# **PowerLogic**<sup>™</sup>

# Dynamic Voltage Restorer 150–900

## **Operation Manual**

**PowerLogic**<sup>™</sup> offers power quality, uptime and efficiency.

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## **Safety Information**

## **Important Information**

Read these instructions carefully, and look at the equipment to become familiar with the device before trying to install, operate, service, or maintain it. The following special messages may appear throughout this documentation or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.



The addition of this symbol to a "Danger" or "Warning" safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

## **DANGER**

**DANGER** indicates a hazardous situation which, if not avoided, **will result in** death or serious injury.



**WARNING** indicates a hazardous situation which, if not avoided, **could result in** death or serious injury.

## 

**CAUTION** indicates a hazardous situation which, if not avoided, **could result** in minor or moderate injury.

### NOTICE

NOTICE is used to address practices not related to physical injury.

### **Please Note**

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

A qualified person is one who has skills and knowledge related to the construction and operation of electrical equipment and its installation, and has received safety training to recognize and avoid the hazards involved.

### **Related Topics**

Safety Information (Parent Topic)

## **About the Book**

## **Document Scope**

The aim of this document is to provide the operators with the technical information needed to operate the PowerLogic<sup>™</sup> DVR system. This document also provides the information about the environmental measures and the European standards to be followed while installing the PowerLogic<sup>™</sup> DVR system.

## **Validity Note**

This guide is valid for the operation of the PowerLogic<sup>™</sup> DVR system.

## **Online Information**

The information contained in this guide is likely to be updated at any time. Schneider Electric strongly recommends that you have the most recent and up-todate version available on www.se.com/ww/en/download/.

The technical characteristics of the devices described in the present document also appear online. To access the information online, go to the Schneider Electric home page.

### **Related Documents**

Title of documentation	Reference number
PowerLogic™ Dynamic Voltage Restorer 150–900 – Installation Manual	NNZ6555100
PowerLogic™ DVR Catalogue	998-21308859

You can download these technical publications and other technical information from our website at www.se.com/ww/en/download/.

## **Precautions**

## **General Precautions**

Installation, wiring, testing, and service must be performed in accordance with all local and national electrical codes.

## **A A DANGER**

#### HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Apply appropriate Personal Protective Equipment (PPE) and follow safe electrical work practices. See NFPA 70E in the USA, CSA Z462, or applicable local standards.
- The equipment must be installed and serviced only by qualified electrical personnel.
- Do not exceed the maximum limits of device ratings.
- Ground the equipment using the ground connecting point provided before turning on the power supply to the system.
- Turn off the power supply before working on the system.
- Once the power is turned off, wait for 3 minutes to allow the capacitors to discharge prior to opening the doors or removing the covers.
- Always use a sensing device of proper rated voltage to confirm that the power is off.
- Replace all devices, doors, and covers before turning on the power supply to the system.
- Carefully inspect the interior for tools left behind before replacing the covers and closing the doors.

Failure to follow these instructions will result in death or serious injury.

#### NOTE:

For personnel and system safety, you must read and understand the instructions contained in this document before working on the system.

Keep these instructions in a place accessible to all the personnel who will work with the unit.

Arbitrary modifications are forbidden: The unit must not be subjected to any modification regarding its construction or safety without the consent from Schneider Electric. Schneider Electric will not own any responsibility for the damage caused as the result of the modification. Particularly, all repair work, soldering of printed circuit boards, and replacing of components, modules and printed circuit boards, without the authorisation from Schneider Electric is forbidden. Use only the original parts provided by Schneider Electric to replace the spare parts.

**Use the unit for the purpose for which it was designed**: Any other use of the unit is strictly forbidden. Schneider Electric is not responsible for any damage that might result when used for any other purpose. In such cases, the user shall assume exclusive responsibility for any risk. The use for which the unit was designed is defined in the documentation. The system shall be exposed only to admissible environmental conditions. These are defined in the technical details provided with the equipment.

Schneider Electric will not own responsibility for any inadequate, negligent, or incorrect installation of the equipment.

The instructions to operate the PowerLogic<sup>™</sup> DVR system under safe conditions are as follows:

- The system parts should not be used for other purposes.
- The system does not contain any repairable or replaceable elements. In case
  of any malfunction or if any problem occurs while operating the unit, contact
  Schneider Electric.
- Do not place the system near power magnets as this might cause a malfunction.
- Do not block or cover the ventilation grills in the housing.
- The system is designed in accordance with current EU legislation. Follow the electricity supply regulations corresponding to the country in which the unit is to be installed.
- Even with all safety systems, verify that there is no voltage before touching any active point of the system.
- The system is designed for industry use only. Do not use the system for domestic or commercial use.
- During assembly work, start-up, or maintenance, it is recommended to wear personal safety equipment to avoid any damage due to accidental electric arcing.
- The system must be protected against rain and excess humidity. It must be installed in a clean atmosphere where there is no inflammable liquids, gases or oxidising substances. If any liquid is spilt accidentally on the system, disconnect the system and consult Schneider Electric personnel immediately.
- For any problems with the contents of this manual, contact Schneider Electric for assistance.

### **Related Topics**

Precautions (Parent Topic)

### **Environmental Precautions**

In order to take the measures to conserve the environment, it is recommended to follow the steps for the disposal of packages/products/batteries:

### Package Disposal



- The exceptions detailed in the First Additional Provision of Law 11/1997 on commercial or industrial packaging states that the final holder of the waste of used containers and packaging must deliver the waste to an authorized recuperator, recycler, or revaluer in appropriate conditions for reuse.
- The subsets of the system are recyclable products and cannot be treated as household/ municipal waste at the end of its useful life.
- To preserve the environment, manage the waste in accordance with the current environmental regulations and requirements in each country or community. For any assistance, consult the manufacturer.

### **Product Disposal**



- This electrical-electronic device (AEE) is marked with the symbol of compliance with the European Directive 2012/19 / EU (WEEE) regarding used electrical and electronic equipment (Waste electrical and electronic equipment WEEE, RD 110/2015).
- The directive provides the general framework valid throughout the European Union for the removal and reuse of waste from EEE.
- To dispose off the product and to ensure its proper management, follow the current local environmental legislation and regulations. In this way, it will contribute to environmental conservation.
- The wheeled bin crossed out on the product, in the documentation or on its packaging, means that the electrical-electronic devices and batteries must be collected separately at the end of their life cycle.
- According to the current local legislation and environmental regulations, before the deposit of the RAEE in their collection facilities, the batteries must be removed and deposited separately from the rest of the RAEE for proper management.
- Never dispose the product or its associated equipment with household waste.
- The symbols marked on the product are valid in the European Union and in those places where separate collection systems are available.

### **Battery Disposal**



- Used batteries are reusable consumer products and a recycling process must be carried out.
- Used batteries that do not go through the recycling process must be disposed off in accordance with the regulations and environmental requirements in each country or community. This requirement applies in the European Union and in those places where separate collection systems are available.
- · For any assistance, consult the battery manufacturer.

### **Related Topics**

• Precautions (Parent Topic)

## **Overview**

## Introduction to PowerLogic<sup>™</sup> DVR System

### PowerLogic<sup>™</sup> Master Range

PowerLogic<sup>™</sup> smooths the power supply, protects the network, the installation and the operator by improving the power factor and hence the quality of the power. It also allows for remote control of equipment and the monitoring of its performance and condition in real time.

### Introduction

The PowerLogic<sup>™</sup> Dynamic Voltage Restorer (PowerLogic<sup>™</sup> DVR) system is an innovative system designed to mitigate and to eliminate the effect of electrical disturbances that can impact critical processes and/or services.

### Challenge

Due to natural phenomena, the energy generation systems, transportation systems, and distribution systems have certain limitations. These systems can cause electrical disturbances due to factors such as consequences of manoeuvres, breakdowns, atmospheric phenomena, or disturbances introduced by receivers. These disturbances can affect the processes and/or services and can have significant economic consequences for companies.

Most of the existing equipment in the industry meets the sensitivity curve defined by IEEE 446 standard as shown in the following image. The equipment will operate normally without any problem while the voltage is in between the two lines of the curve, as shown in the light grey area.



Unfortunately, the electrical grids are not always between the two lines. The disturbances in the electrical grids are represented by dark grey areas and it depends on the magnitude and duration of the disturbance. These disturbances cannot be eliminated completely, so it is necessary to adapt the customer facilities in order to help to protect from the disturbances that can impact the normal operation and to minimize the disturbing emissions that can be generated and introduced in the electricity grid.

The typical range of the disturbances that usually causes problem time duration of 0-500 milliseconds and voltage drop of -10 to -40%. Although, the most serious disturbances can reach -60%, when suffering greater lapses of time. The detected failure in the mains could produce a series of disturbances due to automatic reconnections while trying to correct these detected faults. This series of disturbances often requires that the voltage compensation equipment operates for several seconds.

