

ABB Industry Oy

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Comp-AC type ACS 400 frequency converter

ENVIRONMENTAL INFORMATION

Recycling instructions

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Code: 3AFE 64428900

1. Introduction

This document covers the environmental information of the following products:

- ACS 400 product family, frame sizes R1, R2, R3 and R4 with accessories and option modules, according to the sales brochure.

The document comprises a summary of materials used in the products and instructions how to handle an end-of-life product.

This document is intended for ABB internal use as well as for commercial recyclers.

While environmental regulations vary from country and region to another, and are also evolving rapidly by time, it is recommended to contact local environmental authorities for up-to-date information when consulting with customers or other stakeholders about proper product material recovery or other treatment.

Information for local customers, like where an end-of-life product can be returned, is recommended to be provided with this information.

Further information is available from
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GLOBAL/FIDRI/intra/fidri002intra.nsf.

2. Product package

The product package is made of corrugated board and EPS (expanded polystyrene) that can be recycled.

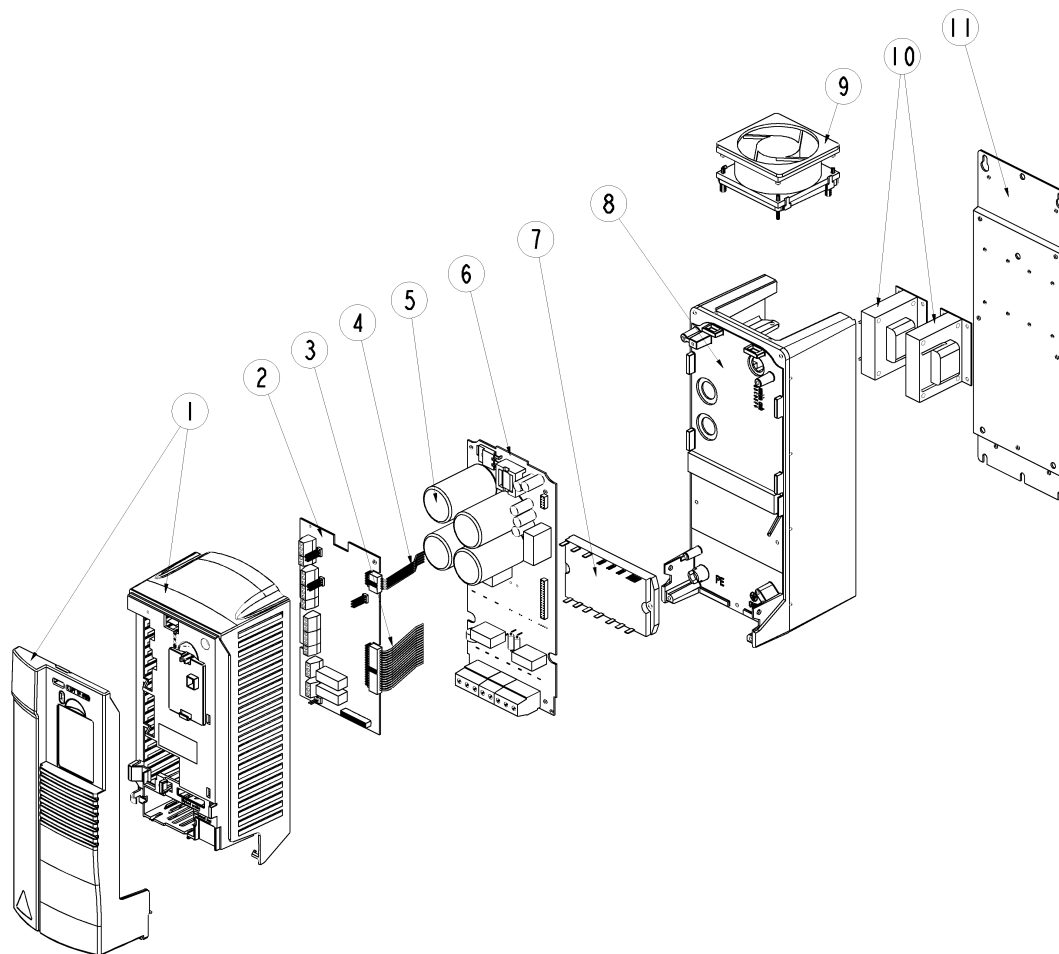
To avoid pollution caused by unnecessary transportation, the manufacturing factory is not taking back used packages. Package recycling is organized by the importing ABB sales company locally, according to local regulations.

