Zelio Control - Measurement and control relays

Multifunction 3-phase control relays RM22TA, RM22TU, RM22TR, and RM22TG

RM22T●●●

Presentation

RM22 Zelio multifunction control relays monitor the following functions on 3-phase supplies:

Functions	RM22TA	RM22TU	RM22TR	RM22TG
Sequence of phases L1, L2, and L3	■	■	■	■
Phase failure with regeneration	■	■	■	■
Asymmetry	■	□	□	□
Undervoltage	□	■	□	□
Overvoltage and undervoltage	□	□	■	□

■ Function performed
□ Function not performed

Depending on the model RM22T●●● control relays:
- Accept different nominal 3-phase voltages: up to 480 V ∼
- Monitor their own power supply measured as a true rms value
- Are designed for clip-on mounting on DIN rail

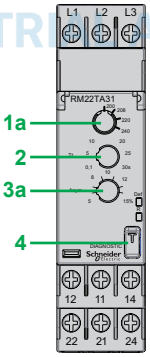
They feature:
- Sealable cover to protect the settings
- Diagnostic button for load circuit testing
- Relay output status LED
- Fault detection indication LED
- Dial pointer LED indicator for relay power ON status
- Relay output On-delay or Off-delay

Applications

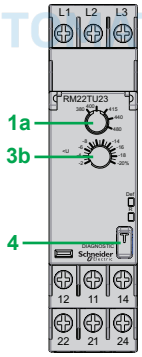
- Control for connection of moving equipment (site equipment, agricultural equipment, refrigerated trucks)
- Control for protection of persons and equipment against the consequences of reverse running (lifting, handling, elevators, escalators, etc.)
- Control of sensitive 3-phase supplies
- Protection against the risk of a driving load (phase failure)
- Normal/emergency power supply switching

Description

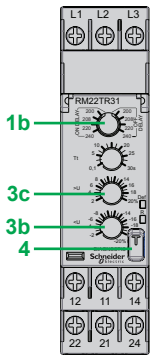
RM22TA



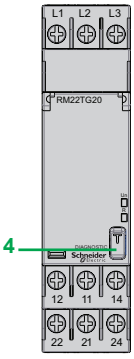
RM22TU



RM22TR



RM22TG



1a Voltage range selector switch
1b Voltage range/On-Off delay selector
2 Time delay adjustment potentiometer **Tt**
3a Asymmetry threshold setting potentiometer **Asym**
3b Undervoltage setting potentiometer **<U**
3c Overvoltage setting potentiometer **>U**
4 Diagnostic button

Un Green LED: indicates that supply to the relay is on
R Yellow LED: indicates relay output state
DEF Yellow LED: indicates fault detection

Zelio Control - Measurement and control relays

Multifunction 3-phase control relays
RM22TA, RM22TU, RM22TR, and RM22TG

Operating principle

Multifunction 3-phase supply control relays monitor:
- Own power supply
- Correct sequencing of phases L1, L2, and L3
- Fault signaling by LED
- Phase failure, including in the case of voltage regeneration
- Undervoltage from - 2…- 20 % of the supply voltage Un
- Overvoltage from 2…20 % of the supply voltage Un
- Asymmetry from 5…15 % of the supply voltage Un

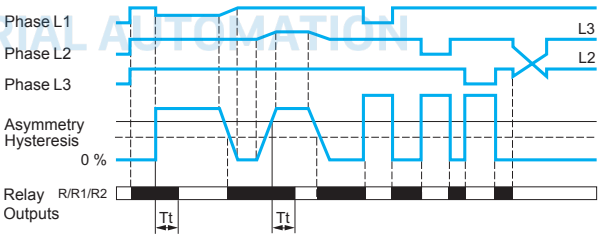
Voltage switch operation:
- Set the switch to 3-phase supply voltage Un.
- The position of this switch is taken into account on energization of the device.
- If the switch position is changed while the device is operating, all the LEDs flash but the product continues to operate normally with the voltage selected at the time of energization preceding the change of position.
- If the switch is returned to the original position selected prior to the last energization, the LEDs return to their normal state.

