Backup Power Testing (NEMA)

Help Ensure Reliability and Availability of Backup Power Systems with Proper Testing

EcoStruxure Power Digital Application

0100DB2312 12/2023

Eco@truxure[®] Power





Legal Information

The information provided in this document contains general descriptions, technical characteristics and/or recommendations related to products/solutions.

This document is not intended as a substitute for a detailed study or operational and site-specific development or schematic plan. It is not to be used for determining suitability or reliability of the products/solutions for specific user applications. It is the duty of any such user to perform or have any professional expert of its choice (integrator, specifier or the like) perform the appropriate and comprehensive risk analysis, evaluation and testing of the products/solutions with respect to the relevant specific application or use thereof.

The Schneider Electric brand and any trademarks of Schneider Electric SE and its subsidiaries referred to in this document are the property of Schneider Electric SE or its subsidiaries. All other brands may be trademarks of their respective owner.

This document and its content are protected under applicable copyright laws and provided for informative use only. No part of this document may be reproduced or transmitted in any form or by any means (electronic, mechanical, photocopying, recording, or otherwise), for any purpose, without the prior written permission of Schneider Electric.

Schneider Electric does not grant any right or license for commercial use of the document or its content, except for a non-exclusive and personal license to consult it on an "as is" basis.

Schneider Electric reserves the right to make changes or updates with respect to or in the content of this document or the format thereof, at any time without notice.

To the extent permitted by applicable law, no responsibility or liability is assumed by Schneider Electric and its subsidiaries for any errors or omissions in the informational content of this document, as well as any non-intended use or misuse of the content thereof.

AccuSine[™], Acti 9[™], Altivar[™], ASCO[™], BlokSeT[™], ComPacT[™], EcoStruxure[™], EnerLin'X[™], ETAP[™], EVlink[™], EvoPacT[™], Galaxy[™], Harmony[™], Iso-Gard[™], Masterclad[™], MasterPacT[™], MicroLogic[™], Modicon[™], Okken[™], PowerLink[™], PowerLogic[™], PowerPacT[™], Power-Zone[™], PremSeT[™], PrismaSeT[™], Schneider Electric[™], SM AirSeT[™], Square D[™], SureSeT[™], TeSys[™], TransferPacT[™], Trihal[™], and Vigilohm[™] are trademarks and the property of Schneider Electric SE, its subsidiaries, and affiliated companies. All other trademarks (Cyber Sciences[™], Hirschmann[™]) are the property of their respective owners.

Table of Contents

Overview	5
Context of Application	5
Application Outcomes	5
Electrical Architecture	7
Introduction	7
Medium Voltage Generator Architecture	7
Low Voltage Generator Architecture	7
Digital Architecture	9
Medium Voltage Generator Architecture	9
Low Voltage Generator Architecture	10
ASCO Medium and Low Voltage Architecture	10
System Description	12
Data Flow	12
Inputs	12
Data Recording and Timestamping	14
Time Synchronization	15
Data Processing	16
Outputs	16

Overview

Context of Application

Critical buildings such as hospitals and data centers rely on backup power systems, also sometimes referred to as Emergency Power Supply Systems (EPSS), to supply the facility with power during an interruption of the utility incomer(s). During such an event, power is transferred from the utility supply to the alternate power source using Automatic Transfer Switch(es) / Power Transfer Switch(es) (ATS/PTS). According to the Electric Power Research Institute (EPRI), backup power systems fail to start 20% to 30% of the time. Common causes include starter battery failure, low fuel levels, wet stacking, controls in the wrong state, etc.

In some critical facilities such as hospitals, regulatory requirements specify how and how often the backup/emergency power systems need to be maintained and tested. They also prescribe how these test and maintenance activities are to be recorded. Doing this manually is error-prone and cumbersome. Examples of such regulatory requirements are: IEC 60364-7-710 (Europe), HTM-06-01 (UK), NFPA 99 and 110 (USA), AS_NZS 3009 (Australia / New Zealand), CSA Z32 and C282 (Canada).

Problem to Solve

The facility/energy manager needs to:

- Ensure the reliability and availability of backup power supply systems in the event of unexpected power outages.
- Save time, improve productivity, and ensure accuracy of testing process and documentation per standards or manufacturer recommendations.
- Comply with local and international standards and satisfy reporting requirements of regulatory bodies in critical buildings.

Purpose of the Application

Provide automated backup power test reporting including:

- Automatic/Power Transfer Switch (ATS/PTS)
- Backup generators
- Uninterruptable Power Supply (UPS)

Record key legislated parameters for compliance reports including:

- Transfer time for ATS/PTS and generators
- · Generator run time, engine loading, exhaust and engine temperature
- · Annual generator runtime for emission requirements reporting
- Ability of UPSs to sustain critical loads during power outage

Application Outcomes

Live Data Display

Device diagrams with status and analog values are available for ATS/PTS, generators, and UPS.

