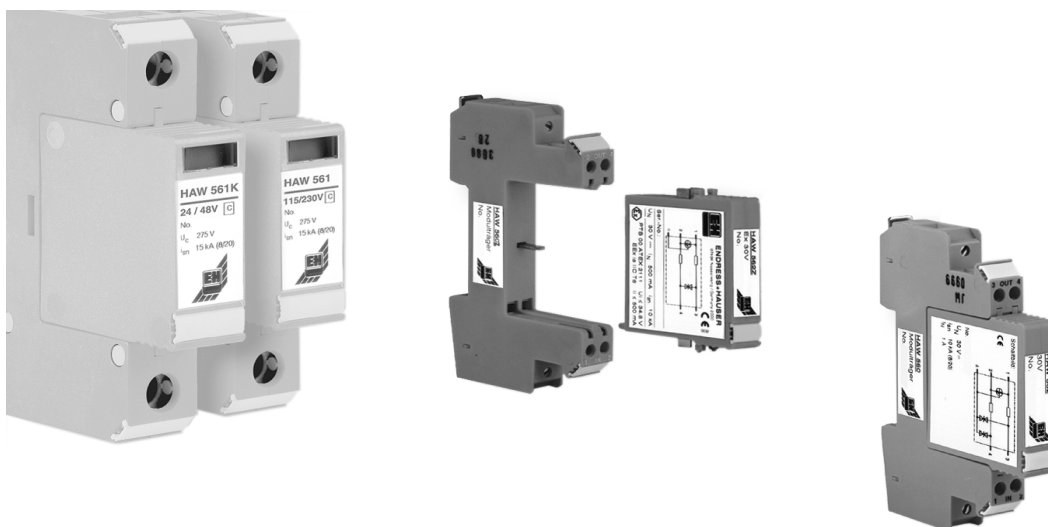


## Technical Information

# HAW561/561K/HAW560/560Z, HAW562/562Z, HAW565, HAW566

Overvoltage protection limiting high voltages on signal cables and components



### Application

#### HAW561/561K

The modules are single pole overvoltage protection units used to limit high voltage surges (classification C). For application in low voltage instrumentation supply cables or in low voltage main and sub distribution.

#### HAW560/560Z

Module carrier for the HAW562/562Z, HAW565 and HAW566 surge arresters. Construction as in-line termination.

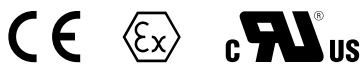
For IEC 60715 top hat DIN rail installation. HAW560Z can be applied in Ex areas.

#### HAW562/562Z, HAW565, HAW566

HAW562/562Z, HAW565 and HAW566 are surge arresters constructed as an in-line termination system. The HAW562Z can be applied in Ex areas.

### Your benefits

- Security against external surges
- Modular construction
- In-line terminals included
- Module exchange without opening circuit
- Application in Ex areas (HAW560Z, HAW562Z)
- High function security
- Compact construction
- Simple installation on IEC 60715 top hat DIN rail or in protective housing
- Failure display (on HAW561/561K)



## Function and system design

### Operating principle

Protection of supply or instrumentation as well as signal cables and components from overvoltage surges, that can be induced, for example, by distant lightning strikes or switch sequences.

#### Operation of power supply protection units:

Using the impedance-free connection of the protection unit interference voltage drops cannot be introduced on the power lines.

#### Operation of signal cable protection units:

Low and matched disconnection impedance between the individual protection steps within the unit guarantee high compatibility with the system to be protected.

### System construction

#### Module carrier HAW560/560Z

The HAW560/560Z units are constructed as carriers for the HAW562/562Z, HAW565 and HAW566 modules. The HAW560 module carrier is meant for mounting the HAW562, HAW565 and HAW566 modules in the safe (non-Ex) areas, and the HAW560Z as module carriers for the HAW562Z in an Ex area. The modules are constructed in-line terminations.

The circuit is not opened when the module is removed.

#### HAW562/562Z, HAW565 and HAW566 surge arresters

The HAW562/562Z, HAW565 and HAW566 modules are used as surge arresters in in-line termination systems for protection of signal lines and components:

- HAW562 (0/4 to 20 mA, PROFIBUS-PA)
- HAW562Z (0/4 to 20 mA, PROFIBUS-PA, EEx ia IIC T6)
- HAW565 (PROFIBUS-DP, Rackbus RS485, etc.)
- HAW566 (Signal line Prosonic S, 110 V AC/DC, etc.)

The blue HAW562Z surge arrester module is for application in intrinsically safe circuits.

#### HAW561/561K surge arresters

The HAW561/561K is a single pole surge arrester for limiting overvoltages in low voltage supply cables. It protects the connected users and instrumentation from overvoltage surges. The modular construction of the HAW561/561K makes insulation measurements of the connected instrumentation possible when the protection module is removed.

### Application area

Surge protection of various measurement instrumentation seen on an example of a water treatment plant.