Phase + asymmetry control relay: RM22TA

- The relay monitors its own supply voltage Un:
  - correct sequence of three phases
  - failure of at least one of the three phases (U measured < 0.7 x Un)
  - asymmetry adjustable from 5…15 % of Un
- If a sequencing or phase failure fault is detected, the relay opens instantly.
- If an asymmetry fault is detected, the relay opens at the end of the time delay set by the user.
- On energization of the device with a detected measured fault, the relay stays open.

Function diagram

- Functions:
  - Sequence of phases L1, L2, L3
  - Phase failure
  - Asymmetry **Asym**



Tt: time delay after crossing of threshold (adjustable on front panel)

Zelio Control - Measurement and control relays

Multifunction 3-phase control relays RM22TA, RM22TU, RM22TR, and RM22TG

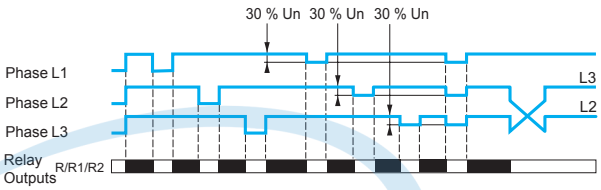
Operating principle (continued)

Phase + undervoltage control relays: RM22TU

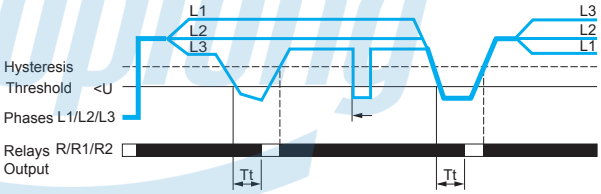
- The relay monitors its own supply voltage Un:
  - correct sequence of the three phases
  - failure of at least one of the three phases (U measured < 0.7 x Un)
  - undervoltage adjustable from - 2…- 20 % of Un
- If a sequencing or phase failure fault is detected, the relay opens instantly.
- If a voltage fault is detected, the relay opens instantly.
- On energization of the device with a detected measured fault, the relay stays open.

Function diagrams

- Functions:
  - Sequence of phases L1, L2, L3
  - Phase failure



  - Undervoltage control **<U**



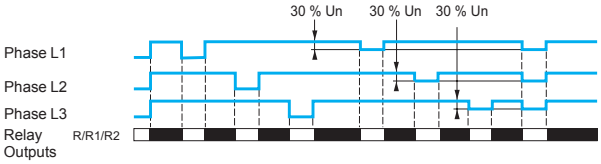
Tt: time delay after crossing of threshold

Phase + undervoltage/overvoltage control relay: RM22TR

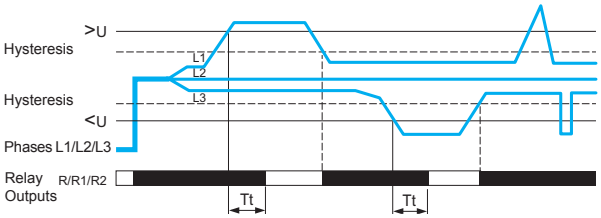
- The relay monitors its own supply voltage Un:
  - phase failure
  - undervoltage and overvoltage
- An adjustable time delay, on crossing the thresholds, provides immunity to transients, and prevents spurious triggering of the output relay.
- If a voltage fault is detected, the relay opens at the end of the time delay set On-delay or Off-delay by the user.
- On energization of the device with a detected measured fault, the relay stays open.
- In the event of phase failure, the relay opens instantly.

