



## 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

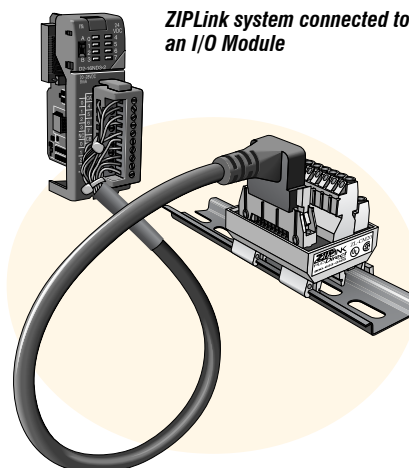
##### 16 point

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.



### 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
<b>Discrete Modules</b>		
DC Sink/Source In	✓	✓
DC Output	✓	✓
AC Input	✓	✓
AC Output	✓	✓
Relay Out	✓	✓
DC In / Relay Out	✓	✓
<b>Analog Modules</b>		
Analog Current In	✓	✓
Analog Voltage In	✓	✓
Analog Current Out	✓	✓
Analog Voltage Out	✓	✓
Analog Isolated Current Out	✓	✓
Analog Isolated Voltage Out	✓	✓
Combination Analog	✓	✓
Temperature Input	✓	✓
<b>Speciality Modules</b>		
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
<b>D2-262</b>	256	256	256

3-slot base 64-pts. max.



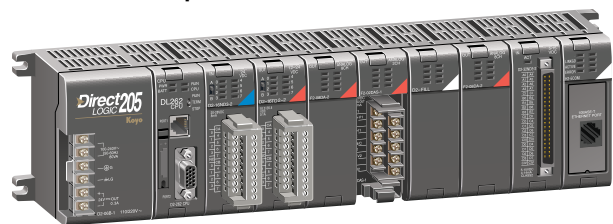
4-slot base 96-pts. max.



6-slot base 160-pts. max.



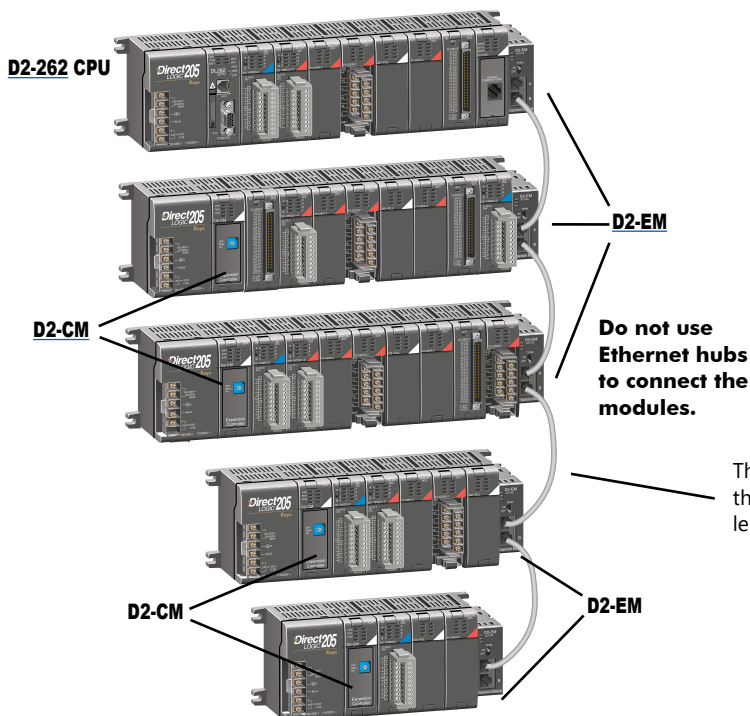
9-slot base 256-pts. max.



## 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.



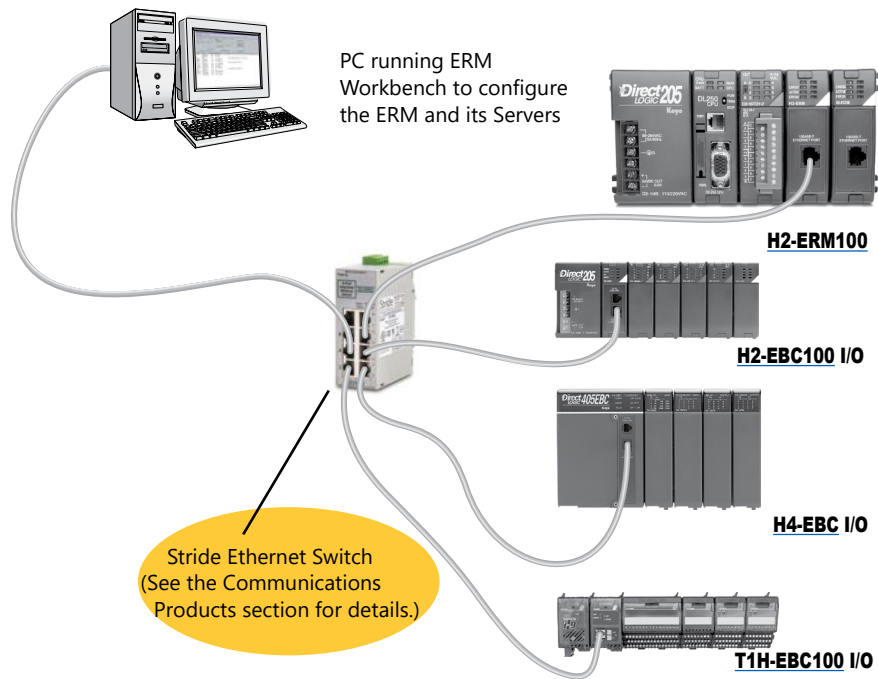
Local Expansion I/O Configuration				
CPU	# of Exp. Bases	Total I/O	Max. Inputs	Max. Outputs
<b>D2-262</b>	4	1280	1024	1024

