

ABB industrial drives

# Hardware manual

## ACS880-607 1-phase brake units



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# List of related manuals

<b>General drive manuals</b>	<b>Code (English)</b>
<i>Electrical planning instructions for ACS880 multidrive cabinets and modules</i>	<a href="#">3AUA0000102324</a>
<i>Mechanical installation instructions for ACS880 multidrive cabinets</i>	<a href="#">3AUA0000101764</a>
<i>Safety instructions for ACS880 multidrive cabinets and modules</i>	<a href="#">3AUA0000102301</a>
<b>Inverter unit manuals and guides</b>	
<i>ACS880-107 inverter units hardware manual</i>	<a href="#">3AUA0000102519</a>
<i>ACS880 primary control program firmware manual</i>	<a href="#">3AUA0000085967</a>
<i>ACS880 primary control program quick start-up guide</i>	<a href="#">3AUA0000098062</a>
<b>Supply unit manuals</b>	
<i>ACS880-307 (+A003) diode supply units hardware manual</i>	<a href="#">3AUA0000102453</a>
<i>ACS880 diode supply control program firmware manual</i>	<a href="#">3AUA0000103295</a>
<b>Brake unit manuals</b>	
<i>ACS880-607 1-phase brake units hardware manual</i>	<a href="#">3AUA0000102559</a>
<b>Option manuals and guides</b>	
<i>ACS-AP-x Assistant control panels user's manual</i>	<a href="#">3AUA0000085685</a>
<i>Drive composer start-up and maintenance PC tool user's manual</i>	<a href="#">3AUA0000094606</a>
<i>Manuals and quick guides for I/O extension modules, fieldbus adapters, etc.</i>	

You can find manuals and other product documents in PDF format on the Internet. See section [Document library on the Internet](#) on the inside of the back cover. For manuals not available in the Document library, contact your local ABB representative.

# Hardware manual

ACS880-607 1-phase brake units

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# Introduction to the manual

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## Contents of this chapter

This chapter introduces this manual.

## Safety instructions

Obey all safety instructions for the drive.

Read the **complete safety instructions** before you install, start up, or use the drive. The complete safety instructions are given in *Safety instructions for ACS880 multidrive cabinets and modules* (3AUA0000102301 [English]).

Read the **task-specific safety instructions** before starting the task. See the subsection describing the task.

## Target audience

The manual is intended for people who plan the installation of, install, start up and use the brake units. Read the manual before you work on the units. You are expected to know the fundamentals of electricity, wiring, electrical components, and electrical schematic symbols.

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## Contents of the manual

This manual consists of the following chapters:

- [Introduction to the manual](#) introduces this manual.
- [Operation principle and hardware description](#) describes the operation principle and construction of the brake units.
- [Mechanical installation](#) describes the mechanical installation of the brake units.
- [Planning the electrical installation](#) contains instructions on selecting, placing and protecting the brake circuit components and cables.
- [Electrical installation](#) contains instructions on wiring the brake units.
- [Installation checklist](#) contains a list for checking the mechanical and electrical installation of the brake units.
- [Start-up](#) contains the start-up procedure of the brake units.
- [Fault tracing and maintenance](#) describes the fault tracing possibilities and maintenance instructions of the brake units.
- [Technical data](#) contains the technical specifications of the brake units, eg, the ratings, sizes and technical requirements, provisions for fulfilling the requirements for CE and other markings.
- [Example circuit diagrams](#) contains the basic circuit diagrams of the ACS880-607-0320-3+D151 and ACS880-607-0640-3+D151 brake units.

## Related documents

The multidrive user documentation consists of technical drawings and a set of manuals. The technical drawings are tailor-made for each drive. The composition of the manual set depends on the composition of the drive. The manuals are listed on the back of the front cover.

## Terms and abbreviations

Term/Abbreviation	Explanation
Control board	Circuit board in which the control program runs
Brake chopper	Conducts the surplus energy from the intermediate circuit of the drive to the brake resistor when necessary. The chopper operates when the DC link voltage exceeds a certain maximum limit. The voltage rise is typically caused by deceleration (braking) of a high inertia motor.
Brake chopper module	Brake chopper enclosed inside a metal frame or enclosure. Intended for cabinet installation. See <a href="#">Brake chopper</a> .
Brake chopper unit	Brake chopper modules under control of one control board and related accessories. The control board is considered part of the unit.
Brake resistor	Dissipates the drive surplus braking energy conducted by the brake chopper to heat. Essential part of the brake circuit. See <a href="#">Brake chopper</a> .
Brake unit	Brake chopper and resistors
Cubicle	One section of a cabinet-installed drive. A cubicle is typically behind a door of its own.
Drive	Frequency converter for controlling AC motors

Term/Abbreviation	Explanation
EMC	Electromagnetic compatibility
IGBT	Insulated gate bipolar transistor; a voltage-controlled semiconductor type widely used in various converters because of their easy controllability and high switching frequency.
Inverter	Converts direct current and voltage to alternating current and voltage.
Multidrive	Drive for controlling several motors which are typically coupled to the same machinery. Includes one supply unit, and one or several inverter units.
NBRC	Chopper control board. See <a href="#">Control board</a> .
Parameter	User-adjustable operation instruction to the drive, or signal measured or calculated by the drive
SAFUR	Series of optional brake resistors

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# Operation principle and hardware description

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## Contents of this chapter

This chapter describes the operation principle and construction of the brake units.

## Product overview

ACS880-607 is an air-cooled cabinet-installed brake unit, which forms a part of an ACS880 multidrive system. As standard, it includes brake chopper(s). Brake resistors are available as options (+D151).

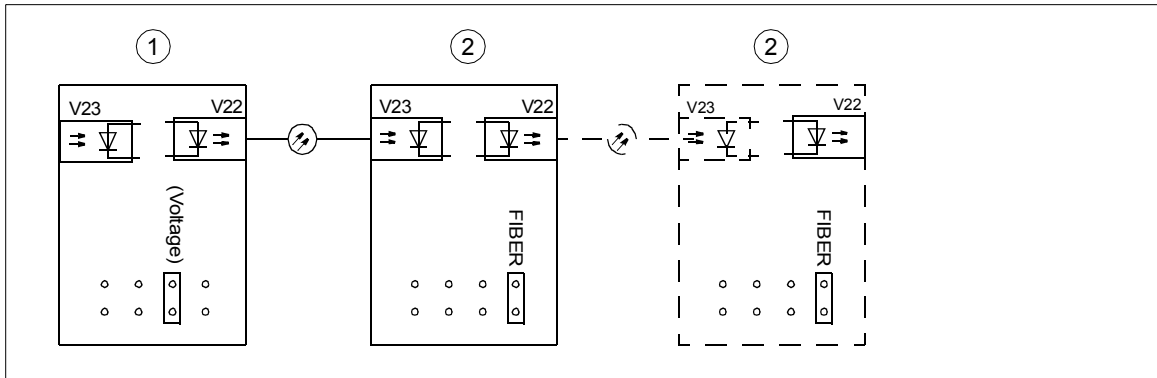
## Operation principle

The brake chopper handles the energy generated by a decelerating motor. The chopper connects the brake resistor to the intermediate DC circuit whenever the voltage in the circuit exceeds the limit defined by the control program. Energy consumption by the resistor losses lowers the voltage until the resistor can be disconnected.

Typically, a drive system is equipped with a brake chopper(s) if:

- high capacity braking is needed and the drive cannot be equipped with a regenerative supply unit
  - a backup for the regenerative supply unit is needed.
-

When several brake choppers are in use, the first chopper in the chain acts as the master for the other choppers. The voltage selection jumper of the master (1) is set to the appropriate voltage at the factory, while the followers (2) are set to FIBER.



### ■ Cooling fan

The brake chopper cubicle is equipped with a cooling fan. In brake units equipped with factory-installed brake resistors (+D151), two resistors are installed into the same cubicle and share one cooling fan. The fan is supplied from the auxiliary control unit (ACU) cubicle of the drive.

### ■ DC fuses

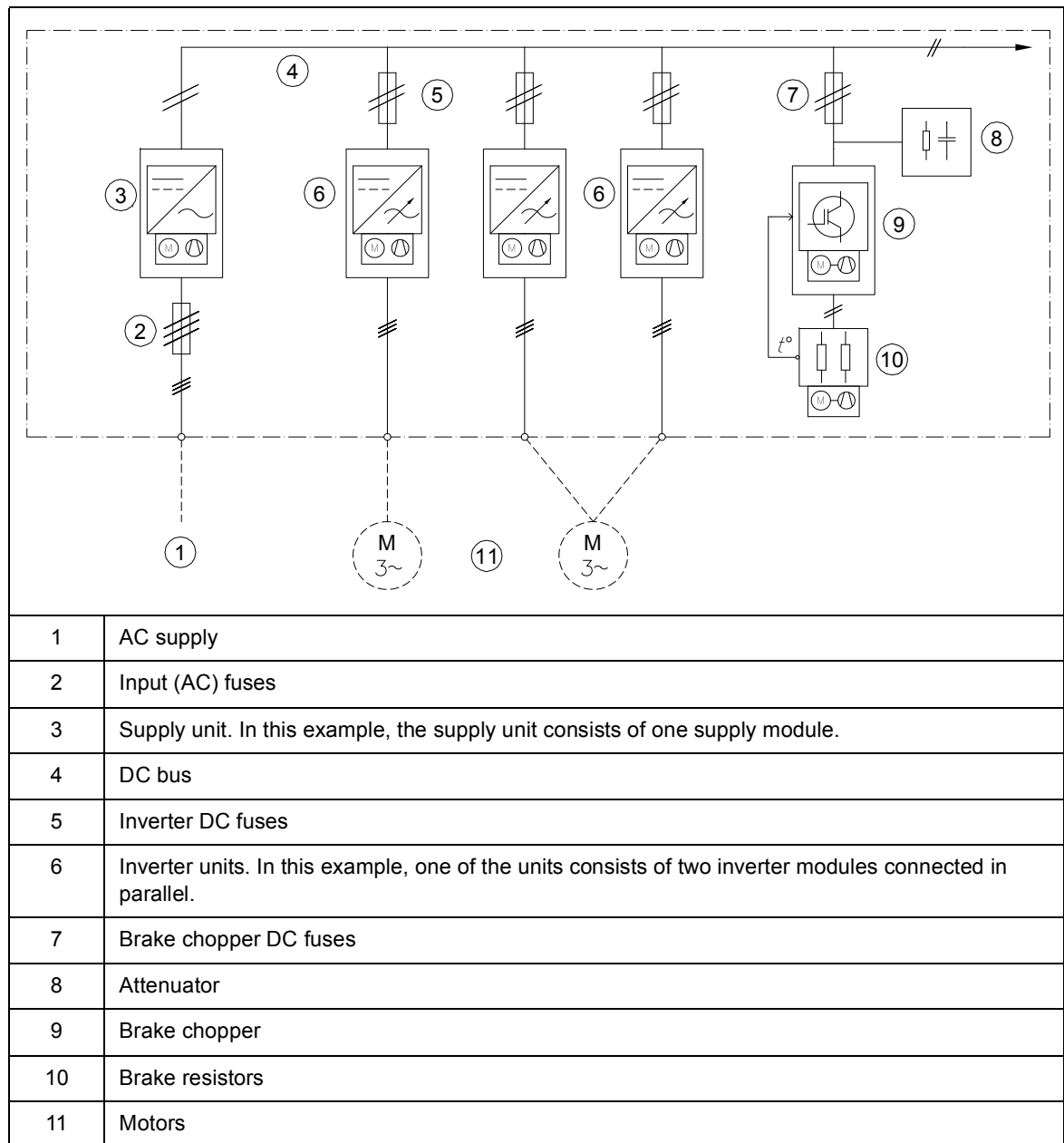
The brake unit is equipped with DC fuses as standard. The fuses protect the brake chopper and the brake circuit cables in a cable short-circuit situation.

