Specification

Ratings
220-240 (±10%) Vac Supplies – Single (…-1) or Three Phase (…-3)

Part Number	Constant Torque Ratings		Variable Torque Ratings		
	Nominal Power (kW)	Output Current (A)	Nominal Power (kW)	Output Current (A)	Frame Size
690P - 21(3)1400...	0.75	4.0	-	-	B
690P - 21(3)1700...	1.5	7.0	-	-	B
690P - 21(3)2105...	2.2	10.5	-	-	B
690P - 232165...	4.0	16.5	-	-	B
690P - 232220...	5.5	22	7.5	28	C
690P - 232280...	7.5	28	11	42	C
690P - 232420...	11	42	15	54	D
690P - 232540...	15	54	18.5	68	D
690P - 232680...	18.5	68	-	-	D
690P - 232800...	22	80	30	104	E
690P - 233104...	30	104	37	130	F
690P - 233130...	37	130	45	154	F
690P - 233154...	45	154	55	192	F

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

Part Number	Constant Torque Ratings		Variable Torque Ratings		
	Nominal Power** (kW)	Output Current (A)	Nominal Power** (kW)	Output Current (A)	Frame Size
690P - 431250...	0.75	2.5	-	-	B
690P - 431450...	1.5	4.5	-	-	B
690P - 431550...	2.2	5.5	-	-	B
690P - 431950...	4.0	9.5	-	-	B
690P - 432120...	5.5	12	-	-	B
690P - 432160...	7.5	16	11	23	C
690P - 432230...	11	23	15	31 (UL=27)*	C
690P - 432300...	15	30	18.5	37	C
690P - 432380...	18.5	38	22	45	D
690P - 432450...	22	45	30	59 (UL=52)*	D
690P - 432590...	30	59	37	73	D
690P - 432730...	37	73	45	87	E
690P - 432870...	45	87	55	105	E
690P - 433105...	55	105	75	145	F
690P - 433145...	75	145	90	165	F
690P - 433180...	90	180	110	205	F
690P - 433216...	110	216	132	260	G
690P - 433250...	132	250	150	302	G
690P - 433316...	160	316	180	361	G
690P - 433361...	180	361	220	420	G
690P - 433375...	200	375	250	480	H
690P - 433420...	220	420	250	480	H
690P - 433480...	250	480	300	545	H
690P - 433520...	280	520	315	590	H
690P - 433590...	315	590	355	650	J

For power ratings above 315kW consult your local sales office.

* UL = XX; XX = max current for UL certification.
**All powers stated are nominal at 380 Vac. Higher power outputs may be possible at higher voltage. Always check output current. Please refer to your SSD Drives sales outlet for details of 500V drives.

Dimensions

Model	Overall Dimensions		Mounting Centres			
	H	W	D	H1	W1	G
Frame B	233.0	176.5	181.0*	223.0	129.0	G
Frame C	348.0	201.0	208.0	335.0	150.0	-
Frame D	453.0	252.0	245.0	471.0	150.0	-
Frame E	668.0	257.0	312.0	630.0	150.0	-
Frame F	720.0	257.0	355.0	700.0	150.0	-
Frame G	1042.0	456.0	465.0			16.0
Frame H	1177.0	572.0	465.0			16.0
Frame J	1288.0	675.0	465.0			16.0

Dimensions are in millimetres.
Please refer to your SSD Drives sales outlet for dimensional drawings for each Frame.
*197.0 when fitted with system brd.

Overload
- Constant Torque Ratings; 150% for 60 seconds, 180% for 0.5 second. Frame C to F
- Variable Torque Ratings; 110% for 60 seconds

Output Frequency
- 0 - 480Hz

Ambient
- Constant Torque Ratings; 0 - 45°C (40°C with IP40 Cover)
- Variable 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 B; 3, 6 or 9kHz
- Package Size F, G, H and J and K; 3kHz
- Package Size C, D, and E; 3 or 6kHz All with audibly silent switching frequency

Dynamic Braking
- Each drive can be fitted with an internal dynamic brake switch. Package Size B and C – Standard Package Size D to K – Optional

