YASKAWA

REGENERATIVE UNIT
R1000

EN
DE

Content

Experience and Innovation

Since 1915 YASKAWA has manufactured and supplied products for machine building and industrial automation. Our standard products as well as tailor-made solutions are well known and have a high reputation for outstanding quality and reliability.

YASKAWA is the leading global manufacturer of inverter drives, servo drives, machine controllers, medium voltage inverters, and industrial robots.

We have always been a pioneer in motion control and drive technology, launching product innovations, which optimise the productivity and efficiency of both machines and systems.

YASKAWA Eschborn, Germany

Today we produce more than 1.9 million inverters per year. Considering this, YASKAWA is probably the biggest inverter manufacturer in the world.


YASKAWA Motoman Robots

Furthermore, with a yearly production of more than 1 million servo motors and 25,000 robots we offer a wide range of products for drive automation processes in many different industries. YASKAWA technology is used in all fields of machine building and industrial automation.

Wherever You Are – Our Local Support is Near

Employing more than 14,600 people worldwide

More than 1,350 employees in worldwide service network

More than 1,500 employees in Europe

The Power Regenerative Unit

The R1000 regenerative braking unit is a smart and efficient alternative to dynamic braking for single or multi-axis drive installations with a high amount of regenerative motor operation. Instead of wasting it as heat, the R1000 feeds excessive braking energy back to the grid, thus reducing the energy consumption of the installation.

ENERGY EFFICIENT FOUR-QUADRANT

R1000 saves energy by making excessive braking energy available to other consumers in the same grid instead of wasting it as heat. R1000 provides high duty cycle braking capabiltiy, thus it can shorten machine cycles and increase productivity of machinery.

COMPATIBLE

R1000 Regenerative Braking Units can be used with any conventional drive that has full access to the DC bus.

SAVE ENERGY COST

Especially in high duty braking applicati-ons such as cranes, escalators or lifts the R1000 provides numerous advantages. The small installation space and low heat generation impact installation cost, while using the regenerated energy reduces the running cost so that the R1000 pays back in a short period.

SMART SYSTEM DESIGN

R1000 is purely selected by braking power and can therefore be selected smaller than the drive it is connected to. Thus it allows to minimize system space, optimize cost and maximise efficiency.

COOL OPERATION

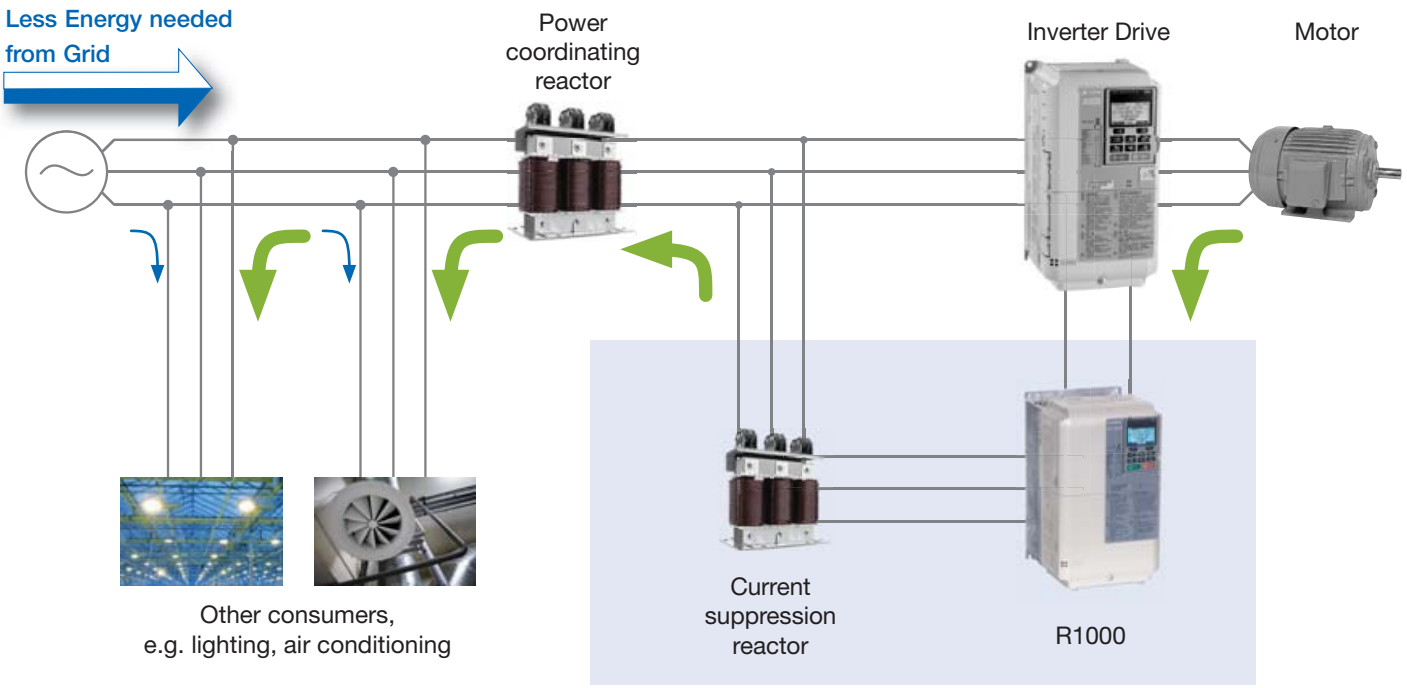
R1000 eliminates the need for safely located braking resistors, thus saving valuable space and reducing the risk of fire. Less heat is generated so that the demand for ventilation is greatly reduced. Additionally maintenance, e.g. for resistor cleaning becomes needless.

