Table of contents

This manual is divided into two parts. This part *(Operating Manual)* concerns the general notes for the operation, installation and settings of the device.
The second part (Safety Manual PRO 10-SIL, from page 24) applies additionally for the signal generators in safety-relevant systems (PRO 10-SIL and PRO 10-3G/3D-SIL).

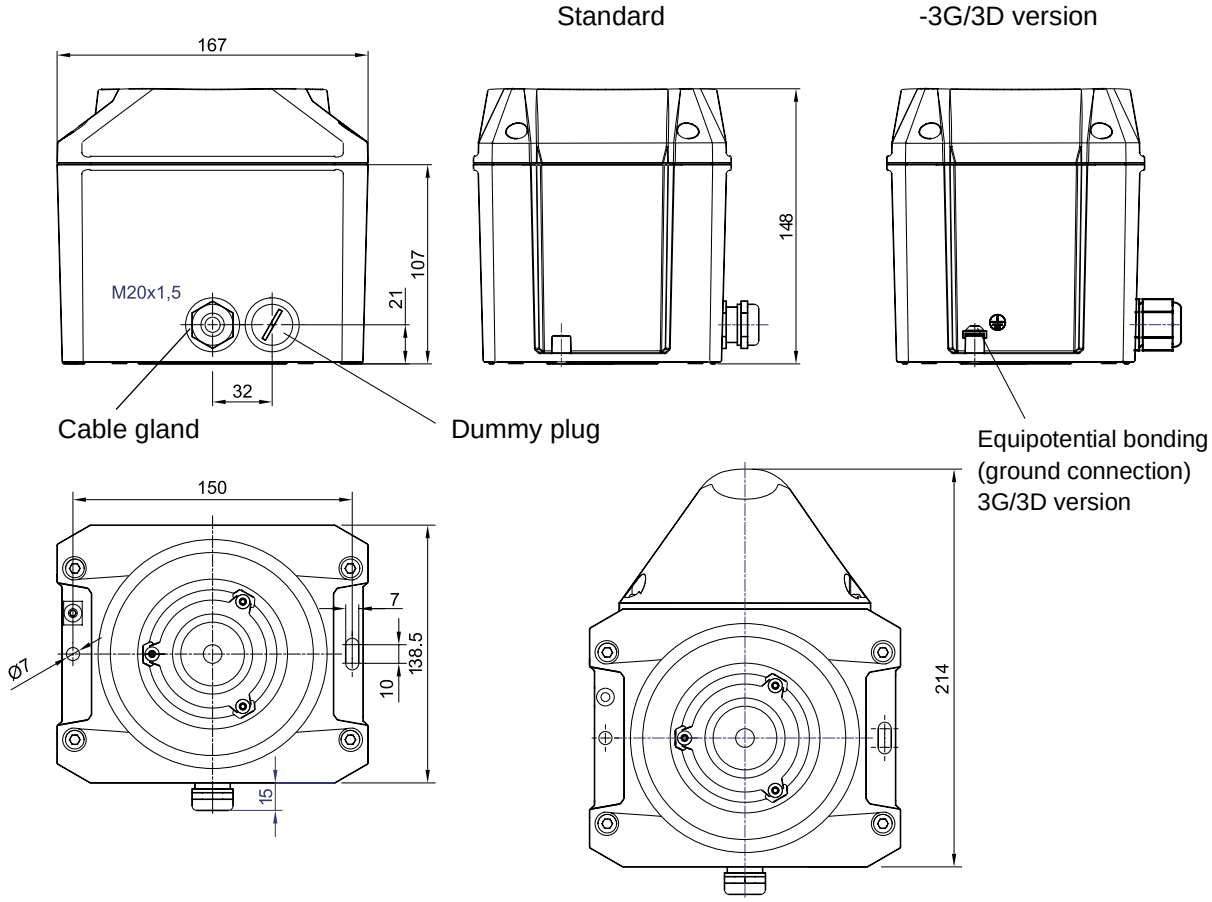
1. Intended use

Signal generators of the PRO 10 series are intended for signaling of dangerous situations, for example, in industry, trade and building areas. The signal generators generate acoustic signals in 80 different tone types which can be selected by means of a switch.
It is also possible to switch over to a maximum of 3 further tones by means of electrical controls (-TAS, -TAV and -TAR).
Additional optical signaling is also possible by using the sounder-light combination. Lights with LED technology of the PRO L-10 series or with xenon technology of the PRO X-10 series can be selected.
Special versions for use in safety-relevant applications up to Level SIL 2 (Option -SIL) are also available as well as devices for use in explosive areas (Option -3G/3D).
The devices must only be operated when undamaged and within the specified parameters. The function of the device can only be guaranteed if the upper and lower parts are correctly joined together.
The devices are suitable for indoor and outdoor use.

2. Scope of delivery

The scope of delivery consists of:
1x Signal device with 1x cable gland
1x Quick guide
1x Resistor (only for –SSM versions)

3. Dimensions



Signal generator-light combination

4. Technical data

4.1 General

	PRO 10	PRO L 10	PRO X 10
Max. sound level	116 dB (A) 1m		
Volume control	- 4 dB -10 dB -16 dB - 22 dB - 26 dB - 30 dB by DIP switch setting or external control		
Tones	80, of which 3 are externally controllable		
Light source	--	LED	Xenon tube
Light intensity	--	23 cd (transparent)	56 cd (transparent) / 5 J (transparent)
Duty cycle	100 %		
Connecting terminals	0.14 - 2.5mm² fine stranded / AWG24 - AWG 14 4 mm² solid / AWG12		
Protection category	IP 66/67 (EN 60529), Type 4 & 4x		
Impact strength	PRO 10	IK 09 (EN 50102)	
	PRO L 10/ PRO X 10	IK 08 (EN 50102)	
Protection class	I		
Overvoltage category	II		
Operating temperature	-40 °C…+55 °C		
Storage temperature	-40 °C…+70 °C		
Max. rel. air humidity	90 %		
Cable inlet	2x M20 x 1.5		
Sealing range of the cable gland	Standard: 6 – 13 mm 3G/3D versions: 7 – 13 mm		
Housing material	Aluminum		
Lens material	PC		
Installation attitude	any (Sound funnel must not face upwards after assembly of the device)		
Lens colors	transparent, white, yellow, amber, red, green, blue only PRO L 10: RGBW version: white		

4.2 Electrical data PRO 10 (sounder part, all versions)

Rated operating voltage	12 V DC	24 V DC	48 V DC	120 V DC	24 V AC	48 V AC	115 V AC	230 V AC
Operation voltage range	10 - 60V DC			108-132 V DC *	18 – 53 V AC *		95 – 265 V AC	
Rated frequency	--				50/ 60 Hz			
Sounder rated current consumption (max)	960 mA	400 mA	200 mA	85 mA	700 mA	410 mA	145 mA	95 mA
Power consumption (max)	12 W	10 W	10 W	10 W	18 VA	21 VA	17 VA	21 VA

***** not for SIL devices

4.3 Electrical data PRO L 10 (light part LED)

Rated operating voltage	12 V DC	24 V DC	48 V DC	120 V DC	24 V AC	115 V AC	230 V AC
Operation voltage range	10 – 60 V DC			108 – 132 V DC	21.6 – 26.4 V AC	95 – 265 V AC	
Rated frequency	--				50/ 60 Hz		
Rated current consumption (max)	275 mA	120 mA	65 mA	25 mA	167 mA	51 mA	36 mA
Power consumption (max)	3.5 W	3 W	3.1 W	3 W	4 VA	6 VA	8.5 VA

4.4 Electrical data PRO X 10 (light part xenon)

Rated operating voltage	12 – 48 V	24 V AC	115 V AC	230 V AC
Operation voltage range	10 – 60 V DC	18 – 30 V AC	90 – 135 V AC	187 – 255 V AC
Rated frequency	--	50/ 60 Hz		
Rated current consumption (1 Hz)	450 mA 280 mA@24 V	600 mA	140 mA	95 mA
Power consumption	6.7 W	14.4 VA	19 VA	24 VA

5. Approvals

(Approvals are valid for marked devices)

<table>
<tr><td>Construction Product Regulation (305/2011/EU)

In Preparation</td><td>PRO 10:
<table>
<tr><th></th><th>PRO 10</th></tr>
<tr><td>Rated operating voltage</td><td>24 – 48 V DC</td></tr>
<tr><td>Voltage range in accordance with EN54-3</td><td>10 V – 60 V</td></tr>
<tr><td>Tone
2
9
15
57
60
104
131
128
146</td><td>Compliant with Construction Product Regulation (305/2011/EU)
1200Hz-500Hz (Sägezahn/ Sawtooth) DIN/PFEER P.T.A.P.
Sawtooth rising, 800-970 Hz, 1s
500Hz-1200Hz (Ansteigender Ton/ Slow whoop)
Continuous tone 950 Hz
825Hz (Dauerton/ Continuous tone)
660Hz (Unterbrochener Ton/ Interrupted tone)
800Hz/ 1000Hz (Wechselton/ Alternating tone)
Alternating tone, 1025 Hz, 825 Hz, 0.5s
544Hz/ 440Hz (NF S 32-001)</td></tr>
<tr><td>Coverage volume</td><td>EN54-3:
see document 30454-005-1</td></tr>
<tr><td>Environmental protection class</td><td>Type B</td></tr>
<tr><td>Installation attitude</td><td>any</td></tr>
</table></td></tr>
<tr><td rowspan="3">VdS</td><td>PRO 10/ PRO L 10/ PRO X 10</td></tr>
<tr><td>In preparation</td></tr>
<tr><td>See Construction Product Regulation (305/2011/EU) for data</td></tr>
<tr><td>DNV</td><td>In preparation</td></tr>
<tr><td>MED/MER</td><td>In preparation</td></tr>
<tr><td>UL, cUL</td><td>In preparation:
S7256
UCST, UCST7, ULSZ, ULSZ7, UEES, UEES7 (see page 11 in the English language chapter for further information)</td></tr>
<tr><td>Ex-Zone 2 + 22</td><td>See chapter 6. Explosion-protected versions PRO 10-3G/3D/ PRO L 10-3G/3D</td></tr>
</table>

6. Explosion-protected versions PRO 10-3G/3D/ PRO L 10-3G/3D

These signal generators are suitable for use in potentially hazardous area of Zone 2, in accordance with EN 60079-10-1 and in Zone 22, in accordance with EN 60079-10-2. The devices can be used for gases of temperature classes T1, T2, T3 and T4 and in environments with non-conductive dusts. The surface temperature of the signal generator housing does not exceed +135°C. The IP protection category IP66/67 is achieved.

	Directive 2014/34/EU (ATEX)	
Standard conformity	EN IEC 60079-0 EN IEC 60079-7 EN 60079-31	
Designation:		
PDG 24.0009 X	Ex II3G Ex ec IIC T4...T3 Gc	-40°C ≤ T_a ≤ +55 °C
PDG 24.0010 X	Ex II3D Ex tc IIIB T135°C Dc IP66/67	-40°C ≤ T_a ≤ +55 °C

6.1 Installation requirements

The signal generators must be installed in accordance with the latest versions of the appropriate parts of DIN EN 60079 or equivalent IEC specifications.

EN 60079-10-1	Explosive atmosphere - Part 10-1: Classification of areas subject to gas explosion
EN 60079-10-2	Explosive atmosphere - Part 10-2: Classification of areas subject to flammable dust
EN 60079-14	Explosive atmosphere - Part 14: Project planning, selection and installation of electrical systems

6.2 Special conditions for use

X : The signal generator can be used for temperature class T3. The maximum sound pressure level must be limited to stage -4dB or lower for use in temperature class T4. The sound pressure level is reduced by means of the coding switch settings of DIP **S10**. The switch position **S10-1** and **S10-2** to OFF may not be used in this case.

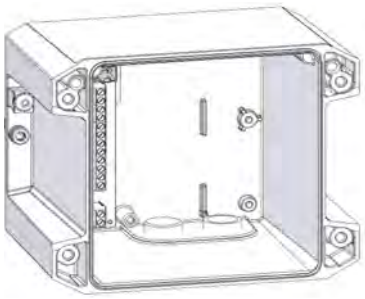
The signal generator can be used for the stationary installation. Strain relief of the connection cables must be ensured when the original cable gland is used. The installed cable gland is limited to applications with low mechanical hazard in accordance with EN IEC 60079-0. If a protected assembly is not possible, Ex-e glands without this restriction must be used together with a connection thread seal.
Minimum requirement: M20x1.5, IP66/67, II3G Ex ec IIC Gc / II3D Ex tc IIIB Dc, Ta -40°C to +70°C.
Original cable gland:
Wiska ESKE/1-e 20, sealing range 7-13mm, IECEx PTB 13_0034 X / PTB 13 ATEX 1015 X
The combi-devices with light are suitable for a “low” degree of mechanical hazard in accordance with the requirements of EN IEC 60079-0. This means that the combi-devices must be assembled protected against impact. A protective basket is not absolutely necessary.

