USING SURESERVO®
WITH DIRECTLOGIC PLCS

CONTENTS OF THIS CHAPTER...

COMPATIBLE DIRECTLOGIC PLCS AND MODULES

The following tables show which DirectLOGIC PLCs and modules can be used with SureServo® servo systems.

DirectLOGIC PLCs/Modules for Use with Sure Servo Systems	
DL05 PLCs	
D0-05AD	DL05 CPU, 8 AC in / 6 DC out, 110/220VAC power supply. Inputs: 8 AC inputs, 90-120 VAC, 2 isolated commons. Outputs: 6 DC outputs, 6-27 VDC current sinking, 1.0A/pt. max., 1 common. 2 outputs are configurable for independent CW/CCW pulse train output or step and direction pulse output up to 7kHz (0.5A/pt.).
D0-05DD	DL05 CPU, 8 DC in / 6 DC out, 110/220VAC power supply. Inputs: 8 DC inputs, 12-24 VDC current sinking/sourcing, 2 isolated commons. Outputs: 6 DC outputs, 6-27 VDC current sinking, 1.0A/pt. max., 1 common. 2 outputs are configurable for independent CW/CCW pulse train output or step and direction pulse output up to 7kHz (0.5A/pt.) (not available when using high-speed inputs).
D0-05DD-D	DL05 CPU, 8 DC in / 6 DC out, 12/24VDC power supply. Inputs: 8 DC inputs, 12-24 VDC current sinking/sourcing, 2 isolated commons. Outputs: 6 DC outputs, 6-27 VDC current sinking, 1.0A/pt. max., 1 common. 2 outputs are configurable for independent CW/CCW pulse train output or step and direction pulse output up to 7kHz (0.5A/pt.) (not available when using high-speed inputs).
DL06 PLCs	
D0-06DD1	DL06 CPU, 20 DC in / 16 DC out, 110/220VAC power supply, with 0.3A 24VDC auxiliary device power supply. Inputs: 20 DC inputs, 12-24 VDC current sinking/sourcing, 5 isolated commons (4 inputs per common). Outputs: 16 DC outputs, 12-24 VDC current sinking, 1.0A/pt. max., 4 commons non-isolated (4 points per common). 2 outputs are configurable for independent CW/CCW pulse train output or step and direction pulse output up to 10kHz (0.5A/pt.) (not available when using high-speed inputs).
D0-06DD1-D	DL06 CPU, 20 DC in / 16 DC out, 12/24VDC power supply. Inputs: 20 DC inputs, 12-24 VDC current sinking/sourcing, 5 isolated commons (4 inputs per common). Outputs: 16 DC outputs, 12-24 VDC current sinking, 1.0A/pt. max., 4 commons non-isolated (4 points per common). 2 outputs are configurable for independent CW/CCW pulse train output or step and direction pulse output up to 10kHz (0.5A/pt.) (not available when using high-speed inputs).
DL05/DL06 High Speed Counter I/O Module	
H0-CTRIO	DL05/06 High Speed Counter I/O Interface Module, 4 DC sink/source inputs 9-30 VDC, 2 isolated sink/source DC outputs, 5-30 VDC, 1A per point. Inputs supported: 1 quadrature encoder counters up to 100kHz, or 2 single channel counters up to 100kHz, and 2 high speed discrete inputs for Reset, Inhibit, or Capture. Outputs supported: 2 independently configurable high speed discrete outputs or 1 channel pulse output control, 20Hz-25kHz per channel, pulse and direction or cw/ccw pulses.
DL105 PLCs	
F1-130AD	DL130 CPU, 10 AC in / 8 DC out, 110/220VAC Power Supply. Inputs: 10 AC inputs, 80-132 VAC, 3 isolated commons. Outputs: 8 DC outputs, 5-30VDC current sinking, 0.5A/pt. max, 3 internally connected commons. 3 internally connected commons. 2 outputs are configurable for independent CW/CCW pulse train output or step and direction pulse output up to 7kHz (@ 0.25A/pt. max).
F1-130DD	DL130 CPU, 10 DC in / 8 DC out, 110/220 VAC Power Supply. Inputs: 10 DC inputs, 12-24 VDC current sinking/sourcing, 3 isolated commons. Outputs: 8 DC outputs, 5-30VDC current sinking, 0.5A/pt. max, 3 internally connected commons. 2 outputs are configurable for independent CW/CCW pulse train output or step and direction pulse output up to 7kHz (@ 0.25A/pt. max) (not available when using high-speed inputs).
F1-130DD-D	DL130 CPU, 10 DC in / 8 DC out, 12/24VDC Power Supply. Inputs: 10 DC inputs, 12-24 VDC current sinking/sourcing, 3 isolated commons. Outputs: 8 DC outputs, 5-30VDC current sinking, 0.5A/pt. max, 3 internally connected commons. 2 outputs are configurable for independent CW/CCW pulse train output or step and direction pulse output up to 7kHz (@ 0.25A/pt. max) (not available when using high-speed inputs).
DL205 High Speed Counter I/O Modules	
H2-CTRIO *	DL205 High Speed Counter I/O Interface Module, 8 DC sink/source inputs 9-30VDC, 4 isolated sink/source DC outputs, 5-30VDC, 1A per point. Inputs supported: 2 quadrature encoder counters up to 100kHz, or 4 single channel counters up to 100kHz, and 4 high speed discrete inputs for Reset, Inhibit, or Capture. Outputs supported: 4 independently configurable high speed discrete outputs or 2 channels pulse output control, 20Hz-25kHz per channel, pulse and direction or cw/ccw pulses.
D2-CTRINT	Counter Interface Module, 4 isolated DC inputs, 1 pulse train output (cw) or 2 pulse train outputs (cw,ccw) with DC input restrictions, accepts two up-counters when used with D2-240 or D2-250(-1) (one only with D2-230), or one up/down counter. (not available when using high-speed inputs).
(table continued next page)	