EASY TO HANDLE PACKAGE

R1000 comes in an easy to handle package. Only one material number for all components makes procurement simple and assures completeness and parts compatibility.

Save Energy with Power Regeneration

Unlike dynamic braking, which dissipates all braking energy in the form of heat, the R1000 avoids wasted energy by delivering it back to the power source for use by other loads. R1000 can flexibly be used to maximise efficiency of single- and multi-axis systems.



Economical Dynamic Braking

The R1000 provides the most economical way of dynamic braking by

- Selection purely by braking power – R1000 can be smaller than the drive
- Less energy consumption from grid as other consumers in the same installation can use braking energy
- Less space and heat by removed braking choppers and resistors
- Reduced ventilation requirements by less heat emission

Flexible Application

The R1000 can be used on single drives as well as in drives, servo or other systems that have an interconnected DC bus.

All Compatible

The R1000 can work with all conventional drives having full power access to DC bus. By that it is the perfect match when planning energy efficient new installations but when upgrading existing installations.

For a Wide Range of Applications

Using the R1000 Regenerative Unit saves energy and thereby money within a broad range of applications. This includes applications with large-inertia loads, 4-quadrant loads, long-term energy feedback and quick braking.


Motor Test Benches


Robots


Cranes, Hoists


Winders


Elevators


Escalators

Stopping

- Elevators and Lifts
- Centrifuges
- Saws
- Large Fans
- Machine Tool Spindles

Eccentric

- Presses
- Dryers
- Vibratory Equipment

Continuous Regen

- Winders
- Downhill Conveyors
- Dynamometers

R1000 Selection

A

- Determine the maximum regenerative power.
- Select an R1000 kit with a power rating higher than the calculated regenerative power, keeping in mind the R1000 overload capability (150% for 30 seconds).
- Select a Power Coordinating Reactor which fits to the drive (see tables below).

