



# Instruction Manual

## RIM Tach<sup>®</sup> Signal Splitter



# northstar

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## LIMITED WARRANTY

NorthStar Technologies, Inc. (henceforth NorthStar), the manufacturer, warrants this product for a period of twelve (12) months from the date of shipment. During the warranty period, under authorized return component parts to NorthStar freight prepaid, the company will repair, or at its option replace, any part found to be defective in material or workmanship, without charge to the Owner for parts, service labor, or associated customary shipping cost. Replacement or repaired parts will be warranted for only the unused portion of the original warranty.

This warranty is limited to NorthStar products purchased and installed in the United States. This same protection will extend to any subsequent owner during the warranty period. It does not apply to damage caused by accident, misuse, fire, flood or acts of God, or from failure to properly install, operate, or maintain the product in accordance with the printed instructions provided.

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## WARRANTY RETURN POLICY

If you experience any technical problems with NorthStar's products, please contact our Technical Support Department at (614) 818-1150 from 8:00 A.M. to 5:00 P.M. Eastern Standard Time (EST), Monday through Friday or in writing to fax: (614) 891-6909, or email to [service@northstar-tec.com](mailto:service@northstar-tec.com). Please be ready to provide your customer number, item description, serial number, invoice number, date of purchase, and the specifics of the problem.

A representative will attempt to solve your problem over the telephone by running a few diagnostics. If it is determined by our representative in conjunction with the Customer that the product requires to be returned to NorthStar's factory for warranty repair, a Return Goods Authorization (RGA) number will be issued. For control purposes, only those items identified with an RGA number may be returned to NorthStar. Please make sure that the RGA number is clearly marked on the shipping label. Packages missing an RGA number cannot be accepted by our Receiving Department and must be returned to the sender freight COD. Ship returned products to NorthStar PRE-PAID and insured for its full value.

EXPRESS SERVICE IS OFFERED ON ALL WARRANTY REPAIRS WHERE AN RGA NUMBER HAS BEEN ISSUED. IF THE SAME WARRANTY PART THAT IS BEING RETURNED IS IN STOCK, NORTHSTAR WILL IMMEDIATELY SHIP OUT A NEW REPLACEMENT PART, INVOICE THE REPLACEMENT PART AND ISSUE A CREDIT INVOICE WHEN THE RGA NUMBER WARRANTY PART IS RECEIVED AT LAKE SHORE AND IS CONFIRMED TO BE A WARRANTY REPAIR. NORTHSTAR WILL EXPRESS SHIP THE PRODUCT PRE-PAID, USING THE SAME METHOD BY WHICH THE WARRANTY PART WAS SHIPPED TO NORTHSTAR, (i.e., IF THE RGA WARRANTY PART WAS SHIPPED OVERNIGHT, NORTHSTAR WILL SHIP IN THE SAME MANNER.)

There is a 15% restocking fee on all items returned for credit to NorthStar. This includes all items in that are returned for exchange. All replacement parts must be purchased before they are sent out to the customer. If credit needs to be issued it will be issued upon the return of the product if the unit is in good condition.

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# Chapter One

## Introduction

### 1.0 Safety Summary

High current, voltage, and rotating parts can cause serious or fatal injury. The use of electric machinery, like all other uses of concentrated power and rotating equipment, may be hazardous. Installing, operating, and maintaining electric machinery should be performed by qualified personnel, in accordance with applicable provisions of the National Electrical Code and sound local practices. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the instrument. NorthStar Technologies, Inc. assumes no liability for the customer's failure to comply.

#### Rotating Machinery

Avoid contact with rotating parts. Avoid by-passing or rendering inoperative any safety guards or protection devices. Avoid extended exposure in close proximity to machinery with high noise levels. Use proper care and procedures in handling, lifting, installing, operating and maintaining the equipment.

#### Before Installation

Safe maintenance practices with qualified personnel is imperative. Before starting maintenance procedures, be positive that, (1) equipment connected to the shaft will not cause mechanical rotation, (2) main machine windings have been disconnected and secured from all electrical power sources, and (3) all accessory devices associates with the work area have been de-energized. If high potential insulation test is required, follow procedures and precautions outlined in NEMA standards MG-1.

#### Grounding

Improperly grounding the frame of the machine can cause serious or fatal injury to personnel. Grounding of the machine frame and structure should comply with the National Electrical Code and with sound local practices. Check wiring diagram before connecting power.

