

## SPECIFICATION RATINGS

### 220 - 240 (±10%) Vac Supplies - Single Phase and Three Phase

Part Number	Constant Torque Ratings		Quadratic (Fan) Torque Ratings		Frame Size	Built-in Reactor	Built-in Brake Switch
	Hp	Output Current (A)	Hp	Output Current (A)			
690+0001/230/...*	1	4	-	-	B	-	YES
690+0002/230/...*	2	7	-	-	B	-	YES
690+0003/230/...*	3	10.5	-	-	B	-	YES
690+0005/230/...*	5	16.5	-	-	B	-	YES
690+0007/230/...	7.5	22	10	28	C	DC	YES
690+0010/230/...	10	28	15	42	C	DC	YES
690+0015/230/...	15	42	20	54	D	DC	Optional
690+0020/230/...	20	54	25	68	D	DC	Optional
690+0025/230/...	25	68	-	-	D	DC	Optional
690+0030/230/...	30	80	40	104	E	DC	Optional
690+0040/230/...	40	104	50	130	F	AC	Optional
690+0050/230/...	50	130	60	154	F	AC	Optional
690+0060/230/...	60	154	75	192	F	AC	Optional

\*Add a '1' suffix for controllers using a single-phase supply.

### 380 - 460 (±10%) Vac Supplies - Three Phase

Part Number	Constant Torque Ratings		Quadratic (Fan) Torque Ratings		Frame Size	Built-in Reactor	Built-in Brake Switch
	Hp	Output Current (A)	Hp	Output Current (A)			
690+0001/460/...	1	2.5	-	-	B	-	YES
690+0002/460/...	2	4.5	-	-	B	-	YES
690+0003/460/...	3	5.5	-	-	B	-	YES
690+0005/460/...	5	9.5	-	-	B	-	YES
690+0007/460/...	7.5	11	-	-	B	-	YES
690+0010/460/...	10	14	-	-	B	-	YES
690+0015/460/...	15	21	20	27	C	DC	YES
690+0020C/460/...	20	27	25	34	C	DC	YES
690+0025/460/...	25	38	30	45	D	DC	Optional
690+0030/460/...	30	45	40	52	D	DC	Optional
690+0040D/460/...	40	52	50	65	D	DC	Optional
690+0050/460/...	50	73	60	87	E	DC	Optional
690+0060/460/...	60	87	75	105	E	DC	Optional
690+0075/460/...	75	100	100	125	F	AC	Optional
690+0100/460/...	100	130	125	156	F	AC	Optional
690+0125/460/...	125	156	150	180	F	AC	Optional
690+0150/460/...	150	180	-	-	F	AC	Optional
690+0175/460/...	175	216	200	260	G	External	Optional
690+0200/460/...	200	250	250	302	G	External	Optional
690+0250/460/...	250	316	300	361	G	External	Optional
690+0300/460/...	300	361	350	420	G	External	Optional
690+0350/460/...	350	420	400	480	H	External	Optional
690+0400/460/...	400	480	450	545	H	External	Optional
690+0450/460/...	450	520	500	590	H	External	Optional
690+0500/460/...	500	590	550	650	J	External	Optional
690K0600/460/2G...*	600	685	700	798	K	AC	Optional
690K0700/460/2H...*	700	798	800	912	K	AC	Optional
690K0800/460/2H...*	800	988	900	1120	K	AC	Optional
690K0900/460/3G...*	900	1028	1000	1197	K	AC	Optional
690K1000/460/2J...*	1000	1120	1100	1235	K	AC	Optional
690K1000/460/3H...**	1000	1197	1200	1368	K	AC	Optional
690K1300/460/3H...**	1300	1482	1500	1681	K	AC	Optional
690K1500/460/3J...**	1500	1681	1600	1852	K	AC	Optional

All horsepower ratings assume a 1800 RPM base speed motor.