Function diagrams

- Functions:
  - Phase failure



  - Overvoltage and undervoltage (Off-delay)



Tt: time delay after crossing of threshold (adjustable on front panel)

Zelio Control - Measurement and control relays

Multifunction 3-phase control relays
RM22TA, RM22TU, RM22TR, and RM22TG

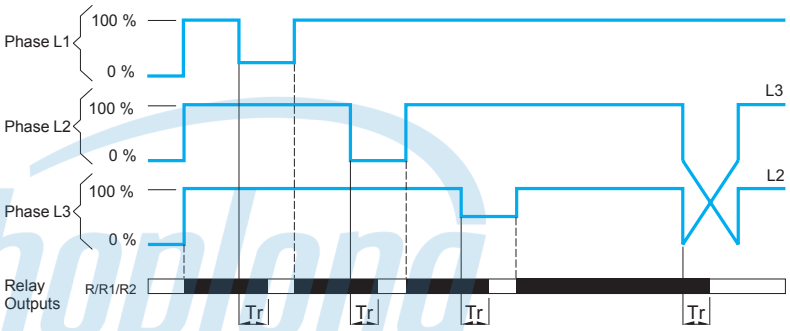
Operating principle (continued)

Phase control relays: RM22TG

- The RM22TG relay monitors:
  - correct sequencing of the three phases
  - total loss of one or more of the phases
- When phase sequence and voltages are correct (> 183 V ∿), the output relays are closed and the yellow LED is on.
- When there is a sequencing fault or total loss of one or more phases (detected as soon as one of the voltages drops below 100 V) the relay opens instantly and the LED goes off.
- On energization of the device with a detected measured fault, the relay stays open.

Function diagram

- Function:
  - Sequence of phases L1, L2, L3
  - Phase failure



Tr: response time on appearance of a fault

References

Function	Rated 3-phase supply voltage	Measurement range	Time delay	Output	Reference	Weight
	V	V				kg/*lb*
■ Phase sequence ■ Phase failure ■ Asymmetry	200…240 ∿	200…240 ∿	Off delay (0.1...30 s)	2 C/O 8 A	**RM22TA31**	0.090/ *0.198*
	380…480 ∿	380…480 ∿	Off delay (0.1...30 s)	2 C/O 8 A	**RM22TA33**	0.090/ *0.198*
■ Phase sequence ■ Phase failure ■ Undervoltage and overvoltage	200…240 ∿	200…240 ∿	On/Off delay (0.1...30 s)	2 C/O 8 A	**RM22TR31**	0.090/ *0.198*
	380…480 ∿	380…480 ∿	On/Off delay (0.1...30 s)	2 C/O 8 A	**RM22TR33**	0.090/ *0.198*
■ Phase sequence ■ Phase failure ■ Undervoltage	200…240 ∿	200…240 ∿	No	2 C/O 8 A	**RM22TU21**	0.090/ *0.198*
	380…480 ∿	380…480 ∿	No	2 C/O 8 A	**RM22TU23**	0.090/ *0.198*
■ Phase sequence ■ Phase failure	208…480 ∿	183…528 ∿	No	2 C/O 8 A	**RM22TG20**	0.090/ *0.198*

RM22TA31

RM22TR31

RM22TG20

RM22TU21

Zelio Control - Measurement and control relays

Liquid level control relays RM22LA and RM22LG

RM22LG11MR

RM22LA32MT

Presentation

RM22LA and RM22LG liquid level control relays control one or two liquid levels, with a fill or empty function:

Functions	RM22LA 32MR/32MT	RM22LG 11MR/11MT
Level 1/Level 2	■	■
Fill operation	■	■
Empty operation	■	■
Low sensitivity	■	□
Standard sensitivity	■	■
High sensitivity	■	□

■ Function performed
□ Function not performed

RM22 liquid level control relays feature:
- A dial pointer LED indicator for relay power ON status
- A relay output status LED

The settings are protected by a sealable cover and the control status is indicated by an LED. The relays are designed for clip-on mounting on a DIN rail.

