



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*

-4°F - 158°F (-20°C to 70°C)

Ambient operating temperature**

32°F - 131°F (0° to 55°C)

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 -4° to 158°F (-20° to 70°C)

** Operating temperature for the Handheld Programmer is 32° to 122°F (0° to 50°C)

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

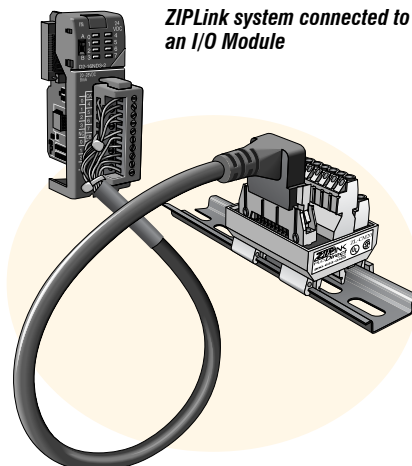
16 point

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
- **DINnectors** and **ZIPLinks** — Refer to the Terminal Blocks and Wiring section of this catalog for the complete line of products available.

DINnectors terminal blocks

DINnectors are DIN-rail mounted connectors or terminal blocks. They provide a means of connecting and identifying two or more wires. All **DINnectors** 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.



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.



Local and Local Expansion I/O Configurations

Local I/O configurations

Four I/O base configurations to select from

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

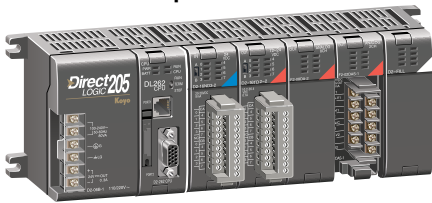
3-slot base 64-pts. max.



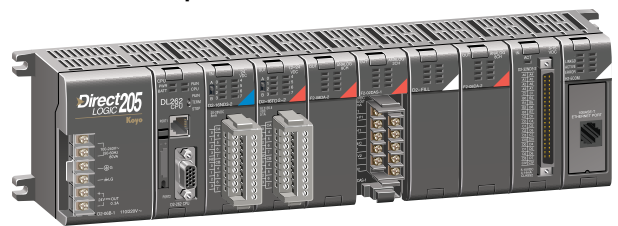
4-slot base 96-pts. max.



6-slot base 160-pts. max.



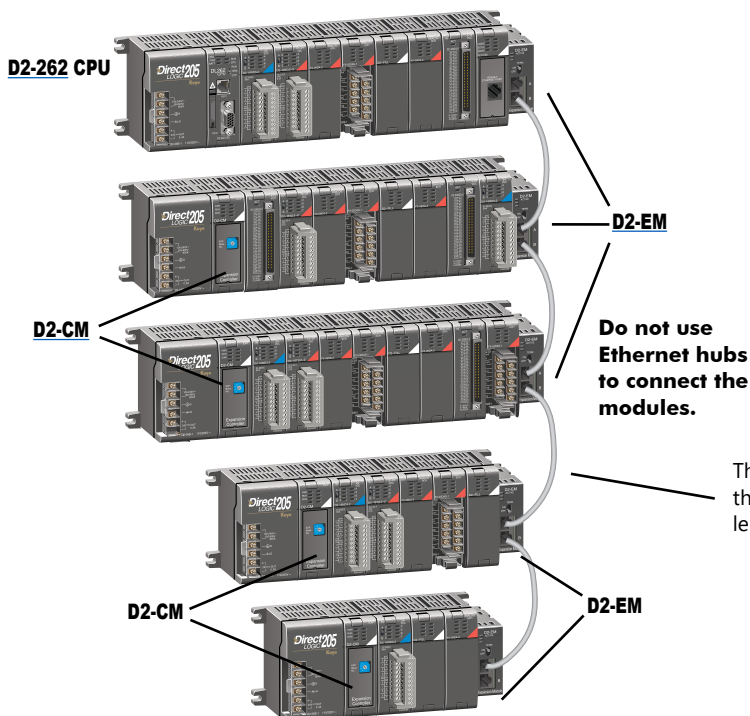
9-slot base 256-pts. max.



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.



