

## Allen-Bradley 1785-L20C15

The Allen-Bradley/Rockwell Automation 1785-L20C15 processor is a PLC 5 series ControlNet processor. It uses a lithium battery for backup. The 1785-L20C15 ControlNet processor supports both scheduled and unscheduled peer-to-peer communication with other ControlNet nodes. Its backplane current rating is 2.7 Amps at 5 Volts DC and its heat dissipation rating is 54 BTU per hour. The 1785- Technical specifications for 1785-L20C15

Manufacturer Rockwell Automation

Brand Allen-Bradley

Part Number/Catalog No. 1785-L20C15

Module Type ControlNet PLC-5 Processor

Processor PLC-5/20C

Max User Memory Words 16 Kilowords

Battery-Backed Static RAM Yes

EEPROM Program Backup Option (using 1785-ME16, -ME32, -ME64, and -M100) Yes

Protected Memory No

Max Total I/O Forcible 512 (any mix) or 384 in + 384 out (complementary), Nonforcible 3200

Max Analog I/O Forcible 512 and Nonforcible 32000

I/O Scan Time Per Rack ControlNet I/O 0.5 ms (average); Universal Remote I/O 10 ms at 57.6 kbits/s, 7 ms at 115.2 kbits/s, 3 ms at 230.4 mbits/s

Max I/O Chassis Total 77

Max I/O Chassis Extended Local 0

Max I/O Chassis Universal Remote 12

RS-232-C/422-A/423- A Ports 1

Control Coprocessor Expansion Port Yes Description

The Allen-Bradley 1785-L20C15 is a PLC-5 Controller. 1785-L20C15 is one of ControlNet PLC-5 programmable controllers' sub-series. This sub-series is part of the enhanced programmable controllers PLC-5 series. The 1785-L20C15 merges I/O modules including local, extended, and remote devices on various type of communication interfaces into one coherent control system suited for various process control challenges. 1785-L20C15 easily integrates into the ControlNet phase 1.5 communication network due to the integrated ControlNet phase 1.5 communication interface. 1785-L20C15 shares specifications and functionality with other members of PLC-5/20 series of programmable controllers. 1785-L20C15 has one built-in port dedicated for Data Highway Plus (DH+) communication interface. That port is marked as channel 1A. Besides that, the 1785-L20C15 has one port that can be configured both as DH+ or Remote I/O (adapter or scanner). This port is marked as channel 1B. DH+ communication can be used both for remote programming and monitoring of 1785-L20C15 and for creating a peer-to-peer communication network between the various PLC-5 controllers. Remote I/O connection is used for real-time data exchange between the controller and I/O, operator interface, and other devices.

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On the front panel of the 1785-L20C15 controller, there is 25-pin connector marked channel 0. This is an optically isolated EIA RS232C port. Channel 0 supports ASCII and DF1 full-duplex, half-duplex master and half-duplex slave protocols. On the front panel, there is a channel 0 communication green indicator light. Beside channel 0, there is 8-pin mini-DIN connector marked as channel 1A, this is DH+ programming terminal connection parallel to channel 1A. There are two three-pin connectors and they are used as communication ports. One is marked as channel 1A and that port is dedicated to DH+ communication and there is port channel 1B which can be configured as remote I/O scanner, remote I/O adapter or DH+ communication port. There is also an RJ-45 connector for ControlNet Network Access Port, used for establishing a temporary ControlNet connection for some external device. There are also two BNC coax cable connectors dedicated to the ControlNet communication link. ControlNet can be realized as a non-redundant and redundant network.