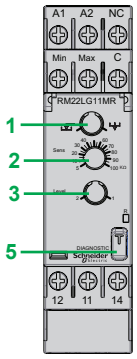
Applications

These devices monitor the levels of conductive liquids.
They control the actuation of pumps or valves to regulate levels and are also suitable for protecting submersible pumps against dry running, or protecting tanks from “overflow”. They can also be used to control dosing of liquids in mixing processes and to protect heating elements in the event of non-immersion.
They have a transparent, hinged cover on their front panel to avoid any accidental alteration of the settings. This cover can be directly sealed.

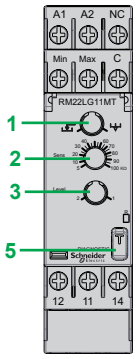
- Application examples for compatible liquids:
  - □ spring, town, industrial, and sea water
  - □ metallic salt, acid, or base solutions
  - □ liquid fertilizers
  - □ non-concentrated alcohol (< 40 %)
  - □ liquids in the food-processing industry: milk, beer, coffee, etc.

Description

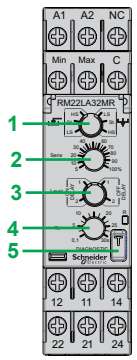
RM22LG11MR



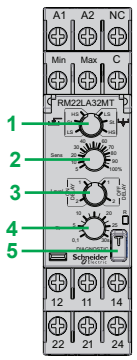
RM22LG11MT



RM22LA32MR



RM22LA32MT



1 Configuration: selection of the operating mode (Fill or Empty) and the sensitivity range (**LS/St/HS)**
2 Sensitivity control potentiometer (kΩ or %)
3 Configuration: selection of the number of levels and theOn/Off time delay
4 Time delay control potentiometer **Tt**
5 Diagnostic button

R Yellow LED: indicates relay output state

Zelio Control - Measurement and control relays

Liquid level control relays
RM22LA and RM22LG

Operating principle

Liquid level control relays are designed to measure and control the levels of conductive liquids by means of resistive probes.
The operating principle is based on measurement of the apparent resistance of the liquid between two submerged probes. When this value is less than the threshold setting on the front panel of the device, the relay changes state. To avoid electrolytic phenomena, an AC current runs across the probes.
A selector switch on the front panel allows selection of the required function and the sensitivity range. Control of a single level can be achieved by using the second selector switch. In this case, the Max. level probe stays up in the air and an adjustable time delay avoids any wave effect. Both products activate their output relay when a tank is either emptying or filling.

Level control relays with adjustable sensitivity range

A selector switch on the front panel of these relays allows selection of the required sensitivity range and the empty or fill function. A second switch allows selection of the number of levels (1 or 2) and the type of time delay in the case of level 1 mode. The position of these configuration switches is taken into account on energization.
■ If the configuration switch is set to an unacceptable position, the product detects a fault, the output relay stays open, and the LEDs flash to signal the position error.
■ If the configuration switch position is changed while the device is operating, all the LEDs flash, but the product continues to operate normally with the function selected at the time of energization preceding the change of position.
■ If the configuration switch is returned to the original position selected prior to the last energization, the LEDs return to their normal state.

■ Control of two levels, empty and fill function
□ Empty function
level: 2, function:
- **LS** (Low Sensitivity: 250 Ω…5 kΩ)
- **St** (Standard Sensitivity: 5 kΩ…100 kΩ)
- **HS** (High Sensitivity: 50 kΩ…1 MΩ)

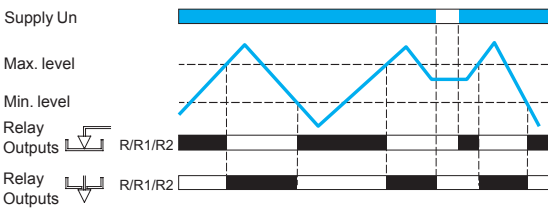
The output relay stays open until the liquid reaches the Max. level probe.
As soon as the Max. level is reached, the contact closes and then allows emptying of the tank (valve opens, pump starts, ...). When the level drops below the Min. level, the contact opens to stop the emptying process.

