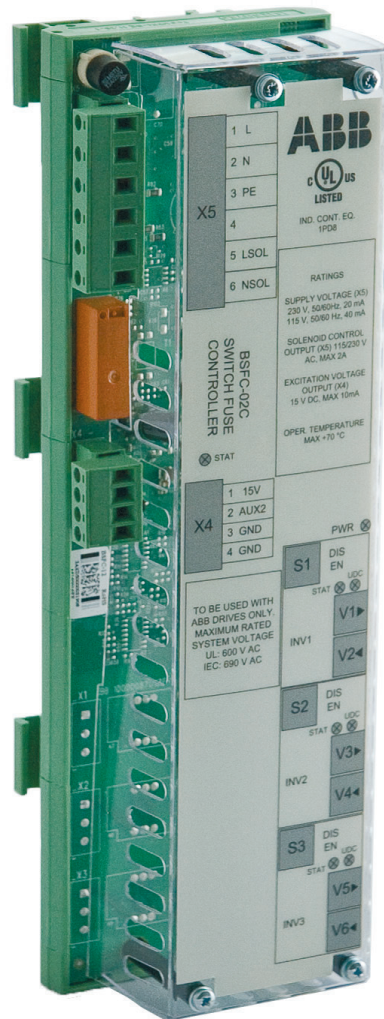


ABB INDUSTRIAL DRIVES

# BSFC-02C and BSFC-12C charging controllers

## Hardware manual





# BSFC-02C and BSFC-12C charging controllers

Hardware manual

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3. Installation





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# 1

## Introduction to the manual

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### Contents of this chapter

This chapter gives the basic information on the manual.

### Applicability

This manual is applicable to BSFC-02C and BSFC-12C charging controllers.

### Safety instructions

Obey all safety instructions delivered with the drive. Read the complete safety instructions before you install, commission, use or service the drive. The complete safety instructions are given in *ACS880 multidrive cabinets and modules safety instructions* (3AUA0000102301 [English]) or *ACS880 liquid-cooled multidrive cabinets and modules safety instructions* (3AXD50000048633 [English]).

### Target audience

This manual is intended for people who plan the installation, install, start up and service the drive, or create instructions for the end user of the drive concerning the installation and maintenance of the drive.

Read the manual before working on the drive. You are expected to know the fundamentals of electricity, wiring, electrical components and electrical schematic symbols.

The manual is written for readers worldwide. Both SI and imperial units are shown.

---

## Related documents

Manual	Code
<b>General manuals</b>	
<i>ACS880 multidrive cabinets and modules safety instructions</i>	3AUA0000102301
<i>ACS880 liquid-cooled multidrive cabinets and modules safety instructions</i>	3AXD50000048633
<i>ACS880 multidrive cabinets and modules electrical planning instructions</i>	3AUA0000102324
<i>ACS880 liquid-cooled multidrive cabinets and modules electrical planning instructions</i>	3AXD50000048634
<i>Drive modules cabinet design and construction instructions</i>	3AUA0000107668
<i>BCU-02/12/22 control units hardware manual</i>	3AUA0000113605
<i>CIO-01 I/O module for distributed I/O bus control user's manual</i>	3AXD50000126880
<b>Supply module manuals</b>	
<i>ACS880-204 IGBT supply modules hardware manual</i>	3AUA0000131525
<i>ACS880-204LC IGBT supply modules hardware manual</i>	3AXD50000284436
<i>ACS880 IGBT supply control program firmware manual</i>	3AUA0000131562
<i>ACS880-304 +A003 diode supply modules hardware manual</i>	3AUA0000102452
<i>ACS880-304...+A018 diode supply modules hardware manual</i>	3AXD50000010104
<i>ACS880-304LC+A019 diode supply modules hardware manual</i>	3AXD50000045157
<i>ACS880 diode supply control program firmware manual</i>	3AUA0000103295
<i>ACS880-904 regenerative rectifier modules hardware manual</i>	3AXD50000020457
<i>ACS880 regenerative rectifier control program firmware manual</i>	3AXD50000020827
<b>Inverter module manuals and guides</b>	
<i>ACS880-104 inverter modules hardware manual</i>	3AUA0000104271
<i>ACS880-104LC inverter modules hardware manual</i>	3AXD50000045610
<i>ACS880 primary control program firmware manual</i>	3AUA0000085967
<i>ACS880 primary control program quick start-up guide</i>	3AUA0000098062
<b>Brake module and DC/DC converter module manuals</b>	
<i>ACS880-604 1-phase brake chopper modules hardware manual</i>	3AUA0000106244
<i>ACS880-604LC 1-phase brake chopper modules hardware manual</i>	3AXD50000184378
<i>ACS880-604 3-phase brake modules hardware manual</i>	3AXD50000022033
<i>ACS880 (3-phase) brake control program firmware manual</i>	3AXD50000020967
<i>ACS880-1604 DC/DC converter modules hardware manual</i>	3AXD50000023642
<i>ACS880-1604LC DC/DC converter modules hardware manual</i>	3AXD50000371631
<i>ACS880 DC/DC converter control program firmware manual</i>	3AXD50000024671
<b>Module package hardware manuals</b>	
<i>ACS880-04 module packages hardware manual</i>	3AUA0000138495
<i>ACS880-14 and -34 module packages hardware manual</i>	3AXD50000022021
<b>Option manuals</b>	
<i>ACS880-1007LC liquid cooling unit user's manual</i>	3AXD50000129607
<i>ACX-AP-x assistant control panels user's manual</i>	3AUA0000085685
<i>BAMU-12C auxiliary measurement unit hardware manual</i>	3AXD50000117840
<i>Drive composer start-up and maintenance PC tool user's manual</i>	3AUA0000094606
<i>Drive application programming (IEC 61131-3) manual</i>	3AUA0000127808



Manual	Code
<i>Installation frames for ACS880 multidrive modules hardware manual</i>	3AXD50000010531
Manuals and quick guides for I/O extension modules, fieldbus adapters, safety functions modules, etc.	

See [www.abb.com/drives/documents](http://www.abb.com/drives/documents) for all manuals on the Internet.

You can find all documentation related to the multidrive modules on the Internet at <https://sites-apps.abb.com/sites/lvacdrivesengineeringssupport/content>.

## Terms and abbreviations

Term	Description
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 in a metal frame or housing. Intended for cabinet installation.
Brake unit	Brake chopper modules and the necessary auxiliary equipment, such as control electronics, fusing and cabling
Cabinet	An enclosure that consists of one or more cubicles
Cubicle	One section of a cabinet-installed drive. A cubicle is typically behind a door of its own.
DC/DC converter module	Converter power electronics, related components and DC capacitors enclosed in a metal frame or enclosure. Intended for cabinet installation.
DC/DC converter unit	DC/DC converter module(s) under control of one control board, and related components
DC link	DC circuit between rectifier and inverter
Drive	Frequency converter for controlling AC motors
Drive module	Frequency converter enclosed in a metal frame or enclosure. Intended for cabinet installation.
EMC	Electromagnetic compatibility
Frame, frame size	Physical size of the drive or power module
Inverter	Converts direct current and voltage to alternating current and voltage.
Inverter module	Inverter bridge, related components and drive DC link capacitors enclosed in a metal frame or enclosure. Intended for cabinet installation.
Inverter unit	Inverter module(s) under control of one control board, and related components. One inverter unit typically controls one motor.
Multidrive	Drive for controlling several motors which are typically coupled to the same machinery. Includes one supply unit, and one or several inverter units.
Power module	Common term for drive module, inverter module, supply module, brake chopper module etc.
Supply module	Rectifier bridge and related components enclosed in a metal frame or enclosure. Intended for cabinet installation.