The ControlNet Network is an open control communication network that meets the demands of real-time, high-throughput applications. ControlNet supports a controller-to-controller direct interlocking and real-time control of I/O, drives and valves. ControlNet is formed with Coax cable, but it can also be created using appropriate hardware units and optical fiber cables, and it can cover longer distances between modules. There can be multiple PLC-5 controllers on the same ControlNet network, and each controller can handle its own I/O on the network, and at the same time, controllers can communicate with each other. Multiple controllers can receive input data from one I/O or device node. It is important to note here that on the same ControlNet network it is not possible to mix products with a different ControlNet phase. For example, 1785-L20C15 has phase 1.5 ControlNet interface and it cannot be mixed with devices with phase 1.0 and 1.25 interfaces. Channel 1B on 1785-L20C15 can be configured either as remote I/O scanner or remote I/O adapter communication port. Remote I/O scanner mode is used to read/write I/O information between a controller and remote I/O device. When in this mode, 1785-L20C15 is a supervisory controller for other controllers that are in adapter mode and remote I/O adapter modules. When channel 1B is configured as remote I/O adapter mode than controller monitors and control its controller-resident local I/O while communicating with the supervisory controller via a remote link.

On 1785-L20C15 Data Highway Plus (DH+) link can be used on channel 1A (this channel is dedicated to this type of communication), and on channel 1B. DH+ communication can be used for data transfer to other PLC-5 controller or other higher level components of the control system. DH+ link can be used for programming multiple PLC-5 controllers. The maximum cable length for DH+ link depends on the used transmission rate. It is crucial that all devices on a DH+ link are configured to communicate at the same transmission rate. That length goes from maximal 3048m for speed 57.6 kilobits per second, to 762m for a speed of 230.4 kilobits per second. 1785-L20C15 has several light indicators on the front panel that indicate various statuses of the controller, and communication interfaces integrated into the controller. Indicator marked BATT is used for displaying the status of the internal battery (red when the battery is low). Indicator marked PROC

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indicates controller current mode, it is green when the controller is in RUN mode, and red when some fault exists. FORCE indicator is colored amber when I/O forces are enabled. COMM indicator is linked with channel 0 communication status. The indicator is green when the channel is communicating. Channel 1A and 1B both have dedicated status indicator. There are ControlNet I/O status indicator (green/red), and dedicated Channel 2 ControlNet status indicators for Channel 2 ControlNet.

For changing controller mode of work, on the front panel of the 1785-L20C15, there is a three position key-switch. Each position correspond to one mode of processor. RUN mode is used for running controller program, outputs are enabled. In RUN mode I/O can be forced, data table values can be edited. Programs can be saved. When 1785-L20C15 processor is in program mode (PROG position of key switch) outputs are disabled, and ladder files, SFC files or data files can be created, modified and deleted. Download and upload transfers with memory module is possible. Programs can be saved/restored. Moving key to REM position set 1785-L20C15 controller in remote mode. When the processor is in remote run sub-mode outputs are enabled, the program can be saved and restored and edited while operating. Remote program sub-mode is same as normal program mode. While in remote test sub-mode, ladder programs can be executed with outputs disabled, ladder programs or data files cannot be created or deleted. Programs can be saved/restored and edited while operating.

**\*\*16000\*\*** words is the size of user memory space of 1785-L20C15. RAM of the controller has a battery backup. For program backup, an EEPROM module can be installed in front panel situated slot. Memory modules with various capacities are available. The total number of I/O (including local I/O and universal remote I/O combined) is 512 any mix. 512 inputs and 512 outputs complementary, meaning that in order to use this much I/O, pairs of modules must have duplicate addresses. the maximal number of analog I/O is 512. 1785-L20C15 can utilize a total of 77 I/O chassis, and among them 12 can be universal remote I/O chassis. Backplane current load of 1785-L20C15 is 2.7 A operating at 5 V typically or 3 A at 5V maximum. 1785-L20C15 do not have capability of connecting extended local I/O chassis. Using integrated ControlNet phase 1.5 communication interface 1785-L20C15 can utilize up to non-forcible 32000 I/O, or non-forcible 32000 analog I/O. Scan time for I/O chassis on ControlNet network is 0.5ms on average.

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