D2-250-1 Key Features

DL250-1 CPU
D2-250-1   <--->

D2-250-1 can serve as network master

Easily connect programming devices or HMI to CPU ports

MODBUS® RTU or DirectNET™ protocol

Connect operator interfaces to port 1 on the slaves

Use port 2 on D2-260 or D2-250-1 to network slaves

Use D2-DCM module if D2-240 is slave or if D2-250-1/D2-260 port 2 is occupied

D2-250-1 replaces D2-250

Our D2-250-1 CPU replaces the D2-250 CPU. The D2-250-1 offers all the features and functionality of the D2-250 with the addition of local I/O expansion capability. The D2-250-1 offers an incredible array of features for a CPU that costs so little.

Release 2.1 or higher of *Direct*SOFT is required to program the D2-250-1. Release 4.0 or higher is required if you intend to use local expansion I/O.

If you're using a handheld programmer, at least version 2.10 of the handheld programmer firmware is required.

A few key features of the D2-250-1 CPU follow.

Local expansion I/O

The D2-250-1 supports local expansion up to three total bases (one CPU base and two expansion bases). Expansion bases are commonly used when there are not enough slots available in the CPU base, when the base power budget will be exceeded or when placing an I/O base at a location away from the CPU base, but within the expansion cable limits. All local and expansion I/O points are updated on every CPU scan. Each local expansion base requires the D2-CM module in the CPU slot. The local CPU base requires the D2-EM Expansion Module, as well as each expansion base. For more information on local expansion, refer to the Expansion Modules pages later in this section.
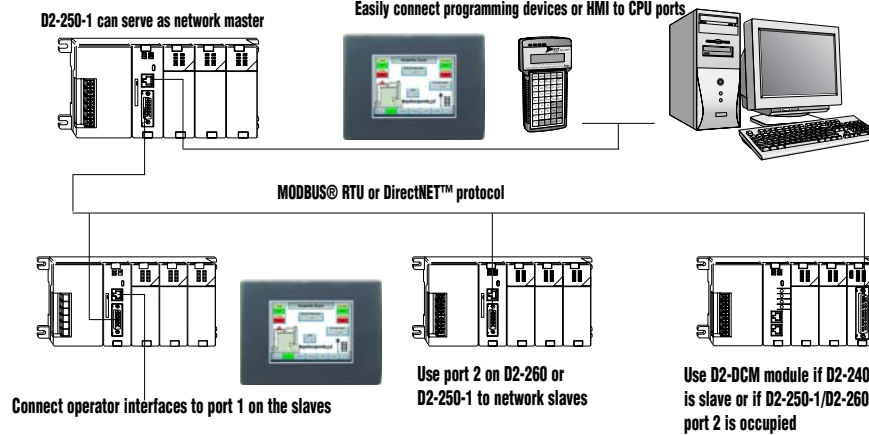
Powerful built-in CPU communications

The D2-250-1 offers two communication ports that provide a vast array of communication possibilities. The top RS-232 port is for programming, connection to a *C-more* operator interface panel or DV-1000, or to serve as a single *Direct*NET slave. The 15-pin bottom port (port 2) supports RS-232 or RS-422. This port offers several different protocol options such as:

- K-sequence
- *Direct*NET master/slave
- Modbus RTU master/slave

Port 2 can also serve as a remote I/O master. The D2-250 supports the Ethernet Communication Module and Data Communication Module for additional communications ports.
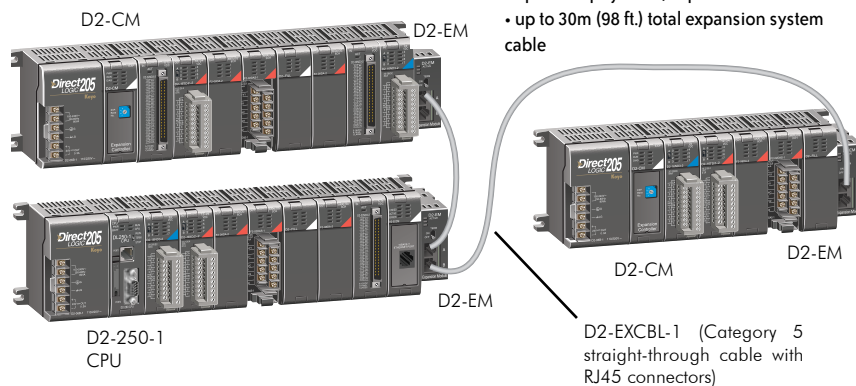
Four PID loops with auto-tuning

The D2-250-1 CPU can process up to 4 PID loops directly in the CPU. You can select from various control modes including automatic, manual, and cascade control. There are a wide variety of alarms including Process Variable, Rate of Change, and Deviation. The loop operation parameters (Process Variable, Setpoint, Setpoint Limits, etc.) are stored in V-memory, which allows easy access from operator interfaces or HMIs. Setup is accomplished with easy-to-use setup menus and monitoring views in *Direct*SOFT programming.

The auto-tuning feature is easy to use and can reduce setup and maintenance time. Basically, the CPU uses the auto-tuning feature to automatically determine near optimum loop settings. See the next page for a PID loop control block diagram.