## Hardware description

---

### Contents of this chapter

This chapter shows an overview of the BSFC units and describes the connectors, settings and LEDs. In addition, it contains circuit diagram examples of the DC supply circuit of ACS880 frame R8i modules, and describes switch-on and switch-off sequences of the units.

### Overview

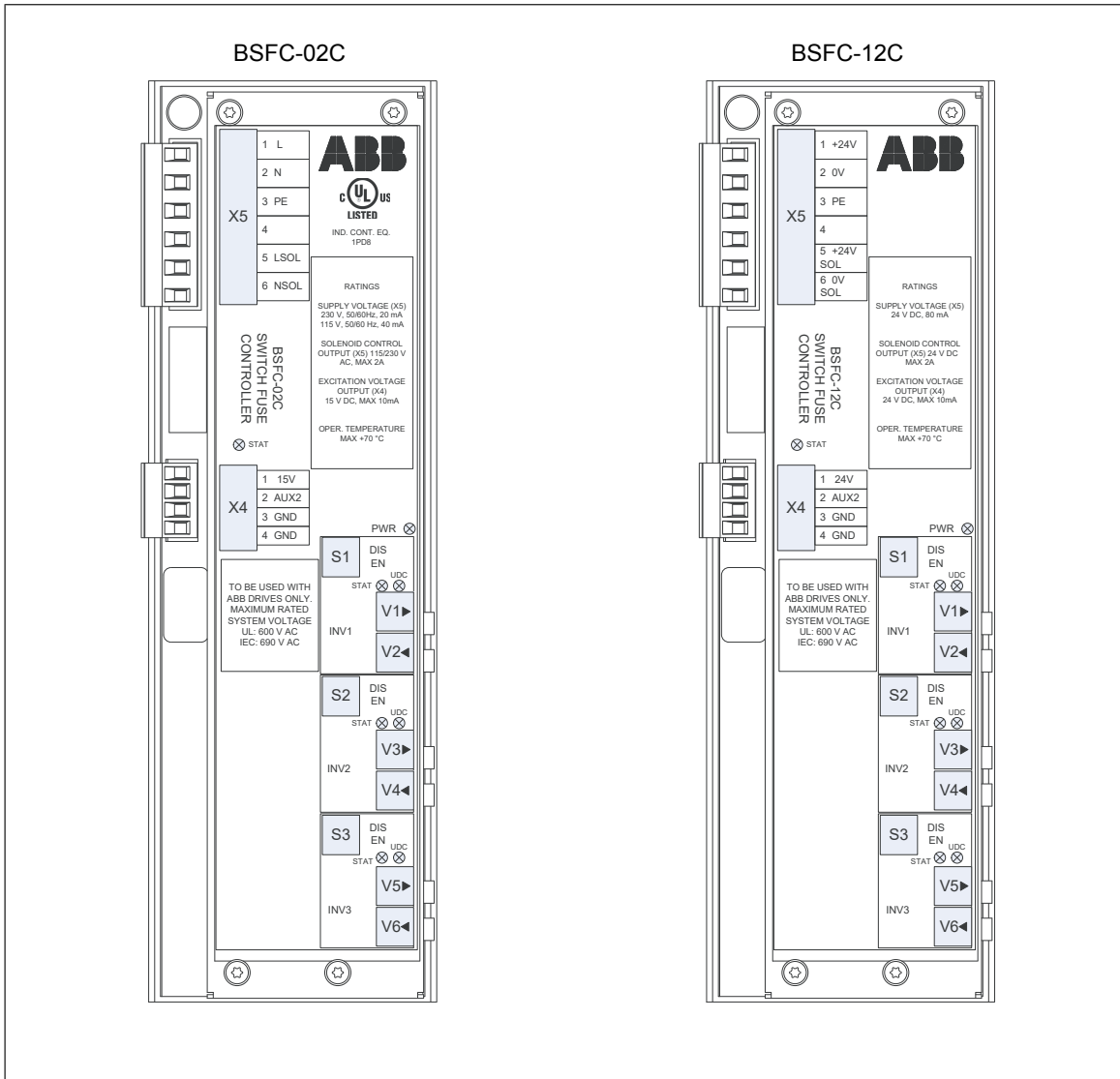
ACS880 frame size R8i inverter modules can be connected to the drive DC bus through a disconnecter (or fuse-switch). This configuration requires a charging circuit to charge the DC capacitors of the modules in a controlled way. The DC voltage can be directly connected to the modules only after the capacitors are charged to a sufficient level. The BSFC is a unit that monitors the charging, and controls switch-on and switch-off of the DC voltage.

In addition to inverter units, the BSFC can be used with other units consisting of R8i modules, such as brake or DC/DC converter units. One BSFC unit can control the charging of up to 3 frame R8i modules.

The BSFC unit can be installed onto a standard mounting rail.

---

# Layout



X4	Switch status monitoring (Q10 and Q11).
X5	Power supply input for BSFC and operating voltage output for DC switch-disconnector locking solenoid.
V1...V6	Fiber optic links to inverters 1, 2 and 3.
S1...S3	Enable switches for charging circuit monitoring (inverters 1, 2 and 3). <b>Note:</b> The BSFC unit does not allow the closing of the DC switch-disconnector unless monitoring is enabled for at least one inverter module.
STAT 1...3	Inverter charging status LEDs (3 pcs).
U <sub>DC</sub> 1...3	Inverter “ready for start” LEDs (3 pcs).
PWR	BSFC power on LED.

## Connectors

### ■ BSFC-02C

Connector		Description
X4		Switch status monitoring (inverter DC switch-disconnector (Q11), and inverter charging switch (Q10)).
1	+15 V	Supply voltage for switch status monitoring circuit (Q10 and Q11). Max. 10 mA
2	AUX2	Digital input monitoring the switch status (Q10 and Q11).
3	GND	Ground for control electronics
4	GND	Ground for control electronics
X5		Power supply input & DC switch-disconnector [Q11] locking solenoid control output
1	L	External 230/115 V AC input
2	N	Neutral
3	PE	Protective Earth
4	NC	Not connected
5	LSOL	230/115 V AC control voltage for DC switch-disconnector [Q11] locking solenoid
6	NSOL	Neutral for switch Q11 locking solenoid
V1	INV1 EN	Optical transmitter (start enable to Inverter 1)
V2	$U_{DC1}$	Optical receiver ( $U_{DC} > 80\%$ acknowledgement from Inverter 1)
V3	INV2 EN	Optical transmitter (start enable to Inverter 2)
V4	$U_{DC2}$	Optical receiver ( $U_{DC} > 80\%$ acknowledgement from Inverter 2)
V5	INV3 EN	Optical transmitter (start enable to Inverter 3)
V6	$U_{DC3}$	Optical receiver ( $U_{DC} > 80\%$ acknowledgement from Inverter 3)

