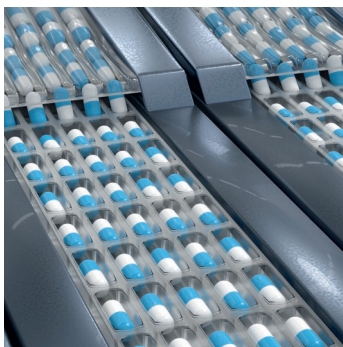
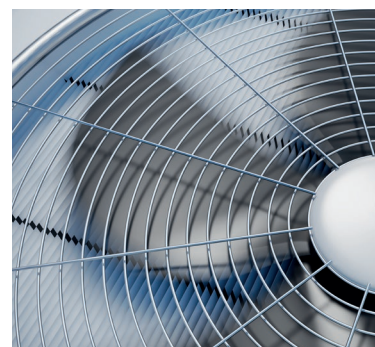




# AC15 Variable Speed Drive

IP20 Compact Drive for Motor Control in  
General Purpose Applications 0.37 - 30 kW



ENGINEERING YOUR SUCCESS.



**WARNING – USER RESPONSIBILITY**

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- This document and other information from Parker-Hannifin Corporation, its subsidiaries and authorized distributors provide product or system options for further investigation by users having technical expertise.
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# Variable Speed Drive - AC15 Series

## Overview

### Description

The AC 15 Compact Drive is a simple to use, reliable and economical solution for every-day motor control applications that require speed or torque control in the power range of 0.37 kW to 30 kW. With compact dimensions and features normally only associated with higher specification drives, including Safe Torque Off, Ethernet communications, sensorless vector mode for control of both Permanent Magnet (PMAC) and AC induction motors and a full 150 % overload for 1 minute, AC 15 provides an optimized solution for OEM machine builders looking for a compact, cost-effective drive without compromising on performance.

### Simplicity

AC15 is designed to reduce the time and effort required to install, setup and commission through it's easy to use integrated keypad and application macros, or the powerful DSE Lite tool and rich function block set. Minimal wiring requirements and easily accessed terminals make AC 15 quick and easy to install. Auto-tuning sensorless vector mode takes AC15 beyond simple V/Hz control allowing users requiring greater dynamic speed or torque control for their application to benefit from the drive's enhanced speed and torque accuracy.

### Reliability

Proven technology and manufacturing techniques ensure AC 15 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, AC15 is capable of withstanding class C3 environments, allowing you to operate AC 15 with the utmost confidence in more applications.



