

Instruction manual

New Value, First Value and  
Process Indicator System

# NEMS

With contactor voltage  
DC12V...DC48V  
AC12V...AC260V



Sensors and Systems  
for Combustion Engineering



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## General information

## 2 General information

### 2.1 Validity of this manual

---

This manual applies to NEMS with contactor voltage DC12V...AC260V in any configuration. For using the functions of the LAMTEC SYSTEM BUS modules, you need the configuration software (for RS232 or LAMTEC SYSTEM BUS).

### 2.2 For your safety

#### 2.2.1 Heed the Equipment Safety Law

---

The Equipment Safety Law stipulates:

**Heed instructions for use!**

Only proceed in accordance with this operating manual (document no.: DLT5080).

**Only use the device for the prescribed application.**

Operation only by trained personnel. The device may only be operated and maintained by persons who are qualified to do so on account of their level of knowledge and their training.

**Liability for the functioning of the equipment transferred to the owner or operator**

Liability for the functioning of the equipment shall in all cases be transferred to the owner or operator if the equipment is improperly operated, serviced or repaired by persons who do not possess the necessary expertise, or if the equipment is handled in a manner other than that prescribed.

LAMTEC GmbH & Co. KG will not accept liability for damages arising from failure to comply with the above instructions. The above instructions do not extend the warranty and liability conditions of the Conditions of Sale and Supply of LAMTEC GmbH & Co. KG.

Where reference is made to laws, regulations or standards, these are based on the legal system of the Federal Republic of Germany.

## **General information**

### **2.3 Using this manual**

#### **2.3.1 Purpose of this manual**

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This manual only covers operation, commissioning and maintenance.

Special information which covers the options relating to this device is explained in separate documents if necessary.

#### **2.3.2 Preliminary remarks**

---

The procedure to be followed in order to make the best possible use of this manual is specified below:

Check to make sure that the settings of your NEMS correspond with the requirements of the installation. The factory settings are shown on the sticker on the device.

What physical input variables (voltage, contact) and values are required by your NEMS.

What physical NEMS output variables (voltage, relay signal) and values are expected by the installation.

Do the settings of the NEMS relating to operating performance correspond with the relevant requirements (indicator performance, safety interlock chains).

If these points are unclear, please read the section entitled "Settings" from page 30.

#### **2.3.3 The intermediate headings**

---

Are intended to guide you if you know how to operate the NEMS and just want to look up a specific piece of information.

## Safety information

### 3 Safety information

In these Operating Instructions, the following symbols are used as important safety instructions to the user. These symbols appear wherever there is a need for this information in a particular section. It is essential to note and comply with the safety instructions, particularly the warnings.



**WARNING**

Indicates possible danger to personnel, particularly with regard to electrical equipment.



**WARNING**

*Indicates possible danger to personnel if the system components are not handled correctly.*



**IMPORTANT!**

*Indicates danger to system components or possible impairment of functionality.*



**NOTE:**

Contains important additional information for the user concerning the system or system components and provides helpful tips.

Contained in texts which provide information on how to perform tasks.

In performing all tasks, the operator is requested to observe all statutory safety regulations and to do everything possible, according to the circumstances, to prevent injury to persons or damage to equipment.

## Intended application

### 4 Intended application

The **NEMS** is a new value, first value and process indicator system consisting of individual **NEMS16** devices, each with 16 indicator inputs. By networking via a LAMTEC SYSTEM BUS, it is possible to create an indicator system with a maximum of 1024 signals (64 individual devices). The inputs are divided in 4x4er groups. Thus you can operate the inputs with different contactor voltages. Each indicator input (DC12V...DC30V and AC12V...AC260V) can be converted to fault or process status signal as well as normal open or closed contacts and is displayed by means of a luminous, three-colour LED on the front panel.

When an indicator input is switched to the active state, the relevant LED changes over to a flashing light or a continuous light.

It is also possible to print out the signals in chronological order via a serial logging printer or a display and operating terminal connected at the LAMTEC SYSTEM BUS.

The device contains a real-time clock which is synchronised with another NEMS16 in the system.

#### 4.1 Applications

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- Process monitoring
- Monitoring of safety interlock chains in combustion engineering
- Chronological recording and processing of fault values and operating data. Coupling to standard field bus systems (eg Profibus) is possible as an option.
- Logging and further processing in conjunction with higher-level computer systems.
- Decentralised recording of locally distributed signals.

## System elements

### 5 System elements

#### 5.1 Panel installation

---



Standard panel installation housing made of black sheet steel with bezel.

Dimensions (h x w x d): 144 mm x 72 mm x 200 mm.

The front of the device is covered by a plastic film with integrated sealed keypad.

This film also contains a pocket into which the labelling strips can be inserted.

Electrical connection is made to plug-in terminals at the back.

The electronic unit can be extracted by removing the front and detaching the connectors.

See section 12.1.

Designs with and without RS232 interface.

AC230V version product no.: 680R1200 without RS232

AC230V version product no.: 680R1201 with RS232

DC24V version product no.: 680R1210 without RS232

DC24V version product no.: 680R1211 with RS232

#### 5.2 Design for mounting rail

---



Line voltage AC230V version product no.: 680R1220 without RS232

Line voltage DC24V version product no.: 680R1222 without RS232

#### 5.3 Display and operating terminal

---



For displaying incoming and outgoing fault and process status signals in chronological order. Timing accuracy of the time stamps: typ. + 1 ms, max. + 5 ms.

For configuring, operating and displaying the NEMS devices.

To be connected via the NEMS LAMTEC SYSTEM BUS.

Product no. Panel installation AC230V: 680R6002

Product no. Panel installation DC5V : 680R6003

Product no. Panel installation DC24V : 680R6004

Product no. Panel installation DC110V : 680R6005

Product no. installed in 19" rack DC5V : 680R6006

## System elements

### 5.4 Radio clock

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The system time can also be sent to the system via a radio clock connected to the 2<sup>nd</sup> RS232 port instead of the integrated real-time clock.

Product no. Wall mounting case AC230V or DC24V: 680R6020

### 5.5 Field bus link

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The NEMS signals can be converted to a standard field bus protocol (Profibus, Interbus-S, CAN-Open, Modbus, Ethernet) via a communications processor connected to the LAMTEC SYSTEM BUS.

### 5.6 Text display

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Signals displayed as clear text on a 2 x 20-digit text display.

### 5.7 Printer

---

For printing out incoming and outgoing fault and process status signals in chronological order. Timing accuracy of the time stamps: typ. + 1 ms, max. + 5 ms.

For connection to the RS232 interface of the NEMS or to the display and operating terminal.

### 5.8 External horn

---



Electronic triple sensor for instrument boards.

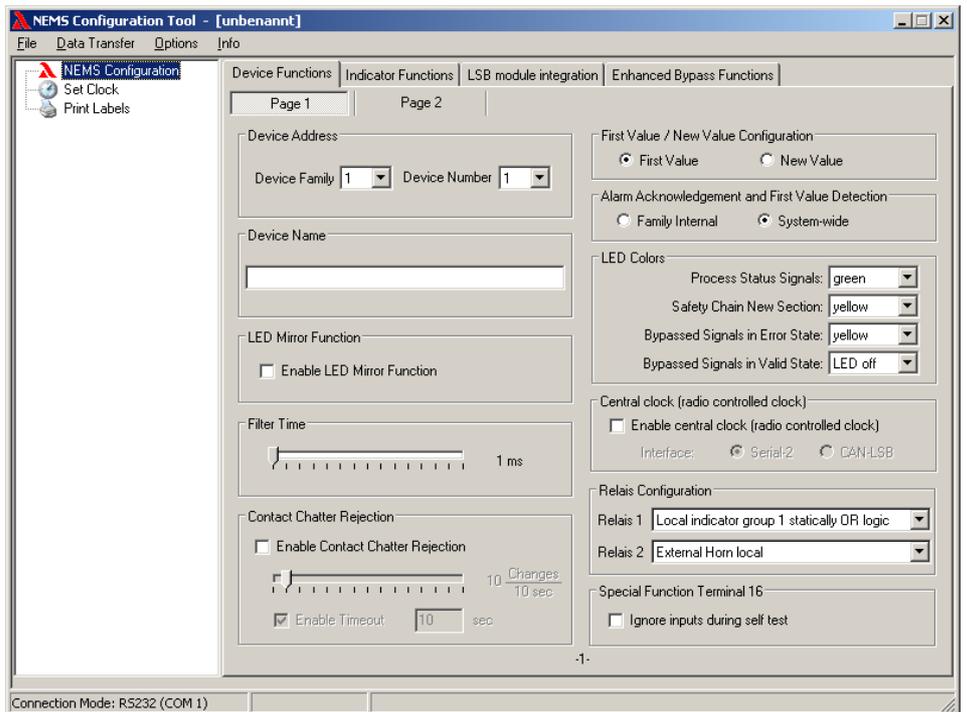
3 inputs for DC18-30V.

AC230V version Product no.: LH4/OK-230

DC24V version Product no.: LH4/OK-24

# System elements

## 5.9 Message text and configuration software



Software for inputting message texts and user-friendly configuration of the NEMS.

### For individual devices:

For connection to an existing RS232 interface

Product no.: 680R1053

For connection to the LAMTEC SYSTEM BUS via USB converter

Product no.: 680R1056 (without release code)

For several devices (indicator system):

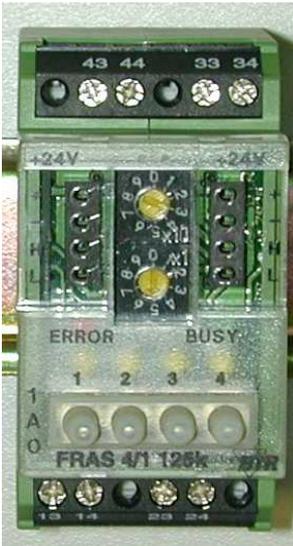
For connection to the LAMTEC SYSTEM BUS via USB converter

Product no.: 680R1052 (with release code)

## System elements

### 5.10 Digital output module

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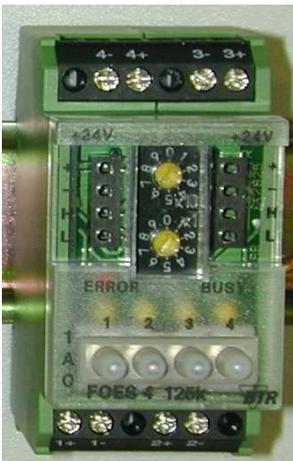


- To creation of max. 26 global indicator groups (A...Z)
- 4 relay outputs 250 V, 6 A
- Fast wiring of several modules by strapping plugs
- Hand control elements
- Without programming applicable
- Product no.: 663R4027

See chapter 10.7

### 5.11 Digital input module

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- To reset of each global indicator group (A...Z)
- 4 digital inputs DC24V (isolated).
- Fast wiring of several modules by strapping plugs
- Hand control elements
- Without programming applicable
- Product no.: 663R4028

See chapter 10.7

# Functions

## 6 Functions

### 6.1 Indicator inputs

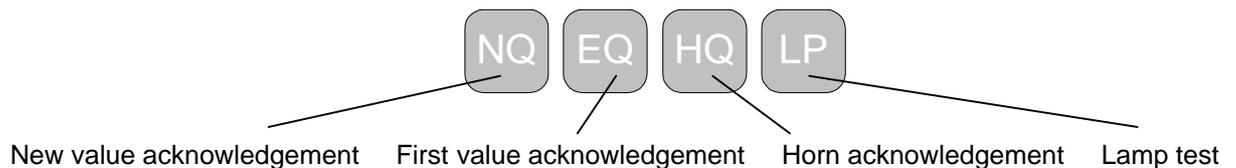
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- 16 indicator inputs (4x4) per device isolated by means of optocouplers.
- Resolution 100ms.
- Can be set to first value or new value function or process status signal.
- Contactor voltage DC12...DC48V and AC12...AC260V-one phase.
- Each input freely configurable to fault or process status signal.
- Each input freely configurable to normal open or closed contacts.
- Each input freely configurable to internal and/or external horn.
- Each input freely configurable to local indicator group 1 and/or 2 and relay output 1 and/or 2.
- Each input freely configurable to global indicator group A...Z, witch can be distributed by digital output moduls. Configuration only via configuration software.
- Configuration is carried out using combinations of the front keys or using a PC with installed configuration software from WIN98.
- Max. 6 input bypasses with free allocation of the bypassed inputs. Inverted input bypasses can be configured (bypass is set when signal sent).
- Inputs 9...16 can be freely assigned to external keys with a choice of NQ, NQ, HQ or LP in each case, edge-triggered and with OR operation of several inputs.
- Acknowledgement also possible by digital input module. Configuration only via configuration software.
- Signals can be deactivated/activated via inputs or bus signal.
- Virtual indicator inputs, ie signals displayed via LAMTEC SYSTEM BUS.

### 6.2 Keyboard

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Sealed keypad integrated in the handle for operating and programming the NEMS.



# Functions

## 6.3 LEDs

---

- 16 three-colour LEDs for displaying the signals.
- Red with flashing frequency of 2 Hz = first value indication
- Red with flashing frequency of 1 Hz = new value indications,  
Green continuous light = process status signals.
- 1 LED (green) for displaying readiness for service.

## 6.4 LAMTEC SYSTEM BUS

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- Can be expanded via LSB to up to 1024 indicator inputs. Therefore a total of up to 64 NEMS16 devices can be connected to an indicator system.
- Functions connected in parallel eg keys or first value interlocking
  - a) limited to the family
  - b) not limited to the family (whole system)



**NOTE:**

Synchronisation of flashing, date, time and printer output is always for the whole system (not limited).

- Possible via additional module RS232, RS422 or RS485 interface.
- Optional field bus connection possible (Profibus, Modbus, Interbus, CANopen)..
- For connecting a operating terminal. Chronological signal output. Timing accuracy of the time stamps: typ. + 1 ms.
- For reading the message texts and configuration using a PC with configuration software.
- For mirroring the LEDs on slave NEMS devices (NEMS without indicator inputs, just LED display and key operation).
- Connection to the FMS and ETAMATIC combustion management systems in order to display the faults as clear text .
- Output of clear text messages on a text display via LSB
- For creation up to 26 Indicator groups (A...Z) via additional digital output modules with each 4 isolated outputs.
- Reseting of the indicator inputs via additional digital input modul.

## 6.5 Interface

---

- Via separte module RS232, RS422 or RS485 possible.
- For connecting a printer
- For connenting a radio clock
- For connecting the configuration software

# Functions

## 6.6 Relays

---

2 relay contacts (relay 1 and 2) freely configurable to:

- Relay OFF
- Local indicator group 1 or 2 statically (OR-logic)  
Incoming signal – relay ON, outgoing signal – relay OFF.  
No reaction to new incoming signals.
- Local indicator group 1 or 2 impulse (OR- logic)  
Incoming signal – relay ON for 0,5sec.  
Relay ON for 1sec. in the event of new incoming signals.
- Local indicator group 1 or 2 acknowledgable (OR- logic)  
Incoming signal – relay ON,  
Relay only released by acknowledging the signal.
- HORN external global  
HORN group contact for a whole system.



**NOTE:**

All signals which are set to "Horn external" or "Horn internal & external" are signalled by the "Horn external global".

If signals are set to "Horn off" or "Horn internal", then they will not be signalled by the "Horn external global".

The horn acknowledgement always operates all the NEMS devices in the system.

- HORN external lokal  
HORN group contact for a single device.
- WATCHDOG-function  
Indication of a fault in the device.
- Printer fault
- Local indicator group 1 or 2 statically (AND-logic)  
Relay ON by 16 incoming signals  
Relay immediately OFF by outgoing signal
- Local indicator group 1 or 2 impulse (AND- logic)  
Relay ON for 0,5sec. by 16 incoming signals.
- Indicator group 1 or 2 acknowledgable (AND- logic)  
Relay ON by 16 incoming signals.  
Relay only released by acknowledging the signal.
- LSB (PROFIBUS)  
Relays can be controlled via the PROFIBUS FMS/VMS/ETAMATIC.

# Settings

## 7 Settings



NOTE:

The **factory settings** are marked with a “#”.

### 7.1 Device

---

Each NEMS16 device has adjustable functions which relate to the whole device:

- **First value #**
- New value
- **Printer ON/OFF #**
- **Printer with #/without synchronisation**
- **Print process status signals ON #/OFF**
- **Keys and first value interlocking not limited to the family #**
- **LED mirror function ON/OFF #**
- **Communication processor PROFIBUS ON/OFF #**
- Process status signal LEDs green #/red
- Bypassed input LEDs yellow #/OFF
- Print number of characters from the message texts 32# red/64 green (only with printer without synchronisation)
- Signal acknowledgement by the display and operating terminal ON#/OFF
- External key functions ON/OFF #
- LAMTEC SYSTEM BUS family (1-4) # = 1
- LAMTEC SYSTEM BUS address (1-16) # = 1

### 7.2 Inputs

---

Each of the 16 indicator inputs can be programmed to the following adjustable functions:

- Fault status signal #
- Process status signal
- Normal open contacts #
- Normal closed contacts
- Input bypass
- Assignment to internal and #/or external horn (relay 2)/OFF
- Assignment to relay 1 #
- Assignment to relay 2
- Assignment to local indicator group 1 #
- Assignment to local indicator group 2

# Settings

## 7.3 Relays

---

Each of the indicator relays can be programmed to the following adjustable functions:

- Relay OFF
- Local group 1 statically (OR-logic) # = relay 1
- Local group 1 impulse (OR-logic)
- Local group 1 acknowledgable (OR-logic)
- Local group 2 statically (OR-logic)
- Local group 2 dynamically (OR-logic)
- Local group 2 impulse (OR-logic)
- Local group 2 acknowledgable (OR-logic)
- Horn external global
- Horn external local # = relay 2
- Watchdog
- Printer fault
- Local group 1 statically (AND-logic)
- Local group 1 impulse (AND-logic)
- Local group 1 acknowledgable (AND-logic)
- Local group 2 statically (AND-logic)
- Local group 2 impulse (AND-logic)
- Local group 2 acknowledgable (AND-logic)

Setting is carried out using combinations of the front keys as specified in the programming list in this manual or using a PC with installed configuration software from WIN98.

If we are to install the customer-specific setting, then at the end of the manual you will find a "Configuration sheet" for you to fill in and send to us.

# Settings

## 7.4 Lables

---

The factory setting is entered on a lable on the side of the device.

This corresponds to either the details from the customer or, if no details were specified, the factory setting (default values).

On a lable on the other side of the device you can see the technical datas.

<b>NEMS16</b> Neuwert-, Erstwert und Betriebsmeldesystem Kontaktgeberspannung DC12-48V, AC12-260V		
Artikel-Nr.: 680R1201	Ser.-Nr.:	
Auftrag:	Datum:	
Versorgungsspannung: AC230V	Software:	
 LAMTEC	LAMTEC Mess- und Regeltechnik für Feuerungen GmbH & Co KG Impexstraße 5, D-69190 Walldorf 0049/(0)6227/6052-0	

## 7.5 Using the front keys

---

The NEMS16 can be configured by operating various key combinations or individual keys.

This works for all types of NEMS16.

## 7.6 Via RS232

---



NOTE:

The configuration software for RS232 is recommended for the user-friendly setting of individual NEMS16 devices. The devices can be setted directly via the serial interface of the NEMS16 and using a PC.

This only works for NEMS16 devices with an RS232 interface.

## 7.7 Via LAMTEC SYSTEM BUS

---

The configuration software for the LAMTEC SYSTEM BUS is recommended for user-friendly setting of several NEMS16 devices. The devices in the system can be setted directly using the LSB of the NEMS16s, an LSB-USB converter and a PC. Only the addressing of the LAMTEC SYSTEM BUS has to be carried out manually beforehand. This setting can be entered at the Walldorf plant.

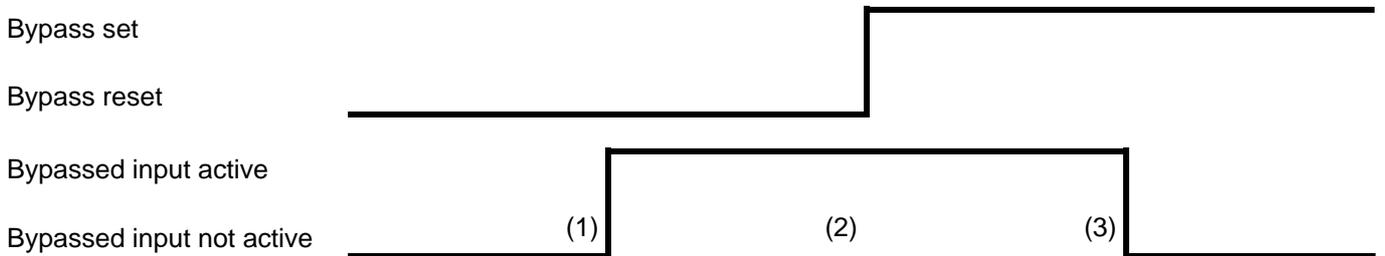
This works for all types of NEMS16 device.

## Performance with bypasses

### 8 Performance with bypasses

#### 8.1 Bypasses normal / LED not inverted

##### 8.1.1 Bypass enabled and bypassed input active:

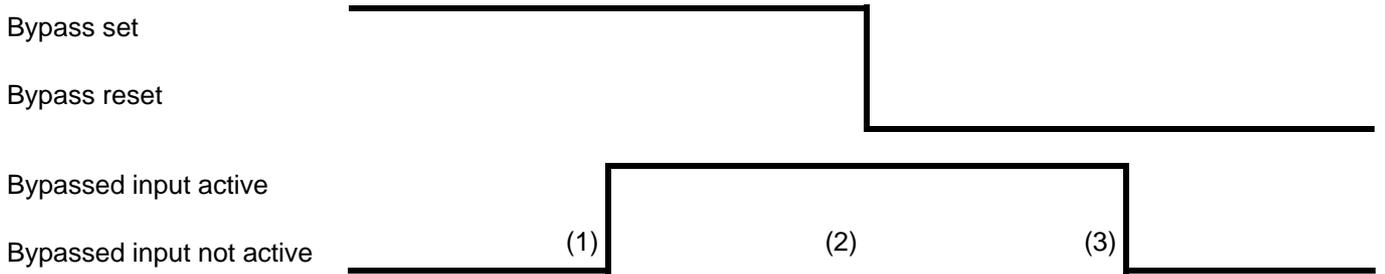


##### NEMS-reactions:

(1):	Bypassed input	<ul style="list-style-type: none"> <li>• LED flashes red,</li> <li>• Printer MKO message ("Incoming signal")</li> </ul>
(2):	Bypass:	<ul style="list-style-type: none"> <li>• LED flashes red,</li> <li>• Printer BSE message ("Bypass selected")</li> </ul>
	Bypassed input:	<ul style="list-style-type: none"> <li>• LED flashes red if not acknowledged yet</li> <li>• LED with continuous yellow light if acknowledged</li> <li>• no printer MGE message ("Outgoing signal")</li> </ul>
(3):	Bypassed input:	<ul style="list-style-type: none"> <li>• LED flashes red if not acknowledged yet</li> <li>• LED OFF if acknowledged</li> <li>• no printer MGE message ("Outgoing signal")</li> </ul>

## Performance with bypasses

### 8.1.2 Bypass disabled and bypassed input active:



#### NEMS-reactions:

(1):	Bypassed input:	<ul style="list-style-type: none"> <li>• LED with continuous yellow light if acknowledged</li> <li>• no printer MKO message ("Incoming signal")</li> </ul>
(2):	Bypass:	<ul style="list-style-type: none"> <li>• LED flashes red if not acknowledged yet</li> <li>• LED off if acknowledged</li> <li>• Printer BRS message enabled ("Bypass reset")</li> </ul>
	Bypassed input:	<ul style="list-style-type: none"> <li>• LED with continuous red light if acknowledged</li> <li>• no printer MKO message ("Incoming signal")</li> </ul>
(3):	Bypassed input:	<ul style="list-style-type: none"> <li>• LED OFF if acknowledged</li> <li>• Printer MGE message ("Outgoing signal")</li> </ul>

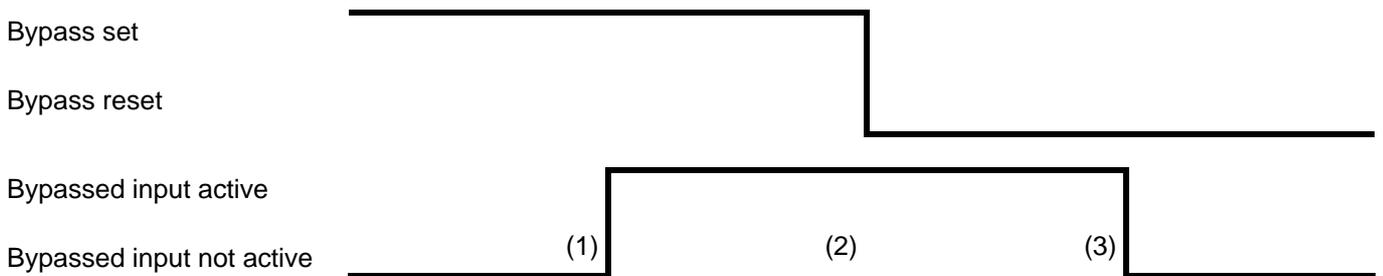
# Performance with bypasses

## 8.2 Bypasses inverted (eg burner off)



NOTE:  
In this case input bypass must be configured as process status signal!!!