## ■ BSFC-12C

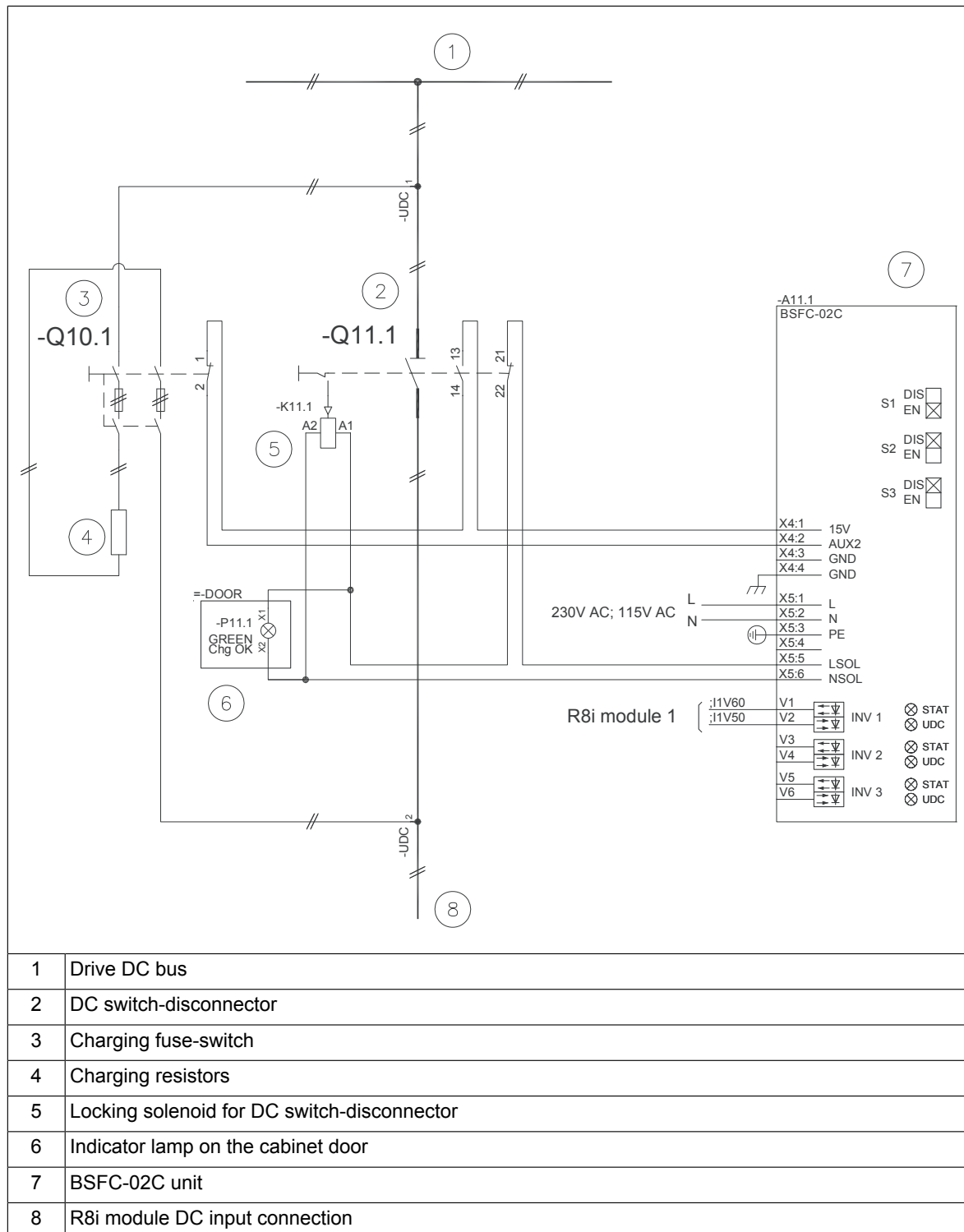
Connector		Description
X4		Switch status monitoring (DC switch-disconnector (Q11), and inverter charging switch (Q10)).
1	+24 V	Supply voltage for switch status monitoring circuit (Q10 and Q11). Max. 10 mA
2	AUX2	Digital input monitoring the switch status (Q10 and Q11).
3	GND	Ground for control electronics
4	GND	Ground for control electronics
X5		Power supply input & DC switch-disconnector [Q11] locking solenoid control output
1	+24 V	+24 V DC power supply input
2	0 V	0 V DC
3	PE	Protective Earth
4	NC	Not connected
5	+24 V SOL	24 V DC control voltage for DC switch-disconnector [Q11] locking solenoid
6	0 V SOL	Neutral for DC switch-disconnector [Q11] locking solenoid
V1	INV1 EN	Optical transmitter (start enable to Inverter 1)
V2	$U_{DC1}$	Optical receiver ( $U_{DC} > 80\%$ acknowledgement from Inverter 1)
V3	INV2 EN	Optical transmitter (start enable to Inverter 2)
V4	$U_{DC2}$	Optical receiver ( $U_{DC} > 80\%$ acknowledgement from Inverter 2)
V5	INV3 EN	Optical transmitter (start enable to Inverter 3)
V6	$U_{DC3}$	Optical receiver ( $U_{DC} > 80\%$ acknowledgement from Inverter 3)

## LEDs

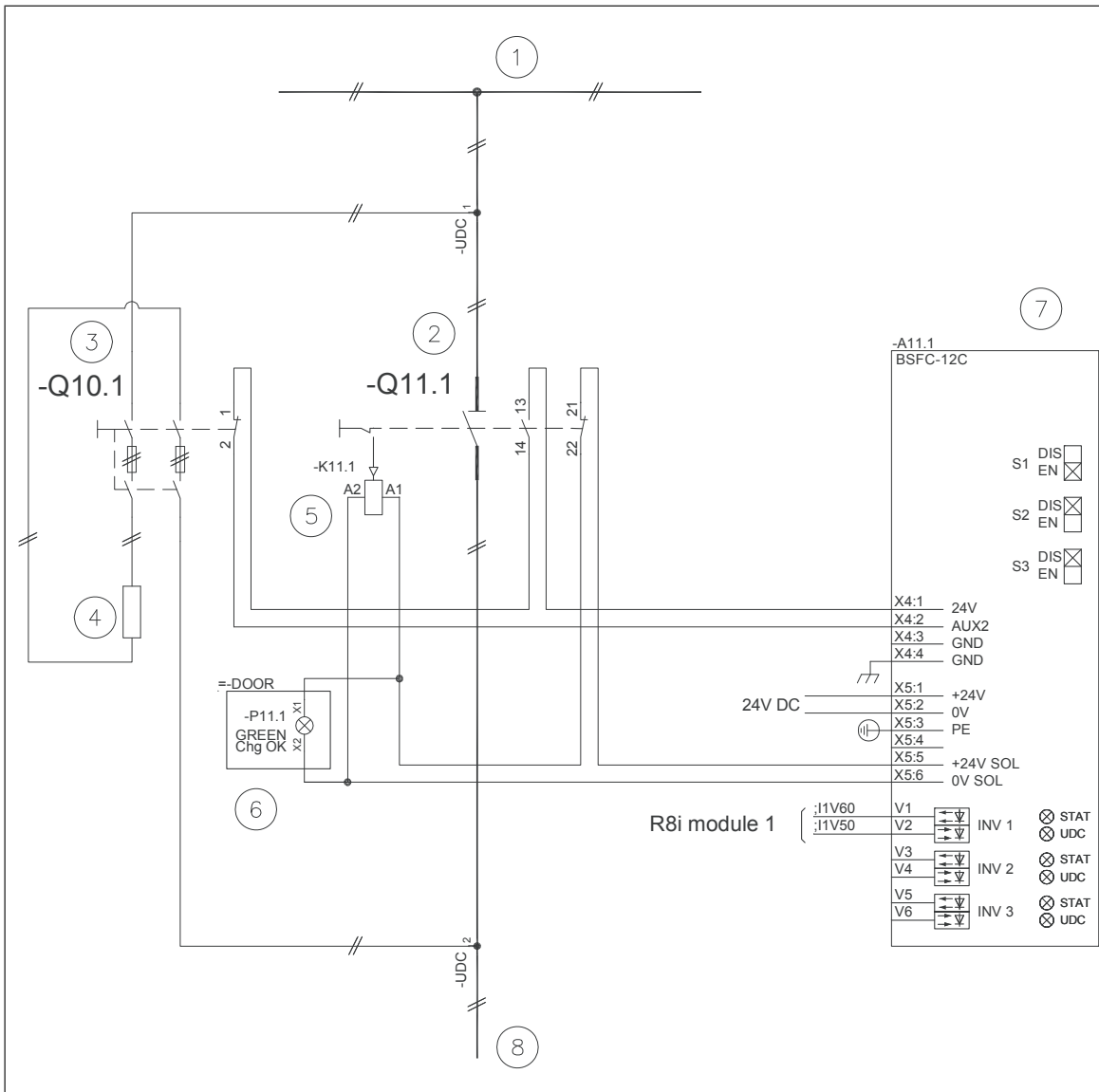
Name	Color	Indication	When on
INV1 STAT	Yellow	Charging of inverter 1 is in progress, or inverter 1 is not in use	DC switch-disconnector [Q11] main contacts are open (auxiliary contact connected to connector X4 is open).
INV2 STAT	Yellow	Charging of inverter 2 is in progress, or inverter 2 is not in use	
INV3 STAT	Yellow	Charging of inverter 3 is in progress, or inverter 3 is not in use	
INV1 $U_{DC}$	Green	Inverter 1 ready to start	DC voltage of the inverter capacitor bank is above 80% of nominal.
INV2 $U_{DC}$	Green	Inverter 2 ready to start	
INV3 $U_{DC}$	Green	Inverter 3 ready to start	
PWR	Green	BSFC is powered on	Voltage for internal logic (5 V) is present.

