

BELT WATCH

SOPHISTICATED 2-WIRE SYSTEM TO MONITOR CONVEYOR SAFETIES



APPLICATION

Pull Cord & Belt Sway Switches are installed along the conveyor to provide safety against malfunctioning.

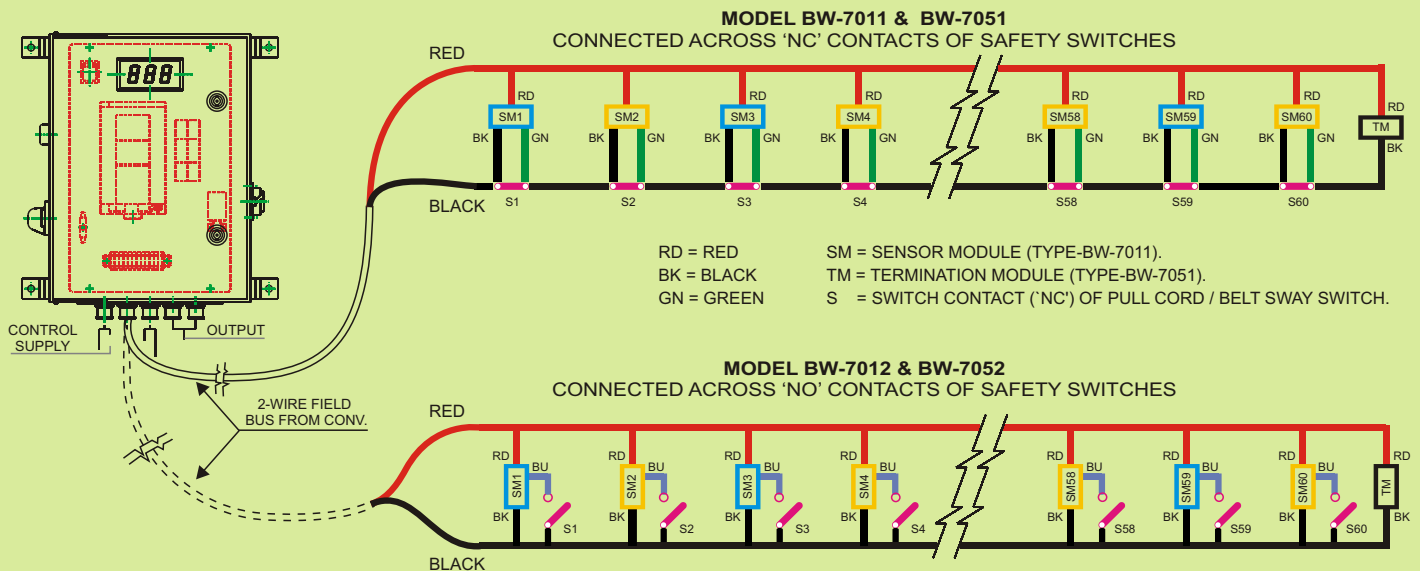
Modern complex bulk material conveying systems contain a large number of belts having considerable lengths, involving hundreds of safety switches. Checking out the actuated switch for rectifying and putting the system back into operation, therefore, becomes a long drawn out process resulting in huge production loss.

While some relief was provided by indicating flags or lamps fitted on the individual switches, it was imperative to provide an arrangement to enable the operator in the remote control room to know immediately the location of the "operated" switch.

So far, this was being achieved by providing the "Diode Plates" inside the switches to identify the location of the "operated" switch by audio-visual display in the control room with suitable control circuitry.

The biggest disadvantage of this system was the necessity to lay multi-core cable along the conveyor. More the number of switches, more was the number of diodes per switch & consequently more number of cores in the cable. The cost of such multi-core cable matched or even exceeded that of the safety switches themselves.

Jayashree has now introduced "BELT WATCH" - the sophisticated monitoring system that is simple, cost effective and most importantly - highly reliable.