Package recycling is recommended while recycling preserves raw materials and reduces waste being landfilled.

3. Product materials

3.1 Structure of ACS 400 module, frame sizes R1 and R2

The main components of ACS 400 are shown in the figure below.

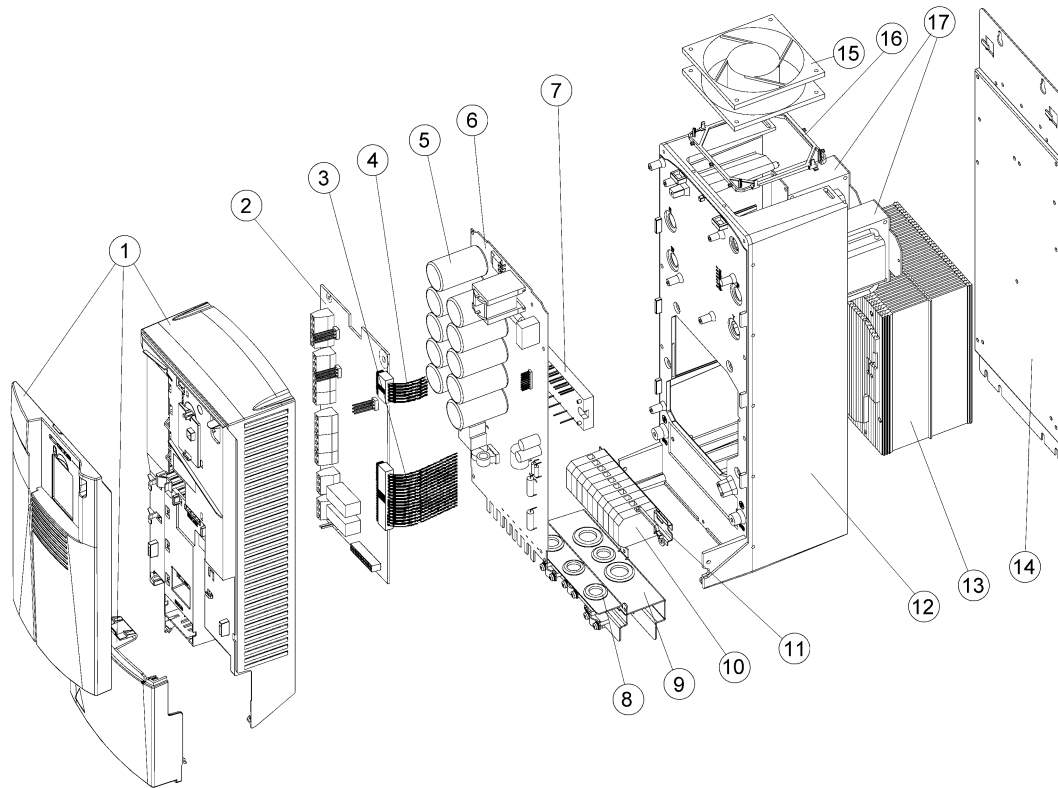


Part No.	Name	Qty.	Materials	Weight / g
1	Cover parts	2	PC+ABS = Cycloy ®	370-490
2	Printed circuit board	1	Various	150
3	Cable (34 pole)	1	PVC, Cu, Sn, Au, Ni, phosphor bronze, thermoplastic polyester, glass-filled nylon	35
4	Cable (10 pole)	1	PVC, Cu, GF, Sn, Au, Ni, phosphor bronze, thermoplastic polyester, glass-filled nylon	15
5	Electrolytic capacitor	2-6	Various	125-375
6	Printed circuit board	1	Various	320-400
7	Power module (IGBT)	1	Various	60-120
8	Heatsink	1	Aluminum alloy, G-AlSi8Cu3Fe	2800-4000
9	Fan	1	Various, plastic parts PBT+PA	150
10	Chokes	2-4	Fe 68 weight-%, Cu 28 %, various 4%	1200-2400
11	Back plate	1	Zinc coated steel	440-570

Total weight: 5665 - 8705 g

3.2 Structure of ACS 400 module, frame sizes R3 and R4

The main components of ACS 400 are shown in the figure below.

