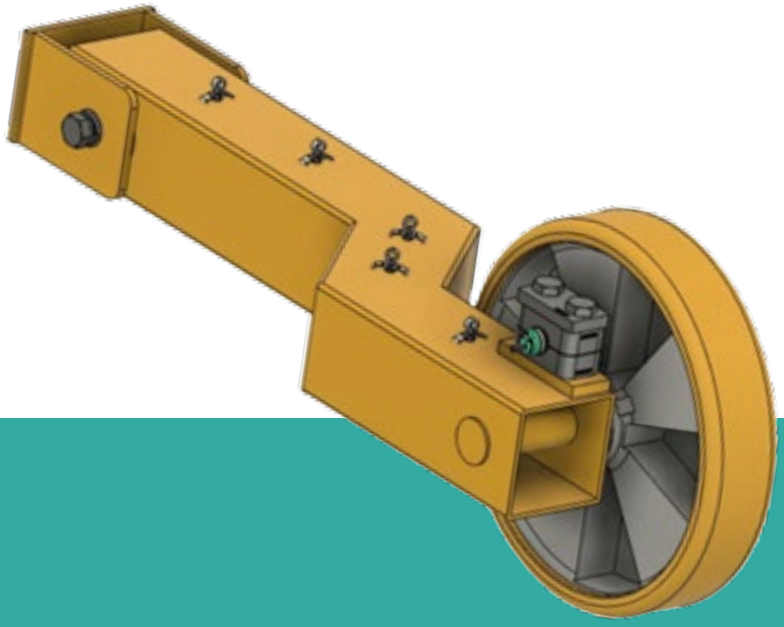
Instrowest Speed Sensor Operation Manual &

Data Specifications



HOW MUCH ARE YOUR INSTRUMENTS COSTING YOU?

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Legal Information

Warning notice system

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

⚠ DANGER
indicates that death or severe personal injury will result if proper precautions are not taken.

⚠ WARNING
indicates that death or severe personal injury may result if proper precautions are not taken.

⚠ CAUTION
indicates that minor personal injury can result if proper precautions are not taken.

NOTICE
indicates that property damage can result if proper precautions are not taken.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The product/system described in this documentation may be operated only by personnel qualified for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, can identify risks and avoiding potential hazards when working with these products/systems.

Proper use of Instrowest products

Note the following:

⚠ WARNING
Instrowest products may only be used for the applications described in the relevant technical documentation. If products and components from other manufacturers are used, these must be recommended or approved by Instrowest. Proper transport, storage, installation, assembly, commissioning, operation and maintenance are required to ensure that the products operate safely and without any problems. The permissible ambient conditions must be complied with. The information in the relevant documentation must be observed.

Trademarks

All names identified by ® are registered trademarks of Instrowest or the manufacturers they apply to. The remaining trademarks in this publication may be trademarks whose use by third parties for their own purposes could violate the rights of the owner.

Disclaimer of Liability

We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

Introduction

Welcome to the user manual for the Instrowest Speed Sensor. This document provides detailed information on the installation, operation, and maintenance of the Speed Sensor to ensure optimal performance and longevity.

Description

The Instrowest Speed Sensor is a compact, low-profile, wheel-driven return belt speed sensor. The sensor wheel rotates on a shaft fixed to the trailing arm, and an externally mounted proximity switch detects the rotation of the wheel, generating a signal proportional to belt speed. This output signal is transmitted via cable connection to the integrator to determine the rate of conveyed material.

Operating on the principle of a proximity switch, the sensor generates pulses upon detecting metal on a rotating drum or wheel. By calculating the number of pulses per revolution and knowing the circumference of the drum or wheel, the linear speed at the circumference can be determined over a selected time base.

Key Formula:

$$\text{Belt speed} = \left(\frac{\text{Number of pulses counted}}{\text{pulses per revolution}}\right) \times \text{Wheel circumference (m)} \times \frac{1}{\text{Time (s)}}$$

Specifications:

- Pulses per revolution = 5
- 0.25m wheel circumference = 0.7854 meters

Example Calculation:
If 600 pulses are counted over one minute:

$$\left(\frac{600 \text{ pulses}}{5 \text{ pulses per rev}}\right) \times 0.7854 \text{ m} \times \frac{1}{60 \text{ s}} = 1.5168 \text{ m/s}$$

The wheel and proximity switch are mounted on an offset swing arm, which pivots at the connection to the mounting bracket.

