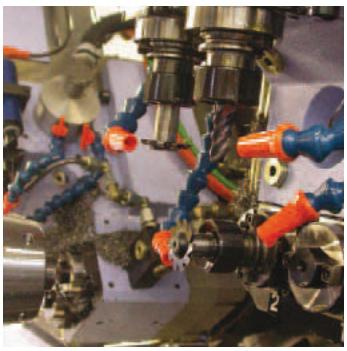
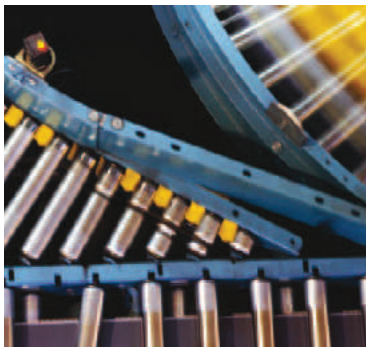


aerospace
climate control
electromechanical
filtration
fluid & gas handling
hydraulics
pneumatics
process control
sealing & shielding

AC10 Variable Speed Drive

For Simple, Reliable Motor Control in General Purpose Applications
0.2 - 15 kW Micro Drive



Parker

ENGINEERING YOUR SUCCESS.

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- The user, through its own analysis and testing, is solely responsible for making the final selection of the system and components and assuring that all performance, endurance, maintenance, safety and warning requirements of the application are met. The user must analyze all aspects of the application, follow applicable industry standards, and follow the information concerning the product in the current product catalog and in any other materials provided from Parker or its subsidiaries or authorized distributors.
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Parker Hannifin

The global leader in motion and control technologies

A world class player on a local stage

Global Product Design

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

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

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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.

Electromechanical Worldwide Manufacturing Locations

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

Asia
Wuxi, China
Chennai, India

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

Offenburg, Germany

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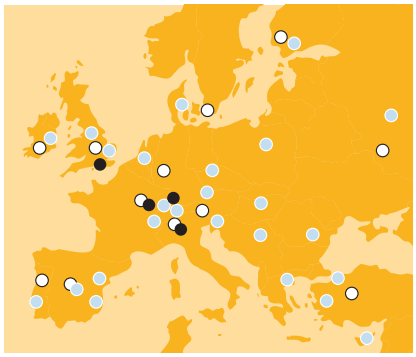
Parker provides sales assistance and local technical support through a network of dedicated sales teams and authorized technical distributors throughout Europe.

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



Electromechanical Manufacturing
Parker Sales Offices
Distributors

Dijon, France

Variable Speed Drive - AC10 Series

Overview

Description

AC10 Micro Drive is a simple, reliable and economical solution to every-day motor control applications requiring speed or torque control within the power range of 0.2 kW to 15 kW. Having compact dimensions and features normally only associated with higher specification drives, including, sensorless vector mode, output frequency up to 650 Hz, 3 phase 400 V supplies in all 5 frame sizes and a full 150 % overload at 0.5 Hz for 1 minute, AC10 provides an optimised solution for OEM machine builders looking for a compact, cost-effective drive without compromising on performance.

Features

Simplicity

AC10 is designed to reduce the time and effort required to install, setup and commission through its easy to use integrated keypad.
Minimal wiring requirements and two easily accessed terminal rails make AC10 fast and simple to install, having you up and running in no time at all.
Auto-tuning sensorless vector mode takes AC10 beyond simple V/Hz control allowing users requiring greater dynamic speed or torque control for their application to benefit from the drives enhanced 0.5 % speed and 5 % torque accuracy.

