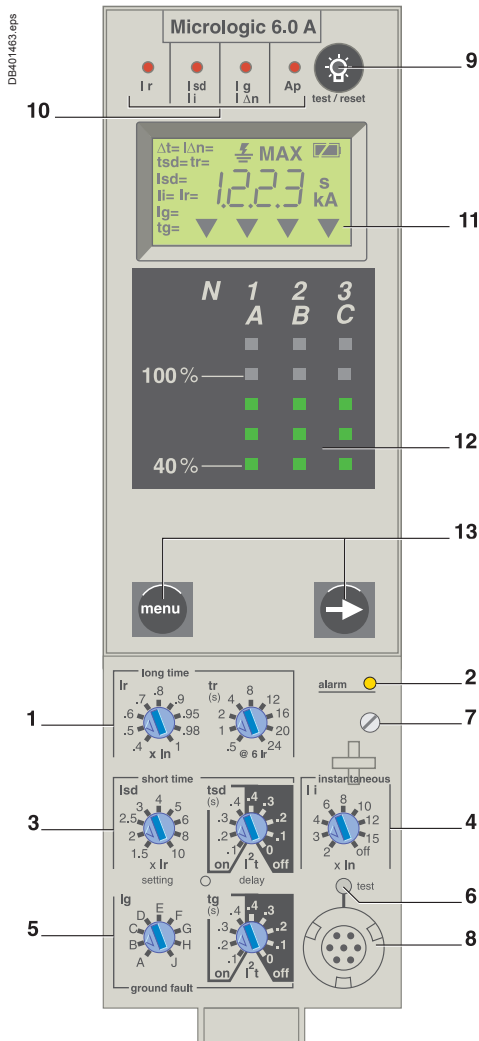


Micrologic A control units protect power circuits. They also offer measurements, display, communication and current maximeters. Version 6 provides earth-fault protection, version 7 provides earth-leakage protection.



- 1 long-time threshold and tripping delay
- 2 overload alarm (LED) at 1,125 Ir
- 3 short-time pick-up and tripping delay
- 4 instantaneous pick-up
- 5 earth-leakage or earth-fault pick-up and tripping delay
- 6 earth-leakage or earth-fault test button
- 7 long-time rating plug screw
- 8 test connector
- 9 lamp test, reset and battery test
- 10 indication of tripping cause
- 11 digital display
- 12 three-phase bargraph and ammeter
- 13 navigation buttons

### "Ammeter" measurements

Micrologic A control units measure the true (rms) value of currents. They provide continuous current measurements from 0.2 to 1.2 In and are accurate to within 1.5 % (including the sensors). A digital LCD screen continuously displays the most heavily loaded phase (Imax) or displays the I1, I2, I3, IN, Ig, IΔn, stored-current (maximeter) and setting values by successively pressing the navigation button. The optional external power supply makes it possible to display currents < 20 % In. Below 0.1 In, measurements are not significant. Between 0.1 and 0.2 In, accuracy changes linearly from 4 % to 1.5 %.

### Communication option

In conjunction with the COM communication option, the control unit transmits the following:

- settings
- all "ammeter" measurements
- tripping causes
- maximeter readings.

### Protection

Protection thresholds and delays are set using the adjustment dials.

#### Overload protection

True rms long-time protection.

Thermal memory: thermal image before and after tripping.

Setting accuracy may be enhanced by limiting the setting range using a different long-time rating plug.

Overload protection can be cancelled using a specific LT rating plug "Off".

#### Short-circuit protection

Short-time (rms) and instantaneous protection.

Selection of I2t type (ON or OFF) for short-time delay.

#### Earth-fault protection

Residual or source ground return earth fault protection.

Selection of I2t type (ON or OFF) for delay.

#### Residual earth-leakage protection (Vigi).

Operation without an external power supply.

Δ Protected against nuisance tripping.

⋈ DC-component withstand class A up to 10 A.

#### Neutral protection

On three-pole circuit breakers, neutral protection is not possible.

On four-pole circuit breakers, neutral protection may be set using a three-position switch: neutral unprotected (4P 3d), neutral protection at 0.5 Ir (4P 3d + N/2), neutral protection at Ir (4P 4d).

#### Zone selective interlocking (ZSI)

A ZSI terminal block may be used to interconnect a number of control units to provide total discrimination for short-time and earth-fault protection, without a delay before tripping.

### Overload alarm

A yellow alarm LED goes on when the current exceeds the long-time trip threshold.

### Fault indications

LEDs indicate the type of fault:

- overload (long-time protection Ir)
- short-circuit (short-time Isd or instantaneous Ii protection)
- earth fault or earth leakage (Ig or IΔn)
- internal fault (Ap).

### Battery power

The fault indication LEDs remain on until the test/reset button is pressed. Under normal operating conditions, the battery supplying the LEDs has a service life of approximately 10 years.

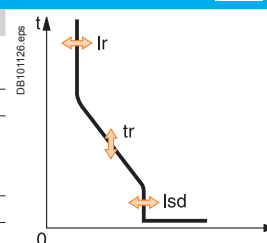
### Test

A mini test kit or a portable test kit may be connected to the test connector on the front to check circuit-breaker operation. For Micrologic 6.0 A and 7.0 A control units, the operation of earth-fault or earth-leakage protection can be checked by pressing the test button located above the test connector.

