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climate control
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sealing & shielding



ACR9640

IEC61131-3 Controller with Powerlink



PRIMERA
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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.

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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

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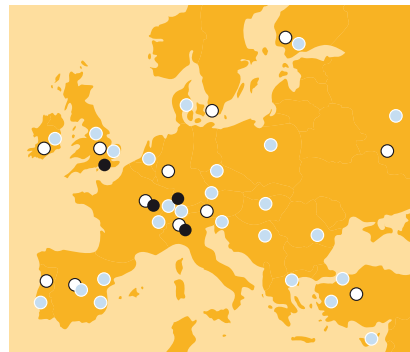
For contact information, please refer to the Sales Offices on the back cover of this document or visit www.parker.com



Milan, Italy



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- Parker Sales Offices
- Distributors



Dijon, France

IEC61131-3 Controller with Powerlink - ACR9640

Overview

Description

The ACR EPL family is Parker's premier standalone motion controller family, capable of controlling up to 16 axes of motion. Connectivity and communication features give the ACR EPL flexibility for use in a wide variety of machine architectures. The ACR EPL excels as a standalone machine and motion controller, interfacing with a PC or working alongside a PLC. A powerful DSP makes the ACR EPL an outstanding multitasking servo controller. The ACR EPL includes easy-to-use project-development tools that enable fast, efficient application creation and maintenance. The ACR EPL is the solution for standalone applications requiring industry-leading performance in an affordable and easy-to-use package. The ACR9640 is a compact, cost-effective, EPL-only controller including Ethernet, USB and an integrated 2-port hub for ETHERNET Powerlink connections. I/O can be added using CANopen or by utilizing the inputs and outputs on the EPL drives.

ETHERNET Powerlink expands the ACR EPL family by adding a real-time motion controller over standard Ethernet hardware. The high speed digital communications network enhances machine performance and configuration possibilities while reducing set-up time and installation complexity.

Features

- Control of 16 ETHERNET Powerlink drives
- 10/100 Base-T Ethernet
- USB 2.0
- EtherNet/IP compatibility
- CANopen expansion I/O
- CE (EMC & LVD), UL and cUL Recognized
- Multitasking of up to 24 simultaneous programs
- Interpolation of 8 axes in any combination
- IEC61131-3 programming with structured text, continuous function chart and ladder diagram



Technical Characteristics - Overview

	ACR9640
Power supply	24 VDC, 1A
Processor	32 bit DSP @150 MFLOPS/75 Hz
User memory	2 MB flash-based
Motion bus	ETHERNET Powerlink: 16 axes
Operating system	Multi-tasking RTOS
Ethernet	TCP/UDP, ETHERNET/IP
CANopen	DS401 protocol

Proven Control Engine with IEC61131-3 Programming

The ACR-9640 Controller provides multitasking of up to 16 simultaneous programs with multiple coordinate systems.

Motion and programming capabilities:

- IEC61131 programming
 - Structured text, ladder logic and CFC
 - PLCopen motion function blocks
 - Parker function blocks
- Linear interpolation up to 8 axes
- Up to 16 PLC tasks: timer, cyclic or interrupt configurable task priority
- Additional 16 AcroBasic tasks available
- Segmented electronic camming
- Electronic gearing with real-time phase advance
- Linear, circular, helical and spline interpolation
- Gantry lock
- Backlash and ballscrew compensation

Hardware features:

- EPL versions support up to 16 axes of coordinated motion
- Equipped with 2 MB of user memory standard
- Robust connectors hold up in harsh environments
- EtherNet/IP, CANopen, USB2.0, RS232 and RS485 communications are supported, with multiple channels available simultaneously
- Industry-standard Ethernet/IP communications
- ETHERNET Powerlink digital motion bus
- CANopen I/O support for over 1000 points of I/O
- Indicator LED's improve your troubleshooting capability



ACR-9640 supports standard PLCopen function blocks, and adds Parker custom multi-axis functions

