



# PROTECTION RELAYS

## MC3V

### Multifunction three phase overvoltage / undervoltage relay

Three-phase voltage relay, suitable for protection of HV, MV, LV power transmission and distribution systems.

The relay MC3V measures the true R.M.S. value of the 3 phase to neutral voltages fed to three transformers isolated high-impedance inputs.

#### Protective Functions

- **F59** : 2 Overvoltage elements
- **F27** : 2 Undervoltage elements
- **F81>** : 1 Overfrequency element
- **F81<** : 1 Underfrequency element
- **F59Vo** : 1 Zero sequence Overvoltage element
- **F59V2** : 1 Negative Sequence Overvoltage Element
- **F27V1** : 1 Positive Sequence Undervoltage Element

#### Measurements

- Real Time Measurements (V - Hz)
- Trip Recording (last 20 trips with date & time)

#### Control

- 4 Output Relays (programmable)
- 3 Digital Inputs
- Time tagged multiple event recording
- Oscillographic wave form capture
- Blocking Outputs and Blockings Input for pilot wire selectivity coordination

#### Technical Characteristics

- Complete autodiagnostic program
- Display LCD 16 (2x8) characters
- 4 Leds for signalization



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### Communications

- 1 RS485 Serial communication port on rear side
- 1 RS232 Serial communication port on front panel
- Modbus RTU / IEC870-5-103 Communication Protocols

### Expansion Modules (optional)

The relay support only one expansion module

- "UX10-4" 10 Digital Input and 4 Outputs Relay
- "14DI" 14 Digital Inputs.
- "14DO" 14 Output Relays

### Mounting

- 1 Module box (2 modules with expansion), totally draw-out execution
- IP44 protection case (on request IP54)

### Power Supply Ratings

- Type 1 : 24V(-20%) / 110V(+15%) a.c. - (-20%) / 125V(+20%) d.c.
- Type 2 : 80V(-20%) / 220V(+15%) a.c. - 90V(-20%) / 250V(+20%) d.c.

### Software

- MCom2 Program interface for device management

| Programmable Input Quantities                               |                      |             |
|---|----------------------|-------------|
| Fn = System frequency                                       | (50 ÷ 60)Hz          |             |
| V1 = Rated primary phase to phase voltage of system's Pts   | (0.05 ÷ 500)kV       | step 0.01kV |
| V2 = Rated secondary phase to phase voltage of system's Pts | (50 ÷ 400)V          | step 0.01V  |
| Real time Measurements                                      |                      |             |
| f - EA - EB - EC - Vo - V1 - V2                             |                      |             |
| 1 - F59 (V>): First Overvoltage Element                     |                      |             |
| Function enabling   | Enable/Disable       |             |
| Voltage setting range                                       | V> = (0.5 ÷ 1.50)Vn  | step 0.01Vn |
| Independent trip time delay                                 | tV> = (0.05 ÷ 60)s   | step 0.01s  |
| Instantaneous output  | ≤ 0.03s              |             |
| 2 - F59 (V>>): Second Overvoltage Element                   |                      |             |
| Function enabling   | Enable/Disable       |             |
| Voltage setting range                                       | V>> = (0.5 ÷ 1.50)Vn | step 0.01Vn |
| Independent trip time delay                                 | tV>> = (0.05 ÷ 60)s  | step 0.01s  |
| Instantaneous output  | ≤ 0.03s              |             |
| 1 - F27 (V<): First Undervoltage Element                    |                      |             |
| Function enabling   | Enable/Disable       |             |
| Voltage setting range                                       | V< = (0.2 ÷ 1.20)Vn  | step 0.01Vn |
| Independent trip time delay                                 | tV< = (0.05 ÷ 60)s   | step 0.01s  |
| Instantaneous output  | ≤ 0.03s              |             |
| 2 - F27 (V<<): Second Undervoltage Element                  |                      |             |
| Function enabling   | Enable/Disable       |             |
| Voltage setting range                                       | V<< = (0.2 ÷ 1.20)Vn | step 0.01Vn |
| Independent trip time delay                                 | tV<< = (0.05 ÷ 60)s  | step 0.01s  |
| Instantaneous output  | ≤ 0.03s              |             |
| 1 - 81> (f>): Maximum Frequency Element                     |                      |             |
| Function enabling   | Enable/Disable       |             |
| Voltage setting range                                       | V< = (0.2 ÷ 1.20)Vn  | step 0.01Vn |
| Independent trip time delay                                 | tV< = (0.05 ÷ 60)s   | step 0.01s  |
| Instantaneous output  | ≤ 0.03s              |             |

### 1 - 81< (f<): Minimum Frequency Element

|                             |                                    |             |
|-----------------------------|------------------------------------|-------------|
| Function enabling           | Enable/Disable                     |             |
| Voltage setting range       | $f < = (40 \div 70)\text{Hz}$      | step 0.01Hz |
| Independent trip time delay | $t_{f <} = (0.05 \div 60)\text{s}$ | step 0.01s  |
| Instantaneous output        | $\leq 0.03\text{s}$                |             |

