ABB industrial drives

Hardware manual
ACS580MV Bypass

List of related manuals

Drive hardware manuals and guides	Code (English)
ACS580MV hardware manual	*2UBB004520*
ACS580MV Engineering Guideline	*2UBB013672*
ACS580MV Base frame & TEU layout design	*2UBB020589*
ACS580MV Wiring Diagram of system 0	*2UBB005084*
ACS580MV Wiring Diagram of system 1	*2UBB005085*
ACS580MV Wiring Diagram of system 2	*2UBB005086*
Manual Bypass Operation Sequence-A	*2UBB005332*
Auto Bypass Operation Sequence-A	*2UBB005333*

You can find manuals and other product documents in PDF format on the Internet. See *http://www.abb.com/motors&drives*. For manuals not available in the Document library, contact your local ABB representative.

For more information, please refer to ACS580 MV Hardware Manual which can be found by scanning the QR code below.

APP version (IOS/Android)

Web page version

Hardware manual

ACS580MV Bypass

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Safety instructions

Contents of this chapter

This chapter contains the safety instructions which you must obey when you install and operate and do maintenance on the bypass - drive system. If you ignore the safety instructions, injury, death or damage can occur.

Safety instructions are used to highlight a potential hazard when working on the equipment. Safety instructions must be strictly followed! Non-compliance can jeopardize the safety of personnel, the equipment and the environment.

	**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.

The safety instructions are derived from the following standards:

- ISO 3864-2:2004 (E)

  Graphical symbols – Safety colors and safety signs – Part 2: Design principles for product safety labels

- ANSI Z535.6

  American National Standard for Product Safety Information in Product Manuals, Instructions, and Other Collateral Materials

User’s responsibilities

It is the responsibility of those in charge of the bypass- drive system to ensure that each person involved in the installation, operation or maintenance of the bypass- drive system has received the appropriate training and has thoroughly read and clearly understood the instructions in this manual and the relevant safety instructions.

General safety information

To maintain safety and minimize hazards observe the following:

- Before the bypass- drive system is energized, make sure that:
  - all foreign objects are removed from the bypass- drive system
  - all internal and external covers are securely fastened and all doors are closed, locked and / or bolted
- Before starting to work on the bypass- drive system, make sure that:
  - the main and auxiliary power supply to the drive and bypass is switched off, locked out, and tagged out
  - the bypass cabinet is dead
  - safety ground connections are in place
  - appropriate personal protective equipment is provided and used when required
  - everyone involved is informed.
- When working near the running drive protective earmuffs should be worn.
- Before work is carried out simultaneously on the bypass- drive system and on other drive system equipment, make sure that
  - the relevant safety codes and standards are observed
  - all energy sources of the equipment are turned off
  - lock-out and tag-out devices are in place
  - barriers and appropriate covers are used on equipment which is still live
  - everyone involved is informed.
- In case of fire in the drive room:
  - Observe the established rules and regulations for fire protection
  - Only firemen with appropriate protective equipment are allowed to enter the bypass-drive room.

Possible residual risks

The following risks can arise from a bypass-drive system and pose a hazard to people. These risks must therefore be taken into account by the system integrator and / or the plant owner when assessing the risks of the machinery.

- Electric power equipment generates electro-magnetic fields which can cause a hazard to people with metal implants and / or a pacemaker.
- Bypass-drive system components can move unintentionally when being commissioned, operated, or serviced due to, for example:
  - Operation of the equipment outside the scope of the specifications
  - Incorrectly assembled or installed equipment
  - Wrongly connected cables
  - External influence on, or damage of the equipment
  - Wrong parameter settings
  - Faulty hardware.
- Hazardous touch voltages can be present on drive system components caused by, for example:
  - Operation of the equipment outside the scope of the specifications
  - External influence on, or damage of the equipment
  - Induced voltages by external equipment (e.g. induced voltage from a spinning rotor)
  - Condensation on equipment components, or pollution
  - Faulty hardware.
- High temperatures, noise, particles, or gases can be emitted from bypass-drive system components caused by, for example:
  - Operation of the equipment outside the scope of the specifications
  - External influence on, or damage of the equipment
  - Wrong parameter settings
  - Faulty hardware.
- Hazardous substances can be emitted from bypass-drive system components due to, for example:
  - Incorrect disposal of components.

Safety labels

Safety labels are attached to the cabinet where necessary to alert personnel of potential hazards when working on the equipment. The instructions on the safety labels must always be followed, and the labels must be kept in a perfectly legible condition.

General safety in installation, start-up and maintenance

These instructions are for all personnel that install the bypass cabinet and do maintenance work on it:

- The 3-contactors/knife switches can only be operated when the MCB is open.
- The input and output cables should be located in the bypass unit

Electrical safety in installation, start-up and maintenance

Precautions before electrical work

These warnings are for all personnel who do work on the bypass- drive, motor cable or motor.

DANGER

High voltage!

Before starting to work on the bypass- drive system, make sure:

- that the main and auxiliary power supply to the drive is switched off, locked out, and tagged out
- that the bypass- drive system is dead
- that safety ground connections are in place
- that personal protective equipment is provided and used when required
- that everyone involved is informed.

Before energizing the bypass- drive system, make sure:

- that all foreign objects are removed from the bypass- drive system
- that all internal and external covers are securely fastened and all doors are closed, locked and / or bolted
- that the release dials of safety switches are in the locked position.

Obey these instructions. If you ignore them, injury or death, or damage to the equipment can occur. If you are not a qualified electrician, do not do installation or maintenance work. Go through these steps before you begin any installation or maintenance work.

1. Clearly identify the work location.
2. Disconnect all possible voltage sources.
   - Open the main circuit breaker of the drive.
- Wait until internal circuits are discharged completely and doors are unlocked (15 minutes).
   - Open the upstream disconnector to disconnect the supply voltage from the input busbars.
   - Disconnect any external power sources from the control circuits before you do work on the control cables.
3. Protect any other energized parts in the work location against contact.
4. Take special precautions when close to bare conductors.

5. Measure that the installation is de-energized.
   - Use only instrumentation (e.g., meters, oscilloscopes, etc.) intended for high voltage measurements.
6. Always discharge equipment and verify that it is neither electrically alive nor thermally hot.
7. Always install temporary grounding as required by the local regulations.
8. Ask for a permit to work from the person in control of the electrical installation work.

