

BALLUFF

sensors worldwide

BID F101 Safety Switches

User's manual



English

www.balluff.com

Original user's manual

All rights reserved. Protected within the legally permissible limits of the United States and internationally. This document may not be copied or modified without prior written permission from Balluff.

All the trademarks and names appearing here are for identification purposes only. Some of these trademarks may be registered trademarks of the respective owners.

Balluff is not liable if the safety instructions, assembly specifications, and functional tests described are not observed or the conditions for the intended use are not complied with.

BID F101 Safety Switches

1	About This Manual	4
1.1	Typographical Conventions	4
1.2	Terminology Used	5
1.3	Warnings	5
2	About This Product	6
2.1	Product Description	6
2.2	Scope of Delivery	7
2.3	Safety Switch Product Overview	7
2.4	Actuator Product Overview	9
3	General Safety Notes	10
3.1	Approved Use	10
3.2	Non-approved Use	10
3.3	Personnel Requirements	10
3.4	Improper Installation and Handling of the Product	11
3.5	Relevant Standards	11
3.6	Obligations of the Operating Company	11
3.7	Operational Malfunctions	11
4	Assembly	12
4.1	Setting the Actuator Head	12
4.2	Installing Safety Switches on the Profile Frame	13
4.3	Installing Safety Switches on Sheet Metal	14
4.4	Installing the Actuator	14
5	Connections	15
5.1	Electrical Connection	15
5.2	Pin Assignments	15
5.3	Function Test	16
6	Operation	17
6.1	LED Status Indicator	17
6.2	Auxiliary Release (only BID...M3...)	18
6.3	Escape Release (only BID...R-...)	19
7	Maintenance, Care, and Disposal	20
7.1	Disposal	20
8	Technical Data	21
8.1	Safety Switch Dimensions	21
8.2	Actuator Dimensions	23
8.3	Technical Data of the Safety Switches	25
8.4	Technical Data of the Actuator	26
9	Accessories	27
9.1	Actuator Accessories	27
9.2	Connection Cables Accessories	27

1

About This Manual

This manual contains all the information you need for operating the following products:

Product	Function
BID F101-2M100-M20ZZ0-S92	Interlocking device
BID F101-2M1M3-M02AZ0-S115	Guard locking device
BID F101-2M1E3-M02AZ0-S115	
BID F101-2M1M3R-M02AZ0-S115	
BID F101-2M1E3R-M02AZ0-S115	
BAM TG-ID-016-A01	Actuator
BAM TG-ID-016-H01	
BAM TG-ID-016-H02	

Special safety-relevant knowledge is required for correct integration of a safety switch in a machine.

For questions that go beyond the scope of this manual, our Technical Customer Service is available for any information pertaining to the functionality of the series BID F10 safety switches and safety regulations related to proper installation.

1. Read this manual completely and follow the instructions contained in it. In particular, follow the safety and warning instructions.
2. Retain this manual and ensure that it is always available directly at the location of the use.
3. Make this manual available to third parties as necessary.



Note

In the interest of continual product improvements, non-safety-relevant technical data for this product and the contents of this manual are subject to change without notice. The latest version of this manual can be found online at www.balluff.com

1.1 Typographical Conventions

Actions

Individual action instructions are indicated by a preceding triangle:

- ▶ Action instruction 1
⇒ Result of action
- ▶ Action instruction 2

Action sequences are numbered in order:

1. Step 1
2. Step 2

Symbols



Note

The symbol and the word Notes indicate information which is helpful or important for use of the product.

BID F101

Safety Switches

1

About This Manual

1.2 Terminology Used

Interlocking device	Safety Switches
Guard locking device	Safety switches with guard locking

1.3 Warnings

Warning notes are especially safety-relevant and are used for accident avoidance. This information must be read thoroughly and followed exactly. The warning notes are constructed as follows:



SIGNAL WORD

- Type and source of the hazard
- Consequences of non-observance
- Measures for hazard avoidance

The signal words used have the following meaning:

NOTICE

The warning word NOTICE indicates a risk which can result in **damage to or destruction of the product** .

CAUTION

The general warning symbol combined with the signal word CAUTION indicates a risk which can result in **slight or moderate injuries**.

WARNING

The general warning symbol combined with the signal word WARNING indicates a risk which can result in **serious injury or death** .

DANGER

The general warning symbol combined with the signal word DANGER indicates a risk which can result **directly in serious injury or death** .

2

About This Product

2.1 Product Description

Safety switches are devices that provide both personal protection and equipment protection by securing access to dangerous areas in conjunction with a machine control system and a safety guard. Depending on the requirements, safety switches without guard locking, with mechanical guard locking, or with electrical guard locking can be used.

To free up machine functions, which are safeguarded by a safety switch, a suitable, mechanically coded actuator must be functionally merged with the safety switch and the guard locking must be activated if necessary. The safe state (stopping the dangerous machine movement) is initiated by deactivating the guard locking or separating the actuator from the safety switch. The actuator is attached to the movable part for this purpose and the safety switch to the fixed part of the safety guard.



Note

Actuators (with or without a handle) and safety switches must be ordered separately.

Series BID F101 safety switches have two actuator insertion openings into which the actuator can be inserted from above or from the side. In addition, the actuating head can be adapted to the respective application in 90° increments (see "Setting the Actuator Head" on page 12).

Safety switch (interlocking device) without guard locking

When the safety guard is opened, the safety switches without guard locking trigger a switching signal, which shuts down the dangerous movement of the machine. When the safety guard is open (the actuator is not inserted into the actuator head), the dependent safety contacts are positively opened and prevent hazardous machine function.

Safety switch (interlocking device) with guard locking

Safety switches with guard locking can keep the safety guard to the danger zone closed until the hazardous movement has stopped.

When the guard locking is active, the actuator cannot be removed from the actuator head and the safety guard cannot be opened.

