


SMART CONVEYOR MONITORING SYSTEMS



TRIP INDICATOR



Proto 
Control

ADDRESSABLE SAFETY SWITCH TECHNOLOGY

CONVEYOR SAFETY SWITCHES WITH TRIP INDICATOR AND PC INTERFACE

PROTOCONTROL make Pull Cord, Belt Sway and Heavy Duty Limit Switches are used for conveyor safety in material handling industries. PROTOCONTROL has developed first time in INDIA (even in world) the concept of TRIP INDICATOR with communication facility. Conventionally safety switches are installed at 30 meter distance on a conveyor. If any of the installed safety switches is actuated, there was not any provision for the exact identification of location and status of safety switch in control room. Operator has to rush at field for detection of safety switch to check and locate the actuated switch or any cable fault. In this process there were losses in production, time, money and sometimes life also. Now PROTOCONTROL make embedded based technology has solved this problem and given the solution. Switches are now offered with communication facility so that, sitting in the control room, operator can check the status of safety switch. Every switch is to be fitted with separate communication card. With this feature every switch can be assigned with specific address code. The most important thing is only two core cable is required for this communication i.e. no any additional cable is required.

FUNCTIONAL DESCRIPTION :

The Trip Indicator unit consists of main display unit (Trip Indicator) located in control room and communication cards to be mounted in each safety switch located in the field. When any safety switch gets operated, conveyor will trip INSTANTLY and signal sent to the Trip Indicator from where TRIP relay o/p is generated; accordingly the operated switch number is displayed and communicated to PC/PLC as per requirement .

HOW TO SELECT TRIP INDICATOR UNIT ?

PROTOCONTROL has developed full range of Trip indicator system. All varieties are available with maximum number of installations within INDIA and even in abroad.

The selection of any particular type model depends mainly on number of conveyors, length of conveyor, safety norms to be implemented. It is recommended to understand clearly the concept of Trip Indicator of individual model first. Then go through specifications and technical details of each variety of Trip Indicator models (For basic features refer Trip Indicator model selection chart). Many varieties right from single conveyor to multi conveyor system and from very economical basic system to much sophisticated high-end options are available. We request you to call us for necessary support to select any particular model before choosing exact option.

1 .TRIP INDICATOR :

The Trip Indicator system is offered in different models as below

Trip Indicator Model : TRS

Features like Auto Reset, Roll Call, Bypass, Individual Addressing, Binary O/P etc. are the unique features which are available now only with PROTOCONTROL make TRS model.

Trip Indicator Model : TRA

TRA model is economical than TRS model having only basic features, These models are self addressable types and requires termination module for their proper functioning. These are working on analog principal.

From the above models TRS model is most versatile model having all required/ additional features. Multiconveyor indication system is also available with different options. The panels with required numbers of trip indicator units can be supplied.

Different Options :

TRS 14

- Model with Back Panel Mounting 260 (H) X 144 (W) size.
- Max. 4 Nos. of Groups / Loops are available.
- Suitable model for very high length above 1 km up to 20 kms conveyors.



TRS9/TRA 9

- Model with Front / Back Panel Mounting. (96(H) x 96(W) size.
- LCD display version available.
- Max. 2 Nos. of Groups / Loops are possible.
- Suitable for medium size length conveyors



TRS 4/TRA 4

- Model with Front /Back Panel Mounting. (48(H) x 96(W) size.
- Mostly used in multi conveyor automation packages along with PROTOCONTROL make belt watch panels.
- Two Group/ Loop only to be used up to 1-1.5 KM conveyor
- Supply Voltage :24 V DC (External) if mounted in belt watch panel.



TRAR :

Din rail mounting model (Without Display). TRA basic model with minimum required features, without actual indication. This is blind model which can be interfaced with external PLC or separate Protocontrol make Display unit through 4-20mA analog output

NOTE :

The above TRS/TRA models are having many optional outputs, for details please refer ordering proforma.

COMPARISON BETWEEN TRS AND TRA MODELS.

