

Easy Series

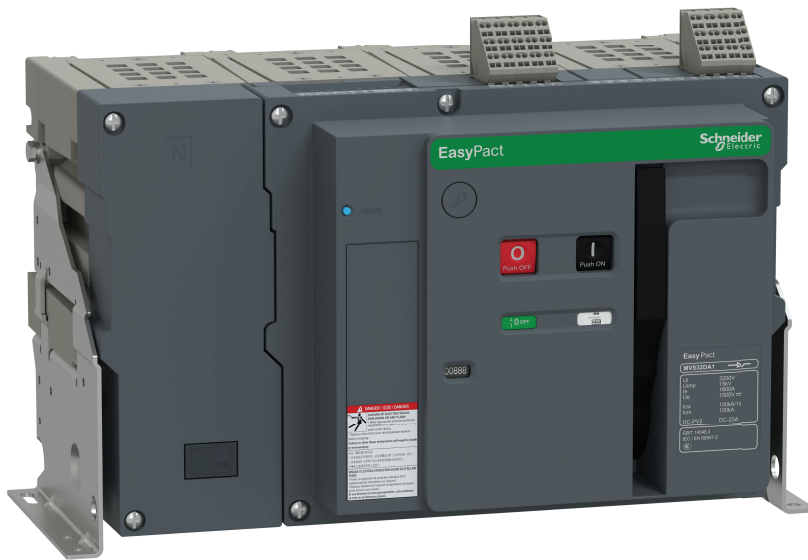
EasyPact MVS DA1 Switch-Disconnectors

From 1600 to 4000 A

User Guide

Easy Series offers essential and accessible value devices.

DOCA0351EN-00
06/2024



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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

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

CAUTION

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.

Safety Notice

DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E, CSA Z462, NOM 029-STPS or local equivalent.
- This equipment must only be installed and serviced by qualified electrical personnel.
- Turn off all power supplying this equipment before working on or inside this equipment.
- Always use a properly rated voltage sensing device to confirm power is off.
- Put back all devices, doors, and covers before turning on power to this equipment.
- Beware of potential hazards, and carefully inspect the work area for tools and objects that may have been left inside the equipment.

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

About the Book

Document Scope

The aim of this guide is to provide users, installers, and maintenance personnel with technical information needed to operate EasyPact™ MVS DA1 switch-disconnectors in compliance with the UL and IEC standards.

Validity Note

This guide applies to EasyPact MVS DA1 switch-disconnectors.

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-to-date version available on www.se.com/ww/en/download.

The technical characteristics of the devices described in this guide also appear online. To access the information online, go to the Schneider Electric home page at www.se.com.

Related Documents

Title of documentation	Reference number
<i>EasyPact MVS DA1 Fixed Switch-Disconnectors - Installation Guide</i>	BQT99365

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

Information on Non-Inclusive or Insensitive Terminology

As a responsible, inclusive company, Schneider Electric is constantly updating its communications and products that contain non-inclusive or insensitive terminology. However, despite these efforts, our content may still contain terms that are deemed inappropriate by some customers.

EasyPact MVS DA1 Description

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Easy Series Master Range

Easy Series delivers a range of energy management and industrial automation products that focus on core features to meet the needs of the customers at a value price. The Easy Series products are intuitive to set up and ride. The series includes essential product lines such as circuit breakers, UPS, metering, motion and drives, human-machine interface, PLC, and push buttons.

EasyPact MVS DA1 Range

EasyPact MVS DA1 Switch-Disconnectors

The range of EasyPact MVS DA1 switch-disconnectors offers current ratings from 1600 to 4000 A, for DC power systems up to 1500 V DC. The range is covered by one frame size.

EasyPact MVS DA1 switch-disconnectors are available in 4-pole (4P) power system.

EasyPact MVS DA1 Switch-Disconnecter Performances

The switch-disconnector functions in the following performance level:

- DA1 (1600 to 4000 A) at 1500 Vdc: $I_{cw} = 100 \text{ kA}$

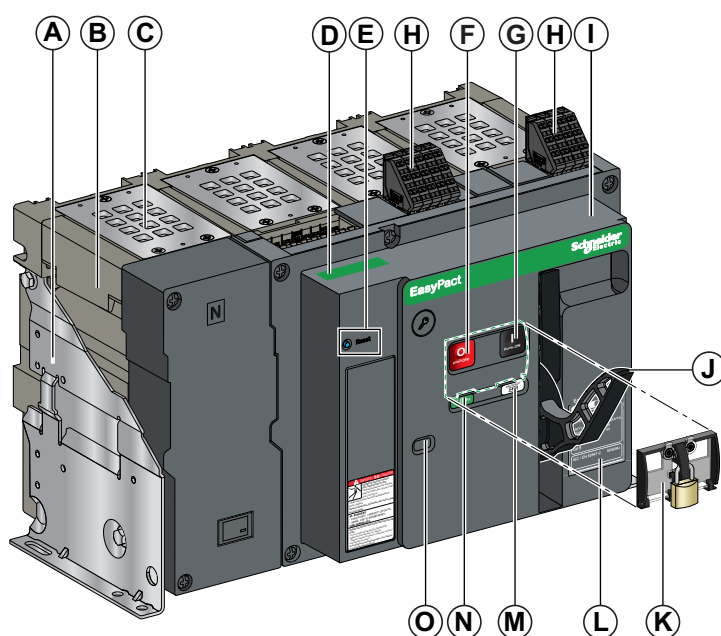
Neutral Position on 4P Devices

On 4P switch-disconnectors, the neutral is on the left side as standard.

Switch Disconnectors

Switch Disconnectors Description

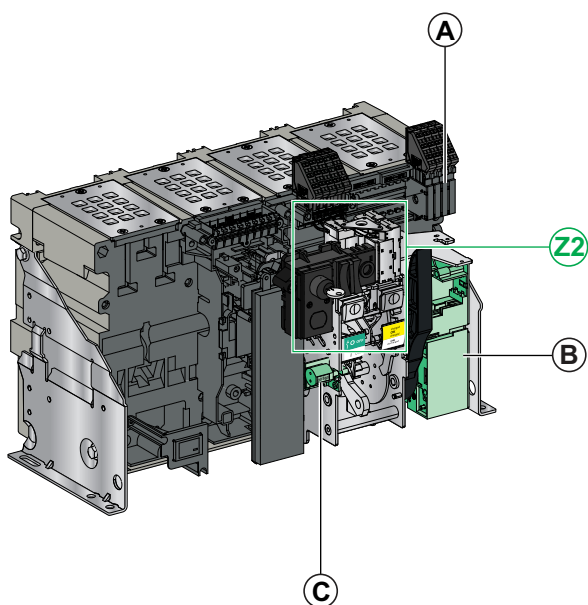
The following image shows the standard version of the switch-disconnector (no optional accessories).



- A** Mounting side plate
- B** Carrying handle
- C** Arc chute
- D** Product identification label with manufacturing date
- E** Blue fault-trip reset button
- F** Opening pushbutton
- G** Closing pushbutton
- H** Terminal blocks for standard accessories
- I** Front cover
- J** Spring charging handle
- K** VBP pushbutton locking cover (optional)
- L** Rating plate
- M** Spring charged and ready-to-close indicator
- N** Main-contact position indicator
- O** Window to read the CDM mechanical operation counter

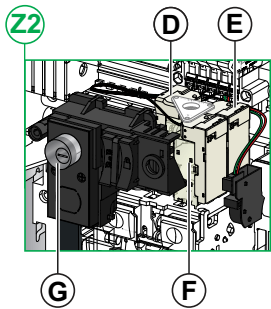
Switch Disconnectors Accessories Description

The following image shows the accessories available for the switch-disconnector.



