

**• DC and AC Voltage and frequency monitoring** (5Hz...50Hz...60Hz...70Hz - 400Hz)

**RPL23** : 50Vac-Dc..... 800Vac 5Hz to 70Hz, 1200Vdc

**RPL23-BT** : 12Vac-Dc.....250Vac 5Hz to 70Hz, 375Vdc

True RMS measurement (AC+DC)

Monitor : Undervoltage, overvoltage, phase asymmetry,

phase loss, under frequency, over frequency

For single phase, three-phase network or DC voltage

compatible with variable speed drive (PWM filter embedded)

**• Phase sequence control** (option)

**• RPL23uC**: specific version for short voltage dips detection

**• RPL23peak**: specific version for peak voltage detection

**• RPL23Ho** : specific version for zero sequence voltage detection

**• RPL23F** : specific version for extended frequency detection up to 400Hz

**• Display** Voltage and default indication for diagnosis

**• Fully configurable** with pushbutton under the front face

**• Auxiliary power supply** universal 20... 265Vac-dc or 100... 400Vac-dc

**• SIL2 option** in accordance to IEC 61508



The network control relay RPL23 provide a maximal protection for machines, plants and systems. It detects network and voltage defaults in order to avoid any serious and costly breakdown.

**Characteristics:**

Phase loss or phase failure detection

Under-voltage and over-voltage detection

Under-frequency and over-frequency detection

Phase symmetry checking

Time delay and rearm behaviour configurable

Display of voltage value and fault type

Defaults indication by LED

Option : Phases sequence control

Auxiliary power supply : 20...265 Vac/dc or 100...440Vac/dc

**Details of operation:**

The effective voltages L1N, L2N, L3N are measured and monitored in real time. For networks without neutral, an artificial neutral point is created in the relay.

The **RPL23Ho** compute the rms value of the zero sequence voltage  $V_0$

with the following equation  $\frac{1}{3} \sqrt{(L1N+L2N+L3N)^2}$

(quadratic average of the sum of periodic voltages of each phases)

The output relays are activated in normal operation conditions, they are released on assigned fault detection.

Release the output relay if internal default is detected.

Phase failure detection, even in case of connected loads voltage feedback, by measuring the phase asymmetry. (A motor which continues to turn despite of a phase failure, can regenerate a voltage)

**Feature:**

- hinged front face (access to configuration buttons)

- DIN rail mounting

- Pluggable screw terminal blocks (up to 2.5 mm2)

- Conformal coating, protection rating IP20 (enclosure / terminal blocks)

**Application:**

- Monitoring of protection tripping (fuse).

- Failure of control supply voltage.

- Single phase operation of a three-phase motor (overheating).

- Strongly asymmetrical load detection.

- Line supply dips detection.

- Protection against destruction due to overvoltage.

- Speed drive (frequency converter).

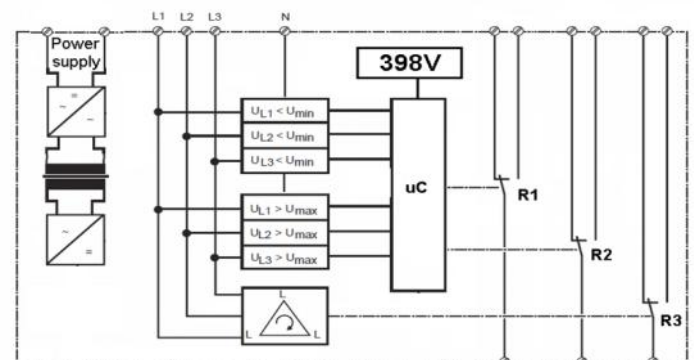
**Functional security data:**

component type B , HFT = 0

$\lambda f = 239 \text{ fit}$  , DC = 87.8 % , PFH : 16 to 21 fit , SFF = 92 %



**Synoptic:**



**Version and order code:**

[Request a quote](#)

