

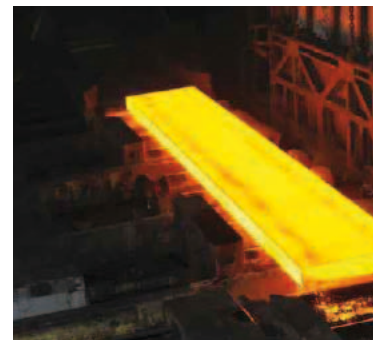


aerospace
climate control
electromechanical
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pneumatics
process control
sealing & shielding



AC890PX Modular Chassis Drive

High Power AC Drive 110 kW - 2000 kW



ENGINEERING YOUR SUCCESS.



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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.

Local Application Expertise

Parker has local engineering resources committed to adapting and applying our current products and technologies to best fit our customers' needs.

Manufacturing to Meet Our Customers' Needs

Parker is committed to meeting the increasing service demands that our customers require to succeed in the global industrial market. Parker's manufacturing teams seek continuous improvement through the implementation of lean manufacturing methods throughout the process. We measure ourselves on meeting our customers' expectations of quality and delivery, not just our own. In order to meet these expectations, Parker operates and continues to invest in our manufacturing facilities in Europe, North America and Asia.

Worldwide Manufacturing Locations

Europe

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

Asia

Shanghai, China
Chennai, India

North America

Rohnert Park, California
Irwin, Pennsylvania
Wadsworth, Ohio
Charlotte, North Carolina
New Ulm, Minnesota



Offenburg, Germany

Local Manufacturing and Support in Europe

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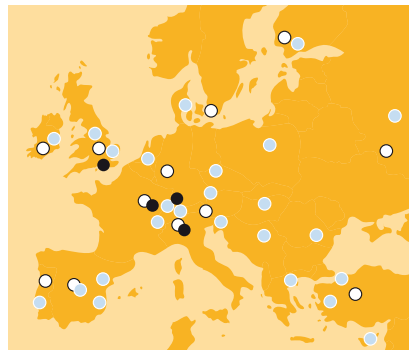
For contact information, please refer to the Sales Offices on the back cover of this document or visit www.parker.com



Milan, Italy



Littlehampton, UK



- Manufacturing
- Parker Sales Offices
- Distributors



Dijon, France

High Power AC Drive - AC890PX Modular Chassis Drive

Overview

Description

AC890PX Modular Chassis drive is supplied in a kit format for assembly into a standard Rittal TS range industrial enclosure. This enables system integrators and panel builders to add any number of drive sections into their standard electrical control systems, thereby reducing overall enclosure size and complexity.

The AC890PX Modular Chassis kit is supplied complete with all of the necessary individual components and fixings required to complete the assembly of the drive. It can easily be assembled by a technician with minimal drives technical knowledge

Features

- AC Fed (SD) or DC Fed (CD) modular design configuration
- Power range 110 - 400 kW
- Sold in kit format for self-assembly
- Easy integration into power drive systems



Drive shown part assembled

Technical Characteristics - Overview

The AC fed (SD) version of the AC890PX Modular Chassis drive is available with three AC input power supply options to suit individual requirements.

Version	400 V nominal	600 V nominal	700 V nominal
Power Supply	380...480 VAC kW ratings @400 VAC 50 Hz HP ratings @460 VAC 60 Hz	500...575 VAC HP ratings @575 VAC 60 Hz	600...690 VAC kW ratings @690Vac 50 Hz
Heavy Duty	110...315 kW, 215...580 A 150...500 HP, 200...580 A	110...315 kW, 160...410 A 200...400 HP, 160...410 A	110...315 kW, 130...340 A 200...400 HP, 130...340 A
150 % overload for 60 s			
Normal Duty	132...400 kW, 260...700 A 200...600 HP, 250...700 A	132...400 kW, 170 - 440 A 200...500 HP, 240 - 500 A	132...400 kW, 160 - 430 A 200...500 HP, 160 - 430 A
110 % overload for 60 s			

Range Overview

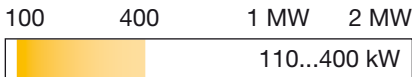
The AC890PX Modular Chassis Drive is a high performance, high power modular drive designed to control 3-phase induction or permanent magnet AC motors, or to be used as an active front-end with power ratings ranging from 110 kW...2000 kW. It can be supplied either in modular kit form, or as a packaged drive system.

AC890PX Modular Chassis High Power AC Drive: 110...400 kW

The AC890PX Modular Chassis drive has been designed to be sold in kit form for assembly by a system integrator or panel builder. The product is engineered for easy assembly into a standard industrial enclosure with all necessary fixing brackets supplied as part of the kit. The AC890PX Modular Chassis drive offers systems builders the flexibility to add all ancillary components in order to tailor the product to meet their customers needs.



Packaged Drive Options - Factory Supplied



AC890PX Modular FASTPACK simple packaged drive system: 110...400 kW

The AC890PX Modular FASTPACK provides users with a ready-to-install standalone drive in an industrial enclosure complete with all additional control equipment. FASTPACK delivers an integrated packaged solution for single motor applications on short lead times. A range of standard pre-engineered control and communications options can be specified to complete the package and provide the necessary control and feedback, whatever the application.



AC890PX Modular Air-Cooled Parallel AC Systems Drive: 400...900 kW

Larger power paralleled drive solutions based on the AC890PX Modular Chassis drive can be supplied as a fully engineered solution direct from the factory. This allows up to three AC890PX Modular Chassis drives to be paralleled together to achieve control of motors with powers up to 900 kW. The air cooled solution provides a cost effective solution as the modular design of the product allows only the required power stages to be supplied to create a parallel solution.



AC890PX Modular Advanced- Cooled AC Systems Drive: 500 kW...2 MW

Higher power ratings of up to 2 MW can be achieved using Parker's innovative advanced-cooled 'PowerPak' modules. These larger drives use the same modular construction as the rest of the AC890PX Modular Chassis drive range but are supplied with Parker's 2-phase advanced cooling system, which uses a non-conductive liquid refrigerant. This enables power density to be increased significantly, resulting in a significantly smaller footprint than can be achieved by air-cooling alone.

Product Description

The AC890PX Modular Chassis is a modular high power AC drive platform designed for industrial applications with power requirements ranging from 110 kW up to 2000 kW. Available in kit form for integration into a standard control enclosure, or as a packaged standalone air-cooled or 2-phase liquid refrigerant cooled drive, AC890PX Modular Chassis drives can be configured for use in a wide range of applications and industries.

Compact Modular Design

The plug-in modular nature of the AC890PX Modular Chassis makes it easy to configure the drive to suit a number of alternative input power configurations including 12/18 pulse and Active Front End (AFE). The 'PowerPak' phase modules, common supply modules, capacitor and control module can be arranged to suit the particular requirements of the application.



PowerPak Phase Module

Low-maintenance ensures maximum machine up-time and productivity

Thanks to a plug-in design, the power modules of the AC890PX Modular Chassis drive has been designed to be replaceable in minutes by any technician, even a non-specialist. These lightweight, ship anywhere modules help to reduce machine or process downtime and lost productivity in the event of a fault occurring.

AC890PX Modular Chassis drives can be configured with different PowerPak module combinations dependant upon the application.

CP Module

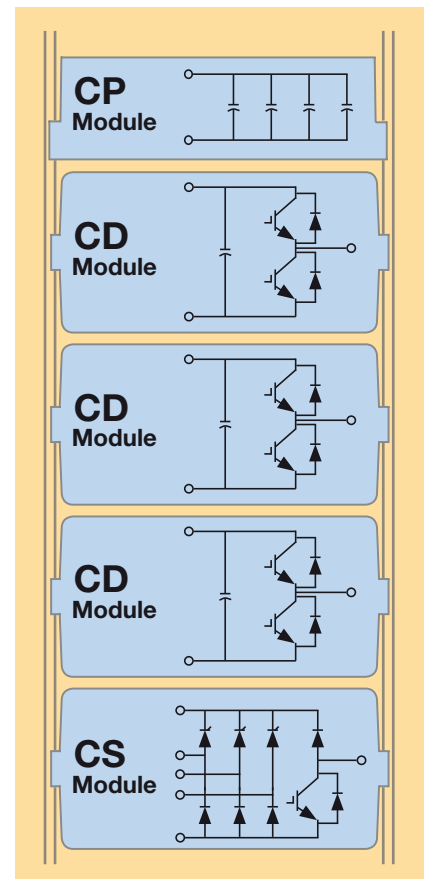
The capacitor module is only fitted to 400 kW drives and provides extra capacitance for the DC bus.

CD Module

These output modules each provide a single phase of the complete drive and can be interchanged with each other.

CS Module

A 3-phase input rectifier containing a half-controlled diode/thyristor bridge. This module supplies DC to the three CD modules and also includes an integral dynamic brake switch.



Features and Benefits

AC890PX Modular Chassis drive can be configured for five modes of operation allowing the appropriate level of control to be selected for the motor and application:

- **Open-loop V/F speed control**
This is the simplest form of control available and is ideal for motor speed control where an AC induction motor is controlled by varying the voltage and frequency supplied to the motor.
- **Sensorless flux vector control**
A ultra high performance sensorless vector algorithm, delivers a combination of both high torque and close speed regulation without the need for any speed measuring transducer.
- **Closed-loop flux vector control**
Full closed-loop flux vector performance can be achieved 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 of applications.
- **Servo control**
Extremely fast control loops and process bus make the AC890PX Modular Chassis drive ideal for single Permanent magnet AC motor control.
- **4 Quadrant active front-end power supply module**
The drive is used to feed energy back into the mains supply with sinusoidal currents and unity power factor with very low levels of harmonic distortion.