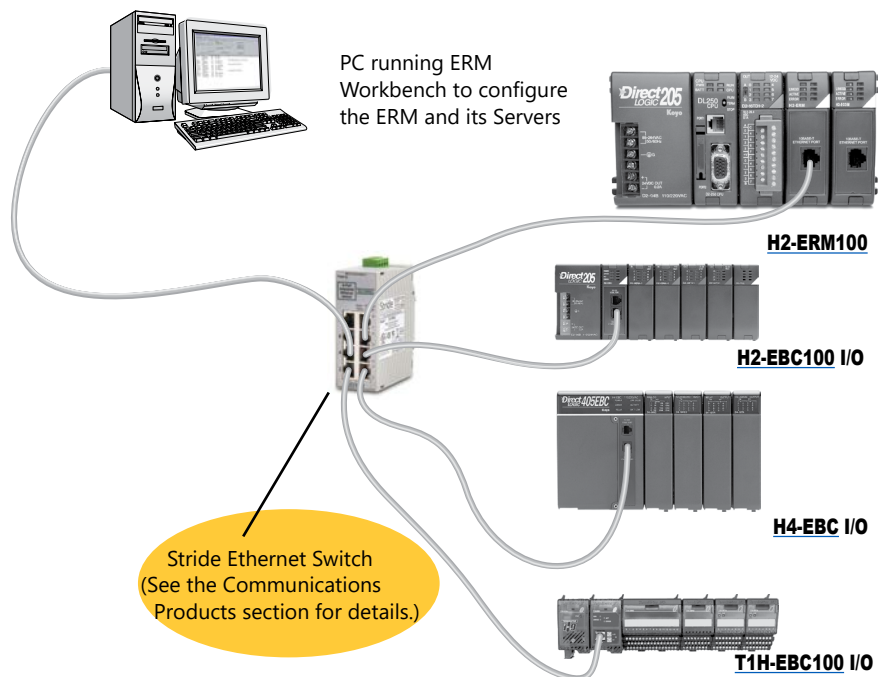
| Local Expansion I/O Configuration | | | | |
|-----------------------------------|-----------------|-----------|-------------|--------------|
| CPU | # of Exp. Bases | Total I/O | Max. Inputs | Max. Outputs |
| D2-262 | 4 | 1280 | 1024 | 1024 |

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.



Remote I/O Configurations

Ethernet remote I/O configuration using [H2-ERM100](#) and EBC Servers



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



I/O Addressing Schemes

DL205 I/O addressing scheme

You may have used other PLC systems prior to trying **DirectLOGIC** 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

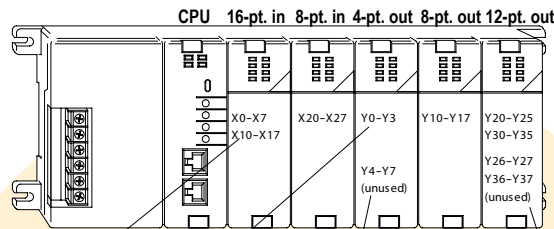
Remote I/O allows you to assign addresses manually. You can choose the data type for the remote points. Ethernet remote I/O ([H2-ERM100](#)) allows you to map the analog I/O channels directly into V-memory (16-bit words) while mapping the discrete I/O points into input/output bit memory (Xs & Ys). Serial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

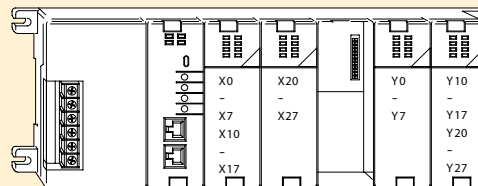
You may be tempted to leave empty slots for future expansion. This is perfectly acceptable, but it is very important that you understand the implications of placing a module in the empty slot at a later time.

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.

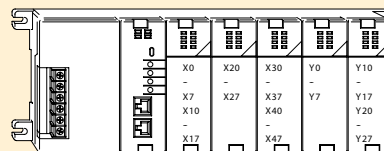
You should always add extra modules to the right of existing modules of the same type to avoid any re-addressing of your I/O points.



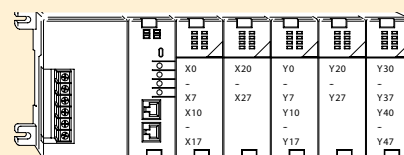
Inputs start at X0 Outputs start at Y0 4-pt. module has four points unused 12-pt. module skips points and has four unused points



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.