If the signal generator is exposed to processes which generate strong charge carriers, e.g. direct influence on the signal generator by pneumatic transport media or unintentional and dry rubbing on the surface, dangerous electrostatic charging could occur. Precautions must therefore be considered in the choice of the installation site and during cleaning work.
It is recommended to install the signal generator out of reach of persons to avoid interaction with persons or touching by objects. For cleaning, only rinse the device with water or wipe off with damp cloths and do not use compressed air, high-pressure or steam jets.

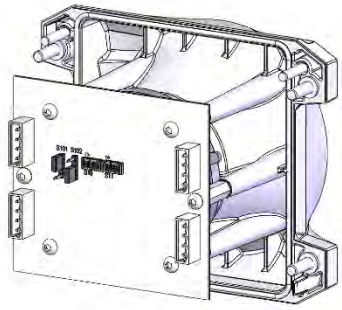
6.3 Assembly

Check that the seals are undamaged and clean while assembling and sealing the housing.
The cable glands must be assembled with housing connection seals unless these are already fitted.

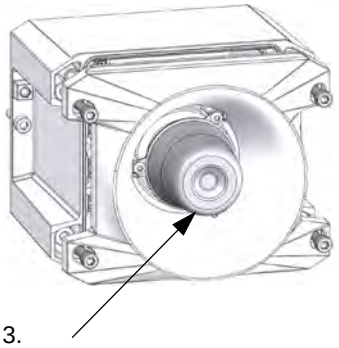
7. Assembly



1.
Fasten the lower part to the assembly surface and connect the electrical wiring.



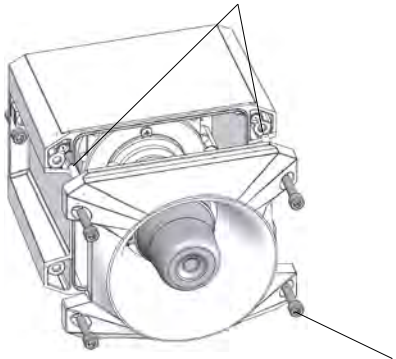
2.
Set the operating mode.



3.
Assemble the upper part.

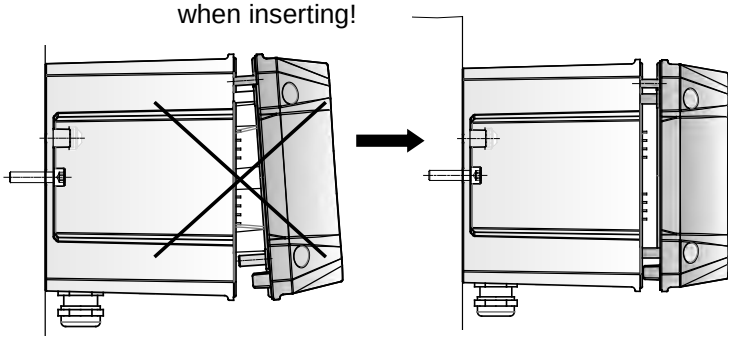
Hold the upper part by the funnel.

Notes:



Do not assemble with force.

When loosening/tightening the housing screws, hold/fix the upper part in position directly on the lower part.



Tighten the four Torx-T30 housing sealing screws with a torque of 6.4 Nm crosswise in at least two steps. Suitable fastening material must be used for assembly.

8. Commissioning

8.1 Safety information

	**DANGER - Danger to life due to electric shock** Voltage-carrying units and exposed connection cables may cause electric shocks and serious accidents. ➢ Only trained and authorized electricians may work on electrical connections. ➢ Disconnect all supply lines from mains before installation and secure them against reconnection. Always ensure absence of voltage. The operating voltage must only be applied when the housing is firmly closed.
	**WARNING - Danger due to unauthorized use of the devices** Improper use may lead to serious accidents. ➢ Ensure that the connection cable is protected against pulling and twisting during installation. ➢ The devices are only intended for fixed assembly. To ensure long-term function: ➢ Do not mount the sound projector pointing upwards in dusty environments or outdoors.
	**DANGER - Danger due to damage to the devices** Non-compliance with the information on the type plate can lead to serious accidents. ➢ Always observe the information on the type plate when installing and maintaining the units.
	**CAUTION - Risk of injury due to sharp edges or heated components** ➢ Wear suitable personal protective equipment (PPE) for installation, assembly or service/maintenance work. ➢ Keep wiring away from sharp edges, corners and internal components; avoid collisions with component parts.
	**CAUTION - Risk of hearing impairment** ➢ Wear sound insulation equipment during work/testing to prevent hearing impairment. ➢ Unexpected triggering of the sound can lead to startled reactions.
	**CAUTION - Risk of sight impairment** When using the signal generator-light combination (PRO L 10, PRO X 10): ➢ Avoid constant, direct glances into the activated lights to prevent impairment of vision. ➢ Unexpected triggering of the flash can lead to startled reactions.

8.2 Additional safety notes for explosion-protected devices (-3G/3D)

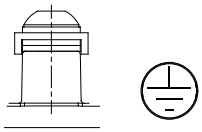
	**DANGER - Areas with an explosion hazard!** Work in areas with an explosion hazard may only be carried out by trained and authorized specialists. ➢ Do not open when under voltage. ➢ "Low" degree of risk of mechanical danger - see special conditions for use in the Operating Manual. ➢ Danger due to electrostatic discharges - see special conditions for use in the Operating Manual. ➢ For use in temperature class T4 - see special conditions for use in the Operating Manual.

8.3 Electrical connection

Connection cables:

Wire end ferrule 7 mm,
torque, 0.4 – 0.6 Nm
clampable cross-section:
maximum 2.5mm² multi-wire
or
maximum 4 mm² solid

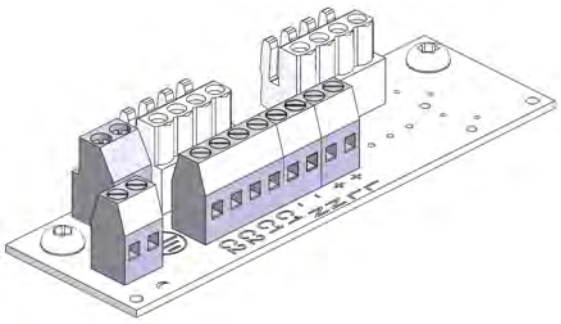
Equipotential bonding for -3G/3D devices:

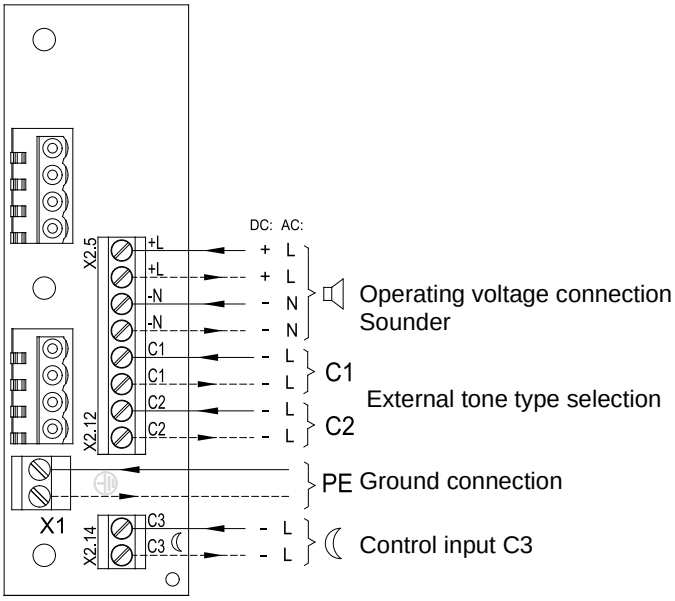


Cross-section 4 mm² min, protected against twisting.
Tightening torque: 2.5 Nm

8.3.1 PRO 10/ PRO 10-3G/3D

- Observe the 8.1 Safety information!
- **For PRO 10-3G/3D**, also observe the 8.2 Additional safety notes !





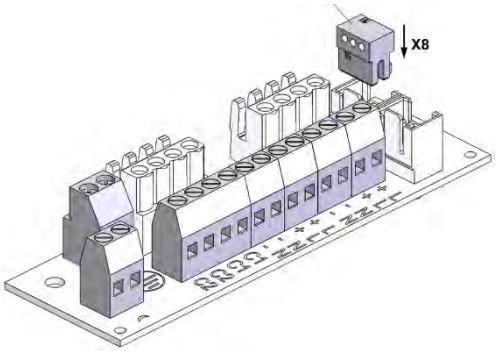
Controls of C1 and C2 are described in chapter 9.4 Changing the tones by external control.

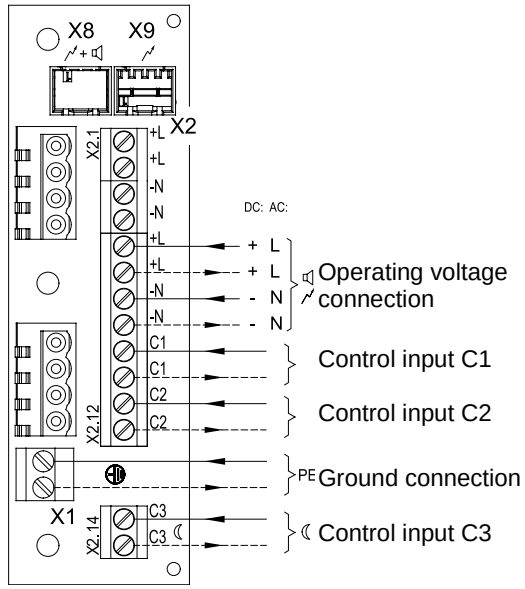
8.3.2 Electrical connection PRO L 10/ PRO X 10

➢ Observe the Safety information!

Joint operation of light and sounder (factory setting)

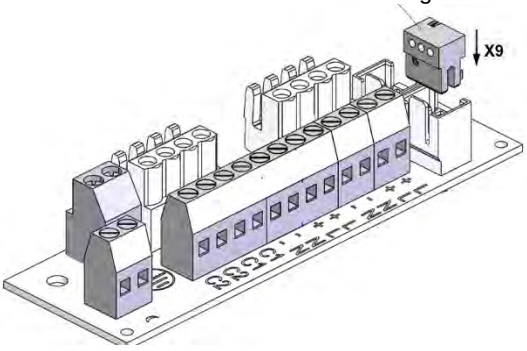
Connector from the light board

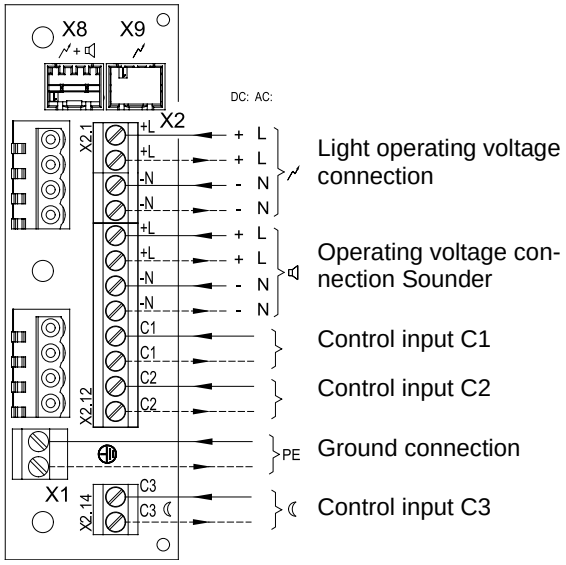




Separate operation of light and sounder

Connector from the light board



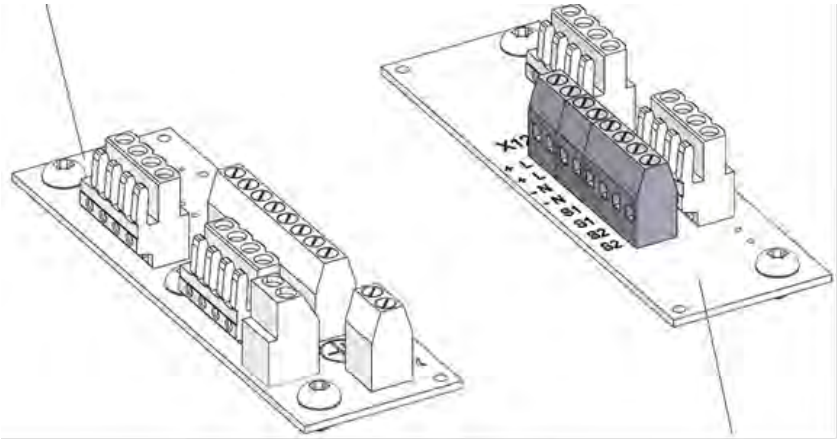


Controls of C1 and C2 are described in chapter 9.4 Changing the tones by external control.