Reliability

Proven technology and manufacturing techniques ensure AC10 has been engineered and built to deliver consistently outstanding levels of performance day in, day out ensuring maximum uptime and productivity.
Thanks to its conformally coated PCBs, AC10 is able to withstand even the most arduous class 3C3 environment which many other drives in this class would struggle with, allowing you to operate AC10 with the utmost confidence in more applications

Technical Characteristics - Overview

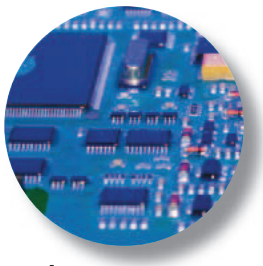
Power Supply	230 V ±15 % Single Phase 230 V ±15 % Three Phase 400 V ±15 % Three Phase
Input Frequency	44 … 67 Hz
Power Range	0.2…15 kW
Operating Temperature	0…40 °C
Protection	IP20
Analogue Inputs	2x (0-10 V, 0-5 V, 0-20 mA, 4-20 mA)
Analogue Outputs	1x (0-10 V, 0-20 mA)
Digital Intputs	5x 24 VDC
Digital Outputs	1x 24 VDC
Relay Output	1x 5 A @230 VAC

IE2 Efficiency MR Series AC Induction Motors

An ideal complement to AC10, the MR Series AC Induction motors are IE2 efficient and start from a power range of 0.09 kW. Featuring optional axial in-line force ventilation fan and holding brake, the MR motor is a high quality durable AC motor which when matched to the AC10 will provide you with a complete motor/drive package that will deliver optimal performance in your application.

AC10 Drives Range

One of the smallest micro-drives available and with five different frame sizes covering a power range of 0.2 kW through to 15 kW, AC10 is a low-cost, compact solution for simple AC induction motor control in a wide range of applications across a host of different industries.



Suited to all environments

- Optional Internal EMC filter allows use in C3 industrial environments
- Conformal coating provides protection in arduous class 3C3 environments
- Global availability and support
- 50 °C operating temperature
- Fan-cooled heatsink, convection cooled electronics

Flexible I/O

- Freely assignable digital inputs and outputs, and relay output to suit your application needs
- 1 analogue output and 2 analogue inputs for connection to speed potentiometers and panel meters
- Internal dynamic brake switch as standard

Modbus/RS485 communication

- Connection to Parker PDB drive setup and monitoring tool
- Connection to PLC or other Modbus RTU / RS485 network

Extra power when it's needed

- 150 % overload for 60 seconds at 0.5 Hz to provide extra starting torque for shifting high inertia loads
- Output power can be uprated for operation in lower ambient temperatures

Simple or enhanced performance

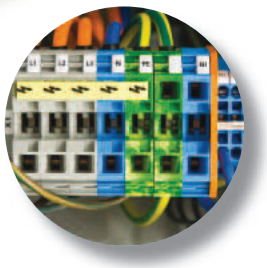
- Simple V/Hz control for general energy saving applications
- Enhanced auto-tuning sensorless vector control providing higher dynamic performance for applications requiring greater speed or torque accuracy

All at the touch of a button

- Standard ergonomic keypad providing full access to all drive functions
- 4 LEDs provide instant indication of drive status
- Remote mountable keypad option for ease of setup and operation
- Simple out of the box operation thanks to integrated macros and quick start guide

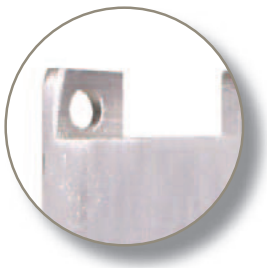
High Speed Operation

- Up to 650 Hz output for high speed operations such as spindles, centrifuges, mixers etc.



Choice of operating voltages

- 230 V single and three phase input up to 2.2 kW
- 400 V three phase input from 0.2 kW through to 15 kW



Compact Dimensions

- When compared to other micro drives of similar functionality, AC10 is noticeably more compact reducing cabinet space and freeing up valuable floor space.

Control at your fingertips

AC10 comes complete with an ergonomic operator keypad as standard featuring 4 LED drive status indicators, a 4 digit 7 segment LED display and a tactile membrane style keypad. In addition to displaying status and running information, the LED display is also used to access drive configuration parameters which can be quickly and easily changed via the keypad.
The keypad can also be used to take local control of the motor to start, stop, increase or decrease motor speed.
An optional Ikeypad is also available and can be mounted remotely from the drive.