### Solution

The PowerLogic<sup>TM</sup> DVR system is a flexible compensator that injects and absorbs energy and helps to mitigate and eliminate the effect of electrical disturbances. It offers an extremely stable voltage (Vn  $\pm 1\%$ ) with a very fast response.

The topology of the PowerLogic<sup>™</sup> DVR system allows to continuously regulate nominal voltage up to a certain percentage or compensates voltage sag from deeper percentage without using energy storage such as battery or capacitors. The system mitigates other network quality problems, such as fluctuations, Flicker effects, regulation problems, and voltage imbalance. The system is designed for the demanding process industry, data centres, and in general, for customers with high regulation accuracy.

### PowerLogic<sup>™</sup> DVR System Range

The following table shows the full range of PowerLogic<sup>™</sup> DVR systems based on disturbance correction capabilities.

Continuous regulation range	Maximum sag without voltage alteration	Maximum sag without switching to static bypass	PowerLogic™ DVR system power
			150 kVA
±20%			220 kVA
			300 kVA
	-40%	-70%	440 kVA
			500 kVA
			600 kVA
			750 kVA
			900 kVA
			220 kVA
+20% - 25%	-50%	-70%	440 kVA
			660 kVA
			150 kVA
+20% - 30%	-60%	-70%	300 kVA
			450 kVA

The PowerLogic<sup>™</sup> DVR system can be formed by one master unit only, or by a parallel system consisting of one master unit and a maximum of two slave units.

The PowerLogic<sup>™</sup> DVR systems require an additional manual bypass cabinet. It is mandatory to install this cabinet as it has the following functionalities:

- Allows continuous power supply to the load during the maintenance of the system.
- Works as a distribution cabinet to facilitate the power connection between units that are in a parallel system.

Depending on the nominal current of the system, there are four manual bypass cabinets (630 A, 1250 A, 2000 A, and 3200 A).

### PowerLogic<sup>™</sup> DVR System Configurations

The following table shows the system configurations for each PowerLogic<sup>™</sup> DVR system and the type of manual bypass cabinet that is required, based on the nominal voltage.

PowerLogic™ DVR 380/400/415 Vac Systems				
Maximum sag correction	PowerLogic™ DVR system power	System configuration Power per uni		Manual bypass
	150 kVA	М	150 kVA	630 A
	220 kVA	М	220 kVA	630 A
	300 kVA	М	300 kVA	630 A
-40%	440 kVA	M+S	220 kVA	1250 A
	500 kVA M+S		250 kVA	1250 A
	600 kVA	M+S	300 kVA	1250 A
	750 kVA	M+2S	250 kVA	2000 A
	900 kVA	M+2S	300 kVA	2000 A
	220 kVA	М	220 kVA	630 A
-50%	440 kVA	M+S	220 kVA	1250 A
	660 kVA	M+2S	220 kVA	2000 A
	150 kVA	М	150 kVA	630 A
-60%	300 kVA	M+S	150 kVA	1250 A
	450 kVA	M+2S	150 kVA	1250 A

PowerLogic™ DVR 200/208/220 Vac Systems					
Maximum sag correction	PowerLogic™ DVR system power	owerLogic™ DVR system power Power per unit		Manual bypass	
	150 kVA	М	150 kVA	630 A	
	220 kVA	М	220 kVA	1250 A	
	300 kVA	М	300 kVA	1250 A	
409/	440 kVA	M+S	220 kVA	2000 A	
-40%	500 kVA	M+S	250 kVA	2000 A	
	600 kVA	M+S	300 kVA	3200 A	
	750 kVA	M+2S	250 kVA	3200 A	
	900 kVA	M+2S	300 kVA	3200 A	
	220 kVA	М	220 kVA	1250 A	
-50%	440 kVA	M+S	220 kVA	2000 A	
	660 kVA	M+2S	220 kVA	3200 A	
	150 kVA	М	150 kVA	630 A	
-60%	300 kVA	M+S	150 kVA	1250 A	
	450 kVA	M+2S	150 kVA	2000 A	

### **Related Topics**

Overview (Parent Topic)

## **Main Characteristics**

The main characteristics of the PowerLogic™ DVR systems are:

- Mitigates three-phase voltage sags up to -70% deep or single-phase interruptions
- Continuous regulation to offer high stabilization (±1%)
- Very high-performance feeding systems (> 98%)
- Power ranges from 150 to 900 kVA (others on demand)
- · Minimizes the necessary investment and operating costs
- · Batteries or other energy storage components are not required
- Compensates voltage dips even for longer times (up to 30 seconds)
- Compensates swell and overvoltage up to +20%
- Independent compensation per phase
- Compensates balanced and unbalanced voltage drops
- Power supply to the load by static bypass in case of detected failure
- Overload in Normal mode: 150% overloads for 1 second
- Overload in Static Bypass mode: 200% for 60 seconds, 500% for 10 seconds and 3000% for 0.2 seconds
- High response speed (< 3 milliseconds)
- Energy flows in both directions
- Never interrupts the service
- · Modular design that facilitates maintenance and repairs
- · Easy to connect in parallel up to 3 units
- Mitigates voltage sags according to regulations: SEMI F47, IEC 61000-4-11, and IEC 61000-4-34 (depending on the model)
- · Chronology of disturbances and monitoring system
- Touchscreen monitoring system

### **Related Topics**

• Overview (Parent Topic)

### **Types of Disturbances**

In addition to voltage sags elimination, the PowerLogic<sup>™</sup> DVR topology also offers the possibility of mitigation of other energy quality problems at the same time such as fluctuations, Flicker effects, slow and fast regulation problems, and overvoltage and voltage unbalance.

The PowerLogic<sup>™</sup> DVR has proven effective in mitigating the above energy quality problems with high stabilization accuracy and with an ultrafast response, generally less than 3 milliseconds.



### **Related Topics**

- Voltage Fluctuations and Flicker Effect
- Voltage and Overvoltage Regulation
- Voltage Sag
- Voltage Unbalance Compensation
- Overview (Parent Topic)

#### **Voltage Fluctuations and Flicker Effect**

The PowerLogic<sup>™</sup> DVR characteristics such as continuous operation, high accuracy, and rapid response, solves the problem of voltage fluctuations and additionally compensates for Flicker phenomena.

### **Related Topics**

• Types of Disturbances (Parent Topic)

### Voltage and Overvoltage Regulation

The PowerLogic<sup>™</sup> DVR responds quickly and accurately with slow and fast voltage regulations (within the continuous regulation of PowerLogic<sup>™</sup> DVR system) caused by the load variations that arise in the power grid.

The PowerLogic<sup>™</sup> DVR regulation capacity compensates overvoltage upto +20%.

### **Related Topics**

Types of Disturbances (Parent Topic)

### **Voltage Sag**

Voltage sag is a sharp reduction in the supply voltage to a value between 90% and 1% of the nominal voltage, followed by the restoration of the voltage after a short period of time.

The following table details the different values of sag percentage that define the system.

Value	Equipment parameter
s1	Lower limit of continuous regulation
s2	Maximum sags without voltage alteration
s3	Maximum sag without static bypass

The following table shows the function of PowerLogic<sup>™</sup> DVR system for the corresponding voltage sag value.

Voltage sag value	Function of PowerLogic™ DVR system
≤ s1	Permanently compensates the disturbances up to $\leq$ s1 value and obtains a nominal output voltage of ±1%.
	Compensates and obtains an output voltage of $\pm 1\%$ of the nominal voltage.
Between s1 and s2	<b>NOTE:</b> The system operation against this sag range with a duration of 30 seconds is guaranteed.

Voltage sag value	Function of PowerLogic™ DVR system			
	Compensates gradually altering the output voltage depending on the depth of the sag.			
	<ul> <li>If the sag is 5% greater than s2, the output voltage will be 95% of the nominal voltage.</li> </ul>			
Between s2 and s3	<ul> <li>If the sag is 10% greater than s2, the output voltage will be 90% of the nominal voltage.</li> </ul>			
	NOTE: The system operation against this sag range with a duration of < 1 second is guaranteed, if no upstream protection of the PowerLogic <sup>™</sup> DVR system or the impedance of the network prevents it.			
>s3	PowerLogic™ DVR system switches to Static Bypass mode and obtains an output voltage the same as the input voltage.			

The following image details the 3-phase compensation capacity of PowerLogic™ DVR system.



The PowerLogic<sup>™</sup> DVR system eliminates 3-phase, 2-phase, and 1-phase voltage sags, since it compensates the each phase independently. The following graph shows an example of PowerLogic<sup>™</sup> DVR system operation where sudden drop in the input voltage (green line) is compensated to stable output voltage (blue line).



