

FR-HC2

High power factor converter

Effective suppression of power supply harmonics



Effective suppression of harmonics with a Total Harmonic Distortion of Current (THDi) less than 4 %



Large energy saving effects by supplying energy back

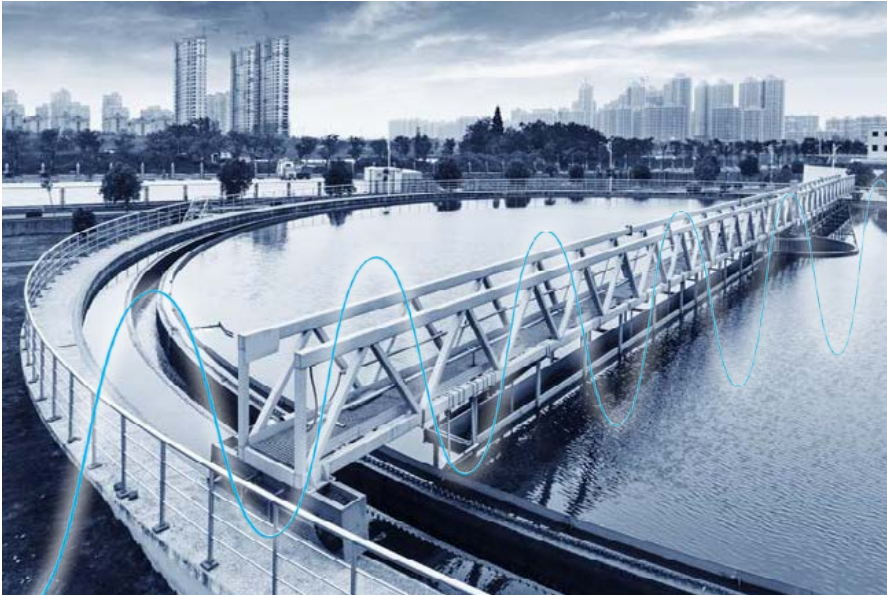


Parallel operation of 10 inverters with one unit



Use of long-life components for a long period of application

Effective use of regenerative energy



The FR-HC2 effectively suppresses inverter's power supply harmonics and saves energy.



High power factor converter FR-HC2

During braking operation the kinetic energy of the mechanical system is supplied back to the inverter. This energy normally remains unused and crepitates as heat, e.g. by a brake resistor. The high power factor converter FR-HC2 from Mitsubishi Electric supplies this generated energy back to mains.

Alternatively frequency inverters connected to the FR-HC2 can be supplied by this energy. One converter is able to supply up to 10 frequency inverters in parallel. The high power factor converter is also equipped with a powerful filter for reducing mains disturbances by suppressing the power supply harmonics. The FR-HC2 converters are available in an output range from 7.5 until 560 kW.

Greatly suppressed power supply harmonics

The FR-HC2 converters, being the self-excitation three-phase bridge circuit under "the Harmonic Suppression Guidelines for Specific Consumers", take the conversion coefficient of the equivalent capacity ($K_5 = 0$). The waveform with high peaks, which is typical

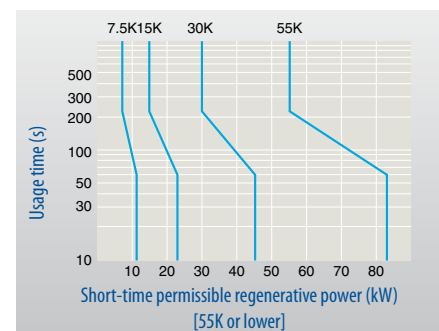
of inverter's input current, is reshaped to be a sine wave with lower input current effective values.

The lowered effective value enables adoption of smaller power-supply-side devices, such as a power supply transformer, MCCB, and cables. Such smaller equipment is more economical and saves the cost of equipment.