When the guard locking is not activated, the corresponding safety contacts are positively opened. This is independent of the position of the safety guard or of the actuator.

Mechanical guard locking (BID...M3...)

This guard locking device works according to the closed circuit principle: It is activated by spring force and unlocked by electromagnetic actuation (control of the solenoid). When disconnected, the safety guard cannot be opened.



Note

In a de-energized state, the guard locking can only be released by the auxiliary release on the safety switch.

Electrical guard locking (BID...E3...)

This guard locking device works according to the open circuit principle: It is electromagnetically activated and released by spring force. As long as voltage is applied to the solenoid, the safety guard cannot be open.



Note

From the de-energized state, the guard locking will be immediately released and access to the danger enabled. Only use this locking principle after strict assessment of the accident risk.



WARNING

Persons in the danger zone

Defeating or bypassing the safety guard can result in death or serious injury.

- Avoid possible defeating or bypassing of the safety guard.

BID F101 Safety Switches

2

About This Product

2.2 Scope of Delivery

Safety Switches

The following parts are included:

- Safety Switch
- Manual (printed version)
- Key for the auxiliary release (only for BID F101- ... M3 ...)

Actuator

The following parts are included:

- Actuator

2.3 Safety Switch Product Overview

Safety switch	Guard locking	Auxiliary release	Escape release	Order code
BID F101-2M100-M20ZZ0-S92	–	–	–	BID0005
BID F101-2M1M3-M02AZ0-S115	Mechanical	X	–	BID0004
BID F101-2M1E3-M02AZ0-S115	Electrical	–	–	BID0003
BID F101-2M1M3R-M02AZ0-S115	Mechanical	X	X	BID0002
BID F101-2M1E3R-M02AZ0-S115	Electrical	–	X	BID0001

Type Code

BID F101 - 2M1 - - M - - 0 - - - -

Guard locking

- 00 without guard locking
- M3 mechanical guard locking (closed circuit principle) 24 V DC
- E3 electrical guard locking (open circuit principle) 24 V DC

Escape release

- without escape release
- R with escape release

Positively driven contact

- 02 2 positively driven contacts (guard locking status)
- 20 2 positively driven contacts (actuator status)

Auxiliary contact

- AZ 1 auxiliary contact (actuator status)
- ZZ without additional auxiliary contacts

Connection

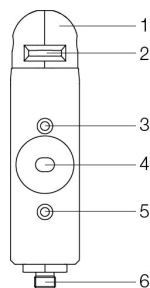
- S92 M12 connector, 5-pin, A-coded
- S115 M12 connector, 8-pin, A-coded

BID F101 Safety Switches

2

About This Product

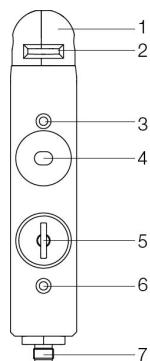
Without guard locking



BID F101-2M100-M20ZZ0-S92

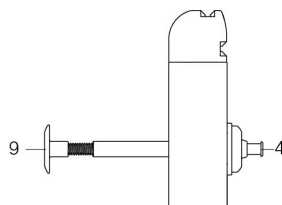
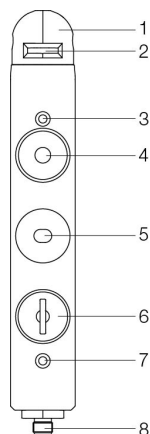
- 1 Actuator head
- 2 Actuator insertion opening
- 3 Mounting hole
- 4 Status LED
- 5 Mounting hole
- 6 Plug connector socket

With mechanical guard locking function (closed circuit principle)



BID F101-2M1M3-M02AZ0-S115

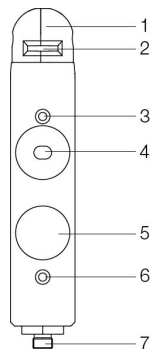
- 1 Actuator head
- 2 Actuator insertion opening
- 3 Mounting hole
- 4 Status LED
- 5 Auxiliary release
- 6 Mounting hole
- 7 Plug connector socket



BID F101-2M1M3R-M02AZ0-S115

- 1 Actuator head
- 2 Actuator insertion opening
- 3 Mounting hole
- 4 Reset (escape release – 9.)
- 5 Status LED
- 6 Auxiliary release
- 7 Mounting hole
- 8 Plug connector socket
- 9 Escape release

With electrical guard locking function (open circuit principle)



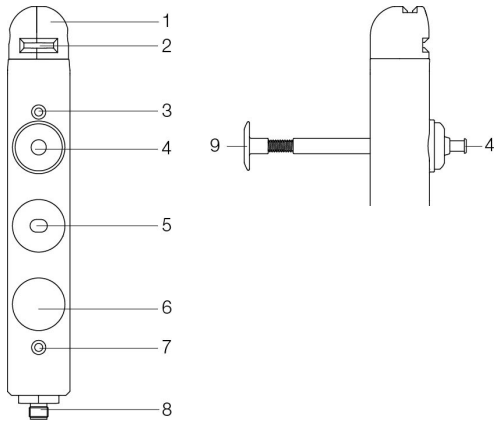
BID F101-2M1E3-M02AZ0-S115

- 1 Actuator head
- 2 Actuator insertion opening
- 3 Mounting hole
- 4 Status LED
- 5 Cover
- 6 Mounting hole
- 7 Plug connector socket

BID F101
Safety Switches

2

About This Product



BID F101-2M1E3R-M02AZ0-S115

- 1 Actuator head
- 2 Actuator insertion opening
- 3 Mounting hole
- 4 Reset (escape release – 9.)
- 5 Status LED
- 6 Cover
- 7 Mounting hole
- 8 Plug connector socket
- 9 Escape release

2.4 Actuator Product Overview



Note

Actuators are not included in the scope of delivery. Please order separately.