### ■ Attenuator

The brake unit is equipped with an attenuator. The attenuator damps intermediate circuit voltage spikes at the brake chopper input terminals, thus decreasing stress on the chopper.

## Single-line diagram of the drive system

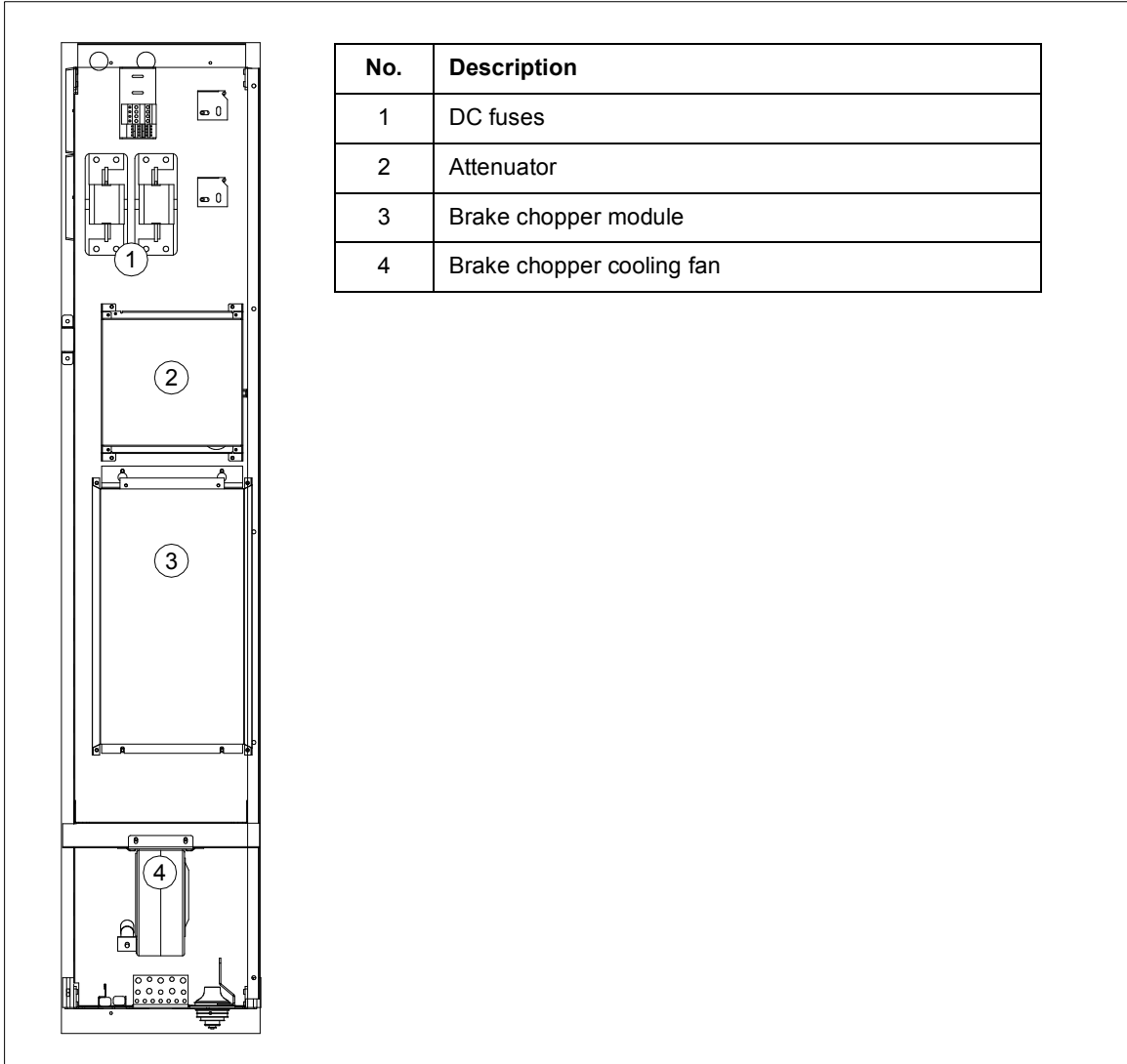
The diagram below depicts a typical common DC bus drive system.



## Layout drawings

### ■ Brake chopper cubicle

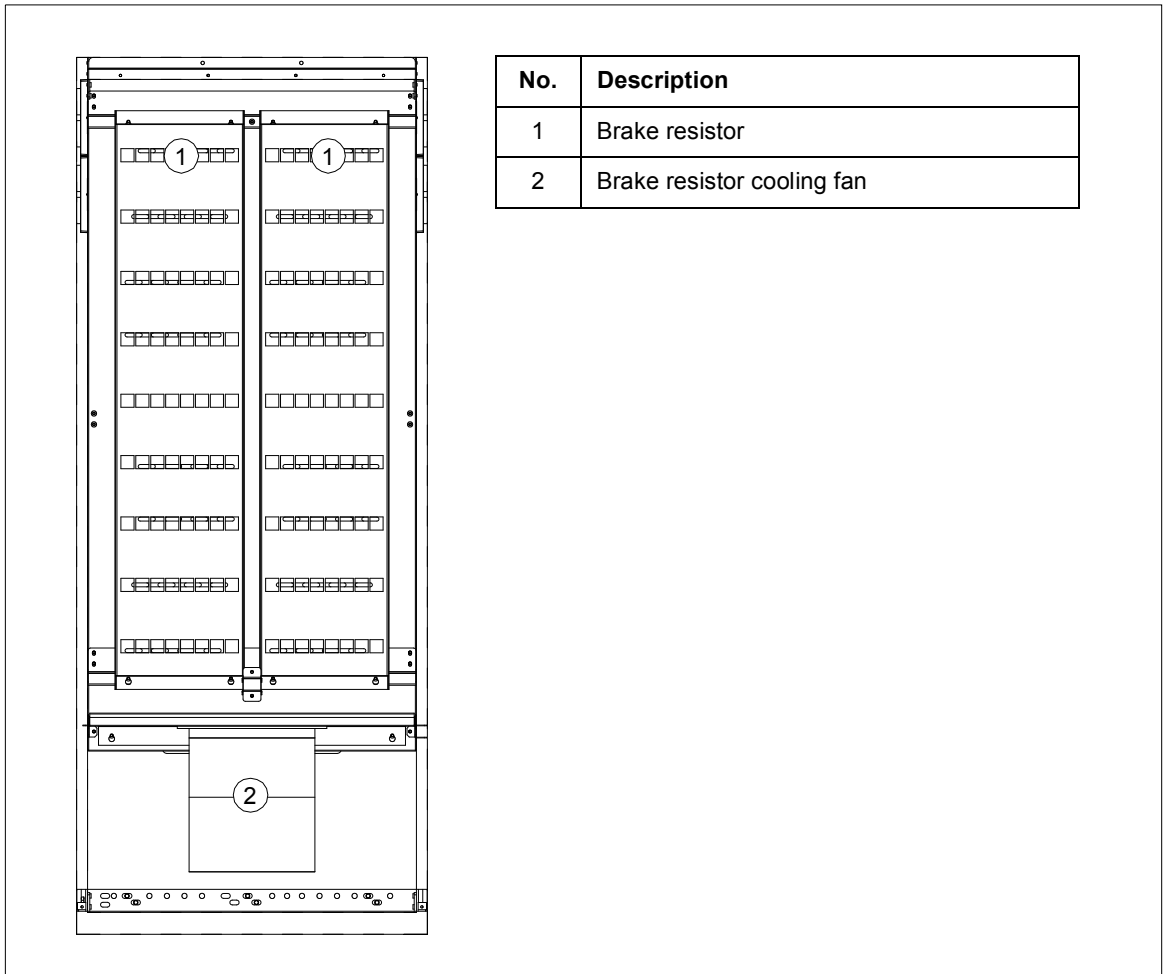
The figure below shows the components of the brake chopper cubicle with the door open and shrouds removed.





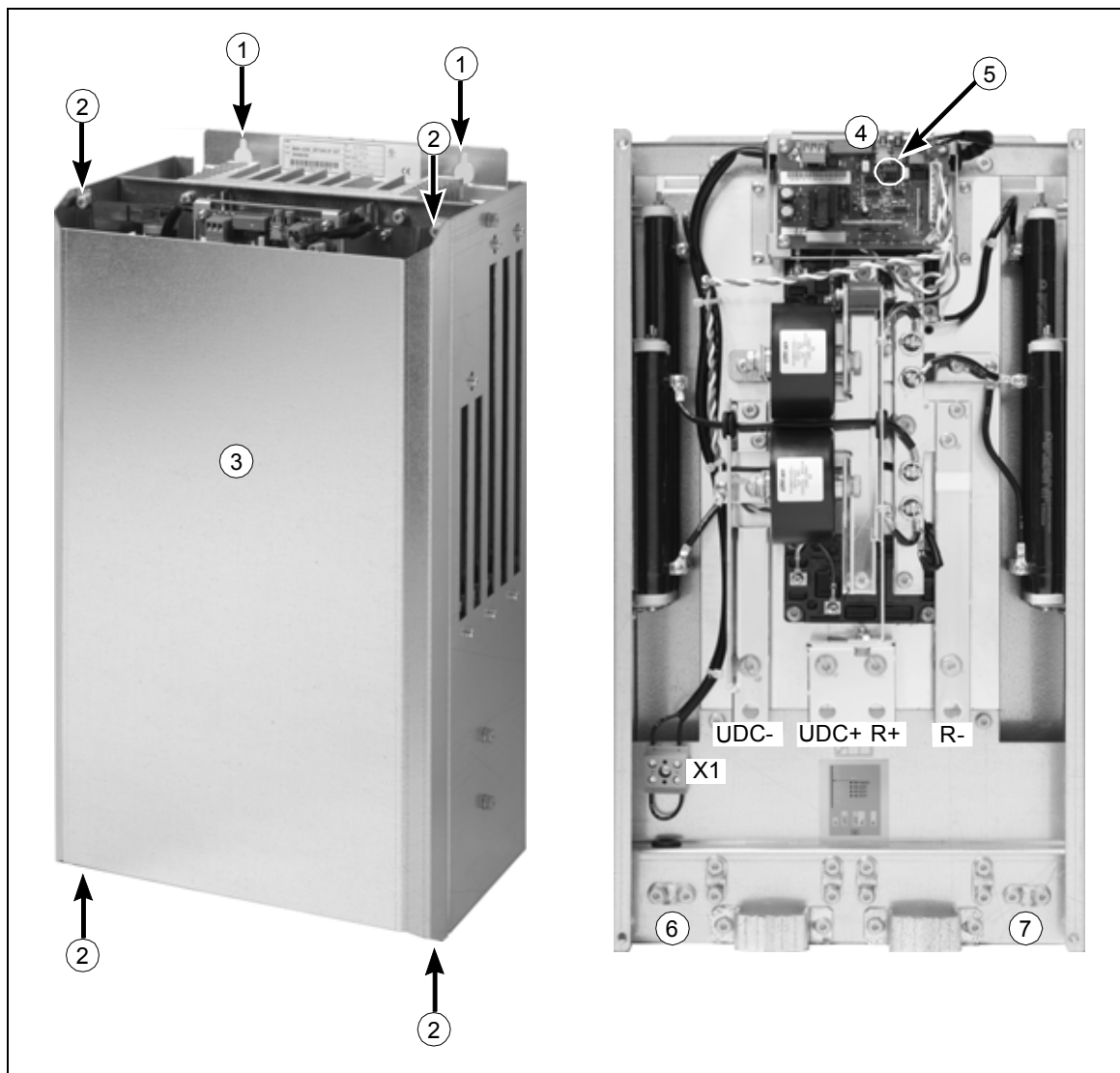
■ **Brake resistor cubicle (option +D151)**

The figure below shows the components of the brake resistor cubicle with the door open and shrouds removed.



