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climate control  
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filtration  
fluid & gas handling  
hydraulics  
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process control  
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## AC690+ Integrator Series

From 0.75 kW to 1000 kW



ENGINEERING YOUR SUCCESS.



**WARNING – USER RESPONSIBILITY**

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# Parker Hannifin

## The global leader in motion and control technologies

### A world class player on a local stage

#### Global Product Design

Parker Hannifin has more than 40 years experience in the design and manufacturing of drives, controls, motors and mechanical products. With dedicated global product development teams, Parker draws on industry-leading technological leadership and experience from engineering teams in Europe, North America and Asia.

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##### Europe

Littlehampton, United Kingdom  
Dijon, France  
Offenburg, Germany  
Filderstadt, Germany  
Milan, Italy

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Wuxi, China  
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##### North America

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#### Local Manufacturing and Support in Europe

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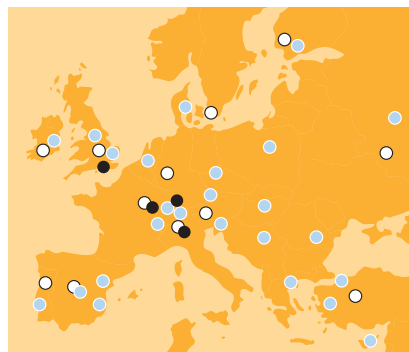
For contact information, please refer to the Sales Offices on the back cover of this document or visit [www.parker.com](http://www.parker.com)



Milan, Italy



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- Electromechanical Manufacturing
- Parker Sales Offices
- Distributors



Dijon, France

# Integrator Series AC Drive - AC690+

## Overview

### Description

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.

The AC690+ is available in 380-500 V 3-phase 0.75 to 1000 kW and 220-240 V 0.75 to 55 kW.



### Features

#### Modes of Operation

The AC690+ can be user configured for 3 different modes of operation.

##### Open-loop (volts/frequency) control

This mode is ideal for basic motor speed control, or multiple motors driven in parallel. 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.

##### 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 of applications.

#### Benefits

- Vector control with / without encoder feedback
- Power ratings 0.37 to 1000 kW
- Supplied in enclosure above 355 kW
- Pre-programmed application Macros
- Programmable over communications
- Programming identical to DC 590+ DC drive
- Variable torque ratings
- Class B EMC filters

### Technical Characteristics - Overview

AC690+	Integrator Series AC Drive
<b>Power supply</b>	380...460 V ( $\pm 10\%$ ) 3-phase 0.75...1000 kW 380...500 V ( $\pm 10\%$ ) 3-phase 2.2...110 kW 220...240 V ( $\pm 10\%$ ) 1-phase 0.37...2.2 kW 220...240 V ( $\pm 10\%$ ) 3-phase 0.37...37 kW
<b>Environment</b>	<b>Constant torque:</b> 0...45 °C (40 °C with IP40 cover) derating possible up to 50 °C max <b>Max altitude:</b> 1000 m, derate by 1% for every 100 m above 1000 m
<b>Overload</b>	<b>Constant torque:</b> 150 % for 60 s, 180 % for 1 s <b>Variable torque:</b> 115 % for 10 s
<b>Output frequency</b>	0...480 Hz
<b>Dynamic braking</b>	Each drive can be fitted with an internal dynamic brake switch Frame B and C: standard Frame D, E and F: optional

### Demanding Environments

For environments that have dusty, humid or corrosive atmospheres, the AC690+ can optionally be supplied with conformally coated circuit boards that improve the drives resistance to corrosion, thereby increasing reliability and service life.

Industries that would typically benefit from conformal coating could include:

- Water and wastewater
- Paper and pulp processing
- Steel
- Marine and offshore
- Outdoor cranes
- Wind & wave power generation
- Food processing

**Encoder feedback option with encoder technology box**

The AC 690+ 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



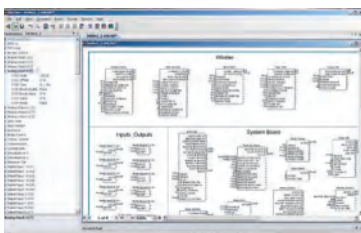
**Mechanical protection options to suit all environments**

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

- **IP20** – For mounting inside an electrical enclosure.
- **IP40/NEMA 1** – The optional top cover, with cable gland plate enables the drive to be directly wall or machine mounted. (Frames B to E)
- **IP54** – Ideal for mounting in aggressive environments. Higher levels of protection are available as a special build option on request. A multitude of control options can be added to the drive using our FASTPACK option.
- **Through panel mounting** - This option allows the drive to be mounted with the major heat producing components and heatsink outside the enclosure, keeping the electronics clean and cool (Frames C, D and E).

**Integrated function blocks**

- Winder Control
- Process PID
- Raise / Lower
- Spinning Load Start



**Open standard fieldbus communications**

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
- Ethernet
- DeviceNet
- Modbus RTU
- CANopen
- ControlNet
- Link (Parker SSD proprietary bus)

**Programming / Operator controls**

The AC690+ HMI provides access to all of the drive’s functions in a logical and intuitive manner. The readout is backlit and displays all functions in plain language and engineering units. The HMI 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.



## Enclosure specifications

(above 355 kW for constant torque)

- Energy Saving
- Fast return on investment in pump and fan applications
- Improved power factor  
Flux vector control with / without encoder and V/F control
- Reduced harmonics through 12 or 18 pulse coupling
- Improved HVAC control

### 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.

<b>6 pulse Model</b>	Power Rating	Constant torque: 355...900 kW Variable torque: 400...1000 kW
	Supply Voltage	380...460 VAC ( $\pm 10\%$ ) 3-phase
	Disconnect Switch	Standard
	Input inductance	Standard for limiting harmonic current
	Output Choke	Standard
	Operator Panel	6901 operator keypad mounted on enclosure door
<b>12 pulse model (optional)</b>	Harmonics	Reduced harmonic current
	Power Rating	Constant torque: 355...600 kW Variable torque: 400...650 kW
	Supply Voltage	380...460 VAC ( $\pm 10\%$ ) 3-phase
	Disconnect Switch	Standard
	Input Transformer	(not included in the enclosure) optional 2 secondaires U/D
	Operator Panel	6901 operator keypad mounted on enclosure door
<b>18 pulse model (option)</b>	Harmonics	Total harmonic distortion (current) in accordance with limits of IEEE 519 (1992)
	Power Rating	Constant torque: 630...900 kW Variable torque: 750...1000 kW
	Supply Voltage	380...460 VAC ( $\pm 10\%$ ) 3-phase
	Disconnect Switch	Standard
	Input Transformer	(not included in the enclosure) optional 3 secondaires phase shifted by 20°
	Operator Panel	6901 operator keypad mounted on enclosure door



**Description**

In many applications the overall power consumed by the system is less than the sum of power of the installed motors. Indeed, all sections of a machine do not consume energy at the same time. Typically, some motors will be driven electrically while others are being driven by the momentum of the machine. For such applications, it is economically advantageous to connect the drives of all sections of the machine to a common DC bus: the energy-generating sections are then fed into the energy-consuming sections, which reduces the overall energy consumption of the system.