A1000 and V1000 General Inverter

A1000 Drive CIMR-AC4A□□□□	V1000 Drive CIMR-VC4A□□□□	Power Coordinating Reactor Model	IP20 cover (optional)	EMC Filter Model
0002	0002	LR3 40-4/2	IP20-Box31	HLD 110-500/8
0004	0004	LR3 40-4/4	IP20-Box32	
0005	0005	LR3 40-4/6		
0007	0007	LR3 40-4/10		
0009	0009			HLD 110-500/12
0011	0011	LR3 40-4/16		HLD 110-500/16
0018	0018	LR3 40-4/20		HLD 110-500/30
0023	0023	LR3 40-4/25	IP20-Box33	
0031	0031	LR3 40-4/45	IP20-Box35	HLD 110-500/42
0038	0038			
0044		LR3 40-4/63	IP20-Box36	FB-40060A
0058				
0072		LR3 40-4/70	IP20-Box37	FB-40072A
0088		LR3 40-4/90	IP20-Box39	FB-40105A
0103		LR3 40-4/115	IP20-Box41	
0139		LR3 40-4/160		FB-40170A
0165				
0208		LR3 40-4/200		FB-40250A
0250		LR3 40-4/250	IP20-Box44	
0296		LR3 40-4/300		FB-40414A
0362		LR3 40-4/400		
0414				
0515		LR3 40-4/500	IP20-Box45	FB-40675A
0675		LR3 40-4/710	IP20-Box46	
0930		LR3 40-4/1200		FB-41200A
1200				

* Drawings, dimensions and weight information for reactors and filters can be found on pages 10 and 11.

L1000A and V1000A Lift Inverter

L1000A Drive CIMR-LC4x□□□□	L1000V Drive CIMR-LC4V□□□□	EN12015 Compliant Power Coordinating Reactor		EMC Filter Model
		IP00 Model	IP20 Model	
0005	0009	B 1103136	IP20-Box32	HLD 110-500/8
0006	0015			
0009	0018			
0015	0024	B 1103138	IP20-Box35	
0018	0031			HLD 110-500/12
0024		B 1103139	IP20-Box36	HLD 110-500/16
0031		B 1103140	IP20-Box37	HLD 110-500/30
0039		B 1103141	IP20-Box39	
0045				HLD 110-500/42
0060		B 1103142		
0075				FB-40060A
0091		B 0910013	IP20-Box42	
0112				FB-40072A
0150		B 1411053	on request	FB-40105A
0180				
0216		2 x B 0910013	2 x IP20-Box42	FB-40170A

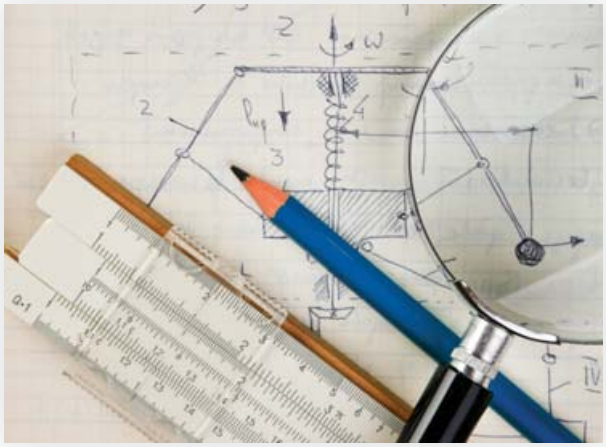
* Drawings, dimensions and weight information for reactors and filters can be found on pages 10 and 11.

B

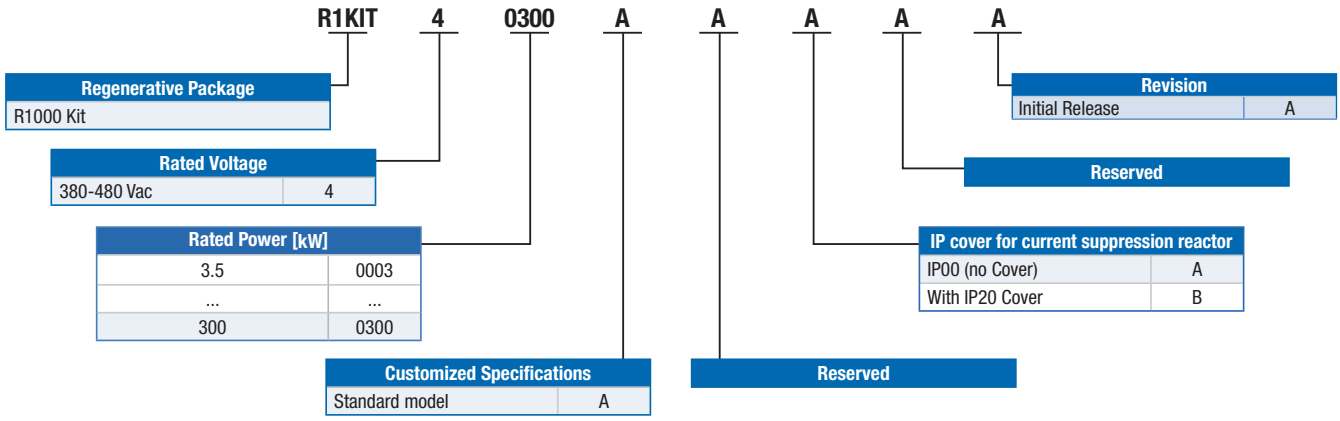
- If the braking power is unknown, a simple selection of the R1000 kit can be done with the table below.