### **Related Topics**

• Types of Disturbances (Parent Topic)

### Voltage Unbalance Compensation

The PowerLogic<sup>™</sup> DVR system has correction capability per phase and can instantly balance the three phases at its output.

The PowerLogic<sup>™</sup> DVR system is compatible with bi-directional power flow.

### **Related Topics**

Types of Disturbances (Parent Topic)

## Internal Architecture of PowerLogic<sup>™</sup> DVR System

The PowerLogic<sup>™</sup> DVR system consists of a transformer and a set of reversible rectifier and inverter. The following image details the internal architecture of the PowerLogic<sup>™</sup> DVR system.



The system receives the energy directly from the line. This energy is used to compensate the defective or excess voltage at its input, independently for each phase, to generate the stable output  $(\pm 1\%)$ .

The PowerLogic™ DVR system consists of:

- Preload
- Rectifier
- Inverter
- Static bypass
- Booster transformer
- Digital signal processor (DSP)
- Input autotransformer

### **Related Topics**

- Preload
- Rectifier and Inverter
- Static Bypass
- Booster Transformer
- Digital Signal Processor
- Input Autotransformer (Only Used for AVC DVR 200/208/220 Vac Systems)
- Overview (Parent Topic)

### Preload

During start-up, the preload module slowly increases the alternating input voltage to the rectifier. This module helps to prepare the equipment to start without drawing large current at the input.

### **Related Topics**

Internal Architecture of PowerLogic<sup>™</sup> DVR System (Parent Topic)

### **Rectifier and Inverter**

The rectifier and the inverter module consists of power structure integrated with a control system based on a DSP, which is responsible to operate the unit with excellent reliability.

The rectifier and the inverter module is operated by Pulse Width Modification (PWM), which is combined with an advanced control system. For the rectifier module, the PWM unit supplies continuous voltage to the DC-link from the alternating input voltage and for the inverter module, the PWM unit supplies a low distortion sine waveform from the DC-link.

The information to control the rectifier and the inverter module is transmitted to the DSP.

The rectifier and the inverter module consists of a forced ventilation system that will be activated during the start-up of the module.

The temperature sensor of the rectifier and the inverter module disables its operation, if the temperature of the module increases above the pre-determined values.

### **Related Topics**

Internal Architecture of PowerLogic<sup>™</sup> DVR System (Parent Topic)

### **Static Bypass**

During the system Stop event, the static bypass module isolates the system from the input line. The Stop event can be triggered manually or due to an internal fault resulting in short-circuit in the primary of the booster transformer. The module consists of an ultra-fast electronic bypass and a parallel contactor to perform a permanent static bypass.

### **Related Topics**

Internal Architecture of PowerLogic<sup>™</sup> DVR System (Parent Topic)

### **Booster Transformer**

This module isolates the system from the input line, when the defective or excess voltage is compensated to maintain the stable output voltage.

### **Related Topics**

Internal Architecture of PowerLogic<sup>™</sup> DVR System (Parent Topic)

#### **Digital Signal Processor**

The Digital Signal Processor (DSP) card is responsible for managing the PowerLogic<sup>™</sup> DVR system. It receives the status signals of the different modules of the system, and measures such as input voltage, output voltage, and output current.

It sends action commands to the current control cards of the rectifier and inverter modules and manages the start and stop events of the preload and static bypass modules. It also performs the management of the control signals.

The DSP card measures the three phases input and output voltage and the current consumption at all times. It is programmed with complex algorithms that allows the system to compensate the disturbances that arise in the power grid. It performs the necessary calculations to give the appropriate commands to the

modules, so that the transitions between the start, stop, and bypass supports are properly synchronized in phase.

### **Related Topics**

• Internal Architecture of PowerLogic<sup>™</sup> DVR System (Parent Topic)

### Input Autotransformer (Only Used for AVC DVR 200/208/220 Vac Systems)

For PowerLogic  $^{\rm TM}$  DVR 200/208/220 Vac systems, an autotransformer is installed at the input of the rectifier.

### **Related Topics**

• Internal Architecture of PowerLogic<sup>™</sup> DVR System (Parent Topic)

## Interior Views of PowerLogic<sup>™</sup> DVR Unit and Manual Bypass



The following image shows the interior view of PowerLogic™ DVR 380/400/415





### **Related Topics**

• Overview (Parent Topic)

## **HMI User Interface**

The PowerLogic<sup>™</sup> DVR unit is provided with a touch control panel to monitor the status of the system.

The PowerLogic<sup>™</sup> DVR system operation is controlled online. Depending on the status of the system, the PowerLogic<sup>™</sup> DVR system operates in different modes.

### **Related Topics**

- Control Panel
- Menus

## **Control Panel**

The user interacts with the unit through the control panel located on the front panel of the PowerLogic<sup>™</sup> DVR unit.



The control panel provides the information of the current operating status, instantaneous and accumulated values, and the possible events that causes the system to malfunction. The control panel is also used to edit some of the parameters.

The control panel screen is divided into three sections as shown below.

Menu bar
Main window
Status bar

### **Related Topics**

- Menu Bar
- Main Window
- Status Bar
- HMI User Interface (Parent Topic)

### Menu Bar

The Menu bar is displayed on the top of the screen and it contains buttons to access all the available menus as shown in the following image.



- A Menu buttons
- B Control panel status LED
- C Logout button

The Logout button is used to close the session.

The control panel status LED blinks in green when the control panel is active and in red when there is a communication failure with the DSP board.

### **Related Topics**

Control Panel (Parent Topic)

#### **Main Window**

By default, the control panel displays the **Home** screen. The user can navigate to the other menus by using the menu buttons available on the Menu bar.

The following image shows the structure of the main window and its elements.



Element	Description
Navigation tree	Provides access to the different submenus.
Content section	Displays the content of the selected menu
Controls	Displays the control buttons to perform relevant actions

### **Related Topics**

Control Panel (Parent Topic)

### **Status Bar**

The Status bar is located at the bottom of the control panel screen. It displays the information of the general status of the system as shown in the following image.



- C Access level button
- D Current parameter configuration
- E System time

The following table details the elements of the Status bar.

Elements	Description
Event bell	<ul><li>Provides the global status of the system events. The status are indicated as follows:</li><li>Green: No active events</li></ul>
	Red: Active events
Message area	Displays the system messages.
Current parameter	Allows to visualize and to modify the operating parameters of the PowerLogic™ DVR system.
configuration	• Active: The saved configuration of the PowerLogic™ DVR is same as the one shown.
	<ul> <li>Temporary: The configuration of the PowerLogic<sup>™</sup> DVR system is changed and it is not saved in the system. The parameter configuration is automatically transferred to the Active configuration.</li> </ul>
	<b>NOTE:</b> If the modified configuration is not saved within 5 minutes, the data will be lost.
Access level button	Indicates the access level of the current user in a numerical format. This button is also used to change the access level. The access to the different menus are enabled based on the user access level.
System time	Displays the current time of the system.

### **Related Topics**

Control Panel (Parent Topic)

### Menus

Once the PowerLogic<sup>TM</sup> DVR system starts, the **Home** screen appears on the control panel screen. By default, the screen displays the access level as **Access Level: 1** (Basic User).

NOTE: The Access Level: 1 is a read-only access.

To edit the settings in the **Parameters** menu, the **Access Level: 2** (Advanced User) is required.

To change the access level, perform the following steps:

1. Press the Access Level button on the Status bar.

Result: A Virtual keyboard appears on the screen.

				G					
evel:									-
			Passwor	rd:		4			
1	2	3	4	5	6	7	8	9	0
q	w	е	r	t	у	u	i	0	p
a	s	d	f	g	h	j	k	1	ñ
z	×	c	v	b		n	m	ABC	abc
8									0

2. Select Level 2 and enter the default password: ADVAN222

Result: The access level of the user is changed to Access Level: 2.

**NOTE:** It is recommended to access the upper levels only by qualified technicians or Schneider Electric personnel.

3. Pressing the **Logout** button on the Menu bar ends the current session.

Result: The Home screen with Access Level: 1 is displayed.

The different menus are accessed from the Menu bar.

**NOTE:** If no operation is done on the control panel for 5 minutes (default), the screen saver mode is activated.

To activate the control panel, click on any part of the screen.

### 

## POTENTIAL COMPROMISE OF SYSTEM AVAILABILITY, INTEGRITY, AND CONFIDENTIALITY

Change default passwords at first use to help prevent unauthorized access to device settings and information.

Failure to follow this instruction can result in equipment damage.

For information on changing password, refer to Passwords menu on, page 32.

### **Related Topics**

- Home Menu
- Status Menu
- Parameters Menu
- Events Menu
- Event Log Menu
- Status and Events
- HMI User Interface (Parent Topic)

### Home Menu

The **Home** menu displays the current status of the PowerLogic<sup>™</sup> DVR system through synoptic scheme. It provides the visual information on status of different modules (such as transformer, static bypass, rectifier, and inverter), certain input and output measures, and the last registered sag.



