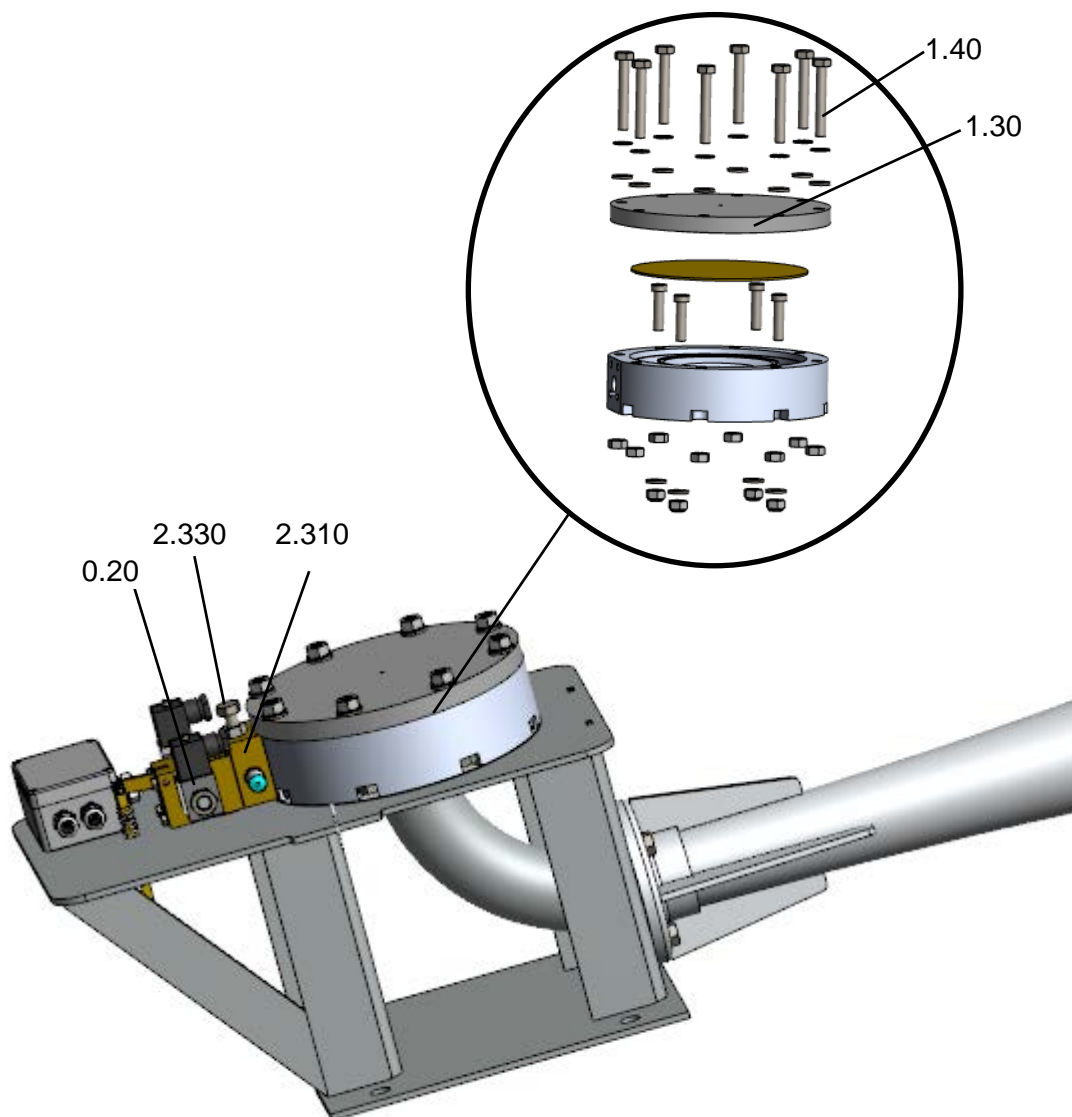


**Operating Instructions**  
**Makrofon ZM200/110b ZVE(E) H**



The Makrofon ZM200/110b consists of a brass casing. The sound is produced by a diaphragm which is chucked into the housing held by a cover which is screwed on the housing.

The signal is released electrically by the operation valve unit ZVE (0.20); for emergency release you can choose between a pull-rope or a second magnet valve. The Makrofon can be supplied with or without heating device.

The Makrofon including operating valve ZVE is suitable for pressure between 6 and 40 bar.

**The Makrofon is adjusted to a duty factor of 15% !**

### **Mounting**

The Makrofon signal set must be positioned as high as possible. It is fastened with four screws M16 which have to be secured well. When laying the compressed air pipe for the ZÖLLNER Makrofon, a compressed air filter must be installed upstream of the Makrofon valve. The filter must be fixed easily accessible in a temperature protected room (maximum pipe length between Makrofon and filter is 2000 mm), making sure that the condensation water cannot freeze up and that the filter can be cleaned at any time. The pipe between filter and Makrofon valve must be made of stainless material, e.g. copper.

It is essential to vent the pipe thoroughly before connecting to the horn, in order to remove all foreign matter from the feeding main.

### **Maintenance**

In case of sound disturbances, first of all it must be checked out if enough compressed air is flowing to the Makrofon with the valve open. Compressed air filter, operating valve and pipes must be cleaned.

After loosening the 8 fastening screws part (1.40) in the cover of the casing part (1.30), the diaphragm can be taken out.

The diaphragm is fixed by properly securing the fastening screws M12 with a maximum torque of 40 Nm after the cover of the casing has been inserted.

The correct amount of air is adjusted by turning the reduction screw part (2.330) relative to the air pressure. At the same time all electric connections must be checked.



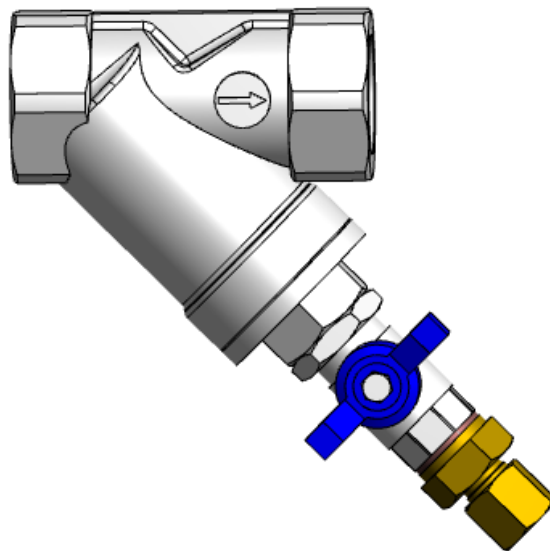
According to annex III, paragraph 1(e) the sound pressure level of the vessel's own signal at listening posts shall not exceed 110 dB(A). This means that persons staying at a distance of less than 30 metres away from the Makrofon must wear ear protection. Before a signal is released it must be assured that no person is right in front of the Makrofon.