Conditions for installation of surge arresters in a water treatment plant are:

- Lightning protection of plant and buildings
- Lightning protection of the main power supply distribution circuits in accordance with local regulations
- Low impedance foundation grounding
- Linked grounding of all buildings and plant ( → Fig. 'Linked grounding')

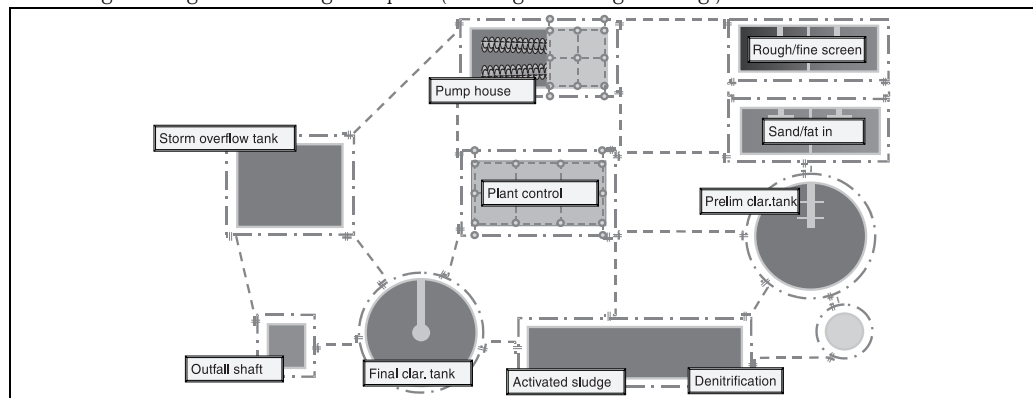


Fig. 1 Linked grounding (schematic diagram)

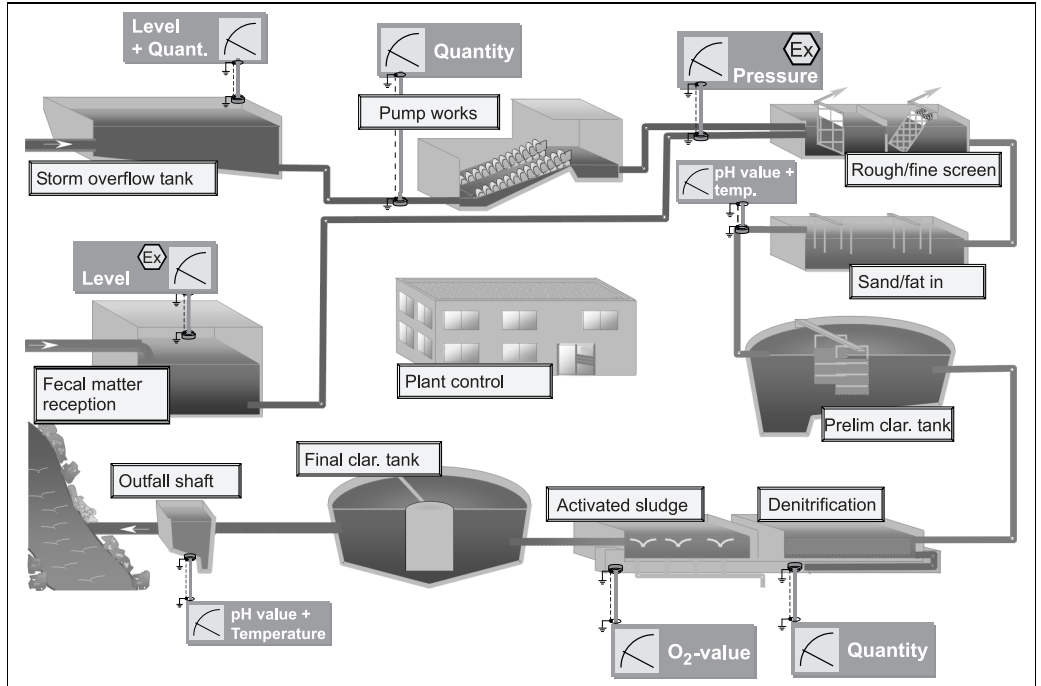
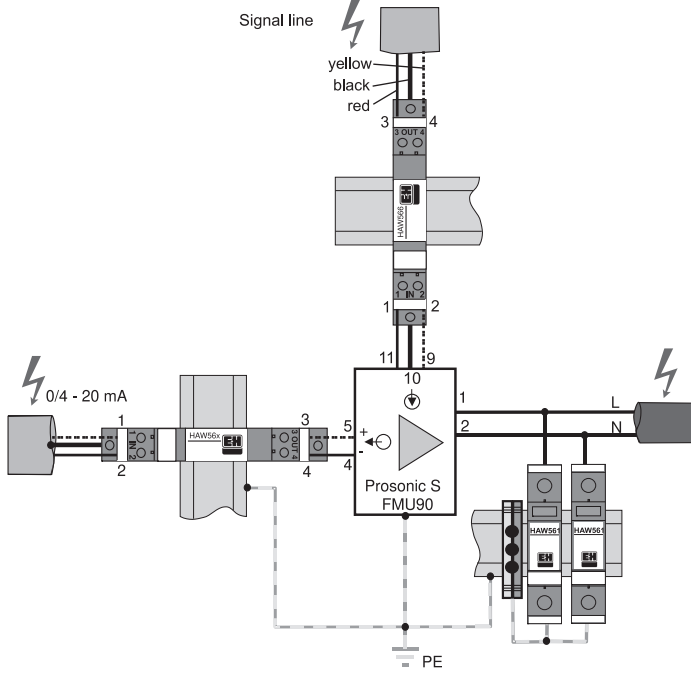
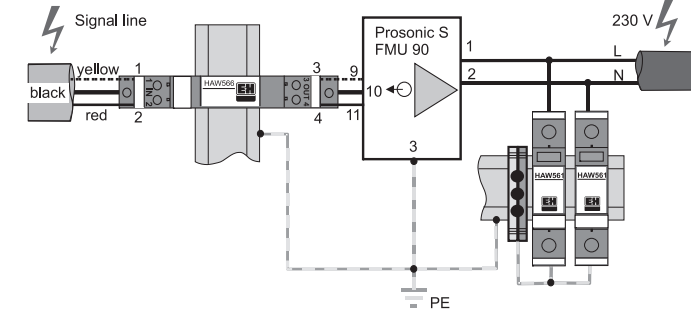

