

# **Technical Documentation Installation and Service Manual**

## **Automatic Fire Suppression System**

**BlazeCut TD100EA**

**BlazeCut TV100FA**

**BlazeCut TD200EA**

**BlazeCut TV200FA**

**BlazeCut TD300EA**

**BlazeCut TV300FA**

**BlazeCut TD400EA**

**BlazeCut TV400FA**

## 1. INTRODUCTION

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### MANUFACTURER INFORMATION

BlazeCut s.r.o., Brusnicová 3299/7, 900 25 Chorvátsky Grob, Slovak Republic

[www.blazecut.com](http://www.blazecut.com); [info@blazecut.com](mailto:info@blazecut.com)



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### INSTRUCTIONS FOR USE OF THE MANUAL

Any person performing installation, inspection, maintenance or replacement of components or any interference with the BlazeCut system shall have this manual available, read it and proceed solely in accordance with it.

Failure to follow the instructions in this manual may result in system malfunctioning, cause damage to the protected device and presents serious danger to life and health of persons.

This document is supplied with the BlazeCut system. The system operator shall keep this manual during the operating life of the system and provide it to the persons performing installation, inspection, maintenance or replacement of components.

The operator of the system is obliged to provide necessary information for persons entering the protected area about presence of the system and risks arising out of operation of the system and provide appropriate training and information for operators of the system in case of fire.

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### WARNINGS AND CAUTIONS



**This symbol in the text represents warning of specific risk, danger, or warning of described procedure. Failure to follow the instructions in the text marked with this symbol may result in damage to property, loss of warranty, unforeseeable event or threat to safety, health or life of persons performing the operation on the system or persons in their vicinity. Do not proceed contrary to the instructions marked with such symbol.**

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### FURTHER INFORMATION

BlazeCut® is a registered trademark of BlazeCut s.r.o. 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 BlazeCut system manufacturer:

BlazeCut s.r.o., Brusnicová 3299/7, 900 25 Chorvátsky Grob, Slovak Republic

[www.blazecut.com](http://www.blazecut.com)

[info@blazecut.com](mailto:info@blazecut.com)

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## 2. BASIC INFORMATION ABOUT THE SYSTEM

Commercial name: BlazeCut

Characteristics: automatic fire suppression system

BlazeCut system is designed to protect small closed spaces with greater risk of fire. BlazeCut system operates automatically without any external power source. Extinguishing agent is stored in a storage tube, which also serves to apply extinguishing agent. In case of fire the detection tube degrades by the effect of fire or high temperature and melts. Extinguishing agent is then released through a „nozzle“ thus created.

Depending on the type used, system BlazeCut is suitable for the protection of spaces such as:

- boat engine rooms,
- engine compartments of road vehicles (cars, SUVs, vans, recreational vehicles, minibuses, old timers, etc.),
- engine compartments of other vehicles (quads, small tractors, motor mowers, motorized carts, etc.),
- electrical switchboards, fuse boxes, electrical supply sources, battery spaces, car batteries, inductors,
- other enclosed spaces with risk of fire (network installations, servers, audio-video equipment, etc.).

### OPTIONAL COMPONENTS

System BlazeCut enables to send a signal after its activation via additional components using pressure switch with electronical output of notifying the activation of the system. These components can be connected to any type of system BlazeCut. For further information contact the supplier of BlazeCut system. Description included in Annex no. 1.

System BlazeCut can use external alarm or signaling unit connected to the pressure switch, the alarm or signaling units alert the driver or personnel with light and sound signals in case of fire or system activation. These components can be connected to any type of system BlazeCut equipped with a pressure switch. For further information contact the supplier of BlazeCut system. Description included in Annex no. 2.

### 2.1. PACKAGE CONTENTS

**Table 1. Standard package contents**

Component	Amount
pressure tube with pressure gauge	1
clean extinguishing agent HFC-227ea/HFC-236fa	depending on the type 0,25 – 1 kg
Installation cable ties	depending on the type
information sticker for labelling the protected enclosure	1
user manual	1

BlazeCut system was designed and tested as a whole using original components with specific properties. Using other components and spare parts than those supplied by the manufacturer is prohibited and may change the functionality of the system and causes loss of warranty. Fastening components for detection tube are exempted, provided other installation and maintenance instructions are followed and provided they are suitable for use in the protected enclosure (heat resistance etc.). To order original spare parts and for further information contact the supplier of BlazeCut system.

## 2.2. TECHNICAL SPECIFICATION AND TYPES

**Table 2. Types of BlazeCut system:**

Type name	Amount of extinguishing agent (grams)	Caption
TD100EA	250 ± 5	T - tube (tube)
TV100FA	250 ± 5	D – systems designated to devices (D – device)
TD200EA	500 ± 5	V – systems designated to vehicles (V – vehicle)
TV200FA	500 ± 5	Three digit number – approximate length of the tube in cm
TD300EA	750 ± 10	EA - extinguishing agent used HFC-227ea
TV300FA	750 ± 10	FA - extinguishing agent used HFC-236fa
TD400EA	1000 ± 10	
TV400FA	1000 ± 10	

Inner diameter of the tube: 15 mm

Outer diameter of the tube: 18 mm

Standard operation pressure at 20°C: 2 – 6 bar\*

\*when using a type with the pressure switch, the system is pressurized with nitrogen (N<sub>2</sub>) to higher pressure as normal vapor pressure of the extinguishing agent to prevent from false alarms, see also Annex no.1 of the manual

Minimum and maximum operation temperature (without the pressure switch):

- from - 40°C to + 80°C for systems with HFC-236fa extinguishing agent
- from - 40°C to + 60°C for systems with HFC-227ea extinguishing agent

Minimum and maximum operation temperature (with the pressure switch):

- from - 20°C to + 80°C for systems with HFC-236fa extinguishing agent
- from - 20°C to + 55°C for systems with HFC-227ea extinguishing agent

Burst pressure: about 20 bar

Material of the tube: heat sensitive plastic

Material of the fittings: stainless steel

Material of the pressure gauge: brass

## 2.3. USE OF THE SYSTEM

BlazeCut system is designed for protection of closed spaces from fire using volume fire suppression. Specific extinguishing agent concentration must be reached in the space, which depends on the amount of extinguishing agent used. The indicative maximum volumes of the protected space are listed below:

**Table 3. Indicative maximum volume of the protected space by system BlazeCut**

Type of system	Agent	Max. volume of the protected enclosure (m <sup>3</sup> ) at T <sub>min</sub> *	Max. volume of the protected enclosure (m <sup>3</sup> ) at 20°C*	Max. volume of the protected enclosure (m <sup>3</sup> ) at T <sub>max</sub> *
TD100EA	HFC-227ea	0,20	0,25	0,29
TV100FA	HFC-236fa	0,22	0,28	0,35
TD200EA	HFC-227ea	0,39	0,50	0,58

TV200FA	HFC-236fa	0,43	0,56	0,69
TD300EA	HFC-227ea	0,59	0,75	0,87
TV300FA	HFC-236fa	0,65	0,84	1,04
TD400EA	HFC-227ea	0,78	1,01	1,16
TV400FA	HFC-236fa	0,86	1,12	1,39

\* Maximum volume of the protected space, reaching extinguishing concentration of 12% of the volume of the space.  $T_{min}$  a  $T_{max}$  – see chapter 2.2. The volume of the equipment or devices inside the space such as the engine block inside the engine compartment etc. shall not be excluded from the calculation.

