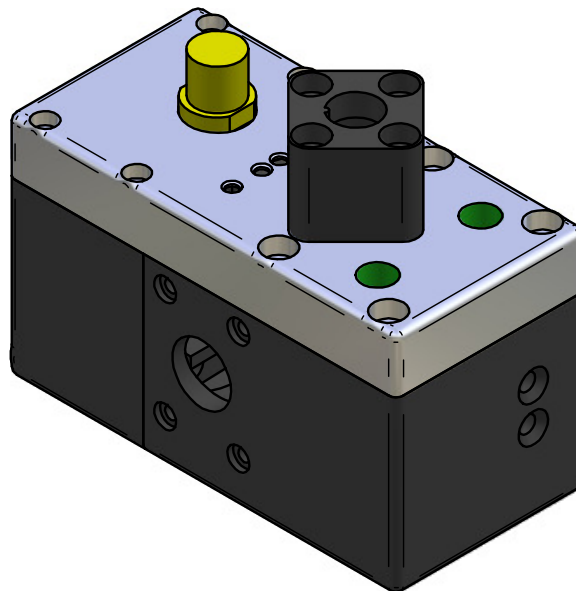# Operating Instructions

SB05

Year of manufacture: 2015
Version: 22.10.2015

These operating instructions as well as other written instructions have been made under the machine safety decree 2006/42/EG.

To assure a trouble-free and safe operation of the system the operating instructions as well as all other written instructions have to be followed strictly.

Comply strictly with the manufacturer's suggested maintenance and cleaning rates.

If problems arise that are not dealt with in the operating instructions please contact the manufacturer of the system.

Manufacturer:

Fa. VA Laserautomation GmbH

Zanitzen 25

8742 St. Anna am Lavantegg

Tel. +43 720 720 334

Fax. +43 720 720 3344

office@laserautomation.at

www.laserautomation.at

Contents

1   Safety instructions

The safety instructions as well as a copy of the operating instructions always have to be kept near the system or have to be available for the user at any time.

Make sure that all the safety equipment (barriers, protective plates, danger signs etc.) is mounted and in proper condition.

Before working at the system disconnect it from the power supply and make sure that it cannot be switched on unintentionally. Operations at the electronics must be carried out only by qualified personnel!

All operations at the system must be done only by **trained personnel**. Maintenance, servicing and cleaning operations at the machine must be carried out only by *trained service personnel*.

Keys for using the key switch on the system need to be kept safe and should only be provided for the laser safety representative. The representative is also responsible for handing out the keys for the key switch, necessary for switching on the module.

Before starting the system the pneumatic supply and possible water supply have to be checked regarding correct assembling and leak tightness.

Attention!!!

Person, module and environment hazard can be the result of the non-observance of the safety instructions. The non-observance of the safety instructions leads to the loss of claim damages!!!

Beware!!!

The use of different here not mentioned operating instructions, other adjusting devices or other avenues of approach can lead to dangerous radiative explosions.

1.1   Switching on the system

Before switching on the system make sure that nobody is in the danger area of the system. The module must be switched on only by trained personnel.

When switching on make sure that no servicing, maintenance or clearing operations are being carried out at the system.

Before switching on the system check if all the safety equipment is present and functional.

1.2 Operating the system

During standard operation the casing covers and doors have to be mounted.

Look out for unusual smoke formation at regular intervals during standard operation.

!!! Attention fire hazard!!!

1.3 Switching off the system

The Shutter can be switched off at every operation status.

1.4 Servicing and cleaning

Servicing and cleaning operations have to be carried out only by trained personnel or service personnel.

The *laser safety representative* must supervise every *servicing, cleaning, adjusting and maintenance operation*, which is carried out when the laser is switched on.

The **laser safety representative** has to supervise in particular the use of protective clothing as well as the compliance with the safety instructions when handling *laser of class 4*.

It is recommended to check the system periodically (f.e. weekly) to guarantee a failure-free operation of the system and pay special attention to the following:

- check the optics and mechanical parts of the module before start up of the system

- check and clean the optics

- clean the cover with a damp cloth

1.5 Safety instructions for transporting the module

Whatever distance - short or long - the system is transported, following operations have to be necessarily carried out after completed assembly and before switching on the module:

- The optics must be checked on fouling and damaging.

- The safety equipment must be complete and properly mounted.

- The safety equipment must be checked on its functionality.

1.6 Safety regulations when handling laser of class 4

The module is conforming to laser class 4, when the cover is opened.

Avoid radiation, exposure of eye and skin to direct or scattered beaming!!