The drive AC690+ configured in 4 quadrant mode is the ideal solution to power such systems. Thanks to the 4Q functionality of the AC690+, the excess energy in the system is returned to the network and not dissipated in the form of heat through braking resistors. The current waveforms are almost sinusoidal, which minimizes network harmonics.

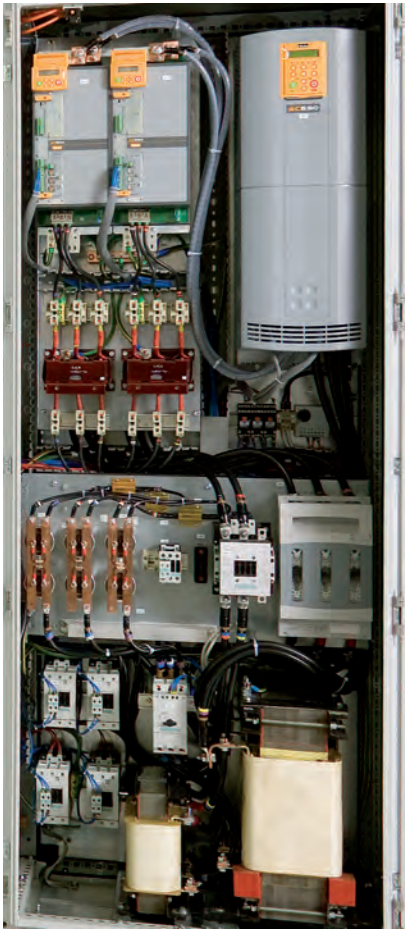
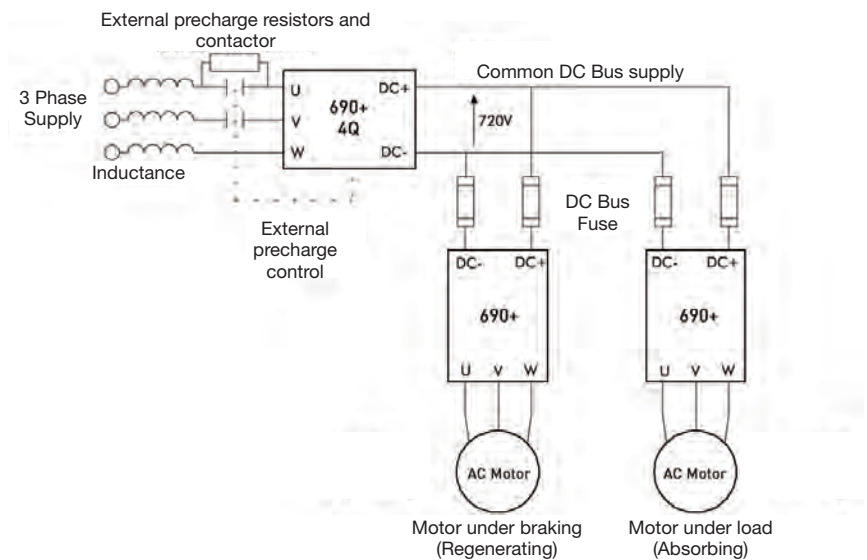


Image shows a typical 4 Quadrant system implemented using AC890 Modular Systems Drives



**Benefits**

- Energy saving
- No maintenance (No braking resistor)
- Reducing the size of the supply required by distributing energy through the DC bus system
- Reduced harmonics meeting the limits of IEEE 519
- High power factor (cos  $\phi$  ~1)



# Technical Characteristics

## General Characteristics

<b>Power Supply</b>	380...460 V ( $\pm 10\%$ ) 3-phase 0.75...1000 kW; 380...500 V ( $\pm 10\%$ ) 3-phase 2.2...110 kW; 220...240 V ( $\pm 10\%$ ) 1-phase 0.37...2.2 kW; 220...240 V ( $\pm 10\%$ ) 3-phase 0.37...37 kW
<b>Environment</b>	Constant torque: 0...45 °C (40 °C with IP40 cover) derating possible up to 50 °C max Max altitude: 1000 m, derate by 1 % for every 100 m above 1000 m
<b>Overload</b>	Constant torque: 150 % for 60 s, 180 % for 1 s; Variable torque: 115 % for 10 s
<b>Output Frequency</b>	0...480 Hz
<b>Switching Frequency</b>	Frame B 3,6 or 9 kHz; Frame C, D, E and F 3 or 6 kHz - All with audibly silent switching frequency
<b>Dynamic Braking</b>	Each drive can be fitted with an internal dynamic brake switch Frame B and C: standard; Frame D, E and F: optional
<b>Analogue Inputs</b>	4 Configurable, 10 bits (13 bits with optional system card), 0...10 V, 0... $\pm 10$ V, 0...20 mA, 4...20 mA
<b>Analogue Outputs</b>	3 Configurable, 10 bits, 0...10 V, 0... $\pm 10$ V, 0...20 mA, 4...20 mA
<b>Digital Inputs</b>	7 Configurable, nominal 24 VDC (30 VDC max)
<b>Digital Outputs</b>	3 Configurable, relay contacts 3 A/230 VAC
<b>Reference Supplies</b>	+10 VDC, -10 VDC, +24 VDC
<b>Motor Thermistor input</b>	PTC

<b>Function Block Programming</b>	Function block programming allows a tremendously flexible control structure to be created with ease. An almost infinite combination of user functions can be realised often alleviating the need for an external PLC. However, the drive is pre-configured so it can be used straight from the box as a standard AC drive without further adjustment.
<b>Analogue Functions</b>	If So, summing, subtractor, multiplier, divider, if higher then lower then If, Counter, Timer
<b>Boolean Functions</b>	NOT, AND, NAND, OR, NOR, XOR, Trigger, Flip-Flop
<b>Application Macros</b>	Simple speed control, Forward/Reverse, Raise/Lower, Process PID, Preset speeds, Winder control.
<b>6901 Operator Keypad</b>	The 6901 keypad is designed for setting-up, configuring and operating the AC690+ drive. The intuitive menu navigation and parameter display is simple and easy to use. Main features: <ul style="list-style-type: none"> <li>• Remote mounting capability on front of enclosure</li> <li>• Backlit display</li> <li>• Multilingual 2x16 alphanumeric display</li> <li>• Customizable display</li> <li>• Local Control: Speed setpoint, Start/Stop, Jog and Direction</li> <li>• Password protection</li> <li>• Quick set-up mode</li> </ul>
<b>Systems Expansion Module</b>	The optional systems expansion module allows for advanced applications such as phase locking between drives and register control. Key features include: <ul style="list-style-type: none"> <li>• 5 Additional user configurable Inputs / Outputs</li> <li>• 4 High resolution analogue inputs (12 bits plus sign)</li> <li>• 2 Additional encoder inputs</li> <li>• 2 High speed register mark inputs</li> </ul>