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 |
| CPU | CPU slot only | | |
| DC Input | ✓ | | ✓ |
| AC Input | ✓ | ✓ | ✓ |
| DC Output | ✓ | ✓ | ✓ |
| AC Output | ✓ | ✓ | ✓ |
| Relay Output | ✓ | ✓ | ✓ |
| Analog Input & Output | ✓ | ✓ | ✓ |
| Local Expansion1 (D2-262) | | | |
| Base Expansion Unit (D2-EM) | ✓ | | |
| Base Controller Unit (D2-CM) | | ✓ CPU slot only | |
| Remote I/O | | | |
| Remote Client | ✓ | | |
| Remote Server Unit | | | |
| Ethernet Remote Client | ✓ | | CPU slot only |
| 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 |
| | | | | F2-CP128 | None |
| AC INPUT | | COMBINATION | | | |
| D2-08NA-1 | 8 in | D2-08CDR | 8 in*/8 out* | | |
| D2-08NA-2 | 8 in | | | | |
| D2-16NA | 16 in | | | | |
| DC OUTPUT | | ANALOG | | REMOTE I/O | |
| 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 | | |
| 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 | | |
| 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 | | |
| | | F2-02DAS-2 | 32 out | | |
| | | F2-08DA-1 | 16 out | | |
| | | F2-08DA-2 | 16 out | | |
| | | F2-04RTD | 32 in | | |
| | | F2-04THM | 32 in | | |
| D2-08TA | 8 out | | | H2-ERM100 | None |
| F2-08TA | 8 out | | | | |
| D2-12TA | 16** out | | | | |

* 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.



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.

- Using a chart similar to the one below, fill in column 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.
- 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).
- 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).
- 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 |
|----------|-----------------------------|--------------------|------------------|-----------------------------------|
| | | <i>Device Type</i> | <i>5VDC (mA)</i> | <i>External Power 24 VDC (mA)</i> |
| 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 |



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 ZIPLinks to reduce power requirements

If your application requires a lot of relay outputs, consider using the ZIPLink 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 ZIPLink connection systems. See the I/O module specifications at the end of this section.



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

| 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.



Wiring Solutions

Wiring Solutions using the ZIPLink Wiring System

ZIPLinks eliminate the normally tedious process of wiring between devices by utilizing prewired cables and DIN rail mount connector modules. It's as simple as plugging in a cable connector at either end or terminating wires at only one end.

Prewired cables keep

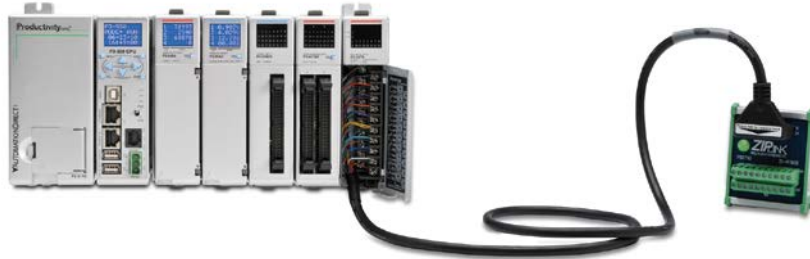
installation clean and efficient, using half the space at a fraction of the cost of standard terminal blocks. There are several wiring

solutions available when using the ZIPLink System ranging from PLC I/O-to-ZIPLink Connector Modules that are ready for field

termination, options for connecting to third party devices, GS, DuraPulse and SureServo Drives, as well as special relay, transorb and communications modules. Pre-printed I/O-specific adhesive label strips for quick marking of ZIPLink modules are provided with ZIPLink cables. See the following solutions to help determine the best ZIPLink system for your application.

Solution 1: Do-more, DirectLOGIC, CLICK and Productivity Series I/O Modules to ZIPLink Connector Modules

When looking for quick and easy I/O-to-field termination, a ZIPLink connector module used in conjunction with a prewired ZIPLink cable, consisting of an I/O terminal block at one end and a multi-pin connector at the other end, is the best solution.



Using the PLC I/O Modules to ZIPLink Connector Modules selector tables located in this section,

1. Locate your I/O module/PLC
2. Select a ZIPLink Module
3. Select a corresponding ZIPLink Cable.

Solution 2: Do-more, DirectLOGIC, CLICK and Productivity Series I/O Modules to 3rd Party Devices

When wanting to connect I/O to another device within proximity of the I/O modules, no extra terminal blocks are necessary when using the ZIPLink Pigtail Cables. ZIPLink Pigtail Cables are prewired to an I/O terminal block with color-coded pigtail with soldered-tip wires on the other end.



Using the I/O Modules to 3rd Party Devices selector tables located in this section,

1. Locate your PLC I/O module
2. Select a ZIPLink Pigtail Cable that is compatible with your 3rd party device.

Solution 3: GS Series and DuraPulse Drives Communication Cables

Need to communicate via Modbus RTU to a drive or a network of drives?

ZIPLink cables are available in a wide range of configurations for connecting to PLCs and SureServo, SureStep, Stellar Soft Starter and AC drives. Add a ZIPLink communications module to quickly and easily set up a multi-device network.