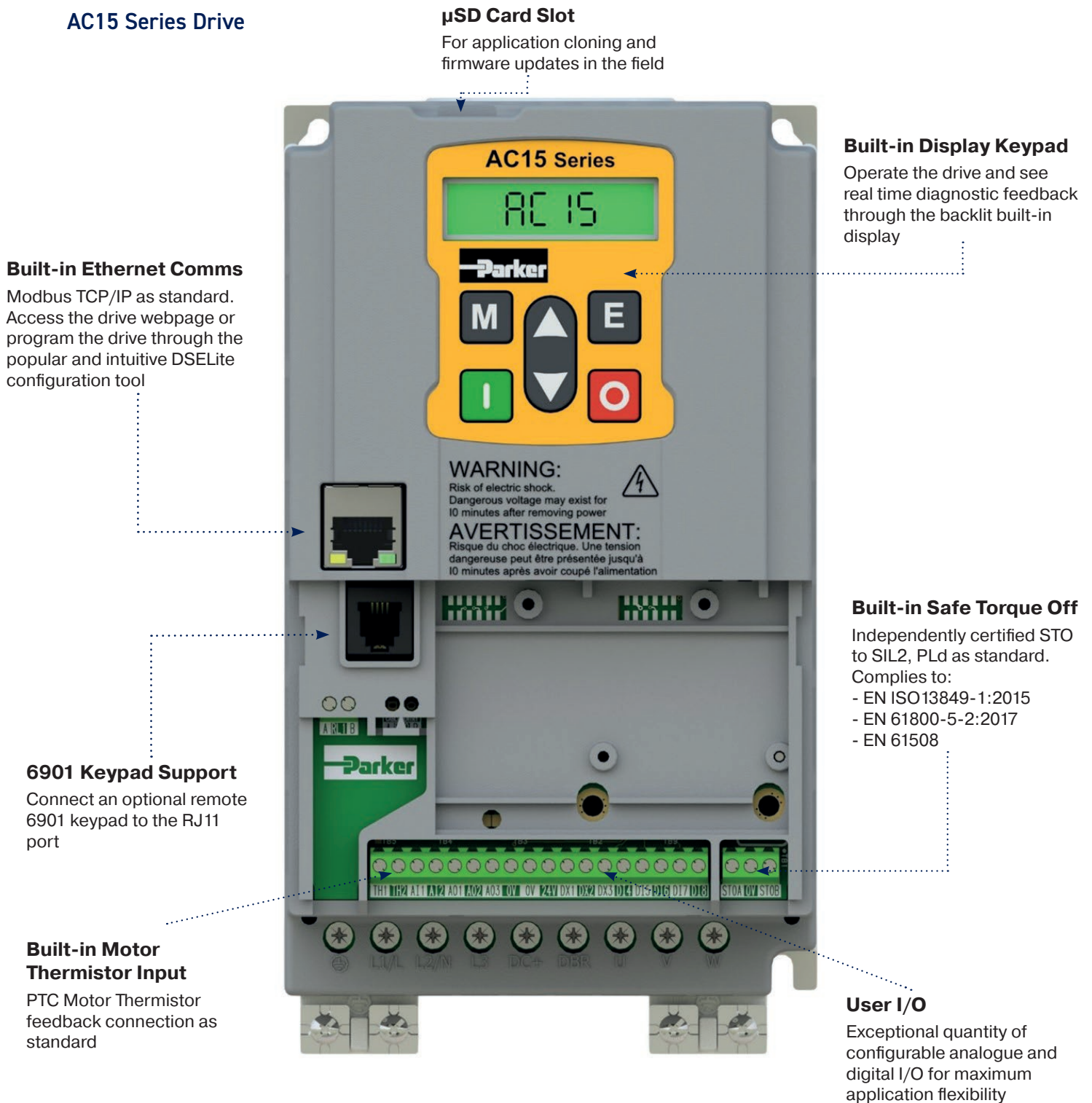
### Technical Characteristics - Overview

|                              |                                                                                                                             |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| <b>Power Supply</b>          | 220 ... 240 VAC $\pm 10\%$ Single Phase<br>220 ... 240 VAC $\pm 10\%$ Three Phase<br>380 ... 480 VAC $\pm 10\%$ Three Phase |
| <b>Input Frequency</b>       | 50/60 Hz $\pm 10\%$                                                                                                         |
| <b>Power Range</b>           | 0.37...30 kW Heavy Duty (HD)                                                                                                |
| <b>Overload</b>              | 150% for 60 sec.                                                                                                            |
| <b>Output Frequency</b>      | 0.5 - 590 Hz                                                                                                                |
| <b>Safe Torque Off (STO)</b> | SIL2, PLd                                                                                                                   |
| <b>Operating Temperature</b> | 0...40 °C (derate up to max 45°C)*                                                                                          |
| <b>Altitude</b>              | 0-1000m (derate up to 2000m)                                                                                                |

\* Temperature derate not available on 0.37kW 230V version

## Features

### AC15 Series Drive



### Standards & Compliance

The product is certified to the latest international standards:

Europe:

- Low Voltage Directive 2014/30/EU
- Electro-Magnetic Compatibility Directive 2006/42/EC
- EN61800-5-1:2017+A11:2021
- EN61800-3:2018
- IE 2 Compliant

North America & Canada:

- UL61800-5-1
- CSA22.2#274-17



## Applications

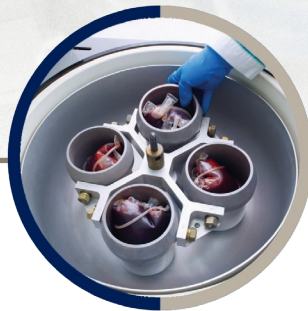
AC15 provides a no-fuss approach to general purpose industrial motor control applications across a wide range of industries, giving users the benefits of the inherent energy-saving properties of using a variable speed drive, as well as the improved reliability and extended service life benefits associated with smoother starting and stopping of regularly cycling loads.