At every operation with switched on laser pay attention to the following:

When handling with radiation use in any way marked goggles for your laser wavelength (for example CO_2 Class4: D 10600 L5)

Make sure that the module is switched on only with correctly mounted casing covers. Otherwise there is danger of emission into the surrounding area.

The operator of the system has to make sure that all the safety equipment like covers, safety switches, pilot lamps and danger signs do work, are cleaned, visible, and maintained according to the operating instructions; in case of damage they have to be replaced.

The key switches for switching on the laser must be kept with the laser protective representatives who hands them out only to authorized persons.

1.7 Required qualifications

Trained personnel

Operating personnel who have been trained by VA LASERAUTOMATION GMBH according to the operating instructions in the course of initial operation.

Service personnel

Personnel who carries out maintenance and servicing operations according to the operating instructions and under survey of the laser protective representative. The laser protective representative must instruct servicing and maintenance personnel in laser handling and appropriate safety precautions.

Laser protective representative

Persons, that have the specialized knowledge to estimate and control laser hazards and take the responsibility for supervising the protective measures to prevent laser hazards. The course of instruction for laser protective representatives is a precondition.

Qualified personnel

The operator of the system has to make sure that every operation on the system is being carried out only by qualified personnel, that means e.g. operations concerning the electronics have to be carried out only by skilled electrician.

1.8 Example – Computation PLe SB05

To reach PLe, the respective components of a laser system have to be taken into consideration. The computation example consists of two contactors with recirculation (in the mode of operation with low demand, f.e. switch size for double switch capacity) to shut down the laser power in case of malfunction of the shutter. The operating cycles of the shutter and the contactors must be adjusted to the actual conditions and the achievable PL must be recalculated.

Attention!

Area of responsibility, competence, safety trainings and the supervision of the personnel relating the compliance with the safety regulations must be arranged accurately by the operating company.

2 Technical data

Type No.	020120010	**Description**	SB05 Shutter box
Year of MFG	2015	**Weight**	Shutter 900 g
Dimensions (H/B/T)	See drawings		
Aperture	14 mm		

2.1 Connectors

Medium	**Use**	**Data**	**Notes**
Electricity	Power supply	24 VDC/ 0.5A	
Coolant	Cooling of the beam trap	Water-glycol-mixture	Glycol supplementary approx. 25-28 %

2.2 Environmental conditions

The intended use for the Shutter box SB05 is to be mounted on a laser system with a laser up to the power of 600Wcw (10,6µm, with water cooling). Following environmental conditions should be provided:

Environmental temperature:	15-40°C
Atmosphere:	normal
Coolant temperature:	18-22°C (there should be no condensation)
Flow:	> 2l/min
Coolant pressure:	max. 4 bar

2.3 Intended use

The intended use takes the observation of the scheduled information in the operating instructions regarding the installation, the operating, the set up, the maintenance, the cleaning and the fault clearance for granted!

2.4 Extensibility

To keep the warranty claims, all extensions and technical rebuilding at the existing system (condition at technical approval) must be reviewed with the manufacturer still before realisation.

2.5   Accessory components

To keep the warranty claims, make sure to review the mounting of accessory components with the manufacturer even before realisation.

Every different use must be reviewed with the manufacturer!

Misuse of the system, as well as failure to comply with the operating instructions of the manufacturer or with the operating instructions of the components in the appendix, leads to a loss of warranty and damages claims.

3 Transport and Storage

Special attention need to be taken to all technical norms and accident prevention regulations when handling the system and all corresponding components.

During transportation and storage please take attention to the following:

- the system and all corresponding components should be handled with extra care during transportation to avoid damage

- if possible, please transport and store the system and all corresponding components in the original packaging

- after the transport please make sure, that all components are still there and without damage

- if the system isn't going to be assembled immediately after the transport, please make sure that the module is going to be stored appropriate

- the storage should take place in a dry room with a steady temperature (if possible)

- if the storage takes very long please pay special attention to the packaging and – if necessary – repack the system in a damp-proof package

4 Service and Maintenance

It is recommended to check the system and all included components periodically, in order to avoid troubles, danger or damages.

Contained optics, used up or damaged parts should be replaced only with original spare parts or with standard parts.

To avoid live threatening injuries and damages on the system, following points must be considered:

- Maintenance and cleaning must be carried out only by trained or service personnel.
- The laser safety representative must supervise every servicing, cleaning, adjusting and maintenance operation, which is carried out when the laser is switched on.
- The laser safety representative has to supervise in particular the use of protective clothing as well as the compliance with the safety instructions when handling laser of class 4.
- General safety advices must be considered and followed during every servicing, cleaning, adjusting and maintenance operation.
- Secure the area for service and maintenance.
- Switch of all power supply and secure the module against unintentionally switch on.
- Switch all pressure units "depressurised" (compressed air and water).

