



Security and dependability for your electrical grid

Easergy MiCOM series 30, 40
Protection relay



schneider-electric.com

Life Is On

Schneider
Electric

A man and a woman are standing on a hill, looking at the sun through their hands. The sun is low on the horizon, creating a warm, golden glow. The man is on the left, and the woman is on the right. They are both wearing dark clothing. The background shows a hazy landscape with hills under a cloudy sky.

“

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 series 30, 40 protection relay range offers scalable levels of functionality and hardware options to best suit your protection requirements.

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

A well-known user friendliness, based on a standard and simple user interface across the entire range makes Easergy MiCOM ideal in any environment, from the more complex bay level control with mimic, to the simplest LCD display with menu interrogation.

Turn data into action with EcoStruxure™ Grid

EcoStruxure™ architecture and interoperable technology platform bring together energy, automation, and software. It provides enhanced value around 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 Schneider Electric reliability ensure that the equipment is de-energised only when absolutely necessary. Risks are minimised and servicing time reduced by predicting maintenance operations.

1999

Launch of Easergy MiCOM protection relays

2018

Over 650 000 Easergy MiCOM units installed around the world



“With Easergy protection relays, you can count on simple, high-performance products and the support of top-notch Schneider Electric teams. Meet your obligations the easy way.”

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 minimizing any risk to interrupt the deliveries 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 Px40 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 augmented reliability and availability.

Easergy warranty process

The extended 10-year warranty applies to Easergy MiCOM under the following conditions:

- Register the product until 18 month by flashing the QR code in the front face with "My Schneider" smartphone application,
- Products that follow ProDiag MV RELAY diagnosis conducted every FOUR YEARS (normal operating conditions),
- Replaced or repaired product provided with the latest version of hardware and firmware, functionally compliant with the original product.



Increase your capabilities...

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.

Easergy MiCOM series 30

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 deep customization by a maximum operational safety.

Easergy MiCOM series 40

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 & 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 is achieved thanks to the standardized time sync method IEC 61850-9-3 (PTP, 1588v2)

“

The Easergy MiCOM protection relay range provides the capability for a wide variety of protection, control, measurement, and communication.”

