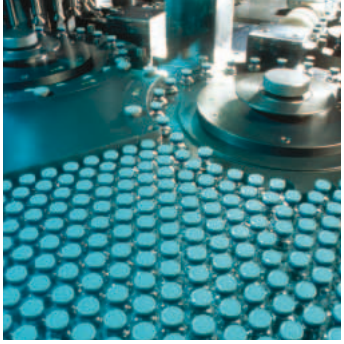


aerospace
climate control
electromechanical
filtration
fluid & gas handling
hydraulics
pneumatics
process control
sealing & shielding

PIO - Parker I/O-System

Modular I/O - System

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.

Parker Hannifin

- the global leader in motion and control technologies

A world class player on a local stage

Global Product Design

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

Local Application Expertise

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

Manufacturing to Meet Our Customers' Needs

Parker is committed to meeting the increasing service demands that our customers require to succeed in the global industrial market. Parker's manufacturing teams seek continuous improvement through the implementation of lean manufacturing methods throughout the process. We measure ourselves on meeting our customers' expectations of quality and delivery, not just our own. In order to meet these expectations, Parker operates and continues to invest in our manufacturing facilities in Europe, North America and Asia.

Worldwide Manufacturing Locations

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

Asia
Shanghai, China
Chennai, India

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

Offenburg, Germany

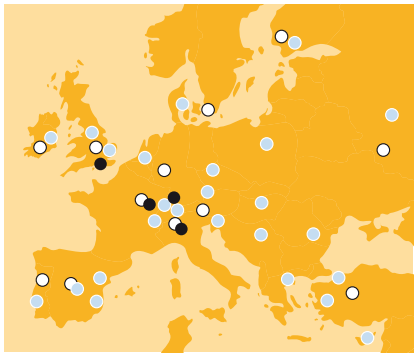
Local Manufacturing and Support in Europe

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

For contact information, please refer to the Sales Offices on the back cover of this document or visit www.parker.com

Milan, Italy

Littlehampton, UK



Manufacturing
Parker Sales Offices
Distributors

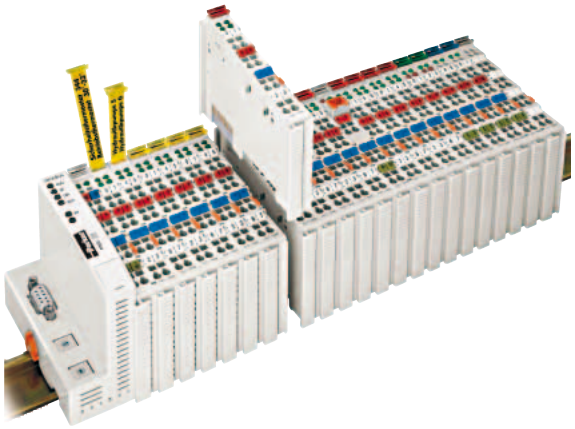
Dijon, France

Modular I/O - System - PIO

Overview

Description

Parker Hannifin's modular expandable bus terminal system uses electronic devices to capture a wide variety of control signals from field devices. Connections to the field level can be implemented quickly and reliably with PIO.
PIO offers the convenience of exceptionally simple installation. The individual modules can be installed and removed without any tools.
Different modules can be combined with each other within the bus terminal system.
Gold-plated contacts guarantee reliable connections between the individual modules. A conducting ground contact adds additional safety.



Features

- **Fieldbus independent layout**
- **Easy to extend with additional modules**
- **Exceptionally compact design**
- **Intrinsically-safe contacts**
- **Maintenance free**
- **Mixed voltages can be combined**
- **Great flexibility ensures optimal adaptability in different applications**
- **Integrated input filter**
- **Opto-isolation**
- **Suitable for copper cables from 0.08 mm² to 2.5 mm²**
- **Error and status display (LED)**
- **Access options for simple signal test**
- **Short-circuit proof inputs**
- **Options for clear, unambiguous identification**