### DIMENSIONS

Frame Size	Overall Dimensions			Mounting Centers		
	H	W	D	H1	H2	W1
Frame B	233 (9.17)	176.5 (6.95)	181 (7.15)	223 (8.78)	-	129.5 (5.10)
Frame C	348 (13.70)	201 (7.91)	208 (8.19)	335 (13.19)	-	150 (5.90)
Frame D	453 (17.8)	252 (9.92)	245 (9.65)	440 (17.3)	-	150 (5.90)
Frame E	668 (26.3)	257 (10.1)	312 (12.3)	630 (24.8)	-	150 (5.90)
Frame F	720 (28.3)	257 (10.1)	355 (14.)	700 (27.5)	-	150 (5.90)
Frame G	1042 (41)	456 (17.9)	465 (18.3)	300 (11.8)	16 (0.6)	420 (16.5)
Frame H	1177 (46.3)	572 (22.5)	465 (18.3)	300 (11.8)	16 (0.6)	536 (21.1)
Frame J	1288 (50.7)	677 (26.6)	465 (18.3)	300 (11.8)	16 (0.6)	641 (25.2)
Frame K*	2007 (79)	3251 (128)	610 (24)	-	-	-
Frame K**	2007 (79)	3658 (144)	610 (24)	-	-	-

Dimensions are in millimeters (inches)

Kframe dimensions include modified NEMA 12 ventilated enclosures with flange disconnect option

\* 6-Pulse input (12-pulse optional)

\*\* 6-Pulse input (18-pulse optional)

See back cover for diagrams

### Overload

- Constant Torque Ratings; 150% for 60 seconds, 180% for 1 second
- Quadratic Torque Ratings; 115% for 60 seconds

### Output Frequency

- 0 - 1000 Hz; V/Hz mode
- 0 - 350 Hz; closed loop vector mode
- 0 - 120 Hz; sensorless vector mode

### Ambient

- Constant Torque Ratings; 0 - 45°C (40°C with IP40 Cover)
- Quadratic Torque Ratings; 0 - 40°C (35°C with IP40 Cover)
- Derate from temperatures above to 50°C max.
- Altitude up to 1000m ASL
- Derate 1% per 100m above 1000m

### Switching Frequency

- Package size C - E; 3 or 6 KHz
- Package size F - K; 3 KHz
- Some exceptions apply
- All with audibly silent switching frequency

### Dynamic Braking

- Each drive can be fitted with an internal dynamic brake switch, external for frames G, H and J
- Package Size B and C; Standard
- Package Size D - K; Optional

### Inputs/Outputs

- Analog Inputs (4 Total - All user configurable)
  - 10 bit (12 bit with systems expansion module); 0 - 10V, 0 - ±10V, 0 - 20mA or 4 - 20mA
- Analog Outputs (3 Total - All user configurable)
  - 10 bit; 0 - 10V, 0 - ±10V, 0 - 20mA or 4 - 20mA
- Digital Inputs (8 Total - All user configurable)
  - Nominal 24V dc (30V dc max.)
- Digital Outputs (3 Total - All user configurable)
  - Volt free relay contacts, 3A at 230Vac max.
- Reference Supplies
  - +10V dc
  - 10V dc
  - +24V dc

### Optional Equipment

- Serial Communication Technology Box
  - ProfibusDP
  - DeviceNET
  - Controlnet
  - Canopen
  - Ethernet
  - LINK
  - Lonworks
  - El Bisynch/Modbus/RS422/RS485
- Encoder Feedback Technology Box
- Systems Expansion Module providing;
  - 6 Digital I/O
  - 4 12 bit Analog Inputs
  - 2 Reference Encoder Inputs
  - 2 High Speed Register Mark Inputs
- EMC Compliant Filters
- IP54 Protected Modules
- Long Cable Output Chokes

### Standards

- The 690+ series meets the following standards when installed in accordance with the relevant product manual.
- CE Marked to EN50178 (Safety, Low Voltage Directive)
- EN61800-3 (EMC)
- UL listed to US and Canadian safety standard UL508C