8.3.3 Electrical connection PRO 10-SIL

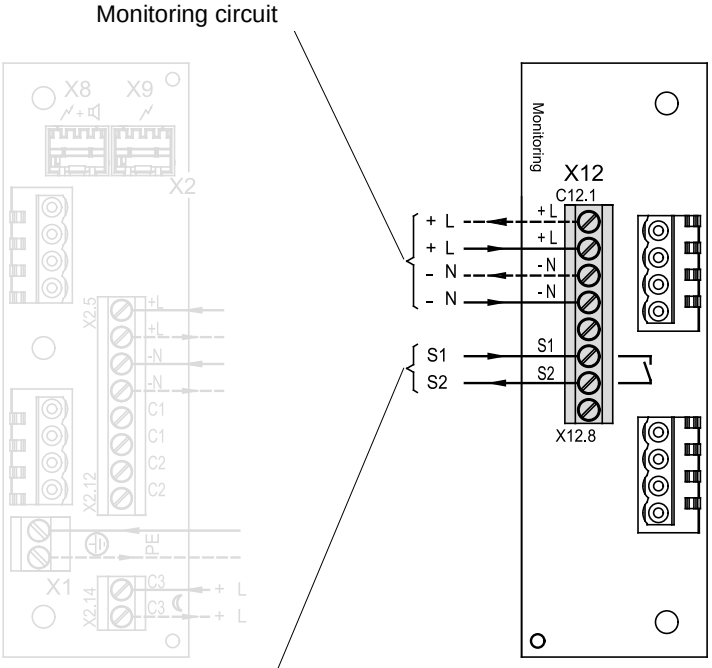
➢ Observe the Safety information!

Circuit board PRO 10 (see 8.3.1 PRO 10)



Circuit board
Monitoring circuit

Operating voltage connection
Monitoring circuit



Potential-free alarm contact

9. Tone and volume settings

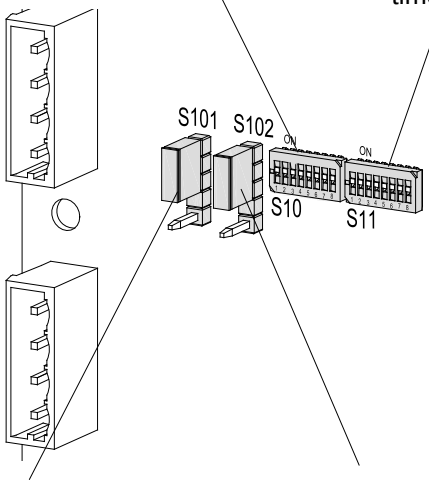
9.1 General setting possibilities

The desired tone can be selected using the tone selector switch **S11** (on the driver board in the upper part). The possible tones are described in the tone type table in the Annex.
The selected tone is generated after the supply voltage is applied.

DC version

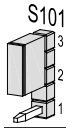
S10
Volume setting,
(day/night switching)

S11
Tone selector switch and timeout

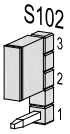


S101
Bridge
reverse polarity
protection diode

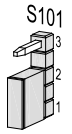
S102
Selection of control voltage
polarity for C1, C2 and C3



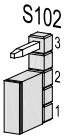
with reverse polarity protection
Factory setting



- Factory setting

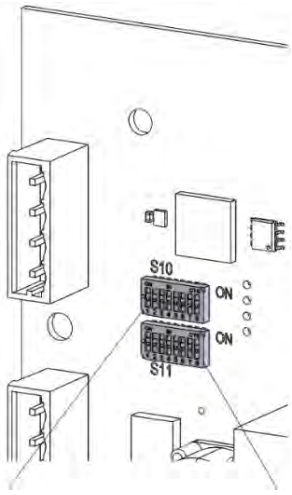


Without reverse polarity protection



+

AC version



S10
Volume setting,
(day/night switching)

S11
Tone selector switch
and timeout

9.2 Volume setting and day/night switching

The signal generator volume can be set by **S10** (see Table 1). With the external volume setting, it is also possible to operate the signal generator with two different volumes (see Table 2). Control input **C3** is used to switched between them. If **C3** is not controlled, the set volume is generated from the “internal” range, see Table 1. When **C3** is controlled, the set volume is selected from the “external” (Table 2) range.
See chapter 9.1 for how to set the polarity of the control voltage of **C3**.

Table 1 - Volume reduction with control of C3 (exclusively internal)

S10								Setting
1	2	3	4	5	6	7	8	
OFF	OFF			OFF				Maximum volume (Not usable for -3G/3D temperature class T4)
ON	OFF			OFF				- 4 dB
OFF	ON			OFF				- 10 dB
ON	ON			OFF				- 16 dB
		OFF	OFF	ON				- 16 dB
		ON	OFF	ON				- 22 dB
		OFF	ON	ON				- 26 dB
		ON	ON	ON				- 30 dB

- Switches 6,7,8 not used

Table 2 - Volume reduction with control of C3 (external)

S10					C3	Setting
1	2	3	4	5		
OFF	OFF			OFF	OFF	Maximum volume (Not usable for -3G/3D temperature class T4)
ON	OFF			OFF	OFF	- 4 dB
OFF	ON			OFF	OFF	- 10 dB
ON	ON			OFF	OFF	- 16 dB
		OFF	OFF	OFF	ON	- 16 dB
		ON	OFF	OFF	ON	- 22 dB
		OFF	ON	OFF	ON	- 26 dB
		ON	ON	OFF	ON	- 30 dB

9.3 Duration of the tone signal S11 (timeout)

The duration of the emitted signal can be limited automatically with switch **S11**. In this case, the acoustic signal is stopped according to the selected time. The acoustic signal can only be reactivated by interrupting the voltage supply.

Duration of the tone signal *								
S11								Setting
1	2	3	4	5	6	7	8	
OFF	OFF	Selection of tones, see annex						No timeout
ON	OFF							60 s
OFF	ON							15 min
ON	ON							45 min

***** not usable for SIL versions

9.4 Changing the tones by external control

It is possible to obtain up to three additional tone types using the following electrical controls for applications that require additional tones in addition to the base tone. The volume can be set additionally.
The desired base tone (♪, see tone type table in the Annex) is always set first with the tone selector switch **S11** on the driver board. The corresponding additional tones (C1, C2, C1+C2) can be found in the "Control of tones" table in the Annex. See the tables in chapter 9.2 for the possible volume settings.

9.4.1 Stage selection via control voltage (-TAS), AC and DC versions

DC version:

Note: Always apply the supply voltage together with the control inputs.

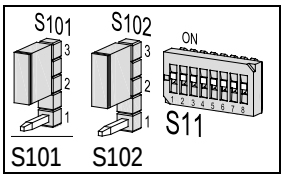
Caution: If the control voltage is higher than the supply voltage or the supply voltage is not present at all, the operating current will be supplied via the control inputs C1 and C2. An appropriate load capacity of the system being supplied must be guaranteed.

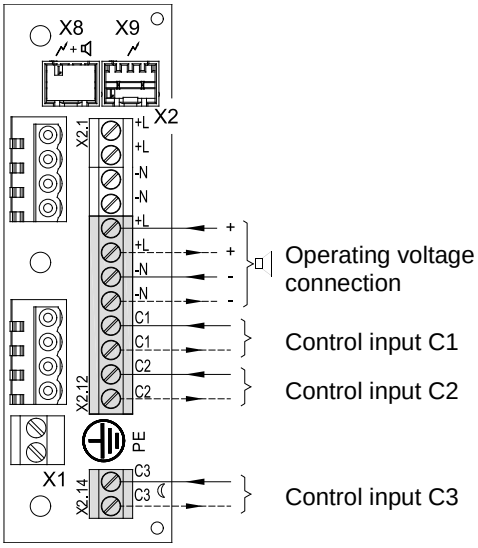
Negative control: (Factory setting)

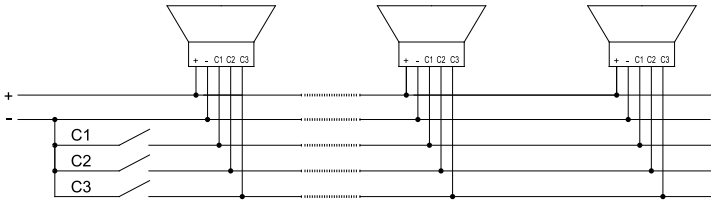
Switch setting should be as follows:

- Switch **S101**: with reverse polarity protection
- Switch **S102**: to "**–**"

Switch on the driver board:





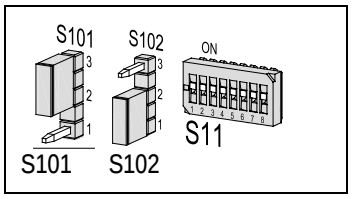


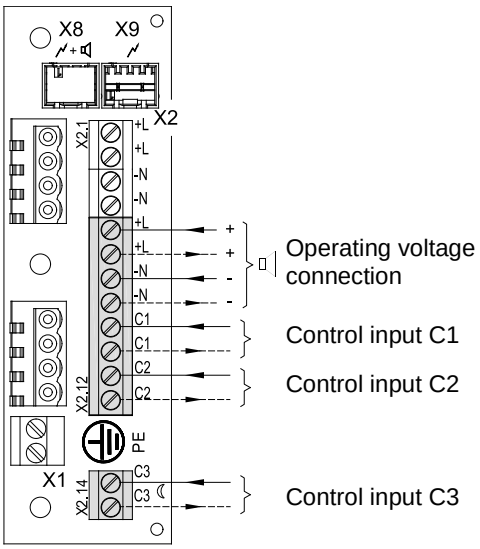
Positive control: (Factory setting)

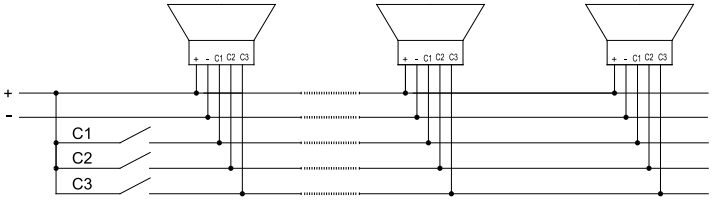
Switch setting should be as follows:

- Switch **S101**: with reverse polarity protection, (with rectifier)
- Switch **S102**: to "**+**" (positive control)

Switch on the driver board:



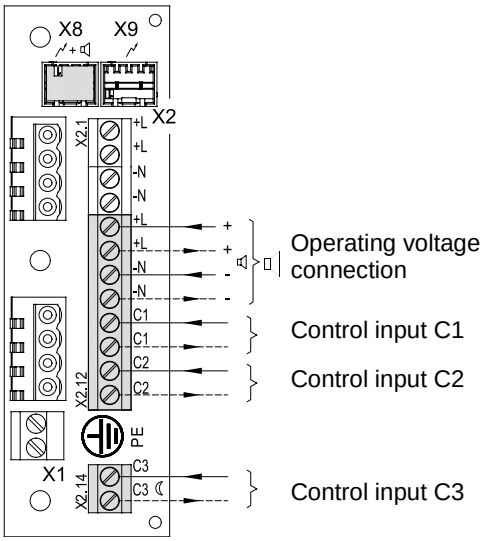


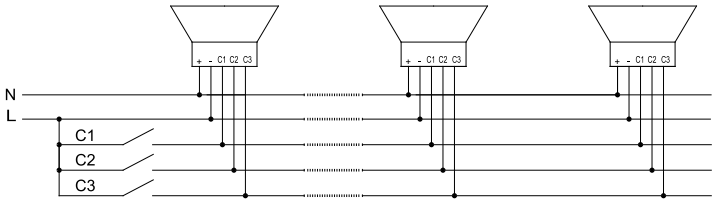


AC version:

Note: Always apply the supply voltage together with the control inputs.

Connect phase "**L**" of the supply voltage to control inputs C1, C2 or C3.





9.4.2 Stage selection by supply via control input (TAV) – all DC versions

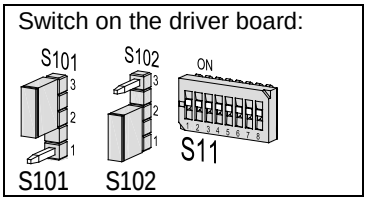
Note: Only applicable to DC version!

The sounder can be supplied with operating voltage via the control inputs C1 / C2 on the connection board. Supply and stage selection therefore take place simultaneously.

