# AC30 Variable Speed Drive

## AC30V, AC30P, and AC30D

Three Performance Levels to Suit a Wide Range of Applications

1 - 650 HP (0.75 - 450 kW)

**Parker**

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# AC30 - Three Performance Levels to Suit a Wide Range of Applications

# Parker Hannifin

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Rohnert Park, CA

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Wuxi, China

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# Variable Speed Drive - AC30 Series

## Overview

### Description

AC30 drive has been designed to provide users with exceptional levels of control, from simple open-loop pumps and fans through to closed-loop process line applications. Its flexible and highly modular construction enables a wide range of communications and I/O modules to be easily added as required.

The AC30 has been designed with simplicity in mind, but this doesn't compromise its functionality. Integrated macros for a range of applications and PLC functionality enable more capable users to create sophisticated control that would previously have required a separate PLC.

Designed for operation in environment class 3C3 and 3C4 for Hydrogen Sulphide ($H_2S$) as standard (tested at 25 ppm for 1200 hours), temperatures up to 50° C with optional integrated EMC filter to C2 1st environment and DC link choke to reduce line harmonics. AC30 also complies with RoHS substance restrictions in accordance with EC Directive 2011/65/EU. Units through 100 HP are marine certified by DNV-GL.

### Features

**Flexibility**

- Open-loop or optional closed-loop operation with pulse encoder or resolver feedback module
- Suitable for operation with AC induction and Permanent Magnet AC (PMAC) servo motors
- Ethernet TCP/IP as standard
- Supports both IEC61131-3 CODESYS programming via PDD & PDQ; or DSE / DSELite depending upon firmware installed
- I/O expansion options (Dependent upon firmware installed. See chart on page 9)
- Support for popular industrial fieldbuses
- Chassis or through-panel mount as standard

**Simplicity**

- Parker DSELite or Parker Drive Quicktool (PDQ) drive management software tool
- Multi-language graphical keypad
- Quick start wizards
- Terminal covers removable with drive in place

## Designed with you in mind

Throughout every stage of the design process, our engineering teams worked to equip the AC30 with a wealth of features that benefit both OEMs and End-users alike.

Working with the three principles of Flexibility, Simplicity and Reliability in mind, our engineers have created a product that not only delivers class-leading performance but also offers excellent usability in a host of motor control applications.

### Flexibility
A fully featured list of standard functionality along with the use of common control and option modules allows users to put the drive to work in many different open or closed-loop applications without having to invest significant time and effort in re-engineering motor control systems.

### Simplicity
From the clear and concise backlit LCD display to the power terminal covers that can be removed with the drive in the cabinet, AC30 has been engineered to make the process of operating and maintaining the drive as easy as possible.

### Reliability
Although no one can guarantee problems will never happen, our engineers have taken every possible step to reduce their likelihood of occurring. We have included a number of features in the AC30 that will ensure any loss of productivity is minimized and production restarted as safely and as soon as possible.

### Engineered cooling improves reliability

- Intelligent design minimizes force ventilation requirements
- Removable fan improves maintainability
- Isolated power stack cooling path reduces contamination of control electronics
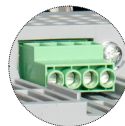
### Unobstructed access to power and dynamic brake terminals

- Terminal covers removable with drive in place
- Dynamic brake switch included as standard
- Easy access to DC Bus connections
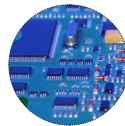
### Suitable for harsh environments

- AC30 is conformally coated as standard and meets the requirements of environment classes 3C1, 3C2 (all defined substances) plus 3C3 and 3C4 for Hydrogen Sulphide ($H_2S$)
- Internal EMC filter options up to C2 1st environment for use in commercial buildings
- CE marked to EN61800-5-1 and NRTL listed to UL508C and C22.2#14
- DC chokes above 3 HP reduce harmonics to below IEC/EN61000-3-12 limits
- Marine certified by GNV-DL through 100 HP

### Compact footprint, chassis or through-panel mounting

- Multi-position feet with keyhole slots for ease of mounting
- Reduced heat radiation allows side-by-side mounting

### Expandable I/O capabilities

- A range of option modules expand AC30 to accommodate application specific I/O
- High-performance, closed-loop control with pulse encoder or resolver feedback module
- Spring clamp terminals reduce installation time and risk of loose connections

### Ethernet connectivity and built in diagnostic web pages

- Built in web pages allow AC30 to be interrogated over the onboard Ethernet and Modbus TCP/IP connection
- **LINKnet** compatible when using DSE/DSELite firmware

### Simplified configuration and data storage with SD cards

- SD card simplifies firmware updates and allows drive configuration and data to be stored

### Intuitive and easy to use, multi-function graphical keypad

- Remote mountable and easy to use tactile keypad makes drive setup and operation simple

### Field-installable communications

- Seamless integration into automation systems

EtherNet/IP™   PROFI BUS   CANopen   PROFI NET®
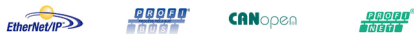
Communications modules compatible only when using IEC61131-3 CODESYS firmware

### Safe-Torque-Off (STO) for safety critical applications

- Protecting users and machinery against unexpected motor start-up in accordance with EN13849-1 at PLe Cat3 or SIL 3 to EN61800-5-2

### Graphical Keypad

The tactile IP55 keypad can be mounted either on the drive itself or remotely and provides access to all drive functions.

The backlit LCD display can be configured to present information in any one of a number of different languages, or even in your own custom language with your own user-defined units.

### Simple Setup Wizard and Macros

- Integrated quick start wizards means you don't have to be an expert to configure the drive within minutes
- Dedicated macros and integrated function blocks simplify the creation of specific motor control applications

### Keypad Remote Mounting

The graphical keypad can be mounted remotely to the drive with the use of a connecting cable. When remote mounting, a blanking cover can be fitted to the drive in place of the keypad.

# AC30 Series Variable Speed Drive

## Overview

The AC30 is a modular product allowing users to select power stack, control module, I/O and communications modules and accessories to perfectly match the requirements of the application, making it a highly customizable yet cost effective solution. The three interchangeable control modules provide the basis for the series: the standard AC30V control module, the AC30P module with a host of advanced connectivity options, and the AC30D module which adds dual encoder and registration mark system capability.

**1) Select Power Stack**

Power stacks range from 1 to 650 HP.

**2) Select Control Module**

A range of control modules (V, P, or D) offer varying levels of intelligent automation control.

**3) Select Comms & I/O Options**

A wide range of communications, fieldbus, I/O and feedback options are available.

**4) Choose accessories**

Additional product accessories can be ordered to suit application and installation requirements.

# AC30 Series Capability & Connectivity

## AC30V

The AC30V is the base drive for **standalone applications**. More than a basic pump and fan drive, Its program can be easily modified to suit the application using DSE / DSELite when using DSE firmware or PDD / PDQ when using IEC61131-3 CODESYS firmware.

## AC30P

Supporting latest developments in IoT and employing principles discussed in Industry 4.0 the AC30P is equipped with **dual Ethernet ports**. This allows more advanced applications including multiple drive configurations. Plug into one port and access multiple drives supported by 1588 time synchronized peer to peer communication.

