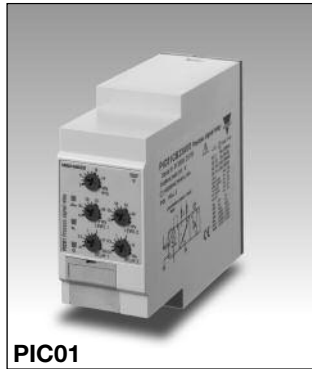


# Monitoring Relays 1-Phase True RMS AC/DC Over and Under Current Types DIC01, PIC01



- TRMS AC/DC over + under, over+over, under+under current and voltage monitoring relays
- DC process signal plus/minus monitoring relay (DIC01)
- Selection of measuring range by DIP-switches
- Adjustable current and voltage on relative scale
- Adjustable hysteresis on relative scale
- Separately adjustable delay functions (0.1 to 30 s)
- Programmable latching or inhibit at set level
- Output: 1 or 2 x 8 A SPDT relay N.D. or N.E. selectable
- For mounting on DIN-rail in accordance with DIN/EN 50 022 (DIC01) or plug-in module (PIC01)
- 45 mm Euronorm housing (DIC01) or 36 mm plug-in module (PIC01)
- LED indication for relay(s), alarm and power supply ON
- Galvanically separated power supply

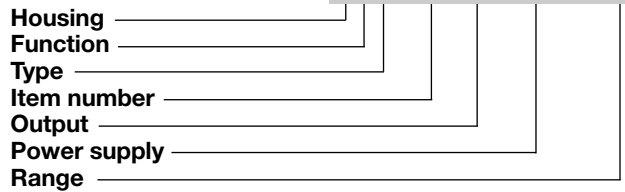
## Product Description

DIC01 and PIC01 are precise TRMS AC/DC over+under, over+over or under+under current and voltage (selectable by DIP-switch) monitoring relays. DIC01 can perform also DC plus/minus measurement by short circuiting pins Z3 and Y1. The devices can be connected to the MI or MP and A82 or E82 current transformers. Both relays have two individual set levels with their own

time delay. Only for DIC01 each set level can work with a single SPDT relay. 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 relays.

## Ordering Key

**DIC 01 D B23 AV0**



## Type Selection

Mounting	Output	Supply: 24 VDC	Supply: 48 VDC	Supply: 24/48 VAC	Supply: 115/230 VAC
DIN-rail	2xSPDT	<b>DIC 01 D 724 AV0</b>	<b>DIC 01 D 748 AV0</b>	<b>DIC 01 D B48 AV0</b>	<b>DIC 01 D B23 AV0</b>
Plug-in	SPDT	<b>PIC 01 C 724 AV0</b>	<b>PIC 01 C 748 AV0</b>	<b>PIC 01 C B48 AV0</b>	<b>PIC 01 C B23 AV0</b>

## Input Specifications

<b>Input</b>					
Current level		DIC01: Terminals Y1, Y2 PIC01: Terminals 6, 7		<b>Note 1:</b> The input voltage cannot raise over 300 VAC/DC with respect to ground (PIC01 only)	
Voltage level		DIC01: Terminals Y1, Y3 PIC01: Terminals 5, 7			
DC levels (DIC01 only)		Connecting terminals Z3, Y1			
<b>Measuring current ranges</b>		<b>Internal resis.</b>	<b>Max. curr.</b>	<b>CT ranges</b>	<b>AAC rms</b> <b>Max. curr.</b>
Direct				MI and MP ranges (0.4 to 4 V <sub>p</sub> input)	
Selectable by DIP-switch				1-ph.:            3-ph.:	
0.5 to 5 mA AC/DC	} (DIC01 only)	50 Ω	35 mA	MI 5            MP 3005	0.5 to 5 A    20 AAC
2 to 20 mA AC/DC		50 Ω	55 mA	MI 20          MP 3020	2 to 20 A    50 AAC
-5 to 5 mA DC		50 Ω	35 mA	MI 100        MP 3100	10 to 100 A 250 AAC
-20 to 20 mA DC		50 Ω	55 mA	MI 500        MP 3500	50 to 500 A 750 AAC
Max. current for 1 s				100 mA	
<b>Measuring voltage ranges</b>		<b>Internal resis.</b>	<b>Max. volt.</b>	<b>Note 2:</b>	
Direct				MP 3... current transformers not suitable for under current measurements due to the output signal of the device (see data sheet)	
Selectable by DIP-switch					
0.1 to 1 V AC/DC	} (DIC01 only)	> 10 kΩ	7 V		
1 to 10 V AC/DC		> 10 kΩ	20 V		
0.4 to 4 V <sub>p</sub> AC		> 10 kΩ	100 V		
-1 to 1 VDC		> 10 kΩ	7 V		
-10 to 10 VDC		> 10 kΩ	20 V		
Max. voltage for 1 s			100 V		