### Typical applications for AC15 include...

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



**Conveyors**



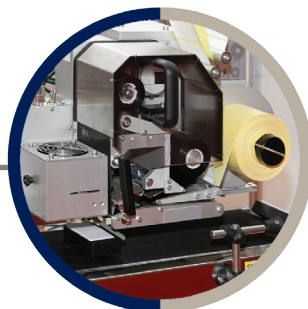
**Centrifuges**



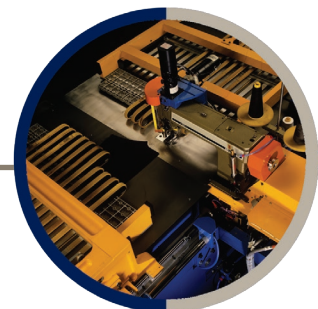
**Fans**



**Mixers**



**Packaging Machines**



**Textile Machines**

## Technical Characteristics

### Power Ratings

| 220-240 VAC, Single Phase Supply Voltage |                   |                    |                      |            |
|------------------------------------------|-------------------|--------------------|----------------------|------------|
| Order Code                               | Input Current [A] | Output Current [A] | HD Power Rating [kW] | Frame Size |
| 15G-11-0025-BF                           | 5.8               | 2.5                | 0.37                 | 1          |
| 15G-11-0045-BF                           | 10                | 4.5                | 0.75                 |            |
| 15G-11-0070-BF                           | 14                | 7                  | 1.5                  |            |
| 15G-12-0100-BF                           | 20                | 10                 | 2.2                  | 2          |

| 220-240 VAC, Three Phase Supply Voltage |                   |                    |                      |            |
|-----------------------------------------|-------------------|--------------------|----------------------|------------|
| Order Code                              | Input Current [A] | Output Current [A] | HD Power Rating [kW] | Frame Size |
| 15G-31-0025-BF                          | 3.5               | 2.5                | 0.37                 | 1          |
| 15G-31-0045-BF                          | 5.4               | 4.5                | 0.75                 |            |
| 15G-31-0070-BF                          | 7.8               | 7                  | 1.5                  |            |
| 15G-32-0100-BF                          | 11                | 10                 | 2.2                  | 2          |
| 15G-33-0170-BF                          | 18.5              | 17                 | 4                    | 3          |
| 15G-34-0210-BF                          | 22                | 21                 | 5.5                  | 4          |
| 15G-35-0300-BF                          | 31                | 30                 | 7.5                  | 5          |
| 15G-35-0400-BF                          | 41                | 40                 | 11                   |            |

| 380-480 VAC, Three Phase Supply Voltage |                   |                    |                      |            |
|-----------------------------------------|-------------------|--------------------|----------------------|------------|
| Order Code                              | Input Current [A] | Output Current [A] | HD Power Rating [kW] | Frame Size |
| 15G-41-0012-BF                          | 1.5               | 1.2                | 0.37                 | 1          |
| 15G-41-0020-BF                          | 3                 | 2                  | 0.75                 |            |
| 15G-41-0040-BF                          | 5                 | 4                  | 1.5                  |            |
| 15G-42-0065-BF                          | 7.5               | 6.5                | 2.2                  | 2          |
| 15G-42-0090-BF                          | 11                | 9                  | 4                    |            |
| 15G-43-0120-BF                          | 14                | 12                 | 5.5                  | 3          |
| 15G-43-0170-BF                          | 18.5              | 17                 | 7.5                  |            |
| 15G-44-0230-BF                          | 24                | 23                 | 11                   | 4          |
| 15G-44-0320-BF                          | 36.5              | 32                 | 15                   |            |
| 15G-45-0380-BF                          | 44                | 38                 | 18.5                 | 5          |
| 15G-45-0440-BF                          | 51                | 44                 | 22                   |            |
| 15G-45-0600-BF                          | 70                | 60                 | 30                   |            |



## Electrical Characteristics

|                                 |                                                                                                                             |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| <b>Power Supply</b>             | 220 ... 240 VAC $\pm 10$ % Single Phase<br>220 ... 240 VAC $\pm 10$ % Three Phase<br>380 ... 480 VAC $\pm 10$ % Three Phase |
| <b>Input Frequency</b>          | 50/60 Hz $\pm 10$ %                                                                                                         |
| <b>Power Range</b>              | 0.37...30 kW Heavy Duty (HD)                                                                                                |
| <b>Overload</b>                 | 150% for 60 sec.                                                                                                            |
| <b>Output Frequency</b>         | 0.5...590 Hz                                                                                                                |
| <b>Max. Switching Frequency</b> | 10 kHz                                                                                                                      |
| <b>Control Modes</b>            | Volts/Hertz or Sensorless Vector (SLV) modes                                                                                |
| <b>Supported Motors</b>         | Induction & PMAC                                                                                                            |

