

## Main station L11-H2

### Ordering data

Designation	Type	Item no.
Main station	L11-H2	128 814 41 AX
Main station of design "Saar"	L11-H2	128 814 41 01 AX



- Supply of L111 system line through an intrinsically safe power supply unit
- Line monitoring of DC and WL wires
- Option for switchover between normal start-up warning and selective start-up warning
- Separation of WL line and line-type cable for selective start-up warning
- Control via parallel interface (start-up warning / repair work mode / stop acknowledgement)
- Generation of a start-up warning tone and its monitoring
- Switchover between two different start-up warning tones through DIP-switch
- Output of a "faulted line tone"
- Signal output for:  
WL line OK / Enable / Flashing of start-up warning
- WL wire connection: protected against polarity reversal
- Type of protection: I M 2 EEx ia I

### Configuration

The main station L11-H2 basically consists of the modules L1 central module 8063A11E, L1 tone generator 8063A21 and the connecting terminals. These components are installed in a blue powder-coated steel sheet enclosure of protection degree IP54. The connecting cables are led into the enclosure and brought into contact

with the respective connecting terminals through four cable entries of size PG16 and one of size PG21 (optionally, the WL system line can be connected to a 6-pole socket).

In the "Saar" design, the main station L11-H2 additionally features 2 REL9.2 coupling modules with diode terminating elements.

## Functional Description

The main station L11-H2 is the starting point of the L111 system line and supplies all devices of the intercom system or the first power supply section connected to the system line with current from the external 12V power supply unit.

The internal electronics modules of the L11-H2 main station also are supplied by the external power supply unit.

To ensure proper functioning of the system, a voltage of  $\geq 8$  V DC must always be applied to the end of the WL line. If the applied voltage is below 6 V DC, the output "WL line OK" of the L11-H2 will be switched off.

The L11-H2 modules (L1 central module 8063A11E and L1-tone generator 8063A21) generate the start-up warning tone (emergency service siren tone or howling tone, adjustable via switch S1), stop acknowledgement tone and faulted line tone. The L1 central module 8063A11E monitors the two LF wires in the system line (WL1 and WL2) and indicates the corresponding state via the output "WL line OK" which is separated by an optocoupler. If a fault is detected on the LF lines of the L111 system line, the "faulted line tone" will be emitted for a pre-set period of time and then switched off (depending on the version of the operating program), to prevent the rechargeable batteries of the speaking stations from unnecessary strain.

The L1 central module 8063A11E also monitors the start-up warning during normal operation and repair work mode (see below). If the request "start-up warning" is set via the corresponding output, regardless of repair work mode also being active or not, the central module will first check if a fault on the LF lines occurred. If so, the request will be ignored and the faulted line tone will be emitted instead.

If the supply line features an open circuit, the main station L11-H2 also emits the faulted line tone.

Additionally, the L1 central module 8063A11E coordinates the LF connection with the external WL line (line-type cable). Depending on the switching position of S3, emission of a selective start-up warning is possible. This ensures that the start-up warning tone will not be injected into the external WL line (line-type cable). In case of selective warnings, the operator can inject the start-up warning tone at the volume pre-set by him into the external WL line (line-type cable) by means

of slide switch "EXT.WL" and internal potentiometer P4 (e.g. for check purposes in a control room on the surface).

To control the L11-H2 functions (start-up warning / repair work mode / stop acknowledgement), the L1-central module 8063-A11E features three inputs for the connection of potential-free contacts functioning as diode terminating elements (see block diagram):

- \* Start-up warning  
Terminal 7 / 8 LED "ANL"
- \* Repair work mode  
Terminal 9 / 10 LED "REP"
- \* Stop acknowledgement  
Terminal 11 / 12 LED "STQ"

If one of the above mentioned inputs is activated via an intrinsically safe contact with diode terminating element function (contact is closed), the corresponding LED at the L1-central module is on and remains activated as long as the corresponding input signal is active.

The output of L11-H2 status information to external devices and/or systems is ensured by three potential-free optocoupler outputs (with diode terminating element function), to which intrinsically safe circuits may be connected (see block diagram):

- \* Flashing of start-up warning  
Terminal 1 / 2 LED "ANL"
- \* Enable  
Terminal 3 / 4 LED "FRG"
- \* WL line OK  
Terminal 5 / 6 LED "LTG"

If one of the above mentioned outputs is activated, the corresponding LED at the L1 tone generator module is on. If deactivated, the outputs are high impedance, if deactivated, they are low impedance.

In the "Saar" design, relay modules are connected in series to the optocoupler outputs "enable" (terminals 3 / 4) and "WL line OK" (terminals 5 / 6). By means of an appropriate connection with diode terminating elements, thus a potential-free changeover switch with double diode characteristics can be generated.