Motor Capacity (kW) / Drive Capacity (kW)	R1000 Kit R1KIT4□□□□AA□AA
4.0 or less	0003
5.5	0005
7.5	0007
11	0010
15	0014
18.5	0017
22	0020
30	0028
37	0035
45	0043
55	0053
75	0073
110	0105
160	0150
220	0210
315	0300

* Drawings, dimensions and weight information for reactors and filters can be found on pages 10 and 11.



Model Number Key for the R1000 Package



R1000 Packages

R1000 is available in pre configured packages including the R1000 and the current suppression reactor. Main reactors have to be selected according to the drive used.

R1000 Package Example

Package Content

- R1000 Regenerative Braking Unit
- Current suppression reactor
- IP20 cover for current suppression reactor (optional)

R1000
Regenerative Unit

Current Suppression Reactor

400 V Class

Capacity	Part Number Kit	Part Number		IP20 cover for current suppression reactor (optional)
[kW]	Order Number	R1000 Unit	Current Suppr. Reactor (1%)	
3.5	R1KIT40003AA□AA	CIMR-RC4A03P5FAA	B1509105	IP20-Box31
5	R1KIT40005AA□AA	CIMR-RC4A0005FAA	B1509105	IP20-Box31
7	R1KIT40007AA□AA	CIMR-RC4A0007FAA	B1509106	IP20-Box31
10	R1KIT40010AA□AA	CIMR-RC4A0010FAA	B1509107	IP20-Box31
14	R1KIT40014AA□AA	CIMR-RC4A0014FAA	B1509108	IP20-Box31
17	R1KIT40017AA□AA	CIMR-RC4A0017FAA	B1509108	IP20-Box31
20	R1KIT40020AA□AA	CIMR-RC4A0020FAA	B1509109	IP20-Box31
28	R1KIT40028AA□AA	CIMR-RC4A0028FAA	B1509110	IP20-Box32
35	R1KIT40035AA□AA	CIMR-RC4A0035AAA	B1504118	IP20-Box32
43	R1KIT40043AA□AA	CIMR-RC4A0043AAA	B1509111	IP20-Box32
53	R1KIT40053AA□AA	CIMR-RC4A0053AAA	B1509112	IP20-Box33
73	R1KIT40073AA□AA	CIMR-RC4A0073AAA	B1509113	IP20-Box35
105	R1KIT40105AA□AA	CIMR-RC4A0105AAA	B1509114	IP20-Box35
150	R1KIT40150AA□AA	CIMR-RC4A0150AAA	B1505002	IP20-Box39
210	R1KIT40210AA□AA	CIMR-RC4A0210AAA	B1505008	IP20-Box39
300	R1KIT40300AA□AA	CIMR-RC4A0300AAA	B1505011	IP20-Box39

R1000 Specifications

Operating Environment

▶ **Ambient Temperature**	-10 to +50 °C (open chassis)
▶ **Humidity**	95% RH or less (non condensating)
▶ **Storage Temperature**	-20 to +60 °C (short-term temperature during transportation)
▶ **Altitude**	Up to 1000 meters (output derating required above 1000 m, max. 3000 m)
▶ **Shock**	Model 4A03P5 to 4A0073: 10 to 20 Hz: 9.8 m/s², 20 to 55 Hz: 5.9 m/s² Model 4A0105 to 4A0300: 10 to 20 Hz: 9.8 m/s², 20 to 55 Hz: 2.0 m/s²
▶ **Protection Design**	IP00 Open Type enclosure, Indoor use (Protected from corrosive gases and dust)
▶ **Standards**	UL508C, IEC 61800-5-1, IEC 61800-3, RoHS