PLCOpen Function Blocks:		Parker Function Blocks:		
Administrative	Motion	Gear	Cam	Other Custom Functions
MC_Power	MC_MoveAbsolute	ACR_GearIn	ACR_Camin	ACR_ReadFlag
MC_ReadStatus	MC_MoveRelative	ACR_GearIn_lhpos	ACR_Camin_lhpos	ACR_ReadDintParameter
MC_ReadAxisError	MC_MoveAdditive	ACR_GearIn_Trq	ACR_Camin_Trq	ACR_ReadRealParameter
MC_ReadParameter	MC_MoveVelocity	ACR_GearIn_Trqp	ACR_Camin_Trqp	ACR_WriteFlag
MC_ReadBoolParameter	MC_Home	ACR_GearOut		ACR_WriteDintParameter
MC_WriteParameter	MC_Stop	ACR_GearOut_Trq		ACR_WriteRealParameter
MC_WriteBoolParameter		ACR_GearOut_Trqp		ACR_MoveCoordinated
MC_ReadActualPosition				ACR_TouchProbe

Industry-standard programming in a proven platform

The ACR9640 offers the best of IEC61131-3 standard programming. With structured text, continuous function chart and ladder diagram programming, we offer the right language for your application.

Multiple fieldbus options

The ACR9640 supports EPL for high-speed motion and CANopen for analog and discrete I/O. EtherNet/IP is also supported for integration with other PLC's and HMI's. EtherNet/IP, CANopen, USB2.0, RS232 and RS485 communications are supported, with multiple channels available simultaneously.

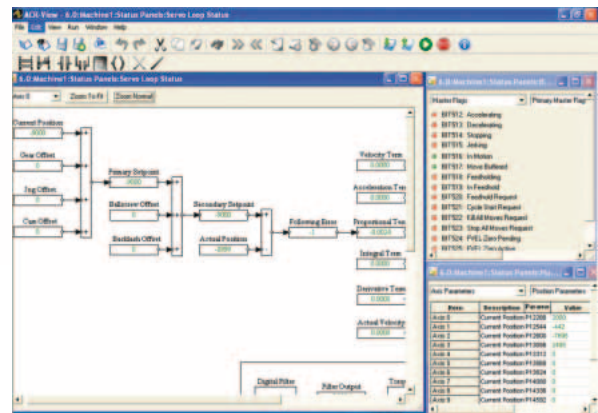
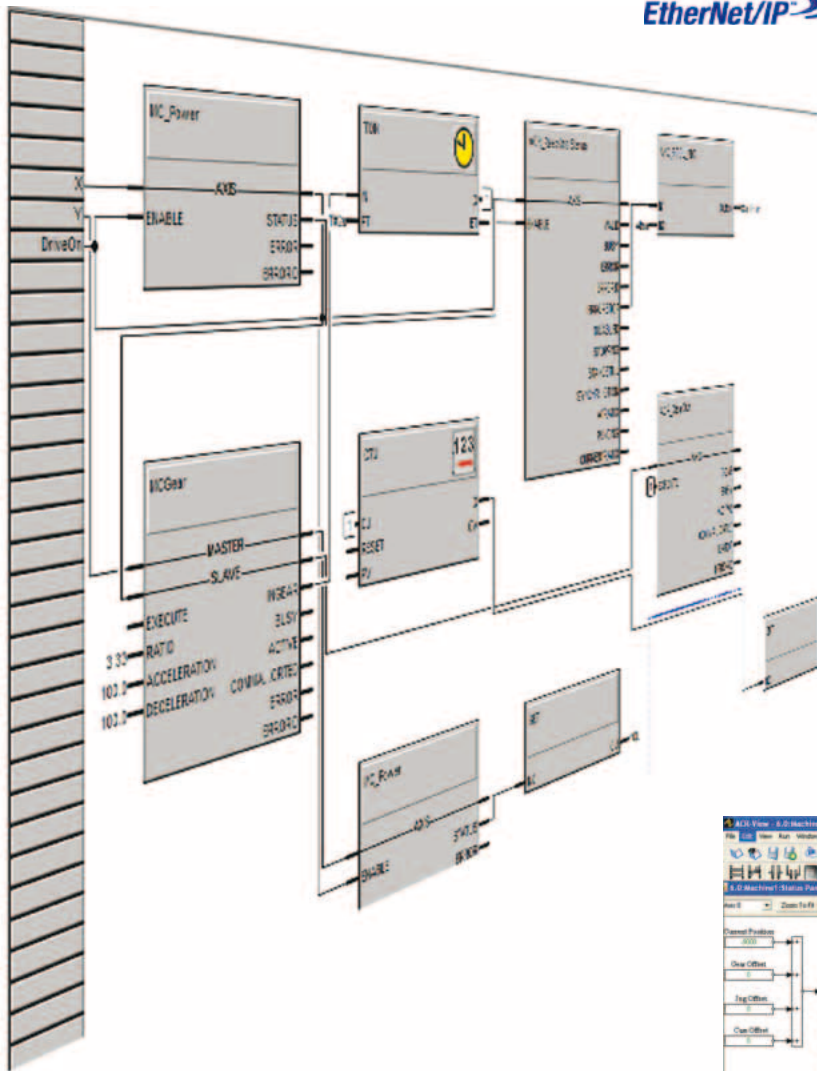
Connectivity