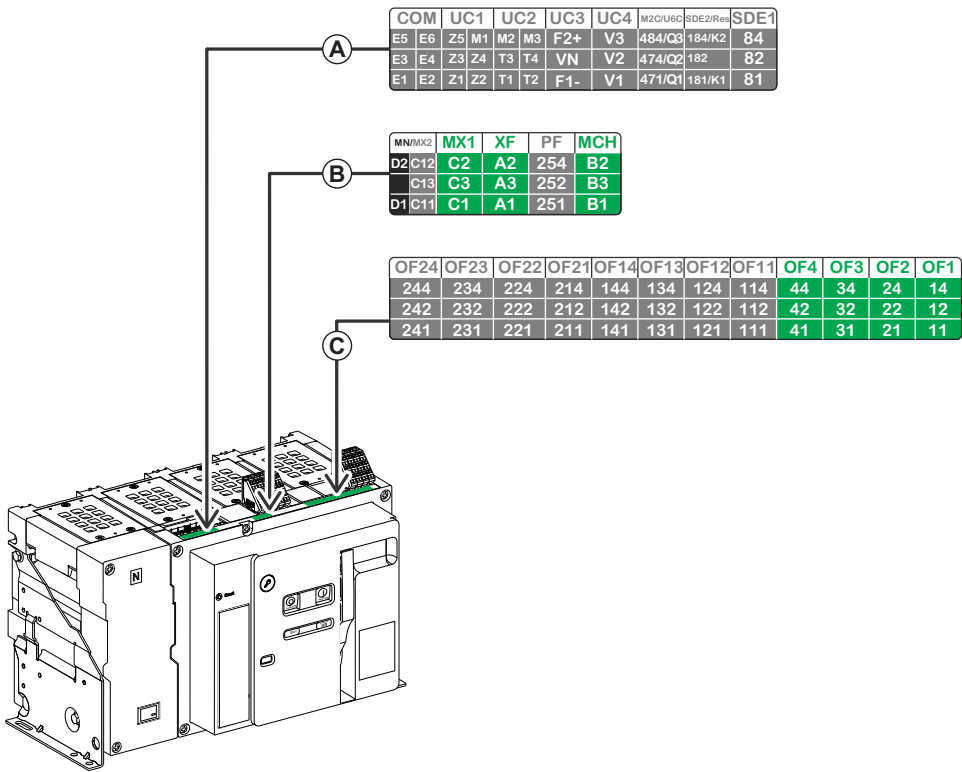
- A** Four OF indication contacts (standard)
- B** MCH gear motor (standard)
- C** CDM operation counter (optional)
- Z2** See following images

The following image zoom in on the accessories for the switch-disconnector:



- D MN undervoltage release (optional)
- E MX1 opening voltage release (standard)
- F XF closing voltage release (standard)
- G VSPO OFF-position locking by keylocks (optional)

Switch-Disconnector Terminal Block Description



- Terminal block supplied as standard on the switch-disconnector
- Terminal block for optional accessories on the switch-disconnector
- Terminal block not used on the switch-disconnector

Assignment of Terminal Blocks

⚡⚠ DANGER

HAZARD OF ELECTROCUTION FOR VOLTAGES ABOVE 480 VAC

If voltage greater than 480 Vac is connected to a terminal, it is forbidden to connect adjacent terminals to a 24 Vdc SELV (Safety Extra Low Voltage) power supply in order to observe the insulation distances.

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

The following table describes the assignment and the availability of the terminal blocks for the switch-disconnector:

- Standard terminal blocks and the associated accessories are delivered with the switch-disconnector.
- Optional terminal blocks are delivered with the switch-disconnector only if the associated optional accessories are installed in the switch-disconnector.
- N/A indicates that the terminal blocks and the associated optional accessories are not compatible with the switch-disconnector.

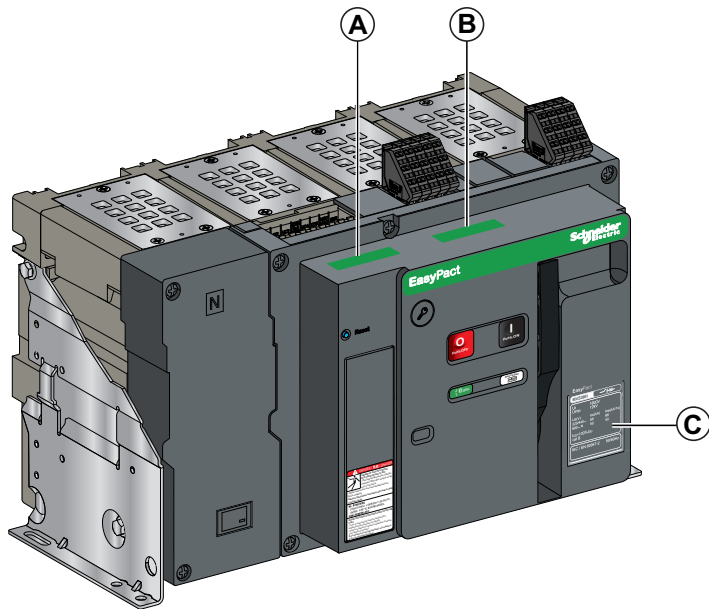
Marking	Description	Switch-disconnector
COM	Not used	Not used
UC1–UC4	Not used	Not used
M2C/U6C	Not used	Not used
SDE2/Res	Not used	Not used
SDE1	Not used	Not used
MN	MN undervoltage release	Optional
MX2	MX2 opening voltage release	Not used
MX1	MX opening voltage release	Standard
XF	XF closing voltage release	Standard
PF	PF ready-to-close contact	Not used
MCH	MCH gear motor	Standard
OF1-OF4	4 OF indication contacts	Standard
OF11-OF24	8 OF indication contacts	Not used

Switch-Disconnecter Identification

Identification

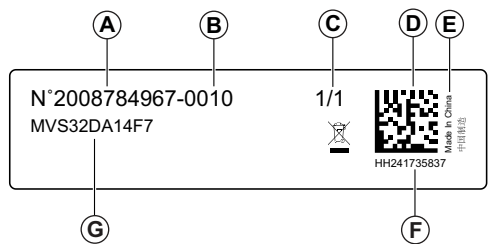
The EasyPact MVS DA1 switch-disconnector can be identified in the following ways:

- Rating plate on the switch-disconnector
- Identification labels on the switch-disconnector



- A Product identification label
- B Accessory voltages label
- C Rating plate

Product Identification Label



Legend	Description	Explanation
A	Product code	The product code is a line of code representing the complete configuration of a EasyPact switch-disconnector. It is automatically generated for each EasyPact switch-disconnector after completing the configuration by using the Product Selector configuration tool. The product code appears on the invoice and on the delivery documents as well as on the EasyPact switch-disconnector and packaging labels. The product code can be entered in the Product Selector configuration tool, which generates the complete configuration of the EasyPact switch-disconnector.
B	Schneider Electric internal identification numbers	—

Legend	Description	Explanation
C	Item number/quantity	Item number/quantity is printed on the label. Only the useful character is printed.
D	Datamatrix	Datamatrix contains the serial number of the EasyPact switch-disconnector.
E	Manufacturing country	Country where the EasyPact switch-disconnector is manufactured.
F	Switch-disconnector serial number	The switch-disconnector serial number is coded as PPYYWWDNNNN, where: • PP: Plant code • YY: Year of manufacture • WW: Week of manufacture • D: Day of the week of manufacture (Monday = 1) • NNNN: The production number of the switch-disconnector on the day. Ranges from 0001 to 9999. For example, PP240820007 is the seventh switch-disconnector manufactured at plant PP on Tuesday, February 20, 2024.
G	Description of the switch-disconnector	The description of the switch-disconnector, specifies the following characteristics: • Range • Performance level • Rating • Number of poles

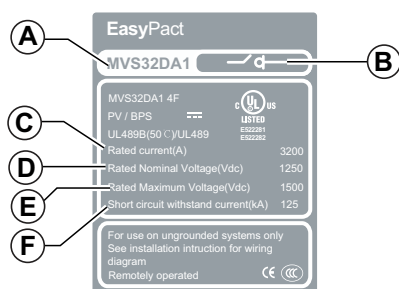
Accessory Voltages Label

MX 024/030 VAC/VDC FIX BREAKER
XF 024/030 VAC/VDC FIX BREAKER
MN 024/030 VAC/VDC FIX BREAKER
GEAR MOTOR 024/030 VDC FIX BREAKER

The accessory voltages label gives the voltage of the accessories which are installed in the switch-disconnector and which need to be connected to a power supply.