Suitable for use with AC induction and PMAC motors

AC890PX Modular Chassis drive can control any of the following motor types, offering total flexibility of motor selection, allowing the most suitable motor to be selected for the application:

- AC Induction motors
- PMAC servo motors
- Torque Motors
- High speed PMAC servo motors

Compatible with a wide range of feedback options

Thanks to a range of optional feedback cards, AC890PX Modular Chassis drive works with all types of popular feedback systems providing greater flexibility during the design stage of a project:

- Incremental encoder
- Resolver
- SinCos (Endat 2.1) encoder
- Absolute encoder EnDat2.2 option 02



AC induction motors



PMAC brushless motors



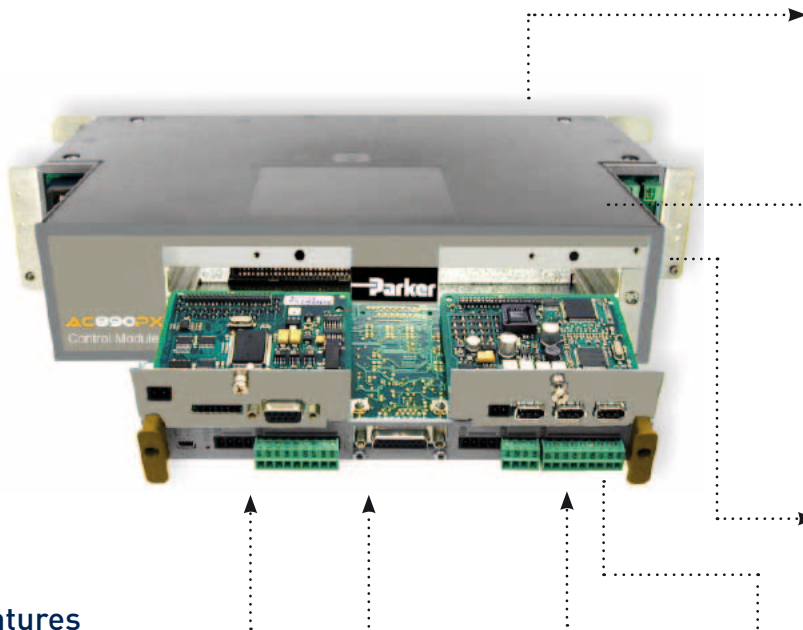
Torque motors



High speed PMAC motors

AC890PX Control Module

At the heart of the AC890PX Modular Chassis drive is a highly advanced control module that manages all of the drives functions. Taking advantage of leading edge control algorithms running on a fast 150 MHz microprocessor, the drive can achieve very high-bandwidth control loops. This allows you to use the drive for the most demanding of industrial applications.



Features

Support for popular industrial fieldbus networks



Range of feedback options

- Incremental encoder
- EnDat® 2.2 option 02 (SinCos) encoder
- Resolver

Ultra-fast control loops

- Torque loop: 62.5 μ s
- Speed loop: 62.5 μ s
- Position loop: 62.5 μ s

Open FireWire IEEE 1394 Process Port

- 125 μ s cycle time
- Real-time synchronization between drives

Benefits

Integrated safety functionality

The integrated Safe Torque Off (STO) functionality offers protection against unexpected motor start-up, in accordance to EN 13849-1 PLe, SIL 3 as standard.

Minimal delay between fieldbus setpoints and the control loops

Designed to integrate in existing automation systems, the AC890PX Modular Chassis drive 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.

Flexible feedback options

The AC890PX Modular Chassis drive offers system designers complete flexibility in their choice of feedback technology to best suit the needs of their application.

Open standards for protection of investment

The AC890PX Modular Chassis drive has been specifically designed to integrate seamlessly into your automation network with the addition of a communications interface.

Two performance levels to suit all applications:

Advanced Performance

Motion control with position control,
Motion control function blocks: incremental move, absolute move, move home
Section Control: line drive master ramp, winder blocks (speed and current winder), PID process, sequencer control.

High Performance

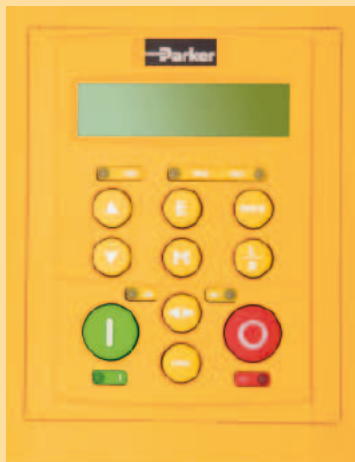
All advanced features plus:
Library of pre-engineered application specific LINK VM function blocks such as:
Shaftless printing, cut-to-length, advanced winding and advanced traversing.

Tools

Programming / Operator Controls

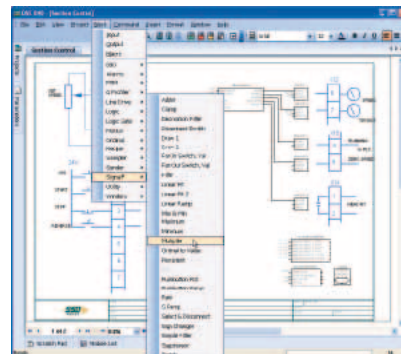
The AC890PX Modular Chassis drive operator keypad provides access to all of the drive's functions in a logical and intuitive manner. The backlit display presents all functions in plain language and engineering units. PLC-like function blocks for advanced applications.

- Multilingual
- Quick setup menu
- Auto-tuning
- Diagnostic messages
- Drive configuration



Drive System Explorer (DSE)

DSE software allows users to program, configure, monitor and diagnose AC890PXM drives with the use of a PC. An easy to use interface guides the user through every step of project creation and implementation.



Applications

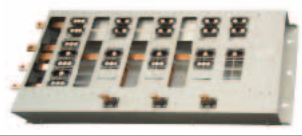









AC890PX Modular Chassis drives are suited to many different motor control and power conversion applications where power density and compactness are key design considerations:

- Fan and pump control
- Automotive test stands
- Extruders
- Decanter and batch centrifuges
- Hoists and cranes
- Winder/un-winder stands
- Ski-lifts and cable cars
- Wind turbine grid-tie
- Offshore and marine
- Solar energy capture
- Ocean / wave energy grid-tie



Component List Overview

The following is an overview of the parts supplied as part of a AC890PX Modular Chassis kit. The actual contents will vary dependant upon the configuration and rating of the product ordered.

Qty	Description	
1	Backplate Busbar Assembly	
1	Pair of mounting rails	
	Set of TS8 mounting brackets and assembly screws	
	Vent hood	
1	AC890 series control module	
	AC890PX-Series STO card	
1	CS module (AC890PXS only)	
3	CD module	
1	CP module (400 kW only)	
1	Set of control cables	

Technical Characteristics

Power Ratings

Model Variant	Asynchronous motors				PMAC Servo motors	
	Heavy Duty [kW/HP]	Normal Duty [kW/HP]	Heavy Duty [A]	Normal Duty [A]	Heavy Duty [A]	Normal Duty [A]
Nominal 400 VAC modules / 565 VDC						
890PX**-43215..	110/147	132/177	215	260	155	190
890PX**-43260..	132/177	160/214	260	340	185	245
890PX**-43300..	160/214	200/268	300	390	210	285
890PX**-43420..	200/268	250/335	420	480	295	350
890PX**-43480..	250/335	315/422	480	600	340	435
890PX**-43520..	280/375	355/476		660	365	475
890PX**-43580..	315/422	400/536	580	720	410	520
Nominal 460 VAC modules / 650 VDC						
890PX**-43215..	112/150	149/200	200	250	140	180
890PX**-43260..	149/200	187/250	250	320	175	230
890PX**-43300..	187/250	224/300	300	380	210	275
890PX**-43420..	224/300	298/400	380	480	270	350
890PX**-43480..	298/400	298/400	460	590	325	425
890PX**-43580..	373/500	448/600	580	700	405	505
Nominal 575 VAC modules / 810 VDC						
890PX**-63160..	112/150	149/200	160	210	90	120
890PX**-63210..	149/200	187/250	210	250	115	145
890PX**-63260..	224/300	224/300	260	310	140	180
890PX**-63310..	112/150	298/400	310	420	170	240
890PX**-63410..	298/400	298/400	410	480	220	275
Nominal 690 VAC modules / 975 VDC						
890PX**-73130..	110/147	132/177	130	160	60	85
890PX**-73160..	132/177	160/214	160	190	75	105
890PX**-73190..	160/214	200/268	190	240	85	130
890PX**-73230..	200/268	250/335	230	280	105	150
890PX**-73280..	250/335	315/422	280	340	125	185
890PX**-73320..	280/375	355/476	320	390	145	210
890PX**-73340..	315/422	400/536	340	430	155	235

See Ordering Information for full order codes and description



Electrical Characteristics

AC890PX Modular Chassis Drive

Power Supply Requirements

Power Supply	400 V Nominal	600 V Nominal	700 V Nominal
Rated Input Voltage	3 Ø 300...460 VAC ±10 %	3 Ø 500...575 VAC ±10 %	3 Ø 600...690 VAC ±10 %
Input Frequency	45...65 Hz		
Maximum Switching Frequency	2 kHz (standard), adjustable to 4 kHz de-rating may apply		
Overload: Heavy Duty	150 % for 60 seconds		
Overload: Normal Duty	110 % for 60 seconds		
Output Frequencies	0...1000 Hz in V/Hz mode		
	0...350 Hz in Closed loop vector mode		
	0...120 Hz in Sensorless vector mode		
Earth Leakage Current	>100 mA		
Input Power Factor	0.94		

Auxiliary Supply Requirements

Auxiliary Voltage	24 VDC		
Control Module and Fans	30 W		
Tech Cards - Speed Feedback	8902/EQ: Encoder Quadrature Incremental - 8 W		
	8902/E1: Sin/Cos Encoder - 3.3 W		
	8902/M1: Mark Registration - 1 W +5 V plus upto 3 W +24 V supply		
	8902/RE: Resolver - 3.2 W		
	8902/RR: Resolver + Repeater - 4.4 W		
Tech Cards - Communications	8903/DN: Devicenet, 8903/CB: CANopen, 8903/CN: ControlNet, 8903/SP: Peer to peer	1.3 W	
	8903/PB: Profibus	2.3 W	
	8903/NIM: Modbus/TCP, 8903/IP: Ethernet IP, 8903/PB: Profinet	1.6 W	

