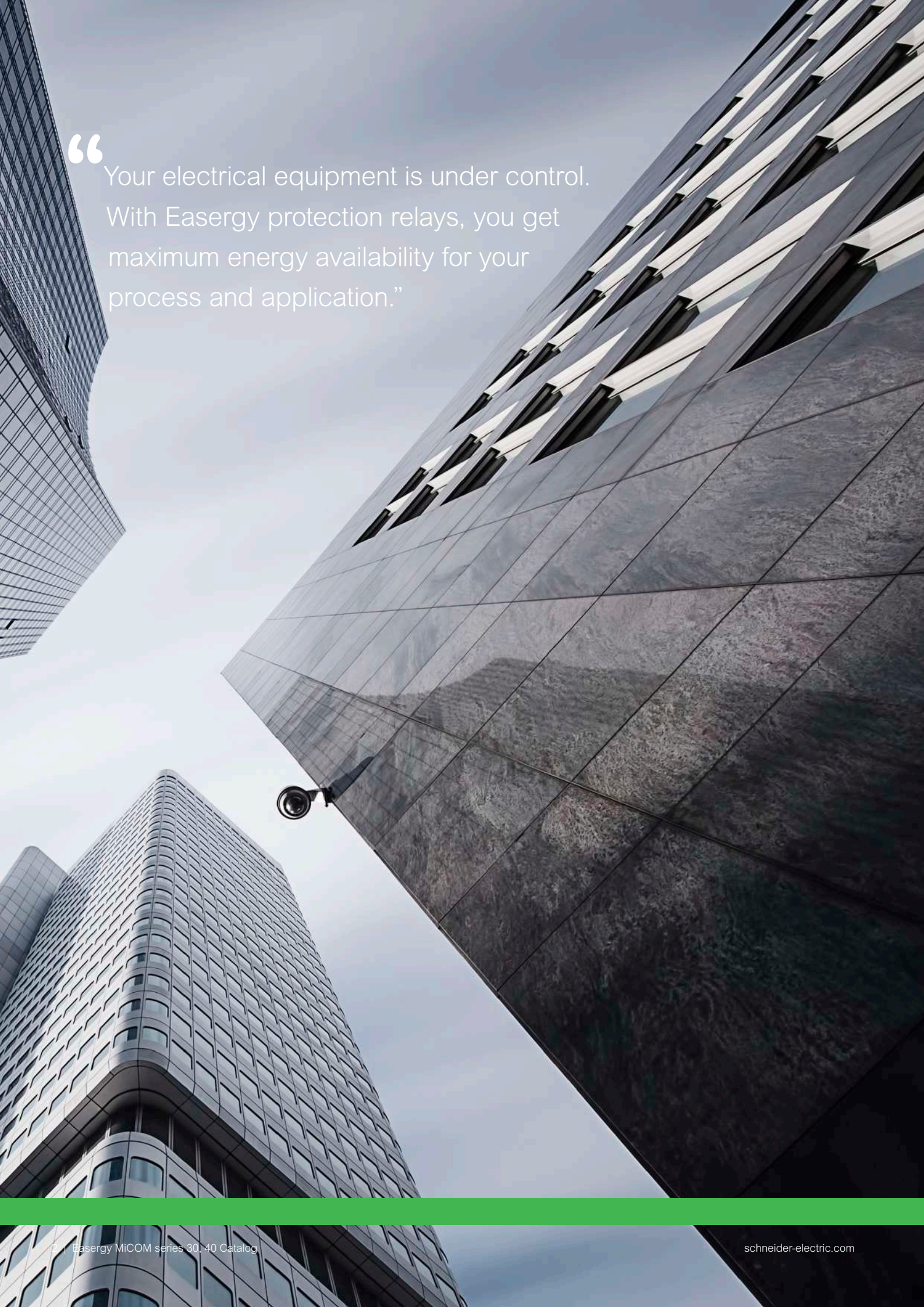
PowerLogic MiCOM series 30, 40

Catalog 2022

Comprehensive range of digital protection relays

se.com/easergy

Life Is On Schneider Electric


“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 ergonmically 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

