Electrohydraulic Motion Controls

Proportional Directional & Pressure Control Valves
Servovalves, Electronics, Accessories

Catalog HY14-2550/US

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

Parker

ENGINEERING YOUR SUCCESS.

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SAFETY GUIDE

For safety information, see Safety Guide SG HY14-1000 at www.parker.com/safety or call 1-800-CParker.

Cat HY14-2550-frtcvr.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

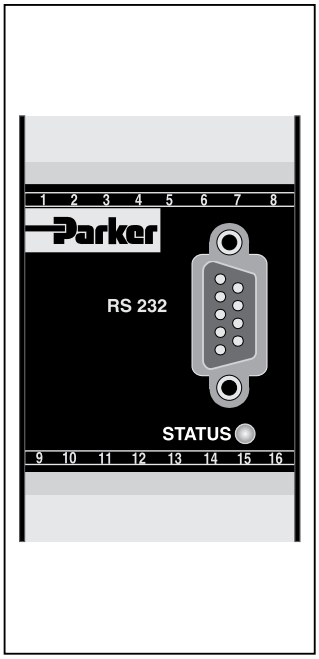
Contents

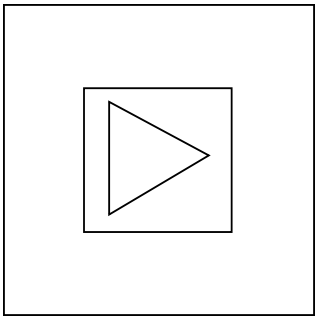
D

General Description

Series PWD00A-400 electronic module for driving open loop proportional valves is compact and easy to install with DIN rail mounting and plug-in terminals. The digital design allows for programmable parameters such as solenoid drive current, mins and maxs, and ramps. Profiles controlled by on-off logic signals can be configured through internal velocity setpoints and ramps. The module provides flexibility for different applications and repeatability from unit to unit. The module parameters are programmed with an RS-232 interface and user friendly software (ProPxD) with default values for the standard valves.

The PWD00A-400 module contains the functions required by typical open loop proportional valve applications (series D*FB, D*FW, D*1FW, WLL, RLL valves).





Features

- Programmable parameters.
- Analog or Profile Capability.
- RS-232 Interface.
- User friendly programming software.
- Plug-in terminals.
- Four independent ramps.
- Input Enable with Status indicator.
- Differential input on analog command.
- Compliant with European EMC Standards.

CE

Specifications

General			
Model	Module package for snap-on mounting on EN 50022 rail	**Mounting Position**	Any
Package Material	Polycarbonate	**Ambient Temperature Range**	-20°C to +60°C (-4°F to +140°F)
Inflammability Class	V2 to V0 acc. UL 94	**Protection Class**	IP 20 acc. DIN 40050

Electrical			
Duty Ratio	100%	**Channel Recall Signal**	Off – 0 to 5.0 VDC; On – 8.5 to 30 VDC; Ri = 30K ohm
Supply Voltage	18 VDC to 30 VDC, ripple < 5% eff., surge free (29 VDC to 30 VDC for 24V coils)	**Status Signal**	Off – 0 to 0.5 VDC; On – Supply Voltage; rated max. 15 mA
Switch-on Current Typ.	22A for 0.2 mS	**Adjustment Ranges** Minimum Maximum Ramp Time Zero Offset Current	**preset** 0 to 50% 0 to 1000 50 to 100% 0 to 1000 0 to 32.5 s 0 to 32.5 +75 to -75% +1000 to -1000 0.8/3.5/2.7/1.8/1.3 A 0/1/2/3/4/5
Current Consumption Max.	2.0A		
Pre-fusing	2.5A medium lag		
Command Signal	+10 to 0 to -10 VDC, ripple < 0.01 % eff., surge free, Ri = 150K ohm **Do not input a command greater than ±10 VDC.**	**Interface**	RS 232C, DSub 9p. male for null modem cable
		EMC	EN 50081-2, EN 50082-2
Input Signal Resolution	0.025%	**Connection**	Screw terminals 0.2 to 2.5 mm², plug-in
Differential Input Voltage Maximum	30V for terminals 5 and 6 against PE (terminal 8)	**Cable Specification**	16 AWG overall braid shield for supply voltage and solenoids 20 AWG overall braid shield for sensor and signal
Enable Signal	Off – 0 to 5.0 VDC On – 8.5 to 30 VDC; Ri = 30K ohm	**Cable Length**	50m (164 ft.)

Ordering Information

PWD — Electronic Module DC Valve

00 — Position Control Universal

A —

400 — Module Type

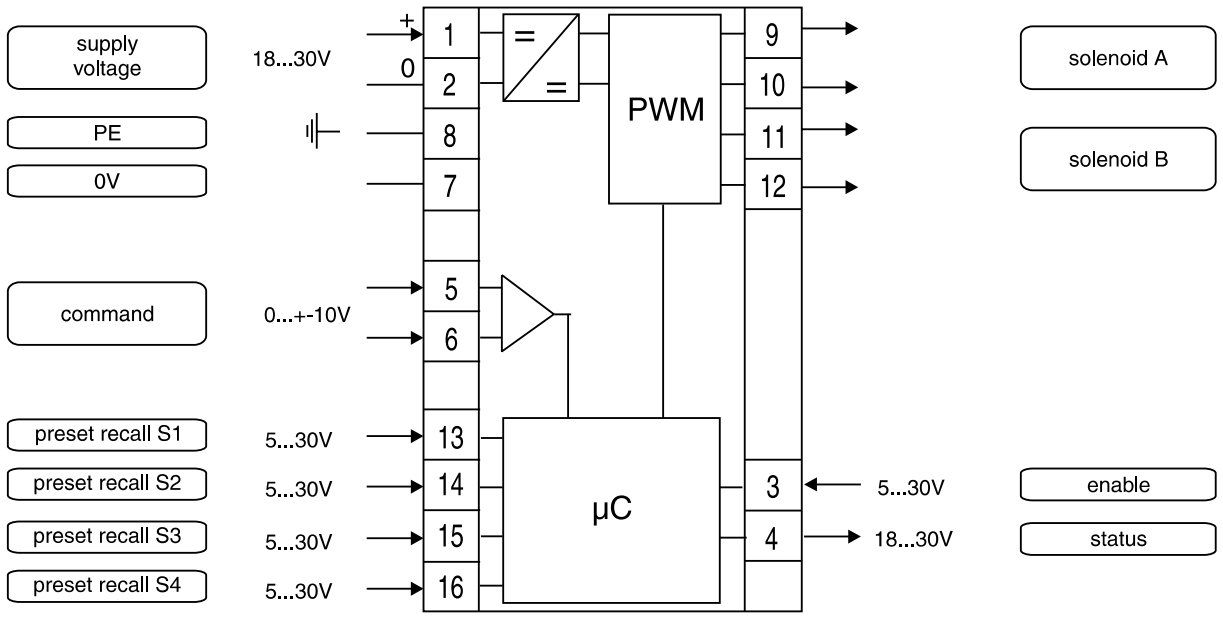
Code	Description
400	Amplifier, MIN/MAX adjustable, UP/DOWN ramps, Command inputs

— Design Series

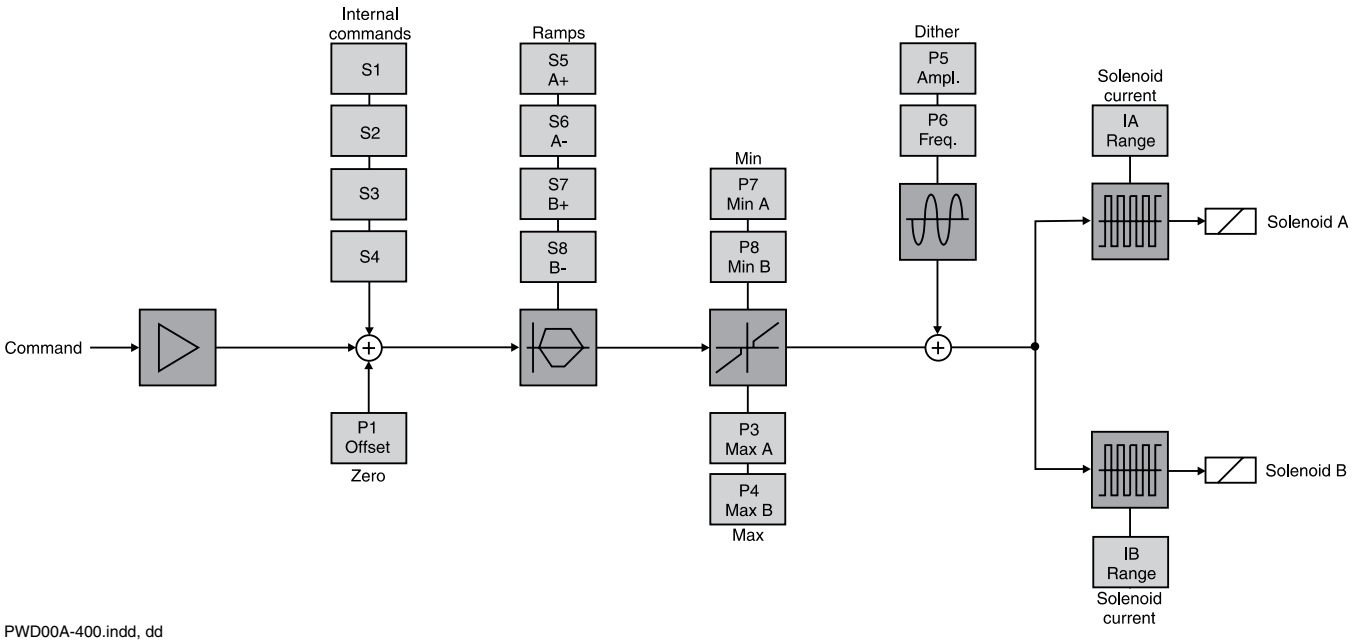
NOTE: Not required when ordering.

Weight: 160 g (0.35 lbs.)

Block Diagram — Wiring



Signal Flow Diagram

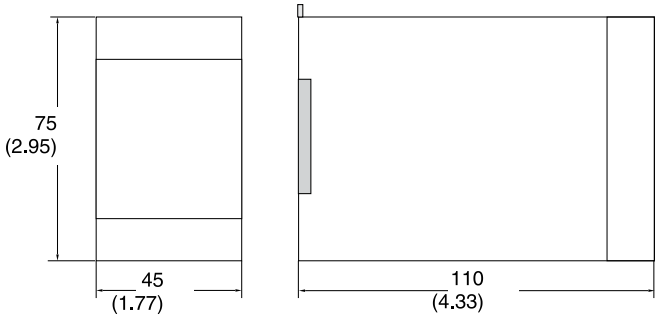


PWD00A-400.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

Dimensions

Inch equivalents for millimeter dimensions are shown in (**)



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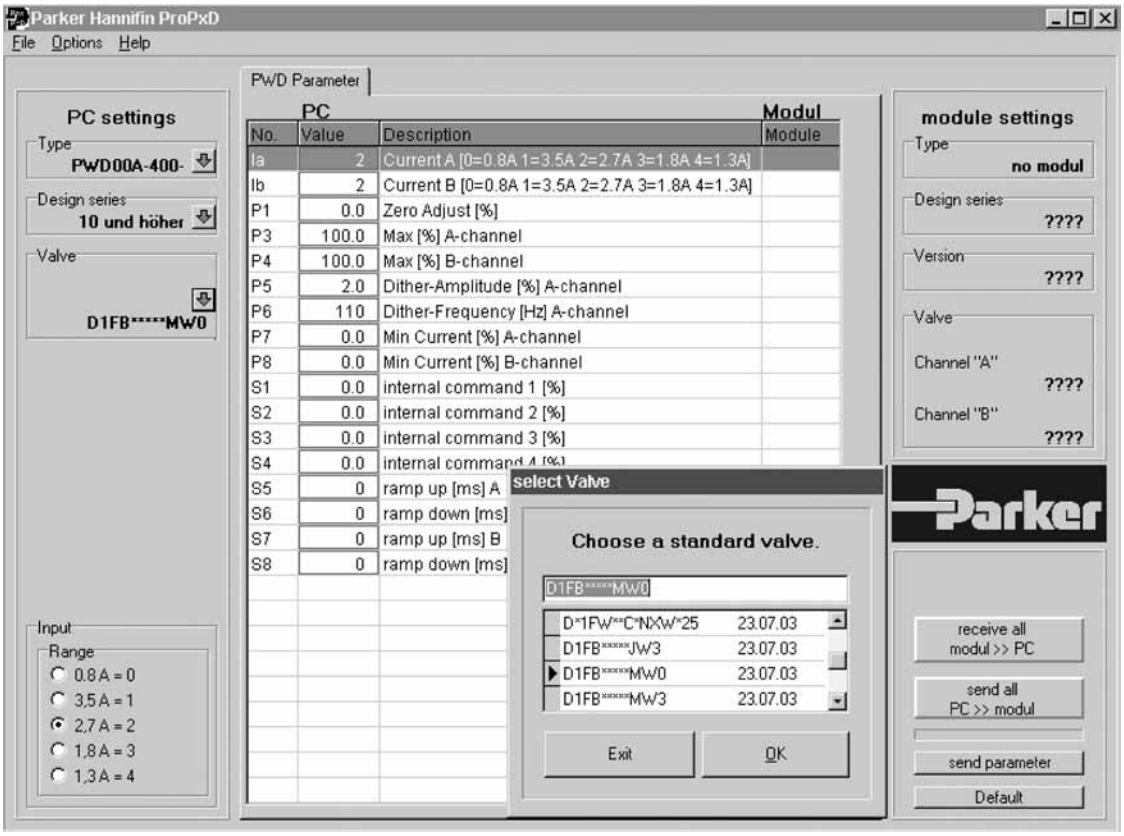
ProPxD Interface Program

The new ProPxD software permits user-friendly parameter setting for the electronic module series PCD, PWD and PZD.

Via the clearly arranged entry screen the parameters can be identified and modified. Storage of complete parameter sets to floppy or hard disk is possible as well as printout or record as a text file for further documentation. Stored parameter sets may be loaded anytime and transmitted to the electronic module in the same manner as the default parameters which are available for all standard valve series. Inside the electronic a nonvolatile memory stores the data with the option for recalling or modification.

Features

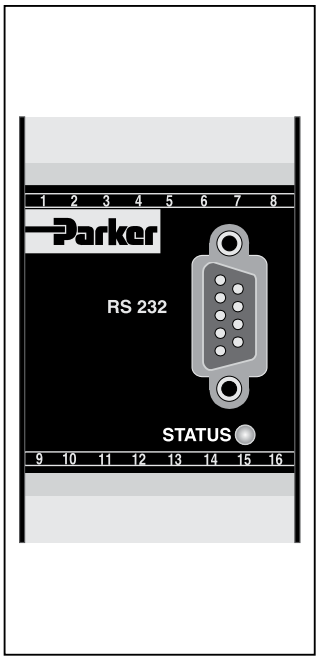
- User-friendly editing of all parameters.
- Default values for standard valves.
- Identification and documentation of parameter sets.
- Executable with all Windows® operating systems from Windows® 95 upwards.
- Simple communication between PC and electronic via serial interface RS-232 and nullmodem cable.

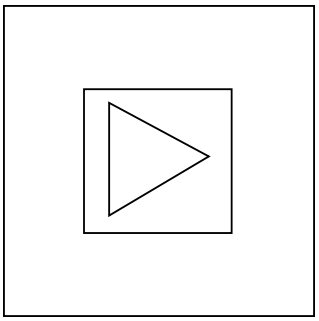


General Description

Series PWDXXA-40* electronic module for driving proportional valves with spool position feedback is compact and easy to install with DIN rail mounting and plug-in terminals. The digital design allows for programmable parameters such as solenoid drive current, mins, maxs, ramps and a range of position feedback signals. The module provides flexibility and repeatability from unit to unit. The module parameters are programmed with an RS-232 interface and user friendly software (ProPxD) with default values for standard valves.

The PWDXXA-40* module contains the functions required by typical internal closed loop proportional valve applications (series D*FC, D*1FS, RLL*R, WLL*R and TEL valves).





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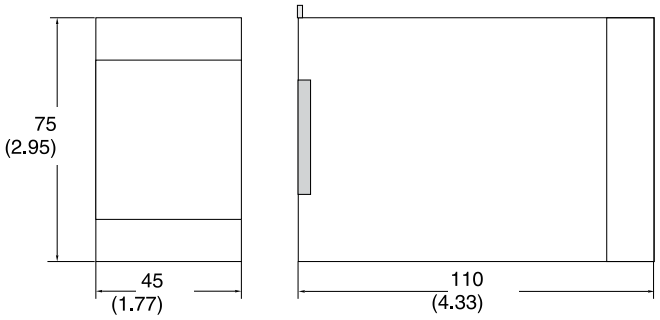
Features

- Interface and tuning for spool position feedback.
- Programmable parameters.
- ±10V, ± 20 mA, 4-20 mA position transducer input.
- RS-232 Interface.
- User friendly programming software.
- Plug-in terminals.
- Four independent ramps.
- Input Enable with Status indicator.
- Differential command input.
- Compliant with European EMC Standards.

Dimensions

Inch equivalents for millimeter dimensions are shown in (**)



Ordering Information

PWD	XX	A	—	40		—	
Electronic Module DC Valve	Position Control Universal			Module Type	Technology Function		Design Series

NOTE: Not required when ordering.

Code	Description
40	Amplifier, MIN/MAX adjustment, UP/DOWN ramps, Command input

Code	Description
0	Standard
1	Linearization Option

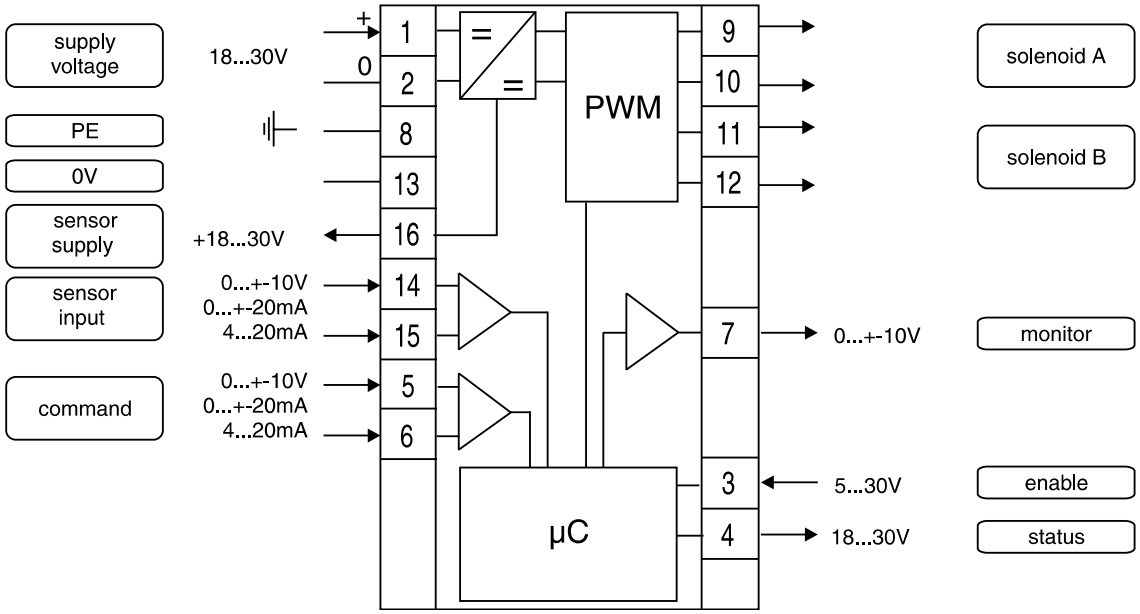
Weight: 160g (.35 lbs.)

D

Specifications

General			
Model	Module package for snap-on mounting on EN 50022 rail	**Mounting Position**	Any
Package Material	Polycarbonate	**Ambient Temperature Range**	-20°C to +60°C (-4°F to +140°F)
Inflammability Class	V2 to V0 acc. UL 94	**Protection Class**	IP 20 acc. DIN 40050
Electrical			
Duty Ratio	100%	**Status Signal**	Off – 0 to 0.5 VDC; On – Supply Voltage; rated max. 15 mA
Supply Voltage	18 VDC to 30 VDC, ripple < 5% eff., surge free	**Monitor Signal**	+10 to 0 to -10 VDC, rated max. 5 mA, signal resolution 0.4%
Switch-on Current Typ.	22A for 0.2 mS	**Adjustment Ranges**	Minimum 0 to 50% Maximum 50 to 100% Ramp Time 0 to 32.5 s Zero Offset +100 to -100% Current 1.3/2.7/3.5 A Initial Current 0 to 25%
Current Consumption Max.	2.0A		
Pre-fusing	2.5A medium lag		
Command Signal	+10 to 0 to -10 VDC, ripple < 0.01 % eff., surge free, Ri = 100K ohm +20 to 0 to -20 mA, ripple < 0.01 % eff., surge free, Ri = 200 Ohm 4 to 12 to 20 mA, ripple < 0.01 % eff., surge free, Ri = 200 Ohm < 3.6 mA = solenoid output off, > 3.8 mA = solenoid output on (acc. NAMUR NE43)	**Interface**	RS 232C, DSub 9p. male for null modem cable
		EMC	EN 50081-2, EN 50082-2
Input Signal Resolution	0.025%	**Connection**	Screw terminals 0.2 to 2.5 mm², plug-in
Differential Input Voltage Max.	30V for terminals 5 and 6 against PE (terminal 8)	**Cable Specification**	16 AWG overall braid shield for supply voltage and solenoids 20 AWG overall braid shield for sensor and signal
Enable Signal	Off – 0 to 2.5 VDC On – 5 to 30 VDC; Ri = 30K ohm	**Cable Length**	50m (164 ft.)
Options			
Technology Function	Code 1 – Software adjustable transfer function with 10 compensation points for linearization of valve behavior.		