## Input Specifications (cont.)

CT ranges (cont.)	AAC rms	Max. curr.
A82 ranges (2 to 20 mA input)		
A82-10/20 25	2.5 to 25 A	30 AAC
A82-10/20 50	5 to 50 A	60 AAC
A82-10/20 100	10 to 100 A	120 AAC
A82-10/20 250	25 to 250 A	300 AAC
A82-10/20 500	50 to 500 A	600 AAC
E82-20 ranges (2 to 20 mA input)		
E82-20 25	2.5 to 25 A	50 AAC
E82-20 50	5 to 50 A	100 AAC
<b>Contact input</b>		
DIC01	Terminals Z1, Y1	
PIC01	Terminals 8, 9	
Disabled	> 10 k $\Omega$	
Enabled	< 500 $\Omega$	
Latch disable	> 500 ms	

## Output Specifications

<b>Output</b>	1 or 2 x SPDT relays
Rated insulation voltage	250 VAC
<b>Contact ratings</b> (AgSnO <sub>2</sub> )	$\mu$
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
<b>Mechanical life</b>	$\geq 30 \times 10^6$ operations
<b>Electrical life</b>	$\geq 10^5$ operations (at 8 A, 250 V, $\cos \varphi = 1$ )
<b>Operating frequency</b>	$\leq 7200$ operations/h
<b>Dielectric strength</b>	
Dielectric voltage	$\geq 2$ kVAC (rms)
Rated impulse withstand volt.	4 kV (1.2/50 $\mu$ s)

## Supply Specifications

<b>Power supply</b>	Overvoltage cat. III (IEC 60664, IEC 60038)	<b>DC supply</b>	<b>AC supply</b>
Rated operational voltage through terminals:		Supply to input	2 kV
A1, A2 or A3, A2 (DIC01)		Supply to output	4 kV
2, 10 or 11, 10 (PIC01)		Input to output	4 kV
724:	24 VDC $\pm 20\%$ , insulated	<b>Rated operational power</b>	
748:	48 VDC $\pm 20\%$ , insulated	AC	5 VA
B48:	24/48 VAC $\pm 15\%$	DC	3 W
	45 to 65 Hz, insulated		
B23:	115/230 VAC $\pm 15\%$		
	45 to 65 Hz, insulated		

## General Specifications

<b>Power ON delay</b>	1 s $\pm 0.5$ s or 6 s $\pm 0.5$ s	<b>Environment</b>	(EN 60529)
<b>Reaction time</b>	(input signal variation from -20% to +20% or from +20% to -20% of set value)	Degree of protection	IP 20
Alarm ON delay	< 100 ms	Pollution degree	3 (DIC01), 2 (PIC01)
Alarm OFF delay	< 100 ms	Operating temperature	-20 to 60°C, R.H. < 95%
<b>Accuracy</b>	(15 min warm-up time)	Storage temperature	-30 to 80°C, R.H. < 95%
Temperature drift	$\pm 1000$ ppm/°C	<b>Housing</b>	
Delay ON alarm	$\pm 10\%$ on set value $\pm 50$ ms	Dimensions	DIC01 45 x 80 x 99.5 mm
Repeatability	$\pm 0.5\%$ on full-scale		PIC01 36 x 80 x 94 mm
<b>Indication for</b>		<b>Weight</b>	Approx. 250 g
Power supply ON	LED, green	<b>Screw terminals</b>	
Alarm ON	LED, red (flashing 2 Hz during delay time)	Tightening torque	Max. 0.5 Nm acc. to IEC 60947
Output relay ON	1 or 2 x LED(s), yellow	<b>Approvals</b>	UL, CSA (except 748)
		<b>CE Marking</b>	Yes
		<b>EMC</b>	
		Immunity	Electromagnetic Compatibility
		Emission	According to EN 61000-6-2
			According to EN 61000-6-3