The ACR EPL controllers include a separate Ethernet port for TCP/IP and EtherNet/IP™ traffic. The ACR controller acts as a gateway between the real-time EPL domain and other communications, allowing the EPL network to remain focused on time-critical motion and I/O functions. The controller can service multiple communications channels at once, giving users many options for PC and PLC connectivity in development and normal operation.

The EtherNet/IP™ network is designed to use standard Ethernet and TCP/IP equipment for the industrial environment. The application layer protocol is an open standard - CIP™ (Control and Information Protocol). CIP is the same upper layer protocol used by DeviceNet™ and ControlNet™ networks, allowing interoperability between various industrial devices.

ACR-View

ACR-View automatically generates a suite of common tags for each project you define. These tags can be automatically used in your Xpress HMI application.

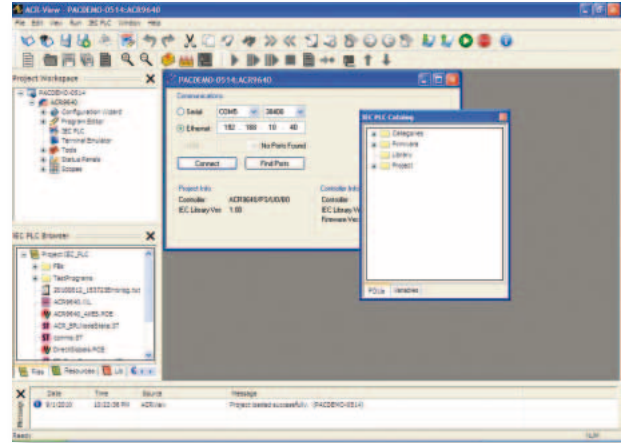


ACR-View Software Development Kit

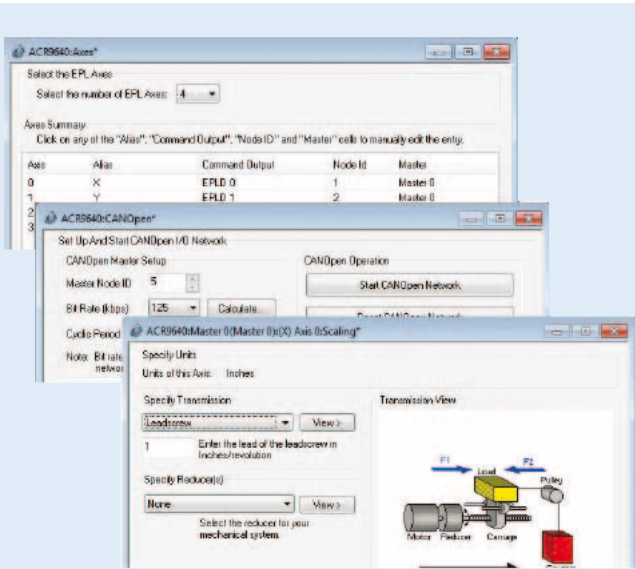
ACR-View is a powerful project-development suite that assists the user of the ACR family products in programming, debugging and commissioning their application. Many features are incorporated to assist both the novice and expert users in developing code. All the tools needed to build and maintain a motion project are included:

- Ethernet, USB, CANOpen and serial connection support
- Project Configuration Wizard
- Servo tuning tools
- Built-in oscilloscope, strip chart and XY plot
- IEC61131-3 editor (structured text, ladder diagram and continuous function chart)
- Real-time terminal interface
- Servo loop diagnostic tool
- Comprehensive status panels
- Integrated help files

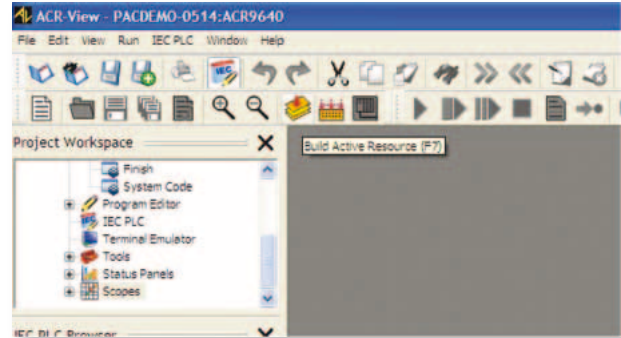
Development Overview



Configuration Wizard

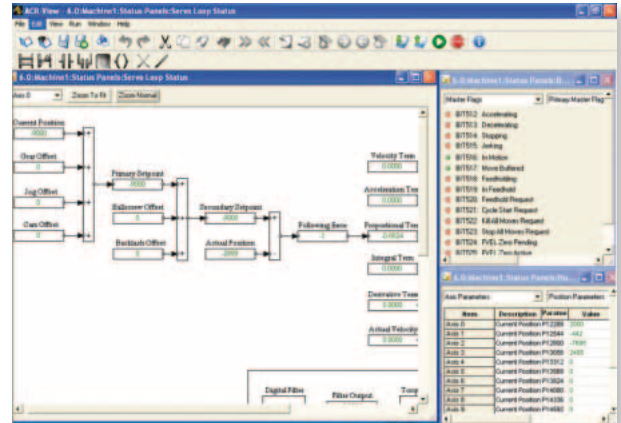


Project set-up is streamlined through the use of the Configuration Wizard. The ACR9640 can be configured in a matter of minutes as the user is guided through a series of simple steps. ACR-View will set the necessary parameters to have the controller ready for motion and code development.



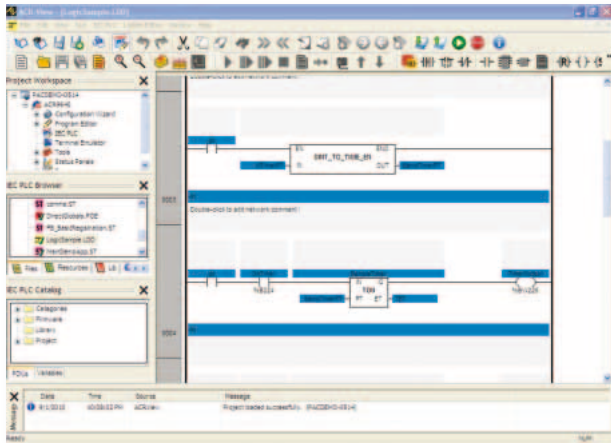
ACR-View's configurable environment allows you to create a development system that works the way you do. Elements of the environment can be docked, floated or moved to where they work best for you. Additional information is available from tool tips and a context sensitive help system.