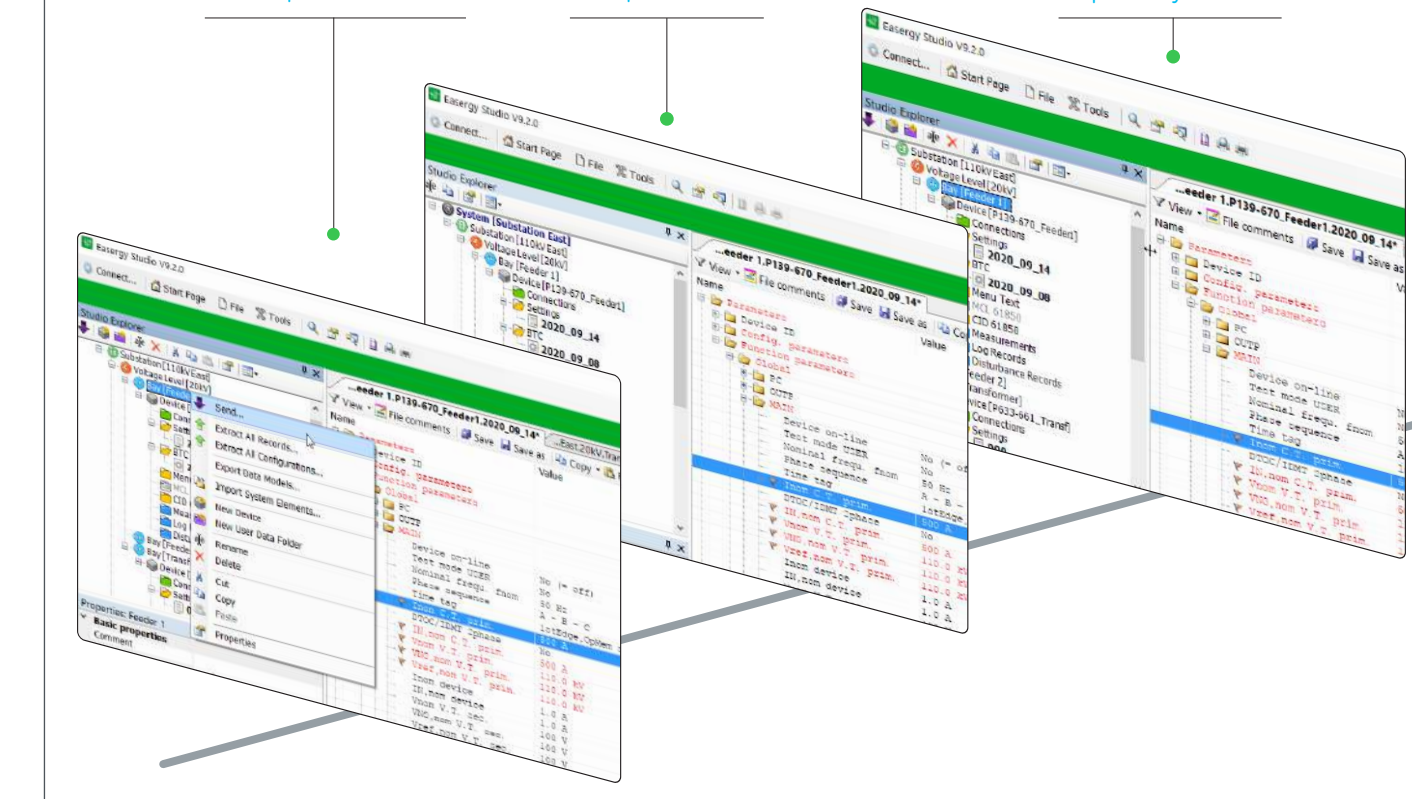
Summary of functions

Easily and quickly apply protection, control, and monitoring settings

Automatic hardware description

Application compliance

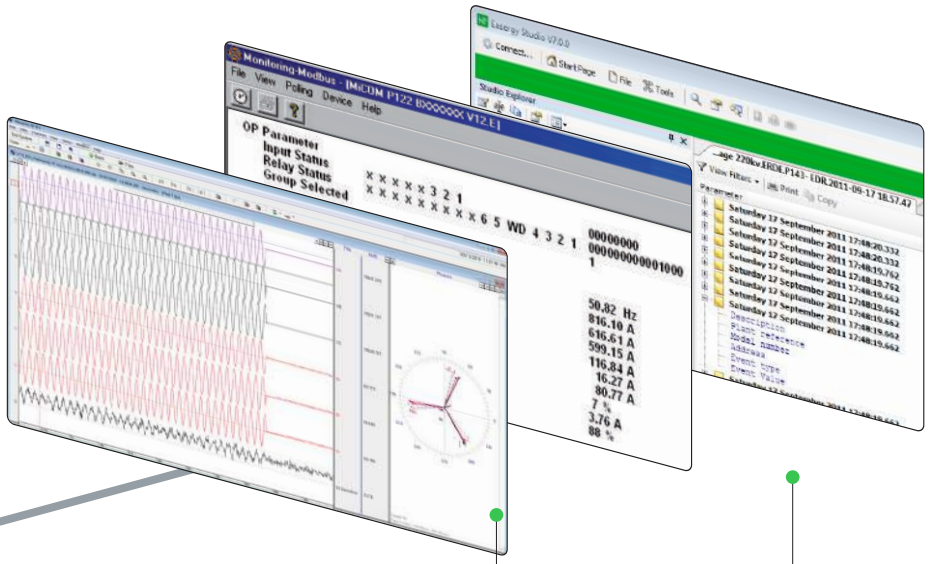
Fine tune capability



...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

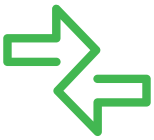
Easergy MiCOM protection devices combine best-in-class protection techniques with the latest technology for dependability, and high quality in advanced protection applications.

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 upt 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.


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

Greater peace of mind throughout your installation lifecycle

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.

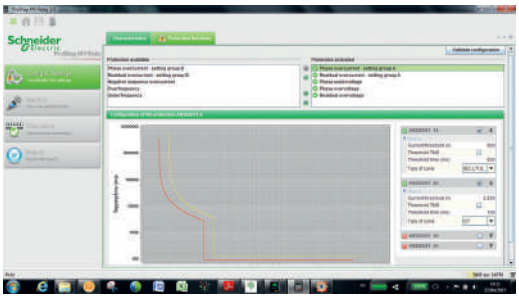
This diagnostic checks the protection relay's conformity against the original product specifications to ensure that they meet their goals of:

- 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

