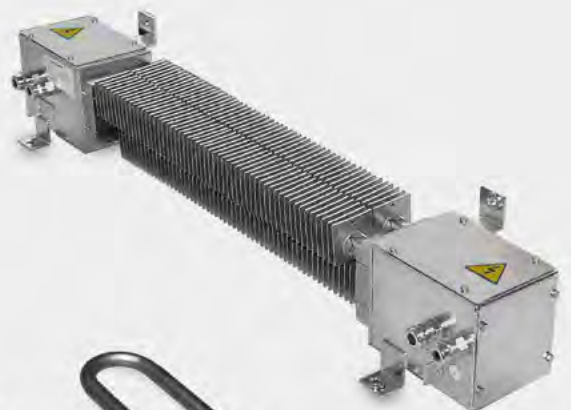
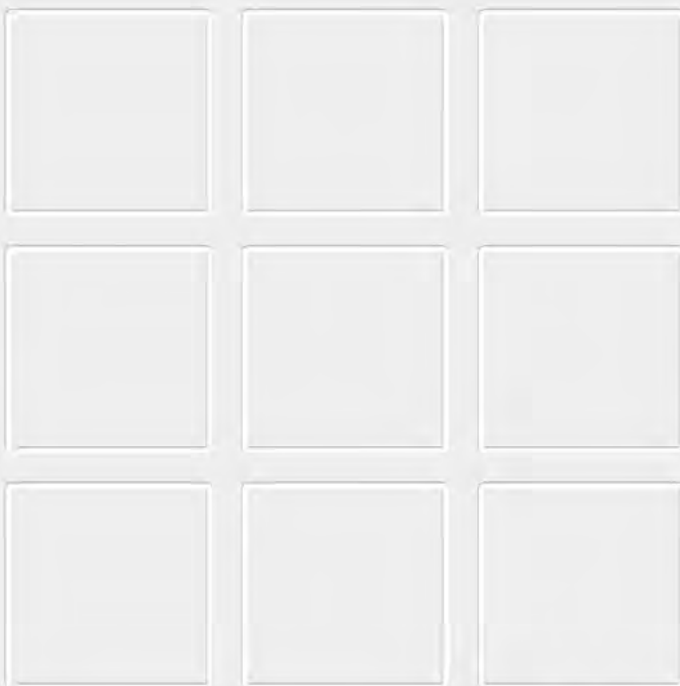


4

Electrics for rolling stock

Air and water heaters
for rail vehicles

Catalogue F195.en



Heaters for rail vehicles

Development and manufacture of heaters for rail vehicles has a tradition for decades with Schaltbau.

Schaltbau's radiators and tubular elements for air and water heaters are the backbone of the air conditioning system and supply of warm water in rail vehicles all over Europe. To meet different demands we developed a great variety of products - our standard product line. .

Features

- Fully qualified for railway service
- Long life owing to special design
- Corrosion-resistant heaters made of chrome nickel steel (INOX)
- High dielectric strength, resistor wire embedded in watertight sheath
- Suitable for nominal voltages of 3 kV DC max. Dielectric strength up to 9 kV cold!

Applications

Heaters in air conditioning systems of European rail vehicles - also used for cross-border traffic

- Tubular elements for air heaters
- Schaltbau tubular elements are designed for use in electric convection heaters and heaters in ventilation and air conditioning systems of rail vehicles. When connected in series the nominal voltage over all serial elements is 3 kV.
- Radiators
- Our radiators are used where in addition to the air conditioning system of a rail vehicle further convection heaters become necessary as, for instance, in vestibules, corridors, sanitary facilities, and driver's cabs of multiple unit trains. They are also applied in rolling stock for commuter service where there is no central heating and air conditioning system.
- Heaters for the supply of warm water in European rail vehicles, also used for cross-border traffic
- Tubular elements for water heaters

In water heaters of air conditioning systems and for heating tanks of drinking and service water, tubular elements are used. They serve a double function: they heat the water and protect the tank against freezing. The operating voltage of a tubular heater system is 3 kV max.

