

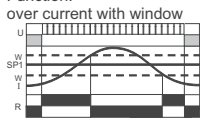


Function

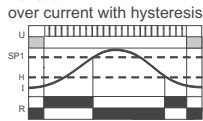
- Control relay active
- Control relay passive
- Contact closed
- Contact open

DIP-Switch: Auto-Reset / Relay normal

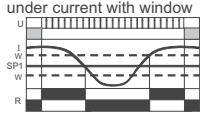
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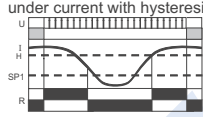
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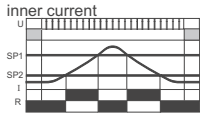
Function:



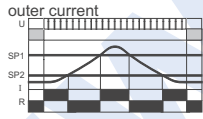
Function:



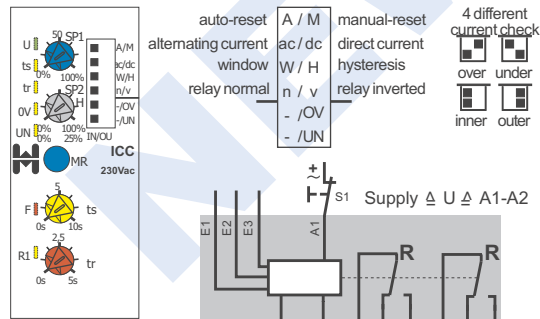
Function:



Function:



DIP-Switch



For further information please refer to our homepage www.hiquel.com in the products area, or contact us per mail or e-mail.

input	range	resistance	I_{EMAX} (20°C)
E1-M	0mA - 100mA	500 mOhm	0,5 A
E2-M	0mA - 1A	50 mOhm	2 A
E3-M	0A - 10A	5 mOhm	15 A

part no	supply	output	sup. galv. iso*	UL US	housing types
ICC 24Vac	24V~ 2,5VA/1W	DCPO	yes	-	L
ICC 115Vac	115V~ 2,5VA/1W	DCPO	yes	-	L
ICC 230Vac	230V~ 2,5VA/1W	DCPO	yes	-	L
ICC 400Vac	400V~ 2,5VA/1W	DCPO	yes	-	L

* The measurement input is galvanically isolated from the power supply

ICC

overview

- ◆ AC or DC current monitor
- ◆ 3 different current ranges
- ◆ 4 selectable base modes (over, under, between septoints, outside setpoints)
- ◆ 2 selectable measuring functions
- ◆ automatical and manual reset selectable
- ◆ output relay contact invertable
- ◆ LED indicator for power supply, over current and under current, failure and status of the output relay, start-up & reaction timer
- ◆ 22.5mm DIN rail mount housing

specification

supply voltage variation	nominal voltage -20%..+10%
frequency range	48 - 63 Hz
duty cycle	100%
repeat accuracy	< 1%
output relay specification	max. 6A 230V~
Ue/Ie AC-15	24V/1,6A 115V/1,6A 230V/1,6A
Ue/Ie DC-13	24V/1A
expected life time	DCPO
mechanical	10 x 10 ⁶ operations
electrical	8 x 10 ⁴ operations
screws	pozidrive 1
screw tightening torque	0,6...0,8Nm
operating conditions	-20 to +60 °C non condensing

* EN 60947-5-1 VDE 0435

ordering information



in-case

Einphasen-Stromüberwachung /
Single-phase current monitoring

ICC

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BESCHREIBUNG / FEATURES

- Messung von Gleich- oder Wechselstrom
- 3 unterschiedliche Strommessbereiche
- 4 Messmodi (über, unter, innerhalb oder außerhalb des Bereiches)
- 2 Messfunktionen
- Automatischer oder manueller Reset wählbar
- Fehlerspeicherfunktion
- Invertierbares Ausgangsrelais
- Ausgangsstufe mit 2 Wechsler
- LED Anzeige für Versorgungsspannung, Über- und Unterstrom, Fehler, Status des Ausgangsrelais, Start- und Reaktionstimer
- Gehäusebreite: 22,5mm klemmbar
- AC or DC current monitor
- 3 different current ranges
- 4 selectable base modes (over, under, between setpoints, outside setpoints)
- 2 selectable measuring functions
- automatic or manual reset selectable
- Alarm memory function
- Output relay contact invertable
- DPCO output relay
- LED indicator for power supply, over and under current, alarm, failure and status of the output relay, start-up and reaction timer
- 22,5mm DIN rail mount housing

BESTELLDATEN / ORDERING INFORMATION

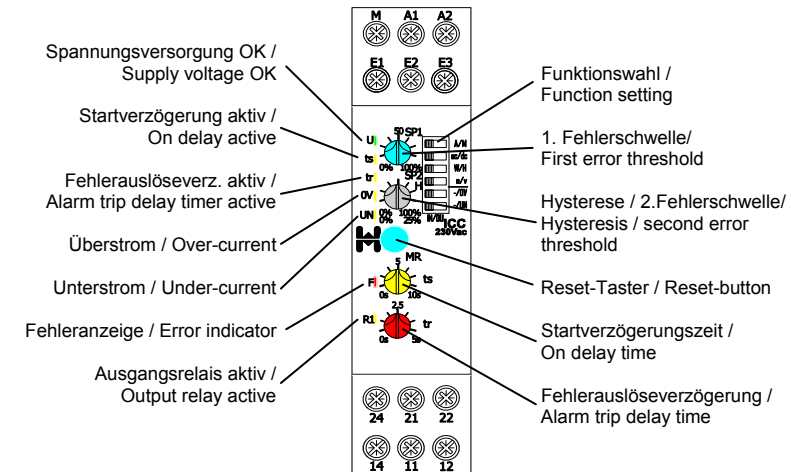
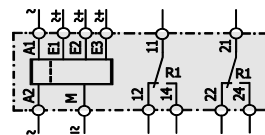
Artikel / Article	Nennspannung / nominal voltage	
ICC 24Vac	24Vac	2,5VA / 1W
ICC 115Vac	115Vac	2,5VA / 1W
ICC 230Vac	230Vac	2,5VA / 1W
ICC 400Vac	400Vac	2,5VA / 1W

TECHNISCHE DATEN / SPECIFICATION

Spannungsbereich / supply voltage variation	Nennspannung / nominal voltage	-20%..+10%
Zulässige Frequenz / frequency range	48 - 63 Hz	
Einschaltdauer / duty cycle	100%	
Wiederholgenauigkeit / repeat accuracy	<1%	
Ausgangsstufe / output relay specification	max. 6A 230V~	
Ue/Ie AC-15*	24V/1,5A 115V/1,5A 230V/1,5A	
Ue/Ie DC-13*	24V/1A	
Lebensdauer / expected life time	2 Wechsler / DPCO	
Mechanisch / mechanical	10 x 10 ⁵ Schaltspiele / operations	
Elektrisch / electrical	8 x 10 ⁴ Schaltspiele / operations	
Schrauben / screws	Pozidrive 1	
Anzugsdrehmoment / screw tight. torque	0,6...0,8Nm	
Arbeitsbedingungen / operating conditions	-20 bis +60 C	nicht kondensierend / non condensing

* EN 60947-5-1 VDE 0435

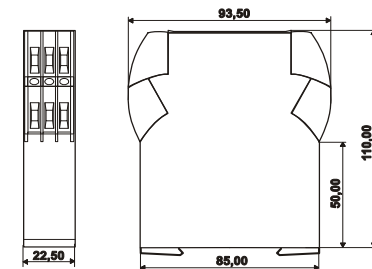
ANSCHLUSS / CONNECTION BLOCK DIAGRAM



ZULASSUNG & KENNZEICHNUNG / TYPE APPROVAL INFORMATION



ABMESSUNGEN / DIMENSIONS (mm)



MONTAGE / MOUNTING

Die Montage ist mittels Schnapp-Befestigung auf einer symmetrischen Hutschiene nach DIN EN 50022 vorzunehmen. Die Geräte sind für dicht an dicht Montage bei einer Umgebungstemperatur von -20 bis + 60°C geeignet.

Lever opens the spring clip on the base to mount device on a symmetrical DIN rail according to DIN EN 50022. The devices are suitable for mounting side by side without an air gap with an ambient temperature range from -20 to + 60°C.

Detailed description (English)

The ICC monitors a single-phase current signal. It is suitable to alternate and direct currents. There are three different current ranges available to improve the measuring precision. Thresholds for the alarm functions, alarm reaction time and start delay time can be easily adjusted using the rotary switches on the front plate. The alarm output relay is DPCO.

SUPPLY-VOLTAGE

(A1) L / L1
(A2) N / L2

Note: The supply-voltage range depends on the nominal voltage of the particular device!

MEASURING INTERFACE

0..100mA AC/DC	Terminal: (E1) – (M) Apparent ohmic resistance: 0,500Ω Maximum current at 20°C (68°F): 0,5A _{eff}
0..1A AC/DC	Terminal: (E2) – (M) Apparent ohmic resistance: 0,050Ω Maximum current at 20°C (68°F): 2,0A _{eff}
0..10A AC/DC	Terminal: (E3) – (M) Apparent ohmic resistance: 0,005Ω Maximum current at 20°C (68°F): 15A _{eff}

AC frequency range: f = 48..63Hz

Note: Only one of the above mentioned variations is allowed to use at the same time! In DC-mode only positive currents ($pot_{E1...3} \geq pot_M$) can be measured. Accurate measuring result for DC-currents are only possible without any overlaid signals (f<0,1Hz). AC-current measuring is only reasonable for sinusoidal signals within a frequency range from 48 to 63Hz.

LED STATUS INDICATION

U	green	ON	Supply voltage is OK
ts	yellow	FLASH	Start delay time is active
tr	yellow	FLASH	Alarm trip delay time is active
OV	yellow	ON	The actual current value is above the over-current threshold.
	yellow	FLASH	The actual current value lies between the over-current threshold and the over-current fall-back threshold after exceeding the over-current threshold.
UN	yellow	ON	The actual current value is below the under-current threshold.
	yellow	FLASH	The actual current value lies between the under-current threshold and the under-current fall-back threshold after falling below the under-current threshold.
F	red	ON	Setting fault, internal program fault or changing the function mode
R1	yellow	ON	Output relay is active

CONTROLS

The controls of the *in-case* series are color coded for simplicity. Blue potentiometers or rotary switches are used for set values, time settings are yellow, the time range of a reaction timer is red, and percentage hysteresis is always grey.

SP1	blue	Potentiometer to adjust threshold 1 of the selected monitoring-function (setting range: 0-100%).
H/SP2	grey	Potentiometer to adjust threshold 2 (setting range: 0-100%) respectively hysteresis (setting range: 5-25% of SP1). The interpretation depends on the selected monitoring-function (see DIP-switches OV/UN).
MR	blue	Pressing the MR-button resets an (stored) alarm. Note: The ICC features 2 different manual reset functions: <i>Volatile manual reset (factory setting):</i> If the ICC is in alarm mode, the alarm will be reset when the supply voltage is removed. The alarm can also be reset by pressing the MR-button (without removing the power supply). <i>Non-volatile (Latched) manual reset:</i> With this reset function, if the ICC is in alarm mode when the supply voltage is removed, the alarm condition will be electronically latched. Therefore when the supply voltage is re-established the alarm condition will be restored! The only way to reset the alarm is to press the MR-button with the supply voltage connected. (for switching between volatile and non-volatile manual reset see special operating modes)
ts	yellow	Potentiometer to adjust the start delay time (setting range: 0-10 seconds). The start delay time will be activated after turning on the power supply. Within this time interval the measured current will be ignored. Note: In over-current mode combined with ac-measuring the start delay time changes its characteristics (see monitoring functions).
tr	red	Potentiometer to adjust the alarm trip delay time respectively reaction time (setting range: 0-5 seconds). The alarm condition needs to persist at least the configured time before it is handed over to the output relay.

DIP-switches for basic functions

A/M	<input type="checkbox"/> A/N <input type="checkbox"/> ac/dc <input type="checkbox"/> W/H <input type="checkbox"/> n/v <input type="checkbox"/> -/OV <input type="checkbox"/> -/UN	Automatic Reset (A): Automatic reset of an alarm.	<input type="checkbox"/> A/N <input type="checkbox"/> ac/dc <input type="checkbox"/> W/H <input type="checkbox"/> n/v <input type="checkbox"/> -/OV <input type="checkbox"/> -/UN	Manuel Reset (M): An alarm can only be reset by pressing the MR-button. Note: For volatile / non-volatile manual reset see special operating modes!
ac/dc	<input type="checkbox"/> A/N <input type="checkbox"/> ac/dc <input type="checkbox"/> W/H <input type="checkbox"/> n/v <input type="checkbox"/> -/OV <input type="checkbox"/> -/UN	Alternate current (ac): Measuring sinusoidal currents (f=48..63Hz).	<input type="checkbox"/> A/N <input type="checkbox"/> ac/dc <input type="checkbox"/> W/H <input type="checkbox"/> n/v <input type="checkbox"/> -/OV <input type="checkbox"/> -/UN	Direct current (dc): Measuring direct currents without any overlaid signals (f<0,1Hz).
W/H	<input type="checkbox"/> A/N <input type="checkbox"/> ac/dc <input type="checkbox"/> W/H <input type="checkbox"/> n/v <input type="checkbox"/> -/OV <input type="checkbox"/> -/UN	Window (W): See monitoring functions.	<input type="checkbox"/> A/N <input type="checkbox"/> ac/dc <input type="checkbox"/> W/H <input type="checkbox"/> n/v <input type="checkbox"/> -/OV <input type="checkbox"/> -/UN	Hysteresis (H): See monitoring functions.

n/v	<input type="checkbox"/> A/N <input type="checkbox"/> ac/dc <input type="checkbox"/> W/H <input type="checkbox"/> n/v <input type="checkbox"/> -/OV <input type="checkbox"/> -/UN	Normal (n): The output relay works corresponding to the normal function.	<input type="checkbox"/> A/N <input type="checkbox"/> ac/dc <input type="checkbox"/> W/H <input type="checkbox"/> n/v <input type="checkbox"/> -/OV <input type="checkbox"/> -/UN	Invertiert (v): The output relay function is inverted..
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Note: These functions can be used in any combination.

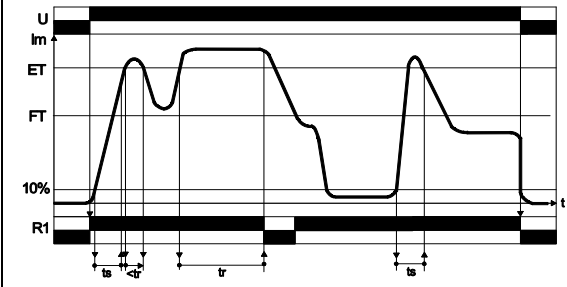
DIP-switches for monitoring function

OV	<input type="checkbox"/> A/N <input type="checkbox"/> ac/dc <input type="checkbox"/> W/H <input type="checkbox"/> n/v <input type="checkbox"/> -/OV <input type="checkbox"/> -/UN	Over-current monitoring „OVER“ in AC-mode: This function generates an over-current alarm if the monitored current exceeds the over-current threshold level (ET) for at least the alarm trip delay time. With automatic reset, the alarm condition is not given any more, if the monitored value falls below the fall-back threshold level (FT). With manual reset it is necessary to stroke the MR-button to reset the alarm condition. During an active start delay time the current value is not monitored. The start delay time begins to run when the actual current exceeds the level of 10% ET.
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Adjusting ET and FT:

Window (W): $ET = SP1 \cdot W$ $FT = SP1 \cdot H$

Hysteresis (H): $ET = SP1$ $FT = SP1 - H$



OV
-
(dc)

Over-current monitoring „OVER“ in DC-mode:
 This function generates an over-current alarm if the monitored current exceeds the over-current threshold level (ET) for at least the alarm trip delay time. With automatic reset, the alarm condition is not given any more, if the monitored value falls below the fall-back threshold level (FT). With manual reset it is necessary to stroke the MR-button to reset the alarm condition. During an active start delay time the current value is not monitored. The start delay time begins to run once with power on.

Adjusting ET and FT:
 Window (W): $ET = SP1 + H$ $FT = SP1 - H$
 Hysteresis (H): $ET = SP1$ $FT = SP1 - H$

UN

Under-current monitoring „UNDER“:
 This function generates an under-current alarm if the monitored current falls below the under-current threshold level (ET) for at least the alarm trip delay time. With automatic reset, the alarm condition is not given any more, if the monitored value exceeds the fall-back threshold level (FT). With manual reset it is necessary to stroke the MR-button to reset the alarm condition. During an active start delay time the current value is not monitored. The start delay time begins to run once with power on.

Adjusting ET and FT:
 Window (W): $ET = SP1 - H$ $FT = SP1 + H$
 Hysteresis (H): $ET = SP1$ $FT = SP1 + H$

Current range monitoring „INNER“:
 This function generates an alarm if the monitored current exceeds the over-current threshold level (UET) or the current falls below the under-current threshold level (LET) for at least the alarm trip delay time. With automatic reset, the alarm condition is not given any more, if the monitored value falls below the upper fall-back threshold level (UFT) or the value exceeds the lower fall-back threshold level (LFT). With manual reset it is necessary to stroke the MR-button to reset the alarm condition. During an active start delay time the current value is not monitored. The start delay time begins to run once with power on.

Adjusting ET und FT:
 The setting of Window/Hysteresis (W/H) is not relevant!
 $UET = SP1$ $UFT = SP1 - H$
 $LET = SP2$ $LFT = SP2 + H$

OV
UN

Current range monitoring „OUTER“:
 This function generates an alarm if the monitored current falls below the over-current threshold level (UET) or the current exceeds the under-current threshold level (LET) for at least the alarm trip delay time. With automatic reset, the alarm condition is not given any more, if the monitored value exceeds the upper fall-back threshold level (UFT) or the value falls below the lower fall-back threshold level (LFT). With manual reset it is necessary to stroke the MR-button to reset the alarm condition. During an active start delay time the current value is not monitored. The start delay time begins to run once with power on.

Adjusting ET und FT:
 The setting of Window/Hysteresis (W/H) is not relevant!
 $UET = SP1$ $UFT = SP1 + H$
 $LET = SP2$ $LFT = SP2 - H$

Legend:

- U Supply voltage
- Im Measured current
- ts Start delay time
- tr Alarm trip delay time
- R1 Output relay state
- ET Error threshold
- UET Upper Error threshold
- LET Lower Error threshold
- FT Fallback threshold
- UFT Upper fallback threshold
- LFT Lower fallback threshold
- t Time

Note: It is not necessary to remove the supply voltage before making any changes in the setting of the controls. If either threshold or function is changed the red LED-indicator F is active for a short time for checking purposes. The new settings are immediately active. Depending on the change of the settings, the output relay might be switched off temporary.

OUTPUT RELAY

Active All monitoring functions are within the nominal range, the device is OK.
 Inactive At least one monitoring function is not within the nominal range or the device has an internal fault (see LED-indicator F).

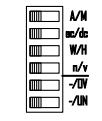
Note: The output relay is galvanically isolated from the power supply terminals!

SPECIAL OPERATING MODES

The following special operating modes are available for the ICC:
 #2 Volatile manual reset. Reset can be performed by momentary break in supply or by pressing the MR button
 #4 Non-volatile manual reset. Reset can only be performed with the supply voltage on by pressing the MR button. If supply voltage is switched off the fault state is stored in memory and will be active when the supply voltage comes back on.

The factory setting is „#2 - Volatile“. To switch between the special operating modes consider the following steps:

1. Write down the actual DIP-switch settings
2. Turn off the power supply
3. Change the DIP-switch positions as shown below:



4. Press the MR-button **and keep pressed!**
5. Turn on the power supply
6. As soon as the LED-indicator F flashes, the MR-button can be released
7. Every stroke on the MR-button changes the special operating mode. The actual mode is indicated with a special flashlight signal on the LED-indicator F. The flash signal is composed as follows: Number of operating mode = number of flashlight signals followed by a short pause. This signal is repeated constantly. The last-selected special function mode is automatically stored.
8. Turn off the power supply
9. Restore the original DIP-switch settings
10. The device can be put in operation again