

aerospace  
climate control  
electromechanical  
filtration  
fluid & gas handling  
hydraulics  
pneumatics  
process control  
sealing & shielding



## Compact drive for sensorless servo control

AC650S series 0.25 – 7.5kW



ENGINEERING YOUR SUCCESS.

# Compact drive for sensorless servo control

AC650S series 0.25 – 7.5kW

## Description

The AC650S series is designed to save energy in general purpose applications by replacing induction motors by more efficient permanent-magnet motors.

Easy to commission and maintain, it runs the motor without speed sensor.

It is available up to 1.5 kW for 230V supply and up to 7.5kW for 400V three-phase supply.



## Features and benefits

### Side-by-side mounting

reduces the space used in a cubicle.

### Energy savings

achieved when using a permanent-magnet motor instead of an induction motor can amount to up to 12%, thanks to the higher efficiency of permanent magnet motors.

The AC650S comes with one **PID controller**. It can be set to control process parameters like pressure or flow rate.



A **cloning module** is available as option for **easy maintenance**. It allows to save up to 10 drive configurations without a PC.

**Sensorless motor control** removes the need for a speed sensor, which improves the system reliability.

**Easy commissioning** thanks to built-in application macros for the most common applications and free setup wizard.

**Built-in filter** for EMC compliance to EN61800-3.

## Typical applications

Used in combination with AC650S drives, Parker permanent magnet motors are specially recommended as alternatives to induction motors in the following applications:

- When **energy savings** are important : conveyers, fans, pumps, hydraulic systems, extruders...

- In **compact machines**, when compact drive solutions are

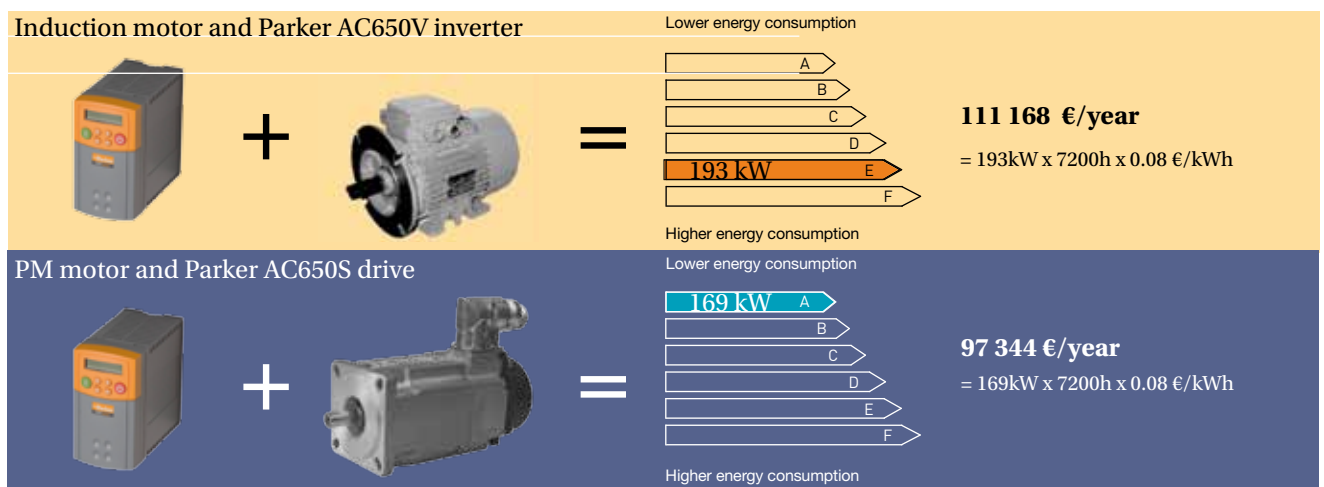
mandatory or when room in cubicle is limited : machine-tools, packaging machines, conveyers, winders/unwinders, special-purpose machines ...

# Energy savings, maximum compactness

## Energy savings

The AC650S drive features an advanced sensorless control algorithm for permanent-magnet motors.

Coupled with the high efficiency of Parker permanent-magnet motors, huge electricity costs savings can be achieved.



**Typical annual savings**  
assuming 100 x 1.5kW motors

**13 824 €/year**

## Maximum compactness for smaller machines, no need to have a forced ventilation.

The Parker PM motors are up to 75% smaller than same-power induction motors, which enables you make ultra-compact machines.