## ■ Brake chopper module

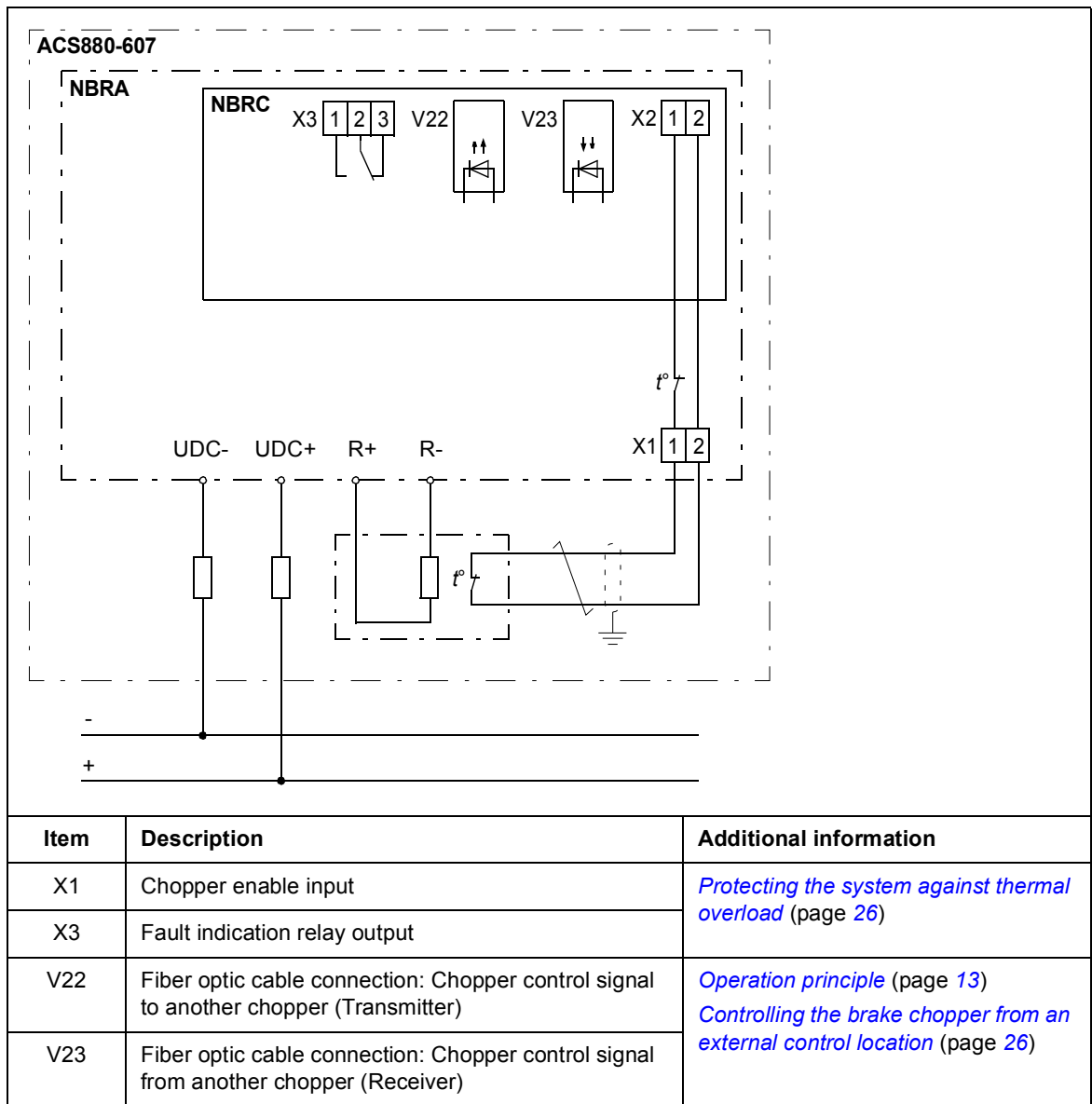
The components of the brake chopper module are shown below.



1	Four fastening points at the back of the unit
2	Four front panel fastening screws
3	Front panel
4	Chopper control board (NBRC) with control terminals (see page 19)
5	Voltage selection jumper (see page 39)
6	PE (protective earth) clamp
7	Grounding clamp
X1	Enable input terminal block (see page 19)
UDC-	Power connection terminals
UDC+	
R+	
R-	

## Overview of power and control connections



The diagram below shows the power and control connections of the brake unit.





## Type designation labels

Each brake unit and brake chopper module is equipped with a type designation label.

An example label of a brake unit is shown below.

 MADE IN FINLAND	① ACS880-607-0400-7	④ Input U 742/849/976 V DC I 107 A Output U 0...742/849/976 V DC I 107 A Resistor Rmin 2.72 Ohm Rmax 2.72 Ohm	⑤ CE	
② <table border="1" style="display: inline-table; border-collapse: collapse;"> <tr><td style="padding: 2px;">FRAME</td></tr> </table>	FRAME	IP22 UL type 1, NEMA 1 UL/CSA max 849 V DC/849 V DC	③  S/N: 113460001	
FRAME				
No.	Description			
1	Type designation			
2	Frame size			
3	Serial number <ul style="list-style-type: none"> <li>The first digit of the serial number refers to the manufacturing plant.</li> <li>The next four digits refer to the unit's manufacturing year and week, respectively.</li> <li>The remaining digits complete the serial number so that there are no two units or modules with the same number.</li> </ul>			
4	Ratings			
5	Valid markings			

An example label of a brake chopper module is shown below.

	④		⑤
①	ABB	Un 513...707 VDC	
②	Type NBRA-659C OPTION/SP KIT	Rmin 1.2 / 1.35 Ohm	CE
③	Code 59006436	Duty cycle 1 / 5 min	
	 Serial number ★ 1113801151 ★	Irms 468 / 391 ADC Rn 1.2 / 1.43 Ohm	
No.	Description		
1	Type designation		
2	Brake chopper module order code		
3	Serial number <ul style="list-style-type: none"> <li>The first digit of the serial number refers to the manufacturing plant.</li> <li>The next four digits refer to the unit's manufacturing year and week, respectively.</li> <li>The remaining digits complete the serial number so that there are no two units or modules with the same number.</li> </ul>		
4	Ratings		
5	Valid markings		

# 3

## Mechanical installation

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### Contents of this chapter

This chapter describes the mechanical installation of the brake units.

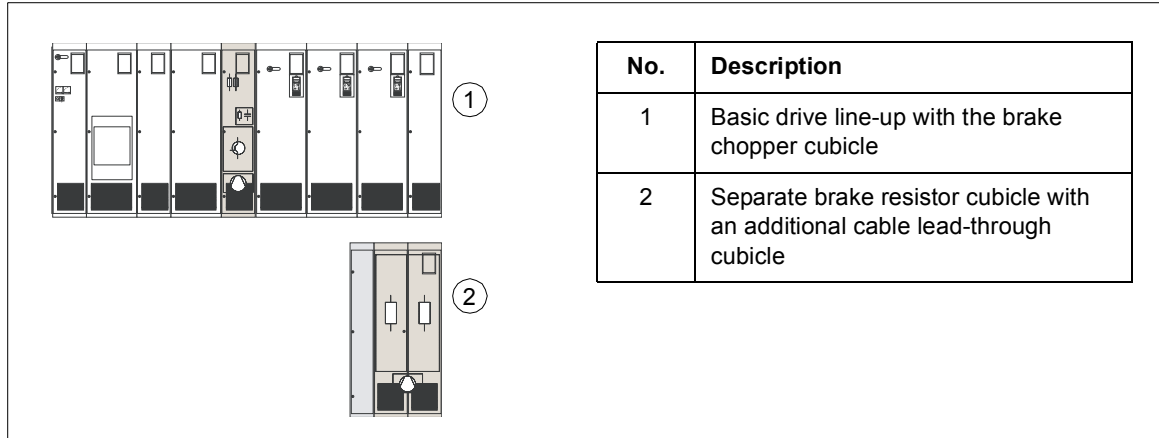
### **Brake units with factory-installed brake resistors (option +D151)**

The ACS880 multidrive - the brake unit as one part of the complete drive - is transported in shipping splits. For the mechanical installation of the shipping splits, see *Mechanical installation instructions for ACS880 multidrive cabinets* (3AUA0000101764 [English]).

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## ■ Brake resistors in a separate line-up

In special cases, it is possible to install the brake resistor cubicle(s) of the brake unit separate from the basic drive line-up. See the figure below. **Note** that then you must order the brake resistor cubicle as separate.



When you install the brake resistor cubicle, obey the instructions given for the brake units without factory-installed resistors.



**WARNING!** Never install the brake chopper cubicle separate from the basic line-up.

## Brake units without factory-installed brake resistors

The ACS880 multidrive - the brake unit as one part of the complete drive - is transported in shipping splits. For the mechanical installation of the shipping splits, see *Mechanical installation instructions for ACS880 multidrive cabinets* (3AUA0000101764 [English]).

For the installation of brake resistors, obey the instructions provided by the resistor manufacturer.



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## Planning the electrical installation

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### Contents of this chapter

This chapter contains instructions on selecting, placing and protecting the brake circuit components and cables.

### Limitation of liability

The installation must always be designed and made according to applicable local laws and regulations. ABB does not assume any liability whatsoever for any installation which breaches the local laws and/or other regulations. Furthermore, if the recommendations given by ABB are not followed, the drive may experience problems that the warranty does not cover.

### Generic guidelines

See *Electrical planning instructions for ACS880 multidrive cabinets and modules* (3AUA0000102324 [English]) for the generic guidelines for planning the electrical installation (selecting cables, routing cables, etc.) of the air-cooled multidrive cabinets.

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## Brake units with factory-installed brake resistors (option +D151)

The brake unit is an operational unit after the shipping splits are joined. No customer setting or wiring is required.

For information on the protections and external control of the brake unit, see sections:

- [Protecting the system against thermal overload](#) on page 26
- [Protecting the resistor cable against short-circuits](#) on page 26
- [Controlling the brake chopper from an external control location](#) on page 26.

## Brake units without factory-installed brake resistors

### ■ Selecting the brake resistors

The brake unit must be equipped with a brake resistor by the user.



**WARNING!** ABB is not responsible for customer resistor selection or protection of the resistor.

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Select the resistor according to the resistor specification given in chapter [Technical data](#).

In addition, consider the following:

- Each chopper must feed a resistor or resistor assembly of its own.
  - The resistance ( $R$ ) of the brake resistor assembly must be equal to or above the value specified. Never use resistance values below the specified value.
  - The resistor must withstand the specified brake cycles.
  - The ventilation of the space/room in which the resistors are located must meet the air flow amounts specified.
  - The resistor assembly must be equipped with a thermal switch. See also section [Protecting the system against thermal overload](#) on page 26.
- 



**WARNING!** Before you connect the resistor thermal switch to the chopper enable input terminal, make sure that the isolation level and protection of the switch are sufficient. The switch is at the intermediate circuit potential. This voltage is extremely dangerous. The normally closed switch/contact should always be properly isolated (test voltage over 2.5 kV) and shrouded against contact. The same requirements are valid for the connection cable.