The fire suppressing depends on many other factors apart from the amount of extinguishing agent, such as the properties of the flammable substances in the space, shape and degree of closure of the space, air circulation and ambient temperature. In order to reach desired extinguishing concentration and effective use of BlazeCut system consult the choice of type, amount of filling, use of extinguishing agent and installation method with the supplier of the system.

It is necessary that conditions in the protected area are in accordance with allowed parameters of the system, especially minimum and maximum temperature in the protected area.

Remember that there are a lot of factors and variables that affect the extinguishing process in case of fire. Is not possible to guarantee total suppression of fire in the protected enclosure under all circumstances.

System BlazeCut is designed to protect of 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.

Use of the system is also limited by the properties of extinguishing agent and its possible application. Detailed information is included in Chapter 8.

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#### WARNING



**Install and use system BlazeCut only with originally supplied components. Do not replace anything in the system, use only original components and spare parts. Use of components not approved by the manufacturer causes loss of warranty, may cause malfunction of the system and provides threat to safety and health of people.**



**System BlazeCut is designed as independently operating unit. It is not possible to connect several independent systems into one unit.**



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



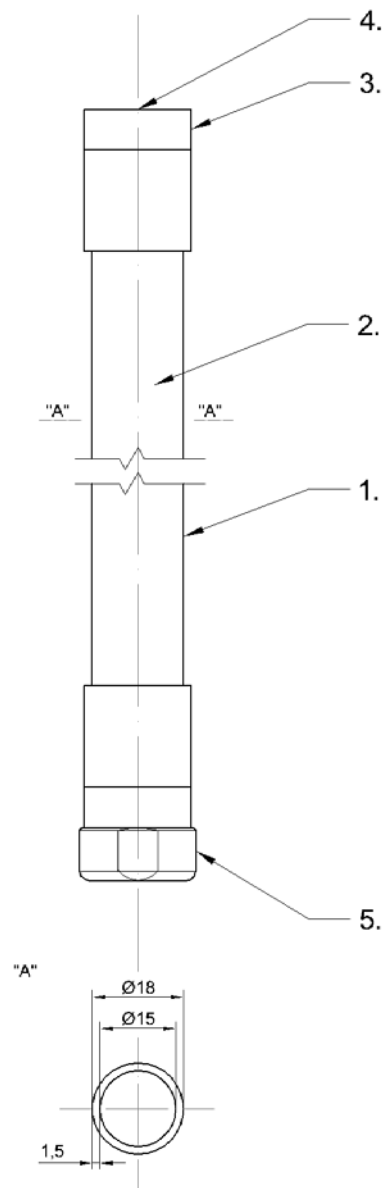
**The system may be installed only by persons older than 18 years, physically and mentally capable. Incorrect interference with the system may cause malfunction of the system and provides threat to safety and health of people.**



**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. COMPONENTS OF THE SYSTEM AND THEIR DESCRIPTION**

- Fig. 1** Scheme of the system and description of components, all data in millimeters
1. Pressure tube
  2. Extinguishing agent depending on the type HFC-227ea or HFC-236fa
  3. Fitting of the tube with outlet M10x1 and with filling valve
  4. Sealing screw (inside the fitting)
  5. Pressure gauge of the system



**PRESSURE TUBE**

Pressure tube serves as storage of extinguishing agent, depending on the type can be filled by extinguishing agent HFC-227ea or HFC-236fa, the amount depends on the type. Extinguishing agent is in the form of liquefied gas. Pressure in the cylinder varies depending on the ambient temperature.



**Pressure tube is under constant pressure. Do not damage the tube, do not puncture or throw. During transportation secure against movement. During transfer do not rub against the ground. Do not mend damaged tube. Do not store or transport in vicinity of strong sources of heat, aggressive chemical substances (caustic, corrosive substances), prevent contact with sharp objects, vibrations or loading with other objects. Store in dry and well ventilated rooms.**



**Always handle the pressure tube as if it were under pressure, unless it is directly verified that it is completely empty.**

## FITTINGS OF THE TUBE

Fittings of the tube close the tube and keep the system under pressure. Valves and pressure gauge are slotted in them. They enable connecting additional components – pressure switch.



**Do not try to remove the fittings of the tube if it is under pressure. Protect the fittings from corrosive substances during storage and transportation.**

## PRESSURE GAUGE

Current pressure in the system can be determined by reading the value on the pressure gauge, which is mounted on the fitting tube. Try to install the pressure gauge so that the pressure values can be read.

## 4. INSTALLATION INSTRUCTIONS

1. The tube in the packaging is reinforced with cable ties. Cut the cable ties. Proceed carefully not to damage the tube.
2. The packaging contains installation cable ties for installation in the protected enclosure. It is possible to use other method of mounting depending on the method of installation in the protected enclosure provided other installation instructions are followed and provided they are suitable for use in the protected enclosure (heat resistance etc.). If possible it is recommended to use durable mounts such as rubber insulated metal clamps to prevent detachment of the tube in case of fire. Do not use a steel fastening material for installation (steel clamps, sheet, wire etc.) that might be in contact with the pressure tube.
3. Shape the tube into desired shape during installation depending on the shape of the protected enclosure.
4. Place self-adhesive information sticker to label the protected enclosure onto a visible place after installation. Place the sticker on even surface. Clean the surface thoroughly before sticking. Do not place the sticker at places reaching high temperatures (engine block etc.)