**Note:** Micrologic A control units come with a transparent lead-seal cover as standard.

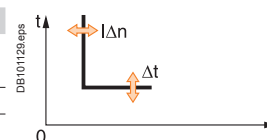
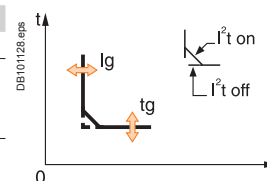
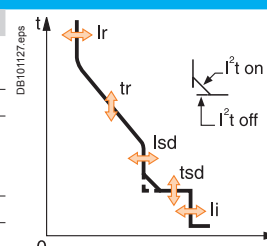
## Protection Micrologic 2.0 A

| Long time                           |                      |          |                                                           |      |      |     |     |     |      |      |      |
|-------------------------------------|----------------------|----------|-----------------------------------------------------------|------|------|-----|-----|-----|------|------|------|
| Current setting (A)                 |                      |          | 0.4                                                       | 0.5  | 0.6  | 0.7 | 0.8 | 0.9 | 0.95 | 0.98 | 1    |
| Tripping between 1.05 and 1.20 x Ir |                      |          | Other ranges or disable by changing long-time rating plug |      |      |     |     |     |      |      |      |
| Time setting                        |                      | tr (s)   | 0.5                                                       | 1    | 2    | 4   | 8   | 12  | 16   | 20   | 24   |
| Time delay (s)                      | Accuracy: 0 to -30 % | 1.5 x Ir | 12.5                                                      | 25   | 50   | 100 | 200 | 300 | 400  | 500  | 600  |
|                                     | Accuracy: 0 to -20 % | 6 x Ir   | 0.7 <sup>(1)</sup>                                        | 1    | 2    | 4   | 8   | 12  | 16   | 20   | 24   |
|                                     | Accuracy: 0 to -20 % | 7.2 x Ir | 0.7 <sup>(2)</sup>                                        | 0.69 | 1.38 | 2.7 | 5.5 | 8.3 | 11   | 13.8 | 16.6 |
| Thermal memory                      |                      |          | 20 minutes before and after tripping                      |      |      |     |     |     |      |      |      |
| (1) 0 to -40 % - (2) 0 to -60 %     |                      |          |                                                           |      |      |     |     |     |      |      |      |
| Instantaneous                       |                      |          |                                                           |      |      |     |     |     |      |      |      |
| Pick-up (A)                         | Isd = Ir x ...       |          | 1.5                                                       | 2    | 2.5  | 3   | 4   | 5   | 6    | 8    | 10   |
| Accuracy: ±10 %                     |                      |          |                                                           |      |      |     |     |     |      |      |      |
| Time delay                          |                      |          | Max resettable time: 20 ms<br>Max break time: 80 ms       |      |      |     |     |     |      |      |      |



## Protection Micrologic 5.0 / 6.0 / 7.0 A

| Long time                                                                 |                                       |                      | Micrologic 5.0 / 6.0 / 7.0 A                              |      |      |     |      |     |      |      |      |
|---------------------------------------------------------------------------|---------------------------------------|----------------------|-----------------------------------------------------------|------|------|-----|------|-----|------|------|------|
| Current setting (A)                                                       | $I_r = I_n \times \dots$              |                      | 0.4                                                       | 0.5  | 0.6  | 0.7 | 0.8  | 0.9 | 0.95 | 0.98 | 1    |
| Tripping between 1.05 and 1.20 x I <sub>r</sub>                           |                                       |                      | Other ranges or disable by changing long-time rating plug |      |      |     |      |     |      |      |      |
| Time setting                                                              |                                       | tr (s)               | 0.5                                                       | 1    | 2    | 4   | 8    | 12  | 16   | 20   | 24   |
| Time delay (s)                                                            | Accuracy: 0 to -30 %                  | 1.5 x I <sub>r</sub> | 12.5                                                      | 25   | 50   | 100 | 200  | 300 | 400  | 500  | 600  |
|                                                                           | Accuracy: 0 to -20 %                  | 6 x I <sub>r</sub>   | 0.7 <sup>(1)</sup>                                        | 1    | 2    | 4   | 8    | 12  | 16   | 20   | 24   |
|                                                                           | Accuracy: 0 to -20 %                  | 7.2 x I <sub>r</sub> | 0.7 <sup>(2)</sup>                                        | 0.69 | 1.38 | 2.7 | 5.5  | 8.3 | 11   | 13.8 | 16.6 |
| Thermal memory                                                            |                                       |                      | 20 minutes before and after tripping                      |      |      |     |      |     |      |      |      |
| (1) 0 to -40 % - (2) 0 to -60 %                                           |                                       |                      |                                                           |      |      |     |      |     |      |      |      |
| Short time                                                                |                                       |                      |                                                           |      |      |     |      |     |      |      |      |
| Pick-up (A)                                                               | $I_{sd} = I_r \times \dots$           |                      | 1.5                                                       | 2    | 2.5  | 3   | 4    | 5   | 6    | 8    | 10   |
| Accuracy: ±10 %                                                           |                                       |                      |                                                           |      |      |     |      |     |      |      |      |
| Time setting t <sub>sd</sub> (s)                                          | Settings                              | I <sup>2</sup> t Off | 0                                                         | 0.1  | 0.2  | 0.3 | 0.4  |     |      |      |      |
|                                                                           |                                       | I <sup>2</sup> t On  | -                                                         | 0.1  | 0.2  | 0.3 | 0.4  |     |      |      |      |
| Time delay (ms) at 10 x I <sub>r</sub>                                    | t <sub>sd</sub> (max resettable time) |                      | 20                                                        | 80   | 140  | 230 | 350  |     |      |      |      |
| (I <sup>2</sup> t Off or I <sup>2</sup> t On)                             | t <sub>sd</sub> (max break time)      |                      | 80                                                        | 140  | 200  | 320 | 500  |     |      |      |      |
| Instantaneous                                                             |                                       |                      |                                                           |      |      |     |      |     |      |      |      |
| Pick-up (A)                                                               | $I_i = I_n \times \dots$              |                      | 2                                                         | 3    | 4    | 6   | 8    | 10  | 12   | 15   | off  |
| Accuracy: ±10 %                                                           |                                       |                      |                                                           |      |      |     |      |     |      |      |      |
| Time delay                                                                |                                       |                      | Max resettable time: 20 ms<br>Max break time: 50 ms       |      |      |     |      |     |      |      |      |
| Earth fault                                                               |                                       |                      | Micrologic 6.0 A                                          |      |      |     |      |     |      |      |      |
| Pick-up (A)                                                               | $I_g = I_n \times \dots$              |                      | A                                                         | B    | C    | D   | E    | F   | G    | H    | J    |
| Accuracy: ±10 %                                                           | $I_n \leq 400\text{ A}$               |                      | 0.3                                                       | 0.3  | 0.4  | 0.5 | 0.6  | 0.7 | 0.8  | 0.9  | 1    |
|                                                                           | $400\text{ A} < I_n < 1250\text{ A}$  |                      | 0.2                                                       | 0.3  | 0.4  | 0.5 | 0.6  | 0.7 | 0.8  | 0.9  | 1    |
|                                                                           | $I_n \geq 1250\text{ A}$              |                      | 500                                                       | 640  | 720  | 800 | 880  | 960 | 1040 | 1120 | 1200 |
| Time setting t <sub>g</sub> (s)                                           | Settings                              | I <sup>2</sup> t Off | 0                                                         | 0.1  | 0.2  | 0.3 | 0.4  |     |      |      |      |
|                                                                           |                                       | I <sup>2</sup> t On  | -                                                         | 0.1  | 0.2  | 0.3 | 0.4  |     |      |      |      |
| Time delay (ms)                                                           | t <sub>g</sub> (max resettable time)  |                      | 20                                                        | 80   | 140  | 230 | 350  |     |      |      |      |
| at I <sub>n</sub> or 1200 A (I <sup>2</sup> t Off or I <sup>2</sup> t On) | t <sub>g</sub> (max break time)       |                      | 80                                                        | 140  | 200  | 320 | 500  |     |      |      |      |
| Residual earth leakage (Vigi)                                             |                                       |                      | Micrologic 7.0 A                                          |      |      |     |      |     |      |      |      |
| Sensitivity (A)                                                           | $I_{\Delta n}$                        |                      | 0.5                                                       | 1    | 2    | 3   | 5    | 7   | 10   | 20   | 30   |
| Accuracy: 0 to -20 %                                                      |                                       |                      |                                                           |      |      |     |      |     |      |      |      |
| Time delay Δt (ms)                                                        | Settings                              |                      | 60                                                        | 140  | 230  | 350 | 800  |     |      |      |      |
|                                                                           | Δt (max resettable time)              |                      | 60                                                        | 140  | 230  | 350 | 800  |     |      |      |      |
|                                                                           | Δt (max break time)                   |                      | 140                                                       | 200  | 320  | 500 | 1000 |     |      |      |      |

