Technical Data

Original Instructions

ControlLogix and GuardLogix Controllers

Bulletin 1756

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Summary of Changes

This publication contains the following new or updated information. This list includes substantive updates only and is not intended to reflect all changes.

Topic	Page
Added ControlLogix® 5580 No Stored Energy (NSE) controllers, ControlLogix-XT™ 5580 controllers, and ControlLogix 5580 Process controllers.	Throughout
Added ControlLogix 5580 Redundancy information.	Throughout

Catalog Numbers

This publication is applicable to these controllers and modules:

ControlLogix Standard Controller Catalog Numbers:	1756-L61, 1756-L62, 1756-L63, 1756-L63XT, 1756-L64, 1756-L65, 1756-L71, 1756-L71K, 1756-L72, 1756-L72K, 1756-L73, 1756-L73K, 1756-L73XT, 1756-L74, 1756-L74K, 1756-L75, 1756-L75K, 1756-L81E, 1756-L81EK, 1756-L82E, 1756-L82EK, 1756-L83E, 1756-L83EK, 1756-L84E, 1756-L84EK, 1756-L85E, 1756-L85EK
No Stored Energy (NSE) Catalog Numbers:	1756-L81E-NSE, 1756-L82E-NSE, 1756-L83E-NSE, 1756-L84E-NSE, 1756-L85E-NSE
ControlLogix-XT Catalog Numbers:	1756-L81EXT, 1756-L82EXT, 1756-L83EXT, 1756-L84EXT, 1756-L85EXT
Process Catalog Numbers:	1756-L81EP, 1756-L83EP, 1756-L85EP
GuardLogix® Controller Catalog Numbers:	1756-L61S, 1756-L62S, 1756-L63S, 1756-LSP, 1756-L71S, 1756-L71SK, 1756-L72S, 1756-L72SK, 1756-L73S, 1756-L73SK, 1756-L7SP, 1756-L7SPK, 1756-L73SXT, 1756-L7SPXT, 1756-L81ES, 1756-L81ESK, 1756-L82ES, 1756-L82ESK, 1756-L83ES, 1756-L83ESK, 1756-L84ES, 1756-L84ESK, 1756-L8SP, 1756-L8SPK
Armor™ ControlLogix Catalog Numbers:	1756-L72EROM, 1756-L73EROM
Armor™ GuardLogix® Catalog Numbers:	1756-L72EROMS, 1756-L73EROMS
ControlLogix Redundancy Modules Catalog Numbers:	1756-RM2, 1756-RM2K, 1756-RM2XT

ControlLogix Controllers

The ControlLogix® controller provides a scalable controller solution that is capable of addressing many I/O points. You can place the ControlLogix controller into any slot of a ControlLogix I/O chassis, and install multiple controllers in the same chassis.

ControlLogix controllers can monitor and control I/O across the ControlLogix backplane, and over network links. The ControlLogix 5580 controllers have an embedded Ethernet port for a direct connection to Ethernet-enabled devices and networks, and also support communication interface modules in the local chassis. To provide communication for ControlLogix 5570 or ControlLogix 5560 controllers, install the appropriate communication interface module into the local chassis.

The ControlLogix 5580 No Stored Energy (NSE) controllers are intended for use in applications that require the installed controller to deplete its residual stored energy to specific levels before transporting it into or out of your application.

ControlLogix 5580 and ControlLogix 5570 controllers are available with a conformal coating that adds a layer of protection when exposed to harsh, corrosive environments. Products with a conformal coating have a 'K' suffix at the end of the catalog number.

ATTENTION: ControlLogix 5580 conformal coated products are shipped with port protection plugs installed to provide a layer of protection from corrosive environments. In order to meet the corrosive atmosphere rating of the product, port plugs need to be installed in unused ports at all times during storage and operation. If temporary access is required, plugs can be removed, and should be reinserted after temporary access is complete.