Block Diagram — Wiring



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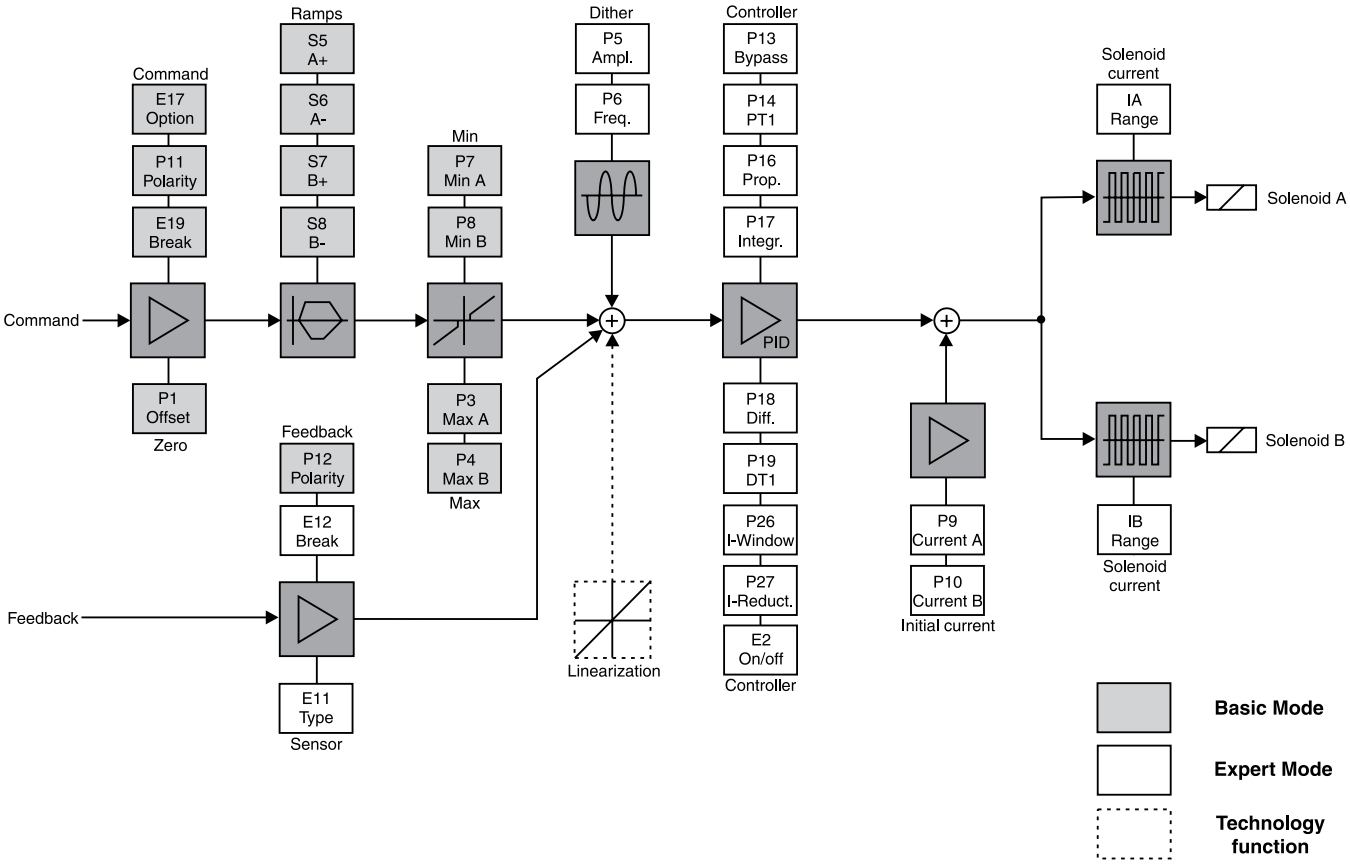
Signal Flow Diagram



PWDXXA-40.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

ProPxD Interface Program

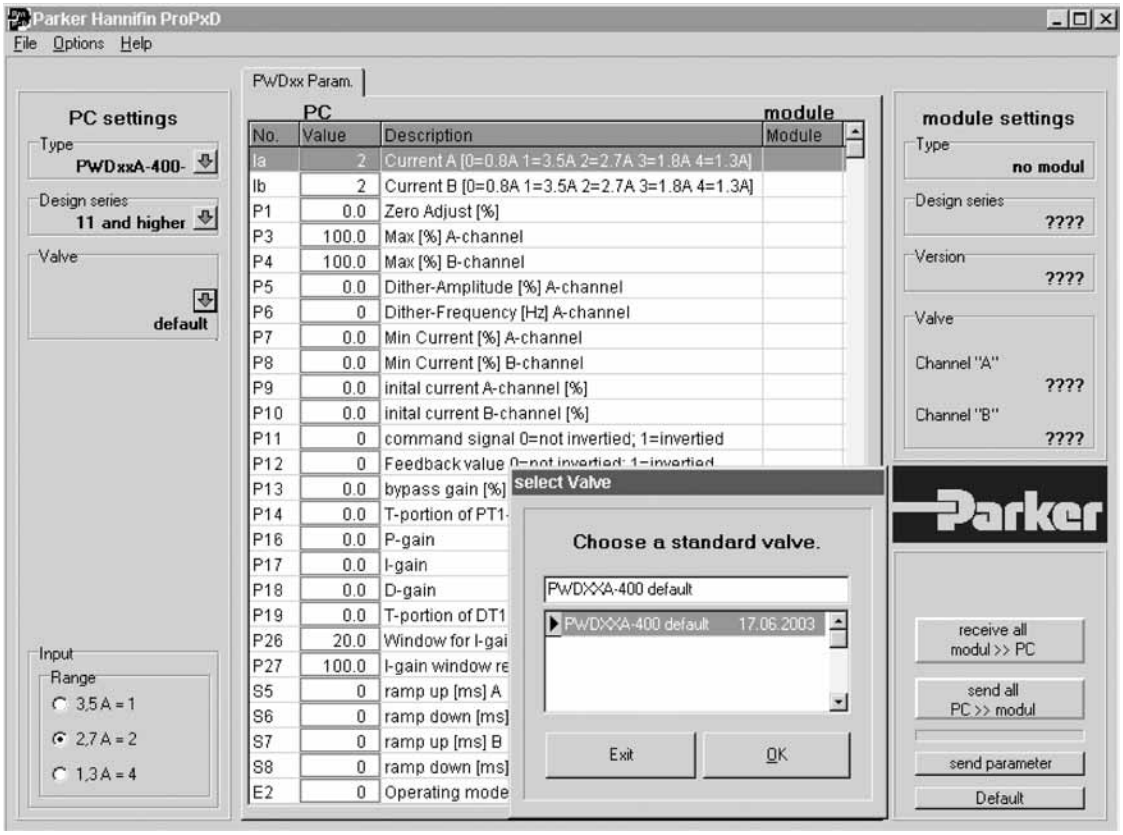
The new ProPxD software permits user-friendly parameter setting for the electronic module series PCD, PWD and PZD.

Via the clearly arranged entry screen the parameters can be identified and modified. Storage of complete parameter sets to floppy or hard disk is possible as well as printout or record as a text file for further documentation. Stored parameter sets may be loaded anytime and transmitted to the electronic module in the same manner as the default parameters which are available for all standard valve series. Inside the electronic a nonvolatile memory stores the data with the option for recalling or modification.

Features

- User-friendly editing of all parameters.
- Default values for standard valves.
- Identification and documentation of parameter sets.
- Executable with all Windows® operating systems from Windows® 95 upwards.
- Simple communication between PC and electronic via serial interface RS-232 and nullmodem cable.

D

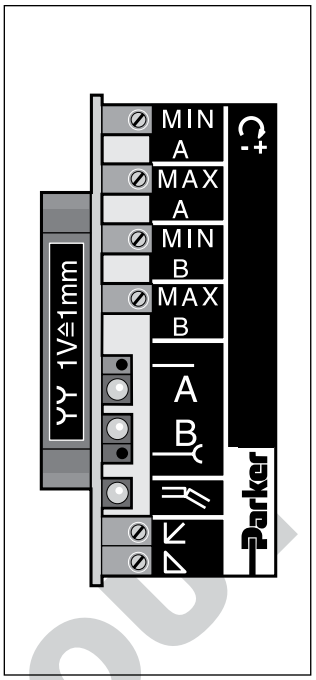


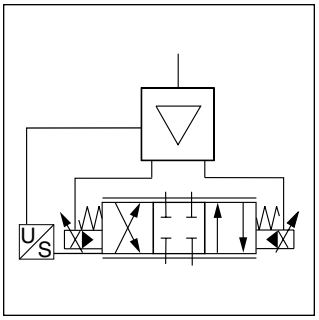
General Description

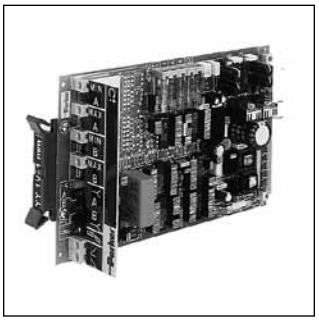
Series EW104 electronic module is used to control pilot operated D**FS proportional directional valves with main stage spool position feedback. The module accepts a ±10 volt command signal where spool position is controlled by a closed loop PID circuit on the module.

Features

- Spool overlap range can be manipulated with MIN potentiometer, adjustable by feeding a constant set value of 0.2V.
- MAX limiting of spool stroke with full set value range. Can be set up after MIN has been set and feeding a constant set value of 10V.
- DIP-switch from internal ramp generation to external ramp supply.
- Pulsed low-loss amplifier power stage with supporting constant current control for consistent temperature-independent solenoid forces.
- Dither generator with applied frequency to improve static characteristics.
- Diagnosis of spool stroke by means of measuring sockets as well as LEDs for indicating working conditions.

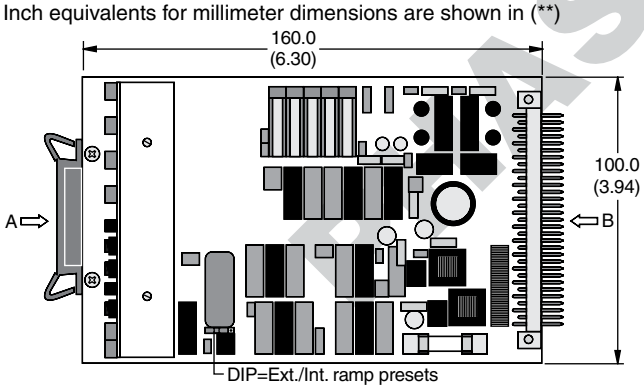






Dimensions

Inch equivalents for millimeter dimensions are shown in (**)



For new applications:
EW104: Refer to PWDXXA-400

Specifications

Connection	31 Pole Male Connector, DIN 41617
Power Supply	Regulated: 18-26V Unregulated: 22-38V
Command Signal	0 to +10 VDC and 0 to -10 VDC
Input Select Voltage	5 to 30 VDC
Power Required	40 VA
Reference Outputs	±10 VDC @10 mA
Max. Solenoid Output Current	1.3A
Ambient Temp. Range	0°C to +70°C (+32°F to +158°F), Standard Range
Ramps	0 to 5 seconds adjustable
Shielded Cable Connection	Supply connections + valve: 1.5 sq. mm (16 AWG) Transducer + Command Signals: 0.5 sq. mm (20 AWG)
Fuse	2A medium lag, DIN 41571/5x20 mm

Ordering Information

EW — Electronic Module Directional Valve

☐ — Size

Code	Valve Size	Mounting Pattern	Valve Spool Stroke	
10	D31FS	NG10	±5.0 mm	(0.20 in.)
16	D41FS	NG16	±6.0 mm	(0.24 in.)
25	D81FS	NG25	±9.3 mm	(0.37 in.)
26	D91FS	NG25	±9.3 mm	(0.37 in.)
32	D111FS	NG32	±15.0 mm	(0.59 in.)

104 — Module Type

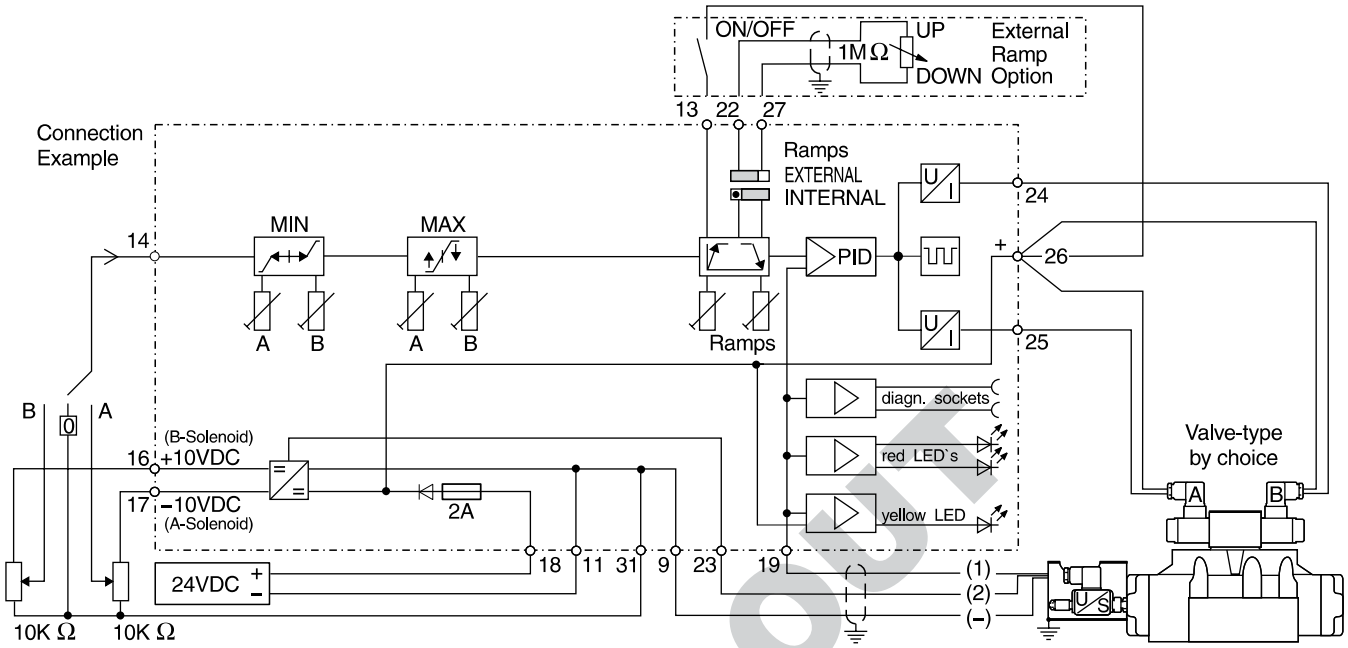
Code	Description
104	Amplifier, adjustable, MIN/MAX-limiting Up/Down ramps

☐ — Design Series

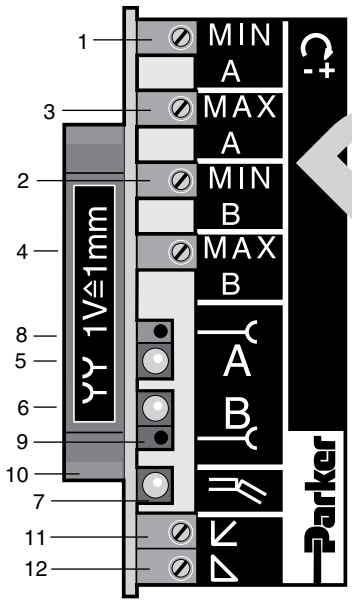
EW104.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

Block Diagram — Wiring



Operating and Diagnostic Elements (Elevation A)



1–2 MIN limiting potentiometers for A and B sides

3–4 MAX limiting potentiometers for A and B sides

5–6 Red LEDs for: stroke direction indication

7 Yellow LED for:
- correct voltage supply,
- correct connection of transducer

8 Red socket for spool diagnostic

9 Black socket for spool diagnostic (0V potential)

10 Blue grip strip with reference information for measured values on the measuring sockets.

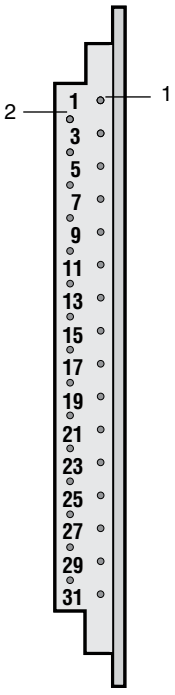
11 UP ramp potentiometer

12 DOWN ramp potentiometer

Notes:

- Turn off the electrical power to this board whenever the hydraulic supply to the valve is not on.
- Always turn off the power to this board before removing it from the card holder.

Connector (Elevation B)



9 Reference potential 0V Transducer
11 Reference potential 0V supply
13 Input ramp disable
14 Input command voltage 0...+/-10 VDC
16 Output +10V reference
17 Output -10V reference
18 Input 24 VDC supply
19 Input transducer signal
22 Input external ramp option
23 Output transducer supply
24 Output control solenoid B
25 Output control solenoid A
26 Output control solenoid A+B with possibility for external switch connection
27 Input external ramp option
31 Reference potential 0V set value

EW104.indd, dd

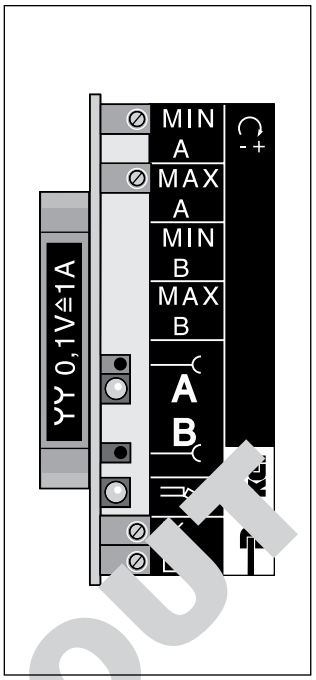
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

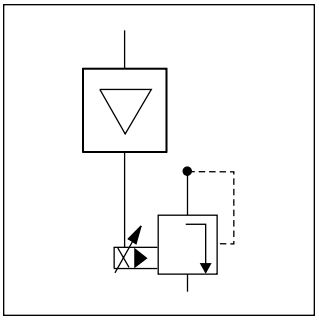
General Description

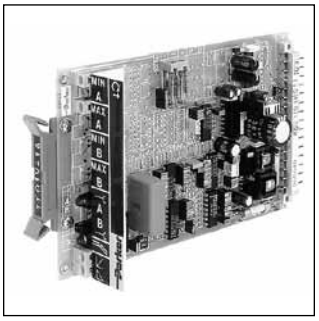
Series ED104 electronic module is used to control DSA/DWE/DWU pressure control valves. The module accepts a 0 to 10 volt command signal, and produces a proportionally linear output current used to drive the valve's proportional solenoid. Two ramp adjustments provide smooth transition between selected pressures. Note that the linearity of the valve itself determines the linearity of the system. Refer to the specific valve data for actual linearity performance.

Features

- Processing and amplification of the externally supplied positive set-values into output signals for the control solenoid.
- Can be combined with PZD00A-400 or external programmable control.
- DIP switch from internal ramp generation to external ramp setting.
- MIN/MAX limiters for matching the working range to the full set value range.
- Pulsed low-loss amplifier power stage with supporting constant current control for consistent, temperature-independent, solenoid forces.
- Dither generator with applied frequency to improve static characteristics.
- Diagnosis by means of diagnostic sockets as well as LEDs for indicating working conditions.

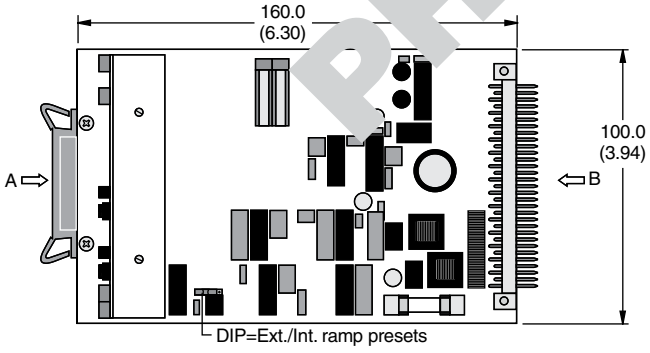






Dimensions

Inch equivalents for millimeter dimensions are shown in (**)



Specifications

Connection	31 Pole Male Connector, DIN 41617
Power Supply	Regulated: 18-26V Unregulated: 22-38V
Command Signal	0 to +10 VDC and 0 to -10 VDC
Input Select Voltage	5 to 30 VDC
Power Required	40 VA
Reference Outputs	+10 VDC 10 mA
Max. Solenoid Output Current	1.3A with set value 10V
Ambient Temp. Range	0°C to +70°C (+32°F to +158°F), Standard Range
Ramps	0 to 5 seconds adjustable
Shielded Cable Connection	Supply connections + valve: 1.5 sq. mm (16 AWG) Command Signals: 0.5 sq. mm (20 AWG)
Fuse	2A medium lag, DIN 41571/5x20 mm

For new applications:
ED104: Refer to PCD00A-400

Ordering Information

ED — Electronic Module Pressure Valve

For:
DSA
DWE
DWU

00

104 — Module Type

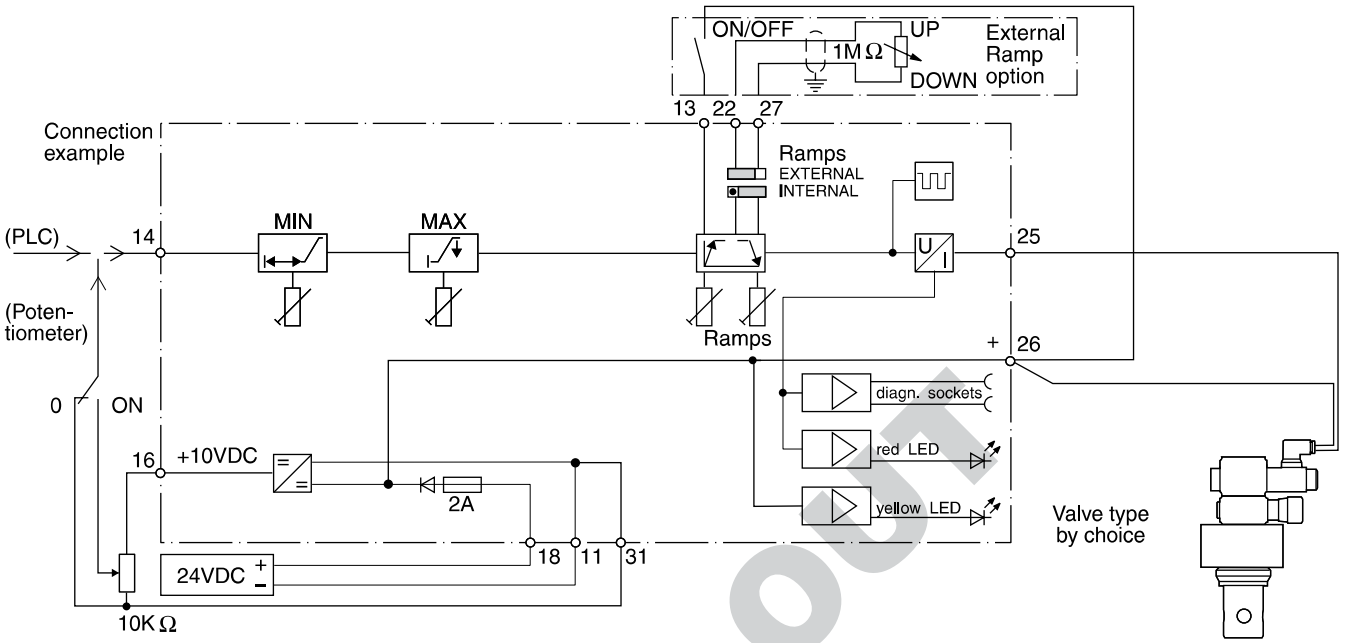
Code	Description
104	Amplifier, adjustable MIN/MAX-limits, Up/Down Ramps

□ — Design Series

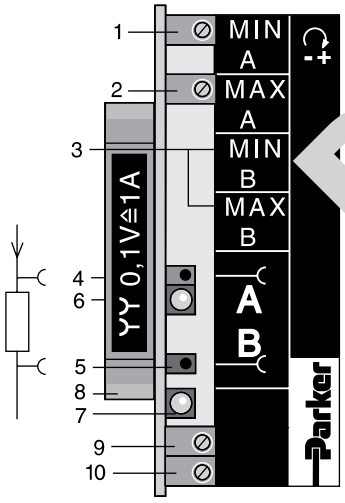
ED104.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

Block Diagram — Wiring



Operating and Diagnostic Elements (Elevation A)



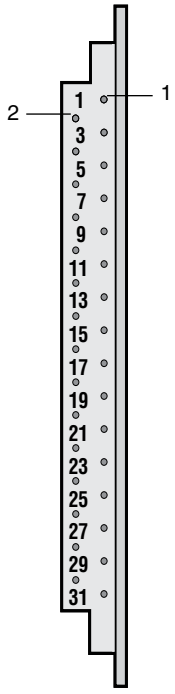
1 MIN-limiting for matching the lowest pressure
2 MAX-limiting for matching the highest pressure
3 Not used
4 Red socket for current diagnostic
5 Black socket for current diagnostic
6 Red LED (A) for:
- function indicator control solenoid
- (B unused here)
7 Yellow LED for:
- correct voltage supply
8 Red grip strip with reference information for measured values on the diagnostic sockets
9 UP ramp potentiometer
10 Down ramp potentiometer

Only potential-free measuring equipment to be used

Notes:

- Turn off the electrical power to this board whenever the hydraulic supply to the valve is not on.
- Always turn off the power to this board before removing it from the card holder.