### 8.2.1 Bypass enabled and bypassed input active:

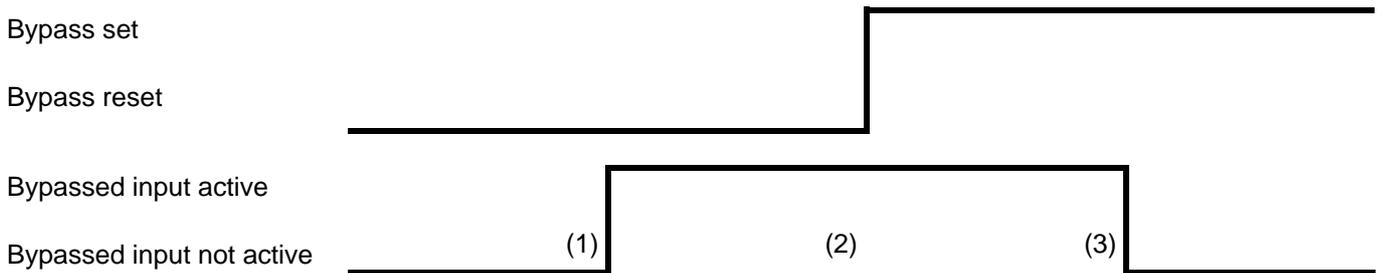


**NEMS-reactions:**

(1):	Bypass:	<ul style="list-style-type: none"> <li>LED with continuous green light (no change)</li> </ul>
	Bypassed input:	<ul style="list-style-type: none"> <li>LED flashes red,</li> <li>Printer MKO message ("Incoming signal")</li> </ul>
(2):	Bypass:	<ul style="list-style-type: none"> <li>LED OFF</li> </ul>
	Bypassed input:	<ul style="list-style-type: none"> <li>LED flashes red if not acknowledged yet</li> <li>LED with continuous yellow light if acknowledged</li> <li>no printer MGE message ("Outgoing signal")</li> </ul>
(3):	Bypassed input:	<ul style="list-style-type: none"> <li>LED flashes red if not acknowledged yet</li> <li>LED OFF if acknowledged</li> <li>no printer MGE message ("Outgoing signal")</li> </ul>

## Performance with bypasses

### 8.2.2 Bypass disabled and bypassed input active:



#### NEMS-reactions:

(1):	Bypass:	<ul style="list-style-type: none"> <li>LED OFF (no change)</li> </ul>
	Bypassed input:	<ul style="list-style-type: none"> <li>LED with continuous yellow light</li> <li>no printer MKO message ("Incoming signal")</li> </ul>
(2):	Bypass:	<ul style="list-style-type: none"> <li>LED with continuous green light (or if conf. as fault status signal. Then flashes red if not acknowledged yet or off if acknowledged)</li> <li>Printer BRS message ("Bypass reset")</li> </ul>
	Bypassed input:	<ul style="list-style-type: none"> <li>LED with continuous red light</li> <li>no printer MKO message ("Incoming signal")</li> </ul>
(3):	Bypassed input:	<ul style="list-style-type: none"> <li>LED OFF if acknowledged</li> <li>Printer MGE message ("Outgoing signal")</li> </ul>

## Setting via the front keys

### 9 Setting via the front keys

#### 9.1 Entering configuration mode

---



Hold down keys **NQ** + **EQ** simultaneously for 3 s.

- LEDs 1-16 switch to a running green light.

#### 9.2 Exiting configuration mode

---



Press keys **NQ** + **EQ** briefly simultaneously.

- Exit configuration mode and return to the normal mode.
- This key combination works on any configuration level.

#### 9.3 Restoring the factory setting

---



Hold down keys **NQ** + **EQ** + **HQ** simultaneously for 3 seconds.

- LEDs 5-12 switch to continuous yellow light.

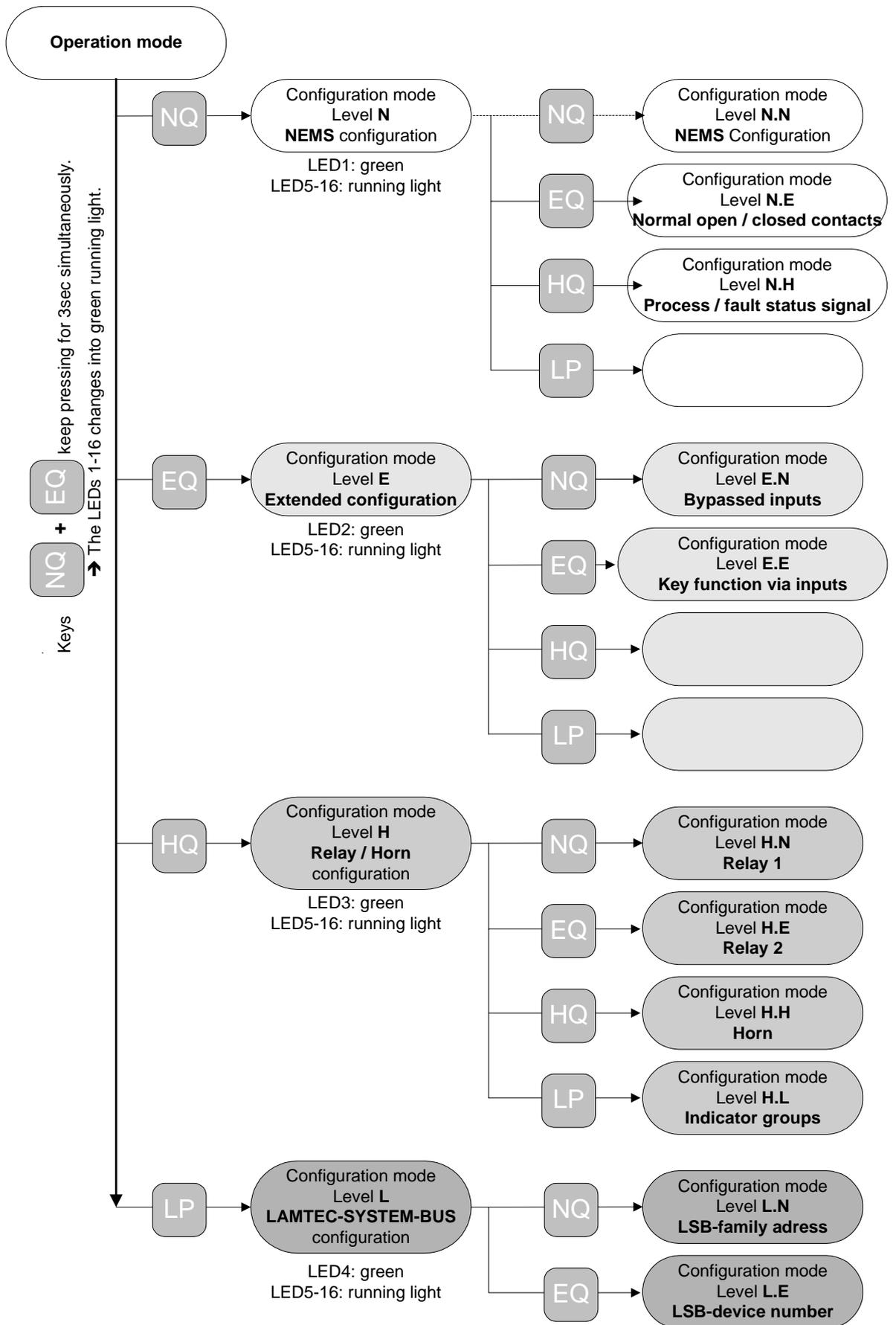
Press keys **NQ** + **EQ** briefly simultaneously.

- Factory setting is restored.
- Exit configuration mode and return to the normal mode.

***The individual factory settings are identified by a # in each case on the following pages!***

# Setting via the front keys

## 9.4 Structure - overview



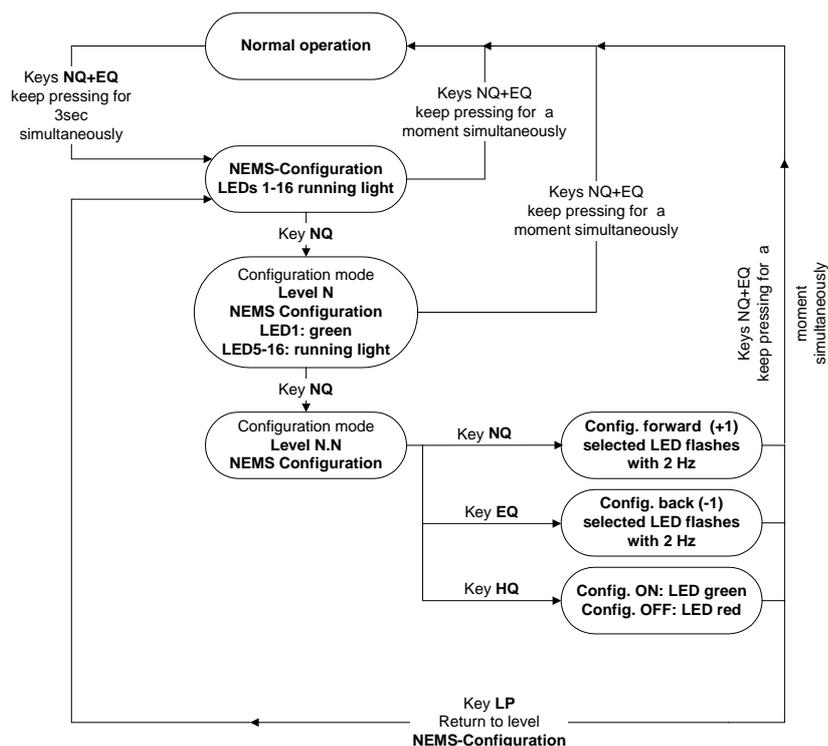
# Setting via the front keys

## 9.5 Level N.N – device functions

Hold down **NQ** + **EQ** simultaneously for 3 s, then **NQ**, then **NQ**

At this level you can configure the following settings on the NEMS:

- LED1 green: First value #
- LED2 green: New value
- LED3 green/red #: Printer ON/OFF #
- LED4 green/red #: Printer with/without # synchronisation
- LED5 green # /red: Print process status signals ON#/OFF
- LED6 green #/red: Keys and first value interlocking not limited to the family ON #/OFF
- LED7 green/red #: LED mirror function ON/OFF #  
If "ON": Set device to the same address (Level L.E) as the NEMS to be mirrored.
- LED 8 green/red #: Com. processor PROFIBUS ON/OFF #
- LED 9 green #/red: Process status signal LEDs green #/red
- LED10 green #/red: Bypassed input LEDs yellow #/OFF
- LED11 green/red #: Print 32 # or 64 characters from message texts (only with printer without synchronisation)
- LED12 green #
- LED13 green #/red: Signal acknowledgement by the display and operating terminal
- LED14 green / red #:report bypassed inputs ON / OFF#
- LED15 green / red #: LEDs of the bypassed inputs in good operating condition green / OFF #
- LED16 green/red #

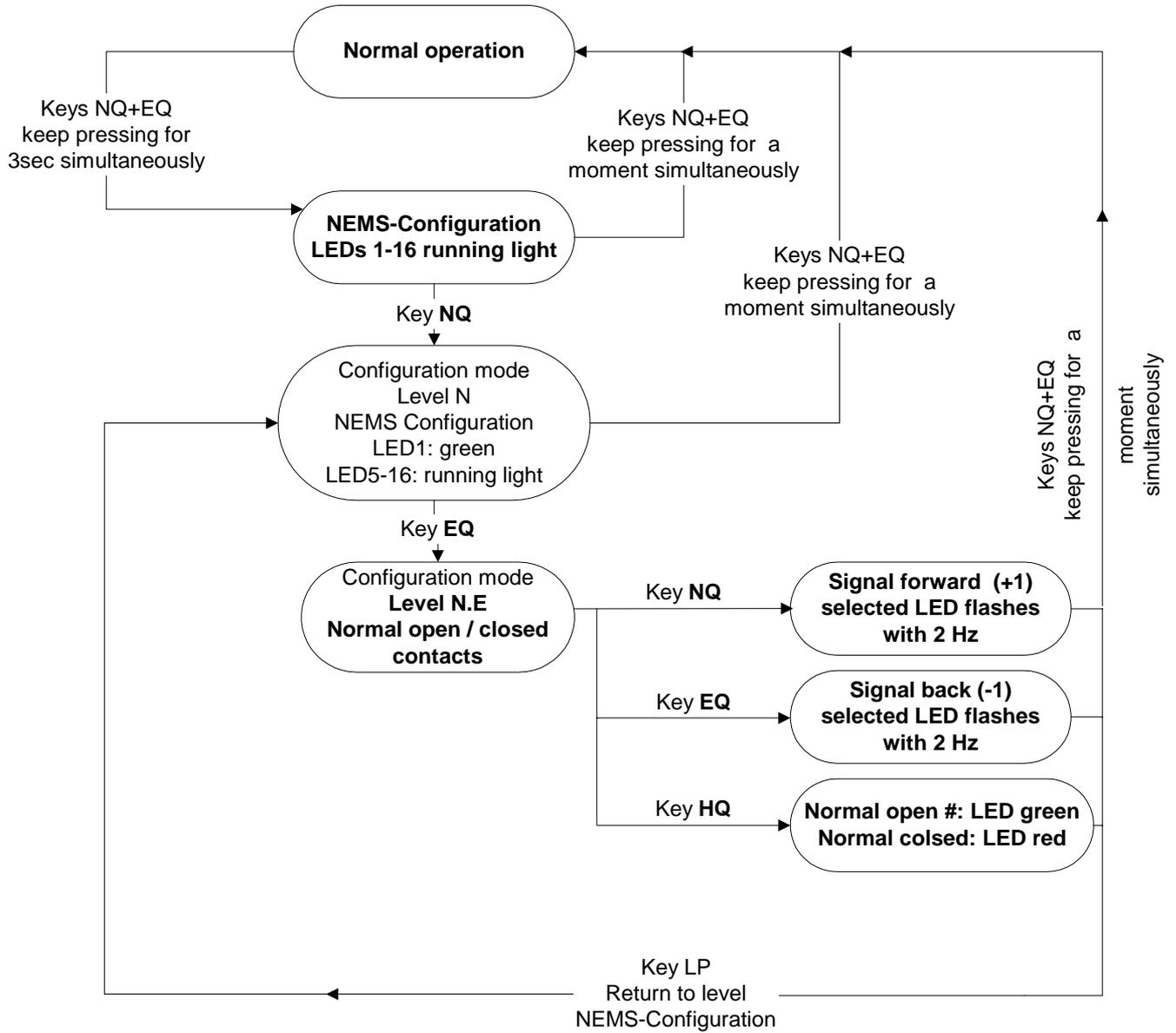


# Setting via the front keys

## 9.6 Level N.E – Normal open/closed contacts

Hold down **NQ** + **EQ** simultaneously for 3 s, then **NQ**, then **EQ**

At this level you can configure each of the 16 indicator inputs to the normal open or closed contacts principle.

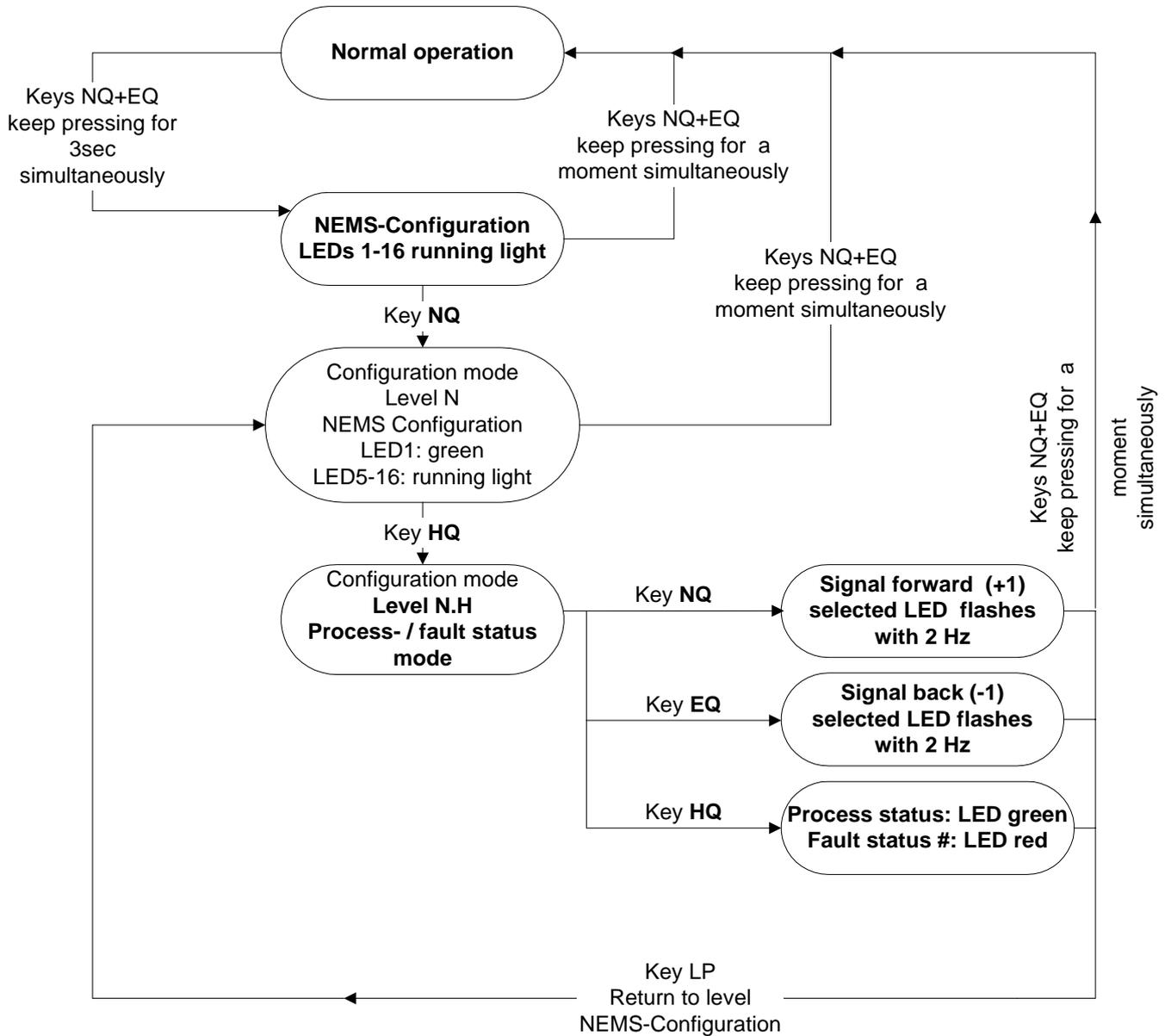


# Setting via the front keys

## 9.7 Ebene N.H – Operating/Fault mode

Hold down **NQ** + **EQ** simultaneously for 3 s, then **NQ**, then **HQ**

At this level you can configure each of the 16 inputs to process or fault indicator input.



# Setting via the front keys

## 9.8 Level E.N – Bypassed inputs

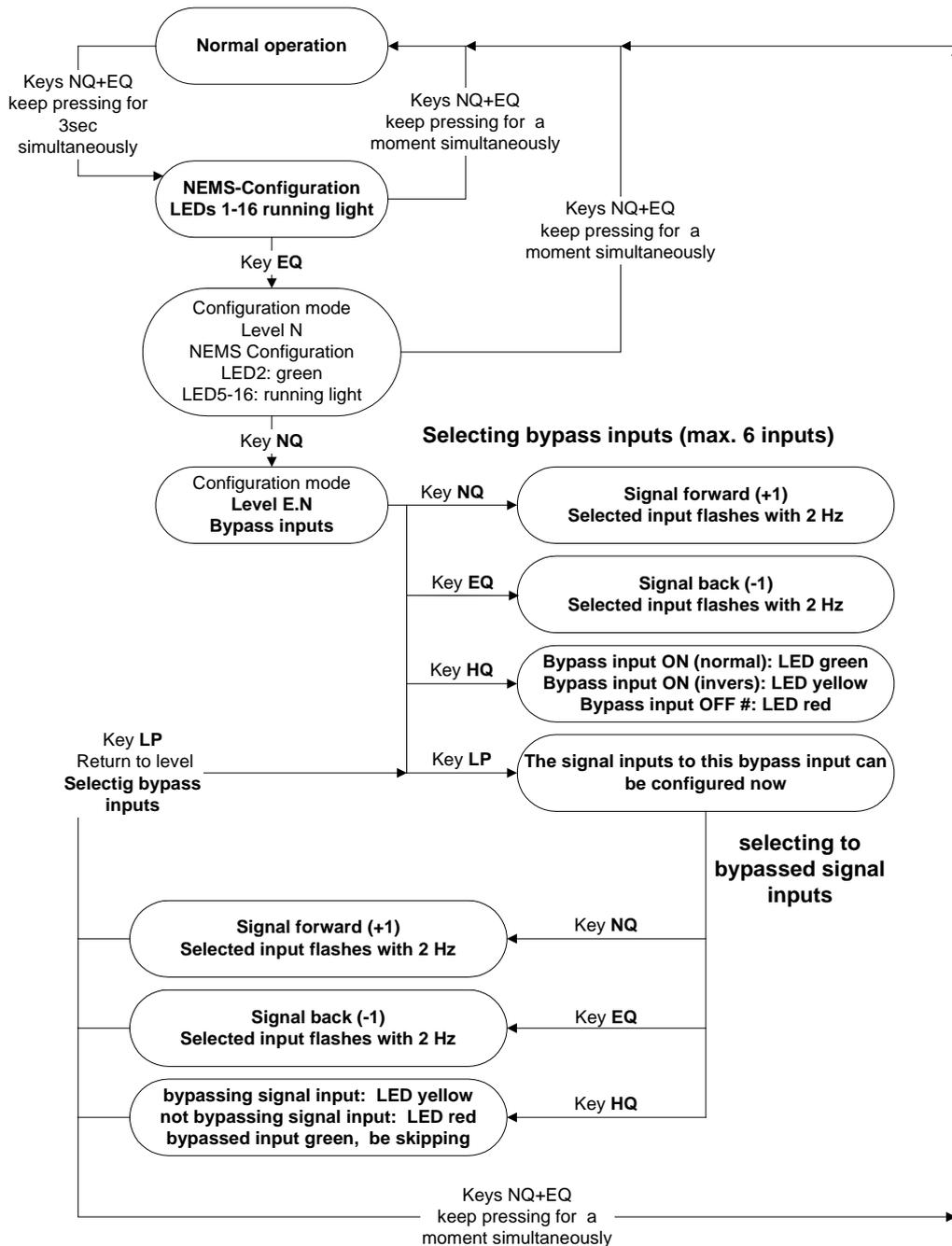
Hold down **NQ** + **EQ** simultaneously for 3 s, then **EQ**, then **NQ**

A bypass can be set in order to skip any indicator input by means of configuration. In combustion engineering, for example, during “Gas operation” the signals from the “Oil operation” safety interlock chain are irrelevant and can be bypassed.



**NOTE:**

When assigning the indicator inputs to the input bypass selected, the input bypass is always displayed by means of a green LED regardless of whether it is configured as “normal” or “inverted” in order to prevent it from being confused with the bypassed indicator inputs (LEDs yellow).