ControlLogix 5580 Controllers

ControlLogix 5580 Controller Features

Feature	1756-L81E, 1756-L81EK, 1756-L81E-NSE	1756-L82E, 1756-L82EK, 1756-L82E-NSE	1756-L83E, 1756-L83EK, 1756-L83E-NSE	1756-L84E, 1756-L84EK, 1756-L84E-NSE	1756-L85E, 1756-L85EK, 1756-L85E-NSE
Controller tasks	32 tasks 1000 programs/task Local I/O event triggers: No limit				
Built-in communication ports(8)	1-port USB(1) Embedded Ethernet port				
USB port communication	USB 2.0 Full speed (12 Mbps) Programming, configuration, firmware update, and online edits only				
Ethernet performance	10/100/1000 Mbps				
I/O Capacity (Class 0/1) - packets/second (2) (3)	• 128,000 without CIP Security™ • 40,000 with integrity • 20,000 with integrity and confidentiality				
Message Rate Capacity HMI/MSG (Class 3) - messages/second (2) (3)	• 2000 without CIP Security • 1500 with integrity • 900 with integrity and confidentiality				
Communication options	• EtherNet/IP™ • ControlNet® • DeviceNet® • Data Highway Plus™ • Remote I/O • SynchLink™ • Third-party process and device networks				
EtherNet/IP nodes supported max(4)	60 nodes(6) 100 nodes(7)	80 nodes(6) 175 nodes(7)	100 nodes(5) 250 nodes(7)	150 nodes(6) 250 nodes(7)	300 nodes(8)
Network connections, per network module located in the local chassis	• ControlLogix 5580 Controllers front EtherNet/IP port. See 'EtherNet/IP nodes supported, max' in this table. • 256 EtherNet/IP; 128 TCP (1756-EN2*x*) • 128 EtherNet/IP; 64 TCP (1756-ENBT) • 100 ControlNet (1756-CN2/A) • 40 ControlNet (1756-CNB/D, 1756-CNB/E) • 128 ControlNet (1756-CN2/B)				
Integrated motion	• Integrated Motion on the EtherNet/IP network				
Controller redundancy	Full support with Studio 5000 Logix Designer® application version 33.00.00 or later.(9)				
Programming languages	• Relay ladder logic (RLL) • Structured text • Function Block Diagram • Sequential function chart (SFC)				

(1) The USB port is intended for temporary local programming purposes only and not intended for permanent connection. Do not use the USB port in hazardous locations.

(2) I/O numbers are maximums; they assume no HMI/MSG. HMI/MSG numbers are maximums, they assume no I/O. Maximums assume the processor is the target, not the originator. Packet rates vary depending on packet size. For more details, see Troubleshoot EtherNet/IP Application Technique, publication ENET-AT003, and the EDS file for a specific catalog number.

(3) For information on integrity and confidentiality, see the CIP Security with Rockwell Automation Products Application Technique, publication SECURE-AT001.

(4) A node is an EtherNet/IP device that you add directly to the I/O configuration, and counts toward the node limits of the controller. For more information on EtherNet/IP nodes, see the ControlLogix 5580 Controllers User Manual, publication1756-UM543.

(5) With Studio 5000 Logix Designer® Application Version 28 and Version 29.

(6) With Studio 5000 Logix Designer Application Version 29.

(7) With Studio 5000 Logix Designer Application Version 30 or greater.

(8) With Studio 5000 Logix Designer Application Version 28 or greater.

(9) When the controller is enabled for redundancy: the Ethernet port is off, Integrated motion is not supported, and DeviceNet, ControlNet, RIO, DH+™ networks are not supported. See the ControlLogix 5580 Redundant Controller User Manual, publication 1756-UM015.

