

Heater GALMATHERM®

Operating instructions

280B22EN01



Before commissioning the heater, please read these operating instructions carefully and in full.

They contain important information regarding operation and safety.

Table of Contents

1.	Identification	4
1.1	Model data	4
1.2	Address of manufacturer / dealer	7
1.3	Standards and guidelines	7
2.	General information	8
2.1	Warning notes	8
2.2	Explanation of symbols	9
2.3	Warranty and repairs	9
2.4	Correct use	10
3.	Safety regulations	11
4.	Product description	12
4.1	Construction	12
4.2	Models and accessories	13
4.3	Attributes of processed materials	13
4.4	Technical data	14
5.	Labelling	15
6.	Installation	16
7.	Electrical connection and commissioning	17
7.1	Connecting the device	17
7.2	Commissioning the device	18
7.3	Testing the device	19
8.	Servicing and maintenance	20
9.	Transport - Storage - Disposal	22
9.1	Transport and storage	22
9.2	Returning the device	23
9.3	Disposing of the heater	23
10.	Warranty	24

Identification

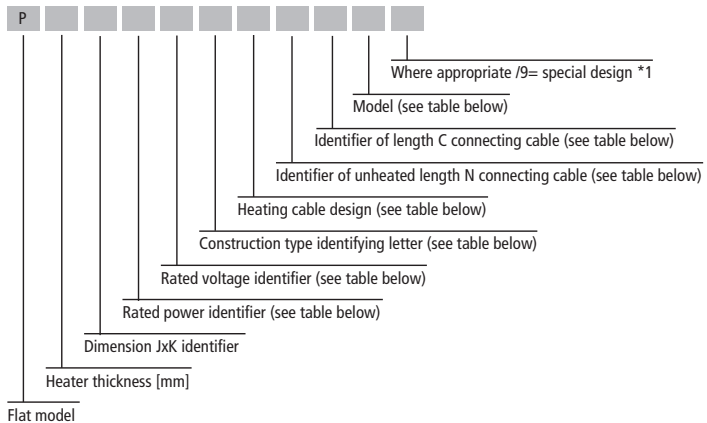
1. Identification

1.1 Model data

The model plate, which is stuck to the orange-coloured connection sleeve, contains all of the key data for the GALMATHERM® heater. The model designation provides information on the specification.

Flat models

P...



*1 according to drawing specifications

Identification

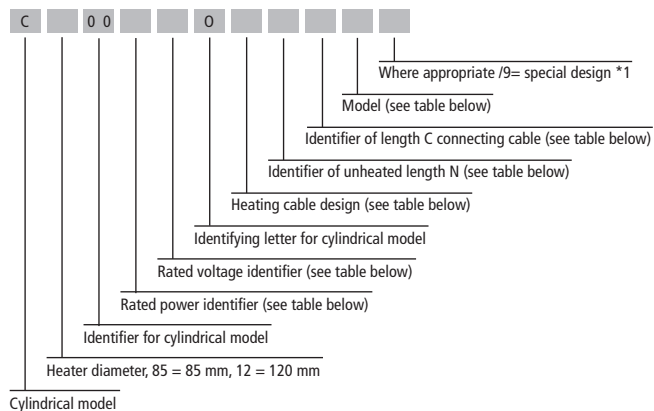
Rated power	Rated voltage	Construction type	Heating cable design	Length N Length C
10 = 1.0 kW	1 = 110 V~	J = cable on narrow side	F = FEP; 1 W/cm ²	0 = 1 m
15 = 1.5 kW	2 = 230 V~	K = cable on broad side	G = FEP double layer; 1 W/cm ²	1 = 1.5 m
20 = 2.0 kW	4 = 230 V3~		P = PFA; 1 W/cm ²	2 = 2 m
30 = 3.0 kW	5 = 400 V3~		D = PFA double layer; 1 W/cm ²	3 = 2.5 m
40 = 4.0 kW	6 = 460 V3~		HD = PFA; 0.5 W/cm ²	4 = 3 m
45 = 4.5 kW				5 = 3.5 m
60 = 6.0 kW				6 = 4 m
90 = 9.0 kW				7 = 4.5 m
12 = 12.0 kW				8 = 5 m
13 = 15.0 kW				9 = length as per drawing