Connector (Elevation B)



11 Reference potential 0V supply
13 Input ramp disable
14 Input command voltage 0 to +10 VDC
16 Output +10V reference
18 Input 24 VDC supply
22 Input external ramp option
25 Output control solenoid
26 Output control solenoid
27 Input external ramp option
31 Reference potential 0V set value

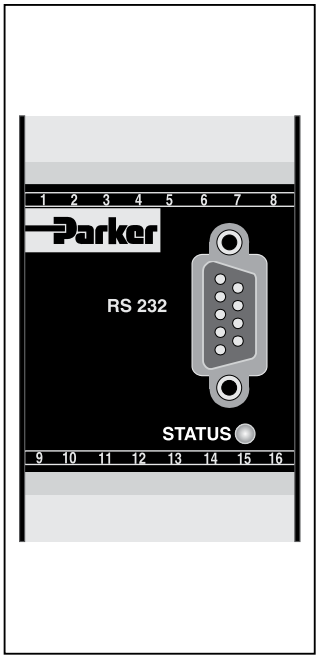
ED104.indd, dd

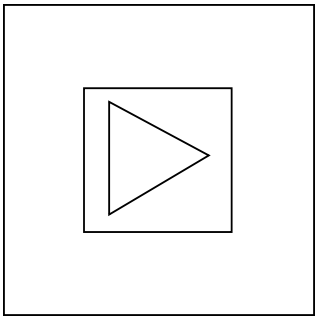
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

General Description

Series PCD00A-400 electronic module for driving proportional pressure control and proportional throttle valves is compact and easy to install with DIN rail mounting and plug-in terminals. The module is designed to drive two coils independent of each other. The digital design allows for programmable parameters such as solenoid drive current, mins, maxs, ramps and setpoints. The module provides flexibility and repeatability from unit to unit. The module parameters are programmed with an RS-232 interface and user friendly software (ProPxD) with default values for standard valves.

The PCD00A-400 module contains the functions required by typical pressure control and throttle valve applications (series RE*W, PE*W, DSAE, VBY, VMY, TDA, and TEA valves).





Features

- Two independent valve drivers.
- Ramps, Setpoints, Mins, Maxs.
- 5 output current selections.
- Programmable parameters.
- RS-232 Interface.
- User friendly programming software.
- Plug-in terminals.
- Compliant with European EMC Standards.

Specifications

General			
Model	Module package for snap-on mounting on EN 50022 rail	**Mounting Position**	Any
Package Material	Polycarbonate	**Ambient Temperature Range**	-20°C to +60°C (-4°F to +140°F)
Inflammability Class	V2 to V0 acc. UL 94	**Protection Class**	IP 20 acc. DIN 40050
Electrical			
Duty Ratio	100%	**Status Signal**	Off – 0 to 0.5 VDC; On – Us; rated max. 15 mA
Supply Voltage	18 VDC to 30 VDC, ripple < 5% eff., surge free* (29 VDC to 30 VDC for 24 V coils)	**Adjustment Ranges** Minimum Maximum Ramp Time Current	**preset** 0 to 50% 0 to 1000 50 to 100% 0 to 1000 0 to 32.5 s 0 to 32.5 0.8/3.5/2.7/1.8/1.3 A 0/1/2/3/4/5
Switch-on Current Typ.	22A for 0.2 mS		
Current Consumption Max.	5.0A	**Interface**	RS 232C, DSub 9p. male for null modem cable
Pre-fusing	6.3A medium lag	**EMC**	EN 50081-2, EN 50082-2
Command Signal	0 to +10 VDC, ripple < 0.01 % eff., surge free, Ri = 150K ohm	**Connection**	Screw terminals 0.2 to 2.5 mm², plug-in
Input Signal Resolution	0.025%	**Cable Specification**	16 AWG overall braid shield for supply voltage and solenoids 20 AWG overall braid shield for sensor and signal
Differential Input Voltage Max.	30V for terminals 5 and 6 against PE (terminal 8)		
Enable Signal	Off – 0 to 5.0 VDC; On – 8.5 to 30 VDC; Ri = 30K ohm	**Cable Length**	50m (164 ft.)
Channel Recall Signal	Off – 0 to 5.0 VDC; On – 8.5 to 30 VDC; Ri = 30K ohm		

PCD00A-400.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

Ordering Information

PCD — Electronic Module Pressure/Throttle Valves

00 — Without Position Control Universal

A — —

400 — Module Type

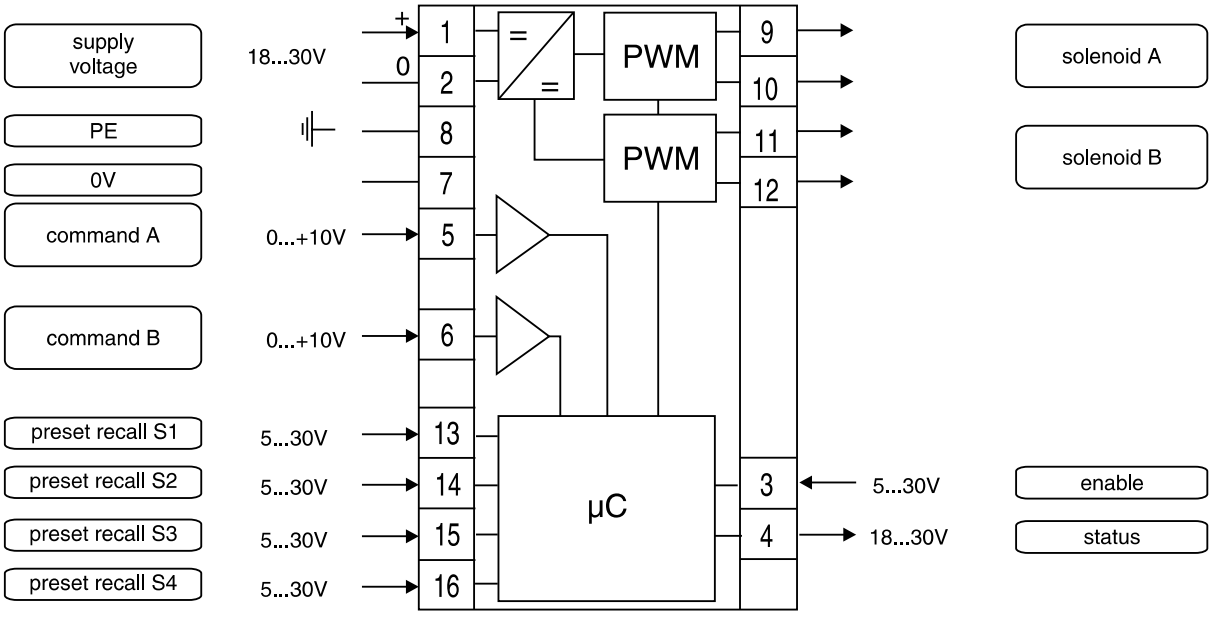
[ ] — Design Series
NOTE: Not required when ordering.

Weight: 160 g (0.35 lbs.)

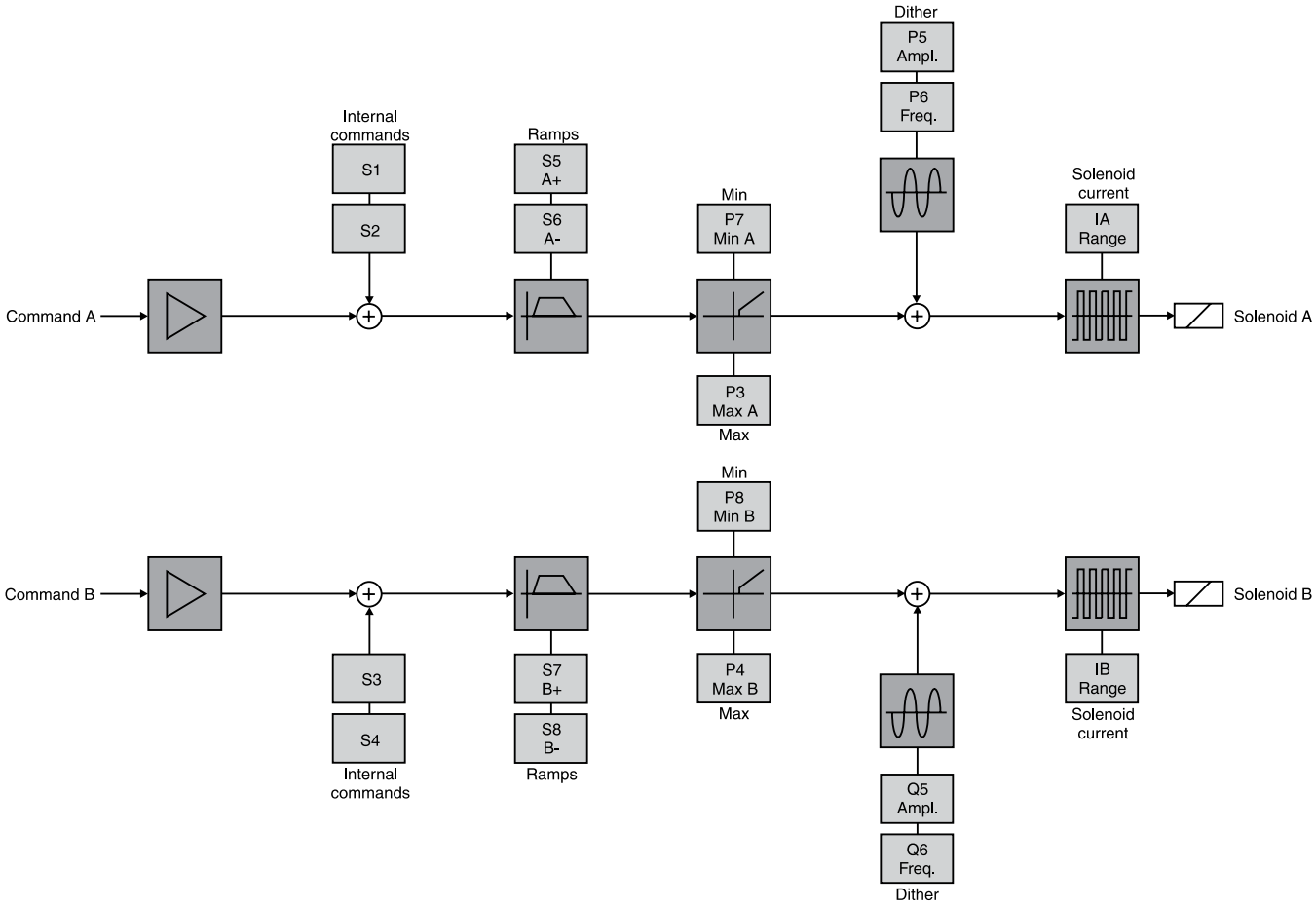
Code	Description
400	2 Amplifiers, MIN/MAX-adjustment, UP/DOWN ramps, Command inputs, 4 Command signal presets

D

Block Diagram — Wiring



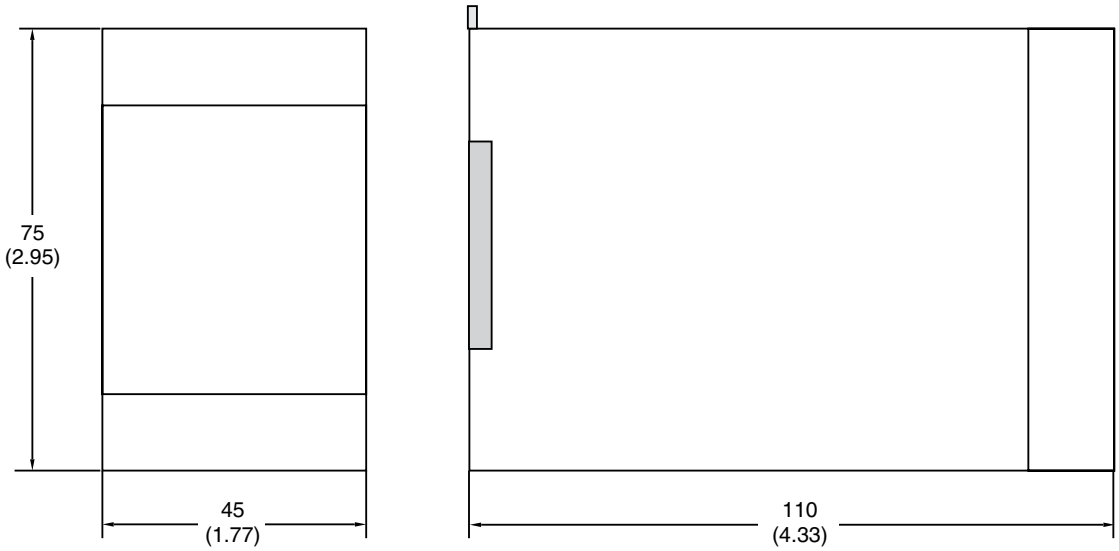
Signal Flow Diagram



D

Dimensions

Inch equivalents for millimeter dimensions are shown in (**)



ProPxD Interface Program

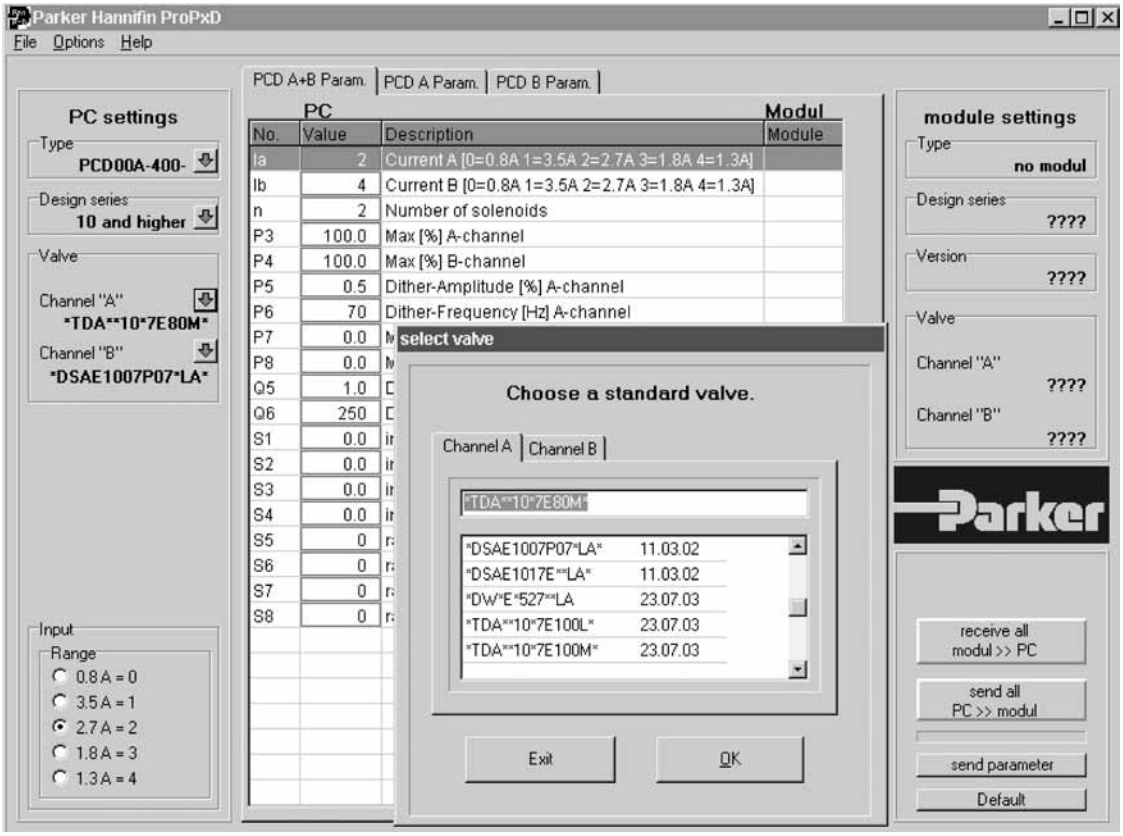
The new ProPxD software permits user-friendly parameter setting for the electronic module series PCD, PWD and PZD.

Via the clearly arranged entry screen the parameters can be identified and modified. Storage of complete parameter sets to floppy or hard disk is possible as well as printout or record as a text file for further documentation. Stored parameter sets may be loaded anytime and transmitted to the electronic module in the same manner as the default parameters which are available for all standard valve series. Inside the electronic a nonvolatile memory stores the data with the option for recalling or modification.

Features

- User-friendly editing of all parameters.
- Default values for standard valves.
- Identification and documentation of parameter sets.
- Executable with all Windows® operating systems from Windows® 95 upwards.
- Simple communication between PC and electronic via serial interface RS-232 and nullmodem cable.

D



General Description

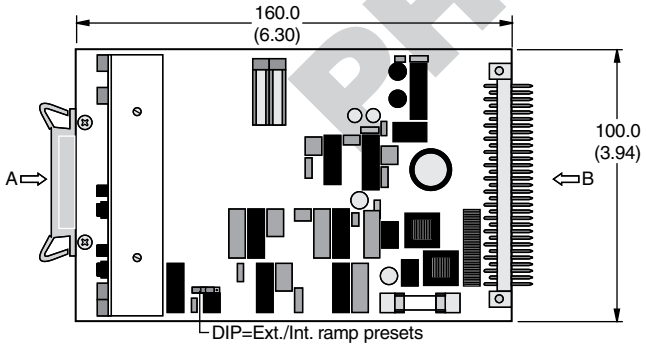
Series ET104 electronic module is used to control TDA and TEA proportional throttle valves configured with the 'L' solenoid option. For valves configured with the 'M' solenoid option, refer to driver card PCD00A-400. The module accepts a 0 to 10 volt command signal, and produces a proportionally linear output current used to drive the valve's proportional solenoid. Note that the linearity of the valve itself determines the linearity of the system. Refer to the specific valve data for actual linearity performance. Two ramp adjustments provide control of actuator acceleration and deceleration.

Features

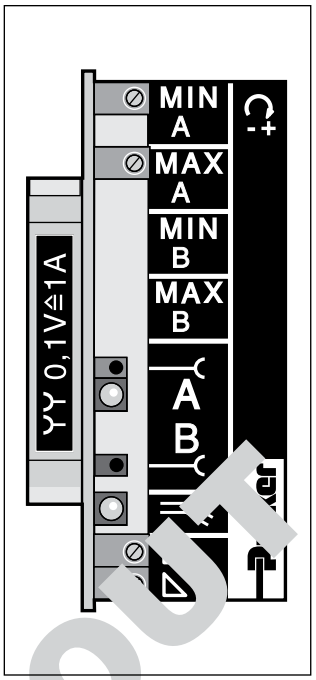
- Processing and amplification of the externally supplied positive set-values into output signals for the control solenoid.
- Can be combined with PZD00A-400 or external programmable control.
- DIP switch from internal ramp generation to external ramp setting.
- MIN/MAX limiters for matching the working range to the full set value range.
- Pulsed low-loss amplifier power stage with supporting constant current control for constant, temperature-independent, solenoid forces.
- Dither generator with applied frequency to improve static characteristics.
- Diagnosis by means of diagnostic sockets as well as LEDs for indicating working conditions.

