

Do-more H2 Series PLC Overview

Do-more H2 Series PLC Modules

The Do-more H2 Series PLC is the new technology that makes control applications easier to implement. It uses proven DirectLOGIC hardware as a platform for a powerful, flexible instruction set, with a user-friendly programming environment. The Do-more H2 Series PLC utilizes most of the modules that are part of the DL205 PLC family. You simply install a Do-more H2 Series CPU module into a DL205 base unit. However, the specifications of the Do-more H2 Series PLC are very different from the DL205 PLC. This overview covers the key features of the Do-more H2 Series PLC.



Do-more H2 CPU Module

DL205 PLC base unit and I/O modules

CPU modules

The Do-more H2 Series PLC offers two CPU modules, [H2-DM1](#) and [H2-DM1E](#), both of which must be programmed using the Do-more Designer programming software. You cannot use the existing DL205 CPU modules ([D2-250-1](#), [D2-260](#), or [D2-262](#)) with Do-more Designer.



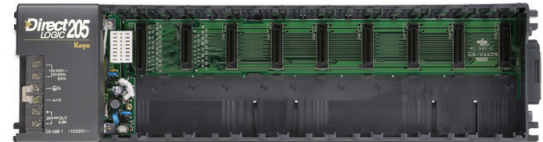
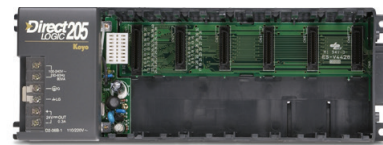
[H2-DM1](#)



**[H2-DM1E](#)
(with Ethernet)**

Base units

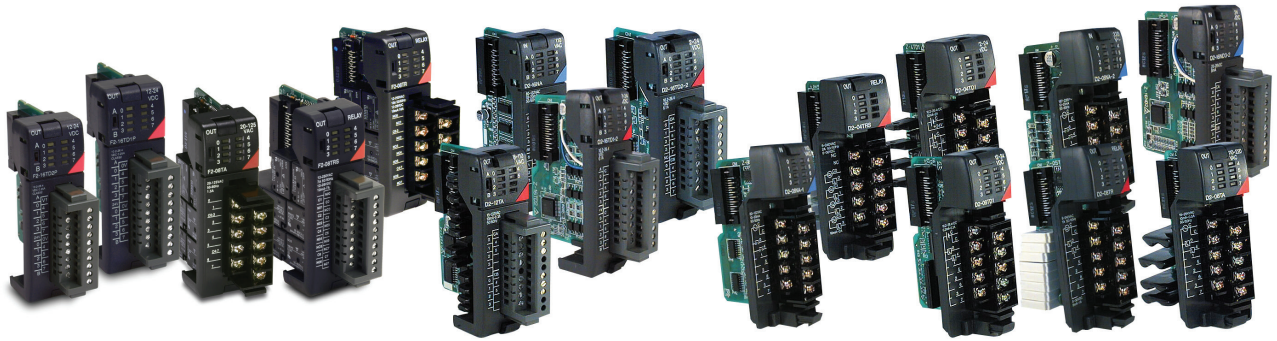
The Do-more H2 Series PLC supports all of the base units available for the DL205 PLC.



Do-more H2 Series PLC Overview

Discrete I/O modules

The Do-more H2 Series PLC supports all of the discrete I/O modules available for the DL205 PLC.



Analog I/O modules

The Do-more H2 Series PLC supports all of the analog I/O modules available for the DL205 PLC.



Do-more H2 Series PLC Overview

Specialty modules

The Do-more H2 Series PLC supports many of the specialty modules available for the DL205 PLC. The following modules are supported:



H2-ECOM100



H2-SERIO



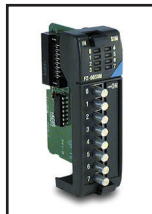
H2-SERIO-4



H2-ERM100



H2-CTRIO2



F2-08SIM

Specialty modules NOT supported

The following modules are NOT supported by the Do-more H2 Series PLC.



D2-HPP



D2-DCM



D2-CTRINT



F2-CP128



D2-EM



D2-DCM

Programming Software

The Do-more H2 Series PLC can only be programmed by Do-more Designer. (DirectSOFT programming software is not compatible with Do-more PLCs)

Do-more H2 Series PLC Overview

Module Compatibility

The following table shows which DL205 components are supported by the H2-DM1 and H2-DM1E Do-more CPUs.

Module Compatibility Table					
Module	Part Number	Status	Module	Part Number	Status
Base Units	D2-03B-1	✓	Analog I/O Modules	D2-03B-1	✓
	D2-04B-1	✓		D2-04B-1	✓
	D2-06B-1	✓		D2-06B-1	✓
	D2-09B-1	✓		D2-09B-1	✓
	D2-03BDC1-1	✓		D2-03BDC1-1	✓
	D2-04BDC1-1	✓		D2-04BDC1-1	✓
	D2-06BDC1-1	✓		D2-09BDC1-1	✓
	D2-09BDC1-1	✓		D2-06BDC2-1	✓
	D2-06BDC2-1	✓		D2-09BDC2-1	✓
	D2-09BDC2-1	✓		D2-08ND3	✓
Discrete I/O Modules	D2-08ND3	✓	Local Expansion Modules	D2-08NA-2	No
	D2-16ND3-2	✓		D2-16NA	No
	D2-32ND3	✓	Specialty Modules	D2-04TD1	✓
	D2-32ND3-2	✓		D2-08TD2	No
	D2-08NA-1	✓		D2-16TD1-2	
	D2-08NA-2	✓		D2-16TD2-2	✓
	D2-16NA	✓		F2-16TD1P	No
	D2-04TD1	✓		D2-32TD1	✓
	D2-08TD1	✓		D2-32TD2	✓
	D2-08TD2	✓		D2-08TA	✓
	D2-16TD1-2	✓		F2-08TA	✓
	D2-16TD2-2	✓		D2-12TA	No
	F2-16TD1P	✓		D2-04TRS	✓
	F2-16TD2P	✓		D2-08TR	No
	D2-32TD1	✓		F2-08TR	✓
	D2-32TD2	✓		F2-08TRS	✓
	D2-08TA	✓	Programmer	D2-12TR	No
	F2-08TA	✓		D2-08CDR	
	D2-12TA	✓			
	D2-04TRS	✓			
	D2-08TR	✓			
	F2-08TR	✓			
	F2-08TRS	✓			
	D2-12TR	✓			
	D2-08CDR	✓			

✓ = Supported No = Not Supported

Do-more H2 Series PLC Overview

Communications

The Do-more H2 Series PLC supports many communication protocols. The following table shows which CPU module communications port or specialty module supports each protocol.

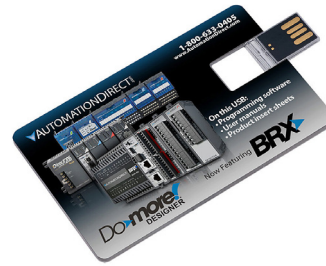
Protocols	CPU Modules			Specialty Modules		
	<i>H2-DM1 / H2-DM1E</i>		<i>H2-DM1E</i>	<i>H2-ECOM100</i>	<i>H2-SERIO H2-SERIO-4</i>	<i>H2-ERM100</i>
	USB Port	RS-232 Serial Port	Ethernet Port			
<i>Do-more Designer Programming</i>	Yes	Yes	Yes	Yes	Yes	
<i>Modbus/RTU Client (Master)</i>		Yes			Yes	
<i>Modbus/RTU Server (Slave)</i>		Yes			Yes	
<i>Modbus/TCP Client (Master)</i>			Yes	Yes		
<i>Modbus/TCP Server (Slave)</i>			Yes	Yes		
<i>DirectLOGIC RX/WX Client (Master)</i>			Yes	Yes		
<i>DirectLOGIC RX/WX Server (Slave)</i>			Yes	Yes		
<i>K-Sequence Server (Slave)</i>		Yes		Yes	Yes	
<i>DirectNET Server (Slave)</i>				Yes		
<i>HEI Ethernet Remote I/O Master</i>			Yes			Yes
<i>SMTP (EMail) Client w/Authentication</i>			Yes			
<i>Simple Network Time Protocol (SNTP) Client</i>			Yes			
<i>Do-more/PEERLINK</i>			Yes			
<i>Do-more Time Synchronization Protocol (Client, Server, Alternate Client)</i>			Yes			
<i>Do-more Logger/UDP</i>			Yes			
<i>Serial ad-hoc ASCII/Binary Programatic Control</i>		Yes			Yes	
<i>UDP ad-hoc Programmatic Control</i>			Yes			
<i>TCP Client Programmatic Control</i>			Yes			
<i>TCP Server Programmatic Control</i>			Yes			

Blank = Not Supported

Do-more H2 Series PLC Overview

Do-more Designer (Part No. [DM-PGMSW-USB](#))

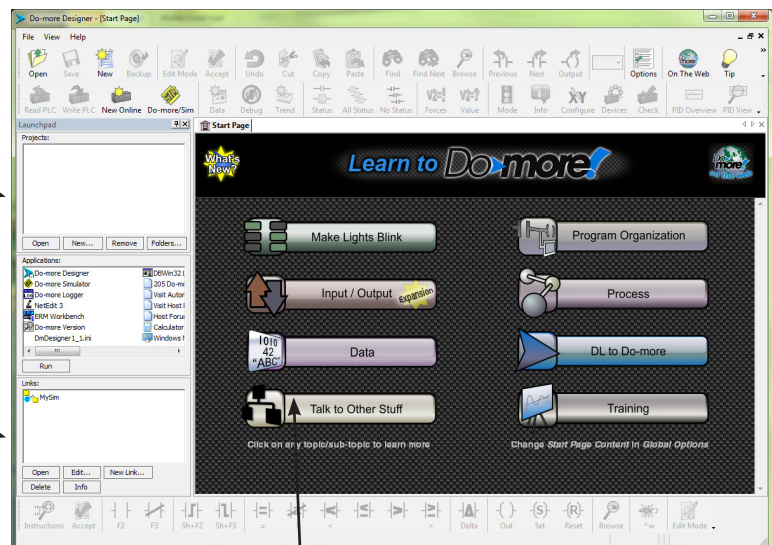
Do-more Designer is the full-featured programming software for the Do-more PLC series. Do-more Designer is a free download from Automationdirect.com. A USB version is also available for purchase for \$13.00.



Start Page

When the software is started, the Start Page is displayed. This page contains a Launchpad with Projects, Applications and Links windows. It also contains shortcuts to important help file topics and the Do-more Simulator.

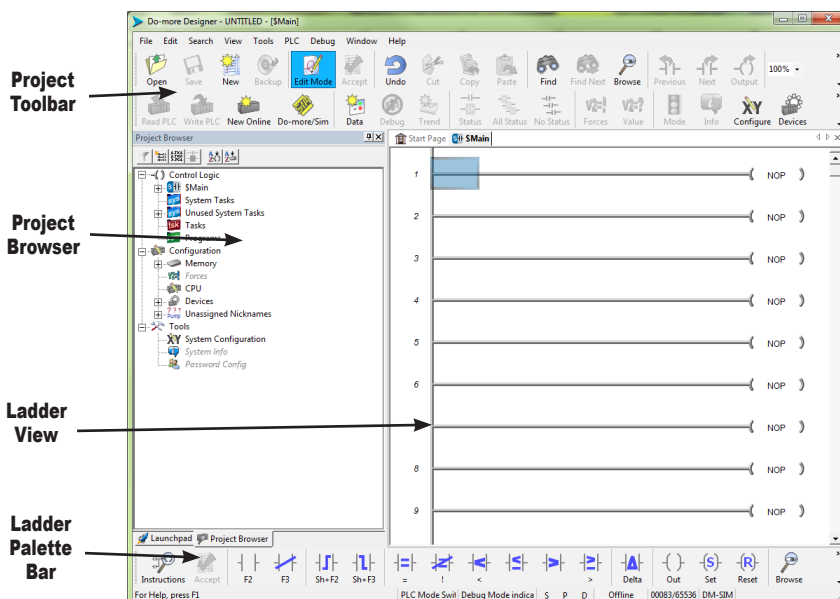
Launchpad



Help File
Shortcuts

Main Programming Window

The Main Programming Window is displayed when a new program is started or an existing program is opened. It is divided into Menus, Toolbars, and Windows that work together to make project development as simple as possible.