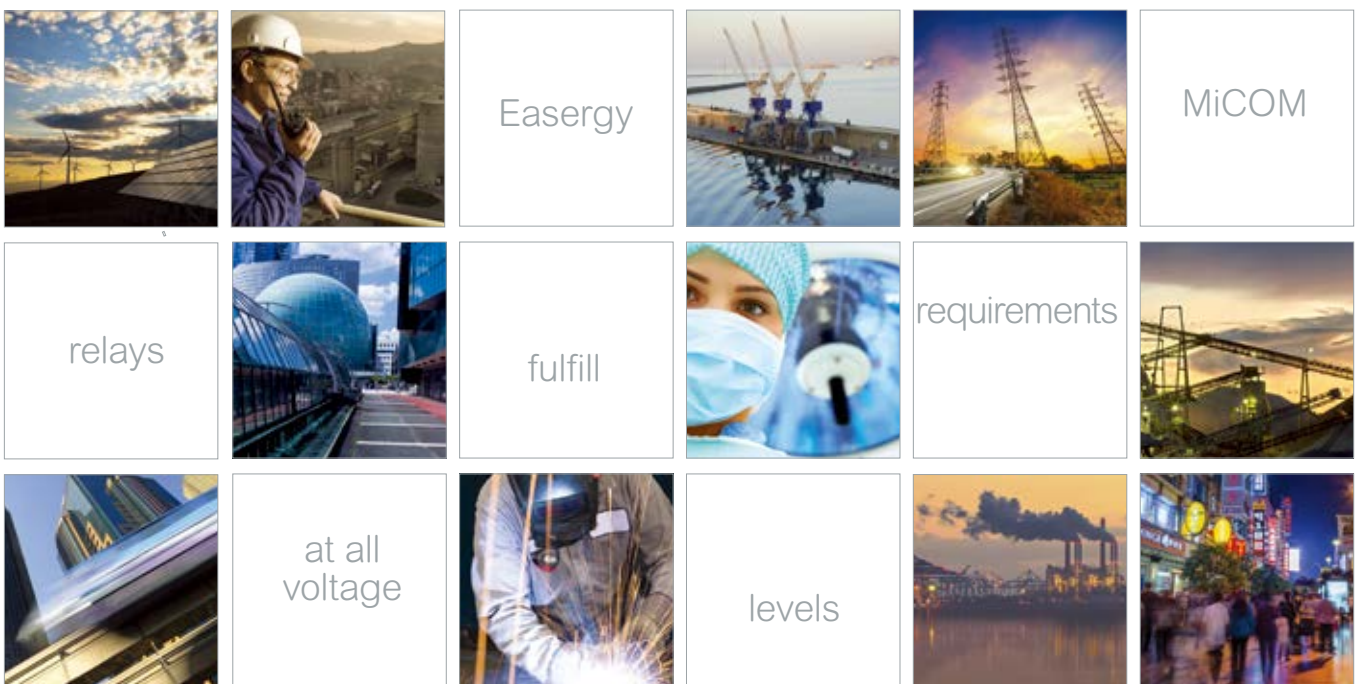
...with a comprehensive range

The individual strengths of both series together with the common setting tool provide a maximum of flexibility for any customer need.

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 applications	series 30	series 40
Feeder*	P13x	P14x
Motor & Voltage & Frequency	P13x	P24x
Generator		P34x
Distance	P43x	P44x
Line differential	P53x	P54x
Transformer	P63x	P64x
Busbar		P74x
Breaker failure & Auto-reclose		P84x
Railway	P13x, P43x, P63x	