### 4.1. FOLLOW THE FOLLOWING INSTRUCTIONS DURING INSTALLATION

1. Place system BlazeCut in the proximity of the protected equipment where the risk of fire is greatest (in the proximity of engines, parts of the systems reaching highest temperatures, systems containing flammable liquids or gases, protected objects, electrical installations, connections, circuit breakers, inductors, batteries etc.).
2. For maximum efficiency and engine protection, do not place of the system BlazeCut 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.
3. Proceed carefully during installation not to damage the tube with sharp objects. Do not break the tube, do not bend forcibly. Make sure not to damage the tube after closing the protected enclosure (e.g. after closing the engine compartment, installation of covers, equipment etc.) and also that no part is hit by moving parts of the engine (engine fans etc.)
4. System BlazeCut must be firmly mounted in the protected enclosure so that it does not move. Use included installation cable ties or other suitable methods of fastening. The maximum distance between the mounts shall not be more than 20 cm.
5. Fasten the system to firm parts of the construction in the protected enclosures. Do not fasten to parts, which move during operation of the vehicle. Make sure that the fastening components are not damaged during operation of the vehicle. If any part of system BlazeCut moves out of its place of installation extinguishing effect of the system may be decreased, the part or the vehicle may be damaged.
6. System BlazeCut cannot be to in direct contact with the parts or in immediate proximity of parts that heat to temperature of more than 80°C during operation when using HFC-236fa agent and more than

60°C when using HFC-227ea agent (e.g. engine block, engine turbocharger, exhaust pipes, heated parts of inductors etc.).

7. Install the system so that it is not exposed to aggressive chemical substances (caustic, acids, solvents, corrosive substances etc.) and to direct influence of weather conditions.

8. When fastening the system make sure not to damage other parts of the vehicle.

9. The tube cannot be in direct contact with galvanized or zinc plated objects as these have adverse effects on plastics in general and may cause to plastic tube galvanic corrosion what might result in a short period of time to degradation and damage of the tube.



**Be aware of the danger posed by the protected device. Do not install and perform maintenance of the system while the engine of vehicles 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.**



**The tube has minimum bending radius of approximately 16 cm. Do not bend the tube under this radius. Excessive bending can damage the tube (rupture, breaking) and destroy the tube. As a result of the damage the extinguishing agent can splash out and provide threat to health of persons.**

## 5. INSTRUCTIONS FOR FUNCTIONALITY INSPECTION AND MAINTENANCE

System BlazeCut does not require any special maintenance. It is recommended to occasionally visually inspect the system and its state. Inspect the pressure in the system. Inspect the firmness of the fastening.

### 5.1. VISUAL INSPECTION

During the movement of the tube the movement of the bubbles of the vapors of extinguishing agent is visible. This indicates that extinguishing agent is in the tube and system BlazeCut is functional. Visually inspect the overall state of the equipment. Focus on possible damage: deep grooves on the tube, signs of strain damage on the tube (change of color of the tube), dents on the tube and other deformations, corrosion of the metals parts of the system (fittings of the tube, pressure gauge), other visible signs of damage. Inspect the fitting parts of the system for any leaks and signs of leakage of extinguishing agent from the system.

### 5.2. PRESSURE INSPECTION OF THE SYSTEM

Due to physical and chemical properties of the agent, pressure in the tube can vary depending on the ambient temperature. The higher the ambient temperature, the higher pressure in the tube and vice versa at very low temperatures the pressure of agent vapors is zero (see Chapter 8.).

Indicator on the pressure gauge can vary from 0 bar (when temperatures are very low) to 15 bar (when temperatures are very high). This is not a sign of defect in the system.

### 5.3. IMPORTANT: IN THESE CASES SYSTEM BLAZECUT MUST BE REPLACED:

1. The system was used or emptied from other reason.
2. The system was exposed to direct fire.
3. The tube shows signs of damaged as described in chapter „Visual Inspection“.
4. Metal parts of the equipment are corroded or shows visible signs of damage as described in chapter „Visual Inspection“.



## 6. INSTRUCTIONS FOR PROCEDURE IN CASE OF FIRE AND AFTER SYSTEM ACTIVATION



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 fuel/gas) in order to protect the persons and property according to applicable legislation.

After using the system in case of fire it is not necessary to clean the protected enclosure. Extinguishing agent does not leave residue. Ventilate the protected enclosure properly, do not enter in the area before ventilation. Remove the used system from the protected enclosure. The same procedure should be followed after the release of extinguishing agent from other reasons (system damage etc.).



In case of fire the system activates automatically burning the tube without previous warning. In case of fire do not come into direct proximity of the system, there is a risk of being affected by extinguishing agent.



In case of activation of the system do not enter the protected enclosure and do not open the covers of the protected enclosure, wait for total release of extinguishing agent.

## 7. WARNINGS



The system is under constant pressure. Any interference with the system is prohibited.



Any interference or repair of the system may be performed by qualified persons ensuring correct technical practice. Do not repair or replace anything in system BlazeCut. System interference or replacements shall result in loss of warranty and may cause malfunction of the system or provide danger to persons.



Do not interfere with the system if it was exposed to high temperature (as a result of operation of the protected device or after exposure to fire etc.). If the system is hot, the temperature of extinguishing agent increases and pressure in the system increases. If the pressure in the system is higher than 15 bar the system is reaching burst pressure. In this case the tube must not be mechanically stressed. Release of a hot extinguishing agent under high pressure can cause serious injury. Wait till the system cools down.



In case of leakage of liquid extinguishing agent during handling the system use impervious working gloves.



Do not try to suppress the fire holding the system BlazeCut close to fire or by throwing it to the fire. Danger of serious injury.

## 8. INFORMATION ON EXTINGUISHING AGENT USED

System BlazeCut uses extinguishing agent depending on the type:

- HFC-236fa; chemical name: 1,1,1,3,3,3-Hexafluoropropane. It is halogen derivative of hydrocarbons. It is liquefied hydrocarbon gas, colorless, slightly ethereal odor.
- HFC-227ea; chemical name: 1,1,1,2,3,3,3-Heptafluoropropane. It is halogen derivative of hydrocarbons. It is liquefied hydrocarbon gas, colorless and odorless.

The system contains fluorinated greenhouse gases covered by the Kyoto Protocol.

The extinguishing agent HFC-227ea used in the system BlazeCut is UL recognized and FM Approved.



The extinguishing agent HFC-236fa used in the system BlazeCut is UL recognized.



Amount and type of extinguishing agent is stated in chapter 2.2. and on information label of the system.

### 8.1. DESCRIPTION OF EXTINGUISHING AGENT

Extinguishing agent is clean extinguishing medium, used in system BlazeCut for volume fire suppression. Extinguishing effects are due to cooling and anticatalyst 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.

### MAIN ADVANTAGES OF 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 or objects
- zero ozone depletion potential (ODP - Ozone Depletion Potential)

### 8.2. PERMISSIBLE USES

Extinguishing agent 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.

