Allen-Bradley

1785 PLC-5 Programmable Controllers

System Overview

Rockwell Automation


NetLinx
Open Network Architecture

PLC-5 CONTROLLER...THE FOUNDATION OF CONTROL ARCHITECTURE

Proven

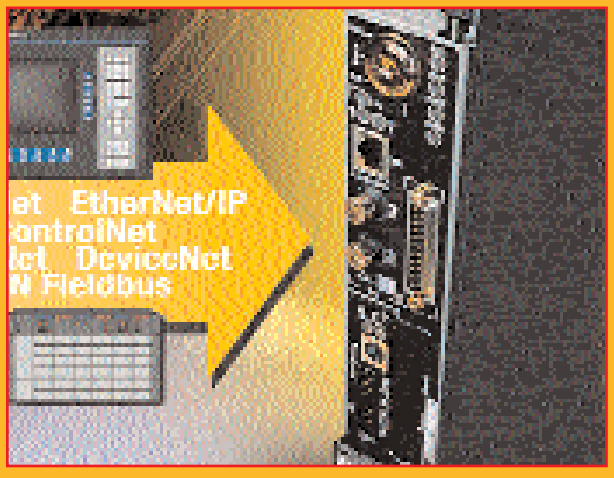
- Controls hundreds of thousands of processes today
- Over 70% of Dow Jones Industrials use PLC-5
- Qualifies for certification from key standards organizations
- Offers a Mean Time Between Failure (MTBF) rating higher than that of any comparable programmable controller

Solutions

- Allows multiple I/O platform choices
- Provides a choice of languages: Ladder Logic, Sequential Function Charts (SFCs), Structured Text, Function Block Languages
- Enables a choice of backup solutions
- Comes in a range of memory sizes to fit your application

You Can Build On

- Connects the latest open networks as well as existing networks
- Provides state-of-the-art diagnostic services and control networking via ControlNet
- Enables you to integrate control and information systems:
  - EtherNet/IP to network PLC-5 systems directly with information systems
  - SoftLogix 5 software to perform PLC-5 control on a PC-based platform
- Improves integration of serial devices with access through front panel serial port



The PLC-5 controller stands at the center of a control architecture that brings together existing and future systems by means of networks such as EtherNet/IP, ControlNet and DeviceNet, and offers connectivity among MicroLogix, SLC 500, SoftLogix and ControlLogix controllers. Because they include embedded network connections, PLC-5 controllers enable your control architecture to be flexible enough to include cost-effective connections to a wide range of devices.

A SOUND CHOICE FOR YOUR CONTROL INVESTMENT

At the center of thousands of Allen-Bradley control solutions around the globe you'll find a PLC-5® controller. One reason: flexibility in terms of programming, networking, I/O, and choice of controllers to suit your requirements. Another: reliability, with a MTBF (Mean Time Between Failure) rating that exceeds 400,000 hours. One more: a commitment to compatibility between the products you buy today and new products continually being introduced by Rockwell Automation. Our modular architecture allows automated systems to grow with your needs, without your having to sacrifice capital or training investments.

A leading Mexican cement manufacturer uses Allen-Bradley PLC-5 controllers because they can be easily modified to adapt to future needs.

You'll Find A PLC-5 Controller in an Application Like Yours

The features of PLC-5 controllers make them well-suited for many applications:

- Integration with operator interfaces, I/O and power monitors in the brew house, yeast/fermentation and finishing areas of **breweries**.
- Direct network connections for powertrain, paint shop and other **automotive** manufacturing applications.
- Affordable remote communication and control to enable SCADA (Supervisory Control and Data Acquisition) solutions for **water/waste water treatment** facilities.
- Integration of control with **information systems** to facilitate the databases needed for documentation of your production process.
- Real-time control for a quick response to diverse customer demands in **metals** production.
- Standardization of control throughout a facility in **material handling** and routing, from baggage, cargo, parcel and container handling to warehousing and distribution of bulk materials.
- Integration of motion, vision, logic and barcode scanners in **semiconductor and electronics** production to simplify and standardize such critical processes as fabrication.
- Hydraulic positioning or force control on the wet and dry ends of **paper** machines by means of a PLC-5 system that includes 1771 hydraulic control modules to reduce leaks, extend fluid life and reduce power consumption.
- Industrially hardened control platforms for **batch and continuous processes** in diverse applications such as petroleum, chemical processing, cement, municipal and military to simplify maintenance.

Control YOUR Future Today

You're concerned with more than the purchase of a controller: you need to solve manufacturing challenges – lower cost, improved throughput, higher quality and increased flexibility.

Our PLC-5 controller is part of a highly integrated control solution to assure that your control system will be up-and-running and available to solve those challenges. We provide a great deal more than an off-the-shelf solution.

- Our sales, distribution and system integration network can provide **consultation** at the start, middle or maintenance phase of your project.
- Our programming and other software tools offer a **common look-and-feel** that saves you retraining costs and time.
- We provide **networking connections** that bring you forward to today's open networks.
- Our hardware platforms offer unmatched breadth in terms of **application-specific** solutions available from us and from other vendors participating in the Encompass program.
- Spare parts/support are **globally available** through a distribution network and technical support organization unsurpassed by any other automation supplier.

The benefits to you come in **time savings, cost savings** and **faster start-ups** that result from pre-integrated products designed to work together as well as services available to you from initial conception to ongoing maintenance.

Table of Contents

The following table describes the information and its location in this system overview:

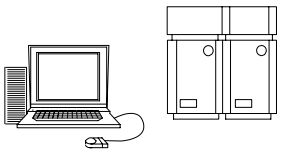
Communication Choices Let You Connect to the Future

What to consider:
- type of information to send/receive
- system performance
- distance/size of application
- available networks
- future expansion

Rockwell Automation offers many control and communication media products that help you integrate plant operations. These products, combined with other vendors' products, provide plant-wide solutions that meet your control system and business needs.

You determine your communication architecture based on your networking needs. There are three main types of networks:

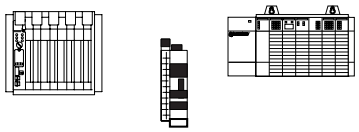
Information networks



An information network:

- provides a link between the plant floor and manufacturing execution systems
- connects to multiple vendor's host computers
- has the capacity to transfer large data files
- supports standard network management and troubleshooting tools

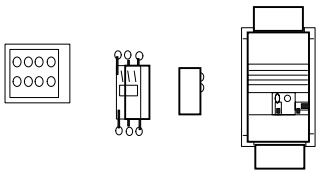
Control networks



A control network:

- offers real-time performance
- is deterministic and repeatable
- supports peer-to-peer messaging
- connects to programmable controllers, personal computers, man-machine interface devices, drives, motion devices, etc.
- support programming and device configuration

Device networks



A device network:

- reduces wiring costs because devices do not need to be directly wired to a programmable controller
- supports device-level diagnostics
- connects to multiple vendors' devices

The networking capabilities, lead by EtherNet/IP™ network, ControlNet™ network, and DeviceNet™ network, allow information exchange between a range of devices and computing platforms and operating systems. PLC-5 controllers come with different network connections. Choose the network(s) that best meets your needs:

If your application requires:	Use this network:	Type:
• high-speed data transfer between information systems and/or a large quantity of controllers • Internet/Intranet connection • program maintenance	EtherNet/IP network *see page 6*	*information network*
• plantwide and cell-level data sharing with program maintenance	Data Highway Plus™ *see page 11*	*information network*
• high-speed transfer of time-critical data between controllers and I/O devices • deterministic and repeatable data delivery • program maintenance • media redundancy or intrinsic safety options	ControlNet network *see page 7*	*control and information network*
• connections between controllers and I/O adapters • distributed controllers so that each controller has its own I/O and communicates with a supervisory controller	Universal Remote I/O *see page 12*	*control network*
• connections of low-level devices directly to plant floor controllers, without the need to interface them through I/O modules • more diagnostics for improved data collection and fault detection • less wiring and reduced start-up time than a traditional, hard-wired system	DeviceNet network *see page 8*	*device network*
• modems • messages that send and receive ASCII characters to or from devices such as ASCII terminals, bar code readers, message displays, weigh scales, or printers • supervisory control and data acquisition (SCADA)	serial network *see page 9*	*serial network*

Ethernet Network and EtherNet/IP Protocol

***Features*:**

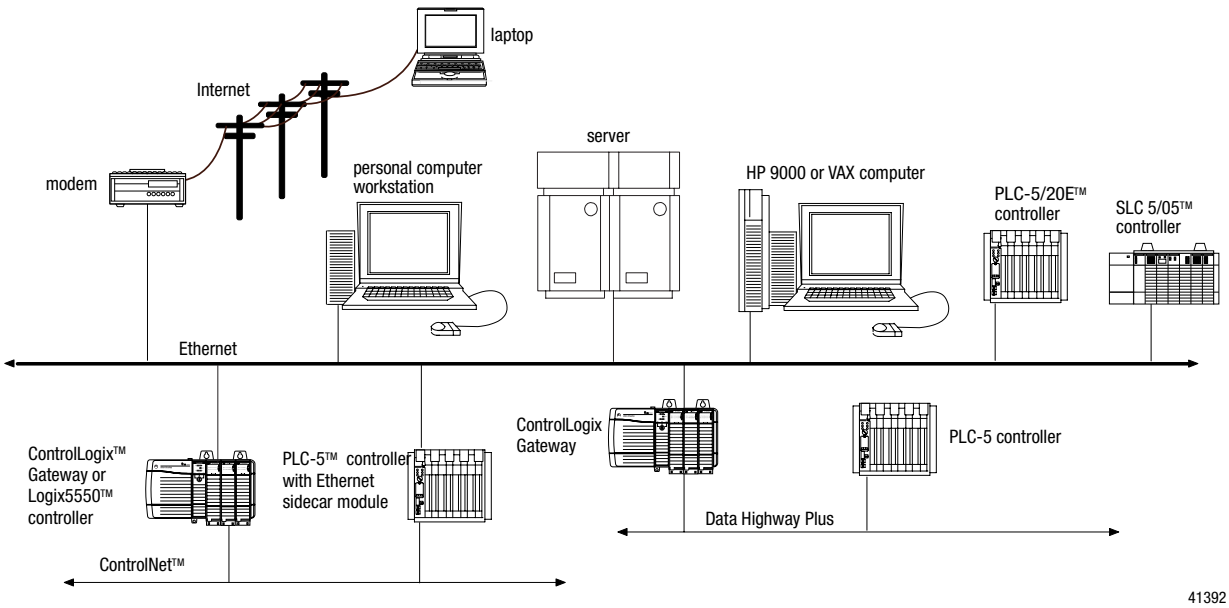
- *information layer*
- *high-speed exchange of information*
- *high bandwidth*
- *can be used via the Internet*

The Ethernet network is a local area network designed for the high-speed exchange of information between computers and related devices. With its high bandwidth (10Mbps to 100Mbps), an Ethernet network allows many computers, controllers, and other devices to communicate over vast distances.

With an Ethernet network you have many possibilities because you can maximize communication between the great variety of equipment available from vendors.

An Ethernet network provides enterprise-wide systems access to plant-floor data. At the application layer, EtherNet/IP is the implementation of the Control and Information Protocol (CIP) on the Ethernet network. Ethernet/IP is an open protocol that enables multi-vendor integration.

Additionally, EtherNet/IP uses the protocols used by the Internet. Both the Ethernet PLC-5 and Ethernet Interface Module contain features that allow you to use the Internet to access product information and to create and enhance application diagnostics. For more information on these features, refer to page 15 of the *Controller Choices* section.



Ethernet specifications

Cable options:	Data transmission rate:	Maximum cable length:	Maximum drop cable length:	Maximum number of nodes:
10Base-5	10Mbps	500m	50m	100
10Base-2	10Mbps	200m	50m	30
10Base-T	10Mbps	100m	n/a	n/a
10Base-FL	10Mbps	2000m	n/a	n/a

For more information, see the *EtherNet/IP System Overview*, publication ENET-SO001.