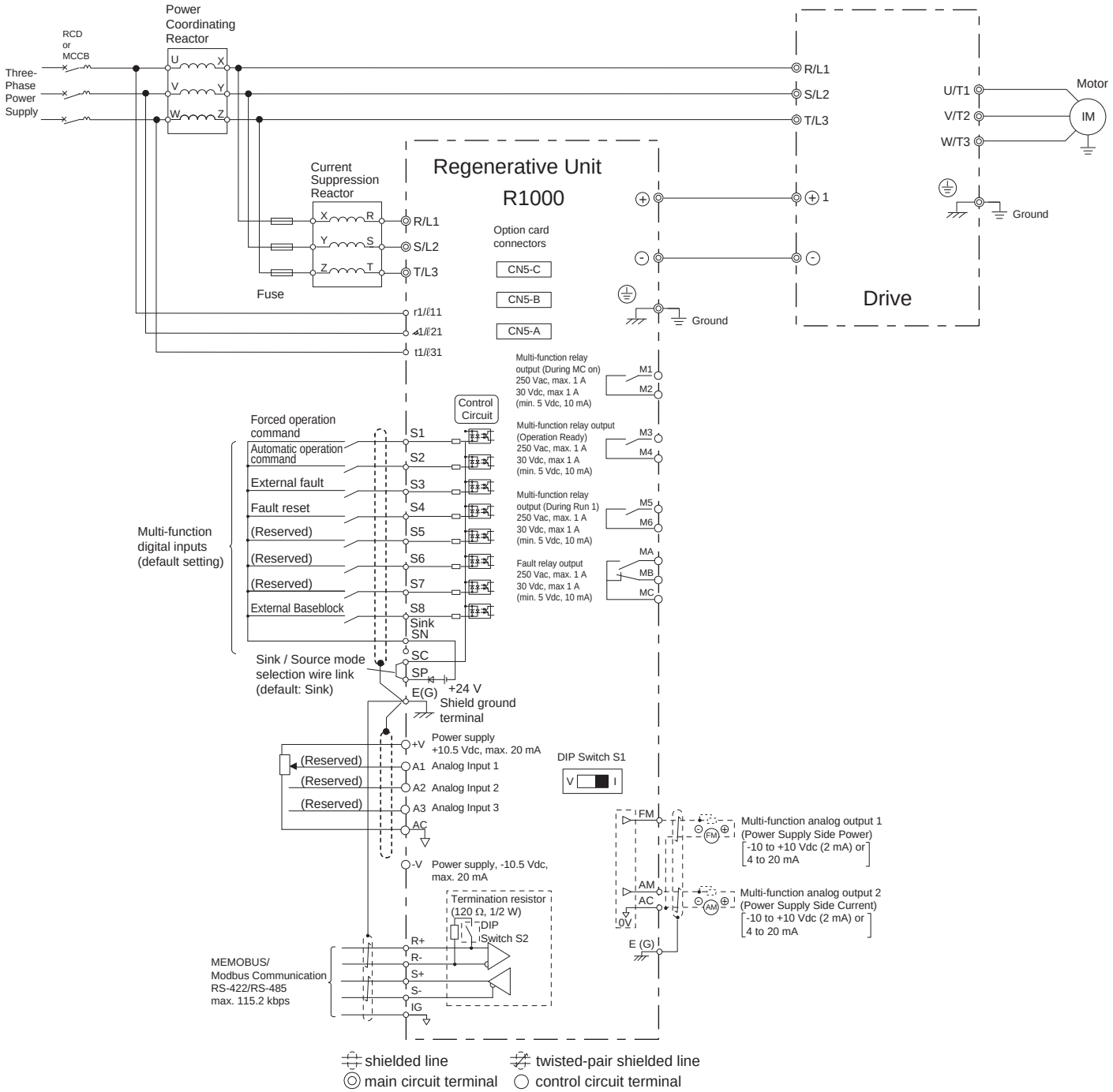
Power Ratings

	400 V Class															
CIMR-RC□A□□□□□AA	**03P5**	**0005**	**0007**	**0010**	**0014**	**0017**	**0020**	**0028**	**0035**	**0043**	**0053**	**0073**	**0105**	**0150**	**0210**	**0300**
Max. Applicable Motor Capacity (kW)	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55	75	110	160	220	315
Regeneration Capacity (kW)	3.5	5	7	10	14	17	20	28	35	43	53	73	105	150	210	300
Rated Current DC (A)	7	11	15	22	30	36	43	58	73	89	109	149	217	320	440	629
Rated Current AC (A)	5	8	11	16	22	27	32	43	54	66	81	110	161	237	326	466
Rated Voltage / Rated Frequency	380 to 480 VAC -15 to +10% / 50/60 Hz ± 2%															
Control Method	120° excitation method															
Input Power Factor	0.9 min. (for rated load)															
Overload Protection	30 s at approx. 150% of rated current															
Regenerative Torque	150% 30 s, 100% 25% ED 60 s, 80% continuous															

Options

	Item	Description	Model Code
Input / Output	▶ **Analogue Monitor**	**2 channel analogue output option** –10 to +10 VDC (Res. 1/2048)	AO-A3
	▶ **Digital Output**	**8 channel digital output option** 6 photo couplers (48 V, 50 mA or less), 2 relay contact outputs max 250 VAC/30 VDC, 1 A	DO-A3
Communication	▶ **Communication Interface Unit**	CANopen	under development
		CC-Link	SI-C3
		DeviceNet	under development
		EtherCAT	SI-ES3*
		EtherNet/IP	SI-EN3/SI-EN3D*
		MECHATROLINK-II	SI-T3
		Modbus/TCP	SI-EM3
		POWERLINK	SI-EL3
		PROFIBUS-DP	under development
		PROFINET	SI-EP3
Others	▶ **24 V Power Supply**	Provides power supply for the control circuit and option boards when main circuit power is off	PS-A10LB PS-A10HB
	▶ **USB Copy Unit**	USB converter for PC Tool usage and copy unit for easy parameter setup duplication and backup in one	JVOP-181
