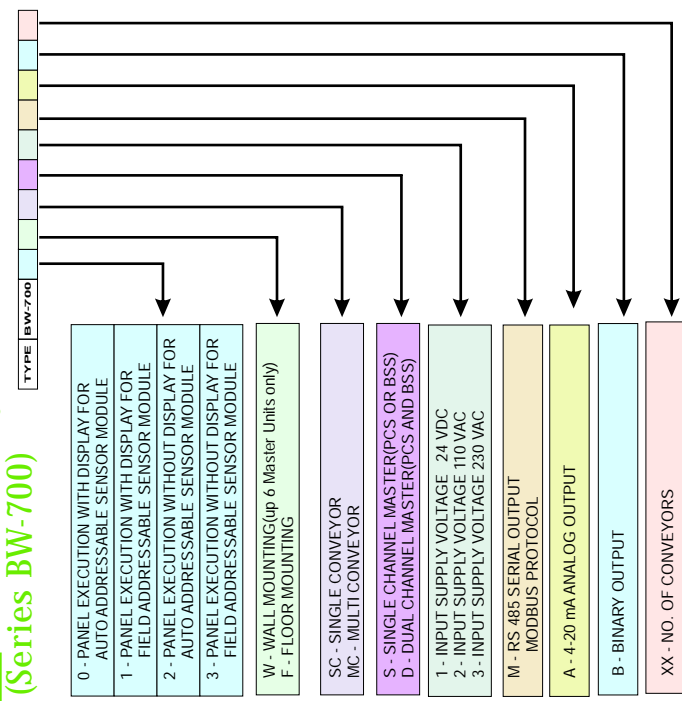


ORDERING INFORMATION

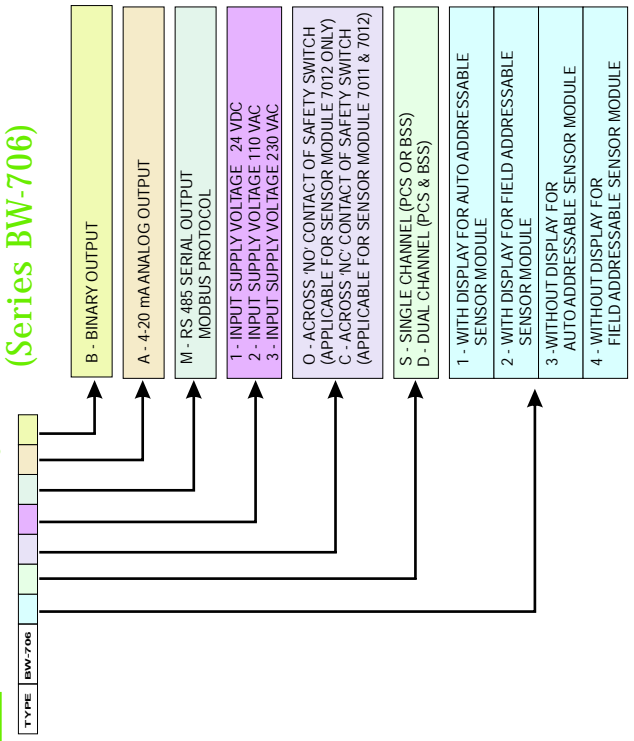
EXECUTION I

A1] BELT WATCH System With Panel (Series BW-700)



EXECUTION II

A2] BELT WATCH System Without Panel (Series BW-706)



A1] BW7000WMD3MA-O4
 Belt Watch System in wall mounted panel for multiconveyors (4 nos) using Dual Channel Master Unit Flush mounted in & optimally designed Control Panel Complete with Power Supply & other Auxiliary Switch Gear in Pre-wired Ready to install in input supply 240 VAC, Output MODBUS (RS 485) & 4-20 mA.

B] BW7011C
 Auto addressable Sensor Module - Wired Across "NC" Contact

C] BW7051
 Termination module for auto addressable Sensor Module

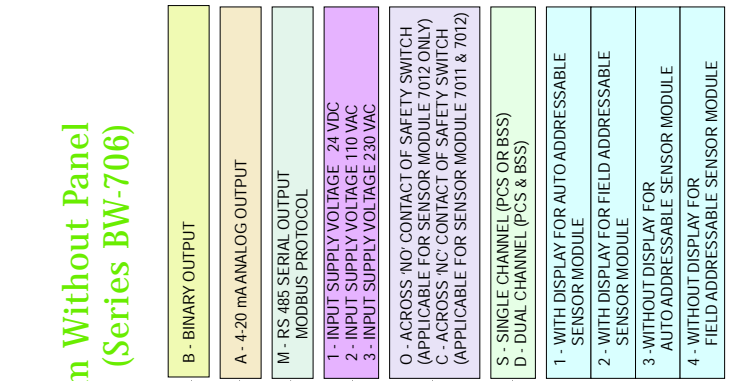
B] Belt Watch Sensor Module Series BW-701
 1 - AUTO ADDRESSABLE ONLY "C" OPTION
 2 - FIELD ADDRESSABLE
 O - ACROSS NO CONTACT OF SAFETY SWITCH (FOR FIELD ADDRESSABLE SENSOR MODULE)
 C - ACROSS NC CONTACT OF SAFETY SWITCH (FOR FIELD ADDRESSABLE SENSOR MODULE)