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



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

Automatic hardware description

Protection activation

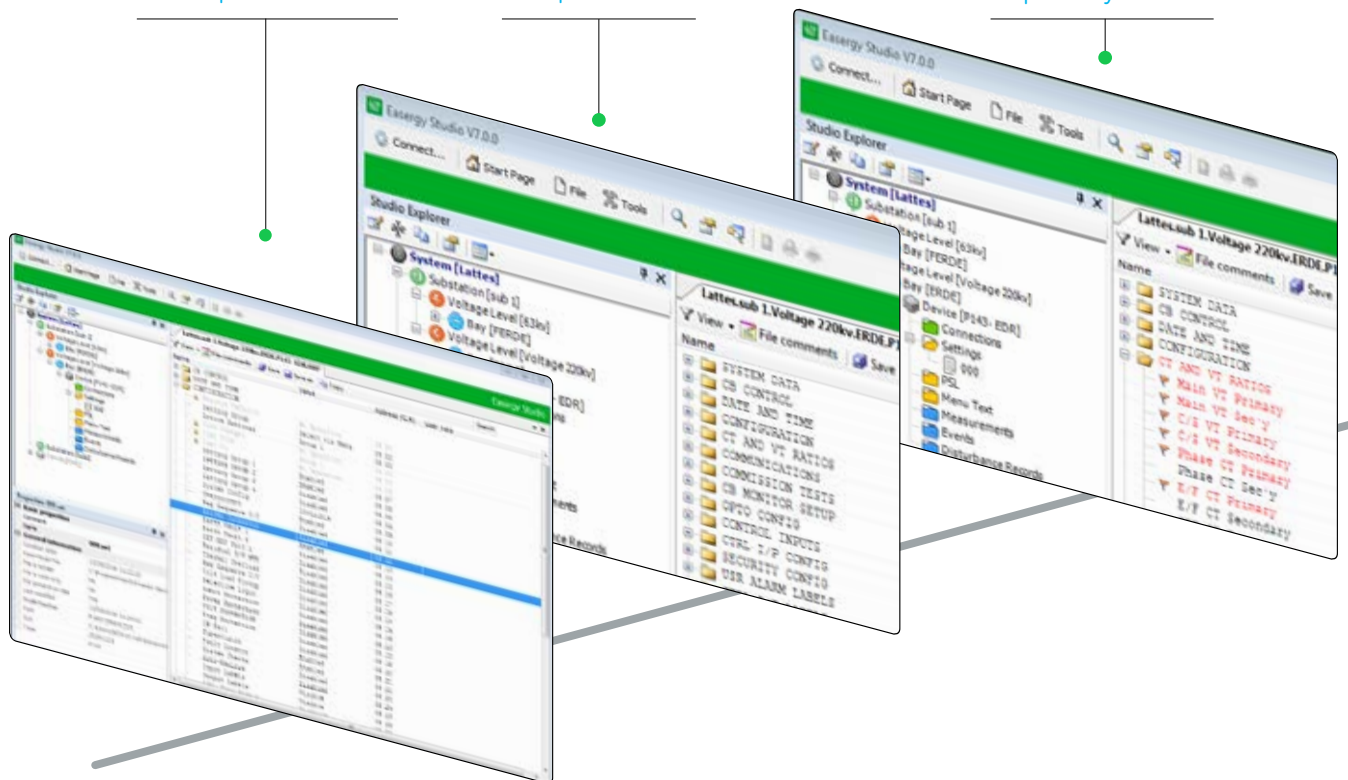
Enable protection functions

Application compliance

Summary of functions

Easily and quickly apply protection, control, and monitoring settings

Fine tune capability



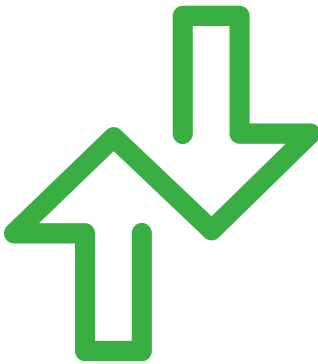
...with a simple operating software

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

Operation

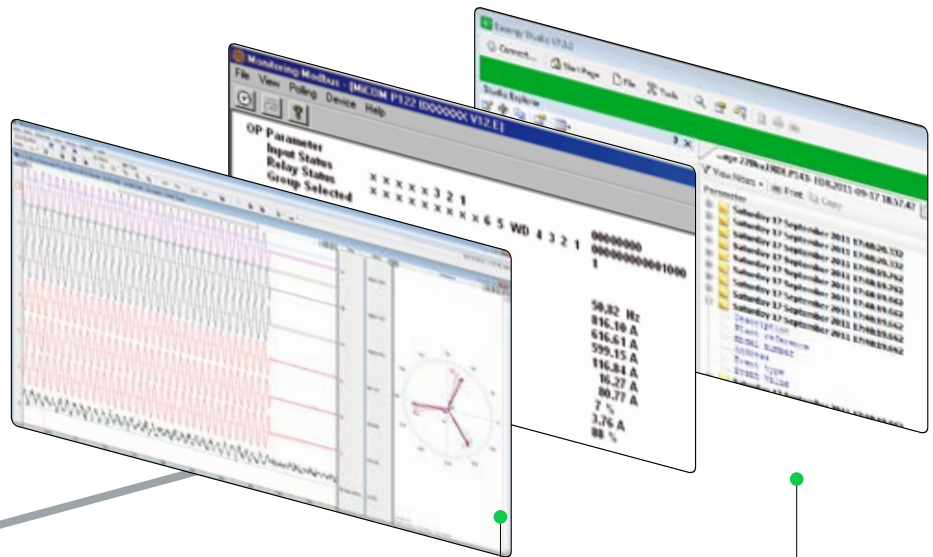
Download

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 relays combine best-in-class protection techniques with the latest technology for dependability, high quality, and the best possible protection.



Secure

For operational security, Easergy MiCOM offers Role-Based Access Control (RBAC), encrypted passwords, port hardening, alarms, logs, monitoring, and the Security Access Tool (SAT) 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 series 30 and 40 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 communication, 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 protocols vary by product.



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.



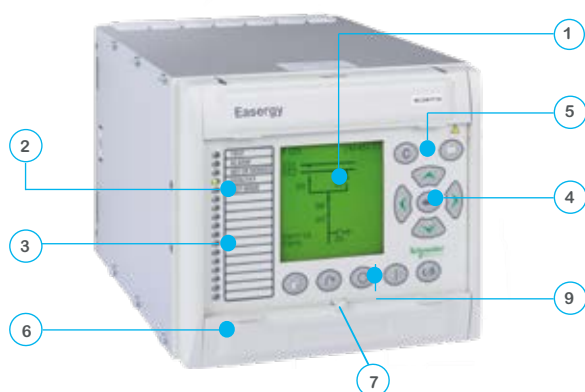
Scheme

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.



