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## AC 890 Modular Systems Drive

AC Drives 0.55 – 1200kW (0.75 – 1500 HP)



ENGINEERING YOUR SUCCESS.

# AC 890 Modular Systems Drives

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## Product Overview

The AC890 is a compact, modular systems drive engineered to control speed and position of open-loop and closed-loop AC motors or servo motors.

The AC890 meets the requirements of all variable speed applications, from simple motor speed control to the most sophisticated integrated multi-drive systems.



## One Drive Fits All

The AC890 is compatible with any AC motor and virtually any speed/position feedback option. With this flexibility you may not even need to replace your existing AC motor to achieve high performance, saving you time and money.

### Feedback Options

- **Incremental encoder**
- **EnDat 21 (SinCos) encoder**
- **Resolver**



# Modular Design

Available in two styles

## Stand Alone Version



### The Complete Drive

The AC890 Series Stand Alone Drive provides a complete AC input to AC motor output, with power input and output terminals. Other features of the Stand Alone Drive include:

- Power output to 900 kW (1200 HP) in 9 frame sizes
- access to all feedback and networking options
- built-in dynamic brake switch – provisions to add external braking resistor
- 24 VDC control board supply for programming without power
- USB programming port
- torque and speed analogue outputs
- 208-500 VAC input supply

## Common Bus Version



### Common Bus Drive

The AC890 is also available in a common bus platform, where individual motor output drives are easily connected to a common bus supply.

### Common Bus Drive (CD)

#### Features:

- Power output to 900 kW (1200 HP) in 9 frame sizes
- access to all feedback and networking options
- 24 VDC control board supply for programming without power
- USB programming port
- torque and speed analogue outputs

### Common Bus Supply Module (CS) Features:

- built-in dynamic braking unit
- diagnostic operator panel
- 208-500 VAC power supply
- up to 162A output per module

**The AC890 can be user configured for 5 different operating modes**

### Open-Loop (volts/frequency) Control

This mode is ideal for basic motor speed control.

### Sensorless Vector Control

With its ultra high performance sensorless vector algorithm, it delivers a combination of both high torque and close speed regulation without the need for any speed measuring transducer.

### Closed-Loop Vector Control

Full closed-loop flux vector performance can be achieved with the AC890 by simply adding an encoder feedback 'technology box'. This provides 100% continuous full load standstill torque, plus a highly dynamic speed loop more than sufficient for the most demanding applications.

### Servo Control

Designed for the most demanding servo systems. The ultra fast control loops and process bus make the AC890 ideal for single or multi axis applications.

### 4 Quadrant Active front-end power supply module

With this configuration, the energy is fed back into the mains supply with sinusoidal currents and unity power factor; a very low current harmonic content is achieved.

## Performance Level Options

### Advanced Performance

Motion control firmware with added position loop, motion control function blocks, move incremental, move absolute, move home, line drive master ramp and section control, winder blocks (speed winder, current winder), full function PID, machine state, and others.

### High Performance

All Advanced features plus: Library of pre-engineered application specific LINK VM function blocks such as: Shaftless Printing, cut-to-length, advanced winding, advanced traversing and others.

# A High Performance Design

\*Stand alone version shown

## Features

### High Speed feedback

- Incremental encoder
- EnDat® 2.1 (SinCos) encoder
- Resolver

### Open FireWire IEEE 1394

#### Process Port

- 125µs cycle time
- Real-time synchronization between drives



### Open Communications

EtherNet/IP®  
conformance tested

ControlNet™  
TESTED TO EXCEL

PROFINET®  
IO-Device

DeviceNet™  
SAFETY INTEGRATED

CANopen

### Fast 150Mhz micro processor



## Benefits

### Minimal delay between the fieldbus setpoints and the control loops

Designed to integrate in existing automation systems, the AC890 features high performance ports linked directly to the fast control loops of the drive.

Minimum delay exists between your digital setpoint sent through a fieldbus and the control loops.