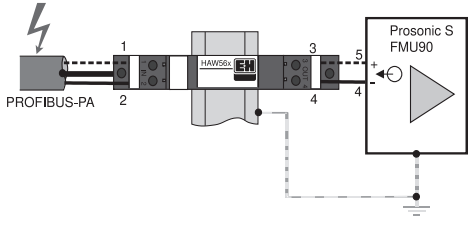

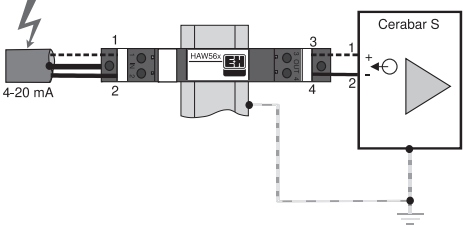


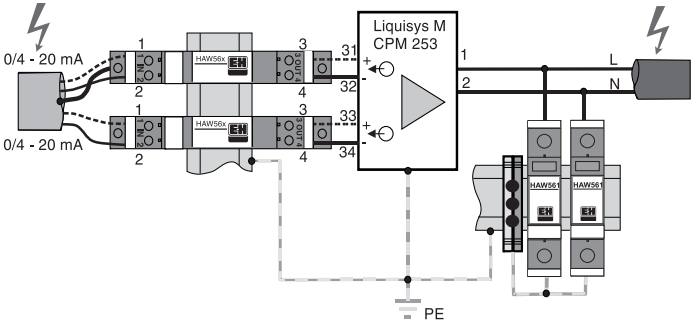
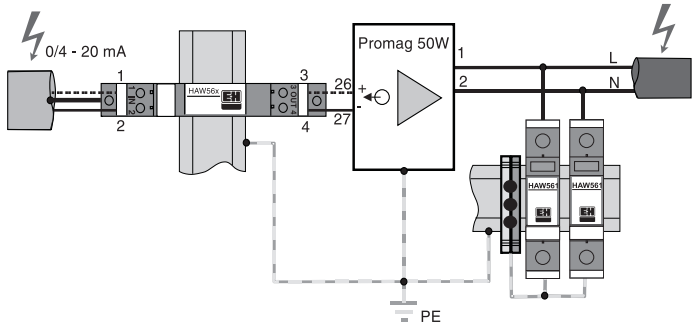
Fig. 2 Water treatment example (schematic diagram)

Fitting out measurement points on a water treatment plant

Measurement points	Measurement signal	Measurement point requirements	Connection diagram
<p><b>Storm overflow tanks</b> Level and overflow quantity</p>	<ul style="list-style-type: none"> <li>Level measurement: 0/4 to 20 mA</li> <li>Overflow quantity measurement: 0/4 to 20 mA</li> </ul> <p>Transducer Prosonic S FMU90 with 2 Prosonic FDU9x sensors</p>	<ul style="list-style-type: none"> <li>2 x HAW560 + 562 for 0/4 to 20 mA signals</li> <li>2 x HAW561 for power supply to the transducer</li> <li>2 x HAW560 + 566 for the sensor signal line</li> </ul>	