### Power Supply 380-460 V (±10 %) 50/60 Hz 3-phase

Order Reference	Frame	Constant Torque		Variable Torque		Inductance	Braking Module	
		Nominal Power [kW]	Output Current [A]	Nominal Power [kW]	Output Current [A]			
690-431250B0-B...	B	0.75	2.5	-	-	N/A	Standard	
690-431450B0-B...	B	1.5	4.5	-	-			
690-431550B0-B...	B	2.2	5.5	-	-			
690-431950B0-B...	B	4.0	9.5	-	-			
690-432120B0-B...	B	5.5	12	-	-			
690-432120C0-B...	C	5.5	12					
690-432140B0-B...	B	6.0	14			Standard - Internal Inductance DC Bus		Option
690-432160C0-B...	C	7.5	16	11	23			
690-432230C0-B...	C	11	23	15	31 (UL=27)*			
690-432300C0-B...	C	15	31	18.5	38			
690-432310D0-...	D	15	31	18.5	38			
690-432380D0-...	D	18.5	38	22	45			
690-432450D0-...	D	22	45	30	59 (UL=52)*			
690-432590D0-...	D	30	59	37	73			
690-432590E0-...	E	30	59	37	73			
690-432730E0-...	E	37	73	45	87			
690-432870E0-...	E	45	87	55	105			
690-433105F2-...	F	55	105	75	145			
690-433145F2-...	F	75	145	90	165			
690-433180F2-...	F	90	180	110	205			
690-433216G2-...	G	110	216	132	260			
690-433250G2-...	G	132	250	150	302			
690-433316G2-...	G	160	316	180	361			
690-433361G2-...	G	180	361	220	420			
690-433375H2-...	H	200	375	250	480			
690-433420H2-...	H	220	420	250	480			
690-433480H2-...	H	250	480	300	545			
690-433520H2-...	H	280	520	315	590			
690-433590J2-...	J	315	590	355	650			
690GM1800-43-xx + 690GS1800-43-xx	K	355	685	400	798			
690HM2200-43-xx + 690HS2200-43-xx	K	400	798	475	912			
690HM2800-43-xx + 690HS2800-43-xx	K	500	988	600	1120			
690JM3150-43-xx + 690JS3150-43-xx	K	600	1120	650	1235			
690GM1800-43-xx + 2 x 690GS1800-43-xx	K	550	1028	630	1197			
690HM2200-43-xx + 2 x 690HS2200-43-xx	K	630	1197	750	1368			
690HM2800-43-xx + 2 x 690HS2800-43-xx	K	800	1482	900	1681			
690JM3150-43-xx + 2 x 690JS3150-43-xx	K	900	1681	1000	1852			

### Power Supply 380-500 V ( $\pm 10\%$ ) 50/60 Hz 3-phase

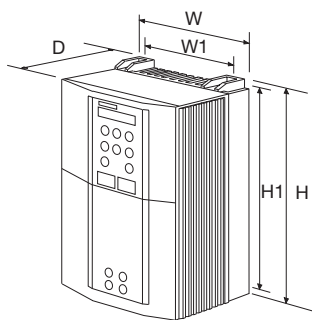
Order Reference	Frame	Constant Torque		Variable Torque	
		Nominal Power [kW]	Output Current [A]	Nominal Power [kW]	Output Current [A]
690-531500B0-B...	B	2.2	5.0	-	-
690-531800B0-B...	B	4.0	8.0	-	-
690-532110B0-B...	B	5.5	11	-	-
690-532110C0-B...	C	5.5	11	7.5	14
690-532140C0-B...	C	7.5	14	11	21
690-532210C0-B...	C	11	21	15	27
690-532270C0-B...	C	15	27	18.5	34
690-532280D0-...	D	15	28	18.5	36
690-532360D0-...	D	18.5	36	22	42
690-532420D0-...	D	22	42	30	52
690-532520D0-...	D	30	52	37	65
690-532540E0-...	E	30	54	37	67
690-532670E0-...	E	37	67	45	79
690-532790E0-...	E	45	79	55	98
690-533100F2-...	F	55	100	75	125
690-533125F2-...	F	75	125	90	156
690-533156F2-...	F	90	156	110	180

### Power Supply 220-240 V ( $\pm 10\%$ ) 50/60 Hz

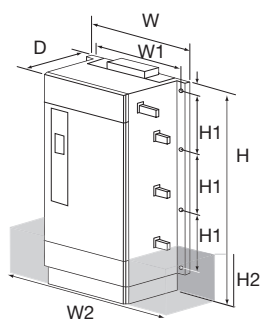
Order Reference	Number of phases	Frame	Constant Torque		Variable Torque		Inductance	Braking Module
			Nominal Power [kW]	Output Current [A]	Nominal Power [kW]	Output Current [A]		
690-211400B0-B...	1	B	0.75	4.0	-	-	No	Standard
690-211700B0-B...	1	B	1.5	7.0	-	-		
690-212105B0-B...	1	B	2.2	10.5	-	-		
690-231400B0-B...	3	B	0.75	4.0	-	-		
690-231700B0-B...	3	B	1.5	7.0	-	-		
690-232105B0-B...	3	C	2.2	10.5	-	-		
690-232165B0-B...	3	C	4.0	16.5	-	-		
690-232220C0-B...	3	C	5.5	22	7.5	28	Standard - Internal inductance DC Bus	Option
690-232280C0-B...	3	C	7.5	28	11	42		
690-232420D0-...	3	D	11	42	15	54		
690-232540D0-...	3	D	15	54	18.5	68		
690-232680D0-...	3	D	18.5	68	n.a.	n.a.		
690-232800E0-...	3	E	22	80	30	104		
690-233104F2-...	3	F	30	104	37	130		
690-233130F2-...	3	F	37	130	45	154		
690-233154F2-...	3	F	45	154	55	192		

Power ratings stated based on a supply voltage of 230 VAC

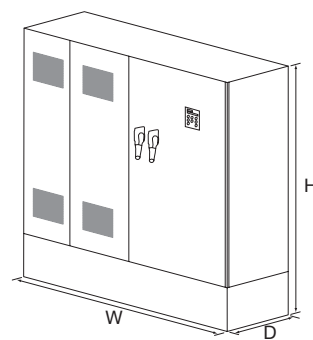
## Dimensions



Frame B, C, D, E, F



Frame G, H, J



Frame K

Model	Dimensions [mm]				Mounting Centres [mm]					Weight [kg]
	H without brake	H with brake	W	D	W2	H2	H1	W1	G	
Frame B	233	233	177	181	-	-	223	130	-	4.3
Frame C	348	348	201	208	-	-	335	150	-	9.3
Frame D	453	453	252	245	-	-	440	150	-	17.4
Frame E	669	669	257	312	-	-	630	150	-	32.5
Frame F	720	720	257	349	-	-	700	150	-	41.0
Frame G	1042	1490	455	465	675	225	300	420	16	100
Frame H	1177	1750	570	465	805	360	300	536	16	125
Frame J	1288	1825	1177	465	825	333	300	641	16	170
Frame K 355/400 kW*	2000	2000	1600	600	-	-	-	-	-	-
Frame K 400/475 kW*	2000	2000	1600	600	-	-	-	-	-	-
Frame K 500/600 kW*	2000	2000	1600	600	-	-	-	-	-	-
Frame K 600/650 kW*	2000	2000	2000	600	-	-	-	-	-	-
Frame K 550/630 kW*	2000	2000	2400	600	-	-	-	-	-	-
Frame K 630/750 kW*	2000	2000	2400	600	-	-	-	-	-	-
Frame K 800/900 kW*	2000	2000	2400	600	-	-	-	-	-	-
Frame K 900/1000 kW*	2000	2000	3000	600	-	-	-	-	-	-