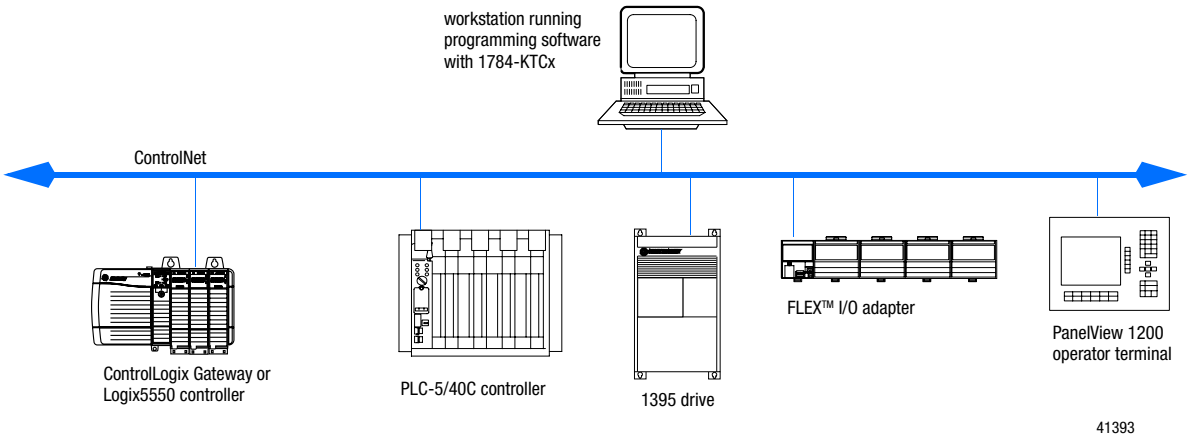
ControlNet Network

Features:

- *control layer*
- *transfers I/O and program data*
- *high-speed*
- *deterministic*

The ControlNet network is an open, high-speed deterministic network used for transmitting time-critical information. It provides real-time control and messaging services for peer-to-peer communication. As a high-speed link between controllers and I/O devices, a ControlNet network combines the capabilities of existing Universal Remote I/O and Data Highway Plus™ networks. You can connect a variety of devices to a ControlNet network, including personal computers, controllers, operator interface devices, drives, I/O modules, and other devices with ControlNet connections.

At the control layer, a ControlNet network combines the functionality of an I/O network and a peer-to-peer messaging network. This open network provides the performance required for critical control data, such as I/O updates and controller-to-controller interlocking. ControlNet also supports transfers of non-critical data, such as program uploads, downloads, and messaging.



ControlNet specifications

Rates:	Cable lengths:	Maximum number of nodes:
transmission: 5Mbps network update time: 2-100ms	1000m (3,280 ft.) with 2 devices 250m (820 ft.) with a maximum of 48 devices tap drop cable length fixed at 1m (3 ft.) maximum distance 6km with repeaters	99

For more information, see the *ControlNet Network System Overview*, publication CNET-SO001.

DeviceNet Network

Features:

- *device layer*
- *open standard*
- *directly connects low-level devices*

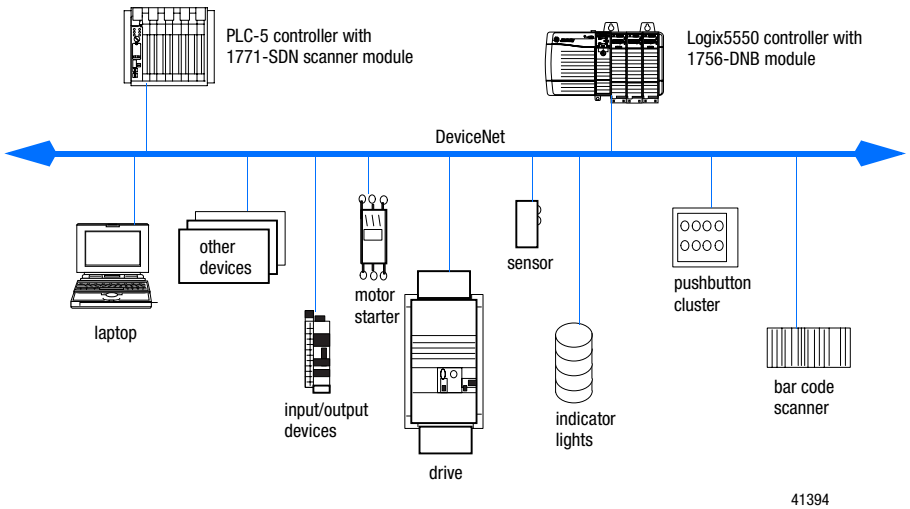
A DeviceNet network is an open, I/O communication link that provides connections between simple, industrial devices (such as sensors and actuators) and high-level devices (such as controllers). Based on standard Controller Area Network (CAN) technology, this open network offers a level of interoperability between like devices from multiple vendors. A DeviceNet network reduces:

- installation costs
- start-up and commissioning time
- system and machine down time

A DeviceNet network provides:

Feature:	Benefit:
interoperability	simple devices from multiple vendors that meet DeviceNet standards are interchangeable, giving you flexibility and choice
common network	an open network provides common, end-user solutions, and reduces the need to support a wide variety of device networks
lower maintenance costs	you can remove and replace devices without disrupting other devices
cost-effective wiring	one wire supplies communications and 24V power networked device installation is more cost-effective than traditional I/O wiring

At the device layer, a DeviceNet network can connect low-level devices directly to plant-floor controllers without the need to interface them through I/O modules.



DeviceNet specifications

Data transmission rate:	Cable trunk length:	Cumulative drop length:	Maximum drop length:	Maximum number of nodes:
125k bit/s	500m (1,640 ft.)	125m (512 ft.)	6 m (20 ft.)	64
250k bit/s	250m (820 ft.)	78m (256 ft.)		
500k bit/s	100m (328 ft.)	39m (128 ft.)		

For more information, see the *DeviceNet Selection Guide*, publication DNET-SG001 and the *DeviceNet Scanner Launch*, publication 1771-LM001A.

Serial Network

Features:

- *communicate using DF1 protocol*
- *RS-232, -423, -422A configurable*
- *supports SCADA applications*

The PLC-5 serial port is configurable for RS-232, RS-423, or RS-422A-compatible serial communication. Use the serial port to connect devices that:

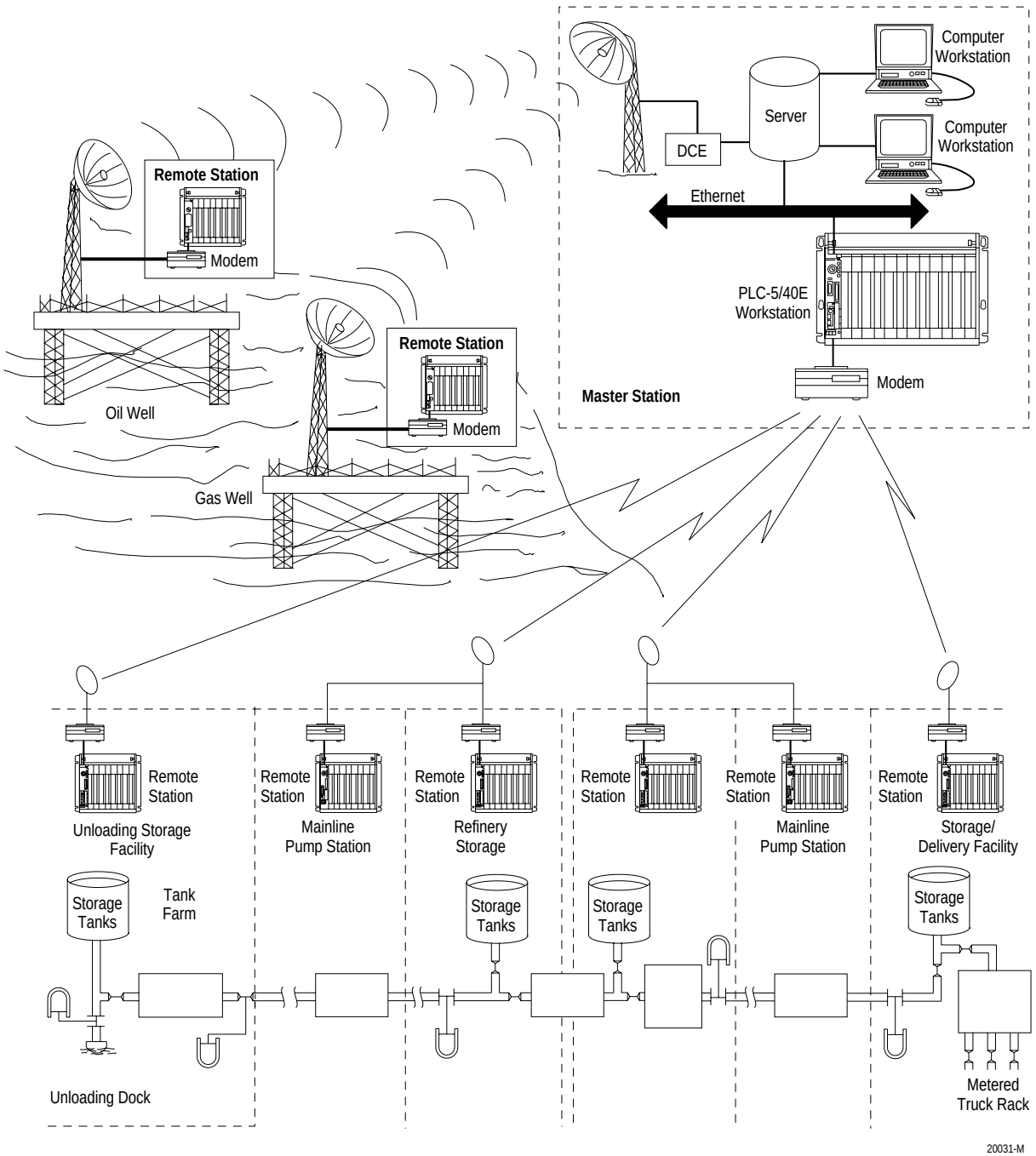
- communicate using the DF1 protocol, such as modems, communication modules, programming workstations, or other serial devices.
- send and receive ASCII characters, such as ASCII terminals, bar-code readers, and printers.

When configured for system mode, the serial port supports the DF1 protocol. Use system mode to communicate with others devices on the serial link. You can select a DF1 mode:

Use this DF1 mode:	For:
point to point	communication between a PLC-5 controller and other DF1-compatible devices. In point-to-point mode, the PLC-5 controller uses DF1 full-duplex protocol.
DF1 master	control of polling and message transmission between the master and each remote node. In master mode, the PLC-5 controller uses DF1 half-duplex polled protocol.
DF1 slave	using the controller as a slave station in a master/slave serial network. In slave mode, the PLC-5 controller uses DF1 half-duplex protocol.

The serial port (in system mode) also supports supervisory control and data acquisition (SCADA) applications. SCADA systems let you monitor and control remote functions and processes using serial communication links between master and slave locations.

When configured for user mode, the serial port supports ASCII devices. Use the PLC-5 ASCII instructions to send and receive information from these devices.



Data Highway Plus

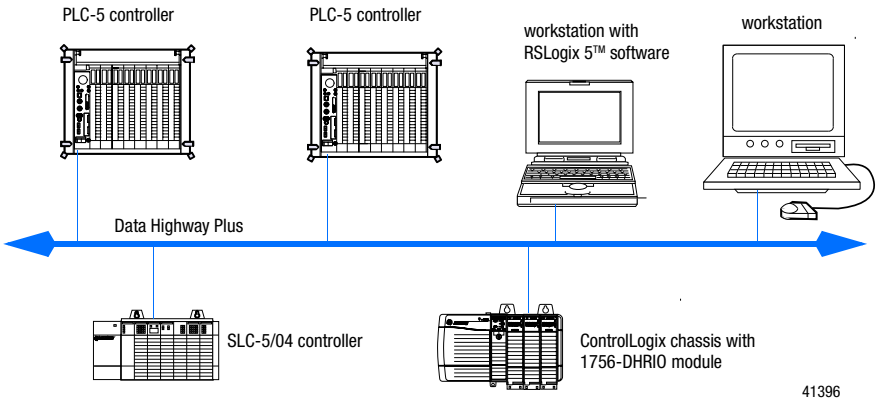
Features:

- *supports remote programming*
- *popular, existing standard*
- *peer-to-peer communications*

The Data Highway Plus (DH+) network is a local area network designed to support remote programming and data acquisition for factory-floor applications. You can also use DH+ communication modules to implement a small peer-to-peer network.

You can use a DH+ network for data transfer to other PLC-5 controllers or high-level computers and as a link for programming multiple PLC-5 controllers. A PLC-5 controller can communicate over a DH+ network with other controllers and with a workstation.

The DH+ network supports daisy chain and trunkline-dropline configurations.



DH+ specifications

Data transmission rate:	Maximum cable length:	Maximum number of nodes:
57.6kbps	3,048m (10,000 ft.)	64 per link 99 links per network
115.2kbps	1,524m (5,000 ft.)	
230.4kbps	762m (2,500 ft.)	