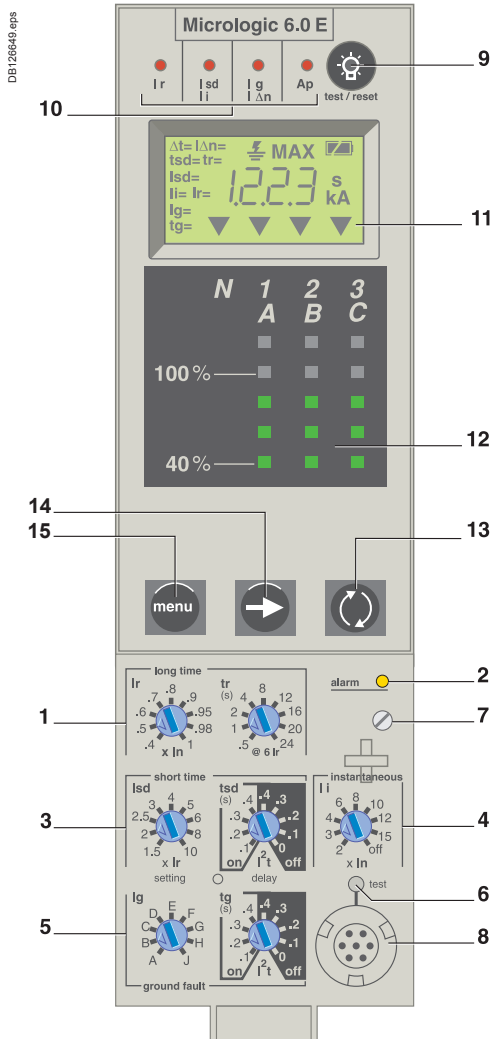


## Ammeter Micrologic 2.0 / 5.0 / 6.0 / 7.0 A

| Type of measurements   |                | Range                | Accuracy |
|------------------------|----------------|----------------------|----------|
| Instantaneous currents | I1, I2, I3, IN | 0.2 x In to 1.2 x In | ±1.5 %   |
|                        | Ig (6.0 A)     | 0.2 x In to In       | ±10 %    |
|                        | IΔn (7.0 A)    | 0 to 30 A            | ±1.5 %   |
| Current maximeters of  | I1, I2, I3, IN | 0.2 x In to 1.2 x In | ±1.5 %   |

**Note:** all current-based protection functions require no auxiliary source.  
The test / reset button resets maximeters, clears the tripping indication and tests the battery.

Micrologic E control units protect power circuits. They also offer measurements, display, communication and current maximeters. Version 6 provides earth-fault protection.