## Mode of Operation

DIC01 and PIC01 monitor both AC and DC current and voltage. DIC01 can also monitor positive and negative DC voltage connecting terminals Y1 and Z3.

**Example 1**  
(no contact input - under+over voltage - 2 x SPDT N.D. relays (1 x SPDT for PIC01) - TRMS)  
**DIC01:** One relay operates when the voltage drops below

the under voltage set point for more than the respective delay time. It releases when the voltage exceeds the set level plus the set hysteresis. The other relay operates

when the voltage exceeds the over voltage set point for more than the respective delay time. It releases when the voltage drops below the set level minus hysteresis.

## Mode of Operation (cont.)

**PIC01:** The relay operates when the voltage drops below the under voltage set level for more than the respective set delay time or when it exceeds the over voltage set level for more than the relative set delay time. The relay releases when the voltage exceeds the under voltage set level plus hysteresis and it drops below the over voltage set level minus hysteresis (the hysteresis is the same for both set levels).

### Example 2

(latch enable active - under+under current - 2 x SPDT relays (1 x SPDT for PIC01) - TRMS)  
**DIC01:** Each relay operates and latches when the current drops below the respective set level for more than the respective delay time. Provided that the current has exceeded the respective set level plus hysteresis, each relay releases

when the contact input's connection is interrupted.

**PIC01:** The relay operates when the current drops below the higher set level for more than the respective delay time. Provided that the current has exceeded the higher set level plus hysteresis the relay releases when the contact input's connections is interrupted.

### Note

Different delay times can be used for appropriate reaction according to the set points.

### Example 3

(inhibit enable active - over+over current with MI CT - DPDT relay (SPDT for PIC01) - TRMS)  
 Provided that the contact input's connection is interrupted, the relay operates when the current flowing in the MI CT exceeds the lower set level for more than the

respective delay time. It releases when the current drops below the lower set level minus hysteresis or when the contact input's pins are connected.

### Example 4

(inhibit enable active - over+over current with A82-10 CT - DPDT relay (1 x SPDT for PIC01) - TRMS)  
 Provided that the contact input's connection is interrupted, the relay operates when the current flowing in the A82-10 CT exceeds the lower set level for more than its delay time. It releases when the current drops below the lower set level minus hysteresis or when the contact input's pins are connected.

### Example 5 (DIC01 only)

(no contact input - under+over voltage - 2 x SPDT N.D. relays

- plus/minus DC  
 One relay operates when the voltage drops below the under voltage set point for more than the respective delay time. It releases when the voltage exceeds the set level plus the set hysteresis. The other relay operates when the voltage exceeds the over voltage set point for more than the respective delay time. It releases when the voltage drops below the set level minus hysteresis.

In this case the spare front label has to be placed on the device for proper level adjustment.

### Note

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

## Function/Range/Level and Time Delay Setting

Adjust the input range setting the DIP switches 1 and 2 of the main black selector as shown below.

Select the desired function setting the DIP switches 3 to 6 of the black selector and 1, 2 of the small red selector as shown below.

To access the DIP switches open the grey plastic cover as shown below

The selection between current and voltage is automatically selected through the input connectors.

TRMS or positive/negative DC monitoring selectable by short-circuiting terminals Y1 and Z3 (DIC01 only).