Environmental Characteristics

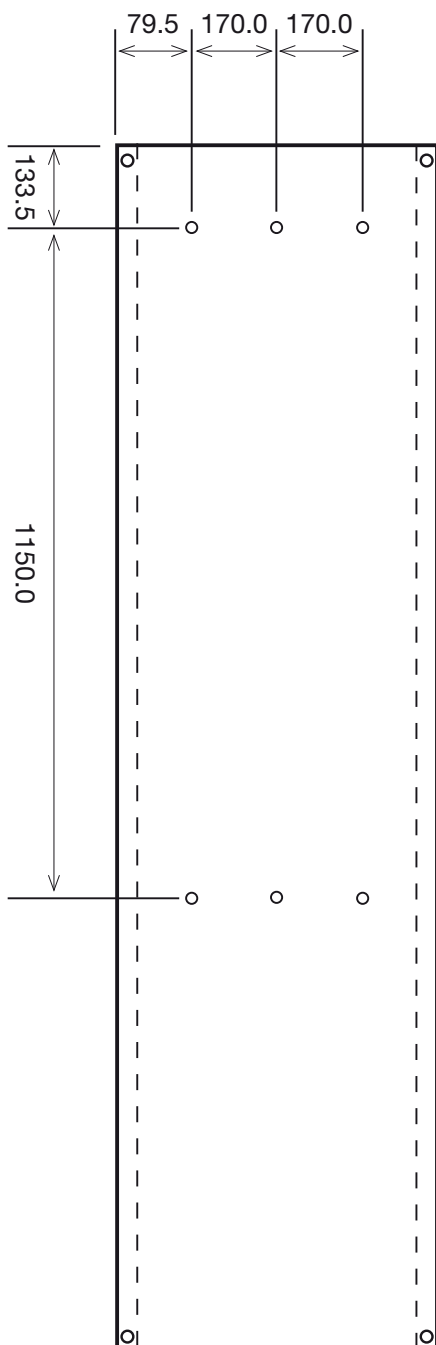
Operating Temperature	0 to +40 °C, derate up to a maximum of +50 °C
Storage Temperature	-25 to +55 °C
Shipping Temperature	-25 to +70 °C
Product Enclosure Rating	IP20/ NEMA 1 standard
Altitude	1000 m ASL. Derate output current by 1.5 % per 100 m to a maximum of 2000 m
Operating Humidity	Maximum 90 % relative humidity at 40 °C non-condensing
Climatic Conditions	Class 3k3, as defined by EN60721

Standards and Conformance

Pollution Degree	Pollution degree II (non-conductive pollution, except for temporary condensation)
Europe	This product conforms with the Low Voltage Directive 2006/95/EC
EMC Compatibility	CE Marked to EN618000-3 (EMC Directive)
Safety	SIL3 / PLe as per EN13849-1

Dimensions

The AC890PX Modular Chassis Drive has been designed to mount in a standard 600 x 600 mm Rittal TS8 cubicle. The mounting system is sufficiently flexible to allow the AC890PXM to be installed in other floorstanding enclosure with minimal modification. If the product is to be mounted in a wider or deeper cubicle then additional brackets may be required to form a rigid frame. Refer to booklet HM501225U001 for detailed assembly and mounting instructions.



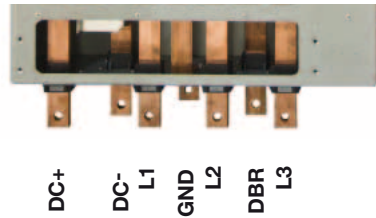
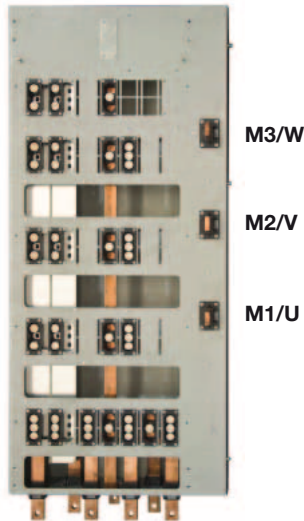
Power Rating	Length (mm)	Width (mm)	Depth (mm)	Weight
110 kW	1150	500	515	135 kg
132 kW	1150	500	515	135 kg
160 kW	1150	500	515	135 kg
200 kW	1150	500	515	135 kg
250 kW	1150	500	515	135 kg
280 kW	1150	500	515	155 kg
315 kW	1150	500	515	155 kg

Power Ratings are based on 400V nominal supply, constant torque ratings
 All dimensions and weights are approximate.

Drawing shows TS8006 backplate

Connections

Power connectors



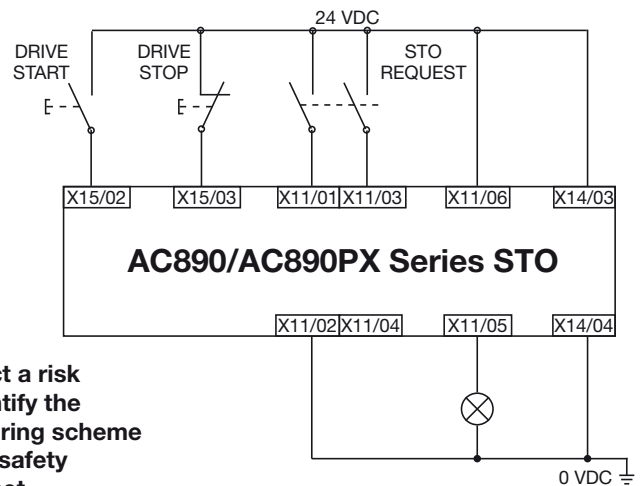
Term.	Description
DC+	DC Link Bus +Ve
DC-	DC Link Bus -Ve
L1	L1 AC Input Supply
GND	Earth
L2	L2 AC Input Supply
DBR	Dynamic Brake Resistor
L3	L3 Ac input Supply
M1/U	Motor Output U
M2/V	Motor Output V
M3/W	Motor Output W

Safe Torque Off (STO)

The AC890 series features Safe Torque Off functionality as standard, offering users protection against unexpected motor start-up in accordance with EN 13849-1 PLe or SIL 3.

The STO functionality helps protect personnel and machinery by preventing the drive from restarting automatically. It disables the drive pulses and disconnects the power supply to the motor, so that the drive cannot generate any potentially hazardous movement. The state is monitored internally within the drive.

Term.	Label	Description
X11/01	STOA	To disable STO: connect to X14/03
X11/02	STO 0V	To disable STO: do not connect
X11/03	STO B	To disable STO: connect to X14/03
X11/04	STO 0V	To disable STO: connect to X14/04
X11/05	STATUS-	To disable STO: do not connect
X11/06	STATUS+	To disable STO: do not connect
X11/07	STO 0V	To disable STO: connect to X14/04



The example wiring diagram shows the minimum connections required to implement STO with the AC890PXM series AC drives.

Users must conduct a risk assessment to identify the appropriate STO wiring scheme and ensure that all safety requirements are met.

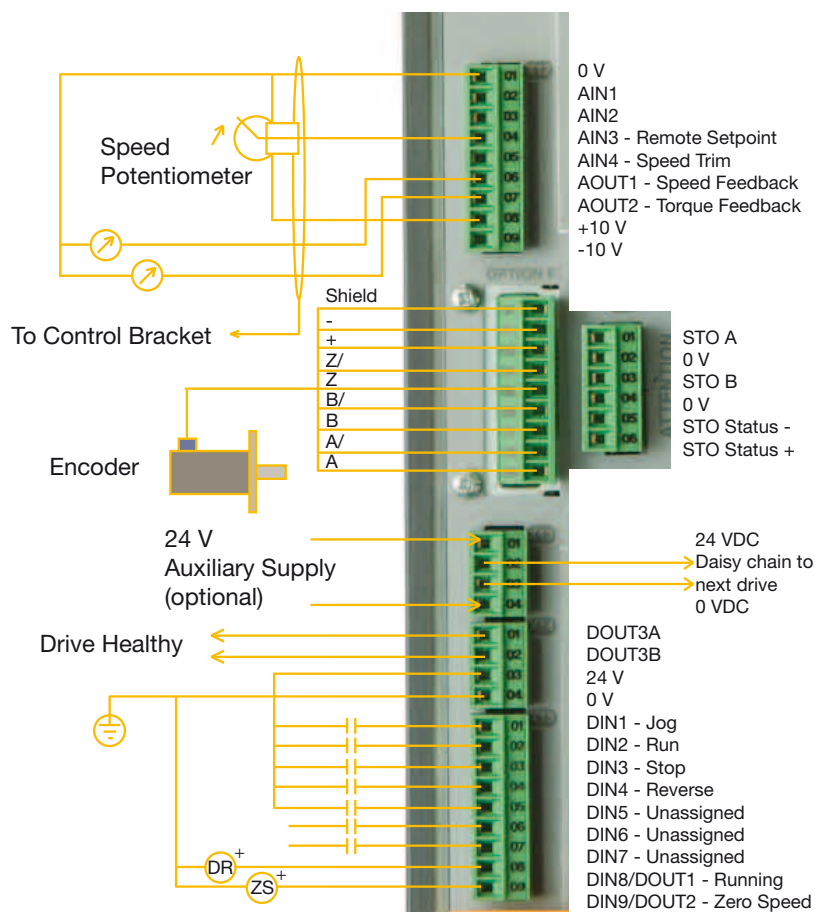


It is the user's responsibility to ensure the safe and correct use of the STO function of the AC890PX-Series. User's should read and fully understand chapter 6 (Safe Torque Off) of the product user manual. Manual No. HA501299_01

