



SAFEMASTER W
Wireless Safety System
Radio Controlled Safety Module
UH 6900

Pair mode

Translation
of the original instructions

0275374



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Before installing, operating or maintaining this device, the user manual must be carefully read and understood on the enclosed CD.



Before installing, operating or maintaining this device, these instructions must be carefully read and understood.



Keep instructions for future reference



The installation must only be done by a qualified electrician!



Do not dispose of household garbage!
The device must be disposed of in compliance with nationally applicable rules and requirements.

To help you understand and find specific text passages and notes in the operating instructions, we have important information and information marked with symbols.

Symbol and Notes Statement



DANGER:
Indicates that death or severe personal injury will result if proper precautions are not taken.



WARNING:
Indicates that death or severe personal injury can result if proper precautions are not taken.



CAUTION:
Indicates that a minor personal injury can result if proper precautions are not taken.



INFO:
Referred information to help you make best use of the product.



ATTENTION:
Warns against actions that can cause damage or malfunction of the device, the device environment or the hardware / software result.

General Notes

The product hereby described was developed to perform safety functions as a part of a whole installation or machine. A complete safety system normally includes sensors, evaluation units, signals and logical modules for safe disconnections. The manufacturer of the installation or machine is responsible for ensuring proper functioning of the whole system. DOLD cannot guarantee all the specifications of an installation or machine that was not designed by DOLD. The total concept of the control system into which the device is integrated must be validated by the user. DOLD also takes over no liability for recommendations which are given or implied in the following description. The following description implies no modification of the general DOLD terms of delivery, warranty or liability claims.

Designated Use

The UH 6900 is an innovative wireless safety system to protect man and machine. A feature of the wireless safety system is its safety-oriented bi-directional radio transmission for transmitting signals between two wireless safety modules so that the two separate safety devices, each of them installed on a different machine part that is not connected to the other by wires (for example, moving machine parts), work together as one system. Therefore SAFEMASTER W radio controlled safety modules are intended for the wireless remote control of machines and plant parts that used to be controlled by cable. Their usage is only restricted by valid safety instructions that prohibit, for example, staying under suspended loads.

Designated Use

Typical applications are:

- Hazard areas where protective equipment is necessary for the safety of persons but where wiring is impossible or not reasonable, for example in applications with extremely wide-spread, extensive hazard zones;
- Mobile and stationary plants and equipment, for example large machines, assembly halls and scaffolds, conveyor belts, high-rack warehouses, warehouses, forklifts, etc.
- The radio transmission range is up to 800 m

Safety Notes



Risk of electrocution!
Danger to life or risk of serious injuries.

- Disconnect the system and device from the power supply and ensure they remain disconnected during electrical installation.
- The device may only be used for the applications described in the mutually applicable operating instructions / data sheet. The notes in the respective documentation must be heeded. The permissible ambient conditions must be observed.
- Note the VDE and local regulations, particularly those related to protective measures.



Risk of fire or other thermal hazards!
Danger to life, risk of serious injuries or property damage.

- The device may only be used for the applications described in the mutually applicable operating instructions / data sheet. The notes in the respective documentation must be heeded. The permissible ambient conditions must be observed. In particular, the current limit curve must be heeded.
- The device may only be installed and put into operation by experts who are familiar with this technical documentation and the applicable health and safety and accident prevention regulations.



Functional error!
Danger to life, risk of serious injuries or property damage.

- The device may only be used for the applications described in the mutually applicable operating instructions / data sheet. The notes in the respective documentation must be heeded. The permissible ambient conditions must be observed.
- The device may only be installed and put into operation by experts who are familiar with this technical documentation and the applicable health and safety and accident prevention regulations.
- The unit should be panel mounted in an enclosure rated at IP 54 or superior. Dust and dampness may lead to malfunction.



Installation fault!
Danger to life, risk of serious injuries or property damage.

- Make sure of sufficient protection circuitry at all output contacts for capacitive and inductive loads.



Attention!