	▶ **IP65 Operator Mounting Frame**	Provides a simple way of installing the LCD Remote Operator of the drive on a cabinet wall or door	JVOP-V11001
	▶ **Heatsink Outside Mounting Kit**	Mount the drive with heatsink outside of the panel	Models 4A03P5 to 0007: EZZ020800B Models 4A0010 to 0014: EZZ020800C Models 4A0017 to 0028: EZZ020800D
	▶ **DriveWizard Plus**	Software used for parametrization	
	▶ **IP20/NEMA1 Kit**		Models 4A0035 to 0043: DACT36126 Models 4A0053 to 0073: DACT36186 Models 4A0105 to 0150: DACT36662

Standard Connection Diagram



Dimensions for 400 V Models from 3.5 kW to 300 kW

R1000 Regenerative Unit 400 V

Part Number Kit	R1000 Model CIMR-RC4A□□□□	Regeneration Capacity [kW]	IP Protection	Figure	Dimensions [mm]												Weight
					W	H	D	W1	H0	H1	H2	H3	D1	t1	t2	d	[kg]
R1KIT40003AA□AA	03P5	3.5	IP20/NEMA1, UL Type1	1	140	260	167	122	–	248	6	–	55	5	–	M5	4
R1KIT40005AA□AA	0005	5															
R1KIT40007AA□AA	0007	7															
R1KIT40010AA□AA	0010	10			180	300	187	160	–	284	8	–	75	5	–	M5	5
R1KIT40014AA□AA	0014	14															
R1KIT40017AA□AA	0017	17		2	220	365	197	192	350	335	8	15	78	5	–	M6	8
R1KIT40020AA□AA	0020	20															
R1KIT40028AA□AA	0028	28															
R1KIT40035AA□AA	0035	35	Open-Chassis IP00	3 (IP00), 4 (IP20)	275	450	258	220	–	435	7.5	–	100	2.3	2.3	M6	20
R1KIT40043AA□AA	0043	43															
R1KIT40053AA□AA	0053	53			325	550	283	260	–	535	7.5	–	110	2.3	2.3	M6	33
R1KIT40073AA□AA	0073	73															
R1KIT40105AA□AA	0105	105			450	705	330	325	–	680	12.5	–	130	3.2	3.2	M10	62
R1KIT40150AA□AA	0150	150															
R1KIT40210AA□AA	0210	210		1	500	800	350	370	–	773	13	–	130	4.5	4.5	M12	85.6
R1KIT40300AA□AA	0300	300															87