Special purpose heaters

Do you need a special variant? Do not hesitate to contact us! Maybe the heater you are looking for is among our many **special designs**. If not, we also supply heaters **manufactured to customer requirements**. In this case, however, minimum order quantities apply.

Ordering code

Example: **IA108-250-500-L0450-A**

Series

Air heaters, tubular element

IA008	straight
IA108	straight
IA109	U-shape
IA114	U-shape

Water heaters, tubular element

ZHx81	ZH081, ZH381 ZH581, and ZH881 Series
-------	---

Radiators

ZHxxx	ZH024, ZH242, ZH254, ZH449, ZH481, and ZH485 Series
-------	--

Nominal voltage

250	250 V example, dependent on variant *
-----	--

Nominal load

500	500 W example, dependent on variant *
-----	--

Length

L0450	450 mm example, dependent on variant *
-------	---

Diameter, finish, terminal type

Diameter

None	Ø 22 mm, all air heaters	} water heaters only
25	Ø 25 mm	
28	Ø 28 mm	

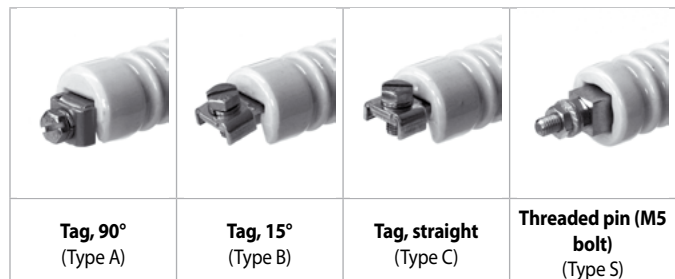
Finish

None	Chrome nickel steel (INOX), air heaters only	} water heaters only
L	coated	
V	chromium plated	

Terminal type

A	Tag, 90°
B	Tag, 15°
C	Tag, straight
S	Threaded pin (M5 screw)

* Value dependent on variant manufactured to customer requirements (nominal voltage, sheath temperature, nominal load), see also page 7 »How to choose the heater of the right size«.



IA008 Series Tubular heaters

Air heaters

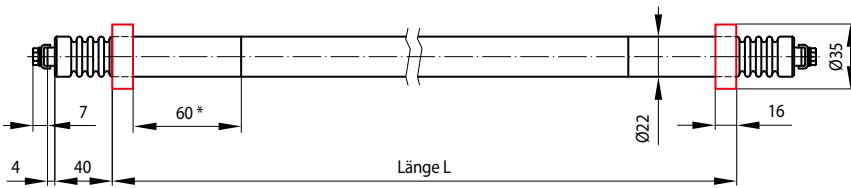


Fig. 1: Tubular heaters

Tag Type A

Series	L	Stock items	Fig.
IA008	450	IA008-125-167-L0450-A	1
	450	IA008-250-167-L0450-A	1
	490	IA008-250-175-L0490-A	1
	750	IA008-500-333-L0750-A	1
	950	IA008-500-333-L0950-A	1
	1098	IA008-600-1500-L1098-S-R	2

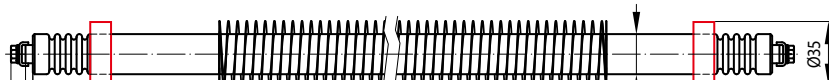
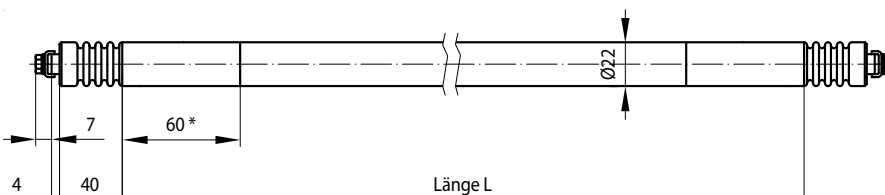