Fig. 3 Connection diagram 1

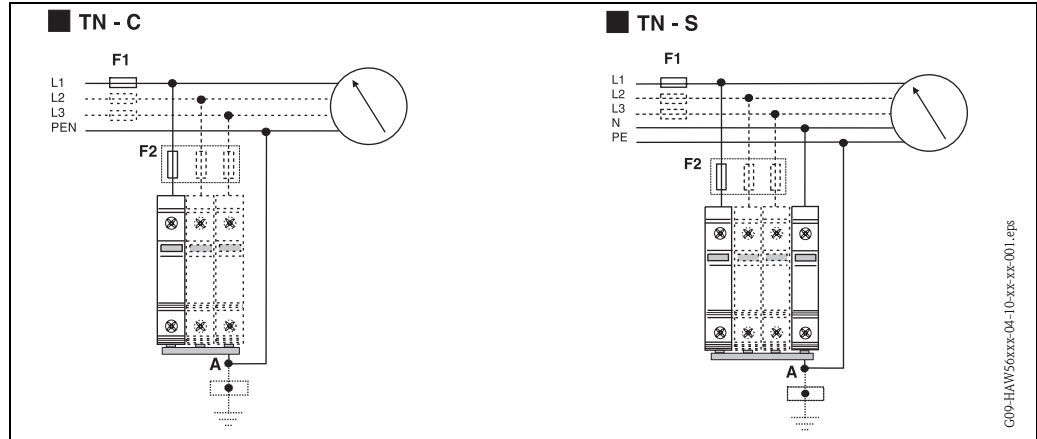
Measurement points	Measurement signal	Measurement point requirements	Connection diagram
<p><b>Pumping system</b> Quantity</p>	<ul style="list-style-type: none"> <li>Quantity measurement: 0/4 to 20 mA</li> </ul> <p>Prosonic S FMU90 transducer with Prosonic FDU9x level measurement sensors</p>	<ul style="list-style-type: none"> <li>1 x HAW560 + 562 for 0/4 to 20 mA signals</li> <li>2 x HAW561 for power supply to the transducers</li> <li>1 x HAW560 + 566 for the sensor signal line</li> </ul>	 <p><i>Fig. 4 Connection diagram 2</i></p>
<p><b>Pump station</b></p>	<ul style="list-style-type: none"> <li>Level measurement</li> </ul> <p>Prosonic S FMU90 transducer with Prosonic FDU9x level measurement sensor</p>	<ul style="list-style-type: none"> <li>1 x HAW560 + 566 for signal line. Use gas discharge tube for indirect shield earthing</li> </ul>	 <p><i>Fig. 5 Connection diagram 3</i></p>
<p><b>Sewage inlet</b> Intrinsically safe level</p> <p></p>	<ul style="list-style-type: none"> <li>Level measurement: PROFIBUS-PA signal</li> </ul> <p>Transducer Prosonic FMU90</p>	<ul style="list-style-type: none"> <li>1 x HAW560Z + 562Z for PROFIBUS PA signal in Ex-area</li> </ul>	 <p><i>Fig. 6 Connection diagram 4</i></p>
<p><b>Pipe work</b> Intrinsically safe pump pressure monitoring</p> <p></p>	<ul style="list-style-type: none"> <li>Pressure measurement: 4 to 20 mA</li> </ul> <p>Pressure transmitter Cerabar S</p>	<ul style="list-style-type: none"> <li>1 x HAW560Z + 562Z for 4 to 20 mA remote signal in Ex-area</li> </ul>	 <p><i>Fig. 7 Connection diagram 5</i></p>

Measurement points	Measurement signal	Measurement point requirements	Connection diagram
<p><b>Inlet prelim clarification pit</b> pH value + temperature</p>	<ul style="list-style-type: none"> <li>■ pH-value measurement: 0/4 to 20 mA</li> <li>■ Temperature measurement: 0/4 to 20 mA</li> </ul> <p>Liquisys M CPM253 transmitter with sensors CYA611 and CPS11</p>	<ul style="list-style-type: none"> <li>■ 2 x HAW560 + 562 for 0/4 to 20 mA remote signal</li> <li>■ 2 x HAW561 for power supply to the transmitter</li> </ul>	 <p><i>Fig. 8 Connection diagram 6</i></p>
<p><b>Denitrification</b> Recirculation quantity</p>	<ul style="list-style-type: none"> <li>■ Flow measurement: 0/4 to 20 mA</li> </ul> <p>Promag 50 W flow meter</p>	<ul style="list-style-type: none"> <li>■ 1 x HAW560 + 562 for 0/4 to 20 mA remote signal</li> <li>■ 2 x HAW561 for power supply to the transmitter</li> </ul>	 <p><i>Fig. 9 Connection diagram 7</i></p>
<p><b>Activation pit</b> Dissolved oxygen</p>	<ul style="list-style-type: none"> <li>■ Oxygen content measurement: 0/4 to 20 mA</li> </ul> <p>Liquisys M CPM253 transmitter with sensor COS41</p>	<ul style="list-style-type: none"> <li>■ 1 x HAW560 + 562 for 0/4 to 20 mA remote signal</li> <li>■ 2 x HAW561 for power supply to the transmitter</li> </ul>	<p>Connection schematic see connection diagram 2 and 7</p>
<p><b>Outfall</b> pH value and temperature</p>	<p>See inlet prelim clarification</p>	<p>See inlet prelim clarification</p>	<p>Connection schematic see connection diagram 1 and 6</p>