In the following, the L11-H2 functions start-up warning, repair work mode and stop acknowledgement are described in detail:

- \* **Start-up warning:**  
(normal operation, no repair work mode):

(for the corresponding periods for early warning etc. as stored in the operation program, refer to the operating program versions which are listed separately)

### \*\* Activation:

The control sends the request "start-up warning" to the main station L11-H2, by closing one of the intrinsically safe contacts with diode terminating element function which is connected to terminals 7 / 8 of the L11-H2.

### \*\* Action of the L11-H2:

The main station L11-H2 verifies whether the intercom wire pair in the system line operates without fault. If no line fault is detected, the start-up warning tone generator is activated (2 tones possible, setting by means of a DIP switch / see below), the start-up warning tone is emitted and monitored for its adequate volume.

After the programmed early warning period (5 s) has ended, the intrinsically safe potential-free optocoupler output "enable" (terminals 3 / 4) is activated, while the start-up warning tone will still be emitted for a pre-set post warning period and then be shut off. The output "enable" remains activated as long as the request for the emission of the "start-up warning" is enabled and no line fault is detected.

During the start-up warning (early warning period + post warning period) the signal "flashing of start-up warning" is available at terminals 1 / 2 of the L1 tone generator. This signal can be used to simultaneously indicate the start-up warning optically, with the output being activated at a pulse duty factor of 0.5 s : 0.5 s (the corresponding LED "ANL" of the L1 tone generator will flash at the pulse rate of the activation).

If the control cancels the request "start-up warning" directly after receipt of the signal "enable", the start-up warning will immediately be stopped and the signal "enable" be cancelled, too (the corresponding LEDs go off).

In two cases the signal "enable" is not be activated:

1. a line fault is detected
2. the start-up warning tone at the L1 central module output does not reach the necessary minimum volume

\* **Sectional start-up warning**  
(selective start-up warning):

(for the corresponding periods for early warning etc. as stored in the operation program, refer to the operating program versions which are listed separately)

\*\* Precondition:

Set DIP switch S3 of L1 tone generator 8063-A21 of L11-H2 (main station) to the position "sectional start-up warning" (S3 = OFF).

\*\* Activation:

The control sends the request "start-up warning" to the main station L11-H2, by closing one of the intrinsically safe contacts with diode terminating element function which is connected to terminals 7 / 8 of the L11-H2.

\*\* Action of the L11-H2:

The main station L11-H2 verifies whether the intercom wire pair in the system line operates without fault. If no line fault is detected, the start-up warning tone generator is activated (2 tones possible, setting by means of a DIP switch / see below), the start-up warning tone is emitted and monitored for its adequate volume.

Attention:

The start-up warning tone will only be emitted via the WL line of this WL system. The start-up warning tone will not be emitted via the external WL line (connecting cable to other WL systems, in short "line type cable"). The "faulted line tone" or the "stop acknowledgement tone" also will only be emitted via the WL wires of the corresponding L111 system line and will not be injected into the external WL line.

After the programmed early warning period (5 s) has ended, the intrinsically safe potential-free optocoupler output "enable" (terminals 3 / 4) is activated, while the start-up warning tone will still be emitted for a pre-set post warning period and then shut off.

The output "enable" remains activated as long as the request for the emission of the "start-up warning" is enabled and no line fault is detected.

During the start-up warning (early warning period + post warning period) the signal "flashing of start-up warning" is available at terminals 1 / 2 of the L1 tone generator.

If the control cancels the request "start-up warning" directly after receipt of the signal "enable", the start-up warning will immediately be stopped and

the signal "enable" be cancelled, too (the corresponding LEDs go off).

Note:

The function "sectional start-up warning" is used, where a sectional warning is necessary, e.g. on a large conveyor system, consisting of several individual conveyors. During the start-up of an individual conveyor, the start-up warning will only be emitted in the section of this specific conveyor; the other conveyor sections will not be concerned.

This function is realised by separating the external line-type cable from the WL line of the L111 system line by a relay contact for the duration of signalling the tones "start-up warning", "faulted line", and "stop acknowledgement".

A "non-reacting amplifier" within the L1 tone generator of the L11-H2 enables voice and signals of the external line-type cable to reach the WL line of the L111 system line even during a "sectional start-up warning"; a transmission in reverse direction, however, is not possible.

\* **Repair work mode:**

(for the corresponding periods for early warning etc. as stored in the operation program, refer to the operating program versions which are listed separately)

\*\* Activation:

First, the control sends the information "repair work mode" to the main station L11-H2, by closing one of the intrinsically safe contacts with diode terminating element function which is connected to terminals 9 / 10 of the L11-H2.

Then the control sends the request "start-up warning" to the main station L11-H2, by closing an intrinsically safe contact with diode terminating element function which is connected to terminals 7 / 8 of the L11-H2.

