7 Steps to Specifying a DL205 System

The following 7 steps will help you specify a DL205 PLC system. They are also covered in more detail on the pages that follow. Your first priority when designing a system should be safety. Please make sure that all of the components in your system will operate within the product's environmental and operating specifications. This catalog is intended to provide abbreviated product descriptions, benefits and prices. It is not intended to be a substitute for the product manuals.

Before you begin selecting products for your DL205 PLC system, be sure to evaluate all of your application needs and any future growth potential.

STEP 1

Review the DL205 family of products

The DL205 family offers a wide variety of products. Please review the complete product offering.

STEP 2

Select a CPU, programming tool and cable

The DL205 family offers a traditional CPUs: the D2-262. Please take the time to understand the features and specifications of the CPU (i.e. built-in communications ports protocols, instructions, etc.).

To program the DL205 CPUs, choose between the Windows-based DirectSOFT programming software and PC cable or handheld programmer. CPU-slot Server base controllers are also introduced in this step.

STEP 3

Additional communications ports needed?

If your application requires more than the built-in CPU communications ports, then select the H2-ECOM100 Ethernet communications module, or the D2-DCM serial communications module. These modules add more ports for networking or connection to an HMI, etc.
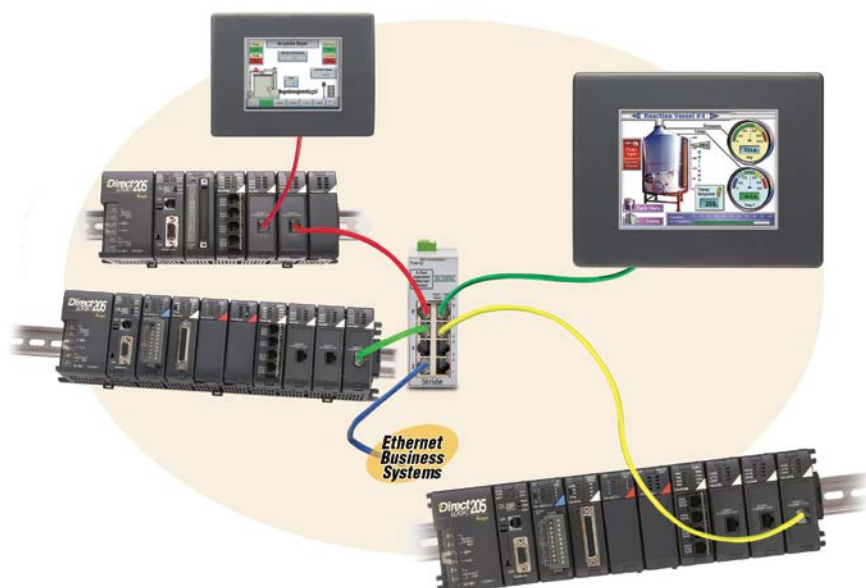
7 Steps to Specifying a DL205 System

STEP 4 — Select the discrete, analog and specialty I/O modules

Since there are several different types of I/O and specialty modules available for the DL205 system, it is important to review the module specifications in detail when selecting them for your system. The hardware specifications for the modules are described at the end of the DL205 section, starting with the specialty modules and followed by the discrete and analog I/O modules.

STEP 5 — Choose an I/O configuration method

The DL205 offers several configurations of I/O. Choose among local I/O, local expansion I/O and remote I/O. A DL205 system can be developed using a combination of the configuration arrangements. It is important to understand the octal addressing scheme and I/O module placement restrictions that are described in this step.

Example: Local expansion I/O

STEP 6 — Check the power budget

It is very important to verify that the selected CPU and I/O modules will operate within the base power budget. Tables list the power supplied and consumed by each DL205 device. This step also describes base dimensions and mounting requirements.

Max. current required

Current required

Current supplied

Remaining current available

STEP 7 — Place your order!

Place your order either online at www.automationdirect.com, by calling 1-800-633-0405 or by faxing your order to 1-770-889-7876. See the Ordering section in this catalog for details.

Four ways to order:
- Online
- Email
- Phone
- FAX

1 2 3 4 5 6 7
HERE

Step 1: Review the DL205 Product Family

CPUs

- D2-262 – 30.4K words total memory
  - 2 communications ports
  - 16 built-in PID loops with auto-tuning

Programming tools

- **Direct**SOFT Programming Software for Windows
  - Handheld Programmer (D2-HPP)

Bases

- 3-slot base (includes power supply)
  - 110/220 VAC (D2-03B-1)
  - 12/24 VDC (D2-03BDC1-1)
- 4-slot base (includes power supply)
  - 110/220 VAC (D2-04B-1)
  - 12/24 VDC (D2-04BDC1-1)
- 6-slot base (includes power supply)
  - 110/220 VAC (D2-06B-1)
  - 12/24 VDC (D2-06BDC1-1)
  - 125VDC (D2-06BDC2-1)
- 9-slot base (includes power supply)
  - 110/220 VAC (D2-09B-1)
  - 12/24 VDC (D2-09BDC1-1)
  - 125VDC (D2-09BDC2-1)

Local expansion modules

- D2-262 CPU, using D2-0*B-1 or D2-0*BDC*-1 only
- Base expansion module (D2-EM)
- Expansion base controller module (D2-CM)
- Expansion base cable (D2-EXCBL-1)

Discrete input modules

- **DC input**
  - 8-pt. 12-24 VDC sink/source (D2-08ND3)
  - 16-pt. 24VDC sink/source (D2-16ND3-2)
  - 32-pt. 24VDC sink/source (D2-32ND3)
  - 32-pt. 5-12 VDC sink/source (D2-32ND3-2)
- **AC input**
  - 8-pt. 110VAC (D2-08NA-1)
  - 16-pt. 110VAC (D2-16NA)
  - 8-pt. 220VAC (D2-08NA-2)

Discrete output modules

- **DC output**
  - 4-pt. 12-24 VDC sink (D2-04TD1)
  - 8-pt. 12-24 VDC sink (D2-08TD1)
  - 8-pt. 12-24 VDC source (D2-08TD2)
  - 16-pt. 12-24 VDC sink (D2-16TD1-2)
  - 16-pt. 12-24 VDC source (D2-16TD2-2)
  - 16-pt. 24VDC sink (Fault protected) (F2-16TD1P)
  - 16-pt. 24VDC source (Fault protected) (F2-16TD2P)
  - 32-pt. 12-24 VDC sink (D2-32TD1)
  - 32-pt. 12-24 VDC source (D2-32TD2)
- **AC output**
  - 8-pt. 18-220 VAC (D2-08TA)
  - 8-pt. 20-125 VAC (F2-08TA)
  - 12-pt. 18-110 VAC (D2-12TA)
- **Relay output**
  - 4-pt. 4A/pt (Isolated) (D2-04TRS)
  - 8-pt. 1A/pt (D2-08TR)
  - 8-pt. 10A/pt. (F2-08TR)
  - 8-pt. 7A/pt (Isolated) (F2-08TRS)
  - 12-pt. 1.5 A/pt (D2-12TR)

Combination discrete modules

- 4-pt. 24VDC in/4pt Relay Out (D2-08CDR)

Analog modules

- **Analog input**
  - 4-ch. in, 12 bit, current (F2-04AD-1)
  - 4-ch. in, 12 bit, voltage (F2-04AD-2)
  - 8-ch. in, 12 bit, current (F2-08AD-1)
  - 8-ch. in, 12 bit, voltage (F2-08AD-2)
- **Analog output**
  - 2-ch. out, 12 bit, current (F2-02DA-1)
  - 2-ch. out, 16 bit, current (Isolated) (F2-02DAS-1)
  - 2-ch. out, 12 bit, voltage (F2-02DA-2)
  - 2 -ch. out, 16 bit, voltage (Isolated) (F2-02DAS-2)
  - 8-ch. out, 12 bit, current (F2-08DA-1)
  - 8-ch. out, 12 bit, voltage (F2-08DA-2)
- **Combination analog in/out**
  - 4-ch. in/2-ch. out, 12 bit, current (F2-4AD2DA)
  - 8-ch. in/4-ch. out, 16 bit, current (F2-8AD4DA-1)
  - 8-ch. in/4-ch. out, 16 bit, voltage (F2-8AD4DA-2)
- **Temperature input**
  - 4-ch. in, RTD (F2-04RTD)
  - 4-ch. in, Thermocouple (F2-04THM)

Communications/ networking modules

- Ethernet Communications Module (H2-ECOM100)
- Serial Data Communications Module (D2-DCM)

Remote I/O modules

- **Ethernet**
  - Ethernet Remote Client Module (H2-ERM100)
  - Ethernet Base Controller (server) (H2-EBC100)

Specialty modules

- Basic CoProcessor (F2-CP128)
- 8-pt. Input Simulator (F2-08SIM)
- Counter I/O (H2-CTRIO2)
- Counter Interface (D2-CTRINT)**

CPU-slot Server controllers

- Ethernet Base Controller (H2-EBC100)

Operator interface

- See the **C-more** and HMI sections in this catalog for a complete line of compatible text and touch panels and configuration software.

Connection systems

- See the Terminal Blocks and Wiring Solutions section in this catalog for information on **DIN**nector terminal blocks, **ZIP**Link connection systems and other connection accessories for use with the DL205 system.

NOTE: D2-262 CPU does not support the D2-CTRINT module.

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Step 2: Select the CPU, Programmer and Cable

DL205 Family CPUs

There are many things to consider when choosing a CPU, most of which depend on your particular application. The facing page provides a comparison between the CPUs. This section provides a quick summary of the key features for each CPU.

System Capacity

System capacity is the ability of the CPU to accommodate a variety of applications. Consider both ladder memory and data registers (V-memory). For ladder memory, most Boolean instructions require one word. Some other instructions, such as timers, counters, etc., require two or more words.

Our V-memory locations are 16-bit words and are useful for data storage, etc.

If you think you may exceed 256 local I/O points, the D2-262 CPU will support up to four additional bases.