The information about the last sag occurrence is displayed on left side of the window under **Last Sag**.

The **Home** menu displays the working status of the system (displayed below the inverter and rectifier blocks) as shown in the image.

The **Home** menu consists of the following buttons to perform the specific tasks.

**NOTE:** Prior confirmation is required to carry out any of the following commands.

Button	Action
Start	This button is disabled because the start command is performed by the lock, which is placed in the manual bypass cabinet.
Stop	This button is disabled because the stop command is performed by the lock, which is placed in the manual bypass cabinet.
Reset	This button must be pressed when the PowerLogic <sup>™</sup> DVR system stops due to an event which needs to be resolved. This button is used to restart the system. Pressing the <b>Reset</b> button will stop the PowerLogic <sup>™</sup> DVR system, if it is working in the Normal mode.

### **Related Topics**

Menus (Parent Topic)

### Status Menu

The Status menu displays the general information about the status of the system.

Home	Status	Parameters 🛆 Events 🗁 Event Log 🔩 Logout
System	Name	Value
	Name	PowerLogic DVR
🛆 Measures	Description	
Status	Location	Paris
	Contact	Schneider@SE.com
	Code	000000
	Firmware	DVR-1.2.7-SE-NC
	Configuration	Active
	1	Concelo Debast
		Console Reboot
A		Active Access Level: 2 10:4

The **Status** menu consists of the following submenus which are described in the following subsections. They can be accessed by clicking the navigation tree on the left side of the window.

### System

This submenu displays the generic system data. The following table details the parameters of the **System** submenu.

Parameter	Description		
Name	Name of the equipment		
Description	Description of the equipment		
Location	Description of the geographic location of the equipment		
Contact	E-mail of the person in charge of the equipment		
Code	Code of the system (factory setting)		
Firmware	Firmware version (factory setting)		
Configuration	Status of the system configuration:		
	• Active: The setup displayed on the screen is the same as the one used in the equipment.		
	<ul> <li>Temporary: The setup displayed on the screen has been modified and has not yet been saved in the equipment.</li> </ul>		

The Console Reboot button resets the screen without interrupting the equipment.

### **Measures**

This submenu displays the PowerLogic™ DVR system measurements such as voltage, current, and power as shown in the following image.

•	Home	Status	rs 🛕 Events 📄	Event Log	ut
Γ	👻 System	Name	Value		-
h	-	Phase R Input Voltage			
	Measures	Phase S Input Voltage	399.9 V		
	Status	Phase T Input Voltage	401.9 V		
		Bus Voltage	528.5 V		
		Phase R Output Voltage	394.7 V		
		Phase S Output Voltage	398.9 V		
		Phase T Output Voltage	396.6 V		
		Phase R Output Current	1.8 A		
		Phase S Output Current	2.2 A		
		Phase T Output Current	2.6 A		
		Phase R Output Power	0.3 kW		
		Phase S Output Power	0.0 kW		-
4		1		Active Access Level: 2	13:43

The following table details the parameters of the **Measures** submenu.

Parameter	Description
Phase R Input voltage	Input voltage phase R
Phase S Input voltage	Input voltage phase S
Phase T Input voltage	Input voltage phase T
Bus Voltage	Bus voltage
Phase R Output voltage	Output voltage phase R
Phase S Output voltage	Output voltage phase S
Phase T Output voltage	Output voltage phase T
Phase R Output current	Output current phase R
Phase S Output current	Output current phase S
Phase T Output current	Output current phase T
Phase R Output power	Output power phase R
Phase S Output power	Output power phase S
Phase T Output power	Output power phase T

### Status

This submenu displays the general system status.

0	Ame Home	💡 Status 🛛 🎇 Parameters	🛕 Events 📄	Event Log	🛃 Logo	ut
ſ	System	Name	Value			
		Control Status				
l	Measures	<ul> <li>DSP Communication Failure</li> </ul>	NO			
I	Status					
ľ						
					1	_
4	L			Active A	Access Level: 2	13:43

The following table details the parameters of the Status submenu.

Parameter	Description	
Control Status	Working status of the PowerLogic™ DVR system (refer Status and Events, page 36)	
DSP Communication Failure	Communication status between the control panel and the DSP:	
	No: There is a communication (LED blinking in green)	
	• <b>Yes</b> : There is a communication failure (LED blinking in red)	

### **Related Topics**

Menus (Parent Topic)

### **Parameters Menu**

The **Parameters** menu allows to visualise and to modify the operating parameters of the PowerLogic<sup>™</sup> DVR system. The submenus of **Parameters** menu can be accessed by clicking the navigation tree on the left side of the screen.

**NOTE:** Any modification of the setup values can lead to malfunction in the PowerLogic<sup>™</sup> DVR system. It is recommended to modify the setup values by only qualified technicians or Schneider Electric service personnel.

• 🚡 Home	Status Parameters	🛕 Events 📄 Event Log 🚳 Logout
🗢 🖲 System	Name	Value
	Description	
Passwords	Location	Paris
₽ DVR	Contact	Schneider@SE.com
	Date	15/01/2021 10:42:11
	Time Zone	Europe/Madrid
	Language for notifications	Spanish
	Backlight Timeout	5 minutes
	Logout Timeout	5 minutes
	-	× - 4
	☐ Save	Cancel
4		Active Access Level: 2 10:42

The bottom of the screen consists of various buttons, which are used to change the configuration status. The following table describes the buttons.

Button	Action
Save 🖬	Allows to save the current <b>Temporary</b> configuration of the PowerLogic™ DVR system and establish it as the <b>Active</b> configuration of the system.
Cancel 🕷	Allows to return to the previous Active configuration that was saved.
Factory 🗟	Allows to restore the original values of factory default settings and sets them in the <b>Temporary</b> configuration. Press the <b>Save</b> button to set these values as <b>Active</b> parameters.
Language 🔤	Allows to change the language of the control panel. The available languages are Spanish, English, and Chinese.
Ok 🦿	Accepts the modification of the parameter.

The **Parameters** menu consists of following submenus which are used to set the parameters and to monitor the internal operation of the PowerLogic<sup>™</sup> DVR system.

### System

This submenu displays the details of the generic system data. The following table details the parameters of the **System** submenu.

Parameter	Description
Description	Description of the equipment
Location	Description of the geographic location of the equipment
Contact	E-mail of the person in charge of the equipment
Date	Internal date of the equipment
Time Zone	Time zone of system clock
Language for notifications	Language of the description column of the Event Log menu
Backlight Timeout	Time (in minutes) to shut down the display of the equipment
Logout Timeout	Time (in minutes) to automatically end the user session

### Passwords

This submenu allows to change the passwords.

•	Home	🔓 Status	% Parameters	A Events	Event L	.og 🛃 Log	out
-	🗟 System	Name	Vá	alue			
h		Advanced	User Password *				
	Passwords						
	🗲 DVR						
		Current passv	vord:			_	
		New passwor	d:			-	
			iave 💧	Cancel	Factory	ŽA	
4					Active	e Access Level: 2	16:36

The following table details the parameters of the **Password** submenu.

Parameter	Description	Default password
Basic User Password	Allows to change the password for Basic User (level 1).	BASIC111
Advanced User Password	Allows to change the password for Advanced User (level 2).	ADVAN222

Enter the Current password corresponding to the Active Access level, then enter the New password. The format of New password should be 8 characters long, numbers or letters (upper or lower case).

After 3 unsuccessful retries, access will be blocked for 1 minute.

To change the password on another level, first click on Access Level at bottom of the display and follow the procedure described on page 23 to log on the expected level. Then, repeat the procedure above to change the default password.

### DVR

This submenu displays the generic information of the PowerLogic™ DVR system.

9	🔓 Home	Status 🕺 Parameter	s 🔥 Events 📄 Event	Log 🛃 Logout
F	System	Name	Value	
		Nominal AC Voltage (LL)		
L	Passwords	Nominal sag	40 %	
	🔑 dvr	Number of parallel units	1	
Г		Nominal Frequency	50.0 Hz	
		Nominal AC Voltage (LL)	400.0	- V 🦿
		Save	& Cancel	<b>Š</b> A
1			<ul> <li>Activ</li> </ul>	ve Access Level: 2 12:28

The following table details the parameters of the **DVR** submenu.

Parameter	Description		
Nominal AC Voltage (LL)	Nominal voltage of the mains (phase to phase)		
Nominal sag	Percentage of sag that the system is able to compensate		
Number of parallel units	Number of equipment connected in parallel		
Nominal Frequency	Installation nominal frequency		

### **Related Topics**

Menus (Parent Topic)

### **Events Menu**

The **Events** menu displays the active alarms in the system. The information displayed in this menu is used to detect problems in the installation and to take actions accordingly.