## AC30D

The AC30D module gives you the great features of the AC30P as well as additional built in terminals to allow **dual encoder inputs and an encoder output.** This gives systems functionality to the AC30 allowing "electronic line shaft" capability, phase locking between drives, and registration control. This also frees up the I/O plug in slot to allow for even more I/O to be added if needed.

| Feature | Using IEC61131-3 CODESYS Firmware | | | Using DSE Firmware | | |
|---|---|---|---|---|---|---|
| | AC30V | AC30P | AC30D | AC30V | AC30P | AC30D |
| Application Macros | Basic | System | System | Basic | System | System |
| Safety Torque Off (STO) | √ | √ | √ | √ | √ | √ |
| Modbus Server | √ | √ | √ | √ | √ | √ |
| Basic web server | √ | √ | √ | | | |
| Parker Drive Quick (PDQ) tool programming | √ | √ | √ | | | |
| DSE/DSELite system programming | | | | √ | √ | √ |
| DSE function block libraries | | | | √ | √ | √ |
| IEC61131-3 System Application libraries | | √ | √ | | | |
| Ethernet/IP | Option | √ | √ | √ | √ | √ |
| Profinet | Option | √ | √ | | | |
| Profibus | Option | Option | Option | | | |
| CANopen | Option | Option | Option | | | |
| EtherCAT | Option | Option | Option | | | |
| RS485/Modbus RTU | Option | Option | Option | | | |
| Modbus client | | √ | √ | | √ | √ |
| IEEE1588 time synchronized peer to peer comms | | √ | √ | | √ | √ |
| LINKnet time synchronized peer to peer comms | | | | √ | √ | √ |
| SMART diagnostics | | √ | √ | | √ | √ |
| User customizable web server | | √ | √ | | √ | √ |
| Parker Drive Developer (PDD) advanced programming | | √ | √ | | | |
| Virtual master synchronization (same as AC890) | | √ | √ | | √ | √ |
| Multi-axis phase lock (same as AC690+ system board/890) | | √ | √ | | √ | √ |
| Resolver feedback | Option | Option | Option | Option | Option | Option |
| Dual encoder inputs | | | √ | | | √ |
| Programmable encoder output | | | √ | | | √ |

# System Connectivity

The AC30 Series can be configured to operate in a number of different power control configuration modes to suit the exact requirements of your application. The flexibility of the AC30 Series enables our range of control modules to operate standalone or as an integral part of any automation architecture.

## System Integration

The AC30 series can be easily integrated into your application supported by the wide range of connectivity options. AC30 series control modules can be programmed with our suite of software tools allowing users to configure the product to exactly match the application. Connectivity is provided via our hardware IO terminals offered on all control modules and expanded with our IO options or via standard and optional fieldbus modules.[1]

[1] Option modules supported only when using IEC61131-3 CODESYS firmware

### Hardwired I/O Configuration

The AC30 series offers analog and digital inputs and outputs to maximize application compatibility. The I/O can be expanded using 7004 option modules.

Our standard application macros set each I/O point to a dedicated function. For customization the I/O can be configured to match your application using PDD or PDQ.



### Fieldbus Connectivity

All AC30 variants include Ethernet. Using IEC61131-3 CODESYS firmware, ModbusTCP/IP and ProfiNet are standard with Ethernet /IP and a range of common field bus protocols supported via option modules.

Using DSE firmware, Modbus TCP/IP, Ethernet/IP and LINKNet are standard. Field bus option cards are not supported.



### Peer to Peer Configuration

The standard Ethernet on the AC30P/D offers peer to peer communication between drives. This allows for seamless data transfer. The peer to peer communication is 1588 time synchronized allowing phase locking between axis independent of which firmware is loaded.[2]



[2] When using DSE firmware both IEEE1588 and LINKnet are supported simultaneously

# Technical Specifications

## Ratings

| Order Code | Normal Duty Ratings | | | Heavy Duty Ratings | | | Frame |
|---|---|---|---|---|---|---|---|
| | kW / HP | Output Current A | | kW/HP | Output Current A | | |
| | | 400 VAC | 480 VAC | | 400 VAC | 480 VAC | |
| 380-480 (± 10 %) VAC Supplies Three Phase | | | | | | | |
| 31x-4D0004-B*-2S-0000 | 1.1 / 1.5 | 3.5 | 3 | 0.75/1 | 2.5 | 2.1 | D |
| 31x-4D0006-B*-2S-0000 | 2.2 / 3 | 5.5 | 4.8 | 1.5/2 | 4.5 | 3.4 | D |
| 31x-4D0010-B*-2S-0000 | 4/5 | 10 | 7.6 | 3/4 | 7.5 | 5.8 | D |
| 31x-4D0012-B*-2S-0000 | 5.5 / 7.5 | 12 | 11 | 4/5 | 10 | 7.6 | D |
| 31x-4E0016-B*-2S-0000 | 7.5 / 10 | 16 | 14 | 5.5/7.5 | 12 | 11 | E |
| 31x-4E0023-B*-2S-0000 | 11/15 | 23 | 21 | 7.5/10 | 16 | 14 | E |
| 31x-4F0032-B*-2S-0000 | 15 / 20 | 32 | 27 | 11/15 | 23 | 21 | F |
| 31x-4F0038-B*-2S-0000 | 18 / 25 | 38 | 36 | 15/20 | 32 | 27 | F |
| 31x-4G0045-B*-2S-0000 | 22 / 30 | 45 | 40 | 18/25 | 38 | 36 | G |
| 31x-4G0060-B*-2S-0000 | 30 / 40 | 60 | 52 | 22/30 | 45 | 40 | G |
| 31x-4G0073-B*-2S-0000 | 37 / 50 | 73 | 65 | 30/40 | 60 | 52 | G |
| 31x-4H0087-B*-2S-0000 | 45 / 60 | 87 | 77 | 37/50 | 73 | 65 | H |
| 31x-4H0105-B*-2S-0000 | 55 / 75 | 105 | 96 | 45/60 | 87 | 77 | H |
| 31x-4H0145-B*-2S-0000 | 75 / 100 | 145 | 124 | 55/75 | 105 | 96 | H |
| 31x-4J0180-B*-2S-0000 | 90 / 125 | 180 | 156 | 75/100 | 145 | 124 | J |
| 31x-4J0205-B*-2S-0000 | 110 / 150 | 205 | 180 | 90/125 | 180 | 156 | J |
| 31x-4J0260-B*-2S-0000 | 132 / 200 | 260 | 240 | 110/150 | 205 | 180 | J |
| 31x-4K0315-BE-2S-0000 | 160 / 250 | 315 | 302 | 132/200 | 260 | 240 | K |
| 31x-4K0380-BE-2S-0000 | 200 / 300 | 380 | 361 | 160/250 | 315 | 302 | K |
| 31x-4K0440-BE-2S-0000 | 250 / 350 | 440 | 414 | 200/300 | 380 | 361 | K |
| 31x-4L0530-NE-2S-0000 | 315 / 450 | 530 | 520 | 280/400 | 440 | 480 | L |
| 31x-4L0590-NE-2S-0000 | 355 / 500 | 590 | 590 | 315/450 | 530 | 520 | L |
| 31x-4M0650-NE-2S-0000 | 400 / 550 | 650 | 650 | 355/500 | 590 | 590 | M |
| 31x-4M0700-NE-2S-0000 | 450 / 600 | 700 | 680 | 400/550 | 650 | 640 | M |
| 31x-4N0790-NE-2S-0000 | 485 /650 | 790 | 770 | 450/600 | 700 | 700 | N |

x = Control module type: V, P, or D
* N = No C3 Filter (normally stocked) E = with C3 filter (special order)
Frames L, M & N only available with C3 filter and do not have a brake module

