

# PowerLogic MiCOM series 30, 40

Catalog 2022

Comprehensive range of digital protection relays

A low-angle, upward-looking photograph of several modern skyscrapers. The buildings feature glass and metallic facades, with sharp lines and geometric patterns. The sky is a pale, clear blue. The perspective creates a sense of height and architectural grandeur.

“

Your electrical equipment is under control.  
With Easergy protection relays, you get  
maximum energy availability for your  
process and application.”

# Increase energy availability

Maximize energy availability and the profits generated by your installation while protecting life and property.

## Choose a cost-effective solution for your application

The flexible Easergy MiCOM protection relay range offers scalable levels of functionality and hardware options to meet or exceed your protection functionality requirements.

The versatile hardware and common relay management software (Easergy Studio) allows simple configuration and installation in different applications.

Well-known user friendliness, based on a standardized user interface across the entire range makes Easergy MiCOM suitable for any environment, from the more complex bay level control with mimic, to the simplest LCD display with menu interrogation.

# 660 000

Easergy MiCOM units installed around the world since 1999

## Turn data into action with EcoStruxure™ Grid

EcoStruxure™ architecture and interoperable technology platform bring together energy, automation, and software. It provides enhanced value around protection, improve safety, reliability, efficiency, sustainability, and connectivity.



Every Easergy MiCOM relay provides you with intuitive access to all system information in several languages so that you can manage your electrical installation effectively. If an unpredictable situation occurs, clear and complete information puts you in a position to make the right decisions immediately. The electrical supply is restored without delay.

## Augment installation availability

Easergy MiCOM relays maintain high energy availability thanks to their diagnostics function that continuously monitors network status. In-depth analysis capabilities and high quality standards mean that equipment is only de-energized when absolutely necessary. Risks are minimised and servicing time reduced by predicting maintenance operations.

# Improve satisfaction...

Save time at every step in project development and installation to consistently meet your project deadlines.

## Go for cybersecurity

Cybersecurity functions improve the quality of services and minimize any risk to interrupt power delivery resulting from accidental or intentional actions. Cybersecurity is an ongoing process that encompasses procedures, policies, software, and hardware. One of the key aspects of the cybersecurity is to define a security policy. This security policy structures the roles and responsibilities within the organization. EcoStruxure Cybersecurity Admin Expert tool is able to map the organization, company or department security policy already defines to each single element of the system (HMI, IED, Network element, etc). Therefore, it creates an efficient way to define the access restriction to any device of the system. This tool and Easergy MiCOM relays are using the Role Based Access Control (RBAC) concept.

## Ready for smart digital substation

Within the scope of smart digital substation, and thanks to process bus technology, Easergy MiCOM serie 40 devices notably contribute to simplify the substation traditional engineering process (replacing the high amount of traditional copper wires by a limited number of Ethernet cables), improved people safety (as dangerous wires carrying current and voltage signals are removed from the cubicles) and ease the maintenance procedures of your substation whilst improving the continuity of service (as Process Bus by itself is providing isolation from the primary circuits).

## Make settings easily

A single PC software tool for the entire Easergy range makes system start-up and operation particularly easy. The user-friendly program, Easergy Studio, guides you step by step from the initial programming to final commissioning. Easergy protection relays produce a detailed report on system configuration and all the activated protection functions.

## Communicate the open way

In addition to the DNP3, IEC 60870-5-103, Courier and Modbus standards, Easergy MiCOM protection relays complies with IEC 61850 Edition 1 & 2 (GOOSE messages, TCP/IP redundancy as well as IEC 60870-5-104) and uses the communication protocol that is today's market standard to interface with all brands of electrical-distribution devices. Ethernet redundancy implementation (HSR/PRP), Dual IP features, and Rapid Spanning Tree Protocol (RSTP IEEE 802.1D 2004) provide also improved data availability.

## Easy to use HMI

The new color 5.7" LCD HMI with ergonomically arranged navigation buttons (available on Easergy MiCOM series 30) provides easy and intuitive interaction with the device. 4 new softkeys and 6 additional function keys are fully configurable to facilitate fast and direct access to the most frequently used functions.

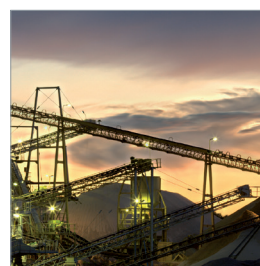
## ... with a comprehensive range

The individual strengths of Easergy MiCOM series 30 and 40 together with the common setting tool provide a maximum of flexibility for any customer need.

| Easergy MiCOM applications       | Px30 series         | Px40 series |
|----------------------------------|---------------------|-------------|
| Feeder*                          | P13x                | P14x        |
| Motor and voltage and frequency  | P13x                | P24x        |
| Generator                        |                     | P34x        |
| Distance                         | P43x                | P44x        |
| Line differential                | P53x                | P54x        |
| Transformer                      | P63x                | P64x        |
| Busbar                           |                     | P74x        |
| Breaker failure and auto-reclose |                     | P84x        |
| Railway                          | P138/P436/P438/P638 |             |

\* Easergy MiCOM C434 bay controller is also available. Please contact us for more information.

Easergy MiCOM series offer a FULL RANGE of protection devices for complete solution from cost-effective to high-end network protection and bay control for all applications and segments.



# Easergy MiCOM series 30, 40 at a glance

## Easergy MiCOM Px30

Fulfills the network protection requirements of utility, industrial and renewable applications with particular focus on integrated feeder bay control management and provides dedicated railway protection devices. Multifunctional devices designed for selective short-circuit protection, ground fault protection and overload protection of transmission lines, transformers and cables in medium- and high-voltage systems.

Specific features and benefits are:

- Flexible modular Input/Output options together with platform wide interoperability allowing simple product adaptation to changing requirements by cost optimized life cycle maintenance.
- Protection can be operated on solidly or (low-) impedance grounded, with Petersen coil resonant grounded or with isolated neutral star point networks.
- Various hardware options with selectable 24TE, 40TE, 84TE mounting case; detachable HMI option; conversable surface/flush mounting or the optional Pin, Ring and Hybrid terminal connection variants provide a maximum on adaptability to any customer need or spatial constraint, by offering nearly the same protection functionality in all hardware variants.
- Full Programmable Scheme Logic (PSL) and function keys in addition to the high number of proven fixed protection functions allow advanced protection scheme engineering
- New color 5.7" Graphical-HMI provides an enhanced flexibility for Single Line Diagram (SLD) mimics which allows you to visualize most complex arrangements on the new display. The new 4.3" single-color Text-HMI completes the range with simplicity of interaction.
- USB port front port provides easy to use communication with the device. No needs for external converters.
- Easy and intuitive interaction with the device thanks to the intuitive and ergonomically arranged navigation keys
- 6x fully configurable function Keys with tri-color LEDs provide direct access to your customized functions or common operations.
- The removable paper labels provide flexibility and simplicity for maintenance.



## Easergy MiCOM Px40

Fulfills the protection requirements for a wide market of utility and industrial application and offers a wide range of protection functions. Any element in the utility and industrial network (line, transformer, generator, motor, busbar and circuit breaker), from generation to transmission, can be protected by an Easergy MiCOM series 40 device.

Specific features and benefits are:

- Full range of protection devices and one with the largest installed base worldwide in transmission and distribution utilities and power plants.
- The well-known, powerful and user-friendly Programmable Scheme Logic (PSL), provides a maximum on functionality to cover any protection application (from basic to really advanced ones).
- Detailed post-mortem analysis required by exigent customers is fully included thanks to its powerful disturbance and events recording features.
- Powerful process bus board, with standardized Ethernet redundancy (PRP) for augmented reliability and availability, fully compliant with the latest standard IEC 61869 and backwards compatible with the previous 9-2LE.
- Accurate time stamping of events implemented some years ago thanks to the standardized time sync method IEC 61850-9-3 (PTP, 1588v2)



The long term successful operation experience of the Easergy MiCOM series and the consistently following of new technology trends for new developments combined with specific customized solutions give our customers high confidence in the reliability of their long term investments.

# Save time...

The Easergy Studio programming and operating software provides a single environment for the entire range.

