLINDER VALVES

The cylinder valve is assembled and part of the cylinder when the BlazeCut system is supplied. The valve is closed by an internal piston, which holds the pressure in the cylinder. The piston opens with a rapid decrease of pressure on the top side of the piston. This can be caused by a pneumatic activation or with an electric activation using an electric solenoid.



Prevent the cylinder valve from damage and impact. Do not lift the cylinder holding it by the cylinder valve or by other components connected to the valve. Always store and transport cylinders with the valve facing upwards.



Do not try to remove the valve off the cylinder if the cylinder is under pressure. Never untighten a plug or fitting closing the detection ports on the cylinder valve. If removed, this can cause the immediate opening of the cylinder valve piston and release the extinguishing agent.



The valve is mounted on the cylinder by a specific tightening torque. Do not tighten or release the valve. If a leak is detected between the valve and cylinder join, the charged cylinder cannot be used.

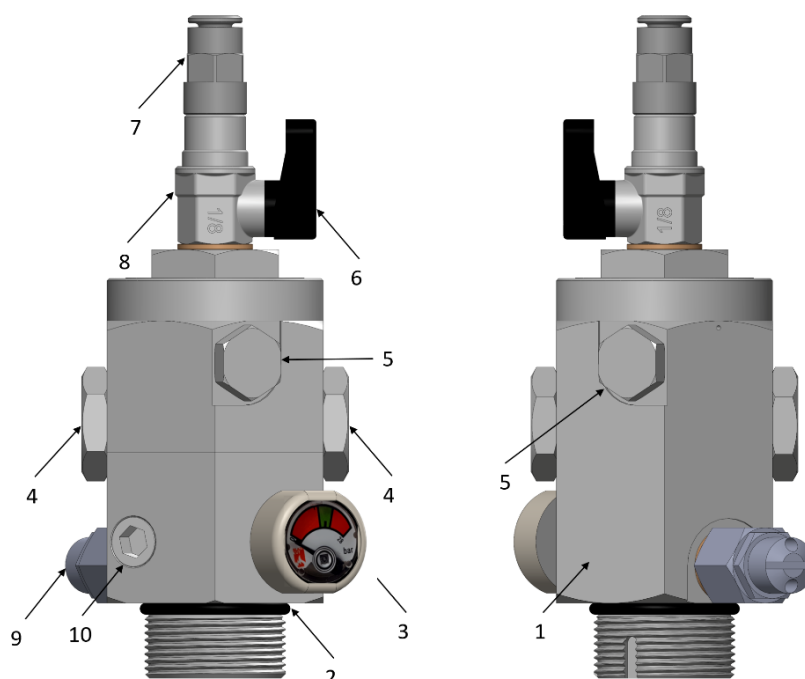
4.2.1 VALVE 20x WITHOUT THE INTEGRATED SOLENOID – SYSTEMS C(EA, FK)20x

Pressure that is in the detection circuit keeps the piston in closed position. The piston of the valve will open when there is a drop of pressure in the detection circuit which is connected to the top side of the cylinder valve. This principle is solely mechanical and independent of any external power supply. The piston can be also released by a manual actuation device.

Valve Series 20x are mostly used in LOP applications with BlazeTube detection. A pneumatic hose can be used for connecting directly to a remote actuator, for a manual system only when required.

Table 21: Parameters of valves 201, 202, 203

Total height of the valve	Height of the valve without the cylinder thread	Cylinder thread	Dip tube thread	Distribution outlet thread	Pressure gauge thread	BlazeTube detection outlet	Ball valve thread
141 mm	125 mm	M30x1.5	M16x1.5	G3/8"	M10x1	Ø 6 mm	G1/8"

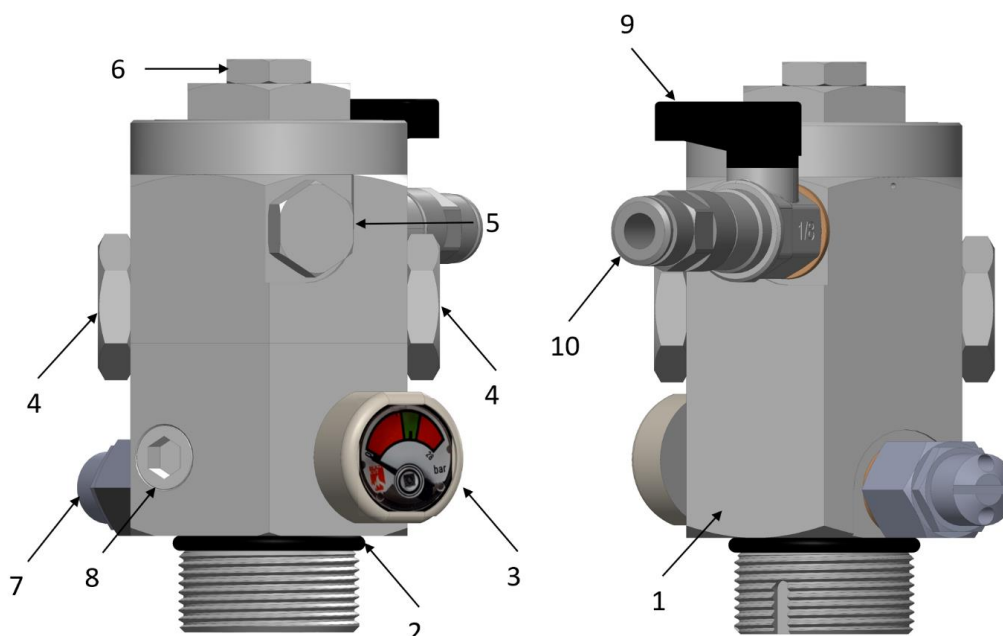


Standard configuration of the 201, 202, 203 valves

1. body of the cylinder valve
2. O-ring seal of the cylinder valve
3. M10x1 port with an installed pressure gauge APG004
4. 2x G3/8" agent discharge outlet with a valve plug FVP1B06 – for fittings for a Red Fire Hose, Feed Hose or steel tubes
5. 2x G1/8" outlet with a valve plug FVP1B02. Can be ordered with:
 - a) valve adapter FVABM0210 (G1/8" to M10x1)
 - b) ball valve ABV001 with BlazeTube push-in connector and a bonded seal FVG002
6. removable lever of the ball valve
7. push-in connector for a Ø 6 mm BlazeTube detection
 - a) valve 201: straight fitting FBT1BP026
 - b) valve 202: elbow fitting FBT2BP026
 - c) valve 203: Tee fitting FBT3PBP6026
8. G1/8" outlet with a ball valve ABV001 and a bonded seal FVG002
9. G1/8" outlet with a pressure relief valve APR001 or APR003 and a bonded seal FVG002
10. M10x1 port with a valve plug FVP1M10 – for Pressure Switch APS001-xx, APS003-xx or Pressure Transducer ATA100 (see [ANNEX 2: PRESSURE MONITORING](#))

Table 22: Parameters of the valves 207-01

Total height of the valve	Height of the valve without the cylinder thread	Cylinder thread	Dip tube thread	Distribution outlet thread	Pressure gauge thread	BlazeTube detection outlet	Ball valve thread
95 mm	79 mm	M30x1.5	M16x1.5	G3/8"	M10x1	Ø 6 mm	G1/8"



Standard configuration of the 207-01 valve

1. body of the cylinder valve
2. O-ring seal of the cylinder valve
3. M10x1 port with an installed pressure gauge APG003
4. 2x G3/8" agent discharge outlet with a valve plug FVP1B06 – for fittings for a Red Fire Hose, Feed Hose or a steel tube
5. G1/8" outlet with a valve plug FVP1B02. Can be ordered with:
 - a) valve adapter FVABM0210 (G1/8" to M10x1)
 - b) ball valve ABV001 with BlazeTube push-in connector and a bonded seal FVG002
6. G1/8" outlet with a valve plug FVP1B02
7. G1/8" outlet with a pressure relief valve APR001 or APR003 and a bonded seal FVG002
8. M10x1 port with a valve plug FVP1M10 – for Pressure Switch APS001-xx, APS003-xx or Pressure Transducer ATA100 (see [ANNEX 2: PRESSURE MONITORING](#))
9. removable lever of the ball valve
10. G1/8" outlet with a ball valve ABV001 with BlazeTube push-in connector and a bonded seal FVG002
Can be ordered also with:
 - a) valve plug FVP1B02

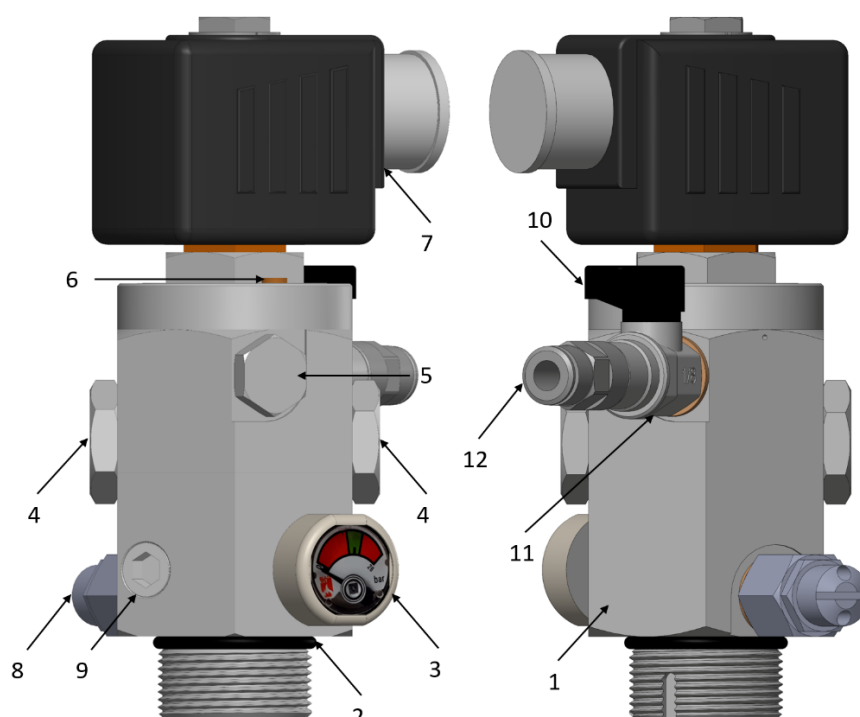
4.2.2 VALVES 211 AND 212 WITH THE INTEGRATED SOLENOID – SYSTEMS (EA, FK)(211, 212)

Solenoid is electromagnetic coil. When electrical current is sent to the coil, it produces a magnetic field. The field transforms into mechanical energy, which secures the release of pressure from the top side of the valve piston opening the discharge ports and releasing the agent.

The system is supplied with a solenoid connector mounted on the solenoid. When fire is detected, the solenoid allows to activate the system manually (e.g., alarm panel, electric actuator) or automatically using electrical detection such as smoke and/or heat detectors, LHD BlazeWire etc.

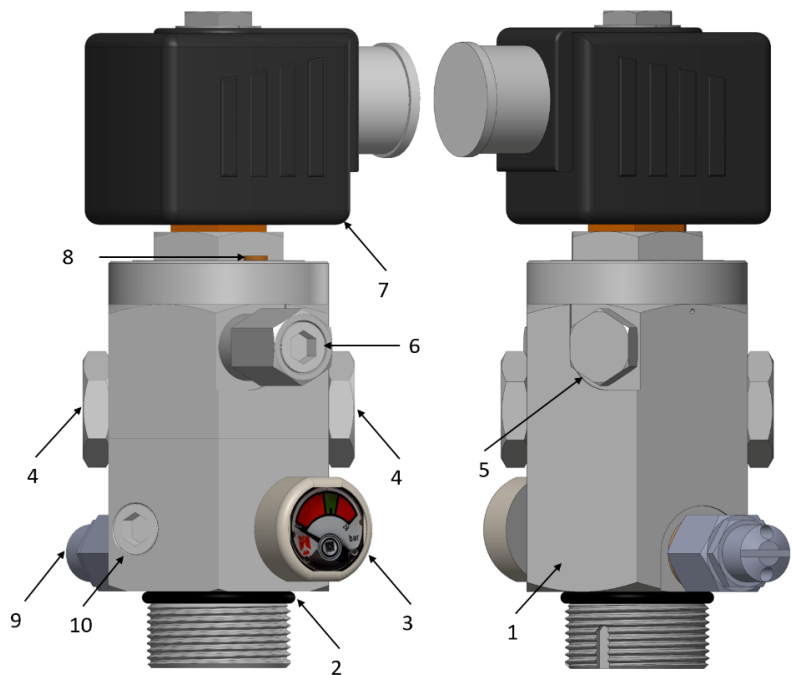
Table 23: Parameters of the 211 and 212 valves

Total height of the valve	Height of the valve without the cylinder thread	Cylinder thread	Dip tube thread	Distribution outlet thread	Pressure gauge thread	BlazeTube detection outlet	Ball valve thread
137 mm	121 mm	M30x1.5	M16x1.5	G3/8"	M10x1	Ø 6 mm	G1/8"



Standard configuration of 21x-01 valves

1. body of the cylinder valve
2. O-ring seal of the cylinder valve
3. M10x1 port with an installed pressure gauge APG004
4. 2xG3/8" agent discharge outlet with a valve plug FVP1B06 – for fittings for a Red Fire Hose, Feed Hose or steel tubes
5. G1/8" outlet with a valve plug FVP1B02. Can be ordered with:
 - a) valve adapter FVABM0210 (G1/8" to M10x1)
 - b) ball valve ABV001 with BlazeTube push-in connector and a bonded seal FVG002
6. venting port cap – **keep in place at all times**
7. solenoid valve 24 V DC or 12 V DC
8. G1/8" outlet with a pressure relief valve APR001 or APR003 and a bonded seal FVG002
9. M10x1 port with a valve plug FVP1M10 – for Pressure Switch APS001-xx, APS003-xx or Pressure Transducer ATA100 (see [ANNEX 2: PRESSURE MONITORING](#))
10. removable lever of the ball valve
11. G1/8" outlet with a ball valve ABV001 and a bonded seal FVG002
12. push-in connector FBT1BP026 for a Ø 6 mm BlazeTube detection



Standard configuration of 21x-30 valves

1. body of the valve
2. O-ring seal of the valve
3. M10x1 port with an installed pressure gauge APG004
4. 2xG3/8" agent discharge outlet with a valve plug FVP1B06 – for fittings for a Red Fire Hose, Feed Hose or steel tubes
5. G1/8" outlet with a valve plug FVP1B02. Can be ordered with:
 - a) valve adapter FVABM0210 (G1/8" to M10x1)
 - b) ball valve ABV001 with BlazeTube push-in connector and a bonded seal FVG002
6. G1/8" outlet with a valve adapter FVABM0210 (G1/8" to M10x1) with a plug
7. solenoid valve 24 V DC or 12 V DC
8. venting port cap – **keep in place at all times**
9. G1/8" outlet with a pressure relief valve APR001 or APR003 and a bonded seal FVG002
10. M10x1 port with a valve plug FVP1M10 – for Pressure Switch APS001-xx, APS003-xx or Pressure Transducer ATA100 (see [ANNEX 2: PRESSURE MONITORING](#))

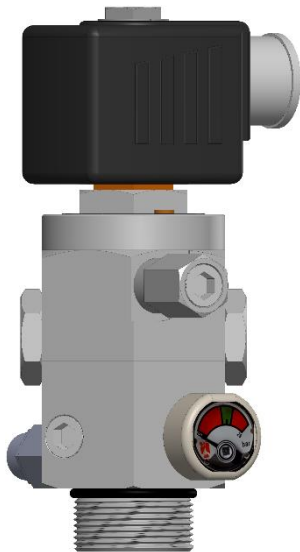
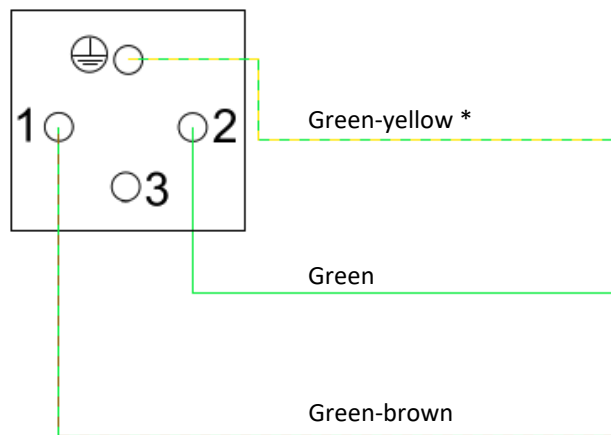
Table 24: Types of solenoid connectors

Part №	IP rating	Description
ASP002	IP67	Solenoid plug for electrics, with integrated seal



ASP002

Please refer to component manual *CM-AP2-EN Alarm Panels AAP210, AAP211, AAP310* for full wiring detail.



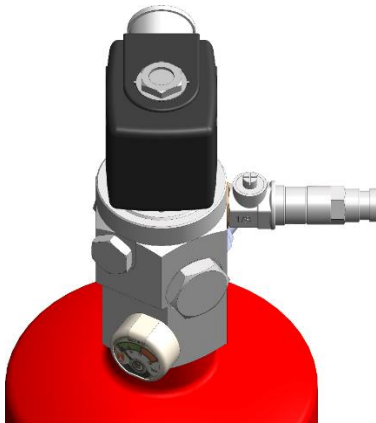
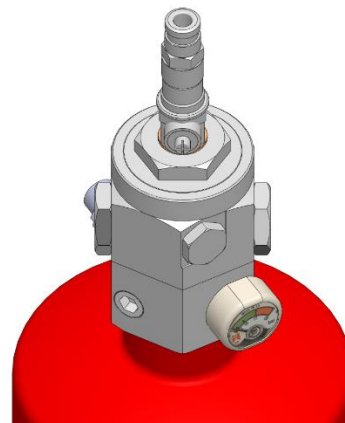
** optional ground wire*

ASP002 wiring diagram

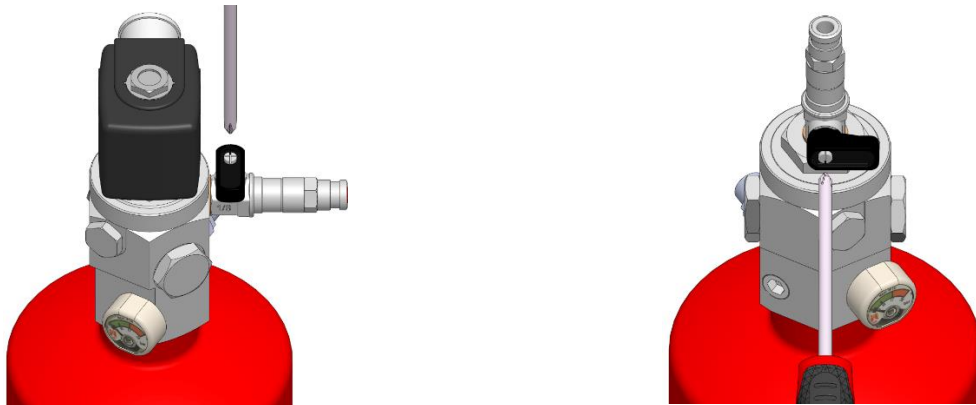
4.2.3 BLAZETUBE DETECTION CONNECTOR

The BlazeTube detection connector with a $\varnothing$ 6 mm outlet is on the cylinder valve. Part of this connector is a small ball valve mounted in the valve detection outlet with thread G1/8". The ball valve is closed when supplied and must only be opened after pressurisation of the BlazeTube detection, for the system to become fully functional.

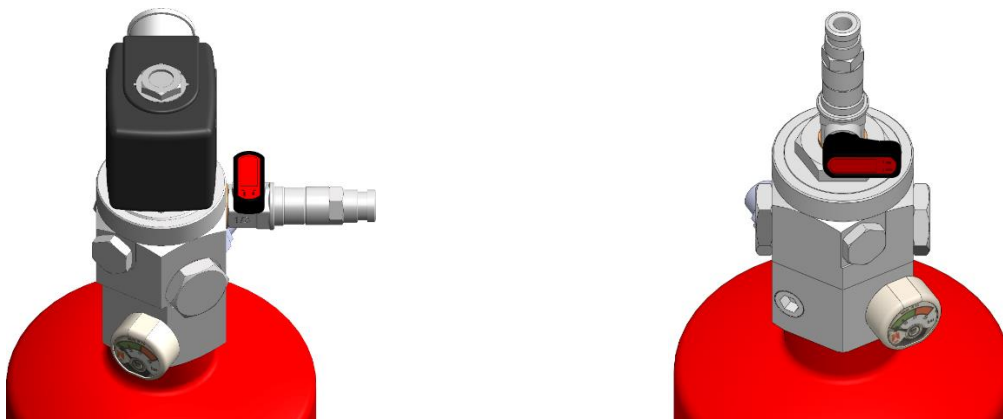
For safety reasons cylinders under pressure must be protected against accidental activation by removal of the lever of the ball valve during transportation of the cylinder. Install the lever during installation of the BlazeTube detection. During the installation of the ball valve lever, follow the steps listed below. To uninstall the ball valve lever, remove the red cover by pushing its pin on the back and follow the steps in reverse to the installation.



Ball valves without a lever



Use a screwdriver for mounting and dismanting



Place the red cover on the lever



Do not try to remove the BlazeTube detection ball valve connector from the cylinder valve if the system is under pressure. This will cause the cylinder valve to activate and discharge the agent.



Always remove the lever of the ball valve during transportation of cylinders which are under pressure.



Do not open the ball valve of the BlazeTube detection connector before pressurisation of the tube, the valve piston of the cylinder will open and the extinguishing agent will be released. Protect the ball valve from accidental opening during transportation and handling of the cylinder. Follow the instructions for transportation of the cylinder.

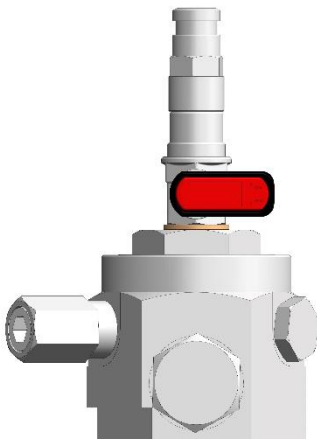


Always keep the discharge ports on the valve plugged until the BlazeTube detection is pressurised to the correct pressure.

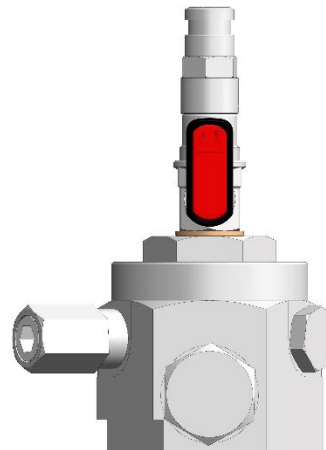
The ball valve of the BlazeTube detection connector can only be opened after completing the following:



- the cylinder of the system is properly fastened;
- the system is completely installed, without discharge hoses connected;
- both discharge outlets are to remain plugged off until charging is completed correctly;
- the BlazeTube detection is properly connected to the valve and to the end-of-line adapter;
- the end-of-line adapter is properly mounted and secured with a P-clamp;
- the BlazeTube detection is pressurised to 1 bar above the current cylinder pressure.

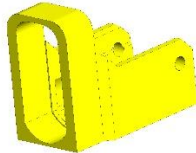


Ball valve is closed

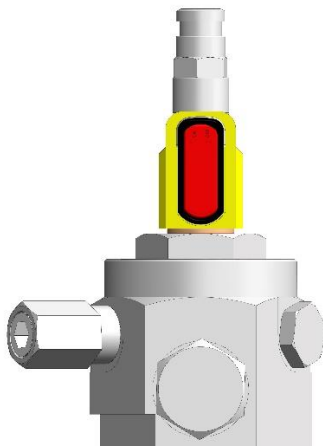


Ball valve is open

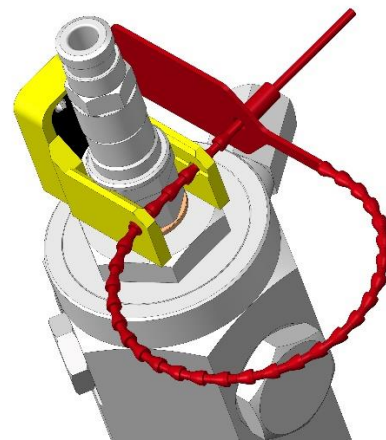
To prevent unintentional switch of the ball valve lever to closed position, install the ball valve anti tamper safety lock ABL001 and a plastic lock seal ALS001.



Ball valve anti tamper safety lock ABL001



Installed ball valve anti tamper safety lock



Installed plastic lock seal

Put the ball valve anti tamper safety lock in position so that the front face of it and the front face of the ball valve lever are in plane. To secure the ball valve anti tamper safety lock, insert a plastic lock seal through the two holes on the ball valve anti tamper safety lock. Fasten the lock seal tightly.

4.2.4 DISCHARGE OUTLET

The cylinder valve contains two outlets for the discharge networks. They are closed by the valve piston of the cylinder. The outlets have a thread G3/8". These outlets are sealed with plugs to prevent accidental activation of the system when BlazeCut system is supplied and installed.



The valve plugs of the outlets for discharge networks must always be mounted on the cylinder valve. Remove the valve plugs after the BlazeTube has been charged correctly and the ball valve has been successfully opened without issue. The connecting of discharge hoses will be one of the last steps in the systems installation process.

Table 25: Parts for the cylinder valve

Picture	Part №	Description	Material
	FDO1BM0618	discharge outlet fitting straight reduced coupling G3/8" for 12 mm tube (M18x1.5) - BODY, Male-Male,	galvanized steel
	FDO1BM0618-SET	discharge outlet fitting straight reduced coupling G3/8" for 12 mm tube (M18x1.5) - SET, Male-Male	galvanized steel
	FDO1BM0622	discharge outlet fitting straight reduced coupling G3/8" for 15 mm tube (M22x1.5) - BODY, Male-Male	galvanized steel
	FDO1BM0622-SET	discharge outlet fitting straight reduced coupling G3/8" for 15 mm tube (M22x1.5) - SET (with rings and nuts), Male-Male	galvanized steel
	FDO1BB0604	discharge outlet fitting straight reduced coupling, G3/8" for 1/4" RF hose (G1/4"), Male-Male	galvanized steel
	FDO1BB0608	discharge outlet fitting straight reduced coupling, G3/8" for 1/2" RF hose (G1/2"), Male-Male	galvanized steel
	FVABM0210	valve adaptor G1/8" - M10x1 with internal Schrader valve, includes M10x1 plug	stainless steel, EPDM sealing
	APR001	Pressure relief valve for ILP/DLP valves, 22 bar set pressure, G1/8"	stainless steel, EPDM sealing
	APR003	Pressure relief valve for ILP/DLP valves, EPDM sealing, 25 bar set pressure, G1/8"	nickel-plated brass, EPDM sealing
	FVP1B02	valve plug G1/8"	stainless steel EPDM sealing

	FVP1B06	valve plug G3/8"	stainless steel EPDM sealing
	FVP1M10	valve plug M10x1	stainless steel EPDM sealing
	FVG002	Bonded seal, 1/8", used with ball valve ABV001 and pressure relief valve APR001 or APR003	stainless-steel, EPDM seal
	ABV001	ball valve G1/8" to G1/8"	chrome nickel-plated brass body, EPDM sealing
	ABL001	Ball valve anti tamper safety lock with lock seal	plastic

4.3 PRESSURE GAUGE

Actual pressure in the cylinder can be determined by reading the value on the pressure gauge, which is mounted on the cylinder valve, alternatively an additional gauge on the end-of-line adapter or pneumatic remote actuator ARA010 or ARA020. Green zone of the pressure gauge indicates the permissible pressure in the system.

Table 26: Types of pressure gauges

Part №	Description	Pressure range	Thread	Material
APG001	for HFC-227ea	green zone: 8 – 20 bar red zones: 0 – 8 bar, 20 – 28 bar	M10x1	body: nickel plated brass O-ring: EPDM
APG002	for FK-5-1-12	green zone: 12 – 20 bar red zones: 0 – 12 bar, 20 – 28 bar	M10x1	body: nickel plated brass O-ring: EPDM



Pressure gauge APG001



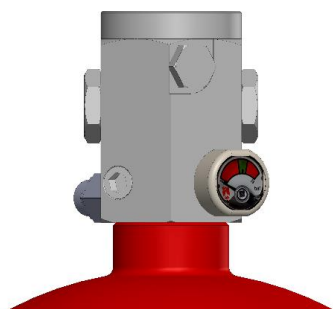
Pressure gauge APG002

When the system is supplied, the pressure gauge is mounted on the cylinder valve in the bottom outlet with a thread M10x1. It is always recommended to keep the pressure gauge located in the same position as it was supplied. If there is a need for the pressure gauge relocation, replacement or installation of additional gauge, follow instructions in Annex [A2.4](#).

Always place the pressure gauge so that the value of pressure is clearly visible.



If the system is in operation and the BlazeTube detection under pressure, when mounting and dismantling the pressure gauge at the end-of-line device, the ball valve on the cylinder valve must be closed to avoid a false actuation.



Standard location of a pressure gauge

4.4 BLAZETUBE DETECTION

The BlazeTube detection works on pneumatic principles and is an automatic activator of the BlazeCut system. BlazeTube is manufactured to fulfil the highest market standards and combining key features like high chemical resistance, long lifetime, UV stability, flexibility and reliable fire detection.

BlazeTube is connected to the valve using the BlazeTube detection outlet with the push-in connector FBT1BP026. The BlazeTube has an end of line device at the opposing end. The BlazeTube detection is placed in the protected enclosure. During installation, the tube is pressurised by nitrogen gas and this keeps the piston of the cylinder valve closed. Pressure in the tube and in the cylinder is the same during the operation of the system. During fire, the tube ruptures where the fire and temperature are at their greatest. This immediately decreases pressure in the tube and opens the piston of the cylinder valve. The fire suppression system activates and releases the extinguishing agent without any delay.

The time taken to cause the rupture of the BlazeTube detection may vary and depends on the pressure in the tube, which is affected by the level of pressurisation in the system and ambient temperature. The higher the pressure in the BlazeTube detection, the sooner the BlazeTube detection ruptures and activates the system.

Table 27: BlazeTube detection parameters

Parameter	Property
material	special heat sensitive plastic
colour	red RAL3000
outside diameter	6 mm
operating temperature	-30 to +110 °C
activation temperature	about 144 °C
life span	up to 10 years



ABT144-6-UL

Table 28: Compatibility with selected common chemicals

Name	Status	Name	Status
Sodium Hydroxide, 35 %	OK	Standard fuel with alcohol	OK
Ammonium Hydroxide, 10 %	OK	Standard fuel without alcohol	OK
Isopropyl alcohol	OK	Sodium Carbonate, 20 %	OK
Ethanol	OK	Sodium Hypochlorite, 10 %	OK
Methanol	OK	Sodium Chloride, 10 %	OK
Diethyl ether	OK	Zinc Chloride, 50 %	OK
Acetone	OK	Citric Acid, 10 %	OK
Toluene	OK	Acetic Acid, 5 %	OK
Hexane	OK	Sulfuric Acid, 38 %	OK
iso-Octane	OK	Lactic Acid, 10 %	OK
Insulating Oil	OK	Ethylene Glycol in water, 50 %	OK
Multi-grade motor oil	OK	Hydrogen peroxide	OK
Hypoid gear oil	OK	Ethyl Acetate	OK
Diesel fuel	OK	Water	OK

Table 29: Types of BlazeTube detection

Part №	Description
ABT144-6-UL	UL certified BlazeTube 6 mm, red, activation temperature 144 °C, per metre

Table 30: BlazeTube detection standard kits

Part №	Description
KABT144-6-UL-005	Standard kit with UL certified BlazeTube 6 mm, red, activation temperature 144 °C, 5 meters with Cable Gland ACG112, Cable Ties ACT314and Labels ALA018.
KABT144-6-UL-010	Standard kit with UL certified BlazeTube 6 mm, red, activation temperature 144 °C, 10 meters with Cable Gland ACG112, Cable Ties ACT314and Labels ALA018.
KABT144-6-UL-015	Standard kit with UL certified BlazeTube 6 mm, red, activation temperature 144 °C, 15 meters with Cable Gland ACG112, Cable Ties ACT314and Labels ALA018.
KABT144-6-UL-020	Standard kit with UL certified BlazeTube 6 mm, red, activation temperature 144 °C, 20 meters with Cable Gland ACG112, Cable Ties ACT314and Labels ALA018.
KABT144-6-UL-030	Standard kit with UL certified BlazeTube 6 mm, red, activation temperature 144 °C, 30 meters with Cable Gland ACG112, Cable Ties ACT314and Labels ALA018.
KABT144-6-UL-040	Standard kit with UL certified BlazeTube 6 mm, red, activation temperature 144 °C, 40 meters with Cable Gland ACG112, Cable Ties ACT314and Labels ALA018.

Table 31: BlazeTube detection heavy-duty kits

Part №	Description
KABT144-6-UL-005-HD	Heavy duty kit with UL certified BlazeTube 6 mm, red, activation temperature 144 °C, 5 meters with Cable Gland ACG112, P-clamps APC020, Grommets AGBT005 and Labels ALA018
KABT144-6-UL-010-HD	Heavy duty kit with UL certified BlazeTube 6 mm, red, activation temperature 144 °C, 10 meters with Cable Gland ACG112, P-clamps APC020, Grommets AGBT005 and Labels ALA018
KABT144-6-UL-015-HD	Heavy duty kit with UL certified BlazeTube 6 mm, red, activation temperature 144 °C, 15 meters with Cable Gland ACG112, P-clamps APC020, Grommets AGBT005 and Labels ALA018
KABT144-6-UL-020-HD	Heavy duty kit with UL certified BlazeTube 6 mm, red, activation temperature 144 °C, 20 meters with Cable Gland ACG112, P-clamps APC020, Grommets AGBT005 and Labels ALA018
KABT144-6-UL-030-HD	Heavy duty kit with UL certified BlazeTube 6 mm, red, activation temperature 144 °C, 30 meters with Cable Gland ACG112, P-clamps APC020, Grommets AGBT005 and Labels ALA018
KABT144-6-UL-040-HD	Heavy duty kit with UL certified BlazeTube 6 mm, red, activation temperature 144 °C, 40 meters with Cable Gland ACG112, P-clamps APC020, Grommets AGBT005 and Labels ALA018



BlazeTube detection standard kit



BlazeTube detection heavy duty kit

4.5 BLAZETUBE PUSH-IN CONNECTORS

BlazeCut double seal push-in connectors provide a double tight connection on the BlazeTube, thus ensuring a highly reliable connection and avoiding possible leakage that may occur. Connection and disconnection of the tube can be repeated several times without the use of proper tools and without compromising the performance of the connector and the sealing of the tube.

The BlazeTube detection can be connected through Tee, elbow or straight push-in connectors. It is recommended to minimise the use of connectors and install them low in the main fire risk areas to avoid high temperatures during the operation of the equipment.

Table 32: BlazeTube push-in connectors

Part №	Description	Working temperature	Working pressure	Material
FBT1PP66	straight connector for BlazeTube Ø 6 mm, NBR	-20 to +80 °C	0.9 – 60 bar	body and gripper: nickel-plated brass seals: EPDM or NBR
FBT3PPP666	Tee connector for BlazeTube Ø 6 mm, NBR			
FBT1BP026	outlet connector for BlazeTube Ø 6 mm, G1/8", EPDM	-30 to +80 °C		
FBT2BP026	elbow connector 360° rotation for BlazeTube Ø 6 mm, G1/8", EPDM			
FBT3BPB6026	Tee connector 360° rotation for BlazeTube, Ø 6 mm, G1/8", EPDM			



FBT1PP66



FBT1BP026



FBT3PPP666



FBT2BP026



FBT3BP6026

4.6 BLAZETUBE END-OF-LINE DEVICES

Table 33: List of end-of-line devices

Part №	Description
FBT1P6	End-of-line plug Ø 6 mm
AEA006	End-of-line adapter Ø 6 mm with standard push-in connector for BlazeTube
ARA010	Remote actuator pneumatic, bulkhead mount*
ARA020	Remote actuator pneumatic, boxed*
ARA110	Remote actuator electric, bulkhead mount*
ARA120	Remote actuator electric, boxed*

*see Annex for detail description.

4.6.1 END-OF-LINE PLUG

End-of-line plugs are used to close one of the BlazeTube detections when branching the BlazeTube.

Table 34: Types of end-of-line plugs

Part №	Description	Working temperature	Working pressure	Material
FBT1P6	End-of-line plug Ø 6 mm	-30 to +80 °C	0.9 – 60 bar	body and gripper: nickel-plated brass seals: EPDM



FBT1P6

4.6.2 END-OF-LINE ADAPTER

BlazeTube end-of-line adapter is used for pressurisation of the BlazeTube detection when the system is installed (see Chapter 8.4) and for pressurisation of the system during inspection (see Chapter 10.4).

IMPORTANT!

The end of the adapter with internal thread M10x1 must be occupied by a pressure gauge, Pressure Switch APS001 or Pressure Transducer ATA100, to protect the Shrader valve inside.