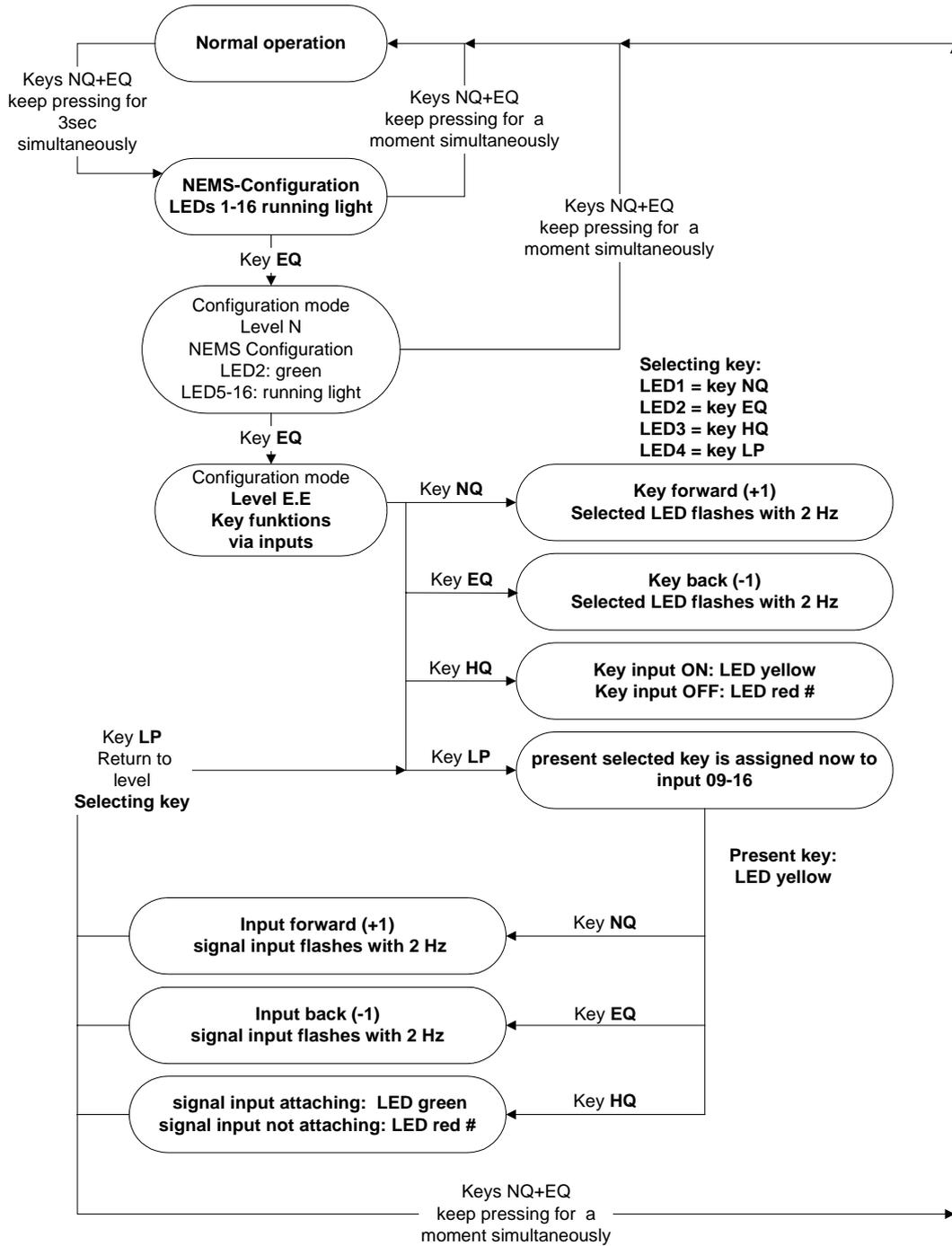
# Setting via the front keys

## 9.9 Level E.E – Keyfunctions via inputs

Hold down **NQ** + **EQ** simultaneously for 3 s, then **EQ**, then **EQ**

Indicator inputs 09-16 can be configured as key inputs, eg for external acknowledgement keys or lamp testing.

You also have the facility to connect all acknowledgement keys to one input. This will give you group acknowledgement:



# Setting via the front keys

## 9.10 Level H.N – Relay 1

Hold down **NQ** + **EQ** simultaneously for 3 s, then **HQ** then **NQ**

The actual setting is displayed in binary code on the LEDs.

- „0“: Relay 1 OFF
- „1“: Local group 1 statically (OR-logic) #  
incoming signal from indicator group 1 – relay picks up,  
outgoing signal from indicator group 1 – relay drops off,  
no reaction to new incoming signals.
- „2“: Local group 1 impulse (OR-logic)  
Incoming signal – relay ON for 0,5sec.  
Relay ON for 1sec. in the event of new incoming signals.
- „3“: Local group 1 acknowledgable (OR-logic)  
incoming signal from indicator group – relay picks up,  
relay only drops off if the signal is acknowledged
- „4“: Local group 2 statically (OR-logic)
- „5“: Local group 2 dynamically (OR-logic)
- „6“: Local group 2 acknowledgable (OR-logic)
- „7“: Horn external global

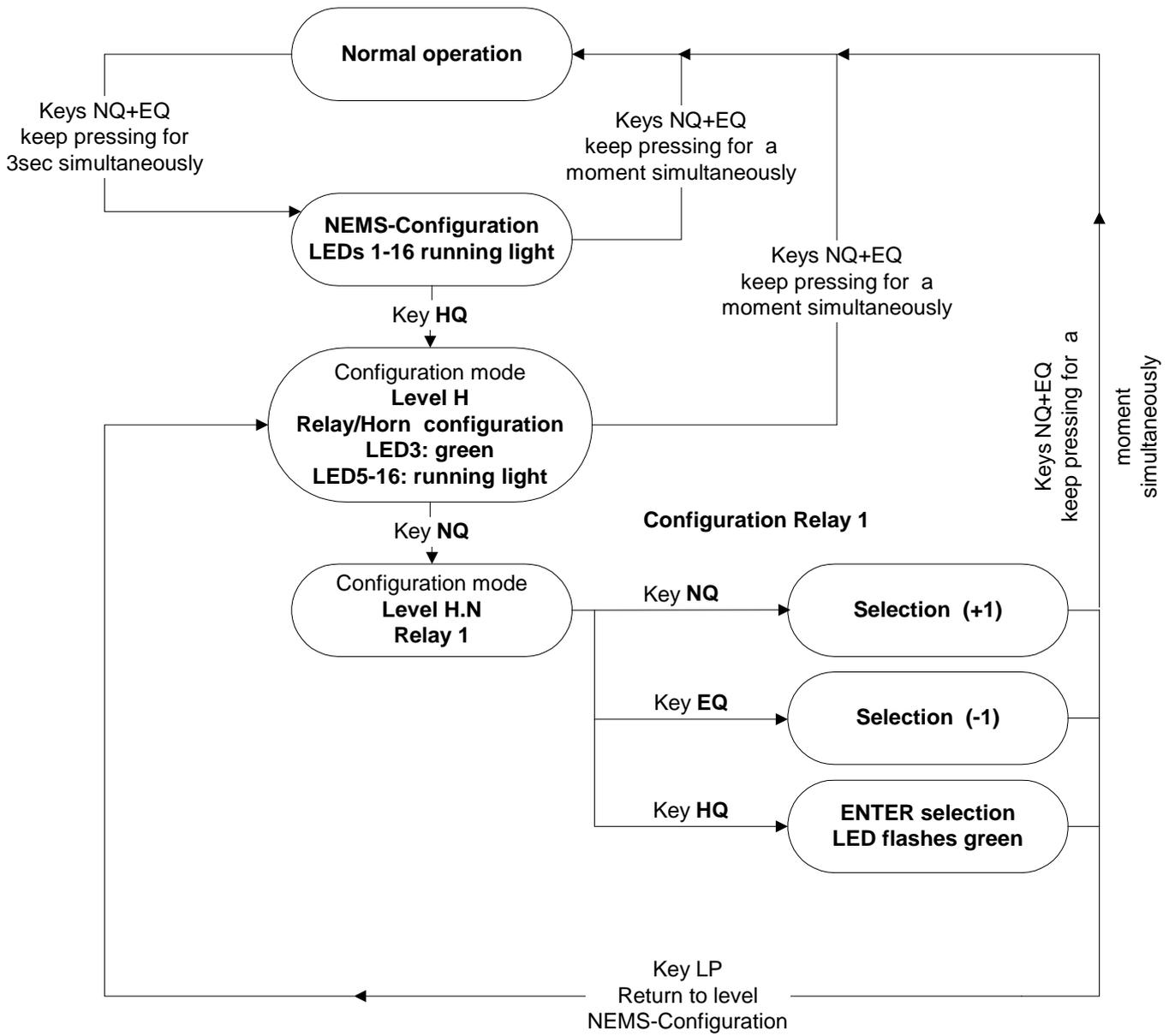


**NOTE:**

All signals which are set to “Horn external“ or “Horn internal & external“ are signalled by the “Horn external global“.

- „8“: Horn external lokal
- „9“: Watchdog(equipment fault)
- „10“: Printer fault
- „11“: Local group 1 statically (AND-logic)
- „12“: Local group 1 impulse (AND-logic)
- „13“: Local group 1 acknowledgable (AND-logic)
- „14“: Local group 2 statically (AND-logic)
- „15“: Local group 2 dynamically (AND-logic)
- „16“: Local group 2 acknowledgable (AND-logic)
- „17“: Local group 1 dynamically (OR-FUNKTION)  
Incoming signal – relay ON, outgoing signal – relay OFF.  
Relay ON for 1sec. in the event of new incoming signals.
- „18“: Local group 2 dynamically (AND-logic)
- „19“: LSB (PROFIBUS FMS/VMS/ETAMATIC)

# Setting via the front keys



## Level H.N – Relay 1

## Setting via the front keys

### 9.11 Level H.E – Relay 2

Hold down **NQ** + **EQ** simultaneously for 3 s, then **HQ**, then **EQ**

The actual setting is displayed in binary code on the LEDs.

- „0“: Relay 2 OFF
- „1“: Local group 1 statically (OR-logic) #  
incoming signal from indicator group 1 – relay picks up,  
outgoing signal from indicator group 1 – relay drops off,  
no reaction to new incoming signals.
- „2“: Local group 1 impulse (OR-logic)  
Incoming signal – relay ON for 0,5sec.  
Relay ON for 1sec. in the event of new incoming signals.
- „3“: Local group 1 acknowledgable (OR-logic)  
incoming signal from indicator group – relay picks up,  
relay only drops off if the signal is acknowledged
- „4“: Local group 2 statically (OR-logic)
- „5“: Local group 2 dynamice (OR-logic)
- „6“: Local group 2 acknowledgable (OR-logic)
- „7“: Horn external global

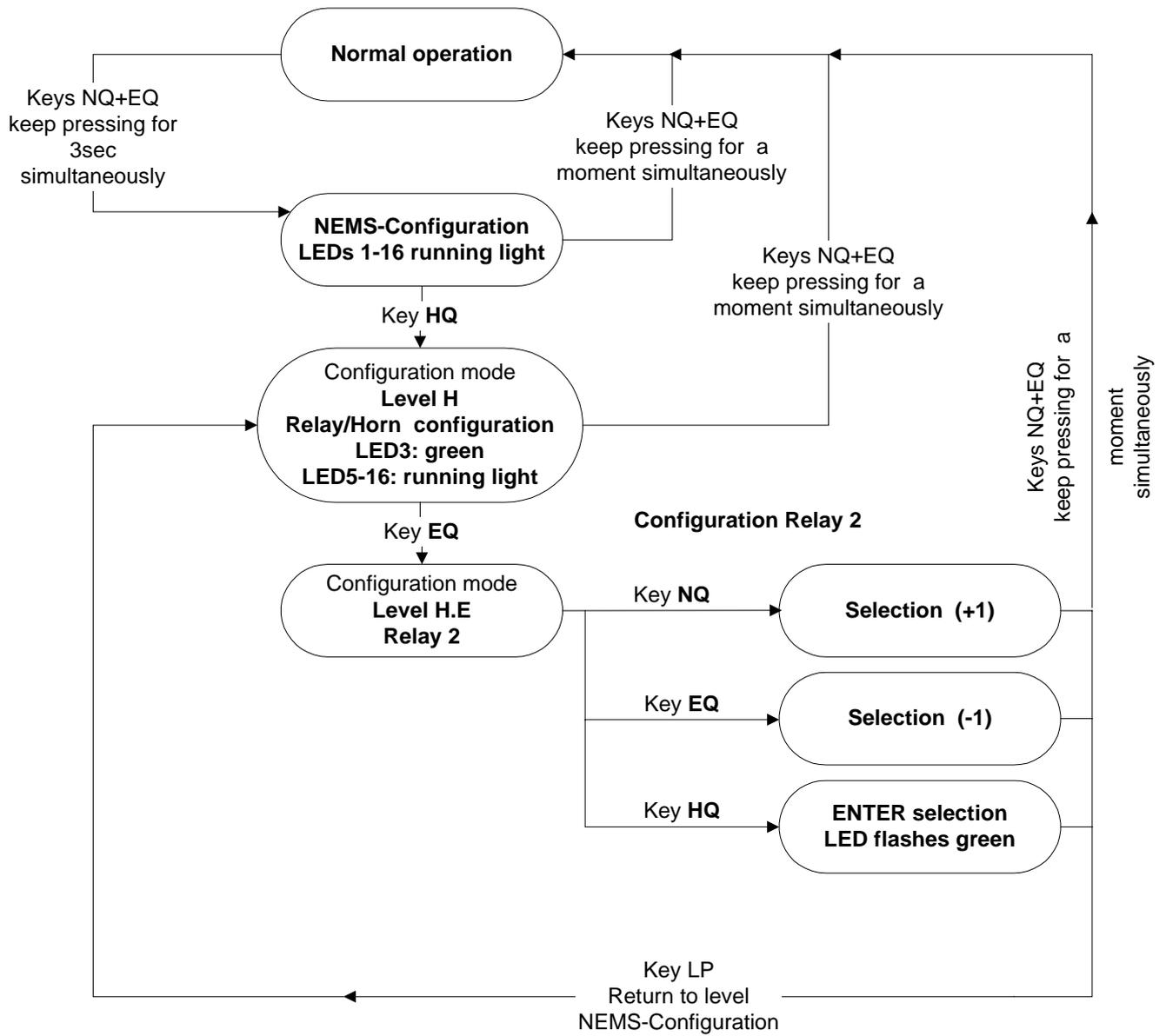


**NOTE:**

All signals which are set to “Horn external“ or “Horn internal & external“ are signalled by the “Horn external global“.

- „8“: Horn external lokal
- „9“: Watchdog (equipment fault)
- „10“: Printer fault
- „11“: Local group 1 statically (AND-logic)
- „12“: Local group 1 impulse (AND-logic)
- „13“: Local group 1 acknowledgable (AND-logic)
- „14“: Local group 2 statically (AND-logic)
- „15“: Local group 2 dynamically (AND-logic)
- „16“: Local group 2 acknowledgable (AND-logic)
- „17“: Local group 1 dynamically (OR-logic)  
Incoming signal – relay ON, outgoing signal – relay OFF.  
Relay ON for 1sec. in the event of new incoming signals.
- „18“: Local group 2 dynamically (AND-logic)
- „19“: LSB (PROFIBUS FMS/VMS/ETAMATIC)

# Setting via the front keys



## Level H.E – Relay 2

# Setting via the front keys

## 9.12 Level H.H - Horn

Hold down **NQ** + **EQ** simultaneously for 3 s, then **HQ**, then **HQ**

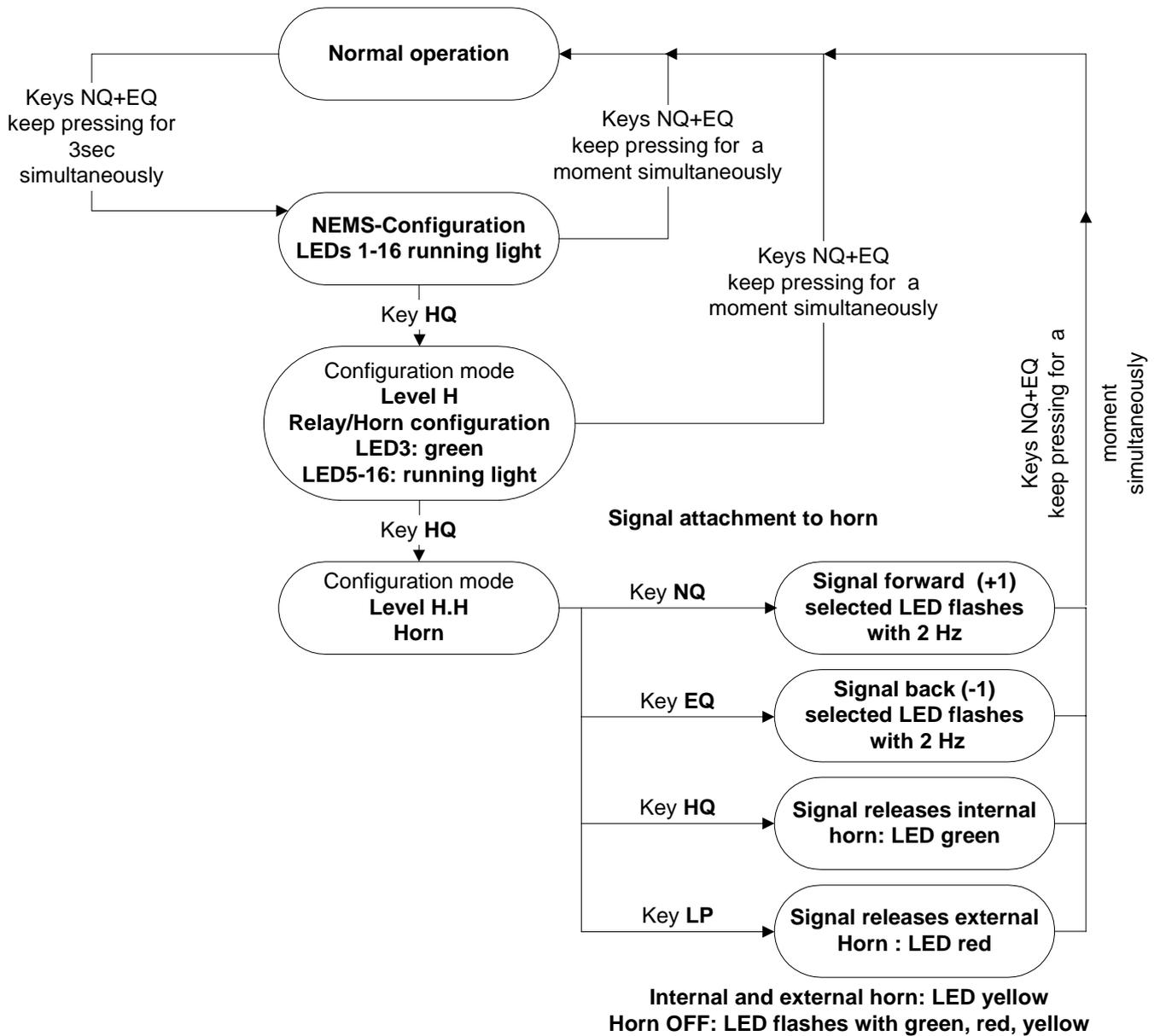
At this level you can set the horn function to each of the 16 indicator inputs.

Signal triggers internal horn (LED green)

Signal triggers internal and external horn # (LED yellow)

Signal triggers external horn (LED red)

Signal does not trigger any horn (LED flashes in sequence green/red/yellow)

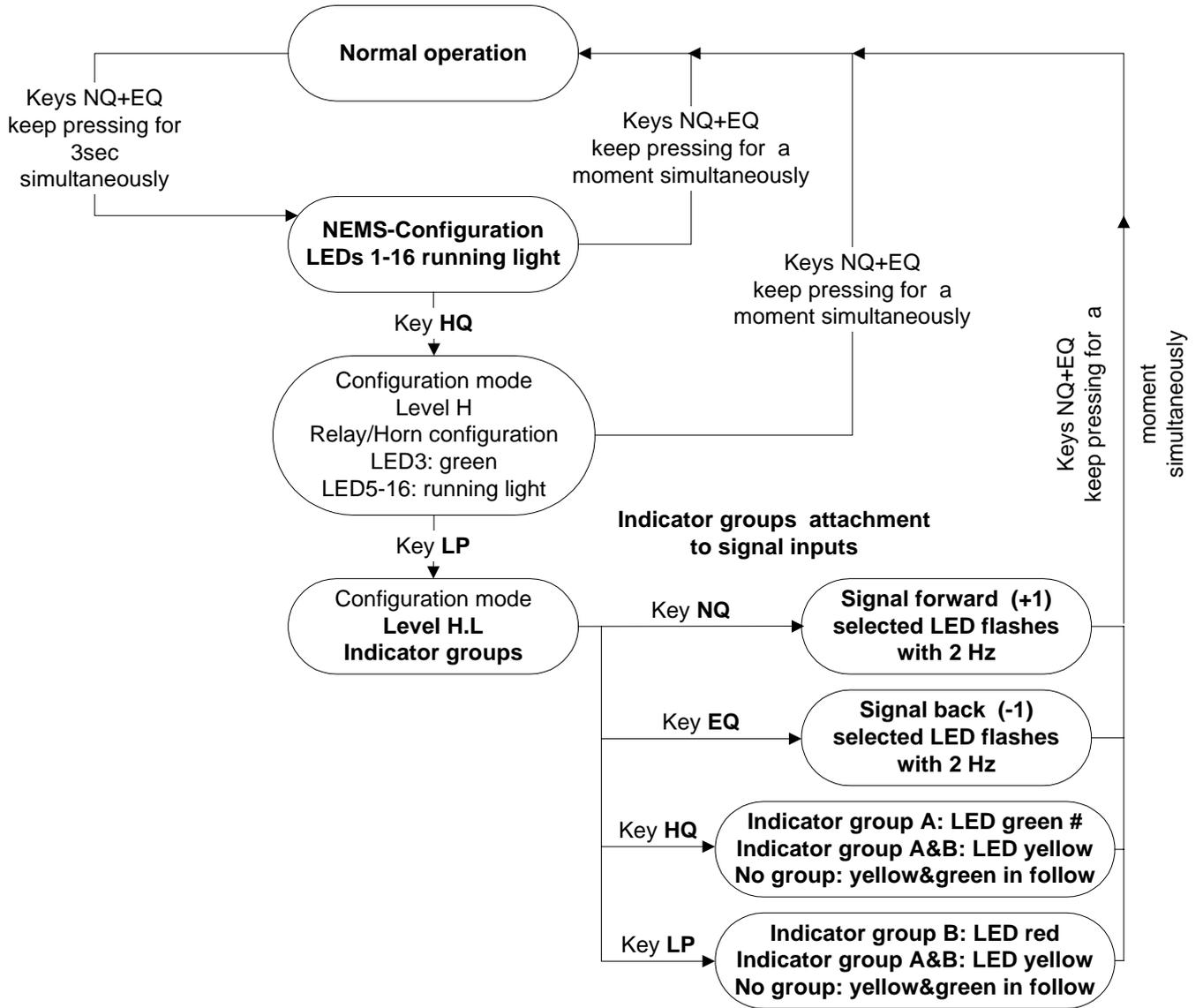


# Setting via the front keys

## 9.13 Level H.L – Local indicator groups

Hold down **NQ** + **EQ** simultaneously for 3 s, then **HQ**, then **LP**

At this level you can set local indicator group 1 and/or 1 to each of the 16 indicator inputs.