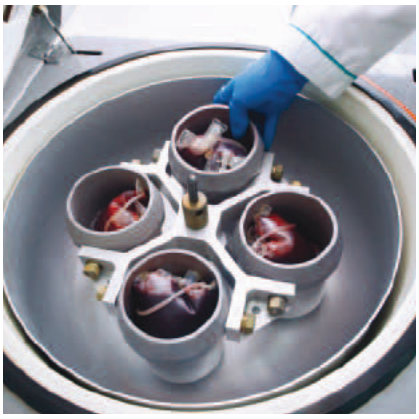
Applications

AC10 provides a no-fuss approach to general purpose industrial motor control applications across a wide range of industries, giving users the benefits of the inherent energy-saving properties of using a variable speed drive, as well as the improved reliability and extended service life benefits associated with smoother starting and stopping of regularly cycling loads.

Typical applications for AC10 include...

- **Conveyor**
- **Centrifuge**
- **Fans**
- **Mixers**
- **Packaging Machines**
- **Textile Machines**
- **Strapping Machines**
- **Labelling Machines**
- **Industrial Washing Machines**
- **Machine Tool Spindles**
- **Roller Doors**

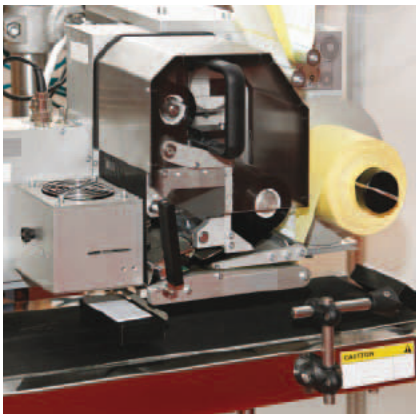
Conveyors



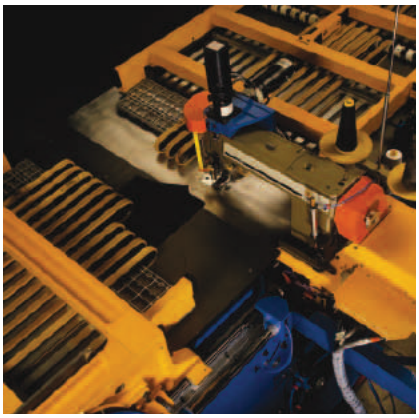
Centrifuges

Fans

Mixers



Packaging Machines



Textile Machines

Technical Characteristics

Power Ratings

220 V Single Phase Input / 220 V Three phase Input		
Nominal Power [kW]	**Output Current [A]**	**Frame Size**
0.2	1.5	1
0.4	2.5	1
0.55	3.5	1
0.75	4.5	1
1.1	5	2
1.5	7	2
2.2	10	2

400 V Three phase Input		
Nominal Power [kW]	**Output Current [A]**	**Frame Size**
0.2	0.6	1
0.4	1	1
0.55	1.5	1
0.75	2	1
1.1	3	2
1.5	4	2
2.2	6.5	2
3	7	3
4	9	3
5.5	12	3
7.5	17	4
11	23	4
15	32	5

Electrical Characteristics

Power Supply	1 phase 230 V ±15 % 3 phase 230 V ±15 % 3 phase 400 V ±15 %
Rated Input Frequency	44… 67 Hz
Maximum Switching Frequency	10 kHz without derating
Overload	150 % of Rated Current for 60 s
Output Frequency	0.5…650 Hz
Switching Frequency	2…10kHz selectable
Control Mode	Volts/Hertz or Sensorless Vector (SLV) Mode
Earth Leakage Current	>10 mA (all models)

Environmental Characteristics

Temperature range	
	Operating Temperature: 0…+50 °C, derate above 40 °C
Humidity	
	Operating humidity: Below 90 % Relative Humidity, non-condensing
Vibration	
	Below 0.5 g
Altitude	
	1000 m ASL
Protection Degree	
	IP20
Chemically Active Substances	
	For the standard product, compliance with EN60271-3-3 is Class 3C3