\*\* Action of the L11-H2:

The main station L11-H2 verifies whether the intercom wire pair in the system line operates without fault. If no line fault is detected, the start-up warning tone generator is activated, the start-up warning tone is emitted and monitored for its adequate volume. After the programmed early warning period, the intrinsically safe, potential-free optocoupler output "enable" will be activated (terminals 3 / 4). The start-up warning tone will be emitted as long as the request "start-up warning" is valid, without, however, exceeding a maximum start-up warning

period. After 12 s (after starting the emission of the start-up warning tone) the volume will be reduced to approx. 1/3 of the original volume.

After the end of the maximum start-up warning period (3 min.) the output "enable" will be deactivated and the emission of the start-up warning tone ends. To emit a further warning (in repair work mode), it is necessary to cancel and restart the request "start-up warning".

\* **Stop acknowledgement**

(for the corresponding periods for the signalling stored in the operating program, refer to the operating program versions which are listed separately)

\*\* Activation:

The control sends the request "stop acknowledgement" to the main station L11-H2, by closing one of the intrinsically safe contacts with diode terminating element function which is connected to terminals 11 / 12 of the L11-H2.

\*\* Action of the L11-H2:

The main station L11-H2 verifies whether the intercom wire pair in the system line operates without fault. If no line fault is detected, the stop acknowledgement tone (5x50ms, 800Hz impulse at an interval of 50ms, 4.5 s break) is sent to the WL line.

Attention:

The control input "stop acknowledgement" as described above can only be used in the standard design version. The "Saar" design does not feature this control input and the corresponding function.

\* **Line monitoring:**

\*\* Activation:

The monitoring electronics in the L1 central module of the L11-H2 (main station) detects a fault on the system line in the DC wire pair and/or in the WL wire pair, if the DC voltage drops below 6V DC in the conductor loop DC wire <-> WL wires (this may be caused by wire break / short circuit or by low-resistance shunt).

\*\* Action of the L11-H2:

The output "WL line OK" of the L1 tone generator of the L11-H2 is deactivated (i.e. it is set into a high-impedance condition) and the corresponding LED "LTG" goes off. The emission of the start-up warning tone is interrupted, the output "enable" is deactivated and the faulted line tone (800 Hz impulse for 0.5 s, 1.5 s break)

## Main station L11-H2

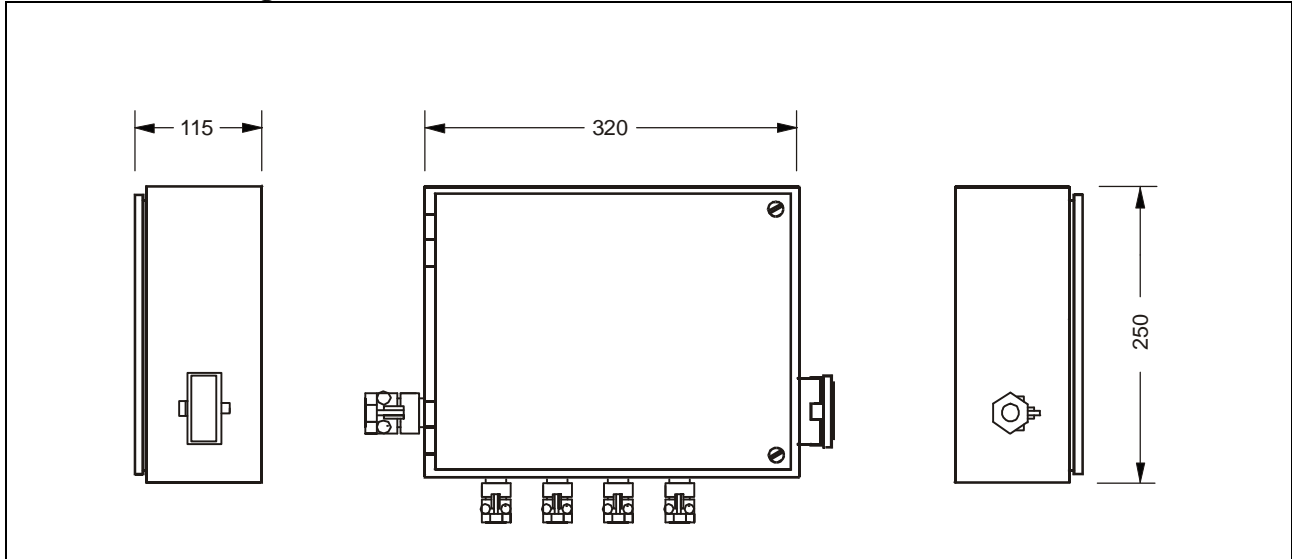
is emitted via the WL wires of the L111 system line.