1. TRS models are working on advanced digital technology principal where as all TRA models are working on old analog principal.
2. Addressing of individual safety switch is possible in TRS model only. But it is not possible in TRA model as these are self addressable type. This means in TRS model every switch can be assigned permanent number (addressing facility). This number will not change even few switches are bypassed or removed for maintenance or any other purpose. ABSENT status of any safety switch will be indicated on display. However in TRA models the number will change causing unwanted miscommunication problems.
3. TRS models can work without termination module but in TRA model termination module is must for proper functioning.
4. TRS models are suitable to work for small as well long conveyors up to 20 Km. However TRA models are suitable to work for conveyor with limited distance.
5. TRS models can be used without any trouble even when safety switches used are in open environment area (work very effectively

switches used are in open environment area (work very effectively even though dust/ water contamination present in safety switch)

2. CC 4W (COMMUNICATION WITHOUT MASTER UNIT).

In this system only communication cards (slave cards) will be supplied. Most economical option which requires no control unit and best suitable for PLC controlled very small conveyors. However minimum 4 core cable is required for each loop and from conveyor to control room.

Salient Features:

- No need of Trip Indicator unit .Only Communication cards are sufficient.
- Can give the information about the status (like Trip, OK etc.) of stations with location number to external MODBUS master on standard baud rate of 9600 (typical).
- 24 V DC Power Supply (External).
- RS 485 MODBUS RTU (for Master like PLC or PC) Communication Output.
- Max stations per loop will be 31 numbers

3. OTHER OPTIONAL PRODUCTS :

3.a. ADAPTER UNIT :[AD]

For extra safety separate hardwire tripping (through separate 'NC' contact in series) is to be used, it is strongly recommended to use separate Protocontrol make ADAPTOR Unit along with Trip Indicator unit. Adaptors are recommended for very long conveyor.

Basically these are to be used to avoid mixing of power and data signals and are with safety intrinsically safe current loop. However if 24vdc separate loop is already used for hardwire tripping then adaptor is not required. Adaptor units can be used along with any model of trip indicator.

Advantages :

- Adaptor gives extra safety due to low current and HARDWIRE switching.

- Useful to avoid malfunctioning possibility due to mixing of power and data cable which is not recommended as per international standard.

- Fail safe circuit. i.e conveyor will trip due to adaptor as well as trip indicator also in case of power fail / loose connection etc.

- Since current is very low no armored cable is required. This will save the cable cost.

3.b. ISOLATOR UNIT : [IU]

Used in belt watch panel where retransmission output is required. These are available for one group and two groups. Isolator unit will provide optically and galvanically isolated outputs.

3.c. JUMBO DISPLAY UNIT : [JDU]

Information on trip indicator unit can be made available with 4/ 6/ 8 inch height display unit which will be mounted on conveyor side such that every one on conveyor can see the actual operated safety switch number. Two options are possible.