## Configuration

### Equipment setup

Upload data on-line from the relay or off-line from a data model template

### Protection activation

Enable protection functions

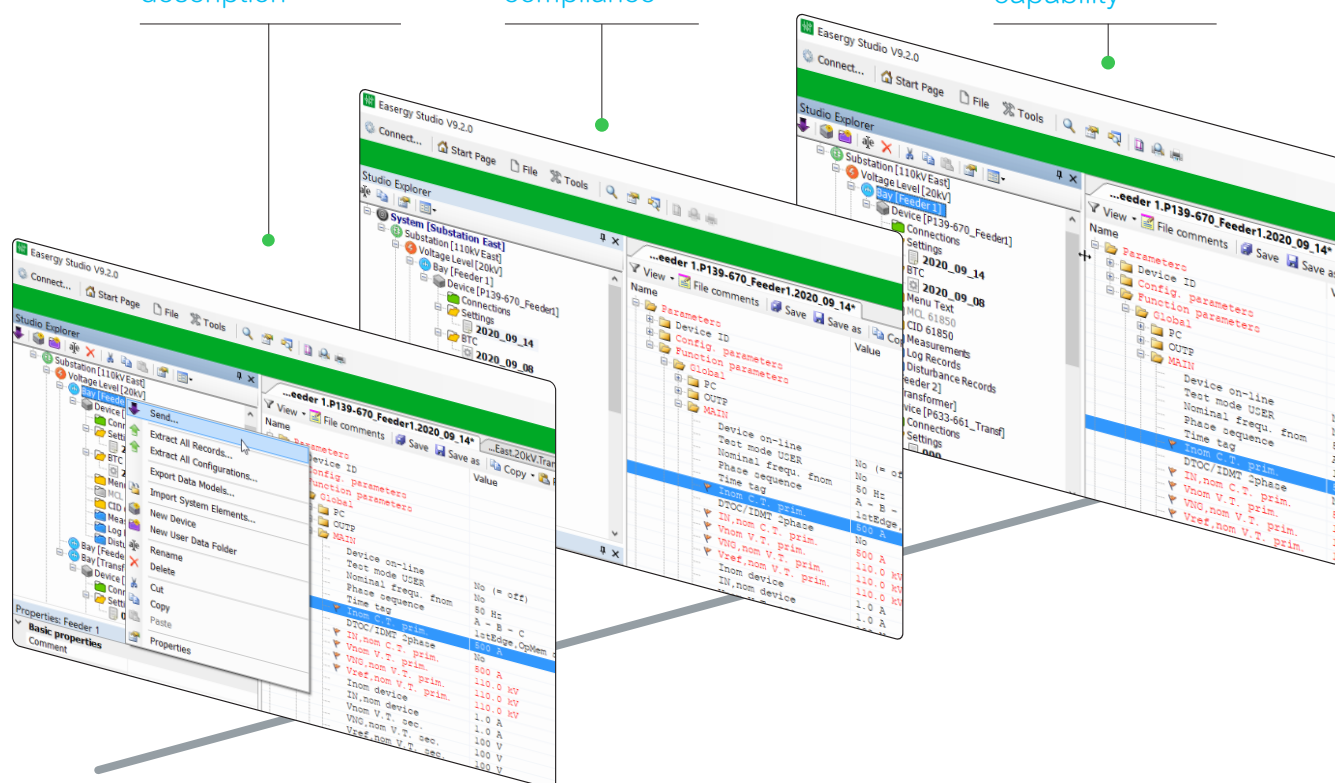
### Summary of functions

Easily and quickly apply protection, control, and monitoring settings

### Automatic hardware description

### Application compliance

### Fine tune capability



# ...with a simple operating software

The result is a simple, user-friendly approach for fast commissioning.

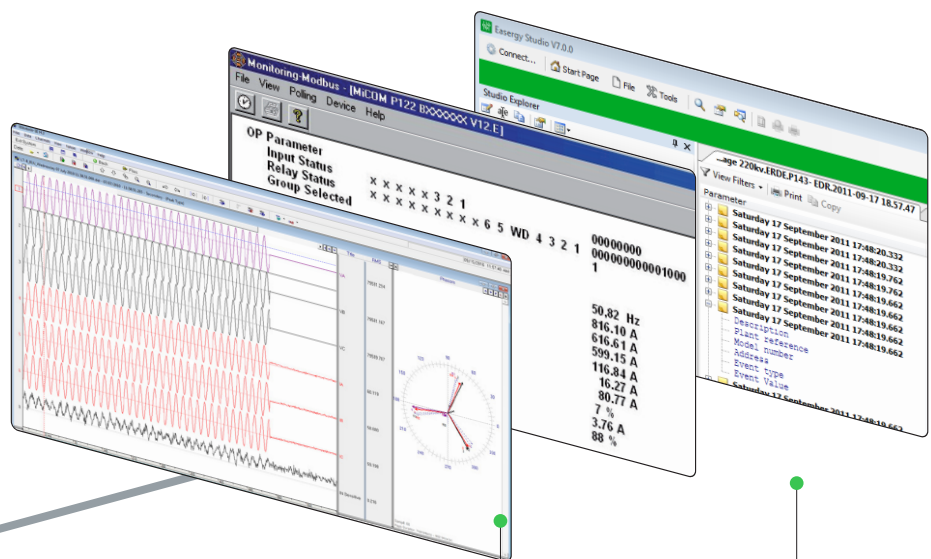
☐ Operation

## Download

Setting file ready to be downloaded to Easergy MiCOM relay

## Export

Straightforward facility for commissioning



## Analysis of waveform capture

Display, analysis, and printing of disturbance records

## Real-time supervision

Supervision of the status of all the relays in the electrical installation

## Management of events

Display of event records in chronological order

Complete peace of mind during operation

# Protect your network...

## Protect

Easergy MiCOM protection devices combine best-in-class protection techniques with the latest technology for dependability, and high quality in advanced protection applications.



## Secure

For operational security, Easergy MiCOM offers Role-Based Access Control (RBAC), encrypted passwords, port hardening, alarms, logs, monitoring, and the Security Access Tool (CAE - Cyber Security Admin) to help your existing staff manage access without advanced skills or training. Easergy MiCOM including operational and cybersecurity, compliant to IEC 62351. It helps to protect installations with security based on embedded features such as Role Based Access Control (RBAC), port hardening, security logs and access traceability. Easergy MiCOM devices by default including RBAC with different users defined and a Security Administrator



## Communicate

Local and remote communication is provided and designed for use with the Easergy Studio software. Easergy MiCOM devices provide IEC 61850 Edition 1 & 2, IEC 60870-5-104 as well as GOOSE messaging, Dual IP (PRP/HSR) and VLAN for physical Ethernet network segregation and redundancy. RSTP, IEC 60870-5-104 and flexible product naming (fPN) complete the communication capabilities. Port types, quantities, and serials protocols vary by product (see pages 19 and 20).



## Configure

Settings are defined via the Easergy Studio support package. This intuitive software lets you manage settings for your entire Easergy MiCOM installed base, with multiple independent setting groups. They can be activated locally, remotely, or via a dedicated input condition, which allows different system operating conditions or adaptive relaying, and you can import IEDs into systems from pre-configured IEC 61850 SCD files.



# ...with a complete set of tools

## Measure

Easergy MiCOM devices measure and store a wide range of highly accurate values including current, voltage, frequency, power, and others, from instantaneous or derived values. You can view measurements on the device or transfer them via communication ports.



## Record

Locally and remotely viewable, event records are generated by status changes to logic inputs, outputs, settings, and alarms. All records are time tagged to a resolution of 1ms and are retained even during auxiliary supply interruptions. These devices also capture information about faults and disturbances, and oscillographic analysis using Easergy Studio provides quick analysis of analogue and digital signals.



## Control

Fully programmable function keys and programmable tri-state LEDs are available. Some Easergy MiCOM devices provide programmable hot-keys for direct menu access (e.g. Trip/Close command). Time synchronization can be implemented from various sources including an optional IRIG-B port or via an IEC 61850-9-3 (PTP, 1588) time synchronization communication protocol. The new colored Graphical- and black and white text-HMI ease the handling and perfect the operational security to control up to 15 switchgear units.



## Scheme

You can use Easergy Studio to configure programmable scheme logic. Easergy MiCOM devices use graphical programming or Boolean equations. Programmable graphical logic in these relays is an extremely powerful tool. Users can customize protection and control functions or add additional supervision or custom schemes, e.g. trip circuit supervision or frequency restoration. This logic is event driven so that protection is not delayed. An online status monitoring feature is also available.





“On-site condition  
maintenance with  
ProDiag MV Relay.”

# Greater peace of mind throughout your installation lifecycle



## Why carry out diagnostics?

Business competitiveness depends strongly on productivity, and productivity means uptime. On-site condition maintenance, with regular diagnostics, provides a long-term solution to avoid downtime.

## Why perform Easergy relay diagnostics with Schneider Electric?

Schneider Electric offers a complete range of maintenance services to provide you with the necessary level of maintenance for your Easergy devices. Having Schneider Electric at your side means our highly qualified personal can perform the right maintenance, while complying with manufacturer procedures and international services.

## Diagnosing protection relay tripping capability

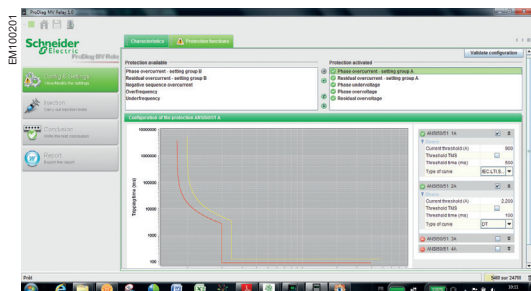
The **ProDiag MV Relay** diagnostic solution should be used on MV protection relays that have not received any diagnostics within the last four years.