Do-more H2 Series PLC Overview

Do-more Designer Features

Do-more Designer has the following main features:

- Supports the Do-more PLC instruction set
- Project Browser (Window to organize the user project)
- Data View (Interface to monitor PLC data in a list)
- Trend View (Interface to monitor PLC data with trend graphs)
- PID View (Interface to monitor and tune the individual PID control loop)
- PID Overview (Interface to monitor multiple PID control loops)
- Debug View (Interface to debug the ladder programs)

When Do-more Designer is installed on your PC, the following tools are also installed:

- Do-more Simulator (Offline simulator of ladder program execution and PID control)
- Do-more Logger (Software tool to log PLC data)
- ERM Workbench (Configuration tool for the ERM modules)
- NetEdit 3 (Configuration tool for the ECOM/EBC Ethernet modules)

PC Requirements

The Do-more Designer Windows-based programming software works with Windows® XP (Home or Professional, 32-bit), Vista (Home, Basic, Premium, 32 or 64-bit), Windows 7 (Home, Professional, Ultimate, 32 or 64-bit) or Windows 8 (Home, Professional, Enterprise 32 or 64-bit; Windows 8 RT edition is NOT supported).

Please check the following requirements when choosing your PC configuration:

- Minimum PC to PLC Connectivity, at least one of the following:
 - USB Port: connects to the CPU with USB-A connector (USB-A to USB-B cable)
 - RS-232 Serial Port: connects to the CPU with RJ-12 connector (RJ-12 to DB9 or RJ-12 to USB-B serial converter cable)
 - Ethernet Port: connects to the CPU ([H2-DM1E](#)) with RJ-45 10Base-T or 100Base-T (Cat5 Patch Cable)
- Hard Disk: 100MB free disk space
- Video Display: 1024x768, 256 colors resolution (1280x720, true color recommended)
- Windows XP, 32-bit:
 - 800MHz, single core CPU (2GHz, multi-core or hyperthreaded recommended)
 - 512MB RAM (2GB recommended)
- Vista or Windows 7 or Windows 8, 32 or 64-bit:
 - 1GHz, single core CPU (2GHz, multi-core recommended)
 - 1GB RAM (3GB recommended)

Programming Cables

The Do-more H2 Series CPU module [H2-DM1](#) has two communication ports (USB and RS-232 serial) and the H2-DM1E has three communication ports (USB, RS-232 serial and Ethernet). You can use any of those ports for programming and monitoring. Needed cables for these ports are listed below and can be purchased at Automationdirect.com.

USB Cables (USB 2.0, Type A-B connectors) available:

- USB-CBL-AB3 (3 ft.)
- USB-CBL-AB6 (6 ft.)
- USB-CBL-AB10 (10 ft.)
- USB-CBL-AB15 (15 ft.)

RS232 Serial Cable

- D2-DSCBL (12 ft. 9-pin D-sub to RJ12 connector)

Ethernet Cables (Cat5e)

- Automationdirect.com sells many Ethernet patch cables in various colors and lengths. Please check the Cables section in this catalog for further details.

This Instruction Set was developed specifically for the new Do-more PLC; the 'Instruction Palette' displays all available instructions.

You may see some similarities to the DirectLOGIC PLC instruction set. However, the instruction set for the Do-more PLC is more advanced and intuitive. A good example is the MATH instruction. Now, just one MATH instruction covers all math operations and also allows you to mix different data types in one expression.

There are over 60 operators and functions available with the MATH instruction.

Note: To learn more about the MATH instruction, please refer to the Do-more Designer help topic 'MATH – Math Expression'.

+ , * , / , % , ** , < , <= , = , != , > , && , || , & , | , ^ , << , >> , >>> , ~ , !

ABS, ACOS, ASIN, ATAN, AVGR, COS, COUNTIFEQ, COUNTIFNE,
COUNTIFGE, COUNTIFGT, COUNTIFLE, COUNTIFLT, DEG, E, FRAC, IF,
LN, LOG, MAXR, MAX, MINR, MIN, NOW, PI, RAD, RANDINT, RANDREAL,
REF, ROUND, SIN, SQRT, STDEVR, STDEVPR, SUMIFEQ, SUMIFNE,
SUMIFGE, SUMIFGT, SUMIFLE, SUMIFLT, SUMR, TAN, TICKms,
TICKus, TOINT, TOREAL, TRUNC

Do-more H2 Series PLC Overview

Data Types

The Do-more PLC supports the following seven primary data types:

- Bit (0 or 1)
- Unsigned Byte (0 to 255)
- Signed Byte (-128 to 127)
- Unsigned Word (0 to 65,535)
- Signed Word (-32,768 to 32,767)
- Signed DWord (-2,147,483,648 to 2,147,483,647)
- Real (-3.4028235E+038 to 3.4028235E+038)

Note: As you can see, the BCD data type that is popular for the DirectLOGIC PLC is not included in this list. However, you can use the BCDTO and TOBCD instructions if you need to use the BCD data type with your application. Those instructions convert the data between the BCD data type and the integer/real data types.

Data Structure

The Do-more PLC supports data structures as additional data types. Structures use the familiar PC programming organization of "dot notation". All available elements of a structure are shown in this format. The following data structures are currently available:

- Timer Structure
- Counter Structure
- String Structure
- PID Structure
- Date/Time Structure
- Task Structure
- Rampsoak Structure
- Program Structure
- DeviceRef Structure
- Drum Structure

The data structure is a set of data. For instance, a Timer structure (Timer Struct) has the following set of data:

- Acc (Accumulated Time, Signed DWord)
- Done (Bit)
- Zero (Bit)
- Timing (Bit)
- Reset (Bit)

When you use a timer instruction (TMR), a Timer structure is assigned to the instruction. If you select 'T0', you can access the above data with dot notation. For instance, to access the accumulated time (Acc), enter 'T0.Acc'. To access the Done bit, enter 'T0.Done'

Memory Addressing

With the Do-more PLC, each memory address type has its own specific data type. Here are some examples:

- V (Unsigned Word)
- N (Signed Word)
- D (Signed DWord)
- R (Real)

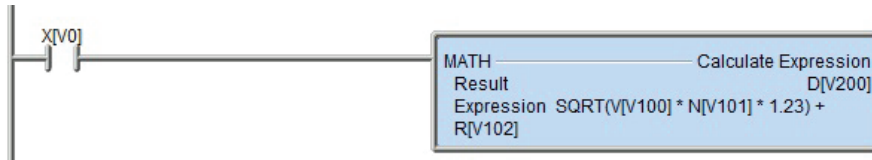
If you see address 'V123' in the ladder program, the memory address always stores an Unsigned Word value. With this memory addressing method, it becomes easier to read and write the ladder programs.

Although most of the memory addressing is decimal, the memory addresses DLX, DLY, DLC and DLV use octal. These four memory addresses can be used to exchange data with DirectLOGIC PLCs, which use octal memory addressing.

Do-more H2 Series PLC Overview

Array Addressing

The Do-more PLC supports array addressing with all memory addresses. V-memory address must be used as the index for an array. With the Do-more PLC, the following ladder program is valid.



Note: In this example, V0, V100, V101, V102 and V200 are indices.

Code-block, Program and Task

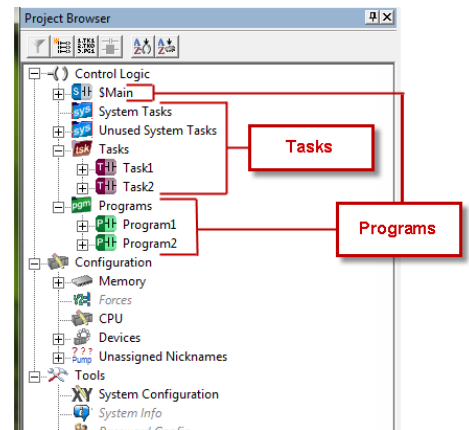
One Do-more project can consist of more than one ladder program. Each ladder program is called a 'Code-block'. The Do-more PLC supports two types of code-blocks, Program and Task. Here are their definitions.

Program

Programs are code-blocks that run based on an event using the RUN instruction. They can be self-terminating or never terminate. Stage programming is only supported inside Program code-blocks.

Task

Tasks are code-blocks that are enabled and disabled using the ENTASK instruction. The ENTASK instruction allows you to specify an interval to execute the task's logic with a millisecond resolution or to execute a single time on a leading edge input.



Stages

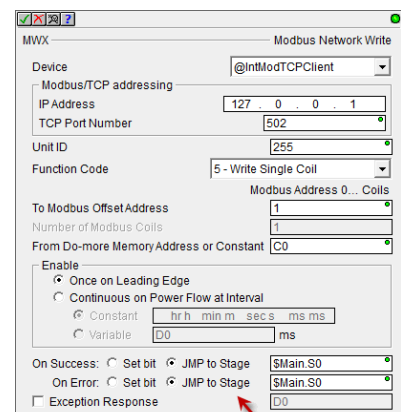
The Do-more PLC supports Stages. You can use Stages only in the Program code-blocks. (They are not available in the Task code-blocks.) The Do-more PLC supports the following instructions for Stage Programming¹:

- SG (SG)
- JMP (Jump To Stage)²
- JMPI (Index Jump)
- SGSET (Enable Stage)
- SGRST (Disable Stage)
- SGRSTR (Disable Range of Stages)
- SGCONVRG (Converge Multiple Stages to SG)
- SGDIVRG (Jump to Multiple Stages)



¹ There is no ISG (Initial Stage) instruction for the Do-more PLC; the first stage in the Program code-block becomes the initial stage automatically.

² Many asynchronous instructions can directly initiate a Jump to Stage.



Do-more H2 Series PLC Overview

Comparison with the DL205 PLC

The following spec table shows the major differences between the Do-more H2 Series PLC and the DL205 PLC.

	Do-more H2 Series PLC	DL205 PLC
Instruction Set	Do-more PLC instruction set	DirectLOGIC PLC instruction set
Total Memory Bytes	262.1K	30.4K
Default Data Type	Decimal and Real (Data can be referred in different data types with the 'Casting' feature.)	BCD, HEX and Real
Memory Addressing	Decimal mainly (There are some octal memory addresses to exchange data with DirectLOGIC PLCs easily.)	Octal
User-defined Memory Addresses	Yes	No
Bit of Memory	Available for all memory addresses (e.g. V100.2, D200.3)	Yes, D2-250-1 and D2-262 only
Array Addressing	Available for all memory addresses (e.g. X[V100], D[V200])	Available only for V-memory addresses (e.g. P2000)
Math Calculation	No accumulator, the MATH instruction can support a mix of different data types.	Using accumulator or using the MATHBCD, MATHBIN or MATHR instruction for each data type.
Number of Code Blocks	1 system program 6 system tasks Up to 256 user programs Up to 256 user tasks	1
Looping	FOR-NEXT, WHILE-WEND, REPEAT-UNTIL	FOR-NEXT
Subroutines	No (Use Code-blocks)	Yes
User Document (Nicknames, Rung Comments...) Storing	Stored in the CPU module	No (Stored on PC only)
Password Protection	Multiple passwords	Single password
Run-time Editing	Bumpless	Ladder program execution is paused during the ladder program transfer in RUN mode.
Analog I/O Configuration	The X, WX and WY addresses are assigned to analog I/O channels automatically. (Manual addressing is available also.)	Configured by ladder program
Local Base Expansion	No	Yes (with D2-EM and D2-DCM)
Number of PID Loops	Over 2000	4 (D2-250-1), 16 (D2-262)
Memory Back-up Battery	Included	Optional
Firmware Update	CPU module firmware can be updated from Do-more Designer.	Use firmware update tool
Built-in RS-232 Port	Yes, Full duplex	Yes, Half duplex
Built-in USB Port	Yes	No
Built-in Ethernet Port	Yes (H2-DM1E)	No
Programming Software	Do-more Designer	DirectSOFT

Do-more H2 Series PLC System Specifications

General Specifications

General Specifications	
Operating Temperature	32°F to 131°F (0°C to 55°C)
Storage Temperature	−4°F to 158°F (−20°C to 70°C)
Ambient Humidity	30% to 95% relative humidity (non-condensing)
Environmental Air	No corrosive gases
Vibration	MIL STD 810C, Method 514.2 IEC60068-2-6 JIS C60068-2-6 (Sine wave vibration test)
Shock	MIL STD 810C, Method 516.2 IEC60068-2-27 JIS C60068-2-27
Noise Immunity	NEMA ICS3-304
Agency Approvals	UL508 (File No. E157382, E316037) CE (EN61131-2)

