

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



# Parker Automation Controller

Integrated Machine Control, Multi-Axis Motion, and Visualization



ENGINEERING YOUR SUCCESS.

# Parker Automation Controller - PAC

Powerful, integrated, and designed for the global machine market, the Parker Automation Controller (PAC) provides OEMs with a standards-based automation solution designed to tackle the most demanding applications. The PAC consolidates advanced logic, multi-axis motion, signal handling, and web-published visualization into one performance driven solution, thus eliminating the need for unnecessary hardware and communication links, and increasing developer efficiency.

The PAC employs the industry-leading EtherCAT communication protocol for motion, I/O, and third-party device connectivity, and combined with the Parker Automation Manager IDE for application development, the PAC provides OEMs with an engineered solution for the most demanding applications; a single, intuitive environment for application development; industry standard programming; machine-to-machine communication; network separation; and even Intellectual Property (IP) protection methods among other features.

With the standard dual LAN capability for network separation,



built-in OPC Server, Modbus TCP functionality, and the ability to integrate directly into Ethernet/IP and Profinet networks, the PAC provides unprecedented connectivity for complimentary devices *and* network isolation for IT professionals.

The solid state design is precisely engineered for demanding industrial environments. The powerful, yet energy efficient Intel® Atom™ processor allows for fanless operation while supporting

dual-cores, 64-bit instructions, and Hyperthreading technology. Coupled with the removable, solid state SD storage media, all moving parts have been eliminated for a robust, industrial grade control solution.

## Hardware

- Intel Atom Dual-core, 1.60GHz, 64-bit
- 1GB DDR3 SDRAM
- Fan-less
- SD Application Memory
- Local & Remote I/O
- DIN Rail Mounting

## Software

- IEC61131-3 Programming
- PLCopen Motion Control
- DIN 66025 CNC G-code
- Simulation Runtime Engine
- Web-configuration Tool
- Custom Libraries
- Extensible, Reusable Code

## Communications

- EtherCAT
- Ethernet/IP
- Profinet
- Profibus
- OPC Server
- Modbus TCP
- Dual LANs

# Parker Automation Controller - PAC

## Hardware Features





# Parker Automation Controller - PAC

## PAC Specifications

<b>Processor</b>	Intel® Atom CPU, 1.6 GHz, Dual Core, 64bit, 1 MB L2 Cache
<b>Memory</b>	Up to 1GB DDR3 SDRAM, 1066 MHz, PC3-8500, 204-pin SODIMM Socket
<b>Storage</b>	2GB Secure Digital Card (SD)
<b>Retentive Memory</b>	256kB, 512kB
<b>BIOS</b>	Insyde H <sub>2</sub> O
<b>Input Voltage</b>	24 VDC (-15 %/+25 %), SELV, 1.2A, 29W, Req. Class 2 Power Source, Overvoltage Cat. 1
<b>Fuse</b>	Littelfuse Nano SMF Slow Blow Type -- Littelfuse Part Number R454002
<b>Shock Rating</b>	10g peak, 11ms (operating); 30g peak, 11ms (non-operating)
<b>Operating Vibration</b>	10-500Hz: 2grms random
<b>Altitude</b>	10,000 ft. (3048m)
<b>Relative Humidity</b>	0% to 95% non-condensing
<b>Operating Temperature</b>	32 to 122 °F (0-50 °C) Ambient
<b>Storage Temperature</b>	-13 to 158 °F (-25 to 70 °C)
<b>Environmental</b>	IP20, RoHS Compliant
<b>Heat Dissipation</b>	5.0 W max. w/o optional communications module, 5.8 W maximum w/ optional module
<b>Weight</b>	1.45 lbs (0.66kgs) w/o optional comm. module; 1.65 lbs (0.75kgs) w/ optional module
<b>Dimensions</b>	3.27"H x 4.93"W x 8.02"L w/o optional comm. module; 3.53"H w/ optional module
<b>Mounting</b>	35 mm DIN rail (top-hat rail)
<b>Ports</b>	2x RJ-45 10/100/1000BaseT Ethernet; 1x RJ45 100Mbit/s EtherCAT supporting IEEE1588 distributed clocks; 2 x USB 2.0 Host Type A