SYSTEM KEY COMPONENTS

- A. MASTER CUM DISPLAY UNIT
- B. SENSOR MODULES
- C. TERMINATION MODULES
- D. CONTROL PANEL

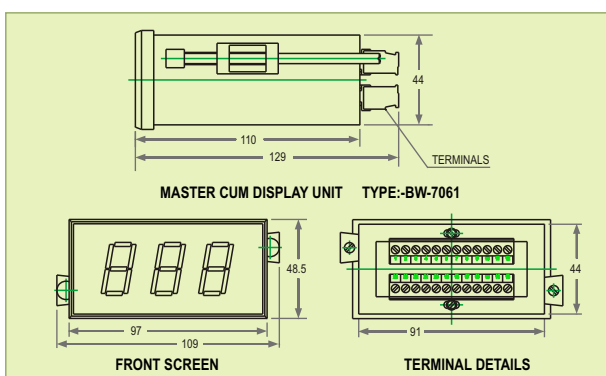
These components are designed in several varieties to meet different levels of sophistication that the customer may ask for.

A. MASTER CUM DISPLAY UNIT

Models **BW7061A- BW7061B**

FEATURES

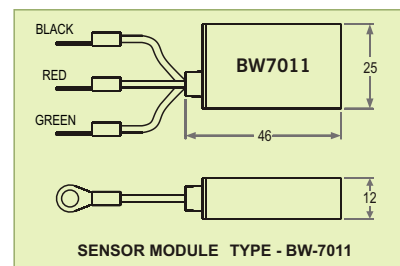
- ❖ Model BW7061A to communicate with Sensor modules BW7011 to provide standard arrangement for short conveyors having upto 60 NOS. of safety switches.
- ❖ Model BW7061B to combine with Sensor Modules BW7012 for monitoring upto 250 Nos. of safety switches on long conveyors.
- ❖ Highly compact enclosure suitable for flush mounting with an easy read "one inch, seven segment" display screen.
- ❖ "One per conveyor" structure.
- ❖ Built-in Trip contact
- ❖ Auto change over design to retain trip contact in action even in case of master failure.
- ❖ Various PC/PLC connectivities.
- ❖ Robust design to withstand aggressive environment and provide immunity against EMI/EMC interference.



B. SENSOR MODULES (NODES) BW7011& BW7012

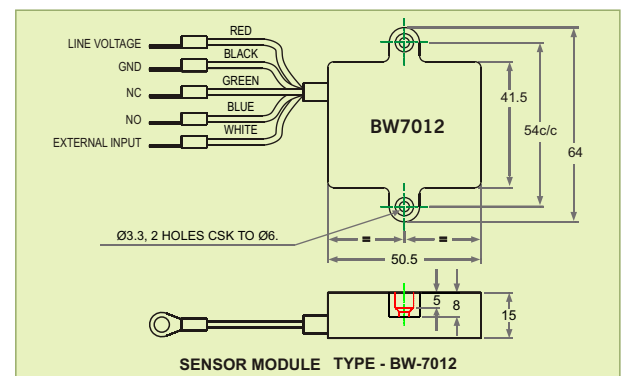
The modules have compact sleek epoxy potted polymer enclosures for easy accommodation inside the switch housing.

Model **BW7011**- To be connected across NC contacts of safety switches for providing remote position indication for short conveyors having upto 60 Nodes.



Model **BW7012**- An addressable module for connection across NO or NC contacts of safety switches and recommended for longer conveyors having upto 250 Nodes.

This model has added advantage of monitoring more than one conveyor with a common Master Cum Display unit if trip command is not required.



IMPORTANT FEATURE

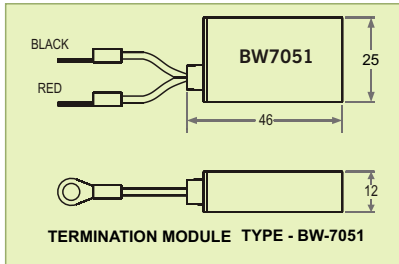
In case of total failure of the Master Unit, the two wire bus interconnecting the modules can be diverted to PLC so that the safety tripping of the conveyor is ensured thereby allowing the handling system to continue operation.