# Accessories and Options

## Communication Cards

The AC690+ Communication cards allow the AC690+ to be connected to the most common industry standard fieldbuses



### Features

- Communications cards can be factory fitted as part of the drive, or purchased separately for fitting on-site
- Dimensions HxWxD: 127 mm x 76.2 mm x 25.4 mm
- LED indication of network and card status

Ethernet Communications Interface	
*Order Code: 6053-ETH-00 and 6055-ETH-00	
Supported Protocols	Modbus/TCP and Ethernet IP
Communication Speed	10/100 M bits/s
Station Address	Selectable via switch or Internet Explorer
Suitable for	AC690+ version 4.7+ DC590+ version 7.1+

ControlNet Communications Interface	
*Order Code: 6053-CNET-00 and 6055-CNET-00	
Supported Messages	Polled I/O
Station Address	Selectable via Software
Suitable for	AC690+ version 4.7+ DC590+ version 5.17+

Devicenet Communications Interface	
*Order Code: 6053-DNET-00 and 6055-DNET-00	
Supported Protocols	DeviceNet Drive Profile Drive – Group 2 slave only
Station Address	DeviceNet Drive Profile Drive – Group 2 slave only
Suitable for Drives	AC690+ DC590+ version 5.x+

Modus Plus Communications Interface	
*Order Code: 6053-MBP-00 and 6055-MBP-00	
Supported Protocols	Modbus Plus
Cabling	RS485 2 or 4 wire
Communication Speed	1 M bits/s
Station Address	Selectable via Software
Suitable for	AC690+ version 4.7+ DC590+ version 7.1+

CANopen Communications Interface	
*Order Code: 6053-CAN-00 and 6055-CAN-00	
Profile	DS402
Supported Messages	SDO, PDO, NMT, SYNC
Communication Speed	20 K, 50 K, 125 K, 250 K, 500 K, 1M bits/s selectable
Station Address	Selectable via Switch
Suitable for	AC690+ DC590+ version 5.x+

Profibus-DP Communications Interface	
*Profibus-DP (6053-PROF-00 and 6055-PROF-00)	
Supported Protocols	Profibus-DP
Communication Speed	Automatically Detected
Station Address	Selectable via Software
Suitable for	AC690+ version 1.x+ DC590+ version 5.x+

RS485/Modbus Communications Interface	
*Order Code: 6053-EI-00 and 6055-EI-00	
Supported Protocols	Modbus RTU, EI Bisynch ASCII
Cabling	RS485 2 or 4 wire
Communication Speed	300 to 115200 bits/s
Station Address	Selectable via Software
Suitable for	AC690+ version 4.7+ DC590+ version 5.17+

LonWorks	
*Order Code: 6053-LON-00 and 6055-LON-00	
Supported Protocols	LonWorks
Delivered	with a resource file compatible with LonMaker software (or equivalent)
Suitable for	AC690+ version 5.1+

Johnson Controls	
*Order Code: 6053-JMET-00 and 6055-JMET-00	
Supported Protocols	Johnson Controls N2

\* Refer to previous page for details of drive frame compatibility

## HTTL Encoder Feedback Card

### Description

The HTTL Encoder Feedback Card allows an incremental encoder to be connected to the AC690+ AC drive, allowing users to take full advantage of the integrated torque control and speed regulation functionality.

The HTTL Encoder Feedback card has the following features:

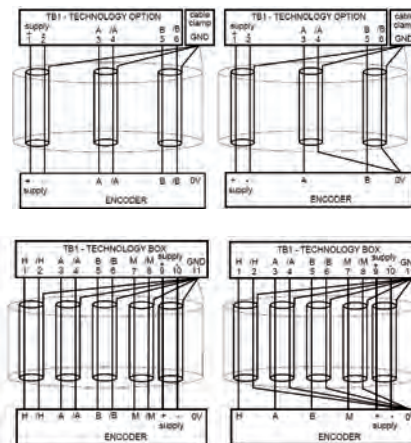
- 4 Optically isolated differential inputs A, B, M and H
- Adjustable isolated 10...20 V encoder power output

### Specifications

<b>Maximum input frequency</b>	250 kHz
<b>Receiver current consumption</b>	≤10 mA per channel
<b>Input format</b>	2-channels in quadrature, clock / direction, or clock only
<b>De-phasing</b>	>1 μs
<b>Differential input voltage</b>	10...30 V max
<b>Encoder power</b>	Maximum Load: Card AH467407U001: 200 mA or 2 W Housing 6054/HTTL/00: 250 mA or 2.5 W Voltage 10...20 V software adjustable



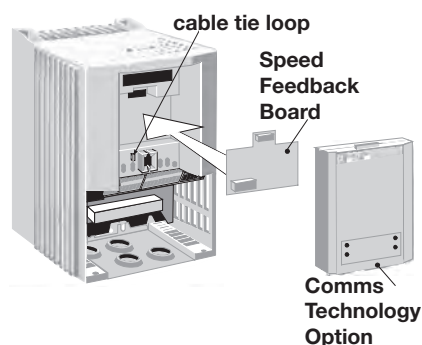
### Installation and Cabling



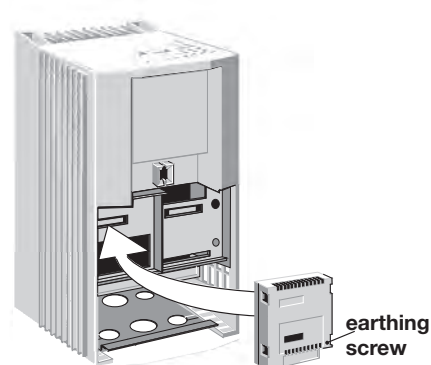
### Product Codes

Order Code	Drives
<b>AH467407U001</b>	AC690+ Frame B (690-xxxxxB...) drives
<b>6054/HTTL/00</b>	AC690+ Frames C - K drives