Universal Remote I/O

Features:

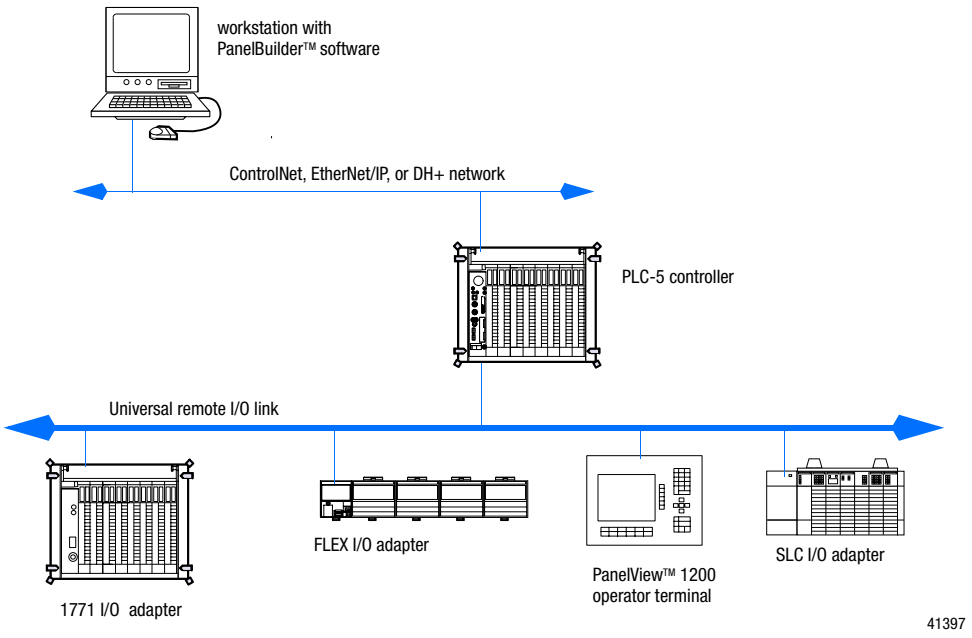
- *connects I/O modules*
- *popular, existing standard*
- *supports "Pass-Thru"*

The strength and versatility of the Universal Remote I/O network comes from the breadth of products it supports. In addition to 1771 I/O, the Universal Remote I/O network supports many Rockwell Automation and third-party devices.

Typical applications range from simple I/O links with controllers and I/O, to links with a variety of other devices. You connect devices through remote I/O adapter modules or built-in remote I/O adapters.

Using the Universal Remote I/O network instead of direct-wiring a device over a long distance to a local I/O chassis helps reduce installation, start-up, and maintenance costs by placing the I/O closer to the sensors and actuators.

Some devices like PLC-5 support "Pass-Thru," which lets you configure devices on a Universal Remote I/O network from an Ethernet, ControlNet or Data Highway Plus network.



Universal Remote I/O specifications

Data transmission rate:	Maximum cable length:	Maximum number of nodes:
57.6kbps	3,048m (10,000 ft.)	1 scanner 32 adapters
115.2kbps	1,524m (5,000 ft.)	
230.4kbps	762m (2,500 ft.)	

The PLC-5 Controller: The Foundation of Your Control Architecture

What to consider:
- I/O requirements
- memory requirements
- communication requirements

PLC-5 controllers are high-speed, single-slot controllers you can use for control and information processing. PLC-5 controllers are designed for larger sequential and regulatory control applications with specialized I/O requirements and/or the need to coordinate with other controllers and devices.

PLC-5 controllers come with different memory sizes and network connections. The Enhanced PLC-5 controllers offer a standard set of functions and communication options. The other PLC-5 controllers offer different communication options, while maintaining the same functions. Choose the controller that best meets your needs:

If your application requires:	Select from:
• connectivity to a large number of Universal Remote I/O devices • connectivity to a large number of DH+ devices	Enhanced PLC-5 controllers *see page 14*
• EtherNet/IP connectivity • communication with other Ethernet PLC-5 controllers and host computers	Ethernet PLC-5 controllers *see page 15*
• high-speed communication for control and information processing • deterministic, repeatable data transfers • ControlNet connectivity	ControlNet PLC-5 controllers *see page 16*
• communication with other DeviceNet devices • DeviceNet connectivity	PLC-5 DeviceNet scanner module *see page 17*
• limited access to critical or proprietary areas of programs • selectively access to processor memory and I/O elements • restricted use of processor operations	Protected PLC-5 controllers *see page 19*

Enhanced PLC-5 controllers

Features

- *configurable ports for DH+ or Universal remote I/O*
- *configurable RS-232, 422, 423A serial port*
- *advanced instruction set*
- *multiple main control programs*
- *processor input interrupts*
- *selectable timed interrupts*
- *global status flags*
- *programmable fault response*
- *hot backup support*

Every PLC-5 controller offers built-in, configurable ports for Data Highway Plus (DH+) or Universal Remote I/O. A DH+ connection supports remote programming and information access, in addition to peer-to-peer communication between the PLC-5, other controllers and devices. A Universal Remote I/O connection supports real-time data exchange for I/O, operator interface, and other third-party devices.

Enhanced PLC-5 controllers

Controller	Maximum User Memory (words)	Total I/O Maximum	Channels
PLC-5/11 (1785-L11B)	8K	512 any mix **or** 384 in + 384 out (complement)	1 DH+/remote I/O
PLC-5/20 (1785-L20B)	16K	512 any mix **or** 512 in + 512 out (complement)	1 DH+ 1 DH+/remote I/O
PLC-5/30 (1785-L30B)	32K	1024 any mix **or** 1024 in + 1024 out (complement)	2 DH+/remote I/O
PLC-5/40 (1785-L40B)	48K	2048 any mix **or** 2048 in + 2048 out (complement)	4 DH+/remote I/O
PLC-5/60 (1785-L60B)	64K	3072 any mix **or** 3072 in + 3072 out (complement)	4 DH+/remote I/O
PLC-5/80 (1785-L80B)	100K	3072 any mix **or** 3072 in + 3072 out (complement)	4 DH+/remote I/O

You can add the 1785-ENET sidecar module to any enhanced PLC-5 controller to provide TCP/IP Ethernet connectivity. For more information, see page 15.

Ethernet PLC-5 controllers

Features

- *high-bandwidth computer and controller communications via TCP/IP Ethernet*
- *plus the features of the Enhanced PLC-5 controllers*
- *access product information via Internet and web browser or Human Machine Interface software*

The Ethernet PLC-5 controller integrates the Allen-Bradley architecture into an industry-standard EtherNet/IP system, offering a flexible and open solution.

With the Ethernet PLC-5 controller's built-in communication capabilities, your entire enterprise can use standard Ethernet or Internet connectivity to control and monitor production. Using the Internet and web browser, you can create your own custom web pages to provide executive summaries of process information. These pages are accessible to any Internet user who has network access to the PLC-5 processor. The embedded web server provides access to PLC-5 diagnostics. Domain Name Service (DNS) and Simple Network Management Protocol (SNMP) are also supported.

Ethernet PLC-5 controllers

Controller	Maximum User Memory (words)	Total I/O Maximum	Channels
PLC-5/20E (1785-L20E)	16K	512 any mix **or** 512 in + 512 out (complement)	1 Ethernet 1DH+ 1 DH+/remote I/O
PLC-5/40E (1785-L40E)	48K	2048 any mix **or** 2048 in + 2048 out (complement)	1 Ethernet 2 DH+/remote I/O
PLC-5/80E (1785-L80E)	100K	3072 any mix **or** 3072 in + 3072 out (complement)	1 Ethernet 2 DH+/remote I/O

PLC-5 Ethernet Interface Module

Features

- *adds Ethernet functionality to any Enhanced PLC-5 controller*
- *high-bandwidth computer and controller communications via TCP/IP Ethernet*

The PLC-5 Ethernet Interface Module (1785-ENET) is a single-slot module that attaches to the side of any Enhanced PLC-5 series B or later controller, Ethernet PLC-5 controller, or ControlNet PLC-5 controller to provide additional Ethernet connectivity.

When a 1785-ENET module is used with:	The interface module provides:
Enhanced PLC-5 controller	Ethernet connectivity without sacrificing DH+ or Universal Remote I/O ports
Ethernet PLC-5 controller	additional Ethernet connectivity by supporting dual Ethernet links
ControlNet PLC-5 controller	dedicated Ethernet connectivity for plant and office integration

Using the Ethernet Interface Module's built-in communication capabilities, your entire enterprise can use standard Ethernet or Internet connectivity to control and monitor production. Using the Internet and web browser, you can create your own custom web pages to provide executive summaries of process information. These pages are accessible to any Internet user who has network access to the PLC-5 processor. The embedded web server provides access to PLC-5 diagnostics. Domain Name Service (DNS) and Simple Network Management Protocol (SNMP) are also supported.

ControlNet PLC-5 controllers

Features

- *high-speed communication through a ControlNet port*
- *redundant media options*
- *hot backup option*
- *plus the features of the Enhanced PLC-5 controllers*

The ControlNet PLC-5 controller offers embedded ControlNet communication capabilities for control and information processing. The ControlNet network provides both I/O control and peer-to-peer communications on a 5Mbps network, with repeatability and determinism.

You can have multiple ControlNet PLC-5 controllers on one ControlNet network, with each controller handling its own I/O on the network, and at the same time communicating with each other. Multiple controllers can receive input data from one I/O or device node.

ControlNet PLC-5 controllers

Controller	Maximum User Memory (words)	Total I/O Maximum	Channels
PLC-5/20C (1785-L20C15)	16K	512 any mix **or** 512 in + 512 out (complement)	1 ControlNet 1 DH+ 1 DH+/remote I/O
PLC-5/40C (1785-L40C15)	48K	2048 any mix **or** 2048 in + 2048 out (complement)	1 ControlNet 2 DH+/remote I/O
PLC-5/80C (1785-L80C15)	100K	3072 any mix **or** 3072 in + 3072 out (complement)	1 ControlNet 2 DH+/remote I/O

A ControlNet backup module provides backup of ControlNet I/O. For details, see page 33.

PLC-5 DeviceNet Scanner Module

Features

- *improved performance over Series B*
- *Auto Device Replacement (ADR)*
- *shared inputs between scanners wihtout separate connections*
- *change of state, cyclic I/O, pass-through and slave mode capability*
- *electronic keying*
- *I/O data server for explicit peer-to-peer messaging*
- *network access to scanner diagnostice tables such as idle, node status, fault*
- *improved enable/disable of slaves in scan list*
- *ODVA compliant*

The 1771-SDN/C PLC-5 DeviceNet scanner module acts as an interface between DeviceNet devices and the PLC-5 programmable controller. The scanner module communicates with DeviceNet devices using the latest DeviceNet Master Library (DML) to:

- read inputs from a device
- write outputs to a device
- download configuration data
- monitor a device's operation status

Communicating in the form of block transfers and discrete I/O, the scanner module exchanges device I/O data, status information and configuration data. The scanner has two channels that let you connect to two DeviceNet networks.

The 1771-SDN/C scanner module is a direct replacement for the series B version - but has new features and benefits. The series C module has a series B-compatible switch setting to allow for direct replacement of a series B module without requiring any changes to the existing system.

Specification	Description
Catalog Number	1771-SDN/C - PLC-5 DeviceNet Scanner module
Compatibility	Compatible with any PLC-5, any 1771-SDN/B DeviceNet Scanner module, current Windows™ operating system, RSNetWorx for DeviceNet™ software version 3.11 or later and RSLogix5™ software.
Module Location	1771-A1B through -A4B or later I/O chassis
Power Consumption - Backplane Current - DeviceNet[1]	 5Vdc, 0.8A 24Vdc, 50mA per channel Class 2
Isolation Voltage	Optical Isolation between backplane and DeviceNet channel, tested to withstand 500Vac for 60 seconds 1 Megohm resistor from DeviceNet channel to chassis
Baud Rates	125 Kbits/s, 250 Kbits/s, 500 Kbits/s
I/O Data Sizes	0 to 24 bits discrete (based on slot addressing) In: 356 words Out: 356 words
Dimesions (HxWxD)	270 x 30 x 170mm (10.6 x 1.2 x 6.7 inches)

Specifications continued on next page

Certifications (when product is marked)	cUL_{us}	UL Listed Industrial Control Equipment. Certified for US and Canada
	cUL_{us}	UL Listed for Class I, Division 2 Groups A, B, C, D Hazardous Locations. Certified for US and Canada
	CE[2]	European Union 89/336/EEC EMC Directive, compliant with: EN 50081-2; Industrial Emissions EN 50082-2; Industrial Immunity European Union 73/23/EEC LVD Directive, compliant with: EN 61131-2; Programmable Controllers
	C-Tick[2]	Australian Radiocommunications Act, compliant with: AS/NZS 2064; Industrial Emissions
	ODVA	ODVA conformance tested to ODVA DeviceNet specifications

[1]To remain compliant with UL/CSA certification, the DeviceNet power supply must meet NEC Class 2 requirements.