Actuator	incl. handle	suitable for	order code
BAM TG-ID-016-A01	–	Hinged/sliding doors	BAM0270
BAM TG-ID-016-H01	X	Hinged doors	BAM0271
BAM TG-ID-016-H02	X	Sliding doors	BAM0272



Note

The minimum possible door radius is 150 mm.

Type Code

BAM TG - ID - 016 -

Type _____

- A01 Actuator without handle
- H01 Actuator with handle
- H02 Actuator with handle

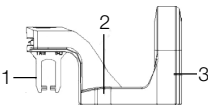
Without handle



BAM TG-ID-016-A01

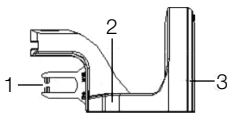
- 1 Mounting hole

With handle



BAM TG-ID-016-H01

- 1 Actuator
- 2 Mounting hole
- 3 Handle



BAM TG-ID-016-H02

- 1 Actuator
- 2 Mounting hole
- 3 Handle

3

General Safety Notes



Note

In addition, please note DIN EN ISO 14119.

3.1 Approved Use

BID F101 interlocking devices are "safety switches" and optional with solenoid locking. To actuate the safety switch, the suitable, mechanically coded actuator must be functionally merged with the safety switch or separated from it. Thus together with the machine control the hazardous machine functions are safeguarded.

- Safety switches without guard locking prevent (interlock) hazardous machine functions, as long as they are monitored and movable safety guard is not closed. They are used to trigger a stop command if the safety guard is opened during a dangerous machine function.
- Safety switches with guard locking (guard locking device) prevent hazardous machine functions, as long as they are monitored and movable safety guard is not closed and is locked. They prevent the opening of the safety guard until the underlying, hazardous movements have come to a complete stop. If the guard locking is prematurely released, a stop command is triggered.

3.2 Non-approved Use

- Safety switches and actuators must not be used as a mechanical stop (e.g., for the safety guard).
- The auxiliary release must only be used in exceptional cases. Therefore, the auxiliary release key may only briefly (during the exceptional case) be inserted in the auxiliary release.
- If a guard locking device is used with an escape release, actuation of the escape release must not be possible from outside the safeguarded area.
- Measures must be taken against the foreseeable defeating of the interlocking device (see DIN EN ISO 14119).
- The safety switch must be selected so that it withstands all anticipated forces (i.e., the bouncing of the safety guard or automatically operated safety guard).



Note

Should the impact/rebound forces be higher than the forces specified by Balluff for this product, measures to reduce or eliminate these forces must be taken.



Note

Before resetting the auxiliary release and resuming normal operation, ensure that there is no other person in the danger zone and that all safety functions are active again.

3.3 Personnel Requirements

Installation and startup are to be performed only by skilled professionals. The specifications contained in this manual as well as the regionally prevailing standards and directives must be followed. Skilled professionals are people who are familiar with the work such as installation and the operation of the product and have the necessary qualifications for these tasks.

Personnel operating in the danger zone must be trained in the functionality and operation of the safety switch.

3

General Safety Notes

3.4 Improper Installation and Handling of the Product



WARNING

Improper Installation and Handling of the Product

Technical interventions or changes to the product as well as improper installation (e.g., as a mechanical stop) or handling can lead to death or serious injury and can damage the product and related equipment .

- ▶ Safety components may not be rendered ineffective or defeated in any case.
- ▶ For actuating the safety switch, only use the specifically provided actuator, which must be permanently connected to the safety guard.
- ▶ Electrically supplied guard locking devices (open circuit principle) may only be used after a strict assessment of the accident risk.

3.5 Relevant Standards

The machine designer is responsible for the correct and safe integration of the safety switch in the overall system and must also validate this.

Specific measures to reduce possibilities of defeating and bypassing should be taken into consideration.

When installing and operating, adhere to the following guidelines:

EN ISO 13849-1/-2

Safety-related parts of control systems

EN ISO 14119

Interlocking devices associated with guards

EN 60204-1

Electrical equipment of machines

Before using any safety components, a risk assessment must be performed on the machine according to the following guidelines:

EN ISO 14121

Safety of machinery, risk assessment

EN 62061

Safety of machinery – Functional safety of safety-related electrical, electronic, and programmable electronic control systems.

3.6 Obligations of the Operating Company

The operating company is responsible for adhering to the prevailing safety and accident prevention regulations in any specific individual case.

All electrical connections must be protected by safety transformers per IEC 61558-2-6 which limit the output voltage in case of a fault or isolated from the power supply by equal value isolation transformers (PELV).

3.7 Operational Malfunctions

- ▶ If a malfunction occurs on the interlocking device, a complete function test must be performed (see “5.3 Function Test” on page 16).
- ▶ In the event of defects and malfunctions that cannot be rectified, the device must be taken out of operation for replacement and secured against unauthorized use.



DANGER

Persons in the danger zone

People can go unnoticed in the danger zone and be injured or killed.

- ▶ Before mounting the safety switch, ensure that there are no hazards posing risks in the danger zone during the assembly.



DANGER

Improper Installation and Handling of the Product

Technical interventions or changes to the product as well as improper installation (e.g., as a mechanical stop) or handling can lead to death or serious injury and can damage the product and related equipment .

- ▶ Under no circumstances should safety switches be rendered ineffective or defeated.
- ▶ For actuating the safety switch, only use the specifically provided actuator.
- ▶ Electrically supplied safety locking devices (open circuit principle) may only be used after a strict assessment of the accident risk.
- ▶ To prevent easy removal or change in position, securely attach the elements of the interlocking device (e.g., welding, bonding, non-removable screws, rivets...). This also applies to corresponding holders or mounting brackets.