Note:

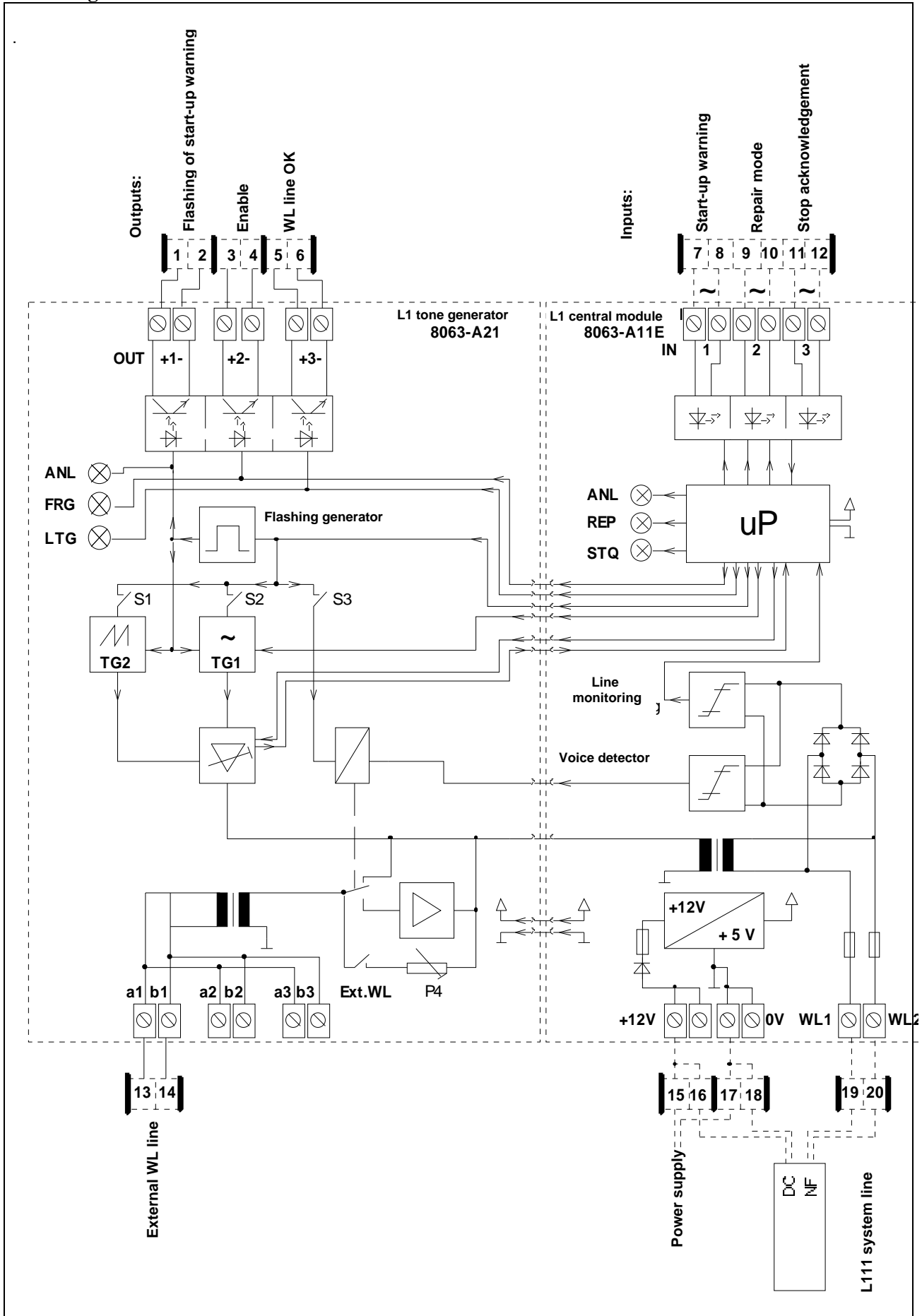
If the detected fault is a break of the WL wire pair, the faulted line tone will only be emitted by the speaking stations (LV30) installed between the

L111 main station and the location of the break (this does not apply to a short circuit of the WL wire pair).

