

Differential Current Monitor DSW3/2

Manufacturer: Siemens AG

Model: 3RR2441-1AA40 SIRIUS Monitoring Relay

Operating Instructions

430B22EN01



EN 1088 (5.7)



The 3RR2441-1AA40 monitoring relay from Siemens has been specially configured and parameterised by Mazurczak GmbH for use as a differential current monitor.

The DSW3/2 differential current monitor is exclusively for commercial and industrial usage.

The monitor may only be connected by an electrical specialist.

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1. General information

These operating instructions are a part of the device.

- ▶ Retain the operating instructions for the entire service life of the device.

To view the document online, enter the product code.




1.1 Warning notes

 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.

1.2 Warranty and repairs

If you wish to make a claim under the warranty or required repairs, return the DSW3/2 differential current monitor to Mazurczak GmbH postage paid with details of the defect.

2. General safety instructions

 DANGER	Dangerous voltage Risk of fatality, risk of serious injury or property damage. Hazardous electrical voltages can lead to electric shocks, burns and property damage. Disconnect the system and devices from the voltage supply prior to starting work.
 WARNING	Risk of fire/burns If a reset is performed after a fault occurs, the connected loads are supplied with voltage again. Make sure that the loads have been installed in accordance with the assembly and operating instructions before a reset.
 CAUTION	Protection from electrostatic charging When handling and installing the DSW3/2 differential current monitor, ensure protection against electrostatic charging of the components.

2.1 Designated use

The DSW3/2 differential current monitor is exclusively for commercial and industrial usage.

The monitor may only be connected by an electrical specialist.

The DSW3/2 differential current monitor is used for monitoring the steady phase current of electrical heating appliances. Once a phase imbalance appears due to an irregular current overload of $\geq 5.0\%$, the DSW3/2 switching contact (terminals 31/34) opens. This is shown on the integrated display. The DSW3/2 is reset by simultaneously pressing and holding down on the two control buttons. The status of the device is shown on the display.

2.1.1 Restriction note

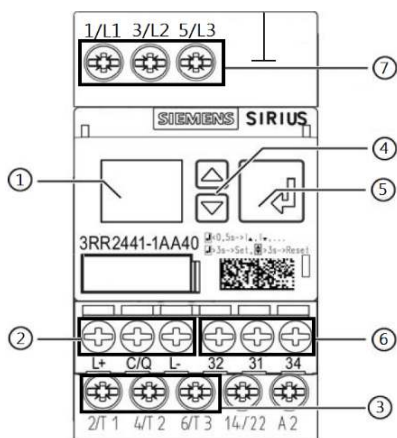
The differential current monitor DSW3/2 cannot be used in connection with control interventions with a phase angle control or for signal packages which change the sinus waves.

2.2 Standards and guidelines

The DSW3/2 differential current monitor complies with the following regulations:

Device standards	<ul style="list-style-type: none">• IEC / EN 60947-1 "Low-voltage switchgear: General specifications"• IEC / EN 60947-4-1 "Contactors and motor starters: Electromechanical contactors and motor starters"• IEC / EN 60947-5-1 "Control circuit devices and switching elements: Electromechanical control circuit devices"; VDE 0660 "Low-voltage switchgear"• DIN EN 50042 "Terminal marking"• DIN EN 60044-1 "Instrument transformers – Part 1: Current transformers"
EMC standards	<ul style="list-style-type: none">• IEC / EN 61000-6-2 "Generic immunity standard – Industrial environment"• IEC / EN 61000-6-4 "Generic emission standard – Industrial environment"
Climatic resistance	<ul style="list-style-type: none">• IEC 60721-3-3 "Classification of environmental conditions" The monitoring relays are climate resistant as per IEC 60721-3.
Contact protection	<ul style="list-style-type: none">• IEC / EN 60529 "Degrees of protection provided by enclosures" The monitoring relays are safe to touch as per IEC / EN 60529.