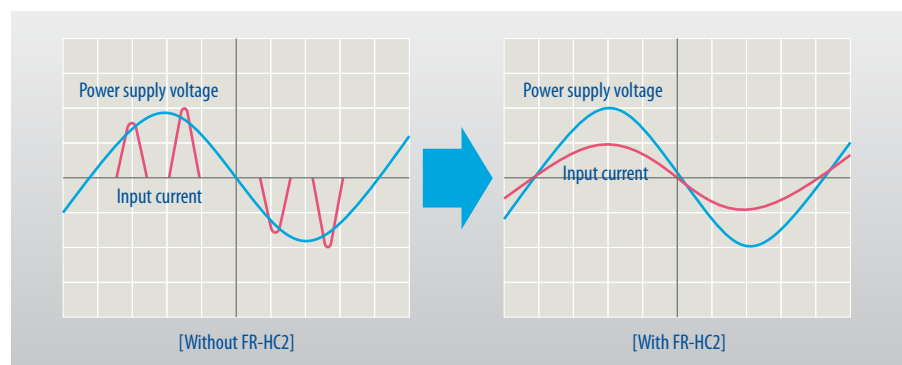
Power regeneration function for energy saving

The power regeneration function, which comes as a standard feature, eliminates the need for brake units and gives a great breaking capability.

The regeneration is available continuously with 100 % torque, and for 60 s with the maximum of 150 % torque. The regenerative power from the motor is returned to the power source, so that such a system significantly saves energy.



Power regeneration function for great breaking capability

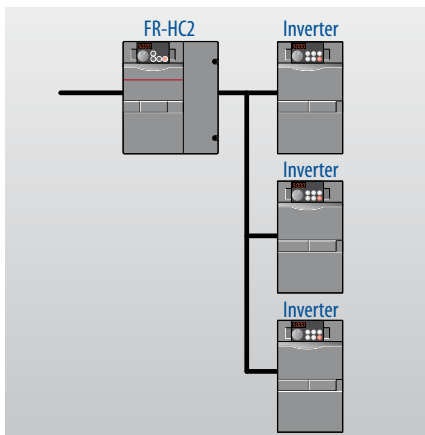


The FR-HC2 reshapes the waveform with high peaks to a sine wave.

Connectable to multiple inverters

The common converter method enables the connection to up to 10 inverters and servo amplifiers. The power returned during regenerative driving can be supplied to another inverter or servo amplifier, saving the overall energy.

The capacity of the FR-HC2 is determined in that way, that it is equal or higher as the cumulative capacity of all connected inverters. For maximum harmonic suppression the cumulative capacity of all connected inverters should be the half rated capacity of the FR-HC2.



Max. 10 units are connectable to one converter.

Compact design for space saving

The FR-HC2 high power factor converters (excluding 15 K) in combination with the appropriate input reactors (75 K or higher) are very compact and save installation space.

Long life parts

Estimated service lifespan of the consumable parts, like cooling fan, main circuit smoothing capacitor and smoothing capacitors on the printed board are 10 years. The service life of the cooling fans can additionally be extended with the ON/OFF control of the cooling fan. Thanks to the long life capacitors, the service life of the whole converter is further extended.

To obtain higher environmental resistance, the FR-HC2 has coated printed circuit boards and copper plated conductors. Magnetic contactors also have anti-corrosive coatings on. Further features, that ensure a longer service life.



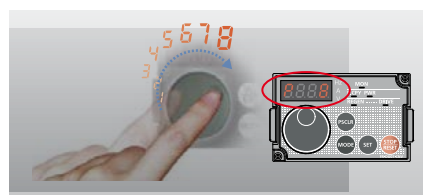
Standard accessories

Life diagnosis function

The degree of deterioration of the main circuit capacitor, cooling fan, and inrush current limit circuit can be diagnosed on the monitor. Using the self-diagnosis function, the part life warning can be output and the deterioration degree can be monitored. Thus, the self-diagnosis function prevents troubles from occurring.

Operation panel with setting dial

Parameters can be copied using the operation panel FR-DU07-CNV. The setting values of the parameters can be stored to the operation panel and the optional parameter unit FR-PU07. Items such as input current, input voltage, input power (with the regenerative display), bus voltage, etc. can be monitored. Operation can be easily performed with the setting dial.



Parameter change with a simple finger movement

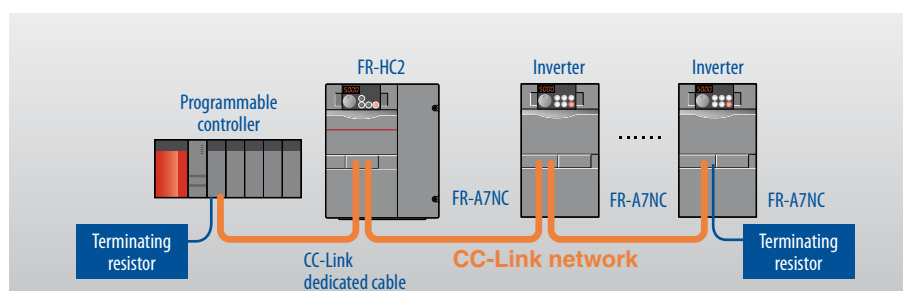
Supporting more network protocols

The converters of the FR-HC2 series support RS-485 as a standard. With the optional available option board FR-A7NC, the FR-HC2 also supports CC-Link.

