Overview

PowerLogic™ P7 protection and control devices are based on state-of-the-art technology concepts and developed in close cooperation with customers, so it's built to meet your toughest demands:

- Flexible and modular design that allows the user to adapt the hardware to their needs.
- Embeds latest cybersecurity functionality to help prevent intentional misuse and cyber-threats.
- Fast and simple maintenance thanks to modularity and standardized boards and modules.

PowerLogic™ products are designed to be user friendly, a feature that is proven in our customer reports day after day. You'll benefit from features that include:

- A complete set of flexible, configurable protection and control functions related to the application.
- Switchgear control with tailorable single-line diagram, programmable function keys, LEDs, and customizable alarms.
- 7" touchscreen with intuitive navigation concept.
- Easy-to-use Engineering tool for setting parameters, device configuration, and network fault analysis.
- Both serial and Ethernet communication, including Ethernet redundancy with RSTP/HSR/PRP support.
- Efficient engineering thanks to IEC 61850 Edition 2.1.

PM107437

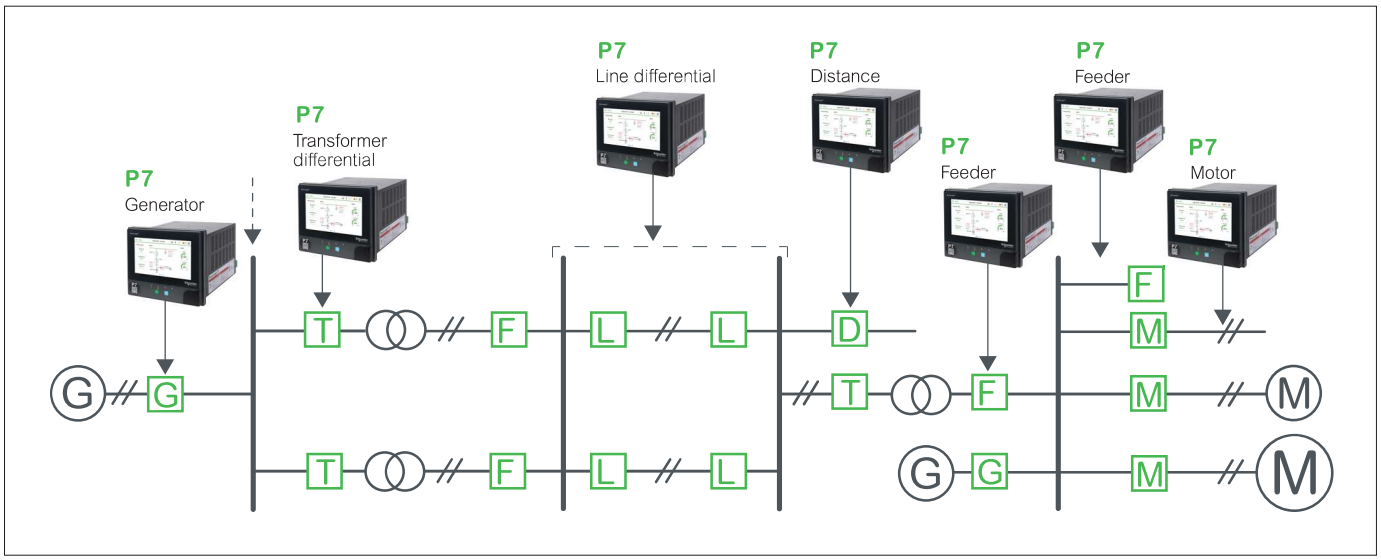
PowerLogic P7

PowerLogic™ P7 high-end protection and control devices are designed for electrical power systems in:

- Utilities
- Critical buildings and Industry:
  - Data Center
  - Transportation
- Large industrial processes:
  - Oil and Gas
  - Mining
  - Mineral and Metals
  - Electro-intensive

Range Overview

DM107110



Range overview shows future application scope

Selection Guide

PowerLogic™ P7 provides specific functions to address your needs in a one-box design, regardless of application.