Reports

• Generator Test (EPSS) Report

	Cenerator A					6:49:16 AM - 1	1/5/2013 7:38:
			Generator	Load Summ	nary		
	1152013-640:16 AN						Nanoplate: 200 11/5/2013 7:35:1
	10021121249:10 AN						
Lo	agest Continuous	Load	Nameplate %	Threshold	Actual Run Duration	Required Ru Duration	n Test Stab
15/2013	6:50:00 AM - 11:5/2013	7:30:00 AM	22%	400 XW	48.0 min	30 min	PASS
500							
400							
200							
200							
100		•••••		•••••	•••••		
	6.55.00 AM	•	7:05:00 AM	7:15:00 AM Reactive Power			7.35.90 AM
ě.	e.55.00 AM		tosoo an awa → aar → ax Readings fi	7:15:00 AM Readive Power	Table	ean Is Load	7.05:00 AM
i.	6.55.00 AM		7.05.00 AM	7:15:00 AM Reactive Power	7250 Thresheld st Continuou	0 AM	
i.	ession Add Min Measurement		70500 AM AVA - XIII - AXX Readings fo Nin	7:15:00 AM - Reactive Power or the Longe Avg	T255 Threshold st Continuou	ow Is Load Max	7.0550 AM Units
i.	ESSIDIAN Mir Measurement Astre Perer		70500 AM AWA - ANT - ROX Readings fo Min 429.85	2:15:00 AM Reactive Power or the Longe Avg 431.0	T255 Threshold st Continuou a 5 53	o AM Is Load Max 432.09	7.05.00 AM Units W
i.	6.55.00 AM		7:05:00 AM AWA • XHT • AXX Readings fo Nin 429:35 452.82	2:15:00 AM - Reactive Power or the Longe Avg 431.0 455.0	T255 Thresheld st Continuou a b b b b b b b b b b b b b	0 AM IS Load Max 432,09 454,00	7.05.00 AM Units MY WA
Ĭ.	6.55.00 AM Min Measurement Asive Pever Apparent Pever Current Phase A		7:05:00 AM AVA • XIII • AXA Readings & Min 429:35 452:82 603:52	2.15.00 AM Peedive Power or the Longe Avg 431.6 453.6 000.0	Trasi Threshold st Continuou a 56 53 55 56 56 56 56 56 56 56 56 56	0 AM 10 Load Max 432.09 454.80 600.30	23530 AM Units WV V/A A
i.	ESSIDE AM Mile Measurement Active Pawer Apparent Pawer Current Phase A Current Phase B		70500 AM NVA • XIII • AX Readings f Nin 429.85 492.82 603.52 603.62	7:15:00 AM - Reactive Power or the Longe Avg 433.6 606.0 606.1	7285 Threshold st Continuou 6 5 5 10 13	0 AM 16 Load Max 432.09 444.80 608.30 608.51	7.3530 AM Units AW AA A A
ř.	ESS 00 AM Main Measurement Active Paver Appront Paver Connet Phase A Current Phase B Current Phase C		7:05:00 AM WA A ANY A DX Readings for Min 429:85 492:82 603:52 603:52 603:82 603:87	7:1500 AM - Reactive Power or the Long o Avg 431 0 455 0 606 0 100 1	7285	0 AM IS Load Max 432,09 444,00 000,30 000,51 000,51 000,51	23530 AM Units MV A A A A A
i.	ESSID AM Mile Mobisurement Alber Pever Appent Prove Current Phase B Current Phase D Current Phase A		7:08:00 AM AVA A AW AVA A AW AWA AWA AWA AWA AWA AWA AW	7:1500 AM - Readive Power or the Long o 431 5 455 8 600 6 600 1 410 5	7285	0 AM IS Load Max 432.09 454.80 600.50 600.51 608.78 410.55	73590 AM Units WW WA A A X V
ě.	ESSID AM Mile Molasurenet Adree Perer Correct Phase A Currect Phase A Currect Phase A Voltage Phases AN		7:05:00 AM AVA A AN AVA A AN AVA A AN AVA A AN AVA A AVA A	7:1500 AM Resolve Power or the Longe Avg 431.0 455.6 606.0 606.1 606.1 606.2	7285	E Load Max 432.09 454.80 608.30 608.51 608.38 470.58 237.25	23590 AM Units NW WA A A X V V V
ž	ESSED AM Molasurement Active Power Current Phase A Current Phase B Current Phase C Voltage Phases AN Voltage Phases AN		7:05:00 AM AVA A AM AVA A AM AVA A AM AVA A AM AVA A AVA A A AVA A AVA A A AVA A AVA A A AVA A A AVA A A AVA A A AVA A A A AVA A A A A	7:1500 AM Resolve Power or the Longe Avg 431 c 455.6 606.0 606.1 455.6 606.1 455.6 606.2 606.1 455.6 606.1 605.1	7380 Threshold st Continuou 5 5 5 5 5 5 5 6 6 6 6 7 7 6 6 6 7 7 7 7	E Load Max 432.09 454.80 606.50 606.51 608.78 405.95 237.26 411.61	23590 AM Units KW MA A A A X V V V V V

Backup Power System Test Report

Generator Activity Report

	der	12/1/201	15 12:00:00 A		rator Acti 8 12:00:00 Af	
	Non E	mergency Ac	tivity for RJH	_EC_Genera	tor	
0 EC_Generator_01	20 hours	40	60	80	100	120
EC_Generator_02	hours					
Generator		Non Emerg	gency Hours	Rema	ining Non Emer	gency Hours
EC_Generator	01	5.21	hours		94.79 hour	s
EC Generator	02	5.21	hours		94.79 hour	rs

Generator Activity Report

- Generator Load Summary Report
- Generator Battery Health Report
- UPS Auto-Test Report