## Connections of the DC supply circuit

### ■ BSFC-02C



■ BSFC-12C



1	Drive DC bus
2	DC switch-disconnector
3	Charging fuse-switch
4	Charging resistors
5	Locking solenoid for DC switch-disconnector
6	Indicator lamp on the cabinet door
7	BSFC-12C unit
8	R8i module DC input connection



## Inverter power switch-on sequence

The terms and designations used in the table below refer to the diagrams in section [Connections of the DC supply circuit](#).

1. User turns charging switch [Q10] to position 1 (ON).
    - Charging of the inverter capacitors starts through the charging resistors [R10]:
      - Auxiliary contact 1-2 of charging switch [Q10] opens.
      - BSFC prevents the starting of inverters and the closing of DC switch-disconnector [Q11].
      - BSFC monitors inverter  $U_{DC}$  signals through fiber optic link(s) *INV1...INV3*.
      - *INV STAT* and *PWR* LEDs are on.
    - When the charging is complete (inverter DC voltage over 80% of nominal):
      - BSFC receives a  $U_{DC}$  signal from the inverter(s).
      - BSFC connects operating voltage to the solenoid of DC switch-disconnector [Q11]. The solenoid releases the locking mechanism, allowing operation of the handle.
      - *INV UDC* and *PWR* LEDs are on.
      - The *Charging OK* light [P11] on the cabinet door is on, indicating that the operation of the DC switch-disconnector [Q11] is allowed.
  2. User turns DC switch-disconnector [Q11] to position 1 (ON).
    - Main contacts 1-2...7-8 of DC switch-disconnector [Q11] connect inverter(s) to DC power supply.
    - Auxiliary contact 13-14 of DC switch-disconnector [Q11] closes.
    - Auxiliary contact 21-22 of DC switch-disconnector [Q11] opens, de-energizing the solenoid. The *Charging OK* light [P11] on the cabinet door goes off.
    - *INV UDC* and *PWR* LEDs are on.
  3. User turns charging switch [Q10] to position 0 (OFF).
    - BSFC receives a “main switch ON, charging switch OFF” signal through terminal AUX2.
    - BSFC sends an enable signal to inverter through the fiber optic link.
    - *INV UDC* and *PWR* LEDs are on.
-

## Inverter power switch-off sequence

---



### WARNING!

Do not open the DC switch-disconnector [Q11] while the inverters are loaded.

---

The terms and designations used in the table below refer to the diagrams in section [Connections of the DC supply circuit](#).

1. User stops the inverters.
2. User turns DC switch-disconnector [Q11] handle to position 0 (OFF).
  - DC switch-disconnector [Q11] disconnects inverter(s) from the DC power supply.
  - Contact 13-14 of DC switch-disconnector [Q11] switches off the AUX2 signal to the BSFC unit. BSFC switches INV1 EN signal off, which disables inverter start.
  - Auxiliary contact 21-22 closes, energizing the solenoid of DC switch-disconnector [Q11]. The solenoid releases the locking mechanism of the DC switch-disconnector. Operation of the handle is possible as long as inverter DC voltage remains high.
  - *INV UDC* and *PWR* LEDs are on. The *Charging OK* light [P11] on the cabinet door is on.
  - The inverter DC voltage decreases to zero gradually. When below 80% of nominal:
    - Inverters switch off UDC signals from BSFC unit.
    - BSFC switches off the operating voltage to solenoid of DC switch-disconnector [Q11]. Locking mechanism activates, which prevents turning the handle into position 1 (ON).
    - *INV UDC* and *PWR* LEDs are on.

## Locking solenoid control

The DC switch-disconnector [Q11] has a locking solenoid, which prevents the operation of the handle when the solenoid is de-energized. You can only close the DC switch-disconnector [Q11] when:

- DC voltage of all inverter modules monitored by the BSFC unit exceed 80% of the nominal value. (BSFC receives  $U_{DC}$  signals from inverters and energizes the solenoid).
  - DC switch-disconnector [Q11] handle is in position 0 (OFF).
-

# 3

## Installation

---

### Contents of this chapter

This chapter instructs how to install the BSFC unit into a user-defined cabinet.

### Electrical safety precautions

These electrical safety precautions are for all personnel who do work on the drive, motor cable or motor.

**WARNING!**

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 and equipment.
  2. Disconnect all possible voltage sources. Make sure that re-connection is not possible. Lock out and tag out.
    - Open the main disconnecting device of the drive.
    - Open the charging switch if present.
    - Open the disconnecter of the supply transformer. (The main disconnecting device in the drive cabinet does not disconnect the voltage from the AC input power busbars of the drive cabinet.)
    - If the drive is equipped with a DC/DC converter unit (optional): Open the DC switch/disconnector ([Q11], option +F286) of the DC/DC converter. Open the disconnecting device of the energy storage connected to the DC/DC converter unit (outside the drive cabinet).
- 



- Open the auxiliary voltage switch-disconnector (if present), and all other possible disconnecting devices that isolate the drive from dangerous voltage sources.
  - In the liquid cooling unit (if present), open the motor protective circuit breaker(s) of the cooling pumps.
  - If you have a permanent magnet motor connected to the drive, disconnect the motor from the drive with a safety switch or by other means.
  - Disconnect any dangerous external voltages from the control circuits.
  - After you disconnect power from the drive, always wait 5 minutes to let the intermediate circuit capacitors discharge before you continue.
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. If the measurement requires removal or disassembly of shrouding or other cabinet structures, obey the local laws and regulations applicable to live working (including – but not limited to – electric shock and arc protection).
    - Use a multimeter with an impedance greater than 1 Mohm.
    - Make sure that the voltage between the drive input power terminals (L1, L2, L3) and the grounding (PE) busbar is close to 0 V.
    - Make sure that the voltage between the drive DC busbars (+ and -) and the grounding (PE) busbar is close to 0 V.
    - Make sure that the voltage between the drive output terminals (T1/U, T2/V, T3/W) and the grounding (PE) busbar is close to 0 V.
  6. Install temporary grounding as required by the local regulations.
  7. Ask the person in control of the electrical installation work for a permit to work.