		PowerLogic P7
		
Motor		●
Generator		●
Characteristics		
Measuring inputs	Current	4CT (1/5A) or 6CT (1/5A per analogue module)
	Core balance current	1CT (1A) core balanced
	Voltage	4VT or 3VT per analogue module
Arc-flash sensor inputs		-
Digital	Inputs	8...40 (40TE)
	Outputs	8...32 (40TE) + Watchdog (WD)
Temperature sensor input		0 to 8 (external module)
Front ports		1 mini-USB for configuration
Power supply		24...34 Vdc; 48...125 Vdc; 110...250 Vdc/ac
Ambient temperature, in service		-40...70 °C (-40...158 °F)
Communication		
Hardware modules	Serial	●
	Ethernet	●
	Redundant Ethernet	Optional SFP modules
Protocols	DNP3 Ethernet	●
	DNP3 serial	●
	Modbus Ethernet	●
	Modbus serial	●
Redundancy protocols	RSTP	●
	PRP / HSR	●
	Failover	●
Time synchronization	IRIG-B(1), Protocol	●
	SNTP, PTP IEEE 1588	●
Others		
Control		Mimic, up to 10 controlled objects
Logic (Matrix + Logic Equations)		●
Cybersecurity		●
Modular hardware (board withdrawability)		●
Mounting variants	Flush/rack	●/●

(1) IRIG-B module is a separate accessory

Selection Guide by Functionality

PowerLogic P7 function	IEC 61850 Logical node	ANSI code	Motor application (stages instantiated)		Generator application (stages instantiated)	
			Level 0	Level 1	Level 0	Level 1
Current protection functions						
Protection trip conditioning	**PTRC**	86	1	2	1	4
Phase overcurrent[1]	PH**PTOC**	50/51	2	2	2	4
Ground fault overcurrent[2]	EF**PTOC**	50N/51N	4	6	4	8
Sensitive ground fault overcurrent	VSEF**PTOC**	50SG/51SG	2	2	2	2
Negative sequence overcurrent	NPS**PTOC**	46	2	2	2	2
Inrush	ID**PHAR**	68ID	2	2	2	2
Selective overcurrent logic (SOL)	SOL**GAPC**	N/A	1	1	1	1
Phase undercurrent	PH**PTUC**	37	2	2	-	-
Voltage dependent overcurrent	PH**PVOC**	51V	-	-	1	1
Voltage protection functions						
Undervoltage	PH**PTUV**	27	2	2	2	2
Overvoltage	PH**PTOV**	59	2	2	2	2
Positive phase sequence undervoltage	PPS**PTUV**	47	1	1	1	2
Neutral overvoltage[3]	EF**PTOV**	59N	1	4	1	3
Negative phase sequence overvoltage	NPS**PTOV**	47	1	1	1	1
Frequency protection functions						
Overfrequency	**PTOF**	81O	*	2	*	2
Underfrequency	**PTUF**	81U	*	4	*	4
Differential protection functions						
High impedance differential[4]	HIZ**PDIF**	87/64REF	*	1	*	1
Biased differential protection	PH**PDIF**	87	*	1	*	1
Temperature protection functions						
Thermal overload protection for machine	THM**PTTR**	49	1	1	1	1
Temperature supervision	**STMP**	38/49T	8	8	8	8
Motor protection functions						
Motor monitoring	**ZMOT**	N/A	1	1	-	-
Motor start-up supervision, locked rotor	**PMSS**	48	1	1	-	-
Stall	JAM**PTOC**	51LR	1	1	-	-
Motor restart inhibition	**PMRI**	66	1	1	-	-
Voltage check	VC**PTUV**	47	1	1	-	-
Generator protection functions						
Third harmonic undervoltage	ST**PTUV**	27TN	-	-	1	1
Inter-turn protection based on split phase[5]	IT**PDIF**	87G	-	-	*	1
Inadvertent energization	IE**PIOC**	50/27	-	-	1	1
Speed protection functions						
Overspeed	**POVS**	12	1	2	1	2
Underspeed[6]	**PZSU**	14	2	3	2	3
Speed detection	**TRTN**	N/A	1	1	1	1
Distance/impedance protection functions						
Field failure	FF**PDIS**	40	*	1	*	1
Underimpedance	UZ**PDIS**	21	-	-	*	1
Out of step	OOS**PPAM**	78	*	1	*	1
Power protection functions						
Directional active overpower	P**PDOP**	32P	-	-	2	4
Directional reactive overpower	Q**PDOP**	32Q	2	2	1	2
Directional active underpower	P**PDUP**	37P	2	2	1	1

(1) PHPTOC1/2 are on PHTCTT1 and PHPTOC3/4 are on PHTCTT2
(2) EFPTOC1/2 are on PHTCTT1 and EFPTOC7/8 are on PHTCTT2; EFPTOC3/4 are on TCTR1 and EFPTOC5/6 are on TCTR2.
(3) For P7M, EFPTOV1 is on PHTVTT1 and EFPTOV2/3/4 are on TVTR1/2/3.
For P7G, EFPTOV1 is on PHTVTT1 and EFPTOV2/3 are on TVTR2/3.
(4) HIZPDIF1 is on PHTCTT2 and TCTR2.
(5) ITPDIF1 is on PHTCTT2.
(6) One PZSU stage is dedicated to Zerospeed ZEROPZSU.

