PowerLogic[™]

Dynamic Voltage Restorer 150–900

Installation Manual

PowerLogic[™] 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.

About the Book

Document Scope

The aim of this document is to provide the installers with the technical information needed to install the PowerLogic[™] DVR system. This document also provides the information about the environmental measures and the European standards to be followed while installing the PowerLogic[™] DVR system.

Validity Note

This guide is valid for the installation of the PowerLogic[™] 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 – Operation Manual	NNZ6555700
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[™] 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.

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.

Overview

Introduction to PowerLogic[™] DVR System

PowerLogic[™] Master Range

PowerLogic[™] 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[™] Dynamic Voltage Restorer (PowerLogic[™] 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 PowerLogicTM 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[™] 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[™] DVR System Range

The following table shows the full range of PowerLogic[™] 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
		-70% 220 kVA 300 kVA 440 kVA 500 kVA 600 kVA	220 kVA
			300 kVA
±20%	40%		440 kVA
	-40 /6		500 kVA
			600 kVA
	75 90	750 kVA	
			900 kVA
		-70% 220 660	220 kVA
+20% - 25%	-50%		440 kVA
			660 kVA
+20% - 30%			150 kVA
	-60%	-70%	PowerLogic™ DVR system power 150 kVA 220 kVA 300 kVA 440 kVA 500 kVA 600 kVA 750 kVA 900 kVA 220 kVA 150 kVA 600 kVA 600 kVA 150 kVA 900 kVA 150 kVA 150 kVA 300 kVA 440 kVA 450 kVA
			450 kVA

The PowerLogic[™] 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[™] 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[™] DVR System Configurations

The following table shows the system configurations for each PowerLogic[™] 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 unit	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
-60%	150 kVA	М	150 kVA	630 A
	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	System configuration	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
-40%	440 kVA	M+S	220 kVA	2000 A
	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
-60%	150 kVA	М	150 kVA	630 A
	300 kVA	M+S	150 kVA	1250 A
	450 kVA	M+2S	150 kVA	2000 A

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

Receiving, Handling, and Storing

Receiving the Unit

The PowerLogic[™] DVR system package consists of:

- PowerLogic[™] DVR units (1 master unit and for parallel systems, 1 or 2 slave units are added to increase capacity)
- Manual bypass cabinet
- · Installation manual, operation manual, and electrical diagrams
- · Includes other options if requested

Once the package is arrived, follow the steps:

- 1. Remove all the packaging material.
- 2. Inspect the equipment visually for the possible damage occurred during transportation.

NOTE: For any signs of damage or mishandling, contact shipping company and Schneider Electric immediately.

- 3. List and check all the items indicated on the delivery note are delivered. To do this, check the manufacturer's data plate located on the front or inside the equipment door.
- 4. Read carefully the product safety label which is located on the front door of each cabinets.

NOTE:

- After receiving the product, if the customer finds any defect in the quantity or quality of the product, the claim must be filed within 24 hours. For more information on how to file a claim with the shipping company, contact Schneider Electric. The shipping claim must be filed at the receiving end of the delivery.
- If any part is received in a poor state condition, a detailed note of the part must be provided on the delivery note.

Handling the Unit

Depending on the system voltage, the following bases can be used for handling the PowerLogic[™] DVR unit cabinets:

Feet:

- Used for the system configurations for the input voltage 380 Vac, 400 Vac, or 415 Vac.
- The PowerLogic[™] DVR units must be handled with a pallet truck or forklift truck as shown in the following image.



The manual bypass cabinet can also be handled in the same way as 380 Vac, 400 Vac, or 415 Vac PowerLogic™ DVR units.

Bedplate cabinet:

- Used for the system configurations for the input voltage 200 Vac, 208 Vac, or 220 Vac.
- The PowerLogic[™] DVR units must be handled with a forklift truck having adjustable forks with a dimensions limited to 150 x 150 mm as shown in the following image.



A Holes for moving the cabinet with a suitable forklift

ACAUTION

RISK OF EQUIPMENT DAMAGE

- Handling the cabinets by any other means could cause damage and will void the product warranty.
- Make sure that the system is placed in the upright position, standing on its feet or bedplate base.