CPU Modules

Specifications



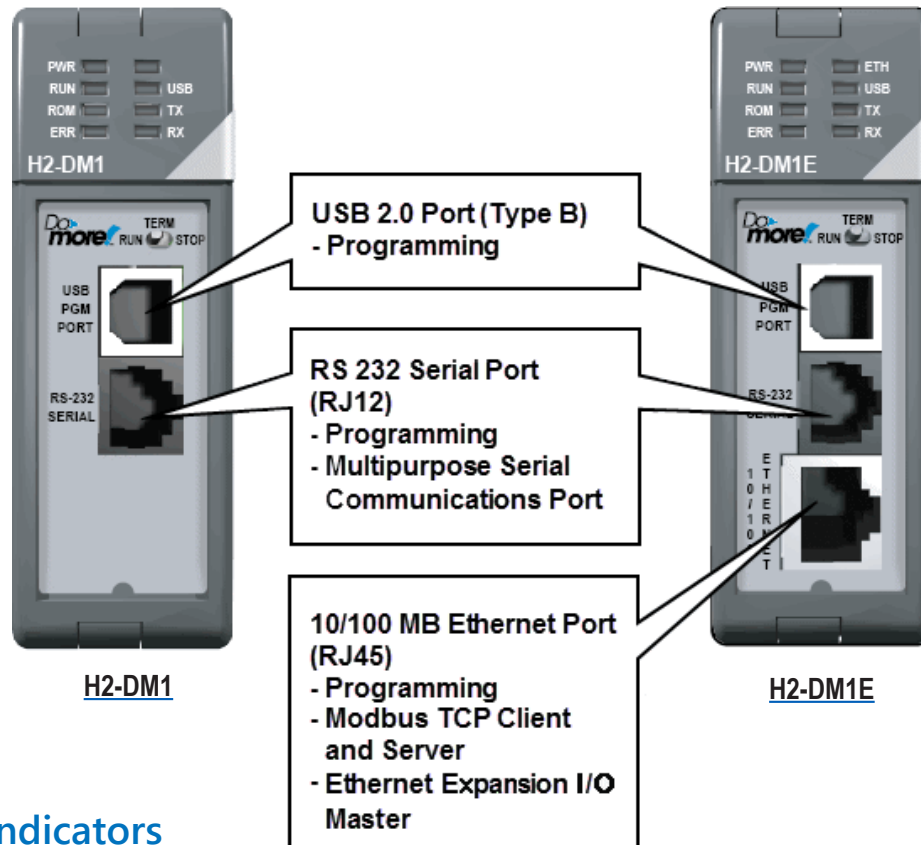
H2-DM1
\$437.00



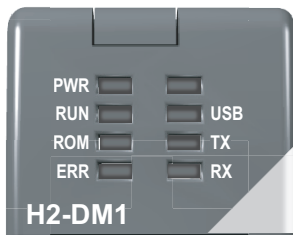
H2-DM1E
\$584.00

Feature	H2-DM1	H2-DM1E
Total Memory (bytes)	262144 bytes	
Ladder Memory (instruction words)	65536 instruction words	
V-Memory (words)	Configurable up to 65536 (4096 default)	
Non-volatile V Memory (words)	Configurable up to 65536 (4096 default)	
D-memory (DWORDs)	Configurable up to 65536 (4096 default)	
Non-volatile D Memory (DWORDs)	Configurable up to 65536 (4096 default)	
R-memory (REAL DWORDs)	Configurable up to 65536 (4096 default)	
Non-volatile R Memory (REAL DWORDs)	Configurable up to 65536 (4096 default)	
Boolean execution/K	50us	
Stage Programming	Yes	
Number of Stages	128 per Program code-block; number of code-blocks configurable to memory limit	
Handheld Programmer	No	
Programming Software for Windows	FREE Do-more Designer	
Built-In communications ports	USB, RS-232	USB, RS-232, Ethernet (10/100 Base-T)
Program Memory	Flash ROM	
Total I/O points available	X, Y, each configurable up to 65536 (2048 default); WX, WY (analog in/out) each configurable up to 65536 (256 default)	
Local I/O points available	256	
Ethernet Remote I/O Discrete points	131072	
Ethernet Remote I/O Analog I/O Channels	32768	
Max Number of Ethernet slaves per Channel	16	
I/O points per Remote Channel	32768	
Discrete I/O Module Point Density	4/8/12/16/32	
Slots per Base	3/4/6/9	
Number of instructions available	>160	>170
Control relays	Configurable up to 65536 (2048 default)	
Special relays (system defined)	1024	
Special registers (system defined)	512	
Timers	Configurable up to 65536 (256 default)	
Counters	Configurable up to 65536 (256 default)	
System Date/Time structures	8	
User Date/Time structures	Configurable up to 65536 (32 default)	
ASCII String/Byte buffer structures	Configurable up to memory limit (192 default)	
Modbus Client memory	Yes, configurable up to memory limit, default 1024 input bits, 1024 coil bits, 2048 input registers, 2048 holding registers	
DL Classic Client memory	Up to memory limit, default 512 X, 512 Y, 512 C, 2048 V	
Immediate I/O	No	
Interrupt input (hardware / timed)	No	
Subroutines	Program and Task code-blocks, up to memory limit	
Drum Timers	Yes, up to memory limit	
Table Instructions	Yes	
Loops	FOR/NEXT, WHILE/WEND, REPEAT/UNTIL loops	
Math	>60 operators and functions: Integer, Floating Point, Trigonometric, Statistical, Logical, Bitwise, Timing	
ASCII	Yes, IN/OUT, Serial, Ethernet TCP and UDP; 11 output script commands	
PID Loop Control, Built In	Yes, configurable to memory limit (over 2000)	
Time of Day Clock/Calendar	Yes	
Run Time Edits	Yes	
Supports True Force	Yes	
Internal Diagnostics	Yes	
Password security	Multi-user, credentialed, session-based security	
System error log	Yes	
User error log	Yes	
Battery backup	Yes (Battery included)	

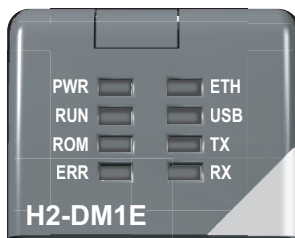
CPU Modules



LED Status Indicators



H2-DM1



H2-DM1E

LED Indicators		
Indicator	Status	Description
PWR	Green	Base Power ON
	Yellow	Low Battery
RUN	Green	CPU is in RUN Mode
	Yellow	Forces are Active
ROM	Yellow	CPU is updating Non-volatile Memory
ERR	Red	CPU Fatal Error
ETH	Green	Ethernet Link Good
	Yellow	Ethernet Activity
USB	Green	USB Receive Activity
	Yellow	USB Transmit Activity
TX	Green	RS-232 Transmit Activity
RX	Green	RS-232 Receive Activity

PLC Mode Switch



Mode Switch Functions	
Mode Switch Position	CPU Action
RUN (Run Program)	CPU is forced into RUN Mode if no errors are encountered.
TERM (Terminal)	RUN, PROGRAM and DEBUG modes are available. In this mode, the mode of operation can be changed through the Programming Software.
STOP (Stop Program)	CPU is forced into STOP Mode.

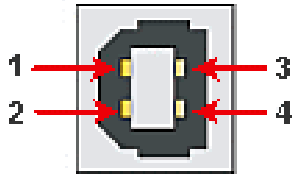
CPU Modules

Communication Ports

USB Port

Used exclusively for programming and monitoring via a PC running Do-more Designer.

USB Port Specifications	
Description	Standard USB 2.0 Slave input for programming and online monitoring, with built-in surge protection. Not compatible with older full speed USB devices.
Cables (ADC part #)	USB Type A to USB Type B: USB-CBL-AB3 (3ft) USB-CBL-AB6 (6ft) USB-CBL-AB10 (10ft) USB-CBL-AB15 (15ft)

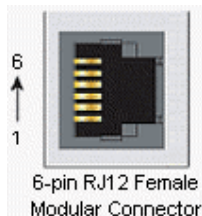


Pin	Description	
1	5V	Bus Voltage Sense
2	D-	Data -
3	D+	Data +
4	0V	Ground

RS-232 Port

RJ-12 style connector used for:

- Connection to a PC running Do-more Designer
- Modbus RTU Master connections
- Modbus RTU Slave connections
- ASCII Incoming and Outgoing communications
- Custom Protocol Incoming and Outgoing communications



RS-232 Port Specifications	
Description	Non-isolated, full duplex RS-232 DTE port used for programming, online monitoring or can connect the CPU as a Modbus RTU or ASCII master or slave to a peripheral device. Includes ESD and built-in surge protection.
Baud Rates	1200, 2400, 4800, 9600, 19200, 38400, 57600, and 115200
+5V Cable Power Source	220mA maximum at 5V, $\pm 5\%$. Reverse polarity and overload protected.
Maximum Output Load (TXD/RTS)	3kV, 1000pf
Minimum Output Voltage Swing	$\pm 5V$
Output Short Circuit Protection	$\pm 15mA$
Cable Options (ADC part #)	D2-DSCBL FA-CABKIT FA-ISOCQN for converting RS-232 to isolated RS-422/485

Pin	Description	
1	0V	Power (-) connection (GND)
2	5V	Power (+) connection (220mA max.)
3	RXD	Receive Data (RS-232)
4	TXD	Transmit Data (RS-232)
5	RTS	Request to Send (RS-232)
6	CTS	Clear to Send (RS-232)

For a list of protocols supported by each port, please refer to the Communications topic of the Do-more H2 Series PLC Overview in this section.

CPU Modules

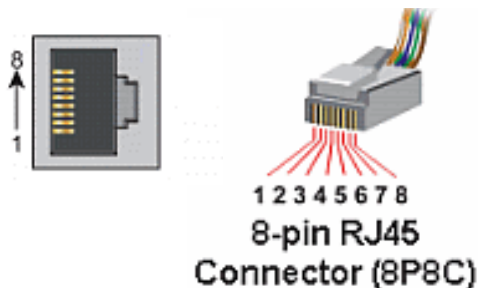
Ethernet Port

RJ-45 style connector used for:

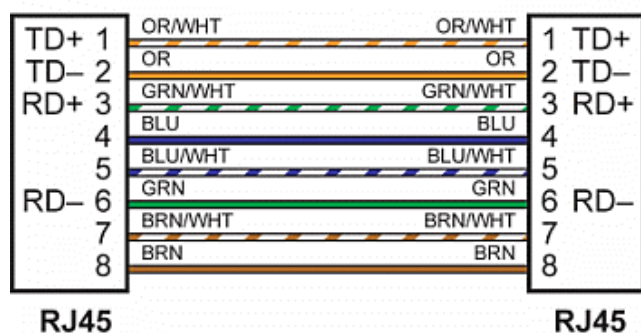
- Connection to a PC running Do-more Designer
- Modbus TCP Client connections (Modbus requests sent from the CPU)
- Modbus TCP Server connections (Modbus requests received by the CPU)
- Ethernet Expansion I/O Master

Ethernet Port Specifications

Description	Standard transformer isolated Ethernet port with built-in surge protection for programming, online monitoring, Modbus/TCP client/server connections (fixed IP or DHCP) and Ethernet Expansion I/O capabilities.
Transfer Rate	10/100 Mbps; Auto-MDX (Crossover)

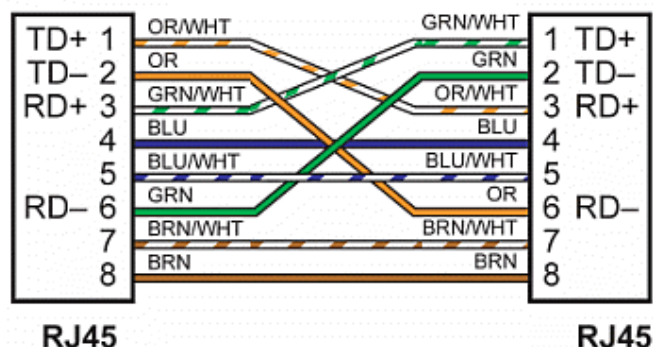


Patch (Straight-through) Cable



Crossover Cable

10/BASE-T/100BASE-TX



For a list of protocols supported by each port, please refer to the Communications topic of the Do-more H2 Series PLC Overview in this section.