### **Adjustment of the reduction screw**

Before releasing the valve the first time, turn the reduction screw (2.330) as far as possible into the flange (2.310). Afterwards the sound of the signal is too low. With a higher pressure before the valve, turn the reduction screw out, moving it  $\frac{1}{2}$  to  $1\frac{1}{2}$  times around. In case of lower pressure, move the reduction screw 2 to 4 times around.

Adjust the reduction screw in such a way that pure sound (without any scratching noise) is transmitted. After adjustment the reduction screw must be secured with the hexagon nut.

### **Filter F2**

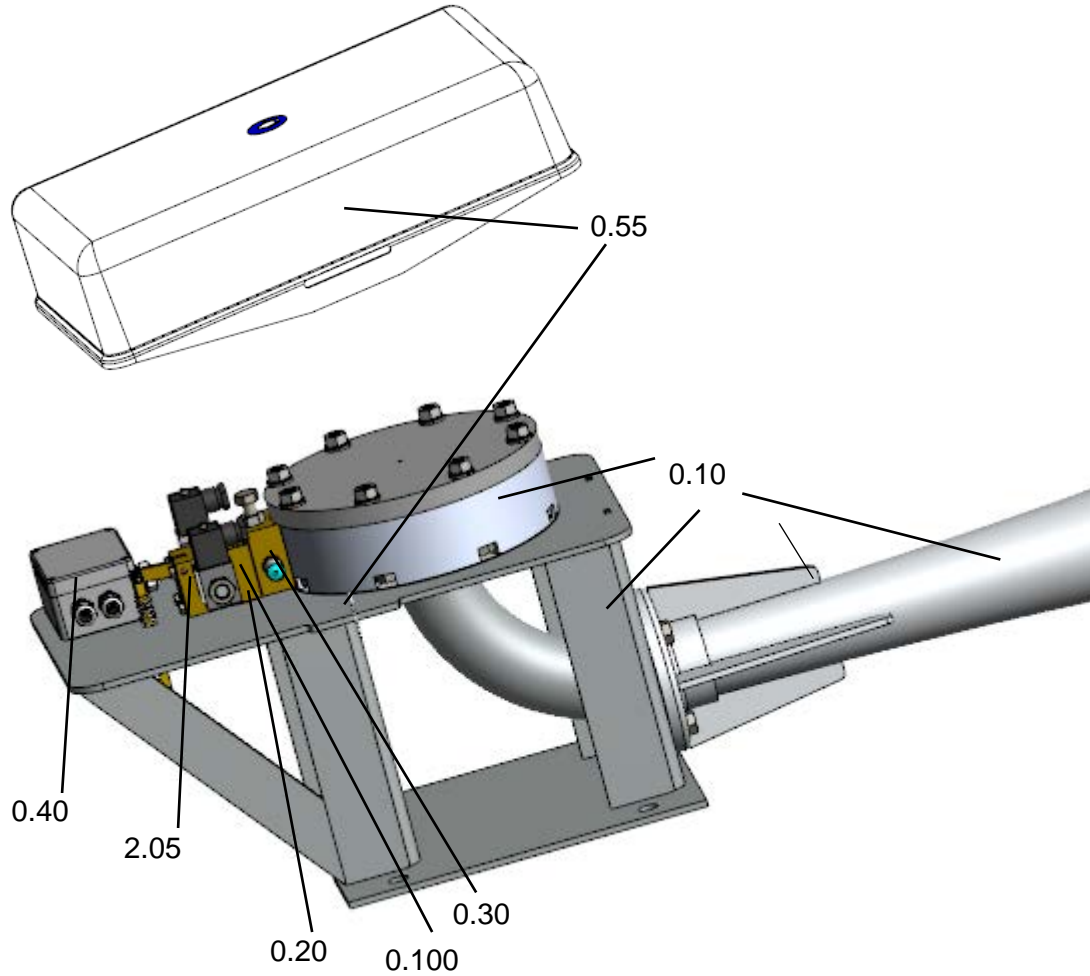


Product: ZM200/110b  
Voltage: 230 V or 115 V AC or 24 V DC  
Air pressure: 6-40 bar  
Sound Pressure: 143 dB(A)  
Protection Class: IP56  
weight: 35,6 kg



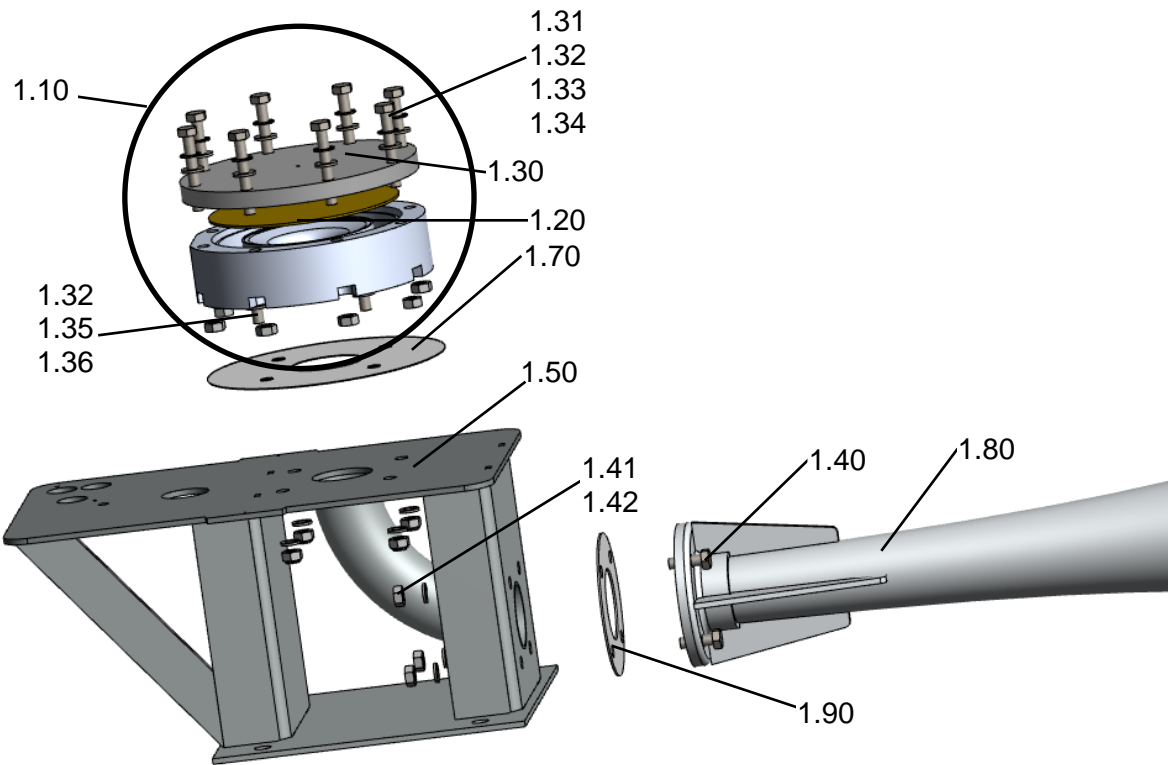
Radewisch 40, 24145 Kiel, Germany  
Register of Companies Kiel No. HR B 9618 KI  
Presidents: Dr. Philipp Murmann, Ulrich Matthiesen  
WEEE register: DE 30136569