Network connectivity for the FR-HC2 series means also, that the power can be monitored during driving/regenerative driving. This monitoring shows the energy saving effect very distinctly. Alarm functions and voltage monitors of each phase help to spot the cause of an alarm.

Peripheral devices

The FR-HC2 is delivered in combination with compatible filters and reactors. Furthermore an outside box for installation of the FR-HC2 outside a building is available. For more informations please refer to the Mitsubishi Inverter Family catalogue or contact your Mitsubishi distributor.



Networking with 10 Mbit/s communication speed

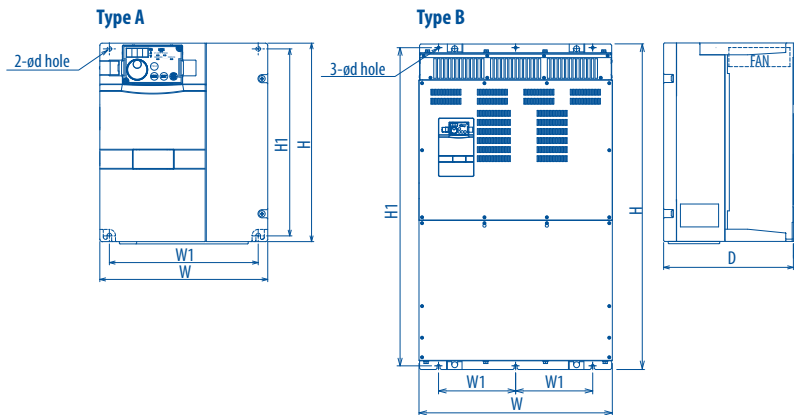
Specifications

Product line	200 V type FR-HC2-□K						400 V type FR-HC2-HmK ^①										
	7.5	15	30	55	75		7.5	15	30	55	75	110	160	220	280	400	560
Applicable inverter capacity	kW						kW										
Rated output capacity ^③	kW						kW										
Rated input voltage	3-phase 200–220 V 50 Hz/200–230 V 60 Hz ^②						3-phase 380–460 V 50 Hz/60 Hz ^②										
Rated input current	A						A										
Overload capacity ^⑤	150 % of rated motor capacity for 60 s																
Permissible power supply voltage fluctuation	170–242 V, 50 Hz 170–253 V, 60 Hz					170–230 V 50/60 Hz	323–506 V, 50/60 Hz					323–460 V, 50/60 Hz					
Permissible power supply frequency fluctuation	±5 %																
Input power factor	0.99 or more (when load ratio is 100 %)																
Power supply capacity	kVA						kVA										
Protective structure ^⑥	Enclosed type (IP20) ^⑦			Open type (IP00)			Enclosed type (IP20) ^⑦			Open type (IP00)							
Cooling	Fan cooling																

- Remarks:
- ① Model name of the 400 V class ends with H.
 - ② The permissible voltage imbalance ratio is 3 % or less. (Imbalance ratio = (highest voltage between lines – average voltage between three lines)/average voltage between three lines x 100).
 - ③ DC output capacity when the input voltage is 200 V AC (400 V for the 400 V class).
 - ④ Change the MC power supply stepdown transformer tap according to the input voltage. (Refer to the Instruction Manual)
 - ⑤ The % value of the overload current rating indicates the ratio of the overload current to the converter's rated input current. For repeated duty, allow time for the converter and the inverter to return to or below the temperatures under 100 % load.
 - ⑥ The protective structure is IP40 for FR-DU07-INV (except the PU connector) and IP00 for the outside box (220 K or lower) and the reactor regardless of their capacities.
 - ⑦ When the hook of the converter front cover is cut off for installation of the plug-in option, the protective structure changes to the open type (IP00).

