

# Instructions for Use



## Control and Valve Box

acc. to **DIN EN ISO 7396-1**

Gebrauchsanweisung Ventil- und Kontrollstation Typ Düsseldorf

## Please note !!!

The notes and technical details mentioned in this documentation / these instructions for installation reflect the status at the time of printing.

Due to permanent development efforts for our products,  
we reserve the right to constructional modifications  
at any time.

For this reason and depending on the state of construction and development,  
the illustrations of this documentation  
may deviate from the actual appearance of the product.

But this fact does not have any influence on the functional correctness  
of the notes and operational sequences.

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## 1. Manufacturer's Data

### Product

Control and Valve Box Type Düsseldorf

### Manufacturer and Sales Office

**HEYER**®  **AEROTECH**  
Medizinische Gasversorgungssysteme



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## 2. Introduction

*Dear customer!*

Thank you for choosing a HEYER Aerotech product.

HEYER Aerotech appliances are state-of-the-art technology and manufactured according to extremely strict quality standards.

You have purchased a highly professional and long-lasting product which is easy to maintain. It is based on the experience of decades and the know-how of powerful medical technology.

The Control and Valve Box Type Düsseldorf complies with all the standards and guidelines currently applicable for the production and operation of the equipment.

If, nonetheless, you should find a reason for complaint please do not hesitate to contact our customer service department at any time.



**Before putting the equipment into operation for the first time, please carefully read these instructions for use and pay special attention to the notes which have been marked additionally.**

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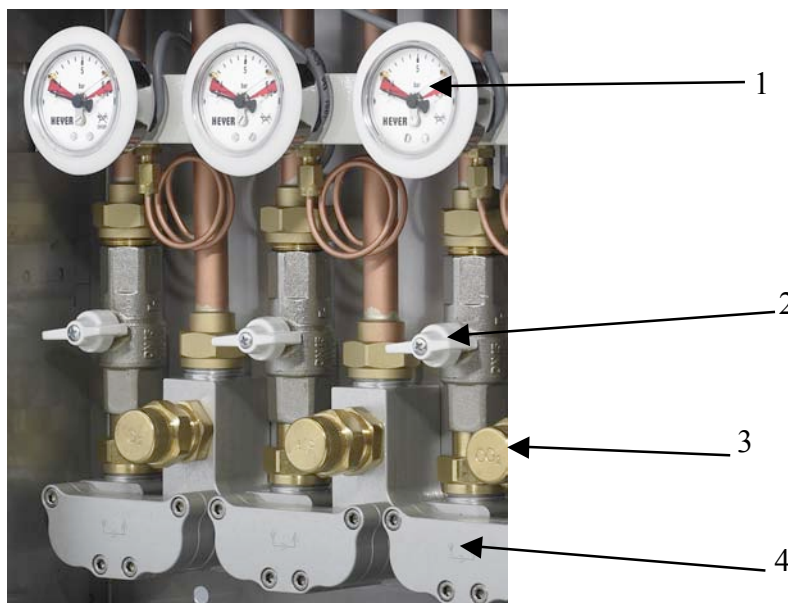
### 3. Functional and Operational Principles

#### 3.1 Cutoff device

For operational safety reasons and for monitoring purposes, the lines of a central gas supply unit are divided into different sections.

In order to be prepared for operational breakdowns of plant components as well as for monitoring purposes, we recommend a separation per wards or per semi-wards. The installation of control and valve boxes enables you to cut off specific components while keeping up operation in the other components (sections). In such a case, a cutoff valve ( $\Rightarrow$ Illustr. 1 $\rightarrow$ 2) has to be closed. The displays for pressure and vacuum give information on the current values ( $\Rightarrow$ Illustr. 1 $\rightarrow$ 1).

In the HEYER Aerotech Control and Valve Boxes Type Düsseldorf the cutoff devices and the Medium Monitors have been integrated within one case.



Illustr. 1 Inside view of control and valve box

#### Legend:

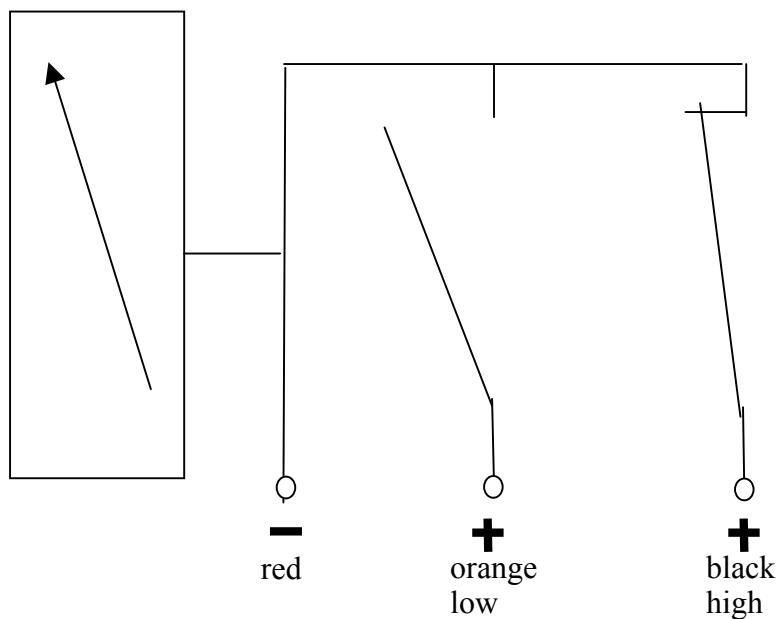
- 1: Pressure gauge / vacuum gauge
- 2: Cutoff valve
- 3: Emergency supply
- 4: Physical separation

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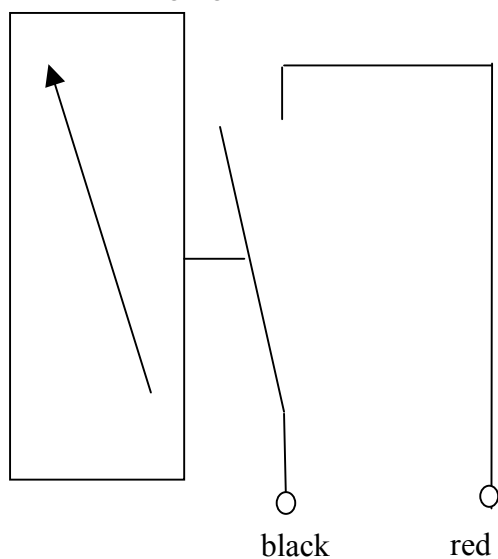
### 3.2 Pressure gauge / vacuum gauge

Alarm messages for high or low pressures are produced by pressure gauges or vacuum gauges, i.e. display instruments which are located in the control and valve box (⇒ Illustr. 1, page 5). They can be connected according to the following wiring diagram:

Wiring diagram for pressure gauge



Wiring diagram for vacuum gauge



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### **3.3 Medium Monitor**

#### **3.3.1 Product Description**

#### **3.3.2 Installation**

3.3.2.1 Basis Board and Basis Board Extension

3.3.2.2 Relay module

3.3.2.3 Medium Monitor

3.3.2.4 Connection of additional notification systems via CAN-Bus

#### **3.3.3 Putting into Operation**

3.3.3.1 Display

3.3.3.2 Basic function

3.3.3.3 Test function

3.3.3.4 Service menu



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### 3.3.1 Product Description

The emergency system is used for pressure monitoring of a control and valve box for medical gases or vacuums. Up to five different gases/vacuums can be monitored simultaneously. The individual gases/vacuums have been equipped with pressure gauges or vacuum gauges. When a gauge signals high or low pressure the emergency system will notify the user visually and acoustically.