The D2-262 supports Ethernet and serial Remote Client modules used when building a remote I/O network. Port 2 on the D2-262 can also serve as a remote I/O client.

Performance

For applications that require fast scan times, additional communications or advanced instructions the D2-262 CPU performs even the most basic of math or data instructions, and will provide better overall performance.

D2-262

Programming and Diagnostics

Our CPUs offer an incredible array of instructions and diagnostic features that can save you many hours of programming and debug time. From basic Boolean contact logic to PID and floating point math, we have it covered! The table on the next page covers some of the basic instruction categories, but for more details, see our complete list of instructions at the end of this section. If you already have DirectSOFT and/or a Handheld Programmer, you may have to upgrade the software/firmware to accommodate the D2-262 CPU.

Built-in CPU Communications

Every DL205 CPU provides at least one built-in RS-232 communication port. Either CPU will perform equally well when using an operator interface. The CPU has two built-in communication ports. For the most flexibility, it has built-in *Direct*NET Server support capability through the top and bottom ports, and *Direct*NET/Modbus RTU Client/Server support on the bottom port. The bottom port supports baud rates of 2400 to 38.4K. The D2-262 provides support for ASCII IN/OUT communications as well.

If you require more than two ports, we also offer an Ethernet Communications Module that can be used to quickly add a communication port to a DL205 system with the D2-262 CPU. A D2-DCM module can be added to provide an additional serial communications port.

D2-262 CPU Specifications

D2-262 CPU Specifications		
System Capacity		
Total memory available (words)	30.4	
Ladder memory (words)	15872 Flash	
V-memory (words)	14592	
Battery backup	Yes	
Total CPU memory I/O pts. available (actual I/O pts. depend on I/O configuration method selected)	8192 (1024 X + 1024 Y + 2048 CR + 2048 GX + 2048 GY)	
Local I/O (pts.)	256	
Local Expansion I/O (pts.)	1280 (4 exp. bases max.) (Including local I/O)	
Serial Remote I/O (pts.)	8192 max. (Including local & exp. I/O)	
Remote I/O channels	8 (7+1 CPU port)	
I/O per remote channel	2048	
Ethernet Remote I/O	Yes	
Discrete I/O pts.	8192 (Including local and exp.I/O)	
Analog I/O channels	Map into V-memory	
Remote I/O channels	Limited by power budget	
I/O per remote channel	16,384 (16 fully expanded H4-EBC Servers using V-memory and bit-of-word instructions)	
Performance		
Contact execution (Boolean)	0.61 µs	0.1 µs
Typical scan (1K Boolean)	1.9 ms	1.0 ms
Programming and Diagnostics		
RLL Ladder Style	Yes	
RLL PLUS/Flowchart Style (Stages)	Yes/1024	
Run time editing	Yes	
Supports Overrides	Yes	
Variable/fixed scan	Variable	
Instructions	231	
Control relays	2048	
Timers	256	
Counters	256	
Immediate I/O	Yes	
Subroutines	Yes	
For/Next loops	Yes	
Timed Interrupt	Yes	
Integer Math	Yes	
Floating-point Math	Yes	
Trigonometric functions	Yes	
Table Instructions	Yes	
PID	Yes, 16 loops	
Drum Sequencers	Yes	
Bit of Word	Yes	
ASCII Print	Yes	
Real-time clock/calender	Yes	
Internal diagnostics	Yes	
Password security	Multi-level	
System and user error log	Yes	
Communications		
Built-in ports	Port 1 RS-232 Port 2 RS-232/422/485	
K-sequence (proprietary protocol)	Yes	
*Direct*NET™	Yes	
Modbus RTU Client/Server	Yes	
ASCII communications	IN/OUT	
Maximum baud rate	38.4K port 2	

D2-262 Key Features

D2-262 CPU

D2-262 $424.00

D2-262 can serve as network Client   **Easily connect programming devices or HMI to CPU ports**

MODBUS® RTU or DirectNET™ network protocol

Connect operator interfaces to port 1 on the Servers

Use port 2 on D2-262 to network Servers

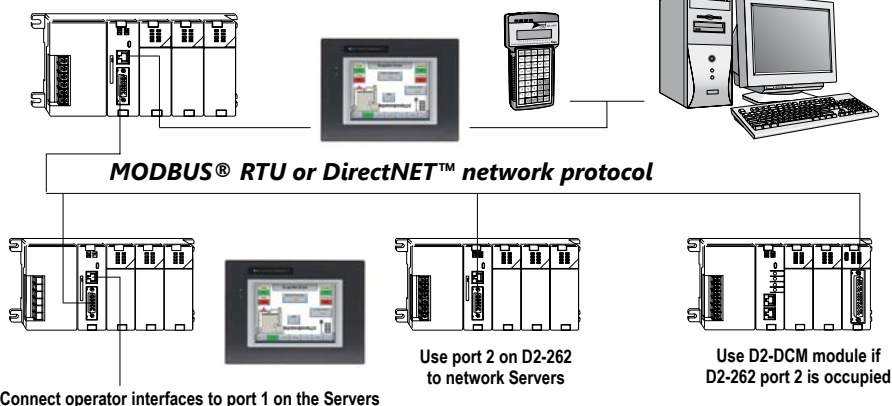**Use D2-DCM module if D2-262 port 2 is occupied**

D2-262: Our most powerful DL205 CPU

Our D2-262 CPU provides all the capabilities of the D4-450 and D4-454 CPUs, plus several additional features rarely found in a PLC of this size. With such an incredible array of features, you may be able to replace PLCs costing hundreds (or thousands) more.

DirectSOFT is required to program the D2-262. If using a handheld programmer (H2-HPP), version 2.10 of the handheld programmer firmware is required. Here are a few key features about the D2-262 CPU

Powerful built-in CPU communications

Each D2-262 CPU offers two communications ports that provide a vast array of communication possibilities. The top RJ-12
RS-232 port can be used for connection to a ***C-more*** operator interface panel or as a single K-sequence or DirectNET Server. The 15-pin bottom port (port 2) supports RS-232 or RS-422/RS485. This port offers several different protocol options such as:

• K-sequence

• ***Direct***NET Client/Server

• Modbus RTU Client/Server
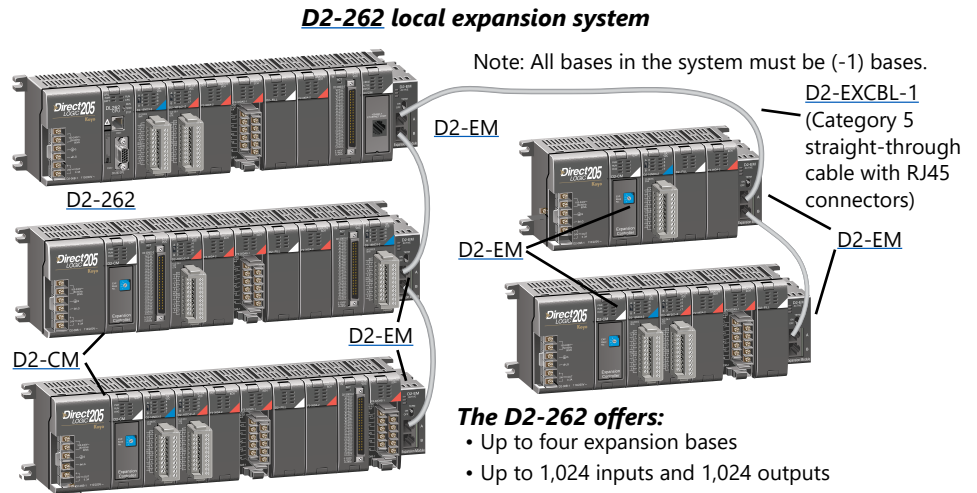
• ASCII In/Out Communications

Port 2 can also serve as a remote I/O Client. The D2-262 supports the Ethernet Communication module and Data Communication Module for additional communications ports.
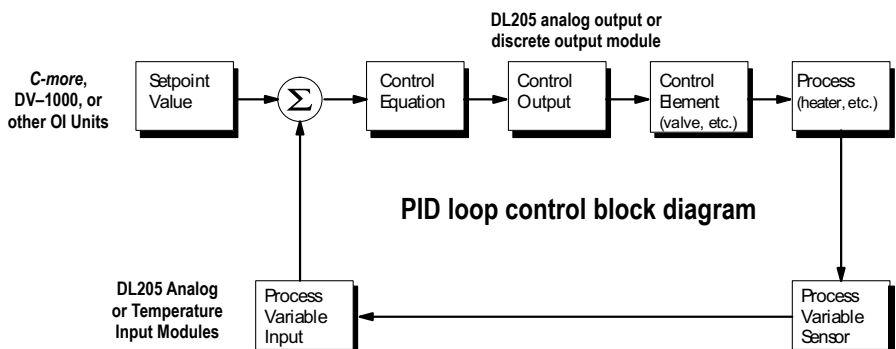
D2-262 Key Features

Local expansion I/O

The D2-262 supports local expansion up to five total bases (one CPU base and four expansion bases). Expansion bases are commonly used when there are not enough slots available in the CPU base, when the base power budget will be exceeded, or when placing an I/O base at a location away from the CPU base (but within the expansion cable limits). All local and expansion I/O points are updated on every CPU scan. Each local expansion base requires the D2-CM module in the CPU slot. The local CPU base requires the D2-EM Expansion Module, as well as each expansion base. For more information on local expansion, refer to the Expansion Modules pages later in this section.

D2-262 local expansion system

Note: All bases in the system must be (-1) bases.

D2-EM

D2-262

D2-CM

D2-EM

D2-EM

D2-EM

D2-EXCBL-1 (Category 5 straight-through cable with RJ45 connectors)

The D2-262 offers:
- Up to four expansion bases
- Up to 1,024 inputs and 1,024 outputs
- Up to 30m (98ft) total expansion system cable

16 PID loops with auto-tuning

The D2-262 CPU can process up to 16 PID loops directly in the CPU. You can select from various control modes including automatic, manual, and cascade. There are also a wide variety of alarms including Process Variable, Rate of Change, and Deviation. The loop operation parameters (Process Variable, Setpoint, Setpoint Limits, etc.) are stored in V-memory, which allows easy access from operator interfaces or HMIs. Setup is accomplished with easy-to-use setup menus and monitoring views in DirectSOFT programming.