Table 35: End-of-line adapter

Part №	Description	Working temperature	Working pressure	Thread
AEA006	End-of-line adapter Ø 6 mm with push-in connector, EPDM	-30 to +80 °C	0.9 – 60 bar	M10x1 to connect the pressure gauge or pressure switch/transducer

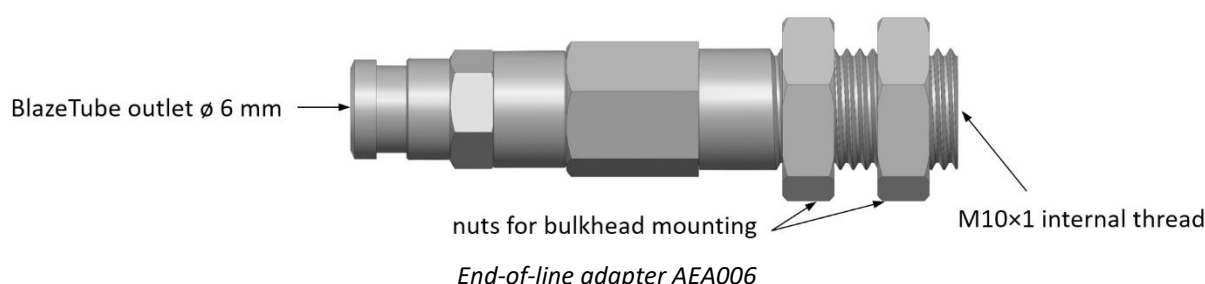
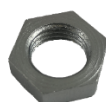


Table 36: End-of-line adapter accessories and kit

Part №	Description
ANE001	spare nut for end-of-line adapter AEA006, M14x1.5, galvanized steel
KAEA006-H	end-of-line adapter for 6 mm BlazeTube detection, APG001 pressure gauge and P-clamp APC014
KAEA006-FK	end-of-line adapter for 6 mm BlazeTube detection, APG002 pressure gauge and P-clamp APC014



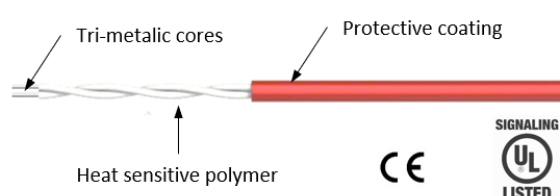
ANE001



End-of-line adapter kit

4.7 BLAZE WIRE

BlazeWire Linear Heat Detector is a cable constructed using two twisted and tensioned, tri-metallic conductors. Each of the conductive cables are coated in a heat sensitive polymer which, when heated to its rated temperature, melts, causing the two wires to touch. The resulting short sends a signal to the alarm panel, indicating that a fire (or excessive heat) has been detected. This action takes place at the first heated point anywhere along the Blaze Wire's length, which can be up to 50 metres in length. It does not require that a specific length be heated in order to initiate an alarm nor is system calibration necessary to compensate for changes in the installed ambient temperature.



BlazeWire is specifically designed for use in applications where extreme environmental and product performance must be met. It provides excellent abrasion resistance and excellent chemical and permeation

resistance to a wide variety of acids, bases, organic solvents as well as simple gases. In addition, the jacket exhibits very little change in tensile properties upon outdoor exposure to sunlight and weather.

Table 37: Types of BlazeWire

Part №	Colour	Outside diameter	Max. recommended ambient temperature	Activation temperature	Length
ABW105	black	4.50 ± 0.12 mm	70 °C	105 °C	per metre, max. 50 m
ABW185	red	3.60 ± 0.12 mm	125 °C	185 °C	
ABW240	white	3.00 ± 0.10 mm	200 °C	240 °C	

Table 38: Common BlazeWire parameters

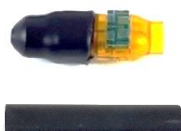
Parameter	Property
maximum voltage rating	30 V AC, 42 V DC
resistance	100 Ω/km per leg
minimum bending radius	50 mm
minimum operating temperature	-40 °C

Features

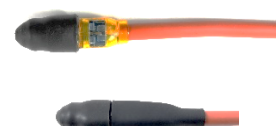
- line coverage - continuous sensitivity up to 50 metres,
- 105 °C (221 °F), 185 °C (365 °F) or 240 °C (392 °F) temperature rating. (Other temperatures available for special projects);
- Withstands severe environmental conditions;
- Approved for hazardous locations;
- Easy to install, test, and splice;
- Compatible with other initiation devices on same circuit. (Detectors, actuators);
- UL 521 Approved and compliant with the EN54:28 standard;
- complies with the CPR, EMC and the Low Voltage Directive (LVD).



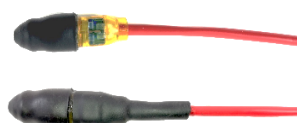
5 m coil of BlazeWire ABW185



End of line resistor AER001 with heat shrink



Silicone cable connected with the AER001 and covered with heat shrink



BlazeWire connected with the AER001 and covered with heat shrink



Silicone cable and BlazeWire connected to the Electrical splice AES3550-2

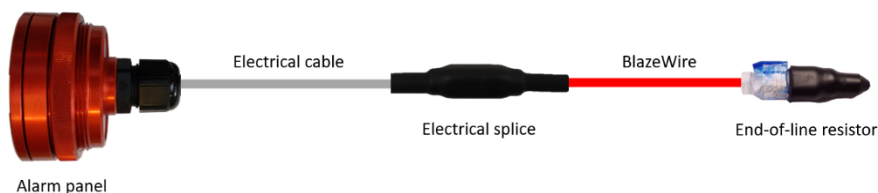


Silicone cable and BlazeWire connected to Electrical splice AES3550-2 heat shrink covered

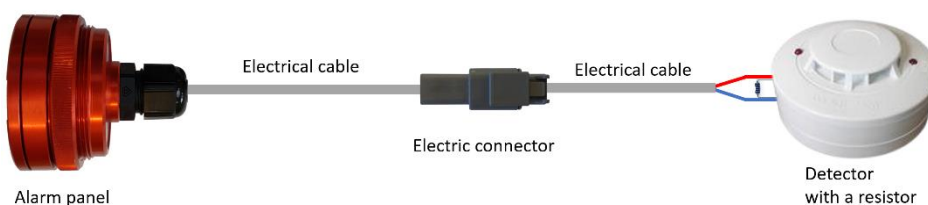
The BlazeWire must be installed above main fire risk areas. Make sure it is not in direct contact with parts of the protected equipment or close to parts that reach high temperatures during operation. Some examples are engine turbos and exhausts, heat diffusers etc.

When using BlazeWire or other electric detection, the end of detection line must be secured by the End-of-line Resistor (EOR) AER001 that is supplied in a kit. It is recommended to keep the EOR low in the main fire risk areas to avoid heat sources, so it is not exposed to the risk of damage. Maximum allowed operating temperature of the EOR AER001 is 100 °C. The resistor is supplied with a glue heat shrink that is placed over the resistor and BlazeWire when spliced to the resistor connector to seal and hold it firmly to the BlazeWire. The EOR with equal parameters can be yellow or transparent in colour.

It is recommended to use the Electrical Splice AES3550-2 with the heat shrink between the BlazeWire and electrical cable for firm hold and sealing. The Electrical splice connectors are supplied in the BlazeWire kits. See below pictures for suggested installation of the Electrical splice connector. The Electrical splice with equal parameters can be yellow or transparent in colour. It is not necessary to install the BlazeWire in whole length from the protected enclosure to the alarm panel. The BlazeWire can be used in the main fire risk area and standard or silicone cable can be used to connect to the alarm panel. See below figures for possible connection options.

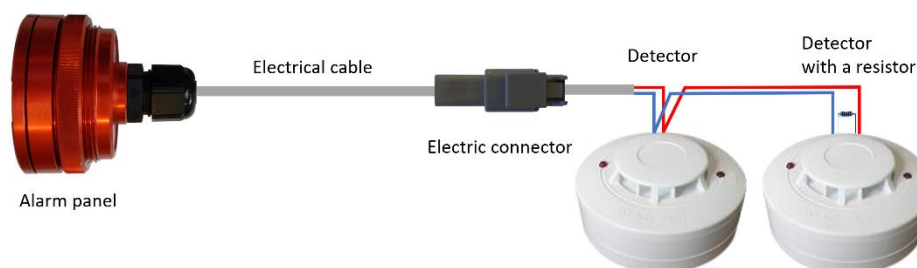


Connection of the BlazeWire to the alarm panel

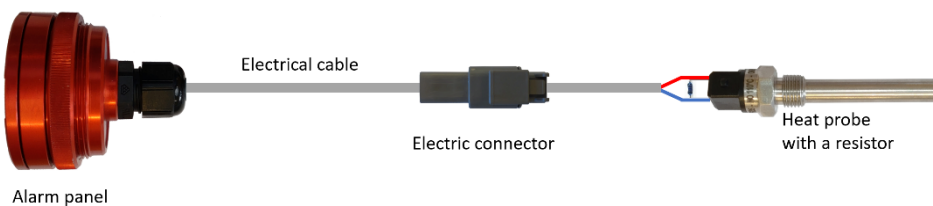


Connection of a detector to the alarm panel

When installing two or more relay detectors, they have to be connected in parallel. The furthest one requires a resistor AER101 installed.

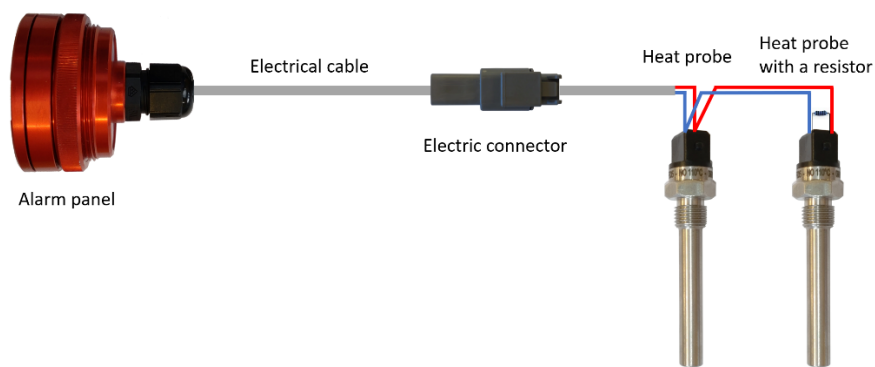


Parallel connection of two detectors to the alarm panel

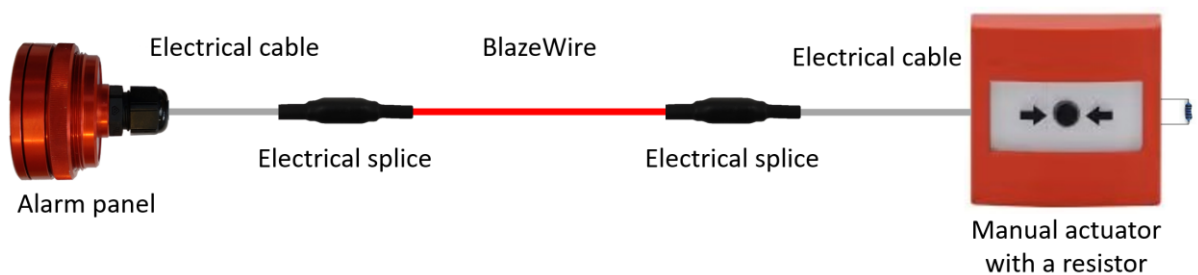


Connection of a heat probe to the alarm panel

When installing two or more heat probes, they have to be connected in parallel. The furthest one requires a resistor AER101 installed. For specifications and connection details see the component manual CM-HPD-EN Heat Probe Detector.



Parallel connection of two heat probes to the alarm panel

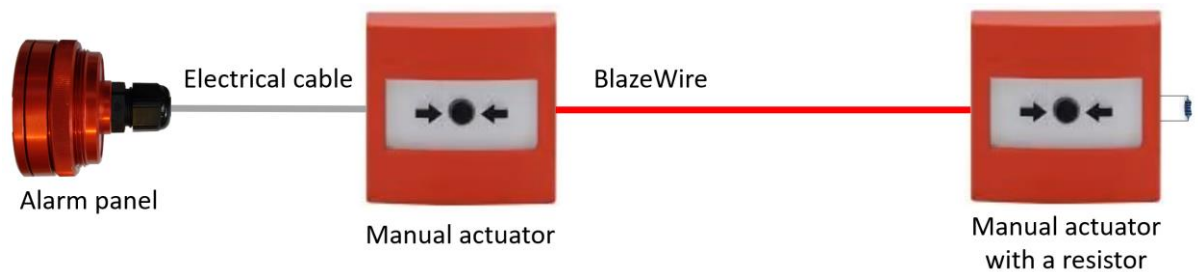


Connection of the BlazeWire and a manual electric actuator to the alarm panel



Connection of a manual electric actuator and the BlazeWire to the alarm panel

When installing two or more manual electric actuators, they have to be connected in parallel. The furthest one requires a resistor AER101 installed.



Parallel connection of two manual electric actuators and the BlazeWire to the alarm panel

Table 39: Standard BlazeWire kits

Part №	Content
KABW185-005	5 metres 185 °C BlazeWire, 3x Electrical Splice connector AES3550-2, 3x Heat Shrink AHS001, End-of-line Resistor AER001, P-clamp APC014, 20x Cable Ties ACT314 and 2x label ALA018
KABW185-010	10 metres 185 °C BlazeWire, 3x Electrical Splice connector AES3550-2, 3x Heat Shrink AHS001, End-of-line Resistor AER001, P-clamp APC014, 40x Cable Ties ACT314 and 4x label ALA018
KABW185-015	15 metres 185 °C BlazeWire, 3x Electrical Splice connector AES3550-2, 3x Heat Shrink AHS001, End-of-line Resistor AER001, P-clamp APC014, 60x Cable Ties ACT314 and 6x label ALA018
KABW185-020	20 metres 185 °C BlazeWire, 3x Electrical Splice connector AES3550-2, 3x Heat Shrink AHS001, End-of-line Resistor AER001, P-clamp APC014, 80x Cable Ties ACT314 and 8x label ALA018
KABW105-005	5 metres 105 °C BlazeWire, 3x Electrical Splice connector AES3550-2, 3x Heat Shrink AHS001, End-of-line Resistor AER001, P-clamp APC014, 20x Cable Ties ACT314 and 2x label ALA018
KABW105-010	10 metres 105 °C BlazeWire, 3x Electrical Splice connector AES3550-2, 3x Heat Shrink AHS001, End-of-line Resistor AER001, P-clamp APC014, 40x Cable Ties ACT314 and 4x label ALA018
KABW105-015	15 metres 105 °C BlazeWire, 3x Electrical Splice connector AES3550-2, 3x Heat Shrink AHS001, End-of-line Resistor AER001, P-clamp APC014, 60x Cable Ties ACT314 and 6x label ALA018
KABW105-020	20 metres 105 °C BlazeWire, 3x Electrical Splice connector AES3550-2, 3x Heat Shrink AHS001, End-of-line Resistor AER001, P-clamp APC014, 80x Cable Ties ACT314 and 8x label ALA018

Table 40: Heavy duty BlazeWire kits

Part №	Content
KABW185-005-HD	5 metres 185 °C BlazeWire, 3x Electrical Splice connectors AES3550-2, 3x Heat Shrink AHS001, End-of-line Resistor AER001 with P-clamp APC014, 10x silicone grommets AGBW003 with P-clamps APC020 and 2x label ALA018
KABW185-010-HD	10 metres 185 °C BlazeWire, 3x Electrical Splice connectors AES3550-2, 3x Heat Shrink AHS001, End-of-line Resistor AER001 with P-clamp APC014, 20x silicone grommets AGBW003 with P-clamps APC020 and 4x label ALA018
KABW185-015-HD	15 metres 185 °C BlazeWire, 3x Electrical Splice connectors AES3550-2, 3x Heat Shrink AHS001, End-of-line Resistor AER001 with P-clamp APC014, 30x silicone grommets AGBW003 with P-clamps APC020 and 6x label ALA018
KABW185-020-HD	20 metres 185 °C BlazeWire, 3x Electrical Splice connectors AES3550-2, 3x Heat Shrink AHS001, End-of-line Resistor AER001 with P-clamp APC014, 40x silicone grommets AGBW003 with P-clamps APC020 and 8x label ALA018
KABW105-005-HD	5 metres 105 °C BlazeWire, 3x Electrical Splice connectors AES3550-2, 3x Heat Shrink AHS001, End-of-line Resistor AER001 with P-clamp APC014, 10x silicone grommets AGBW003 with P-clamps APC020 and 2x label ALA018
KABW105-010-HD	10 metres 105 °C BlazeWire, 3x Electrical Splice connectors AES3550-2, 3x Heat Shrink AHS001, End-of-line Resistor AER001 with P-clamp APC014, 20x silicone grommets AGBW003 with P-clamps APC020 and 4x label ALA018
KABW105-015-HD	15 metres 105 °C BlazeWire, 3x Electrical Splice connectors AES3550-2, 3x Heat Shrink AHS001, End-of-line Resistor AER001 with P-clamp APC014, 30x silicone grommets AGBW003 with P-clamps APC020 and 6x label ALA018
KABW105-020-HD	20 metres 105 °C BlazeWire, 3x Electrical Splice connectors AES3550-2, 3x Heat Shrink AHS001, End-of-line Resistor AER001 with P-clamp APC014, 40x silicone grommets AGBW003 with P-clamps APC020 and 8x label ALA018



BlazeWire Standard Kit



BlazeWire Heavy Duty Kit

4.8 FASTENING MATERIAL

Linear parts of The BlazeCut system (BlazeTube detection, hoses, tubes, cables, LHD BlazeWire) must be tightly fastened and secured against movement. Use enclosed connecting material if necessary. It is possible to use other suitable fastening systems if they provide secure mounting of the components and are suitable for the environment (high temperatures etc.). Avoid damaging the components when fastening. Follow the instructions in this manual when fastening.

4.8.1 P-CLAMPS AND FASTENERS

BlazeCut system kits are supplied with various P-clamps suitable for firm fastening of the BlazeCut components.

Table 41: P-clamps

Part №	Description	Material
APC003-SS	P-clamp, 3 mm - suits BlazeWire	stainless steel
APC006-SS	P-clamp, 6 mm - suits 6 mm BlazeTube	stainless steel
APC006	6 mm – suits 6 mm BlazeTube detection	galvanized steel, rubber insert
APC008	8 mm – suits LOP hose G1/4" ALH050-G14 - ALH500-G14	galvanized steel, rubber insert
APC010	10 mm – suits spiral ABTS006 and 1/4" Red Fire Hose ARFH04	galvanized steel, rubber insert
APC012	12 mm – all push-in BlazeTube connectors and 1/4" Red Fire Hose ARFH04 sleeve with fitting	galvanized steel, rubber insert
APC014	14 mm – suits end of line plug FBT1P6, end-of-line resistor AER001, end-of-line adapter AEA006	galvanized steel, rubber insert
APC016	16 mm – crimped sleeve LOP hose G1/4" ALH050-G14 - ALH500-G14	galvanized steel, rubber insert
APC018	18 mm – suits feed hose crimped sleeve AFH050-M22 - AFH500-M22, 1/2" Red Fire Hose ARFH08	galvanized steel, rubber insert
APC020	20 mm – suits 1/2" Red Fire Hose ARFH08 sleeve with fitting, grommets	stainless steel, PVC cover

Table 42: Through panel fasteners

Part №	Description	Material
ACG112	cable gland with locknut, for detection tube, 12 mm steel tube and electrical cable, 18.5 mm hole for mounting	polyamide
ACG115	cable gland with locknut, for 15mm steel tube, 28 mm hole for mounting	polyamide



*P-clamp APC003-SS,
APC006-SS*



*P-clamp APC006 -
APC018*



P-clamp APC020



*Cable gland ACG112,
ACG115*

4.8.2 PROTECTIVE SPIRALS AND BRAIDS FOR THE BLAZETUBE DETECTION

In case of installation in the engine compartment or other enclosures with increased risk of mechanical damage the BlazeTube detection must be installed in the protective spiral or braid. Slot the BlazeTube detection into the protective spiral or braid before installation.



Do not use the protective braid on the BlazeTube detection in the main fire risk area as it could affect activation time of the BlazeTube detection.

IMPORTANT!

Always ensure the cut ends of spiral do not turn inward towards the BlazeTube, this will avoid scratches and damage to the BlazeTube.

Table 43: Types of protective spirals and braids

Part №	Description	Material	Length
ABTS006-005	protective spiral for Ø 6 mm BlazeTube detection	stainless steel	5 m
ABTS006-010	protective spiral for Ø 6 mm BlazeTube detection	stainless steel	10 m
ABTB006-005	protective braid for Ø 6 mm BlazeTube, from -55 °C to 180 °C	polyamide	5 m
ABTB006-010		polyamide	10 m

Table 44: Protective spiral kits

Part №	Description
KABTS006-005	for Ø 6 mm BlazeTube, 5 metres protective spiral ABTS006, 10 P-clamps APC010
KABTS006-010	for Ø 6 mm BlazeTube, 10 metres protective spiral ABTS006, 20 P-clamps APC010



Protective spiral



Protective spiral with BlazeTube



Protective spiral kit



Protective braid

4.8.3 BLAZE WIRE AND BLAZE TUBE GROMMETS

For installation of the BlazeWire and BlazeTube (6 mm versions only) in harsh environments use silicone grommets and plastic-coated P-clamps APC020. Maximum recommended distance between the clamps is 500 mm. When ordering the heavy duty BlazeWire and BlazeTube kits, the clamps and silicone grommets are included.

Table 45: Types of grommets

Part №	Description	Material
AGBW003	3 mm hole – suits BlazeWire	silicone
AGBT005	5 mm hole – suits BlazeTube	silicone



ABW185 BlazeWire in the P-clamp APC020 and grommet AGBW003



6 mm BlazeTube in the P-clamp APC020 and grommet AGBT005

Two lengths of high temperature cable ties are available for fastening of cables and BlazeTube in fixed installations.

Table 46: Cable ties

Part №	Description
ACT314	heat resistance up to +125°C, 3.6 x 140 mm, black colour
ACT528	heat resistance up to +125°C, 5 x 280 mm, black colour



Never use cable ties for installation of BlazeTube in engine compartment or other installations with high ambient temperature. Always use suitable P-clamps.

4.9 LABELS

Various high quality UV stabilized labels are supplied with the BlazeCut system to ensure that the operator or people that may come in contact with the system are informed about its presence and operation. All labels can be reordered separately when replacement is required due to damage.

Table 47: Notification labels

Part №	Description	Comment
ALA001	General Warning 150 x 100 mm	To notify there is a fire suppression system.
ALA002	"Shutdown Equipment" 100 x 70 mm	Label placed in the cabin near the alarm panel to notify the operator about delay time set to shut down equipment. Includes peel-off numbers that are placed on label in accordance with delay time set on the panel.
ALA003	"Delay discharge" 100 x 70 mm	Label placed in the protected area to notify the operator or personnel about delay time set to discharge the system. Includes peel-off numbers that are placed on label in accordance with delay time set on the panel.
ALA004	"In the event of a fire" 100 x 70 mm	Vehicle system label placed in the cabin to notify the operator about procedure in the event of a fire.
ALA005	"In the event of a fire" 100 x 70 mm	Gas system label (fixed installation) placed in the protected area to notify the operator or personnel about procedure in the event of a fire.
ALA006	"Actuation arrow" 200 x 90 mm	Reflective label to highlight location of remote manual actuator.
ALA007	"Manual Actuator" 100 x 70 mm	Label placed next to remote actuators to notify the operator or personnel how to manually actuate the system in the event of a fire.
ALA018	"Caution fire detection" 135 x 25 mm	Label for BlazeTube and BlazeWire
ALA019	"Fire alarm" Ø 53 mm	Label for Buzzer fire alarm
ALA036	Cylinder service record	service label for the system, interior use only
ABS110	"BlazeCut" 110 x 68 mm	promotional sticker
ABS220	"BlazeCut" 220 x 135 mm	promotional sticker
ABS300	"BlazeCut" 300 x 110 mm	promotional sticker AFSS



General warning label ALA001



ALA002



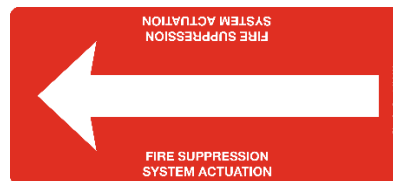
ALA003



ALA004



ALA005



ALA006



ALA007



ALA018



ALA019



ABS110 and ABS220



ABS300

Cylinder service record				
Do not alter or modify the installation without reference to the authorised installer or manufacturer!				
System kit:				
Installation date:				
Date	Code	Comment	Next service due	Signature
Codes		Certified servicing body		
C - commissioned A - annual service U - unscheduled service R - refill of agent		place for distributor/installer label 120x25 mm		

ALA036

Table 48: Labels for cylinders

Part №	Agent	Cylinder size
ALA020	HFC-227ea	1.2 L, 2.4 L
ALA021	HFC-227ea	5.0 L, 7.8 L
ALA022	HFC-227ea	13 L, 16 L
ALA029	FK-5-1-12	1.2 L, 2.4 L
ALA030	FK-5-1-12	5.0 L, 7.8 L
ALA031	FK-5-1-12	13 L, 16 L

BLAZE CUT FIRE SUPPRESSION SYSTEM

Contact
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45 Evans Street
Bulman, NSW, 2247, Australia

Manufacturer
BlazeCut s.r.o.
Priemyselná 2521
900 27 Bernádkovo, Slovakia

CLEAN AGENT

Technical Specification
Type of agent: HFC-227ea
Allowed operation temperature: -20°C up to +55°C
Operation pressure at 20°C: 12 bar
Charged with: Nitrogen (N₂)

Instructions for installation, maintenance and inspection

- The system may be installed, maintained and inspected by persons trained or authorised by BlazeCut.
- Installation, maintenance and inspection must be performed in accordance with instructions in the BlazeCut Installation and Service Manuals.
- Inspection of the system must be performed at least once in 12 months.
- Inspection of the system condition must be performed according to local legislation and statutory requirements.
- Install and maintain the system with BlazeCut components. The use of components not approved by the manufacturer will void the warranty, and may cause malfunction of the system, threatening the safety and health of people.

WARNING

- The system is under constant pressure; any mechanical interference is prohibited.
- Interference with the system may cause malfunction of the system and presents danger to safety and health of people.
- Do not use the system as a portable fire extinguisher! It can present danger to the safety and health of people.
- Contains gas under pressure; may explode if heated.

Attention
 Always consult suitability of use of the system and type of extinguishing agent in specific conditions with the manufacturer.
 Contains fluorinated greenhouse gases. Chemical name: 1,1,1,1,2,2,2-heptafluoropropane (HFC-227ea).

CLEAN AGENT 1354

Cylinder labels identifying type of extinguishing agent and basic information and instructions about the system

5 DEFINITION OF LEGAL REQUIREMENTS



BlazeCut system – cylinder, valve and BlazeTube detection form a pressure configuration. It forms a system that is under constant pressure, after the system is installed. Installation of the pressure configuration of the system, its activation and inspection, maintenance and operation is governed by specific legislation and these activities may only be performed by persons with relevant professional qualification subject to applicable legislation. Activation and operation of the equipment under pressure is also governed by specific legislation and professional inspections and tests.



BlazeCut system CEA (20x, 211, 212) contains clean extinguishing agent HFC-227ea. This is fluorinated greenhouse gas (hereinafter only HFC gas). Installation of the system, its activation, operation and repair and maintenance is governed by specific legislation and these activities may be performed only by persons with professional qualification. Operation of the system is also governed by specific legislation and is subject to inspections for gas leak.



Always observe local legislation and statutory requirements.

6 INFORMATION ON EXTINGUISHING AGENT USED

Systems BlazeCut CEA(20x, 211, 212) use extinguishing agent:

- HFC-227ea; chemical name: 1,1,1,2,3,3,3-Heptafluoropropane. It is halogen derivative of hydrocarbons. It is liquefied hydrocarbon gas, colourless and odourless. GWP: 3220

Systems with HFC gas contain fluorinated greenhouse gas.

Systems BlazeCut CFK(20x, 211, 212) use extinguishing agent:

- FK-5-1-12, chemical name: Perfluoro (2-Methyl-3-Pentanone). It is a fluorinated ketone, synthetically made agent. In normal conditions it is a non-conductive clear liquid, with a slight odour.

6.1 DESCRIPTION OF HFC GAS

Extinguishing agent is clean extinguishing medium, used in BlazeCut system for volume or local fire suppression. Extinguishing effects are due to cooling and antecatalyst effect. Extinguishing agent siphons heat from fire, enters the chain chemical reaction of burning, slows this reaction and stops it.

Extinguishing agent is not toxic or poisonous, it does not have carcinogenic or mutagenic effects and it is considered environmentally accepted substitute for halon extinguishing agents harmful to the environment used in the past.

With volume fire suppression the efficiency of the system depends mainly on extinguishing concentration, which should be reached in the area of fire. Desired extinguishing concentration with HFC-227ea is lower than concentration dangerous to people. This enables the use of extinguishing agent in areas where people are present.

6.1.1 MAIN ADVANTAGES OF THE EXTINGUISHING AGENT

- Electrically non-conductive
- Non-corrosive
- Resistant to temperature changes
- Safe for people when safety instructions are followed
- Leaves no residue
- Does not damage equipment, objects or sensitive devices
- Zero ozone depletion potential (ODP - Ozone Depletion Potential)

6.2 DESCRIPTION OF FK-5-1-12

Extinguishing agent is clean extinguishing medium, used in BlazeCut system for volume fire suppression. Extinguishing effects are due to cooling and antecatalyst effect. Extinguishing agent siphons heat from fire, enters the chain chemical reaction of burning, slows this reaction and stops it.

Extinguishing agent is not toxic or poisonous, it does not have carcinogenic or mutagenic effects.

FK-5-1-12 is an ecological "green" alternative. It is considered to be a next generation substitution of halon agents used in past. Compare to chemical extinguishing substances used today (like HFC gas) FK-5-1-12 has currently, the lowest global warming potential (GWP = 1), lowest atmospheric lifetime (5 days) and zero ozone depletion potential (ODP = 0). These unique environmental features promise to FK-5-1-12 its long-term use in the future.

With volume fire suppression the efficiency of the system depends mainly on extinguishing concentration, which should be reached in the area of fire. Desired extinguishing concentration with FK-5-1-12 is lower than concentration dangerous to people. This enables the use of extinguishing agent in areas where people are present.

6.2.1 MAIN ADVANTAGES OF THE EXTINGUISHING AGENT

- Electrically non-conductive
- Non-corrosive
- Resistant to temperature changes
- Safe for people when safety instructions are followed
- Leaves no residue
- Does not damage equipment, objects or sensitive devices
- Zero ozone depletion potential (ODP - Ozone Depletion Potential)
- Almost zero global warming potential (GWP – Global Warming Potential)

6.3 PERMISSIBLE USES OF CLEAN EXTINGUISHING AGENTS

HFC-227ea and FK-5-1-12 may be used for the following classes of fire:



Class A – flammable combustibles (creating flames)



Class B – flammable liquids



Class C – flammable gaseous substances



*System is suitable for fire suppression of electrical equipment under voltage**

Always consult suitability of use of the system and type of extinguishing agent in specific conditions with the supplier.

Although the extinguishing agent is not toxic or poisonous, unnecessary excessive exposure of persons to its influence should be avoided. Under no circumstances should persons be exposed to the extinguishing agent for more than 5 minutes even if an extinguishing concentration is not exceeding LOAEL level (see toxicity information in table below).

The BlazeCut system is primarily designed for small, enclosed areas and equipment where people are not normally present (or only for a short time for inspection, maintenance, etc.), or in small rooms that can be vacated within 30 seconds of activation of the system. In this case, it is possible to design an extinguishing concentration exceeding the LOAEL level.).

If people are constantly present in the protected area, always consult the use of the system with the supplier. The system must be designed so that when the extinguishing agent is released the extinguishing concentration level which could be dangerous to people is not exceeded. It is also necessary to establish additional local measures to evacuate people from the protected area as soon as possible.

More information about HFC-227ea and FK-5-1-12 can be found in Safety data sheet supplied by the manufacturer or distributor.

6.4 SOME PHYSICAL AND CHEMICAL PROPERTIES

Table 49: Properties of HFC-227ea

Property	Description
Global warming potential	3220
Ozone depletion potential	0
Chemical name	1,1,1,2,3,3,3-Heptafluoropropane
Formula	CF ₃ CHFCF ₃
CAS number	431-89-0
Extinguishing concentration*	6.7 % of volume
Boiling point at pressure 1 bar	-16.34 °C
Freezing point	-131 °C
Critical temperature	101.75 °C
Critical pressure	2925 kPa
Critical density	621 kg/m ³
Density in liquefied form at 25° C	1387.7 kg/m ³
Pressure of saturated vapours at 25° C	454.73 kPa
Molecular weight	170
Dielectric Strength at 1 atm, 25 °C (N ₂ =1)	2.0
Dielectric Strength in kV (vapor)	13.9
Toxicity LC ₅₀ (4 h inh.)	800 000 ppm
Toxicity AEL	1000 ppm
Toxicity NOAEL	9 % concentration, 90 000 ppm
Toxicity LOAEL	10.5 % concentration, 105 000 ppm
Flammability	inflammable substance
Form	liquefied gas
Colour	colourless substance
Odour	odourless

*Extinguishing concentration determined for reference substance n-Heptane

Table 50: Properties of FK-5-1-12

Property	Description
Global warming potential	1
Ozone depletion potential	0
Chemical name	Dodecafluoro-2-methylpentan-3-one
Formula	CF ₃ CF ₂ C(O)CF(CF ₃) ₂ or C ₆ F ₁₂ O
CAS number	756-13-8
Extinguishing concentration*	4.5 % of volume
Boiling point at pressure 1 bar	49.2 °C
Freezing point	-108 °C
Critical temperature	168.7 °C
Critical pressure	1865 kPa
Critical density	639.1 kg/m ³
Density in liquid form at 25 °C	1600 kg/m ³
Pressure of saturated vapours (at 25 °C)	40.4 kPa
Molecular weight	316.04
Dielectric Strength at 1 atm, 25 °C (N ₂ =1)	2.3
Dielectric Strength in kV (vapour)	16
Dielectric Strength in kV (gaseous mixture 5 % in air)	9.2
LC ₅₀ (4 h inh.)	100 000 ppm
Toxicity NOAEL	>10 % concentration, 100 000 ppm
Toxicity LOAEL	10 % concentration, 100 000 ppm
Flammability	non-flammable substance
Form	liquid
Colour	colourless substance
Odour	Slight odour

*Extinguishing concentration determined for reference substance n-Heptane

6.5 LIMITED USES OF CLEAN EXTINGUISHING AGENTS

Clean extinguishing agents are not suitable for fire suppression in spaces with:

- Certain chemicals or mixtures of chemicals, such as cellulose nitrate and gunpowder, which are capable of rapid oxidation in the absence of air;
- Reactive metals such as lithium, sodium, potassium, magnesium, titanium, zirconium, uranium and plutonium;
- Metal hydrides;
- Chemicals capable of undergoing autothermal decomposition, such as certain organic peroxide and hydrazine.

6.6 WARNINGS



During the system activation the extinguishing agent emerges from the nozzles under high pressure and at very low temperature. It is recommended that the automatic activation function of the system is deactivated during when working less than 1 metre from the nozzles. No permanent work place should be placed less than 1 metre from the nozzles.



Extinguishing agent under normal (atmospheric) pressure evaporates quickly. Do not breathe vapours. Exposure to high concentrations may cause health problems: a temporary loss of nerve activity, numbness, dizziness, confusion, loss of coordination, drowsiness, unconsciousness, irregular heartbeat, palpitations, depression, fainting, weakness. Exposure to extreme concentrations of extinguishing agent may cause death without warning.



Extinguishing agent is heavier than air in a gaseous state. Accumulation in enclosed or low area may cause lack of oxygen and suffocation. After use of the system use natural or forced ventilation and do not enter thereafter.



HFC gases in liquid form may cause frostbite upon contact with eyes and skin. Avoid contact of liquid extinguishing agent with eyes and skin.



For installation, inspection, maintenance and repair of the system always use eye protection - wear appropriate protective glasses with side-shields. and appropriate protective impervious working gloves.



Extinguishing agent is subject to thermal decomposition and forms toxic products – hydrogen halides after long exposure to high temperatures in the fire area. Avoid prolonged exposure of extinguishing agent to high temperatures After fire is indicated take precautions to avoid prolonged exposure of extinguishing agent to high temperatures. After use of the system secure the area by natural or forced ventilation. Use the system only in permissible ways required by the manufacturer.

The most dangerous by-product of thermal decomposition of the extinguishing agent is hydrogen fluoride (HF). It is a gaseous substance, irritating and toxic, it is dissolved in water in mucous membrane creating hydrofluoric acid. Symptoms of HF exposure depend on the intensity and duration of exposure and are mainly as follows:

- Irritation of eyes and mucous membranes of the nose,
- Total respiratory irritation at a high concentrations,
- Irritation to the skin at high concentrations,
- Without medical assistance very high concentrations can cause death.

6.7 HANDLING OF HFC-227EA

Systems BlazeCut CEA (20x, 211, 212) contain clean extinguishing agent HFC-227ea. This is fluorinated greenhouse gas. Installation of the system, its activation and repair and maintenance is governed by specific legislation and may be performed only by persons with professional qualification.

Operation of the system is also governed by specific legislation and performing relevant gas leak inspections.

Operator of the system must prevent leak of HFC-227ea and as soon as possible repair any detected leak using all measures which are technically feasible and do not entail disproportionate costs.

Operator of the system is obliged to ensure recovery of the gas by a person with professional qualification in case of maintenance or expiration of containers holding HFC-227ea. This means gathering and storage of gas and ensuring their recycling, regeneration or destruction.



Do not open the valves of the cylinder and components before completing the system. Do not activate the system without reason.



Always have appropriate detection device for inspection of leak of HFC gases used in BlazeCut system during the installation, maintenance and inspection of the system. Always follow the manual of the detection device.



In case of suspected leak of extinguishing agent, it is essential that the operator of the system shall take corresponding measures immediately to prevent leak of extinguishing agent and repair any detected leak as soon as possible.

NOTE

For the purposes of this chapter "Inspection for leak" means that the equipment or system is tested for leak using direct or indirect measuring methods, focusing on those parts of the equipment or system, which are most likely to leak.