**RPL23** : 2 electromechanical output relays, changeover contact  
auxiliary power supply 20...265Vac/dc

option **-HV** auxiliary power supply 100...440Vac/dc

option **-RS** solid state relay output (N.O contact). Switching capacity  
60V 0.5A or 400V 0.1A (to define) response time < 5 ms

option **/SIL2** SIL2 model in accordance to IEC 61508

**RPL23/Po** : With phase order detection function

**RPL23-bt**: Low voltage version: 12Vac ... 150Vac (L-N)

**RPL23uC**: Short voltage dips detection (5ms mini)

**RPL23F**: specific version for frequency detection ( 5Hz....440Hz)

**RPL23peak**: Peak voltage detection (1ms mini)

**RPL23Ho** : Zero sequence voltage detection

**RPL23-400** : 400 Hz version (without frequency measurement)

**RPL23-A** : Self powered version (single phase only)

**MEASURE INPUT**

TYPE	RANGE	ACCURACY
<b>RPL23 Standard version</b>		
rated phase-to-phase voltage:	50 ... 800Vac, 1200Vdc	+/-1.5%
maximum measurable voltage:	1100 Vac, 1600 Vdc	
Frequency detection:	5 ... 70Hz	+/-0.2Hz
<b>RPL23-bt : Low voltage version</b>		
rated phase-to-phase voltage:	12 ... 250 Vac 375vdc	+/-1.5%
maximum measurable voltage:	275 Vac, 400 Vdc	
Frequency detection:	5 ... 70Hz	+/-0.2Hz
Adjustable measure range (standard version)		
Undervoltage : - 70 % ; overvoltage: + 70 %		
under frequency : 5Hz ; over frequency: 70Hz +/-1 Hz @50Hz		
scale from 30% to 170% of the rated voltage		
wiring : 3 wires (L1,L2,L3) + neutral (optional)		
Drawing current : < 1 mA		
Input impedance: > 1 Mohms		
(>250K for low voltage version)		

- RPL23uC:** dips and short interruptions detection (5ms mini)
- RPL23F:** frequency fault detection 5Hz...440Hz +/-0.2Hz
- RPL23peak:** peak voltage detection (1ms mini)

**ENVIRONMENT**

Operating temperature	-20 to 60 °C
Storage temperature	-40 to 85 °C
Humidity	95 % not condensed
Weight	150 g
Protection rating	IP 20
Dielectric strength	2500 Vrms continuous
(Measure input/Power supply/Contacts)	

Shock CEI 60068-2-27 (operational)	5 G / 11 ms
Bump CEI 60068-2-29 (transportation)	30 G / 6 ms
Vibrations CEI 60068-2-6 ( operational)	1 G / 10 - 150 Hz
Vibrations CEI 60068-2-6 ( transportation)	2 G / 10 - 150 Hz

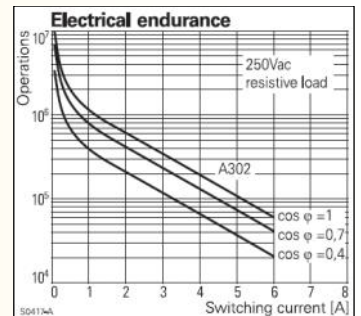
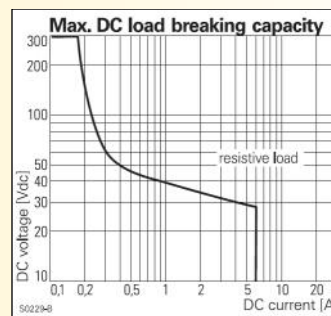
MTBF (MIL HDBK 217F)	> 4 200 000 Hrs @ 25°C
Life time	> 200 000 Hrs @ 30°C

**AUXILIARY POWER SUPPLY**

standard: 20 ... 265 Vac-dc, 2 VA  
 High voltage: 100 ... 440 Vac-dc, 2.5VA (RPL23-HV)

**OUTPUT RELAY**

free potential changeover contact  
 Isolation 2500Vac  
 Impulse withstand voltage (1.2 / 50 µs) 6000V  
 Switching power AC 440 Vac / 6Aac, 1500VA  
 Switching power DC 300 Vdc / 0.15Adc  
 Load type lifetime (nbr of operations)  
 5 A, 250 Vac, resistive 1x10<sup>5</sup>  
 2 A, 250 Vac, cos phi 0.4 2x10<sup>5</sup>  
 1 A, 24 Vdc, L / R=48 ms 2x10<sup>5</sup>  
 6 A, 250 Vac, resistive 7x10<sup>4</sup>  
 3 A, 250 Vac, cos phi 0.4 2x10<sup>5</sup>  
 Programmable response time: 0.5 ... 600 s (standard version)  
 Relay latency time: 2.5 ms (RPL23uC and RPL23peak version)

