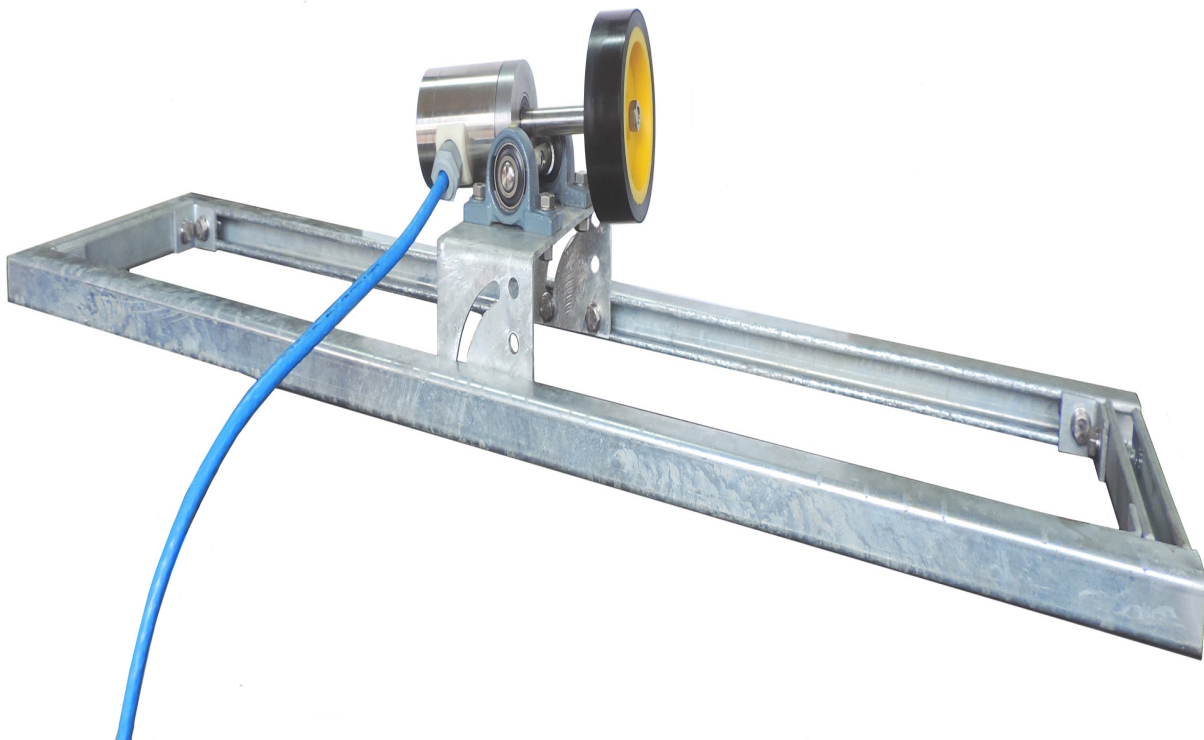


**Scanbelt Speed Switch Universal  
c/w Proxy  
BSD3000**



**Table of Contents**

**Overview**

**Features and Benefits**

**Hardware Specifications**

**Signal Descriptions**

**Functional Specifications**

**Wiring Diagrams**

**Device Configuration**

**User Interface**

**Terms and conditions**

**Contact Information**



## Scanbelt Speed Switch Universal c/w Proxy BSD3000

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### Overview

The iCBSM100 is a 24VDC powered controller capable of monitoring the speed of a conveyor belt. The instrument has been designed to provide many useful features required for such a device in today's industrial applications:

## Features and Benefits

- Supports 3 types of transducers i.e. Inductive proximity, Namur Proximity and Doppler Radar sensor.
- Supports various roller/idler diameters, quantity of “sensing points” and gear ratios.
- Dry contacts indicating the belt speed conditions i.e. Nominal Speed, Under Speed and Over Speed.
- Galvanic ally isolated 4-20mA speed output.
- Modbus RS485 interface
- Allows operating in “Master” or “Slave Mode”.
- LCD interface and 4 buttons facilitating user friendly interface
- Supports “External Start Input” when operating in Master Mode
- Configurable Speed Set-point.
- Configurable Trip Delay Time
- Configurable Over-speed and Under-speed Alarms.
- Configurable Start-Up time when operating in Master Mode

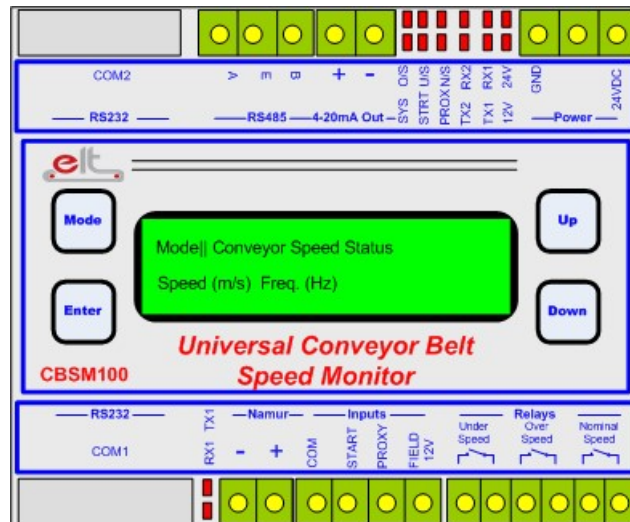


Figure 1 CBSM100



# Scanbelt Speed Switch Universal c/w Proxy BSD3000

## Hardware Specifications

Description	Specification
<b>Power</b>	
Supply Voltage	18-27 V DC
Supply Current	300mA
<b>Mechanical</b>	
Form Factor	Din Rail Mountable
Dimensions	105mm x 125mm x 60mm
<b>Environmental</b>	
Operating Temperature	0-60 Degrees Celsius
<b>User Interface</b>	
Keypad	4 Button Tactile Keypad
LED Indicators	System 12V Field Supply Voltage 24V Input Supply Under-speed Over-speed Nominal speed Start Input Modbus RTU port Receive Modbus RTU Port Transmit Doppler Radar Sensor Transmit Doppler Radar Sensor Receive
LCD	2 X16 Line Character
<b>I/O</b>	
Inputs	Optically Isolated inductive proximity sensor. 0.5 Hz – 100Hz. (0.1 m/s – 10m/s). Accuracy +/- 0.25 m/s Namur proximity sensor. (TBA) Doppler radar sensor. Supported Model DR500s
Outputs	Isolated 4-20mA current output @ 1.6mA per m/s. Accuracy +/- 5% Nominal Speed Voltage Free Relay Contact. Under-speed voltage Free Relay Contact Over-speed voltage free Relay Contact Relay Contact Rating (1A/125VAC – 2A 30V dc)
<b>Application Ports</b>	
Modbus RTU RS232 Port	Baud Rate: 9600 bps, 1 Stop Bit, 1 Start Bit, 8 Data Bits No Parity Bits
Modbus RTU RS485 Port	Baud Rate: 9600 bps, 1 Stop Bit, 1 Start Bit, 8 Data Bits No Parity Bits


