

Maximize protection

MiCOM series 10, 20, 30, 40

Comprehensive range of digital protection relays



Make the most of your energy

Schneider
Electric

Increase energy availability



Fast response

+



Maximum dependability

=

100% available energy

Your electrical equipment is under control. With MiCOM protection relays, you get maximum energy availability for your process.

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

The MiCOM protection relay range

Offers scalable levels of functionality and hardware options to best suit your protection requirements, and allows you to choose the most cost-effective solution for your application. The versatile hardware and common relay management software (MiCOM S1 Studio) allows simple configuration and installation in different applications.

A standard and simple user interface across the entire range makes MiCOM ideal in any environment, from the more complex bay level control with mimic, to the most simple LCD display with menu interrogation.

1999

Launch of
MiCOM
Protection
Relays

Keep informed to operate intelligently

Every MiCOM relay provides you with intuitive access to all system information in your own language so that you can manage your electrical installation effectively.

If a problem occurs, clear and complete information puts you in a position to make the right decisions immediately. The electrical supply is restored without delay.

2015

Over
900,000
MiCOM units
installed
around the
world

Augment installation availability

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.



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

Increase your capabilities...

From cost-effective to high-end protection and control, the comprehensive MiCOM range allows complete optimisation of your solution

MiCOM series 10

Fulfuls the basic requirements of buildings and small industries applications with a particular focus on overcurrent and motor protection. Two families are available.

- Auxiliary powered
- Self powered / dual powered



MiCOM series 20

Fulfuls the basic/medium requirements of industrial, utility and building applications providing simplicity and ease of use in a wide range of installations.

- Scalable solutions where type and quantity of protection features is model-dependent
- Flexible logic equations available on most models
- Compact hardware options for easy installation
- Common functions throughout the range
- Multi-language HMI
- Advanced protection functions



MiCOM series 30

Fulfuls the protection requirements of utility and industrial applications with particular focus on integrated feeder control and provides dedicated railway protection devices.

- Redundancy to IEC 62439 on PRP (Parallel Redundancy Protocol)
- Protection with bay-level control options to facilitate feeder management
- Input/Output quantity selectable based on requirements
- Numerous rear port communication hardware options available with a wide range of protocols selectable via software
- Protection functions available for isolated/Petersen coil earthed systems
- Surface and flush mounted (including detachable HMI option) as well as compact case models available in the range
- Full Programmable Scheme Logic (PSL) and function keys



MiCOM series 40

Fulfuls the protection requirements for a wide market of utility and industrial application and offers a wide range of protection functions.

- Redundancy to IEC 62439 on PRP (Parallel Redundancy Protocol) or HSR (High-availability Seamless Redundancy)
- Dual IP addresses for independent Ethernet channels
- Compliant Interoperability (IEC 61850 Edition 1 & Edition 2)
- Operational Security ensured by Role-Based Access Control (RBAC) to IEC 62351
- Full Programmable Scheme Logic (PSL) available with graphic configuration tool for easy setting management



... with a comprehensive range

	series 10	series 20	series 30	series 40
Feeder	P11x	P12x	P13x	P14x
Motor	P21x	P22x		P24x
Generator				P34x
Distance			P43x	P44x
Line differential		P52x	P53x	P54x
Transformer			P63x	P64x
Busbar		P72x		P74x
Breaker failure & Auto-reclose		P821		P84x
Voltage & Frequency		P92x		
Preferred application				

MiCOM relays fulfil requirements at all voltage levels



Save time...