3. Product description




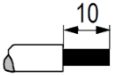
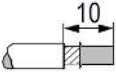


DSW3/2 differential current monitor,
frontal view

1	Display
2	24 V _{DC} supply voltage port
3	Heater port
4	Control buttons (reset)
5	Confirmation button
6	Changeover contact / contactor port
7	Supply voltage port

3.1 Technical data

Protection class	IP 20
Dimensions	W = 45 mm, H = 86 mm, D = 80 mm
Installation	On 35 mm top hat rail (as per DIN EN 60715)
Ambient temperature	–25 to 60°C
Max. ambient humidity	10 to 95 %
Supply voltage	24 V _{DC} ± 15%
Power consumption	2.5 W at 24 V _{DC}
Measuring input	3 x I with I _{Max} = 16 A~
Signal output	230 V / 3 A~ changeover contact
Release current imbalance	≥ 5 %
Release time	3 seconds

Terminal designation			
	2T1 / 4T2 / 6T3 / 14/22 / A2	L+ / CQ / L- / 32 / 31 / 34	1L1 / 3L2 / 5L3
	 PZ 2 (Ø5 to 6 mm) 0.6 to 1.2 Nm	 PZ 2 (Ø5 to 6 mm) 0.8 to 1.2 Nm	 PZ 2 (Ø5 to 6 mm) 0.8 to 1.2 Nm
	max. 2 x (1.5 to 4) mm ²	1 x (0.5 to 4) mm ² 2 x (0.5 to 2.5) mm ²	---
	2 x (1.5 to 2.5) mm ²	1 x (0.5 to 2.5) mm ² 2 x (0.5 to 1.5) mm ²	0.5 to 2.5 mm ²

3.2 Function

The currents to be monitored are connected to T1/L1, T2/L2 and T3/L3. An even, symmetrical phase loading is a requirement. In this process, monitoring one or even several heating devices is possible. The phasing is irrelevant, since only the current amounts are evaluated. The maximum permitted current (16 A) must not be exceeded. If a phase is interrupted, the current returns to 0 A for separately connected heating devices; there is a differential current for several heating devices connected in parallel. The output relay trips if there is a current imbalance of $\geq 5.0\%$ between phases. An error message is shown on the display. This state can be reset by simultaneously pressing on both control buttons for at least 2.5 seconds (a counter appears on the display). If the error is still present after resetting, then the relay will trip again after roughly 1 seconds. The DSW3/2 does not respond when switching off the entire three-phase load (e.g. by the temperature controller) and upon the return of the voltage supply.

3.3 Note on the switching threshold

The response value of the differential current monitor is $\geq 5.0\%$ of the current imbalance and depends not on the overall load. In the event of loads connected in delta, you must ensure that the current is reduced by a factor of $\sqrt{3}/2 = 0.866$ in the remaining phases after switching off a phase. Thus the switching threshold for delta-connected loads increases.

A trip test should be conducted on the DSW3/2 during first commissioning to check for safe functioning. When doing so, a phase difference of 5 % should be simulated. The DSW3/2 must then trip after a response time of roughly 3 seconds.

3.4 Applications

As per the schematic diagram in Fig. 1 (see page 11)

- Connection of one or multiple heaters, three-phase
- Connection of one or multiple heaters, three-phase with anti-burn system

As per the schematic diagram in Fig. 2 (see page 11)

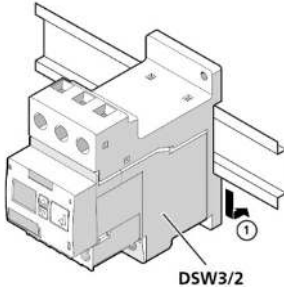
- Connection of one or multiple heaters, two-phase
- Connection of one or multiple heaters, two-phase with anti-burn system

As per the schematic diagram in Fig. 3 (see page 11)

- Connection of one or multiple heaters, single-phase
- Connection of one or multiple heaters, single-phase with anti-burn system

4. Attachment / detachment

The differential current monitor is fitted to a 35 mm top hat rail as per DIN EN 60715 and as shown in the following illustration. This is detached in reverse sequence.