C] Belt Watch Termination Module Series BW-705
 TO BE USED WITH "NC" CONFIGURATION OF SAFETY SWITCH.
 1 - FOR AUTO ADDRESSABLE
 2 - FOR FIELD ADDRESSABLE
 3 - SENSOR MODULE

Example : EXECUTION II - A2 + B + C
A2] BW7063SC1B
 Belt Watch System using Single Channel Master Unit with input supply 24 VDC, Output Binary.

B] BW70120
 Field addressable Sensor Module wired across "NO" Contact

C] Not Required

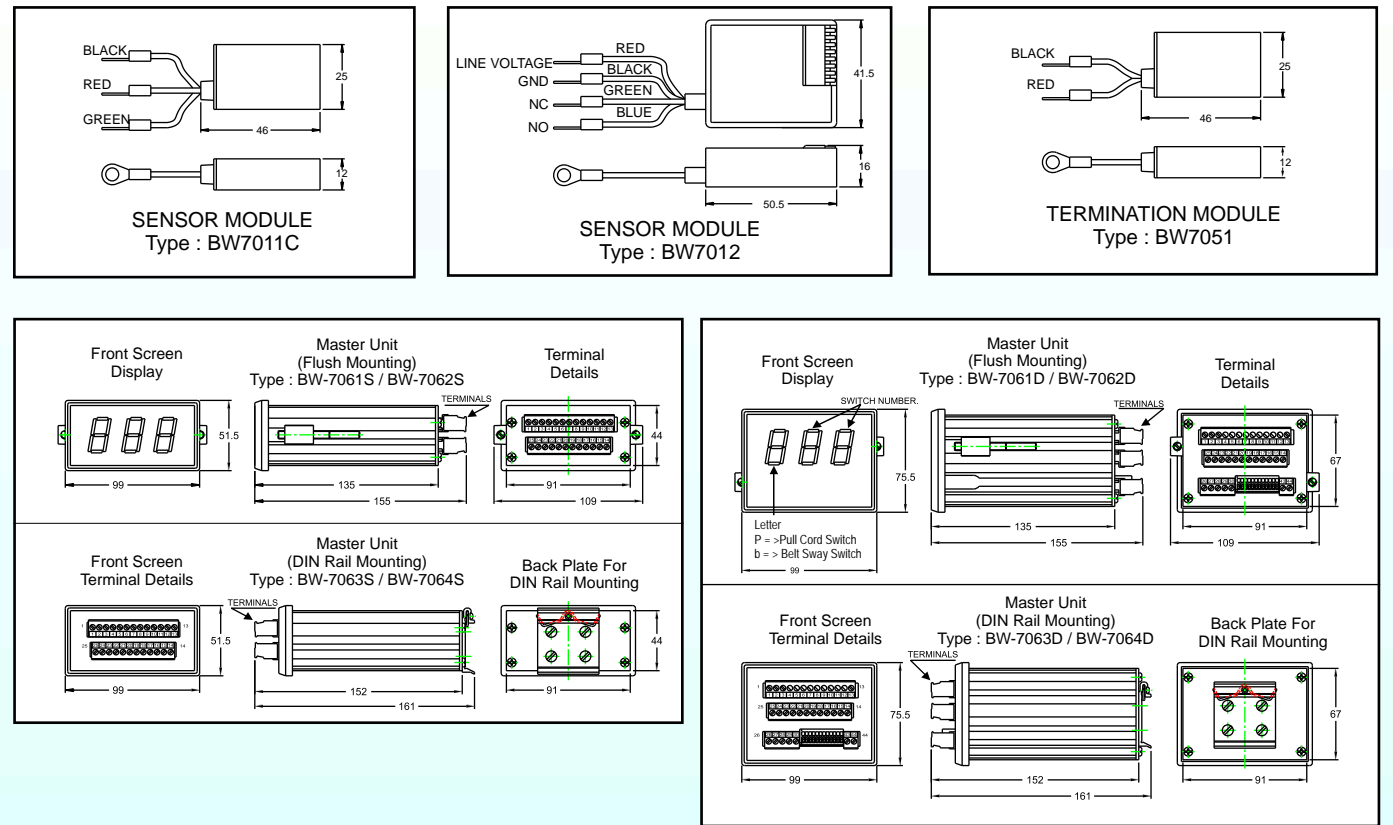


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Line Diagrams for the components



Note : The Panels are individually designed to meet the requirements of each installation, hence the dimensions will vary from case to case.