## Electrical Characteristics

| Power Supply | 480 V Nominal |
|---|---|
| Rated Input Voltage | 3 Ø 380-480 VAC ±10% |
| Input Frequency | 45-65 Hz |
| Maximum Switching Frequency | 4 kHz up to maximum of 12 kHz - de-rating may apply |
| Overload: Heavy Duty | 150% for 60 seconds - 180% for 3 seconds |
| Overload: Normal Duty | 110% for 60 seconds - 180% of HD full load current for 3 seconds |
| Output Frequencies | 0-500 Hz at 4 kHz switching frequency |
| | 0-590 Hz at 8 kHz switching frequency |
| | 0-590 Hz at 12 kHz switching frequency |
| Earth Leakage Current | >10 mA (all models) |

# Technical Specifications

## Environmental Characteristics

| | |
|---|---|
| **Operating Temperature** | 0 to +40°C (32°F to 104°F) Normal Duty, 0 to +45°C (32°F to 113°F) Heavy Duty, derate up to a maximum of +50°C (122°F) (Refer to manual for derating specifics) |
| **Storage Temperature** | -25°C to +55°C (-13°F to 131°F) |
| **Shipping Temperature** | -25°C to +70°C (-13°F to 158°F) |
| **Product Enclosure Rating** | IP20 - remainder of surfaces (Europe) UL (c-UL) Open Type (North America) |
| **(Panel mounted)** | IP20 UL (c-UL) Open Type (North America) |
| **(Through-panel mounted)** | IP20 UL (c-UL) Open Type (North America) |
| **Altitude** | 1000 m ASL. Derate output by 1% per 100 m to a maximum of 2000 m |
| **Operating Humidity** | Maximum 85% relative humidity at 40°C (104°F) non-condensing |
| **Atmosphere** | Non-flammable, non-corrosive and dust free |
| **Climatic Conditions** | Class 3k3, as defined by EN60721-3-3 |
| **Chemically Active Substances** | For the standard product, compliance with EN60271-3-3 is: <br> • Both classes 3C3 and 3C4 for Hydrogen Sulphide gas ($H_2S$) at a concentration of 25 ppm for 1200 hours <br> • Both classes 3C1 (rural) and 3C2 (urban) for all 9 defined substances as defined in table 4 |
| **Operating Vibration** | Test Fc of EN60068-2-6 <br> 10 Hz<=f<=57 Hz sinusoidal 0.075 mm amplitude <br> 57 Hz<=f<=150 Hz sinusoidal 1 g <br> 10 sweep cycles per axis on each of three mutually perpendicular axes |
| **Overvoltage Category** | Overvoltage category III (numeral defining an impulse withstand level) |
| **Pollution Degree** | Pollution degree II (non-conductive pollution, except for temporary condensation) for control electronics <br> Pollution Degree III (dirty air rating) for through-panel mounted parts |

## Standards and Conformance

| | |
|---|---|
| **North America/Canada** | Complies with the requirements of UL508C and CSA22.2 #14 as an open-type drive |
| **Europe** | This product conforms with the Low Voltage Directive 2006/95/EC |
| **EMC Compatibility** | CE Marked in accordance with 2004/108/EC (EMC Directive) |
| **RoHS Compliance** | This product complies with RoHS substance restrictions in accordance with EC Directive 2011/65/EU |
| **Reach** | This product complies with the REACH regulations EC1907/2006 |
| **European Machinery Directive** | Safe-Torque-Off (STO) complies with the requirements of ISO13849-1 (Safety-related parts of control systems) at PLe Cat3 or SIL 3 to EN61800-5-2 |
| **DNV Marine Certification (Det Norske Veritas)** | Complies with the 'Classification of Ships, High Speed & Light Craft and Det Norske Veritas Offshore Standards'. This applies to all AC30 Frequency converters with powers up to 100 HP for use in marine and offshore applications |

# Dimensions

**Panel Mounting**
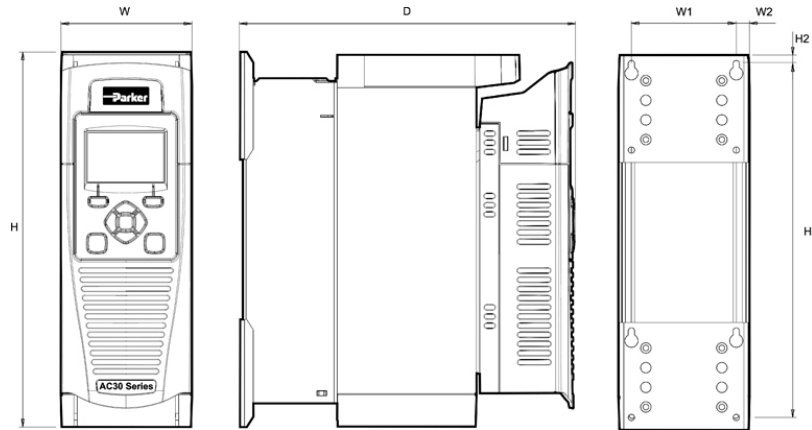
Approximate Dimensions [in/mm]

| Size | Weight [lb/kg] | H | H1 | H2 | W | W1 | W2 | D | Mounting |
|---|---|---|---|---|---|---|---|---|---|
| Frame D | 10/4.5 | 11.26/286.0 | 10.6/270.0 | 0.25/6.5 | 3.93/100.0 | 3.15/80.0 | 0.39/10.0 | 10.0/255.0 | 4.5mm slot, M4 mountings |
| Frame E | 15/6.8 | 13.11/333.0 | 12.6/320.0 | 0.25/6.5 | 4.92/125.0 | 3.93/100.0 | 0.49/12.5 | 10.0/255.0 | |
| Frame F | 22/10.0 | 15.07/383.0 | 14.5/370.0 | 0.25/6.5 | 5.90/150.0 | 4.92/125.0 | 0.49/12.5 | 10.0/255.0 | |
| Frame G | 49/22.3 | 18.90/480.0 | 18.31/465.0 | 0.29/7.25 | 8.66/220.0 | 7.48/190 | 0.51/13.0 | 11.30/287 | 5.5mm slot, M5 |
| Frame H | 95/42.8 | 26.38/670.0 | 25.59/650.0 | 0.39/10.0 | 10.24/260.0 | 8.66/220 | 0.79/20 | 12.44/316 | 6.8mm slot, M6 |
| Frame J | 196/89 | 31.5/800 | 30.7/780 | 0.39/10.0 | 13/330 | 11.22/285 | 0.89/22.5 | 14.72/374 | M8 mountings |
| Frame K | 276/125 | 51.2/1300 | 50/1272 | 0.55/14.0 | 15.75/400 | 11/280 | 2.36/60 | 15.16/385 | M10 mountings |
| Frame L | 401/182 | 52.76/1340 | 51.57/1310 | 0.59/15 | 21.06/535 | 18.5/470 | 1.26/32 | 14.88/378 | |
| Frame M | 529/240 | 57.6/1463 | 57.01/1448 | 0.59/15 | 23.78/604 | 21.46/545 | 1.16/29.5 | 14.88/378 | |
| Frame N | 586/266 | 62.72/1593 | 61.54/1563 | 0.59/15 | 23.78/604 | 21.46/545 | 1.16/29.5 | 14.88/378 | |

*The AC30D control module increases the shown depth by 18mm on all frame sizes.

