



**SAFETY SWITCHES  
CONTROL INSTRUMENTS  
ACCESSORIES  
PULLCORD TRIP INDICATION SYSTEM  
LEVEL SENSING PRODUCTS  
JUNCTION BOXES & PUSH BUTTON STATIONS**



**Proto  
Control** 

## Introduction

Protocontrol name is established in Indian industries as a leading supplier of safety switches and control instruments from last two decades with its quality products and efficient pre-sale and after sale support.

## Philosophy

We believe in long term relations with customer hence word 'customer' appears first in our dictionary.

## New Developments

We always strive for improvement in product, technology, material & method. Hence introduced many new concepts & applications to satisfy needs of customer. We are the first in India (even first in world) to offer Addressable Type Pull Cord Switch Technology -Trip Indicator. This concept is now adopted by all major conveyor manufacturers in India.

We are the first who exported & commissioned this product on long conveyor. We successfully introduced Disc Type Chute Block Device for material handling plants. Protocontrol offers variety of safety and controlling instruments for use in material handling plants. These instruments find application in conveyor safety, speed and level monitoring.

## CONVEYOR SAFETY SWITCHES AND ACCESSORIES :

- Pull Cord Switch
- Belt Sway Switch
- Heavy Duty Limit Switch
- Zero Speed Switch / Electronic Speed Switch
- Electronic Speed Switch with Extension Stand
- Flameproof Safety Switches
- Pull Cord Wire
- Tying Clips, Hooks, Cable Glands & Mounting Brackets

## CONTROL INSTRUMENTS

- Damaged Belt Detector / Belt Weir Monitor
- Material Flow Switch
- Belt Loading Monitor
- De-Interlocking Switches
- Anti collision switch for cranes
- Chute-Block Detector
- Boot Level Indicator
- Diaphragm Type Level Switch
- Material Level Switch Tilt Switch
- Vibrating Fork Type Level Switch
- Paddle Type Level Switch
- Ultrasonic Level Transmitter
- Radar level Transmitter
- Wind Velocity Monitor : Anemometer

## SPECIALISED INSTRUMENTS

- Trip Indicator Addressable Type Pull Cord Switch System
- Cement Bag Counter
- Pulse Jet Sequencer Timer

## WEATHERPROOF & FLAMEPROOF JUNCTION BOXES AND PUSH BUTTON STATIONS

- Junction Boxes
- Push Button Stations
- Pendant Control Stations

## COMPLETE TURNKEY AUTOMATION PACKAGE

- Electrical Panels -MCCs
- Logic and Automation Panels







Protocontrol is an approved vendor for major project consultants. Many project orders are executed successfully. Following are some important names.

## CONSULTANTS

- Mecon Ltd.
- Desein Pvt. Ltd.
- Hindustan Dorr-Oliver Ltd.
- M.N.Dastur & Co.Ltd.
- NTPC Ltd.
- Avant - Garde Engineers & Consultants (P) Ltd.
- MITCON Consultancy Services Ltd.
- Fichtner Consulting Engineers (I) Pvt.Ltd.
- CMPDILtd.
- Holtec Ltd
- Jacob H & G
- ACC
- NPCIL Ltd.

We executed many project orders for following customers

## CEMENT

- ACC Ltd.
- Grasim Industries Ltd.
- Maihar Cement
- Rajashree Cement
- Zuari Cement
- Orissa Cement
- Chettinad Cement
- Shree Cement
- Ambuja Cement
- Madras Cements Ltd.
- Vasavdatta Cement
- Ultratech Cement Ltd
- Dalmia Cement
- Lhaki Cement
- Penna Cement
- Binani Cement

## STEEL-ALUMINIUM-OTHER METALS

- Essar Steel Ltd.
- JSW Ltd.
- Steel Authority Of India Ltd.
- NMDC Ltd.
- Hindustan Zink Ltd.
- Hindalco Industries, Mahan Aluminium
- Jindal Steel and Power Ltd.
- Lloyds Steel Ltd
- Ispat Industries Ltd.
- Tata Steel