Model
A1 = steel frame with PVDF sheathing
A2 = steel frame with PP sheathing
A3 = steel frame with FEP sheathing, without guide component
A5 = steel frame with FEP sheathing
B1 = PVDF frame with holder
B2 = PP frame with holder
C1 = frame made from PVDF tape
C2 = frame made from PP tape
C3 = frame made from FEP tape
D1 = frame made from PVDF tape
D2 = frame made from PP tape
D3 = frame made from FEP tape
D6 = frame made from PVDF tape, FEP spacer
E = frame made from PP
ES = frame and supporting feet made from PP
F = frame made from PVDF
FS = frame and supporting feet made from PVDF
M1 = model A1 with PVDF guard plate
M2 = model A2 with PP guard plate
M5 = model A5 with PP guard plate
Q = frame and guard plate made from PP
QS = frame, guard plate and supporting feet made from PP
R = frame and guard plate made from PVDF
RS = frame, guard plate and supporting feet made from PVDF

Identification

Cylindrical models

C...



*1 according to drawing specifications

Rated power	Rated voltage	Heating cable design	Length N Length C
10 = 1.0 kW	1 = 110 V~	F = FEP; 1 W/cm ²	0 = 1 m
15 = 1.5 kW	2 = 230 V~	G = FEP double layer; 1 W/cm ²	1 = 1.5 m
20 = 2.0 kW	4 = 230 V3~	P = PFA; 1 W/cm ²	2 = 2 m
30 = 3.0 kW	5 = 400 V3~	D = PFA double layer; 1 W/cm ²	3 = 2.5 m
40 = 4.0 kW	6 = 460 V3~		4 = 3 m
45 = 4.5 kW			5 = 3.5 m
60 = 6.0 kW			6 = 4 m
90 = 9.0 kW			7 = 4.5 m
12 = 12.0 kW			8 = 5 m
13 = 15.0 kW			9 = length as per drawing

Model
P1 = angular shape with holder, PVDF
P2 = angular shape with holder, PP
R1 = with holder, PVDF
R2 = with holder, PP
S1 = without holder, PVDF
S2 = without holder, PP

Identification

Other information on the model plate:

Article number	10-figure
Device number	6-figure
Protection category	IP class

Further information on the connection coupling:

Splashproof symbol	IP 64
Test mark	CE mark
Rated power P =	[kW]
Rated voltage U =	[V], current type

1.2 Address of manufacturer / dealer

See reverse of these operating instructions

1.3 Standards and guidelines

GALMATHERM® heater type P... and C... complies with the following requirements.

- Directive on Electromagnetic Compatibility (EMC) 2014/30/EU
- Low Voltage Directive 2014/35/EU
- EN 60519/1-2 (devices are categorised in protection class 1)
- EN 60529, IP 64 splashproof
- Thermal safety class 1 with the additional installation of safety equipment (for example temperature limiter, temperature guard) in the tank.

General information

2. General information

These installation instructions form an integral part of the device and must be kept available throughout the service life of the device.

Propagation as well as duplication of this document, exploitation and communication of its content are forbidden, unless explicitly permitted. Violations will cause indemnities.


All rights are reserved for the case of patent, utility model or design patent registration.


Supporting documents


Document	Content
Installation instructions Heater GALMATHERM®	Instructions on installing the heater / installation instructions
Information / data sheet: Heater GALMATHERM®	Product description and technical data
Resistance list (http://www.rotkappe.de or inquire with the manufacturer)	Recommended uses for materials in process liquids

2.1 Warning notes

Warning notes in these instructions are identified as follows:

 DANGER	Warning of an immediate threat of danger. Failure to observe this direction will lead to death, serious injury or severe material damage.
--	---

 WARNING	Warning of potential danger. Failure to observe this direction can lead to death, serious injury or severe material damage.
---	---

 CAUTION	Warning of potential danger situation. Injuries or material damage are possible.
---	--

General information

2.2 Explanation of symbols

✓ Requirements that must be satisfied.