## Power supply

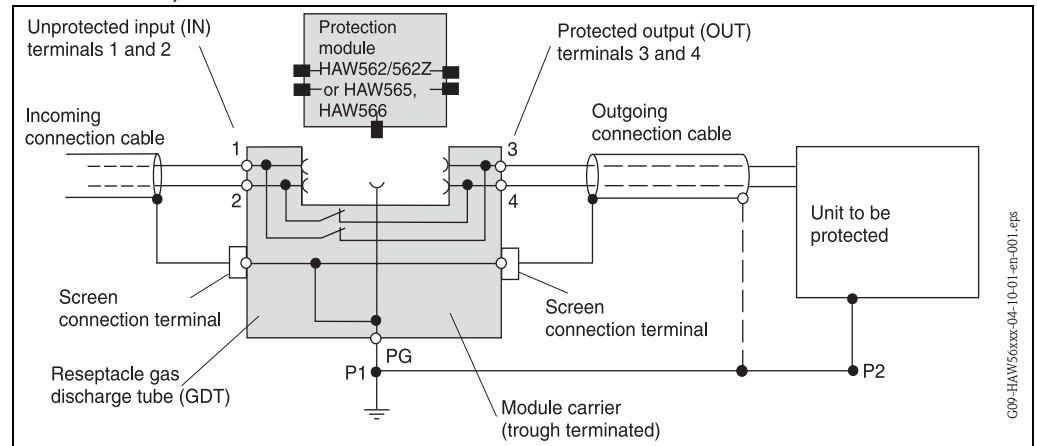
### Electrical connection

#### HAW561 and 561K



A fixed allocation of the phase and ground terminals is not allocated (pole security). The unit is fitted on both ends with a multi function connection terminal. This gives the opportunity to simultaneously connect a cable as well as a fork ferrule from standard busbars. Connection of the unit is as in the diagram above. Dependent on the cabling, up to four units will be required.

#### HAW562/562Z, HAW565 and HAW566



Connection of the unit as in the diagram. The ground connection is made using the DIN rail. For the signal cable screen connection on the HAW565 unit a special EMC spring terminal is supplied!

### Supply voltage

#### Power supply

HAW561	HAW561K	HAW562/562Z	HAW565	HAW566
115/230 V AC/DC	24/48 V AC/DC	30 V DC	5 V DC	110 V AC/DC

#### Maximum permissible operating voltage

HAW561	HAW561K	HAW562/562Z	HAW565	HAW566
275 V AC 350 V DC	75 V AC 100 V DC	34.8 V DC	6.0 V DC	130 V AC 170 V DC

### Potential equalisation

The unit to be protected and the surge arrester must be connected to the same potential.

**Current consumption**

	HAW561	HAW561K	HAW562	HAW562Z	HAW565	HAW566
Max. current consumption ( $I_N$ ) in the unit to be protected	125 A	125 A	1A	500 mA	100 mA	1 A
Nominal discharge current (8/20) per line ( $i_{sn}$ )	20 kA	10 kA	10 kA	10 kA	10 kA	10 kA
Max. discharge (8/20) current ( $i_{max}$ )	40 kA	40 kA	20 kA	20 kA	20 kA	20 kA

**Voltage protection level at  $i_{sn}$**

	HAW561	HAW561K	HAW562	HAW562Z	HAW565	HAW566
Line/line			$\leq 130$ V	$\leq 60$ V	$\leq 25$ V	$\leq 730$ V
Line/PG	< 1 kV at 5 kA < 1.5 kV at $i_{sn}$	< 350 V at 5 kA < 450 kV at $i_{sn}$	$\leq 65$ V	$\leq 1$ kV	$\leq 20$ V	$\leq 400$ V

**Response times**

	HAW561/ 561K	HAW562	HAW562Z	HAW565	HAW566
Line/line		$\leq 1$ ns	$\leq 1$ ns	$\leq 1$ ns	$\leq 25$ ns
Line/PG	$\leq 25$ ns	$\leq 1$ ns	$\leq 100$ ns	$\leq 1$ ns	$\leq 25$ ns

**Limit frequency**

HAW561/561K	HAW562	HAW562Z	HAW565	HAW566
-	7.0 MHz	6.0 MHz	100 MHz	24 MHz

**Impedance length/line**

HAW561/561K	HAW562	HAW562Z	HAW565	HAW566
-	2.2 $\Omega$	1.8 $\Omega$	1 $\Omega$	-

**Capacitance**

	HAW561/ 561K	HAW562	HAW562Z	HAW565	HAW566
Line/line	-	0.5 nF	1.1 nF	50 pF	6,2 nF
Line/PG	-	0.9 nF	2 pF	50 pF	0,4 nF

**Fuse protection (for units HAW561 and 561K)**

(Only required if not already available on the power source) up to: 125 A gL/gG  
Short circuit protected at max. fuse: 50 kA / 50 Hz