Fig. 2: Tubular heaters, ribbed

Tag Type A

IA108 Series Tubular heaters

Air heaters

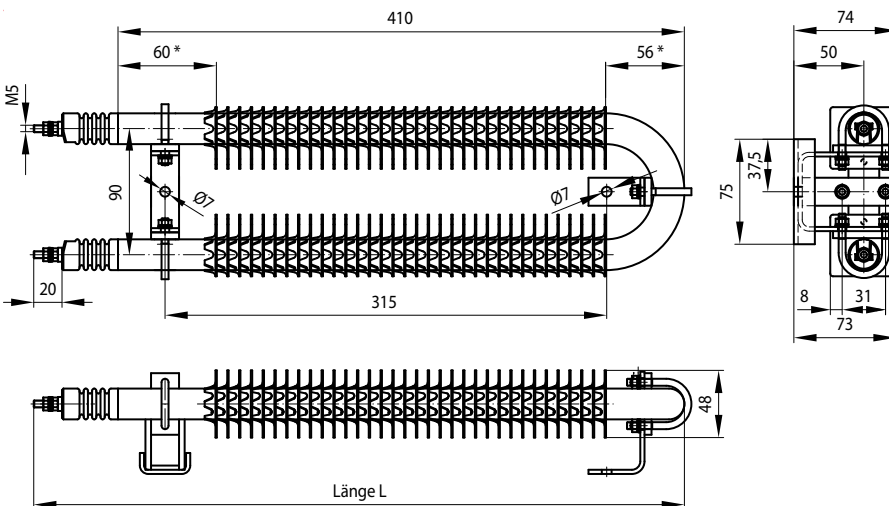


Tag Type A

Series	L	Stock items
IA108	1180	IA108-125-1000-L1180-B
	548	IA108-400-200-L0548-B
	505	IA108-500-200-L0505-C
	710	IA108-500-200-L0710-B
	945	IA108-500-200-L0945-C
	1080	IA108-500-250-L1080-B
	1260	IA108-500-250-L1260-B
	1470	IA108-500-250-L1470-B
	1260	IA108-500-375-L1260-B
	1470	IA108-500-375-L1470-B
	1115	IA108-500-1000-L1115-A
	548	IA108-600-200-L0548-B

ZH1037 Series Tubular heaters, ribbed

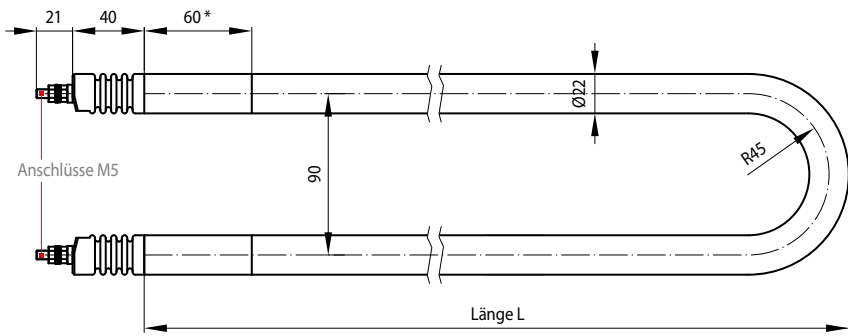
Air heater



Series	L	Stock items
ZH1037	470	ZH1037-750-300-L0470

IA109 / IA114 Series Tubular heaters

Air heaters



Threaded pin Type S

Series	L	Stock items
IA109	418	IA109-150-300-L0418-S
	512	IA109-150-400-L0512-S
	586	IA109-250-1100-L0586-S
	586	IA109-500-1100-L0586-S
	410	IA109-750-300-L0410-S
IA114	532	IA109-1000-293-L0532-A
	568	IA114-250-1100-L0568-S
	454	IA114-500-500-L0454-S