**Makrofonanlage / Makrofon Signal Set ZM200/110b ZVE H**  
**Makrofonanlage / Makrofon Signal Set ZM200/110b ZVEE H**



| Teil part | Bezeichnung                     | Description                  | Reference |
|-----------|---------------------------------|------------------------------|-----------|
| 0.10      | Makrofon ZM200/110Hz            | Makrofon ZM200/110Hz         | Page 2    |
| 0.20      | Ventileinheit ZVEE              | valve unit ZVEE              | Page 3    |
| 0.20      | Ventileinheit ZVE               | valve unit ZVE               | Page 4    |
| 0.100     | Ventileinheit Kolben            | valve unit piston            | Page 5    |
| 0.100     | Magnetventil ZVE                | magnet valve ZVE             | Page 5    |
| 0.30      | Anschlußflansch kompl.          | connecting flange compl.     | Page 6    |
| 2.05      | Dichtungssatz ZVE-Ventil        | set of gaskets for ZVE valve | Page 7    |
| 0.55      | Haube ZM200 mit 2 Federsteckern | cover ZM200 with 2 clamps    | Page 7    |
| 0.35      | Anschluss Handzugleine ZM       | connection Pull Rope ZM      | Page 8    |
| 0.40      | Anschlußkasten Heizung          | distribution box heating     | Page 9    |

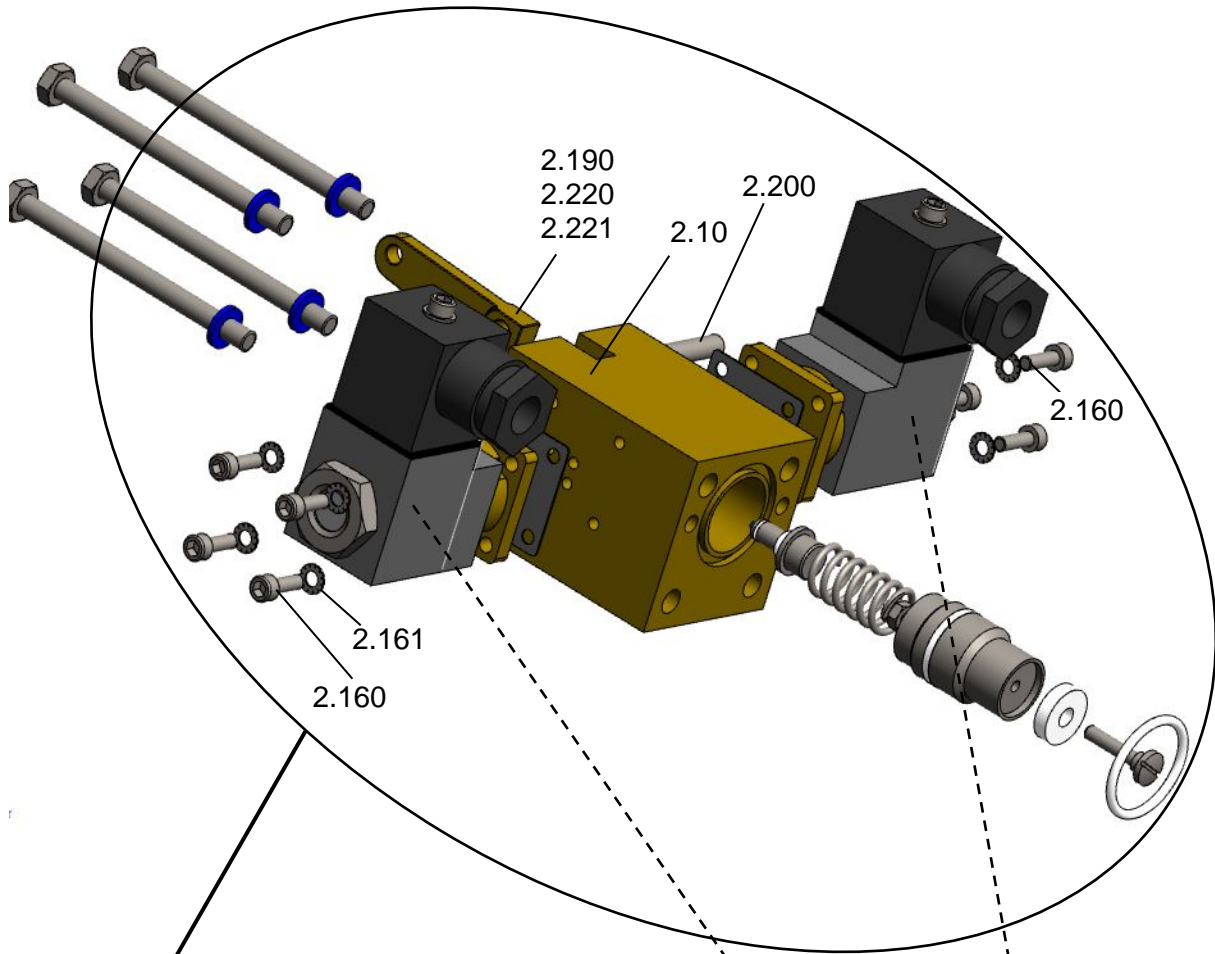
**Makrofon 110 Hz kompl. Makrofon 110 Hz compl.**