# Setting via the front keys

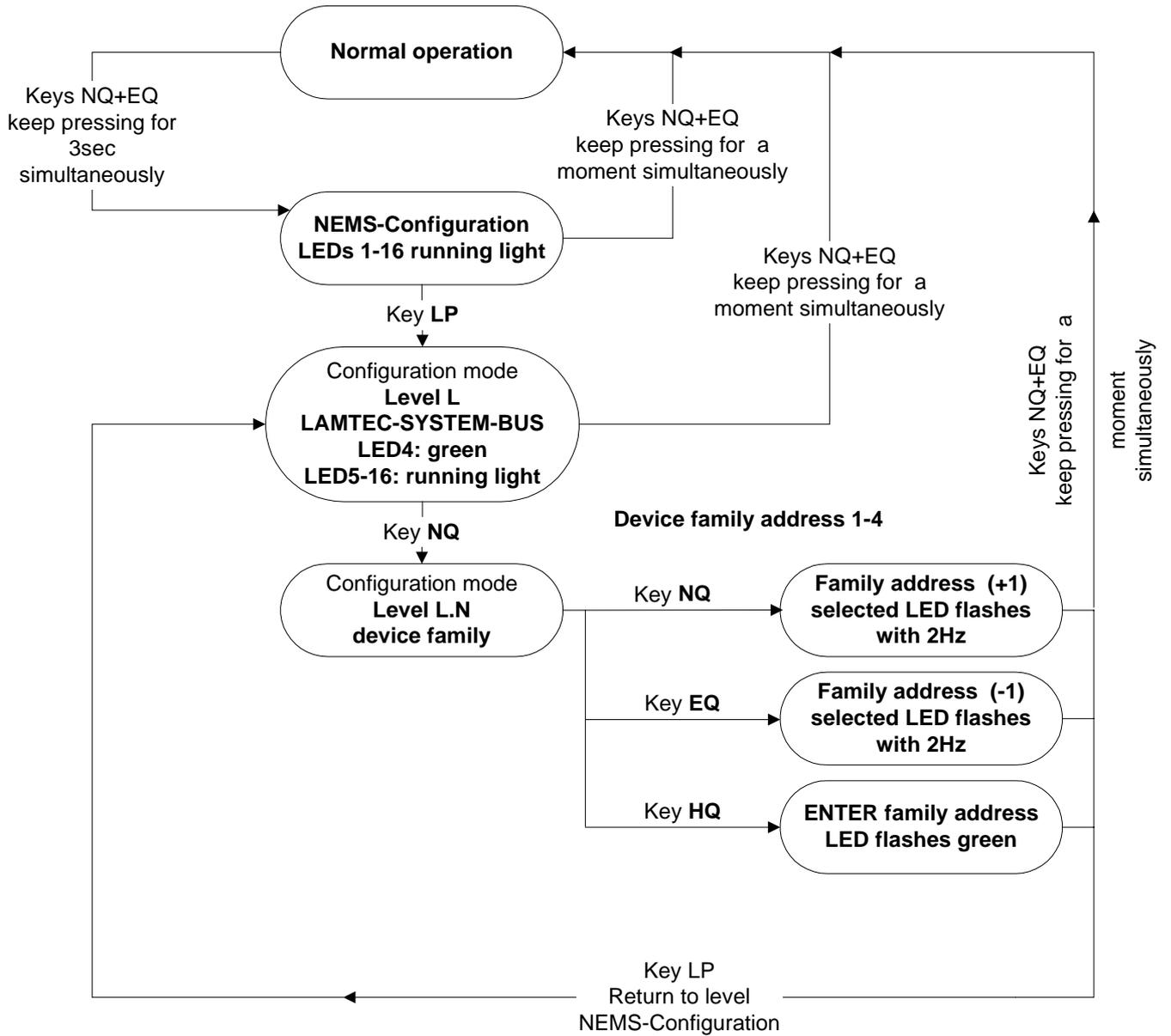
## 9.14 Level L.N – LAMTEC SYSTEM BUS – device family

Hold down **NQ** + **EQ** simultaneously for 3 s, then **LP**, then **NQ**

At this level you can set the device families (1-4).



**NOTE:**  
There are 16 device addresses available for each device family.  
(default = family 1).



# Setting via the front keys

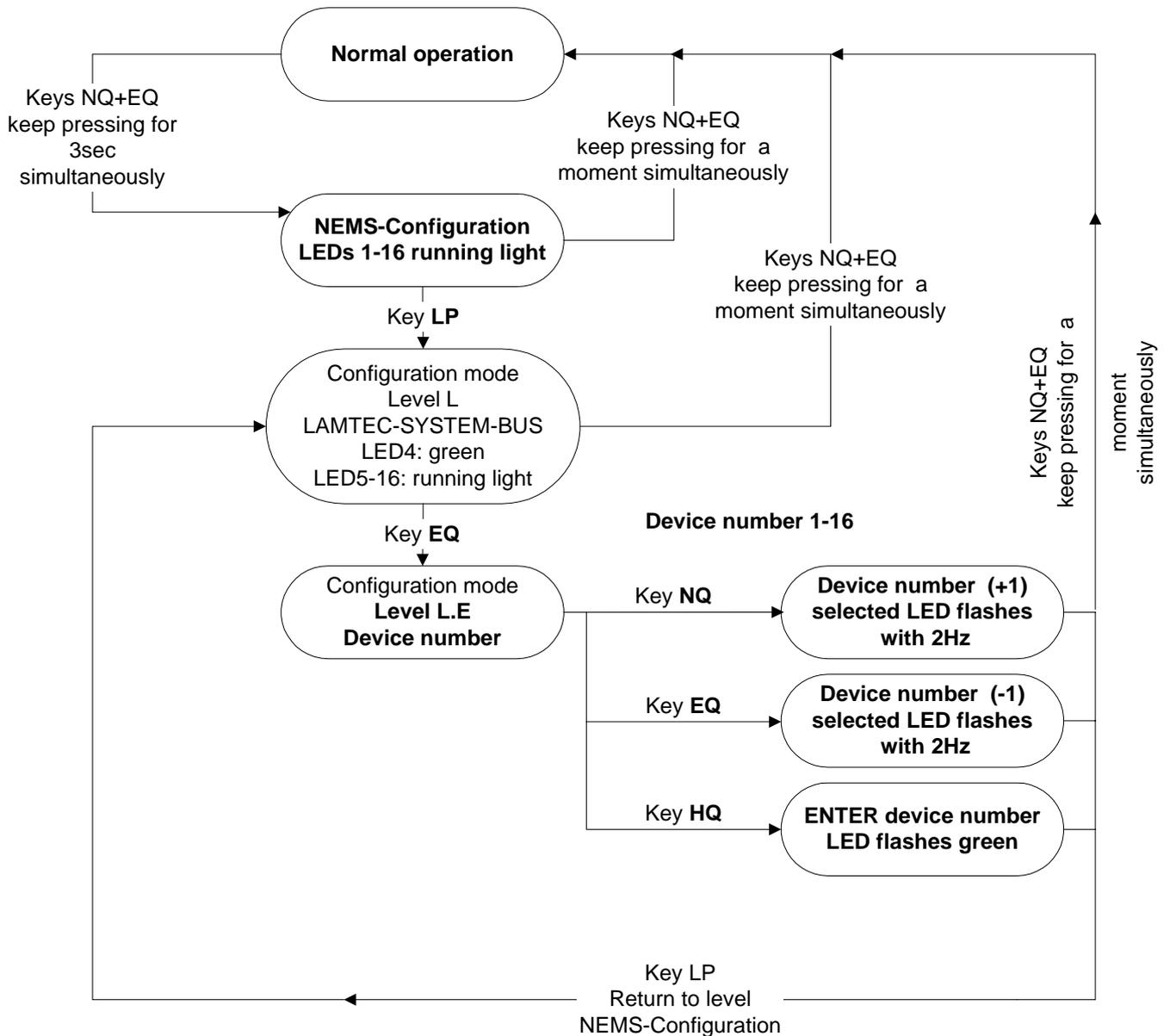
## 9.15 Level L.E – LAMTEC SYSTEM BUS – device addresses

Hold down **NQ** + **EQ** simultaneously for 3 s, then **LP**, then **EQ**

At this level you can set the device address (1-16).



**NOTE:**  
 If an equipment address is allocated twice in an indicator system, the NEMS devices in question will switch to configuration mode (operating light LEDs 1-16). You can then change the duplicated equipment address using the key sequence LP → EQ.  
 (default = address 1)



## Configuration software

### 10 Configuration software

Software for entering indicator texts and user-friendly configuration of the NEMS.

**For individual devices:**

For connection to an existing RS232 interface

Product no.: 680R1053

For connection to the LAMTEC SYSTEM BUS via USB converter

Product no.: 680R1056

**For several devices (indicator system):**

For connection to the LAMTEC SYSTEM BUS via USB converter

Product no.: 680R1052

#### 10.1 Installation



**NOTE to NEMS-Config!**

If you acquired the CAN version of NEMS Config, it is first necessary to install the device driver of the provided USB/CAN module.

Please follow the provided installation guidance. If this driver is not installed, NEMS Config starts in the RS232-Mode.

NEMS Config is fully executable on the following Windows versions:

Windows 98, ME, 2000 also XP. By Windows 95 and NT4.0 (ServicePack 6 or higher) supports NEMS Config only RS232-Mode, because Windows 95 and NT4.0 doesn't support USB, which would be necessary for the CAN-operation. Note that you need for the installation under Windows NT4.0, 2000 and XP of administrator rights.

Start the file „NEMS\_Config\_X.Y.Z.exe“ to install the software. Choose your language and follow the instructions on the screen. The required data-files will be stored automatically in this directory:

„C:\Programme\Lamtec\NEMS config X.Y.Z“.

The program can be started by mouse double click from the Desktop.



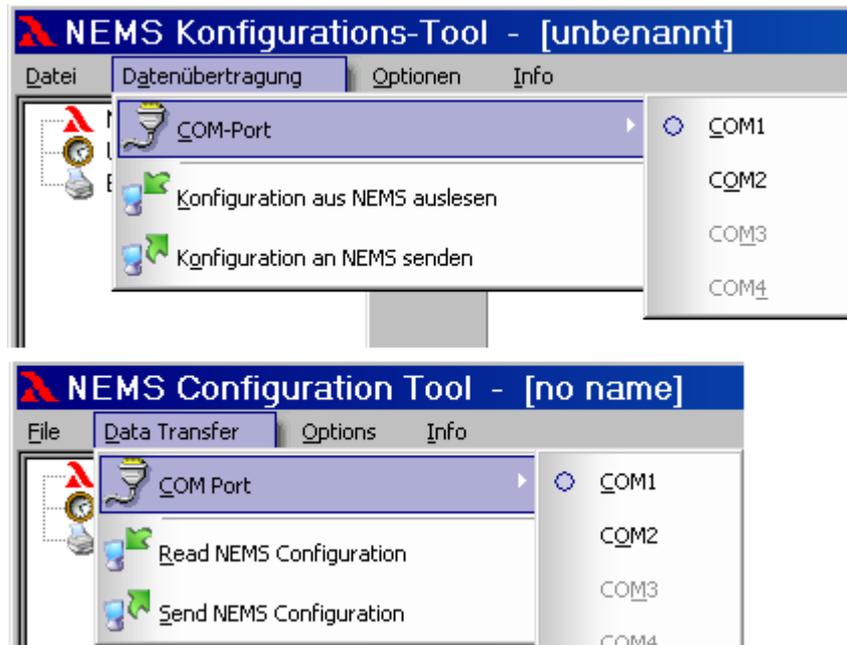
## Configuration software

### 10.1.1 Configuration COM-Port

---

To communicate with NEMS prepare a free serial port.

For its configuration click on the menu „Data Transfer->COM Port“.



### 10.2 To interface the NEMS via RS232

---

Attention: Connect and disconnect the RS 232 cable only when NEMS is switched OFF from line power!

When the RS 232 cable is plugged on to NEMS serial port, then the configuration software is able

### 10.3 To interface the NEMS via USB - LAMTEC SYSTEM BUS

---

Connect your USB/CAN-Adapter with your USB-Port at the PC. A new component will be recognized and missing drivers will be installed automatically.

Wiring diagram see 22.4.

Attach now the CAN side to the clamps of the first NEMS (term.23 CAN-low, term.25 CAN-high). Make sure that the terminal resistance for the LAMTEC SYSTEM BUS at the last NEMS and at the plug of the USB CAN adapter is set.

In order to work with the CAN version, you must enter still the release code:

Start the configuration software

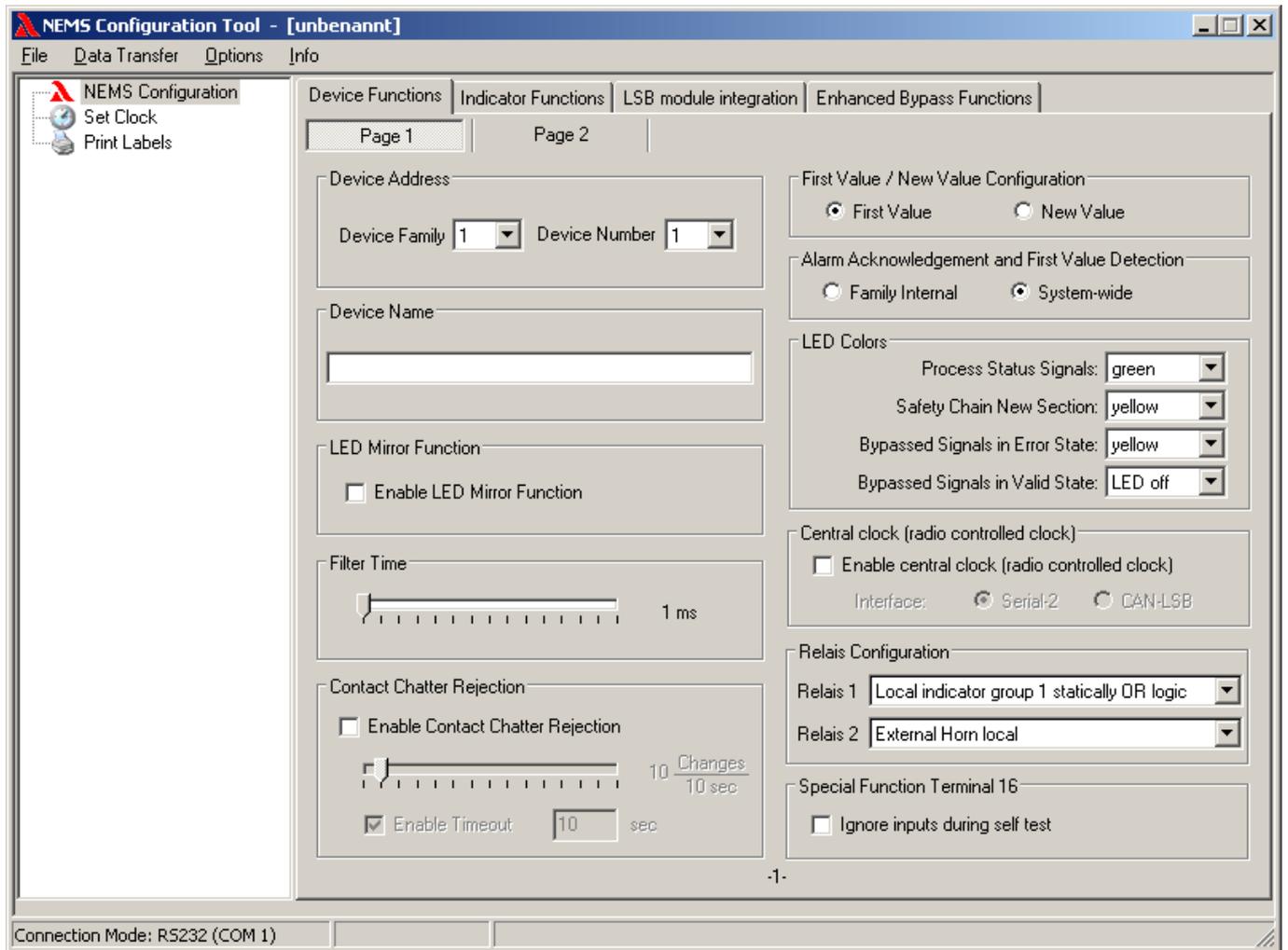
„Options → CAN-Version release“ and enter your Code.

After the next restart of the configuration software you have then access to all NEMS in the system.

Switch ON the NEMS now.

# Configuration software

## 10.4 Device functions



### 10.4.1 Device address (Page 1)

At this level you can set the device family (1-4) (default=1)



NOTE:

There are 16 device addresses available for each device family.

and the device number (1-16) (default=1).



NOTE:

If an equipment address is allocated twice in an indicator system, the NEMS devices in question will switch to configuration mode (operating light LEDs 1-16). You can then change the duplicated equipment address using the key sequence LP → EQ

With single devices is this function without meaning.

### 10.4.2 LED Mirror function (Page 1)

For mirroring the LEDs on slave NEMS devices (NEMS without indicator inputs, just LED display and key operation).

If "ON": Set device to the same LSB address (Level L.E) as the NEMS to be mirrored.

# Configuration software

## 10.4.3 Filter time (Page 1)

---

Setting the filter time (delay time) of the indicator inputs. This filter time relates to all inputs.

- Filter time from 1...127ms

## 10.4.4 Contact chatter rejection (Page 1)

---

Setting of contact chatter rejection (number of changes in level within 10 s) of the indicator inputs. This contact chatter rejection relates to all inputs.

## 10.4.5 First value / new value configuration (Page 1)

---

Selection if the NEMS indicates the first message separately.

- First value → LED red with flash frequency 2Hz
- New value → LED red with flash frequency 1Hz

## 10.4.6 Acknowledgement via front keys and first value interlocking (Page 1)

---

The acknowledgement of fault signals via the keys, as well as the first value interlocking has either system-spreading validity, or are limited to the own device family.

## 10.4.7 Colours of the LEDs (Page 1)

---

### **Process status signal green / red:**

Process status signals can be signaled alternatively with green steady light or red steady light

### **Safety interlock chains new section yellow/red/green:**

If a safety interlock chain was released, then a again recognized isolating point can be signaled alternatively with yellow steady light, or with red steady light (by configuration as fault signal) and/or green steady light (by configuration as process status signal).

### **Bypassed signals in ERROR state yellow/OFF:**

If a bypass is enable, then the mode of this input can be signaled alternatively with yellow steady light, or without a light (LED OFF).

### **Bypassed signals in valid state (without faults) green/OFF:**

If a bypass is disable, then the mode of this input can be signaled alternatively with green steady light, or without a light (LED OFF).

## 10.4.8 Central clock (radio controlled clock) (Page 1)

---

If you have a radio controlled clock in the system, this option must be set to „enable“.

## Configuration software

### 10.4.9 Relay configuration (Page 1)

---

Settings for relay 1 and relay 2

- Relay OFF
- Local indicator group 1 or 2 statically (OR-logic)  
incoming signal from indicator group 1 or 2 – relay ON,  
outgoing signal from indicator group 1 or 2 – relay OFF,  
no reaction to new incoming signals.
- Local indicator group 1 or 2 statically (AND-logic)  
All 16 incoming signal from indicator group 1 or 2 – relay ON,  
outgoing signal from indicator group 1 or 2 – relay OFF,
- Local indicator group 1 or 2 impulse (OR-logic)  
incoming signal from indicator group 1 or 2 – relay ON for 0,5sec.  
Relay ON for 1sec. in the event of new incoming signals.
- Local indicator group 1 or 2 impulse (AND-logic)  
All 16 incoming signal from indicator group 1 or 2 – relay ON for 0,5sec.
- Local indicator group 1 or 2 acknowledgable (OR-logic)  
incoming signal from indicator group 1 or 2 – relay ON,  
relay only OFF if the signal is acknowledged
- Local indicator group 1 or 2 acknowledgable (AND-logic)  
All 16 incoming signal from indicator group 1 or 2 – relay ON  
relay only OFF if the signal is acknowledged
- Local indicator group 1 or 2 dynamically (OR-logic)  
incoming signal from indicator group 1 or 2 – relay ON,  
relay OFF off for 0.5 s in the event of new incoming signals.  
outgoing signal from indicator group 1 or 2 – relay OFF
- HORN external global  
HORN group contact for a whole system.



**NOTE:**

All signals which are set to "Horn external" or "Horn internal & external" are signalled by the "Horn external global".

If signals are set to "Horn off" or "Horn internal", then they will not be signalled by the "Horn external global".

The horn acknowledgement always operates all the NEMS devices in the system.

- HORN external lokal  
HORN group contact for a single device.
- WATCHDOG-function  
Indication of a fault in the device.
- Printer fault

LSB (PROFIBUS)  
be controlled via the PROFIBUS FMS/VMS/ETAMATIC.

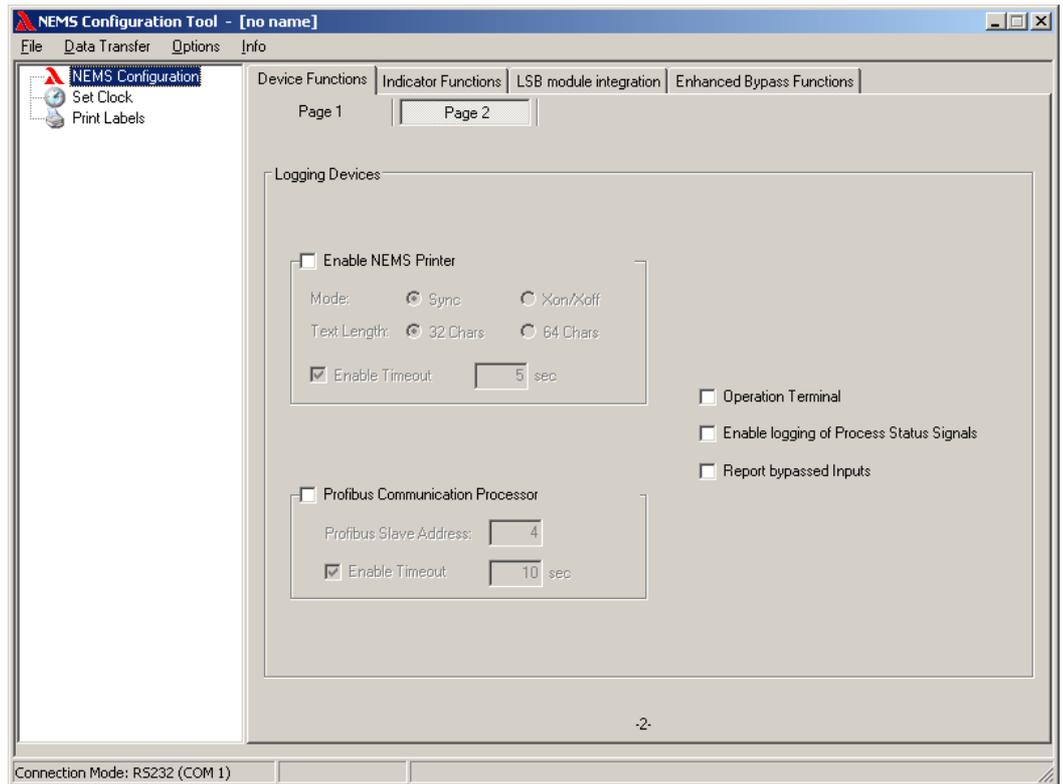
Relays can

### 10.4.10 Special function terminal 16 (Page 1)

---

With safety-oriented control systems, during the self-testing of the indicator loop inputs 1-15 are ignored for 5 ms If "ON": set input 16 to normal closed contacts (Level N.E) and process status signal (Level N.H).

## Configuration software



### 10.4.11 Enable NEMS Printer (Page 2)

For printing out incoming and outgoing fault and process status signals in chronological order. Timing accuracy of the time stamps: typ. + 1 ms .... + 5 ms. For connection to the RS232 interface of the NEMS. Activate this option, if the NEMS has a printer, which is directly attached at the NEMS master.

### 10.4.12 PROFIBUS communication processor (Page 2)

The NEMS signals can be converted to a PROFIBUS protocol via a communications processor connected to the LAMTEC SYSTEM BUS. Activate this option, if the NEMS has a communications processor with PROFIBUS (also in connection with PROFIBUS FMS/VMS/ETAMATIC).

### 10.4.13 Operation terminal (Page 2)

For displaying incoming and outgoing fault and process status signals in chronological order. Timing accuracy of the time stamps: typ. + 1 ms ... + 5 ms. For configuring, operating and displaying the NEMS devices. To be connected via the NEMS LAMTEC SYSTEM BUS. Activate this option, if the NEMS has to be connected to this terminal.

### 10.4.14 Enable logging of process status signals (Page 2)

Activate this option, if also process status signals are to be printed (also with delivery to the PROFIBUS).

