Installation and Field Wiring

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Installing the H0-CTRIO(2) Module

The H0-CTRIO(2) module is compatible with *Direct*LOGIC DL05 and DL06 PLCs. Consideration must be given to the firmware versions of the PLCs to assure their compatibility with the H0-CTRIO(2) (see chart below).

SPECIAL NOTE: *For applications requiring multiple CTRIO modules, DirectLOGIC CPUs, and dynamic access (in ladder logic) to CTRIO data, we recommend using the D2-250-1, D2-260 or DL06 CPU. These CPUs support Bit-of-Word addressing, 32 bit math instructions and have adequate memory for multiple CTRIO applications.*

The H0-CTRIO(2) module plugs into any option card slot in the DL05 and DL06 base.

For installation instructions, refer to the DL05 or DL06 User Manual (D0-USER-M or D0-06USER-M).

PLC CPU	Firmware	*Direct*SOFT
H0-CTRIO(2)		
DL05	v. 4.60 or later	v. 4.0, Build 16 or later
DL06	v. 1.40 or later	v. 4.0, Build 16 or later

At first power-up the CTRIO(2) module, the OK LED will be blinking. The blinking LED indicates that the module is in program mode.

CPU and CTRIO Compatibility Chart

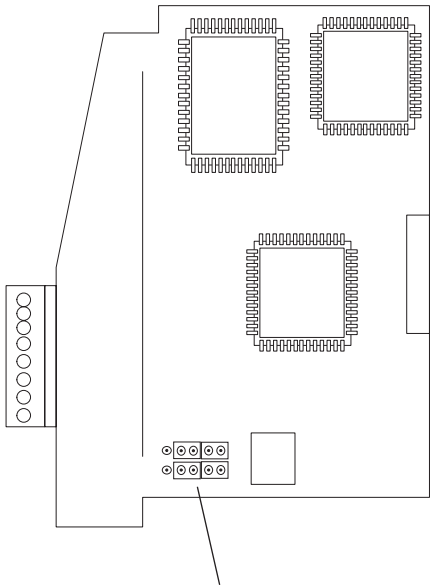
Updated firmware versions can be downloaded from our web site at **www.automationdirect.com**.

NOTE: *CTRIO Workbench Version 2.2.0 or later is required for the H0-CTRIO2.*

Setting H0-CTRIO(2) Jumpers

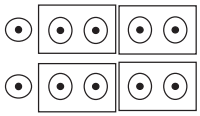
The module internal jumpers must be set to the **High Common** position for high side switching (sourcing) outputs or to the **Low Common** position for low side switching (sinking) outputs. The sink/source jumper selection sets both outputs to the same option. Source operation is the factory default setting.

H0-CTRIO



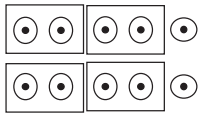
Jumper Selections

Sourcing Outputs



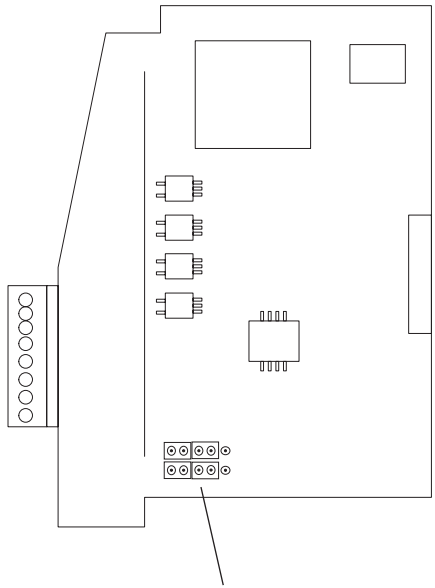
High Common position for switching the high side of a DC load.

Sinking Outputs



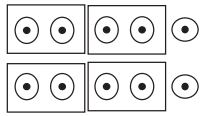
Low Common position for switching the low side of a DC load.

H0-CTRIO2



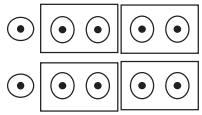
Jumper Selections

Sourcing Outputs



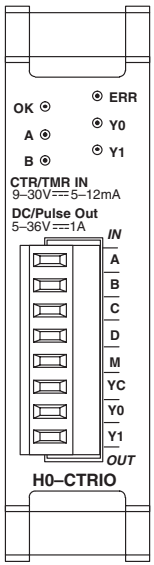
High Common position for switching the high side of a DC load.

Sinking Outputs



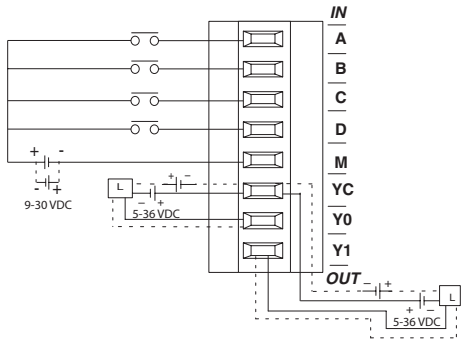
Low Common position for switching the low side of a DC load.

Wiring the H0-CTRIO(2) Module



The H0-CTRIO(2) module has one input channel, consisting of 4 optically isolated input points (A–D on common M). The inputs can be wired to either sink or source current.

The module has 2 optically isolated output points (Y0–Y1 on common YC). The outputs can be wired to either sink or source current, but the sink/source jumper selection sets both outputs to the same option. Sourcing outputs must be wired so positive current flows into the YC terminal and then out of the Yn terminal. Sinking outputs must be wired so positive current flows into Yn terminal and then out of the YC terminal (see the diagram to the right and the schematic on page 3-9). Source operation is the factory default setting for the outputs.



The module is configured, using CTRIO Workbench, to accommodate the user's application. The function of each input (counting, timing, reset, etc.) and output (pulse output, discrete output, etc.) is defined in the configuration of the module.

Refer to Chapters 5 and 6 to determine what input and output configurations are possible.

NOTE: *Field device wiring must be compatible with the module configuration.*

See the notes below for further details about power source considerations, circuit polarities, and field devices. Also, refer to the specifications in Chapter 1 on pages 1-7 and 1-8 for more information.

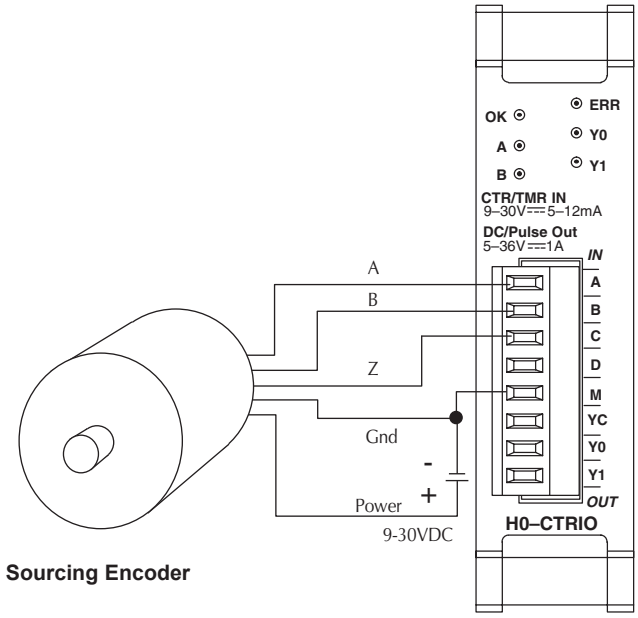
NOTES:

1: Inputs (A, B, C, and D) require user-provided 9–30VDC power sources. Terminal M is the common for the inputs. Maximum current consumption is 12mA per input point.

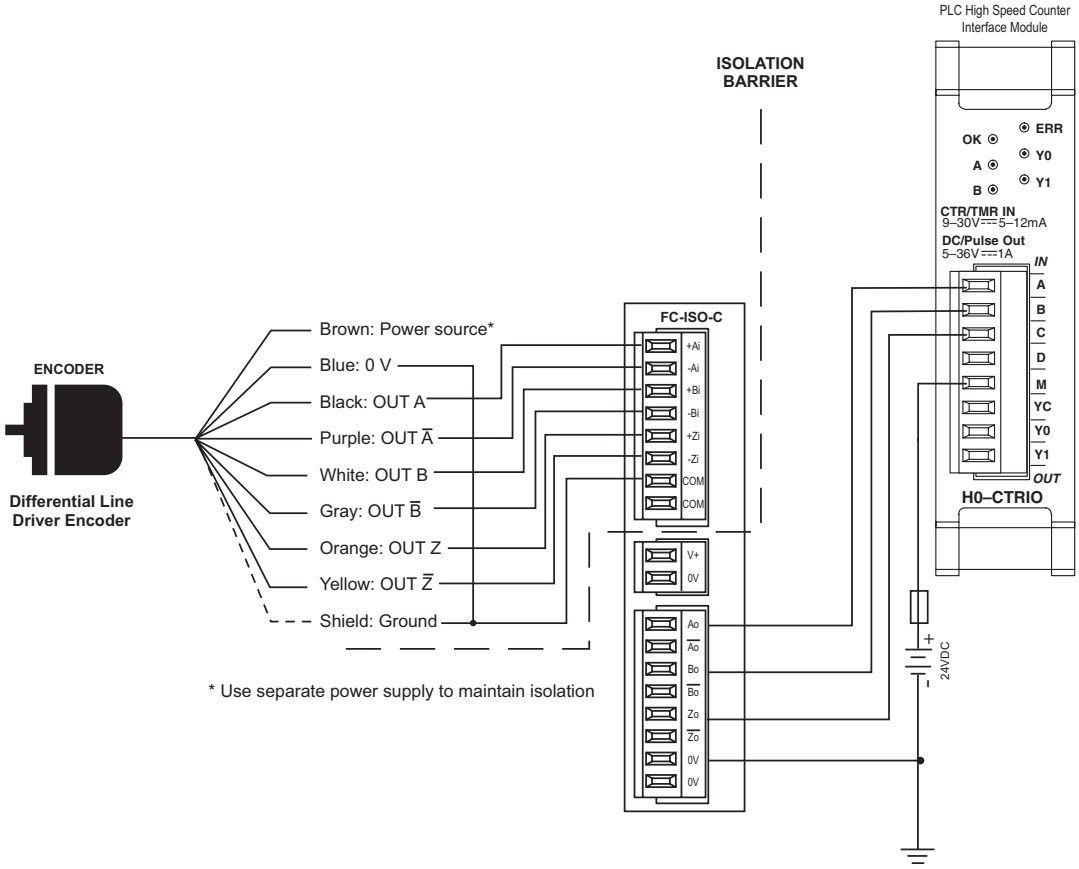
2: Polarity of the input power sources (shown above) can be reversed. Consideration must be given, however, to the polarity of the field device. Many field devices are designed for only one polarity and can be damaged if power wiring is reversed.