## Environmental Characteristics

|                                     |                                                |
|-------------------------------------|------------------------------------------------|
| <b>Temperature range</b>            | 0-40 °C (derate up to max. 45 °C)*             |
| <b>Humidity</b>                     | Up to 90 % Relative Humidity, non-condensing   |
| <b>Vibration</b>                    | < 0.5 g                                        |
| <b>Altitude</b>                     | 0-1000 m (derate 1% per 100m up to max. 2000m) |
| <b>Protection Degree</b>            | IP20                                           |
| <b>Pollution Degree</b>             | Category 2                                     |
| <b>Chemically Active Substances</b> | Compliance with EN60271-3-3: C3                |

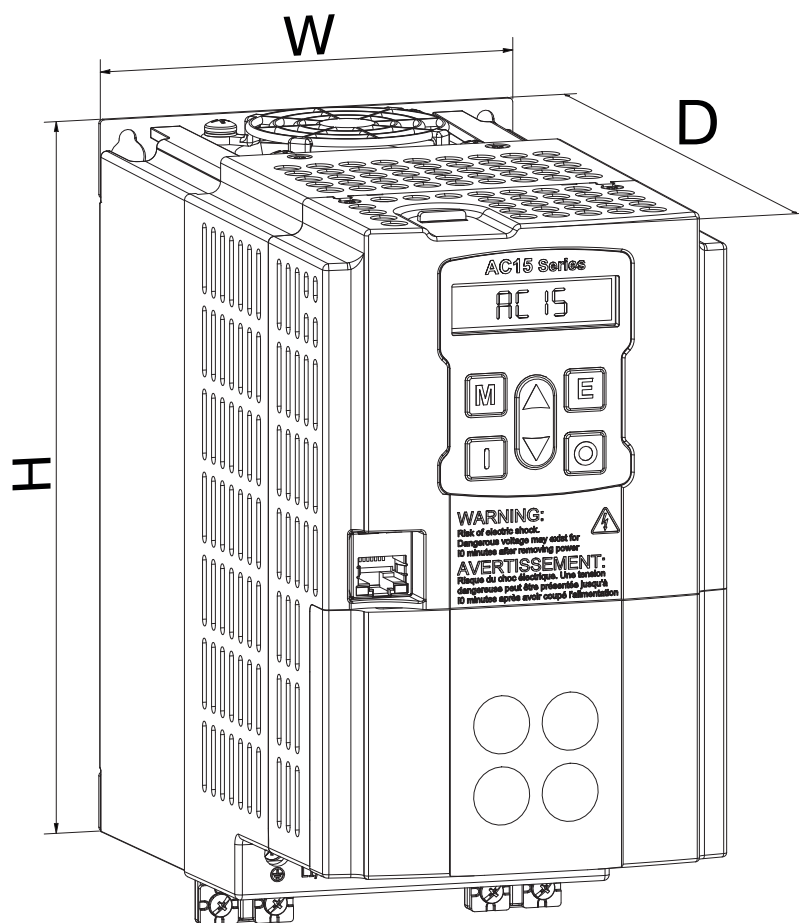
\* Temperature derate not available on 0.37kW 230V version

## Standards and Compliance

|                               |                                                                                                                                                                               |
|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Europe</b>                 | This product conforms with:<br>- Low Voltage Directive 2014/30/EU<br>- Electro-Magnetic Compatibility Directive 2006/42/EC<br>- EN61800-5-1:2007+A11:2021<br>- EN61800-3:2018 |
| <b>North America / Canada</b> | Complies with the requirements of:<br>- UL61800-5-1<br>- CSA22.2#274-17<br>as an open-type drive                                                                              |
| <b>STO</b>                    | Independently certified to:<br>- EN ISO13849-1:2015<br>- EN 61800-5-2:2017<br>- EN 61508                                                                                      |
| <b>RoHS</b>                   | This product complies with the RoHS substance restrictions in accordance with EC Directive 2011/65/EU                                                                         |
| <b>REACH</b>                  | This product complies with the REACH regulations EC1907/2006                                                                                                                  |