After long exposure of extinguishing agent to heat the agent decomposes thermally creating dangerous products. In case of installation to enclosures with risk of smoldering solid (e.g. wood, coal, paper, textiles etc.) use the system BlazeCut with additional components – pressure switch and outlet for signalization of system activation.

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 also in case when the extinguishing concentration does not exceed the LOAEL level (see toxicity data in the 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.

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.



**During the system activation the extinguishing agent is discharged from the tube under high pressure and at very low temperature. No permanent work place should be placed less than 1 meter from the system if the system is not installed in enclosure that prevents the extinguishing agent being discharged onto the people or no other barriers are in place preventing the extinguishing agent being discharged onto the people.**

### 8.3. IMPROPER USES

Extinguishing agent is not suitable for fire suppression in spaces with:

- Certain chemicals or mixtures of chemicals, such as cellulose nitrate and gunpowder, that 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 peroxidase and hydrazine.

### 8.4. SOME PHYSICAL AND CHEMICAL PROPERTIES

**Table 4.** HFC-236fa

Name	HFC-236fa
<b>Global warming potential</b>	<b>9810</b>
<b>Ozone depletion potential</b>	<b>0</b>
Chemical name	1,1,1,3,3,3-Hexafluoropropane
Formula	CF <sub>3</sub> CH <sub>2</sub> CF <sub>3</sub>
CAS number	690-39-1
Extinguishing concentration* (% of volume)	6,7
Boiling point (at pressure of 1 bar) (°C)	-1,4
Freezing point (°C)	-94
Critical temperature (°C)	124,9
Critical pressure (kPa)	3200
Density in liquefied form (at 25°C) (kg/m <sup>3</sup> )	1360
Density of saturated vapors (at 25°C) (kg/m <sup>3</sup> )	272,4
LC <sub>50</sub> (4 h inh.)	457 000
Toxicity AEL (ppm)	1000
Toxicity NOAEL (ppm)	90 000
Toxicity LOAEL (ppm)	105 000
Flammability	nonflammable substance
Form	liquefied gases
Color	colorless substance
Odor	slightly ethereal

\*Extinguishing concentration determined for reference substance n-Heptane

Relation of the HFC-236fa vapor pressure from temperature:

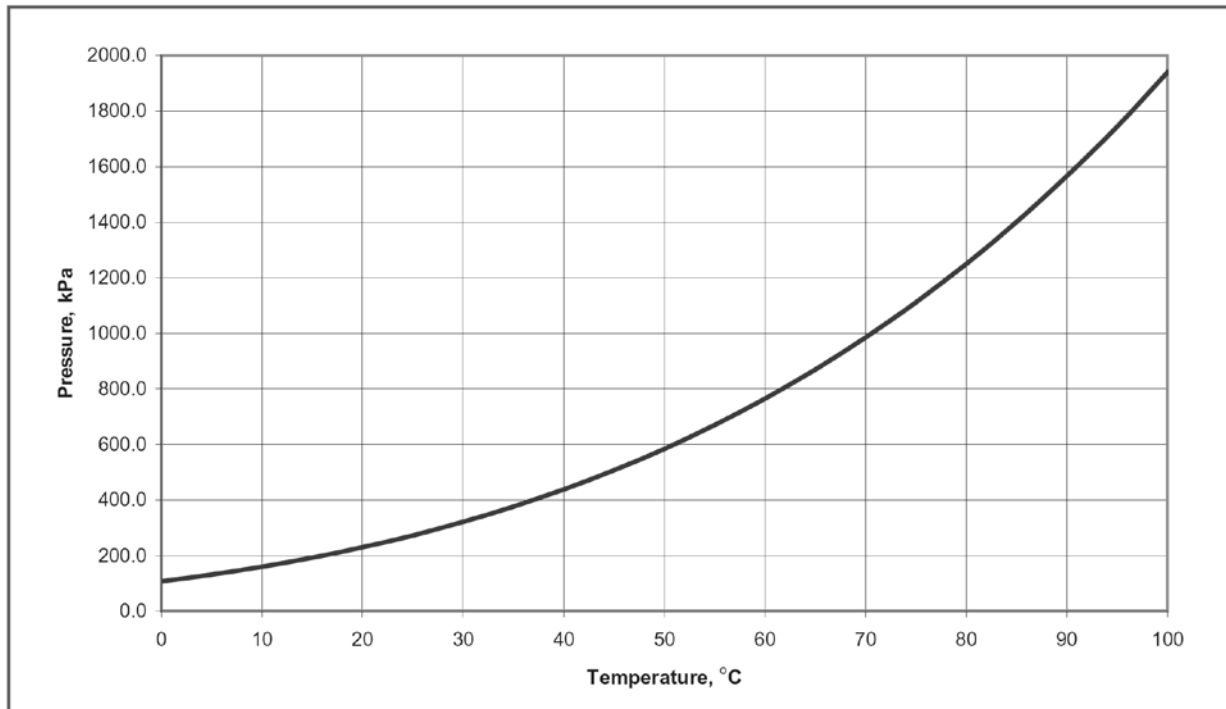
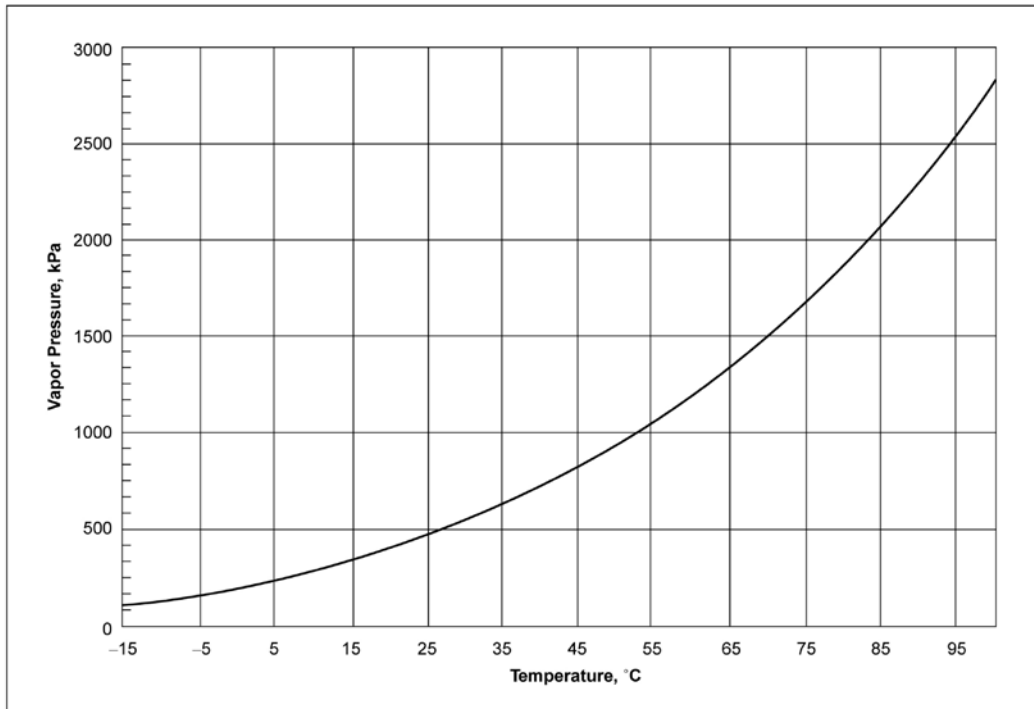