## PAC Standards and Conformance

Tests	Specification
<b>Harmonic Current Emissions</b>	EN 61000-3-2:2006 + A2:2009, IEC 61000-3-2:2009
<b>Voltage Fluctuations and Flicker</b>	EN 61000-3-3:2008, IEC 61000-3-3:2008
<b>Electrostatic Discharge Immunity</b>	IEC 61000-4-2:2008
<b>Radiated Electromagnetic Field Immunity</b>	IEC 61000-4-3:2010
<b>Electrical Fast Transient Burst Immunity</b>	IEC 61000-4-4:2012
<b>Surge Immunity</b>	IEC 61000-4-5:2005
<b>Radio Frequency Common Mode Immunity</b>	IEC 61000-4-6:2008
<b>Power Frequency Magnetic Field Immunity</b>	IEC 61000-4-8:2009
<b>Voltage Interrupts Immunity</b>	IEC 61000-4-11:2004
<b>Radiated &amp; Conducted Emissions</b>	EN 55011:2009 + A1:2010
<b>CISPR 11 Group 1, Class A</b>	CISPR 11:2009 + A1:2010
<b>†‡ Part 1 General Requirements</b>	EN61010-1:2010
<b>†‡ Part 2-201 Particular Requirements for Control Equipment</b>	EN61010-2-201:2013
<b>‡Part 1: General Requirements</b>	UL 61010-1, 3rd Edition, 2012-04-17
<b>‡Part 1: General Requirements</b>	CAN/CSA-C22.2 No. 61010-1, 3rd Ed, 2012-04
<b>†‡ Part 2-201: Particular requirements for control equipment</b>	UL 61010-2-201
<b>Protection Degree IP20</b>	IEC 60529, Ed 2.1+CORRs. 1:2003, 2:2007, 3:2009

†Safety Requirements ‡Electrical Equipment for Measurement, Control and Laboratory use.

# Parker Automation Controller - PAC

## PAC I/O

The PAC I/O System comprises a variety of modules for digital, analog and temperature signals as well as communication interfaces. The modules connect directly to the controller via the built-in EtherCAT bus for local architectures and are extended to remote locations via the extender and bus coupler modules, thus supporting both local and distributed I/O architectures.

PAC I/O modules feature a removable cage-clamp terminal design which provides for easy wiring and assembly and allows for the removal and insertion of modules without interfering with

wiring; LED status indicators for the EtherCAT bus, I/O, power and each signal channel; front-face shield-grounding to the din-rail; removable label inserts; easy access front mounted module disconnects; and laser-etched identification and schematic information.

PAC I/O communicates natively on the EtherCAT bus and is unencumbered by protocol converters; therefore it provides the full functionality and throughput of high-speed EtherCAT to meet the most demanding I/O requirements.



## PAC I/O Modules

Module Type	Part Number	PACIO Description
Bus Coupler	PACIO-400-00	PACIO EtherCAT Bus coupler, 3 A
Digital I/O Modules	PACIO-450-02	PACIO DI16/DO8 (16 inputs/8 outputs), 1 A
	PACIO-450-03	PACIO DI16/DO16 (16 inputs/16 outputs), 1 ms delay, 0.5 A
	PACIO-450-13	PACIO DI16/DO16 (16 inputs/16 outputs), 1 ms delay, 0.5 A Low-side
	PACIO-451-02	PACIO DI32 (32 inputs), 1 ms delay
	PACIO-451-03	PACIO DI16 (16 inputs), 1 ms delay
	PACIO-450-05	PACIO DI8/DO8 (8 inputs/8 outputs), 1 ms delay, 0.5 A
	PACIO-452-01	PACIO DO16 (16 outputs), 0.5 A
	PACIO-452-02	PACIO DO8 (8 outputs) 1 A
	PACIO-441-01	PACIO AI4-mA (4 single-ended analog input module), 12 Bit resolution
Analog	PACIO-441-02	PACIO AI4/8-VDC (4 differential/8 single-ended analog input module), 13 Bit
	PACIO-442-02	PACIO AO4-VDC/mA (4 analog output module), 12 Bit resolution
	PACIO-443-01	PACIO AI4-Pt/Ni100 (4 analog inputs, 70 to 300 ohm resistance), 16 Bit
Temperature	PACIO-443-03	PACIO AI4-Pt/Ni1000 (4 analog inputs, 70 to 3000 ohm resistance), 16 Bit
	PACIO-454-01	PACIO Counter/Enc (encoder counter module)
Counter	PACIO-455-03	PACIO Profibus DP Slave Module
Interfaces	PACIO-400-02	PACIO Extender 2 Port (EtherCAT I/O extender)
	PACIO-412-01	PACIO Shield 2x8 mm
Accessories	PACIO-412-02	PACIO Shield 14 mm
	PACIO-411-00	Power Distribution Module (distributes 0 VDC or 24 VDC)