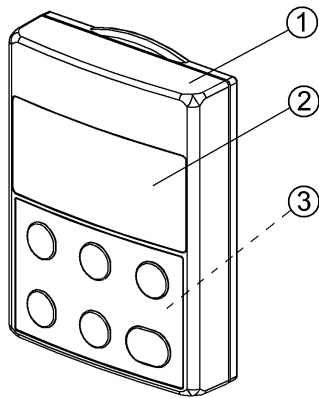


Part No.	Name	Qty.	Materials	Weight / g
1	Cover parts	3	PC+ABS = Cycoloy ®	785-940
2	Printed circuit board	1	Various	150
3	Cable (34 pole)	1	PVC, Cu, Sn, Au, Ni, phosphor bronze, thermoplastic polyester, glass-filled nylon	35
4	Cable (10 pole)	1	PVC, Cu, GF, Sn, Au, Ni, phosphor bronze, thermoplastic polyester, glass-filled nylon	15
5	Electrolytic capacitor	8-18	Various	400-900
6	Printed circuit board	1	Various	1250-2000
7	Power module (IGBT)	1	Various	180-300
8	Sealing Ring	6	Rubber	18
9	Gland Plate Set	1	Zinc Coated Steel	200
10	Connector Set	1	Various	255-520
11	DIN-Rail	1	Zinc Coated and Chromated Steel	52-58
12	Frame	1	Aluminium Alloy	4400-7150
13	Heatsink	1	Aluminium Alloy	5700-8050
14	Back plate	1	Zinc coated steel	1230-1520
15	Fan	1	Various	290-620
16	Fan Finger Guard	1	R3 – ABS/PC, R4 – Cr Coated Steel	26-75
17	Chokes	2	Fe 68 weight-%, Cu 28 %, various 4%	4400-6100

Total weight: 19500-28600 g

3.2 Accessories and option modules

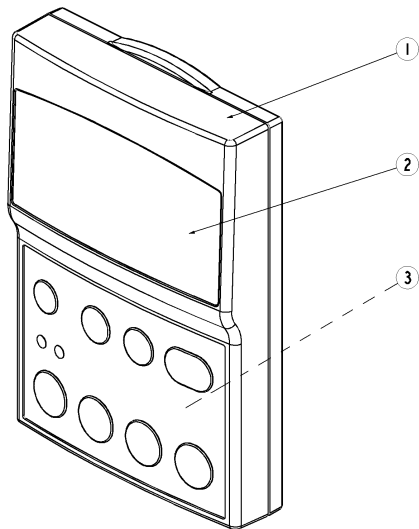
CONTROL PANEL



ACS100-PAN (dimensions 67 mm x 50 mm):

Part No.	Name	Qty.	Materials
1	Cover	1	PC+ABS = (Bayblend ®)
2	LCD display	1	Various
3	Printed circuit board	1	Various

Total weight: 36 g

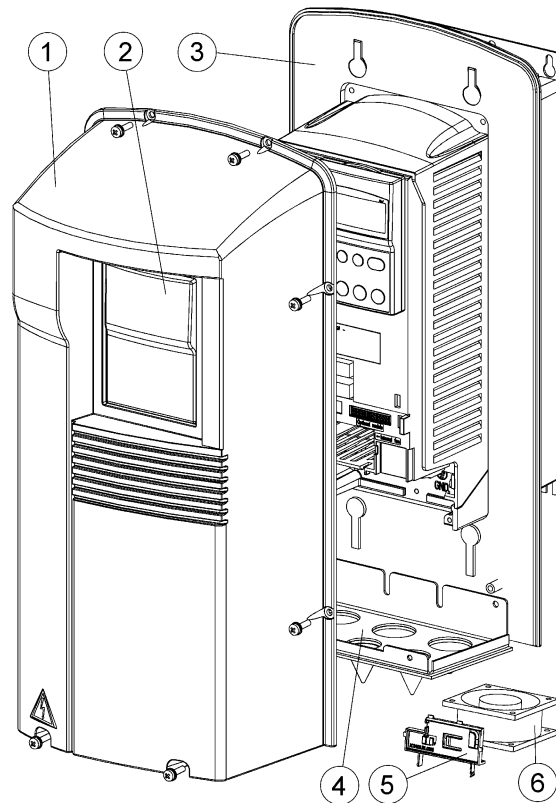


ACS-PAN (dimensions 100 mm x 70 mm):