A button and a (multicoloured) LED have been assigned to each individual gas type. This LED will shine green in normal condition and red in a state of alarm. The button can be used to deactivate the acoustic alarm. An LCD-display, which shows the designations of the different gases/vacuums, is located above the buttons and LEDs. In addition, this display shows the status of the individual LEDs (OK, HIGH, LOW).

The electronic system for pressure monitoring is available in 3-fold or 5-fold design. By means of a drop-down menu in the software, both designs can be configured as an **emergency signal device** or as an **operating signal device**.

The emergency signal device is used as the master unit monitoring the pressure and vacuum gauges. The operational signal device is used for external display of the operational statuses identified by the emergency signal device. An emergency signal device can be connected to several operating signal devices.

The user interface is made of glass with capacitive keys (with acoustic echo). Apart from the buttons for deactivating the acoustic alarm, there are three more buttons for menu navigation (ENTER, UP, DOWN).

For forwarding the operational statuses to a control centre for the building, up to three relays (excessive pressure, pressure drop, no failure) for each gas/vacuum have been installed on a motherboard. For more flexibility in equipping the relays, the motherboard has been equipped with five plug-in slots for relay modules. The relay modules consist of 1 to 3 relays with the corresponding terminals.

Additionally, the motherboard has been equipped with a power adapter of primary 230VAC or 24VAC and secondary 24VDC / 16VA for the power supply of the emergency system.

Principally, all cable connections are being monitored.

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### 3.3.2 Installation

#### 3.3.2.1 Basis Board and Basis Board Extension

The Basis Board is used for power supply of the Medium Monitor display of up to 3 displays and the Medium Monitor display of up to 5 displays.

The external main power supply of 230 VAC / 50 Hz-60 HZ is carried out at the **terminal block X1** terminals L / N / PE.

In addition, **up to 3 relay modules** can be plugged onto the **Basis Board**.

The relay modules are used for forwarding the messages to external notification systems.  
(see 2.2 Relay Modules)

The **terminal block X3** of the Basis Board is also used to monitor the control voltage (power supply) for the Medium Monitor.

The **terminal block X 4** is used for power supply of an external Medium Monitor. For additional notification systems, the power of 24 VAC required can be tapped here.

When installing the Basis Board, the insulating plate is first placed onto the threaded bolts provided for that purpose. After that, place the threaded standoffs and then the Basis Board onto the threaded bolts.

Screw the Basis Board onto the case by means of hexagon nuts.  
Finally protect the threaded bolts with plastic plugs.

For control and valve boxes of the sizes 4 and 5 gases, the Basis Board Extension will be required additionally and can only be mounted onto these bases.

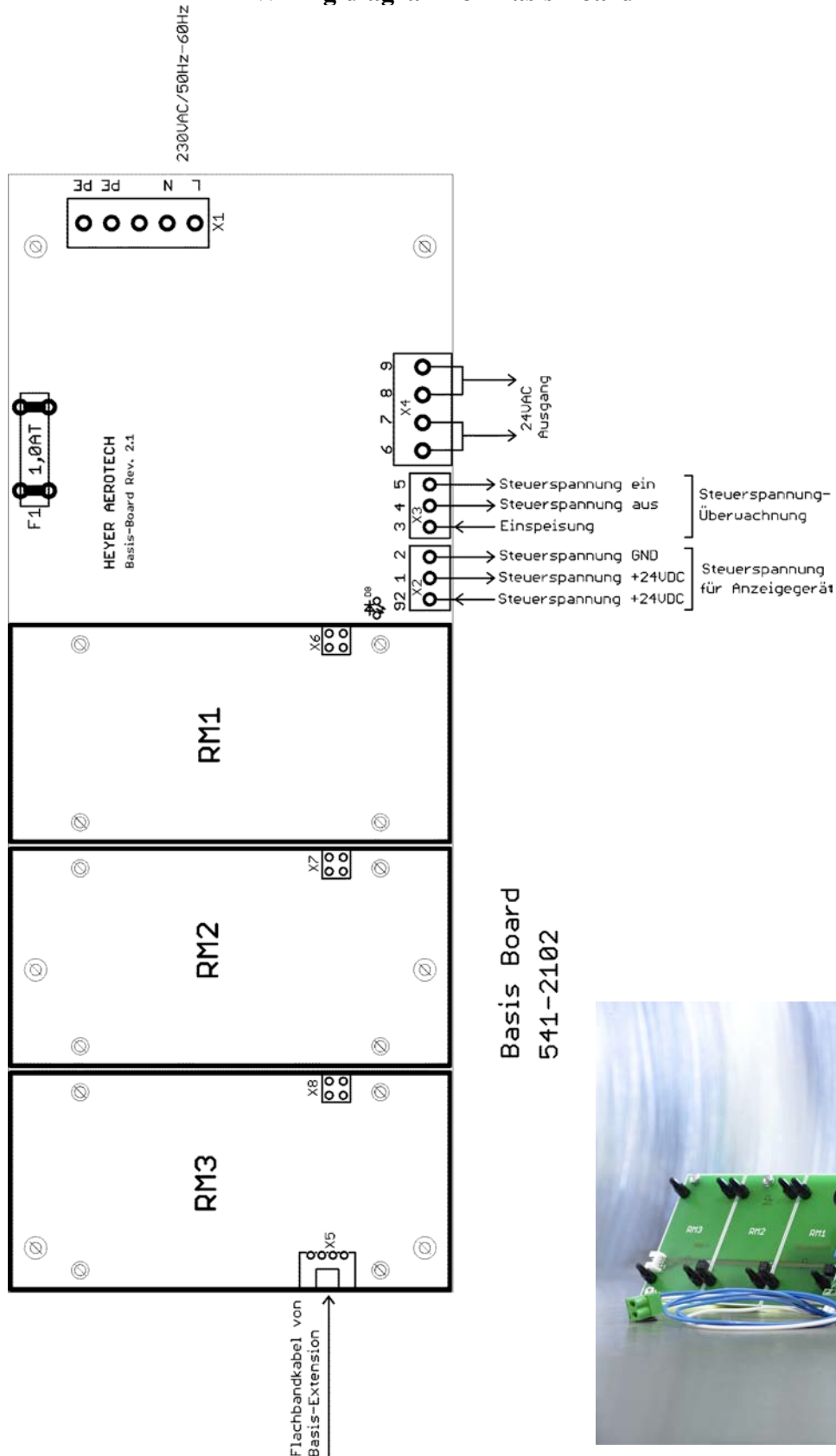
The **Basis Board Extension** is suitable for plugging **up to 2 relay modules**.

Fixing is carried out in the same way as described for the Basis Board.

The cable provided at the extension has to be connected with **terminal block X5** of the Basis Board.

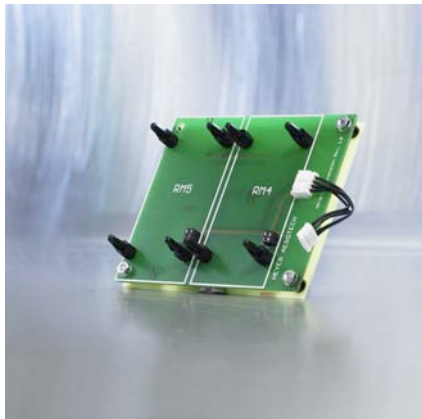
## Gebrauchsanweisung Ventil- und Kontrollstation Typ Düsseldorf