# Parker Automation Controller - PAC

## PAC I/O Specifications

<b>Fieldbus</b>	EtherCAT 100Mb/s
<b>Dimensions</b>	25mm x 120mm x 90mm (W x H x D)
<b>Housing Mount</b>	Aluminum
<b>Shield</b>	Front face of module housing thru to DIN rail
<b>Installation</b>	35mm DIN rail (top-hat rail)
<b>I/O Connection</b>	Spring-assisted combi-plug terminal w/ mechanical ejector, 4...36-pin
<b>Signal Indication</b>	LEDs: located next to the signal's terminal connection
<b>Diagnosis</b>	LEDs: bus state, module state, broken wire/excessive current
<b>Number of Channels</b>	Up to 32 digital I/Os on every module, up to 8 analog channels per module
<b>Supply Voltage</b>	24 VDC -20%/+25%
<b>Number of I/O Modules</b>	20 local and then 20 per bus coupler (total max. power consumption per station: 3A)
<b>Density</b>	Up to 32 digital I/Os per module; up to 8 analog channels per module
<b>Electrical installation</b>	Modules electrically insulated from one another and from the bus
<b>Storage Temperature</b>	-25°C ... + 70°C
<b>Operating Temperature</b>	0°C ... +50°C
<b>Relative Humidity</b>	5% ... 95% non-condensing
<b>Protection</b>	IP20
<b>Noise Immunity</b>	Zone B, EN 61131-2, earth grounded DIN rail in earth grounded cabinet
<b>CE Compliance</b>	2004/108/EC Electromagnetic Compatibility
<b>UL</b>	UL508
<b>RoHS</b>	RoHS Compliant

## Accessories and Options

### Communication Options

The Parker Automation Controller (PAC) employs the industry leading EtherCAT communication protocol for motion, I/O, and 3rd party device connectivity. Along with EtherCAT, each unit also comes standard with Modbus TCP, an OPC Server, and dual LANs for network separation.

To compliment the standard protocols, the PAC provides options for Ethernet/IP, Profinet, and Profibus, and therefore the PAC can integrate directly into Ethernet/IP and Profinet

networks for machine-to-machine communication.



PROFINET communication module

- **EtherCAT**
- **Ethernet/IP**
- **Profinet**
- **Profibus**
- **Modbus TCP**
- **OPC Server**
- **Dual LANs**

# Parker Automation Controller - PAC

# Parker Automation Manager IDE

Smart and powerful, Parker Automation Manager is the single integrated development environment for programming complex logic, multi-axis motion, signal handling, and web-published visualizations.

With Automation Manager, engineers can leverage their existing knowledge and work smarter, more efficient and more effective than ever with the full suite of IEC 61131-3 programming languages, PLCopen Motion Control, Parts I and II, and g-code conforming to the DIN66025 standard. This standards-based approach provides a common platform for control engineers and flattens the learning curve, thus saving OEMs time and money.

## IEC61131-3 Programming

- Ladder Diagram
- Structured Text
- Continuous Function Chart
- Function Block Diagram
- Sequential Function Chart
- Instruction List

## PLCopen Motion Control I & II

### DIN 66025 G-code

The common platform approach is complemented by a powerful simulation engine for logic and motion that allows for faster development and by a complete suite of debugging tools, including powerflow; inline variable forcing, watch, and trending; system logging; and breakpoints for logic analysis.

Automation Manager supports reusable, extensible software; object-oriented programming techniques; and even custom library creation for libraries that

can be deployed as compiled—and optionally licensed—code and deployed to protect the

## Simulation Runtime Debugging

- Variable Forcing and/or Setting
- Multiple Watch Windows
- Trending
- Powerflow
- Breakpoints

## System Logger

## Extensible Software

## Object-oriented Programming

## Custom Libraries

### Intellectual Property (IP) of OEMs.

Engineers can now manage an entire product line in one project by including multiple hardware configurations and deploying the appropriate reusable software packages to specific application containers. This method allows OEMs to maintain their program files in one project and make code changes in one place to affect all versions of a particular machine. Thus machine builders now have a development platform specifically designed to support modular machines and valuable add-on software modules.