[2]See the Product Certification link at www.ab.com for Declarations of Conformity, Certificates, and other certification details.

Protected PLC-5 controllers

Features

- *selectively prevent access to data*
- *guard individual data elements*
- *protect specific elements within the processor status file*
- *reduce the risk of unauthorized program modifications*
- *plus the features of the Enhanced PLC-5 controllers*

The protected PLC-5 controller lets you limit access to critical or proprietary areas of programs, selectively guard controller memory and I/O, or restrict use of controller operations. The distinctive safety-yellow labels on the controller identify the protected PLC-5 controller.

Use the programming software to assign class privileges to specific user accounts or a user's job function, such as system administrator, plant engineer, maintenance engineer, or operator. Using four privilege classes and associated passwords, you can limit access to critical areas of programs and restrict access to:

- communication channels
- remote nodes attached to the ControlNet or DH+ network
- program files
- data files

The protected PLC-5 controller expands system validity and security beyond that provided by the password-and-privilege feature of the other PLC-5 controllers. The Rockwell Automation clutch/brake application package combines the protected PLC-5 controller with specially-designed software to support stamping press applications.

Protected PLC-5 controllers

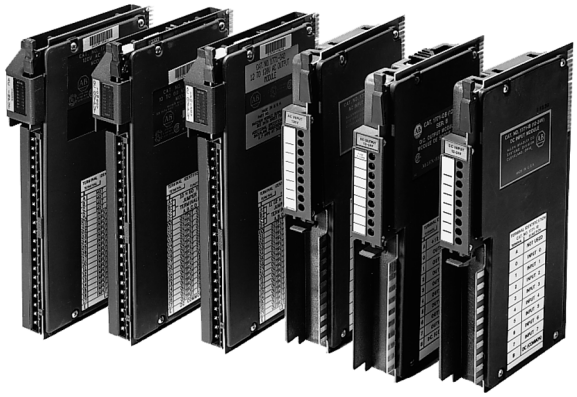
Controller	Maximum User Memory (words)	Total I/O Maximum	Channels
PLC-5/26 (1785-L26B)	16K	512 any mix **or** 512 in + 512 out (complement)	1 DH+ 1 DH+/remote I/O
PLC-5/46 (1785-L46B)	48K	2048 any mix **or** 2048 in + 2048 out (complement)	4 DH+/remote I/O
PLC-5/46C (1785-L46C15)	48K	2048 any mix **or** 2048 in + 2048 out (complement)	1 ControlNet 2 DH+/remote I/O
PLC-5/86 (1785-L86B)	100K	3072 any mix **or** 3072 in + 3072 out (complement)	4 DH+/remote I/O

A Choice of I/O to Meet Your Exact Requirements

What to consider:
- type of information to send/receive
- application requirements
- electrical requirements

Rockwell Automation offers many types of I/O modules and has more than 3 million modules installed in applications worldwide. Rockwell Automation offers both rack-based and block-based modules.

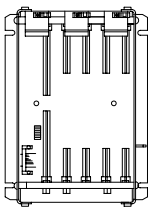
The following sections outline the available I/O modules. For more information about these I/O modules, see the *I/O Product System Overview*, publication CIG-SO001D.



If your application requires preferred I/O for PLC-5, and:	Use this type of I/O:	On any of these networks:
native I/O providing highest performance is chassis-based and needs to accommodate a wide range of I/O types controls an entire process is a master/slave configuration for distributed control	1771 I/O *see page 23*	ControlNet, Universal Remote I/O, Extended Local I/O
If your application:	**Use this type of I/O:**	**On any of these networks:**
is chassis-based and requires different types of I/O has smaller size requirements than 1771 communicates with SLC controllers	1746 I/O *see page 24*	ControlNet, Universal Remote I/O, Extended Local I/O
requires an exact mix of I/O with flexibility and granularity requires lower installation and maintenance costs	1734 POINT I/O *see page 25*	DeviceNet, PROFIBUS
has distributed control that requires multiple types of I/O devices near a machine requires low-cost, low I/O point count with modular space-saving design	1793 FLEX Integra™ *see page 26*	Ethernet, ControlNet, DeviceNet, Universal Remote I/O, Extended Local I/O, PROFIBUS
has distributed control that requires multiple types of I/O devices near a machine	1794 FLEX I/O *see page 26*	Ethernet, ControlNet, DeviceNet, Universal Remote I/O, Extended Local I/O, PROFIBUS
has distributed control in a hazardous area	1797 FLEX Ex™ I/O *see page 27*	ControlNet via bus isolator, DeviceNet, Universal Remote I/O
has distributed control that requires multiple types of I/O devices in harsh environments	1798 FLEX Armor™ *see page 29*	DeviceNet, PROFIBUS

If your application requires preferred I/O for PLC-5, and:	Use this type of I/O:	On any of these networks:
requires rackless design with panel or DIN-rail mounting requires modular, high-density I/O	1769 Compact I/O™ *see page 27*	DeviceNet, Local I/O
requires I/O with built-in power supply and network adapter distinct functionality and reduced environmental requirements	1790 CompactBlock LDX I/O *see page 28*	DeviceNet, PROFIBUS
has distributed control must have I/O mounted near sensors or actuators uses motor starters, solenoids, or indicators	1791D I/O CompactBlock I/O™ *see page 28*	DeviceNet, Remote I/O, PROFIBUS
has distributed control must have I/O mounted near sensors or actuators uses motor starters, solenoids, or indicators	1792D ArmorBlock MaXum™ I/O *see page 29*	DeviceNet

1771 chassis



Features:

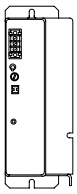
- *consistent size and mounting provides "universal" configuration*
- *can leave empty slots for future expansion*
- *removable wiring arms*

The PLC-5 controller requires a 1771 chassis. You can also place local 1771 I/O modules in this same chassis.

The consistent size and mounting of the available 1771 chassis provide a "universal" configuration for system design and chassis-mounting configurations. Select the chassis size that best fits your application:

Chassis:	Number of slots:
1771-A1B	4
1771-A2B	8
1771-A3B	12
1771-A4B	16

1771 power supplies



Features:

- *require no space outside the chassis (except for 1771-P7)*
- *connect directly to the chassis backplane*
- *can be paralleled to provide greater current*
- *redundancy is available for greater reliability*

The 1771 power supplies provide 5V dc power directly to the chassis backplane. These power supplies occupy one or two slots in a 1771 chassis and can provide up to 8 amps per supply to the I/O chassis.

Power supply:	Input voltage:	Output current at 5V dc:	Number of slots required:
1771-P4R	120V ac	8A	2
1771-P4S	120V ac	8A	1
1771-P4S1	100V ac	8A	1
1771-P5	24V dc	8A	2
1771-P5E	24V dc	8A	2
1771-P6R	220V ac	8A	2
1771-P6S	220V ac	8A	1
1771-P6S1	200V ac	8A	1
1771-P7	120/220V ac	16A	1
1771-PS7	120/220V ac	16A	1
1771-P10	125V dc	8A	2

For more information, see the *1771 I/O Chassis and Power Supplies Product Data*, publication 1771-2.185.

1771 I/O modules

Features:

- *broad range of signal interfaces to ac and dc sensors and actuators*
- *isolated inputs and outputs for use in applications such as motor control centers where individual control transformers are used*
- *optical coupling and filter circuitry for signal noise reduction*
- *wide range of analog signal levels, including standard analog inputs and outputs, direct thermocouple inputs, and RTD temperature inputs*
- *analog devices with up to 16-bit resolution*

The 1771 series I/O modules offer digital, analog, and special-requirement modules. The 1771 I/O modules feature a wide range of:

- signal interfaces to ac and dc sensors and actuators
- I/O densities with as many as 32 I/O points per module
- signal levels, including standard analog inputs and outputs and direct thermocouple and RTD temperature inputs

Characteristic:	Description:
Types of products available	• digital • analog • positioning • process control • specialized
Communications	• Local I/O • Remote I/O • Extended Local I/O • ControlNet I/O

When you select 1771 I/O modules, you must also select:

- chassis
- power supply
- adapter module (if in remote chassis or Extended Local chassis)

For a selection chart of available 1771 I/O modules, see page 38.

For more information about the family of 1771 I/O modules, see the following publications:

Publication Title:	Publication Number:
1771 Digital I/O AC Input and Output Modules Product Data	1771-2.182
1771 Analog Input and Output Modules Product Data	1771-2.183
1771 Digital I/O DC Input and Output Modules Product Data	1771-2.180

See www.automation.rockwell.com/encompass for additional 1771 I/O modules offered through the Encompass program.

1746 I/O modules

Features:

- *extensive offering of I/O modules*
- *cost and space effective*
- *wide range of analog signal levels, including standard analog inputs and outputs, direct thermocouple inputs, and RTD temperature inputs*
- *isolated inputs and outputs for use in applications such as motor control centers where individual control transformers are used*
- *optical coupling and filter circuitry for signal noise reduction*
- *combination modules support inputs and outputs on one module, providing space-saving expansion*
- *shipped with wiring arms*
- *analog devices with up to 16-bit resolution*

The 1746 I/O modules (SLC 500 I/O) provide a cost-effective Remote I/O option. Use an SLC 500 Remote I/O module or ControlNet adapter module to directly interface 1746 I/O modules to the PLC-5 system. The 1746 I/O modules feature:

- high-density, 32-point and combination modules, which reduce rack size and panel space requirements
- removable terminal blocks and 16-point modules, which simplify wiring and replacing modules
- industrial design, including input filtering and optical isolation

Characteristic:	Description:
Types of products available	• digital • analog • positioning • specialized
Communications	• Local I/O • Remote I/O • ControlNet I/O

When you select 1746 I/O modules, you must also select:

- chassis
- power supply
- cabling components
- adapter module (if in remote chassis or extended-local chassis)

For more information, see the following publications:

Publication Title:	Publication Number:
SLC 500 System Overview	1747-SO001
SLC Analog I/O Modules Technical Data	1746-TD001
SLC Thermocouple Module Technical Data	1746-TD002
SLC RTD/Resistance Module Technical Data	1746-TD007
SLC Modular Chassis and Power Supplies Technical Data	1746-TD003

1734 POINT I/O modules

Features:

- *compact size allows module installation in push button and MMI panels*
- *as low as 3mm channel density*
- *powered by DeviceNet or auxiliary power supply*
- *locate close to sensors and actuators*
- *network, module and point-level diagnostics*
- *multi-directional mounting orientation*

POINT I/O is designed to handle a growing number of applications that require a more exact mix of I/O with more flexibility and granularity. POINT I/O has one to four channels of I/O per module, which reduces wiring, installation and commissioning costs resulting in a lower overall cost of ownership. POINT I/O modules offer:

- commission one loop or subsystem at a time
- sequential addressing, selectable fault states and input filters
- compatibility with I/O scanner, PLC or SLC programmable controllers on the DeviceNet network
- protected outputs with diagnostics
- application breadth - wide range of I/O types
- removable terminals, removal and insertion under power (RIUP), DIN-rail assembly

Characteristic:	Description:
Types of products available	• digital • analog • counters
Communications	• DeviceNet I/O • PROFIBUS

When you select POINT I/O modules, you must also select:

- communication interface
- power supply
- terminal base
- network cabling components
- DIN-rail

You can use up to 63 modules per adapter module, but only 12 modules with the low-cost, DeviceNet physical-interface module.

For more information about the family of POINT I/O modules, see the *POINT I/O Technical Data*, publication 1734-TD002.