Additional instructions and notes

- Do not connect the bypass- drive system to a voltage higher than what is on the rating plate.
- The motor cable terminals of the bypass- drive system are at a dangerous voltage when the input power is on, regardless of whether the motor is running or not.
- External wiring can supply dangerous voltages to the terminals of relay outputs.

Grounding

- Always ground the bypass- drive system, the motor and adjoining equipment. Assure that the drive is grounded on both sides, i.e. on supply and motor side. This is necessary for the personnel safety. Proper grounding also reduces electromagnetic emission and interference.
- Make sure that the cross-section of the grounding conductors is sufficient. See the *ACS580MV Engineering Guideline*. Obey the local regulations.

2

Introduction to the manual

Contents of this chapter

This manual is purposed to give an introduction of ABB Manual/Auto bypass feature which is in-line with ACS580MV.

Manual/auto bypass is an option used as a backup for drive failure (e.g. a trip) or drive maintenance, then the motor can be switched to bypass (DOL) mode. The bypass cabinet follows drive standard IEC 61800-4.

GB1985 (manual bypass); GB/T11022(electrical operated manual bypass); IEC 60470 (2000), IEC 632-1 (1978), ICS3 – UL347(premium electrical operated manual bypass).

Bypass unit introduction

2 kinds of bypass can be supplied: manual bypass and auto bypass.

In manual bypass, three isolation switches are as the main components in the cabinet.

In auto bypass, three contactors are as the main components in the cabinet.

The bypass unit is integrated with drive and shipped together, no matter manual or auto bypass.

Applicable products

Manual/Auto bypass cabinet covers all voltage levels (6-11kV).

Manual/Auto bypass is applicable for almost all the power range except below products:

- ACS580MV-07-0410-060
- ACS580MV-07-0435-066
- ACS580MV-07-0429-105
- ACS580MV-07-0410-110

Contact information

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Target audience

This manual is intended for people who have a thorough knowledge of the bypass- drive system and the industrial environment and have obtained the required qualification.

Related manuals

See *List of related manuals* on the inside of the front cover.

3

Operation principle and hardware description

Contents of this chapter

This chapter provides information on ABB Manual/Auto bypass feature which are in-line with ACS580MV and describes the operation principle of the bypass.

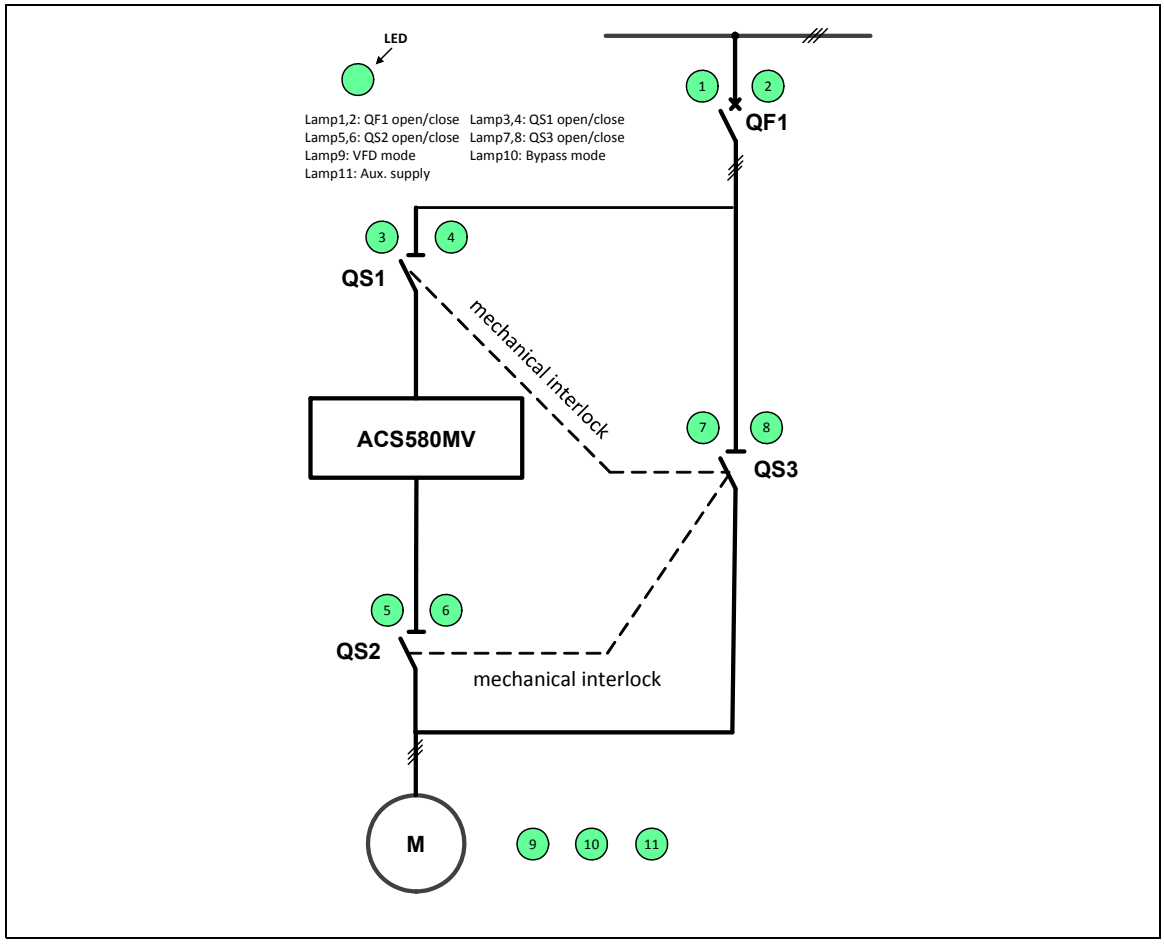
Manual Bypass

Warning

The light should not indicate the final status of switch at the switching process. Customer should check the status of switch through inspection window, and confirm that the mode selection switch is locked to working position.