In the event of any detected failure, the **Events** menu displays the information of the event which is used by the technical personnel to analyse the problem. If any event occurs in the system, the bell icon on the lower left side will turn red.



Each system event has the following information:

- Event code
- · Event name
- Date and time of the event occurred

More information about each possible events that generates the fault in the system is provided in the section Troubleshooting, page 51.

### **Related Topics**

Menus (Parent Topic)

### **Event Log Menu**

The Event Log menu maintains the record of the:

- different events that occurred in the system (refer Troubleshooting, page 51)
- different working status changes of the system (refer Status and Events, page 36)
- sags registered by the system

	Home Status		% Parameters	A Events	Event Log	Logo	out
ode	Event	Stat.	Date	Description			
20	Thermostat failure	4	10/12/20 15:15:20				
25	Status change	4	10/12/20 15:15:07	Thermostat	failure		
15	Mains voltage failure	4	10/12/20 15:13:40				
25	Status change	4	10/12/20 15:13:27	ON			
02	Sag registered	4	10/12/20 15:13:27	Ph: S Dur: 4	68 ms Min: 95 % Avg	j: 21 %	
15	Mains voltage failure	4	10/12/20 15:09:55				
25	Status change	4	10/12/20 15:09:42	Mains failure	,		
10	Instantaneous voltage failure	4	10/12/20 15:08:39				
25	Status change	4	10/12/20 15:08:26	ON			
02	Sag registered	4	10/12/20 15:08:26	Ph: S Dur: 6	28 ms Min: 61 % Avg	: 63 %	
10	Instantaneous voltage failure	4	10/12/20 15:06:44				
25	Status change	4	10/12/20 15:06:31	Instantaneo	us voltage failure		
15	Mains voltage failure	4	10/12/20 15:03:38				
25	Status change	4	10/12/20 15:03:25	ON			
02	Sag registered	4	10/12/20 15:03:25	Ph: S Dur: 6	21 ms Min: 37 % Avg	j: 51 %	
	🗑 Delete Ev	ent Lo	og	3	SAG Log		

An event is recorded when it activates (appears on the screen) and deactivates (disappears from the screen).

The **Event Log** menu displays the following information of each event:

· Event code

- Event name
- Status
  - The status of the event is indicated as follows:
  - Red: The event is activated.
  - Green: The event is deactivated.
  - Yellow: Status change or sag registered.
- Date and time of the event occurred
- Description

The menu displays the description only for the **Status change** or **Sag registered** event.

The system records the maximum number of events up to 5000. For the monitoring of the events, the menu displays the 100 most recent events on the screen.

The chronological order of the events indicates the system operation with respect to long-term maintenance. It also provides the information of the component heating and electrical problems that occurred in the system.

Only user with an access level higher than level 2 has an authority to delete the recorded events by pressing **Delete Event Log** button.

**NOTE:** Be careful while deleting the recorded events. Once the events are deleted, it cannot be restored.

The **Event Log** displays the sag registered by the system as **Sag registered** events on the screen.

To access the list of all sags registered by the system, press SAG Log button.

The **SAG Log** window displays the following information for each sag on the screen:

- Minimum percentage of voltage remaining in the network during the sag
- Average percentage of voltage remaining in the network during the sag
- · Duration of the event in milliseconds
- Phase of greatest voltage drop
- · Date and time of the disturbance

•		Home	🔓 Status	3% P	arameters	🛕 Eve	ents 📄	Event Log	🛃 Logo	ut
N	tinim	um (%) Averag	e (%) Duration (m	s) Phase	Date					
	47	50	316	R	03/09/19	14:52:49				
	47	54	343	R	03/09/19	14:52:35				
	65	96	556	R	03/09/19	14:43:40				
	37	52	63	S	03/09/19	14:17:22				
	58	60	312	R	03/09/19	13:58:23				
	74	78	356	R	03/09/19	13:53:00				
	17	36	21	R	03/09/19	13:34:30				
	46	49	520	R	02/09/19	17:21:43				
	52	62	52	R	02/09/19	17:20:27				
	45	57	52	S	02/09/19	17:01:00				
	42	56	68	s	02/09/19	16:57:13				
	46	59	53	S	02/09/19	16:55:55				
	57	59	1214	R	02/09/19	15:41:27				
	57	59	614	R	02/09/19	15:35:45				
	63	65	316	S	02/09/19	15:32:40				$\mathbf{v}$
			🗑 Delete Sag	Log			Event I	.og		
4								Active Active	cess Level: 2	13:45

Only user with an access level higher than level 2 has an authority to delete the recorded sags by pressing **Delete Sag Log** button. To return to the **Event Log** menu, press the **Event Log** button in the **SAG Log** window.

**NOTE:** Be careful while deleting the recorded sags. Once the sags are deleted, it cannot be restored.

### **Related Topics**

•

Menus (Parent Topic)

### **Status and Events**

A **Status** is a mode of operation of the system in any possible situation. An **Event** is a condition which must be met to force a status change.

Depending on the events or different situations which may occur, the system switches through different working status which are reflected in:

- Event Log menu as Status change events
- Status menu
- Home menu

The following table provides the list of possible working status of the system. The system compensates only when the static bypass is off and the inverter module is on.

Status	Description	Status of internal modules
OFF	The system is stopped manually.	Static bypass ON
	The system is in Mains failure or Minimum Bus	Rectifier module OFF
	<b>Voltage</b> status. In this case, the system will be in <b>OFF</b> status until the conditions are removed.	Inverter module OFF
Pre-charging	Transitory status until DC-link voltage reaches a	Static bypass ON
	value. The precharge contactor is closed.	Rectifier module OFF
		Inverter module OFF
Pre-ON	Transitory status until the system checks it can start.	Static bypass ON
	contactor is closed.	Rectifier module ON
		Inverter module OFF
ON	N The system is working in normal operation mode.	
		Rectifier module ON
		Inverter module ON
Pre-OFF	Transitory status between any status and <b>OFF</b> status.	Static bypass ON
		Rectifier module OFF
		Inverter module OFF
Overload	The system has detected an <b>Overload</b> event. Once	Static bypass ON
	status.	Rectifier module ON
		Inverter module OFF
Instantaneous voltage failure	The system has detected an <b>Instantaneous voltage</b>	Static bypass ON
	system switches to <b>ON</b> status.	Rectifier module ON
		Inverter module OFF
Mains failure	The system has detected a <b>Mains voltage failure</b>	Static bypass ON
	removed, the system will follow the start-up sequence	Rectifier module OFF
	automatically.	Inverter module OFF
Minimum bus voltage	The system has detected a <b>Minimum bus voltage</b>	Static bypass ON
	follow the start-up sequence automatically.	Rectifier module OFF
		Inverter module OFF

Status	Description	Status of internal modules
Maximum sag	The system has detected an <b>Output voltage</b>	Static bypass ON
	<b>integrator limitation</b> event. Once the condition is removed, the system switches to <b>ON</b> status	Rectifier module ON
		Inverter module OFF
Driver alarm	The system has detected a Driver alarm event. The	Static bypass ON
	system will autoreset. If this is repetitive, the system switches to the <b>Driver failure</b> status.	Rectifier module OFF
		Inverter module OFF
Maximum bus voltage alarm	oltage alarm The system has detected a <b>Maximum bus voltage</b>	
	the system will change to <b>Maximum bus voltage</b>	Rectifier module ON
	failure status.	Inverter module OFF
Pre-charging failure	When DC-link voltage does not reach a value in the	Static bypass ON
	start-up sequence. This status must be manually reset.	
		Inverter module OFF
Capacitor voltage failure	or voltage failure The system has detected a <b>Maximum capacitor</b>	
voltage event. This status must be manually i		Rectifier module OFF
		Inverter module OFF
Maximum bus voltage failure	The system has detected a <b>Maximum bus voltage</b>	Static bypass ON
	This status must be manually reset.	Rectifier module OFF
		Inverter module OFF
Thermostat failure	The system has detected a <b>Thermostat failure</b>	Static bypass ON
	event. This status must be manually reset.	Rectifier module OFF
		Inverter module OFF
Driver failure	The system has detected a <b>Driver failure</b> event. This status must be manually reset	Static bypass ON
		Rectifier module OFF
		Inverter module OFF
Temperature failure	The system has detected a <b>High temperature alarm</b>	Static bypass ON
		Rectifier module OFF
		Inverter module OFF
Fuse failure/AC capacitor	Transitory status between any status (except OFF status) and Fuse failure or AC capacitor failure	Static bypass ON
	status.	Rectifier module OFF
		Inverter module OFF
Fuse failure	Input fuse blown. This status must be manually reset.	Static bypass ON
		Rectifier module OFF
		Inverter module OFF
AC capacitor failure	Any AC power capacitor of rectifier/inverter module has lost its capacity. This status must be manually	Static bypass ON
	reset.	Rectifier module OFF
		Inverter module OFF

The events occurred in the PowerLogic<sup>™</sup> DVR system are recorded in **Events** or **Event Log** menus. More information about each possible events that generates the fault in the system is provided in the section Troubleshooting, page 51.