The auto-tuning feature is easy to use and can reduce setup and maintenance time. Basically, the CPU uses the auto-tuning feature to automatically determine near optimum loop settings.

PID loop control block diagram

D2-262 Key Features

Full array of instructions

The right instruction can greatly simplify your programming task and can save hours of programming time.

The D2-262 supports over 280 powerful instructions, such as:

- Four types of drum sequencers
- Leading / trailing edge triggered one-shots
- Bit-of-word manipulation
- Floating point conversions
- Trigonometric functions
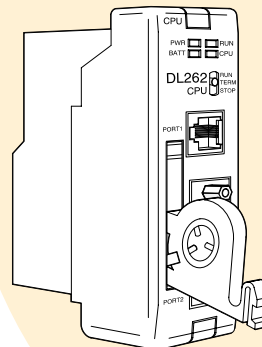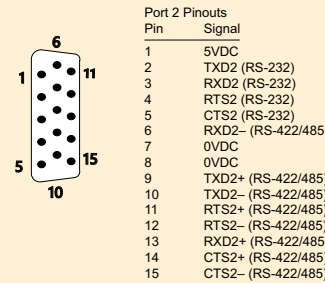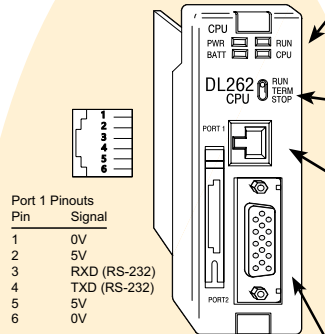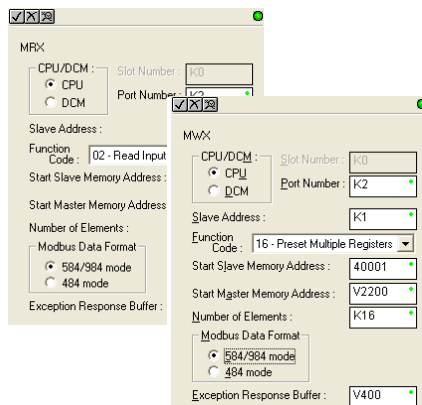- Table instructions
- ASCII IN/OUT instructions

For a complete list of instructions supported by all DL205 CPUs, see the end of this section.

Modbus RTU instructions

The D2-262 CPU supports easy-to-use Modbus Read/Write instructions that expand our existing Modbus network instruction capabilities. The MRX or MWX instructions allow you to enter native Modbus addressing in your ladder program with no need to perform octal-to-decimal conversion. We added Function codes 05, 06 and the ability to read Server Exception Codes. These flexible instructions allow the user to select the following parameters within one instruction window:

- 584/984 or 484 Modbus data type
- Server node (0-247)
- Function code
- Modbus starting Client / Server memory address
- Number of bits
- Exception code starting address

Examples of MRX and MWX instructions in DirectSOFT

Port 1 Pinouts

Pin	Signal
1	0V
2	5V
3	RXD (RS-232)
4	TXD (RS-232)
5	5V
6	0V

Port 2 Pinouts

Pin	Signal
1	5VDC
2	TXD2 (RS-232)
3	RXD2 (RS-232)
4	RTS2 (RS-232)
5	CTS2 (RS-232)
6	RXD2– (RS-422/485)
7	0VDC
8	0VDC
9	TXD2+ (RS-422/485)
10	TXD2– (RS-422/485)
11	RTS2+ (RS-422/485)
12	RTS2– (RS-422/485)
13	RXD2+ (RS-422/485)
14	CTS2+ (RS-422/485)
15	CTS2– (RS-422/485)

*ZIP*Link communications adapter modules

*ZIP*Link cables and communications adapter modules offer fast and convenient screw terminal connection for the bottom port of the D2-262 CPUs. The adapter modules are RS232/422/485 compatible and are offered with or without indicating LEDs and surge protection. See the Terminal Blocks and Wiring Solutions section in this catalog for more information.

ZL-CMA15L shown

CPU Status Indicators

RUN	ON	CPU is in RUN mode
	OFF	CPU is in PROGRAM mode
BATT	ON	Battery backup voltage is low
	OFF	Battery backup voltage is OK or disabled
CPU	ON	CPU internal diagnostics detects error
	OFF	CPU is OK
PWR	ON	CPU power good
	OFF	CPU power failure

Mode Switch

RUN	Puts CPU into RUN mode
TERM	Allows peripherals (HPP, *Direct*SOFT) to select the mode of operation
STOP	Forces CPU out of RUN mode

Port 1

Protocols	K-sequence Server, *Direct*NET™ Server, Modbus RTU Server
Devices	Can connect w/HPP, *Direct*SOFT, *C-more*, O/I panels, or any *Direct*NET Client
Specs.	6P6C phone jack connector RS-232 9,600 baud Fixed address Odd parity only 8 data bits one start, one stop asynchronous, half-duplex, DTE

Port 2

Protocols	K-sequence Server, *Direct*NET Client/Server, Modbus RTU Client/Server, ASCII IN/OUT, Remote I/O Client
Devices	Can connect w/many devices, such as PCs running *Direct*SOFT, DSData, HMI packages, *C-more*, other O/I panels, any *Direct*NET or Modbus RTU Client or Server, or ASCII devices
Specs.	HD15 connector RS-232, RS-422/485* 2400/4800/9600/19.2K/38.4K baud Odd, even, or no parity Selectable address (1-90, HEX 1 – 5A) 8 data bits, one start, one stop Asynchronous, Half-duplex, DTE

Battery (Optional)

D2-BAT-1	Coin type, 3.0V Lithium battery, 560mA, battery number CR2354

Note: Batteries are not needed for program backup. However, you should order a battery if you have parameters in V-memory that must be maintained in case of a power outage.
***RS485 for Modbus protocol only**

On-board memory

The D2-262 has 15.5K words of flash memory on board for your program plus 14.2K words of data registers. With flash memory, you don't have to worry about losing the program due to a bad battery.

Built-in remote I/O connection

The bottom port on the D2-262 can be used as a Client for serial remote I/O networks.

D2-262 Key Features

ASCII communications instructions

The D2-262 CPU supports several easy-to-use instructions that allow ASCII strings to be read into and written from the PLC communications ports.

Raw ASCII: Port 2 can be used for either reading or writing raw ASCII strings, but not for both.

Embedded ASCII characters: The D2-262 can decipher ASCII embedded within a supported protocol (K-Sequence, *Direct*Net, Modbus, Ethernet) via the CPU ports or D2-DCM.

Here's how the D2-262 can receive ASCII input strings:

• **ASCII IN (AIN) -** This instruction configures port 2 for raw ASCII input strings with parameters such as fixed and variable length ASCII strings, termination characters, byte swapping options, and instruction control bits. Use barcode scanners, weight scales, etc. to write raw ASCII input strings into port 2 based on the (AIN) instruction's parameters.

• Write embedded ASCII strings directly to V-memory from an external HMI or similar Client device via a supported communications protocol using the CPU ports, H2-ECOM100 or D2-DCM. The AIN instruction is not used in this case.

• If a D2-262 PLC is a Client on a network, the Network Read instruction (RX) can be used to read embedded ASCII data from a Server device via a supported communications protocol using port 2, H2-ECOM100 or D2-DCM. The RX instruction places the data directly into V-memory.

Here's how the D2-262 can write ASCII output strings:

• **Print from V-memory (PRINTV)** - Use this instruction to write raw ASCII strings out of port 2 to a display panel or a serial printer, etc. The instruction features the starting V-memory address, string length, byte swapping options, etc. When the instruction's permissive bit is enabled, the string is written to port 2.

• **Print to V-memory (VPRINT)** - Use this instruction to create pre-coded ASCII strings in the PLC (i.e. alarm messages). When the instruction's permissive bit is enabled, the message is loaded into a pre-defined V-memory address location. Then the (PRINTV) instruction may be used to write the pre-coded ASCII string out of port 2. American, European and Asian Time/Date stamps are supported.

• **Print Message (PRINT) -** This existing instruction can be used to create pre-coded ASCII strings in the PLC. When the instruction's permissive bit is enabled, the string is written to port 2. The VPRINT/PRINTV instruction combination is more powerful and flexible than the PRINT instruction.

• If a D2-262 PLC is a Client on a network, the Network Write instruction (WX) can be used to write embedded ASCII data to an HMI or Server device directly from V-memory via a supported communications protocol using port 2, H2-ECOM100 or D2-DCM.

Example of AIN instruction in DirectSOFT

Additional instructions that help manage the ASCII strings

The following instructions can be very helpful in managing the ASCII strings within the CPU's V-memory:

• **ASCII Find (AFIND)** - Finds where a specific portion of the ASCII string is located in continuous V-memory addresses. Forward and reverse searches are supported.

• **ASCII Extract (AEX)** - Extracts a specific portion (usually some data value) from the ASCII find location or other known ASCII data location.

• **Compare V-memory (CMPV)** - This instruction is used to compare two blocks of V-memory addresses and is usually used to detect a change in an ASCII string. Compared data types must be of the same format (i.e. BCD, ASCII, etc.).

• **Swap Bytes (SWAPB)** - Usually used to swap V-memory bytes on ASCII data that was written directly to V-memory from an external HMI or similar Client device via a communications protocol. The AIN and AEX instructions have a built-in byte swap feature.