1794 FLEX I/O modules

Features:

- *vertical or horizontal DIN-rail mount*
- *sensor/actuator wires attach to terminal base (not module)*
- *one adapter for as many as eight terminal bases*
- *mix and match digital and analog*
- *integrated terminal block*
- *keyed interlocks (mechanical and electrical)*

The 1794 series I/O modules (FLEX I/O) is a flexible, low-cost, modular I/O system for distributed applications. FLEX I/O combines the terminal strip with the I/O interface so you can wire field devices directly. The 1794 I/O modules feature:

- modular design, which reduces costs by solving a large range of application requirements with one I/O architecture
- small size, which reduces packaging costs
- individual wire termination locations, which reduce purchasing costs and complexity, as well as packaging costs
- diagnostics and removal and insertion under power, which lowers the mean time to repair equipment and leverages your control investment
- flexible communications, which helps to control future costs by providing an economical migration path

Characteristic:	Description:
Types of products available	• digital • analog • specialized (1794) • relay (1793)
Communications	• Local I/O • Remote I/O • ControlNet I/O • DeviceNet I/O

1793 FLEX Integra I/O modules

The 1793 series I/O modules (FLEX Integra) is fully compatible with the large family of 1794 FLEX I/O communication adapters and I/O modules. Additionally, FLEX Integra I/O modules provide I/O points at lower cost and where cabinet space is minimal. The 1793 I/O modules feature:

- low point count allows a more exacting mix of I/O in highly distributed systems

When you select either the 1793 FLEX Integra or 1794 FLEX I/O modules, you must also select:

- adapter module and cabling components
- terminal base unit
- DIN rail
- power supply

For more information, see the *FLEX I/O and FLEX Integra Product Data*, publication 1794-2.1.

1769 Compact I/O modules

Features:

- *unique, modular rackless design eliminates the I/O rack from the system*
- *patented communications bus is integrated into the modules*
- *DIN-rail or panel mountable*
- *DIN latches and screw mounting holes are integrated - no additional hardware is necessary*

1769 Compact I/O is a unique, new PLC-style I/O platform offering industry leading features. It can be used to expand other distributed I/O with the appropriate network adapter. Compact I/O also offers:

- modular, high-density I/O with low point cost
- installation ease - removable terminal blocks, front (direct) insert/remove without rewiring
- individual diagnostic LEDs for easy troubleshooting
- software keying to prevent incorrect module placement
- 1492 wiring system provides cables that are prewired between the 1492 interface module and I/O module which reduces wiring time and probability of wiring error
- multiple controller support - network support

Characteristic:	Description:
Types of products available	• digital, analog, specialty
Communications	• DeviceNet I/O, Local I/O

The DeviceNet communication adapter is capable of supporting up to 30 I/O modules on a single DeviceNet node.

For more information about the family of Compact I/O modules, see the *1769 Compact I/O System Overview*, publication 1769-SO001.

1797 FLEX Ex I/O modules

Features:

- *builds on standard FLEX I/O features*
- *allows installation in a hazardous area*
- *can mix with FLEX I/O modules*

The 1797 series I/O modules (FLEX Ex I/O) is a flexible, I/O system that mounts directly to the controlled equipment in a hazardous area. This eliminates the need for intrinsically safe (IS) barriers/isolators and separation of control and process. Additionally, the modules:

- offer modularity for distributed intrinsically-safe systems
- have dual-fault protection intrinsically-safe circuits that provide high fault tolerance
- have I/O circuitry that provides full IS field-device protection

Characteristic:	Description:
Types of products available	• digital, analog, specialized
Communications	• Local I/O, Remote I/O, ControlNet I/O, DeviceNet I/O

When you select 1797 FLEX Ex I/O modules, you must also select:

- adapter module and cabling components
- bus isolator module and cabling components
- terminal base unit
- DIN rail
- power supply

For more information, see the *FLEX Ex I/O Product Data*, publication 1797-2.1.

1791D CompactBlock I/O modules

Features:

- *very compact size*
- *includes power supply and adapter*
- *can place close to sensors and other devices*
- *mount vertically or horizontally*

The 1791D I/O modules (CompactBlock I/O) are designed for applications that require I/O to be distributed close to sensors and actuators or to be placed in small enclosures. The modules feature:

- self-contained package that provides cost-effective distribution of up to 32 points per node
- small size that lets you install in shallow and confined areas
- hardware watchdog circuit
- DeviceLogix™ Smart Component Technology provides limited I/O logic for intelligent I/O block

Characteristic:	Description:
Type of products available	• digital
Communications	• DeviceNet I/O, Remote I/O, PROFIBUS

When you select 1791D I/O modules, the I/O circuits, a built-in power supply, and a Remote I/O adapter are included. You must select an enclosure and cabling components.

For more information about 1791D CompactBlock I/O, see the *1791D Block I/O Technical Data*, publication 1791D-TD001.

1790 CompactBlock LDX I/O modules

Features:

- *supports up to 64 I/O points per node*
- *rotary node address switches and autobaud simplify configuration*
- *polled, cyclic and change-of-state DeviceNet operation*
- *mounts vertically or horizontally on DIN-rail or panel mount*

1790 CompactBlock LDX I/O is a compact unit for monitoring and controlling I/O in a location remote from the processor. Each block contains I/O circuits, a built-in power supply and a built-in DeviceNet I/O or PROFIBUS adapter. Similar to 1791D CompactBlock I/O, 1790 CompactBlock LDX I/O is a lower-cost option thanks to distinct functionality and reduced environmental requirements. CompactBlock LDX I/O also offers:

- lowest price per point DeviceNet I/O - integrated nature of block allows for very low acquisition and maintenance costs
- space-saving capability - ideal for installation in the smallest of enclosures in any orientation
- universal sink/source inputs
- compatibility with DeviceNet Auto Device Replacement feature
- expandability - up to three digital expansion modules per base block with included ribbon cable (depending on catalog number)
- termination choices - D-shell connector for quick disconnect or terminal strip with fixed screw termination

Characteristic:	Description:
Types of products available	• 24Vdc, 120Vac, relay contact, analog, RTD and thermocouple
Communications	• DeviceNet I/O, PROFIBUS

For more information about the family of CompactBlock LDX I/O modules, see the *CompactBlock LDX I/O Technical Data*, publication 1790D-TD001.

1792D ArmorBlock MaXum I/O modules

Features:

- *sealed housing and connectors for washdown in dirty environments*
- *compact size*
- *no enclosure required, rated NEMA 4X/6P and IP67*
- *extended vibration and temperature specifications*
- *mount vertically or horizontally*

The 1792D I/O modules (ArmorBlock MaXum I/O) are designed for applications where I/O can be distributed without an enclosure. The block I/O modules feature:

- a unique design that accommodates any DeviceNet media such as standard, round or KwikLink™ flat connection
- DeviceLogix Smart Component Technology provides limited I/O logic for intelligent I/O block
- autobaud capability allows automatic match of system
- rotary node address switches for easy configuration

Characteristic:	Description:
Type of products available	• digital
Communication	• DeviceNet I/O

When you select 1792D ArmorBlock MaXum I/O modules, the I/O circuits, a built-in power supply, and a DeviceNet I/O adapter are included. You must select cabling components. These modules do not require an enclosure.

For more information about 1792D ArmorBlock MaXum I/O, see the *1792D ArmorBlock MaXum I/O Technical Data*, publication 1792-TD001.

1798 FLEX Armor I/O modules

Features:

- *modular IP67 platform*
- *can be built and optimized around an application*
- *enclosureless platform*
- *12mm or 18mm connections to DeviceNet*

The 1798 series I/O modules (FLEX Armor) is a hardened, fully modular and expandable I/O system. FLEX Armor is designed to be distributed throughout your application and mounted directly on your machine or in a Class I, Division 2 area. Additionally, the 1798 series I/O modules are designed to endure harsh, shop-floor applications where grease, water and particulate materials are present.

- small size, which reduces packaging costs
- zero cabinet - reduces wiring and installation time
- diagnostics and RIUP which lowers the mean time to repair equipment and leverages your control investment
- quick-connect sealed connectors, flexible and modular construction, robust status indicators reduce commissioning time
- rated NEMA 4X/6P, IP65/67, saves the cost of an enclosure

Characteristic:	Description:
Types of products available	• digital and analog
Communications	• Local I/O and DeviceNet I/O

When you select 1798 FLEX Armor I/O modules, you must also select:

- adapter module and cabling components
- terminal base unit
- DIN rail
- power supply

For more information, see the *FLEX Armor I/O Technical Data*, publication 1798-TD001.

Select from a Set of Compatible Software Tools

What to consider:
- computer platform
- operating environment
- programming language

The PLC-5 controllers support multiple industry-standard programming languages. You can program in structured text, function block, sequential function charts, or ladder logic. This versatility means you can maintain and troubleshoot programs in the same language that you develop them.

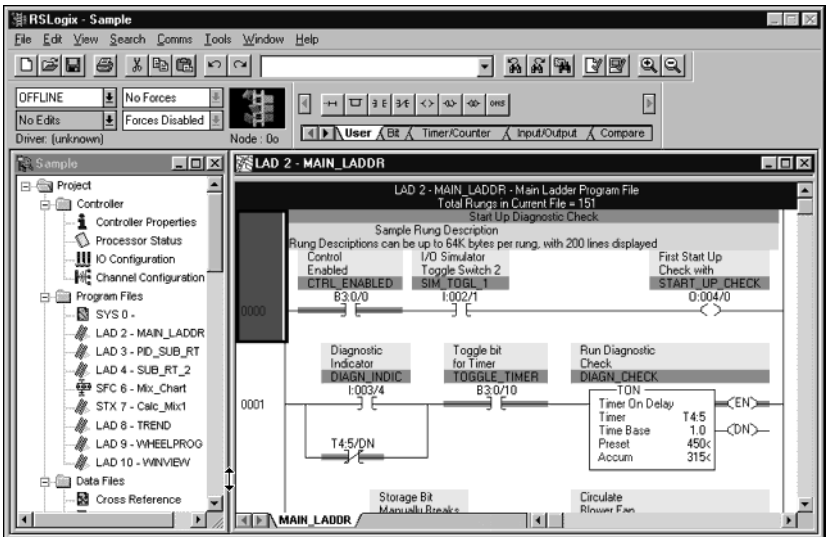
Programming software

Features:

- *supports ladder logic, sequential function charts, and structured text*
- *intuitive user interface*
- *libraries of custom logic*
- *extensive diagnostics*
- *drag and drop free-form editing*

The RSLogix5 family of programming software products offers a common means of viewing PLC-5 programs. For current 32-bit-based Windows™ products:

RSLogix offers:	Which means you can:
free-form editing	concentrate on your application logic rather than keeping syntax correct as you write the program
drag-and-drop editing	cut, copy, and paste data table elements, rungs, SFC components, or whole program files
point-and-click I/O configuration	assign a module in your configuration with a simple click or drag-and-drop



RSLogix5 increases your productivity by:

- including structured text and sequential function chart editors that are based on IEC 1131-3 requirements
- letting you create libraries of reusable programming
- supporting symbolic ladder and structured text programming so that you can use symbols you create
- exporting to or importing from spreadsheet programs using the comma-separated-value format
- providing advanced diagnostics through a customer data monitor that lets you view the status of bits, timers, counters, and other data elements

Rockwell Automation also offers A.I. series programming software to support DOS and non-32-bit Windows environments. Your investment in these programming packages can be re-used in RSLogix5.

Integrating other software tools

Beyond programming, you might choose these other Rockwell Automation software tools:

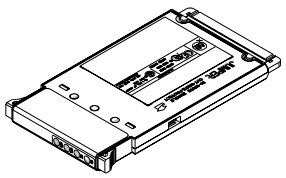
Select this:	To:
RSView32	monitor and control your production system
RSTools	extend RSView32 into data management for universal connectivity to industrial devices and data management applications using ActiveX controls
RSTrend	log and monitor PLC-5 data in a wide variety of data collection applications, including automatic data acquisition, data scaling, trending graphs, and log reports
RSWire	produce accurate, error-free schematics for simultaneous manufacturing and support documentation
RSBatch	create an object-oriented batch automation solution based on S88.01
RSBizWare RSSqL	bridge the gap between a control system and the rest of the enterprise with a transaction-based system
RSRules	monitor timing relationships between I/O elements or bit addresses and diagnose real-time machine behavior that differs from accepted operation
RSMACC	provide channel management capabilities for a control network. Gain access to centralized and integrated maintenance information, applications and project files. Monitor, secure, back-up, verify and audit control system devices, projects and intellectual property.

For more information on these products, visit www.software.rockwell.com.