The **MiCOM S1 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

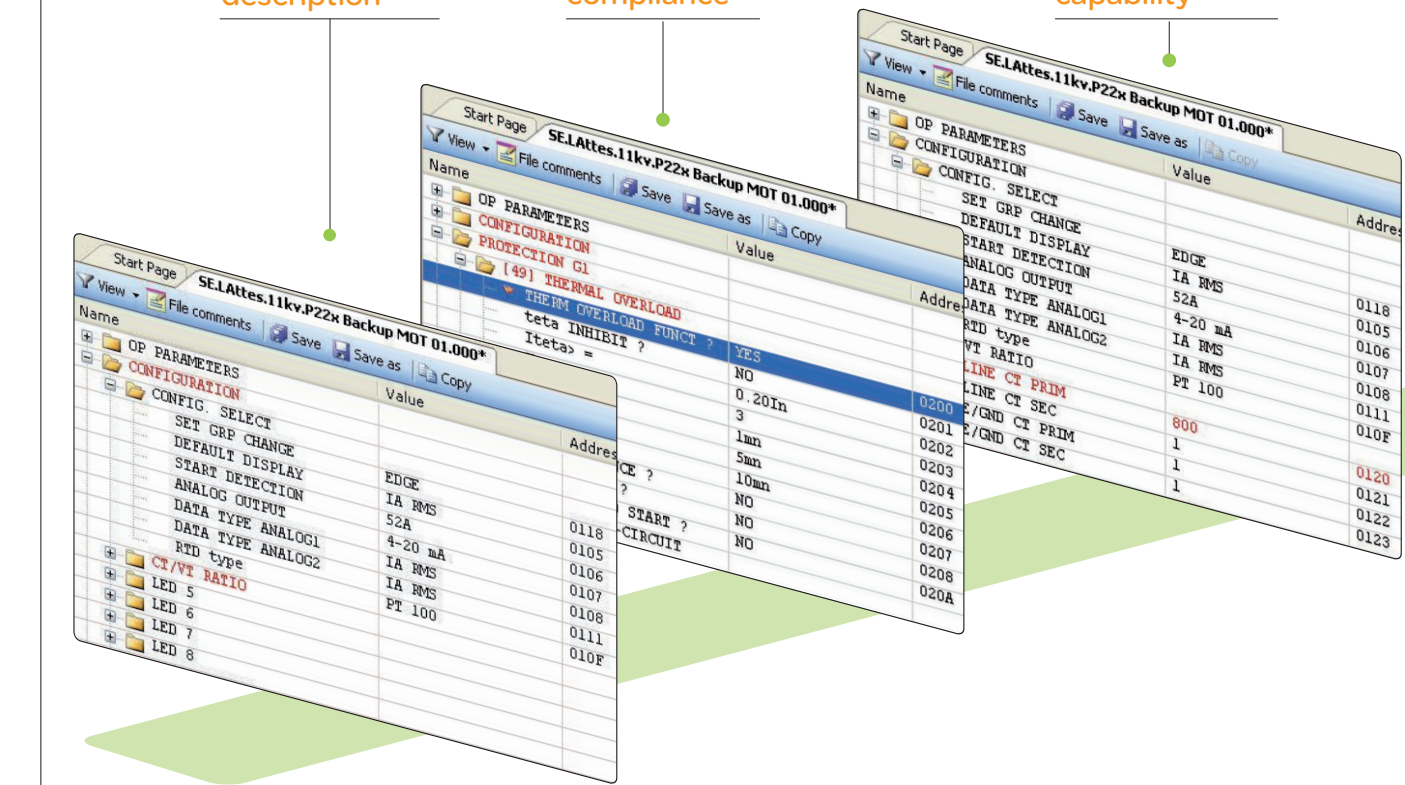
Summary of functions

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

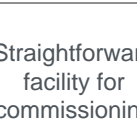


Setting file ready to be downloaded to MiCOM relay

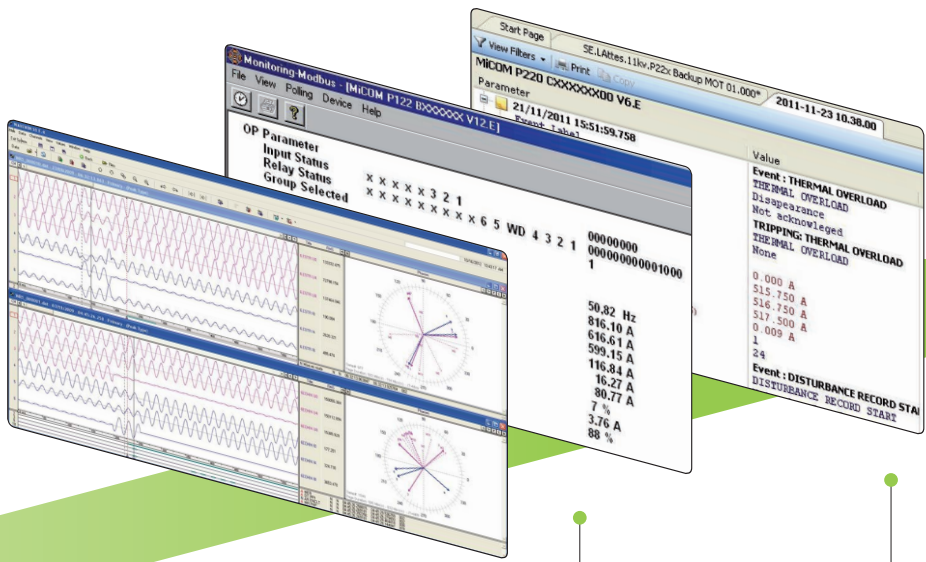
download



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



MiCOM protection relays were launched in 1999 using best-in-class protection techniques. Now combined with the latest technology, these dependable devices exhibit the high quality you expect.

At Schneider Electric, these protection techniques are fine tuned to give you the best possible protection for your assets. We also engineer quality into every device in line with best-in-class standards to match our protection performance.

Our latest devices are better than they have ever been.

Secure



Our comprehensive self monitoring provides complete confidence by detecting issues to ensure high reliability for your plant and assets.

MiCOM series 40 offers operational security to maximise the benefits of Ethernet. Ensured by Role-Based Access Control (RBAC) to IEC 62351, it restricts and logs intentional, accidental, or malicious access to protection data or configuration. It is further strengthened with encrypted passwords, port hardening, alarms, logs and monitoring. Security Access Tool (SAT) ensures that your existing staff can manage access without advanced skills or training.

Please contact your local Schneider Electric representative for availability.

Communicate



Local and remote communication is provided and designed for use with the MiCOM S1 Studio software. Rear communication port(s*) are intended for remote communication to SCADA or engineering access.

MiCOM series 30 and 40 devices can provide IEC 61850 communication and GOOSE messaging. MiCOM series 40 also provides Dual IP (PRP / HSR) for physical segregation of the Ethernet networks enabling seamless communication redundancy. All port types, quantities, and protocols vary by product. Please check the order form for availability.