This diagnostic checks the protection relay's conformity against the original product specifications to ensure that they meet their goals of:

- Reducing risks by isolating hazardous segments of the network where an electrical fault has been detected
- Maintaining high energy availability to avoid a total power outage and costly downtime
- Maximizing uptime by performing in-depth analysis and de-energizing equipment only when absolutely necessary

**ProDiag MV Relay's** unique features:

- Automatic download of all protection relay settings through drivers in the ProDiag MV Relay manager
- Easy verification of modifications made to protection settings since the last visit
- Easy verification of MV Relay original technical specifications



# Simplify your operation with a user friendly design

## Easergy MiCOM Px30:

### Case construction designed to provide high density of functionality

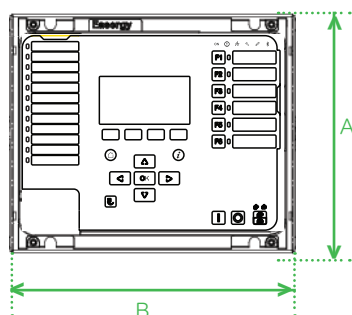
Easergy MiCOM devices are housed in specially designed cases that provide a high density of functionality within the product. Model and serial number are easily visible on the front of the device.

The cases are suitable for either rack or panel mounting. An option for surface mounting is also supported on the series 30 for installations with space limitations.

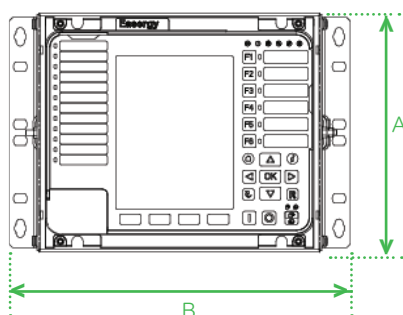
The 40TE case relays can be combined with the use of standard mounting accessories to form a complete 19" rack. This saves space and allows for a neat installation.

| Dimensions (mm) | A     | B     | C     | D     | E     |
|-----------------|-------|-------|-------|-------|-------|
| 40TE            | 184.5 | 213.4 | 262.7 | 227.9 | 177.5 |
| 84TE            |       | 434.8 |       |       |       |
| 40TE Surface    |       | 260.2 | 266,7 | -     |       |
| 84TE Surface    |       | 481.6 |       |       |       |

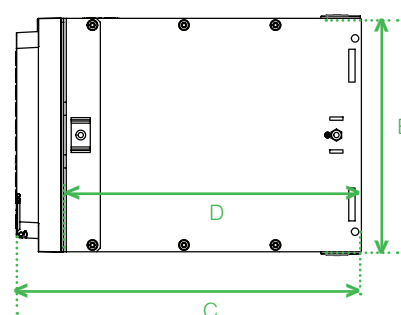
Front view  
Text display



Front view  
Graphical display (Surface option)



Side view



## Wiring

External connections are made via pin-type terminal. Optional ring-type terminals are available.

Note: Maximum sizes for guidance only, for specific product information please check the relevant product documentation.

# Easergy MiCOM Px30 front panel user interface

84TE and 40TE format with new 5.7" color Graphical-HMI



84TE and 40TE format with new 4.3" single-color Text-HMI



| LEDS |                                |
|------|--------------------------------|
| ON   | On (Green)                     |
| !    | Alarm (Yellow)                 |
| ⚡    | Trip (Red)                     |
| 🔧    | Maintenance (Yellow)           |
| ✎    | Edit mode                      |
| □    | 12 customizable tri-color LEDs |

| KEYS            |                                                                                                                                                                                                                                                                                                       |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 🏠               | Pressing the HOME key returns to the Single Line Diagram from anywhere in the menu. If setting mode is enabled, the setting change should be confirmed/cancelled when pressing the HOME key. The edited setting parameter value is returned to its original value if the setting change is cancelled. |
| ℹ️              | Press the I-key to access a selected event recording from either the panel level or from any other point in the menu tree.                                                                                                                                                                            |
| R               | Reset control key                                                                                                                                                                                                                                                                                     |
| Navigation keys | OK ENTER key: activate or confirm a function                                                                                                                                                                                                                                                          |
|                 | ⬆ UP key: move up in the menu or increase a numerical value                                                                                                                                                                                                                                           |
|                 | ⬇ DOWN key: move down in the menu or decrease a numerical value                                                                                                                                                                                                                                       |
|                 | ⬅ LEFT key: move backwards in a parallel menu or select a digit in a numerical value                                                                                                                                                                                                                  |
|                 | ➡ RIGHT key: move forwards in a parallel menu or select a digit in a numerical value                                                                                                                                                                                                                  |
| ⌂               | Switchgear control selection key                                                                                                                                                                                                                                                                      |
| ○               | Switchgear control key (OPEN)                                                                                                                                                                                                                                                                         |
| ⏏               | Switchgear control key (CLOSE)                                                                                                                                                                                                                                                                        |
| 🔄               | Local/remote control key                                                                                                                                                                                                                                                                              |
| F1              | Customizable function keys                                                                                                                                                                                                                                                                            |

# Easergy MiCOM Px40:

## Case construction designed to provide high density of functionality

Easergy MiCOM devices are housed in specially designed cases that provide a high density of functionality within the product. Communication ports and model/serial number information is concealed by upper and lower covers on certain models.

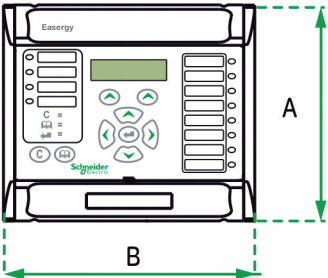
Physical protection of the front panel user interface and prevention of casual access is provided by an optional transparent front cover (selected models only), which can be fitted or omitted, since the front panel has been designed to IP52 protection against dust and water.

The cases are suitable for either rack or panel mounting. .

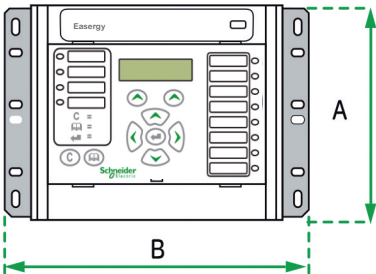
The differing case widths of relays can be combined with or without the use of standard blanking plates to form a complete 19" mounting. This saves space and allows for a neat installation.

| Case format | A   | B     | C                     | D                     | E         |
|-------------|-----|-------|-----------------------|-----------------------|-----------|
| 40TE        | 177 | 206   | 240<br>(incl. wiring) | 270<br>(incl. wiring) | 157.5 max |
| 60TE        |     | 309.6 |                       |                       |           |
| 80TE        |     | 413.2 |                       |                       |           |
| 80TE Rack   |     | 483   |                       |                       |           |

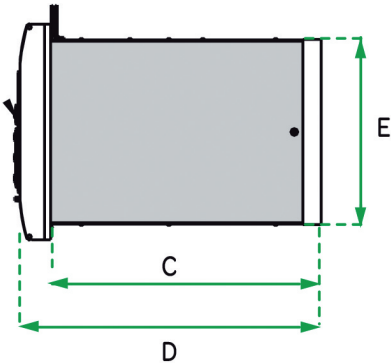
Front view



Front view  
(Surface option)



Side view



## Wiring

External connections are made via ring-type terminal.

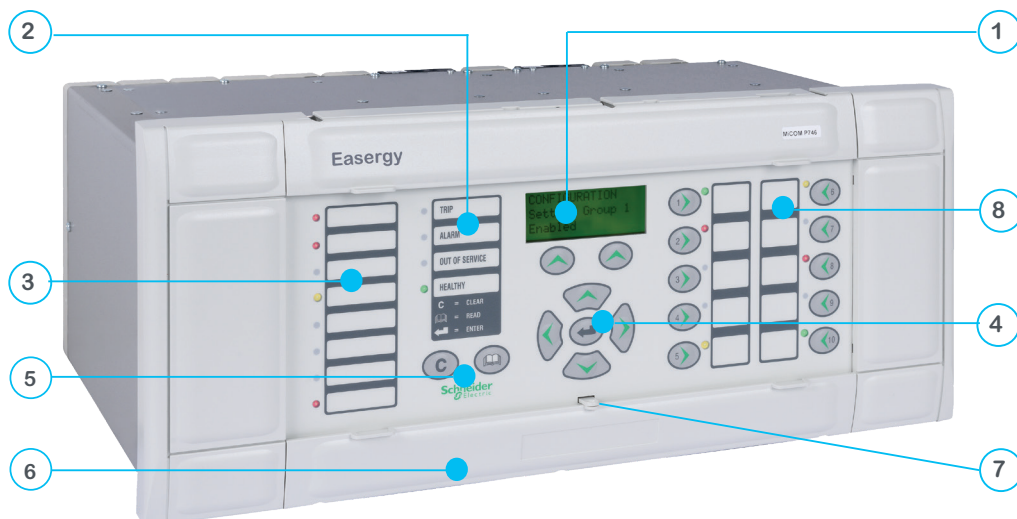
## Multiple languages for a true global convenience:

The user interface and menu text is available in English, French, German, and Spanish as a standard. Other languages, e.g. Russian and Chinese, are supported on some relays depending on the market requirements.