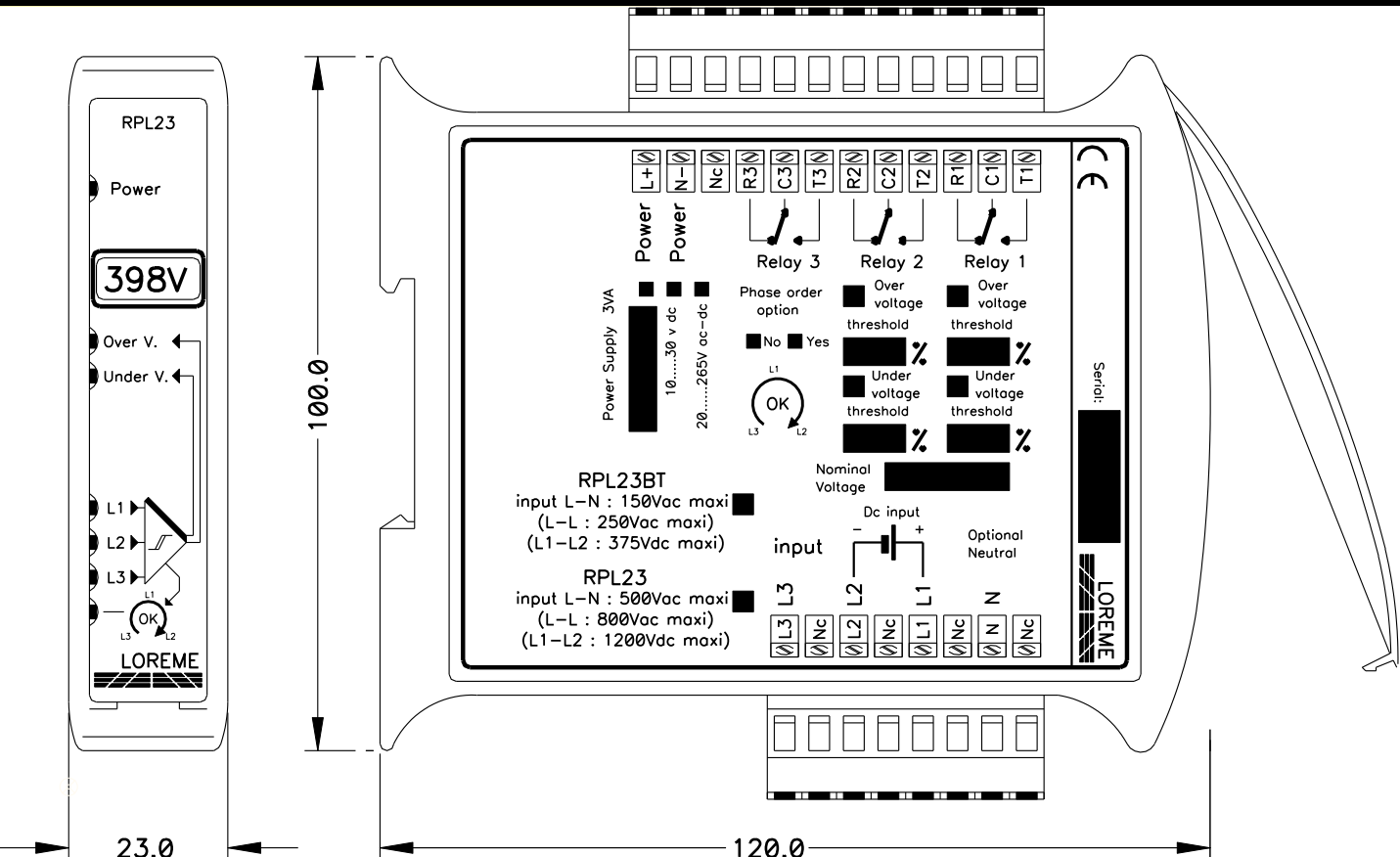


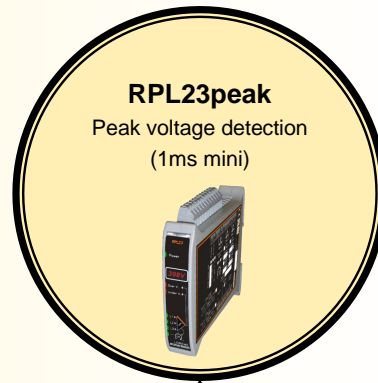
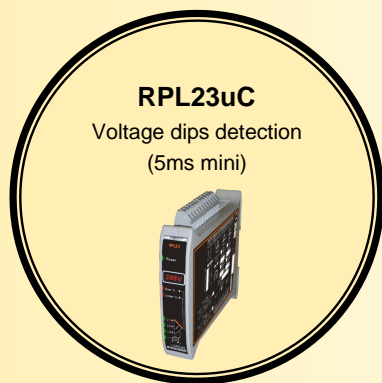
**Electromagnetic compatibility 2014/30/UE / Low Voltage Directive 2014/35/UE**

Immunity standard for industrial environments		Emission standard for industrial environments
EN 61000-6-2		EN 61000-6-4