D2-250-1 local expansion system

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

D2-CM

D2-EM

D2-EM

D2-250-1 CPU

D2-CM

D2-EM

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

The D2-250-1 offers:
- up to two expansion bases
- up to 768 physical I/O points
- up to 30m (98 ft.) total expansion system cable

Automation Direct

PLC Overview
DL05/06 PLC
DL105 PLC
DL205 PLC
DL305 PLC
DL405 PLC
Field I/O
Software
C-more HMIs
Other HMI
AC Drives
Motors
Steppers/ Servos
Motor Controls
Proximity Sensors
Photo Sensors
Limit Switches
Encoders
Pushbuttons/ Lights
Process
Relays/ Timers
Comm.
TB's & Wiring
Power
Enclosures
Appendix
Part Index

D2-250-1 Key Features

Full array of instructions

The D2-250-1 supports over 210 powerful instructions, such as:
- Four types of drum sequencers
- Leading and trailing edge triggered one-shots
- Bit-of-word manipulation
- Floating point conversions
- Four PID loops

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

On-board memory

The D2-250-1 has 7.6K words of flash memory on board for your program plus 7.1K words of V-memory (data registers). With flash memory, you don't have to worry about losing the program due to a bad battery. If you have critical data stored in the capacitor backed V-memory, simply purchase the optional lithium battery (D2-BAT-1) to permanently maintain these parameters.
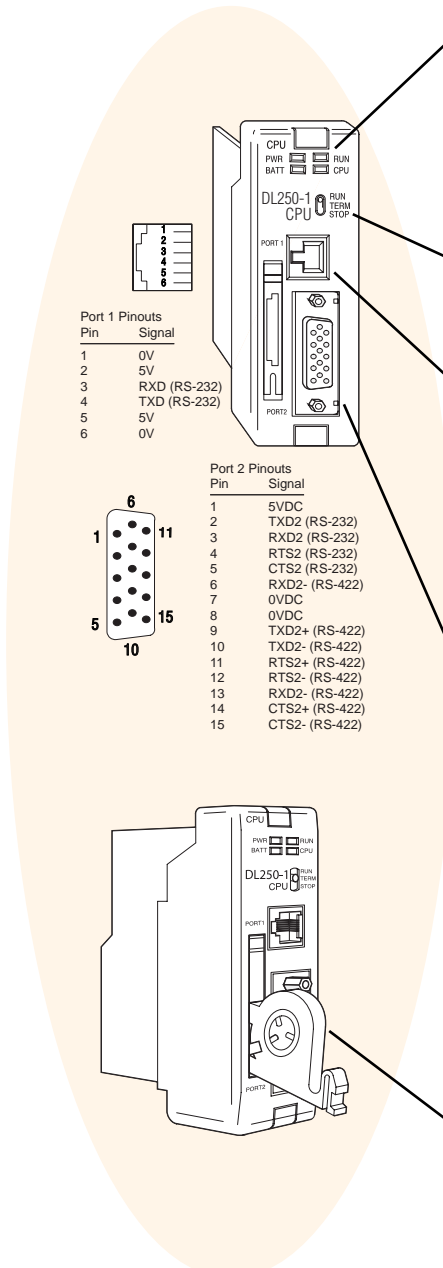
Built-in remote I/O connection

In addition to providing outstanding communications capabilities, the bottom port on the D2-250-1 can also be a master for remote I/O networks. If you need extra I/O at a remote distance from the CPU, you can use this port to add up to seven of our remote slave stations. (See the D2-RSSS for additional information later in this section.)

DN-15TB

*ZIP*Link communications adapter modules

*ZIP*Link cables and communications adapter modules offer fast and convenient screw terminal connections for the D2-250-1 lower port. They are RS232/422 DIP switch selectable. For part numbers and descriptions, see the Terminal Blocks and Wiring section in this catalog .

Port 1 Pinouts

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

Port 2 Pinouts

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

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

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

Port 1	
Protocols	K-sequence slave, *Direct*NET™ slave, Modbus RTU slave
Devices	Can connect w/HPP, *Direct*SOFT, *C-more*, DV-1000, O/I panels, or any *Direct*NET master
Specs.	6P6C phone jack connector RS-232 9,600 baud Fixed address Odd parity only 8 data bits one start, one stop asynchronous, half-duplex, DTE

Port 2	
Protocols	K-sequence slave, *Direct*NET Master/Slave, Modbus RTU Master/Slave, ASCII OUT, Remote I/O Master
Devices	Can connect w/many devices, such as PCs running *Direct*SOFT, DSData, HMI packages, *C-more*, DV-1000, other O/I panels, any *Direct*NET or Modbus RTU master or slave, or ASCII devices
Specs.	HD15 connector RS-232/422 300/600/1200/2400/4800 9600/19.2 K/38.4 Kbaud Odd, even, or no parity Selectable address (1–90, HEX 1 – 5A) 8 data bits, one start, one stop Asynchronous, Half-duplex, DTE

Battery (Optional)	
D2-BAT-1	Coin type, 3.0 V Lithium battery, 560 mA, battery number CR2354

Note: Batteries are not needed for program back-up. However, you should order a battery if you have parameters in V-memory that must be maintained in case of a power outage.

PID loop control block diagram

PID loop control block diagram