7 FILLING AND CHARGING OF SYSTEMS

7.1 FILLING AND CHARGING OF SYSTEMS WITH HFC-227EA

All systems containing HFC-227ea are supplied factory filled and charged. For pressurization of BlazeTube detection follow instructions in Chapter [8.5](#).

7.2 FILLING AND CHARGING OF SYSTEMS WITH FK-5-1-12

7.2.1 DISASSEMBLY

IMPORTANT!

Before starting the disassembly, make sure that the cylinder is unpressurized!

1. Firmly fasten the cylinder assembly to a clamping device, so that the cylinder is firmly fastened but not damaged.
2. Use a spanner size 46 to unscrew the valve.
3. Remove the valve with a dip tube attached.
4. When handling a cylinder from a previously used system, pour out the remaining agent from the cylinder into a sealable container.

IMPORTANT!

Agents removed from containers during service or maintenance procedures should not be mixed with new agent! Ensure that the old agent is recycled, regenerated or disposed of in accordance with any applicable laws and regulations.

5. Clean the inside of the cylinder from residual agent, moisture or other debris using air compressor or similar tool.

7.2.2 FILLING WITH EXTINGUISHING AGENT

1. Unscrew the valve with the dip tube attached.

IMPORTANT!

Before filling, make sure the cylinder inside is clean, dry and there is no moisture. If there is any residual moisture, dry the inside of the cylinder using air compressor or similar tool.

Use a filling funnel to fill the extinguishing agent FK-5-1-12. The amount of FK-5-1-12 depends on volume of the cylinder. Always check your system specifications on the cylinder label before proceeding.

System model: CFK2xx
System kit: CFK2xx-xx-2.5-x-x
Cylinder volume: 2.4 L
Amount of agent: 2.5 kg
Serial number: 0000001
Production week: 01-2024

Cylinder volume [L]	Standard amount of FK-5-1-12 agent [kg]	Agent amount range [kg]*
1.2	1.25	0.7 – 1.3
2.4	2.5	1.4 – 2.7
5	5.0	2.8 – 5.7
7.8	7.5	5.8 – 8.9
13	11.0	9 – 13
16	12.0	10 – 16

2. Pour in an exact amount of the extinguishing agent FK-5-1-12.
3. Follow steps in Chapter [7.2.3](#).

7.2.3 ASSEMBLY

NOTE

Have all your components clean and ready. For used cylinder valve overhaul follow instructions in Technical Bulletin *TB-OIV Overhaul for ILP Valves*.

1. Firmly fasten the cylinder to a clamping device, so that the cylinder is firmly fastened but not damaged.
2. Ensure that the dip tube is clear and by hand screw it to the valve.
3. First by hand screw in the valve with dip tube to the cylinder.
4. Use a torque wrench (size 46) set to 50 Nm torque to tighten the valve on the cylinder. Do not overtighten the valve!
5. Label with the model designation should be in accordance with parameters of the filled system. When refilling and the parameters are no longer valid, a new label has to be applied.
6. Record this procedure to the system's Supporting Document *SD-RSCS Refill* on a service label/tag.



Assembly of the valve using a torque wrench

To proceed with pressurisation of the cylinder and BlazeTube, use of Tool Charging Kit is needed. To cut the BlazeTube detection use special cutter ATC002 included in the Tool charging kit.

Table 51: Tool charging kit

Model	Included components
KATC001	1 x adjustable regulation valve up to 20 bar with W24.32x1/14" connection 1 x Charging adapter ATC001 2 m BlazeTube, 6 mm 1 x BlazeTube cutter
KATC001-xxx	1 x Adjustable regulation valve up to 20 bar with various connections, see below 1 x Charging adapter ATC001 2 m BlazeTube, 6 mm 1 x BlazeTube cutter Available connections: W21.8x1/14", NEVOC W30x2, G3/4", G5/8" male, W30x2"LH, W21.8x1/14"LH NOTE: Other options may be available; pricing & delivery time on request only
KARV002	1 x adjustable regulation valve up to 30 bar with W24.32x1/14" connection 1 x Charging adapter ATC001 2 m BlazeTube, 6 mm 1 x BlazeTube cutter



Tool charging kit KATC001, KARV002

7.3 PROCEDURE OF PRESSURIZATION FOR VALVES 201, 202, 203 AND 207



Proceed carefully and strictly follow the following steps. Fasten the connectors of the tubes, charging adapter and BlazeTube detection firmly and inspect. Their accidental disconnecting during pressurization would release the extinguishing agent into the system.



Never connect or disconnect the charging adapter to the BlazeTube detection if the ball valve of the outlet of the BlazeTube detection on the cylinder valve is open.



Due to risk of activation during pressurization of the system it is necessary to seal the outlets of the discharge networks on the cylinder valve. Remove the discharge networks and seal the outlets with the G3/8" valve plugs.

Procedure for valves 211-01 and 212-01 is described in Chapter [7.4](#), for valves 211-30 and 212-30 (without BlazeTube outlet) in Chapter [7.5](#).

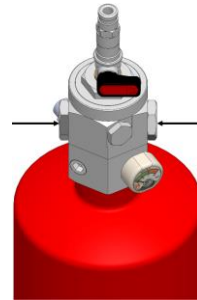
NOTE

Always charge the cylinder through the BlazeTube push-in connector on the valve.

Step 1:

Make sure that the discharge ports are plugged with valve plugs FVP1B06, to avoid loss of agent in case of an accidental discharge when pressurizing.

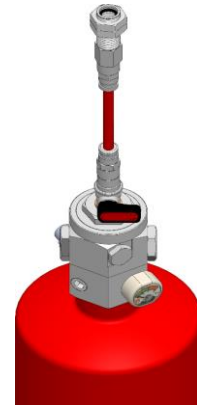
Make sure that the ball valve on the cylinder valve is closed.



Step 2:

Connect a BlazeTube with end-of-line adapter AEA006 to the BlazeTube push-in connector on the cylinder valve.

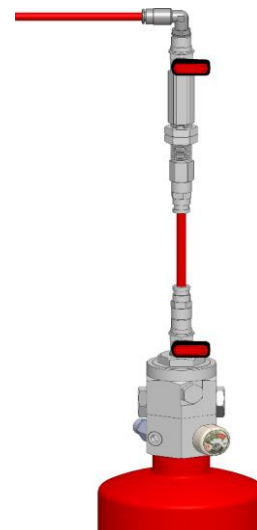
On valves 203 also plug the other side of the BlazeTube Tee connector with at least 10 cm long BlazeTube with a plug FBT1P6 or end-of-line adapter AEA006.



Step 3:

Make sure the ball valve on the charging adapter is closed.

Mount by hand the charging adapter ATC001 to the end-of-line adapter's M10x1 port by rotating it clockwise. Hold the end-of-line adapter to push counter-clockwise while tightening. Tighten the charging adapter properly.



Step 4:

Set the regulator on the source of N₂ to the desired value (**15 bar at 20 °C ± 3 °C ambient temperature**). For pressure filling values at different temperatures refer to

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Table 15 or [Table 16](#).

Open the regulator valve.

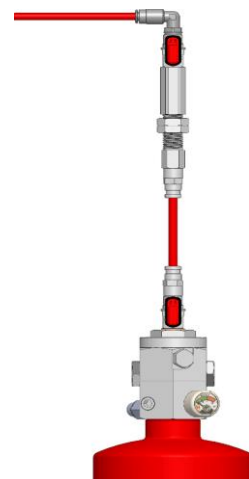


Step 5:

Slowly open the ball valve on the charging adapter first and then on the cylinder valve. Pressurize the cylinder.

During pressurization hissing can be heard. When the hissing stops, keep the ball valves open for at least 30 seconds to stabilize the pressure.

Close the ball valve on the cylinder valve, shake the cylinder several times and repeat **Step 5** until the pressure stabilises at the desired value.

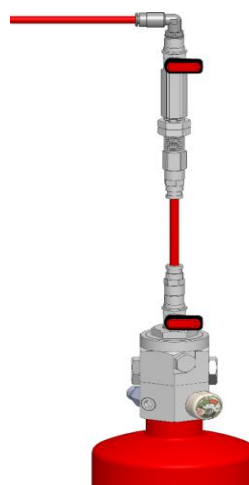


Step 6:

Close the ball valve on the cylinder valve.

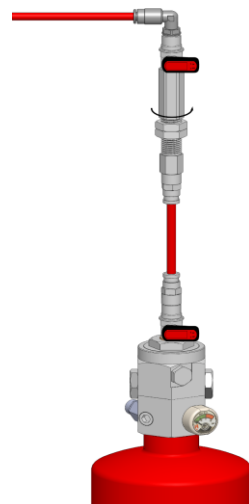
Step 7:

Close the ball valve on the charging adapter.



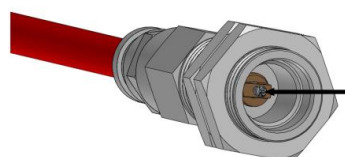
Step 8:

Unscrew the charging adapter from the M10x1 port of the end-of-line adapter (with size 16 spanner). You can use size 14 spanner on the valve adapter to push clockwise while unscrewing the charging adapter.



Step 9:

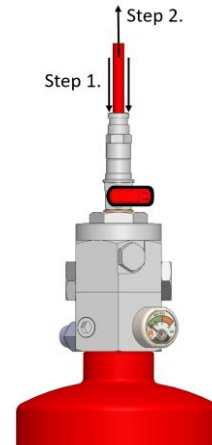
Push in the integrated Schrader valve inside the end-of-line adapter AEA006, to release pressure from the BlazeTube.



Step 10:

Disconnect the BlazeTube from the push-in connector on the cylinder valve.

Follow additional steps from Chapter [7.6](#).



7.4 PROCEDURE OF PRESSURIZATION FOR VALVES 211-01 AND 212-01



Proceed carefully and strictly follow the following steps. Fasten the connectors of the tubes, charging adapter and BlazeTube detection firmly and inspect. Their accidental disconnecting during pressurization would release the extinguishing agent into the system.



Never connect or disconnect the charging adapter to the BlazeTube detection if the ball valve of the outlet of the BlazeTube detection on the cylinder valve is open.



Due to risk of activation during pressurization of the system it is necessary to seal the outlets of the discharge networks on the cylinder valve. Remove the discharge networks and seal the outlets with the G3/8" valve plugs.

Procedure for valves 201, 202, 203 and 207 is described in Chapter [7.3](#), for valves 211-30 and 212-30 (without BlazeTube outlet) in Chapter [7.5](#).

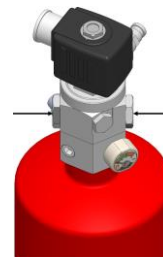
NOTE

Always charge the cylinder through the BlazeTube push-in connector on the valve.

Step 1:

Make sure that the discharge ports are plugged with valve plugs FVP1B06, to avoid loss of agent in case of an accidental discharge when pressurizing.

Make sure that the ball valve on the cylinder valve is closed.



Step 2:

Connect a BlazeTube with end-of-line adapter AEA006 to the BlazeTube push-in connector on the cylinder valve.



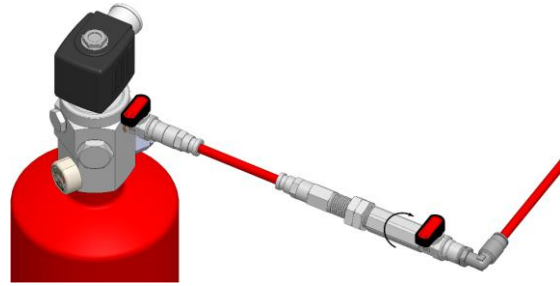
AUTOMATIC FIRE SUPPRESSION SYSTEMS



Step 3:

Make sure the ball valve on the charging adapter is closed.

Mount by hand the charging adapter ATC001 to the end-of-line adapter's M10x1 port by rotating it clockwise. Hold the end-of-line adapter to push counter-clockwise while tightening. Tighten the charging adapter properly.



Step 4:

Set the regulator on the source of N₂ to the desired value (**15 bar at 20 °C ± 3 °C ambient temperature**). For pressure filling values at different temperatures refer to

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Table 15 or [Table 16](#).

Open the regulation valve.

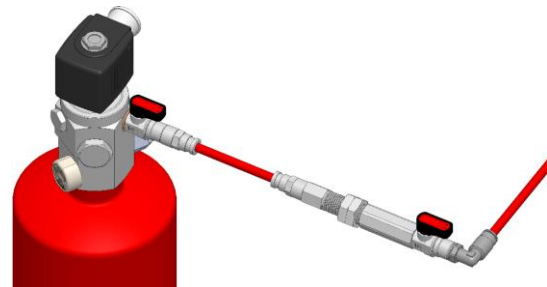


Step 5:

Slowly open the ball valve on the charging adapter first and then on the cylinder valve. Pressurize the cylinder.

During pressurization hissing can be heard. When the hissing stops, keep the ball valves open for at least 30 seconds to stabilize the pressure.

Close the ball valve on the cylinder valve, shake the cylinder several times and repeat **Step 5** until the pressure stabilises at the desired value.

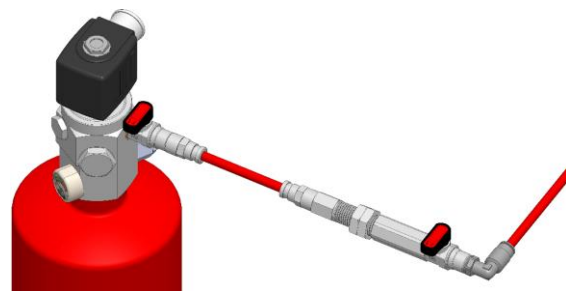


Step 6:

Close the ball valve on the cylinder valve.

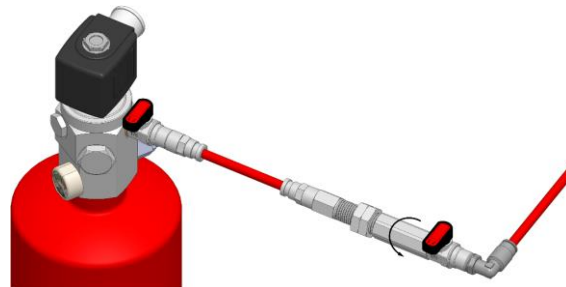
Step 7:

Close the ball valve on the charging adapter.



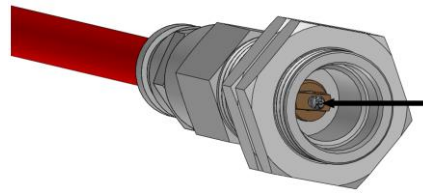
Step 8:

Unscrew the charging adapter ATC001 from the end-of-line adapter (with size 16 spanner). Hold the end-of-line adapter to push clockwise while unscrewing the charging adapter.



Step 9:

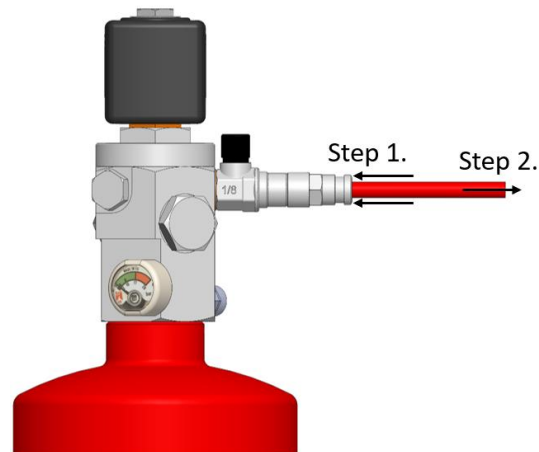
Push in the integrated Schrader valve inside the end-of-line adapter AEA006, to release pressure from the BlazeTube.



Step 10:

Disconnect the BlazeTube from the push-in connector on the cylinder valve.

Follow additional steps from Chapter [7.6](#).



7.5 PROCEDURE OF PRESSURIZATION FOR VALVES 211-30 AND 212-30



Proceed carefully and strictly follow the following steps. Fasten the connectors of the tubes, charging adapter and BlazeTube detection firmly and inspect. Their accidental disconnecting during pressurization would release the extinguishing agent into the system.



Never connect or disconnect the charging adapter to the BlazeTube detection if the ball valve of the outlet of the BlazeTube detection on the cylinder valve is open.



Due to risk of activation during pressurization of the system it is necessary to seal the outlets of the discharge networks on the cylinder valve. Remove the discharge networks and seal the outlets with the G3/8" valve plugs.

Proceed according to instructions in this chapter to pressurize the cylinder only. For pressurization of BlazeTube detection follow instructions in the system manuals *SM-ICA ILP Clean Agents Systems*.

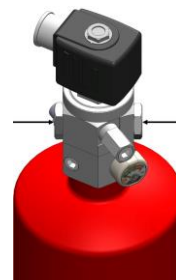
Procedure for valves 201, 202, 203 and 207 is described in Chapter [7.3](#), for valves 211-01 and 212-01 is described in Chapter [7.4](#).

IMPORTANT!

Always charge the cylinder through the valve adapter's M10x1 port.

Step 1:

Make sure that the discharge ports are plugged with valve plugs FVP1B06, to avoid loss of agent in case of an accidental discharge when pressurizing.



Step 2:

Remove the M10x1 plug FVP1M10 from the valve adapter FVABM0210 using a size 4 hex key.



Step 3:

Make sure the ball valve on the charging adapter is closed.

Mount the charging adapter ATC001 to the valve adapter's M10x1 port by rotating clockwise. Tighten the charging adapter properly



Step 4:

Set the regulator on the source of N₂ to the desired value (**15 bar at 20 °C ± 3 °C ambient temperature**). For pressure filling values at different temperatures refer to

AUTOMATIC FIRE SUPPRESSION SYSTEMS



Table 15 or [Table 16](#).

Open the regulator valve.

Step 5:

Slowly open the ball valve on the charging adapter and pressurize the cylinder.

During pressurization hissing can be heard. When the hissing stops, keep the ball valves open for at least 30 seconds to stabilize the pressure.

Close the ball valve on the cylinder valve, shake the cylinder several times and repeat **Step 5** until the pressure stabilises at the desired value.

Step 6:

Close the ball valve on the charging adapter.



Step 7:

Unscrew the charging adapter from the M10x1 port of the valve adapter FVABM0210 (with size 16 spanner). You can use size 14 spanner on the valve adapter to push clockwise while unscrewing the charging adapter.



Step 8:

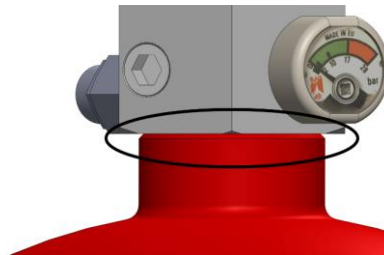
If no continuous hissing can be heard, screw in the M10x1 plug FVP1M10 and tighten it using a size 4 hex key.

Follow additional steps from the Chapter [7.6](#).



7.6 ADDITIONAL STEPS AFTER PRESSURIZATION

Observe the value on the cylinder valve's pressure gauge and check the system components for leaks. If pressure is decreasing, the BlazeTube detection may not be connected properly or some component may not be mounted tightly. Also check the connection between the cylinder neck ring and the cylinder valve using a foaming solution. Observe if no bubbles are formed due to loss of pressure through the connection.



Connection between the cylinder neck ring and the valve.

IMPORTANT!

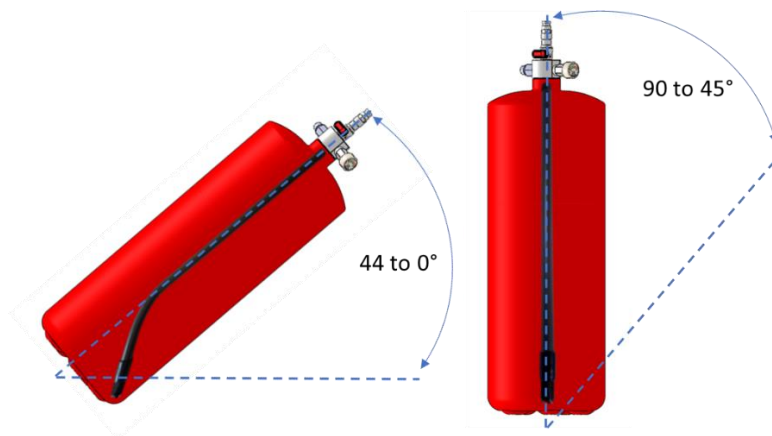
Never install the cylinder assembly if any leak is detected!

8 INSTRUCTIONS FOR INSTALLATION OF THE SYSTEM

8.1 INSTALLATION AND PLACEMENT OF THE CYLINDER

In order to release the extinguishing agent by pressure, there is a dip tube in the cylinder. Therefore, the cylinder is recommended to be installed in vertical position. If the cylinder is leaning, the extinguishing agent may not be fully released, the greater the mounted angle of the cylinder the higher risk of the agent not discharging entirely. Maximum recommended tilt of the cylinder is 45° from vertical axis.

All cylinders mounted between an angle of 45° to 90° (vertical) can have a straight dip tube that is supplied as standard from the factory. However, any angle between 44° and 0° (a full horizontal position) will require an angled dip tube fitted at the factory and this will ensure the overall performance of the system will be maintained. Please contact BlazeCut technical support if your cylinder requires an angled dip tube.



The cylinder should be placed as close to the protected area as possible, so that the length of the agent distribution network and detection lines can be as short as possible. If the cylinder is placed directly into the protected area, the cylinder should be protected from elevated temperatures or potential damage if necessary.

The cylinder should be placed so that the cylinder label is visible and the current pressure can be read on the pressure gauge and be readily accessible to allow future servicing or inspection.

Only install undamaged cylinders that are properly labelled and with the correct mounted cylinder valve. The cylinder is supplied pressurised to required pressure at the time of filling. The current pressure can be determined by reading the value on the pressure gauge, which is mounted on the cylinder valve when the system is supplied.



Do not install the cylinder, if the pressure is significantly different from values stated on the cylinder label or stated in this manual.

Carefully select a firm and secure part of the equipment to install the cylinder bracket using appropriate fasteners. If necessary, fabricate additional support to mount the cylinder. The cylinder must be properly fastened in the bracket using the bracket straps supplied. Once installed ensure all fastenings are firm and have no risk of loosening.

When installed in a vehicle, if the cylinder is situated in a horizontal position the valve must not be situated in a driving direction. Situate the bracket of the cylinder in a position so the cylinder will not eject from the bracket during a crash.

BlazeCut fire suppression systems are supplied with standard brackets as standard for fixed and mobile applications except places in harsh environments (high vibrations, corrosive environment, higher risk of damage etc) where heavy duty brackets are required.



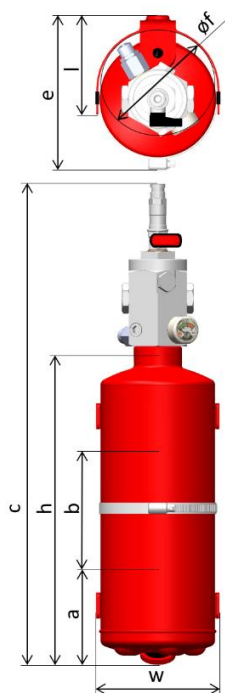
Light bracket ACB012



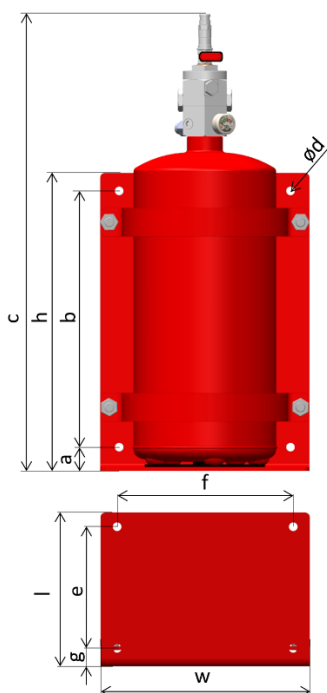
Standard bracket ACB3xx



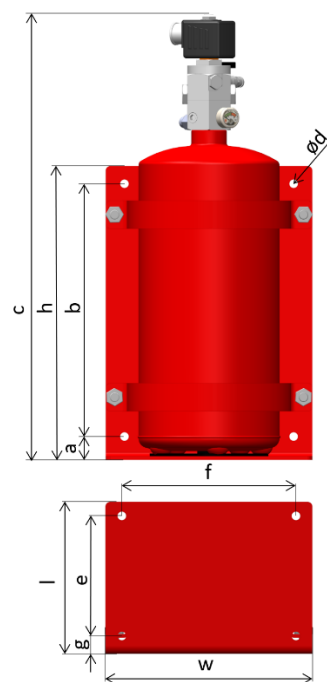
Heavy duty bracket ACB2xx



*Cylinder with 201 valve
in a light bracket ACB012*



*Cylinder with 201 valve
in a bracket*



*Cylinder with 211 or 212 valve
in a bracket*

Table 52: Brackets

Part №	l × w × h [mm]	a [mm]	b [mm]	Ø d [mm]	e [mm]	f [mm]	g [mm]	Material	Colour	Operating temperature
ACB012	104×96×241	59	120	5.5	63	Ø 90	-	powder coated steel	red RAL3000	-40 to +80 °C
ACB250	166×236×285	72	188	11	126	140	23			
ACB213	200×270×504	90	342	11	154	164	26			
ACB312	103×60×216	25.5	165	7	84	46	12			
ACB324	135×80×294	24.5	249.5	9	112	62	14			
ACB350	185×100×314	26	268	9	154	82	19			
ACB313	214×125×505	34.5	450	9	181	107	21			

Table 53: Brackets and cylinder assembly combinations

Cylinder volume [L]	Bracket	Bracket weight [kg]	Valve type	Total height c [mm]
1.2	ACB012	0.32	201, 202, 203	380
			207	334
			211, 212	376
1.2	ACB312	0.48	201, 202, 203	380
			207	334
			211, 212	376
2.4	ACB324	1.15	201, 202, 203	455
			207	409
			211, 212	451
5.0	ACB250	5.63	201, 202, 203	445
			207	399
			211, 212	441
5.0	ACB350	1.67	201, 202, 203	445
			207	399
			211, 212	441
7.8	ACB250	5.63	201, 202, 203	595
			207	549
			211, 212	591
7.8	ACB350	1.67	201, 202, 203	595
			207	549
			211, 212	591
13.0	ACB213	9.85	201, 202, 203	668
			207	622
			211, 212	664
13.0	ACB313	2.98	201, 202, 203	668
			207	622
			211, 212	664
16.0	ACB213	9.85	201, 202, 203	780
			207	734
			211, 212	776
16.0	ACB313	2.98	201, 202, 203	780
			207	734
			211, 212	776

For the protection of the cylinder and valve in applications where high levels of shock and vibrations occur, the use of anti-vibration mounts is required. Anti-Vibration Mounts AVM001-M10 must be combined with heavy duty cylinder brackets ACB2xx.

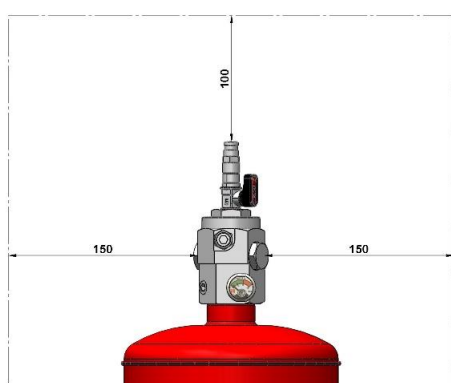
Table 54: Anti-vibration mounts

Picture	Part №	Description	Material
	AVM001-M10	For use with heavy duty cylinder brackets ACB2xx	galvanised steel, rubber

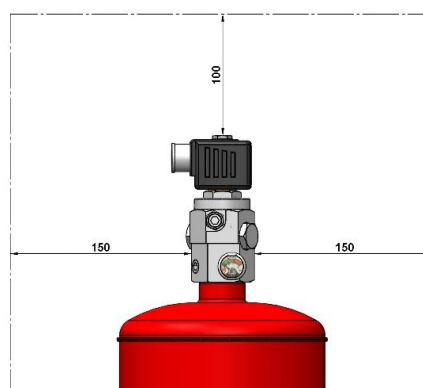
NOTE

4 or 8 pieces are required for one bracket.

When placing the cylinder, leave free area around the cylinder valve of minimum of 150 mm on the sides and minimum of 100 mm above the valve, to install other components of the system and perform maintenance of the system in future.



Example with the valve 201



Example with the valve 211 or 212

8.2 MULTIPLE CYLINDERS CONNECTION

The BlazeCut system enables to simultaneously connect multiple cylinders to protect larger spaces.

The method of functioning and activating the system is the same when multiple cylinders are connected simultaneously. The BlazeTube detection must be connected to all the valves so that when the pressure in it decreases all the valve pistons on all the cylinders are opened simultaneously.

8.2.1 INSTALLATION

In case of simultaneous connection of multiple cylinders, the extinguishing agent in all cylinders must be the same and all cylinders must be under the same pressure before installation.

The amount of extinguishing agent in each cylinder is indicated on the label of each cylinder, the total amount of the extinguishing agent in the system kit is the sum of the quantities of extinguishing agent in individual cylinders. The cylinders are connected into one pressurised unit after installation of the system, the pressure in all cylinders at steady state is always equal.

When multiple cylinders are connected it is possible to combine systems. If an electronic detection or activation is required, the master cylinder valve will be a 21x series valve with solenoid and is connected to multiple 20x series valves. If a pneumatic detection or activation is preferred, the master cylinder valve will be a 20x series valve, which is connected to multiple 20x series valves. In order to simultaneously release the extinguishing agent, all the cylinders must connect to the master cylinder valve which is connected to one detection circuit.

Table 55: BlazeTube installation limits in single and multiple cylinders configurations

Number of cylinders	Valve type combinations	Maximum Length of BlazeTube [m]
Single cylinder	20x	40
	211	40
	212	40
Multiple cylinders: Electronic actuation and BlazeTube in protected enclosure	211/212 + 20x	15
	211/212 + 20x + 20x	15
	211/212 + 20x + 20x + 20x	10
	211/212 + 20x + 20x + 20x + 20x	10
	211/212 + 20x + 20x + 20x + 20x + 211/212*	10
Multiple cylinders: LOP actuation with BlazeTube in protected enclosure	20x + 20x	40
	20x + 20x + 20x	40 in a loop
	20x + 20x + 20x + 20x	40 in a loop
	20x + 20x + 20x + 20x + 20x	40 in a loop
	20x + 20x + 20x + 20x + 20x + 20x	40 in a loop

NOTE

Maximum multiple cylinders configuration using the solenoid require two 211 or 212 series valves situated as first and last valve in the multiple cylinders configuration.

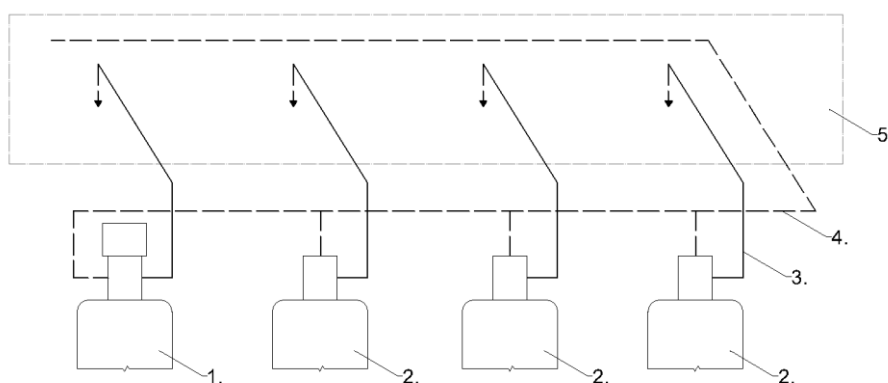
8.2.2 DISTRIBUTION NETWORK

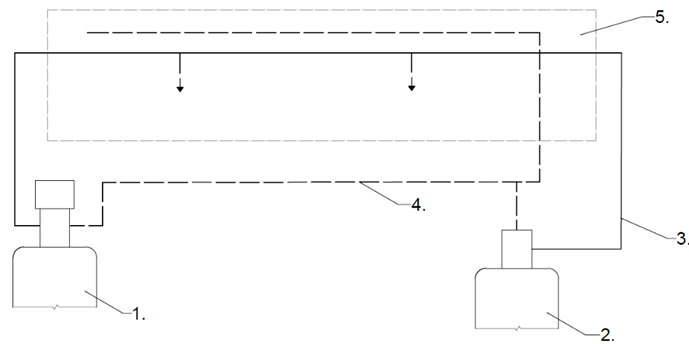
If multiple cylinders are connected, the distribution tubes must be connected to each cylinder by using at least one agent discharge outlet of each valve. In order to secure a fast discharge of the agent, it is necessary to use separate distribution networks from each cylinder.



Never connect distribution lines from several cylinders into one distribution circuit, as this will restrict the flow rate, extend the discharge time and reduce the performance of the system.

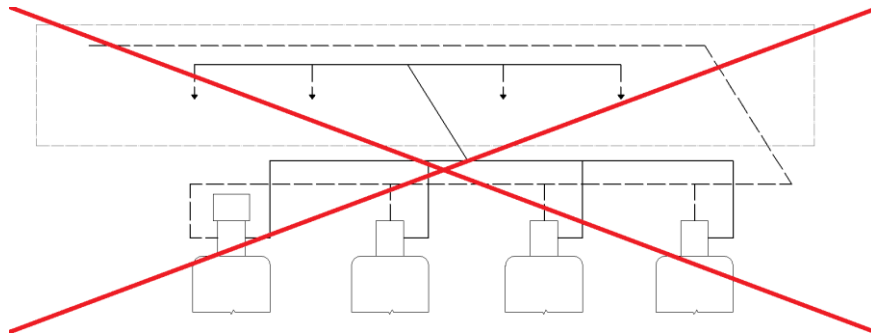
In case of multiple cylinder connection, the cylinders must be placed on the same level and the tubes must be installed as symmetric as possible in order to prevent the extinguishing agent to extrusion from one cylinder to another and incomplete discharge of the extinguishing agent.





Recommended configurations of multiple cylinders connection

1. Cylinder with the 211 or 212 series valve to secure electronic activation of the system. If only LOP actuation is required all valves in multiple cylinders connection are 20x series valves.
2. Cylinder with the valve without the solenoid, 20x series valve
3. Distribution network
4. BlazeTube detection
5. Protected enclosure



Not recommended configuration of multiple cylinders in joint distribution tubes

8.2.3 BLAZETUBE IN MULTIPLE CYLINDERS CONNECTION

The BlazeTube in multiple cylinders connection is used:

- for a fire detection and also to connect the cylinders to secure simultaneous discharge of all cylinders,
- only to connect the cylinders to secure simultaneous discharge of all cylinders e.g., in installations using an electronic detection (BlazeWire, detector).

If the BlazeTube is used also for detection any part of this manual related to installation and pressurisation of the BlazeTube detection apply also to multiple cylinder connection.



Multiple cylinders connection of two 203 and one 202 series valves with BlazeTube used for both detection and connection of the cylinders

In installations where the BlazeTube is used only to connect the valves, the BlazeTube is not pressurised through the end-of-line device but from the master cylinder. Once the BlazeTube is installed slowly open ball valves on all cylinders one by one, starting closest to the master cylinder. This is to pressurise the BlazeTube and connect all cylinders into one pressurised unit. Once pressurised the discharge plugs can be removed and the discharge lines can be connected.



Multiple cylinders connection of one 211 or 212, 203 and 202 series valves with BlazeTube used only for connection of the cylinders

NOTE

When using BlazeTube for connection of valves make sure the length of BlazeTube is as symmetric as possible to secure simultaneous opening of all pistons in the valves.

8.2.4 PRESSURE MONITORING

Only one Pressure Switch APS001-xx, APS003-xx or one Pressure Transducer ATA100 is necessary when having a multiple cylinder connection. The pressure device can connect to one of the valves after completing the installation and the cylinder valves are connected into one pressurised unit (see Chapter [A2.4](#)).

8.3 INSTALLATION OF DISTRIBUTION NETWORK



Use only original components in distribution networks. Do not extend the network with unoriginal components. Do not use unoriginal hoses, tubes, fittings and nozzles.

8.3.1 RED FIRE HOSES

Red Fire Hose is easy to assemble with straight or elbow reusable push-on couplings. Both size variants can be used as part of the agent distribution network combined with distribution tubes.

Table 56: Red Fire Hoses

Part №	Size	Inner diameter	Outside material	Inside material	Operating temperature	Length
ARFH08	1/2"	13 mm	NBR/PVC based	rubber with fibre braid reinforcement	-40 to 100 °C	per metre
ARFH04	1/4"	6 mm				



Cut of the Red Fire Hose

8.3.2 FEED HOSES

Feed hose is used as follows:

- from discharge outlet connector to first fitting connecting rigid tube in order to secure maximum flow rate and fast discharge.
- in between the nozzles if it is not possible to use a rigid tube due to obstructions in enclosure (depending on size of the system).
- in whole installation e.g., in vehicle applications (depending on size of the system).
- depending on type of installation, only one feed hose is used or if required two feed hoses from both discharge outlets can be used.

Table 57: Feed hoses

Part №	Length [cm]	Thread size	Material - outside	Operating temperature
AFH050-M22	50	M22x1.5	stainless steel wire braid	-40 to 230 °C
AFH075-M22	75			
AFH100-M22	100			
AFH200-M22	200			
AFH300-M22	300			
AFH400-M22	400			
AFH500-M22	500			



Feed hose

8.3.3 DISTRIBUTION TUBES

Steel tubes can be used in whole installation (fixed applications) or in part of installation where use of Red Fire Hoses is not possible e.g., due to high temperatures like in engine compartment above the turbo or exhaust manifold.

Type of tube is used depending on size of the system.