⇒ Essential measures (one step).

1. The first step in work to be carried out. The following measures are numbered in the corresponding sequence.

2.3 Warranty and repairs

For warranty or repair work, send the cleaned and neutralised heater shipping paid to the manufacturer or your dealer specifying the nature of the fault.

Please also see section 9, which contains instructions on how to return items, and section 10, which lists the terms and conditions of the warranty.

General information

2.4 Correct use

GALMATHERM® heaters of type P... and C... are designed exclusively for industrial and commercial use.

Correct use of the equipment

- GALMATHERM® heaters can be used to heat aqueous liquids at ambient pressure.

Correct use also includes the following points:

- GALMATHERM® heaters must not be used to heat flammable and/or explosive liquids, gases or solids.
- GALMATHERM® heaters must not be used in areas at risk of explosion.
- The regulations in these operating instructions must be observed.
- The heaters must be protected from severe mechanical stress.
- GALMATHERM® heaters exhibiting visible damage must not be used.
- GALMATHERM® heaters must never be modified or converted.

The manufacturer accepts no liability for damage caused by incorrect use, intentional modifications to the device, disregard for the operating instructions and the use of unskilled personnel. The manufacturer's warranty shall also be deemed void in such circumstances.



Danger of explosion and fire!

- **GALMATHERM® heaters must not be used:**
 - with flammable or explosive products
 - in areas at risk of explosion
 - to heat gases or solids.
 - If you are uncertain, consult the manufacturer of the process liquid for advice.

Safety regulations

3. Safety regulations

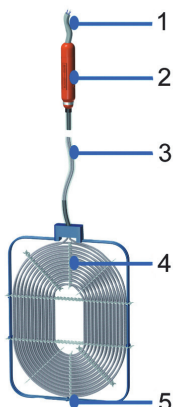
- ⇒ The connection and commissioning of the GALMATHERM® Heater must be carried out by a qualified electrician.
The qualified electrician is responsible for ensuring that the GALMATHERM® Heater is connected up correctly.
- ⇒ Before commissioning, read these operating instructions carefully and fully and follow the instructions they contain.
- ⇒ Comply with any standards and directives that are applicable in your country.
- ⇒ Be aware of the EMC Directive for the installation process.
- ⇒ When used with hazardous substances (hot, toxic or harmful materials), note the safety instructions on the handling of hazardous substances.
- ⇒ You must comply with the accident prevention regulations, safety and operating regulations.
- ⇒ Comply with the limit values for the proper usage of the GALMATHERM® heater (see also technical data in point 4.4).
- ⇒ Ensure that the operating personnel, surrounding area and process medium are safe at all times.
- ⇒ Ensure that no-one is in direct contact with the heated process fluid.
- ⇒ Ensure that the heater materials and process fluid are compatible (chemical/thermal resistance).
- ⇒ Secure the heater permanently so it cannot be removed from the tank or system.
- ⇒ Protect the heater with an overtemperature guard and a run-dry protection.
- ⇒ Ensure that the operating personnel receive training and instruction in how to use the heater.
- ⇒ Document any modifications and additions in these instructions and keep them permanently available at the heater's place of use.

Product description

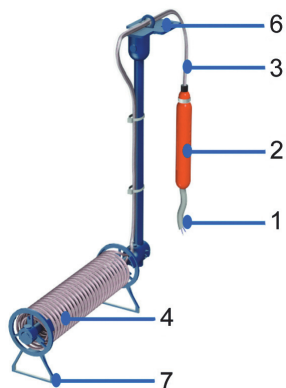
4. Product description

4.1 Construction

Heater GALMATHERM®
Flat models



Heater GALMATHERM®
Cylindrical models



- 1 Connecting cable, length C
- 2 Connection sleeve
- 3 Unheated area, length N, fluoropolymer-coated (FEP, PFA) unheated connection cable
Minimum and maximum immersion depth black plastic markings
- 4 Heated area, fluoropolymer-coated (FEP, PFA) heating cable
- 5 Frame (material and type depending on application)
- 6 For GALMATHERM® heater type C... cylindrical model P or R: PVDF or PP holder
- 7 Example of an installation tool
PVDF or PP feet for GALMATHERM® heaters cylindrical type C ... Model P