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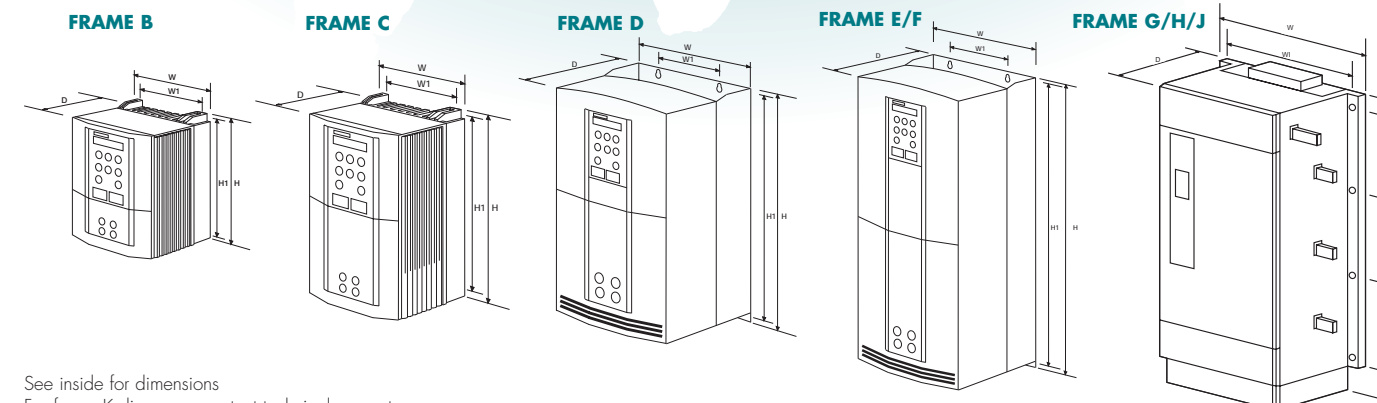
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See inside for dimensions  
For frame K diagrams, contact technical support



# AC690+ Integrator Series

## AC DRIVES 1HP - 1600HP



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Iss4 3/2005

# 690+ AC Drive Integrator Series

Three phase  
380-460V  
ratings from frac-  
tional  
to 1600Hp  
220-240V  
ratings to 60Hp.

The 690+ series is a single range of ac drives designed to meet the requirements of all variable speed applications from simple single motor speed control through to the most sophisticated integrated multi drive systems. The heart of the 690+ is a highly advanced 32-bit microprocessor based motor control model.

This provides an exceptional dynamic performance platform to which can be added a host of communications and control options, enabling you to tailor the drives to meet your exact requirements.

The INTEGRATOR series is a single family of variable speed drives that includes both AC (690+ range) and DC (590+ range) drive technologies. One family that provides the benefits of common programming, set-up and communications - one family that accommodates all your variable speed drive requirements.



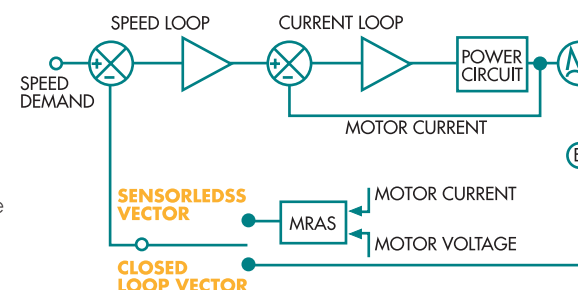
THE 690+ CAN BE USER CONFIGURED FOR 4 DIFFERENT OPERATING MODES

## Open Loop (volts/frequency) Control

This mode is ideal for basic motor speed control. The quick set-up menu and plain language display ensures the quickest and easiest, trouble free start up.

## Sensorless Vector Control

High starting torque and tight speed regulation is provided by a sophisticated MRAS (Model Reference Adaptive System) motor control strategy. MRAS provides accurate speed simulation (without the need for any speed measuring transducer) by continually modelling the motor.



To achieve the ultimate performance the 690+ utilises speed and current loops in both sensorless and closed loop vector modes. In sensorless vector mode the speed feedback is derived from the highly advanced Model Reference Adaptive System (MRAS)

## THE 690+ MODULAR SYSTEM ALLOWS YOU TO TAILOR THE DRIVE TO MEET YOUR EXACT REQUIREMENTS YOU USE, AND PAY, ONLY FOR THE FUNCTIONS YOU NEED

### Encoder Feedback Option

The 690+ is converted from open loop control to high performance closed loop control by simply adding the plug-in encoder feedback technology box.

### Systems Expansion Board

The optional add-on "systems" expansion board is available for more advanced applications and includes phase locking between drives and register control. It fits behind the main control board and provides the following functionality;

- 6 Configurable Digital Inputs/Outputs
- 4 High Resolution (12 bit plus sign) Analog Inputs
- 2 Encoder Inputs
- 2 High Speed Register Mark Inputs

## Closed Loop Vector Control

Full closed loop flux vector performance can be achieved with the 690+ by simply adding an encoder feedback 'technology box'. This provides 100% continuous full load standstill torque plus a highly dynamic speed loop (up to 45 Hz bandwidth); more than sufficient for the most demanding applications.