Table 58: Tubes

Part №	Outer diameter	Inner diameter	Length	Material
ATS012	12 mm	10 mm	1000 mm	stainless steel 304L/1.4307 Standard: EN10217-7
ATS015	15 mm	13 mm	1000 mm	stainless steel 304L/1.4307 Standard: EN10217-7



ATS012, ATS015

NOTE

The feed hoses and steel tubes use metric parallel thread fittings to connect between each other, so it is possible to combine hoses and tubes at any place using same fittings.

Table 59: Compatibility of 12 mm tubes and hoses

Part №	Description	Thread size
AFH050-M22 – AFH500-M22	feed hose	M22x1.5 to M18x1.5
ATS012	stainless steel tube 12 mm	

Table 60: Compatibility of 15 mm tubes and hoses

Part №	Description	Thread size
AFH050-M22 – AFH500-M22	feed hose	M22x1.5
ATS015	stainless steel tube 15 mm	



Never combine 15 mm tube with 12 mm tube otherwise you restrict or alter flow rate in distribution network.

To achieve most effective use of BlazeCut system consult the type of hoses and tubes, method of creating the networks and their placement in the protected enclosure with the supplier of the system. In some cases, it may be necessary to add further components to the distribution networks (e.g., extension if the cylinder with extinguishing agent is located far from the protected enclosure). Consult specific cases with the supplier of the system.



To reduce the chance of contamination and an accidental discharge with the discharge circuit, the G3/8" valve plugs must remain mounted on the cylinder valve as supplied and only be removed after the detection circuit is connected and charged.

The distribution network includes all hoses, tubes and fittings installed, from the discharge port to the nozzles including. The network should be as short, straight and simple as possible to achieve sufficient pressure and maximum flow of the extinguishing agent through to the nozzles. Emptying the cylinder and achieving the required extinguishing concentration in the protected area should be as fast as possible. When designing the distribution hose/tubes it is appropriate to use as few connections and fittings as possible. Especially avoid using too many elbows in the distribution networks. Narrowing of the diameter in network is possible only in the direction of the flow of the extinguishing agent. If possible, the hoses and tubes should be as symmetric as possible.

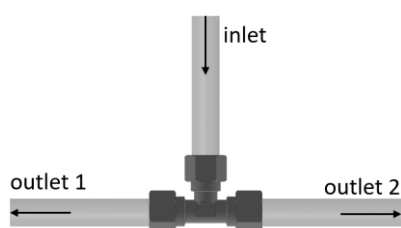
Other ways of streamlining the flow of extinguishing agent in the distribution hose/tubes, which can be used, if possible:

- When using two distribution networks, connect the ends to create a loop. This may increase the flow of extinguishing agent and accelerate the emptying of the cylinder.
- Avoid changes of direction of the distribution networks in the vicinity of the fittings within the distance of ten times the internal diameter of the tubes. Keep this distance between the fittings.

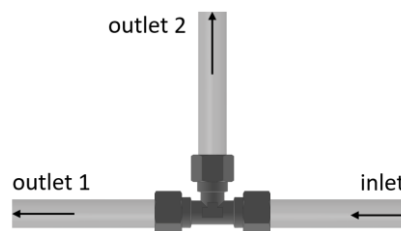
To ensure even distribution of the agent to both outlets in a Tee fitting, make sure that all the following conditions are met:

- inlet is perpendicular to both outlets, while both outlets lie in a horizontal plane
- at least minimum allowed distance between fittings is preserved
- both outlets are connected to the same diameter feed hose, distribution hose or tube
- the distribution hoses or tubes are fitted with nozzles with equal flow rates
- bend tubes rather than use elbow fittings.

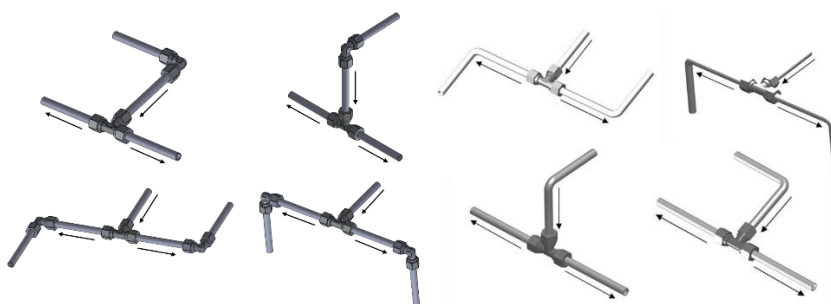
Not following these conditions can lead to significant disproportion of flow rates of over 50 %.



Example of connection with even distribution of agent



Example of connection with uneven distribution of agent



Acceptable ways of connections into a Tee

Table 61: Bending radius

Type of hose or tube	Minimum bending radius [mm]
Feed hose	85
stainless steel tube 12 mm	25
stainless steel tube 15 mm	30



Do not forcibly bend the hoses and tubes below the minimum bending radius . This can cause damage and reduce the performance of the system.

Place the hoses/tubes through appropriate parts of the protected enclosure and gradually clamp with appropriate fastening material (see Chapter 4.8). Proper mounting of the hoses/tubes prevents them from rubbing and vibrating ensuring durability of the installed system. When the system is activated and extinguishing agent released, the hoses/tubes are exposed to the forces of pressure and flow of extinguishing agent. During the activation of fire system, the hoses/tubes must not be displaced, as it may change the desired flow and direction of extinguishing agent from the nozzles.



Always place clamps next to fittings connecting nozzles to make sure they will hold firmly in place at time of discharge of the extinguishing agent.

Table 62: Maximum fastening distance

Type of hose or tube	Maximum fastening distance [mm]
Feed hose	500
Red Fire Hose 1/4"	750
Red Fire Hose 1/2"	750
stainless steel tube 12 mm or 15 mm	1000

Fasten hoses also in place of bending. Properly fasten the hoses just before the ending with the nozzle to prevent changing the direction of flow of the extinguishing agent. When using the tube, the maximum distance between the last fastening and nozzle must not be more than 100 mm.

NOTE

In environments with high vibration, shorter clamping distances and use of heavy duty tube clamps are recommended.

Table 63: Tube clamps

Part №	Description
ATC012	Tube clamp, 12 mm - suits 12 mm tube, galvanized steel
ATC015	Tube clamp, 12 - 16 mm - suits 12 and 15 mm tube, galvanized steel, rubber insert
ATC112	Heavy duty tube clamp polyamide, zinc plated top, carbon steel bottom, for welding, suits 12 mm tube
ATC212-SS	Heavy duty tube clamp polyamide, stainless steel with bolting flaps, 12 mm - suits 12 mm tube



Tube clamp ATC012



Heavy duty tube clamp ATC112



Tube clamp ATC015



Heavy duty tube clamp ATC212-SS

For through panel fasteners see [Table 42](#).

8.3.4 FITTINGS

Fittings for rigid tubes are supplied in two versions:

1. SET: includes rings and nuts – suitable when connecting ATS012 or ATS015 rigid tubes
2. BODY: supplied without rings and nuts – suitable when connecting feed hoses or distribution hoses

Table 64: List of fittings used with a 12 mm tube (M18x1.5)

Picture	Part №	Description	Material
	FTFTN12U18	Tube nut for cutting ring for 12 mm tube (M18x1.5)	galvanized steel
	FTFCR12	Tube ring compressing for 12 mm tube	galvanized steel
	FTF1MM1818	Tube fitting straight coupling for 12 mm tube (M18x1.5) - BODY, Male-Male	galvanized steel
	FTF1MM1818-SET	Tube fitting straight coupling for 12 mm tube (M18x1.5) - SET (with rings and nuts), Male-Male	galvanized steel

	FRC1MM2218	Tube fitting straight reduced coupling Feed Hose (M22x1.5) to 12 mm tube (M18x1.5) - BODY, Male-Male	galvanized steel
	FRC1MM2218-SET	Tube fitting straight reduced coupling Feed Hose (M22x1.5) to 12 mm tube (M18x1.5) - SET (with rings and nuts), Male-Male	galvanized steel
	FTF2MM1818	Tube fitting elbow equal for 12 mm tube (M18x1.5) - BODY, Male-Male	galvanized steel
	FTF2MM1818-SET	Tube fitting elbow equal for 12 mm tube (M18x1.5) - SET (with rings and nuts), Male-Male	galvanized steel
	FTF2MU1818	Tube fitting elbow with rotary nut to nozzle connector for 12 mm tube (M18x1.5) - BODY, Male-Female	galvanized steel
	FTF2MU1818-SET	Tube fitting elbow with rotary nut to nozzle connector for 12 mm tube (M18x1.5) - SET (with rings and nuts), Male-Female	galvanized steel
	FTF3MMM181818	Tube fitting tee equal for 12 mm tube (M18x1.5) - BODY, Male-Male-Male	galvanized steel
	FTF3MMM181818-SET	Tube fitting tee equal for 12 mm tube (M18x1.5) - SET (with rings and nuts), Male-Male-Male	galvanized steel
	FTF3MUM181818	Tube fitting tee with rotary nut to nozzle connector for 12 mm tube (M18x1.5) - BODY, Male-Female-Male, galvanized steel	galvanized steel
	FTF3MUM181818-SET	Tube fitting tee with rotary nut to nozzle connector for 12 mm tube (M18x1.5) - SET (with rings and nuts), Male-Female-Male	galvanized steel

	FTF3MMU181818	Tube fitting tee with rotary nut to distribution hose for 12 mm tube (M18x1.5) - BODY, Male-Male-Female	galvanized steel
	FTF3MMU181818-SET	Tube fitting tee with rotary nut to distribution hose for 12 mm tube (M18x1.5) - SET (with rings and nuts), Male-Male-Female	galvanized steel
	FBH1MM1818	Tube fitting bulkhead for 12 mm tube (M18x1.5) - BODY, Male-Male	galvanized steel
	FBH1MM1818-SET	Tube fitting bulkhead for 12 mm tube (M18x1.5) - SET (with rings and nuts), Male-Male	galvanized steel

Table 65: List of nozzle fittings used with a 12 mm tube

Picture	Part №	Description	Material
	FNF1MB1804	Nozzle connector for 12 mm tube (M18x1.5) and nozzle ANG014 (G1/4") - BODY, Male-Male	galvanized steel
	FNF1MB1804-SET	Nozzle connector for 12 mm tube (M18x1.5) and nozzle ANG014 (G1/4") - SET (with rings and nuts), Male-Male	galvanized steel
	FNF1MB1806	Nozzle connector for 12 mm tube (M18x1.5) and nozzle ANG038 (G3/8") - BODY, Male-Male	galvanized steel
	FNF1MB1806-SET	Nozzle connector for 12 mm tube (M18x1.5) and nozzle ANG038 (G3/8") - SET, Male-Male	galvanized steel
	FNF1MB1808	Nozzle connector for 12 mm tube (M18x1.5) and nozzle ANG012 (G1/2") - BODY, Male-Male	galvanized steel
	FNF1MB1808-SET	Nozzle connector for 12 mm tube (M18x1.5) and nozzle ANG012 (G1/2") - SET, Male-Male	galvanized steel

Table 66: List of fittings used with a 15 mm tube (M22x1.5)

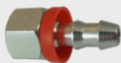
Picture	Part №	Description	Material
	FTFTN15U22	Tube nut for cutting ring for 15 mm tube (M22x1.5)	galvanized steel
	FTFCR15	Tube ring compressing for 15 mm tube	galvanized steel
	FTF1MM2222	Tube fitting straight coupling for 15 mm tube (M22x1.5) - BODY, Male-Male	galvanized steel
	FTF1MM2222-SET	Tube fitting straight coupling for 15 mm tube (M22x1.5) - SET (with rings and nuts), Male-Male	galvanized steel
	FTF2MM2222	Tube fitting elbow equal for 15 mm tube (M22x1.5) - BODY, Male-Male	galvanized steel
	FTF2MM2222-SET	Tube fitting elbow equal for 15 mm tube (M22x1.5) - SET (with rings and nuts), Male-Male	galvanized steel
	FNF2MU2222	Tube fitting elbow with rotary nut for 15 mm tube (M22x1.5) and nozzle connector (M22x1.5) - BODY, Male-Female	galvanized steel
	FNF2MU2222-SET	Tube fitting elbow with rotary nut for 15 mm tube (M22x1.5) and nozzle connector (M22x1.5) - SET (with rings and nuts), Male-Female	galvanized steel
	FTF3MMM222222	Tube fitting tee equal for 15 mm tube (M22x1.5) - BODY, Male-Male-Male	galvanized steel
	FTF3MMM222222-SET	Tube fitting tee equal for 15 mm tube (M22x1.5) - SET (with rings and nuts), Male-Male-Male	galvanized steel

	FNF3MUM222222	Tube fitting tee with rotary nut for 15 mm tube (M22x1.5) and nozzle connector (M22x1.5) - BODY, Male-Female-Male	galvanized steel
	FNF3MUM222222-SET	Tube fitting tee with rotary nut for 15 mm tube (M22x1.5) and nozzle connector (M22x1.5) - SET (with rings and nuts), Male-Female-Male	galvanized steel
	FBH1MM2222	Tube fitting bulkhead for 15 mm tube (M22x1.5) - BODY, Male-Male	galvanized steel
	FBH1MM2222-SET	Tube fitting bulkhead for 15 mm tube (M22x1.5) - SET (with rings and nuts), Male-Male	galvanized steel

Table 67: List of nozzle fittings used with 15 mm tube

Picture	Part №	Description	Material
	FNF1MB2204	Nozzle connector for 15 mm tube (M22x1.5) and nozzle ANG014 (G1/4") - BODY, Male-Male	galvanized steel
	FNF1MB2204-SET	Nozzle connector for 15 mm tube (M22x1.5) and nozzle ANG014 (G1/4") - SET (with rings and nuts), Male-Male	galvanized steel
	FNF1MB2206	Nozzle connector for 15 mm tube (M22x1.5) and nozzle ANG038 (G3/8") - BODY, galvanized steel, Male-Male	galvanized steel
	FNF1MB2206-SET	Nozzle connector for 15 mm tube (M22x1.5) and nozzle ANG038 (G3/8") - SET (with rings and nuts), Male-Male	galvanized steel
	FNF1MB2208	Nozzle connector for 15 mm tube (M22x1.5) and nozzle ANG012 (G1/2") - BODY, Male-Male	galvanized steel
	FNF1MB2208-SET	Nozzle connector for 15 mm tube (M22x1.5) and nozzle ANG012 (G1/2") - SET (with rings and nuts), Male-Male	galvanized steel

Table 68: List of fittings for Red Fire Hose (G1/4", G1/2" thread)

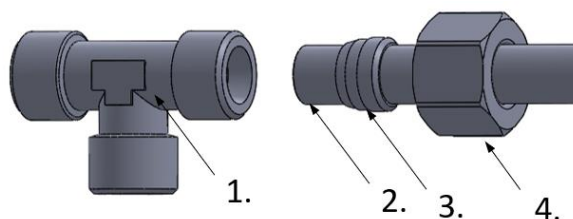
Picture	Part №	Description	Material
	FHF1CR0404	Hose fitting push on straight female swivel for 1/4" RF hose (G1/4"), Female-Push-on	galvanised steel
	FHF2CR0404	Hose fitting push on elbow female swivel for 1/4" RF hose (G1/4"), Female-Push-on	galvanised steel
	FHF1CR0808	Hose fitting push on straight female swivel for 1/2" RF hose (G1/2"), Female-Push-on	galvanised steel
	FHF2CR0808	Hose fitting push on elbow female swivel for 1/2" RF hose (G1/2"), Female-Push-on	galvanised steel
	FHF1BB0404	Hose fitting straight coupling for 1/4" RF hose (G1/4"), Male-Male	galvanised steel
	FRC1BC0408	Hose fitting reduced coupling swivel straight for 1/4" RF hose (G1/4") and fitting G1/2", Male-Female	galvanised steel
	FRC1BB0804	Hose fitting reduced coupling for 1/2" RF hose (G1/2") and 1/4" RF hose (G1/4"), Male-Male	galvanised steel
	FHF1BB0808	Hose fitting straight coupling for 1/2" RF hose (G1/2"), Male-Male	galvanised steel
	FRC1BM0818	Hose fitting reduced coupling for 1/2" RF hose (G1/2") and 12 mm tube (M18x1.5) - BODY, Male-Male	galvanised steel
	FRC1BM0818-SET	Hose fitting reduced coupling for 1/2" RF hose (G1/2") and 12 mm tube (M18x1.5) - SET, Male-Male	galvanised steel

	FRC1CM0818	Hose fitting reduced coupling for fitting G1/2" and 12 mm tube (M18x1.5) - Female-Male	galvanised steel
	FHF2BC0404	Hose fitting swivel nut elbow for 1/4" RF hose (G1/4"), Male-Female	galvanised steel
	FHF2BB0808	Hose fitting elbow equal for 1/2" RF hose (G1/2") - Male-Male	galvanized steel
	FHF2BC0808	Hose fitting swivel nut elbow for 1/2" RF hose (G1/2"), Male-Female	galvanised steel
	FHF4BC0808	Hose fitting swivel nut 45° for 1/2" RF hose (G1/2"), Male-Female	galvanised steel
	FHF3BCB040404	Hose fitting swivel nut tee for 1/4" RF hose (G1/4"), Male-Female-Male	galvanised steel
	FHF3BBB080808	Hose fitting equal tee for 1/2" RF hose (G1/2"), Male-Male-Male	galvanised steel
	FHF3CCC080808	Hose fitting swivel nut tee for 1/2" RF hose (G1/2"), Female-Female-Female	galvanised steel
	FHF3BCB080808	Hose fitting swivel nut tee for 1/2" RF hose (G1/2"), Male-Female-Male	galvanised steel
	FHF3BBC080808	Hose fitting swivel nut side tee for 1/2" RF hose (G1/2"), Male-Male-Female	galvanised steel

	FBH1BB0404	Hose bulkhead fitting straight for 1/4" RF hose (G1/4"), Male-Male	galvanised steel
	FBH1BB0808	Hose bulkhead fitting straight for 1/2" RF hose (G1/2"), Male-Male	galvanised steel

Table 69: List of nozzle fittings for Red Fire Hose (G1/4", G1/2" thread)

Picture	Part №	Description	Material
	FNF1BB0806	Nozzle connector for 1/2" RF hose (G1/2") and nozzle ANG038 (G3/8"), Male-Male	galvanised steel



Connection of steel tube to a fitting

1. Tube Tee fitting FTF3MMM181818
2. Tube ATS012
3. Tube compressing ring fitting FTFCR12
4. Tube compressing nut fitting FTFTN12U18

The Red Fire Hose is connected by the use of push on fittings.

1. Measure and cut the hose using a hose cutter or a sharp knife.
2. When inserting the fitting into the hose use a light coating of soapy water or a light oil.
3. Place the fitting inside the hose. You will need to grip the hose approximately 25-50 mm (1-2 inches) from the end with the fitting inserted.
4. Press the push on fitting against a hard surface, or use a vice while holding the hose, until fully inserted and pushing hard against the red cap.



NOTE

Once assembled the hose and push on fittings are rated to very high pressures. There is no need to use additional hose clamps or cable ties to further secure the hose fitting.

8.3.5 NOZZLES

Plan ahead where to place the extinguishing nozzles. The nozzles on the distribution networks must be placed inside the protected enclosure and be above the riskiest places of the enclosure.

For maximum efficiency and protection, do not place the nozzles of the system behind barriers that could restrict or reduce the fire suppression effect of the system by preventing direct penetration of extinguishing agent into the protected enclosure and forming desired concentration.

The distribution networks must always be ended by a nozzle. There may not be any free outlets in the distribution network e.g., connectors without nozzles.

Table 70: Specification of nozzles for HFC-227ea and FK-5-1-12

Part №	Thread size	Orifice quantity	Orifice size	Material
ANG014	G1/4"	8	1.5 mm	stainless steel
ANG038	G3/8"	8	2.6 mm	
ANG012	G1/2"	8	4.5 mm	



ANG014



ANG038

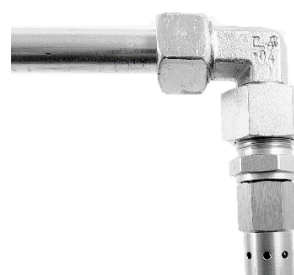


ANG012

Nozzle can be installed directly to a fitting using Tee or Elbow fittings with rotary nut or through the tube extension. See below figures.



Nozzle connection through Elbow fitting and tube extension



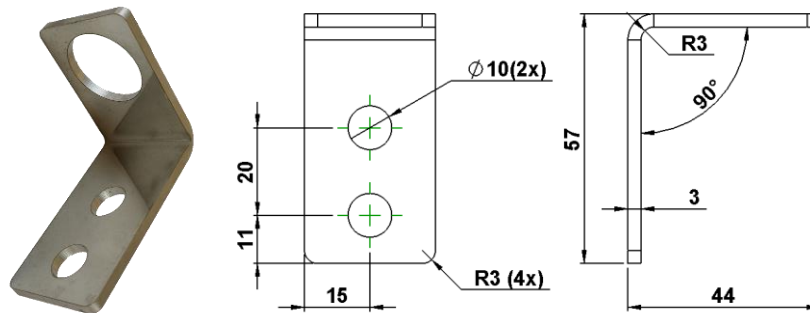
Direct nozzle connection on Elbow with a rotary nut

NOTE

Favour nozzle connection through Elbow fitting and tube extension. Use of Elbow with a rotary nut will reduce agent flow, as it has a smaller internal diameter.

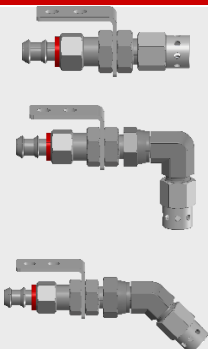
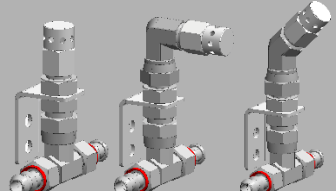
Table 71: Nozzle bracket

Part №	Assembly hole	Description	Material
ANB001	22 mm	for firm fixing of nozzle assembly or other components (remote actuator, EOL adapter)	stainless steel



Nozzle bracket ANB001 dimensions

Table 72: Nozzle assemblies for mobile applications (only for systems with 1/2" nozzles)

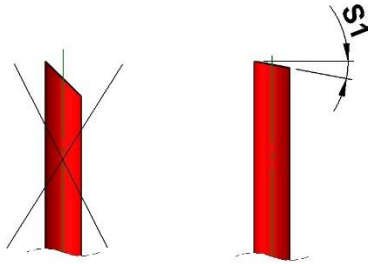
Part №	Picture	Description	Components
KNAG11-012		Nozzle Kit Assembly Gas G1/2" Nozzle - End Of Line Type	1x FHF1CR0808 1x FBH1BB0808 1x FHF2BC0808 1x FHF4BC0808 1x ANG012 1x ANB001 1x AWR001
KNAG21-012		Nozzle Kit Assembly Gas G1/2" Nozzle - T fitting In Line Type	2x FHF1CR0808 1x FBH1BB0808 1x FHF3BCB080808 1x FHF2BC0808 1x FHF4BC0808 1x ANG012 1x ANB001 1x AWR001

8.4 INSTALLATION OF THE BLAZETUBE DETECTION

The efficiency of BlazeCut system significantly depends on correct placement of the BlazeTube detection. Follow the instructions below. The BlazeTube must be placed so that it is disrupted as soon as the fire starts before damaging other components of BlazeCut system and before the fire spreads outside of the protected enclosure.

BlazeCut system uses quick slotting system of mounting BlazeTube detections in connectors with double seal to prevent leak of extinguishing agent and of pressure. Use only the connectors supplied with the system. Ends of the BlazeTube detection must be properly adjusted. End of the BlazeTube detection must be straight before inserting, without cuttings and notches to avoid damaging the seals in the connectors.

To cut the BlazeTube detection use special cutter ATC002 included in the Tool charging kit KATC001.



*Example of incorrect (left) and correct (right)
BlazeTube end cuts*



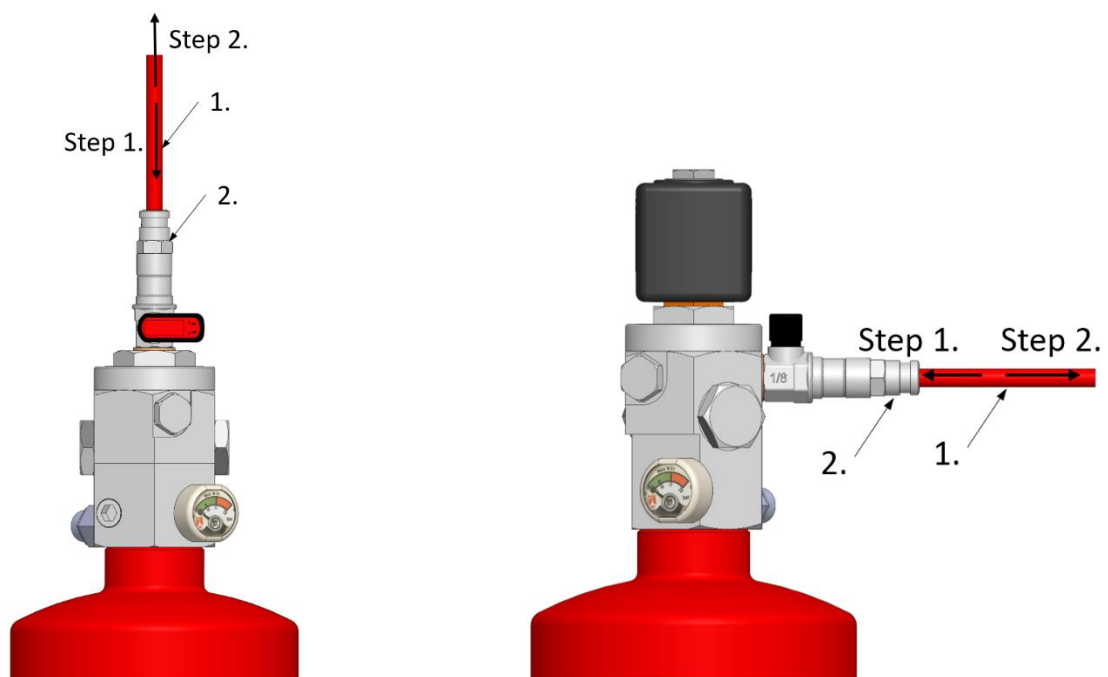
BlazeTube cutter ATC002

Step 1: Cut the BlazeTube detection straight, maximum degree of chamfer is 5°

Fasten the BlazeTube detection firmly so that it is slotted into the BlazeTube outlet connector and pushed all the way by hand. After slotting always check if the BlazeTube is firmly fastened by gently pulling it. Do not open the ball valve on the BlazeTube outlet connector yet.

Step 1: Slot the BlazeTube detection firmly into the connector all the way

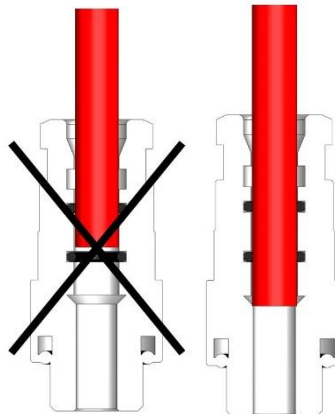
Step 2: Pull the BlazeTube detection slightly and make sure that it is firmly fastened



*Scheme of connecting the BlazeTube detection to the fittings on the cylinder valve
(example: valve 201 on the left, valve 211-30 on the right)*

1. BlazeTube Detection
2. BlazeTube Detection outlet connector FBT1BP026

Always slot the BlazeTube detection to the outlet all the way in.



Detail of slotting the BlazeTube detection to the end-of-line adapter



Do not open the ball valve before pressurising the BlazeTube! This may open the valve piston of the cylinder and extinguishing agent will be released. Protect the ball valve before accidental opening during transportation and handling of the cylinder. Follow the instructions for transportation of the cylinder.

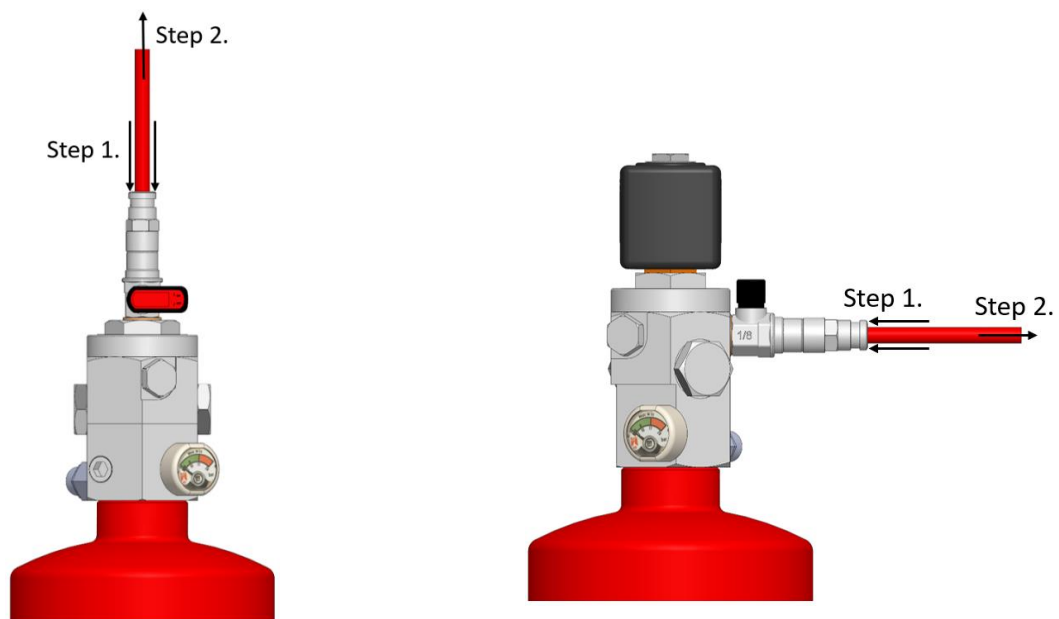


During normal operation of the system, the pressure in the BlazeTube detection is the same as in the cylinder.

Disconnect the BlazeTube detection from a BlazeTube connector by pushing the connector's ring in (away from the BlazeTube detection) and pull the BlazeTube detection away from the BlazeTube connector. Proceed accordingly when disconnecting the BlazeTube detection from the end-of-line adapter.

Step 1: Push the ring of the BlazeTube detection outlet connector

Step 2: Pull the BlazeTube detection from the connector



*Disconnection of the BlazeTube detection from the valve
(example: valve 201 on the left, valve 211 or 212 on the right)*



During disconnection of the BlazeTube detection under pressure a pressure is released and if the system was in operation also small amount of agent is released. In such case always wear appropriate protective glasses with side-shields and suitable protective gloves. Aim the BlazeTube detection always apart. Make sure not to interpose any other person.

If the BlazeTube detection is under pressure disconnection can be more difficult. The pressure can be released by pushing a small pin of the charging adapter inside the end-of-line device. Before this procedure, dismount the pressure gauge and make sure that the ball valve is closed.

8.4.1 PROCEDURE OF INSTALLATION OF THE BLAZETUBE DETECTION IN THE PROTECTED ENCLOSURE

Place the BlazeTube detection in the protected enclosure and gradually fasten with P-clamps and fastening elements. Proper fastening of BlazeTube detection is important. In case of fire, it is exposed to fast changes in pressure and forces of flowing gas. Maximum distance between fastenings of the tube cannot be more than 250 mm. Fastening must also be in place where the tube bends. The BlazeTube detection has minimum bend radius of 100 mm. Do not bend the tube more. To preserve sufficient flexibility of the BlazeTube detection, it is recommended to install it at ambient temperature of more than 10 °C.

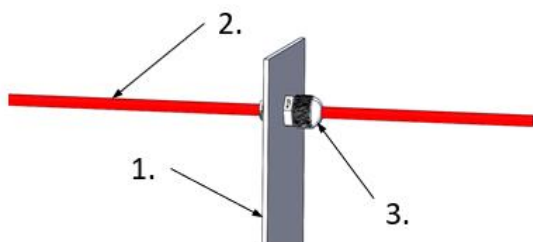
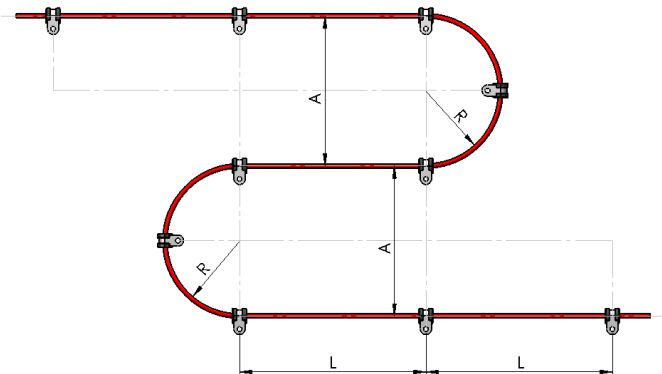
IMPORTANT!

The BlazeTube detection must come out of each connection in direct position in order to avoid any leakage. If a redirection of the BlazeTube detection is needed the bend of the tube from the connection must be in a minimum distance of 50 mm.

Table 73: Boundary dimension values

Symbol	Value
A	max 1000 mm
L	max 250 mm
R	min 100 mm
Max. number of bends per 1 m	3

At the crossing of the BlazeTube through a structure it is advised to protect the BlazeTube



1. structure
2. BlazeTube detection
3. protective element (cable gland ACG112, rubber grommet etc.)

Place the BlazeTube detection as close as possible above the places with greatest risk of fire. Do not place the tube horizontally next to places of possible fire, it may significantly delay activation of the system in case of fire.

The BlazeTube detection cannot be placed freely in the protected enclosure. It must be tightened to appropriate construction. If necessary, the BlazeTube detection can be installed in open space (e.g., above the protected device) by using steel wire, which is wired in suitable area of the protected enclosure and the BlazeTube detection can be tightened on a steel wire. Use a steel wire with appropriate strength and wire the steel wire firmly.

Proceed carefully during installation not to damage the tube with sharp objects. Do not stretch or forcibly bend the BlazeTube.

During the installation of BlazeTube detection, specifically make sure that the tube will not be damaged during operation of the equipment covered. After the system is fully installed and functional, if the BlazeTube is damaged, the system will activate.

The tube cannot be in direct contact with hot parts of the protected device or in immediate proximity of parts of the device, which heat to high temperatures during operation (transformers etc.).

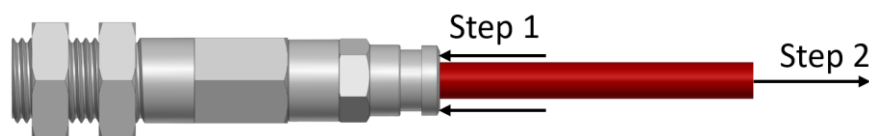
Depending on the size and shape of the protected enclosure use necessary length of the BlazeTube detection. If you do not use the whole tube, cut the ending; the ending must be adjusted, see figures above.

Place the loose ending of the BlazeTube detection into the area so that it is possible to pressurise the system using charging kit through end-of-line adapter of the tube, and also to enable in future to perform inspection of pressure in the system with pressure gauge on end-of-line adapter of the tube, if the pressure gauge will be installed at the end-of-line adapter.

Fasten the end-of-line adapter into the ending of the BlazeTube; proceed according to the figure below.

Step 1: BlazeTube detection properly slotted to the end-of-line adapter all the way

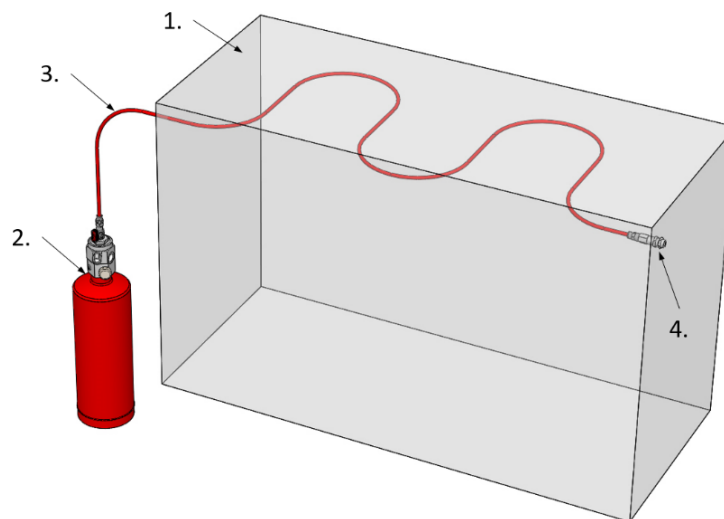
Step 2: After slotting always make sure that the BlazeTube is firmly fastened by gentle pulling it



Connection of the BlazeTube detection on the end-of-line adapter

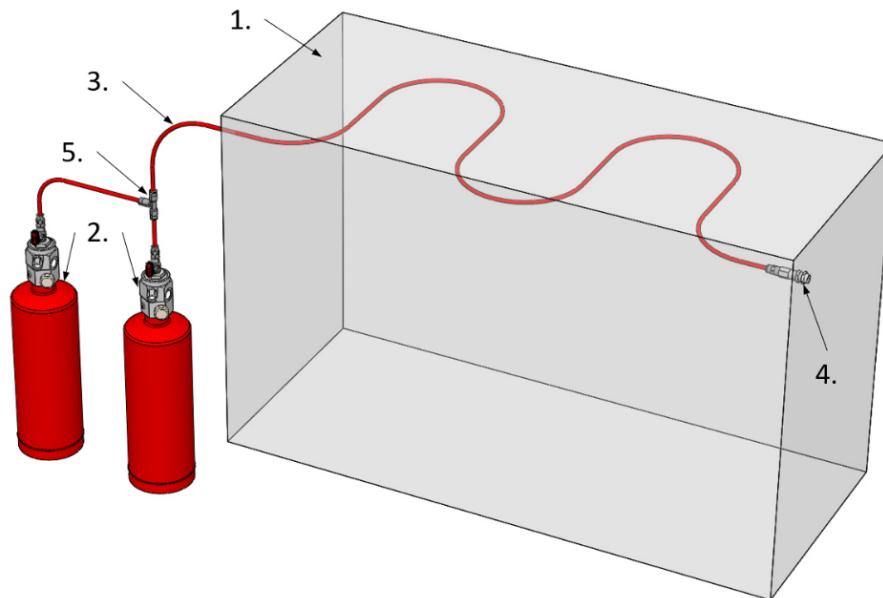
8.4.2 EXAMPLES OF INSTALLATION OF THE BLAZETUBE DETECTION

For maximum length of BlazeTube see [Table 55](#) in Chapter [8.2](#).