Rating Plate

The rating plate with the switch-disconnector information is located on the front cover of the switch-disconnector.



A Switch-disconnector size

B Type of switch-disconnector: switch-disconnector suitable for insulation

C Rated current

D V_{dc}: rated nominal voltage

E V_{dc}: rated maximum voltage

F I_{cu}: rated ultimate short-circuit breaking capacity

Operating Conditions

Introduction

EasyPact MVS DA1 switch-disconnectors are designed and tested for operation in industrial atmospheres. It is recommended that equipment is cooled or heated to the proper operating temperature and kept free of excessive vibration and dust.

Ambient Temperature

EasyPact MVS DA1 switch-disconnectors can operate under the following temperature conditions:

- Electrical and mechanical characteristics specified for an ambient temperature of -25 °C to +70 °C.
- Switch-disconnector closing specified down to -35 °C by manual operation with closing pushbutton.

Storage condition: -40 °C to +85 °C.

Extreme Atmospheric Conditions

EasyPact MVS DA1 switch-disconnectors have successfully passed tests for extreme atmospheric conditions, defined by the following standards:

Standard	Title
IEC 60068-2-1	Dry cold, at -40 °C
IEC 60068-2-2	Dry heat, at +85 °C
IEC 60068-2-30	Damp heat (temperature +55 °C, relative humidity 95%)
IEC 60068-2-52 level 2	Salt mist

Vibration

EasyPact MVS DA1 switch-disconnectors have successfully passed tests for the following vibration levels, in compliance with IEC 60068-2-6:

- 2 Hz to 13.2 Hz: amplitude +/- 1 mm.
- 13.2 Hz to 100 Hz: constant acceleration of 0.7 g.

Altitude

EasyPact MVS DA1 switch-disconnectors are designed and tested to operate at altitudes below 2000 m.

At altitudes above 2000 m, the characteristics of the ambient air (electrical resistance, cooling capacity) lower the product characteristics as follows:

Characteristics	Altitude				
	0 m	2000 m	3000 m	4000 m	5000 m
Impulse withstand voltage U_{imp} (kV)	15	15	14	12	10
Rated insulation voltage (U_i) (V)	1600	1600	1600	1600	1600
Maximum rated operational voltage 50/60 Hz U_e (V)	1500	1500	1500	1500	1500
Rated current (A) at 40 °C	1 x I_n	1 x I_n	0.98 x I_n	0.96 x I_n	0.94 x I_n

Electromagnetic Disturbances

EasyPact MVS DA1 switch-disconnectors have protection against:

- Overvoltages caused by devices that generate electromagnetic disturbance.
- Overvoltages caused by atmospheric disturbance or by a distribution-system outage (for example, a lighting system failure).
- Devices emitting radio waves (for example, radio transmitters, walkie-talkies, or radar).
- Electrostatic discharge produced by users.

EasyPact MVS DA1 switch-disconnectors have successfully passed the electromagnetic-compatibility tests (EMC) defined by the IEC 60947-3, appendix F international standard.

The switch-disconnectors have passed the above tests and therefore:

- No nuisance tripping occurs.
- Tripping times are respected.

Temperature Reduction

The following table shows the maximum rated current I_n of the switch-disconnector with vertical or mixed wiring in different T_i (IEC 60947-3).

When T_i is above 70 °C, contact your field service representative.

Wiring type	Vertical wiring							Mixed wiring						
Temperature inside switchboard (T_i) (°C)	40	45	50	55	60	65	70	40	45	50	55	60	65	70
MVS16DA1 (4P)	1600 A							1600 A						
MVS20DA1 (4P)	2000 A							2000 A						
MVS25DA1 (4P)	2500 A							2500 A						
MVS32DA1 (4P)	3200 A					3140 A	2950 A	3200 A					3000 A	2820 A
MVS40DA1 (4P)	4000 A					3800 A	3530 A	4000 A				3800 A	3600 A	3400 A

Power Loss

Power loss ($P = 3I^2R$) is measured at rated current I_n and frequency of 50/60 Hz.

Switch-disconnector	Power loss (w)
MVS16DA1 (4P)	215
MVS20DA1 (4P)	335
MVS25DA1 (4P)	540
MVS32DA1 (4P)	550
MVS40DA1 (4P) CCC	860

EasyPact MVS DA1 Normal Operation

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Device Operating Actions

What's in This Chapter

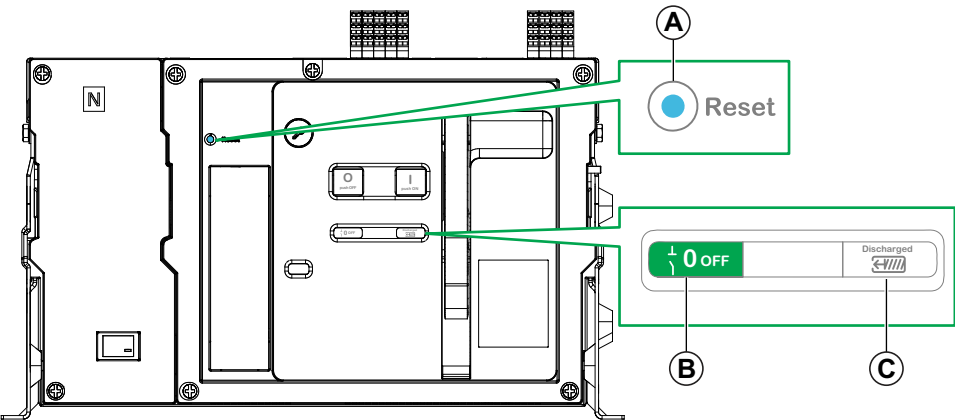
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Operating the Switch-Disconnector

Switch-Disconnector Status

The indicators on the front of the switch-disconnector show the following information:

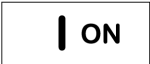
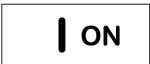
- Reset button:
 - In: the switch-disconnector is closed or open voluntarily (not tripped)
 - Out: the switch-disconnector has tripped
- Position indicator of main contacts: ON or OFF.
- Closing spring and ready-to-close indicator. The state can be one of the following:
 - Discharged (no energy to close the switch-disconnector)
 - Charged not ready-to-close
 - Charged ready-to-close



- A** Reset button
- B** Position indicator of main contacts
- C** Closing spring and ready-to-close indicator

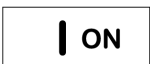
The combination of both indicators gives the switch-disconnector status:

Position indicator of main contacts	Closing spring and ready-to-close indicator	Switch-Disconnector status description
		The switch-disconnector is off (main contacts are open) and closing spring is discharged.
		The switch-disconnector is off (main contacts are open) and closing spring is charged. The switch-disconnector is not ready-to-close because at least one of the following conditions is true: • The switch-disconnector has tripped and must be reset. • The MX opening voltage release is energized. • The MN undervoltage release is not energized. • The switch-disconnector is mechanically locked in the open position by using padlock or keylock.
		The switch-disconnector is off (main contacts are open) and closing spring is charged. The switch-disconnector is ready-to-close.