**Through-Panel Mounting**
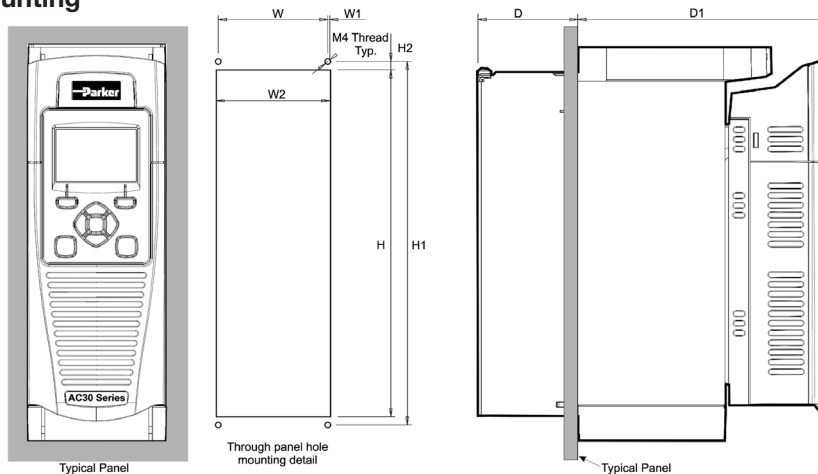
Approximate Dimensions [in/mm]

| Size | H | H1 | H2 | W | W1 | W2 | D | D1 | Mounting |
|---|---|---|---|---|---|---|---|---|---|
| Frame D | 9.8/250 | 10.3/262 | 0.24/6 | 3.1/79 | 0.06/1.5 | 3.2/82 | 2.8/72 | 7.1/181 | |
| Frame E | 11.7/297 | 12.2/309 | 0.24/6 | 4.1/104 | 0.04/1 | 4.0/102 | 2.8/72 | 7.1/181 | Use M4 mountings |
| Frame F | 13.7/347 | 14.1/359 | 0.24/6 | 5.1/129 | 0.04/1 | 5.0/127 | 2.8/72 | 7.1/181 | |
| Frame G | 17.3/440 | 17.9/455.8 | 0.31/7.9 | 7.7/195 | 0.02/0.4 | 7.7/195.8 | 3.74/95 | 7.5/190 | Use M5 mountings |
| Frame H | 24.3/617 | 25.2/641 | 0.47/12 | 8.6/218 | 4.5 | 8.9/227 | 3.9/99 | 8.3/211 | Use M6 mountings |
| Frame J | 29.3/745 | 765 | 0.39/10 | 10.8/275 | 12.5 | 11.8/300 | 5.0/128 | 9.55/242.6 | Use M6 mountings |

Through panel mounting is not offered for frame K to N.

13

# Connections

## Power connections

| Term. | Description |
|-------|-------------|
| DB+ | Dynamic Brake Resistor |
| DB- | Dynamic Brake Resistor |
| DC+ | DC Link Bus + |
| DC- | DC Link Bus - |
| L1 | L1 AC Input Supply |
| L2 | L2 AC Input Supply |
| L3 | L3 AC input Supply |
| M1 | Motor Output 1/U |
| M2 | Motor Output 2/V |
| M3 | Motor Output 3/W |
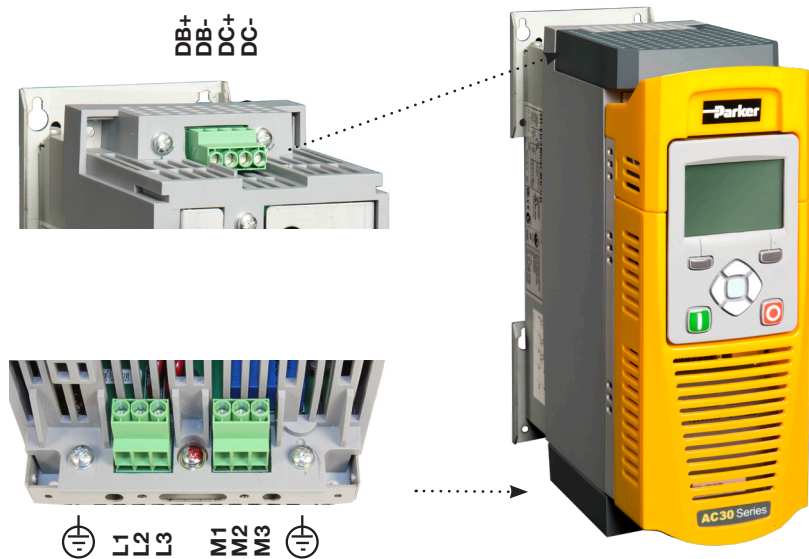
## Safe Torque Off (STO)

The AC30 series features Safe Torque Off functionality as standard, offering users protection against unexpected motor start-up in accordance with EN13849-1 at PLe Cat 3 or SIL 3 to EN61800-5-2.

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

The example wiring diagram shows the minimum connections required to implement STO with the AC30 series AC drives.

| Term. | Label | Description |
|-------|-------|-------------|
| X10/01 | STO A Input | STO Channel A input signal |
| X10/02 | STO Common | Return signals for STO A and STO B |
| X10/03 | STO B Input | STO Channel B input signal |
| X10/04 | STO Common | Return signals for STO A and STO B |
| X10/05 | STATUS A | STO Status Indication |
| X10/06 | STATUS B | STO Status Indication |
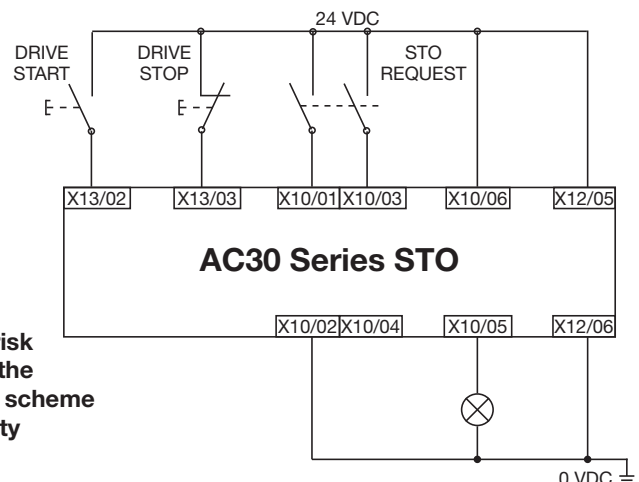
**Users must conduct a risk assessment to identify the appropriate STO wiring scheme and ensure that all safety requirements are met.**

⚠️ **It is the user's responsibility to ensure the safe and correct use of the STO function of the AC30 Series. User's should read and fully understand chapter 6 (Safe Torque Off) of the product user manual. Manual No. HA501718U001**