Table 1 Hardware Specifications



**Scanbelt Speed Switch Universal  
c/w Proxy  
BSD3000**

**Signal Descriptions**

No	Signal Name	Signal Description
1	24V DC	Input 24VDC Power (+)
2	COM	Input 24VDC Power Common (-)
3	4-20mA +	4-20mA 12-32VDC Input
4	4-20mA -	4-20mA Current Output @ 12V-32VDC
5	RS485 A	RS485 Communications A Line
6	RS485 E	RS485 Communications Common
7	RS485 B	RS485 Communications B Line
8	COM 2	RS232 Common. Pin 2=TX 3=RX 5=COM
9	COM 1	RS232 Common. Pin 2=TX 3=RX 5=COM
10	Namur +	Namur Proximity Sensor +VE
11	Namur -	Namur Proximity Sensor -VE
12	COM	Isolated 12V Field Supply Common
13	Start	Optically Isolated Start Input 12-24VDC
14	Proxy	Inductive Proximity Sensor Signal Input 12-24VDC
15	FLD 12V	Isolated 12V Field Supply Voltage
16	Under Speed Relay	Voltage Free Under Speed Relay - NO. Closed=Fault OPEN=Healthy
17	Over Speed Relay	Voltage Free Under Speed Relay - NO. Closed = Fault. OPEN=Healthy
18	Nominal Speed Relay	Voltage Free Nominal Speed Relay -NO. Closed = On Speed. OPEN=Fault



The iCBSM100 is capable of operating in two modes i.e. Master and Slave depending on the application. In both of the above mentioned modes of operation, the instrument provides speed indication via the LCD as well as via the 4-20mA output and Modbus RTU interface.

### **Master Mode – Typical Application**

This mode allows the instrument to operate without the need for an intelligent host such as a Belt Controller or PLC.

After a 'Start' is received from a device as simple as a 'Motor Control Start Button', the instrument will activate the 'Nominal Speed' relay. If the 'Set Point' speed is not attained within the user configurable 'Startup Time', the 'Nominal Speed' relay will be de-activated indicating an under-speed fault.

If the 'Set Point' speed is attained within the 'Start Up' time, the 'nominal speed' relay will remain activated. The speed input will be monitored for 'under-speed' and over-speed conditions. The event resulting in the fault is captured via the 'over-speed' or 'under-speed' relays. The relevant relay remains energized until the next 'Start Input' is received. Speed information is available via the 4-20mA output, LCD and Modbus RTU interface.

Figure 2 Typical Application Master Mode

## Slave Mode – Typical Application

This mode allows the instrument to operate in conjunction with an intelligent device such as a PLC or Conveyor Belt Controller. In this mode of operation, the host controller controls the operation of the motor with the CBSM100 providing speed information only. During this mode of operation, the instrument operates as in the case of the Master Mode except the fact that the 'Start Input' is ignored and the 'Nominal Speed' relay output is not 'bypassed' during start up. The host controller should ignore the state of the 'nominal speed' relay output during the 'ramp up' towards the set-point speed. If the 'set-point' speed configured in the HOST CONTROLLER is not attained within the configured time set in the HOST CONTROLLER, the host should then take the appropriate control action.