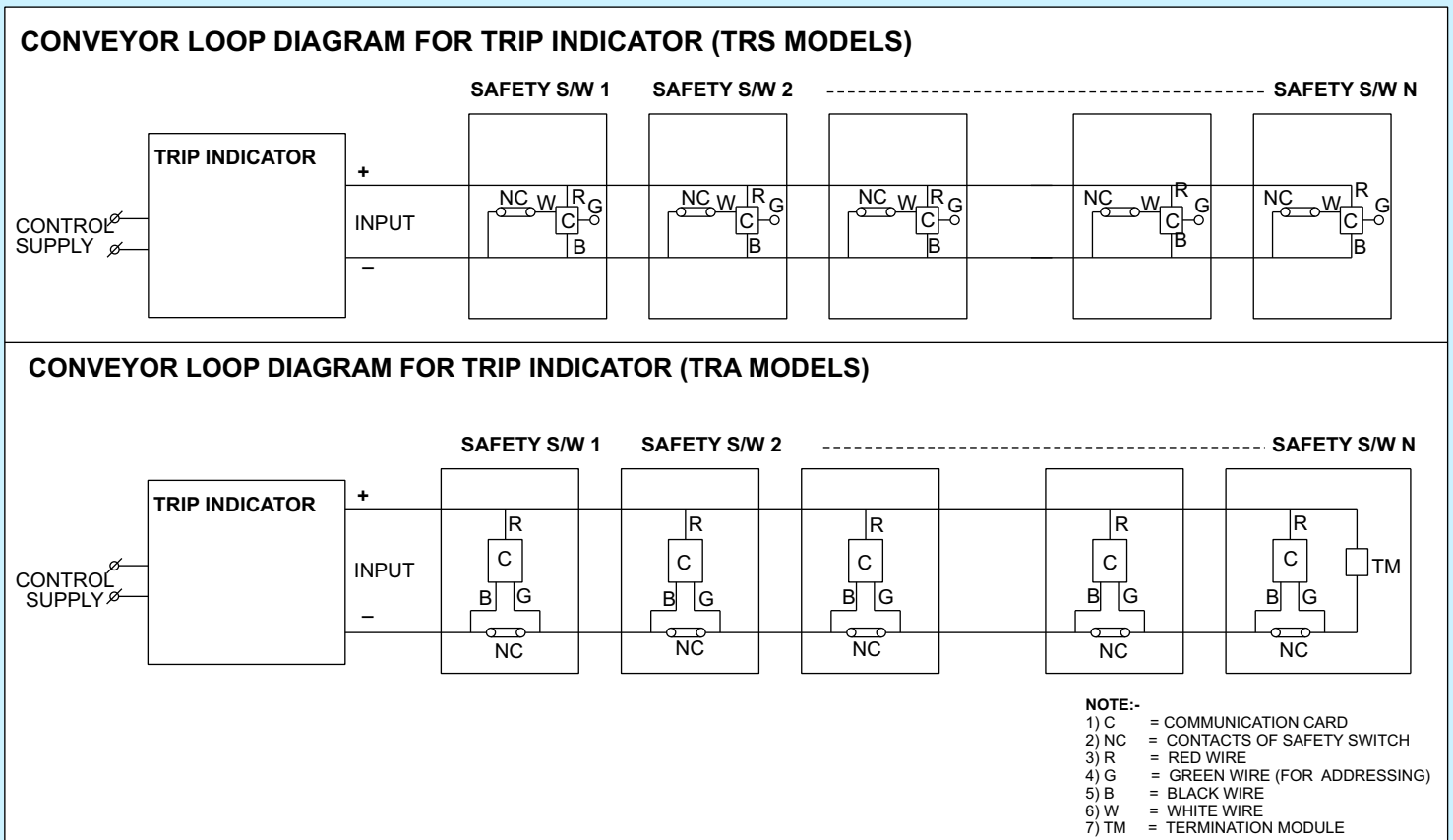
a) Pre wired Jumbo Display Unit. In this option the jumbo display will be on conveyor side and trip indicator display in control room will be made available on jumbo display through wiring.

b) Wireless Jumbo Display Unit.

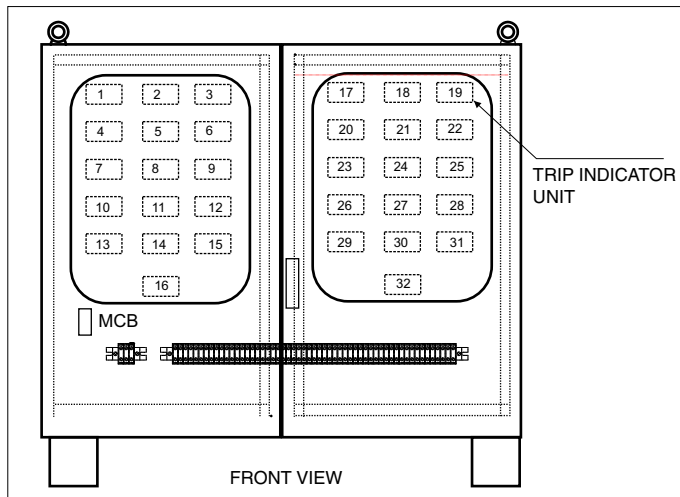
In this option wireless transmitter/receiver pair will be used. Wireless transmitter will be located near to trip indicator and wireless receiver will be located near to Jumbo display.

