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Data Sheet: T1H-CTRIO-DS Rev A

# Terminator I/O

## T1H-CTRIO Counter I/O Module (use base T1K-16B or T1K-16B-1)

Insert Module into Base

Install Assembly on DIN Rail

Slide Assembly into Position

Module Specifications

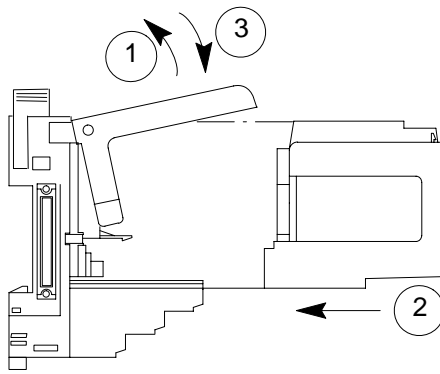
Wiring and Dimensions

**WARNING:** To minimize the risk of potential safety problems, you should follow all applicable local and national codes that regulate the installation and operation of your equipment. These codes vary from area to area and it is your responsibility to determine which codes should be followed, and to verify that the equipment, installation, and operation are in compliance with the latest revision of these codes.

*Equipment damage or serious injury to personnel can result from the failure to follow all applicable codes and standards. We do not guarantee the products described in this publication are suitable for your particular application, nor do we assume any responsibility for your product design, installation, or operation.*

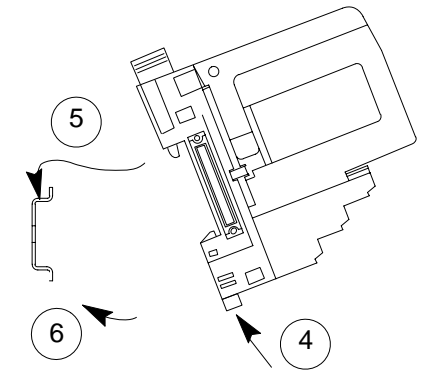
If you have any questions concerning the installation or operation of this equipment, or if you need additional information, please call us at 770-844-4200.

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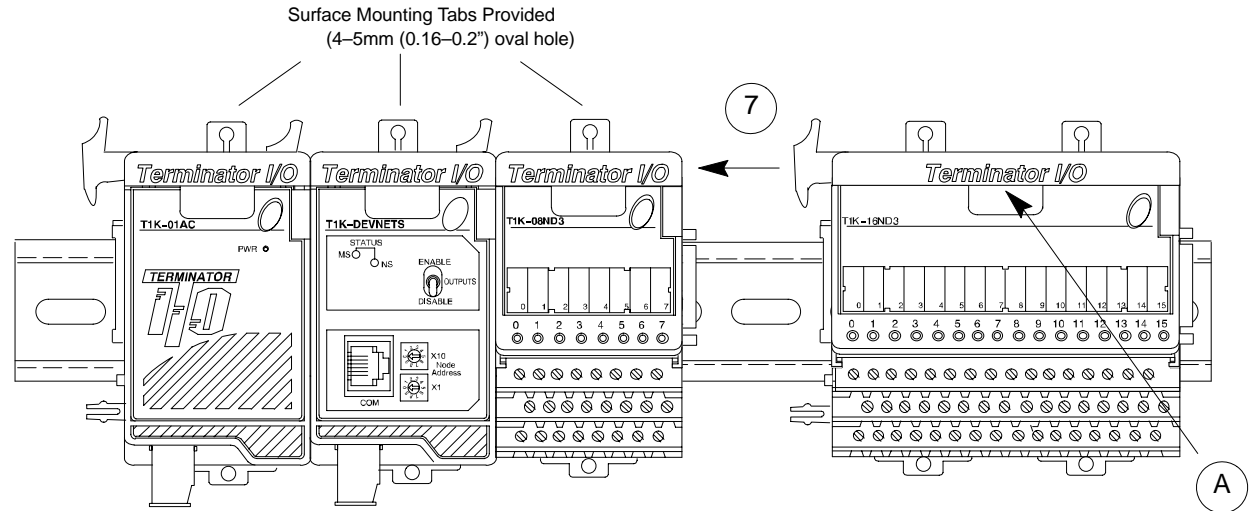
### Insert Module into Base

1. Pull base arm back to allow space for module to enter base
2. Align module slides with base track
3. Press module firmly into base



### Install Assembly on DIN Rail

4. Make sure the locking tab is in the latched position
5. Hook upper tab over upper flange of DIN rail
6. Tilt assembly toward DIN rail until module snaps securely to DIN rail



### Slide Assembly into Position on DIN Rail

7. Slide the module assembly on the DIN rail until the clip arm attaches securely to the adjacent module.

**A.** To remove the module from the base, lift the center of the base arm slightly outward and upward to release the module. Lifting the base arm further will eject the module.  
**B.** To remove the module assembly from the DIN rail, lift the clip arm up and slide the module assembly away from the adjacent module. Use a small screwdriver to pull the locking tab to the down position.

## Specifications

### T1H- CTRIO Counter I/O Module

#### Input Specifications:

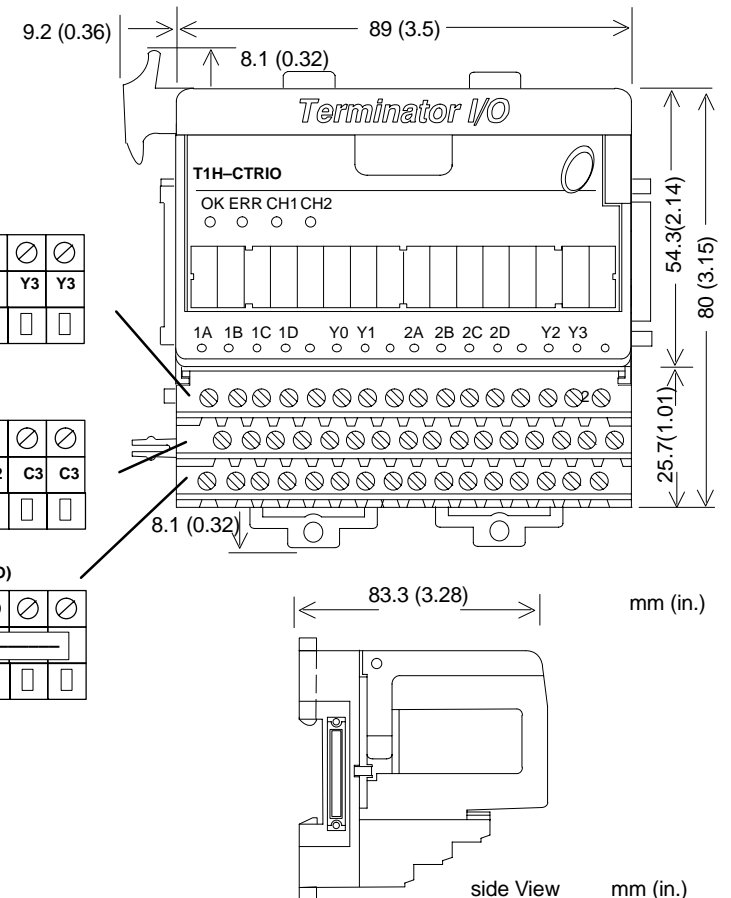
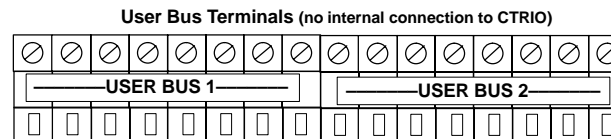
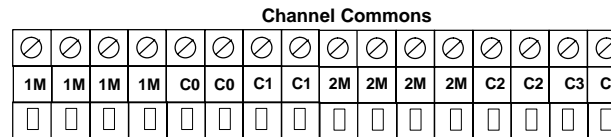
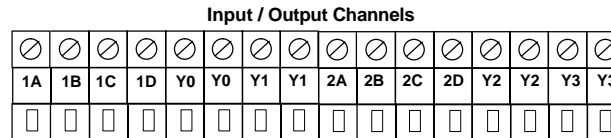
Inputs	8 pts. ( 2 isolated channels / 4 pts. each channel), sink / source, 100K Hz max; See Input Resources Table for available Input Function options
Minimum Pulse Width	5us
Input Voltage Range	9–30VDC
Maximum Voltage	30VDC
Input Voltage Protection	Zener clamped at 33VDC
Rated Input Current	8mA typical, 12mA maximum
Minimum ON Voltage	9.0VDC
Maximum OFF Voltage	2.0VDC
Minimum ON Current	5.0mA @ 9.0VDC
Maximum OFF Current	2.0mA
OFF to ON Response	< 3us
On to OFF Response	< 3us

#### Output Specifications:

Outputs	4 pts., independently isolated, sink/source (FET Outputs); See Output Resources Table for available Output Function options
Voltage Range	5–36VDC
Maximum Voltage	36VDC
Output Clamp Voltage	60VDC
Maximum Load Current	1.0A
Max. Leakage Current	100uA
Inrush Current	5.0A for 20ms
OFF to ON Response	< 3us
ON to OFF Response	< 3us
ON State Voltage Drop	< 0.3V
External Power Supply	for loop power only, not required for internal module function
Overcurrent Protection	15A max
Thermal Shutdown	T <sub>junction</sub> = 150°C
Overtemperature Reset	T <sub>junction</sub> = 130°C
Duty Cycle Range	1% to 99% in 1% increments
Operating Environment	0°C–60°C, Humidity 5 to 95%

## Wiring & Dimensions

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



## LED Indicators

#### LED Diagnostic Definitions

OK	ER	Description
ON	OFF	All is well – Run Mode
ON	ON	Hardware Failure
Blinking	Blinking	Boot Mode – Use for Field OS Upgrades
Blinking	OFF	Program Mode
OFF	Blinking	Module Self –diagnostic Failure
OFF	ON	Module Error due to Watchdog Timeout
OFF	OFF	No Power to Module

#### LED Descriptions

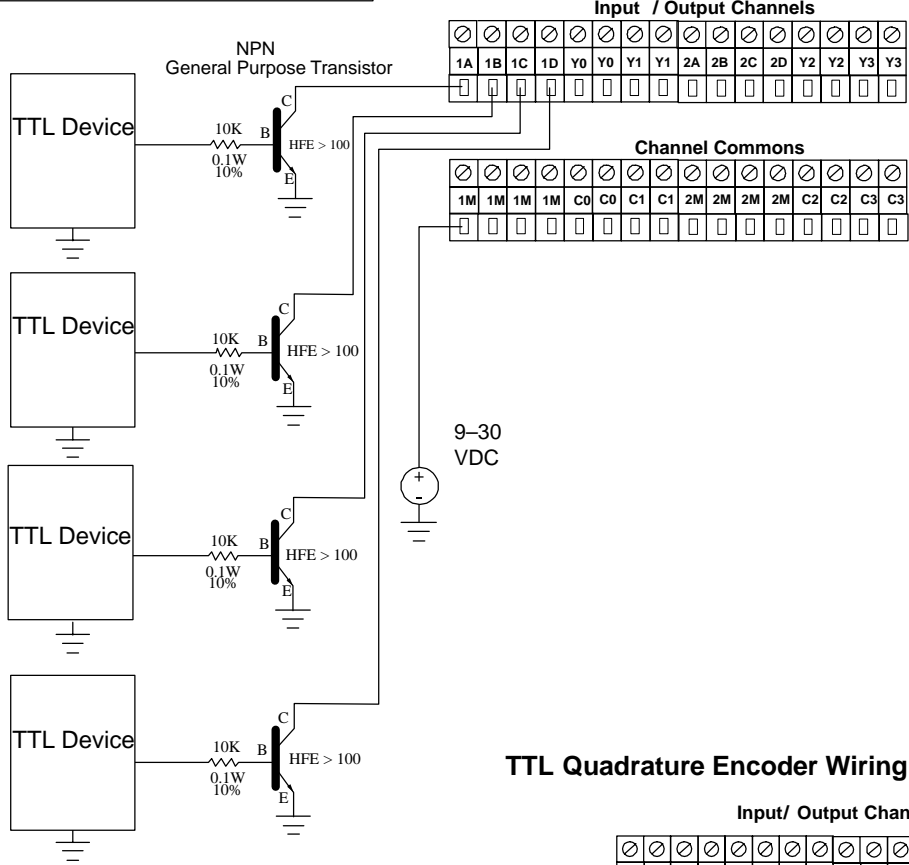
OK	Module OK
ER	User Program Error
CH1	Channel 1 Status
CH2	Channel 2 Status
1A–1D	Channel 1 A–D Status
2A–2D	Channel 2 A–D Status
Y0 – Y3	Output Status

#### LED Diagnostic Definitions

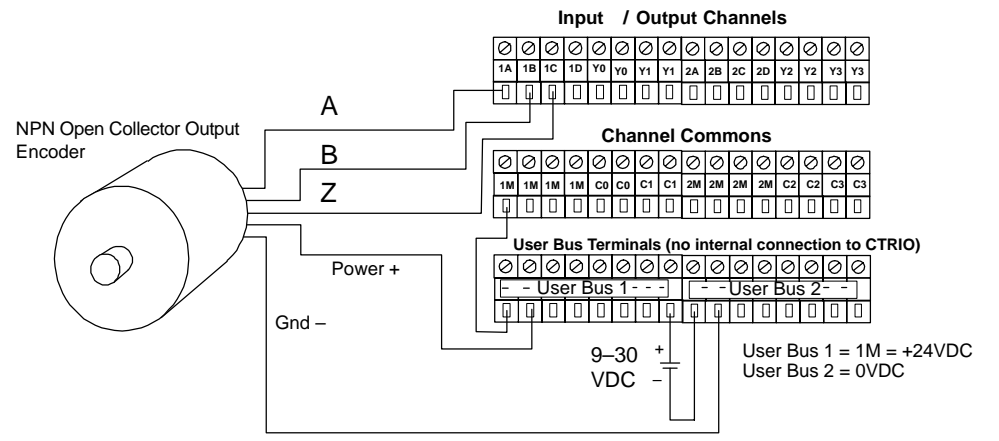
CH1	Blinks when Channel 1 Function 1 is counting or timing
CH2	Blinks when Channel 2 Function 1 is counting or timing
Y0–Y3	Follows actual output state; ON = output is passing current

# Input Wiring Diagrams

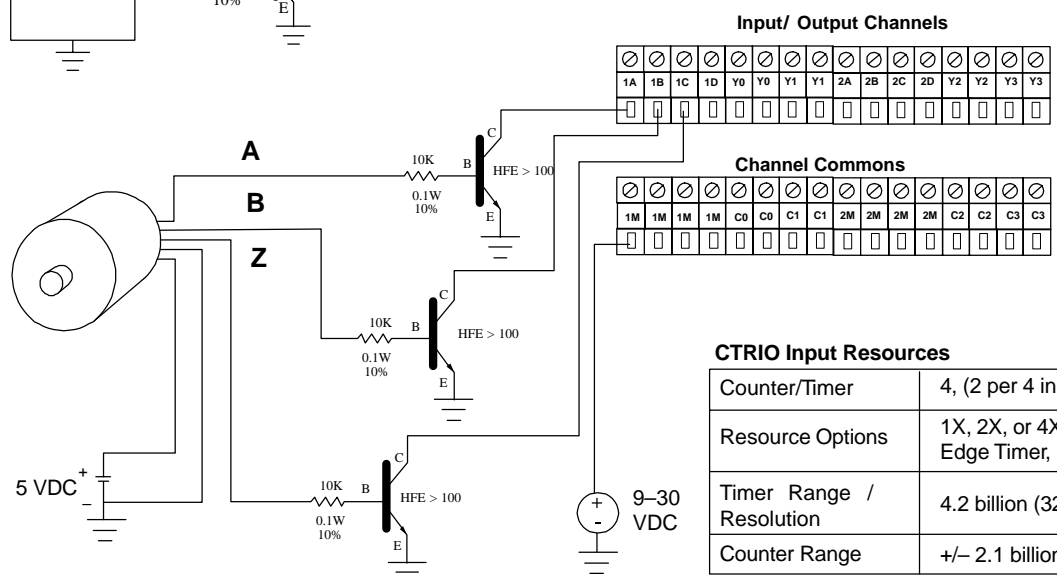
## TTL Input Wiring Example



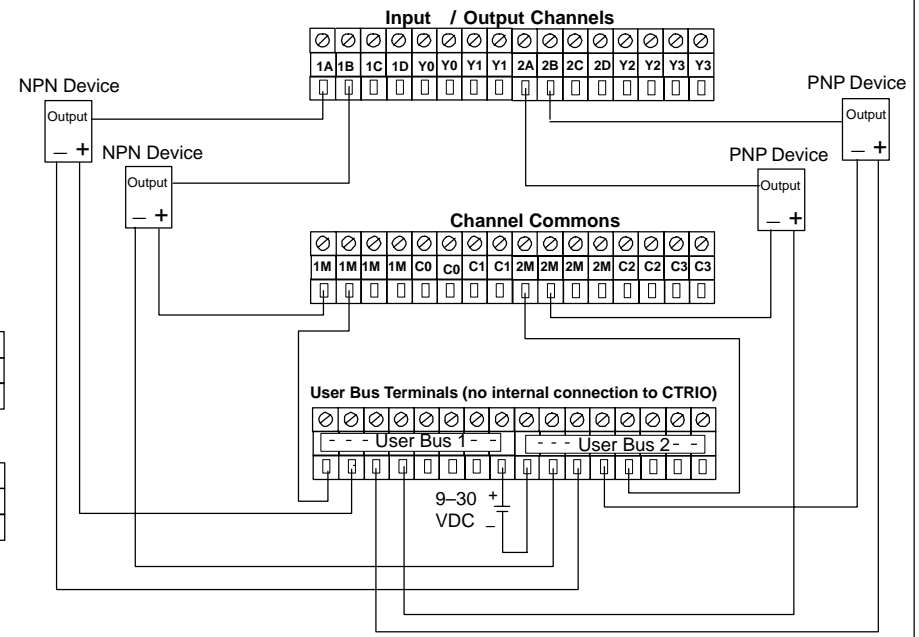
## Quadrature Encoder Wiring Example



## TTL Quadrature Encoder Wiring Example



## Input Wiring Example



### CTRIO Input Resources

Counter/Timer	4, (2 per 4 input channel group)
Resource Options	1X, 2X, or 4X Quadrature, Up or Down Counter, Edge Timer, Dual Edge Timer, Pulse Catch, Reset, Inhibit, Capture
Timer Range / Resolution	4.2 billion (32 bits); 1us
Counter Range	+/- 2.1 billion (32 bits or 31 bits + sign bit)

User Bus 1 = 1M = +24VDC  
User Bus 2 = 2M = 0VDC

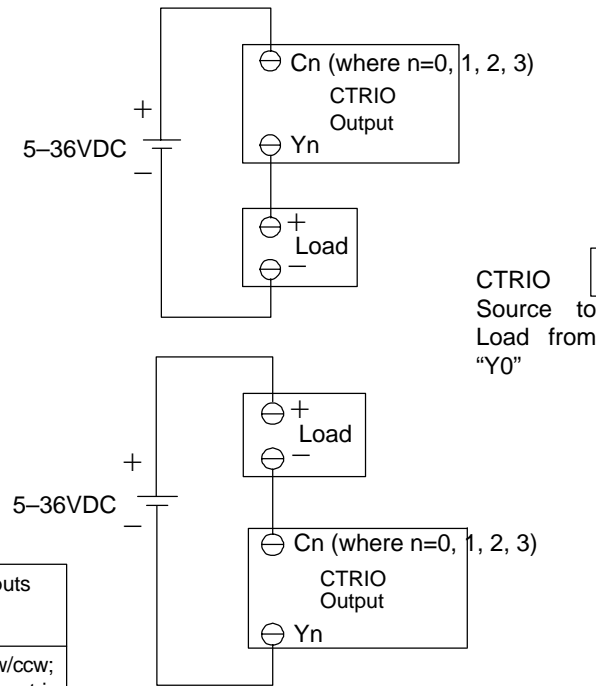
## Output Wiring Diagrams

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 Cn terminal and then out of the Yn terminal.

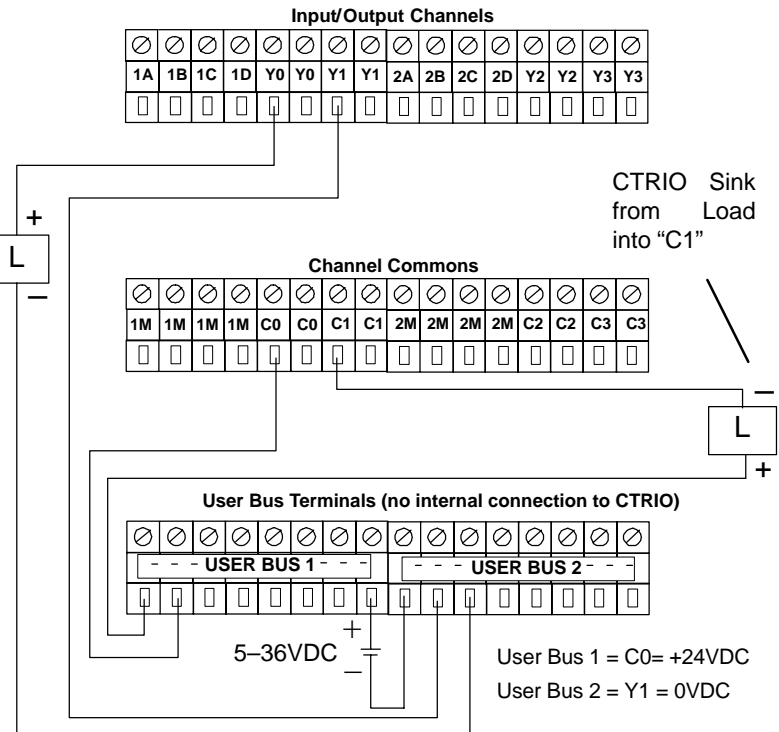
### CTRIO Output Resources

Pulse outputs / Discrete outputs	Pulse outputs: 2 Channels (2 outputs per channel); Discrete outputs: 4 pts.
Resource Options	Pulse Outputs: pulse/direction or cw/ccw; Profiles: Trapezoid, S–Curve, Symmetrical S–Curve, Dynamic Positioning, Dynamic Velocity, Home Search, Velocity mode, Run to limit mode and Run to position mode; Discrete Outputs: 4 configurable for set, reset, pulse on, pulse off, toggle and reset count function (assigned to respond to Timer/Counter functions); RawMode: Direct access to output from user program
Target Position Range	+/- 2.1 billion (32 bits or 31 bits + sign bit)

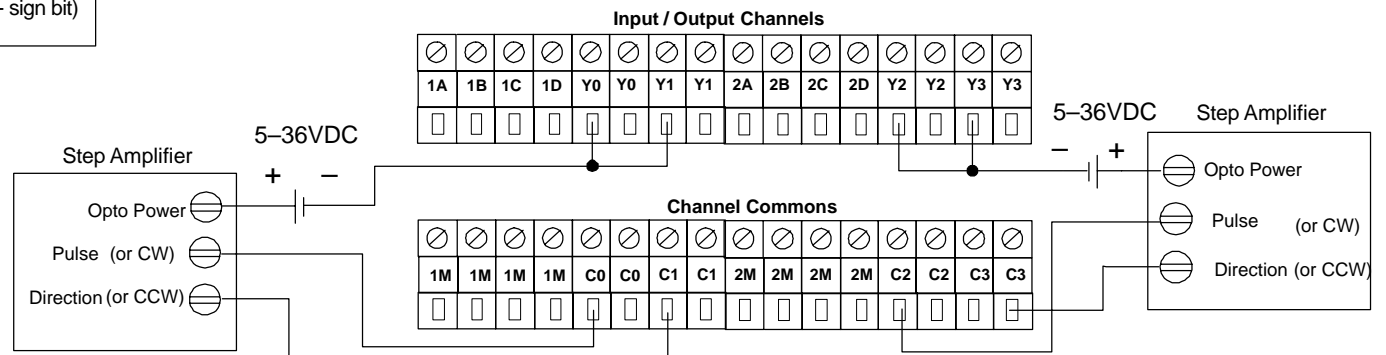
### Output Wiring Schematic



### Output Wiring Example



### Stepper/Servo Drive Wiring Example



The stepper wiring example assumes 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, but you must consult your stepper amplifier documentation to ensure that this method is applicable.