Drive Controlled Pump
Installation Manual DCP3

ENGINEERING YOUR SUCCESS.

The installation manual contains only the most important information.

For detailed information please refer to manual HA501718U001 on the site **www.parker.com/ssd/ (Literature/Manuals).**

⚠ WARNING – USER RESPONSIBILITY

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.

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.

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.

To the extent that Parker or its subsidiaries or authorized distributors provide component or system options based upon data or specifications provided by the user, the user is responsible for determining that such data and specifications are suitable and sufficient for all applications and reasonably foreseeable uses of the components or systems.

Offer of Sale

Please contact your Parker representation for a detailed ”Offer of Sale”.

Safety

Safety Information

Please read these important safety notes before installing and operating this equipment

CAUTION

Caution notes in the manual warn of danger to equipment.

WARNING

Notes in the manual warn of danger to personel.

Requirements

Intended users

This manual is to be made available to all persons who are required to install, configure or service equipment described herein, or any other associated operation.

The information given is intended to highlight safety issues, and to enable the user to obtain maximum benefit from the equipment.

Complete the following table for future reference detailing how the unit is to be installed and used.

Application area

The equipment described is intended for industrial motor speed control utilising AC induction motors or AC permanent magnet synchronous machines.

Personnel

Installation, operation and maintenance of the equipment should be carried out by competent personnel. A competent person is someone who is technically qualified and familiar with all safety information and established safety practices; with the installation process, operation and maintenance of this equipment; and with all the hazards involved.

Installation details			
Model Number (see product label)		**Where installed (for your own information)**	
Unit used as a: (refer to Certification)	☐ Component ☐ Relevant Apparatus	**Unit fitted:**	☐ Cubicle mounted ☐ Through Panel Mounted

DANGER
Risk of electric shock

WARNING
Hot surfaces

Caution
Refer to documentation

Earth/Ground
Protective Conductor Terminal

Hazards

DANGER! - Ignoring the following may result in injury

1. This equipment can endanger life by exposure to rotating machinery and high voltages.
2. The equipment must be permanently earthed due to the high earth leakage current, and the drive motor must be connected to an appropriate safety earth.
3. Ensure all incoming supplies are isolated before working on the equipment. Be aware that there may be more than one supply connection to the drive.
4. There may still be dangerous voltages present at power terminals (motor output, supply input phases, DC bus and the brake, where fitted) when the motor is at standstill or is stopped.
5. For measurements use only a meter to IEC 61010 (CAT III or higher). Always begin using the highest range. CAT I and CAT II meters must not be used on this product.
6. Allow at least 5 minutes for the drive's capacitors to discharge to safe voltage levels (<50 V). Use the specified meter capable of measuring up to 1000 V dc & ac rms to confirm that less than 50 V is present between all power terminals and between power terminals and earth.
7. Unless otherwise stated, this product must NOT be dismantled. In the event of a fault the drive must be returned. Refer to "Routine Maintenance and Repair".

Ignoring the following may result in injury or damage to equipment
Where there is conflict between EMC and Safety requirements, personnel safety shall always take precedence.

Safety

- Never perform high voltage resistance checks on the wiring without first disconnecting the drive from the circuit being tested.
- Whilst ensuring ventilation is sufficient, provide guarding and /or additional safety systems to prevent injury or damage to equipment.
- When replacing a drive in an application and before returning to use, it is essential that all user defined parameters for the product's operation are correctly installed.
- All control and signal terminals are SELV, i.e. protected by double insulation. Ensure all external wiring is rated for the highest system voltage.
- Thermal sensors contained within the motor must have at least basic insulation.
- All exposed metalwork in the Inverter is protected by basic insulation and bonded to a safety earth.
- RCDs are not recommended for use with this product but, where their use is mandatory, only Type B RCDs should be used.

EMV

- In a domestic environment this product may cause radio interference in which case supplementary mitigation measures may be required.
- This equipment contains electrostatic discharge (ESD sensitive parts. Observe static control precautions when handling, installing and servicing this product.
- This is a product of the restricted sales distribution class according to IEC 61800-3. It is designated as "professional equipment" as defined in EN61000-3-2. Permission of the supply authority shall be obtained before connection to the low voltage supply.

Control Unit Removal / Fitting

Isolate supply before plugging or unplugging control unit to the power stack.

CAUTION!

APPLICATION RISK

- The specifications, processes and circuitry described herein are for guidance only and may need to be adapted to the user's specific application. We can not guarantee the suitability of the equipment described in this Manual for individual applications.

RISK ASSESSMENT

Under fault conditions, power loss or unintended operating conditions, the drive may not operate as intended. In particular:

- Stored energy might not discharge to safe levels as quickly as suggested, and can still be present even though the drive appears to be switched off
- The motor's direction of rotation might not be controlled
- The motor speed might not be controlled
- The motor might be energised

A drive is a component within a drive system that may influence its operation or effects under a fault condition. Consideration must be given to:

- Stored energy
- Supply disconnects
- Sequencing logic
- Unintended operation

Introduction

Initial steps

Use the manual to help you plan the following:

Installation

Know your requirements:

- certification requirements, CE/UL/CUL conformance
- conformance with local installation requirements
- supply and cabling requirements

Programming (Parker Drive Quicktool) – pc programming tool

Know your application:

- Install the Parker Drive Quicktool (PDQ) after downloading it from www.parker.com/ssd/pdq
- Connect your pc to your Drive via Ethernet
- Commission your Drive with the Parker Drive Quicktool wizard
- Go to Appendix D Parameter Reference for more information

PC REQUIREMENTS

Minimum system requirements:

- 1GB RAM
- 1GHz Pentium
- 1GB free Hard Disk space
- 1024x768 screen resolution

Operating Systems:

- Windows XP
- Windows Vista (32 bit)
- Windows 7 (32 & 64 bit)
- Windows 8 (32 & 64 bit)

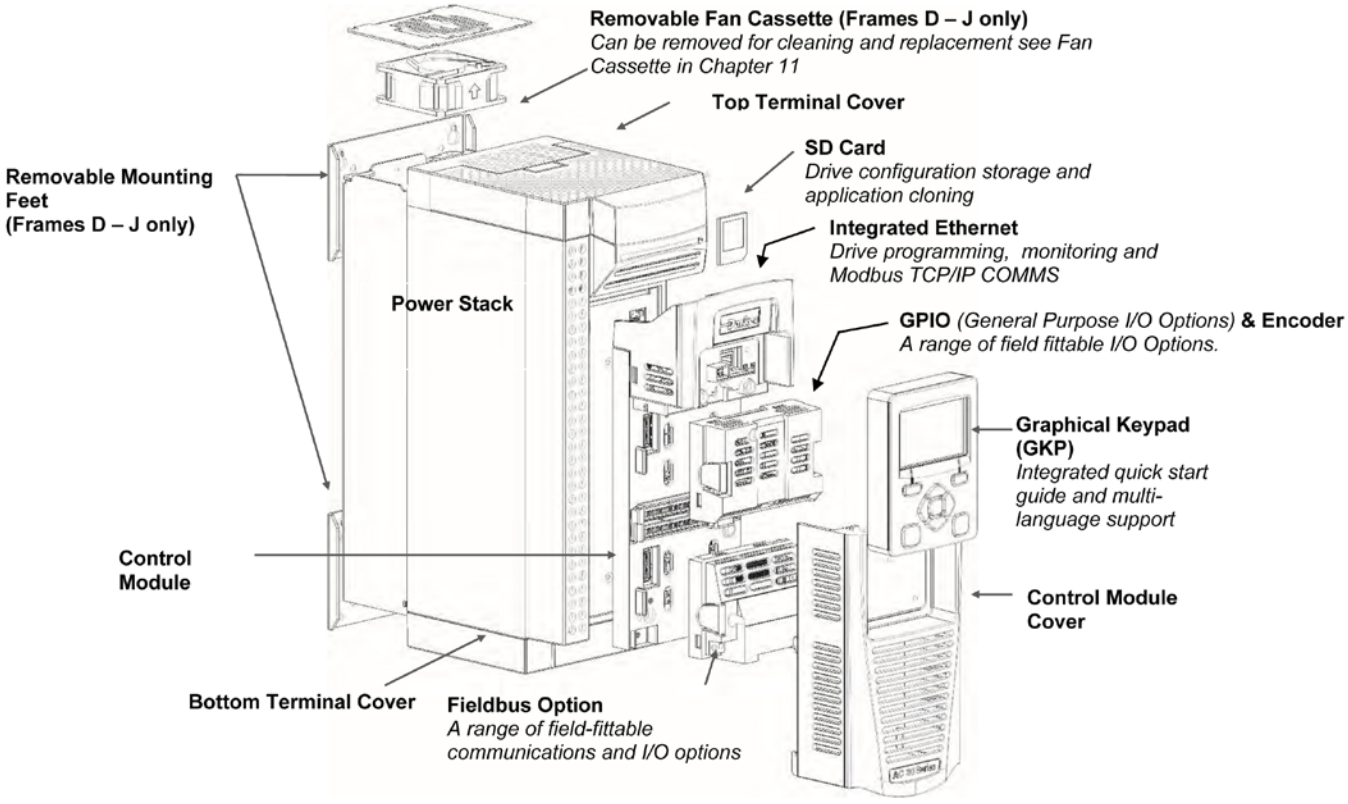
Power ratings

Bestellschlüssel		Normalbetrieb		Überlastbetrieb		Baugröße
		kW	Ausgangsstrom Aeff 400 VAC	kW	Ausgangsstrom Aeff 400 VAC	
DCP3	3P5	1,1	3,5	0,75	2,5	D
DCP3	4P5	1,5	4,5	1,1	3,5	D
DCP3	5P5	2,2	5,5	1,5	4,5	D
DCP3	7P5	3	7,5	2,2	5,5	D
DCP3	010	4	10	3	7,5	D
DCP3	012	5,5	12	4	10	D
DCP3	016	7,5	16	5,5	12	E
DCP3	023	11	23	7,5	16	E
DCP3	032	15	32	11	23	F
DCP3	038	18	38	15	32	F
DCP3	045	22	45	18	38	G
DCP3	060	30	60	22	45	G
DCP3	073	37	73	30	60	G
DCP3	087	45	87	37	73	H
DCP3	105	55	105	45	87	H
DCP3	145	75	145	55	105	H
DCP3	180	90	180	75	145	J
DCP3	205	110	205	90	180	J
DCP3	260	132	260	110	205	J
DCP3	380	200	380	160	315	K
DCP3	440	250	440	200	380	K
DCP3	315	160	315	132	260	K

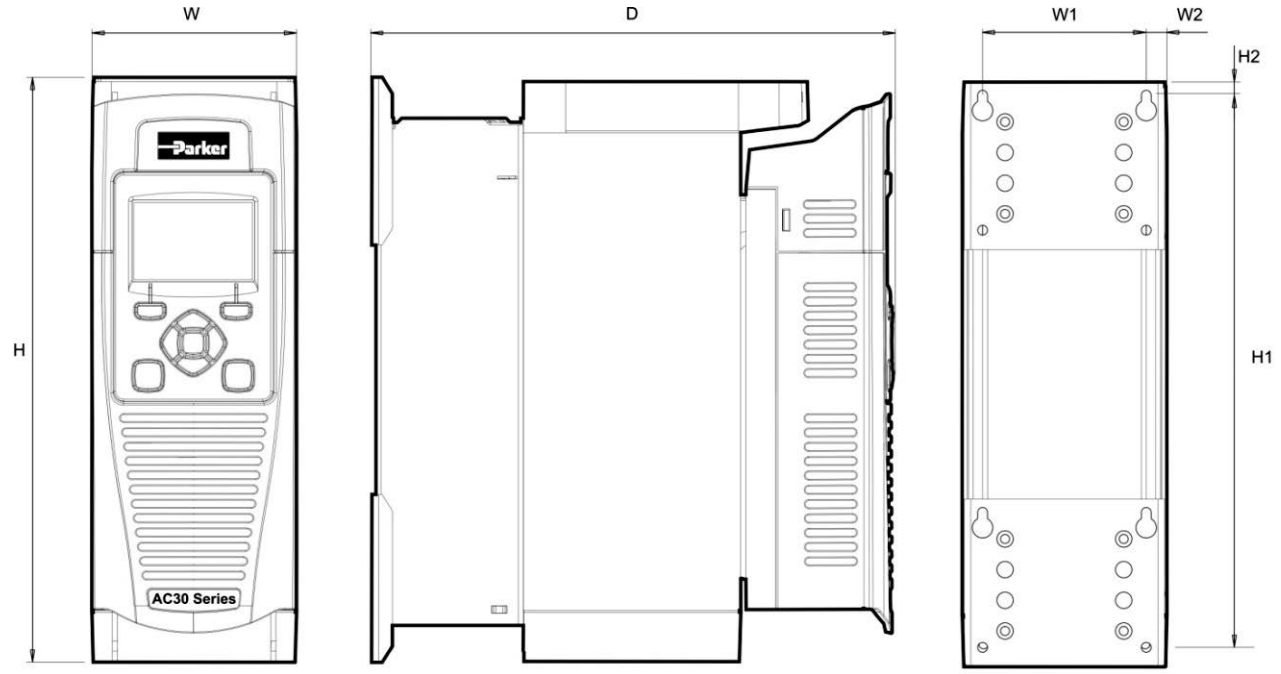
Product overview

Product Range

AC30V FRAME D, E, F, G, H, J, K



Mounting
Cubicle Mount
Mechanical Dimensions for AC30V Drive - Size D Illustrated



Dimensions for cubicle mount installation

Models	Max. Weight	H	H1	H2	W	W1	W2	D	Fixings
Size D	4.5 kg	286	270	6.5	100	80	10	255	4.5 mm slots & holes M4 fixings
Size E	6.8 kg	333	320	6.5	125	100	12.5	255	
Size F	10 kg	383	370	6.5	150	125	12.5	255	
Size G	22.3 kg	480	465	7.25	220	190	13	287	5.5 mm slots & holes M5 fixings
Size H	42.8 kg	670	650	10	260	220	20	316	6.8 mm slots & holes M6 fixings
Size J	89 kg	800	780	10	260	285	23	374	9.0 mm slots & holes M6 fixings
Size K	125 kg	1310	1282	15	400	280	60	457	M10 fixings

All dimensions are in millimetres

Mounting

Mounting the drive

These units are not suitable for wall mounting. They must be mounted vertically inside an additional enclosure. Depending on required level of EMC compliance refer to Appendix C "Compliance".

Note: Frame H, J & K only

These models are heavy and will require two people to lift, or the use of a fork lift to install it. The product will stand vertically on flat surfaces.

Ventilation

The drive gives off heat in normal operation and must therefore be mounted to allow the free flow of air through the ventilation slots and heatsink.

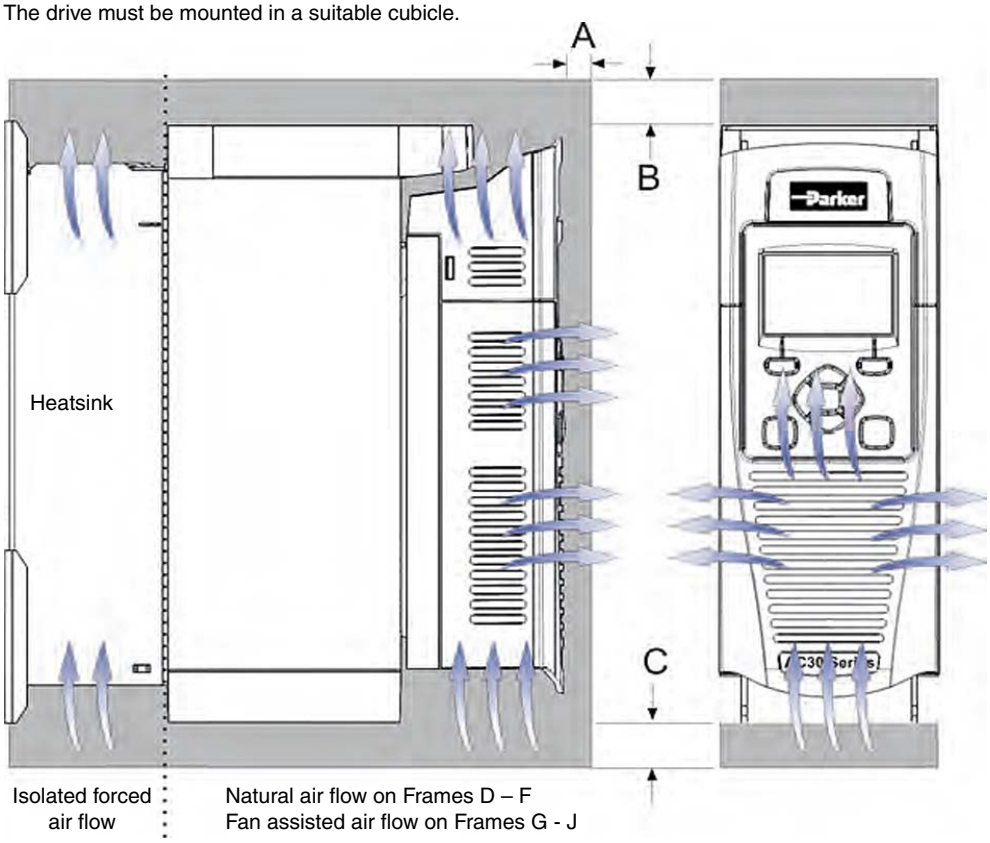
Maintain minimum clearances for ventilation as given in the tables below to ensure adequate cooling of the drive, and that heat generated by

other adjacent equipment is not transmitted to the drive. Be aware that other equipment may have its own clearance requirements. When

mounting two or more AC30V units together, these clearances are additive. Ensure that the mounting surface is normally cool.

Minimum Air Clearance (size D, E, F, G, H, J & K) Cubicle-Mount Product/Application

(Europe: IP2x, USA/Canada: Open Type).
The drive must be mounted in a suitable cubicle.



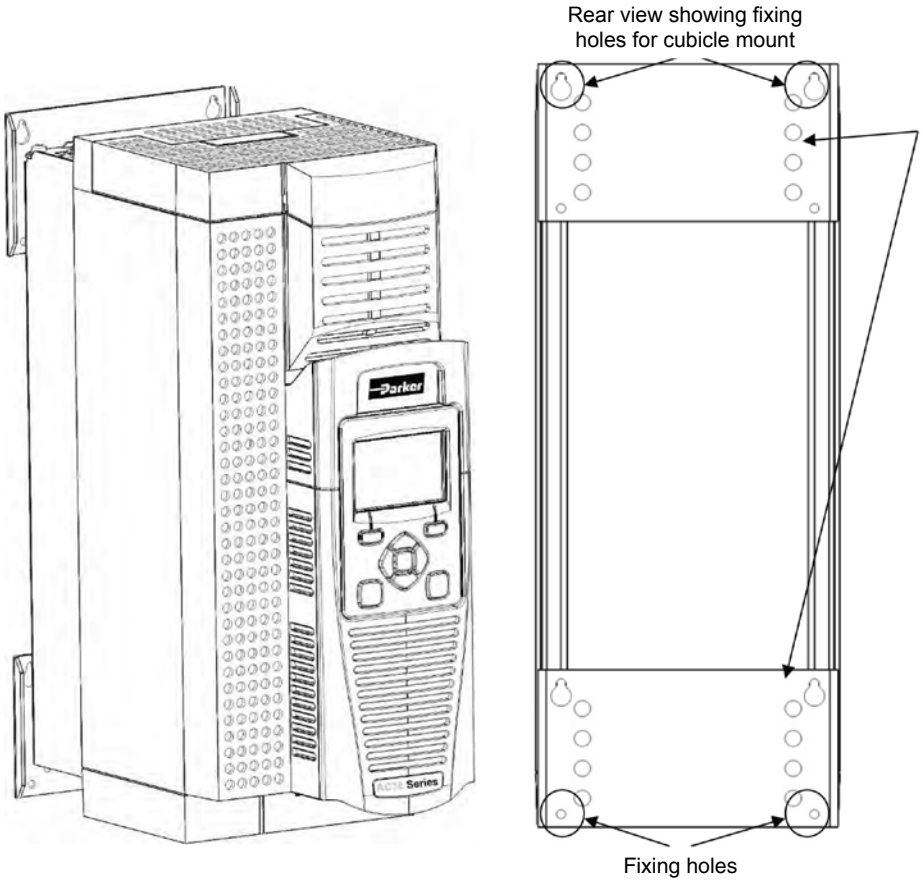
Air Clearance for a Cubicle Mount Product/Application, Frame D Illustrated.

	Clearances for IP20 Product (mm)		
	A	**B**	**C**
Size D–H	10	75	75 minimum (excludes cabling requirements)
Size J	10	100	100 minimum (excludes cabling requirements)
Size K	10	200	200

Mounting brackets, frames D, E, F & G

The brackets can be moved up/down by using the alternative holes, which are set at 15 mm intervals.

Cubicle mounting details (all frame size)
Series AC30V

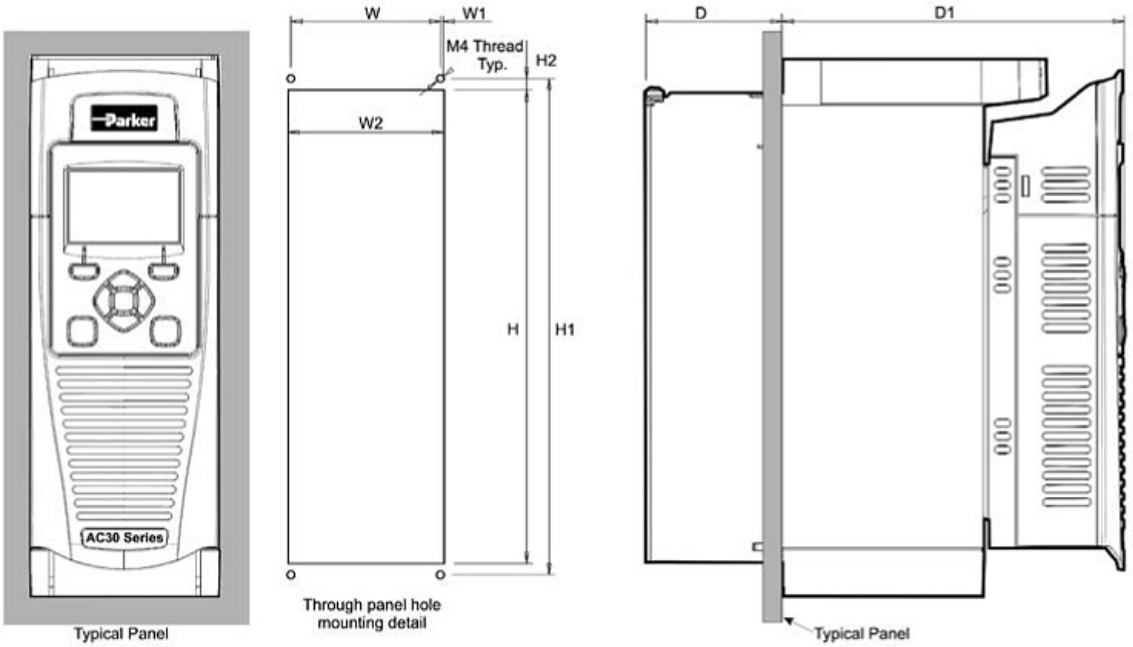


Note: Frame H, J and K have a single mounting plate which cannot be moved.

Through Panel Mount

Through panel mounting a drive in a cubicle allows you to use a smaller cubicle because much of the heat generated by the drive is dissipated outside the cubicle.

Dimensions for through panel installation sizes D, E, F, G, H and J



Model	H	H1	H2	W	W1	W2	D	D1	Fixings
Size D	250	262	6	79	1.5	82	72	181	
Size E	297	309	6	102	1	104	72	181	Use M4 fixings
Size F	347	359	6	127	1	129	72	181	
Size G	440	455.8	7.9	195	0.4	195.8	95	190	Use M5 fixings
Size H	617	641	12	218	4.5	227	99	211	Use M6 fixings
Size J	745	765	10	275	12.5	300	128	242.6	

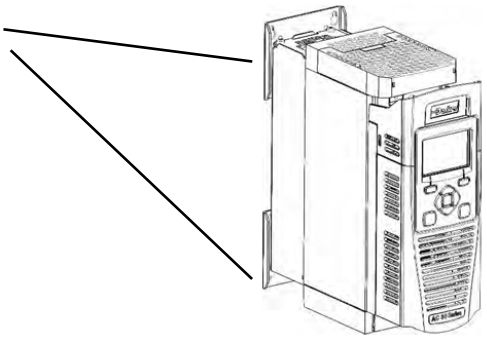
All dimensions are in millimetres

Through panel installation for frame size K is not possible.

Through panel mounting details (all frame sizes)

To allow mounting; first disassemble the drive by following instructions 1 to 4 and then instructions 5 to 7 for mounting:

1. Unscrew and remove mounting bracket(s).

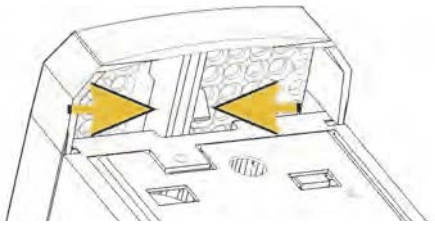


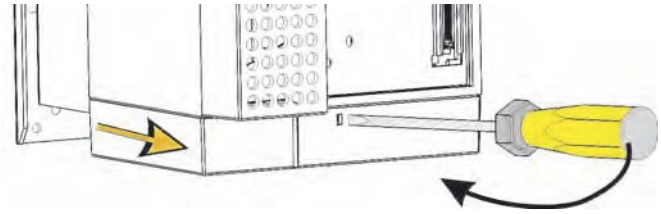
2. Remove Control Module Cover.
3. Remove Control Module.
4. Top & Bottom Cover Removal Instructions.

Frame D only

Top Cover: Squeeze together the bracket under the top cover and lift off cover.

Bottom Cover: After inserting a screwdriver into the slot slightly push to the left to release the catch.

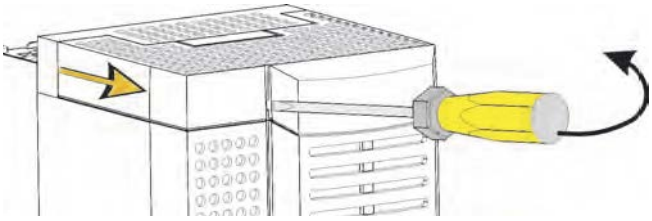




Frames E, F, G, H and J

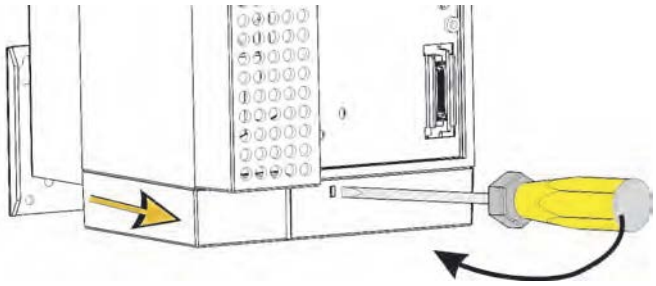
Top Cover:

To remove insert a screwdriver into the slot and move to the right to release the catch, and then slide off cover.