G Elec	der			UPS	Auto Te	est Repo
0 1100			10010044-104	0.00 444 - 122	2014 15/00/00	PM (Server Loc
Genues 43			12/12/14/12/2		1201411.00.00	r in (derrer coo
Device Name	Timestore	Priority	Cause	Cause Value	Effect	Effect Value
UPS.Galaxy42	12110214 0.28 55.000 PM	25	Ballery Automatic Test in Progress	1.00	SP1 Status	Estreme
UPS Celenv-62	1210214 0:28 55.000 PM	25	Battery Automatic Test In Progress	OFF	SP1 Stetus	077
UPS Galaxy 62	12/1/22/14 0/28 55 200 PM	25	Eattery Status	256.00	SPIDI Status	Estreme
LPR Calaxy 62	1210214 028 55 000 PM	25	Ration Status	0.000	SPICI SMUS	Battery Test. Competed
UPS Galacy-62	10102014 0-22-35 000 054		Ballery Automatic	(1)	SE'I Status	Congresso
			Test in Progress			Battery Test in
UP6.Galery-62	1210014 622 35.000 PM	25	Bellery Status	258.000	57(0) 534545	Progress
UP5.Galaxy-62	12/10214 0:13:06.000 PM	25	Load Protected	ON	SP(0) Status	ON
Groups-62 Desire Name	Timestore	Printly	Cause	Cause Volue	Fillert	Fillent Value
			Ration Advanta			
UPS.Galaxy-64	12/10/14 0:28:55.000 PM	25	Test In Progress Bettery Automatic	1.00	SP1 Status	Entreme
UPS. Galaxy 64	1212014 828.55.000 PM	25	Test in Progress	OFF	8P1 BMus	OFF
UPS.Galaxy-64	1210214 8:28:55.000 PM	25	Bettery Status	258.00	SP(0) Status	Entreme
UP9.Galaxy-64	1212214 8:28:55.000 PM	25	Battery Status	0.000	\$P(0) \$5666	Battery Test Completed
UP5.Galary-64	12/10014 8:22:35.000 PM	25	Battery Automatic Test In Progress	CIN	SP1 Status	ON
UPS.Galaxy.64	12/12/214 0:22:35.000 PM	25	Battery Status	258.000	\$P(0) \$5666	Battery Test in Progress
UPS.Galery-64	1210014 81208.000 PM	25	Load Protected	ON	57(0)-51elus	ON
UPS.Galaxy-60	12/10/214 7:58:55.000 PM	25	Ballery Automatic Test in Progress	1.00	SP1 Status	Estreme
UP8.Calaxy.63	12100147.58.55.000 PM	25	Battery Automatic Test In Progress	OFF	8P1 Blatus	OFF
UPS.Galaxy-60	12112214 7:58:55.000 PM	25	Battery Status	256.00	SP(0) Status	Entreme
LPS. Galaxy 63	1210214 7.58.55.000 PM	25	Battery Status	6.000	\$F(0) \$5646	Battery Test Completed
UPS Galary-60	12/1/22/14 7:52:25.000 PM	25	Battery Automatic Test In Progress	ON	SP1 Status	ON
LPR Calaxy ED	1211/2014 7/52 35 000 PM	25	Ration Risks	256.000	17121 3340as	Buttery Test in
UPS Geleny-60	12112214 242-06 000 PM	25	Load Protected	00	SPIDI Status	Propries
UPS Galaxy 64	1210214 7.33.55.000 PM	15	Ration Judgmate	1.00	SP1 Status	Edware
UP5.Galery-64	1210214 7:32 55 500 PM	25	Test in Progress Battery Automatic	orr	SP1 Stelus	orr
UPS.Calary-64 UPS.Galary-64	1210214 7:33:55.000 PM 1210214 7:33:55.000 PM	25	Test in Progress Battery Status	256.00	SPID Status	Estame
						Battery Tent
UP8.Calaxy.64	1210014 7:33.56.000 PM	25	Battery Datus Battery Automatic	0.000	8P(0) 834545	Completed
UPS.Galaxy-60	12/1/22/14 7:28:55.000 PM	25	Eallery Automatic Test in Progress	1.00	SP1 Status	Estreme

UPS Auto-Test Report

• UPS Battery Health Report

Electrical Architecture

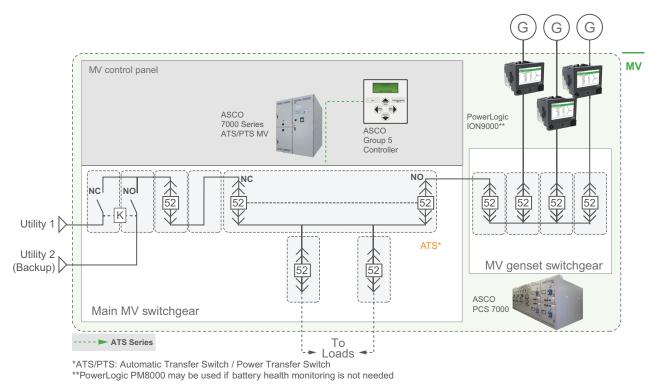
Introduction

The implementation of the Backup Power Testing application is different in the case of an MV or LV generator architecture.

The following diagrams detail the areas of the architecture where the connected products should be installed for both configurations.

Medium Voltage Generator Architecture

When generators are connected to medium voltage distribution, the following typical architecture can be implemented:

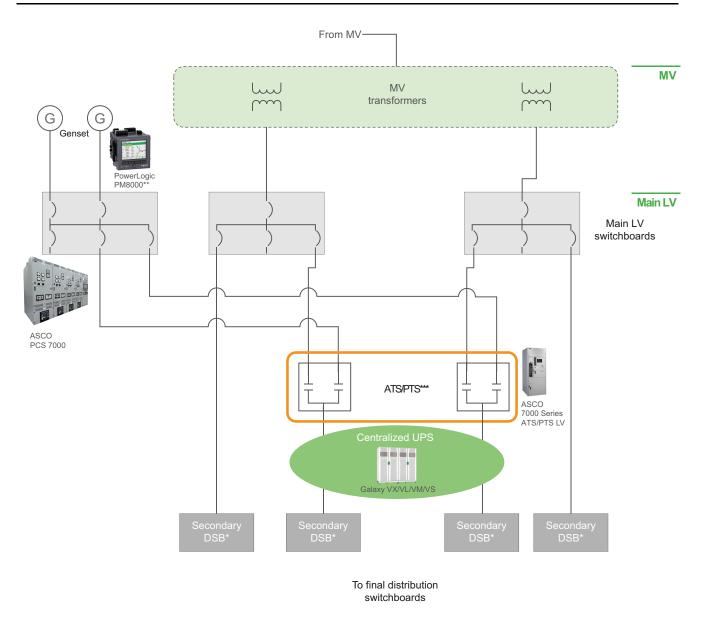


Low Voltage Generator Architecture

If the backup/emergency power system operates on a low voltage section of the network, it will usually include several ATS/PTSs¹.