Status Panels

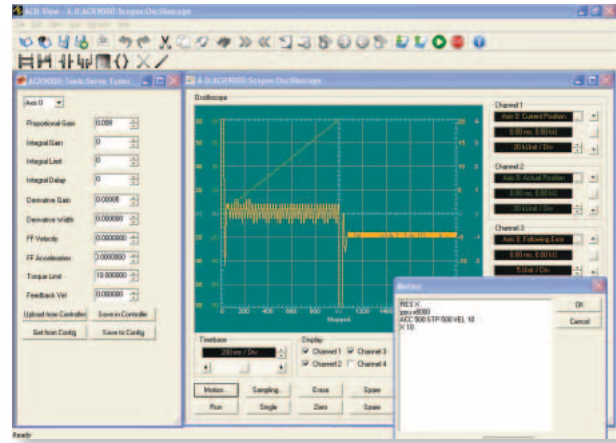


View virtually any parameter or flag within the controller using the Bit and Numeric Status panels. The Servo Loop Status panel allows in-depth analysis of servo operation.

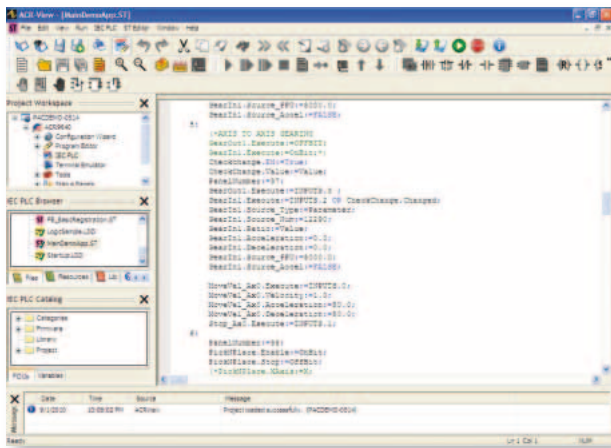
Editors



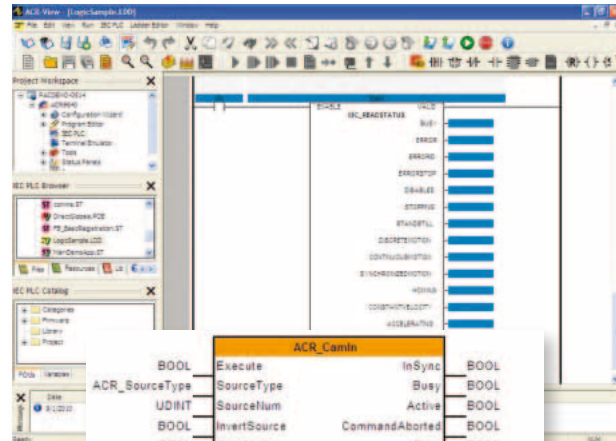
Tuning



Servo tuning can be optimized with ACR-View's powerful oscilloscope feature. Up to four channels of data can be observed and stored. Tuning gains are updated immediately and move profiles can be tailored to best fit the application's needs.

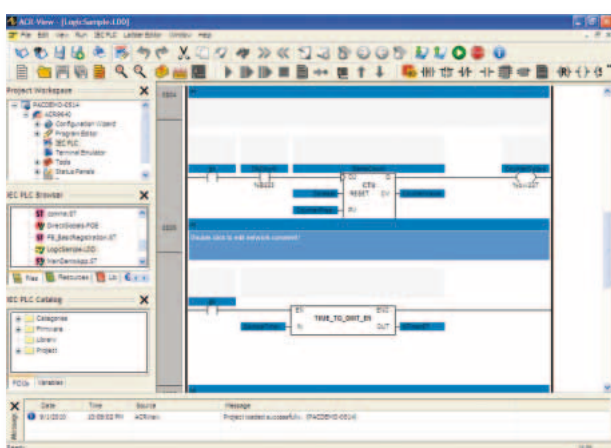


Motion Control Function Blocks



ACR_CamIn			
BOOL	Execute	InSync	BOOL
ACR_SourceType	SourceType	Busy	BOOL
UDINT	SourceNum	Active	BOOL
BOOL	InvertSource	CommandAborted	BOOL
REAL	CamScale	Error	BOOL
REAL	CamOffset	ErrorID	WORD
UDINT	CamCycles	EndOfProfile	BOOL
DINT	IndexOffset		

ACR_GearIn			
BOOL	Execute	InGear	BOOL
ACR_SourceType	SourceType	Busy	BOOL
INT	SourceNum	Active	BOOL
REAL	Ratio	CommandAborted	BOOL
REAL	Acceleration	Error	BOOL
REAL	Deceleration	ErrorID	WORD
REAL	SourcePPU		
BOOL	SourceAccel		
DINT	OffsetMax		
DINT	OffsetMin		



IEC61131-3 editors support complete project development in one or several supported languages. Motion and I/O logic are supported in all languages.