Following risks need to be expecting when maintaining the system:

- Assembling wrong optics, spare parts or wear parts could lead to heavy damage of the module.
- Unintentionallly switching on of the power could lead to serious injuries and heavy machine damages.

In order to guarantee a trouble-free function of the system, pay attention to the following:

- Visual check of the optical and mechanical components before start up the module
- Check and clean the optics
- Clean the cover with a damp cloth
- Check the compressed air and coolant supply units

4.1 Maintenance plan

Tasks to be proceeded	Cycle
Visual check of the optical and mechanical components	monthly
Check the deviation mirrors	monthly
Visual check – and if needed – cleaning the optics	monthly

5   Closedown and disposal

Pay attention to all technical standards and accident prevention regulations when disposing the system and the components.

When closing down and disposing pay attention to:

- When the system is going to be shut down for a long period, all optical components (mirrors, lenses, safety glasses) need to be disassembled and stored properly to avoid contaminations.
- If it's not possible to disassemble the optical components without destroying them, pack and store the whole unit dustproof.
- If you want to store the system after closedown, please pay attention to point 3 – Transport and Storage.
- The personnel responsible for the disposal of the system and the components must pay attention to all standards.

6 Mechanical data

6.1 Assembly Drawing - Shutter
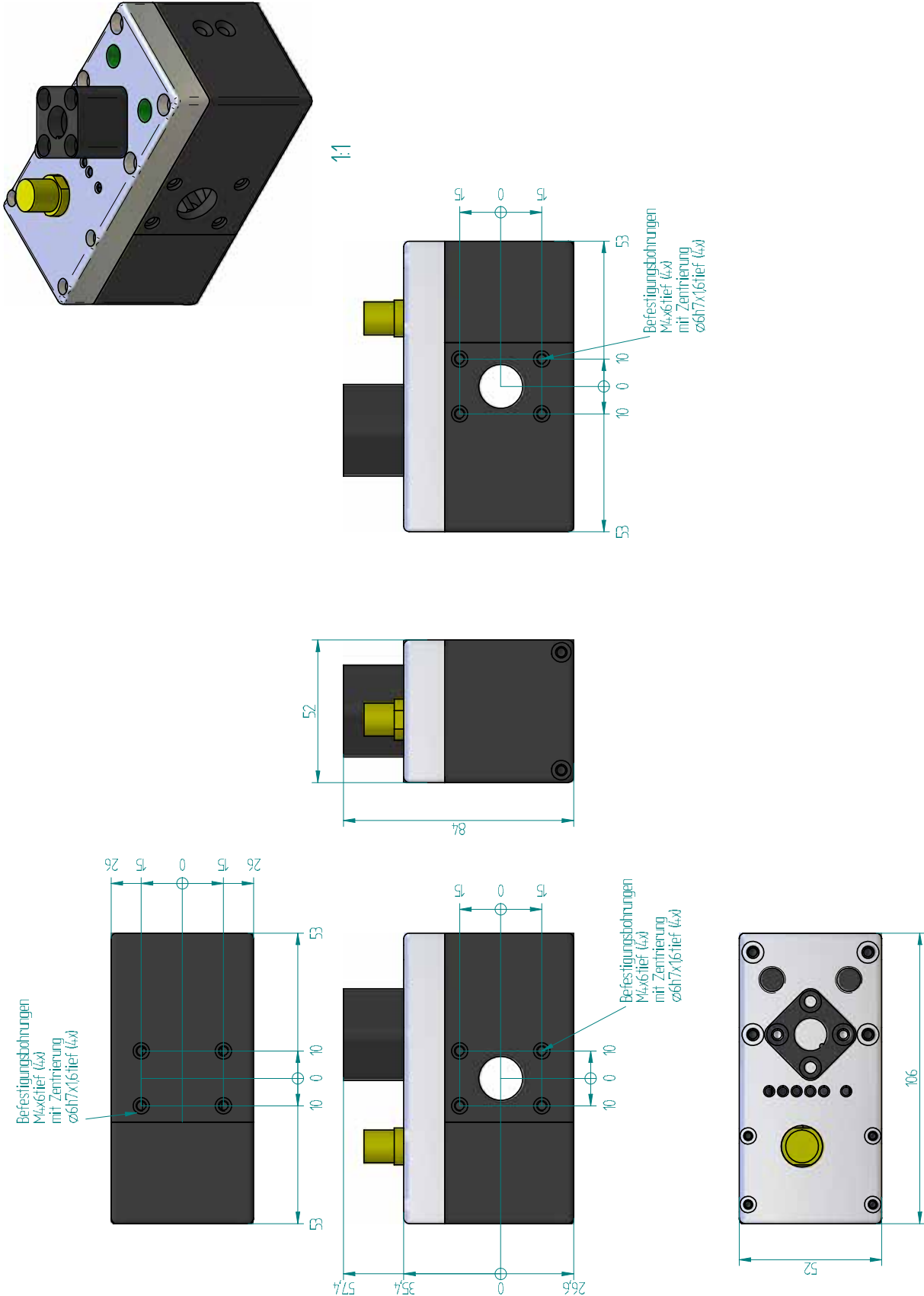
7 Electric

7.1 PLC-Interface (12 pole circular connector)

VDC	1		DC Ground
	2		+ 24 VDC 500 mA
DI +24V	3	Open Shutter	24 VDC level opens the shutter (Remote Interlock must be ON)
	4	NC	not connected
	5	Remote Interlock	24 VDC level unlocks the shutter operation
DO +24V	6	Over temperature	24 VDC level - Over temerature fault
	7	Shutter closed	24 VDC level as a feedback signal from the closed shutter
	8	Shutter opened	24 VDC level as a feedback signal from the opened shutter
Shutter Interlock	9	IN 1	Safety Circuit 1 Contact closed when Shutter closed
	10	OUT 1	
	11	IN 2	Safety Circuit 2 Contact closed when Shutter closed
	12	OUT 2	
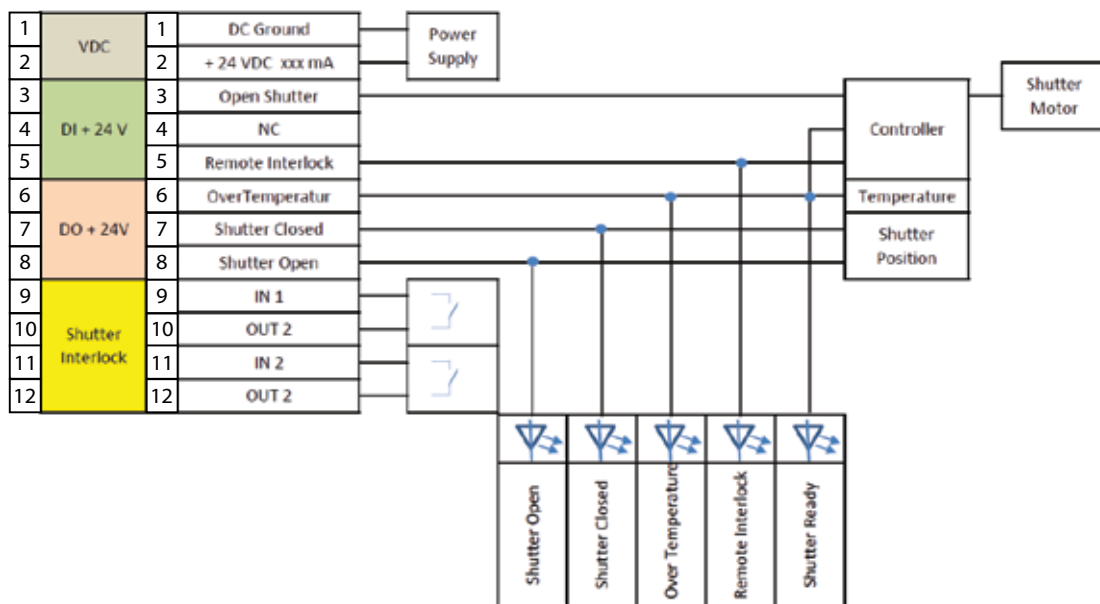
Abbildung | Maßzeichnung | Polbild

7.2 Status display

NC	OT	SO	IC	SC	SR
🟢	🔴	🟡	🟢	🟢	🟢
Green	Red	Orange	Green	Green	Green
NC	Over Temp	Shutter open	Interlock closed	Shutter closed	Shutter ready

7.3 Troubleshooting

Message	Description	Troubleshooting
OT - glows	Temperature of the beam trap is too high	Deactivate Laser, check cooling circuit
SO - no flash when shutter is activated	No feedback from the shutter-open position sensor	Replace circuit board
IC – no flash	External safety circuit open	Check security query
SC - no flash when shutter is activated	No feedback from the shutter-closed position sensor	Replace circuit board
SR - no flash	Malfunction of the power supply	Check power supply