As illustrated below, the ATS/PTS¹ and the genset will each be equipped with a power meter that will collect analog electrical data from its power outputs as well as status details via digital I/O ports.

^{1.} ATS/PTS: Automatic Transfer Switch / Power Transfer Switch



ATS/PTS*** status

- DSB = Distribution Switchboard
 ** PowerLogic PM8000 may be used if generator battery health monitoring is not needed
 *** ATS/PTS: Automatic Transfer Switch / Power Transfer Switch

Digital Architecture

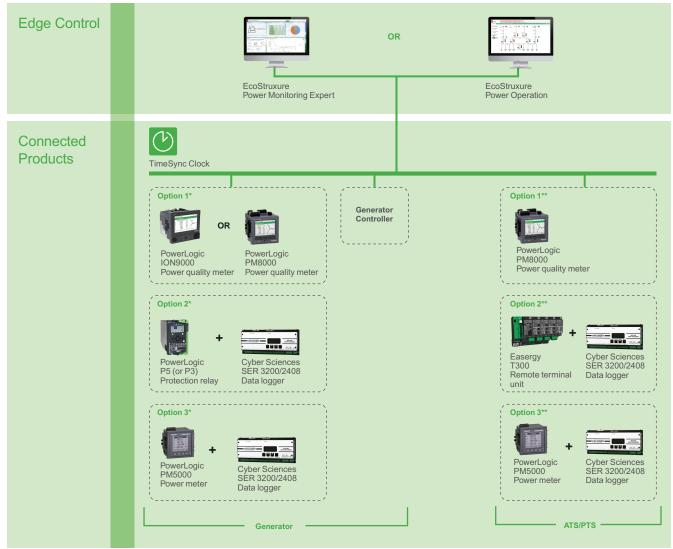
There are three possible digital architectures for the Backup Power Testing application:

- Medium Voltage Generator Architecture
- Low Voltage Generator Architecture
- ASCO Medium and Low Voltage Architecture

Medium Voltage Generator Architecture

The digital architecture of the Backup Power Testing application recommends direct Ethernet connections to the connected products. Data is captured on board connected products and uploaded into the Edge Control software (EcoStruxure Power Monitoring Expert or Power Operation) for data processing, visualization and reporting

The recommended digital architecture to implement the Backup Power Testing application with a medium voltage generator is shown below:



Ethernet - technical LAN

* Option 1 is the recommended architecture. Option 2 should be considered if PowerLogic P5, Easergy P3 with embedded metering is already present in the architecture.

Option 3 can be considered if an entry-level meter such as PowerLogic PM5000 is specified.

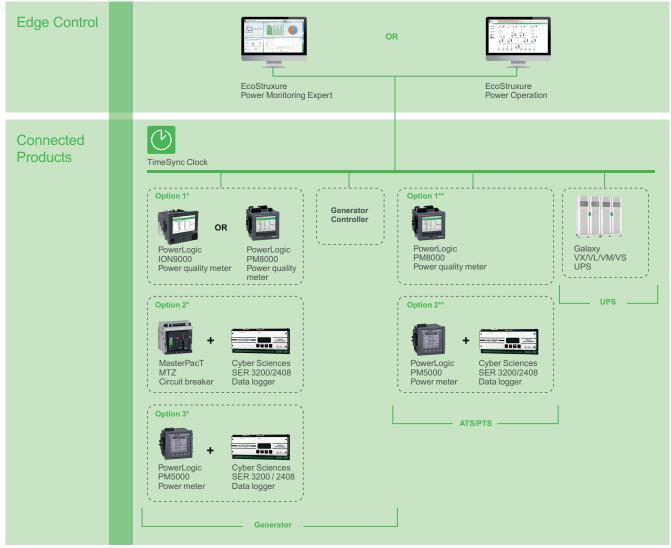
** Option 1 is the recommended architecture. Option 2 should be considered if Easergy T300 is present in the architecture.

Option 3 can be considered if an entry-level meter such as PowerLogic PM5000 is specified.

Low Voltage Generator Architecture

The digital architecture of the Backup Power Testing application recommends direct Ethernet connections to the connected products. Data is captured on board connected products and uploaded into the Edge Control software (EcoStruxure Power Monitoring Expert or Power Operation) for data processing, visualization and reporting.

The recommended digital architecture to implement the Backup Power Testing application with a low voltage generator is shown below:



Ethernet - technical LAN

* Option 1 is the recommended architecture. Option 2 should be considered if MasterPacT MTZ with embedded metering is already present in the architecture.

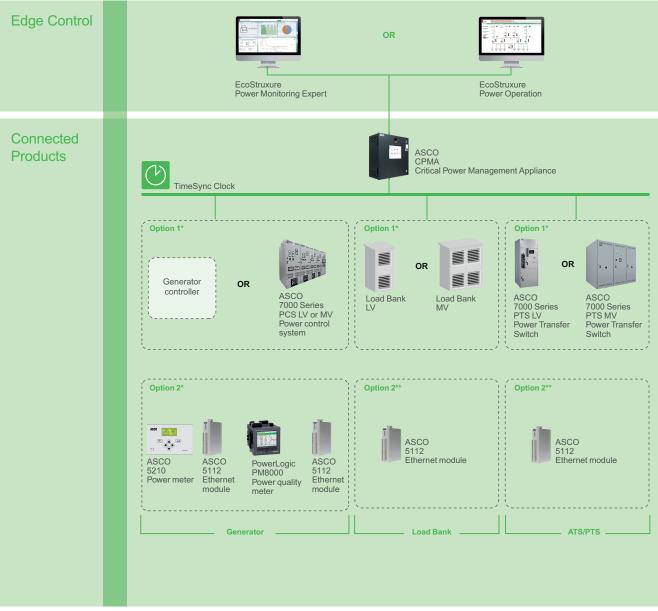
Option 3 can be considered if an entry-level meter such as PowerLogic PM5000 is specified.