DirectLOGIC PLCs/Modules for Use with Sure Servo Systems (continued)	
Terminator I/O High Speed Counter I/O Module	
T1H-CTRIO *	Terminator I/O High Speed Counter I/O Interface Module, 8 DC sink/source inputs 9-30VDC, 4 isolated sink/source DC outputs, 5-30VDC, 1A per point. Inputs supported: 2 quadrature encoder counters up to 100kHz, or 4 single channel counters up to 100kHz, and 4 high speed discrete inputs for Reset, Inhibit, or Capture. Outputs supported: 4 independently configurable high speed discrete outputs or 2 channels pulse output control, 20Hz-25kHz per channel, pulse and direction or cw/ccw pulses. (Use with T1K-16B or T1K-16B-1 terminal base.)
DL405 High Speed Counter I/O Module	
H4-CTRIO	DL405 High Speed Counter I/O Interface Module, 8 DC sink/source inputs 9-30VDC, 4 isolated sink/source DC outputs, 5-30VDC, 1A per point. Inputs supported: 2 quadrature encoder counters up to 100kHz, or 4 single channel counters up to 100kHz, and 4 high speed discrete inputs for Reset, Inhibit, or Capture. Outputs supported: 4 independently configurable high speed discrete outputs or 2 channels pulse output control, 20Hz-25kHz per channel, pulse and direction or cw/ccw pulses.
* Note: The H2-CTRIO and T1H-CTRIO High Speed Counter I/O Interface Modules can also be used to control the SureServo Servo System in PC-Based Control systems with Think & Do/Studio or with our embedded WinPLC/EBC module plugged into the CPU slot of the DL205 base.	