## 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.



## Planning the installation of the BSFC unit

---



### WARNING!

Use a grounding wristband when you handle printed circuit boards. Do not touch the boards unnecessarily. The boards contain components sensitive to electrostatic discharge.

---

### ■ Placing

Install the BSFC unit in a heated indoor environment. Make sure that the temperature meets the requirement given in the technical data. Also make sure that the ambient conditions meet the requirements of the hardware manual of the inverter modules.

Do not install the BSFC unit far from the inverters. The length of the fiber optic cable(s) between the unit and the inverter(s) must not be more than 4 m (13.1 ft).

---



### WARNING!

No condensation is permitted. There are connectors that are connected to drive main circuit potential.

---



### WARNING!

Protect the BSFC unit against accidental contact. There are connectors that are connected to drive main circuit potential.

---

### ■ List of components needed in power supply circuit

- DC switch-disconnector kit (DC switch-disconnector, BSFC unit, charging switch, charging resistors)<sup>1)</sup>
- DC fuses for inverter
- Charging circuit fuses
- Fiber optic cables for BSFC – inverter connection (one pair for each inverter)
- Main DC supply cables/busbars
- Charging circuit cables, BSFC power supply cables, DC switch-disconnector control cables.

<sup>1)</sup> Only available from ABB.

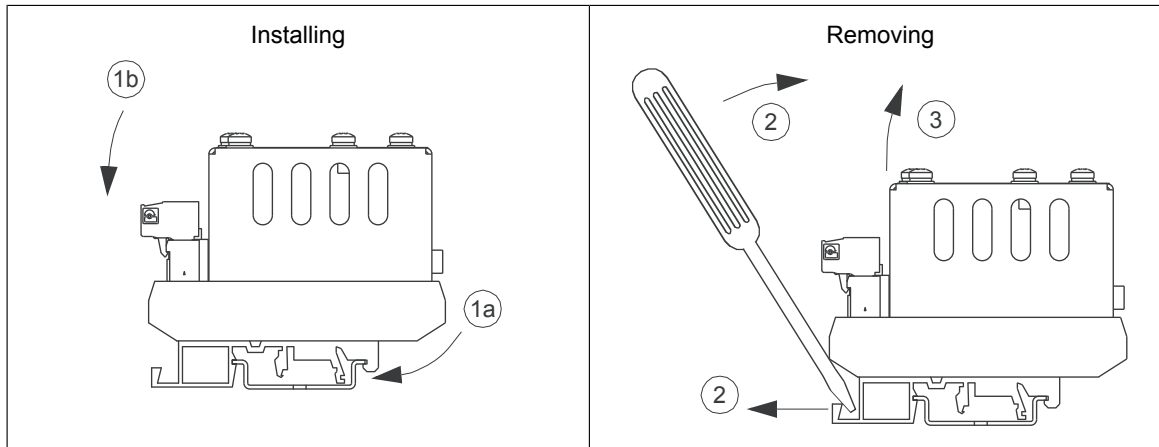
Make sure that all components meet the ABB specifications. For the charging circuit wire specification, see chapter [Circuit diagrams \(page 25\)](#). Always use cables recommended by ABB or equivalent. The cables are connected to the drive main circuit.

---



## Installing and removing the BSFC unit

1. Install the unit by pushing the feet onto a 35 mm EN50022 mounting rail (1a).
2. Remove the unit by bending the feet outwards lightly (2) and lifting the unit simultaneously (3).



## Wiring the BSFC unit

For instructions on wire selection and wiring, refer to the diagrams in chapter [Circuit diagrams](#) (page 25).



# Technical data

---

## Contents of this chapter

This chapter contains the technical specifications of the BSFC units.

## Specifications

	<b>BSFC-02C</b>	<b>BSFC-12C</b>
<b>Power supply input (X5)</b>	Operating voltage 115 V AC or 230 V AC $\pm 10\%$ , 50/60 Hz Current consumption 20 mA (230 V AC) or 40 mA (115 V AC) typical	Operating voltage 24 V DC $\pm 10\%$ Current consumption 80 mA typical
	Protection by Microfuse 2 A, slow 6-position detachable screw terminal block, wire size max. 2.5 mm <sup>2</sup> .	
<b>Solenoid control output (X5)</b>	Control voltage 115 V AC or 230 V AC, +10/-15%	Control voltage 24 V DC $\pm 10\%$
	Control current max. 2 A for 3.5 s or max. 4 A for 20 ms Protection by Microfuse 2 A, slow (common with power supply input) 6-position detachable screw terminal block, wire size max. 2.5 mm <sup>2</sup>	
<b>Switch feedback input (X4)</b>	Voltage output 15 V DC max. 10 mA	Voltage output 24 V DC max. 10 mA
	4-position detachable screw terminal block, wire size max. 2.5 mm <sup>2</sup>	
<b>Optical links (V1...V6)</b>	Avago Versatile Link series 5 MBd optical transmitters & receivers Max. optical cable (POF) length 4 m (13.1 ft)	
<b>Standards applied</b>	Safety requirements: EN 50178 Electronic equipment for use in power installations IEC 61800-5-1 Semiconductor power converters for adjustable frequency drive systems UL 508 C Industrial Control Equipment EMC emission: EN/IEC 61000-6-4 Emission standard for industrial environments EMC immunity: EN/IEC 61000-6-2 Immunity for industrial environments	

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	BSFC-02C	BSFC-12C
<b>Operating temperature</b>	Free air circulation: 0...70 °C (32...158 °F)	
<b>Dimensions (L × W × D)</b>	247 mm × 79 mm × 66.5 mm (9.72 in × 3.11 in × 2.62 in)	
<b>Mounting</b>	35 mm mounting rail EN 50022, vertical or horizontal	
<b>Other features</b>	UL approved (UL Listed according to UL 508 C)	
	Conformal coating as standard	

## Optical components

The specifications of the optic cable are as follows:

- Storage temperature: -55 ... +85 °C (-67 ... +185 °F)
- Installation temperature: -20 ... +70 °C (-4 ... +158 °F)
- Maximum short-term tensile force: 50 N (11.2 lbf)
- Minimum short-term bend radius: 25 mm (1.0 in)
- Minimum long-term bend radius: 35 mm (1.4 in)
- Maximum long-term tensile load: 1 N (3.6 ozf)
- Flexing: Max. 1000 cycles

ABB drive products in general utilize 5 and 10 MBd (megabaud) optical components from Avago Technologies' Versatile Link range. Note that the optical component type is not directly related to the actual communication speed.

**Note:** The optical components (transmitter and receiver) on a fiber optic link must be of the same type.

Plastic optical fiber (POF) cables can be used with both 5 MBd and 10 MBd optical components. 10 MBd components also enable the use of Hard Clad Silica (HCS®) cables, which allow longer connection distances thanks to their lower attenuation. HCS® cables cannot be used with 5 MBd optical components.

The maximum lengths of fiber optic links for POF and HCS® cables are 20 and 200 meters (65.6 ft and 656 ft) respectively.