Table 5. HFC-227ea

Name	HFC-227ea
<b>Global warming potential</b>	<b>3220</b>
<b>Ozone depletion potential</b>	<b>0</b>
Chemical name	1,1,1,2,3,3,3-Heptafluoropropane
Formula	CF <sub>3</sub> CHFCF <sub>3</sub>
CAS number	431-8-90
extinguishing concentration* (% of volume)	6,4
Boiling point (at pressure 1 bar) (°C)	-16,34
Freezing point (°C)	-131
Critical temperature (°C)	101,75
Critical pressure (kPa)	2925,0
Density in liquefied form (at 25°C) (kg/m <sup>3</sup> )	1387,7
Density of saturated vapors (at 25°C)	454,73
Toxicity LC50 (4 h inh.)	800 000
Toxicity AEL (ppm)	1000
Toxicity NOAEL (ppm)	100 000
Toxicity LOAEL (ppm)	150 000
Flammability	nonflammable substance
Form	liquefied gas
Color	colorless substance
Odor	odorless

\*Extinguishing concentration determined for reference substance n-Heptane

Relation of the HFC-227ea vapor pressure from temperature:



Detailed information on extinguishing agent is included in safety data sheet.

### 8.5. WARNINGS



Extinguishing agent under normal (atmospheric) pressure evaporates quickly. Do not breathe vapors. 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.



Extinguishing agent in liquid form may cause frostbite upon contact with eyes. Avoid contact of liquid extinguishing agent with eyes. For installation, inspection, maintenance and repair of the system always use eye protection - wear appropriate protective glasses with side-shields.



Extinguishing agent in liquid form may cause frostbite upon contact with skin. When leak of liquid extinguishing agent from the system is detected use appropriate protective impervious working gloves.

#### NOTE:



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.

## 9. FIRST AID INSTRUCTIONS

In case of direct contact with extinguishing agent proceed as follows:

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### GENERAL INFORMATION:

In all cases of doubt, or when the symptoms persist, seek medical attention.

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### FOLLOWING INHALATION:

Move the person to fresh air and keep at rest in a position comfortable for breathing. If the person is not breathing or if breathing is irregular or breathing has stopped, administer artificial respiration or oxygen by trained personnel. Loosen tight clothing such as collar, tie, waistband, and belt. Do not administer adrenaline and its derivatives. Seek medical attention immediately.

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### FOLLOWING EYE CONTACT:

Carefully flush/irrigate with water for several minutes. If possible remove contact lenses, if they are inserted. Continue flushing. Seek medical attention.

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### FOLLOWING SKIN CONTACT:

Flush/irrigate the affected area with large amount of water. Do not use hot water. Remove contaminated clothing affected by extinguishing agent. If you experience frostbite, seek medical attention.

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### INGESTION:

Ingestion is not considered a potential route of exposure.

## 10. CERTIFICATION AND TESTING

Construction documentation of system BlazeCut was assessed and is in accordance with safety-technical requirements what is confirmed by expert opinion no. 05561/4/2014 issued by notified body:

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

System BlazeCut is in conformity with the construction documentation confirmed by the abovementioned expert opinion and approved by the certificate no. 05561/4/2014 issued by notified body:

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

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

Suitability, reliability and efficiency of system BlazeCut was tested and confirmed by tests in accordance with technical requirements, certificate no. B-39-00926-14 was issued by qualified notified body:

Strojírenský zkušební ústav, s.p., Hudcova 424/56b, 621 00 Brno, Czech Republic.

A copy of the technical requirements and the certificate is available at the manufacturer of system BlazeCut: BlazeCut s.r.o., Brusnicová 3299/7, 900 25 Chorvátsky Grob, Slovak Republic.

# BlazeCut components

## Pressure switch BlazeCut BC001

### 1. BASIC INFORMATION ABOUT THE COMPONENTS

Commercial name: BlazeCut BC001

Characteristics: additional components for automatic fire suppression system BlazeCut.

#### 1.1. SPECIFICATION AND DESCRIPTION OF FUNCTION

Pressure switch informs when the system is activated using external control unit or send signal to the external device to perform other operations (e.g. disconnecting the voltage supply into the protected enclosure). The switch contains cable connector, which is connected to electric cables connected to external devices.

The pressure switch reacts and send a signal in case of decrease of pressure in the system under set value. The pressure switch always send the signal when the pressure in the system decreases regardless of the cause, in case of fire, and in case of accidental activation of the system or rapid decrease of pressure in the system.

Due to physical and chemical properties of the extinguishing agent at very low ambient temperatures when the vapor pressure of the extinguishing agent is zero (see chapter 8 of the manual) the pressure switch could send a false alarm signaling zero pressure. Due to this reason when the pressure switch is used on the system it is pressurized with a nitrogen (N<sub>2</sub>) so the pressure in the system is never zero. Relation of the extinguishing agent vapor pressure from temperature described in chapter 8.4 will in this case differ and is slightly higher.

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#### OPTIONAL COMPONENTS

Cable conduit is optional component. It helps protect the pressure switch cable in case of installation in spaces, where it could be damaged (engine compartments etc.). For further information contact the supplier of BlazeCut system.

#### 1.2. USE

The pressure switch can be connected to all types of system BlazeCut described in this manual:

BlazeCut TD100EA  
 BlazeCut TV100FA  
 BlazeCut TD200EA  
 BlazeCut TV200FA  
 BlazeCut TD300EA  
 BlazeCut TV300FA  
 BlazeCut TD400EA  
 BlazeCut TV400FA

Pressure switch can be used as a universal means of sending signal after system BlazeCut activation. External systems can be informed via the signal (control panel, signalization etc.) or automatic processes can be performed with external devices (switching off electrical current, stopping the activity of the equipment etc.). The external device must be equipped to receive the signal transmitted by the pressure switch of system BlazeCut.