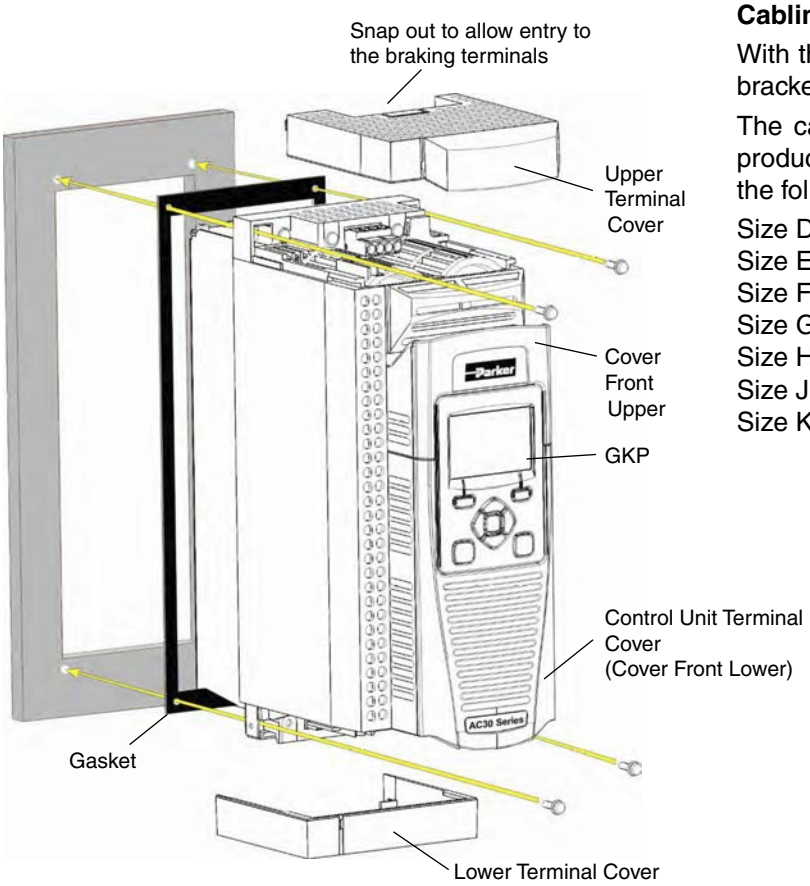
Bottom Cover:

To remove bottom cover insert a screwdriver into the slot and move to the left to release the catch, and then slide off cover.



5. Fit gasket to the drive so that an air-tight seal will be made between the drive and the panel.
   Through Panel Kits, can be purchased from Parker using the following part numbers:
   Size D – LA502668
   Size E – LA502669
   Size F – LA502670
   Size G – LA502471
   Size H – LA502472
   Size J – LA502793
   Size K – not applicable

6. Tighten all screws in place as shown, according to panel insert requirements.
7. At this stage you can wire the power cables.



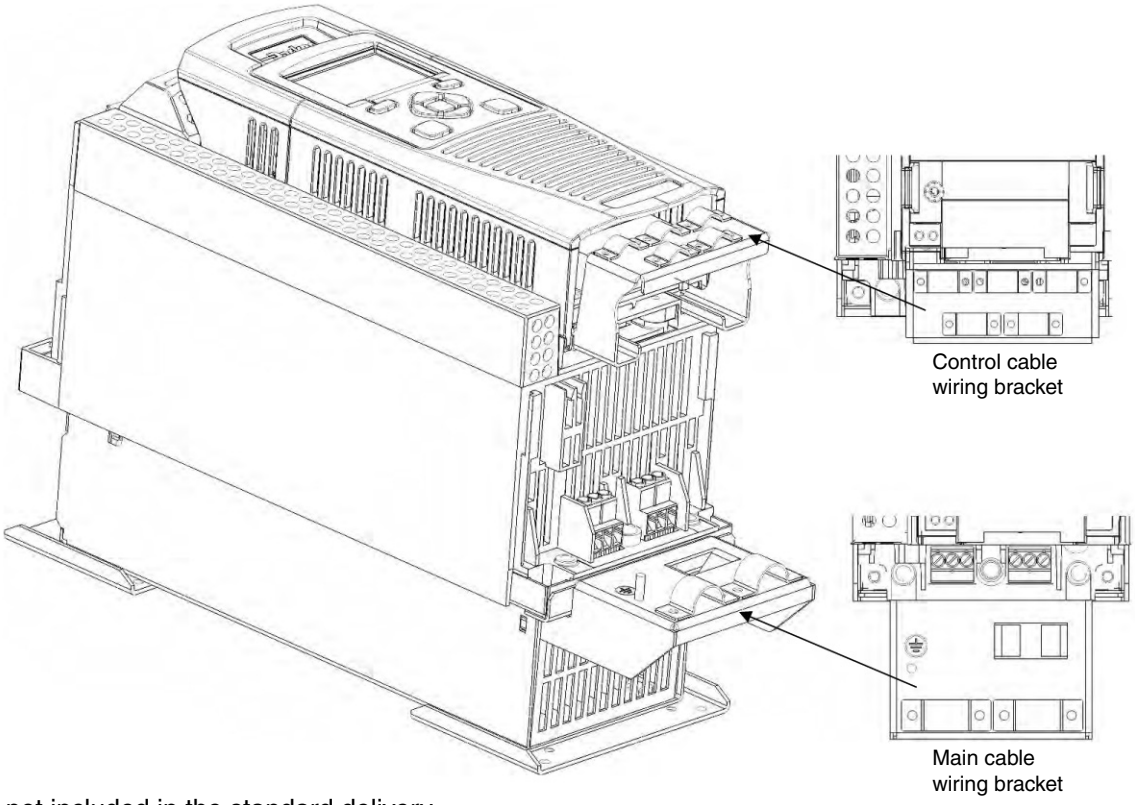
Cabling Bracket for Control & Main Cable

With the bottom cover off you can screw the cabling brackets in place, if required.

The cabling brackets are standard with C2 filtering products and can also be obtained from Parker using the following part numbers:

Size D – LA501935U001
Size E – LA501935U002
Size F – LA501935U003
Size G – LA501935U004
Size H – LA501935U005
Size J – LA501935U006
Size K – not applicable

Frame E illustrated



Parts are not included in the standard delivery.

Installation

Wiring instructions

Important: The control board 0V must be connected to protective earth outside of the product to meet EMC and safety requirements.

Note: You can still operate the drive in Local mode, if necessary, with any Application selected.

Power Wiring Connections
Protective Earth (PE) Connections

The unit must be **permanently earthed** according to EN 61800-5-1 - see below. Protect the incoming mains supply using a suitable fuse or circuit breaker (circuit breaker types RCD, ELCB, GFCI are not recommended).

Power connections

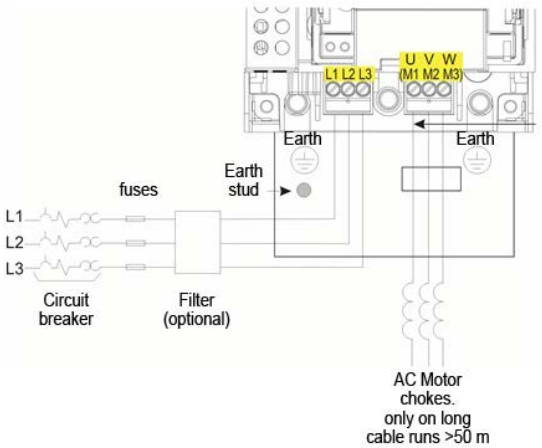
Power Wiring Connections

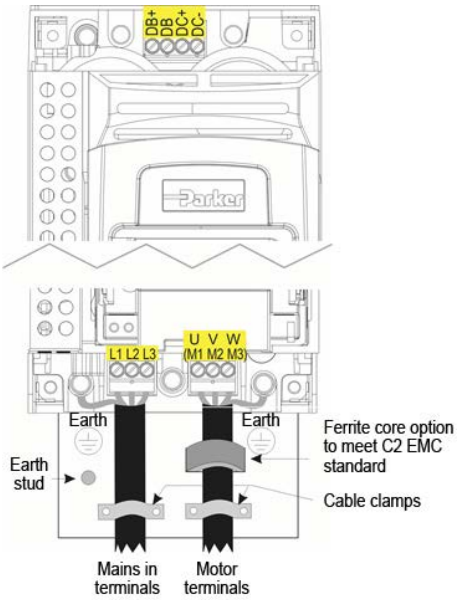
Feed the power supply and motor cables into the drive under the cable clamps using the correct cable entries, and connect to the power terminals. Tighten all terminals to the correct tightening torque; refer to the Terminal Tightening Torques table.

Important: The drive is only suitable for earth referenced supplies (TN) when fitted with an internal filter. External filters are available for use on TN and IT (non-earth referenced) supplies.

For installations to EN 61800-5-1 in Europe:

- For permanent earthing, two individual incoming protective earth conductors (<10 mm² cross-section) or one conductor (>10 mm² cross-section) are required. Each earth conductor must be suitable for the fault current according to EN 60204.

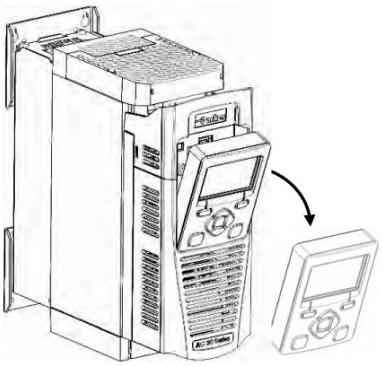




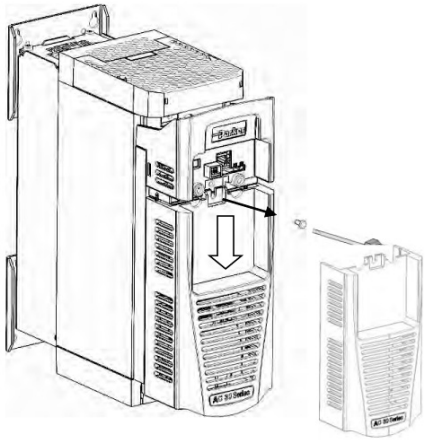
Control Module Cover Removal

To gain access to the control wiring first remove the control module cover as follows:

1. First remove the GKP by pulling from the top down, and remove.

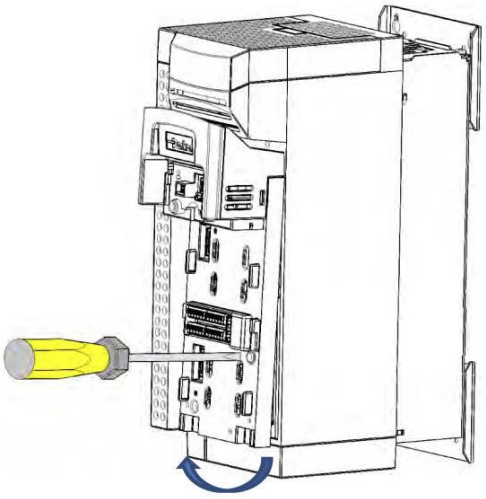


2. Undo the screw and slide the control module cover down slightly, then remove.

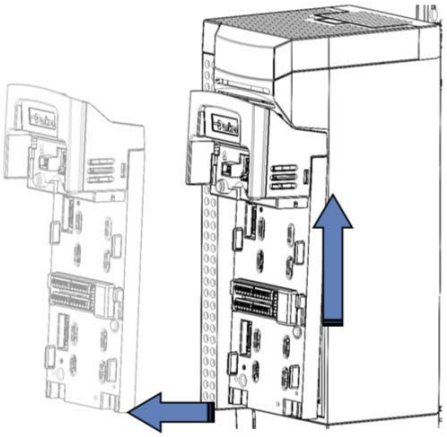


Control Module Removal

Isolate supply before plugging or unplugging control unit to the power stack.



1. Unscrew captive screw.
2. Lift lower edge of assembly.
3. Slide assembly upwards, as far as possible, to unlatch from unit.



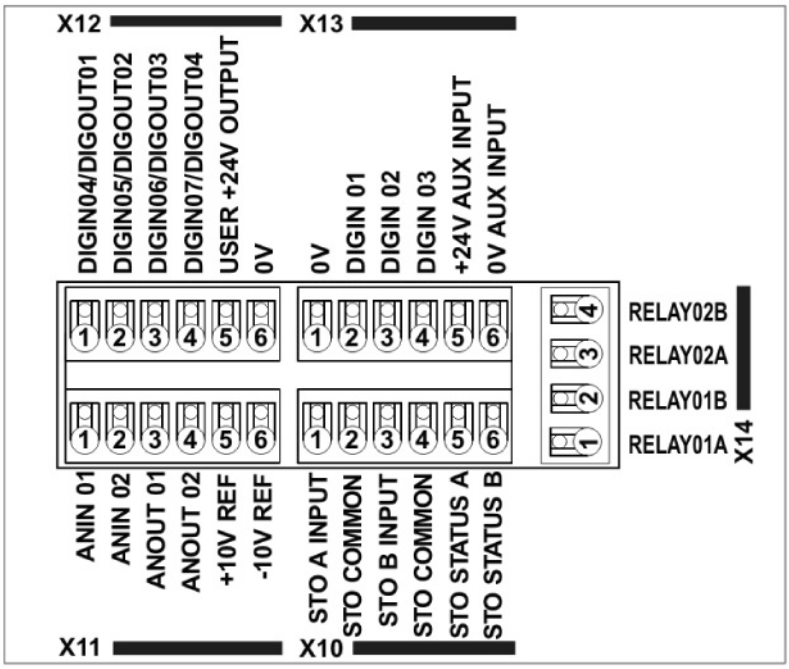
Control wiring connections

Terminal ID	Function
X10/01	STO A Input
X10/02	STO Common
X10/03	STO B Input
X10/04	STO Common
X10/05	STO Status A
X10/06	STO Status B
X11/01	Anin 01 (+10V, 0-10V, 0-20mA, 4-20mA)
X11/02	Anin 02 (+10V, 0-10V)
X11/03	Anout 01 (+10V, 0-10V)
X11/04	Anout 02 (0-10V, 0-20mA, 4-20mA)
X11/05	+10V reference
X11/06	-10V reference
X12/01	Digin 04 / Digout 01
X12/02	Digin 05 / Digout 02
X12/03	Digin 06 / Digout 03
X12/04	Digin 07 / Digout 04
X12/05	User +24V output
X12/06	0 V
X13/01 (LH)	0 V
X13/02	DIGIN 1
X13/03	DIGIN 2
X13/04	DIGIN 3
X13/05	+24V AUX input
X13/06	0V AUX input
X14/01 (BOT)	Relay 01 (contact A)
X14/02	Relay 01 (contact B)
X14/03	Relay 02 (contact A)
X14/04	Relay 02 (contact B)

Terminal Cable Specification

Solid minimum H05(07)V-U 0.2 mm^2.
Solid maximum H05(07)V-U 1.5 mm^2.
Flexible minimum H05(07)V-K 0.2 mm^2.
Flexible maximum H05(07)V-K 1.5 mm^2.
W.wire end Ferrule DIN462228 Pt 1 minimum 0.25 mm^2.
W.wire end Ferrule DIN462228 Pt 1 maximum 1.5 mm^2.
W.plastic collar Ferrule DIN462228 Pt4 minimum 0. 25 mm^2.
W.plastic collar Ferrule DIN462228 Pt4 maximum 0.75 mm^2.

Control Wiring Layout Diagram



Control wiring connections

Inputs – Analogue (DCP3xxxA)

Analogue / Digital Inputs

	Selected Hydraulic Application (Control Type)				
Terminal	**Q Control**	**p Control**	**p/Q Control**	**LS Control**	**Accumulator Control**
ANIN01 (X11/01)	Pressure Feedback 1)	Pressure Feedback	Pressure Feedback	Pressure Feedback p0	Pressure Feedback
ANIN02 (X11/02)	Flow Setpoint	Pressure Setpoint	Flow Setpoint	Pressure Feedback LS1	not used
ANIN11 (X21/02) (optional)	not used	not used	Pressure Setpoint	Pressure Setpoint	not used
DIGIN01 (X13/02)	Start Drive				
DIGIN02 (X13/03)	No Stop				
DIGIN03 (X13/04)	Reset				
DIGIN04 (X12/01)	Pump 1 On/Off				Switch On Signal
DIGIN05 (X12/02)	Pump 2 On/Off				Switch off Signal
DIGIN06 (X12/03)	Terminal used as DIGOUT 03				
DIGIN07 (X12/04)	Terminal used as DIGOUT 04				

Inputs – Fieldbus (DCP3xxxC/D/E/P/N)

Analogue / Digital Inputs

	Selected Hydraulic Application (Control Type)				
Terminal	**Q Control**	**p Control**	**p/Q Control**	**LS Control**	**Accumulator Control**
ANIN01 (X11/01)	Pressure Feedback 1)	Pressure Feedback	Pressure Feedback	Pressure Feedback p0	Pressure Feedback
ANIN02 (X11/02)	not used			Pressure Feedback LS1	not used
ANIN11 (X21/02) (optional)	not used				
DIGIN01 (X13/02)	not used				
DIGIN02 (X13/03)	not used				
DIGIN03 (X13/04)	not used				
DIGIN04 (X12/01)	not used				Switch on Signal
DIGIN05 (X12/02)	not used				Switch off Signal
DIGIN06 (X12/03)	Terminal used as DIGOUT 03				
DIGIN07 (X12/04)	Terminal used as DIGOUT 04				

Control word (2021)

	Selected Hydraulic Application (Control Type)				
Bit	**Q Control**	**p Control**	**p/Q Control**	**LS Control**	**Accumulator Control**
0	Start Drive				
1	No Stop				
2	Reset				
3	Pump 1 on/off				Switch on signal
4	Pump 2 on/off				Switch off signal
5..15	reserved				

1) Not required (can be used to display)

Outputs – Analogue (DCP3xxxA)

Analogue / Digital Outputs

	Selected Hydraulic Application (Control Type)				
Terminal	**Q Control**	**p Control**	**p/Q Control**	**LS Control**	**Accumulator Control**
ANOUT 01 (X11/03)	Actual motor speed				
ANOUT 02 (X11/04)	Command signal for pressure relief valve				
RELAY 01 (X14/01 & X14/02)	Drive running				
RELAY 02 (X14/03 & X14/04)	Not Tripped				
DIGOUT 01 (X12/01)	Terminal used as DIGIN 04				
DIGOUT 02 (X12/02)	Terminal used as DIGIN 05				
DIGOUT 03 (X12/03)	Bypass Valve*				
DIGOUT 04 (X12/04)	Flow reached	Pressure reached	Flow reached	Pressure reached	Pressure reached
DIGOUT 11 (X20/01) (optional)			Pressure reached		

Outputs – Fieldbus (DCP3xxxC/D/E/P/N/T)

Status word (2022)

	Selected Hydraulic Application (Control Type)				
Bit	**Q Control**	**p Control**	**p/Q Control**	**LS Control**	**Accumulator Control**
0	Drive running				
1	Not tripped				
2	Bypass Valve 1)				
3	Flow reached	Pressure reached	Flow reached	Pressure reached	reserved
4	reserved		Pressure reached	reserved	
5..15	reserved				

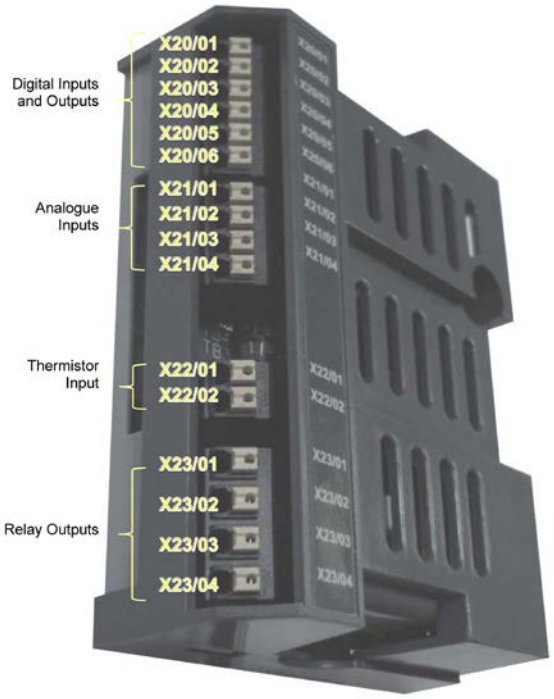
1) If internal speed setpoint < minimum speed then DIGOUT 03 = TRUE else FALSE, can be used to control a bypass valve (not included)

Option Modules

There are a range of Option Cards that may come factory-fitted to the AC30V.

Product Code	Description
7004-01-00	General Purpose I/O Option, referred to as GPIO Digital Inputs or Outputs, Analogue Inputs, Motor Thermistor Input, Volt-free Relay Outputs, Real-Time Clock
7004-02-00	Motor Thermistor Input
7004-03-00	Motor Thermistor and Real-Time Clock
7004-04-00	Pulse Encoder and Motor Thermisto

General Purpose I/O Option



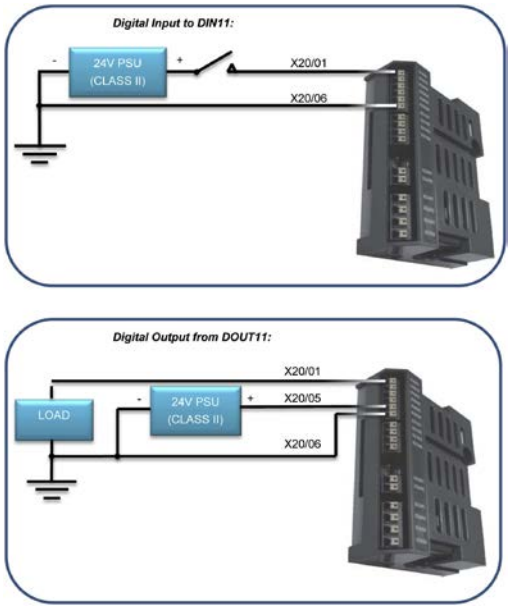
Terminal	Name	Range	Description
X20/01	DIN11/ DOUT11	0 to 24 VDC	Digital Input / Output 11 See the notes below.
X20/02	DIN12/ DOUT12	0 to 24 VDC	Digital Input / Output 11 See the notes below.
X20/03	DIN13/ DOUT13	0 to 24 VDC	Digital Input / Output 11 See the notes below.
X20/04	DIN14/ DOUT14	0 to 24 VDC	Digital Input / Output 11 See the notes below.
X20/05	24V DC Input	24 V ± 10 %	24V DC Input. Required to power digital outputs DOUT11 to DOUT14. See the notes below.
X20/06	DIG 0V	0 V	0 V reference for digital inputs and outputs. See the notes below.

Note:

If any of X20/01 to X20/04 is to be configured as digital output, then X20/05 must be connected to the positive output from a 24V supply and X20/06 must be connected to the negative output from the same supply.

Digital input and output ports are fully isolated from the drive electronics. Therefore it is essential that X20/06 is grounded at an appropriate point in the system.

Example:



Analogue Inputs

Terminal	Name	Range	Description
X21/01	AN 0V	0 V	Analogue signal reference
X21/02	ANIN11	-10 V to 10 V	Analogue Input 11
X21/03	ANIN12	-10 V to 10 V	Analogue Input 12
X21/04	ANIN13	-10 V to 10 V	Analogue Input 13

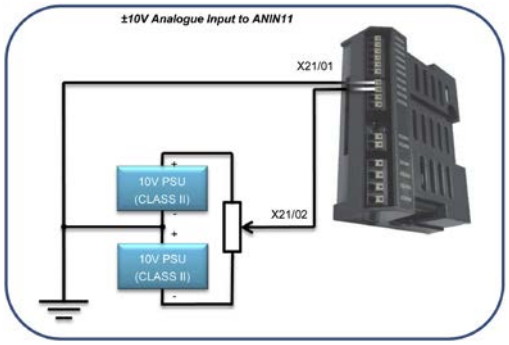
Note:

These analogue input ports are differential. That means that the signal reference on terminal X20/01 is not directly connected internally to the drive 0 V terminal.

Therefore X21/01 must be connected to the user 0 V signal reference with should be grounded at an appropriate point in the system.

If any analogue input are unused, they should be connected to X21/01 to prevent invalid values being reported.

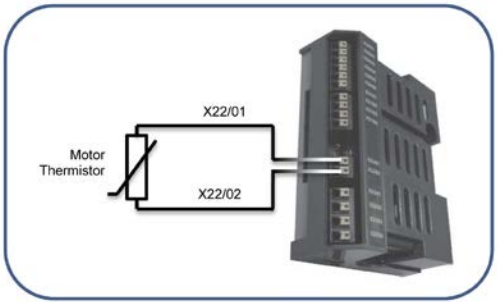
Example:



Motor Thermistor

Terminal	Name	Range	Description
X22/01	TH1	0 to 4.5 kΩ	Connect motor thermistor between these two terminals.
X22/02	TH2		

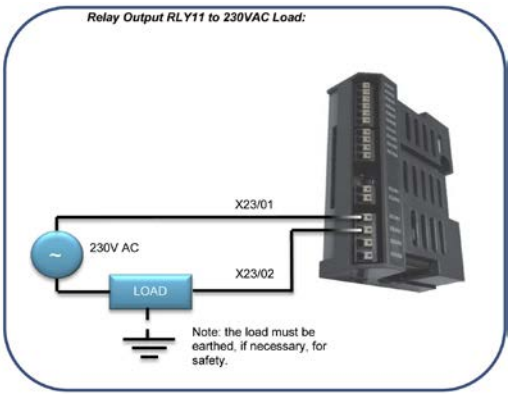
Example:



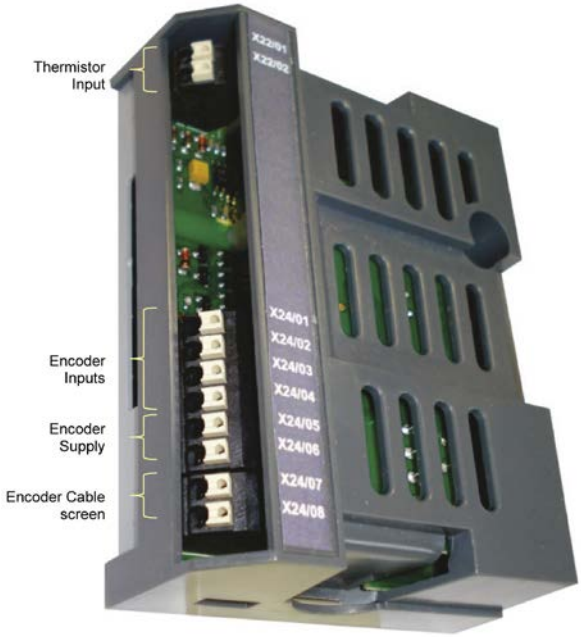
Volt-free Relays

Terminal	Name	Range	Descripiton
X23/01	RLY11A	3A @ 250 V AC 3A @ 30 V DC	Terminal A of Relay 11
X23/02	RLY11B		Terminal B of Relay 11
X23/03	RLY12A		Terminal A of Relay 12
X23/04	RLY12B		Terminal B of Relay 12

Example:



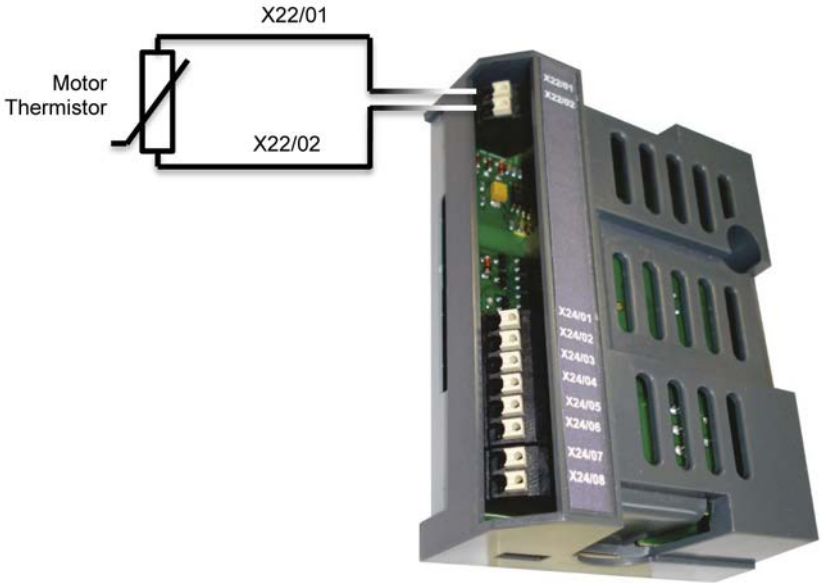
Encoder and Motor Thermistor



Motor Thermistor

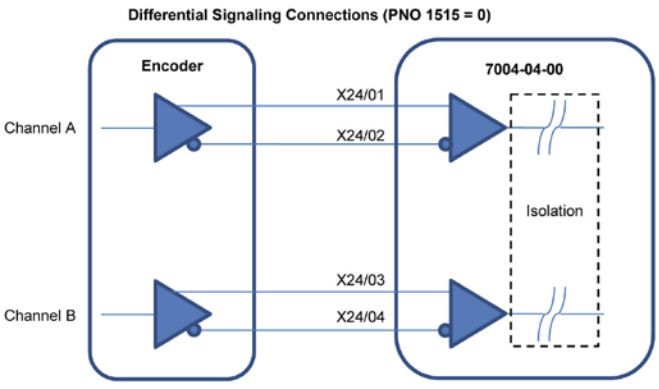
Terminal	Name	Range	Description
X22/01	TH1	0 to 4.5 kΩ	Connect motor thermistor between these two terminals.
X22/02	TH2		

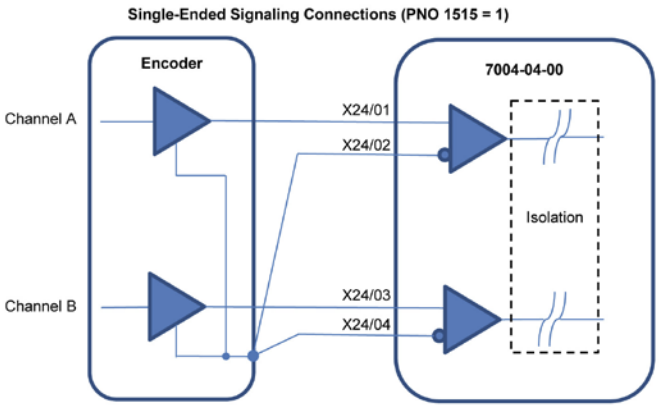
Example:



Pulse Encoder

Terminal	Name	Range	Description
X24/01	Channel A	±3 V to ±24 V (differential) or 0 V to 24 V (Single-Ended)	Encoder inputs, compatible with a wide range of encoders.
X24/02	Channel A		
X24/03	Channel B		
X24/04	Channel B		
X24/05	Supply positive	Selectable 5 V, 12 V, 15 V and 24 V	Software-selectable power supply output to encoder.
X24/06	Supply negative		
X24/07	Cable Screen		
X24/08	Cable Screen		





Note:

The encoder power supply is fully isolated from the drive internal circuits and from the encoder inputs on X24 terminals 01 to 04.