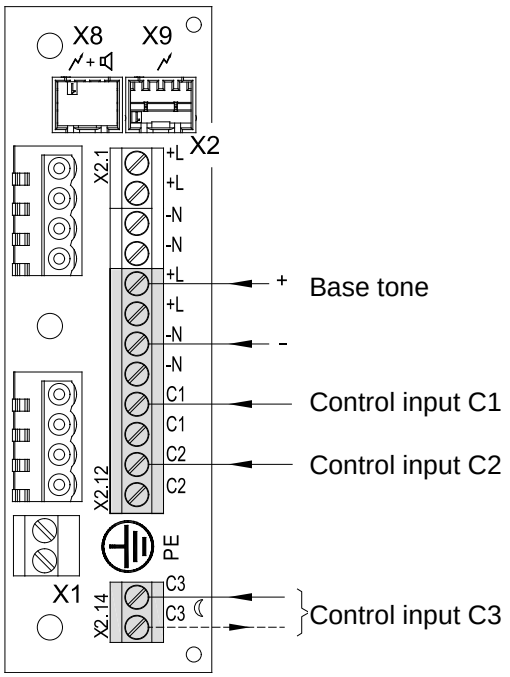
Switch setting should be as follows:

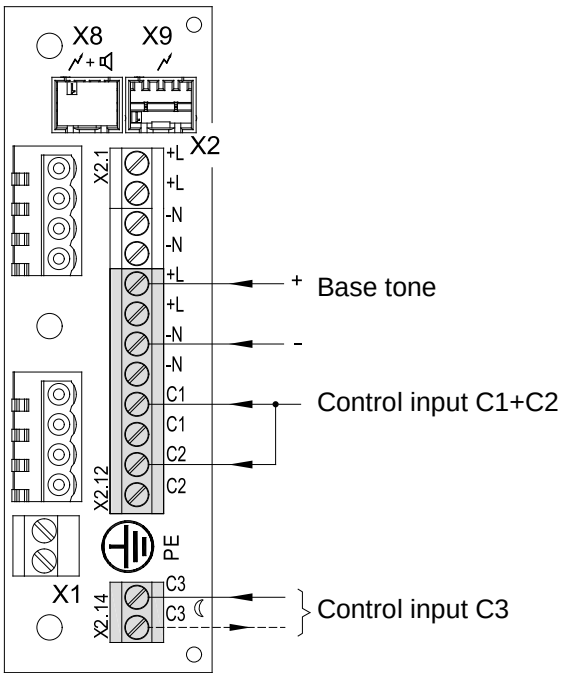
- Switch **S101**: with reverse polarity protection
- Switch **S102**: to "**+**"

Switch on the driver board:

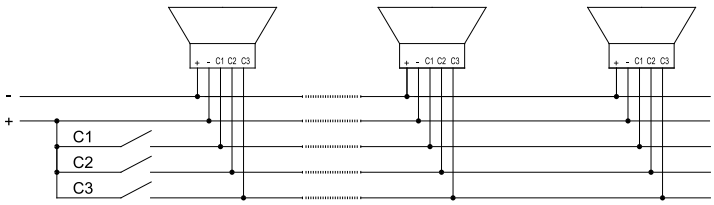


- Connect the negative terminal on the connection board.
- Connection of the positive voltage to plus terminal. The base tone (♪) is generated.
- Connection of the positive voltage to C1 on the connection board generates tone C1.
- Connection of the positive voltage to C2 on the connection board generates tone C2.
- Simultaneous connection of the positive voltage to C1 and C2 on the connection board generates tone "C1+C2".





Example: Control tone C1+C2:

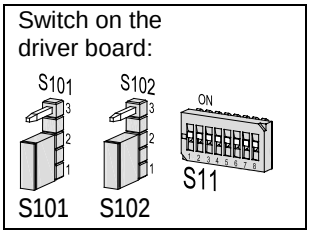


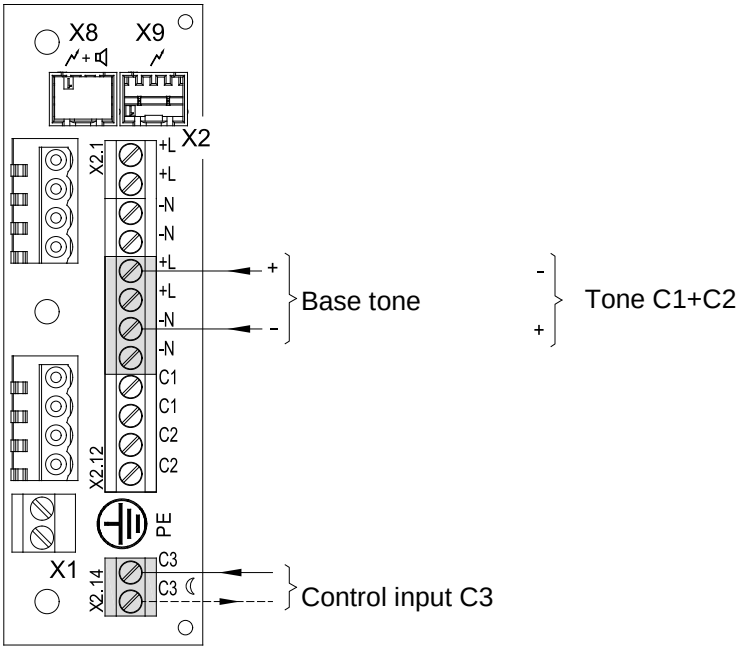
9.4.3 Stage selection by reverse polarity (TAR) - all DC versions (except option –SSM)

Note: Only applicable to DC version!
Not applicable to –SSM versions!
The control inputs C1, C2 and C3 must not be connected on the connection board!

Switch setting should be as follows:

- Switch **S101**: without reverse polarity protection
- Switch **S102** to "**+**"





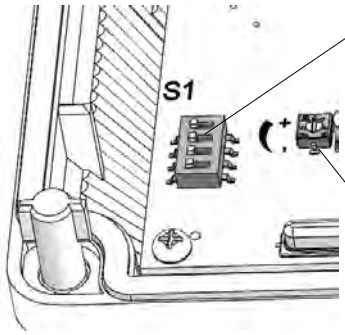
Tone "C1+C2" can also be selected by reversing the polarity of the operating voltage to the base tone (♪).

10. PRO L 10 - setting the operating modes

The operating mode is set using the **S1** switch on the board in the lens, see tables below.
Synchronicity:
The devices meet all the requirements of EN54-23 (synchronous operation).
Note: The devices must be operated with the same potential to ensure synchronous operation.

10.1 Single color LED

Circuit board in the lens



S1
Operating mode selection

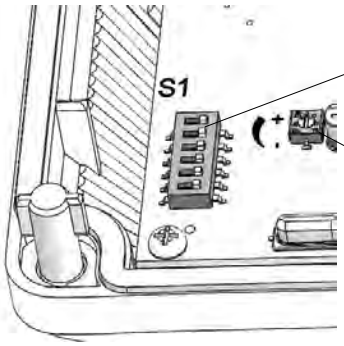
Light intensity control

Flashing light: 10 – 100%
Flashing / continuous light: 45 – 100%

S1				Operating mode
1	2	3	4	
OFF	OFF	OFF	OFF	Flashing light 1 Hz *
OFF	OFF	ON		Flashing light 0.75 Hz
OFF	ON	OFF		Continuous light
OFF	ON	ON		Blinking light 1 Hz
ON	OFF	OFF		Flashing light 2 Hz
ON	OFF	ON		Blinking light 2 Hz
ON	ON	OFF		Flashing light 0.1 Hz
ON	ON	ON		Flashing light 0.5 Hz
OFF	OFF	ON		Double flash mode (DFM3) see Option

* Factory setting

10.2 Multicolor LED



S1
Operating mode selection

Light intensity control

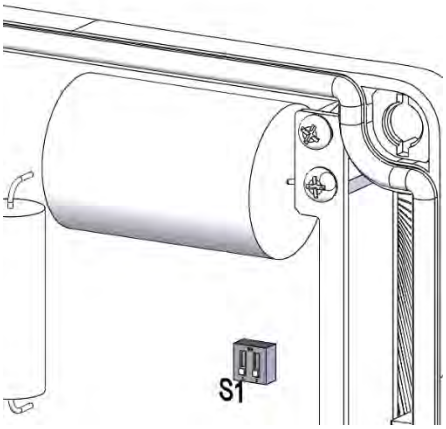
Flashing light: 10 – 100%
Flashing / continuous light: 45 – 100%

S1			Operating mode
1	2	3	
OFF	OFF	OFF	Flashing light 1 Hz *
OFF	OFF	ON	Flashing light 0.75 Hz
OFF	ON	OFF	Continuous light
OFF	ON	ON	Blinking light 1 Hz
ON	OFF	OFF	Flashing light 2 Hz
ON	OFF	ON	Blinking light 2 Hz
ON	ON	OFF	Flashing light 0.1 Hz
ON	ON	ON	Flashing light 0.5 Hz

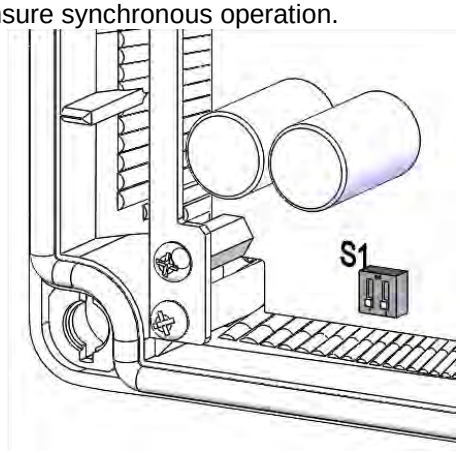
S1			Color assignment
4	5	6	
OFF	OFF	OFF	Red *
	OFF	ON	Blue
	ON	OFF	Green
	ON	ON	Yellow
* Factory setting			

11. PRO X 10: Setting the flash frequency

The flash frequency is set using the S1 switch on the board in the lens, see table below.
Synchronicity:
The devices meet all the requirements of EN54-23 (synchronous operation).
Note: The devices must be operated with the same potential to ensure synchronous operation.



AC version



DC version

	1 Hz	0.75 Hz	0.5 Hz	0.1 Hz
*	ON 1 2 OFF OFF	ON 1 2 ON OFF	ON 1 2 OFF ON	ON 1 2 OFF ON ON

* Factory setting

12. PRO 10-SIL/ PL d

This version is suitable for use in safety-relevant applications up to Level SIL2 and PL d.
The appropriate safety manual for these versions (from page 24) is an integral part of this manual.

13. Options

13.1 -SSM (Soft-Start-Module, only 24V DC)

The switch-on current peak is limited to:

PRO 10-SSM **PRO X 10-SSM**	: max. 2.1 A		: max. 2.1 A

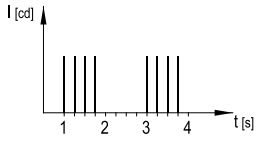
The operating voltage is only switched through to the operating equipment from >7 V.
Operating voltage range: 18 V – 30 V DC

Positioning of the resistor (1kOhm) is as follows:

- Only leave the resistor for line monitoring in the last device in the line.
- Two resistors must be used for separate connection of the signal generator and the flashing light.
- Remove any resistors that are not required.

13.2 Double flash mode PRO L 10

Applies for PRO L 10 with single color LED:



DFM3

Instead of the "Flash 0.75 Hz" mode, the double flash DFM3 is available.

14. Accessories

Item No.	Designation
28312000020	CABLE GLAND M20x1.5 ATEX

15. Maintenance, service, repairs

- Observe the Safety information during all work on the device.

The device requires no special maintenance.

- Do not use abrasive, solvent-containing or chemically aggressive cleaners for cleaning the outside.
  Do not use sharp tools for cleaning and especially avoid scratching th lens.
  Do not clean with high pressure.
- Only replace components using original spare parts.
- Only have repairs carried out at the manufacturer's premises.

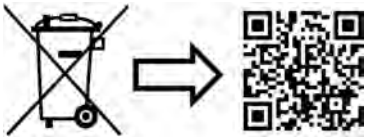
Conversions, modifications, improper and impermissible use as well as failure to observe the notes in this operating instructions shall void any warranty.

Explosion-protected versions:
The special conditions for use must be observed during cleaning work in order to avoid electrostatic discharges (see 6. Explosion-protected versions PRO 10-3G/3D/ PRO L 10-3G/3D)

Dust deposits must be removed regularly.

16. Decommissioning, dismantling and disposal

- Observe the Safety information during all work on the device.



www.pfannenberg.com/disposal

Safety Manual PRO 10-SIL/ PRO 10-3G/3D-SIL

This safety manual supplements the Operating Manual with specifications for use in safety-relevant systems.

17. Brief description

The PRO 10-SIL signal generator is designed for use in safety-relevant applications up to Safety Integrity Level SIL2 and PL d in accordance with IEC61508. In this version, the circuit part for generating the acoustic warning signal as a main function is supplemented by a nonreactive monitoring circuit. Errors of the main function are output as a collective fault signal and transferred to a higher-level control for evaluation.

18. Intended use

The operational safety of the device and the connected system can only be guaranteed when used for the intended purpose in accordance with the specifications in the Operating Manual and this Safety Manual. This device can present application-specific risks if used improperly or not for the intended purpose.