Single-line circuit diagram

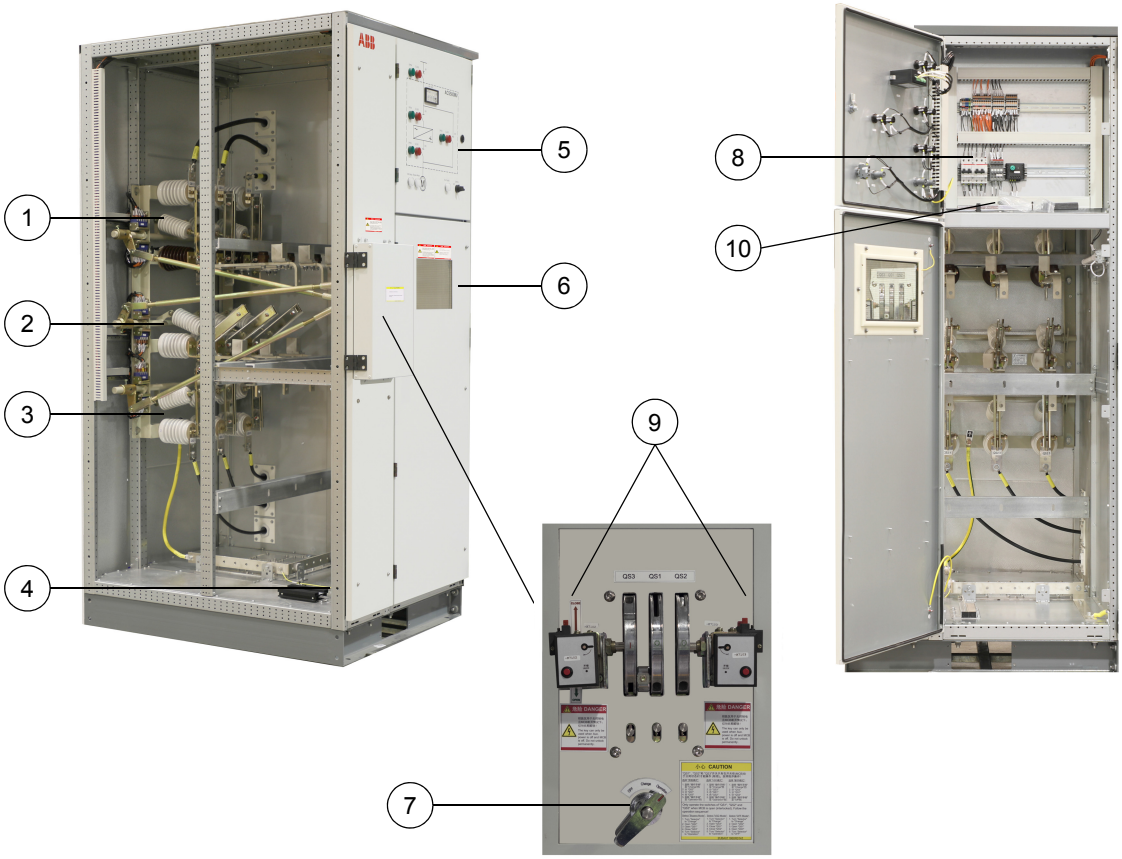
The diagram below describes the single diagram of manual bypass with isolation switches (x3).



There are three isolation switches in the manual bypass cabinet, the cabinet is in line with ACS580MV.

Cabinet layout

The cabinet layout is shown below.



	Description
1.	QS1
2.	QS3
3.	QS2
4.	Space heater(2PCS behind door)
5.	Control Panel
6.	Observation window
7.	Selector
8.	Control parts
9.	Electro-Magnetic locks
10.	Status Change Bar

There is a position mode selector on the front door of bypass cabinet, three position modes can be selected: Change position, OFF position and Operation position. The definition of three modes is as below:

Change position: three isolation switches can be operated manually only the switch is in change position and MCB is in open position.

OFF position: as soon as three isolation switches are all open, the switch can be adjusted to OFF position. In OFF position, three isolation switches cannot be operated anymore.

Operation position: in case of VFD mode (QS1 and QS2 are closed, QS3 is open) or bypass mode (QS1 and QS2 are open, QS3 is closed), the switch can be adjusted to operation position. In operation position, three isolation switches cannot be operated anymore.

The 3 switches cannot be adjusted when the MCB is in close position.

How to operate the position mode selector:

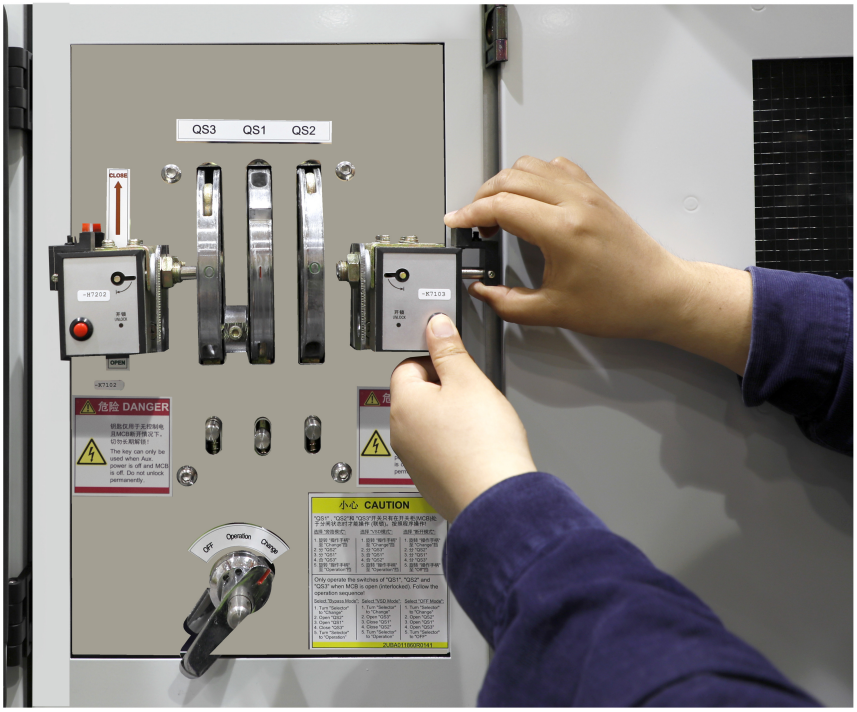
- Pull the selector handle out
- Turn the handle to wanted position: OFF, Operation or Change

How to operation the 2pcs electro-magnetic locks:

- Push the red round button located in the front of the electro-magnetic lock;
- At the same time pull the small handle out;
- Release the red round button located in the front of the electro-magnetic lock;
- Push the red square button down to lock the handle in the open position;

Then the isolation switch status can be changed. Remember to release the electro-magnetic lock handle when the change is finished.

The front button can’t be pushed more than 5S.