#### Do Not Operate In An Explosive Atmosphere

Do not operate the instrument in the presence of flammable gases or fumes. Operating any electrical instrument in such an environment constitutes a definite safety hazard.

#### Keep Away From Live Circuits

Operating personnel must not remove instrument covers. Component replacement and internal adjustments must be made by qualified maintenance personnel. Do not replace components with power cable connected. To avoid injuries, always disconnect power and discharge circuits before touching them.

#### Do Not Substitute Parts Or Modify Instrument

Do not install substitute parts or perform any unauthorized modification to the instrument. Introducing additional hazards is dangerous. Return the instrument to an authorized NorthStar Technologies, Inc. representative for service and repair to ensure that safety features are maintained.



**CAUTION!** Very important information, that *must* be read and followed, regarding safety and proper unit functioning.



**DO THIS!** Accessory instruction, that must be read and followed, without safety concerns.



**NOTE:** Useful information that should be read.



**QUESTION:** Helpful hints to answer your possible questions.

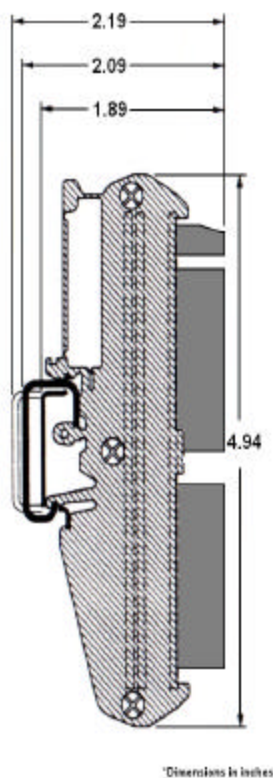


Figure 1: Dimensional Drawing

## 1.1. General

These instructions do not claim to cover all details of variation in equipment or to provide for every possible contingency or hazard to be met in connection with installation, operation, and service.

## 1.2 Description

The Signal Splitter is an advanced, digital encoder signal splitting device designed to route a digital encoder's signals to multiple isolated devices. Accepting single ended A, B, & Z encoder signals alone or with their complements, the Signal Splitter can output two isolated, quadrature encoder signals with their complements ( $A/\bar{A}$ ,  $B/\bar{B}$ ,  $Z/\bar{Z}$ ). In addition, the Signal Splitter will accept 5-26VDC digital encoder and proximity sensor signals, and output two independent, isolated, line driver outputs of 5-26VDC based on user defined voltage levels. The Signal Splitter also has the capability to repeat and amplify a fading signal, either caused by large distances between the encoder and motor drive and/or by environmental or electrical interference, providing a clean, clear, square wave output. Compatible with virtually every incremental digital encoder, the Signal Splitter's unique and cost-effective technology eliminates the expense and maintenance of two separate encoders.

## 1.3 Specifications (subject to change without notice).

Electrical Specifications	
Input Signal	Digital encoder input with or w/o complements (quadrature or single channel)
Input Voltage	5-26VDC
Input Current	2mA minimum
Input Impedance	1.8Kohms opto-isolated
Operating Frequency	120KHz maximum
Output Signal	2 independent isolated line driver output sets
Output Supply Voltage	5-26VDC
Output Current	150mA max per channel
Common Mode Transient Immunity	1,000V/ $\mu$ s
Connector Wire Gauge	26-16 AWG
Mechanical Specifications	
Size	1.8" (4.6mm) wide x 4.94" (125.5mm high x 2.19" (5.56mm) max deep
Case	PVC
Side Elements	Polyamide PA non-reinforced
DIN-Rail <sup>®</sup> Mounting Hooks	DIN 35, DIN 32
Environmental Specifications	
Operating Temperature	0°C to 55°C
Storage Temperature	-20°C to 70°C
Electric Protection	Short circuit, reverse polarity, output is ESD protected to MIL-STD-883

## CHAPTER TWO INSTALLATION

### 2.0 Inspection and Unpacking

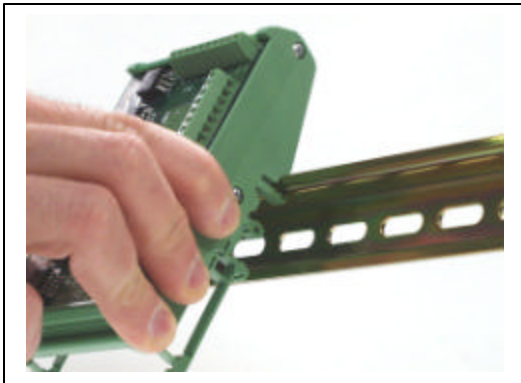
Inspect shipping container for external damage. All claims for damage (apparent or concealed) or partial loss of shipment must be made in writing to NorthStar within (5) days from receipt of goods. If damage or loss is apparent, please notify the shipping agent immediately. Open shipping container and locate the packing list. The packing list is included to verify that all components, accessories, and manual were received. Please use the packing list to check off each item as the unit is unpacked. Inspect for damage. NorthStar recommends that the shipping container be retained for future shipping, storage, or return to factory purposes.