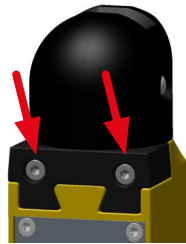


Note

If during the life time of the machine the replacing of components is expected, and if a quick replacement is necessary, other mounting elements can be used. In this case, additional measures must be taken to minimize the possibilities of defeating of the interlocking device. (see DIN EN ISO 14119)

4.1 Setting the Actuator Head

1. Remove the cap screws on the back panel completely.



- ⇒ The actuator head can be rotated in 90° increments.
2. Turn the actuator head into the desired position.
 3. Insert screws into the rear panel again and tighten with a min. 2.0 Nm.
 - ⇒ The safety switch is ready. Check the function of your device version before installing.

CAUTION

Impairment of Safety Functions Due to Environmental Influences

Corrosion and the ingress of foreign bodies can damage the safety switch and affect the safety functions.

- ▶ Place the safety switch in a corrosive-free environment and protect it from the ingress of chips, sand, blasting shot, etc.
- ▶ To counteract increased external influences (vibrations, shocks, or pounding), install the safety switch vibration-free or with vibration dampers.

4

Assembly

4.2 Installing Safety Switches on the Profile Frame



Note

In order to simplify assembly and ensure a smooth operation, insert the actuator to be installed in the safety switch.



Note

The following steps 1 and 2 are relevant only for safety switches with an escape release. For all other safety switches, installation can be started at step 3.

1. Remove (unscrew) the red button to the escape release and the corresponding spring before installation.
2. Drill a hole with Ø 11 mm in the frame for the escape release.
3. Position two suitable M5 T-slot nuts in the profile frame.
4. Attach the safety switch with two screws (e.g., M5 one-way screws) (max. Torque: 2.5 Nm).
5. Insert spring in the escape release and screw red button with loctite again.

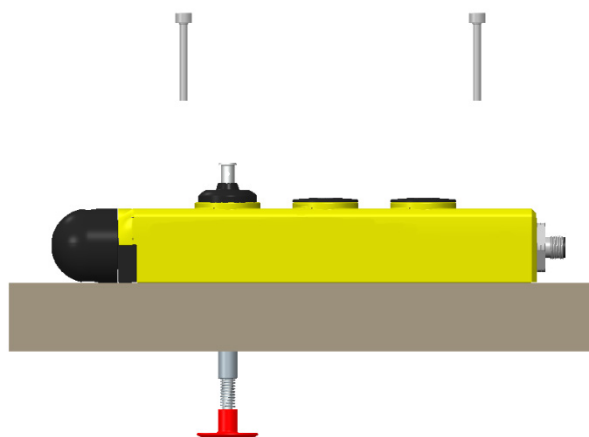


Figure 1: Installing Safety Switches on the Profile Frame

4

Assembly

4.3 Installing Safety Switches on Sheet Metal



Note

The sheet must be made of solid metal and be at least 3 mm thick (min. 6 mm, when the safety switch is screwed directly to the sheet by means of threaded holes).



Note

Insert the actuator into the safety switch to mount. This simplifies installation and ensures a smooth operation.



Note

The following steps 1 and 2 are relevant only for safety switches with an escape release. For all other safety switches, installation can be started at step 3.

1. Remove (unscrew) the red button before installation.
2. Drill a hole with Ø 11 mm in the sheet metal for the escape release.
3. To attach the safety switch with screws in the sheet metal: tap 2 x M5 screws in the sheet metal.
– or –
To attach the safety switch with nuts: drill 2 holes with Ø 5.5 mm through the sheet metal (drilling patterns see “8 Technical Data” on page 21 ff.).
4. Attach the safety switch with two screws (e.g., M5 one-way screws) (max. Torque: 2.5 Nm).
5. Insert spring in the escape release and screw red button with loctite again.

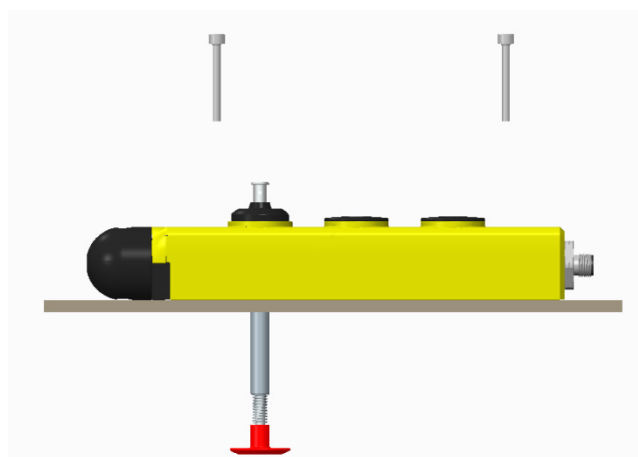


Figure 2: Installing Safety Switches on Sheet Metal

4.4 Installing the Actuator

1. Position the actuator on the door or on the movable part of the safety guard so that it is inserted into the actuating head smoothly and centrally when closing the safety guard and does not hit the actuating head. A mechanical stop for the safety guard must be provided separately.
2. Depending on the mounting type (see 4.2 on page 13 and 4.3 on page 14), position suitable M5 T-slot nuts in the profile frame or drill holes in the position of the mounting holes.
3. Fasten the actuator via the mounting holes (e.g., with M5 two-way screws or rivets).

BID F101
Safety Switches

5

Connections

5.1 Electrical Connection

The safety switches are connected using M12 connectors. The switch housing opening is not necessary. The guard locking has an operating voltage of 24 V DC.



CAUTION

Increased output voltage in the case of a fault

An unlimited output voltage can cause damage to the product and machine in the case of a fault.

- Isolate all electrical connections from the power supply either by a safety transformer according to IEC 61558-2-6 or by other equivalent isolation measures (PELV).

Depending on the safety switch type, different plug connectors and connecting cables are used. For more information, see “Pin Assignments” on page 15 and “Technical Data” on page 21.