Part No.	Name	Qty.	Materials
1	Cover	1	PC+ABS = Cycology®
2	LCD display	1	Various
3	Printed circuit board	1	Various

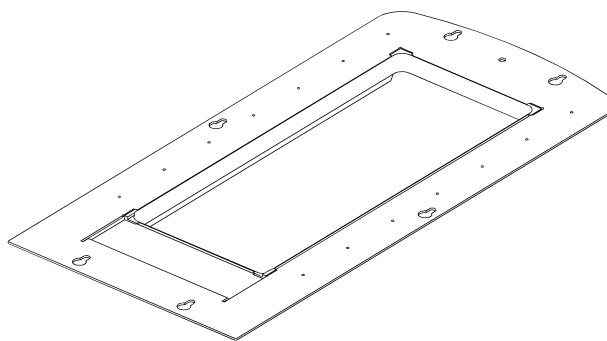
Total weight: 85

ACS 400 IP 54 PARTS, ALL FRAME SIZES



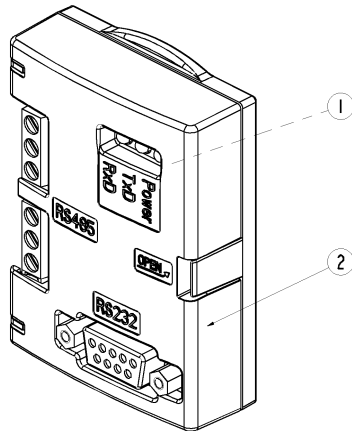
Part No.	Name	Qty.	Materials	Weight / g			
				R1	R2	R3	R4
1	Cover	3	PC+ABS = Cycloy ®	990	1250	1410	1920
2	Cover sheeting	1	Polyester/PC	3	3	3	3
3	Back plate	1	Zinc coated steel + rubber	855	1280	1795	1980
4	Feedtrough plate	1	Zinc coated steel + EPDM rubber	235	235	310	310
5	Fixing clip for Fan	1	PC+ABS = Cycloy ®	4	4	4	4
6	Fan	1	Various	60	60	60	60

FLANGE MOUNTING PLATE



Material	Weight / g			
	R1	R2	R3	R4
Zinc coated steel	780	1225	1130	1225

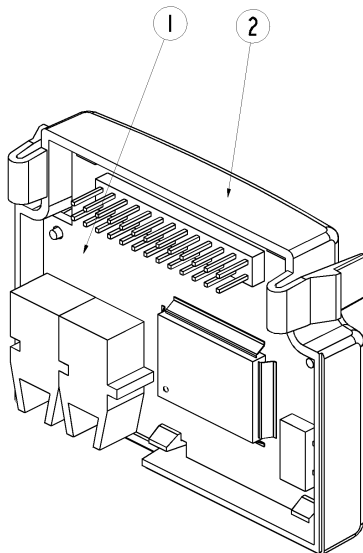
RS 232/485 ADAPTER



Part No.	Name	Qty.	Materials
1	Printed circuit board	1	Various
2	Plastic cover	1	PC+ABS =Bayblend ®