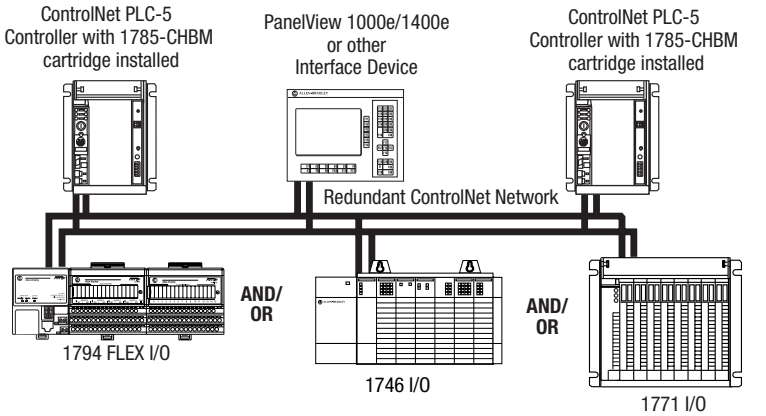
Applying Backup Solutions

Increasing system fault tolerance

ControlNet backup module



The ControlNet backup module provides backup of ControlNet I/O. A secondary controller qualifies critical control information with the primary controller. Both controllers consume information from inputs and connect to outputs, but only the primary controller controls the outputs. The secondary controller establishes control of outputs if the primary controller shuts down.

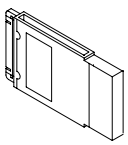


The ControlNet backup module provides:

Feature:	Benefit:
high performance, deterministic delivery of I/O data	The backup module supports standard features of ControlNet: high-speed data transmission (5Mbps), user-selectable, deterministic delivery of remote I/O data.
execution of control programs in both the primary and secondary controller	Both the primary and the secondary controller view remote inputs and continuously execute their control program. Switchover time is faster because there is no need to crossload data table information or control programs.
two selectable modes of backup operation	Select: • **synchronous** for a system where both controllers must keep as close as possible to each other to minimize data table divergence. • **asynchronous** for a system where application performance, such as program scan times, must be optimized.
redundant cabling	You have the option of wiring a second, or redundant, cable to all remote I/O nodes. Should one cable break, the second cable will provide continued and uninterrupted transmission.
availability in 1771, 1746 or 1794 platforms	Three offerings of I/O to choose or match the type to fit your hot backup application

Backing up controller memory

EEPROM memory



You can back up program files using an EEPROM module. This EEPROM module comes in four sizes:

If you want this amount of backup memory:	Select:
16K words	1785-ME16
32K words	1785-ME32
64K words	1785-ME64
100K words	1785-ME100

Expanding Your System

Working together

Encompass, Rockwell Automation's third-party product referencing program, builds on the strengths of our products.

Other Encompass products

As a technology-sharing program, Encompass is product based and application focused. Encompass allows third-party companies to provide functionality not delivered in Rockwell Automation products. There are three types of Encompass-referenced products:

Category:	Description:
peripheral	a complementary product with no embedded preferred connectivity that meets requirements for distribution and support
regional	a regionally-complementary product with preferred connectivity to the Rockwell Automation architecture that meets requirements for distribution and support within the referencing region
global	a global complementary product with preferred connectivity to the Rockwell Automation architecture that meets requirements for distribution and support around the globe

The following table lists specific products and manufacturers that are part of the Encompass program.

Products:	Encompass Partner:
1771 LDT Interface Module 1771 Programmable Limit Switch 1771 Resolver Interface Module	Advanced Micro Controls, Inc.
Gemco Series 1771	Ametek - Patriot Sensors
1776-TS Time Stamp Module	Control Technology International, Inc.
1771-WS Weigh Scale Module	Hardy Instruments
1771 12Vdc Power Supply 1771 24Vdc Power Supply 1771 48Vdc Power Supply	Intronics Inc.
Optical Comm Modules for: • Ethernet • ControlNet • DF-1 • Data Highway • DH-485 • Modbus • RS-232 • RS-485	Phoenix Digital Corporation
“C” Programmable Solutions AGA/API Flow Computers Honeywell DE Interface Modbus Plus Communications-PLC PLC Protocol Solutions PLC Protocol Solutions-MVI	ProSoft Technology
High-Density 32 Analog Input Module Isolated AC 16 Triac Output Module Isolated AC/DC 16 Input Module	Spectrum Controls, Inc.
PLC-5 PROFIBUS Scanner Module	Woodhead Connectivity

For more detailed information, refer to the Encompass product directory, publication 6873-QR003A-EN-P, or see www.automation.rockwell.com/encompass.

PLC-5 Controllers

Controller	Maximum User Memory (words)	Total I/O Maximum	Channels	Maximum Number of I/O Chassis				Backplane Current Load
				Total	Extended Local	Remote	ControlNet	
Enhanced PLC-5 controllers								
PLC-5/11 (1785-L11B)	8K	512 any mix **or** 384 in + 384 out (complement)	1 DH+/remote I/O	5	0	4	0	2.3A
PLC-5/20 (1785-L20B)	16K	512 any mix **or** 512 in + 512 out (complement)	1 DH+ 1 DH+/remote I/O	13	0	12	0	2.3A
PLC-5/30 (1785-L30B)	32K	1024 any mix **or** 1024 in + 1024 out (complement)	2 DH+/remote I/O	29	0	28	0	2.3A
PLC-5/40 (1785-L40B)	48K	2048 any mix **or** 2048 in + 2048 out (complement)	4 DH+/remote I/O	61	0	32 max/link	0	3.3A
PLC-5/60 (1785-L60B)	64K	3072 any mix **or** 3072 in + 3072 out (complement)	4 DH+/remote I/O	93	0	32 max/link	0	3.3A
PLC-5/80 (1785-L80B)	100K	3072 any mix **or** 3072 in + 3072 out (complement)	4 DH+/remote I/O	93	0	32 max/link	0	3.3A
Ethernet PLC-5 controllers								
PLC-5/20E (1785-L20E)	16K	512 any mix **or** 512 in + 512 out (complement)	1 Ethernet 1DH+ 1 DH+/remote I/O	13	0	12	0	3.6A
PLC-5/40E (1785-L40E)	48K	2048 any mix **or** 2048 in + 2048 out (complement)	1 Ethernet 2 DH+/remote I/O	61	0	60	0	3.6A
PLC-5/80E (1785-L80E)	100K	3072 any mix **or** 3072 in + 3072 out (complement)	1 Ethernet 2 DH+/remote I/O	65	0	64	0	3.6A
ControlNet PLC-5 controllers								
PLC-5/20C (1785-L20C15)	16K	512 any mix **or** 512 in + 512 out (complement)	1 ControlNet 1 DH+ 1 DH+/remote I/O	77	0	12	64	3.0A
PLC-5/40C (1785-L40C15)	48K	2048 any mix **or** 2048 in + 2048 out (complement)	1 ControlNet 2 DH+/remote I/O	125	0	60	64	3.0A
PLC-5/80C (1785-L80C)15	100K	3072 any mix **or** 3072 in + 3072 out (complement)	1 ControlNet 2 DH+/remote I/O	125	0	60	64	3.0A

Controller	Maximum User Memory (words)	Total I/O Maximum	Channels	Maximum Number of I/O Chassis				Backplane Current Load
				Total	Extended Local	Remote	ControlNet	
Protected PLC-5 controllers								
PLC-5/26 (1785-L26B)	16K	512 any mix **or** 512 in + 512 out (complement)	1 DH+ 1 DH+/remote I/O	13	0	12	0	2.3A
PLC-5/46 (1785-L46B)	48K	2048 any mix **or** 2048 in + 2048 out (complement)	4 DH+/remote I/O	61	0	32 max/link	0	3.3A
PLC-5/46C (1785-L46C15)	48K	2048 any mix **or** 2048 in + 2048 out (complement)	1 ControlNet 2 DH+/remote I/O	125	0	60	64	3.0A
PLC-5/86 (1785-L86B)	100K	3072 any mix **or** 3072 in + 3072 out (complement)	4 DH+/remote I/O	93	0	32 max/link	0	3.3A
Extended-local PLC-5 controllers								
PLC-5/40L (1785-L40L)	48K	2048 any mix **or** 2048 in + 2048 out (complement)	2 DH+/remote I/O 1 extended local	61	16	32 max/link	0	3.3A
PLC-5/60L (1785-L60L)	64K	3072 any mix **or** 3072 in + 3072 out (complement)	2 DH+/remote I/O 1 extended local	81	16	32 max/link	0	3.3A

1771 I/O Modules

Digital Input Modules

Category:	Catalog number:	Inputs and outputs:	Voltage:	Backplane Current Load:
TTL	1771-IG	8 in	--	122mA
	1771-IGD	16 in	--	130mA
24V dc sink source load	1771-IB	8 in	10-27V	74 mA
	1771-IBD	16 in	10-30V	250mA
	1771-IBN	32 in	10-30V	280mA
	1771-IT	8 in	12-24V	74mA
	1771-IQ	8 in	5-30V	150mA
	1771-IQ16	16 in	10-32V isolated	100mA
	1771-IS	72 in	5V multiplexer	800mA
	1771-DW	7 in	15-27 wire fault	300mA
	1771-DS	8 in	10-27V latching	375mA
48V dc sink source load	1771-IC	8 in	42-56V	74mA
	1771-IH	8 in	24-50V	74mA
	1771-ICD	16 in	20-60V	250mA
24V dc source sink load	1771-IV	8 in	12-24V	74mA
	1771-IVN	32 in	10-30V	280mA
	1771-IQ	8 in	5-30V	150mA
	1771-IQ16	16 in	10-32V isolated	100mA
24V ac	1771-IN	8 in	12-28V	80mA
	1771-IND	16 in	16-30V ac 9-30V dc	250mA
120V ac/dc	1771-ID	6 in	92-138V isolated	74mA
	1771-IAD	16 in	79-138V	195mA
	1771-ID16	16 in	77-138V ac 105-138V dc isolated	75mA
	1771-IA	8 in	87-138V ac 97-138V dc	75mA
120V ac	1771-IAN	32 in	85-138V	280mA
200V ac/dc	1771-IMD	16 in	184-250V ac 166-230V dc	250mA
220V ac/dc	1771-ID01	6 in	184-276V ac/dc	74mA
	1771-IM	8 in	184-276V ac/dc	75mA

Digital Output Modules

Category:	Catalog number:	Inputs and outputs:	Voltage:	Backplane Current Load:
TTL	1771-OG	8 in	5.0-5.3V	168mA
	1771-OGD	16 in	5.0-5.3V	230mA
24V dc sink	1771-OVN	32 out	10-30V	330mA
	1771-OQ16	16 out	10-32V isolated	400mA
24V dc source	1771-OQ	8 out	20.4-26.4V isolated	225mA
	1771-OQ16	16 out	10-32V isolated	400mA
	1771-OB	8 out	10-27V	165mA
	1771-OBD	16 out	10-60V	300mA
	1771-OBN	32 out	10-30V	330mA
	1771-OBDS	16 out	10-40V electronic fusing	300mA
48V dc source	1771-OC	8 out	42-53V	165mA
24V ac	1771-ON	8 out	20-30V	225mA
	1771-OND	16 out	10-60V	700mA
120V ac	1771-OP	4 out	92-138V protected	350mA
	1771-OD	6 out	92-138 isolated	225mA
	1771-ODZ	8 out	92-138V isolated	350mA
	1771-ODD	16 out	85-138V isolated	420mA
	1771-OA	8 out	92-138V	210mA
	1771-OD16	16 out	74-138V isolated	200mA
	1771-OAD/B	16 out	10-138V	295mA
120/240V ac	1771-OAN	32 out	80-265V	800mA
	1771-OMI16	16 out	74-276 isolated	330mA
220V ac	1771-OR	6 out	184-276V isolated	255mA
	1771-OM	8 out	184-250V	225mA
	1771-OMD	16 out	184-250V	700mA
24-120V ac/dc relay contact	1771-OW	8 out	24-138V ac resistive load 24-125V dc	700mA
	1771-OW16/B	16 out	24-250V ac isolated 24-150V dc isolated	1.3A
	1771-OWN	32 out	24-138V ac 24-125V dc	2.5A
	1771-OWNA	32 out	24-138V ac resistive load 24-125V dc	2.5A
	1771-OX	4 out	0-250V ac isolated inductive load 0-175V dc isolated	550mA
0-24V ac/dc	1771-OYL	8 out	0-24V ac/dc	420mA
	1771-OZL	8 out	0-24V ac/dc	420mA