Simplify your operation...

Easergy MiCOM series 30 with bay control



Easergy MiCOM series 40



The front panel user interfaces comprises:

1. A back-lit liquid crystal display (series 30, 40)
Graphic LCD display (series 30)
2. 4 fixed function LEDs (series 40)
5 fixed function LEDs (series 30)
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
9. Switchgear control keys for control for up to 10 devices with graphical HMI, with text HMI up to 3 (series 30)

User languages:

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.

The ability to customize the menu text and alarm descriptions is also supported. User language options provide true global convenience

Wiring

External connections are made via ring-type terminal. These take pin-type terminals along with the series 30 relays as an option.

...with a user friendly design

Case construction

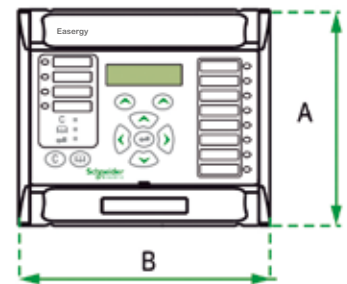
Easergy MiCOM devices are housed in specially designed cases that provide a high density of functionality within the product. Communication ports and model/serial number information is concealed by upper and lower covers on certain models.

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.

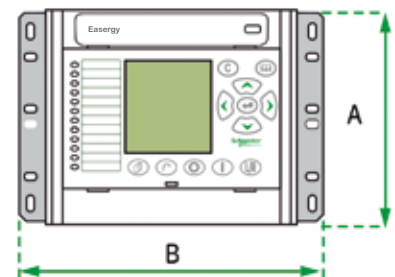
The cases are suitable for either rack or panel mounting. An option for surface mounting is also supported on the series 30 for installations with space limitations.

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.

Front view



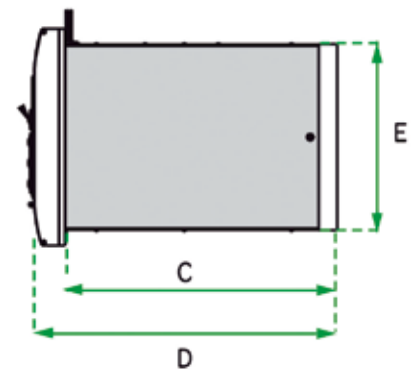
Front view (Surface option)



Easergy MiCOM Dimensions (in mm)

		A	B	C	D	E
series 30	24TE	184,5	186.4	227.9	253.6	177.5
	40TE		260.2			
	84TE		481.6			
	24TE Surface		186.4	257.1		
	40TE Surface		260.2			
	84TE Surface		481.6			
series 40	40TE	177	206	240 (incl. wiring)	270 (incl. wiring)	157.5 max
	60TE		309.6			
	80TE		413.2			
	80TE Rack		483			

Side view



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

Technical data description

General series data	Easergy MiCOM series 30	Easergy MiCOM series 40
Frequency 50/60 Hz	■	■
Dual rated 1 A / 5 A	■	■
Opto inputs	max 82	max 64
Output contacts	max 48	max 60
High break contacts	max 16	max 8
Continuous carry	5 A / 8 A / 10 A	10 A
Short duration current	30 A for 0.5 (3 s)	30 A for 3 s
LED indication (freely programmable)	23 (19)	22 (18)
Function keys / hot keys	6	10 / 2
Settings groups	4	4
Fault records	8	15
Event records	1000	250 - 512
Disturbance records	16.4 s (max 8 rec.)	75 s (max 10.5 s/rec.)
Programmable logic	Fully programmable	Graphical / Fully programmable
IRIG B	Option	Option
LCD Display with EIA(RS) 232 front port	Alphanumeric / Graphical	Alphanumeric
Rear Port / 2nd rear port	Yes / Option	Yes / Option
Courier	EIA(RS)485 or fibre	K-Bus / EIA(RS) 485 or fibre
Modbus	EIA(RS)485 or fibre	EIA(RS) 485 or fibre
IEC 60870-5-103	EIA(RS)485 or fibre	EIA(RS) 485 or fibre
IEC 60870-5-101	EIA(RS)485 or fibre	-
DNP3.0	EIA(RS)485 or fibre	EIA(RS) 485 or Ethernet (RJ45, fibre)
IEC 60870-5-104	■	-
IEC 61850	Wire RJ45 or fibre	Wire RJ45 or fibre
IEC 61850 Process Bus	-	Wire RJ45 or fibre
IEC61850-9-3 (PTP, 1588) time sync	-	■
Terminals	Pin or Ring	Ring