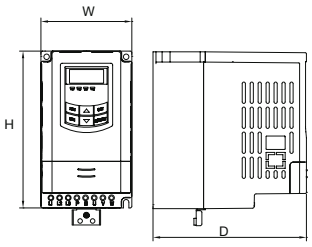
Standards and Conformance

Overvoltage Category	
	Overvoltage category III (numeral defining an impulse withstand level)
EMC Compatibility	
	Meets the requirements of IEC/EN61800-3 : 2004 “Adjustable speed electrical power drive systems – Part 3”

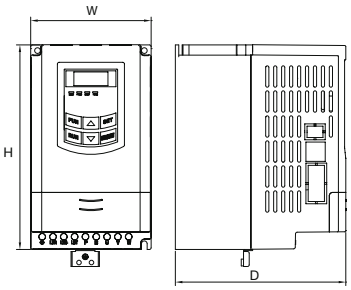
Dimensions

Dimensions [mm]

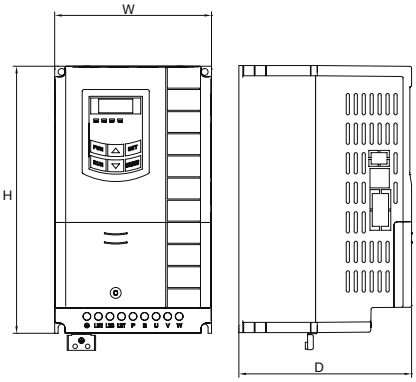
AC10				
Frame	**Height (H)**	**Width (W)**	**Depth (D)**	**Weight [kg]**
1	138	80	135	1.25
2	180	106	150	1.76
3	235	138	152	2.96
4	265	156	170	4.9
5	340	205	196	7.5