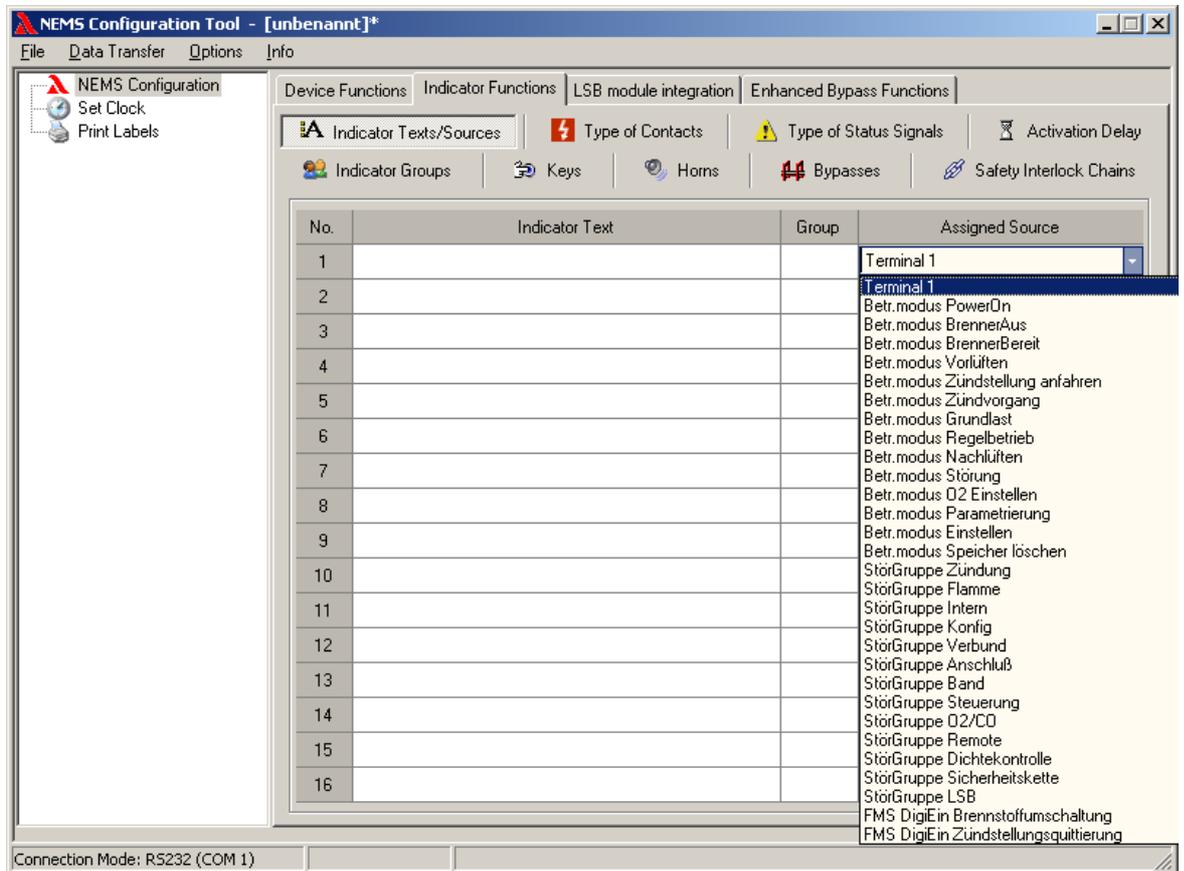
### 10.4.15 Report bypassed inputs (Page 2)

Activate this option, if also bypassed inputs are to be reported (also with delivery to the PROFIBUS).

# Configuration software

## 10.5 Indicator functions

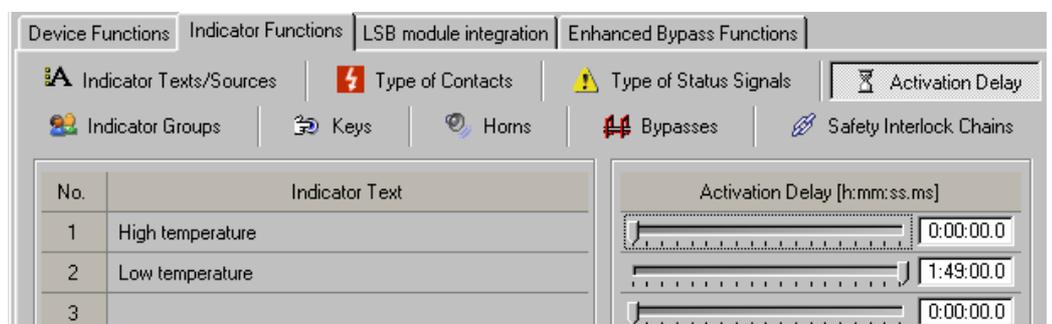
### 10.5.1 Indicator texts / sources



- For entering indicator texts.
- For entering global indicator groups (A...Z), (output control via digital output module), (locator GG at the printer - chapter 17.1.4)
- For selection of the source of the indicator function.

The selection of the source can be either the associated clamp input, or however a LSB message over the LAMTEC SYSTEM BUS.

### 10.5.2 Aktivation Delay

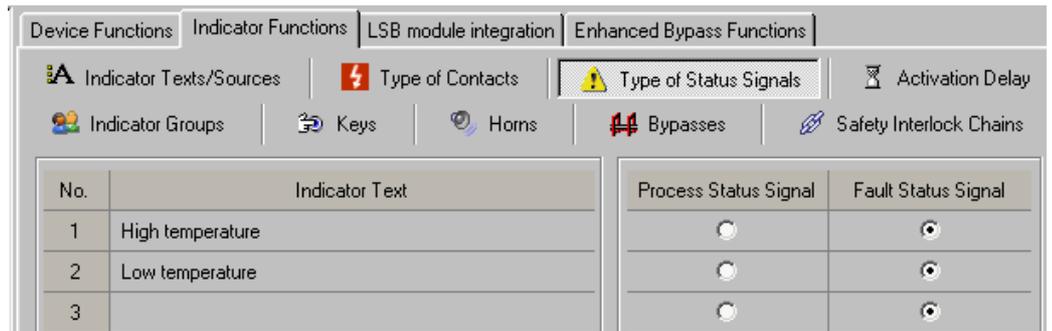


Selection for each input

- Delay time for each input from 0 .... 1h:49min:00sec:0ms
- Colour of LED yellow, for incoming signals using the delay time.  
See also chapter 8.1 Bypasses normal / LED not inverted.

# Configuration software

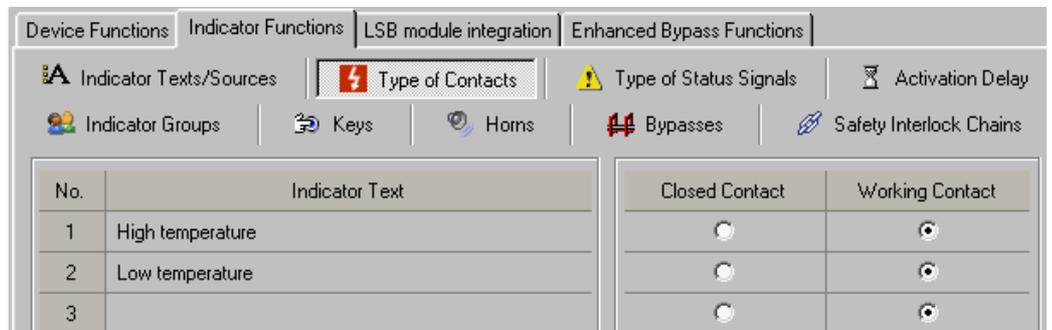
## 10.5.3 Type of status signal



Selection for each input

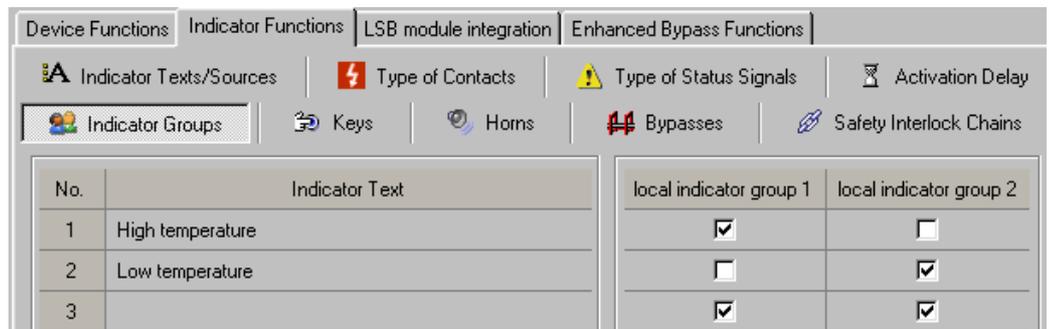
- Fault status signal: LED flashes as first value or new value
- Process status signal: LED only (ON/OFF)

## 10.5.4 Type of contacts



- Selection for each input
- Closed contacts (normal closed): contactor of the input in normal mode (without faults) closed.
- Working contacts (normal open): contactor of the input in normal mode (without faults) open.

## 10.5.5 Local indicator groups



Selection if an input is to be assigned to local indicator group 1 and/or 2.

- Output via relay 1 and/or relay 2.

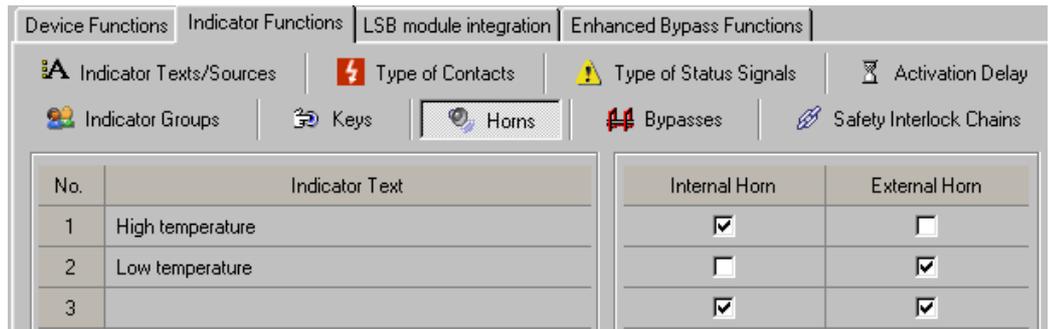


**NOTE:**

The indicator group 1 and 2 refer only in each case locally, separately for each NEMS In opposite to the global indicator groups A...Z via the LSB modules.

# Configuration software

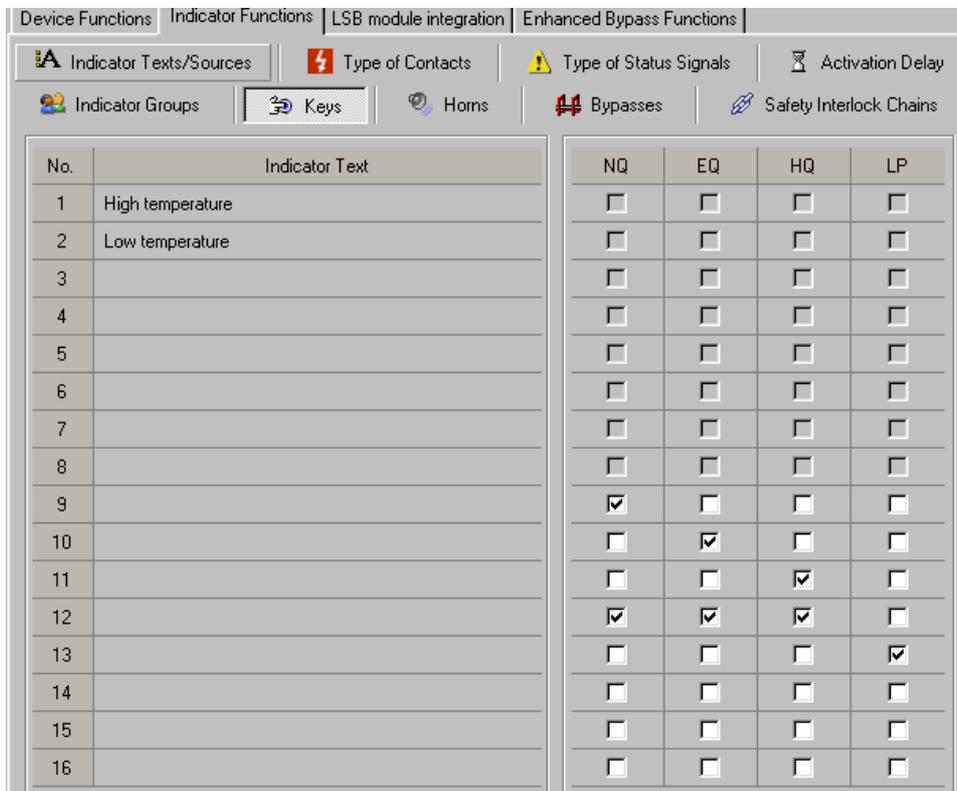
## 10.5.6 Horn



Selection if an input is to be assigned only to internal horn and/or to external (relay) horn or OFF.

- Output via internal horn or via relay 1 and/or relay 2.

## 10.5.7 Acknowledgement via external keys



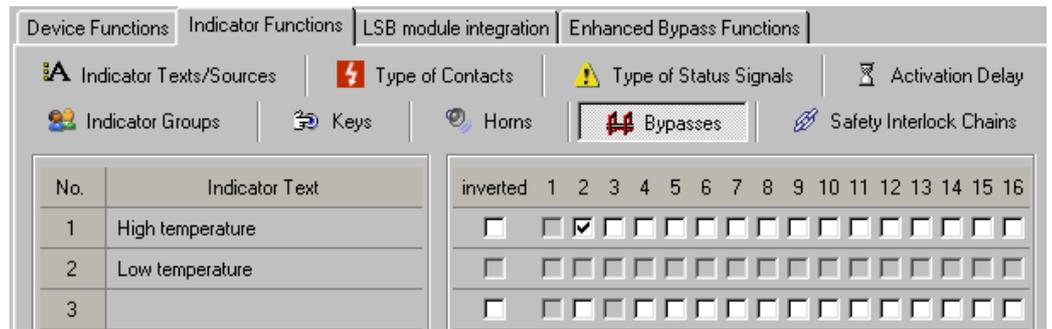
Selection, which input is to be used for external acknowledgement keys.

- Starting from input 9...16.
- Also collecting acknowledgement possible

Further acknowledgement possibilities see also LSB module connection?.

# Configuration software

## 10.5.8 Bypasses

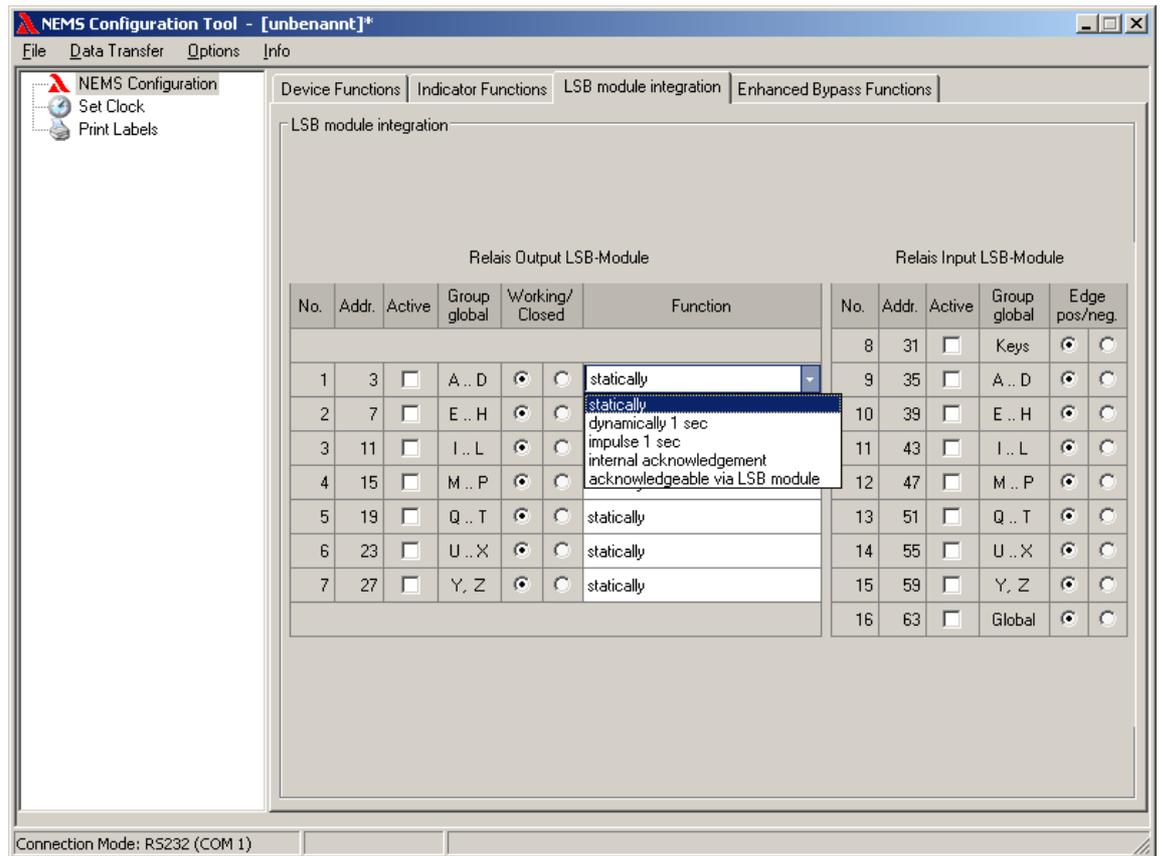


Indicator inputs can be bypassed by appropriate selection.

- For Example: By activation of input 1 input 2 is bypassed
- See also chapter 8 „Performance with bypasses“.

# Configuration software

## 10.6 LSB-Module connection



Assignment of the digital output modules to indicator groups A...Z and to the function.

- Working contacts (normally open):  
The output contacts of the moduls are in normal mode (without faults) open.
- Closed contacts (normally closed):  
The output contacts of the moduls are in normal mode (without faults) closed.
- Static:  
Incoming signal – output contact ON, outgoing signal – contact OFF.  
No reaction to new incoming signals.
- Dynamic 1sec:  
Incoming signal – output contact ON, outgoing signal – contact OFF.  
Contact OFF for 1sec. in the event of new incoming signals.
- Impulse 1sec:  
Incoming signal – Output contact for 1sec. ON,  
In the event of new incoming signals – contact allways for 1 sec ON.
- Acknowledgeable internal:  
Incoming signal – output contact ON,  
Contact only released by acknowledging the signal.
- Acknowledgeable via BTR:  
Contact only released by acknowledging the signal via digital input module

Assignment of the digital input modules to indicator groups A...Z and to the function.

- Only function of acknowledgement.
- Alternatively with positive or negative edge.

# Configuration software

## 10.6.1 Digital output module



- To creation of max. 26 global indicator groups (A...Z)
- 4 relay outputs 250 V, 6 A
- Fast wiring of several modules by strapping plugs
- Hand control elements
- Without programming applicable
- Product no.: 663R4027

The field bus modules FRAS 4/1 are universally applicable output modules, which are controlled via LAMTEC SYSTEM BUS (for DIN rail assembly).

The module is addressed via an adjustable address (1... 99) and conveyed in the data bytes to implement whether data requested or whether instructions.

In connection with a digital input module, the digital output module can be remote controlled.



**NOTE:**

Hand control elements:

Position „1“ → Output contact always closed

Position „A“ → Output contact switches via LAMTEC SYSTEM BUS

Position „0“ → Output contact always open

Address	Output 1	Output 2	Output 3	Output 4
<b>03</b>	Indicator group A	Indicator group B	Indicator group C	Indicator group D
<b>07</b>	Indicator group E	Indicator group F	Indicator group G	Indicator group H
<b>11</b>	Indicator group I	Indicator group J	Indicator group K	Indicator group L
<b>15</b>	Indicator group M	Indicator group N	Indicator group O	Indicator group P
<b>19</b>	Indicator group Q	Indicator group R	Indicator group S	Indicator group T
<b>23</b>	Indicator group U	Indicator group V	Indicator group W	Indicator group X
<b>27</b>	Indicator group Y	Indicator group Z		

- Attitude of the address on the module
- Activation and attitude of functionality via configuration software



**Note:**

The module is to be connected without distance. After connection of 15 modules the supply voltage must be started again externally.

# Configuration software

## 10.6.2 Digital input module



- To reset of each global indicator group (A...Z)
- 4 digital inputs DC24V (isolated).
- Fast wiring of several modules by strapping plugs
- Hand control elements
- Without programming applicable
- Product no.: 663R4028

The field bus modules FOES4 are universally applicable output modules, which are controlled via LAMTEC SYSTEM BUS (for DIN rail assembly).

The module is addressed via an adjustable address (1... 99) and conveyed in the data bytes to implement whether data requested or whether instructions.

In connection with a digital input module, the digital output module can be remote controlled.



Hand control elements:

Position „1“ → Input always HIGH

Position „A“ → Input switches via external contact

Position „0“ → Input always low LOW

Address	Input 1	Input 2	Input 3	Input 4
31	NQ	EQ	HQ	LP
35	Reset IG-A	Reset IG-B	Reset IG-C	Reset IG-D
39	Reset IG-E	Reset IG-F	Reset IG-G	Reset IG-H
43	Reset IG-I	Reset IG-J	Reset IG-K	Reset IG-L
47	Reset IG-M	Reset IG-N	Reset IG-O	Reset IG-P
51	Reset IG-Q	Reset IG-R	Reset IG-S	Reset IG-T
55	Reset IG-U	Reset IG-V	Reset IG-W	Reset IG-X
59	Reset IG-Y	Reset IG-Z		
63	Global LSB	Global NEMS		

- Attitude of the address on the module
- Activation and attitude of functionality via configuration software
- Adjustable to positive/negative edge



Note:

The module is to be connected without distance. After connection of 15 modules the supply voltage must be started again externally.

# Configuration software

## 10.7 Set clock

- Setting the internal clock of the NEMS.
- Only necessarily by printing of messages, and/or in connection with display and operating terminal.



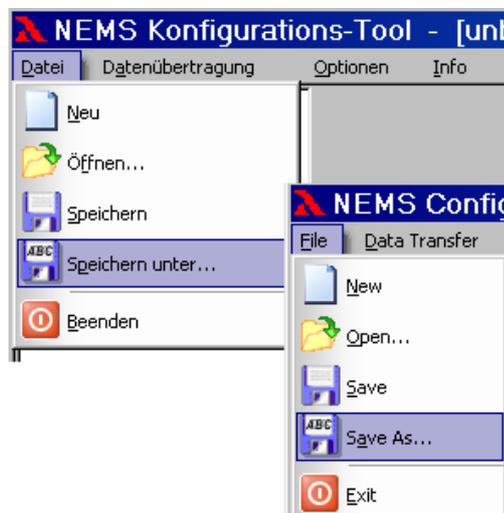
NOTE:

If "Central clock" is set to "enable", setting of the time via configuration software or display and control terminal does not become certified.

## 10.8 Print labels

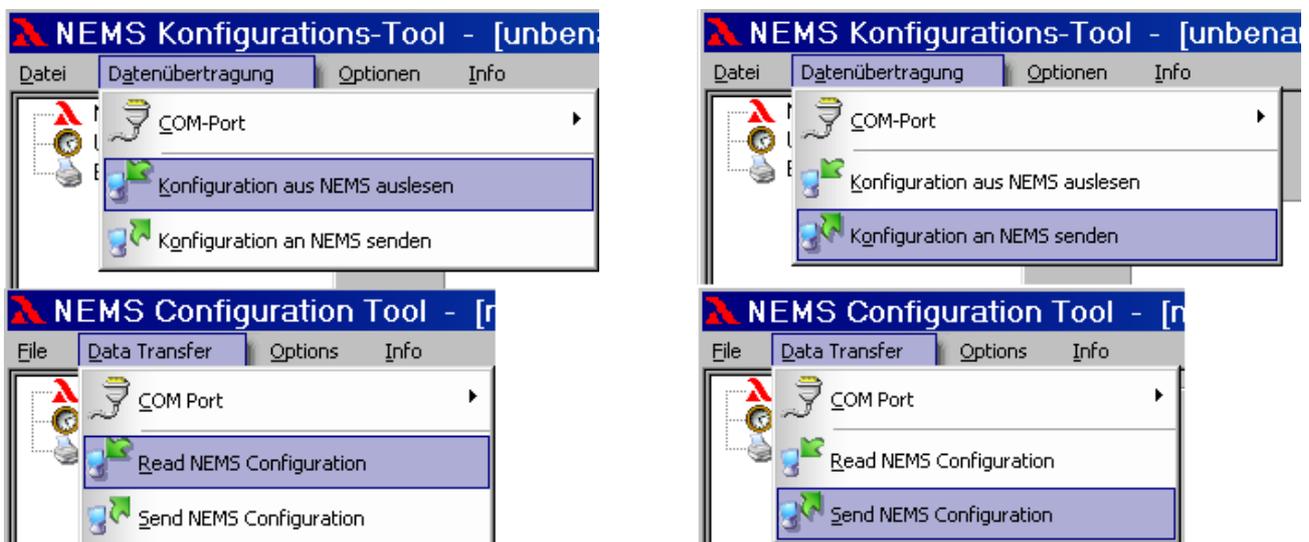
Printing of inscription cards with indicator texts, which are slid into the front plate.