CPU Modules

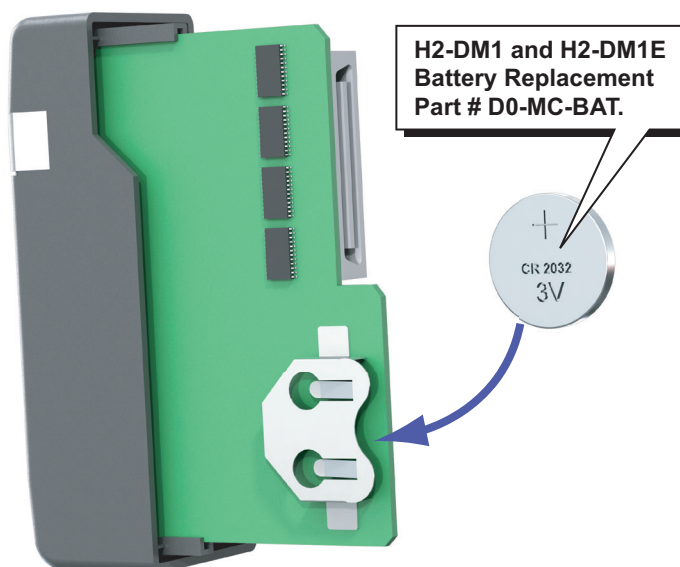
Battery Specifications

A battery is included with the Do-more CPU and is used to retain the Time and Date along with any Tagname values that are set up as retentive. It is recommended that the battery be replaced once every five years or when one year of cumulative OFF time has been exceeded.

Up to two hours is allowed to change out a battery without loss of data.

D0-MC-BAT is \$3.25.

Battery	
<u>D0-MC-BAT</u>	Coin type, 3.0 V Lithium battery, number CR2032



CPU Modules

Ethernet Expansion I/O

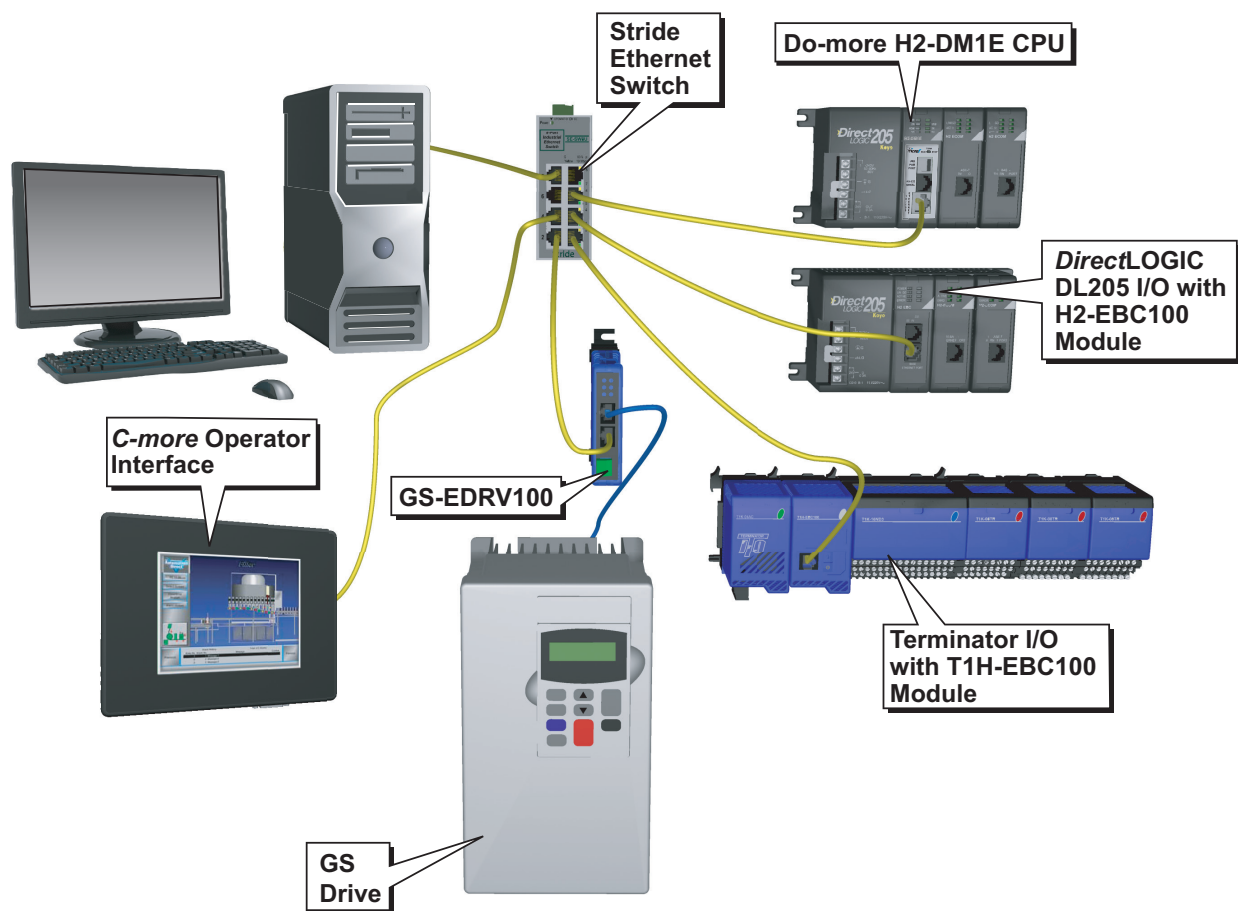
With Do-more Designer Software version V1.1 and newer, the [H2-DM1E](#) CPU's built-in Ethernet port can be configured as an Ethernet Expansion I/O master. Much like the [H2-ERM100](#) module, the Ethernet Expansion I/O feature allows expansion beyond the local chassis to slave I/O using the onboard high-speed Ethernet link.

The onboard Ethernet port can support up to 16 slave devices. The slave I/O modules supported are:

- [H2-EBC100](#)
- [T1H-EBC100](#) (Terminator I/O)
- [GS-EDRV100](#) (GS Drives)

The Ethernet Expansion I/O network uses Category 5 UTP cables for cable runs up to 100 meters (328 ft.) with extended distances achieved through Ethernet switches.

It is highly recommended that a dedicated network be used with the Ethernet Expansion I/O feature. Ethernet Expansion I/O networks and ECOM/office networks should be isolated from one another to prevent network delays.



Base Units

To use the Do-more H2 Series PLC, you must have at least one base unit. A base unit has an internal power supply that converts the input power (110-220 VAC, 24VDC, or 125VDC) to 5VDC in order to activate the modules installed in the base unit. For the Do-more H2 Series PLC, 10 types of base units are available.

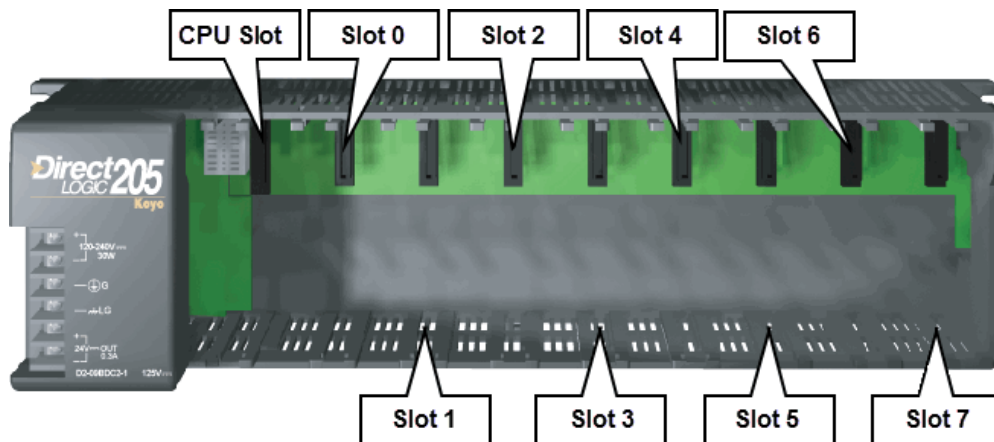
Base Unit Part Numbers

Number of Module Slots	Input Power Type		
	110–220 VAC	24VDC	125VDC
3 slot	D2-03B-1	D2-03BDC1-1	-
4 slot	D2-04B-1	D2-04BDC1-1	-
6 slot	D2-06B-1	D2-06BDC1-1	D2-06BDC2-1
9 slot	D2-09B-1	D2-09BDC1-1	D2-09BDC2-1

Base Unit Prices	
Part Number	Price
D2-03B-1	\$211.00
D2-04B-1	\$230.00
D2-06B-1	\$305.00
D2-09B-1	\$328.00
D2-03BDC1-1	\$282.00
D2-04BDC1-1	\$311.00
D2-06BDC1-1	\$337.00
D2-09BDC1-1	\$356.00
D2-06BDC2-1	\$284.00
D2-09BDC2-1	\$379.00

In the base unit, the far left slot is called the 'CPU Slot'. It is used for a CPU or base controller. Optional modules (discrete I/O modules, analog I/O modules, and specialty modules) can be installed in the other slots. For instance, if you pick a base unit with nine slots, you can install up to eight optional modules.

Module Slots are numbered from left to right starting with zero. The slot to the right of the CPU slot is Slot 0, the slot to the right of it is Slot 1 and so on. The following is an example with the nine slot base unit D2-09B-1.



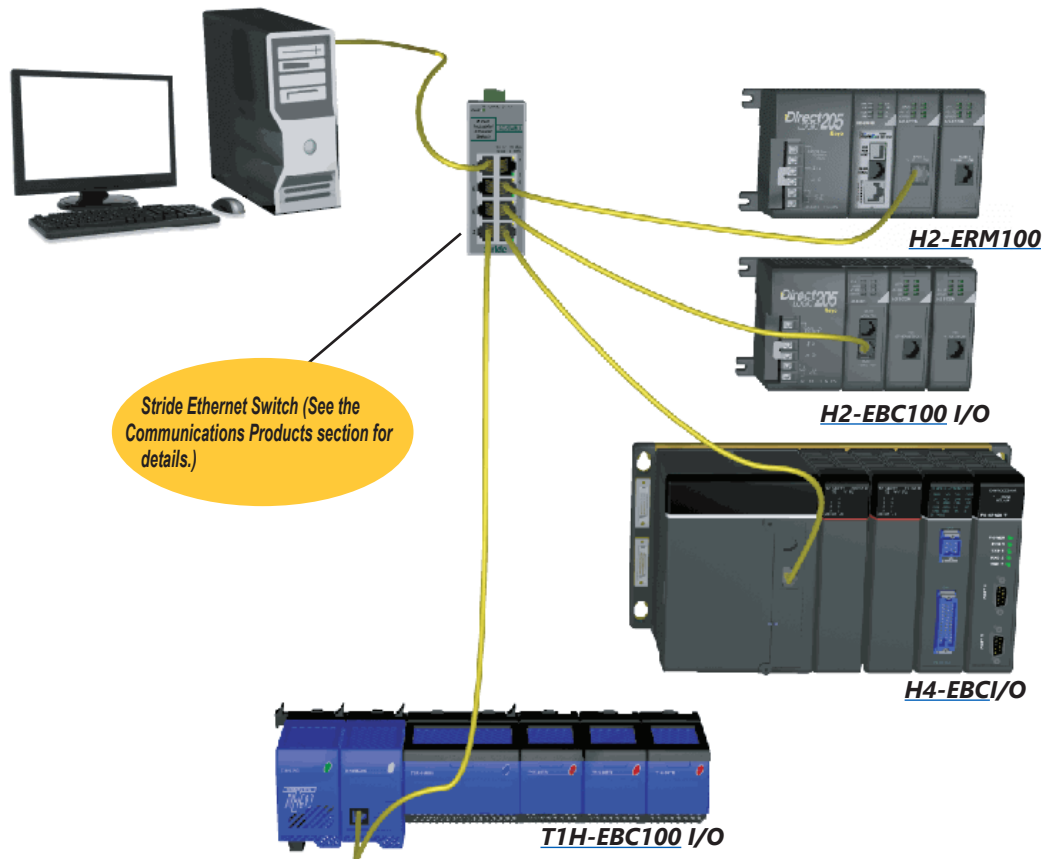
The following is a detailed specification table for the base units.