Analog Input Modules

Category:	Catalog number:	Inputs and outputs:	Range: Voltage and Current:	Backplane Current Load:
selectable	1771-IFE	8 differential or 16 single	±10V dc ±20mA	750mA
	1771-IFF	8 differential or 16_single	±10V dc ±20mA	750mA
	1771-IL	8 differential, isolated	±10V dc ±20mA	1.3A
	1771-IE	8 single	±10V dc	500mA
	1771-NIV	8 in	±5V dc ±20mA	1.5A
	1771-NIV1	8 in	±10V dc ±20mA	1.5A
voltage only	1771-IFMS	8 differential	0-50mV	750mA
current only	1771-NIS	8 in isolated	4-20mA	2.9mA
thermocouple	1771-IXE	8 floating differential	±99.99mV	750mA
	1771-IXHR	8 floating differential	±99.99mV	750mA
	1771-NT1	8mV/TC	±100mV	1.5A
	1771-NT2	8mV/TC	-5/+55mV dc	1.5A
RTD	1771-IR	6 in	RTD	800mA
	1771-NR	8 in	RTD isolated	1.5A
mixed	1771-NIVR	4V/current in	±5V dc ±20mA	1.5A
	1771-NIVT	4V/current and 4mV/TC in	±5V dc for volt/current ±20mA ±100mV for mV/TC	1.5A

Analog Output Modules

Category:	Catalog number:	Inputs and outputs:	Range: Voltage and Current:	Backplane Current Load:
selectable	1771-OFE1	4 out	±10V dc	1.5A
current only	1771-OFE2	4 out	4-20mA	1.5A
	1771-OFE3	4 out	0-50mA	2.5A
	1771-NOC	8 out	0-25mA	2.9A at 20mA 3.3A at 25mA
voltage only	1771-NOV	8 out	±10V dc	2.1A

Analog Combination Modules

Category:	Catalog number:	Inputs and outputs:	Range: Voltage and Current:	Backplane Current Load:
selectable voltage	1771-NBV1	6 in 2 out	±10V dc ±20mA	1.8A
selectable current	1771-NBVC	6 in 2 out	±5V dc/±20mA 0-25mA	1.8A
current	1771-NB4S	2 in 2 out isolated	4-20mA 0-25mA	1.6A
	1771-NBSC	6 in 2 out isolated	4-20mA 0-25mA	3.0A
RTD	1771-NB4T	2 in 2 out	mV/TC ±100mV 0-25mA	1.5A
	1771-NBRC	6 in 6 out	RTD 0-25mA	1.8A
	1771-NBTC	6 in 2 out	mV/TC ±100mV 0-25mA	1.6A

Intelligent Modules

Category:	Catalog number:	Use:	Backplane Current Load:
counter	1771-IJ	incremental encoder/counter	1.2A
	1771-IK	high-speed counter	1.2A
	1771-VHSC	very high speed counter	0.65A
	1771-DE	absolute encoder	0.8A
	1771-DL	gray encoder	0.12A
positioning	1771-QA	stepper motor positioning	0.8A to 2.4A
	1771-QB	linear positioning	1.6A
	1771-QC	servo positioning	1.75A
	1771-M3	servo controller	1.75A
	1771-ES	servo encoder feedback expander	1.7A
	1771-M1	stepper motor controller	1.75A
	1771-QD	injection molding	0.5A
	1771-QDC	plastic molding	1.2A
	1771-QH	force control	1.2A
	1771-HS	IMC 120 motion control	0.72A
	1771-HS1	IMC 121 motion control	1.06A
	1771-HS3	IMC 123 motion control	1.06A
	1771-HRA	resolver excitation	0.065A
flow	1771-CFM	configurable flowmeter	1.0A
specialty	1771-PM	clutch/brake control	1.2A
	1771-SIM	I/O simulator	0.2A
	1771-DR	high-speed logic	1.1A
	1771-PD	PID control	1.2A
	1771-DC	real-time clock	
	1771-DB	BASIC	0.65A without DH-485 0,75A with DH-485
	1771-LC	loop control	
temperature	1771-TCM	temperature control	1.5A
hydraulic	1771-QH	high-speed transparent transition	1.2A
plastics	1771-QDC	plastic molding	1.2A
	1771-QI	co-injection	1.2A

1771 and 1785 Communication Modules

Catalog number:	Function:	Design considerations:	Backplane Current Load:
1771-ACN, -ACNR	Interfaces I/O modules in an I/O chassis to a ControlNet scanner port across a ControlNet network	Place in remote ControlNet chassis Requires ControlNet PLC-5 controller	1.0A
1771-ASB	Interfaces I/O modules in an I/O chassis to a remote scanner port across a universal remote I/O link	Place in a remote chassis Requires any PLC-5 controller that supports universal remote I/O	1.0A
1771-SDN	Interfaces a local PLC-5 controller to a maximum of 2 DeviceNet networks	Place in the local chassis	1.2A
1771-DA	Interfaces a PLC-5 controller and a peripheral device that generates ASCII characters	Place in the local chassis	1.3A
1771-DB	Provides an interface between a PLC-5 controller, 1771 backplane and RS-232, -422 or -485 devices	Place in the local chassis	.75A (with 1747-PIC) .65A
1771-DCM	Provides a remote I/O adapter port for a local PLC-5 controller to communicate with a remote I/O scanner port of a supervisory process across a remote I/O link	Place in the local chassis	1.2A
1771-KE	Provides an interface between RS-232-C devices and Data Highway link with both full and half duplex protocols	Place in the local chassis. Power source is the 1771 I/O chassis power supply.	1.2A
1771-KF	Provides an interface between RS-232-C devices and Data HIghway link with both full and half duplex protocols	Includes mounting bracket for external mounting or in a standard industrial enclosure (NEMA Type 12 or similar) Power source is user-supplied (1771-P2 or similar)	1.2A
1785-KA	Provides an interface between a DH+ link and a Data Highway link	Place in the local chassis	2.0A
1785-KE	Interfaces a DH+ link to an RS-232-C	Place in the local chassis	1.2A

Completing a PLC-5 System

What to select:
- communication modules
- 1771 I/O modules
- PLC-5 controller
- controller options
- chassis
- power supply
- miscellaneous cables

Use these worksheets to complete an order for a PLC-5 system. Each area will refer you to previous sections in this overview to make specific device selections. Complete each set of worksheets for one chassis.

✓ Selecting communication modules

Based on communication requirements (other that what is available on the controller), select the communication modules needed to connect to other networks. Use the chart that starts on page 43.

Communication module catalog number:	Backplane current load:
	total current load:

✓ Selecting 1771 I/O modules

Select the 1771 I/O modules for the local chassis. Use the charts that start on page 38.

I/O module catalog number:	I/O points per module:	Backplane current load:
	total I/O points:	total current load:

✓ Selecting the PLC-5 controller

Based on the number of I/O points required and the communication options, select the PLC-5 controller. Use the charts that start on page 36.

Total number of I/O points:	Total number of racks:	Total number of chassis:	Need a serial port?	Need an Ethernet port?	Need a ControlNet port?

Record your PLC-5 controller choice here:

Category:	Selection:
PLC-5 controller	
Backplane current load	

✓ Selecting controller options

Based on the controller options that are available, select which you need for your system. See the information that starts on page 34.

If you need:	List the catalog number:
backup controller memory (EEPROM)	
backup support	

✓ Selecting the chassis

Based on the total number of modules, select a chassis. See the chart on page 21.

Module type:	Number selected:
communication modules	
I/O modules	
PLC-5 controller	1 maximum
PLC-5 hot backup module	1 maximum
slot-based power supply	1 maximum
total slots required:	
catalog number of chassis:	

✓ Selecting the power supply

Based on the total current draw of all modules in the chassis, select the power supply. See the chart on page 22.

Module type:	Backplane current load:
communication modules	
I/O modules	
PLC-5 controller	
PLC-5 hot backup module, if any	
total current:	
catalog number of power supply:	

✓ Selecting miscellaneous cables

Based on the PLC-5 controller and the communication options, select the cables you need.

Connection type:	Select:	For information see:
serial	make a 26-pin cable	*Enhanced and Ethernet PLC-5 Programmable Controllers User Manual* publication 1785-6.5.12
universal remote I/O	1770-CD Belden 9463	
DH+	1770-CD Belden 9463	
Ethernet	(5E) 5810-TC02, -TC15 (1785-ENET) 1785-TC02, -TC15	*EtherNet/IP System Overview* publication ENET-SO001A-EN-P
ControlNet	1786-CP	*ControlNet Network System Overview* publication 1786-2.12
DeviceNet	1485C series catalog numbers	*DeviceNet Product Overview* publication DN-2.5

PLC-5 Specifications

Backplane Current	PLC-5/11, -5/20, -5/30: 2.7A @ 5Vdc PLC-5/40, -5/40L, -5/60, -5/60L, -5/80, -5/86: 3.3A @ 5Vdc
Operating Temperature	IEC 60068-2-1 (Test Ad, Operating Cold), IEC 60068-2-2 (Test Bd, Operating Dry Heat), IEC 60068-2-14 (Test Nb, Operating Thermal Shock): 0-60°C (32–140°F)
Storage Temperature	IEC 60068-2-1 (Test Ab, Un-packaged Non-operating Cold), IEC 60068-2-2 (Test Bc, Un-packaged Non-operating Dry Heat), IEC 60068-2-14 (Test Na, Un-packaged Non-operating Thermal Shock): –40 to 85°C (–40 to 185°F)
Relative Humidity	IEC 60068-2-30 (Test Db, Un-packaged Non-operating Damp Heat): 5–95% non condensing
Vibration	IEC60068-2-6 (Test Fc, Operating): 2g @10–500Hz
Shock	IEC60068-2-27:1987, Test Ea (Unpackaged shock, ES#002) Operating - 30g Non-operating - 50g
Emissions	CISPR 11: Group 1, Class A
ESD Immunity	IEC 61000-4-2: 4kV contact discharges
Radiated RF Immunity	IEC 61000-4-3: 10V/m, 3V/m Broadcast Bands, with 1kHz sine-wave 80% AM from 30MHz to 1000Mhz
EFT/B Immunity	IEC 61000-4-4: ±2kV at 5kHz on communications ports
Surge Transient Immunity	IEC 61000-4-5: ±2kV line-earth(CM) on signal ports
Conducted RF Immunity	IEC 61000-4-6: 10Vrms with 1kHz sine-wave 80%AM from 150kHz to 30MHz
Enclosure Type Rating	None (open style)
Time-of-Day Clock/Calendar[1]	Maximum Variations at 60× C: ± 5 min per month Typical Variations at 20× C: ± 20 s per month Timing Accuracy: 1 program scan
Available Cartridges	1785-CHBM ControlNet Hot Backup Cartridge[2] (required for each processor used in a hot backup system)
	1785-RC Relay Cartridge
Battery	Allen-Bradley 1770-XYC
Memory Modules[3]	• 1785-ME32 • 1785-ME64 • 1785-M100
I/O Modules	Bulletin 1771 I/O, 1794 I/O, 1746 I/O, and 1791 I/O including 8-, 16-, 32-pt, and intelligent modules
Hardware Addressing	2-slot • Any mix of 8-pt modules • 16-pt modules must be I/O pairs • No 32-pt modules 1-slot • Any mix of 8- or 16-pt modules • 32-pt modules must be I/O pairs 1/2-slot—Any mix of 8-,16-, or 32-pt modules

Specifications continued on next page

Communication	• Serial • DH+ • DH using 1785-KA • Remote I/O • ControlNet	Wire Category 2[4]
	• Relay Cartridge	Wire Category 1[4]
Location	1771-A1B, -A2B, A3B, -A3B1, -A4B chassis; left-most slot	
Weight	PLC-5/20, -5/26, -5/30: 3 lbs, 3 oz (1.45 kg) PLC-5/40, -5/40L, -5/46: 3 lbs, 2 oz (1.42 kg) PLC-5/60, -5/60L: 3 lbs, 2 oz (1.42 kg) PLC-5/80, -5/86: 3 lbs, 2 oz (1.42 kg)	
Certifications[5] (when product or package is marked)	UL — UL Listed Industrial Control Equipment CSA — CSA Certified Process Control Equipment for Class I, Division 2 Group A,B,C,D Hazardous Locations CE — European Union 89/336/EEC EMC Directive, compliant with: EN 50081-2; Industrial Emissions EN 50082-2; Industrial Immunity European Union 73/23/EEC LVD Directive, compliant with: EN 61131-2; Programmable Controllers C-Tick — Australian Radiocommunications Act, compliant with: AS/NZS 2064; Industrial Emissions AS/NZS 2064 — Industrial Emissions	

1 The clock/calendar will update appropriately each year.

2 The 1785-CHBM cannot be used with the 1785-5/60C processor.

3 The 1785-ME16 cannot be used with ControlNet PLC-5 processors.

4 For more information, refer to publication 1770-4.1, *Industrial Automation Wiring and Grounding Guidelines*.

5 See the Product Certification link at www.ab.com for Declarations of Conformity, Certificates, and other certification details