## Customizable Interface

## Cam Editor (Graphical & Tabular)

## G-code Editor (Graphical & Tabular)

## Auto Declaration & Completion

## Recipe Manager

## Alarm Configuration

## Unit Conversions

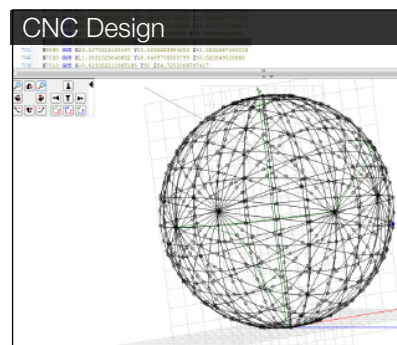
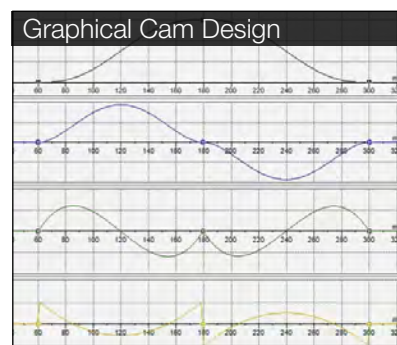
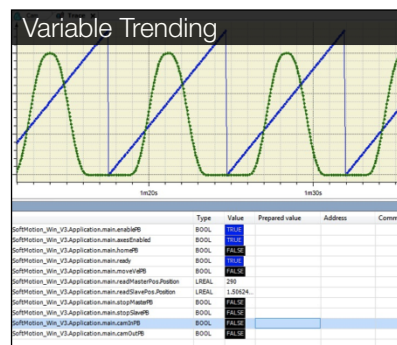
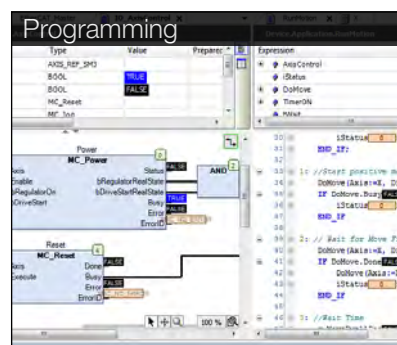
### Web-published Visualization

