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AC650S PMAC Servo Motor Drive

Product Catalog



Parker

ENGINEERING YOUR SUCCESS.

Compact Drive for Sensorless Servo Control

AC650S Series

0.25kW - 7.5kW

Description

The AC650S series is designed to save energy in general purpose applications by replacing traditional three phase induction motors with more efficient and physically smaller permanent magnet AC servo motors like the NX series.

Easy to commission and maintain, and with a similar look and feel to the AC650 and AC650V, it provides simple speed and direction control of the motor without the need for a feedback device and the associated wiring.

The AC650S is available in three frame sizes, covering applications up to 1.5 kW with 230V supply and up to 7.5kW with 460V three-phase supply.



Side-by-side mounting reduces cabinet space.

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 an option for **easy maintenance.** It allows 10 drive configurations to be saved without a PC.

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

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

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

Typical applications

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

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

- In **compact machines**, when compact drive solutions are required or where electrical enclosure space is limited: machine-tools, packaging machines, winders/unwinders, special-purpose machines ...

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Compact Drive for Sensorless Servo Control

AC650S Series

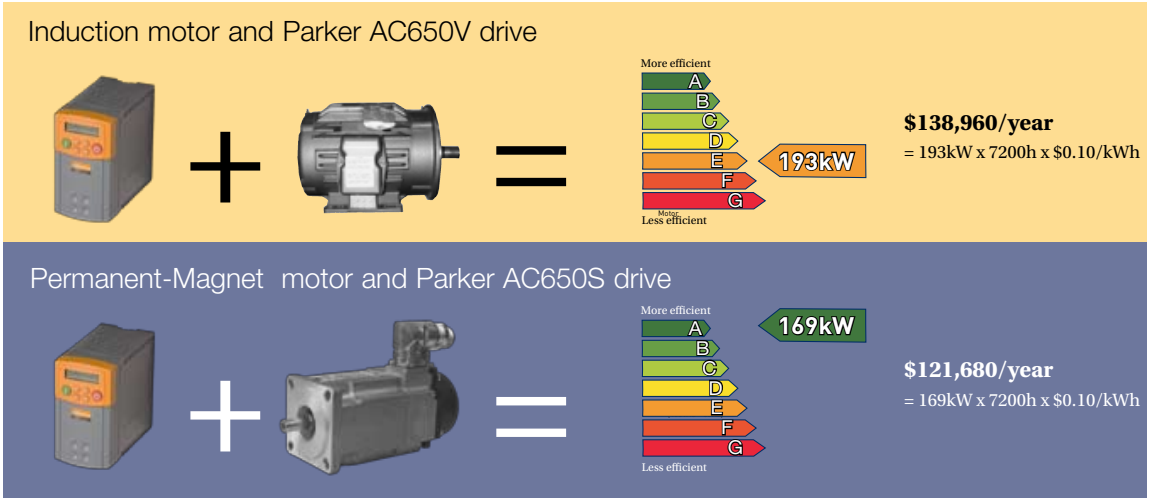
0.25kW - 7.5kW

Energy savings and compact size

The AC650S Compact Sensorless servo drive series features an advanced sensorless control algorithm for controlling permanent-magnet AC motors.

When used with Parker's high efficiency permanent-magnet motors, the AC650S delivers impressive performance and high energy efficiency, which in turn leads to lower energy usage than with conventional induction motors.

The use of servo motors also enables machine builders to design smaller machines when compared to standard induction motors of the same size. In some cases servo motors can be as much as 75% smaller than their induction motor equivalents.



Typical annual savings
assuming 100 x 1.5kW motors

$17,280/year

Extremely compact solution for smaller machines

Parker PMAC motors have high power density, and are up to 75% smaller than the same power induction motors, which enables you make ultra-compact machines. Furthermore, compared to induction motors, PMAC motors are available with a very economical brake option and have no need for force ventilation.



Minimal electrical enclosure space requirements

The AC650S is one of the smallest drives of its kind on the market today. Leading thermal design and management enables the AC650S to be mounted side-by-side with other AC650 series drives in the electrical cabinet. This in turn reduces the size and cost of the enclosure and helps to improve the overall envelope of the machine, making more compact designs possible.