How to change the isolation switch status when the position mode selector is in “Change” position and the electro-magnetic locks are in open position:

- Put the status change bar in the slot of the round panel;
- Push the small standout (below the round panel) down;
- Turn the bar to open/close position

Bypass customer interface

Manual bypass with isolation switches here stated can only be operated in local mode, remote operation by DCS is not accessible.

Manual bypass cabinet will be the interface for ACS580MV, MCB and DCS, not only for power cables but also for control signals. The detail information for manual bypass interfaces can be found in below figure. Control signals between ACS580MV and DCS which are not shown in the figure should be still connected via the top/bottom plate of ACS580MV control cabinet.

The cable entry in manual bypass cabinet can be either bottom or top.

The diagram below describes the Manual bypass with isolation switches interfaces.

Manual Bypass (MBU=0001)

X20	Customer Interface Terminal Block	
1	L	Control power supply 230 VAC, 50/60 Hz, 3 A
3	N	
PE	PE	

X200	Customer Interface Terminal Block	
1 2 5 6 9 10 3 4 7 8	Auxiliary contacts to customer Thermal current: Ith = 6 A @40 °C Rated operational current: AC-15 240 VAC, 4 A; 400 VAC, 3 A; 500 VAC, 2A DC-13 24 VDC, 2.5 A; 110 VDC, 0.7 A; 240 VDC, 0.4 A	Auxiliary contacts to customer Thermal current: Ith = 6 A @40 °C Rated operational current: AC-15 240 VAC, 4 A; 400 VAC, 3 A; 500 VAC, 2A DC-13 24 VDC, 2.5 A; 110 VDC, 0.7 A; 240 VDC, 0.4 A

X210	Customer Interface Terminal Block	
Forbid customer to set common point for open status, close status and ready status!		
3	Internal supply: 230 VAC, 0.25A	MCB Close Status
4	MCB Close Status	
1	Internal supply:24 VDC, 20mA	MCB Open Status
2	MCB Open Status	
5	Internal supply:24 VDC, 20mA	MCB Ready Status
6	MCB Ready Status	

X220	Customer Interface Terminal Block	
1 2	QS1 Close Status	Auxiliary contacts to customer 380 VAC, 16 A; 250 VDC, 5 A
3 4	QS2 Close Status	
5 6	QS3 Close Status	
11 12	Control Power Supply Failure	Connect contacts to customer AC-14 400 VAC, 1 A; 230 VAC. 2 A DC-12 220 VDC 1 A; 110 VDC 1.5 A DC-13 60 VDC, 2 A; 24 VDC 4 A
13 14	Space Heater Failure	

Below lamp indicators can be found on front door for friendly operation:

- QF1 close/open
- QS1 close/open
- QS2 close/open
- QS3 close/open
- VFD operation mode
- Bypass operation mode

Operation sequence

Maintenance to VFD

- Check all the enclosures of drive and bypass unit are properly closed and VFD is ready for operation
- Unlock the mode selection switch
- Set the mode selection switch to “Unlock position”
- Close QS1
- Close QS2
- Set the mode selection switch to “Working position”
- Lock the mode selection switch
- Close QF1.

Maintenance to Bypass

- Check all the enclosures of bypass unit are properly closed and ready for operation
- Unlock the mode selection switch
- Set the mode selection switch to “Unlock position”
- Close QS3
- Set the mode selection switch to “Working position”
- Lock the mode selection switch
- Close QF1.

VFD to Bypass

- Open QF1
- Unlock the mode selection switch
- Set the mode selection switch to “Unlock position”
- Open QS2
- Open QS1
- Wait for at least 3 x rotor time constant (if not available, wait for longer than 5s)
- Close QS3
- Set the switch to “Working position”
- Lock the mode selection switch
- Close QF1.

Bypass to VFD

- Open QF1
- Unlock the mode selection switch
- Set the mode selection switch to “Unlock position”
- Open QS3
- Close QS1
- Close QS2
- Set the mode selection switch to “Working position”
- Lock the mode selection switch
- Close QF1.

VFD to Maintenance

- Open QF1
- Unlock the mode selection switch
- Set the mode selection switch to “Unlock position”
- Open QS2
- Open QS1
- Set the mode selection switch to “Maintenance position”
- Lock the mode selection switch.

Bypass to Maintenance

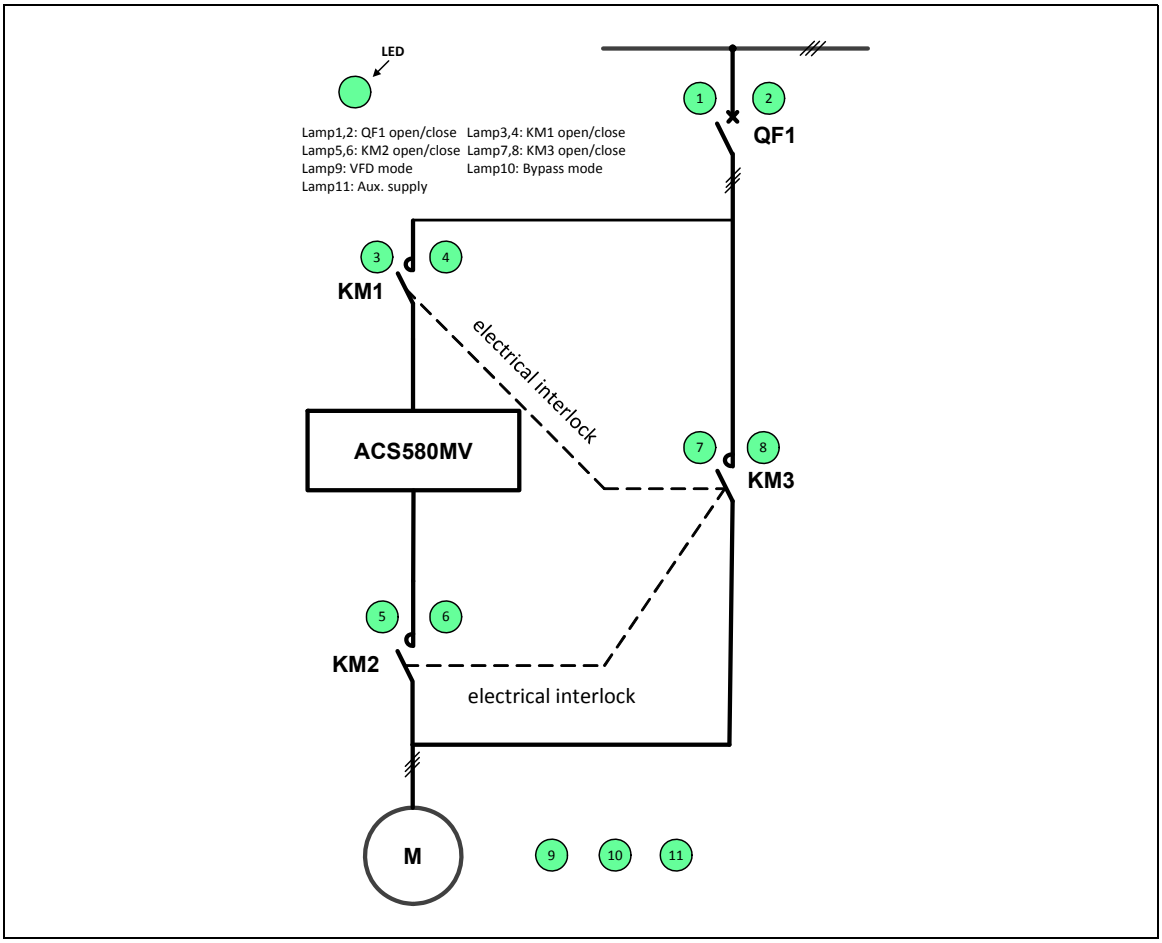
- Open QF1
- Unlock the mode selection switch
- Set the mode selection switch to “Unlock position”
- Open QS3
- Set the mode selection switch to “Maintenance position”
- Lock the mode selection switch.