ACR-View not only incorporates the industry-standard PLCopen function blocks for motion, but goes beyond with proprietary multi-axis and coordinated function blocks.

ETHERNET Powerlink

EPL Controller Managing Node (MN)

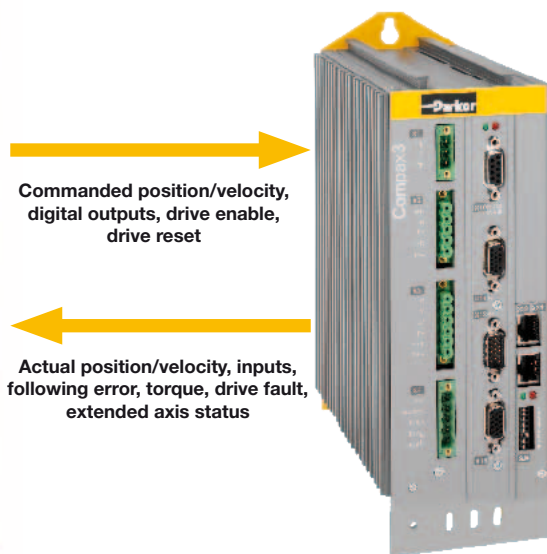
- Stores and runs the motion program
- Supervises and controls local drive I/O and system expansion I/O
- Generates motion trajectories for all axes
- Sends position set points to drives
- Synchronizes positions of multiple axes for tightly coordinated motion

Compax3 EPL I30 Controlled Node (CN)

- Closing servo loops including torque, velocity and position loops
- Local I/O (8 in, 4 out)
- High-speed inputs for registration
- Encoder feedback from motor, Resolver ...
- STO



ACR9640 Multi-axis
EPL Controller



Compax3
EPL Servo Drive

ETHERNET Powerlink Communications

- Replace the traditional ± 10 V analog control and feedback cables with an all-digital Ethernet network
- Real-time, deterministic data to and from nodes is guaranteed each cycle with the slot communications network protocol, illustrated in the diagram below
- Proven, robust CANopen profiles are sent over proven, robust Ethernet hardware
- Standard TCP/IP communications does not interrupt determinism, as it takes place during the asynchronous slot at the end of the cycle
- Excellent performance with timing jitter $< 1 \mu s$



Technical Characteristics

Technical Data

ACR9640 EPL Controller

Hardware	Axes/controller	16 EPL axes
	Power requirement	24 VDC, 1 A
	Processor	32 bit floating-point DSP @150 MFLOPS / 75 MHz
	User memory	2 MB flash-based. Retains user programs and system configuration parameters
	Firmware	Flash-based
	Operating system	Multi-tasking RTOS
	Battery backup	Non-volatile memory retains all system and user variables (5 years @25 °C)
Performance	Multi-tasking	8 coordinated systems/16 text programs/8 ladder programs
	Trajectory update	64 bit precision, 500 µs (axes dependent)
	Interpolation	Linear, circular, sinusoidal, helical, elliptical, spline, 3D arcs
Communications	ETHERNET Powerlink	ETHERNET Powerlink V2. Integrated 2-port hub, RJ-45 connectors Supports EPL DS402 drives in interpolated position mode
	Serial interface	1 serial port (RS232 and/or RS422)
	Ethernet	10/100 Base-T, RJ-45 connector. Supports IP protocols TCP/UDP, EtherNet/IP
	USB	USB 2.0, type B connection
	CANopen	Standard 9-pin D-sub connector Supports DS401 protocol for I/O devices
Provided software	Development software	ACR-View software development kit
	Language support	Libraries for C++, VB6, C#, VB.NET, LabVIEW

