

# FR-A700

## Frequency Inverter

### Upgrade from FR-A500 to a new class of drive



Industry leading performance gives faster production cycles and reduced material wastage



Design life of 10 years ensures reliable operation for longer and greater return on investment



Four load level options (SLD, LD, ND and HD) offer easier product sizing and greater flexibility

# If you liked the FR-A500, then you will love the FR-A700

Are you still designing systems using the FR-A500? Then you are not alone. Many users of Mitsubishi inverters have found the FR-A500 to be a reliable and flexible solution to their high precision motor control needs. However, as time progresses the number of new FR-A500 installations is decreasing, as many users are now switching to Mitsubishi's latest high performance inverter the FR-A700.

## Packed full with benefits

The FR-A700 brings a performance increase that will both surprise and delight users.

### ■ Long life

The thoughtful design of the new cooling fan has resulted in a design life of 10 years.



FR-A700 – Power, precision and performance

## Building on success

The intelligent design of the FR-A700 has a high degree of compatibility with the FR-A500. Many of the parameters are the same, making it easy to transfer set-ups across especially when using the FR Configurator software which adopts the existing settings and adjust them automatically to the FR-A700.

The removable terminal blocks are also compatible with the FR-A500. An extensive rewiring is not necessary.

This can be extended even longer by using the inverters intelligent ON/OFF control. In addition the life of the capacitor has also been expanded based on 10 years.

### ■ Self monitoring

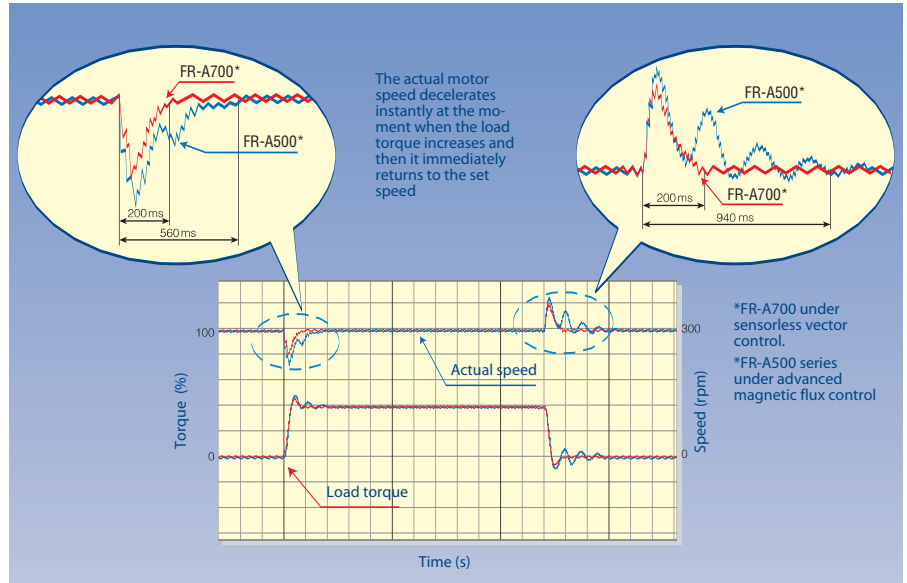
The FR-A700 can monitor the state of deterioration of the main circuit capacitor, control capacitor and in-rush limit circuits. When degradation starts to occur alarm messages are automatically output helpin users to maintain their system in optimal performance.

**Wide network connectivity**

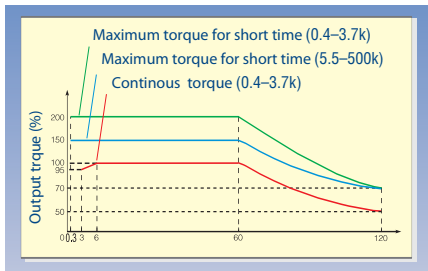
The FR-A700 can be connected to many major networks including Profibus-DP, CC-Link, LonWorks, CANopen, DeviceNET for example. In addition the units have USB connection as standard as well as RS485 which can be used for conventional multi drop applications or in a Modbus RTU configuration.

**Highest level performance**

The FR-A700's high accuracy and fast response speed are achieved because of Real Sensorless Vector Control. This allows high performance to be achieved even with motors without encoder feedback. The FR-A700 supports a speed control range of 1:200 over the 0.3 Hz to 60 Hz driving range and in addition the speed response has now been increased to 120 rad/s.



