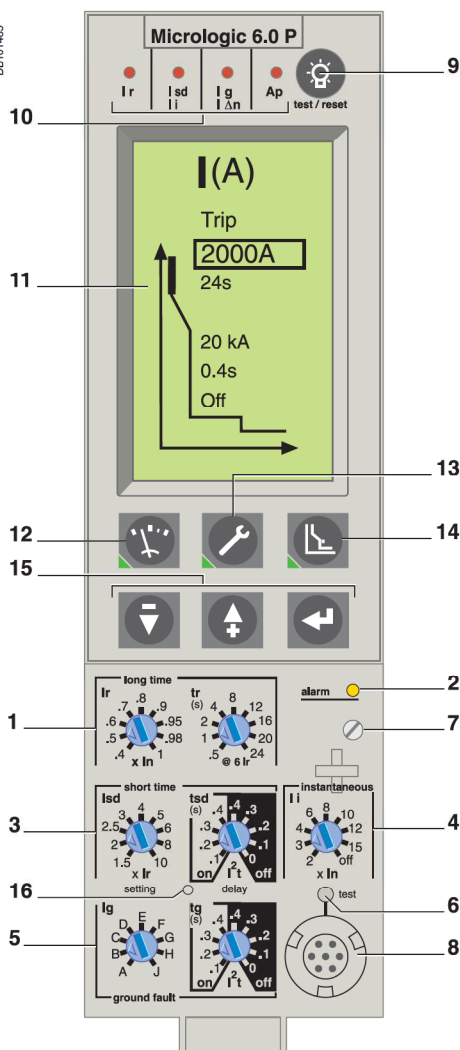*Micrologic P control units include all the functions offered by Micrologic A.*
*In addition, they measure voltages and calculate power and energy values.*
*They also offer new protection functions based on currents, voltages, frequency and power reinforce load protection in real time.*



**Micrologic 6.0 P**

Ir | Isd Ii | Ig IΔn | Ap

test / reset

I(A)

Trip

2000A

24s

20 kA

0.4s

Off

long time
Ir .7 .8 .9 .95 .98 .6 .5 .4 1 x In
tr (s) 4 8 12 2 16 1 20 .5 @ 6 Ir 24

alarm

short time
Isd 3 4 5 2.5 6 2 8 1.5 10 x Ir
tsd (s) .4 .3 .2 .1 .1 .2 0 off on I²t
setting delay
instantaneous
Ii 4 6 8 10 12 2 15 off x In

Ig
C D E F G B H A J
ground fault
tg (s) .4 .3 .2 .1 .1 .2 0 off on I²t

test

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 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.

### 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, 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, 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. 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 or by an M2C or M6C programmable contact.

## Measurements

The Micrologic P control unit calculates in real time all the electrical values (V, A, W, VAR, VA, Wh, VARh, VAh, Hz), power factors and cosφ factors.
The Micrologic P control unit also calculates demand current and demand power over an adjustable time period. Each measurement is associated with a minimeter and a maximeter.
In the event of tripping on a fault, the interrupted current is stored. The optional external power supply makes it possible to display the value with the circuit breaker open or not supplied.

## Histories and maintenance indicators

The last ten trips and alarms are recorded in two separate history files. Maintenance indications (contact wear, operation cycles, etc.) are recorded for local access.

## Indication option via 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.

## 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.

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

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## Protection — Micrologic 5.0 / 6.0 / 7.0 P

### Long time (rms) — Micrologic 5.0 / 6.0 / 7.0 P

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Current setting (A) | $Ir = In \times \dots$ | | 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 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[1] | 1 | 2 | 4 | 8 | 12 | 16 | 20 | 24 |
| | Accuracy: 0 to -20 % | 7.2 x Ir | 0.7[2] | 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) Accuracy: ±10 % | $Isd = Ir \times \dots$ | | 1.5 | 2 | 2.5 | 3 | 4 | 5 | 6 | 8 | 10 |
| Time setting tsd (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) at 10 Ir | tsd (max resettable time) | | 20 | 80 | 140 | 230 | 350 | | | | |
| (I²t Off or I²t On) | tsd (max break time) | | 80 | 140 | 200 | 320 | 500 | | | | |