## Control wiring connections: AC30V & AC30P

| Term. | Label |
| --- | --- |
| X10/01 | STO A Input |
| X10/02 | STO Common Return |
| X10/03 | STO B Input |
| X10/04 | STO Common Return |
| X10/05 | STO Status A |
| X10/06 | STO Status B |
|  |  |
| X11/01 | ANIN 01 Analog Input (±10 V, 0-10 V, 0-20 mA, 4-20 mA) |
| X11/02 | ANIN 02 Analog Input (±10 V, 0-10 V) |
| X11/03 | ANOUT 01 Analog output (±10 V, 0-10 V) |
| X11/04 | ANOUT 02 Analog output (0-10 V, 0-20 mA, 4-20 mA) |
| X11/05 | +10 V Reference |
| X11/06 | -10 V Reference |
|  |  |
| X12/01 | DIGIN04 / DIGOUT 01 Digital In/Out |
| X12/02 | DIGIN05 / DIGOUT 02 Digital In/Out |
| X12/03 | DIGIN06 / DIGOUT 03 Digital In/Out |
| X12/04 | DIGIN07 / DIGOUT 04 Digital In/Out |
| X12/05 | User +24 V Output |
| X12/06 | 0 V Common |

| Term. | Label |
| --- | --- |
| X13/01 | 0V Common |
| X13/02 | DIGIN 1 Digital Input |
| X13/03 | DIGIN 2 Digital Input |
| X13/04 | DIGIN 3 Digital Input |
| X13/05 | +24 V Auxiliary Input |
| X13/06 | 0 V Auxiliary Input |
|  |  |
| X14/01 | Relay Output 01 (Contact A) |
| X14/02 | Relay Output 01 (Contact B) |
| X14/03 | Relay Output 02 (Contact A) |
| X14/04 | Relay Output 02 (Contact B) |

*Relay outputs are not present on AC30P/D. These are replaced by dual Ethernet ports.



AC30V

AC30P/D



**AC30 Series**
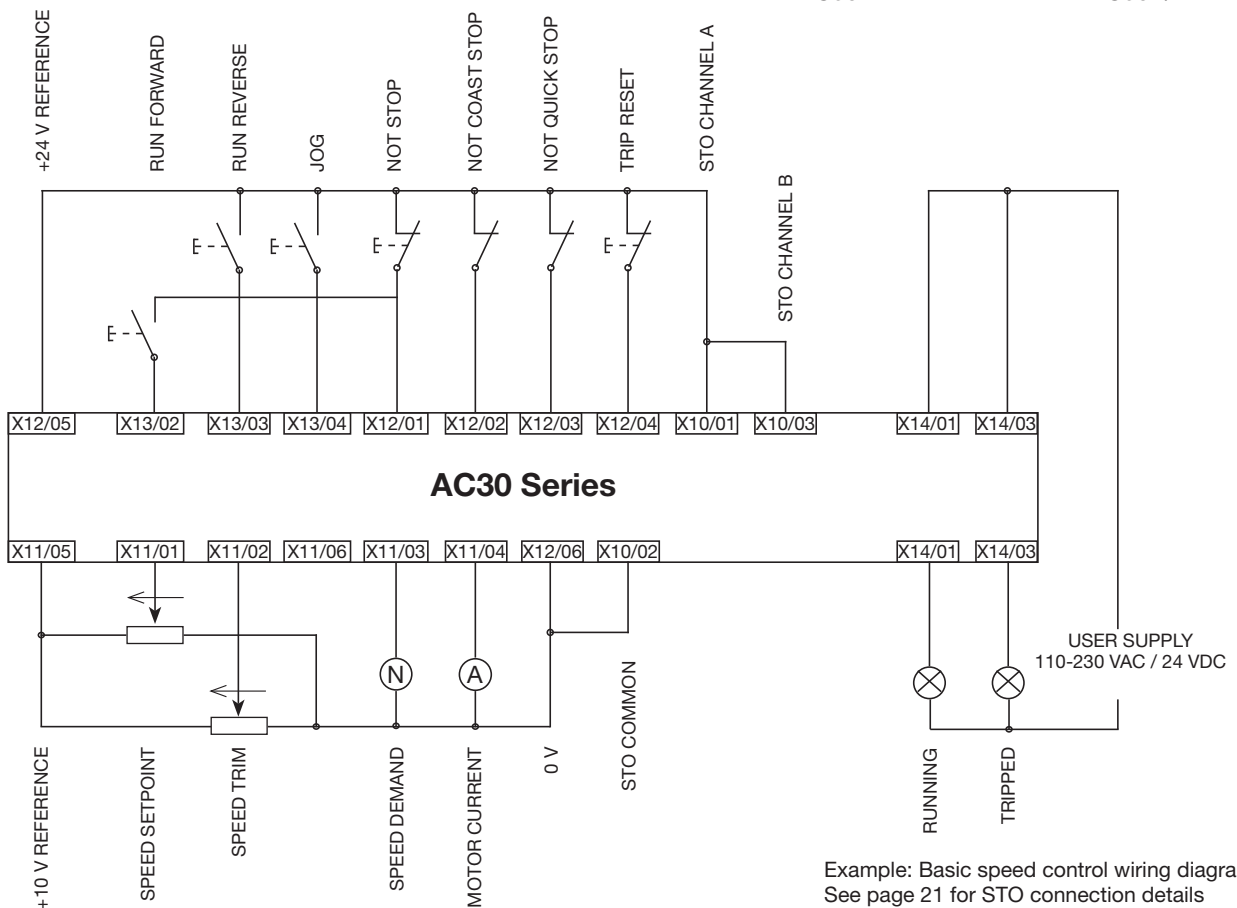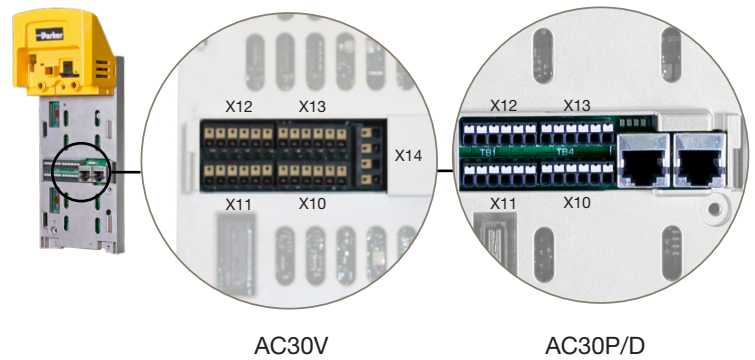
Example: Basic speed control wiring diagram
See page 21 for STO connection details

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## Control wiring connections: AC30D

The wiring on the AC30D is the same as AC30P with the additional systems connections shown below.

| Term. | Label |
|---|---|
| X30/01 | DIGIN 1 |
| X30/02 | DIGIN 2 |
| X30/03 | DIGIN 3 |
| X30/04 | DIGIN 0V |
| X30/05 | +24V System Aux. Input |
| X30/06 | 0V System Aux. Input |
| | |
| X31/01 | Encoder 2 - A Input |
| X31/02 | Encoder 2 - /A Input |
| X31/03 | Encoder 2 - B Input |
| X31/04 | Encoder 2 - /B Input |
| X31/05 | Encoder 2 - Z Input |
| X31/06 | Encoder 2 - /Z Input |
| X31/07 | Encoder PSU Output - Positive Terminal (internally connected to X32/07) |
| X31/08 | Encoder PSU Output - 0V Terminal (internally connected to X32/08) |

| Term. | Label |
|---|---|
| X32/01 | Encoder 1 - A Input |
| X32/02 | Encoder 1 - /A Input |
| X32/03 | Encoder 1 - B Input |
| X32/04 | Encoder 1 - /B Input |
| X32/05 | Encoder 1 - Z Input |
| X32/06 | Encoder 1 - /Z Input |
| X32/07 | Encoder PSU Output - Positive Terminal (internally connected to X31/07) |
| X32/08 | Encoder PSU Output - 0V Terminal (internally connected to X31/08) |
| | |
| X33/01 | Encoder Transmit - A Output |
| X33/02 | Encoder Transmit - /A Output |
| X33/03 | Encoder Transmit - B Output |
| X33/04 | Encoder Transmit - /B Output |
| X33/05 | Encoder Transmit - Z Output |
| X33/06 | Encoder Transmit - /Z Output |