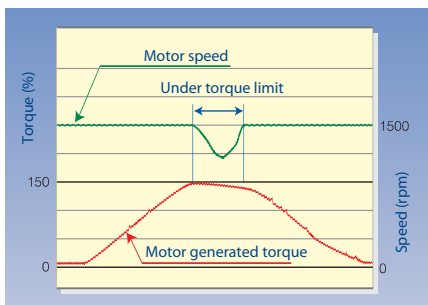
Example of actual speed variation when a load is instantaneously applied



Example of torque characteristics under real sensorless control

**Torque limit function**

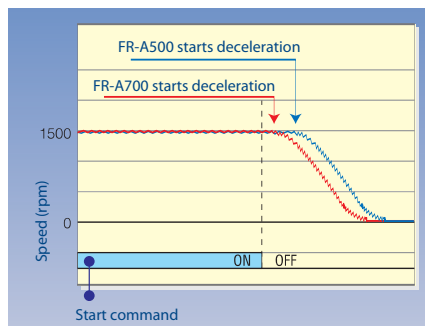
This function allows the FR-A700 to limit the maximum motor torque during speed control operation. This can be used as a method to prevent damage to controlled machinery where sudden torque disturbances occur, such as with grinding applications for example.



Example of torque limit characteristics

**Input response time reduced to 50 %**

With high precision-high speed applications even the slightest delay's can be serious. The FR-A700 has reduced its response time by half compared to FR-A500.



Example of input command signal response characteristic

**Up to 4.7 times faster response to fluctuating loads**

Impacting loads and sudden load changes, as seen in sawmill applications or large quarry conveyors, are handled quicker and easier by the FR-A700 helping to keep production running smoothly under even the most demanding conditions. The FR-A700 responded up to 2.8 times faster to applied loads and almost 4.7 times faster for removed loads.

**Higher accuracy operation**

When using the FR-A700 in Vector control mode with a motor with encoder feedback, users can benefit from greater speed and torque control. The speed control range of

the FR-A700 is now comparable to a simple servo system (1:1500) with an accuracy of  $\pm 0.01\%$ .

**PLC inside as standard**

The FR-A700 also has an integrated PLC function that gives the customer the ability to adapt the FR-A700's performance to his individual needs. Because of this, many small applications can now be completely handled by the FR-A700 inverter without any other control device. The PLC function allows access to the inverters internal data registers as well as digital and analog I/O. Any results obtained from mathematical calculations can be stored in the inverters EPROM memory. This keeps the results safe, even when main power is removed from the system. Programming the PLC function is simple and easy when using Mitsubishi's GX Developer programming software.

**Four approved load ratings**

The FR-A740 range has four approved load ratings.

Rating	Duty	Overload capacity
SLD	Super light	120 %
LD	Light	150 %
ND	Normal	200 %
HD	Heavy	250 %

This allows users to select the most appropriate inverter with confidence and ease. It also means that in many applications users can actually use a smaller inverter frame size, saving space and cost.

# Specifications ///

Item	FR-A500(L-G)	FR-A 700
Control method	V/F control Advanced magnetic flux vector control	V/F control Advanced magnetic flux vector control Real sensorless vector control Vector control (used with a plug-in option FR-A7AP)
Changed/cleared functions	User group 1 (16), user group 2 (16) (Parameter 160 and 173 to 175)	User group (16) only Setting methods were partially changed (Parameter 160 and 172 to 173)
	User initial value setting (Parameter 199)	User initial value setting (Parameter 199) was cleared Substitutable with the copy function of the operation panel (FR-DU07)
	Intelligent mode selection (Parameter 60)	Parameter number change (Parameter 60: Energy saving control selection) (Parameter 292: Automatic acceleration/deceleration)
	Program operation (Parameter 200 to 231)	Function not supported, it can be achieved with PLC option
Terminal block	Removable terminal block	Removable terminal block Downward compatibility (A500 terminal block mountable)
Analog outputs	2 outputs (1 x pulse, 1 x voltage)	2 outputs (1 x current, 1 x voltage)
Parameter unit (PU)	FR-PU04, DU04	FR-PU07 FR-DU07 FR-PU04 (some functions, such as parameter copy, are unavailable.) FR-DU04 unavailable
Plug-in options	Dedicated plug-in option (incompatible)	
	Computer link, relay output option FR-A5NR	Built into the inverter (RS-485 terminals, relay output 2 points)
Installation size dimensions	FR-A740-00023 to 00250, 00470, 00620, 04320 and 05470 are compatible in mounting. For the FR-A740-00310, 00380, an optional intercompatibility attachment (FR-AAT) is necessary (see table below for unit "size" exceptions).	
	Heatsink protrusion attachment is not compatible. Also, the panel cut dimension of 00023 to 00126, 00310, 00380, 02160 or more is not compatible.	