Technical Characteristics - Overview

PIO - Parker I/O-System	
Bus terminals	Digital and analog input and output terminals
Fieldbus coupler (Standard and ECO version)	• CANopen • PROFIBUS • DeviceNet • ETHERNET TCP/IP
Current via power contacts	max. 10 A
Voltage isolation	500V System / Supply
Operating temperature	0...55 °C
Enclosure rating	IP20
Resistance to vibrations	in accordance with IEC 60068-2-6
Resistance to impact	in accordance with IEC 60068-2-27
EMC Interference immunity Interference emission	in accordance with EN 50082-2 (96) in accordance with EN 50081-2 (94)
International Standards	CE, UL 508

Technical Data

Fieldbus Coupler

CANopen

	PIO-337 Standard	PIO-347 ECO
Signals	digital and analog	digital and analog
max. number of couplers in the system	110	110
Transfer medium	screened copper cable 3 x 0.25 mm²	screened copper cable 3 x 0.25 mm²
max. bus length	40...1000 m depending on cable and baud rate	40...1000 m depending on cable and baud rate
Transfer rate	10 kBaud...1 MBaud	10 kBaud...1 MBaud
max. number of bus terminals	64	64
Fieldbus input process image	max. 512 bytes	max. 32 bytes
Fieldbus output process image	max. 512 bytes	max. 32 bytes
Supply voltage	24 VDC (-15 %...+20 %)	24 VDC (-15 %...+20 %)
Input current	max. 500 mA at 24 V	260 mA at 24 V typ. at nominal load
Internal current drain	350 mA at 5 V	350 mA at 5 V
max. vectorial sum current for bus terminals	1650 mA at 5 V	650 mA at 5V
Power contacts	3; 24 VDC (-15 %...+20 %)	none
Current via power contacts	max. 10 A	-

PROFIBUS DP

	PIO-333 Standard	PIO-343 ECO
Signals	digital and analog	digital and analog
max. number of couplers in the system	96 with repeater	125 with repeater
Number of I/O points	Approx. 6000 (depending on the master)	Approx. 6000 (depending on the master)
Transfer medium	Copper cable as per EN 50170	Copper cable as per EN 50170
max. bus length	100...1200 m depending on cable and baud rate	100...1200 m depending on cable and baud rate
Transfer rate	9.6 kBauds...12 MBauds	9.6 kBauds...12 MBauds
Transmission time	typ. 1 ms, max. 3.3 ms	typ. 1 ms, max. 3.3 ms
max. number of bus terminals	63	63
Fieldbus input process image	max. 128 bytes	max. 32 bytes
Fieldbus output process image	max. 128 bytes	max. 32 bytes
Supply voltage	24 VDC (-15 %...+20 %)	24 VDC (-15 %...+20 %)
Input current	max. 500 mA at 24 V	260 mA at 24 V typ. at nominal load
Internal current drain	200 mA at 5V	350 mA at 5 V
max. vectorial sum current for bus terminals	1800 mA at 5 V	650 mA at 5V
Power contacts	3; 24 VDC (-15 %...+20 %)	none
Current via power contacts	max. 10 A	-

DeviceNet™

	PIO-306 Standard	PIO-346 ECO
Signals	digital and analog	digital and analog
max. number of couplers in the system	64 with scanner	64 with scanner
Number of I/O points	Approx. 6000 (depending on the master)	Approx. 6000 (depending on the master)
Transfer medium	screened copper cable trunk line: 2x0.82 mm² + 2x1.7 mm² drop line: 2x0.2 mm² + 2x0.32 mm²	screened copper cable trunk line: 2x0.82 mm² + 2x1.7 mm² drop line: 2x0.2 mm² + 2x0.32 mm²
max. bus length	100...500 m depending on cable and baud rate	100...500 m depending on cable and baud rate
Transfer rate	125 - 250 - 500 kBauds	125 - 250 - 500 kBauds
max. number of bus terminals	64	63
Fieldbus input process image	max. 512 bytes	max. 32 bytes
Fieldbus output process image	max. 512 bytes	max. 32 bytes
Supply voltage	24 VDC (-15 %...+20 %)	24 VDC (-15 %...+20 %)
Input current	<500 mA at 24 V	260 mA at 24 V typ. at nominal load
DeviceNet Interface	<120 mA at 11 V	<120 mA at 11 V
Internal current drain	350 mA at 5 V	350 mA at 5 V
max. vectorial sum current for bus terminals	1650 mA at 5 V	650 mA at 5V
Power contacts	3; 24 VDC (-15 %...+20 %)	none
Current via power contacts	max. 10 A	-