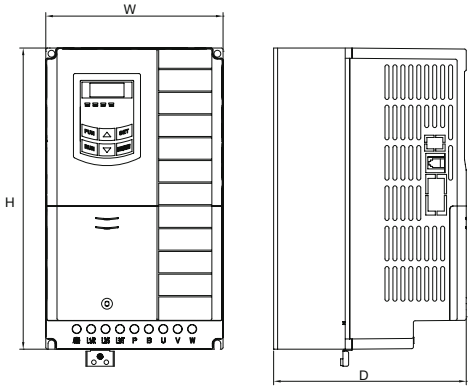
Frame 1



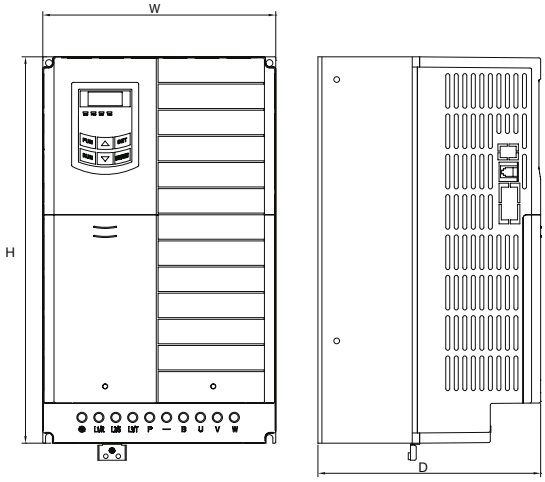
Frame 2



Frame 3



Frame 4



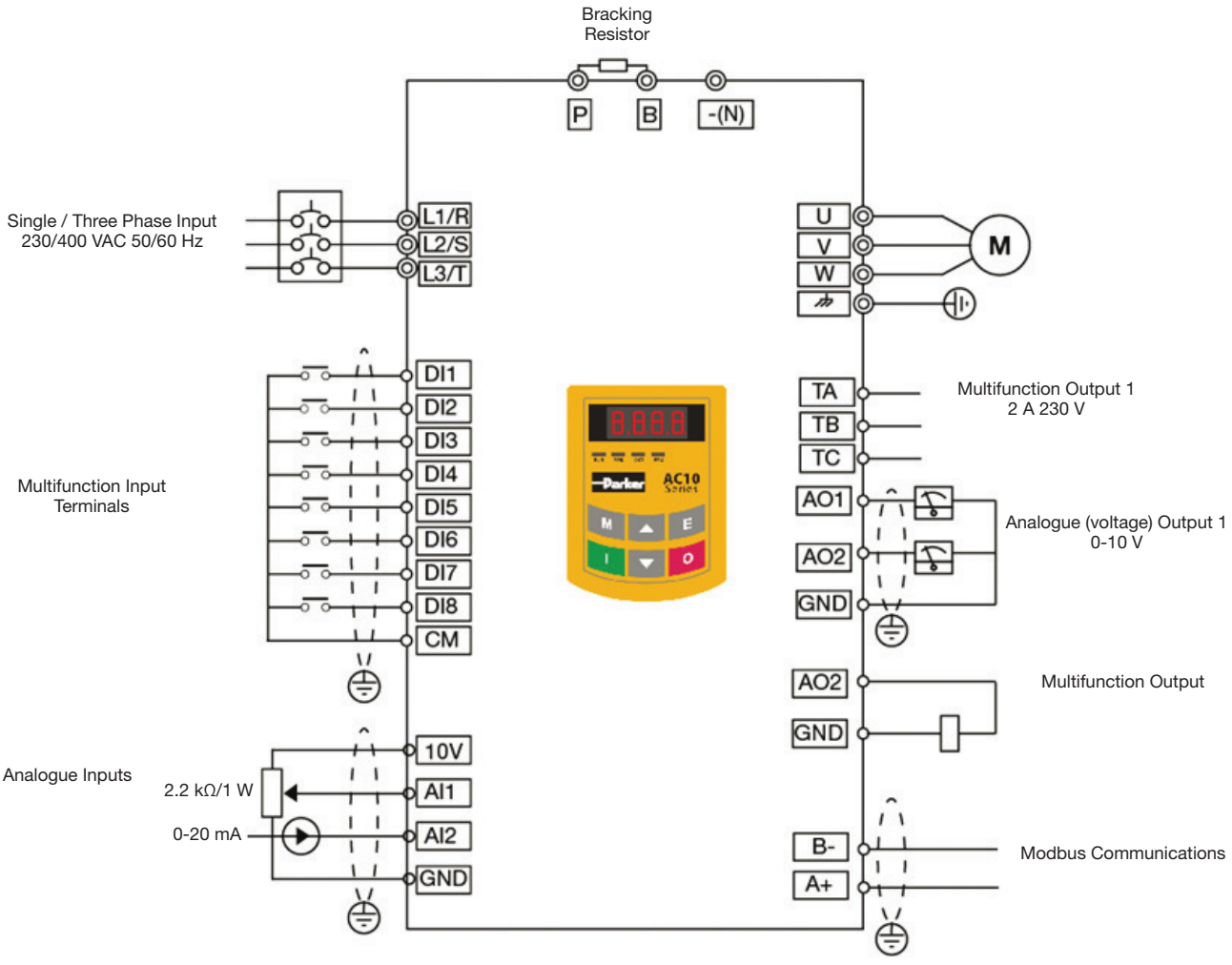
Frame 5

Connections

Terminal	Description
L1/R	Single or three phase input L1
L2/S	Single or three phase input L2
L3/T	Three phase input L3
P	Braking Resistor
B	Braking Resistor
U	Motor Output 1/U
V	Motor Output 2/V
W	Motor Output 3/W