Ethernet

Introduction

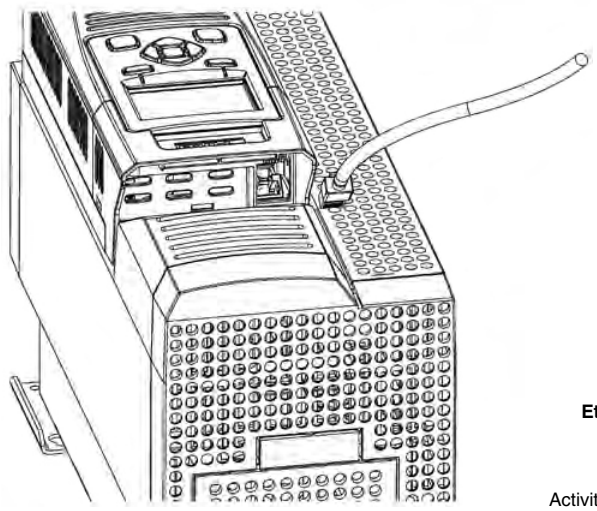
Communications to the AC30 is via an Ethernet port on the Control Module. This allows access to:

- The PDQ and PDD PC programming tools
- The Modbus TCP server (see Appendix A - Modbus TCP)
- The HTTP server (see section below)
- Application access to the Ethernet

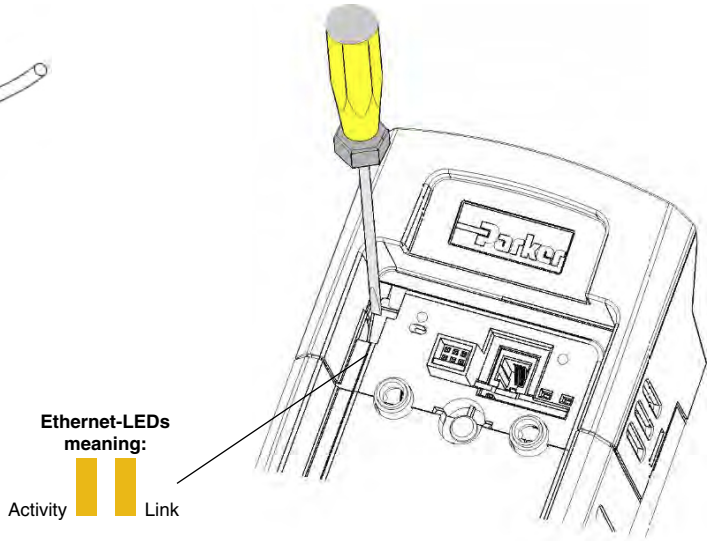
The Ethernet port operates at 10/100 MHz, half/full duplex. Internet Protocol version 4 (IPv4) is supported. Connection is recommended via an Ethernet switch.

Connecting to a Network

Insert the Ethernet cable as shown below:



To remove the cable first remove the GKP and then insert a screwdriver to release the catch on the Ethernet clip.



Recommended cable:

We recommend using CAT5e screened or CAT6 screened.

Status monitoring

The MAC address of the Ethernet port is fixed at the factory and can be read using the parameter

0945 MAC Address

The current IP settings of the AC30 can be monitored using the following parameters:

0926 IP Address
0927 Subnet Mask
0928 Gateway Address

The state of the Ethernet can be monitored using the parameter **0919 Ethernet State** and from the Ethernet icon on the GKP status bar.

Setting the IP Address

To enable communications over the Ethernet an IP address must be set. The IP address may be set as follows:

- Manually to a fixed address
- Automatically by a DHCP server connected on the network
- Automatically by the AC30 to a link-local address using Auto-IP (also known as Automatic Private IP Addressing)

The parameters 0929 DHCP and 0930 Auto IP are used to determine how the IP address is set. The factory default of these parameters is TRUE.

The parameter 0936 Setting Lock, when set to TRUE, prevents a configuration tool from modifying the IP settings.

Manually Setting the IP Address

Parameter	Setting
0929 DHCP	FALSE
0930 Auto IP	FALSE
0933 User IP-Address	Preferred IP Address
0934 User Subnet Mask	Preferred Subnet Mask
0935 User Gateway Address	Preferred Gateway Address

To set the IP address manually both the DHCP and Auto-IP must be disabled. The IP address, subnet mask and gateway address will be set from the values in the parameters **0933 User IP Address, 0934 User Subnet Mask, 0935 User Gateway Address.**
If the network does not have a gateway to another network then the gateway address may be set to 0.0.0.0

Automatically Assigning an IP Address using DHCP

Parameter	Setting
0929 DHCP	TRUE
0930 Auto IP	FALSE

If the network on which the AC30 is connected has a DHCP (Dynamic Host Configuration Protocol) server then the IP address may be assigned by this server. The DHCP must be enabled. The AC30 will then request an IP address, subnet mask and gateway address from the DHCP server.

Note: The IP address is requested by the AC30 each time the drive is powered up or when the Ethernet cable is plugged in. There is no guarantee that the DHCP server will provide the same IP address each time.

Automatically Assigning an IP Address using Auto-IP

Parameter	Setting
0929 DHCP	FALSE
0930 Auto IP	TRUE

The AC30 may assign itself a link-local address automatically using Auto-IP. This would be used where an automatic address is required but where no DHCP server is available, such as a small local network or when connecting an AC30 drive directly to a PC (point to point). The Auto-IP must be enabled.

The AC30 will choose an IP address randomly from the link-local range **169.254.*.***. The AC30 checks that no other Ethernet device on the network is using the address before allocating it. The AC30 will store this IP address (in parameter **0931 Last Auto IP Address**) and attempt to use it next time Auto-IP is used. The gateway address is fixed to 0.0.0.0

Using Both DHCP and Auto-IP

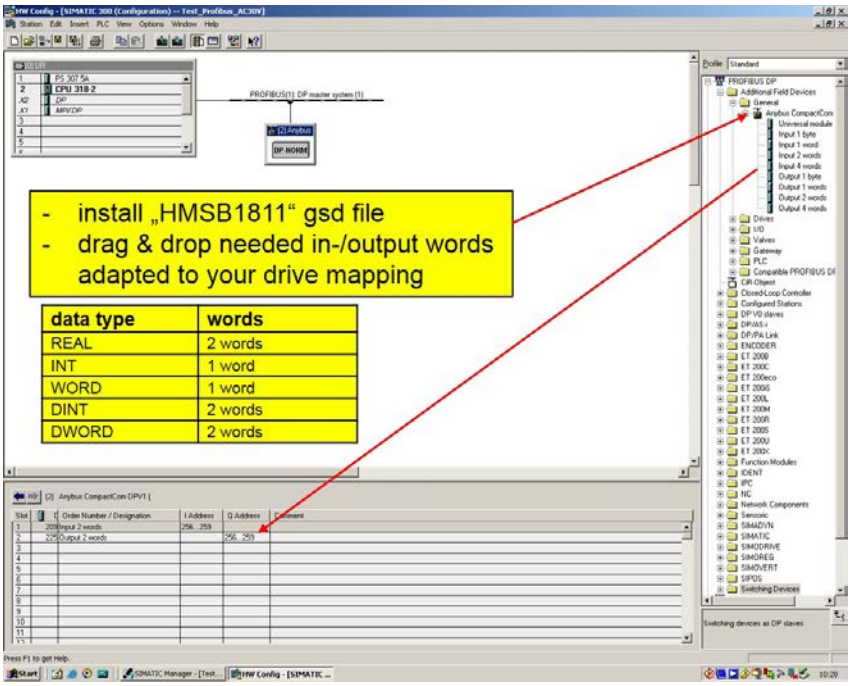
Parameter	Setting
0929 DHCP	TRUE
0930 Auto IP	TRUE
0932 DHCP to Auto IP	Timeout in seconds after which DHCP stops and Auto IP address is assigned.

If both the DHCP and Auto-IP are enabled then an IP address will be obtained automatically depending on the network. This is the default setting.

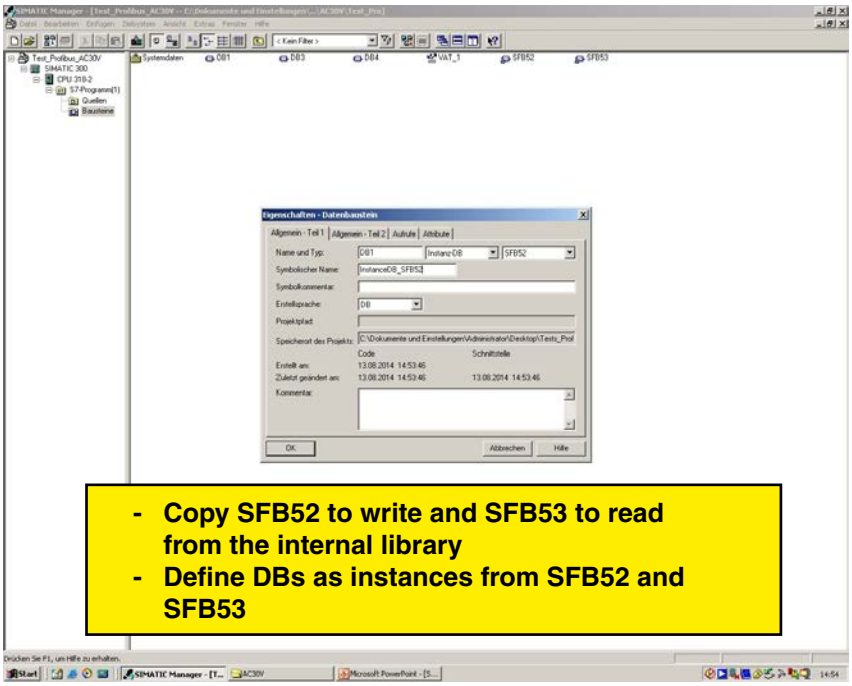
The AC30 will take a link-local address in the range 169.254.*.* if no DHCP server is discovered on the network. If a DHCP server is available (or becomes subsequently available) then the AC30 will take the IP address from the server. Note that the DHCP has precedence.

Profibus communication with Siemens S7

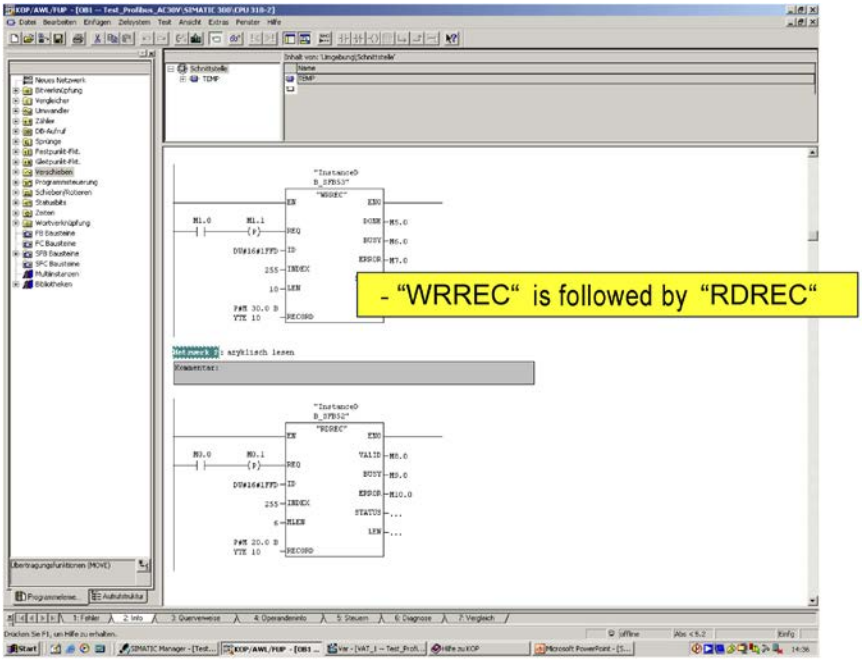
Cyclic communication

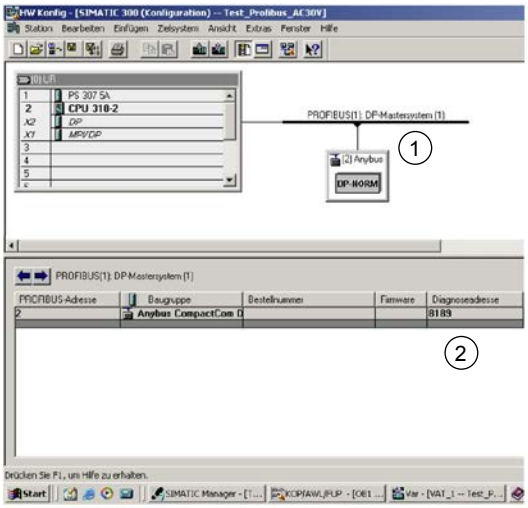


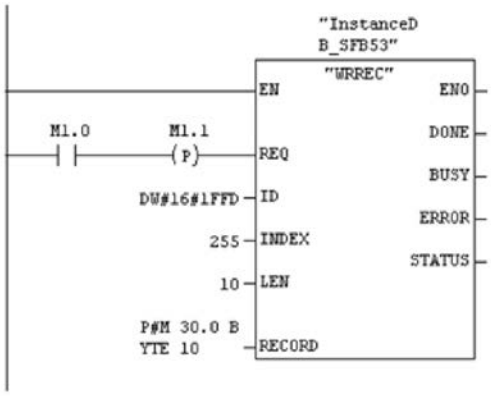
Acyclic communication

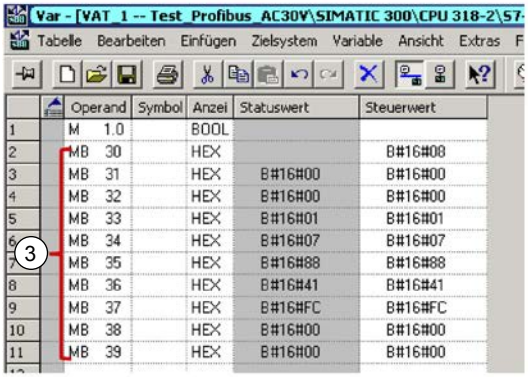


Acyclic communication



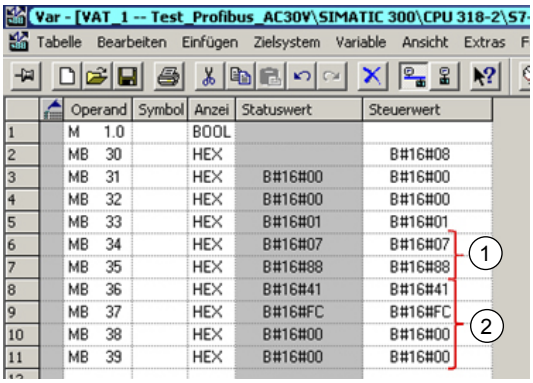






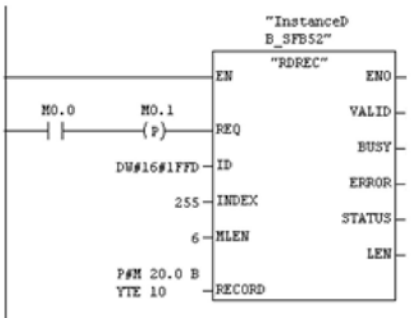
- ID is the Anybus diagnosis ID
- Click on the DP master system (1)
- Reading diagnostic ID (2)
- INDEX is always 255
- LEN contains the size of record (3)
- RECORD should be set as shown

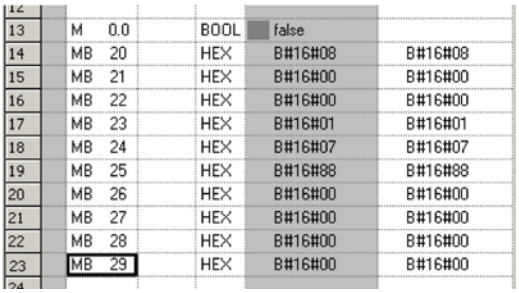
Acyclic communication



- Parameter number is written to MB34 and MB35 (1)
- Here 1928 (INT) → 788 (hex)
- Value is written to MB36 - MB39 (2)
- Here 31.5 (IEEE754) → 41FC (hex)

- RDREC is applied like “WRREC“
- LEN has a length of 6 bytes MB20 – MB25





STO Functional description

Safe Torque Off SIL3/PLe

General Information

This equipment if used incorrectly is potentially dangerous. Therefore under no circumstances should it be used before these instructions have been read and understood by the end user who should be appropriately qualified to operate the equipment.

This section provides general information about Safe Torque Off (STO).

Two safety functions can be implemented with the AC30V: STO and Safe Stop 1 (SS1). In order to meet all aspects of STO and SS1, an external safety control unit should be used.

To implement Safe Stop 1 (SS1), the external safety control unit causes the drive to decelerate to rest. Once at rest, it invokes STO in the AC30V.

Please refer to EN61800-5-2:2007 para 4.2.2.3 for the formal definitions.

It is the user's responsibility to:

1. Risk assess the machine.
2. Design, implement and assess an appropriate solution for each application to meet all relevant safety requirements.

STO is an electronic inhibit intended for use during normal operation of the machine. It is not intended for use during machine maintenance, repair, replacement or other similar activities. For these activities recognised electrical power isolation devices and lock-off procedures should be used. The AC30V STO function is a factory-fitted and factory-tested feature.

STO is a means of preventing an AC30V drive from delivering rotational force to its connected electric motor. Please refer to EN61800-5-2:2007 para 4.2.2.2 for the formal definition.

To ensure a high degree of safety, two independent STO control channels are implemented in hardware. The STO circuit in the AC30V is designed such that a fault in one control channel will not affect the other channel's ability to prevent the drive from starting, i.e. the STO function of the AC30V drive is tolerant to any single fault. It may not be tolerant to an accumulation of faults. This is in keeping with its declared safety ratings.

STO always overrides any attempt to start the drive. If one or both STO control inputs is requesting the STO function, the drive will not start, even if for example, the drive's software malfunctions and tries to cause the motor to turn.

The STO function is implemented in hardware; it overrides all software activities. The only software involvement is to report STO status to the user via a Graphical Keypad (GKP), serial communications link or user terminal as defined by the drive configuration.

The declared sil/pl capability of this sto product can be achieved only when the two sto user inputs are driven independently. They must not both be driven from a common source; otherwise the single fault detection will be completely inoperative.

Use of the product in this "common source" condition invalidates the sto product specification and is entirely at the user's own risk.

User connections

The STO terminals are on a 6-way terminal block X10. This is mounted on the AC30V control housing. Terminal designations are:

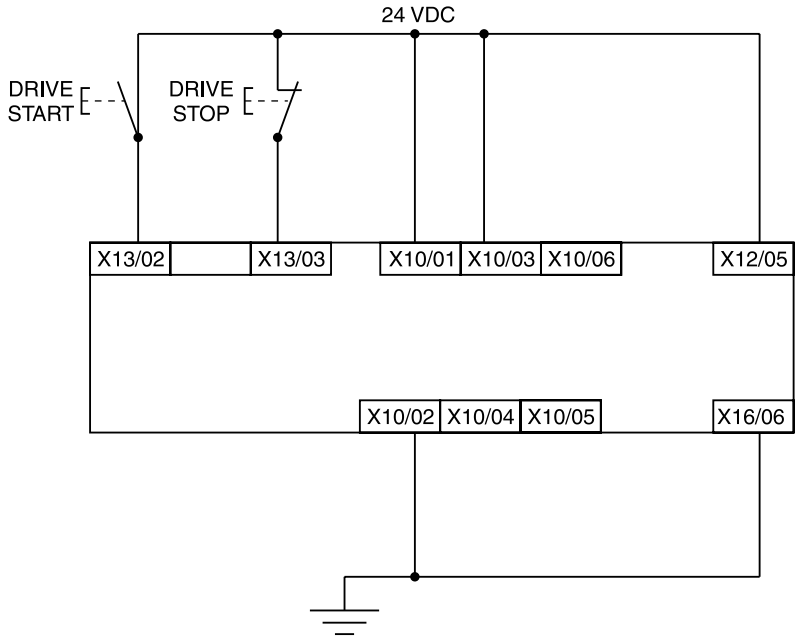
Terminal Number	Terminal Name	Description
X10/01	STO A Input	0V or not connected = drive will not run, STO is active on channel A. 24V = drive is enabled to run if X10/03 is also 24V. This input is optically isolated from all other AC30V terminals except X10/02, X10/03 and X10/04.
X10/02	STO Common 3	Signal return for STO A Input and STO B Input. Connected internally to X10/04. This terminal or X10/04 must be connected to earth at one common point in the drive system.
X10/03	STO B Input	0V or not connected = drive will not run, STO is active on channel B. 24V = drive is enabled to run if X10/01 is also 24V. This input is optically isolated from all other AC30V terminals except X10/01, X10/02 and X10/04.
X10/04	STO Common 2	Signal return for STO A Input and STO B Input. Connected internally to X10/02. This terminal or X10/02 must be connected to earth at one common point in the drive system.
X10/05	STO Status A	Together with X10/06, this terminal forms an isolated solid-state relay output. This output is ON (equivalent to closed relay contacts) when the STO circuit is in the 'safe' state, i.e. the drive will not cause its motor to produce torque. However, this output should be used primarily as an indication. In the unlikely event of a fault in the STO circuit, this output could turn on erroneously to give a false indication of the STO status. It must not be used as a guarantee that the motor will not produce torque. The solid-state relay is protected by a self-resetting fuse.
X10/06	STO Status B	Together with X10/05, this terminal forms an isolated solid-state relay output. See the description for X10/05.

Truth table

Overview	STO Input A X10/01	STO Input B X10/03	Drive Function	STO Status Output X10/05, X10/06
STO Active	0V	0V	Drive cannot start or supply power to its motor. STO trip reported. This is the intended safe state of the product with correct dual-channel operation.	ON
Abnormal one-channel operation detection	24V 0V	0V 24V	Drive cannot start or supply power to its motor. STO trip reported. If either of these conditions persists for more than 3.0 seconds (the maximum fault detection time), the STO function will lock into a fault state. The drive cannot start until the fault is rectified; all power is removed and reapplied (both mains and any auxiliary 24V dc power). This is single channel operation and thus deemed not as intended for category 3 / PLe / SIL3 structure implementation.	OFF
STO Inactive	24V	24V	Drive is enabled to run under software control. The drive can supply power to its motor.	OFF
Drive unpowered	Don't care	Don't care	Drive cannot start or supply power to its motor.	OFF

[1] Do not connect both X10/02 and X10/4 to earth, otherwise an earth loop could be created.

Applications that do not require STO function



STO inputs X10/01 and X10/03 must be connected to 24VDC with respect to terminals X10/02 or X10/04.

STO Status output on X10/05 and X10/06 may be left disconnected.

All wiring shown is within the control cubicle.

Here the STO inputs X10/01 and X10/03 have been set to the inactive state (tied to +24V). Drive control is performed solely through software with no inherent safety function. The drive is controlled with its own start and stop pushbuttons.

Only X10/02 or X10/4 must be earthed, i.e. they should not both be earthed otherwise it is possible to create an earth loop.

