

Monitoring Relays

1-Phase True RMS AC/DC Over or Under Current

Types DIB01, PIB01

CARLO GAVAZZI



DIB01



PIB01

- TRMS AC/DC over or under current monitoring relay
- Current measuring through internal shunt
- Selection of measuring range by DIP-switches
- Measuring ranges from 0.1 mA to 10 A AC/DC
- Adjustable current on relative scale
- Adjustable hysteresis on relative scale
- Adjustable delay function (0.1 to 30 s)
- Programmable latching or inhibit at set level
- Output: 8 A SPDT relay N.D. or N.E. selectable
- For mounting on DIN-rail in accordance with DIN/EN 50 022 (DIB01) or plug-in module (PIB01)
- 22.5 mm Euronorm housing (DIB01) or 36 mm plug-in module (PIB01)
- LED indication for relay, alarm and power supply ON
- Galvanically separated power supply

Product Description

DIB01 and PIB01 are precise TRMS AC/DC over or under current (selectable by DIP-switch) monitoring relays. Direct measuring or through current transformer. Owing to the built-in latch function, the ON-position of the relay output can be maintained. Inhibit function

can be used to avoid relay operation when not desired (maintenance, transitions). The LED's indicate the state of the alarm and the output relay. Through the built-in shunt it is possible to monitor loads up to 10 A AC/DC.

Ordering Key

DIB 01 C B23 5A

Housing _____
 Function _____
 Type _____
 Item number _____
 Output _____
 Power supply _____
 Measuring range _____

Type Selection

Mounting	Output	Measuring range	Supply: 24 VDC	Supply: 24/48 VAC	Supply: 115/230 VAC
DIN-rail	SPDT	0.1 to 5 mA AC/DC	DIB 01 C 724 5mA	DIB 01 C B48 5mA	DIB 01 C B23 5mA
		1 to 50 mA AC/DC	DIB 01 C 724 50mA	DIB 01 C B48 50mA	DIB 01 C B23 50mA
		10 to 500 mA AC/DC	DIB 01 C 724 500mA	DIB 01 C B48 500mA	DIB 01 C B23 500mA
		0.1 to 5 A AC/DC	DIB 01 C 724 5A	DIB 01 C B48 5A	DIB 01 C B23 5A
		1 to 10 A AC/DC	DIB 01 C 724 10A	DIB 01 C B48 10A	DIB 01 C B23 10A
Plug-in	SPDT	0.1 to 5 mA AC/DC	PIB 01 C 724 5mA	PIB 01 C B48 5mA	PIB 01 C B23 5mA
		1 to 50 mA AC/DC	PIB 01 C 724 50mA	PIB 01 C B48 50mA	PIB 01 C B23 50mA
		10 to 500 mA AC/DC	PIB 01 C 724 500mA	PIB 01 C B48 500mA	PIB 01 C B23 500mA
		0.1 to 5 A AC/DC	PIB 01 C 724 5A	PIB 01 C B48 5A	PIB 01 C B23 5A
		1 to 10 A AC/DC	PIB 01 C 724 10A	PIB 01 C B48 10A	PIB 01 C B23 10A

Input Specifications

Input	Measuring ranges (cont.)		Internal resist.	Max. curr.
Current level	DIB01: Terminals Y1, Y2 PIB01: Terminals 5, 7			
Measuring ranges	Internal resist.	Max. curr.		
..5MA:	0.1 to 1 mA AC/DC	50 Ω	50 mA	
	0.2 to 2 mA AC/DC	50 Ω	50 mA	
	0.5 to 5 mA AC/DC	50 Ω	50 mA	
	Max. current for 1 s		100 mA	
..50MA:	1 to 10 mA AC/DC	5 Ω	150 mA	
	2 to 20 mA AC/DC	5 Ω	150 mA	
	5 to 50 mA AC/DC	5 Ω	150 mA	
	Max. current for 1 s		500 mA	
Measuring ranges (cont.)				
..500MA:	10 to 100 mA AC/DC			
	20 to 200 mA AC/DC			
	50 to 500 mA AC/DC			
	Max. current for 1 s			
..5A:	0.1 to 1 A AC/DC			
	0.2 to 2 A AC/DC			
	0.5 to 5 A AC/DC			
	Max. current for 1 s			
..10A:	1 to 10 A AC/DC			
	Max. current for 1 s			

Input Specifications (cont.)

Measuring ranges (cont.)

Standard CT (examples)	AAC_{rms}	Max. curr.
TADK2 50 A/5 A	5 to 50 A	60 A
TAD2 150 A/5 A	15 to 150 A	180 A
TAD6 400 A/5 A	40 to 400 A	480 A
TAD12 1000 A/5 A	100 to 1000 A	1200 A
TACO200 6000 A/5 A	600 to 6000 A	7200 A

Note:

The input voltage cannot raise over 300 VAC/DC with respect to ground (PIB01 only)

Contact input

DIB01	Terminals Z1, Y1
PIB01	Terminals 8, 9
Disabled	> 10 kΩ
Enabled	< 500 Ω
Latch disable	> 500 ms

Output Specifications

Output	SPDT relay
Rated insulation voltage	250 VAC
Contact ratings (AgSnO ₂)	μ
Resistive loads AC 1	8 A @ 250 VAC
DC 12	5 A @ 24 VDC
Small inductive loads AC 15	2.5 A @ 250 VAC
DC 13	2.5 A @ 24 VDC
Mechanical life	≥ 30 x 10 ⁶ operations
Electrical life	≥ 10 ⁵ operations (at 8 A, 250 V, cos φ = 1)
Operating frequency	≤ 7200 operations/h
Dielectric strength	
Dielectric voltage	≥ 2 kVAC (rms)
Rated impulse withstand volt.	4 kV (1.2/50 μs)

