

ABB Oy
Product Support
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Comp-AC

ENVIRONMENTAL INFORMATION

Recycling instructions for drive of type ACS 300

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1. Introduction

This document covers the environmental information of the following products:

- ACS 300 product family, frame sizes R0, R1 and R2,
with all 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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The newest revision of this document can be found in "ABB Library".

A life cycle assessment (LCA) has been carried out for two ACS 300 models.

2. Product package

The product package is made of corrugated board that can be recycled. R0 and R1 packages contain also PE foam that is recyclable.

Packages are equipped with recycling symbols.

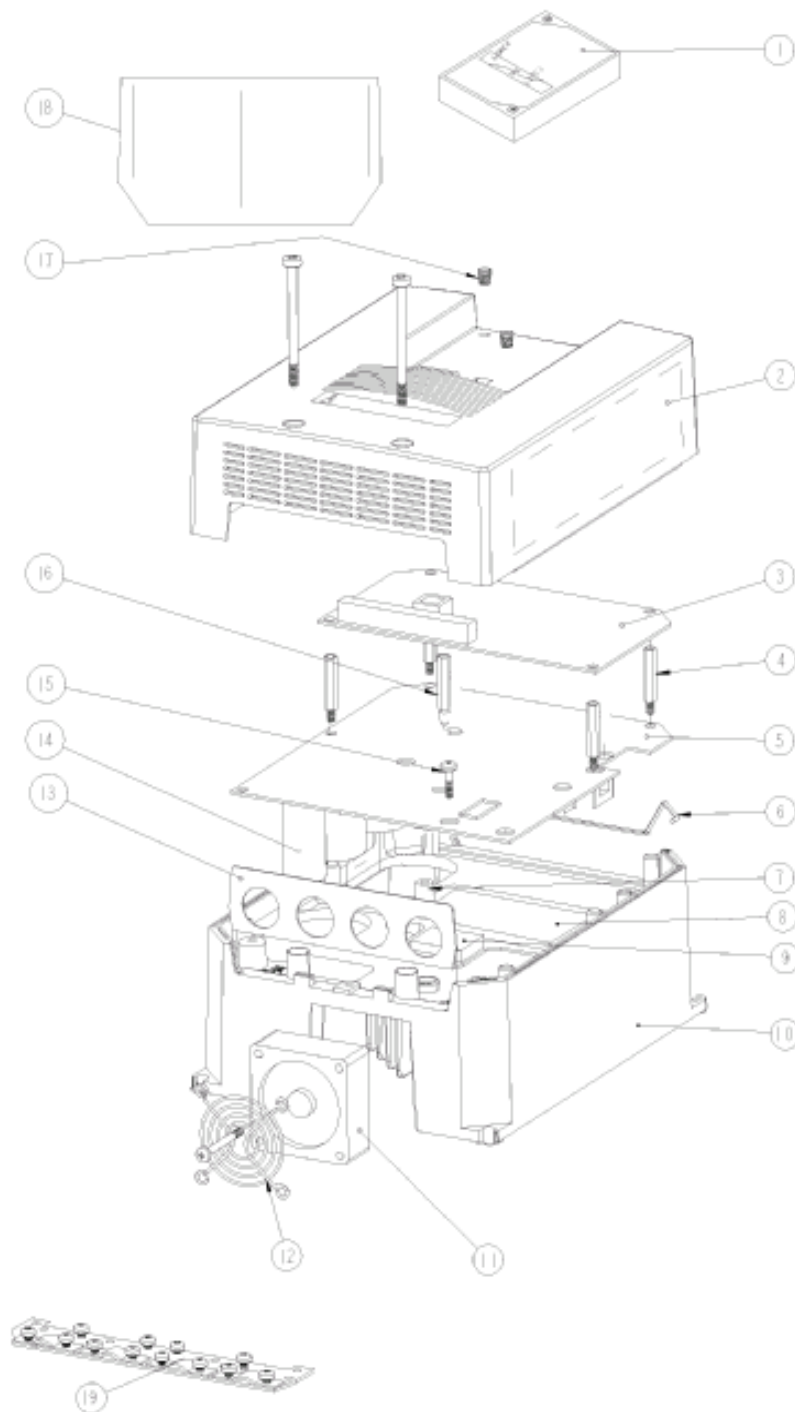
To avoid pollution caused by unnecessary transportation, the manufacturing factory is not taking back used packages. Package recycling is organized by the importing ABB sales company locally, according to local regulations.