## Dimensions [mm]

| AC15 Series |            |           |           |             |
|-------------|------------|-----------|-----------|-------------|
| Frame       | Height (H) | Width (W) | Depth (D) | Weight [kg] |
| 1           | 138.0      | 81.5      | 144.3     | 1.1         |
| 2           | 180.0      | 108.4     | 185.0     | 2.0         |
| 3           | 237.5      | 141.6     | 184.0     | 3.3         |
| 4           | 265.0      | 161.0     | 196.0     | 4.4         |
| 5           | 340.0      | 210.0     | 220.2     | 8.0         |



## Power Connections

### Frame 1

| Terminal | Description                           |
|----------|---------------------------------------|
| L3 / PE  | Supply Input phase L3 / Earth         |
| L2 / N   | Supply Input phase L2 / Neutral       |
| L1 / L   | Supply Input phase L1 / Live          |
| DC+      | Dynamic Brake Resistor connection (+) |
| DBR      | Dynamic Brake Resistor connection (-) |
| U        | Motor Output phase U                  |
| V        | Motor Output phase V                  |
| W        | Motor Output phase W                  |

### Frame 2-4

| Terminal | Description                           |
|----------|---------------------------------------|
| PE       | Earth                                 |
| L1 / L   | Supply Input phase L1 / Live          |
| L2 / N   | Supply Input phase L2 / Neutral       |
| L3       | Supply Input phase L3                 |
| DC+      | Dynamic Brake Resistor connection (+) |
| DBR      | Dynamic Brake Resistor connection (-) |
| U        | Motor Output phase U                  |
| V        | Motor Output phase V                  |
| W        | Motor Output phase W                  |

### Frame 5

| Terminal | Description                                 |
|----------|---------------------------------------------|
| PE       | Earth                                       |
| L1       | Supply Input phase L1                       |
| L2       | Supply Input phase L2                       |
| L3       | Supply Input phase L3                       |
| DC+      | DC+ / Dynamic Brake Resistor connection (+) |
| DC-      | DC-                                         |
| DBR      | Dynamic Brake Resistor connection (-)       |
| U        | Motor Output phase U                        |
| V        | Motor Output phase V                        |
| W        | Motor Output phase W                        |



## Control Connections

| Label  | Description                                             |
|--------|---------------------------------------------------------|
| RLY1A  | RelayOutput 1 (Contact A)                               |
| RLY1B  | RelayOutput 1 (Contact B)                               |
| TH1    | Motor Thermistor Input                                  |
| TH2    | Motor Thermistor Input                                  |
| AIN1   | Analogue Input 1 ( $\pm 10V^*$ , 0-10V, 0-20mA, 4-20mA) |
| AIN2   | Analogue Input 2 ( $\pm 10V^*$ , 0-10V, 0-20mA, 4-20mA) |
| AOUT1  | Analogue Output 1 (0-10V, 0-20mA)                       |
| AOUT2  | Analogue Output 2 (0-10V, 0-20mA)                       |
| AOUT3* | Analogue Output 3 ( $\pm 10V$ , 0-10V)                  |
| 0V     | 0V reference for analogue & digital I/O                 |
| 0V     | 0V reference for analogue & digital I/O                 |
| 24V    | 24V user supply                                         |
| DIO1   | Digital Input / Output 1 (24V configurable)             |
| DIO2   | Digital Input / Output 2 (24V configurable)             |
| DIN3   | Digital Input 3                                         |
| DIN4   | Digital Input 4 (High speed capable)                    |
| DIN5   | Digital Input 5 (High speed capable)                    |
| DIN6   | Digital Input 6                                         |
| DIN7*  | Digital Input 7                                         |
| DIN8*  | Digital Input 8                                         |
| STO1   | STO input channel A                                     |
| STO0V  | STO 0V reference                                        |
| STO2   | STO input channel B                                     |

\* = Frames 2-5 only



## Software

### Parker Drive System Explorer (DSE Lite)

Parker drive configuration software Drive System Explorer (DSE) Lite is an easy to use drive configuration software package, designed to make programming your application as simple as possible without compromising on functionality.