Restrictions regarding the used modes

The “duration of the tone signal” (timeout) operating mode with automatic switch-off of the sound radiation is ruled out for safety-relevant applications.
Only the DIP switch settings S11-1 and S11-2 to ON are permitted.

19. Technical data of the monitoring circuit

Rated voltage/frequency	12V DC, 24V DC, 48V DC	115V 50/60 Hz, 230V AC/ 50/60 Hz
Operation voltage range	10V DC – 60V DC	95V 50/60Hz – 265V 50/60 Hz
I_{RMS} (Ub=12V DC)	25 mA	
I_{RMS} (Ub=24V DC)	17 mA	
I_{RMS} (Ub=48V DC)	15 mA	
I_{RMS} S (Ub=115V 50Hz)		23 mA
I_{RMS} (Ub=230V 50Hz)		25 mA
Duty cycle	100 %	
Fault message output contact load capacity	Solid State relay 230V~/80 mA, RDSON<35Ω	
Operating temperature	-40 °C…+55 °C	
Storage temperature	-40 °C…+70 °C	
Relative humidity	90 %	
Clamping range of the connection terminal	feindrähtig/ stranded 2.5mm² eindrähtig/ solid 4 mm²	

20. Product description and system integration

The device is divided into its main components in two independently functioning circuit parts. The main function is to generate an acoustic warning signal. This main function can be used as a primary safety function for a higher-level, safety-oriented guidance and control system.
A second, additional circuit part diagnoses the acoustic signal of the main function and, in trouble-free operation, transmits a message at the output which signals proper operation, see Fig. 1 Circuit principle.

However, ongoing monitoring to be considered for the safety parameters only exists when the following conditions are satisfied:

- The monitoring function is simultaneously active with the warning system.
- The status of the monitoring function alarm output is evaluated continuously by the higher-level guidance and control system.
- Evaluation takes place at least during the requesting of the acoustic warning system as a safety function.

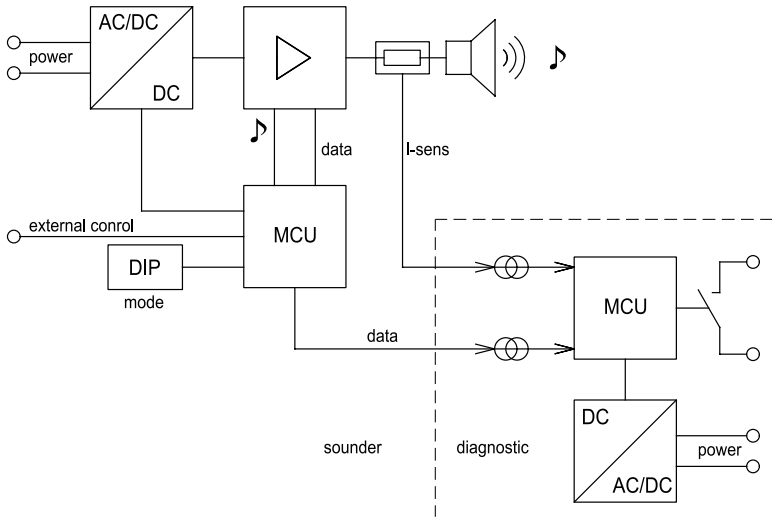


Fig. 1 Circuit principle

If the main function (generation of an acoustic warning signal) is not used as a safety function, the monitoring function can be used instead as a safety function for a higher-level, safety-oriented guidance and control system. In this case, the function of the generation of an acoustic warning signal is part of the machine function. The safety-oriented PRO 10-SIL device is not sufficient as a single component to achieve a safety-oriented complete system. It is part of a safety loop and always requires a higher-level, safety-oriented guidance and control system, see Fig. 2 Example of a system integration of the monitored sounder.

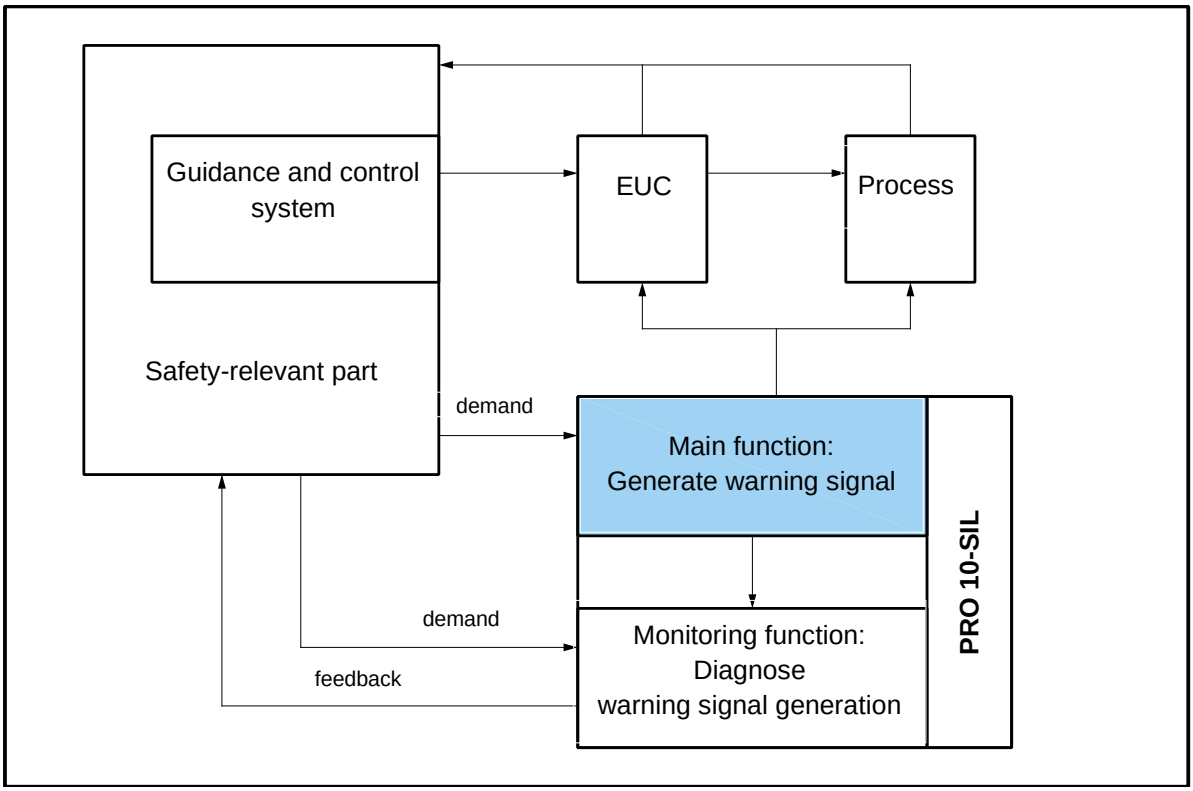


Fig. 2 Example of a system integration of the monitored sounder

21. Evaluation of the system integrity

21.1 General

The safety-oriented device is designed according to DIN EN 61508-6 as 1001-Architecture and has ZERO hardware error tolerance in accordance with DIN EN 61508-2. Restrictions of the safety integrity due to the architecture are considered based on the classification as a type-B partial system.
Regardless of the safety integrity, the device has an MTTF(d) of more than 100 years.
The safety-oriented device is suitable for requirements both in “Low Demand Mode” and in “High Demand Mode”. The system integrator of the higher-level guidance and control system is responsible for compliance with the marginal conditions for these requirement modes in accordance with DIN EN 61508-4.

21.2 Operating modes

The safety-oriented device can be incorporated into the higher-level, safety-oriented guidance and control system in different ways as a result of the selected architecture concept. The incorporation itself can be summarized in two topologies:

21.2.1 Generation of the acoustic warning signal as a safety function

a) Demand of the safety function without further evaluation of the monitoring function

b) Demand of the safety function with simultaneous evaluation of the monitoring function task and automatic testing of the monitoring function sufficiently frequently for the demand rate. For further information, see the application example 22.1 Use as an acoustic warning system for detecting dangerous conditions.

c) Demand of the safety function with simultaneous evaluation of the monitoring function task and automatic testing of the monitoring function. The automatic testing of the monitoring function must take place immediately before requesting generation of the acoustic warning signal as a safety function. For further information, see the application example 22.2 Use as an acoustic warning system with chronologically known demand of the safety function.

21.2.2 Monitoring as a safety function

a) Demand of the monitoring function as a safety function without prior automatic testing of the monitoring function.

b) Demand of the monitoring function as a safety function with automatic testing of the monitoring function immediately before requesting the safety function. The acoustic signaling is not part of the safety function here but is evaluated as part of the machine, device or process function. See application example 22.3 Use as start-up warning of machines.

The operating behavior of the monitoring function as well as the automatic function test sequence are described in chapter 24. Automatic function test.

21.3 Safety integrity

Different safety integrity values are achieved depending on the type of incorporation and the operating voltage version used. These are listed in the tables 1 to 4.

PRO 10-SIL 10 – 60V DC:

Value	Warning signal as safety function	Warning signal as safety function + Monitoring function	Warning signal as safety function + Monitoring function + Test monitoring function before demand
	See chapter 21.2.1 par. a)	See chapter 21.2.1 par. b)	See chapter 21.2.1 par. c)
PFD* (T1=1year)	1.597E-03	6.591E-04	2.22E-04
PFH [1/h]	3.65E-07	1.5E-07	5.06E-08
$MTTF_d$ [a]	>100	>100	>100
DC [%]	0	68.1	89.3
SFF [%]	91.9	98.1	99.4
SIL**	2	2	2
PL	c	d	d
Category	1	2	2
*	Calculation applies for an interval of the repeat tests of T1 = 8760h and MRT=MTTR=1h		
**	The safety integrity level already considers the restrictions due to the 1oo1 architecture, the classification as a type B system and the prerequisites for avoiding systematic errors up to SIL2		

Table 1: Safety integrity level for inclusion of the generation of the warning signal as a safety function of the PRO 10-SIL, 10 – 60V DC

Value	Monitoring function as a safety function	Monitoring function as a safety function + Test monitoring function before demand
	See chapter 21.2.2 par. a)	See chapter 21.2.2 par. b)
PFD* (T1=1year)	4.697E-04	3.246E-05
PFH [1/h]	1.07E-07	7.39E-09
$MTTF_d$ [a]	>100	>100
DC [%]	0	93.1
SFF [%]	96.8	99.8
SIL**	2	2
PL	c	d
Category	1	2
*	Calculation applies for an interval of the repeat tests of T1 = 8760h and MRT=MTTR=1h	
**	The safety integrity level already considers the restrictions due to the 1oo1 architecture, the classification as a type B system and the prerequisites for avoiding systematic errors up to SIL2	

Table 2: Safety integrity level for inclusion of the generation of the warning signal as a safety function of the PRO 10-SIL,10 – 60V DC

PRO 10-SIL 95V – 265V (50/ 60 Hz)

Value	Warning signal as safety function	Warning signal as safety function + Monitoring function	Warning signal as safety function + Monitoring function + Test monitoring function before demand
	See chapter 21.2.1 par. a)	See chapter 21.2.1 par. b)	See chapter 21.2.1 par. c)
PFD* (T1=1year)	1.792E-03	6.971E-04	2.517E-04
PFH [1/h]	4.09E-07	1.59E-07	5.74E-08
MTTFd [a]	>100	>100	>100
DC [%]	0	69.4	89
SFF [%]	91.1	98.0	99.3
SIL**	2	2	2
PL	c	d	d
Category	1	2	2
*	Calculation applies for an interval of the repeat tests of T1 = 8760h and MRT=MTTR=1h		
**	The safety integrity level already considers the restrictions due to the 1oo1 architecture, the classification as a type B system and the prerequisites for avoiding systematic errors up to SIL2		

Table 3: Safety integrity level for inclusion of the generation of the warning signal as a safety function of the PRO 10-SIL, 95V – 265V (50/ 60 Hz)

Value	Monitoring function as a safety function	Monitoring function as a safety function + Test monitoring function before demand
	See chapter 21.2.2 par. a)	See chapter 21.2.2 par. b)
PFD* (T1=1year)	4.85E-04	3.955E-05
PFH [1/h]	1.11E-07	9.0E-09
MTTFd [a]	>100	>100
DC [%]	0	91.9
SFF [%]	96.7	99.7
SIL**	2	2
PL	c	d
Category	1	2
*	Calculation applies for an interval of the repeat tests of T1 = 8760h and MRT=MTTR=1h	
**	The safety integrity level already considers the restrictions due to the 1oo1 architecture, the classification as a type B system and the prerequisites for avoiding systematic errors up to SIL2	

Table 4: Safety integrity level for inclusion of the generation of the warning signal as a safety function of the PRO 10-SIL, 95V – 265V (50/ 60 Hz)

Restrictions of the safety integrity with regard to achieved PFH and PFD can be found in tables 2 and 3 of DIN EN 61508-1 and with regard to the architecture and necessary SFF in table 3 of the DIN EN 61508-2. Because of the implemented measures and procedures to avoid systematic errors, the safety integrity level is limited to SIL2 PL d.