---

### ■ Selecting and routing the brake resistor cables

For the recommended copper cable for connecting the resistor to the chopper, see section [Resistor cable sizes for brake units without factory-installed resistors](#) on page 50.

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### Minimizing electromagnetic interference

Obey these rules in order to minimize the electromagnetic interference caused by rapid current changes in the resistor cables:

- Shield the braking power line completely, either by using shielded cable or a metallic enclosure. Unshielded single-core cable can only be used if it is routed inside a cabinet that efficiently suppresses radiated emissions.
- Install the cables away from other cable routes.
- Avoid long parallel runs with other cables. The minimum parallel cabling separation distance should be 0.3 meters.
- Cross the other cables at right angles.
- Keep the cable as short as possible in order to minimize the radiated emissions and stress on chopper IGBTs. The longer the cable, the higher the radiated emissions, inductive load and voltage peaks over the IGBT semiconductors of the brake chopper.

### Maximum cable length

The maximum cable length of the resistor cable(s) is 50 m (164 ft).

### EMC compliance of the complete installation

**Note:** ABB has not verified that the EMC requirements are fulfilled with external user-defined brake resistors and cabling. The EMC compliance of the complete installation must be considered by the customer.

### ■ Placing the brake resistors

Install the resistors outside the drive in a place where they will cool.

Arrange the cooling of the resistor in a way that:

- no danger of overheating is caused to the resistor or nearby materials
- the temperature of the room the resistor is located in does not exceed the allowed maximum.

Supply the resistor with cooling air/water according to the resistor manufacturer's instructions.



**WARNING!** The materials near the brake resistor must be non-flammable. The surface temperature of the resistor is high. Air flowing from the resistor is of hundreds of degrees Celsius. If the exhaust vents are connected to a ventilation system, make sure that the material withstands high temperatures. Protect the resistor against contact.

---

### ■ Selecting the chopper enable input cable

Make sure that the cable connecting the resistor thermal switch to chopper enable input X1 meets the following requirements:

- shielded cable
  - rated operating voltage between a core and ground  $> 750 (U_0)$
  - insulation test voltage  $> 2.5$  kV.
-

## Protecting the system against thermal overload

The drive control program includes a resistor and resistor cable thermal protection function, which can be tuned by the user. The brake chopper protects itself and the resistor cables against thermal overload. In brake units without factory-installed brake resistors, make sure that the following conditions are met:

- the resistor assembly is equipped with a thermal switch, which is connected to chopper enable input X1 (see page [29](#))
- the cables are dimensioned according to the nominal current of the drive.

### ■ Operation principle

If the resistor overheats, the thermal switch opens and interrupts the chopper enable input signal. The signal is internally wired to the chopper control board via a temperature sensitive switch. Upon a fault, the relay output either opens the drive main circuit breaker or gives a fault indication to the overriding control system, which takes care of the protection.

For more information on the thermal protection function, see the appropriate firmware manual.

## Protecting the resistor cable against short-circuits

The brake unit is equipped with DC fuses as standard. The fuses protect the chopper and the brake circuit cables in a cable short-circuit situation.

## Controlling the brake chopper from an external control location

The chopper can be controlled from an external control location via a fiber optic link (terminals V22 and V23 on the chopper control board). Using the link, it is possible to synchronize several brake choppers.

## 5

# Electrical installation

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## Contents of this chapter

This chapter contains instructions on wiring the brake units.

### Brake units with factory-installed brake resistors (option +D151)

The brake unit is an operational unit after the shipping splits are joined. No customer setting or wiring is required.

### Brake units without factory-installed brake resistors

#### ■ Safety

Obey the safety instructions for the drive. See *Safety instructions for ACS880 multidrive cabinets and modules* (3AUA0000102301 [English]).



**WARNING!** If you ignore these instructions, physical injury or death, or damage to the equipment can occur.

- Only qualified electricians are allowed to carry out the installation.
  - Make sure that the drive is disconnected from the power line. Wait for 5 minutes to let the drive DC capacitors discharge. Ensure by measuring with a multimeter (impedance at least 1 Mohm) that there is no voltage present.
  - **Note:** The DC bus, resistor and enable input terminals (UDC+, UDC-, R+, R-, X1 and X2) carry a dangerous voltage.
- 

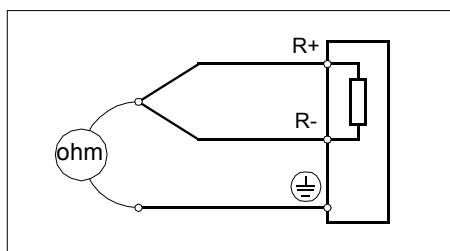


## ■ Checking the insulation of the resistor circuit

Do not make any voltage tolerance or insulation resistance tests on the brake chopper modules. Every brake chopper module has been tested for insulation between the main circuit and the chassis at the factory.

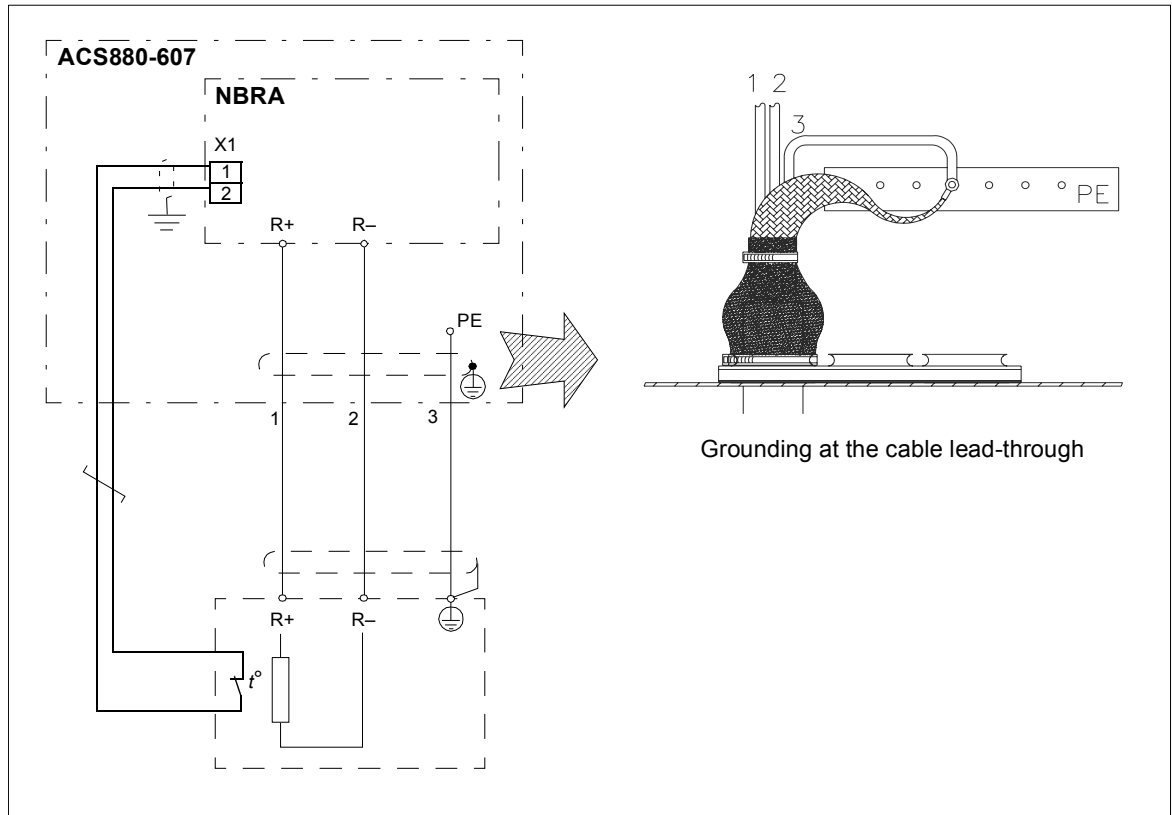
Check the insulation of the brake resistor assembly as follows:

1. Check that the resistor cable is connected to the resistor, and disconnected from the chopper output terminals R+ and R-.
2. At the brake unit end, connect the R+ and R- conductors of the resistor cable together. Measure the insulation resistance between the combined conductors and the PE conductor by using a measuring voltage of 1 kV DC. The insulation resistance must be higher than 1 Mohm.



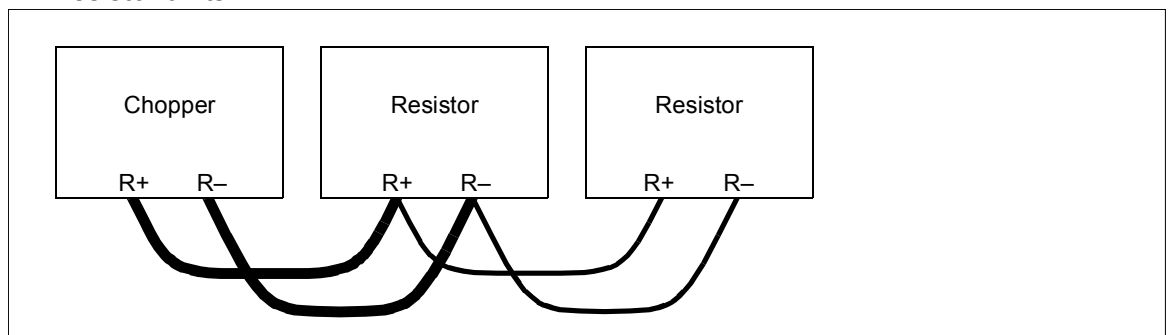
■ Connecting the resistor cables and thermal switch

Connection diagram



Connection procedure

1. Connect the resistor cable and the thermal switch as shown in the connection diagram above. **Note** the connection of the third conductor and the cable shield. See also the circuit diagrams delivered with the unit.
2. Connect the brake resistors in parallel as shown below.  
**Note:** The cable between the chopper and the first resistor must be able to carry the entire braking power. Provide adequate support for the cables below the chopper and resistor units.





## 6

# Installation checklist

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## Contents of this chapter

This chapter contains a list for checking the mechanical and electrical installation of the brake units.

## Checklist

Check the mechanical and electrical installation of the brake unit before start-up. Go through the checklist together with another person.



**WARNING!** Only qualified electricians are allowed to carry out the work described below. Obey the complete safety instructions for the drive. If you ignore the safety instructions, injury or death can occur.

Open the main switch-disconnector of the drive and lock it to open position.

Ensure by measuring that the drive is not powered.

<input checked="" type="checkbox"/>	Check that ...
<input type="checkbox"/>	The ambient operating conditions meet the specifications given in the drive hardware manual.
<input type="checkbox"/>	The brake unit cabinet has been attached to floor, and if necessary due to vibration etc, also from top to the wall or roof.
<input type="checkbox"/>	The cooling air will flow freely in and out of the brake unit cabinet, and air recirculation inside the cabinet will not be possible (air baffle plates are in place).
<input type="checkbox"/>	The cooling circuit joints at the shipping split joining cubicles are tight.
<input type="checkbox"/>	<b>Units without factory-installed brake resistors only:</b> The resistor cable has been connected to the appropriate terminals, and the terminals have been tightened. (Pull the conductors to check.)

---

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<input checked="" type="checkbox"/>	<b>Check that ...</b>
<input type="checkbox"/>	<b>Units without factory-installed brake resistors only:</b> The brake resistor cable has been routed away from other cables.
<input type="checkbox"/>	The control cables have been connected to the appropriate terminals, and the terminals have been tightened. (Pull the conductors to check.)
<input type="checkbox"/>	There are no tools, foreign objects or dust from drilling inside the brake unit cabinet.
<input type="checkbox"/>	All shrouds and the front panel of the brake chopper module are in place. Cabinet doors have been closed.