| Teil part | Ident-Nr. Ident-No. | Stck Qty. | Bezeichnung              | Description              | Techn. Daten Techn. Data |
|-----------|---------------------|-----------|--------------------------|--------------------------|--------------------------|
| 1.10      | 010457230           | 1         | Gehäuse ZM200 POM kompl. | housing ZM200 POM compl. | Ø 250 x 60               |
| 1.20      | 889020241           | 1         | Membrane                 | diaphragm                | Ø 200 x 2,4              |
| 1.30      | 01907567            | 1         | Deckel ZM 200 POM        | cover ZM 200 POM         | Ø 250 x 21               |
| 1.31      | 2044120801          | 8         | Sechskantschraube        | hexagon screw            | M12x80                   |
| 1.32      | 211100121           | 12        | Scheibe                  | washer                   | Ø13,0                    |
| 1.33      | 211310121           | 8         | Fächerscheibe            | serrated washer          | A13 Nist                 |
| 1.34      | 21034121            | 8         | Sechskantmutter          | hexagon nut              | M 12                     |
| 1.35      | 20851120451         | 4         | Inbusschraube            | Allen screw              | M12x45                   |
| 1.36      | 21032121            | 4         | Sicherungsmutter         | locknut                  | M12                      |
| 1.40      | 2044120351          | 4         | Sechskantschraube        | hexagon screw            | M 12 x 35                |
| 1.41      | 211300121           | 4         | Scheibe                  | washer                   | Ø 12 x 21 x 2,5          |
| 1.42      | 21034121            | 4         | Sechskantmutter          | hexagon nut              | M 12                     |
| 1.50      | 0104435             | 1         | Trichterbogen            | bent piece of horn       | 520x320x260              |
| 1.70      | 0104495             | 1         | Dichtung                 | gasket                   | 250/75 x 1               |
| 1.80      | 0104621             | 1         | Trichter 110Hz           | sound horn 110Hz         | Ø 585 x 1000             |
| 1.90      | 0105209             | 1         | Dichtung                 | gasket                   | Ø 150/75 x 2             |

Ventileinheit ZVEE (H) / Valve unit ZVEE (H)

Ident-No. see below



| Ident-Nr. | Bezeichnung        | Description     | Techn. Data  |                   |
|-----------|--------------------|-----------------|--------------|-------------------|
|           |                    |                 | main current | emergency current |
| 010424021 | Ventileinheit ZVEE | valve unit ZVEE | 24 V DC      | 24 V DC           |
| 010424022 | Ventileinheit ZVEE | valve unit ZVEE | 115 V AC     | 24 V DC           |
| 010424023 | Ventileinheit ZVEE | valve unit ZVEE | 230 V AC     | 24 V DC           |
| 010424024 | Ventileinheit ZVEE | valve unit ZVEE | 115 V AC     | 115 V AC          |
| 010424025 | Ventileinheit ZVEE | valve unit ZVEE | 230 V AC     | 230 V AC          |

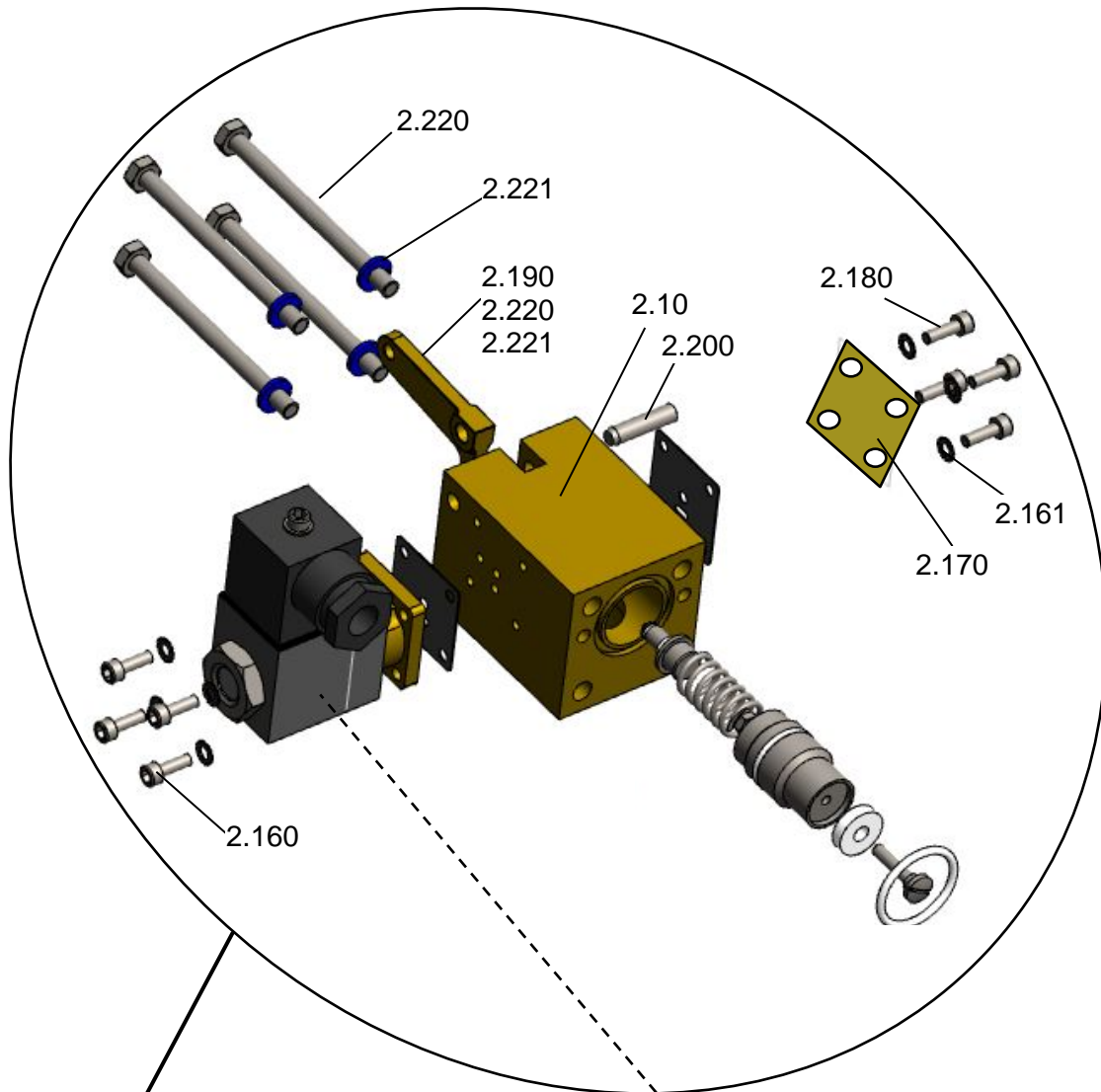
| Teil part | Ident-Nr. Ident-No. | Stck Qty. | Bezeichnung       | Description    | Techn. Daten Techn. Data |
|-----------|---------------------|-----------|-------------------|----------------|--------------------------|
| 2.10      | 0104239             | 1         | Gehäuse           | housing        | 50x50x67                 |
| 2.160     | 2002040121          | 8         | Zylinderschraube  | cylinder screw | M4x12                    |
| 2.161     | 211310041           | 8         | Scheibe           | washer         | 4.3                      |
| 2.190     | 0104589             | 1         | Hebel             | lever          | 52x8x25                  |
| 2.200     | 212206025           | 1         | Zylinderstift     | cylinder pin   | 6m6x24                   |
| 2.220     | 2043060801          | 4         | Sechskantschraube | hexagon screw  | M6x80                    |
| 2.221     | 211310061           | 4         | Scheibe           | washer         | 6x11,8x1,6               |