22. Application example

22.1 Use as an acoustic warning system for detecting dangerous conditions

When using as a a warning system after detecting dangerous conditions, the generation of an acoustic warning signal as a safety function must be evaluated, see also chapter 21.2.1 par. b). A measurement detects a dangerous condition and initiates the safe condition by controlling the acoustic warning system (personnel/operator is warned).
The diagnosis can only be considered with regular function testing, the minimum interval of which must correspond to about ten to one hundred times the demand rate in accordance with IEC/ EN 61508. If the regular testing is automatic, the diagnosis can be evaluated so that the diagnosis coverage factor is included in the calculation of the reliability parameters. This possibility exists here for the “Low Demand

Mode". The function test must be conducted by a higher-level guidance system (as described in chapter 24. Automatic function test).
The acoustic warning system with monitoring function is used as follows, see also Fig. 3 and Fig. 4.

a) A measurement Input (**1**), Logic (**2**) detects a dangerous condition and activates the acoustic warning system Output (**3**)
b) The monitoring function (**4**) diagnoses the function of the acoustic warning system and reports OK to a higher-level system (**5**).
c) If no OK is reported, the higher-level control and guidance system (**5**) initiates the safe condition by other measures (**6**).

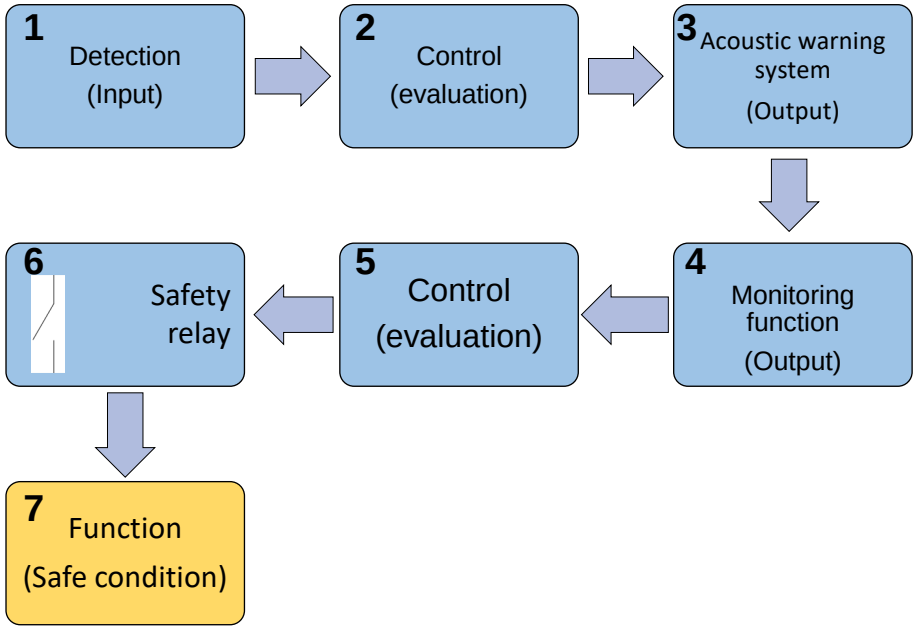


Fig. 3 Acoustic warning system on detection of dangerous conditions

The safety loop in a single-channel architecture consists of position **1** to **6** as shown in Fig. 3 and Fig. 4. In chapter 21.3Safety integrity the safety integrity for the partial systems acoustic warning system (position **3**) and monitoring function (position **4**) are evaluated. Please note that the sum of all PFH or PFD values for the whole system must correspond to the required safety integrity level.

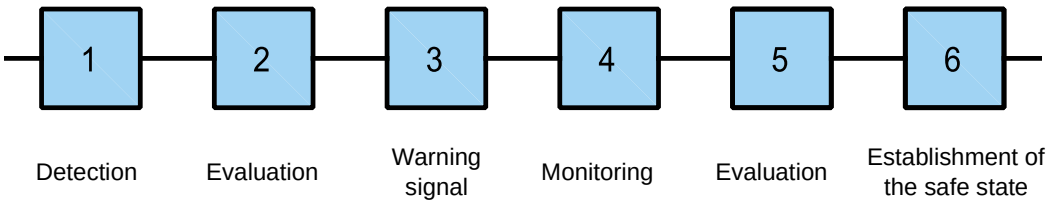


Fig. 4 Safety-relevant block diagram of the warning system

22.2 Use as an acoustic warning system with chronologically known demand of the safety function

If an automatic function test can be performed immediately before the known occurrence of the dangerous condition (e.g. Imminent dangerous process step or approaching danger points), the use of the warning system for generating acoustic warning signals as a safety function in "High Demand" applications is possible, see also chapter 21.2.1 par. c).
An enable may only be given after a successful test. In this case, the demand for the minimum interval of the test start in accordance with IEC/ EN61508 is fulfilled by the nearness in time to the demand of the safety function. Test functions in the higher-level guidance system and appropriate measures for error messages must meet the requirements for functional safety according to IEC/ EN61508. The function test must be conducted by a higher-level guidance system (as described in chapter 24. Automatic function test).
During the demand of the acoustic warning signal as a safety function, the monitoring circuit diagnoses the acoustic signal and in trouble-free operation, transmits a message at the output which signals proper operation. An evaluable monitoring only exists when the monitoring function is activate simultaneously

with the acoustic warning signal and the status of the monitoring function alarm output is evaluated by the higher-level guidance and control system.
The acoustic warning system with monitoring function is used as follows after demand of the safety function, the generation of an acoustic warning signal, see also Fig. 5 and Fig. 6 .

a) Performance of the automatic test
b) If test was successful, function enable (**7**) by the higher-level guidance and control system
c) The monitoring function (**4**) diagnoses the function of the aoustic warning system (**3**) and reports OK to a higher-level system (**5**).
d) If no OK is reported, the higher-level control and guidance system (**5**) initiates the safe condition by other measures (**6**).

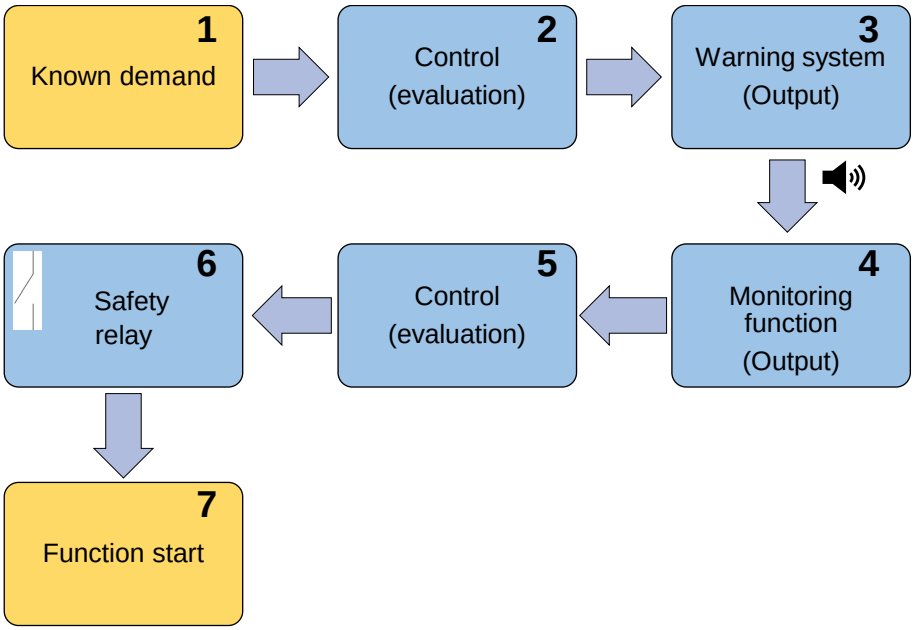


Fig. 5 Acoustic warning system with chronologically known demand of the safety function

The safety loop in these single-channel architectures consists of position **2** to **6** as shown in Fig. 5 and Fig. 6 . In chapter 21.3 the safety integrity of the partial systems acoustic warning system (position **3**) and monitoring function (position **4**) are evaluated. Please note that the sum of all PFH or PFD values for the whole system must correspond to the required safety integrity level.

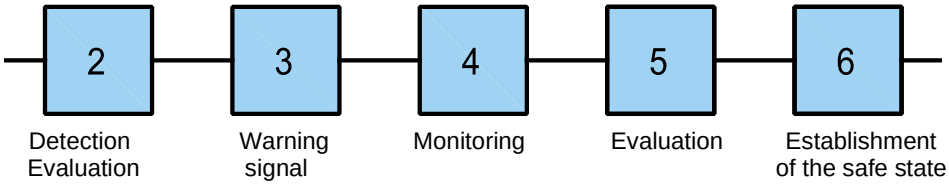


Fig. 6 Safety-relevant block diagram

22.3 Use as start-up warning of machines

When used as a start-up warning of machines, the function of the generation of the acoustic warning signal can be evaluated as the function of the machine, see also chapter 21.2.2 par. b). The monitoring function diagnoses this function and initiates the safe state by a safety loop in case of failure. This architecture is shown schematically in Fig. 7.
Start-up warnings and similar applications are architectures which can usually be assigned to the “High Demand Mode”. Therefore, immediately before switching on the machine or the occurrence of a dangerous condition, an automatic function test of the monitoring function must be performed by a higher-level guidance system (as described in chapter 24. Automatic function test). An enable may only be given after a successful test. Test functions in the higher-level guidance system and appropriate measures for error messages must meet the requirements for functional safety according to IEC/EN 61508.

During the demand of the acoustic signal, the monitoring circuit diagnoses error-free operation as a safety function and sends a message at the output. An evaluable monitoring only exists when the monitoring function is activated simultaneously with the main function and the status of the monitoring function alarm output is evaluated by the higher-level guidance and control system.

The start-up warning is used as follows after demand of the safety function, see also Fig. 7 and Fig. 8.

a) Performance of the automatic test

b) If test was successful, triggering of machine start (**7**)

c) The monitoring function (**4**) diagnoses the function of the acoustic warning system (**3**) and reports OK to a higher-level system (**2**).

d) If no OK is reported, the higher-level control and guidance system (**2**) initiates the safe condition by other measures (**5**).

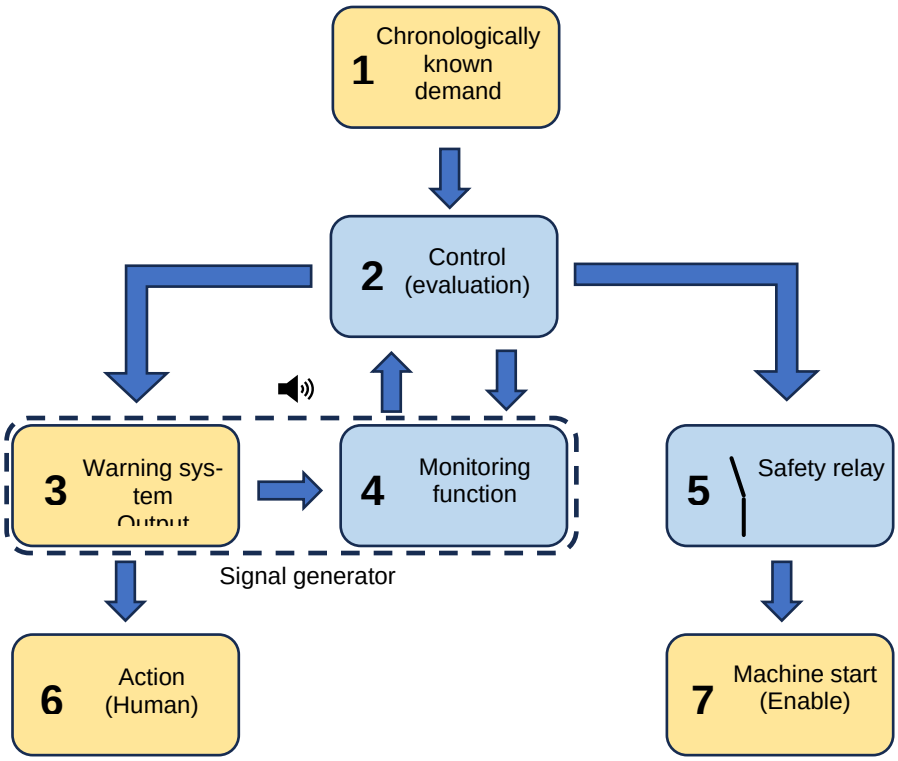


Fig. 7 Start-up warning

The safety loop consists of monitoring function (position **4**), evaluation of the dangerous condition (position **2**) and elements of the machine control (position **5**) for starting the test function and reaching the safe state. In chapter 21.3 the Safety integrity for the monitoring function partial system (position **4**) is evaluated. The elements of the machine control (position **2** and position **5**) were not considered in the analysis.