Failure to follow these instructions can result in injury or equipment damage.

Methods of Handling

Correct Handling

AWARNING

MECHANICAL HAZARD

- Use a forklift truck or pallet truck to move the equipment.
- Do not use crane or lifting rings to move the equipment.
- For 380 Vac, 400 Vac, or 415 Vac PowerLogic[™] DVR units, make sure that the centre of gravity of the cabinet is centred over the right-hand door, as the heaviest components are located on the right side.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

The following image shows the correct way of handling unit with the pallet truck.



Incorrect Handling

AWARNING

RISK OF EQUIPMENT DAMAGE

Handling with straps, hooks, belts, or similar devices may cause damage to the equipment. This will void the product warranty.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

The following image shows the incorrect ways of handling the unit.



Storing the Unit

Follow the steps for storing the unit prior to installation:

- It should be stored in a cool, dry, well-ventilated location that is protected against rain, splashing water, and chemical agents.
- It must be protected from risk of overheating due to exposure to direct sunlight or through windows.
- It must be covered with a tarpaulin or plastic wrapper to protect it against dust, dirt, paint, or other foreign materials.

NOTE: The recommended storage temperature range is 15 °C to 25 °C. The maximum and minimum storage temperature is +85 °C and –30 °C respectively. The recommended relative humidity range is 30% to 90%.

NOTICE

RISK OF EQUIPMENT DAMAGE

Do not stack the packages. The equipment must be placed in accordance with the silkscreen printed details available on the packaging box.

Failure to follow this instruction may void the product warranty

Installation

Installation

This chapter provides the information required to install the PowerLogic[™] DVR system and its associated equipments.

Read and understand all instructions in this manual prior to installation. The correct installation of the PowerLogic[™] DVR system is essential for proper operation of all components.

For installation, the location chosen should provide working clearances complying with applicable local standards.

A A DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Apply appropriate Personal Protective Equipment (PPE) and follow safe electrical work practices. Follow 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.

Follow the steps for the installation of PowerLogic[™] DVR system and its associated equipments:

- Make sure that the foundation is prepared for the PowerLogic[™] DVR system. Refer Mounting, page 17.
- 2. Make sure that the environmental requirements are satisfied. Refer Environmental Precautions, page 18.
- 3. Attach the enclosure to the floor.
- 4. Do the electrical connections for the PowerLogic[™] DVR system. Refer Electrical Connections, page 28.
- 5. Set up the parallel interconnections if applicable.
- 6. Make the remote control wiring connections.

NOTE: When the unit is installed on IT grounding system, make sure to remove the ground cable of the EMI filter. Refer IT Grounding System, page 45.

Installation Location

Mounting

The mounting location must be able to support the weight of the PowerLogic[™] DVR system without sagging. For more information about weight specifications, refer to the Physical Description, page 20.

The floor must be as level as possible. The accepted tolerance is ± 2 mm/m.

If the floor is not level, use U-, T-, or I- shape section support to check for the floor evenness in both directions as shown in the following image.



Front and Rear Clearances

For the proper air flow and for the maintenance purpose (in case if any component to be replaced), the rear side of the PowerLogic[™] DVR system must have a minimum distance of 400 mm. The front side of the PowerLogic[™] DVR system must have enough space to allow personnel to pass through the system with the doors fully opened. Refer to the following image for the recommended front and rear clearance distance.



The recommended installation location for PowerLogic[™] DVR system should:

- Support the entry of fresh air flow from the front side and the exit of hot air from the rear side of the unit, to facilitate the natural convection as much as possible.
- Protect the PowerLogic[™] DVR system from overheating due to exposure to direct sunlight.
- Maintain the recommended system distances from the rest of the installation.

ACAUTION

EQUIPMENT DAMAGE

For proper ventilation of the system, strictly follow the instructions provided in this section.

Failure to follow these instructions can result in thermal detection.

Environmental Precautions

The PowerLogic[™] DVR system is designed for indoor use only (IP20 degree of protection). It requires a continuous exchange of air inside the enclosure for adequate cooling. Make sure that the air quality inside the room complies with the

Pollution Degree 2 which excludes conductive particles, significant amounts of dust, or corrosive, or harmful gases. Normally, only non-conductive pollution occurs.