Position indicator of main contacts	Closing spring and ready-to-close indicator	Switch-Disconnector status description
		The switch-disconnector is on (main contacts are closed) and closing spring is discharged.
		The switch-disconnector is on (main contacts are closed) and closing spring is charged. The Switch-disconnector is not ready-to-close because it is already closed.

Switch-Disconnector Indication Contacts

The position of the switch-disconnector main contacts is indicated by OF indication contacts.

Name	Contact number	Position of indicators and contacts		
Position indicator of main contacts	—			
Main contact position	—	Closed	Open	Open
Reset button position	—	IN	IN	OUT
OF indication contact position	1–2	Open	Closed	Closed
	1–4	Closed	Open	Open

Anti-Pumping Function

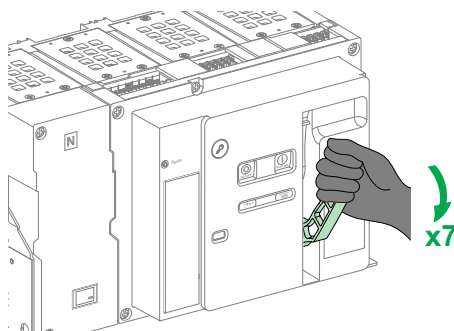
EasyPact MVS DA1 switch-disconnectors provide a mechanical anti-pumping function. In the event of simultaneous maintained opening and closing orders, the standard mechanism blocks the main contacts in the open position. After a trip due to an electrical fault or intentional opening using the manual or electrical controls, the closing order must first be discontinued, then reactivated to close the switch-disconnectors. This prevents a cycle of closing and opening.

When remote operation features are used, allow at least four seconds for the MCH gear motor to charge the switch-disconnectors closing spring completely before the XF closing voltage release is actuated.

Charging the Closing Spring

The closing spring must be charged with sufficient energy to close the EasyPact MVS DA1 switch-disconnector:

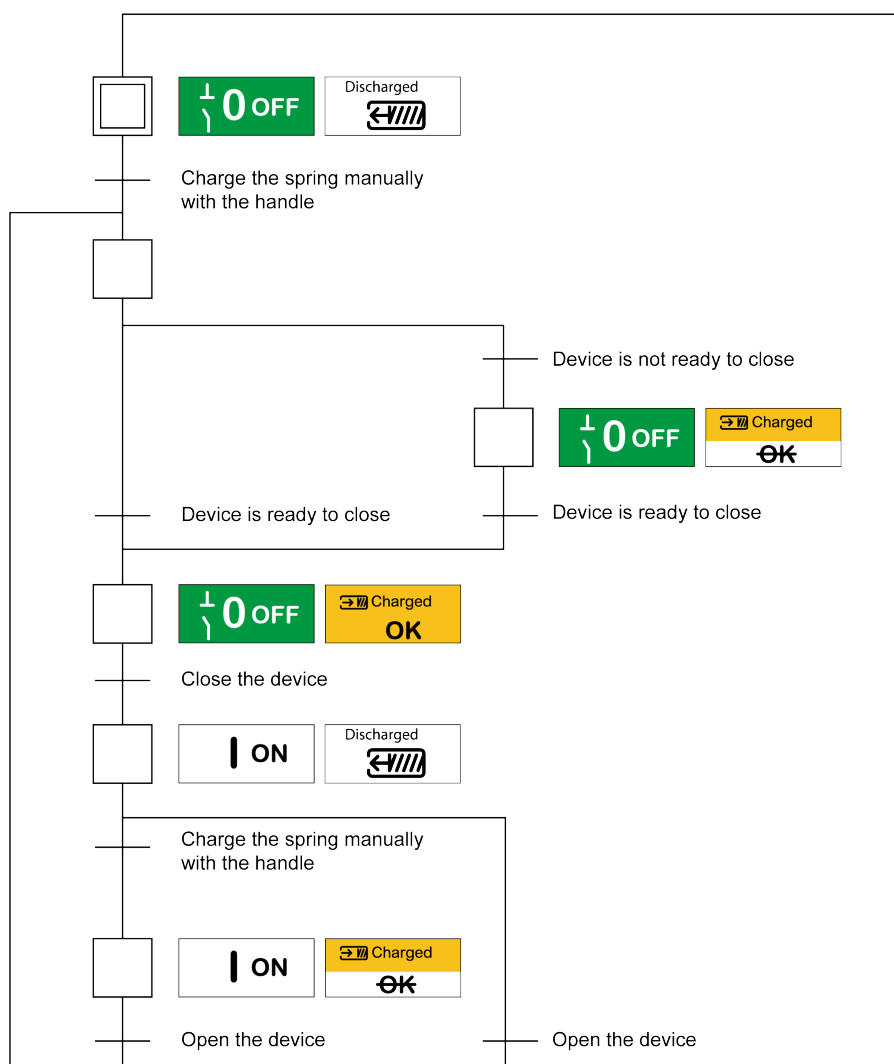
- Manual charge: Charge the mechanism by pulling the spring charging handle down seven times.



- Automatic charge: If the optional MCH gear motor is installed, the spring is automatically charged after closing.

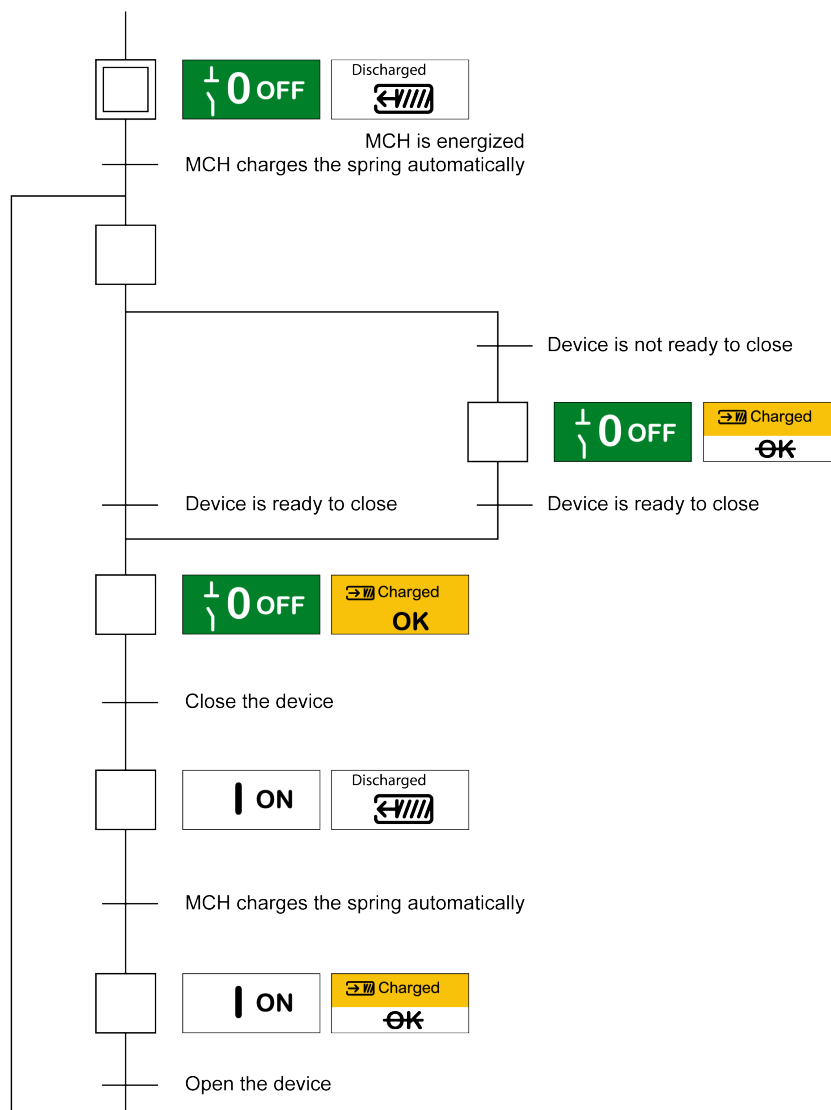
Manual Operation Cycle with the Spring Charging Handle