Total weight: 41 g

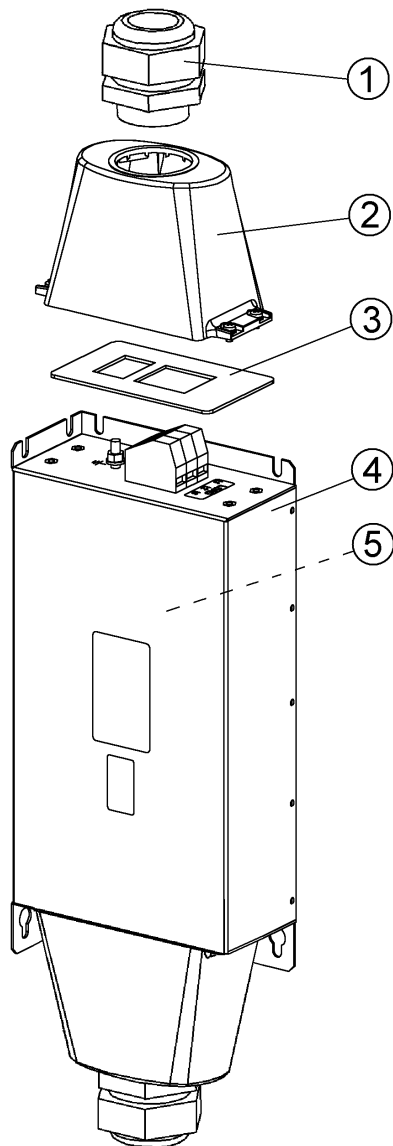
DDCS MODULE



Part No.	Name	Qty.	Materials
1	Printed circuit board	1	Various
2	Cover	1	PC + ABS = Cycoloy ®

Total weight: 15 g

ACS400 RFI-FILTERS

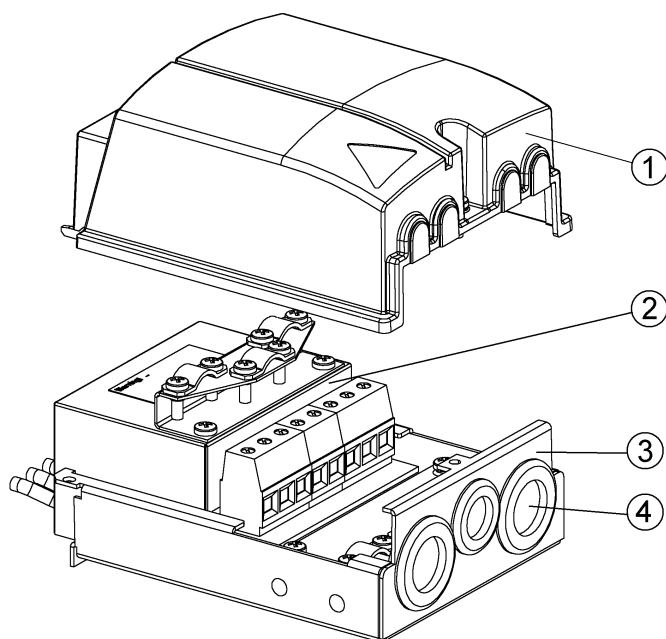


3 Circuitry
Capacitors
Ferrites
Insulation materials
Wiring

Part No.	Name	Qty.	Materials	Weight/g			
				IF11-3	IF21-3	IF31-3	IF41-3
1	Lead-through	2	PA	45-90	45-90	90-180	90-180
2	IP54 shield	2	ABS/PC	100	100	270	270
3	Gasket	2	Cellular rubber	3	3	5	5
4	Case	1	Tin Plated or Zinc coated Steel	1650	2100	2200	2800
5	Circuitry	1	Various	3700	4300	3550	3750