Install and use this pressure switch only with specific systems BlazeCut only with originally supplied components. Do not replace anything on the system. Using components not approved by the manufacturer or using with other systems causes loss of warranty, may cause malfunction of the system and presents danger to life and health of persons.

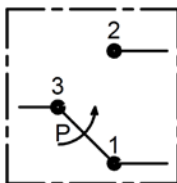
## 2. INSTALLATION AND CONNECTING

### 2.1. INSTALLATION RULES

Pressure switch cannot be in direct contact or be in immediate proximity with parts which heat to temperature of more than 80° C (e.g. engine block, engine turbocharger, exhaust pipe, heated parts of inductors etc.).

Install the pressure switch so that it is not exposed to aggressive chemical substances (caustic, acids, solvents, corrosive substances etc.) and to direct influence of weather conditions.

### 2.2. PARAMETERS AND CONNECTING THE PRESSURE SWITCH



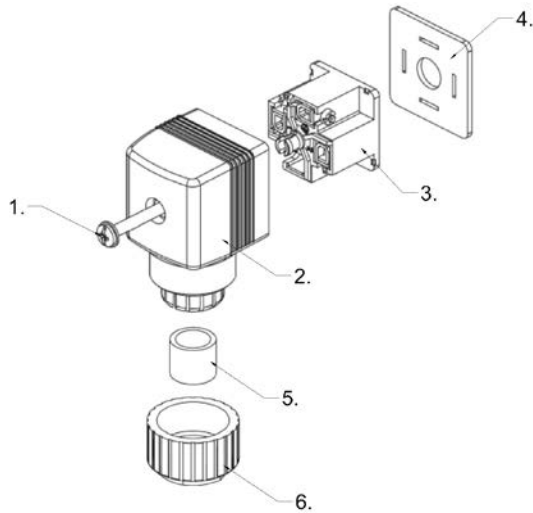
**Fig. 2** Method of closing the electrical circuit with the pressure switch on connectors

Switch point: set to 1 bar  
 Hysteresis: min. 0,5 bar / max. 1,8 bar  
 Load cycles: max. 100 / min  
 Max. voltage: 250 V  
 Switching power: from 24 V DC → 5 mA; to 250 V DC → 4A  
 IP rating: IP65, with a cable plug  
 Working temperature: from - 20°C up to 100°C  
 El. outlet: DIN EN 175301-803 A

Connecting procedure:

1. If possible place the cable from the pressure switch to external devices. Fasten the cable gradually to suitable firm constructions. Do not fasten to parts, which move during operation of the device. Leave certain free area at the tube of the system to fasten cables to cable connectors later. Make sure not to damage other parts of the vehicle when fastening the system.
2. Disconnect the cable connector from the pressure switch and connect cables to corresponding connectors depending from the method of connecting of the external device. Do not connect the cable connector to the pressure switch yet.



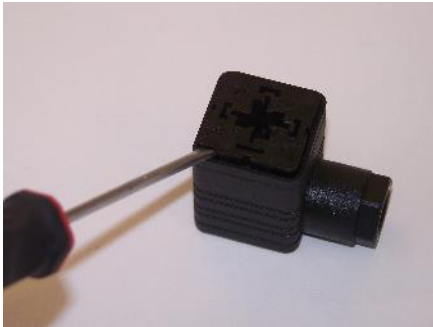


**Fig. 3** Cable connector – details

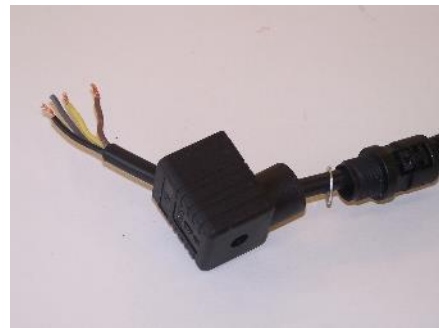
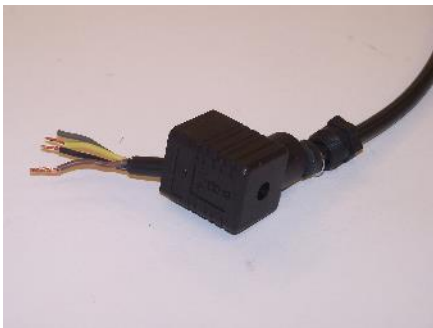
1. Screw; use screwdriver for installation and removal of connectors, tightening torque max. 5 Nm
2. Cable connector – cover of the connectors
3. Electrical connectors; use flat head screwdriver to remove from cover of the connector
4. Seal of the connector of the pressure switch
5. Seal of the entry of the cable to the cable connector
6. Security nut, in case of using cable conduit remove and use connector conduit

In case of using cable conduit as optional component proceed accordingly. Remove the security nut from the cable connector and connect the conduit to the connector using rotating terminals (see figures below on the right).

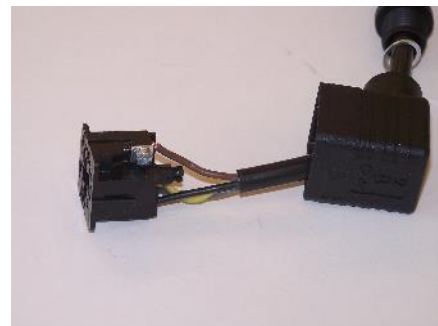
S1. Electrical connectors are ejected from the cover with screwdriver



S2. Slot the cover of the connectors with sealing and security nut onto the cable and adjust the ending of the cable if necessary. In case of use of the cable conduit remove the security nut from cable connector and slot the conduit onto the cable. (fig. on the right).



S3. Connect the cable to the electrical connectors



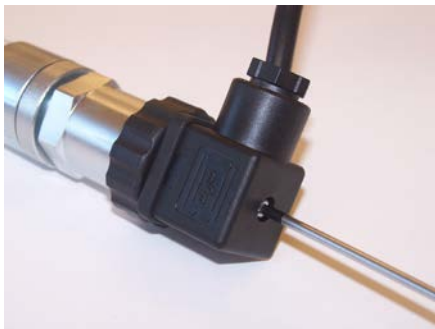
S4. Slot the electrical connectors into the cover and fasten the cable onto the cover using the security nut



**Fig. 4** Procedure of connecting the cable to the cable connector. The pictures on right demonstrate the installation when using cable conduit.

3. After connecting the cable to the external device, before connecting the cable connector to the pressure switch perform functionality test of the electrical installation as follows:
  - Short circuit the connectors of the cable connector of the pressure switch where el. cables are connected – the alarm of the system must activate or the external device must receive the signal.
4. If the test was successful, slot the cable connector onto the pressure switch according to the figures below.
5. The system is connected and functional.
6. If the tests were not successful, inspect the connection of electrical cables and that they are not damaged.