# 5

## Circuit diagrams

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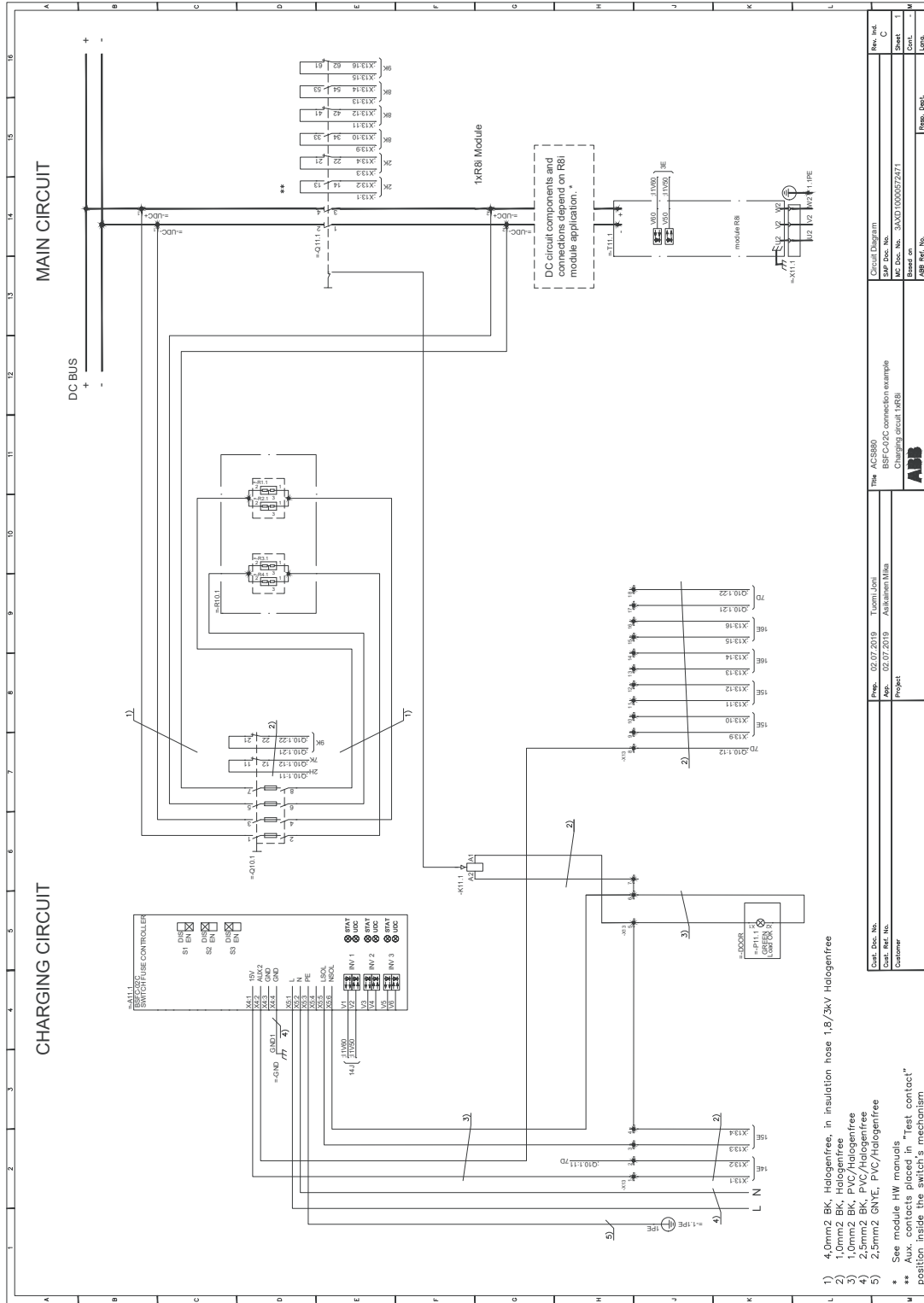
### Contents of this chapter

This chapter shows the connections between the switch-disconnector, the charging controller and one or two inverters. The BSFC-02C is supplied from a 115 V AC or 230 V AC power source, and the BSFC-12C is supplied from a 24 V DC power source.

---

# BSFC-02C

## ■ Charging circuit 1×R8i



- 1) 4,0mm<sup>2</sup> BK, Halogenfree, in insulation hose 1,8/3kV Halogenfree
  - 2) 1,0mm<sup>2</sup> BK, Halogenfree
  - 3) 1,0mm<sup>2</sup> BK, PVC/Halogenfree
  - 4) 2,5mm<sup>2</sup> BK, PVC/Halogenfree
  - 5) 2,5mm<sup>2</sup> GNE, PVC/Halogenfree
- \* See module HW manuals  
 \*\* Aux. contacts placed in "test contact" position inside the switch's mechanism

Rev. No.	Rev. C
Sheet No.	1
Sheet Total	1
Rev. Date	02.07.2019
Rev. Desc.	Charging circuit 1xR8i
Rev. Ref. No.	
Rev. Desc.	

Proj. No.	33X010000272471
Proj. Name	ABB Ref. No.
Proj. Desc.	

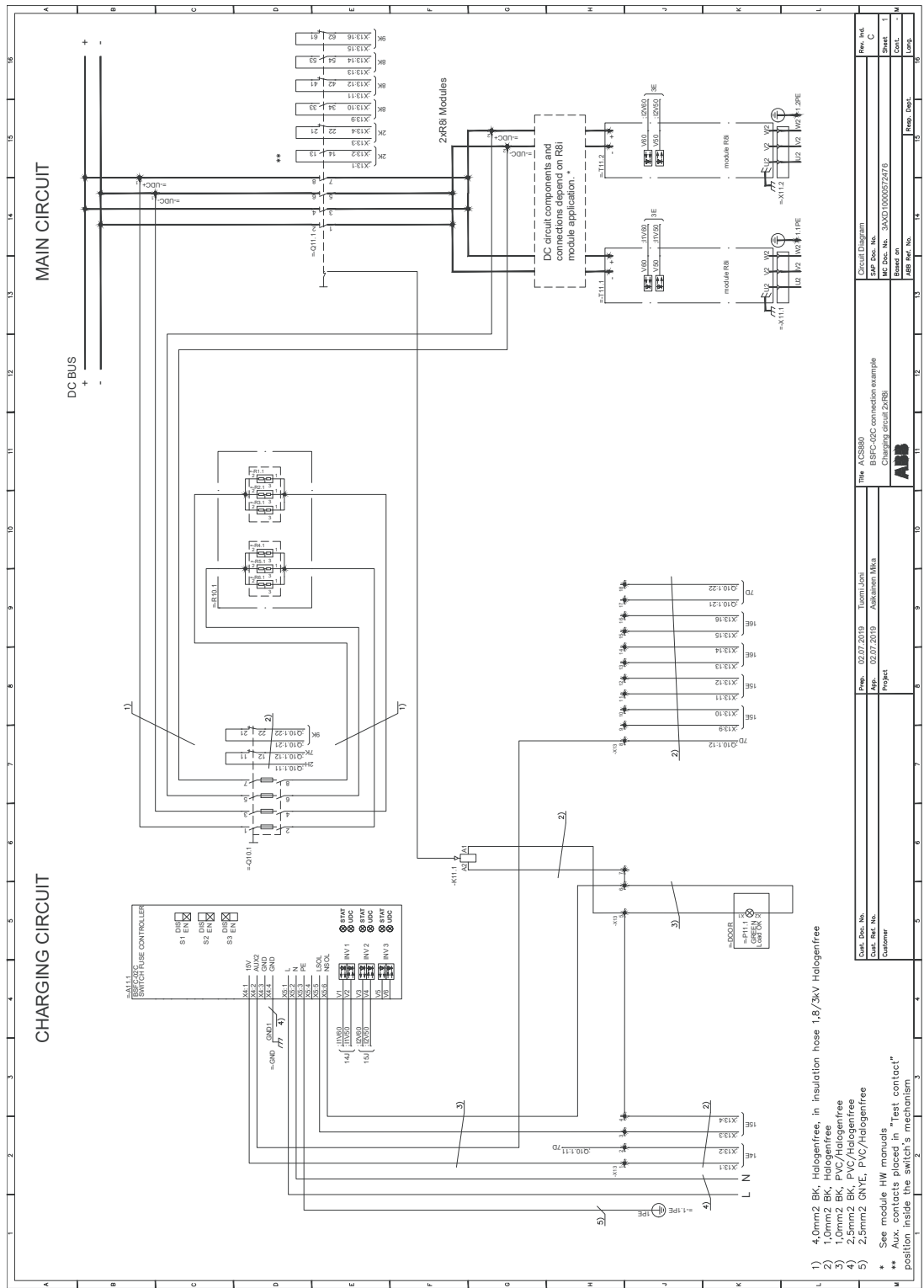
Proj. No.	33X010000272471
Proj. Name	ABB Ref. No.
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Proj. No.	33X010000272471
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Proj. No.	33X010000272471
Proj. Name	ABB Ref. No.
Proj. Desc.	