### 1 - 59o (Vo>): Zero Sequence Voltage Control Element

|                             |                                       |             |
|-----------------------------|---------------------------------------|-------------|
| Function enabling           | Enable/Disable                        |             |
| Voltage setting range       | $V_{o>} = (0.1 \div 2)V_n$            | step 0.01Vn |
| Independent trip time delay | $t_{V_{o>}} = (0.05 \div 60)\text{s}$ | step 0.01s  |
| Instantaneous output        | $\leq 0.03\text{s}$                   |             |

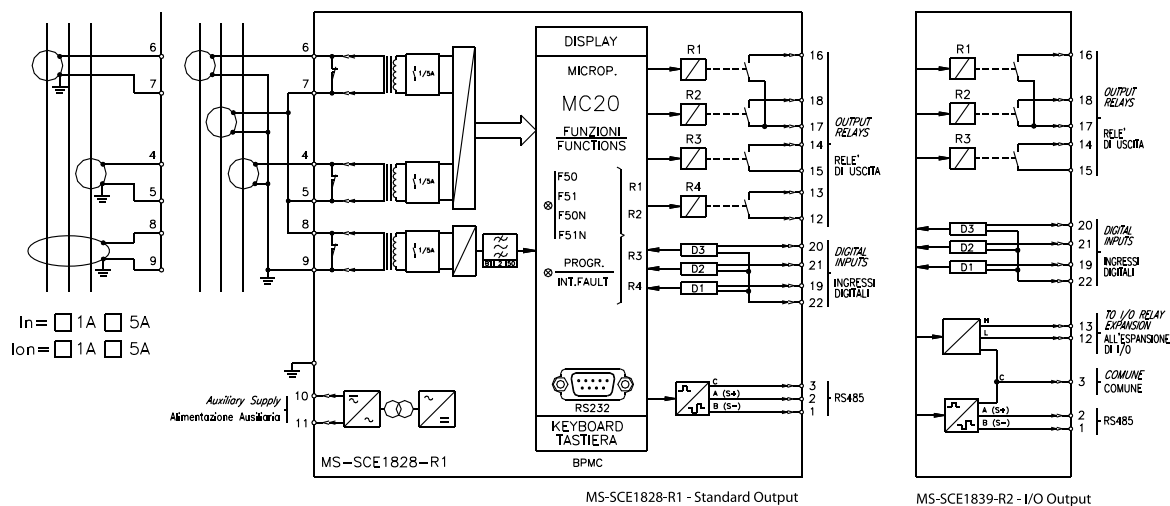
### 1 - 27 (V1<): Positive Sequence Undervoltage Element

|                             |                                       |             |
|-----------------------------|---------------------------------------|-------------|
| Function enabling           | Enable/Disable                        |             |
| Voltage setting range       | $V_{1<} = (0.02 \div 1.5)V_n$         | step 0.01Vn |
| Independent trip time delay | $t_{V_{1<}} = (0.05 \div 60)\text{s}$ | step 0.01s  |
| Instantaneous output        | $\leq 0.03\text{s}$                   |             |

### 1 - 47 (V2>): Negative Sequence (Unbalanced) Overvoltage Element

|                             |                                       |             |
|-----------------------------|---------------------------------------|-------------|
| Function enabling           | Enable/Disable                        |             |
| Voltage setting range       | $V_{2>} = (0.1 \div 1.5)V_n$          | step 0.01Vn |
| Independent trip time delay | $t_{V_{2>}} = (0.05 \div 60)\text{s}$ | step 0.01s  |
| Instantaneous output        | $\leq 0.03\text{s}$                   |             |

## Connection Diagram



| Typical Characteristics                            |   |                        |
|--|---|------------------------|
| Accuracy at reference value of influencing factors | 2% Un                                       | for measurements       |
|  | 2% + (to=20 ÷ 30ms)                         | for times              |
| Rated Voltage                                      | Un = (50 ÷ 400)Vac phase to phase           |                        |
| Voltage Overload                                   | 2Un for 1sec                                |                        |
| Burden on voltage input                            | 0.2 VA/phase at Un                          |                        |
| Average power supply consumption                   | ≤ 7 VA                                      |                        |
| Output relays                                      | rating 6A; Vn = 250V                        |                        |
|  | A.C. resistive switching = 1500W (400V max) |                        |
|  | make = 30 A (peak) 0.5 sec.;                |                        |
|  | break = 0.3 A, 110 Vcc,                     |                        |
|  | L/R = 40 ms (100.000 op.)                   |                        |
| Order code - Example                               |   |                        |
| MC3V   | 1   | 1                      |
|  | Power Supply                                | Output Options         |
|  | 1 = Type 1                                  | 1 = Standard (with R4) |
|  | 2 = Type 2                                  | 2 = UX10-4             |
|  |   | 3 = 14DI               |
|  |   | 4 = 14DO               |

The technical specifications reported are not binding and they should be agreed in the contract.

**For further technical information on our products visit [www.microelettrica.com](http://www.microelettrica.com)**

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