EN 61000-4-2 ESD	EN 61000-4-8 AC MF	EN 55011 group 1 class A
EN 61000-4-3 RF	EN 61000-4-9 pulse MF	
EN 61000-4-4 EFT	EN 61000-4-11 AC dips	
EN 61000-4-5 CWG	EN 61000-4-12 ring wave	
EN 61000-4-6 RF	EN 61000-4-29 DC dips	



**WIRING AND OUTLINE DIMENSIONS:**

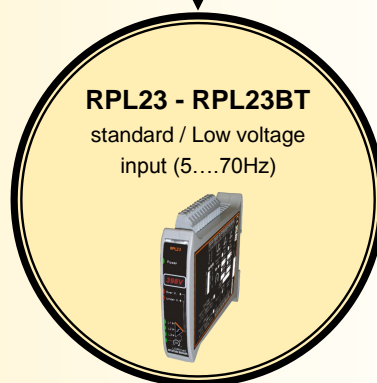
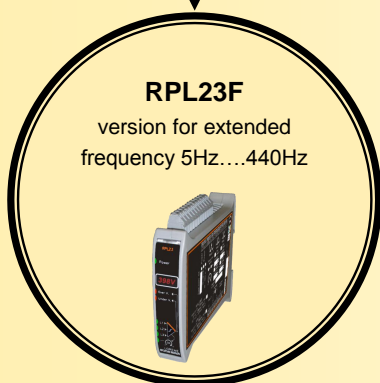
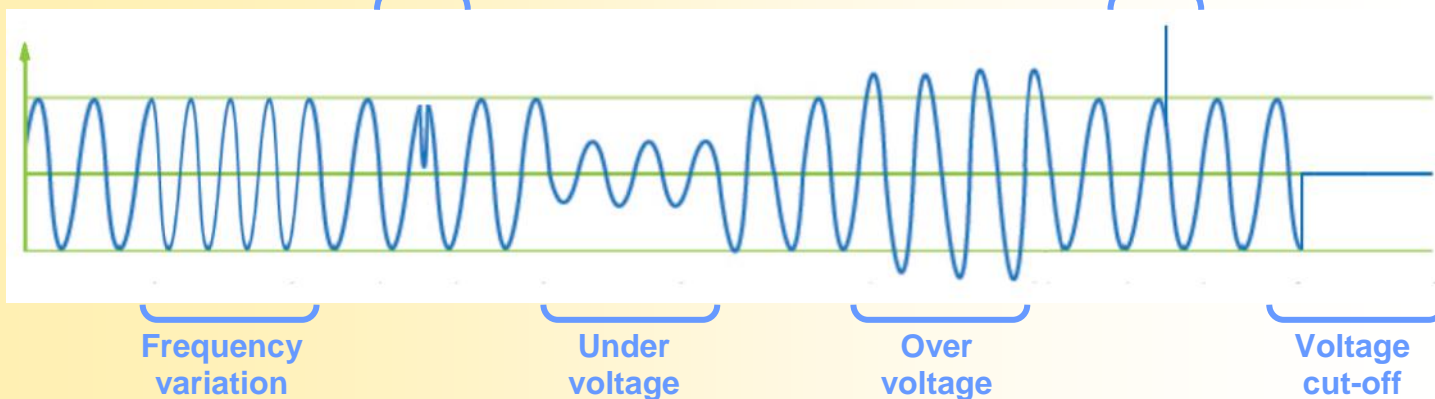