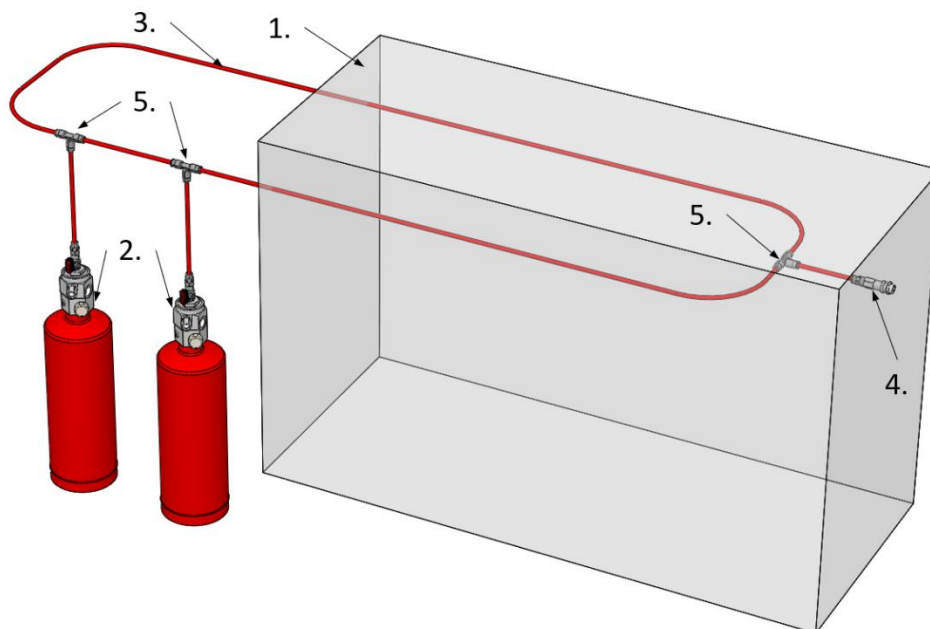
Simple installation with one cylinder

1. Protected enclosure
2. Cylinder with the valve
3. BlazeTube detection
4. End-of-line adapter or pneumatic actuator



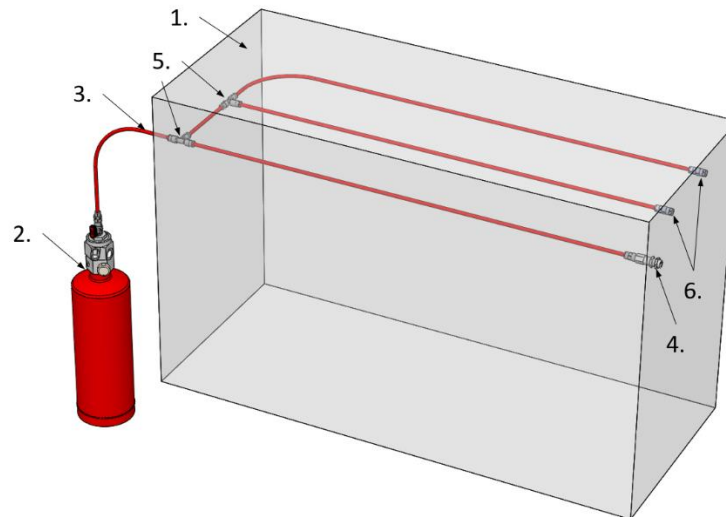
Simple installation of multiple cylinders. The BlazeTube detection must be connected to both cylinders by using a Tee connector.

1. Protected enclosure
2. Cylinder with the valve
3. BlazeTube detection
4. End-of-line adapter or pneumatic actuator
5. BlazeTube Tee connector



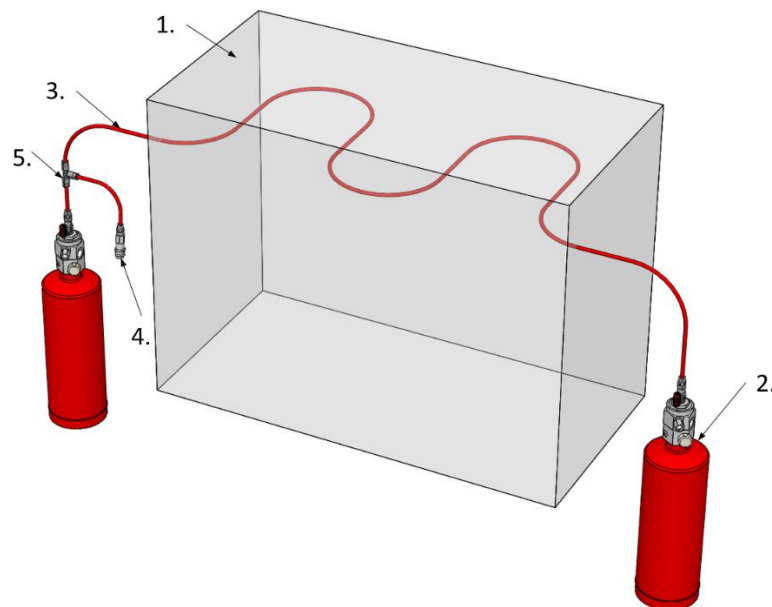
*Multiple cylinders installation with the BlazeTube detection in loop.
Recommended for applications where long BlazeTube detection is needed.*

1. Protected enclosure
2. Cylinder with the valve
3. BlazeTube detection
4. End-of-line adapter or pneumatic actuator
5. BlazeTube Tee connector



Installation with one cylinder, the BlazeTube detection is branched. This method reduces length of the BlazeTube detection. It is suitable for installations where large space has to be covered and the BlazeTube detection would have to be very long when using simple installation.

1. Protected enclosure
2. Cylinder with the valve
3. BlazeTube detection
4. End-of-line adapter or pneumatic actuator (one end-of-line device is sufficient for one installation)
5. BlazeTube Tee connector
6. End-of-line plug



Cylinders are situated on opposite sides of the protected enclosure. This method is suitable when larger space needs to be protected, for example the protected enclosure is long (shafts etc.).

1. Protected enclosure
2. Cylinder with the valve
3. BlazeTube detection
4. End-of-line adapter or pneumatic actuator
5. BlazeTube Tee connector

8.4.3 GENERAL WARNINGS AND INSTRUCTIONS

Manual activation devices must always be installed in easily accessible places so that the person operating them would not be endangered by fire the operation of the system itself (see [ANNEX 3: PNEUMATIC REMOTE ACTUATORS ARA010 AND ARA020](#)).

Electronic activation of the system (using an electric actuator or an alarm panel) enables to place the devices for manual activation in greater distance from the protected area than activation using pneumatic remote actuators (see [ANNEX 4: ELECTRIC REMOTE ACTUATORS ARA110 AND ARA120](#)).

8.5 PRESSURISATION OF THE BLAZETUBE DETECTION

The cylinder and BlazeTube detection must be pressurised with correct pressure by nitrogen gas (N₂) before the system is put into operation. Use appropriate source of N₂ - cylinder with control valve. The pressurised system must be pressurised to value corresponding to the operating pressure for the given temperature (see Chapter [4.1](#)).



*Tool charging adapter
ATC001*

Pressurisation is performed through the end-of-line adapter of the BlazeTube detection using charging adapter ATC001. The BlazeTube detection end-of-line adapter has a port with thread M10x1 and contains a Schrader valve.

This valve closes and opens automatically during removal or installation of the charging adapter or the pressure gauge. It is possible to install and remove these components even when the tube is under pressure.

Depending on the cylinder valve used, proceed according to instructions in Chapter [8.5.1](#) or [8.5.2](#) to pressurise both the cylinder and BlazeTube at once or BlazeTube separately.

For multiple cylinder configurations, follow steps in Chapter [10.4.1](#).

If your system uses pneumatic remote actuator (ARA010 or ARA020), you can also pressurise the system following procedures in the corresponding Annex.



Proceed carefully and strictly follow the following steps. Fasten the connectors of the tubes, charging adapter and BlazeTube detection firmly and inspect. Their accidental disconnecting during pressurisation would release the extinguishing agent into the environment.



Never connect or disconnect the charging adapter to the BlazeTube detection if the ball valve of the port of the BlazeTube detection on the cylinder valve is open.



Due to risk of activation during pressurisation of the system it is necessary to seal the outlets of the discharge networks on the cylinder valve. Remove the discharge networks and seal the outlets with the G3/8" valve plugs.



Pressurise the BlazeTube detection correctly. If the pressure in it is lower than in the cylinder, the valve piston of the cylinder could open and extinguishing agent could be released when opening the ball valve.

8.5.1 PRESSURISATION PROCEDURE OF THE CYLINDER AND THE DETECTION SYSTEM – VALVES 201, 202 AND 207

Proceed according to instructions in this chapter to pressurise the cylinder and BlazeTube detection at once.

For pressurisation of BlazeTube detection only, skip **Step 6** and **Step 7**.

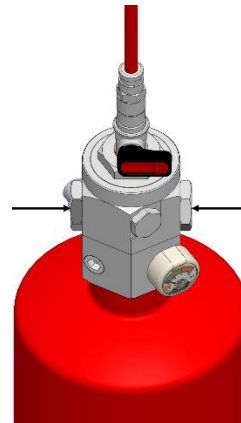
Procedure for valves 211-01 and 212-01 is described in Chapter [8.5.2](#), for valves 211-30 and 212-30 (without BlazeTube outlet) in Chapter [10.4.2](#).

Step 1:

Make sure that the discharge ports are plugged with valve plugs FVP1B06, to avoid loss of agent in case of an accidental discharge when pressurising.

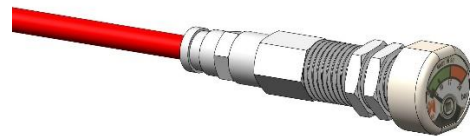
Make sure that the ball valve on the cylinder valve is closed.

Read and write down the value of pressure from the pressure gauge on the cylinder valve.



Step 2:

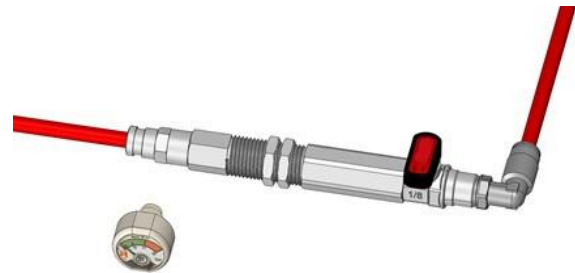
If installed, remove the pressure gauge (pressure switch or transducer) from the end-of-line adapter AEA006 at the end of the BlazeTube.



Step 3:

Make sure the ball valve on the charging adapter is closed.

Mount by hand the charging adapter ATC001 to the end-of-line adapter's M10x1 port by rotating clockwise. Hold the end-of-line adapter to push counter-clockwise while tightening. Tighten the charging adapter properly.



Step 4:

Set the regulator on the source of N₂ to the value at least on the level of pressure in the cylinder increased by 1 bar. For pressure filling values at different temperatures refer to

[Table](#)
[Table 16.](#)

15

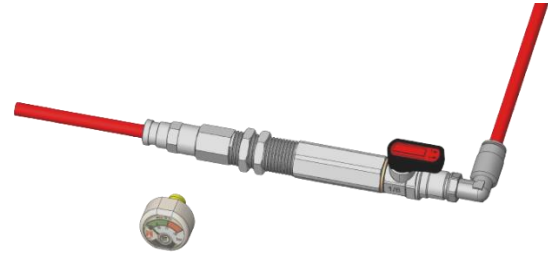
or

Open the regulator valve.

Step 5:

Slowly open the ball valve of the charging adapter and pressurise the BlazeTube detection first.

During pressurisation hissing can be heard. When the sound stops, pressurisation is finished. Keep the ball valve open for at least 30 seconds to stabilize the pressure in the BlazeTube detection.

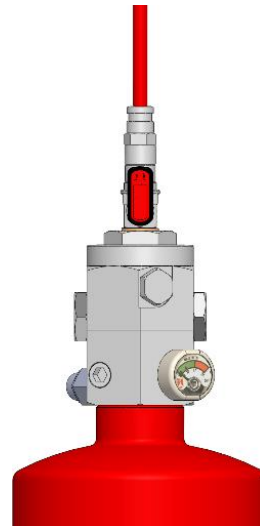


Step 6 (skip if pressurising only the BlazeTube):

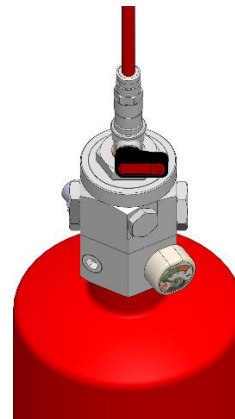
Slowly open the ball valve on the cylinder valve and pressurise the cylinder.

During pressurisation hissing can be heard. When the hissing stops, keep the valve open for at least 30 seconds to stabilize the pressure.

Close the ball valve on the cylinder valve, shake the cylinder several times and repeat **Step 6** until the pressure stabilises at the desired value.

**Step 7 (skip if pressurising only the BlazeTube):**

Close the ball valve on the cylinder valve.

**Step 8:**

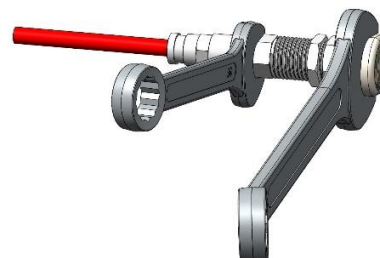
Close the ball valve on the charging adapter.

Step 9:

Unscrew the charging adapter from the M10x1 port of the end-of-line adapter (with size 16 spanner). You can use size 14 spanner on the valve adapter to push clockwise while unscrewing the charging adapter.

**Step 10:**

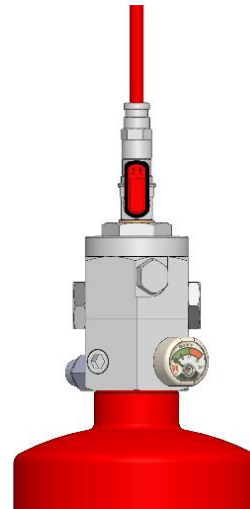
Mount the pressure gauge (pressure switch or transducer) back. Tighten it with spanner 22 mm.



Step 11:

If the pressure is not decreasing, very slowly open the ball valve on the cylinder valve. Pressures in the tube and the cylinder will equalise. Wait approximately 30 seconds.

Follow additional steps from Chapter [8.5.3](#).



WARNINGS



Since this moment, the cylinder and the BlazeTube detection are connected in one pressure unit. Proceed carefully not to damage the BlazeTube detection. Its damage would cause activation of the system and release of extinguishing agent.



Do not try to remove the BlazeTube detection from the BlazeTube outlet on the cylinder valve or remove the end-of-line adapter if the BlazeTube is under pressure and the ball valve is open.



Fast and careless opening of the ball valve may activate the system and release extinguishing agent.

8.5.2 PRESSURISATION PROCEDURE OF THE CYLINDER AND THE DETECTION SYSTEM – VALVES 21X-01

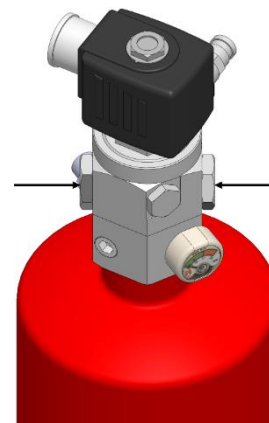
Proceed according to instructions in this chapter to pressurise the cylinder and BlazeTube detection at once.

For pressurisation of BlazeTube detection only, skip **Step 7** and **Step 8**.

Procedure for valves 201, 202, 203 and 207 is described in Chapter [8.5.1](#), for valves 211-30 and 212-30 (without BlazeTube outlet) in Chapter [10.4.2](#).

Step 1:

Make sure that the discharge ports are plugged with valve plugs FVP1B06, to avoid loss of agent in case of an accidental discharge when pressurising.



Step 2:

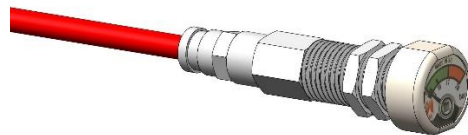
Make sure that the ball valve on the cylinder valve is closed.

Read and write down the value of pressure from the pressure gauge on the cylinder valve.



Step 3:

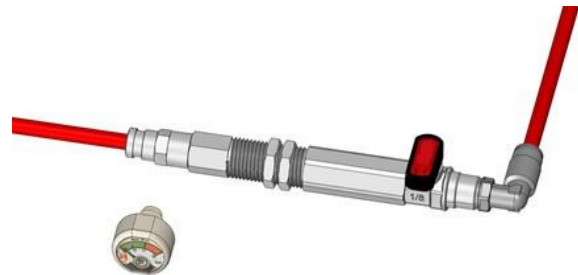
If installed, remove the pressure gauge (pressure switch or transducer) from the end-of-line adapter AEA006 at the end of the BlazeTube.



Step 4:

Make sure the ball valve on the charging adapter is closed.

Mount by hand the charging adapter ATC001 to the end-of-line adapter's M10x1 port by rotating clockwise. Hold the end-of-line adapter to push counter-clockwise while tightening. Tighten the charging adapter properly.



Step 5:

Set the regulator on the source of N₂ to the value at least on the level of pressure in the cylinder increased by 1 bar. For pressure filling values at different temperatures refer to

AUTOMATIC FIRE SUPPRESSION SYSTEMS



[Table 15](#)
[Table 16](#).

15

or

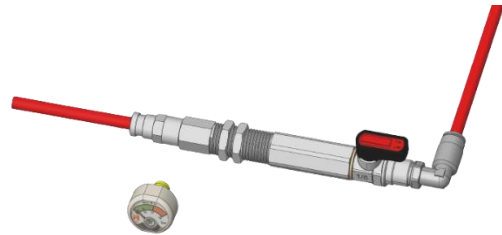
Open the regulator valve.



Step 6:

Slowly open the ball valve of the charging adapter and pressurise the BlazeTube detection first.

During pressurisation hissing can be heard. When the sound stops, pressurisation is finished. Keep the ball valve open for at least 30 seconds to stabilize the pressure in the BlazeTube detection.



Step 7 (skip if pressurising only the BlazeTube):

Slowly open the ball valve on the cylinder valve and pressurise the cylinder.

During pressurisation hissing can be heard. When the hissing stops, keep the valve open for at least 30 seconds to stabilize the pressure.

Close the ball valve on the cylinder valve, shake the cylinder several times and repeat **Step 7** until the pressure stabilises at the desired value.



Step 8 (skip if pressurising only the BlazeTube):

Close the ball valve on the cylinder valve.



Step 9:

Close the ball valve on the charging adapter.

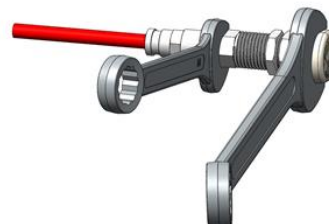
Step 10:

Unscrew the charging adapter from the M10x1 port of the end-of-line adapter (with size 16 spanner). You can use size 14 spanner on the valve adapter to push clockwise while unscrewing the charging adapter.



Step 11:

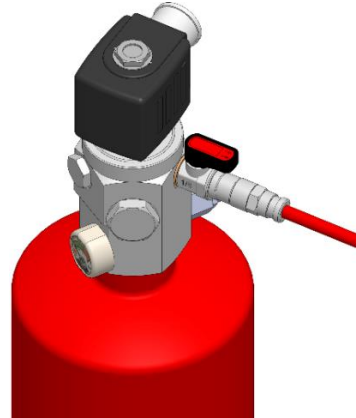
Mount the pressure gauge (pressure switch or transducer) back. Tighten it with spanner 22 mm.



Step 12:

If the pressure is not decreasing, very slowly open the ball valve on the cylinder valve. Pressures in the tube and the cylinder will equalise. Wait approximately 30 seconds.

Follow additional steps from Chapter [8.5.3](#).



Since this moment, the cylinder and the BlazeTube detection are connected in one pressure unit. Proceed carefully not to damage the BlazeTube detection. Its damage would cause activation of the system and release of extinguishing agent.



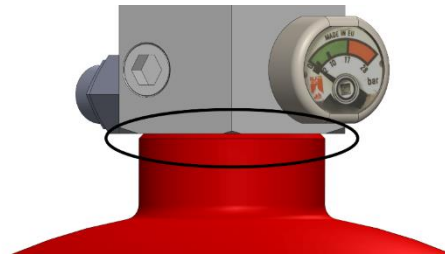
Do not try to remove the BlazeTube detection from the BlazeTube outlet on the cylinder valve or remove the end-of-line adapter if the BlazeTube is under pressure and the ball valve is open.



Fast and careless opening of the ball valve may activate the system and release extinguishing agent.

8.5.3 ADDITIONAL STEPS AFTER PRESSURISATION

Observe the value on the cylinder valve's pressure gauge and check the system components for leaks right away and after 30 minutes. If pressure is decreasing, the BlazeTube detection may not be connected properly or some component may not be mounted tightly. Also check the connection between the cylinder neck ring and the cylinder valve using a foaming solution. Observe if no bubbles are formed due to loss of pressure through the connection.



Connection between the cylinder neck ring and the valve

IMPORTANT!

Never install the cylinder assembly if any leak is detected!

8.6 FINAL INSPECTION OF THE SYSTEM INSTALLATION

Fill-out the Supporting Document *SD-CRILP Commissioning-Installation Report C Series ILP*.

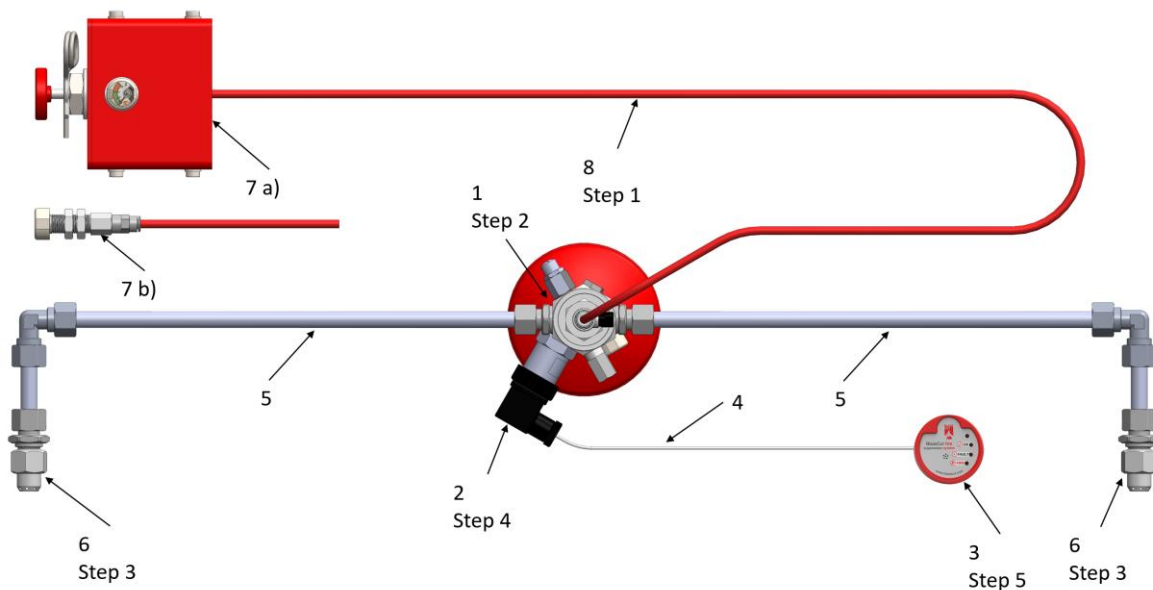
9 OPERATION OF BLAZECUT SYSTEM IN CASE OF FIRE

BlazeCut system is designed to protect closed spaces from fire using volume fire suppression applying clean extinguishing agent. BlazeCut system suppresses fire automatically without any external power source (LOP principle) or through electronic activation (LHD BlazeWire, detectors etc.).

Below is description of operating using BlazeTube detection, but the principle of operation is the same also with electronic activation through LHD BlazeWire, detectors etc.

9.1.1 OPERATION OF SYSTEMS USING VALVE TYPE 20X WITHOUT THE SOLENOID

Procedure during automatic activation of the system is described in figure below.



Procedure during automatic activation of the system

1. Cylinder valve (view from above)
2. Pressure Switch/Transducer with a cable connector
3. *External device (e.g., Alarm Panel AAP210)
4. Electrical cables
5. Extinguisher distribution network
 - a) steel tubing and fittings
 - b) Fire hose and fittings
 - c) combination of steel tubing and Fire hoses, fittings
6. Nozzles
7. End-of-line device
 - a) pneumatic remote actuator
 - b) End-of-line connector with a manometer
 - c) cylinder without a solenoid – valve type 20x
 - d) cylinder with a solenoid – valve type 21x-01
8. BlazeTube detection

Step 1: BlazeTube detection (8.) detects fire

Step 2: Piston of the cylinder valve (1.) opens as a result of decrease of pressure in the BlazeTube detection (8.)

Step 3: Release of the extinguishing agent through nozzles (6.)

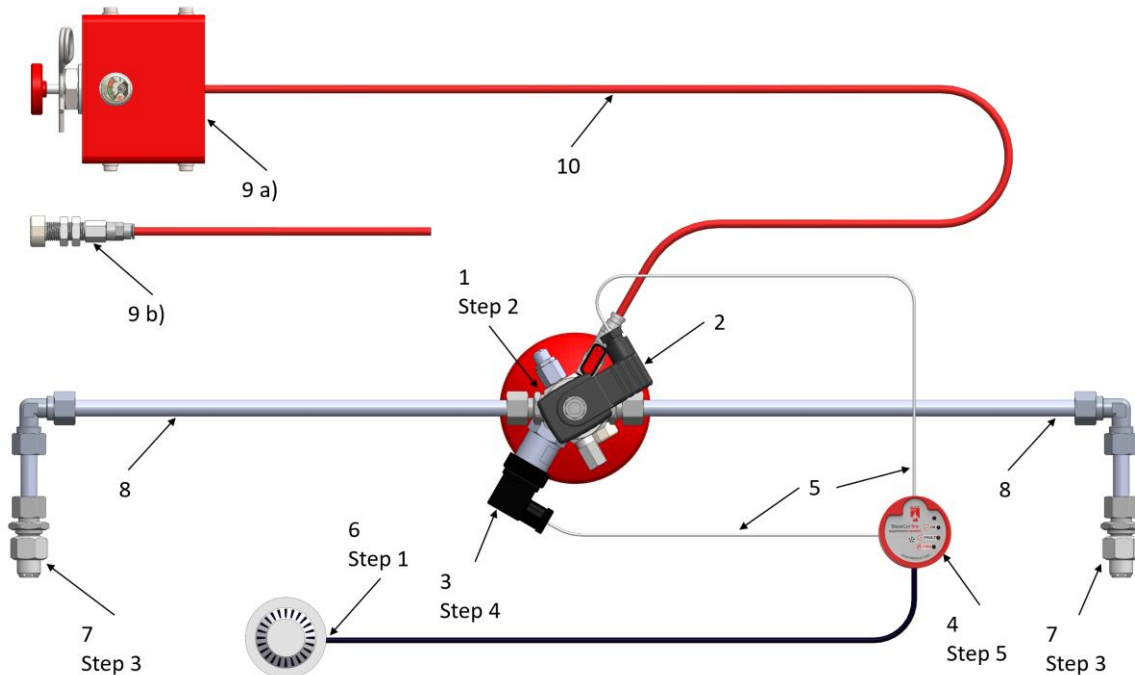
Step 4: * The Pressure Switch/Transducer sends signal to the external device after fire or decrease of pressure in the system

Step 5: * External device makes the operation

*Applicable only when the Pressure Switch/Transducer is installed.

The system can be activated manually using a remote pneumatic actuator.

9.1.2 OPERATION OF SYSTEMS USING VALVE TYPE 211 AND 212 WITH A SOLENOID – CPO21X



Procedure during automatic activation of the system with valve type 21x-01

1. Cylinder valve (view from above)
2. Solenoid with a cable connector
3. Pressure Switch/Transducer with a cable connector
4. **External device (e.g., Alarm Panel AAP210)
5. Electrical cables
6. Fire detection device – heat/smoke detector and electrical cable
7. Nozzles
8. Extinguisher distribution network
 - a) steel tubing and fittings
 - b) Fire hose and fittings
 - c) combination of steel tubing and Fire hoses, fittings
9. End-of-line device
 - a) pneumatic remote actuator
 - b) End-of-line connector with a manometer
 - c) cylinder without a solenoid – valve type 20x
10. BlazeTube detection

Step 1: Fire detection device (6.) detects fire

Step 2: Piston of the cylinder valve (1.) opens as a result of electric signal to the solenoid (2.)

Step 3: Release of the extinguishing agent through nozzles (7.)

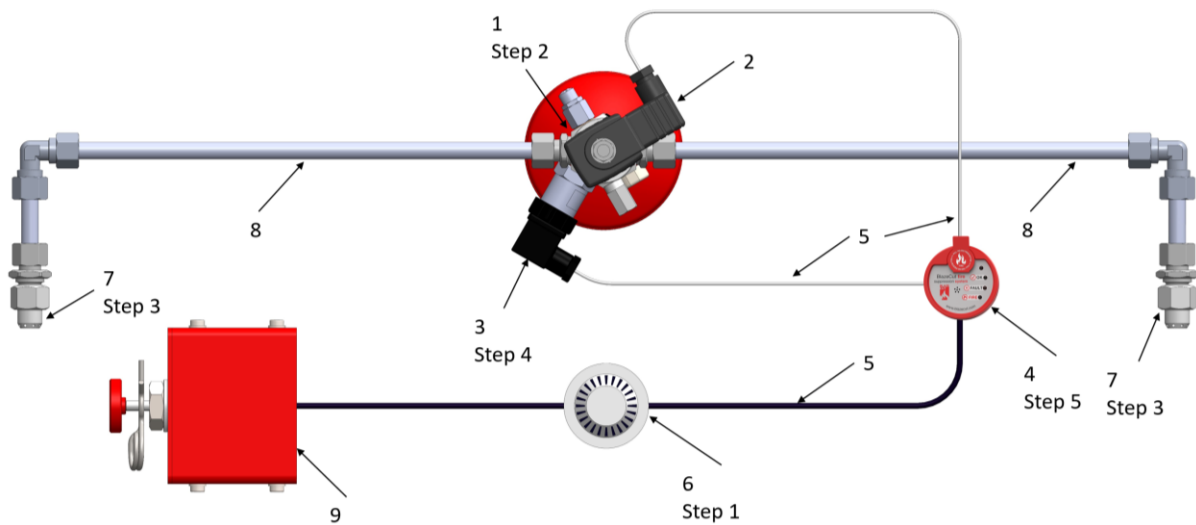
Step 4: * The Pressure Switch/Transducer sends signal to the external device after fire or decrease of pressure in the system

Step 5: ** External device makes the operation

*Applicable only when the Pressure Switch/Transducer is installed.

**External device described on the pictures above shall not be only one device but also separate independent devices.

The system can be activated manually using a remote pneumatic actuator or a solenoid connected to an external device - e.g., Alarm Panel AAP210.



Procedure during manual activation of the system with valve type 21x-30

1. Cylinder valve (view from above)
2. Solenoid with a cable connector
3. Pressure Switch/Transducer with a cable connector
4. **External device (e.g., Alarm Panel AAP210)
5. Electrical cables
6. Fire detection device – BlazeWire and end-of-line resistor
7. Nozzles
8. Extinguisher distribution network
 - a) steel tubing and fittings
 - b) Fire hose and fittings
 - c) combination of steel tubing and Fire hose, fittings
9. Electric remote actuator

Step 1: Fire detection device (6.) detects fire

Step 2: Piston of the cylinder valve (1.) opens as a result of electric signal to the solenoid (2.)

Step 3: Release of the extinguishing agent through nozzles (7.)

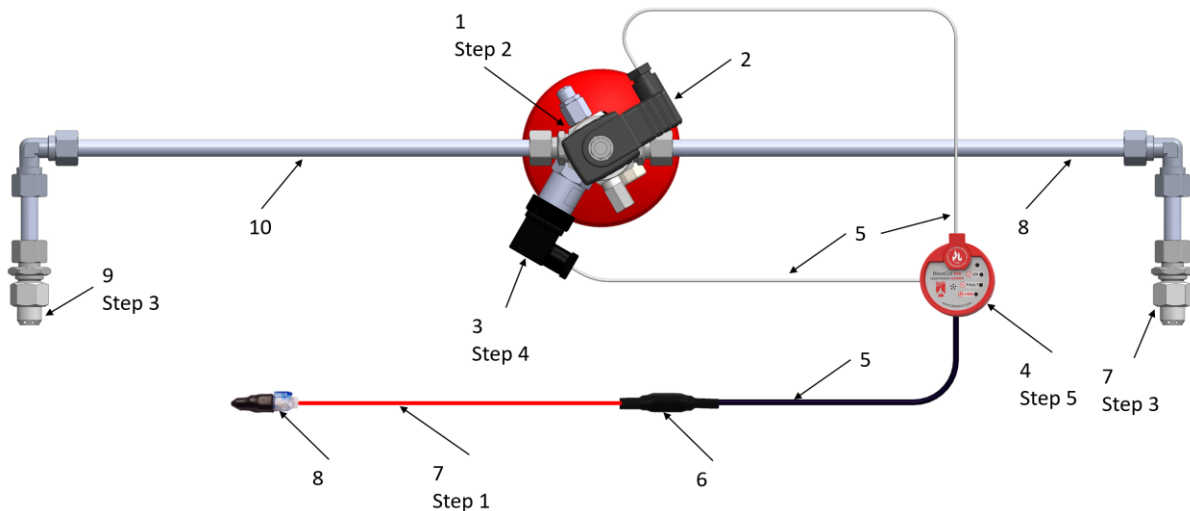
Step 4: * The Pressure Switch/Transducer sends signal to the external device after fire or decrease of pressure in the system

Step 5: ** External device makes the operation

*Applicable only when the Pressure Switch/Transducer is installed.

**External device described on the pictures above shall not be only one device but also separate independent devices.

The system can be activated manually using solenoid connected to an external device e.g., Alarm Panel AAP211, remote electric actuator.



Procedure during manual activation of the system with valve type 21x-30

1. Cylinder valve (view from above)
2. Solenoid with a cable connector
3. Pressure Switch/Transducer with a cable connector
4. **External device (e.g., Alarm Panel AAP211)
5. Electrical cables
6. Electrical splice
7. Fire detection device – BlazeWire
8. End-of-line resistor
9. Nozzles
10. Extinguisher distribution network
 - a) steel tubing and fittings
 - b) Fire hose and fittings
 - c) combination of steel tubing and Fire hose, fittings

Step 1: Fire detection device (7.) detects fire

Step 2: Piston of the cylinder valve (1.) opens as a result of electric signal to the solenoid (2.)

Step 3: Release of the extinguishing agent through nozzles (9.)

Step 4: * The Pressure Switch/Transducer sends signal to the external device after fire or decrease of pressure in the system

Step 5: ** External device makes the operation

*Applicable only when the Pressure Switch/Transducer is installed.

**External device described on the pictures above shall not be only one device but also separate independent devices.

The system can be activated manually using solenoid connected to an external device e.g., Alarm Panel AAP211, remote electric actuator.

9.1.3 WARNINGS



Do not manually activate the system without reason. Use manual activation only in case of reasonable suspicion of fire in the protected enclosure.



Do not manually activate the system if persons are present in the protected enclosures.



In case of fire the system activates automatically without previous warning. Do not come to immediate proximity of the nozzles of the system in case of fire, there is risk of being struck by extinguishing agent.



If the system is activated wait for its activity to finish. Do not enter the protected enclosures and do not open the covers of the protected enclosure during the activity of the system.



In case of fire in the vehicle the driver must immediately stop the vehicle, stop the engine of the vehicle and perform further measures according to operation instructions of the vehicle (for example cut-off the supply of gas/fuel) in order to protect the persons and property according to applicable legislation.

10 REGULAR INSPECTION AND MAINTENANCE OF THE FIRE SUPPRESSION SYSTEM



Pressure configuration of the system is reserved technical equipment under pressure. Its activation and operation is subject to professional inspections and tests performed by revision technician according to applicable legislation. Operator is obliged to have inspections of safety condition of the equipment performed and immediately remove defects detected.



Always follow local legislation and statutory requirements.



All inspections (except daily operator's checks) and repairs, whether during regular maintenance or in exceptional situation, must be performed by a person authorized and trained by the manufacturer and depending on the procedure with corresponding professional qualification to ensure correct operation of the fire suppression system.

Required system inspection and maintenance must be followed to ensure long term, reliable and safe operation of the BlazeCut system.

Inspection and test intervals stated in [Table 74](#) are minimum intervals required by the manufacturer. If the legislation in place of installation requires shorter intervals as stated in the table or additional inspections and tests, which are not stated in the table, it is necessary that these inspections are performed in accordance with this legislation. Additionally, if the environment where the system is installed is harsh, the system may require inspections every 3-6 months due to possible damage that may occur.