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
<b>Communications</b>	10/100Base-T Ethernet
<b>Data Transfer Rate</b>	100 Mbps
<b>Link Distance</b>	100 meters (328 ft)
<b>Ethernet Port</b>	RJ45
<b>Embedded Web Server</b>	HTTP (unsecure)
<b>Ethernet Protocols</b>	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
<b>D2-262</b>	Limited by power budget	16 Servers (H2-EBC100, H4-EBC or T1H-EBC100)	8192	Map into available memory registers	16,384 <sup>1</sup>

<sup>1</sup> 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

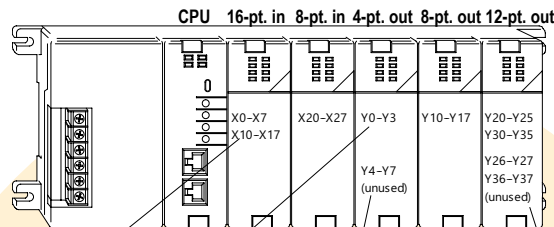
Remote I/O allows you to assign addresses manually. You can choose the data type for the remote points. Ethernet remote I/O ([H2-ERM100](#)) allows you to map the analog I/O channels directly into V-memory (16-bit words) while mapping the discrete I/O points into input/output bit memory (Xs & Ys). Serial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

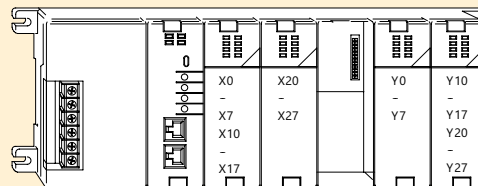
You may be tempted to leave empty slots for future expansion. This is perfectly acceptable, but it is very important that you understand the implications of placing a module in the empty slot at a later time.

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.

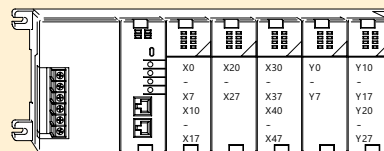
*You should always add extra modules to the right of existing modules of the same type to avoid any re-addressing of your I/O points.*



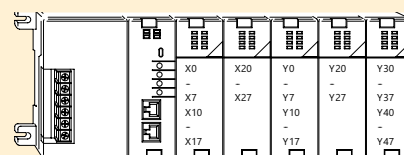
Inputs start at X0      Outputs start at Y0      4-pt. module has four points unused      12-pt. module skips points and has four unused points



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's	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) <sup>3</sup>	Slot 0 only		
Counter I/O (H2-CTRIO2) <sup>2</sup>	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		
AC OUTPUT				H2-ERM100	None
D2-08TA	8 out				
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>B</b>	<b>CURRENT SUPPLIED</b>			
	Base	9 slot	2,600	300
<b>C</b>	<b>CURRENT REQUIRED</b>			
	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			
<b>D</b>	<b>OTHER</b>			
	Operator interface	EA9-	150	0
	Handheld programmer	D2-HPP	200	0
<b>E</b>	Maximum Current Required		1736	80
<b>F</b>	Remaining Current Available		2600-1730=870	300-80=220

Power Supply Specifications			
Specification	AC Powered Bases	24 VDC Powered Bases	125 VDC Powered Bases
<b>Part Numbers</b>	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
<b>Voltage Withstand (dielectric)</b>	1 minute @ 1,500 VAC between primary, secondary, field ground, and run relay		
<b>Insulation Resistance</b>	> 10Mq at 500VDC		
<b>Input Voltage Range</b>	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
<b>Auxiliary 24 VDC Output</b>	300mA max.	None	300mA max.
<b>Maximum Inrush Current</b>	30A	10A	20A
<b>Maximum Power</b>	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
<b>Operator Interface</b>		
C-more Micro-Graphic	210	0

Power Supplied			
Device	Price	5V(mA)	24V Auxiliary
<b>Bases</b>			
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
<b>CPUs</b>		
D2-262	336	0
<b>DC Input Modules</b>		
D2-08ND3	50	0
D2-16ND3-2	100	0
D2-32ND3	25	0
D2-32ND3-2	25	0
<b>AC Input Modules</b>		
D2-08NA-1	50	0
D2-08NA-2	100	0
D2-16NA	100	0
<b>Input Simulator Module</b>		
F2-08SIM	50	0
<b>DC Output Modules</b>		
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
<b>AC Output Modules</b>		
D2-08TA	250	0
F2-08TA	250	0
D2-12TA	350	0
<b>Relay Output Modules</b>		
D2-04TRS	250	0
D2-08TR	250	0
F2-08TR(S)	670	0
D2-12TR	450	0
<b>Combination In/Out Module</b>		
D2-08CDR	200	0

Power Supplied			
Device	Price	5V(mA)	24V Auxiliary
<b>Bases</b>			
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
<b>Analog Modules</b>		
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
<b>Specialty Modules</b>		
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
<b>Remote I/O</b>		
H2-ERM100, (-F)	300, (-F: 450)	0
<b>Programming Devices</b>		
D2-HPP	200	0

\* Requires external 5VDC for outputs

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

# ZIPLINK™ Wiring Solutions

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## 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-RFU20 4		
Relay		ZL-RRL16-24-2 ZL-RRL16W-24-2 ZL-RRL16F-24-2 ZL-RRL16HDF-24-2		
F2-16TD1P	19	Feedthrough	ZL-RTB20 (-1)	
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	Feedthrough		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.