□ Fill function
level: 2, function:
- **LS** (Low Sensitivity: 250 Ω…5 kΩ)
- **St** (Standard Sensitivity: 5 kΩ…100 kΩ)
- **HS** (High Sensitivity: 50 kΩ…1 MΩ)

The output relay stays energized until the liquid reaches the Max. level probe.
As soon as the Max. level is reached, the contact opens and the pump stops.
When the level drops below the Min. level, the contact closes again and pumping re-starts to raise the level.

Function diagram

■ Fill/Empty function (2 levels)



Zelio Control - Measurement and control relays

Liquid level control relays RM22LA and RM22LG

Operating principle (continued)

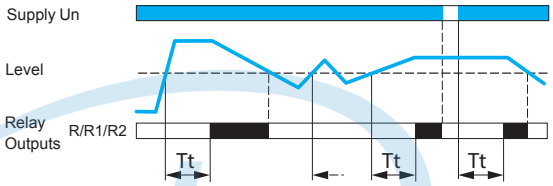
Level control relays with adjustable sensitivity range (continued)

■ Control of one level, empty function
□ level: 1 - **on delay** functions:
- **LS** (Low Sensitivity: 250 Ω…5 kΩ)
- **St** (Standard Sensitivity: 5 kΩ…100 kΩ)
- **HS** (High Sensitivity: 50 kΩ…1 MΩ)

When the liquid level rises above the probe for a time greater than the time delay value Tt set on the front panel, the relay is energized and stays energized until the liquid level drops back to the probe.
If the liquid drops back below the set level before the end of the time delay, the relay does not energize.

Function diagram

■ Empty function T on

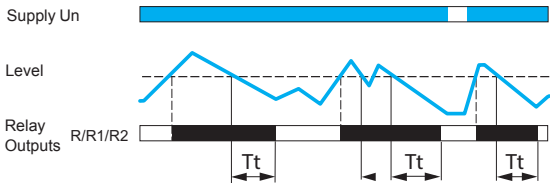


■ Control of one level, empty function
□ level: 1 - **off delay** functions:
- **LS** (Low Sensitivity: 250 Ω…5 kΩ)
- **St** (Standard Sensitivity: 5 kΩ…100 kΩ)
- **HS** (High Sensitivity: 50 kΩ…1 MΩ)

When the liquid level rises above the probe, the relay instantly energizes and stays energized until the liquid again reaches the probe level for a time Tt set on the front panel.
If the liquid drops back below the set level before the end of the time delay period, the relay stays energized.

Function diagram

■ Empty function T off

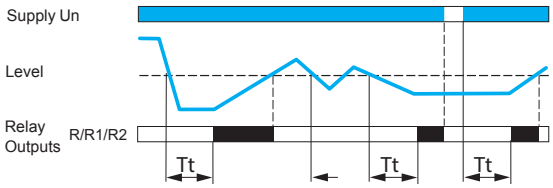


■ Control of one level, fill function
□ level: 1 - **on delay** functions:
- **LS** (Low Sensitivity: 250 Ω…5 kΩ)
- **St** (Standard Sensitivity: 5 kΩ…100 kΩ)
- **HS** (High Sensitivity: 50 kΩ…1 MΩ)

When the liquid level drops below the probe for a time greater than the time delay value Tt set on the front panel, the relay is energized and stays energized until the liquid level rises back up to the probe.
If the liquid rises back above the set level before the end of the time delay period, the relay does not energize.