Configure



Settings are defined via the MiCOM S1 Studio support package. The intuitive support software is all you need for the management of your entire MiCOM installed base, which manages all setting files with its unique substation file management facility.

The built-in datamodel manager also ensures that you always have the latest support files installed on your computer for all of your devices. Multiple independent setting groups are supported in most MiCOM relays. They can be activated locally, remotely, or via a dedicated input condition, to allow for different system operating conditions or adaptive relaying.

... with a complete set of tools

Measure



MiCOM devices measure (and store) a wide, comprehensive range of system values such as current, voltage, frequency, power, etc., from instantaneous or derived values.

Measurements can be displayed on the front LCD display or transferred via the communication ports. The high accuracy measurement class transformers throughout the MiCOM range provide data that you can rely on.

Record



Event records are generated by status changes to logic inputs, outputs, settings, and alarms. They are readily available for view on the LCD display, or extracted via the communication ports. All records are time tagged to a resolution of 1ms and are retained even during auxiliary supply interruptions.

Fault records capture information including fault number, date and time, active setting group, or function that issued the trip and measurement values. Disturbance records capture the sampled values of all analogue inputs such as phase currents or voltages present during the fault. Oscillographic analysis using MiCOM S1 Studio provides quick analysis of analogue and digital signals on the same time-scale. They can be extracted from the relay via the communication ports and saved in COMTRADE format.

Control



Fully programmable function keys and programmable tri-state LEDs (red/yellow/green) are available on MiCOM series 30 and 40. Bay Control on selected series 30 devices is provided on a graphical display with customisable mimic. MiCOM series 40 also provides programmable hot-keys for direct menu access (e.g., Trip/Close command).

Time synchronisation of the internal real-time clock can be implemented from various sources including an optional IRIG-B port (MiCOM series 30, Compact and 40) or communication protocol (protocol and device dependent).

Scheme



Programmable scheme logic is configured using MiCOM S1 Studio. MiCOM series 20 uses Boolean equations, whilst series 30, Compact, and series 40 use graphical programming (series 30 and Compact can use either method). Flexible logic in most series 20 relays allows users to create equations to be assigned to LEDs, outputs, trips, alarms, or back into other equations.

Programmable graphical logic in MiCOM series 30 and 40 relays is an extremely powerful tool. Users can customise protection and control functions or add additional supervision or custom schemes, e.g., trip circuit supervision or frequency restoration. This logic is event driven to ensure that protection is not delayed.

Simplify your operation...

... with a user friendly interface



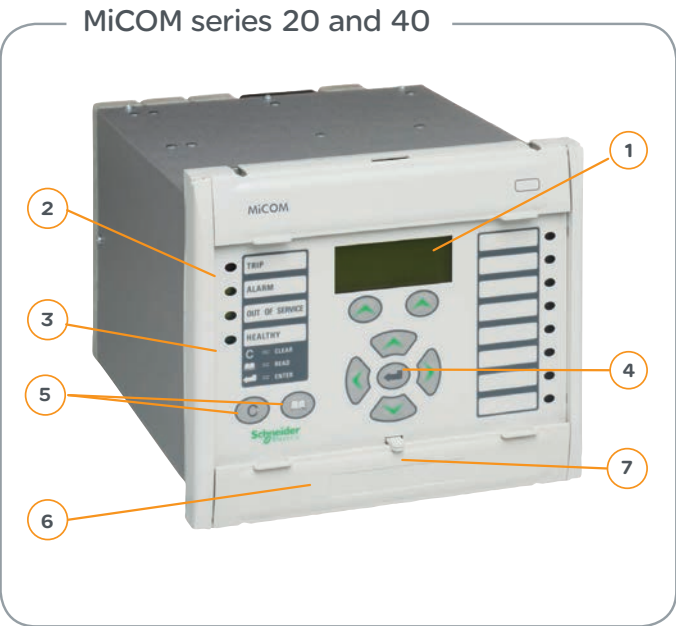
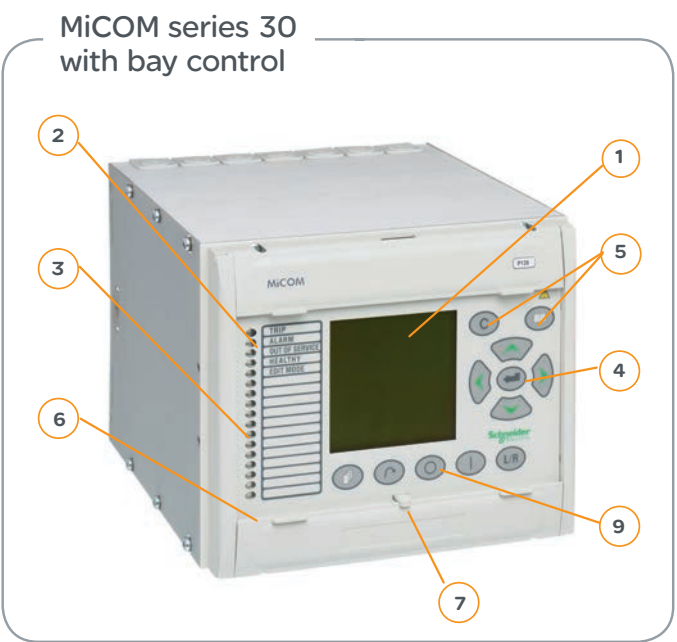
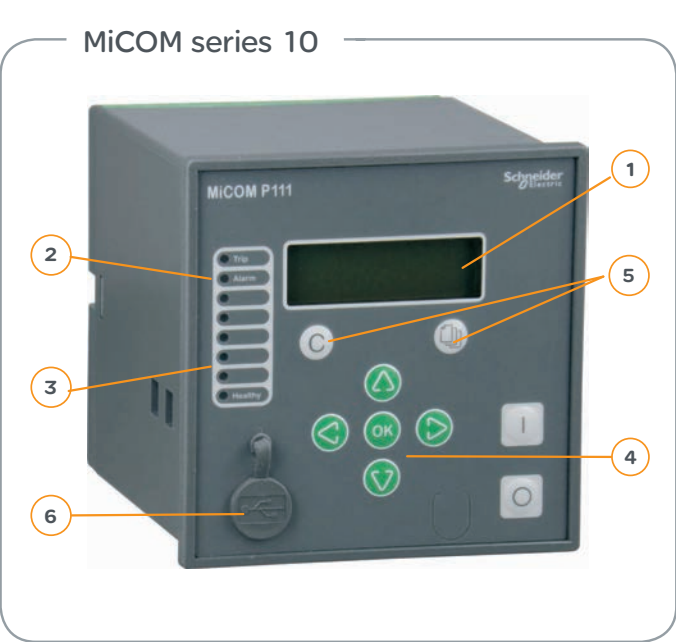
The front panel user interfaces comprises:

1. A back-lit liquid crystal display (series 10, 20, 30, 40)
Graphic LCD display (series 30)
2. 3 fixed function LEDs (series 10)
4 fixed function LEDs (series 20, 40)
5 fixed function LEDs (series 30)
3. Up to 4 user programmable LEDs (series 20)
Up to 18 user programmable LEDs (series 30)
Up to 8 user programmable LEDs (series 40)
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 (compact case, series 30 and 40)
9. Switchgear control keys up to six bays control (series 30)

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 on series 30 and 40.

> User language options provide true global convenience



Mechanical description

Case construction

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.

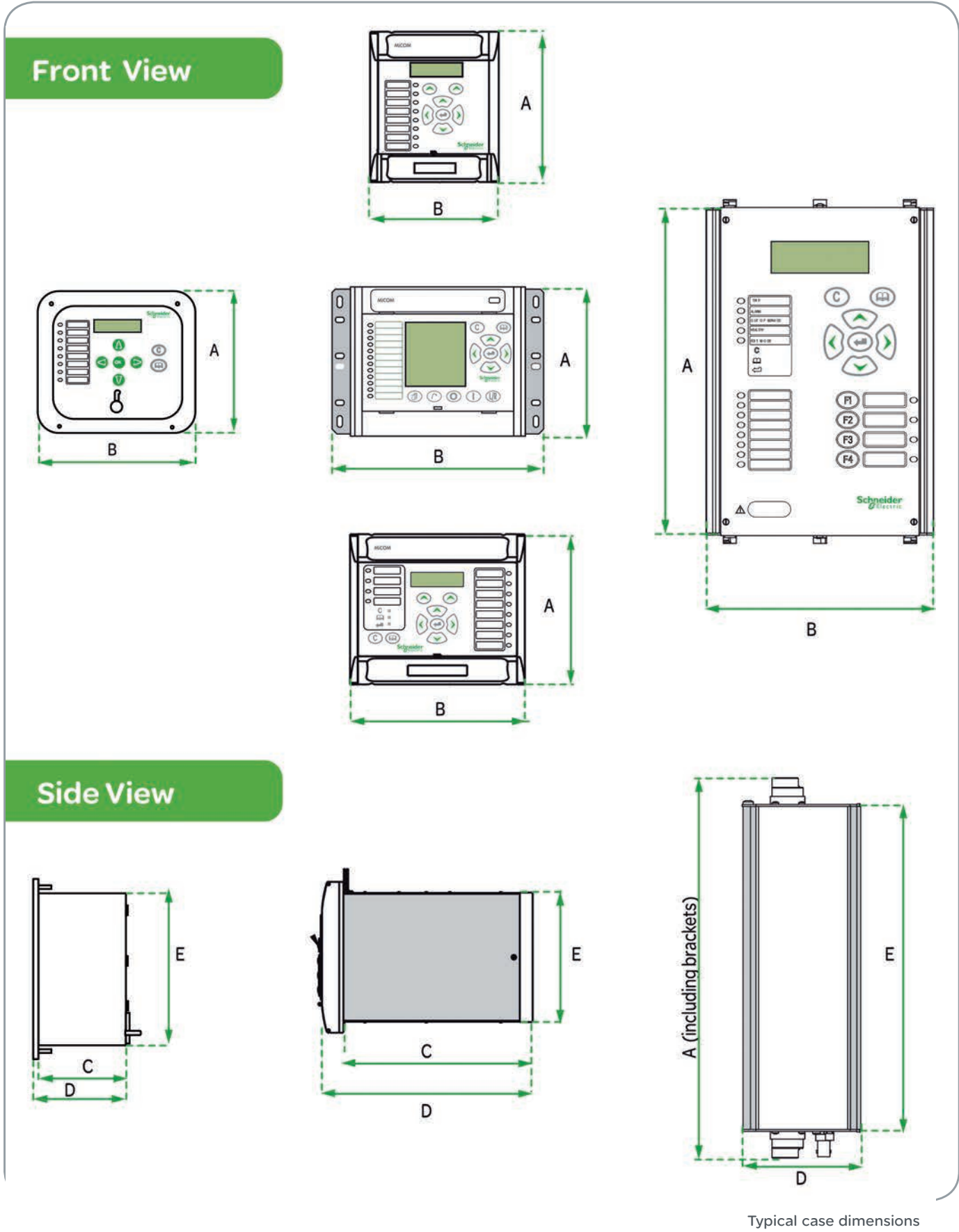
The cases are suitable for either rack or panel mounting.