Mounting

The Instrowest Speed Sensor is designed to monitor the return belt speed and should be mounted between the send and return of the belt in a trailing direction.

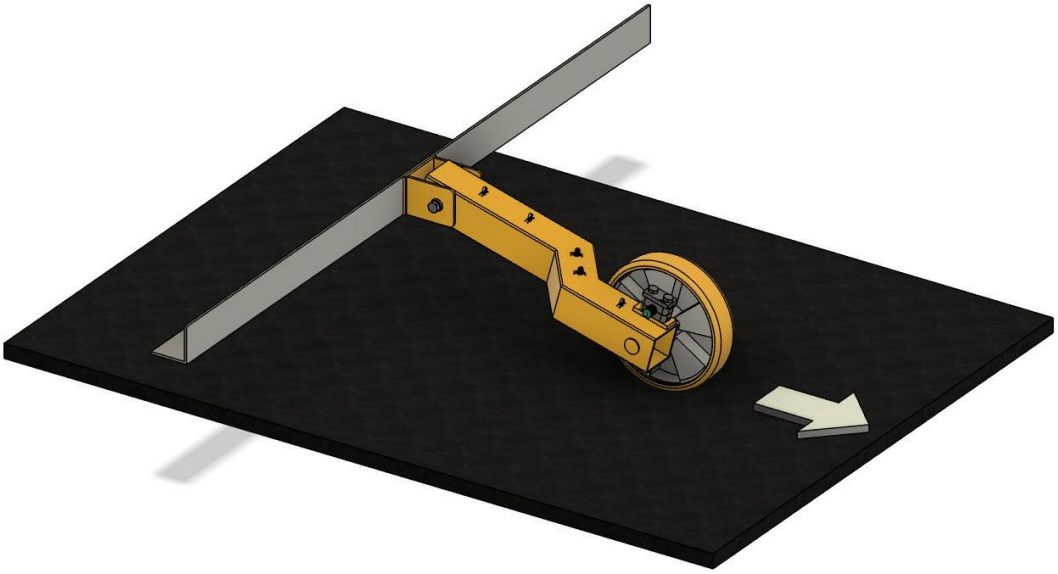


Figure 1. Instrowest Speed Sensor installed. Arrow depicting the belt travel direction of the return belt

Installation Steps:

1. Remove the Mounting Bracket:
    - Detach the mounting bracket from the sensor arm by removing the two arm retaining bolts located on each side of the bracket.

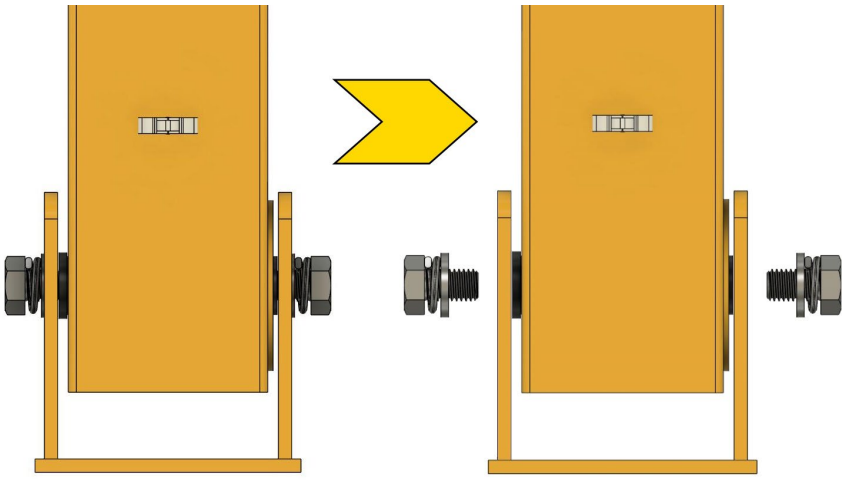


Figure 2. Removal of bracket from sensor arm

2. Mount the Bracket:
    - Secure the mounting bracket in the centreline of the conveyor frame using user-sourced M12 fasteners on a user-supplied spreader or existing idler frame.