ZH081, ZH381, ZH881 Series Tubular heaters

Water heaters

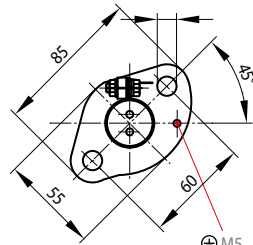
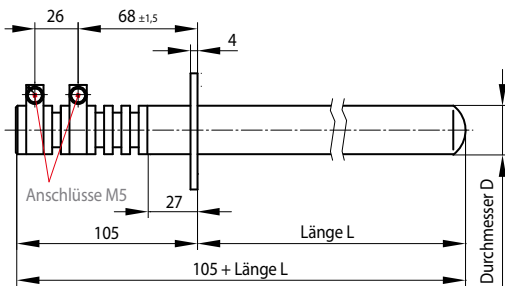


Fig.: ZH881

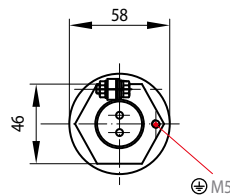
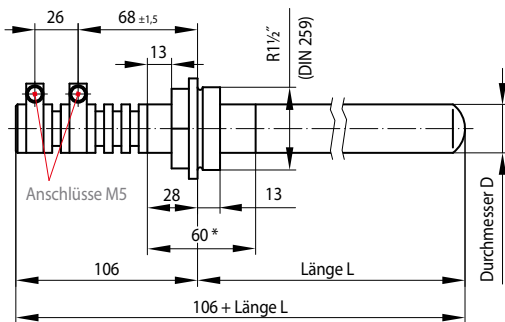


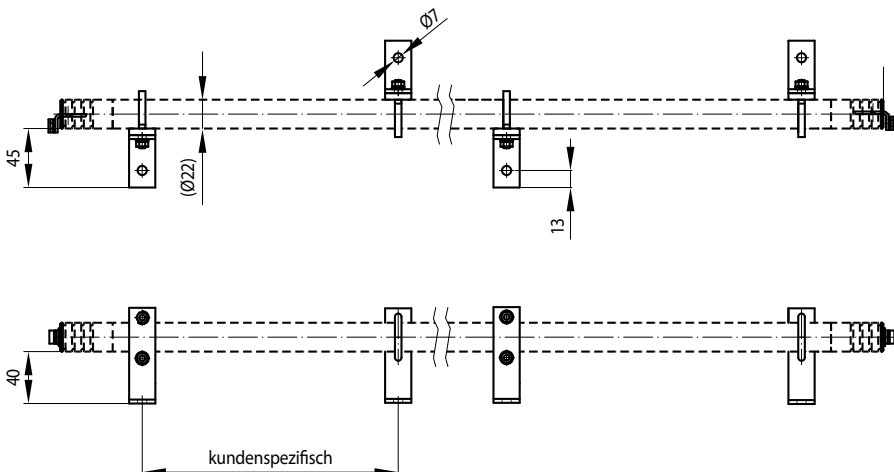
Fig.: ZH881, special design without flange

Series	L	D	Stock items
ZH081	433	25	ZH081-167-500-L433-25
	433	25	ZH081-500-500-L433-25
ZH381	499	28	ZH381-250-1300-L499-28
ZH581	430	28	ZH581-250-930-L430-28
ZH881	392	28	ZH881-250-900-L392-28-S**
	433	28	ZH881-500-500-L433-28
	433	28	ZH881-500-750-L433-28
	773	28	ZH881-500-1600-L773-28
	773	28	ZH881-500-2000-L773-28
841	28	ZH881-880-2400-L841-28	