An option for surface mounting and a compact case 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.

Dimensions (in mm)		A	B	C	D	E
series 10	Compact 1	106.5	106.5	113	118	101.5
	Compact 2	184	157	110	140	150
series 20	20TE	177	103	240 (incl. wiring)	270 (incl. wiring)	157.5
	30TE		155	139.8 223	166.4 249.6	155.2 156
series 30	24TE	184,5	186.4	227.9	253.6	177.5
	40TE		260.2			
	84TE		481.6			
	40TE Surface		260.2		257.1	177.5
	84TE Surface		481.6			
series 30 Compact	Compact	294.4	175.6		88.5	253
series 40	40TE	177	206	240 (incl. wiring)	270 (incl. wiring)	157.5 max
	60TE		309.6			
	80TE		413.2			
	80TE Rack		483			

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



Wiring

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

Technical data description

Power supplies

A wide range of power supply options are available at the ordering stage.

	Nominal Voltage Vnom.	Operate Range (V)	
		dc	ac
series 10	24-60Vdc/ac	19-72	19-66
	60-250 Vdc / 90-240 Vac	48-300	71-265
series 20	24-250 Vdc / 48-240 Vac	19.2-300	38.4-264
	48-250 Vdc / 48-240 Vac	38.4-300	38.4-264
series 30	24-60 Vdc	19-72	-
	60-250 Vdc / 100-230 Vac	48-300	100-230
series 40	24-48 Vdc	19-65	-
	48-110 Vdc / 40-100 Vac	37-150	32-110
	110-250 Vdc / 100-240 Vac	87-300	80-265

Digital Inputs

A wide range of opto input voltages are supported throughout the range.

	Auxiliary Voltage	Thresholds (V)
series 10	> 24 Vdc/ac	> 19.2 Vdc/ac
	> 90 Vac	> 71 Vac
	> 90 Vdc	> 71 Vdc
series 20	24- 250 Vdc / 48-240 Vac	> 19.2 Vdc/ac (Variant code "Z")
	48- 250 Vdc / 48-240 Vac	> 19.2 Vdc (Variant code "T") > 105 Vdc (Variant code "H") > 77V (70% of Uaux. 110 Vdc; Variant code "V") > 154V (70% of Uaux. 220 Vdc; Variant code "W")
series 30	Standard Variant > 18 (Uaux. 24-250 Vdc)	Thresholds
		Further Options > 73 V (67% of Uaux. 110 Vdc) > 90 V (60-70% of Uaux. 125/150 Vdc) > 146 V (67% of Uaux. 220 Vdc) > 155 V (60-70% of Uaux. 220/250 Vdc)
series 40	Universal programmable voltage thresholds	
	24/27, 30/34, 48/54, 110/125 and 220/250 Vdc	

General series data

	series 10	series 20	series 30		series 40
			Standard case	Compact case	
Frequency 50/60Hz	■	■	■	■	■
Dual rated 1A/5A *	■	■	■	■	■
Opto inputs	max 8	max 12	max 82	2	max 64
Output contacts	max 8	max 8	max 48	8	max 60
Continuous carry	5A	5A	5A	5A	10A
Make and carry	25A for 3s	30A for 3s	30A for 0.5s	30A for 0.5s	30A for 3s
High break contacts			■		■
LED indication (freely programmable)	8 (6)	8 (4)	29 (24)	17 (12)	22 (18)
Function keys / Hot keys	No	No	6	4	10/2 **
Settings groups	up to 2	up to 8	4	4	4 (2)
Fault records	20	25	8	8	5
Event records	200	250	1000	200	250-512
Disturbance records	5 (6s max)	5 (15s max)	8 (16.4s max)	8 (16.4s max)	75 s max.
Programmable logic	No	Flexible logic **	Fully programmable	Fully programmable	Fully programmable
IRIG B	No	Option	Option	Option	Option
LCD display	Alphanumeric	Alphanumeric	Alphanumeric / Graphical **	Alphanumeric	Alphanumeric
Front port	USB	RS 232	RS 232	RS 232	RS 232
Rear Port/2nd rear port	Yes/No	Yes/Option	Yes/Option	Yes/Option	Yes/Option
Courier	No	EIA(RS)485 **	EIA(RS)485 or fibre	EIA(RS)485 or fibre	K-Bus/ EIA(RS) 485 or fibre**
Modbus	Yes	EIA(RS)485	EIA(RS)485 or fibre	EIA(RS)485 or fibre	EIA(RS) 485 or fibre**
IEC 60870-5-103	Yes	EIA(RS)485	EIA(RS)485 or fibre	EIA(RS)485 or fiber	EIA(RS) 485 or fibre **
IEC 60870-5-101	No	No	EIA(RS)485 or fibre	EIA(RS)485 or fibre	No
DNP3.0	No	EIA(RS)485 **	EIA(RS)485 or fibre	EIA(RS)485 or fibre	EIA(RS) 485 or fibre**
IEC 61850	No	No	With Ethernet	No	With Ethernet
One box bay control with mimic	No	No	Yes **	No	No
Terminals	Pin or Ring **	Ring	Pin or Ring	Pin	Ring