- The safety function must be triggered during commissioning.
- Opening the device or implementing unauthorized changes voids any warranty
- Please note: Validation according to DIN EN ISO 13849-2 is always required for the complete system
- If more than one wireless systems are used at the same location, the different systems must be set up for different radio frequencies.
- The equipment must be handled with care and be checked in regular intervals, depending on the usage and as necessary.

You, as the installer of the machine or plant, must make clear reference to these safety instructions in the relevant operating manual.

Extended safety regulations for secondary equipment

Each device is identified by a device identification stored in the device. This device identification is programmed by E. Dold & Söhne GmbH & Co. KG and cannot be changed by the customer.

Identical devices can be supplied on customer request.

The following extended safety regulations apply to the devices with identical device identification.

- Hazards may arise through the simultaneous use of multiple radio-controlled safety modules with the same device identifiers (secondary devices).
- Simultaneous use of secondary devices can result in life-threatening hazards.
- **Replacement devices**
If radio-controlled safety modules with identical (already assigned) device identifiers are delivered for replacement purposes, these devices should be kept under lock and key. Before commissioning a replacement device, the device to be replaced must be permanently decommissioned.
- **Secondary devices in a system**
If there is a secondary device in a system, measures must be implemented to ensure that the simultaneous use of two or more radio-controlled safety modules with identical identifiers is impossible. It must be guaranteed that only one device is supplied with electrical power at any given time.
- **Secondary devices in two or more systems**
If the secondary device is in another system, the systems must be far enough apart to ensure that a radio link between the two systems can be permanently ruled out. Furthermore, measures must be implemented to prevent the devices coming together.
- **Risk of mix-up**
Non-active emergency stop devices shall not be mixed up with active emergency stop devices. If there is a secondary device in a system, measures must be implemented to prevent mix-ups. The emergency stop devices must always be able to be uniquely assigned.



Product Description

The radio controlled safety module UH 6900 is an innovative wireless safety system to protect man and machine. A feature of the wireless safety system is its safety-oriented bi-directional radio transmission for transmitting signals between two wireless safety modules so that the two separate safety devices, each of them installed on a different machine part that is not connected to the other by wires (for example, moving machine parts), work together as one system.

Therefore SAFEMASTER W radio controlled safety modules are intended for the wireless remote control of machines and plant parts that used to be controlled by cable. Their usage is only restricted by valid safety instructions that prohibit, for example, staying under suspended loads.

Typical applications are:

- Hazard areas where protective equipment is necessary for the safety of persons but where wiring is impossible or not reasonable, for example in applications with extremely wide-spread, extensive hazard zones;
- Mobile and stationary plants and equipment, for example large machines, assembly halls and scaffolds, conveyor belts, high-rack warehouses, warehouses, forklifts, etc.
- The radio transmission range is up to 800 m.

Notes

Before installing, operating or maintaining this device, the user manual must be carefully read and understood on the enclosed CD.

Please note: Validation according to DIN EN ISO 13849-2 is always required for the complete system

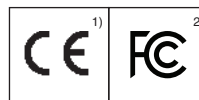
Your Advantages

- Higher safety in dangerous areas
- More efficiency and economy by wireless communication
- Compact, easy to install devices
- DIN rail mounting
- Removable terminal blocks
- Adjustable functions via rotary switch:
 - Full safety operation with different start modes (two-hand type IIIA and/or manual start, auto start)
 - Cross-operation with different start modes (two-hand type IIIA and/or manual start, auto start)
 - Safety operation with optional radio control with different start modes (manual start on S42, manual start via radio, or auto start)
- Valid for all operating modes:
 - Start function via radio with or without detection of an additional start signal at the IIR input.
- License-free frequency range 433 MHz or 869 MHz for the European market (EU version)
- License-free frequency range 915 MHz for the US-american market Markt (US version)
- Radio channel, transmitter power, and module name can be set by means of a parameterization software
- Status indicator for the devices connected via radio, by means of the parameterization software including status of radio transmission quality