S1. Connect cable connector on pressure switch, seal must be mounted on the connector



S2. Use screwdriver to fasten, max. tightening torque 5 Nm



**Fig. 5** Connecting the cable connector to the pressure switch. The pictures on right demonstrate the installation when using cable conduit.



**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.**

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**NOTE:**

In case of malfunction or disconnecting of electrical components (external device, pressure switch, el. installation) the system remains functional, these components are not necessary for its automatic activation in case of fire.

# BlazeCut components

## Signaling unit BlazeCut BC016

### 1. BASIC INFORMATION ABOUT THE COMPONENTS

Commercial name: BlazeCut BC016

Characteristics: additional components for automatic fire suppression system BlazeCut.

#### 1.1. SPECIFICATION AND DESCRIPTION OF FUNCTION

Control unit of system BlazeCut informs the persons of decrease in pressure in the system with light and sound signals. It is connected to additional components of system BlazeCut BC001 and reacts to its signal.

Signaling unit is connected to the system with electric cables. It is connected to electric power supply of the vehicle; it can also be connected to reserve 9 V battery to secure light and sound signals under all circumstances. It is installed in the driver area so that the unit is within the driver's reach and light and sound signals may be visible and audible under any circumstances.

Signaling unit of system BlazeCut is especially suitable for use in connection with the systems installed into enclosures such as:

- motor boats,
- road vehicles (cars, SUVs, vans, recreational vehicles, minibuses, old timers, etc.),
- other vehicles (quads, small tractors, etc.)

#### 1.2. USE

BlazeCut BC016 is used in systems BlazeCut only using additional components BlazeCut BC001.

The signaling unit can be connected to the pressure switch of all types of system BlazeCut described in this manual:

BlazeCut TD100EA

BlazeCut TV100FA

BlazeCut TD200EA

BlazeCut TV200FA

BlazeCut TD300EA

BlazeCut TV300FA

BlazeCut TD400EA

BlazeCut TV400FA



**Install a use signaling unit of the system BlazeCut only with only with original supplied components. Do not replace anything in the system. 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.**

## 2. INSTALLATION AND CONNECTING



**Do not place the unit where it could affect the operation of the vehicle or reduce driver visibility from the driver cabin of the vehicle.**

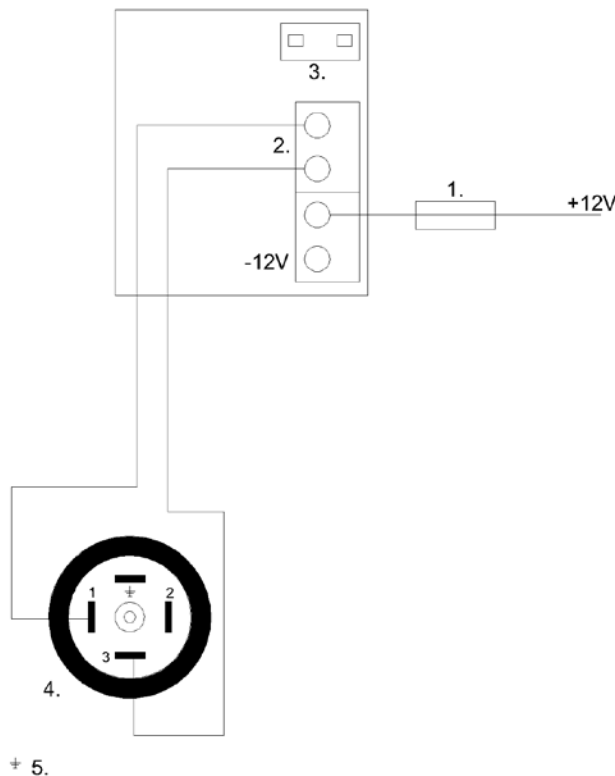


**Before interfering with electrical installation in the vehicle, make sure that the power clamps of the vehicle are disconnected from the car battery of the vehicle.**



**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.**

1. Place the signaling unit of the system in the driver cabin, so that the unit is within the driver's reach and field of vision (light and sound signals in case of system activation). It is necessary to cut out a mounting hole to install the signaling unit. Fasten the unit firmly in the cabin with supplied screws. Make sure not to damage any devices or vehicle installation.
2. Protect the part of the electrical installation placed in the protected enclosure (e.g. by cable conduit with the connector, additional components of system BlazeCut, for further information contact the system supplier).
3. If possible place the cables from the pressure switch through the vehicle to the signaling unit. Fasten the cables gradually to suitable firm parts of the vehicle construction. Leave free area around the signaling unit to later connect cables to cable connectors.
4. Proceed accordingly when connecting to the voltage source of the vehicle. The system has its own fuse on the cable connected on the source of the vehicle. If possible use suitable voltage source.
5. If possible, ground the system to the frame of the vehicle.
6. Connect the signaling unit to the pressure switch as shown on the scheme of connecting, proceed in accordance with the instructions for connecting the pressure switch.



**Fig. 6** Scheme of connecting the pressure switch to the signaling unit

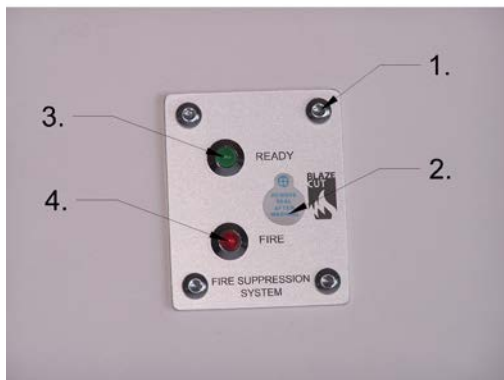
1. Fuse 1 A
2. Connectors for the pressure switch
3. Connectors for the reserve 9 V battery
4. Pressure switch BC001
5. If possible, ground the system to the frame (bodywork)

## 2.1. PARAMETRES OF SIGNALING UNIT

Material of the panel: aluminum  
Color of the panel: anodized aluminum  
Weight of the unit (gross):  $\pm 32$  g  
Dimensions: 50 x 45 x 23 mm  
Connectors: 2  
Connector of reserve source: 1  
Operation voltage: 12 V DC  
Current consumption: ready 20 mA; alarm 40 mA  
Luminous intensity: Alarm red led: 200 mCd / Ready green led: 20 mCd  
Sound power: 83 dB (d = 0,1 m)  
Frequency:  $\pm 4,1$  kHz  
Operation temperature: from - 20° C to + 70° C

## 3. DESCRIPTION OF FUNCTION OF THE SIGNALING UNIT

The signaling unit of system BlazeCut informs of decrease in pressure in the system with light and sound signals.