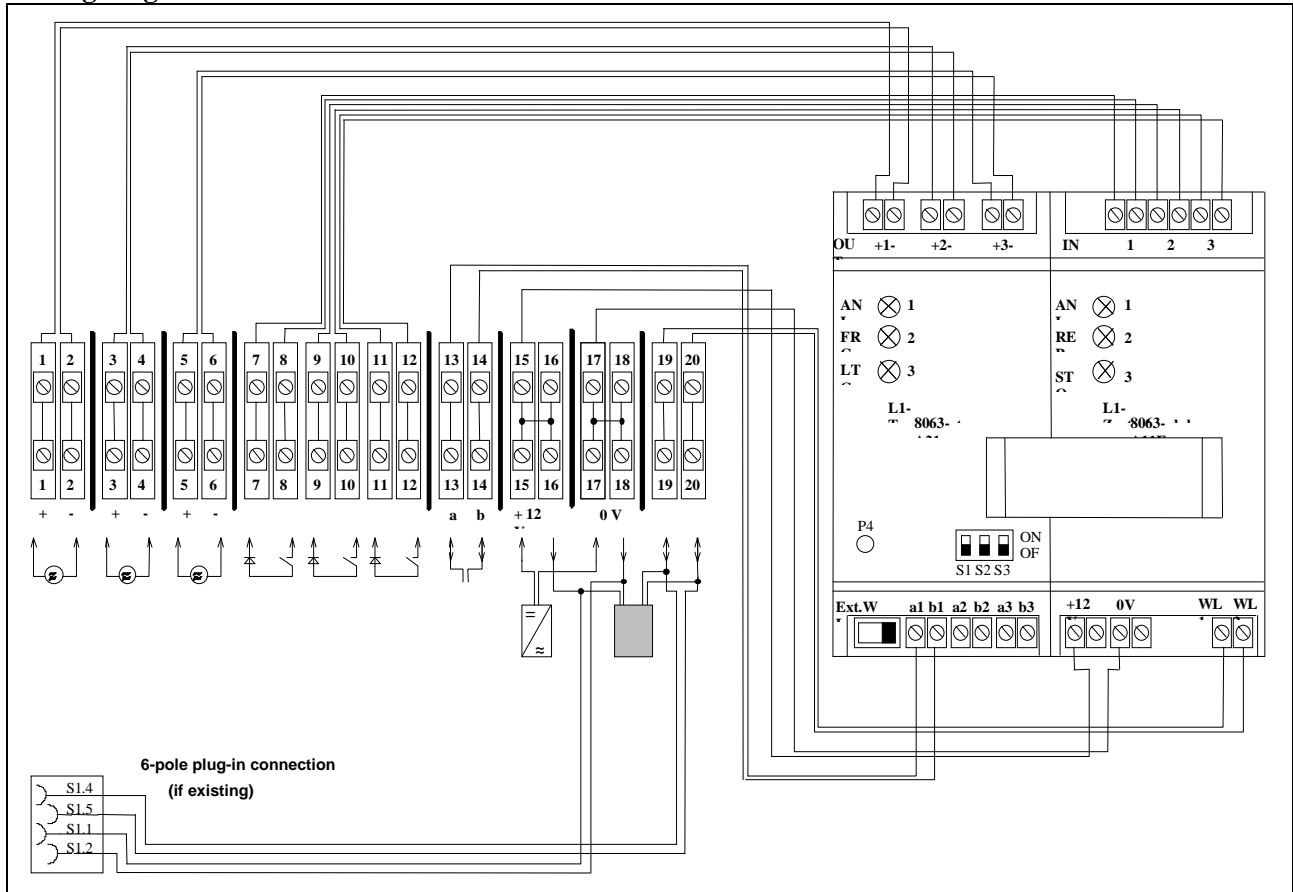
### Dimensional drawing L11-H2



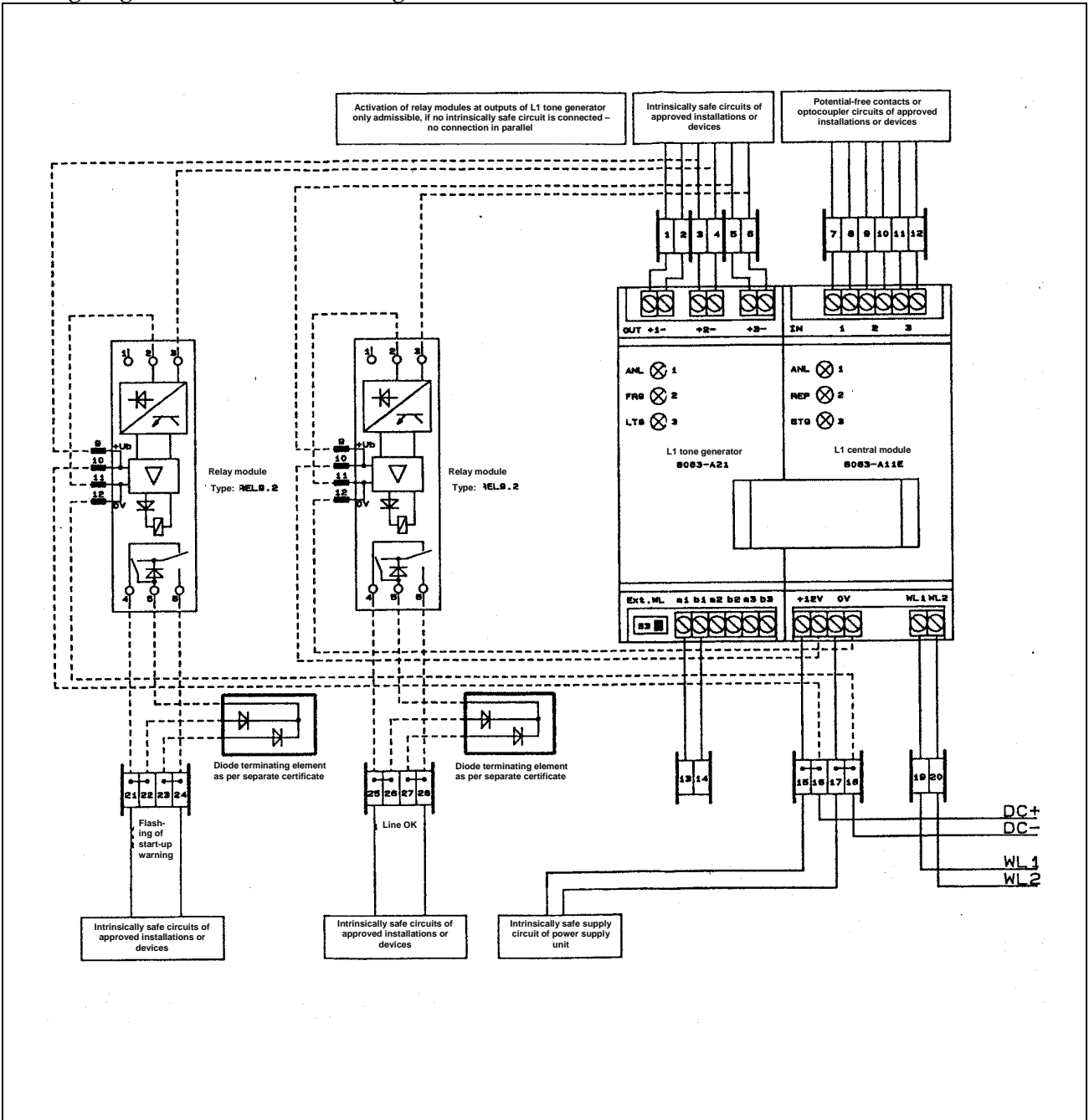
Block diagram L11-H2



**Wiring diagram**



Wiring diagram L11-H2 "Saar" design



**Technical data L11-H2**

Designation	Main station
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Type	L11-H2
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**Parameters****Power supply circuit (input): Connecting terminals for the external 12V power supply**

Terminal 15:	+ 12 V <sub>DC</sub> ± 10%
Terminal 17:	0 V <sub>DC</sub>
Power input:	max. 45 mA
Protection against polarity reversal:	protective diode

**Supply circuit (output): Connecting terminals for the DC wires of the L111 system line**

Terminal 16:	+ 12 V <sub>DC</sub> ± 10%
Terminal 18:	0 V <sub>DC</sub>

**Connections for the DC wires of the L111 system line (with Wieland plug connection, if existing)**

S1.1:	+ 12 V <sub>DC</sub> ± 10%
S1.2:	0 V <sub>DC</sub>

**Supply circuit parameters**

**(KL15 to KL18 of the main station, or terminals KL5.1/5.2: DC+, KL5.3/5.4: DC- of the L1 central module)**

Voltage U <sub>i</sub>	13.8V <sub>DC</sub>
Current I <sub>o</sub>	45mA
Internal capacitance C <sub>i</sub>	≤ 7,5μF
Internal inductance L <sub>i</sub>	≤ 20μH

**WL line****Connecting terminals for the WL wires of the L111 system line**

Terminal 19:	WL1
Terminal 20:	WL2

**Connecting terminals for the WL wires of the L111 system line (incl. 6-pole plug connection, if existing)**

S1.4:	WL1
S1.5:	WL2

Transmission level on the WL line:	- 6dBm at 600 Ohm