### **Related Topics**

• Menus (Parent Topic)

## **Operation Modes**

## **Static Bypass Operation Mode**

The PowerLogic<sup>™</sup> DVR system sends a command to the static bypass and contactor to stop compensating the voltage during the following conditions, so that the output voltage is equal to the input voltage.

- energized for the first time
- stopped manually
- · stopped automatically due to a serious fault
- · the input voltage exceeds the tolerances allowed by the system

The system continuously analyses the grid input signal. The DSP helps to ensure the stability of the system as shown in the following image.



### **Related Topics**

Operation Modes (Parent Topic)

### **Normal Operation Mode**

During this mode, the rectifier and inverter modules will run and the static bypass module is open as shown in the following image. The output voltage is permanently regulated to the nominal voltage, if the input voltage and frequency are within the allowed range.



### **Related Topics**

• Operation Modes (Parent Topic)

## **Manual Bypass Operation Mode**

The PowerLogic<sup>™</sup> DVR system consists of manual bypass switches that enable the maintenance work without interrupting the electrical power supply to the load. In this mode, the loads are not protected against the disturbances caused due to the electrical power supply.



### **Related Topics**

• Operation Modes (Parent Topic)

## Commissioning

This section provides the information for commissioning the PowerLogic<sup>™</sup> DVR system. You must read and understand the following instructions before turning on the power supply.

### A A DANGER

#### HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Apply appropriate Personal Protective Equipment (PPE) and follow safe electrical work practices. See NFPA 70E in the USA, CSA Z462, or applicable local standards.
- The equipment must be installed and serviced only by qualified electrical personnel.
- Do not exceed the maximum limits of device ratings.
- Ground the equipment using the provided ground connecting point before turning on the power supply to the system.
- Turn off the power supply before working on the system.
- Once the power is turned off, wait for 3 minutes to allow the capacitors to discharge prior to opening the doors or removing the covers.
- Always use a sensing device of proper rated voltage to confirm that the power is off.
- Replace all devices, doors, and covers before turning on the power supply to the system.
- Carefully inspect the interior for tools left behind before replacing the covers and closing the doors.

#### Failure to follow these instructions will result in death or serious injury.

**NOTE:** Once the unit is commissioned, there is no need to perform the above procedure again.

## 

#### HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC

- The internal switch **I1** must be operated in the commissioning and in the start-up, after the maintenance operations.
- Once the PowerLogic<sup>™</sup> DVR system is running in the Normal mode, the internal switch I1 must be in **ENABLE START** to enable the system to restart in case of an event.
- In case of breakdown or during the maintenance tasks, the internal switch I1
  must be in DISABLE START position. This helps to ensure safety and helps
  to prevent the system from restart.

Failure to follow these instructions will result in death or serious injury.

### **Related Topics**

- Pre-requisites
- · Commissioning and Start-up

### **Pre-requisites**

Once the equipment is received, installed, and connected in its operating location, the following points must be performed before operating the PowerLogic<sup>™</sup> DVR system:

- Check the input and output connections:
  - The wire must be adequate.
  - The terminals must be fitted correctly.
  - Check the tightening torque corresponding to the screws used in each case.
  - · Check that the input and output phase sequences are correct.
- Make sure that the power connected to the equipment does not exceed the nominal value.
- Verify the fuses F1, F2, F3, F4, F5, and F6 of each PowerLogic<sup>™</sup> DVR unit are in good condition and fitted correctly.
- Check that the internal switch I1 of the PowerLogic<sup>™</sup> unit is in **DISABLE START** position.

DISABLE START	0	0 1
ENABLE START	1	

- Check that all loads are OFF.
- Check the installation and wiring connections to make sure that there are no short circuits or uninsulated parts.

### **Related Topics**

Commissioning (Parent Topic)

### **Commissioning and Start-up**

Once the connection and installation procedure provided in the section Prerequisites, page 42 is performed and verified, the system can be started. To start the system, perform the following steps:

- 1. Turn the manual bypass switches I1, I2, I3 to OFF position.
- 2. Insert the corresponding key into the **Lock Key** of manual bypass cabinet and turn it clockwise. The key is locked in this position.
- 3. Energize the system by powering through the manual bypass input as shown in the following image.



- 4. Check the correct sequence of the phases and correct voltages between Phase-Phase and Ground-Neutral in input connections of the manual bypass cabinet with a multimeter and phasemeter.
- 5. Turn the manual bypass switch **I2** to **ON** position.



6. Check the correct sequence of the phases and correct voltages between Phase-Phase and Ground-Neutral in OUTPUT connections of the manual bypass cabinet with a multimeter and phasemeter.

7. Turn the input manual bypass switch **I1** to **ON** position.



 Check the correct sequence of the phases and correct voltages between DVR OUTPUT connections and OUTPUT connections of the manual bypass cabinet with a multimeter and phasemeter to check connections between manual bypass cabinet and PowerLogic<sup>™</sup> DVR units are correct.



9. Turn the output manual bypass switch **I3** to **ON** position and then manual bypass switch **I2** to **OFF** position.



- 10. Reassemble protection covers.
- 11. Set the internal switch **I1** of PowerLogic<sup>™</sup> DVR unit to **ENABLE START** position to enable to start the system.

DISABLE START	0	0 1
ENABLE START	1	$\bigcirc$

12. Make sure that the PowerLogic<sup>™</sup> DVR system is turned on and is in the Static Bypass mode. Check if there are no alarms. On the control panel of the screen, it should be in **OFF** mode.



- 13. Close the door of all cabinets.
- 14. Adjust the following settings in the Parameters menu.
  - Location
  - Time zone
  - Select language
  - Nominal AC voltage
  - Nominal frequency

For more information to know how to edit the settings, refer Parameters Menu, page 30.

- 15. Turn the **Lock Key** anticlockwise and remove it from its lock. Insert the corresponding key into **Start Key I4** of manual bypass cabinet, and turn the key clockwise. This causes a series of internal actions as described below, during the state transition from Static Bypass to Normal mode.
  - Activation of the pre-charging system
  - · Close the main contactor to power the rectifier module
  - · Supplies the inverter
  - · Commands to open the static bypass
  - · System begins to compensate for disturbances caused by its input

16. Check that the system values are correct and there are no alarms. Check that the system is in the Normal mode.



Once the above steps are performed correctly, the PowerLogic  $^{\rm TM}$  DVR system can be operated.

### **Related Topics**

Commissioning (Parent Topic)

## **Operation Procedures**

## **A A DANGER**

### HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Apply appropriate Personal Protective Equipment (PPE) and follow safe electrical work practices. See NFPA 70E in the USA, CSA Z462, or applicable local standards.
- The equipment must be installed and serviced only by qualified electrical personnel.
- Do not exceed the maximum limits of device ratings.
- Ground the equipment using the provided ground connecting point before turning on the power supply to the system.
- Turn off the power supply before working on the system.
- Once the power is turned off, wait for 3 minutes to allow the capacitors to discharge prior to opening the doors or removing the covers.
- Always use a sensing device of proper rated voltage to confirm that the power is off.
- Replace all devices, doors, and covers before turning on the power supply to the system.
- Carefully inspect the interior for tools left behind before replacing the covers and closing the doors.

Failure to follow these instructions will result in death or serious injury.

### **Related Topics**

- Automatic Transfer to Static Bypass Mode
- System Stop
- Manual Bypass Procedure

## **Automatic Transfer to Static Bypass Mode**

When the system is in Normal mode, the following situations occur depending on the severity level causing the automatic transition to the Static Bypass mode.

- When the PowerLogic<sup>™</sup> DVR system is switched to any one of the working status provided below, the system automatically switches to the Static Bypass mode. Once the detected error is resolved, the system automatically switches back to the Normal mode.
  - Overload status
  - Instantaneous voltage failure status
  - Mains failure status
  - Minimum bus voltage status
  - Maximum sag status
  - Driver alarm status
  - Maximum bus voltage alarm status

- When the PowerLogic<sup>™</sup> DVR system is switched to any one of the working status provided below, the system switches to the Static Bypass mode permanently. The system must be verified and restarted once the detected error is resolved. The system must be manually reset by using a **RESET** command once the problem detected is eliminated.
  - Pre-charging failure status
  - Capacitor voltage failure status
  - Maximum bus voltage failure status
  - Thermostat failure status
  - Driver failure status
  - Temperature failure status
  - Fuse failure status
  - AC capacitor failure status

### **Related Topics**

• Operation Procedures (Parent Topic)

### **System Stop**

To stop the system manually, perform the following steps:

1. Insert the corresponding key into the **Lock key** of the manual bypass cabinet and turn the key clockwise.

**Result**: This action sends the Stop command to the system. As a result, the system switches to the Static Bypass mode.