### AC690+ Frame B AC Drives



### AC690+ Frames C-K Drives



## System Expansion Module

### Description

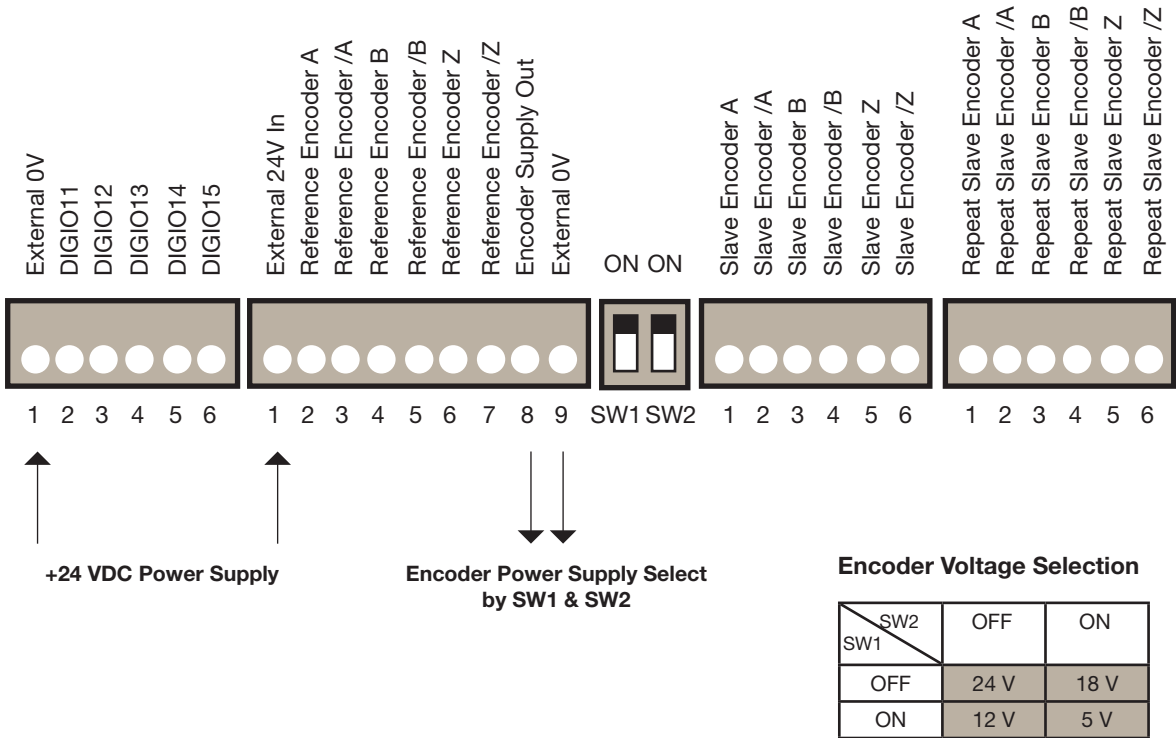
With the System expansion module, the AC690+ can be used in sophisticated applications, or where a small amount of automation is required to be used in conjunction with the drive.

The following features are available:

- Analogue Inputs AIN1-4 become high resolution (12 bit plus sign)
- 5 isolated I/O points, configurable as either inputs or outputs
- Variable isolated output power for encoders
- Master encoder inputs (Isolated HTTL): A, A/, B, B/, Z and Z/
- Slave encoder inputs (Isolated HTTL): A, A/, B, B/, Z and Z/
- Slave encoder output retransmission (Isolated HTTL): A, A/, B, B/, Z and Z/.

### External Power Supply

An external 1A / 24 VDC (±10 %) must be connected to the card.

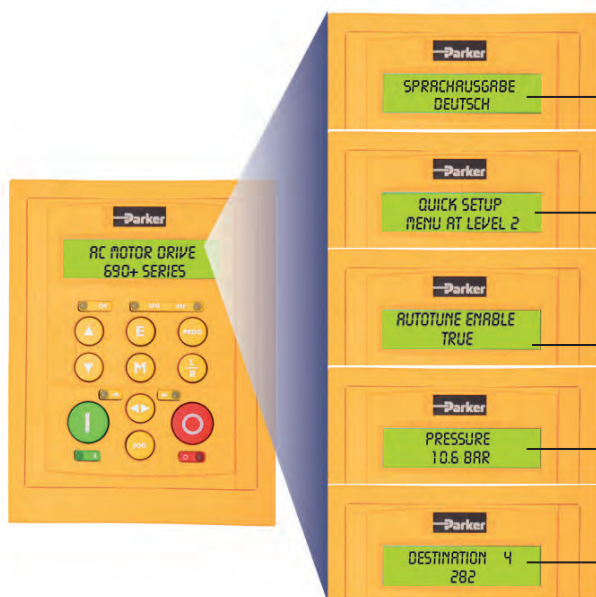


## Operator Keypads

### Standard operator keypad 6901-00-G

#### Features

- Local motor control: start, speed, direction, diagnostics
- Operator menus and parameter configuration
- Quick setup menu
- Password protection for parameter configuration



#### Multilingual

English · French · German · Italian · Portuguese · Swedish · Polish

#### Quick setup menu

Intuitive menus allowing easy and quick setup of the drive

#### Auto-tuning

Automatic tuning of motor parameters ensures maximum dynamic motor performance

#### Diagnostics messages

Display input and output parameters as well as drive operating units

#### Drive configuration

### Advanced operator keypad 6911-01-00-G

#### Features

- 128x64 pixels semi-graphical resolution
- RS232 and RS485 ports
- Recording of parameters to keypad and restore to drive (Memory card 256 MB to 2 GB)





## Braking Resistors

### for AC Drives

#### Description

Brake resistors are used with AC650, AC650V, or AC690 drives equipped with a braking option modules. They are designed to allow the drive to stop a motor at full load during deceleration or an overhauling load.



#### Brake resistor selection

Brake resistor assemblies must be rated to absorb both peak braking power during deceleration and the average power over the complete cycle.

#### Resistors above 500 W

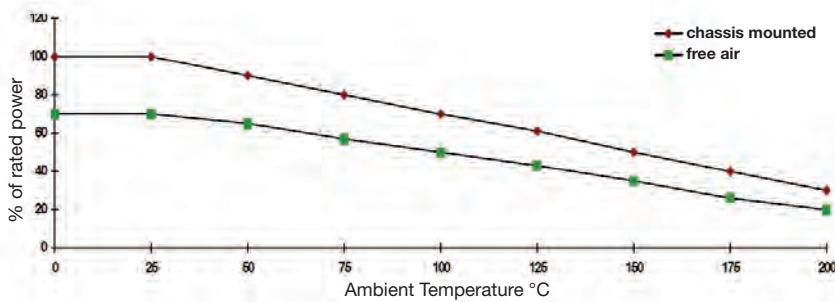
Resistors above 500 W are available upon request :

- IP20 protection up to 3 kW
- IP13 protection between 4.2 and 9.8 kW

$$\text{Peak braking power} = \frac{0.0055J \times (n_1^2 - n_2^2) \text{ (W)}}{t_b}$$

$$\text{Average braking power } P_{av} = \frac{P_{pk} \times t_b}{t_c}$$

J - total inertia in kgm<sup>2</sup>  
 n<sub>1</sub> - initial speed in min<sup>-1</sup>  
 n<sub>2</sub> - final speed min<sup>-1</sup>  
 t<sub>b</sub> - braking time in s  
 t<sub>c</sub> - cycle time in s

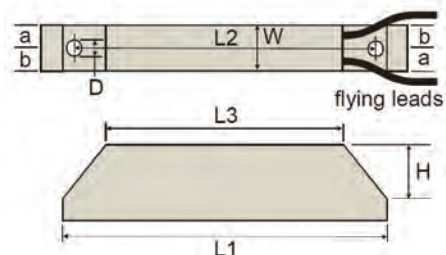


### Dimensions

Nominal Power [kW]	Dimensions		
	L [mm]	H [mm]	P [mm]
1.0	137	450	140
1.6	182	450	140
2.0	182	450	140
2.5	227	450	140
3.0	227	450	140
4.2	450	440	540
5.6	530	440	540
7.0	530	440	540
8.4	610	440	540
9.8	610	440	540

Model	Impedance [Ω]	Nom. Power [W]	Dimensions							
			L1	L2	L3	W	H	D	a	b
CZ467715	500	60	100	87	60	22	41	4.3	10	12
CZ467714	200	100	165	152	125	22	41	4.3	10	12
CZ389853	100	100	165	152	125	22	41	4.3	10	12
CZ467717	100	200	165	146	125	30	60	4.3	13	17
CZ463068	56	200	165	146	125	30	60	4.3	13	17
CZ388397	56	200	165	146	125	30	60	4.3	13	17
CZ388396	36	500	335	316	295	30	60	4.3	13	17
CZ467716	28x2	500	335	316	295	30	60	4.3	13	17

Overload 5 s : 500 %  
 Overload 3 s : 833 %  
 Overload 1 s : 2500 %



## Three Phase Line Reactors

### for AC Drives

#### Description

Parker's range of line reactors have been especially selected to match the requirements of the Parker AC drive range and can be used on both the input and output sides of the drive. They are used to reduce the harmonic content of the supply current. A choke fitted in the drive output limits the capacitive current when motor cable runs in excess of 50 m are used. It prevents overcurrent trips and temperature rise of the motor.