Features

- **For Applications**
 - Performance Level (PL) e and category 4 to EN ISO 13849-1
 - Maximum SIL 3 according to IEC/EN 62061:2021
 - Safety Integrity Level (SIL) 3 to IEC/EN 61508 and IEC/EN 61511
- Machine directive 2006/42/EG
- EN ISO 13851: Safety of machinery - Two-hand control devices -
- DIN EN 300 220: Electromagnetic compatibility and Radio spectrum Matters (ERM) - Short Range Devices (SRD) - Radio equipment to be used in the 25 MHz to 1000 MHz frequency range with power levels ranging up to 500 mW
- Depending on the operating mode, to connect:
 - E-stop push-button (2-channel), safety gate, LC (non-contact safety system, for example light curtain) of the type 4 in accordance with EN 61 496 or the two-hand type IIIA in accordance with EN ISO 13851.
 - 1 start button
 - Changeover switch (2-channel) to indicate radio use in the Safety operation with optional radio control operating mode
- For two-way communication via radio:
 - Safety shut-down commands
 - Signals from 8 non-safety-relevant DC 24 V inputs at 8 non-safety-relevant DC 24 V semiconductor outputs
- Broken wire and short circuit monitoring function with error indication
- Semiconductor output to indicate poor or missing radio control
- 2 semiconductor outputs for status indication
- LEDs to indicate
 - status of module
 - status of all inputs and outputs
 - the radio transmission and its quality
- Width: 45 mm

Approvals and Markings



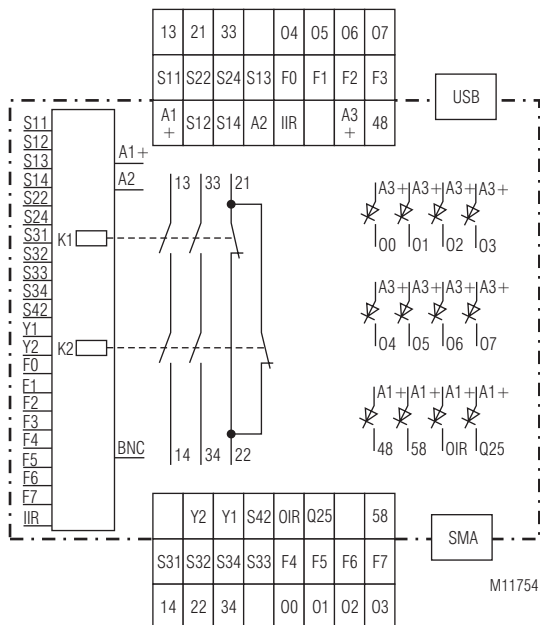
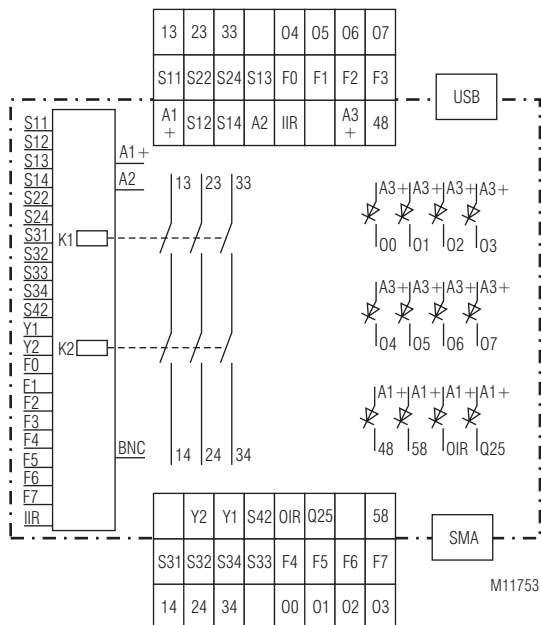
¹⁾ Only for EU variants

²⁾ Only for US variants

Functions

Each UH 6900 radio controlled safety module is installed in a switch cabinet or on a mobile device and is operated with a plug-in or external antenna. It detects the signals of up to three wired safety elements plus the signals from the related second active radio controlled safety module that are sent through a safe radio transmission. Safety-relevant switching commands are switched by relay outputs, non-safety-relevant control signals through semiconductor outputs.