Total weight: 4700/6150/6200/7000g

ACS400-IF22-3 INTEGRATED FILTER, FOR FRAME SIZES R1 AND R2

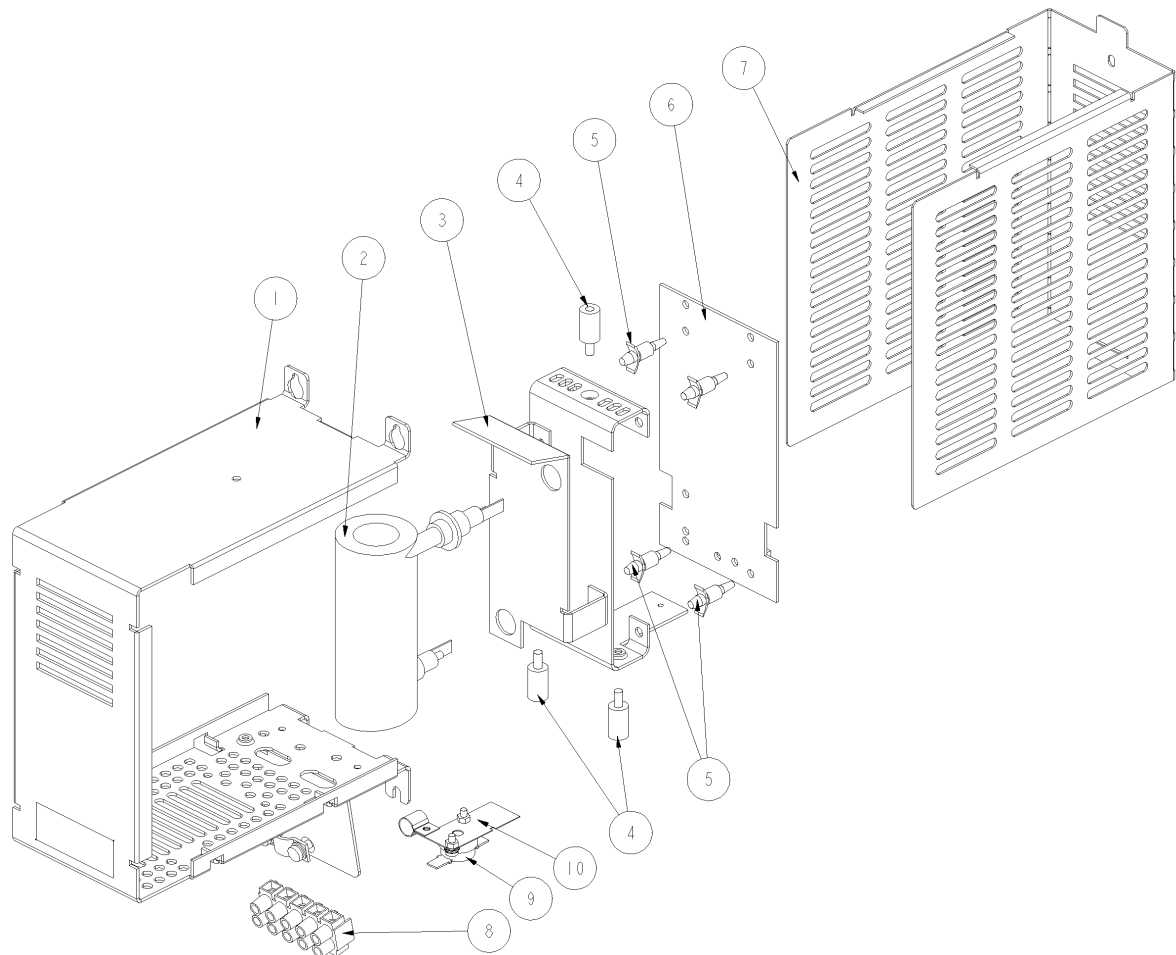


Part No.	Name	Qty.	Materials	Weight / g
1	Cover	1	PC/ABS	85
2	Filter box + electronics	1	Various	480
3	Frame	1	Zinc coated steel	325
4	Sealing ring	3	Rubber	10