## POWER

- NTPC Ltd.
- NPCIL Ltd
- Adani Power Ltd.
- Costal Gujarat Power Ltd
- Reliance Energy
- Neyveli Lignite Corporation Ltd.
- Rajasthan Rajya Vidyut Utpadan Nigam Ltd.
- Gujarat State Electricity Corporation Ltd.
- MAHAGENCO
- DVC Ltd.
- APGENCO
- UPSEB

## FERTILISER –CHEMICAL

- IOCL Ltd.
- Kribhco Ltd.
- RCF Ltd.
- GHCL Ltd.
- Gharda Chemicals Ltd.
- IFFCO
- Kanoria Chemicals
- GSFC Ltd.
- Coromandel Fertiliser

## MATERIAL HANDLING INDUSTRIES

- ACB India Ltd.
- GMDC Ltd.
- South Eastern Coalfields Ltd.
- Uranium Corporation Of India Ltd.
- NMDC Ltd.
- Northern Coalfields Ltd

## EPC CONTRACTORS –Turnkey Project Executor

- BHEL Ltd.
- Larsen And Toubro Ltd.
- Vinar Systems Pvt Ltd.
- Flsmidth Minerals Pvt. Ltd.
- Alstom Projects India Ltd.
- S.K.Samanta & Co.Pvt.Ltd.
- Sandvik Asea Ltd.
- Schneider Electric India Pvt Ltd.
- Gea Process Engineering I Pvt Ltd.
- Emerson Process Management (I)Pvt. Ltd.
- Metso Minerals(I) Pvt. Ltd.
- Hyquip Projects Pvt.Ltd
- Kirloskar Brothers Ltd.
- Siemens Ltd.
- HEC Ltd.
- Durgapur Projects Ltd.
- ABB Ltd.
- Shapoorji Pallonji & Co. Ltd.

In today's modern material handling plants multiple numbers of conveyors are used to transfer material from one location to other. Protocontrol make Safety and control products find application for stopping the conveyor at the time of an emergency.

## OPERATION :

Pull cord switch also known as Rope Operated Emergency switch is used as a safety switch to stop the conveyor belt in case of an emergency by pulling the rope. Pull cord switch is mounted on the walkway side of the conveyor belt, preferably at about every 30 meters. When the rope is pulled from any side, the switch gets operated. Unless and until the handle is reset manually to normal position, the switch remains in operated condition. NC contacts of all pull cord switches are wired in series and further connected to PLC. When any switch along the belt operates, the contact opens and conveyor is stopped.

## CONSTRUCTION :

Pull cord switch is housed in dust and weatherproof enclosure with IP 65 grade of protection. Sturdy and heavy-duty Cam-Switch with robust contacts is used to give longer service life. Operating handle fitted with spring steel rings at both ends for fixing the rope. The design of the rings gives maximum flexibility in operating condition. Enclosure is epoxy painted to give high corrosion resistance. The switch is designed with manual reset type of mechanism.

## FEATURES :

- Heavy duty enclosure for dusty industrial use
- Special tubular silicon gasket
- Enclosure : Cast Al. (standard.)
- Special enclosures like DMC - SMC /Cast Iron or Flameproof (certified for use in hazardous areas)
- Non rusting hardware for cover.
- Retaining type stainless steel screws.
- SS ring for tying pull cord rope
- Heavy duty contacts
- Special rubber seal (O ring) on shaft for better protection against ingress of dust & dirt
- Performance tested at reputed third party lab for 20,000 operations
- Models with indicating lamp, junction box & flag indication (refer under optional accessories).

## STANDARD SPECIFICATIONS :

- Reset : Snap action, Manual Reset Type
- Enclosure : Weatherproof, field mounting Type, IP 65 Cast Al/Cast Iron, epoxy painted, colour light gray, IS 631 (as standard) other colour are available as per requirement
- Output Contacts : 1 NO + 1 NC / 2 NO + 2 NC / 2 NC / 4 NC
- Contact Rating for standard models :16 Amp resistive at 440 VAC
- DMC/SMC (FRP) enclosure for use in corrosive environment.
- Special flame proof enclosure for use in hazardous area, Group IIa, IIb, IIc