- 1 long-time threshold and tripping delay
- 2 overload alarm (LED) at 1, 125 Ir
- 3 short-time pick-up and tripping delay
- 4 instantaneous pick-up
- 5 earth-leakage or earth-fault pick-up and tripping delay
- 6 earth-leakage or earth-fault test button
- 7 long-time rating plug screw
- 8 test connector
- 9 lamp test, reset and battery test
- 10 indication of tripping cause
- 11 digital display
- 12 three-phase bargraph and ammeter
- 13 navigation button "quick View" (only with Micrologic E)
- 14 navigation button to view menu contents
- 15 navigation button to change menu

(1) Display on FDM121 only.

**Note:** Micrologic E control units come with a transparent lead-seal cover as standard.

### "Energy meter" measurements

**In addition to the ammeter measurements of Micrologic A**

Micrologic E control units measure and display:

- current demand
- voltages: phase to phase, phase to neutral, average <sup>(1)</sup> and unbalanced <sup>(1)</sup>
- instantaneous power: P, Q, S
- power factor: PF
- power demand: P demand
- energy: Ep, Eq <sup>(1)</sup>, Es <sup>(1)</sup>.

Accuracy of active energy Ep is 2 % (including the sensors). The range of measurement is the same as current with Micrologic A, depending of an external power supply module (24 V DC).

### Communication option

In conjunction with the COM communication option, the control unit transmits the following:

- settings
- all "ammeter" and "energy" measurements
- enable connection to FDM121
- tripping causes
- maximeter / minimeter readings.

### Protection

Protection thresholds and delays are set using the adjustment dials.

#### Overload protection

True rms long-time protection.

Thermal memory: thermal image before and after tripping.

Setting accuracy may be enhanced by limiting the setting range using a different long-time rating plug. Overload protection can be cancelled using a specific LT rating plug "Off".

#### Short-circuit protection

Short-time (rms) and instantaneous protection.

Selection of I<sup>2</sup>t type (ON or OFF) for short-time delay.

#### Earth-fault protection

Source ground return earth fault protection.

Selection of I<sup>2</sup>t type (ON or OFF) for delay.

#### Neutral protection

On three-pole circuit breakers, neutral protection is not possible.

On four-pole circuit breakers, neutral protection may be set using a three-position switch: neutral unprotected (4P 3d), neutral protection at 0.5 Ir (4P 3d + N/2), neutral protection at Ir (4P 4d).

#### Zone selective interlocking (ZSI)

A ZSI terminal block may be used to interconnect a number of control units to provide total discrimination for short-time and earth-fault protection, without a delay before tripping.

### Overload alarm

A yellow alarm LED goes on when the current exceeds the long-time trip threshold.

### M2C programmable contacts

The M2C (two contacts) programmable contacts may be used to signal events (Ir, Isd, Alarm Ir, Alarm Ig, Ig). They can be programmed using the keypad on the Micrologic E control unit or remotely using the COM option (BCM ULP).

### Fault indications

LEDs indicate the type of fault:

- overload (long-time protection Ir)
- short-circuit (short-time Isd or instantaneous li protection)
- earth fault (Ig)
- internal fault (Ap).

### Trip history

The trip history displays the list of the last 10 trips. For each trip, the following indications are recorded and displayed:

- the tripping cause: Ir, Isd, li, Ig or Auto-protection (Ap) trips
- the date and time of the trip (requires communication option).

### Battery power

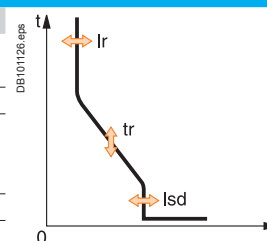
The fault indication LEDs remain on until the test/reset button is pressed. Under normal operating conditions, the battery supplying the LEDs has a service life of approximately 10 years.

### Test

A mini test kit or a portable test kit may be connected to the test connector on the front to check circuit-breaker operation. For Micrologic 6.0 E control units, the operation of earth-fault or earth-leakage protection can be checked by pressing the test button located above the test connector.

## Protection Micrologic 2.0 E

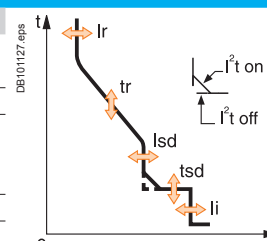
| Long time                           |                      |                                                           |                    |      |      |     |     |      |      |      |      |
|-------------------------------------|----------------------|-----------------------------------------------------------|--------------------|------|------|-----|-----|------|------|------|------|
| Current setting (A)                 |                      | 0.4                                                       | 0.5                | 0.6  | 0.7  | 0.8 | 0.9 | 0.95 | 0.98 | 1    |      |
| Tripping between 1.05 and 1.20 x Ir |                      | Other ranges or disable by changing long-time rating plug |                    |      |      |     |     |      |      |      |      |
| Time setting                        | tr (s)               | 0.5                                                       | 1                  | 2    | 4    | 8   | 12  | 16   | 20   | 24   |      |
| Time delay (s)                      | Accuracy: 0 to -30 % | 1.5 x Ir                                                  | 12.5               | 25   | 50   | 100 | 200 | 300  | 400  | 500  | 600  |
|                                     | Accuracy: 0 to -20 % | 6 x Ir                                                    | 0.7 <sup>(1)</sup> | 1    | 2    | 4   | 8   | 12   | 16   | 20   | 24   |
|                                     | Accuracy: 0 to -20 % | 7.2 x Ir                                                  | 0.7 <sup>(2)</sup> | 0.69 | 1.38 | 2.7 | 5.5 | 8.3  | 11   | 13.8 | 16.6 |
| Thermal memory                      |                      | 20 minutes before and after tripping                      |                    |      |      |     |     |      |      |      |      |
| (1) 0 to -40 % - (2) 0 to -60 %     |                      |                                                           |                    |      |      |     |     |      |      |      |      |



| Instantaneous   |                |                                                     |   |     |   |   |   |   |   |    |  |
|-----------------|----------------|-----------------------------------------------------|---|-----|---|---|---|---|---|----|--|
| Pick-up (A)     | Isd = Ir x ... | 1.5                                                 | 2 | 2.5 | 3 | 4 | 5 | 6 | 8 | 10 |  |
| Accuracy: ±10 % |                |                                                     |   |     |   |   |   |   |   |    |  |
| Time delay      |                | Max resettable time: 20 ms<br>Max break time: 80 ms |   |     |   |   |   |   |   |    |  |