The installation place must have the following characteristics:

- · Dust protection
- · Protection against excessive humidity and high heat sources
- Protection against atmospheric agents
- · Avoid exposure of system to gases or corrosive products
- No obstruction in the ventilation outlets provided in the front and back of the cabinets

The installation place must guarantee the following parameters:

- The ambient temperature of an operating environment must be between 0 °C and +40 °C.
- The location must not exceed 1000 m altitude.
- The relative humidity range must be 0 to 95% without condensation, and a maximum dew point of +37 °C.

The PowerLogic[™] DVR system generates significant heat during operation, due to which a proper ventilation for the system is required for cooling. For more information on the wattage loss for each PowerLogic[™] DVR system range, refer to Cooling and Ventilation, page 26.

The PowerLogic[™] DVR system is designed to operate within an operating temperature limits. If the system exceeds the limits, the system shuts down or the performance of the system is degraded.

NOTE: The upper or lower limit of the operating temperature range should not be used as ideal temperature levels.

The system reliability and the product life expectancy of the PowerLogic[™] DVR system can be improved, if the temperature levels are maintained between 20 °C and 25 °C.

Physical Description and Dimension

Physical Description

The following table shows the weight and dimensions for the different units of PowerLogic $^{\rm TM}$ DVR system.

Type of PowerLogic™ DVR unit	Weight	Dimensions (Width × Depth × Height)
Master or Slave for 380/400/415 Vac	1250 Kg	1214 × 750 × 2152 mm
Master or Slave for 200/208/220 Vac	1600 Kg	1835 × 750 × 2152 mm

The following table shows the weight and dimensions for the different types of manual bypass cabinet.

Type of Manual Bypass	Weight	Dimensions (Width × Depth × Height)
630 A	200 Kg	614 × 750 × 2152 mm
1250 A	375 kg	1100 × 750 × 2152 mm
2000 A	575 kg	1100 × 750 × 2152 mm
3200 A	775 kg	1200 × 750 × 2152 mm

Dimensional Schemes

The following diagrams show the dimensions of all ranges of $\mathsf{PowerLogic}^{\mathsf{TM}}$ DVR systems.

PowerLogic™ DVR 380/400/415 Vac Unit



PowerLogic™ DVR 200/208/220 Vac Unit



DETAIL FLOOR FIXING & OUTPUT WINDOWS FOR CONNECTION : A-A





Manual Bypass 630 A



FROM NEXT DOOR A-A (Floor mounting detail)

Manual Bypass 1250-2000 A



A-A (Floor mounting detail)

Manual Bypass 3200 A





Cooling and Ventilation

The cooling air enters through the front vents of the PowerLogic[™] DVR unit and expels through the grills from the rear panel.



The following table details the heat dissipated by each PowerLogic[™] DVR system during operation and the air flow extraction in the electrical room.

Maximum sag correction	PowerLogic™ DVR system power	Heat dissipated (kW)	Air flow (m³/h)
	150 kVA	4.6	2000
	220 kVA	5.7	2000
	300 kVA	6	2000
40%	440 kVA	11.4	4000
-40 %	500 kVA	12	4000
	600 kVA	12	4000
	750 kVA	18	6000
	900 kVA	18	6000
	220 kVA	4.4	2000
-50%	440 kVA	8.8	4000
	660 kVA	13.2	6000
	150 kVA	3	2000
-60%	300 kVA	6	4000
	450 kVA	9	6000

Placing the Cabinets in a System

The PowerLogic[™] DVR system is paired with up to 2 additional slave units to form systems up to 900 kVA and requires the installation of the manual bypass cabinet.

Below are the different options available for the placement of cabinets. Normally, there are 3 basic configurations and their recommended placement is shown in the following image.



The manual bypass cabinet can be placed in different positions as shown in the following image.



Installing Cabinets on the Floor

The cabinets should be attached to the floor. Refer to the dimensional drawings provided in the section Dimensional Schemes, page 20 for installing the cabinets on the floor.