TYPICAL CONNECTIONS TO A DL05 PLC

The following wiring diagram shows typical connections between the SureServo® Servo System components and a DirectLOGIC DL05 PLC. Refer to the DL05 Micro PLC User Manual, p/n D0-USER-M, "Chapter 3: High-Speed Input and Pulse Output Features," for detailed programming instructions when using the PLC for the Mode 30: Pulse Output function.
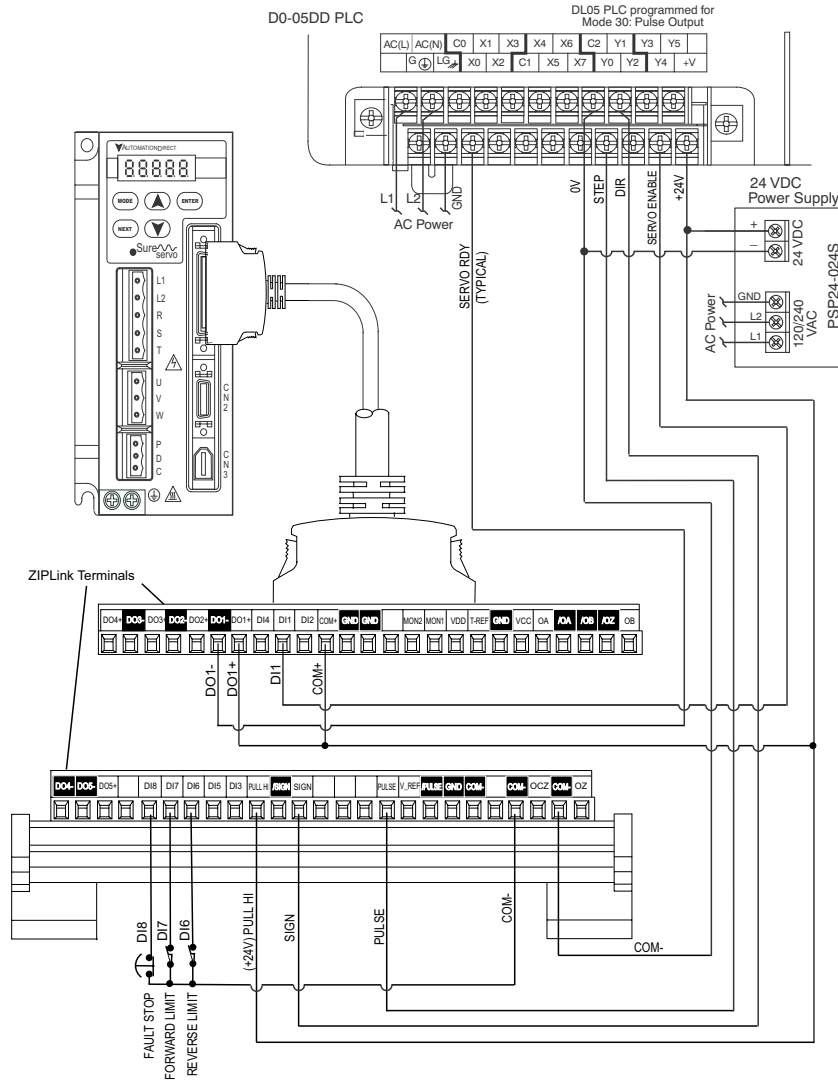
TYPICAL CONNECTIONS TO AN H0-CTRIO

The following wiring diagram shows typical connections between the SureServo® Servo System components and a DirectLOGIC H0-CTRIO High Speed Counter I/O Interface Module installed in either a DL05 or DL06 PLC option slot. Refer to the CTRIO High-Speed Counter Module User Manual, p/n HX-CTRIO-M, for detailed programming instructions when using the H0-CTRIO module.