Example of VPRINT instruction in DirectSOFT

DL205 Programming Tools and Cables

Selecting a programming device

There are two tools for programming the DL205 CPUs: *Direct*SOFT PC-based programming software and the D2-HPP handheld programmer.
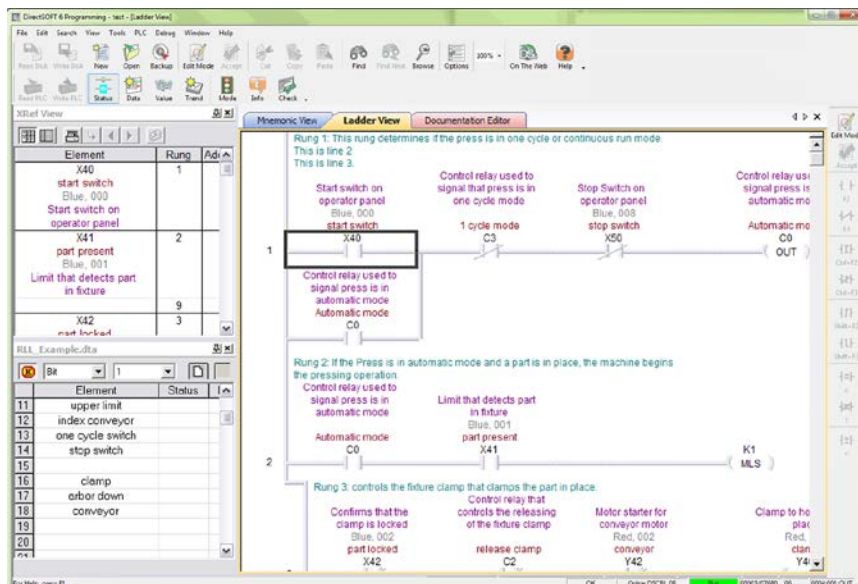
DirectSOFT programming software

Our powerful Windows-based programming package makes it easy for you to program and monitor your DL205 PLC system. See the *Direct*LOGIC Overview Section DL in this catalog for detailed information on *Direct*SOFT.

| *Direct*Soft Part Number	Price	Description
PC-DSOFT6	$462.00	Programs all *Direct*LOGIC PLC CPUs; offers IBox intelligent instructions
PC-DS100	Free	Free version of *Direct*SOFT; programs all *Direct*LOGIC PLC CPUs; limited to 100 word program
Note: D2-262 CPU requires *Direct*SOFT version 6.3 or later		

DL205 programming cables

Choose the proper cable to connect the DL205 CPU to your PC running DirectSoft.

CPU	Port	Cable	Price
D2-262	Top port	**D2-DSCBL**	$35.00
	Bottom port	**D2-DSCBL-1**	$67.00
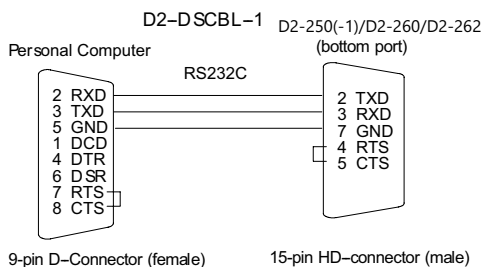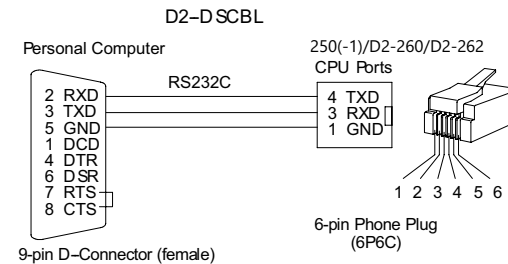
Handheld programmer

The D2-HPP handheld programmer connects to an RJ12 phone jack port on any of the DL205 CPUs. The handheld unit contains a zero force insertion socket that can be used to store programs on an optional EEPROM. Can be used with DL05, DL06, DL105, and DL205 models.

Pin labeling conforms to IBM DTE and DCE standards

D2–DSCBL

Personal Computer — RS232C — 250(-1)/D2-260/D2-262 CPU Ports

9-pin D–Connector (female)

6-pin Phone Plug (6P6C)

D2–DSCBL–1

Personal Computer — RS232C — D2-250(-1)/D2-260/D2-262 (bottom port)

9-pin D–Connector (female)

15-pin HD–connector (male)
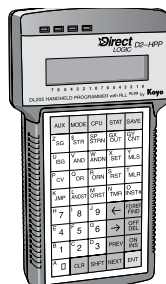
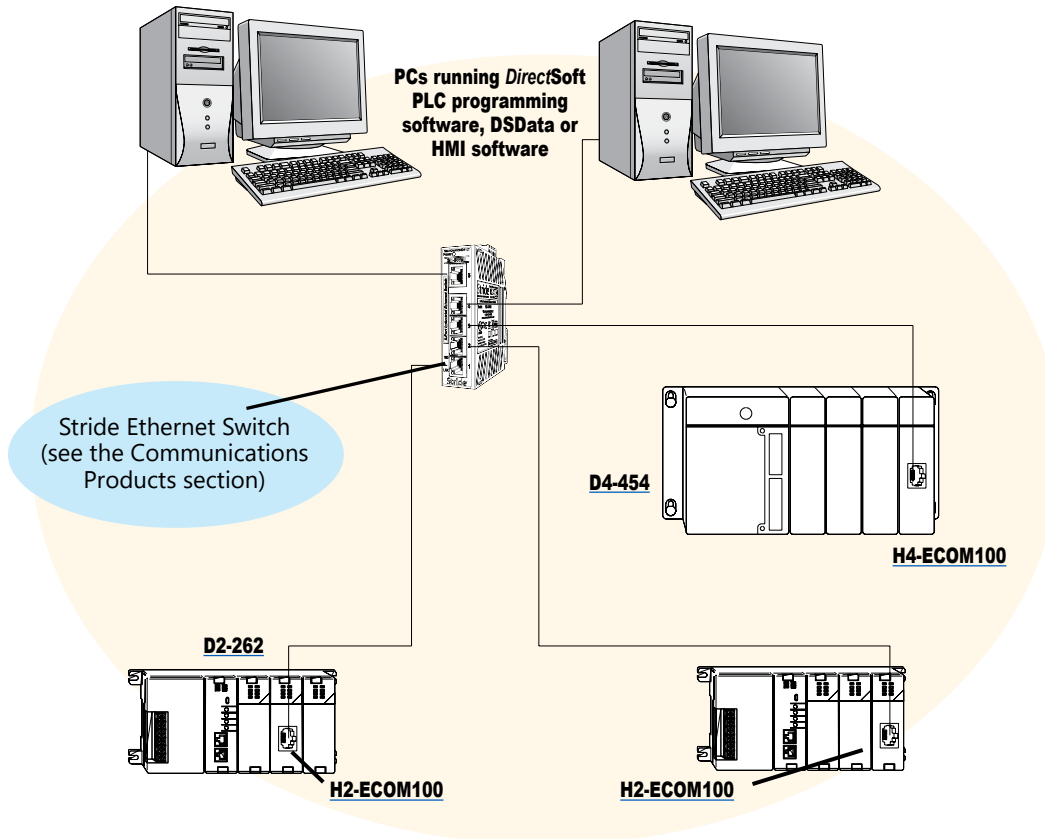*D2-HPP*
Handheld programmer, cable included (DV-1000CBL)

Step 3: Additional Communications Ports Needed?

Do you need communications ports in addition to the built-in CPU communications ports to connect to an operator interface or HMI? Would you like to connect to a network of other AutomationDirect products, or a Modbus RTU or Ethernet network? If so, then choose between the H2-ECOM100 Ethernet communications module or the D2-DCM serial data communications module. Both modules' specifications and communications details are covered later in this section.

H2-ECOM100 Ethernet network

PCs running *Direct*Soft PLC programming software, DSData or HMI software

Stride Ethernet Switch (see the Communications Products section)

D4-454

H4-ECOM100

D2-262

H2-ECOM100

H2-ECOM100

The H2-ECOM100 can be used for:
• High-speed peer-to-peer networking of PLCs (any PLC can initiate communications)
• CPU programming with *Direct*SOFT Programming Software
• High-speed data acquisition via HMI or other HMI software
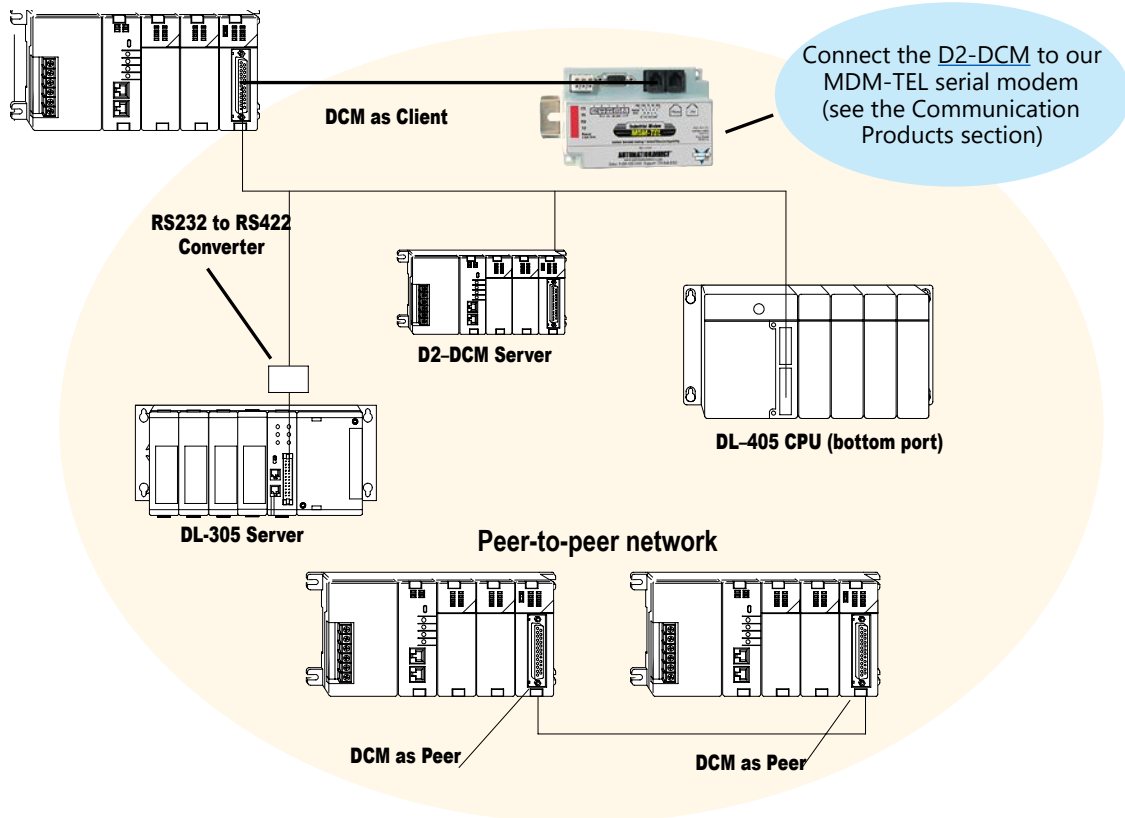• Virtually unlimited number of network nodes
• Very easy to setup