Electrical Connections

The following diagram details the electrical connections of the PowerLogic $^{\rm TM}$ DVR system.



- 1 System input cables (upstream to Manual Bypass)
- 2 System output cables (downstream to Manual Bypass)
- 3 PowerLogic[™] DVR unit input cables
- 4 PowerLogic[™] DVR unit output cables
- 5 DC cable connection (Cable of length 4.5 m provided)

NOTE:

The neutral connection is not required for PowerLogic[™] DVR system. The neutral connection should be connected to the manual bypass cabinet only if required by the loads.

The section of power cable should be chosen according to the maximum permanent input current. The maximum input current in case of maximum sag should be considered as a temporary overload.

NOTICE

RISK OF EQUIPMENT DAMAGE

For PowerLogic ${}^{\rm T\!M}$ DVR 200/208/220 Vac systems, use only flexible copper cables.

Failure to follow these instructions can result in equipment damage.

NOTICE

RISK OF EQUIPMENT MALFUNCTION

The length of cables between manual bypass and input/output of each PowerLogic[™] DVR units should be the same.

Failure to follow these instructions can result in a uncorrect sharing of current between PowerLogic™ DVR systems.

The aluminium or copper cables can be used for the connections of input and output system. For the connection between manual bypass to PowerLogic[™] DVR units, it is recommended to use the copper cable on PowerLogic[™] DVR 380/400/415 Vac systems and mandatory to use copper cable on PowerLogic[™] DVR 200/208/220 Vac systems.

PowerLogic™ DVR 380/400/415 Vac Systems					
Maximum sag correction	PowerLogic™ DVR system power	System input maximum permanent current (cable no. ①)	System input current in maximum sag (cable no. •)	System output nominal current (cable no. 2)	
	150 kVA	285 A	380 A	228 A	
	220 kVA	418 A	557 A	334 A	
	300 kVA	570 A	760 A	456 A	
-40%	440 kVA	836 A	1114 A	669 A	
	500 kVA	950 A	1266 A	760 A	
	600 kVA	1140 A	1519 A	912 A	
	750 kVA	1425 A	1899 A	1140 A	
	900 kVA	1709 A	2279 A	1367 A	
	220 kVA	446 A	669 A	334 A	
-50%	440 kVA	891 A	1337 A	669 A	
	660 kVA	1337 A	2006 A	1003 A	
-60%	150 kVA	326 A	570 A	228 A	
	300 kVA	651 A	1140 A	456 A	
	450 kVA	977 A	1703 A	684 A	

PowerLogic™ 200/208/220 Vac Systems					
Maximum sag correction	PowerLogic™ DVR system power	System input maximum permanent current (cable no. •)	System input current in maximum sage (cable no. •)	System output nominal current (cable no. 2)	
	150 kVA	541 A	722 A	433 A	
	220 kVA	794 A	1059 A	635 A	
	300 kVA	1083 A	1443 A	866 A	
-40%	440 kVA	1588 A	2117 A	1270 A	
	500 kVA	1805 A	2406 A	1444 A	
	600 kVA	2165 A	2887 A	1732 A	
	750 kVA	2707 A	3609 A	2165 A	
	900 kVA	3248 A	4330 A	2598 A	
	220 kVA	847 A	1270 A	635 A	
-50%	440 kVA	1694 A	2540 A	1270 A	
	660 kVA	2540 A	3811 A	1905 A	
-60%	150 kVA	619 A	1083 A	433 A	
	300 kVA	1237 A	2165 A	866 A	
	450 kVA	1856 A	3248 A	1299 A	

The following table details the system input and the system output current.