5.2 Pin Assignments

Safety switches without guard locking

Safety Switch BID F101-2M100-...-S92	Plug Connector BID F101-...-S92	Pin Assignment	
		1	11
		2	22
		3	34
		4	12
		5	21, 31

Safety switches with mechanical guard locking function (closed circuit principle)

Safety Switch BID F101-2M1M...-S115	Plug Connector BID F101-...-S115	Pin Assignment	
		1	11 (guard locking monitoring)
		2	31 (guard monitoring)
		3	22 (guard locking monitoring)
		4	12 (guard locking monitoring)
		5	34 (guard monitoring)
		6	21 (guard locking monitoring)
		7	A2 (0 V)
		8	A1 (+UB)

Safety switches with electrical guard locking function (open circuit principle)

Safety switch BID F101-2M1E...-S115	Plug Connector BID F101-...-S115	Pin Assignment	
		1	11 (guard locking monitoring)
		2	31 (guard monitoring)
		3	22 (guard locking monitoring)
		4	12 (guard locking monitoring)
		5	34 (guard monitoring)
		6	21 (guard locking monitoring)
		7	A2 (0 V)
		8	A1 (+UB)

BID F101 Safety Switches

5

Connections

5.3 Function Test

- Ensure that the actuator and safety switch are correctly aligned with each other (see “4 Assembly” on page 12) and the machine is de-energized.

Safety switches without guard locking

Mechanical function test

- Open and close the movable safety guard several times. The actuator must be inserted into the safety switch easily.

Electrical function test

1. Close the safety guard.
2. Start the machine.
3. Open the safety guard of the machine and check that it stops upon opening.
4. Turn off the machine.
5. Open the safety guard.
6. Check that when the safety guard is open, the machine will not start.

Safety switches with guard locking

Ensure that the auxiliary release and escape release are in the delivery status and "Inactive".

1. Close the safety guard.
2. Activate the guard locking (see “2.1 Product Description” on page 6)
 - Mechanical guard locking: The safety guard is locked when the guard locking solenoid is not actuated (energized).
 - Electrical guard locking: The safety guard is locked when the guard locking solenoid is driven actively.
3. Check that the safety guard will not open.
4. Start the machine.
5. Stop the machine.
6. Deactivate guard locking (see “2.1 Product Description” on page 6).
7. Check that when the safety guard is closed but the guard locking is deactivated, the machine will not start.
8. Open the safety guard.
9. Activate the guard locking.
10. Check that the machine will not start.

BID F101

Safety Switches

6

Operation

6.1 LED Status Indicator

BID F101-2M100

LED (red)	Safety guard	System condition
○ Off	Closed	Safety guard closed (access possible at any time) or missing voltage supply
● On	Open	Safety guard open

BID F101-2M1E ... / BID F101-2M1M ...

LED (green)	LED (red)	Safety guard	Guard locking	System condition
● On	○ Off	Closed	active	Safety guard closed and locked (access not possible)
● On	● On	Closed	inactive	Safety guard closed and Guard locking released (access enabled)
○ Off	● On	Open	inactive	Safety guard open
○ Off	○ Off	–	–	Missing voltage supply

6

Operation

6.2 Auxiliary Release (only BID...M3...)

With the auxiliary release, the mechanical guard locking can be released outside the safeguarded area. A key is required for this purpose, which is included in the scope of delivery.



DANGER

Persons in the danger zone

By releasing, the guard locking intervenes in the safety function. People can enter the danger zone even though the control has not approved access.

- ▶ Ensure that no unauthorized persons enter the danger zone and no danger to persons or machine arises, as long as the guard locking is released.
- ▶ For your own safety, ensure that no one resets the safety switch before all persons have left the danger zone.



DANGER

Automatic restart of the machine

Depending on the control (control signal) of the guard locking solenoid, the guard locking is activated immediately after closing the safety guard and the machine can restart automatically.

- ▶ Avoid automatically restarting the machine on the control side.



Note

A key to operate the auxiliary release is included in the scope of delivery of the BID... M3... safety switch series. To prevent unauthorized use, keep the key separate from the switch and only make it accessible to authorized personnel.



Release the guard locking

- ▶ Insert the key in the auxiliary release and rotate it 180° clockwise.
⇒ The guard locking is mechanically released. The guard locking safety contacts are open and the safety guard can be opened. The key cannot be removed in this position.

Restoring the guard locking

- ▶ Turn the key back to the original position and remove.
⇒ The device is functional again in this state (see "5.3 Function Test" on page 16).

BID F101 Safety Switches

6

Operation

6.3 Escape Release (only BID...R-...)

On safety switches with an escape release (BID ... R ...), the guard locking can be unlocked from the danger zone without any additional aids.



DANGER

Persons in the danger zone

By releasing, the guard locking intervenes in the safety function. People can also enter the danger zone even though the control has not approved access.

- ▶ Ensure that no unauthorized persons enter the danger zone and no danger to persons or machine arises, as long as the guard locking is released.
- ▶ Before resetting the safety switch to the original state, ensure that there are no persons in the danger zone.



DANGER

Automatic restart of the machine

Depending on the control (control signal) of the guard locking solenoid, the guard locking is activated immediately after the safety guard and the machine can restart automatically.

- ▶ Avoid automatically restarting the machine on the control side.



Releasing the guard locking

- ▶ Press the red button of the escape release (back of the switch).
 - ⇒ The guard locking is mechanically removed. The guard locking safety contacts are open. The safety guard can be opened.

Restoring the guard locking

1. Close the safety guard.
2. Press the reset button of the escape release (front of the switch).
 - ⇒ Depending on the control (control signal) of the guard locking solenoid, the guard locking is immediately activated.

7

Maintenance, Care, and Disposal

For an error-free and lasting function, the following described tests should be performed regularly.

- ▶ **In case of defect, the system is not put into operation!**
Fix the defect and re-examine!



Note

In case of changes to the system, the startup inspection must be carried out again!

1x daily or before each shift:

- ▶ Check for bypassing or possible indications for this.

1x weekly:

- ▶ Check for smooth switching function.
- ▶ Check the guard locking function.
- ▶ Check the auxiliary release and escape release function.
- ▶ Check for loose cables and plug connections.
- ▶ Check for material wear, fragments, and increasing wear.
- ▶ Check for correct and reliable installation position.