Auto Bypass

Single-line circuit diagram

In this case, the isolation switches are typically replaced by contactors, the high voltage vacuum contactor is a reasonable solution in pricewise comparing with breakers.

The diagram below describes the single diagram of auto bypass with contactor(x3).



There are three contactors in bypass cabinet, the cabinet is in-line with ACS580MV. KM1 and KM2 are both electrically interlocked with KM3, they cannot be closed at the same time.

There is a switch on the front door of bypass cabinet, 3 control modes can be selected: local mode stop mode and remote mode. In local mode, three contactors can be operated manually with corresponding switches on the front door. In remote mode, three contactors can only be controlled by DCS. In stop mode, three contactors can’t be operated any more.

Cabinet layout

The cabinet layout is shown below.

	Description
1.	KM1(if bottom entry cable) or KM2 (if top entry cable) behind plate
2.	KM3
3.	KM2(if bottom entry cable) or KM1 (if top entry cable)
4.	Space heater
5.	Panel

Customer interface

Auto bypass with contactors can be operated in local mode (cabinet front door) or remote mode (customer DCS).

Bypass cabinet will be the interface for ACS580MV, MCB and DCS, not only for power cables but also for control signals. Detail information for bypass interfaces can be found in below figure. The control signals between ACS580MV and DCS which are not shown in the figure should be still connected via the top/bottom plate of ACS580MV control cabinet.

The cable entry in bypass cabinet can be either bottom or top.

The diagram below describes the auto bypass with contactors Interfaces.

Auto Bypass (MBU=0002/0003)

X30 **Customer Interface Terminal Block**

1	L	Control power supply 230 VAC, 50/60 Hz, 11 A
3	N	
PE	PE	

X300 **Customer Interface Terminal Block**

1	MCB Close CMD	Auxiliary contacts to customer Thermal current: Ith = 6 A @40 °C Rated operational current: AC-15 240 VAC, 4 A; 400 VAC, 3 A; 500 VAC, 2A DC-13 24 VDC, 2.5 A; 110 VDC, 0.7 A; 240 VDC, 0.4 A
2		
5	MCB Open CMD	
6		
9	MCB Trip CMD	
10		
3	Bypass mode Remote MCB Close CMD	
4		
7	Bypass mode Remote MCB Open CMD	
8		

X310 **Customer Interface Terminal Block**

Forbid customer to set common point for open status, close status and ready status!

3	Internal supply: 230 VAC, 0.25A	MCB Close Status
4	MCB Close Status	
1	Internal supply:24 VDC, 20mA	MCB Open Status
2	MCB Open Status	
5	Internal supply:24 VDC, 20mA	MCB Ready Status
6	MCB Ready Status	

X320 **Customer Interface Terminal Block (MBU=0002)**

1	KM1 Close Status	Auxiliary contacts to customer 380 VAC, 5 A; 380 VDC, 1 A
2		
3	KM2 Close Status	
4		
5	KM3 Close Status	
6		
11	Control Power Supply Failure	Connect contacts to customer AC-14 400 VAC, 1 A; 230 VAC. 2 A DC-12 220 VDC 1 A; 110 VDC 1.5 A DC-13 60 VDC, 2 A; 24 VDC 4 A
12		
13	Space Heater Failure	
14		

X320 **Customer Interface Terminal Block (MBU=0003, ABB contactors)**

1	KM1 Close Status	Auxiliary contacts to customer 24…250 VAC/VDC, 10 A
2		
3	KM2 Close Status	
4		
5	KM3 Close Status	
6		
11	Control Power Supply Failure	Connect contacts to customer AC-14 400 VAC, 1 A; 230 VAC. 2 A DC-12 220 VDC 1 A; 110 VDC 1.5 A DC-13 60 VDC, 2 A; 24 VDC 4 A
12		
13	Space Heater Failure	
14		

X330 **Customer Interface Terminal Block (MBU=0002, local brand contactors)**

1	KM1 Close CMD	Control Signal from customer Internal supply 230 VAC, 4.5 A
2		
11	KM1 Open CMD	
12		
3	KM2 Close CMD	
4		
13	KM2 Open CMD	
14		
5	KM3 Close CMD	
6		
15	KM3 Open CMD	
16		

X330	Customer Interface Terminal Block (MBU=0003, ABB contactors)	
1	KM1 Close CMD	Control Signal from customer Internal supply 230 VAC, 2.5 A
2		
11	KM1 Open CMD	
12		
3	KM2 Close CMD	
4		
13	KM2 Open CMD	
14		
5	KM3 Close CMD	
6		
15	KM3 Open CMD	
16		

Below lamp indicators can be found on front door for friendly operation:

- QF1 close/open
- KM1 close/open
- KM2 close/open
- KM3 close/open
- VFD mode
- Bypass mode

Switches for contactor manual operation can be found on the front door as well:

- KM1 close/open
- KM2 close/open
- KM3 close/open

Selector of local/remote/stop mode is also designed.