### Instantaneous

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pick-up (A) Accuracy: ±10 % | $Ii = In \times \dots$ | | 2 | 3 | 4 | 6 | 8 | 10 | 12 | 15 | off |
| Time delay | | | Max resettable time: 20 ms  Max break time: 50 ms | | | | | | | | |



### Earth fault — Micrologic 6.0 P

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pick-up (A) Accuracy: ±10 % | $Ig = In \times \dots$ | | A | B | C | D | E | F | G | H | J |
| | 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 | | | | |

### Residual earth leakage (Vigi) — Micrologic 7.0 P

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Sensitivity (A) Accuracy: 0 to -20 % | $I\Delta n$ | | 0.5 | 1 | 2 | 3 | 5 | 7 | 10 | 20 | 30 |
| 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 | | | | |
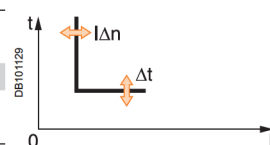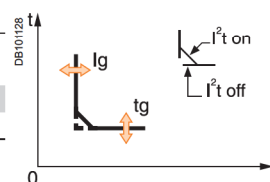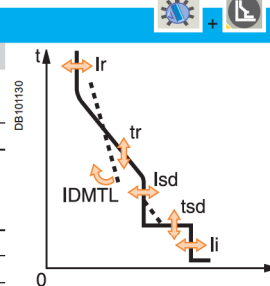


## Alarms and other protection — Micrologic 5.0 / 6.0 / 7.0 P

| | | Threshold | Delay |
|---|---|---|---|
| **Current** | | | |
| Current unbalance | **Iunbalance** | 0.05 to 0.6 Iaverage | 1 to 40 s |
| Max. demand current | **Imax demand** : I1, I2, I3, IN, | 0.2 In to In | 15 to 1500 s |
| **Earth fault alarm** | | | |
| | I⏚ | 10 to 100 % In[1] | 1 to 10 s |
| **Voltage** | | | |
| Voltage unbalance | **Uunbalance** | 2 to 30 % x Uaverage | 1 to 40 s |
| Minimum voltage | **Umin** | 100 to Umax between phases | 1.2 to 10 s |
| Maximum voltage | **Umax** | Umin 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 | **Fmin** | 45 to Fmax | 1.2 to 5 s |
| Maximum frequency | **Fmax** | Fmin to 440 Hz | 1.2 to 5 s |
| **Phase sequence** | | | |
| Sequence (alarm) | ΔØ | Ø1/2/3 or Ø1/3/2 | 0.3 s |
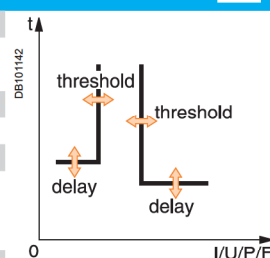


## Load shedding and reconnection — Micrologic 5.0 / 6.0 / 7.0 P

| Measured value | | Threshold | Delay |
|---|---|---|---|
| Current | **I** | 0.5 to 1 Ir per phases | 20 % tr to 80 % tr |
| Power | **P** | 200 kW to 10 MW | 10 to 3600 s |
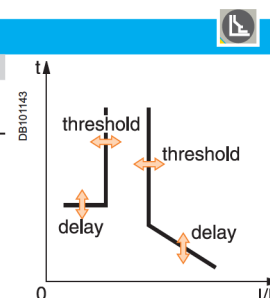


*(1) In ≤ 400 A 30 %*
*400 A < In < 1250 A 20 %*
*In ≥ 1250 A 10 %*

**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.*