- 2. Remove the **Lock key** from its lock. Turn the key anticlockwise to its initial position.
- 3. De-energize the PowerLogic<sup>™</sup> DVR system and the load.
- 4. Turn the internal switch **I1** of the PowerLogic<sup>™</sup> DVR master unit to **OFF** position, and then switch **I1** and **I3** of manual bypass cabinet to **OFF** position.

### **Related Topics**

Operation Procedures (Parent Topic)

### **Manual Bypass Procedure**

For PowerLogic<sup>™</sup> DVR system maintenance or repair work, perform the procedures provided in the following sections.

### **Related Topics**

- Switching from Normal to Manual Bypass Mode
- Switching from Manual Bypass to Normal Mode
- Operation Procedures (Parent Topic)

### Switching from Normal to Manual Bypass Mode

Perform the following steps to switch the PowerLogic<sup>™</sup> DVR system from Normal to Manual Bypass mode:

 Insert the corresponding key into the Lock Key of manual bypass cabinet and turn the key clockwise. The key will remain blocked in this position.

**Result**: The system switches to the Static Bypass mode. Make sure that the system is stopped on the control panel.

- 2. Turn the manual bypass switch I2 to ON position, and then set the manual bypass output switch I3 to OFF position.
- 3. Turn the manual bypass input switch I1 to OFF position.

**Result**: The PowerLogic<sup>™</sup> DVR system is switched from Normal to Manual Bypass mode.

The following image shows the schematic of manual bypass cabinet.



The following image shows the switch views of manual bypass cabinet.



Before removing any protective cover of master or slave units, perform the following steps:

- 1. Set the internal switch **I1** of the PowerLogic<sup>™</sup> unit to the **DISABLE START** position.
- 2. Wait for at least 3 minutes for the capacitors to discharge.
- 3. Use a sensing device of proper rated voltage to confirm that the power is off.

### **Related Topics**

Manual Bypass Procedure (Parent Topic)

### Switching from Manual Bypass to Normal Mode

To switch the PowerLogic<sup>™</sup> DVR system from Manual Bypass to Normal mode operation, perform the following steps:

- 1. Replace all devices and carefully inspect the interior for tools left behind before replacing the covers.
- 2. Set the internal switch **I1** of the PowerLogic<sup>™</sup> unit to **ENABLE START** position.
- 3. Turn the manual bypass input switch **I1** to **ON** position.
- 4. Make sure that the PowerLogic<sup>™</sup> DVR system is turned on and the system is in the Static Bypass mode on the control panel.
- 5. Turn the manual bypass output switch **I3** to **ON** position and then the manual bypass switch **I2** to **OFF** position.

- 6. Turn the LOCK KEY anticlockwise, and remove it from the lock.
- 7. Insert the corresponding key into **START KEY I4** of manual bypass cabinet, and turn the key clockwise to start the system. Check that the system is started on the control panel.

**Result**: The PowerLogic<sup>™</sup> DVR system is switched from Manual Bypass to Normal operation mode.

### **Related Topics**

• Manual Bypass Procedure (Parent Topic)

## Troubleshooting

### **Related Topics**

- Malfunctions of the PowerLogic<sup>™</sup> DVR System
- Recommended Spare Parts

## Malfunctions of the PowerLogic<sup>™</sup> DVR System

For the events such as anomaly, strange noise, or malfunction, Schneider Electric recommends to switch the PowerLogic<sup>™</sup> DVR system from Normal mode to Manual Bypass mode. To perform the switching operation, refer Switching from Normal to Manual Bypass Mode, page 48. For any assistance, contact Schneider Electric customer service.

The **Events** (refer Events Menu, page 33) and **Event Log** (refer Event Log Menu, page 34) menus in the control panel of the PowerLogic<sup>™</sup> DVR system provides information of the events that causes the fault. The name of each event indicates the type of system error.

Code	Event	Description	Equipment action	Solution
00	System start	Control panel start-up	-	-
01	Password change	Change of any level password	-	-
02	Sag registered	A sag has been detected and registered.	-	-
10	Instantaneous voltage failure	The inverter module does not follow a voltage reference.	The equipment switches to Static Bypass mode keeping the rectifier modules on.	Wait for the equipment to fix the problem. Otherwise, contact Schneider Electric.
11	Overload	Current value exceeded in the output of the system or in the inverter module.	The equipment switches to Static Bypass mode keeping the rectifier modules on.	Reduce the load. The equipment will restart when there is no overcurrent. Otherwise, contact Schneider Electric.
12	Maximum bus voltage	DC-link voltage higher than the configured value	The equipment switches to Static Bypass mode keeping the rectifier modules on.	Wait for the equipment to fix the problem. Otherwise, contact Schneider Electric.
			If this situation is persistent, the equipment switches to Static Bypass mode.	Stop the equipment completely and turn it on again. This event must be reset. If the error persists, contact Schneider Electric.
13	Maximum capacitor voltage	High voltage in any group of DC-link capacitors of rectifier/ inverter modules.	The equipment switches to Static Bypass mode.	Stop the equipment completely and turn it on again. This event must be reset. If the error persists, contact Schneider Electric.
14	Minimum bus voltage	DC-link voltage lower than the configured value	The equipment switches to Static Bypass mode.	Wait until the equipment fixes the problem. Otherwise, stop the equipment completely and turn it on again. If the error persists, contact Schneider Electric.

	Friend	Decemination		O a badi a s
Code	Event	Description	Equipment action	Solution
15	Mains voltage failure	Power grid voltage out of range (+20% -70%), except for asymmetrical sags (Line to Neutral sags)	if there is grid power, the equipment switches to Static Bypass mode keeping the rectifier modules on. If there is no grid power, the equipment stops.	Wait until the power grid returns to normal condition. The equipment will restart automatically. Otherwise, contact Schneider Electric.
16	Output voltage integrator limitation	When there is a sag deeper than maximum sag correction and longer than 1 second.	The equipment switches to Static Bypass mode keeping the rectifier modules on.	Wait until the power grid returns to normal condition. The equipment will restart automatically. Otherwise, contact Schneider Electric.
17	Driver alarm	Driver fault detection in rectifier or inverter modules.	The equipment switches to Static Bypass mode. However, the equipment will try to autoreset.	Wait to the equipment to autoreset. If it cannot, Driver failure event will be set.
18	Stop by failure	Any error that needs to be reset.	The equipment switches to Static Bypass mode.	Stop the equipment completely and turn it on again. This event must be reset. If the error persists, contact Schneider Electric.
19	Driver failure	Persistence of the driver alarm	The equipment switches to Static Bypass mode.	Stop the equipment completely and turn it on again. This event must be reset. If the error persists, contact Schneider Electric.
20	Thermostat failure	Exceeded rectifier/ inverter module heatsink temperature (90 °C)	The equipment switches to Static Bypass mode.	Stop the equipment completely and turn it on again. This event must be reset. If the error persists, contact Schneider Electric.
21	Internal power limitation	When there is a sag deeper than maximum sag correction and longer than 1 second.	The equipment switches to Static Bypass mode, keeping the rectifier modules on.	Wait until the power grid returns to normal condition. The equipment will restart automatically. Otherwise, contact Schneider Electric.
		Due to DC-link voltage is lower than the configured value for any reason.	Remains working but reducing the compensation.	Stop the equipment completely and turn it on again. If the error persists, contact Schneider Electric.
		Both conditions above	The equipment switches to Static Bypass mode, keeping the rectifier modules on.	Wait until the power grid returns to normal condition. The equipment will restart automatically. Otherwise, contact Schneider Electric.
23	PLL failure	Synchronism fault with power grid or frequency of the grid out of range	The equipment switches to Static Bypass mode keeping the rectifier modules on.	Wait until the power grid returns to normal condition. Otherwise, contact Schneider Electric.

Code	Event	Description	Equipment action	Solution
24	DSP communication failure	Loss of communication between the DSP board and the control panel	The equipment remains working.	Stop the equipment completely and turn it on again. If the error persists, contact Schneider Electric.
25	Status change	Transition between working states	-	-
26	High temperature alarm	Exceeded booster transformer temperature (70 °C)	The equipment switches to Static Bypass mode.	Stop the equipment completely and turn it on again. This event must be reset. If the error persists, contact Schneider Electric.

When a serious error occurs causing the system to stop, contact Schneider Electric customer service. Schneider Electric provides you the required information and helps to resolve the problems.

For more information, visit our company website at Schneider Electric.