Applications

Description

The Drive Controlled Pump Applications provides 5 pump control configurations:

- “Q” Control
- “P” Control
- “p/Q” Control (flow control with pressure control)
- “LS” control (Load sensing)
- Accumulator Control

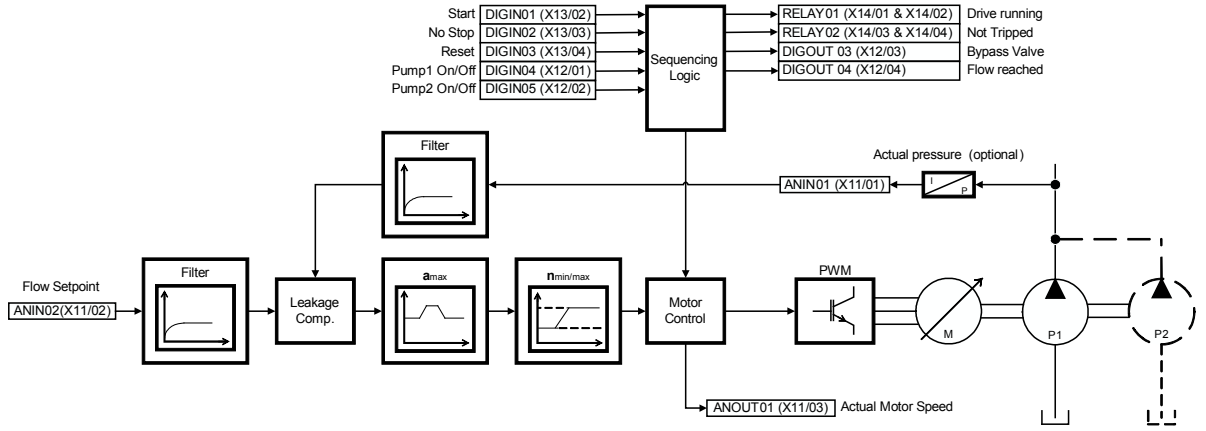
Features

- Graphical user interface for hydraulic-functions
- Supports variable and fixed displacement pumps
- Drive parameter settings for Parker-pumps(v, n_{max}, a_{max}, …) by order code
- Integrated control of optional bypass valve (on/off) and proportional pressure relief valve
- Double pump: on/off control for low and high pressure
- Leakage compensation of Parker DCP Pumps
- Electrical power control
- Master-Slave pump control

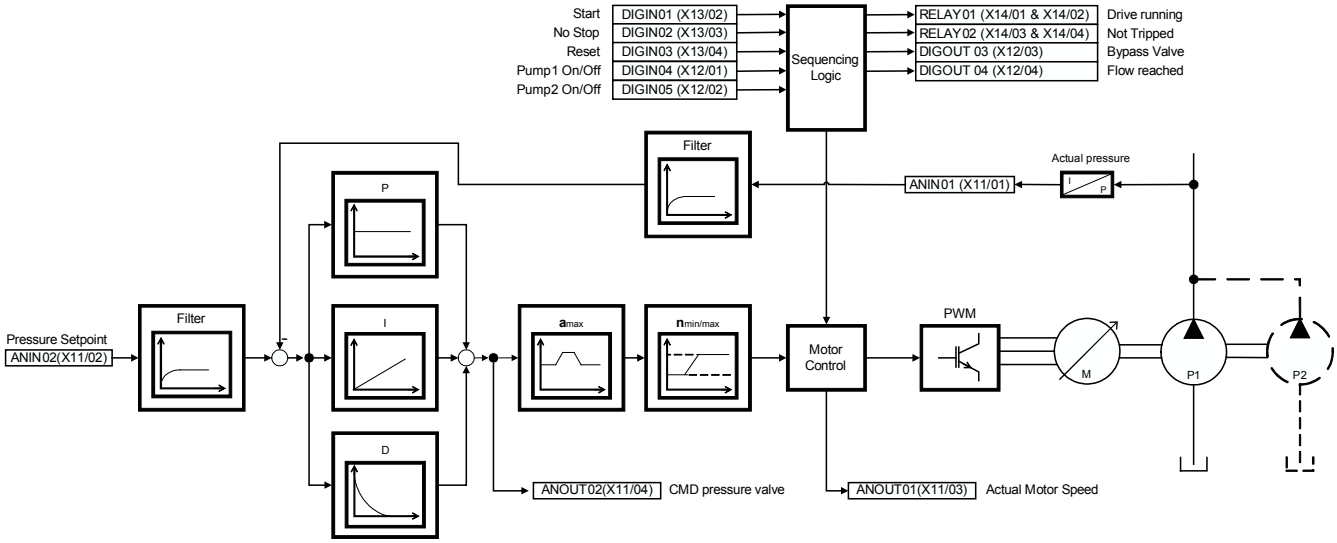
Requirements

To use the AC30V for hydraulic control as described in this manual, the application DCP_Application_Program must be loaded into an AC30V series drive with firmware 1.10 or newer.

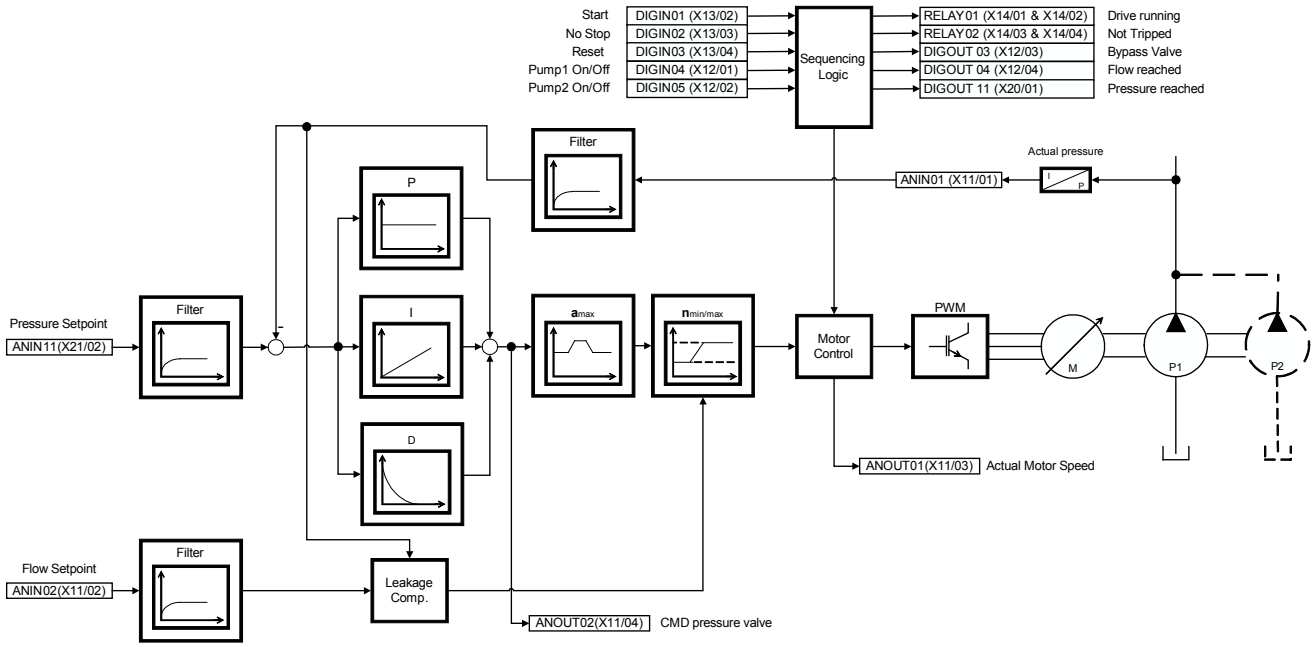
Volume flow control (Q Control)



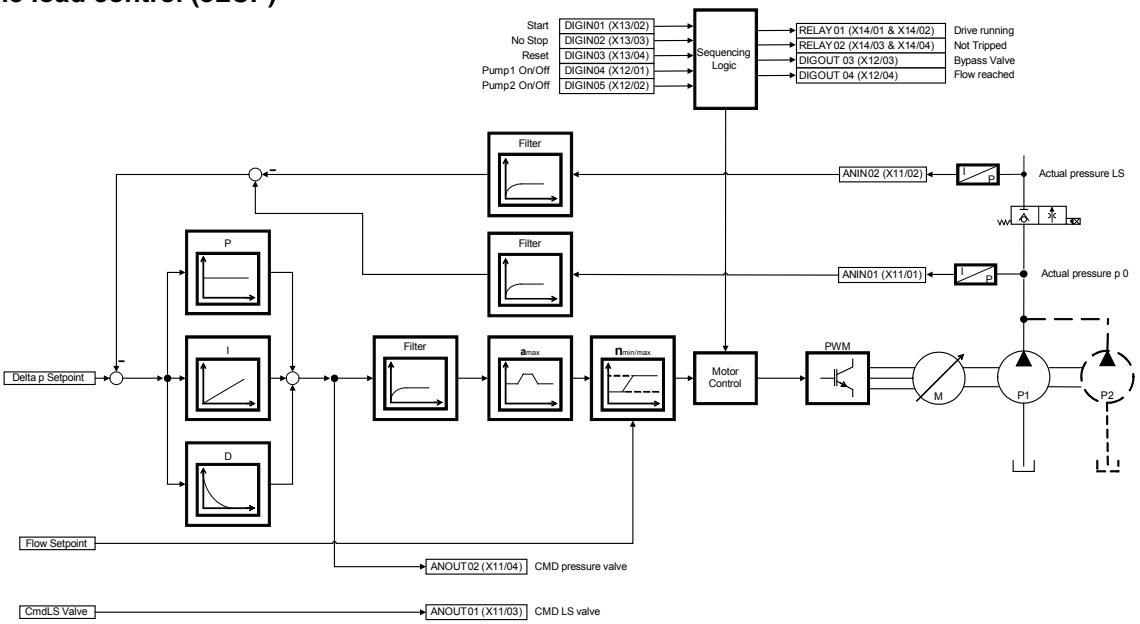
Pressure control (p Control)



Volume flow control with superimposed pressure control (p/Q Control)



Electronic load control (eLCP)



The Graphical Keypad

The AC30V is fitted with a Graphical Keypad referred to throughout as GKP.

It provides for local control of the drive, monitoring, and complete access for application programming.

Insert the Keypad into the front of the drive (replacing the blank cover); or if supplied separately to be used remotely, up to 3 meters away, use the mounting kit with connection lead.

Fitting a Remote GKP

When fitting the GKP remotely to either a cubicle or panel mount it **must** be fitted to a flat surface. Maximum cable length < 3 meters.

▶ If ordered separately includes the GKP kit the GKP and the connecting cable - part number 7001-00-00.

▶ If the GKP is ordered with the actuator and delivered, the connecting cable is not included.

Cut out details:

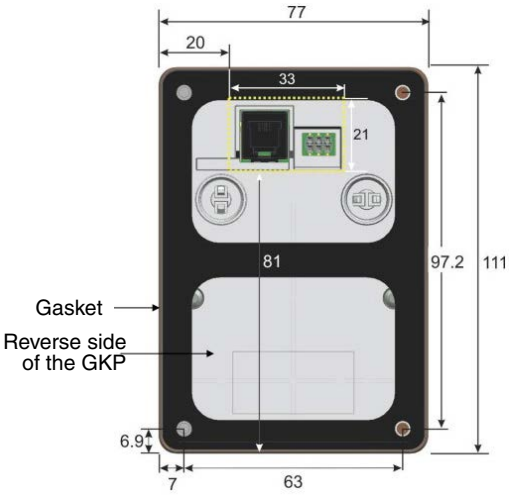
GKP – Reverse side

The yellow dotted line is the cutout detail to allow remote fitting the connection lead, also shows screw hole details.

Use M3 x 10 self tapping screws.

Connection lead RS232/REM OPSTA with a Steward 28A2025-OAO connector.

All measurements in millimeter.



The Display

- The top line of the display is used to show the drive status
- The central region of the display shows the selected parameters or navigation menu
- The bottom line of the display indicates the action associated with the soft keys
- The actions of the soft keys are context dependent
- The central navigation and editing keys are referred to as UP, DOWN, LEFT, RIGHT and OK
- The Run, (green), and Stop, (red), keys are used to start and stop the motor when the drive is in local control mode.

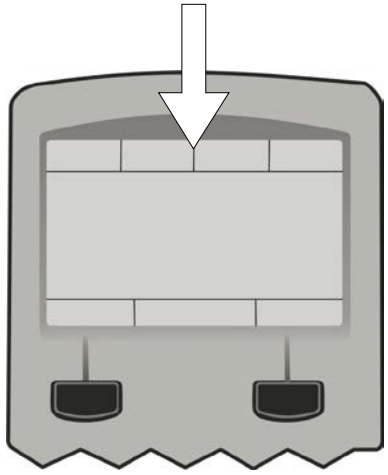
Keys

The nine keys of the Graphical Keypad are divided into three groups. These are the Run and Stop keys, the soft keys and the central navigation and editing keys

Key	Operation	Description
	RUN	Only operates when Local start / stop control mode is active Control Runs the motor
	STOP	Control Stops the motor when local start / stop control mode is active. Trip reset Resets any trips.
Softkey 1		Navigation Displays the previous level's menu Edit Aborts the edit, leaving the value unchanged
Softkey 2		Changes the Local/Remote Mode selection
	OK	Navigation Displays the next menu level or parameter. Changes to edit mode when a parameter is selected. Edit Accepts the value of the displayed parameter Long Press, (greater than 1s): Displays information about the selected parameter.
	UP	Navigation Moves up through the list of parameters Edit Increments the value of the displayed parameter
	DOWN	Navigation Moves down through the list of parameters Edit Decrements the value of the displayed parameter
	LEFT	Navigation Displays the previous level's menu Edit Selects the digit to be changed
	RIGHT	Navigation Displays the next menu level or parameter Edit Selects the digit to be changed

Left side Right side

Run, stop and direction	Trip	Ethernet	Control source



The individual status conditions are indicated pictorially:

Run, Stop and Direction

Running in the positive direction	
Running in the negative direction	
Stopped, (ready to run in the positive direction)	
Stopped, (ready to run in the negative direction)	

Trip

Drive tripped, (indication flashing)	
Warning	

Ethernet

IP Address missing, (indication flashing)	
IP Address configured	

Control source

Start / stop control from the keypad	
Start / stop control from the terminals	
Start / stop control from a communications master	

Soft key action indication

The use of Soft Key 1 and Soft Key 2 is indicated on the bottom line of the display by the icon shown above the key.

Soft Key 1

Softkey 1 is used as return or abort.

Return:	
Abort:	

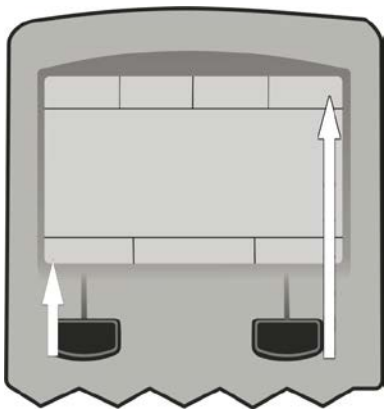
When navigating around the menu tree, the return function navigates to the previous level. In this case the return is the opposite of the OK key.

When changing a parameter value the Abort key discards any modifications and leaves the parameter unchanged.

Soft Key 2

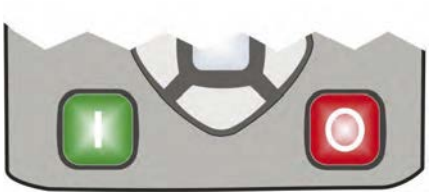
2 softkey is used to select the mode for the start / stop control.

Toggle between Local and Remote modes	



LEDS

The Graphical Display has two light emitting diodes, one illuminates the green run key, and one illuminates the red stop key. Each LED may be independently off, on or flashing.



Run key LED	Stop key LED	Description
OFF	Flashing	Stopping
OFF	ON	Stopped
ON	OFF	Running
Flashing	OFF	Auto Restart pending
Both flashing		The drive is not in its OPERATIONAL state
Flashing Green then Red		The drive is in a FAULT state

Menu Organisation

The Menu System consists of a series of menus and sub-menus organised into a “tree” structure. Navigate around the tree on the GKP using the UP, DOWN, LEFT and RIGHT keys. Individual parameters may be present in the menu tree at more than one location. Parameters and/or menus that are not required or are empty are automatically hidden on the GKP and web page.

Menu map summary

- Control Screen
- Setup
  - Quick Setup
  - Application
  - Motor Control
    - Control & Type
    - Motor Nameplate
    - Motor Data PMAC
    - Auto Restart
    - Autotune
    - SVC PMAC
  - Inputs and Outputs
    - Base IO
    - Option
  - Communications
    - Base Ethernet
    - Base Modbus
    - Option
  - Clone
  - Environment
- Monitor
  - Quick Monitor
  - Application
  - Motor & Drive
  - Inputs and Outputs
  - Communications
    - Base Ethernet
    - Base Modbus
    - Option
  - Energy Meter
  - Trips
- Favourites
- Parameters

Setup::Application				
Q Control	**p Control**	**p/Q Control**	**LS Control**	**Accumulator Control**
Application	Application	Application	Application	Application
App Selection	App Selection	App Selection	App Selection	App Selection
Setup Pump	Setup Pump	Setup Pump	Setup Pump	Setup Pump
Q Control	p Control	Q Control	LS Control	Accu Control
Bypass valve	Bypass valve	p Control	Bypass valve	Bypass valve
Analog Inputs	Pressure valve	Bypass valve	Pressure valve	Analog Inputs
	Analog Inputs	Pressure valve	Analog Inputs	
Component Prot.	Component Prot.	Analog Inputs	Component Prot.	Component Prot.
	Component Prot.	Component Prot.		

Monitor::Application				
Q Control	**p Control**	**p/Q Control**	**LS Control**	**Accumulator Control**
Application	Application	Application	Application	Application
Digital IOs	Digtal IOs	Digital IOs	Digital IOs	Digital IOs
Fieldbus	Fieldbus	Fieldbus	Fieldbus	Fieldbus
Testfunction	Testfunction	Testfunction	Testfunction	Testfunction
Status Q Control	Status p Control	Status pQ Control	Status LS Control	Status Accu Control
Controller Status	Controller Status	Controller Status	Controller Status	Speed Loop Ctrl
Speed Loop Ctrl	Speed Loop Ctrl	Speed Loop Ctrl	Speed Loop Ctrl	HPU Messages
HPU Messages	HPU Messages	HPU Messages	HPU Messages	

The Drive Controlled Pump application software adds parameters and menus to the GKP.

Control menu				
Q Control	**p Control**	**p/Q Control**	**L S Control**	**Accumulator Control**
1917 Flow Setpoint	1930 Pressure Setpoint	1917 Flow Setpoint	1960 Target Delta p	1932 Actual pressure
1919 Actual Flow	1932 Actual pressure	1919 Actual Flow	1961 Actual delta p LS	1949 Switch On pressure
1932 Actual pressure		1930 Pressure Setpoint	1932 Actual pressure	1950 Switch Off pressure
		1932 Actual pressure	1962 Actual pressure LS	

Favorite				
Q Control	**p Control**	**p/Q Control**	**L S Control**	**Accumulator Control**
	1992 Factor PID Pressure Valve	1992 Factor PID Pressure Valve	1992 Factor PID Pressure Valve	
1924 Leckage Comp. Flow	1924 Leckage Comp.Flow	1924 Leckage Comp.Flow	1924 Leckage Comp.Flow	1924 Leckage Comp.Flow

Settings::Applikation Menü				
Q Control	**p Control**	**p/Q Control**	**LS Control**	**Accumulator Control**
App. Selection	App. Selection	App. Selection	App. Selection	App. Selection
Setup pump	Setup pump	Setup pump	Setup pump	Setup pump
Setup Q Control	Setup p Control	Setup Q Control	Setup LS Control	Setup Accu Control
Bypass Valve	Bypass Valve	Setup p Control	Bypass Valve	Bypass Valve
Analog Input Q	Pressure Valve	Bypass Valve	Pressure Valve	Analog Input Accu
Component Protection	Analog Input p	Pressure Valve	Analog Input LS	Component Protection
	Component Protection	Analog Input pQ	Component Protection	
		Component Protection		

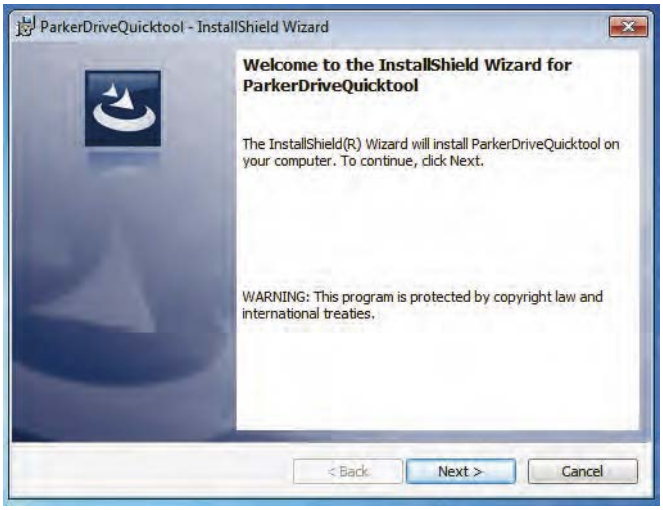
Einstellungen::Quick Setup Menü									
Q Control		**p Control**		**p/Q Control**		**LS Control**		**Accumulator Control**	
1900	Selected Application	1900	Selected Application	1900	Selected Application	1900	Selected Application	1900	Selected Application
1901	Pump Type	1901	Pump Type	1901	Pump Type	1901	Pump Type	1901	Pump Type
1904	Double Pump	1904	Double Pump	1904	Double Pump	1904	Double Pump	1904	Double Pump
1905	Displacement Pump1	1905	Displacement Pump1	1905	Displacement Pump1	1905	Displacement Pump1	1905	Displacement Pump1
1906	Displacement Pump2	1906	Displacement Pump2	1906	Displacement Pump2	1906	Displacement Pump2	1906	Displacement Pump2
1908	Pump speed min	1908	Pump speed min	1908	Pump speed min	1908	Pump speed min	1908	Pump speed min
1909	Pump speed max	1909	Pump speed max	1909	Pump speed max	1909	Pump speed max	1909	Pump speed max
1912	Max pressure pump1	1912	Max pressure pump1	1912	Max pressure pump1	1912	Max pressure pump1	1912	Max pressure pump1
1913	Max pressure pump2	1913	Max pressure pump2	1913	Max pressure pump2	1913	Max pressure pump2	1913	Max pressure pump2
1922	Qmax at 100% ANIN02			1922	Qmax at 100% ANIN02				
		1937	P max at 100% AIN02	1937	P max at 100% AIN02	1937	P max at 100% AIN02	1937	P max at 100% AIN02
		1942	Upper Limit pressure	1942	Upper Limit pressure	1942	Upper Limit pressure	1942	Upper Limit pressure
1938	Max p Sensor p0	1938	Max p Sensor p0	1938	Max p Sensor p0	1938	Max p Sensor p0	1938	Max p Sensor p0
		1935	Pressure Ramp up	1935	Pressure Ramp up	1935	Pressure Ramp up		
		1936	Pressure Ramp down	1936	Pressure Ramp down	1936	Pressure Ramp down		
				1990	Max p Pressure Valve	1960	Delta p Setpoint		
				1991	Feed Forward Pressure Valve	1963	Max p Sensor LS		
						1990	Max p Pressure Valve	1946	Pressure Mode
						1991	Feed Forward Pressure Valve	1949	Switch On pressure
						1990	Max p Pressure Valve	1950	Switch Off pressure
						1991	Feed Forward Pressure Valve	1990	Max p Pressure Valve
								1991	Feed Forward Pressure Valve

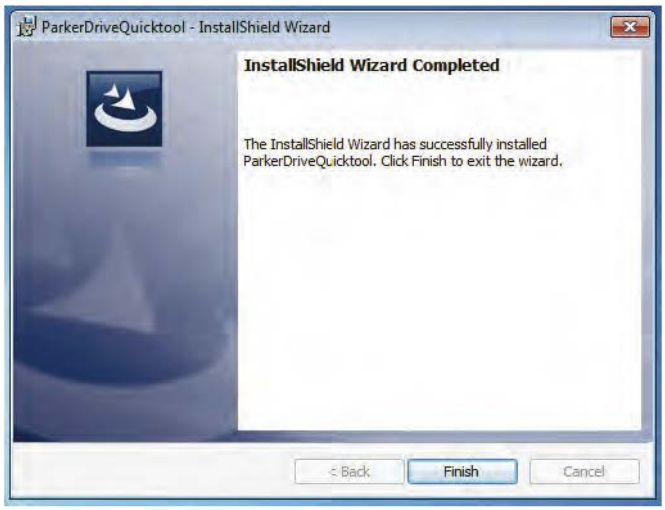
Monitor::Quick Monitor menu									
Q Control		p Control		p/Q Control		LS Control		Accumulator Control	
1917	Flow Setpoint			1982	Flow Setpoint				
1919	Actual flow			1919	Actual flow				
		1930	Pressure Setpoint	1930	Pressure Setpoint				
						1960	Delta p Setpoint		
						1961	Actual Delta p LS		
1932	Actual pressure	1932	Actual pressure	1932	Actual pressure	1932	Actual pressure	1932	Actual pressure
						1962	Actual pressure LS		
								1949	Switch On pressure
								1950	Switch Off pressure
		1971	Controller Output	1971	Controller Output	1971	Controller Output		
		1968	Pressure Controller Kp	1968	Pressure Controller Kp	1968	Pressure Controller Kp		
		1969	Pressure Controller Ki	1969	Pressure Controller Ki	1969	Pressure Controller Ki		
		1970	Pressure Controller Kd	1970	Pressure Controller Kd	1970	Pressure Controller Kd		
		1973	Inner window Ipart	1973	Inner window Ipart	1973	Inner window Ipart		
		1974	Outer window Ipart	1974	Outer window Ipart	1974	Outer window Ipart		
		1975	Pos. Limit Ki	1975	Pos. Limit Ki	1975	Pos. Limit Ki		
		1976	Neg. Limit Ki	1976	Neg. Limit Ki	1976	Neg. Limit Ki		
		2056	Rate Feedback	2056	Rate Feedback	2056	Rate Feedback		

Parker Drive Quicktool (PDQ)

Installation

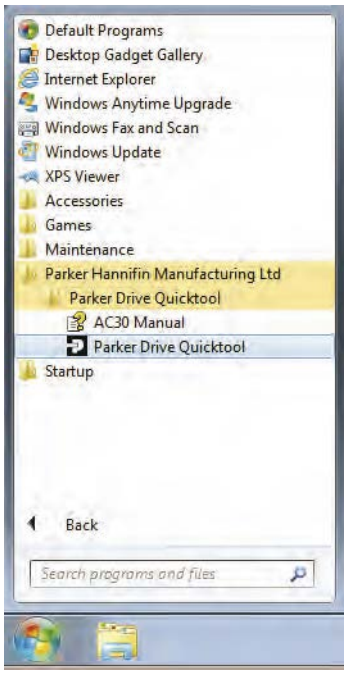
Launch the installer, setup.exe, from the latest version from www.parker.com/ssd/pdq





Follow the steps of the InstallShield Wizard.