** Option 1 is the recommended architecture. Option 2 can be considered if an entry-level meter such as PowerLogic PM5000 is specified.

ASCO Medium and Low Voltage Architecture

In this architecture, data from the ASCO PTS (Power Transfer Switch), PCS (Power Control System), and from Load Banks and Generator Controllers are acquired by the ASCO CPMA (Critical Power Management Appliance) which can perform data processing and visualization. The processed data can also be displayed in the Edge Control software (EcoStruxure Power Monitoring Expert or Power Operation) for data visualization and reporting.

The recommended digital architecture to implement the Backup Power Testing application with the ASCO system is shown below:



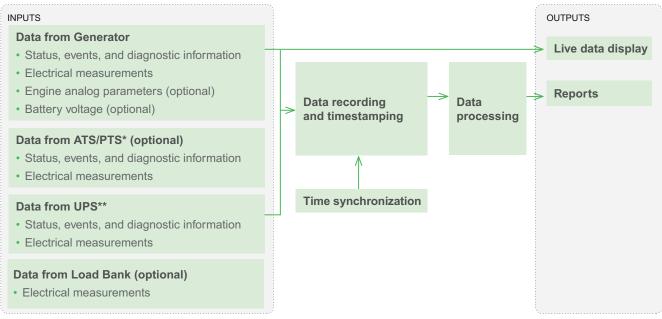
Ethernet - technical LAN

- * Option 1 is the recommended architecture for Greenfield and/or Digital based solutions
- ** Option 2 is the recommended architecture for Brownfield / Retrofit or hardwired solutions.

System Description

Data Flow

The Backup Power Testing application can be broken down as follows:



* ATS/PTS: Automatic Transfer Switch / Power Transfer Switch

** UPS: Uninterruptible Power Suppy

Inputs

Data from Generator

The following data are required:

Status, events, and diagnostic information:

- Stopped, running
- Generator starting, generator power availability (optional)
- Power outage status (optional)

Electrical measurements:

- Voltage (line to neutral / line to line)
- Current
- Total power, total apparent power
- Power factor
- Frequency
- Engine analog measurements (optional):
 - Engine coolant temperature
 - Exhaust gas temperature
 - Engine oil pressure
 - Engine start battery voltage

This input data may be provided by the generator controller, the power control system (ASCO 7000 Series PCS), power meters (PowerLogic ION9000, PM8000,

PM5000, ASCO 5210), data loggers (Cyber Sciences SER 3200/2408, ASCO 5112), and/or embedded metering (PowerLogic P5/P3, MasterPacT MTZ).

PowerLogic

PM8000



PCS



PowerLogic

ION9000



PowerLogic

PM5000





ASCO 5210



Sciences SER 3200/ 2408



PowerLogic

P3



MasterPac₁ MTZ

Data from Automatic Transfer Switch / Power Transfer Switch (ATS/PTS)

ASCO

5112

The following data are collected:

Status, events, and diagnostic information:

• Normal, Test, Emergency

Electrical measurements:

ATS/PTS load data (optional)

This input data may be provided by the ATS/PTS controller (PowerLogic T300, ASCO 7000 Series PTS), power meters (PowerLogic ION9000, PM8000, PM5000), and/or data loggers (Cyber Sciences SER 3200/2408).





PowerLogic T300



ASCO 7000 Series 7000 Series PTSIV



PTS MV

PowerLogic

PM8000

PowerLogic ION9000



PowerLogic

PM5000



Cyber Sciences SER 3200/2408

Data from Uninterruptible Power Supply (UPS)

The following data are collected:

Status, events, and diagnostic information:

- Operating mode
- UPS fault .
- Charger fault ٠
- Output overload

Electrical measurements:

- Voltage and current (line to neutral / line to line)
- Frequency
- Battery voltage signature

These input data are provided by the UPS (Galaxy VX/VL/VM/VS).



Data from Load Bank (optional)

The following data are collected:

Electrical measurements:

- Voltage (line to neutral / line to line)
- Current
- Total power, total apparent power
- Power factor
- Frequency



Load Bank MV

Load Bank LV

Data Recording and Timestamping

To help ensure the validity of the test reports and avoid repetition of the test due to data loss, data must be recorded and timestamped at the connected product level. This will allow producing a valid report even if there was a temporary communication loss between the Edge Control software and the connected products during the test.

Advanced meters such as the PowerLogic ION9000, PM8000, and some PowerLogic PM5000 models (PM53xx and PM55xx) can timestamp and record onboard input data, energy measurements, and connected equipment states. EcoStruxure Power Monitoring Expert or Power Operation can then retrieve the records with their original timestamp.







PowerLogic PM8000



PowerLogic PM5000

For other connected products (PowerLogic P5/P3, MasterPacT MTZ, entrylevel PowerLogic PM5000 models) measurements are acquired by the connected products and then recorded and timestamped by associated Cyber Sciences SER 3200/2408 or by the ASCO CPMA (Critical Power Management Appliance).





P3





PowerLogic P5

PowerLogic



PowerLogic PM5000



CPMA



SÉR 3200/2408

Timestamping Requirements for Backup Generator and ATS/PTS

Due to the accuracy requirements of the Generator Test (EPSS) Report, it is necessary to have all status data recorded with high time precision. Depending on the jurisdiction, this is typically greater than ±100 ms.

When using power meters to monitor generator and ATS/PTS, a custom framework is required to record all required data. This framework is described in detail in the Backup Power module in the EcoStruxure Power Monitoring Expert System Guide.

Advanced power meters (PowerLogic ION9000 and PM8000) support this framework.

Timestamping Requirements for UPS

For UPS test reports, time accuracy is not as critical, but should still be within ±1second.