Technical Specifications - ControlLogix 5580 Controllers

Attribute	1756-L81E, 1756-L81EK	1756-L82E, 1756-L82EK	1756-L83E, 1756-L83EK	1756-L84E, 1756-L84EK	1756-L85E, 1756-L85EK	1756-L81E-NSE, 1756-L82E-NSE, 1756-L83E-NSE, 1756-L84E-NSE, 1756-L85E-NSE
User memory	3 MB	5 MB	10 MB	20 MB	40 MB	1756-L81E-NSE: 3 MB 1756-L82E-NSE: 5 MB 1756-L83E-NSE: 10 MB 1756-L84E-NSE: 20 MB 1756-L85E-NSE: 40 MB
Digital I/O max	128,000					
Analog I/O max	4000					
Total I/O max	128,000					
Optional nonvolatile memory storage	2 GB Secure Digital Card (1784-SD2), ships pre-installed in the controller(1)					
Energy storage module	Embedded in controller, nonremovable					
Current draw @ 1.2V DC	5.0 mA					
Current draw @ 5.1V DC	1.20 A					
Power dissipation	6.2 W					
Thermal dissipation	21.2 BTU/hr					
Residual Stored Energy	Not Applicable					Depletes to 400 µJ in 40 seconds
Isolation voltage	50V (continuous), Basic Insulation type, USB port to backplane, Ethernet port to backplane, and USB port to Ethernet port Type tested at 1000V AC for 60 seconds					
Weight approx	0.394 kg (.868 lb)					
Slot width	1					
Module location	Chassis-based, any slot					
Chassis	1756-A4, 1756-A4K, 1756-A7, 1756-A7K, 1756-A10, 1756-A10K, 1756-A13, 1756-A13K,1756-A17, 1756-A17 K Series B, Series C					
Power supply, standard	1756-PA50, 1756-PA72, 1756-PA72K, 1756-PA75, 1756-PA75K, 1756-PB50, 1756-PB72, 1756-PB72K, 1756-PB75, 1756-PB75K, 1756-PH75, 1756-PC75					
Power supply, redundant	1756-PA75R, 1756-PA75RK, 1756-PB75R, 1756-PB75RK, 1756-PSCA2, 1756-PSCA2K					
Wire category(2)	3 - on USB port 2 - on Ethernet ports					
Wire size	Ethernet connections: Ethernet cabling and installation according to IEC 61918 and IEC 61784-5-2					
North American temperature code	T4					
ATEX temperature code	T4					
IECEx temperature code	T4					
Enclosure type rating	None (open-style)					

(1) Larger versions may be available. See ControlLogix Controller Accessories on page 43.

(2) Use this conductor category information to plan conductor routing. See Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

Environmental Specifications - ControlLogix 5580 Controllers

Attribute	1756-L81E, 1756-L81EK, 1756-L81E-NSE, 1756-L82E, 1756-L82EK, 1756-L82E-NSE, 1756-L83E, 1756-L83EK, 1756-L83E-NSE,1756-L84E, 1756-L84EK, 1756-L84E-NSE,1756-L85E, 1756-L85EK, 1756-L85E-NSE
Temperature, operating 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 °C < Ta < +60 °C (+32 °F < Ta < +140 °F) for Standard Chassis, Series C 0 °C < Ta < +50 °C (+32 °F < Ta < +122 °F) for Standard Chassis, Series B
Temperature, nonoperating IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat), IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock)	Chassis series B and C: -40...+85 °C (-40...+185 °F)
Temperature, surrounding air max	60 °C (140 °F) for Standard Chassis, Series C 50 °C (122 °F) for Standard Chassis, Series B
Relative humidity IEC 60068-2-30 (Test Db, Unpackaged Damp Heat)	5...95% noncondensing
Vibration IEC 60068-2-6 (Test Fc, Operating)	2 g @ 10...500 Hz