Power Supply Specifications			
Specification	AC Powered Bases	24VDC Powered Bases	125VDC 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	> 10MΩ at 500VDC		
Input Voltage Range	85–132 VAC (110 range) 170–264 VAC (220 range) 47–63 Hz	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

Base Units

I/O Expansion

When you need to use more than eight optional modules or you need to install base units in isolated locations, the Do-more H2 Series PLC supports the Ethernet Remote I/O System.



Note for DL205 PLC customers

The Do-more H2 Series PLC does NOT support local expansion I/O with the [D2-EM/D2-CM](#).

Base Units

Module Placement and I/O Usage Tables

There are very few I/O module placement restrictions with the Do-more H2 Series PLC family. In general, any mix of analog and discrete module types can be used in any local or Ethernet remote base. However, specialty modules can't be used in the Ethernet remote base except for the [F2-08SIM](#). Reference the Module Placement Restrictions table to the right for the Do-more H2 Series PLC.

Analog I/O in the Ethernet remote bases

When using an analog module in an Ethernet remote base, the analog update time to the CPU will be asynchronous to the scan time. Critical analog I/O should be located in the local base.

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	Ethernet Remote Base
CPU's Discrete I/O Analog I/O	CPU slot only ✓ ✓	✓ ✓
Base Controller H2-EBC100		CPU slot only
Specialty Modules H2-CTRIO2 H2-ECOM100 H2-SERIO H2-SERIO-4 H2-ERM100 F2-08SIM	✓ ✓ ✓ ✓ ✓ ✓	✓

I/O Module Point Usage					
DC INPUT		RELAY OUTPUT		SPECIALTY MODULES	
D2-08ND3	8 X	D2-04TRS	8 Y1		
D2-16ND3-2	16 X	D2-08TR	8 Y		
D2-32ND3	32 X	F2-08TR	8 Y		
D2-32ND3-2	32 X	F2-08TRS	8 Y		
AC INPUT		D2-12TR	16 Y2		
D2-08NA-1	8 X	COMBINATION			
D2-08NA-2	8 X	D2-08CDR	8 X/8 Y1		
D2-16NA	16 X				
DC OUTPUT		ANALOG		F2-08SIM	8 X
D2-04TD1	8 Y ¹	F2-04AD-1	8 X/4 WX	H2-CTRIO2	None
D2-08TD1	8 Y	F2-04AD-2	8 X/4 WX	H2-EBC100	None
D2-08TD2	8 Y	F2-08AD-1	8 X/8 WX	H2-ECOM100	None
D2-16TD1-2	16 Y	F2-08AD-2	8 X/8 WX	H2-ERM100	None
D2-16TD2-2	16 Y	F2-02DA-1L	2 WY	H2-SERIO	None
F2-16TD1P	16 X/16 Y	F2-02DA-2L	2 WY	H2-SERIO-4	None
F2-16TD2P	16 X/16 Y	F2-4AD2DA	8 X/4 WX/2 WY		
D2-32TD1	32 Y	F2-8AD4DA-1	8 X/8 WX/7 WY		
D2-32TD2	32 Y	F2-8AD4DA-2	8 X/8 WX/7 WY		
AC OUTPUT		F2-02DAS-1	2 WY		
D2-08TA	8 Y	F2-02DAS-2	2 WY		
F2-08TA	8 Y	F2-08DA-1	8 WY		
D2-12TA	16 Y ²	F2-08DA-2	8 WY		
		F2-04RTD	8 X/4 WX		
		F2-04THM	8 X/4 WX		

Note 1: 4-pt. modules consume eight points. Only the first four points are used.

Note 2: 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 Y8–Y13. Y6–Y7, and Y14–Y15 would be unused.

Base Units

Power Budget

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 module. 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 for a base exceeds the maximum power available from the power supply, you may be able to resolve the problem by using remote I/O bases.

Base 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 Do-more PLC 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 Do-more PLC 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			
	SLOT 0	H2-DM1E	275	0
	SLOT 1	D2-16ND3-2	100	0
	SLOT 2	D2-16ND3-2	100	0
	SLOT 3	D2-16NA	100	0
	SLOT 4	D2-08NA-1	50	0
	SLOT 5	D2-16TD1-2	200	80
	SLOT 6	D2-08TA	250	0
	SLOT 7	D2-08TA	250	0
D	OTHER			
	Operator interface	EA1-S3ML	220	0
E	Maximum Current Required	1545	80	
F	Remaining Current Available	2600-1545=1055		300-80=220

Power Supply Specifications			
Specification	AC Powered Bases	24VDC Powered Bases	125VDC 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 @ 1500VAC between primary, secondary, field ground, and run relay		
Insulation Resistance	> 10MΩ at 500VDC		
Input Voltage Range	85-132 VAC (110 range) 170-264 VAC (220 range) 47-63 Hz	10.2-28.8 VDC (24VDC) with less than 10% ripple	100-264 VDC (125 VDC) with less than 10% ripple
Auxiliary 24VDC Output	300mA max.	None	300mA max.
Maximum Inrush Current	30A	10A	20A
Maximum Power	80VA	25W	30W

Base Units

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 module. The Power Consumed charts list how much INTERNAL power from each power source is required for the modules. Use this information when calculating the power budget for your system.

In addition to the internal power sources, bases offer a 24VDC 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 ZL-RRL16-24-1 or ZL-RRL16-24-2. These modules can switch high current (10A) loads without putting a heavy 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.



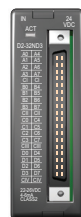
Power Supplied					
Device	5V(mA)	24V Auxiliary	Device	5V(mA)	24V Auxiliary
Bases			Bases		
D2-03B-1	2600	300	D2-04BDC1-1	2600	None
D2-04B-1	2600	300	D2-06BDC1-1	2600	None
D2-06B-1	2600	300	D2-09BDC1-1	2600	None
D2-09B-1	2600	300	D2-06BDC2-1	2600	300
D2-03BDC1-1	2600	None	D2-09BDC2-1	2600	300

Power Consumed		
Device	5V(mA)	24V Auxiliary
CPUs		
H2-DM1	250	0
H2-DM1E	275	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
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	670	0
F2-08TRS	670	0
D2-12TR	450	0
Combination In/Out Module		
D2-08CDR	200	0

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
F2-02DA-2L	40	70 @ 12V
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		
H2-CTRIO2	275	0
H2-EBC100	300	0
H2-ECOM100	300	0
H2-ERM100	300	0
H2-SERIO	80	0
H2-SERIO-4	80	0
F2-08SIM	50	0
Note 1: Add an additional 20mA per output loop.		

Discrete I/O Modules

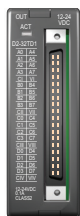
The Do-more H2 Series PLC supports all discrete I/O modules available for the DL205 PLC.

**D2-08ND3****D2-16ND3-2****D2-32ND3****D2-32ND3-2****D2-08NA-1****D2-08NA-2****D2-16NA**

Discrete Input Modules			
Part Number	Number of Inputs	Description	Price
<u>D2-08ND3</u>	8	Sinking/Sourcing DC Input	\$80.00
<u>D2-16ND3-2</u>	16	Sinking /Sourcing DC Input	\$148.00
<u>D2-32ND3</u>	32	Sinking /Sourcing DC Input	\$185.00
<u>D2-32ND3-2</u>	32	Sinking /Sourcing DC Input	\$180.00
<u>D2-08NA-1</u>	8	AC input	\$110.00
<u>D2-08NA-2</u>	8	AC input	\$140.00
<u>D2-16NA</u>	16	AC input	\$194.00

**D2-04TD1****D2-08TD1****D2-08TD2****D2-16TD1-2****D2-16TD2-2****F2-16TD1P**

Discrete Output Modules			
External Id	Number of Outputs	Description	Price
<u>D2-04TD1</u>	4	Sinking Output	\$106.00
<u>D2-08TD1</u>	8	Sinking Output	\$97.00
<u>D2-08TD2</u>	8	Sourcing Output	\$98.00
<u>D2-16TD1-2</u>	16	Sinking Output	\$172.00
<u>D2-16TD2-2</u>	16	Sourcing Output	\$154.00
<u>F2-16TD1P</u>	16	Protected Sinking Output	\$178.00
<u>F2-16TD2P</u>	16	Protected Sourcing Output	\$179.00
<u>D2-32TD1</u>	32	Sinking Output	\$183.00
<u>D2-32TD2</u>	32	Sourcing Output	\$182.00
<u>F2-08TA</u>	8	AC Output	\$208.00
<u>D2-08TA</u>	8	AC Output	\$195.00
<u>D2-12TA</u>	12	AC Output	\$223.00
<u>D2-04TRS</u>	4	Isolated Relay Output	\$114.00
<u>D2-08TR</u>	8	Relay Output	\$111.00
<u>F2-08TR</u>	8	Relay Output	\$149.00
<u>F2-08TRS</u>	8	Isolated Relay Output	\$200.00
<u>D2-12TR</u>	12	Relay Output	\$184.00

**F2-16TD2P****D2-32TD1****D2-32TD2****F2-08TA****D2-08TA****D2-12TA****D2-04TRS****D2-08TR****F2-08TR****F2-08TRS****D2-12TR****D2-08CDR**

Discrete Input/Output Modules			
Part Number	Number of Channels	Description	Price
<u>D2-08CDR</u>	4/4	Sinking/Sourcing DC Input with Relay Output	\$98.00

For more detailed specifications and wiring diagrams, please refer to the DL205 PLC section in this catalog.

Discrete I/O Modules

The following table may be helpful for you to select the right modules for your application.

Discrete Input Modules					
Input Type	Specification	Number of Input Points per Module			
		4	8	16	32
DC (Sinking/Sourcing)	4.5–15.6 VDC				D2-32ND3-2
	10.2–26.4 VDC		D2-08ND3		
	20–28 VDC	D2-08CDR¹		D2-16ND3-2	D2-32ND3
AC	80–132 VAC		D2-08NA-1	D2-16NA	
	170–265 VAC		D2-08NA-2		

Note 1: D2-08CDR is a combo I/O module that has four discrete input and four discrete output points.

Discrete Output Modules						
Output Type	Specification	Number of Output Points per Module				
		4	8	12	16	32
DC (Sinking)	4A @ 10.2–26.4 VDC	D2-04TD1				
	0.3A @ 10.2–26.4 VDC		D2-08TD1			
	0.25A @ 10.2–26.4 VDC				F2-16TD1P	
	0.1A @ 10.2–26.4 VDC				D2-16TD1-2	
	0.1A @ 12–24 VDC					D2-32TD1
DC (Sourcing)	0.3A @ 10.8–26.4 VDC		D2-08TD2			
	0.25A @ 10.2–26.4 VDC				F2-16TD2P	
	0.1A @ 10.2–26.4 VDC				D2-16TD2-2	
	0.1A @ 12–24 VDC					D2-32TD2
AC (SSR)	1.5A @ 24–140 VAC		F2-08TA			
	0.5A @ 15–264 VAC		D2-08TA			
	0.3A @ 15–132 VAC			D2-12TA		
DC/AC (Relay)	10A @ 12–28 VDC / 12–250 VAC		F2-08TR			
	7A @ 12–28 VDC / 12–250 VAC		F2-08TRS			
	4A @ 5–30 VDC / 5–240 VAC	D2-04TRS				
	1.5 @ 5–30 VDC / 5–240 VAC			D2-12TR		
	1A @ 5–30 VDC / 5–240 VAC	D2-08CDR¹	D2-08TR			

Note 1: D2-08CDR is a combo I/O module that has four discrete input and four discrete output points.

For more detailed specifications and wiring diagrams, please refer to the DL205 PLC section in this catalog.

Analog I/O Modules

The Do-more H2 Series PLC supports all analog I/O modules available for the DL205 PLC.