Furthermore, the motors are available with a very economical brake option.



## Minimum cubicle space

The AC650S is among the smallest drive of the market. Side-by-side mounting is

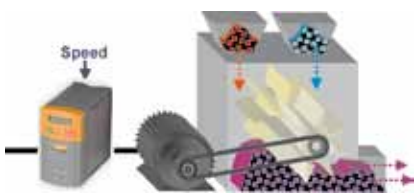
possible, which minimizes even more the space required in cubicles for multi-drives systems.

# Easy commissioning

## Built-in macros

Built-in macros for the most common applications allow easy commissioning.

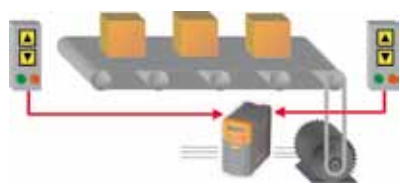
**- Basic speed control**  
Voltage and current source speed demand with digital start/stop and direction.



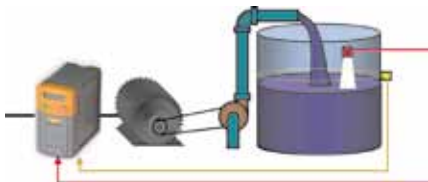
**- Manual/Auto control**  
Switch between a local or remote speed setpoint.



**- Preset speeds**  
Up to 8 preprogrammed speed setpoints, selected by digital inputs



**- Raise / Lower**  
Increase and decrease speed setpoint from raise/lower digital inputs



**- PID Control**  
Control pressure, flow, temperature or other variables by monitoring transduced feedback with the built-in PID function.

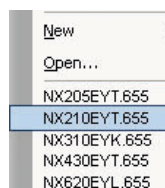


## Easy commissioning, optimal performances

On top of macros built in the drive, a setup wizard is available for free to optimally tune the drive according to the load characteristics for any PM motor. A library of Parker motors further eases the commissioning workload.

Just select the motor, specify the load inertia and you are done in minutes !

Motor library  
Load inertia estimate

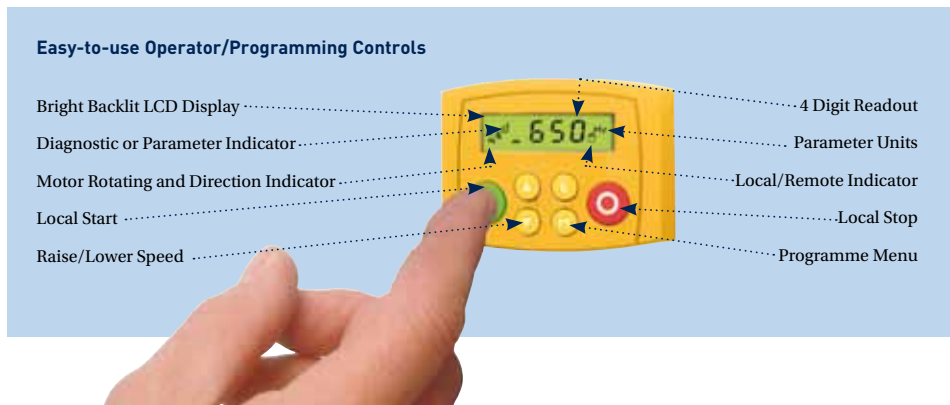


Library of Parker PM motors



# Diagnostics and maintenance

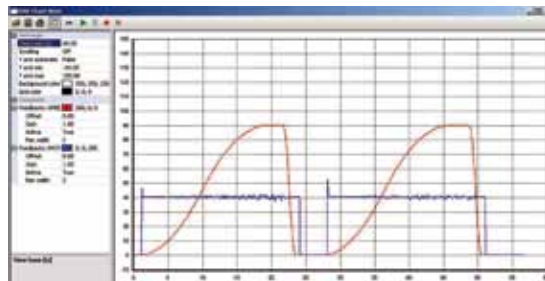
Easy diagnostics and maintenance can be achieved through the friendly operator station



## Monitoring

The “on line” programming, monitoring and diagnostic software platform DSE lite is available for free.

During drive operation, it is possible to monitor every parameter in the “chart recorder”.



## Cloning module

A cloning module (option) allows to save, archive and clone up to 10 drive configurations without using a PC.