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AC650S Series

0.25kW - 7.5kW

Technical Specification

Power Supply	**0.25 to 1.5kW, single phase supply** 220-240 Vac +/- 10 %, 50-60 Hz +/- 5% **0.37 to 7.5kW, three Phase supply** 380-460 Vac +/- 10 %, 50-60 Hz +/- 5%
Environment	0-40°C (derate to 50°C) Up to 1000m ASL (derate > 1000m)
Protection	IP20
Overload	150% for 30 seconds
Output Frequency	0-500 Hz
Inputs/Outputs Analog Inputs	2; 0-10V, 0-10V/4-20mA
Analog Outputs	2; 0-10V, load <10mA
Digital Inputs	5 ; User configurable 15V to 24VDC
Digital Relay Output	1; Relay output 4A@240V
Motor Thermistor Input	Standard
Communications Options	Profibus-DP, Modbus RTU
Programming port	RS232 - standard
Programming tool	DSE Lite
Cloning Option	Up to 10 drive configurations can be saved without the need for a PC

Application Macros	User Selectable pre-programmed application macros **Basic speed control** voltage or current source speed demand with digital start/stop snd direction. **Manual/Auto control** switch between a local or remote speed demand signal **Preset speeds** select up to 8 pre-programmed speeds selected by digital inputs. **Raise/Lower control** increase and decrease speed from raise / lower digital inputs. **PID control** control pressure, flow, temperature or other variable by monitoring transducer feedback

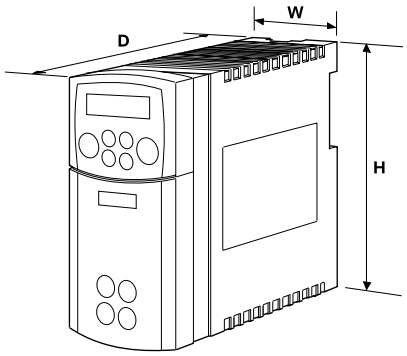
Standards

The AC650S series of AC drives 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 Standard UL508C
- cUL Listed to Canadian Standard C22.2 #14

Dimensions (in/mm)

Frame Size	H	W	D
1	5.4/137	2.9/73	5.6/142
2	7.6/192	2.9/73	6.8/173
3	10.1/257	3.8/96	7.9/200



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Selection and Order Codes

AC650S Series

0.25kW -7.5kW

Drives

Part Number	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	460V 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 (minimum quantities apply) - Please consult your local sales office for details					
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		1.1 / 1.5	5.5	2	
650S-43115020-B▪1P00-A1	460V 3ph	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

Dynamic Braking

D/B Kit includes resistor, overload, protective cage, and enclosure top or panel mounting						
Part Number	Voltage	Nominal Power - CT (HP)	Ohms	Amps	Watts	Dimensions (in) LxWxH
LA471358	230	3, 5	56	1.9	202	6.5 x 1.2 x 2.4
LA471353	460	0.5, 0.75, 1, 1.5	500	0.35	60	4x1x2
LA471355	460	2, 3	200	0.71	100	6.5x1x2
LA471356	460	5	100	1	100	6.5x1x1.6
LA471357	460	7.5	100	1.42	200	6.5x1.2x2.4
LA471358	460	10	56	1.89	200	6.5x1.2x2.4

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Permanent -Magnet Servo Motors

NX Series

Compatible with AC650S



230 VAC power supply							
At rated speed		@ 1500 rpm	@ 3000 rpm	Inertia	Amps	Motor Part Number	Drive Part Number
Nn (rpm)	Pn (kW)	P (kW)	P (kW)	(kg.m²x10⁻⁵)	(RMS)		
6000	0.21	0.07	0.13	2.1	4	NX205EYUR6001	650S-21140010-001P00-A1
5000	0.37	0.15	0.27	3.8	4	NX210EYPR6001	650S-21140010-001P00-A1
2000	0.38	0.29	_	7.9	4	NX310EYPR6001	650S-21140010-001P00-A1
3500	0,62	0,29	0.55	7.9	4	NX310EYKR6001	650S-21140010-001P00-A1
1900	0.72	0.58	_	29	4	NX420EYPR6001	650S-21140010-001P00-A1
3350	1.09	0.58	1.06	29	7	NX420EYKR6001	650S-21170020-001P00-A1
1750	0.95	0.83	_	42.6	4	NX430EYMR6001	650S-21140010-001P00-A1
2700	1.38	0.83	_	42.6	7	NX430EYJR6001	650S-21170020-001P00-A1
3500	1.67	0.83	1.5	42.6	7	NX430EYFR6001	650S-21170020-001P00-A1
1850	1.47	1.21	_	98	7	NX620EYRR6001	650S-21170020-001P00-A1
1650	1.82	1.8	_	147	7	NX630EYWR6001	650S-21170020-001P00-A1
850	1.38	_	_	320	7	NX820EYXR6001	650S-21170020-001P00-A1