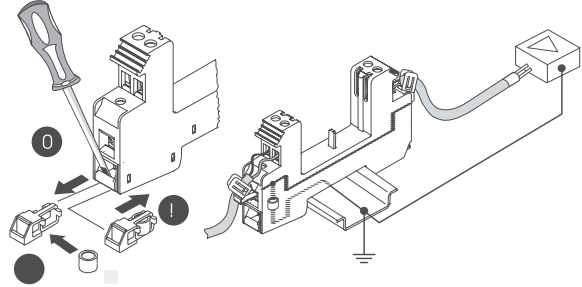
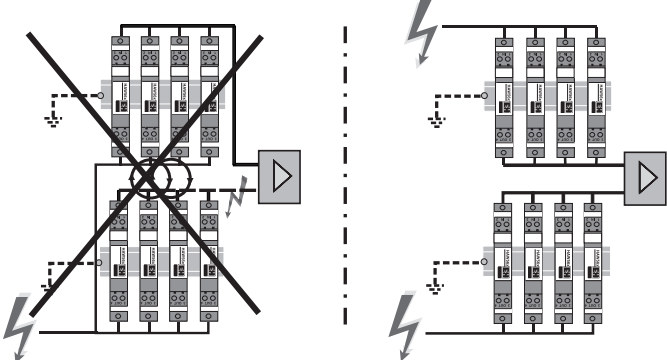
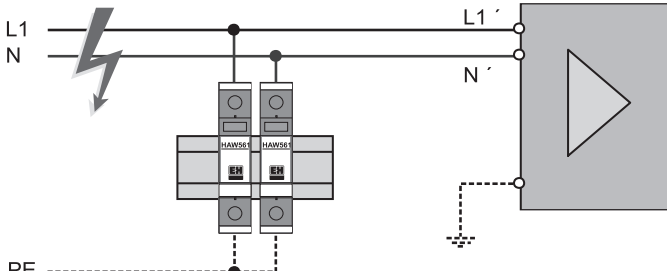
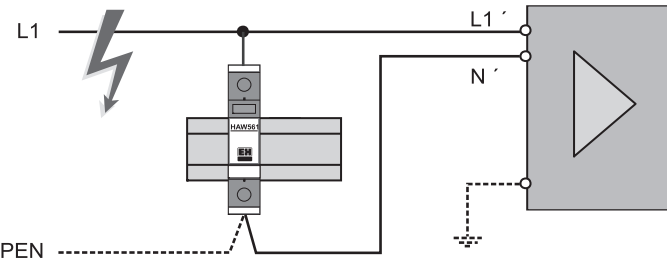
## Installation

**Installation instructions**

**Mounting location**

<ul style="list-style-type: none"> <li>Installation on 35 mm top hat rail to IEC 60715 (Drawing as example for HAW561/561K).</li> </ul>	
<ul style="list-style-type: none"> <li>Correct installation (HAW560/562/565/566); L and R of the cable have no influence on <math>U_r</math>; <math>U_p = U_r</math>; <math>I_a</math> = current transfer</li> </ul>	
<ul style="list-style-type: none"> <li>Incorrect installation I (HAW560/562/565/566) L and R of the cable worsen <math>U_r</math>; <math>U_r = U_p + U_R + U_L</math>; <math>I_a</math> = current transfer</li> </ul>	
<ul style="list-style-type: none"> <li>Incorrect installation II (HAW560/562/565/566) Due to incorrect cable installation, interference is transmitted from unprotected cables to the protected cables.</li> </ul>	



<ul style="list-style-type: none"> <li>■ Indirect shield earthing via gas discharge tube (GDT) (HAW566 with Prosonic S)</li> </ul>	
<ul style="list-style-type: none"> <li>■ Multiple unit installation (HAW560/562/565/566)</li> </ul>	
<ul style="list-style-type: none"> <li>■ Correct installation on separated N - PE system (HAW561/561K)</li> </ul>	
<ul style="list-style-type: none"> <li>■ Correct installation on combined PEN system (HAW561/561K)</li> </ul>	

## Environment

### Ambient temperature

HAW561	HAW561K	HAW562	HAW562Z	HAW565	HAW566
-40 °C to 80 °C	-40 °C to 80 °C	-25 °C to 80 °C	-25 °C to 80 °C	-25 °C to 80 °C	-40 °C to 80 °C

### Storage temperature

See 'Ambient temperature'