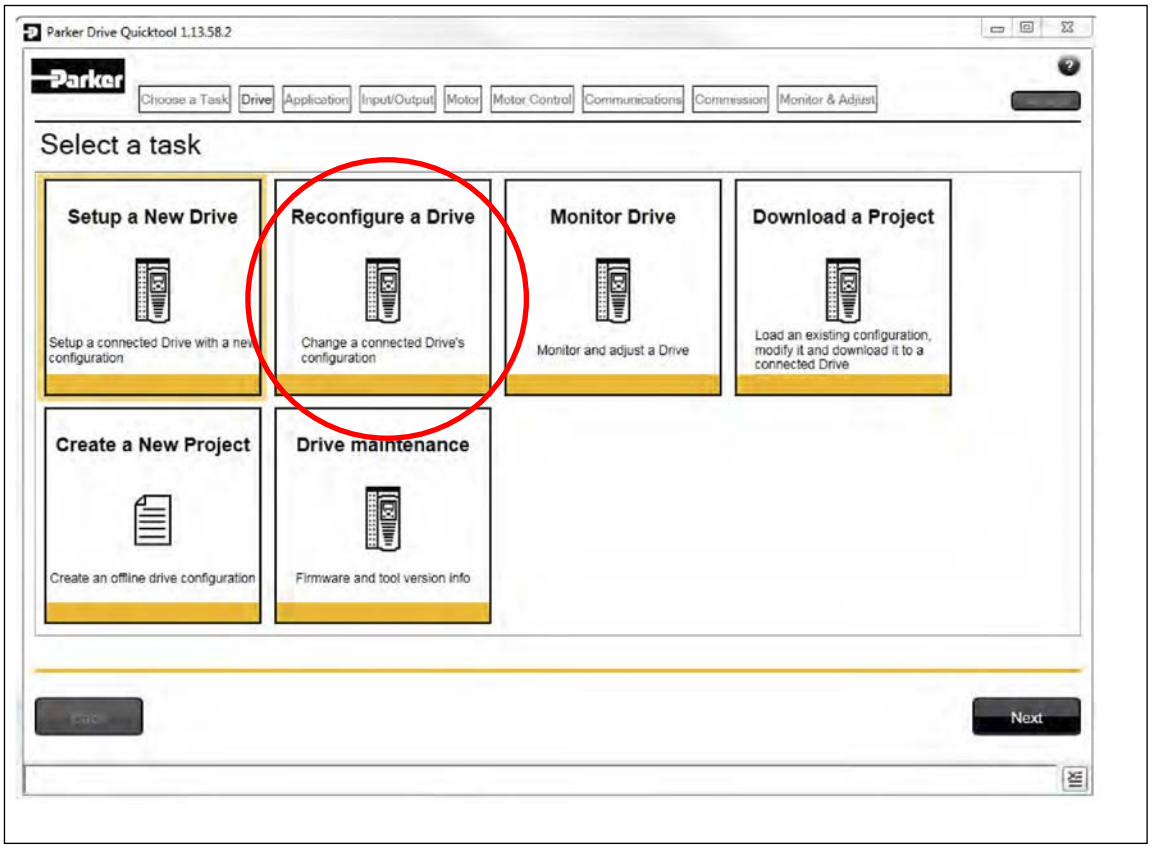
Starting the wizard

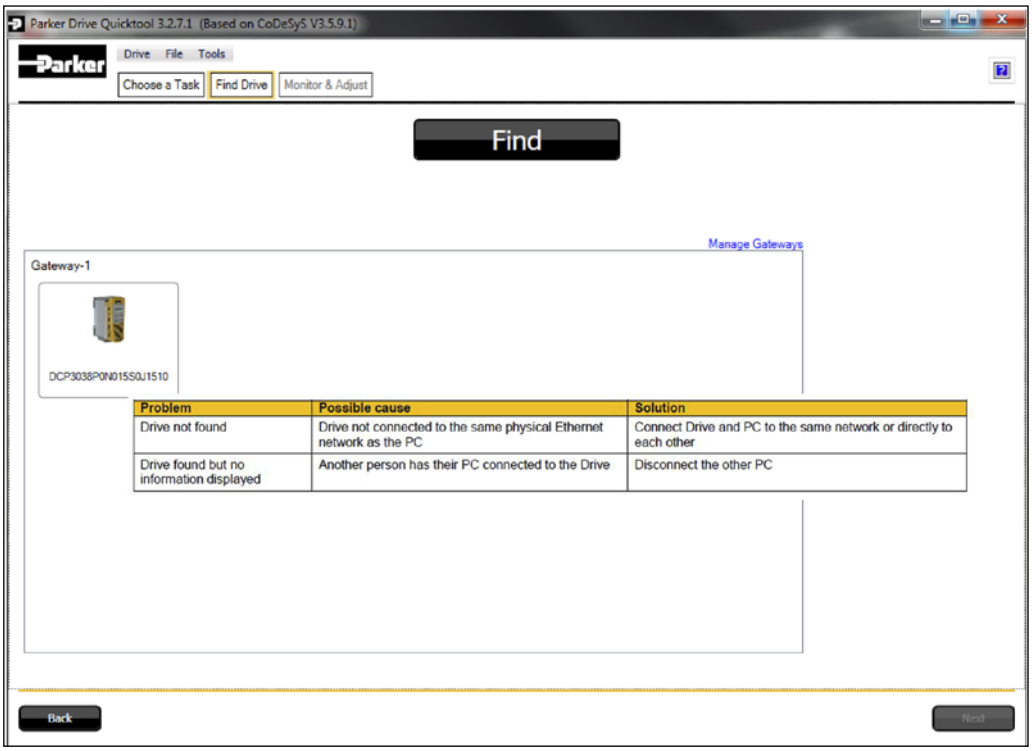


Once the InstallShield completes, run the PDQ from the “Start” menu as shown or from the desktop shortcut.

Requires an Ethernet connection → PC to Drive

Task selection



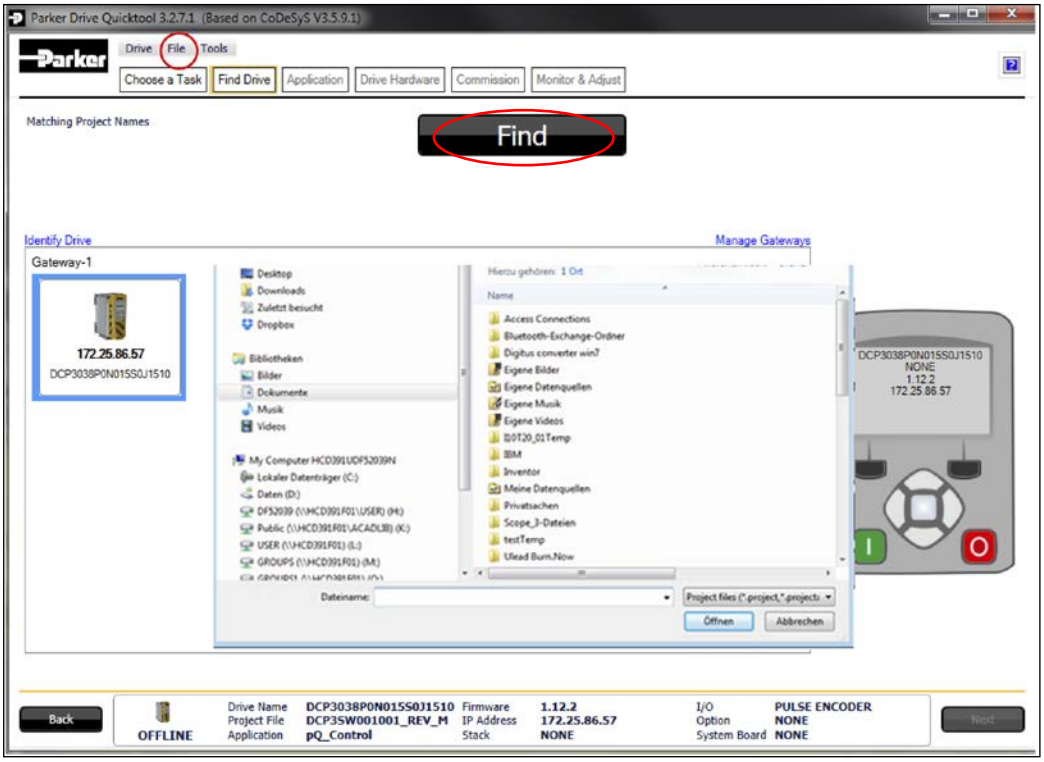


The wizard will automatically detect all AC30V Drives that are visible to the PC via it's Ethernet connections. This normally takes 10 seconds, during which time the user interface will go grey and will not respond to you. Once the Drive detection is complete, find your Drive in the list and click on it with the mouse. Information about the selected Drive will be displayed in the status area at the bottom of the screen. Ensure you have selected the correct Drive before continuing. If Drive Brake Switch is not fitted it will be indicted by the symbol as shown in Figure 9-5.

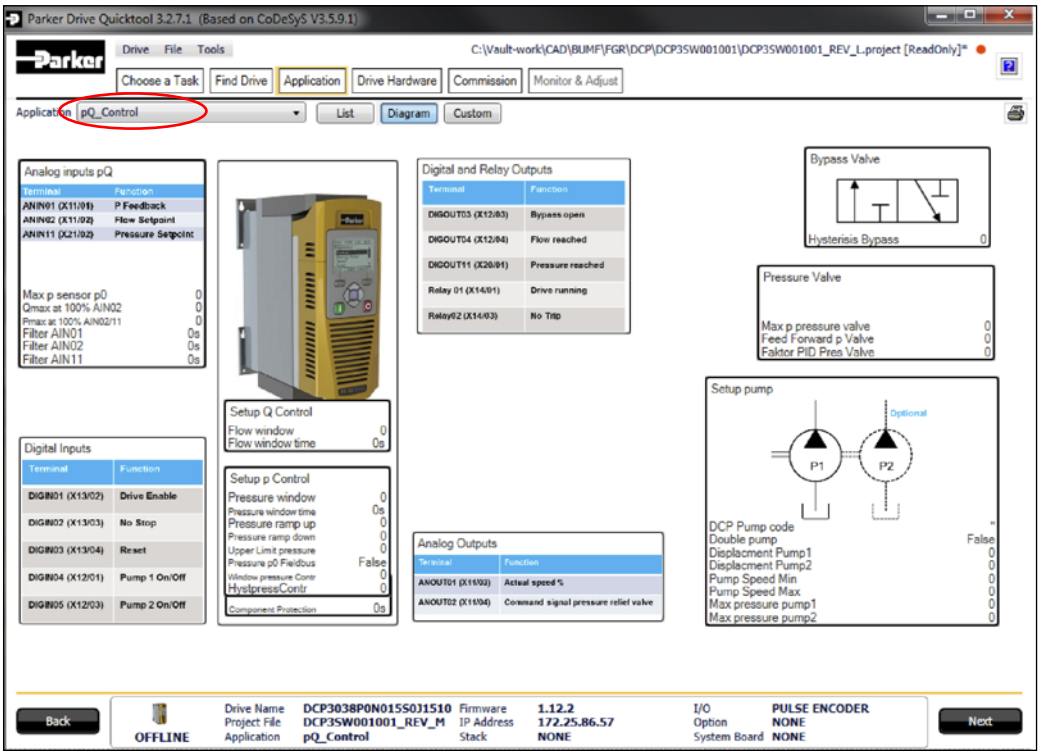
Note: The selected drive's name will match that shown on the GKP home screen.

Click on the "Next" button to begin Commissioning this Drive.

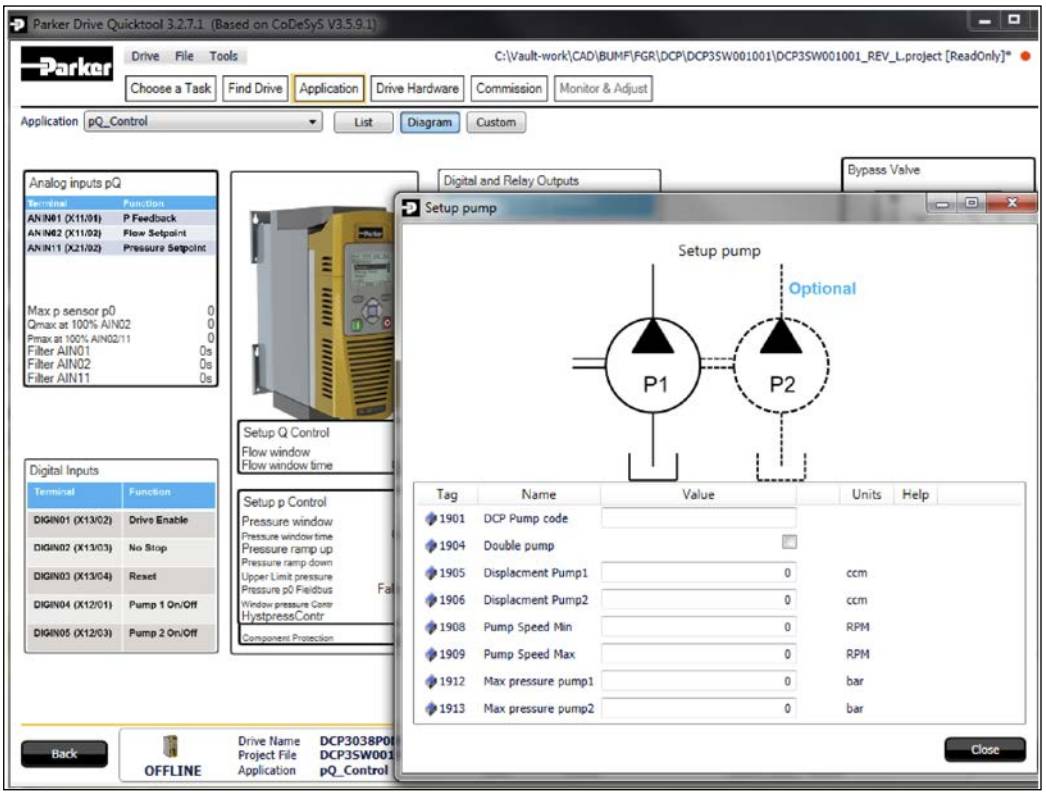
Open DCP application



Select application

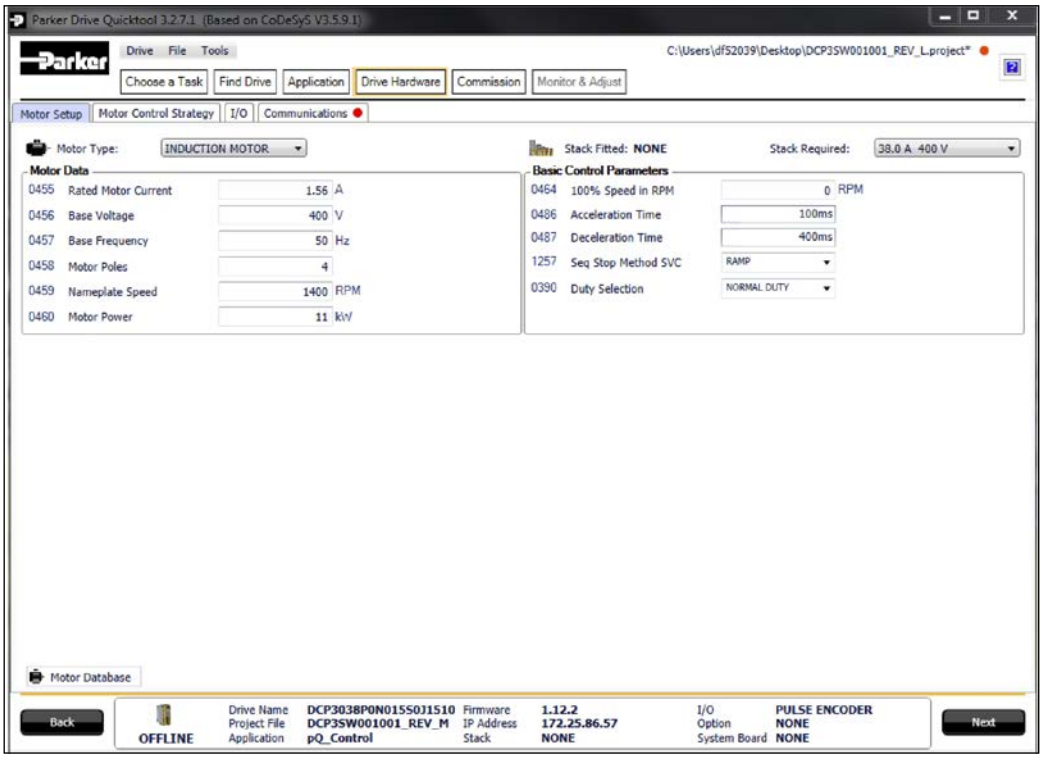


Setup DCP application



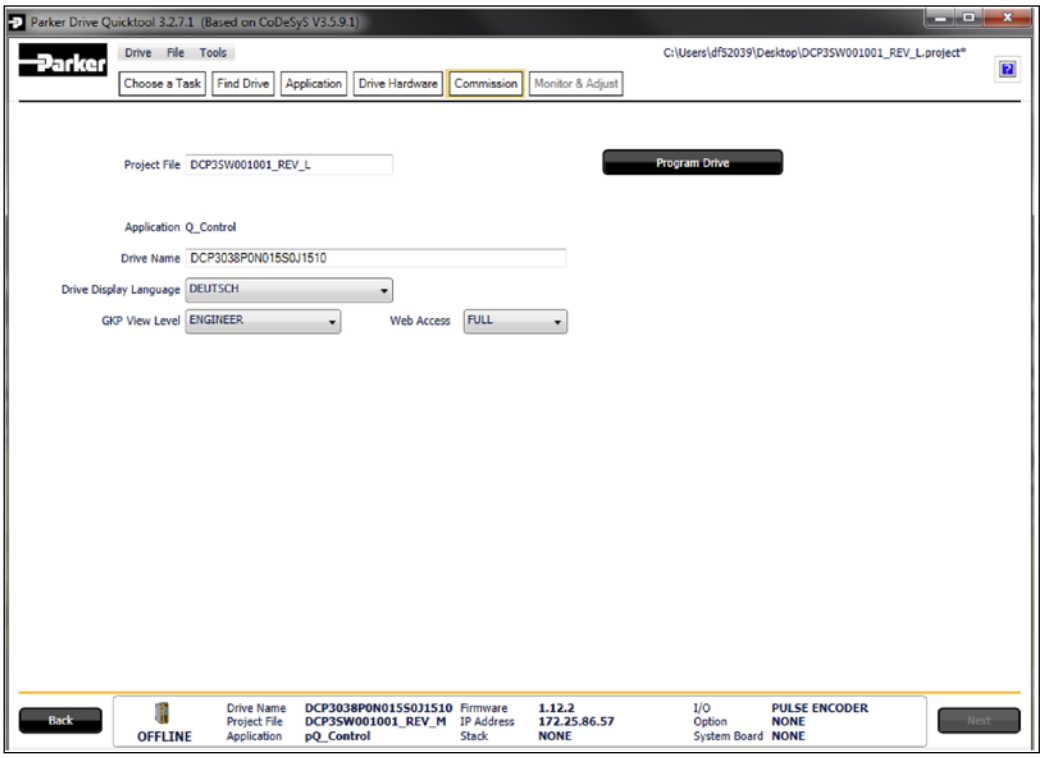
Parameter can be set by clicking the appropriate icon.

Setup motor, drive control, IOs and communication



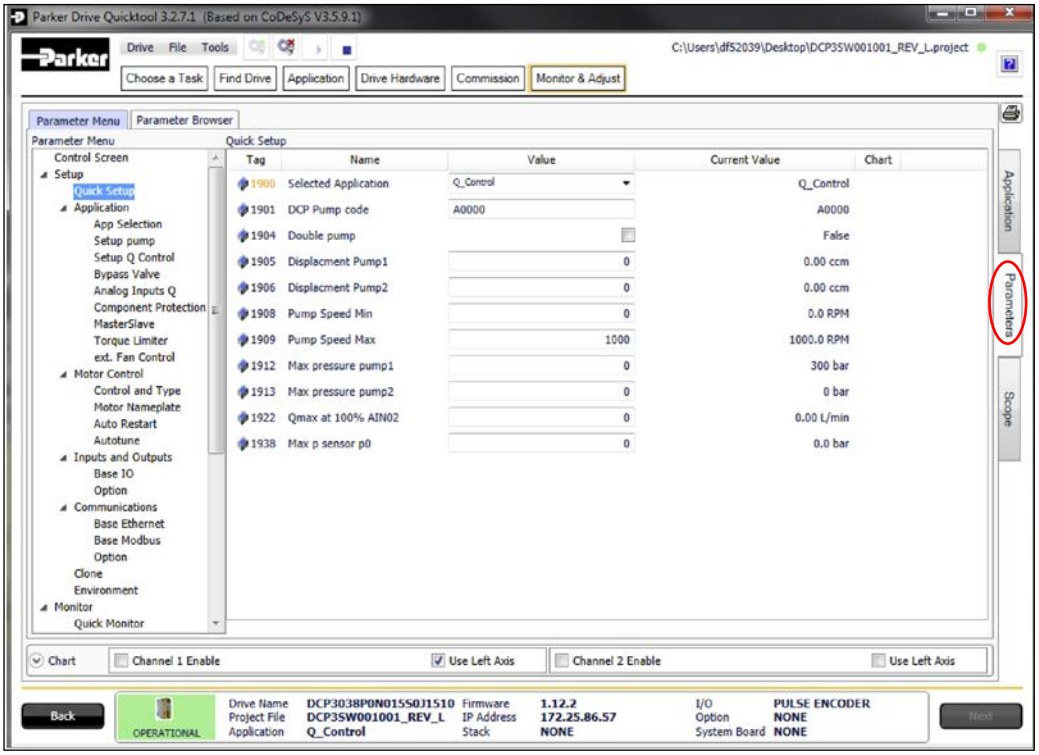
Set customer specific motor data, control strategy, I/Os and communication.

Commission the drive



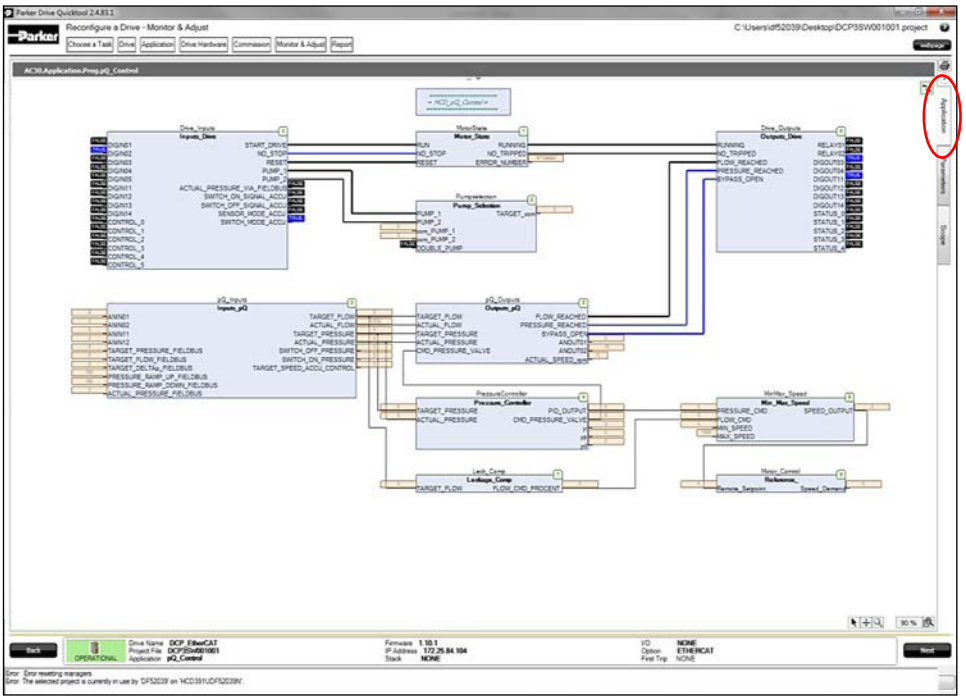
At this step the settings are whrite to the drive. A drive name can be set to.

Monitor and optimize the drive



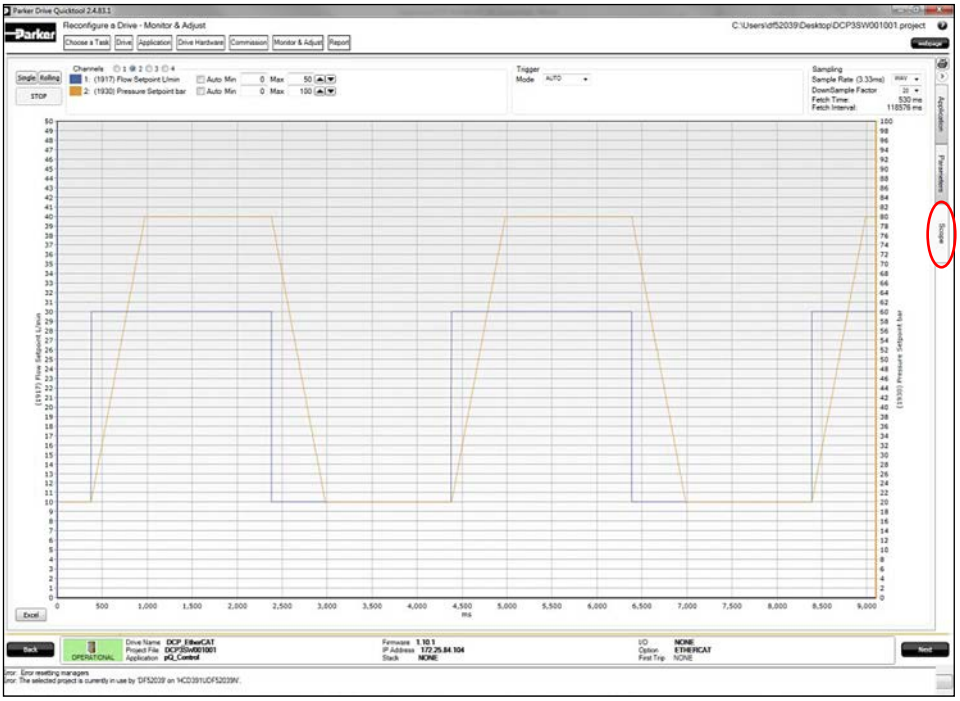
At parameter the optimization parameters can be set.

Monitor and optimize the drive



Under application can view the history and state of active application.

Monitor and optimize the drive



Under scope can viewed and stored the profile of parameters. Export as excel file is possible.

Parameter description

App Selection

This parameter selects the application. Depending on the selected application, the control strategy and terminal usage change.

Menu item	Setup::Application::App Selection
PNO	**1900**
Parameter Descriptions	Selected Application
Selection of Drive Controlled Pump modes:	
0: Q CONTROL	Flow control
1: p CONTROL	Pressure control
2: p/Q CONTROL	Flow control with mit combined pressure control
3: LS CONTROL	Load sensing
4: ACCUMULATOR CONTROL	Accumulator function with pressure sensor or 2-level pressure switch
Description	The selected application can only be changed when the drive is in configuration mode. The menus and parameters, viewed on the GKP (graphical keypad) depend on the application. Unused parameters are hidden.

Pump Settings

This parameter defines the settings of the pump(s).

Menu item	Setup::Application::Setup pump			
PNO	**1901**	**1904**	**1905**	**1906**
Parameter name	Pump type	Double pump	Displacement pump1	Displacement pump2
Parameter description	The pump type is defined by the last 5 digits of the DCP order code.	Single or Double pump	Displacement of pump 1 [ccm/rev]	Displacement of pump 2 [ccm/rev]
Function	By selecting the appropriate type of pump, all relevant parameters such as displacement, min. / max. speed, max. pressure and number of pumps (double pump (yes / no)) are set automatically.	If the pump is not configured via the DCP code, this parameter selects between single or double pump. The DCP code has to be set to default (DCPxxxxxxxxxxA0000).	If the pump is not configured via the DCP code, this parameter sets the displacement of pump 1. The DCP code has to to be set to default (DCPxxxxxxxxxxA0000).	If the pump is not configured via the DCP code, this parameter sets the displacement of pump 2. The DCP code has to be set to default (DCPxxxxxxxxxxA0000).

Menu item	Setup::Application::Setup pump			
PNO	**1908**	**1909**	**1912**	**1913**
Parameter name	Pump speed min	Pump speed max	Max pressure pump 1	Max pressure pump 2
Parameter description	Min. rotation speed of the pumps [rpm]	Max. rotation speed of the pumps [rpm]	Max. pressure of pump 1 [bar]	Max. pressure of pump 2 [bar]
Function	If the pump is not configured via the DCP code, this parameter sets the min. speed of the drive. If a double pump is selected, the higher min. speed of both pumps has to be selected (entered). The DCP code has to be set to default (DCPxxxxxxxxxxA0000).	If the pump is not configured via the DCP code, this parameter sets the max. speed of the drive. If a double pump is selected, the lower max. speed of both pumps has to be selected (entered). The DCP code has to be set to default (DCPxxxxxxxxxxA0000).	If the pump is not configured via the DCP code, this parameter sets the max. pressure of pump 1. If a double pump is installed, the max. pressure is a function of the pump selection. (e.g.: max. pressure of pump 1 = 300 Bar /// max. pressure of pump 2 = 170 Bar. If both pumps are used, the max. pressure is p = 170 Bar. If the second pump is deactivated (e.g. via the digital input), the max. pressure is set to p = 300 Bar.) The DCP code needs to be set to default (DCPxxxxxxxxxxxA0000).	If the pump is not configured via the DCP code, this parameter sets the max. pressure of pump 2. If a double pump is installed, the max. pressure is a function of the pump selection. (e.g.: max. pressure of pump 1 = 300 Bar /// max. pressure of pump 2 = 170 Bar. If both pumps are used, the max. pressure is p = 170 Bar. If the second pump is deactivated (e.g. via the digital input), the max. pressure is set to p = 300 Bar.)