Function diagram

■ Fill function T on



Tt: time delay after crossing of threshold

Zelio Control - Measurement and control relays

Liquid level control relays
RM22LA and RM22LG

Operating principle (continued)

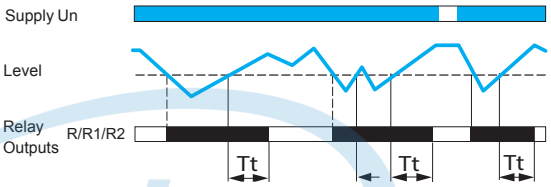
Level control relays with adjustable sensitivity range (continued)

□ level: 1 - **off delay** functions:
- **LS** (Low Sensitivity: 250 Ω…5 kΩ)
- **St** (Standard Sensitivity: 5 kΩ…100 kΩ)
- **HS** (High Sensitivity: 50 kΩ…1 MΩ)

When the liquid level drops below the probe, the relay instantly energizes and stays energized until the liquid level again reaches the probe level and stays above it for a time greater than the time delay period Tt set on the front panel.
If the liquid drops back below the set level before the end of the time delay period, the relay stays energized.

Function diagram

■ Fill function T off



Tt: time delay after crossing of threshold

References

Function	Rated supply voltage	Measurement range	Time delay	Output	Reference	Weight
	V	Ω				kg/*lb*
■ Level 1/ Level 2 ■ Fill operation ■ Empty operation	24…240 ≂	5 K...100 K	No	1 C/O 8 A	**RM22LG11MR**	0.100/ *0.220*
	380…415 ∿	5 K...100 K	No	1 C/O 8 A	**RM22LG11MT**	0.100/ *0.220*
	24…240 ≂	250...1 M	On/Off delay (0.1...30 s)	2 C/O 8 A	**RM22LA32MR**	0.110/ *0.242*
	380…415 ∿	250...1 M	On/Off delay (0.1...30 s)	2 C/O 8 A	**RM22LA32MT**	0.110/ *0.242*

RM22LG11MR

RM22LG11MT

RM22LA32MR

RM22LA32MT

Zelio Control - Measurement and control relays

1-phase or DC voltage control relays RM22UA and RM22UB

RM22UA21MR

RM22UA31MR

Presentation

RM22UA and RM22UB 1-phase or DC voltage control relays monitor the following functions:

Functions / RM22	UA2●MR	UA3●MR	UA33MT	UB34
Overvoltage (without memory)	■			
Undervoltage (with/without memory)		■	■	
Overvoltage (with/without memory)		■	■	
Overvoltage or undervoltage (windows mode)		■	■	■

■ Function performed
■ Function not performed

RM22 control relays enable:
- Automatic AC or DC recognition
- Selection between overvoltage and undervoltage
- Monitoring their own supply voltage measured as true rms value
- Selectable memory function

They feature:
- Dial pointer LED indicator for relay power ON status
- Relay output status LED

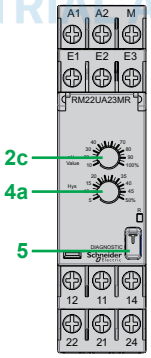
The settings are protected by a sealable cover and the control status is indicated by an LED. The relays are designed for clip-on mounting on a DIN rail.

Applications

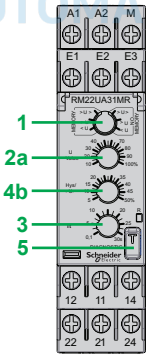
- Protection of electronic or electromechanical devices against overvoltage and undervoltage
- Normal/emergency power supply switching
- DC motor overspeed control
- Monitoring of AC or DC supplies
- Battery and speed monitoring (with tacho-generator)

Description

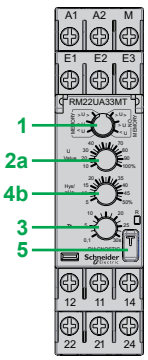
RM22UA2●MR



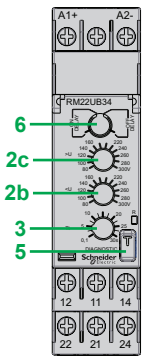
RM22UA3●MR



RM22UA33MT



RM22UB34



1 Configuration: selection of operating mode **<U** (undervoltage), **>U** (overvoltage), **>U>** (overvoltage and undervoltage), MEMORY - NO MEMORY (with or without memory)