With the exception of 12 units, all FR-A740 inverters have the same footprint as the equivalent FR-A540 product. The 12 exceptions are smaller than their FR-A540 equivalent – see the table for details.

Capacity (kW)	FR-A540				FR-A740				Drilling compatible
	Model	W	H	D	Model	W	H	D	
11	FR-A540-11k	250	400	190	FR-A740-00310	220	300	190	—
15	FR-A540-15k	250	400	190	FR-A740-00380	220	300	190	—
30	FR-A540-30k	340	550	195	FR-A740-00770	325	550	195	✓
37	FR-A540-37k	450	550	250	FR-A740-00930	435	550	250	✓
45	FR-A540-45k	450	550	250	FR-A740-01160	435	550	250	✓
55	FR-A540-55k	450	550	250	FR-A740-01800	435	550	250	✓
75	FR-A540-75k	480	740	360	FR-A740-02160	465	620	300	—
90	FR-A540-90k	480	740	360	FR-A740-02600	465	620	300	—
110	FR-A540-110k	480	740	360	FR-A740-03250	465	740	360	✓
132	FR-A540-132k	498	1010	380	FR-A740-03610	465	740	360	—
280	FR-A540-280k	790	1330	440	FR-A740-06830	680	1010	380	—
450	FR-A540-450k	1100	1900	500	FR-A740-10940	995	1580	440	—

## EUROPEAN BRANCHES

MITSUBISHI ELECTRIC EUROPE B.V. 25, Boulevard des Bouvets F-92741 Nanterre Cedex Phone +33 (0)1 / 55 68 55 68	<b>FRANCE</b>
MITSUBISHI ELECTRIC EUROPE B.V. Gothaer Straße 8 D-40880 Ratingen Phone +49 (0)21 02 / 4 86-0	<b>GERMANY</b>
MITSUBISHI ELECTRIC EUROPE B.V. Westgate Business Park, Ballymount IRL-Dublin 24 Phone +353 (0)1 / 419 88 00	<b>IRELAND</b>
MITSUBISHI ELECTRIC EUROPE B.V. Viale Colleoni 7 I-20041 Agrate Brianza (MI) Phone +39 039 / 60 53 1	<b>ITALY</b>
MITSUBISHI ELECTRIC EUROPE B.V. Carretera de Rubí, 76-80 E-08190 Sant Cugat del Vallés Phone +34 93 / 565 31 31	<b>SPAIN</b>
MITSUBISHI ELECTRIC EUROPE B.V. Travelers Lane Hatfield Herts. AL10 8 XB Phone +44 (0)1707 / 27 61 00	<b>UK</b>