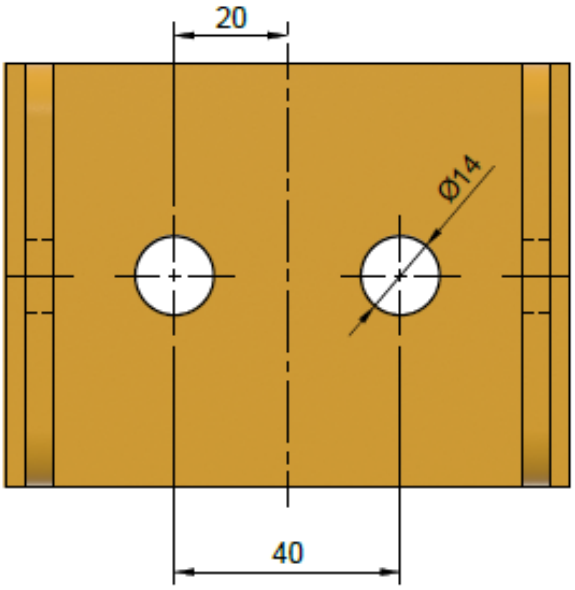


Figure 3. Dimensions of mounting bracket to fix to conveyor cross-member or idler frame (not to weigh frame)

3. Reattach the Sensor Arm:
    - Once the mounting bracket is secured, reattach the sensor arm to the bracket using the two sensor retaining bolts removed earlier.

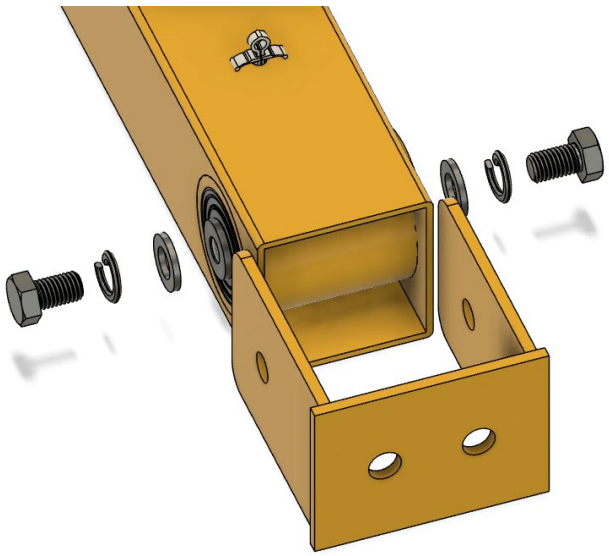


Figure 4. Re-attachment of the sensor arm to mounting bracket

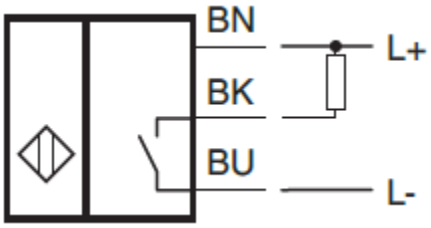
Wiring Diagram/Connections

NOTE
All wiring must be done in conjunction with approved conduit, boxes, and fittings and to procedures in accordance with all governing regulations.

Ensure that there is sufficient slack in the cabling to allow the sensor arm to pivot freely so the wheel rides on the belt. Restriction of the arm can cause slippage or excessive contact between the belt and the wheel.

The wiring diagram for the speed sensor is determined by the type of Pepperl & Fuchs® M18 barrel inductive sensor selected for the speed sensor in service.
The three sensor types available are:

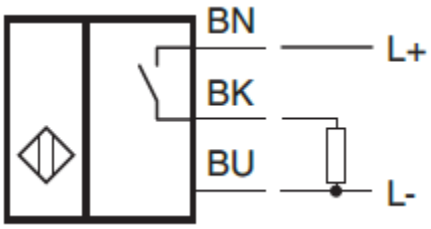
- Pepperl + Fuchs NBN12-18GM50-E0; 3-wire, NO, NPN, 0-9.72mm, 5-36 V, 0-1300Hz



Instrowest Speed Sensor – NPN	Integrator
Brown	Excitation (+15 V DC)
Black	Signal
Blue	Common

⚠ WARNING
Pepperl + Fuchs NBN12-18GM50-E0 cannot be installed within a hazardous area