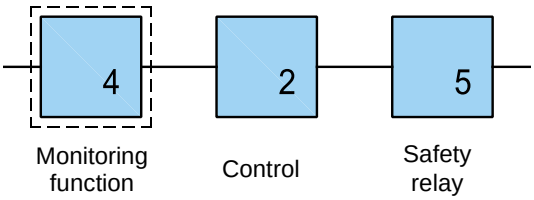


Fig. 8 Safety-relevant block diagram

23. Operating behavior of the monitoring device

The required guidance and control system must be able to conduct an error analysis based on the status of the fault message output in connection with the operating state of the acoustic signal generator and the monitoring circuit. Dependencies between operating state and fault message output are shown in Fig. 9. Also note the possible switching states as shown in Fig. 10 Function time diagram **for error**.
It is assumed that the monitoring device is supplied with operating voltage at least 1 s before the sounder channel is switched on and the status of the alarm output is checked 0.5 s after switching on at the earliest.

a) Switching on the supply voltage of the sounder channel results in activation of the MOS relay in the error-free state (the output of the MOS relay becomes low-ohmic). This takes place with a delay of 0.2 seconds. Prerequisite is that a tone type has been selected with the aid of the

coding switch for the tone type selection or an appropriate tone was controlled in the “external tone type selection” and the monitoring circuit is applied to the supply voltage.

b) If the operating voltage of the sounder channel is switched off, an error message is output with a delay of 0.2 s to 2.5 s by the fault message output (the output of the MOS relay becomes high-ohmic). A reaction of the alarm relay of >0.2 s can be expected for uninterruptedly radiated tones. The greater delay can occur for interrupted tones when switching off in tone pauses.

c) If the case occurs during operation of the sounder channel that the sound fails without the operating voltage for the sounder channel having been switched off, the alarm output becomes high-ohmic after a maximum delay time of 4 s and an error is signaled.

23.1 Time dependencies

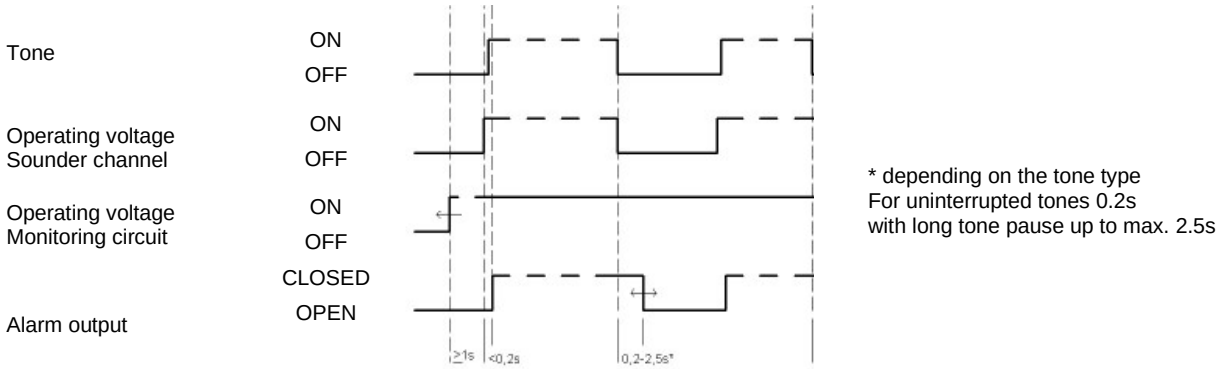


Fig. 9 Function time diagram for error-free operation

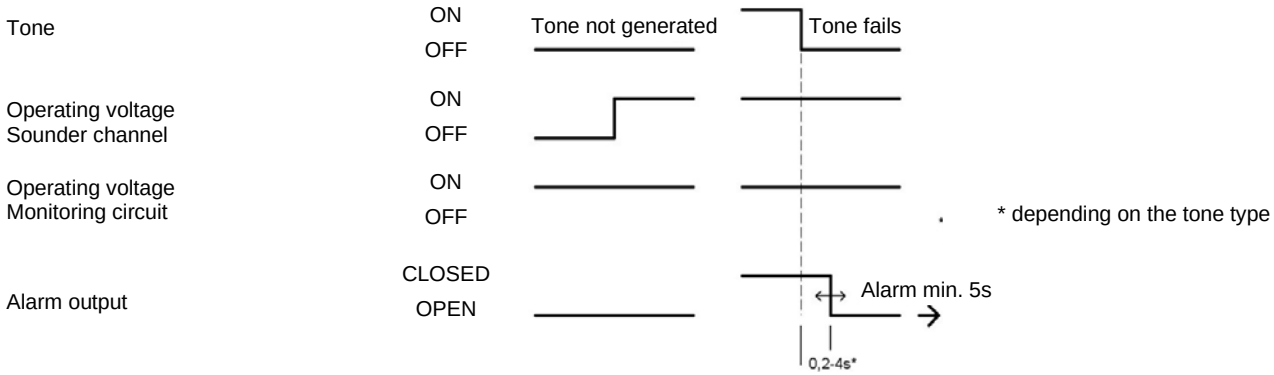


Fig. 10 Function time diagram for error

24. Automatic function test

An automatic function test must be performed at regular intervals for applications in “Low Demand Mode”.
At what intervals an automatic function test must be performed depends on the ultimate application into which the sounder is incorporated. The system-specific test intervals must be defined in the respective safety proofs.
The test intervals must correspond to 10 to 100 times the demand rate of the safety function.
For applications with known demand of the safety function, an automatic function test must be performed before the system starts or the danger occurs. An enable may only be given after a successful test.
The automatic function test must be triggered and evaluated by a safety-relevant control.
Both partial systems - the acoustic warning system and the monitoring function - have separate supply voltage connections. This allows independent testing of the functions and can be executed as follows.

a) Switch on the voltage supply of the monitoring function with deactivated acoustic warning system (can be omitted depending on the application if the monitoring is applied permanently to the supply)

b) Check whether the fault message output is high-ohmic >0.5 s after switching on

c) Switch on the acoustic warning system (tone is generated)

d) Check whether the fault message output has switched (low-ohmic) after >0.2 s

It is important for the system test that the status change of the fault message output is detected dependent on the generation of the acoustic warning signal.
The operating behavior of the monitoring device including the time dependencies is described in chapter 23..

25. Process safety time

Conclusions whether the process safety time can be kept, can be deduced based on the function-time diagrams in chapter 23.1 Time dependencies (response times of the fault message output). The response times for the generation of the acoustic warning signal and/or the switching status of the fault message output are shown here dependent on the switch-on time of the operating voltages.

26. Limits of the application

The acoustic warning of persons is a willingness-dependent measure because it demand a conscious action of one or more individuals. The establishment of a safe state is, however, subject to limitations and requires additional measures. This architecture corresponds to the specifications of the European Machinery Directive only if no constructional safety or another willingness-independent measure for achieving the safe state is possible according to the state of the art.
The limits of the evaluation of the safety integrity of the sounder in systems can be read in chapter 21.3 Safety integrity .

27. Commissioning

The function of the sounder must be checked after first-time commissioning, recommissioning and after every repair. The safety function must be validated especially. The function test (as described in chapter 24. Automatic function test) must be performed for this.
Also observe the appropriate chapters in the first part of this Operating Manual for the commissioning.

27.1 Notes

a) The Operating Manual and the Safety Manual are aimed at trained and authorized electrical specialists. Their contents must be accessible to and implemented by the specialized personnel at all times.
b) The safety notes in this Operating Manual, the local installation standards as well as the applicable safety regulations and accident prevention rules must be observed.
c) The sounder must be selected so that the acoustic signal is guaranteed clearly perceptible at maximum ambient noise level. The warning signal must exceed the ambient noise level by +10 dB(A).
d) When using several signals (tone types), these must be clearly differentiable to enable targeted actions by trained personnel.
e) Do not mount two sounders in the immediate vicinity of each other because their mutual influencing in simultaneous operation cannot be ruled out. A distance of >1m meets the requirement.
f) The housing connection screws (Torx-T30) of the sounder must be tightened with a torque of approx. 6.4 Nm crosswise in at least two steps.
g) The owner is responsible for trouble-free operation of the device.

27.2 Electrical connection

See chapter 8.3.3 Electrical connection PRO 10-SIL

28. Maintenance

See also chapter 15. Maintenance, service, repairs.
Modifications to the device may only be made by the manufacturer. The safety parameters must be re-determined and the functional safety must be tested. Modifications by the user are not allowed and will lead to loss of the safety classifications and warranty rights.

28.1 Repeat test (proof test) and service life

WARNING	**Unsafe device condition** The safety function must be considered unsafe during the repeat test. Effects on connected devices must be considered. Other measures may have to be taken to maintain the safety.

Repeat tests serve for identification of errors which cannot be diagnosed automatically.
The repeat tests must be made at intervals according to the implemented PFD, see chapter 21.3 Safety integrity.
The system-specific test intervals must be defined in the respective proofs.

The owner is responsible for selecting the type of test. The test must be made manually and includes the following tests:

<table>
<tr><th>Test *</th><th>Test step</th><th>Test instruction</th></tr>
<tr><td rowspan="6">1) Visual check</td><td>a) Housing</td><td>No mechanical damage, fastening at the installation site, housing closed and complete</td></tr>
<tr><td>b) Sound emission</td><td>Not obstructed, closed or impaired by heavy dust deposits</td></tr>
<tr><td>c) Cable gland</td><td>Firm fit, sealing to cable ensured</td></tr>
<tr><td>d) Condensate</td><td>No condensate inside the sounder</td></tr>
<tr><td>e) Electrical compo-nents</td><td>No soiling and signs of corrosion on components and circuit boards</td></tr>
<tr><td>f) Condition of the con-nection terminals</td><td>Mechanical integrity of the connection terminals</td></tr>
<tr><td rowspan="5">2) Function</td><td>a) Insulation test</td><td>The following test is conducted:
- From the operating voltage connections to the housing (connection board sounder X2-5 to X2-8 and connection board X12-1 to X12-4 to the housing)
- Between the operating voltage connections of the sounder and the monitoring circuit housing (connection board sounder X2-5 to X2-8 to connection board monitoring circuit X12-1 to X12-4)
Make sure here that damage to the system to be supplied is avoided (isolation from control and/or supply)
≥1MOhm, measuring voltage 500V</td></tr>
<tr><td>b) Potential isolation</td><td>Check isolation between fault message output and connection of the operating voltage supply of the monitoring channel.
The connections at X12 of the connection board must be disconnected for this.
Check the connections X12-1 and X12-3 to X12-5 and X12-7 with a continuity tester. These must be high-ohmic (>1MΩ).
The negative pole of the continuity tester must be applied to connection X12-1 or X12-3.</td></tr>
<tr><td>c) Operating current consumption</td><td>Tone type 60, at highest sound pressure level =>DIP S10 and DIP S11
<table>
<tr><td colspan="4">DIP</td></tr>
<tr><td>S10-1</td><td>OFF</td><td>S11-1</td><td>OFF</td></tr>
<tr><td>S10-2</td><td>OFF</td><td>S11-2</td><td>OFF</td></tr>
<tr><td>S10-3</td><td>n.a.</td><td>S11-3</td><td>OFF</td></tr>
<tr><td>S10-4</td><td>n.a.</td><td>S11-4</td><td>OFF</td></tr>
<tr><td>S10-5</td><td>OFF</td><td>S11-5</td><td>ON</td></tr>
<tr><td>S10-6</td><td>n.a.</td><td>S11-6</td><td>ON</td></tr>
<tr><td>S10-7</td><td>n.a.</td><td>S11-7</td><td>ON</td></tr>
<tr><td>S10-8</td><td>n.a.</td><td>S11-8</td><td>OFF</td></tr>
</table>
Supply voltage 24V DC
Signal generator: 400 mA I_{rms} ±10%
Monitoring circuit: 17 mA
with error message
Supply voltage 230V 50Hz
Signal generator: 90mA I_{rms} ±10%
Monitoring circuit: with error message</td></tr>
<tr><td>d) Reverse polarity pro-tection</td><td>In DC devices connection with reverse polarity operating voltage depending on jumper setting S101 no acoustic signal or select a different tone</td></tr>
<tr><td>e) Tone switching by external control</td><td>When using the external control of the inputs C1 and C2
the test step “i.) Tone type” must be repeated for all externally controlled tone types in the application.</td></tr>
</table>

	f) Tone switching by external control with reverse polarity	When using and only in DC devices, depending on jumper setting S102 external tone section with the respective other polarity possible.
	g) Day/night switching	When using the external control of input C3, the volume switching from day to night level of the sound radiation must be checked. Here, a subjective perception of the reduction in the sound pressure level suffices. Alternatively, the operating current consumption of the sounder can be monitored.
	h) Manual function test	Step by step, manual performing of the function test as described in chapter 24. Automatic function test of the Safety Manual. With checking of the switching status of the fault message output and its correct evaluation by the higher-level control. The response times of the fault message output must be checked, see chapter 23. Operating behavior of the monitoring device; preferably with the tone type(s) and sound level used in the system.
	i) Tone type	Acoustic check of the tone pattern(s) of the tone type(s) used on site. This can be done subjectively by trained personnel. Hereby, the pattern (pauses, frequency sequence, frequency change, pause times) must be checked as in the tone type table in the annex to this Operating Manual. The person must be able to identify the warning signal. Alternatively, suitable technical aids can be used for this test. The signal can be tapped oscillographically by a microphone and preamplifier or electrically at the speaker connections for an analysis.
	j) Sound level check, recognizability	Sound level measurement or subjective evaluation of the sound level by a representative group of persons with test started under max. ambient noise level. The sound level must be more than +10 dB above the max. ambient noise level or clearly recognizable by this circle of persons. The tone type used in the system must be used. Alternatively, a sound level measurement can be made in a low-reflection room or under outdoor conditions. Hereby, at least the rated sound level 109dB(A) minus 3 dB (A) must be reached with tone no. 60 at a distance of one meter.
3) Recording	a) Record of the test results	Must comply with the functional safety rules in accordance with IEC/ EN 61508.