Table 74: Overview of inspections

Period / interval	Obligatory scope
Daily operator's check	<ol style="list-style-type: none"> 1. Check system pressure 2. Fire Alarm Panel check (if used) 3. Ensure actuators are undamaged and tamper seals are in place and in good condition (if used) 4. Visual inspection of the system: check for loose and/or damage to cylinder assembly, hoses, brackets, nozzles, detection, etc.
1 x 12 months	<ol style="list-style-type: none"> 1. Overall inspection of the system 2. Inspection of pressure in the system
1 x 5 years	<ol style="list-style-type: none"> 1. Overall inspection of the system
1 x 10 years	<ol style="list-style-type: none"> 1. Overall inspection of the system 2. Pressure test of the cylinder 3. Service of the cylinder valve (see technical bulletin <i>TB-OIV-EN Overhaul for ILP Valves</i>) 4. Replacement of BlazeTube detection (if used)
In special incident	<ol style="list-style-type: none"> 1. Overall inspection of the system 2. Inspection of pressure in the system
As necessary	<ol style="list-style-type: none"> 1. Inspection of weight of extinguishing agent in the system 2. Inspection with the detection device for the inspection of leaks of HFC gases* 3. Pressurisation of the system 4. Replacement of wear and tear parts

*only for systems CEA(20x, 211, 212,) with HFC-227ea

IMPORTANT!

If any deficiencies are found, appropriate corrective action shall be taken immediately!

Inspection must be performed also after each exceptional circumstance (e.g., accidental activation, exposure to mechanical or excessive thermal stress for example in case of fire without activation of the system).

In case of performing exceptional inspection, the 12-month period to perform the next regular inspection starts only when exceptional inspection was performed in full scope.

Regular replacement of components subject to wear and tear (effects of temperature, pressure and environment) is also necessary in BlazeCut system.

If necessary inspection of leaks of HFC gas used in BlazeCut system (Chapter [6.7](#)), only for systems CEA (20x, 211, 212,) using HFC-227ea gas, pressurisation of the system (Chapter [10.4](#)) or inspection of weight of extinguishing agent in the system (Chapter [10.3](#)) is performed.

IMPORTANT!

Agents removed from containers during service or maintenance procedures shall be recovered and recycled or disposed of in accordance with any applicable laws and regulations.

10.1 INSPECTION OF THE SYSTEM INSTALLATION

10.1.1 GENERAL RULES

The pressure of the system is inspected by control pressure gauge situated on the cylinder valve or on the end-of-line adapter. If both pressure gauges are installed use the most accessible pressure gauge.

During inspection of pressure, the ball valve on the cylinder valve must be open to inspect pressure in the system correctly (like during regular operation of the system). During inspection, the system cannot be heated (e.g., during operation of the protected enclosure) and exposed to a direct sunlight.

10.1.2 DAILY OPERATOR PRESSURE CHECK

Read the pressure gauge. If the pressure is within the green zone, the system is operational. If the pressure indicator is in the red zone, contact the service technician.



Pressure level is optimal



Pressure level is critical

If the system is using a Pressure Switch APS001-xx, APS003-xx for monitoring of low pressure or a Pressure Transducer ATA100 for constant monitoring with the AAP210 or AAP211 panel, the visual check of pressure gauge is not necessary as the alarm panel will notify the operator by warning light and buzzer on the panel, in case of low pressure.

10.1.3 12-MONTH PRESSURE INSPECTION



When mounting and unmounting the pressure gauge or control pressure gauge to the end-of-line device the ball valve of the outlet of the BlazeTube detection must be always closed.

During inspection proceed as follows:

- Read pressure on pressure gauge (on the cylinder valve or end-of-line adapter) and remove it.
- Measure pressure by installing control pressure gauge (with adapter compatible with outlet M10x1) and compare detected value with data from the pressure gauge of the system. Values must be equal, permissible tolerance of pressure is maximum 1 bar. In case of discrepancy replace the pressure gauge of the system.
- If the control pressure gauge detects pressure in the system lower by more than 10 % than the required value of pressure, taking into consideration temperature (see Chapter [4.1](#)), perform the pressurisation of the system and proceed according to Chapter [10.4](#).

If the control pressure gauge detects pressure in the system lower by more than 20 % than the required value of pressure, taking into consideration temperature (see Chapter [4.1](#)), it is possible that the system is not tight.

Proceed as follows:

- Perform inspection for leak of extinguishing agent with detection device for the inspection of leaks of HFC gas used in BlazeCut system and proceed according to Chapter [6.7](#), only for systems CEA(20x, 211, 212) using HFC-227ea gas.
- Perform inspection of the amount of extinguishing agent in the system by weighting the cylinder, proceed according to Chapter [10.3](#).

10.2 BASIC POINTS OF INSPECTION FOR THE SYSTEM

- Check completeness of the system,
- Clean the surface of the cylinder and the cylinder valve, tubes/hoses, pressure gauges from major dirt,
- Check surface of the cylinder, focus on possible changes in shape of the cylinder, mechanical damage, signs of corrosion, signs of leak, etc.,
- Check firmness of the connection of the discharge network, check correct tightening of the fittings with a spanner,
- Check firmness of the connection of the BlazeTube detection by gently pulling the tube,
- Check that the discharge network is not damaged, focus on possible change of shape, colour, dents, damage caused by temperature or mechanical damage,
- Check firmness of the fastening of the cylinder in the bracket, check the fastenings of the hoses/tubes, of the nozzles, firmness of the fastening of the electrical installation, check firmness of the mounting of the cable connectors depending on installed components (the solenoid, the pressure switch/transducer, the alarm panel etc.),
- Force air through the discharge line to ensure all delivery lines are clear,
- Manual actuators – check actuator housing for damage & security, condition of indicator gauge if fitted,
- Electronic system – check condition of BlazeWire and supports,
- Clean and check that all corresponding labelling of the system and warning labels marking the area protected by BlazeCut system are undamaged.

Remove detected defects immediately. During replacement of components and reconnecting the hoses/tubes, the electrical installation and during pressurisation of the system proceed in accordance with the procedures described in Chapter [12](#).

10.3 INSPECTION OF WEIGHT OF EXTINGUISHING AGENT IN SYSTEM

Inspection of weight of extinguishing agent in the system is performed:

- If the control pressure gauge detects pressure in the system lower by more than 20% than the required value of pressure, taking into consideration temperature (see Chapter [4.1](#)),
- If leak is detected by the detection device for the inspection of leaks of HFC gas used in BlazeCut system during operation of the system (if the inspection is performed, see Chapter [6.7](#), only for systems CEA(20x, 211, 212) using HFC-227ea gas.

During inspection of the amount of extinguishing agent in the system by weighting the cylinder with the valve must be removed from the system, proceed according to Chapter [12.3](#).

If decrease of weight of extinguishing agent by more than 5 % is detected when weighting the cylinder or leak is detected, the cylinder must be replaced.

Decrease of weight of extinguishing agent can be calculated according to the formula:

$$P = \left(\frac{M_1 - M_2}{M_3} \right) 100\%$$

P – decrease of weight of extinguishing agent in percent [%]

M_1 – weight of the cylinder and valve including extinguishing agent* [kg], $M_1 = M + M_3$

M_2 – weight of the cylinder and valve including extinguishing agent detected by weighing [kg]

M_3 – amount of extinguishing agent [kg], amount of extinguishing agent is marked on label of the cylinder (see Chapter [4.1](#))

Table 75: Weight of empty systems C(EA, FK)(20x, 211, 212)

Volume of a cylinder [L]	Valve	M* [kg]
1.2	20x	2.03
	211, 212	2.31
2.4	20x	2.61
	211, 212	2.89
5.0	20x	3.52
	211, 212	3.80
7.8	20x	4.42
	211, 212	4.70
13.0	20x	6.32
	211, 212	6.60
16.0	20x	8.32
	211, 212	8.60

*weight of a cylinder, dip tube, valve without the extinguishing agent, valve plugs and Pressure Switch/Transducer, tolerance ± 0.05 kg

If the detected decrease of weight is not more than 5 %, install the cylinder back, proceed according to Chapter [12.3](#).

10.4 PRESSURISATION OF THE SYSTEM DURING MAINTENANCE

During the operation of the system there is always a natural slight pressure leak in the system. The leak occurs on the BlazeTube connectors and through the BlazeTube detection itself due to permeability of the material. The operation conditions and the size of the cylinder also influence the pressure decrease. Therefore, it is necessary to pressurise the system occasionally if the pressure decrease is more than 10 %.

During pressurisation of the system during maintenance the cylinder is also pressurised as opposed to pressurising only the BlazeTube detection during installation.

Pressurisation is performed through the end-of-line adapter of the BlazeTube detection. The BlazeTube detection end-of-line adapter has outlet with thread M10x1 and it contains a Schrader valve, which must be pushed and opened with the charging adapter. This valve closes and opens automatically during removal or installation of the charging adapter.

For valves 201, 202, 207, 211 and 212 follow steps in Chapter [8.5](#).

For multiple cylinder configurations (MCC), follow steps in Chapter [10.4.1](#).

If your system uses pneumatic remote actuator (ARA010 or ARA020), you can also pressurise the system following procedures in the corresponding Annex.

10.4.1 SYSTEMS WITH BLAZETUBE – VALVES 201, 202, 203, 207

Use the charging adapter ATC001 with swivel neck. Procedure of pressurisation using end-of-line adapters AEA006 is shown in figures below.



Proceed carefully and strictly follow the following steps. Fasten the connectors of the tubes, charging adapter and BlazeTube detection firmly and inspect. Their accidental disconnecting during pressurisation would release the extinguishing agent into the system.



Due to risk of activation during pressurisation of the system it is necessary to seal the outlets of the discharge networks on the valve. Remove the discharge networks and seal the outlets with the G3/8" valve plugs.

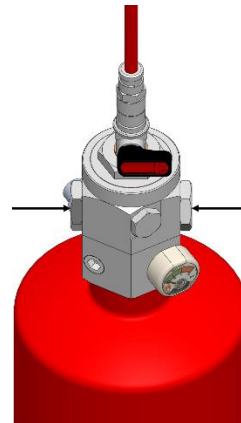


Never connect or disconnect the charging adapter to the BlazeTube detection if the ball valve of the outlet of the BlazeTube detection on the cylinder valve is open.

Step 1:

Make sure that the discharge ports are plugged with valve plugs FVP1B06, to avoid loss of agent in case of an accidental discharge when pressurising.

For MCC: Make sure **Step 1** is carried out on all cylinders.

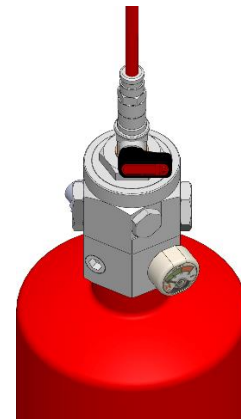


Step 2:

Make sure that the ball valve on the cylinder valve is closed.

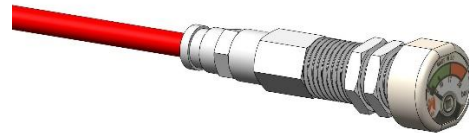
Read and write down the value of pressure from the pressure gauge on the cylinder valve.

For MCC: Make sure **Step 2** is carried out on all cylinders and pressure in all cylinders is the same.



Step 3:

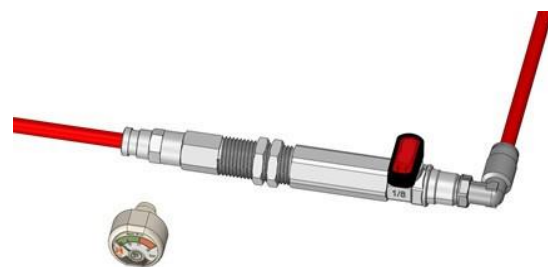
If installed, remove the pressure gauge (pressure switch or transducer) from the end-of-line adapter AEA006 at the end of the BlazeTube.



Step 4:

Make sure the ball valve on the charging adapter is closed.

Mount by hand the charging adapter ATC001 to the end-of-line adapter's M10x1 port by rotating clockwise. Hold the end-of-line adapter to push counter-clockwise while tightening. Tighten the charging adapter properly.



Step 5:

Set the regulator on the source of N₂ to the value at least on the level of pressure in the cylinder increased by 1 bar. For pressure filling values at different temperatures refer to

AUTOMATIC FIRE SUPPRESSION SYSTEMS



[Table](#)
[Table 16.](#)

15

or

Open the regulator valve.



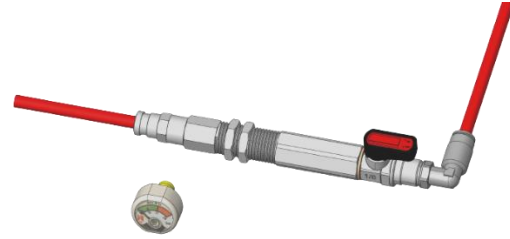
AUTOMATIC FIRE SUPPRESSION SYSTEMS



Step 6:

Slowly open the ball valve of the charging adapter and pressurise the BlazeTube detection first.

During pressurisation hissing can be heard. When the sound stops, pressurisation is finished. Keep the ball valve open for at least 30 seconds to stabilize the pressure in the BlazeTube detection.

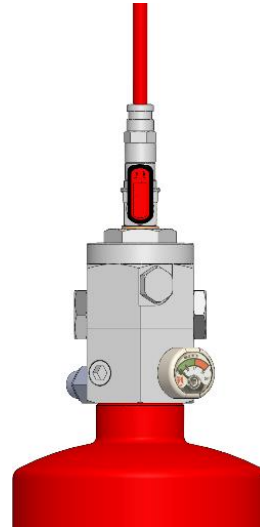


Always open the regulation valve and ball valve of the charging adapter and pressurise the BlazeTube detection first.

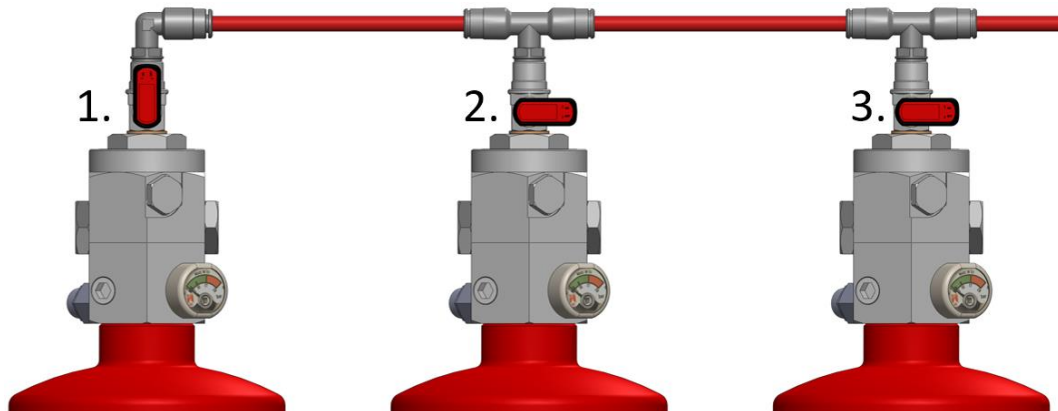
Step 7:

Slowly open the ball valve on the cylinder valve and pressurise the cylinder.

During pressurisation hissing can be heard. When the hissing stops, keep the valve open for at least 30 seconds to stabilize the pressure.



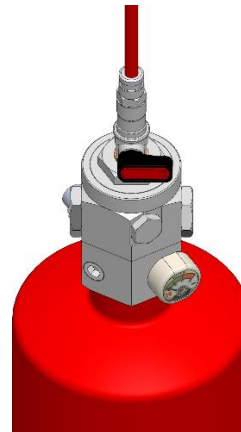
For MCC: On the furthest cylinder (1.), open the ball valve on the cylinder valve and follow **Step 7**. Leave the valve open and repeat **Step 7** with cylinder 2. and so on, until all the cylinders are pressurised.



Step 8:

Close the ball valve on the cylinder valve.

For MCC: Close the ball valve on all the cylinder valves.



Step 9:

Close the ball valve on the charging adapter.

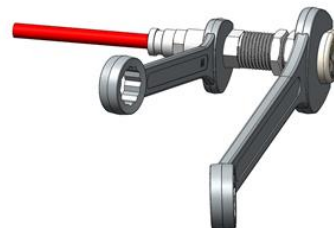
Step 10:

Unscrew the charging adapter from the M10x1 port of the end-of-line adapter (with size 16 spanner). You can use size 14 spanner on the valve adapter to push clockwise while unscrewing the charging adapter.



Step 11:

Mount the pressure gauge (pressure switch or transducer) back. Tighten it with spanner 22 mm.

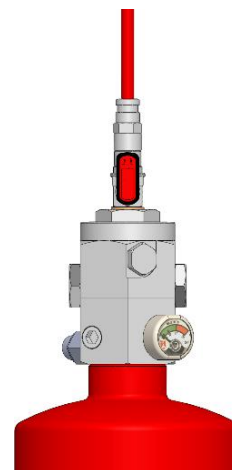


Step 12:

If the pressure is not decreasing, very slowly open the ball valve on the cylinder valve. Pressures in the tube and the cylinder will equalise. Wait approximately 30 seconds.

For MCC: Open the ball valve on all the cylinder valves.

Follow additional steps from Chapter [10.4.3](#).



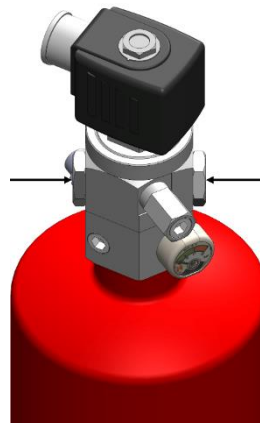
10.4.2 SYSTEMS WITHOUT BLAZETUBE – VALVES 211-30 AND 212-30

IMPORTANT!

Always charge the cylinder through the valve adapter's M10x1 port.

Step 1:

Make sure that the discharge ports are plugged with valve plugs FVP1B06, to avoid loss of agent in case of an accidental discharge when pressurising.



Step 2:

Remove the pressure switch, transducer or M10x1 plug FVP1M10 from the valve adapter FVABM0210 using a size 4 hex key.



Step 3:

Make sure the ball valve on the charging adapter is closed.

Mount the charging adapter ATC001 to the valve adapter's M10x1 port by rotating clockwise. Tighten the charging adapter properly.



Step 4:

Set the regulator on the source of N₂ to the value at least on the level of pressure in the cylinder increased by 1 bar. For pressure filling values at different temperatures refer to

AUTOMATIC FIRE SUPPRESSION SYSTEMS



[Table](#)
[Table 16.](#)

15

or

Open the regulator valve.



AUTOMATIC FIRE SUPPRESSION SYSTEMS



Step 5:

Slowly open the ball valve on the charging adapter and pressurise the cylinder.

During pressurisation hissing can be heard. When the hissing stops, keep the valve open for at least 30 seconds to stabilize the pressure.

When pressurising an unpressurised cylinder, close the ball valve on the charging adapter, shake the cylinder several times and repeat Step 5 until the pressure stabilises at the desired value.



Step 6:

Close the ball valve on the charging adapter.



Step 7:

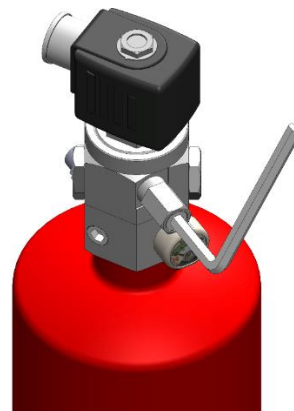
Unscrew the charging adapter from the M10x1 port of the valve adapter FVABM0210 (with size 16 spanner). You can use size 14 spanner on the valve adapter to push clockwise while unscrewing the charging adapter.



Step 8:

Screw in the M10x1 plug FVP1M10 and tighten it using a size 4 hex key.

Follow additional steps from Chapter [10.4.3](#).

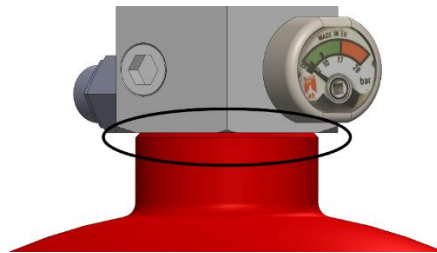


10.4.3 ADDITIONAL STEPS AFTER PRESSURISATION

Observe the value on the cylinder valve's pressure gauge and check the system components for leaks right away and after 30 minutes. If pressure is decreasing, some component may not be mounted tightly. Also check the connection between the cylinder neck ring and the cylinder valve using a foaming solution. Observe if no bubbles are formed due to loss of pressure through the connection.

IMPORTANT!

Never install the cylinder assembly if the connection is not tight!



Connection between the cylinder neck ring and the valve

11 SYSTEM DEACTIVATION AND REMOVAL

11.1 SYSTEM DEACTIVATION

If necessary, BlazeCut system may be disabled without removing it from of the protected enclosure. Disabling is possible as follows:

11.1.1 DISAMBLEMENT OF THE BLAZETUBE DETECTION (AUTOMATIC ACTIVATION):

Close the ball valve on the cylinder valve. In this case even after damaging the tube the cylinder valve does not open and extinguishing agent is not released. However, it remains possible to activate the system manually from the external device (e.g., AAP211 alarm panel) using solenoid.

11.1.2 DISAMBLEMENT OF ACTIVATION FROM EXTERNAL DEVICE – ONLY FOR SYSTEMS WITH THE VALVE TYPE 211 AND 212 WITH SOLENOID: C(EA, FK)(211, 212)

Disconnect the cable connector from the solenoid on the cylinder valve. Protect uncovered electrical connectors from dirt (e.g., by insulation tape). All electrical detection (LHD BlazeWire or detectors) and electrical manual activation is now disabled. In this case automatic activation using the BlazeTube detection remain active.

11.1.3 TOTAL DISAMBLEMENT OF THE SYSTEM

Disable the BlazeTube detection and solenoid. The system cannot be activated.

11.2 REMOVAL OF THE SYSTEM FROM SERVICE

The system must be immediately put out of service in the following cases:

- The system has been used or emptied for other reason.
- The system has been exposed to direct flame or temperatures exceeding the limits of the system operation.
- The cylinder or valve shows signs of damage (deformation, cracks, leaks, severe corrosion, unusual phenomena that cannot be inspected or removed during operation of the system).
- If the pressure in the system is significantly higher with the respect to the ambient temperature or if it exceeds the highest permissible pressure level of the system.

Subsequent measures to ensure safety of the system and protection of persons must be taken by the persons trained and authorized by the manufacturer and, depending on the procedure, with corresponding professional qualification. If necessary, contact your supplier of the BlazeCut system.

12 REPLACEMENT OF COMPONENTS AND RESTORATION OF ACTIVITY

When replacing components and restoring system activity, also follow instruction from other chapters stated in this manual.

12.1 CLEANING THE SYSTEM



During cleaning process always wear appropriate protective glasses, breathing mask and suitable protective gloves and clothes.

During maintenance of BlazeCut system clean the surface of the cylinder, the cylinder valve and the tubes from major dirt with pressurised air and/or an appropriate cleaning textiles or cloths and nonaggressive cleaning products. Do not use aggressive cleaning products such as solvents and caustics to clean the system.

Do not expose the system and especially its electronic parts to direct effect of water pressure during cleaning of the protected enclosure with high-pressure water.

12.2 RESTORATION OF ACTIVITY OF BLAZECUT SYSTEM IN CASE OF FIRE



Install and use BlazeCut system only with original supplied components. Do not replace anything in the system; use only original component and spare components. Using components not approved by the manufacturer causes loss of warranty, may cause malfunction of the system and presents danger to life and health of persons.



The system may be installed, maintained and repaired only by persons trained or authorized by the manufacturer and depending on procedure also with relevant professional qualification. Unprofessional interference with the system may cause malfunction of the system and presents danger to safety and health of people.

After using the system in case of fire it is not necessary to clean the protected enclosure from extinguishing agent. Extinguishing agent does not leave residue. Ventilate the protected enclosure properly, do not interfere with or work in the area before ventilation.

After the fire extinguishing is finished, observe the following instructions:

- Enter the protected area only after the system operation is finished.
- Unless absolutely necessary (e.g., fire is still present and it is necessary to use a portable fire extinguisher), enter the protected area only after it has been properly ventilated and cooled off and make sure that entry is safe.
- If immediate entry is necessary, persons must be properly protected (using self-contained breathing apparatus, protective clothing, etc.).

If the system is automatically activated in case of fire in the protected enclosure, it is necessary to replace several components. Proceed as follows:

- Check all components of the system for any damage. Any part that was exposed to direct fire or temperature above maximum operating temperature of the component shall be replaced,
- Replace the cylinder with extinguishing agent – it is possible to replace the cylinder assembly (cylinder, extinguishing agent, valve) or only cylinder with extinguishing agent and use old valve that needs to be serviced according to Technical Bulletins *TB-OIV Overhaul for ILP Valves* – ask the BlazeCut system supplier for refilled cylinder or refilled cylinder assembly. Proceed according to Chapter [12.3](#) of this Manual,
- Replace the detection (BlazeTube or BlazeWire) if the reason for system activation was detection of fire through this detection system – BlazeTube detection is replaced always in whole length (proceed according to Chapter [12.4](#) of this Manual; BlazeWire must be replaced at least 3 meters on each side of the detection point or damaged part,
- Force air through the discharge line to ensure all delivery lines are clear,
- Check if electrical installation was not damaged, replace possible damaged parts,
- Clean all components from the foam and dirt caused by the fire,

- When all components are checked, cleaned and replaced connect the cable connectors to the Pressure Switch/Transducer or solenoid and check correct functioning of the electrical installation.

During installation of new components or their replacement and during repeatedly connecting the tubes/hoses, electrical installation and pressurisation of the system proceed according to instruction in respective Chapters.

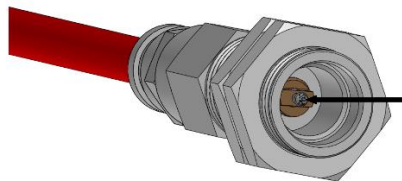
Proceed likewise in case of manual activation of the system or accidental activation of the system for other reasons.

12.3 REPLACEMENT OF THE CYLINDER

During replacement use only undamaged cylinder filled with the correct extinguishing agent, properly labelled, with correctly mounted cylinder valve. Cylinder assemblies can be supplied pressurised or unpressurised, depending on agent used or customer request. Check for pressure in the cylinder with the pressure gauge mounted on the cylinder valve. Pressures corresponding to actual temperature are stated in Chapter [4.1](#).

During replacement of the cylinder proceed as follows:

1. Close the ball valve on the cylinder valve of the old cylinder assembly. Disconnect cable connectors on the Pressure Switch/Transducer and solenoid, if used in the system and remove the Pressure Switch/Transducer.
2. If the BlazeTube detection is under pressure, remove the pressure gauge (pressure switch or transducer) from the end-of-line adapter AEA006 at the end of the BlazeTube, if installed. Push in the Schrader valve inside the end-of-line adapter to release the pressure from the BlazeTube.



Schrader valve inside the end-of-line adapter

3. Disconnect the BlazeTube detection and the distribution tubes/hoses.
4. Loosen the clamps of the bracket of the cylinder and remove it from the bracket.
5. Place a new cylinder assembly into the bracket and fasten properly with clamps.
6. Connect the BlazeTube detection, the distribution tubes/hoses on the cylinder valve, install the Pressure Switch/Transducer and connect the cable connector, if used in the system and connect the cable connectors of the electrical components.
7. If the removed cylinder assembly is under pressure, seal both outlets of distribution tubes with thread G3/8" with corresponding valve plugs.

After replacement of the cylinder have corresponding safety inspection of the pressure device performed according to Chapter [10](#).

After replacement of the cylinder with HFC gas, corresponding inspection and measures to prevent leak of HFC gas according to Chapter [6.7](#) have to be performed.

During removal and installation of individual components proceed according to the instructions as stated in individual Chapters relating to components.

12.4 REPLACEMENT OF THE BLAZETUBE DETECTION



Do not try to remove the BlazeTube detection from the cylinder valve when the tube is under pressure and the ball valve on the cylinder valve is open.

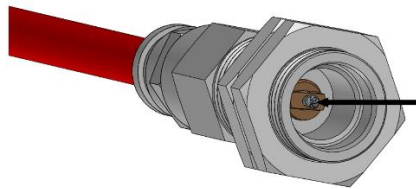


Before handling the BlazeTube detection during removal, replacement or adjustment fastening in the protected enclosure always close the ball valve on the cylinder valve where the tube is fastened. When the BlazeTube detection is connected to the cylinder valve and the ball valve is open, if the tube is damaged and the pressure decreases, the fire suppression system is always activated and the extinguishing agent is released completely.



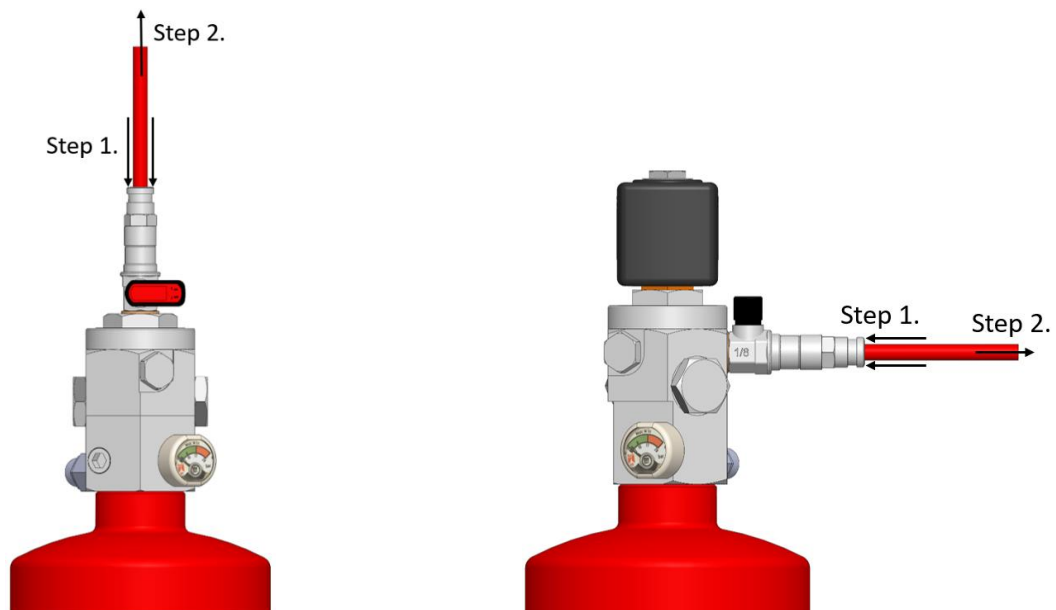
During disconnection of the BlazeTube detection under pressure a pressure is released and if the system was in operation also small amount of agent is released. In such case always wear appropriate protective glasses with side-shields and suitable protective gloves. Aim the BlazeTube detection always apart. Make sure not to interpose any other person.

1. Close the ball valve on the cylinder valve, position of the lever as shown on figure below.
2. If the BlazeTube detection is under pressure, remove the pressure gauge (pressure switch or transducer) from the end-of-line adapter AEA006 at the end of the BlazeTube, if installed. Push in the Schrader valve inside the end-of-line adapter to release the pressure from the BlazeTube.



Schrader valve inside the end-of-line adapter

3. Disconnect the BlazeTube detection from the outlet connector of the cylinder valve. Disconnect the tube by pushing the ring inwards in the place of entry of the tube to the fitting (toward the fitting) and remove the tube. Proceed accordingly when disconnecting the end-of-line adapter of the BlazeTube detection. Proceed according to the instructions in Chapter [8.4](#). Be careful, if the tube was under pressure, the pressure will leak from the BlazeTube detection.



The ball valve is closed

4. Fasten the new BlazeTube detection properly to the outlet connector of the cylinder valve. Fasten the BlazeTube detection so that the tube is slotted to the outlet of the connector and pushed by hand all the way in. After slotting always make sure by pulling that the tube is firmly gripped.
5. Place the BlazeTube detection in the protected enclosure and gradually fasten with clamps.
6. During installation proceed further according to Chapter [8.4](#).
7. Pressurise the BlazeTube detection, proceed according to Chapter [8.5](#).
8. When using systems with HFC gas after replacement of the BlazeTube detection, corresponding inspection and measures to prevent leak of HFC gas according to Chapter [6.7](#) have to be performed.

12.5 DECLARATION OF CONFORMITY

Upon installation of each piece of the system the Commissioning/Installation Report must be prepared. Send the original of the Report to the manufacturer of the system. Keep the copy of the original.

Records on the maintenance and inspection of the system indicating the scope of service must be kept. Keep the maintenance records.

Declaration of conformity is issued by the manufacturer for each of the systems separately. The basis and requirement to issue the declaration of conformity is the Report issued by the authorized qualified person with relevant professional qualification in accordance with the relevant legislation and delivered to the manufacturer, whereby the authorized person certifies correct installation of the system pursuant to the technical documentation.

In the declaration of conformity, the manufacturer declares that the equipment under pressure is in conformity with the certificate of the type of the equipment under pressure issued in accordance with the requirements of European directive 2014/68/EU, Module B+E.

Supervising the implementation of the obligations arising out of the approved quality assurance system is ensured by notified body:

Technická inšpekcia, a.s., Trnavská cesta 56, 821 01 Bratislava, Slovak Republic (NB 1354).

Pursuant to the abovementioned, the equipment under pressure is labelled with CE conformity mark and identification code of notified body: 1354.

The products are safe when the terms of use and technical requirements are observed.