3.d. PC SOFTWARE (Optional)

The trip indicator system can be supplied with required PC-Scada type software with which all information available on indicator will also be made available on PC. PC can provide the details of all conveyors connected to trip indicator system. The information like status of switches (either beltsway or pull cord) on conveyor, Status of conveyor, etc information can be viewed on PC by selecting any conveyor. The history of all conveyor status can be logged in graphical format. Total plant can be viewed on a screen in the form of mimic so that all plant conveyor status can be monitored.



BELT WATCH PANEL



PROTOCONTROL offers total turn key package for Trip Indicating system. Being manufacturers of all variety of safety switches, proximity switches, level switches, transmitters etc in one roof and which are specially required for all material handling packages. Now Protocontrol has entered into total automation package including design, supply, installation and commissioning, cable routine, electrical and instrumentation control panel etc. Various options are offered depending on Trip Indicator model selection. Instrumentation grade control panel with proper electrical accessories/ instrumentation grade wiring as per international standards are provided. Turn key package engineering/ procurement/ support can be provided on project to project basis.

BELT WATCH PANEL: [BWP]

Special economical package with very small size specially developed Trip Indicating units.

DESCRIPTION:

The belt watch panel is convenient system for large number of small conveyors. The belt watch panel consists of 8, 16, 24 or 32 nos. of small size Trip Indicators depending on the requirement. It is also possible to manufacture the panel as per user requirement. This system can be very efficient and economical, where there are several small conveyors. In belt watch panel, the panel itself is like a special product specially manufactured considering cost saving with all required features with some compromise in size/ features etc. Ideally PROTOCONTROL make individual Trip Indicator is best recommended product to be used individually for each conveyor/ loop. However for small length but more quantity conveyor groups, Belt Watch Panel can be a best option. But this may need more cable length from conveyor to panel depending on the location of each conveyor.

SPECIFICATIONS :

1] SIZE : The size of belt watch panel will depend on quantity of Trip Indicators are used.

2] NO. OF TRIP INDICATORS : There can be 8, 12, 16, 24 or 32 small Trip Indicators in one panel.

3] POWER SUPPLY : Belts watch panel will take single phase, power supply (230 V 50 Hz). However individual Trip Indicator units will be provided with 24 V DC power source. 24 V DC power source will be generated internally for powering all Trip Indicators.

4] MOUNTING : Belt watch panel can be wall / floor mounted type depending on size..

5] DESCRIPTION : Panel will consist of a common power supply unit for all the Trip Indicators. This 24 V dc which is looped in all the Trip Indicators mounted internally. Panel consists of a relay card. There will be separate relay for each Trip Indicator unit. The contacts of these relays will be terminated on the terminal strip mounted in the panel. The panel consists of Trip Indicator units as per the user selection. The trip indicators will be mounted on the front side in panel cut outs. The Trip Indicators will display station numbers. Each Trip Indicator will have an output for tripping action of the conveyor.

6] TRIP INDICATOR UNIT : Panel will consist of Trip Indicator units. One Trip indicating unit per conveyor is recommended

7] INPUT : Input will be from communication cards mounted in each safety switch . Each Trip Indicator unit will take 2 wire i/p from each loop and will be connected to the Trip Indicator assigned to that conveyor. While connecting the stations of conveyor to belt watch panel user can connect both Belt Sway and Pull Cord switches in one single loop or connect BS and PC switches to two different Trip Indicator units/loops depending on the requirement and model selected.

8] OUTPUT:

- a) There will be a separate trip relay for each conveyor/loop. Relays are mounted separately and are not a part of Trip Indicating unit.
- b) Isolated 4-20mA current o/p is also available as an option for each loop. External PLC /DCS can take this input for detection of safety switch location in analog way.
- c) Serial Communication to PLC /DCS will be available as an option.

9] COMMUNICATION : (optional)

The panel will consist of a Master/Slave Unit (MSU). This master/slave unit will be located inside the panel. All the Trip Indicators will be connected to MSU through suitable protocol. The master unit can also communicate with external PLC or DCS. With Modbus RTU Protocol (slave) which will be common communication output for all Trip Indicators in panel .Other protocols are also made available on request.