7.1 Disposal

Dispose of the device in compliance with national/regional regulations concerning waste or contact local approved facilities for proper waste disposal.

BID F101
Safety Switches

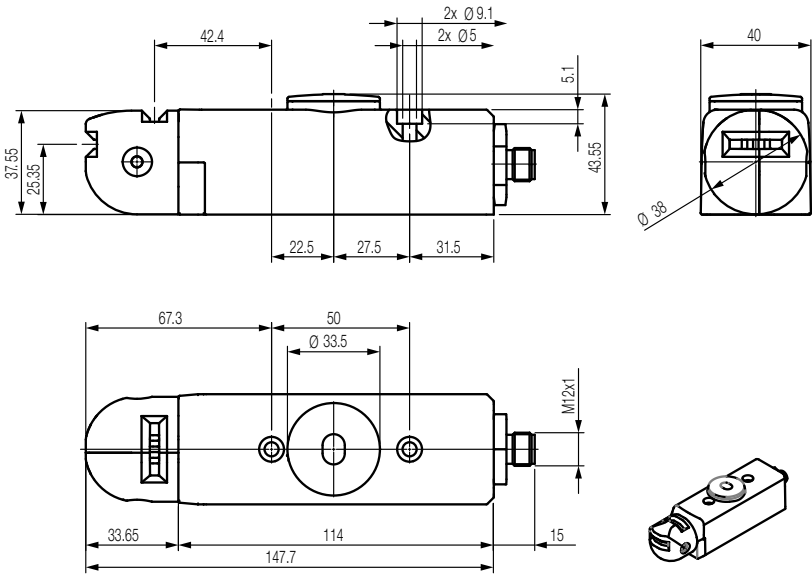
8

Maintenance, Care, and Disposal

8.1 Safety Switch
Dimensions

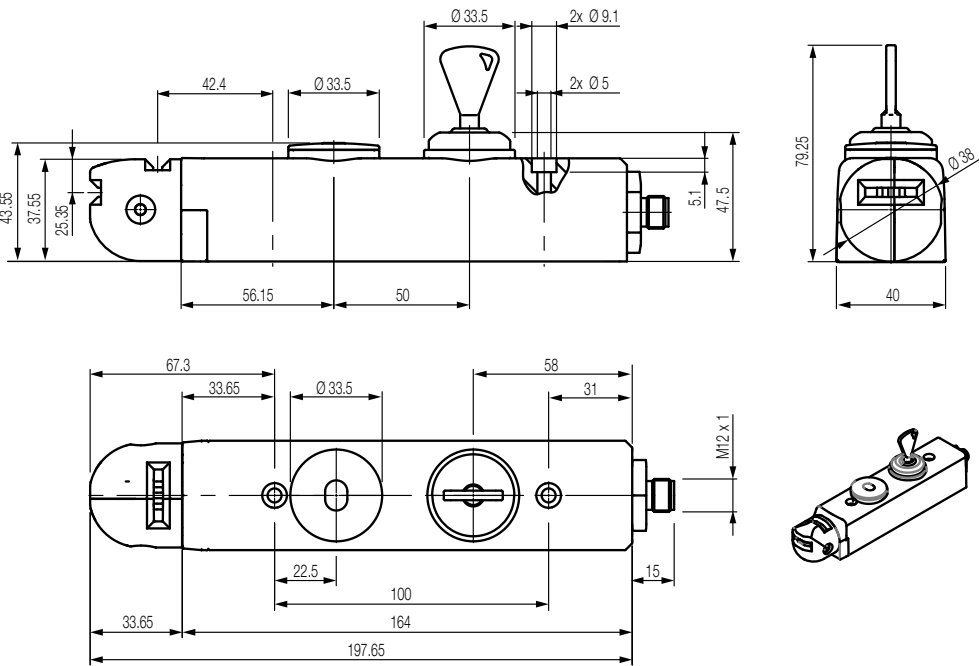
Safety switches without guard locking

BID F10-
2M100-M20ZZ0-
S92



Safety switches with mechanical guard locking function (closed circuit principle)