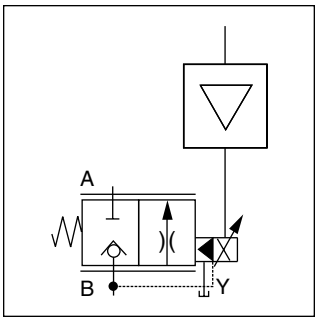
Dimensions

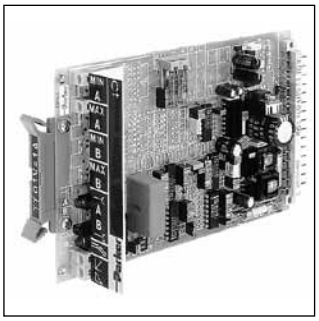
Inch equivalents for millimeter dimensions are shown in (**)



For new applications:
ET104: Refer to PCD00A-400







Specifications

Connection	31 Pole Male Connector, DIN 41617
Power Supply	Regulated: 18-26V Unregulated: 22-38V
Power Required	40 VA
Command Signal	0 to +10 VDC
Input Select Voltage	5 to 30 VDC
Reference Outputs	+10 VDC 10 mA
Max. Solenoid Output Current	1.05A with set value 10V
Ambient Temp. Range	0°C to +70°C (+32°F to +158°F), Standard Range
Ramps	0 to 5 seconds adjustable
Shielded Cable Connection	Supply connections + valve: 1.5 sq. mm (16 AWG) Command Signals: 0.5 sq. mm (20 AWG)
Fuse	2A medium lag, DIN 41571/5x20 mm

Ordering Information

ET — Electronic Module Pressure Valve

Size

Code	Valve	Sol.
00	TDA...LAF E16 to E50	35mm
00	TEA...LAF E16 to E50	35mm
99	TDA...LAF E63 to E100	60mm
99	TEA...LAF E63 to E100	60mm

104 — Module Type

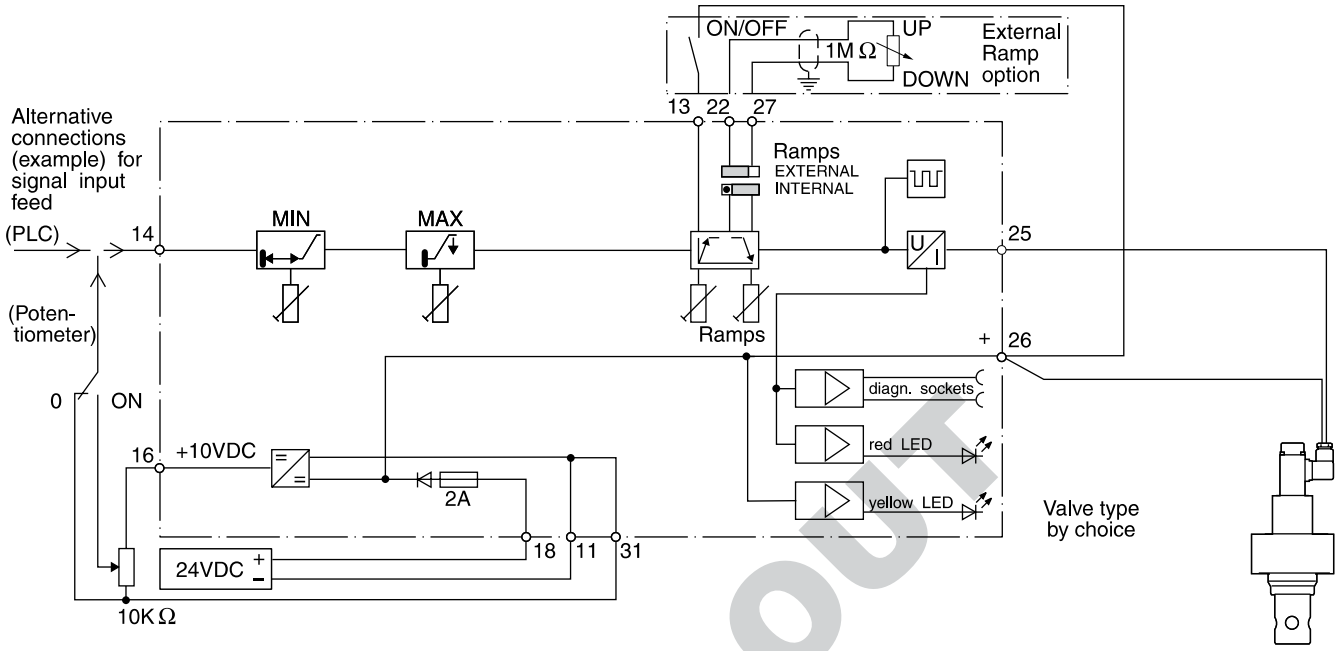
Code	Description
104	Amplifier, adjustable MIN/MAX limits, UP/DOWN ramps for valves with 'L' solenoid option

Design Series

ET104.indd, dd

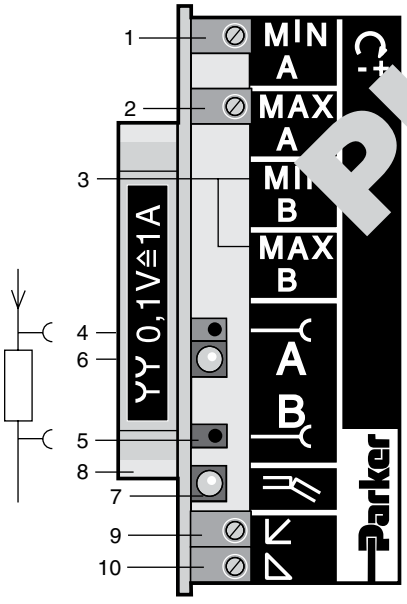
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

Block Diagram — Wiring



D

Operating and Diagnostic Elements (Elevation A)



1 MIN limiter for matching the smallest throttle aperture
2 MAX limiter for matching the largest throttle aperture
3 not used
4 Red socket for current diagnostic
5 Black socket for current diagnostic
6 Red LED (A) for:
- function indicator control solenoid
- (B not used)

7 Yellow LED for:
- correct voltage supply

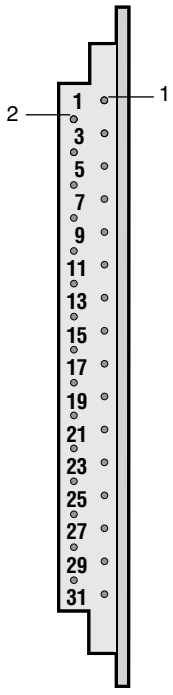
8 Green grip strip with reference information for measured values
9 UP ramp potentiometer
10 DOWN ramp potentiometer

Only potential-free measuring equipment to be used

Notes:

- Turn off the electrical power to this board whenever the hydraulic supply to the valve is not on.
- Always turn off the power to this board before removing it from the card holder.

Connector (Elevation B)



11 Reference potential 0V supply
13 Input ramp disable
14 Input command voltage 0...+10 VDC
16 Output +10V reference
18 Input 24 VDC supply
22 Input external ramp option
25 Output control solenoid
26 Output control solenoid
27 Input external ramp option
31 Reference potential 0V set value

ET104.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

General Description

Series BD90 servo amplifiers are high performance amplifiers designed to work with Series BD and DY servovalves. The amplifiers are packed with many desirable features that make them extremely versatile performers in motion control systems.

Features

- **Voltage or Current Commands —** The user has the option of command input ranges of either ±14 VDC or ±28 mA.
- **Two Differential Input Feedback Amplifiers —** Both inner and outer loops have Proportional-Integral-Derivative gain.
- **Built-in Power Supply —** The BD90 has its own power supply with inputs rated at either 115 VAC or 230 VAC.
- **Dither Circuitry —** The user can select either the on-board 60 Hz dither circuit, or input his own external dither frequency.
- **Reference Power Supply —** A reference suply voltage of ±15 VDC @ 350 mA, and ±10 VDC @ 50 mA.
- **External Logic Shutdown —** Allows the user to shut down the output to the valve by applying an external voltage signal.
- **Convenient Mounting —** The BD90 mounts in a convenient standard “Snap-Trac” mount.
- **Plug-in Terminal Strips —** This feature makes it unnecessary to remove the wires from the terminal strip.

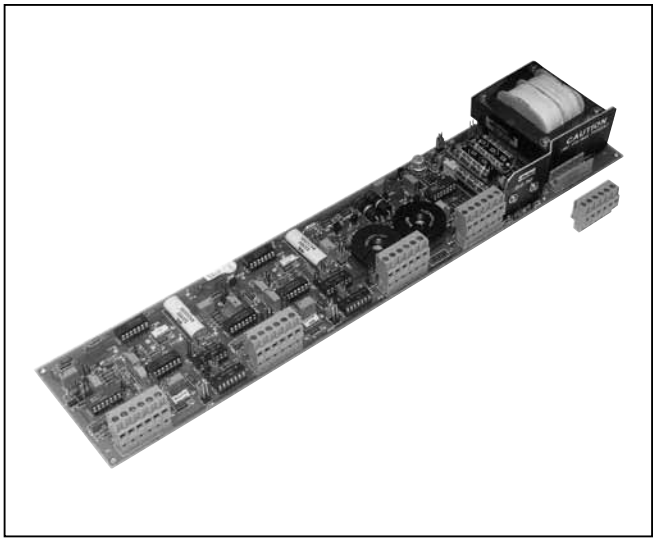
Ordering Information

BD — Servo Amplifier for BD Series and DY (>15mA) Series Servovalves

90 — Input Power

Code	Description
90	115 VAC

BD90 Connector 1000177
Snap-Trac BD90 830007-15
Snap-Trac is included with delivery

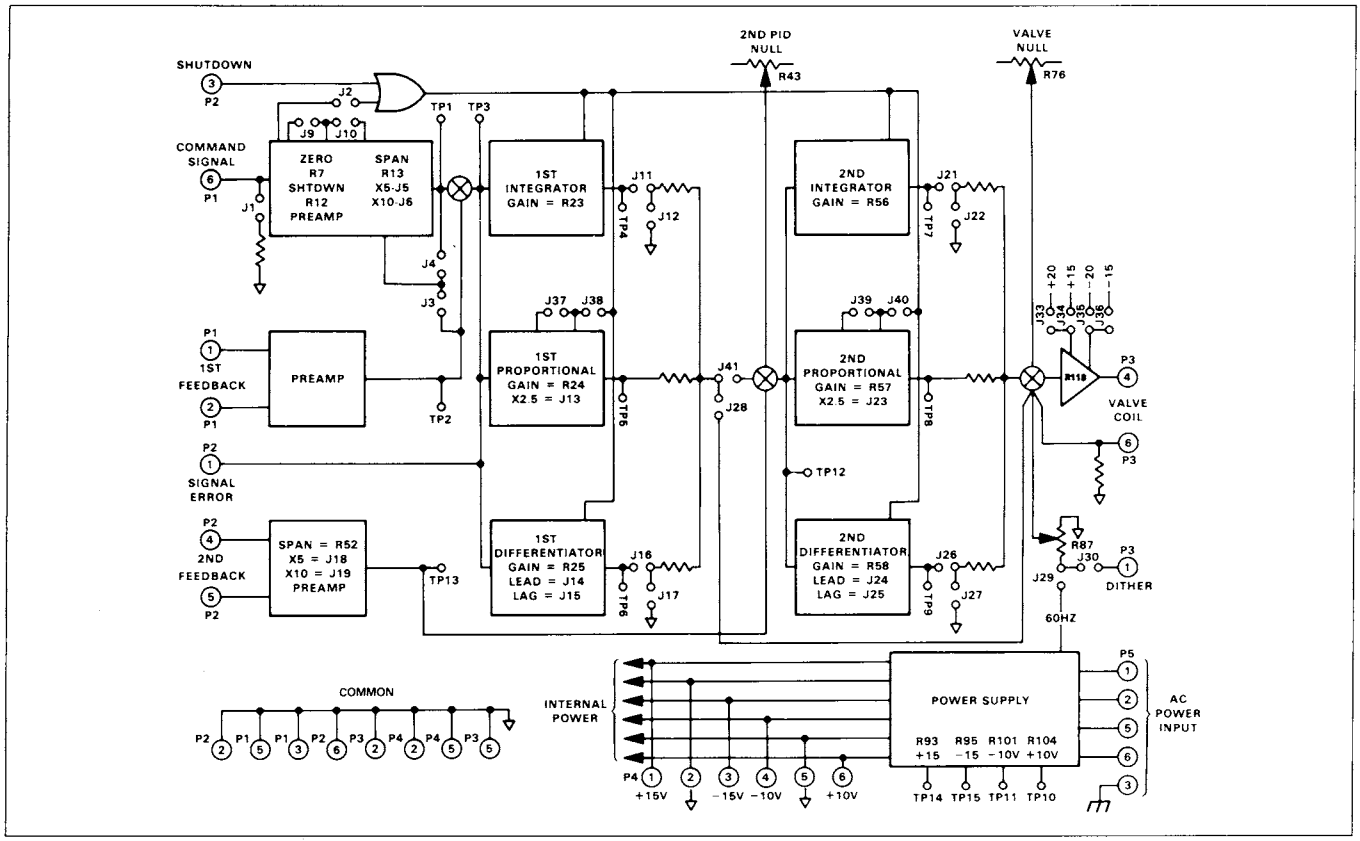


Specifications

Power Supply	BD90 – 115 VAC or 230 VAC @ 30 VA, 50/60 Hz
Command Signal Range	±14 VDC, ± 28 mA
Input Impedance on Command Terminals	100k ohm minimum
Input Impedance on Feedback Terminals	50K ohm minimum
Current Output	15 to 150 mA Icoil x Rcoil ≤12.5V (BD90 up to 200 mA with J33 and J35)
Operating Temperature Range	0°C to 70°C (32°F to 158°F)
Reference Voltage	±15 VDC @ 350 mA
Supplies	±10 VDC @ 50 mA
External Logic Shutdown Voltage Required	+4 to +10 VDC, sink input
Shutdown Input Impedance	10K ohm
Protection Class	Open, not rated

D

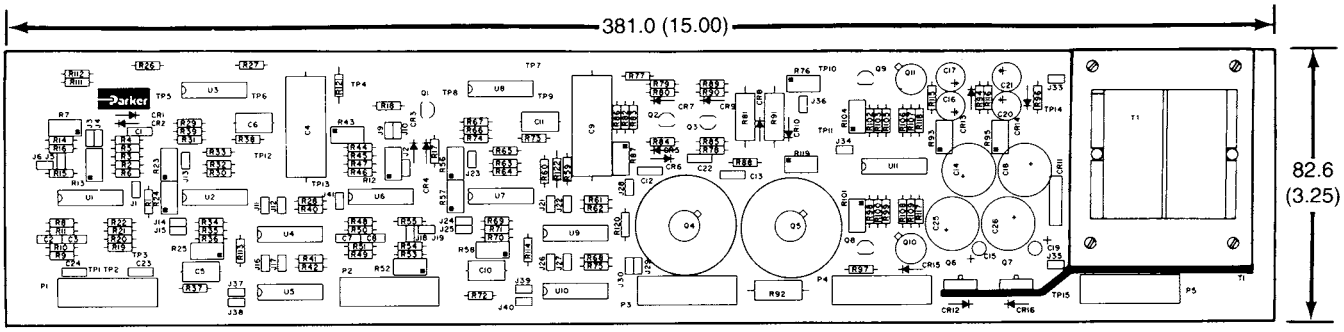
Block Diagram — Wiring



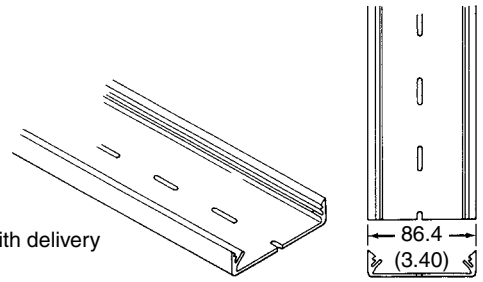
BD90 Servo Amplifier

Dimensions

Inch equivalents for millimeter dimensions are shown in (**)



BD90 Servo Amplifier



Snap-Trac is included with delivery

BD90.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

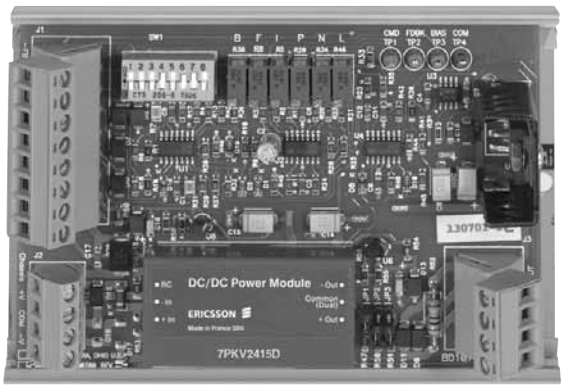
General Description

Series BD101 is an accessory card designed to solve a variety of common system problems. It is available in both ±15 VDC and 24 VDC versions.

This card can function as a current driver for the BD servo valves. Maximum current outputs of ±30 mA, ±60 mA, ±100 mA and ±150 mA are jumper configurable.

Closed loop options are switch selectable with integral and proportional control. Feedback scaling, input bias, and gain adjustments are provided. Outputs currents up to ±150 mA or voltage output of ±10 VDC are available.

Current command of ±20 mA can be converted to ±10 VDC.



Features

- Open loop current driver for up to ±150 mA.
- ±20 mA input to ±10 VDC output option.
- Closed loop option with proportional and/or integral control.
- ±10 VDC reference voltages available.
- Available in ±15 VDC and +24 VDC versions.
- Differential inputs provide better noise immunity.
- Scaling and bias available on input signals.

Specifications

Power Supply Input	BD101-15 ±15 VDC @ 200 mA BD101-24 24 VDC Nominal (22-28 VDC) @ 250 mA
CMD and FDBK Inputs **Voltage** **Current**	Differential Inputs ±10 VDC max. 100K ohm input impedance ±20 mA max switch configurable 499 ohm input impedance
Reference Voltages	±10 VDC @ 10 mA
Current Output	±30 mA, ±60 mA, ±l00 mA, or ±150 mA Fixed up to ±150 mA Adjustable Icoil Rcoil ≤12.5 V
Voltage Output	±10 VDC @ 10 mA 1000 ohm output impedance
Operating Temperature Range (Ambient)	BD101-15: 0°C to 70°C (32°F to 158°F) BD101-24: 0°C to 70°C (32°F to 158°F) (≤ 100 mA load) 0°C to 55°C (32°F to 131°F) (> 100 mA load)
Size	82.6mm (3.25") wide x 127mm (5.00") long x 38.1mm (1.5") high
Mounting	Snap-Trac Parker PN 830007-5.25

Ordering Information

BD — Signal Conditional Card

101 — Style

—

□ — Power Supply

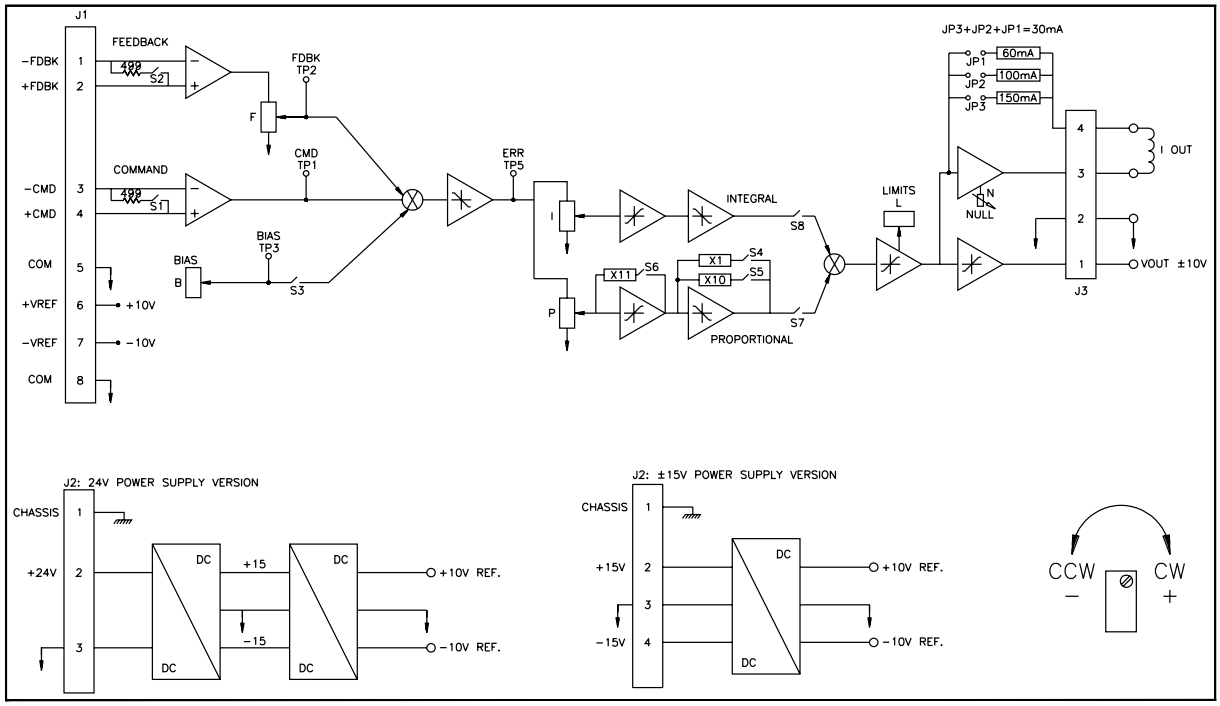
Code	Description
15	±15 VDC @ 200 mA
24	24 VDC nominal

[ ] — Design Series

NOTE: Not required when ordering.

Note: Snap-Trac is included with delivery

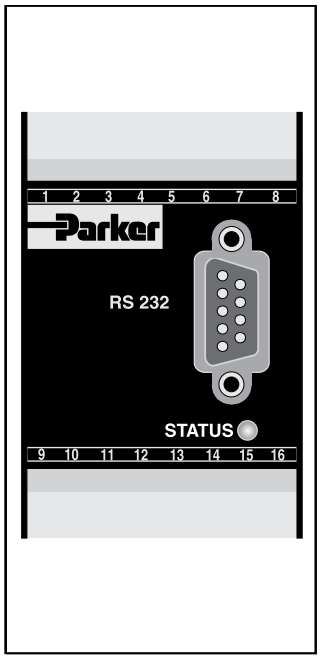
Block Diagram — Wiring

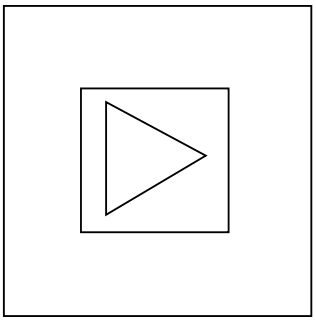


Dimensions – Inch eqivalents for millimeter dimensions are shown in (**)

General Description

Parker electronic modules PID00A-40* for rail mounting are compact, easy to install and provide time saving wiring by disconnectable terminals. The digital design of the circuit results in good accuracy and optimal adaption for closed loop controls by a comfortable interface program.





CE

Features

The described electronic unit combines all necessary functions for the optimal operation of closed loop controls. The most important features are:

- Extended PID controls.
- Speed control with position feedback.
- Differential input stage with different signal options.
- Output stage with different output options.
- Four-quadrant ramp function.
- Status indicator.
- Digital circuit design.
- Parametering by serial interface RS-232.
- Connection by disconnectable terminals.
- Compatible to the relevant European EMC standards.
- Optional technology function "linearization"
- Simple to use interface program.

Ordering Information

PID — **00** — **A** — **40** — [ ] — [ ]

- **PID**: Electronic Module, Closed Loop Control
- **00**: Universal
- **A**
- **40**: Min/Max Ajustment, Accel/Decel Ramps, Command Input
- [ ]: Technology Function
- [ ]: Design Series NOTE: Not required when ordering.