### 2.1 Mechanical Installation and Removal From Din-Rail<sup>®</sup>

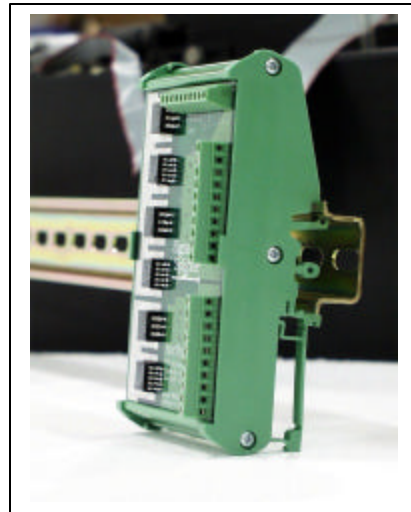
The Signal Splitter will mount to both Asymmetrical (32mm) and Symmetrical (35mm) styles of DIN-Rail<sup>®</sup>.

**To INSTALL Signal Splitter on Din-Rail<sup>®</sup>:**

- 1. latch top mounting clip of the Signal Splitter on the Din-Rail<sup>®</sup>.**
- 2. push in to latch bottom mounting clip on Din-Rail<sup>®</sup>.**



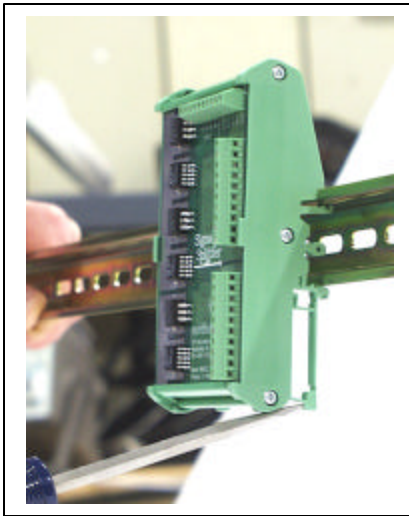
*Step 1: Latch top mounting clip onto DIN-Rail<sup>®</sup>.*



*Step 2: Latch bottom onto DIN-Rail<sup>®</sup>.*



Do not force the Signal Splitter to mount onto the DIN-Rail<sup>®</sup>. Excessive pressure on the Signal Splitter will damage the unit. The Signal Splitter will easily mount if installed correctly.



Step 3 (Removal): Pry Splitter off DIN-Rail<sup>®</sup> with screw driver.

**To REMOVE Signal Splitter from Din-Rail<sup>®</sup>:**

1. place a flat screw driver into the bottom mounting clip “foot” of the Signal Splitter and pry the bottom half of the Signal Splitter off the Din-Rail<sup>®</sup>.
2. lift the entire Signal Splitter off the Din-Rail<sup>®</sup>.



Using a screwdriver is especially helpful when multiple units are mounted on the DIN-Rail<sup>®</sup>.

## 2.2 Electrical Installation

The Signal Splitter will function with either output connector disconnected. However, terminals  $V_{in}$  and COMMON, of the OUTPUT 1 connector, supply power to terminal +12VDC and COMMON of the INPUT connector. This +12VDC signal can be used to power the encoder (see Section 2.2.1). If the OUTPUT 1 connector is disconnected, an external power supply will be necessary to provide the encoder power. Also, if the OUTPUT 1 connector is to be isolated from the encoder, a separate power supply must be used (see Section 2.2.1). Two terminal block points (9 and 10) exist on each connector for the user’s convenience.