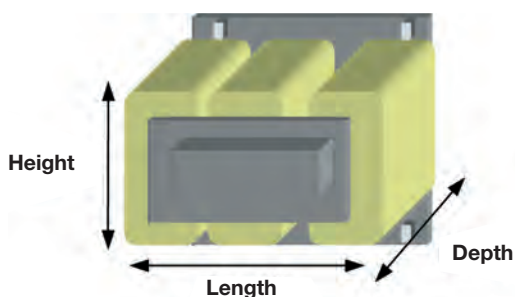
As well as helping with compliance with IEEE 519 there are other benefits to using line/load reactors including:

- Increased drive system reliability
- Reduced harmonics / surge currents
- Reduced motor noise and temperature
- Improved true power factor

#### Dimensions

Order Reference	Inductance	In [A]	Height [mm]	Length [mm]	Depth [mm]	Fixing Centres [mm]	Weight (approx.) [kg]
CO389936U401	75 $\mu$ H	315	215	330	320	175 x 225	70
CO389936U402	50 $\mu$ H	480	215	330	320	175 x 225	95
CO466448U040	50 $\mu$ H	36	70	155	127	48 x 140	2.5
CO466448U165	50 $\mu$ H	148.5	115	190	155	93 x 170	12
CO466709U038	30 $\mu$ H	342	370	350	226	240 x 320	38
CO466709U050	25 $\mu$ H	450	431	420	226	290 x 381	53
CO466709U073	20 $\mu$ H	653	431	420	226	290 x 381	60
CO466709U083	15 $\mu$ H	747	431	420	226	290 x 381	69
CO468314U650	5 $\mu$ H	650	30	300	325*	100 x 250	35
CO468325U006	1.749 mH	12.7	83	157	160*	60 x 80	6
CO468325U037	0.416 mH	54	110	240	250*	80 x 200	13
CO468325U110	0.137 mH	165	140	300	310*	110 x 240	30
CO468326U006	2.917 mH	12.8	170	240	260*	80 x 140	17
CO468326U037	0.693 mH	54	240	360	380*	120 x 200	50
CO468326U110	0.227 mH	165	320	390	490*	280 x 260	130
CO468325U055	0.282 mH	79	130	240	250*	100 x 200	19
CO466448U015	50 $\mu$ H	13.5	60	80	67	64 x 40	1
CO466448U110	50 $\mu$ H	100	100	190	155	170 x 75	7.5
CO468326U006	2.917 mH	12.8	170	240	260	80 x 140	17
CO466448U070	50 $\mu$ H	63	85	155	127	140 x 63	4.5
CO466250U012	15 $\mu$ H	1080	400	420	450	300 x 140	170

\* Include Earth Stud



## Software

### Drive System Explorer Lite (DSE Lite) Software

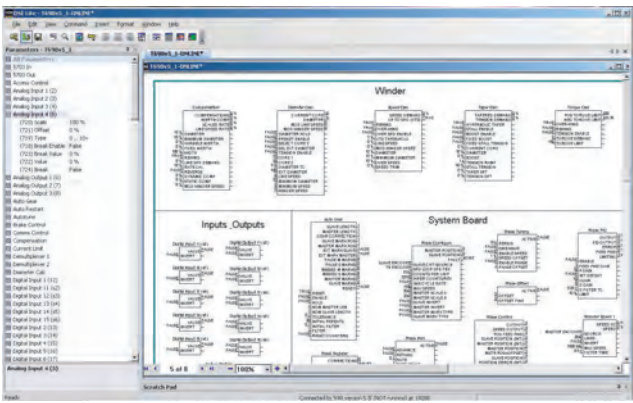
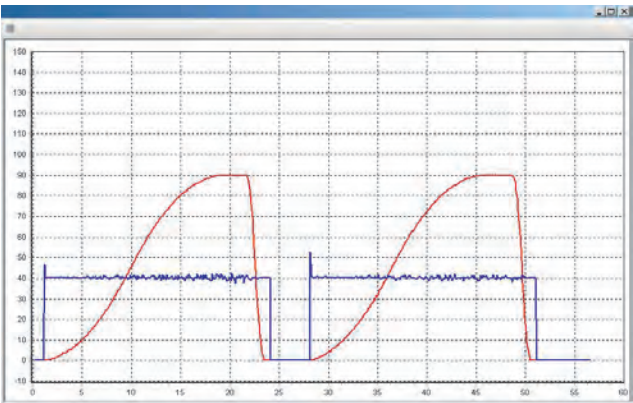
#### Description

DSE Lite software is an easy to use configuration, commissioning and monitoring tool with graphical interface for the Parker SSD Drives range of AC and DC drives.

While the drive is in running mode the oscilloscope function allows "on-line" monitoring of selected parameters and the recording of trends.

DSE Lite, allows the user to create, parameterize and configure user defined applications thanks to function blocks dedicated to speed control, Winder, PID, Diameter calculator, Shaftless...

DSE Lite is downloadable from our website.  
[www.parker.com](http://www.parker.com)



# Order Code

## AC690+ Integrator Series

	1	2	3	4	5	6	7	8	9	10	11	12	13			
Order example	690	-	21	1400B	0	-	B	0	0	P	00	-	A	0	0	0

### 1 Product Family

<b>690</b>	AC690+ Integrator Series AC Drive
<b>C690</b>	AC690+ Integrator Series AC Drive (Conformal Coating)

### 2 Supply Voltage

<b>21</b>	230 V 1-phase
<b>23</b>	230 V 3-phase
<b>43</b>	400/460 V 3-phase
<b>53</b>	400/500 V 3-phase

### 3 Power / Current Rating @230 V 1-phase

@230 V 1-phase	Constant Torque kW/A	Variable Torque HP/A	Frame
-------------------	-------------------------	-------------------------	-------

<b>1400B</b>	0.75/4.0	1.0/4.0	B
<b>1700B</b>	1.5/7.0	2.0/7.0	B
<b>2105B</b>	2.2/10.5	3.0/10.5	B

@230 V 3-phase	Constant Torque kW/A	Variable Torque HP/A	Frame
-------------------	-------------------------	-------------------------	-------