### Wiring diagram for Basis Board

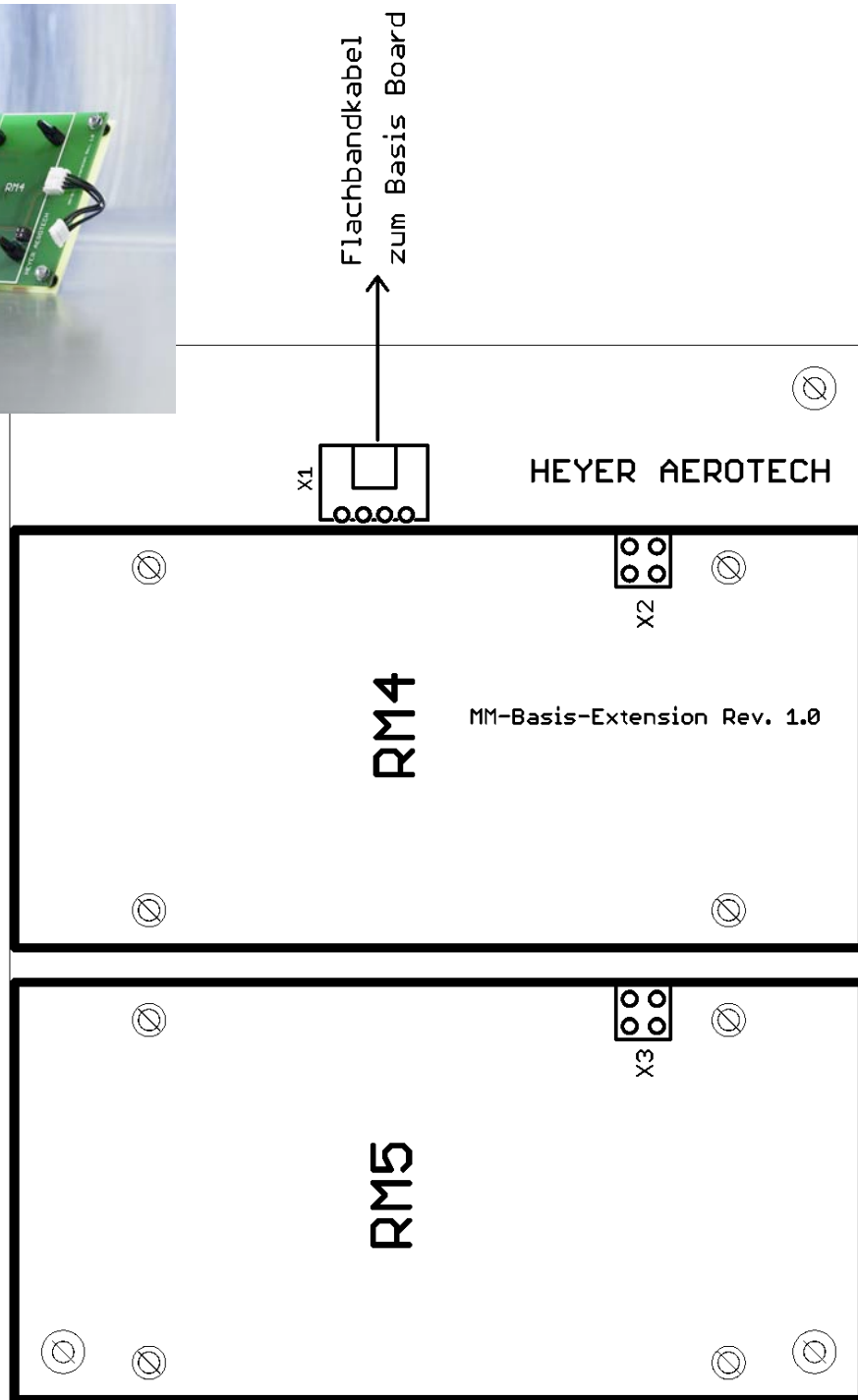


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### Wiring diagram for Basis Board Extension (only required for control and valve boxes with 4 or 5 gases)



Basis Board Extension  
541-2103



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### 3.3.2 Installation

#### 3.3.2.2 Relay module

The relay modules are used for forwarding messages to external notification systems.

If **no** external messages are required the relay modules will not be necessary.

Medium Monitors for additional notifications can be **connected and controlled without relay modules via CAN-bus** (see 2.4 Connection of additional notification systems via CAN-Bus).

2 types of relay modules can be used:

- a) Relay module 3-fold and
- b) Relay module 1-fold

##### a) Relay module 3-fold

This relay module connects the malfunction messages

**High pressure / Low pressure / Failure**

with the contacts.

The contacts are potential-free.

By repositioning the Jumper S1 (in direction of ON) the contacts of the terminal block X1 can be connected with the internal 24 VDC potential.

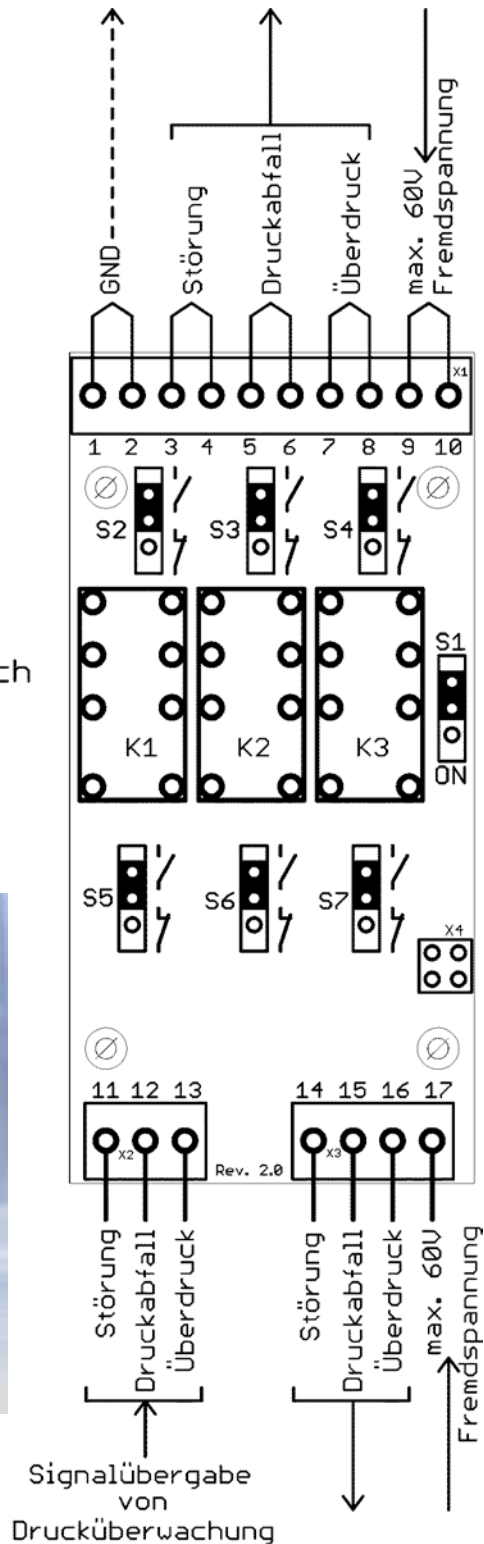
The notifications may be tapped twice at the **terminal block X 1** and once at the **terminal block X 3**. Repositioning the jumpers S2 to S7 allows the user to choose between breaker and maker.

The **terminal block X2** is used for taking in signals from the Medium Monitor.

The relay module is plugged onto the Basis Board in such a way that the 4-pole plug X4 at the relay module fits into the corresponding 4-pole jack on the Basis Board (X2 Basis Board) and the 4 clamping bolts snap into place.

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### Wiring diagram for relay module 3-fold



Relais-Modul 3-fach  
541-2105



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## b) Relay module 1-fold

This relay module connects the malfunction message

### **Failure**

with the contacts.

The contacts are potential-free.

By repositioning the Jumper (S1) the contacts can be provided with potential.

The notifications may be tapped twice at the **terminal block X 1** and once at the **terminal block X 3**.

By repositioning the Jumper S1 (in direction of ON) the contacts of the terminal block X1 can be connected with the internal 24 VDC potential.