Content of net for reference only



Ventileinheit ZVE (H) / Valve Unit ZVE (H)

Ident-No. see below



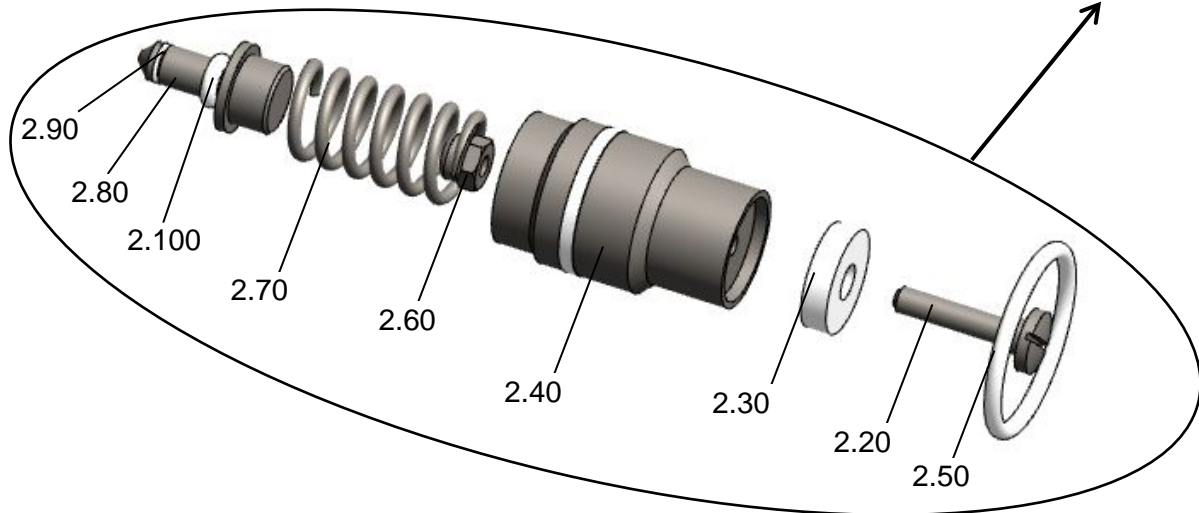
| Ident-Nr.  | Bezeichnung       | Description    | Techn. Data                                 |
|------------|-------------------|----------------|---|
| 010424012  | Ventileinheit ZVE | valve unit ZVE | 24 V DC<br>115 V AC<br>230 V AC<br>220 V DC |
| 010424013  | Ventileinheit ZVE | valve unit ZVE |   |
| 010424014  | Ventileinheit ZVE | valve unit ZVE |   |
| 0104240220 | Ventileinheit ZVE | valve unit ZVE |   |

| Teil part | Ident-Nr. Ident-No. | Stck Qty. | Bezeichnung       | Description    | Techn. Daten Techn. Data |
|-----------|---------------------|-----------|-------------------|----------------|--------------------------|
| 2.10      | 0104239             | 1         | Gehäuse           | housing        | 50x50x67                 |
| 2.160     | 2002040121          | 4         | Zylinderschraube  | cylinder screw | M4x12                    |
| 2.161     | 211310041           | 8         | Scheibe           | washer         | 4.3                      |
| 2.170     | 0104545             | 1         | Blindflansch      | blank flange   | 32x32x4                  |
| 2.180     | 2002040101          | 4         | Zylinderschraube  | cylinder screw | M4x10                    |
| 2.190     | 0104589             | 1         | Hebel             | lever          | 52x8x25                  |
| 2.200     | 212206025           | 1         | Zylinderstift     | cylinder pin   | 6m6x24                   |
| 2.220     | 2043060801          | 4         | Sechskantschraube | hexagon screw  | M6x80                    |
| 2.221     | 211310061           | 4         | Scheibe           | washer         | 6x11,8x1,6               |



**Ventileinheit Kolben / Valve Unit Piston**

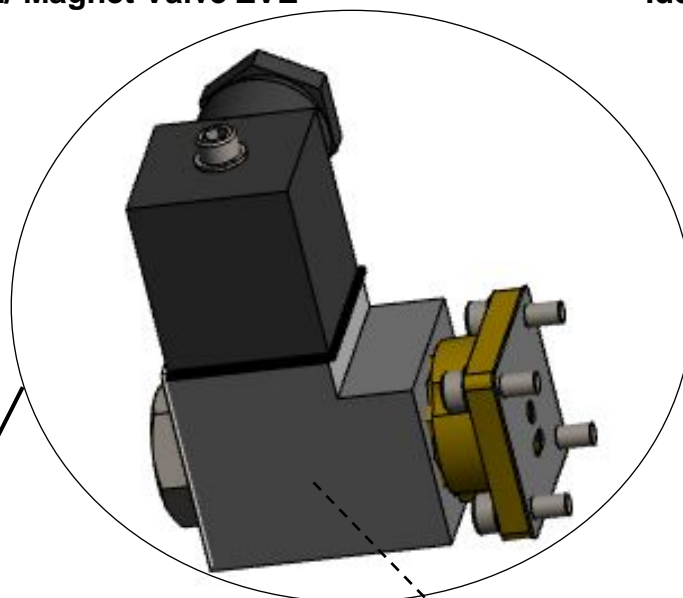
**Ident-No. 01415855**



| Teil part | Ident-Nr. Ident-No. | Stck Qty. | Bezeichnung       | Description     | Techn. Daten Techn. Data |
|-----------|---------------------|-----------|-------------------|-----------------|--------------------------|
| 2.20      | 0103121             | 1         | Linsenschraube    | fillister screw | M4x3x17                  |
| 2.30      | 01703011            | 1         | Dichtung          | gasket          | Ø 16x5.5x4               |
| 2.40      | 0104181             | 1         | Kolben            | piston          | Ø 22x36                  |
| 2.50      | 0104488             | 1         | Kolbenring        | piston ring     | Ø 22,1x18.2x2.2          |
| 2.60      | 21034041            | 1         | Sechskantmutter   | hexagon nut     | M4                       |
| 2.70      | 0104311             | 1         | Druckfeder        | pressure spring | Ø13/2x28                 |
| 2.80      | 0104312             | 1         | Entlüftungsbolzen | vent bolt       | Ø13,5x22                 |
| 2.90      | 502100324           | 1         | O-Ring            | O-ring          | R3.3x2.4                 |
| 2.100     | 50210041            | 1         | O-Ring            | O-ring          | R4x1                     |