PowerLogic™ DVR 380/400/415 Vac Systems					
Maximum sag correction	PowerLogic™ DVR system power	System configuration	Unit input maximum permanent current (cable no. 3)	Unit output nominal current (cable no.	Recommended section (per phase, cable no. 🕄 and 🕘)
	150 kVA	М	285 A	228 A	1 × 70 mm ²
	220 kVA	М	418 A	334 A	1 × 120 mm ²
	300 kVA	М	570 A	456 A	1 × 185 mm ²
-40% 4 5 6 7 9	440 kVA	M+S	418 A	334 A	1 × 120 mm ²
	500 kVA	M+S	475 A	380 A	1 × 150 mm ²
	600 kVA	M+S	570 A	456 A	1 × 185 mm ²
	750 kVA	M+2S	475 A	380 A	1 × 150 mm ²
	900 kVA	M+2S	570 A	456 A	1 × 185 mm ²
	220 kVA	М	446 A	334 A	
-50%	440 kVA	M+S	446 A	334 A	1 × 120 mm ²
	660 kVA	M+2S	446 A	334 A	
	150 kVA	М	326 A	228 A	
-60%	300 kVA	M+S	326 A	228 A	1 × 70 mm ²
	450 kVA	M+2S	326 A	228 A	

The following table details the PowerLogic[™] DVR unit current and recommended power cables.

PowerLogic™ DVR 200/208/400 Vac Systems					
Maximum sag correction	PowerLogic™ DVR system power	System configuration	Unit input maximum permanent current (cable no. ③)	Unit output nominal current (cable no.	Recommended section (per phase, cable no. ④ and ④)
	150 kVA	М	541 A	433 A	1 × 185 mm ²
	220 kVA	М	794 A	635 A	1 × 300 mm ²
	300 kVA	М	1083 A	866 A	2 × 240 mm ²
409/	440 kVA	M+S	794 A	635 A	1 × 300 mm ²
-40%	500 kVA	M+S	903 A	722 A	2 × 185 mm ²
	600 kVA	M+S	1083 A	866 A	2 × 240 mm ²
	750 kVA	M+2S	903 A	722 A	2 × 185 mm ²
	900 kVA	M+2S	1083 A	866 A	2 × 240 mm ²
	220 kVA	М	847 A	635 A	
-50%	440 kVA	M+S	847 A	635 A	1 × 300 mm ²
	660 kVA	M+2S	847 A	635 A	
	150 kVA	М	619 A	433 A	
-60%	300 kVA	M+S	619 A	433 A	1 × 185 mm ²
	450 kVA	M+2S	619 A	433 A	

NOTE: Hypothesis taken for recommended section of cables 3 and 4:

- Copper cable
- Class temperature : 90°C
- Ducting: single cables directly routed on the floor
- Maximum ambient temperature: 40°C

For any other cable characteristics or laying mode that mention above, the section should be redefine using the max permanent current, the characteristics of the cable and the laying mode.

Recommended Upstream Protection

It is recommended to place an upstream protection that houses only the incoming electrical installation to the equipment. The function of all visible elements in the switchboards shall be clearly indicated.

The upstream connection switchgear consists of:

- Overcurrent and short-circuit protection: An upstream circuit breaker must be installed at the input of the system according to the recommendations provided in the following table. If the short-circuit current capacity at DVR point connection is greater than the PowerLogic[™] DVR short-circuit withstand rating (refer table), use current-limitation circuit breaker.
- Overvoltage protectors: It is recommended that the general supply connection to the building be fitted with protector against surges due to atmospheric discharges.
- **Differential protection**: If a differential protection is used, it should be type B with a minimum time delay of 100 ms, and a minimum value should be set depending on the system configuration.

Master	Master + 1 Slave	Master + 2 Slaves
1 A	2 A	3 A

The following table details the recommended upstream circuit breaker and its settings, and the short-circuit withstand rating of the system.