* CT thermal ratings continuous: 4 In/10s & 30 In/1s & 100 In

** model dependent

MiCOM range description

Feeder management and overcurrent relays											
series		10			20						
model		P111	P115	P116	P120	P121	P122	P123	P125	P126	P127
CHARACTERISTICS	Case size				20TE	20TE	20TE	20TE	30TE	30TE	30TE
	CT Inputs	4	4	4	1	4	4	4	1	4	4
	VT Inputs								1	1	3
	Opto Inputs (max)	8	2	6	2	2	3	5	4	7	12
	Output Contacts (max)	8	4	7	4	4	6	8	6	8	8
	Output for striker triggering		1	1							
	Magnetic flags (max)			5							
ANSI	PROTECTION FUNCTION	P111	P115	P116	P120	P121	P122	P123	P125	P126	P127
32	Directional power										■
37	Undercurrent			■			■	■		■	■
46	Negative sequence overcurrent			■			■	■		■	■
46BC	Broken conductor			■			■	■		■	■
47	Negative sequence overvoltage										■
49	Thermal overload	■		■			■	■		■	■
50/51N	Ground fault	■	■	■		■	■	■	■	■	■
50/51P	3 Phase overcurrent	■	■	■		■	■	■		■	■
50/51P/N	1 Phase or earth overcurrent				■				■		
50BF	Circuit breaker failure	■	■	■			■	■		■	■
51V	Voltage controled overcurrent										■
59/27	Over/Under voltage										■
59N	Residual over voltage								■	■	■
64	Restricted earthfault				■	■	■	■	■	■	■
67N	Ground fault directional								■	■	■
67P	Phase directional										■
67W	Wattmetric earthfault								■	■	■
79	Autoreclose			■				■		■	■
81	Under/Over frequency										■
81R	Rate of change of frequency										■
86	Lock-out	■	■	■	■	■	■	■	■	■	■
CTS	Current transformer supervision										■
SOTF	Switch on to fault	■		■				■		■	■
TCS	Trip circuit supervision	■		■			■	■		■	■
VTS	Voltage transformer supervision										■
	Circuit breaker monitoring	■		■			■	■		■	■
	Cold load pick-up	■		■			■	■		■	■
	Inrush blocking	■		■			■	■			■

Feeder management relays								series
30			40					
P130C	P132	P139	P141	P142	P143	P145	model	
Compact	24, 40 or 84TE	40 or 84TE	40TE	40TE	60 or 80TE	60TE	Case size	
4	4	4	5	5	5	5	CT Inputs	
3	4 or 5	4 or 5	3	3	3 or 4	3 or 4	VT Inputs	
2	70	70	8	16	32	32	Opto Inputs (max)	
8	32	28	8	15	30	32	Output Contacts (max)	
							RTDs (max. option)	
	10	10					Analogue Input/ Output (max)	
	1/2	1/2					Function Keys / Hotkeys	
■	■	■	■	■	■	■	Bay Control & Monitoring	
	■	■					- with Mimic	
	■	■					Interlocking logic	
P130C	P132	P139	P141	P142	P143	P145	PROTECTION FUNCTION	ANSI
	■	■			■	■	Check synchronising	25
■	■	■	■	■	■	■	Directional power	32
		■					Master sequence device	34
■	■	■	■	■	■	■	Undercurrent	37
■	■	■	■	■	■	■	Negative sequence overcurrent	46
■	■	■	■	■	■	■	Broken conductor	46BC
■	■	■	■	■	■	■	Negative sequence overvoltage	47
■	■	■					Incomplete sequence relay	48
■	■	■	■	■	■	■	Thermal overload	49
■	■	■	■	■	■	■	Ground fault	50/51N
■	■	■	■	■	■	■	3 Phase overcurrent	50/51P
	■	■					1 Phase or earth overcurrent	50/51P/N
■	■	■	■	■	■	■	Circuit breaker failure	50BF
■	■	■					Motor	51LR
	■	■	■	■	■	■	Voltage controled overcurrent	51V
■	■	■	■	■	■	■	Over/Under voltage	59/27
■	■	■	■	■	■	■	Residual over voltage	59N
	■	■	■	■	■	■	Restricted earthfault	64
■	■	■					Startup monitoring	66
■	■	■	■	■	■	■	Ground fault directional	67N
	■	■	■	■	■	■	Sensitive directional earthfault	67N
■	■	■	■	■	■	■	Phase directional	67P
■	■	■	■	■	■	■	Wattmetric earthfault	67W
■	■	■		■	■	■	Autoreclose	79
■	■	■	■	■	■	■	Under/Over frequency	81
■	■	■	■	■	■	■	Rate of change of frequency	81R
■	■	■					Protective signalling	85
■	■	■	■	■	■	■	Lock-out	86
■	■	■	■	■	■	■	Current transformer supervision	CTS
■	■	■	■	■	■	■	Switch on to fault	SOTF
■	■	■	■	■	■	■	Trip circuit supervision	TCS
■	■	■	■	■	■	■	Voltage transformer supervision	VTS
	■	■	■	■	■	■	Neutral admittance	YN
	■	■	■	■	■	■	Circuit breaker monitoring	
■	■	■	■	■	■	■	Cold load pick-up	
■	■	■	■	■	■	■	Inrush blocking	
■	■	■	■	■	■	■	InterMiCOM	
■	■	■					Limit value monitoring	