**Magnetventil ZVE/ Magnet Valve ZVE**

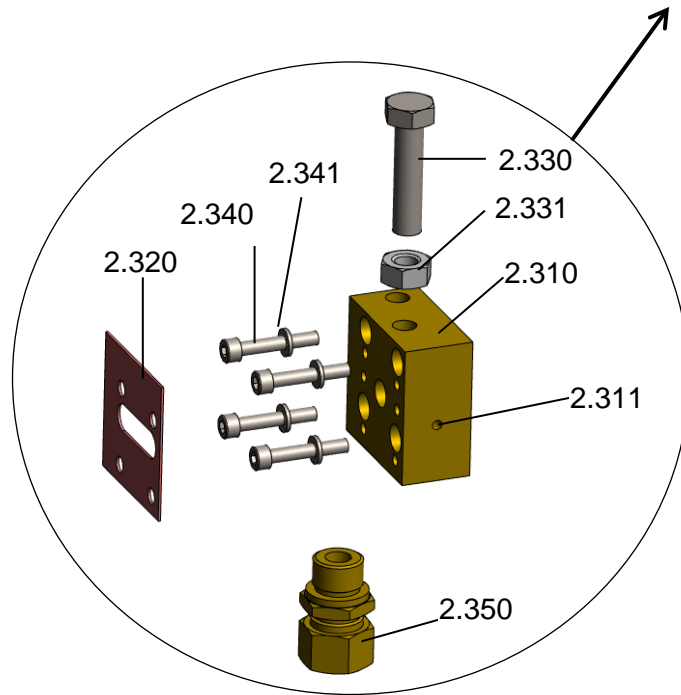
**Ident-No. see below**



| Ident-Nr. Ident-No. | Bezeichnung  | Description  | Techn. Data |
|---------------------|--------------|--------------|-------------|
| 00171644            | Magnetventil | magnet valve | 24 V DC     |
| 00171642            | Magnetventil | magnet valve | 115 V AC    |
| 00171643            | Magnetventil | magnet valve | 230 V AC    |
| 00171645            | Magnetventil | magnet valve | 220 V DC    |

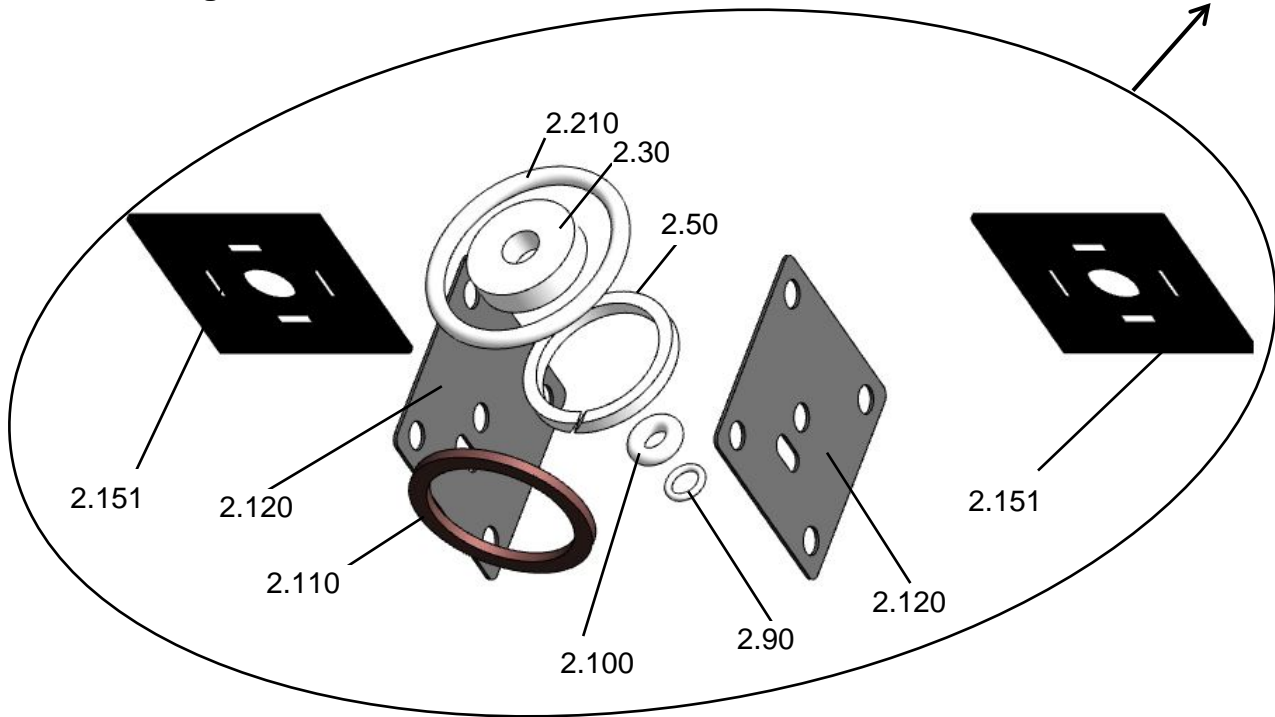
Anschlußflansch kompl. / Connecting Flange Compl.