Inputs/Outputs
- Analogue Inputs (4 Total – All user configurable) 10 bit (12 bit with systems expansion module); 0 - 10V, 0 - ±10V, 0 - 20mA, 4 - 20mA.
- Analogue Outputs (3 Total – All user configurable) 10 bit; 0 - 10V, 0 - ±10V, 0 - 20mA, 4 - 20mA.
- Digital Inputs (7 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
- (6901) Operator/Programming Controller
- Serial Communication Technology Box
  - Profibus
  - Devicenet
  - Controlnet
  - Canopen
  - Ethernet
  - Link
  - Lonworks
  - EI Bisynch/Modbus/RS422/RS485
- Encoder Feedback Technology Box
- Systems Expansion Module providing;
  - 6 Digital I/O
  - Convert existing Analogue Inputs to 12 bit
  - 2 Reference Encoder Inputs
  - 2 High Speed Register Mark Inputs
- EMC Compliant Filters
- IP40 (NEMA 1) Protection Covers
- IP54 Protected Modules
- Long Cable Output Chokes

Standards
- The AC690+ series meets the following standards when installed in accordance with the relevant product manual.
- CE Marked to EN50178 (Safety, Low Voltage Directive).
- CE Marked to EN61800-3 (EMC Directive).
- UL listed to US safety standard UL508C.
- cUL listed to Canadian standard C22.2 #14.

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Catalogue HA500346 (Issue 2 October 2008)

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AC690+ Integrator Series

AC Drives 0.75 – 1000kW

ENGINEERING YOUR SUCCESS.

AC690+ Drive Integrator series

0.75 – 1000kW

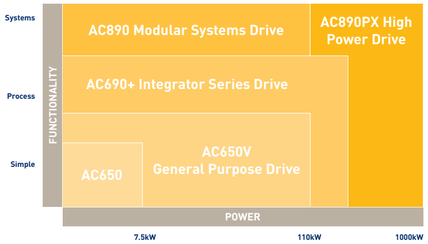
Product Overview

The AC690+ 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 AC690+ 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.

Three phase (380-500V) ratings from 0.75 to 1,000kW and single/three phase (220-240V) ratings from 0.75 to 55kW

AC Drives Product Overview



The AC690+ 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 AC690+ is converted from open-loop control to high performance closed-loop control by simply adding the plug-in encoder feedback technology box.

High Performance Systems Expansion Module

The optional add-on "systems" expansion module 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;

- **5 Configurable Digital Inputs/Outputs**
- **Converts existing 4 Analogue Inputs to High Resolution (12 bit plus sign)**
- **2 Encoder Inputs**
- **2 High Speed Register Mark Inputs**

Fieldbus Communications Options

The AC690+ has a whole host of communication technology box options allowing seamless multi-vendor integration into networked systems using the most common industrial fieldbus communications protocols.

- **Profibus-DP**
- **Canopen**
- **Controlnet**
- **Lonworks**
- **RS422/RS485**
- **Ei Bisynch**
- **Link**
- **Ethernet**
- **Devicenet**
- **Modbus RTU**

Mechanical Protection Options to suit all environments

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.

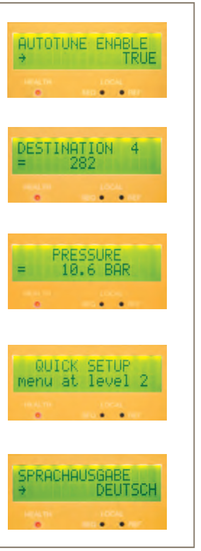
Programming/ Operator Controls

The AC690+ HMI 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**
- **Customised screens**
- **Configuration**

Dual Torque Ratings

Units from 7.5kW and above can be user selected for either Constant Torque applications (with 150% overload capability) making the AC690+ ideally suited to variable torque pump and fan applications.



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 realised 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 and therefore reducing cost.

Standard Macros

- Basic Speed Control
- Forward/Reverse
- Raise/Lower
- Process PID
- Preset Speeds
- Closed Loop Speed Feedback
- Winder Control

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

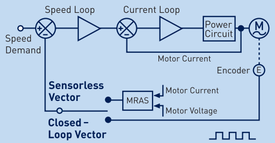
The AC690+ can be user configured for 3 different operating modes

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 AC690+ 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).

Closed-Loop Vector Control

Full closed-loop flux vector performance can be achieved with the AC690+ 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.