* represents that the function will be available from the higher application level.
\- represents that the function is not available for the application type.

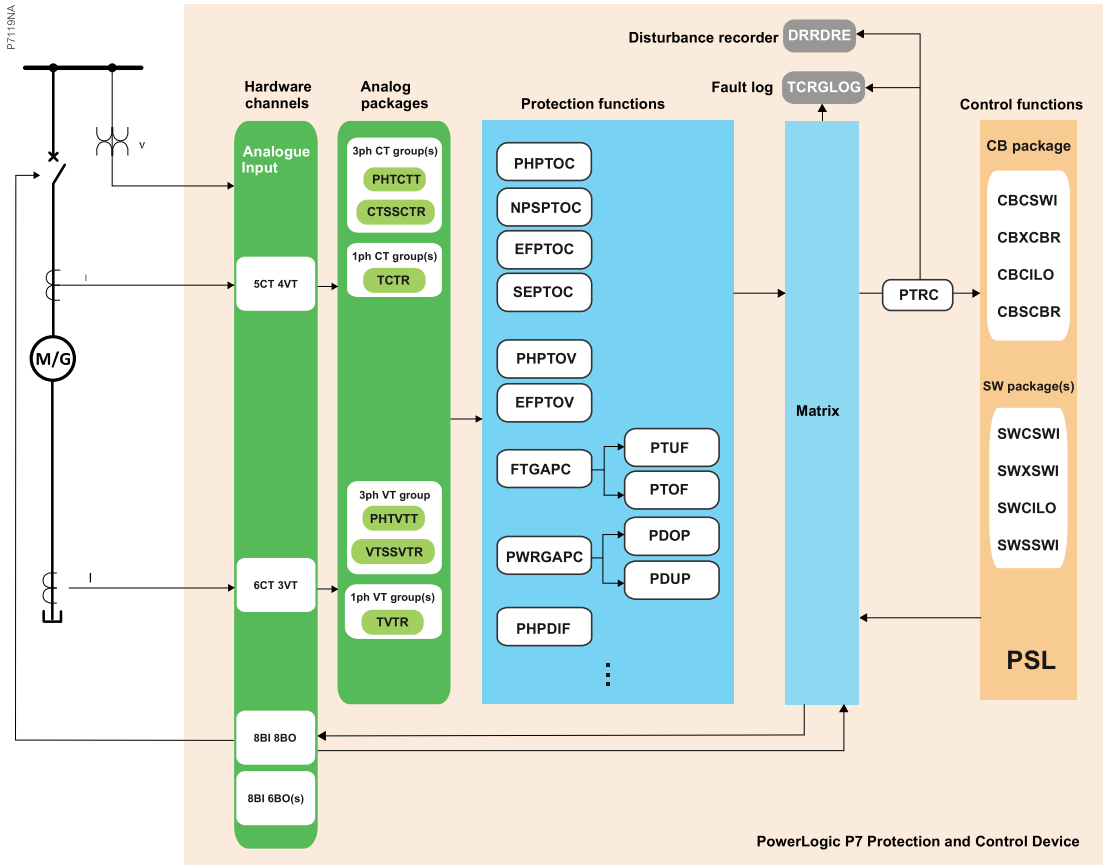
Selection Guide by Functionality

PowerLogic P7 function	IEC 61850 Logical node	ANSI code	Motor application (stages instantiated)		Generator application (stages instantiated)	
			Level 0	Level 1	Level 0	Level 1
Monitoring functions						
CT supervision	CTS**SCTR**	60	1	2	1	2
VT supervision	VTS**SVTR**	60FL	1	1	1	1
Circuit breaker supervision	CB**SCBR**	N/A	1	1	1	1
Switch monitoring	SW**SSWI**	N/A	5	9	5	9
DC battery voltage monitoring	**ZBAT**	N/A	1	1	1	1
Bay dead	PD**GAPC**	N/A	1	1	1	1
Control functions						
Circuit breaker proxy	CB**XCBR**	N/A	1	1	1	1
Circuit breaker control	CB**CSWI**	N/A	1	1	1	1
Circuit breaker interlocking	CB**CILO**	N/A	1	1	1	1
Circuit breaker failure	**RBRF**	50BF	1	1	1	1
Switch proxy	SW**XSWI**	N/A	5	9	5	9
Switch control	SW**CSWI**	N/A	5	9	5	9
Switch interlocking	SW**CILO**	N/A	5	9	5	9
Logs and records						
Sequence of event record	GEN**GLOG**	N/A	1	1	1	1
Disturbance record	DR**RDRE**	N/A	1	1	1	1
Fault record	TCR**GLOG**	N/A	1	1	1	1
Operation log	GEN**GLOG**	N/A	1	1	1	1
CT group measurement						
3ph current	VECA**MMXU**	N/A	1	2	1	2
3ph RMS current	RMSA**MMXU**	N/A	1	2	1	2
Sequence current	A**MSQI**	N/A	1	2	1	2
1ph current	VECAX**MMXU**	N/A	1	2	1	2
1ph RMS current	RMSAX**MMXU**	N/A	1	2	1	2
VT group measurement						
3ph voltage	VECV**MMXU**	N/A	1	1	1	1
3ph RMS voltage	RMSV**MMXU**	N/A	1	1	1	1
Sequence voltage	V**MSQI**	N/A	1	1	1	1
1ph voltage	VECVXMMXU	N/A	*	3	1	3
1ph RMS voltage	RMSVX**MMXU**	N/A	*	3	1	3
Bay measurement						
Fundamental frequency active, reactive and apparent power values, power factor	BAY**MMXU**	N/A	1	1	1	1