Note: Maximum sizes for guidance only, for specific product information please check the relevant product documentation.

## Easergy MiCOM Px40 front panel user interface

80TE format



The front panel user interfaces comprises:

1. A back-lit liquid crystal display
2. 4 fixed function LEDs
3. Up to 18 user programmable LEDs
4. Menu navigation and data entry keys
5. "READ" and "CLEAR" keys for viewing and reset of alarms
6. Front communication port
7. Facility for fitting a security seal
8. Programmable function keys

Easergy MiCOM Px40 serie exist also in 40TE and 60TE



# Technical data description

## General series data

| Easergy MiCOM Px30 Series            |                                  |
|--------------------------------------|----------------------------------|
| Frequency 50/60 Hz                   | ■                                |
| Dual rated 1 A / 5 A                 | ■                                |
| Opto inputs                          | max 82                           |
| Output contacts                      | max 48                           |
| High break contacts                  | max 16                           |
| Continuous carry                     | 5 A / 8 A / 10 A                 |
| Short duration current               | 30 A for 0.5 (3 s)               |
| LED indication (freely programmable) | 23 (19)                          |
| Function keys / hot keys             | 6                                |
| Settings groups                      | 4                                |
| Fault records                        | 8                                |
| Event records                        | 3000                             |
| Disturbance records                  | max 32 s (max 8 rec.)            |
| Programmable logic                   | Fully programmable               |
| IRIG B                               | Option                           |
| LCD Display with USB port or RS232   | Alphanumeric / Graphical (color) |
| Rear Port / 2nd rear port            | Yes / Option                     |
| Serial communication                 | EIA(RS)485 or fibre              |
| Courier                              | ■                                |
| Modbus / DNP3                        | ■ / ■                            |
| IEC 60870-5-103 /-101                | ■ / ■                            |
| Ethernet communication               | Wire RJ45 or fibre               |
| IEC 60870-5-104 / DNP3oE             | ■ / -                            |
| IEC 61850                            | ■                                |
| IEC 61850 Process Bus                | -                                |
| IEC61850-9-3 (PTP, 1588) time sync   | ■*                               |
| Terminals                            | Pin or Ring                      |

## Power supplies

| Nominal Voltage Vnom.        | Operate Range |              |
|------------------------------|---------------|--------------|
| 24 - 60 Vdc                  | 19 - 66 Vdc   |              |
| 60 - 250 Vdc / 100 - 230 Vac | 48 - 275 Vdc  | 90 - 253 Vac |

## Digital Inputs

| Auxiliary Voltage                                  | Thresholds                                                                                                                                                                  |
|----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Standard Variant<br>> 18 V (VA, min: 24 - 250 Vdc) | Standard variant:<br>65% of 24 Vdc (VA,min)<br>Special variant:<br>65% of 127 Vdc (VA,nom)<br>65% of 250 Vdc (VA,nom)<br>65% of 110 Vdc (VA,nom)<br>65% of 220 Vdc (VA,nom) |

\* please ask for availability

# Technical data description

## General series data

## Easergy MiCOM Px40 Series

|                                         |                                              |
|-----------------------------------------|----------------------------------------------|
| Frequency 50/60 Hz                      | ■                                            |
| Dual rated 1 A / 5 A                    | ■                                            |
| Opto inputs                             | max 64                                       |
| Output contacts                         | max 60                                       |
| High break contacts                     | max 8                                        |
| Continuous carry                        | 10 A                                         |
| Short duration current                  | 30 A for 3 s                                 |
| LED indication (freely programmable)    | 22 (18)                                      |
| Function keys / hot keys                | 10 / 2                                       |
| Settings groups                         | 4                                            |
| Fault records                           | 15                                           |
| Event records                           | 250 - 512                                    |
| Disturbance records                     | 75 s (max 10.5 s/rec.)                       |
| Programmable logic                      | Graphical / Fully programmable               |
| IRIG B                                  | Option                                       |
| LCD Display with EIA(RS) 232 front port | Alphanumeric                                 |
| Rear Port / 2nd rear port               | Yes / Option                                 |
| Courier                                 | K-Bus / EIA(RS) 485 or Ethernet (RJ45/Fibre) |
| Modbus                                  | EIA(RS) 485                                  |
| IEC 60870-5-103                         | EIA(RS) 485 or Ethernet (RJ45/Fibre) *       |
| IEC 60870-5-101                         | -                                            |
| DNP3.0                                  | EIA(RS) 485 or Ethernet (RJ45, fibre) *      |
| IEC 60870-5-104                         | -                                            |
| IEC 61850                               | Wire RJ45 or fibre                           |
| IEC 61850 Process Bus                   | Wire RJ45 or fibre *                         |
| IEC61850-9-3 (PTP, 1588) time sync      | ■ **                                         |
| Terminals                               | Ring                                         |
| HSR/PRP                                 | ■ *                                          |
| RSTP                                    | ■ *                                          |

|                | Nominal Voltage<br>Vnom.      | Operate Range |              |
|----------------|-------------------------------|---------------|--------------|
|                |                               | dc            | ac           |
| Power supplies | 24 - 32 Vdc                   | 19 - 38 Vdc   | -            |
|                | 48 - 110 Vdc / 40 - 100 Vac   | 37 - 150 Vdc  | 32 - 110 Vac |
|                | 110 - 250 Vdc / 100 - 240 Vac | 87 - 300 Vdc  | 80 - 265Vac  |

## Digital Inputs

Universal programmable voltage thresholds  
24/27, 30/34, 48/54, 110/125 and 220/250 Vdc

\* please ask for availability (depending on product)