** Special design without flange

ZH1040 Series Mounting brackets for tubular heaters

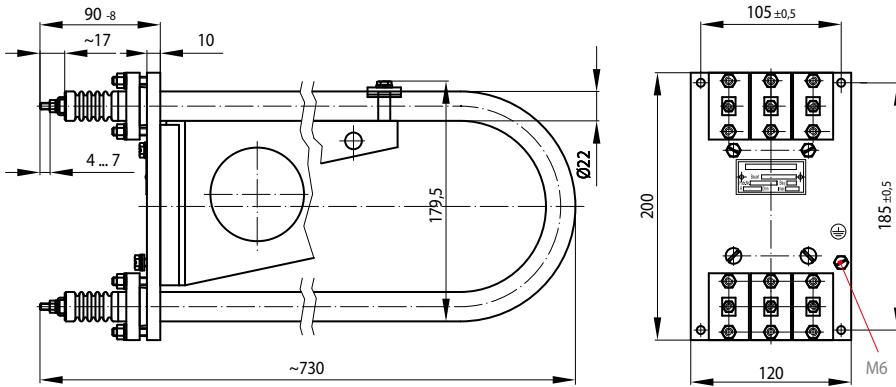
Accessories air heaters



Bracket	Suitable for series
ZH1040	IA008-vv-xxx-Lyyy-z
	IA108-vv-xxx-Lyyy-z
	IA109-vv-xxx-Lyyy-z
	IA114-vv-xxx-Lyyy-z
	ZH485

Series resistors

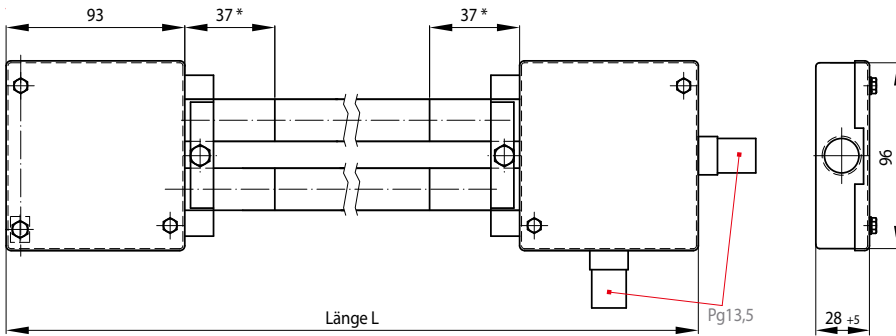
Air heaters, brake resistors



Series	Stock items
IA109	IA109-4,5
	IA109-4,5/4,5
	IA109-4,5/4,5/4,5
	IA109-4,5/7/7
	IA109-7
	IA109-7/4,5/4,5
	IA109-7/7/4,5
	IA109-7/7/7
	IA109-15
	IA109-15/15/15
	IA109-250
	IA109-250/250
	IA109-710
IA109-710/710	