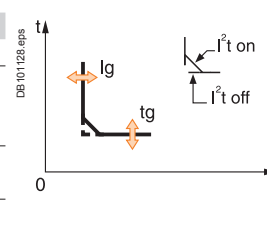
## Protection Micrologic 5.0 / 6.0 E

| Long time                           |                      | Micrologic 5.0 / 6.0 E                                    |                    |      |      |     |     |      |      |      |      |
|-------------------------------------|----------------------|-----------------------------------------------------------|--------------------|------|------|-----|-----|------|------|------|------|
| Current setting (A)                 | Ir = In x ...        | 0.4                                                       | 0.5                | 0.6  | 0.7  | 0.8 | 0.9 | 0.95 | 0.98 | 1    |      |
| Tripping between 1.05 and 1.20 x Ir |                      | Other ranges or disable by changing long-time rating plug |                    |      |      |     |     |      |      |      |      |
| Time setting                        | tr (s)               | 0.5                                                       | 1                  | 2    | 4    | 8   | 12  | 16   | 20   | 24   |      |
| Time delay (s)                      | Accuracy: 0 to -30 % | 1.5 x Ir                                                  | 12.5               | 25   | 50   | 100 | 200 | 300  | 400  | 500  | 600  |
|                                     | Accuracy: 0 to -20 % | 6 x Ir                                                    | 0.7 <sup>(1)</sup> | 1    | 2    | 4   | 8   | 12   | 16   | 20   | 24   |
|                                     | Accuracy: 0 to -20 % | 7.2 x Ir                                                  | 0.7 <sup>(2)</sup> | 0.69 | 1.38 | 2.7 | 5.5 | 8.3  | 11   | 13.8 | 16.6 |
| Thermal memory                      |                      | 20 minutes before and after tripping                      |                    |      |      |     |     |      |      |      |      |
| (1) 0 to -40 % - (2) 0 to -60 %     |                      |                                                           |                    |      |      |     |     |      |      |      |      |



| Short time                         |                                |                                                     |     |     |     |     |     |    |    |     |
|------------------------------------|--------------------------------|-----------------------------------------------------|-----|-----|-----|-----|-----|----|----|-----|
| Pick-up (A)                        | $I_{sd} = I_r \times \dots$    | 1.5                                                 | 2   | 2.5 | 3   | 4   | 5   | 6  | 8  | 10  |
| Accuracy: $\pm 10\%$               |                                |                                                     |     |     |     |     |     |    |    |     |
| Time setting $t_{sd}$ (s)          | Settings                       | $I^2t$ Off                                          | 0   | 0.1 | 0.2 | 0.3 | 0.4 |    |    |     |
|                                    |                                | $I^2t$ On                                           | -   | 0.1 | 0.2 | 0.3 | 0.4 |    |    |     |
| Time delay (ms) at $10 \times I_r$ | $t_{sd}$ (max resettable time) | 20                                                  | 80  | 140 | 230 | 350 |     |    |    |     |
| ( $I^2t$ Off or $I^2t$ On)         | $t_{sd}$ (max break time)      | 80                                                  | 140 | 200 | 320 | 500 |     |    |    |     |
| Instantaneous                      |                                |                                                     |     |     |     |     |     |    |    |     |
| Pick-up (A)                        | $I_i = I_n \times \dots$       | 2                                                   | 3   | 4   | 6   | 8   | 10  | 12 | 15 | off |
| Accuracy: $\pm 10\%$               |                                |                                                     |     |     |     |     |     |    |    |     |
| Time delay                         |                                | Max resettable time: 20 ms<br>Max break time: 50 ms |     |     |     |     |     |    |    |     |

| Earth fault                         |                     | Micrologic 6.0 E         |     |     |     |     |     |      |      |      |  |
|-------------------------------------|---------------------|--------------------------|-----|-----|-----|-----|-----|------|------|------|--|
| Pick-up (A)                         | Ig = In x ...       | A                        | B   | C   | D   | E   | F   | G    | H    | J    |  |
| Accuracy: ±10 %                     | In ≤ 400 A          | 0.3                      | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8  | 0.9  | 1    |  |
|                                     | 400 A < In < 1250 A | 0.2                      | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8  | 0.9  | 1    |  |
|                                     | In ≥ 1250 A         | 500                      | 640 | 720 | 800 | 880 | 960 | 1040 | 1120 | 1200 |  |
| Time setting tg (s)                 | Settings            | I²t Off                  | 0   | 0.1 | 0.2 | 0.3 | 0.4 |      |      |      |  |
|                                     |                     | I²t On                   | -   | 0.1 | 0.2 | 0.3 | 0.4 |      |      |      |  |
| Time delay (ms)                     |                     | tg (max resettable time) | 20  | 80  | 140 | 230 | 350 |      |      |      |  |
| at In or 1200 A (I²t Off or I²t On) |                     | tg (max break time)      | 80  | 140 | 200 | 320 | 500 |      |      |      |  |