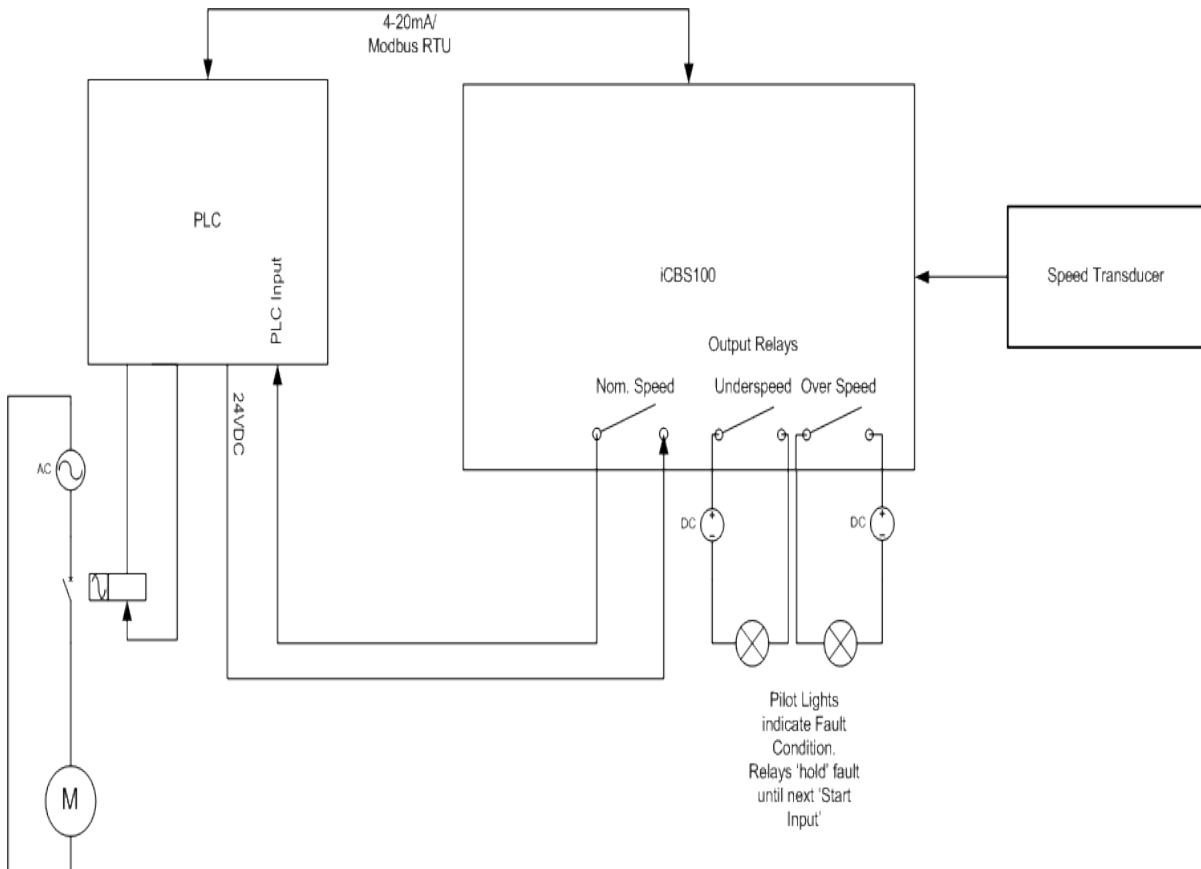


Figure 3 Typical Application Slave Mode

- **4-20mA outputs**

The isolated 4-20mA provides a current output proportional to the belt speed measured.

The following table provides illustrates the output characteristics of the device. The accuracy of the output is +-5% resulting in an accuracy of +/- 0.25 m/s.

<b>Item</b>	<b>Belt Speed (m/s)</b>	<b>Current Output(mA)</b>
1	0	4
2	1	5.6
3	2	7.2
4	3	8.8
5	4	10.4
6	5	12
7	6	13.6
8	7	15.2
9	8	16.8
10	9	18.4
10	10	20

Table 2. Current Output as function of Belt Speed

- **Modbus RTU Interface**

**Serial Port Settings**

**Baud Rate:** 9600  
**Data Bits :** 8  
**Start Bits :** 1  
**Stop Bits :** 1  
**Parity Bits:** None

Not released as at date of datasheet

## Wiring Diagram

### Sensor Type: Inductive Proximity Sensor

Isolated Configuration (recommended)