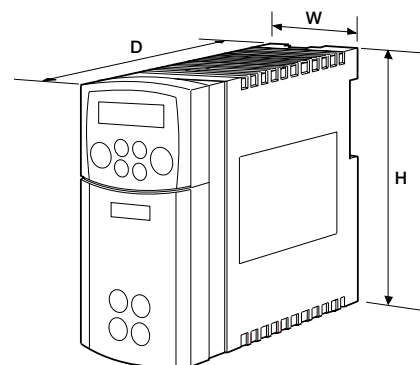
No need to be an expert to maintain the machine !



# Specifications

Specifications		
<b>Power Supply</b> <b>0.25 to 1.5kW :</b> 220-240Vac $\pm$ 10%, 50-60Hz $\pm$ 5% <b>0.37 to 7.5kW, three-phase units :</b> 380-460Vac $\pm$ 10%, 50-60Hz $\pm$ 5%	<b>Inputs / Outputs</b> <b>2 Analogue Inputs</b> 0-10V, 0-10V/4-20mA <b>2 Analogue Outputs</b> 0-10V, load <10mA <b>5 Digital Inputs</b> User configurable ; 15V to 24V DC <b>2 Digital Inputs / Outputs</b> User configurable as inputs or outputs	<b>User Selectable pre-programmed Applications Macros</b> <ul style="list-style-type: none"> <li>• Basic Speed Control - voltage or current source speed demand with digital start/stop and direction.</li> <li>• Manual/Auto Control - switch between a local or remote speed demand signal.</li> <li>• Preset Speeds - select up to 8 preprogrammed speeds selected by digital inputs.</li> <li>• Raise / Lower - increase and decrease speed from raise/lower digital inputs.</li> <li>• PID Control - control pressure, flow, temperature or other variable by monitoring transducer feedback.</li> </ul>
<b>Ambient</b> 0-40°C (derate to 50°C) Up to 1000m ASL (derate > 1000m) IP20 protected	<b>1 Digital Relay Output</b> Relay output 4A @ 240V	
<b>Overload</b> 150% heavy duty ratings	<b>1 Motor Thermistor Input</b>	
<b>Output Frequency</b> 0-500Hz	<b>Power Supply Outputs</b> 24V dc (50mA) - Digital I/O supply 10V dc (10mA) - Analogue reference supply	
<b>Standards</b> The AC650S series meets the following standards when installed in accordance with the relevant product manual. <ul style="list-style-type: none"> <li>• CE Marked to EN50178 (Safety, Low Voltage Directive).</li> <li>• CE Marked to EN61800-3 (EMC Directive).</li> <li>• UL listed to US standard UL508C.</li> <li>• cUL listed to Canadian standard C22.2 #14.</li> </ul>	<b>Communication Options</b> Profibus-DP, Modbus RTU  <b>Cloning option</b> Up to 10 drive configurations saved without a PC	

Dimensions			
Frame Size	H	W	D
1	137	73	142
2	192	73	173
3	257	96	200





# Electrical ratings

## Drive ratings

Product code	Supply voltage	Nominal power (KW / HP)	Output current (A)	Frame	Overload
650S-21140010-0■1P00-A1	230V 1ph	0.75 / 1.0	4	1	150 % x 30 sec
650S-21170020-0■1P00-A1		1.5 / 2.0	7	2	
650S-43125020-B■1P00-A1	400V 3ph	0.75 / 1.0	2,5	2	
650S-43155020-B■1P00-A1		2.2 / 3.0	5,5	2	
650S-43190030-B■1P00-A1		4.0 / 5.0	9	3	
650S-43216030-B■1P00-A1		7.5 / 10	16	3	
The models listed below are available for special order only ( <b>minimum quantities apply</b> ) - <b>Please consult</b> your nearest Parker contact					
650S-21115010-0■1P00-A1	230V 1ph	0.25 / 0.3	1,5	1	150 % x 30 sec
650S-21122010-0■1P00-A1		0.37 / 0.5	2,2	1	
650S-21130010-0■1P00-A1		0.55 / 0.75	3	1	
650S-21155020-0■1P00-A1	400V 3ph	1.1 / 1.5	5,5	2	
650S-43115020-B■1P00-A1		0.37 / 0.5	1,5	2	
650S-43120020-B■1P00-A1		0.55 / 0.75	2	2	
650S-43135020-B■1P00-A1		1.1 / 1.5	3,5	2	
650S-43145020-B■1P00-A1		1.5 / 2.0	4,5	2	
650S-43168030-B■1P00-A1		3.0 / 4.0	6,8	3	
650S-43212030-B■1P00-A1	5.5 / 7.5	12	3		