Code	Function
0	Standard
1	Linearization Option

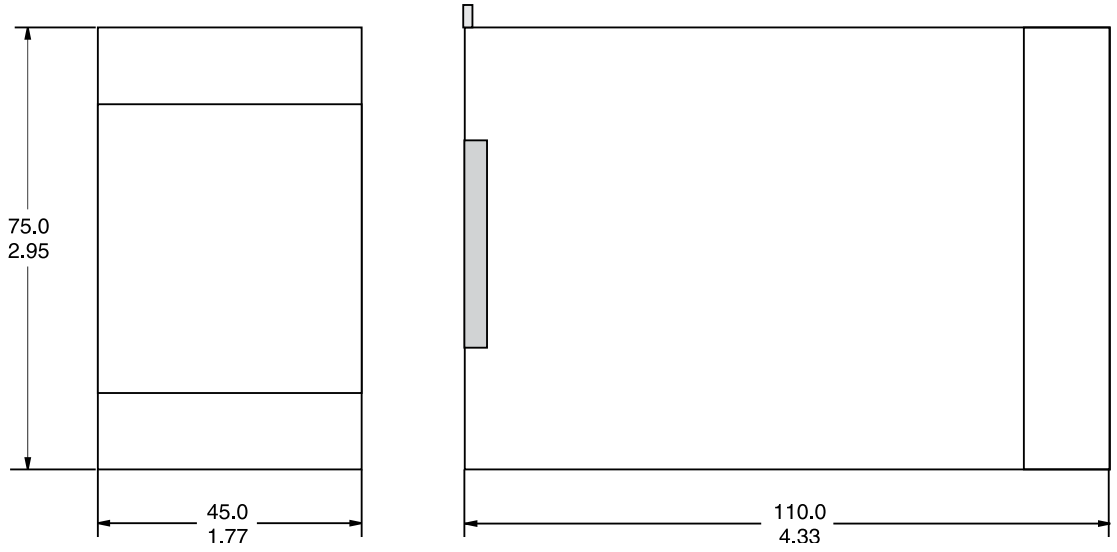
Specifications

General	
Model	Module package for snap-on mounting on EN 50022 rail
Package Material	Polycarbonate
Inflammability Class	V2...V0 acc. UL 94
Mounting Position	Any
Ambient Temperature	-20°C to +60°C (-4°F to +140°F)
Protection Class	IP 20 acc. DIN 40050
Weight	0.16 kg (0.35 lbs.)
Electrical	
Duty Ratio	100%
Supply Voltage	18...30 VDC, ripple <5% eff., surge free
Current Consumption Max.	100 mA
Pre-fusing	500 mA
Command Signal Options	+10...0...-10 V, ripple <0.01 eff., surge free, Ri = 100 kOhm +20...0...-20 mA, ripple <0.01 eff., surge free, Ri = 200 kOhm 4...12...20 mA, ripple <0.01 eff., surge free, Ri = 200 kOhm <3.6 mA = solenoid output OFF, <3.8 mA = solenoid output ON, (acc. NAMUR NE43)

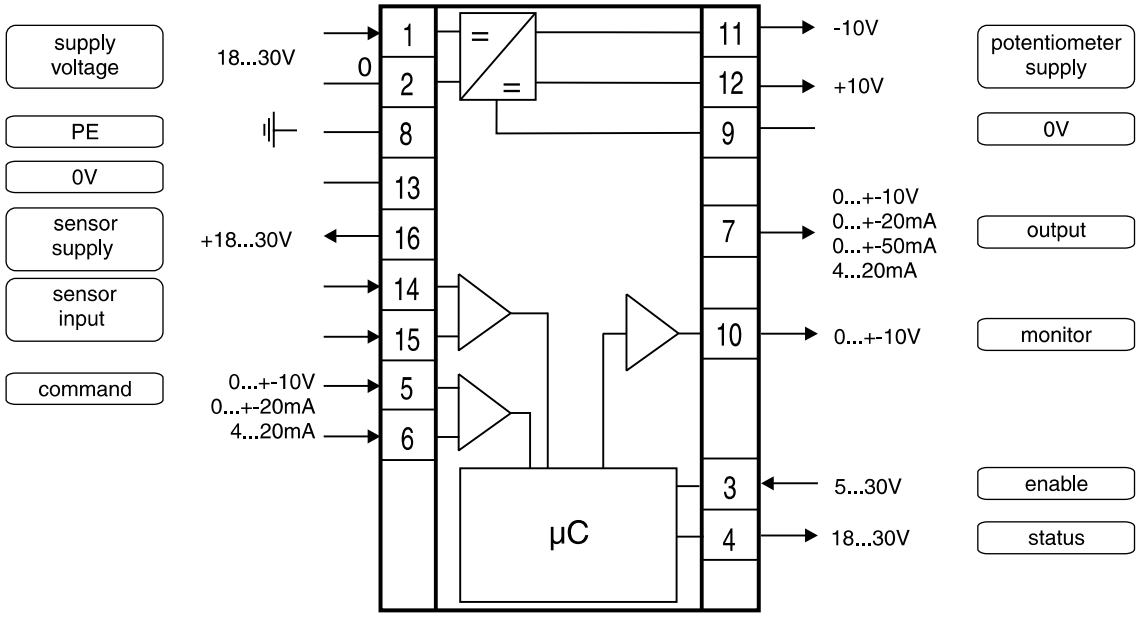
Electrical (cont.)	
Input Signal Resolution	0.025 %
Differential Input Voltage Max.	30 V for terminals 5 and 6 against PE (terminal 8)
Enable Signal	0...2.5 V: OFF / 5...30 V: ON Ri = 100 kOhm
Status Signal	0...0.5 V: OFF / Us: ON rated 15 mA maximum
Monitor Signal	+10...0...-10 V, rated 5 mA max., signal resolution 0.4%
Adjustment Ranges	Minimum: 0...50 % Maximum: 50...100% Ramp: 0...32.5 s Zero Offset +100%...-100%
Interface	RS 232C, DSub 9p. male for null modem cable
EMC	EN 50081-2, EN 50082-2
Connection	Screw Terminals 0.2...2.5 mm², disconnectable
Cable Specification	20 AWG overall braid shield
Cable Length	50 m (164 ft.)
Options	
Technology Function	Code 1: Software adjustable transfer function with 10 compensation points for linearization of valve behavior

Dimensions

Inch equivalents for millimeter dimensions are shown in (**)

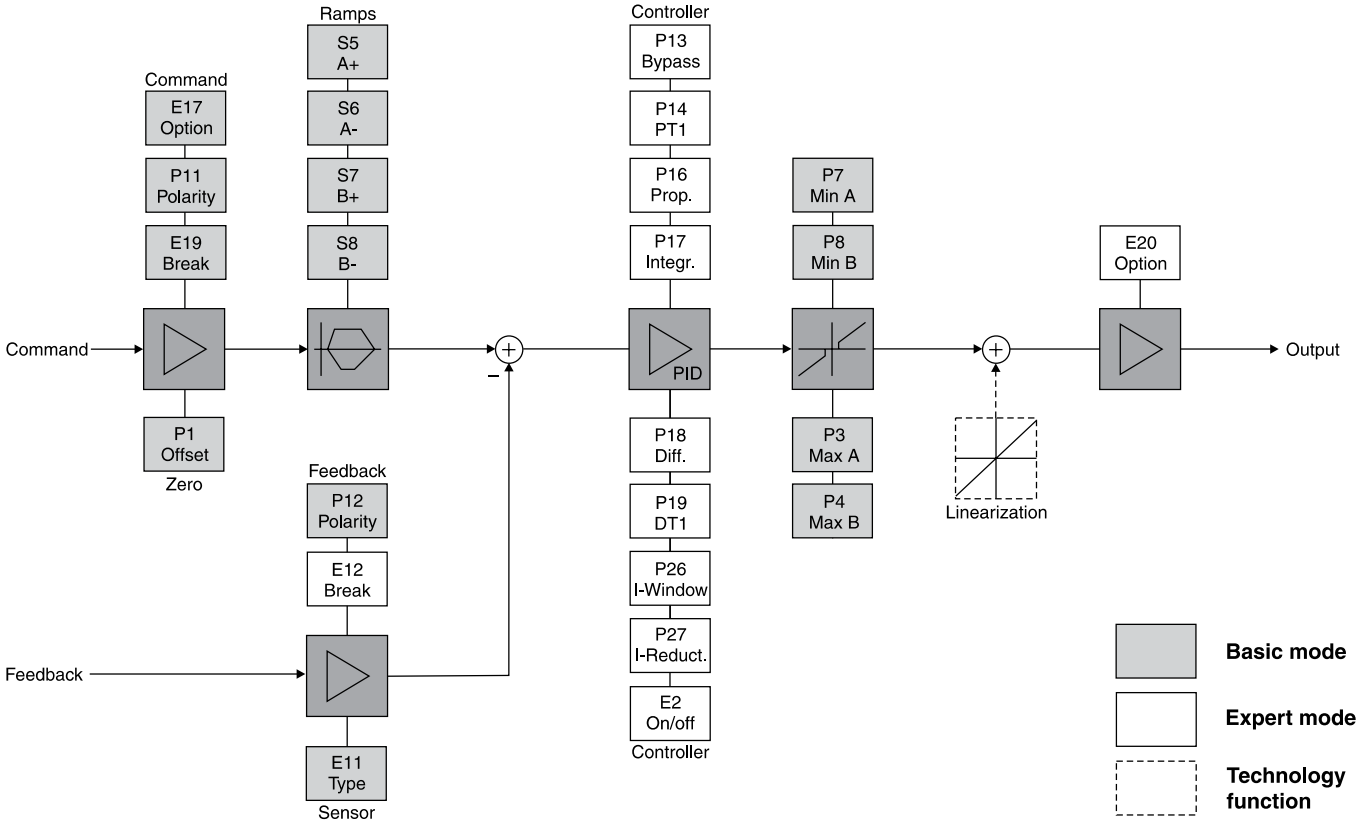


Block Diagram — Wiring



D

Signal Flow Diagram



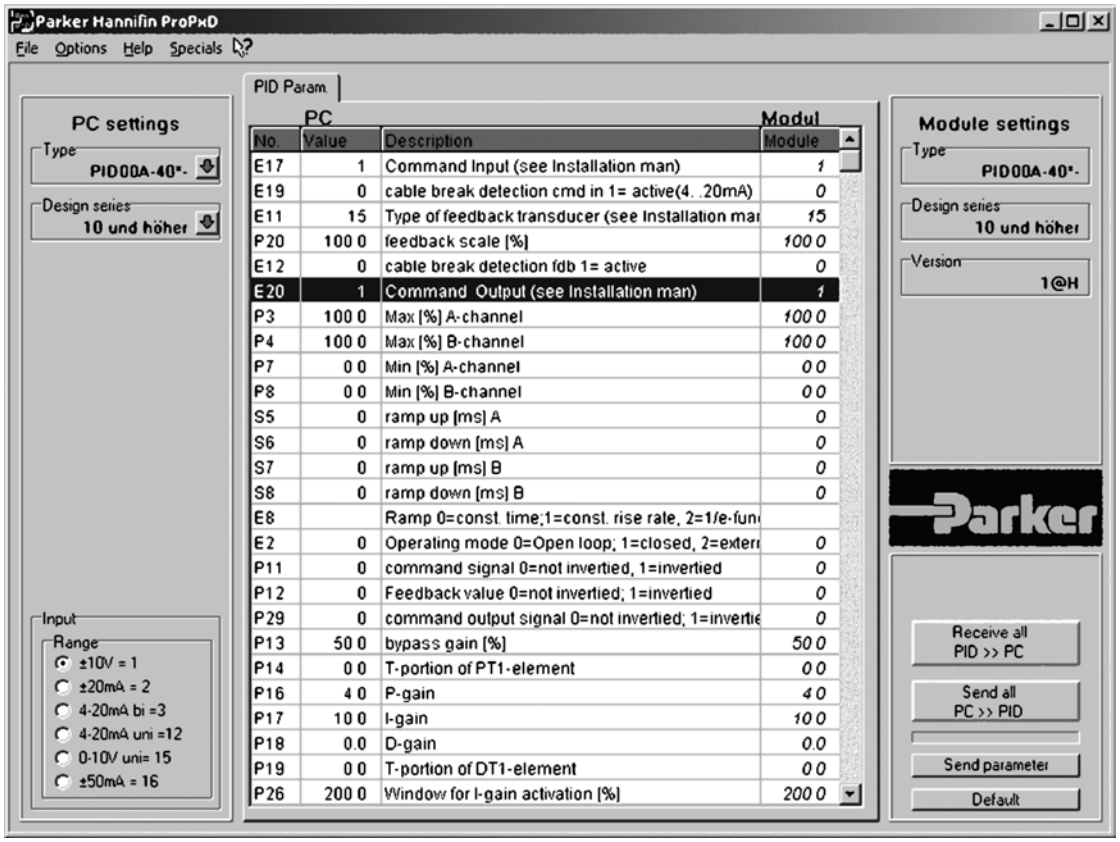
ProPxD Interface Program

The new ProPxD software permits comfortable parameter setting for the electronic module series PCD, PWD, PZD and PID.

Via the clearly arranged entry mask the parameters can be noticed and modified. Storage of complete parameter sets to floppy or hard disk is possible as well as printout or record as a text file for further documentation. Stored parameter sets may be loaded anytime and transmitted to the electronic module in the same manner as the basic parameters which are available for all usable valve series. Inside the electronic a nonvolatile memory stores the data with the option for recalling or modification.

Features

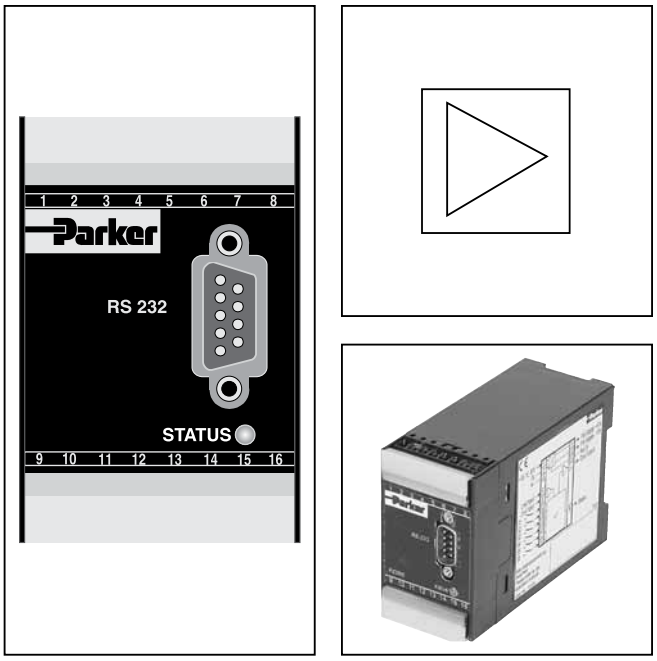
- Simple editing of all parameters
- Storage and loading of optimized parameter adjustments
- Executable with all Windows® operating systems from Windows® 95 upwards
- Communication between PC and electronic via serial interface RS-232 and nullmodem cable
- Simple to use interface program. Download free of charge **www.parker.com/euro_hcd → Services → downloads**



General Description

Series PZD00A-40* electronic modules provide options to enhance PWD, PCD driver modules and valves with onboard electronics. The modules are compact and easy to install with DIN rail mounting and plug-in terminals. The digital design allows for programmable parameters such as input signal conditioning, setpoints, ramps, mins, maxs, and command output options. The modules provide flexibility for different applications and repeatability from unit to unit. The module parameters are programmed with an RS-232 interface and user friendly software (ProPxD) with default values for the standard valves.

The PZD00A-40* module contains the functions required by typical proportional valve applications (series D*FP, D**FH valves, PWD, PCD modules).

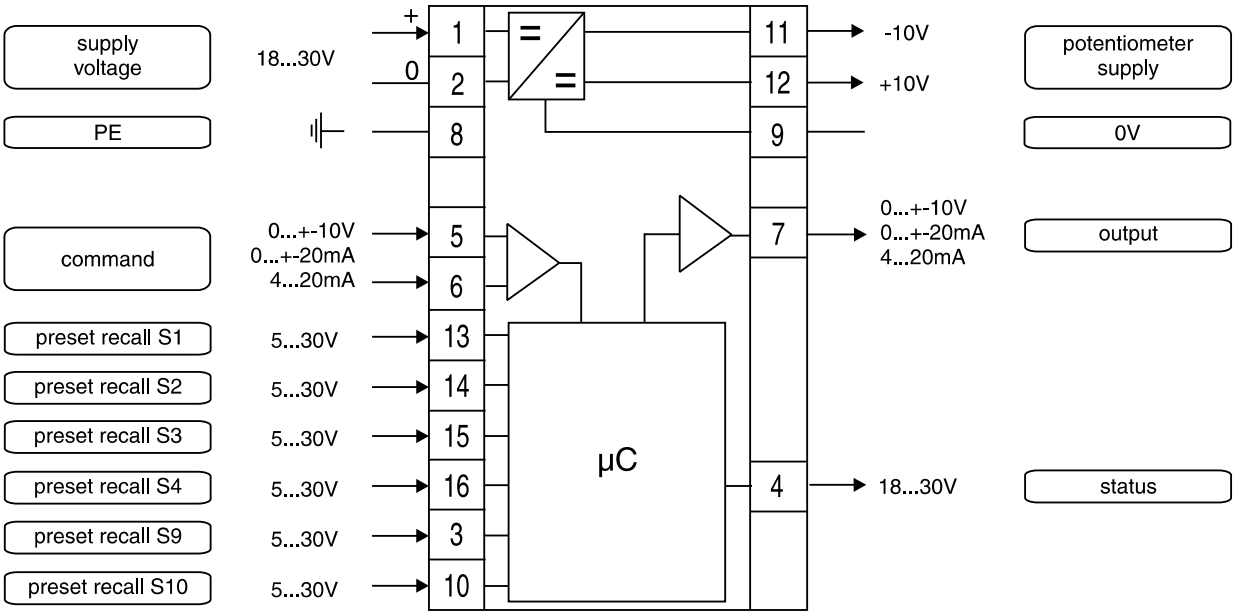


D

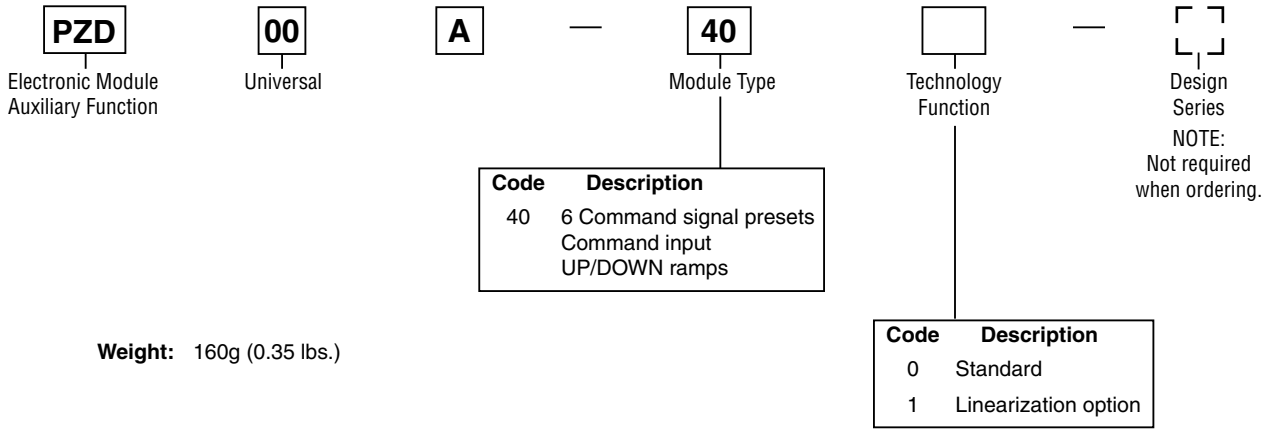
Features

- Setpoints, ramp options, mins, maxs.
- Command output options.
- Programmable parameters.
- Reference voltages.
- RS-232 Interface.
- User friendly programming software.
- Plug-in terminals.
- Compliant with European EMC Standards.

Block Diagram — Wiring



Ordering Information



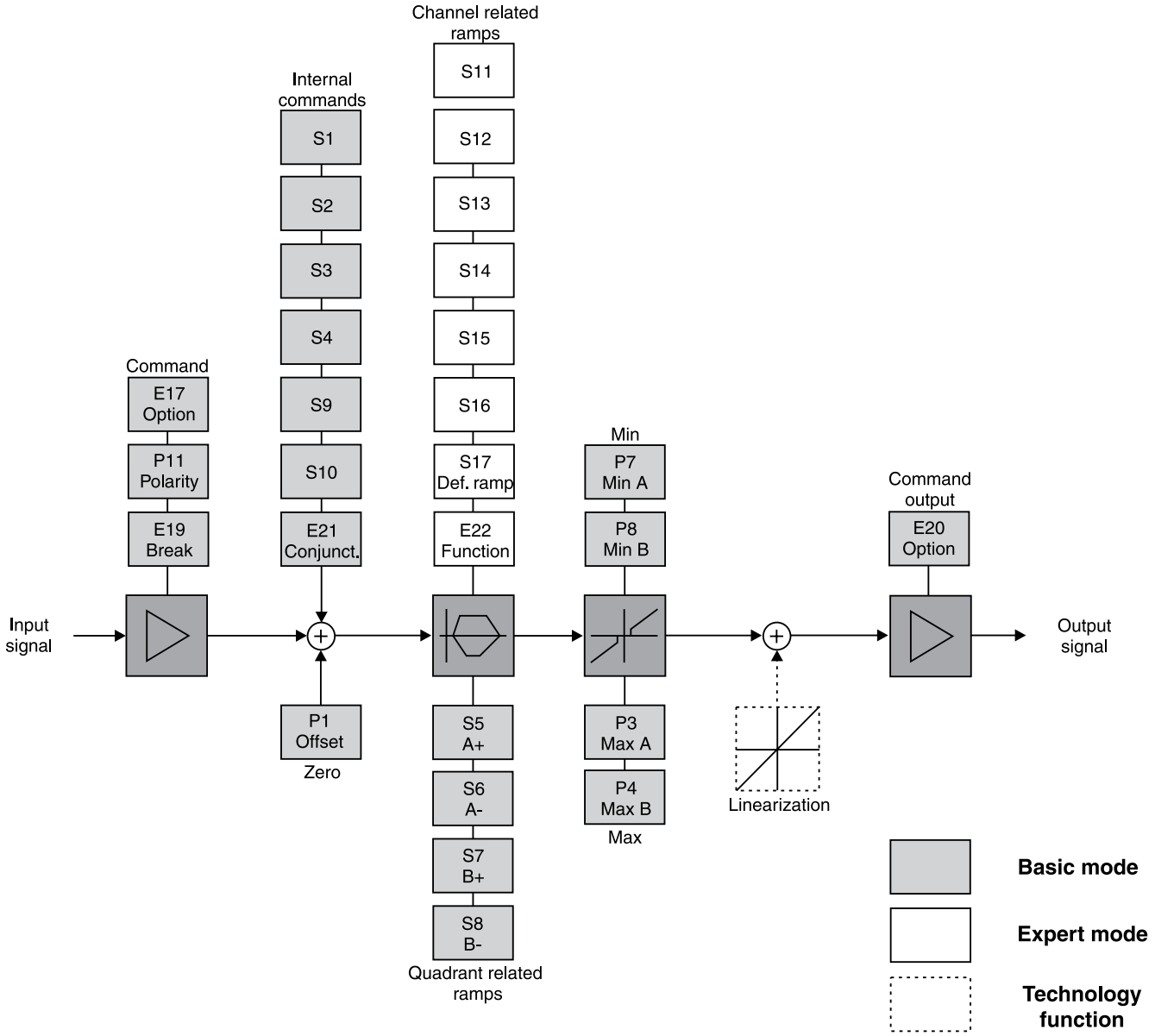
Weight: 160g (0.35 lbs.)

D

Specifications

General			
Model	Module package for snap-on mounting on EN 50022 rail	**Mounting Position**	Any
Package Material	Polycarbonate	**Ambient Temperature Range**	-20°C to +60°C (-4°F to +140°F)
Inflammability Class	V2 to V0 acc. UL 94	**Protection Class**	IP 20 acc. DIN 40050
Electrical			
Duty Ratio	100%	**Status Signal**	Off – 0 to 0.5 VDC; On – Supply Voltage; rated max. 15 mA
Supply Voltage	18 VDC to 30 VDC, ripple < 5% eff., surge free	**Output Signal**	+10 to 0 to -10 VDC, rated max. 15 mA +20 to 0 to -20 mA, Ro < 500 ohm 4 to 12 to 20 mA, Ro < 500 ohm
Current Consumption Max.	100 mA		
Pre-fusing	500 mA medium lag		
Command Signal	+10 to 0 to -10 VDC, ripple < 0.01 % eff., surge free, Ri = 100K ohm +20 to 0 to -20 mA, ripple < 0.01 % eff., surge free, Ri = 200 Ohm 4 to 12 to 20 mA, ripple < 0.01 % eff., surge free, Ri = 200 Ohm < 3.6 mA = output signal 0 V / 0 mA / 12 mA acc. to output option > 3.8 mA = output signal on (acc. NAMUR NE43)	**Output Signal Resolution**	0.025%
		Reference output	+10 / -10, 2%, rated max. 15 mA
		Adjustment Ranges Minimum Maximum Cmd Channels Ramp Time Zero Offset	 0 to 50% 50 to 100% +100 to -100% 0 to 32.5 s +100 to -100%
		Interface	RS 232C, DSub 9p. male for null modem cable
Input Signal Resolution	0.025%	**EMC**	EN 50081-2, EN 50082-2
Differential Input Voltage Max.	30 VDC for terminals 5 and 6 against PE (terminal 8)	**Connection**	Screw terminals 0.2 to 2.5 mm², disconnectable
Channel Recall Signal	Off – 0 to 2.5 VDC On – 5 to 30 VDC Ri = 100K ohm	**Cable Specification**	20 AWG overall braid shield
		Cable Length	50m (164 ft.)
Options			
Technology Function	Code 1: Software adjustable transfer function with 10 compensation points for linearization of valve behavior.		