ZH242 Series Radiator

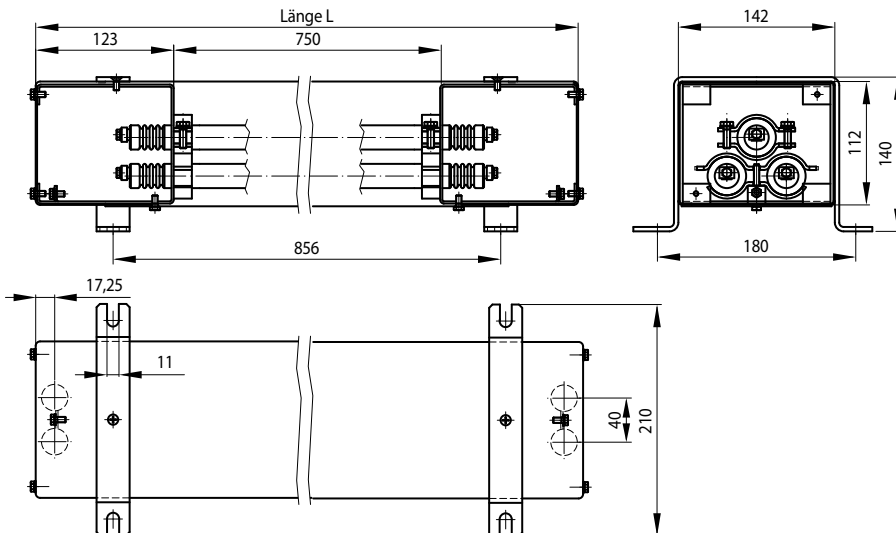
Air heater



Series	L	Stock items
ZH242	1650	ZH242-1000-750-L1650

ZH254 Series Radiator

Air heater



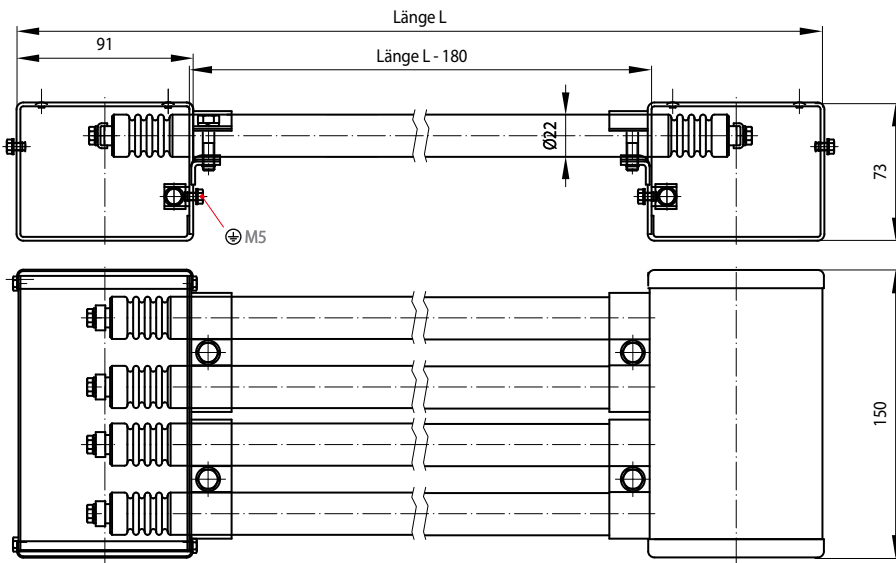
Series	L	Stock items
ZH254	996	ZH254-500-1000-L0996