460 VAC power supply							
At rated speed		@ 1800 rpm	@ 3600 rpm	Inertia	Amps	Motor Part Number	Drive Part Number
Nn (rpm)	Pn (kW)	P (kW)	P (kW)	(kg.m²x10⁻⁵)	(RMS)		
6000	0.24	0.08	0.16	2.1	2.5	NX205EYUR6001	650S-43125020-B01P00-A1
6000	0.45	0.18	0.32	3.8	2.5	NX210EYPR6001	650S-43125020-B01P00-A1
4200	0.75	0.35	0.66	7.9	2.5	NX310EYPR6001	650S-43125020-B01P00-A1
6000	1.01	0.35	0.66	7.9	2.5	NX310EYKR6001	650S-43125020-B01P00-A1
2000	0.77	0.70	1.27	29	2.5	NX420EYVR6001	650S-43125020-B01P00-A1
4000	1.37	0.70	1.27	29	5.5	NX420EYPR6001	650S-43155020-B01P00-A1
6000	1.90	0.70	1.27	29	5.5	NX420EYKR6001	650S-43155020-B01P00-A1
2500	1.37	1.00	_	42.6	2.5	NX430EYQR6001	650S-43125020-B01P00-A1
3600	1.78	1.00	1.80	42.6	5.5	NX430EYMR6001	650S-43155020-B01P00-A1
4000	1.92	1.00	1.80	42.6	5.5	NX430EYLR6001	650S-43155020-B01P00-A1
1700	1.39	-	-	98	2.5	NX620EYIR6001	650S-43125020-B01P00-A1
3800	2.68	1.45	2.60	98	5.5	NX620EYRR6001	650S-43155020-B01P00-A1
6000	2.77	1.45	2.60	98	9	NX620EYKR6001	650S-43190030-B01P00-A1
2700	2.76	2.16	_	147	5.5	NX630EYRR6001	650S-43155020-B01P00-A1
3400	3.24	2.16	3.38	147	9	NX630EYWR6001	650S-43190030-B01P00-A1
4600	3.66	2.16	3.38	147	9	NX630EYLR6001	650S-43190030-B01P00-A1
1800	2.83	2.83	_	320	5.5	NX820EYXR6001	650S-43155020-B01P00-A1
4000	5.62	2.83	5.20	320	16	NX820EYRR6001	650S-43216030-B01P00-A1
5900	7.20	2.83	5.20	320	16	NX820EYMR6001	650S-43216030-B01P00-A1
1900	4.85	4.68	_	620	9	NX840EYRR6001	650S-43210030-B01P00-A1
3400	7.35	4.68	7.67	620	16	NX840EYWR6001	650S-43216030-B01P00-A1
1600	5.53	_	_	920	16	NX860EYWR6000	650S-43216030-B01P00-A1

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

- Excellent motion control
- Compact dimensions and robust design
- Large set of options and customization possibilities
- Also available: EX series motors for hazardous atmospheres
- High-speed variant up to 17000 RPM
- CE and UL variants

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Options

AC650S Series AC Drive

Cloning Module



Description

The cloning module allows the user to store up to 10 separate drive configurations which can then be transferred between different drives. The configurations can be mapped between different drive sizes. This is an invaluable tool for commissioning or plant maintenance personnel allowing drives to be backed up and reconfigured simply and easily.

Product Details

Part Number	Description
6514/00	Cloning Module

RS485 Modbus Interface



Description

The RS485/RS232 communications interface provides serial data communication, allowing an AC650V drive to connect to a Modbus RTU network as a slave station.

Product Details

Part Number	Description
6513/EI00/00	RS485/RS232 Communications Interface

Features

- Protocols : ModBus RTU or EI-6ASCII
- Compatible with AC650/650V versions 4.x and above
- Connection by shielded twisted pair cable (RS485)
- Connection by shielded 3 core cable (RS232)
- Configuration of input function blocks
- Baud rate configurable by software
- Slave address configurable by software
- Direct access to all drive parameters

Operator Keypads



6511/xxxx/00

Product Details

Part Number	Description
6511/TTL/00	TTL keypad (local mounting)
6511/RS232/00	RS232 keypad (remote mountable)

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Options

AC650S Series AC Drive

Profibus-DP Interface

Description

The PROFIBUS option supports the PROFIBUS-DP PROFIBUS protocol, designed specifically for communication between a PLC system and remote I/O.

The Profibus interface enables the drive to connect to a Profibus-DP as a slave station.

Features

- Profibus-DP network
- Connection by shielded twisted pair
- Baud rate configurable by software up to 12M Baud
- LED indication of card and communication status

PROFIBUS Module 6513/PROF/00



Product Details

Part Number	Description
6513/PROF/00	Profibus-DP communications interface

Conformal Coating

For environments that have dusty, humid or corrosive atmospheres, the AC650 family can optionally be supplied with conformally coated circuit boards that improve the drive's resistance to corrosion, thereby increasing reliability and service life. Environments that would typically benefit from conformal coating could include:

- **Water and wastewater treatment plants**
- **Paper and pulp processing mills**
- **Steel mills**
- **Marine and offshore**
- **Outdoor cranes**
- **Wind & wave power generation**
- **Food processing plants**
- **Chemical plants**



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