BM100201



Simplify your operation with a user friendly design

Easergy MiCOM Px30:
Case construction designed to provide high density of functionality

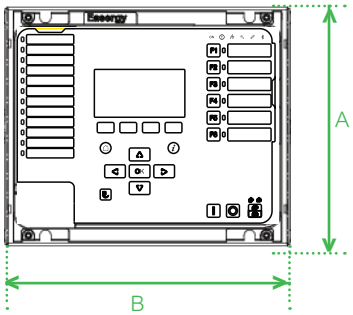
Easergy MiCOM devices are housed in specially designed cases that provide a high density of functionality within the product. Model and serial number are easily visible on the front of the device.

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.

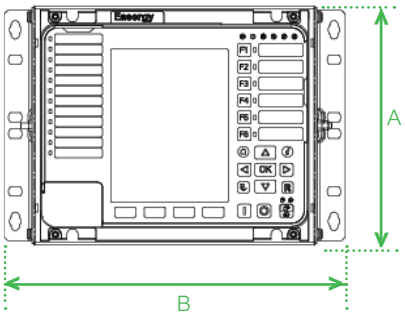
The 40TE case relays can be combined with the use of standard mounting accessorie to form a complete 19” rack. This saves space and allows for a neat installation.

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			

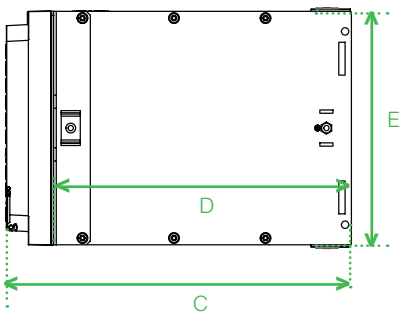
Front view
Text display



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.
		Press the I-key to access a selected event recording from either the panel level or from any other point in the menu tree.
		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.