Table 5 Repeat test

* If one of the tests is negative, the complete system must be taken out of operation and and kept in a safe condition by other measures.

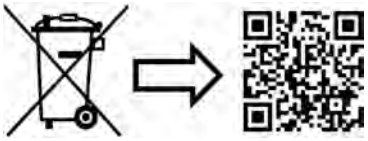
28.2 Fault rectification

Faults may occur during use despite the high functional safety. The causes for this may be in the device, in the operating voltage supply or in the evaluation of the control system.
The system owner is responsible for taking suitable measures to rectify faults that occur. If the device is defective, it must be repaired at the factory. Only original spare parts may be used for replacement.

Please visit our Internet site for trouble-free handling: Service & Support - Pfannenberg (https://www.pfannenberg.com/de/service-support/)

29. Decommissioning, dismantling and disposal

Observe the Safety information during all work on the device.



www.pfannenberg.com/disposal

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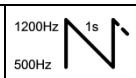
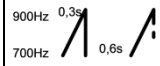
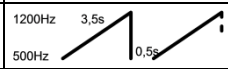
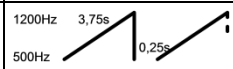
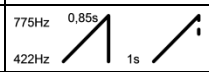
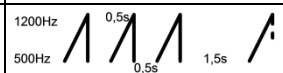
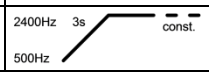
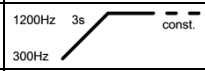
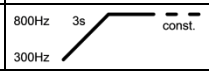
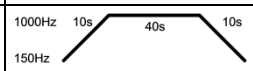
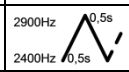
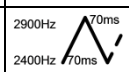
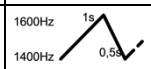
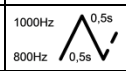
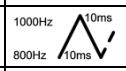
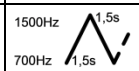
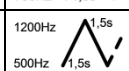
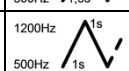
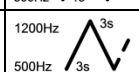
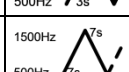
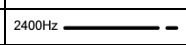
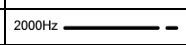
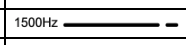
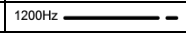
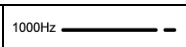
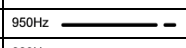
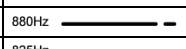
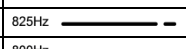
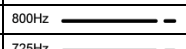
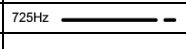
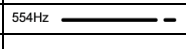
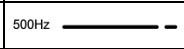
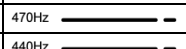
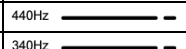
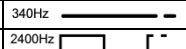
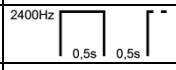
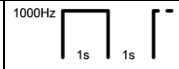
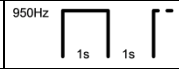
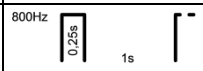
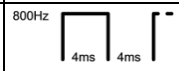
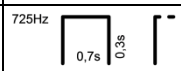
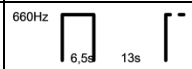
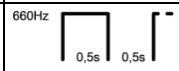
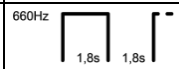
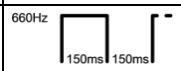
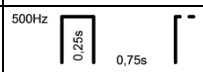
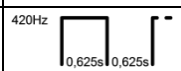
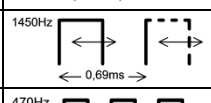
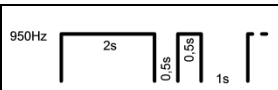
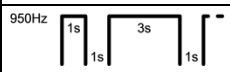
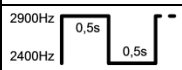
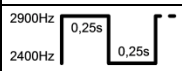
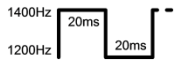
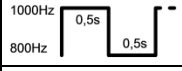
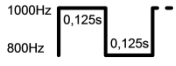
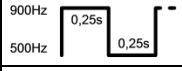
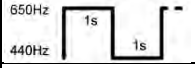
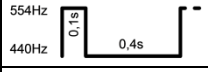
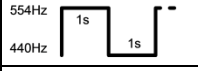
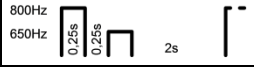
Fax: +49/ (0)40/ 734 12-101
service@pfannenberg.com
http://www.pfannenberg.com

Tonartentabelle/ Tone table/ Tableau de sons/ Tabella suoni/ „Таблица звуковых тонов“

Grund-Ton-Nr. (♪)	Beschreibung/ Description/ Descrizione/ Описание	
1	Kein Ton/ Silence/ Pas de son/ Nessun suono	
2*	Saw tooth, Germany DIN 33404-3 (emergency signal), PFEER PTAP	
9	Slow whoop, fire alarm, UK BS5839-1	
11	Whoop (fast)	
13	Whoop	
15	Slow whoop, evacuation, Netherlands NEN 2575	
16	Slow whoop, evacuation Australia AS2220	
18	Slow whoop, NFPA	
22	Whoop, Australia AS1670, ISO8201	
23	Siren	
24	Siren	
25	Siren	
26	Industrial alarm (Germany)	
27	Sweeping	
29	Sweeping (fast)	
30	Sweeping	
31	Sweeping, France NF C 48-265	
33	Sweeping, UK BS5839-1 (medium sweep)	
34	Sweeping (fast)	
35	Sweeping, UK BS5839-1 (fast sweep)	
36	Sweeping	
43	Sweeping	
44	Sweeping, IMO 3d, Germany KTA3901 evacuation	
45	Sweeping	
46	Sweeping, Finland General Alarm	
52	Continuous	
53	Continuous	
54	Continuous, Finland All Clear	
55	Continuous	
56	Continuous, PFEER (Gasalarm)	
57	Continuous, UK BS5839-1	
59	Continuous	
60	Continuous	
61	Continuous	
63	Continuous	
65	Continuous, Sweden SS031711 (All Clear)	
66	Continuous	
67	Continuous, Germany KTA3901 (All Clear)	
68	Continuous	
69	Continuous	
71	Continuous	
77	Intermittent	
82	Intermittent, PFEER (General Alarm), UK BS5839-1 (Back-up Alarm)	
83	Intermittent, PFEER (General Alarm)	
88	Intermittent	
90	Intermittent	
91	Intermittent	
92	Intermittent	
93	Intermittent (fast), electromechanical horn	
97	Intermittent	
98	Intermittent, Sweden SS 031711 (Imminent Danger)	
100	Intermittent, Industrial Alarm (Germany)	
101	Intermittent, Sweden SS031711 (Important Message (Pre Mess))	
102	Intermittent, Sweden SS031711 (Local Warning)	
103	Intermittent, Sweden SS031711 (Air Raid)	
104	Intermittent, Sweden SS031711 (Imminent Danger)	
107	Intermittent, Germany KTA3901 (evacuation)	
109	Intermittent, Australia AS2220,AS1610, AS1670	
110	Intermittent (fast variable), Bell	
111	Intermittent, ISO8201 (emergency evacuation signal), USA (evacuation)	
112	Intermittent, ISO8201 (emergency evacuation signal)	
113	Intermittent, ISO8201 (emergency evacuation signal) treble tone	

Anhang/ Appendix/ Annexe/ Appendice/ Приложение

Grund-Ton-Nr. (♪)	Beschreibung/ Description/ Descrizione/ Описание	
115	Intermittent, IMO (Telefon Call)	
116	Intermittent, IMO (abandon ship)	
117	Intermittent, IMO SOLAS III/50 + SOLAS III/6.4 (General Alarm)	
122	Alternating	
123	Alternating	
124	Alternating, Singapore	
125	Alternating	
128	Alternating	
130	Alternating, UK BS5839-1 (Fire Alarm)	
131	Alternating, UK BS5839-1 (Fire Alarm, Level crossing)	
135	Alternating, UK BS5839-1 (Fire Alarm, increased urgency – Level crossing)	
142	Alternating	
143	Alternating, Germany Industrial Alarm	
144	Alternating	
146	Alternating, France NFS 32-001 (fire alarm)	
147	Alternating, Sweden SS031711 (turn out)	
148	Alternating, Sweden SS031711 (turn out)	
152	Alternating-intermittent	

Ansteuerung der Töne/ Selection of the tones/ Activation des sons/ Controllo dei toni / Управление звуко-выми тонами

Tonartenschalter/ Selector –switch (Einstellung des Grundtones/ Adjusting the base tone)							External Tone Control		
							C1	C2	C1+C2
3	4	5	6	7	8	Grund-Ton No.(♪)	Tone No.	Tone No.	Tone No.
						1	2	88	57
ON						2 *	128	112	57
	ON					2	26	100	93
ON	ON					2	61	131	112
		ON				9	57	11	82
ON		ON				15	131	52	112
	ON	ON				16	109	52	56
ON	ON	ON				18	111	57	68
			ON			22	16	109	68
ON			ON			23	131	52	112
	ON		ON			24	131	52	131
ON	ON		ON			25	131	52	92
		ON	ON			26	2	100	93

Tonartenschalter/ Selector –switch (Einstellung des Grundtones/ Adjusting the base tone)							External Tone Control		
							C1	C2	C1+C2
3	4	5	6	7	8	Grund-Ton No. (♪)	Tone No.	Tone No.	Tone No.
ON		ON	ON			27	123	52	92
	ON	ON	ON			29	35	52	61
ON	ON	ON	ON			30	27	52	77
				ON		31	131	52	57
ON				ON		33	30	52	35
	ON			ON		34	35	52	93
ON	ON			ON		35	27	52	110
		ON		ON		36	146	67	57
ON		ON		ON		43	131	52	91
	ON	ON		ON		45	2	57	93
ON	ON	ON		ON		52	15	65	82
			ON	ON		54	46	54	131
ON			ON	ON		55	131	52	128
	ON		ON	ON		56	82	35	33
ON	ON		ON	ON		59	143	59	101
		ON	ON	ON		60	131	52	125
ON		ON	ON	ON		65	131	52	93
	ON	ON	ON	ON		66	110	52	107
ON	ON	ON	ON	ON		69	131	52	110
					ON	71	131	52	93
ON					ON	77	61	52	122
	ON				ON	82	131	52	83
ON	ON				ON	83	56	2	82
		ON			ON	88	2	57	128
ON		ON			ON	90	131	52	125
	ON	ON			ON	91	30	52	110
ON	ON	ON			ON	92	33	52	57
			ON		ON	93	2	128	57
ON			ON		ON	97	2	63	93
	ON		ON		ON	100	131	52	125
ON	ON		ON		ON	101	98	102	65
		ON	ON		ON	103	131	65	147
ON		ON	ON		ON	104	103	65	101
	ON	ON	ON		ON	109	16	52	22
ON	ON	ON	ON		ON	110	131	61	91
				ON	ON	112	2	57	128
ON				ON	ON	113	52	123	104
	ON			ON	ON	115	117	116	44
ON	ON			ON	ON	116	117	93	125
		ON		ON	ON	117	93	116	125
ON		ON		ON	ON	123	27	52	77
	ON	ON		ON	ON	124	53	83	2
ON	ON	ON		ON	ON	130	2	107	67
			ON	ON	ON	131	2	112	57
ON			ON	ON	ON	135	16	56	109
	ON		ON	ON	ON	142	2	54	88
ON	ON		ON	ON	ON	143	59	93	33
		ON	ON	ON	ON	144	110	61	2
ON		ON	ON	ON	ON	146	31	67	57
	ON	ON	ON	ON	ON	148	131	52	92
ON	ON	ON	ON	ON	ON	152	110	61	13

* Werkseinstellung/ Factory setting/ Réglage d'usine/ Impostazione di fabbrica/ Заводская настройка

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