DSE Lite is based around straightforward block programming and an intuitive user interface which supports user-defined configurations and offers real-time monitoring and charting. DSE Lite allows the user to create, parameterize and configure user defined applications as well as parameterize and connect fixed Motor Control blocks with up to 100 'links'

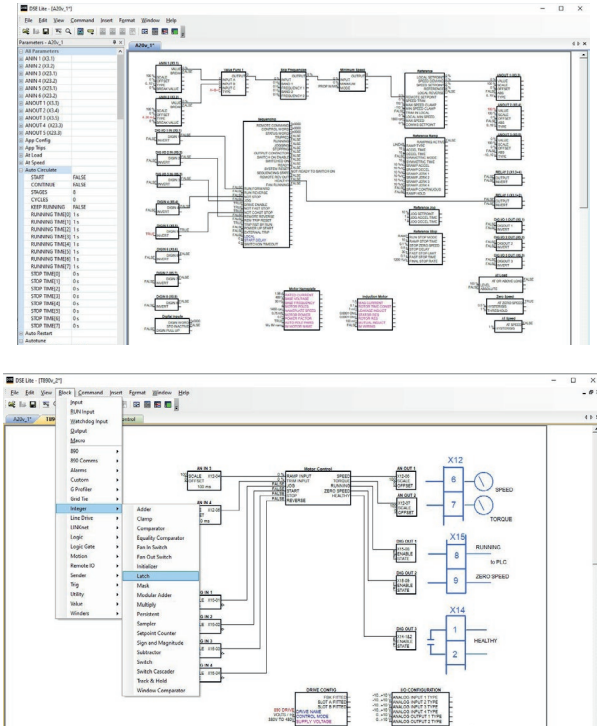
Thanks to the on-line help and pre-configured macro templates, users can achieve the optimum drive configuration without the need to navigate through complicated parameter menus.

DSE Lite for AC15 uses a standard Ethernet connection between PC and inverter, so no special lead is required.

Enhanced features of the AC15 include:

- High speed Ethernet connectivity
- Network scan feature
- Drive network identification
- Firmware installs over Ethernet
- Save a project to on-board Flash memory
- Compatibility with the AC30 Series PDD scope feature.

It is available free of charge to download from [www.parker.com](http://www.parker.com).





## Accessories and Options

### 6901 Remote Mounting Keypad

The popular 6901 remote mounting keypad can be mounted away from the drive, such as on the door of an electrical enclosure. This interface allows users to configure, operate and monitor the drive without having to access the drive directly.

The remote keypad provides an alternative to the drive mounted keypad, offering a clear English language display and greater functionality. The remote mounting kit provides mounting bezel and a 1.5 m cable that is plugged into the RJ11 port on the drive.

| Order Code | Description              |
|------------|--------------------------|
| 6901-00-G  | 6901 DisplayKeypad       |
| 6052-00-G  | 6901 remote mounting kit |



### Cable Screening Bracket

Cable Screening Brackets are available for the AC15. These brackets offer a means of grounding the power cable screen connections, as well as supporting the power cables when connected to the drive.

| Order Code  | Description                         |
|-------------|-------------------------------------|
| ASP-0039-01 | AC15 Bracket Kit - Frame 1          |
| ASP-0039-02 | AC15/20 Bracket Kit - Frame 2       |
| ASP-0039-03 | AC15/20 Bracket Kit - Frame 3, 400V |
| ASP-0039-04 | AC15/20 Bracket Kit - Frame 4, 400V |
| ASP-0039-05 | AC15/20 Bracket Kit - Frame 5, 400V |
| ASP-0039-06 | AC15/20 Bracket Kit - Frame 3, 230V |
| ASP-0039-07 | AC15/20 Bracket Kit - Frame 4, 230V |
| ASP-0039-08 | AC15/20 Bracket Kit - Frame 5, 230V |



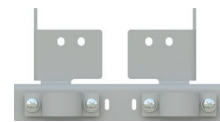
ASP-0039-01



ASP-0039-02



ASP-0039-03



ASP-0039-04



ASP-0039-05



ASP-0039-06



ASP-0039-07



ASP-0039-08

## 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 utilize the drive's onboard dynamic braking capability, high power resistor(s), connected across the DC link, allow the dissipation of this excess energy for fast stops or load 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.