Ethernet networking with the H2-ECOM100

The D2-262 CPU supports the H2-ECOM100 Ethernet communications module. Any PLC on an ECOM network can initiate communications with another PLC or use *Direct*Soft to program any PLC on the network. This is the fastest data transfer rate we offer for HMI or other Windows-based software. When monitoring your PLC, you will notice much faster updates using the ECOM module. The H2-ECOM100 module supports the industry standard 10 or 100Base-T with an RJ45 port. The ECOM modules use standard cables, hubs and repeaters which are available from a large number of suppliers. A virtually unlimited number of PLCs can be connected to an Ethernet network using ECOM modules.

D2-DCM serial network

DCM as Client

Connect the D2-DCM to our MDM-TEL serial modem (see the Communication Products section)

RS232 to RS422 Converter

D2–DCM Server

DL–405 CPU (bottom port)

DL-305 Server

Peer-to-peer network

DCM as Peer

DCM as Peer

The D2-DCM can be used for:
- *Direct*Net networking of PLCs (only one DCM or PC can serve as Client)
- Peer-to-peer networking of two DCM modules (each can serve as a Client or Server)
- CPU programming with *Direct*SOFT Programming Software
- Data acquisition via HMI, DSData Server, or other HMI software
- A Server on a Modbus RTU network
- Connection to a serial modem (MDM-TEL)

Serial networking with the D2-DCM

The D2-262 CPU supports the D2-DCM Data Communications Module, which can serve as a *Direct*Net Client/Server, *Direct*Net peer, or a Modbus RTU Server. The D2-DCM supports both RS-232 and RS-422. You can program the CPU through the DCM locally, or if a PC is the RS-422 Client, you can use *Direct*Soft to program any PLC on the network.

Step 4: Select the I/O Modules

There are several factors you should consider when choosing an I/O module.

1. Environmental specifications: What environmental conditions will the I/O module be subjected to?

2. Hardware specifications: Does this product have the right features, performance and capacity to adequately serve your application?

3. Field termination: How does this module connect to field devices? Do you need a sinking or sourcing DC module?

4. Power budget: It is very important that your module selections operate within the base power budget. Refer to the power budget description later in this section.

Check the environmental specifications

The following table lists the environmental specifications that globally apply to the DL205 system (CPUs, bases, and I/O modules). Be sure the modules you choose are operated within these environmental specifications.

Specifications and ratings

Storage temperature*
-4ºF – 158ºF (-20ºC to 70ºC)
Ambient operating temperature**
32ºF – 131ºF (0º to 55ºC)
Ambient humidity
30% - 95% relative humidity (non-condensing)
Vibration resistance
MIL STD 810C, Method 514.2
Shock resistance
MIL STD 810C, Method 516.2
Noise immunity
NEMA (ICS3-304)
Atmosphere
No corrosive gases
Storage temperature for the Handheld Programmer is –4º to 158ºF (-20º to 70ºC)
**Operating temperature for the Handheld Programmer is 32º to 122ºF (0º to 50ºC)*

This logo is placed by each I/O module that supports ZIPLink connection systems. (The I/O modules are listed at the end of this section.) See the Terminal Blocks and Wiring section for details on ZIPLinks.

Review I/O hardware specifications

The hardware specifications for every DL205 module are described later in this section.

Take time to understand the specification charts, the derating curves and the wiring diagrams. The module specifications should help you determine if this module is right for your application.

Factors affecting field termination

DL205 modules use three types of field terminations. They include a low density removable terminal block (used on modules with eight or fewer points), a high density removable terminal block (European style terminal block available on modules with 12 to 16 points), and a 40-pin connector (for modules with 32 points). The module diagrams indicate the connector type that is on the module. You can also use our super fast and inexpensive ZIPLink I/O connector systems.

Module types and suggested AWG range

4 point
16* - 24 AWG
8 point
16* - 24 AWG
12 point
16* - 24 AWG
16 point
16* - 24 AWG
32 point
Ribbon and Solder-style Connectors
Note: 16 AWG Type TFFN or Type MTW can be used on 8 pt. modules. Other types of 16 AWG may be acceptable, but it really depends on the thickness of the wire insulation. If the insulation is too thick and you use all the I/O points, then the plastic terminal cover may not close properly.
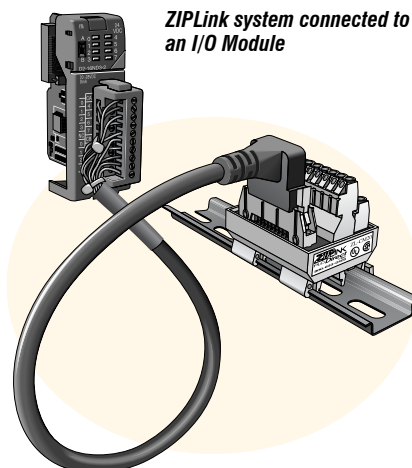
ZIPLink system connected to an I/O Module

Need spare parts?

Sometimes it is helpful to have extra I/O module connectors or spare fuses. The DL205 spare parts and accessories are listed below:

- D2-FILL – Filler module for empty slots
- D2-8IOCON – 8-pt. I/O terminal blocks
- D2-16IOCON – 16-pt. I/O terminal blocks
- D2-IOCVR – Spare terminal block covers
- D2-FUSE-1 – Fuses for D2-12TA
- D2-FUSE-3 – Fuses for D2-04TD1, D2-04TRS, D2-08TR, D2-08CDR
- D2-FUSE-4 – Fuses for D2-12TR
- D2-ACC-1 – Base power terminal strip screws
- D2-ACC-2 – Spare terminal screws for 4-pt. and 8-pt. I/O modules
- ZL-D24-CON-X – Solder-type connector for 32-pt. and 64-pt. modules
- **DIN***nectors* and **ZIP**Links — Refer to the Terminal Blocks and Wiring section of this catalog for the complete line of products available.

DINnectors terminal blocks

DIN*nectors* are DIN-rail mounted connectors or terminal blocks. They provide a means of connecting and identifying two or more wires. All **DIN***nectors* are UL, CSA, VDE, SEV, RINA and IEC approved. For more information, refer to the Terminal Blocks and Wiring section.

ZIPLink connection systems

ZIPLinks consist of PLC interface cables and connector modules that offer "plug and play" capability by plugging one end of the ZIPLink cable into an I/O module and the other end into the ZIPLink connector module. This eliminates the tedious process of wiring PLC I/O terminals to terminal blocks individually. For more information, refer to Wiring Solutions in this section or see the Terminal Blocks and Wiring Solutions section in this catalog.

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I/O Availability

I/O Availability Table		
PLC CPU / CPU-Slot Controller	*D2-2622*	*H2-EBC100*
Discrete Modules		
DC Sink/Source In	✓	✓
DC Output	✓	✓
AC Input	✓	✓
AC Output	✓	✓
Relay Out	✓	✓
DC In / Relay Out	✓	✓
Analog Modules		
Analog Current In	✓	✓
Analog Voltage In	✓	✓
Analog Current Out	✓	✓
Analog Voltage Out	✓	✓
Analog Isolated Current Out	✓	✓
Analog Isolated Voltage Out	✓	✓
Combination Analog	✓	✓
Temperature Input	✓	✓
Speciality Modules		
Local Expansion	✓	
Communications	✓	
Remote I/O	✓	
CoProcessor	✓	
Counter I/O (H2-CTRIO2)	✓	✓
*Counter Interface (D2-CTRINT)**		

Sinking and sourcing for DC field devices

If you are using a DC type of field device, then you should consider whether the device is a sinking or sourcing configuration. This may affect your module selection since it determines the manner in which the device must be wired to the module (AUTOMATIONDIRECT offers both sinking and sourcing modules). Refer to the sinking/sourcing appendix for a complete explanation on how this affects your system selection.

Analog module selection tips

If you're going to control the speed of an AC inverter or drive with the DL205 analog module, make sure you select either the current sourcing F2-02DAS-1 or voltage sourcing F2-02DAS-2 isolated analog output module. Complete module specifications are listed later in this section.

If you need to operate within a 12VDC environment, the analog module part numbers that end with (-L) will operate at 12VDC. Most of the other modules require 24VDC.

H2-CTRIO2 vs. D2-CTRINT high-speed counter module

Select the H2-CTRIO2 instead of the D2-CTRINT* if your application requires:

- More than one quadrature encoder
- More than two single up counters
- Compatibility with the WinPLC
- High-speed inputs or outputs > 5 kHz
- Output operations on the module based on counts without interacting with the CPU

The H2-CTRIO2 is configured using "CTRIO Workbench", a Windows-based "Wizard" utility, eliminating the need for ladder logic programming to configure the module. Multiple CTRIO modules can be used in a base to support additional input/output pulse trains

*NOTE: D2-262 CPU does not support the D2-CTRINT module.

Step 5: Choose an I/O Configuration

I/O configurations

The DL205 system offers local I/O, local expansion and remote I/O system configurations. A DL205 system can use a combination of the configuration arrangements. The tables, along with the configuration diagrams, list the number of I/O points, bases, etc. that are available with each configuration.