In addition, a non-contact sender and a non-contact receiver (for example, light curtain or infrared sender and receiver) may be connected to force the system to start from a specific location via radio.



Connection Terminals

Terminal designation	Signal description
A1+	DC 24 V supply voltage for radio controlled safety module
A2	Common earth
48/58	Non-safety DC 24 V semiconductor outputs: State of radio controlled safety module
S11, S31	Test outputs for short circuit detection of the safety inputs Sx2
S13, S33	Test outputs for short circuit detection of the safety inputs Sx4
S12, S14	Inputs of the two-channel safety input 1
S22, S24	Inputs of the two-channel safety input 2
S32, S34	Inputs of the two-channel safety input 3
S42	Input for hard-wired start button
Y1/Y2	Input for feedback loop of external contact reinforcement
13/14	1 st safety output, safety NO contact
23/24 or 21/22	2 nd safety output, safety NO contact monitoring output (NC contact)
33/34	3 rd safety output, safety NO contact
IIR	Input for enabling the received start signal
OIR	Output with image of sent start signal
Q25	Output for input signal quality < -80 dBm
F0 to F7	Non-safety function inputs
O0 to O7	Non-safety DC 24 V function outputs
A3+	DC 24 V power supply of the function outputs O0 to O7

Inputs and Outputs

Inputs

- 3 two-channel safety inputs DC 24 V
- 1 DC 24 V input for start button
- 1 feedback circuit to monitor external relays
- 1 DC 24 V input that can be used as start signal in addition to the start signal received via radio
- 8 non-safety-relevant DC 24 V functional inputs, the status of which is sent to the opposite side

Outputs

- 3 safety-relevant NO contacts or 2 safety-relevant NO contacts + 1 NC contact (can only be used as an indicator contact)
- 1 DC 24 V semiconductor output that reproduces the start signal sent via radio as an additional start signal for the release of the safety relay on the opposite side
- 8 non-safety-relevant DC 24 V semiconductor outputs that are controlled by the opposite side
- 2 DC 24 V semiconductor outputs to display the status of the radio-controlled safety module
- 1 non-safety-relevant DC 24 V semiconductor output to indicate poor or missing radio control

Setting

USB port
to parameterize the module

RST: Received start signal
SST: Sent start signal
RNA: Received enable signal
SNA: Sent enable signal
Q1-Q4: Quality of radio control

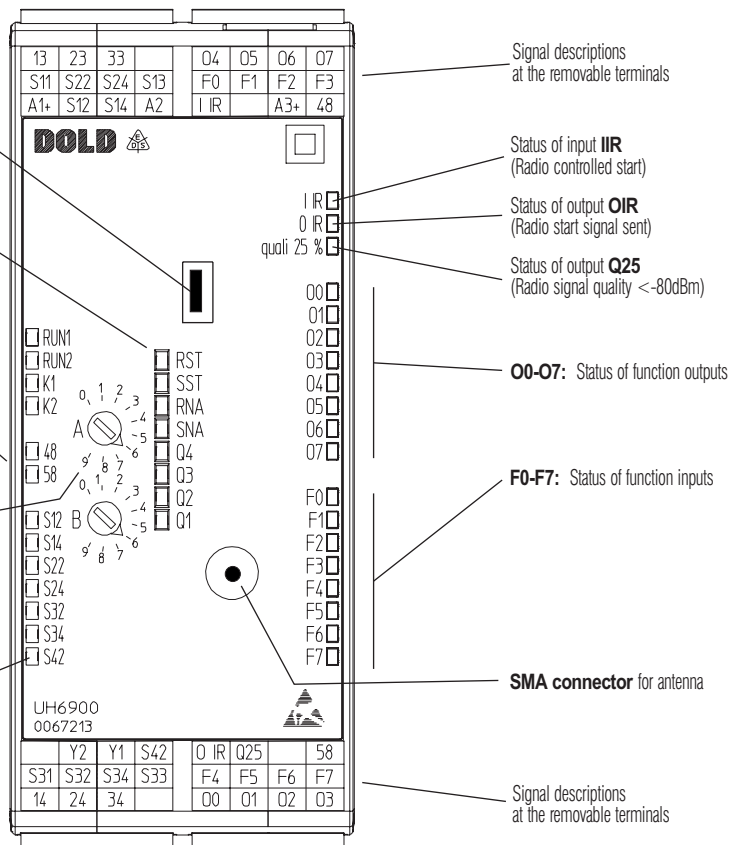
RUN 1, 2: Status of module
K1, K2: Status of safety relay