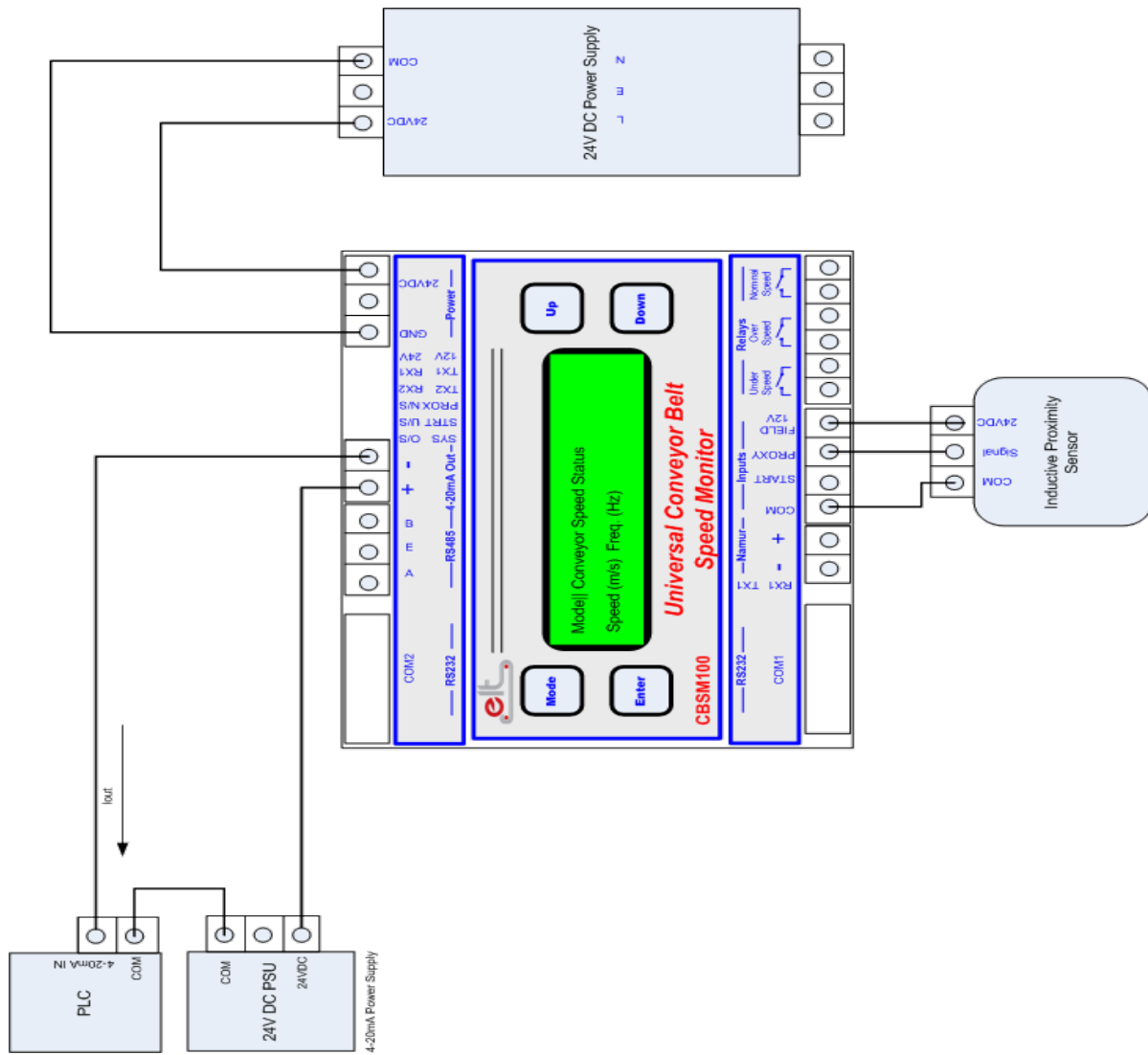


Figure 4. Unit configured in an isolated configuration.

## Device Configuration

The following parameters allow the CBSM100 to be configured for a wide variety of applications.