**F2-04AD-1****F2-04AD-2****F2-08AD-1****F2-08AD-2****F2-04RTD****F2-04THM**

Analog Input Modules			
Part Number	Number of Channels	Description	Price
<u>F2-04AD-1</u>	4	Analog Current Input	\$396.00
<u>F2-04AD-2</u>	4	Analog Voltage Input	\$432.00
<u>F2-08AD-1</u>	8	Analog Current Input	\$486.00
<u>F2-08AD-2</u>	8	Analog Voltage Input	\$516.00
<u>F2-04RTD</u>	4	RTD	\$539.00
<u>F2-04THM</u>	4	Thermocouple	\$582.00

**F2-02DA-1****F2-02DA-2****F2-02DA-2L****F2-02DAS-1****F2-02DAS-2****F2-08DA-1****F2-08DA-2**

Analog Output Modules			
Part Number	Number of Channels	Description	Price
<u>F2-02DA-1</u>	2	Analog Current Output	\$282.00
<u>F2-02DA-2</u>	2	Analog Voltage Output	\$295.00
<u>F2-02DA-2L</u> *	2	Analog Voltage Output	retired
<u>F2-02DAS-1</u>	2	Isolated Analog Current Output	\$432.00
<u>F2-02DAS-2</u>	2	Isolated Analog Voltage Output	\$471.00
<u>F2-08DA-1</u>	8	Analog Current Output	\$535.00
<u>F2-08DA-2</u>	8	Analog Voltage Output	\$530.00

* F2-02DA-2L works with external 12VDC power instead of external 24VDC power.

**F2-4AD2DA****F2-8AD4DA-1****F2-8AD4DA-2**

Analog Input/Output Modules			
Part Number	Number of Channels	Description	Price
<u>F2-4AD2DA</u>	4/2	Analog Current Input/Output	\$556.00
<u>F2-8AD4DA-1</u>	8/4	Analog Current Input/Output	\$697.00
<u>F2-8AD4DA-2</u>	8/4	Analog Voltage Input/Output	\$689.00

For more detailed specifications and wiring diagrams, please refer to the DL205 PLC section in this catalog.

Analog I/O Modules

The following table may be helpful for you to select the right modules for your application.

Analog Input Modules			
Input Type	Specification	Number of Input Points per Module	
		4	8
Current	0–20 mA		F2-8AD4DA-1 (16 bit)
	4–20 mA	F2-04AD-1 (12 bit) F2-4AD2DA (12 bit)	F2-08AD-1 (12 bit)
Voltage	0–5 V, 0–10 V, $\pm 5V$, $\pm 10V$	F2-04AD-2 (12 bit)	F2-08AD-2 (12/13 bit)
	0–5 V, 0–10 V		F2-8AD4DA-2 (16 bit)
	0–5 V, 0–156.25 mV, $\pm 5V$, ± 156.25 mV	F2-04THM (16 bit)	
RTD	Pt100, Pt1000, iPt100, CU-10V, CU-50V	F2-04RTD (0.1 degree)	
Thermocouple	Type J, E, K, R, S, T, B, N, C	F2-04THM (0.1 degree)	

Analog Output Modules				
Output Type	Specification	Number of Output Points per Module		
		2	4	8
Current	4–20 mA	F2-02DA-1 (12-bit) F2-02DAS-1 (16-bit) F2-4AD2DA (12 bit)	F2-8AD4DA-1 (16 bit)	F2-08DA-1 (12 bit)
Voltage	0–5 V, 0–10 V, $\pm 5V$, $\pm 10V$	F2-02DA-2 (12 bit) F2-02DA-2L (12 bit)		
	0–5 V, 0–10 V	F2-02DAS-2 (16-bit)	F2-8AD4DA-2 (15/16 bit)	F2-08DA-2 (12 bit)

Note 1: [F2-02DA-2L](#) works with external 12VDC power instead of external 24VDC power.

For more detailed specifications and wiring diagrams, please refer to the DL205 PLC section in this catalog.

Specialty Modules

The Do-more H2 Series PLC supports the following specialty modules.

Ethernet Communication Modules

Part Number	Description
<u>H2-ECOM100</u>	100 MBit Ethernet Communication Module

Serial Communication Modules

Part Number	Description
<u>H2-SERIO</u>	3-port RS-232 Serial I/O Module
<u>H2-SERIO-4</u>	3-port RS-232/RS-485 Serial I/O Module

Ethernet Remote I/O Modules

Part Number	Description
<u>H2-ERM100</u>	10/100Base-T Ethernet Remote Master Module
<u>H2-EBC100</u>	100 MBit Ethernet Base Controller

High Speed I/O Modules

Part Number	Description
<u>H2-CTRIO2</u>	High Speed Counter Interface Module

Input Simulator Module

Part Number	Description
<u>F2-08SIM</u>	8-point Input Simulator

Specialty Modules

H2-ECOM100 \$450.00



H2-ECOM100

Overview

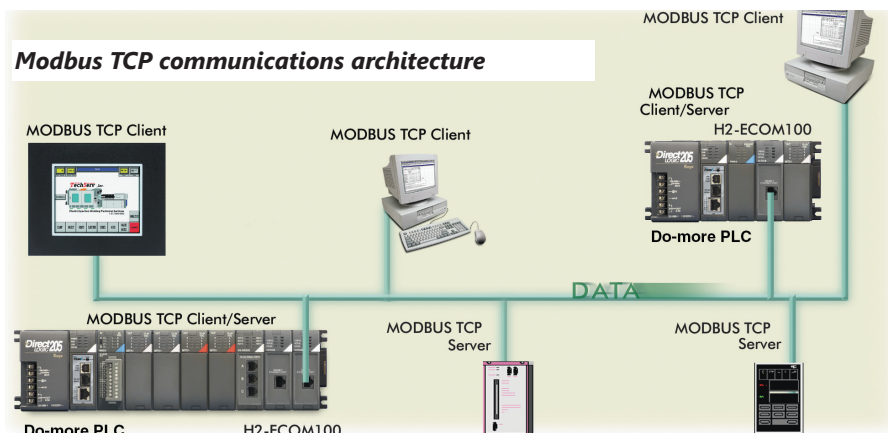
Ethernet Communications Modules offer features such as:

- High-speed peer-to-peer networking of PLCs
- Fast updates with Do-more Designer Software
- High-performance access for Human Machine Interface (HMI), ERP, MES or other Windows-based software
- Industry standard Modbus TCP Client/Server Protocol

Simple connections

Use Category 5 UTP cables which can be run up to 100 meters between nodes. If needed, use repeaters to extend distances and expand the number of nodes.

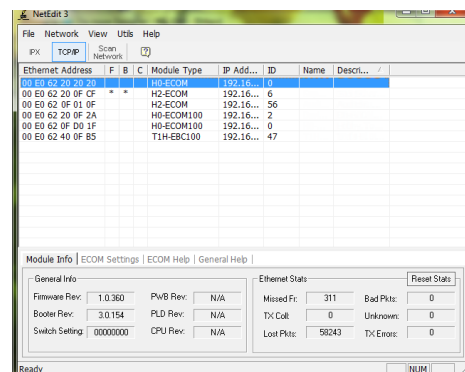
Our Stride Ethernet switches are compatible with the ECOM modules. See the Communications Products section for information on these items.



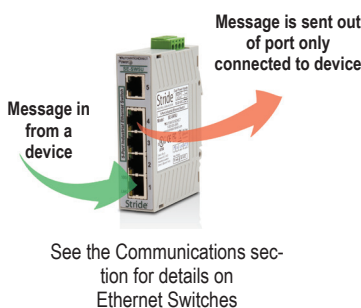
NetEdit 3 Configuration Software

NetEdit 3 Configuration Software is included in the free Do-more Designer software. Use NetEdit 3 to configure the ECOM modules for your network. Flexible addressing allows you to use your choice of protocols and identification methods. Assign each module a number, a name or both. You don't have to use an IP address, but you can if it's necessary for your network. NetEdit 3 uses two protocols for PC-to-PLC communications: IPX and TCP/IP. The NetEdit 3 screen displays all identifiers and troubleshooting information for each module on the network. You can use NetEdit 3 to adjust parameters for PLC-to-PLC communications by clicking on Advanced Settings. The network identifiers can also be changed from Do-more Designer software.

NetEdit 3 Configuration Software



The H2-ECOM100 supports the Industry Standard Modbus TCP Client/Server Protocol



Specifications	H2-ECOM100
Communications	10/100Base-T Ethernet
Data Transfer Rate	100 Mbps max.
Link Distance	100 meters (328 feet)
Ethernet Port	RJ45
Ethernet Protocols	TCP/IP, IPX, Modbus TCP, DHCP, HTML configuration
Power Consumption	300mA @ 5VDC

Specialty Modules

H2-SERIO \$267.00
H2-SERIO-4 \$267.00

**H2-SERIO****H2-SERIO-4**

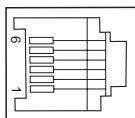
Serial I/O Modules

Add serial ports to your Do-more H2 Series PLC system by simply plugging the H2-SERIO or H2-SERIO-4 module into the base.

The H2-SERIO module has three RS-232 ports, while the H2-SERIO-4 module has two RS-232 ports and one RS-422/485 port.

H2-SERIO(-4) Wiring: RS-232

RS-232
6 pin RJ12 Phone
Type Jack – both ports



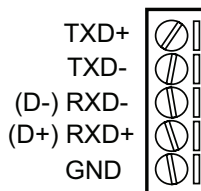
H2-SERIO(-4) RS-232 Pin Descriptions		
1	0V	Power (-) connection (GND)
2	CTS	Clear to Send
3	RXD	Receive data (RS-232)
4	TXD	Transmit data (RS-232)
5	RTS	Request to Send
6	0V	Signal Ground (GND)

H2-SERIO / H2-SERIO-4 Specifications

	H2-SERIO	H2-SERIO-4
Module Type	Serial Communications Module	
Approvals	cUL Listed, file number E185989	
Number of Serial Ports per Module	3 ports: all RS-232 (RJ12 jack)	3 ports: 2 RS-232 ports (RJ12 jack) and 1 RS-422/485 (5 position terminal strip)
Signals	RS-232: CTS, RXD, TXD RTS, GND RTS transmission delay times: 5, 50, 250 and 500 ms	RS-232: CTS, RXD, TXD RTS, GND RTS transmission delay times: 5, 50, 250 and 500 ms RS-422 (4 wire): TX+, TX-, RX-, RX+, GND RS-485 (2 wire): Data+, Data-, GND
Recommended Cables	RS-232: ZL-RJ12-CBL-2	RS-232: ZL-RJ12CBL-2 RS-422: ADC L19853-x (Belden 8103) RS-485: ADC L19954-x (Belden 9842)
Protocols Supported	Do-more programming, K-sequence slave, MODBUS RTU master/slave, serial ASCII (full-duplex)	
Power Consumption	80mA @ 5VDC	
Baud Rates	1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200	
Parity	None, odd, even	
Start and Stop Bits	1, 2	
Operating Environment	0 to 60°C (32°F to 140°F), 5% to 95% RH (non-condensing); No corrosive gases, Pollution level 2; Vibration: MIL STD 810C 514.2; Shock: MIL STD 810C 516.2	
Storage Temperature	-20°C to 70°C (-4°F to 158°F)	

H2-SERIO-4 Wiring: RS-422/485

RS422/485



H2-SERIO-4 RS-422 Pin Descriptions		
1	TXD+	Transmit data
2	TXD-	
3	(D-) RXD-	Receive data
4	(D+) RXD+	
5	GND	Signal Ground (GND)

H2-SERIO-4 RS-485 Pin Descriptions		
1	TXD+	N/A
2	TXD-	
3	(D-) RXD-	Transmit/Receive data
4	(D+) RXD+	
5	GND	Signal Ground (GND)

Specialty Modules

H2-ERM100 \$344.00



H2-ERM100

Overview

The H2-ERM100 Ethernet Remote Master connects a Do-more H2 Series PLC's local CPU base to remote slave I/O over a high-speed Ethernet link.

Need a lot of I/O?

Each ERM module can support up to 16 additional H2-EBC100 systems, 16 Terminator I/O EBC systems (T1H-EBC100), or 16 fully expanded H4-EBC systems. Of course, combinations are fine, too. The ERM also supports Edrives. See the Drives section for details.

Note: Applications requiring an extremely large number of T1H-EBC100 analog I/O or H4-EBC 16-channel analog I/O, could exceed the buffer capacity of a single H2-ERM100 module. In these cases, an additional H2-ERM100 may be required.

Specifications	H2-ERM100
Communications	10/100BaseT Ethernet
Data Transfer Rate	100 Mbps
Link Distance	100 meters (328 feet)
Ethernet Port	RJ45
Ethernet Protocols	TCP/IP, IPX, Modbus TCP/IP, Ethernet/IP, DHCP, HTML configuration
Power Consumption	300mA @5 VDC

Simple connections

The H2-ERM100 connects to your control network using Category 5 UTP cables for cable runs up to 100 meters. Distances can be greatly extended with Ethernet/Fiber media converters like the SE-MC2U-ST.