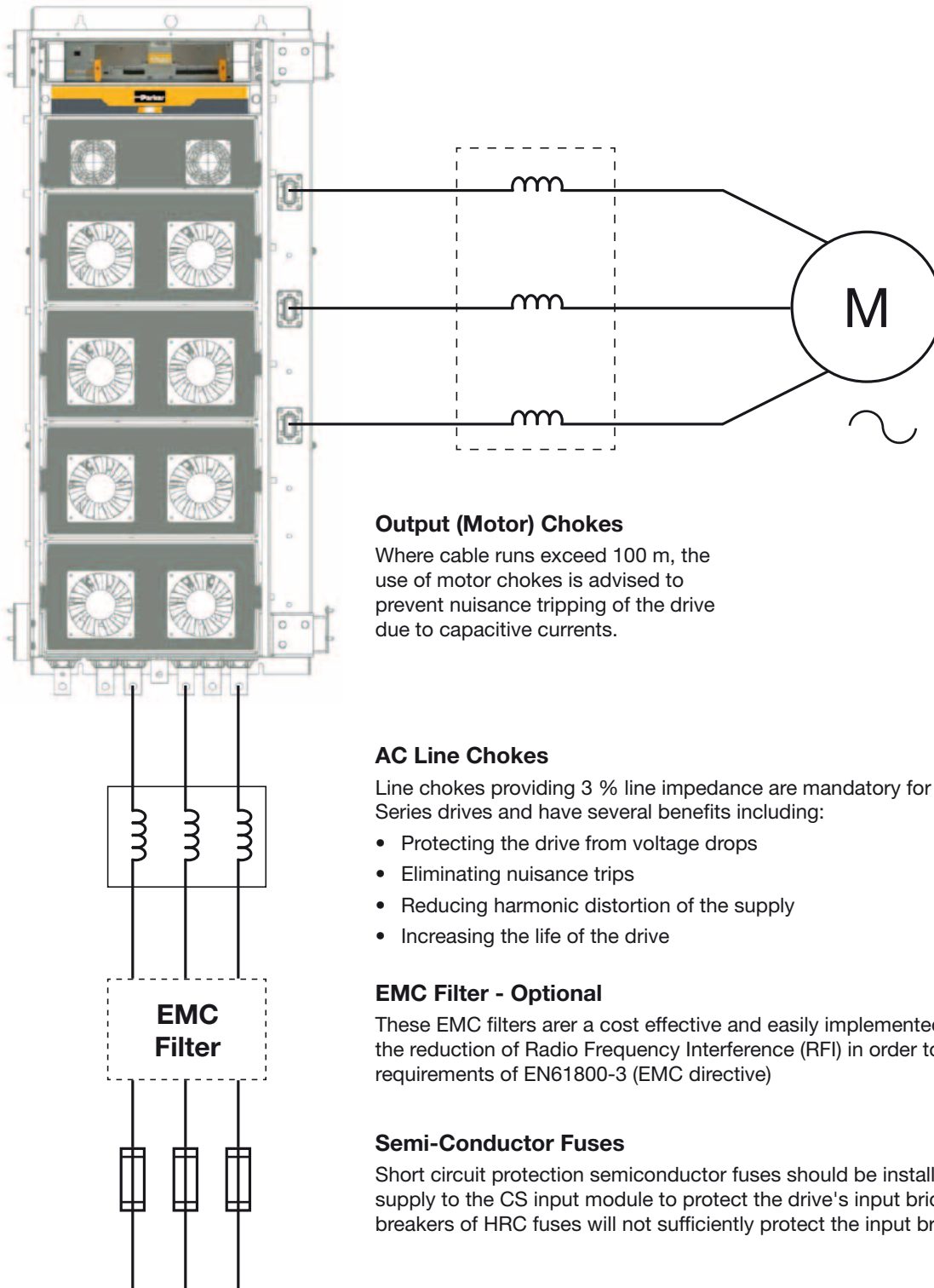
Non-power connectors

Term.	Label	Description
X10/		USB programming port
X12/01	0 V	0 V Reference Supply
X12/02	AIN1	Analogue Input 1
X12/03	AIN2	analogue Input 2
X12/04	AIN3	Analogue Input 3 - Remote setpoint
X12/05	AIN4	Analogue Input 4 - Speed Trim
X12/06	AOUT1	AOUT1 - Speed Feedback
X12/07	AOUT2	AOUT2 - Torque Feedback
X12/08	+10 V	+10 V Reference Supply
X12/09	-10 V	-10 V Reference Supply
X13/01	24 VDC	24 VDC - User Supplied
X13/02	24 VDC	24 VDC- Daisy chain out to next drive
X13/03	0 VDC	0 VDC - Daisy chain out to next drive
X13/04	0 V	0 V -User Supplied
X14/01	DOUT3A	Drive healthy relay output
X14/02	DOUT3B	Drive healthy relay output
X14/03	24 VDC	24 V DC Common supply
X14/04	0 V	0 V Reference

Term.	Label	Description
X15/01	DIN1	Digital Input 1 - (Jog)
X15/02	DIN2	Digital Input 2 - (Run)
x15/03	DIN3	Digital Input 3 - (Stop)
X15/04	DIN4	Digital Input 4 - (Reverse)
X15/05	DIN5	Digital Input 5 - (Unassigned)
X15/06	DIN6	Digital Input 6 - (Unassigned)
X15/07	DIN7	Digital Input 7 - (Unassigned)
X15/08	DINOUT1	Digital In/Out - (Running)
X15/09	DINOUT2	Digital In/Out - (Zero Speed)
X16/01	DOUT4A	Relay output 4
X16/02	DOUT4B	Relay output 4
X16/03	DOUT5A	Relay output 5
X16/04	DOUT5B	Relay output 5
X16/05	DOUT6A	Relay output 6
X16/06	DOUT6B	Relay output 6
X16/08	THERMB	Motor thermistor input B
X16/09	THERMA	Motor thermistor input A



Standard Power Configurations



Output (Motor) Chokes

Where cable runs exceed 100 m, the use of motor chokes is advised to prevent nuisance tripping of the drive due to capacitive currents.

AC Line Chokes

Line chokes providing 3 % line impedance are mandatory for the AC890PX-Series drives and have several benefits including:

- Protecting the drive from voltage drops
- Eliminating nuisance trips
- Reducing harmonic distortion of the supply
- Increasing the life of the drive

EMC Filter - Optional

These EMC filters are a cost effective and easily implemented solution for the reduction of Radio Frequency Interference (RFI) in order to meet the requirements of EN61800-3 (EMC directive)

Semi-Conductor Fuses

Short circuit protection semiconductor fuses should be installed in the 3-phase supply to the CS input module to protect the drive's input bridge. Circuit breakers or HRC fuses will not sufficiently protect the input bridge.

Versatile Power Configurations

The AC890PX-Series can be configured to operate in a number of different power configuration modes to suit the exact requirements of your application. The modularity of the AC890PX-Series enables different combinations of PowerPak modules to be easily selected and installed to achieve these schemes without involving significant amounts of pre-engineering work.

Building Blocks

AC890PX-Series is available in two basic variants which can be combined to create a number of different input power configurations.

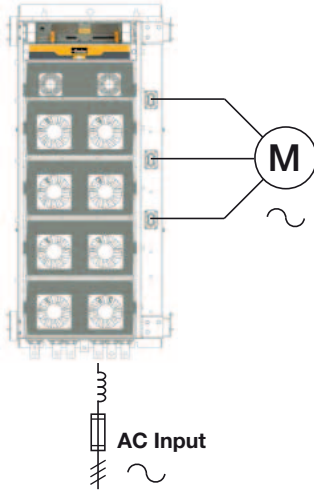
Both versions are available in power ratings of 110 kW...400 kW

(SD) Standard Inverter

An AC fed inverter suitable for use with a 400...690 VAC input. This can be used either as a standalone drive in its own right or as the AC input drive in a multi-drive application.

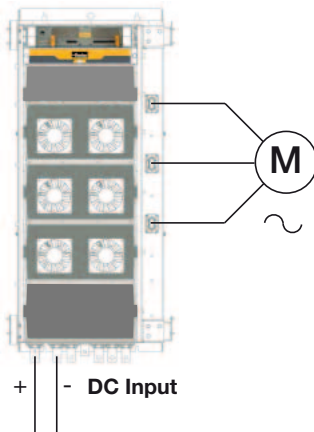
(CD) DC Fed Inverter

A DC fed inverter for use with a 500...1000 VDC input. As with the SD inverter this can be used as a standalone drive where a suitable DC supply is available, or more usually as part of a multi-drive system.



Standard Inverter (SD)

Standard inverter configuration for control of single motor applications in either open or closed loop mode.



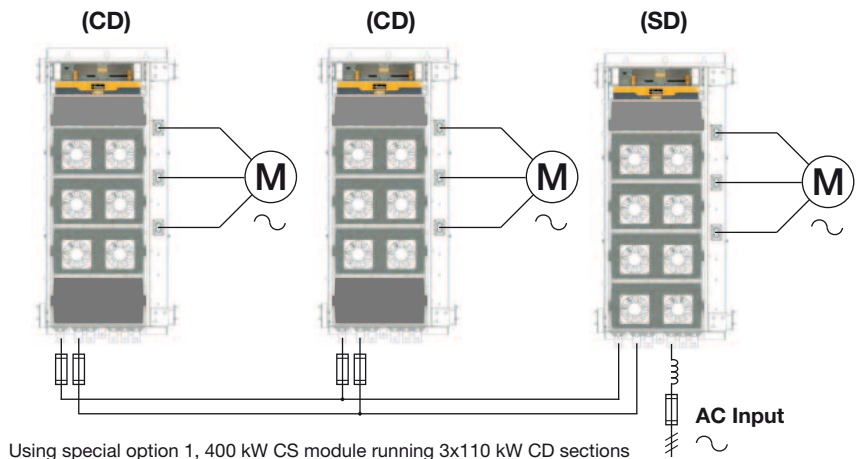
DC Fed Inverter (CD)

DC fed inverter for either single or multi-drive configurations where a suitable DC input supply is available.

Common DC Bus System

Common DC bus system using a standard (SD) inverter with a high power input stage to supply multiple (CD) common bus drives.