Instruction Set

The PLC-5 controller supports multiple industry-standard programming languages. You can program logic in IEC 1131-based structured text, function block, and these built-in ladder logic instructions:

Instruction family:	Description:
relay-type	The bit (relay-type) instructions monitor and control the status of bits. XIC, XIO, OTE, OTL, OTU,IIN, IOT, IDI, IDO
timer and counter	The timer and counter instructions control operations based on time or the number of events. TON, TOF, RTO, CTU, CTD, RES
compare	The compare instructions compare values by using an expression or a specific compare instruction. CMP, EQU, GEQ, GRT, LEQ, LES, LIM, MEQ, NEQ
compute	The compute/math instructions evaluate arithmetic operations using an expression or a specific arithmetic instruction. CPT, ACS, ADD, ASN, ATN, AVE, CLR, COS, DIV, LN, LOG, MUL, NEG, SIN, SQR, SRT, STD, SUB, TAN, XPY
logical	The logical instructions perform logical operations on bits. AND, NOT, OR, XOR
conversion	The conversion instruction convert integer and BCD values or convert radian and degree values. TOD, FRD, DEG, RAD
bit modify move	The move instructions modify and move bits. BTD, MOV, MVM
file	The file instructions perform operations on file data and compare file data. FAL, FSC, COP, FLL
diagnostic	The diagnostic instructions compare data to help you detect problems. FBC, DDT, DTR
shift	Use the shift instructions to modify the location of data within files. BSL, BSR, FFL, FFU, LFL, LFU
sequencer	Sequencer instructions monitor consistent and repeatable operations. SQO, SQI, SQL
program control	Program flow instructions change the flow of ladder program execution. MCR, JMP, LBL, FOR, NXT, BRK, JSR, SBR, RET, TND, AFI, ONS, OSR, OSF, SFR, EOT, UIE, UID
process control	The process control instruction provides closed-loop control. PID
block-transfer	The block-transfer instructions transfer words to or from other devices. BTR, BTW, CIO
message	The message instruction reads or writes a block of data to another station. MSG
ASCII	The ASCII instruction read, write, compare, and convert ASCII strings. ABL, ACB, ACI, ACN, AEX, AHL, AIC, ARD, ARL, ASC, ASR, AWA, AWT

Notes

PLC-5 SPECIFICATIONS AND CERTIFICATIONS

Category	Controller	Catalog Number	Max. User Memory Words	Total I/O Max.	Number of Communication Ports (Mode)
Enhanced	PLC–5/11	1785–L11B	8K	512	1 DH+ or Remote I/O (Adapter or Scan)
	PLC–5/20	1785–L20B	16K	512	1 DH+ and 1 DH+ or Remote I/O (Adapter or Scan)
	PLC–5/30	1785–L30B	32K	1024	2 DH+ or Remote I/O (Adapter or Scan)
	PLC–5/40	1785–L40B	48K	2048	4 DH+ or Remote I/O (Adapter or Scan)
	PLC–5/40L	1785–L40L	48K	2048	2 DH+ or Remote I/O (Adapter or Scan) and 1 Extended Local I/O
	PLC–5/60	1785–L60B	64K	3072	4 DH+ or Remote I/O (Adapter or Scan)
	PLC–5/60L	1785–L60L	64K	3072	2 DH+ or Remote I/O (Adapter or Scan) and 1 Extended Local I/O
	PLC–5/80	1785–L80B	100K	3072	4 DH+ or Remote I/O (Adapter or Scan)
EtherNet/IP	PLC–5/20E	1785–L20E	16K	512	1 EtherNet/IP, 1 DH+ and 1 DH+ or Remote I/O (Adapter or Scan)
	PLC–5/40E	1785–L40E	48K	2048	1 EtherNet/IP and 2 DH+ or Remote I/O (Adapter or Scan)
	PLC–5/80E	1785–L80E	100K	3072	1 EtherNet/IP and 2 DH+ or Remote I/O (Adapter or Scan)
ControlNet	PLC–5/20C	1785–L20C15	16K	512[3]	1 ControlNet (dual media) and 1 DH+
	PLC–5/40C	1785–L40C15	48K	2048[3]	1 ControlNet (dual media) and 2 DH+ or Remote I/O (Adapter or Scan)
	PLC–5/80C	1785–L80C15	100K	3072[3]	1 ControlNet (dual media) and 2 DH+ or Remote I/O (Adapter or Scan)
VMEbus	PLC–5/V30B	1785–V30B	32K[1]/64Kbytes[2]	896	2 DH+ or Remote I/O (Adapter or Scan)
	PLC–5/V40B	1785–V40B	48K[1]/64Kbytes[2]	1920	4 DH+ or Remote I/O (Adapter or Scan)
	PLC–5/V40L	1785–V40L	48K[1]/64Kbytes[2]	1920	2 DH+ or Remote I/O (Adapter or Scan) and 1 Extended Local I/O
	PLC–5/V80B	1785–V80B	100K[1]/64Kbytes[2]	2944	4 DH+ or Remote I/O (Adapter or Scan)
Protected	PLC–5/26	1785–L26B	16K	512	1 DH+ and 1 DH+ or Remote I/O (Adapter or Scan)
	PLC–5/46	1785–L46B	48K	2048	4 DH+ or Remote I/O (Adapter or Scan)
	PLC–5/86	1785–L86B	100K	3072	4 DH+ or Remote I/O (Adapter or Scan)

[1]PLC Controller Data Table/Program [2]VME [3]ControlNet provides additional I/O capacity.

MEETING STANDARDS AND PROVIDING QUALITY SUPPORT

ISO 9000 REGISTRATION

Rockwell Automation has registered business groups and facilities, encompassing 18 separate sites and more than 25 major product families, to ISO 9001 standards. Rockwell Automation's primary manufacturing facilities are registered to ISO 9001. This registration means that our quality system governing the design, development, manufacture, delivery, and internal customer service processes for our products has been verified by third party audits.

CERTIFICATION FOR MARINE AND OFF-SHORE APPLICATIONS

The PLC-5 controllers appearing in the adjacent chart have been certified for use in marine and offshore applications around the world by:

- Lloyd's Register
- American Bureau of Shipping
- Det Norske Veritas
- Bureau Veritas
- Registoro Italiano Navale
- Germanischer Lloyd
- Korean Registry

UL CERTIFICATION

Generally Rockwell Automation pursues applicable certification by Underwriters Laboratories (UL) for our products. For actual UL listing of a specific controller, always refer to the label on the product.

CSA CERTIFICATION

Generally Rockwell Automation pursues applicable certification by the Canadian Standards Association (CSA) for our products. For actual CSA certification of a specific controller, always refer to the label on the product.

COMPLIANCE WITH EUROPEAN UNION DIRECTIVES

Rockwell Automation products covered by European Union Directives are intended for sale and use within the European market and conform with the essential requirements of these directives. For actual CE conformity of a specific controller, always refer to the label on the product.

Support From Global Manufacturing Services

Rockwell Automation GMS delivers local support expertise, and the advanced technology resources of Rockwell, when and where it's needed, helping customers achieve a global competitive advantage with these services:

- **Asset Management** for repair and remanufacturing services to help assure top performance of your equipment.
- **Engineering Services** from the most basic product set-up to sophisticated, comprehensive consulting and project management.
- **Training** from standard training classes and on-site delivery options to training needs analyses, Tailored Training classes, and fully customized performance solutions.
- **Technical Support** for fast, accurate answers to your day-to-day or emergency Rockwell Automation products questions.
- **Packaged Services** such as Automated Tool Monitoring System for maximized tool usage and machine uptime; Automation Passport for immediate parts and service availability, Computer Configuration Services for one-stop, out-of-the-box computer solutions; and Enhanced Information Processors for faster, more powerful and more affordable processing.

We're Global Because We're Local To You

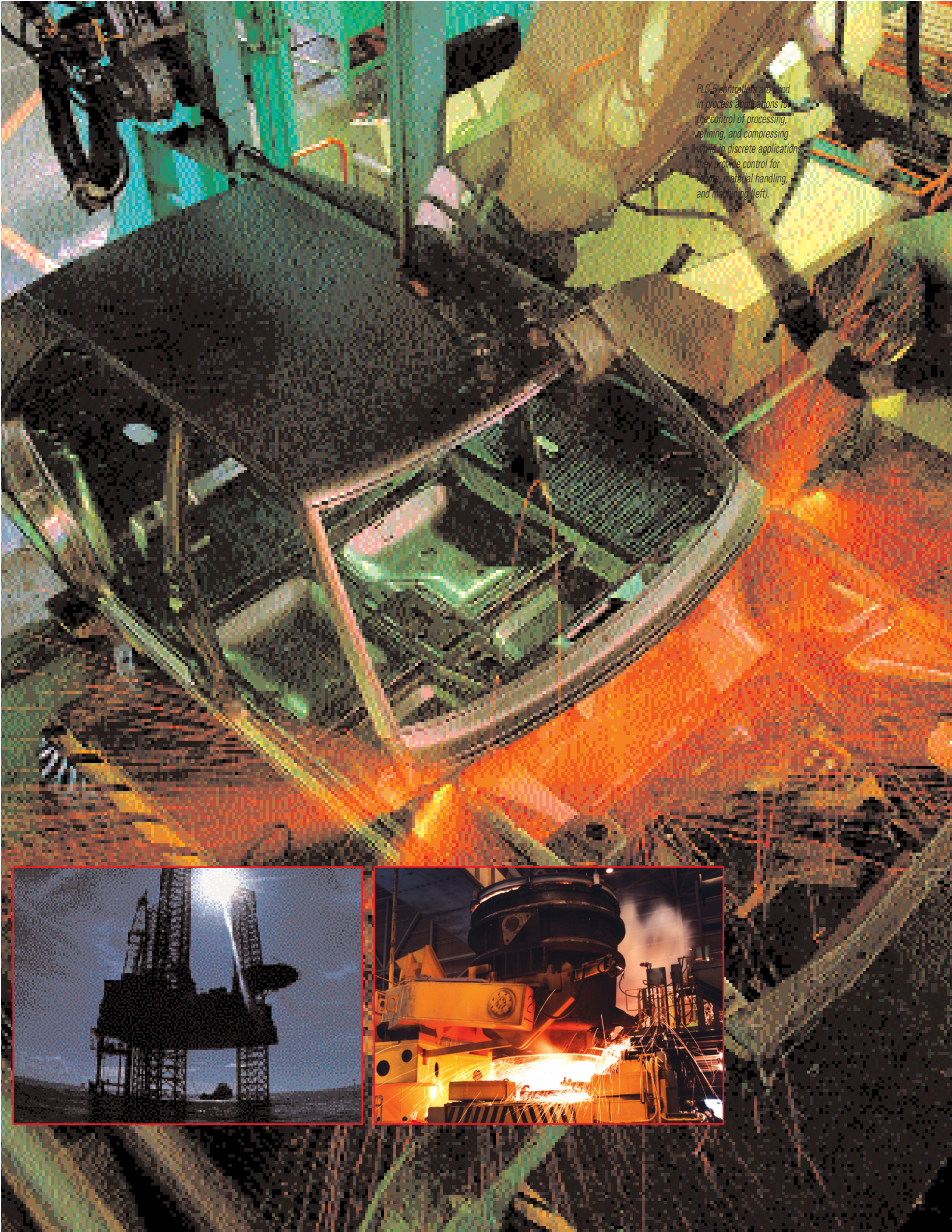
Rockwell Automation's unique Complete Automation strategy of helping customers achieve a competitive advantage is supported by thousands of authorized partners, distributors, and system integrators around the world. Complete Automation is our commitment to understand your complete automation needs, both technical and commercial, and to respond to these needs by bringing together the best the industry has to offer.

Complete Confidence

You are never alone. Our support network offers complete system integration and support services including sales and order support, application engineering, installation supervision, system start-up, training, field services, and ongoing product support. Our technical support helpline utilizes the most advanced phone system available today. You can easily access a Rockwell Automation sales representative, appointed distributor, or authorized system integrator almost anywhere around the world.

PLC-5 controllers are used in process applications for the control of processing, refining, and compressing while in discrete applications, they provide control for robots, material handling, and machining.

For support information: www.support.automation.rockwell.com
For PLC-5 information: www.ab.com/plclogic/plc5.html



PLC-5 controllers are used in process applications for the control of processing, refining, and compressing while in discrete applications they provide control for assembly, material handling, and machining (left).

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