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.