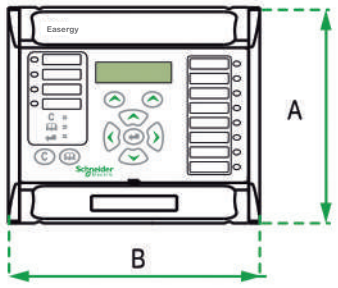
Physical protection of the front panel user interface and prevention of casual access is provided by an optional transparent front cover (selected models only), which can be fitted or omitted, since the front panel has been designed to IP52 protection against dust and water.

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

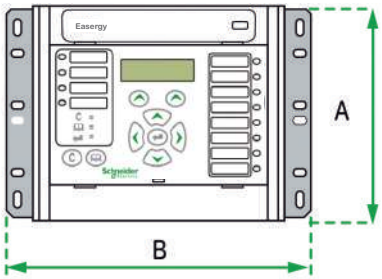
The differing case widths of relays can be combined with or without the use of standard blanking plates to form a complete 19" mounting. This saves space and allows for a neat installation.

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

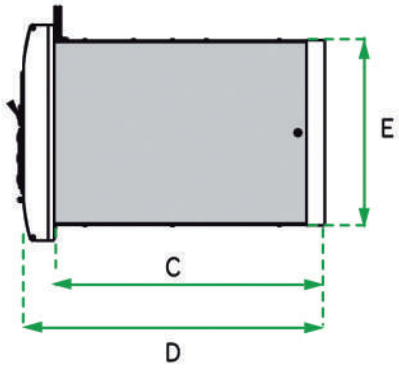
Front view



Front view
(Surface option)



Side view



Wiring

External connections are made via ring-type terminal.

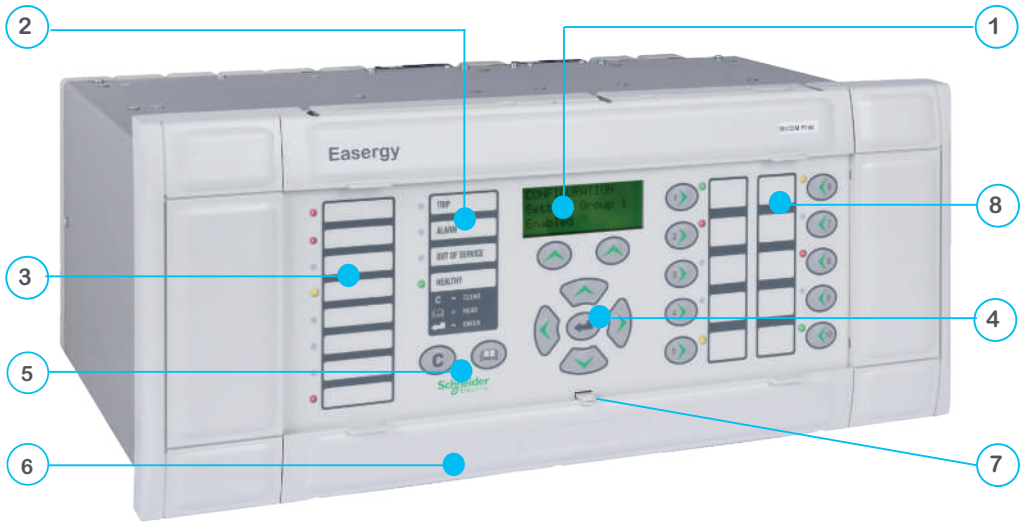
Multiple languages for a true global convenience:

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 > 18 V (VA, min: 24 - 250 Vdc)	Standard variant: 65% of 24 Vdc (VA,min) Special variant: 65% of 127 Vdc (VA,nom) 65% of 250 Vdc (VA,nom) 65% of 110 Vdc (VA,nom) 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 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[1]	■	■	■	
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	■	■	■	

[1] **ANSI 25** is only for 010.135 MAIN Feeder mode **Classic single feed**.

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