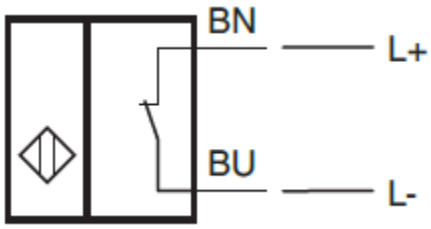
- Pepperl + Fuchs NBN12-18GM50-E2; 3-wire, NO, PNP, 0-9.72mm, 5-36 V, 0-1300Hz



Instrowest Speed Sensor – PNP	Integrator
Brown	Excitation (+15 V DC)
Black	Signal
Blue	Common

⚠ WARNING
Pepperl + Fuchs NBN12-18GM50-E2 cannot be installed within a hazardous area

- Pepperl + Fuchs NCBS-18GM70-NO; 2-wire, NAMUR, 0-4.05mm, 8.2 V, 0-1000Hz



Instrowest Speed Sensor – Namur	Integrator
Brown	Signal
Blue	Common

⚠ WARNING
Ensure when using a Namur inductive sensor within a hazardous area that all hazardous area compliances and standards referenced and adhered to.

NOTICE
Pepperl + Fuchs NCBS-18GM70-NO may require a switch amplifier to work with certain weighing integrators

Calibration

The Instrowest Speed Sensor does not require calibration however refer to the installed weightometer integrator manual for completing a speed adjustment.

Maintenance

Routine maintenance ensures the longevity and proper function of the Instrowest Speed Sensor. Key components to monitor include the wheel, bearings and the proximity switch.

Wheel Maintenance

- Ensure the wheel is free of debris and rotates smoothly. Replace the wheel if worn or damaged.

Bearing Maintenance

- The bearings come greased
- Periodic greasing of the bearings is recommended to ensure longevity. A grease nipple is supplied and installed on the wheel axle. Holes in the axle will release grease into the wheel bearings.
- AS2 Shell Alvania S2 Grease or equivalent can be used