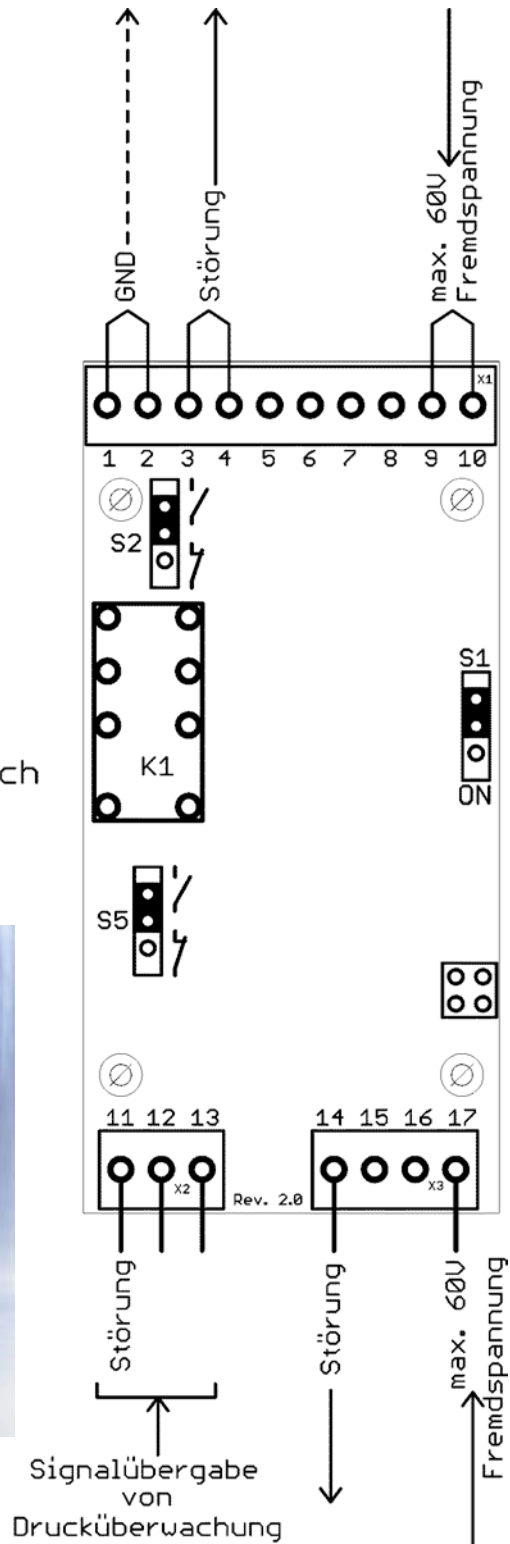
The **terminal block X2** is used for taking in signals from the Medium Monitor.

The relay module is plugged onto the Basis Board in such a way that the 4-pole plug X4 at the relay module fits into the corresponding 4-pole jack on the Basis Board (X2 Basis Board) and the 4 clamping bolts snap into place.

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### Wiring diagram for relay module 1-fold

Relais-Modul 1-fach  
541-2104





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### 3.3.2 Installation

#### 3.3.2.3 Medium Monitor

##### 3.3.2.3.1 Design

The medium monitor is available in 2 designs:

**Medium Monitor display for up to 3 displays**

**Medium Monitor display for up to 5 displays**

##### 3.3.2.3.2 Mounting

The Medium Monitor is placed into the corresponding front plate from the front and then screwed onto the front plate from the back by means of 4 screws and clip sheets.

##### 3.3.2.3.3 Connection of pressure gauge and vacuum gauge

The pressure gauge and the vacuum gauge are connected to the Medium Monitors using the following terminals.

###### **Medium Monitor display for up to 3 displays**

The pressure gauges are connected to terminals 1, 2 and 3

of terminal blocks X1 to X3.

For vacuum gauges, only terminals 2 and 3 will be used.

Additionally, a bridge has to be provided between terminals 1 and 3.

**Only one pressure gauge / vacuum gauge may be connected to one terminal block.**

###### **Medium Monitor display for up to 5 displays**

The pressure gauges are connected to terminals 1, 2 and 3

of the terminal blocks X1 to X5.

For vacuum gauges, only terminals 2 and 3 will be used.

Additionally, a bridge has to be provided between terminals 1 and 3.

**Only one pressure gauge / vacuum gauge may be connected to one terminal block.**

##### 3.3.2.3.4 Providing power supply

Power supply of 24 VDC / AC is connected to the terminal block X6, terminals 1 and 2, for both Medium Monitor designs. Polarity does not play a role here.

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### 3.3.2 Installation

#### 3.3.2.4 Connection of additional notification systems via CAN-Bus

When a Medium Monitor is used as an additional notification system it can be connected to the main equipment by means of a CAN-Bus.

The cable of the CAN-Bus of the main Medium Monitor equipment (Master) is connected to the terminal block X8 or X9, terminals 1 to 5. Please make sure that the screening of the CAN-Bus cable is placed onto terminal 5.

At the Master (and only the Master!) equipment, an earth wire has to be connected to the terminal block X15 (Shield). This is used to connect the screening of the CAN-Bus cables at one point with PE (earth).

At the additional notification system (Slave) the CAN-Bus cable coming from the main equipment (Master) is connected to the terminal block X8 or X9, terminals 1 to 5. Please also make sure here that the screening is placed onto terminal 5.

Any other additional notification system will then be assigned to the terminal block X8 or X9, terminals 1 to 5 .. and so on ... (see **Wiring example for CAN-Bus connection**).

Up to 5 Slaves may be connected to the Master equipment.  
But the total length of cables must not exceed 500 metres.

Power supply for the additional notification system comes from the Basis Board of the Master at terminal block X4 onto the terminal block X6 of the Slave Medium Monitor.

**Cross section of lines for power supply has to be 2.5 mm<sup>2</sup>.**

Power supply for the next slave may be tapped from terminal block X7, terminals 1 and 2.

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The CAN-Bus is a line bus and has to be closed at both ends of the line by means of a 120 ohm resistance. This resistance of 120 ohms can be activated by plugging the red Jumper J1 onto the Medium Monitor.



**If only one CAN-Bus cable has been connected to the Medium Monitor (end of line) the red Jumper J1 has to be plugged in.  
If both CAN-Bus cables have been connected this Jumper J1 has to be removed.**

We recommend using the following CAN-BUS cables:

up to 40m bus line

Manufacturer: Lappkabel / Article No.: 2170261 /

Designation: UNITRONIC BUS CAN UL/CSA ( CMX) 2x2x0.22sqmm

up to 300m bus line

Manufacturer: Lappkabel / Article No.: 2170264 /

Designation: UNITRONIC BUS CAN UL/CSA ( CMX) 2x2x0.34sqmm

up to 500 m bus line

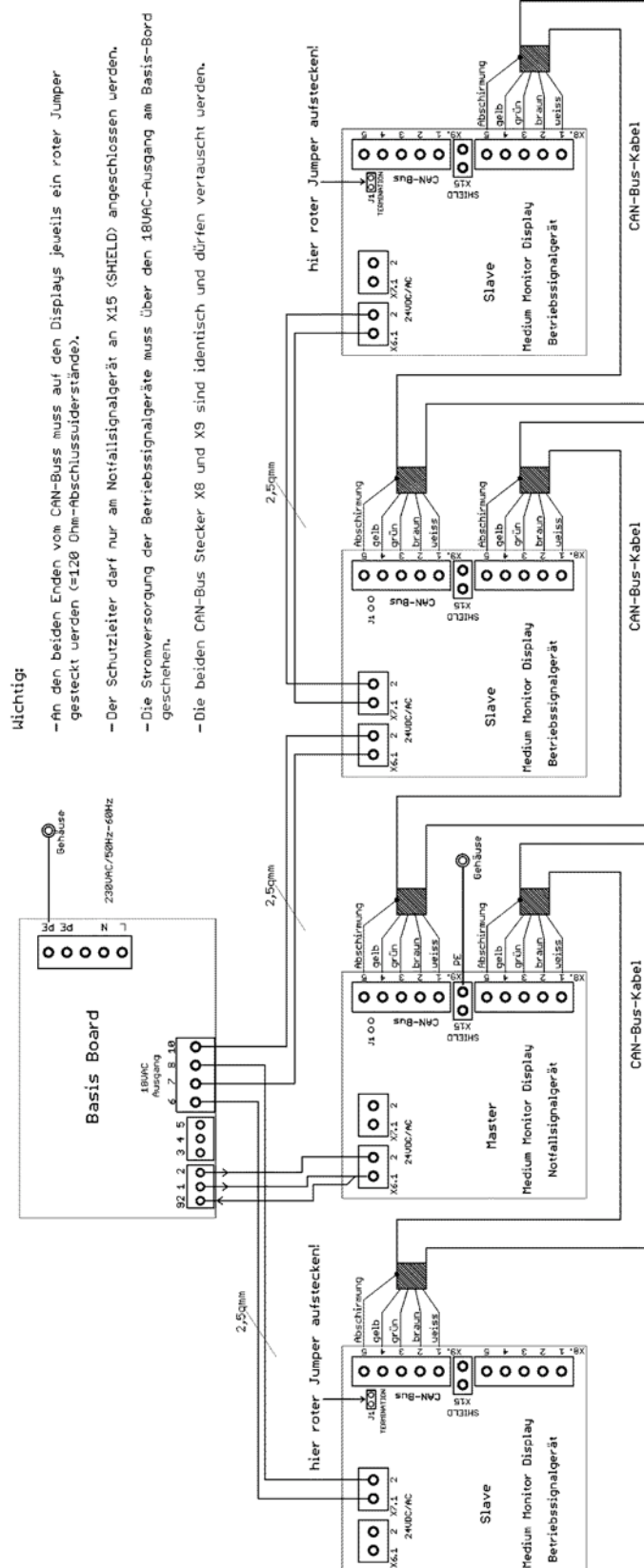
Manufacturer: Lappkabel / Article No.: 2170267 /

Designation: UNITRONIC BUS CAN UL/CSA ( CMX) 2x2x0.5sqmm

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### Wiring example for CAN-Bus connection

Beispiel für eine CAN-Bus Schaltung



**Wichtig:**

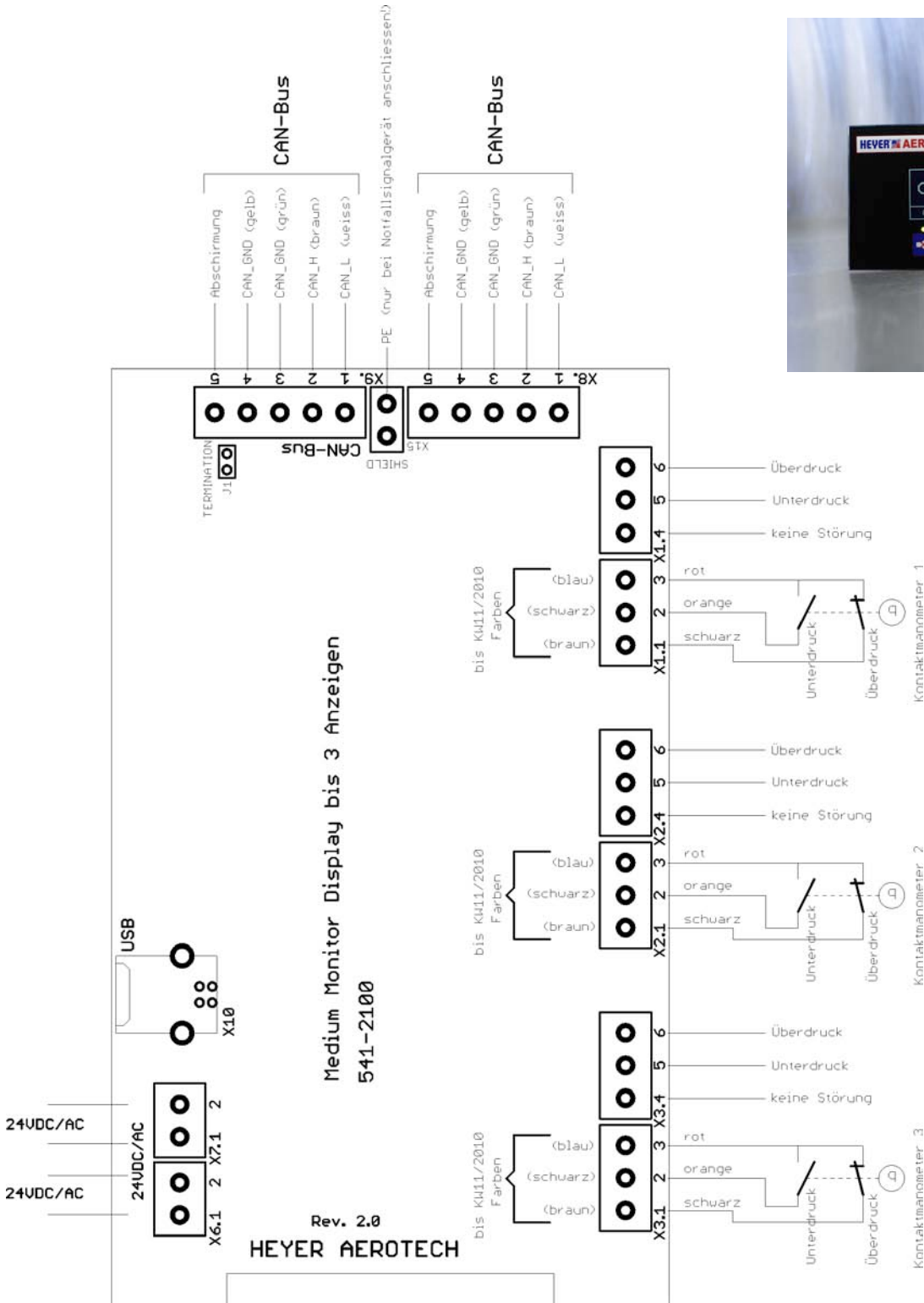
- An den beiden Enden vom CAN-Buss muss auf den Displays jeweils ein roter Jumper gesteckt werden (≈120 Ohm-Abschlusswiderstände).
- Der Schutzleiter darf nur am Notfallsignalgerät an X15 (SHIELD) angeschlossen werden.
- Die Stromversorgung der Betriebsignalgeräte muss über den 18VAC-Ausgang am Basis-Bord geschehen.
- Die beiden CAN-Bus Stecker X8 und X9 sind identisch und dürfen vertauscht werden.