I/O bases

I/O bases are used for local I/O, local expansion or remote I/O configurations. The (-1) bases are required for local I/O expansion that is supported by the CPUs. The (-1) bases can be used with all DL205 CPUs (Older, non-(-1) bases can be used if local expansion is not required). There are four DL205 base sizes (3, 4, 6, and 9-slot), each of which has a built-in power supply.

Local I/O

The D2-262 CPU supports local I/O and local expansion bases. All local I/O points are updated on every CPU scan. The I/O count limits are determined by the number of available I/O slots, the I/O module point density, and the power budget available for the system.

Local expansion

The D2-262 supports local expansion up to five total bases (one CPU base and four expansion bases). Expansion bases are commonly used when there are not enough slots available in the CPU base, or when the base power budget will be exceeded. Each local expansion base requires the D2-CM module in the CPU slot. The local CPU base requires the D2-EM Expansion Module, as well as each expansion base. The modules are connected using the D2-EXCBL-1. When using expansion bases, discrete I/O are updated synchronously with each scan, while analog I/O are asynchronous with the scan.

Ethernet remote I/O

The DL205 Ethernet Remote I/O system allows you to locate I/O bases at a remote distance from the CPU. For many applications, this can reduce wiring costs by allowing I/O points to be located near the devices they are controlling.

The Ethernet Remote Client module (H2-ERM100) is placed in an I/O slot of the local CPU base. Ethernet Base Controller (EBC) modules serve as the remote Server units and are placed in the CPU slot of one or more remote bases. You can use standard DL205 modules in the remote bases. The Remote

Servers are connected to the Client using Category 5 UTP cables for cable runs up to 100 meters. Use repeaters to extend distances and hubs to expand the number of nodes.

Each H2-ERM100 module can support up to: 16 H2-EBC100 systems, 16 Terminator I/O EBC systems, 16 fully expanded H4-EBC systems, or any combination of these.

The PLC, ERM and EBC Server modules work together to update the remote I/O points. These three scan cycles are occurring at the same time, but asynchronously. It is recommended that critical I/O points that must be monitored every scan be placed in the CPU base.

ERM Workbench is an easy-to-use Windows-based software utility for configuring the ERM and its remote Servers.

It is highly recommended that a dedicated Ethernet remote I/O network be used for the ERM and its Servers. While Ethernet networks can handle a very large number of data transactions, and normally handle them very quickly, heavy Ethernet traffic can adversely affect the reliability of the Server I/O and the speed of the I/O network. Ensure ERM networks, multiple ERM networks and ECOM/office networks are isolated from one another.

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Local and Local Expansion I/O Configurations

Local I/O configurations

Local I/O Configuration

CPU	Total I/O	Max. Inputs	Max. Outputs
D2-262	256	256	256

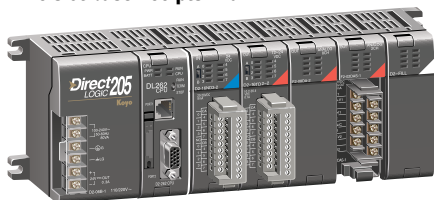*Four I/O base configurations to select from*
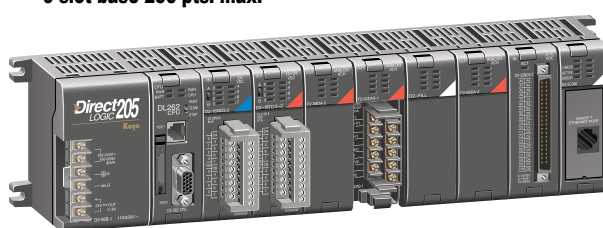
3-slot base 64-pts. max.

4-slot base 96-pts. max.

6-slot base 160-pts. max.

9-slot base 256-pts. max.

Local expansion I/O configurations using D2-EM and D2-CM modules

D2-262 local expansion system

The D2-262 support local expansion, up to five total bases (one CPU base and four expansion bases). All bases in an expansion system must be (-1) bases. The CPU base can be located at any point in the expansion system layout. The maximum total expansion system cable length is 30m (98ft). For more information, refer to the Expansion Module specification pages later in this section.

D2-262 CPU

D2-EM

D2-CM

Do not use Ethernet hubs to connect the modules.
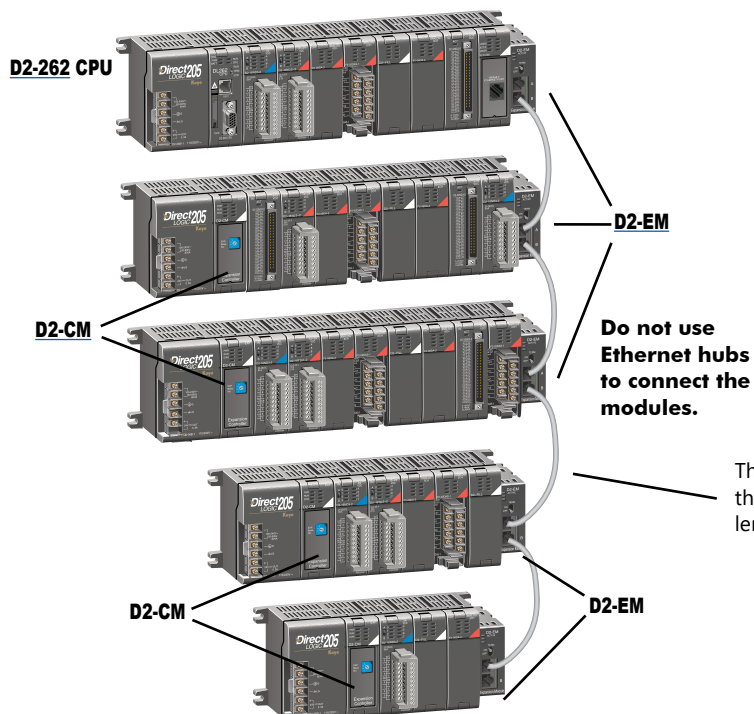
Local Expansion I/O Configuration

CPU	# of Exp. Bases	Total I/O	Max. Inputs	Max. Outputs
D2-262	4	1280	1024	1024

The D2-EXCBL-1 is a Category 5 straight-through cable that connects the D2-EM modules together. The cable can be user made in custom lengths up to 30m depending upon the configuration.

D2-CM

D2-EM

Remote I/O Configurations
Ethernet remote I/O configuration using H2-ERM100 and EBC Servers

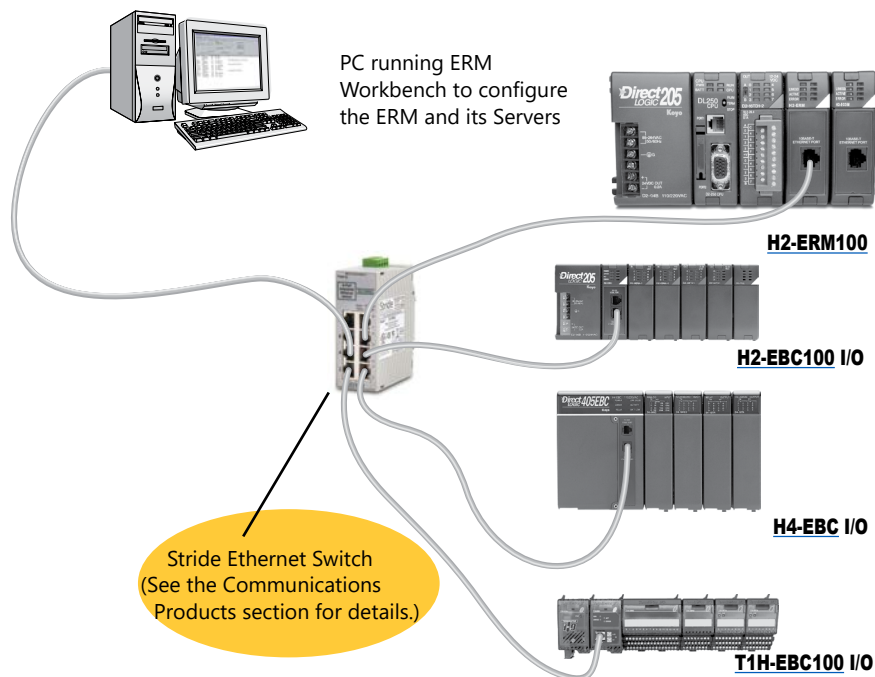PC running ERM Workbench to configure the ERM and its Servers

H2-ERM100

H2-EBC100 I/O

H4-EBC I/O

T1H-EBC100 I/O

Stride Ethernet Switch (See the Communications Products section for details.)

Specifications	H2-ERM100
Communications	10/100Base-T Ethernet
Data Transfer Rate	100 Mbps
Link Distance	100 meters (328 ft)
Ethernet Port	RJ45
Embedded Web Server	HTTP (unsecure)
Ethernet Protocols	TCP/IP, IPX, Modbus TCP/IP, DHCP, HTML (unsecure) configuration

Ethernet Remote I/O Configuration					
CPU	Max. # of Channels	Max. # of Servers/ Channel	Discrete I/O pts.	Analog I/O	Remote I/O pts / Channel
D2-262	Limited by power budget	16 Servers (H2-EBC100, H4-EBC or T1H-EBC100)	8192	Map into available memory registers	16,384 [1]

1 *16,384 I/O pts. can be achieved with 16 fully expanded H4-EBC Servers using V-memory and bit-of-word instructions.*

Note: It is highly recommended that a dedicated Ethernet remote I/O network be used for the ERM and its Servers. While Ethernet networks can handle a very large number of data transactions, and normally handle them very quickly, heavy Ethernet traffic can adversely affect the reliability of the Server I/O and the speed of the I/O network. Ensure ERM networks, multiple ERM networks and ECOM/office networks are isolated from one another.