Ident-No. 01044360



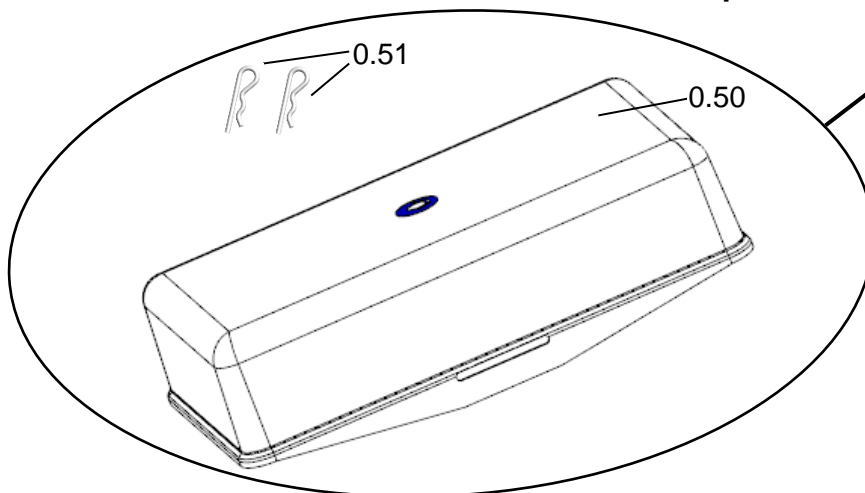
| Teil part | Ident-Nr. Ident-No. | Stck Qty. | Bezeichnung       | Description       | Techn. Daten Techn. Data |
|-----------|---------------------|-----------|-------------------|-------------------|--------------------------|
| 2.310     | 0104436             | 1         | Anschlußflansch   | Connecting flange | 60x60x30                 |
| 2.311     | 2016040052          | 1         | Gewindestift      | set screw         | M4x5                     |
| 2.320     | 0104446             | 1         | Flanschdichtung   | Flange gasket     | 60x60x1                  |
| 2.330     | 2044120501          | 1         | Sechskantschraube | hexagon screw     | M12x50                   |
| 2.331     | 21034121            | 1         | Sechskantmutter   | Hexagon nut       | M12                      |
| 2.340     | 2035060351          | 4         | Zylinderschraube  | Cylinder screw    | M6x35                    |
| 2.341     | 211300061           | 4         | Sperrkantring     | Washer            | 6x11,8x1,6               |
| 2.350     | 267001830           | 1         | Verschraubung     | Screwed joint     | GE15-LR                  |

Dichtungssatz ZVE-Ventil / Set of Gaskets for ZVE Valve Ident-No. 017142



| Teil part | Ident-Nr. Ident-No. | Stck Qty. | Bezeichnung | Description | Techn. Daten Techn. Data |
|-----------|---------------------|-----------|-------------|-------------|--------------------------|
| 2.30      | 01703011            | 1         | Dichtung    | gasket      | Ø 16x5.5x4               |
| 2.50      | 0104488             | 1         | Kolbenring  | piston ring | Ø 22,1x18.2x2.2          |
| 2.90      | 502100324           | 1         | O-Ring      | o-ring      | R3.3x2.4                 |
| 2.100     | 50210041            | 1         | O-Ring      | o-ring      | R4x1                     |
| 2.110     | 502102525           | 1         | O-Ring      | o-ring      | R25x2.5                  |
| 2.120     | 0104486             | 2         | Dichtung    | gaske       | 32x32x0,5                |
| 2.151     | 620374756           | 2         | Dichtung    | gasket      | 27x27x1,5                |
| 2.210     | 50302161            | 1         | Dichtung    | gasket      | A21x26x1.5               |

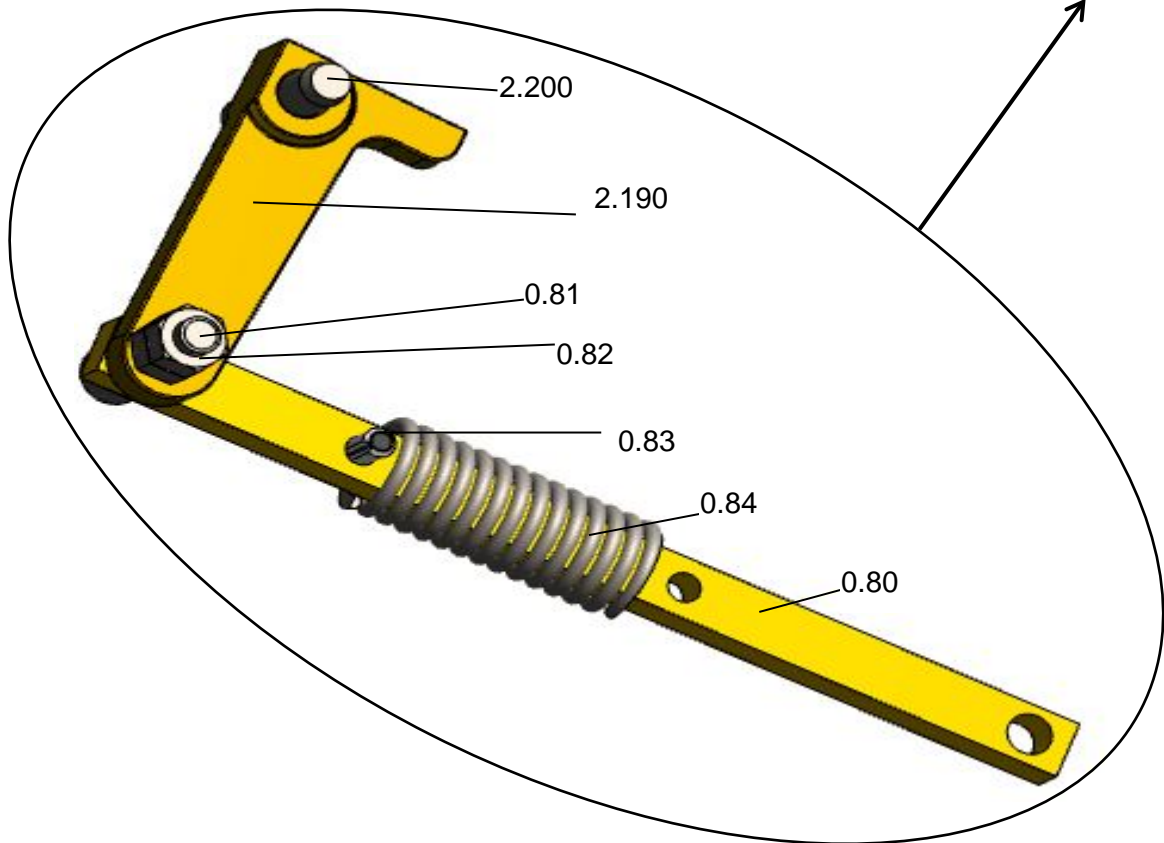
Haube ZM200 mit 2 Federsteckern / Cover ZM200 with 2 Clamps Ident-No. 01044371



| Teil part | Ident-Nr. Ident-No. | Stck Qty. | Bezeichnung | Description  | Techn. Daten | Techn. Data |
|-----------|---------------------|-----------|-------------|--------------|--------------|-------------|
| 0.50      | 0104437             | 1         | 525x325x145 | Haube ZM200  |              | cover       |
| 0.51      | 0104483             | 2         | Ø 3x75      | Federstecker |              | clamp       |