## EUROPEAN REPRESENTATIVES

GEVA GmbH Wiener Straße 89 AT-2500 Baden Phone +43 (0)2252 / 85 55 20	<b>AUSTRIA</b>	Louis poulsen Geminievej 32 DK-2670 Greve Phone +45 (0)70 / 10 15 35	<b>DENMARK</b>	BEIJER ELECTRONICS UAB Savanoriu Pr. 187 LT-02300 Vilnius Phone +370 (0)5 / 232 3101	<b>LITHUANIA</b>	CONSYS Promyshlennaya St. 42 RU-198099 St Petersburg Phone +7 812 / 325 3653	<b>RUSSIA</b>	INEA SR D.O.O. Karadjordjeva 12/260 SER-113000 Smederevo Phone +381 (0)26 / 617 163	<b>SERBIA</b>	CSC Automation Ltd 15, M. Raskova St., Fl. 10, Off. 1010 UA-02002 Kiev Phone +380 (0)44 / 494 33 55	<b>UKRAINE</b>
TEHNIKON Oktjabrskaya 16/5, Off. 704 BY-220030 Minsk Phone +375 (0)17 / 2104626	<b>BELARUS</b>	BEIJER ELECTRONICS Pärnu mnt. 160i EE-11317 Tallinn Phone +372 (0)6 / 51 81 40	<b>ESTONIA</b>	INTEHISIS SRL Bld. Traian 23/1 MD-2060 Kishinev Phone +373 (0)20 / 587 6424	<b>MOLDOVA</b>	Electrotechnical Sys. Siberia Partizanskaya st. 27, Office 14 RU-121355 Moscow Phone +7 495 / 744 55 54	<b>RUSSIA</b>	AutoCont Control Radlinského 47 SK-02601 Dolný Kubín Phone +421 43 / 5868 210	<b>SLOVAKIA</b>	SHERF MOTION TECHN. LTD Rohov Hamerikava 19 IL-58851 Holon Phone +972 (0)3 / 559 54 62	<b>ISRAEL</b>
Koning & Hartman b.v. Woluwelaan 31 BE-1800 Vilvoorde Phone +32 (0)2 / 257 02 40	<b>BELGIUM</b>	ITECO A.B.E.E. S. Mavrogenous Str. GR-18542 Piraeus Phone +30 211 / 1206 900	<b>GREECE</b>	Koning & Hartman b.v. Haarlerbergweg 21-23 NL-1101 CH Amsterdam Phone +31 (0)20 / 587 76 00	<b>NETHERLANDS</b>	ELEKTROSTYLE Poslannikov Per., 9, Str. 1 RU-105005 Moscow Phone +7 495 / 542 43 23	<b>RUSSIA</b>	INEA d.o.o. Stegne 11 SI-1000 Ljubljana Phone +386 (0)1 / 513 8100	<b>SLOVENIA</b>		
AKHMATON 4, A. Ljapchev Blvd. BG-1756 Sofia Phone +359 (0)2 / 97 44 058	<b>BULGARIA</b>	Meltrade-LTD Fertő utca 14, HU-1107 Budapest Phone +36 (0) 1 / 431-9726	<b>HUNGARY</b>	Beijer Electronics A/S Teglværksveien 1 NO-3002 Drammen Phone +47 (0) 32 / 24 30 00	<b>NORWAY</b>	RPS-AUTOMATIKA Pr. Budenovskiy, 97, Office 311 RU-344065 Rostov on Don Phone +7 8632 / 22 63 72	<b>RUSSIA</b>	Beijer Electronics AB Kragatan 4A S-20124 Malmö Phone +46 (0)40 / 35 86 00	<b>SWEDEN</b>		
INEA CR D.O.O. Losingjska 4 a HR-10000 Zagreb Phone +385 (0)1 / 36 940 01	<b>CROATIA</b>	KAZPROMAUTMATICS LTD. 2, Scladskaya str. KAZ-470046 Karaganda Phone +7 3212 / 50 11 50	<b>KAZAHSTAN</b>	MPL Technology SP Z.O.O. Ul. Krakowska 50 PL-32-083 Balice Kraków Phone +48 (0) 12 / 630 47 00	<b>POLAND</b>	STC Drive Technique Poslannikov Per. 9, str. 1 RU-105005 Moscow Phone +7 495 / 790 72 10	<b>RUSSIA</b>	ECONOTEC AG Dartlitzstr. 4 CH-8309 Nürensdorf Phone +41 (0)44 / 838 48 11	<b>SWITZERLAND</b>		
AutoCont Jelinkova 59/3 CZ-72100 Ostrava Svinov Phone +420 (0)59 / 5691 150	<b>CZECH REPUBLIC</b>	BEIJER ELECTRONICS SIA Lienes iela 28 LV-1009 Riga Phone +371 (0)784 / 2280	<b>LATVIA</b>	Silius Trad. & Serv. SRL Str. Biharia Nr. 67-77 RO-013981 Bucuresti 1 Phone +40 (0) 21 / 2 01 1147	<b>ROMANIA</b>	CRAFT D.O.O. Toplicane str. 4 lok 6 SER-1800 Nis Phone +381 (0)18 / 292-24-4/5	<b>SERBIA</b>	GTS Dartlitzce Cad. No. 43A KAT-2 TR-34384 Okmeydanı-Istanbul Phone +90 (0)212 / 320 16 40	<b>TURKEY</b>		
										CBI Ltd Private Bag 2016 ZA-1600 Isando Phone +27 (0) 11 / 9 28 20 00	<b>SOUTH AFRICA</b>



Mitsubishi Electric Europe B.V. /// FA - European Business Group /// Gothaer Straße 8 /// D-40880 Ratingen /// Germany  
Tel.: +49(0)2102-4860 /// Fax: +49(0)2102-486112 /// info@mitsubishi-automation.com /// www.mitsubishi-automation.com

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