Motor management relays										
series		10	20		30			40		
model		P211	P220	P225	P130C	P132	P139	P241	P242	P243
CHARACTERISTICS	Case size	-	30TE	30TE	Compact	24, 40 or 84TE	40 or 84TE	40TE	60TE	80TE
	CT Inputs	4	4	4	4	4	4	4	4	7
	VT Inputs			1 or 3	3	4 or 5	4 or 5	3	3	3
	Opto Inputs (max)	4	5	11	2	70	70	8	16	16
	Output Contacts (max)	4	5	5	8	32	28	7	16	16
	RTDs / Thermistors		6/0 or 4/2	10/3 or 0/0		10/0	10/0	10/0	10/0	10/0
	Analogue Input/Output (max)		0/1	0/2		1/2	1/2	4/4	4/4	4/4
	Function keys				■	■	■	■	■	■
	Interlocking logic					■	■	■	■	■
ANSI	PROTECTION FUNCTION	P211	P220	P225	P130C	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				■	■	■	■	■	■
	Anti Backspin			■				■	■	■
	Circuit breaker monitoring		■	■		■	■	■	■	■

Generator management relays					
40				series	
P342	P343	P344	P345	model	
40 or 60TE	60 or 80TE	80TE	80TE	Case size	CHARACTERISTICS
5	8	8	9	CT Inputs	
4	4	5	7	VT Inputs	
24	32	32	32	Opto Inputs (max)	
24	32	32	32	Output Contacts (max)	
10	10	10	10	RTDs	
4/4	4/4	4/4	4/4	Analogue Input/Output (max)	
■	■	■	■	Function keys	
■	■	■	■	Interlocking logic	
P342	P343	P344	P345	PROTECTION FUNCTION	ANSI
■	■	■	■	Underimpedance	21
■	■	■	■	Overfluxing	24
■	■	■	■	Check synchronising	25
■	■	■	■	100 % stator earth fault (3rd)	27TN/ 59TN
■	■	■	■	Directional power	32L/ O/R
■	■	■	■	Thermal overload	38/49
■	■	■	■	Loss of field	40
■	■	■	■	Negative sequence overcurrent	460C
■	■	■	■	Negative sequence thermal	46T
■	■	■	■	Negative sequence over voltage	47
■	■	■	■	Thermal overload	49T
■	■	■	■	Unintentional energisation	50/27
■	■	■	■	Phase overcurrent	50/51P
■	■	■	■	Circuit breaker failure	50BF
■	■	■	■	Ground fault	50N/ 51N
	■	■	■	Interturn/split phase	50DT
■	■	■	■	Voltage dependent O/C	51V
■	■	■	■	Under/over voltage	59/27
■	■	■	■	Residual over voltage	59N
■	■	■	■	Restricted earth fault	64
■	■	■	■	Wattmetric earth fault	64N/ 32N
■	■	■	■	Rotor earth fault (MiCOM P391 option)	64R
			■	100 % stator earth fault (low frequency)	64S
■	■	■	■	Sensitive directional earth fault	67N
■	■	■	■	Phase directional	67P
■	■	■	■	Wattmetric sensitive earth fault	67W
	■	■	■	Pole slipping	78
■	■	■	■	Turbine abnormal frequency	81AB
■	■	■	■	Under/Over frequency	81
	■	■	■	Generator Differential	87G/ 87GT
■	■	■	■	Current transformer supervision	CTS
■	■	■	■	Trip circuit supervision	TCS
■	■	■	■	Voltage transformer supervision	VTS
■	■	■	■	Circuit breaker monitoring	