The following image shows an Open/Close/Open (OCO) cycle for manually charged switch-disconnectors without MCH gear motor:



Electrical Operation Cycle with an MCH Gear Motor

The following image shows an Open/Close/Open (OCO) cycle for electrically charged switch-disconnectors using an MCH gear motor:



Opening the Switch-Disconnector

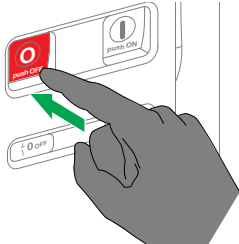
Opening Conditions

To open the switch-disconnector, the switch-disconnector must be closed (I).

NOTE: An opening order always takes priority over a closing order.

Opening the Switch-Disconnector

The following tables present the different ways to open the switch-disconnector.

Opening type	Accessories	Opening action	
Mechanical	—	Press the opening pushbutton on the front of the switch-disconnector. This opening action is possible at any time.	
Automatic	MN undervoltage release, with or without MN delay unit.	The MN undervoltage release opens the switch-disconnector automatically in the case of voltage drop.	
By external pushbutton	- External pushbutton wired by customer. - One of the following accessories: - MX standard opening voltage release. - MN undervoltage release, with or without MN delay unit.	Press the external pushbutton which is connected to the MX opening voltage release or to the MN undervoltage release via the customer terminal block. When the MN undervoltage release is connected to the MN delay unit, the switch-disconnector opens with the corresponding time delay.	

Closing the Switch-Disconnecter

Closing Conditions

To close the switch-disconnector, the following conditions must be met:

- Switch-disconnector is open (O).
- Closing spring is charged.
- The switch-disconnector is ready to close, **OK** is displayed.

NOTE: An opening order always takes priority over a closing order. The switch-disconnector cannot be closed while an opening order is being received. If **OK** is crossed-out on the ready-to-close indicator, an order to open is being received (either electrically or mechanically) and must be ended before **OK** can be displayed.

⚡⚡

DANGER

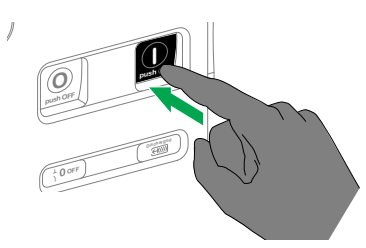
HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

Do not re-close the device on an electrical fault. First inspect and, if necessary, repair the downstream equipment.

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

Closing the Switch-Disconnecter

The following tables present the different ways to close the switch-disconnector.

Closing type	Accessories	Closing action	
Mechanical	–	Press the closing pushbutton on the front of the switch-disconnector. The closing action is possible when the closing conditions are met.	
External pushbutton	- External pushbutton wired by customer - XF standard closing voltage release - MCH gear motor	Press the external pushbutton, which is connected to the XF closing voltage release through the customer terminal block.	

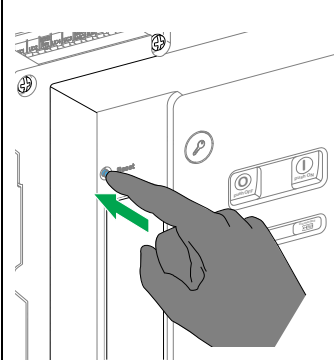
Resetting the Switch-Disconnectors

Resetting Conditions

After a trip, the switch-disconnector must be reset before closing.

Resetting the Switch-Disconnectors

The switch-disconnector can be reset mechanically with the blue fault-trip reset button:

Type of resetting	Accessories	Resetting action	
Mechanically with the blue fault-trip reset button.	–	Push in the blue fault-trip reset button on the front of the switch-disconnector. This resetting action is always possible. Pushing in the blue fault-trip reset button resets the SDE fault-trip indication contact, and allows the switch-disconnector to be closed.	

Operating Accessories

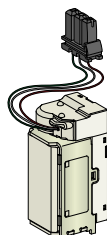
XF, MX, and MN Voltage Releases

XF and MX voltage releases are standard accessories mounted inside the device. MN voltage release is optional accessory.

The standard voltage releases are designed to receive either pulse-type or maintained voltage operating orders.

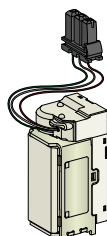
XF Closing Voltage Release

The XF closing voltage release closes the device instantaneously when powered if the spring mechanism is charged. The minimum duration of the pulse operating order must be 200 ms.



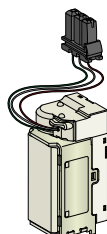
MX Opening Voltage Release

The MX opening voltage release opens the device instantaneously when powered. The minimum duration of the pulse operating order must be 200 ms. The MX standard opening voltage release locks the device in OFF position if the command is maintained.



MN Undervoltage Release

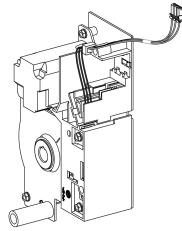
The MN undervoltage release instantaneously opens the device when its supply voltage drops to a value between 35% and 70% of its rated voltage. If there is no supply to the release, it is impossible to close the device, either manually or electrically. Any attempt to close the device has no effect on the main contacts. Device closing is enabled again when the supply voltage of the release returns to 85% of its rated value.



MCH Gear Motor

This is a standard accessory that is mounted inside the device.

The MCH gear motor automatically charges the spring mechanism when the device is closed, allowing instantaneous closing of the device following opening.

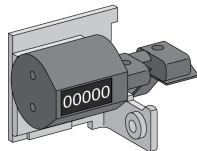


CDM Mechanical Operation Counter

This is an optional accessory that is mounted inside the device.

The CDM mechanical operation counter counts the number of operating cycles and is visible on the front panel. It is compatible with manual and electrical control functions.

This option is compulsory for all source-changeover systems.



Switch-Disconnecter Locking Actions

What's in This Chapter

Locking the Pushbuttons.....	32
Locking the Switch-Disconnecter in Open Position with Keylocks.....	34

About Locking Actions

A locking action is a manual locking operation made by the user. A number of optional locking accessories are available for the EasyPact MVS DA1 switch-disconnector.

Locking the Pushbuttons

Description

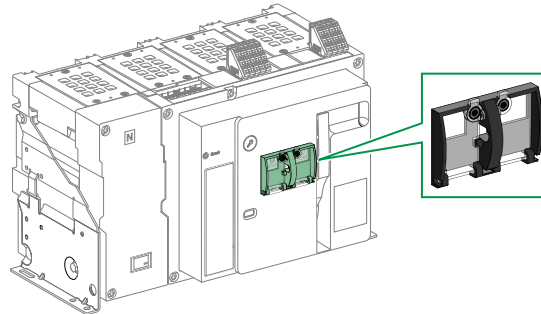
The pushbutton locking cover is an optional accessory for the EasyPact MVS DA1 switch-disconnector that forbids access to the closing and opening pushbuttons:

- Together or separately.
- By using a padlock (shackle diameter 5–8 mm).
- By using a lead seal.
- By using screws.