---



## 7

# Start-up

## Contents of this chapter

This chapter contains the start-up procedure of the brake units.





**WARNING!** Only qualified electricians are allowed to perform the work described in this chapter. Obey all safety instructions in *Safety instructions for ACS880 multidrive cabinets and modules* (3AUA0000102301 [English]). If you ignore the safety instructions, injury or death, or damage to the equipment can occur.

**Note:** Some brake resistors are coated with oil film for protection. The protective oil will burn off when the brake resistor is used for the first time. Make sure that the airflow is sufficient.

## Start-up procedure

Action	Additional information
<b>Preliminary actions – Units with factory-installed brake resistors (option +D151)</b>	
<input type="checkbox"/> Check that the drive is ready for the brake unit start-up: <ul style="list-style-type: none"> <li>• The supply and inverter units have been installed according to the instructions given in their hardware manuals.</li> <li>• The supply unit has been started up according to the instructions given in the appropriate supply unit manual.</li> <li>• The inverter units have been started up according to the instructions given in the hardware manual and appropriate firmware manual.</li> </ul>	See the supply and inverter module hardware manuals and other appropriate manuals on the inside of the front cover.
<input type="checkbox"/> Close all cabinet doors.	

Action	Additional information
<b>Preliminary actions – Units without factory-installed brake resistors</b>	
	<b>WARNING!</b> Make sure that the disconnecter of the supply transformer is locked to open position, ie, no voltage is, or can be, connected to drive inadvertently. Check also by measuring that there is no voltage connected.
<input type="checkbox"/>	Check that the mechanical and electrical installation of the brake unit has been inspected and is OK. See chapter <i>Installation checklist</i> .
<input type="checkbox"/>	Check that the insulation of the resistor circuit has been measured and is OK. See section <i>Checking the insulation of the resistor circuit</i> on page 28.
<input type="checkbox"/>	Check that the drive is ready for the brake unit start-up: <ul style="list-style-type: none"> <li>• The supply and inverter units have been installed according to the instructions given in their hardware manuals.</li> <li>• The supply unit has been started up according to the instructions given in the appropriate supply unit manual.</li> <li>• The inverter units have been started up according to the instructions given in the hardware manual and appropriate firmware manual.</li> </ul> See the supply and inverter module hardware manuals and other appropriate manuals on the inside of the front cover.
<input type="checkbox"/>	Close all cabinet doors.
<b>Power switch-on</b>	
	<b>WARNING!</b> Before the power switch-on, make sure that there are inverters connected to the intermediate circuit. A rule of thumb: the sum of the inverter powers must be at least 30% of the rated power of the brake unit ( $P_{brmax}$ value).  Too few inverters connected results in a low intermediate circuit capacitance. Upon the power switch-on, the DC voltage will overshoot the controller voltage limit, causing an immediate switching to braking mode. High brake current will blow the inverter DC fuses.
<input type="checkbox"/>	Close the disconnecter of the supply transformer (if still open).
<input type="checkbox"/>	Switch on power to the drive and start the supply unit.
<b>Operational checks</b>	
<input type="checkbox"/>	Make sure that it is safe to start the drive. Start the drive and increase the rotation speed of the high-inertia motor that will generate power to the drive intermediate circuit when it is decelerated. Use a low speed at first.
<input type="checkbox"/>	Deactivate the overvoltage controllers of all inverters (parameter 30.30 Overvoltage control in Primary control program). For the inverter parameter settings, see the appropriate firmware manual.
<input type="checkbox"/>	Make sure that the stop mode of the motor to be decelerated is ramp stop (parameter 21.03 Stop mode in Primary control program) and set the deceleration time according to the drive control mode in parameter group 23, 26 or 28. Use a relatively long deceleration time at first.



	Action	Additional information
<input type="checkbox"/>	Check that the brake chopper evokes and operates during the deceleration of the high-inertia motor: Give a stop command to the inverter running the motor.	The DC voltage level during the braking indicates the brake unit operation: <ul style="list-style-type: none"> <li>• <u>Successful braking:</u> DC voltage level is: <math>1.2 \cdot 1.35 \cdot U_{1\max}</math></li> <li>• <u>Unsuccessful braking:</u> DC voltage level exceeds <math>1.21 \cdot 1.35 \cdot U_{1\max}</math> and inverter trips on overvoltage. See chapter <a href="#">Fault tracing and maintenance</a>.</li> </ul> If the brake chopper does not function at all, see chapter <a href="#">Fault tracing and maintenance</a> .
<input type="checkbox"/>	Repeat the stop sequence a few times with higher rotation speeds and shorter deceleration times.	







# Fault tracing and maintenance

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## Contents of this chapter

This chapter describes the fault tracing possibilities and maintenance instructions of the brake units.

## Maintenance

If installed into an appropriate environment, the brake unit does not require maintenance, except for regular cleaning and cooling fan replacement. For the maintenance interval of the cooling fans, contact your local ABB representative.

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## Fault indications

A fault in the resistor brake circuit prevents fast motor deceleration, and may cause the drive to trip on a fault.

If a fault is detected by the chopper control board, the brake chopper disconnects the brake resistor from the intermediate circuit, and the chopper fault indication relay output is de-energized.

Depending on the application, the relay output either opens the drive main circuit breaker or gives a fault indication to the overriding control system. See the circuit diagrams delivered with the unit.

<b>Fault indication/Fault</b>	<b>Cause</b>	<b>Remedy</b>
Fault indication relay output switches off the main power or gives a fault indication to an overriding control system.	Chopper or resistor overheated.	Check connections. Let equipment cool.
	No enable input received by chopper control board.	Check that enable input is on.
	Short circuit in resistor or power cables.	Check power cables and resistor.
	Chopper control board failure. Chopper damaged; it is not able to disconnect resistor from intermediate circuit.	Contact local ABB representative.
Chopper does not function.	Chopper voltage setting too high. Inverter overvoltage control is on.	Check voltage setting. Check parameters of all inverters. Check that enable input is on.
Chopper starts to function at too low a DC voltage.	Chopper voltage setting too low.	Check voltage setting.
Inverter trips on fault 3210 DC link overvoltage.	Chopper voltage setting is too high.	Check voltage setting. Check parameters of all inverters.
Brake resistor or chopper overheats.	The maximum brake cycle exceeded or resistor cooling insufficient.	Check duty cycle and resistor cooling.
	Chopper voltage setting incorrect or jumper missing.	Ensure that voltage setting is correct and jumper is properly in place.

## Selecting the voltage when replacing a chopper

The voltage is preset, according to the drive supply voltage, at the factory for each brake chopper. On the field, you need to adjust the voltage setting only if a brake chopper is changed. To adjust the setting:

1. Remove the chopper front panel by undoing the four screws at the top and bottom of the panel.
2. Set the voltage selection jumper on the chopper control board (see page 18) to the appropriate voltage as shown below.

Drive supply voltage 380...415 V	<table border="1"> <tbody> <tr> <td>&gt;500 V</td> <td>400 V</td> <td>230 V</td> <td>FIBER</td> </tr> <tr> <td><input type="radio"/></td> <td><input checked="" type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> </tr> <tr> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> </tr> </tbody> </table>	>500 V	400 V	230 V	FIBER	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
>500 V	400 V	230 V	FIBER										
<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>										
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>										
Drive supply voltage 440...500 V	<table border="1"> <tbody> <tr> <td>&gt;500 V</td> <td>400 V</td> <td>230 V</td> <td>FIBER</td> </tr> <tr> <td><input checked="" type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> </tr> <tr> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> </tr> </tbody> </table>	>500 V	400 V	230 V	FIBER	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
>500 V	400 V	230 V	FIBER										
<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>										
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>										
Drive supply voltage 525...690 V	<table border="1"> <tbody> <tr> <td>&gt;500 V</td> <td>400 V</td> <td>230 V</td> <td>FIBER</td> </tr> <tr> <td><input checked="" type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> </tr> <tr> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> </tr> </tbody> </table>	>500 V	400 V	230 V	FIBER	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
>500 V	400 V	230 V	FIBER										
<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>										
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>										

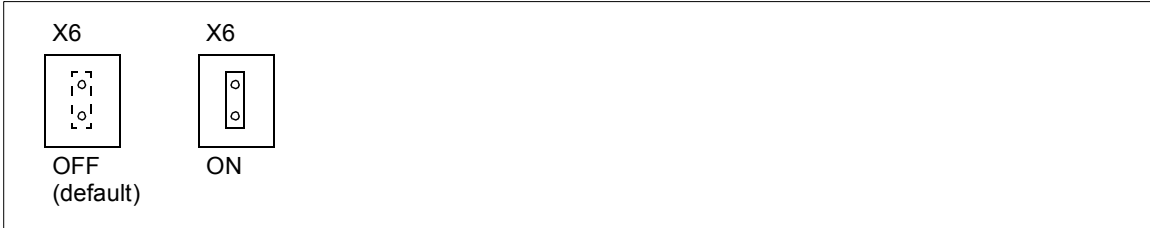
**Note:** In follower choppers, you must set the voltage to FIBER.



**WARNING!** An incorrect jumper setting or missing jumper may cause brake chopper malfunctioning or damage to the chopper or resistor.

## NRED voltage reducer selection for NBRA-669

The NRED voltage reducer can be used to protect the NBRC-61 chopper control board from overvoltage peaks. Jumper X6 on the chopper control board defines if the NRED voltage reducer is used. By default, the NRED voltage reducer is used and the jumper is set to OFF (recommended).



**Note:** When the jumper is set to ON, the NRED voltage reducer is not used. You must use this setting if the chopper control board is replaced with a newer version and the brake chopper does not include the NRED voltage reducer board.





# Technical data

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## Contents of this chapter

This chapter contains the technical specifications of the brake units, for example, the ratings, sizes and technical requirements, provisions for fulfilling the requirements for CE and other markings.

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## Ratings

### ■ Only chopper

These brake units are not equipped with brake resistors, or resistor cubicles or fans. The resistors must be selected according to the specifications and installed by the user.