Using the Drives Communication selector tables located in this section,

1. Locate your Drive and type of communications
2. Select a ZIPLink cable and other associated hardware.



ZIPLINK™ Wiring Solutions

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Solution 4: Serial Communications Cables

ZIPLink offers communications cables for use with **DirectLOGIC**, CLICK, and Productivity CPUs, that can also be used with other communications devices. Connections include a 6-pin RJ12 or 9-pin, 15-pin and 25-pin D-sub connectors which can be used in conjunction with the RJ12 or D-Sub feedthrough modules.

Using the Serial Communications Cables selector table located in this section,

1. Locate your connector type
2. Select a cable.



Solution 5: Specialty ZIPLink Modules

For additional application solutions, **ZIPLink** modules are available in a variety of configurations including stand-alone relays, 24VDC and 120VAC transorb modules, D-sub, RJ12 and RJ45 feedthrough modules, communication port adapter and distribution modules, and SureServo 50-pin I/O interface connection.

Using the **ZIPLink** Specialty Modules selector table located in this section,

1. Locate the type of application
2. Select a **ZIPLink** module.



Solution 6: ZIPLink Connector Modules to 3rd Party Devices

If you need a way to connect your device to terminal blocks without all that wiring time, then our pigtail cables with color-coded soldered-tip wires are a good solution. Used in conjunction with any compatible **ZIPLink** Connector Modules, a pigtail cable keeps wiring clean and easy and reduces troubleshooting time.

Using the Universal Connector Modules and Pigtail Cables table located in this section,

1. Select module type
2. Select the number of pins
3. Select cable.





PLC I/O Modules to ZIPLink Connector Modules – Do-more!/DL205

| Do-more / DL205 PLC Input Module ZIPLink Selector | | | | |
|---|------------|-------------|-----------------|--|
| PLC | ZIPLink | | | |
| Input Module | # of Terms | Component | Module Part No. | Cable Part No. † |
| D2-08ND3 | 10 | Feedthrough | ZL-RTB20 (-1) | ZL-D2-CBL10 * |
| D2-16ND3-2 | 19 | Feedthrough | | ZL-D2-CBL19 |
| | | Sensor | ZL-LTB16-24-1 | ZL-D2-CBL19-1 ZL-D2-CBL19-2 |
| D2-32ND3 1 | 40 | Feedthrough | ZL-RTB40 (-1) | 180 deg conn: ZL-D24-CBL40 |
| | | Sensor | ZL-LTB32-24-1 | ZL-D24-CBL40-1 ZL-D24-CBL40-2 |
| D2-32ND3-2 1 | 40 | Feedthrough | ZL-RTB40(-1) | 45 deg conn: ZL-D24-CBL40-X ZL-D24-CBL40-1X ZL-D24-CBL40-2X |
| | | Sensor | ZL-LTB32-24-1 | |
| D2-08NA-1 | 10 | Feedthrough | ZL-RTB20 (-1) | ZL-D2-CBL10 |
| D2-08NA-2 | 10 | | | ZL-D2-CBL10-1 |
| D2-16NA | 19 | | | ZL-D2-CBL10-2 |
| | | | | ZL-D2-CBL19 * |

† X in the part number represents a 45° angle.

| Do-more/DL205 PLC Combo In/Out Module ZIPLink Selector | | | | |
|--|------------|-------------|-----------------|----------------|
| PLC | ZIPLink | | | |
| Combo Module | # of Terms | Component | Module Part No. | Cable Part No. |
| D2-08CDR | 10 | Feedthrough | ZL-RTB20 (-1) | ZL-D2-CBL10 * |

| Do-more/DL205 PLC Analog Module ZIPLink Selector | | | | | | |
|--|--------------|--|---------------|---|--|---|
| PLC | ZIPLink | | | | | |
| Analog Module | # of Terms | Component | Module | Cable | | |
| F2-04AD-1 | 10 | Feedthrough | ZL-RTB20 (-1) | ZL-D2-CBL10 ZL-D2-CBL10-1 ZL-D2-CBL10-2 | | |
| F2-08AD-1 | | | | | | |
| F2-04AD-2 | | | | | | |
| F2-08AD-2 | | | | | | |
| F2-02DA-1 | | | | ZL-D2-CBL19 ZL-D2-CBL19-1 ZL-D2-CBL19-2 | | |
| F2-02DAS-1 | | | | | | |
| F2-08DA-1 | | | | | | |
| F2-02DA-2 | | | | | | |
| F2-02DAS-2 | | | | ZL-D2-CBL10 ZL-D2-CBL10-1 ZL-D2-CBL10-2 | | |
| F2-08DA-2 | | | | | | |
| F2-4AD2DA | | | | | | |
| F2-8AD4DA-1 | | | | | | |
| F2-8AD4DA-2 | | | | 19 | | ZL-D2-CBL19 ZL-D2-CBL19-1 ZL-D2-CBL19-2 |
| | | | | | | |
| F2-04RTD | Matched Only | These modules are not supported by the ZIPLink wiring system | | | | |
| F2-04THM | | | | | | |