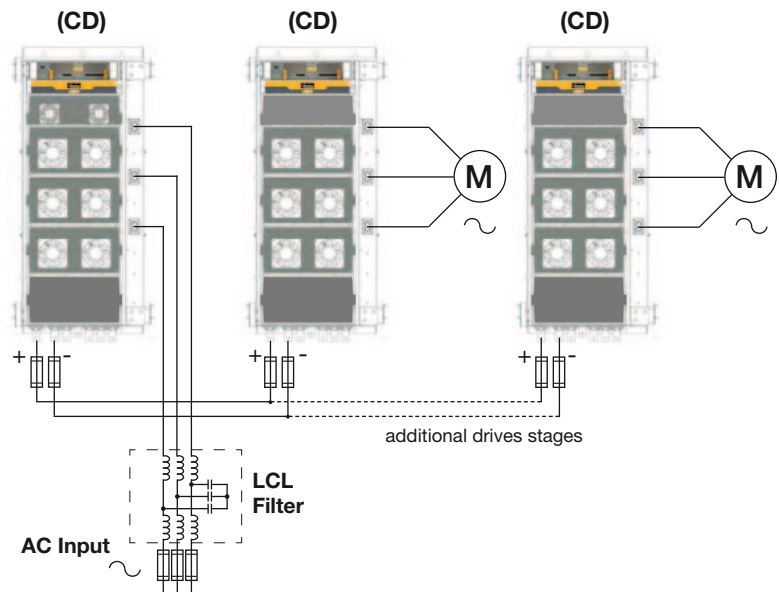
- Power range to 400 kW
- 400...700 VAC AC input
- Multi-motor applications
- Common DC bus power sharing



Active Front End (AFE)

Regenerative drive solution for excess system energy and for regenerative applications. With active input for elimination of supply harmonics with unity power factor.

- Power range to 2 MW
- 4Q regenerative system
- Unity power factor

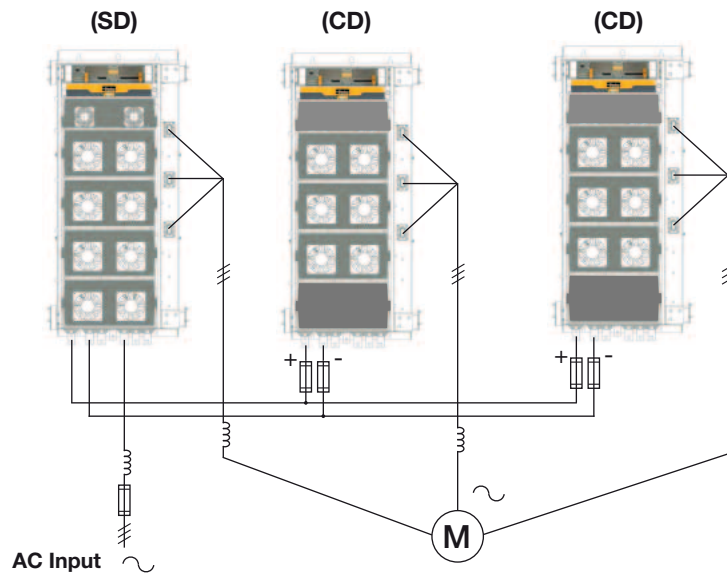


Parallel (AC890PXP)

For power demands greater than 400 kW, offered as pre-built systems in either air or liquid cooled formats for single-, multi-motor, or AFE control.

AC890PX-Series control module can control up to 3x sections of power modules to achieve power ratings of up to 2000 kW.

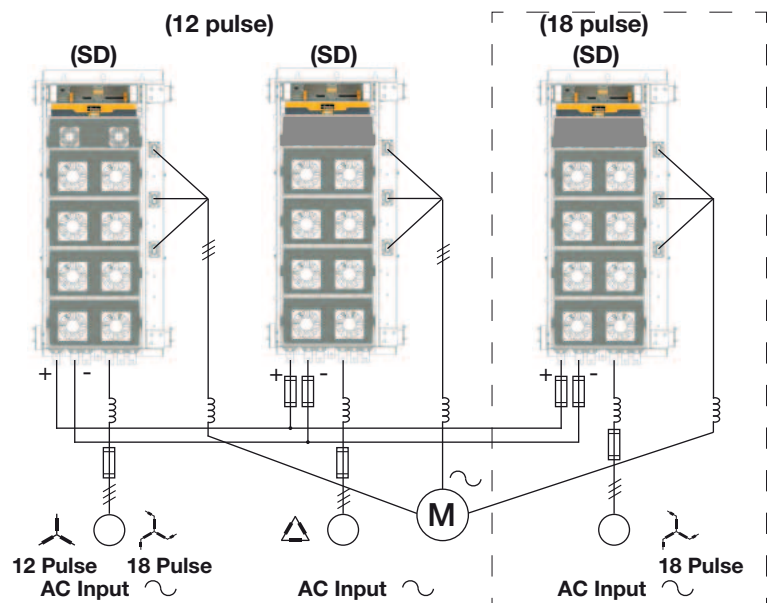
- AC or DC input supply
- Motor control or AFE configuration
- Air-cooled to 1200 kW, advanced-cooled to 2 MW



12/18 Pulse Configuration

Offered as a pre-built system, the 12/18 pulse configuration can be used in single-motor applications where power quality and minimal supply harmonic distortion is critical.

- 400..690 VAC AC input
- Power range to 1000 kW
- Minimised input harmonics



Accessories and Options

Communication Interfaces

8903-IP-00	Ethernet IP communication interface
Supported Protocols	Ethernet IP
Communication Speed	10/100 Mbps/s
Station Address	By Drive System Explorer software via RTNX protocol
Suitable for firmware	Version 3.2+

8903-IM-00	Ethernet Modbus/TCP communication interface
Supported Protocols	Modbus TCP
Communication Speed	10/100 Mbps/s
Station Address	By Drive System Explorer software via RTNX protocol
Suitable for firmware	Version 3.2+

8903-DN-00	DeviceNet communication interface
Supported Protocols	Supports the group 2 only slave subset of the DeviceNet protocol
Communication Speed	125 k, 250 k and 500 kbps/s
Station Address (MACID)	Dip switch or software setting of station address and network speed
Supported Messages	Polled I/O, Cyclic Outputs, Change of State (COS), Explicit Messaging
Suitable for firmware	Version 1.9+

8903-CB-00	CANopen communication interface
Profile	DS402
Communication Speed	20 k, 50 k, 125 k, 250 k, 500 k, 1 Mbps/s selectable by software or DIP switch setting
Station Address	DIP switch or software setting of station address and network speed
Supported Messages	SDO, PDO, NMT, SYNC
Suitable for firmware	Version 1.3+

8903-CN-00	ControlNet communication interface
Communication Speed	Selectable by software or DIP switch setting
Station Address	Software setting of station address
Supported Messages	Polled I/O
Suitable for firmware	Version 1.4+

8903-PB-00	PROFIBUS-DP communication interface
Supported Protocols	PROFIBUS-DP; Demand data and Data exchange
Communication Speed	Up to 12 Mbps/s; selected by the master
Station Address	DIP switch or software setting of station address
Suitable for firmware	Version 1.4+

8903-FA-00	Firewire IEEE 1394 communication interface
Communication Speed	Up to 400 MBaud
Communication Supported	Peer-to-peer communication between drives via IEEE 1394 standard
Suitable for firmware	Version 3.2+



Communication Interfaces

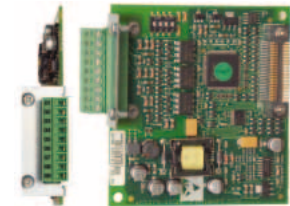
8903-PN-00	PROFINET I/O communication interface
Supported Protocols	PROFINET I/O Real-Time (RT) Protocol
Communication Speed	100 Mbits/s
Station Address	Software setting of station address via DSE
Suitable for firmware	Version 3.3+
8903-SP-00	CAN peer to peer communication interface
Supported Protocols	Peer to peer data exchange with other drives
Communication Speed	Up to 1 Mbits/s selectable by DIP switch
Station Address	Selected by DIP switch setting
Suitable for firmware	Version 3.3+
8903-CT-00	EtherCAT communication interface
Supported Protocols	CANopen over EtherCAT (CoE) DS301 compliant
Communication Speed	100 Mbits/s
Suitable for firmware	Version 3.7+
8903-RS-00	RS485 / Modbus communication interface
Supported Protocols	Modbus RTU only
Communication Speed	1200 to 115200 bits/s
Station Address	Selectable via software
Suitable for firmware	Version 3.7+



Feedback Cards

Incremental Quadrature Encoder Card 8902-EQ

8902-EQ-00-00	Optional HTTL Incremental Encoder
Maximum pulse rate	250 kHz (differential) 200 kHz (single ended)
Receiver current	≤10 mA per channel
Input Format	Two differential channels in quadrature (Clock/direction or clock only)
Input Voltage	±30 V (differential), 0...30 V (single-ended)
Input Voltage Differential	±30 V maximum
Input Voltage Threshold dip switch settings	3 V ±1 V (differential) 8 V ±1 V (single-ended)
Encoder Power Supply	Maximum load 200 mA or 2 W

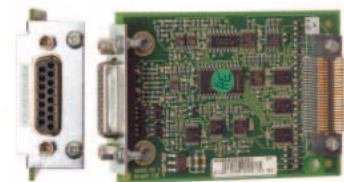


Description

The HTTL 8902-EQ speed feedback option allows incremental encoders to be connected directly to the drive to provide highly accurate speed feedback measurement. Supplies variable voltage isolated encoder power supply.

Resolver Feedback Card 8902-RE

8902-RE-00-00	Optional Resolver feedback card
Maximum Speed	Up to 50 000 min ⁻¹ (with 2 pole resolver)
Carrier Output Signal	7 V _{rms} , 8 kHz
Maximum Carrier Supply	70 mArms
Maximum Input Voltage	±12 V _{peak}
Accuracy	<5 minutes
Resolution	Equivalent to 16 bits in one revolution of resolver
Inputs	Differential inputs Z _{in} ~2 kΩ
Maximum Input Voltage	12 V _{peak}



Description

The 8902-RE resolver speed feedback option allows the resolver to be connected directly to the drive to provide highly accurate speed feedback measurement. Contains a carrier output signal to power the resolver.