48, 58: Status of outputs for module
status indicator

A, B: Rotary switch to set the
module

S12-S32:
Status of safety inputs

S42:
Status of start button



Regulatory Information for devices in the US industry

E. Dold & Soehne GmbH & Co. KG
UH6900



FCC ID: 2A3XQUH6900

DOLD article numbers: 0069358, 0069359, 0069362, 0069363, 0069366, 0069367

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

NOTE: Devices with FCC approval do not have a CE marking because the frequencies used do not comply with the Radio Equipment Directive 2014/53/EU (RED) and vice versa.

NOTE: Changes or modifications made to this equipment not expressly approved by E. Dold & Soehne GmbH & Co. KG may void the FCC authorization to operate this equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

NOTE: Radiofrequency radiation exposure Information:

The radiated output power of the device is far below the FCC radio frequency exposure limits. Nevertheless, the device should be used in such a manner that the potential for human contact during normal operation is minimized. Use of other accessories may not ensure compliance with FCC RF exposure guidelines.

NOTE: Use of other accessories listed in this operation instructions may void the FCC authorization to operate this equipment.

NOTE: Professional Installation only

Technical Data	
Radio EU variants	
Conformity:	EN 300 220
Carrier frequency:	UHF, frequency modulated (FM)
Channels:	64 channels (433 MHz) 12 channels (869 MHz)
Freq. range (license free):	433.1000 ... 434.6750 MHz 869.7125 ... 869.9875 MHz
Max. HF-transmitter power:	10 dBm (10 mW) (433 MHz) 7 dBm (5 mW) (869 MHz)
Radio US variants	
Conformity:	FCC 15.249(a) FCC 15.209(a)/15.249(b)(1)(2)(3) FCC 15.207(a) FCC 15.109
Carrier frequency:	UHF, frequency modulated (FM)
Channels:	128 channels (915 MHz)
Freq. range (license free):	911.8000 ... 918.1500 MHz
Maximum field strength:	94 dB μ V/m at 3 m distance
Aerial:	ZB6900/051
Max. HF-transmitter power	
Cable: -	-7.5 dBm
Cable: ZB6900/042 (2 m)	-7.5 dBm
Cable: ZB6900/043 (5 m)	-5 dBm
Cable: ZB6900/046 (10 m)	-3.5 dBm
Radio General	
Min. HF transmitter power:	-40 dBm (0,0001 mW)
Distance:	Up to 800 m in open area *)
Antenna:	1/2 antenna, impedance 50 Ω , plug in as accessory
Sensitivity:	< -100 dBm

*) The distance can vary with the ambient conditions of the remote control and the receiver aerial (roof construction, metal walls etc.)

Power supply

Nominal voltage U_N:	DC 24 V
Voltage range	
at max. 5% residual ripple:	0.85 ... 1.15 U_N
Nominal consumption:	3.6 W (semiconductor outputs not connected)
Control voltage on S11, S13, S31, S33:	Approx. DC 23 V pulses, mean value approx. 7 V at U_N
Control voltage on 48, 58, O1R, Q25, O0, O1, O2, O3, O4, O5, O6, O7:	Approx. DC 23 V at U_N
Control current on S12, S14, S22, S24, S32, S34, S42, I1R, F0, F1, F2, F3, F4, F5, F6, F7:	Each approx. 4 mA at U_N
Min. voltage for active signals on S12, S14, S22, S24, S32, S34, S42, F0, F1, F2, F3, F4, F5, F6, F7:	DC 12 V
Max. voltage for inactive signal on S12, S14, S22, S24, S32, S34, S42, F0, F1, F2, F3, F4, F5, F6, F7:	DC 4 V
Max. input voltage on S12, S14, S22, S24, S32, S34, S42, F0, F1, F2, F3, F4, F5, F6, F7:	DC 30 V
Fusing:	Internal with PTC
Max. time difference between input signals of one function	
E-stop, Light curtains, Gates:	3 s
Two-hand:	500 ms