ACS880-607-	Module type	$P_{brmax}$ kW	$R_{tot}$ ohm	$I_{max}$ A	$I_{rmsA}$	$P_{cont.k}$ W	Duty cycle (1 min/5 min)		Duty cycle (10 s/60 s)		$E_R$ kJ
							$P_{br}$ kW	$I_{rms}$ A	$P_{br}$ kW	$I_{rms}$ A	
<b><math>U_N = 400\text{ V}</math> (Range 380...415 V)</b>											
0320-3	NBRA-659	353	1.20	545	149	96	303	468	353	545	–
0640-3	2×NBRA-659	706	0.60	1090	298	192	606	936	706	1090	–
0960-3	3×NBRA-659	1058	0.40	1635	447	288	909	1404	1059	1635	–
1280-3	4×NBRA-659	1411	0.30	2180	596	384	1212	1872	1412	2180	–
1600-3	5×NBRA-659	1764	0.24	2725	745	480	1515	2340	1765	2725	–
1920-3	6×NBRA-659	2117	0.20	3270	894	576	1818	2808	2118	3270	–
<b><math>U_N = 500\text{ V}</math> (Range 380...500 V)</b>											
0400-5	NBRA-659	403	1.43	571	136	109	317	391	403	498	–
0800-5	2×NBRA-659	806	0.72	1142	272	218	634	782	806	996	–
1200-5	3×NBRA-659	1208	0.48	1713	408	327	951	1173	1209	1494	–
1600-5	4×NBRA-659	1611	0.36	2284	544	436	1268	1564	1612	1992	–
2000-5	5×NBRA-659	2014	0.29	2855	680	545	1585	1955	2015	2490	–
2400-5	6×NBRA-659	2417	0.24	3426	816	654	1902	2346	2418	2988	–
<b><math>U_N = 690\text{ V}</math> (Range 525...690 V)</b>											
0400-7	NBRA-669	404	2.72	414	107	119	298	267	404	361	–
0800-7	2×NBRA-669	807	1.36	828	214	238	596	534	808	722	–
1200-7	3×NBRA-669	1211	0.91	1242	321	357	894	801	1212	1083	–
1600-7	4×NBRA-669	1615	0.68	1656	428	476	1192	1068	1616	1444	–
2000-7	5×NBRA-669	2019	0.54	2070	535	595	1490	1335	2020	1805	–
2400-7	6×NBRA-669	2422	0.45	2484	642	714	1788	1602	2424	2166	–

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■ Chopper with factory-installed resistors (option +D151)

ACS880-607-	Module type	Resistors		$P_{brmax}$ kW	$R_{tot}$ ohm	$I_{max}$ A	$I_{rms}$ A	$P_{cont.}$ kW	Duty cycle (1 min/5 min)		Duty cycle (10 s/60 s)		$E_R$ kJ
		Type	Qty*						$P_{br}$ kW	$I_{rms}$ A	$P_{br}$ kW	$I_{rms}$ A	
<b><math>U_N = 400\text{ V}</math> (Range 380...415 V)</b>													
0320-3+D151	NBRA-659	2×SAFUR180F460	2×30	353	1.20	545	84	54	167	444	287	444	12000
0640-3+D151	2× NBRA-659	2× (2×SAFUR180F460)	4×30	706	0.60	1090	168	108	333	514	575	888	24000
0960-3+D151	3× NBRA-659	3× (2×SAFUR180F460)	6×30	1058	0.40	1635	252	162	500	771	862	1332	36000
1280-3+D151	4× NBRA-659	4× (2×SAFUR180F460)	8×30	1411	0.30	2180	336	216	667	1028	1150	1776	48000
1600-3+D151	5× NBRA-659	5× (2×SAFUR180F460)	10× 30	1764	0.24	2725	420	270	833	1285	1437	2220	60000
1920-3+D151	6× NBRA-659	6× (2×SAFUR180F460)	12× 30	2117	0.20	3270	504	324	1000	1542	1724	2664	72000
<b><math>U_N = 500\text{ V}</math> (Range 380...500 V)</b>													
0400-5+D151	NBRA-659	2×SAFUR200F500	2×27	403	1.35	605	67	54	167	206	287	355	10800
0800-5+D151	2× NBRA-659	2× (2×SAFUR200F500)	4×27	806	0.68	1210	134	108	333	412	575	710	21600
1200-5+D151	3× NBRA-659	3× (2×SAFUR200F500)	6×27	1208	0.45	1815	201	162	500	618	862	1065	32400
1600-5+D151	4× NBRA-659	4× (2×SAFUR200F500)	8×27	1611	0.34	2420	268	216	667	824	1150	1420	43200
2000-5+D151	5× NBRA-659	5× (2×SAFUR200F500)	10× 27	2014	0.27	3025	335	270	833	1030	1437	1775	54000
2400-5+D151	6× NBRA-659	6× (2×SAFUR200F500)	12× 27	2417	0.23	3630	402	324	1000	1236	1724	2130	64800
<b><math>U_N = 690\text{ V}</math> (Range 525...690 V)</b>													
0400-7+D151	NBRA-669	2×SAFUR200F500	2×27	404	1.35	835	97	54	167	149	287	257	10800
0800-7+D151	2× NBRA-669	2× (2×SAFUR200F500)	4×27	807	0.68	1670	194	108	333	298	575	514	21600
1200-7+D151	3× NBRA-669	3× (2×SAFUR200F500)	6×27	1211	0.45	2505	291	162	500	447	862	771	32400
1600-7+D151	4× NBRA-669	4× (2×SAFUR200F500)	8×27	1615	0.34	3340	388	216	667	596	1150	1028	43200
2000-7+D151	5× NBRA-669	5× (2×SAFUR200F500)	10× 27	2019	0.27	4175	485	270	833	745	1437	1285	54000
2400-7+D151	6× NBRA-669	6× (2×SAFUR200F500)	12× 27	2422	0.23	5010	582	324	1000	894	1724	1542	64800

\* The number of resistor elements. The resistance of one element is 8 ohm.

**Definitions**

<p><b>Example: ACS880-607-0640-3</b></p> <p style="text-align: center;"> <math>R_{tot}</math>  <math>P_{brmax}</math>  <math>P_{br}</math>  <math>P_{cont.}</math> </p>	<p><b>Brake unit</b></p> <p><math>P_{brmax}</math> Maximum braking power per brake unit allowed momentarily</p> <p><math>R</math> <b>Units with factory-installed brake resistors (+D151):</b> Resistance value for the used resistor per brake chopper (resistance of one 2×SAFURxxxxxxx assembly).  <b>Units without factory-installed brake resistors:</b> The minimum allowed resistance value for the brake resistor per chopper (recommended resistance).</p> <p><math>R_{tot}</math> Total recommended brake resistor resistance of the listed resistor assembly</p> <p><math>I_{max}</math> Peak brake current (DC) per chopper</p> <p><math>P_{cont.}</math> Continuous brake power per brake unit</p> <p><math>E_R</math> Energy pulse that the resistor assembly will withstand (400 s duty cycle). This energy will heat the resistor element from 40°C to the maximum allowable temperature.</p> <hr/> <p><b>Duty cycle (10 s / 60 s)</b></p> <p><math>I_{rms}</math> Total rms DC current (per chopper) during a period of 10 seconds with braking power <math>P_{br}</math></p> <p><math>P_{br}</math> Short term braking power per brake unit allowed for 10 seconds every 60 seconds</p> <p style="text-align: center;"> <math>P_{br}</math>  0  10 s      50 s </p> <hr/> <p><b>Duty cycle (1 min / 5 min)</b></p> <p><math>I_{rms}</math> Total rms DC current (per chopper) during a period of 1 minute with braking power <math>P_{br}</math></p> <p><math>P_{br}</math> Short term braking power per brake unit allowed for one minute every 5 minutes</p> <p style="text-align: center;"> <math>P_{br}</math>  0  1 min      4 min </p> <hr/> <p><b>Brake current wave form</b></p> <p style="text-align: center;"> <math>I_{max}</math>  <math>I_{rms}</math>  0  1 min or 10 s      4 min or 50 s </p>
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## DC fuses

### ■ Only chopper

ACS880-607-	Fuse type	Qty	$U_N$ V	$I_N$ A
<b><math>U_N = 400</math> V (Range 380...415 V)</b>				
0320-3	170M5146	2	1250	630
0640-3	170M5146	4	1250	630
0960-3	170M5146	6	1250	630
1280-3	170M5146	8	1250	630
1600-3	170M5146	10	1250	630
1920-3	170M5146	12	1250	630
<b><math>U_N = 500</math> V (Range 380...500 V)</b>				
0400-5	170M5146	2	1250	630
0800-5	170M5146	4	1250	630
1200-5	170M5146	6	1250	630
1600-5	170M5146	8	1250	630
2000-5	170M5146	10	1250	630
2400-5	170M5146	12	1250	630
<b><math>U_N = 690</math> V (Range 525...690 V)</b>				
0400-7	170M5146	2	1250	630
0800-7	170M5146	4	1250	630
1200-7	170M5146	6	1250	630
1600-7	170M5146	8	1250	630
2000-7	170M5146	10	1250	630
2400-7	170M5146	12	1250	630

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### ■ Chopper with factory-installed resistors (option +D151)

ACS880-607-	Fuse type	Qty	$U_N$ V	$I_N$ A
<b><math>U_N = 400</math> V (Range 380...415 V)</b>				
0320-3+D151	170M5146	2	1250	630
0640-3+D151	170M5146	4	1250	630
0960-3+D151	170M5146	6	1250	630
1280-3+D151	170M5146	8	1250	630
1600-3+D151	170M5146	10	1250	630
1920-3+D151	170M5146	12	1250	630
<b><math>U_N = 500</math> V (Range 380...500 V)</b>				
0400-5+D151	170M5146	2	1250	630
0800-5+D151	170M5146	4	1250	630
1200-5+D151	170M5146	6	1250	630
1600-5+D151	170M5146	8	1250	630
2000-5+D151	170M5146	10	1250	630
2400-5+D151	170M5146	12	1250	630

ACS880-607-	Fuse type	Qty	$U_N$ V	$I_N$ A
<b><math>U_N = 690</math> V (Range 525...690 V)</b>				
0400-7+D151	170M5146	2	1250	630
0800-7+D151	170M5146	4	1250	630
1200-7+D151	170M5146	6	1250	630
1600-7+D151	170M5146	8	1250	630
2000-7+D151	170M5146	10	1250	630
2400-7+D151	170M5146	12	1250	630

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## Dimensions, weights and free space requirements

### ■ Only chopper

ACS880-607-	Height		Width		Depth		Weight	
	mm	in.	mm	in.	mm	in.	kg	lb
<b><math>U_N = 400</math> V (Range 380...415 V)</b>								
0320-3	2130	83.86	400	15.75	600	23.62	23.62	242
0640-3	2130	83.86	800	31.50	600	23.62	23.62	484
0960-3	2130	83.86	1200	47.24	600	23.62	23.62	726
1280-3	2130	83.86	1600	62.99	600	23.62	23.62	968
1600-3	2130	83.86	2000	78.74	600	23.62	23.62	1210
1920-3	2130	83.86	2400	94.49	600	23.62	23.62	1452
<b><math>U_N = 500</math> V (Range 380...500 V)</b>								
0400-5	2130	83.86	400	15.75	600	23.62	110	242
0800-5	2130	83.86	800	31.50	600	23.62	220	484
1200-5	2130	83.86	1200	47.24	600	23.62	330	726
1600-5	2130	83.86	1600	62.99	600	23.62	440	968
2000-5	2130	83.86	2000	78.74	600	23.62	550	1210
2400-5	2130	83.86	2400	94.49	600	23.62	660	1452
<b><math>U_N = 690</math> V (Range 525...690 V)</b>								
0400-7	2130	83.86	400	15.75	600	23.62	110	242
0800-7	2130	83.86	800	31.50	600	23.62	220	484
1200-7	2130	83.86	1200	47.24	600	23.62	330	726
1600-7	2130	83.86	1600	62.99	600	23.62	440	968
2000-7	2130	83.86	2000	78.74	600	23.62	550	1210
2400-7	2130	83.86	2400	94.49	600	23.62	660	1452

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■ Chopper with factory-installed resistors (option +D151)

ACS880-607-	Height		Width		Depth		Weight	
	mm	in.	mm	in.	mm	in.	kg	lb
<b><math>U_N = 400\text{ V}</math> (Range 380...415 V)</b>								
0320-3+D151	2130	83.86	1200	47.24	600	23.62	23.62	748
0640-3+D151	2130	83.86	2400	94.49	600	23.62	23.62	1496
0960-3+D151	2130	83.86	3600	141.73	600	23.62	23.62	2244
1280-3+D151	2130	83.86	4800 <sup>1)</sup>	188.98 <sup>1)</sup>	600	23.62	23.62	2992
1600-3+D151	2130	83.86	6000 <sup>1)</sup>	236.22 <sup>1)</sup>	600	23.62	23.62	3740
1920-3+D151	2130	83.86	7200 <sup>1)</sup>	283.46 <sup>1)</sup>	600	23.62	23.62	4488
<b><math>U_N = 500\text{ V}</math> (Range 380...500 V)</b>								
0400-5+D151	2130	83.86	1200	47.24	600	23.62	340	748
0800-5+D151	2130	83.86	2400	94.49	600	23.62	680	1496
1200-5+D151	2130	83.86	3600	141.73	600	23.62	1020	2244
1600-5+D151	2130	83.86	4800 <sup>1)</sup>	188.98 <sup>1)</sup>	600	23.62	1360	2992
2000-5+D151	2130	83.86	6000 <sup>1)</sup>	236.22 <sup>1)</sup>	600	23.62	1700	3740
2400-5+D151	2130	83.86	7200 <sup>1)</sup>	283.46 <sup>1)</sup>	600	23.62	2040	4488
<b><math>U_N = 690\text{ V}</math> (Range 525...690 V)</b>								
0400-7+D151	2130	83.86	1200	47.24	600	23.62	340	748
0800-7+D151	2130	83.86	2400	94.49	600	23.62	680	1496
1200-7+D151	2130	83.86	3600	141.73	600	23.62	1020	2244
1600-7+D151	2130	83.86	4800 <sup>1)</sup>	188.98 <sup>1)</sup>	600	23.62	1360	2992
2000-7+D151	2130	83.86	6000 <sup>1)</sup>	236.22 <sup>1)</sup>	600	23.62	1700	3740
2400-7+D151	2130	83.86	7200 <sup>1)</sup>	283.46 <sup>1)</sup>	600	23.62	2040	4488

<sup>1)</sup> An additional 200 mm junction section is needed.