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**Note:**

**This connection configuration offers polarity reversal protection. For the connection of the WL wires, an interchange of terminal 19 with terminal 20 or of connection S1.4 with connection S1.5 is permitted.**

**Audio frequency circuit parameters**

**(terminals KL6.1: WL1(-), KL6.2: WL2 (+) of the L1 central module)**

Voltage U <sub>o</sub>	6V <sub>DC</sub>
Signal voltage U <sub>o</sub>	800mV <sub>AC</sub>
Current I <sub>o</sub>	0.6mA <sub>DC</sub>
Signal current I <sub>o</sub>	1.1mA <sub>AC</sub>
Internal capacitance C <sub>i</sub>	≤ 2.2μF
Internal inductance L <sub>i</sub>	≤ 900mH

**External WL line****Connecting terminals for the external WL line (line cable)**

Terminal 13:	a1
Terminal 14:	b1

Transmission level on the external WL line:	- 6dBm at 600 Ohm (transformer decoupling)
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**Technical data L11-H2 (continued)****Audio frequency circuit parameters**

(terminals 19/20 of main station, terminals "ext. WL" of L1 tone generator or main station 13/14)

Signal voltage $U_o$	800mV <sub>AC</sub>
Signal current $I_o$	1.1mA <sub>AC</sub>
Internal capacitance $C_i$	≤ 10μF
Internal inductance $L_i$	≤ 900mH

**Input circuits**

These inputs feature a line protection according to the half-wave method (frequency approx. 180 Hz), range for 0.8 mm PE connecting cable: approx. 3 km

In the control, potential-free contacts with diode terminating element function must be made available (max. residual voltage < 1.1 V).