IMPORTANT: The use of the pushbutton locking cover is mandatory to padlock the closing pushbutton.

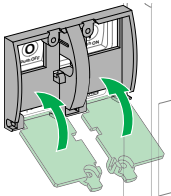
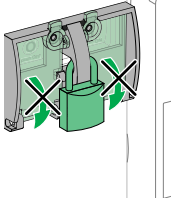
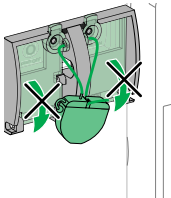
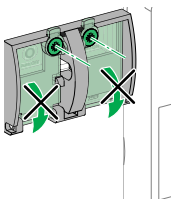
VBP Pushbutton Locking Accessory

The pushbutton locking accessory is an optional transparent cover, mounted on the front cover of the switch-disconnector, which covers the closing and opening pushbuttons.



For information on the accessory installation, consult the instruction sheet on the Schneider Electric website: [MVS21736](#).

Locking the Pushbuttons

Step	Action	
1	Close the transparent covers of the locking accessory. NOTE: One or both transparent covers of the locking accessory can be closed and locked.	
2	Lock the transparent covers in place by using a padlock, lead seal, or screws.	Padlock  Lead seal  Screws 

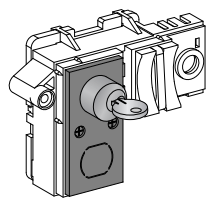
Locking the Switch-Disconnecter in Open Position with Keylocks

Description

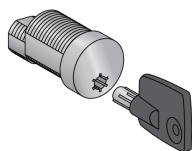
- Optional keylocks can be used:
- To lock one EasyPact MVS DA1 switch-disconnector in the open position.
When locked, the switch-disconnector cannot be closed either locally with the closing pushbutton or remotely.
- To use keylocks to lock the switch-disconnector in the open position, an optional OFF-position locking accessory is necessary.

VSPO OFF-Position Locking Accessory

The OFF-position locking accessory is an optional accessory that is mounted on the front of the switch-disconnector.

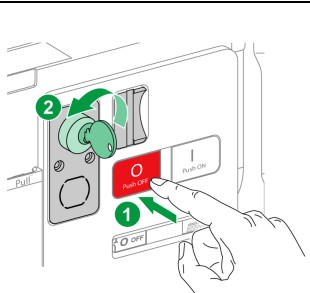


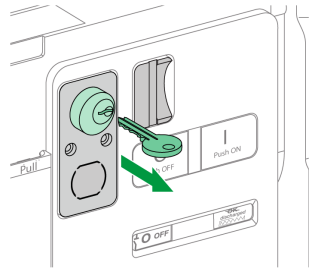
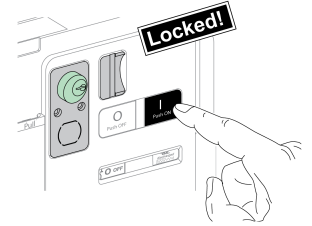
- The OFF-position keylocking accessory can be fitted with one keylock.
- The following type of keylock can be fitted:
- Profalux keylock



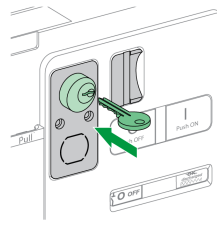
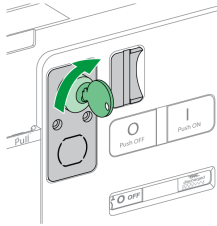
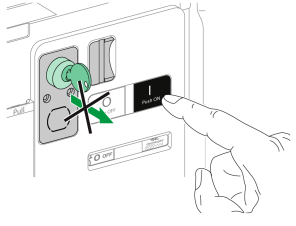
For information on the accessory installation, consult the instruction sheet on the Schneider Electric website: [MVS21736](#).

Locking the Switch-Disconnecter in Open Position

Step	Action	
1	Press and hold the opening pushbutton.	
2	With the opening pushbutton pressed, turn the key clockwise to lock the switch-disconnector.	

Step	Action	
3	Remove the key.	
4	Release the opening pushbutton.	
5	Check that the switch-disconnector is locked in the open position and cannot be closed either locally with the closing pushbutton or remotely.	

Unlocking the Switch-Disconnector

Step	Action	
1	Put the key in the keylock.	
2	Turn the key clockwise to unlock the switch-disconnector.	
3	Press the closing pushbutton to close the switch-disconnector. NOTE: The key remains captive in the keylock.	

EasyPact MVS DA1 Commissioning

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Inspection.....	39
Tests	40
Final Checks and Reporting	42

Introduction to Commissioning

Overview

⚠️ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E, CSA Z462, NOM 029-STPS, or local equivalent.
- This equipment must only be installed and serviced by qualified electrical personnel.
- Unless specified otherwise in the commissioning procedures, all operations (inspection, test, and preventive maintenance) must be carried out with the switch-disconnector and the auxiliary circuits de-energized.
- Check that the switch-disconnector is de-energized on the upstream and downstream terminals.
- Always use a properly rated voltage sensing device to confirm that the switch-disconnector and the auxiliary circuits are de-energized.
- Install safety barriers and display a danger sign.
- During the tests, it is strictly forbidden for anyone to touch the switch-disconnector or the conductors while voltage is applied.
- Before putting the equipment back into operation, it is mandatory to check that all connections are made with the correct tightening torque, there are no tools or objects inside the equipment, all devices, doors, and protective covers are in position, and the switch-disconnector is off (open position).

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

This part details the testing and commissioning procedure for EasyPact MVS DA1 switch-disconnector that must be done before it can be accepted as fit for service and connected to a power supply.

The commissioning procedure must be done by an authorized commissioning engineer with appropriate training and experience:

- Only qualified electrical personnel with training and experience on low voltage circuits must perform the work described in this chapter.

Personnel must understand the hazards involved in working with or near low-voltage equipment. Such work must be performed only after reading the complete set of instructions.

- Some inspections or procedures require that certain parts of the electrical system remain energized at hazardous voltage during the procedure. Observe all safety messages (Danger, Warning, Caution) throughout this chapter and the corresponding instruction notices.
- Wear personal protective equipment, recognize potential hazards, and take adequate safety precautions when performing the procedures outlined in this chapter and the corresponding instruction notices.

The commissioning procedure assumes that the switch-disconnector is not connected to a power system or a control system at the start of the procedure.

The results of all observations, tests, adjustments, together with any relevant comments must be recorded on the appropriate form, if applicable.

Wherever possible, testing must be done without disconnecting or disturbing existing wiring.

Scope

The commissioning procedure applies to the EasyPact MVS DA1 switch-disconnector.

The associated information, which must be read with this procedure, includes specific schematic diagrams, connections, and trip levels for the switch-disconnector covered by this document.

Equipment

The following equipment is required to do the tests detailed in the commissioning procedure:

- Insulation resistance tester
- Multimeter

Inspection

Visual Inspection

Step	Action
1	Record the equipment identification, including substation name, switchboard name, EasyPact MVS DA1 switch-disconnector type, serial number, and protection settings.
2	Check that the switch-disconnector is undamaged, correctly mounted, and securely fastened in the switchboard.
3	Check the clearance at terminal blocks.
4	Check that there is no debris remaining at the back of the switch-disconnector housing/ enclosure.
5	Check that the ground terminals of the switch-disconnector are securely connected with the correct grounding cables.
6	Check that all external surfaces are undamaged.
7	Rectify any non-conformities, if possible. All equipment non-conformities must be referred to asset management.