AC30D
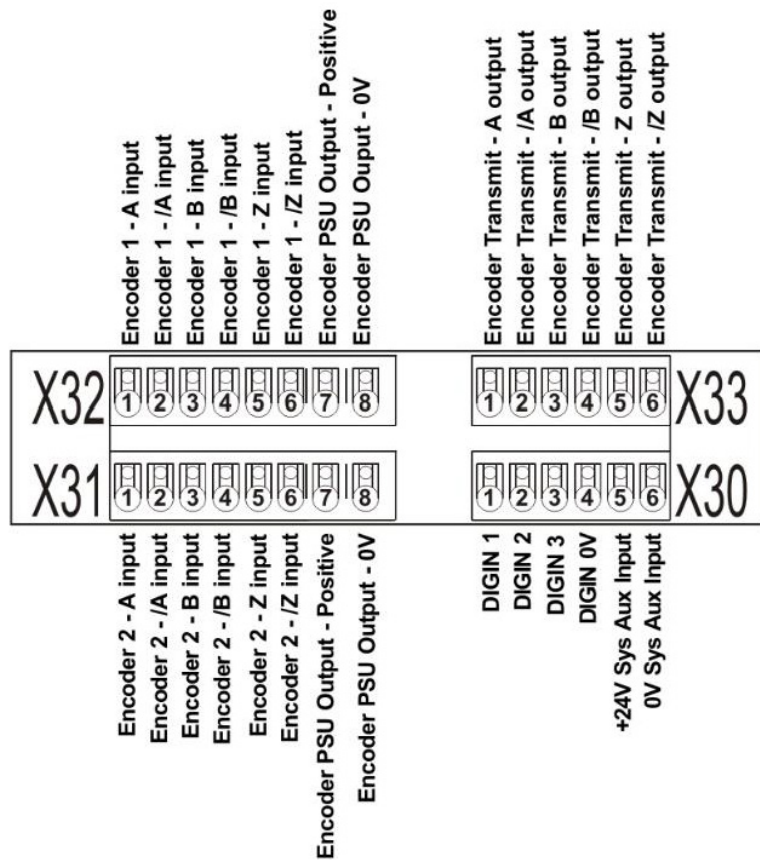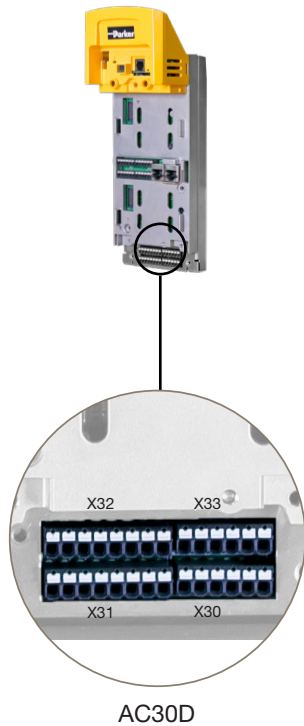
# Accessories and Options

## Operator Keypad

| Order Code | Description |
|---|---|
| 7001-00-00 | IP54 Graphical keypad |
| 7001-01-00 | Keypad blanking cover |
| LA501991U300 | Keypad remote mounting kit (3 m cable and screws) |

**Description:**

The backlit LCD graphical keypad can be either mounted locally on the drive or remotely with the use of a remote mounting kit. The keypad has 3 pass code protected user access levels. The keypad can be used to set-up and commission the drive, change parameter settings, monitor running status or diagnose warning or alarm conditions. The display information can be shown in English, German, French, Spanish or Italian.

7001-00-00    7001-01-00

## Line Reactors, EMC Filters, and C2 Filter Kits

A full range of line reactors, EMC filters and C2 filter kits are available for the AC30

## Braking Resistors

These resistor sets are designed for stopping the system at rated power. They are rated for 10 seconds in a 100 second duty cycle. They should be mounted on a heatsink (back panel) in a protected area and covered to prevent injury from burning.

# Communication Interfaces

These options appliy only to units with IEC61131-3 CODESYS firmware

| 7003-PB-00 | PROFIBUS DP-V1 communication interface |
|---|---|
| Supported Protocols | PROFIBUS-DP; Demand data and Data exchange |
| Communication Speed | Up to 12 Mbits/s; automatically detected |
| Max. number of devices | 32 per segment, 126 total |
| Supported Messages | Up to 152 bytes cyclic I/O, 68 bytes class 1 and 2 acyclic data, 152 bytes configuration data. GSD file provided |

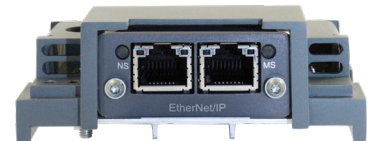| 7003-EC-00 | EtherCAT communication interface |
|---|---|
| Supported Protocols | CANopen over EtherCAT (CoE) DS301 compliant |
| Communication Speed | 100 Mbits/s |
| Max. number of devices | 65534 |
| Supported Messages | SDO, PDO, NMT, SYNC |

| 7003-CB-00 | CANopen communication interface |
|---|---|
| Profile | DS301 V4.02 |
| Communication Speed | 10 k, 20 k, 50 k, 125 k, 250 k, 500 k, 1 Mbits/s or automatically detected |
| Max. number of devices | 127 |
| Supported Messages | SDO, PDO, NMT, SYNC |

| 7003-PN-00 | PROFINET I/O communication interface |
|---|---|
| Supported Protocols | PROFINET I/O Real-Time (RT) Protocol |
| Communication Speed | 100 Mbits/s full duplex |
| Max. number of devices | Virtually unlimited |
| Supported Messages | Up to 256 bytes of cyclic I/O in data in each direction |

| 7003-IP-00 | Ethernet/IP communication interface |
|---|---|
| Supported Protocols | Ethernet/IP |
| Communication Speed | 10/100 Mbits/s full/half duplex |
| Max. number of devices | Virtually unlimited |
| Supported Messages | Up to 256 bytes of consumed data and 256 bytes of produced data, CIP parameter object support, Explicit messaging |

| 7003-RS-00 | RS485 / Modbus RTU communication interface |
|---|---|
| Supported Protocols | Modbus RTU |
| Communication Speed | 1200 to 115 200 bits/s |
| Max. number of devices | 247 |
| Supported Messages | Up to 256 bytes of cyclic I/O data in each direction |

# Input and Output Cards

## 7004-01-00 - General Purpose I/O Module

| Digital Inputs & Outputs | 4x Digital inputs or outputs |
|---|---|
| Analog Inputs/Outputs | 3x Analog inputs (±10 V) |
| Relay Outputs | 2x Volt-free relay outputs (230 VAC) |
| Motor Temperature Sensing | 1 motor thermistor input |
| Real time Clock | Included |

### Description:

The general purpose I/O (GPIO) option module can be fitted to all AC30 series drives in the upper I/O option module slot. The modules are field installable and offer users the opportunity to expand the drive's standard I/O capability, allowing more complex motor control solutions to be implemented.