8   Declaration of conformity

The manufacturer, the company

VA LASERAUTOMATION GMBH

Zanitzen 25

A-8742 St. Anna am Lavantegg

Tel.: +43 720 720 334
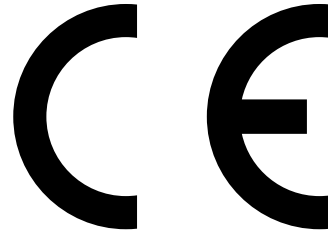
declares, that the **Shutter box SB05**, corresponds to the regulations of the machine safety decree MSV 2010 and the machinery directive 2006/42/EG in the version as as currently amended including their modifications:

- Only allowed to put into operation with Laser

- Only allowed to be used for assembly into a module

- Following terms of the European regulations must be fulfilled:
  2006/42/EG machinery directive
  2006/95/EG low voltage directive
  2004/108/EG EMV directive

- Please make sure, that the system is conforming to the directives mentioned; otherwise it is not allowed to start up the components.

The producer declares, that the product mentioned above is an incomplete machine/module in the sense of the machinery directive 2006/42/EG. The product mentioned above is only allowed to be used for assembly into a machine/module or into an incomplete machine/module. That's why this product doesn't fulfil all the requirements of the machinery directive.

CE-conformity marking attached in: 2015

St. Anna,   22.10.2015

Mag. Rita Muhrer / CEO

9   Appendix A

Project name	1231 Shutter SB05
Safety standard	EN ISO 13849-1:2006 + COR:2009 + EN ISO 13849-2:2012
Author	Michael Muhrer
Company name	VA Laserautomation GmbH
Company address	Zanitzen 25
	A8742 Obdach
Version	
Creation Date	October 21, 2015 9:40:28 PM CEST
Last saved date	October 21, 2015 9:42:12 PM CEST
Pilz PAScal	Version v1.7.3 Build2

Using Version 3.2 of the calculation algorithm in accordance with EN ISO 13849-1

Using Version 3.1 of the calculation algorithm in accordance with EN/IEC 62061

SRP/CS overview

System/Module	Target PL	Result	CCF Factor	PFHd	Achieved PL
SBE05	e	Target Achieved	Target Achieved	5.36E-08	e

details: SBE05
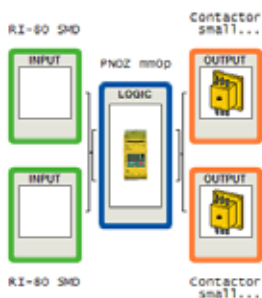
Name	SBE05
Target PL	e
Result	Target Achieved
CCF Factor	Target Achieved
PFHd	5.36E-08
Achieved PL	e

Risk Assessment

Severity	S2: Serious (normally irreversible injury including death)
Severity comment	Laser Class 4. The accessible laser radiation is very dangerous for the eye and the skin. Even diffuse scattered radiation can be dangerous. Using this laser radiation, be aware of the danger of fire and explosion.
Frequency/Duration	F2: Frequent to continuous and/or the exposure time is long
Frequency/exposure comment	The frequency of operation and the period of application are user-dependent and therefore unknown.
Possibility of Avoidance	P2: Scarcely Possible
Avoidance comment	The possibility of prevention is user-dependent and therefore unknown.

CCF result

	Point(s):90/100
	No (0)
1	Yes (15)
	No (0)

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2	Yes (20)
	No (0)
3.1	Yes (15)
3.2	Yes (5)
	No (0)
4	No (0)
	No (0)
5	No (0)
	No (0)
6.1	Yes (25)
6.2	Yes (10)

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SB05

Subsystem details: SBE05

Subsystem	Author	Type	Number of physical elements/channels	Cat.	Diagnostic coverage [%]
Subsystem 1		Input	Two	Category calculated by PAScal	Created from DC for the elements contained
Subsystem 2		Logic	One	Category calculated by PAScal	Created from DC for the elements contained
Subsystem 3		Output	Two	Category calculated by PAScal	Created from DC for the elements contained