Terminal	Description
TA	Alarm N/O Relay Contact 5 A 24 VDC
TB	Alarm N/C Relay Contact 5 A 24 VDC
TC	Drive Alarm Common
DO1	Digital Output 1
24V	24 VDC Power output (max 50 mA)
CM	0 V DC Common
DI1	Digital Input 1
DI2	Digital Input 2
DI3	Digital Input 3
DI4	Digital Input 4
DI5	Digital Input 5
10V	10 V Reference supply (max 20 mA)
AI1	Analogue input 1
AI2	Analogue input 2
GND	Power Supply 0 V
AO1	Analogue Output
A+	RS485 Channel A
B-	RS485 Channel B

- Analogue Inputs 2: (0-10 V, 0-5 V, 0-20 mA, 4-20 mA)
- Analogue Output 1: (0-10 V, 0-20 mA)
- Digital Inputs 5: Nominal 24 VDC
- Digital Output 1: Nominal 24 VDC
- Relay Output 1: Volt free contact, 5 A @230 VAC max.



Accessories and Options

Remote Mounting Keypad

The remote mounting keypad allows users to mount the keypad away from the drive, such as on the door of an electrical enclosure, allows users to configure, operate and monitor the drive without having to access the drive directly.
The remote keypad provides the same functionality as the drive mounted keypad and is connected to the drive via a 1.5 m cable plugged into the port on the left hand side of the drive.

Order Code	Description
1001-00-00	Remote Keypad

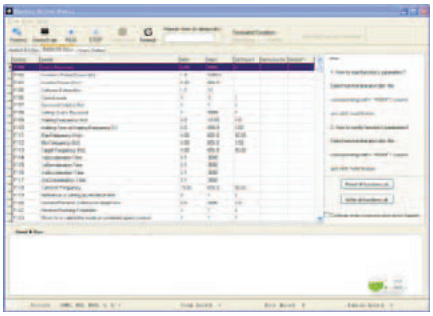
Software - Parker Drive Basic (PDB)

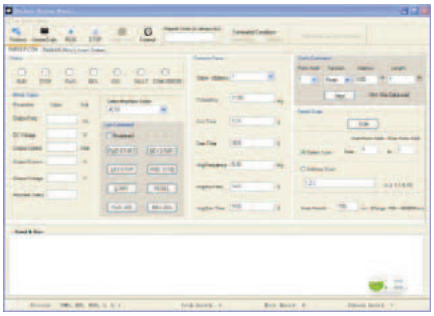
Configuration and Diagnostic Monitoring Software

Parker Drive Basic is a monitoring and configuration software tool for use with AC10 Variable Speed Drives.

Connecting to the AC10 over Modbus, Parker Drive Basic enables users to import, modify and export drive parameters as well as providing a convenient means of starting, stopping and monitoring the operation of the drive.

Note: an RS232/RS485 adapter is required to enable connection between PC and drive





Output Choke

To reduce capacitive currents and prevent nuisance tripping in installations with longer cable runs, a choke may be fitted to the drives output in series with the motor.

Order Code	Motor Power Normal Duty [kW]	Choke Inductance [mH]	Current [A_{rms}]
CO55931	1.1	2	7.5
	1.5		
	2.2		
	3.0		
CO57283	4.0	0.9	22
	5.5		
	7.5		
CO57284	11	0.45	33
	15		

EMC Filter

A range of custom designed optional EMC (Electromagnetic Compatibility) filters are available for use with AC10. They are used to help achieve conformance with EMC directive BS EN61800-3.
AC10 can be ordered with an EMC filter fitted that meets the requirements of a class C3 environment. For class C2 or C1 environments, please contact your local sales office.

Braking Resistor

During deceleration, or with an over-hauling load, the motor acts as a generator. Energy flows back from the motor into the DC link capacitors within the drive, causing their voltage to rise. If this voltage exceeds a maximum value, the drive will trip to protect the capacitors and internal power devices. The amount of energy that can be absorbed by the capacitors can vary between different applications causing the drive to trip on overvolts. To increase the drive's dynamic braking capability, high power resistor(s), connected across the DC link, allow the dissipation of this excess energy for short term stoppage or braking.