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

Networking ERMs with other Ethernet devices

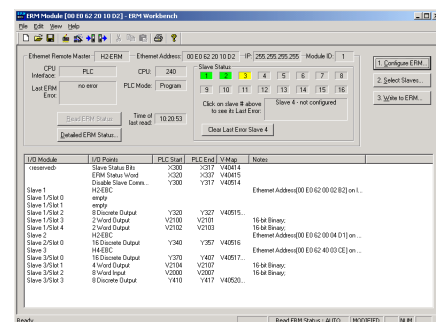
It is highly recommended that a dedicated Ethernet remote I/O network be used for the H2-ERM100 and its slaves. While Ethernet networks can handle a large number of data transactions, and normally handle them very quickly, heavy Ethernet traffic can adversely affect the reliability of the slave I/O and the speed of the I/O network. Ensure ERM networks, multiple ERM networks and ECOM/office networks are isolated from one another.

Software configuration

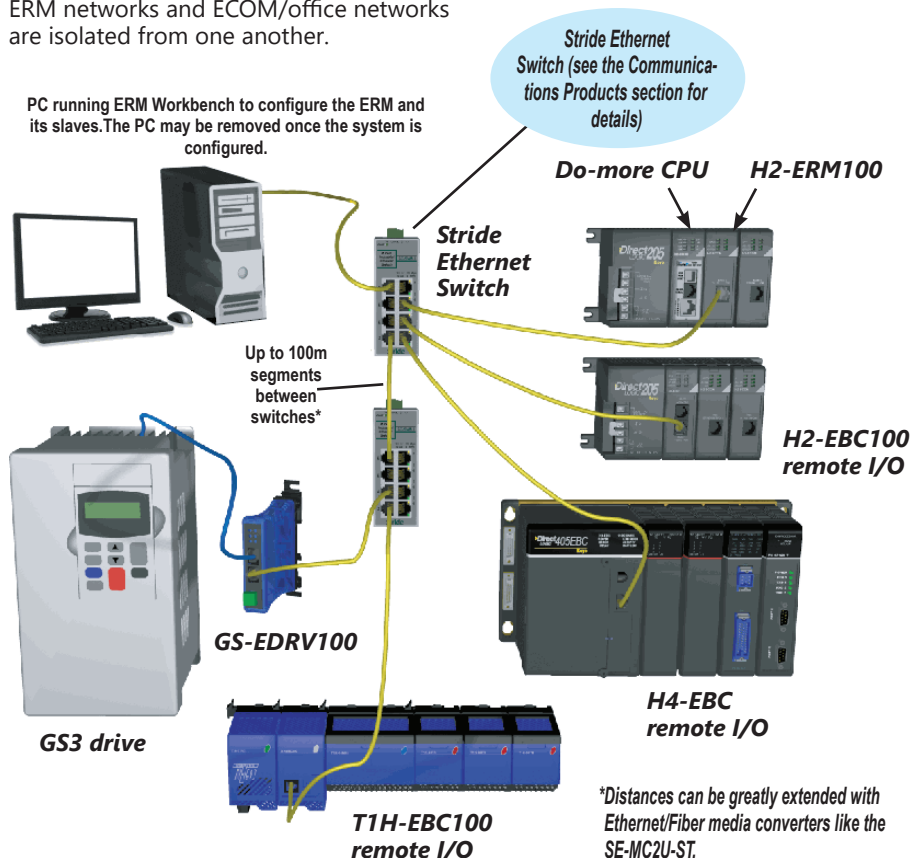
ERM Workbench is a software utility that must be used to configure the ERM and its remote Ethernet slaves. ERM Workbench supports two methods of configuring the ERM I/O network:

- ERM Workbench PLC Wizard greatly simplifies the configuration procedure when a PLC is used as the CPU interface.
- ERM Workbench configures the I/O network whether the CPU interface is a PLC or WinPLC, and allows access to all H2-ERM100 I/O network parameters.

ERM Workbench Software



PC running ERM Workbench to configure the ERM and its slaves. The PC may be removed once the system is configured.



**Distances can be greatly extended with Ethernet/Fiber media converters like the SE-MC2U-ST.*

Specialty Modules

H2-EBC100 \$492.00



H2-EBC100

Use EBCs for Ethernet remote I/O slaves

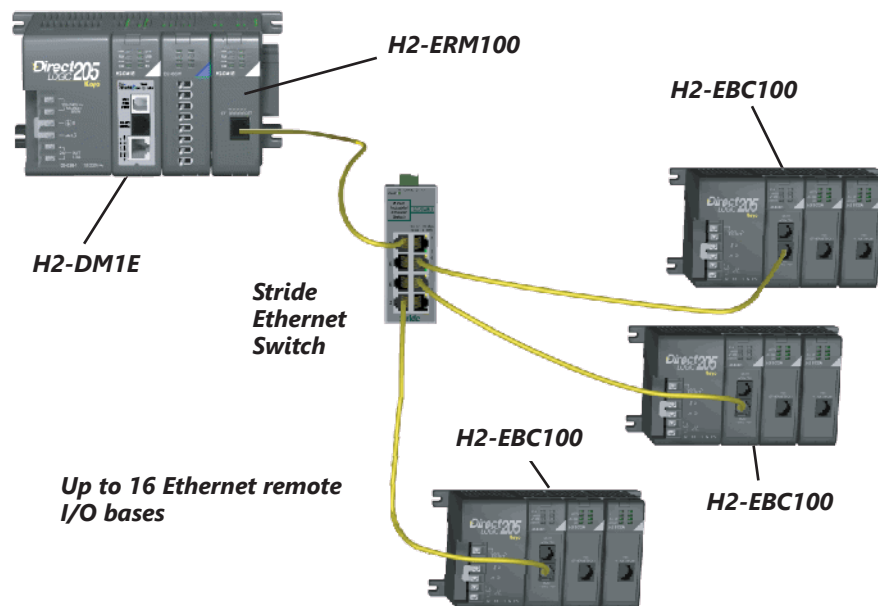
The H2-EBC100 Ethernet Base Controller module provides a low-cost, high-performance Ethernet link for the Do-more H2 Series PLC using the H2-ERM100 module and Ethernet remote I/O. The H2-EBC100 supports industry standard 10/100BaseT Ethernet communications and is compatible with TCP/IP, IPX, Modbus TCP/IP and Ethernet/IP protocols

Easy to use, reliable and fast

The H2-EBC100 module plugs into the CPU slot of any DL205 I/O base and supports all DL205 discrete and analog I/O modules. All EBC modules can be configured using NetEdit 3, included in the free Do-more Designer software. The H2-EBC100 also supports HTML configuration.

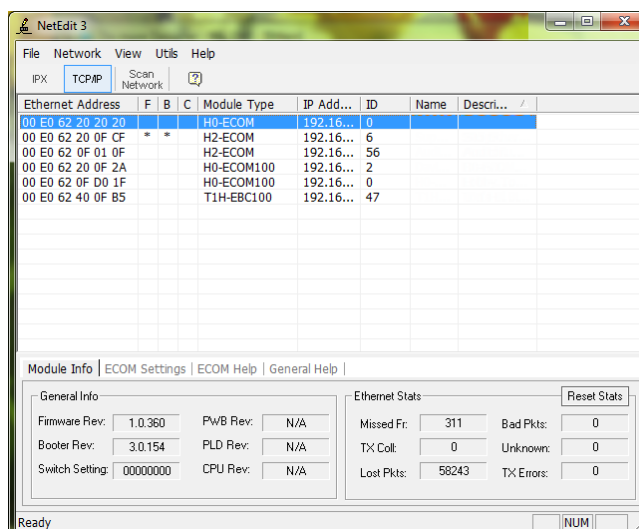
Specifications	H2-EBC100
Communications	10/100 Base-T Ethernet
Data Transfer Rate	100 Mbps max.
Link Distance	100 meters (328 feet)
Ethernet Port / Protocols	RJ45, TCP/IP, IPX, Modbus TCP/IP, Ethernet/IP, DHCP, HTML configuration
Serial Port / Protocols	RJ12, K-Sequence, ASCII IN/OUT, Modbus RTU
Power Consumption	300mA

Do-more H2 Series PLC



Up to 16 Ethernet remote I/O bases

NetEdit 3 Configuration Software



Specialty Modules

H2-CTRIO2 \$471.00



H2-CTRIO2

Overview

The H2-CTRIO2 Counter I/O module is designed to accept high-speed pulse input signals for counting or timing applications. This module also provides a high-speed pulse output signal for servo/stepper motor control, monitoring and alarming as well as other discrete control functions.

The CTRIO2 module offers greater flexibility for applications which call for precise counting or timing based on input events or for high speed control output applications. It can also be used for applications that call for a combination of both high-speed input and high-speed output control functions.

The CTRIO2 module has its own microprocessor and operates asynchronously with respect to the CPU. Therefore, the response time of the on-board outputs is based on the module scan time, not the CPU scan time.

Software Configuration

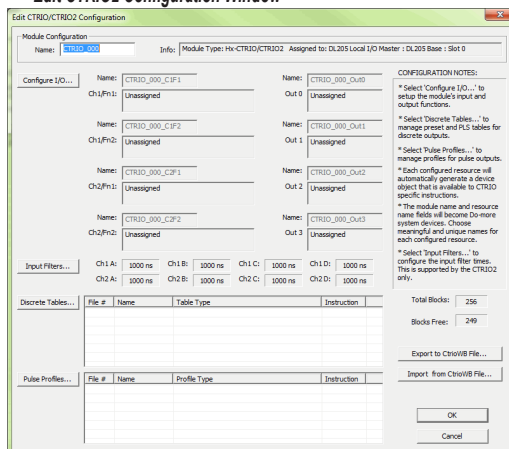
All scaling and configuration is done from within the Edit CTRIO/CTRIO2 Configuration window of Do-more Designer. This eliminates the need for PLC ladder programming or other interface device programming to configure the module.

General Specifications	
Specifications	H2-CTRIO2
Discrete I/O Points Used	None (I/O map directly in H2-DM1/E data structure)
Base Power Required	275mA Max
Isolation	1500V I/O to Logic, 1000V among Input Channels and All Outputs

Input Specifications	
Specifications	H2-CTRIO2
Inputs	8 pts sink/source
Maximum Input Frequency	250kHz
Minimum Pulse Width	0.5 µsec
Input Voltage Range	9–30 VDC
Maximum Voltage	30VDC
Input Voltage Protection	Zener Clamped at 33VDC
Rated Input Current	8mA typical 12mA maximum
Minimum ON Voltage	9.0 VDC
Maximum OFF Voltage	2.0 VDC
Minimum ON Current	5.0 mA
Maximum OFF Current	2.0 mA
OFF to ON Response	< 0.5 µsec
ON to OFF Response	< 0.5 µsec

Output Specifications	
Specifications	H2-CTRIO2
Outputs	4 pts (sink/source), independently isolated
Pulse Outputs	2 channels, 20Hz to 250kHz Pulse/Direction or CW/CCW
Minimum Pulse Width	0.5 µsec
Output Voltage Range	5–36 VDC
Maximum Output Voltage	36VDC
Maximum Load Current	1.0 A at 23°C 0.5 A at 60°C
Maximum Leakage Current	100µA
Inrush Current	2.0 A for 10ms
ON State V Drop	0.45 VDC or less
Overcurrent Protection	Yes
OFF to ON Response	<1 µsec
ON to OFF Response	<1 µsec
Maximum Output Frequency	
Velocity Mode	65kHz
Run to Limit Mode	
Run to Position Mode	
Trapezoid	
S-Curve	
Symmetrical S-Curve	250kHz
Dynamic Positioning	
Home Search	
Free Form	
Dynamic Velocity	
Dynamic Positioning Plus	
Trapezoid Plus	
Trapezoid with Limits	

Edit CTRIO2 Configuration Window



Inputs Supported:

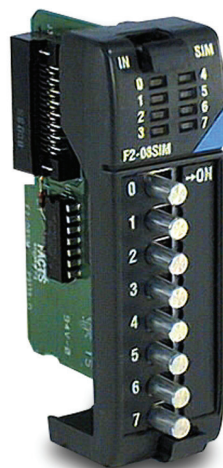
- Counter
- Quad Counter
- Pulse Catch
- Edge Timer
- Dual Edge Timer

Outputs Supported:

- Pulse train - used for servo/stepper motor control. Configurable for CW/CCW or step and direction
- Discrete outputs - assigned to Counter/Timer input functions
- Raw output - outputs controlled directly from the CPU interface program
- Programmable limit switch

Specialty Modules

F2-08SIM **\$118.00**



F2-08SIM

F2-08SIM Input Simulator

Inputs per Module	8
Base Power Required 5VDC	50mA
Terminal Type	None
Status Indicator	Switch side
Weight	2.65 oz. (75g)

Dimensions and Installation

Understanding the installation requirements for your Do-more H2 Series PLC system will help ensure that the components operate within their environmental and electrical limits.