2a Voltage threshold setting potentiometer **U** value

2b Undervoltage setting potentiometer **<U**

2c Overvoltage setting potentiometer **>U**

3 Time delay adjustment potentiometer **Tt**

4a Hysteresis adjustment potentiometer **Hys**

4b Hysteresis/overvoltage and undervoltage window mode adjustment potentiometer **Hys/>U>**

5 Diagnostic button

6 Configuration: selection of On-delay or Off-delay

R Yellow LED: indicates relay output state

Zelio Control - Measurement and control relays

1-phase or DC voltage control relays
RM22UA and RM22UB

Operating principle

1-phase or DC voltage control relays monitor:
- the voltage of 1-phase and DC supplies
- their own supply voltage for the RM22UB model

An adjustable time delay, on crossing the thresholds, provides immunity to transients, and prevents spurious triggering of the output relay.

Overvoltage + undervoltage control relays with/without memory: RM22 UA2●MR/ UA3●MR/UA33MT

The operating mode is fixed by the user:
- Undervoltage with or without memory
- Overvoltage with or without memory

The position of the configuration switch and the operating mode is read by the product on energization:
- If the configuration switch is set to an unacceptable position, the product detects a fault, the output relay stays open, and the LEDs flash to indicate the position error.
- If the configuration switch position is changed while the device is operating, all the LEDs flash, but the product continues to operate normally with the function selected at the time of energization before position change.
- If the configuration switch is returned to the original position selected prior to the last energization, the LEDs return to their normal state.

The undervoltage or overvoltage threshold value is set by means of a potentiometer graduated as a percentage of the scale value of U to be monitored. The hysteresis is adjusted by means of a potentiometer graduated from 5…50 % of the threshold setting. The hysteresis value must not exceed the limit values of the measuring range.

- Overvoltage without memory

If the voltage controlled exceeds the threshold setting for a time greater than that set on the front panel (0.1…30 s), the output relay opens and LED R goes off. During the time delay, this LED flashes.
As soon as the voltage drops below the value of the threshold setting minus the hysteresis, the relay instantly closes.

- Undervoltage without memory

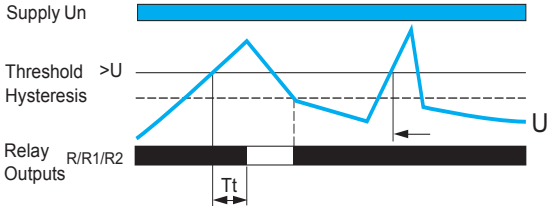
If the voltage controlled falls below the threshold setting for a time greater than that set on the front panel (0.1…30 s), the output relay opens and LED R goes off. During the time delay, this LED flashes.
As soon as the voltage rises above the value of the threshold setting plus the hysteresis, the relay instantly closes.

- Overvoltage/undervoltage with memory

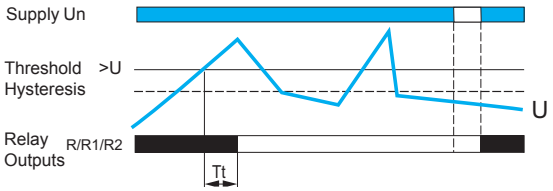
If “Memory” mode is selected, the relay opens when crossing of the threshold is detected and then stays in that position. The power must be switched off to reset the product.