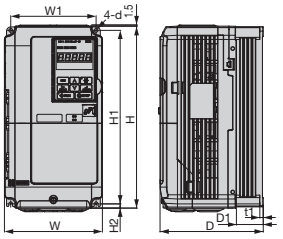


Figure 1

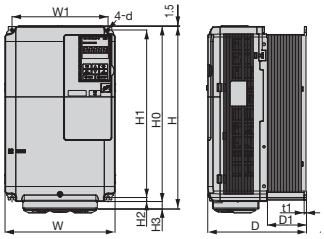


Figure 2

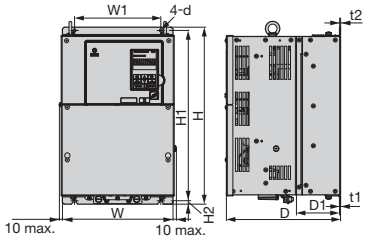


Figure 3

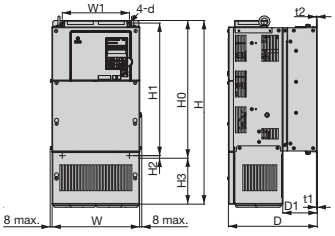


Figure 4

Current Suppression Reactor

Part Number Kit	Current Suppr. Reactor (1%)	Figure	Dimensions [mm]			Weight	IP20 cover (optional)	Dimensions [mm]			Weight
			W	H	D	[kg]		W	H	D	[kg]
R1KIT40003AA□AA	B 1509105	5	78	102	63	0.85	IP20-Box31	170	130	170	0.9
R1KIT40005AA□AA	B 1509105										
R1KIT40007AA□AA	B 1509106		96	118	60	1.31					
R1KIT40010AA□AA	B 1509107					1.32					
R1KIT40014AA□AA	B 1509108		120	150	90	1.9					
R1KIT40017AA□AA	B 1509108										
R1KIT40020AA□AA	B 1509109					1.93					
R1KIT40028AA□AA	B 1509110	6	155	195	102	3.8	IP20-Box32	190	155	220	1.25
R1KIT40035AA□AA	B 1504118			175	95	4					
R1KIT40043AA□AA	B 1509111			195	102	4.43					
R1KIT40053AA□AA	B 1509112				110	5.95	IP20-Box33	205	170	280	1.5
R1KIT40073AA□AA	B 1509113	7	185	160	125	6.9	IP20-Box35	225	145	250	1.45
R1KIT40105AA□AA	B 1509114				140	10.8					
R1KIT40150AA□AA	B 1505002		220	205	115	17	IP20-Box39	240	210	330	2.2
R1KIT40210AA□AA	B 1505008		230	215	140	22					
R1KIT40300AA□AA	B 1505011		240	235	150	29					

* Appearance might change with capacity.