Environmental Specifications - ControlLogix 5580 Controllers

Attribute	1756-L81E, 1756-L81EK, 1756-L81E-NSE, 1756-L82E, 1756-L82EK, 1756-L82E-NSE, 1756-L83E, 1756-L83EK, 1756-L83E-NSE,1756-L84E, 1756-L84EK, 1756-L84E-NSE,1756-L85E, 1756-L85EK, 1756-L85E-NSE
Shock, operating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	30 g
Shock, nonoperating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	30 g
Emissions	IEC 61000-6-4
ESD immunity IEC 61000-4-2	6 kV contact discharges 8 kV air discharges
Radiated RF immunity IEC 61000-4-3	10V/m with 1 kHz sine-wave 80% AM from 80...2000 MHz 10V/m with 200 Hz 50% Pulse 100% AM @ 900 MHz 10V/m with 200 Hz 50% Pulse 100% AM @ 1890 MHz 3V/m with 1 kHz sine-wave 80% AM from 2000...2700 MHz
EFT/B Immunity IEC 61000-4-4	±2 kV at 5 kHz on Ethernet ports
Surge Transient Immunity IEC 61000-4-5	±2 kV line-earth (CM) on Ethernet ports
Conducted RF Immunity IEC 61000-4-6	10V rms with 1 kHz sine-wave 80% AM from 150 kHz...80 MHz

Certifications - ControlLogix 5580 Controllers

Certification(1)	1756-L81E, 1756-L81EK, 1756-L81E-NSE, 1756-L82E, 1756-L82EK, 1756-L82E-NSE, 1756-L83E, 1756-L83EK, 1756-L83E-NSE, 1756-L84E, 1756-L84EK, 1756-L84E-NSE, 1756-L85E, 1756-L85EK, 1756-L85E-NSE
c-UL-us	UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E65584. UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada. See UL File E194810.
CSA	CSA Certified Process Control Equipment. See CSA File LR54689C. CSA Certified Process Control Equipment for Class I, Division 2 Group A,B,C,D Hazardous Locations. See CSA File LR69960C.
FM	FM Approved Equipment for use in Class I Division 2 Group A,B,C,D Hazardous Locations
CE	European Union 2004/108/EC EMC Directive, compliant with: • EN 61326-1; Meas./Control/Lab., Industrial Requirements • EN 61000-6-2; Industrial Immunity • EN 61000-6-4; Industrial Emissions • EN 61131-2; Programmable Controllers (Clause 8, Zone A & B)
RCM	Australian Radiocommunications Act, compliant with EN 61000-6-4; Industrial Emissions
Ex	European Union 94/9/EC ATEX Directive, compliant with: • EN 60079-15; Potentially Explosive Atmospheres, Protection "n" • EN 60079-0; General Requirements • II 3 G Ex nA IIC T4 Gc • DEMK013ATEX1325026X
IECEx	IECEx System, compliant with: • IEC 60079-15; Potentially Explosive Atmospheres, Protection "n" • IEC 60079-0; General Requirements • II 3 G Ex nA IIC T4 Gc • IECEx UL 14.0008X
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with Article 58-2 of Radio Waves Act, Clause 3
EAC	Russian Customs Union TR CU 020/2011 EMC Technical Regulation Russian Customs Union TR CU 004/2011 LV Technical Regulation
EtherNet/IP	ODVA conformance tested to EtherNet/IP specifications
CIP Security	ODVA conformance tested to CIP Security specifications

(1) See the Product Certification link at http://www.ab.com for Declarations of Conformity, Certificates, and other certification details.

ControlLogix 5570 Controllers

ControlLogix 5570 Controllers Features

Feature	1756-L71, 1756-L71K, 1756-L72, 1756-L72K, 1756-L73, 1756-L73K, 1756-L74, 1756-L74K, 1756-L75, 1756-L75K
Controller tasks	• 32 tasks • 100 programs/task • Event tasks: all event triggers
Built-in communication ports	1-port USB(1)
Communication options	• EtherNet/IP • ControlNet • DeviceNet • Data Highway Plus • Remote I/O • SynchLink • Third-party process and device networks
USB port communication	Programming, configuration, firmware update, and online edits only
Controller connections supported max(2)	500
Network connections, per network module	• 100 ControlNet (1756-CN2/A) • 40 ControlNet (1756-CNB/D, 1756-CNB/E) • 128 ControlNet (1756-CN2/B) • 256 EtherNet/IP; 128 TCP (1756-EN2x) • 128 EtherNet/IP; 64 TCP (1756-ENBT)
Controller redundancy	Full support
Integrated motion	• SERCOS interface • Analog options (encoder input, LDT input, SSI input) • Integrated Motion on the EtherNet/IP network
Programming languages	• Relay ladder logic • Structured text • Function Block Diagram • Sequential function chart (SFC)

(1) The USB port is intended for temporary local programming purposes only and not intended for permanent connection. Do not use the USB port in hazardous locations.
(2) ControlLogix 5570 controllers use connections to establish communication links between devices. For more information on how to use and calculate connections, see the ControlLogix System User Manual, publication 1756-UM001.