<b>1400B</b>	0.75/4.0	1.0/4.0	B		
<b>1700B</b>	1.5/7.0	2.0/7.0	B		
<b>2105B</b>	2.2/10.5	3.0/10.5	B		
<b>2165B</b>	4.0/16.5	5.0/16.5	B		
<b>2220C</b>	5.5/22	7.5/22	7.5/28	10/28	C
<b>2280C</b>	7.5/28	10/28	11/42	15/42	C
<b>2420D</b>	11/42	15/42	15/54	20/54	D
<b>2540D</b>	15/54	20/54	18.5/68	25/68	D
<b>2680D</b>	18.5/68	25/68	-	-	D
<b>2800E</b>	22/80	30/80	30/104	40/104	E
<b>3104F</b>	30/104	40/104	37/130	50/130	F
<b>3130F</b>	37/130	50/130	45/154	60/154	F
<b>3154F</b>	45/154	60/154	55/192	84/192	F

@400/ 460 V 3-phase	Constant Torque kW/A	Variable Torque HP/A	Frame
---------------------------	-------------------------	-------------------------	-------

<b>1250B</b>	0.75/2.5	1.0/2.5	B		
<b>1450B</b>	1.5/4.5	2.0/4.5	B		
<b>1550B</b>	2.2/5.5	3.0/5.5	B		
<b>1950B</b>	4.0/9.5	5.0/9.5	B		
<b>2120B</b>	5.5/12	7.5/11	B		
<b>2140B</b>	6.0/14	10/14	B		
<b>2120C</b>	5.5/12	7.5/12	7.5/16	10/16	C
<b>2160C</b>	7.5/16	10/14	11/23	15/21	C
<b>2230C</b>	11/23	15/21	15/30	20/27	C
<b>2300C</b>	15/30	20/27	18.5/37	25/34	C
<b>2310D</b>	15/31	20/31	18.5/38	25/38	D
<b>2380D</b>	18.5/38	25/38	22/45	30/45	D
<b>2450D</b>	22/45	30/45	30/59	40/52	D
<b>2590D</b>	30/59	40/52	37/73	50/65	D
<b>2590E</b>	30/59	40/59	37/73	50/73	E
<b>2730E</b>	37/73	50/73	45/87	60/87	E
<b>2870E</b>	45/87	60/87	55/105	75/105	E

### @400/ 460 V 3-phase

Constant Torque kW/A	Variable Torque HP/A	Frame
-------------------------	-------------------------	-------

<b>3105F</b>	55/105	75/100	75/145	100/125	F
<b>3145F</b>	75/145	100/130	90/165	125/156	F
<b>3156F</b>	90/180	125/156	110/205	150/180	F
<b>3180F</b>	90/180	150/180	110/205	150/180	F
<b>3216G</b>	110/216	175/216	132/260	200/260	G
<b>3250G</b>	132/250	200/250	150/302	250/302	G
<b>3316G</b>	160/316	250/316	180/361	300/361	G
<b>3361G</b>	180/361	300/361	220/420	350/420	G
<b>3375H</b>	200/375	-	250/480	-	H
<b>3420H</b>	220/420	350/420	250/480	400/480	H
<b>3480H</b>	250/480	400/480	300/545	450/545	H
<b>3520H</b>	280/520	450/520	315/590	505/590	H
<b>3590J</b>	315/590	500/590	355/650	550/650	J

### @500 V 3-phase

Constant Torque kW/A	Variable Torque HP/A	Frame
-------------------------	-------------------------	-------

<b>1500B</b>	2.2/ 5.0	-	-	B
<b>1800B</b>	4.0 /8.0	-	-	B
<b>2110B</b>	5.5/11	-	-	B
<b>2110C</b>	5.5/11	-	7.5/14	C
<b>2140C</b>	7.5/14	-	11/21	C
<b>2210C</b>	11/21	-	15/27	C
<b>2270C</b>	15/27	-	18.5/34	C
<b>2280D</b>	15/28	-	18.5/36	D
<b>2360D</b>	18.5/36	-	22/42	D
<b>2420D</b>	22/42	-	30/52	D
<b>2520D</b>	30/52	-	37/65	D
<b>2540E</b>	30/54	-	37/67	E
<b>2730E</b>	37/67	-	45/79	E
<b>2870E</b>	45/79	-	55/98	E
<b>3105F</b>	55/100	-	75/125	F
<b>3145F</b>	75/125	-	90/156	F
<b>3156F</b>	90/156	-	110/180	F

### 4 Auxiliary Supply

<b>0</b>	Not Required (frames B - E)
<b>1</b>	115V 1-ph (frame F - J only)
<b>2</b>	230V 1-ph (frame F - J only)

<b>5</b>	<b>Brake Switch</b>
<b>0</b>	Not fitted (option for frames D - J)
<b>B</b>	Brake switch fitted (optional on frames D – J) (must be fitted on frames B & C)
<b>6</b>	<b>Filter</b>
<b>0</b>	Not fitted (option for frame B) (fitted filter not available for frames C – F)
<b>F</b>	Filter fitted (option on frame B only)
<b>7</b>	<b>System Board</b>
<b>0</b>	Not fitted
<b>S</b>	System Board fitted
<b>8</b>	<b>Mounting</b>
<b>P</b>	Panel mount (option on frames B - E, must be selected on frame C - J)
<b>W</b>	Wall mount (option on frames B - E only)
<b>T</b>	Through panel mount (option for frames C - E only)
<b>9</b>	<b>Special Options</b>
<b>00</b>	None
	Documented special options (01 - 99) (refer to local sales office)
<b>10</b>	<b>Language</b>
<b>A</b>	English (50 Hz)
<b>B</b>	English (60 Hz)
<b>D</b>	German
<b>E</b>	Spanish
<b>F</b>	French
<b>G</b>	Portuguese
<b>I</b>	Italian
<b>L</b>	Polish
<b>S</b>	Swedish
<b>11</b>	<b>Keypad</b>
<b>0</b>	None (option on frames B – F)
<b>4</b>	6901 keypad fitted (option on frames B – F) (must be specified for frames G – J)
<b>12</b>	<b>Speed Feedback</b>
<b>0</b>	None
<b>3</b>	HTTL Encoder
<b>13</b>	<b>Communication</b>
<b>0</b>	None
<b>C</b>	ControlNet
<b>D</b>	DeviceNet
<b>E</b>	Ethernet
<b>J</b>	Johnson Metasys
<b>L</b>	Link
<b>M</b>	Modbus+
<b>N</b>	CANopen
<b>P</b>	Profibus
<b>R</b>	RS485 (EI Bisynch)
<b>S</b>	Siemens Apogee
<b>W</b>	LonWorks