Reduced scale diagrams / dimensions in mm

*Cold length

ZH449 Series Radiators

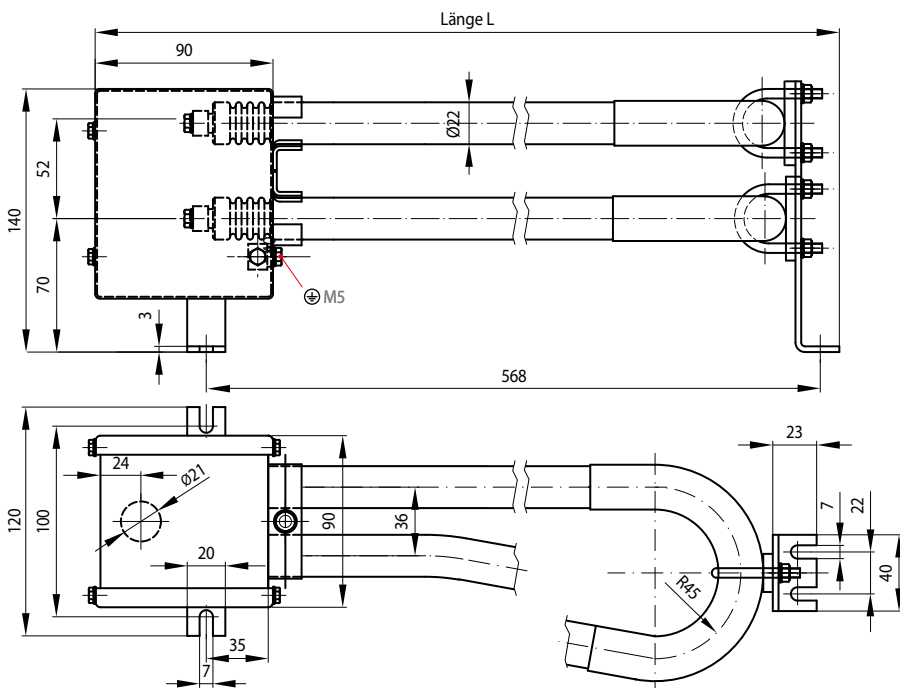
Air heaters



Series	L	Stock items
ZH449	890	ZH449-1000-800-L0890
	1260	ZH449-1000-1000-L1260
	1650	ZH449-1000-1000-L1650
	1440	ZH449-1000-1250-L1440
	1650	ZH449-1000-1250-L1650

ZH485 Series Radiators

Air heaters



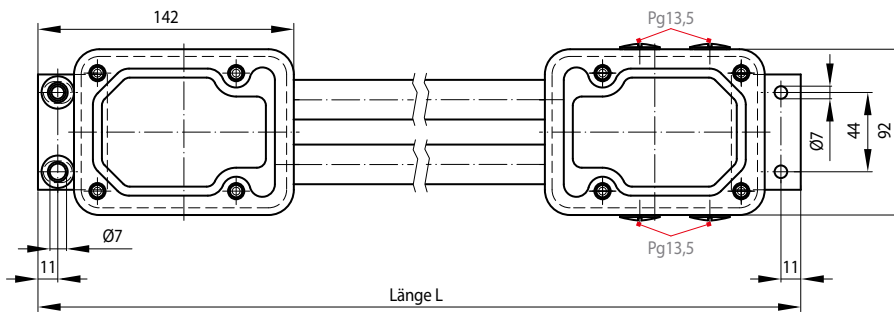
Series	L	Stock items
ZH485	635	ZH485-500-750-L0635
	660	ZH485-1000-1000-L0660