\*\* Except for P24x, P34x, P740

## Feeder management and overcurrent relays

| Easergy MiCOM series |                                                   | 30             |                 | 40   |      |            |        |
|----------------------|---------------------------------------------------|----------------|-----------------|------|------|------------|--------|
| model                |                                                   | P132           | P139            | P141 | P142 | P143       | P145   |
| CHARACTERISTICS      | Case size                                         | 24, 40 or 84TE | 40 or 84TE      | 40TE | 40TE | 60 or 80TE | 60TE   |
|                      | CT Inputs                                         | 4              | 4               | 5    | 5    | 5          | 5      |
|                      | VT Inputs                                         | 4 or 5         | 4 or 5          | 3    | 3    | 3 or 4     | 3 or 4 |
|                      | Opto Inputs (max)                                 | 70             | 70              | 8    | 16   | 32         | 32     |
|                      | Output Contacts (max)                             | 38             | 36              | 8    | 15   | 30         | 32     |
|                      | High Break Contacts (max)                         | 16             | 16              |      | 4    | 8          | 8      |
|                      | RTDs (max)                                        | 10             | 10              |      |      |            |        |
|                      | Analogue Input / Output (max)                     | 1/2            | 1/2             |      |      |            |        |
|                      | Function Keys / Hotkeys                           | with new HMI   | with new HMI    | -/■  | -/■  | ■/■        | ■/■    |
|                      | Bay Control and Monitoring including Interlocking | ■              | Graphical Mimic |      |      |            |        |
| ANSI                 | PROTECTION FUNCTION                               | P132           | P139            | P141 | P142 | P143       | P145   |
| 25                   | Check synchronising                               | ■              | ■               |      |      | ■          | ■      |
| 32                   | Directional power                                 | ■              | ■               | ■    | ■    | ■          | ■      |
| 32V                  | Voltage controlled direct. reactive power         | ■              | ■               |      |      |            |        |
| 34                   | Master sequence device                            |                | ■               |      |      |            |        |
| 37                   | Undercurrent                                      | ■              | ■               | ■    | ■    | ■          | ■      |
| 46                   | Negative sequence overcurrent                     | ■              | ■               | ■    | ■    | ■          | ■      |
| 46BC                 | Broken conductor                                  |                |                 | ■    | ■    | ■          | ■      |
| 47                   | Negative sequence over voltage                    | ■              | ■               | ■    | ■    | ■          | ■      |
| 48                   | Incomplete sequence relay                         | ■              | ■               |      |      |            |        |
| 49                   | Thermal overload                                  | ■              | ■               | ■    | ■    | ■          | ■      |
| 50/51N               | Ground fault                                      | ■              | ■               | ■    | ■    | ■          | ■      |
| 50/51P               | 3 Phase overcurrent                               | ■              | ■               | ■    | ■    | ■          | ■      |
| 50/51P/N             | 1 Phase or earth overcurrent                      | ■              | ■               |      |      |            |        |
| 50BF                 | Circuit breaker failure                           | ■              | ■               | ■    | ■    | ■          | ■      |
| 51LR                 | Motor                                             | ■              | ■               |      |      |            |        |
| 51V                  | Voltage controlled overcurrent                    | ■              | ■               | ■    | ■    | ■          | ■      |
| 59/27                | Over / Under voltage                              | ■              | ■               | ■    | ■    | ■          | ■      |
| 59N                  | Residual over voltage                             | ■              | ■               | ■    | ■    | ■          | ■      |
| 64                   | Restricted earth fault                            | ■              | ■               | ■    | ■    | ■          | ■      |
| 66                   | Startup monitoring                                | ■              | ■               |      |      |            |        |
| 67N                  | Transient ground fault detection                  | ■              | ■               |      |      |            |        |
| 67N                  | Ground fault directional                          | ■              | ■               | ■    | ■    | ■          | ■      |
| 67N                  | Ground fault direct. pulse detection              | ■              | ■               |      |      |            |        |
| 67N                  | Sensitive directional earth fault                 | ■              | ■               | ■    | ■    | ■          | ■      |
| 67P                  | Phase directional                                 | ■              | ■               | ■    | ■    | ■          | ■      |
| 67W                  | Wattmetric earth fault                            | ■              | ■               | ■    | ■    | ■          | ■      |
| 79                   | Auto-reclose                                      | ■              | ■               |      | ■    | ■          | ■      |
| 81                   | Under / Over frequency                            | ■              | ■               | ■    | ■    | ■          | ■      |
| 81P                  | Under frequency load shedding                     | ■              | ■               |      |      |            |        |
| 81R                  | Rate of change of frequency                       | ■              | ■               | ■    | ■    | ■          | ■      |
| 85                   | Protective signalling                             | ■              | ■               |      |      |            |        |
| 86                   | Lock-out                                          | ■              | ■               | ■    | ■    | ■          | ■      |
| CTS                  | Current transformer supervision                   | ■              | ■               | ■    | ■    | ■          | ■      |
| SOTF                 | Switch on to fault                                | ■              | ■               | ■    | ■    | ■          | ■      |
| TCS                  | Trip circuit supervision                          | ■              | ■               | ■    | ■    | ■          | ■      |
| VTs                  | Voltage transformer supervision                   | ■              | ■               | ■    | ■    | ■          | ■      |
| YN                   | Neutral admittance                                | ■              | ■               | ■    | ■    | ■          | ■      |
|                      | Circuit breaker monitoring                        | ■              | ■               | ■    | ■    | ■          | ■      |
|                      | Cold load pick-up                                 | ■              | ■               | ■    | ■    | ■          | ■      |
|                      | Inrush blocking                                   | ■              | ■               | ■    | ■    | ■          | ■      |
|                      | Limit value monitoring                            | ■              | ■               |      |      |            |        |
|                      | Process Bus interface                             |                |                 |      |      |            | ■      |

## Motor management relays

| Easergy MiCOM series |                                                   | 30             |                 | 40   |      |      |
|----------------------|---------------------------------------------------|----------------|-----------------|------|------|------|
| model                |                                                   | P132           | P139            | P241 | P242 | P243 |
| CHARACTERISTICS      | Case size                                         | 24, 40 or 84TE | 40 or 84TE      | 40TE | 60TE | 80TE |
|                      | CT Inputs                                         | 4              | 4               | 4    | 4    | 7    |
|                      | VT Inputs                                         | 4 or 5         | 4 or 5          | 3    | 3    | 3    |
|                      | Opto Inputs (max)                                 | 70             | 70              | 12   | 16   | 16   |
|                      | Output Contacts (max)                             | 38             | 36              | 11   | 16   | 16   |
|                      | RTDs (max)                                        | 10             | 10              | 10   | 10   | 10   |
|                      | Analogue Input / Output (max)                     | 1/2            | 1/2             | 4/4  | 4/4  | 4/4  |
|                      | Function keys / Hotkeys                           | with new HMI   | with new HMI    | -/■  | ■/■  | ■/■  |
|                      | Bay Control and Monitoring including Interlocking | ■              | Graphical Mimic |      |      |      |
| ANSI                 | PROTECTION FUNCTION                               | P132           | P139            | P241 | P242 | P243 |
| 14                   | Speed switch input                                | ■              | ■               | ■    | ■    | ■    |
| 25                   | Check synchronising                               | ■              | ■               |      |      |      |
| 27LV                 | Reacceleration                                    | ■              | ■               | ■    | ■    | ■    |
| 30/46/86             | Unbalance / Lock out                              | ■              | ■               | ■    | ■    | ■    |
| 32L/O/R              | Directional power                                 | ■              | ■               |      |      |      |
| 32R                  | Reverse power                                     | ■              | ■               | ■    | ■    | ■    |
| 37                   | Loss of load                                      | ■              | ■               | ■    | ■    | ■    |
| 37P/37N              | Undercurrent                                      | ■              | ■               | ■    | ■    | ■    |
| 38/49                | Thermal overload                                  | ■              | ■               | ■    | ■    | ■    |
| 40                   | Loss of field                                     |                |                 | ■    | ■    | ■    |
| 46                   | Negative sequence overcurrent                     | ■              | ■               | ■    | ■    | ■    |
| 47                   | Negative sequence over voltage                    | ■              | ■               | ■    | ■    | ■    |
| 47N                  | Neutral over voltage                              | ■              | ■               |      |      |      |
| 50/51P               | Phase overcurrent                                 | ■              | ■               | ■    | ■    | ■    |
| 50BF                 | Circuit breaker failure                           | ■              | ■               | ■    | ■    | ■    |
| 50N/51N              | Ground fault                                      | ■              | ■               | ■    | ■    | ■    |
| 50S/51LR/ 51S        | Locked rotor                                      | ■              | ■               | ■    | ■    | ■    |
| 55                   | Out of step                                       |                |                 | ■    | ■    | ■    |
| 59/27                | Under / Over voltage                              | ■              | ■               | ■    | ■    | ■    |
| 59N                  | Residual over voltage                             | ■              | ■               | ■    | ■    | ■    |
| 64N/32N              | Wattmetric earth fault                            | ■              | ■               | ■    | ■    | ■    |
| 66/48/51             | Startup monitoring                                | ■              | ■               | ■    | ■    | ■    |
| 67N                  | Ground fault directional                          | ■              | ■               |      |      |      |
| 67N                  | Ground fault direct. pulse detection              | ■              | ■               |      |      |      |
| 67N                  | Sensitive directional earth fault                 | ■              | ■               | ■    | ■    | ■    |
| 67P                  | Phase directional                                 | ■              | ■               |      |      |      |
| 81O                  | Over frequency                                    | ■              | ■               |      |      |      |
| 81U                  | Under frequency                                   | ■              | ■               | ■    | ■    | ■    |
| 81R                  | Rate of change of frequency                       | ■              | ■               |      |      |      |
| 87M                  | Motor differential                                |                |                 |      |      | ■    |
| CTS                  | Current transformer supervision                   | ■              | ■               | ■    | ■    | ■    |
| TCS                  | Trip circuit supervision                          | ■              | ■               | ■    | ■    | ■    |
| VTS                  | Voltage transformer supervision                   | ■              | ■               | ■    | ■    | ■    |
|                      | Circuit breaker monitoring                        | ■              | ■               | ■    | ■    | ■    |
|                      | Clio board                                        |                |                 | ■    | ■    | ■    |
|                      | Anti Backspin                                     |                |                 | ■    | ■    | ■    |