This redundancy is a very valuable feature preventing production loss by allowing continued safe operation of the bulk material conveyor installation in spite of electronic component failure.

C. TERMINATION MODULES

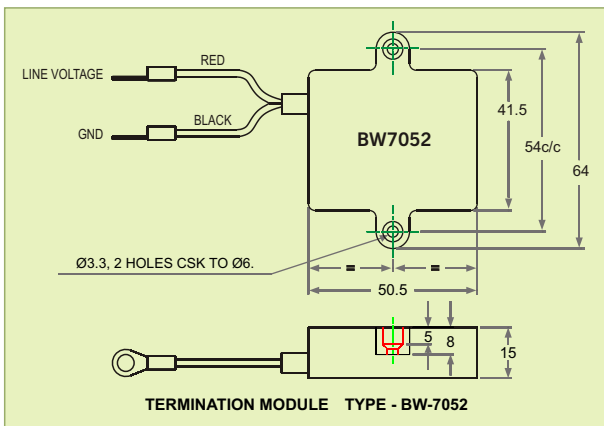
Models **BW7051** & **BW7052**

Model **BW7051** is to be used in conjunction with Sensor Modules BW 7011.



Model **BW7052** is to be used in conjunction with Sensor Modules 7012.

These modules are connected in the two wire control bus just after the last safety switch, as shown in the schematic diagram.



D. CONTROL PANEL

The Control Panel has sheet metal enclosure to accommodate the Master Cum Display Unit together with auxiliary switchgear to provide a stand alone Belt Watch system for remote position indication.

As per the user's choice, the panel can have following executions.

- ❖ Panel in bracket mounting sheet metal enclosure to IP 55 grade of protection to monitor a single conveyor. This is installed at the head of the conveyor.
- ❖ Panel in Bracket/Floor mounted sheet metal enclosure to IP55 grade of protection to monitor a group of conveyors. This may be installed in a location suitable for the group.
- ❖ Floor mounted central control panel in sheet metal enclosure to IP31 grade of protection to monitor all the conveyors of the material handling installation. This is to be located in the central operator control room.

OPERATION

The Master cum Display Unit is incorporated in a control panel together with power supply & other auxiliary switchgear. The control panel is located either at the head of the conveyor or in the conveyor control room.

The appropriate models of Sensor Modules are inserted one in each Pull Cord and/or Belt Sway Switch along the conveyor and connected across NC or NO contacts of the safety switch as per system design specifications.

The Sensor Modules are inter connected with the Master Cum Display Unit in the control panel through a two core armoured control cable with copper conductor.

For short distances the conductor size can be 1.5 sq.mm. whereas for longer conveyors having more than 500 metre length the preferred size is 2.5 sq.mm.

The Termination Module is located just after the last switch of the conveyor and connected as shown in the typical schematic diagram.

A typical schematic control circuit layout is an illustration of the principle of operation. The Master Cum Display Unit and the Sensor & Termination modules operate on 24V DC supply.

An auxiliary Power Supply Unit is used in the control panel to accept an input supply voltage of 110/240 V, single phase-50Hz and provide 24 V DC output for Master Cum Display Unit and Sensor Modules.

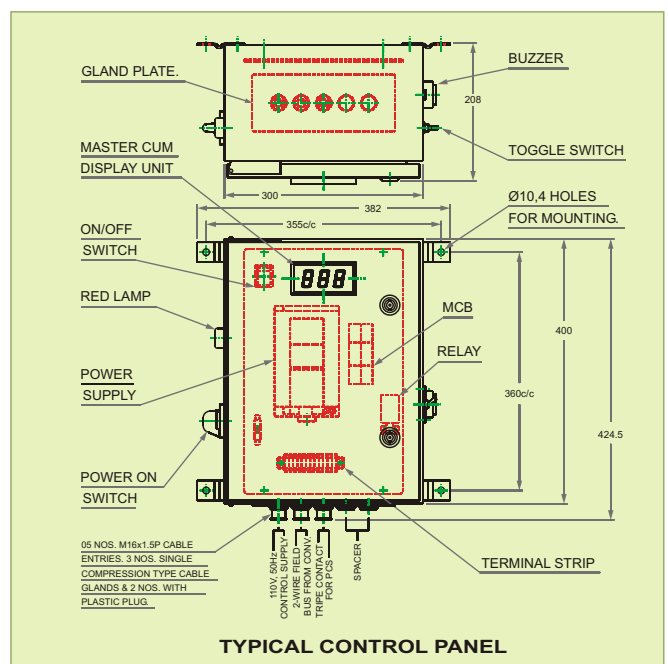
The Master Cum Display Unit communicates with the Sensor Modules and detects the position of the operated switch and shows the position No. on- "1 inch seven segment" display screen. The Master Unit also displays the positions in cyclic manner if more than one switch are actuated. The Master Unit also detects and displays open circuit or short circuit in the two wire control bus and issues "All Healthy" signal as & when no switch is actuated.