### Replacement of analogue solutions

Your existing analogue setpoint-based solutions can be replaced by a digital fieldbus-based solution with minimal bandwidth loss.

### Flexible feedback

The AC890 offers system designers complete flexibility in their choice of feedback technology.

### Open standards for protection of investment

The AC890 has been deliberately designed to integrate seamlessly into your automation network.

To connect to your PLC or fieldbus network you can simply choose from the wide range of communication technology boxes.

### Serves the most demanding applications

Taking advantage of leading edge control algorithms running on a fast 150Mhz microprocessor, the AC890 drive can achieve very high-bandwidth control loops.

This allows you to use the drive for the most demanding industrial applications e.g. printing, cut-to-length, rotary shear, converting and slitting.

## Common Bus Version

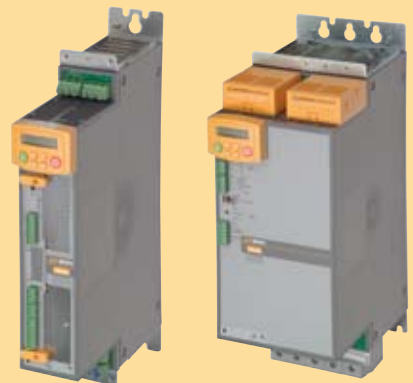
### Compact space saving

We have designed the AC890 with your panel space in mind:

The AC890 benefits from the latest advances in semiconductor cooling technology which make it extremely compact.

The control terminal connectors are removable for easy servicing.

Common bus configuration can help you achieve a smaller systems design footprint.



# Drive System Explorer

## Configuration and Programming Software

### Modular function blocks for fast and easy project creation

DSE, the development environment for AC890 drives, has been designed to assist you in the creation and management of your project.

At the project creation stage, the project tree contains all the sections or axis of the machine.

### Function blocks reusability

DSE offers user-defined macros that can be reused. The LINK programming environment, with PLC-like function blocks, makes application programming simple and reduces the training needs of the technical staff.

### Built-in library of function blocks for advanced applications

DSE comes with a library of built-in function blocks for advanced applications at no extra cost:

- Shaftless printing
- Winder
- Registration

### Section control

The configuration of the most complex machines is fast and error-free.

- Parameters setting and project creation
- High bandwidth digital oscilloscope
- Monitoring and online tuning

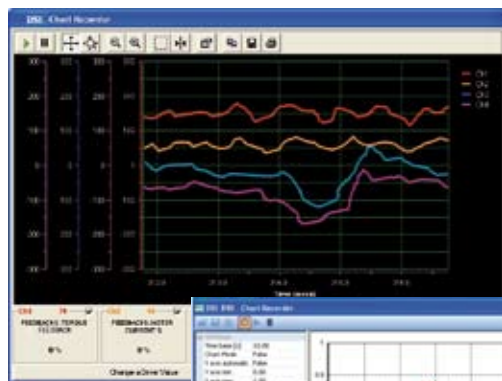
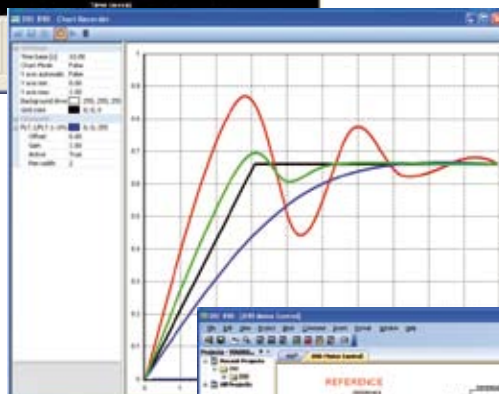
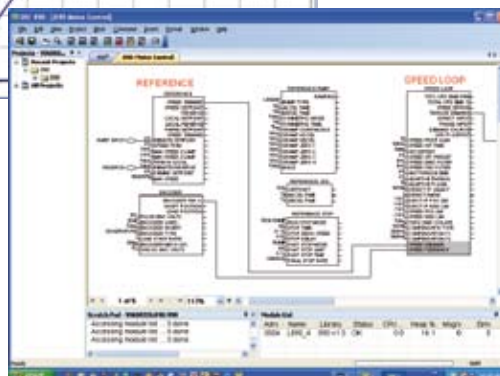


Chart Variables on line

Monitoring and on line tuning



Totally Flexible LINK Block Diagram



# Options



### Keypad Options

The AC890 features three user keypad options, which allow the user to read drive parameters on three screen sizes. Remote mounting is also available and is required on some drive frame sizes.