■ = 0, drives with no EMC filter ; ■ = F, for drives with built-in EMC filter

## Associations with Parker NX servo motors

230 Vac power supply									
At rated speed		@ 1500 rpm @ 3000 rpm		At low speed		Inertia (kg.m².10 <sup>-3</sup> )	Motor code	Drive Code	
Nn (rpm)	Pn (kW)	P (kW)	P (kW)	M0 (Nm)	I0 (Arms)				
6000	0,21	0,07	0,13	0,45	1,14	2,1	NX205EYUR6000	650S-21140010-001P00-A1	
5000	0,37	0,15	0,27	1	1,99	3,8	NX210EYPR6000	650S-21140010-001P00-A1	
2000	0,38	0,29	-	2	1,39	7,9	NX310EYPR6000	650S-21140010-001P00-A1	
3500	0,62	0,29	0,55	2	2,43	7,9	NX310EYKR6000	650S-21140010-001P00-A1	
1900	0,72	0,58	-	4	2,71	29	NX420EYPR6000	650S-21140010-001P00-A1	
3350	1,09	0,58	1,06	4	4,43	29	NX420EYKR6000	650S-21170020-001P00-A1	
1750	0,95	0,83	-	5,5	3,43	42,6	NX430EYMR6000	650S-21140010-001P00-A1	
2700	1,38	0,83	-	5,5	5,24	42,6	NX430EYJR6000	650S-21170020-001P00-A1	
3500	1,67	0,83	1,5	5,5	6,64	42,6	NX430EYFR6000	650S-21170020-001P00-A1	
1850	1,47	1,21	-	8	5,31	98	NX620EYRR6000	650S-21170020-001P00-A1	
1650	1,82	1,8	-	12	6,74	147	NX630EYWR6000	650S-21170020-001P00-A1	
850	1,38	-	-	16	5,16	320	NX820EYXR6000	650S-21170020-001P00-A1	
400 Vac power supply									
6000	0,21	0,07	0,13	0,45	1,14	2,1	NX205EYUR6000	650S-43125020-B01P00-A1	
6000	0,39	0,15	0,27	1	1,99	3,8	NX210EYPR6000	650S-43125020-B01P00-A1	
3700	0,65	0,29	0,55	2	1,39	7,9	NX310EYPR6000	650S-43125020-B01P00-A1	
6000	0,88	0,29	0,55	2	2,43	7,9	NX310EYKR6000	650S-43125020-B01P00-A1	
1750	0,67	0,58	-	4	1,36	29	NX420EYVR6000	650S-43125020-B01P00-A1	
3500	1,19	0,58	1,06	4	2,71	29	NX420EYPR6000	650S-43155020-B01P00-A1	
6000	1,65	0,58	1,06	4	4,43	29	NX420EYKR6000	650S-43155020-B01P00-A1	
2250	1,19	0,83	-	5,5	2,45	42,6	NX430EYQR6000	650S-43125020-B01P00-A1	
3150	1,55	0,83	1,5	5,5	3,43	42,6	NX430EYMR6000	650S-43155020-B01P00-A1	
3500	1,67	0,83	1,5	5,5	3,78	42,6	NX430EYLR6000	650S-43155020-B01P00-A1	
1500	1,21	1,21	-	8	2,42	98	NX620EYIR6000	650S-43125020-B01P00-A1	
3350	2,33	1,21	2,17	8	5,31	98	NX620EYRR6000	650S-43155020-B01P00-A1	
5800	2,41	1,21	2,17	8	8,88	98	NX620EYKR6000	650S-43190030-B01P00-A1	
2350	2,4	1,8	-	12	5,25	147	NX630EYRR6000	650S-43155020-B01P00-A1	
3000	3,12	1,8	3,12	12	6,74	147	NX630EYWR6000	650S-43190030-B01P00-A1	
4000	3,48	1,8	3,12	12	8,98	147	NX630EYLR6000	650S-43190030-B01P00-A1	
1620	2,53	2,36	-	16	5,16	320	NX820EYXR6000	650S-43155020-B01P00-A1	
3500	4,89	2,36	4,33	16	11	320	NX820EYRR6000	650S-43216030-B01P00-A1	
5150	6,26	2,36	4,33	16	16	320	NX820EYMR6000	650S-43216030-B01P00-A1	
1650	4,22	3,9	-	28	8,9	620	NX840EYRR6000	650S-43290030-B01P00-A1	
3000	6,39	3,9	6,39	28	15,9	620	NX840EYWR6000	650S-43216030-B01P00-A1	
1400	5,26	-	-	41	15,6	920	NX860EYWR6000	650S-43216030-B01P00-A1	