ETHERNET TCP/IP

	PIO-341 Standard
Signals	digital and analog
max. number of socket connections	3 HTTP, 5 MODBUS/TCP, 128 for ETHERNET/IP
Number of I/O modules	limited by ETHERNET specification
Transfer medium	Twisted Pair S-UTP 100 Ω CAT 5
max. bus length	100 m between hub and PIO-341; max. network length is limited by the ETHERNET specification
Transfer rate	10/100 MBits/s
max. number of bus terminals	64
Fieldbus input process image	max. 2 kBytes
Fieldbus output process image	max. 2 kBytes
Supply voltage	24 VDC (-15 %...+20 %)
Input current	500 mA at 24 V
Internal current drain	300 mA at 5 V
max. vectorial sum current for bus terminals	1700 mA at 5 V
Power contacts	3; 24 VDC (-15 %...+20 %)
Current via power contacts	max. 10 A

ECO fieldbus couplers are used in situations where mainly digital inputs and outputs are to be connected and the number of analogue inputs and outputs is small.
The system is supplied directly via the coupler. The field supply is connected via a separate input terminal (PIO-602).

Bus Terminals

Digital inputs



	PIO-400 2DI 24 VDC 3.0 ms 2-channel digital input terminal	**PIO-402** 4DI 24 VDC 3.0 ms 4-channel digital input terminal	**PIO-430** 8DI 24 VDC 3.0 ms 8-channel digital input terminal
Number of inputs	2	4	8
Data width of the process image	2 Bits	4 Bits	8 Bits
Connection	2 - 4 wires, positive switching	2 - 3 wires, positive switching	single-wire, positive switching
Power contacts	3; 24 VDC (-15 %...+20 %)	2; 24 VDC (-15 %...+20 %)	2; 24 VDC (-15 %...+20 %)
Internal current drain	3.7 mA at 5 V	7.5 mA at 5 V	17 mA at 5 V
Signal voltage (0)	-3...+5 VDC	-3...+5 VDC	-3...+5 VDC
Signal voltage (1)	15...30 VDC	15...30 VDC	15...30 VDC
Input current (typ.)	4.5 mA	4.5 mA	2.8 mA
Dimensions (mm) WxHxD	12x64x100	12x64x100	12x64x100

Analog inputs



	PIO-456 2AI ±10 VDC differential input 2-channel analog input terminal	**PIO-468** 4AI 0-10 VDC S.E. 4-channel analog input terminal	**PIO-480** 2AI 0-20 mA differential input 2-channel analog input terminal
Number of inputs	2	4	2 (opto-isolated)
Data width of the process image	2*2 bytes	4*2 bytes	2*2 bytes
Connection	differential input	Single-ended	differential input
Power contacts	none	none	none
Internal current drain	80 mA at 5 V	60 mA at 5 V	<100 mA at 5 V
Signal input	±10 V	0...10 V	0...20 mA
Resolution	12 bits	12 bits	14 bits (A/D converter) 13 bits (measurement value)
Dimensions (mm) WxHxD	12x64x100	12x64x100	12x64x100

Digital outputs



	PIO-501 2DO 24 VDC 0.5 A 2-channel digital output terminal	PIO-504 4DO 24 VDC 0.5 A 4-channel digital output terminal	PIO-530 8DO 24 VDC 0.5 A 8-channel digital output terminal
Number of outputs	2	2	4
Data width of the process image	2 bits	4 bits	8 bits
Connection	short-circuit proof, positive switching	short-circuit proof, positive switching	short-circuit proof, positive switching
Power contacts	3; 24 VDC (-15 %...+20 %)	2; 24 VDC (-15 %...+20 %)	2; 24 VDC (-15 %...+20 %)
Internal current drain	3.5 mA at 5 V	7 mA at 5 V	25 mA at 5 V
Type of load	resistive, inductive, lamp load	resistive, inductive, lamp load	resistive, inductive, lamp load
Output current	0.5 A	0.5 A	0.5 A
Switching frequency (max.)	5 kHz	5 kHz	1 kHz
Dimensions (mm) WxHxD	12x64x100	12x64x100	12x64x100