### Connection Details:



Example connection details for 7004-01-00 GPIO module
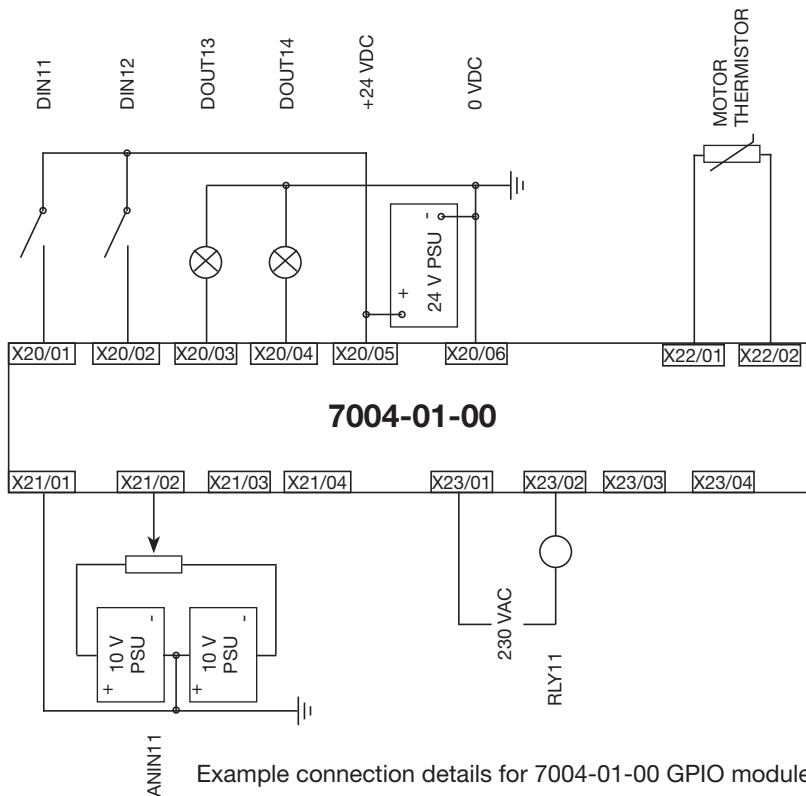
| Terminal | Label |
|---|---|
| X20/01 | DIN11/DOUT11 |
| X20/02 | DIN12/DOUT12 |
| X20/03 | DIN13/DOUT13 |
| X20/04 | DIN14/DOUT14 |
| X20/05 | +24 VDC |
| X20/06 | 0 VDC COMMON |
|  |  |
| X21/01 | REFERENCE |
| X21/02 | ANIN11 |
| X21/03 | REFERENCE |
| X21/04 | ANIN12 |
|  |  |
| X22/01 | MOTOR THERMISTOR |
| X22/02 | MOTOR THERMISTOR |
|  |  |
| X23/01 | RLY11 |
| X23/02 | RLY11 |
| X23/04 | RLY12 |
| X23/04 | RLY12 |

# Input and Output Cards

## 7004-04-00 - Pulse Encoder Feedback Module

| Maximum Input Frequency | 250 Hz per channel |
|---|---|
| Supply Voltage Output | 5 V, 12 V, 15 V, 24 V |
| Input Format | Quadrature, or Clock (inputs A & /A) and Direction (input B & /B) |
| Motor Thermistor Details | Same as 7004-02-00 |

### Description:

The pulse encoder feedback module allows an incremental encoder to be connected to the AC30 for enhanced torque control and speed regulation. In addition, the option is equipped with a motor thermistor input. This option can be used with all AC30 series control modules to provide full closed-loop vector induction motor control and also to provide a speed reference into any AC30 control module.
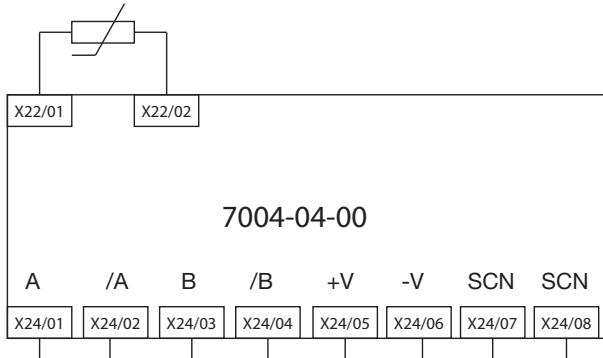
| Terminal | Description |
|---|---|
| X24/01 | Channel A |
| X24/02 | Channel /A |
| X24/03 | Channel B |
| X24/04 | Channel /B |
| X24/05 | Supply positive |
| X24/06 | Supply negative |
| X24/07 | Cable screen |
| X24/08 | Cable screen |
| X22/01 | Motor thermistor |
| X22/02 | Motor thermistor |

## 7004-05-00 - Resolver Feedback Module

### Description:

The resolver feedback option is compatible with AC30P and AC30D drives featuring firmware versions 2.13 and 3.13 (or later). It offers compatibility with a wide range of resolvers from many different manufacturers. A range of resolver connection cables are available for use with NX, MGV, EY, NV and EX motors from Parker.
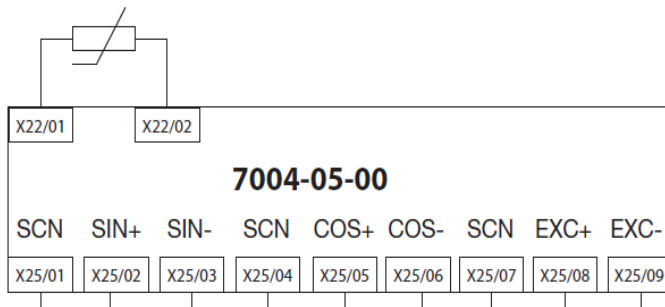
| Terminal | Description |
|---|---|
| X25/01 | Cable screen |
| X25/02 | SIN+ |
| X25/03 | SIN- |
| X25/04 | Cable screen |
| X25/05 | COS+ |
| X25/06 | COS- |
| X25/07 | Cable screen |
| X25/08 | EXC+ |
| X25/09 | EXC- |
| X22/01 | Motor thermistor |
| X22/02 | Motor thermistor |

# AC30 Series Product Configuration

The AC30 is a modular product, allowing users to select the correct power stack, control module and options to perfectly match their application. Simply select the required parts to build a product bill of materials that meets your requirements. Minimum required parts to build a complete drive is one control module and one power stack.