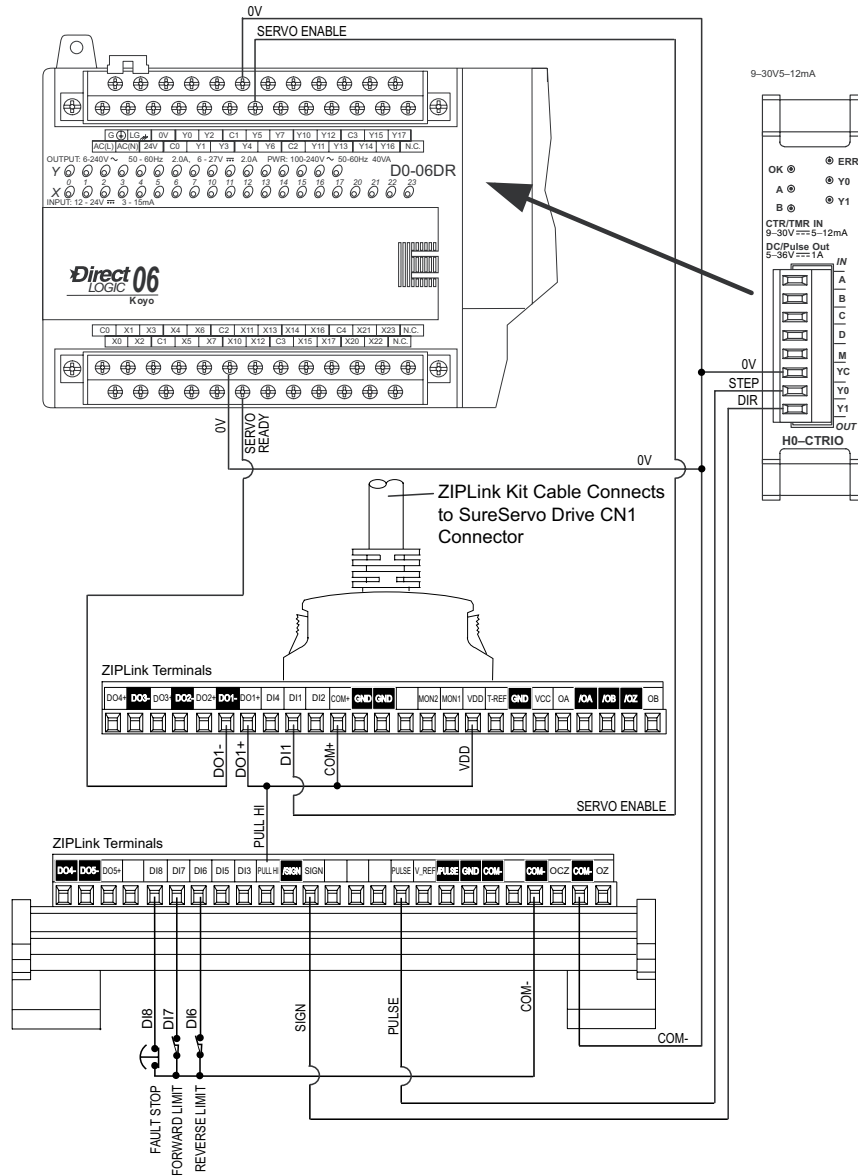## TYPICAL CONNECTIONS TO A DL06 PLC

The following wiring diagram shows typical connections between the SureServo® servo components and a DirectLogic DL06 PLC. Although this example is a PLC, any Modbus master controller would work in this control scheme.

Refer to the DL06 programming manual for detailed programming instructions and examples using Port 2 of the DL06 for Modbus communications. Modbus register addresses can be found in Chapter 6 of this manual.

Below find a few quick-start tips when using this control method:

- *The communication parameters P3-01 (Baud rate) and P3-02 (protocol) should match in all the devices and the multidrop network. Each device on this network MUST have a unique Modbus identifier; set P3-00 to a unique address. P3-05 (RS communication type) must also be set the same in each servo system.*
- *To use RS485 communications, simply jumper the TX- and RX- signals together as well as the TX+ and RX+ signals and set parameter P3-05 = 1.*
- *If your application needs to change speeds, positions, ramps, etc. frequently, P2-30 should be set to 5 to prevent excessive writes to flash memory. As with any EE-type memory, there is a finite number of times the hardware can be written to before it will become damaged and fail. By setting the parameter to 5, the drive uses the new values that are written but they are not set to flash memory, thereby not prematurely damaging the drive.*
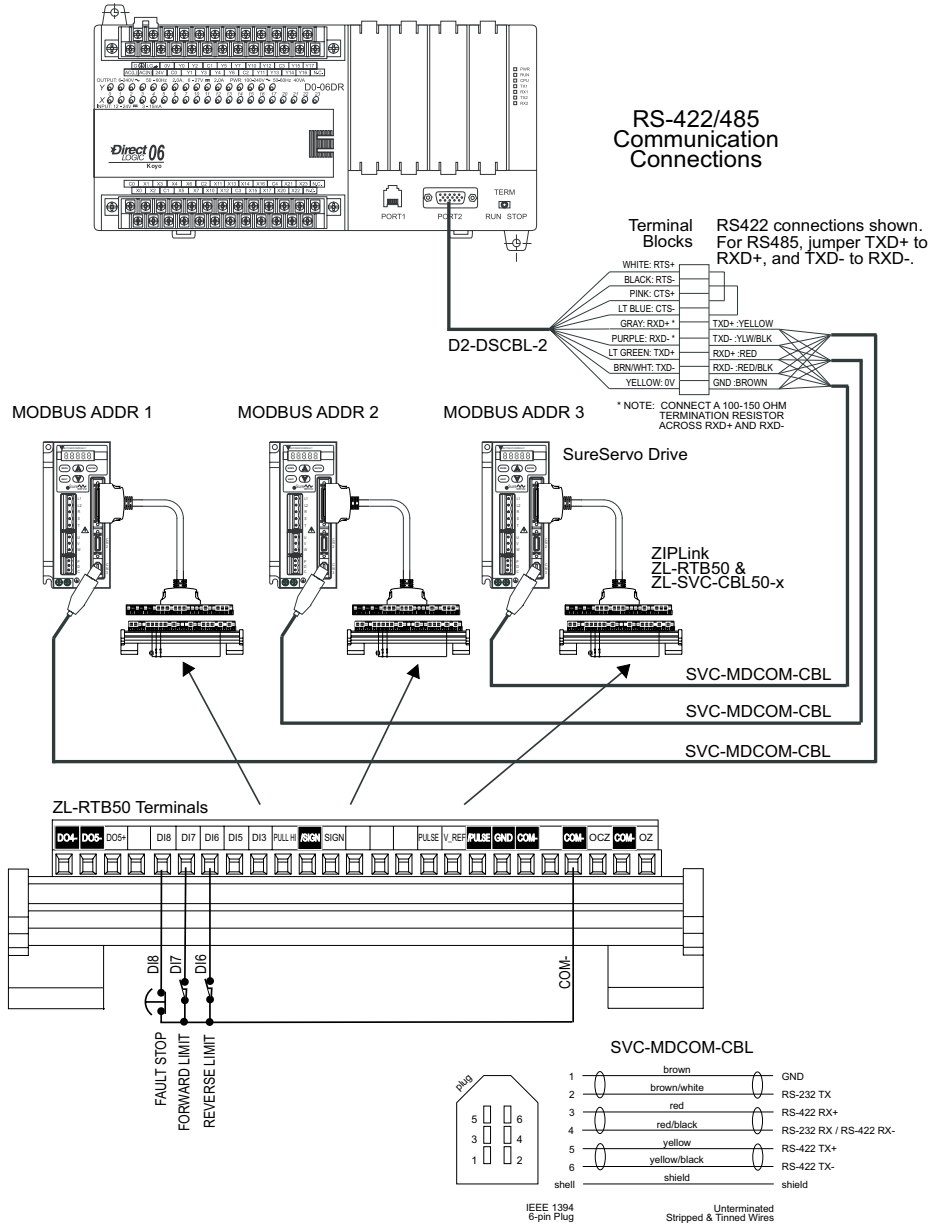
NOTE: The value in P2-30 is NOT stored in flash memory and MUST be set each time the drive is powered up (default is zero).

(see diagram on next page)

TYPICAL CONNECTIONS TO A DL06 PLC   (CONTINUED FROM PREVIOUS PAGE)
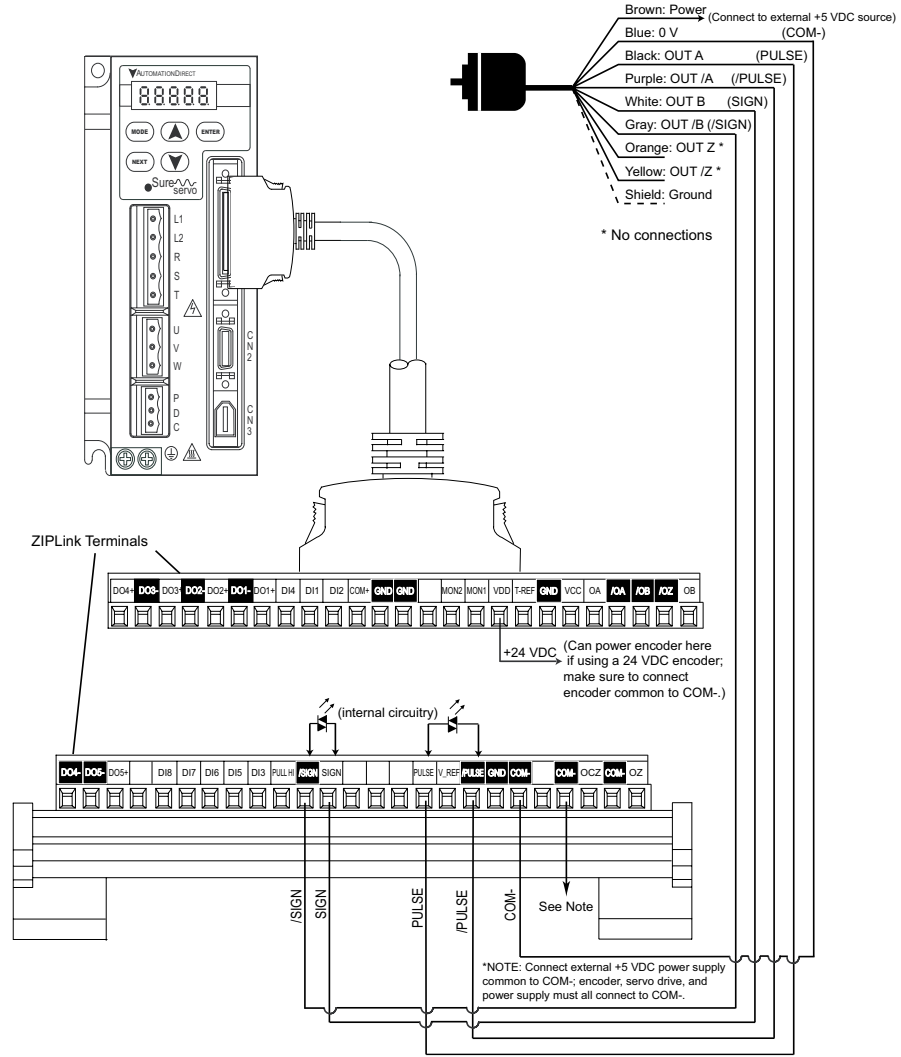
TYPICAL DL06 CONNECTIONS – MULTIPLE DRIVES/MOTORS THROUGH COMMUNICATION

Note: Refer to Chapter 6 for more detailed Modbus communications information.

CONNECTING SURESERVO® TO ADC LINE DRIVER ENCODERS

ADC Model TRD-Sxxx-VD
Line Driver Encoder Connections

Brown: Power (Connect to external +5 VDC source)
Blue: 0 V (COM-)
Black: OUT A (PULSE)
Purple: OUT /A (/PULSE)
White: OUT B (SIGN)
Gray: OUT /B (/SIGN)
Orange: OUT Z *
Yellow: OUT /Z *
Shield: Ground

* No connections

ZIPLink Terminals

DO4- DO3- DO3+ DO2- DO2+ DO1- DO1+ DI4 DI1 DI2 COM+ GND GND MON2 MON1 VDD T-REF GND VCC OA /OA /OB /OZ OB

+24 VDC (Can power encoder here if using a 24 VDC encoder; make sure to connect encoder common to COM-.)

(internal circuitry)

DO4- DO5- DO5+ DI8 DI7 DI6 DI5 DI3 PULL HI /SIGN SIGN PULSE V_REF /PULSE GND COM- COM- OCZ COM- OZ

/SIGN SIGN PULSE /PULSE COM- See Note

*NOTE: Connect external +5 VDC power supply common to COM-; encoder, servo drive, and power supply must all connect to COM-.

CONNECTING SURESERVO® TO ADC OPEN-COLLECTOR ENCODERS

ADC Model TRD-Sxxx-BD
Open-Collector Encoder Connections

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