Fig. 1: Radiator with two tubular heaters

Fig. 2: Radiator with one tubular heater

ZH024 Series Radiators

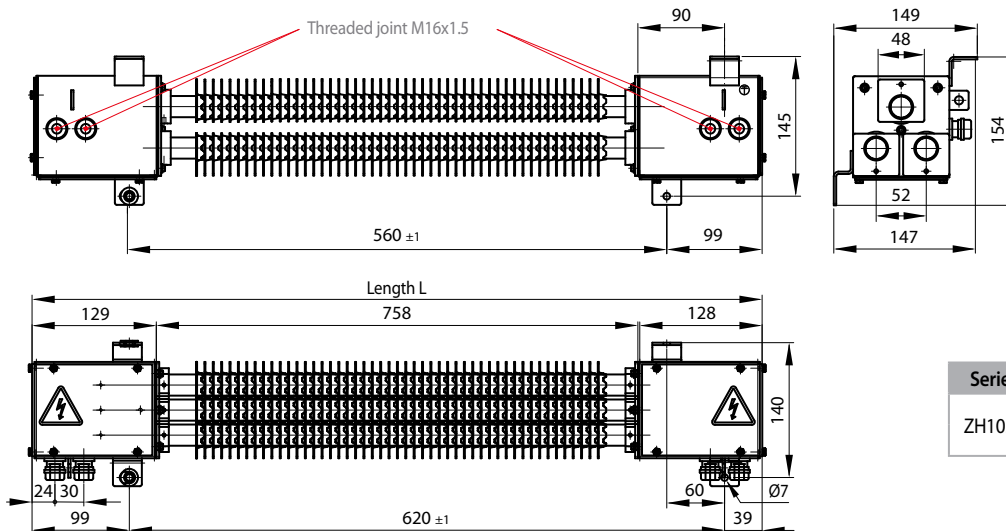
Air heaters



Series	L	Stock items
ZH024	730	ZH024-1000-400-L0730
	1166	ZH024-1000-400-L1166

ZH1039 Series Radiator

Air heaters



Series	L	Stock items
ZH1039	758	ZH1039-1200-600-L0758
	818	ZH1039-1800-600-L0818

How to choose the heater of the right size

For choosing the heater with the proper dimensions the following instructions should be observed. The right size of a heater depends on the minimum length of its coiled resistor wire and the maximum permissible sheath temperature.

1. Sheath temperature dependent on amount of power which a heater produces.

Watt density is the amount of power in watts which a heater produces per square centimetre of heated surface area (W/cm^2). In accordance with UIC 550 the supply voltage may vary between -30 % and +25 %. With line voltage 3 kV DC a range of -40 % up to +35 % is tolerated including voltage peaks of 5 kV for 20 msec. duration. The wattage rating of the heater ($P = U^2 / R$) is, therefore, increased by the operating voltage squared. This means that with an overvoltage of 25 % the wattage rating of the heater goes up 56.25 % (+35 % overvoltage even results in a 82 % increase of the wattage rating!).

Notice that the wattage rating of the heater directly impacts the watt density. Consequently, the size of the surface area of the heating elements must be large enough to cope with this „worst case“ and prevent the elements from burning through.

2. Minimum length of heating element necessary for a specific heat output

The resistance element of an electric heater is usually in the form of a wire which is wound on an insulator in such a way that the individual coils are separate and do not touch. The wire has a specific diameter to be capable of carrying the current required. This results in a maximum resistance per cm of coiled wire. And from this the minimum length of a heating element necessary for a specific heat output can be derived.

So the minimum length of the coiled resistor wire and the maximum sheath temperature should be taken into consideration in selecting the right size of a heater element.

Sheath temperature can also be reduced by using ribbed tubular heater elements such as ZH1037 and ZH1039 Series ones.

Schaltbau GmbH

For detailed information on our products and services visit our website – or give us a call!

Schaltbau GmbH
Hollerithstrasse 5
81829 Munich
Germany



Phone +49 89 9 30 05-0
Fax +49 89 9 30 05-350
Internet www.schaltbau-gmbh.com
e-Mail contact@schaltbau.de

with compliments:



Schaltbau GmbH manufactures in compliance with RoHS.



The production facilities of Schaltbau GmbH have been IRIS certified since 2008.



Certified to DIN EN ISO 14001 since 2002. For the most recent certificate visit our website.



Certified to DIN EN ISO 9001 since 1994. For the most recent certificate visit our website.

Electrical Components and Systems for Railway Engineering and Industrial Applications

Connectors

- Connectors manufactured to industry standards
- Connectors to suit the special requirements of communications engineering (MIL connectors)
- Charging connectors for battery-powered machines and systems
- Connectors for railway engineering, including UIC connectors
- Special connectors to suit customer requirements

Snap-action switches

- Snap-action switches with positive opening operation
- Snap-action switches with self-cleaning contacts
- Enabling switches
- Special switches to suit customer requirements

Contactors

- Single and multi-pole DC contactors
- High-voltage AC/DC contactors
- Contactors for battery powered vehicles and power supplies
- Contactors for railway applications
- Terminal bolts and fuse holders
- DC emergency disconnect switches
- Special contactors to suit customer requirements

Electrics for rolling stock

- Equipment for driver's cab
- Equipment for passenger use
- High-voltage switchgear
- High-voltage heaters
- High-voltage roof equipment
- Equipment for electric brakes
- Design and engineering of train electrics to customer requirements

We reserve the right to make technical alterations without prior notice.

For updated product information visit www.schaltbau-gmbh.com.
Issued 10-2014