

# SC-320 Tachometer Relay



## ORDERING CODE

TYPE	MODEL	VOLTAGE	POWER SUPPLY	RELAY CONTACTS
SC	320	230V	AC	SP

## Application Examples

- Back-up system for tacho generator on mine hoists.
- Over-speed detection on mine loco's, fork-lift trucks, etc.
- Sequence starting on interdependent conveyor belts.
- Starter motor disabling on diesel engines.
- Conveyor belt slip detection.
- Conveyor belt tearing detection.
- Indication of production speed or manufacturing feed rates.
- Indication of rotational speed.

## Features

- Failsafe feature.
- Direct interface with NAMUR two-wire proximity sensors or limit switches.
- Low power sensor signal to DIN 19234.
- Sensor cable fault indication.
- Programmable speed ranges: 10 RPM to 10 000 RPM.
- Programmable for over-speed or under-speed detection.
- 0 to 1mA proportional output for tachometer instruments.
- 4-20mA available on request.
- Speed setpoint adjustable on calibrated scale 0-100%.
- Start-up delay.
- 10A SPDT relay output.

## Description of Operation

The **SC-320** is a multi-range tachometer relay, interfacing with NAMUR (DIN 19234) proximity sensors or limit switches. The sensor will provide a pulse every time a metal object enters the sensing area (e.g. A nut or bolt on a rotating shaft or the teeth of a gear wheel). Monitoring the frequency of pulses received from the sensor, the module provides either over-speed or under-speed detection, as well as a proportional output for a tachometer instrument in five-overlapping ranges from 10 RPM to 10 000 RPM. The mode of operation is programmable and the unit features sensor cable fault indication.

**Start-up Delay:** When power is applied to the module, the relay energises immediately, ignoring abnormal speed conditions experienced during initiation.

**Over-speed Sensing:** When programmed for over-speed sensing, the relay de-energises if the speed exceeds the limit. When the speed drops below 10% of the setpoint, the relay energises.

**Under-speed Sensing:** When programmed for under-speed sensing, the relay de-energises if the speed drops below the setpoint. When the speed rises above 10% of the set limit, the relay energises.

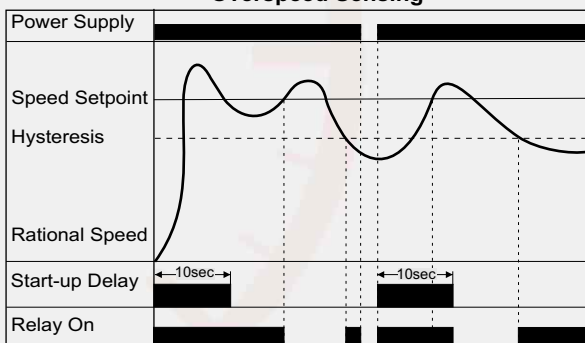
**Cable Fault:** When cable fault occurs on the sensor line, a LED on the module will indicate fault condition. When the cable fault is an open circuit (cable fracture), both the "cable fault" LED and the "input sensing" LED will illuminate. If the fault is a short circuit in the cable, only the "cable fault" LED will illuminate.

**Hysteresis:** Hysteresis represents the difference between the tripping point and the recovery point of the unit. The hysteresis is fixed to 10% to prevent relay chatter when the speed fluctuates around the setpoint.

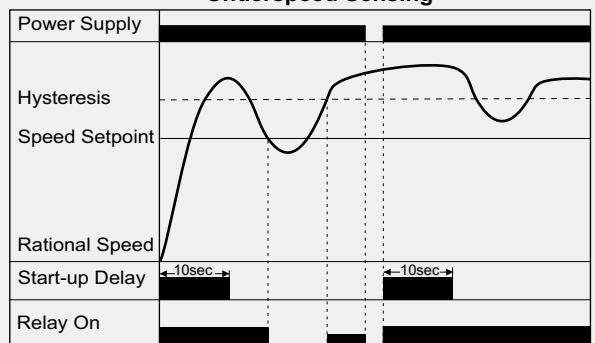
**Response time:** If the 10 seconds response time on the lower speed ranges (100 and 300 RPM) is too slow, it is recommended to increase the number of target points on the rotating surface. This results in a multiplication and hence a higher RPM range when a faster response time is required.