The Master also provides a potential free trip contact to serve as tripping command for the conventional electromechanical control system.

Connectivity with PLC and/or PC is also provided.

The above describes the standard Belt Watch System as applied to a given conveyor.

In practice, the system design is optimized for each installation, to provide maximum operational flexibility & reliability.



CONFIGURATION

The system can be offered in three basic configurations :

1. A Control Panel for each conveyor, incorporating the Master Cum Display Unit, Power Supply, and other auxiliary switchgear. This is designed for installing at the head of the conveyor.
2. A Control Panel as above however suitable for monitoring a group of conveyors. This is to be installed at a convenient location to suit site supervision.
3. A Central Control Panel to monitor the safety switches on all the conveyors of a material handling installation. This is installed in the main control room.



A special software (E Switch) is available for PC connectivity with the control panel. This software enables the PC to display the operated switch status and history. More details of this software are available on request.

For all the above configurations the Sensor Modules are to be placed one in each safety switch and the Termination Module at the end of each 2-core control cable.

A single master cum display unit with a single two core control cable is adequate for connecting all the safety switches (Pull Cord as well as Belt Sway Switches) of a given conveyor if position indication or indication as well as tripping command on actuation of either type of safety switch is desired.

However, if separate tripping commands for Pull Cord Switch and Belt Sway switch are desired, two Master Units and two control cables per conveyor are a must. In this case the system cost practically doubles.



ORDERING INFORMATION

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| <ul style="list-style-type: none"> ● No. & Lengths of conveyors. ● No. of Pull Cord & Belt Sway Switches per conveyor. ● Configuration <ul style="list-style-type: none"> a. One panel per conveyor Or b. One panel per group of conveyors. Or c. Central control panel for entire installation. ● Operation <ul style="list-style-type: none"> a. Display b. Display with common trip command for Pull Cord & Belt Sway switches c. Display with separate trip commands for Pull Cord & Belt Sway switches | <ul style="list-style-type: none"> ● Connectivity <ul style="list-style-type: none"> a. To PLC with Choice of Mod Bus protocol b. To PC with E Switch software for display & record. ● Parallel outputs <ul style="list-style-type: none"> a. Potential free contact for conventional electromechanical System b. Binary O/P c. 4-20 mA O/P ● Control Supply <ul style="list-style-type: none"> a. 110V-50 Hz Or b. 240 V- 50 Hz Or c. Any other |
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Belt-1000-05-08

BELT WATCH

Latest addition to family Model BW 7061DU Dual channel Master-Cum-Display Unit



Features :

- Provides two channels per conveyor
One for sensing all Pull Cord Switches
Other for sensing all Belt Sway Switches
- Communicates with upto 60 Nos. of Sensor Modules Type BW 7011 per channel.
- Distinct display of Pull Cord & belt Sway Switches on the common window.
- Compact 96x72 enclosure for flush mounting on panel door providing 1"-seven segment display.
- Separate trip contacts for Pull Cord & Belt Sway Switches.
- Auto changeover design to retain trip contacts in action even in case of Master failure.
- Various PLC/PC connectivities.
- Robust design to withstand aggressive environment and provide immunity against EMI/EMC interference.