3: The maximum allowable current per output circuit is 1A.

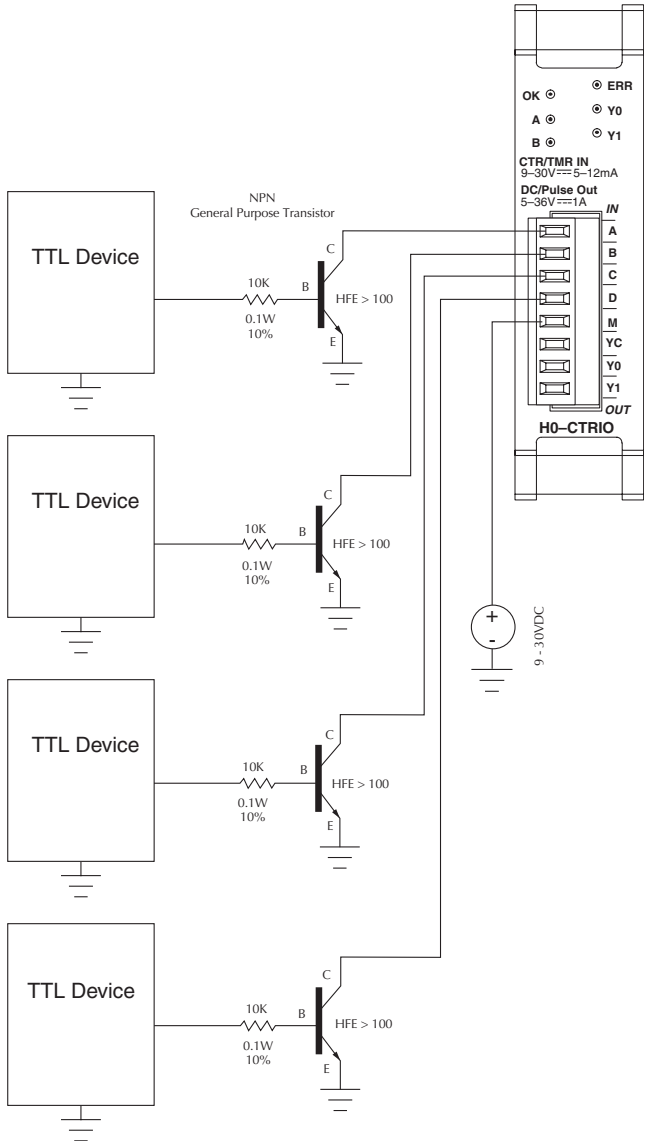
H0- CTRIO(2) Quadrature Encoder Wiring Example



H0-CTRIO(2) TTL Quadrature Encoder Field Wiring

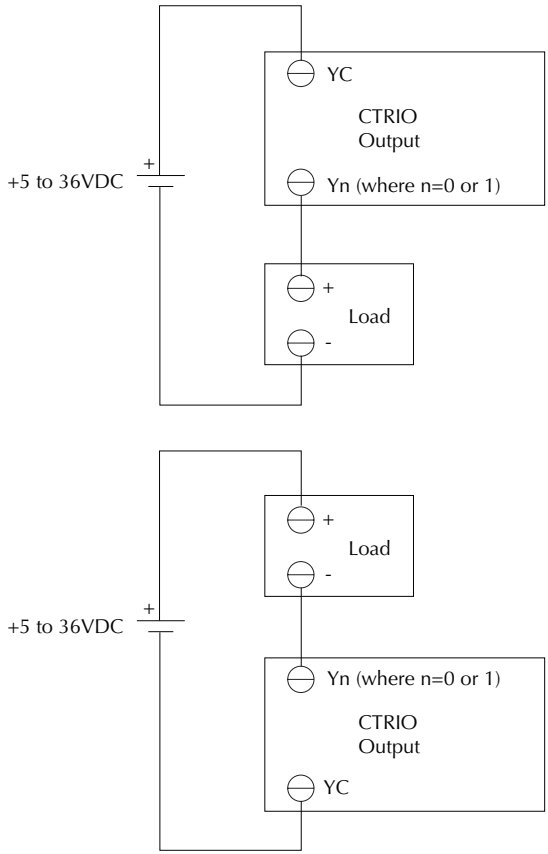


H0- CTRIO(2) TTL Input Wiring



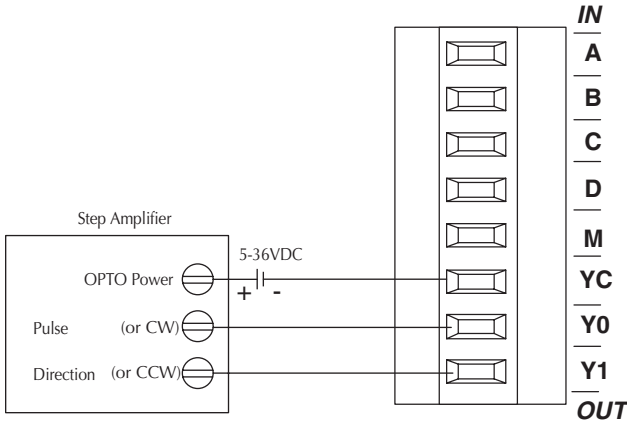
H0- CTRIO(2) Output Wiring Schematic

See page 3-3 for locating and setting the jumpers



H0-CTRIO(2) Stepper/Servo Drive Wiring Example

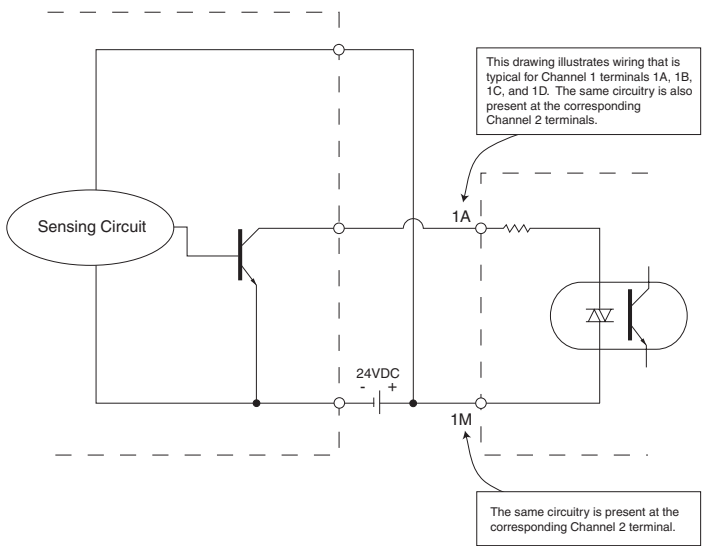
NOTE: *Sinking output connection shown.*



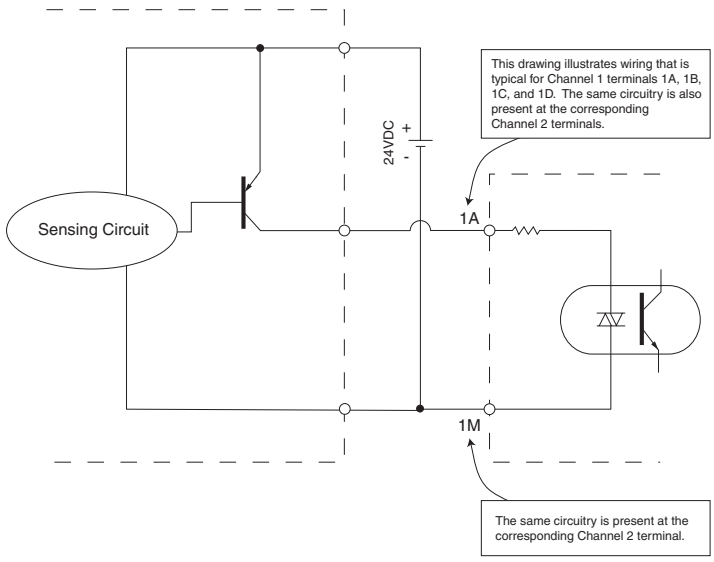
See page 3-3 for locating and setting the jumpers

Solid State Input Device Wiring to the H0-CTRIO(2) Module

NPN Field Device



PNP Field Device



Installing the H2-CTRIO(2) Module

The H2-CTRIO(2) module is compatible with Do-more CPUs and several DL205 CPU/slot interface devices. Consideration must be given to the firmware version of the CPU to assure their compatibility with the H2-CTRIO(2) (see chart below).

The H2-CTRIO(2) module plugs into any I/O slot of any Do-more or *Direct*LOGIC 205 base except slot 0 when using a *Direct*LOGIC PLC. Slot 0 is also not allowed if using the H2-CTRIO and a WinPLC or H2-PBC controller. However, slot 0 is available for the H2-CTRIO(2) module when using the H2-EBC interface devices (Slot 0 is the I/O slot adjacent to the CPU).

NOTE: *The H2-CTRIO(2) cannot be used in DL205 local expansion bases or in Serial Remote I/O bases.*

For installation instructions, refer to the:

- DL205 User Manual (D2-USER-M) if using a DirectLOGIC PLC
- DL205 Installation and I/O Manual (D2-INST-M) if using a WinPLC, EBC or PBC module.
- Do-more H2 series PLC Harware User Manual (H2-DM-M) if using a Do-more PLC

At first power-up of the CTRIO(2) module, the OK LED will be blinking. The blinking LED indicates that the module is in program mode.

CPU and CTRIO Compatibility Chart

CPU-slot Device	Firmware	Hardware	*Direct*SOFT	Slot Restrictions
H2-CTRIO(2)				
D2-240	v. 3.22 or later	Any	v. 3.0C, Build 71 or later	any I/O slot except 0
D2-250	v. 1.56 or later	Any	v. 3.0C, Build 71 or later	any I/O slot except 0
D2-250-1	v. 3.5 or later	Any	v. 3.0C, Build 71 or later	any I/O slot except 0
D2-260	v. 1.2 or later	Any	v. 4.0 or later	any I/O slot except 0
H2-WinPLC	Any	xK or later	N/A	any I/O slot except 0
H2-EBC	v. 2.1.357 or later	Any	N/A	prior to Rev 9A any I/O slot except 0; Rev 9A or later any I/O slot
H2-PBC	Any	Any	N/A	prior to Rev 4A any I/O slot except 0; Rev 4A or later any I/O slot
Do-more	Any	Any	N/A	No Restrictions

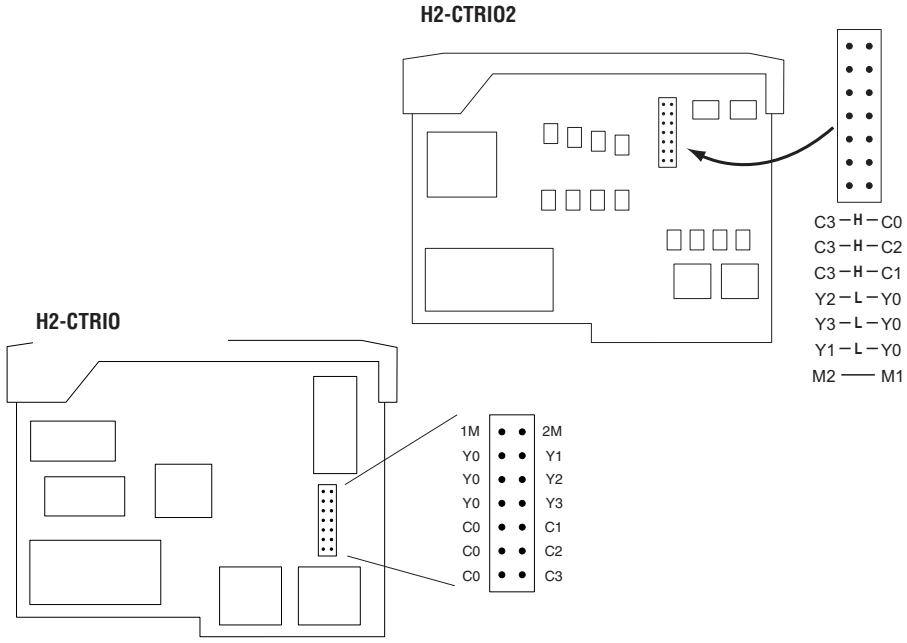
NOTE: *CTRIO Workbench version 2.2.0 or later is required for H2-CTRIO2. However, with a Do-more CPU, CTRIO Workbench is not used at all. Instead, the Do-more Designer Module Configuration is used to configure the H2-CTRIO2.*

Updated firmware versions can be downloaded from our web site at **www.automationdirect.com**.

Setting H2-CTRIO(2) Jumpers

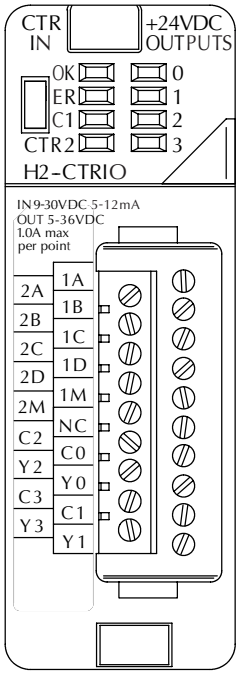
SPECIAL NOTE: *For applications requiring multiple CTRIO modules, DirectLOGIC CPUs, and dynamic access (in ladder logic) to CTRIO data, we recommend using the D2-250-1 or D2-260 CPU. These CPUs support Bit-of-Word addressing, 32 bit math instructions and have adequate memory for multiple CTRIO applications.*

Jumpers are provided to connect input commons or outputs/output commons. Use of these jumpers is not necessary to set up the CTRIO(2) module. The jumpers are provided solely for convenience in wiring.

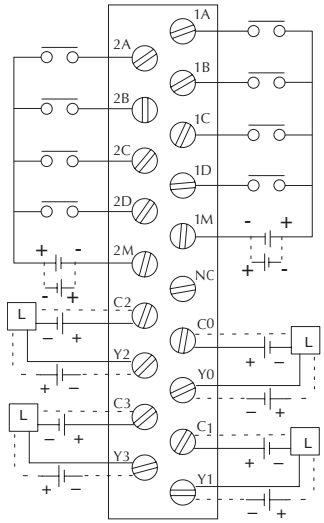


H2-CTRIO(2) Jumper Functions		
H2-CTRIO	**H2-CTRIO2**	**Function**
1M-2M		Install jumper to internally connect the input commons 1M and 2M in order to reduce wiring if appropriate.
Y0-Y1		Install jumper(s) to internally connect Y0 to other Y terminals in order to reduce wiring if appropriate. Connect wire at Y0.
Y0-Y2		
Y0-Y3		
C0-C1		Install jumper(s) to internally connect C0 to other C terminals in order to reduce wiring if appropriate. Connect wire at C0.
C0-C2		
C0-C3		
	C3-C0	Install jumper(s) to internally connect C3 to other C terminals in order to reduce wiring if appropriate. Connect wire at C3.
	C3-C1	
	C3-C2	

Wiring the H2-CTRIO(2) Module



The H2-CTRIO(2) module has two independent input channels, each consisting of 4 optically isolated input points (1A–1D on common 1M and 2A–2D on common 2M). The inputs can be wired to either sink or source current. The module has 4 optically isolated output points (pts. Y0–Y3 with isolated commons C0–C3, respectively). The outputs must be wired so positive current flows into C(n) terminal and then out of the Y(n) terminal (see diagram at left and the schematic on page 3-17). Remember that the internal jumpers can be used to connect the input commons or outputs/output commons together.



The module is configured, using CTRIO Workbench, to accommodate the user's application. The function of each input (counting, timing, reset, etc.) and output (pulse output, discrete output, etc.) is defined in the configuration of the module.

Refer to Chapters 5 and 6 to determine what input and output configurations are possible.

NOTE: *Field device wiring must be compatible with the module configuration.*

See the notes below for further details about power source considerations, circuit polarities, and field devices.

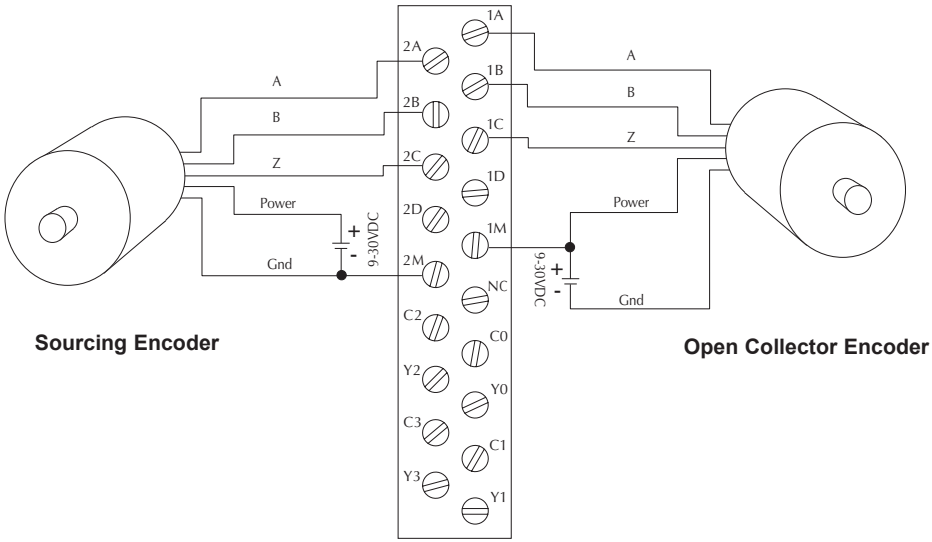
NOTES:

1: Inputs (1A, 1B, 1C, 1D and 2A, 2B, 2C, 2D) require user-provided 9-30VDC power sources. Terminals 1M and 2M are the commons for Channel 1 and Channel 2 inputs. Maximum current consumption is 12mA per input point.

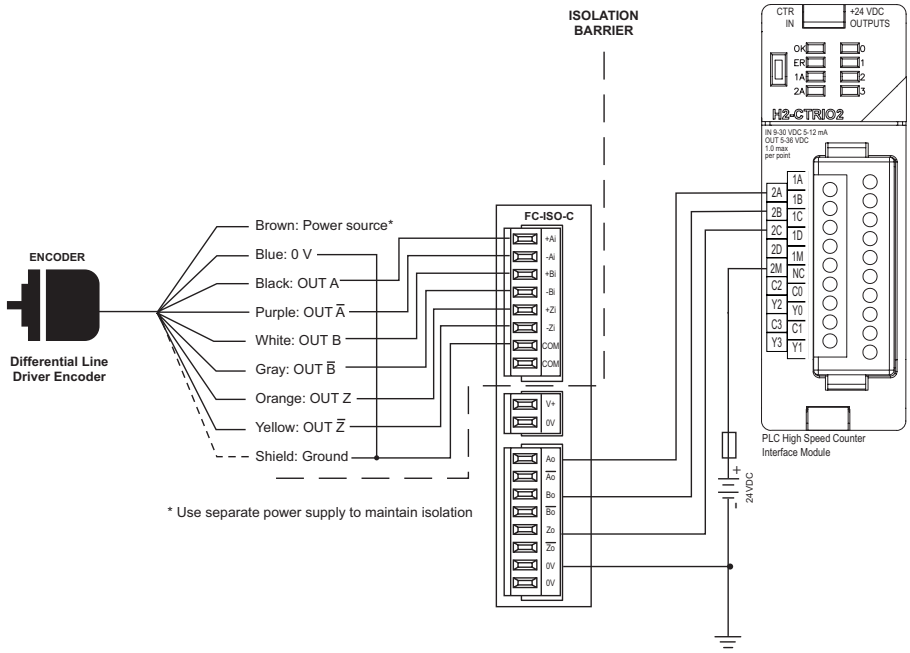
2: Polarity of the input power sources (shown above) can be reversed. Consideration must be given, however, to the polarity of the field device. Many field devices are designed for only one polarity and can be damaged if power wiring is reversed.

3: Outputs have one polarity only (as shown above) and are powered by user-provided 5-36VDC power sources. The maximum allowable current per output circuit is 1A for the H2-CTRIO and 1A at 23°C or 0.5A at 60°C for the H2-CTRIO2.

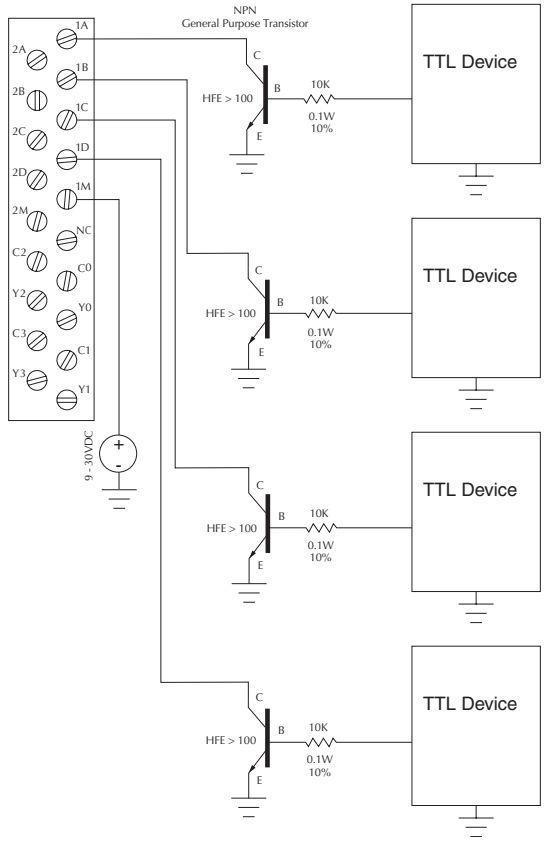
H2- CTRIO(2) Quadrature Encoder Wiring Example



H2-CTRIO(2) TTL Quadrature Encoder Field Wiring

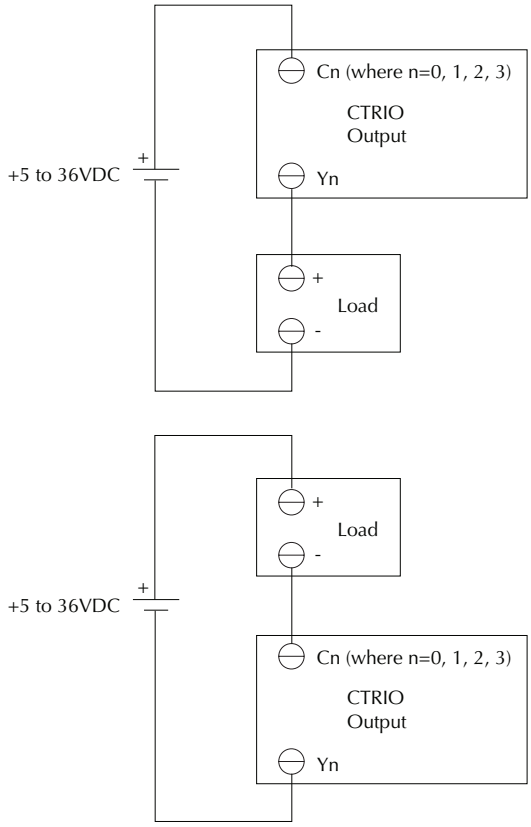


H2-CTRIO(2) TTL Input Wiring



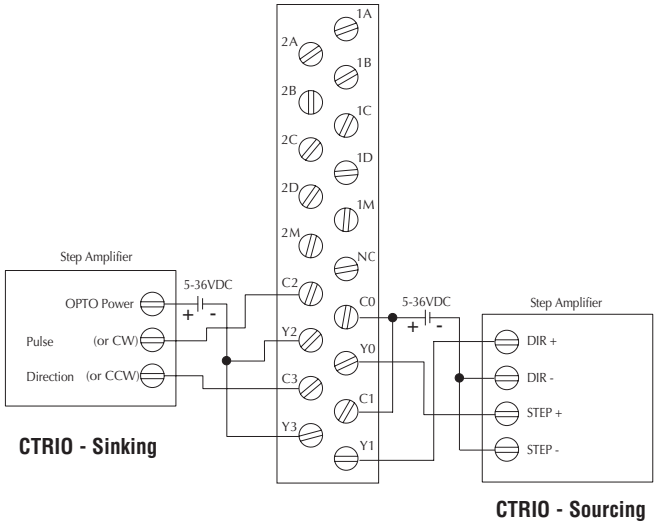
H2- CTRIO(2) Output Wiring Schematic

The CTRIO outputs are individually isolated DC switches that can be used to break the high or the low side of a DC load.



NOTE: *The outputs must be wired so positive current flows into C(n) terminal and then out of the Y(n) terminal.*

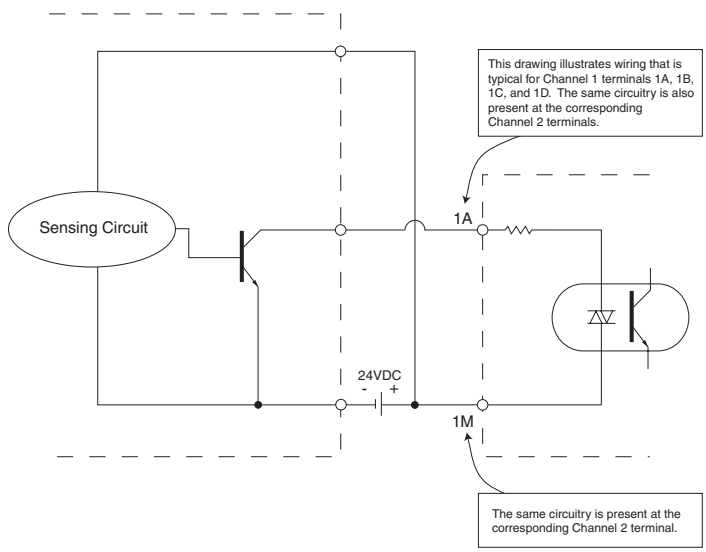
H2-CTRIO(2) Stepper/Servo Drive Wiring Example



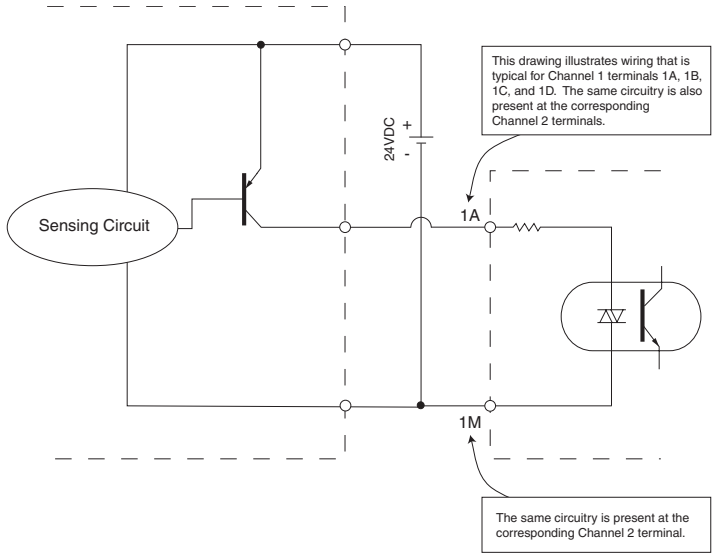
This example assumes that the Step Amplifier interface to be optocoupler LEDs (common anodes at the "OPTO Power" terminal) with internal current limiting resistors. This is a standard method; consult the step amplifier documentation to ensure that this method is applicable.

Solid State Input Device Wiring to the H2-CTRIO(2) Module

NPN Field Device



PNP Field Device



Installing the H4-CTRIO

The H4-CTRIO module is compatible with two DL405 CPU/slot interface devices. Consideration must be given to the firmware versions of the CPU-slot interfaces to assure their compatibility with the H4-CTRIO, (see chart below).

The H4-CTRIO module plugs into any I/O slot of any ***Direct***LOGIC 405 base. H4-EBCs support the use of the H4-CTRIO in DL405 local expansion bases. The H4-CTRIO cannot be used in Serial Remote I/O bases.

For installation instructions, refer to the:

- DL405 User Manual (D4-USER-M) if using a ***Direct***LOGIC PLC
- DL405 Installation and I/O Manual (D4-INST-M) if using an H4-EBC interface

At first power-up of the CTRIO module, the OK LED will be blinking. The blinking LED indicates that the module is in program mode.

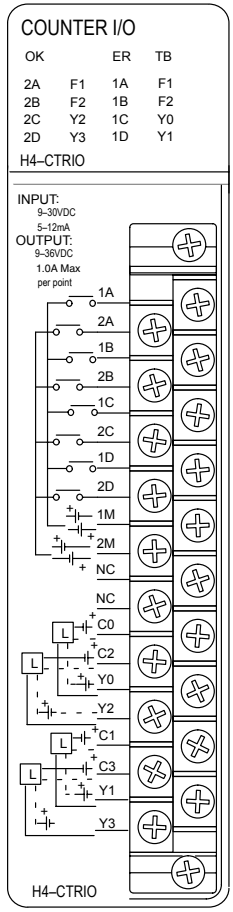
CPU and CTRIO Compatibility Chart

CPU-slot Device	Firmware*	Hardware	*Direct*SOFT
D4-450	April 2000 or earlier: H8 (CISC) v. 2.00 SH (RISC) v. 1.500 May 2000 or later: H8 (CISC) v. 2.00 SH (RISC) v. 2.500	Any	v. 4.0, Build 16 or later
H4-EBC	2.1.328 or later	v. 4F or later	N/A

*Updated firmware versions can be downloaded from our web site at *www.automationdirect.com*

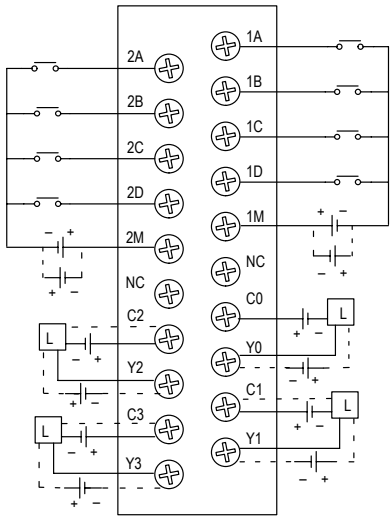
Wiring the H4-CTRIO Module

The H4-CTRIO module has two independent input channels, each consisting of 4 optically isolated input points (1A–1D on common 1M and 2A–2D on common 2M). The inputs can be wired to either sink or source current. The module has 4 optically isolated output points (Y0–Y3 on isolated commons C0-C3, respectively). The outputs must be wired so that positive current flows into Cn terminal and then out of the Yn terminal (See the diagram below and the schematic on page 3-25).



The module is configured, using CTRIO Workbench, to accommodate the user's application. The function of each input (counting, timing, reset, etc.) and output (pulse output, discrete output, etc.) is defined in the configuration of the module.

Refer to Chapters 5 and 6 to determine possible input and output configurations.



NOTE: *Field device wiring must be compatible with the module configuration.*

See the notes below for further details about power source considerations, circuit polarities, and field devices. Also, refer to the specifications in Chapter 1 on pages 1-7 and 1-8 for more information.

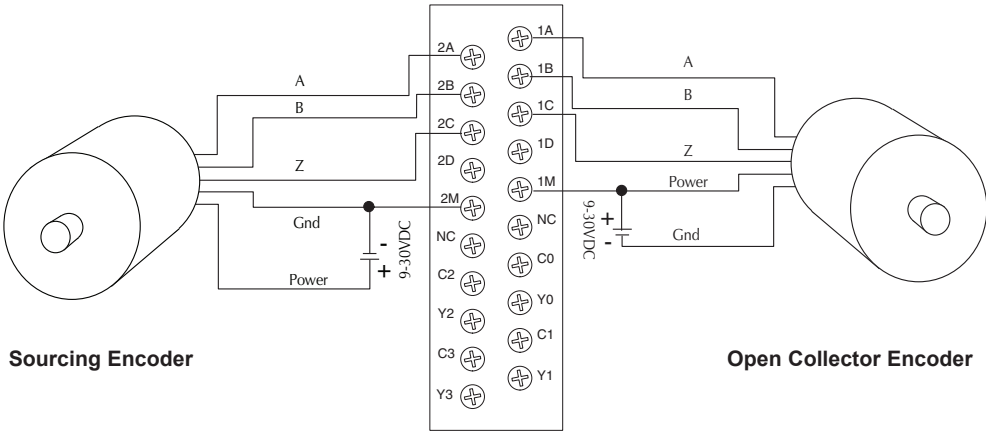
NOTES:

1: Inputs (1A, 1B, 1C, 1D and 2A, 2B, 2C, 2D) require user-provided 9–30VDC power sources. Terminals 1M and 2M are the commons for Channel 1 and Channel 2 inputs. Maximum current consumption is 12mA per input point.

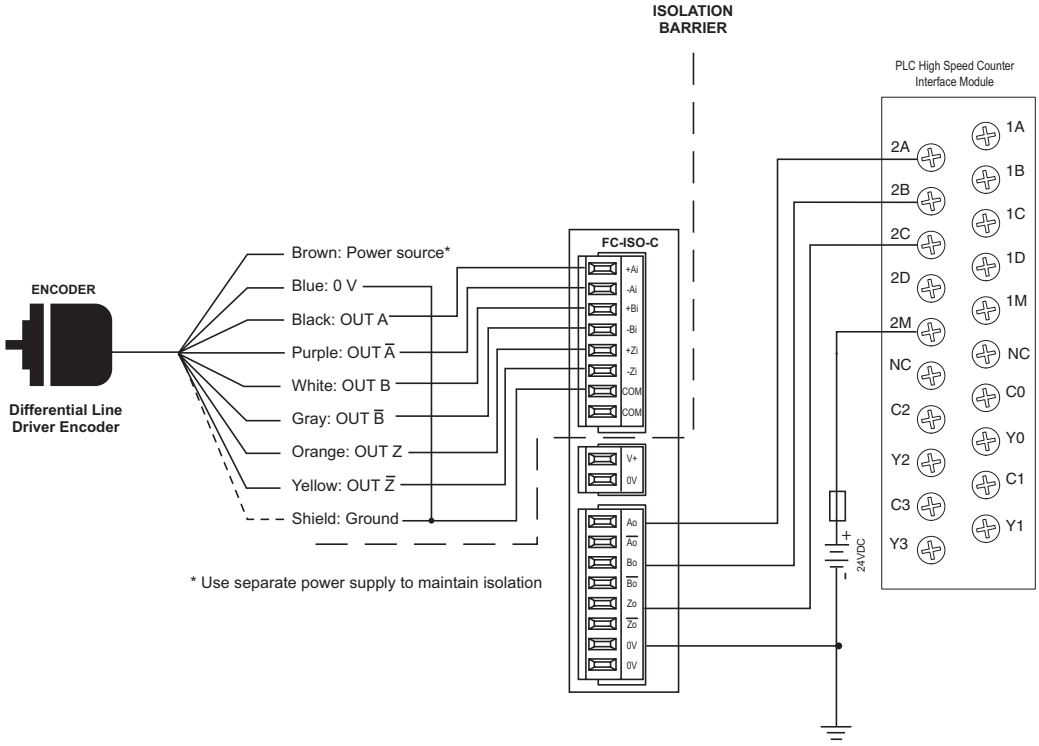
2: Polarity of the input power sources (shown above) can be reversed. Consideration must be given, however, to the polarity of the field device. Many field devices are designed for only one polarity and can be damaged if power wiring is reversed.

3: Outputs have one polarity only (as shown above) and are powered by user-provided 5–36 VDC power sources. The maximum allowable current per output circuit is 1A.

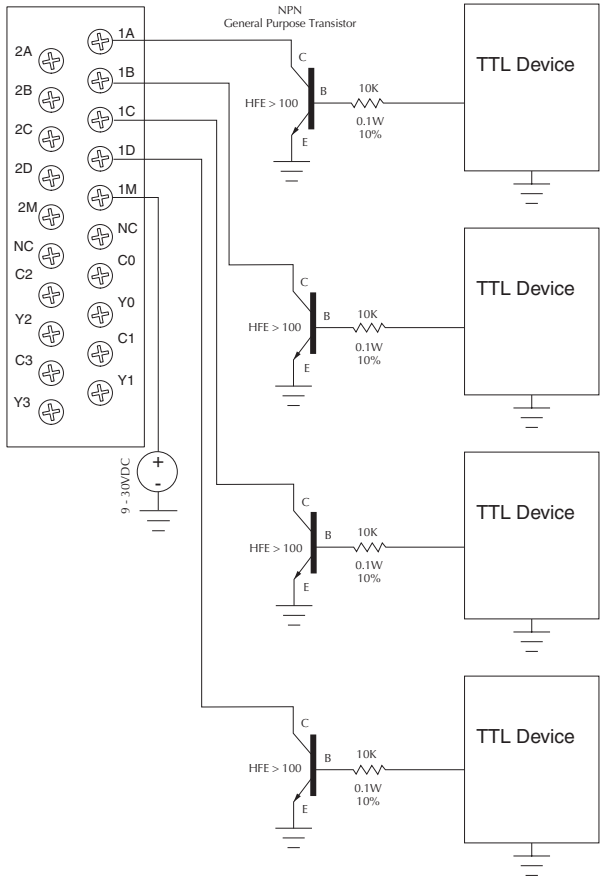
H4-CTRIO Quadrature Encoder Wiring Example



H4-CTRIO TTL Quadrature Encoder Field Wiring

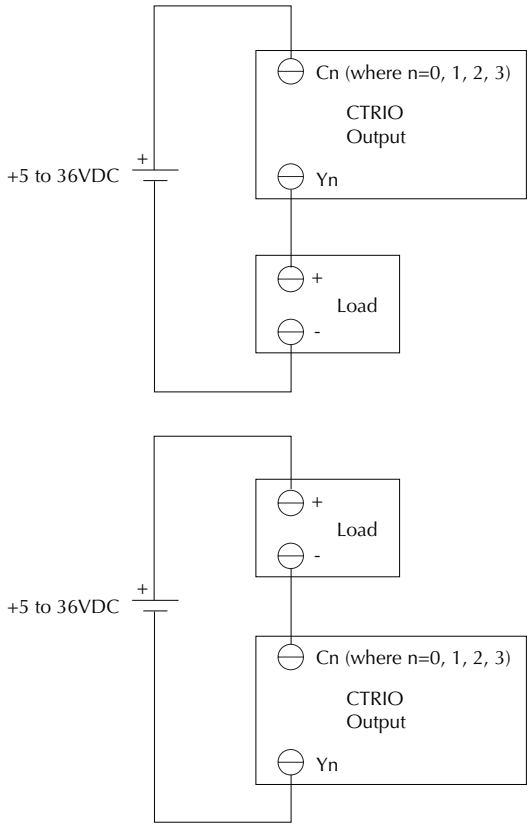


H4-CTRIO TTL Input Wiring



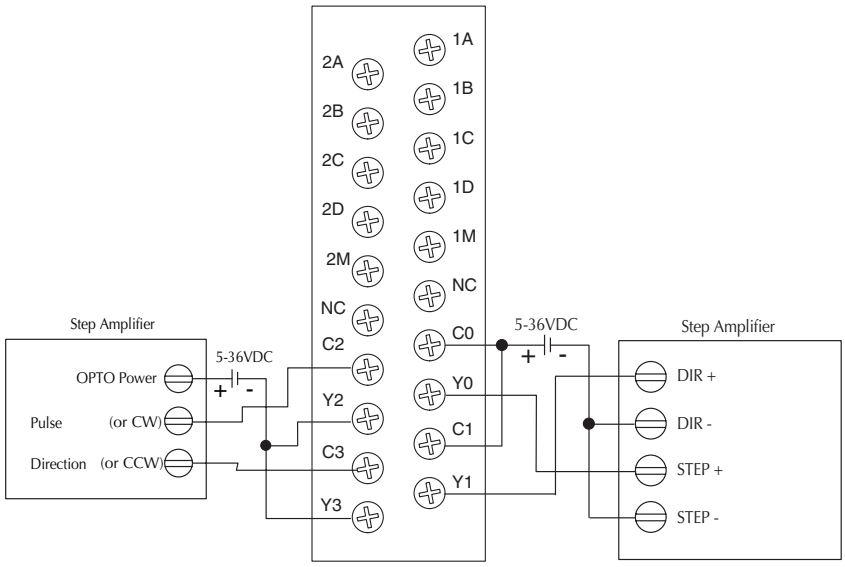
H4-CTRIO Output Wiring Schematic

The CTRIO outputs are individually isolated DC switches that can be used to break the high or the low side of a DC load.



NOTE: *The outputs must be wired so that positive current flows into Cn terminal and then out of the Yn terminal.*

H4-CTRIO Stepper/Servo Drive Wiring Example

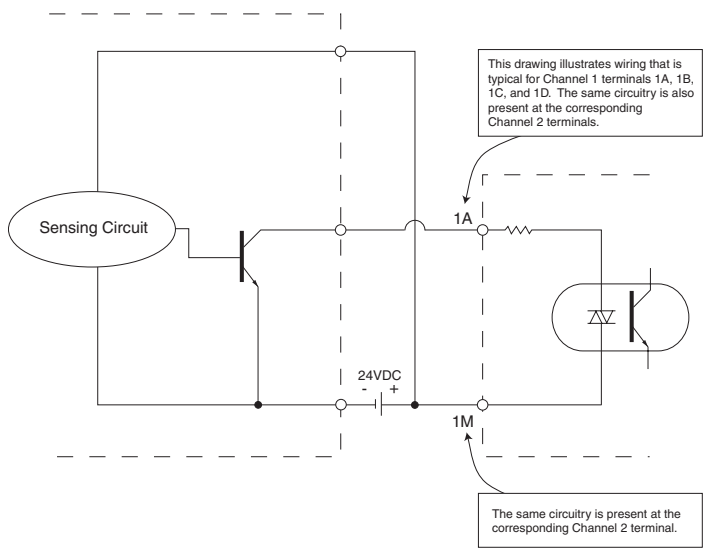


CTRIO - Sinking **CTRIO - Sourcing**

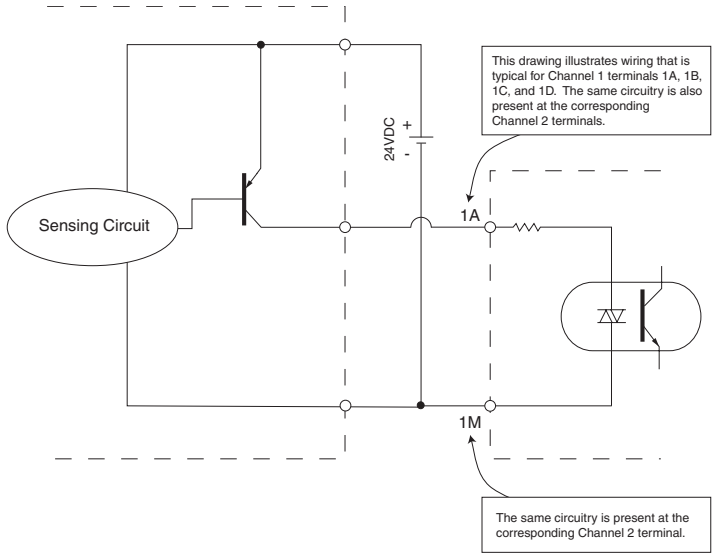
This example assumes that the Step Amplifier interface to be optocoupler LEDs (common anodes at the "OPTO Power" terminal) with internal current limiting resistors. This is a standard method; consult the step amplifier documentation to ensure that this method is applicable.

Solid State Input Device Wiring to the H4-CTRIO Module

NPN Field Device



PNP Field Device



Installing the T1H-CTRIO

The T1H-CTRIO module is compatible with several Terminator I/O Network interface devices. Consideration must be given to the firmware versions of the Network interfaces to assure their compatibility with the T1H-CTRIO, (see chart below).

NOTE: *The T1H-CTRIO is only supported by the T1H-EBC, T1H-EBC100 and T1H-PBC (Obsoleted 08/20).*

The T1H-CTRIO module plugs into any valid I/O slot in a Terminator I/O system. The T1H-CTRIO cannot be used with the Network interfaces: T1K-RSSS, T1K-MODBUS and T1K-DEVNETS.

For installation instructions, refer to the Terminator I/O Installation and I/O Manual (T1K-INST-M)

CPU and CTRIO Compatibility Chart

CPU-slot Device	Firmware*	Hardware
T1H-EBC	v. 1.0.444 or later	v. 2I or later
T1H-EBC100	Any	Any
T1H-PBC**	v. 1.1.10 or later	v. 2D or later

*Updated firmware versions can be downloaded from our web site at *www.automationdirect.com*

*** T1H-PBC obsoleted 08/20.*

At first power-up of the CTRIO module, the OK LED will be blinking. The blinking LED indicates that the module is in program mode.

Wiring the T1H-CTRIO Module

The T1H-CTRIO module has two independent input channels, each consisting of 4 optically isolated input points (1A–1D on common 1M and 2A–2D on common 2M). The inputs can be wired to either sink or source current.

The module has 4 optically isolated output points (Y0–Y3 on isolated commons C0–C3, respectively). The outputs must be wired so that positive current flows into Cn terminal and then out of the Yn terminal, (see the diagram on the following page and the schematic on page 3-34).

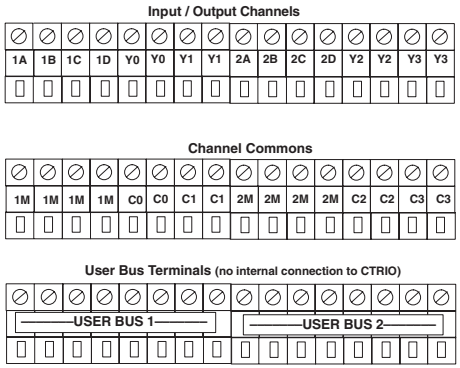
The module is configured, using CTRIO Workbench, to accommodate the user's application. The function of each input (counting, timing, reset, etc.) and output (pulse output, discrete output, etc.) is defined in the configuration of the module.

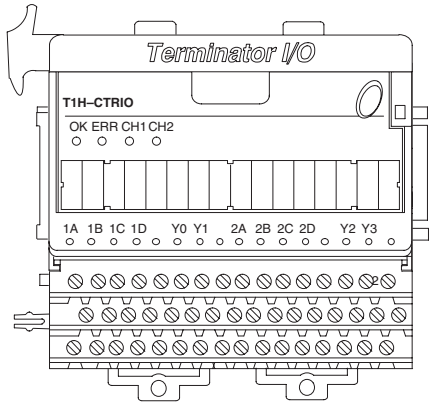
Refer to Chapters 5 and 6 to determine what input and output configurations are possible.

NOTE: *Field device wiring must be compatible with the module configuration.*

See the notes below for further details about power source considerations, circuit polarities, and field devices. Also, refer to the specifications in Chapter 1 on pages 1-7 and 1-8 for more information.

Apply the labels that come with the I/O module to the I/O base terminals to properly identify the base terminal points.





NOTES:

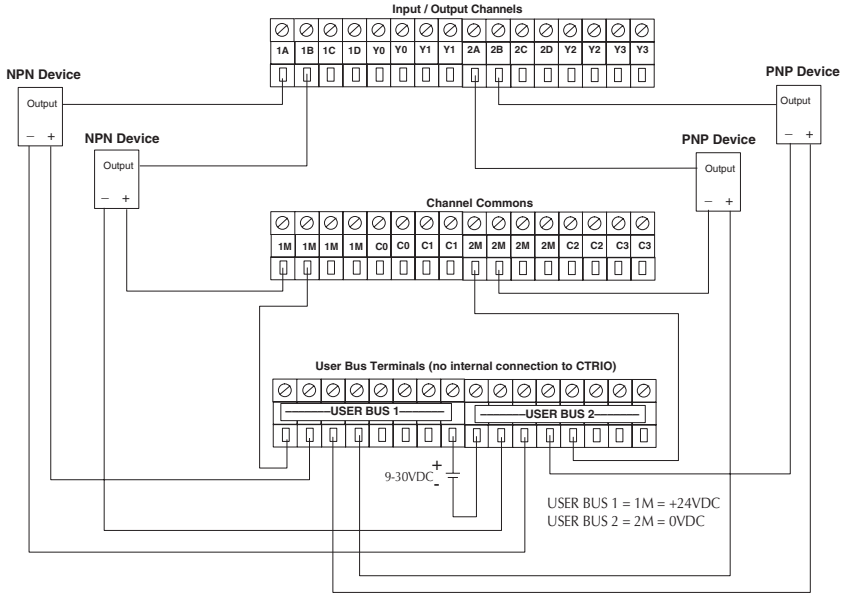
1: Inputs (1A, 1B, 1C, 1D and 2A, 2B, 2C, 2D) require user-provided 9–30VDC power sources. Terminals 1M and 2M are the commons for Channel 1 and Channel 2 inputs. Maximum current consumption is 12mA per input point.

2: Polarity of the input power sources can be reversed. Consideration must be given, however, to the polarity of the field device. Many field devices are designed for only one polarity and can be damaged if power wiring is reversed.

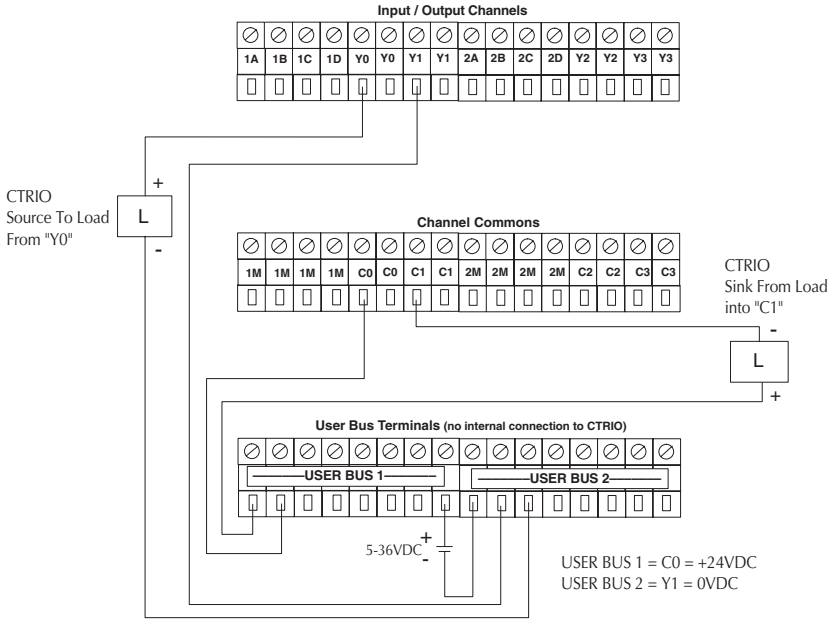
3: Outputs have one polarity only and are powered by user-provided 5–36VDC power sources. The maximum allowable current per output circuit is 1A.

4: User Bus 1 and User Bus 2 are each an independent 8 wiring terminal bus. They can be used for additional power rail connections.

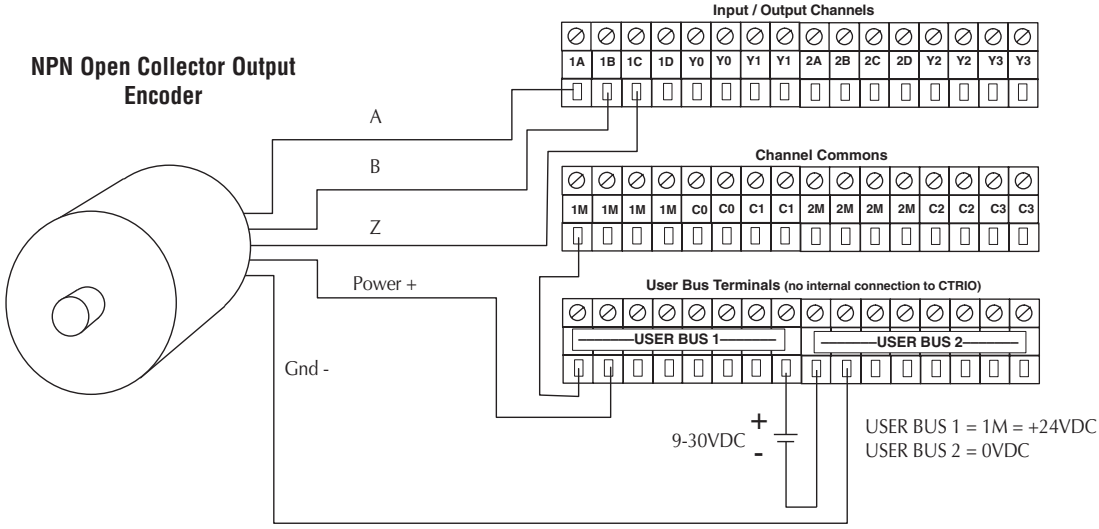
T1H-CTRIO Input Field Wiring



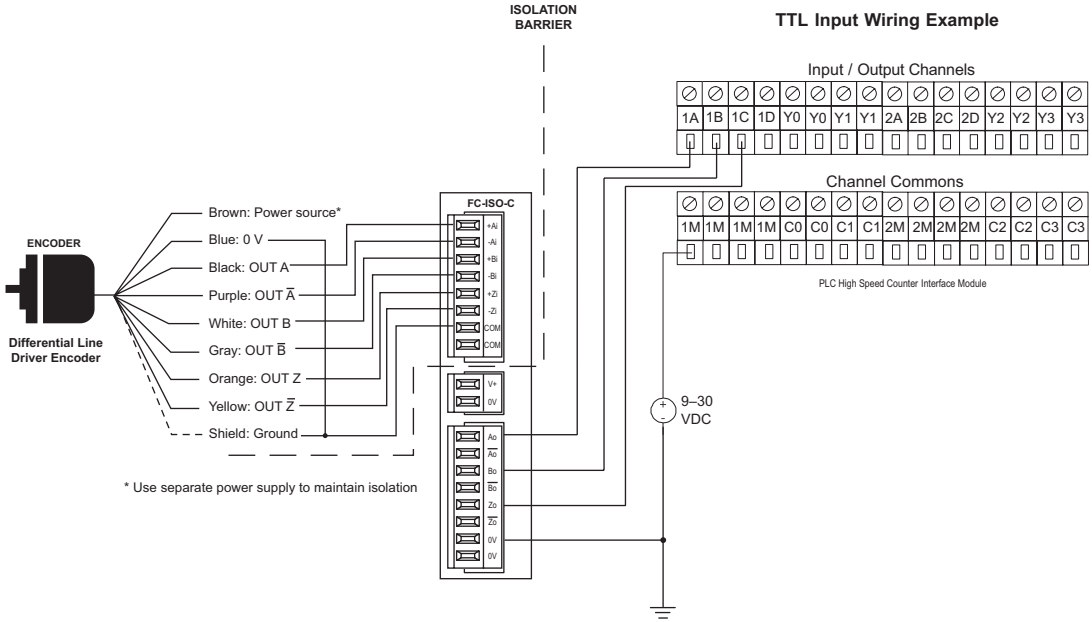
T1H-CTRIO Output Field Wiring



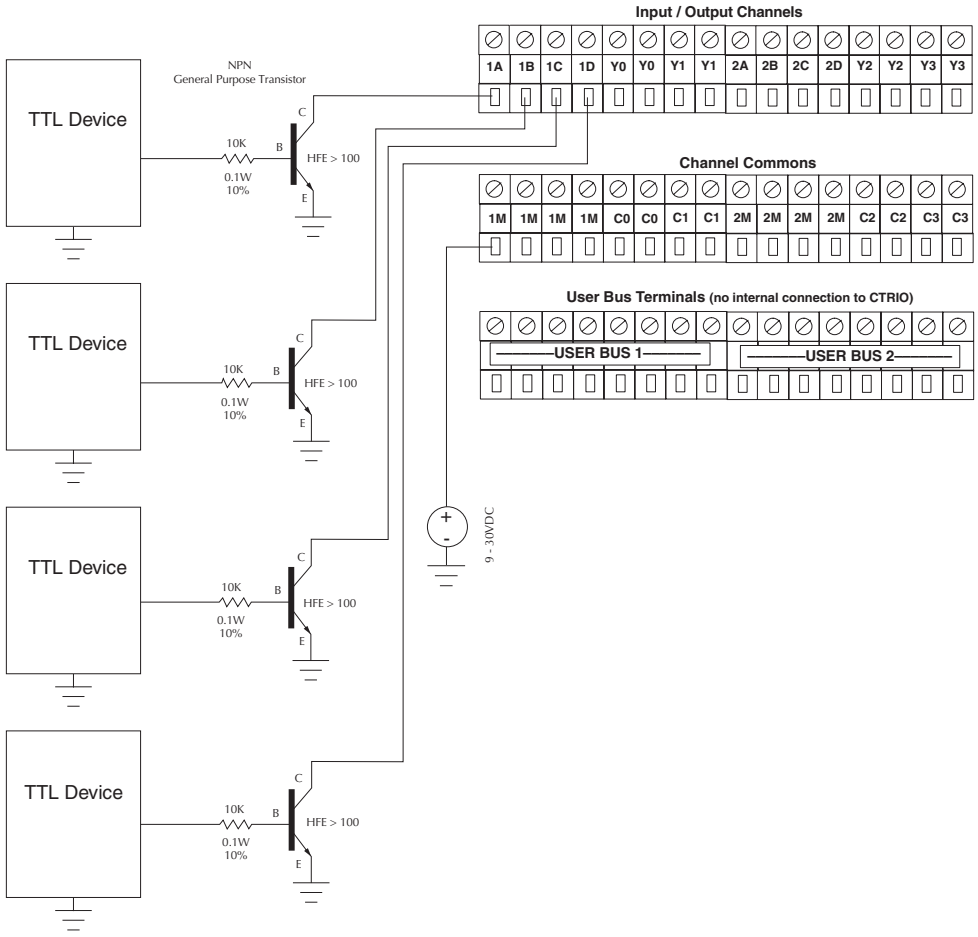
T1H-CTRIO Quadrature Encoder Wiring Example



T1H-CTRIO TTL Quadrature Encoder Field Wiring

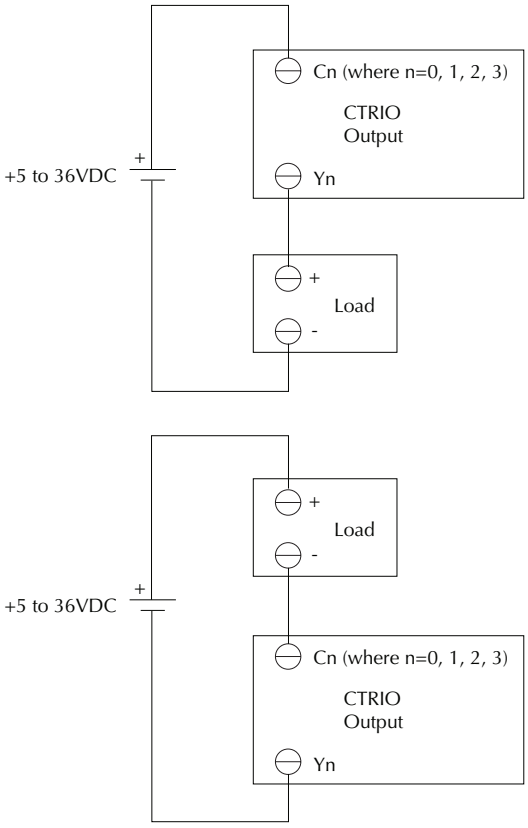


T1H-CTRIO TTL Input Wiring



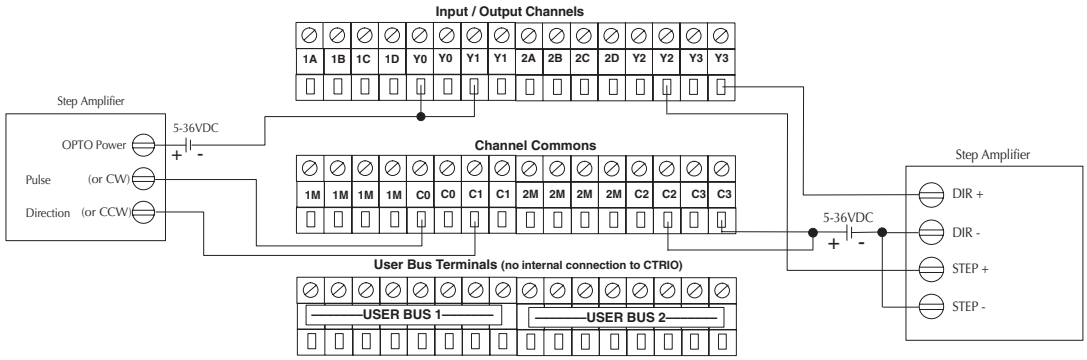
T1H-CTRIO Output Wiring Schematic

The CTRIO outputs are individually isolated DC switches that can be used to break the high or the low side of a DC load.



NOTE: *The outputs must be wired so that positive current flows into Cn terminal and then out of the Yn terminal.*

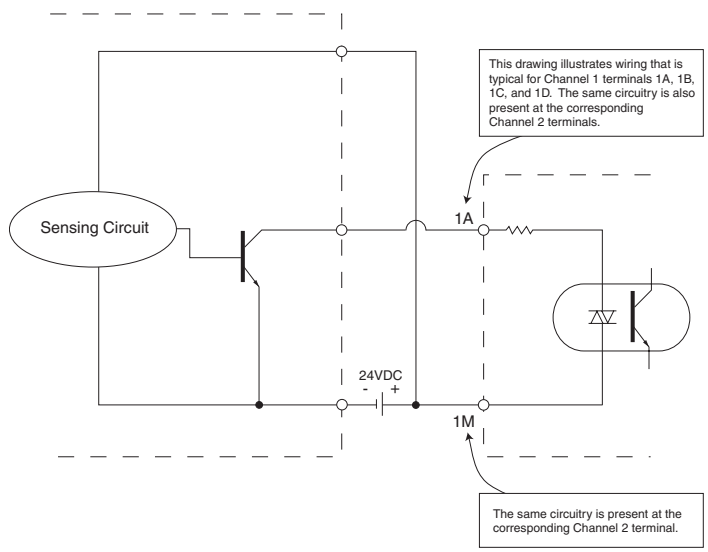
T1H-CTRIO Stepper/Servo Drive Wiring Example



This example assumes that the Step Amplifier interface to be optocoupler LEDs (common anodes at the "OPTO Power" terminal) with internal current limiting resistors. This is a standard method; consult the step amplifier documentation to ensure that this method is applicable.

Solid State Input Device Wiring to T1H-CTRIO Module

NPN Field Device



PNP Field Device