Terminal 7/8:	"Start-up warning"	Control input
Terminal 9/10:	"Repair mode"	Control input
Terminal 11/12:	"Stop acknowledgement"	Control input

**Parameters of the signal circuits**

for the connection to potential-free contacts of approved intrinsically safe systems (terminals KL 7.1/7.2, 7.3/7.4, 7.5/7.6 of L1 central module or main station terminals 7 -12)

Voltage $U_o$	12V <sub>SS</sub>
Voltage $U_n$	6.5V <sub>SS</sub>
Current $I_o$	10mA
Internal capacitance $C_i$	negligible
Internal inductance $L_i$	negligible

**Output circuits:**

The output circuits are separated from each other and from the system by means of optocouplers

Diode terminating element function installed.

**Contact data:**

Switching capacity:	28 V / 50 mA
Residual voltage:	< 1.1 V
Terminal 1/2:	"Flashing of start-up warning"
Terminal 3/4:	"Enable"
Terminal 5/6:	"WL line OK"

**Parameters of the optocoupler output circuits**

Terminals OUT 1/2/3 of the L1 tone generator or main station terminals 1/2, 3/4, 5/6

Voltage $U_i$	30V <sub>DC</sub>
Current $I_i$	200mA
Switching capacity $P_i$	330mW
Internal capacitance $C_i$	negligible
Internal inductance $L_i$	negligible

The output circuits are isolated from each other and from the other electric circuits of the L1 tone generator.

The "Saar" model provides relay changeover contacts with double diode function for the output signals "enable" and "WL line OK":

Terminal 21/24:	"Enable"
Terminal 25/28:	"WL line OK"

Parameters of the potential-free relay contact circuits, terminals 4-6 of the coupling modules or main station terminals 21/22/23/24, 25/26/27/28

Voltage $U_i$	28V <sub>DC</sub>
Current $I_i$	200mA
Switching capacity $P_i$	3 W
Internal capacitance $C_i$	negligible
Internal inductance $L_i$	negligible

**Technical data L11-H2 (continued)****Parameters of the potential-free optocoupler input circuits****Terminals 2 -3 of the coupling modules**

Voltage $U_i$	13.5 V <sub>DC</sub>
Internal capacitance $C_i$	negligible
Internal inductance $L_i$	negligible

**Visual indicators:****L1 central module 8063-A11E:**

LED 1:	"ANL" "Start-up warning"
LED 2:	"REP" "Repair work mode"
LED 3:	"STQ" "Stop acknowledgement"

The LEDs are on, as long as the intrinsically safe contact with diode terminating element function activates the related input (contact = closed).

**L1 tone generator 8063-A21:**

LED 1:	"ANL" "Flashing of start-up warning"
LED 2:	"FRG" "Enable"
LED 3:	"LTG" "WL line OK"

If one of the related outputs is activated, the corresponding LED will also go on. If deactivated, the outputs are high impedance, if deactivated, they are low impedance.

**Model "Saar":**

L1 central module "Saar": The module in the "Saar" design does not use the control input "stop acknowledgement". The related function does not exist (also valid for the stop acknowledgement tone).

L1 tone generator "Saar":

The tone generator stage of the L1 tone generator produces a tone featuring the characteristics of a piezo sound generator:

Start-up warning tone > 2700 Hz;  
0.5s duration / 0.5s break

The L1 tone generator outputs "enable" and "WL line OK" are each connected to one relay module of type REL9.2. Additional diode terminating elements can be connected between the relay outputs and the user connecting terminals "enable" (terminals KL21, KL 24) and "WL line OK" (terminals KL 25 KL 28), to configure a changeover contact with double diode.



**Further technical data:**

Operating mode Continuous operation  
Service position at choice , preferably in vertical position  
with cable entries downwards

Enclosure Sheet steel (colour: blue)  
Enclosure protection degree IP 54  
Cable entries: 4 x PG16  
1 x 6-pole plug connection (female)  
or 1 x PG21

Temperature range  
-operation - 20 to + 40°C  
-storage - 25 to + 70°C  
-Transport - 25 to + 70°C

**Technical data L11-H2 (continued)**

Dimensions	see dimensional drawing
Weight	approx. 6.0 kg
Test and approval	
-type of protection	I M 2 EEx ia I
-approval number	DMT 02 ATEX E 209 X
<b>Marking</b>	
The nameplate is marked as follows:	
Company	FHF Bergbautechnik GmbH 42551 Velbert
Type	L11_H2  I M 2 EEx ia I  0158 DMT 02 ATEX E 209 F. No.... Test....(ref./initials, month/year)