Option	Model
4 digit LCD	6511
2 line LCD	6901
55x40mm Graphical	6911



### TS8000 Operator Interface

The TS8000 operator interface is a web-enabled graphical interface available in 4 sizes. Pre-engineered templates assist system design.

### Bus Bars

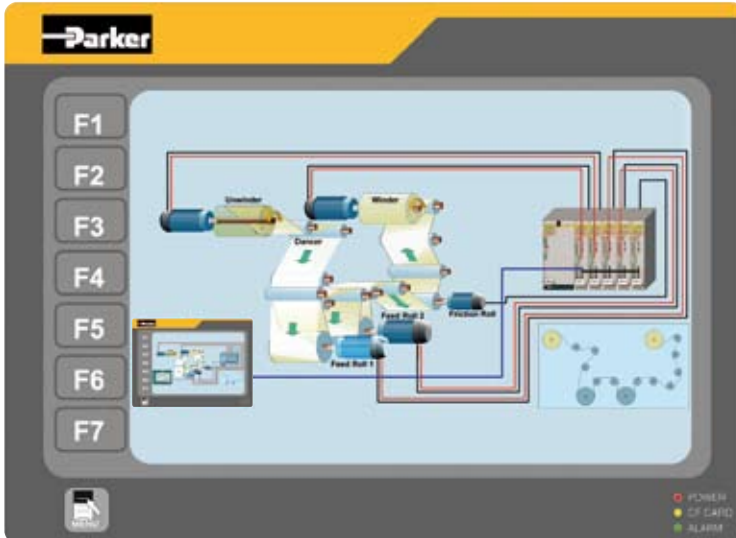
Allow you to join common drives, common supplies and common adapter modules together. 140A max current rating and load sharing between units.

### Duct Components

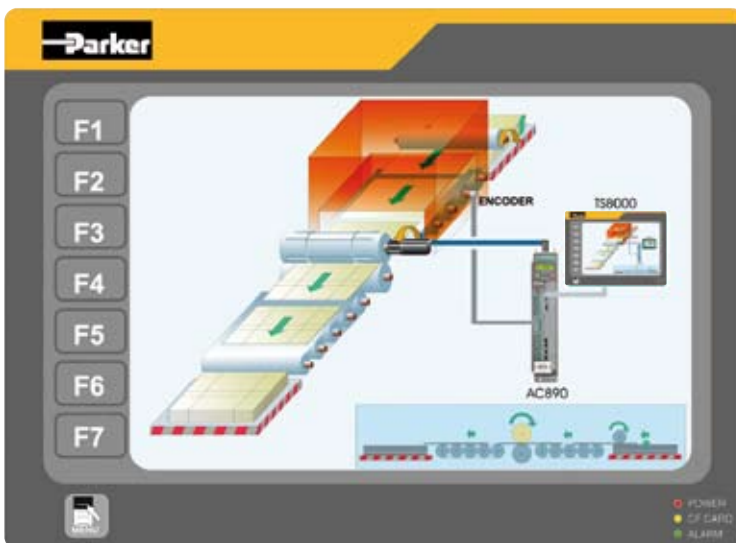
Provides a means of ventilating air directly through the heat sinks and out of the cabinet.