### Selection of level, time delay and hysteresis:

#### Upper knob:

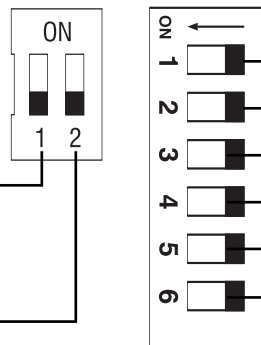
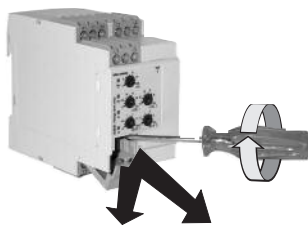
Setting of hysteresis on relative scale: 0 to 30% on set value.

### Centre knobs:

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

### Lower knobs:

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



**Set Point 2 (SP2) monitoring function**  
 ON: Over current or voltage  
 OFF: Under current or voltage

**Relay(s) coupling**  
 ON: 2 x SPDT (DIC01 only)  
 OFF: 1 x DPDT (DIC01, PIC01)

Measuring range (depending on connections)					
Connect	Input term.	SW1	ON	ON	OFF
		SW2	OFF	ON	ON
None	DIC01: Y1,Y2 PIC01: 5,7		0.5 to 5 mA AC/DC	2 to 20 mA AC/DC	None
Y1 to Z3	DIC01: Y1,Y2		-5 to +5 mA DC	-20 to +20 mA DC	None
None	DIC01: Y1,Y3 PIC01: 6,7		0.1 to 1V AC/DC	4 V <sub>p</sub>	1 to 10 V AC/DC
Y1 to Z3	DIC01: Y1,Y3		-1 to +1 V DC	None	-10 to +10 V DC