Feedback Cards

SinCos® EnDat2.1 Feedback Card 8902-E1

8902-E1-00-00	Optional SinCos® encoder card
Maximum Pulse Rate	250 kHz
Receiver Impedance	120 Ω
Input Format	two differential 1 V _{pp} signals in quadrature
Encoder Supply	Maximum load 250 mA Adjustable Voltage 5 V/10 V

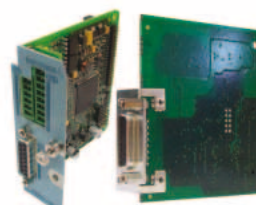


Description

The SinCos® speed feedback option 8902-E1 allows a 1 V_{pp} SinCos® encoder to be connected directly to the drive to provide highly accurate speed feedback measurement. Decodes Heidenhain EnDat2.1 absolute position encoders and supplies 5 V or 10 V for the encoder.

SinCos® registration position 8902-M1 and 8903-M1

8902-M1-00	Slave SinCos® registration
8903-M1-00	Master SinCos® registration
Maximum Pulse Rate	250 kHz
Receiver Impedance	120 Ω
Input Format	2 differential 1 V _{pp} signals in quadrature
Encoder Supply	250 mA maximum load
Supply Voltage	5 V/10 V adjustable
Terminal Type	Sub-D15 connector
Maximum Cable Length	150 m screened cable
Serial Protocol	EnDat2.1



Description

- The 8903-M1-00 and 8902-M1-00 feedback cards allow operation without external registration position, thanks to the connection of the encoder to the drive. They provide highly accurate speed feedback measurement and registration. Nevertheless registration applications are best achieved when both cards are used.
- Interpolates each encoder line with 11-bit accuracy giving 4 million counts/rev. on a 2048 line encoder
- Supplies 5 V or 10 V to the encoder
- Decodes Heidenhain EnDat2.1 absolute position encoders
- Isolated digital inputs that can be used either for general purpose inputs, or for inputs from registration mark sensor (8903-M1 only)
- 3 non-isolated digital outputs that can be either for general purpose outputs or for synthesizing an encoder output (8903-M1 only)

Approved Encoders

	1 V _{pp}	EnDat2.1	Single turn ABS	Multi-turn ABS
Heidenhain:				
ECN113	√	√		√
ECN1113	√	√	√	
EQN425	√			
ECN413				
ERN480				
Stegmann:				
HG660 AKR (xxxx)S	√			
HG660 DKR (xxxx)S	√			
Hengstler:				
RIS58-H				

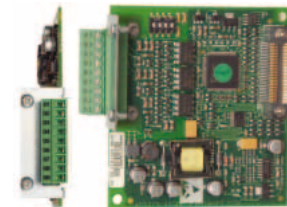
Input and Output Cards

Auxiliary digital input (8903-M1... only)

Low Logic Level	0 V to 5 V relative to X63 pin 5
High Logic Level	15 V to 26 V relative to X63 pin 5
Maximum Input Voltage	30 V relative to X63 pin 5
Input Current	Low logic level <1 mA High logic level >3 mA, <10 mA Typical input at 24 V: 7 mA
Isolation withstand relative to drive chassis	30 V
Input Safety Category	SELV
Terminal Type	6-way pluggable 3.5 mm terminal block
Maximum Cable Length	150 m screened cable is recommended for all lengths, but essential if over 30 m in order to comply with EMC regulations

Auxiliary digital outputs (8903-M1... only)

Input Voltage (VS)	5 V to 24 V
Maximum Input Voltage	30 V
Maximum Output Current	±100 mA per output
Output Voltage	Low logic level <3 V to 100 mA High logic level >VS – 4 V to 100 mA
Overload and short circuit duration	Indefinite withstand
Max. Output Frequency	250 kHz per output
Terminal Type	8-way pluggable 3.5 mm terminal block
Maximum Cable Length	150 m screened cable is recommended for all lengths, but essential if over 30 m in order to comply with EMC regulations



High Resolution Analogue Input 8903-AI and 8903-EP Encoder Card

8903-AI-00-00	High Resolution Analogue Input Card
8903-EP-00-00	Encoder Card
Maximum pulse rate	250 kHz
Receiver current	≤10 mA per channel
Input Format	Two differential channels in quadrature (Clock/direction or clock only)
Input Voltage	±30 V (differential), 0-30 V (single-ended)
Input Voltage Threshold dip switch settings	3 V ±1 V (differential) 8 V ±1 V (single-ended)
Encoder Power Supply	Maximum output current ±100 mA per output

Description

The high resolution Analog Input Option adds a sixth analogue input to the AC890PX Modular Chassis drive. This input can be used, as the other inputs, within a configuration or directly as the speed setpoint for a fast response time.

In addition to this Analog Input the 8903/AI option provides an incremental encoder input as well as an incremental encoder output.

The 8903/EP Encoder Option has the same functionalities of the 8903/AI except for the analogue input.

High Resolution Analogue Input 8903-AI Only

Analogue Input	
Resolution	15 bits + sign bit
Input Voltage Range	±11 V
Input Format	Differential
Input Impedance	100 kΩ
Input Low Pass Filter	3 kHz
Encoder Power Supply	Maximum output current ±100 mA per output

Anciliary Parts

AC Input Chokes

Parker's range of AC input chokes have been especially selected to match the requirements of the Parker AC drive range and are used to reduce the harmonic content of the supply current.

Nominal 400 VAC

Model Number	[kW]	Input Current [A]	Inductance [μ H]	Order code
890PXSA-43215	110	230	100	CO501691U411
890PXSA-43260	132	270	90	CO501691U413
890PXSA-43300	160	340	80	CO501691U416
890PXSA-43420	200	425	55	CO501691U420
890PXSA-43480	250	535	45	CO501691U425
890PXSA-43520	280	600	40	CO501691U428
890PXSA-43580	315	680	35	CO501691U431

For other voltages please contact your local sales office.



Output Chokes

To limit capacitive currents and prevent nuisance tripping in installations with longer cable runs over 100 m, a choke may be fitted to the drives output. This limits the capacitive current and prevents overcurrent trips and excessive temperature rise in the motor. These may be used with 380/460 V and 500/575 VAC drives.

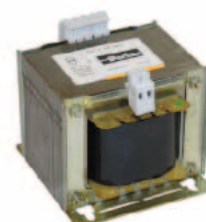
Motor Choke Maximum Current	Order Code
250 A	CO471702U250
320 A	CO471702U320
400 A	CO471702U400
500 A	CO471702U500
600 A	CO471702U600
700 A	CO471702U750



Auxiliary Transformers

1 kVA 30 VAC control transformer for auxiliary power supply requirements.

Supply Voltage	Order Code
400-480 VAC	C0501514
500-690 VAC	C0501515



EMC Filter

A range of custom designed optional EMC (Electromagnetic Compatibility) filters are available for use with Parker SSD Drives product range. They are used to help achieve conformance with the EMC directive BS EN 61800-3:2004 - "Adjustable speed electrical power drive systems - Part 3".



Rating	Order Code
Up to 132 kW	CO467843U340
Up to 315 kW	2-off CO467843U340

AFE 4 Quadrant

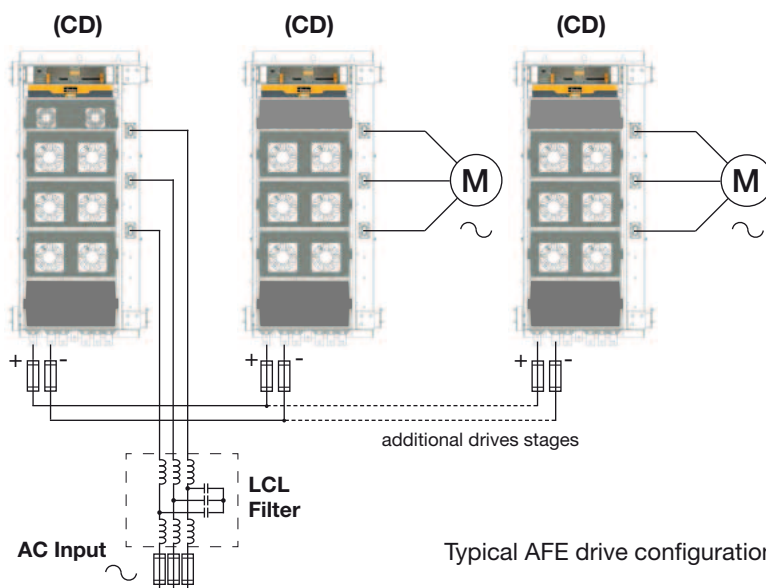
In many applications the overall power consumed by the system is less than the sum of power of the installed motors as some motors will be driven electrically while others are coasting, being driven by the momentum of the machine.

For such applications, it is beneficial 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.



Thanks to the 4 quadrant (4Q) functionality of the AC890PX-Series, 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

Rating	Filter Assembly 110 V fans & control	Filter Assembly 230 V fans & control	L1 (5 %)	L2 (3 %)
Nominal 400 VAC				
Up to 180 kW	LA482468U220	LA482471U220	CO468326U220	CO468325U220
Up to 280 kW	LA482468U315	LA482471U315	CO468326U315	CO468325U315
Up to 315 kW	LA482468U355	LA482471U355	CO468326U355	CO468325U355
Nominal 500 VAC				
Up to 180 kW	LA482469U220	LA482472U220	CO468326U220	CO468325U220
Up to 280 kW	LA482469U315	LA482472U315	CO468326U315	CO468325U315
Up to 315 kW	LA482469U355	LA482472U355	CO468326U355	CO468325U355



Drive System Explorer (DSE) Software

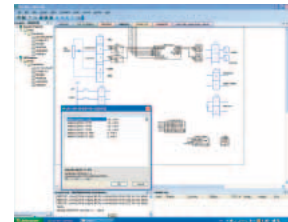
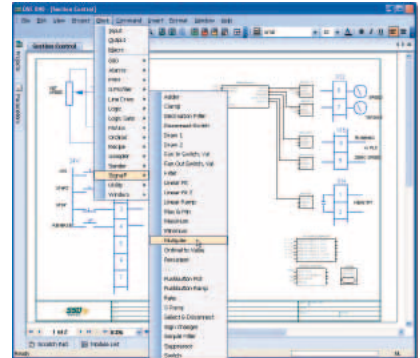
Description

DSE890 is the programming, monitoring and diagnostic software platform for AC890 and AC890PX series variable speed drives. Communication between the drive and PC is via a mini USB port located on the front of the drive.