### Climate class

IEC 60 654-1 Class B2

### Degree of protection

IP 20

## Mechanical construction

### Design, dimensions

#### DIN rail unit dimensions

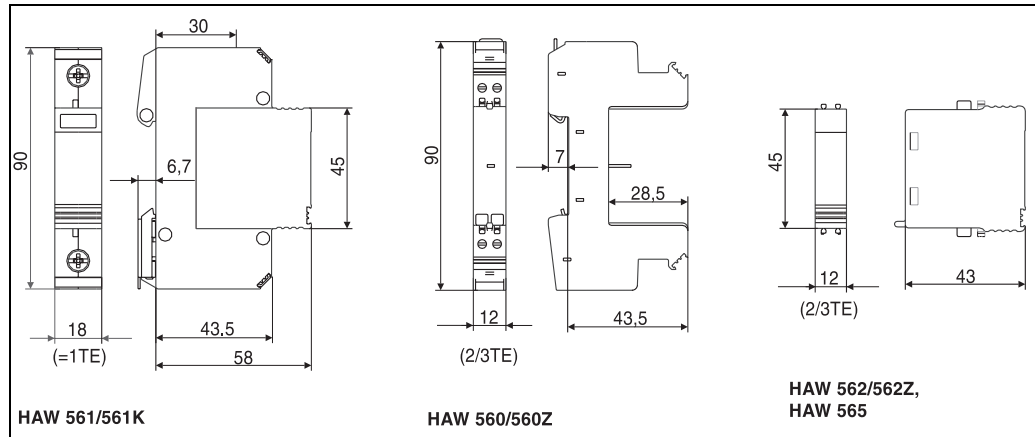


Fig. 10 Dimensions in mm

### Weight

HAW561/ 561K	HAW560/560Z	HAW562/562Z	HAW565	HAW566
approx. 130 g	approx. 40 g	approx. 20 g	approx. 20 g	approx. 20 g

### Material

HAW561/ 561K	HAW562	HAW562Z	HAW565	HAW566
Thermoplast, colour grey	Polyamid PA, colour grey	Polyamid PA, colour blue	Polyamid PA, col- our grey	Polyamid PA, col- our grey

### Terminals

HAW561/561K (1-pole, pole secured)	HAW560/560Z (2-pole)
<ul style="list-style-type: none"> <li>■ min. 1.5 mm<sup>2</sup> single/multi strand</li> <li>■ max. 35 mm<sup>2</sup> multi line/ 25 mm<sup>2</sup> multi strand</li> </ul>	<ul style="list-style-type: none"> <li>■ To 2.5 mm<sup>2</sup> multi strand for signal lines</li> <li>■ To 4 mm<sup>2</sup> for screen connection</li> </ul>

## Human interface

### Display elements

#### HAW561/561K

Green display (= functional) in sight window. The energy transfer of the units is controlled by the integrated thermal monitoring system. In a defect condition (= red display window - means thermal overload) this monitoring system will automatically separate the surge arrester from the power source.



#### Caution!

Units connected are then no longer protected from overvoltages. In this case, the HAW561/561K surge arresters must then be exchanged.

All other units do not have any display elements.

## Certificates and approvals

### Ex approval

Details regarding the availability of the Ex versions (ATEX, FM, CSA, etc.) can be obtained from your local E+H sales organisation. All relevant data for Ex protection can be found in separate Ex documentation, which can be requested separately.

### CE approval

The measurement system fulfils the legal requirements of the EU guidelines. Endress+Hauser acknowledges a successful test of the unit by applying the CE mark.

### Other standards and guidelines

IEC 61010:

Safety requirements for electrical measurement, control and laboratory instrumentation

IEC 61326:

Electromagnetic compatibility (EMC requirements)

HAW561/561K	HAW562	HAW562Z	HAW565	HAW566
IEC 61643-1 EN 61643-11	IEC 61643-21:1999-07 A2, B2, C2, C3, D1			

### UL

UL recognised component to UL-1449 (Standard for Transient Voltage Suppressors), for HAW561/HAW561K

## Ordering information

Product structure	Order number	Unit
	51003569	<p align="center"><b>Surge arrester HAW561K</b></p> For low voltage users 24/48V, single pole, requirement class C, basic component with plugged in protection unit, defect display, 18 mm housing width
	51003570	<p align="center"><b>Surge arrester HAW561</b></p> For standard voltage users 115/230 V, single pole, requirement class C, basic component with plugged in protection unit, defect display, 18 mm housing width
	51003571	<p align="center"><b>Surge arrester module carrier HAW560</b></p> Two pole through terminated for fitting surge arrester modules for units in information technology, 12 mm housing width, colour grey
	51003572	<p align="center"><b>Surge arrester module HAW562</b></p> For protection of 2 single lines, e.g. 2 asymmetrical single lines, e.g.: 0/4 to 20 mA, Profibus PA, 12 mm housing width, colour grey
	51003573	<p align="center"><b>Surge arrester module HAW565</b></p> For protection of 2 single lines, e.g. 2 asymmetrical single lines with high frequency signal transmission, e.g.: Profibus DP, RS 485, 12 mm housing width, colour grey
	51003574	<p align="center"><b>Surge arrester module carrier HAW560Z</b></p> Two pole through terminated for fitting surge arrester modules for units in information technology in Ex areas, 12 mm housing width, colour blue
	51003575	<p align="center"><b>Surge arrester module HAW562Z</b></p> For protection of 2 single lines, e.g. 2 asymmetrical single lines in Ex areas, e.g.: 0/4 to 20 mA, Profibus PA, 12 mm housing width, colour blue
	71028875	<p align="center"><b>Surge arrester module HAW566</b></p> Protection for 2 signal inputs, e.g. 2 asymmetrical inputs, e.g. Prosonic S signal 12 mm housing with, colour grey