*In our search for excellence
 there is no finishing line.
 We are committed to all round
 development with focus on*

Quality Reliability Integrity



जयश्री

BELT WATCH

MICROPROCESSOR BASED 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.

BELT WATCH now offers an elegant solution to assist the operating personnel in pinpointing the operated switch / switches and also to initiate appropriate warning / tripping command to minimize the risk to personnel & equipment on one hand and to reduce the down time on the other.

SYSTEM KEY COMPONENTS

- A. MASTER UNIT
- B. SENSOR MODULES
- C. TERMINATION MODULES
- D. CONTROL PANEL (Optional)
- E. WINDOWS BASED SOFTWARE (Optional)

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

A. MASTER UNIT SERIES BW-706

i) SINGLE CHANNEL

- For indication of all PCS and/or all BSS in series using 2 core cable
- Highly compact enclosure size 96 X 48 X 160 mm
- Available either in Flush mounting with Display Screen or in Din Rail mounting without Display
- "1 inch Seven Segment Display" for easy read out.
- Input power supply 24VDC
- Power consumption 20 VA maximum.
- Built in Potential free Trip Contact.
- "One per Conveyor" structure.
- Auto change over design to retain Trip contact in action in case of Master Unit Failure.
- Various PLC connectivities available on request
 - s RS485 MODBUS serial communication
 - s Binary output
 - s 4-20mA (analog output)- 0.25mA per operated switch



ii) DUAL CHANNEL

- For indication of all PCS in one loop and all BSS in other loop using two nos 2 core cables
- Separate trip contacts for Pull Cord and Belt Sway Switches.
- Highly compact enclosure size 96 X 72 X 160 mm
- All other features remain as above

B. SENSOR MODULE SERIES BW - 701

i) AUTO ADDRESSABLE SENSOR MODULE (Model BW7011)

- Epoxy potted in compact sleek polymer enclosure size 40 X 25 X 12 mm
- Can be accommodated any where inside the safety switch
- Suitable for conveyors up to 1 KM length
- Connected across 'NC' contact of safety switch
- Maximum 60 switches in series per channel per conveyor



ii) FIELD ADDRESSABLE SENSOR MODULE (Model BW7012)

- Epoxy potted in compact sleek polymer enclosure size 50 X 42 X 15 mm
- Can be accommodated any where inside the safety switch
- Detects 'Missing sensor / switch' once installed
- Suitable for long conveyors
- Connected across 'NO' or 'NC' contact of the safety switch as per design specs.
- Maximum 250 switches per channel per conveyor



C. TERMINATION MODULE SERIES BW-705

- To be inserted in last switch of each loop of safety switch
- For 'NC' configuration of safety switch
- Epoxy potted in compact sleek polymer enclosure size 40 X 25 X 12 mm
- Can be accommodated any where inside the safety switch



D. Control Panel (Optional)

The Control Panel in sheet metal enclosure accommodates the Master Units together with auxiliary switchgear to provide a stand alone pre-wired Belt Watch system for remote position indication.

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

i) FOR SINGLE CONVEYOR

- Panel in Bracket mounting sheet metal enclosure
- Grade of Protection – IP55
- To monitor single conveyor
- Can be located at Head end of conveyor or Control room

ii) FOR A GROUP OF CONVEYORS

- Panel in Bracket mounted(up to 6 master units) or Floor mounted(for any no of master units) sheet metal enclosure
- Grade of Protection – IP31
- To monitor group of conveyors
- This may be installed at location suitable for the group of conveyors