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

3. Product materials

3.1 Structure of ACS 300 module

The main components of ACS 300, frame size R1, are shown in the figure below.



that there is no fan in R0. Frame size R2 has a steel casing around the frequency converter and

some components that are not included in other frame sizes. Therefore this picture cannot be interpreted to describe also R2. In the materials table, R2 is also separated from R0 and R1.

Part No.	Name	Qty.	Materials	Weight R0 & R1 (total) / g	Weight R2 (total) / g
1	Cover panel	1	PC	61-64	70
2	Cover part	1	ABS (70%), PC (30%)	289-349	425
3,5	Printed circuit board	2-3	Various	470-792	655
4	Standoff	4-14	Nickel plated brass	31	73
6	Gasket	1	CR	1	1
7	Standoff	1	PVC	1	1
8,9	IGBT and Rectifier bridge	1	Various	95	600
10	Heatsink	1	AlSi12 (trade name A380)	1790-2147	2290
11	Fan*	1-2	PBT, PA, steel	58	190-380
12	Fan guard*	1-2	R1 chromium plated steel, R2 Noryl or ABS	10	15-30
13	Cable plate	1	Zinc coated steel	39	370
14	Capacitors	2-4	Various	101-202	600
15	Combi screw	1	PA	1	1
16	Standoff	1	PA	2	-
17	Hit-Sert	2	brass	1	1
18	IP 21 cover hat	1	ABS (70%), PC (30%)	50	100
19	EMC plate	1	Zinc coated steel	92	355
	Screws etc.	n	carbon steel	100	170
	Casing**	1	Zinc coated steel		3075
	Connectors at C-rail**	1	Zinc coated steel		340
	Input chokes**	3	Fe 70%, Cu 25%, various 5%		3100-3900
	Capacitor fixing screw**	2	PA		20
	Diode bridge**	1	Various		170

* Not in frame size R0

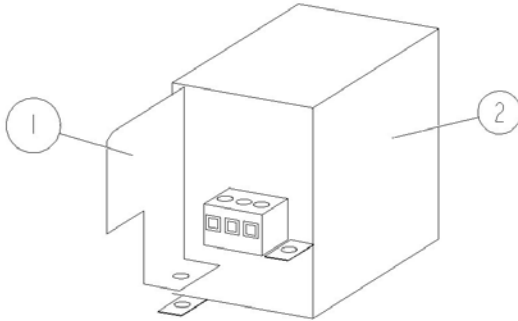
** Only in frame size R2 included as standard

Total weight:

R0 and R1 3192-4035 g
R2 12622-13627 g

3.2 Accessories and option modules

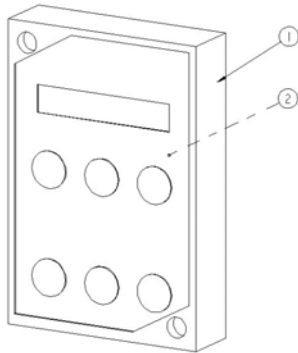
RFI-FILTER



Part No.	Name	Qty.	Materials	Weight / g
1	EMC-plate	1	Tin plated steel	12
2	RFI-filter	1	Various	546

Total weight: 558 g

CONTROL PANEL



Part No.	Name	Qty.	Materials	Weight (total) / g
1	Cover parts	2	ABS+PC=Cycoloy®2800	88
2	Printed circuit boards, connector, flat cable	1	Various, FR PVC, Tin plated copper	59

Total weight: 156 g

RS 232 ADAPTER

Part No.	Name	Qty.	Materials	Weight / g
1	Casing	2	Anodised aluminum	33
2	Printed circuit board	1	Various	25

Total weight: 62 g

DDCS MODULE

Part No.	Name	Qty.	Materials
1	Printed circuit board	1	Various

Total weight: 16 g

RESISTOR

Example: A resistor for the smallest ACS300 (100 ohm, 250 W). Weight of the resistors varies greatly according to the drive type with which it is used.

Part No.	Name	Qty.	Materials	Weight / g
1	Frame	1	Zinc coated steel	545
2	Resistor	1	Steatite C221 or cordierite C551, AlPO_4	385
3	Resistance wire	1	CrAlFe, CrNi, CuNi	21
3	Connectors	1	Porcelain	4
4	Cables	2	Nickelchrome and magnesium oxide, nickel or constantan (50 % Cu, 50 % Ni), insulation silicone	4