## Generator management relays

| Easergy MiCOM series |                                            | 40         |            |      |      |
|----------------------|--------------------------------------------|------------|------------|------|------|
| model                |                                            | P342       | P343       | P344 | P345 |
| CHARACTERISTICS      | Case size                                  | 40 or 60TE | 60 or 80TE | 80TE | 80TE |
|                      | CT Inputs                                  | 5          | 8          | 8    | 9    |
|                      | VT Inputs                                  | 4          | 4          | 5    | 6    |
|                      | Opto Inputs (max)                          | 24         | 32         | 32   | 32   |
|                      | Output Contacts (max)                      | 24         | 32         | 32   | 32   |
|                      | High Break Contacts (max, option)          | 4          | 8          | 8    | 8    |
|                      | RTDs (max)                                 | 10         | 10         | 10   | 10   |
|                      | Analogue Input / Output (max)              | 4/4        | 4/4        | 4/4  | 4/4  |
|                      | Function keys / Hotkeys                    | ■/■        | ■/■        | ■/■  | ■/■  |
| ANSI                 | PROTECTION FUNCTION                        | P342       | P343       | P344 | P345 |
| 21                   | Under-impedance                            | ■          | ■          | ■    | ■    |
| 24                   | Overfluxing                                | ■          | ■          | ■    | ■    |
| 25                   | Check synchronising                        | ■          | ■          | ■    | ■    |
| 27TN/59TN            | 100 % stator earth fault (3rd)             |            | ■          | ■    | ■    |
| 32L/O/R              | Directional power                          | ■          | ■          | ■    | ■    |
| 37N/37P              | Sensitive phase & earth fault undercurrent | ■          | ■          | ■    | ■    |
| 38/49                | Thermal overload                           | ■          | ■          | ■    | ■    |
| 40                   | Loss of field                              | ■          | ■          | ■    | ■    |
| 460C                 | Negative sequence overcurrent              | ■          | ■          | ■    | ■    |
| 46T                  | Negative sequence thermal                  | ■          | ■          | ■    | ■    |
| 47                   | Negative sequence over voltage             | ■          | ■          | ■    | ■    |
| 49T                  | Thermal overload                           | ■          | ■          | ■    | ■    |
| 50/27                | Unintentional energisation                 |            | ■          | ■    | ■    |
| 50/51P               | Phase overcurrent                          | ■          | ■          | ■    | ■    |
| 50BF                 | Circuit breaker failure                    | ■          | ■          | ■    | ■    |
| 50N/51N              | Ground fault                               | ■          | ■          | ■    | ■    |
| 50DT                 | Interturn / split phase                    |            | ■          | ■    | ■    |
| 51V                  | Voltage dependent O/C                      | ■          | ■          | ■    | ■    |
| 59/27                | Under / over voltage                       | ■          | ■          | ■    | ■    |
| 59N                  | Residual over voltage                      | ■          | ■          | ■    | ■    |
| 64                   | Restricted earth fault                     | ■          | ■          | ■    | ■    |
| 64N/32N              | Wattmetric earth fault                     | ■          | ■          | ■    | ■    |
| 64R                  | Rotor earth fault (MiCOM P391 option)      | ■          | ■          | ■    | ■    |
| 64S                  | 100 % stator earth fault (low frequency)   |            |            |      | ■    |
| 67N                  | Sensitive directional earth fault          | ■          | ■          | ■    | ■    |
| 67P                  | Phase directional                          | ■          | ■          | ■    | ■    |
| 67W                  | Wattmetric sensitive earth fault           | ■          | ■          | ■    | ■    |
| 78                   | Pole slipping                              |            | ■          | ■    | ■    |
| 81AB                 | Turbine abnormal frequency                 | ■          | ■          | ■    | ■    |
| 81                   | Under / over frequency                     | ■          | ■          | ■    | ■    |
| 87G/87GT             | Generator differential                     |            | ■          | ■    | ■    |
| CTS                  | Current transformer supervision            | ■          | ■          | ■    | ■    |
| TCS                  | Trip circuit supervision                   | ■          | ■          | ■    | ■    |
| VTS                  | Voltage transformer supervision            | ■          | ■          | ■    | ■    |
|                      | Circuit breaker monitoring                 | ■          | ■          | ■    | ■    |

## Distance protection relays

| Easergy MiCOM series |                                                   | 30             |            |        |              | 40     |       |       |       |            |       |
|----------------------|---------------------------------------------------|----------------|------------|--------|--------------|--------|-------|-------|-------|------------|-------|
| model                |                                                   | P433           | P435       | P437   | P439         | P441   | P442  | P443  | P444  | P445       | P446  |
| CHARACTERISTICS      | Case size                                         | 24, 40 or 84TE | 40 or 84TE | 84TE   | 40 or 84TE   | 40TE   | 60TE  | 80TE  | 80TE  | 40 or 60TE | 80TE  |
|                      | CT Inputs                                         | 4              | 4          | 4 or 5 | 4            | 4      | 4     | 5     | 4     | 4          | 8     |
|                      | VT Inputs                                         | 4 or 5         | 4 or 5     | 4 or 5 | 4 or 5       | 4      | 4     | 4     | 4     | 4          | 5     |
|                      | Opto Inputs (max)                                 | 70             | 82         | 36     | 82           | 8      | 16    | 32    | 24    | 16         | 24    |
|                      | Output Contacts (max)                             | 32             | 48         | 48     | 48           | 14     | 21    | 32    | 46    | 16         | 32    |
|                      | High Break Contacts                               | 4              | 4          | 4      | 16           |        |       |       | 12    | 4          | 12    |
|                      | RTDs (max)                                        | 1              | 1          | 1      | 1            |        |       |       |       |            |       |
|                      | Analogue Input / Output (max)                     | 1/2            | 1/2        | 1/2    | 1/2          |        |       |       |       |            |       |
|                      | Function keys / hotkeys                           | ■/■            | ■/■        | ■/■    | ■/■          | -/■    | ■/■   | ■/■   | ■/■   | ■/■        | ■/■   |
|                      | Bay Control and Monitoring including Interlocking | ■              | ■          |        | Graph. Mimic |        |       |       |       |            |       |
| ANSI                 | PROTECTION FUNCTION                               | P433           | P435       | P437   | P439         | P441   | P442  | P443  | P444  | P445       | P446  |
| 21/21N               | Distance                                          | ■              | ■          | ■      | ■            | ■      | ■     | ■     | ■     | ■          | ■     |
| 25                   | Check synchronising                               | ■              | ■          | ■      | ■            | ■      | ■     | ■     | ■     | ■          | ■     |
| 32                   | Directional power                                 | ■              | ■          | ■      | ■            |        |       |       |       |            |       |
| 32V                  | Voltage controlled directional reactive power     | ■              | ■          |        | ■            |        |       |       |       |            |       |
| 46                   | Negative sequence overcurrent                     | ■              | ■          | ■      | ■            | ■      | ■     | ■     | ■     | ■          | ■     |
| 46/67                | Directional negative sequence                     |                |            | ■      |              | ■      | ■     | ■     | ■     | ■          | ■     |
| 46BC                 | Broken conductor                                  | ■              | ■          | ■      | ■            | ■      | ■     | ■     | ■     | ■          | ■     |
| 49                   | Thermal overload                                  | ■              | ■          | ■      | ■            | ■      | ■     | ■     | ■     | ■          | ■     |
| 50/27                | Switch on-to fault                                | ■              | ■          | ■      | ■            | ■      | ■     | ■     | ■     | ■          | ■     |
| 50/51N               | Earth fault                                       | ■              | ■          | ■      | ■            | ■      | ■     | ■     | ■     | ■          | ■     |
| 50/51P               | Phase overcurrent                                 | ■              | ■          | ■      | ■            | ■      | ■     | ■     | ■     | ■          | ■     |
| 50ST                 | Stub bus protection                               | ■              | ■          | ■      | ■            | ■      | ■     | ■     | ■     | ■          | ■     |
| 59/27                | Over / under voltage                              | ■              | ■          | ■      | ■            | ■      | ■     | ■     | ■     | ■          | ■     |
| 59N                  | Residual over voltage                             | ■              | ■          | ■      | ■            | ■      | ■     | ■     | ■     | ■          | ■     |
| 62/50BF              | Circuit breaker failure                           | ■              | ■          | ■      | ■            | ■      | ■     | ■     | ■     | ■          | ■     |
| 67N                  | Earth fault directional                           | ■              | ■          | ■      | ■            | ■      | ■     | ■     | ■     | ■          | ■     |
| 67N                  | Transient ground fault detection                  | ■              | ■          |        | ■            |        |       |       |       |            |       |
| 67P                  | Phase directional                                 | ■              | ■          | ■      | ■            | ■      | ■     | ■     | ■     | ■          | ■     |
| 67W                  | Wattmetric earth fault                            | ■              | ■          |        | ■            |        |       |       |       |            |       |
| 68                   | Out of step tripping                              | ■              | ■          | ■      | ■            |        |       | ■     |       |            | ■     |
| 78                   | Power swing blocking                              | ■              | ■          | ■      | ■            | ■      | ■     | ■     | ■     | ■          | ■     |
| 79                   | Auto-reclose                                      | 3 pole         | 1/3 p      | 1/3 p  | 1/3 p        | 3 pole | 1/3 p | 1/3 p | 1/3 p | 3 pole     | 1/3 p |
| 81                   | Over / under frequency                            | ■              | ■          | ■      | ■            | ■      | ■     | ■     | ■     | ■          | ■     |
| 81R                  | Rate of change of frequency                       | ■              | ■          | ■      | ■            |        |       | ■     |       | ■          | ■     |
| 81P                  | Under-frequency load shedding                     | ■              | ■          |        | ■            |        |       |       |       |            |       |
| 85                   | Channel aided scheme logic                        | ■              | ■          | ■      | ■            | ■      | ■     | ■     | ■     | ■          | ■     |
| CVTS                 | Capacitive voltage transformer supervision        |                |            |        |              | ■      | ■     |       | ■     |            |       |
| TCS                  | Trip circuit supervision                          | ■              | ■          | ■      | ■            | ■      | ■     | ■     | ■     | ■          | ■     |
| VTS/CTS              | Voltage / current transformer supervision         | ■              | ■          | ■      | ■            | ■      | ■     | ■     | ■     | ■          | ■     |
| ΔI / ΔV              | Delta directional comparison                      |                |            |        |              |        |       | ■     |       |            | ■     |
| YN                   | Neutral admittance                                | ■              | ■          |        | ■            |        |       |       |       |            |       |
|                      | Process Bus interface                             |                |            |        |              |        | ■     | ■     |       | ■          | ■     |
|                      | Mutual compensation                               |                |            | ■      |              | ■      | ■     | ■     |       |            | ■     |