**vorgeschriebenes CAN-Bus-Kabel:**

Gesamtlänge	Hersteller	Art.-Nr.	Bezeichnung
bis 40m	Lappkabel	2170261	UNITRONIC BUS CAN UL/CSA (CHX) 2x2x0,22qmm
bis 300m	Lappkabel	2170264	UNITRONIC BUS CAN UL/CSA (CHX) 2x2x0,34qmm
bis 500m	Lappkabel	2170267	UNITRONIC BUS CAN UL/CSA (CHX) 2x2x0,5qmm

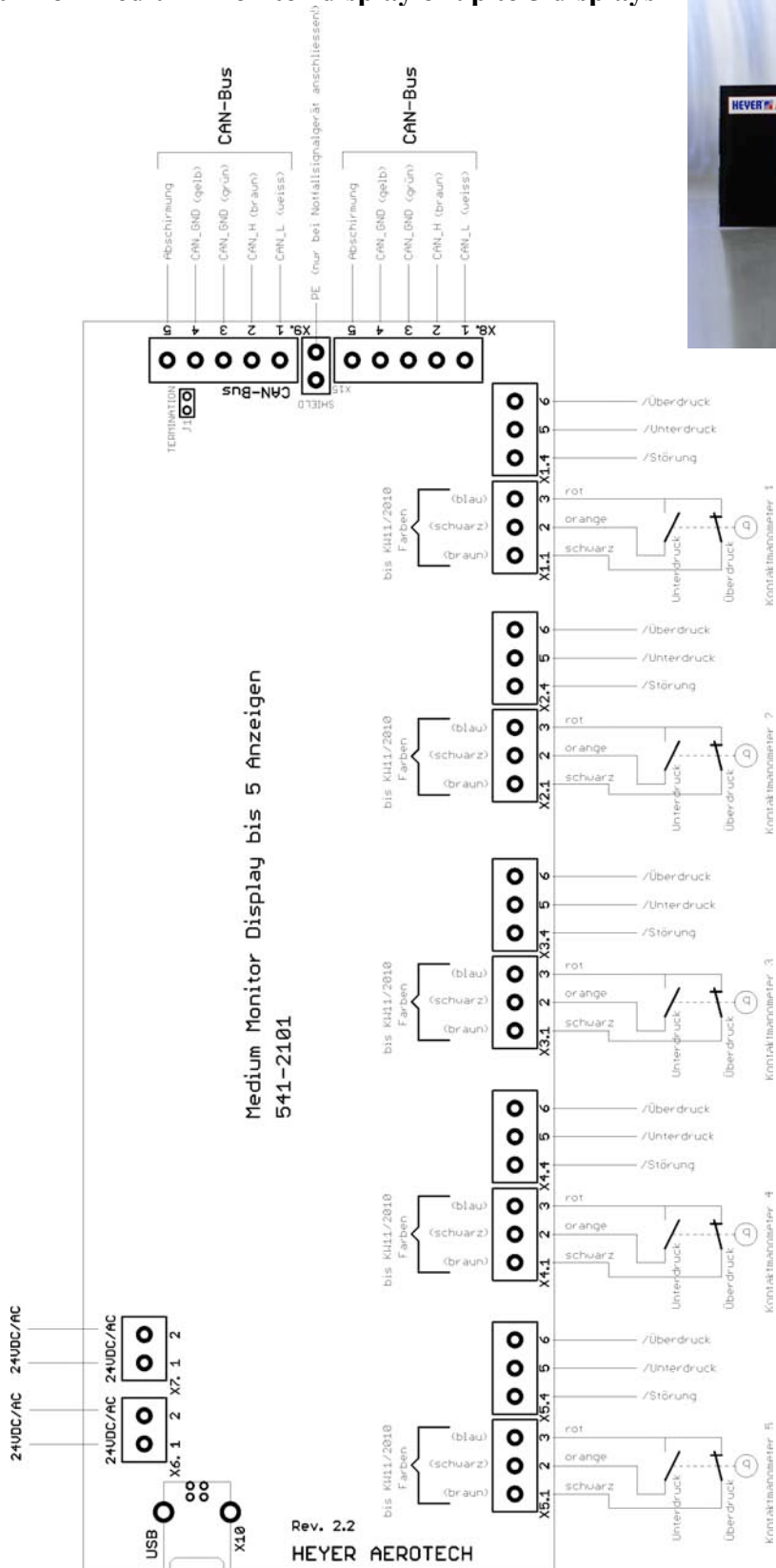
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## Wiring diagram for Medium Monitor display of up to 3 displays



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## Wiring diagram for Medium Monitor display of up to 5 displays



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### 3.3.3 Putting into Operation

#### 3.3.3.1 Display



Illustr. Medium Monitor display with up to 5 displays

1 = Displays for gas types

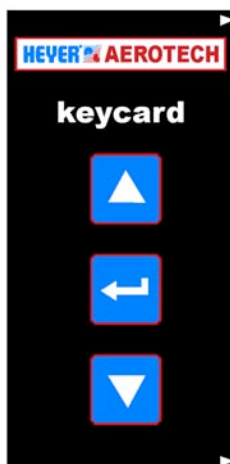
2 = Status line

3 = multicoloured LEDs

4 = Channel buttons (for tests and suppressing of acoustic alarm)

5 = concealed keypad (see “Keycard“)

#### Keycard:



Placing the keycard onto the right margin of the display glass makes the concealed keypad visible. The three keys UP, DOWN and ENTER are used for operation in the service menu.

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### 3.3.3 Putting into Operation

#### 3.3.3.2 General functions

As soon as power supply is provided and the pressure of one channel is alright, the corresponding green LED for this channel will shine and the OK status is displayed in the status line.

With high pressure “HIGH“ will be displayed

and with low pressure “LOW“.

In case of a malfunction, the red LED will shine, the status line will flash and the acoustic alarm will be set off.

In case of a malfunction, the acoustic alarm can be suppressed by pressing the corresponding channel button.

Once an acoustic alarm has been suppressed in this way the red LED will flash and the status line will stop flashing.

In the emergency signal mode, the alarm suppression will be deactivated after 12 minutes. In the operation signal mode, the alarm will be permanently suppressed.

For changing the **basic settings and for setting the gas types** please refer to Chapter **3.4 Service Menu**.

### 3.3.3 Putting into Operation

#### 3.3.3.3 Test function

When the pressure is ok, a test function can be carried out by activating the corresponding channel button.

As a consequence, the red LED will shine, the acoustic alarm will be set off, the relays on the relay module will be activated and the status line will display LOW HIGH.

When no gas type has been selected for a channel, no LED will shine and the relays will not be activated.



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### 3.3.3 Putting into Operation

#### 3.3.3.4 Service menu

Access to the service menu is granted by means of the key combination: UP, DOWN, ENTER, 3xUP (see “Keycard”).

The service menu has been equipped with a time-out function of one minute, i.e. when no key is pressed for one minute the menu will be deactivated automatically.

The menu is made up as follows:

- 1 CONFIGURATION MASTER / SLAVE
- 2 CONFIGURATION
- 3 LCD CONTRAST
- 4 MODE
- 5 CONTACT DELAY
- 6 SOFTWARE VERSION
- 7 EXIT

The UP and DOWN keys are used to select the entry requested.  
(inverse presentation).

The ENTER key is used to change to the corresponding sub-menu.

You can leave the menu by selecting EXIT and pressing the ENTER key.

#### **CONFIGURATION MASTER / SLAVE**

This menu item is used to determine if this Medium Monitor is used as the main notification system (Master, e.g. at a control and valve box) or as an additional notification system (Slave).

The UP and DOWN keys are used to select the entry requested  
(inverse presentation). The ENTER key is used to confirm.

#### **CONFIGURATION**

Here you can set the gas types. When no gas type has been selected „---“, will be displayed.

By pressing the corresponding channel key, one channel can be selected for changing the gas type. For the pre-defined texts please refer to Page 27.

The channel text will be displayed in inverse form.

Now use the UP and DOWN keys to change the gas type.

By pressing the ENTER key the channel will be unselected.

When no gas type has been selected and the ENTER key is pressed the gas types will be saved and the system will return to the main menu.

When the Medium Monitor has been defined as Slave (additional notification system), you will have to define, for each channel, if the information comes

- a) from potential-free contacts (e.g. relay contacts) or
- b) from the CAN-Bus system

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When the information comes from the Bus system, the Master channel to be monitored has to be defined as well.

### ***Example of how to use different Medium Monitors Master 5-fold / Slave 3-fold***

*At the Master Medium Monitor with up to 5 displays for a control and valve box the following gases are monitored:*

*Channel 1 = O<sub>2</sub> / Channel 2 = Air / Channel 3 = Vac / Channel 4 = N<sub>2</sub>O / Channel 5 = Air 800*

*At the Slave Medium Monitor with up to 3 displays the following gases are requested:*

*Channel 1 = Channel 1 Master (O<sub>2</sub>) / Channel 2 = Channel 2 Master (AIR) / Channel 3 = Channel 4 Master (N<sub>2</sub>O)*

*This shows that you are flexible to design the displays of the Medium Monitor.*

*The user himself can decide which messages are important for him and which messages he wants to have monitored separately by the additional notification system.*

### **LCD CONTRAST**

This menu item is used to adapt the contrast for the display.