## 10.9 Window „File“



To open and save of configuration files for NEMS.

## 10.10 Window „Data Transfer“



In the window „Data Transfer“ you can send the settings to NEMS, and you can read the settings from NEMS.

# Commissioning

## 11 Commissioning

### 11.1 Supply voltage

---

Make sure that the supply voltage connected to your installation corresponds with the supply voltage of the NEMS device to be installed. The voltage required is specified on the label attached to the device.

### 11.2 Contactor voltage

---

Make sure that the contactor voltage is between DC12V..DC48V or AC12V...AC260V one phase.

The inputs are divided in 4x4er-Gruppen, where each group with another contactor voltage can be operated. The "N", and/or "0" must be attached at the common contact of the respective indicator group.

### 11.3 LAMTEC SYSTEM BUS

---

If you connect several devices via the LAMTEC SYTEM BUS, make sure that:

- the setting of the equipment family is correct (**Level L.N**)
  - Devices 01-16 → family 1
  - Devices 17-32 → family 2
  - Devices 33-48 → family 3
  - Devices 49-64 → family 4
- each device within a family has a different equipment address (**Level L.E**)
- the terminating resistor has been activated for the first and last device in the bus (BR2 on the NEMS electronics in position 1-2 for the relays)

Up to 64 NEMS16 devices can be networked together to form an indicator system via the LSB. The interconnected units must always form a line; there must be no spur line off the bus.

The termination resistors must be activated on the first and last device in the LSB.



**NOTE:**

If an equipment address is allocated twice in an indicator system, the NEMS devices in question will switch to configuration mode (operating light LEDs 1-16). You can then change the duplicated equipment address using the key sequence LP → EQ.



**NOTE:**

The following recommendations are given for the line lengths and the line cross-section of the LSB:

- 0 – 40 m 2 x 2 x 0.34 mm<sup>2</sup>, stranded in pairs with shield, impedance 120 Ohms.
- 40 – 300 m 2 x 2 x 0.5 mm<sup>2</sup>, stranded in pairs with shield, impedance 120 Ohms.
- 300 – 600 m 2 x 2 x 0.6 mm<sup>2</sup>, stranded in pairs with shield, impedance 120 Ohms.
- 600–1000 m 2 x 2 x 0.75 mm<sup>2</sup>, stranded in pairs with shield, impedance 120 Ohms.

# Commissioning

## 11.4 Save the data record

---



Note:

Once the devices have been configured, the data records are to be saved using the text and configuration software.

Therefore if a device is replaced, the settings can be restored in the shortest possible time.

## 11.5 Connection of the shields

---

All conductors from and to the NEMS are to be shielded (exception: 230 V supply conductor). The shields must be connected as close as possible to the PE busbar.

## 11.6 PE busbar

---

A PE busbar is attached to the back of the device. All shields and the PE are to be connected there.

## 11.7 Laying in the control cabinet

---

The low-voltage lines from and to the NEMS are not to be laid parallel to the supply and outgoing conductors of the power electronics in one channel. Frequency converter conductors and switches, or contactors, which switch high inductive and capacitive loads are especially critical. Parallel routing with the control lines of solenoid valves, ignition transformers or large motor actuators and suchlike are therefore to be avoided.



**IMPORTANT!**

*Although this device far exceeds all the relevant valid EMC standards in part, corresponding wiring is a prerequisite for ensuring that the whole installation will always work perfectly.*

## 11.8 Shielding of supply conductors from the field

---

In the case of shielded supply conductors from the field, the most favourable option is to connect them directly (without intermediate terminals) to the NEMS.

If intermediate terminals should be required, then the shielding in the direct vicinity is to go over the terminal as well. Long routes in the channel without shielding are to be avoided.

# Commissioning

## 11.9 Panel mounting case - electrical connection to AC230V



NEMS16 line voltage AC230V  
Item No.: 680R1200, 680R1201

Connecting terminals plug-in  
4x4 indicator inputs

PE- / shield bar

Connecting terminals plug-in  
2x relay output

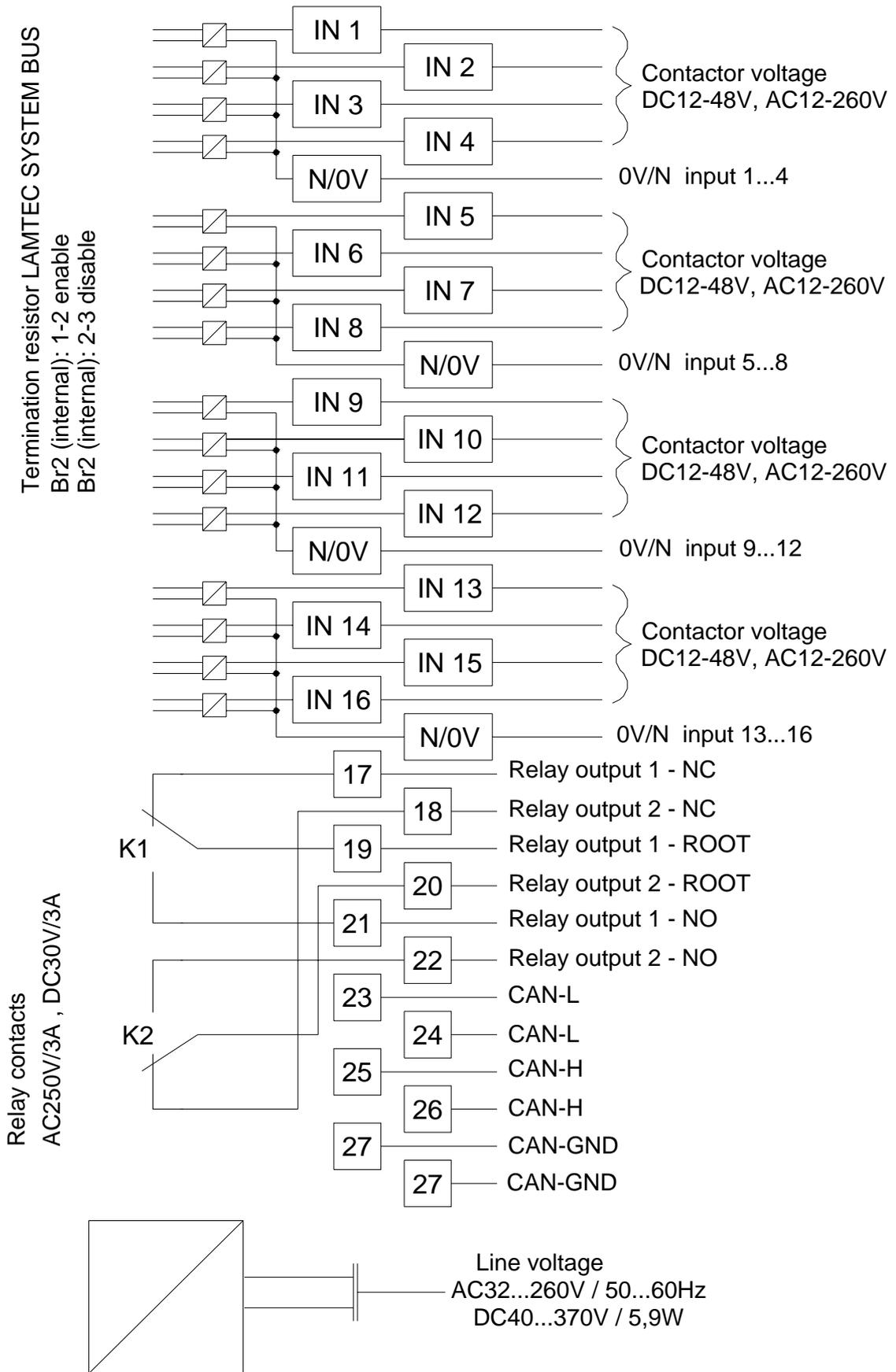
Connecting terminals plug-in  
LAMTEC SYSTEM BUS

Connecting terminals plug-in  
line voltage

*Backview*

# Commissioning

## 11.9.1 Connector assignment AC230V



## Electronic unit

### 12 Electronic unit

#### 12.1 Disassembling the electronic unit

---



- Disconnect the NEMS from the power supply
- Pull out the connector at the back
- Remove front panel
- Remove the electronic unit in the handle from the housing

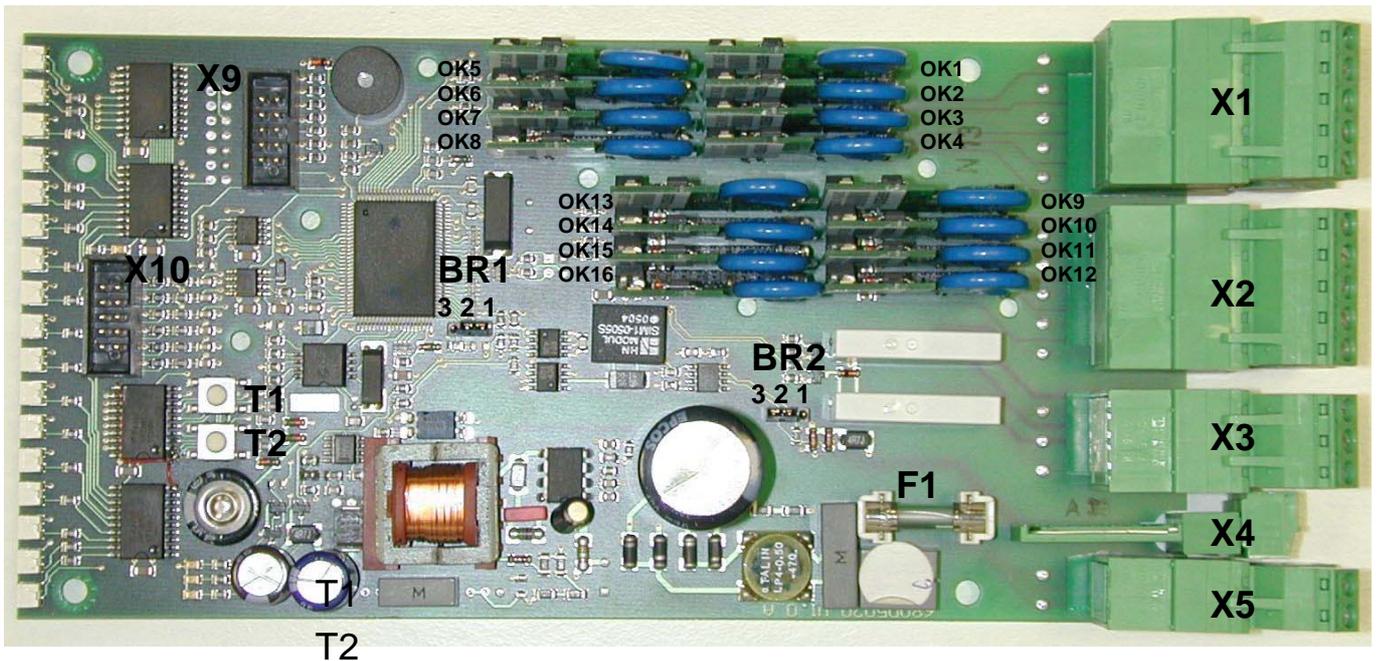


**IMPORTANT!**

***Never insert or remove connectors if supply voltage lies close !***

# Electronic unit

## 12.2 Connectors, fuses and jumper



X1	Indicator input 1...8
X2	Indicator input 9...16
X3	Relay outputs
X4	LAMTEC SYSTEM BUS
X5	Line voltage
X9	Connection for RS232, RS422 and RS485 interface modules
X10	Keyboard connection
F1	T500mA, miniature fuse 5x20, (mains fuse) not for 230 V devices
BR1 position 2-3	Programming mode (only for software update)
BR2 position 1-2 direction relay	Termination LAMTEC SYSTEM BUS enable
BR2 position 2-3 direction LED	Termination LAMTEC SYSTEM BUS disable
SMD-key T1, T2	T1: LSB device address +1 T2: LSB device address -1
OK1...OK16	Opto coupler input modules for contactor voltages DC12...48V, AC12...260V-one phase

## Troubleshooting – Assistance

### 13 Troubleshooting – Assistance

#### 13.1 Power ON- LED does not light up when supplied with DC230V

---

- Check whether voltage is connected to the device at term X5 Kl. L / X5 Kl. N
- Check fuse F1 (T500mA) on the printed circuit board

#### 13.2 Signals are not displayed on the LEDs

---

- Common N or 0V for indicator's group attached?
- Examine whether signal contactor voltage in the correct range lies

#### 13.3 Incorrect configuration

---

- Restore the factory configuration
- Hold down keys **NQ** + **EQ** + **HQ** simultaneously for 3 s.
- LEDs 5-12 switch to continuous yellow light.
- Press keys **NQ** + **EQ** briefly simultaneously.
- Factory configuration will be restored.
- Please take the factory configuration from the lable on the device

#### 13.4 Replacing a device

---

- Save data record using the message text and configuration software
- Replace device
- Set equipment address manually
- Restore the data record by using the text and configuration software

#### 13.5 Several NEMS in the system switch to running light after power on

---

Duplicate device addresses

If an equipment address is allocated twice in an indicator system, the NEMS devices in question will switch to configuration mode (operating light LEDs 1-16). You can then change the duplicated equipment address using the key sequence LP → EQ.

# Maintenance

## 14 Maintenance

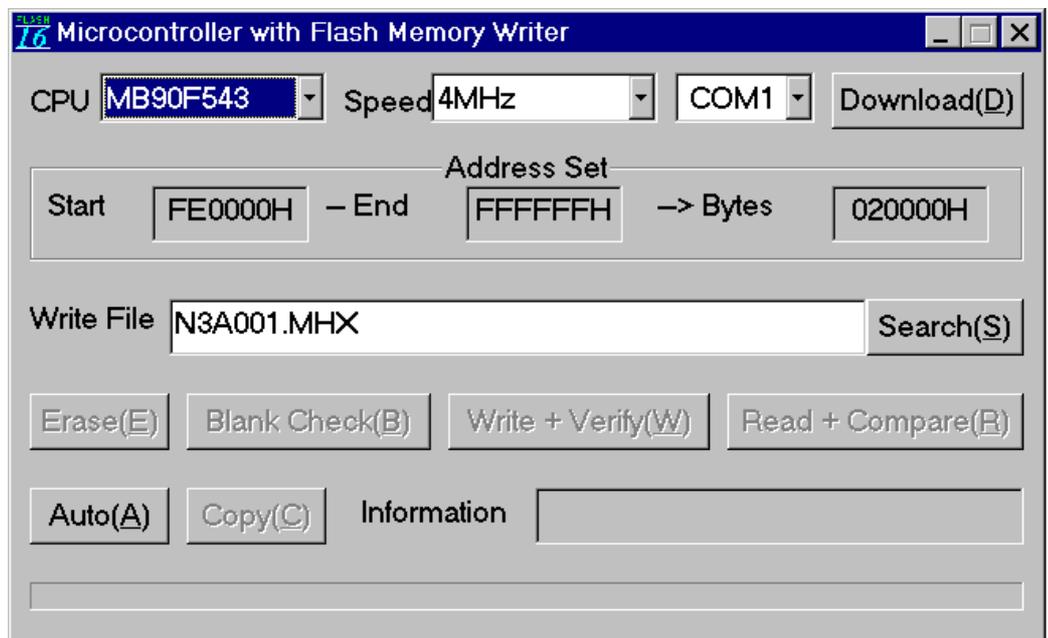
### 14.1 Software update

The following are required

- RS232 interface adapter incl. connection cable for NEMS electronics Connector X4 (only for NEMS without RS232)
- RS232 interface cable as PC connection
- PC with FLASH programming software installed
- Current software file (\*.MHX)

Procedure

- Switch off the NEMS device
- Remove the electronics and connect 24 VDC
- Move BR1 to position 2-3 (for the LEDs)
- Connect RS232 interface adapter incl. connection cable to connector X4
- Connect RS232 interface to the PC
- Switch on the NEMS device
- Start FLASH programming software on the PC
- Set CPU type to MB90F543
- Load current software file \*.MHX
- Program NEMS using "Auto"



- If "All OK" the programming is terminated
- Disconnect NEMS again
- Replace BR1 in position 1-2
- Install the electronics and switch on
- After a brief self-test, the NEMS is ready for operation again

# Maintenance

## 14.2 Software update at several devices at the same time

The following is needed

- Software for entering indicator texts and user-friendly configuration of the NEMS.. For several devices (signalling system) for the connection to the LAMTEC SYSTEM BUS via USB converter article no.: 680R1052
- Software file

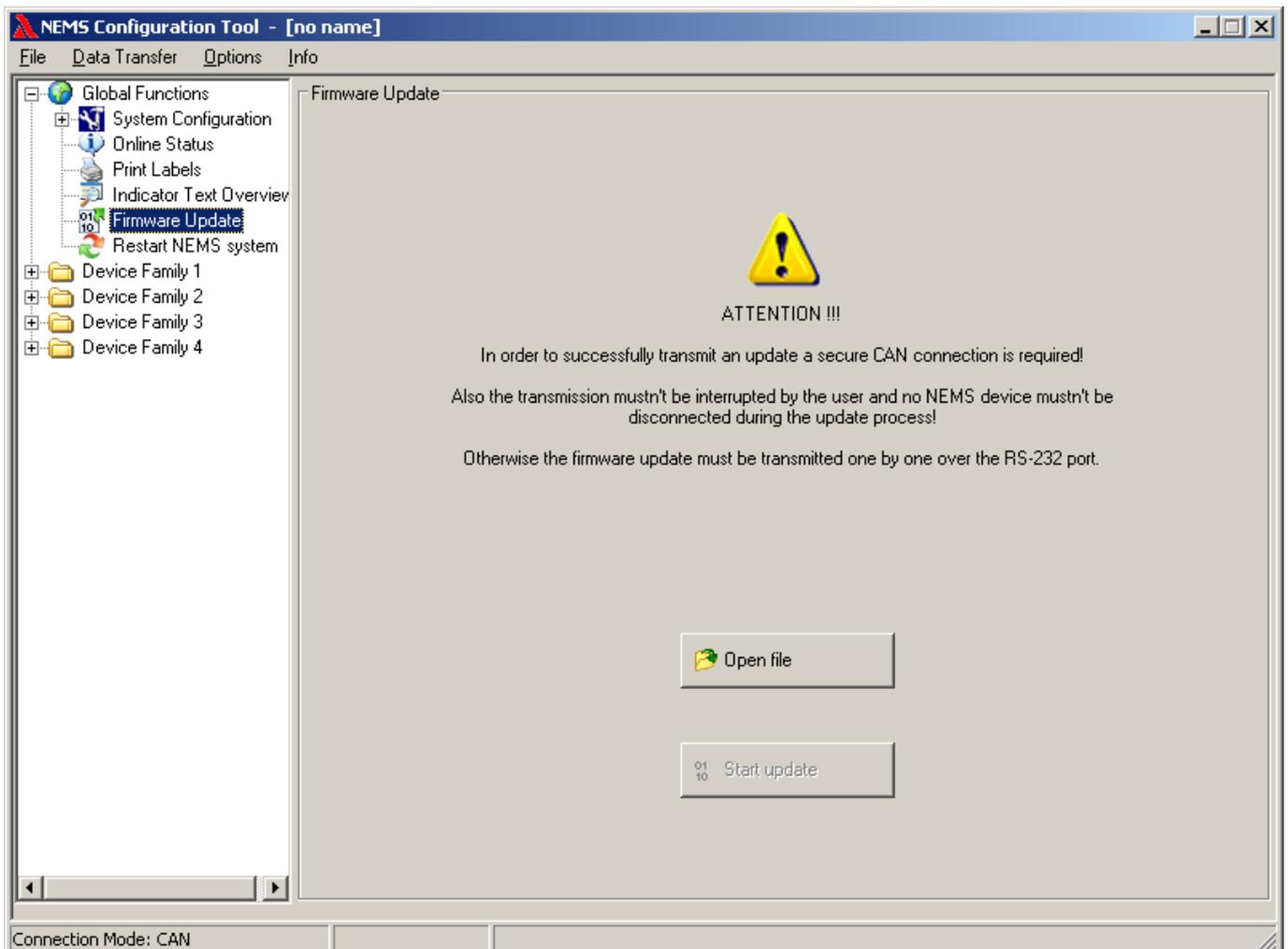
Proceeding

- Connect your PC via CAN/USB module to the NEMS system.
- Start the configuration software in CAN mode.
- Start „Firmware-Update“ in „Global Functions“.
- „Open file“ and software select file for update.



Note:

Jumper JP1 does not have to be changed !!



## Inscription card

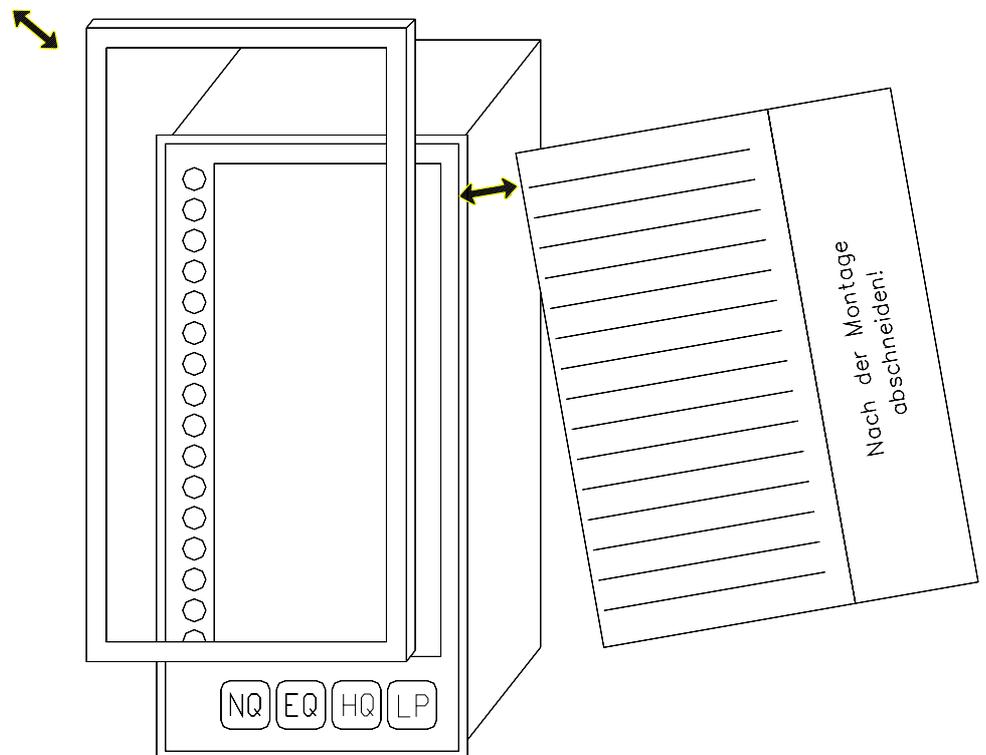
### 15 Inscription card

If you have the text and configuration software, after entering the message texts this labelling card can be printed out from this location.

If you do not have the message text and configuration software, a diskette is provided with the NEMS device containing the labelling file in WORD format. You can use this to create labels on your PC.

These cards can be replaced quite easily if the signal designations are changed. To make them easier to use, the cards have a mounting edge which just has to be cut off once they have been inserted.

- Remove the bezel.
- Push the labelling card under the film.
- Cut off the mounting edge.
- Replace the bezel.



# Accessories

## 16 Accessories

### 16.1 Printer

---

To print out incoming and outgoing fault and process status signals in chronological order. Timing accuracy of the time stamps: typ. +1 ms, max. + 5ms.