Signal Flow Diagram



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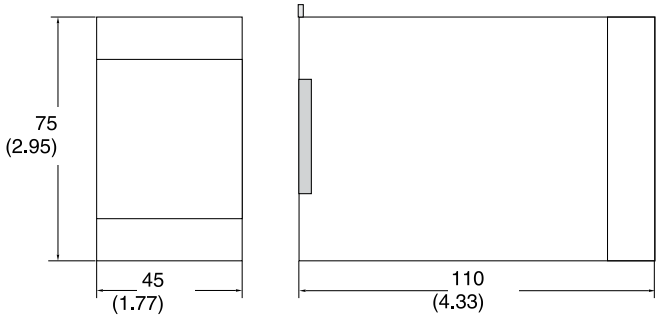
Dimensions

Inch equivalents for millimeter dimensions are shown in (**)



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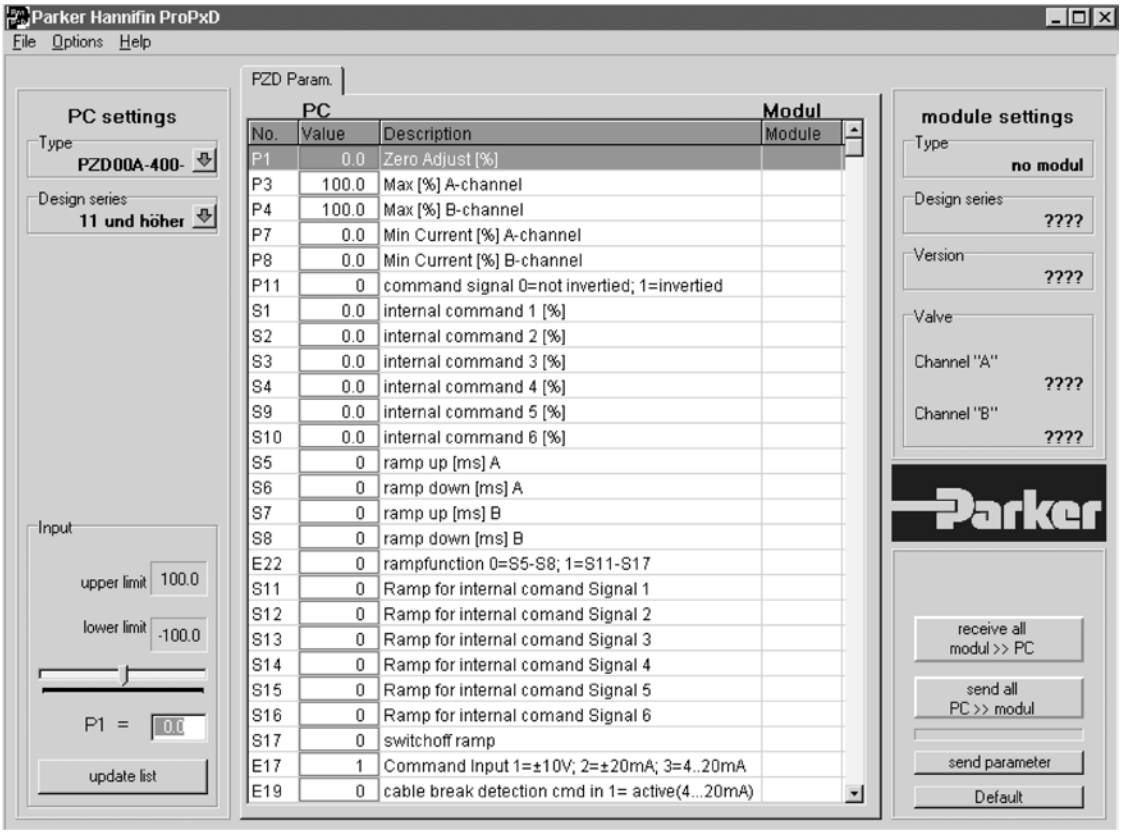
ProPxD Interface Program

The new ProPxD software permits user-friendly parameter setting for the electronic module series PCD, PWD, PZD and PID.

Via the clearly arranged entry screen the parameters can be identified and modified. Storage of complete parameter sets to floppy or hard disk is possible as well as printout or record as a text file for further documentation. Stored parameter sets may be loaded anytime and transmitted to the electronic module in the same manner as the default parameters which are available for all standard valve series. Inside the electronic a nonvolatile memory stores the data with the option for recalling or modification.

Features

- User-friendly editing of all parameters.
- Default values for standard valves.
- Identification and documentation of parameter sets.
- Executable with all Windows® operating systems from Windows® 95 upwards.
- Simple communication between PC and electronic via serial interface RS-232 and nullmodem cable.



General Description

Series Compax3F is the new member of the servo drive family of Parker Hannifin. It is especially designed for the requirements of electrohydraulic systems and in particular for position and force control of electrohydraulic axis.

Attention:

For application support and customized software, please contact your local Parker representative.

D

Large Drive Range

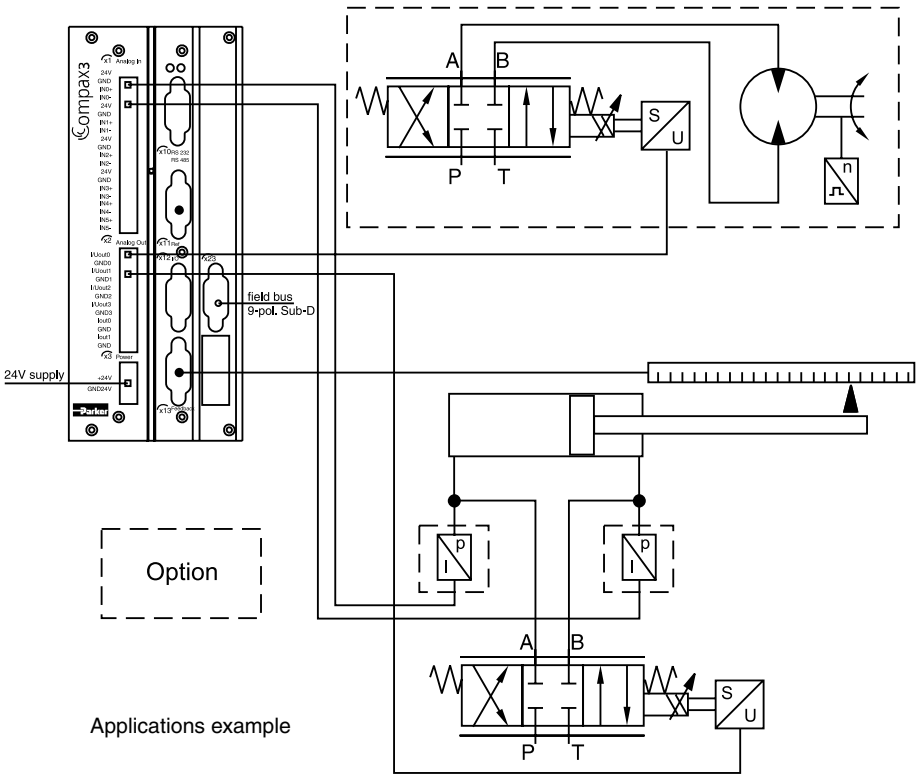
- Valves:
  - Proportional direction control valves
  - Proportional pressure relief and pressure reducing valves
  - Flow valves
- Drives:
  - Cylinders
  - Rotary drives
  - Motors

Range of Application

- Closed loop position and force control of linear cylinders and rotary drives
- Switching between position and force control
- Synchronous run with up to 64 axes

Typical Applications

- Feeder axis
- Position and force control of press cylinders in material forming machines
- Roller clearance control in roller presses
- Die casting machines



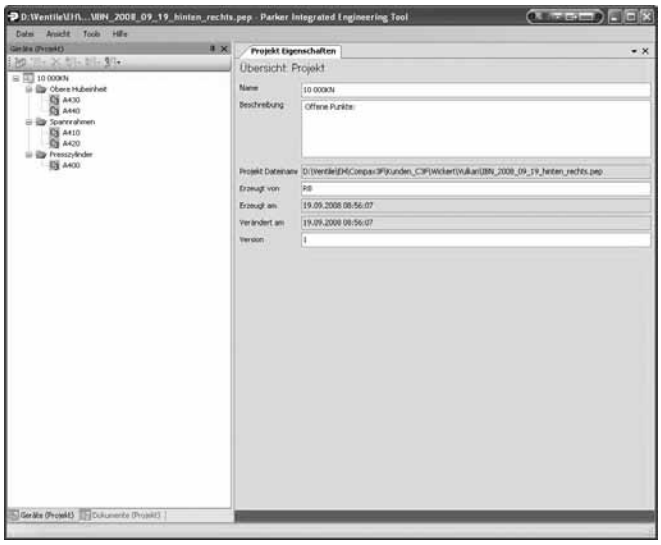
Applications example

C3F.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

Project Development, Commissioning and Programming

PC-Tools - Open and Transparent



- Compax3 ServoManager
  - Intuitively understandable user interface
  - Wizard technology
  - Online help
  - Oscilloscope function
  - Optimized co-ordination of complete mechatronic systems
- Valve and Drive manager
  - All technical data of Parker valves, cylinders and drives available
  - Additionally support through the Compax3F Hydraulics-Manager by configuration of user defined valves and drives.

Software download, free of charge:
www.compax3.com

Monitoring and Control

Operator Panels

Control equipment for all text and graphics applications in industrial environments, from two-line displays to touch-panels using field busses:
- Profibus DP
- CANopen
- DeviceNET
- Interbus-S

For further information please refer to POP:
"Parker Operator Panels".
Download: www.parker-eme.com/pop.

In addition to drivers for Compax3/Compax3 powerPLmC, drivers for other PLC products can be integrated on request.

Flexible Service and Maintenance

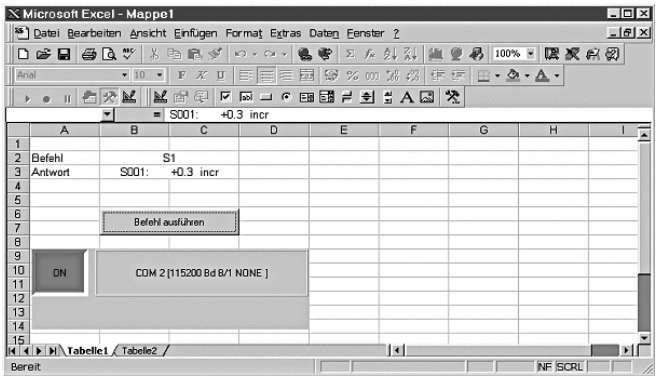
Operating Module

- Backlit plug-in module, text display with two sixteen-character lines
- Simple menu navigation with 4 keys
  - Display of status values and
  - clear text error messages
- Used for changing parameters and manual operation

Integration with the Office Enviroment

ActiveX Plug-in

- Office and industrial environments are constantly growing closer together.
- The use of ActiveX technology allows simple integration into Office application.



International Standards in Programming

Advantages Offered by Integrated Standards

- Programming system
  - CoDeSys
- Programming language
  - IEC61131-3
  - Function modules based on PLCopen

Interface

Field Bus

- Profibus DP
- CANopen (CiADS402)
- DeviceNet
- PowerLink
- EtherCAT
- Address configurable via Dip switch

Connection of External Inputs/Outputs

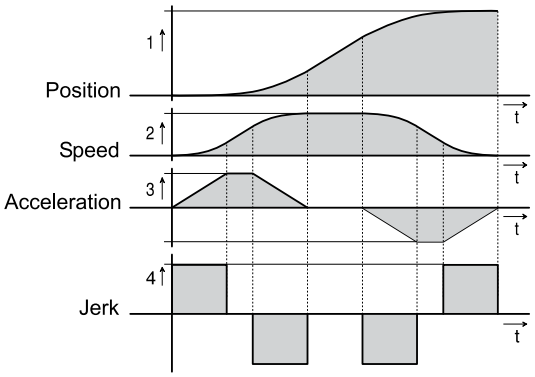
Parker E/A-System (PIO)

Additional external digital and analog inputs and outputs can be integrated via the CANopen.

D

Jerk-limited Set Point Generation, Resulting In:

- Gentle handling of the items being moved
- Increased service life of mechanical components
- Overshoot-free positioning
- Reduced excitation of mechanical resonance frequencies



Control

- 2 control loops for each axis for combined position and force/pressure control

Position Control

- Automatic controller design for position control
  - User-oriented optimization of parameters
- Feed forward control of speed and acceleration which results in:
  - Optimization of the response behaviour
  - Minimization of the following error

Force/Pressure Controller

- PID controller with feed forward control of speed

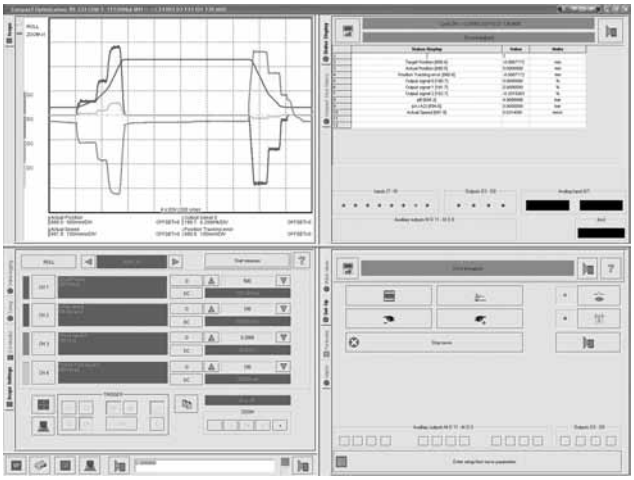
2-Axis Synchronous Run

Hydraulic Specific Functions

- Realization of many different circuit concepts with up to 4 proportional valves possible
- Linearization functions:
  - Consideration of the area of differential cylinders
  - Inverting of the valve set value
  - Compensation of the load pressure (additional pressure sensors necessary)
  - Correction of the nonlinear flow characteristic of the valve
  - Overlap compensation
  - Valve zero point correction
  - Valve set value filters
  - Valve set value limitation
  - All functions for each valve individually available
  - Automatic configuration by component selection in the Compax3 ServoManager

Set Up Controller Optimization

- Compax3F HydraulicsManager
  - All necessary technical data of Parker valves and drives are available
  - additional supported
- Test movement for automatic controller attitude
- Optimization with integrated oscilloscope function
- Automatic pre-setting of the controller for position control possible



Function	Motion control with motion profils. Suitable for position and force/pressure control
Housing / Protection Class	closed metal housing, isolation according to VDE 0160 / IP 20
Supply Voltage [VDC]	21...27VDC, ripple <1VSS
Current Requirements [A]	0,8 for the device, digital outputs 100mA each
Supported Feedback-Systems	• Analog 0..20mA, 4..20mA, ±10V • Start-Stop-Interface • SSI-Interface • EnDat2.1-Interface • 1VSS (max. 400kHz) Interface, 13.5Bit / Distance coding • TTL (RS422) (max. 5MHz), internal post-quadrature resolution
Set Point Generator	• Jerk-limited ramps • Travel data in increments, mm, inches or variable by scale factor • Specification of speed, acceleration, delay and jerk factor • Force/pressure inputs in N, psi, etc. variable by scale factor
Monitoring Functions	• Power/auxiliary supply range • Following error monitoring • Hard- and Software switches
Inputs and Outputs	• 8 control inputs: 24V DC / 10kOhm. • 4 control inputs Active HIGH / short-circuit protected / 24V / 100mA. • 4 analog current input (14Bit). • 2 analog voltage input (14Bit). • 4 analog output (16Bit, current or voltage) switchable in pairs.
RS232 / RS485 (switchable)	
RS232:	• 115200Baud • Word length 8 bits, 1 start bit, 1 stop bit • Hardware handshake XON, XOFF
RS485 (2 or 4-wire):	• 9600, 19200, 38400, 57600 or 115200 Baud • Word length 7/8Bit, 1 Start-, 1 Stop bit • Parity (switchable) even/odd
Bus Systems	• Profibus DP V0-V2 (I20), 12Mbit/s, PROFIdrive-Profil Drive technology • CANopen (CiADS402) (I21) • DeviceNet (I22) • PowerLink (I30) • EtherCAT (I31)
CE Compliance	• EMC interference emission/limit values for industrial utilization according to EN61 800-3 first environment (commercial and residential area), class A via integrated mains filter for up to 10mCable length, otherwise with external mains filter • EMC immunity/limit values for industrial utilization according to EN61 800-3
Insulation Requirements	• Protection class I according to EN 50178 (VDE 0160 part 1) • Contact protection: according to DIN VDE 0106, part 100 • Overvoltage: Voltage class III according to HD 625 (VDE 0110-1) • Degree of contamination 2 according to HD 625 (VDE 0110 part 1) and EN 50178 (VDE 0160 part 1)
Environmental Conditions	• Climate (temperature / humidity / barometric pressure)
General environmental condi tions acc. to EN 60 721-3-1 to 3-3	• Class 3K3
Permissible ambient temperature	• Operation: 0 to +45 °C class 3K3 • Storage: -25 to +70 °C class 2K3 • Transport: -25 to +70 °C class 2K3
Tolerated humidity: non condensing	• Operation: <= 85% class 2K3 • Storage: <= 95% class 3K3 (relative humidity) • Transport: <= 95% class 2K3
Elevation of operating site: <=1000m above sea level for 100% load ratings	• Please inquire for greater elevations Protection class IP20 according EN 60 529
EMC Directives and Harmonized EC Norms	• EC low voltage directive 73/23/EEC and RL 93/68/EEC: EN 50 178, General industrial safety norm Equipping electric power systems with electronic operating equipment HD 625, general electrical safety. Insulation principles for electrical operating equipment EN 60 204-1, Machinery norm, partly applied • EC-EMC directive 89/336/EEC: EN 61 800-3, EMC norm Product standard for variable speed drives EN 50 081-2 ... 50 082-2, EN 61 000-4-2 ...61 000-4-5
UL Certification	USL according to UL508 (listed) / CNL according to C22.2 No: 142-M1987 (listed) Certified: E-File-No: E198563

C3F.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

C3 **F001** **D2** **F12** ☐

Series — Interface — Technology Functions — Options

Code	Interface	T11	T30	T40
I11	Digital inputs/outputs		•	•
I12	Digital inputs/outputs	•		
I20	Profibus DP V0/V1/V2 (12Mbit/s)	•	•	•
I21	CANopen		•	•
I22	DeviceNet		•	•
I30	PowerLink		•	•
I31	EtherCAT		•	•

Code	Technology Functions
T11	Positioning/pressure and force control
T30	Programmable motion control according to IEC61131
T40	Electronic Cam

Code	Options
M00	Standards
M10	Extension 12 digital I/Os & HEDA (motion bus)
M11	HEDA (motionbus)
M12	Extension 12 digital I/Os

Weight: 2.0 kg (4.4 lbs.)

D

Please order connection set ZBH02/04 for Compax 3F separately.

Complete kit with mating plug connectors (X1, X2 and X3) for Compax3 connectors and special shield connecting terminal

Overview Technology Functions

	T11	T30	T40
Set tables for up to 31 motion profiles	x		
Absolute or relative positioning	x	x	x
Force/pressure control	x	x	x
Electronic Gearbox	x	x	x
Dynamic positioning	x	x	x
Hydraulic specific control technology	x	x	x
Reg-related positioning	x	x	x
Programmable according to IEC61131-3		x	x
Programming system DoDeSys		x	x
Up to 6500 instructions		x	x
Recipe table with 288 variables		x	x
PLCopen		x	x
Mark synchronization			x
Cam switching mechanism			x
Cam profiles			x
Coupling and decoupling function			x
Digital I/Os (RS232/485)	x	x	x
Profibus	O	O	O
CANopen		O	O
DeviceNet		O	O
Ethernet Powerlink		O	O
EtherCAT		O	O

x = Standard

O = Optional

C3F.indd, dd

Compax3F T11

Benefits

- No programming skills necessary
- Set table with various motion
- Full controller range available
- an ideal basis for many applications in high-performance motion automation

Function Range T11

- Set tables for positioning, pressure and force control up to 31 motion profiles:
  - Absolute or relative positioning
  - Force/pressure control
  - speed control
  - electronic gearing
- superimposed force and pressure control
- Controller switching between position and force/ pressure control

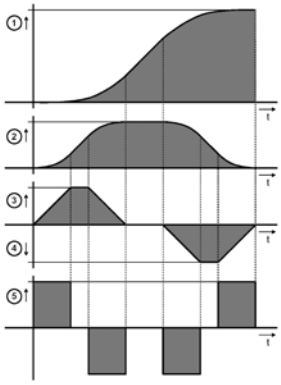
Extended Function Range

- Absolute force control
- superimposed force and pressure control
- Controller switching between position and force/ pressure control
- 2-axis synchronous

Absolute or Relative Positioning

A motion set defines a complete motion with all settable parameters

1. Target position
2. Travel speed
3. Maximum acceleration
4. Maximum deceleration
5. Maximum jerk



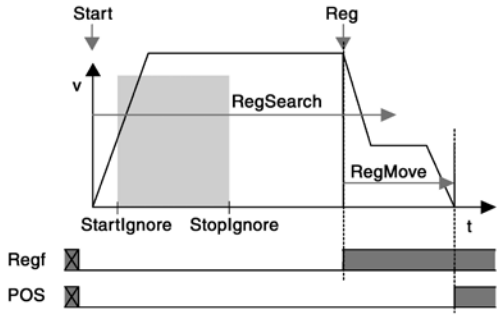
Stop Movement

The Stop set interrupts the current motion set.

Reg-related Positioning

For registration mark-related positioning, 2 motions are defined:

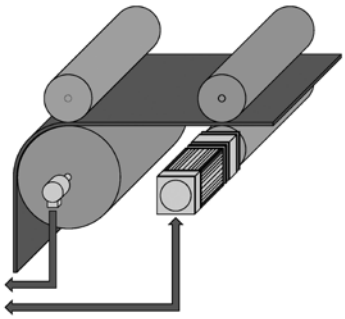
- RegSearch: Search of an external signal, e.g. a registration mark on a product
- RegMove: The external signal interrupts the search movement and the second movement by an offset follows without transition
- Precision of the registration mark detection: <1µs



Electronic Gearbox:

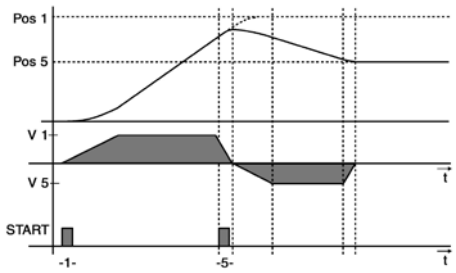
Motion synchronized to a master axis with any transmission ratio. The position of a master axis can be detected via:

- +/-10V analog input
- Step/direction command Input
- the encoder input or
- HEDA, with Compax3 Master



Dynamic Positioning

A new motion profile can be selected during a positioning sequence - a smooth transition takes place.



Compax3 T30 Motion Control According to PLCopen

General

Due to its high flexibility and efficiency the Compax3 motion control according to PLCopen is for most applications the optimal basis for decentralized motion control.