For a comprehensive overview of device recording and timestamping capabilities, refer to Data Recording and Time Synchronization Capabilities of EcoStruxure Power Connected Products.

Time Synchronization

For a consistent chronological view of all events that take place throughout the facility, date and time should be accurately distributed to connected products and other management systems.

Time synchronization can be performed through various technologies (PTP, NTP, SNTP, etc.). An external master clock may be required and can be connected to a GPS antenna to reach the expected time precision.



Data Processing

The following calculations are performed by the Backup Power Module of EcoStruxure Power Monitoring Expert or Power Operation.



EcoStruxure Power Monitoring Expert



EcoStruxure Power Operation

In the case of an ASCO architecture, these calculations can be performed by the ASCO CPMA.



For the Backup Generator and ATS/PTS²

Data processing consists of:

- Analyzing the status information from the generator(s) and ATS/PTSs² and compiling the run history table which details each and every backup power run, including start, stop, and transfer time.
- Among others, the following indicators are extracted from available data:
 - Split of emergency / non-emergency running hours as an annual total.
 - Running hours broken out into categories for Test, Power Outage, Load Shedding.
- For the backup/emergency system³ conformance tests, all success criteria are examined to provide a comprehensive fail/pass status.

For the UPS⁴

Data processing depends on whether the UPS equipment has auto-test capabilities:

- If it has auto-test capabilities, (for example, Galaxy VX/VL/VM/VS), the module will gather all data relevant for the auto-test (final status of the test and status for each step).
- If not, the module compares the battery voltage waveform during a transfer to a reference signature waveform.

Outputs

Outputs are displayed remotely via the Edge Control software EcoStruxure Power Monitoring Expert or Power Operation.

- 3. Also sometimes referred to as Emergency Power Supply System (EPSS)
- 4. UPS: Uninterruptible Power Supply

^{2.} ATS/PTS: Automatic Transfer Switch / Power Transfer Switch

The Backup Power module of EcoStruxure Power Monitoring Expert must be deployed to benefit from the following features.



In the case of an ASCO architecture, outputs are displayed by the ASCO CPMA.



Live Data Display

The following outputs can be configured to represent an operator interface for Backup Power Testing:

- Default Generator, UPS⁵, and ATS/PTS⁶ diagrams
- Generator Performance (EPSS) operator interface. Helps monitor the following during tests in real time:
 - Electrical data: current, voltage, power, frequency, power factor
 - Generator and ATS/PTS run/stop status
- UPS⁵ Auto-test diagrams

	Apparent Power	0.0 KVA	Fael Pressan	0.0 Bor	Bulk Feel Tank Pump LA	OFF
- China - Chin	Reactive Power	0.0 KVAR	Battery Voltage	2.0 VOC	Bulk Feel Tank Pump 18	OFF
	Trae Power	0.0 kW	Engine RFM	0.0 9994	Bulk Feel Tank Pump 2A	orr
	Pawer Factor	0.00	Engine Oil Temp	0.0 C	Bulk Feel Tank Pump 28	OFF
TITLE OF	Voltage A-B	0.0 V	Engine Oil Pressure	0.0 Ber	Bulk Feel Tank 1 Fuel Lvl	OK.
MARKED A	Votage D-C	0.0 V	Engine Coolant Temp	0.0 C	Dulk Feel Tank 2 Feel Lvf	OK
- 1 (A	Voltage C-A	0.0 V	Engine Coolant Pressure	G.D Ber		
	Votage A-N	0.0 V	Exhaust Gas Temp	0.0 C		
	Vohage 8-W	0.0 V	Engine Percent Load	0.0 %		
-	Voltage C-N	0.0 V	Engine Rue Hours	12.0 Hts		
Diesel Generator	Current A	0.0 A				
2.5 HWA, 2 MW, 493/277 V	Current 8	0.0 A				
0	Current C	A 0.0				
0						
	O System in Auto	Low P				
Gen A Switzbaard 450 Y, 2200 A	Remote/Hanual Start		ad Proceare			
- 3	en Aun		amory Vultage			
			ttery Charger Fault			
0.0 KW	Creergency Stop	Overo				
5.0.A .	Oenerator C8 Closed	0 0ves				
4000 AF	0 Control Phil CB Closed		doe Pressure			
	0 Stations		ingine Oil Temp			
Generator Switchgear	Common Alarm	In High E	ingine Coolont Temp			
	0 Generator Running		ngine Coolent Temp			

Generator Equipment Diagram

Reports

The following reports can be generated on-demand or automatically generated and sent by email:

5. UPS: Uninterruptible Power Supply

^{6.} ATS/PTS: Automatic Transfer Switch / Power Transfer Switch

Backup/Emergency Power Reports

Generator Activity Report

Shows the test run hours and other test run data for each generator in the selected group.

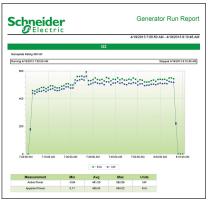
Ŀ	neid	ric					VI (Server Local)	Schneid	er Gener	ator Activity Repo
		Non E	mergency Act	ivity for RJH_	_EC_Genera	tor		Schneid Belect		
	0	20	40	60	80	100	120		Generator Activity Details for RJH_EC_General EC_Generator, H - Salt Insen	ter
EC_Oenerator_0	n <u></u>								521 hours	
C_Generator_G	5.21 hours									
									EC_Denember_E2 - \$31 hours	
	Senerator		Non Emerg		Rema	ning Non Emer				
	Generator_01		5.21			94.79 hour			621 hours	- 1er
EC	Generator 02		5.21	hours		94,79 hour	8			and loss

Generator Activity Report

•

Generator Load Summary Report

Provides a summary graph of electrical data during a generator run.



Generator Load Summary Report

• Generator Test (EPSS) Report

Provides a standard methodology for testing the generators and provides a detailed report of the generator operation during the test.