The UP and DOWN keys are used to modify the value.

The ENTER key is used to save the value which has been set and to return to the main menu.

### **MODE**

Here the UP and DOWN keys are used to adjust the emergency signal mode and the operating signal mode.

The ENTER key is used to save the value which has been set and to return to the main menu.

**Emergency signal = signal is repeated after 12 minutes**

**Operating signal = signal is NOT repeated**

### **CONTACT DELAY**

This menu item is used to set the alarm delay time, by means of the UP and DOWN keys, from 0 (0=50 msec) in steps of 0.25 seconds up to a maximum value of 1.5 sec.

Press the ENTER key to save the value which has been set.

### **SOFTWARE VERSION**

This sub menu shows the software version. Use the ENTER key to return to the main menu.

### **EXIT**

You can leave the menu by selecting EXIT and pressing the ENTER key.

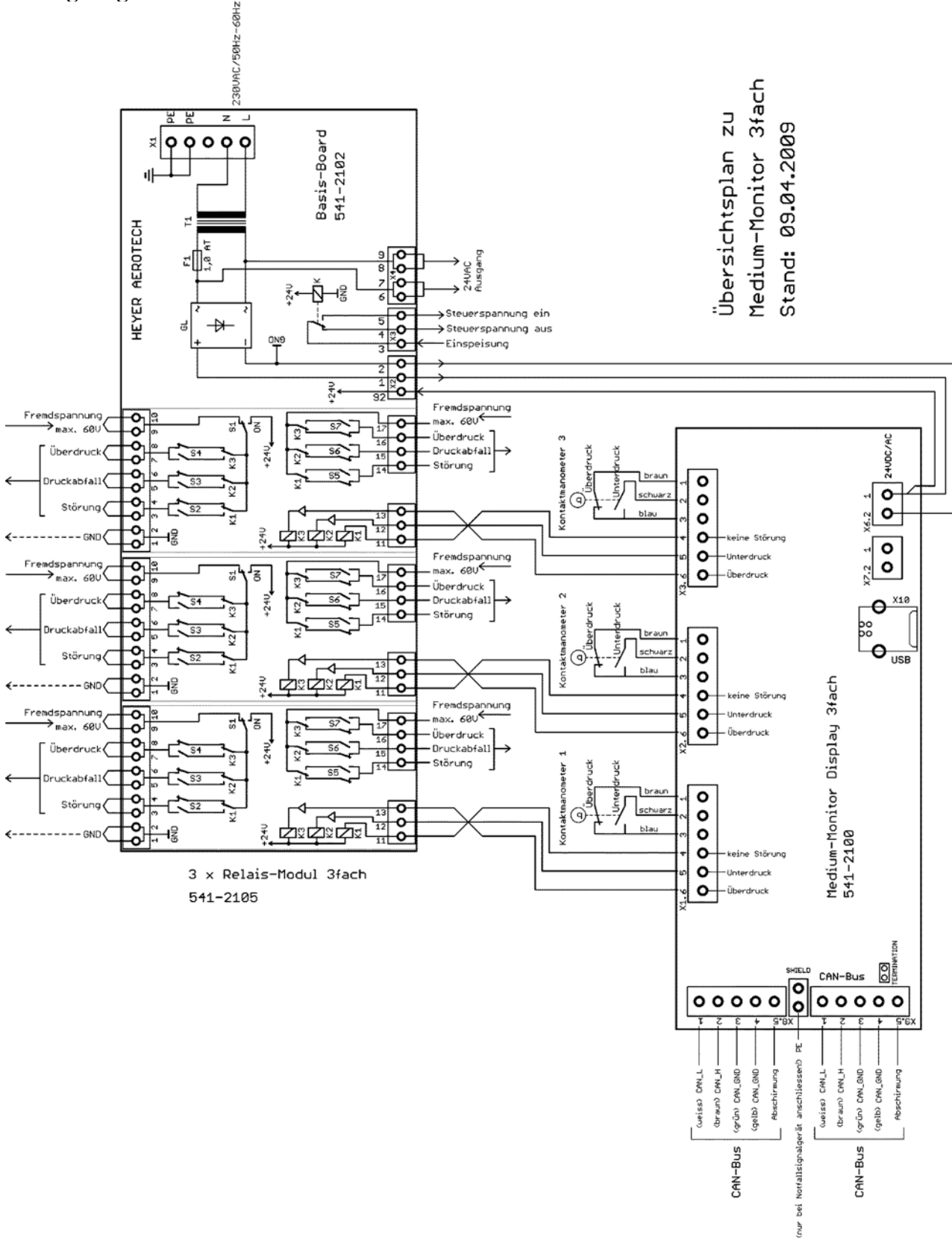
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The following texts have been pre-defined and can be selected in the **CONFIGURATION** menu.

Serial no.	Selection text	Serial no.	Selection text	Serial no.	Selection text
1	O2	33	O2 LEFT	65	à gauche vide
2	Air	34	O2 RIGHT	66	à droite vide
3	Air800	35	Air LINKS	67	la réserve
4	N2O	36	Air RECHTS	68	erreur
5	CO2	37	Air LEFT	69	batterie I
6	N2	38	Air RIGHT	70	batterie II
7	Vac	39	N2O LINKS	71	batterie III
8	LINKS LEER	40	N2O RECHTS	72	la pression du reseau
9	RECHTS LEER	41	N2O LEFT	73	service
10	LEFT EMPTY	42	N2O RIGHT	74	réservoir cryogenique
11	RIGTH EMPTY	43	CO2 LINKS	75	en service
12	RESERVE	44	CO2 RECHTS	76	source de gaz I
13	STÖRUNG	45	CO2 LEFT	77	source de gaz II
14	FAULT	46	CO2 RIGHT	78	source de gaz III
15	Ar	47	Ar LINKS	79	O2 gauche
16	Batterie I	48	Ar RECHTS	80	O2 droite
17	Batterie II	49	Ar LEFT	81	Air gauche
18	Batterie III	50	Ar RIGHT	82	Air droite
19	Battery I	51	N2 LINKS	83	N2O gauche
20	Battery II	52	N2 RECHTS	84	N2O droite
21	Battery III	53	N2 LEFT	85	CO2 gauche
22	Netzdruck	54	N2 RIGHT	86	CO2 droite
23	Line	55	Flasche LINKS	87	Ar gauche
24	Betrieb	56	Flasche RECHTS	88	Ar droite
25	Kaltvergaser	57	Bottle LEFT	89	N2 gauche
26	Tank	58	Bottle RIGHT	90	N2 droite
27	in operation	59	Flasche in Betrieb	91	bouteille gauche
28	Q I	60	3. Quelle	92	bouteille droite
29	Q II	61	Battery LEFT	93	bouteille en service
30	Q III	62	Battery RIGHT	94	troisième source
31	O2 LINKS	63	Batterie LINKS	95	batterie gauche
32	O2 RECHTS	64	Batterie RECHTS	96	batterie droite