Total weight: 900 g

BRAKE CHOPPER UNIT

Brake units A, B, F

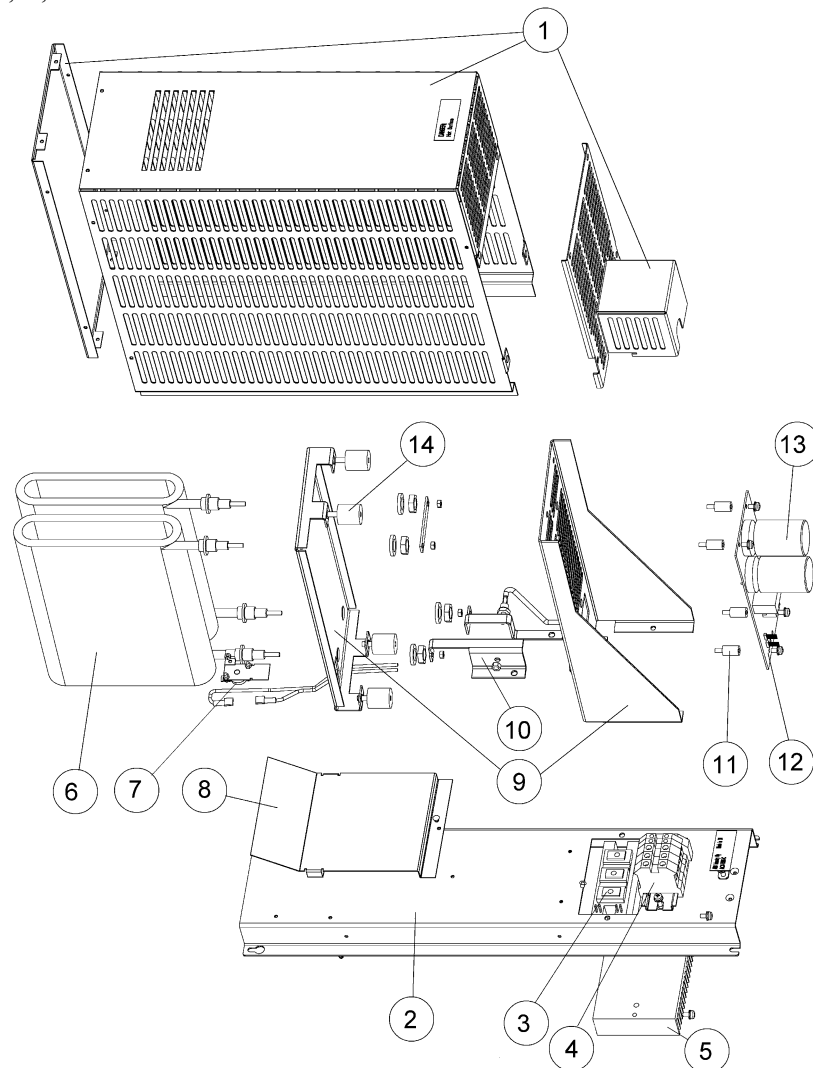


Part No.	Name	Qty.	Materials	Weight / g
1	Frame	1	Zinc coated steel	590-860
2	Resistor	1	Stainless steel, Core: MgO, Ni80+Cr20,	245-465
3	Resistor Plate	1	Zinc coated steel	215-285
4	Insulating pillar	3	PA (Nylon 6)	9
5	Spacer Stud	4	PA (Nylon 6)	4
6	Printed Circuit Board	1	Various	65
7	Cover	1	Zinc coated steel	385-725
8	Connector	1	Various	13
9	Thermostat	1	Various	5
10	Thermostat fixture clip	1	Stainless steel	5

Total weight: 1540 - 2440 g

BRAKE CHOPPER UNIT

Brake units C, D, E



Part No.	Name	Qty.	Materials	Weight / g		
				Unit C	Unit D	Unit E
1	Cover Parts	3	Zinc coated steel	2400	4600	4600
2	Frame	1	Zinc coated steel	1100	3000	3000
3	Power Module (IGBT)	1	Various	170	430	430
4	Connector Set	1	Various	100	200	200
5	DIN-Rail	1	Zinc coated and chromated Steel	30	35	35
6	Resistor	2-6	Stainless steel, Core: MgO, Ni80+Cr20,	2100	6300	4200
7	Thermostat	1	Various	5	5	5
8	Heat Shield	1	Zinc coated steel	145	650	650
9	Inner Frame Parts	2-4	Zinc coated steel	1130	2500	2500
10	Bus Bars	2-6	Aluminium	25	250	250
11	Spacer Stud	4	PA (Nylon 6)	15	15	15
12	Printed Circuit Board	1	Various	140	140	140
13	Electrolytic Capacitor	2	Various	100	100	100
14	Insulating pillar	4	PA (Nylon 6)	40	40	40

Total weight: 7800/19000/17000 g

All screws in the ACS400: Carbon steel, Pozidrivs or Torx recess, Zinc plating

Plastics:

ABS acrylonitrile-butadiene-styrene
EPS expanded polystyrene foam (PS-E)
PBT polybutylene terephthalate
PA polyamide
PC polycarbonate
PVC polyvinyl chloride
GF glassfibre

All plastic parts (weight > 25 g) are marked according to ISO 1043 and DIN 54840.

3.3 Product manuals and sales brochures

All brochures and manuals are printed according to the guidelines of the Nordic Environmental Label criteria and they are equipped with the “Swan” Ecolabel.

To save natural resources and reduce paper waste, all product manuals are available also in electronic media. The documents are available through Lotus Notes (“Document Directory Intranet”).