| Do-more/ DL205 PLC Output Module ZIPLink Selector | | | | |
|---|------------|---------------|---|--|
| PLC | ZIPLink | | | |
| Output Module | # of Terms | Component | Module Part No. | Cable Part No. † |
| D2-04TD1 2 | 10 | Feedthrough | ZL-RTB20 (-1) | ZL-D2-CBL10 |
| D2-08TD1 | | | | ZL-D2-CBL10-1 |
| D2-08TD2 | | | | ZL-D2-CBL10-2 |
| D2-16TD1-2 | 19 | Feedthrough | ZL-RTB20 (-1) | ZL-D2-CBL19 ZL-D2-CBL19-1 ZL-D2-CBL19-2 |
| | | Fuse | | |
| Feedthrough | | ZL-RTB20 (-1) | | |
| Fuse | | ZL-RFU20 4 | | |
| D2-16TD2-2 | | Relay | ZL-RRL16-24-2 ZL-RRL16W-24-2 ZL-RRL16F-24-2 ZL-RRL16HDF-24-2 | |
| | | Feedthrough | ZL-RTB20 (-1) | |
| F2-16TD1P | | | | |
| F2-16TD2P | | | | |
| D2-32TD1 1 | 40 | Feedthrough | ZL-RTB40 (-1) | 180 deg conn: ZL-D24-CBL40 ZL-D24-CBL40-1 ZL-D24-CBL40-2 |
| | | Fuse | ZL-RFU40 4 | |
| | | Feedthrough | ZL-RTB40 (-1) | |
| Fuse | | ZL-RFU40 4 | | |
| D2-32TD2 1 | | | | 45 deg conn: ZL-D24-CBL40-X ZL-D24-CBL40-1X ZL-D24-CBL40-2X |
| | | | | |
| D2-08TA | 10 | Feedthrough | ZL-RTB20 (-1) | ZL-D2-CBL10 |
| F2-08TA | | | | ZL-D2-CBL10-1 ZL-D2-CBL10-2 |
| D2-12TA | 19 | Feedthrough | ZL-RTB20 (-1) | ZL-D2-CBL19 |
| | | Fuse | | ZL-RFU20 4 |
| D2-04TRS 2 | 10 | Feedthrough | ZL-RTB20 (-1) | ZL-D2-CBL10 |
| D2-08TR | | | | ZL-D2-CBL10-1 ZL-D2-CBL10-2 |
| F2-08TRS 2 | | | | ZL-D2-CBL19 * |
| F2-08TR 3 | 10 | | | ZL-D2-CBL10 * |
| D2-12TR | 19 | Feedthrough | ZL-RTB20 (-1) | ZL-D2-CBL19 |
| | | Fuse | | ZL-RFU20 4 |

† X in the part number represents a 45° angle plug

* Select the cable length by replacing the * with: Blank = 0.5 m, -1 = 1.0 m, or -2 = 2.0 m.

1 To make a custom cable for the 32-point modules, use: Solder-style 180° connector ZL-D24-CON or Solder-style 45° connector ZL-D24-CON-X

2 Caution: The D2-04TD1, D2-04TRS, and F2-08TRS outputs are derated not to exceed module specs 2A per point and 2A per common when used with the ZIPLink wiring system.

3 The F2-08TR outputs are derated not to exceed 2A per point and 4A per common when used with the ZIPLink wiring system.

4 Fuses (5 x 20 mm) are not included. See Edison Electronic Fuse section for (5 x 20 mm) fuse. S500 and GMA electronic circuit protection for fast-acting maximum protection. S506 and GMC electronic circuit protection for time-delay performance. Ideal for inductive circuits.

To ensure proper operation, do not exceed the voltage and current rating of ZIPLink module. ZL-RFU20 = 2A per circuit; ZL-RFU40 = 400mA per circuit.



Note: ZIPLink Connector Module specifications follow the Compatibility Matrix tables. ZIPLink Cables specifications are at the end of this ZIPLink section.