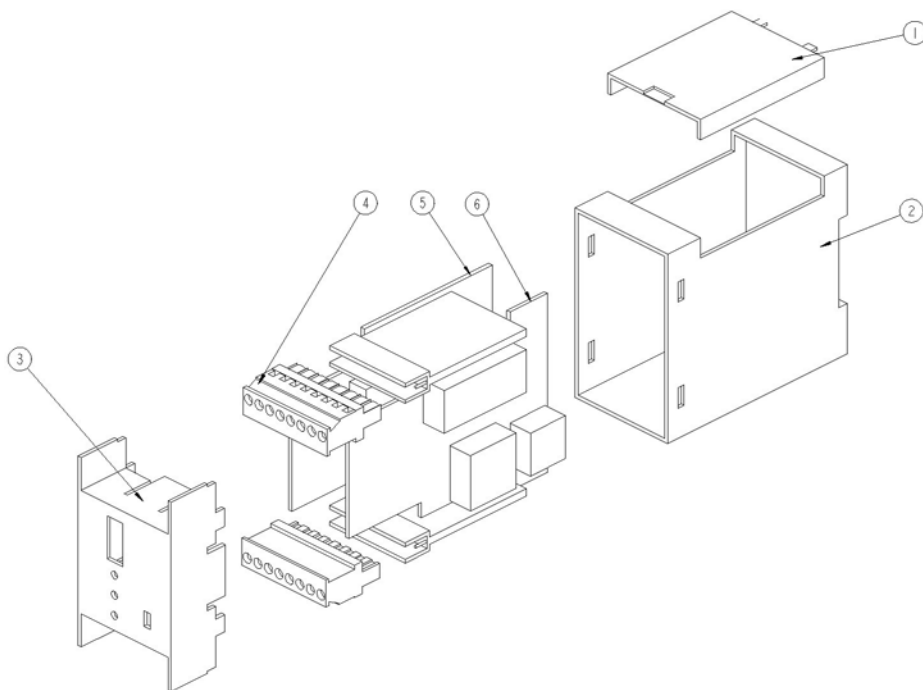
Total weight: 1016 g

INPUT AND OUTPUT CHOKES

Part No.	Name	Qty.	Materials
1	Choke	1-6	Armature sheet 56-69 weight-%, Cu 14-20%, Fe 7-13%, various plastics (incl. PVC, connector PA) 4-13%

Total weight: 1600-16200 g

FIELDBUS ADAPTER



Part No.	Name	Qty.	Materials	Weight / g
1-3	Frame parts	3	ABS	55
4	Connector	1-2	ABS, PA, nickel or tin plated brass	17-33
5,6	Printed circuit boards	2	various	105-120

Total weight: 178-209 g

IP65 SET FOR CONTROL PANEL

Part No.	Name	Qty.	Materials	Weight (total) / g
1	Cable	1	PVC, Cu	75
2	Gasket	1	CR	3

Total weight: 80 g

All screws in ACS300: Carbon steel, Philips recess, Zinc plating

Plastics and rubber:

ABS	acrylonitrile-butadiene-styrene
CR	chloreprene rubber
PBT	polybutene terephthalate
PA	polyamide
PC	polycarbonate
PE	polyethylene
PVC	polyvinyl chloride
FR PVC	fire resistant PVC

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 (“FIDRI Document Directory”), the technical files are accessible for all ABB Drives sales and service people.

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 300 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*
- 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. Proposal for a directive on waste from electrical
and electronic equipment. Second draft. Brussels, 27 July 1998.
4. European Waste Catalogue EWC, EU Directive 94/3/EC.

Table: List of possibly harmful substances in different materials and components after previously mentioned references

Component	Harmful substance(s)	Reference
Printed circuit boards	lead (in solder)	1 2 3
	tetrabromobisphenol A (TBBA, flame retardant)	1 2 3
LCD –display in control panel	N/A	2 3
Electrolytic capacitors	N/A may contain harmful chemicals (DMAC/DMF) *	3 1 2
Plastics, rubber	none	
Iron metals	none	
Aluminum	none	
Power module (IGBT and rectifier)	none	
Resistor	none	
Cables	PVC	1

* composition varies with the manufacture and technical development of the electrolytic capacitors

N/A = not available

5.4 One recycling method

The procedure described below complies with regulations valid in Finland in January, 1998.

- | | |
|---------------------------|--|
| - steel | recycled as material |
| - aluminum | recycled as material |
| - plastics | energy recovery (incineration) or landfilled |
| - printed circuit boards | recycled to collect precious materials |
| - electrolytic capacitors | sent for hazardous material treatment |
| - cables | landfilled |
| - other materials | energy recovery (incineration) or landfilled |

6. Manufacturing

The frame sizes R0 and R1 are manufactured in China. The manufacturer's environmental performance has been assessed by ABB Industry Oy.

The frame size R2 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 Oy

Environmental management system (EMS)

ABB 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 Oy's environmental policy

ABB 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.
5. 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.