## Custom Functions/FBs

## CNC Development

## DXF Import to Dev. Env.

## NC File Import to Runtime

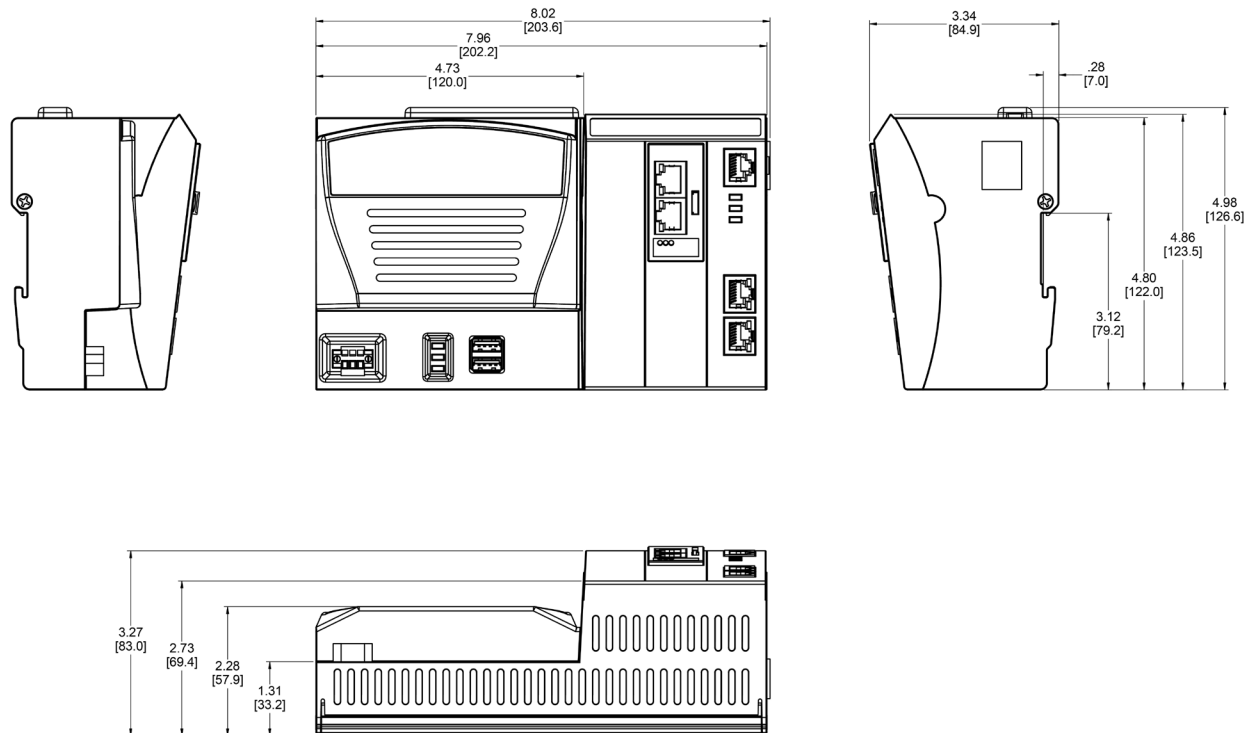


# Parker Automation Controller - PAC

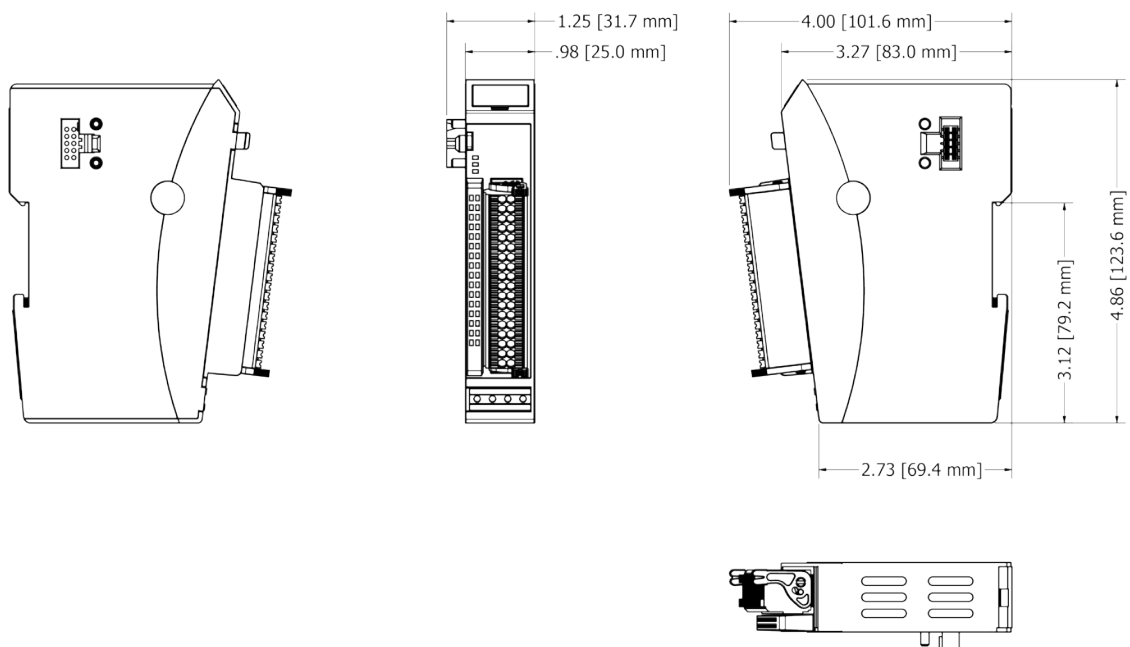
## Dimensions

### PAC Controller

Inches (mm)