Settings Q Control

Menu item	Monitor::Application:: Status Q,p/Q Control	Monitor::Application:: Fieldbus	Monitor::Application:: Status Q,p/Q Control	Monitor::Application:: Status Q Control
PNO	**1917**	**1918**	**1919**	**1920**
Parameter name	Flow Setpoint	Flow Setpoint Fieldbus	Actual Flow	Flow window
Parameter description	Flow setpoint of pump(s) [L/min]	Flow setpoint of pump(s) set by fieldbus [L/min]	Actual flow of the pump(s) [L/min]	Window for “Flow reached” [L/min]
Function	This parameter displays the target flow. The target flow is calculated by the input signal (ANIN02) and the scaling of the flow setpoint or the communication interface (field bus).	This parameter displays the target flow set by the communication interface (field bus).	This parameter shows the actual flow, which is calculated by the actual speed of the motor.	Flow window (+/-) for the message “Flow reached”.

Menu item	Monitor::Application:: Status Q Control	Setup::Application:: Analog Inputs	Monitor::Application:: Digital IOs	Favoriten:
PNO	**1921**	**1922**	**1923**	**1924**
Parameter name	Flow window time	Qmax at 100% AIN02	Flow reached	Leakage Comp. Flow
Parameter description	Window time for “Flow reached” [s]	Scaling of flow setpoint [L/min]	Flow setpoint reached	flow offset at increasing system pressure
Function	Window time for the message “Flow reached”.	Defines the flow setpoint for 100% input signal at ANIN02.	The parameter “Flow setpoint reached” is set to TRUE, if the deviation between the flow setpoint and the actual flow is lower than the flow window.	Displays the flow offset due to increasing system pressure to compensate the pump leakage.

Settings P Control

Menu item	Monitor::Application:: Status p,LS,p/Q Control	Monitor::Application:: Fieldbus	Monitor::Application:: Status p,LS,Accu,Q,p/Q Control	Setup::Application:: Setup p,LS,pQ Control
PNO	**1930**	**1931**	**1932**	**1933**
Parameter name	Pressure Setpoint	Pressure Setpoint Fieldbus	Actual pressure p0	Pressure window
Parameter description	Pressure setpoint [bar]	Pressure setpoint of pump, given by fieldbus [bar]	Actual pressure p0 [bar]	Window for “Pressure reached” [bar]
Function	This value displays the target pressure. The value results from the input signal at ANIN02 (p, LS control), ANIN11 (pQ control) or the communication interface (field bus).	This value displays the target pressure from the communication interface (field bus).	This value displays the actual pressure p0 at ANIN01.	Pressure window (+/-) for the message “Pressure reached”.

Menu item	Setup::Application::Setup p,LS,pQ Control			Setup::Application:: Analog Inputs
PNO	**1934**	**1935**	**1936**	**1937**
Parameter name	Pressure window time	Pressure ramp up	Pressure ramp down	Pmax at 100% AIN02/AIN11
Parameter description	Window time for “Pressure reached” [s]	Pressure ramp up [Bar/s]	Pressure ramp down [Bar/s]	Scaling of pressure setpoint [bar]
Function	Window time for the message “Pressure reached”.	Pressure ramp up.	Pressure ramp down.	Defines the pressure setpoint for 100% input signal at ANIN02 (p, LS control) or ANIN11 (pQ control).

Menu item	Setup::Application:: Analog Inputs	Monitor::Application:: Digital IOs		Setup::Application:: Setup p,LS,Accu,pQ Control
PNO	**1938**	**1939**	**1940**	**1942**
Parameter name	Max p Sensor p0	Pressure reached (p,LS Control)	Pressure reached (pQ Control)	Upper Limit pressure
Parameter description	Scaling of pressure transducer [bar]	Pressure setpoint reached	Pressure setpoint reached	Max. pressure [bar]
Function	Defines the max. pressure for 100% input signal at ANIN01.	The parameter “pressure setpoint reached” is set to TRUE, if the deviation between the pressure setpoint and the actual pressure is lower than the pressure window.	The parameter “pressure setpoint reached” is set to TRUE, if the deviation between the pressure setpoint and the actual pressure is lower than the pressure window.	Limits the max. pressure of the drive. If this max. pressure is higher than the entered max. pressure of pump 1 or 2, this value will be set equal to the max. pressure of pump 1 or 2.

Settings Accu Control

Menu item	Setup::Application:: Setup Accu Control	Monitor::Application::Status Accu Control		Setup::Application:: Setup Accu Control
PNO	1946	1947	1948	1949
Parameter name	Pressure Switch Mode	Sensor Mode On	Switch Mode On	Switch On pressure
Parameter description	Mode for accumulator charging	Device mode for accumulator charging	Switch on pressure [bar]	Switch off pressure [bar]
Function	Selection between the use of a pressure transducer at AIN01 or pressure switches at DIGIN04 (switch on signal) and DIGIN05 (switch off signal). If the parameter is set to TRUE, pressure switches will be used.	The parameter "device mode for accumulator charging" is set to TRUE, if a pressure transducer is used in accumulator charging control (Pressure Switch Mode = FALSE).	When the "switch on pressure" is undershooted, the drive accelerates to the max. rotation speed.	When the "switch off pressure" is overshooted, the drive decelerates to the min. rotation speed or stops.

Menu item	Setup::Application::Setup Accu Control			
PNO	1950	1951	1952	1953
Parameter name	Switch Off pressure	Count T short warning	Count T short error	Tmin OnOff Ctrl
Parameter description	Max. number of too short accumulator charging cycles (warning)		Max. number of too short accumulator charging cycles (error message)	Min. time between two accumulator charging cycles. [s]
Function	When exceeding the max. number of too short accumulator charging cycles, a warning message is generated. The minimum time between two accumulator charging cycles can be defined individually.	When exceeding the max. number of too short accumulator charging cycles, a warning message is generated. The minimum time between two accumulator charging cycles can be defined individually.	When exceeding the max. number of too short accumulator charging cycles, an error message is generated. The minimum time between two accumulator charging cycles can be defined individually.	Defines the min. time between two accumulator charging cycles. If the minimum time of two accumulator charging cycles is undershooted, a warning or an error message is generated.

Menu item	Setup::Application::Setup Accu Control	
PNO	1954	1955
Parameter name	Actl count time short	Reset Accu Error
Parameter description	Actual number of too short accumulator charging cycles.	Resets the number of too short accumulator charging cycles
Function	Actual number of accumulator charging cycles with a pause time shorter than the specified min. time between two accumulator charging cycles.	If this parameter is set to TRUE, the actual number of too short accumulator charging cycles is set to 0 and the error message will disappear.

Note: Parameter 1951-1955 available from REV J

Settings LS Control

Menu item	Setup::Application:: Setup LS Control	Monitor::Application:: Status LS Control		Setup::Application:: Setup Accu Control
PNO	1960	1961	1962	1963
Parameter name	Delta p Setpoint	Actual delta p LS	Actual pressure LS	Max p Sensor LS
Parameter description	Delta pressure setpoint [bar]	Actual delta pressure [bar]	Actual pressure LS [bar]	Scaling of pressure transducer (LS) [bar]
Function	This value sets the delta pressure setpoint for LS control.	This parameter shows the actual pressure difference (p0 – pLS).	This parameter shows the actual pressure pLS at AIN02.	Defines the max. pressure for 100% input signal at ANIN02.

Settings Pressure Controller

Menu item	Setup::Application::Status p,LS,pQ Control			Monitor::Application:: Status p,LS,pQ Control
PNO	1968	1969	1970	1971
Parameter name	Pressure Controller Kp	Pressure Controller Ki	Pressure Controller Kd	Controller Output
Parameter description	Proportional gain of pressure controller [%/Bar]	Integral gain of pressure controller [%/Bar×ms]	Differential gain of pressure controller [%×ms/Bar]	Controller output signal of pressure [%]
Function	Proportional gain of pressure controller. The output is calculated: "(target value – actual value) × p-gain".	Integral gain of pressure controller.	Differential gain of pressure controller.	Controller output signal (yp+yi+yd).

Menu item	Monitor::Application:: Controller Status	Monitor::Application:: Status p, LS, pQ Control		
PNO	1972	1973	1974	1975
Parameter name	Tracking Error	Inner window Ipart	Outer window Ipart	Pos. Limit Ki
Parameter description	Pressure tracking error [bar]	Inner window of I-part [bar]	Outer window of I-part [bar]	Positive limit of I-part [%]
Function	This parameter displays the pressure tracking error. Depending on the application it is calculated different. For p- and pQ control: "pressure setpoint – actual pressure". For LS-control: "delta pressure setpoint – actual delta pressure".	The inner window limits the working range of the integrator of the pressure controller. If the tracking error is less than the inner window, the integrator stops working and the output will stay constant.	The outer window limits the working range of the integrator of the pressure controller. If the tracking error exceeds the outer window, the integrator stops working and the output will stay constant.	This value limits the output of the integrator of the pressure controller in a positive direction.

Menu item	Monitor::Application:: Status p, LS, pQ Control			Monitor::Application:: Controller Status
PNO	1976	1977	1978	1982
Parameter name	Neg. Limit Ki	Rate Feedback	Pressure Controller Td	Controller yp
Parameter description	Negative limit of I-part [%]	Speed feed forward	Time constant of D-term [ms]	Output signal of the derivator [%]
Function	This value limits the output of the integrator of the pressure controller in a negative direction.	This value contains the speed feed forward term. The actual rotation speed is multiplied by this factor and added to the controller output signal. The min. rotation speed of the pump(s) is compensated.	Time constant of derivator.	Shows the derivator part of the controller output signal.

Menu item	Monitor::Application:: Controller Status	
PNO	1983	1984
Parameter name	Controller yi	Controller yd
Parameter description	Stellsignal yi	Stellsignal yd
Function	Shows the integral part of the controller output signal.	Shows the differenztial part of the controller output signal.

Settings Pressure Valve

Menu item	Setup::Application::Pressure Valve		Favoriten:
PNO	1990	1991	1992
Parameter name	Max p Pressure Valve	Feed Forward pressure Valve	Faktor PID pressure Valve
Parameter description	Maximum pressure of pressure relief valve [bar]	Feed forward gain of pressure relief valve [%/Bar]	Gain factor controller output pressure relief valve
Function	This value sets the maximum pressure of the pressure relief valve at 100% control signal.	This value sets the pressure feed forward gain for the proportional pilot pressure valve. If the pressure relief valve opens before the drive has reached the minimum speed, the feed forward gain has to be increased.	This value adjusts the gain of the controller output to the pressure relief valve.

Settings Bypass Valve

Menu item	Setup::Application::Bypass Valve	
PNO	1995	1996
Parameter name	Hysteresis Bypass	Bypass open
Parameter description	Hysteresis for Bypass valve	Bypass open
Function	Hysterisis to close the bypass valve after it has been opened. Bypass valve will be opened if "actual speed = minimal speed". Bypass valve will be closed if "actual speed >= minimal speed + hysterisis".	This parameter is set to TRUE, if set DOUT03 for open bypass valve.

Settings Analog/Digital Inputs

Menu item	Setup::Application::Analog Inputs			Monitor::Application:: Digital IOs
PNO	2000	2001	2002	2003
Parameter name	Filter Analog Input01	Filter Analog Input02	Filter Analog Input11	Start
Parameter description	Filter of analog input 01	Filter of analog input 02	Filter of analog input 11	Start
Function	Filter of analog value AIN01 (pressure transducer p0).	Filter of analog value AIN02 (target Q (Q Control) or target p (p Control)).	Filter of analog value AIN11 (target p (pQ Control)).	This parameter is set to TRUE, if the motor is running via DIN01 or Control.0.

Menu item	Monitor::Application::Digital IOs			
PNO	2004	2005	2006	2007
Parameter name	No Stop	Reset	Pump 1 or switch On	Pump 2 or switch Off
Parameter description	No Stop	Reset error	Pump 1 or switch On pressure	Pump 2 or switch Off pressure
Function	This parameter is set to TRUE, if the motor is set to "No Stop" via DIN02 or Control.1.	This parameter is set to TRUE, if the "Reset" is set via DIN03 or Control.2.	This parameter is set to TRUE, if pump 1 is selected (Q,p,pQ,LS Control) or if "Switch On pressure" is set (Accumulator Control).	This parameter is set to TRUE, if pump 2 is selected (Q,p,pQ,LS - Control) or if "Switch On Pressure" is set (Accumulator Control).

Settings Relay Outputs

Menu item	Monitor::Application::Digital IOs	
PNO	2010	2011
Parameter name	Drive Running Relay01	No Drive Error Relay02
Parameter description	Drive running Relay 01	No Drive error active Relay02
Function	This parameter is set to TRUE, if the motor is enabled and no error is active.	This parameter is set to TRUE, if no drive error is active.

Settings Fieldbus

Menu item	Monitor::Application:: Fieldbus	
PNO	2021	2022
Parameter name	Control Word	Status Word
Parameter description	Control Word	Status Word
Function	This parameter displays the actual controlword.	This parameter displays the actual statusword.

Settings Testfunction

Menu item	Monitor::Application::Testfunction			
PNO	**2030**	**2031**	**2032**	**2033**
Parameter name	DIGIN01 Start	DIGIN02 No Stop	DIGIN03 Reset	DIGIN04 Pump1
Parameter description	Start	No Stop	Reset error	Select pump 1
Function	Simulating of DIN01. Via this parameter, the drive can be started without setting DIN01. This parameter is only used for testing.	Simulating of DIN02. Via this parameter, the drive can be set to “No Stop” without setting DIN02. This parameter is only used for testing.	Simulating of DIN03. Via this parameter, the actual error of the drive can be resetted. This parameter is only used for testing.	Simulating of DIN04. Via this parameter, pump 1 can be turned on or off. It can be used for a double pump only. This parameter is only used for testing.

Menu item	Monitor::Application::Testfunction			
PNO	**2034**	**2035**	**2036**	**2040**
Parameter name	DIGIN05 Pump2	DIGIN04 Switch On	DIGIN05 Switch Off	Testmovement
Parameter description	Select pump 2	Switch On pressure Accumulator control	Switch Off pressure Accumulator control	Testmovement
Function	Simulating of DIN05. Via this parameter, pump 2 can be turned on or off. It can be used for a double pump only. This parameter is only used for testing.	Simulating of DIN04, if the Accumulator Control is active. Via this parameter, the “Switch On Pressure” can be simulated. This parameter is only used for testing.	Simulating of DIN05, if the Accumulator Control is active. Via this parameter. the “Switch Off Pressure” can be simulated. This parameter is only used for testing.	This parameter will start the test movement. External setpoints for Q and p will be ingnored. Settings for the test movement are made in the parameters 2041 to 2045.

Menu item	Monitor::Application::Testfunction			
PNO	**2041**	**2042**	**2043**	**2044**
Parameter name	P1 Testmovement	P2 Testmovement	Q1 Testmovement	Q2 Testmovement
Parameter description	Pressure 1 Testmovement	Pressure 2 Testmovement	Flow 1 Testmovement	Flow 1 Testmovement
Function	Target-pressure 1 for the test movement. The pressure ramps [bar/s] are taken over from the setup of the p-Control.	Target-pressure 2 for the test movement. The pressure ramps [Bar/s] are taken over from the setup of the p-Control.	Target-Flow 1 for the test movement. The ramps are depending on the motor ramps.	Target-Flow 2 for the test movement. The ramps are depending on the motor ramps.

Menu item	Monitor::Application:: Testfunction
PNO	**2045**
Parameter name	Time Testmovement
Parameter description	Time Testmovement
Function	Waiting time between pressure 1 and pressure 2 or flow 1 and flow 2.

Settings Component Protection

Menu item	Setup::Application:: Component Protection
PNO	**2050**
Parameter name	Component Protection
Parameter description	Component Protection
Function	This value is used to protect the motor and pump from overheating at min. speed. After the elapsed time at min. speed, the drive stopps. If the time is set to 0s, the function is switched off.

Settings Trip Status

Menu item	Monitor::Quick Monitor
PNO	**2051**
Parameter name	Trip Status
Parameter description	Trip Status
Function	This value displays the actual error status.

Settings Hydraulic Power Units

Menu item	Monitor::Application:: HPU Messages			
PNO	**2053**	**2054**	**2055**	**2056**
Parameter name	HPU Cont. No warning	HPU Cont. No error	HPU Oil No warning	HPU Oil. No error
Parameter description	No warning of filter is active	No error of filter is active	No warning oil level	No error oil level
Function	This value is set to TRUE, if the warning of the electrical dust indication of the filter is active.	This value is set to TRUE, if the error of the electrical dust indication of the filter is active.	This value is set to TRUE, if the warning of the oil level is active.	This value is set to TRUE, if the error of the oil level is active.

Menu item	Monitor::Application:: HPU Messages	
PNO	**2057**	**2058**
Parameter name	HPU Temp. No warning	HPU Temp. No error
Parameter description	No warning of oil temperature	No error of oil temperature
Function	This value is set to TRUE, if the warning of the oil temperature is active.	This value is set to TRUE, if the error of the oil temperature is active.

Parameter list

PNO	Name	Path(s)	Type	Default	Range	Units	WQ	Selected App
1900	Selected Application	Setup::Application::App Selection	USINT (enum)	0	0: Q CONTROL 1: p CONTROL 2: p/Q Control 3: LS Control 4: ACCUMULA-TOR CONTROL		CONFIG	ALL
1901	Pump type	Setup::Application::Setup pump::Pump type	String	DCP3xx-xA0000			STOPPED	ALL
1904	Double Pump	Setup::Application::Setup pump::Double pump	BOOL	FALSE			STOPPED	ALL
1905	Displacement Pump1	Setup::Application::Setup pump::Displ. Pump1	REAL	0	0 to 1000	CCM	STOPPED	ALL
1906	Displacement Pump2	Setup::Application::Setup pump::Displ. Pump2	REAL	0	0 to 1000	CCM	STOPPED	ALL
1908	Pump Speed min RPM	Setup::Application::Setup pump::Pump Speed Min	REAL	0	0 to 3000	RPM	ALWAYS	ALL
1909	Pump Speed max RPM	Setup::Application::Setup pump::Pump Speed Max	REAL	1000	0 to 6000	RPM	ALWAYS	ALL
1912	Max pressure pump1	Setup::Application::Setup pump::Max pressure pump1	REAL	0	0 to 500	BAR	ALWAYS	ALL
1913	Max pressure pump2	Setup::Application::Setup pump::Max pressure pump2	REAL	0	0 to 500	BAR	ALWAYS	ALL
1917	Flow Setpoint	Monitor::Application::Q Control Monitor::Application::p/Q Control	REAL	0	0 to 1000	LPM	NEVER	Q , pQ
1918	Flow Setpoint Fieldbus	Monitor:Application:Fieldbus	REAL	0	0 to 1000	LPM	ALWAYS	Q , pQ
1919	Actual Flow	Monitor::Application::Q Control Monitor::Application::p/Q Control	REAL	0	0 to 1000	LPM	NEVER	Q , pQ
1920	Flow window	Setup::Application::Q Control	REAL	0	0 to 1000	LPM	ALWAYS	Q , pQ
1921	Flow window time	Setup::Application::Q Control	TIME	0	0 to 60	S	ALWAYS	Q , pQ
1922	Qmax at 100% AIN02	Setup::Application::Analog Input Q Setup::Application::Analog Input pQ	REAL	0	0 to 1000	LPM	ALWAYS	Q , pQ
1923	Flow reached	Monitor::Application::Digital IOs	BOOL	FALSE			NEVER	LS
1924	Leakage Comp. Flow	Favourites	REAL	0	0 to 100	LPM	NEVER	ALL
1930	Pressure Setpoint	Monitor::Application::p Control Monitor::Application::p/Q Control Monitor::Application::LS Control	REAL	0	0 to 500	BAR	NEVER	p, p/Q. LS
1931	Pressure Setpoint Field-bus	Monitor:Application:Fieldbus	REAL	0	0 to 500	BAR	ALWAYS	p, p/Q. LS
1932	Actual pressure p0	Monitor::Application::Q Control Monitor::Application::p Control Monitor::Application::p/Q Control Monitor::Application::LS Control Monitor::Application::Accu Control	REAL	0	0 to 500	BAR	NEVER	ALL
1933	Pressure window	Setup::Application::p Control Setup::Application::p/Q Control Setup::Application::LS Control	REAL	0	0 to 500	BAR	ALWAYS	p, p/Q. LS
1934	Pressure window time	Setup::Application::p Control Setup::Application::p/Q Control Setup::Application::LS Control	TIME	0	0 to 60	S	ALWAYS	p, p/Q. LS
1935	Pressure ramp up	Setup::Application::p Control Setup::Application::p/Q Control Setup::Application::LS Control	REAL	0	0 to 10000	BAR	ALWAYS	p, p/Q. LS
1936	Pressure ramp down	Setup::Application::p Control Setup::Application::p/Q Control Setup::Application::LS Control	REAL	0	0 to 10000	BAR	ALWAYS	p, p/Q. LS
1937	P amx at 100%	Setup::Application::Analog Input p Setup::Application::Analog Input pQ Setup::Application::Analog Input LS	REAL	0	0 to 500	BAR	ALWAYS	p, p/Q. LS

PNO	Name	Path(s)	Type	Default	Range	Units	WQ	Selected App
1938	Max p sensor p0	Setup::Application::Analog Input Q Setup::Application::Analog Input p Setup::Application::Analog Input pQ Setup::Application::Analog Input LS Setup::Application::Analog Input Accu	REAL	0	0 to 500	BAR	ALWAYS	ALL
1939	Pressure reached p,LS Control	WARNING Monitor::Application::Digital IOs	BOOL	FALSE			NEVER	p , LS
1940	Pressure reached pQ	Monitor::Application::Digital IOs	BOOL	FALSE			NEVER	pQ
1941	Min outlet pressure		REAL	0	0 to 100	BAR	ALWAYS	
1942	Upper Limit pressure	Setup::Application::p Control Setup::Application::p/Q Control Setup::Application::LS Control	REAL	0	0 to 500	BAR	ALWAYS	p, p/Q. LS
1946	Pressure Switch Mode	Setup::Application::Accu Control	BOOL	FALSE			ALWAYS	Accu
1947	Sensor Mode On	Monitor::Application::Status Accu Control	BOOL	FALSE			NEVER	Accu
1948	Switch Mode On	Monitor::Application::Status Accu Control	BOOL	FALSE			NEVER	Accu
1949	Switch On pressure	Setup::Application::Accu Control	REAL	0	0 to 500	BAR	ALWAYS	Accu
1950	Switch Off pressure	Setup::Application::Accu Control	REAL	0	0 to 500	BAR	ALWAYS	Accu
1951	Count T short warning		INT	0			ALWAYS	
1952	Count T short error		INT	0			ALWAYS	
1953	T min OnOff control		TIME	0		S	ALWAYS	
1954	Actual Count time short		INT	0			ALWAYS	
1955	Accu min pump speed		INT	0		RPM	ALWAYS	
1960	Delta p Setpoint	Setup::Application::LS Control	REAL	0	0 to 500	BAR	ALWAYS	LS
1961	Actual delta p LS	Monitor::Application::Status LS Control	REAL	0	0 to 500	BAR	NEVER	LS
1962	Actual pressure LS	Monitor::Application::Status LS Control	REAL	0	0 to 500	BAR	NEVER	LS
1963	Max p Sensor LS	Setup::Application::LS Control	REAL	0	0 to 500	BAR	ALWAYS	LS
1968	Pressure Controller Kp	Monitor::Application::p Control Monitor::Application::p/Q Control Monitor::Application::LS Control	REAL	0,001	0 to 100	%/BAR	ALWAYS	p, p/Q, LS
1969	Pressure Controller Ki	Monitor::Application::p Control Monitor::Application::p/Q Control Monitor::Application::LS Control	REAL	0,001	0 to 100	%/BAR	ALWAYS	p, p/Q, LS
1970	Pressure Controller Kd	Monitor::Application::p Control Monitor::Application::p/Q Control Monitor::Application::LS Control	REAL	0	0 to 100	%/BAR	ALWAYS	p, p/Q, LS
1971	Controller Output	Monitor::Application::p Control Monitor::Application::p/Q Control Monitor::Application::LS Control	REAL	0	-100 to 100	%	NEVER	p, p/Q, LS
1972	Tracking Error	Monitor::Application::p Control Monitor::Application::p/Q Control Monitor::Application::LS Control	REAL	0	0 to 500	BAR	NEVER	p, p/Q, LS
1973	Inner window Ipart	Monitor::Application::p Control Monitor::Application::p/Q Control Monitor::Application::LS Control	REAL	0	0 to 500	BAR	ALWAYS	p, p/Q, LS
1974	Outer window Ipart	Monitor::Application::p Control Monitor::Application::p/Q Control Monitor::Application::LS Control	REAL	300	0 to 500	BAR	ALWAYS	p, p/Q, LS
1975	Pos. Limit Ki	Monitor::Application::p Control Monitor::Application::p/Q Control Monitor::Application::LS Control	REAL	100	0.000 to 10.000	s	ALWAYS	p, p/Q, LS
1976	Neg. Limit Ki	Monitor::Application::p Control Monitor::Application::p/Q Control Monitor::Application::LS Control	REAL	-100	0 to 100	%	ALWAYS	p, p/Q, LS
1977	Rate Feedback	Monitor::Application::p Control Monitor::Application::p/Q Control Monitor::Application::LS Control	REAL	0	-10 to 10	%	ALWAYS	p, p/Q, LS