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I/O Addressing Schemes

DL205 I/O addressing scheme

You may have used other PLC systems prior to trying *Direct*LOGIC products. One of the key differences between various PLC systems is the I/O module addressing. This section will show you how we address the individual I/O points in a DL205 system.

Octal addressing

The DL205 uses octal addressing. That is, the I/O point addresses do not include any "8s" or "9s". The I/O points start at 0 and continue in increments of 8 or 16 points, depending on the modules being used. We have designated "X" for inputs and "Y" for outputs.

Note: Four-point modules consume eight points, but only the first four points are actually used by the module. Twelve-point modules consume 16 points, but only 12 points are used. The first six points are used, then two points are skipped, then the next six points are used, and the last two are skipped.

Automatic addressing

The DL205 CPUs automatically examine local I/O modules to establish the correct I/O addressing on power-up. The D2-262 CPU automatically examines I/O modules in expansion bases as well. The modules don't have to be grouped by type and can typically be mixed in any order. However, there are restrictions placed on some specialty modules or combinations of modules (see the next page). The diagram to the right shows sample addresses for a simple system that contains a few discrete I/O modules.

Manual addressing

The D2-262 CPU allows you to manually assign I/O addresses for any or all I/O slots on the local or expansion bases. This feature is useful if you have a standard configuration that you need to change slightly to accommodate a special request (i.e. adding or removing I/O modules from a system). Manual addresses are based on 16-point boundaries.

Remote I/O addressing

Remote I/O allows you to assign addresses manually. You can choose the data type for the remote points. Ethernet remote I/O (H2-ERM100) allows you to map the analog I/O channels directly into V-memory (16-bit words) while mapping the discrete I/O points into input/output bit memory (Xs & Ys). Serial remote I/O allows you to assign one starting address for all of the input modules and one starting address for the output modules.

Leaving empty slots

You may be tempted to leave empty slots for future expansion. This is perfectly acceptable, but it is very important that you understand the implications of placing a module in the empty slot at a later time.

Since the CPU automatically assigns the I/O addresses, it is possible to cause problems by adding a module to the system. Examine the example system shown below. If you added an input module to the empty slot, the new input addresses would start after the existing input addresses, so no problems would occur. However, if you added an output to the empty slot, your remaining output addresses would change. Therefore, you would have to edit your RLL program to reflect the address changes. The manual addressing feature is especially useful when adding an I/O module between existing I/O modules or removing a module.

You should always add extra modules to the right of existing modules of the same type to avoid any re-addressing of your I/O points.
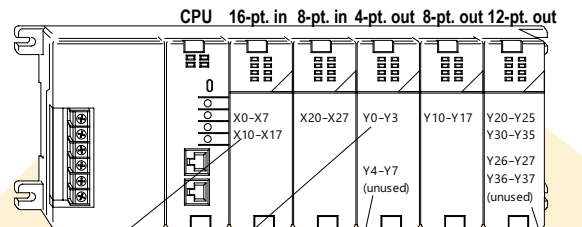
Inputs start at X0 | Outputs start at Y0 | 4-pt. module has four points unused | 12-pt. module skips points and has four unused points
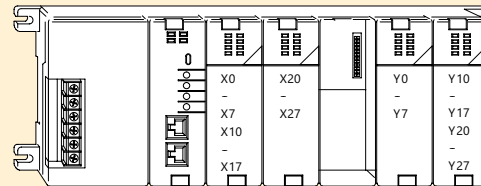
I/O base with a slot left empty. The examples below show the addressing changes if an input or an output module is added to the system.
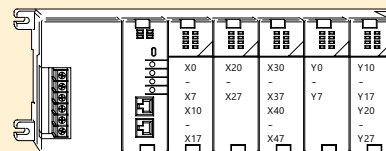
Add Input module. Addresses follow existing, so no program modification is required.
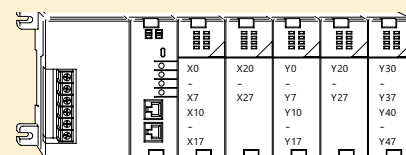
Add output module. Addresses are re-numbered and program modification is required.

1 2 3 4 5 HERE 6 7

Module Placement and I/O Usage Tables

Verify planned I/O module locations

There are very few I/O module placement restrictions in the DL205 family. In general, any mix of analog and discrete module types can be used in any local, expansion or remote base. However, there are a few situations with the analog and specialty modules that warrant some special considerations. Reference the Module Placement Restrictions table to the right for the DL205.

Analog I/O with expansion bases

When using an analog module in an expansion base, the analog update time to the CPU will be asynchronous to the scan time.

I/O point usage

The table to the right indicates the number of I/O points consumed by each module. Use this information to ensure you stay within the maximum I/O count of the I/O system you have chosen.

Module Placement Restrictions			
Module/Unit	*Local CPU Base*	*Local Expansion*	*Remote Base*
CPUs	CPU slot only		
DC Input	✓	✓	✓
AC Input	✓	✓	✓
DC Output	✓	✓	✓
AC Output	✓	✓	✓
Relay Output	✓	✓	✓
Analog Input & Output	✓	✓	✓
Local Expansion[1] (D2-262)			
Base Expansion Unit (D2-EM)	✓		
Base Controller Unit (D2-CM)		✓ CPU slot only	
Remote I/O			
Remote Client	✓		
Remote Server Unit			CPU slot only
Ethernet Remote Client	✓		
CPU Device			
Ethernet Base Controller	CPU slot only		
DeviceNET	CPU slot only		
SDS	CPU slot only		
Specialty modules			
Counter Interface (D2-CTRINT)[3]	Slot 0 only		
Counter I/O (H2-CTRIO2)[2]	Any slot except Slot 0	✓	✓
Simulator	✓		
Data Communications	Any slot except Slot 0		
Ethernet Communications	Any slot except Slot 0		
Basic CoProcessor	Any slot except Slot 0		

1 When used in expansion bases, the analog update is asynchronous to the PLC.
2 H2-CTRIO2 will not work in slot 0 when used with the D2-262. The H2-CTRIO2 is not supported in expansion bases at this time.
3 D2-262 does not support the D2-CTRINT module.

I/O Module Point Usage					
DC INPUT		*RELAY OUTPUT*		*SPECIALTY MODULES*	
D2-08ND3	8 in	D2-04TRS	8* out	D2-CM	None
D2-16ND3-2	16 in	D2-08TR	8 out	F2-08SIM	8 in
D2-32ND3	32 in	F2-08TR	8 out	D2-CTRINT	8 in 8 out
D2-32ND3-2	32 in	F2-08TRS	8 out	H2-CTRIO2	None
		D2-12TR	16** out	D2-DCM	None
				H2-EBC100	None
				H2-ECOM100	None
AC INPUT		*COMBINATION*		F2-CP128	None
D2-08NA-1	8 in				
D2-08NA-2	8 in	D2-08CDR	8 in*/8 out*		
D2-16NA	16 in				
DC OUTPUT		*ANALOG*			
D2-04TD1	8* out	F2-04AD-1	16 in		
D2-08TD1	8 out	F2-04AD-2	16 in		
D2-08TD2	8 out	F2-08AD-1	16 in	*REMOTE I/O*	
D2-16TD1-2	16 out	F2-08AD-2	16 in		
D2-16TD2-2	16 out	F2-02DA-1 & 1L	16 out		
F2-16TD1P	16 in/16 out	F2-02DA-2 & 2L	16 out	H2-ERM100	None
F2-16TD2P	16 in/16 out	F2-4AD2DA	16 in/16 out		
D2-32TD1	32 out	F2-8AD4DA-1	32 in/32 out		
D2-32TD2	32 out	F2-8AD4DA-2	32 in/32 out		
		F2-02DAS-1	32 out		
AC OUTPUT		F2-02DAS-2	32 out		
		F2-08DA-1	16 out		
D2-08TA	8 out	F2-08DA-2	16 out		
F2-08TA	8 out	F2-04RTD	32 in		
D2-12TA	16** out	F2-04THM	32 in		

* 4-pt. modules consume eight points. Only the first four points are used.
** 12-pt. modules consume 16 points. The first six points are assigned, two are skipped, and then the next six points are assigned. For example, a D2-12TA installed in slot 0 would use Y0-Y5, and Y10-Y15. Y6-Y7, and Y16-Y17 would be unused.

(1) (2) (3) (4) (5) (6 HERE) (7)

Step 6: Check the Power Budget

Managing your power resource

When determining the types and quantity of I/O modules you will be using, it is important to remember there is a defined amount of power available from the base power supply.

The chart on the next page indicates the power supplied and used by each DL205 device. The adjacent chart shows an example of how to calculate the power used by your particular system. These charts should make it easy for you to determine if the devices you have chosen will operate within the power budget of your system configuration.

If the I/O you have chosen exceeds the maximum power available from the power supply, you may be able to resolve the problem by using local expansion or remote I/O bases.

DL205 power supply specifications

The table below lists base power supply specifications, including maximum inrush current and maximum power consumed from your power source.

Power budget example

The example on the right shows how to calculate the power budget for the DL205 system. The examples are constructed around a single 9-slot base using the devices shown. It is recommended you construct a similar table for your DL205 system. Follow the steps to the right to determine your power budget.

1. Using a chart similar to the one below, fill in column 2.

2. Using the tables on the next page, enter the current supplied and used by each device (columns 3 and 4). Devices which fall into the "Other" category (Row D) are devices such as the operator interface and the handheld programmer, which also have power requirements, but do not directly plug into the base.

3. Add the current used by the system devices (columns 3 and 4) starting with the CPU slot and put the total in the row labeled "Maximum Current Required" (Row E).

4. Subtract the row labeled "Maximum Current Required" (Row E), from the row labeled "Current Supplied" (Row B). Place the difference in the row labeled "Remaining Current Available" (Row F).

5. If "Maximum Current Required" is greater than "Current Supplied" in either column 3 or 4, the power budget will be exceeded. It will be unsafe to use this configuration, and you will need to restructure your I/O configuration. Note the auxiliary power supply does not need to supply all the external power. If you need more than the 300mA supplied, you can add an external 24V power supply. This will help keep you within your power budget for external power.