Parameter No	Parameter	Description	Range
1	Mode	Setups Master/Slave Mode (Slave Mode)	0-1
2	Sensor Type	Setup Inductive Proxy, Namur or Doppler (Inductive Proxy)	0-2
3	No. of Tabs	Configure number of 'Sensing Tabs' (4)	4-20
4	Gear Ratio	Ration of gear between sensing plate and Roller(1)	1-10
5	Roller Diameter	Diameter of Roller/Wheel/Idler on which speed is being measured, (400mm)	100-1000mm
6	Speed Set point	Desired speed set point (1 m/s)	0.5 m/s-10m/s
7	Trip Delay	Trip Time delay from the time the input speed drops below the Ref Speed (5 sec)	1-10s
8	Start Delay	Time from Start Signal being issued to belt to attaining Set point speed –applies to Master Mode only. (5 sec)	1-100s
9	Under Speed %	Range about the Set Point Speed. Trip below Set point - US%	10-20%
9	Over Speed %	Trip above Set point + OS%	10-20%

Table 3. Configurable Parameters

**User Interface**

The CBSM100 operates in either Running mode or Configuration Mode

**Running Mode**

In running mode, the LCD displays the following information

- Mode: Slave/Master Mode
- Speed Status: Nom (Nominal Speed)/Under Speed/Over Speed
- Speed (m/s): Belt Speed in m/s
- Frequency (Hz) Frequency of Input Speed Signal (Inductive Proximity only)

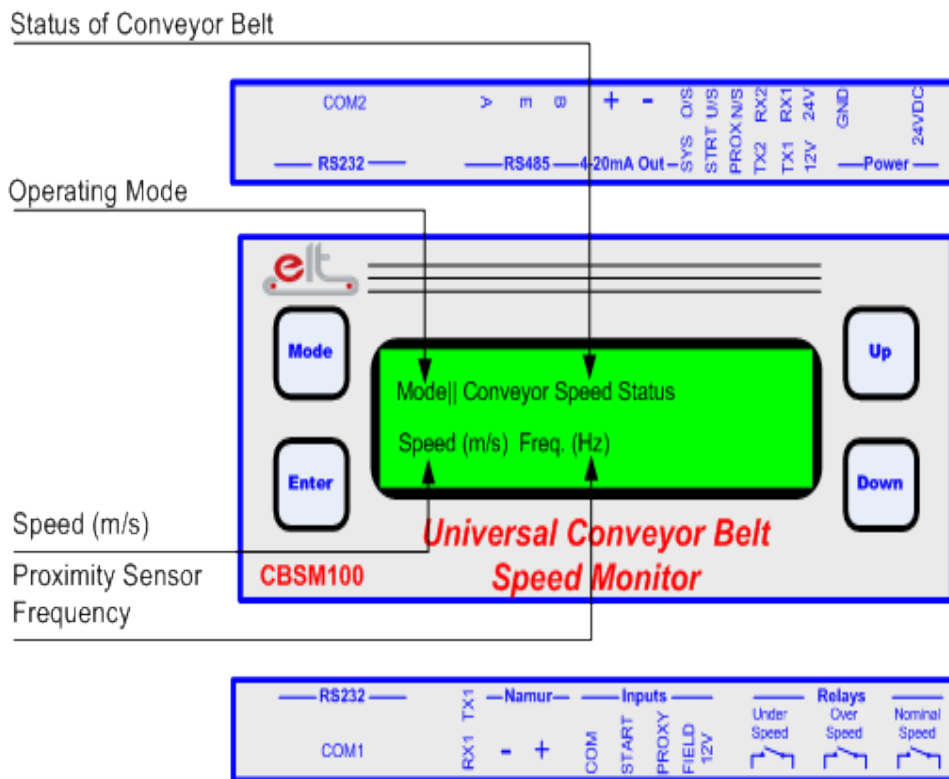


Figure 5. User Interface during Run Mode

## Configuration Mode

### Keypad Button definition



Multi Function Key. From Running Mode, a key press of more than 2 seconds allows access to the configuration mode.

In Configuration Mode, the key serves as a cancel button, returning the user to the previous menu. From the Main Menu, the user is returned to running mode



Allows user to modify parameter.



Allows user to modify parameter



Allows a modified parameter setting to be stored.



# Scanbelt Speed Switch Universal c/w Proxy BSD3000

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