DSW3/2 attachment to support rail

5. Connection

Only allow the DSW3/2 differential current monitor to be connected up by an electrical specialist.

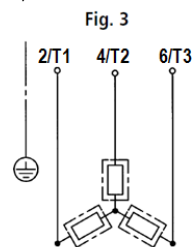
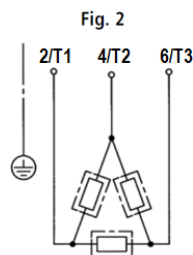
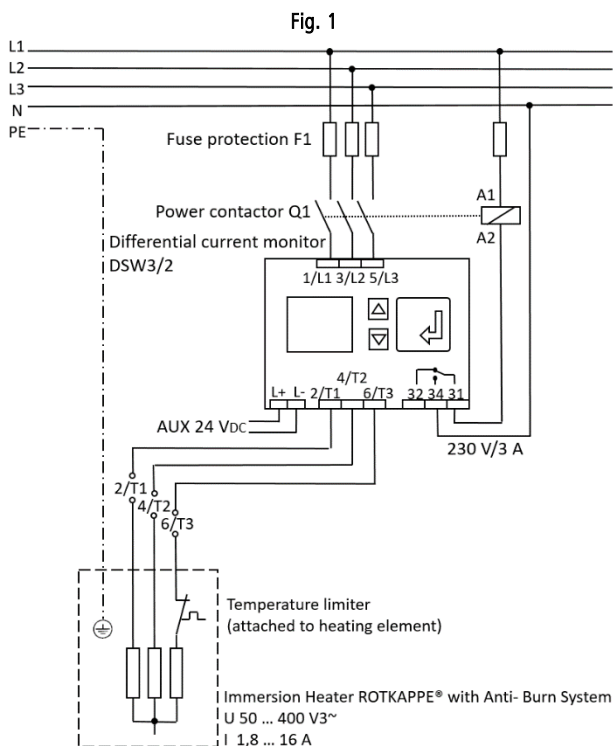


DANGER

Danger of overheating and fire.

If the DSW3/2 differential current monitor is connected up incorrectly, the secure shut-down of the safety immersion heater with anti-burn system ROTKAPPE® cannot be ensured. This could lead to personal injury, serious property damage and fire.

Connect the differential current monitor in accordance with the following schematic diagram.



6. Operation

You can find the following numbers in brackets concerning the elements/Components on page 7 „product description“.

6.1 Parameters

The DSW3/2 differential current monitor is specially parameterised to detect current imbalances of $\geq 5.0\%$.

The parameter level is opened by pressing the control buttons (5) for 3 seconds.

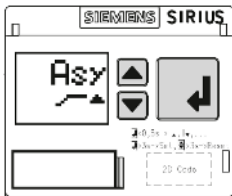
Adjusting the parameters is not possible. The changeover contact (6) opens while the parameter level is opened. The parameter level is exited by pressing the control buttons (5) for 3 seconds once more.

6.2 Current querying

The current currents in the individual phases and the present current imbalance can be queried using the control buttons (4). The relevant values are shown on the display (1).


6.3 Fault detection

If a current imbalance of $\geq 5.0\%$ is detected, then the changeover contact (6) opens within 3 seconds and connected loads are disconnected from the voltage. The following fault message is shown on the display (1):



6.4 Resetting

By simultaneously pressing the control buttons (4) for 2.5 seconds, a reset is performed (a counter appears on the display). If the source of the fault is not resolved, the fault is detected again immediately after the reset and the changeover contact connected again.

 DANGER	Danger of electric shock! The loads are supplied with voltage by a reset.
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7. Disposal

The DSW3/2 differential current monitor is to be disposed of in an environmentally friendly way in accordance with applicable local regulations.