## Accessories

### Protective housing with integrated DIN rail for mounting up to four HAW56x units:

Integrated DIN top hat rail; ground connection; GORE-TEX® filter; 2 lead seal screws and 4 plastic cable entries M20; Material: Pressure die cast aluminium, epoxy coated, ingress protection to IP 66/NEMA4x

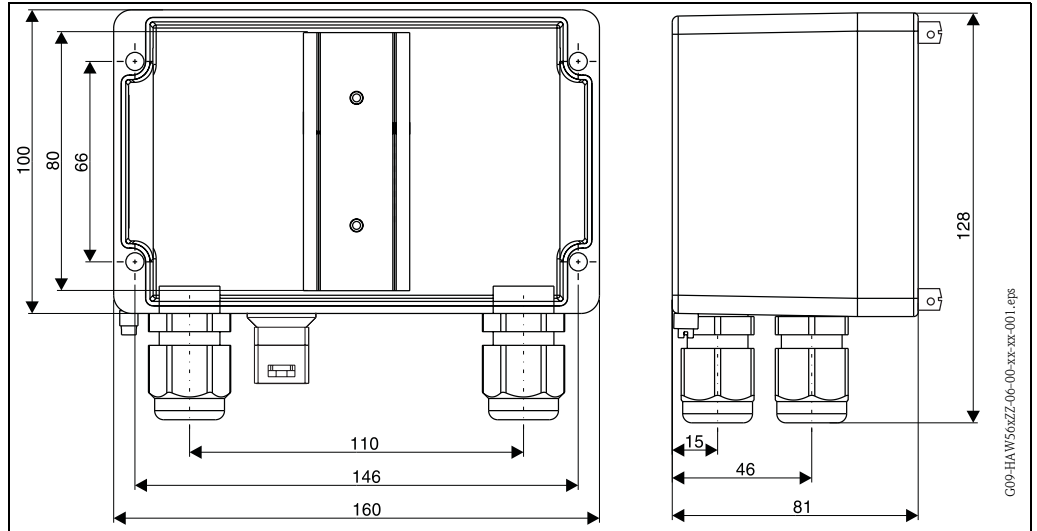


Fig. 11 Dimensions in mm

Order number: 51003750

### Mounting kit for wall or stand pipe mounting the protective housing:

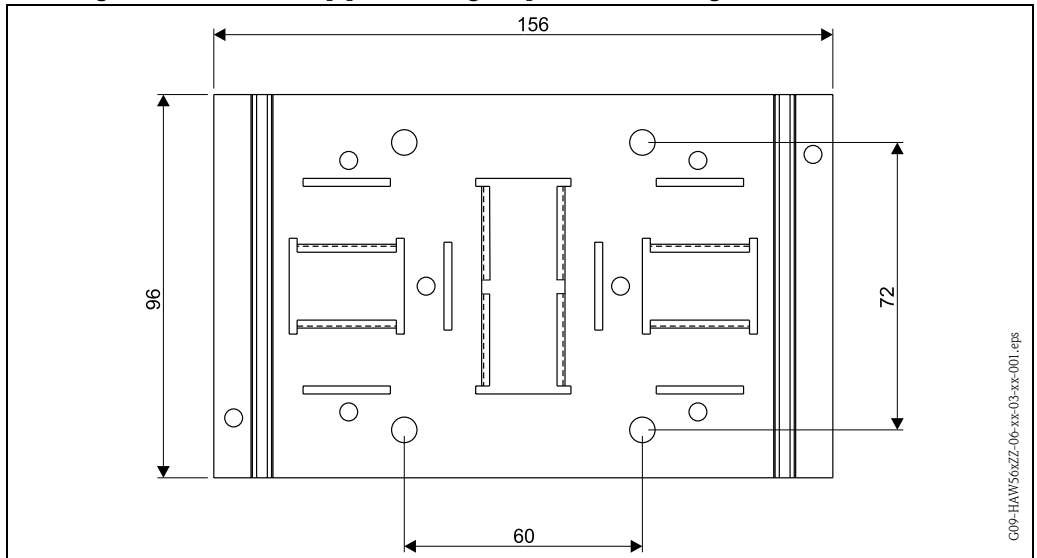


Fig. 12 Dimensions in mm

Order number: 51003773

## Documentation

- Brochure System components (FA016K/09/en)
- Brief operating instructions "HAW561/561K" (KA129R/09/a6)
- Brief operating instructions "HAW560/560Z, HAW562/562Z/565/566" (KA130R/09/a6)
- Ex additional documentation: ATEX, FM, CSA, usw.

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## International Head Quarter

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