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

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

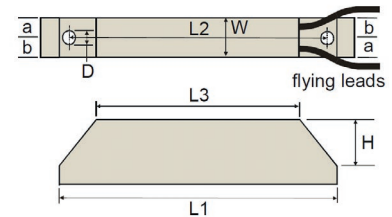
J: total inertia [kgm<sup>2</sup>]  
n<sub>1</sub>: initial speed [min<sup>-1</sup>]  
n<sub>2</sub>: final speed [min<sup>-1</sup>]

t<sub>b</sub>: braking time [s]  
t<sub>c</sub>: cycle time [s]



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

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



## EMC Filter

AC15 are supplied as standard with an EMC filter fitted that meets the requirements of a class C3 environment. For class C2 or C1 environments, an additional external filter may be required. An internal wire link may be easily removed to disconnect the Y capacitors for those installations where earth currents are undesirable.

## Order Code

### AC15

|               | 1          |   | 2        | 3        |   | 4           |   | 5        | 6        |
|---------------|------------|---|----------|----------|---|-------------|---|----------|----------|
| Order example | <b>15G</b> | - | <b>1</b> | <b>1</b> | - | <b>0025</b> | - | <b>B</b> | <b>F</b> |

|                |                                                     |
|----------------|-----------------------------------------------------|
| <b>1</b>       | <b>Device Family</b>                                |
| <b>15G</b>     | AC15 Series, General Purpose AC Drive               |
| <b>2</b>       | <b>Voltage</b>                                      |
| <b>1</b>       | 230 V Single Phase                                  |
| <b>3</b>       | 230 V Three Phase                                   |
| <b>4</b>       | 400 V Three Phase                                   |
| <b>3&amp;4</b> | <b>Frame Size &amp; Current Rating (Heavy Duty)</b> |
|                | <b>230Vac, Single Phase Supply Voltage</b>          |
| <b>1-0025</b>  | Frame 1 - 2.5A (0.37kW)                             |
| <b>1-0045</b>  | Frame 1 - 4.5A (0.75kW)                             |
| <b>1-0070</b>  | Frame 1 - 7A (1.5kW)                                |
| <b>2-0100</b>  | Frame 2 - 10A (2.2kW)                               |
|                | <b>230Vac, Three Phase Supply Voltage</b>           |
| <b>1-0025</b>  | Frame 1 - 2.5A (0.37kW)                             |
| <b>1-0045</b>  | Frame 1 - 4.5A (0.75kW)                             |
| <b>1-0070</b>  | Frame 1 - 7A (1.5kW)                                |
| <b>2-0100</b>  | Frame 2 - 10A (2.2kW)                               |
| <b>3-0170</b>  | Frame 3 - 17A (4.0kW)                               |
| <b>4-0210</b>  | Frame 4 - 21A (5.5kW)                               |
| <b>5-0300</b>  | Frame 5 - 30A (7.5kW)                               |
| <b>5-0400</b>  | Frame 5 - 40A (11kW)                                |
|                | <b>400Vac, Three Phase Supply Voltage</b>           |
| <b>1-0012</b>  | Frame 1 - 1.2A (0.37kW)                             |
| <b>1-0020</b>  | Frame 1 - 2A (0.75kW)                               |
| <b>1-0040</b>  | Frame 1 - 4A (1.5kW)                                |
| <b>2-0065</b>  | Frame 2 - 6.5A (2.2kW)                              |
| <b>2-0090</b>  | Frame 2 - 9A (4.0kW)                                |
| <b>3-0120</b>  | Frame 3 - 12A (5.5kW)                               |
| <b>3-0170</b>  | Frame 3 - 17A (7.5kW)                               |
| <b>4-0230</b>  | Frame 4 - 23A (11kW)                                |
| <b>4-0320</b>  | Frame 4 - 32A (15kW)                                |
| <b>5-0380</b>  | Frame 5 - 38A (18.5kW)                              |
| <b>5-0440</b>  | Frame 5 - 44A (22kW)                                |
| <b>5-0600</b>  | Frame 5 - 60A (30kW)                                |
| <b>5</b>       | <b>Brake Switch</b>                                 |
| <b>B</b>       | Brake Switch Fitted                                 |
| <b>6</b>       | <b>EMC Filter</b>                                   |
| <b>F</b>       | Category C3 Filtered                                |



# 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<sub>2</sub> 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  
Electrohydraulic 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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