Distance protection relays												
series		30					40					
model		P430C	P433	P435	P437	P439	P441	P442	P443	P444	P445	P446
CHARACTERISTICS	Case size	Com- pact	40 or 84TE	40 or 84TE	84TE	40 or 84TE	40TE	60TE	80TE	80TE	40 or 60TE	80TE
	CT Inputs	4	4	4	4 or 5	4	4	4	5	4	4	8
	VT Inputs	3	4 or 5	4 or 5	4 or 5	4 or 5	4	4	4	4	4	5
	Opto Inputs (max)	2	70	82	36	70	8	16	32	24	16	24
	Output Contacts (max)	8	32	48	48	28	14	21	32	46	16	32
	RTDs (option)		1	1	1	1						
	Analogue Input/Output (max)		1/2	1/2	1/2	1/2						
	Function keys/hotkeys	■	■	■	■		■	■	■	■	■	■
	Bay control & monitoring with Mimic					■						
	Interlocking logic		■	■		■						
ANSI	PROTECTION FUNCTION	P430C	P433	P435	P437	P439	P441	P442	P443	P444	P445	P446
21/21N	Distance	■	■	■	■	■	■	■	■	■	■	■
25	Check synchronising		■	■	■	■	■	■	■	■	■	■
32	Directional 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/Undervoltage	■	■	■	■	■	■	■	■	■	■	■
59N	Residual overvoltage	■	■	■	■	■			■		■	■
62/50BF	Circuit breaker failure	■	■	■	■	■	■	■	■	■	■	■
67N	Earth fault directional	■	■	■	■	■	■	■	■	■	■	■
67N	Transient earth fault directional		■	■		■						
67P	Phase directional						■	■	■	■	■	■
67W	Wattmetric earth fault	■	■	■		■						
68	Out of step tripping	■	■	■	■	■			■			■
78	Power swing blocking	■	■	■	■	■	■	■	■	■		■
79	Autoreclose	3 pole	3 pole	1/3 pole	1/3 pole	3 pole	3 pole	1/3 pole	1/3 pole	1/3 pole	3 pole	1/3 pole
81	Over/Under frequency	■	■	■	■	■	■	■		■		■
81R	Rate of change of frequency	■	■	■	■	■						
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	■	■	■		■						
	InterMiCOM	■	■	■	■	■	■	■	■	■	■	■
	Mutual compensation				■			■	■	■		

Line differential protection relays											
20	30		40							series	
P521	P530C	P532	P541	P542	P543	P544	P545	P546	P547	model	
30TE	Com-compact	40 or 84TE	40TE	60TE	60TE	60TE	80TE	80TE	80TE	Case size	CHARACTERISTICS
4	4	4	4	4	5	8	5	8	5	CT Inputs	
	3	4 or 5			4	5	4	5	4	VT Inputs	
5	2	46	8	16	16	16	32	24	24	Opto Inputs (max)	
8	8	30	7	14	14	14	32	32	32	Output Contacts (max)	
	■	■	■	■	■	■	■	■	■	Function Keys/Hotkeys	
		■								Interlocking logic	
P521	P530C	P532	P541	P542	P543	P544	P545	P546	P547	PROTECTION FUNCTION	
					■	■	■	■	■	Distance	21
		■			■	■	■	■	■	Check synchronising	25
■										Loss of load/Undercurrent	37
■	■	■			■	■	■	■	■	Negative sequence overcurrent	46
■	■	■	■	■	■	■	■	■	■	Thermal overload	49
■	■	■	■	■	■	■	■	■	■	Earth fault	50/51N
■	■	■	■	■	■	■	■	■	■	Phase overcurrent	50/51P
■	■	■	■	■	■	■	■	■	■	Circuit breaker failure	50BF
	■	■			■	■	■	■	■	Over/Under voltage	59/27
	■	■			■	■	■	■	■	Wattmetric earth fault	64W
	■	■			■	■	■	■	■	Earth fault directional	67N
		■			■	■	■	■	■	Sensitive directional earth fault	67N
	■	■			■	■	■	■	■	Phase directional	67P
					■	■	■	■	■	Power swing blocking	78
	3 pole	3 pole		3 pole	1/3 pole	1/3 pole	1/3 pole	1/3 pole	1/3 pole	Autoreclose	79
					■	■	■	■	■	Under/Over frequency	81
2	2	2	2/3	2/3	2/3	2/3	2/3	2/3		Line differential (terminal)	87L
									■	Phase comparison	87L
■					■	■	■	■	■	CT supervision	CTS
■	■	■	■	■	■	■	■	■	■	Trip Circuit Supervision	TCS
						■		■		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	

Rail protection relays					
series		30			
model		P138	P436	P438	P638
CHARACTERISTICS	Case size	40 or 84TE	40 or 84TE	40 or 84TE	84TE
	CT Inputs	2	3	3	5
	VT Inputs	1	2	2	1
	Opto Inputs (max)	22	28	28	38
	Output Contacts (max)	48	46	46	64
	RTDs (option)	1	1	1	1
	Analogue Input/ Output (max)	1/2	1/2	1/2	1/2
	Function Keys/Hotkeys	■	■	■	■
ANSI	PROTECTION FUNCTION				
21/21N	Distance		■	■	
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	■	■	■	■
81	Under/Over frequency	■			■
86	Lock-out	■	■	■	■
87T	Transformer differential (windings)				2
di/dt, dv/dt, dφ/dt	Train startups		■	■	
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		■	■	■
	Defrost protection			■	
	High impedance fault detection			■	
	InterMiCOM		■	■	



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