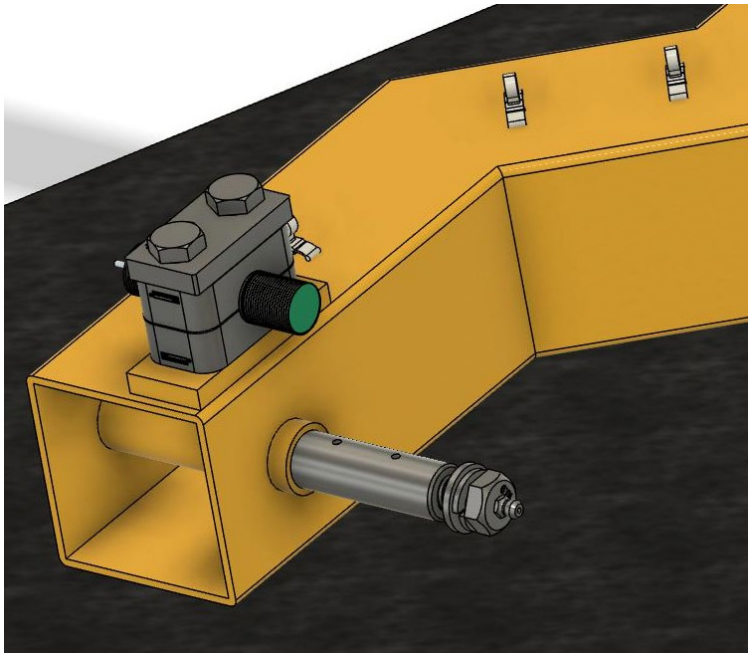


Figure 5. Wheel axle showing grease nipple location

Proximity Switch Replacement

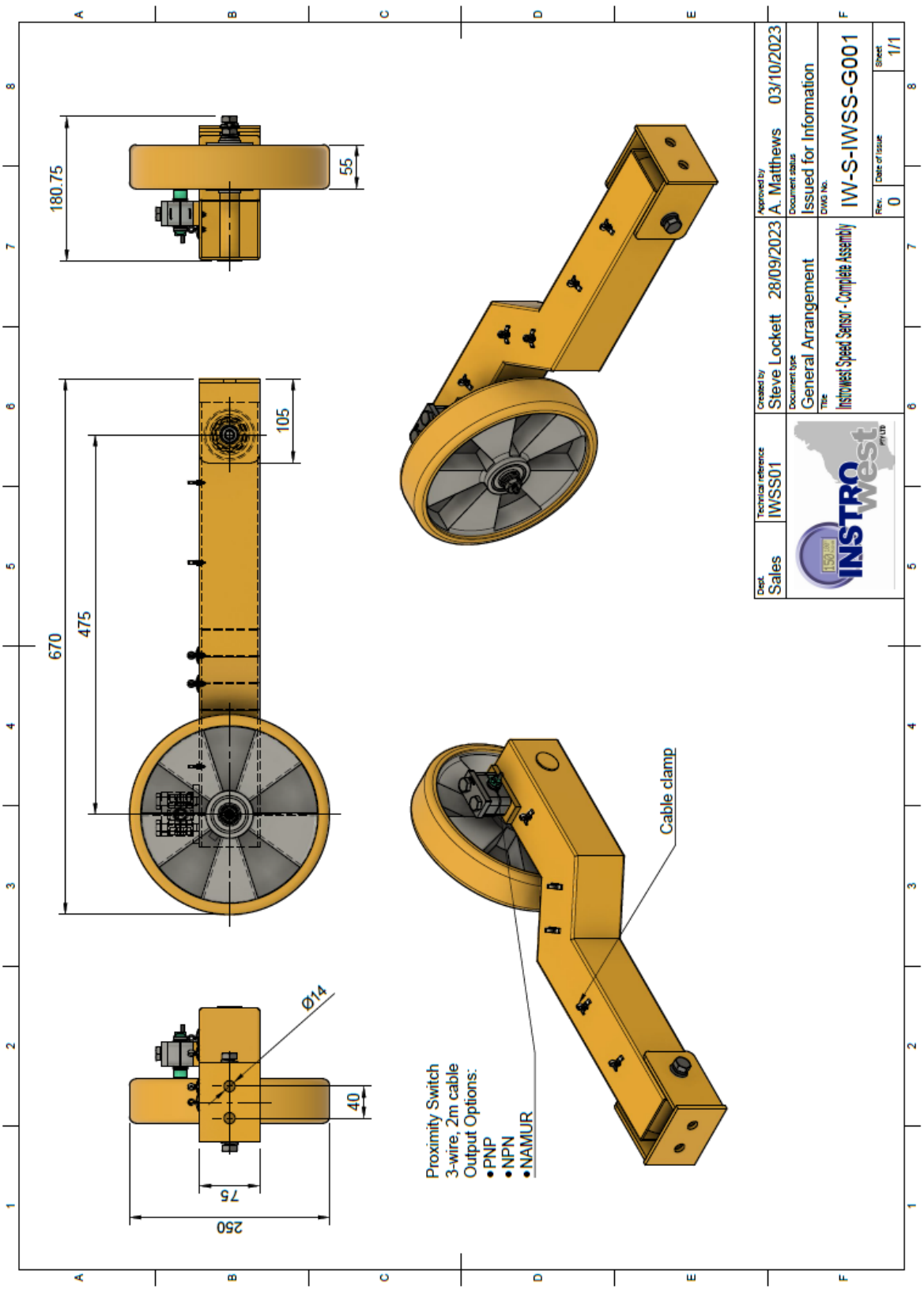
- Follow the wiring diagram specific to your sensor type for disconnection and reconnection.
- Replace the proximity switch if it fails to generate pulses, shows inconsistent readings or the cable is damaged