PowerLogic™ DVR 380/400/415 Vac Systems						
Maximum sag correction	PowerLogic™ DVR system	owerLogic™ DVR system power circuit breaker	Overload settings for upstream circuit breaker			PowerLogic™ DVR
	power		lr	Tr	Isd	short-circuit rating
	150 kVA	ComPact NSX400 MicroLogic 2	285 A	8 s	10	15 kA
-	220 KVA	ComPact NSX630 MicroLogic 2	418 A	8 s	10	15 kA
	300 kVA	ComPact NSX630 MicroLogic 2	570 A	8 s	10	15 kA
400/	440 kVA	ComPact NS1000 MicroLogic 2	836 A	8 s	10	30 kA
-40%	500 kVA	ComPact NS1000 MicroLogic 2	950 A	8 s	10	30 kA
	600 kVA	ComPact NS1250 MicroLogic 2	1140 A	8 s	10	30 kA
	750 kVA	ComPact NS1600 MicroLogic 2	1425 A	8 s	10	45 kA
	900 kVA	ComPact NS2000 MicroLogic 2	1709 A	8 s	10	45 kA
	220 kVA	ComPact NSX630 MicroLogic 2	446 A	8 s	10	12 kA
-50%	440 kVA	ComPact NS1000 MicroLogic 2	891 A	8 s	10	24 kA
	660 kVA	ComPact NS1600 MicroLogic 2	1337 A	8 s	10	36 kA
-60%	150 kVA	ComPact NSX400 MicroLogic 2	326 A	8 s	10	12 kA
	300 kVA	ComPact NS800 MicroLogic 2	651 A	8 s	10	24 kA
	450 kVA	ComPact NS1000 MicroLogic 2	977 A	8 s	10	36 kA

PowerLogic™ DVR 200/208/220 Vac Systems						
Maximum sag correction PowerLogic [⊤] DVR system power	PowerLogic™ DVR system	Recommended upstream circuit breaker	Overload settings for upstream circuit breaker			PowerLogic™ DVR
	power		lr	Tr	Isd	short-circuit rating
-40%	150 kVA	ComPact NSX630 MicroLogic 2	541 A	8 s	10	28 kA
	220 kVA	ComPact NS800 MicroLogic 2	794 A	8 s	10	28 kA
	300 kVA	ComPact NS1250 MicroLogic 2	1083 A	8 s	10	28 kA
	440 kVA	ComPact NS1600 MicroLogic 2	1588 A	8 s	10	56 kA
	500 kVA	ComPact NS2000 MicroLogic 2	1805 A	8 s	10	56 kA
	600 kVA	ComPact NS2500 MicroLogic 2	2165 A	8 s	10	56 kA
	750 kVA	ComPact NS3200 MicroLogic 2	2707 A	8 s	10	84 kA
	900 kVA	ComPact NS3200 MicroLogic 2	3200 A	8 s	10	84 kA
-50%	220 kVA	ComPact NS1000 MicroLogic 2	847 A	8 s	10	22 kA
	440 kVA	ComPact NS2000 MicroLogic 2	1694 A	8 s	10	44 kA
	660 kVA	ComPact NS3200 MicroLogic 2	2540 A	8 s	10	66 kA
-60%	150 kVA	ComPact NSX630 MicroLogic 2	619 A	8 s	10	22 kA
	300 kVA	ComPact NS1250 MicroLogic 2	1237 A	8 s	10	44 kA
	450 kVA	ComPact NS2000 MicroLogic 2	1856 A	8 s	10	66 kA

Downstream Distribution Panel

The load distribution switchboard must consist of load protections. It is recommended to protect each load individually whenever possible.

If the load protections are grouped, make sure that each group does not exceed one-third of the nominal power of the PowerLogic[™] DVR system. This helps to reduce the effect of failure of one load on the other loads. This also helps to avoid damage in the static bypass during short-circuits or large inrush current exceeding the overload capability.

AC Input and Output Connections

A A DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Before connecting the PowerLogic[™] DVR system, make sure that the lines connected between upstream connection switchgear to the system inlet are isolated.
- · Installation and wiring must be performed by qualified personnel only.
- Make sure that all the switches of the PowerLogic[™] DVR system are open or in the OFF position. Place warning signs to avoid accidental operations.
- Make sure that the wires used to connect the mains and circuit breakers in the building have specific rated capacity as required for the equipment to avoid hazards of electric shock or fire.
- Ground the equipment using the ground connecting point provided before turning on the power supply to the system.
- Before doing the electrical connection for the PowerLogic[™] DVR units and manual bypass cabinet, make sure that there is no voltage in the line to avoid any possible electrical risk to personnel.
- Follow all local and national safety regulations provided in the installation manual.

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

The PowerLogic[™] DVR system has 3-phase grid AC input and 3-phase AC output. The connections are accessible at the front of all cabinets through the holes of diameter 13 mm. The information of the input and output connections are available on the labels at the bottom of the cabinet doors.