### **Related Topics**

• Troubleshooting (Parent Topic)

### **Recommended Spare Parts**

Contact Schneider Electric for a list of recommended spare parts for the PowerLogic™ DVR systems, which can help to quickly resolve any malfunction.

### **Related Topics**

Troubleshooting (Parent Topic)

## Maintenance

## NOTICE

#### EQUIPMENT DAMAGE

- Regular maintenance work must be performed.
- All maintenance tasks must be performed only by qualified personnel.

Failure to follow these instructions can result in equipment damage and render the warranty null and void.

Schneider Electric offers a basic maintenance service of the equipment, in order to have a prolonged life of the PowerLogic<sup>™</sup> DVR system.

To help to assure the correct operation of the PowerLogic<sup>™</sup> DVR system, it is necessary to perform several maintenance tasks. These tasks can help to resolve any detected problems before the breakdown occurs and to make sure that the active and passive safety devices are operating correctly.

The frequency of maintenance tasks depends upon the location and atmospheric conditions. The air quality factors such as temperature and dust has a great influence on the amount of maintenance work. The maintenance work is done in order to maintain the functionalities of the equipment within an acceptable level of uncertainty. For example, if the air contains a greater amount of dust in suspension, the maintenance work must be carried out more frequently than the standard frequency indicated.

**NOTE:** For some of these maintenance tasks, the PowerLogic<sup>™</sup> DVR system must be disconnected and shut down.

The recommended maintenance tasks in accordance with the standard frequency are listed as follows:

- Monthly:
  - Visual control of correct operation
    - Values within margins
    - No active event
  - Control of the event history, in search of sporadic or repetitive detected failures
- Biannual:
  - Check on the correct ventilation of the location.
  - Clean the air inlet filters of the equipment.
  - Remove the foreign bodies from the air inlet and outlet.
  - Visually verify for loose connecting wires, rusting, damage to insulation, and so on.
- Annual:
  - Perform complete controlled shutdown of the equipment.
  - Disconnect the external AC protections of the unit (switches, magnetothermal switches, and so on).
  - Verify the connection status of the AC input and output grid of the equipment.
    - Visual check
    - Retightening of connections
  - Replace the anti-particle filters of all cabinets by Venfilter brand with VSB-150 reference or similar.
  - Examine the operation of the fans and thermostat activation.
  - Check for the screw tightness and cabling (possible effect of rodents or similar).

- Examine and vacuum-clean the internal elements:
  - Static bypass module
  - Pre-charging module
  - Rectifier module
  - Inverter module
  - Transformer
  - Remaining electronic elements, power sources, and so on
- Check for the tightening and good condition of the power and signal cables.
- Check for the color changes or deformations due to hot spots.
- Clean the room where the system is located and check if there is water filtration.
- Check for the performance of the switches and contactors.
- Connect the external AC protections of the equipment (switches, thermal magnets, and so on) and perform complete controlled start-up of the equipment.

# **Technical Specification**

Technical characteristics	Parameters	40% sag models	50% sag models	60% sag models			
Input	Nominal voltage	200/208/220 Vac or 38	30/400/415 Vac	·			
	Input voltage range	± 20% Vac	+ 20% - 25%	+ 20% - 30%			
	Phase	3 phases + ground (neutral optional)					
	Frequency	50/60 Hz ± 10 %					
	Frequency variation (df/dt)	4 Hz/s					
Output	Power range	150~900 kVA/kW	220~660 kVA/kW	150~450 kVA/kW			
	Voltage	200/208/220 Vac or 38	30/400/415 Vac				
	Regulation	± 1%					
	Phase	3 phases + ground (neutral optional)					
	Frequency	50/60 Hz					
	Response time	< 3 msec					
	Transfer time to static bypass	< 0.5 msec					
	Overload capacity (in Normal	110% - 30 seconds					
		150% - 1 seconds					
	Overload capacity (in Static Bypass mode)	200% - 60 seconds					
		500% - 10 seconds					
		3000% - 0.2 seconds					
Three-phase correction capacity	Upper limit of continuous regulation	+20%					
	Lower limit of continuous regulation	-20%	-25%	-30%			
	Maximum sag without voltage alteration						
	(Guaranteed up to 30 seconds of operation)	-40%	-50%	-60%			
	Maximum sag without transfer to static bypass <sup>1</sup>	70%	70%	70%			
	(Guaranteed up to 1 seconds of operation)	-70%	-70%	-70%			

<sup>1.</sup> Depends on the impedance of the network.

Technical characteristics	Parameters	40% sag models	50% sag models	60% sag models	
Others	Maximum efficiency	<ul> <li>&gt; 98%</li> <li>2.5 kV – 1 minute</li> <li>Touch panel</li> </ul>			
	Dielectric rigidity				
	Control panel				
	Protections	Short circuits, current limitation, overload, EMI filter, necessary disconnections			
	Paralellable	Up to 3 equipments (Master + 2 Slaves) Yes			
	Maintenance switch				
	Protection degree	IP 20         IK07         Class I         2         III         CLASS 3M1         Forced ventilation			
	IK impact degree				
	Protective class				
	Pollution degree rating				
	Overvoltage category				
	Vibration				
	Refrigeration				
Noise level		< 65 dB			
	Working temperature	0 ~ 40 °C			
	Storage temperature	-30 °C~ 85 °C			
	Altitude	1000 m			
	Relative humidity	0 ~ 95%, without condensation			

The following table details the dimensions and weights of master and slave units, and the manual bypass cabinets.

Master and slave units							
Model	380/400/415 Vac models		200/208/220 Vac models				
Dimensions H×W×D	2152x1214x750 mm		2152x1835x750 mm				
Weight	1250 kg		1600 kg				
Manual bypass cabinet							
Model	630 A	1250 A	2000 A	3200 A			
Dimensions H×W×D	2152 x 614 x 750 mm	2152 x 1100 x 750 mm	2152 x 1100 x 750 mm	2152 x 1200 x 750 mm			
Weight	200 kg	375 kg	575 kg	775 kg			

#### NOTE:

- The technical specifications may be modified without warning.
- For any other technical requirement or modification of existing characteristics, contact Schneider Electric.

## **Standards**

Regulation	Standard	Objective	
European low voltage directive (2014/35/EU)	IEC 62477-1:2012/A11:2014	Safety requirements for power electronic converter systems and equipment	
UK Regulation for Electrical Equipment (SI 2016 No.1101)	IEC 62477-1:2012/A11:2014	Electrical equipment to comply with Electrical Equipment (Safety) Regulations 2016	
European directive on electromagnetic compatibility (2014/30/EU)	<ul> <li>IEC 61000-6-2:2005: Immunity</li> </ul>	Electromagnetic compatibility requirements for industrial environments	
	• IEC 61000-6-4:2007/ A1:2010: Emission		
Shock and Vibration for "Class 3M1 Equipment"	IEC 60721-3-3:2002	Classification of groups of environmental, parameters and their severities-Stationary use at weather protected locations	
UKCA marking	UK	Manufacturer:	
	ĊĂ	Schneider Electric Industries SAS	
		35 Rue Joseph Monier	
		92500 Rueil-Malmaison	
		France	
		Importer:	
		Schneider Electric Limited	
		Stafford Park 5	
		Telford, TF3 3BL	
		United Kingdom	

The PowerLogic<sup>™</sup> DVR systems comply with the following standards:

## Warranty

Schneider Electric provides assurance that the PowerLogic<sup>™</sup> DVR system delivers the desired performance, when the product is operated under specified product technical and operational conditions. The user is recommended to read the installation and operation manuals carefully to understand the technical specifications, operational limits, and the recommended maintenance procedure of the product. The warranty period is counted according to the contractual terms.

Schneider Electric provides assurance to the customer for the proper functioning of the equipment, whenever the use, replace, and repair of the equipment are in accordance to the contractual terms.

The warranty of the product will get cancelled under any of the following circumstances:

- Faults due to improper handling of the product without following the operating instructions, misuse, faulty grid or by natural disasters.
- Improper use of the equipment without following the original characteristic of the equipment as described in the installation, and the operation manual.
- Installation location does not meet the requirements as described in the installation, and the operation manual.
- Regular maintenance operations are not performed as described in the operation manual.
- Equipment deterioration due to external agents (water, dirt, and animals).
- Damage caused by accident, theft, fire, inadmissible atmospheric conditions, external agents (animals and insects), or natural disasters.
- Any intervention and/or repair by an unauthorized technical service.
- The use of equipment or accessories not owned by Schneider Electric and/or not installed by Schneider Electric authorized technical service.
- The environmental operating conditions do not meet the required range.

NOTE:

The installation of elements inside the unit by personnel other than those authorized by Schneider Electric, shall render the warranty null and void. Schneider Electric do not accept responsibility for the repair of equipment if any of the seals installed for internal checks are broken.

The validity of this warranty is limited to the proper use of the equipment according to the operation manual.

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

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