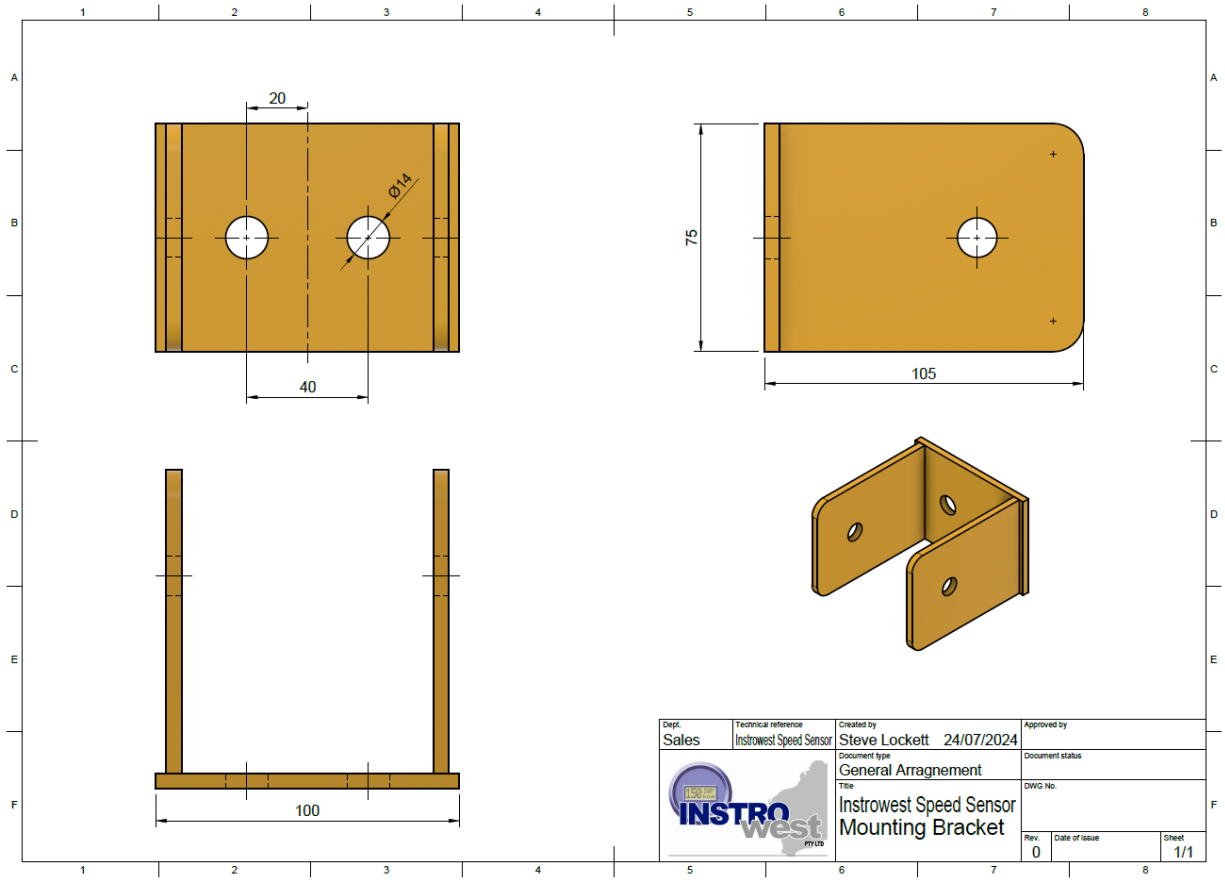
Technical Specifications

Power	NPN & PNP • 5 to 35V DC NAMUR • 8.2V DC
Operating Temperature (Ambient)	NPN & PNP • -40 to 85 °C (-40 to 185 °F) NAMUR • -25 to 100 °C (-13 to 212 °F)
Input	• Bi-directional shaft rotation • 10 to 350 RPM (0.26 to 9.16 m/s)
Output	• Inductive proximity sensor • NPN, PNP or Namur • 5 pulses per revolution • 6.592 pulses/meter
Construction	
Trailing Arm Assembly	Powder Coated Mild Steel
Bearings	NSK Deep Groove Radial Ball Bearings
Induction Sensor and Cable	See data sheets of individual proximity sensors
Approvals	See data sheets of individual proximity sensors

NOTICE
The Instrowest Speed Sensor is to be used only in the manner outlined in this operating instructions or protection provided by the equipment may be impaired.

Dimension Drawings

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Sales
Technical reference
Instrowest Speed Sensor
Created by
Steve Lockett 24/07/2024
Approved by
Document type
General Arragnement
Document status
Title
Instrowest Speed Sensor
Mounting Bracket
DWG No.
Rev.
0
Date of issue
Sheet
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Datasheets

Electronic copies of the proximity sensor data sheets can be found at the following locations;

NPN Inductive Sensor NBN12-18GM50-E0

PNP Inductive Sensor NBN12-18GM50-E2

Namur Inductive Sensor NCB5-18GM70-N0

Technical Support

If this documentation does not completely answer your technical questions, contact an Instrowest representative on 08 95009120 or email sales@instrowest.com.au

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East Rockingham, WA
Australia, 6168