4. Product use

The use of a frequency converter has several positive environmental impacts, like

- Substantial energy savings can be reached using a frequency converter. According to investigations, these savings are in pump and fan drives typically 50 %. This means reduced CO₂ and NO_x emissions in power plants, due to reduced energy demand.
- Process controllability is improved when a state-of-the art drive is used as a part of a process control system, meaning reduced waste
- When a process can be driven in an optimal way, process equipment's (like conveyors' and pumps') wearing is reduced and life time increased, decreasing environmental loading caused by manufacturing new equipment
- Noise is in most cases reduced
- Natural resources like wood in pulp & paper industry are saved while process efficiency is improved

The frequency converter itself does not cause any emissions while in use. Due to reduced energy consumption, overall harmful emissions are reduced as described above.

The product does not need any periodic maintenance.

For more information on product use, see *ACS 400 User's Guide*.

5. Product disposal

Product disposal can be made in two alternative ways. The product can be disassembled manually or crushed in a shredding machine.

5.1 Manual disassembly

The product is disassembled manually and parts are sorted according to their material contents as follows:

- iron metals (plates, screws)
- aluminum (heatsink)
- plastics
- printed circuit boards*
- electrolytic capacitors* (mounted on the main circuit board)
- other*

* For more information, see 5.3 List of potentially harmful materials

Metal parts (iron and aluminum) can easily be recycled, other materials according to local arrangements.

5.2 Mechanical shredding

In this method, a whole product is mechanically shredded into small pieces and materials are sorted using dedicated sorting processes. Components containing harmful materials must, however, be removed before shredding (for more information, see 5.3 List of potentially harmful materials).

5.3 List of potentially harmful materials

Definitions and regulations of hazardous materials differ from country to country and are also changing when knowledge of materials increases. The materials used in the product are materials typically used in electric and electronic devices.

The list given below is based on the following references:

1. EACEM (European Association of Consumer Electronics Manufacturers) List of Environmentally Relevant Substances.
2. Substances contained in products of the electrical/electronics industry. Zentralverband Elektrotechnik- und Elektronikindustrie (ZVEI) e.V., Frankfurt am Main. 1995.
3. European Commission DG XI Environment, Nuclear Safety and Civil Protection. Draft proposal for a directive on Waste Electrical and Electronic Equipment. Brussels, July 5, 1999.
4. European Waste Catalogue EWC, EU Directive 94/3/EC.

6. Manufacturing

The product is manufactured by ABB Industry Oy, Helsinki. The environmental system of the manufacturing unit is certified to ISO 14001.

The accessories and option modules are manufactured by other manufacturers, mainly in Finland.

7. Environmental management system of ABB Industry Oy

Environmental management system (EMS)

ABB Industry Oy has an environmental system covering all divisions and functions of the company. The EMS is certified to ISO 14001 since November, 1996.

The company's environmental objectives include among others items as follows,

- reduce use of material in products, difficult to recycle or reuse
- improve recyclability of products
- reduce environmental burden caused by packaging materials.

ABB Industry Oy's environmental policy

ABB Industry Oy is committed to an environmental policy, which is based on the following:

1. We develop and manufacture products such as alternating current electrical drives and automation systems that save our customers energy and raw materials and give them better control over their processes. We strive continuously to make our products environmentally more sound by applying results obtained in recyclability and life-cycle assessments.
2. We are committed to reducing the harmful environmental impacts of our operations by continuously improving the operation of our production processes.
3. Our minimum requirement is to abide by all acts, decrees and official regulations on environmental protection in all our operations; we aim to ensure that all our subcontractors do likewise. We work closely with our suppliers in seeking environmentally sound solutions.
4. We regularly review the substance and practice of our environmental policy in the light of our environmental management system, setting new environmental goals and targets annually. We regularly inform our

staff and other affiliated groups about our environmental concerns, and make sure that our environmental policy is available to the public.

Our environmental management system, certified to ISO 14001, is the tool for carrying out our environmental policy. The line organisation, assisted by the environmental organisation, is responsible for ensuring that we fulfil our obligations with respect to environmental protection. In raising and maintaining the environmental awareness of our staff, we assign high priority to training.