# AC890 Application Examples

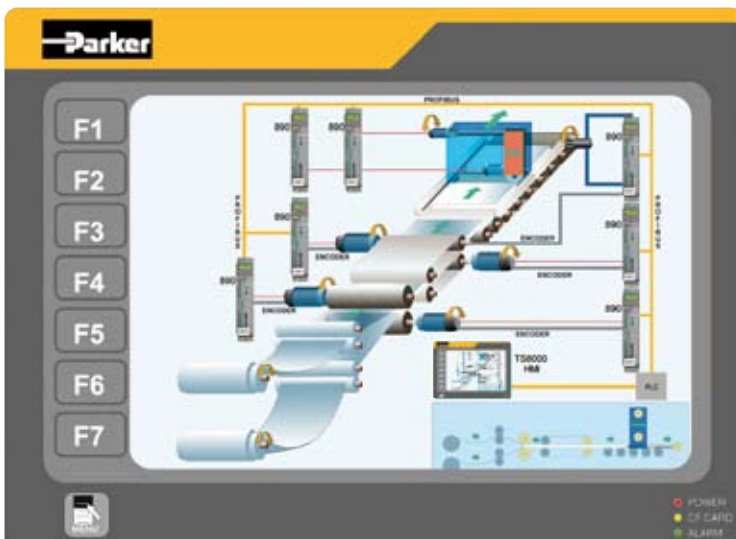
## Paper or Metal Finishing



## Corrugated Cutting



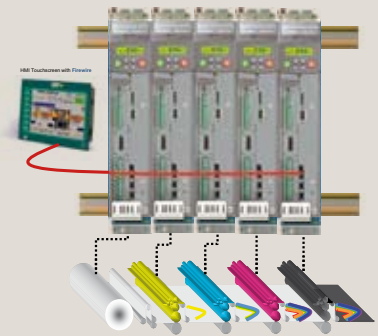
## Laminating



## Shaftless Registration Control Solutions for Printing

Mechanical line shafts are easily replaced with individual AC890 drives, capable of precise synchronization and printing registration adjustment to each section, guaranteeing perfect alignment of each colour.

AC890 High Performance Level features a library of pre-engineered application specific LINK VM function blocks, including shaftless printing, cut-to-length, precision winding, traversing and others.



## The Complete Drive for converting and energy saving:

The AC890 provides precise speed control in a variety of **material converting environments**, including cutting, coating and printing processes.

Additionally, the AC890 provides the technology to **reduce energy consumption** in many traditionally fixed speed applications, such as fans, pumps and compressors.

# Specifications (all ratings shown @ 400Vac)

## Ratings Common Bus Supply Modules

208 - 500 Vac (+/- 10%) 3 phase

kW	(HP)	Amperes	Frame
15	(20)	32	B
30	(40)	54	B
60	(80)	108	D
90	(120)	162	D

## Ratings Common Bus Drive Modules

used with 208 - 230 Vac (+/- 10%) Supplies

kW	(HP)	Amperes		Frame
		Vector / Servo		
0.55	(0.75)	3 / 2.2		B
1.1	(1)	5.5 / 4		B
1.5	(2)	7 / 6		B
2.2	(3)	11 / 8		B
4	(5)	16.5 / 12		B
5.5	(7.5)	24 / 24		C
7.5	(10)	30 / 30		C

## Ratings Common Bus Drive Modules

used with 380 - 500 Vac (+/- 10%) Supplies - 3 phase

kW	(HP)	Amperes		Frame
		Vector / Servo		
0.55	(0.75)	2 / 1.5		B
1.1	(1)	3.5 / 2.5		B
1.5	(2)	4.5 / 3.5		B
2.2	(3)	6 / 4		B
4	(5)	10 / 6		B
5.5	(7.5)	12 / 9		B
7.5	(10)	16 / 12		B
11	(15)	24 / 20		C
15	(20)	30 / 25		C
18.5	(25)	39 / 35		D
22	(30)	45 / 38		D
30	(40)	59 / 50		D
37	(50)	73 / 67		E
45	(60)	87 / 79		E
55	(75)	105 / 78		F <sup>(1)</sup>
75	(100)	145 / 110		F <sup>(1)</sup>
90	(125)	180 / 185		F <sup>(1)</sup>