Anschluss Handzugleine ZM / Connection Pull Rope ZM

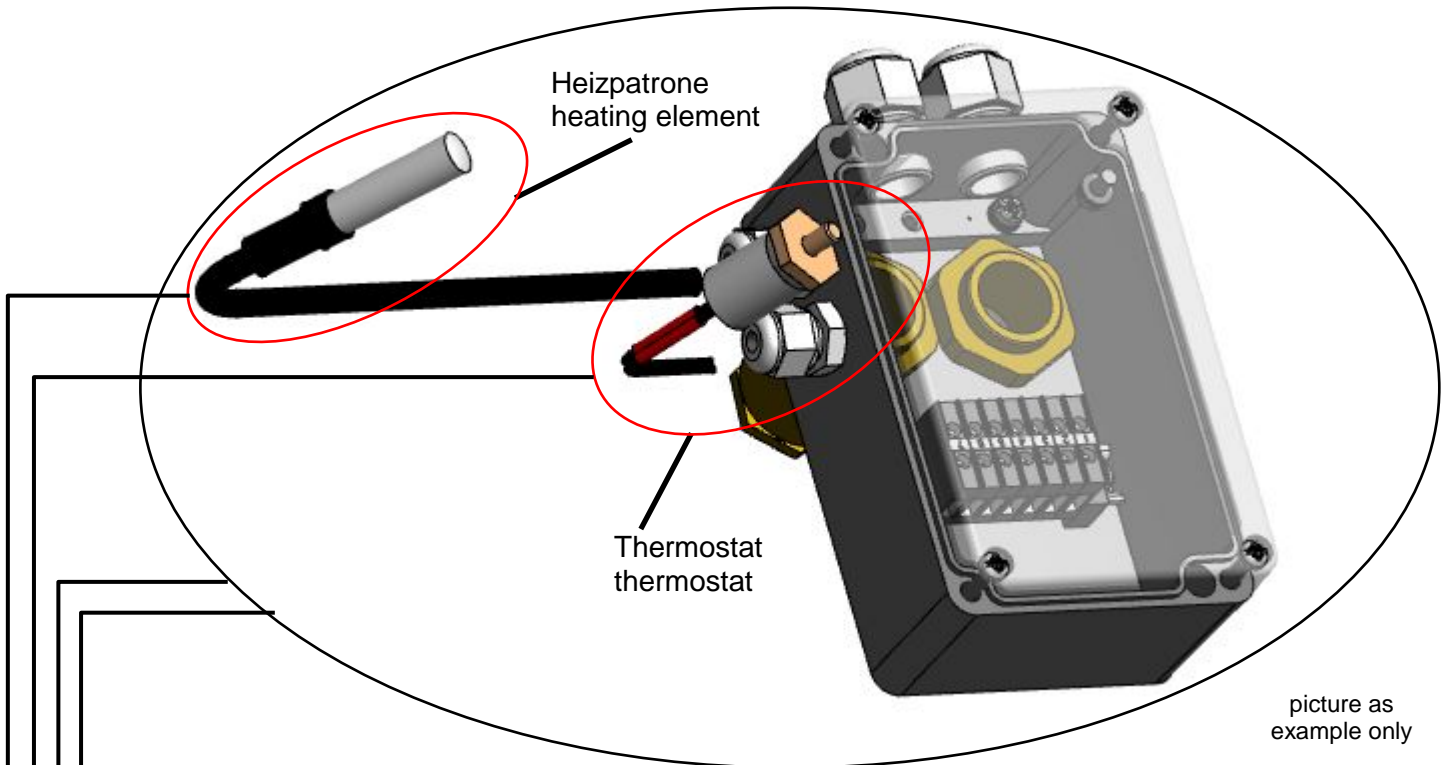
Ident-No. 01415865



| Teil part | Ident-Nr. Ident-No. | Stck Qty. | Bezeichnung      | Description       | Techn. Daten Techn. Data |
|-----------|---------------------|-----------|------------------|-------------------|--------------------------|
| 0.80      | 0104234             | 1         | Zugstange        | connecting rod    | 8x5x125                  |
| 0.81      | 2002050201          | 1         | Zylinderschraube | cylinder screw    | M5x20                    |
| 0.82      | 21034051            | 2         | Sechskantmutter  | hexagon nut       | M5                       |
| 0.83      | 216104161           | 1         | Spannhülse       | withdrawal sleeve | 4X16                     |
| 0.84      | 0104311             | 1         | Druckfeder       | pressure spring   | ∅13/2x28                 |
| 2.190     | 0104589             | 1         | Hebel            | lever             | 52x8x25                  |
| 2.200     | 212206025           | 1         | Zylinderstift    | cylinder pin      | 6m6x24                   |

**Anschlußkasten Heizung / Distribution Box Heating**

**Ident-No. see below**



| Ident-Nr.<br>Ident-No.             | Bezeichnung            | Description              | Techn. Daten<br>Techn. Data   |
|------------------------------------|------------------------|--------------------------|---|
| 010430742<br>010430741<br>01043074 | Anschlußkasten Heizung | distribution box heating | ZM200 ZVE H 24 V DC<br>ZM200 ZVE H 115 V AC<br>ZM200 ZVE H 230 V AC |
|                                    | Anschlußkasten Heizung | distribution box heating |   |
|                                    | Anschlußkasten Heizung | distribution box heating |   |

|                                  |                        |                          |  |
|----------------------------------|------------------------|--------------------------|--|
| 01043077<br>01043076<br>01043075 | Anschlußkasten Heizung | distribution box heating | ZM200 ZVEE H 24 V DC<br>ZM200 ZVEE H 115 V AC<br>ZM200 ZVEE H 230 V AC |
|                                  | Anschlußkasten Heizung | distribution box heating |  |
|                                  | Anschlußkasten Heizung | distribution box heating |  |

In every box above the following main components are included:  
 heating element, thermostat, cable glands, terminals, mounting material

**Only heating and thermostat can be ordered separately:**

|            |            |            |      |
|------------|------------|------------|------|
| 8846027080 | Thermostat | thermostat | IP65 |
|------------|------------|------------|------|

|   |                    |                        |                                 |
|---|--------------------|------------------------|---------------------------------|
| 88441030300<br>88441050300<br>88441040300 | Heizpatrone ZVE(E) | heating element ZVE(E) | 24 V DC<br>115 V AC<br>230 V AC |
|   | Heizpatrone ZVE(E) | heating element ZVE(E) |                                 |
|   | Heizpatrone ZVE(E) | heating element ZVE(E) |                                 |

Filter F2 / Filter F2

Ident-No. 0104620