PNO	Name	Path(s)	Type	Default	Range	Units	WQ	Selected App
1982	Controller yp	Monitor::Application::Controller Status	REAL	0	-100 to 100	%	NEVER	p, p/Q, LS
1983	Controller yi	Monitor::Application::Controller Status	REAL	0	-100 to 100	%	NEVER	p, p/Q, LS
1984	Controller yd	Monitor::Application::Controller Status	REAL	0	-100 to 100	%	NEVER	p, p/Q, LS
1990	Max p pressure Valve	Setup::Application::Pressure Valve Setup::Application::Pressure Valve Setup::Application::Pressure Valve	REAL	0	0 - 500	bar	ALWAYS	p, p/Q, LS
1991	Feed Forward pressure Valve	Setup::Application::Pressure Valve Setup::Application::Pressure Valve Setup::Application::Pressure Valve	REAL	20	0 - 100	%	ALWAYS	p. p/Q, LS
1992	Faktor PID pressure Valve	Monitor::Application::Digital IOs	BOOL	0.2	0 - 1	%	ALWAYS	p. p/Q, LS
1995	Hysteris Bypass	Setup::Application::Bypass Valve Setup::Application::Bypass Valve Setup::Application::Bypass Valve Setup::Application::Bypass Valve Setup::Application::Bypass Valve	REAL	0	0 - 1000	RPM	ALWAYS	ALL
1996	Bypass open	Monitor::Application::Digital IOs Monitor::Application::Digital IOs Monitor::Application::Digital IOs Monitor::Application::Digital IOs Monitor::Application::Digital IOs	BOOL	FALSE			NEVER	ALL
2000	Filter Analog Input01	Setup::Application::Analog Input Q Setup::Application::Analog Input p Setup::Application::Analog Input pQ Setup::Application::Analog Input LS Setup::Application::Analog Input Accu	TIME	0	0 to 60	S	ALWAYS	ALL
2001	Filter Analog Input02	Setup::Application::Analog Input Q Setup::Application::Analog Input p Setup::Application::Analog Input pQ Setup::Application::Analog Input LS	TIME	0	0 to 60	S	ALWAYS	p. p/Q, LS
2002	Filter Analog Input11	Setup::Application::Analog Input pQ	TIME	0	0 to 60	S	ALWAYS	p/Q
2003	Start	Monitor::Application::Digital IOs	BOOL	FALSE			NEVER	ALL
2004	No Stop	Monitor::Application::Digital IOs	BOOL	FALSE			NEVER	ALL
2005	Reset	Monitor::Application::Digital IOs	BOOL	FALSE			NEVER	ALL
2006	Pump 1 or Switch On	Monitor::Application::Digital IOs	BOOL	FALSE			NEVER	ALL
2007	Pump 2 or switch Off	Monitor::Application::Digital IOs	BOOL	FALSE			NEVER	ALL
2010	Drive Running Relay01	Monitor::Application::Digital IOs	BOOL	FALSE			NEVER	ALL
2011	No Drive Error Relay02	Monitor::Application::Digital IOs	BOOL	FALSE			NEVER	ALL
2015	Speed loop Pgain	Monitor::Application::Speed Loop Ctrl	REAL	20	0 to 100	%	ALWAYS	p. p/Q, LS
2016	Speed loop I time	Monitor::Application::Speed Loop Ctrl	TIME	0.1	0 to 10	S	ALWAYS	p. p/Q, LS
2017	I - Defeat	Monitor::Application::Speed Loop Ctrl	BOOL	FALSE			ALWAYS	p. p/Q, LS
2018	I – Preset	Monitor::Application::Speed Loop Ctrl	REAL	0	0 -100	%	ALWAYS	p. p/Q, LS
2019	Dmd Filter TC	Monitor::Application::Speed Loop Ctrl	TIME	0	0 - 10	S	ALWAYS	p. p/Q, LS
2020	Fbk Filter TC	Monitor::Application::Speed Loop Ctrl	TIME	0	0 - 10	S	ALWAYS	p. p/Q, LS
2021	Control Word	Monitor:Application:Fieldbus	WORD	0			ALWAYS	ALL
2022	Status Word	Monitor:Application:Fieldbus	WORD	0			NEVER	ALL
2030	DIGIN01 Start	Monitor::Application::Testfunction	BOOL	FALSE			ALWAYS	ALL
2031	DIGIN02 No Stop	Monitor::Application::Testfunction	BOOL	FALSE			ALWAYS	ALL
2032	DIGIN03 Reset	Monitor::Application::Testfunction	BOOL	FALSE			ALWAYS	ALL
2033	DIGIN04 Pump 1	Monitor::Application::Testfunction	BOOL	FALSE			ALWAYS	ALL
2034	DIGIN05 Pump 2	Monitor::Application::Testfunction	BOOL	FALSE			ALWAYS	ALL
2035	DIGIN04 Switch On	Monitor::Application::Testfunction	BOOL	FALSE			ALWAYS	ALL
2036	DIGIN05 Switch Off	Monitor::Application::Testfunction	BOOL	FALSE			ALWAYS	ALL
2040	Testmovement	Monitor::Application::Testfunction	BOOL	FALSE			ALWAYS	ALL
2041	P1 Testmovement	Monitor::Application::Testfunction	REAL	0	0 - 400	BAR	ALWAYS	ALL
2042	P2 Testmovement	Monitor::Application::Testfunction	REAL	0	0 - 400	BAR	ALWAYS	ALL
2043	Q1 Testmovement	Monitor::Application::Testfunction	REAL	0	0 - 1000	LPM	ALWAYS	ALL
2044	Q2 Testmovement	Monitor::Application::Testfunction	REAL	0	0 - 1000	LPM	ALWAYS	ALL

PNO	Name	Path(s)	Type	Default	Range	Units	WQ	Selected App
2045	Time Testmovement	Monitor::Application::Testfunction	TIME	0	0 - 300	S	ALWAYS	ALL
2050	Component Protection	Setup::Application::Component Protection	TIME	0	0 - 600	S	ALWAYS	ALL
2051	Trip Status	WARNING	DWORD	FALSE			NEVER	ALL
2053	HPU Cont. no warning	WARNING	BOOL	FALSE			NEVER	ACCU
2054	HPU Cont.no error	WARNING	BOOL	FALSE			NEVER	ACCU
2055	HPU Oil no warning	WARNING	BOOL	FALSE			NEVER	ACCU
2056	HPU Oil no error	WARNING	BOOL	FALSE			NEVER	ACCU
2057	HPU Temp. no warning	WARNING	BOOL	FALSE			NEVER	ACCU
2058	HPU Temp. no error	WARNING	BOOL	FALSE			NEVER	ACCU

Trips and Fault Finding

What happens when a trip occurs

When a trip occurs, the drive's power stage is immediately disabled causing the motor and load to coast to a stop. The trip is latched until action is taken to reset it. This ensures that trips due to transient conditions are captured and the drive is disabled, even when the original cause of the trip is no longer present.

Keypad Indications

If a trip condition is detected the activated alarm is displayed on the GKP display.

Resetting a trip condition

All trips must be reset before the drive can be re-enabled. A trip can only be reset once the trip condition is no longer active, i.e. a trip due to a heatsink over-temperature will not reset until the temperature is below the trip level.

You can reset the trip as follows:

1. Press the (STOP) key to reset the trip and clear the alarm from the display.
2. In remote terminal sequencing mode, create a 0 to 1 transition on the RESET TRIP bit, (bit 7), in the App Control Word parameter.
3. In remote communications sequencing mode, create a 0 to 1 transition on the RESET TRIP bit, (bit 7), in the Comms Control Word parameter.

ID	Trip Name	Possible Reason for Trip
1	OVER VOLTAGE	The drive internal dc link voltage is too high: · The supply voltage is too high · Trying to decelerate a large inertia load too quickly; DECEL TIME time too short The brake resistor is open circuit To help prevent this trip, enable the DC Link Volts Limit feature
2	UNDER VOLTAGE	DC link low trip: · Supply is too low/power down
3	OVER CURRENT	The motor current being drawn from the drive is too high: · Trying to accelerate a large inertia load too quickly; ACCEL TIME time too short · Trying to decelerate a large inertia load too quickly; DECEL TIME time too short · Application of shock load to motor · Short circuit between motor phases · Short circuit between motor phase and earth · Motor output cables too long or too many parallel motors connected to the drive · FIXED BOOST level set too high
4	STACK FAULT	Stack self protection · Instantaneous overcurrent detected by the power stack. Refer to OVERCURRENT in this table. · Instantaneous over voltage event. Refer to OVER VOLTAGE in this table
5	STACK OVER CURRENT	The motor current exceeded the capabilities of the power stack. · Instantaneous overcurrent detected by the power stack. Refer to OVERCURRENT in this table.
6	CURRENT LIMIT	V/Hz mode only: If the current exceeds 200% of stack rated current for a period of 1 second, the drive will trip. This is caused by shock loads
7	MOTOR STALL	The motor has stalled (not rotating) Drive in current limit >200 seconds: · Motor loading too great · FIXED BOOST level set too high
8	INVERSE TIME	A prolonged overload condition, exceeding the Inverse Time allowance, has caused the trip: · Remove the overload condition
9	MOTOR I2T	Only for PMAC Motor: A prolonged load condition, exceeding the motor rated current, has caused the trip. The estimated motor load has reached a value of 105%
10	LOW SPEED I	The motor is drawing too much current (>100%) at zero output frequency: · FIXED BOOST level set too high
11	HEATSINK OVERTEMP	Drive heatsink temperature too high · The ambient air temperature is too high · Poor ventilation or spacing between drives · Check heatsink fan is rotating
12	INTERNAL OVERTEMP	Processor temperature or ambient temperature within the power stage too high · The ambient temperature in the drive is too high
13	MOTOR OVERTEMP	The motor temperature is too high, (required IO Option card) · Excessive load · Motor voltage rating incorrect · FIXED BOOST level set too high · Prolonged operation of the motor at low speed without forced cooling · Break in motor thermistor connection
14	EXTERNAL TRIP	The external (application) trip input is high: · Refer to the application description to identify the source of the signal
15	BRAKE SHORT CCT	External dynamic brake resistor has been overloaded: · The external dynamic brake has developed a short circuit. · Wiring fault
16	BRAKE RESISTOR	External dynamic brake resistor has been overloaded: · Trying to decelerate a large inertia too quickly or too often
17	BRAKE SWITCH	Internal dynamic braking switch has been overloaded: · Trying to decelerate a large inertia too quickly or too often
18	LOCAL CONTROL	Keypad has been disconnected from drive whilst drive is running in Local Control: · GKP accidentally disconnected from drive

ID	Trip Name	Possible Reason for Trip
19	COMMS BREAK	Lost option communications: · A break in option communications has been detected. Refer to option communications manual.
20	LINE CONTACTOR	DC Link failed to reach the undervoltage trip level within the contactor feedback time. · The Line contactor failed to connect. · Missing 3-phase line supply
21	PHASE FAIL	· Not yet implemented (reserved for large frame)
22	VDC RIPPLE	The DC link ripple voltage is too high: · Check for a missing input phase · Repetitive start / stop or forward reverse action.
23	BASE MODBUS BREAK	Lost Base Modbus communications: · A break in the Base Modbus communications has been detected. Refer to “Appendix A Modbus TCP”.
24	24V OVERLOAD	24V rail is low · Output overload due to excess current being drawn from the 24v terminal.
25	PMAC SPEED ERROR	Only for PMAC motor : When using the Start feature in Sensorless Vector Control, the real speed hasn’t reached the speed setpoint after 5 seconds to move from open to closed loop control or to move from closed to open loop
26	OVERSPEED	Overspeed: · >150% base speed when in Sensorless Vector mode
27	STO ACTIVE	Attempt to run the motor with the Safe Torque Off active · Check the STO wiring. It may be necessary to power the drive off and on to completely clear this event.
28	FEEDBACK MISSING	The drive has been configured to run in Closed Loop Vector control mode which requires a Pulse Encoder IO Option, but the IO Option has not been correctly configured.
29	INTERNAL FAN FAIL	An internal cooling fan has failed. This will reduce the lifetime of the power electronics. · Return the power stack to a Parker Hannifin repair centre.
30	CURRENT SENSOR	Current feedback phase missing · Check motor phase connections
31	POWER LOSS STOP	A Power Loss Ride Through sequence has occurred and either 1650 Pwrl Time Limit has been exceeded or the motor speed has reached a zero speed during the sequence.

Hexadecimal representation of trips

Each trip has a unique, eight-digit hexadecimal number as shown in the tables below. This number is referred to as the trip mask. The trip masks are used in the Enable, Active and Warnings parameters in the Trips module.

ID	Trip Name	Mask	User Disable
1	OVER VOLTAGE	0000001	
2	UNDER VOLTAGE	0000002	
3	OVER CURRENT	0000004	
4	STACK FAULT	0000008	
5	STACK OVER CURRENT	0000010	
6	CURRENT LIMIT	0000020	✓
7	MOTOR STALL	0000040	✓
8	INVERSE TIME	0000080	✓
9	MOTOR I2T	0000100	✓
10	LOW SPEED I	0000200	✓
11	HEATSINK OVERTEMP	0000400	
12	AMBIENT OVERTEMP	0000800	✓
13	MOTOR OVERTEMP	0001000	✓
14	EXTERNAL TRIP	0002000	✓
15	BRAKE SHORT CCT	0004000	✓

ID	Trip Name	Mask	User Disable
16	BRAKE RESISTOR	0008000	✓
17	BRAKE SWITCH	00010000	✓
18	LOCAL CONTROL	00020000	✓
19	COMMS BREAK	00040000	✓
20	LINE CONTACTOR	00080000	✓
21	PHASE FAIL	00100000	✓
22	VDC RIPPLE	00200000	✓
23	BASE MODBUS BREAK	00400000	✓
24	24V OVERLOAD	00800000	✓
25	PMAC SPEED ERROR	01000000	✓
26	OVERSPEED	02000000	✓
27	SAFE TORQUE OFF	04000000	
28	FEEDBACK MISSING	08000000	
31	POWER LOSS STOP	40000000	✓

Runtime Alerts

A Runtime Alert is a fault that indicates a permanent hardware error. The Runtime Alert display is of the form

```
RUNTIME ERROR
CODE 00000000
```

CODE is a number in the range 0 to 65000. The following value is used to provide additional information to assist Parker Hannifin Technical Support personnel.

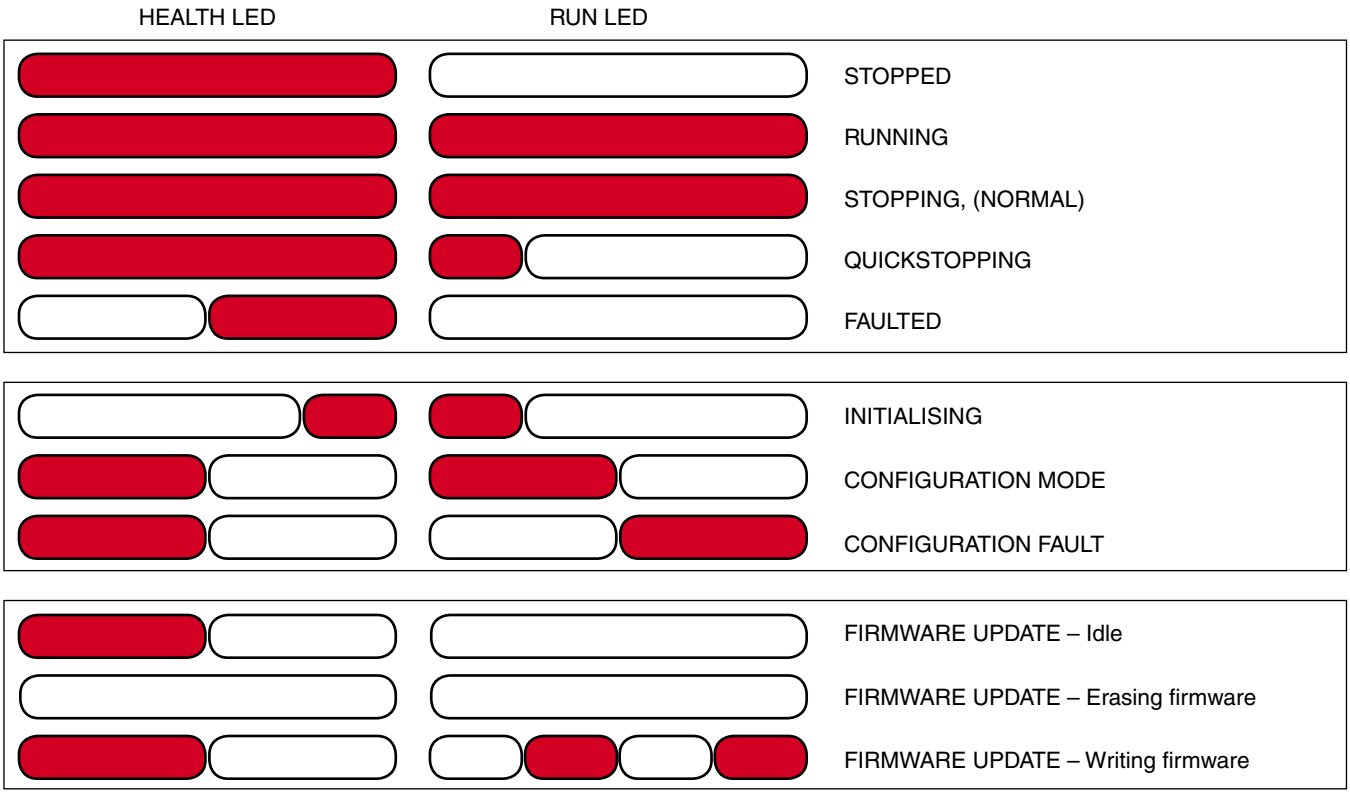
CODE	ERROR	Possible Reason for Error
1 to 255	Internal exception	· VCM not secured to power stack · Option not secured correctly to VCM control card · Earth bonding failure. · Fault during firmware upgrade
12	Memory access	· Attempt to read or write to protected memory. Most likely this will be due to a configuration error. Press OK several times until the drive resets correctly, then replace the configuration using PDQ. · Record the error message and contact Technical Support
1001 to 1003	Processor overload	· Select a lower switching frequency, (Parameters::Motor Control::Pattern Generator::Stack Frequency) · Record the error message and contact Technical Support
1006	Memory overflow	· Reduce the complexity of the application · Reduce the number of parameters being accessed via the on board Modbus TCP protocol · Reduce the number of parameters being accessed by the fieldbus communications option.
1007	Uninitialized pointer	· Record the error message and contact Technical Support
1010 1101 to 1111	Initialization error	· Record the error message and contact Technical Support
1200 to 1299	Communications option error	· Ensure the communications option is correctly fitted · Update the firmware in the AC30. · Replace the communications option
1300	Ethernet fault	· Record the error message and contact Technical Support
1301	Modbus server	· Record the error message and contact Technical Support
1302	HTTP server fault	· Record the error message and contact Technical Support
1303	DCT server fault	· Record the error message and contact Technical Support
1401 1402	Control Module test	· Control module self-test error
1403 1404	Power stack test	· VCM not secured to power stack · Power stack self-test error
1501 1502 1503	IO Option identity IO Option processor Unknown IO Option	· Ensure the IO option is correctly fitted · Update the firmware in the AC30. · Replace the IO option
1502	IO Option processor	· Ensure the IO option is correctly fitted · Update the firmware in the AC30. · Replace the IO option
1503	Unknown IO Option	· Ensure the IO option is correctly fitted · Update the firmware in the AC30. · Replace the IO option
1504	IO Option watchdog	· The IO Option has become disconnected
1601	Stack internal fault	· Return the power stack to Parker Hannifin repair center.

Fault finding

Problem	Possible Cause	Remedy
Drive will not power-up	Fuse blown Faulty cabling	Check supply details, fit correct fuse. Check Product Code against Model No. Check all connections are correct/secure. Check cable continuity
Drive fuse keeps blowing	Faulty cabling or connections wrong Faulty drive	Check for problem and rectify before replacing with correct fuse Contact Parker
Cannot obtain power-on state	Incorrect or no supply available	Check supply details
Motor will not run at switch-on	Motor jammed	Stop the drive and clear the jam Safe Torque Off circuit active. Check the STO connections then power the drive off and on to clear any latched STO fault.
Motor runs and stops	Motor becomes jammed	Stop the drive and clear the jam
	Open circuit speed reference potentiometer	Check terminal

Diagnostic LEDs

There are two diagnostic LEDs fitted next to the SD Card slot. The Health LED is on the left, closest to the connector for the GKP. The flash period is 1s when the drive firmware is active and 2s in the Firmware Update mode.



Technical data

Environmental details

Operating Temperature	Operating temperature is defined as the surrounding air temperature of the drive, when the drive and other equipment adjacent to it is operating at worst case conditions.
NORMAL DUTY HEAVY DUTY	0°C to 40°C, derate up to a maximum of 50°C 0°C to 45°C, derate up to a maximum of 50°C Output power is derated linearly at 2% per degree centigrade for temperature exceeding the maximum rating for the drive.
Storage Temperature	-25°C to +55°C
Shipping Temperature	-25°C to +70 °C
Product Enclosure Rating	IP20 – remainder of surfaces (Europe) UL (c-UL) Open Type (North America/Canada) Cubicle Mounted: IP20; UL (c-UL) Open Type (North America/Canada) Through-panel Mounted: IP20; UL (c-UL) Open Type (North America/Canada)
Altitude	If greater than 1000m above sea level, derate by 1% per 100m to a maximum of 2000m
Humidity	Maximum 85% relative humidity at 40°C non-condensing
Atmosphere	Non flammable, non corrosive and dust free
Climatic Conditions	Class 3k3, as defined by EN60721-3-3
Chemically Active Substances	For the standard product (which inherently includes our optimal level of conformal coating) compliance with EN60721-3-3 is as follows – a) Both classes 3C3 and 3C4 for hydrogen sulphide gas (H2S) at a gas concentration of 25ppm for 1200 hours. b) Both classes 3C1 (rural) and 3C2 (urban) for all nine defined substances as defined in table 4. Classes 3C1 and 3C2 are valid for both storage and transportation purposes. Note - Product was tested and validated with a hydrogen sulphide environment of 25ppm for a continuous period of 1200 hours and validated throughout the test period without failure.
Vibration	Test Fc of EN60068-2-6 10Hz<=f<=57Hz sinusoidal 0.075mm amplitude 57Hz<=f<=150Hz sinusoidal 1g 10 sweep cycles per axis on each of three mutually perpendicular axis
Safety 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 Pollution Degree III (dirty air rating) for through-panel mounted parts
North America/Canada	Complies with the requirements of UL508C as an open-type drive.

Earthing/Safety Details

Earthing	Permanent earthing is mandatory on all units. · Use a copper protective earth conductor 10mm² minimum cross-section, or install a second conductor in parallel with the protective conductor to a separate protective earth terminal · he conductor itself must meet local requirements for a protective earth conductor
Input Supply Details	Drives without filters are suitable for earth referenced (TN) or non-earth referenced (IT) supplies.
(TN) and (IT)	The drive is only suitable for earth referenced supplies (TN) when fitted with an internal filter. External filters are available for use on TN and IT (non-earth referenced) supplies.
Prospective Short Circuit Current (PSCC)	Refer to the appropriate Electrical Ratings table.
Earth Leakage Current	>10mA (all models)

Internal cooling fans

Product		Fan Ratings
FRAME D	All models	1 off 27 cfm (45m³/hr)
FRAME E	All models	1 off 33 cfm (56m³/hr)
FRAME F	All models	2 off 27 cfm (45m³/hr)
FRAME G	All models	2 off 53 cfm (89 m³/hr)
FRAME H	45kW 55 – 75kW	2 off 27 cfm (45 m³/hr) 2 off 53 cfm (89 m³/hr)
FRAME J	All Models	2 off 27 cfm (45 m³/hr) 3 off 80 cfm (133 m³/hr)
FRAME K	All Models	1 off 518 cfm (880 m³/hr)

The forced-vent cooling of the drive is achieved by 1, or in some cases 2 fans. The Fan Rating gives the volume of air venting from the drive.

Electrical Ratings (400 V build variant), Frame D

Power Supply = 380-480V ±10 %, 50/60 Hz ±5% Motor power. output current and input current must not be exceeded under steady state operating conditions Minimum repetitive power up / power down cycle time = 10 mins						
Product Code	Motor Power	Output Current (A)	Input Current (A)	Estimated Efficiency	Switching Frequency (kHz) nominal / maximum	Output Current Derate %/kHz (applied above nominal switching frequency)
Frame D: Input currents for kW ratings are at 400V 50Hz ac input and for Hp ratings at 460V 60Hz ac input. Prospective short circuit current 5kA.						
Normal Duty (Output Overload Motoring 110% for 60s)						
DCP33P5	1.1 kW 1.5 PS	3.5 3.0	4.0 3.5	95 %	4 / 16	2.4 %
DCP34P5	1.5 kW 2 PS	4.5 3.4	5.3 4.5	96 %	4 / 16	3.7 %
DCP35P5	2.2 kW 3 PS	5.5 4.8	7.6 6.4	97 %	4 / 16	4.5 %
DCP37P5	3 kW 4 kW	7.5 10.0	6.5 8.0	97 %	4 / 16	4.0 %
DCP3010	4 kW 5 PS	10.0 7.6	8.0 6.6	97 %	4 / 16	3.9 %
DCP3012	5.5 kW 7.5 PS	12.0 11.0	10.6 9.4	97 %	4 / 16	3.5 %
Heavy Duty (Output Overload Motoring 150% for 60s, 180% for 0.3s short term rating)						
DCP33P5	0.75 kW 1 PS	2.5 2.1	2.9 2.4	95 %	4 / 16	1.0 %
DCP34P5	1.1 kW 1.5 PS	3.5 3.0	4.0 3.5	95 %	4 / 16	3.1 %
DCP35P5	1.5 kW 2 PS	4.5 3.4	5.3 4.5	96 %	4 / 16	4.3 %
DCP37P5	2.2 kW 3 PS	5.5 4.8	5.2 4.6	97 %	4 / 16	3.8 %
DCP3010	3 kW	7.5	6.5	97 %	4 / 16	3.8 %
DCP3012	4 kW 5 PS	10.0 7.6	8.0 6.6	97 %	4 / 16	3.3 %

Electrical Ratings (400 V build variant), Frame E, F

Power Supply = 380-480V ±10 %, 50/60 Hz ±5% Motor power, output current and input current must not be exceeded under steady state operating conditions. Minimum repetitive power up / power down cycle time = 10 min						
Product Code	Motor Power	Output Current (A)	Input Current (A)	Estimated Efficiency	Switching Frequency (kHz) nominal / maximum	Output Current Derate %/kHz
Frame E: Input currents for kW ratings are at 400V 50Hz ac input and for Hp ratings at 460V 60Hz ac input. Prospective short circuit current 5kA.						
Normal Duty (Output Overload Motoring 110% for 60s)						
DCP3016	7.5 kW 10 PS	16 14	14.5 12.1	97 %	4 / 16	5.5 %
DCP3023	11 kW 15 PS	23 21	20.4 18	97 %	4 / 16	5.1 %
Heavy Duty (Output Overload Motoring 150% for 30s, 180% for 0.3s short term rating)						
DCP3016	5.5 kW 7.5 PS	12 11	10.7 9.5	97 %	4 / 16	4.9 %
DCP3023	7.5 kW 10 PS	16 14	14.5 12.7	97 %	4 / 16	4.9 %
Frame F : Input currents for kW ratings are at 400V 50Hz ac input and for Hp ratings at 460V 60Hz ac input. Prospective short circuit current 5kA.						
Normal Duty (Output Overload Motoring 110% for 60s)						
DCP3032	15 kW 20 PS	32 27	28.5 24.5	97 %	4 / 12	6.3 %
DCP3038	18.5 kW 25 PS	38 36	33.5 30.2	97 %	4 / 12	6.7 %
Heavy Duty (Output Overload Motoring 150% for 60s, 180% for 0.3s short term rating)						
DCP3032	11 kW 15 PS	23 21	21.7 19.1	97 %	4 / 12	6.0 %
DCP3038	15 kW 20 PS	32 27	28.5 24.5	97 %	4 / 12	6.1 %

Electrical Ratings (400 V build variant), Frame G

Power Supply = 380-480V ±10 %, 50/60 Hz ±5% Motor power, output current and input current must not be exceeded under steady state operating conditions. Minimum repetitive power up / power down cycle time = 10 min						
Product Code	Motor Power	Output Current (A)	Input Current (A)	Estimated Efficiency	Switching Frequency (kHz) nominal / maximum	Output Current Derate %/kHz
Frame G : Input currents for kW ratings are at 400V 50Hz ac input and for Hp ratings at 460V 60Hz ac input. Prospective short circuit current 10kA.						
Normal Duty (Output Overload Motoring 110% for 60s)						
DCP3045	22kW 30Hp	45 40	40 35.7	98 %	3 / 12	5.7 %
DCP3060	30kW 40Hp	60 52	54.7 48	98 %	3 / 12	5.9 %
DCP3073	37kW 50Hp	73 65	66.2 58.5	98 %	3 / 12	5.6 %
Heavy Duty (Output Overload Motoring 150% for 60s, 180% for 3s short term rating)						
DCP3045	18kW 25Hp	38 36	34.3 30.5	98 %	3 / 12	5.3 %
DCP3060	22kW 30Hp	45 40	41.8 37.5	98 %	3 / 12	5.7 %
DCP3073	30kW 40Hp	60 52	54.7 48	98 %	3 / 12	5.2 %