Product description

4.2 Models and accessories

GALMATHERM® heaters are available in both flat and cylindrical forms for various types of installation. There are also various accessory parts available as installation tools which make operating and maintaining the heaters easier (see supporting documents, point 2).

4.3 Attributes of processed materials

Abbreviation	Colour	Designation	Maximum fluid temperature [°C]	pH value
FEP	Translucent	Fluoroethylene propylene	+ 80	0 – 14
PFA	Translucent	Perfluoro-alkoxy polymer	+ 95	0 – 14
PP	White	Polypropylene	+ 60	0 – 14
PVDF	Blue	Polyvinylidene fluoride	+ 95	0 – 8
PVC	Orange	Polyvinyl chloride	+ 50 Ambient temperature	Not immersible

Product description

4.4 Technical data

- **Connection sleeve**

Material	PVC, orange
Protection category	IP 64 (EN 60529) Splashproof
Temperature range / environment	- 10°C to + 50°C
- **Connection cable**

Standard length	1 m to max. 15 m
Material	PVC insulation, grey (H05 VV-F) or Neoprene, black (H07RN-F), depending on rated power and rated voltage
- **Protective earth connection**

Heating cable: end-to-end copper shield
Cable: green/yellow stranded cable (PE)
- **Specific surface load**

Heating cable load: 0.5 W/cm² or 1 W/cm² (see section 1.1 Identification)
- **Max. permitted fluid temperature**

For aqueous solutions:
80°C (FEP coating)
95°C (PFA coating)
- **Rated power**

See information on the connection sleeve
Min. 1.0 kW to max. 15.0 kW
- **Rated voltage**

See information on the connection sleeve
Min. 110 V~, max. 460 V~
- **Type of current**

1- or 3-phase
- **Storage conditions**

- 10°C to + 50°C, dry

5. Labelling

All of the heater's key data is listed on the connection sleeve:

- Rated power [kW]
- Rated voltage [V]
- Current type [~, 3~]
- Type designation, article number and device number on the model plate

Using the type designation of the model plate and the identification (see point 1.1), it is possible to determine whether the GALMATHERM® heater is being used correctly in relation to materials, dimensions, etc.

See coding scheme:

- GALMATHERM® heaters, flat models P ...
See type details point 1.1
- GALMATHERM® heater, cylindrical model C ...
See type details point 1.1

Using the type key from the product information leaflet "Info/data sheet for GALMATHERM® heaters" (see legend and tables page 5 and page 6), it is possible to determine the types with all their design parameters.

Installation

6. Installation

⇒ Please note the installation instructions are enclosed separately.

Electrical connection and commissioning

7. Electrical connection and commissioning

Type of current	Number of phases	Connection diagram	Cable colours Connection cable (DIN VDE 0293-308)
Alternating current	Single-phase	L1 N PE	brown blue green/yellow
Three-phase current	Three-phase	L1 L2 L3 PE	brown grey black green/yellow

7.1 Connecting the device

The GALMATHERM® heater must be connected up by a professional electrician.


Connect the various wires in the cable separately as shown in the connection diagram. Ensure an all-pole disconnect of the poles with a contact opening distance of at least 3 mm (full separation).


The following points must be checked before connection:

- ✓ The rated voltage of the heater is the same as the mains voltage.
- ✓ The mains supply is switched off.
- ✓ Visual inspection of the heater, including the heating cable, reveals no evidence of damage, cracks or kinks.
- ✓ The materials used in the heater are chemically, mechanically and thermally resistant to the liquid to be heated.
- ✓ The connection cable is resistant to its environmental conditions. The minimum bending radius of 100 mm is respected.
- ✓ Electrical safety equipment (e.g. RCCB, fuse) is present.