A copy of the current certificates can be requested by emailing technical@blazecut.com

13 LIST OF ANNEXES

[ANNEX 1: DETECTION, SIGNALLING AND ACTIVATION DEVICES](#)

[ANNEX 2: PRESSURE MONITORING](#)

[ANNEX 3: PNEUMATIC REMOTE ACTUATORS ARA010 AND ARA020](#)

[ANNEX 4: ELECTRIC REMOTE ACTUATORS ARA110 AND ARA120](#)

ANNEX 1: DETECTION, SIGNALLING AND ACTIVATION DEVICES

A1.1. DETECTORS

Table 76: Detectors

Part №	Description
AHP110	Heat probe detector, switching temperature 110 °C, IP67, operating temperature up to 130 °C, with a 2-pin connector and a mounting nut ANE001
ASD001	Smoke detector with relay output and base, 12 V, IP40, 0°C up to 45°C, EN54, coverage 40 m2. Compatible components: AAP210, AAP211, AAP310 with 12 V power supply (ABP212)
AHD001	Heat detector with relay output and base, 12 V, IP40, -10°C up to 45°C, EN54, coverage 20 m2, actuates at 54°C. Compatible components: AAP210, AAP211, AAP310 with 12 V power supply (ABP212)
AHD002	Heat and smoke detector optical with relay output and base, 12 V, IP40, 0°C up to 45°C, EN54, coverage 20 m2, actuates at 54°C. Compatible components: AAP210, AAP211, AAP310 with 12 V power supply (ABP212)
ASD002	Conventional smoke detector with standard base, 6 - 30 V, IP42, -20°C up to 50°C, EN54, coverage 40 m². Compatible components: AFP020 or use with other fire indicator panels
ASD002-RB	Conventional smoke detector with relay base, 9 - 30 V, IP42, -20°C up to 50°C, EN54, coverage 40 m2. Compatible components: AAP210, AAP211, AAP310 with 9 V to 30 V power supply, back-up power ABP212 or ABP224
AHD003	Conventional heat and smoke detector with standard base, 6 - 30 V, IP42, -20°C up to 50°C, activation temp min. 54°C, max. 65°C, EN54, coverage 20 m2. Compatible components: AFP020 or use with other fire indicator panels
AHD003-RB	Conventional heat and smoke detector with relay base, 9 - 30 V, IP42, -20°C up to 50°C, activation temp min. 54°C, max. 65°C, EN54, coverage 20 m2. Compatible components: AAP210, AAP211, AAP310 with 9 V to 30 V power supply, back-up power ABP212 or ABP224
ADB003	Deep base for detectors ASD002, AHD003, ASD002-RB, AHD003-RB
AHD004	Heat and smoke combined detector with standard base, configurable detection method: A2S (fixed threshold at 58°C), A1R (fixed threshold at 58°C and rate-of-rise), B (fixed threshold at 72°C), BR (fixed threshold at 72°C and rate-of-rise), 10 - 30 V, IP40, -5°C up to 40°C, EN54, coverage 20 m2, LPCB, UL. Compatible components: AFP020 or use with other fire indicator panels
AHD004-RB	Heat and smoke combined detector with relay base, configurable detection method: A2S (fixed threshold at 58°C), A1R (fixed threshold at 58°C and rate-of-rise), B (fixed threshold at 72°C), BR (fixed threshold at 72°C and rate-of-rise), 10 - 30 V, IP40, -5°C up to 40°C, EN54, coverage 20 m2, LPCB, UL. Compatible components: AAP210, AAP211, AAP310 with 10 V to 30 V power supply, back-up power ABP212 or ABP224
ADB004	Deep base for detectors AHD004, AHD004-RB
ASD005	Smoke detector with standard base, 10 - 30 V, IP43, -10°C up to 55°C, EN54-7, coverage 40 m2. Compatible components: AFP020 or use with other fire indicator panels
ASD005-RB	Smoke detector with relay base, 10 - 30 V, IP43, -10°C up to 55°C, EN54-7, coverage 40 m2. Compatible components: AAP210, AAP211, AAP310 with 10 V to 30 V power supply, back-up power ABP212 or ABP224
AHD005	Heat rise detector with standard base, 10 - 30 V, IP43, -10°C up to 55°C, EN54-5, class A2R, coverage 20 m2, activation temp min. 54°C, max. 70°C. Compatible components: AFP020 or use with other fire indicator panels
AHD005-RB	Heat rise detector with relay base, 10 - 30 V, IP43, -10°C up to 55°C, EN54-5, class A2R, coverage 20 m2, activation temp min. 54°C, max. 70°C. Compatible components: AAP210, AAP211, AAP310 with 10 V to 30 V power supply, back-up power ABP212 or ABP224
ACD005	Heat and smoke combined detector with standard base, 10 - 30 V, IP43, -10°C up to 55°C, EN54-5 and EN54-7, coverage 20 m2, class A1R, activation temp min. 54°C, max. 65°C. Compatible components: AFP020 or use with other fire indicator panels
ACD005-RB	Heat and smoke combined detector with relay base, 10 - 30 V, IP43, -10°C up to 55°C, EN54-5 and EN54-7, coverage 20 m2, class A1R, activation temp min. 54°C, max. 65°C. Compatible components: AAP210, AAP211, AAP310 with 10 V to 30 V power supply, back-up power ABP212 or ABP224

AER101	End-of-line resistor 1 k Ω for components connected to Alarm Panel AAP210, AAP211 or AAP310. Compatible components: APS001, APS003, ASD001, AHD001, AHD002, ASD002-RB, AHD003-RB, AHP110, AHP240, ABW105, ABW185, ABW240
AER106	End-of-line resistor 6.2 k Ω for components connected to Alarm Panel AAP400. Compatible components: APS001, APS003, ASD001, AHD001, AHD002, ASD002-RB, AHD003-RB, AHP110, AHP240, ABW105, ABW185, ABW240



ASD001



AHD001



AHD002



ASD002, ASD002-RB, AHD003,
AHD003-RB



AHD004, AHD004-RB



ASD005, ASD005-RB, AHD005,
AHD005-RB, ACD005, ACD005-
RB



AER101, AER106



AHP110

A1.2. SIGNALLING UNITS

Table 77: Signalling units

Part №	Description
ASU001	Signalling unit, light and sound, 81 dB, CE, 6-28 V DC, CE. Suitable for indoor, fixed, low vibration installations
ASU002	Signalling unit red, sounder and beacon with high base, 114 dB, IP44, EN54-3/CE/LPCB, 24 V DC. Suitable for indoor, fixed, low vibration installations
ASU003	Signalling unit red, sounder and beacon with high base, 101 dB(A), IP65, 18-24 V DC, CE, EN54-3. Suitable for fixed, low vibration installations
ASU004	Signalling unit, combined sounder and beacon, 97 dB, IP65 - Type B - 20-30 V DC, CE, EN54-3, -20 °C up to 70 °C. Suitable for outdoor, fixed, low vibration installations
ASR001	Sounder red, multi tone with high base, 92 dB to 112 dB, IP65, CE/VdS, LPCB, 9-15 V DC, CE, EN54-3. Suitable for fixed, low vibration installations
ASR002	Sounder, multi tone with high base, IP65, EN54-3, voltage range 9-29 V DC, operating temperature: -25 °C +80 °C, deep base. Suitable for fixed, low vibration installations
ABR001	Beacon red xenon, IP65, CE, VdS, 9V-60Vdc, CE, EN54-3. Suitable for fixed, low vibration installations
ABR002	Beacon red LED, IP65, CE, R10, 12-24 V DC, -20°C to +50°C, 3 bolt mounting. Suitable for outdoor mobile applications.
ASB001	Sounder black, 97 dB, IP65, SAE J994 Type C, AMCA, UL, CE, E, 12-24 V DC, -40°C to +85°C. Suitable for outdoor mobile applications.
AWB012	Warning buzzer with red LED dots, 12 V DC, 80 dB (@1m), IP50, -20 to +50 °C, stainless steel, 29 mm diameter. Suitable for fixed and mobile installations. Includes ALA019 label.
AWB024	Warning buzzer with red LED dots, 24 V DC, 80 dB (@1m), IP50, -20 to +50 °C, stainless steel, 29 mm diameter. Suitable for fixed and mobile installations. Includes ALA019 label.
ASB8666	Sign Board optical acoustic with text: "EXTINGUISHING IN PROGRESS", size of text: 135x320 mm, IP65, 12/24 V, 100 dB @1 m, -10 °C to +50 °C, CE, fixed applications



ASU001



ASU002, ASU003



ASU004



ASR001



ABR001



ABR002



ASB001



AWB012 and AWB024



ASB8666

A1.3. ALARM PANELS

Table 78: Alarm panels and accessories

Part No	Description
AAP210	Alarm panel without a fire button for C Series, OK, Fault and Fire LED indication (automatic dimmer function), fully configurable via Wi-Fi, include data logging and programmable NO/NC integrated relay output, 9 - 36 V DC, 85 dB buzzer, IP67, -30°C to 70°C, CE, EMC tested, flush or external mounting, red anodized aluminium body, 55 mm diameter. Includes 2x End-of-line Resistor AER101. Note: Requires programming
AAP211	Alarm panel with a fire button for C Series, OK, Fault and Fire LED indication (automatic dimmer function), fully configurable via Wi-Fi, include data logging and programmable NO/NC integrated relay output, 9 - 36 V DC, 85 dB buzzer, IP67, -30°C to 70°C, CE, EMC tested, flush or external mounting, red anodized aluminium body, 55 mm diameter. Includes 2x End-of-line Resistor AER101. Note: Requires programming
AAP310	Alarm panel without a fire button for T and C Series, preconfigured from factory, OK, Fault and Fire LED indication (automatic dimmer function), 9 - 36 V DC, 85 dB buzzer, IP67, -30°C to 70°C, CE, EMC tested, Integrated NO relay output, flush or external mounting, red anodized aluminium body, 55 mm diameter. Includes 1x End-of-line Resistor AER101. Can be used for: a) C Series with just one pressure switch b) as a fire warning device Note: Non-programmable
AAP400	Alarm panel with a test button for T and C Series, preconfigured from factory, OK, Fault and Fire LED indication, 10 - 30 V DC, 85 dB buzzer, IP65, -30°C to 70°C, CE, EMC tested, flush or external mounting, powder coated aluminium body, 64x58x30 mm, 0.5 m cable. Includes 2x End-of-line Resistor AER106. Can be used for: a) C Series with one or two pressure switches b) as a fire warning device Note: Non-programmable
APB210	Panel bracket stainless steel for Alarm Panels AAP210, AAP211 and AAP310
ATS002	Tamper seal for manual button on Alarm Panel AAP211, includes tamper adhesive
ABP212	Back-up power supply 12 V for Alarm Panels AAP210, AAP211 and AAP310, includes 1 x 7.0 Ah battery. For indoor use only
ABP224	Back-up power supply 24 V for Alarm Panels AAP210, AAP211 and AAP310, includes 2 x 7.0 Ah battery. For indoor use only
AFP020	Fire panel conventional (4 zones), extinguishing module included, 2 x 7 Ah accumulators included, internal relay, -5°C to 40°C, 325x325x80 mm, IP40, EN54 and EN12094 certified, for clean agent systems
ACF001	Case for an external fuse, IP66, -20 up to 70 °C, max 10 A (for AEF001, AEF002, AEF100, AEF200)
ACF002	Case for an external fuse, IP50, max 6.3 A (for AEF001, AEF002, AEF100, AEF200)
AEF002	External fuse 2 A for Alarm Panels AAP210, AAP211 and AAP310
AEF200	External fuse 200 mA for Alarm Panel AAP400



AAP210, AAP310



AAP211



AAP400



APB210



ATS002



ABP212



ABP224



AFP020



ACF001



ACF002



AEF002, AEF200

Table 79: Alarm panel kits

Part №	Content
KAAP210	Alarm Panel AAP210 kit without a fire button for C Series, Panel Bracket APB210, 12-pin Deutsch Connector ADC012, Sealing Plugs ADP001, External Fuse AEF002, Fuse Case ACF001, End-of-line Resistors AER101, labels ALA002, ALA003, ALA004 ALA005
KAAP211	Alarm Panel AAP211 kit with a fire button for C Series, Panel Bracket APB210, Tamper Seal ATS002, 12-pin Deutsch Connector ADC012, Sealing Plugs ADP001, External Fuse AEF002, Fuse Case ACF001, End-of-line Resistors AER101, labels ALA002, ALA003, ALA004 ALA005
KAAP310	Alarm Panel AAP310 kit without a fire button for T and C Series, Panel Bracket APB210, 6-pin Deutsch Connector ADC006, Sealing Plugs ADP001, External Fuse AEF002, Fuse Case ACF001, End-of-line Resistor AER101, labels ALA002, ALA004 ALA005
KAAP400	Alarm Panel AAP400 kit with a test button for T and C Series, 6-pin Deutsch Connector ADC006, Sealing Plugs ADP001, External Fuse AEF200, Fuse Case ACF002, End-of-line Resistors AER106, labels ALA004 ALA005



KAAP210



KAAP211



KAAP310



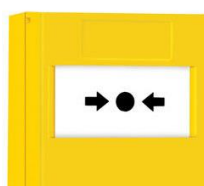
KAAP400

For additional information ask for a component manual *CM-AP2-EN Alarm Panels AAP210, AAP211, AAP310* or *CM-AP4-EN Alarm Panel AAP400*.

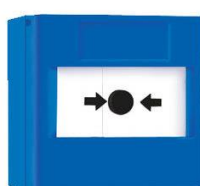
A1.4. ELECTRIC ACTUATORS

Table 80: Electric actuators and accessories

Part №	Description
ARA132-YEL	Remote actuator electric, yellow, IP32, -20°C up to +65°C, EN54-11
ARA132-BLU	Remote actuator electric, blue, IP32, -20°C up to +65°C, EN54-11
ARA132-RED	Remote actuator electric, red, IP32, -20°C up to +65°C, EN54-11
ARA132-YEL-IP67	Remote actuator electric, yellow, IP67, -20°C up to +70°C, EN
ARA132-BLU-IP67	Remote actuator electric, blue, IP67, -20°C up to +70°C, EN
ARA132-RED-IP67	Remote actuator electric, red, IP67, -20°C up to +70°C, EN
ARC113	Remote cover plastic for remote electric actuators against accidental activation for ARA132-YEL, ARA132-BLU, ARA132-RED
ARK113	Remote reset key spare for ARA132-YEL, ARA132-BLU, ARA132-RED



ARA132-YEL



ARA132-BLU



ARA132-RED



ARA132-YEL-IP67



ARA132-BLU-IP67



ARA132-RED-IP67



ARC113



ARK113

ANNEX 2: PRESSURE MONITORING

A2.1. PRESSURE TRANSDUCER ATA100

Pressure Transducer ATA100 provides full range constant pressure monitoring in the system. It can identify a low pressure or overpressure in the system and notify the operator through an Alarm Panel or other external device.

Depending on the system configuration, the Pressure Transducer ATA100 can be installed to the system in several ways described in Chapter [A2.4](#).

Table 81: Specifications of pressure transducer ATA100

Parameter	Description
Material of body	stainless steel
Pressure range	0 – 40 bar
Accuracy	0.5 % BFSL
Maximum overpressure	80 bar
Operation voltage	8 – 30 V DC
Power consumption	8 mA
IP rating	IP67
Operating temperature	from -40 °C up to 70 °C
Thread	M10x1 (14 mm with O-ring and filter)
Electrical cable	25 cm length, 3 x 0.75 mm ²



Pressure Transducer ATA100

A2.2. PRESSURE SWITCH APS001-XX

Pressure Switch APS001-xx is a mechanical switch with one pre-set pressure value (switch point). When the pressure in the system drops below the switch point the pressure switch sends a signal to an Alarm Panel or an external device to perform the operation. The pressure switch is supplied with the cable connector.

The Pressure Switch APS001-xx will send a signal when the pressure in the system decreases regardless of the cause, in case of fire or accidental activation and rapid decrease of pressure in the system which is below the pre-set value.

Depending on the valve type, the Pressure Switch APS001 can be installed to the system in several ways described in Chapter [A2.4](#).

Table 82: Specifications of pressure switch APS001-xx

Parameter	Description		
Material of body	nickel plated steel		
Switch configuration	open or closed (SPDT)		
Hysteresis	min. 0.5 bar, max. 1.5 bar		
Switching frequency	max. 100 min-1		
Power rating	Voltage	Current	
Resistive load AC-12, DC12	AC 250 V	DC 24 V	4 A
Inductive load AC-14, DC14	AC 250 V	DC 24 V	2 A
IP rating	IP65 with cable connector and seal		
Electrical outlet	DIN EN 175301-803 A		
Operating temperature	from -30 °C up to 100 °C		
Thread	M10x1 (12.5 mm with O-ring and filter)		



Pressure Switch APS001-xx

IMPORTANT

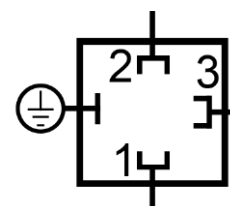
Diagram on the pressure switch label is at atmospheric pressure (e.g., unpressurised system or discharged system).

Table 83: Versions of APS001-xx for clean agents

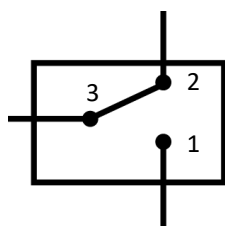
Suitable for	Switch point	Pressure value	Part №
HFC-227ea	Fire indication	5	APS001-5
HFC-227ea	Low pressure	7	APS001-7
FK-5-1-12	Fire indication	9	APS001-9
FK-5-1-12	Low pressure	11	APS001-11

APS001 has a selectable switching function, so it can be set to open or closed state.

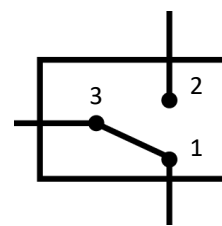
1. Connector for closed circuit – for sending signal to an alarm panel, switching on devices (sirens, beacons) or switching off devices using an external relay
2. Connector for open circuit – for switching off connected devices (e.g., ventilation, that is connected in the electric circuit)
3. COM connector
4. ground connector



APS001 connector



Pressurised



Discharged

A2.3. PRESSURE SWITCH APS003-xx

Pressure Switch APS003-xx is a mechanical switch with one pre-set pressure value (switch point). When the pressure in the system drops below the switch point, the pressure switch sends a signal to an Alarm Panel or an external device to perform the operation. The pressure switch is supplied with a cable connector.

The Pressure Switch APS003 will send a signal when the pressure in the system decreases regardless of the cause, in case of fire or accidental activation and rapid decrease of pressure in the system which is below the pre-set value.

Depending on the valve type, the Pressure Switch APS003 can be installed to the system in several ways described in Chapter [A2.4](#).

Table 84: Specifications of pressure switch APS003

Parameter	Description
Material of body	brass
Switch configuration	closed (no pressure)
Hysteresis	min. 0.5 bar, max. 1.5 bar
Voltage	42 V DC / 100 V AC
Current	max 4 A
IP rating	IP65 with cable connector and seal
Electrical outlet	DIN 43650A
Operating temperature	from -40 °C up to 100 °C
Thread	M10x1 (12.5 mm with O-ring and filter)



Pressure Switch APS003

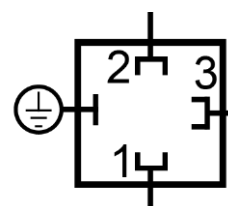
Table 85: Versions of APS003-xx for clean agents

Suitable for	Switch point	Pressure value	Part №
HFC-227ea	Fire indication	5	APS003-5
HFC-227ea	Low pressure	7	APS003-7
FK-5-1-12	Fire indication	9	APS003-9
FK-5-1-12	Low pressure	11	APS003-11

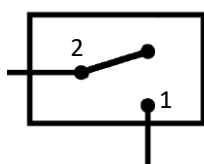
IMPORTANT!

Normal state is at atmospheric pressure (e.g., unpressurised system, system after extinguishing).

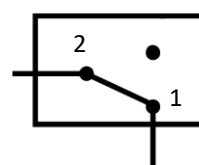
1. Connector for closed circuit – for sending signal to an alarm panel, switching on devices (sirens, beacons) or switching off devices using an external relay
2. COM connector
3. not used
4. ground connector



APS003 connector



Pressurised



Discharged

A2.4. INSTALLATION OF PRESSURE MONITORING COMPONENTS

Pressure monitoring components such as pressure transducers, pressure switches and additional pressure gauges are usually delivered not installed, to prevent them from damaging during transportation. All pressure monitoring components are compatible with M10x1 ports. The M10x1 ports are sealed by a Schrader valve, which closes and opens automatically during removal or installation of the components. The Schrader valve allows to perform these operations even when the system is under pressure. The same principle of sealing is also used on end-of-line adapters and M10x1 adapter FVABM0210 on the cylinder valve.

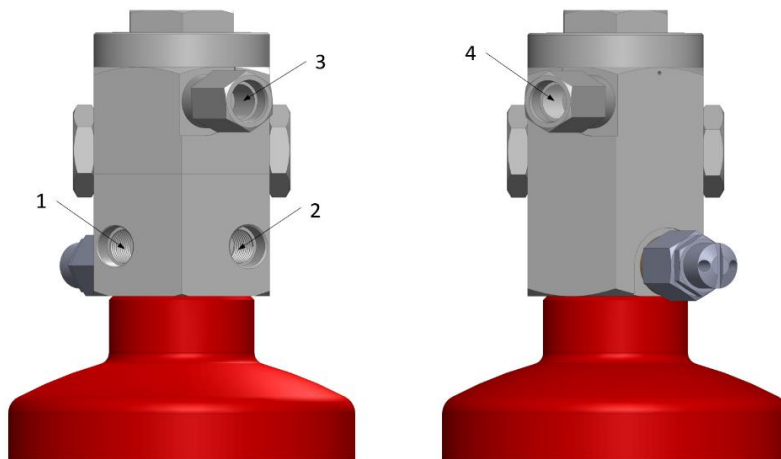
At the time of order, a valve adapter FVABM0210 can be requested to allow for additional M10x1 port for pressure monitoring components.

Suitable outlets for individual components:

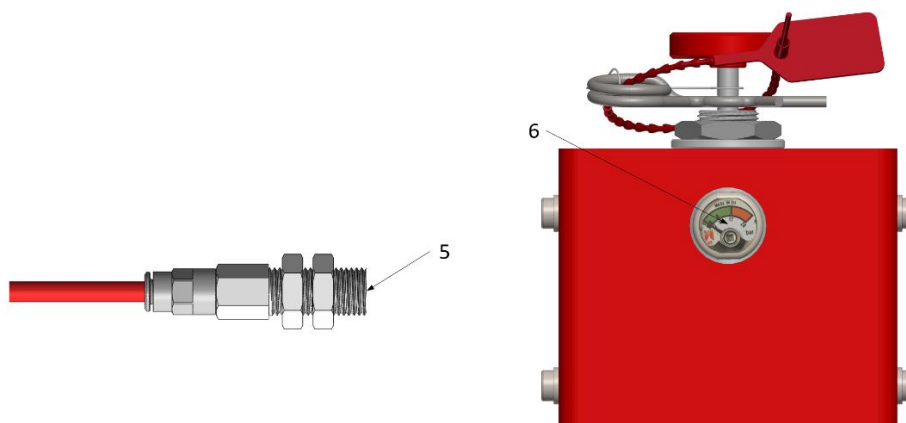
1. first M10x1 port on the cylinder valve
 - a) main pressure gauge
 - b) Pressure Transducer ATA100
 - c) Pressure Switch APS001 or APS003 (version for monitoring low pressure recommended)
2. second M10x1 port on the cylinder valve
 - a) main pressure gauge
 - b) Pressure Transducer ATA100
 - c) Pressure Switch APS001 or APS003 (version for monitoring low pressure recommended)
3. front Valve Adapter FVABM0210 (optional component)
 - a) Pressure Switch APS001 or APS003 (version for fire indication recommended)
4. back Valve Adapter FVABM0210 (optional component)
 - a) Pressure Switch APS001 or APS003 (version for fire indication recommended)
5. End-of-line Adapter AEA006 on a BlazeTube
 - a) additional pressure gauge
 - b) Pressure Transducer ATA100
 - c) Pressure Switch APS001 or APS003 (version for fire indication recommended)
6. Pneumatic Manual Actuator ARA010 or ARA020 (see ANNEX 3 or ANNEX 4)
 - a) additional pressure gauge (comes installed as standard)

IMPORTANT!

Main pressure gauge must always be installed in the appropriate outlet on the cylinder valve. It can be uninstalled only momentarily, during maintenance or gauge relocation.



All M10x1 ports on front (left picture) and back (right picture) of a cylinder valve



Additional M10x1 ports on external components

NOTE

In case of malfunction or disconnection of the pressure monitoring components (Pressure Switch APS001, Pressure Transducer ATA100) the system remains functional. These components are not necessary for its automatic activation in case of fire.

A2.4.1. WARNINGS



If the system is in operation and the BlazeTube detection under pressure, when mounting and dismounting a pressure monitoring component at the end-of-line device, the ball valve on the cylinder valve must be closed, to avoid a false actuation.



Install the pressure switch and pressure transducer so that it is not exposed to aggressive chemical substances (caustic, acids, solvents, corrosive substances etc.) and to direct influence of weather conditions.



Always place the pressure switch and pressure transducer in the lower part of the risk area to avoid direct flames and heat. The pressure switch cannot be in direct contact or be in immediate proximity with parts which heat to temperatures of more than 80 °C (176 °F) e.g., engine block, engine turbocharger, exhaust pipe, heated parts of inductors etc.

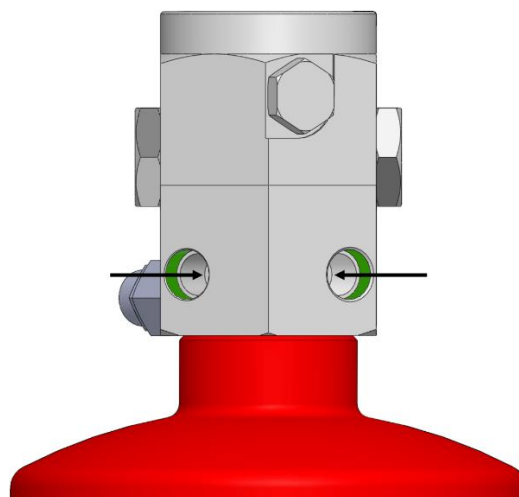


Be aware of the danger posed by the protected device. When working in the vicinity of electrical equipment observe corresponding safety rules and instructions. Work on electrical installations may be performed only by qualified persons.

When unscrewing a plug or a component from the M10x1 ports, do it right before installation of the new component, in order to prevent dirt from getting into the outlet. To properly install the components and prevent any malfunctions of the system, screw in the components tightly and check for presence of any leaks.

In case a pressure transducer, a pressure switch or a pressure gauge has to be uninstalled from any of the bottom M10x1 ports on the cylinder valve, follow these steps:

1. Uninstall (fully unscrew) the desired component. A small amount of extinguishing agent may be released from the port.
2. Clean up the whole port, mainly the sealing surfaces (green area in the picture) on the cylinder valve with a clean dry cloth.
3. Install the new component or seal the outlet with a FVP1M10 plug.



Bottom M10x1 ports with exposed Schrader valves after component uninstallation

A2.5. ELECTRICAL CABLES AND CONDUITS

For installation of electrical components use the appropriate electrical cables supplied as optional components:

- solenoid – two core electrical cable,
- Pressure Transducer ATA100 – two core electrical cable;
- Pressure Switch APS001-xx or APS003-xx – two, three or four core electrical cable.

Table 86: Specifications of cables

Part №	Description	Comment	Length
ASC002	standard cable, 2x0.75 mm ² , -40°C up to 80 °C, UV stabilized	for standard installations	per metre
ASC004	standard cable 4x0.5 mm ² , -40°C up to 80 °C, UV stabilized	for standard installations	per metre
ASC008	standard cable 8x0.5 mm ² , -40°C up to 80 °C, UV stabilized	for standard installations	per metre
ASC010	standard cable 10x0.5 mm ² , -40°C up to 80 °C, UV stabilized	for standard installations	per metre
ASC102	silicone cable 2x0.75 mm ² , -60 °C up to 180 °C, UV stabilized, up to 500 V	for installations with high temperatures like in engine compartments	per metre
ASC103	silicone cable 3x0.50 mm ² , -60 °C up to 180 °C, UV stabilized, up to 500 V	for installations with high temperatures like in engine compartments	per metre
ASC104	silicone cable 4x0.50 mm ² , -60 °C up to 180 °C, UV stabilized, up to 500 V	for installations with high temperatures like in engine compartments	per metre



Standard cable



Silicone cable

Table 87: Silicone cable kits

Part №	Description
KASC102-005	2-core Silicone cable kit, 5 metres, 15 cable ties, -60 °C up to 180 °C
KASC102-010	2-core Silicone cable kit, 10 metres, 30 cable ties, -60 °C up to 180 °C
KASC102-015	2-core Silicone cable kit, 15 metres, 45 cable ties, -60 °C up to 180 °C
KASC102-020	2-core Silicone cable kit, 20 metres, 55 cable ties, -60 °C up to 180 °C
KASC103-005	3-core Silicone cable kit, 5 metres, 15 cable ties, -60 °C up to 180 °C
KASC103-010	3-core Silicone cable kit, 10 metres, 30 cable ties, -60 °C up to 180 °C
KASC103-015	3-core Silicone cable kit, 15 metres, 45 cable ties, -60 °C up to 180 °C
KASC103-020	3-core Silicone cable kit, 20 metres, 55 cable ties, -60 °C up to 180 °C
KASC104-005	4-core Silicone cable kit, 5 metres, 15 cable ties, -60 °C up to 180 °C
KASC104-010	4-core Silicone cable kit, 10 metres, 30 cable ties, -60 °C up to 180 °C
KASC104-015	4-core Silicone cable kit, 15 metres, 45 cable ties, -60 °C up to 180 °C
KASC104-020	4-core Silicone cable kit, 20 metres, 55 cable ties, -60 °C up to 180 °C

In case of installation in spaces with increased risk of damage due to mechanical interference use the cable conduit with conduit connector to protect the electrical cables.

Table 88: Specifications of conduits

Part №	Description	Length
ACC110	internal Ø 10 mm, -40 °C to 120 °C, UV stabilized	per metre



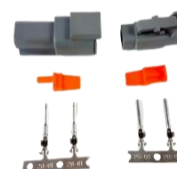
Cable conduit ACC110

Table 89: Specifications of electrical connectors

Part №	Description	Working temperature
ADP001	sealing plug for Deutsch connectors	-55 °C to +125 °C
ADC002	2-pin Deutsch connector	
ADC006	6-pin Deutsch connector	
ADC012	12-pin Deutsch connector	



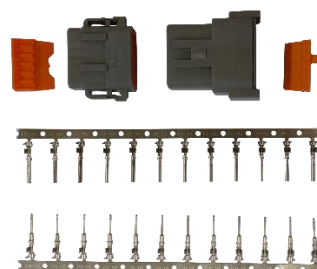
ADP001



2-pin Deutsch connector



6-pin Deutsch connector



12-pin Deutsch connector

ANNEX 3: PNEUMATIC REMOTE ACTUATORS ARA010 AND ARA020

A3.1. BASIC INFORMATION ABOUT THE COMPONENTS

The remote pneumatic actuator is an optional component of the BlazeCut system. The actuator is using a unique double sealing mechanism on the internal shaft that keeps the pressure in the LOP line. It operates on the principle of manual release of pressure from the LOP line after breaking the seals when pressing the knob of the actuator. This results in opening of the piston of the cylinder valve, activating the suppression system and completely releasing the extinguishing agent. This is the same process as during disruption of the BlazeTube detection by effect of fire or heat. After activation, actuator's pin can be easily reset with no need to replace a burst disc or similar.

The pneumatic remote actuator serves as an end-of-line device and comes with an adaptor G1/8" to M10x1 with internal Schrader valve, which can also be used to pressurise the LOP line. The M10x1 port comes with installed pressure gauge as standard.

Any instructions in this manual regarding the end-of-line adapter apply to remote actuator of the system.



The pressure gauge used on the pneumatic remote actuator must be the same type as the gauge used on the pressure cylinder with the extinguishing agent connected to the same LOP line.



Do not press and pull the red knob with a sealing shaft installed in the actuator unless necessary. Excessive use may result in reduced sealing properties of the assembly.

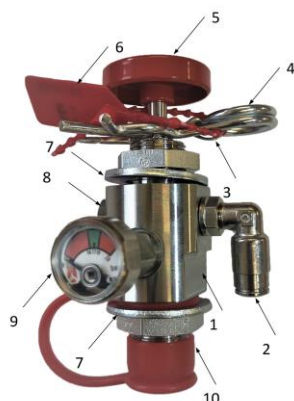
Remote pneumatic actuator ARA010 and ARA020 work on the same principle and are built from the same components, in addition the ARA020 comes with a protective steel cover.

Table 90: Remote actuators

Part №	Content
ARA010-H	Remote actuator pneumatic bulkhead mount, includes dust cap, lock seal and a G1/8" to M10x1 adapter with HFC-227ea pressure gauge. Fitted with one BlazeTube connector elbow FBT2BP026-A on the right, plug on the left. Can be ordered with different BlazeTube connectors for the side ports: FBT2BP026-A, FBT3PBP6026-A or FBT1BP026-A
ARA010-P	Remote actuator pneumatic bulkhead mount, includes a dust cap, lock seal and a G1/8" to M10x1 adapter with Powder pressure gauge. Fitted with one BlazeTube connector elbow FBT2BP026-A on the right, plug on the left. Can be ordered with different BlazeTube connectors for the side ports: FBT2BP026-A, FBT3PBP6026-A or FBT1BP026-A
ARA010-P-25BAR	Remote actuator pneumatic bulkhead mount, includes a dust cap, lock seal and a G1/8" to M10x1 adapter with Powder pressure gauge for 25 bar systems. Fitted with one BlazeTube connector elbow FBT2BP026-A on the right, plug on the left. Can be ordered with different BlazeTube connectors for the side ports: FBT2BP026-A, FBT3PBP6026-A or FBT1BP026-A
ARA010-F	Remote actuator pneumatic bulkhead mount, includes a dust cap, lock seal and a G1/8" to M10x1 adapter with Foam pressure gauge. Fitted with one BlazeTube connector elbow FBT2BP026-A on the right, plug on the left. Can be ordered with different BlazeTube connectors for the side ports: FBT2BP026-A, FBT3PBP6026-A or FBT1BP026-A
ARA010-FK	Remote actuator pneumatic bulkhead mount, includes a dust cap, lock seal and a G1/8" to M10x1 adapter with FK-5-1-12 pressure gauge. Fitted with one BlazeTube connector elbow FBT2BP026-A on the right, plug on the left. Can be ordered with different BlazeTube connectors for the side ports: FBT2BP026-A, FBT3PBP6026-A or FBT1BP026-A
ARA020-H	Remote actuator pneumatic boxed, includes a dust cap, lock seal and a G1/8" to M10x1 adapter with HFC-227ea pressure gauge. Fitted with one BlazeTube connector elbow FBT2BP026-A on the right, plug on the left. Dimensions with the knob: 135x120x90 mm Can be ordered with additional BlazeTube connector FBT2BP026-A for the left port.
ARA020-P	Remote actuator pneumatic boxed, includes a dust cap, lock seal and a G1/8" to M10x1 adapter with Powder pressure gauge. Fitted with one BlazeTube connector elbow FBT2BP026-A on the right, plug on the left. Dimensions with the knob: 135x120x90 mm Can be ordered with additional BlazeTube connector FBT2BP026-A for the left port.
ARA020-P-25BAR	Remote actuator pneumatic boxed, includes a dust cap, lock seal and a G1/8" to M10x1 adapter with Powder pressure gauge for 25 bar systems. Fitted with one BlazeTube connector elbow FBT2BP026-A on the right, plug on the left. Dimensions with the knob: 135x120x90 mm Can be ordered with additional BlazeTube connector FBT2BP026-A for the left port.
ARA020-F	Remote actuator pneumatic boxed, includes a dust cap, lock seal and a G1/8" to M10x1 adapter with Foam pressure gauge. Fitted with one BlazeTube connector elbow FBT2BP026-A on the right, plug on the left. Dimensions with the knob: 135x120x90 mm Can be ordered with additional BlazeTube connector FBT2BP026-A for the left port.
ARA020-FK	Remote actuator pneumatic boxed, includes a dust cap, lock seal and a G1/8" to M10x1 adapter with FK-5-1-12 pressure gauge. Fitted with one BlazeTube connector elbow FBT2BP026-A on the right, plug on the left. Dimensions with the knob: 135x120x90 mm Can be ordered with additional BlazeTube connector FBT2BP026-A for the left port.

Additional parts and replacement components for pneumatic remote actuator are listed in [Table 94](#).

Actuator material: stainless steel body, powder coated steel case.



Remote pneumatic actuator bulk ARA010



Remote pneumatic actuator boxed ARA020

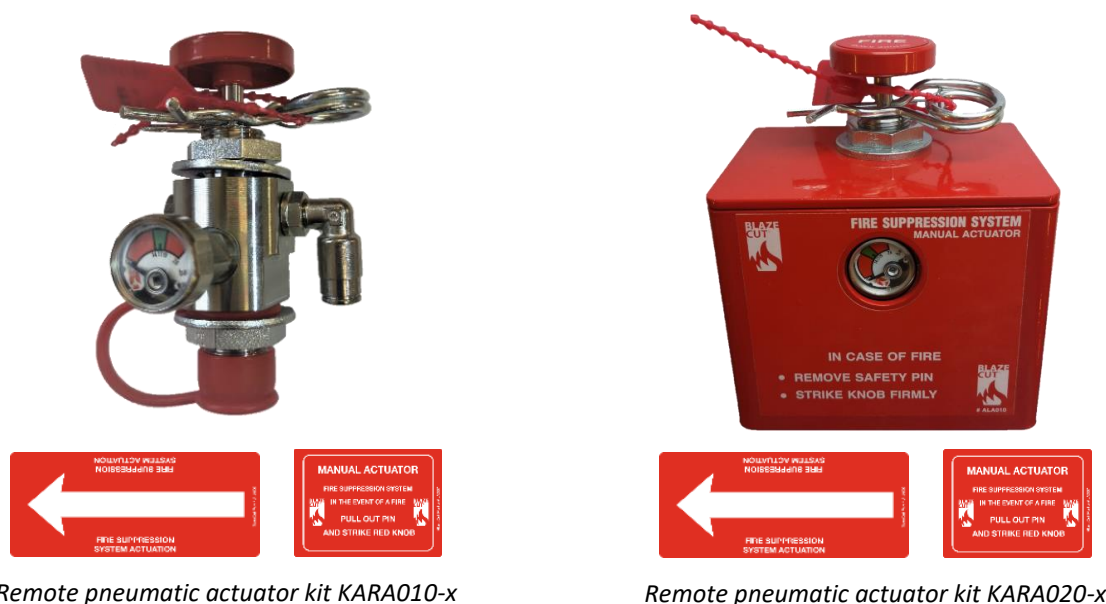
1. Body of the remote actuator
2. BlazeTube Connector FBT2BP026-A
3. Securing wire
4. Safety pin
5. Red knob with a label ALA009
6. Plastic lock seal ALS001
7. Mounting nut and washer
8. G1/8" outlet with a valve plug FVP1B02 as standard – can be ordered with different BlazeTube connectors for the side ports (see [Table 92](#))
9. Pressure gauge mounted on an adaptor FVABM0210
10. Dust cap on a vent

IMPORTANT!

Do not remove the dust cap (10.) from the actuator's body.

Table 91: Remote actuator kits

Part №	Content
KARA010-H	Remote actuator kit pneumatic, bulkhead mount, HFC gauge and labels. Fitted with one BlazeTube connector FBT2BP026-A on the right, plug on the left. Can be ordered with different BlazeTube connectors for the side ports: FBT2BP026-A, FBT3PBP6026-A or FBT1BP026-A
KARA010-FK	Remote actuator kit pneumatic, bulkhead mount, FK-5-1-12 gauge and labels. Fitted with one BlazeTube connector FBT2BP026-A on the right, plug on the left. Can be ordered with different BlazeTube connectors for the side ports: FBT2BP026-A, FBT3PBP6026-A or FBT1BP026-A
KARA020-H	Remote actuator kit pneumatic, boxed, HFC gauge and labels. Fitted with one BlazeTube connector FBT2BP026-A on the right, plug on the left. Can be ordered with additional BlazeTube connector FBT2BP026-A for the left port.
KARA020-FK	Remote actuator kit pneumatic, boxed, FK-5-1-12 gauge and labels. Fitted with one BlazeTube connector FBT2BP026-A on the right, plug on the left. Can be ordered with additional BlazeTube connector FBT2BP026-A for the left port.



NOTE

When using a single pneumatic remote actuator on a LOP line, use standard configuration with one BlazeTube connector and the other outlet plugged. For serial connection of multiple actuators, occupy both outlets with BlazeTube connectors or use one Tee connector FBT3PBP6026-A.