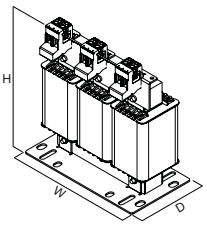


Figure 5 *

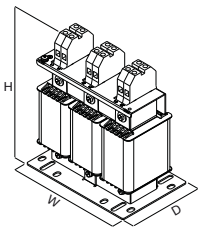


Figure 6 *

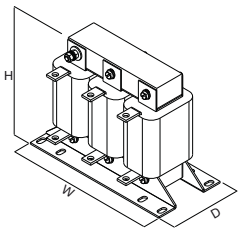
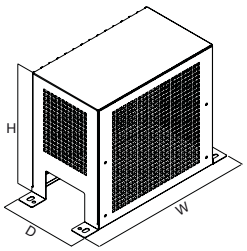


Figure 7 *



IP20 cover

Dimensions of the Power Coordinating Reactor

Power Coordinating Reactor for L1000A/L1000V Lift Inverter

AC Input Reactor 8% IP00 Model	Figure	Dimensions [mm]			Weight	IP20 cover (optional)	Dimensions [mm]			Weight
		W	H	D	[kg]		W	H	D	[kg]
B 1103136	1	155	110	170	6.0	IP20-Box32	190	155	220	1.25
B 1103138	2	185	102	196	7.1	IP20-Box35	225	145	250	1.45
B 1103139		210	125	220	9.6	IP20-Box36	240	165	275	1.75
B 1103140			135		10.7	IP20-Box37	240	175	275	1.8
B 1103141	3	230	166	205	12.5	IP20-Box39	240	210	330	2.2
B 1103142		263			25.0					
B 0910013		330	180	270	36.4	IP20-Box42	290	220	395	2.9
B 1411053		412	220	320	61.5	on request				
2 x B 0910013		660	360	540	72.8	2 x IP20-Box42	580	440	790	5.8

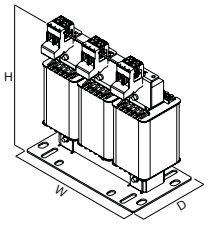


Figure 1 *

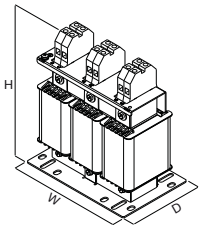


Figure 2 *

Power Coordinating Reactor for A1000/V1000 General Inverter

AC Input Reactor 4% IP00 Model	Figure	Dimensions [mm]			Weight	IP20 cover (optional)	Dimensions [mm]			Weight
		W	H	D	[kg]		W	H	D	[kg]
LR3 40-4/2	1	78	56	100	0.53	IP20-Box31	170	130	170	0.9
LR3 40-4/4		96	60	117	1.31	IP20-Box32	190	155	220	1.25
LR3 40-4/6		96	69	117	1.45					
LR3 40-4/10		120	85	140	2.00					
LR3 40-4/16			95	140	2.70					
LR3 40-4/20		155	95	162	3.80					
LR3 40-4/25			110	177	5.80	IP20-Box33	205	170	280	1.5
LR3 40-4/45	2	185	112	210	8.25	IP20-Box35	225	145	250	1.45
LR3 40-4/63			122		9.65	IP20-Box36	240	165	275	1.75
LR3 40-4/70		210	117	240	10.8	IP20-Box37		175		1.8
LR3 40-4/90	3	267	149	200	16.0	IP20-Box39		210	330	2.2
LR3 40-4/115		291	179	210	21.0	IP20-Box41	280	240	400	2.75
LR3 40-4/160			189		25.5					
LR3 40-4/200		352	194	260	32.0	IP20-Box44	430	250	420	4.2
LR3 40-4/250			207		41.0					
LR3 40-4/300			219		48.0					
LR3 40-4/400			234		56.0					
LR3 40-4/500			245		62.0	IP20-Box45	460			4.4
LR3 40-4/710		480	235	380	102.0	IP20-Box46	630	472	650	15.3
LR3 40-4/1200		555	330	445	186.2					

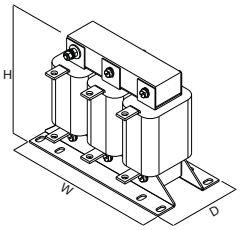
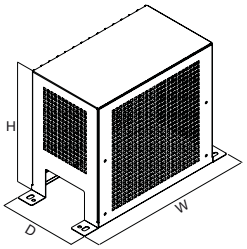


Figure 3 *



IP20 cover

* Appearance might change with capacity.

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