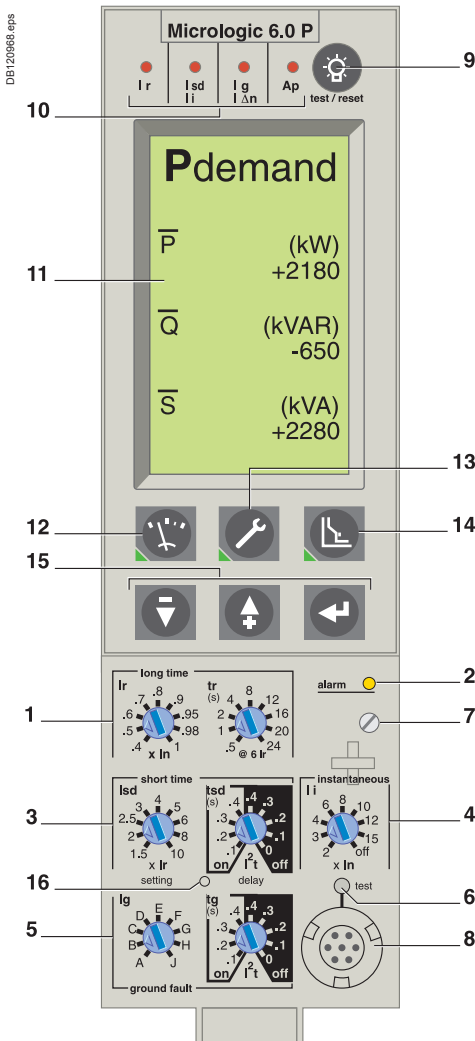


## Energy Micrologic 2.0 / 5.0 / 6.0 E

| Type of measurements              | Range                        | Accuracy |
|-----------------------------------|------------------------------|----------|
| Instantaneous currents            | I1, I2, I3, IN               | ±1.5 %   |
|                                   | Ig (6.0 E)                   | ±10 %    |
| Current maximeters of             | I1, I2, I3, IN               | ±1.5 %   |
| Demand currents of I1, I2, I3, Ig | 0.2 x In to 1.2 x In         | ±1.5 %   |
| Voltages                          | V12, V23, V31, V1N, V2N, V3N | ±0.5 %   |
| Active power                      | P                            | ±2 %     |
| Power factor                      | PF                           | ±2 %     |
| Demand power                      | P demand                     | ±2 %     |
| Active energy                     | Ep                           | ±2 %     |

**Note:** all current-based protection functions require no auxiliary source.  
The test / reset button resets maximeters, clears the tripping indication and tests the battery.

Micrologic P control units include all the functions offered by Micrologic A. In addition, they measure voltages and calculate power and energy values. They also offer new protection functions based on currents, voltages, frequency and power reinforce load protection in real time.



- 1 Long-time current setting and tripping delay.
- 2 Overload signal (LED).
- 3 Short-time pick-up and tripping delay.
- 4 Instantaneous pick-up.
- 5 Earth-leakage or earth-fault pick-up and tripping delay.
- 6 Earth-leakage or earth-fault test button.
- 7 Long-time rating plug screw.
- 8 Test connector.
- 9 Lamp + battery test and indications reset.
- 10 Indication of tripping cause.
- 11 High-resolution screen.
- 12 Measurement display.
- 13 Maintenance indicators.
- 14 Protection settings.
- 15 Navigation buttons.
- 16 Hole for settings lockout pin on cover.

## Protection.....



### Protection settings

The adjustable protection functions are identical to those of Micrologic A (overloads, short-circuits, earth-fault and earth-leakage protection).

#### Fine adjustment

Within the range determined by the adjustment dial, fine adjustment of thresholds (to within one ampere) and time delays (to within one second) is possible on the keypad or remotely using the COM option (BCM ULP).

#### IDMTL (Inverse Definite Minimum Time lag) setting

Coordination with fuse-type or medium-voltage protection systems is optimised by adjusting the slope of the overload-protection curve. This setting also ensures better operation of this protection function with certain loads.

#### Neutral protection

On three-pole circuit breakers, neutral protection may be set using the keypad or remotely using the COM option (BCM ULP), to one of four positions: neutral unprotected (4P 3d), neutral protection at 0.5 Ir (4P 3d + N/2), neutral protection at Ir (4P 4d) and neutral protection at 1,6 Ir (4P 3d + 1,6N). Neutral protection at 1,6 Ir is used when the neutral conductor is twice the size of the phase conductors (major load imbalance, high level of third order harmonics).

On four-pole circuit breakers, neutral protection may be set using a three-position switch or the keypad: neutral unprotected (4P 3d), neutral protection at 0.5 Ir (4P 3d + N/2), neutral protection at Ir (4P 4d). Neutral protection produces no effect if the long-time curve is set to one of the IDMTL protection settings.

### Programmable alarms and other protection

Depending on the thresholds and time delays set using the keypad or remotely using the COM option (BCM ULP), the Micrologic P control unit monitors currents and voltage, power, frequency and the phase sequence. Each threshold overrun is signalled remotely via the COM option (BCM ULP). Each threshold overrun may be combined with tripping (protection) or an indication carried out by an optional M2C or M6C programmable contact (alarm), or both (protection and alarm).

### Load shedding and reconnection

Load shedding and reconnection parameters may be set according to the power or the current flowing through the circuit breaker. Load shedding is carried out by a supervisor via the COM option (BCM ULP) or by an M2C or M6C programmable contact.

### M2C / M6C programmable contacts

The M2C (two contacts) and M6C (six contacts) auxiliary contacts may be used to signal threshold overruns or status changes. They can be programmed using the keypad on the Micrologic P control unit or remotely using the COM option (BCM ULP).