Power supplies	Nominal Voltage V _{nom.}	Operate Range	
		dc	ac
Easergy MiCOM series 30	24 - 60 Vdc	19 - 66 Vdc	-
	60 - 250 Vdc / 100 - 230 Vac	48 - 275 Vdc	90 - 253 Vac
Easergy MiCOM series 40	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	Auxiliary Voltage	Thresholds
Easergy MiCOM series 30	Standard Variant > 18 V (VA, min: 24 - 250 Vdc)	Standard variant with switching threshold at 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)
Easergy MiCOM series 40	Universal programmable voltage thresholds 24/27, 30/34, 48/54, 110/125 and 220/250 Vdc	



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)	32	28	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	■/-	-/-	-/■	-/■	■/■	■/■
Bay Control and Monitoring including Interlocking	Mimic	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	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 for SV			■	■	■	■

Detailed option availability depends on model selection.

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)	32	28	11	16	16
	RTDs / Thermistors	10/0	10/0	10/0	10/0	10/0
	Analogue Input / Output (max)	1/2	1/2	4/4	4/4	4/4
	Function keys / Hotkeys	■/-	-/-	-/■	■/■	■/■
	Bay Control and Monitoring including Interlocking	Mimic	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	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			■	■	■

Detailed option availability depends on model selection.

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	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	■	■	■	■

Detailed option availability depends on model selection.

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	70	8	16	32	24	16	24
	Output Contacts (max)	32	48	48	28	14	21	32	46	16	32
	High Break Contacts	4	4	4	16				12	4	12
	RTDs (option)	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	Mimic	Mimic		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	3 pole	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 for SV						■	■		■	■
	Mutual compensation			■		■	■	■	■		■

Detailed option availability depends on model selection.

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 (option)	■						
	Analogue Input / Output (max)	1/2						
	Function keys / hotkeys	■/-	-/■	■/■	■/■	■/■	■/■	■/■
	Bay Control and Monitoring including Interlocking	Text or Graph. 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
87L	Phase comparison							
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 for SV				■			■

Detailed option availability depends on model selection.

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)	4	34	40	34	12	24	24
	Output Contacts (max)	14	22	30	22	12	24	24
	Analogue Input / Output (max)		1/2	1/2	1/2	4/4	4/4	4/4
	High Break Contacts	4	4	4	4	4	4	8
	RTDs (option)		1	1	1	10	10	10
	Function Keys / Hotkeys	■/-	■/-	■/-	■/-	-/■	■/■	■/■
	Bay Control and Monitoring including Interlocking		Mimic	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		■	■	■		■	■
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 for SV					■	■	■

Detailed option availability depends on model selection.

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 for SV				■

* 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 for SV		■	

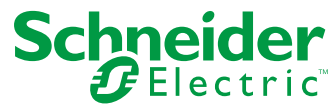
Detailed option availability depends on model selection.

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	3	2	2	1
	Opto Inputs (max)	56	56	56	38
	Output Contacts (max)	48	48	48	64
	RTDs	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	Text or Graph. Mimic	Text or Graph. Mimic	Text or Graph. Mimic	-
ANSI	PROTECTION FUNCTION	P138	P436	P438	P638
21/21N	Distance		■	■	
25	check synchronizing	■	■	■	
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	■	■	■	

Detailed option availability depends on model selection.

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