Dimensions

High power factor converter	W	W1	H	H1	D	d	Type	Weight [kg]	
200 V types	FR-HC2-7.5K	220	195	260	245	170	6	A	7
	FR-HC2-15K	250	230	400	380	190	10	A	12
	FR-HC2-30K	325	270	550	530	195	10	A	24
	FR-HC2-55K	370	300	620	595	250	10	A	39
	FR-HC2-75K	465	400	620	595	300	12	A	53
	FR-HC2-H7.5K/H15K	220	195	300	285	190	6	A	9
400 V types	FR-HC2-H30K	325	270	550	530	195	10	A	26
	FR-HC2-H55K	370	300	670	645	250	10	A	43
	FR-HC2-H75K	325	270	620	595	250	10	A	37
	FR-HC2-H110K	465	400	620	595	300	12	A	56
	FR-HC2-H160K/H220K	498	200	1010	985	380	12	B	120
	FR-HC2-H280K	680	300	1010	984	380	12	B	160
FR-HC2-H400K/H560K	790	315	1330	1300	440	12	B	250	



All dimensions in mm

European Offices

Mitsubishi Electric Europe B.V. Gothaer Straße 8 D-40880 Ratingen Phone: +49 (0)2102 / 486-0	Germany	Mitsubishi Electric Europe B.V. 52, bld. 3 Kosmodamianskaya nab 8 floor RU-115054 Moscow Phone: +7 495 / 721 2070	Russia
Mitsubishi Electric Europe B.V. Radlická 751/13e Avenir Business Park CZ-158 00 Praha 5 Phone: +420 251 551 470	Czech Rep.	Mitsubishi Electric Europe B.V. Carretera de Rubí 76-80 Apdo. 420 E-08190 Sant Cugat del Valles (Barcelona) Phone: +34 (0) 93 / 5653131	Spain
Mitsubishi Electric Europe B.V. 25, Boulevard des Bouvets F-92741 Nanterre Cedex Phone: +33 (0)1 / 55 68 55 68	France	Mitsubishi Electric Europe B.V. (Scandinavia) Fjellvegøen 8 SE-22736 Lund Phone: +46 (0) 8 625 10 00	Sweden
Mitsubishi Electric Europe B.V. Viale Colleoni 7 Palazzo Sirio I-20864 Agrate Brianza (MB) Phone: +39 039 / 60 53 1	Italy	Mitsubishi Electric Turkey Elektrik Ürünleri A.Ş. Şerifali Mahallesi Nutuk Sokak No:5 TR-34775 Ümraniye-İSTANBUL Phone: +90 (0)216 / 526 39 90	Turkey
Mitsubishi Electric Europe B.V. Westgate Business Park, Ballymount IRL-Dublin 24 Phone: +353 (0)1 4198800	Ireland	Mitsubishi Electric Europe B.V. Travellers Lane UK-Hatfield, Herts. AL10 8XB Phone: +44 (0)1707 / 28 87 80	UK
Mitsubishi Electric Europe B.V. ul. Krakowska 50 PL-32-083 Balice Phone: +48 (0) 12 630 47 00	Poland	Mitsubishi Electric Europe B.V. Dubai Silicon Oasis United Arab Emirates - Dubai Phone: +971 4 3724716	UAE