Table 92: Remote pneumatic actuator connectors

Part №	Description	Working temperature	Working pressure	Material
FBT1BP026-A	outlet connector for BlazeTube Ø 6 mm, G1/8"	-30 to +80 °C	0.9 – 60 bar	body and gripper: nickel-plated brass seals: EPDM
FBT2BP026-A	elbow connector 360° rotation for BlazeTube Ø 6 mm, G1/8"			
FBT3PBP6026-A	Tee connector 360° rotation for BlazeTube, Ø 6 mm, G1/8"			



FBT1BP026-A



FBT2BP026-A

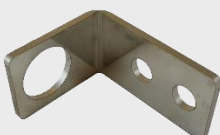
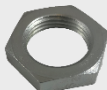


FBT3PBP6026-A

Table 93: Recommended connector combinations for remote pneumatic actuators

№	Suitable for	Left port	Right port	Connection type
1.	ARA010	FBT1BP026-A	FBT1BP026-A	passthrough
2.	ARA010	FBT1BP026-A	Plug	end-of-line
3.	ARA010	Plug	FBT1BP026-A	end-of-line
4.	ARA010	FBT1BP026-A	FBT2BP026-A	passthrough
5.	ARA010, ARA020	FBT2BP026-A	FBT2BP026-A	passthrough
6.	ARA010, ARA020	FBT2BP026-A	Plug	end-of-line
7.	ARA010, ARA020	Plug	FBT2BP026-A	end-of-line
8.	ARA010	FBT3PBP6026-A	Plug	passthrough
9.	ARA010	Plug	FBT3PBP6026-A	passthrough

Table 94: Remote pneumatic actuator accessories

Part №	Description	Comment	Material
FVP1B02		Remote actuator side plug G1/8"	stainless steel sealing
ANC002		Cap for remote actuators ARA010/ARA020, -40°C to 180 °C, ID 17 mm	silicone
APR002		Safety pin for remote actuator	galvanized steel
ALS001		Lock seal for remote actuator and ball valve anti tamper security lock	plastic
ANB001		Bracket for firm fixing of remote actuator	stainless steel
AWR001		Flat washer for remote actuator and nozzle assembly, M20	galvanized steel
ANR001		Nut for remote actuator for bulkhead mounting, M20	galvanized steel
ALA009		Ø 33 mm label for remote actuator "PULL PIN FIRE STRIKE KNOB"	-
ALA010		90 x 80 mm label for pneumatic remote actuator box, includes 3 x overlay stickers for agents (foam, powder, gas) "In case of fire" <ul style="list-style-type: none"> Remove safety pin Strike knob firmly" 	-

A3.2. INSTALLATION OF THE REMOTE ACTUATOR

Always place the remote actuator in the proximity of the protected enclosure so that it is easily accessible when necessary. Do not place it in the area of expected fire, where manual activation after the fire has started is not possible.

Label the remote actuator visibly with the corresponding label ALA007.

The pneumatic actuator ARA010 is suited for mounting onto a custom bracket, cover, dashboard or wall using the included fastening nuts and washers (see Chapter [A3.2.1](#)).

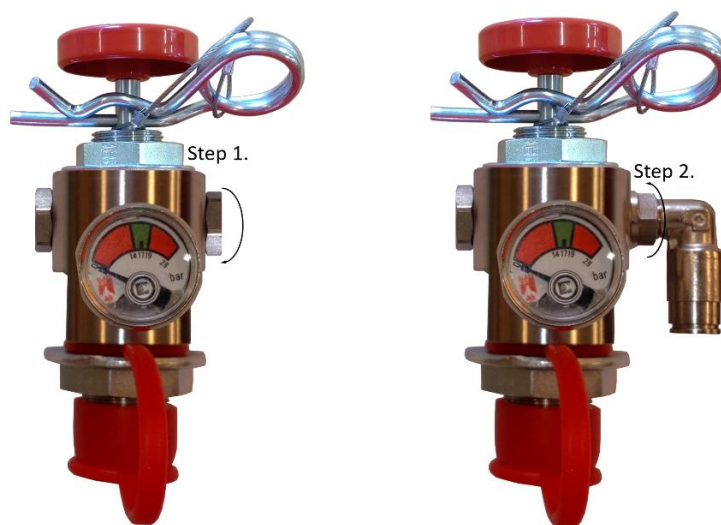
The pneumatic actuator ARA020 with a cover is suited to wall mounting through mounting holes. Use suitable and durable screws to firmly secure the cover for the manual actuator (see Chapter [A3.2.2](#)).

The BlazeTube detection is mounted onto the BlazeTube connector on the remote actuator by slotting into the outlet and pushed by hand all the way in. Always make sure after slotting that the tube is firmly fastened by pulling it gently. Follow all the provisions and instructions in Chapter [8.4](#).

A3.2.1. INSTALLATION OF ARA010

If the supplied configuration isn't convenient, it is possible to change the position of the BlazeTube connector or add an additional one in the place of the FVP1B02 plug. Just unscrew the plug FVP1B02 from the actuators body and screw in the chosen BlazeTube connector.

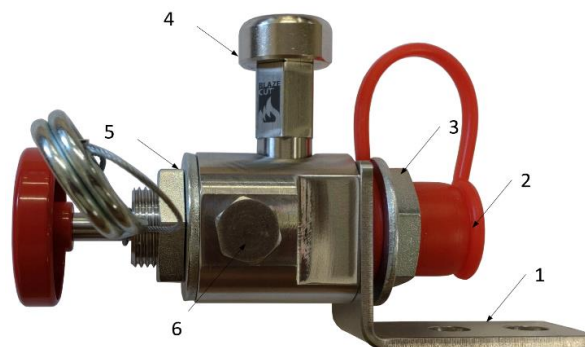
This operation has to be done before installation of the actuator to the desired location.



Step 1: Unscrew the plug FVP1B02 from the actuators body;

Step 2: Screw in the chosen connector for BlazeTube and tighten it with a 12 mm torque wrench to 10 Nm.

To install the actuator ARA010 onto a custom bracket, cover, wall etc., follow the installation figures below.

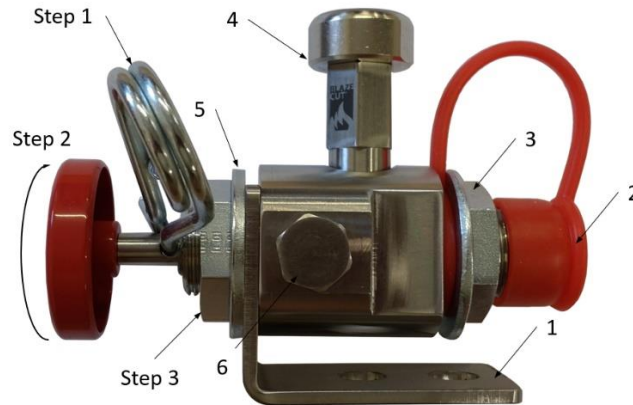


Pneumatic actuator ARA010 – back mounting

1. Bracket (e.g., ANB001) or a solid wall with a hole of $\varnothing$ 21 mm
2. Dust cap ANC002
3. Nut with a washer – keep the order of components as shown on the figure
4. Pressure gauge – should be positioned so it is easy to read
5. Spare nut and washer – used for other mounting option
6. Plugged outlet for BlazeTube connector

IMPORTANT!

Before mounting in the following position, partial disassembly is required. For the assembly and disassembly of the actuator do not use other tools than mentioned in the procedure, as they can damage functional surfaces of the components.



Pneumatic actuator ARA010 – front mounting

1. Bracket (e.g., ANB001) or a solid wall with a hole of $\varnothing$ 21 mm
2. Nut with a washer – keep the order of components as shown on the figure
3. Nut and washer for the dust cap fixture
4. Pressure gauge
5. BlazeTube connector

Step 1: Put your finger into the safety pin, to use it as a lever;

Step 2: Grab the red knob with hand and unscrew it;

Step 3: Remove the safety pin, securing wire, nut and washer;

Step 4: Install the actuator to the bracket;

Step 5: Reinstall the washer and nut, and tighten them with a 27 mm spanner;

Step 6: Reinstall the securing wire and safety pin;

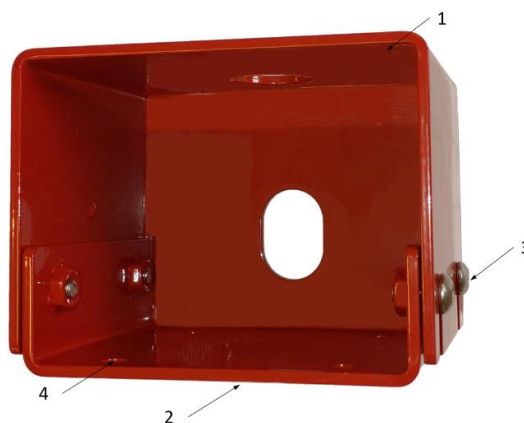
Step 7: Put your finger into the safety pin, grab the red knob with hand and screw it on the shaft;

Step 8: Install the bundled plastic lock seal ALS001.

A3.2.2. INSTALLATION OF ARA020

ARA020 is designed for a wall mount installations, for fixed installations in interior to mobile equipment in harsh environment due to its robust construction and stainless-steel materials.

Before installation of the actuator to the desired location, partial disassembly is required.

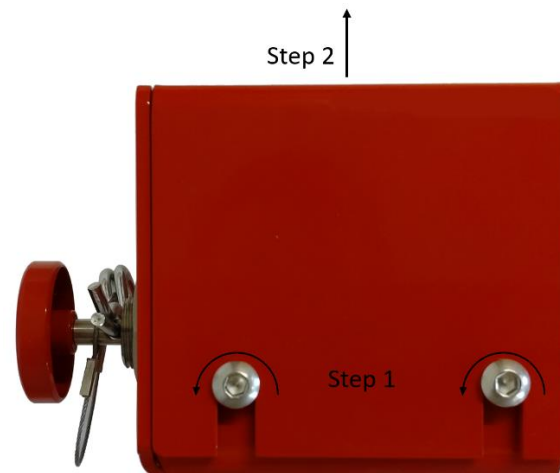


Steel cover of the Actuator ARA020

1. Top cover
2. Bottom cover
3. Fasteners for the cover
4. Mounting holes $\varnothing$ 7 mm (mounting screws are not included)

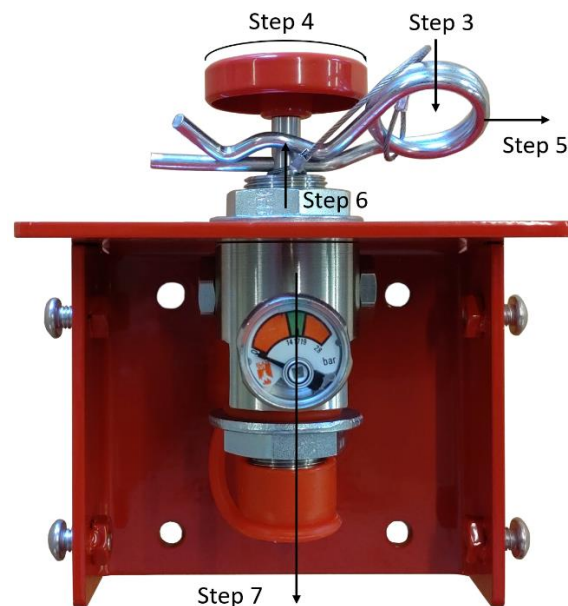
IMPORTANT!

When following Step 3, Step 4 and Step 5, for assembly or disassembly, do not use any tools as they can damage functional surfaces of the components.



Step 1: Loosen the four screws on the actuator steel cover;

Step 2: Remove the top cover;



Step 3: Put your finger into the safety pin, to use it as a lever;

Step 4: Grab the red knob with hand and unscrew it;

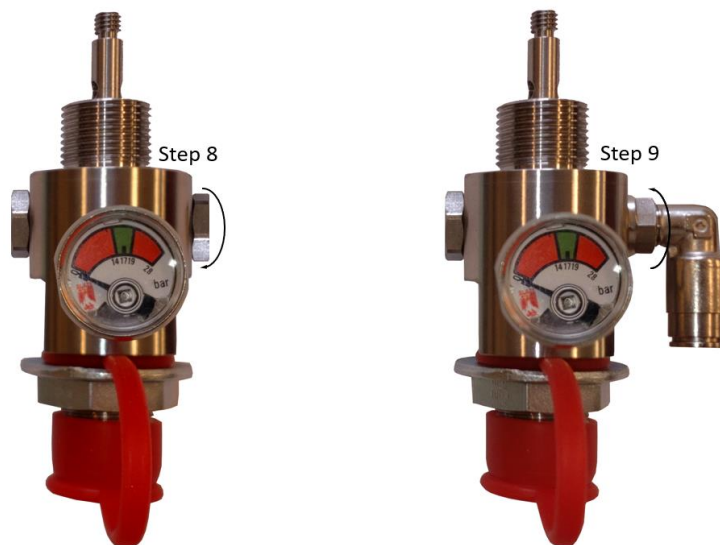
Step 5: Remove the safety pin and securing wire;

Step 6: Remove the nut and the washer;

Step 7: Take out the actuator body from the cover;

NOTE

Step 8 and Step 9 are not necessary if configuration supplied is satisfactory.

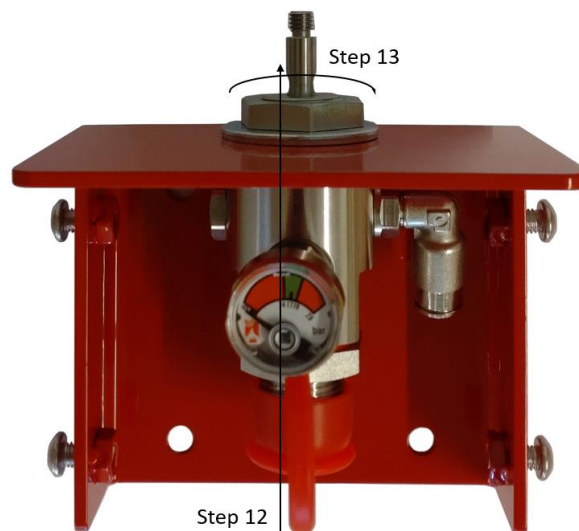


Step 8: Unscrew the plug FVP1B02 from the actuators body with 14 mm spanner;

Step 9: Screw in the chosen connector for BlazeTube and tighten it with a 12 mm torque wrench to 10 Nm;

Step 10: Make holes to the wall on the desired location, following the pattern on the bottom cover;

Step 11: Secure the bottom cover to the wall (mounting screws are not included);



Step 12: Put the actuator body back to the cover;

Step 13: Reinstall the washer and nut, and tighten them with a 27 mm spanner

Step 14: Reinstall the securing wire and safety pin;

Step 15: Put your finger into the safety pin, grab the red knob with hand and screw it on the shaft;

Step 16: Put on the top cover and tighten the for screw on the cover;

Step 17: Install the bundled plastic lock seal ALS001.

A3.3. ACTIVATION OF THE REMOTE ACTUATOR

The remote actuator activates the system by releasing pressure from the LOP line after breaking the seals maintaining pressure in the LOP line when pressing the knob of the actuator. Description of the activation is shown on the figure below.



Procedure of manual activation

Step 1: Firmly pull the safety pin and tear the plastic lock seal;

Step 2: Strike the red knob.



Do not manually activate the system without reason. Use manual activation only in case of reasonable suspicion of fire in the protected enclosure.



Do not manually activate the system if persons are present in the protected enclosures.



If the system is activated wait for its activity to finish. Do not enter the protected enclosures and do not open the covers of the protected enclosure during the activity of the system.

A3.4. PRESSURISATION OF THE LOP LINE

Pressurisation can be performed through the pneumatic remote actuator on end of the BlazeTube detection using a charging adapter ATC001. The pneumatic remote actuator has an outlet with thread M10x1 and contain a Schrader valve.

This valve closes and opens automatically during removal or installation of the charging adapter or the pressure gauge. It is possible to install and remove these components even when the tube is under pressure.



Proceed carefully and strictly follow the following steps. Fasten the connectors of the tubes, charging adapter and BlazeTube detection firmly and inspect. Their accidental disconnecting during pressurisation would release the extinguishing agent into the system.



Never connect or disconnect the charging adapter to the BlazeTube detection if the ball valve of the outlet of the BlazeTube detection on the cylinder valve is open.



Due to risk of activation during pressurisation of the system it is necessary to seal the outlets of the discharge networks on the cylinder valve. Remove the discharge networks and seal the outlets with the G3/8" valve plugs.



Pressurise the BlazeTube detection correctly. If the pressure in it is lower than in the cylinder, the valve piston of the cylinder could open and extinguishing agent could be released when opening the ball valve.

A3.4.1. PRESSURISATION PROCEDURE OF THE CYLINDER AND THE DETECTION SYSTEM – VALVES 201, 202, 203, 211-01, 212-01 THROUGH THE REMOTE ACTUATOR

Proceed according to instructions in this chapter to pressurise the cylinder and BlazeTube detection at once.

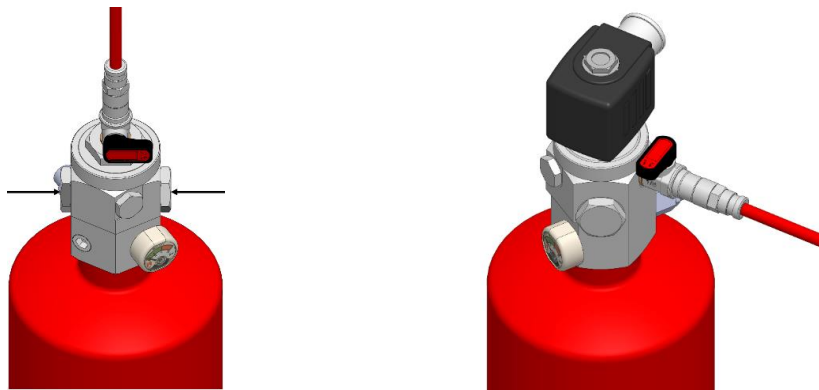
For pressurisation of the LOP line only, skip **Step 6** and **Step 7**.

Step 1:

Make sure that the discharge ports are plugged with valve plugs FVP1B06, to avoid loss of agent in case of an accidental discharge when pressurising.

Make sure that the ball valve on the cylinder valve is closed

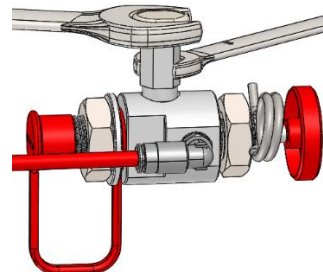
Read and write down the value of pressure from the pressure gauge on the cylinder valve.



Valve 201 (left) and valve 211-01 (right) with plugged ports and closed ball valves

Step 2:

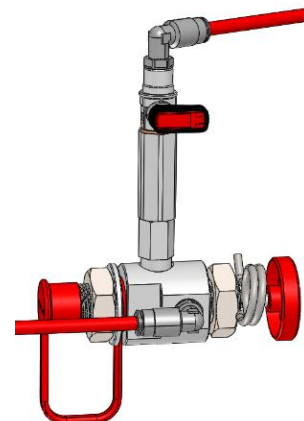
Remove the pressure gauge from the adaptor on the remote actuator. You can use size 14 spanner on the adaptor to push clockwise while unscrewing the pressure gauge with spanner size 22.



Step 3:

Make sure the ball valve on the charging adaptor is closed.

Mount by hand the charging adapter ATC001 to the remote actuator's M10x1 port by rotating clockwise. Tighten the adapter properly.



Step 4:

Set the regulator on the source of N₂ to the value at least on the level of pressure in the cylinder increased by 1 bar. For pressure filling values at different temperatures refer to

[Table](#)
[Table 16.](#)

15

or

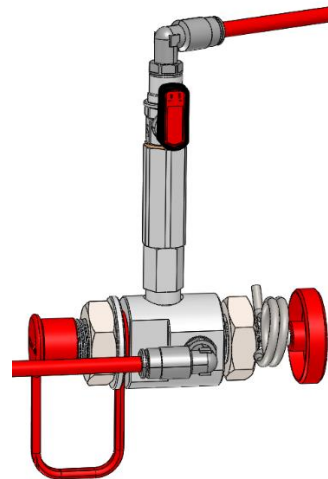
Open the regulator valve.



Step 5:

Slowly open the ball valve of the charging adapter and pressurise the LOP line first.

During pressurisation hissing can be heard. When the sound stops, pressurisation is finished. Keep the ball valve open for at least 30 seconds to stabilize the pressure in the LOP line.

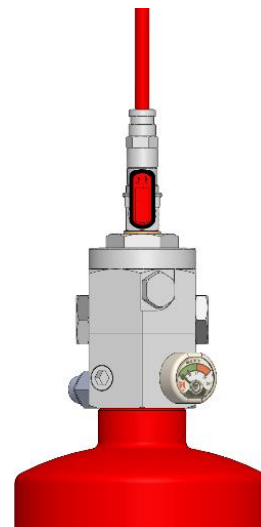


Step 6 (skip if pressurising only the LOP line):

Slowly open the ball valve on the cylinder valve and pressurise the cylinder.

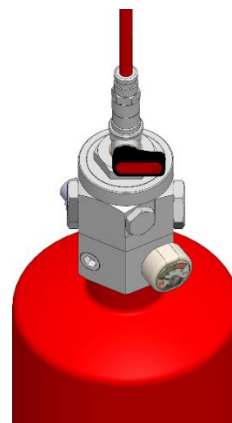
During pressurisation hissing can be heard. When the hissing stops, keep the valve open for at least 30 seconds to stabilize the pressure.

Close the ball valve on the cylinder valve, shake the cylinder several times and repeat **Step 6** until the pressure stabilises at the desired value.



Step 7 (skip if pressurising only the LOP line):

Close the ball valve on the cylinder valve.

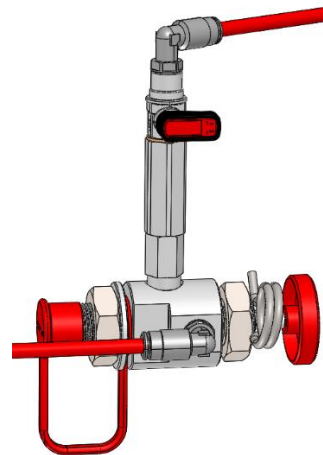


Step 8:

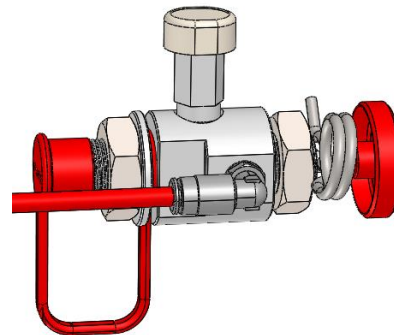
Close the ball valve on the charging adapter.

Step 9:

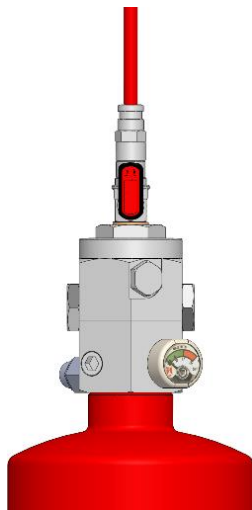
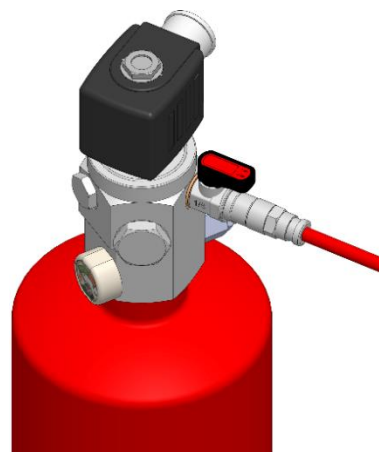
Unscrew the charging adapter from the M10x1 port of the remote actuator (with size 16 spanner). You can use size 14 spanner on the valve adapter to push clockwise while unscrewing the charging adapter.

**Step 10:**

Mount the pressure gauge back. Tighten it with spanner 22 mm.

**Step 11:**

If the pressure is not decreasing, very slowly open the ball valve on the cylinder valve. Pressures in the tube and the cylinder will equalise. Wait approximately 30 seconds.



Valve 201 (left) and valve 211-01 (right) with plugged ports and opened ball valves

Follow additional steps from Chapter [8.5.3](#).



Since this moment, the cylinder and the BlazeTube detection are connected in one pressure unit. Proceed carefully not to damage the BlazeTube detection. Its damage would cause activation of the system and release of extinguishing agent.



Do not try to remove the BlazeTube detection from the BlazeTube outlet on the cylinder valve or remove the end-of-line adapter if the BlazeTube is under pressure and the ball valve is open.



Fast and careless opening of the ball valve may activate the system and release extinguishing agent.

ANNEX 4: ELECTRIC REMOTE ACTUATORS ARA110 AND ARA120

A4.1. BASIC INFORMATION ABOUT THE COMPONENTS

The remote electric actuator is an optional component of the BlazeCut system. It operates on the principle of displacing a ball in a switch, which sends a signal to the solenoid on the cylinder valve, when pressing the knob of the actuator. This results in opening of the piston of the cylinder valve, activating the suppression system and completely releasing the extinguishing agent. This is the same process as during disruption of the BlazeWire (heat detector, smoke detector or heat probe) by effect of fire or heat.

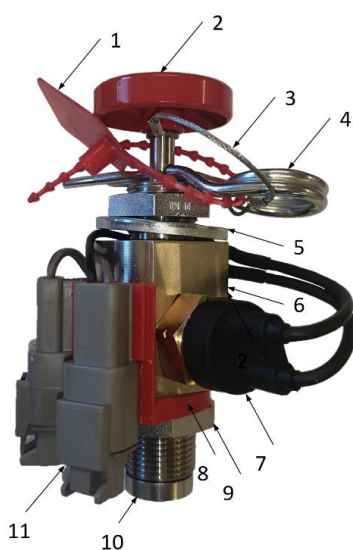
Remote pneumatic actuator ARA110 and ARA120 work on the same principle and are built from the same components, in addition the ARA120 comes with a protective steel cover.

Table 96: Remote actuators

Part №	Content
ARA110	Remote actuator electric, bulkhead mount
ARA120	Remote actuator electric, boxed. Dimensions with the knob: 135x120x90 mm

Additional parts and replacement components for electric remote actuator are listed in [Table 98](#).

Actuator material: stainless steel body, powder coated steel case.



Remote electric actuator bulk ARA110



Remote electric actuator boxed ARA120

1. Plastic lock seal ALS001
2. Red knob
3. Securing wire
4. Safety pin
5. Mounting nut and washer
6. Body of the remote actuator
7. Ball switch
8. Connector holder
9. Securing nut for the connectors holder
10. Actuator plug FAP1B04
11. Electrical connectors

Table 97: Remote actuators

Part №	Content
KARA110	Remote actuator kit electric, bulkhead mount and labels ALA006, ALA007
KARA120	Remote actuator kit electric, boxed and labels ALA006, ALA007

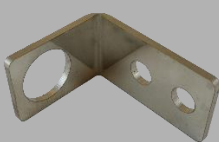
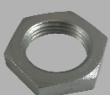


Remote pneumatic actuator kit KARA110-x



Remote pneumatic actuator kit KARA120-x

Table 98: Remote electric actuator accessories

Part №	Description	Comment	Material
APR002		Safety pin for remote actuator	galvanized steel
FAP1B04		Plug G1/4" for electric actuator ARA110, ARA120	galvanized steel, sealing
ALS001		Lock seal for remote actuator and ball valve anti tamper security lock	plastic
ANB001		Bracket for firm fixing of remote actuator	stainless steel
AWR001		Flat washer for remote actuator and nozzle assembly, M20	galvanized steel
ANR001		Nut for remote actuator for bulkhead mounting, M20	galvanized steel

ALA009		Ø 33 mm label for remote actuator "PULL PIN FIRE STRIKE KNOB"	
ALA011		90 x 80 mm label for electric remote actuator box, includes 3 x overlay stickers for agents (foam, powder, gas) "In case of fire" <ul style="list-style-type: none"> Remove safety pin Strike knob firmly" 	

A4.2. INSTALLATION OF THE REMOTE ACTUATOR

Always place the remote actuator in the proximity of the protected enclosure so that it is easily accessible when necessary. Do not place it in the area of expected fire, where manual activation after the fire has started, is not possible.

Label the remote actuator visibly with corresponding label ALA007.

The electric actuator ARA110 is suited for mounting onto a custom bracket, cover, dashboard or wall using the included fastening nuts and washers (see chapter [A4.2.1](#)).

The electric actuator ARA120 with a cover is suited to wall mounting through mounting holes. Use suitable and durable screws to firmly secure the cover for the manual actuator (see chapter [A4.2.2](#)).

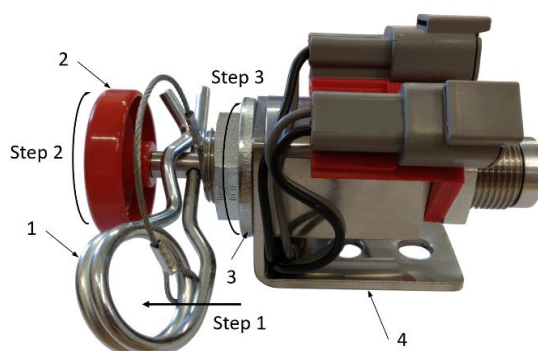
A4.2.1. INSTALLATION OF ARA110

IMPORTANT!

Before mounting in the following position, partial disassembly is required. For the assembly and disassembly of the actuator do not use other tools than mentioned in the procedure, as they can damage functional surfaces of the components.

When mounting the actuator onto a custom bracket, cover, wall etc., follow the installation figures below.

Before mounting in the following position, partial disassembly is required. For the disassembly do not use any tools, as they can damage the surfaces of the components.



Electric actuator ARA110 – front mounting

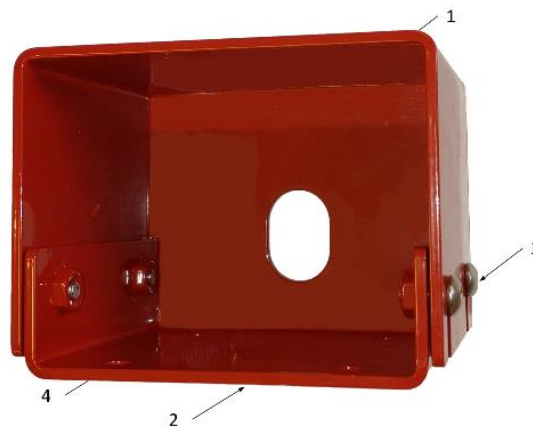
1. Safety pin
2. Red knob
3. Nut and washer – keep the order of components as shown on the figure
4. Bracket (e.g., ANB001) or a solid wall with a hole of Ø 21 mm

- Step 1:** Put your finger into the safety pin, to use it as a lever;
- Step 2:** Grab the red knob with hand and unscrew it;
- Step 3:** Remove the safety pin, securing wire, nut and washer;
- Step 4:** Install the actuator to the bracket;
- Step 5:** Reinstall the washer and nut, and tighten them with a 27 mm spanner;
- Step 6:** Reinstall the securing wire and safety pin;
- Step 7:** Put your finger into the safety pin, grab the red knob with hand and screw it on the shaft;
- Step 8:** Install the bundled plastic lock seal ALS001.

A4.2.2. INSTALLATION OF ARA120

ARA120 is designed for a wall mount installations, for fixed installations in interior to mobile equipment in harsh environment due to its robust construction and stainless-steel materials.

Before installation of the actuator to the desired location, partial disassembly is required.

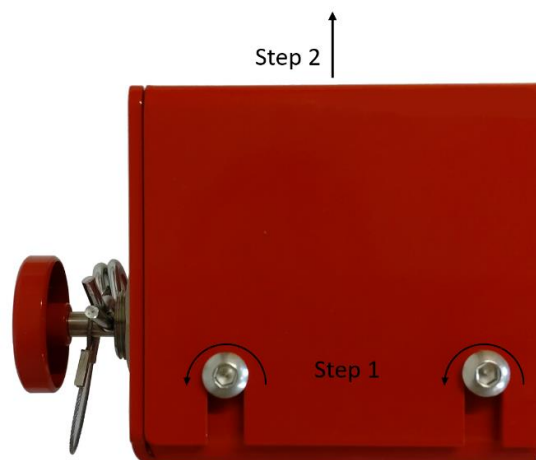


Steel cover of the Actuator ARA120

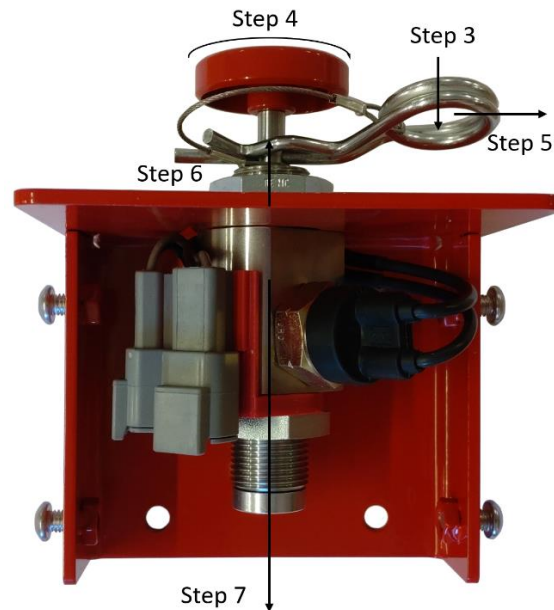
- 1. Top cover
- 2. Bottom cover
- 3. Fasteners for the cover
- 4. Mounting holes $\varnothing$ 7 mm (mounting screws are not included)

IMPORTANT!

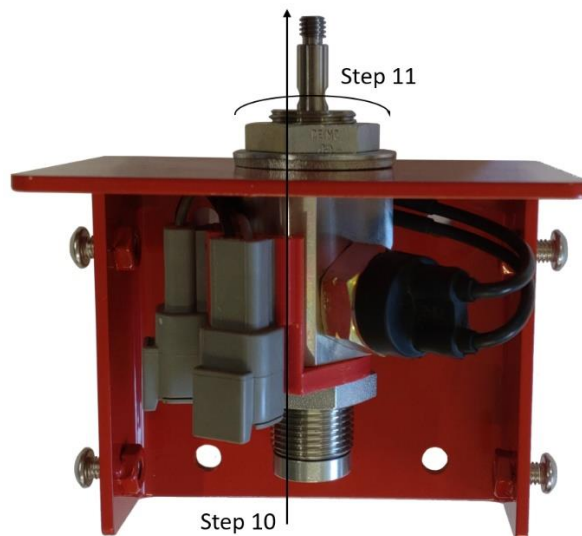
When following Step 3, Step 4 and Step 5, for assembly or disassembly, do not use any tools as they can damage functional surfaces of the components.



- Step 1:** Loosen the four screws on the actuator steel cover;
- Step 2:** Remove the top cover;



- Step 3:** Put your finger into the safety pin, to use it as a lever;
- Step 4:** Grab the red knob with hand and unscrew it;
- Step 5:** Remove the safety pin and securing wire;
- Step 6:** Remove the nut and the washer;
- Step 7:** Take out the actuator body from the cover;
- Step 8:** Make holes to the wall on the desired location, following the pattern on the bottom cover;
- Step 9:** Secure the bottom cover to the wall (mounting screws are not included);



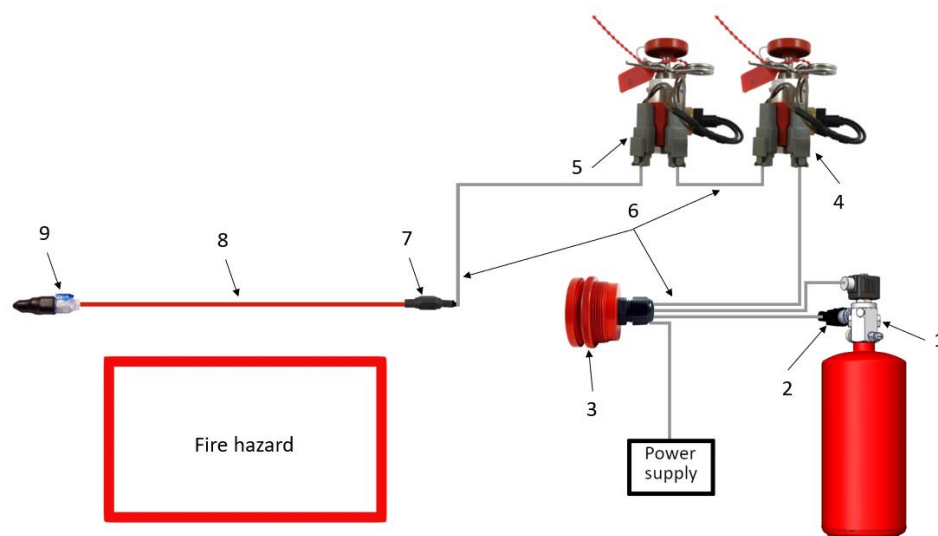
- Step 10:** Put the actuator body back to the cover;
- Step 11:** Reinstall the washer and nut, and tighten them with a 27 mm spanner
- Step 12:** Reinstall the securing wire and safety pin;
- Step 13:** Put your finger into the safety pin, grab the red knob with hand and screw it on the shaft;
- Step 14:** Put on the top cover and tighten the for screw on the cover;
- Step 15:** Install the bundled plastic lock seal ALS001.

A4.2.3. INSTALLATION OF ARA110 OR ARA120 INTO A SYSTEM

The remote electric actuator can be installed in several ways to work in the desired configuration. It can be installed at the end of the LHD line, or in between the end-of-line resistor and the cylinder valve. Using multiple actuators in series and combination of ARA110 with ARA120 is possible.

Table 99: Remote electric actuator configurations

Configuration №	Valve type	Number of LHD lines or el. cables	Number of electric actuators	Method of connection between electric actuators
1.	21x	1	1	-
2.	21x	1	2	serial
3.	21x	2	2	separate



Configuration № 2 of a detection system with electric actuators

1. BlazeCut C Series system with 211 or 212 valve
2. Pressure Switch APS001/Pressure Transducer ATA100
3. Alarm panel
4. Electric actuator ARA110
5. Optional secondary Electric actuators ARA110 or ARA120
6. Electrical cable
7. Electrical splice AES3550-2
8. BlazeWire or detector
9. End-of-line resistor AER001

Other configuration options are possible. Contact your supplier of the BlazeCut system for more information.

A4.3. ACTIVATION OF THE REMOTE ACTUATOR

It operates on the principle of press/release of a ball in a ball switch, which sends a signal to the solenoid, when the strike knob is pressed. Description of the activation is shown on the figure below.

Step 1: Pull the safety pin from the actuator

Step 2: Strike the red knob



Procedure of manual activation



Do not manually activate the system without reason. Use manual activation only in case of reasonable suspicion of fire in the protected enclosure.



Do not manually activate the system if persons are present in the protected enclosures.



If the system is activated wait for its activity to finish. Do not enter the protected enclosures and do not open the covers of the protected enclosure during the activity of the system.

Please note any suggestions for BlazeCut to improve our manuals and email us at technical@blazecut.com

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