Supply Specifications

Power supply	Overvoltage cat. III (IEC 60664, IEC 60038)	
Rated operational voltage through terminals:		
A1, A2 or A3, A2 (DIB01)		
2, 10 or 11, 10 (PIB01)		
724:	24 VDC ± 20%, insulated	
B48:	24/48 VAC ± 15%	
	45 to 65 Hz, insulated	
B23:	115/230 VAC ± 15%	
	45 to 65 Hz, insulated	
Dielectric voltage	DC supply	AC supply
Supply to input	2 kV	4 kV
Supply to output	4 kV	4 kV
Input to output	4 kV	4 kV
Rated operational power		
AC	4 VA	
DC	3 W	

General Specifications

Power ON delay	1 s ± 0.5 s or 6 s ± 0.5 s
Reaction time	(input signal variation from -20% to +20% or from +20% to -20% of set value)
Alarm ON delay	< 100 ms
Alarm OFF delay	< 100 ms
Accuracy	(15 min warm-up time)
Temperature drift	± 1000 ppm/°C
Delay ON alarm	± 10% on set value ± 50 ms
Repeatability	± 0.5% on full-scale
Indication for	
Power supply ON	LED, green
Alarm ON	LED, red (flashing 2 Hz during delay time)
Output relay ON	LED, yellow
Environment	(EN 60529)
Degree of protection	IP 20
Pollution degree	3 (DIB01), 2 (PIB01)
Operating temperature	-20 to 60°C, R.H. < 95%
Storage temperature	-30 to 80°C, R.H. < 95%
Housing dimensions	
DIn-rail version	22.5 x 80 x 99.5 mm
Plug-in version	36 x 80 x 87 mm
Weight	Approx. 150 g
Screw terminals	
Tightening torque	Max. 0.5 Nm acc. to IEC 60947
CE-Marking	Yes

Mode of Operation

DIB01 and PIB01 monitor both AC and DC over or under current through an internal shunt.

Example 1

(connection between terminals Z1, Y1 or 8, 9 - latching function enabled)

The relay operates and latches in operating position when the measured value exceeds (or drops below) the set level for more than the set delay time. Provided that the current has dropped below (or has exceeded) the set point (see hysteresis setting), the relay releases when the interconnection between terminals Z1, Y1 or 8, 9 is interrupted or the power supply is interrupted as well. The red LED flashes until the delay time has expired or the measured value comes back to a non-alarm value (see hysteresis setting).

Example 2 (Standard CT)

(no connection between terminals Z1, Y1 or 8, 9 - latch function disabled)

The relay operates when the measured value exceeds (or drops below) the set level for more than the set delay time. It releases when the current drops below (or exceeds) the set level (see hysteresis setting) or when power supply is interrupted.

Note

When the inhibit contact is opened, if the input signal is already in alarm position, the delay time needs to elapse before relay activation.

Function/Range/Level and Time Delay Setting

Selection of measuring range:
DIP-switch selector (1 to 2)

..5MA

1 2 Input range:
ON ☐ 0.1 - 1 mA
☐ 0.2 - 2 mA
☐ 0.5 - 5 mA

..50MA

1 2 Input range:
ON ☐ 1 - 10 mA
☐ 2 - 20 mA
☐ 5 - 50 mA

..500MA

1 2 Input range:
ON ☐ 10 - 100 mA
☐ 20 - 200 mA
☐ 50 - 500 mA

..5A

1 2 Input range:
ON ☐ 0.1 - 1 A
☐ 0.2 - 2 A
☐ 0.5 - 5 A

Selection of function:
DIP-switch selector (3 to 5)

3
☐ Relay de-energized in normal condition.
☐ Relay energized in normal condition.

4
☐ Power ON delay 6 ± 0.5 s

☐ Power ON delay 1 ± 0.5 s

5
☐ Contact input as latch function enable. When the contact is closed, the latch function is activated. Reset of the latch condition occurs when the contact is open or by power down.

☐ Contact input as inhibit of alarm enable. When the contact is closed the relay remains in normal position even if the alarm condition occurs.

Selection of function:
DIP-switch selector (6)

6
☐ Over current monitoring relay. The alarm condition occurs when the current input is over the set point value.

☐ Under current monitoring relay. The alarm condition occurs when the current input is under the set point value.

Selection of level and time delay:

Upper knob:
Setting of hysteresis on relative scale: 0 to 30% on set value.

Centre knob:
Current level setting on relative scale: 10 to 110% on full scale.

Lower knob:
Setting of delay on alarm time on absolute scale (0.1 to 30 s).

Example 1

Example 1

Example 2

Example 2

Timing diagram showing the sequence of events:

- Power supply**: Constant high voltage.
- Set Level**: A signal that rises and falls, crossing the hysteresis level.
- Hysteresis**: A dashed horizontal line representing the threshold for the relay.
- Relay ON**: Pulses that occur when the Set Level crosses the Hysteresis line. The first pulse is labeled "1 or 6 s".
- Red LED ON**: Pulses that occur when the Relay is ON.

Timing diagram showing the sequence of events:

- Power supply**: High throughout.
- Inhibit ON**: High initially, then low, then high again.
- Set Level**: A sawtooth wave that crosses the **Hysteresis** line.
- Relay ON**: Pulses occur when the Set Level crosses the Hysteresis line from below, with a delay of 1 or 6 seconds.
- Red LED ON**: Pulses occur when the Set Level crosses the Hysteresis line from above.