Positioning with function modules based on PLCopen

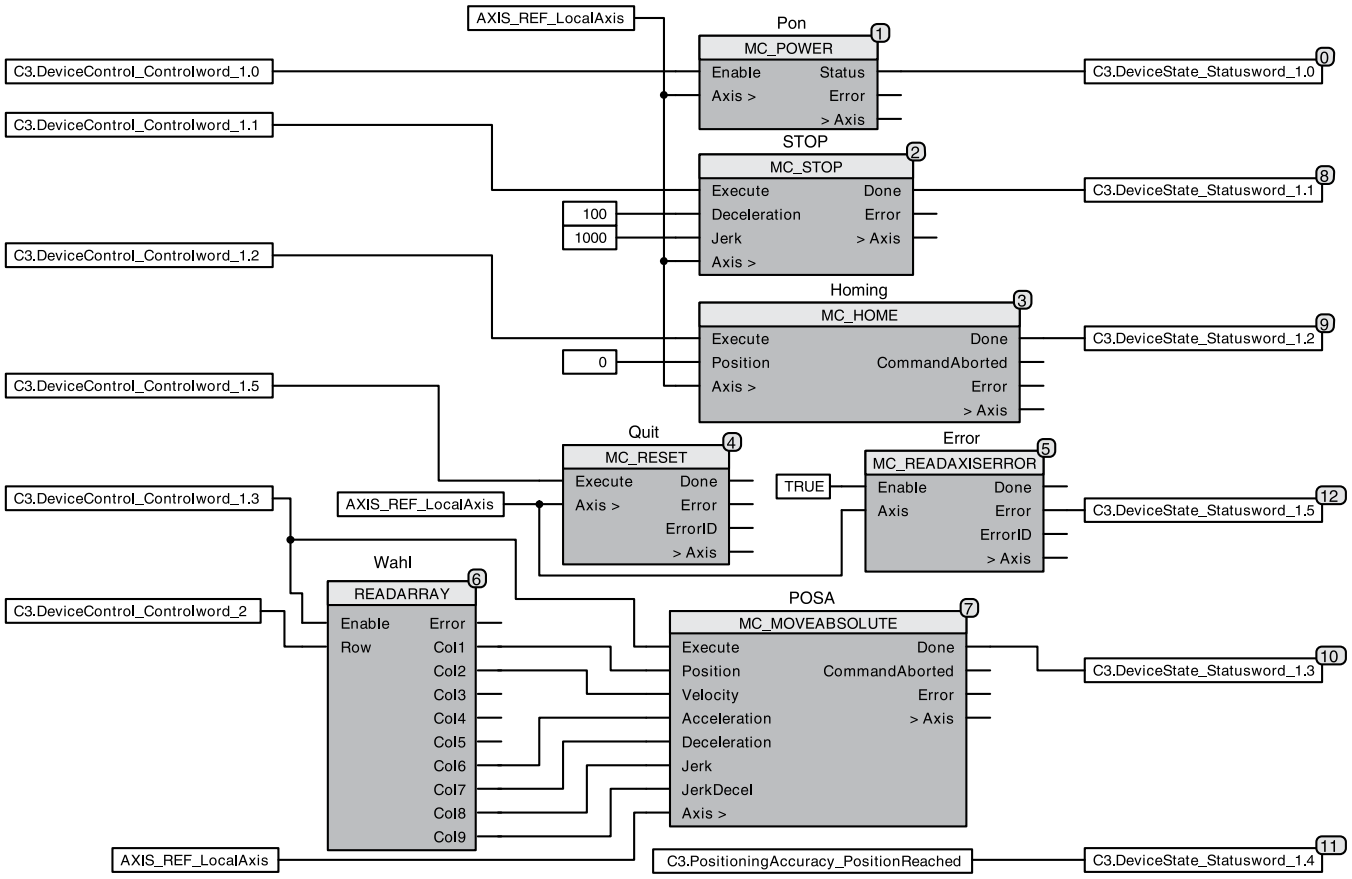
- Programmable based on IEC61131-3
- Programming system: CoDeSys
- Up to 5000 instructions
- 500 16-bit variables / 150 32-bit variables
- Recipe table with 288 variables
- 3 16-bit saved variables (power failure protected) / 3 32-bit saved variables (power failure protected)
- PLCopen-function modules:
  - Positioning: absolute, relative, additive and continuous
  - Machine Zero.
  - Stop, energizing the power stage, quit
  - Position, device status, reading axis error
  - Electronic gearbox (Mc_GearIn)
- IEC61131-3-standard modules:
  - Up to 8 timers (TON, TOF, TP)
  - Trigger (R_TRIG, F_TRIG)
  - Flip-flops (RS, SR)
  - Counters (CTU, CTD, CTUD)
- Device-specific function modules:
  - C3_Input: reading digital inputs
  - C3_Output: writing digital inputs
  - C3_ReadArray: access to recipe table
- Inputs/outputs:
  - 8 digital inputs (24V level)
  - 4 digital outputs (24V level)
  - 6 analog inputs (14 bits)
  - 4 analog outputs (16 bits)
  - Optional addition of 12 digital inputs/outputs

PLCopen function blocks

- Absolute positioning
- Relative positioning
- Additive positioning
- Continuous positioning
- Stop
- Machine zero
- Energizing the power output stage
- Reading device status
- Reading axis error
- Acknowledging errors
- Reading the current position
- Electronic gearbox (gearing)

Example of an field bus interface controlled IEC61131-application

- 2 control words are placed on the cyclic channel of the bus.
- The position data records (position, speed, acceleration etc.) are stored in a table (array).
- The desired position data record is selected with Controlword_2.
- The individual bits of Controlword_1 control positioning.
- A return message is sent via a status word on the cyclic channel of the bus.



Example of a bus interface controlled IEC61131 application

D

Compax3 T40 IEC61131-3 Positioning with Cam Function Modules

General

Compax3 T40 is able to simulate mechanical cams and cam switching mechanisms electronically. The T40 electronic cam was especially optimized for:

- The packaging machine industry
- For the printing industry
- All applications, where a mechanical cam is to be replaced by a flexible, cyclic electronic solution

This helps to solve discontinuous material supply, flying-knive and similar drive applications using distributed drive technology.

Compax3 T40 supports both real and virtual master movements. In addition, the user can switch to other cam profiles or cam segments on the fly.

Programming is carried out in the well-known IEC61131-3 environment.

With the aid of the cam function modules and CamDesigner, cam applications can be implemented very easily.

Function T40

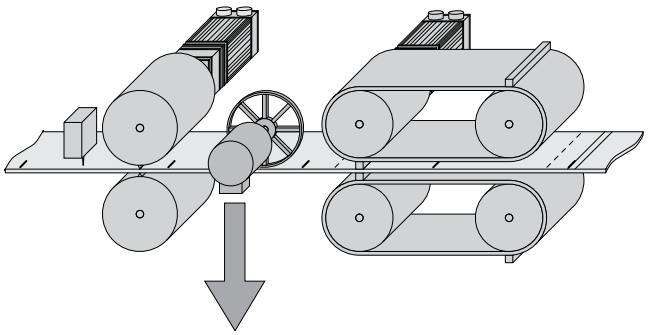
- Technology functions of the T30 version fully integrated and available
- Master position acquisition
- Mark synchronization
- Cam switching mechanism
- Coupling and decoupling function
- Cam profiles
- Cam memory
- Cam creation with CamDesigner

Master Position Acquisition

- Acquisition by incremental encoder
- Acquisition by the HEDA real-time bus

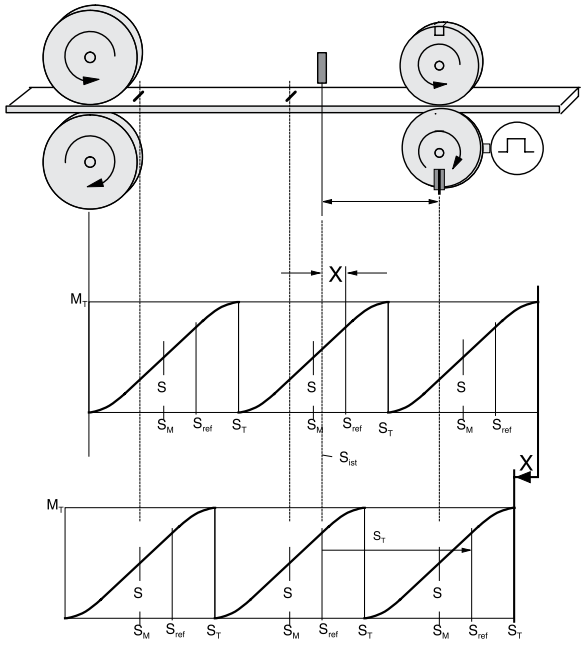
Virtual Master:

A second axis in the IEC program can be used to program a motion profile, which serves as a master for one or several axes.



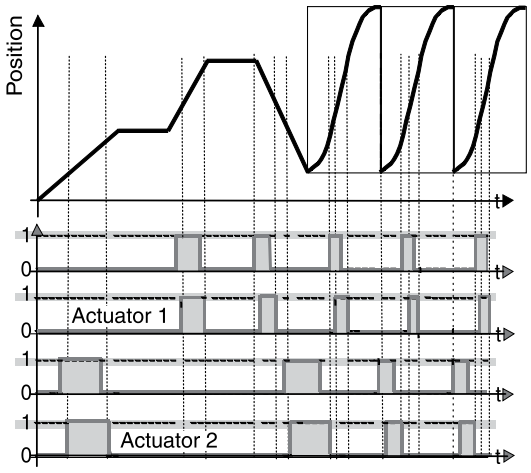
Mark Synchronization

- Master or slave oriented (simultaneous, cam-independent)
- Highly-precise mark recognition (accuracy <1µs; Touchprobe)



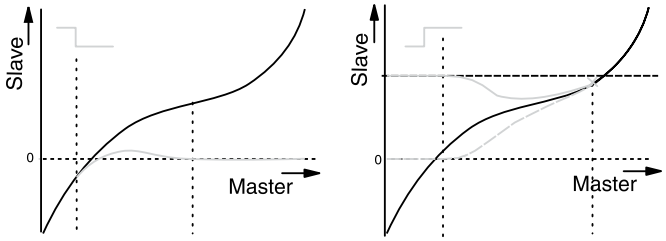
Cam Switching Mechanism

- 36 cams with individual profiles
- 4 fast cams (125µs per cam) standard: 500µs
- 32 serial cams, 16ms/cam cycle (0.5ms/cam)
- Delay-time compensated cams: Compax3 can advance the cam to compensate for delays in switching elements.



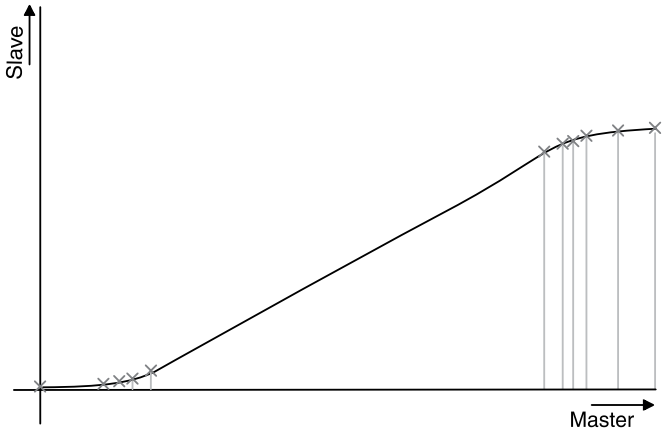
Coupling and Decoupling Functions

- By means of a set point generator
- By means of a change-over function
- Without overspeeding by coupling over several master cycles
- Virtually free set-up of the coupling and decoupling movement
- Master-guided coupling movement
- Random standstill position



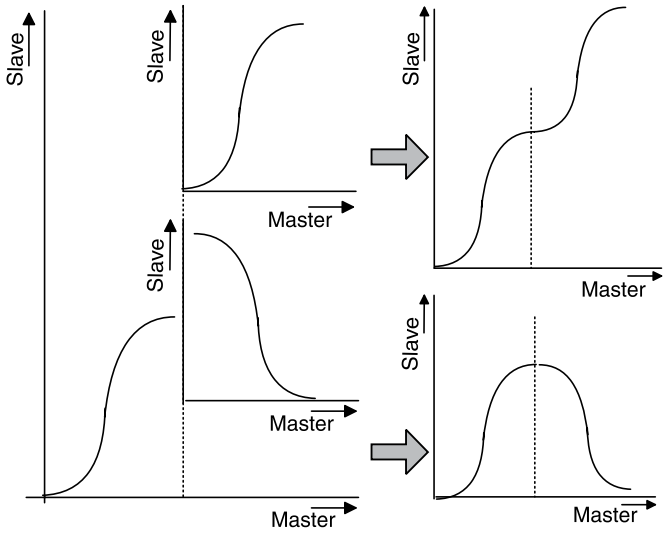
Cam Memory

- 10,000 points (Master/Slave) in 24-bit format
- High-precision profile generation:
  - Variable point spacing with full backup of the current master and slave coordinates (even if the power fails)
  - Linear interpolation between points
- Cam memory for up to 20 curves



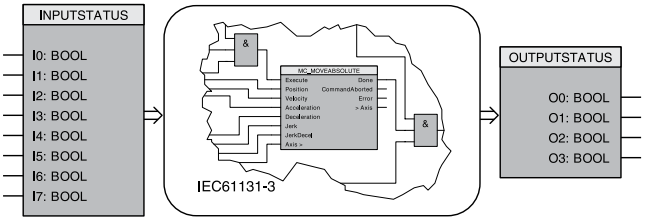
Cam Profiles

- Up to 20 cam segments can be produced by:
- Virtually random cam links (forwards and backwards)
- Freely programmable event-controlled cam branches
- Scalable cam segments and complete cam profiles



Connection of High-Level Controllers

Control via Digital Inputs/Outputs Compax3 I11T30 / I11T40 / I12T11



The digital I/Os can be optionally extended by 12 I/Os (M10 and M12 option).

D

Control via Profibus, Compax3 I20T11 / I20T30 / I20T40

Profibus-ratings	
DP-Versions	DPV0 / DPV1
Baud rate [MBit/s]	up to 12
Profibus ID	C320

Control via CANopen, Compax3 I21T30 / I21T40

CANopen-ratings	
Baud rate [kBit/s]	20, 50, 100, 125, 250, 500, 800, 1000
Service-Data-Object	SDO1
Process-Data-Objects	PDO1, ... PDO4

Control via DeviceNet, Compax3 I22T30 / I22T40

DeviceNet-ratings	
I/O - data	up to 32 bytes
Baud rate [kBit/s]	125...500
Nodes	up to 63 Slaves

Control via Ethernet Powerlink, Compax3 I30T30 / I30T40

Ethernet Powerlink ratings	
Baud rate	100Mbits (FastEthernet)
Cycle time	<200µs; to 240 nodes

Control via EtherCAT Compax3 I30T30 / I30T40

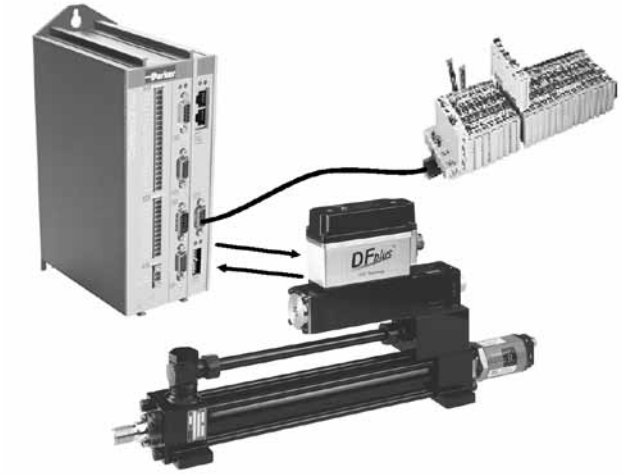
EtherCAT-ratings	
Bau drate	100Mbits (FastEthernet)
Cycle time	<200µs; to 240 nodes

Decentralized Control via CANopen, I21T30 / I21T40

With External Inputs/Outputs (PIO)

Additional external digital and analog inputs and outputs can be integrated via the CANopen master function. For this purpose we offer the Parker I/O system (PIO):

- CANopen field bus coupler: 650mA/5V, 1650mA/5V
- Digital input terminals: 2-, 4-, and 8-channel
- Analog input terminals: 2-channel (0-10V), 4-channel (0-20mA)
- Digital output terminals: 2-, 4-, and 8-channel
- Analog output terminals: 2-channel (0-10V, 0-20mA, +/-10V)

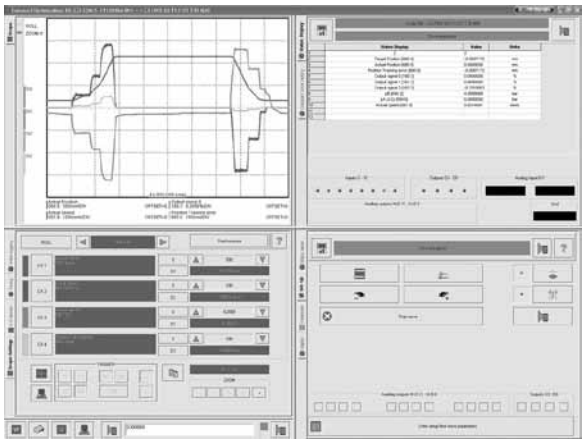


Simple, Wizard-guided Configuration and Commissioning Compax3 ServoManager

Software Tool C3 ServoManager

Configuration is carried out on a PC using the Compax3 ServoManager.

- Wizard-guided configuration
  - Automatic querying of all necessary entries
  - Graphically supported selection
- Setup mode
  - Moving individual axes
  - Predefined profiles
  - Convenient operation
  - Storage of defined profiles
  - Controller pre-setting possible
- Integrated 4-channel oscilloscope
  - Signal tracing directly on the PC
  - Various modes (single/normal/auto/roll)
  - Zoom function
  - Export as image or table (for example to Excel)



Software Tool HydraulicsManager

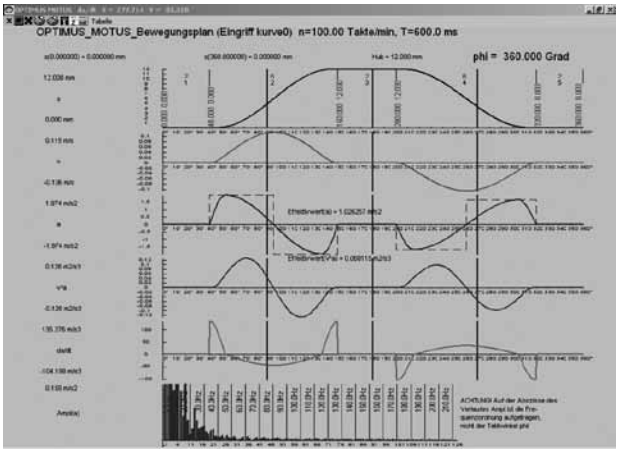
- Simple set up of customer valves, cylinders and drives.
- Technical data of all Parker valves, cylinders and drives available.

C3 HydraulicsManager valve database

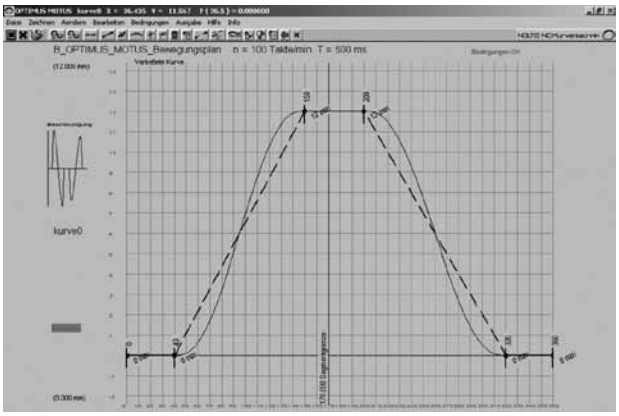
Cam Creation with CamDesigner

Software Tool CamDesigner

- Standardized Nolte cam generating tool with:
  - Standard or extended range of functions
  - Evaluation of the motion profiles
  - Verification of the drive sizing
- Transition laws from VDI directive 2143:
  - Selection of motion laws
  - The CamDesigner basic version features 15 motion laws (based on the dwell-to-dwell (interpolation method)



Evaluation of the motion profile



Cam generation with the integrated CamEditor

D

Advantages Offered by International Standards in Programming

IEC61131-3 Programming Language

IEC61131-3 is the only company- and product-independent programming language with worldwide support for industrial automation devices.

- IEC61131-3 includes graphical and textual programming languages:
  - Instruction list
  - Structured text
  - Ladder diagram
  - Sequential function chart
  - Function block diagram

Integrated standards offer:
- A trusted programming environment
- Standardized programming

Integrated standards reduce:
- The overhead of development
- Maintenance costs
- Software upkeep
- Training overhead

Integrated standards increase:
- Productivity
- Software quality
- Concentration on core competence

Examples:

- Program development in IL

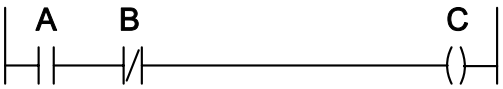
```
0001 FUNCTION_BLOCK AWL_EXAMPLE
0002 (* Sinus und CoSinus einer Zahl berechnen *)
0003 VAR_INPUT
0004    r1: REAL := 0.0;
0005 END_VAR
0006 VAR_OUTPUT
0007    sinus: REAL;
0008    cosinus: REAL := 9.9;
0009 END_VAR
```

```
0001    (* Den Sinus einer Zahl berechnen und mit 1000 multiplizieren *)
0002    LD      r1
0003    SIN
0004    MUL       1000.0
0005    ST      sinus
0006    (* Den Cosinus  einer Zahl berechnen und mit 1000 multiplizieren *)
0007    LD      r1
0008    COS
0009    MUL       1000.0
0010    ST      cosinus
0011
0012    (* Die Zahl weiterschalten *)
0013    LD      r1
0014    ADD       0.1
0015    ST      r1
0016
```

- Instruction list (IL)

```
LD      A
ANDN    B
ST      C
```

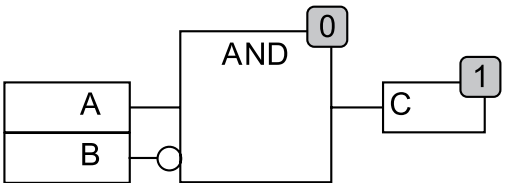
- Ladder diagram



- Structured text

C := A AND NOT B

- Function plan



Function Modules Based on PLCopen

PLCopen is a product and company independent organization that plays a significant role in supporting the IEC61131-3 programming language. Its specific tasks also include defining basic processes relevant to motion. The PLCopen organization consists of both users and manufacturers of automation components.

Parker Hannifin is an active member of the “Motion Control“ task force. This is a great advantage for the users of Parker drive technology, since they are constantly able to profit directly from the latest developments in PLCopen.

Professional Development Tool CoDeSys

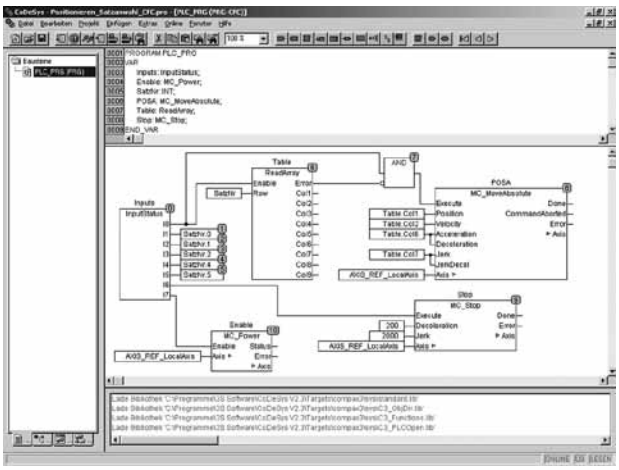
CoDeSys is a development environment for programming that saves a significant amount of time as applications are created.