Environmental Characteristics

Ambient conditions

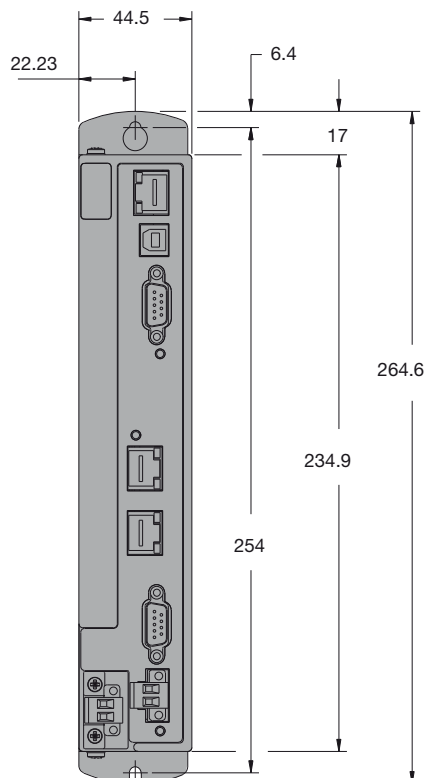
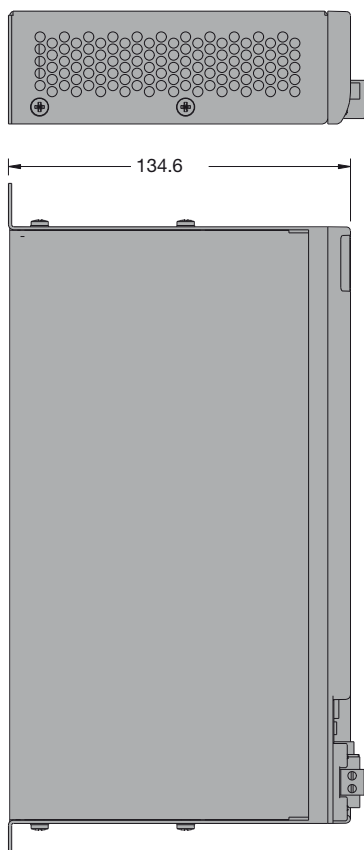
Temperature range	<ul style="list-style-type: none"> Operating temperature: 0...+50 °C Storage temperature: -40...+75 °C
Humidity	Operating humidity: 0...95 % non-condensing
Pollution degree	2 (per IEC61010)
Shock	15 g, 11 ms half-sine
Vibration	10...2000 Hz @2 g

Standards and Conformance

CE compliance	CE (EMC) CE (LVD)
UL certification	UL Recognized
RoHS compliance	Complies with European Union Directive 2002/95/EC - Restriction of Hazardous Substances (RoHS)

Dimensions

Dimensions [mm]



Order Code

ACR9640 EPL

	1	2	3	4
Order example	9640	P1	U0	B0

1	Controller version¹⁾	
	9640	24 VDC input
2	Communication	
	P3	Ethernet, USB, serial and CANopen
3	Number of axes, encoder inputs	
	U0	16 EPL axes
4	Memory	
	B0	Battery backed RAM

¹⁾ All models include ACR-View Software Development Kit CD

Accessories

Cables

	1		2		3
Order example	71	-	016939	-	10

1	Type number of accessory	
	71	Cable
2	Communication	
	016939	RS232 communication cable PC-ACR
3	Cable length	
	10	3 m

EPL accessory ACR-Compax3

	1		2
Order example	SSK28	/	01

1	Type number of accessory	
	SSK28	RJ45 crossover cable (Powerlink)
2	Cable length	
	20	0.25 m
	21	0.5 m
	01	1.00 m

CANopen accessory ACR-PIO

	1
Order example	BUS10/01

1	Type number of accessory	
	SSL02	CANopen cable (length per 1 m) ¹⁾
	BUS10/01	Bus terminator

¹⁾ Example: 2 pieces of SSL02 = 1 SSL02 with 2 m cable length

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

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

- CO² 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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