**Fig. 7** Signaling unit and description of diodes and function

1. Fasten the unit with screws
2. Remove the seal sticker after installation
3. Control diode "READY" is illuminated when the system is connected to voltage source
4. Control diode "FIRE" is illuminated when the system is activated



**If the system signals activation the driver must immediately stop the vehicle, stop the engine of the vehicle and perform further measures according to operation instructions of the vehicle in order to protect the persons and property according to applicable legislation.**

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## SERVICE OF THE SIGNALING UNIT

When the signaling unit is installed with a backup battery, replace the battery at least once in 12 months. If a backup battery is faced to adverse weather conditions (high temperature changes, freezing temperatures etc.) a lifespan of the battery can be shorter. In these cases it is recommended to replace the battery at least once in 6 months.

To replace the battery it is necessary to dismantle the signaling unit from place of installation, the battery is located under the control unit.

**Warning:** If a green light is illuminated on the signaling unit this is not a sign of functioning of the backup battery if the signaling unit is powered from external power source (e.g. auto battery).

# BlazeCut components

## Alarm unit BlazeCut BC004

### 1. BASIC INFORMATION ABOUT THE COMPONENTS

Commercial name: BlazeCut BC004

Characteristics: additional components for automatic fire suppression system BlazeCut.

#### 1.1. SPECIFICATION AND DESCRIPTION OF FUNCTION

The control unit system BlazeCut informs the persons of decrease in pressure in the system with light and sound signals. It is connected to additional components of system BlazeCut BC001 and reacts to its signal.

The alarm unit is connected to the system with electric cables. It is connected with external el. power source.

The alarm unit of system BlazeCut is especially suitable for use in connection with the systems installed into enclosures such as:

- electrical switchboards, fuse boxes, electrical supply sources, battery spaces, car batteries, inductors,
- other enclosed spaces with danger of fire (network installations, servers, audio-video equipment, etc.).

#### 1.2. USE

BlazeCut BC004 is used in systems BlazeCut only using additional components BlazeCut BC001.

The alarm unit can be connected to the pressure switch of all types of system BlazeCut described in this manual:

BlazeCut TD100EA

BlazeCut TV100FA

BlazeCut TD200EA

BlazeCut TV200FA

BlazeCut TD300EA

BlazeCut TV300FA

BlazeCut TD400EA

BlazeCut TV400FA



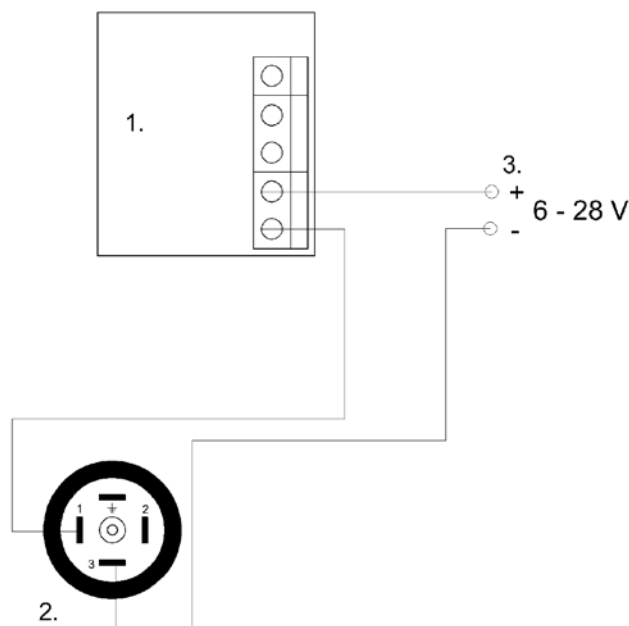
**Install a use alarm unit of the system BlazeCut only with only with original supplied components. Do not replace anything in the system. Using components not approved by the manufacturer causes loss of warranty, may cause malfunction of the system and presents danger to life and health of persons.**

## 2. INSTALLATION AND CONNECTING



**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.**

1. Place the alarm unit of the system so that it is visible and audible. Fasten the unit firmly at a suitable place with screws.
2. If possible place the cables from the pressure switch to the alarm unit. Fasten the cables gradually to suitable firm parts of the construction. Leave free area around the alarm unit to later connect cables to cable connectors. Proceed accordingly when connecting to the voltage source of the vehicle.
3. Connect the alarm unit to the pressure switch as shown on the scheme of connecting, proceed in accordance with the instructions for connecting the pressure switch.



**Fig. 8** Scheme of connecting the pressure switch to the alarm unit

1. Alarm unit
2. Pressure switch
3. Voltage source 6 – 28 V

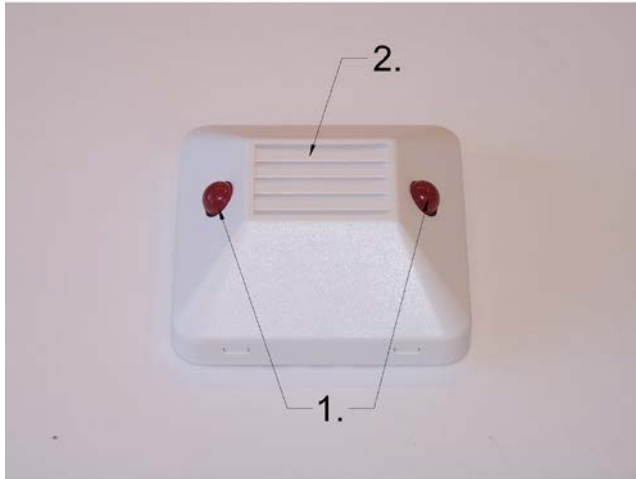
### 2.1. PARAMETRES OF ALARM UNIT

Material: self-extinguishing polycarbonate  
 Color: white  
 Weight of the unit (gross): ± 55 g  
 Dimensions: 80 x 80 x 30 mm  
 Connectors: 5  
 Operation voltage: 6 - 28 V DC  
 Current consumption: 4 mA nominal  
 Luminous intensity: 200 mCd  
 Sound power: 81 dB  
 Frequency: ± 3,6 kHz



### 3. DESCRIPTION OF FUNCTION OF THE ALARM UNIT

The alarm unit of system BlazeCut informs of decrease in pressure in the system with light and sound signals:



**Fig. 9** Description of the alarm unit

1. Light-emitting diodes, flashes in case of alert
2. Opening for acoustic detector, makes sound in case of alert