Operation sequence

In stop mode the 3 contactors cannot be operated anymore.

This section describes how the contactors operated, either manually or by the DCS.

Maintenance to VFD

- Check all the enclosures of drive and bypass unit are properly closed and VFD is ready for operation
- Unlock the mode selection switch
- Set the mode selection switch to “Local position” or “Remote position”
- Lock the mode selection switch
- Close KM1
- Close KM2
- Close QF1.

Maintenance to Bypass

- Check all the enclosures of bypass unit are properly closed and ready for operation
- Unlock the mode selection switch
- Set the mode selection switch to “Local position” or “Remote position”
- Lock the mode selection switch
- Close KM3
- Close QF1.

VFD to Bypass

- Open QF1

  Hint: In case need to switch between“Local position” and “Remote position”, please apply step 2 to step 4, otherwise skip to step 5.
- Unlock the mode selection switch
- Set the mode selection switch to “Local position” or “Remote position”
- Lock the mode selection switch
- Open KM2
- Open KM1
- Wait for at least 3 x rotor time constant (if not available, wait for longer than 5s)
- Close KM3
- Close QF1.

Bypass to VFD

- Open QF1

  Hint: In case need to switch between “Local position” and “Remote position”, please apply step 2 to step 4, otherwise skip to step 5.
- Unlock the mode selection switch
- Set the mode selection switch to “Local position” or “Remote position”
- Lock the mode selection switch
- Open KM3
- Close KM1
- Close KM2
- Close QF1.

VFD to Maintenance

- Open QF1
- Unlock the mode selection switch
- Set the mode selection switch to “Local position”
- Open KM2
- Open KM1
- Set the mode selection switch to “Stop position”
- Lock the mode selection switch.

Bypass to Maintenance

- Open QF1
- Unlock the mode selection switch
- Set the mode selection switch to “Local position”
- Open KM3
- Set the mode selection switch to “Stop position”
- Lock the mode selection switch.

4

Electrical installation

Contents of this chapter

This chapter gives instructions on the installation of the power cables and wiring of control and auxiliary power.

Safety

WARNING Hazardous voltage!

Improper work could lead to life-threatening injury or death.

The electrical installation must be carried out by qualified personnel according to the site and equipment requirements, and the relevant electrical codes.

When the electrical installation is completed, the main and auxiliary power supply to the bypass-drive system must not be switched on without the consent of the ABB commissioning personnel.

Take appropriate measures to prevent main and auxiliary power supply from being switched on during installation.

Overview of installation work

The electrical installation includes the following wire and cable connections:

- Power cables, ground cables
- Auxiliary power, control and cables
- Power supply for space heater

Cable requirements

For information on the requirements for power cables and the ground cable see the *ACS580MV Engineering Guideline*

For information on the requirements for the auxiliary power cable and the control cables, see Auxiliary power and control cables guideline.

Parallel routing of power cables

Cables between bypass- drive system and motor can be laid in parallel. The number of cables laid in parallel is limited by the number of entry holes of the entry plate.

For information on the supply voltages, see Rating label of the bypass- drive system.

Terminal sizes for auxiliary and control connections

Manual bypass

Customer I/O terminal		
Terminal	**Wire cross-section (mm^2)**	
	Solid wire	**Flexible wire**
X200:1	1.5...2.5 mm^2	
X200:2		
X200:3		
X200:4		
X200:5		
X200:6		
X200:7		
X200:8		
X200:9		
X200:10		
X210:1		
X210:2		
X210:3		
X210:4		
X210:5		
X210:6		
X220:1		
X220:2		
X220:3		
X220:4		
X220:5		
X220:6		
X220:11		
X220:12		
X220:13		
X220:14		

Customer I/O terminal		
Terminal	**Wire cross-section (mm^2)**	
	Solid wire	**Flexible wire**
X20:1	0.5...4 mm^2	
X20:3		
X20:PE		

Auto bypass

Customer I/O terminal		
Terminal	**Wire cross-section (mm^2)**	
	Solid wire	**Flexible wire**
X300:1	1.5...2.5 mm^2	
X300:2		
X300:3		
X300:4		
X300:5		
X300:6		
X300:7		
X300:8		
X300:9		
X300:10		
X310:1		
X310:2		
X310:3		
X310:4		
X310:5		
X310:6		
X320:1		
X320:2		
X320:3		
X320:4		
X320:5		
X320:6		
X320:11		
X320:12		
X320:13		
X320:14		
X330:1		
X330:2		
X330:3		
X330:4		
X330:5		
X330:6		
X330:11		
X330:12		
X330:13		
X330:14		
X330:15		
X330:16		

Customer I/O terminal		
Terminal	**Wire cross-section (mm^2)**	
	Solid wire	**Flexible wire**
X30:1	0.5...4 mm^2	
X30:3		
X30:PE		

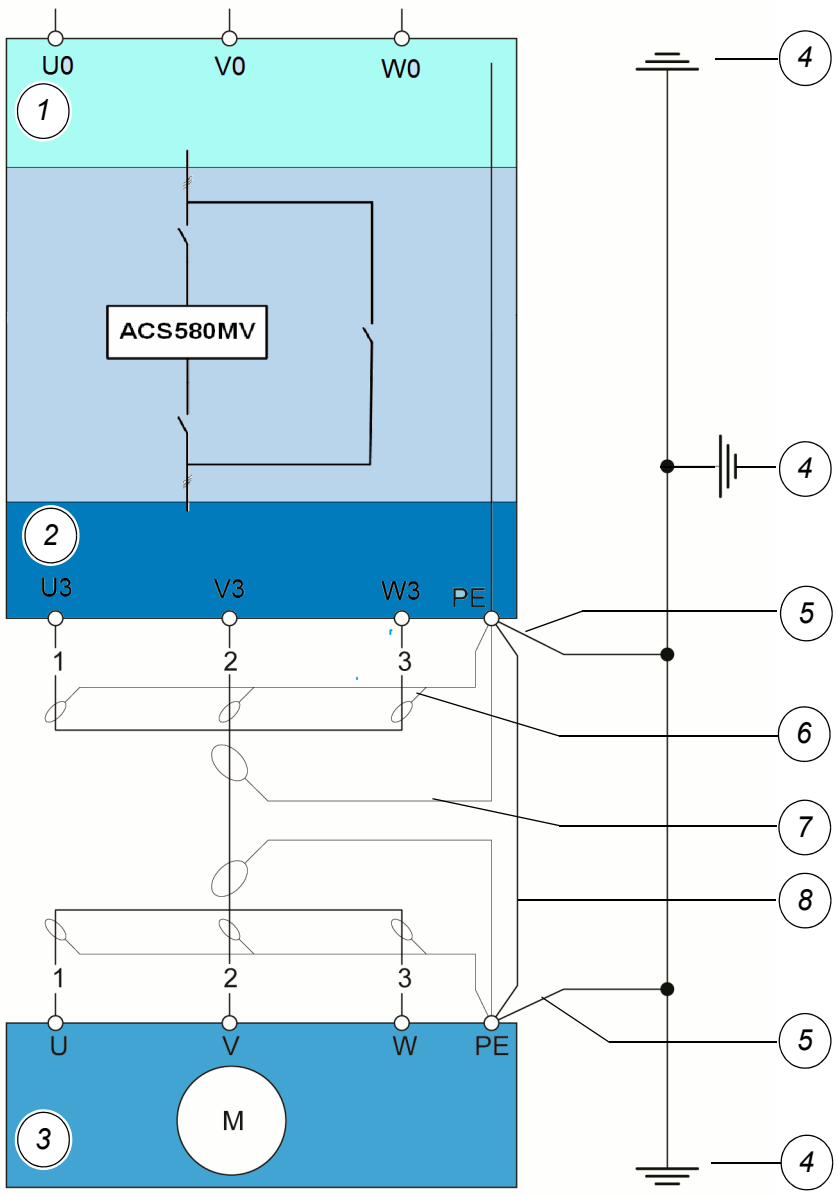
Ground cable and cable shield connections