- One of the most powerful development environments available, established world-wide
- Universal programming platform for various devices
- Visual elements
- Library management for user-defined applications
- Context-sensitive help wizard
- Data exchange between devices from different manufacturers
- Complete online functionality
- Sophisticated technological features
- Standard function modules deposited

. . . and all this for no additional cost

Parker is a member of the “CoDeSys Automation Alliance“.

Program Development in CFC



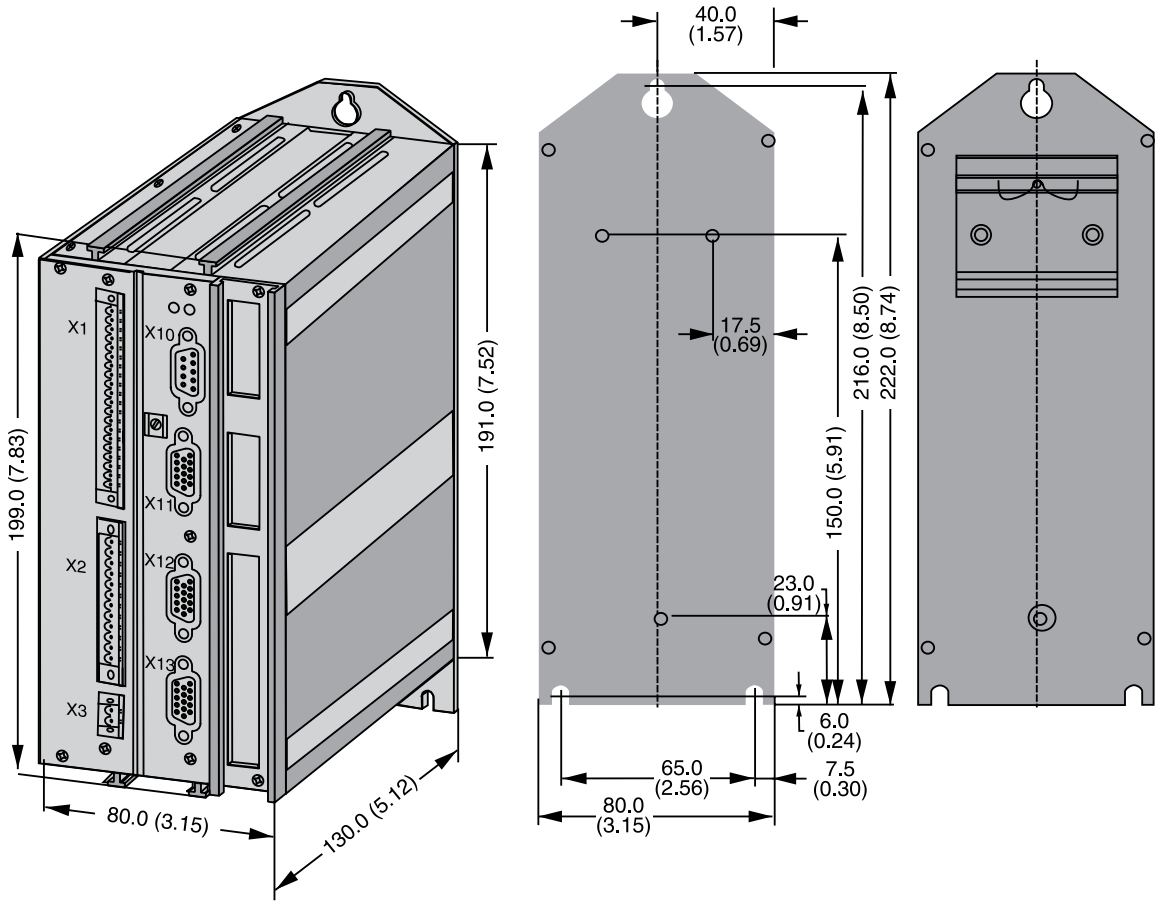
Project Management

Saving an entire project (source file) including symbols and comments to make service calls easier, because there is no need for any project data on the device itself

- Archiving projects as ZIP files
- Creating user-specific libraries that can be reused as tested sections of programs
  - These libraries can be protected
  - Examples include winders, synchronization components etc.
- Various user levels make it possible to lock sections of the program with passwords
- Depending on the task at hand, users can select from among 5 IEC languages plus CFC. These languages can also be mixed

D

Inch equivalents for millimeter dimensions are shown in (**)



Connection Set ZBH02/04

Complete kit with mating plug connectors (X1, X2 and X3) for Compax3 connectors and special shield connecting terminal

Feedback Cable GBK../..

Connection to the Motor:

Under the designation “REK.. + GBK..“ (Feedback cable) we can deliver feedback connecting cables in various lengths to order.

- Prefabricated with plug and cable eye
- The plugs of the Parker motor and feedback cables contain a special surface area screening.
- Cable plans, if you wish to make up your own cables

Terminal Block EAM06/..

For additional wiring of the inputs and outputs:

- Available with or without LED display
- Can be mounted in the control cabinet on a supporting rail
- Connection EAM06/.. via SSK23/..to X11, SSK24/.. to X12

RS232 Cable SSK01 (in various lengths)

Configuration:

Via a PC with the aid of the Compax3 ServoManager.

Communication:

Communication with Compax3 either via RS232 or via RS485 in order to read or write into objects.

Profibus plug BUS08/01

- BUS08/01 with 2 cable inputs (1x BUS08/01 incoming, 1x BUS08/01 continuing) and screw terminals, as well as a switch for activating the terminating resistor. Set to ON for first and last bus node terminating resistor activated.

Profibus cable: SSL01/.. not prefabricated

- Special cable in any length for Profibus wiring (colors according to DESINA).

Operating module BDM01/01

For display and diagnosis purposes:

- Can be plugged in during operation
- Power supply via Compax3 servo control
- For displaying and changing values

HEDA Bus

HEDA bus terminal connector (RJ45) BUS07/01:

- For the first and last Compax3 in the HEDA bus.

HEDA cable: SSK28/.. prefabricated in various lengths:

- Cable for HEDA bus wiring from Compax3-to-Compax3 or PC-to-Compax3 powerPLmC.

CANbus plug BUS10/01

- BUS10/01 with 2 cable inputs (1x BUS10/01 incoming, 1x BUS10/01 continuing) and screw terminals, as well as a switch for activating the terminating resistor. Set to ON for first and last bus node terminating resistor activated

CANbus cable SSL02/.. not prefabricated

- Special cable in any length for CANbus wiring (colors according to DESINA)

External Inputs/Outputs PIO...

For Compax3 I21 from technology function T30 onwards via CANopen:

- Integration of additional external input and output modules (digital and analog)

Connection set for Compax 3										
for C3F001 D2 F12xxx	ZBH 02/04	Z	B	H	0	2	/		0	4
Operating module										
Operating module		B	D	M	0	1	/		0	1
Terminal block										
for I/Os without luminous indicator	for X11, X12	E	A	M	0	6	/		0	1
for I/Os with luminous indicator	for X12	E	A	M	0	6	/		0	2
Interface cables and connectors										
PC-Compax3 (RS232)		S	S	K	0	1	/		...	...[1]
on X11/X13 (Transducer)	With flying leads	S	S	K	2	1	/		...	...[1]
on X12 (I/O digital)	With flying leads	S	S	K	2	2	/		...	...[1]
on X11(Ref/Analog)	For I/O terminal	S	S	K	2	3	/		...	...[1]
on X12 (I/Os digital)	For I/O terminal	S	S	K	2	4	/		...	...[1]
PC - POP (RS232)		S	S	K	2	5	/		...	...[1]
Compax3 - POP (RS485)		S	S	K	2	7	/	../	...	...[3]
Compax3 HEDA - Compax3 HEDA or PC - C3powerPLmC		S	S	K	2	8	/		...	...[2]
Compax3 X11 - Compax3 X11 (Encoder coupling of 2 axes)		S	S	K	2	9	/		...	...[1]
HEDA bus terminal connector (for the 1st and the last Compax3 in the HEDA Bus)		B	U	S	0	7	/		0	1
Feedback cable for Balluff SSI transducer and start/stop		G	B	K	4	0	/		...	...[1]
Feedback cable for SSI transducer and start/stop	With flying leads	G	B	K	5	3	/		...	...[1]
Profibus cable [4]	Not prefabricated	S	S	L	0	1	/		...	...[1]
Profibus connector		B	U	S	0	8	/		0	1
CAN-Bus cable [4]	Not prefabricated	S	S	L	0	2	/		...	...[1]
CAN-Bus connector		B	U	S	1	0	/		0	1

[1] Length code

Length code 1 (Example: SSK01/09: Length 25m)

Length [m]	1.0	2.5	5.0	7.5	10.0	12.5	15	20	25	30	50
Code	01	02	03	04	05	06	07	08	09	10	14

[2] Length code for SSK28

Length code 2 (Example: SSK28/22: Length 3m)

Length [m]	0.25	0.5	1.0	3.0	5.0	10.0
Code	20	21	01	22	03	05

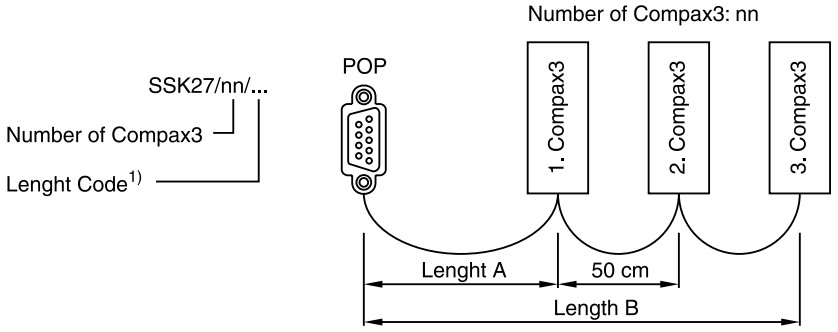
[3] Length code for SSK27

Length A: Cable or connection from POP with **one** Compax3 (POP - 1.Compax3), variable length according to length code[1]
(Example: SSK27/01/01: Length 1.0m)

Length B: Cable or connection from POP with **more than one** Compax3 (nn > 01) (1.Compax3 - 2.Compax3 - …), length between Compax connectors is fixed to 50cm, variable length A from POP with first Compax according to length code[1]
(Example: SSK27/03/01: Length 1.0m)

[4] Colors according to DESINA

Length Code for SSK27



Decentralized Input terminals								
PIO 2DI 24V DC 3.0ms	2-Channel Digital-Input terminal		P	I	O	4	0	0
PIO 4DI 24V DC 3.0ms	4-Channel Digital-Input terminal		P	I	O	4	0	2
PIO 8DI 24V DC 3.0ms	8-Channel Digital-Input terminal		P	I	O	4	3	0
PIO 2AI DC ±10V	2-Channel Analog-Input terminal	(± 10V Differential input)	P	I	O	4	5	6
PIO 4AI 0-10V DC S.E.	4-Channel Analog-Input terminal	(0-10V Signal voltage)	P	I	O	4	6	8
PIO 2AI 0-20mA	2-Channel Analog-Input terminal	(0 - 20mA Differential input)	P	I	O	4	8	0
Decentralized Output terminals								
PIO 2DO 24V DC 0.5A	2-Channel Digital-Output terminal	(Output current 0.5A)	P	I	O	5	0	1
PIO 4DO 24V DC 0.5A	4-Channel Digital-Output terminal	(Output current 0.5A)	P	I	O	5	0	4
PIO 8DO 24V DC 0.5A	8-Channel Digital-Output terminal	(Output current 0.5A)	P	I	O	5	3	0
PIO 2AO 0-10V DC	2-Channel Analog-Output terminal	(0-10V Signal voltage)	P	I	O	5	5	0
PIO 4AO 0-20mA	2-Channel Analog-Output terminal	(0-20mA Signal voltage)	P	I	O	5	5	2
PIO 2AO DC ±10V	2-Channel Analog-Output terminal	(±10V Signal voltage)	P	I	O	5	5	6
CANopen Fieldbus coupler								
CANopen Standard			P	I	O	3	3	7
CANopen ECO			P	I	O	3	4	7

General Description

Series PSD24 power supplies are the compact DIN Rail mount version for easy installation with use of the Digital Modules. This single phase power supply automatically adjusts for either 115 or 230 VAC, 50 or 60 Hz input. The nominal output is a filtered and regulated 24 VDC / 120 Watts 5 amperes. Series PSD power supplies are UL recognized, meet CSA standards and also the CE ms. It is ATEX approved for Class 1, Div 2 Hazardous Locations.

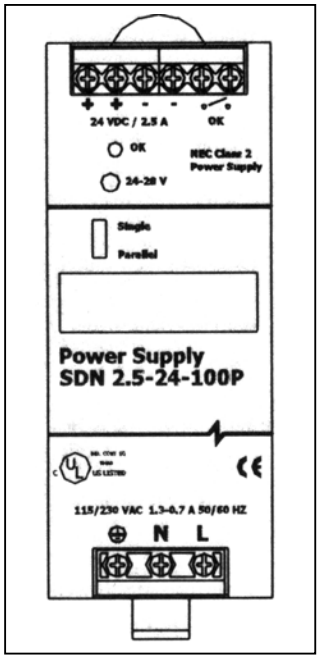
These power supplies provide the power necessary to operate the following Electrohydraulic products:

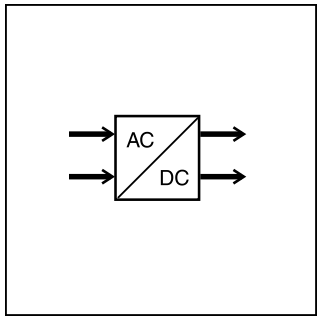
- D*FP, D*1FP, D*FH, D*FL, D*FX, D*FB and RE* valves
- PWD00, PCD00, PWDXX, PID, PZD and EW, electronics

D

Operation

Series PSD24 power supplies have capability for parallel operation. Conductor sizes are listed below in the specification. DIN rail design provides easy installation. A green LED and power on logic is provided (DC OK signal). Compact, rugged, and with > 640,000 hours MTBF make this ideal for idustrial applications.





UL 508 Listed
IND. CONT. EQ.
E61379

UL 60950
E137632
CUL/CSA-C22.2
No. 234-M90

EMC and
Low Volt.
Directive

Ordering Information

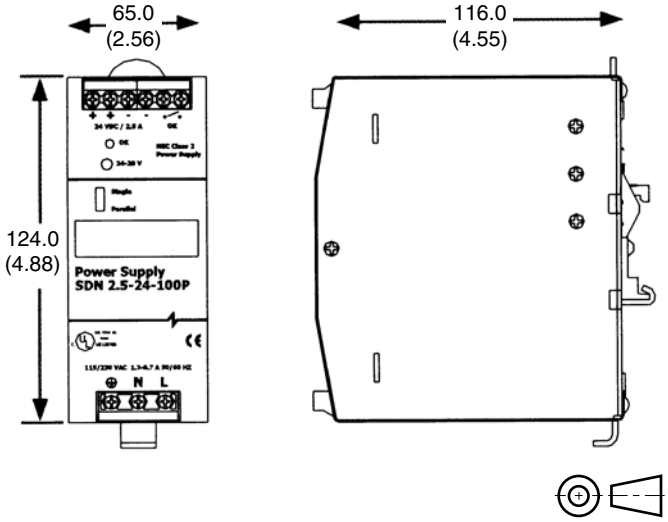
PSD	24
Power Supply	Voltage Output

Code	Description
24	24 VDC, 5.0 amp, on Rail Power Supply

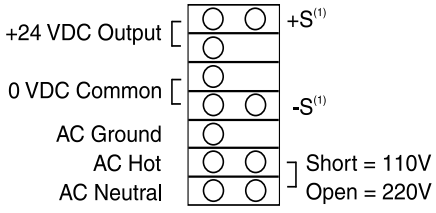
Weight: 0.62 kg (1.5 lbs)

Dimensions

Inch equivalents for millimeter dimensions are shown in (**)



Connector - Pinout



(1) Refer to Operation

Specifications
SDN 2.5-24-100P

Input Power Requirements	
Nominal Voltage	115/230 VAC auto select
AC Range	85 - 132 / 176 - 264 VAC
DC Range [2]	210 - 375 VDC
Frequency	47 - 63 Hz
Nominal Current [1]	2.2 A / 1.0 A
Inrush Current Maximum	typ. < 20 A
Output Power Specifications	
Nominal Voltage	24 VDC (22.5 - 28.5 VDC adjustable)
Tolerance	< ± 2% overall (combination line, load, time and temperature related changes)
Ripple [3]	< 50m Vpp
Nominal Current	5 A (120 W)
Peak Current [4]	6 A 2x Nominal Current < 2 sec.
General Protection Safety	Protected against continuous short-circuit, overload, open-circuit. Protection class 1 (IEC 536), degree of protection IP20 (IEC 529). Safe low voltage: SELV (acc. EN60950)
Installation	
Fusing Input	Internally fused. External 10 A slow acting fusing for the input is recommended to protect input wiring
Mounting	Simple snap on system for DIN Rail TS35/7.5.
Input Connections	IP20-rated screw terminals; connector size range: 16-10 AWG (1.5-6 mm2) for solid conductors, 16-12 AWG (0.5-4 mm2) for flexible conductors
Output Connections	Two connectors per output; Connector size range: 16-10 AWG (1.5-6 mm2) for solid conductors

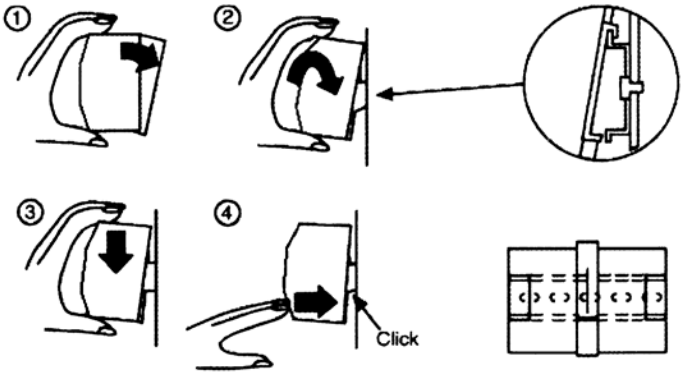
Notes:
1. Input current ratings are conservatively specified with low input, worst case efficiency and power factor.
2. Losses are heat dissipation in watts at full load, nominal input line.
3. Ripple/noise is stated as typical values when measured with a 20 MHz bandwidth scope and 50 Ohm resistor.
4. All peak current is calculated at 24V levels.

D

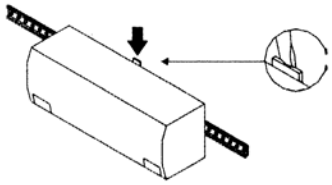
DIN Rail Mounting

Snap on the DIN Rail

1. Tilt unit slightly backwards
2. Put it onto the DIN Rail
3. Push downwards until stopped
4. Push at the lower front edge to lock
5. Shake the unit slightly to ensure that the retainer has locked



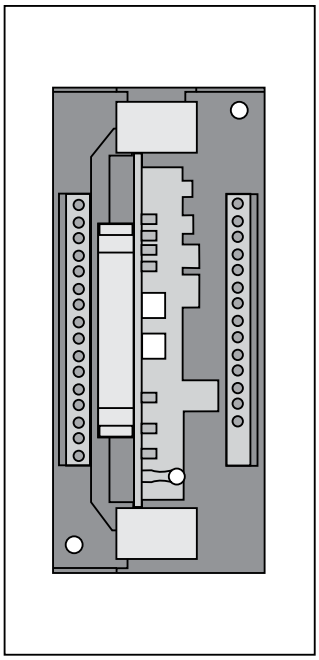
Detachment from DIN Rail

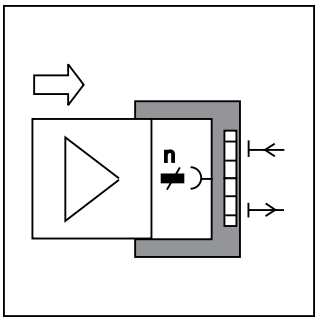


Press button downwards (to unlock) and remove the unit from the DIN Rail.

General Description

Card holders allow easy assembly and wiring of individual electronic driver card models EW, ED, EZ, and ET.





Technical Data

Base-unit	Fastened with screws or DIN rails 35mm
Printed circuit board	Carries the female connector and connection component for the terminal strip
Terminals	Screw terminals per DIN 41617 with wire prot. nominal cross-section AWG11, 5mm pitch
Female connector (per order code)	31 pole to DIN 41617, double row contacts. 15-, 48-, 96 pole to DIN 41612, 2 or 3 rows of contacts

D

Ordering Code

K Card Holder

For Driver card models:
EW 101, 102, 104
ED 101, 102, 104
ET 101, 102, 104, 105
EZ 150, 154, 155, 305

Ordering Code

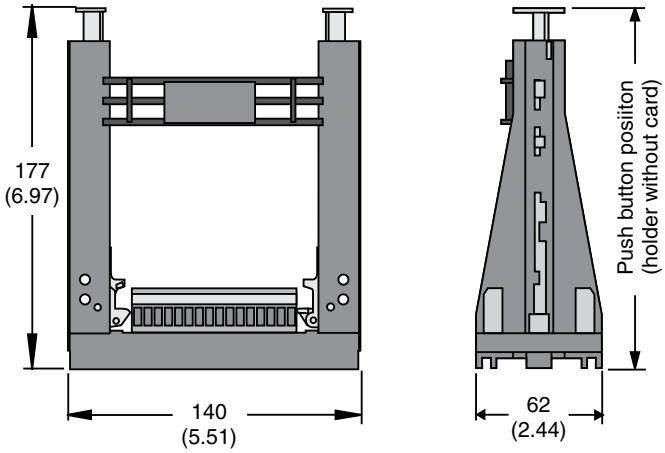
KH32F **= EX00-S05**

For Driver card models:
ET 154
EZ 595

Weight: 0.5 kg (1.0 lbs)

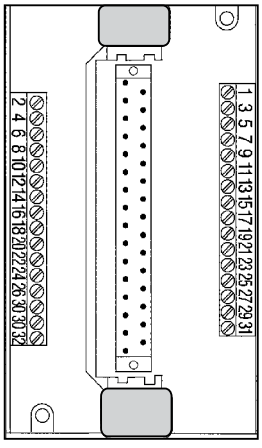
Dimensions

Inch equivalents for millimeter dimensions are shown in (**)

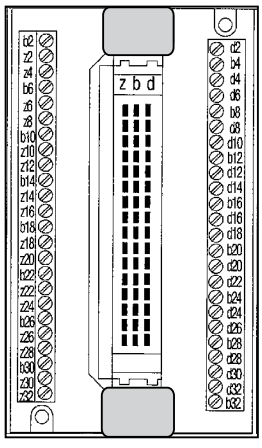


Card Holder for Denison 32 Pin Boards = EX00-S07

Terminal Locations



Model K



Model KH32F

K.indd, dd, an

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA