DL405 CPU Comparisons

DL405 CPU Specifications			
	D4-430	**D4-440**	**D4-450**
System Capacity			
Total memory available (words)	6.5K	22.5K	30.8K
Ladder memory (words)			
built-in memory	3.5K EEPROM	None, requires MC	7.5K flash
with memory cartridge	N/A	up to 15.5K	up to 15.5K
V-memory (words)	3.0K	7.0K	15.3K
Battery backup	Yes	Yes	Yes
Total CPU memory I/O pts. available (*actual I/O points depend on I/O configuration selected*)	1664 (X+Y+CR+GX)	2688 (X+Y,+CR+GX)	8192 (X+Y+GX+GY)
I/O module point density	2/4/8/16/32/64	2/4/8/16/32/64	2/4/8/16/32/64
I/O module slots per base	4/6/8	4/6/8	4/6/8
Local/local expansion	320 in/320 out	320 in/320 out	1024 in/1024 out
Serial remote I/O (including local & exp. I/O)	1664 max.	1664 max.	4224 max.
Remote I/O Channels	2	2	3
I/O pts. per remote module channel	512	512	512; 2048 (port 3)
Ethernet Remote I/O (including local/exp. I/O)	Yes	Yes	Yes
discrete I/O pts.	1664 max. (Including local and exp.I/O)	2688 max. (Including local and exp.I/O)	8192 max. (Including local and exp.I/O)
Analog I/O channels	map into V-memory	map into V-memory	map into V-memory
Remote I/O channels	Limited by power budget	Limited by power budget	Limited by power budget
I/O per remote channel	16,384 (limited to 1664)	16,384 (limited to 2688)	16,384 (16 fully expanded H4-EBC slaves using V-memory and bit-of-word instructions)
Performance			
Contact execution (boolean)	3.0µs	0.33µs	0.96µs
Typical scan (1K boolean)	8-10ms	2-3ms	4-5ms
Programming and Diagnostics			
RLL ladder style	Yes	Yes	Yes
RLL PLUS/flowchart style (Stages)	Yes/384	Yes/1024	Yes/1024
Run time editing	No	Yes	Yes
Supports Overrides	No	No	Yes
Variable/fixed scan	Variable	Variable	Fixed or variable
Instructions	113	170	210
Control relays	480	1024	2048
Timers	128	256	256
Counters	128	128	256
Immediate I/O	Yes	Yes	Yes
Subroutines	No	Yes	Yes
For/next loops	No	Yes	Yes
Timed interrupt	No	Yes	Yes
Integer math	Yes	Yes	Yes
Floating-point math	No	No	Yes
Trigonometric functions	No	No	Yes
Table instructions	No	Yes	Yes
PID	No	No	Yes
Drum sequencers	No	No	Yes
Bit of word	No	No	Yes
Real-time clock/calendar	No	Yes	Yes
Internal diagnostics	Yes	Yes	Yes
Password security	No	Yes	Multi-level
System and User error log	No	Yes	Yes
IBox instructions	No	No	Yes
CPU Ports Communications			
Built-in ports	2 ports	2 ports	4 ports
K-sequence (proprietary protocol)	Yes	Yes	Yes
DirectNET	Yes	Yes	Yes
Modbus master/slave	No	No	Yes
ASCII out (Print)	No	No	Yes
Maximum baud rate	19.2K	19.2K	38.4K

Automation Direct

Company Information

Control Systems Overview

CLICK PLC

Do-More PLCs Overview

Do-More H2 PLC

Do-More T1H PLC

DirectLOGIC PLCs Overview

DirectLOGIC DL05/06

DirectLOGIC DL105

DirectLOGIC DL205

DirectLOGIC DL305

DirectLOGIC DL405

Productivity Controller Overview

Productivity 3000

Universal Field I/O

Software

C-More HMI

C-More Micro HMI

ViewMarq Industrial Marquees

Other HMI

Communications

Appendix Book 1

Terms and Conditions

D4-440/430 Key Features

D4-440 CPU

D4–430 and D4–440 offer two built-in communication ports

Handheld Programmer

Operator Interfaces

DirectNET Network Slave

DirectSOFT

D4-430 CPU

D4-440 CPU

The D4-440 provides a subset of the D4-450's capabilities. If you need fast boolean execution, good communications, and complex math or PID isn't required, this is the CPU for you.

Instruction set

The D4-440 instruction set includes most of the capabilities of the D4-450. The D4-440 does not support some of the more advanced instructions such as PID, floating point math, drum sequencers, trig. functions, IBoxes, etc.
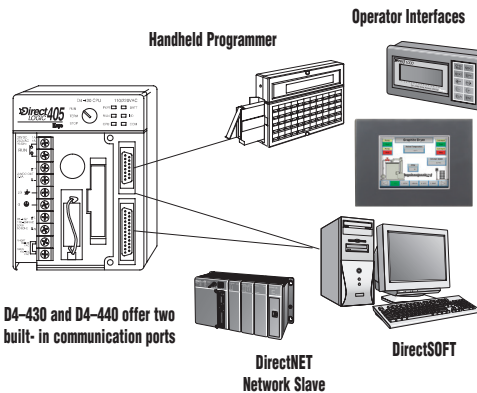
Two built-in communication ports

D4-440 offers two communication ports. The top port can be used for a direct connection to a personal computer for programming, to our handheld programmer, to our DV-1000, or to operator interfaces and touch panels. The bottom port is a slave-only port and supports our *Direct*NET or K-sequence protocol at speeds up to 19.2K baud.

Range of power supplies

The D4-440 provides a wide range of power supply options:
- 110/220 VAC
- 24 VDC
- 125 VDC

Memory cartridges

The table below shows the memory cartridges available for the D4-440 and D4-450. The D4-440 requires a memory cartridge for program storage. The D4-450 has 7.5K of built-in FLASH program memory. However, you can use a memory cartridge instead of the built-in memory if you need more program space. (The D4-430 has built-in program memory and cannot use a memory cartridge.)
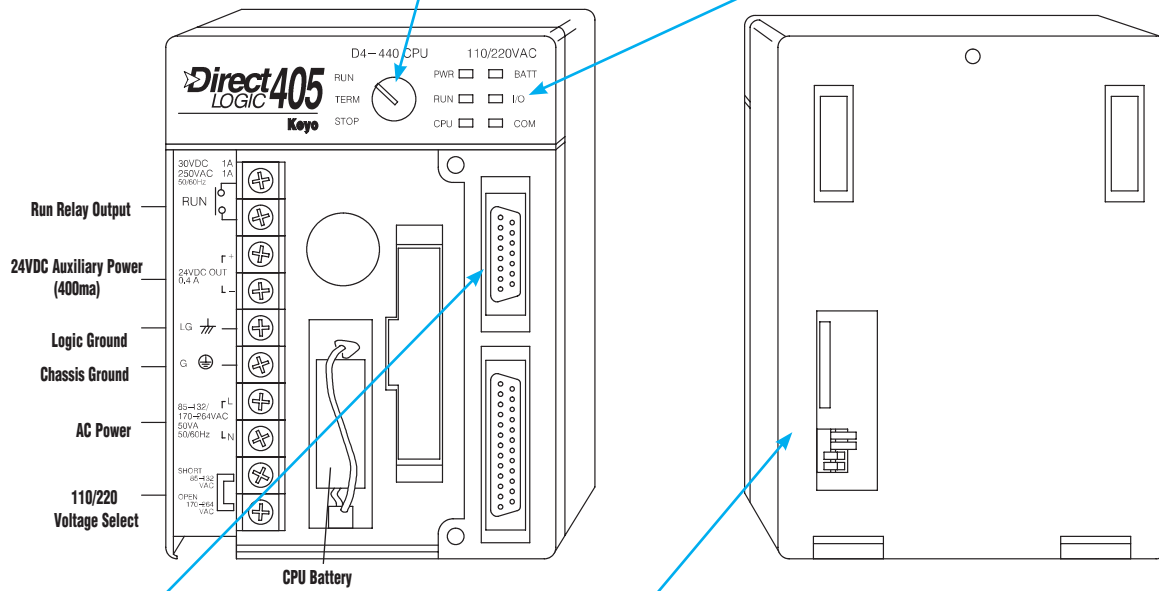
D4-430 CPU

The D4-430 is the most economical CPU in the DL405 product family. If you are primarily looking at the DL405 because of I/O form factor or reasons that don't require tons of CPU horsepower, try the D4-430.

Two built-in communication ports

The D4-430 also offers two communication ports. The top port can be used for a direct connection to a personal computer for programming, to our handheld programmer, to the DV-1000, or to operator interfaces and touch panels. The bottom port is a slave-only port and supports *Direct*NET protocol at speeds up to 19.2K.

Built-in EEPROM memory

One advantage of the D4-430 is 3.5K of built-in EEPROM program memory. A memory cartridge is not required.

	D4-RAM-1	D4-RAM-2	D4-UV-2	D4-EE-2
Program Storage Capacity	7.5K	15.5K	15.5K	15.5K
Cartridge Battery Type	Lithium	Lithium	None	None
Writing Cycle Life	N/A	N/A	1,000	>10,000
Write Inhibit	Internal jumper	Internal jumper	N/A	Internal jumper
Memory Clear Method	Electrical	Electrical	Ultraviolet light	Electrical

D4-440/430 Features

The following diagram shows the various hardware features found on the D4-440 CPU. The D4-430 looks the same, except that the memory cartridge slot can not be used.

CPU Keyswitch

RUN	Forces CPU to RUN mode
TERM	Allows peripherals (HPP, DCM, *Direct*SOFT, etc.) to select operating and TEST modes.
STOP	Forces CPU to STOP mode

CPU Status Indicators

PWR	ON OFF	CPU power good CPU power failure	**BATT**	ON OFF	CPU battery low CPU battery good
RUN	ON OFF	CPU in RUN mode CPU in STOP mode	**I/O**	ON OFF	I/O diagnostics error I/O diagnostics OK
CPU	ON OFF	CPU diagnostic error CPU diagnostics OK	**COM**	ON OFF	Communication error Communication OK

Run Relay Output

24VDC Auxiliary Power (400ma)

Logic Ground

Chassis Ground

AC Power

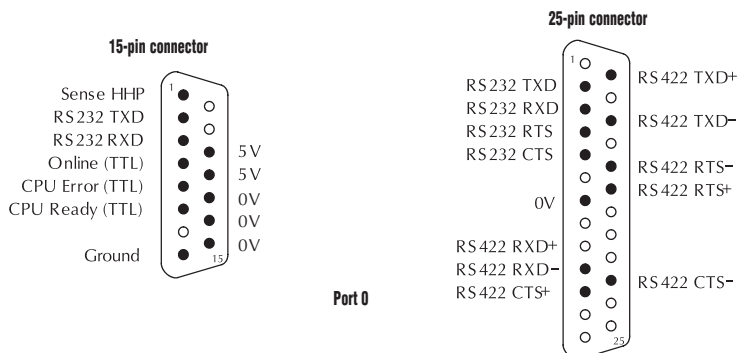110/220 Voltage Select

CPU Battery

Communication Ports

15 Pin	Programming port, RS232C, 9600 Baud, K-sequence protocol, connects to HPP, *Direct*SOFT, DV-1000 and some operator interfaces
25 Pin	Auxiliary port, R232C or RS422, Baud rate selectable via CPU dipswitch, K-sequence protocol, *Direct*NET protocol (slave only) connects to *Direct*NET, *Direct*SOFT, and other operator interfaces

CPU Dipswitch

SW1	ON OFF	CPU battery disabled CPU battery enabled
SW2	ON OFF	Station address is 1 Station address set by HPP

SW3	SW4	Baud
OFF	OFF	300
OFF	ON	1,200
ON	OFF	9,600
ON	ON	19,200

D4-430/D4-440 communications ports pin-outs

15-pin connector

Sense HHP
RS232 TXD
RS232 RXD
Online (TTL)
CPU Error (TTL)
CPU Ready (TTL)
Ground

5V
5V
0V
0V
0V

Port 0

25-pin connector

RS232 TXD
RS232 RXD
RS232 RTS
RS232 CTS

0V

RS422 RXD+
RS422 RXD−
RS422 CTS+

RS422 TXD+
RS422 TXD−

RS422 RTS−
RS422 RTS+

RS422 CTS−

DL405 Programming Tools and Cables

Select a programming device

There are two tools for programming the DL405 CPUs: *Direct*SOFT PC-based programming software and the D4-HPP-1 handheld programmer.

*Direct*SOFT programming software

Our powerful Windows-based programming packages make it easy for you to program and monitor your DL405 PLC system. The version of the software that supports the DL405 CPUs is described in the table below. See the DirectLOGIC Overview Section DL in this catalog for detailed information on DirectSOFT.

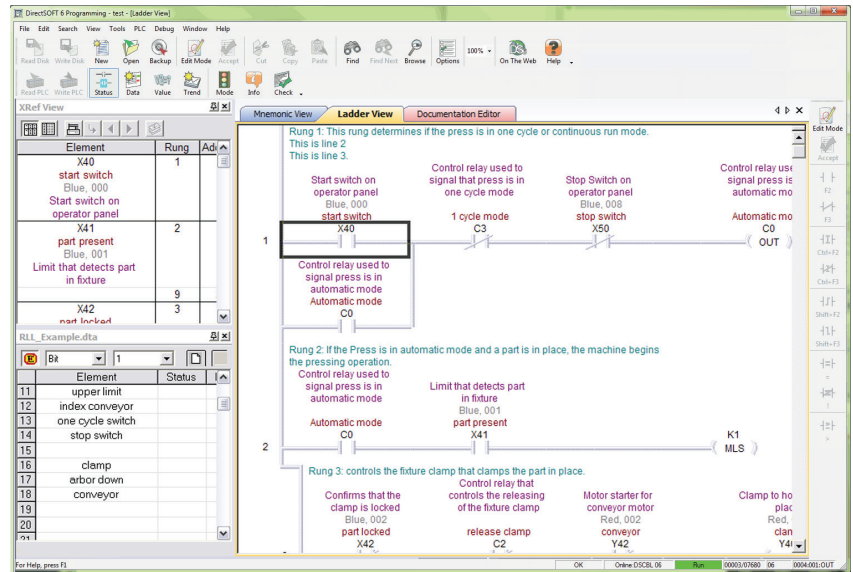| *Direct*Soft Part Number	Price	Description
PC-DSOFT6		Programs all PLC families DL05/06/105/205/305/405
PC-DS100		Free version of *Direct*SOFT; programs all *Direct*LOGIC PLC CPUs; limited to 100 word program

DL405 programming cables

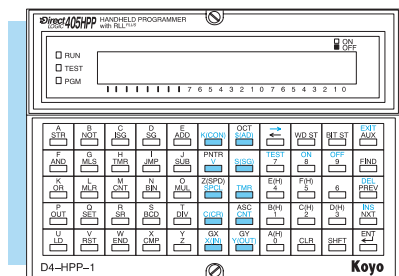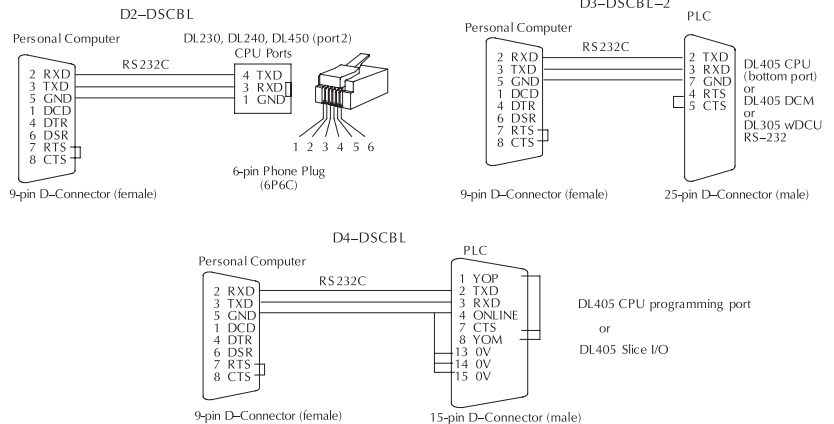Choose the proper cable to connect the DL405 CPU to your PC running *Direct*SOFT.

CPU	Price	Port	Cable	Price
D4-430/ D4-440		Top port (15 pin)	**D4-DSCBL**	
		Lower port (25 pin)	**D3-DSCBL-2**	
D4-450		Top port (15 pin)	**D4-DSCBL**	
		Lower port (25pin)	**D3-DSCBL-2**	
		Phone jack (RJ12)	**D2-DSCBL**	

Handheld programmer

The D4-HPP-1 handheld programmer connects to the 15-pin port on any of the DL405 CPUs. A memory cartridge is located on the side of the handheld programmer. This slot allows you to copy memory cartridges (including UV PROMs) and transfer data/programs between the CPU and a memory cartridge.

Pin labeling conforms to IBM DTE and DCE standards

There are three optional connecting cables available for use with the D4-HPP-1 programmer:

- D4-HPCBL-1: 3m cable
- D4-HPCBL-2: 1.5m cable
- D4-CASCBL: cassette cable