## Losses, cooling data and noise

The heat loss of a brake chopper is one percent of the braking power.

The heat loss of a section with brake resistors is the same as the braking power.

### ■ Only chopper

ACS880-607-	Air flow		Noise dB(A)
	m <sup>3</sup> /h	ft <sup>3</sup> /min	
<b><math>U_N = 400\text{ V}</math> (Range 380...415 V)</b>			
0320-3	660	389	64
0640-3	1320	777	67
0960-3	1980	1166	68
1280-3	2640	1554	69
1600-3	3300	1943	70
1920-3	3960	2331	71
<b><math>U_N = 500\text{ V}</math> (Range 380...500 V)</b>			
0400-5	660	389	64
0800-5	1320	777	67
1200-5	1980	1166	68
1600-5	2640	1554	69
2000-5	3300	1943	70
2400-5	3960	2331	71
<b><math>U_N = 690\text{ V}</math> (Range 525...690 V)</b>			
0400-7	660	389	64
0800-7	1320	777	67
1200-7	1980	1166	68
1600-7	2640	1554	69
2000-7	3300	1943	70
2400-7	3960	2331	71

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■ Chopper with factory-installed resistors (option +D151)

ACS880-607-	Air flow		Noise dB(A)
	m <sup>3</sup> /h	ft <sup>3</sup> /min	
<b>U<sub>N</sub> = 400 V (Range 380...415 V)</b>			
0320-3+D151	2500	1472	66
0640-3+D151	5000	2943	69
0960-3+D151	7500	4415	70
1280-3+D151	10000	5886	71
1600-3+D151	12500	7358	72
1920-3+D151	15000	8830	73
<b>U<sub>N</sub> = 500 V (Range 380...500 V)</b>			
0400-5+D151	2500	1472	66
0800-5+D151	5000	2943	69
1200-5+D151	7500	4415	70
1600-5+D151	10000	5886	71
2000-5+D151	12500	7358	72
2400-5+D151	15000	8830	73
<b>U<sub>N</sub> = 690 V (Range 525...690 V)</b>			
0400-7+D151	2500	1472	66
0800-7+D151	5000	2943	69
1200-7+D151	7500	4415	70
1600-7+D151	10000	5886	71
2000-7+D151	12500	7358	72
2400-7+D151	15000	8830	73

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## Resistor cable sizes for brake units without factory-installed resistors

ACS880-607-	Resistor cable (Cu)*	
	Single-core mm <sup>2</sup>	Multicore mm <sup>2</sup>
<b><math>U_N = 400\text{ V}</math> (Range 380...415 V)</b>		
0320-3	70	3×95+50
0640-3	2×70	2×(3×95+50)
0960-3	3×70	3×(3×95+50)
1280-3	4×70	4×(3×95+50)
1600-3	5×70	5×(3×95+50)
1920-3	6×70	6×(3×95+50)
<b><math>U_N = 500\text{ V}</math> (Range 380...500 V)</b>		
0400-5	70	3×95+50
0800-5	2×70	2×(3×95+50)
1200-5	3×70	3×(3×95+50)
1600-5	4×70	4×(3×95+50)
2000-5	5×70	5×(3×95+50)
2400-5	6×70	6×(3×95+50)
<b><math>U_N = 690\text{ V}</math> (Range 525...690 V)</b>		
0400-7	70	3×95+50
0800-7	2×70	2×(3×95+50)
1200-7	3×70	3×(3×95+50)
1600-7	4×70	4×(3×95+50)
2000-7	5×70	5×(3×95+50)
2400-7	6×70	6×(3×95+50)

\* Size of the cable between the brake chopper and the first resistor which carries the entire braking power; see page 29.

**Note:** In order for the installation to comply with the EMC Directive, unshielded single-core cable can only be used if routed inside a cabinet that efficiently suppresses radiated emissions.

## Terminal and lead-through data for the resistor cable for brake units without factory-installed brake resistors

ACS880-607-	R+, R-, grounding terminals			
	Number of holes	Hole diameter mm	Screw	Tightening torque N·m
<b><math>U_N = 400 \text{ V}</math> (Range 380...415 V)</b>				
0320-3	1	11	M10	35
0640-3	2	11	2×M10	35
0960-3	3	11	3×M10	35
1280-3	4	11	4×M10	35
1600-3	5	11	5×M10	35
1920-3	6	11	6×M10	35
<b><math>U_N = 500 \text{ V}</math> (Range 380...500 V)</b>				
0400-5	1	11	M10	35
0800-5	2	11	2×M10	35
1200-5	3	11	3×M10	35
1600-5	4	11	4×M10	35
2000-5	5	11	5×M10	35
2400-5	6	11	6×M10	35
<b><math>U_N = 690 \text{ V}</math> (Range 525...690 V)</b>				
0400-7	1	11	M10	35
0800-7	2	11	2×M10	35
1200-7	3	11	3×M10	35
1600-7	4	11	4×M10	35
2000-7	5	11	5×M10	35
2400-7	6	11	6×M10	35

The number of holes in the lead-through plate for the resistor cables is

- $n \times 3 \times \text{Ø}60 \text{ mm}$  (2.36")

where  $n = 1 \dots 6$  parallel-connected brake chopper units.

### Degree of protection

The degree of protection of the brake unit is IP22 or IP42.

The degree of protection of the brake chopper module and the SAFUR resistors is IP00.

## Ambient conditions

The unit is to be used in a heated indoor controlled environment.

	Operation	Storage	Transportation
Altitude above sea level	0...2000 m	-	-
	For altitudes over 2000 m, contact ABB.		-
Temperature	0...+40 °C (+32...+104 °F), no condensation allowed	-40...+70 °C (-104...+158 °F)	-40...+70 °C (-104...+158 °F)
Relative humidity	Maximum 95%, no condensation allowed	Maximum 95%, no condensation allowed	Maximum 95%, no condensation allowed
Vibration IEC 60068-2-6:2007, EN 60068-2-6:2008 Environmental testing Part 2-6: Tests -Test Fc: Vibration sinusoidal	10...58 Hz, max. 0.075 mm displacement amplitude  58... 150 Hz 10 m/s <sup>2</sup>	For modules and cabinets in packages: IEC/EN 60721-3-1:1997 Classification of environmental conditions - Part 3: Classification of groups of environmental parameters and their severities - Section 1: Storage	For cabinet package: IEC/EN 60721-3-1:1997 Classification of environmental conditions - Part 3: Classification of groups of environmental parameters and their severities - Section 2: Transportation
Shock IEC 60068-2-27:2008 EN 60068-2-27:2009 Environmental testing - Part 2-27: Tests - Test Ea and guidance: Shock	Not allowed	With packing max. 100 m/s <sup>2</sup> (330 ft./s <sup>2</sup> ) 11 ms	With packing max. 100 m/s <sup>2</sup> (330 ft./s <sup>2</sup> ) 11 ms
Contamination	IEC/EN 60721-3-3:2002: Classification of environmental conditions - Part 3-3: Classification of groups of environmental parameters and their severities Stationary use of weather protected locations	IEC 60721-3-1	IEC 60721-3-2
	Chemical gases: Class 3C2	Chemical gases: Class 1C2	Chemical gases: Class 2C2
	Solid particles: Class 3S1 with IP20, 3S2 with higher IP class	Solid particles: Class 1S3 (packing must support this, otherwise 1S2)	Solid particles: Class 2S2
	No conductive dust allowed.		

## More information on standards and markings

See *Electrical planning instructions for ACS880 multidrive cabinets and modules* (3AUA0000102324 [English]).

# 10

## Example circuit diagrams

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### Contents of this chapter

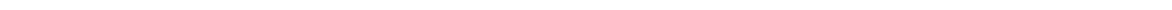
This chapter contains the basic circuit diagrams of the ACS880-607-0320-3+D151 and ACS880-607-0640-3+D151 brake units.

- The ACS880-607-0320-3+D151 unit consists of one brake chopper and two brake resistors.
- The ACS880-607-0640-3+D151 unit consists of two parallel units both including a brake chopper and two brake resistors. One chopper – the first in the chain – acts as the master for the other. The switching of the follower chopper is controlled by the master via a fiber optic link.