Electrical connection and commissioning

7.2 Commissioning the device

 DANGER	<p>Danger of electric shock! Damaged cables or incorrect connection may result in current flowing through the process fluid.</p> <ul style="list-style-type: none">⇒ Install the heater in such a way that a minimum distance of > 10 mm is maintained between the heated area / heating cable surface and heat-sensitive materials and surfaces.⇒ Ensure that no fluid is able to penetrate the connection sleeve and that steam or vapour cannot affect it.⇒ Ensure that the connection cable is de-energized (see also DIN EN 50110-2).⇒ As protection, use an RCCB with a trip current of 30 mA, EN 61008-1/2-1.
--	--

 DANGER	<p>Danger of fire and overheating! Inadequate heat dissipation may result in the heater or heat-sensitive tank parts, etc. being damaged.</p> <ul style="list-style-type: none">⇒ Maintain the minimum distance from the heated area.⇒ Make sure the heat can be dissipated well from the heated area.⇒ Install safety devices in process fluids that tend to form sludge (e.g. heat-permeable cover on the heating cable). Heating must not be carried out in sludge or under encrusted deposits.⇒ Safeguard the heated area against running dry (e.g. install run-dry protection).
--	---

- ✓ The heated area is fully submerged and the fill level is between the markings indicating the minimum and maximum liquid level.
- ✓ No-one is touching the process fluid.
- ✓ The heater is installed correctly in accordance with the installation instructions and is securely fastened in place.
- ✓ Heat dissipation is not obstructed (no deposits, foreign bodies, etc.).

Electrical connection and commissioning

7.2.1 Operating conditions

The maximum temperature of the liquid being heated is within the values set out in the table in point 4.3.

- Generally speaking, GALMATHERM® heaters must only be used up to an operating pressure / hydrostatic pressure of 0.5 bar/50 kPa.
- If used as a tank heater, GALMATHERM® heaters may only be used up to a hydrostatic pressure of 1.5 bar/150 kPa (if liquid temperature and ambient temperature do not exceed 45 °C). This does not affect the connection sleeve and the treaded nipple in the unheated length N: as the protection class of these parts is IP64 they are water-splash proof but **not pressure-tight**.
- There is no physiological safety guarantee for GALMATHERM® heaters.

Operational limits are imposed under the following conditions:

- Process fluids with a high vapour pressure (e.g. organic solvents such as trichloroethylene)
- Hydrocarbons containing chlorine and fluoride
- Fluids that liberate large amounts of gas (e.g. H₂O₂ or HCl)
- Use in ultrasonic cleaning equipment and under increased clean-room conditions is not possible.

Please contact the manufacturer if you have any queries.

7.3 Testing the device


- ⇒ Switch the heater on.
- ⇒ Check the change in temperature of the liquid using a suitable method.


The heater is functioning if an increase in the temperature of the liquid is noted.

Servicing and maintenance

8. Servicing and maintenance

GALMATHERM® heaters are made from corrosion-resistant material and are therefore extremely low-maintenance.

 <p>DANGER</p>	<p>Danger of burns! Touching the hot heating cable can cause burns.</p> <ul style="list-style-type: none">⇒ It is essential that you wait approx. 15 minutes to allow it to cool down.⇒ Ensure that the parts that you wish to remove from the heated fluid are cool. <p>Danger of electric shock! Damaged cables, heating cables or incorrect connection may result in current flowing through the process fluid.</p> <ul style="list-style-type: none">⇒ Ensure that the heater and system are switched off (see also DIN EN 50110-2).
--	---

 <p>WARNING</p>	<p>Danger of injury! Contact with residue from hazardous substances may cause injury and chemical burns.</p> <ul style="list-style-type: none">⇒ Neutralise and clean the contaminated heater before inspection, transport and storage. Refer to the safety directives for handling hazardous substances.⇒ Comply with local waste disposal regulations.
---	---

To ensure maximum performance, they must be checked regularly to ensure they are intact and functioning correctly. Proceed as follows to carry out these checks:


1. Switch the GALMATHERM® heater off.
2. Before removing the heater or before draining the fluid, wait at least 15 minutes until the stored heat has completely dissipated.
3. Remove the heater from the tank, where necessary after removing any securing devices first.