Parker NX motors are the ideal complement to AC650S drives in applications where compactness and energy savings are needed. Their main features are as follows :

- Excellent motion quality
- Compact dimensions and robustness
- Large set of options and customization possibilities
- **EX variant for explosive atmospheres**
- High-speed variant up to 17000rpm
- CE and UL variants

# Sales Offices

## Australia

Parker Hannifin  
(Australia) Pty Ltd  
9 Carrington Road  
Private Bag 4, Castle Hill  
NSW 1765  
Tel : +61 2 9634 7777  
Fax : +61 2 9699 6184

## Belgium

Parker Hannifin SA NV  
Parc Industriel Sud Zone 11  
23, Rue du Bosquet  
Nivelles B - 1400  
Tel : +32 67 280 900  
Fax : +32 67 280 999

## Brasil

Parker Hannifin Ind.e Com. Ltda.  
Av. Lucas Nogueira Garcez, 2181  
Esperança - Caixa Postal 148  
Tel : +55 0800 7275374  
Fax : +55 12 3954 5262

## Canada

Parker Motion and Control  
160 Chisolm Drive  
Milton  
Ontario L9T 3G9  
Tel : +1 (905) 693 3000  
Fax : +1 (905) 876 1958

## China

Parker Hannifin Motion & Control  
(Shanghai) Co.Ltd  
SSD Drives  
280 Yunqiao Road  
Export Processing Zone  
Pudong District  
Shanghai 201206  
P.R.China  
Tel : +86 (21) 5031 2525  
Fax : +86 (21) 5854 7599

## France

Parker SSD Parvex  
8, Avenue du Lac  
BP 249  
F-21007 Dijon Cedex  
Tel : +33 (0) 3 80 42 41 40  
Fax : +33 (0) 3 80 42 41 39

## Germany

Parker Hannifin GmH  
Von-Humoldt-Strasse 10  
64646 Heppenheim  
Tel : +49 (0) 6252 798200  
Fax : +49 (0) 6252 798205

## India

Parker Hannifin India Pvt Limited  
Automation Group - SSD Drives  
Division.  
151, Developed Plots Estate,  
Perungudi, Chennai - 600 096  
Tel : +91 44 43910700  
Fax : +91 44 43910700

## Italy

Parker Hannifin SPA  
Via Gounod, 1  
20092 Cinisello Balsamo,  
Milano  
Tel : +39-02 361081  
Fax : +39 (02) 36108400

## Singapore

Parker Hannifin Singapore Pte Ltd  
11, Fourth Chin Bee Rd  
Singapore 619702  
Tel : +65 6887 6300  
Fax : +65 6265 5125

## Spain

Parker Hannifin (Espana) SA  
Parque Industrial Las Monjas  
Calle de las Estaciones 8  
28850 Torrejonde Ardoz  
Madrid  
Tel : +34 91 6757300  
Fax : +34 91 6757711

## Sweden

Parker Hannifin AB  
Lundavägen 143  
212 24 Malmö  
Tel : +46 (0)40 384550  
Fax : +46 (0)40 183650

## UK

Parker Hannifin Ltd  
Tachbrook Park Drive  
Tachbrook Park  
Warwick  
CV34 6TU  
Tel : +44 (0) 1926 317970  
Fax : +44 (0) 1926 317980

## USA

Parker Hannifin Corp.  
SSD Drives Division  
9225 Forsyth Park Drive  
Charlotte  
North Carolina 28273-3884  
Tel : +1 (704) 588 3246  
Fax : +1 (704) 588 3249

PVD3643GB - Edt 12/2009 - Credits photos : © 2009 Parker Hannifin Corporation. All rights reserved.



## Parker Hannifin Ltd SSD Drives Europe Division

New Courtwick Lane, Littlehampton,  
West Sussex BN17 7RZ United Kingdom  
Tel: +44 (0) 1903 737000 Fax : +44 (0) 1903 737100  
sales.uk.ssd@parker.com  
www.parker.com www.ssddrives.com