The cabinet is equipped with ground buses (marked PE, Protective Earth) for grounding the armor and shields of the cables, and for the connection of the ground cable.

To identify the ground buses, see *ACS580MV Wiring Diagram of system 0*.

Grounding of the drive system

Grounding of the drive system must be in line with the *ACS580MV Engineering Guideline*.



1	Input transformer (TRU)
2	Drive line up with bypass unit
3	Motor
4	Earth electrode
5	Ground cable
6	Cable screen
7	Cable shield
8	Equipotential bonding conductor

Cable entries for external connections

Power cable terminals are located in the bypass unit. They can be accessed after removing the metal cover (tripping loop terminals -XS1 on the cover must be opened first).

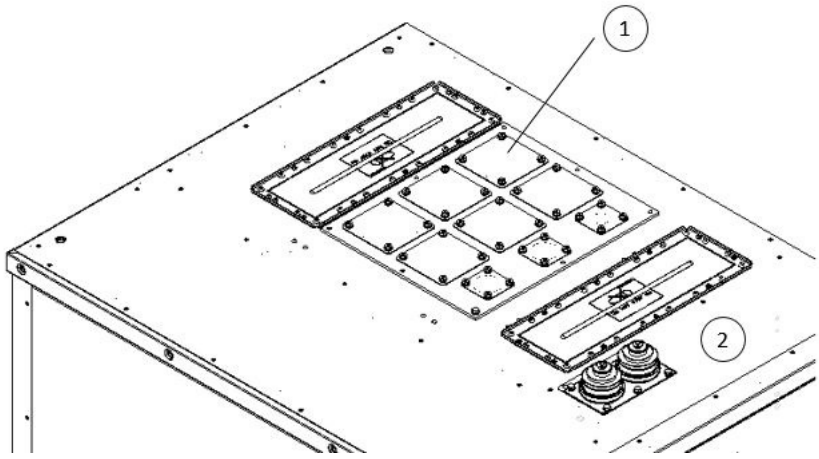
The drive is prepared for top or bottom cable entry with one or a combination of the following cable entries:

- Metal plate hole cable entry for power cables, ground cables and optionally for the 400 V auxiliary supply cables
- Cable entry with EMC plates, EMC cushions and sealing grommets for auxiliary and control cables

For detailed information e.g. location and dimensions, see *ACS580MV Base frame & TEU layout design*.

Manual Bypass power cable entry via holes in cable entry plate

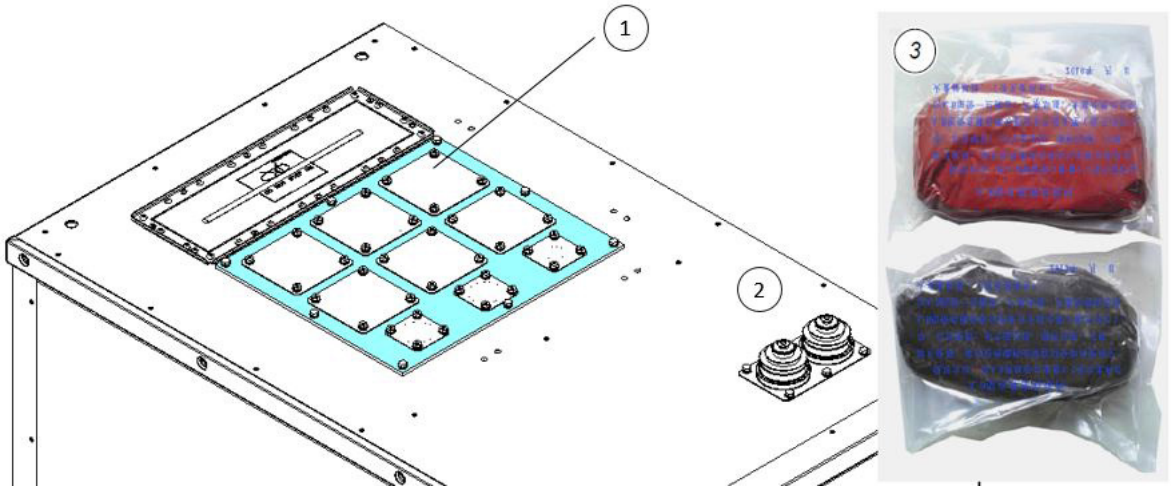
Power cable entry can be from bottom or top.



1	Power cable entry plate (in Bypass)
2	Control cable entry (in Bypass)
3	Sealing compound

Auto Bypass power cable entry via holes in cable entry plate

Power cable entry can be from bottom or top.



1	Power cable entry plate (in Bypass)
2	Control cable entry (in Bypass)
3	Sealing compound

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Installation checklist

Contents of this chapter

This chapter contains an installation checklist which you must complete before commissioning can take place.

Safety

DANGER

High voltage!

Obey the instructions in chapter *Safety instructions*. If you ignore them, injury or death, or damage to the equipment can occur.