## Gebrauchsanweisung Ventil- und Kontrollstation Typ Düsseldorf

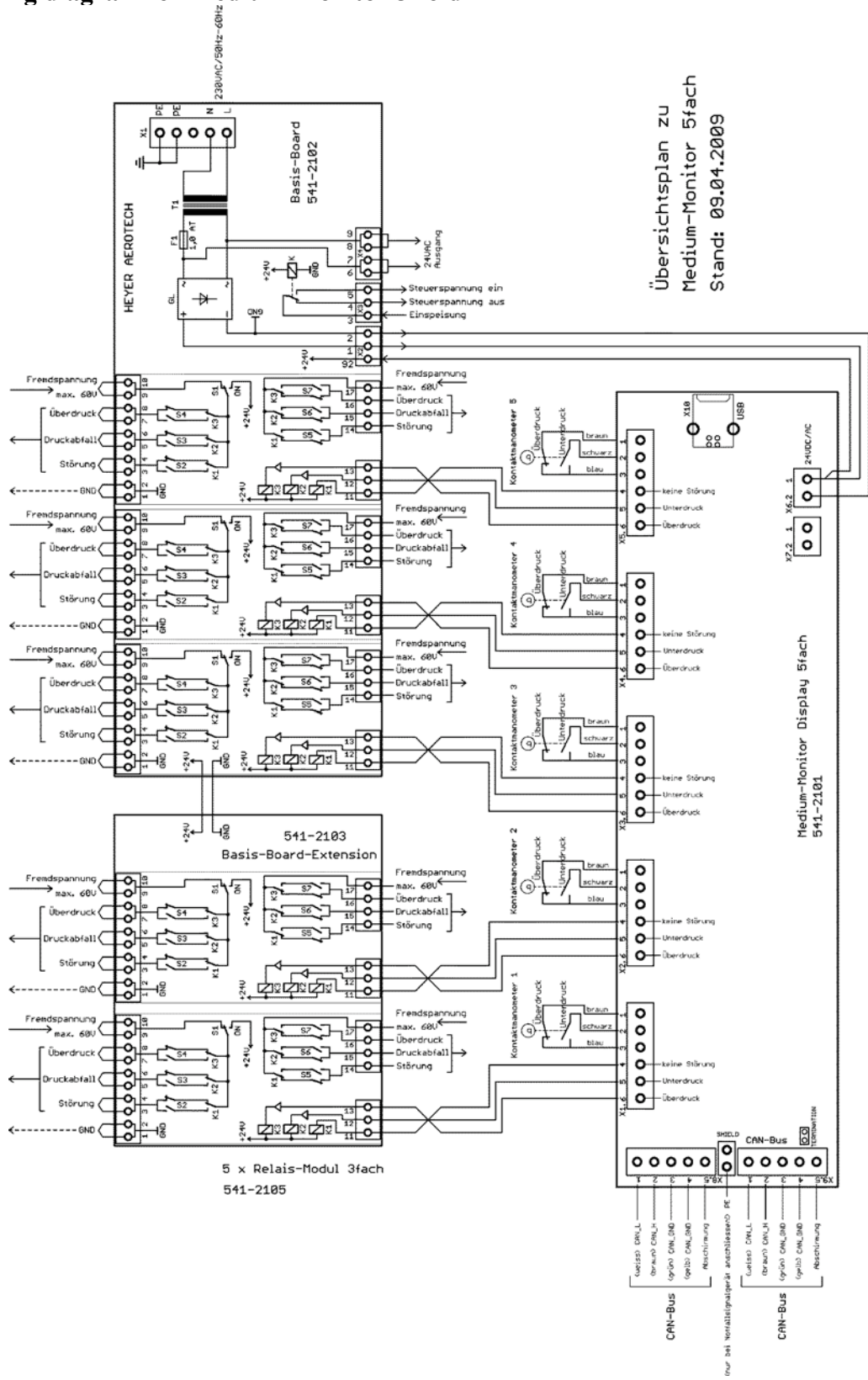
### Wiring diagram for Medium Monitor 3-fold



Übersichtsplan zu  
Medium-Monitor 3fach  
Stand: 09.04.2009

Gebrauchsanweisung Ventil- und Kontrollstation Typ Düsseldorf

### Wiring diagram for Medium Monitor 5-fold



Übersichtsplan zu  
Medium-Monitor 5fach  
Stand: 09.04.2009

Gebrauchsanweisung Ventil- und Kontrollstation Typ Düsseldorf

#### 4. Design Variants and Dimensions

The HEYER Aerotech Control and Valve Box Type Düsseldorf is available in the following design variants:

Designation	Design	Order no.	Dimensions / mm
<b>Concealed installation</b>			
Control and valve box, size 1	1 gas	700-8101	Dimensions: 430 x 305 x 100 Door with frame: 465 x 338 x 10
Control and valve box, size 1	2 gases	700-8103	Dimensions: 430 x 305 x 100 Door with frame: 465 x 338 x 10
Control and valve box, size 1	3 gases	700-8107	Dimensions: 430 x 305 x 100 Door with frame: 465 x 338 x 10
Control and valve box, size 2	4 gases	700-8119	Dimensions : 430 x 400 x 100 Door with frame: 465 x 432 x 10
Control and valve box, size 3	5 gases	700-8120	Dimensions: 430 x 495 x 100 Door with frame: 465 x 527 x 10
<b>Surface installation</b>			
Control and valve box, size 1	1 gas	701-8101	Overall dim.: 645 x 360 x 112
Control and valve box, size 1	2 gases	701-8103	Overall dim.: 645 x 360 x 112
Control and valve box, size 1	3 gases	701-8107	Overall dim.: 645 x 360 x 112
Control and valve box, size 2	4 gases	701-8119	Overall dim.: 645 x 455 x 112
Control and valve box, size 3	5 gases	701-8120	Overall dim.: 645 x 550 x 112

Gebrauchsanweisung Ventil- und Kontrollstation Typ Düsseldorf

## 5. Maintenance

The HEYER Aerotech Control and Valve Box Type Düsseldorf is subject to the maintenance regulations of the central supply unit.

We recommend our customers yearly maintenance of the equipment in order to guarantee a long-lasting service life.

CE 0044

Gebrauchsanweisung Ventil- und Kontrollstation Typ Düsseldorf

## 6. List of Spare Parts

Article number	Designation of article
028-1900	Pressure gauge, 4 bar and 6 bar switching contacts, for oxygen
028-1901	Pressure gauge, 4 bar and 6 bar switching contacts, for neutral gases
028-1902	Pressure gauge, 6.4 bar and 9.6 bar switching contacts, for neutral gases
028-1903	Pressure gauge, -0.4 switching contact, for vacuum
036-3920	Manometer sealing
027-2454	Ball cutoff valve ½ "
020-2950	Gauge glass frame
020-3280	Gauge glass
022-3112	Emergency opening with lock for control and valve box
0000-7298	Sealing set for valve set of control and valve box



Gebrauchsanweisung Ventil- und Kontrollstation Typ Düsseldorf

## 7. Warranty

The warranty period for the medical gas outlet systems by HEYER Aerotech is 12 months starting from the date of sale in accordance with the following conditions:

- During the period of warranty, we will eliminate, free of charge, any damage or failures of the equipment caused by verifiable faults in production or in the material, provided that these failures have been reported without delay after detection. Deviating from this, the warranty for engines of any type, compressors, electric switching devices, semiconductor elements, electric displays and measuring equipment is six months. The elimination of faults, free of charge, will be carried out in our factory. This warranty is not applicable to fragile parts made of glass, for example, or consumable and wearing parts.
- In the case of a guarantee, the decision of whether to repair or exchange the equipment will be at our own option. Cases of guarantee will neither extend the period of warranty nor will they represent the start of a new period of warranty. Spare parts which are installed will not be subject to an individual period of warranty.
- Any damage caused by improper use, faulty operation, mechanical damage or non-observance of the instructions for use as well as any damage caused by force majeure or any other unusual environmental conditions will not be covered by the warranty.
- The warranty claim will expire when interventions, changes or repairs of the equipment have been carried out by people who have not been authorised by us to do so or when the equipment has been used with additional accessories or spare parts of strange origin.

Further claims as well as any so-called consequential damage will be excluded as long as liability is not required by law.

Equipment may be subject to technical changes without notice!

Rev. 2.2 as per 01 June 2010