10] TYPES:

There are two types of Belt watch panels available. These types are based on the models of trip indicator selected for belt watch panel. BWP TRS: (Using TRS models of trip indicator). BWP TRA: (Using TRA models of trip indicator). Refer PROTOCONTROL make Trip indicator catalogue for more details

ADVANTAGES:

- 1] Belt watch panel is very convenient in case of many small conveyor groups.
- 2] Up to 31 conveyors with single loop of 100 safety switches /stations per conveyor can be connected to belt watch panel. This proves belt watch panel system very economical alternative over other options.

LIMITATIONS :

- 1) Not recommended for long conveyors.
- 2) Not useful and economical for small quantity and small conveyors.
- 3) Since common power source for all unit is used, any fault in power supply will cause tripping of all conveyors and unwanted production loss.
- 4) Cable length required will be more as compared with individually mounted units.

ORDERING PRO FORMA : (Belt Watch Panel).	
A) Type:	
a) BWP - b) BWP -	TRS TRA
1 Mounting :	Wall (W) / Floor (FL)
2. Number of units in a panel	from 1- 32
3. Number of groups/ loops	from 1- 64 loops
4. Communication output	A (analog- isolated), C (communication RS 485)
5. Other details like number of Ao, Do, communication details etc will be given along with drawing ,data sheet	
B) COMMUNICATION CARDS: (to be ordered separately) , TRS CC (For BWP TRS) TRACC(For BWP TRA)	

ORDERING PROFORMA

A) CONTROL UNIT	TRS	TRS	TRS	TRA	TRA	TRA
1. Size and Mounting :						
144X144 sq. mm Back Panel Mounting	14		---			
96 (H) X 96 (W) sq. mm Front/ Back Panel Mounting	---	9		9		
48 (H) X 96 (W) sq. mm Front/Back Panel Mounting	---		4	---		4
Din Rail Mounting					R	
2. No. of Stations per Loop						
10 No.	10	10	10	10	10	10
25 No.	25	25	25	25	25	25
50 No.	50	50	50	50	---	50
75 No.	75	75	75	75	---	75
100 No.	100	100	100	100	---	100
150 No.	150					
200 No.	200					
300 No.	300					
400 Nos.	400					
Above 400	999					
3 No. of Groups / Loops						
1 No.	O1	O1	O1	O1	O1	O1
2 No.	O2	O2	O2	O2		O2
3 No.	O3	---	---			
4 No.	O4					
4. Display						
4 digit Red LED display	DE	DE	DE	DE	----	
Alfa Numeric LCD Display	-----	DL	-----	DL		
5 Communication Outputs						
No Communication Output		-----	-----	-----	-----	-----
RS 485 Modbus RTU (Slave)	COM	COM	COM	COM	COM	COM
6. Additional Analog Output						
Not required	X	X	-----	X	X	X
4 - 20 mA Analog single isolated Output (Common for 2 groups with additional digital outputs)	RT1	RT1	-----	RT1	RT1	X
4-20mA Analog Dual isolated output (Separate Output for each group)	----	RT2	-----	RT2	-----	
Binary Output (common for all groups)	BN	BN	-----	-----	-----	
7. Output						
Relay Output	RO	RO	-----	RO	RO	
5 V DC Digital output per group (additional o/p)	-----	D5	D5	D5	-----	
24V DC Digital Output per group (additional o/p)	-----	D24	D24	D24	-----	
B) COMMUNICATION CARDS						
Up to 1 Km conveyor length	TRSCC	TRSCC	TRSCC	TRACC	TRACC	TRACC
Above 1 Km conveyor length	TRSCCL	TRSCCL	TRSCCL	-----		

TYPICAL ORDERING CODE : TRS 14 - 100 - O2 - DE - COM - RO

NOTE

In analog output models with output as 4-20mA It is recommended to use these models up to 32 stations for better resolution (with resolution of 0.5mA per station). More precise external PLC or detection circuit will be required if station numbers on one loop are more than 32.



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