RMS active, reactive and apparent power	BAY**MMXU**	N/A	1	1	1	1
Minimum and maximum demand values: RMS phase currents	DVAL**MMXU**	N/A	1	1	1	1
Minimum and maximum demand values: active, reactive, apparent power and power factor	DVAL**MMXU**	N/A	1	1	1	1
Active and reactive of energy values	E**MMTR**	N/A	1	1	1	1
Bay Fourier current	BAY**MMXU**	N/A	1	1	1	1
Bay RMS current	BAY**MMXU**	N/A	1	1	1	1
Bay sequence current	BAY**MMXU**	N/A	1	1	1	1
Bay Fourier voltage	BAY**MMXU**	N/A	1	1	1	1
Bay RMS voltage	BAY**MMXU**	N/A	1	1	1	1
Bay sequence voltage	BAY**MMXU**	N/A	1	1	1	1

Selection Guide by Application

Application Overview

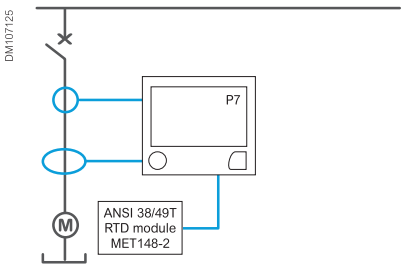
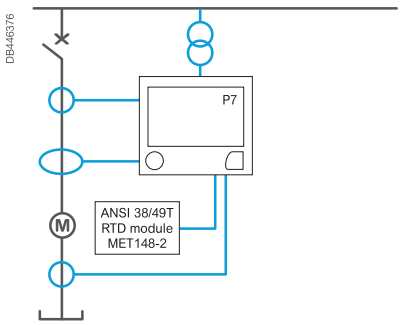
Functional Diagram



Selection Guide by Application

Motor and Motor-Differential Application

Motor and Motor-Differential Application

Motor Protection	
• Motor overcurrent and earth/ground fault overcurrent • Thermal overload • Motor start-up supervision • Motor restart inhibition • Speed protection (Sensor required)	• Motor-Differential voltage & frequency protection • Neutral displacement • Power protection • Field failure • Out of step
Motor protection without voltage monitoring  • Temperature measurement (stator, bearings)	**Motor/Motor-Differential with voltage monitoring** 

Selection Guide by Application

Generator and Generator-Differential Application

Generator and Generator-Differential Application

Generator protection	
• Generator Differential • Short circuit protection • Earth fault protection • Voltage & frequency protection • Thermal overload (ANSI 38/49T)	• 100% stator earth fault • Neutral displacement • Voltage & frequency protection
Generator protection with voltage & frequency monitoring	**Generator protection with voltage & frequency monitoring**