## Line differential protection relays

| Easergy MiCOM series |                                                   | 30                | 40   |        |          |          |          |          |
|----------------------|---------------------------------------------------|-------------------|------|--------|----------|----------|----------|----------|
| model                |                                                   | P532              | P541 | P542   | P543     | P544     | P545     | P546     |
| CHARACTERISTICS      | Case size                                         | 40 or 84TE        | 40TE | 60TE   | 60TE     | 60TE     | 80TE     | 80TE     |
|                      | CT Inputs                                         | 4                 | 3    | 3      | 5        | 8        | 5        | 8        |
|                      | VT Inputs                                         | 4 or 5            |      |        | 4        | 5        | 4        | 5        |
|                      | Opto Inputs (max)                                 | 46                | 8    | 16     | 16       | 16       | 32       | 24       |
|                      | Output Contacts (max)                             | 30                | 7    | 14     | 14       | 14       | 32       | 32       |
|                      | High Break Contacts                               | 16                |      |        | 4        | 4        | 8        | 12       |
|                      | RTDs (max)                                        | ■                 |      |        |          |          |          |          |
|                      | Analogue Input / Output (max)                     | 1/2               |      |        |          |          |          |          |
|                      | Function keys / hotkeys                           | ■/■               | -/■  | ■/■    | ■/■      | ■/■      | ■/■      | ■/■      |
|                      | Bay control and monitoring including interlocking | ■/Graphical Mimic |      |        |          |          |          |          |
| ANSI                 | PROTECTION FUNCTION                               | P532              | P541 | P542   | P543     | P544     | P545     | P546     |
| 21                   | Distance                                          |                   |      |        | ■        | ■        | ■        | ■        |
| 25                   | Check synchronising                               | ■                 |      |        | ■        | ■        | ■        | ■        |
| 46                   | Negative sequence overcurrent                     | ■                 |      |        | ■        | ■        | ■        | ■        |
| 49                   | Thermal overload                                  | ■                 | ■    | ■      | ■        | ■        | ■        | ■        |
| 51LR                 | Motor                                             | ■                 |      |        |          |          |          |          |
| 50/51N               | Earth fault                                       | ■                 | ■    | ■      | ■        | ■        | ■        | ■        |
| 50/51P               | Phase overcurrent                                 | ■                 | ■    | ■      | ■        | ■        | ■        | ■        |
| 50BF                 | Circuit breaker failure                           | ■                 | ■    | ■      | ■        | ■        | ■        | ■        |
| 59/27                | Over / under voltage                              | ■                 |      |        | ■        | ■        | ■        | ■        |
| 64W                  | Wattmetric earth fault                            | ■                 |      |        | ■        | ■        | ■        | ■        |
| 67N                  | Earth fault directional                           | ■                 |      |        | ■        | ■        | ■        | ■        |
| 67N                  | Sensitive directional earth fault                 | ■                 |      |        | ■        | ■        | ■        | ■        |
| 67N                  | Transient ground fault detection                  | ■                 |      |        |          |          |          |          |
| 67P                  | Phase directional                                 | ■                 |      |        | ■        | ■        | ■        | ■        |
| 78                   | Power swing blocking                              |                   |      |        | ■        | ■        | ■        | ■        |
| 79                   | Auto-reclose                                      | 3 pole            |      | 3 pole | 1/3 pole | 1/3 pole | 1/3 pole | 1/3 pole |
| 81                   | Under / over frequency                            | ■                 |      |        | ■        | ■        | ■        | ■        |
| 87L                  | Line differential (terminal)                      | 2                 | 2/3  | 2/3    | 2/3      | 2/3      | 2/3      | 2/3      |
| CTS                  | CT supervision                                    |                   |      |        | ■        | ■        | ■        | ■        |
| TCS                  | Trip circuit supervision                          | ■                 | ■    | ■      | ■        | ■        | ■        | ■        |
|                      | 2 breaker configuration                           |                   |      |        |          | ■        |          | ■        |
|                      | 2nd harmonic restraint                            | ■                 | ■    | ■      | ■        | ■        | ■        | ■        |
|                      | Copper wire signalling                            | ■                 |      |        |          |          |          |          |
|                      | Direct / permissive inter tripping                | ■                 | ■    | ■      | ■        | ■        | ■        | ■        |
|                      | FO signalling                                     | ■                 | ■    | ■      | ■        | ■        | ■        | ■        |
|                      | In Zone transformer                               |                   | ■    | ■      | ■        | ■        | ■        | ■        |
|                      | PLC signalling                                    | ■                 |      |        |          |          |          |          |
|                      | SDH / Sonet networks                              |                   |      |        | ■        | ■        | ■        | ■        |
|                      | Vector compensation                               |                   | ■    | ■      | ■        | ■        | ■        | ■        |
|                      | Process Bus interface                             |                   |      |        | ■        |          |          | ■        |

## Transformer protection relays

| Easergy MiCOM series |                                                   | 30                |                   |                   |                   | 40     |        |            |
|----------------------|---------------------------------------------------|-------------------|-------------------|-------------------|-------------------|--------|--------|------------|
| model                |                                                   | P631              | P632              | P633              | P634              | P642   | P643   | P645       |
| CHARACTERISTICS      | Case size                                         | 24 or 40TE        | 40 or 84TE        | 40 or 84TE        | 84TE              | 40TE   | 60TE   | 60 or 80TE |
|                      | CT Inputs                                         | 6                 | 8                 | 12                | 15                | 8      | 12     | 18         |
|                      | VT Inputs                                         |                   | 1                 | 1                 | 1                 | 1 or 2 | 1 or 4 | 1 or 4     |
|                      | Opto Inputs (max)                                 | 46                | 52                | 52                | 64                | 12     | 24     | 24         |
|                      | Output Contacts (max)                             | 38                | 38                | 46                | 38                | 12     | 24     | 24         |
|                      | Analogue Input / Output (max)                     |                   | 1/2               | 1/2               | 1/2               | 4/4    | 4/4    | 4/4        |
|                      | High Break Contacts                               | 16                | 16                | 16                | 16                | 4      | 4      | 8          |
|                      | RTDs (max)                                        |                   | 1                 | 1                 | 1                 | 10     | 10     | 10         |
|                      | Function Keys / Hotkeys                           | ■/■               | ■/■               | ■/■               | ■/■               | -/■    | ■/■    | ■/■        |
|                      | Bay control and monitoring including interlocking | ■/Graphical Mimic | ■/Graphical Mimic | ■/Graphical Mimic | ■/Graphical Mimic |        |        |            |
| ANSI                 | PROTECTION FUNCTION                               | P631              | P632              | P633              | P634              | P642   | P643   | P645       |
| 24                   | Overexcitation                                    |                   | ■                 | ■                 | ■                 | ■      | ■      | ■          |
| 46                   | Negative sequence overcurrent                     | ■                 | ■                 | ■                 | ■                 | ■      | ■      | ■          |
| 47                   | Negative sequence over voltage                    |                   |                   |                   |                   | ■      | ■      | ■          |
| 49                   | Thermal overload                                  | ■                 | ■                 | ■                 | ■                 | ■      | ■      | ■          |
| 50/51N               | Ground fault                                      | ■                 | ■                 | ■                 | ■                 | ■      | ■      | ■          |
| 50/51P               | Phase overcurrent                                 | ■                 | ■                 | ■                 | ■                 | ■      | ■      | ■          |
| 50BF                 | Circuit breaker failure                           | ■                 | ■                 | ■                 | ■                 | ■      | ■      | ■          |
| 59/27                | Over / under voltage                              |                   | ■                 | ■                 | ■                 |        | ■      | ■          |
| 59N                  | Residual over voltage                             |                   |                   |                   |                   |        | ■      | ■          |
| 67N                  | Ground fault directional                          |                   |                   |                   |                   | ■      | ■      | ■          |
| 67P                  | Phase directional                                 |                   |                   |                   |                   | ■      | ■      | ■          |
| 81                   | Under / over frequency                            |                   | ■                 | ■                 | ■                 | ■      | ■      | ■          |
| 87G/64               | Restricted earth fault                            |                   | 2                 | 3                 | 3                 | 2      | 3      | 3          |
| 87T                  | Transformer diff. (windings)                      | 2                 | 2                 | 3                 | 4                 | 2      | 3      | 3          |
| CTS                  | CT supervision                                    | ■                 | ■                 | ■                 | ■                 | ■      | ■      | ■          |
| TCS                  | Trip Circuit Supervision                          | ■                 | ■                 | ■                 | ■                 | ■      | ■      | ■          |
| VTS                  | VT supervision                                    |                   |                   |                   |                   | ■      | ■      | ■          |
|                      | 2 nd harmonic restraint                           | ■                 | ■                 | ■                 | ■                 | ■      | ■      | ■          |
|                      | Overfluxing / 5th harmonic                        | ■                 | ■                 | ■                 | ■                 | ■      | ■      | ■          |
|                      | Process Bus interface                             |                   |                   |                   |                   | ■      |        | ■          |