Technical Specifications - ControlLogix 5570 Controllers

Attribute	1756-L71, 1756-L71K	1756-L72, 1756-L72K	1756-L73, 1756-L73K	1756-L74, 1756-L74K	1756-L75, 1756-L75K
User memory	2 MB	4 MB	8 MB	16 MB	32 MB
I/O memory	0.98 MB				
Optional nonvolatile memory storage	1 GB (1784-SD1 ships with every controller) 2 GB (1784-SD2)				
Digital I/O max	128,000				
Analog I/O max	4000				
Total I/O max	128,000				
Energy storage module	• 1756-ESMCAP, 1756-ESMCAPK capacitor energy storage module (removable, ships installed with every controller) • 1756-ESMNSE, 1756-ESMNSEK capacitor energy storage module (removable, no residual WallClockTime power backup) • 1756-ESMNRM, 1756-ESMNRMK capacitor energy storage module (nonremovable, helps prevent USB connection and SD card use to help secure the controller)				
Current draw @ 1.2V DC	5 mA				
Current draw @ 5.1V DC	800 mA				
Power dissipation	2.5 W				
Thermal dissipation	8.5 BTU/hr				
Isolation voltage	30V (continuous), basic insulation type, USB port-to-system Type tested at 500V AC for 60 s				
USB port(1)	USB 2.0, full speed (12 Mbps)				
Weight approx	0.25 kg (0.55 lb)				
Slot width	1				
Module location	Chassis-based, any slot				

Technical Specifications - ControlLogix 5570 Controllers (Continued)

Attribute	1756-L71, 1756-L71K	1756-L72, 1756-L72K	1756-L73, 1756-L73K	1756-L74, 1756-L74K	1756-L75, 1756-L75K
Chassis	1756-A4, 1756-A4K, 1756-A7, 1756-A7K, 1756-A10, 1756-A10K, 1756-A13, 1756-A13K,1756-A17, 1756-A17 K				
Power supply, standard	1756-PA50, 1756-PA72, 1756-PA72K, 1756-PA75, 1756-PA75K, 1756-PB50, 1756-PB72, 1756-PB72K, 1756-PB75, 1756-PB75K, 1756-PH75				
Power supply, redundant	1756-PA75R, 1756-PA75RK, 1756-PB75R, 1756-PB75RK,1756-PSCA2, 1756-PSCA2K				
Wire category(2)	3 - on USB port				
North American temperature code	T4A				
ATEX temperature code	T4				
IECEx temperature code	T4				
Enclosure type rating	None (open-style)				

(1) The USB port is intended for temporary local programming purposes only and not intended for permanent connection. Do not use the USB port in hazardous locations.
(2) Use this conductor category information to plan conductor routing. See Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