Analog outputs



	PIO-550 2AO 0-10 VDC 2-channel analog output terminal	PIO-552 2AO 0-20 mA 2-channel analog output terminal	PIO-556 2AO ±10 VDC 2-channel analog output terminal
Number of outputs	2	2	2
Data width of the process image	2*2 bytes	2*2 bytes	2*2 bytes
Power contacts	none	2; 24 VDC (-15 %...+20 %)	none
Signal input	0...10 V	0...20 mA	±10 V
Internal current drain	65 mA at 5 V	60 mA at 5 V	65 mA at 5 V
Resolution	12 bits	12 bits	12 bits
Conversion time	Approx. 2ms	Approx. 2ms	Approx. 2ms
Load impedance	> 5 kOhm	< 500 Ohm	> 5 kOhm
Dimensions (mm) WxHxD	12x64x100	12x64x100	12x64x100

Power Supply Terminal

The power supply terminal is used to supply the field level when ECO couplers are used or if the supply is interrupted by bus terminals with no or only a single power contact.

Passive power supply terminal

	PIO-602
Voltage via power contacts	24 VDC (-15 %...+20 %)
Current via power contacts	max. 10 A

Bus Terminal

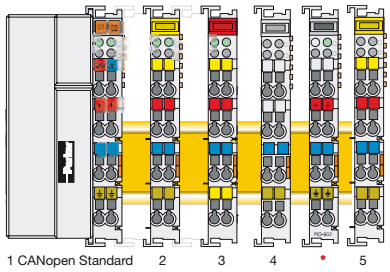
PIO-600: A terminal must be set at the end of each fieldbus node. The terminal closes the internal terminal bus and ensures correct data transmission.

Layout and Configuration Setup

Example of a layout sequence (from left to right):

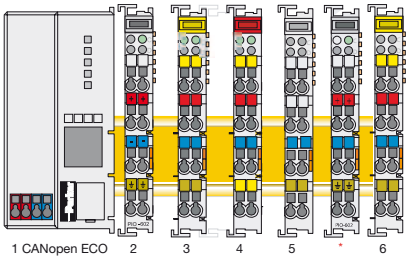
with standard coupler

1. Fieldbus coupler
2. Bus terminals with 3 power contacts
3. Bus terminals with 2 power contacts
4. Bus terminals without power contacts
5. *



with ECO coupler

1. ECO fieldbus coupler
2. PIO-602
3. Bus terminals with 3 power contacts
4. Bus terminals with 2 power contacts
5. Bus terminals without power contacts
6. *



* Expansion on the right side using bus terminals with power contacts requires the use of a PIO-602 potential voltage feed terminal.

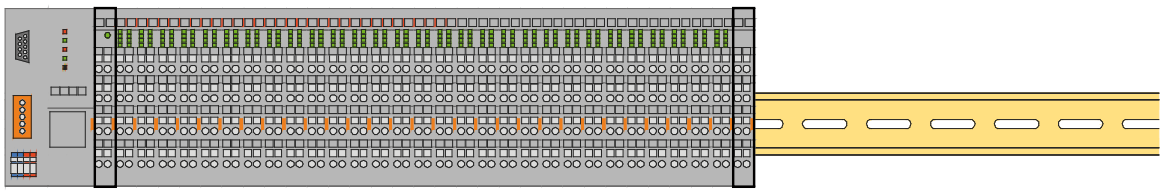
Worked examples

The data for the input currents must be available to calculate the vectorial sum!
The internal current drain of the bus terminals is specified in the technical data. The values of all PIOs in the node are added together to determine the total requirement.

Example 1
The following components are to be used in a node:

- 1 CANopen ECO coupler (PIO-347)
- 16 digital output terminals (PIO-530)
- 14 digital input terminals (PIO-430)

PIO-347 internal current drain	350 mA at 5 V
PIO-347 max. vectorial sum current for bus terminals	650 mA at 5V
Grand total I (5 V):	**1000 mA at 5 V**
PIO-347 fieldbus input process image	max. 32 bytes
PIO-347 fieldbus output process image	max. 32 bytes
PIO-530 internal current drain	16*25 mA = 400 mA
PIO-430 internal current drain	14*17 mA = 238 mA
Total:	**638 mA**
PIO-530 data width of the output process image	16*8 bits = 128 bits (16 bytes)
PIO-430 data width of the input process image	14*8 bits = 112 bits (14 bytes)



