

# Safety Immersion Heaters ROTKAPPE® with Anti-Burn System

ROTKAPPE safety immersion heaters with Anti-Burn System minimise possible thermal damage to plants and tanks in the event of partial or complete loss of the liquid being heated.

Although EN 60519/1-2 specifies that electrically heated systems must be equipped by the user with safety technology (overheating protection and dry-running protection), even the best safety technology cannot protect the systems against mistakes by the operator or against the results of faulty maintenance.

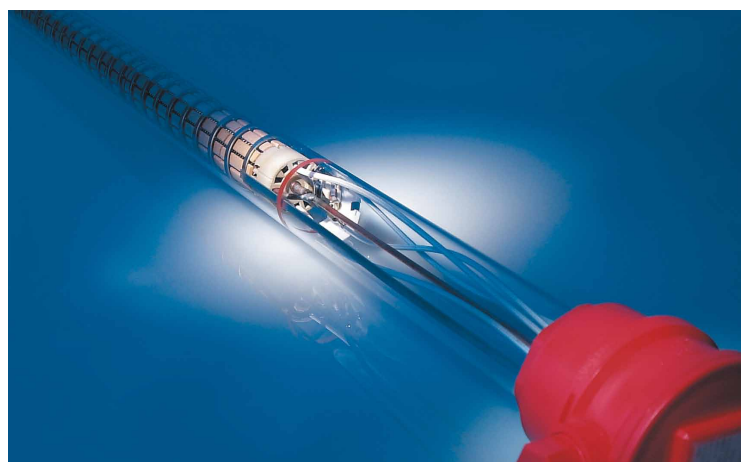
The following „critical” situations in liquid solutions up to 100°C can be avoided by using a safety immersion heater with Anti-Burn System:

- Continuous operation of the heater with low fluid levels (due, for example, to evaporation of the fluid)
- Continuous operation of the heater with no fluid (due, for example, to a sudden, unexpected loss of fluid)
- Continuous operation of the heater when the transfer of heat from the heated immersion tube to the fluid is restricted (by, for example, heavy incrustation on the immersion tube)

ROTKAPPE safety immersion heaters with Anti-Burn System can be installed either vertically or horizontally in tanks and other plants. This flexibility simplifies the planning and installation of electrical immersion heaters to meet a wide range of requirements for such applications.

Please note that it is still necessary to install the normal overheating and dry-running protection devices in plants and tanks with electrical heating systems, even when using ROTKAPPE immersion heaters with Anti-Burn System.

The optimum solution to this can be found in our product range of float switches, conductive level probes and the related electronic controllers. We will gladly advise you in the solution of your safety problems.



## 1- or 2-phase connection

The integrated Anti-Burn System reacts to unpermissibly high immersion tube temperatures and switches off the heater. The heater remains off until the safety circuit is reset manually. This can be done only if the other safety devices are operating correctly and the tank and the heater are in good condition.

The heater cartridges are available for all rated voltages up to 400V and with rated powers of up to 6.0 kW.

## 3- phase connection

The integrated Anti-Burn System is tripped if the immersion tube temperature becomes too high and switches off the heater with the aid of our differential current monitor DSW 3/2 and a power relay. The heater then remains switched off until the safety circuits in the immersion heater and on the differential current monitor are reset manually.

A prerequisite for this is that all other safety devices are functioning correctly and that the tank and the heater are in good condition.

The Anti-Burn System can be installed in all three-phase immersion heaters with rated voltages of up to 400V and a current consumption of 1,8 to 16A.



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The differential current monitor DSW 3/2 monitors the currents in the individual phases (L1, L2, L3) of a three-phase mains supply.

When the limit value set for power consumption imbalance is exceeded, the power contactor is switched off via the relay contact. The limit value recommended for power consumption imbalance is 5.0 %.

The effective process parameters (e.g. Phase current) are indicated on the display. If values exceed or fall below the set limits, the contact switches and the display shows the respective error message.

The DSW 3/2 differential current monitor reacts in the following situations:

- Overload protection (for current consumption monitoring)
- Current phase failure (if the temperature limiter in the immersion heater is activated)
- Current phase failure (if the heating coil fails or in case of cable breakage)

## Technical data DSW 3/2

<b>Dimensions</b>	w = 45 mm, h = 86 mm, d = 80 mm
<b>Mounting</b>	on 35 mm rails (in accordance with EN 60715)
<b>Ambient temperature</b>	-25...60°C
<b>Maximum humidity</b>	10...95 % (no condensation)
<b>Supply voltage</b>	24VDC ± 15 %
<b>Power consumption</b>	2,5W at 24V DC
<b>Measuring inputs</b>	3 x I with I <sub>MAX</sub> = 16A~
<b>Output</b>	Relay contact 230V/3A~
<b>Terminal cross-section</b>	1,5 mm²...4 mm²

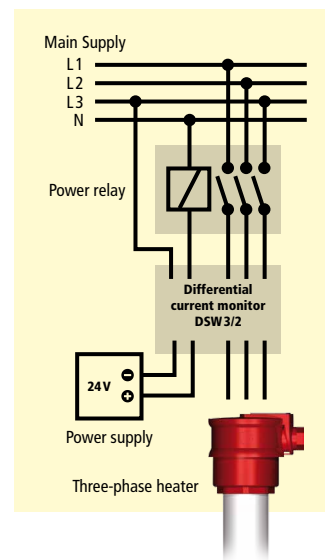
After phase failure, the DSW 3/2 differential current monitor can be reset directly via the control keys ↵. If the error is not resolved, the differential current monitor goes into alarm state again and the respective error message is displayed.

The DSW 3/2 differential current monitor is an IO link device. It can therefore be used as an intelligent sensor / actuator for parameter data transfer to a PLC (via the IO link protocol).

Using a PLC and an IO link allows additional monitoring of the following parameters:

- Phase overcurrent monitor
- Phase undercurrent monitor
- Overcurrent and undercurrent monitor
- Current imbalance monitor
- 3-phase undercurrent detection
- Phase sequence detection (at inductive load)

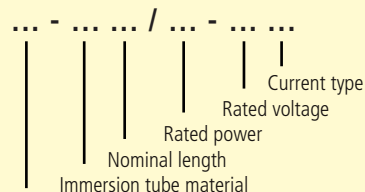
Block diagram for 3-phase-connection



## Relation Heaters DSW 3/2

Immersion heaters with rated power [kW] for 400V 3~	Max. number of heaters per DSW 3/2
1,6/2,0	5
2,5	4
3,15/3,5	3
4,0/5,0	2
6,3/7,0/8,0/10,0	1

## Type designations



T = Safety ROTKAPPE immersion heater with Anti-Burn System, 1/2-phase  
A = Safety ROTKAPPE immersion heater with Anti-Burn System, 3-phase

**Example:** T-PS630/1,6-230Ws:

Safety ROTKAPPE immersion heater with Anti-Burn System, porcelain tube, nominal tube length 630 mm; rated power 1.6 kW; rated voltage 230V (single-phase).

**Restriction note:** The differential current monitor DSW 3/2 cannot be used in connection with control interventions with a phase angle control or for signal packages which change the sinus waves.