### Control Modules

AC30V Control Module

AC30P Control Module

AC30D Control Module

| 30V Codes | 30P Codes | 30D Codes | Description |
|---|---|---|---|
| 30V-2S-0000 | 30P-2S-0000 | 30D-2S-0000 | Control module with graphical keypad and standard coating |
| 30V-1S-0000 | 30P-1S-0000 | 30D-1S-0000 | Control module with blanking cover and standard coating |
| 30V-0S-0000 | 30P-0S-0000 | 30D-0S-0000 | Control module with standard coating and no graphical keypad |

## Accessories

### Graphical Keypad

| Order Code | Description |
|---|---|
| 7001-00-00 | Graphical keypad for local or remote mounting |
| 7001-01-00 | Keypad blanking cover |
| LA501991U300 | Kepyad remote mounting kit (3 m cable and screws) |

### Communication Interfaces

| Order Code | Description |
|---|---|
| 7003-PB-00 | Profibus DPV1 |
| 7003-PN-00 | Profinet IO |
| 7003-CB-00 | CANopen |
| 7003-IP-00 | Ethernet/IP |
| 7003-EC-00 | EtherCAT |
| 7003-RS-00 | RS485/Modbus RTU |

### I/O Options

| Order Code | Description |
|---|---|
| 7004-01-00 | General purpose I/O module |
| 7004-04-00 | Pulse encoder feedback card |
| 7004-05-00 | Resolver feedback card |

# AC30 Complete Drive Product Order Code

The AC30 series may be configured to order under a single product number. This product code includes one power stack and one control module. Option modules must still be ordered separately. Please see table on page 9 for complete list of features offered by each of the AC30 variations.

| | 1 | 2 | 3 | | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| Order example | 31V | 4 | D | 0004 | B | E | 2 | S | 0000 |

| 1 | Device Family | |
|---|---|---|
| | 31V | AC30V - basic standalone unit for single axis applications |
| | 31P | AC30P - Includes peer-to-peer and advanced comms |
| | 31D | AC30D - Includes dual encoder ports and encoder output |

| 2 | Voltage | |
|---|---|---|
| | 4 | 400 V nominal (400 - 460) |

| 3 | Frame Size and Current Rating | |
|---|---|---|

| | HP (normal/heavy duty) | kW (normal/heavy duty) |
|---|---|---|
| D0004 | 1.1/1.5 | 0.75/1 |
| D0006 | 2.2/3 | 1.5/2 |
| D0010 | 4/5 | 3/4 |
| D0012 | 5.5/7.5 | 4/5 |
| E0016 | 7.5/10 | 5.5/7.5 |
| E0023 | 11/15 | 7.5/10 |
| F0032 | 15/20 | 11/15 |
| F0038 | 18/25 | 15/20 |
| G0045 | 22/30 | 18/25 |
| G0060 | 30/40 | 22/30 |
| G0073 | 37/50 | 30/40 |
| H0087 | 45/60 | 37/50 |
| H0105 | 55/75 | 45/60 |
| H0145 | 75/100 | 55/75 |
| J0180 | 90/125 | 75/100 |
| J0205 | 110/150 | 90/125 |
| J0260 | 132/200 | 110/150 |
| K0315 | 160/250 | 132/200 |
| K0380 | 200/300 | 160/250 |
| K0440 | 250/350 | 200/300 |
| L0530 | 315/450 | 280/400 |
| L0590 | 355/500 | 315/450 |
| M0650 | 400/550 | 355/500 |
| M0700 | 450/600 | 400/550 |
| N0790 | 485/650 | 450/600 |

| 4 | Brake Switch [1] | |
|---|---|---|
| | B | Brake switch fitted (Frames D - K. Use "**N**" for frames L - N) |

| 5 | EMC Filter [2] | |
|---|---|---|
| | N | No filter fitted |
| | E | Category C3 filter fitted (standard) |
| | F | Category C2 filter fitted - consult fact. |

| 6 | Graphical Keypad | |
|---|---|---|
| | 2 | Graphical keypad fitted |

| 7 | Environmental Coating [3] | |
|---|---|---|
| | S | Standard 3C3 coating |

| 8 | Special Options | |
|---|---|---|
| | 0000 | No special options |

[1] Drives include brake switch as standard. For non-brake options please contact factory.

[2] The choice of filter should be determined by the environment in which the drive will be installed as defined in IEC/EN61800-3: C2 = domestic & commercial, C3 = industrial
C2 filter is only offered on frames D-H. For other frames use external EMC filter.
Typically frames D-K are stocked with no filter (option "N") and frames L-N are stocked with C3 filter (option "E").

[3] AC30 is conformally coated as standard for use in environments class 3C3 and 3C4 for Hydrogen Sulphide gas. It is also compliant to both classes 3C1 (rural) and 3C2 (urban) for all nine substances defined in table 4 in EN60271-3-3.

# Parker DSELite Software
## (For DSE Firmware)

**Description:**

DSELite is a powerful, intuitive, self documenting graphical configuration and diagnostic software tool which supports all AC30 variants that are flashed to DSE firmware. It also supports all current and most legacy Parker industrial drives.

DSELite can be used to configure applications ranging from simple speed and torque controlled applications such as extruders and mixers through very complex system applications such as center winders. It comes with an array of time proven function blocks for center winders, PID control, master section control, and other continuous process applications. These may be user modified to best suit each application.

All parameters are available for monitoring in the on-board chart function.

DSE Development provides all the same DSELite functionality and adds the ability to create single project containing multiple drives all connected via the LINKnet peer to peer network. LINKnet simultaneously supports DSE and Ethernet/IP thereby eliminating the need for gateway hardware and associated programming when integrating Parker drives with many popular PLC's.
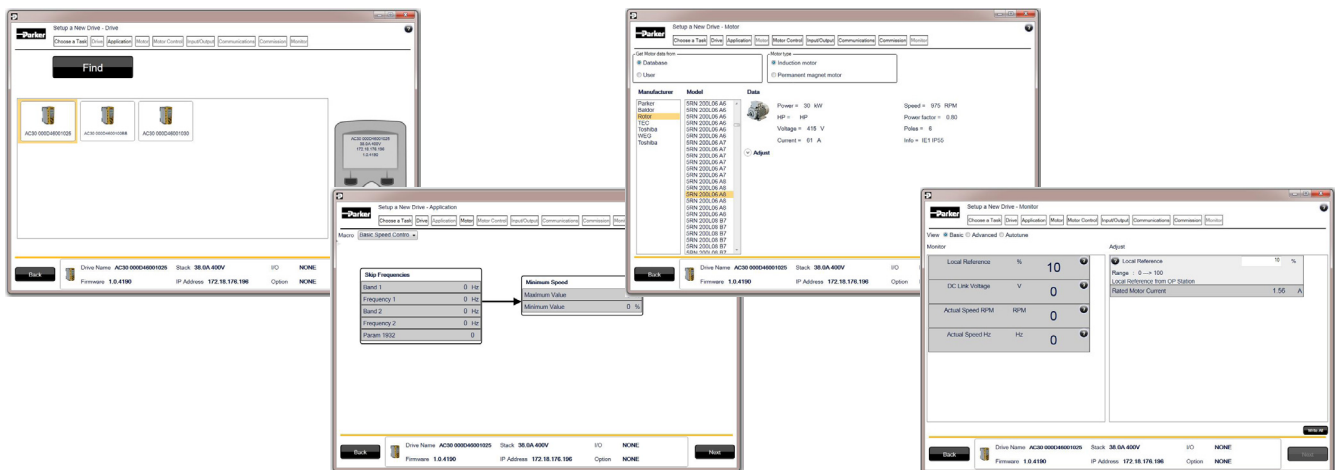
Parker DSELite can be downloaded free of charge from the Parker website.
**www.parker.com/ssdusa/software**

# Parker Drive Quicktool (PDQ) Software
## (For IEC61131-3 CODESYS Firmware)

**Description:**

Parker Drive Quick tool (PDQ) is the easy to use, free of charge software tool that supports AC30 drives flashed to IEC61131-3 CODESYS firmware.

Parker Drive Developer (PDD), allows advanced users to configure AC30 drives for complex applications when the IEC61131-3 CODESYS platform is preferred.

Parker Drive Quicktool is shipped with every drive and can also be downloaded free of charge from the Parker website.
**www.parker.com/ssdusa/software**

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