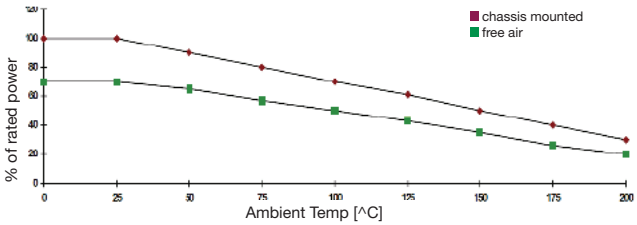
Brake resistor selection

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

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

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

J: total inertia [kgm^2]
n_1: initial speed [min^{-1}]
n_2: final speed [min^{-1}]
t_b: braking time [s]
t_c: cycle time [s]

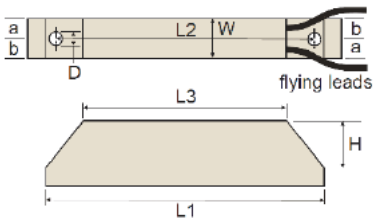


Resistors above 500 W

Resistors above 500 W are available upon request :

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

Model	Impedance [Ω]	Nom. Power [W]	Dimensions [mm]							
			L1	L2	L3	W	H	D	a	b
CZ467715	500	60	100	87	60	22	41	4.3	10	12
CZ467714	200	100	165	152	125	22	41	4.3	10	12
CZ389853	100	100	165	152	125	22	41	4.3	10	12
CZ467717	100	200	165	146	125	30	60	4.3	13	17
CZ463068	56	200	165	146	125	30	60	4.3	13	17
CZ388397	56	200	165	146	125	30	60	4.3	13	17
CZ388396	36	500	335	316	295	30	60	4.3	13	17
CZ467716	28 x 2	500	335	316	295	30	60	4.3	13	17



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

Order Code

AC10

	1	2		3	4		5		6	7
Order example	**10**	**G**	**-**	**1**	**1**	**-**	**0015**	**-**	**B**	**N**

1	**Device Family**		
	10		AC10 Variable Speed Drive
2	**Industry**		
	G		General Purpose
3	**Voltage**		
	1		230 V Single Phase
	3		230 V Three Phase
	4		400 V Three Phase
4&5	**Frame Size & Rating**		
	230 V Supply		
	1	**0015**	0.2 kW
	1	**0025**	0.2 kW
	1	**0035**	0.55 kW
	1	**0045**	0.75 kW
	2	**0050**	1.1 kW
	2	**0070**	1.5 kW
	2	**0100**	2.2 kW
	400 V Supply		
	1	**0006**	0.2 kW
	1	**0010**	0.2 kW
	1	**0015**	0.55 kW
	2	**0020**	0.75 kW
	2	**0030**	1.1 kW
	2	**0040**	1.5 kW
	2	**0065**	2.2 kW
	3	**0080**	3.7 kW
	3	**0090**	4.0 kW
	3	**0120**	5.5 kW
	4	**0170**	7.5 kW
	4	**0230**	11 kW
	5	**0320**	15 kW
6	**Braking Module**		
	B		Braking Module Fitted

7	**EMC Filter**		
	N		No Filter Fitted
	F		C3 EMC Filter Fitted

Parker's Motion & Control Technologies

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

Aerospace

Key Markets

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

Key Products

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

Climate Control

Key Markets

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

Key Products

Accumulators
Advanced actuators
CO_2 controls
Electronic controllers
Filter driers
Hand shut-off valves
Heat exchangers
Hose & fittings
Pressure regulating valves
Refrigerant distributors
Safety relief valves
Smart pumps
Solenoid valves
Thermostatic expansion valves

Electromechanical

Key Markets

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

Key Products

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

Filtration

Key Markets

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

Key Products

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

Fluid & Gas Handling

Key Markets

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

Key Products

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

Hydraulics

Key Markets

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

Key Products

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

Pneumatics

Key Markets

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

Key Products

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

Process Control

Key Markets

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

Key Products

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

Sealing & Shielding

Key Markets

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

Key Products

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

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192-300027N1 November 2013

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