**Control and setting elements****L1 central module 8063-A11E:**

Jumpers JP1 to JP3:

Selection of the current program version

No.:	Program version	JP 1	JP2	JP3
1	V1.12	2 - 1	2 - 1	2 - 1
2*	V1.15	3 - 2	2 - 1	2 - 1
3	V1.17	2 - 1	3 - 2	2 - 1
4	V1.18	3 - 2	3 - 2	2 - 1
5	V1.13	2 - 1	2 - 1	3 - 2

\* = standard setting, 1 = GND, 3 = VCC

**L1 tone generator 8063-A21:**

DIP switch S1 &amp; S2:

Selection of the start-up warning tone

	start-up warning tone	S1	S2	
	howling tone	ON	OFF	
	emergency service siren tone	OFF	ON	

DIP switch S3:

"Sectional start-up warning"

**S3 = OFF** Sectional start-up warning deactivated.

=&gt; In this operating mode, start-up warning tone, faulted line tone and stop acknowledgement tone are only audible in the WL section connected to this L11-H2 but not in the external WL line.

**S3 = ON** Sectional start-up warning deactivated.Slide switch "EXT.WL"  
and potentiometer P4 (internal):

"EXT.WL" = in position EXT.WL and S3 = OFF

=&gt; In this operating mode, the internal potentiometer P4 allows the user to launch start-up warning tone, faulted line tone and stop acknowledgement tone in the external WL line (line-type cable) at the volume pre-set by him

### **Installation and mounting**

The main station is to be fitted to a mounting base of adequate rigidity and stability with regard to the weight of the station.

The vertical position, with the cable entries facing downwards, is the preferred operating position.

The interconnection with other equipment must be certified separately.

Special care shall be taken with regard to the sealing area when the main station is open, to avoid damaging the sealing and the sealing faces. During installation, proper fit and clean condition of the sealing are to be ensured. When closing the enclosure, tighten the cover screws firmly and uniformly. The system line of the intercom system always begins at the main station. An installation at a point along the line is not possible, since otherwise sections of the line will be without monitoring.

### **Commissioning and settings**

Prior to commissioning, verify the proper installation, cables and connections and the desired position of the setting elements. The interconnection with other equipment must be certified separately.

### **Maintenance**

The device does not contain any parts requiring maintenance

### **Disposal**

The disposal of the packaging material and of used parts must be realised in compliance with the regulations of the country in which the device is installed.

**Warning and Safety Advice**

<p>The apparatus is a flameproof device designed for the operation within explosive atmospheres. It complies with safety class group I M 2 and is appropriate for the operation underground.</p> <p>Please pay particular attention to the following warning and safety advice:</p>
The interconnection with other electric equipment must be separately certified.
Make sure the main station is properly connected.
The apparatus is to be connected and installed in accordance with the specified installation instructions by qualified personnel, taking into account the protection type indicated.
The device may only be connected and operated with the specified voltage. The polarity specifications are to be observed.
Make sure the housing is not damaged. Do not operate faulty devices, shut them off immediately.
If the device is operated in an industrial installation, the rules for the prevention of accidents for electrical installations and equipment of the association of the industrial employer's social insurance against occupational accidents shall be observed.
<p>The device may only be operated under the specified ambient conditions. Unfavourable ambient conditions may damage the appliance, possibly jeopardising the user's life as a result. Unfavourable ambient conditions may be:</p> <ul style="list-style-type: none"> <li>• moisture, dust (observe type of protection)</li> <li>• air humidity too high (&gt; 75% rel., condensing)</li> <li>• inflammable gases, vapours, solvents not covered by the protection class of the device.</li> <li>• ambient temperatures too high (&gt;+40°C)</li> <li>• ambient temperatures too low (&lt;-20°C).</li> </ul>
The ambient temperature specified for the device may not be exceeded or failed to be reached during operation, storage and transport.
Repair work may only be realised by the manufacturer or by a person authorized by the manufacturer. Subsequently, a new routine test for the device must be carried out.
The extension and the installation of further parts is not permitted.
Replace faulty components only by the appropriate genuine spare parts.
Only use the cable glands/entries specified by the manufacturer.
If required, additional measures must be taken to protect the device against falling objects.
Make sure the device is protected against damage during transport, storage and when not in use.
Devices that have been operated outside intrinsically safe installations and, in particular, have been supplied with power by a non-intrinsically safe power supply may not be operated in explosive areas due to possible previous damage
<p><b>Attention:</b></p> <p>Disregarding the above points will nullify the explosion protection. The device then represents a danger to the life of the operator and may cause a hazardous atmosphere to explode.</p>

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