

## Current maximum controller HJ10x, HJ30x

Current maximum controller is a device for monitoring alternating current that runs through the device itself and indicating its overrunning by switching the relevant contact relay off. We produce it in two type series **HJ 10x, HJ 30x** for direct measurement and **HJ 11x, HJ 31x** for indirect measurement.

**The model series HJ 10x (HJ 11x)** measures the current level in all three phases. But there is only one regulation channel that can operate one up to three groups of appliances. When overrunning the set current level in any of measured phases, the first appliances group will be disconnected. The alarm device will record the current voltage drop and use it for later boundary analysis. When the measured voltage level drops again, the following group of appliances is disconnected. Reconnecting of appliance group occurs after the current drops below the set limits decreased by the last current drop amount measured during last disconnection. This series is designed for buildings where three phase appliances prevail.

**The model series HJ 30x (HJ 31x)** measures the current level in all three phases and can operate all three independent regulation channels (for each phase one channel) and possibility to control one or two groups of appliances for a channel. When overrunning the set current level in the first phase, the first group of appliances will be disconnected in the first regulation channel. When this current level is again overrun, next group is disconnected after 3 seconds in the same regulation channel. The reconnecting of the group occurs when the current drops below the set limits decreased by the last current drop amount measured during the last disconnection. The function is the same with second and third phase. This model series is designed for buildings where one-phase appliances prevail.

**Installation** of the modules is very easy. This device is designed for installation on DIN board sized of six circuit breaker modules.

- install this device close to the main circuit breaker and output phase conductors draw through ports indicated L1, L2 and L3
- disconnected contacts K1-K6 (according to the module) connect to operating contactor circuit
- in the switch you have to set the level of measured current according to the chart on the controller label. The result level is the sum of separated scales in ON position. E.g. 25A level equals 16+8+1 scales combination
- connect 230 V supply voltage, 50 Hz on the clamps 1 and 2

### Caution:

This device is not designed to save electric circuits against the short-circuit and so it does not react this way.

### **Produced types (types in brackets are for indirect measures)**

Type	reg.channel	amout	group/reg. ch. amout
HJ 101 (HJ111)	1		1
HJ 102 (HJ112)	1		2
HJ 103 (HJ113)	1		3
HJ303 (HJ313)	3		1
HJ 306 (HJ316)	3		2

### Technical parameters:

Measured scale

- direct measurement
- indirect measurement

3 x 100 A

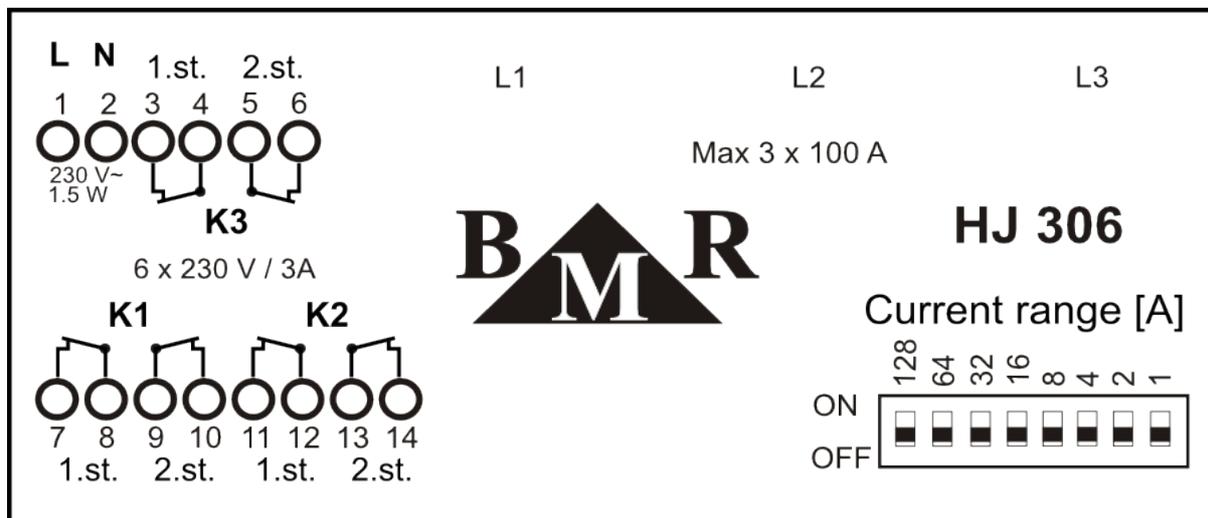
3 x 5 A

Contact load

2 x 3 A / 230 V

Power input

1,5 W



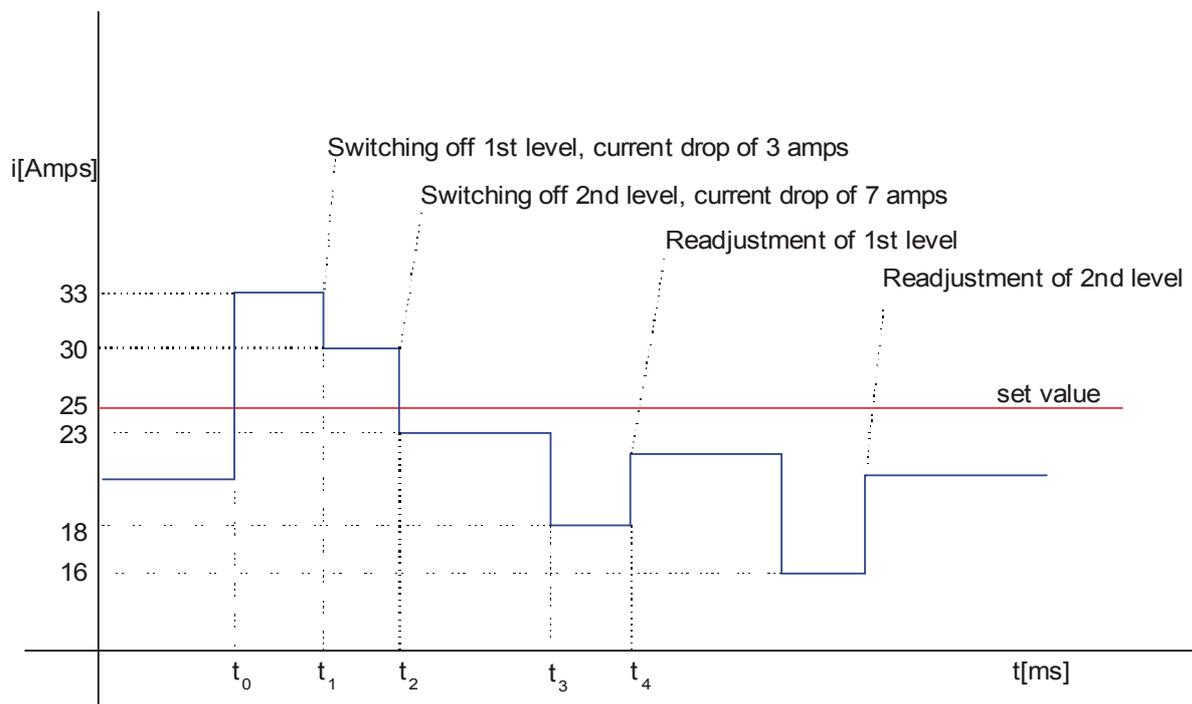
### The principles of measurement:

The current in all three measured phases is lead via current transformers to input of 16 bit A/D converter. The measured current is sampled with frequency 3200 Hz, that means when 50 Hz frequency measured current, it is 64 samples a minute. There is calculated effective current level in all three phases from measured value with the help of DFT (Discrete Fourier Transformation). If the measured current level is higher than the set one on DIP switch, the measurement is repeated approximately after 200 ms and if the level is the same (higher than the set level), first level is switched off. During the next measuring, the processor evaluates the current drop which caused first level switching off and remembers the number amount. If the measured current still stays below the set level, next level is switched off and the current drop is again remembered. Readjustment of the level is only possible under the following condition – the measured current number + current drop of the corresponding level + number 1 is smaller than the set current level.

If both levels are switched off, the prior is first level, i.e. the one sooner switched off. If the above mentioned condition is not accomplished for first level, second level is evaluated. If the condition is fulfilled for second level, it is switched on.

This measurement procedure eliminates regulator reaction for short-circuit and also for temporary current activities that appear e.g. when electric motor starting. This used measurement method allows very exact accuracy also with the currents with distorted not-sine procedures because the chosen sample frequency secures the measurement until 19<sup>th</sup> harmonic measured current.

GRAPH of switching on/off level procedure in relationship to curren flow with HJ 10x and HJ30x



$$t_1 - t_0 = t_2 - t_1 = 200\text{ms}$$

$$t_4 - t_3 \leq 200\text{ms}$$