## Busbar protection relays

| Easergy MiCOM series |                                    | 40         |            |            |         |
|----------------------|------------------------------------|------------|------------|------------|---------|
| model                |                                    | P741* (CU) | P742* (PU) | P743* (PU) | P746    |
| Charact.             | Case size                          | 80TE       | 40TE       | 60TE       | 80TE    |
|                      | CT Inputs                          |            | 4          | 4          | 18/21   |
|                      | VT Inputs                          |            |            |            | 3/0     |
|                      | Opto Inputs (max)                  | 8          | 16         | 24         | 40      |
|                      | Output Contacts (max)              | 8          | 8          | 21         | 32      |
|                      | High Break Contacts                |            | 4          | 8          | 12      |
|                      | Function Keys/Hotkeys              | ■/■        | -/■        | ■/■        | ■/■     |
| ANSI                 | PROTECTION FUNCTION                | P741       | P742       | P743       | P746    |
| 50/51N               | Ground fault                       |            | ■          | ■          | ■       |
| 50/51P               | Phase overcurrent                  |            | ■          | ■          | ■       |
| 50BF                 | Circuit breaker failure            | ■          | ■          | ■          | ■       |
| 87BB                 | Busbar                             | ■          | ■          | ■          | ■       |
| 87CZ                 | Check Zones                        | ■          |            |            | ■       |
| 87P                  | Phase segregated differential      | 8 zones    |            |            | 4 zones |
| 87P                  | Sensitive earth fault differential | 8 zones    |            |            |         |
| CTS                  | CT supervision                     | ■          | ■          | ■          | ■       |
| TCS                  | Trip Circuit Supervision           | ■          | ■          | ■          | ■       |
| VTS                  | VT supervision                     |            | ■          | ■          | ■       |
|                      | Phase comparison                   |            |            |            | ■       |
|                      | CT saturation detection            |            | ■          | ■          |         |
|                      | CT supervision                     |            | ■          | ■          | ■       |
|                      | Process Bus interface              |            |            |            | ■       |

\* Central Unit (CU) can manage up to 28 Peripheral Units (PU) -

## Interconnection, auto-reclose & breaker failure protection relays

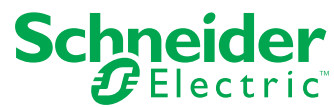
| Easergy MiCOM series |                                       | 40            |               |      |
|----------------------|---------------------------------------|---------------|---------------|------|
| model                |                                       | P341          | P841          | P849 |
| Charact.             | Case size                             | 40 TE or 60TE | 60TE or 80 TE | 80TE |
|                      | CT Inputs                             | 4             | 5 or 8        |      |
|                      | VT Inputs                             | 5             | 4 or 5        |      |
|                      | Opto Inputs (max)                     | 16 or 24      | 16 or 24      | 64   |
|                      | Output contacts (max)                 | 15 or 24      | 14 or 32      | 60   |
|                      | High break contact (max)              |               | 4             | 16   |
| ANSI                 | PROTECTION FUNCTION                   | P341          | P841          | P849 |
| 25                   | Check synchronising                   | ■             | 1 or 2        |      |
| 27                   | Under voltage                         | ■             | ■             |      |
| 47/27D               | Phase sequence voltage                |               | ■             |      |
| 50BF                 | Breaker failure protection            | ■             | 1 or 2        |      |
| 59                   | Over voltage                          | ■             | ■             |      |
| 59N                  | Residual over voltage                 | ■             | ■             |      |
| 64                   | Restricted earth fault                | ■             | ■             |      |
| 64N/32N              | Wattmetric earth fault                | ■             | ■             |      |
| 67P                  | Phase directional with DLR option     | ■             |               |      |
| 79                   | Auto-reclose                          |               | 1 or 2 CBs    |      |
| 81                   | Under / over frequency                | ■             | ■             |      |
| 81R                  | Rate of change of frequency (df/dt+t) | ■             | ■             |      |
| dVq                  | Voltage vector shift                  | ■             |               |      |
| TCS                  | Trip circuit supervision              | ■             | ■             | ■    |
|                      | Tripping mode                         |               | 1p / 3p       | ■    |
|                      | Ferroresonance detection              |               | ■             |      |
|                      | Process Bus interface                 |               | ■             | ■    |

## Rail protection relays

| Easergy MiCOM series |                                                   | 30                |                   |                   |                   |
|----------------------|---------------------------------------------------|-------------------|-------------------|-------------------|-------------------|
| model                |                                                   | P138              | P436              | P438              | P638              |
| CHARACTERISTICS      | Case size                                         | 40 or 84TE        | 40 or 84TE        | 40 or 84TE        | 84TE              |
|                      | CT Inputs                                         | 3                 | 3                 | 3                 | 5                 |
|                      | VT Inputs                                         | 2                 | 2                 | 2                 | 1                 |
|                      | Opto Inputs (max)                                 | 56                | 56                | 56                | 38                |
|                      | Output Contacts (max)                             | 48                | 48                | 48                | 64                |
|                      | RTDs (max)                                        | 1                 | 1                 | 1                 | 1                 |
|                      | Analogue Input / Output (max)                     | 1/2               | 1/2               | 1/2               | 1/2               |
|                      | Function Keys / Hotkeys                           | ■/■               | ■/■               | ■/■               | ■/■               |
|                      | Bay Control and Monitoring including Interlocking | ■/Graphical Mimic | ■/Graphical Mimic | ■/Graphical Mimic | ■/Graphical Mimic |
| ANSI                 | PROTECTION FUNCTION                               | P138              | P436              | P438              | P638              |
| 21/21N               | Distance                                          |                   | ■                 | ■                 |                   |
| 25                   | check synchronizing <sup>1</sup>                  | ■                 | ■                 | ■                 |                   |
| 27/59                | Over / under voltage                              | ■                 | ■                 | ■                 | ■                 |
| 49                   | Thermal overload                                  | ■                 | ■                 | ■                 | ■                 |
| 50/27                | Switch on-to fault                                | ■                 | ■                 | ■                 |                   |
| 50H                  | High current supervision                          | ■                 | ■                 | ■                 |                   |
| 50/51N               | High current earth fault (tank protection)        | ■                 |                   |                   | ■                 |
| 50/51P               | Phase overcurrent                                 | ■                 | ■                 | ■                 | ■                 |
| 62/50BF              | Circuit breaker failure                           | ■                 | ■                 | ■                 | ■                 |
| 67P                  | Phase directional                                 | ■                 | ■                 | ■                 | ■                 |
| 79                   | Auto reclosing                                    | ■                 | ■                 | ■                 |                   |
| 81                   | Under / over frequency                            | ■                 | ■                 | ■                 | ■                 |
| 85                   | Protection signalling                             | ■                 | ■                 | ■                 |                   |
| 86                   | Lock-out                                          | ■                 | ■                 | ■                 | ■                 |
| 87T                  | Transformer differential (windings)               |                   |                   |                   | 2                 |
| di/dt,dv/dt, dφ/dt   | Train startup detection                           |                   | ■                 | ■                 |                   |
| Hz                   | Rail catenary protection                          |                   | 16 2/3            | 25/50/60          |                   |
| TCS                  | Trip circuit supervision                          | ■                 | ■                 | ■                 | ■                 |
| CTS                  | Current transformer supervision                   |                   | ■                 | ■                 |                   |
| VTs                  | Voltage transformer supervision                   | ■                 | ■                 | ■                 |                   |
|                      | 2nd harmonic restraint                            | ■                 | ■                 | ■                 | ■                 |
|                      | 3rd, 5th, 7th harmonic blocking                   | ■                 | ■                 | ■                 |                   |
|                      | Defrost protection                                | ■                 | ■                 | ■                 |                   |
|                      | High impedance fault detection                    | ■                 | ■                 | ■                 |                   |
|                      | InterMiCOM                                        | ■                 | ■                 | ■                 |                   |

<sup>1</sup> ANSI 25 is only for 010.135 MAIN Feeder mode **Classic single feed**.

Life Is On



Schneider Electric Industries SAS  
35, rue Joseph Monier - CS 30323  
F92506 Rueil-Malmaison Cedex