Connection is made to the existing RS232 interface of the NEMS (according to the size of the indicator system in each case) or to the RS232 interface of the display and operating terminal.



Note for printing:  
Configuration "Enable NEMS Printer" must be activated via keyboard level N.N - LED3, or via configuration software.

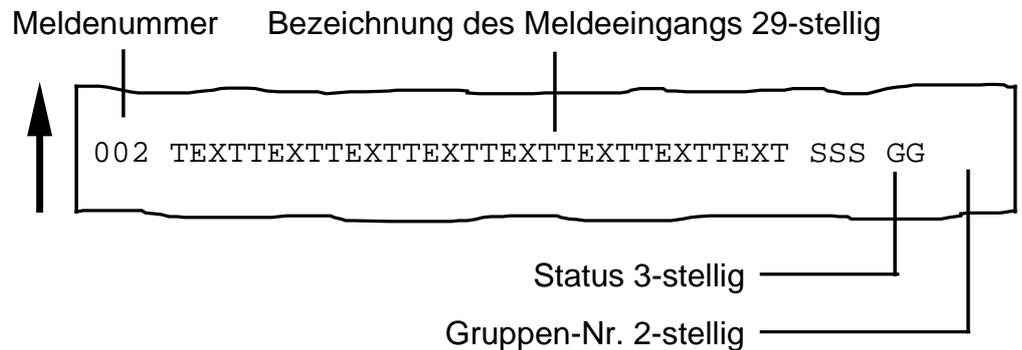


Note for printing process status signals:  
Configuration "Enabel loggin of process status signals" must be activated via keyboard level N.N – LED5, or via configuration software.

### 16.2 Structure of the message print-out

---

A message text is made up of the following:



#### 16.2.1 Indicator number

---

The indicator number is directly connected with the corresponding pin on the input connector. It is not possible to change this definition.

#### 16.2.2 Designation of the indicator input

---

An alphanumeric text with a maximum character length of 29 characters can be entered on the NEMS as the designation for an indicator input.

#### 16.2.3 Number of global indicator group (locator GG)

---

Local indicator groups A...Z

Setting via configuration software.

Output and/or acknowledgement via digital in-/ output module possible.

## Accessories

### 16.2.4 Status (locator SSS)

---

All changes in status relating to the inputs are logged with date and time and always updated immediately.

When a signal changes from OK STATUS to FAULT STATUS, the mnemonic MKO is added to the message text; in the case of an outgoing signal, it is the mnemonic MGE ("Outgoing signal").

#### 16.2.4.1 *Abrgements for indicator signals*

Possible abridgements for the indicator add-on "Status" are as follows:

"MKO": Meldung Kommt - Incoming signal

"MGE": Meldung Geht - Outgoing signal

"MKZ": Meldung Kommt, Zeitstempel ungültig  
Incoming signal, time stamp invalid

"MGZ": Meldung Geht, Zeitstempel ungültig  
OUTGOING SIGNAL, Time stamp INVALID

"MKI": Meldung Kommt, instabil - Incoming signal, unstable

"MGI": Meldung Geht, instabil - Outgoing signal, unstable

#### 16.2.4.2 *Abrgements for process status signals*

"BKO": Betriebsmeldung Kommt - Incoming Process Status Signal

"BGE": Betriebsmeldung Geht - Outgoing Process Status Signal

"BKZ": Betriebsmeldung Kommt, Zeitstempel ungültig  
Incoming Process Status Signal, time stamp invalid

"BGZ": Betriebsmeldung Geht, Zeitstempel ungültig  
Outgoing Process Status Signal, time stamp invalid

"BKI": Betriebsmeldung Kommt, instabil (Fluttermeldung)  
Incoming Process Status Signal, unstable (contact chatter rejection)

"BGI": Betriebsmeldung Geht, instabil (Fluttermeldung)  
Outgoing Process Status Signal, unstable (contact chatter rejection)

#### 16.2.4.3 *Abrgements for contact chatter signals*



**NOTE:**

In the case of "contact chatter signals" you should activate contact chatter rejection in Level E.L or via configuration software (chapter 11.4.4).

„FKO“ : Flattersperre kommt  
"contact chatter rejection" coming in

„FGE“ : Flattersperre geht  
"contact chatter rejection" going out

„FKZ“ : Flattersperre kommt, Zeitstempel ungültig  
"contact chatter rejection" coming in, time stamp invalid

„FGZ“ : Flattersperre geht, Zeitstempel ungültig  
"contact chatter rejection" going out, time stamp invalid

## Accessories

### 16.2.4.4 *Abrgements for bypassed signals*



Note for printing bypassed signals:

Configuration "Report bypassed inputs" must be activated via keyboard level N.N – LED14 (chapter 10.5), or via configuration software (chapter 11.4.15).

**If "Report bypassed inputs" is set to disable:**

- Bypasses will be printed as "BSE", "BRS"
- Bypassed inputs will not be printed.

"BSE": Brücke Gesetzt – Bypass Set

"BRS": Brücke Rückgesetzt – Bypass Reset

"BSZ": Brücke Gesetzt, Zeitstempel ungültig  
Bypass Set, time stamp invalid

"BRZ": Brücke Rückgesetzt, Zeitstempel ungültig  
Bypass Reset, time stamp invalid

"BSI": Brücke Gesetzt, instabil (Fluttermeldung)  
Bypass Set, unstable (contact chatter signal)

"BRI": Brücke Rückgesetzt, instabil (Fluttermeldung)  
Bypass Reset, unstable (contact chatter signal)

**If "Report bypassed inputs" is set to enable:**

- Bypasses will be printed as "MKO", "MGE"
- Bypassed inputs will be printed as "BSE", "BRS".

"BSE": Brücke für diesen Eingang Gesetzt  
Bypassed input set

"BRS": Brücke für diesen Eingang Rückgesetzt  
Bypassed input Reset

"BSZ": Brücke für diesen Eingang Gesetzt, Zeitstempel ungültig  
Bypassed input Set, time stamp invalid

"BRZ": Brücke für diesen Eingang Rückgesetzt, Zeitstempel ungültig  
Bypassed input Reset, time stamp invalid

"BSI": Brücke für diesen Eingang Gesetzt, instabil (Fluttermeldung)  
Bypassed input Set, unstable (contact chatter signal)

"BRI": Brücke für diesen Eingang Rückgesetzt, instabil (Fluttermeldung)  
Bypassed input Reset, unstable (contact chatter signal)

## Accessories

### 16.2.4.5 *Abrgements for system signals (“SYS”)*

- "Central-Clock offline"
- "Central-Clock online"
- "Central-Clock Receive Error"
- "Central-Clock Receive Ok"
- "Central-Clock Annou. MEZ<->MESZ"
- "Central-Clock Change MEZ<->MESZ"
- "Central-Clock Annou. Add.-Second"
- "Central-Clock Add.-Sec.Inserted"
- "NEMS Restart due to PowerOn"
- "NEMS Restart due SW-Watchdog"
- "NEMS Restart due Voltage drop"
- "NEMS Restart Software-Reset"
- "NEMS is offline"
- "NEMS is online again"

### 16.2.5 Indicator groups-No. (locator GG)

---

Indicator groups A...Z. Input via configuration software – indicator texts.

### 16.2.6 Entering indicator texts and time

---

For entering the indicator texts and the time you needs a computer with WINDOWS operating system and installed text and configuration software. This computer is attached to the existing RS232-interface of the NEMS

NEMS without RS232-Schnittstelle the configuration is made by LSB converters.The advantage: Several NEMS can be configured together and at the same time in the system.

## Accessories

### 16.3 Radio Clock

#### 16.3.1 Printer message DCF-77 receipt

---

The DCF-77 receipt is supervised via 24 hr.

If the radio clock have in the last 24 hr. no correct DCF-77 receipt, the message "Central-Clock Receive Error" at 01:59 o'clock each daily will be printed once.

If the radio clock have in the last 24 hr. only one correct DCF-77 receipt, the message "Central-Clock Receive OK" at 01:59 o'clock each daily will be printed once.

#### 16.3.2 Conversion MEZ Central European Summer Time and switching second

---

The conversion MEZ Central European Summer Time and inserting one switching second becomes now max. 1 hr. before announced with the printer messages

"Central-Clock Annou. MEZ<->MESZ"

"Central-Clock Annou. Add.-Second"

The actual time of the conversion MEZ Central European Summer Time and inserting one switching second are now then supervised exactly and announced with the printer messages

"Central-Clock Change MEZ<->MESZ"

"Central-Clock Add.-Sec.Inserted"

accurately at the time of the NEMS conversion.

#### 16.3.3 Format

---

Format of "Central-Clock"-SYS printer messages

Date: Time: No.: Message text: SSS GG

25.04.04 16:04:13,000 ---- Central-clock online ....SYS

Format of "NEMS"-SYS printer messages

Date : Time: No.: Message text SSS GG

25.04.04 16:04:13,000 33 NEMS Restart due to PowerOn. .SYS

25.04.04 16:04:13,000 17 NEMS Restart due to PowerOn.. SYS

25.04.04 16:04:13,000 01 NEMS Restart due to PowerOn. .SYS

The column "No." is the first indicator number of the respctive NEMS device.

Uring restart of the NEMS-System always the complete list of all in the system NEMS devices will be printed.

#### 16.3.4 Entering reporting texts and time

---

For entering the reporting texts and the time you need a computer with WINDOWS operating system and a installed text and configuration software as programming device. This computer is attached to the existing RS232-Schnittstelle of the NEMS

In NEMS without RS232-Schnittstelle the configuration is made by LSB converters. The advantage: Several NEMS can be configured together and at the same time in the system.

If the central clock (radio clock) is configured, placing the time via NEMS configuration software, or via the display and operating terminal is not certified.

## Accessories

### 16.3.5 Performance of the NEMS by operating with/without central clock:

---

In the following operating situations an automatic software RESET of the NEMS system will be started:

- Setting the time NEMS configuration software
- Setting the time via display and operating terminal
- If the central clock (radio clock) is OFFLINE and the ONLINE again.
- Uring conversion MEZ Central European Summer Time

### 16.3.6 DIP-switches of the central clock (radio clock)

---

SW-1, SW-2, SW-4, SW-6, SW-7, SW-8, SW-9: **ON**

SW-3, SW-5. SW-10: **OFF**

# Dimensions

## 17 Dimensions

### 17.1 Panel mounting case

---

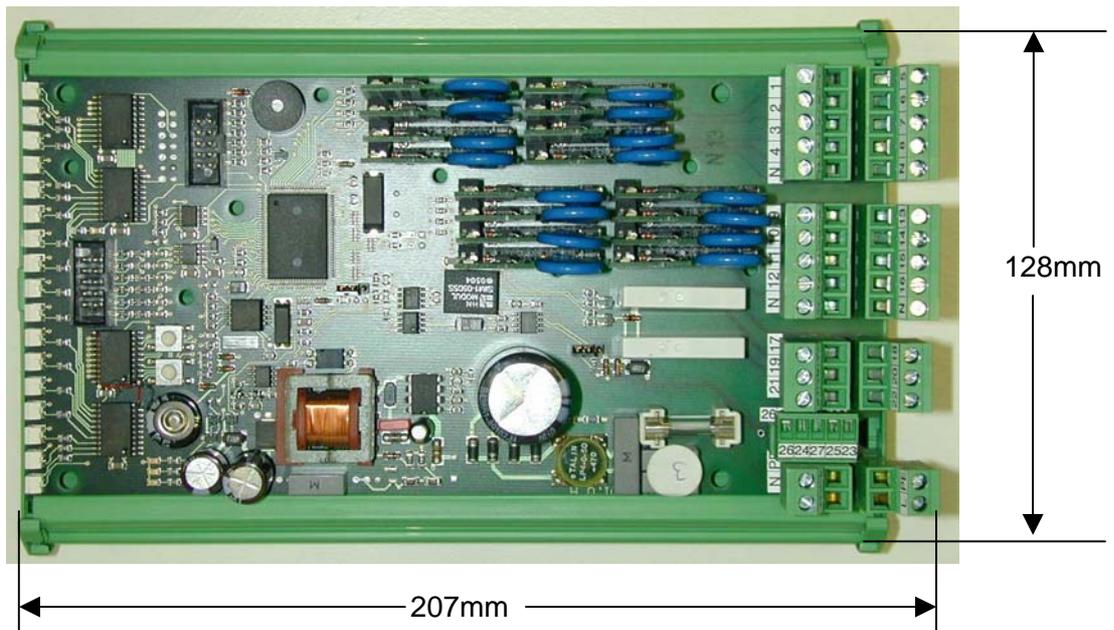
Nominal dimensions width 96mm x height 144mm x depth 200mm

extent of frontage: 16TE

Instrument panel cutout: 90 x 138mm

### 17.2 for mounting rail

---



207mm x 128mm x height: 73mm

## Technical data

### 18 Technical data

#### 18.1 NEMS16 with contactor voltage DC12...AC260V for supply voltage AC230V

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**IMPORTANT!**

*To be used only in grounded power line networks !!*

Without RS232 interface order no.: 680R1200

With RS232 interface order no.: 680R1201

Supply voltage: AC40V...AC260V, 50...60Hz  
DC40V...DC370V

Power consumption: 5,9W

Weight: 1520gr

#### Ambient temperature

Betrieb 0°C - +60°C

Lagerung -25°C - +60°C

Max internal temperature 70°C

#### Permissible ambient humidity

Class F DIN40040

#### Signal inputs

16 (4x4) digital inputs isolated electrically via opto couplers

Trigger level DC12V ... DC48V, AC12V...AC260V-one phase

Power input approx. 5mA per input

#### Outputs

2 relay outputs isolated

Gold-plated contact material designed for AC230V / 3A , DC30V / 3A

#### Protection code DIN 40050

Panel mounting case: IP40 (optionally IP54 at the front)

Panel mounting IP00

#### Times

Delay time (delay) of the indicator inputs are fixed to 100ms.

## Technical data

### Storage of the configuration

Flash storage device

### Number of programmings

Unlimited

### Interface

1 serial interface to 9-pol. sub-D pins

Only for devices with product no.: 680R1001  
680R1011

RS232 (standard setting 19200 baud, parity none, 8 data bits, 1 stop bit)



**IMPORTANT!**

*Connecting and removing the interface is only to be carried out with the device disconnected.*

*Only connect devices which comply with DIN EN60950/ VDE0805.*

### Field bus coupling

External communications processor via LSB for the systems:

- Interbus-S
- Profibus-DP
- Modbus
- CANopen
- Ethernet

### LAMTEC SYSTEM BUS

Via terminals 23, 24, 25, 26, 27

Termination BR2

## Technical data

### 18.2 Digital output modules

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• Rated voltage	DC24V
• DC current input	100 mA
• Power consumption	2,4 W
• Supply voltage	DC19,2V ... DC26,4V
• Controlling	LAMTEC SYSTEM BUS
• Response time (Transmit – relay switches)	15 ms
• Precharge time	200 ms
• Operation temperature	0 °C ... +55 °C
• Storage temperature	-25 °C ... +70 °C
• Protection circuit	pole protection of supply voltage
• Relay status indication	LED
• Function indication	Green LED for BUS activity and VCC
• Operation indication	Red LED for BUS faults
• Specials	Hand control elements
• Product no.:	663R4027
• Product no. ext. Power supply	663R4024

#### 18.2.1 Output contacts

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• Output contact / material	4 normally open contacts / AgNI
• Switching voltage	max. 250 V
• ON-/OFF current max.	12 A / 4 s bei 10 % ED
• Permanent current	6 A/relay but max. 12 A/module
• Protection of the contacts	6 A
• Mechanical life span	1x10 <sup>7</sup> switches
• Electrical life span	1x10 <sup>5</sup> switches
• Permissible switching frequency	360/h bei Nennlast
• Isolation according to VDE 0110	C
• Calculated voltage	AC250V
• Overvoltage category	II
• Withstand voltage spool/contact	AC4000V 50 Hz 1 min
• Withstand voltage contact/contact	AC1000V 50 Hz 1 min

#### 18.2.2 Case

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• Protection code (EN 60529)	Case IP50 clamps IP20
• Humidity IEC60721-3-3	Environment class 3k3
• Clamp dimensions outputs	2,5 mm <sup>2</sup>
• Clamp dimensions(BUS, supply voltage)	1,5 mm <sup>2</sup>
• Weight	95 g
• Dimension	BxHxT 35 x 68 x 60 mm

## Technical data

### 18.3 Digital input module

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- Supply voltage DC24V
- Current 50 mA
- Power consumption 1,2 W
- Controlling LAMTEC SYSTEM BUS
- Product no. 663R4028
- DC current input (DC24V) 6 mA

#### 18.3.1 Digital inputs

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- Input voltage max. DC30V
- Input current (DC24V) 6 mA
- High-signal >DC7V
- Low-signal <DC3V
- Response time (Transmit to receive) 15 ms
- Precharge time
  - 550 ms

#### 18.3.2 Case

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- Protection code (EN 60529) Case IP50 clamps IP20
- Humidity IEC60721-3-3 Environment class 3k3
- Clamp dimensions outputs 2,5 mm<sup>2</sup>
- Clamp dimensions(BUS, supply voltage) 1,5 mm<sup>2</sup>
- Weight 95 g
- Dimension BxHxT 35 x 68 x 60 mm

## Spare parts

### 19 Spare parts

Replacement electronics	680R5020V1.0
Replacement input module	680R5030
Replacement front panel	680P1019
Replacement keyboard	680P1023
Replacement keyboard cable	680P1024
Replacement terminals 2-pins for supply voltage	04K0145/2
Replacement terminals 3-pins for relay output	04K0145/3
Replacement terminals 5-pins for indic. inputs	04K0145/5
Replacement terminals 6-pins for LAMTEC SYSTEM BUS	04K0143/6
Replacement panel installation case	04G0301
Replacement installation mounting (2 off per set)	660R0080
Replacement RS232 module	663P0601
Replacement connecting cable for RS232 module	680R1422
Thermo paper for printer	680R1098

## Accessories

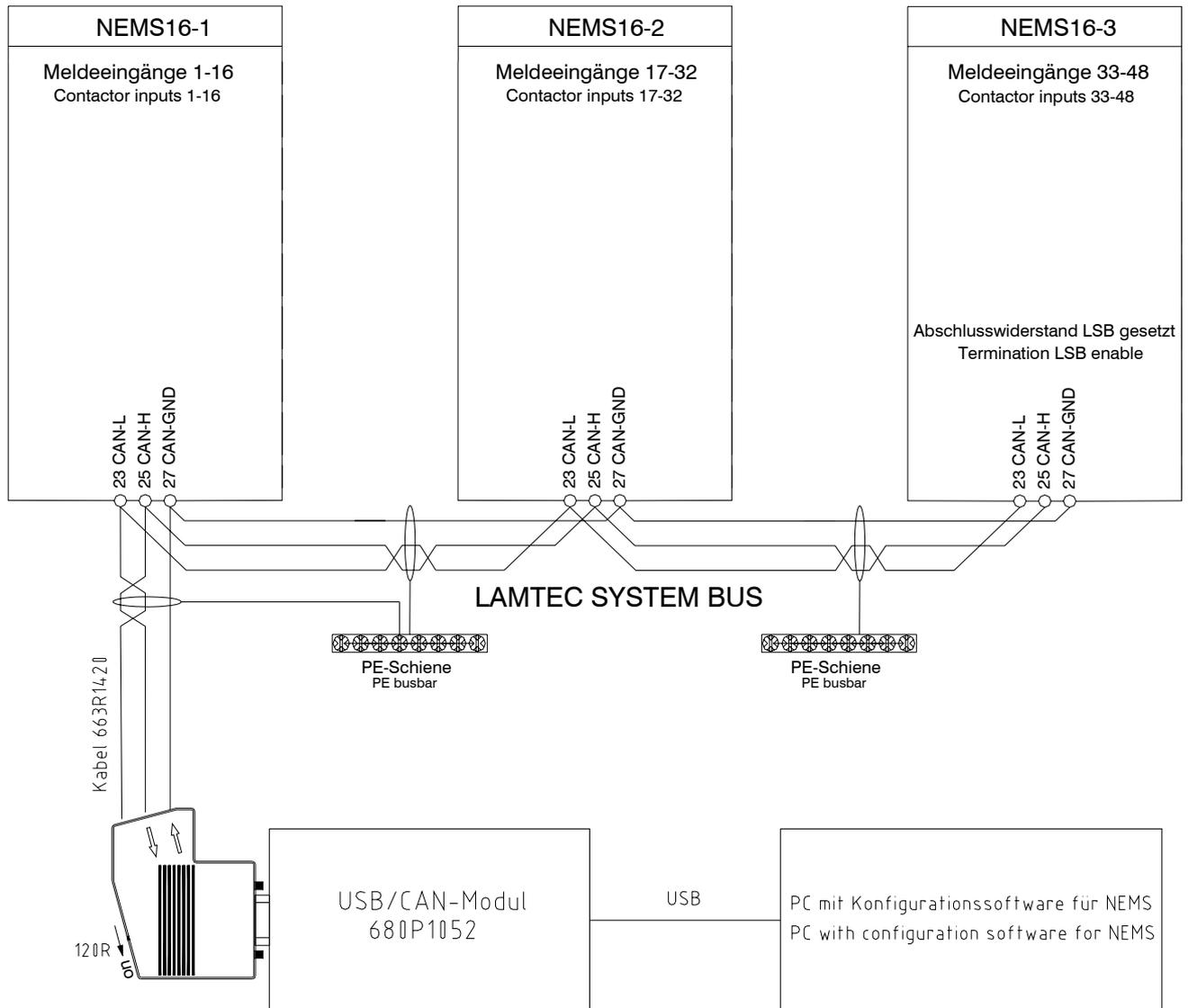
### 20 Accessories

Text- and configuration software For LAMTEC SYSTEM BUS	680R1052
Text- and configuration software for RS232-interface	680R1053
Thermo printer in panel installation case DC24V, without winding device	680R1060
Thermo printer in panel installation case AC230V, without winding device	680R1065
Thermo printer in panel installation case DC24V, with winding device	680R1070
Thermo printer in panel installation case AC230V, with winding device	680R1075
Thermo printer for 19"-Rack, 3HE, DC24V without winding device	680R1080
Thermo printer for 19"-Rack, 3HE, AC230V without winding device	680R1085
Thermo printer for 19"-Rack, 3HE, DC24V with winding device	680R1090
Thermo printer for 19"-Rack, 3HE, AC230V with winding device	680R1095
Display and operating terminal in panel installation case, AC230V	680R6002
Display and operating terminal in panel installation case, DC5V	680R6003
Display and operating terminal in panel installation case, DC24V	680R6004
Display and operating terminal in panel installation case, DC110V	680R6005
Digital output module	663R4027
Digital input module	663R4028
Radio clock module DC24V	680R6020

# Wiring examples

## 21 Wiring examples

### 21.1 PC with configuration software for indicator system



Für die Leitungslängen und den Leitungsquerschnitt des LAMTEC SYSTEM BUS gibt es folgende Empfehlungen:

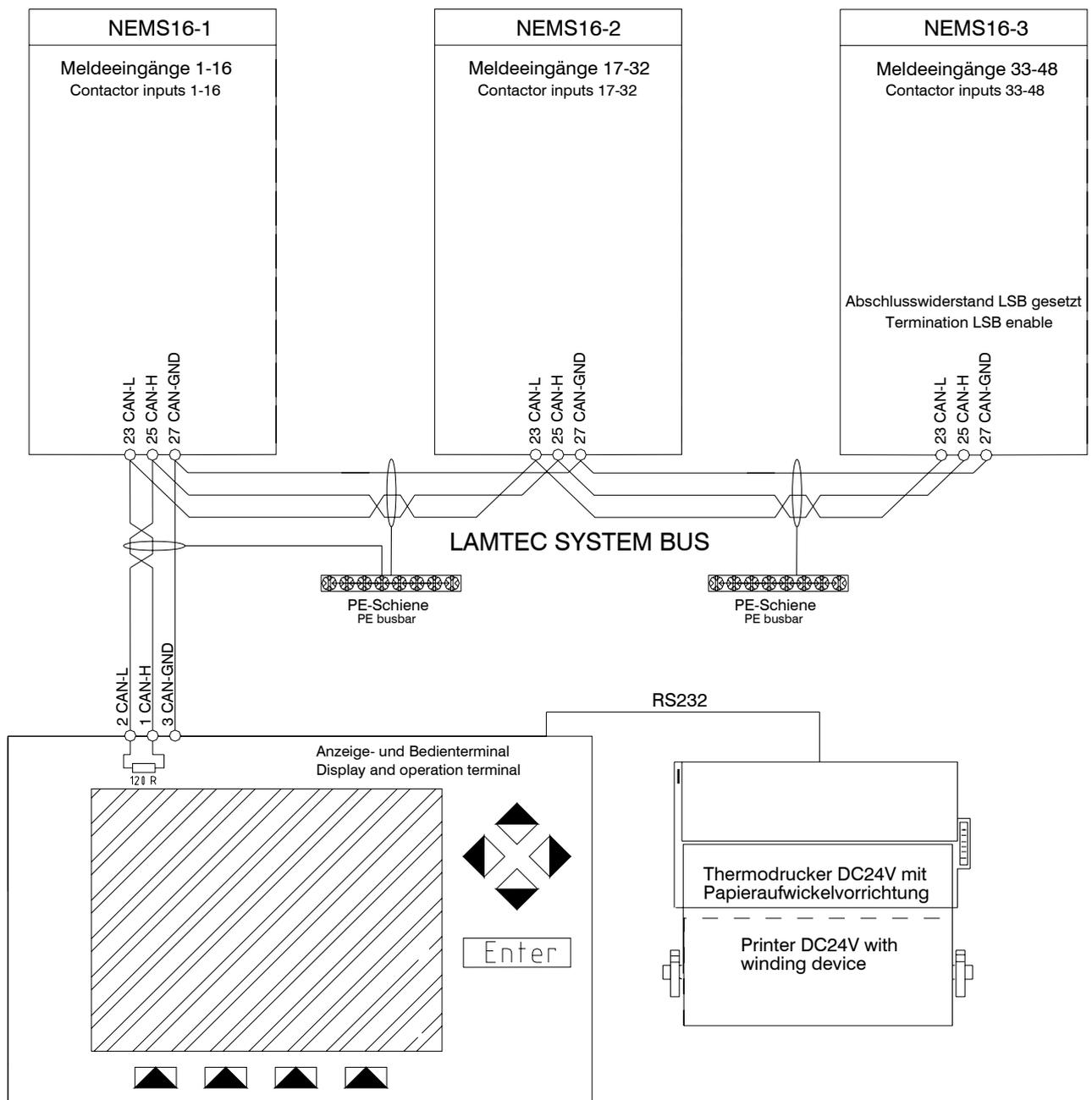
- 0-40m 2x2x0,34qmm, paarig verseilt mit Abschirmung, 120 Ohm
- 40-300m 2x2x0,5qmm, paarig verseilt mit Abschirmung, 120 Ohm
- 300-600m 2x2x0,6qmm, paarig verseilt mit Abschirmung, 120 Ohm
- 600-1000m 2x2x0,75qmm, paarig verseilt mit Abschirmung, 120 Ohm

There are the following recommendations for the cable lengths and the cable cross-cuts for LAMTEC SYSTEM BUS

- 0-40m 2x2x0,34qmm, twisted paired with shield, 120 Ohm
- 40-300m 2x2x0,5qmm, twisted paired with shield, 120 Ohm
- 300-600m 2x2x0,6qmm, twisted paired with shield, 120 Ohm
- 600-1000m 2x2x0,75qmm, twisted paired with shield, 120 Ohm

# Wiring examples

## 21.2 NEMS – printer – display and operating terminal

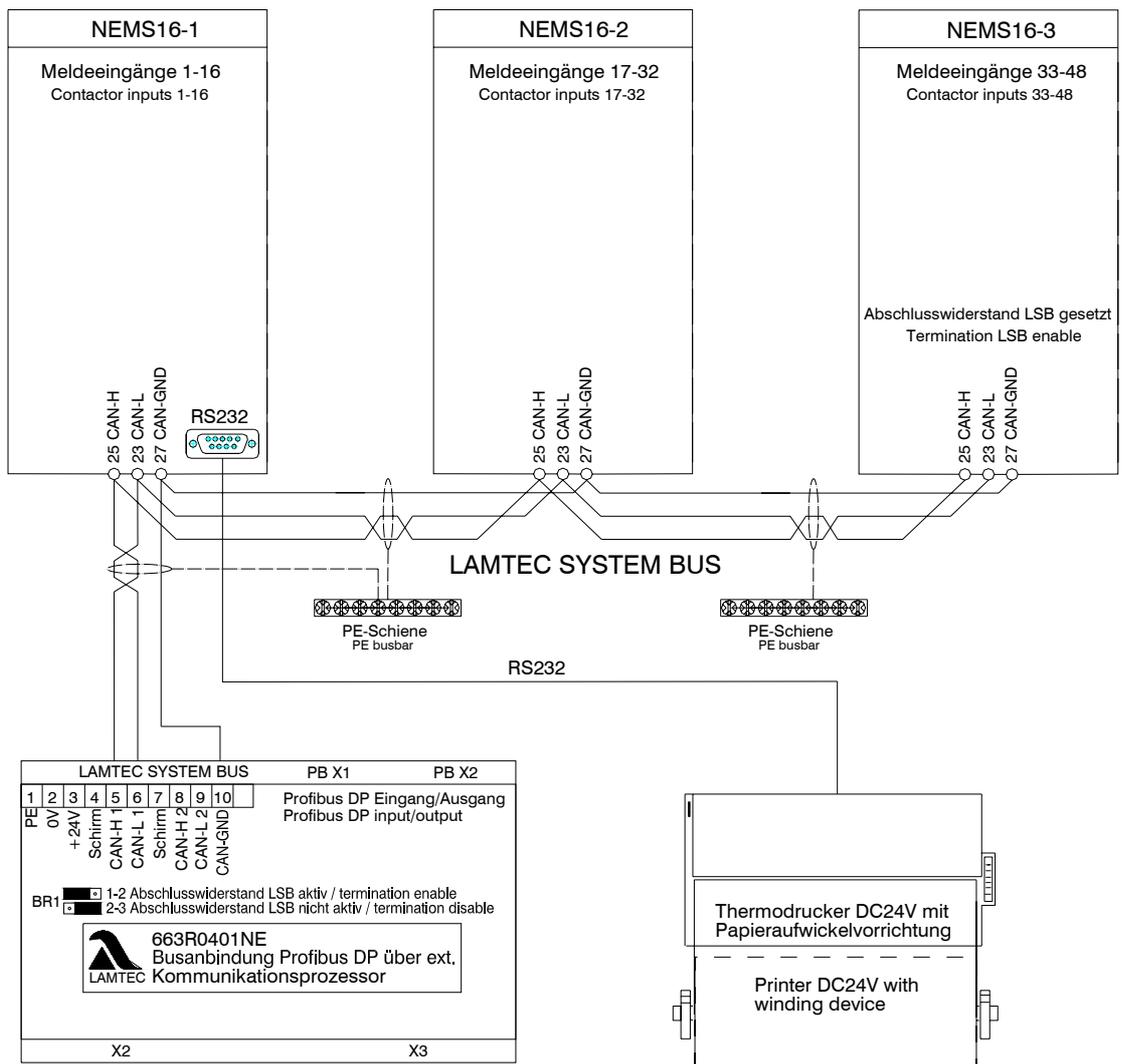


Für die Leitungslängen und den Leitungsquerschnitt des LAMTEC SYSTEM BUS gibt es folgende Empfehlungen:  
 0-40m 2x2x0,34qmm, paarig verseilt mit Abschirmung, 120 Ohm  
 40-300m 2x2x0,5qmm, paarig verseilt mit Abschirmung, 120 Ohm  
 300-600m 2x2x0,6qmm, paarig verseilt mit Abschirmung, 120 Ohm  
 600-1000m 2x2x0,75qmm, paarig verseilt mit Abschirmung, 120 Ohm

There are the following recommendations for the cable lengths and the cable cross-cuts for LAMTEC SYSTEM BUS  
 0-40m 2x2x0,34qmm, twisted paired with shield, 120 Ohm  
 40-300m 2x2x0,5qmm, twisted paired with shield, 120 Ohm  
 300-600m 2x2x0,6qmm, twisted paired with shield, 120 Ohm  
 600-1000m 2x2x0,75qmm, twisted paired with shield, 120 Ohm

# Wiring examples

## 21.3 NEMS – printer – Profibus

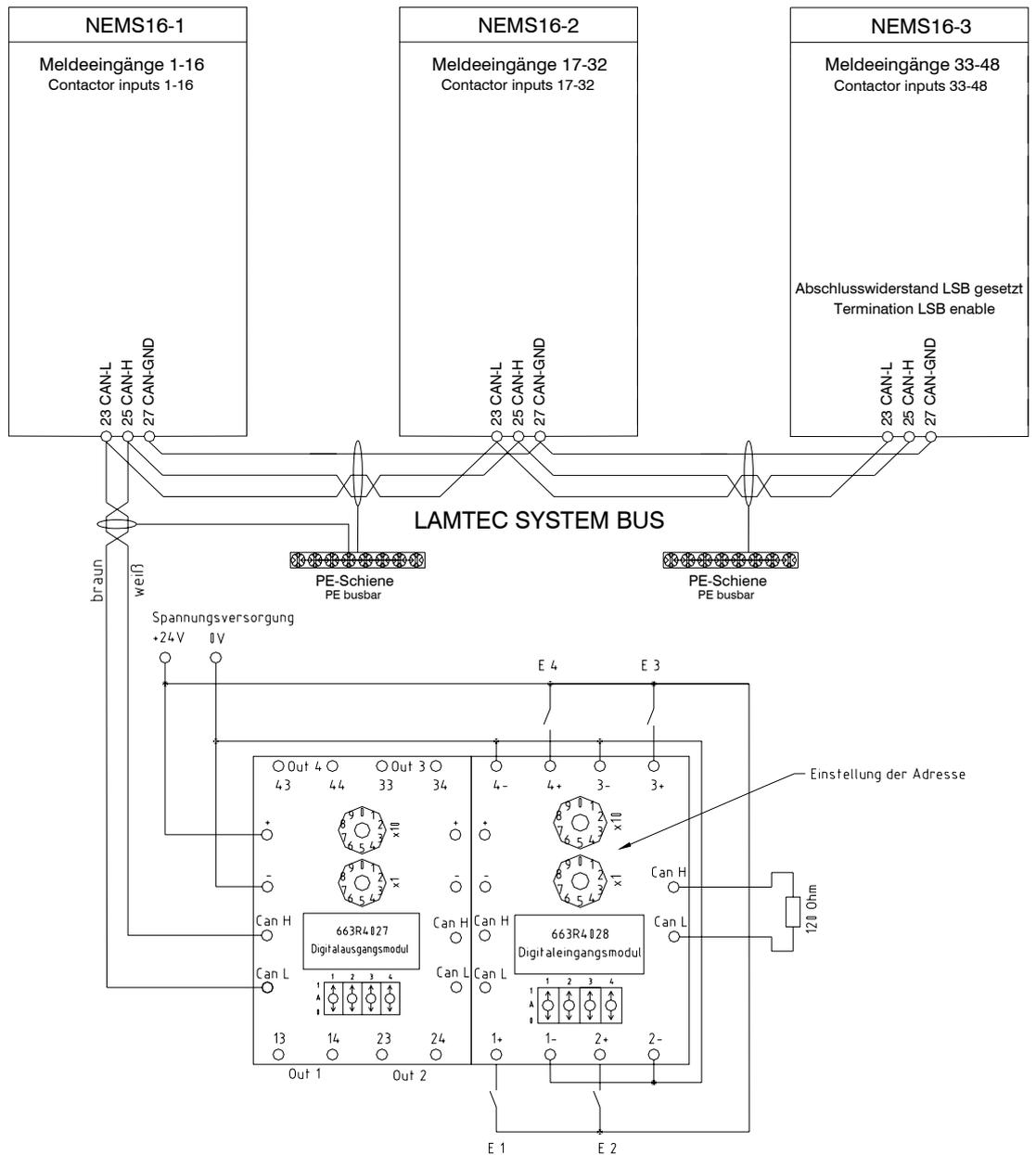


Für die Leitungslängen und den Leitungsquerschnitt des LAMTEC SYSTEM BUS gibt es folgende Empfehlungen:  
 0-40m 2x2x0,34qmm, paarig verseilt mit Abschirmung, 120 Ohm  
 40-300m 2x2x0,5qmm, paarig verseilt mit Abschirmung, 120 Ohm  
 300-600m 2x2x0,6qmm, paarig verseilt mit Abschirmung, 120 Ohm  
 600-1000m 2x2x0,75qmm, paarig verseilt mit Abschirmung, 120 Ohm

There are the following recommendations for the cable lengths and the cable cross-cuts for LAMTEC SYSTEM BUS  
 0-40m 2x2x0,34qmm, twisted paired with shield, 120 Ohm  
 40-300m 2x2x0,5qmm, twisted paired with shield, 120 Ohm  
 300-600m 2x2x0,6qmm, twisted paired with shield, 120 Ohm  
 600-1000m 2x2x0,75qmm, twisted paired with shield, 120 Ohm

# Wiring examples

## 21.4 NEMS with digital input-/output modules

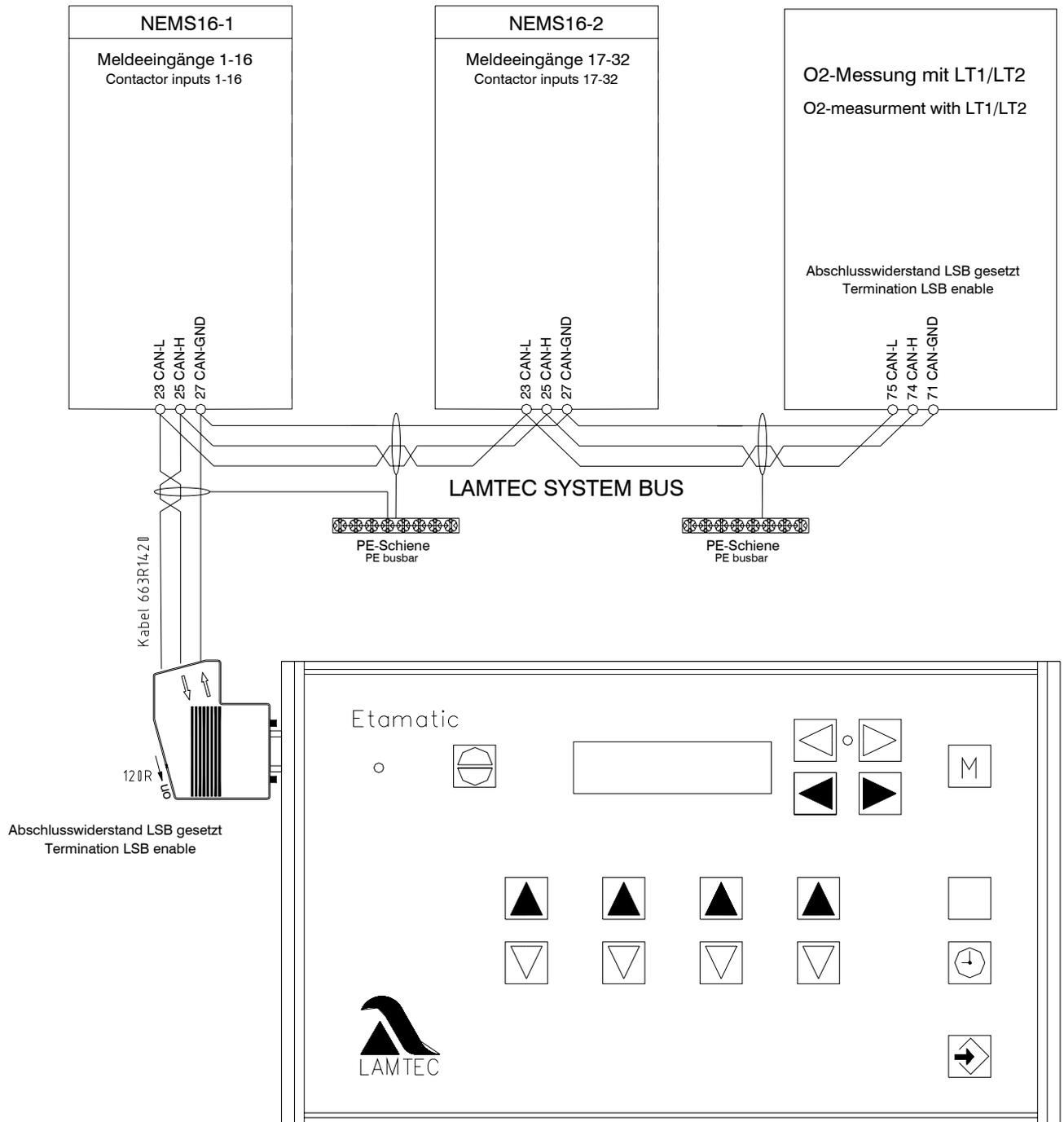


Für die Leitungslängen und den Leitungsquerschnitt des LAMTEC SYSTEM BUS gibt es folgende Empfehlungen:  
 0-40m 2x2x0,34qmm, paarig verseilt mit Abschirmung, 120 Ohm  
 40-300m 2x2x0,5qmm, paarig verseilt mit Abschirmung, 120 Ohm  
 300-600m 2x2x0,6qmm, paarig verseilt mit Abschirmung, 120 Ohm  
 600-1000m 2x2x0,75qmm, paarig verseilt mit Abschirmung, 120 Ohm

There are the following recommendations for the cable lengths and the cable cross-cuts for LAMTEC SYSTEM BUS  
 0-40m 2x2x0,34qmm, twisted paired with shield, 120 Ohm  
 40-300m 2x2x0,5qmm, twisted paired with shield, 120 Ohm  
 300-600m 2x2x0,6qmm, twisted paired with shield, 120 Ohm  
 600-1000m 2x2x0,75qmm, twisted paired with shield, 120 Ohm

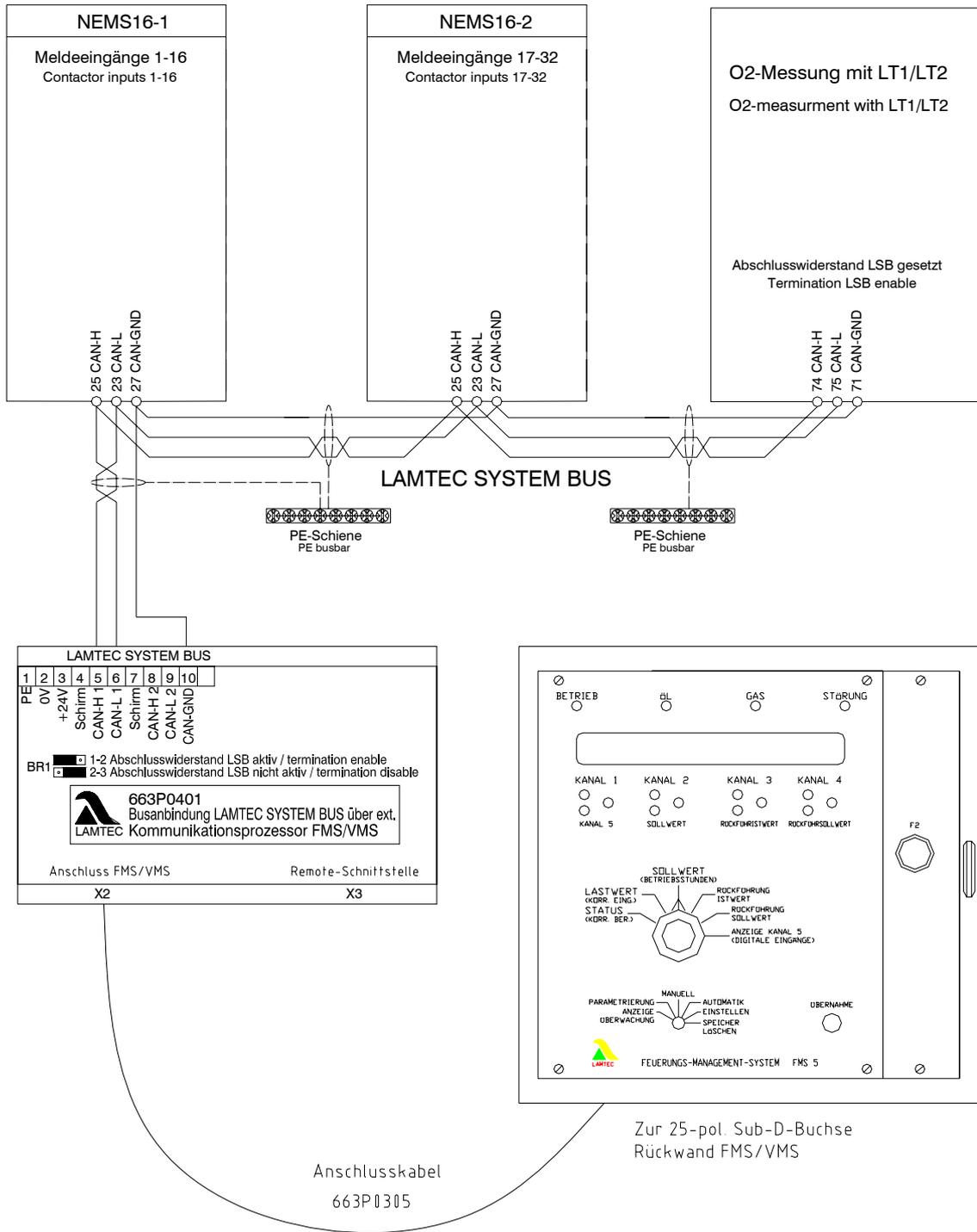
# Wiring examples

## 21.5 NEMS with ETAMATIC and LT



# Wiring examples

## 21.6 NEMS with FMS and LT



## Default settings

### 22 Default settings

<p>Level N.N General settings NQ+EQ 3 s → NQ → NQ</p>	<ul style="list-style-type: none"> <li>• LED1 green: <b>First value</b></li> <li>• LED2 red: <b>New value</b></li> <li>• LED3 red: <b>Printer OFF</b></li> <li>• LED4 green: <b>Printer with synchronisation</b></li> <li>• LED5 green: <b>Print process status signals ON</b></li> <li>• LED6 green: <b>Keys and first value interlocking not limited to the family ON</b></li> <li>• LED 7 red: <b>LED mirror function OFF</b></li> <li>• LED 8 red: <b>Com. processor PROFIBUS OFF</b></li> <li>• LED 9 green: <b>Process status signal LEDs green</b></li> <li>• LED10 green: <b>Bypassed input LEDs yellow</b></li> <li>• LED11 red: <b>32 characters</b></li> <li>• LED12 green:</li> <li>• LED13 green: <b>Signal acknowledgement by the terminal</b></li> <li>• LED14 red: <b>indicating bypassed inputs OFF</b></li> <li>• LED15 red: <b>LEDs of the bypassed inputs in good operating condition OFF</b></li> <li>• LED16 red:</li> </ul>
<p>Normal open/closed contacts principle NQ+EQ 3 s → NQ → EQ</p>	<p><b>All 16 indicator inputs “Normal open contacts principle”</b></p>
<p>Level N.H Operating/fault mode NQ+EQ 3 s → NQ → HQ</p>	<p><b>All 16 indicator inputs “Fault mode”</b></p>
<p>Level E.N Input bypasses NQ+EQ 3 s → EQ → NQ</p>	<p><b>No bypasses activated</b></p>
<p>Level E.E ext. key functions NQ+EQ 3 s → EQ → EQ</p>	<p><b>Key functions via indicator inputs not activated</b></p>

## Default settings

Level H.N Relay 1 NQ+EQ 3 s → HQ → NQ	<b>Relay 1 → Indicator group 1</b>
Level H.E Relay 2 NQ+EQ 3 s → HQ → EQ	<b>Relay 2 → Horn external</b>
Level H.H Horn NQ+EQ 3 s → HQ → HQ	<b>Horn → internal and external</b>
Level H.L Indicator groups NQ+EQ 3 s → HQ → LP	<b>All 16 indicator inputs to indicator group A</b>
Level L.N LAMTEC SYSTEM BUS family NQ+EQ 3 s → LP → NQ	<b>Device family 1</b>
Level L.E LAMTEC SYSTEM BUS address NQ+EQ 3 s → LP → EQ	<b>Device address 1</b>



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