Function diagram

- Function: Overvoltage control **> U**
- Without memory



- With memory



Tt: time delay after crossing of threshold

Zelio Control - Measurement and control relays

1-phase or DC voltage control relays
RM22UA and RM22UB

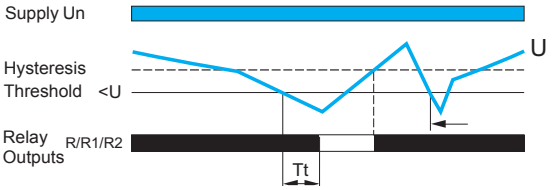
Operating principle (continued)

Overvoltage + undervoltage control relays with/without memory: RM22 UA2●MR/ UA3●MR/UA33MT (continued)

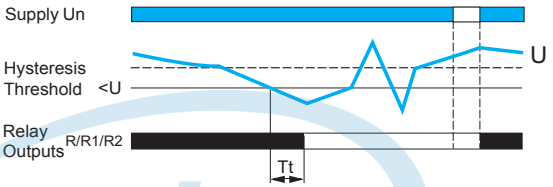
Function diagrams (continued)

■ Function: Undervoltage control **< U**

□ Without memory



□ With memory



Tt: time delay after crossing of threshold

Overvoltage + undervoltage control relay in window mode: RM22 UA3●MR/ UA33MT/UB34

These relays operate in window mode where they check that the voltage controlled stays between a minimum and a maximum threshold.

■ The undervoltage or overvoltage threshold values are set by means of two graduated potentiometers clearly indicating the Un to be monitored. The hysteresis is fixed at 5 % of the threshold setting.

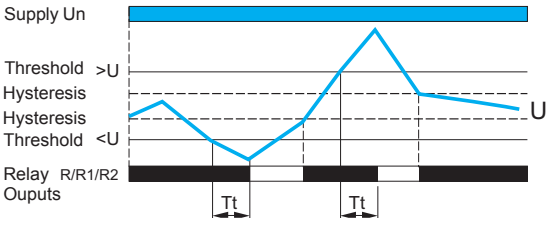
■ If the voltage controlled exceeds the high threshold setting or falls below the low threshold setting for a time greater than that set time on the front panel (0.1…30 s), the output relay opens and LED R goes off. During the time delay, this LED flashes.

■ As soon as the voltage falls below the high threshold setting value minus the hysteresis, or rises above the low threshold setting value plus the hysteresis, the relay instantly closes.

■ On energization of the device with a detected measured fault, the relay stays open.

Function diagrams

■ Functions: Overvoltage and undervoltage control in window mode **<U<**



Tt: time delay after crossing of threshold

Zelio Control - Measurement and control relays

1-phase or DC voltage control relays
RM22UA and RM22UB

RM22UA23MR

RM22UA33MR

RM22UA33MT

RM22UB34

References

Function	Rated supply voltage	Measurement range	Time delay	Output	Reference	Weight
	V	V				kg/*lb*
■ Overvoltage without memory	24…240 ≂	0.05…5 ≂	No	2 C/O 8 A	**RM22UA21MR**	0.110/ *0.242*
	24…240 ≂	1…100 ≂	No	2 C/O 8 A	**RM22UA22MR**	0.110/ *0.242*
	24…240 ≂	15…500 ≂	No	2 C/O 8 A	**RM22UA23MR**	0.110/ *0.242*
■ Overvoltage and undervoltage with/ without memory	24…240 ≂	0.05…5 ≂	Off delay (0.1...30 s)	2 C/O 8 A	**RM22UA31MR**	0.110/ *0.242*
■ Overvoltage and undervoltage with memory window	24…240 ≂	1…100 ≂	Off delay (0.1...30 s)	2 C/O 8 A	**RM22UA32MR**	0.110/ *0.242*
	24…240 ≂	15…500 ≂	Off delay (0.1...30 s)	2 C/O 8 A	**RM22UA33MR**	0.110/ *0.242*
	380…415 ∿	15…500 ∿	Off delay (0.1...30 s)	2 C/O 8 A	**RM22UA33MT**	0.110/ *0.242*
■ Overvoltage and undervoltage without memory	110…240 ≂	80…300 ≂	On/Off delay (0.1...30 s)	2 C/O 8 A	**RM22UB34**	0.090/ *0.198*