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Proj. Name	ABB Ref. No.
Proj. Desc.	

■ Charging circuit 2xR8i

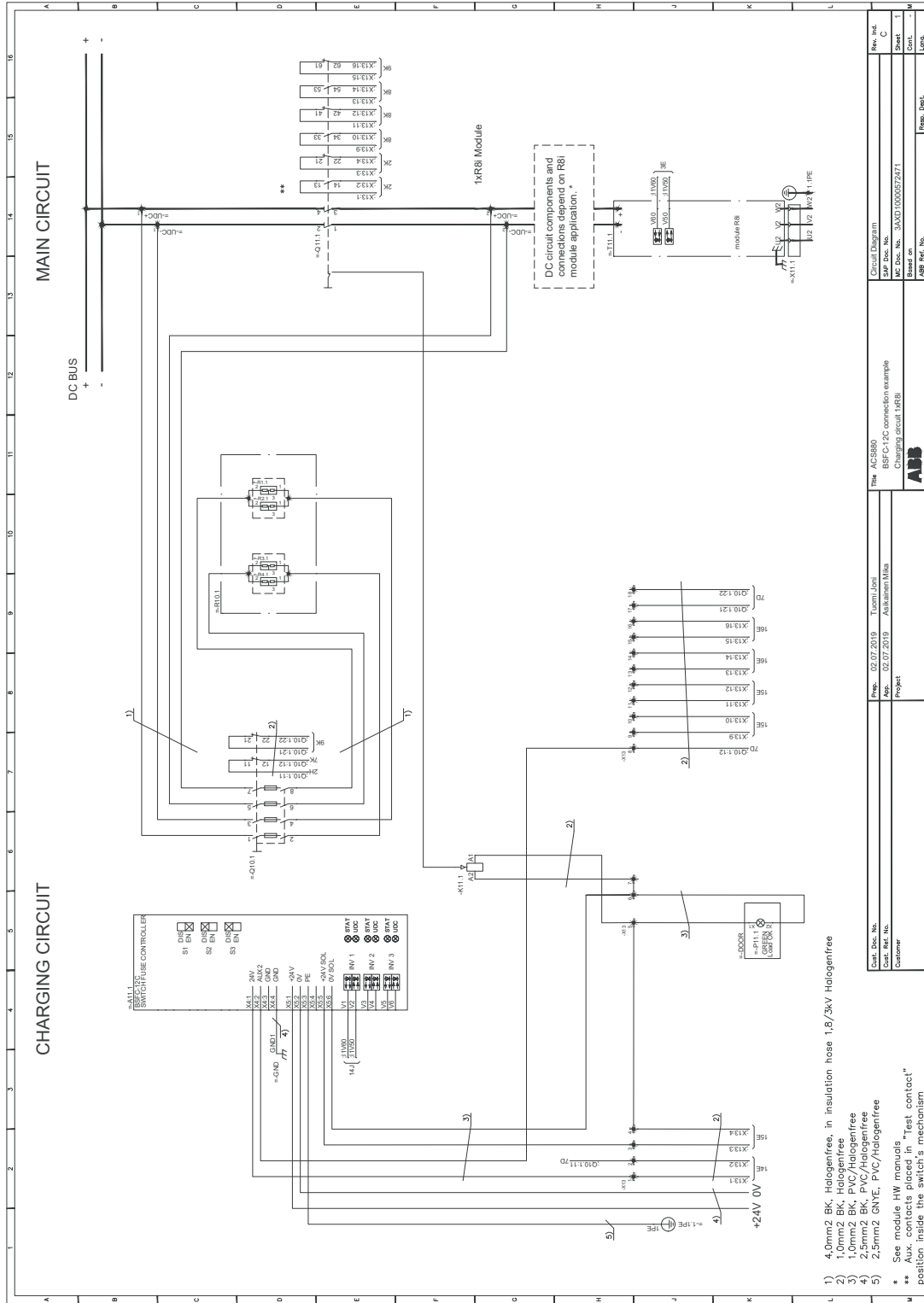


<p>1) 4,0mm2 BK, Halogenfree, in insulation hose 1,8/3kV Halogenfree</p> <p>2) 1,0mm2 BK, Halogenfree</p> <p>3) 1,0mm2 BK, PVC/Halogenfree</p> <p>4) 2,5mm2 BK, PVC/Halogenfree</p> <p>5) 2,5mm2 GVE, PVC/Halogenfree</p> <p>* See module HW manuals</p> <p>** Aux. contacts placed in "test contact" position inside the switch's mechanism</p>	<p>Customer: <b>ABB</b></p> <p>Project: <b>Charging circuit 2xR8i</b></p> <p>App. 02.07.2019 Avulaman Mka</p> <p>Prep. 02.07.2019 Tuomi Jari</p> <p>The ACS890 B SFC-DC connection example</p>	<p>Rev. Int. C</p> <p>Swat. I</p> <p>Cont. I</p> <p>Lang.</p>
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# BSFC-12C

## ■ Charging circuit 1×R8i



- 1) 4,0mm<sup>2</sup> BK, Halogenfree, in insulation hose 1,8/3kV Halogenfree
  - 2) 1,0mm<sup>2</sup> BK, Halogenfree
  - 3) 1,0mm<sup>2</sup> BK, PVC/Halogenfree
  - 4) 2,5mm<sup>2</sup> BK, PVC/Halogenfree
  - 5) 2,5mm<sup>2</sup> GNYE, PVC/Halogenfree
- \* See module HW manuals  
 \*\* Aux. contacts placed in "test contact" position inside the switch's mechanism

Proj. No.	02.07.2019	11mm Jun
App. No.	02.07.2019	Aalkumar/Mba
Project		
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Rev. No.		
Rev. C		
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Release Date		