Technical Data	
Safety output	
Contacts	
UH 6900.03:	3 NO contacts
UH 6900.22:	2 NO contacts, 1 NC contact
The NO contacts are safety contacts. The NC contact can only be used as indicator contact!!	
Contact type:	Relais, forcibly guided
Operating time typ. at U_N:	
Ready for start after power is turned on:	Max. 2,5 s
automatic start:	No operating mode with automatic start
Operating modes	
Full safety operation	
Manual Start:	Max. 1 s ¹⁾
automatic restart:	Max. 1,1 s ¹⁾
Cross-operation	
Manual Start:	Max. 650 ms ¹⁾
automatic restart:	Max. 650 ms ¹⁾
Safety operation with optional radio control	
S32, S34 supplied with power:	
Manual Start:	Max. 70 ms
automatic restart:	Max. 80 ms
S32, S34 not supplied with power:	
Reset through S42 (after reset on control device):	Max. 70 ms
Reset through S42 on control device:	Max. 700 ms ¹⁾
Reset through auto start on control device:	Max. 700 ms ¹⁾

¹⁾ For the start options with additional detection of the IIR input, the delay time of the safety element connected to this input must be added to the pick-up times

Switching off time (reaction time)

S12-S14, S22-S24, S32-S34:	Max. 30 ms
Disconnection with active radio signal (S12-S14, S22-S24, S32-S34 of 2 nd device):	Max. 200 ms
Passive disconnection because of interrupted radio signal:	Max. 500 ms
Nominal output voltage:	Max. AC 250 V DC: see limit curve for arc-free operation

Switching of low loads

Min. switching voltage:	> 5 V
Min. switching current:	> 5 mA
Min. switching capacity:	> 25 mW
Thermal current I_{th}:	Max. 5 A per contact see quadratic total current limit curve

Switching capacity

to AC 15:		
NO contacts:	3 A / AC 230 V	IEC/EN 60947-5-1
NC contacts:	1 A / AC 230 V	IEC/EN 60947-5-1
to DC 13:	2 A / DC 24 V	IEC/EN 60947-5-1
to DC 13 at 0.1 Hz:	8 A / DC 24 V	IEC/EN 60947-5-1

Electrical life

to AC 15 at 2 A, AC 230 V: 10⁵ switching cycles

Permissible switching frequency: Max. 1 200 switching cycles / h

Short circuit strength

max. fuse rating:	6 A gG / gL	IEC/EN 60947-5-1
Mechanical life:	10 x 10 ⁶ switching cycles	

Technical Data

Semiconductor outputs

Outputs (terminals 48, 58, O0 bis O7, OIR, Q25):
Nominal output voltage (A3+):
Nom. output voltage at U_N :

Transistor outputs, switching +
DC 24 V
Min. DC 23 V, max. 100 mA cont. current
max. 400 mA für 0.5 s internal short
circuit, over temperature and overload
protection.
For inductive loads, arrange the necessary
safety measures

Min. operating current:
Residual current:

Min. 1 mA
Min. 0.1 mA

General Data

Operating mode: Continuous operation

Temperature range

Operation: - 25 ... + 55 °C
Storage: - 40 ... + 80 °C
Altitude: ≤ 2000 m

Clearance and creepage distance
rated impuls voltage /
pollution degree:

circuit / contact: 6 kV / 2 IEC 60664-1
contact / contact: 4 kV / 2 IEC 60664-1

Overvoltage category: III

EMC IEC/EN 61326-3-1

Interference suppression
EU variants: Limit value class B EN 55011
US variants: FCC Part 15 Class B

Degree of protection:

Housing: IP 40 IEC/EN 60529
Terminals: IP 20 IEC/EN 60529

Enclosure: Thermoplastic with V0 behaviour
according to UL subject 94

Vibration resistance: Test Fc EN 60068-2-6
Amplitude, constant 0,075 mm; 10 ... 57 Hz
Acceleration, constant 1 g; 57 ... 150 Hz

Shock proof:
Acceleration: 10 g
Impulse length: 16 ms
Number of shocks each
polarity and each axes: 1000

Climate resistance: 25 / 055 / 04 IEC/EN 60068-1

Terminal designation: EN 50005

Wire connection: captive slotted screw
or cage clamp terminals

Mounting: DIN-rail IEC/EN 60715

Weight: 380 g

Dimensions

Width x height x depth: 45 x 107 x 121 mm

Standard Type

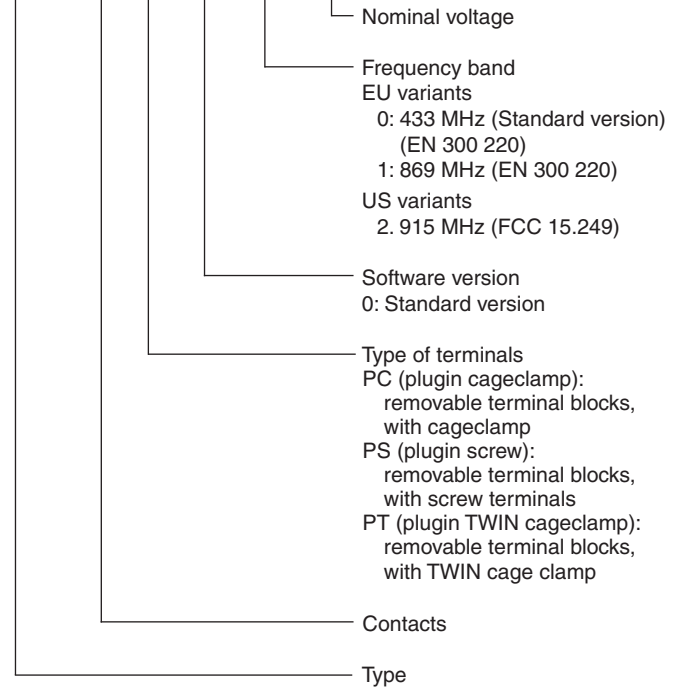
UH 6900.03PS / 00MF0 DC 24 V

Article number: 0067213

- Output: 3 NO contacts
- Nominal voltage U_N : DC 24 V
- Frequency band: 433 MHz
- Width: 45 mm

Ordering Example

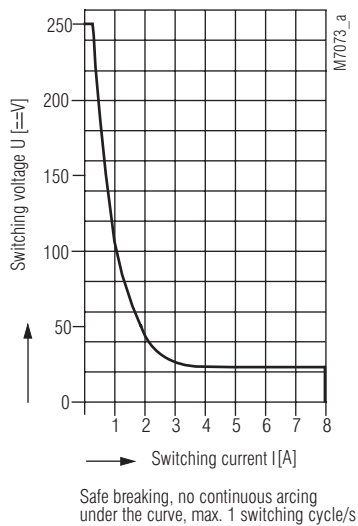
UH 6900 / 0 0 M F DC 24 V



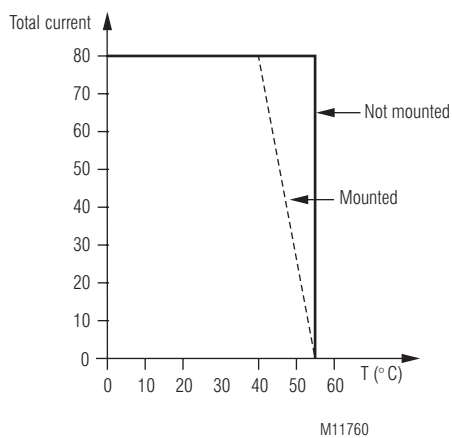
Maintenance and Repairs

- The device contains no parts that require maintenance.
- In case of failure, do not open the device but send it to manufacturer for repair.

Characteristics



Arc limit curve under resistive load



Quadratic total current limit curve