## Regenerative control

Reuses the energy generated by the motor (during the deceleration of applicable load) in applications such as unwinds, test stands and other such applications. Provides Harmonic-free operation which exceeds IEEE 519 standards.

## Communication Options

Connect to the SSD Drives' LINK fiber optic network or a whole host of communication technology box options of the most common Fieldbus protocols, allowing seamless multi-vendor integration into networked systems.

- PROFIBUS-DP
- CANOPEN
- CONTROLNET
- LONWORKS
- RS422/RS485
- EI BISYNCH
- LINK
- ETHERNET
- DEVICENET
- MODBUS

## Mechanical Protection Options

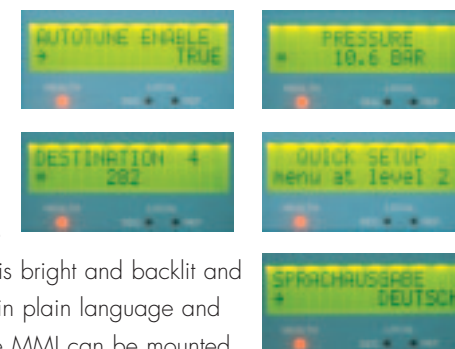
A choice of mechanical protection options allows the drive to be mounted in a variety of different environments.

- IP20 - For mounting inside an electrical enclosure
- IP40/NEMA 1 - The optional top cover, with cable gland plate as standard, enables the drive to be directly wall or machine mounted in applicable environments. The cover raises the protection level on the horizontal surface to IP40 and meets North American NEMA 1 requirements.
- IP54 - a highly cost effective range of robust IP54 enclosures is ideal for mounting the drives in more aggressive environments. A multitude of control options can be added to the drive without the need for secondary enclosures. Higher levels of protection are available as special build options.
- Through Panel Mounting - this option allows the drive to be mounted with the major heat producing components and heatsink outside the enclosure and keeps the control electronics clean and cool.

## Man Machine Interface

The 690+ MMI provides access to all the drives functions in a logical and intuitive manner. The readout is bright and backlit and displays all functions in plain language and engineering units. The MMI can be mounted on the drive itself or alternatively it can be supplied loose, with a mounting kit, for mounting remotely on a panel door, for example.

- Multi-lingual plain language display
- Quick set-up mode
- Autotune commissioning
- Customized screens
- Configuration



## Dual Torque Ratings

Units Size Frame C and above can be user selected for either Constant Torque applications (with 150% overload capability) or alternatively for higher Quadratic 'Fan' Torque ratings (with 115% overload capability).

## THE POWER OF FUNCTION BLOCK PROGRAMMING

Function Block Programming is a tremendously flexible control structure that allows an almost infinite combination of user functions to be realized with ease. Each control function (an input, output, process PID for example) is represented as a software block that can be freely interconnected to all other blocks to provide any desired action.

The drive is despatched with the function blocks pre-configured as a standard ac drive so you can operate it straight from the box without further adjustments. Alternatively you can pick pre-defined Macros or even create your own control strategy, often alleviating the need for an external PLC.

There are over 100 function blocks including...

- INPUTS
- OUTPUTS
- RAMPS
- ENCODER
- RAISE/LOWER
- SKIP FREQUENCIES
- PROCESS PID
- LOCAL/REMOTE
- BRAKE CONTROL
- AUTO RESTART
- SPINNING LOAD START
- MENU STRUCTURE
- CUSTOM SCREENS
- TRIP HISTORY
- PASSWORD
- VALUE FUNCTIONS
  - If
  - Addition
  - Difference
  - Multiplication
  - Division
  - Greater than
  - Less than
  - Counter
  - Timer
- LOGIC FUNCTIONS
  - Not
  - And
  - Nand
  - Or
  - Nor
  - Xor
  - Trigger
  - Flip-flop
- Standard Macros
  - BASIC SPEED CONTROL
  - FORWARD/REVERSE
  - RAISE/LOWER
  - PROCESS PID
  - PRESET SPEEDS
  - CLOSED LOOP SPEED FEEDBACK
  - WINDER CONTROL