Condition of Connections and Auxiliaries

Check switch-disconnector mounting in the switchboard and the tightness of all connections (main connection and auxiliary wiring).

Check that all auxiliaries and accessories are correctly installed:

- Electrical auxiliaries
- Terminal blocks
- Connections of auxiliary circuits

Tests

Overview

The tests to do while commissioning an EasyPact MVS DA1 switch-disconnector are described in this section:

- Functional checks
- Check of MCH gear motor
- Check of electrical continuity
- Check of high-voltage insulation

Only do the tests required, depending on the EasyPact MVS DA1 type and the functions in use, and record the results on the test form. In the event of non-conformance, the result must be recorded and the EasyPact MVS DA1 switch-disconnector must not be accepted into service.

Functional Checks

Follow this procedure to check the operation of the EasyPact MVS DA1 switch-disconnector and record the results on the test form.

Step	Action
1	Manually charge the mechanism by pulling the spring charging handle down.
2	Close the switch-disconnector. Check the closing of the switch-disconnector in each of the different means designed for the application.
3	Open the switch-disconnector. Check the opening of the switch-disconnector in each of the different means designed for the application.

If the switch-disconnector does not close or does not open, refer to [EasyPact MVS DA1 Troubleshooting](#), page 43.

Check of MCH Gear Motor

Follow this procedure to check the operation of the MCH gear motor and record the results on the test form.

Step	Action
1	Remove the MCH gear motor power supply.
2	Do an opening/closing/opening cycle to discharge the mechanism.
3	With the switch-disconnector in the open position and the mechanism discharged, check electrical continuity between terminals B1 and B2, and electrical non-continuity between terminals B1 and B3.
4	Manually charge the mechanism.
5	Reconnect the MCH gear motor power supply. The switch-disconnector closes and the mechanism is automatically charged.
6	Check electrical continuity between terminals B1 and B3.
7	Operate the switch-disconnector several times to check that the spring mechanism automatically recharges after every closing operation.

Check of Electrical Continuity

Follow this procedure to check electrical continuity using a multimeter or continuity checker and record the results on the test form.

Step	Action
1	Close the switch-disconnector.
2	Check electrical continuity on the power terminals for each of the phases, between the upper and lower power terminals.

Check of High-Voltage Insulation

Dielectric tests (high potential and insulation resistance tests) are used to check the insulation between phases, and insulation between each phase and ground. The equipment used to conduct these tests creates a high potential voltage (thousands of volts) to check dielectric or insulation integrity.

Follow this procedure to check insulation resistance and record the results on the test form.

Step	Action
1	Close the EasyPact MVS DA1 switch-disconnector.
2	Measure the insulation resistance using a 500 Vdc insulation resistance tester between one of the phases and the other two phases grounded. Repeat for each phase.
3	Open the EasyPact MVS DA1 switch-disconnector by pressing the opening pushbutton.
4	Measure the insulation resistance using a 500 Vdc insulation resistance tester between one of the phases and ground, with all other phases grounded. Repeat for each phase.
5	Check that the insulation resistance is above 5 MΩ in each case. If this result is not obtained, contact your field service representative.

Final Checks and Reporting

Final Checks

After completing the commissioning tests, check the following:

Step	Action
1	Check that connections are made with the correct tightening torque, that there are no tools or objects inside the equipment, and that all switch-disconnector, doors, and protective covers are in position.
2	Check that the switch-disconnector is off (open position) and the closing spring is charged.

EasyPact MVS DA1 Troubleshooting

What's in This Part

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Troubleshooting: Unexpected Tripping48

Troubleshooting: Mechanical Control Operations49

Troubleshooting: Electrical Control Operations50

Introduction to Troubleshooting

Presentation

This part contains information for troubleshooting problems in a working system. It assumes that the system is correctly installed and that all the commissioning tests have been completed successfully. The troubleshooting operations are described under the following headings:

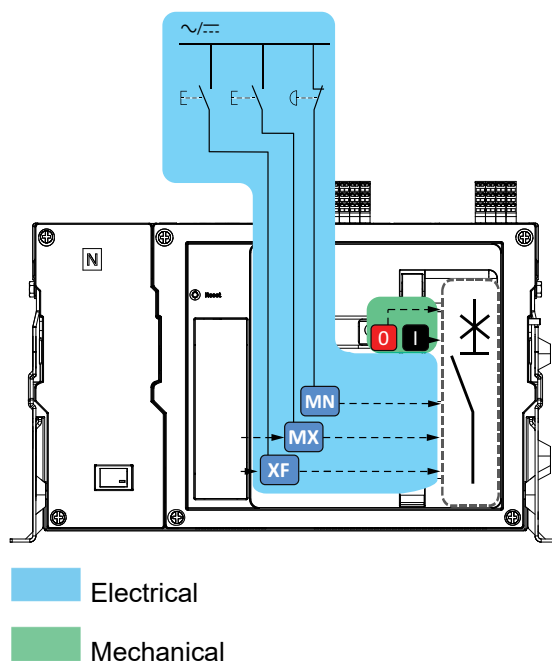
- Unexpected tripping
- Mechanical control operations
- Electrical control operations

Layer Model

When troubleshooting the switch-disconnector, it is useful to consider a layer model. There are two layers:

- Electrical
- Mechanical

The following diagram shows the layers in the switch-disconnector:



If the troubleshooting actions for a layer are not successful, go to the next layer until you reach the mechanical layer. If you cannot solve the problem after troubleshooting the mechanical layer, contact your field service representative.

Maintenance

Schneider Electric recommends a preventive maintenance program to ensure that switch-disconnectors retain the operating and technical characteristics specified in the catalogs during their service life. Maintenance must be carried out by trained and qualified personnel.

⚠️ DANGER**HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E, CSA Z462, NOM 029-STPS, or local equivalent.
- This equipment must only be installed and serviced by qualified electrical personnel.
- Unless specified otherwise in the commissioning procedures, all operations (inspection, test, and preventive maintenance) must be carried out with the switch-disconnector and the auxiliary circuits de-energized.
- Check that the switch-disconnector is de-energized on the upstream and downstream terminals.
- Always use a properly rated voltage sensing device to confirm that the switch-disconnector and the auxiliary circuits are de-energized.
- Install safety barriers and display a danger sign.
- During the tests, it is strictly forbidden for anyone to touch the switch-disconnector or the conductors while voltage is applied.
- Before putting the equipment back into operation, it is mandatory to check that all connections are made with the correct tightening torque, there are no tools or objects inside the equipment, all devices, doors, and protective covers are in position, and the switch-disconnector is off (open position).

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

⚠️ DANGER**HAZARD OF DEVICE FALLING**

- Be sure that lifting equipment has lifting capacity for the device being lifted.
- Follow manufacturer's instructions for use of lifting equipment.
- Wear hard hat, safety shoes, and heavy gloves.