Before starting to work on the bypass unit, make sure:

- that the main and auxiliary power supply to the bypass unit is switched off, locked out, and tagged out
- that the bypass unit is dead
- that safety ground connections are in place
- that personal protective equipment is provided and used when required
- that everyone involved is informed.

Before energizing the bypass unit, make sure:

- that all foreign objects are removed from the bypass unit
- that all internal and external covers are securely fastened and all doors are closed, locked and / or bolted
- that the release dials of safety switches are in the locked position.

WARNING! Obey the instructions in chapter *Safety instructions*. If you ignore them, injury or death, or damage to the equipment can occur.

Checklist

Do the steps in section *Precautions before electrical work* on page *11* before you start the work. Go through the checklist together with another person.

Mechanical installation

1. Cover of operation interlocking device is fastened properly ☐
2. All the input/output power cable and PE cable are in bypass cabinet ☐
3. PE busbar and PE cable is connected properly between drive and bypass cabinet ☐
4. Ambient operating conditions meet the specifications given in chapter *Technical data* ☐
5. Drive installed according to the instructions in this manual (Chapters *Mechanical installation* and *Electrical installation*) ☐
6. Bypass-drive system securely fastened to the floor ☐
7. Visual inspection: ☐
   no badly affixed or damaged components
   no foreign objects inside cabinet
   no dirt, dust and humidity inside cabinet

Electrical installation

1. Types and cross-sections of control cables suitable for the signal type and signal level ☐
2. Types and cross-sections of power cables selected according to the *ACS580MV Engineering Guideline* ☐
3. Cable entry made according to the instructions (Chapter *Electrical installation*) in ACS580MV hardware manual (2UBB004520) ☐
4. All control cable screens and conductors are connected according to the instructions (Chapter *Electrical installation*) in ACS580MV hardware manual (2UBB004520), appropriately labeled, and the customer-side connections are completed ☐

5. Ground cable of bypass- drive system securely connected at both ends ☐

6. Input and motor cables not connected at both ends (cables must be meggered before connection, drive optional - recommended in case of long storage time, humid environment or visible transportation damages) ☐

Main circuit breaker (MCB)

1. Type of MCB selected as per *ACS580MV Engineering Guideline* ☐

2. High voltage connections completed ☐

3. MCB ready to be tested with drive ☐

4. MCB interposing relay settings tested ☐

5. Safety devices checked and in operation ☐

Motor

1. Motor installed, aligned and alignment protocol available ☐

2. Motor decoupled from driven load ☐

3. Ground connection completed ☐

4. Customer side motor protection set and ready (e.g. winding temperature, vibration) ☐

5. Motor auxiliaries (e.g. bearing lubrication, heater cooling) ready ☐

Insulation tests

1. All power cables to bypass-drive system, and from bypass-drive system to motor are meggered, and measured values are within the required limits. ☐

2. Test report of the megger test available ☐

   Note: If the test is carried out by the commissioning engineer of the bypass-drive system, an additional day per bypass-drive system motor combination needs to be reserved. After the test, the feeder cables can be connected, except at the bypass-drive system end. The test must comply with the specification.

3. Optional insulation tests of the bypass-drive system are completed and documented. Insulation tests of the bypass-drive system recommended in case: long storage time (>4 months), humid environment or visible damages due to transportation/installation. ☐

Power supply

1. Medium voltage available for start-up of bypass-drive system ☐

2. Low voltage auxiliary power available for start-up of bypass-drive system ☐

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Technical data

Contents of this chapter

This chapter contains the technical specifications of Manual/Auto bypass.

Environment conditions

Ambient temperature Storage/Transport	 –40 to +70 °C
Operation	0 to +40 °C, no frost allowed
Altitude	Manual bypass with isolation switches: 0 to 2,000 m Manual bypass with contactors(6kV, 6.3kV,6.6kV): 0 to 2,000 m Manual bypass with contactors(10kV,10.5kV,11kV): 0 to 1,000 m
Relative humidity	5 to 95 %, no condensation allowed
Degree of protection	IP42 as standard
Contamination levels	No conductive dust allowed variant

Manual bypass isolation switch technical data

Isolation Switch (for Manual bypass)		**Unit**
Standard	GBT1985-2004	
Type	GN19-12/400	
Rated voltage	12	kV
Normal current	400	A
Withstand voltage at 50Hz	42	kV
Impulse withstand voltage	75	kVbil
Rated frequency	50/60	Hz
Short-time withstand current for 4s	12.5	kA
Rated peak current	32	kA
Mechanical life (operations)	3'000	No.

Auto bypass contactor technical data

Contactors (for Auto bypass)	**Standard**	**Premium**	**Premium**	**Unit**
Standard	GBT1984-2003	IEC 62271	IEC 62271	
Type	JCZ5-12J/D400	VSC 12/400	VSC 7/400	
Rated voltage	12	12	7.2	kV
Normal current	400	400	400	A
Withstand voltage at 50Hz	42	28	23	kV
Impulse withstand voltage	75	75	60	kVbil
Rated frequency	50/60	50/60	50/60	Hz
Short-time withstand current for 1s	4	6	4	kA
Rated peak current	10	15	15	kA
Electrical life at rated current	100'000	1'000'000	1'000'000	No.
Mechanical life (operations)	300'000	1'000'000	1'000'000	No.
Opening time with electrical latching	≤ 60	20…30	20…30	ms
Closing time	≤ 200	30…50	30…50	ms

Dimensions and weight

Type	*Manual Bypass*				*Auto Bypass*			
	Height (mm)	*Depth (mm)*	*Width (mm)*	*Weight (kg)*	*Height (mm)*	*Depth (mm)*	*Width (mm)*	*Weight (kg)*
R1…R6	2135	1211	900	350	2135	1163	700	310
R7…R9	2135	1411	900	400	2135	1363	700	350

Further information

Product and service inquiries

Address any inquiries about the product to your local ABB representative, quoting the type designation and serial number of the unit in question. A listing of ABB sales, support and service contacts can be found by navigating to www.abb.com/searchchannels.

Product training

For information on ABB product training, navigate to www.abb.com/drives and select *Training courses*.

Document library on the Internet

You can find manuals and other product documents in PDF format on the Internet. Go to www.abb.com/drives and select *Document Library.* You can browse the library or enter selection criteria, for example a document code, in the search field.

Contact us

www.abb.com/drives
www.abb.com/drivespartners

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