## Ratings Stand-alone Drive Modules

208 - 240 Vac (+/- 10%) Input - 3 phase

kW	(HP)	Amperes		Frame
		Vector/Servo		
0.55	(0.75)	3 / 2.2		B
1.1	(1)	5.5 / 4		B
1.5	(2)	7 / 6		B
2.2	(3)	11 / 8		B
4	(5)	16.5 / 12		B
5.5	(7.5)	24 / 24		C
7.5	(10)	30 / 30		C

## Ratings Stand-alone Drives

380 - 500 Vac (+/- 10%) Input - 3 phase : Frames B to F  
380 - 460 Vac (+/- 10%) Input - 3 phase : G and above

kW	(HP)	Amperes		Frame	kW	(HP)	Amperes		Frame
		Vector/Servo					Vector/Servo		
0.55	(0.75)	2 / 1.5		B	110	(150)	216 / 153		G
1.1	(1)	3.5 / 2.5		B	132	(175)	250 / 171		G
1.5	(2)	4.5 / 3.5		B	160	(200)	316 / 224		G
2.2	(3)	6 / 4		B	180	(250)	361 / 253		G
4.0	(5)	10 / 6		B	200	(300)	375 / 268		H
5.5	(7.5)	12 / 9		B	220	(300)	420 / 300		H
7.5	(10)	16 / 12		B	250	(350)	480 / 336		H
11.0	(15)	24 / 20		C	280	(400)	520 / 368		H
15.0	(20)	30 / 25		C	315	(450)	590 / 411		J
18.5	(25)	39 / 35		D	355	(500)	685 / -		K
22.0	(30)	45 / 38		D	400	(600)	798 / -		K
30.0	(40)	59 / 50		D	500	(700)	988 / -		K
37.0	(50)	73 / 67		E	550	(800)	1028 / -		K
45.0	(60)	87 / 79		E	600	(900)	1120 / -		K
55.0	(75)	105 / 78		F <sup>(1)</sup>	630	(1000)	1197 / -		K
75.0	(100)	145 / 110		F <sup>(1)</sup>	800	(1300)	1482 / -		K
90.0	(125)	180 / 135		F <sup>(1)</sup>	900	(1500)	1681 / -		K

## Dimensions

Frame Size	Overall Dimensions					
	H		W		D	
	mm	(in)	mm	(in)	mm	(in)
B	434	(17.1)	72	(2.8)	258.5	(10.2)
C	434	(17.1)	116	(4.6)	258.5	(10.2)
D	434	(17.1)	160	(6.3)	258.5	(10.2)
E	668	(26.3)	257	(10.1)	312	(12.3)
F	720	(28.3)	257	(10.1)	349	(13.7)
G	1042	(41.0)	456	(18.0)	465	(18.3)
H	1177	(46.3)	572	(22.5)	465	(18.3)
J	1288	(50.7)	677	(26.7)	465	(18.3)
K*	2007	(79.0)	3251	(128.0)	610	(24.0)
K**	2007	(79.0)	3658	(144.0)	610	(24.0)

Dimensions are in millimeters (inches)

Horsepower ratings correspond to appropriate motor ratings.

K-frame dimensions include NEMA 12 ventilated enclosures with flange disconnect option

\*6-pulse input [12-pulse optional]

\*\*6-pulse input [18-pulse optional]

Please refer to your local regional office for dimensional drawings for each Frame.