Electrical Ratings (400 V build variant), Frame H

Power Supply = 380-480V ±10 %, 50/60 Hz ±5% Motor power, output current and input current must not be exceeded under steady state operating conditions. Minimum repetitive power up / power down cycle time = 10 min						
Product Code	Motor Power	Output Current (A)	Input Current (A)	Estimated Efficiency	Switching Frequency (kHz) nominal / maximum	Output Current Derate %/kHz
Frame H : Input currents for kW ratings are at 400V 50Hz ac input and for Hp ratings at 460V 60Hz ac input. Prospective short circuit current 10kA.						
Normal Duty (Output Overload Motoring 110% for 60s)						
DCP3087	45kW 60Hp	87 77	78.8 69	98 %	3 / 08	8.5 %
DCP3105	55kW 75Hp	105 96	95.8 84.5	98 %	3 / 08	7.8 %
DCP3145	75kW 100Hp	145 124	130 113.5	98 %	3 / 08	9.1 %
Heavy Duty (Output Overload Motoring 150% for 60s, 180% for 3s short term rating)						
DCP3087	37kW 50Hp	73 65	66 58.5	98 %	3 / 08	7.7 %
DCP3105	45kW 60Hp	87 77	79.5 70	98 %	3 / 08	6.9 %
DCP3145	55kW 75Hp	105 96	97.4 87	98 %	3 / 08	8.6 %

Electrical Ratings (400 V build variant), Frame J

Power Supply = 380-480 V ±10 %, 50/60 Hz ±5 % Motor power, output current and input current must not be exceeded under steady state operating conditions. Minimum repetitive power up / power down cycle time = 10 min						
Product Code	Motor Power	Output Current (A)	Input Current (A)	Estimated Efficiency	Switching Frequency (kHz) nominal / maximum	Output Current Derate %/kHz
Frame J :	Input currents for kW ratings are at 400V 50Hz ac input and for Hp ratings at 460V 60Hz ac input. Prospective short circuit current 5kA.					
Normal Duty (Output Overload Motoring 110% for 60s)						
DCP3180	90kW 125Hp	180 156	160 147	98 %	2.5 / 8	8.1 %
DCP3205	110kW 150Hp	205 180	198 175	98 %	2.5 / 8	8.4 %
DCP3260	132kW 200Hp	260 240	236 231	98 %	2.5 / 8	8.7 %
Heavy Duty (Output Overload Motoring 150 % for 60 s, 18 0% for 3 s short term rating)						
DCP3180	75kW 100Hp	145 124	137 119	98 %	2.5 / 8	7.5 %
DCP3205	90kW 125Hp	180 156	164 148	98 %	2.5 / 8	8.6 %
DCP3260	110kW 150Hp	205 180	199 177	98 %	2.5 / 8	8.0 %

Electrical Ratings (400 V build variant), Frame K

Power Supply = 380-480 V ±10 %, 50/60 Hz ±5 % Motor power, output current and input current must not be exceeded under steady state operating conditions. Minimum repetitive power up / power down cycle time = 10 min						
Product Code	Motor Power	Output Current (A)	Input Current (A)	Estimated Efficiency	Switching Frequency (kHz) nominal / maximum	Output Current Derate %/kHz
Frame K:	Input currents for kW ratings are at 400V 50Hz ac input and for Hp ratings at 460V 60Hz ac input. Prospective short circuit current 18 kA.					
Normal Duty (Output Overload Motoring 110% for 60s)						
DCP315	160kW 250Hp	315 302	276 279	98 %	2 / 08	8,5 %
DCP380	200kW 300Hp	380 361	343 333	98 %	2 / 08	7,7 %
DCP440	250kW 350Hp	440 414	428 389	98 %	2 / 08	8,3 %
Heavy Duty (Output Overload Motoring 150 % for 60 s, 18 0% for 3 s short term rating)						
DCP315	132kW 200Hp	260 240	229 225	98 %	2 / 08	7,7 %
DCP380	160kW 250Hp	315 302	276 279	98 %	2 / 08	6,9 %
DCP440	200kW 300Hp	380 361	344 334	98 %	2 / 08	7,5 %

Input fuse ratings (A) Europe 400V model			
Order code	Normal duty	Heavy duty	Frame size
DCP33P5	6A	6A	D
DCP34P5	8A	6A	D
DCP35P5	10A	8A	D
DCP37P5	10A	8A	D
DCP3010	12A	10A	D
DCP3012	16A	10A	D
DCP3016	20A	16A	E
DCP3023	25A	20A	E
DCP3032	32A	25A	F
DCP3038	40A	32A	F
DCP3045	63A	50A	G
DCP3060	80A	70A	G
DCP3073	100A	90A	G
DCP3087	125A	125A	H
DCP3105	150A	150A	H
DCP3145	200A	200A	H
DCP3180	250A	250A	J
DCP3205	315A	315A	J
DCP3260	400A	400A	J
DCP3315	400A	400A	K
DCP3380	500A	500A	K
DCP3440	630A	630A	K

Internal dynamic brake switch

Frame D Internal dynamic brake switch

Product Code	Motor Power (kW/hp)	Brake Switch Peak Current (A)	Peak Brake Dissipation (kW/PS)	Brake Switch Continuous Current (A)	Continuous Brake Dissipation (kW/hp)	Minimum Brake Resistor Value Ω
		20 s maximum, 30 % duty				
400V Build Variant: 380-480V ±10 %, 50/60 Hz +5 % DC link brake voltage: 765 V						
DCP33P5	1.1 / 1.5	1.5A	1.1 / 1.5	1	0.75 / 1	520
DCP34P5	1.5 / 2	2.2A	1.7 / 2.3	1.4	1.1 / 1.5	355
DCP35P5	2.2 / 3	2.9A	2.3 / 3	2	1.5 / 2	260
DCP37P5	3 / 4	4.3A	3.3 / 4.5	2.9	2.2 / 3	177
DCP3010	4 / 5	5.9A	4.5 / 5.5	3.9	3 / 4	130
DCP3012	5.5 / 7.5	7.8A	6 / 7.5	5.2	4 / 5	98

Frame E Internal dynamic brake switch

Product Code	Motor Power (kW/hp)	Brake Switch Peak Current (A)	Peak Brake Dissipation (kW/PS)	Brake Switch Continuous Current (A)	Continuous Brake Dissipation (kW/hp)	Minimum Brake Resistor Value Ω
		20 s maximum, 30 % duty				
400V Build Variant: 380-480V ±10 %, 50/60 Hz +5 % DC link brake voltage: 765 V						
DCP3016	7.5 / 10	10.8A	8.25 / 11.25	7.2	5.5 / 7.5	71
DCP3023	11 / 15	14.7A	11.25 / 15	9.8	7.5 / 10	52

Frame F Internal dynamic brake switch

Product Code	Motor Power (kW/hp)	Brake Switch Peak Current (A)	Peak Brake Dissipation (kW/PS)	Brake Switch Continuous Current (A)	Continuous Brake Dissipation (kW/hp)	Minimum Brake Resistor Value Ω
		20 s maximum, 30 % duty				
400V Build Variant: 380-480V ±10 %, 50/60 Hz +5 % DC link brake voltage: 765 V						
DCP3032	15 / 20	21.5A	16.5 / 22.5	14.4	11 / 15	35
DCP3038	18 / 25	29.4A	22.5 / 30	19.6	15 / 20	26

Frame G Internal dynamic brake switch

Product Code	Motor Power (kW/hp)	Brake Switch Peak Current (A)	Peak Brake Dissipation (kW/PS)	Brake Switch Continuous Current (A)	Continuous Brake Dissipation (kW/hp)	Minimum Brake Resistor Value Ω
		20 s maximum, 30 % duty				
400V Build Variant: 380-480V ±10 %, 50/60 Hz +5 % DC link brake voltage: 765 V						
DCP3045	22 / 30	36A	27 / 37.5	24	18 / 25	21
DCP3060	30 / 40	43A	33 / 45	29	22 / 30	17.7
DCP3073	37 / 50	59A	45 / 60	39	30 / 40	13

Internal brake switch Frame H Internal dynamic brake switch

Product Code	Motor Power (kW/hp)	Brake Switch Peak Current (A)	Peak Brake Dissipation (kW/PS)	Brake Switch Continuous Current (A)	Continuous Brake Dissipation (kW/hp)	Minimum Brake Resistor Value Ω
		20 s maximum, 30 % duty				
400V Build Variant: 380-480V ±10 %, 50/60 Hz +5 % DC link brake voltage: 765 V						
DCP3087	45 / 60	73	5.5 / 75	49	37	10.5
DCP3105	55 / 75	88	67.5 / 90	59	45	8.7
DCP3145	75 / 100	108	82.5 / 112.5	72	55	7

Frame J Internal dynamic brake switch

Product Code	Motor Power (kW/hp)	Brake Switch Peak Current (A)	Peak Brake Dissipation (kW/PS)	Brake Switch Continuous Current (A)	Continuous Brake Dissipation (kW/hp)	Minimum Brake Resistor Value Ω
		20 s maximum, 30 % duty				
400V Build Variant: 380-480V ±10 %, 50/60 Hz +5 % DC link brake voltage: 765 V						
DCP3180	90 / 125	147	112.5 / 150	98	75 / 100	5.2
DCP3205	110 / 150	176	135 / 187.5	118	90 / 125	4.3
DCP3260	132 / 200	216	165 / 225	144	110 / 150	3.55

Frame K internal dynamic brake switch

Product Code	Motor Power (kW/hp)	Brake Switch Peak Current (A)	Peak Brake Dissipation (kW/PS)	Brake Switch Continuous Current (A)	Continuous Brake Dissipation (kW/hp)	Minimum Brake Resistor Value Ω
		20 s maximum, 30 % duty				
400V Build Variant: 380-480V ±10 %, 50/60 Hz +5 % DC link brake voltage: 765 V						
DCP3315	160 / 250	173A	132 / 200	173A	132 / 200	4.4
DCP3380	200 / 300	209A	160 / 250	209A	160 / 250	3.6
DCP3440	250 / 350	262A	200 / 300	262A	200 / 300	2.9

Analogue inputs/outputs

AIN1 (X11/01), AIN2 (X11/02), AOUT1 (X11/03), AOUT2 (X11/04)

Conforming to EN61131-2

	Inputs	Outputs
Range	AIN1: Range selected by parameter 0001 from: 0 to 10 V, -10 V to +10 V, 0 to 20 mA, 4 to 20 mA AIN2: Range selected by parameter 0002 from: 0 to 10 V, -10 V to +10 V Absolute maximum input current 25 mA in current mode (AIN1 only) Absolute maximum input voltage ±24V dc in voltage mode	AOUT1: Range selected by parameter 0003 from: 0 to 10 V, -10 V to +10 V AOUT2: Range selected by parameter 0004 from: 0 to 10V, 0 to 20 mA, 4 to 20 mA Maximum rated output current in voltage mode 10 mA, with short circuit protection
Impedance	Input impedance: Voltage range = 22kW Current range = 120R	Load impedance : Voltage range ≥ 1kΩ Current range ≤ 600Ω
Resolution	12 bits (1 in 4096) over full range	11 bits (1 in 2048)
Accuracy	Better than ±1%	Better than ±1%
Sample / Update Rate	1 ms	1 ms

Reference outputs

+10VREF (X11/05), -10VREF (X11/06)

Output Voltage	+10V and -10V
Accuracy	Better than ±0.5 %
Output Current	<10 mA
Overload / Short Circuit Protection	Indefinite

Digital inputs/outputs

Digital inputs

DIN1 (X13/02) – DIN3 (X13/04), DIO1 (X12/01) – DIO4 (X12/04)

Conforming to EN61131-2

Nominal Rated Voltage	24 V	
Operating Range	DIN1, DIN2, DIN3, DIO1, DIO2, DIO2, DIO4: 0-5 VDC = OFF, 15-24 VDC = ON (absolute maximum input voltage ±30 VDC)	24 V 15 V — ON undefined state 5 V 0 V — OFF
Input Threshold	Typically 10 V	
Input Impedance	3.3 kW	
Input Current	7.3 mA ± 10% @ 24 V	
Sample Interval	1 ms	

Digital outputs

DIO1 (X12/01) – DIO4 (X12/04)

conforming to EN61131-2

Nominal Open Circuit Output Voltage	24 V (minimum 21 V)
Rated Output Current	140 mA : The total current available is 140 mA, either individually or as the sum of all digital outputs and User +24 V Supply.
Overload / Short Circuit Protection	Indefinite

User 24 V supply output (X13/05)

Nominal Open Circuit Output Voltage	24V (minimum 21V)
Rated Output Current	140mA : The total current available is 140mA, either individually or as the sum of all digital outputs and User +24V Supply.

Relays

RL1 (X14/01) – X14/02), RL2 (X14/03) – X14/04)

These are volt-free relay contacts

Maximum Voltage	250V ac or 30V dc
	Protection against inductive or capacitive loads must be provided externally.
Maximum Current	3A resistive load

Configure the drive

Quick Setup

In the menu "Setup" → "Quick Setup"a basic configuration can be operated.

Step 1:

Select Application
Q_Control
P_Control
LS_Control
Accumulator_Control
pQ_Control

Step 2:

DCP Pump code
Enter DCP Pump type (see order code)
DCP3xxxxxxxxxxL2414

After setting the correct pump code, all relevant parameters of the pump will be set automatically. (double pump, displacement, min. speed of the pump, max. speed of the pump, max. pressure of the pump)

Fixed Parameter:
Double pump
Displacement of the pump
Max. pressure of the pump

Adjustable parameters:
Min. pump speed (adjustment pump speed min → pump speed max)
Max. pump speed (adjustment pump speed max → pump speed min)

If the pump code **DCP3xxxxxxxxxx0000** is used, all parameters of the pump can be set individually.

The automatic protection of the pump, that is ensured when inserting the DCP-code, is not given anymore.The speed and pressure range of the motor/pump have to be set manually.

Step 3 → 9 = Example of a pQ-Application

Step 3:

Qmax at 100% AIN02:
Qmax at 100% input at analogue input 02.

$$Qmax = \frac{\text{Displacement ccm} * 100\ \% \text{ Speed rpm}}{1000}$$

If the target-flow is sent via fieldbus, this parameter is not required.

Step 4:

Pmax at 100% AIN02/11:
Maximum target pressure at 100% input at analog input 02 (Application p/LS- Control) or analog input 11 (Application pQ-Control).
If the target-pressure is sent via fieldbus, this parameter is not required.

Step 5:

Upper Limit pressure:
Limits the maximum pressure of the drive. If the max. pressure > max. pressure pump 1/2, then max. pressure = max. pressure pump 1/2.

Step 6:

Max. p for sensor p0: [bar]
This parameter sets the maximum pressure of the pressure transducer at 100% input signal.

Step 7:

Pressure ramp up: [Bar/s]
Pressure ramp down: [Bar/s]

Step 8:

Max. p pressure valve: [bar]
This parameter sets the max. pressure of the pressure valve at 100% input on the PCD-module.
It is only used, if a pressure valve is connected to analog output 02.

Step 9:

Feed Forward p-Valve:
This parameter sets the value of the feed forward and accordingly the control reserve of the pressure valve. If the pressure valve opens before the drive reaches the min. speed, the value has to be increased. (default value: 10%)

Detailed settings can be set in the menu: Settings → Application.
Bypass Valve (Hysterisis Bypass)
"Flow-time and -window" for "Flow Reached".
"Pressure-time and -window" for "Pressure Reached".
Filter analog inputs.

Set of Motor data

If a DCP is delivered as a complete system, the motor data will be set ex factory and should not be changed.

Motor type

Motor type:
Induction Motor (Standard)
PMAC Motor (if a synchronous motor will be selected, an autotune has to be done)

Control Strategy:
Volts/Hertz Control
Vector Control (Standard, if vector control will be selected, an autotune has to be done).

100% Speed in rpm:
This value sets the max. speed of the drive. The max. speed depends on the type of the pump and cannot be exceeded.

Acceleration- and deceleration time:
The acceleration- and deceleration – time is described as the time, the drive needs from 0%-100% and 100%-0% (speed). To avoid an overload of the DC Link Voltage, the choosen time should not be too short. The result would be an error.

Motor name plate

Base Frequency
Rated Motor Current
Motor poles
Base voltage
Nameplate speed

Set of in- and outputs:

In these settings it can be selected, if the in- and outputs are voltage or current signals. In the Base IO the standard in- and outputs are listed. In the option file the expanding in- and outputs are listed (general purpose card required).

Communication:

In the section “communication” the interface and the corresponding settings are set.

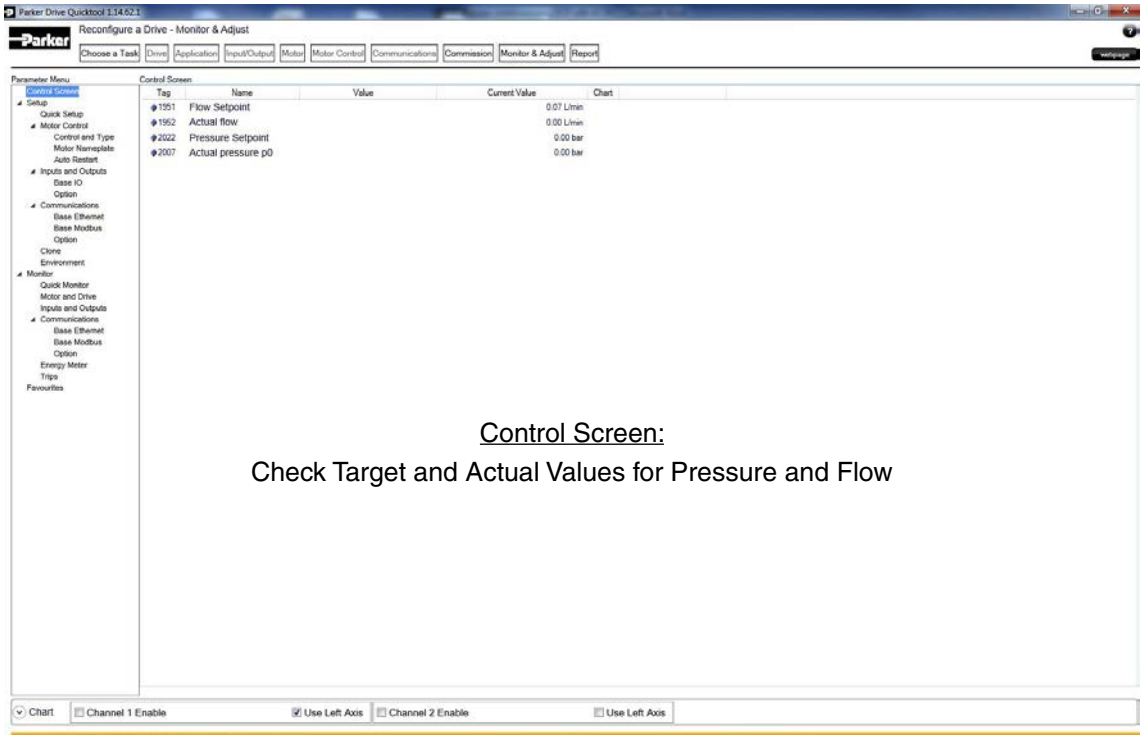
Example: Profibus

Comms Required: Profibus DPV1
Profibus Node Address: 1 (is determined by the address assignment of the PLC)
Comms Trip Enable: TRUE
Read Mapping: (Only the Controlword is fix, the others are free)
0: 2021 (Control word)
1: 1918 (Flow Setpoint Fieldbus)
2: 1931 (Pressure Setpoint Fieldbus)

Write Mapping: (Only the Statusword is fix, the others are free)
0: 2022 (Status word)
1: 1932 (Actual pressure)
2: 1919 (Actual flow)
3: 0393 (Actual speed)

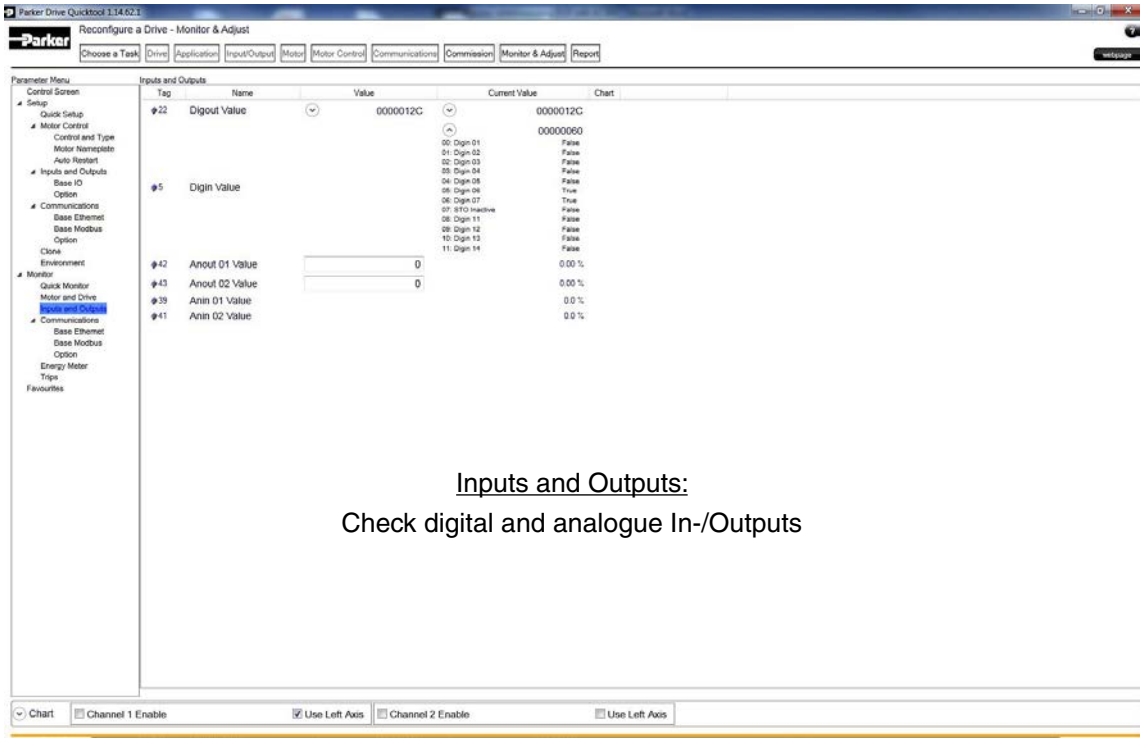
Commissioning the drive

Perform signal check



Control Screen:

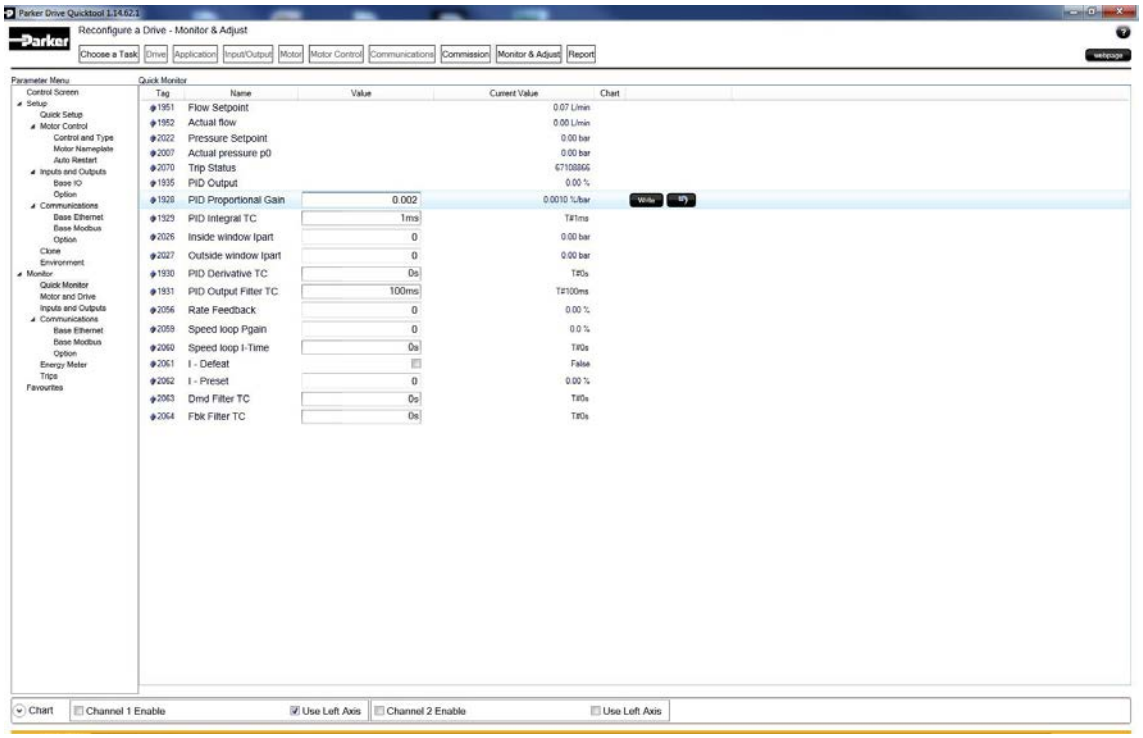
Check Target and Actual Values for Pressure and Flow



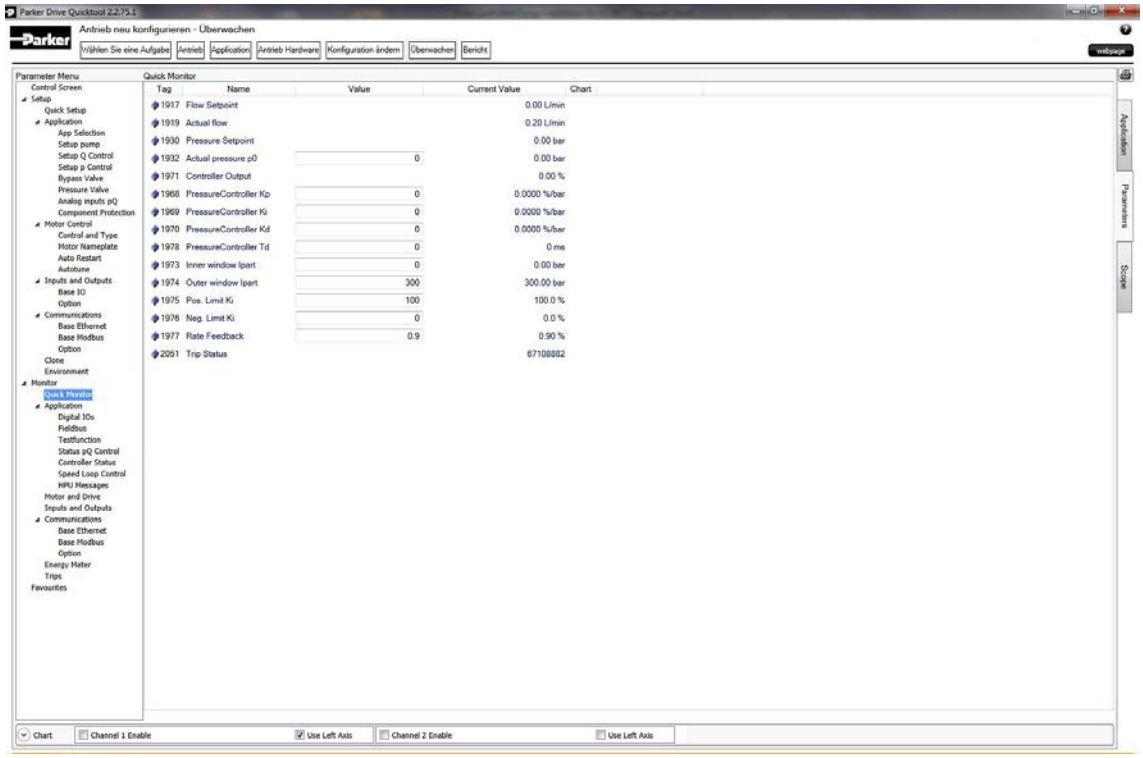
Inputs and Outputs:

Check digital and analogue In-/Outputs

To optimize the drive, please use the Quick Monitor



Change parameter values



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HY11-5715-707/UK, 01/2017

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