PIO-602 **PIO-600**

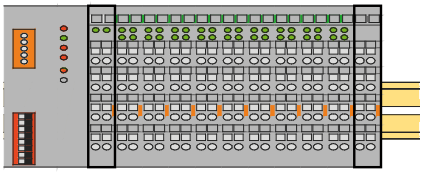
The **CANopen ECO coupler** (PIO-347) is capable of providing the required 638 mA (max. 650 mA) for the bus terminals. It is capable of administering a data width of 14 bytes for the input process image (max. 32 bytes) and a data width of 16 bytes for the output process image (max. 32 bytes).
(A PIO-602 power supply terminal is required).

Example 2
The following components are to be used in a node:

- 1 CANopen ECO coupler (PIO-347)
- 9 analog input terminals (PIO-468)

PIO-347 internal current drain		350 mA at 5 V
PIO-347 max. vectorial sum current for bus terminals		650 mA at 5V
	Grand total I (5 V):	**1000 mA at 5 V**
PIO-347 fieldbus input process image		max. 32 bytes
PIO-347 fieldbus output process image		max. 32 bytes
PIO-468 internal current drain		9*60 mA = 540 mA
	Total:	**540 mA**
PIO-468 data width of the output process image		9*8 bytes = 72 bytes

The **CANopen ECO coupler** (PIO-347) is capable of providing the required 540 mA (max. 650 mA) for the bus terminals.
However, this version requires the use of a **CANopen Standard coupler** (PIO-337), since the required data width of 72 bytes for the input process image cannot be administered by the CANopen ECO coupler (max. 32 bytes).
The CANopen standard coupler (PIO-337) is capable of administering an input process image of 512 bytes.
(No PIO-602 power supply terminal is required).

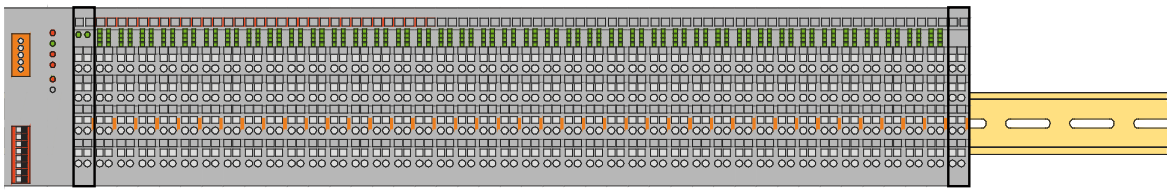


PIO-602 **PIO-600**

Example 3:
The following components are to be used in a node:

- 1 CANopen ECO coupler (PIO-347)
- 16 digital output terminals (PIO-530)
- 24 digital input terminals (PIO-430)

PIO-347 internal current drain		350 mA at 5 V
PIO-347 max. vectorial sum current for bus terminals		650 mA at 5V
	Grand total I (5 V):	**1000 mA at 5 V**
PIO-347 fieldbus input process image		max. 32 bytes
PIO-347 fieldbus output process image		max. 32 bytes
PIO-530 internal current drain		16*25 mA = 400 mA
PIO-430 internal current drain		24*17 mA = 408 mA
	Total:	**808 mA**
PIO-530 data width of the output process image		16*8 bits = 128 bits (16 bytes)
PIO-430 data width of the input process image		14*8 bits = 112 bits (14 bytes)