Thanks to the on-line help, users can achieve the optimum drive configuration without the need to navigate through complicated parameter menus. Advanced programming is carried out through a set of pre-engineered templates in order to create the required configuration. It is possible to monitor every parameter of the drive either as a digital value or as a function in the “chart recorder” during normal operation. Creates projects quickly and easily

- Graphical tool based on a block diagram approach
- Integrated digital oscilloscope
- On-line configuration and monitoring
- System identification tool

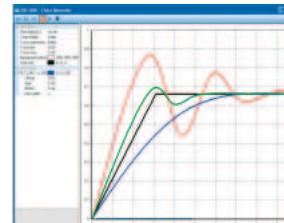
DSE890 Programming Software



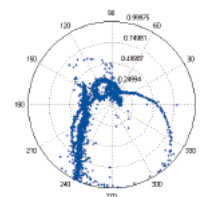
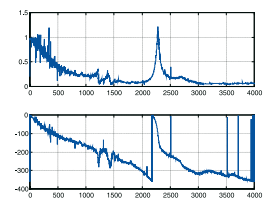
Parameter adjustment and project creation

Product Codes

DSE Lite software (single axis) + USB cable	8906-DSELITE-00
DSE Development software + USB cable	8906-DSEDEV-00
DSE Runtime/Maintenance + USB cable	8906-DSERUN-00
DSD to DSE Development Upgrade + USB cable	8906-DSEDE
DSD Runtime to DSE Runtime Upgrade + USB cable	906-DSERUNUPG-00



real-time data acquisition oscilloscope



System identification tool

Order Code

AC890PX Modular Chassis Drive

	1	2	3		4	5	6		7	8	9		10	11	12	13	14
Order example	890PX	S	A	-	4	3215	M	-	B	0	0	-	1	A	0	0	0

1 Drive family	890PX	High Power Modular AC Drive Series
2 Configuration	S	Standalone Drive (SD)
	C	Common DC Bus Drive (CD)
3 Cooling	A	Air-Cooled
4 Nominal voltage	4	400/460 V Nominal Supply
	6	575 V Nominal Supply
	7	690 V Nominal Supply
5 Power and current ratings (Constant, Variable Torque)	400/460 V Nominal Supply	
	3215	110/132 kW, 150/200 HP
	3260	132/160 kW, 200/250 HP
	3300	160/200 kW, 250/300 HP
	3420	200/250 kW, 300/400 HP
	3480	250/280 kW, 400/500 HP
	3520	280/315 kW, 375/476 HP
	3580	315/400 kW, 500/600 HP
	575 V Nominal Supply	
	3160	112/149 kW, 150/200 HP
	3210	149/187 kW, 200/250 HP
	3260	187/224 kW, 250/300 HP
	3310	224/298 kW, 300/400 HP
	3410	298/373 kW, 400/500 HP
	690 V Nominal Supply	
	3130	110 kW/132 kW, 150/200HP
	3160	132 kW/160 kW, 200/250 HP
	3190	160 kW/200 kW, 250/300 HP
	3230	200 kW/250 kW, 300/400 HP
	3280	250 kW/280 kW, 400/500 HP
	3320	280 kW/315 kW, 375/476 HP
	3340	315 kW/400 kW, 500/600 HP
6 Build Style	M	Modular Chassis Drive
7 Brake	0	Brake not available for CD inverter
	B	Brake fitted as standard to SD inverter

8 Enclosure	0	No Enclosure (Frame M only)
9 Documented special options (0-9)	0	No special option
10 Performance level	1	Advanced
	2	High
11 Supply Frequency	A	50 Hz
	B	60 Hz
12 Feedback Option - Slot F	0	None
	1	SinCos encoder (Endat 2.1)
	3	Incremental quadrature encoder
	5	Resolver
	6	Resolver repeater
	7	Mark registration (Endat 2.1 encoder)
13 Technology Option - Slot A	0	None
	N	CANopen communications
	C	ControlNet communications
	D	DeviceNet communications
	P	Profibus communications
	T	Modbus TCP/IP
	H	Ethernet IP
	F	Profinet
	7	Mark registration (Endat 2.1 encoder)
	S	RS485 communications
	E	Encoder with repeater output
	R	High Resolution Analogue Input
14 Option B	0	Not fitted
	A	Firewire 1394A
	X	CAN peer-to-peer communications
	E	Encoder with repeater output
	R	High Resolution Analogue Input

Packaged Drives Options - Factory Supplied

High Power Packaged AC Drives

110 kW	400 kW	500 kW
AC890PX FASTPACK		
		AC890PX

AC890PX FASTPACK Drive: 110 - 400 kW

In addition to being supplied in kit form, AC890PX Modular Chassis drives can be supplied as a FASTPACK free-standing drive complete with all necessary ancillary components to enable control of either an AC induction or Permanent Magnet AC motor.

Designed as a simple replacement to star/delta or soft start control of motors, FASTPACK can be configured to deliver complete control in a ready-to-install IP33 or IP54 enclosure.

Control options such as operator keypad, start/stop pushbuttons, emergency-stops and output contactors can all be selected from a list of standard options to meet a host of control requirements from simple motor speed control to more complex applications.



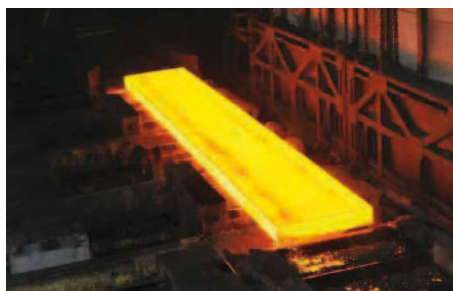
AC890PX Modular Air-Cooled Parallel AC Drive Systems: 400 - 900 kW

For systems with higher power requirements, up to 900 kW, a maximum of three AC890PX Modular Chassis drives can be connected in parallel with the use of additional input and output chokes.

Parker is able to offer this solution as a turnkey fully integrated drive system with all necessary ancillary control hardware and software.

Alternatively a simple freestanding drive with or without AFE can be supplied up to 900 kW.

With cooling designed to meet specific requirements, we can offer any number of cooling methods including chillers, air/water heat exchangers, force/natural ventilation or water cooling.



900 kW

2000 kW

Modular Air-Cooled Parallel

AC890PX Modular Advanced-Cooled Parallel



**AC890PX Modular Advanced-Cooled Parallel AC Drive Systems:
 500 - 2000 kW**

With the introduction of an innovative Parker-engineered cooling system, drive systems with increased power outputs can be created with an extremely compact footprint.

The award-winning, advanced cooling design draws from years of Parker experience in refrigeration technology combined with state of the art drive design to produce a truly high-performance AC drive range.

The hermetically sealed system has no compressor, requires no routine maintenance and uses a non-conductive, non-corrosive coolant.



Related Products

HMI Touchscreens

TS8000 Series

TS8000 is a high performance HMI touchscreen range with powerful features that would normally only be found in PC-based displays.

The TS8000 is able to communicate with many different pieces of hardware through its 10/100Base-T Ethernet port.

Furthermore a USB programming port allows programs to be downloaded, or access to trending and data logging, while data can be collected and stored on a standard CompactFlash card, freeing up internal memory. Multi-lingual interface



- Built-in symbol library of common objects
- Built-in web server
- CompactFlash support
- Integrated automatic multiple protocol conversion
- Free programming software

HMI specifications

Model	Screen	Colour	Number of Pixels
TS8003	32"/FSTN	2	128 x 64
TS8006	5.7"/TFT	256 QVGA	320 x 240
TS8008	7.7"/DSTN	256 VGA	640 x 480
TS8010	10.4"/TFT		
TS8015	15"/TFT	32 000 XGA	1024 x 768

Technical specifications

Power Supply	24 VDC ±20 %
Operating Temperature	0...50 °C
Relative Humidity	80 % non-condensing
Altitude	2000 m
Enclosure	IP66 / Nema 4
Keypads	TS8003: 8 user assignable keys, 5 navigation keys, 12 numeric keys, 7 dedicated keys TS8006: 5 keys for on screen menus TS8008: 7 keys for on screen menus TS8010: 8 keys for on screen menus TS8015: 9 keys for on screen menus
Memory	CompactFlash slot
Communication Ports	Programming: USB 1.1 - connector type B, RS232 - via RJ12 Communication: RS232 - via RJ12, RS485 - via RJ45, Ethernet 10/100 Base T, - connector RJ45

Features

Pre-Engineered Projects

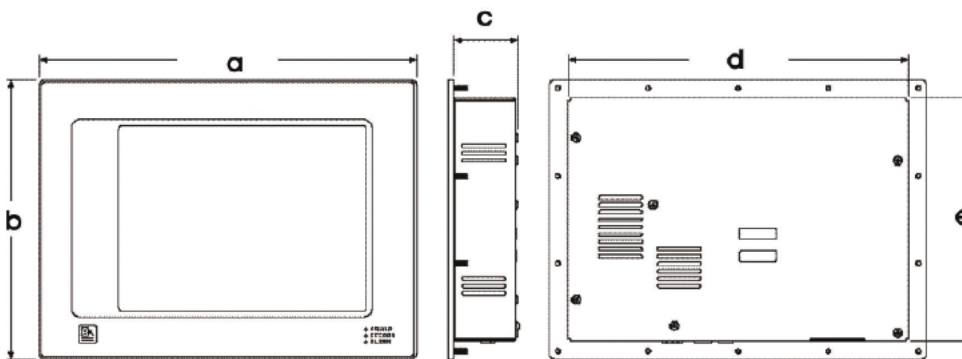
- Library with over 4000 symbols
- Support for BMP, JPG, WMF graphic files
- Database functionality
- Graphical Trend
- Alarm Logs
- Machine Drawings