Device	Subsystem	Operational hours per day	Operational days per year	Time between two operations	Calculated Number of Operations [per hour]	Mission time [year(s)]	Fault detection on wiring	Diagnostic coverage [%]	Demand mode <= 1/100 test rate (Category 2)	MTTFd [year(s)]
1.1.1.1 - RI-80 SMD[1] [***]	Subsystem 1	24	365	0.008 Stunde (n)	125.00	9.13	Detection of shorts across contacts	99.00	No	91.32
1.1.2.1 - RI-80 SMD[1] [***]	Subsystem 1	24	365	0.008 Stunde (n)	125.00	9.13	Detection of shorts across contacts	99.00	No	91.32
1.2.1.1 - PNOZ mm0p[2] [***]	Subsystem 2	-	-	-	-	20.00	None	-	No	-
1.3.1.1 - Contactor small load[3] [***]	Subsystem 3	24	365	1.00 Stunde (n)	1.00	20.00	None	99.00	No	22831.05
1.3.2.1 - Contactor small load[3] [***]	Subsystem 3	24	365	1.00 Stunde (n)	1.00	20.00	None	99.00	No	22831.05

[***]Replace the components after the specified number of years. Please include this in your user manual.

[Number] : See component data for details

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SB05

PL/PFHd Calculation Data

SB05

Subsystem/channel	PL	PFHd	Cat.	DCavg	MTTFd: Limited	MTTFd: sym.	MTTFd values for Channel 1	MTTFd values for Channel 2	DC	Mission time	CCF
SBE05	e	5.36E-08									
REED Schalter: Input	e	2.74E-08	4	99.00%	91.00 years	91.32 years	91.32 years	91.32 years			90
1.1.1.1 - RI-80 SMD							91.32 years		99.00%	9.13 years	
1.1.2.1 - RI-80 SMD								91.32 years	99.00%	9.13 years	
1.2.1.1 - PNOZ mm0p	e	1.54E-09	4							20.00years	
Output	e	2.47E-08	4	99.00%	100.00 years	100.00 years	100.00 years	100.00 years			90
1.3.1.1 - Contactor small load							22831.05 years		99.00%	20.00 years	
1.3.2.1 - Contactor small load								22831.05 years	99.00%	20.00 years	

Component data

Number	Component type	Name	PL	PFHd [per hour]	B10d	MTTFd [year(s)]
1	Input	RI-80 SMD	-	-	10,000,000	-
	Selected device	Unbekannt_MODE_1				
	Selected limitations	RI-80 SMD				
2	Logic	PNOZ mm0p	e	1.54E-9	-	-
	Selected device	772000 V2.1				
	Selected limitations	Logic function I Dual-channel I #NotApplicable I Processing				
3	Output	Contactor small load	-	-	20,000,000	-
	Selected device	Contactor small load				
	Selected limitations	#ConstraintsNotAvailable				

CCF questions (EN ISO 13849-1)

ID	Group	Question
1	Separation / segregation	Physical separation between signal paths e.g. separation in wiring/piping, e.g. sufficient clearances and creepage distances on printed-circuit boards
2	Diversity	Different technologies/design or physical principles are used e.g. first channel programmable electronic and second channel hardwired e.g. kind of initiation e.g. pressure and temperature Measuring of distance and pressure e.g. digital and analogue Components of different manufacturers.
3.1	Design / application / experience	Protection against over-voltage, over-pressure, over-current, etc.
3.2		Components used are well-tried.
4	Assessment / analysis	Are the results of a failure mode and effect analysis taken into account to avoid common-cause failures in design?
5	Competence / training	Have designers/maintainers been trained to understand the causes and consequences of common-cause failures?
6.1	Environmental	Prevention of contamination and electromagnetic compatibility (EMC) against CCF in accordance with appropriate standards. Fluidic systems: filtration of the pressure medium, prevention of dirt intake, drainage of compressed air, e.g. in compliance with the component manufacturers' requirements concerning purity of the pressure medium. Electric systems: Has the system been checked for electromagnetic immunity, e.g. as specified in relevant standards against CCF? For combined fluidic and electric systems, both aspects should be considered.
6.2		Other influences: Are the requirements for immunity to all relevant environmental influences such as, temperature, shock, vibration, humidity (e.g. as specified in relevant standards) considered?

Questions about risk analysis (EN ISO 13849-1)

Risk parameter	Examination	Evaluation
Severity	Severity of Injury	Slight (normally reversible injury) Serious (normally irreversible injury including death)
Frequency/ Exposure	Frequency and/or exposure to a hazard	Seldom to less often and/or the exposure time is short Frequent to continuous and/or the exposure time is long
Possibility of Avoidance	Possibility of avoiding the hazard or limiting the harm	Possible under specific conditions Scarcely Possible

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Explanation of category (EN ISO 13849-1)

The results of the calculation will only be valid if the following requirements are also met.