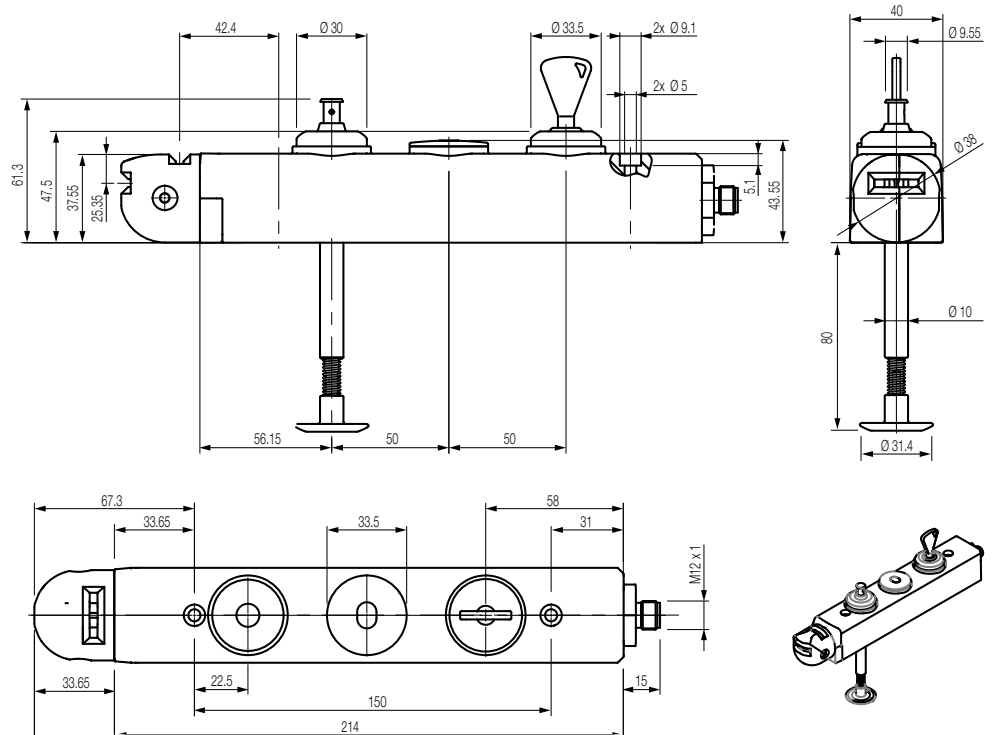
BID 101-
2M1M3-M02AZ0-
S115



8

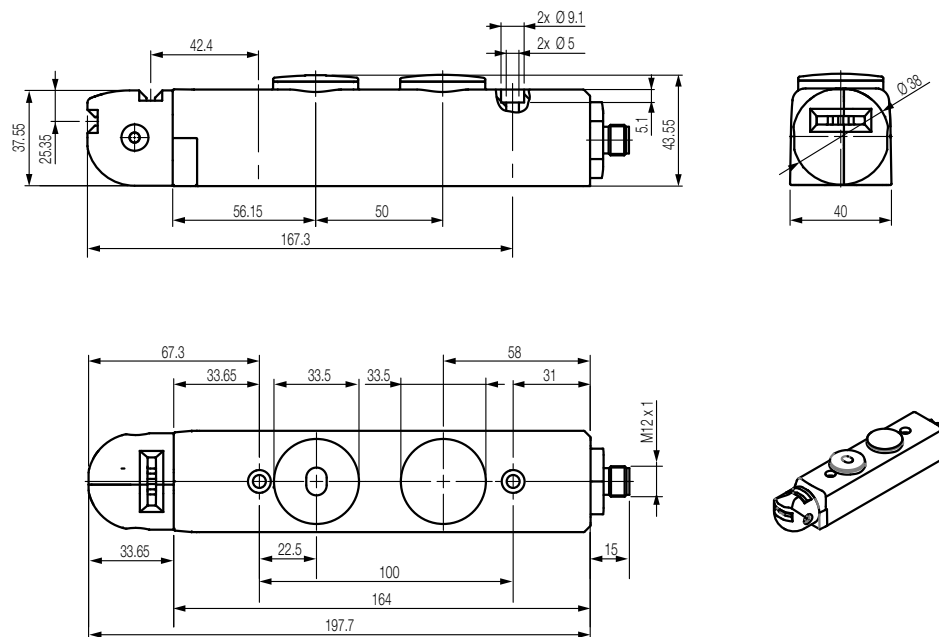
Maintenance, Care, and Disposal

BID F101- 2M1M3R- M02AZ0-S115



Safety switches with electrical guard locking function (open circuit principle)

BID F101- 2M1E3-M02AZ0- S115



Maintenance, Care, and Disposal

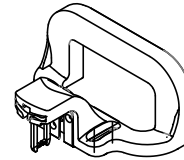
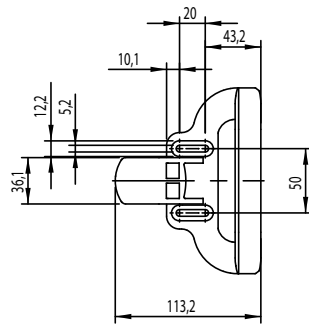
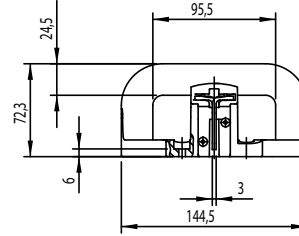
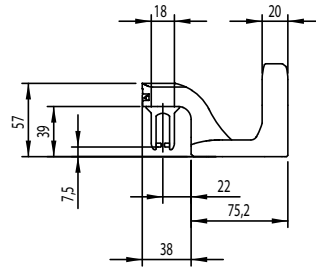
[illegible]

Actuators are not included in the scope of delivery of the safety switches. Please order separately. See “9.1 Actuator Accessories” on page 27.

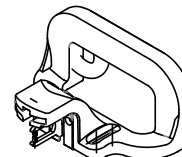
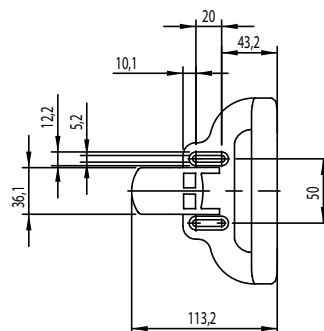
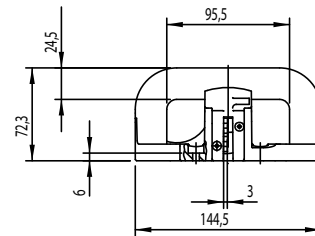
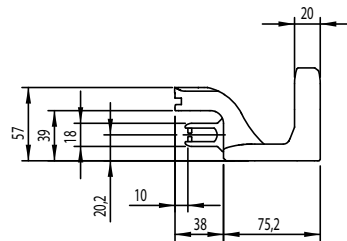
8