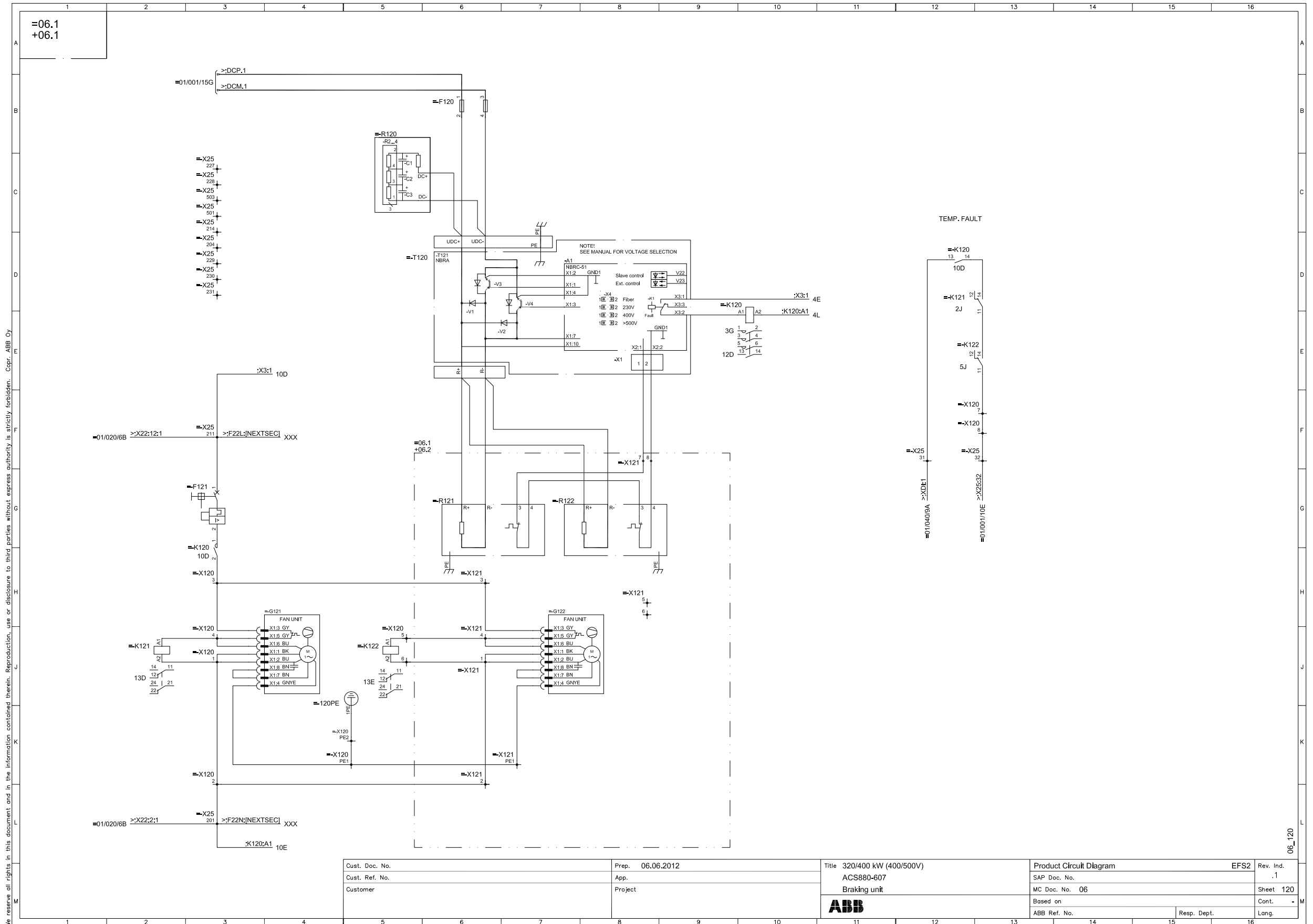
With minor modifications, the basic connections are also valid if there are no factory-installed brake resistors. The corresponding resistor connections are to be done by the user.

**Note:** The actual configuration may differ from this basic configuration. Each delivery includes the valid delivery-specific drawings.

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# ACS880-607-0320-3+D151



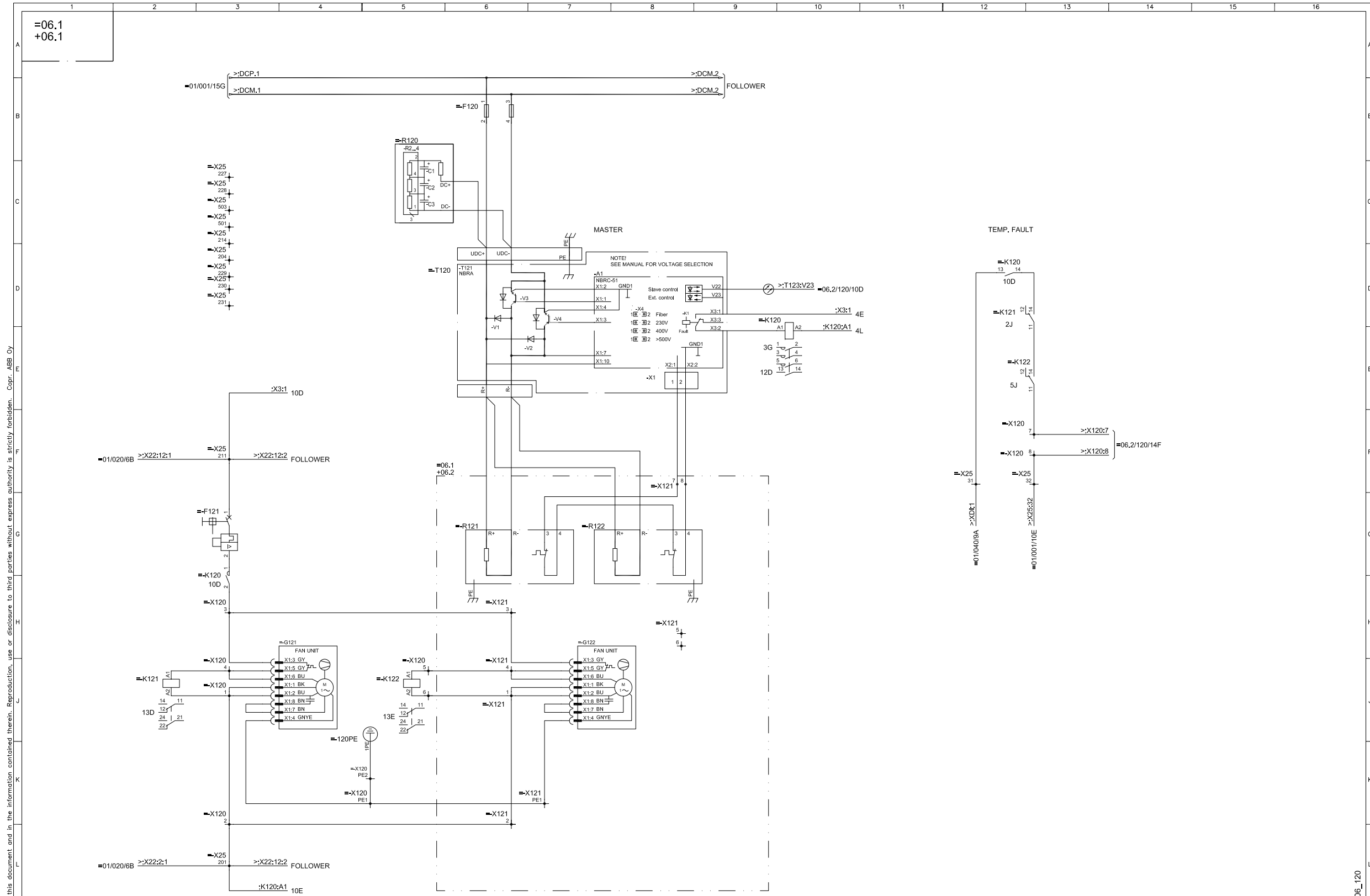
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Cust. Doc. No.	Prep. 06.06.2012	Title 320/400 kW (400/500V)	Product Circuit Diagram	EFS2	Rev. Ind.
Cust. Ref. No.	App.	ACS880-607	SAP Doc. No.		.1
Customer	Project	Braking unit	MC Doc. No. 06		Sheet 120
<b>ABB</b>			Based on		Cont. -
			ABB Ref. No.	Resp. Dept.	Lang.

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# ACS880-607-0640-3+D151, a master – follower configuration

The master unit:



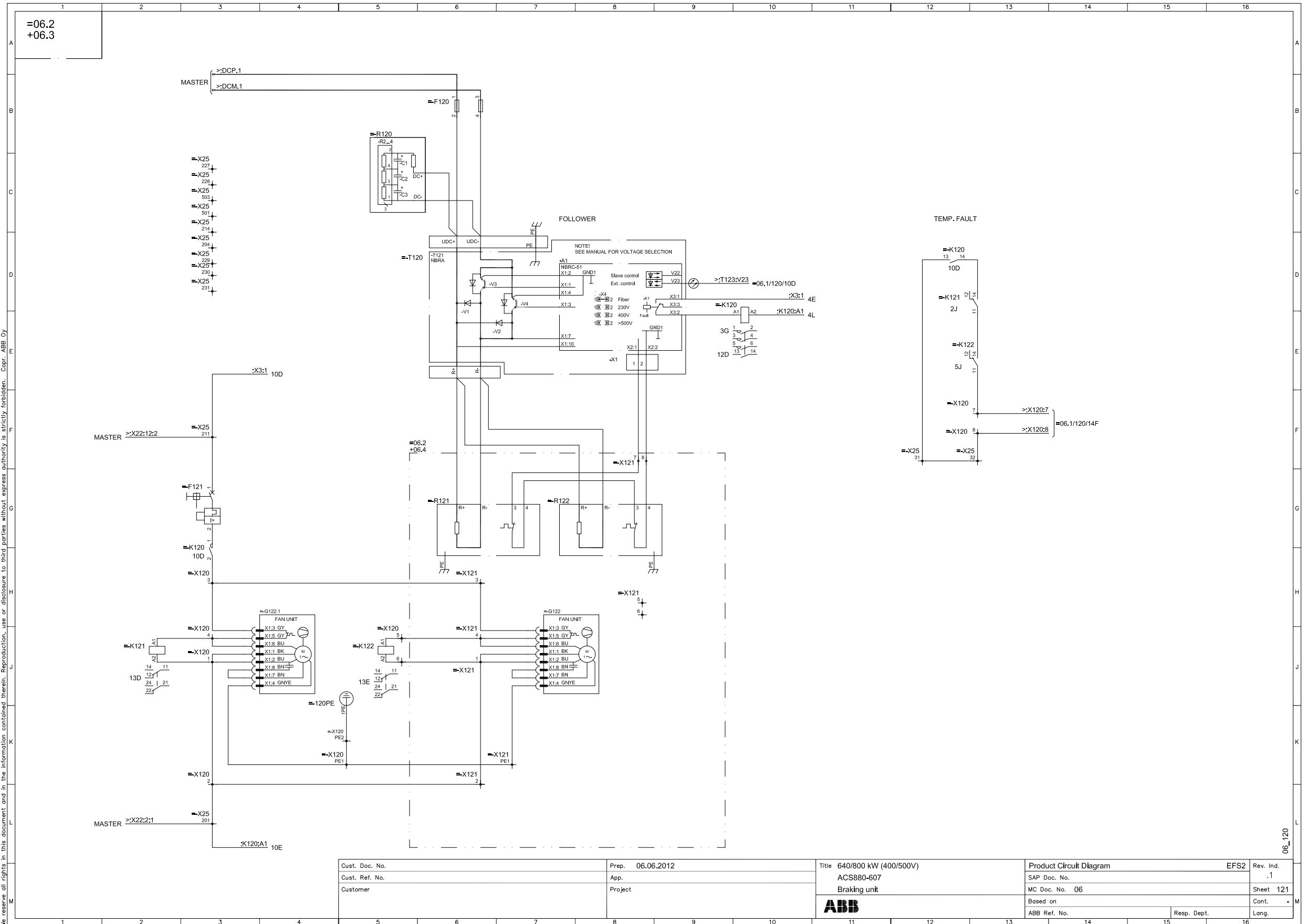
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Cust. Doc. No.	Prep. 06.06.2012	Title 640/800 kW (400/500V)	Product Circuit Diagram	EFS2	Rev. Ind.
Cust. Ref. No.	App.	ACS880-607	SAP Doc. No.		.1
Customer	Project	Braking unit	MC Doc. No. 06		Sheet 120
<b>ABB</b>			Based on		Cont. 121
			ABB Ref. No.	Resp. Dept.	Lang.

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The follower unit:



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Cust. Doc. No.	Prep. 06.06.2012	Title 640/800 kW (400/500V)	Product Circuit Diagram	EFS2	Rev. Ind.
Cust. Ref. No.	App.	ACS880-607	SAP Doc. No.		.1
Customer	Project	Braking unit	MC Doc. No. 06		Sheet 121
<b>ABB</b>			Based on		Cont. -
			ABB Ref. No.	Resp. Dept.	Lang.

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## 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](http://www.abb.com/searchchannels).

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For information on ABB product training, navigate to [www.abb.com/drives](http://www.abb.com/drives) and select *Training courses*.

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