NOTE:

The neutral is not used inside the PowerLogic[™] DVR units. The neutral terminals placed on the manual bypass cabinets are used to make the connection between the system input and system output.

Apply tightening torque of 34 N•m to the screws used for the input/output AC cable for PowerLogic[™] DVR units and manual bypass cabinets.

NOTICE

RISK OF EQUIPMENT DAMAGE

For IT grounding systems, the ground connection to the EMI filter should be disconnected and removed to avoid any damage to the EMI filter when the first grounding fault occurs (Refer *IT Grounding System*, page 45).

Failure to follow these instructions can result in equipment damage.

Follow the steps to provide the connection between PowerLogic[™] DVR system and manual bypass cabinet:

- Connect the protective earth cables (the cable coming from the system INPUT and the cable going to the system OUTPUT) to the ground terminal of the manual bypass cabinet.
- Connect the protective earth cables between the ground terminal of the manual bypass cabinet and the ground terminal of each PowerLogic[™] DVR unit.
- 3. Connect the input wires of the system to INPUT L1 (R), L2 (S), and L3 (T)

connecting terminals of the manual bypass cabinet (refer cable no. • in image Electrical Connections).

NOTE: Make sure that the phase sequence of the wires is connected as per the instruction.

Connect the output wires of the system to OUTPUT L1 (R), L2 (S), and L3 (T) connecting terminals of the manual bypass cabinet (refer cable no. 2 in image Electrical Connections).

NOTE: Make sure that the phase sequence of the wires is connected as per the instruction.

5. Connect the input wires of each PowerLogic[™] DVR unit between DVR INPUT L1 (R), L2 (S), and L3 (T) connecting terminals of the manual bypass cabinet and INPUT L1 (R), L2 (S), and L3 (T) connecting terminals of each PowerLogic[™] DVR unit (refer cable no. ③ in image Electrical Connections).

NOTE: Make sure that the phase sequence of the wires is connected as per the instruction.

 Connect the output wires of each PowerLogic[™] DVR unit between DVR OUTPUT L1 (R), L2 (S), and L3 (T) connecting terminals of the manual bypass cabinet and OUTPUT L1 (R), L2 (S), and L3 (T) connecting terminals of each PowerLogic[™] DVR unit (refer cable no. ④ in image Electrical Connections).

NOTE: Make sure that the phase sequence of the wires is connected as per the instruction.

NOTE:

The input and output cables of the system can be connected at the top or bottom of the manual bypass cabinet.

The input/output cables of PowerLogic[™] DVR unit can be connected only at the bottom of the cabinet.

NOTICE

RISK OF EQUIPMENT MALFUNCTION

- Manual bypass cabinet has neutral terminals both at the top and bottom. The power connection of the input neutral (going to the source) and the output neutral (going to the load) must be connected to the same terminal.
- The power cables (3 phases and ground) between the manual bypass and each of the inputs/outputs of PowerLogic™ DVR units are not provided. These cables must have the same length and section to maintain the current sharing between PowerLogic™ DVR units.

Failure to follow these instructions can result in equipment damage.

The following diagrams show the AC power connections of PowerLogic[™] DVR units and manual bypass cabinets.

Electrical Connections

PowerLogic[™] DVR Unit Input/Output Power Connections



NOTE: In PowerLogicTM DVR units \geq 220 kVA and 200/208/220 Vac, there are 3 holes per connection plate instead of 2 holes.

Manual Bypass 630 A Input/Output Power Connections

Left Side Power Connections



Right Side Power Connections



Front Side Power Connections



Manual Bypass 1250-2000 A Input/Output Power Connections



Left Side Power Connections

Right Side Power Connections



Front Side Power Connections



Manual Bypass 3200 A Input/Output Power Connections

NEUTRAL **OPTION CABLE PASS WITHOUT FALSE SOIL** COPPER CONNECTION 2x(150x10 MM) 000 6 0 Ν Ν 4×073 0 o 0 0 ø Ν 000 4×073 NEUTRAL N 0000080 100 355 20 DVR STOP (NC) > "3-4" 450 125 125 DVR STATE (NO) > "1-2"

Left Side Power Connections

Front Side Power Connections



Master-Slave Interconnections

For the systems with slave units, three sets of cabling must be interconnected between the PowerLogic[™] DVR master and PowerLogic[™] DVR slaves. These interconnections are:

- DC-link
 - This connection permits sharing of DC-link to all PowerLogic™ DVR units.
- · Control signals
- Fibre optic

The connections in master-slave units for these interconnections are located on the front side at the bottom-left part of each PowerLogic[™] DVR unit, with little difference between master and slave unit.