Representatives

GEVA Wiener Straße 89 A-2500 Baden Phone: +43 (0)2252 / 85 55 20	Austria	Beijer Electronics A/S Lykægardsvej 17 DK-4000 Roskilde Phone: +45 (0)46 / 75 76 66	Denmark	Beijer Electronics SIA Rītauzma iela 23 LV-1058 Rīga Phone: +371 (0)6 / 784 2280	Latvia	Fonseca S.A. R. João Francisco do Casal 87/89 PT-3801-997 Aveiro, Esgueira Phone: +351 (0)234 / 303 900	Portugal	I.C. SYSTEMS Ltd. 23 Al-Saad-Al-Alee St. EG-Sarayut, Maadi, Cairo Phone: +20 (0) 2 / 235 98 548	Egypt
OOO TECHNIKON Prospect Nezavisimosti 177-9 BY-220125 Minsk Phone: +375 (0)17 / 393 1177	Belarus	HANS FOLSGAARD A/S Carretera de Rubí 76-80 Apdo. 420 DK-4600 Køge Phone: +45 4320 8600	Denmark	Beijer Electronics UAB Goštautu g. 3 LT-48324 Kaunas Phone: +370 37 262707	Lithuania	Sirius Trading & Services Aleea Lacul Morii Nr. 3 RO-060841 Bucuresti, Sector 6 Phone: +370 37 262707	Romania	SHERF MOTION TECHN. Ltd. Rehov Hamerkava 19 IL-58851 Holon Phone: +972 (0)3 / 559 54 62	Israel
ESCO DRIVES Culliganlaan 3 BE-1831 Diegem Phone: +32 (0)2 / 717 64 60	Belgium	Beijer Electronics Eesti OÜ Pärnu mnt.160i EE-11317 Tallinn Phone: +372 (0)6 / 51 81 40	Estonia	ALFATRADE Ltd. 99, Paola Hill Malta-Paola PLA 1702 Phone: +356 (0)21 / 697 816	Malta	INEA SR d.o.o. Ul. Karadžićeva 12/217 SER-11300 Smederevo Phone: +381 (0)64 / 68 55 187	Serbia	CEG LIBAN Cebaco Center/Block A Autostrade DORA Lebanon-Beirut Phone: +961 (0)1 / 240 445	Lebanon
KONING & HARTMAN B.V. Woluwelaan 31 BE-1800 Woorede Phone: +32 (0)2 / 257 02 40	Belgium	Beijer Electronics OY Vanha Nurmiinjärventie 62 FIN-01670 Vantaa Phone: +358 (0)207 / 463 500	Finland	INTEHESIS SRL bld. Traian 23/1 MD-2060 Kishinev Phone: +373 (0)22 / 66 4242	Moldova	SIMAP SK Jána Denka 1671 SK-911 01 Trenčín Phone: +421 (0)11 / 513 8116	Slovakia	ADROIT TECHNOLOGIES 20 Waterford Office Park 189 Witkoppen Road ZA-Fourways Phone: +27 (0)11 / 658 8100	South Africa
INEA RBT d.o.o. Stegne 11 SI-1000 Ljubljana Phone: +386 (0)1 / 513 8116	Bosnia and Herzeg.	PROVENDOR OY Teljänkatu 8 A3 FIN-28130 Pori Phone: +358 (0)1 / 522 3300	Finland	HIFLEX AUTOM. B.V. Wolwevestraat 22 NL-2984 CD Ridderkerk Phone: +31 (0)180 / 46 60 04	Netherlands	INEA RBT d.o.o. Stegne 11 SI-1000 Ljubljana Phone: +386 (0)1 / 513 8116	Slovenia		
AKHNATON 4, Andrei Lipachev Blvd., PO Box 21 BG-1756 Sofia Phone: +359 (0)2 / 817 6000	Bulgaria	ITECO A.B.E.E. 5, Mavrogenous Str. GR-18542 Piraeus Phone: +359 (0)211 / 1206-900	Greece	IMTECH Marine & Offshore B.V. Sluisdijk 155 NL-3087 AG Rotterdam Phone: +31 (0)10 / 487 19 11	Netherlands	Beijer Electronics Automation AB Box 426 SE-20124 Malmö Phone: +46 (0)40 / 35 86 00	Sweden		
INEA CR Losinjka 4 a HR-10000 Zagreb Phone: +385 (0)1 / 36 940 -01/-02/-03	Croatia	MELTRADE Kft. Fertő utca 14. HU-1107 Budapest Phone: +36 (0)1 / 431-9726	Hungary	KONING & HARTMAN B.V. Haarlerbergweg 21-23 NL-1101 CH Amsterdam Phone: +31 (0)20 / 587 76 00	Netherlands	OMNI RAY AG Im Schörlis S CH-8600 Dübendorf Phone: +41 (0)44 / 802 28 80	Switzerland		
AutoCont C.S. S.R.O. Kafkova 1853/3 CZ-702 00 Ostrava 2 Phone: +420 595 691 150	Czech Republic	T00 Kazpromavtomatika Ul. Zhambyla 28 KAZ-100017 Karaganda Phone: +7 7212 / 50 10 00	Kazakhstan	Beijer Electronics AS Postboks 487 NO-3002 Drammen Phone: +47 (0)32 / 24 30 00	Norway	OOO "CSC-AUTOMATION" 4-B, M. Raskovoyi St. UA-02660 Kiev Phone: +380 (0)44 / 494 33 44	Ukraine		



Mitsubishi Electric Europe B.V. / FA - European Business Group / Gothaer Straße 8 / D-40880 Ratingen / Germany / Tel.: +49(0)2102-4860 / Fax: +49(0)2102-4861120 / info@mitsubishi-automation.com / https://eu3a.mitsubishielectric.com

Art. no. 272783-A / 02.2014 / Specifications subject to change / All trademarks and copyrights acknowledged.