## Accessories and Options

Options	Frame	Fitting	Order Reference
<b>Operator Keypad</b>			
AC690+ (removable)	B - J	Option	6901-00-G
Advanced operator keypad (removable)	B - J	Option	6911-01-00-G
Remote mounting kit	B - J	Option	6052/00
<b>Communication Cards</b>			
Ethernet Modbus/TCP and Ethernet IP	B	Option	6053-ETH-00
	C - J	Option	6055-ETH-00
ControlNet	B	Option	6053-CNET-00
	C - J	Option	6055-CNET-00
Modbus Plus	B	Option	6053-MBP-00
	C - J	Option	6055-MBP-00
DeviceNet	B	Option	6053-DNET-00
	C - J	Option	6055-DNET-00
RS485 / Modbus	B	Option	6053-EI00-00
	C - J	Option	6055-EI00-00
Profibus-DP	B	Option	6053-PROF-00
	C - J	Option	6055-PROF-00
CANopen DS402	B	Option	6053-CAN-00
	C - J	Option	6055-CAN-00
LonWorks	B	Option	6053-LON-00
	C - J	Option	6055-LON-00
Link	B	Option	6053-LINK-00
	C - J	Option	6055-LINK-00
<b>Speed Feedback / Systems Module</b>			
HTTL Encoder Card	B	Option	LA467461
	C - J	Option	6054/HTTL/00
Systems Expansion Module	B	Option	LA467471U002
	C - J	Option	AH463889U001
<b>Accessories</b>			
Brake Resistor			
Chokes			
IP40 Cover for Wall Mounting	B	Option	LA467452
	C	Option	LA465034U002
	D	Option	LA465084U002
	E	Option	LA465058U002
DSE Lite Programming Software			
HMI Operator interace 3 to 15"			
<b>Motors</b>			
Asynchronous Motors			



# Parker's Motion & Control Technologies

At Parker, we're guided by a relentless drive to help our customers become more productive and achieve higher levels of profitability by engineering the best systems for their requirements. It means looking at customer applications from many angles to find new ways to create value. Whatever the motion and control technology need, Parker has the experience, breadth of product and global reach to consistently deliver. No company knows more about motion and control technology than Parker. For further info call 00800 27 27 5374



## Aerospace

### Key Markets

Aftermarket services  
Commercial transports  
Engines  
General & business aviation  
Helicopters  
Launch vehicles  
Military aircraft  
Missiles  
Power generation  
Regional transports  
Unmanned aerial vehicles

### Key Products

Control systems & actuation products  
Engine systems & components  
Fluid conveyance systems & components  
Fluid metering, delivery & atomization devices  
Fuel systems & components  
Fuel tank inerting systems  
Hydraulic systems & components  
Thermal management  
Wheels & brakes



## Climate Control

### Key Markets

Agriculture  
Air conditioning  
Construction Machinery  
Food & beverage  
Industrial machinery  
Life sciences  
Oil & gas  
Precision cooling  
Process  
Refrigeration  
Transportation

### Key Products

Accumulators  
Advanced actuators  
CO<sub>2</sub> controls  
Electronic controllers  
Filter driers  
Hand shut-off valves  
Heat exchangers  
Hose & fittings  
Pressure regulating valves  
Refrigerant distributors  
Safety relief valves  
Smart pumps  
Solenoid valves  
Thermostatic expansion valves



## Electromechanical

### Key Markets

Aerospace  
Factory automation  
Life science & medical  
Machine tools  
Packaging machinery  
Paper machinery  
Plastics machinery & converting  
Primary metals  
Semiconductor & electronics  
Textile  
Wire & cable

### Key Products

AC/DC drives & systems  
Electric actuators, gantry robots & slides  
Electrohydraulic actuation systems  
Electromechanical actuation systems  
Human machine interface  
Linear motors  
Stepper motors, servo motors, drives & controls  
Structural extrusions



## Filtration

### Key Markets

Aerospace  
Food & beverage  
Industrial plant & equipment  
Life sciences  
Marine  
Mobile equipment  
Oil & gas  
Power generation & renewable energy  
Process  
Transportation  
Water Purification

### Key Products

Analytical gas generators  
Compressed air filters & dryers  
Engine air, coolant, fuel & oil filtration systems  
Fluid condition monitoring systems  
Hydraulic & lubrication filters  
Hydrogen, nitrogen & zero air generators  
Instrumentation filters  
Membrane & fiber filters  
Microfiltration  
Sterile air filtration  
Water desalination & purification filters & systems



## Fluid & Gas Handling

### Key Markets

Aerial lift  
Agriculture  
Bulk chemical handling  
Construction machinery  
Food & beverage  
Fuel & gas delivery  
Industrial machinery  
Life sciences  
Marine  
Mining  
Mobile  
Oil & gas  
Renewable energy  
Transportation

### Key Products

Check valves  
Connectors for low pressure fluid conveyance  
Deep sea umbilicals  
Diagnostic equipment  
Hose couplings  
Industrial hose  
Mooring systems & power cables  
PTFE hose & tubing  
Quick couplings  
Rubber & thermoplastic hose  
Tube fittings & adapters  
Tubing & plastic fittings



## Hydraulics

### Key Markets

Aerial lift  
Agriculture  
Alternative energy  
Construction machinery  
Forestry  
Industrial machinery  
Machine tools  
Marine  
Material handling  
Mining  
Oil & gas  
Power generation  
Refuse vehicles  
Renewable energy  
Truck hydraulics  
Turf equipment

### Key Products

Accumulators  
Cartridge valves  
Electrohydraulic actuators  
Human machine interfaces  
Hybrid drives  
Hydraulic cylinders  
Hydraulic motors & pumps  
Hydraulic systems  
Hydraulic valves & controls  
Hydrostatic steering  
Integrated hydraulic circuits  
Power take-offs  
Power units  
Rotary actuators  
Sensors



## Pneumatics

### Key Markets

Aerospace  
Conveyor & material handling  
Factory automation  
Life science & medical  
Machine tools  
Packaging machinery  
Transportation & automotive

### Key Products

Air preparation  
Brass fittings & valves  
Manifolds  
Pneumatic accessories  
Pneumatic actuators & grippers  
Pneumatic valves & controls  
Quick disconnects  
Rotary actuators  
Rubber & thermoplastic hose & couplings  
Structural extrusions  
Thermoplastic tubing & fittings  
Vacuum generators, cups & sensors



## Process Control

### Key Markets

Alternative fuels  
Biopharmaceuticals  
Chemical & refining  
Food & beverage  
Marine & shipbuilding  
Medical & dental  
Microelectronics  
Nuclear Power  
Offshore oil exploration  
Oil & gas  
Pharmaceuticals  
Power generation  
Pulp & paper  
Steel  
Water/wastewater

### Key Products

Analytical Instruments  
Analytical sample conditioning products & systems  
Chemical injection fittings & valves  
Fluoropolymer chemical delivery fittings, valves & pumps  
High purity gas delivery fittings, valves, regulators & digital flow controllers  
Industrial mass flow meters/controllers  
Permanent no-weld tube fittings  
Precision industrial regulators & flow controllers  
Process control double block & bleeds  
Process control fittings, valves, regulators & manifold valves



## Sealing & Shielding

### Key Markets

Aerospace  
Chemical processing  
Consumer  
Fluid power  
General Industrial  
Information technology  
Life sciences  
Microelectronics  
Military  
Oil & gas  
Power generation  
Renewable energy  
Telecommunications  
Transportation

### Key Products

Dynamic seals  
Elastomeric o-rings  
Electro-medical instrument design & assembly  
EMI shielding  
Extruded & precision-cut, fabricated elastomeric seals  
High temperature metal seals  
Homogeneous & inserted elastomeric shapes  
Medical device fabrication & assembly  
Metal & plastic retained composite seals  
Shielded optical windows  
Silicone tubing & extrusions  
Thermal management  
Vibration dampening

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### US Product Information Centre

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