EXPOSED TERMINALS

Make sure that the DC-link terminals are correctly connected and that the polarity (+, 0, -) is correct.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

The following diagrams show the interconnections between master and slave units of the system.



Master Connections

Slave Connections



The three sets of interconnections between master and slaves are provided with the cable length of 4.5 m.

Apply tightening torque of 4 N•m to the screws used for DC-link terminals.

EQUIPMENT DAMAGE

Strictly follow the torque tightness and interconnections instructions provided in this section.

Failure to follow these instructions can result in equipment damage or malfunctions.

Remote Control from Manual Bypass

The PowerLogic[™] DVR master is provided with the terminals to connect to the manual bypass cabinet. Refer to the following image for the location of the terminals. The function of these terminals is to receive the start and stop commands from the manual bypass cabinet. The terminals are located at the bottom of the left door of the PowerLogic[™] DVR master only.



The functions of the terminals are:

- Terminals 1 and 2 Start-up order (NO): The Start key I4 of the manual bypass closes the contact and starts the PowerLogic™ DVR system.
- Terminals 3 and 4 Stop order (NC): The Lock key of the switch I2 of the manual bypass opens the contact and stops the PowerLogic[™] DVR system.

The interconnection between manual bypass cabinet and master unit is provided with the cable length of 4.5 m.

Apply tightening torque of 0.5 N·m to the screws used for remote control terminals.

Dry Contact Terminals

The PowerLogic[™] DVR master includes a series of dry contacts to report the status and alarms of the system. The information of the terminals are provided on the label at the bottom of the door of the unit.

- Terminals 5 and 6 Alarm status (NO): This dry contact reports alarms detected in the system.
- Terminals 7, 8 and 9 Static Bypass status (NO and NC): This dry contact reports the status of the system in normal operation or in static bypass mode. Terminals indicating the static bypass status are also available through a switched contact.

Terminals	Static bypass mode	Normal mode
7–8	Closed	Open
7–9	Open	Closed

Apply tightening torque of 0.5 N·m to the screws used for dry contact terminals.

Characteristics of dry contact: 8 A – 250 Vac or 30 Vdc

Pre-commissioning

Installation Inspection

Inspect the power and control wiring connections. Make sure that the correct terminal points have been used for each wire connection and the wires are firmly tightened prior to start-up.

IT Grounding System

If PowerLogic[™] DVR unit is used in an IT grounding system, it is mandatory to disconnect the ground cable of the EMI filter on each DVR master (and slave(s) if used) unit. The EMI filter capacitors connected between the phases and ground do not comply with the voltage which appears on the first grounding fault between phase to GND.

One end of this cable is located on ground terminal of PowerLogic[™] DVR unit which is accessible at the bottom of left door (middle door in 200/208/220 Vac models), and the other end is located on ground terminal of EMI filter which is accessible at the bottom of left rear panel or left side panel (middle rear panel in 200/208/220 Vac models).

The following image details the EMI filter ground cable connection in PowerLogic[™] DVR unit.



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)	 IEC 61000-6-2:2005: Immunity 	Electromagnetic compatibility requirements for industrial
	 IEC 61000-6-4:2007/ A1:2010: Emission 	environments
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:
	CA	Schneider Electric Industries SAS
		35 Rue Joseph Monier
		92500 Rueil-Malmaison
		France
		luce estern
		<u>Importer</u> :
		Schneider Electric Limited
		Stafford Park 5
		Telford, TF3 3BL
		United Kingdom

The PowerLogic[™] DVR systems comply with the following standards:

Warranty

Schneider Electric provides assurance that the PowerLogic[™] 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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