A	Column 1	Column 2	Column 3	Column 4
		Device Type	5VDC (mA)	External Power 24 VDC (mA)
B	CURRENT SUPPLIED			
	Base	9 slot	2,600	300
C	CURRENT REQUIRED			
	CPU SLOT	D2-262 (CPU)	336	0
	SLOT 0	D2-16ND3-2	100	0
	SLOT 1	D2-16ND3-2	100	0
	SLOT 2	D2-16NA	100	0
	SLOT 3	D2-08NA-1	50	0
	SLOT 4	D2-16TD1-2	200	80
	SLOT 5	D2-08TA	250	0
	SLOT 6	D2-08TA	250	0
	SLOT 7			
D	OTHER			
	Operator interface	EA9-	150	0
	Handheld programmer	D2-HPP	200	0
E	Maximum Current Required		1736	80
F	Remaining Current Available		2600-1730=870	300-80=220

Power Supply Specifications			
Specification	AC Powered Bases	24 VDC Powered Bases	125 VDC Powered Bases
Part Numbers	D2-03B-1, D2-04B-1, D2-06B-1, D2-09B-1	D2-03BDC1-1, D2-04BDC1-1, D2-06BDC1-1, D2-09BDC1-1	D2-06BDC2-1, D2-09BDC2-1
Voltage Withstand (dielectric)	1 minute @ 1,500 VAC between primary, secondary, field ground, and run relay		
Insulation Resistance	> 10Mq at 500VDC		
Input Voltage Range	85-132 VAC (110 range) 170-264 VAC (220 range) 47-63Hz	10.2-28.8 VDC (24VDC), with less than 10% ripple	100-264 VDC (125VDC), with less than 10% ripple
Auxiliary 24 VDC Output	300mA max.	None	300mA max.
Maximum Inrush Current	30A	10A	20A
Maximum Power	80VA	25W	30W

STEP 1 STEP 2 STEP 3 STEP 4 STEP 5 STEP 6 HERE STEP 7

Power Requirements

These charts help determine your power requirements

This section shows the amount of power supplied by each of the base power supplies and the amount of power consumed by each DL205 device. The Power Consumed charts list how much INTERNAL power from each power source is required for the DL205 devices. Use this information when calculating the power budget for your system.

In addition to the internal power sources, the DL205 bases offer a 24 VDC auxiliary power supply with external power connections. This auxiliary power supply can power external devices.

Use *ZIP*Links to reduce power requirements

If your application requires a lot of relay outputs, consider using the *ZIP*Link AC or DC relay output modules. These modules can switch high current (10A) loads without putting a load on your base power budget. Refer to the Terminal Blocks and Wiring Solutions section in this catalog for more information.

This logo is placed next to the I/O modules that are supported by the *ZIP*Link connection systems. See the I/O module specifications at the end of this section.

Power Supplied

Device	Price	5V(mA)	24V Auxiliary
Bases			
D2-03B-1	$200.00	2600	300
D2-03BDC1-1	$249.00	2600	None
D2-04B-1	$217.00	2600	300
D2-04BDC1-1	$274.00	2600	None
D2-06B-1	$268.00	2600	300

Power Consumed

Device	5V(mA)	24V Auxiliary
CPUs		
D2-262	336	0
DC Input Modules		
D2-08ND3	50	0
D2-16ND3-2	100	0
D2-32ND3	25	0
D2-32ND3-2	25	0
AC Input Modules		
D2-08NA-1	50	0
D2-08NA-2	100	0
D2-16NA	100	0
Input Simulator Module		
F2-08SIM	50	0
DC Output Modules		
D2-04TD1	60	20
D2-08TD1	100	0
D2-08TD2	100	0
D2-16TD1-2	200	80
D2-16TD2-2	200	0
F2-16TD1P	70	50
F2-16TD2P	70	50
D2-32TD1	350	0
D2-32TD2	350	0
AC Output Modules		
D2-08TA	250	0
F2-08TA	250	0
D2-12TA	350	0
Relay Output Modules		
D2-04TRS	250	0
D2-08TR	250	0
F2-08TR(S)	670	0
D2-12TR	450	0
Combination In/Out Module		
D2-08CDR	200	0

Power Supplied

Device	Price	5V(mA)	24V Auxiliary
Bases			
D2-06BDC1-1	$304.00	2600	None
D2-06BDC2-1	$279.00	2600	300
D2-09B-1	$333.00	2600	300
D2-09BDC1-1	$360.00	2600	None
D2-09BDC2-1	$359.00	2600	300

Power Consumed

Device	5V(mA)	24V Auxiliary
Analog Modules		
F2-04AD-1	100	5
F2-04AD-2	110	5
F2-08AD-1	100	5
F2-08AD-2	100	5
F2-02DA-1	40	60 (note 1)
F2-02DA-2	40	60
F2-02DAS-1	100	50 / channel
F2-02DAS-2	100	60 / channel
F2-08DA-1	30	50 (note 1)
F2-08DA-2	60	140
F2-4AD2DA	60	80 (note 1)
F2-8AD4DA-1	35	100 (note 1)
F2-8AD4DA-2	35	80 (note 1)
F2-04RTD	90	0
F2-04THM	110	60
Specialty Modules		
D2-CTRINT	50*	0
D2-CM / D2-EM	100/130	0
H2-CTRIO2	275	0
D2-DCM	300	0
H2-EBC100	300	0
H2-ECOM100	300	0
F2-CP128	235	0
Remote I/O		
H2-ERM100, (-F)	300, (-F: 450)	0
Programming Devices		
D2-HPP	200	0

* Requires external 5VDC for outputs

Note 1: Add an additional 20 mA per output loop.

Power Consumed

Device	5V(mA)	24V Auxiliary
Operator Interface		
C-more Micro-Graphic	210	0

Dimensions and Installation

Understanding the installation requirements for your DL205 system will help ensure that the DL205 products operate within their environmental and electrical limits.

Plan for safety

This catalog should never be used as a replacement for the user manual. The user manual, D2-USER-M (downloadable online), contains important safety information that must be followed. The system installation should comply with all appropriate electrical codes and standards.

Environmental specifications

The Environmental Specifications table at the right lists specifications that apply globally to the DL205 system (CPUs, bases, and I/O modules). Be sure that the DL205 system is operated within these environmental specifications.

Base dimensions and mounting

Use the diagrams below to make sure the DL205 system can be installed in your application. To ensure proper airflow for cooling purposes, DL205 bases must be mounted horizontally. It is important to check these dimensions against the conditions required for your application. For example, it is recommended that approximately 3" of space is left in front PLC surface for ease of access and cable clearances. Also, check the installation guidelines for recommended cabinet clearances.

See the Enclosures section for an enclosure that may be suitable for your application
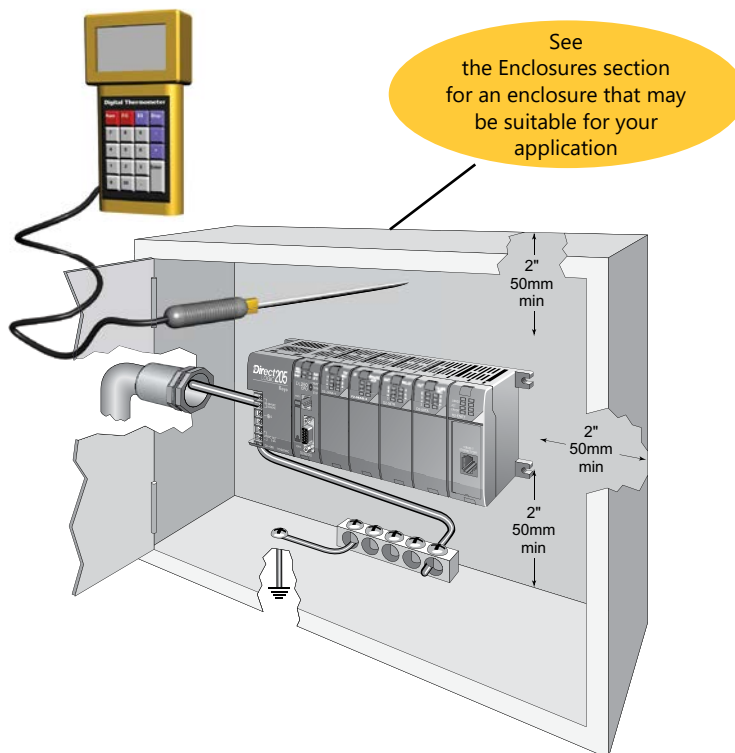
Environmental Specification	Rating
Storage Temperature	-4°F to 158°F (-20°C to 70°C)
Ambient Operating Temperature	32°F to 131°F (0°C to 55°C)
Ambient Humidity	30% to 95% relative humidity (non-condensing)
Vibration Resistance	MIL STD 810C, Method 514.2
Shock Resistance	MIL STD 810C, Method 516.2
Noise Immunity	NEMA (ICS3-304)
Atmosphere	No corrosive gases

Base	A		B		C		D	
D2-03B-1, D2-03BDC1-1	6.77"	172mm	6.41"	163mm	5.8"	148mm	7.24"	184mm
D2-04B-1, D2-04BDC1-1	7.99"	203mm	7.63"	194mm	7.04"	179mm	8.46"	215mm
D2-06B-1, D2-06BDC1-1, D2-06BDC2-1	10.43"	265mm	10.07"	256mm	9.48"	241mm	10.90"	277mm
D2-09B-1, D2-09BDC1-1, D2-09BDC2-1	14.09"	358mm	13.74"	349mm	13.14"	334mm	14.56"	370mm

With D2-DSCBL-1 on port 2 — 5.85" 148mm

With 32pt. ZipLink cable or base expansion unit cable — 4.45" 113mm

With 16pt. I/O — 3.62" 92mm

With 8pt. I/O — 2.95" 75mm

DIN rail slot (35mm)

A
C

3.54" 90mm

2.99" 76mm

B

With D2-EM base expansion module

D

OK

Airflow