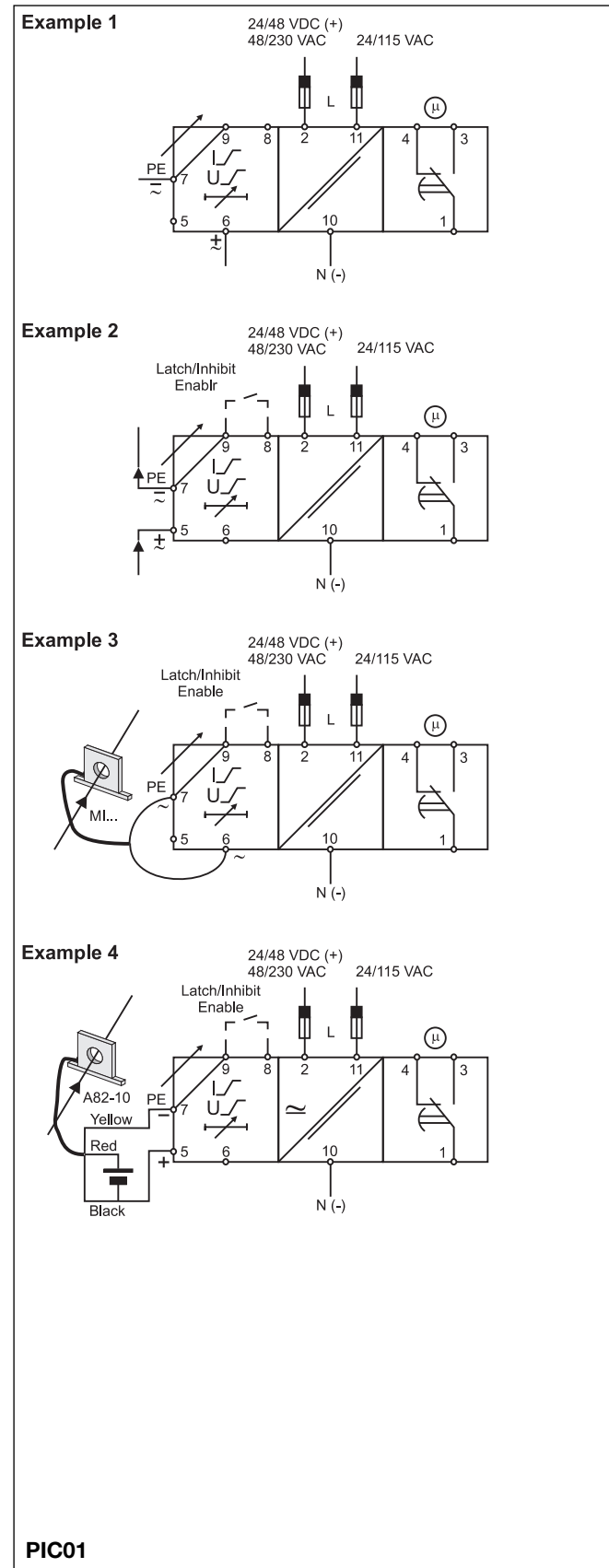
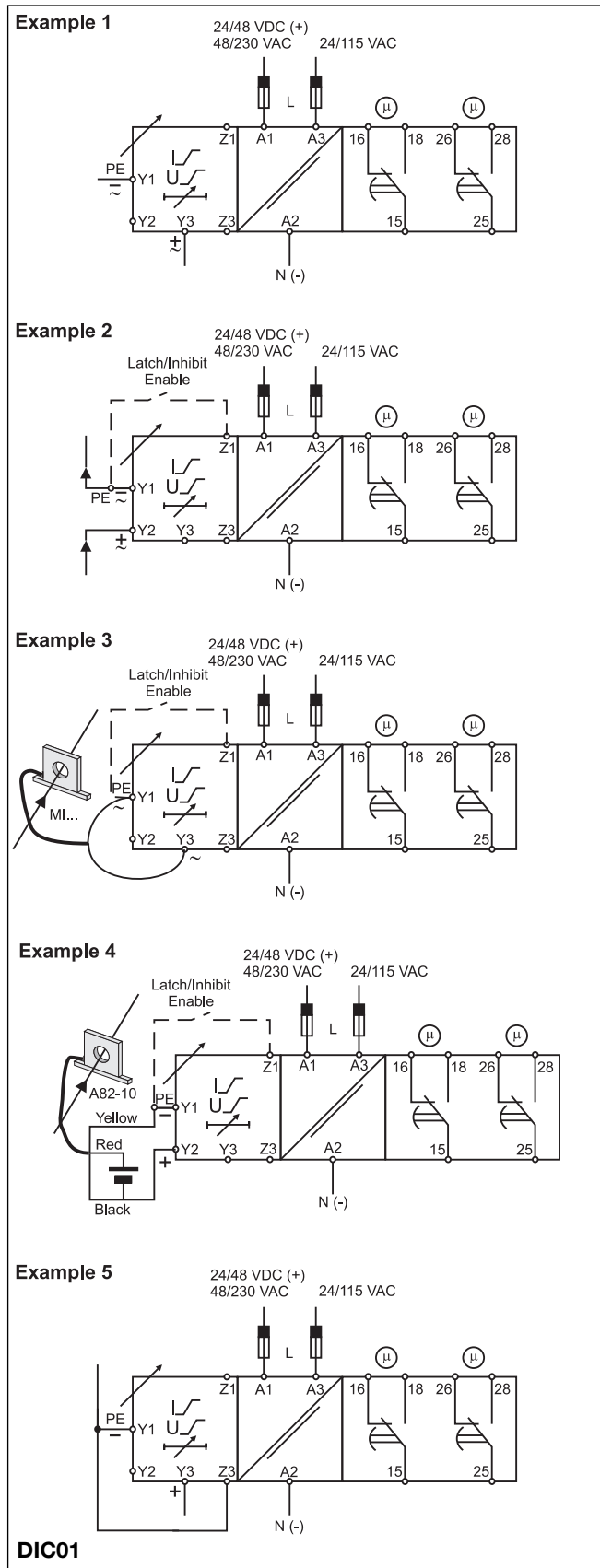
**Relay(s) working mode**  
 ON: Normally De-energized (ND)  
 OFF: Normally Energized (NE)

**Power ON delay**  
 ON: 6 s ± 0.5 s  
 OFF: 1 s ± 0.5 s

**Contact input**  
 ON: Latch function enable  
 OFF: Inhibit function enable

**Set Point 1 (SP1) monitoring function**  
 ON: Over current or voltage  
 OFF: Under current or voltage

# Wiring Diagrams



## Dimensions