Category	Summary of requirements	System behaviour
B	SRP/CS and/or their protective equipment, as well as their components, shall be designed, constructed, selected, assembled and combined in accordance wit relevant standards so that they can withstand the expected influence. Basic safety principles shall be used.	The occurrence of a fault can lead to the loss of the safety function.
1	Requirements of B shall apply. Well-tried components and well-tried safety principles shall be used.	The occurrence of a fault can lead to the loss of the safety function but the probability of occurrence is lower than for category B.
2	Requirements of B and the use of well-tried safety principles shall apply. Safety function shall be checked at suitable intervals by the machine control system.	The occurrence of a fault can lead to the loss of the safety function between the checks. The loss of safety function is detected by the check.
3	Requirements of B and the use of well-tried safety principles shall apply. Safety-related parts shall be designed, so that - a single fault in any of these parts does not lead to the loss of the safety function, and - whenever reasonably practicable, the single fault is detected.	When a single fault occurs, the safety function is always performed. Some, but not all, faults will be detected. Accumulation of undetected faults can lead to the loss of the safety function.
4	Requirements of B and the use of well-tried safety principles shall apply. Safety-related parts shall be designed, so that - a single fault in any of these parts does not lead to a loss of the safety function, and -the single fault is detected at or before the next demand upon the safety function, but that if this detection is not possible, an accumulation of undetected faults shall not lead to the loss of the safety function.	When a single fault occurs the safety function is always performed. Detection of accumulated faults reduces the probability of the loss of the safety function (high DC). The faults will be detected in time to prevent the loss of the safety function.

| Project name	1231 Shutter SB05
Safety standard	EN ISO 13849-1:2006 + COR:2009 + EN ISO 13849-2:2012
Author	Michael Muhrer
Company name	VA Laserautomation GmbH
Company address	Zanitzen 25
	A8742 Obdach
Version	
Creation Date	October 21, 2015 9:40:28 PM CEST
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Pilz PAScal	Version v1.7.3 Build2

Using Version 3.2 of the calculation algorithm in accordance with EN ISO 13849-1
Using Version 3.1 of the calculation algorithm in accordance with EN/IEC 62061

10 Appendix B

RI-80 SMD Series Dry Reed Switch
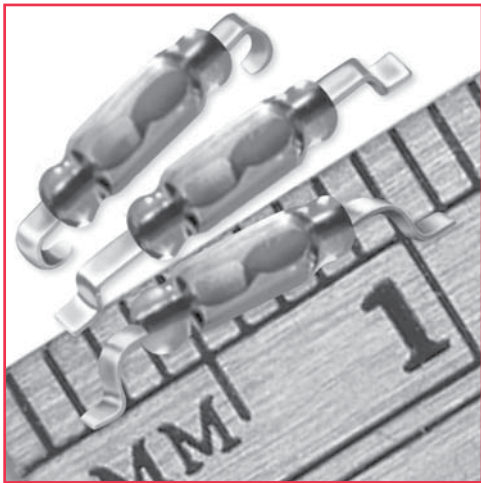
RI-80 SMD Series

Ultra-micro dry-reed switch hermetically sealed in a gas-filled glass envelope. Single-pole, single-throw (SPST) type, having normally open contacts, and containing two magnetically actuated reeds.

The switch is of the double-ended type and may be actuated by an electromagnet, a permanent magnet or a combination of both.
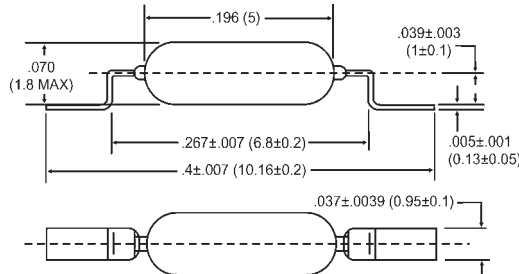
RI-80 SMD Series Features

◆ Ideal for proximity sensors, telecom & medical applications
◆ World's smallest high quality reed switch
◆ Contact layers: Gold, sputtered ruthenium
◆ Superior glass-to-metal seal and blade alignment

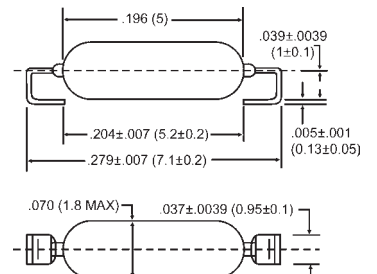*Dimensions in inches (mm)*
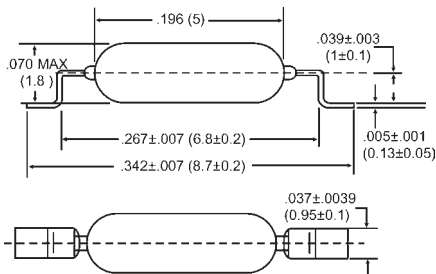
RI-80 SMD G1 Model

RI-80 SMD G2 Model

RI-80 SMD J-Lead Model

General data for RI-80 SMD

AT-Customization
The RI-80 SMD can be supplied in operate ranges to customer specification.