iii) CENTRAL CONTROL PANEL FOR ENTIRE INSTALLATION

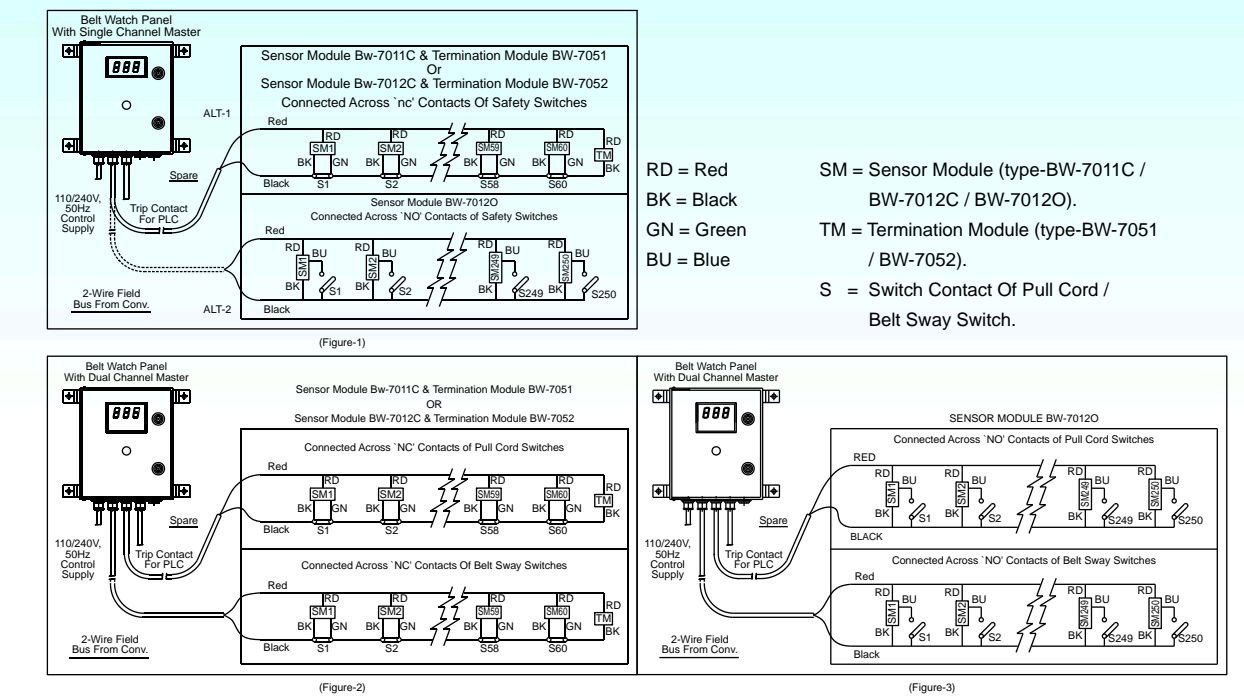
- Panel in Floor mounted sheet metal enclosure
- Grade of Protection – IP31
- To monitor all conveyors at site
- This is to be located in Central Control room

E. "e-switch" - Windows based Software for PC Connectivity

Special software (e-switch) is available for PC connectivity with the Central Control Panel / Group control Panel. This software enables the PC to display the operated switch status & maintain log. More details of this software are available on request.



Typical Schematic Connection Diagram



OPERATION

Figures 1, 2 & 3 show typical Schematic Control Circuit Layouts as an illustration of the Principle Of Operation.

The Master Units are incorporated in a control panel together with Power supply units and other auxiliary switchgear.

The appropriate models of Sensor Modules are inserted one in each safety switch along the conveyor. The Control Panel will accept an input supply of 110/240 V AC and the power supply unit in the panel will provide 24 V DC supply for operation of the Master Units & Sensor Modules.

Fig.1 shows the interconnection between the Single Channel Master Unit (Inside the panel) and the Sensor Modules connected across NC or NO contacts of the switches for Models BW7011C or BW7012C and BW7012O respectively (ALT 1 or ALT 2). A single armoured 2-core cable is adequate for this configuration. Termination Module, located in the last switch of the control loop, is required only for operation with series connected NC contacts. The Modules are connected across NO contacts in parallel with the 2-core cable as shown.

Fig. 2 shows the interconnection between the dual channel Master Unit (inside the panel) and the Sensor Modules connected across NC contacts of Pull Cord & Belt Sway Switches in two separate loops using 2 Nos. armoured 2-core control cables (one for all Pull Cord Switches and other for all Belt Sway switches).

The Termination Modules are located in the last switch of each series loop.

Fig. 3 shows the Dual Channel Master interconnecting with the Sensor Modules Model BW7012C connected

across NO contacts, forming two parallel connected loops of 2-core cable.

The Single Channel Master provides indication as well as one tripping command per conveyor. The Dual Channel master provides indication & tripping commands separately for the two loops. Both Single & Dual Channel Masters provide connectivity with PLC and/or PC if desired.

For short distances, an armoured 2-core PVC cable with copper conductor of 1.5 sq.mm., size can be used. Whereas for longer conveyors with more than 500 metres length the recommended size is 2.5 sq. mm.

The Master Units show the position of one or more operated switches (in a cyclic manner) on 1" seven segment display and also detect & display "Open Circuit" or "Short Circuit" in the two wire control bus. "All Healthy" sign is displayed as and when no switch is actuated.

The above describes a Belt Watch System as applied to a typical conveyor. In practice, the system design is optimized for each installation to allow maximum operational flexibility and convenience.

The Belt watch System is available in panel execution or with Master in open execution.

The Panels are offered in three options i) For single conveyor ii) For a group of conveyor iii) For the entire conveyor installation. In each option the panel incorporates the Master Unit as well as Power supply and Auxiliary Switchgear duly prewired in " Ready to install" condition. If Master Unit alone in open execution is selected, the user has to provide Enclosure & all supporting switchgear and carry out the internal wiring at site.