Can also be configured to conform to the requirements for a Backup/ Emergency Power Supply System (EPSS)⁷ test, including ATS/PTS⁸. For example, the report shows the transfer time of the lead ATS/PTS⁸ and indicates whether the transfer time passes or does not pass the test requirements.

	Generator A						3 6:49:16 AM	4 - 11/5	2013 7:38:1
				Generato	r Load Summ	iary			
UPPR:	1152013-049								aneplate: 200
	110/2010 10:40	TO AN							0.00107.0011
Lo	ngest Conti	nuous Load	1	Nameplate %	Threshold	Actual Run Duration	Required		Test State
15201	0 6:50:00 AM - 1	115/2013 7:38	00 AM	225	400 KW	48.0 min	30 min		PASS
500									
400	11111								
300									
200									
100					•••••				
	50:00 AM 0:50	5:00 AM	-	7:0000 AM	7:15:00 AM Reactive Power	-*- Threshold	00 AM	10 AM 7	35:00 AM
	6.55	Min, A		7:05:00 AM KWA → XW → XX Readings f	7:15:00 AM - Reactive Power or the Longe	725 Threshold st Continuo	us Load	0 AM 7	
		Min, A		7:05:00 AM	7:15:00 AM Reactive Power	735 Threshold st Continuo	00 AM	0 AM 7	25:00 AM Units
	6.55 Measure	Min, A		7:05:00 AM KVA - ANT - Nin Nin	7:1530 AM - Reactive Power or the Longe Avg	735 Threshold st Continuo	us Load Max	DAM 7	Units
	6.55 Measure Active P	Min, Ar Min, Ar sment towr Power		rosco AM KWA KWT AX Reladings f Nin 429.85	2:15:00 AM - Reactive Power or the Longe Avg 401.0	7:25 Threahold at Continuo 6 a	us Load Max 432.09	DAM 7	Units
	6.55 Measure Active P Apparent	Min, Ar Min, Ar street tower Power hase A		70500 AM KVA - KXX - XX Readings f Min 429.35 452.82	7:15:00 AM - Reactive Power or the Longe Avg 4010 453.0	732 Threahdd st Continuo s s a a b	00 AM US Load Max 432.09 454.80	DAM 7	Units kW
	655 Measure Active P Apparent Current Pi	Min, Ar Min, Ar Innent Power Power Nese A hase B		7:05:00 AM KWA XXX AX Readings f Nin 429:35 452:82 603:82	7:15:00 AM - Reactive Power or the Longe Avg 401.0 453.6 606.0	735 Threshold 51 Continuo 6 6 6	00 AM US Load Max 432.09 454.80 608.30	, o a m	Units kw kw
	6.55 Measure Active P Apparent Current Pl Current Pl	Min, Ar Min, Ar sment Power Power hese A hese B hase C		7:05:00 AM KWA X87 AX Reladings f Min 429:95 452:82 603:82 603:82	7:1500 AH - Reactive Power or the Longe Avg 401.0 453.4 606.5 606.1	735 Threshold st Continuo 6 6 6 2	00 AM US Load Max 432.09 454.80 608.30 608.51	, o a m	Units kw kw A A
	ESS Measure Active P Apparent P Current P Current P Valage Piss Valage Piss	Min, Av min, Av ment beer Power here B here B here C asses AB eses AH		7:05:00 AM (VA - X87 -	7:1500 AH - Reactive Power or the Longe 401.0 401.0 606.0 606.1 606.1 606.2 226.3	735	00 AM US Load 422.09 454.80 608.30 608.54 608.76 410.88 237.28	, AM 7	Units Iov KAA A A V V V
6	Active P Active P Accessed Connect P Connect P Connect P Connect P Vallage Pho Vallage Pho Vallage Pho	Min, Av man, Av man, Av ness Power P		70500 AM AX Roadings f Nin 429.55 452.82 603.82	7:1500 AM - Reactive Power or the Longe 401 c 451 c 455 c 600 c 100 c 1	7:28 Threahdd st Continuo 5 3 6 5 2 6 5 2 6 5	00 AM US Load Max 402.00 608.50 608.51 608.55 410.88 237.28 411.01	DAM 7	Units ter A A A V V V V V
	Measure Active P Apparent Convert P Convert P Vallage Phi Vallage Phi Vallage Phi Vallage Phi	Min, A mment town Power Power Nese A heas B asses AN asses BC asses EM		70500 AM (VA + X35 + AN Roadings f Nin 429 55 452 82 603.82 603	2:15 00 AM - Reactive Power or the Longo 401 (400 0 600 0 600 0 600 0 600 0 410 0 226 0 226 0	725 Threahold st Continuo st Continuo	US Load Max 432.09 454.80 608.31 608.35 410.88 237.28 411.61 237.28	DAM 7	Units EW A A A V V V V V V V V
	Active P Active P Accessed Connect P Connect P Connect P Connect P Vallage Pho Vallage Pho Vallage Pho	Min, Ai Min, Ai mash towr Power Power hase A hase 3 hase 5 hase 7 hase 5 hase 5		70500 AM AX Roadings f Nin 429.55 452.82 603.82	7:1500 AM - Reactive Power or the Longe 401 c 451 c 455 c 600 c 100 c 1	725 Threbold at Continuo 5 3 5 3 5 3 5 4 6 5 3 5 4 5 5 5 5 6 5 6 6 6 6	00 AM US Load Max 402.00 608.50 608.51 608.55 410.88 237.28 411.01	DAM 7	Units ter A A A V V V V V

Backup Power System⁷ Test Report

^{7.} Also sometimes referred to as Emergency Power Supply System (EPSS)

^{8.} ATS/PTS: Automatic Transfer Switch / Power Transfer Switch

Generator Battery Health Report

Shows the captured waveform image of the generator voltage when the generator starts, compares it to a reference signature, and uses it to monitor battery performance over time and plan preventative maintenance actions when necessary.