Servicing and maintenance

4. Clean and neutralise the heater. Do not use any harsh, sharp or pointed tools to do this.
 - For maximum safety during maintenance, the heater should be chemically neutralised using suitable substances and then rinsed generously with water.
5. Remove any encrustations and deposits
 - Some chemical solutions or process fluids can form deposits or encrustations on the heating cable. This has a negative impact on the essential heat dissipation through the fluid, which can lead to the thermal destruction of the heating cable sheathing.
As a result of the wide variety of process fluids and ambient conditions at customers' sites it is not possible to provide a general statement here about cleaning methods and servicing cycles.
⇒ If you are in any doubt, ask the manufacturer of the process liquid for advice.
6. Visually inspect the heater
 - Check whether the heating cable exhibits any mechanical damage, kinks or blistering both in the heated area and in the unheated area (length N).
 - If the heating cable does exhibit any such defects, the GALMATHERM® heater must not be used any further.
 - Contact the manufacturer and note point 9, "Transport - Storage - Disposal".
 - Check the condition of the connecting cable.

If there is damage to the insulation or wire strands, return the GALMATHERM® heater to the manufacturer (see point 9.2).

9. Transport - Storage - Disposal

 DANGER	<p>Danger of burns! Touching the hot heating cable can cause burns.</p> <ul style="list-style-type: none">⇒ It is essential that you wait approx. 15 minutes to allow it to cool down.⇒ Ensure that the parts that you wish to remove from the heated fluid are cool.
--	--

 WARNING	<p>Danger of injury! Contact with residue from hazardous substances may cause injury and chemical burns.</p> <ul style="list-style-type: none">⇒ Neutralise and clean the contaminated heater before inspection, transport and storage. Refer to the safety directives for handling hazardous substances.⇒ Comply with local waste disposal regulations.
---	---

9.1 Transport and storage

During transport, care must be taken to ensure that the packaging protects the product securely and prevents any strain on the heater.

The GALMATHERM® heater must be stored in the ambient conditions described under point 4 in the technical data.

Transport - Storage - Disposal

9.2 Returning the device

To return the GALMATHERM® heater, follow the instructions below:

1. Clean and neutralise the heater, removing any dirt or residue where necessary.
2. Please include a description of the conditions in which the heater was being used (e.g. liquid temperature, operating temperature, pH value, chemical composition of the process fluid, contaminations).
3. Describe the defect that has occurred.
4. Specify how long the heater has been operating for.
5. Include your address and details of who to contact at your company in case we have any further questions.

9.3 Disposing of the heater

The heater and any residue of hazardous substances must be disposed of in an environmentally compatible manner in accordance with applicable local guidelines.



Warranty

10. Warranty

GALMATHERM® heaters have a manufacturer's warranty.

The warranty period runs for twelve months from the date the product was received, or a maximum of 15 months in the event of proof of the heater being commissioned later.

This warranty applies solely to the correct use of the heater and to compliance with these instructions. The manufacturer reserves the right to carry out an inspection of any product forming the subject of a complaint.

The manufacturer accepts no liability in the following circumstances:

- Failure to comply with the enclosed operating instructions.
- Incorrect handling of the heater or unintentional damage.
- Technical modifications to the heater.



MAZURCZAK

Heating Cooling Controlling

Original operating instructions

WG 28/10.15/1

Subject to change.

Mazurczak GmbH

Schlachthofstrasse 3

91126 Schwabach, Germany

Phone: +49 91 22 98 55-0

Fax: +49 91 22 98 55-99

kontakt@mazurczak.de

www.rotkappe.de