Plan for safety

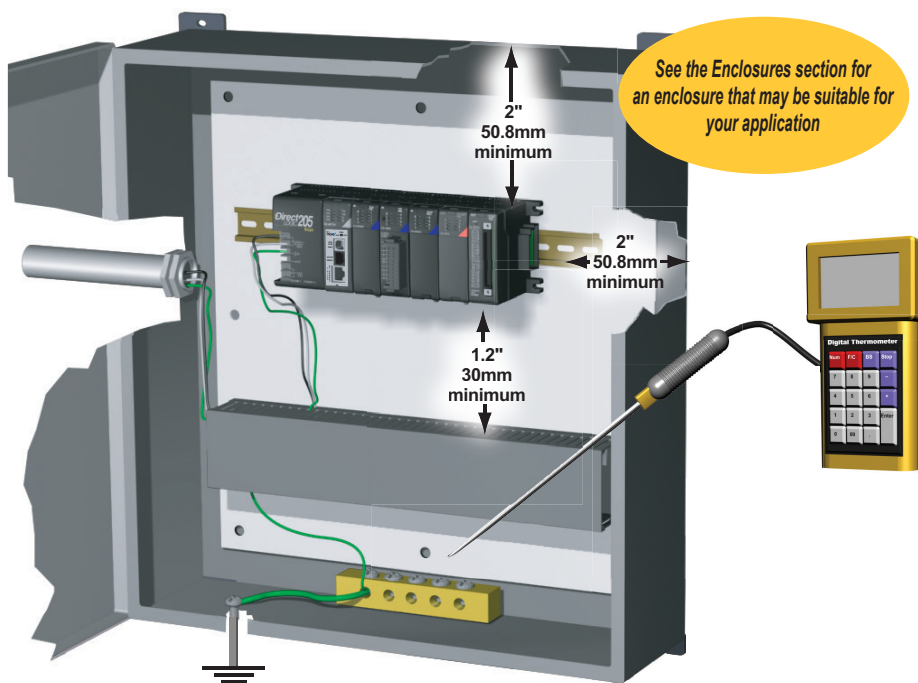
This catalog should never be used as a replacement for the user manual. The user manual, H2-DM-M (sold separately or downloadable online), contains important safety information that must be followed. The system installation should comply with all appropriate electrical codes and standards.

Environmental specifications

The Environmental Specifications table at the right lists specifications that apply globally to the Do-more H2 Series PLC system (CPUs, bases, and I/O modules). Be sure that the system is operated within these environmental specifications.

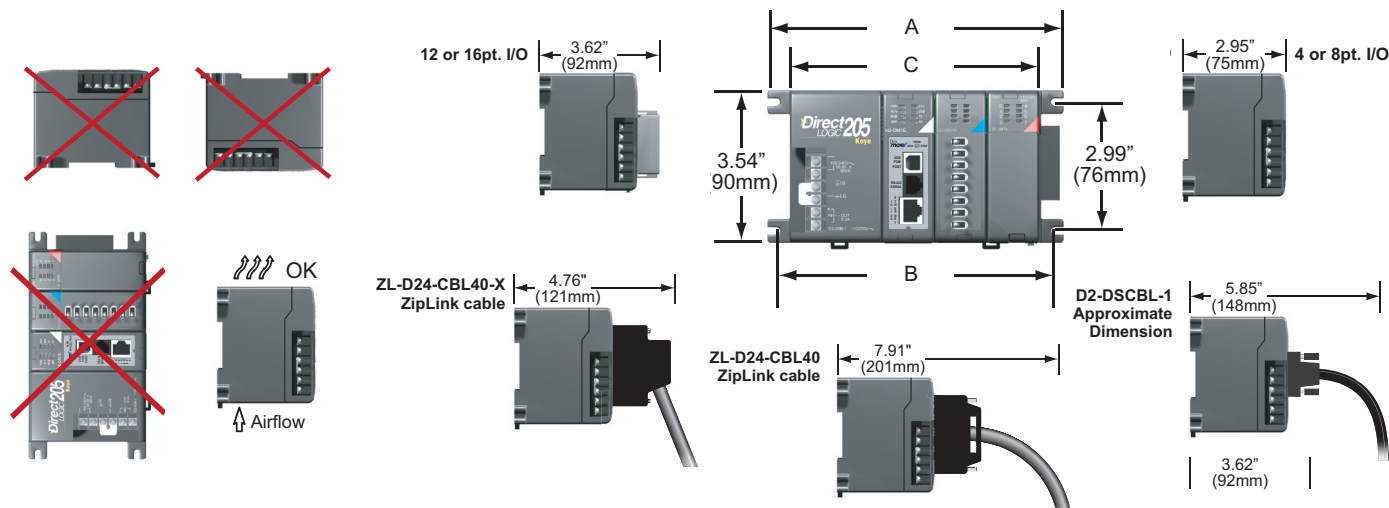
Base dimensions and mounting

Use the diagrams below to make sure the Do-more H2 Series PLC system can be installed in your application. To ensure proper airflow for cooling purposes, 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.



Environmental Specification	Rating
Storage Temperature	-40°F - 158°F (-20°C to 70°C)
Ambient Operating Temperature	32°F - 131°F (0°C 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

Base	A (Base Total Width)		B (Mounting Hole)		C (Component Width)	
	Inches	Millimeters	Inches	Millimeters	Inches	Millimeters
3-slot	6.77"	172mm	6.41"	163mm	5.8"	148mm
4-slot	7.99"	203mm	7.63"	194mm	7.04"	179mm
6-slot	10.43"	265mm	10.07"	256mm	9.48"	241mm
9-slot	14.09"	358mm	13.74"	349mm	13.14"	334mm





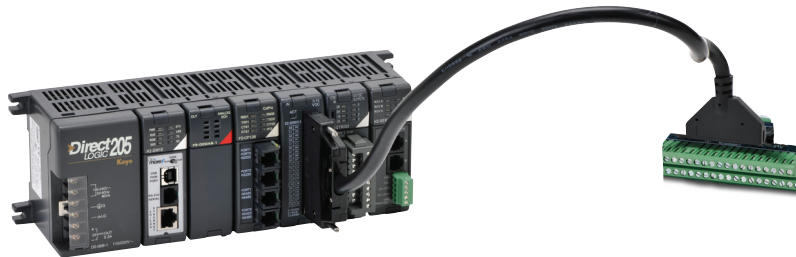
Wiring Solutions

Wiring Solutions using the ZIPLink Wiring System

ZIPLinks simplify 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,

Solution 1: Do-more H2 Series PLC 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 H2 Series PLC to 3rd Party Devices

When wanting to connect I/O to another device within close 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.





Wiring Solutions

Solution 4: Serial Communications Cables

ZIPLink offers communications cables for use with Do-more H2 Series 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 and RJ12 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.





Wiring Solutions

Do-more/DL205 PLC Input Module ZIPLink Selector				
PLC		ZIPLink		
Input Module	# of Terms	Component	Module	Cable †
D2-08ND3	10	Feedthrough	ZL-RTB20	ZL-D2-CBL10 *
D2-16ND3-2	19	Feedthrough	ZL-RTB20	ZL-D2-CBL19 *
		Sensor	ZL-LTB16-24	ZL-D2-CBL19 *
D2-32ND3-1	40	Feedthrough	ZL-RTB40	ZL-D24-CBL40 *
				ZL-D24-CBL40 *X
		Sensor	ZL-LTB32-24	ZL-D24-CBL40 *
				ZL-D24-CBL40 *X
D2-32ND3-2-1	40	Feedthrough	ZL-RTB40	ZL-D24-CBL40 *
				ZL-D24-CBL40 *X
		Sensor	ZL-LTB32-24	ZL-D24-CBL40 *
				ZL-D24-CBL40 *X
D2-08NA-1	10	Feedthrough	ZL-RTB20	ZL-D2-CBL10 *
D2-08NA-2	10	Feedthrough	ZL-RTB20	ZL-D2-CBL10 *
D2-16NA	19	Feedthrough	ZL-RTB20	ZL-D2-CBL19 *

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

Do-more/DL205 PLC Combo In/Out Module ZIPLink Selector				
PLC		ZIPLink		
Combo Module	# of Terms	Component	Module	Cable
D2-08CDR	10	Feedthrough	ZL-RTB20	ZL-D2-CBL10 *
H2-CTRIO2	19	Feedthrough	ZL-RTB20 (-1)	ZL-D2-CBL19 *

Do-more/DL205 PLC Analog Module ZIPLink Selector						
PLC		ZIPLink				
Analog Module	# of Terms	Component	Module	Cable		
<u>F2-04AD-1</u>	10	Feedthrough	<u>ZL-RTB20</u>	<u>ZL-D2-CBL10</u> *		
<u>F2-08AD-1</u>						
<u>F2-04AD-2</u>						
<u>F2-08AD-2</u>						
<u>F2-02DA-1</u>						
<u>F2-02DAS-1</u>	19					<u>ZL-D2-CBL19</u> *
<u>F2-08DA-1</u>						
<u>F2-02DA-2</u>	10					<u>ZL-D2-CBL10</u> *
<u>F2-02DAS-2</u>						
<u>F2-08DA-2</u>						
<u>F2-4AD2DA</u>						
<u>F2-8AD4DA-1</u>						
<u>F2-8AD4DA-2</u>						
<u>F2-04RTD</u> ⁴	Matched Only	See Note 4				
<u>F2-04THM</u> ⁴	Matched Only	See Note 4				

Do-more/DL205 PLC Output Module ZIPLink Selector				
PLC		ZIPLink		
Output Module	# of Terms	Component	Module	Cable †
D2-04TD1¹	10	Feedthrough	ZL-RTB20	ZL-D2-CBL10 *
D2-08TD1	10	Feedthrough		ZL-D2-CBL10 *
D2-08TD2	10	Feedthrough		ZL-D2-CBL10 *
D2-16TD1-2	19	Feedthrough		ZL-D2-CBL19 *
		Fuse	ZL-RFU20⁵	ZL-D2-CBL19 *
D2-16TD2-2	19	Feedthrough	ZL-RTB20	ZL-D2-CBL19 *
		Fuse	ZL-RFU20⁵	ZL-D2-CBL19 *
		Relay	ZL-RRL16-24-2	ZL-D2-CBL19 *
F2-16TD1P	19	Feedthrough	ZL-RTB20	ZL-D2-CBL19 *
F2-16TD2P	19	Feedthrough	ZL-RTB20	ZL-D2-CBL19 *
D2-32TD1¹	40	Feedthrough	ZL-RTB40	ZL-D24-CBL40 *
		Fuse	ZL-RFU40⁵	ZL-D24-CBL40 *
D2-32TD2¹	40	Feedthrough	ZL-RTB40	ZL-D24-CBL40 *
				ZL-D24-CBL40 *X
		Fuse	ZL-RFU40⁵	ZL-D24-CBL40 *
				ZL-D24-CBL40 *X
D2-08TA	10	Feedthrough	ZL-RTB20	ZL-D2-CBL10 *
F2-08TA	10	Feedthrough		ZL-D2-CBL10 *
D2-12TA	19	Feedthrough	ZL-RFU20⁵	ZL-D2-CBL19 *
		Fuse		ZL-D2-CBL19 *
D2-04TRS²	10	Feedthrough	ZL-RTB20	ZL-D2-CBL10 *
D2-08TR	10	Feedthrough		ZL-D2-CBL10 *
F2-08TRS²	19	Feedthrough		ZL-D2-CBL19 *
F2-08TR3	10	Feedthrough		ZL-D2-CBL10 *
D2-12TR	19	Feedthrough		ZL-D2-CBL19 *
		Fuse	ZL-RFU20⁵	ZL-D2-CBL19 *

† 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 The [F2-04RTD](#) and [F2-04THM](#) modules are not supported by the ZIPLink wiring system.

5 Note: 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 Modules and ZIPLink Cables specifications are in the ZIPLink catalog section.