Maintenance, Care, and Disposal

BAM TG-ID-016-H01



BAM TG-ID-016-H02



8

Maintenance, Care, and Disposal

8.3 Technical Data of the Safety Switches

	BID0005	BID0004 BID0002	BID0003 BID0001
Guard locking, Type/Principle	without	Spring force (closed circuit princi- ple)	Magnetic force (open circuit principle)
B _{10d}	5.0 x 10 ⁶ switching cycles		
Electrical Data			
Connection type	M12 connector, 5-pin	M12 connector, 8-pin	
Coding	A-coded		
Number of contacts (safety guard)	2 positively driven contacts + 1 NO	1 NO	
Number of contacts (guard locking)	—	2 positively driven contacts	
Switching function	Snap switch function		
Contact material	Silver		
Switching voltage	min. 5 V DC (at 10 mA)		
Switching current min.	5 mA		
Operating voltage LED	24 V (+10% / -15%)		
Rated insulation voltage U _i	24 V		
Rated surge voltage U _{imp}	500 V		
I _e /U _e (AC)	AC15: 1.0 A / 24 V		
I _e /U _e (DC)	DC13: 0.5 A / 24 V		
I _{the}	4 A at T = 85 °C		
Short-circuit protection	0.2 A fast-action		
Solenoid operation voltage U _s	—	24 V (+10% / -15%) DC	
Power consump- tion solenoid	—	10 W	
Duty cycle sole- noid	—	100%	
Mechanical data			
Auxiliary release	—	Yes	No
Escape release	—	Optional	Optional
Approach direction	laterally + above		
Actuating head adjustable	in 90° increments		
Approach speed	20 m/min.		
Switching fre- quency	3.600/h		
Installation tole- rances	± 3 mm		

8

Maintenance, Care, and Disposal

	BID0005	BID0004 BID0002	BID0003 BID0001
Immersion depth actuator min.	24 mm		
Actuator overtravel max.	3 mm		
Switching opera- tion force	5 N		
Locking force FZh	—	2.500 N	
Actuator extraction force	10 N		
Number of moun- ting holes	2		
Tightening torque	2.5 Nm		
Mounting type	M5 screws		
Type of installation	any		
Vibration	10 – 150 Hz, amplitude 0.35 mm, 1 octave/min., each direction 20 periods		
Impact resistance	Acceleration 0.5 sinusoid 10 N, duration 16 ms, each direction 1000 periods		
Environmental conditions			
Housing material	Die-cast aluminum, powder-coated		
Ambient tempera- ture	0° C...+ 40 °C		
Weight	0.4 kg	0.7...1.0 kg	
Mechanical life expectancy	1.0 x 10 ⁶		
Degree of protec- tion as per IEC 60529	IP65		
Protection class	III		

8.4 Technical Data of the Actuator



Note

Actuators are not included in the scope of delivery. Please order separately. See "9.1 Actuator Accessories" on page 27.

	BAM0270	BAM0271	BAM0272	
Actuator material	Stainless steel			
Housing material	—	Die-cast aluminum, powder-coated		
Design	angled	Actuator with handle		
Mounting type	M5 screws			
Tightening torque	2.5 Nm			
min. door radius	150 mm			

9

Accessories

9.1 Actuator Accessories

Model	Dimensions	Order code
BAM TG-ID-016-A01	17 x 48 x 32 mm	BAM0270
BAM TG-ID-016-H01	145 x 113 x 72 mm	BAM0271
BAM TG-ID-016-H02	145 x 113 x 72 mm	BAM0272

9.2 Connection Cables Accessories

Connection cable (yellow), M12-female, 5-pin / M12-male 5-pin

Model	Female/male	Length	Order code
BCC M415-M415-3A-312-PX4534-006-C033	straight/straight (yellow, A-coded)	0.6 m	BCC0H1R
BCC M415-M415-3A-312-PX4534-020-C033		2.0 m	BCC0H1T
BCC M415-M415-3A-312-PX4534-050-C033		5.0 m	BCC0H1U
BCC M415-M415-3A-312-PX4534-100-C033		10.0 m	BCC0H1W
BCC M415-M415-3A-312-PX4534-200-C033		20.0 m	BCC0H1Y
BCC M415-M425-3A-312-PX4534-006-C033	Straight/right-angle (yellow, A-coded)	0.6 m	BCC0H1Z
BCC M415-M425-3A-312-PX4534-020-C033		2.0 m	BCC0H20
BCC M415-M425-3A-312-PX4534-050-C033		5.0 m	BCC0H21
BCC M415-M425-3A-312-PX4534-100-C033		10.0 m	BCC0H22
BCC M415-M425-3A-312-PX4534-200-C033		20.0 m	BCC0H23

Connection line (yellow), M12-female, 8-pin / M12-male 8-pin

Model	Female/male	Length	Order code
BCC M418-M418-3A-320-PX4825-006-C033	straight/straight (yellow, A-coded)	0.6 m	BCC0H24
BCC M418-M418-3A-320-PX4825-020-C033		2.0 m	BCC0H25
BCC M418-M418-3A-320-PX4825-050-C033		5.0 m	BCC0H26
BCC M418-M418-3A-320-PX4825-100-C033		10.0 m	BCC0H27
BCC M418-M418-3A-320-PX4825-200-C033		20.0 m	BCC0H28
BCC M418-M428-3A-320-PX4825-006-C033	Straight/right-angle (yellow, A-coded)	0.6 m	BCC0H29
BCC M418-M428-3A-320-PX4825-020-C033		2.0 m	BCC0H2A
BCC M418-M428-3A-320-PX4825-050-C033		5.0 m	BCC0H2C
BCC M418-M428-3A-320-PX4825-100-C033		10.0 m	BCC0H2E
BCC M418-M428-3A-320-PX4825-200-C033		20.0 m	BCC0H2F

Connection cable (yellow), M12-female 8-pin/open cable end

Model	Female/male	Length	Order code
BCC M418-0000-1A-069-PX4825-050-C033	angled/open cable end (yellow, A-coded)	5.0 m	BCC0H8N
BCC M418-0000-1A-069-PX4825-100-C033		10.0 m	BCC0H8P
BCC M418-0000-1A-069-PX4825-150-C033		15.0 m	BCC0H8R

M12 locking clip for M12 plug connector

Model	Order code
BAM FK-CC-005-M12-A	BAM01Z4

 **www.balluff.com**

Balluff GmbH
Schurwaldstraße 9
73765 Neuhausen a.d.F.
Germany
Phone +49 7158 173-0
Fax +49 7158 5010
balluff@balluff.de
 www.balluff.com