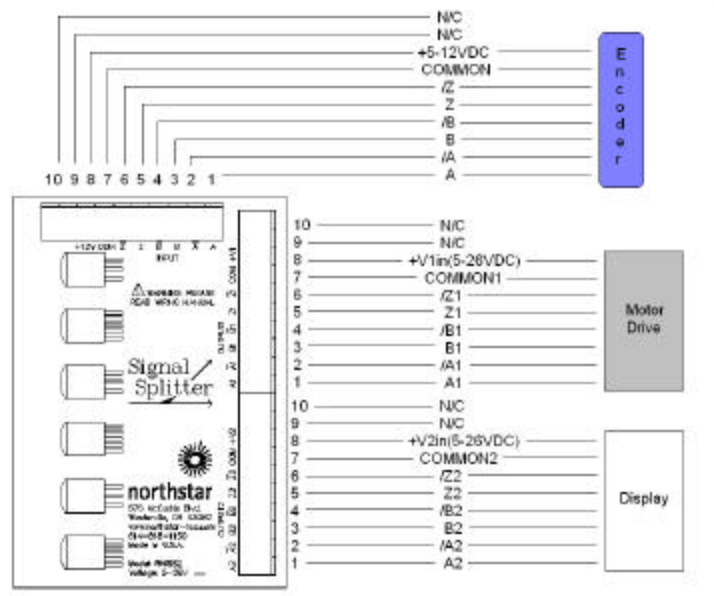


Figure 2: Electrical installation wiring guide

## 2.2.1 Wiring Options

Use the below list of wiring instructions for common Signal Splitter applications. These examples are only a guide, and do not include all possible wiring conditions.

### How do I...

#### 1) ...power my encoder with the +5 to +12VDC supply?

- connect the encoder's POWER and COMMON pins to the INPUT connector pins +12V and COMMON, respectively.

The Signal Splitter is equipped with a +12VDC regulated output to power your encoder. This +12VDC is supplied from the voltage applied to OUTPUT 1 pins  $V_{in}$  and COMMON. Any voltage over +12VDC, up to +26VDC, will be regulated to +12VDC. However, any voltage lower than +12VDC will be passed directly through. For example: if +5VDC is attached to OUTPUT 1, then the +12VDC pin will output +5VDC.



If the encoder is powered with the +12VDC connections, then the encoder will be at the same ground potential as the OUTPUT 1 connector, and the encoder will *not* be isolated from OUTPUT 1.



Do not to exceed the maximum supply voltage recommended by your encoder specifications.

#### 2) ...isolate my encoder from the output channels?

- use a separate power supply to power the encoder.



Use the extra terminals provided on the Signal Splitter INPUT connector for power supply connections to isolate OUTPUT 1 from your encoder.

#### 3) ...use multiple voltage levels?

Every input and output on the Signal Splitter is capable of operating at any voltage between +5 to +26VDC. Every input and output operates independently except for the +12VDC connection on the INPUT connector. For example, you can send a +15VDC encoder signal to both a +24VDC drive and +5VDC display from the same Signal Splitter by applying the desired output voltage level to each of the output connectors.

#### 4)...wire shield connections?

- use the extra terminals to wire shield connections as desired.

#### 5)...connect an encoder that outputs signals A, $\bar{A}$ , B, $\bar{B}$ , Z & $\bar{Z}$ ?

- connect to the INPUT connector, as labeled on the Signal Splitter.



The Signal Splitter will output A,  $\bar{A}$ , B,  $\bar{B}$ , Z &  $\bar{Z}$  signals.



**6)...connect an encoder that outputs signals A & B only?**

- 1) connect A & B to the INPUT connector, as labeled on the Signal Splitter.
- 2) connect  $\bar{A}$  &  $\bar{B}$  on the INPUT connector to the COMMON of the encoder power supply.



If a separate power supply is used to power the encoder, connect  $\bar{A}$  &  $\bar{B}$  to the supply's COMMON and *not* to the +12VDC COMMON pin on the Input connector.



The Signal Splitter will output A,  $\bar{A}$ , B,  $\bar{B}$  signals.

**7) ...connect an encoder that outputs signal A only?**

- 1) connect A to the INPUT connector, as labeled on the Signal Splitter.
- 2) connect  $\bar{A}$  on the INPUT connector to the COMMON of the encoder power supply.
- 3) leave B and  $\bar{B}$  open.



If a separate power supply is used to power the encoder, connect  $\bar{A}$  &  $\bar{B}$  to the supply COMMON and *not* to the COMMON pin on the INPUT connector.



The Signal Splitter will output A and  $\bar{A}$  signals.

**8) ...output complements ( $\bar{A}$  &  $\bar{B}$ ) with only A & B input?**

- See wiring option #6.