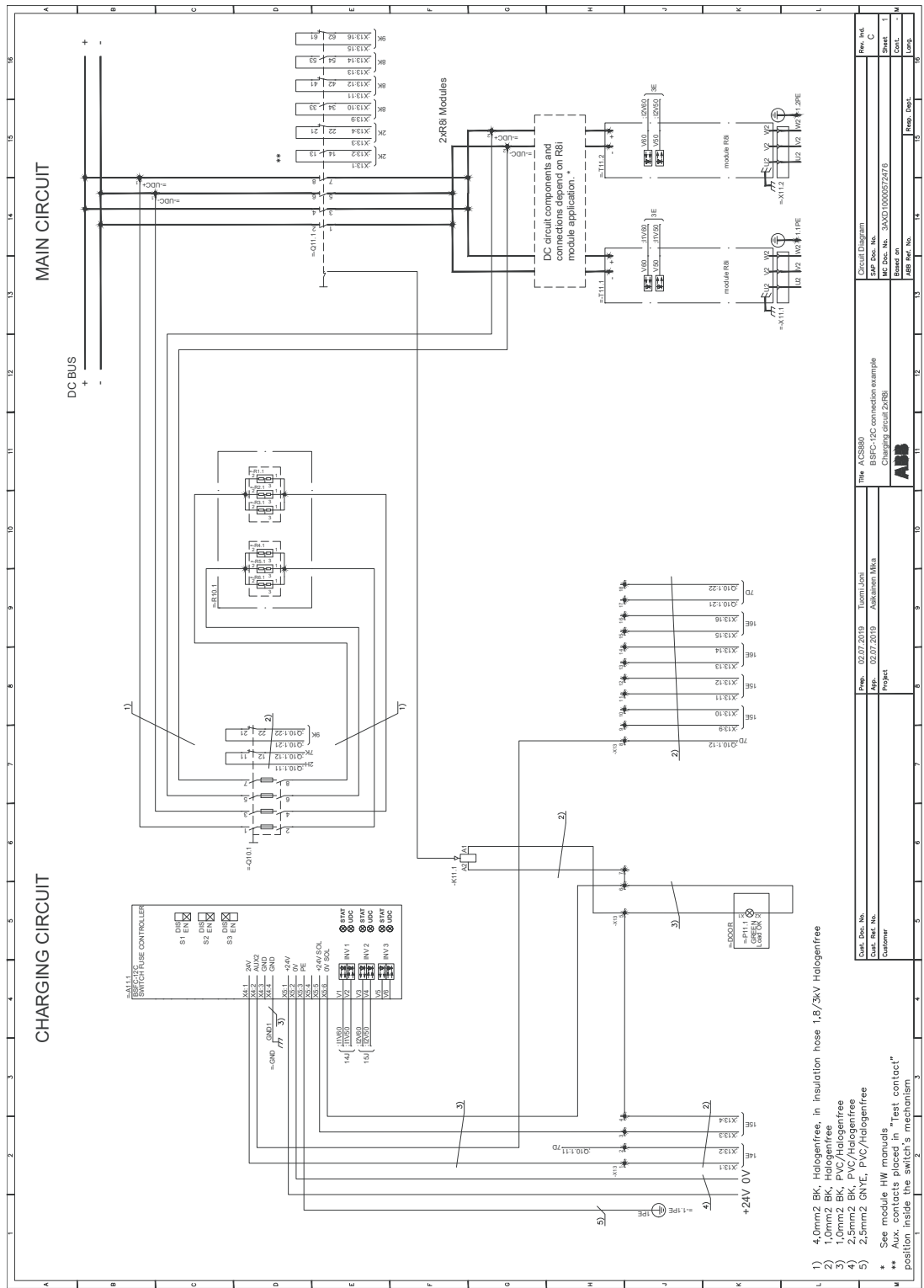


The ACS880  
 BSFC-12C connection example  
 Charging circuit 1xR8i

Circuit Diagram  
 SAP Doc. No. 3AXD0000272471  
 Release Date

Rev. C  
 Sheet  
 Part  
 Unit

■ Charging circuit 2xR8i



Cont. Doc. No.	The ACS890
Cont. Ref. No.	B SFC-12C connection example
Customer	ABB
Prep.	02.07.2019
App.	02.07.2019
Proj.	Charging circuit 2xR8i
Rev. Int.	Rev. C
Sheet	1
Cont.	1
Lang.	Eng.

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A light blue square with rounded corners, centered with a large, bold, black number '6'.

## **Dimension drawings**

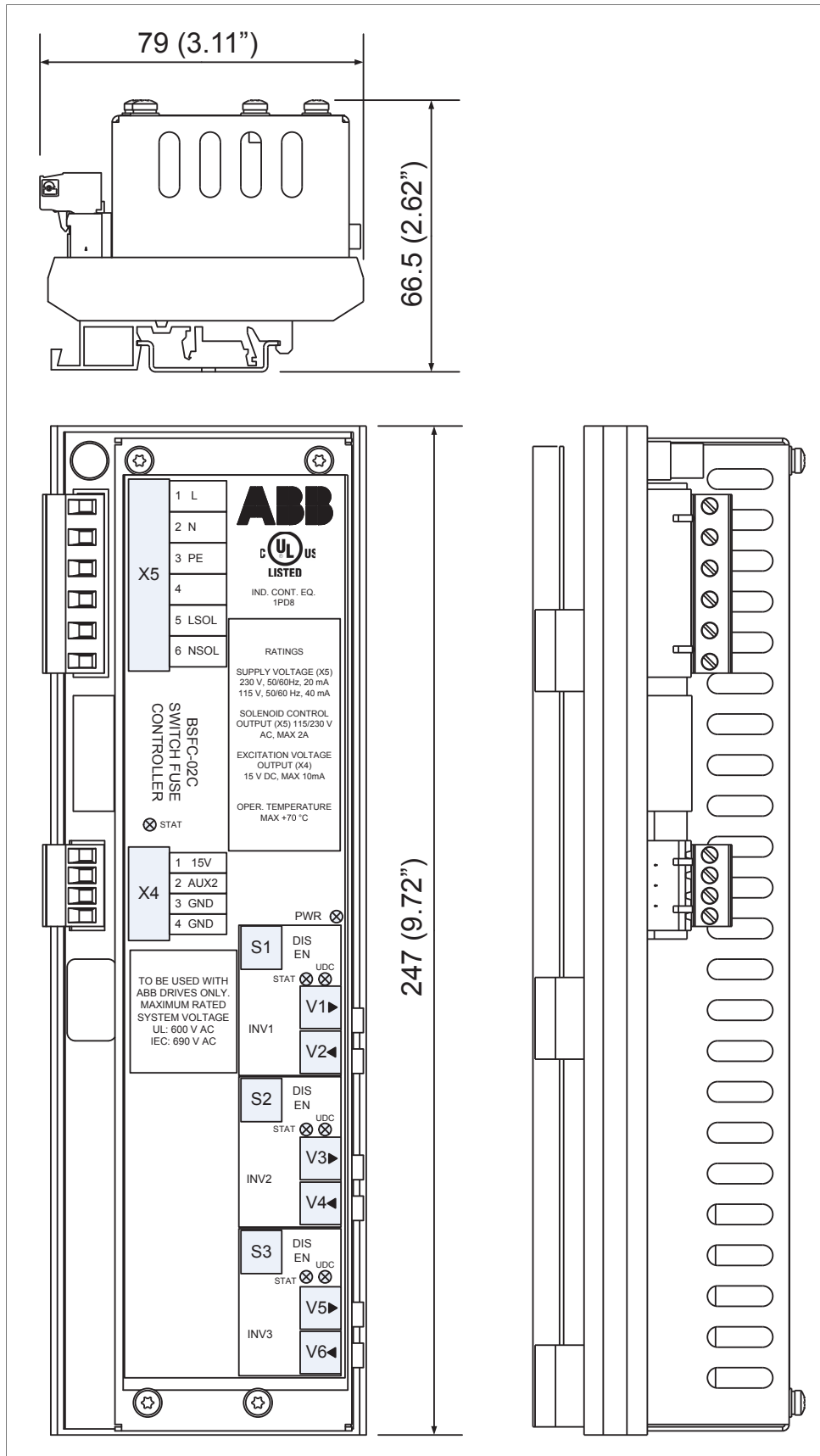
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### **Contents of this chapter**

This chapter contains dimension drawings of the BSFC charging controllers.

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# BSFC-02C and BSFC-12C





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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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