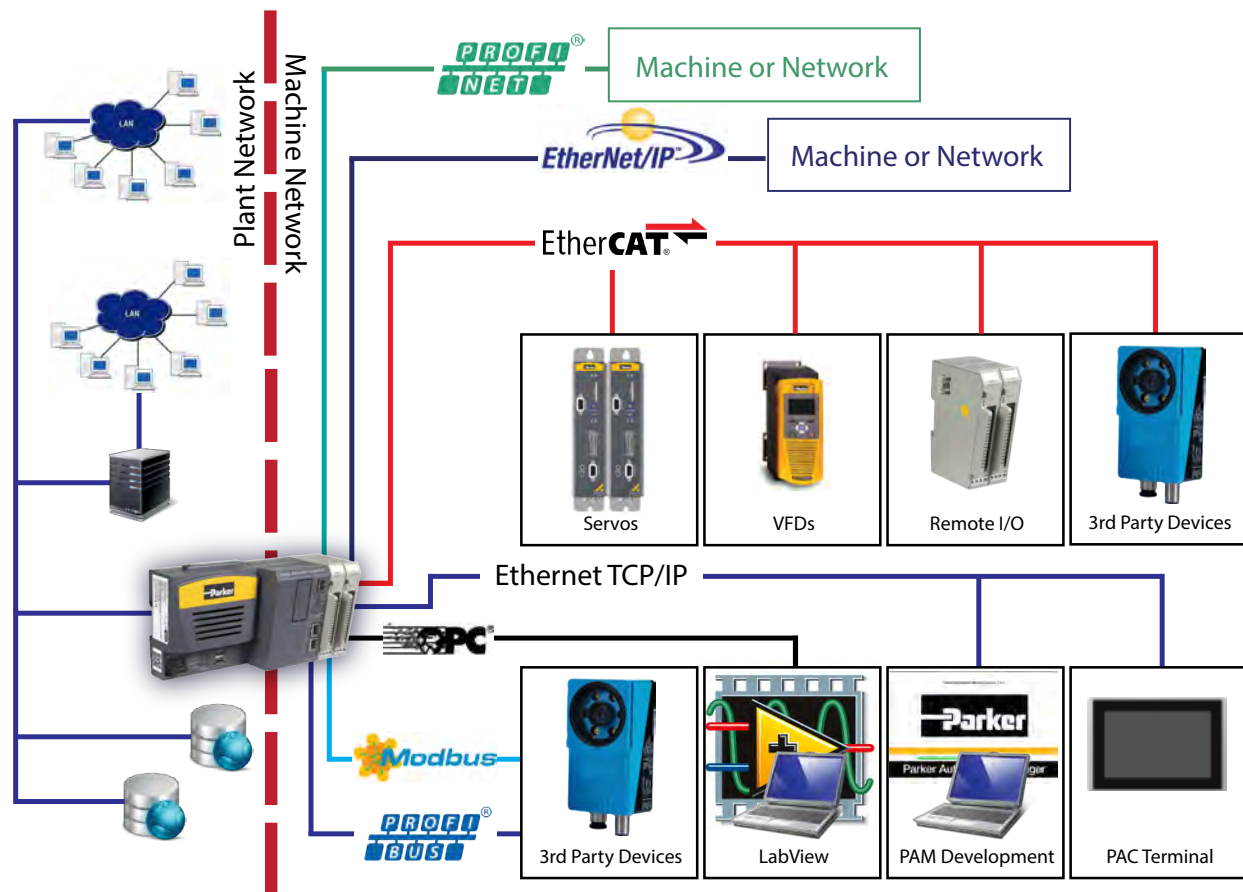


### I/O Modules





# Network Architecture



# Ordering Information

	①		②	③	④	⑤	⑥		⑦	⑧
<b>Order Example:</b>	PAC320	–	M	W	N	2	1	–	3	A

Select an option from each numbered field to create a complete model order code.

① <b>Series</b> <b>PAC320</b> Controller	⑤ <b>Retentive Memory</b> <b>2</b> 256k Bytes
② <b>Software</b> <b>P</b> IEC only <b>M</b> IEC, PLCopen Motion <b>C</b> IEC, PLCopen Motion, CNC	⑥ <b>Processor</b> <b>1</b> 1.60 GHz Dual Core Intel® N2600
③ <b>Visualization</b> <b>X</b> Embedded Xpress Web-visualization <b>W</b> Web-visualization for CNC	⑦ <b>Agency Approvals</b> <b>3</b> UL/cUL/CE
④ <b>Communication Options</b> <b>N</b> No Interface <b>E</b> Ethernet/IP <b>P</b> Profinet Device <b>B</b> Ethernet/IP, PROFINET Device	⑧ <b>Reserved</b> <b>A</b> Reserved