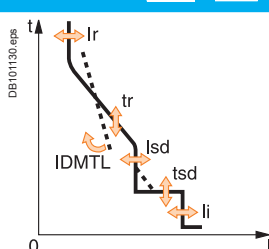
### Communication option (COM)

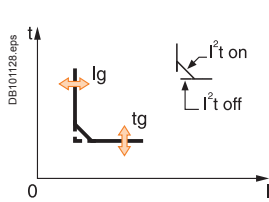
The communication option may be used to:

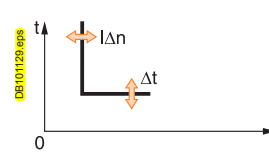
- remotely read and set parameters for the protection functions
- transmit all the calculated indicators and measurements
- signal the causes of tripping and alarms
- consult the history files and the maintenance-indicator register.
- maximeter reset.

An event log and a maintenance register, stored in control-unit memory but not available locally, may be accessed in addition via the COM option (BCM ULP).

**Note:** Micrologic P control units come with a non-transparent lead-seal cover as standard.

| Protection                                    |                                  |                  | Micrologic 5.0 / 6.0 / 7.0 P                              |      |      |        |      |     |      |      |      |  |  |
|-----------------------------------------------|----------------------------------|------------------|-----------------------------------------------------------|------|------|--------|------|-----|------|------|------|--|-------------------------------------------------------------------------------------|
| Long time (rms)                               |                                  |                  | Micrologic 5.0 / 6.0 / 7.0 P                              |      |      |        |      |     |      |      |      |  |                                                                                     |
| Current setting (A)                           | $I_r = I_n \times \dots$         |                  | 0.4                                                       | 0.5  | 0.6  | 0.7    | 0.8  | 0.9 | 0.95 | 0.98 | 1    |  |                                                                                     |
| Tripping between 1.05 and 1.20 x $I_r$        |                                  |                  | Other ranges or disable by changing long-time rating plug |      |      |        |      |     |      |      |      |  |                                                                                     |
| Time setting                                  |                                  | $t_r$ (s)        | 0.5                                                       | 1    | 2    | 4      | 8    | 12  | 16   | 20   | 24   |  |                                                                                     |
| Time delay (s)                                | Accuracy: 0 to -30 %             | $1.5 \times I_r$ | 12.5                                                      | 25   | 50   | 100    | 200  | 300 | 400  | 500  | 600  |  |                                                                                     |
|                                               | Accuracy: 0 to -20 %             | $6 \times I_r$   | 0.7 <sup>(1)</sup>                                        | 1    | 2    | 4      | 8    | 12  | 16   | 20   | 24   |  |                                                                                     |
|                                               | Accuracy: 0 to -20 %             | $7.2 \times I_r$ | 0.7 <sup>(2)</sup>                                        | 0.69 | 1.38 | 2.7    | 5.5  | 8.3 | 11   | 13.8 | 16.6 |  |                                                                                     |
| IDMTL setting                                 | Curve slope                      |                  | SIT                                                       | VIT  | EIT  | HVFuse | DT   |     |      |      |      |  |                                                                                     |
| Thermal memory                                |                                  |                  | 20 minutes before and after tripping                      |      |      |        |      |     |      |      |      |  |                                                                                     |
| (1) 0 to -40 % - (2) 0 to -60 %               |                                  |                  |                                                           |      |      |        |      |     |      |      |      |  |                                                                                     |
| Short time (rms)                              |                                  |                  |                                                           |      |      |        |      |     |      |      |      |  |                                                                                     |
| Pick-up (A)                                   | $I_{sd} = I_r \times \dots$      |                  | 1.5                                                       | 2    | 2.5  | 3      | 4    | 5   | 6    | 8    | 10   |  |                                                                                     |
| Accuracy: $\pm 10$ %                          |                                  |                  |                                                           |      |      |        |      |     |      |      |      |  |                                                                                     |
| Time setting $t_{sd}$ (s)                     | Settings                         | $I^2t$ Off       | 0                                                         | 0.1  | 0.2  | 0.3    | 0.4  |     |      |      |      |  |                                                                                     |
|                                               |                                  | $I^2t$ On        | -                                                         | 0.1  | 0.2  | 0.3    | 0.4  |     |      |      |      |  |                                                                                     |
| Time delay (ms) at 10 $I_r$                   | $t_{sd}$ (max resettable time)   |                  | 20                                                        | 80   | 140  | 230    | 350  |     |      |      |      |  |                                                                                     |
| ( $I^2t$ Off or $I^2t$ On)                    | $t_{sd}$ (max break time)        |                  | 80                                                        | 140  | 200  | 320    | 500  |     |      |      |      |  |                                                                                     |
| Instantaneous                                 |                                  |                  |                                                           |      |      |        |      |     |      |      |      |  |                                                                                     |
| Pick-up (A)                                   | $I_i = I_n \times \dots$         |                  | 2                                                         | 3    | 4    | 6      | 8    | 10  | 12   | 15   | off  |  |                                                                                     |
| Accuracy: $\pm 10$ %                          |                                  |                  |                                                           |      |      |        |      |     |      |      |      |  |                                                                                     |
| Time delay                                    |                                  |                  | Max resettable time: 20 ms<br>Max break time: 50 ms       |      |      |        |      |     |      |      |      |  |                                                                                     |
| Earth fault                                   |                                  |                  | Micrologic 6.0 P                                          |      |      |        |      |     |      |      |      |  |                                                                                     |
| Pick-up (A)                                   | $I_g = I_n \times \dots$         |                  | A                                                         | B    | C    | D      | E    | F   | G    | H    | J    |  |                                                                                     |
| Accuracy: $\pm 10$ %                          | $I_n \leq 400$ A                 |                  | 0.3                                                       | 0.3  | 0.4  | 0.5    | 0.6  | 0.7 | 0.8  | 0.9  | 1    |  |                                                                                     |
|                                               | $400 \text{ A} < I_n < 1250$ A   |                  | 0.2                                                       | 0.3  | 0.4  | 0.5    | 0.6  | 0.7 | 0.8  | 0.9  | 1    |  |                                                                                     |
|                                               | $I_n \geq 1250$ A                |                  | 500                                                       | 640  | 720  | 800    | 880  | 960 | 1040 | 1120 | 1200 |  |                                                                                     |
| Time setting $t_g$ (s)                        | Settings                         | $I^2t$ Off       | 0                                                         | 0.1  | 0.2  | 0.3    | 0.4  |     |      |      |      |  |                                                                                     |
|                                               |                                  | $I^2t$ On        | -                                                         | 0.1  | 0.2  | 0.3    | 0.4  |     |      |      |      |  |                                                                                     |
| Time delay (ms)                               | $t_g$ (max resettable time)      |                  | 20                                                        | 80   | 140  | 230    | 350  |     |      |      |      |  |                                                                                     |
| at $I_n$ or 1200 A ( $I^2t$ Off or $I^2t$ On) | $t_g$ (max break time)           |                  | 80                                                        | 140  | 200  | 320    | 500  |     |      |      |      |  |                                                                                     |
| Residual earth leakage (Vigi)                 |                                  |                  | Micrologic 7.0 P                                          |      |      |        |      |     |      |      |      |  |                                                                                     |
| Sensitivity (A)                               | $I_{\Delta n}$                   |                  | 0.5                                                       | 1    | 2    | 3      | 5    | 7   | 10   | 20   | 30   |  |                                                                                     |
| Accuracy: 0 to -20 %                          |                                  |                  |                                                           |      |      |        |      |     |      |      |      |  |                                                                                     |
| Time delay $\Delta t$ (ms)                    | Settings                         |                  | 60                                                        | 140  | 230  | 350    | 800  |     |      |      |      |  |                                                                                     |
|                                               | $\Delta t$ (max resettable time) |                  | 60                                                        | 140  | 230  | 350    | 800  |     |      |      |      |  |                                                                                     |
|                                               | $\Delta t$ (max break time)      |                  | 140                                                       | 200  | 320  | 500    | 1000 |     |      |      |      |  |                                                                                     |