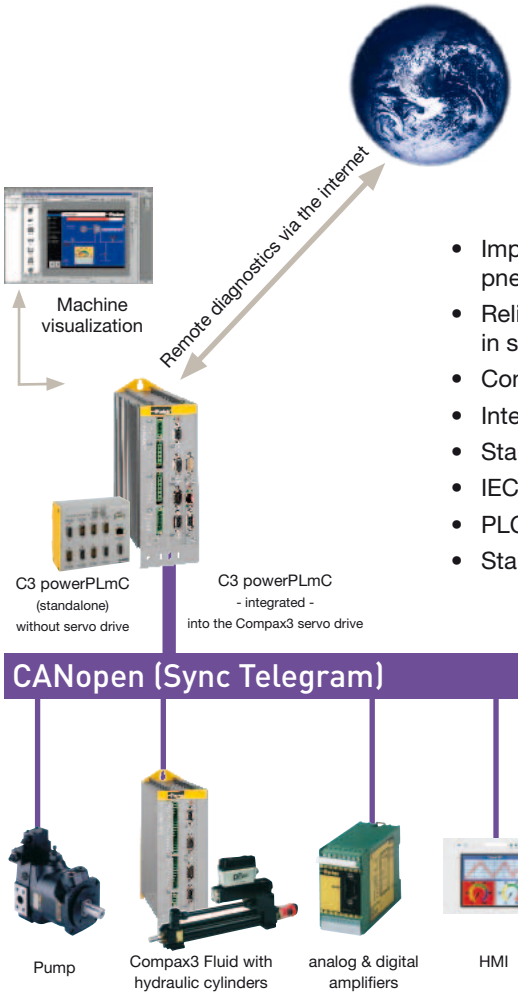
PIO-602 **PIO-600**

The **CANopen ECO coupler** (PIO-347) is capable of administering a data width of 14 bytes for the input process image (max. 32 bytes) and a data width of 16 bytes for the output process image (max. 32 bytes).
This version requires the use of the **CANopen standard coupler** (PIO-337) since the total of currents is exceeded. The CANopen standard coupler (PIO-337) is capable of providing 1650 mA for bus terminals and can administer an input and output process image of 512 bytes each.
(No PIO-602 power supply terminal is required).

System Solutions from Parker Hannifin

Integrating Drive Technology into the Automation Environment

- High-performance control systems
- Pneumatic and hydraulic drives
- Sensor systems
- Input/output modules
- Operator panels for control and monitoring
- Technology functions (winders, cams, etc.)
- Vertical integration (connection to company networks, remote maintenance, etc.)
- Handling and precision mechanics



- Implementation of modular machine concepts with electromechanics, pneumatics and hydraulics
- Relieves the logic and motion function load on the main control system (can in some instances remove the need for the main control system)
- Control, NC functionality and monitoring in a single device
- Integration into control systems and remote maintenance via the Internet
- Standard components make it easy to expand the system
- IEC 61131-3
- PLCopen motion components
- Standard fieldbusses

Features

- 5 programming languages
  - SFC (Sequential function chart)
  - IL (Instruction List)
  - ST (Structured Text)
  - LD (Ladder diagram)
  - FBD (Function block diagram)
  - CFC (Continuous function chart editor)
- Compax3 library
  - IEC - standard components
  - Compax3 - specific components
  - PLCopen Motion control components
  - Technology components

Order Code

Parker I/O System - PIO

	1		2
Order example	**PIO**	**-**	**337**

1	**Series**	
	PIO	Parker I/O system
2	**Fieldbus coupler**	
	337	CANopen coupler
	347	CANopen coupler ECO
	306	DeviceNet coupler
	346	DeviceNet coupler ECO
	333	PROFIBUS coupler (DP/V1 12 MBd)
	343	PROFIBUS coupler ECO (DP 12 MBd)
	341	ETHERNET coupler (TCP/IP)
	Bus terminals	
	Digital inputs	
	400	2DI 24 VDC 3.0 ms
	402	4DI 24 VDC 3.0 ms
	430	8DI 24 VDC 3.0 ms
	Analog inputs	
	456	2AI ±10 VDC differential input
	468	4AI 0-10 VDC S.E.
	480	2AI 0-20 mA differential input
	Digital outputs	
	501	2DO 24 VDC 0.5 A
	504	4DO 24 VDC 0.5 A
	530	8DO 24 VDC 0.5 A
	Analog outputs	
	550	2AO 0-10 VDC
	552	2AO 0-20 mA
	556	2AO ±10 VDC
	System terminals	
	600	Bus terminal (required as terminal for each fieldbus node)
	602	Power supply terminal 24 VDC
	Accessories	
	PIO quick designation system (designation indicators for manual labeling)	
	501-WEISS	**white**
	501-GELB	**yellow**
	501-ROT	**red**
	501-BLAU	**blue**
	501-GRAU	**grey**
	501-ORANGE	**orange**
	501-HELLGRUEN	**light green**

Parker's Motion & Control Technologies

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

AEROSPACE

Key Markets
- Aircraft engines
- Business & general aviation
- Commercial transports
- Land-based weapons systems
- Military aircraft
- Missiles & launch vehicles
- Regional transports
- Unmanned aerial vehicles