## Operational Diagrams

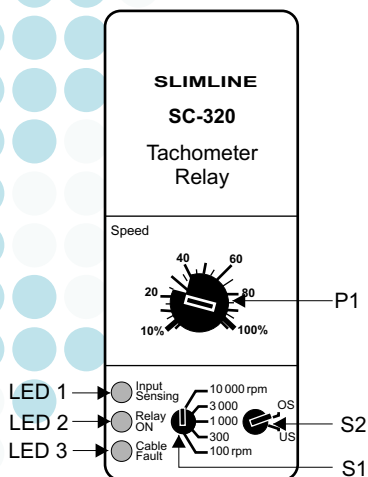
Overspeed Sensing



Underspeed Sensing



## Description of Controls



**P1: The Over-speed / Under-speed Threshold** is adjusted on P1. Maximum setting of 100% corresponds with the speed selected on S1.

**S1: The Speed Range** is set on S1.

**S2: The Mode of Operation** is set on S2. If set to "OS" the unit operates as an over-speed detector. If set to "US" the unit provides under-speed detection.

**LED 1: The LED marked "Input Sensing"** illuminates when the NAMUR sensor detects a target. It also illuminates if the sensor is disconnected or the sensor leads are severed (open circuit).

**LED 2: The LED marked "Relay ON"** illuminates when the relay is energised.

**LED 3: The LED marked "Cable Fault"** illuminates when:  
 - a short circuit occurs the sensor leads, or,  
 - an open-circuit fault occurs on the sensor leads or the sensor is disconnected.

**Note:** An **open circuit** condition will cause both LED1 as well as LED3 to illuminate. A **short circuit** condition will cause only LED3 to illuminate.

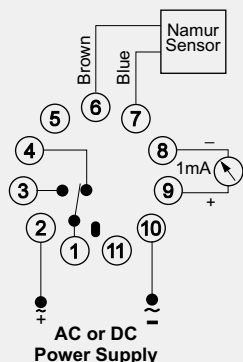
## Wiring and Connection

Power Supply	
Phase/Positive	2
Neutral/Negative	10

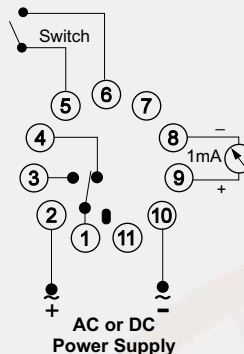
Relay Contacts	
Normally open	1+3
Normally closed	1+4

Sensing Input	
NAMUR sensor input:	Connect brown wire to the pin 6. Connect the blue wire to pin 7.
Limit switch input:	Connect the switch between pin 5 and pin 6.

Analogue Output	
Connect the tachometer instrument to pin 9(+) and pin8 (-), observing polarity.	



**APPLICATION 1**  
NAMUR sensor input



**APPLICATION 2**  
Limit switch input

## Technical Specifications

Power Supply	
AC:	Supply voltage: 12, 24, 110, 230, 400, 415, 525V ±15% Isolation (sensor input to power supply): 2kV Power consumption: 3VA (approx.) 6VA for 415, 525V (approx.)
DC:	Supply voltage: 10-30V, 48, 60, 110V ±15% Isolation: no galvanic isolation Power consumption: 100mA (10-30V) 30mA for higher ranges.

Sensor Input	
Type: NAMUR (DIN 19234) Short Circuit Current: 20mA DC Open Circuit Voltage: 8.2V DC Hysteresis: 10% (fixed)	

Speed Range	Approximate Response time
10-100 RPM	10 seconds
30-300 RPM	10 seconds
100-1 000 RPM	1 second
300-3 000 RPM	1 second
1000- 10 000 RPM	1 second

Repeatability: 1%  
 Start-up delay: approximately 10 seconds  
 (Available 0-15 seconds on special order)  
 Analogue output: 0-1mA DC (proportional).  
 (0-20mA or 4-20mA available as an order option)  
 Maximum load: 7k Ohm  
 Accuracy: 5% of full scale