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

Recommended Frequency for Basic End-User Maintenance

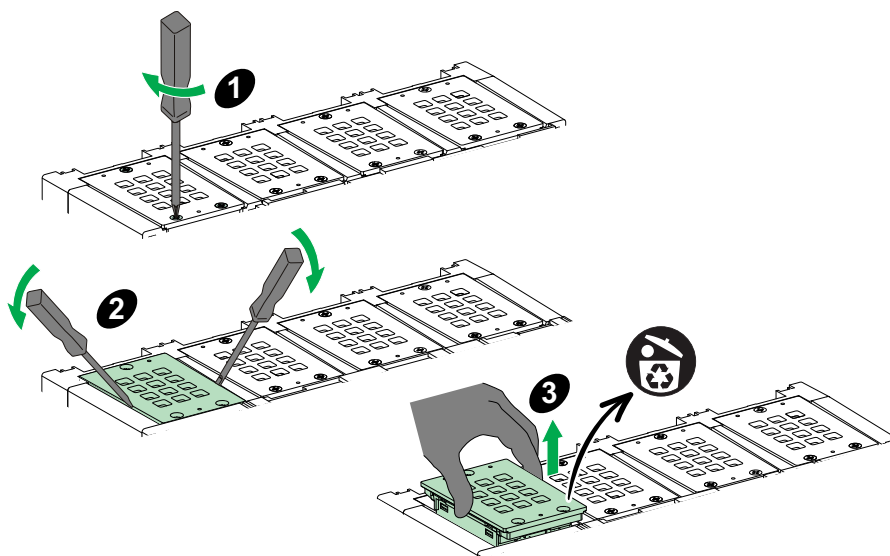
The following table indicates the recommended frequency to perform the basic end-user maintenance.

Maintenance	Frequency
Check the opening and closing of the switch-disconnector locally with the opening or closing pushbuttons or remotely with MX/XF/MN circuits. For more information, refer to Functional Checks, page 40.	Every year
• Check the arc chutes. Refer to Check of Arc Chutes, page 46. • Check the wear of the main contact. Refer to Check of Main Contact, page 46. • Check the tightness of all connections. Refer to Condition of Connections and Auxiliaries, page 39.	Every two years

Check of Arc Chutes

Follow the below procedure to check the arc chute:

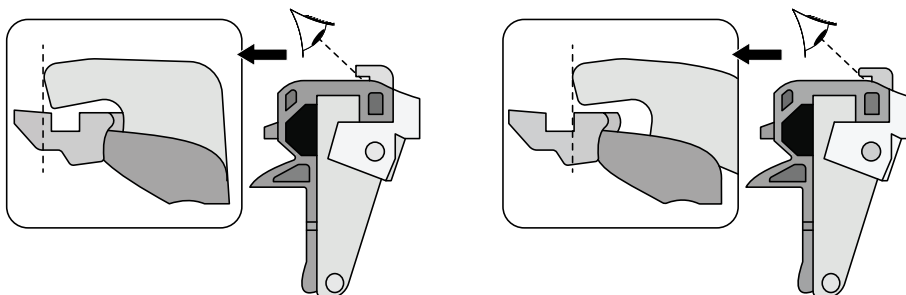
1. Remove two screws on the arc chute.
2. Lift the arc chute with screwdrivers.
3. Take out the arc chute.
4. Check the arc chute and make sure the arc extinguish chamber and arc interrupter plate are undamaged.
5. If the arc extinguish chamber and arc interrupter plate were damaged, replace the arc chute.



Check of Main Contact

Follow the below procedure to check the main contact:

1. Remove the arc chute. Refer to [Check of Arc Chutes](#), page 46.
2. Close the switch-disconnector.
3. Check the main contact and make sure they are undamaged.
4. If the main contact is worn, contact your field service representative to replace.



Mechanical Durability of Components and Accessories

When the component or accessory of the switch-disconnector reaches the maximum mechanical durability, it must be replaced to extend the lifespan of the switch-disconnector.

The following table summarizes the mechanical durability of each accessory.

Component and accessory	Mechanical durability at In (operating cycles)
Main contact	2000
Closing spring	2000
Arc chutes	2000
MCH gear motor	2000
MX/XF/MN circuits	2000
NOTE: To replace the main contact and closing spring, contact your Schneider Electric field service representative.	

Troubleshooting: Unexpected Tripping

Definition

Unexpected tripping is tripping that is not caused by a protection function during normal operation or by tests.

Troubleshooting

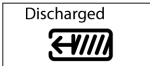
Problem description	Probable causes	Solutions
Switch-disconnector opened without any over-current electrical fault.	Drop in voltage to below the threshold detected by MN undervoltage release.	Check the voltage and the MN supply circuit ($V > 0.85 U_n$).
	An order (for example load-shedding) sent to the MX opening voltage release by another switch-disconnector.	Check the parameters of the switch-disconnector that sent the order.
	Unnecessary opening order from the MX opening voltage release.	Determine the origin of the order and cancel it.

Troubleshooting: Mechanical Control Operations

Definition

Mechanical control operations are operations that are made using the opening or closing pushbuttons.

Switch-Disconnector Cannot be Closed by Using the Mechanical Closing Pushbutton

Symptom	Probable causes	Solutions
The blue fault-trip reset button is popped out.	The blue fault-trip reset button has not been reset.	- Clear the fault. - Push the blue fault-trip reset button.
-	Switch-disconnector is padlocked or keylocked in the open position.	Unlock the switch-disconnector.
The closing spring and ready-to-close indicator shows that the mechanism is discharged. 	Stored energy mechanism is not charged.	- Charge the mechanism manually. - If the switch-disconnector is equipped with an MCH gear motor, check the supply of power to the motor. If the problem persists, replace the MCH gear motor.
The closing spring and ready-to-close indicator shows that the mechanism is charged but the switch-disconnector is not ready to close. 	MX opening voltage release is permanently powered.	As there is an opening order, determine the origin of the order. The order must be canceled before the switch-disconnector can be closed.
	MN undervoltage release is not powered due to an opening order.	As there is an opening order, determine the origin of the order. The order must be canceled before the switch-disconnector can be closed.
	MN undervoltage release is not powered due to insufficient voltage power supply.	Check the voltage and the MN supply circuit ($V > 0.85 U_n$). If the problem persists, replace the MN undervoltage release.

Switch-Disconnector Cannot be Opened by Using the Mechanical Opening Pushbutton

Probable causes	Solutions
Operating mechanism incident or welded contacts.	Contact your field service representative.

Troubleshooting: Electrical Control Operations

Definition

Electrical control operations are operations that are made by an electrical order through a voltage release or by an external pushbutton that is directly connected to a voltage release.

Circuit Breaker Cannot be Closed by Using an External Pushbutton/Electrical Order

Symptom	Probable causes	Solutions
–	Circuit breaker is padlocked or keylocked in the open position.	Unlock the circuit breaker.
–	Electrical closing order not executed by the XF closing voltage release due to insufficient voltage power supply.	Check the voltage and the XF supply circuit (0.85–1.1 Un). If the problem persists, replace the XF closing voltage release.
The closing spring and ready-to-close indicator shows that the mechanism is charged but the circuit breaker is not ready to close. 	MX opening voltage release is permanently powered.	As there is an opening order, determine the origin of the order. The order must be canceled before the circuit breaker can be closed.
	MN undervoltage release is not powered due to an opening order.	As there is an opening order, determine the origin of the order. The order must be canceled before the circuit breaker can be closed.
	MN undervoltage release is not powered due to insufficient voltage power supply.	Check the voltage and the MN supply circuit ($V > 0.85 U_n$). If the problem persists, replace the MN undervoltage release.

Circuit Breaker Cannot be Opened by Using an External Pushbutton/Electrical Order

Probable causes	Solutions
Opening order is not executed by the MN undervoltage release.	Drop in voltage insufficient or residual voltage ($V > 0.35 U_n$) across the terminals of the MN undervoltage release. If the problem persists, replace the MN undervoltage release.
Opening order is not executed by the MX opening voltage release.	Check the voltage and the MX supply circuit (0.7–1.1 Un). If the problem persists, replace the MX opening voltage release.

Additional Checks

If the troubleshooting actions described above do not work, refer to the troubleshooting information for Troubleshooting: Mechanical Control Operations, page 49.

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