| Alarms and other protection    |                                          |  | Micrologic 5.0 / 6.0 / 7.0 P           |              |  |
|--------------------------------|------------------------------------------|--|----------------------------------------|--------------|--------------------------------------------------------------------------------------|
| Current                        |                                          |  | Threshold                              | Delay        |                                                                                      |
| Current unbalance              | $I_{unbalance}$                          |  | 0.05 to 0.6 Iaverage                   | 1 to 40 s    |                                                                                      |
| Max. demand current            | $I_{max\ demand}$ : $I_1, I_2, I_3, I_N$ |  | 0.2 $I_n$ to $I_n$                     | 15 to 1500 s |                                                                                      |
| Earth fault alarm              |                                          |  |                                        |              |                                                                                      |
|                                | $I_{\neq}$                               |  | 10 to 100 % $I_n$ <sup>(3)</sup>       | 1 to 10 s    |                                                                                      |
| Voltage                        |                                          |  |                                        |              |                                                                                      |
| Voltage unbalance              | $U_{unbalance}$                          |  | 2 to 30 % x $U_{average}$              | 1 to 40 s    |                                                                                      |
| Minimum voltage                | $U_{min}$                                |  | 100 to $U_{max}$ between phases        | 1.2 to 10 s  |                                                                                      |
| Maximum voltage <sup>(4)</sup> | $U_{max}$                                |  | $U_{min}$ to 1200 between phases       | 1.2 to 10 s  |                                                                                      |
| Power                          |                                          |  |                                        |              |                                                                                      |
| Reverse power                  | $rP$                                     |  | 5 to 500 kW                            | 0.2 to 20 s  |                                                                                      |
| Frequency                      |                                          |  |                                        |              |                                                                                      |
| Minimum frequency              | $F_{min}$                                |  | 45 to $F_{max}$                        | 1.2 to 5 s   |                                                                                      |
| Maximum frequency              | $F_{max}$                                |  | $F_{min}$ to 440 Hz                    | 1.2 to 5 s   |                                                                                      |
| Phase sequence                 |                                          |  |                                        |              |                                                                                      |
| Sequence (alarm)               | $\Delta\emptyset$                        |  | $\emptyset 1/2/3$ or $\emptyset 1/3/2$ | 0.3 s        |                                                                                      |

| Load shedding and reconnection |     |  | Micrologic 5.0 / 6.0 / 7.0 P |                          |  |
|--------------------------------|-----|--|------------------------------|--------------------------|---------------------------------------------------------------------------------------|
| Measured value                 |     |  | Threshold                    | Delay                    |                                                                                       |
| Current                        | $I$ |  | 0.5 to 1 $I_r$ per phases    | 20 % $t_r$ to 80 % $t_r$ |                                                                                       |
| Power                          | $P$ |  | 200 kW to 10 MW              | 10 to 3600 s             |                                                                                       |

(3)  $I_n \leq 400$  A 30 %  
 $400 \text{ A} < I_n < 1250$  A 20 %  
 $I_n \geq 1250$  A 10 %

(4) For 690 V applications, a step-down transformer must be used if the voltage exceeds the nominal value of 690 V by more than 10 %.

**Note:** all current-based protection functions require no auxiliary source.  
Voltage-based protection functions are connected to AC power via a voltage measurement input built into the circuit breaker.