Key Products
- Flight control systems & components
- Fluid conveyance systems
- Fluid metering delivery & atomization devices
- Fuel systems & components
- Hydraulic systems & components
- Inert nitrogen generating systems
- Pneumatic systems & components
- Wheels & brakes

CLIMATE CONTROL

Key Markets
- Agriculture
- Air conditioning
- Food, beverage & dairy
- Life sciences & medical
- Precision cooling
- Processing
- Transportation

Key Products
- CO^2 controls
- Electronic controllers
- Filter driers
- Hand shut-off valves
- Hose & fittings
- Pressure regulating valves
- Refrigerant distributors
- Safety relief valves
- Solenoid valves
- Thermostatic expansion valves

ELECTROMECHANICAL

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

Key Products
- AC/DC drives & systems
- Electric actuators
- Controllers
- Gantry robots
- Gearheads
- Human machine interfaces
- Industrial PCs
- Inverters
- Linear motors, slides and stages
- Precision stages
- Stepper motors
- Servo motors, drives & controls
- Structural extrusions

FILTRATION

Key Markets
- Food & beverage
- Industrial machinery
- Life sciences
- Marine
- Mobile equipment
- Oil & gas
- Power generation
- Process
- Transportation

Key Products
- Analytical gas generators
- Compressed air & gas filters
- Condition monitoring
- Engine air, fuel & oil filtration & systems
- Hydraulic, lubrication & coolant filters
- Process, chemical, water & microfiltration filters
- Nitrogen, hydrogen & zero air generators

FLUID & GAS HANDLING

Key Markets
- Aerospace
- Agriculture
- Bulk chemical handling
- Construction machinery
- Food & beverage
- Fuel & gas delivery
- Industrial machinery
- Mobile
- Oil & gas
- Transportation
- Welding

Key Products
- Brass fittings & valves
- Diagnostic equipment
- Fluid conveyance systems
- Industrial hose
- PTFE & PFA hose, tubing & plastic fittings
- Rubber & thermoplastic hose & couplings
- Tube fittings & adapters
- Quick disconnects

HYDRAULICS

Key Markets
- Aerospace
- Aerial lift
- Agriculture
- Construction machinery
- Forestry
- Industrial machinery
- Mining
- Oil & gas
- Power generation & energy
- Truck hydraulics

Key Products
- Diagnostic equipment
- Hydraulic cylinders & accumulators
- Hydraulic motors & pumps
- Hydraulic systems
- Hydraulic valves & controls
- Power take-offs
- Rubber & thermoplastic hose & couplings
- Tube fittings & adapters
- Quick disconnects

PNEUMATICS

Key Markets
- Aerospace
- Conveyor & material handling
- Factory automation
- Food & beverage
- Life science & medical
- Machine tools
- Packaging machinery
- Transportation & automotive

Key Products
- Air preparation
- Compact cylinders
- Field bus valve systems
- Grippers
- Guided cylinders
- Manifolds
- Miniature fluidics
- Pneumatic accessories
- Pneumatic actuators & grippers
- Pneumatic valves and controls
- Rodless cylinders
- Rotary actuators
- Tie rod cylinders
- Vacuum generators, cups & sensors

PROCESS CONTROL

Key Markets
- Chemical & refining
- Food, beverage & dairy
- Medical & dental
- Microelectronics
- Oil & gas
- Power generation

Key Products
- Analytical sample conditioning products & systems
- Fluoropolymer chemical delivery fittings, valves & pumps
- High purity gas delivery fittings, valves & regulators
- Instrumentation fittings, valves & regulators
- Medium pressure fittings & valves
- Process control manifolds

SEALING & SHIELDING

Key Markets
- Aerospace
- Chemical processing
- Consumer
- Energy, oil & gas
- Fluid power
- General industrial
- Information technology
- Life sciences
- Military
- Semiconductor
- Telecommunications
- Transportation

Key Products
- Dynamic seals
- Elastomeric o-rings
- EMI shielding
- Extruded & precision-cut, fabricated elastomeric seals
- Homogeneous & inserted elastomeric shapes
- High temperature metal seals
- Metal & plastic retained composite seals
- Thermal management

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