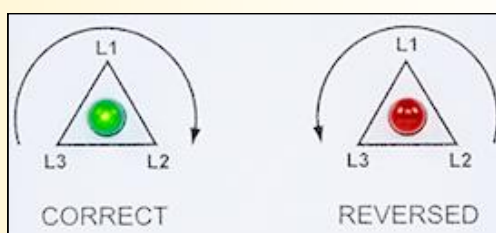
*Choice of protection relay in function of disturbance type to be detected*

Short voltage dips

Voltage transient



**RPL23/Po**  
with phase order detection function



# Zero sequence voltage protective relay

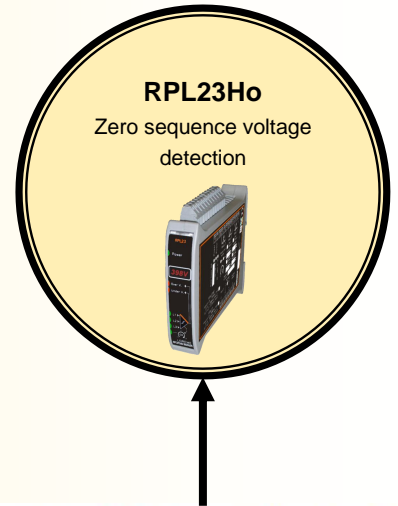


The RPL23Ho is designed to monitoring the zero sequence voltage on three-phase networks with isolated neutral or with high impedance. This multi-functions relay monitor the phase and earth defaults.

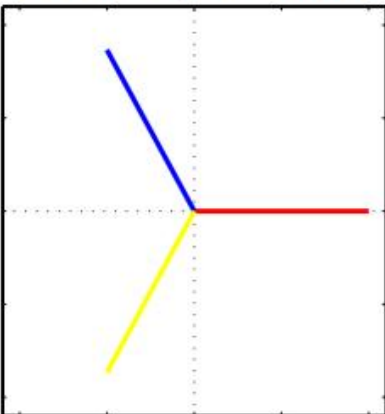
The RPL23Ho compute the RMS value of zero sequence voltage  $V_0$  from the following formula :  $1/3 \sqrt{\int (L1N+L2N+L3N)^2}$

(quadratic average of the sum of periodic voltages of each phases)

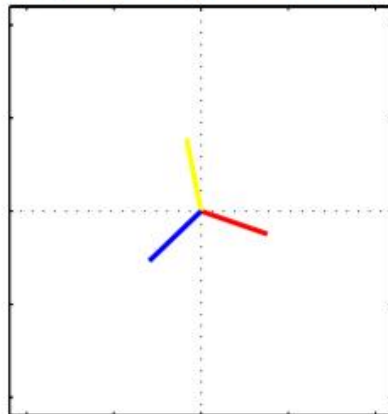
The output relays are activated in normal conditions operation, the output relays are release on assigned fault detection. ( zero sequence overvoltage )



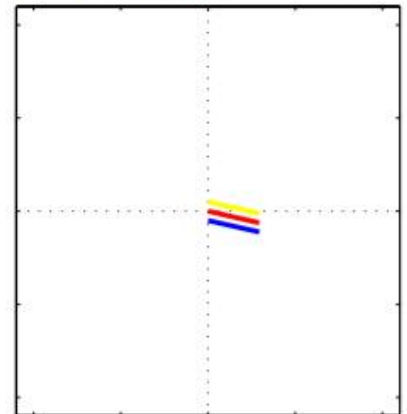
Positive Sequence Vectors



Negative Sequence Vectors



Zero Sequence Vectors



Three Unbalanced Phases