Multilingual Interface

Programming and Display in :		
Italian	German	English
Spanish	French	Dutch
Unicode Support for :		
Japanese	Chinese (traditional)	Chinese (simplified)
Thai	Korean	Others available

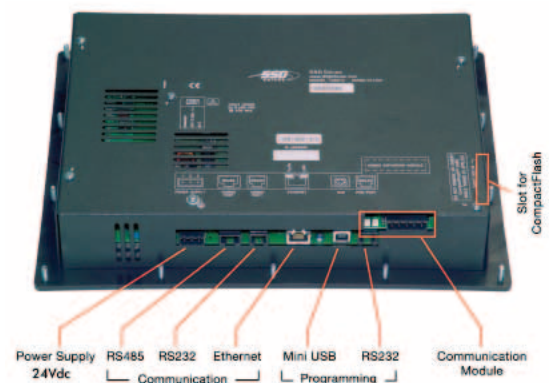
Dimensions

Model	a [mm]	b [mm]	c [mm]	d [mm]	e [mm]	Weight [kg]
TS8003	189.2	148.6	52	153.4	112.8	0.89
TS8006	224.3	179.8	58.4	188.5	144	1.36
TS8008	262	207.8	56	226.3	172	1.74
TS8010	325.8	241.3	56	293.3	210.1	2.51
TS8015	406.4	330.2	78.6	370.6	294.4	5.17



Options

Model	Description
8000/CB/00	CANopen fieldbus option card (master)
8000/DN/00	DeviceNet option card
8000/PB/00	Profibus option card
8000/LK/00	LINK fieldbus option card
8000/FA/00	FireWire fieldbus option card



TMW Series Torque Motors 1200...22 100 Nm

Description

Parker Torque Motors are complete and ready-to-use “direct drive” systems, specifically designed for use with AC890 and AC890PX Modular Chassis drives to fully and effectively respond to the specific needs of the Plastics and Rubber industries. Developed in collaboration with machine builders and end-users, a number of innovative, dedicated features have been integrated into the motors, such as; a generously sized, integrated thrust bearing to support back pressure from the screw, as well as specific mechanisms allowing quick and easy removal of the screw from the motor. Delivering torques up to 22 100 Nm, at speeds ranging from 50 to 500 min⁻¹, Parker Torque Motors represent the perfect alternative to gearbox based systems, for extruders applications of power up to 400 kW.

- High power compact design
- Water or natural cooling
- Overtemperature protection built in
- Wide range of feedback devices
- Integrated thrust bearing
- Customizable shaft ends
- IP54 protection
- IMB3 mounting



MGV High Speed, Low-Inertia Servo Motors

Description

MGV Series servo motors are innovative direct drive solutions specially designed for applications that require high speeds and low inertias. MGV motors can be found in many automotive or aeronautical component test rigs (starters, pumps, alternators, gearboxes...). Highly responsive with exceptional dynamic performance, MGV motors are ideally suited to the needs of simulation testing: speed in urban cycle or motor racing, speed cycling of an internal combustion engine, etc.

- High maximum speeds avoid the need for mechanical gearing
- Low inertia allowing very fast acceleration / deceleration
- Constant power operation above nominal speed removes the requirement to oversize the drive
- Water cooling ensures compact size and low noise operation
- High dynamic capabilities allow the operating conditions of the tested product to be accurately reproduced



Round Frame Asynchronous Vector Motors 0.18 kW...315 kW

Description

These IE2 efficiency round frame asynchronous induction motors are suitable for use with the Parker SSD Drives AC650V, AC690+ and AC890PX Modular ranges of Inverters in closed-loop mode. Featuring a durable rigid construction, these motors are specially engineered for use in heavy industrial applications. Featuring axial, In-Line force ventilation fan and 2048 ppr incremental encoder, the round frame vector motor are suitable for general purpose closed-loop control applications. For applications requiring higher dynamic performance, such as in printing or test rig applications, the MA series square frame vector motors should be considered.

- Light Aluminium body up to and including 160 frame size. Cast Iron construction over 160 frame
- IP55 Protection as minimum
- Foot or flange mounting options
- Paint finished in Black
- Insulation Class F (IEC - EN60034-1))
- Auxiliary cooling fan allows low-speed operation
- 2048 ppr incremental encoder
- 3x PTC thermistors embedded in motor stator



Options

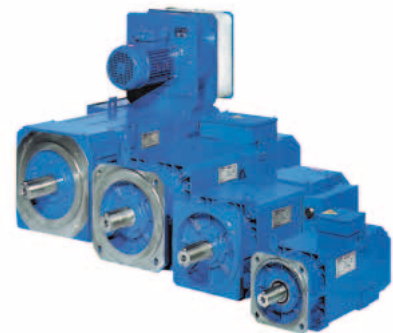
- Adjustable terminal box mounting position
- Holding brake
- IE3 efficiency
- Insulated bearings on 315 frame
- 8-Pole versions also available

Square Frame Asynchronous Vector Motors 0.75 kW...314 kW

Description

The MA series family of motors has been specially engineered to be suitable for high dynamic performance when used with a flux vector type controller - AC890PX Modular, AC690+ and AC650V. They permit operation in constant power at maximum speed up to 8000 min⁻¹.

- Compact square frame format
- Same frame dimensions as DC motors of similar power rating
- Thermostat embedded in stator
- Incremental encoder
- IP23 or IP54 protection
- Insulation Class F (CEI - EN60034-1))
- Auxiliary cooling fan allows low-speed high-torque operation
- High overload capability
- Higher operating speeds



Options

- Terminal box mounting on right or left
- PTC thermister
- S vibration class
- IP55 protection
- Roller bearing on frame 100
- Anti-condensation heater

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

- Aircraft engines
- Business & general aviation
- Commercial transports
- Land-based weapons systems
- Military aircraft
- Missiles & launch vehicles
- Regional transports
- Unmanned aerial vehicles

Key Products

- Flight control systems & components
- Fluid conveyance systems
- Fluid metering delivery & atomization devices
- Fuel systems & components
- Hydraulic systems & components
- Inert nitrogen generating systems
- Pneumatic systems & components
- Wheels & brakes



CLIMATE CONTROL

Key Markets

- Agriculture
- Air conditioning
- Food, beverage & dairy
- Life sciences & medical
- Precision cooling
- Processing
- Transportation

Key Products

- CO₂ controls
- Electronic controllers
- Filter driers
- Hand shut-off valves
- Hose & fittings
- Pressure regulating valves
- Refrigerant distributors
- Safety relief valves
- Solenoid valves
- Thermostatic expansion valves



ELECTROMECHANICAL

Key Markets

- Aerospace
- Factory automation
- Food & beverage
- 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
- Controllers
- Gantry robots
- Gearheads
- Human machine interfaces
- Industrial PCs
- Inverters
- Linear motors, slides and stages
- Precision stages
- Stepper motors
- Servo motors, drives & controls
- Structural extrusions



FILTRATION

Key Markets

- Food & beverage
- Industrial machinery
- Life sciences
- Marine
- Mobile equipment
- Oil & gas
- Power generation
- Process
- Transportation

Key Products

- Analytical gas generators
- Compressed air & gas filters
- Condition monitoring
- Engine air, fuel & oil filtration & systems
- Hydraulic, lubrication & coolant filters
- Process, chemical, water & microfiltration filters
- Nitrogen, hydrogen & zero air generators



FLUID & GAS HANDLING

Key Markets

- Aerospace
- Agriculture
- Bulk chemical handling
- Construction machinery
- Food & beverage
- Fuel & gas delivery
- Industrial machinery
- Mobile
- Oil & gas
- Transportation
- Welding

Key Products

- Brass fittings & valves
- Diagnostic equipment
- Fluid conveyance systems
- Industrial hose
- PTFE & PFA hose, tubing & plastic fittings
- Rubber & thermoplastic hose & couplings
- Tube fittings & adapters
- Quick disconnects



HYDRAULICS

Key Markets

- Aerospace
- Aerial lift
- Agriculture
- Construction machinery
- Forestry
- Industrial machinery
- Mining
- Oil & gas
- Power generation & energy
- Truck hydraulics

Key Products

- Diagnostic equipment
- Hydraulic cylinders & accumulators
- Hydraulic motors & pumps
- Hydraulic systems
- Hydraulic valves & controls
- Power take-offs
- Rubber & thermoplastic hose & couplings
- Tube fittings & adapters
- Quick disconnects



PNEUMATICS

Key Markets

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

Key Products

- Air preparation
- Compact cylinders
- Field bus valve systems
- Grippers
- Guided cylinders
- Manifolds
- Miniature fluidics
- Pneumatic accessories
- Pneumatic actuators & grippers
- Pneumatic valves and controls
- Rodless cylinders
- Rotary actuators
- Tie rod cylinders
- Vacuum generators, cups & sensors



PROCESS CONTROL

Key Markets

- Chemical & refining
- Food, beverage & dairy
- Medical & dental
- Microelectronics
- Oil & gas
- Power generation

Key Products

- Analytical sample conditioning products & systems
- Fluoropolymer chemical delivery fittings, valves & pumps
- High purity gas delivery fittings, valves & regulators
- Instrumentation fittings, valves & regulators
- Medium pressure fittings & valves
- Process control manifolds



SEALING & SHIELDING

Key Markets

- Aerospace
- Chemical processing
- Consumer
- Energy, oil & gas
- Fluid power
- General industrial
- Information technology
- Life sciences
- Military
- Semiconductor
- Telecommunications
- Transportation

Key Products

- Dynamic seals
- Elastomeric o-rings
- EMI shielding
- Extruded & precision-cut, fabricated elastomeric seals
- Homogeneous & inserted elastomeric shapes
- High temperature metal seals
- Metal & plastic retained composite seals
- Thermal management

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