Available with PowerLogic ION9000 only.

Belectric		Battery H	lealth Rep
Battery Waveform Health E	valuation for Generate	r: G1 at 4/3/2013 12:3	0-37 PM.
Reference Waveform Timestamp	12/19/2012 1:33:55 PM	Cumulative Difference	202.32
Waveform Timestamp	4/0/2013 12:30:37 PM	Status	Below Threshold
*		- Reference Manufarm -	Vavefore Value
2		and a second second	
22	and the second s	AL.,	
18	2000		4000
-	Milaeconde		
0.5	culument of some		Votage Difference
0- -0.5-	Anoningeneration	an a	WARNING
.1 0	2000 Milaeconte		4000
	- Cumu	ative Ofference — Cumulativ	e Difference Threshold
1290			
800 -			
400 - 200 -			
0			
-200 -			
-490			

Generator Battery Health Report

Uninterruptible Power Supply (UPS) Reports

UPS Auto-Test Report

Provides information regarding the battery health of your Galaxy VX/VL/VM/ VS UPS devices.

	tric			UPS	Auto Te	est Repo
Groups-43			12/1/2014 12:0	0.00 AM - 12/1	/2014 11:00:00	PM (Server Loo
Device Name	Timestamp	Priority	Cause	Cause Value	Effect	Effect Value
UPS.Galaxy-62	13/12014 6:38:55.000 PM	25	Battery Aslamatic Test in Program	1.00	SP1 Status	Editoria
UPS.Galaxy-62	12/1.2014 6:29:55.000 PM	25	Ratery Automatic Test In Process	077	SP1 Status	orr
uPS.Galaxy-02	13/1 2014 6:28:55 000 PM	25	Battery Status	256.00	SP(0) Status	Extreme
UP8.Oalery-62	13/12014 6/28/55.000 PM	25	Ballery Status	0.000	8P(0) Status	Battery Test Completed
UPS.Galaxy-62	12110014 6:22:35:000 PM	25	Ballery Automatis Test in Progress	ON	SP1 Status	ON
UPS.Galery-62	12/1 2014 6 22 35 000 PM	25	Ballery Status	256.000	SP(2) Status	Battery Test in Progress
UPS.Galacy-62	12/1/2014 0:12:08:000 PM	25	Land Protected	ON	SPVX Status	ON
Groups-62						
Device Name	Timestamp	Priority	Cause	Cause Value	Effect	Effect Value
UPS.Galaxy-64	1211 2014 8:29:55 000 PM	25	Battery Automatis Test In Progress	1.00	SP1 Status	Extreme
UPS.Calery 54	13/12014 8:28:55:000 PM	25	Dattery Automatic Test in Process	OFF	SP1 Blatus	OFF
UPS.Galaxy-64	12/1/2014 8:29:55.000 PM	25	Datery Status	256.00	SP(0) Status	Extreme
UPS.Galaxy-64	13/12014 8:28:55.000 PM	25	Ballery Status	0.000	SP(2) Status	Battery Test Completed
UP5.Galaxy-64	12/1/2014 8:22:35:000 PM	25	Battery Automatic Test In Progress	ON	CP1 Status	ON
UPS.Galaxy-64	13/1 2014 8 22 35 000 PM	25	Babery Status	256.000	SP(2) Status	Battery Test in Propress
UPE.Galery-04	12/1/2014 8:13:08:000 PM	25	Load Protected	ON	SP(2) Stelks	ON
UPS.Galaxy-60	12/10014 7:58:55.000 PM	25	Ballery Asternatis Test In Progress	1.00	SP1 Status	Extreme
UP8.Calery-63	12/12014 7.58:55.000 PM	25	Datlery Automatic Test in Process	OFF	8P1 Blatus	OFF
UPS.Galaxy-65	12/1/2014 7:58:55.000 PM	25	Datlery Status	256.00	SP(0) Status	Extreme
UPS.Galaxy-63	1371 2014 7.58:55.000 PM	25	Babery Status	6.000	SP(2) Status	Battery Test Completed
UPS.Galaxy-65	12/10014 7:52:35:000 PM	25	Battery Automatic Test In Process	ON	SP1 Status	ON
UPS.Galaxy-63	12/12014 7.82.35.000 PM	25	Ballery Status	256.000	SP(2) Status	Dattery Test in Progress
UPS.Galaxy-65	12/1/2014 7:43:08:000 PM	25	Load Protected	ON	SP(2) Status	ON
UPS.Galaxy-64	13/1 0014 7:33:55.000 PM	25	Battery Aslamatic Test in Program	1.00	SP1 Status	Editoria
UPS.Galaxy-64	12/1/2014 7:33:55:000 PM	25	Battery Automatic Test In Process	077	SP1 Status	077
UPS.Galaxy-64	1211 2014 7:33:55 000 PM	25	Babery Status	256.00	SP(0) Status	Extreme
UPS.Calaxy-64	13/1/2014 7:33:55:000 PM	25	Ballery Status	0.000	8P(2) 834946	Dattery Test Completed
UPS.Galaxy-60	12/1/2014 7:28:55 000 PM	25	Ballery Asternatis Teol in Progress	1.00	SP1 Status	Extreme

UPS Auto-Test Report

• UPS Battery Health Report (For third-party UPS)

Displays information related to the health of the battery for a UPS device. The UPS devices intended for use with this report are UPS devices that do not have an auto-test capability.

Available with PowerLogic ION9000 only.



Ups Battery Health Report

UPS Battery Health Report (For third-party UPS)

Schneider Electric 35 rue Joseph Monier 92500 Rueil Malmaison France

+ 33 (0) 1 41 29 70 00

www.se.com

As standards, specifications, and design change from time to time, please ask for confirmation of the information given in this publication.

© 2023 Schneider Electric. All rights reserved.

0100DB2312