Coils
All characteristics are based on unmodified switches. The switches are defined using the Philips Standard Coil. For more information, see *Reed Switch Technical & Application Information* Section of this catalog.

Life expectancy and reliability
The life expectancy data given below are valid for a coil energized at 1.25 times the published maximum operate value for each type in the RI-80 series.

No-load conditions (operating frequency: 100 Hz)
Life expectancy: min. 10^8 operations with a failure rate of less than 2×10^{-9} with a confidence level of 90%.

End of life criteria:
   Contact resistance > 1Ω after 2 ms
   Release time > 2ms (latching or contact sticking).

Loaded conditions (Resistive load: 5V; 100 mA; operating frequency: 170 Hz)

Life expectancy: min. 10^7 operations with a failure rate of less than 10^{-8} with a confidence level of 90%.

End of life criteria:
   Contact resistance > 1Ω after 4 ms
   Release time > .7 ms (latching or contact sticking)

Switching different loads involves different life expectancy and reliability data. Further information available upon request.

Mechanical Data
Contact arrangement is normally open; lead finish is tinned; and can be mounted in any position.

Shock
The switches are tested in accordance with *"IEC 68-2-27"*, test Ea (peak acceleration 150 G, half sinewave; duration 11 ms). Such a shock will not cause an open switch (no magnetic field present) to close nor a switch kept closed by an 80 AT coil to open.

RI-80 SMD Series Dry Reed Switch

Model Number			RI-80 SMD
Parameters	**Test Conditions**	**Units**	
Operating Characteristics			
Operate Range**		AT	5-15**
Release Range**		AT	2-13**
Operate Time - including bounce (typ.)	(energization)	ms	0.35 (20 AT)
Bounce Time (typ.)	(energization)	ms	0.1 (20 AT)
Release Time (max)	(energization)	μs	20 (20 AT)
Resonant Frequency (typ.)		Hz	21.300
Electrical Characteristics			
Switched Power (max)		W	5
Switched Voltage DC (max)		V	175*
Switched Voltage AC, RMS value (max)		V	140
Switched Current DC (max)		mA	350
Switched Current AC, RMS value (max)		mA	250
Carry Current DC; AC, RMS value (max)		A	0.5
Breakdown Voltage (min)		V	230
Contact Resistance (initial max)	(energization)	m Ω	160 (20 AT)
Contact Resistance (initial typ.)	(energization)	m Ω	140 (20 AT)
Contact Capacitance (max)	without test coil	pF	0.45
Insulation Resistance (min)	RH ≤ 45%	M Ω	10^6

* 200V for switches with AT-on value > 10AT.

** AT values of switches before SMD forming in PSC coil.

Vibration
The switches are tested in accordance with "IEC 68-2-6", test Fc (acceleration 10G; below cross-over frequency 57 to 62 Hz; amplitude 0.75 mm; frequency range 10 to 2000 Hz, duration 90 minutes.) Such a vibration will not cause an open switch (no magnetic field present) to close, nor a switch kept closed by an 80 AT coil to open.

Mechanical Strength
The robustness of the terminations is tested in accordance with "IEC 68-2-21", test Ua1 (load 10N).

Operating and Storage Temperature
Operating ambient temperature; min: -55°C; max: +125°C.
Storage temperature; min: -55°C; max: +125°C.

Note: Temperature excursions up to 150°C may be permissible. For more information contact your nearest Coto Technology sales office.

Soldering
The switch can withstand soldering heat in accordance with "IEC 68-2-20", test Tb, method 1B: solder bath at 350 ±10°C for 3.5 ±0.5 s. Solderability is tested in accordance with "IEC 68-2-20" test Ta, method 3: solder globule temperature 235°C; ageing 1b: 4 hours steam.

Welding
The leads can be welded.

11 Appendix C

Example:
PLe with the Configurable Control System PNOZmulti mm0p 24VDC for safety-related interruption of safety curcuits
In case of failure the output O0 on the PNOZ (shutter power supply schould be turned off.
Caution: the pin 2 on the shutter - PLC connection requires 24VDC 0,5A!