## Overload Ratings

Vector: 150% for 60 secs / 180% for 0.5 secs

Servo: 200% for 4 secs

## Output Frequency

0 - 1000 Hz; V/Hz mode

0 - 350 Hz; closed loop vector mode

0 - 120 Hz; sensorless vector mode

0 - 350 Hz; Servo

## Switching Frequency

Frame size B - D: 3,6 or 9 KHz (Vector), 4 KHz (Servo)

Frame size E: 3 or 6 KHz (Vector) 4KHz (Servo)

Frame size F - K: 3 KHz (Vector) 4KHz (Servo)

Frame size G - H: 2.5KHz (Vector) 4KHz (Servo)

Frame size J: 2KHz (Vector) 4KHz (Servo)

Some exceptions apply. All with audibly silent switching frequency

## Dynamic Braking

All drive modules have either regenerative braking or dynamic resistor options

## Operating Temperature

0°C to 45°C (32°F to 113°F) for frames B-F

0°C to 40°C (32°F to 104°F) for frames G-K

## Product Enclosure Rating - IP21

Frame size B-E Open or Enclosed (Type1), frame size

F-K Open type suitable for cubicle mount only.

## Cubicle Rating

Cubicle to provide 10dB attenuation to radiated emissions between 30-100MHz. Cubicle may also require tool for opening or removing any door or panel.

## Humidity

Maximum 85% relative humidity at 40°C non-condensing

## Atmosphere

Non flammable, non corrosive and dust free

## Climatic Conditions

Class 3k3, as defined by EN50178 (1998)

## Vibration

Test Fc of EN60068-2-6

## Standards

### Pollution Degree

Pollution Degree II (non-conductive pollution, except for temporary condensation)

### Europe

When installed in accordance with the manual, this product conforms to the Low Voltage Directive 2006/95/EC.

### North America

Complies with US requirements (UL508C) and Canadian requirements (C22.2 No. 14).

<sup>(1)</sup> Not tested.

## Globally Certified

EMC Directive 2004/108/EC

Low Voltage Directive 2006/95/EC

Globally certified and compliant with the most stringent international regulations, the AC890 can be used anywhere in the world.



# Sales Offices

## Australia

Parker Hannifin  
Pty Ltd  
9 Carrington Road  
Private Bag 4, Castle Hill  
NSW 1765  
Tel: +61 2 9634 7777  
Fax: +61 2 9899 6184

## Belgium

Parker Hannifin SA NV  
Parc Industriel Sud Zone 11  
23, Rue du Bosquet  
Nivelles B -1400 Belgium  
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  
Suite B2109 21st Floor  
Hanwei Plaza  
7 Guanghua Road  
Chaoyang District  
Beijing 100004  
P.R.China  
Tel: +86(10)6561 0520/1/2/3/4/5  
Fax: +86(10)6561 1070

## France

Parker SSD Parvex  
8 Avenue du Lac  
B.P. 249  
F-21007 Dijon Cedex  
Tel: +33 (0)3 80 42 41 40  
Fax: +33 (0)3 80 42 41 23

## Germany

Parker Hannifin GmbH  
Von-Humboldt-Strasse 10  
64646 Heppenheim  
Germany  
Tel: +49(0)6252 798200  
Fax: +49(0)6252 798205

## India

SSD Drives India Pvt Ltd  
151 Developed Plots Estate  
Perungudi,  
Chennai, 600 096, India  
Tel: +91 44 43910700  
Fax: +91 44 43910700

## Italy

Parker Hannifin SPA  
Via Gounod 1  
20092 Cinisello Balsamo  
Milano  
Italy  
Tel: +39 02 66012459  
Fax: +39 02 66012808

## 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) S.A.  
Parque Industrial Las Monjas  
Calle de las Estaciones 8  
28850 Torrejonde Ardoz  
Madrid  
Spain  
Tel: +34 91 6757300  
Fax: +34 91 6757711

## Sweden

Parker Hannifin AB  
Montörgatan 7  
SE-302 60 Halmstad  
Sweden  
Tel: +46(35)177300  
Fax: +46(35)108407

## 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



## Parker Hannifin Ltd SSD Drives Division

New Courtwick Lane, Littlehampton,  
West Sussex BN17 7RZ United Kingdom  
Tel: +44 (0) 1903 737 000 Fax: +44 (0) 1903 737 100  
sales.uk.ssd@parker.com  
www.parker.com www.ssddrives.com