Environmental Specifications - ControlLogix 5570 Controllers

Attribute	1756-L71, 1756-L71K, 1756-L72, 1756-L72K, 1756-L73, 1756-L73K, 1756-L74K, 1756-L74, 1756-L75, 1756-L75K
Temperature, operating 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 °C < Ta < +60 °C (+32 °F < Ta < +140 °F)
Temperature, nonoperating IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat), IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock)	-40...+85 °C (-40...+185 °F)
Temperature, surrounding air max	60 °C (140 °F)
Relative humidity IEC 60068-2-30 (Test Db, Unpackaged Damp Heat)	5...95% noncondensing
Vibration IEC 60068-2-6 (Test Fc, Operating)	2 g @ 10...500 Hz
Shock, operating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	30 g
Shock, nonoperating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	50 g (45 g with SD card installed)
Emissions	IEC 61000-6-4
ESD immunity IEC 61000-4-2	6 kV contact discharges 8 kV air discharges
Radiated RF immunity IEC 61000-4-3	10V/m with 1 kHz sine-wave 80% AM from 80...2000 MHz 10V/m with 200 Hz 50% Pulse 100% AM @ 900 MHz 10V/m with 200 Hz 50% Pulse 100% AM @ 1890 MHz 3V/m with 1 kHz sine-wave 80% AM from 2000...2700 MHz
Conducted RF Immunity IEC 61000-4-6	Not applicable: USB is a temporary programming port.

Certifications - ControlLogix 5570 Controllers

Certification[1]	1756-L71, 1756-L71K, 1756-L72, 1756-L72K, 1756-L73, 1756-L73K, 1756-L74, 1756-L74K, 1756-L75, 1756-L75K
c-UL-us	UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E65584. UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada. See UL File E194810.
CE	European Union 2004/108/EC EMC Directive, compliant with: EN 61326-1; Meas./Control/Lab., Industrial Requirements EN 61000-6-2; Industrial Immunity EN 61000-6-4; Industrial Emissions EN 61131-2; Programmable Controllers (Clause 8, Zone A & B)
RCM	Australian Radiocommunications Act, compliant with EN 61000-6-4; Industrial Emissions
Ex	European Union 94/9/EC ATEX Directive, compliant with: EN 60079-0; General Requirements EN 60079-15; Potentially Explosive Atmospheres, Protection “n” II 3 G Ex nA IIC T4 Gc DEMKO13ATEX1325026X
IECEx	IECEx System, compliant with: IEC 60079-0; General Requirements IEC 60079-15; Potentially Explosive Atmospheres, Protection “n” II 3 G Ex nA IIC T4 Gc IECEx UL 14.0008X
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with Article 58-2 of Radio Waves Act, Clause 3
EAC	Russian Customs Union TR CU 020/2011 EMC Technical Regulation Russian Customs Union TR CU 004/2011 LV Technical Regulation

(1) When marked. See the Product Certification link at http://www.ab.com for Declarations of Conformity, Certificates, and other certification details.

ControlLogix 5560 Controllers

ControlLogix 5560 Controllers Features

Feature	1756-L61, 1756-L62, 1756-L63, 1756-L63XT, 1756-L64, 1756-L65
Controller tasks	• 32 tasks • 100 programs/task • Event tasks: all event triggers
Built-in communication ports	1 port RS-232 serial
Communication options	• EtherNet/IP • ControlNet • DeviceNet • Data Highway Plus • Remote I/O • SynchLink • Third-party process and device networks
Serial port communication	• ASCII • DF1 full/half-duplex • DF1 radio modem • DH-485 • Modbus via logic
Controller connections supported max(1)	250
Network connections, per network module	• 100 ControlNet (1756-CN2/A) • 40 ControlNet (1756-CNB/D, 1756-CNB/E) • 128 ControlNet (1756-CN2/B) • 256 EtherNet/IP; 128 TCP (1756-EN2x) • 128 EtherNet/IP; 64 TCP (1756-ENBT)
Controller redundancy	Full support
Integrated motion	• SERCOS interface • Analog options (encoder input, LDT input, SSI input) • Integrated Motion on the EtherNet/IP network
Programming languages	• Relay ladder logic • Structured text • Function Block Diagram • Sequential function chart (SFC)

(1) ControlLogix 5560 controllers use connections to establish communication links between devices. For more information on connections, see the ControlLogix System User Manual, publication 1756-UM001.

IMPORTANT Scan time for a project that is loaded in a 1756-L64 or 1756-L65 controller can be slower than for the same project loaded in one of the other 1756-L6x controllers. For instruction execution times, see the Logix 5000™ Controllers Instruction Execution Time and Memory Use Reference Manual, publication 1756-RM087.