Standard Model



PC with Terminal Strip



With Junction Box



With Indicating Lamp



PC JB With Mechanical Flag



With JB & Indicating Lamp



Flameproof Model

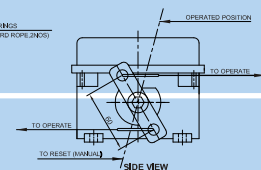
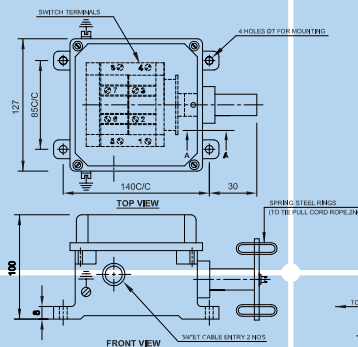


With Reset Lever

## PULL CORD SWITCH PC202 C



**SPECIAL FEATURES:-**  
 1) TYPE CAST ALUMINUM ENCLURE  
 2) RETAINABLE TYPE, NON RUSTING SCREWS FOR COVER

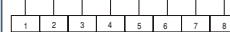


## TERMINAL DIAGRAM

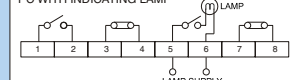
PC 101



PC 202



PC WITH INDICATING LAMP



## OPTIONAL PRODUCT ACCESSORIES :

- Separate junction Box for termination of cables : JB  
Switch without separate JB but with terminal strip for ease of wiring: TS
- Indicating lamp: Long life red LED indicating lamp for indication of operated pull cord switch. Please specify lamp voltage.: IL
- Mechanical flag indicator for pull cord switch : MF
- Separate reset lever for Pull Cord Switch : RL
- Addressable Type Pull Cord Switches: Protocontrol offer complete solution for monitoring of entire plant switches at a centralized location. Please send us conveyor details (No. of switches per conveyor, conveyor layout etc). For more details refer our catalogue on : Trip Indicator.
- Hermetically sealed reed contacts for use in extreme dusty and corrosive conditions : Contact Rating for models with reed switch contact : 30 VA, 24 V DC / 2 3 0 VAC, 1Amp. (Specify control voltage)



Pull Cord Rope : PCW



Tying Clips : BDC



Hooks : HP / HT



Canopy- Protective Plate : PP

## OPTIONAL COMMISSIONING SPARES

Following accessories are offered optionally with Pull cord switches. These accessories are specially developed in reducing installation time of switches.

- Pull Cord wire: 6x7 GI wire construction, covered with PVC diameter approx 5-6 mm specially extruded for material handling plant use.
- Tying clips : Two tying clips are required per switch for tying pull cord cable to switch : BDC
- Hook : Pull cord cable passes through the hooks, which are placed approx 3 Meters apart : HP, HT
- Mounting Plate : Mounting bracket made of sheet steel, powder coated with corrosion resistance paint for mounting pull cord switch. Suitable holes are made to mount pull cord switch at site, Mild Steel, 3 mm : MP
- Cable Gland: Nickel Cr plated brass cable gland, Size 3/4 inch ET : CG
- Additional Canopy ( Protective Plate ) : To protect Pull Cord Switch against falling material like coal and lumps, Mild Steel 5 mm : PP



Cable Glands : CG



Mounting Plate : MP

## ORDERING PROFORMA :

Please refer ordering proforma on page number 7 to select required model Type number

## PULL CORD SWITCHES FOR USE ON AUTOMOBILE CONVEYORS-INSPECTION TABLE

### Type : POPOSR

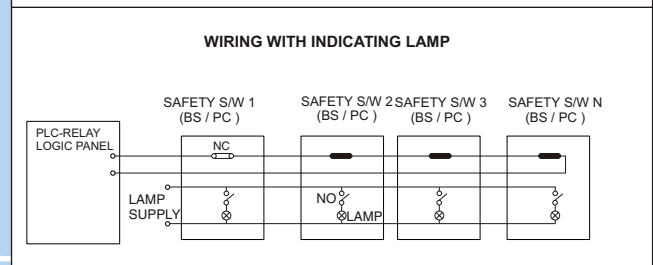
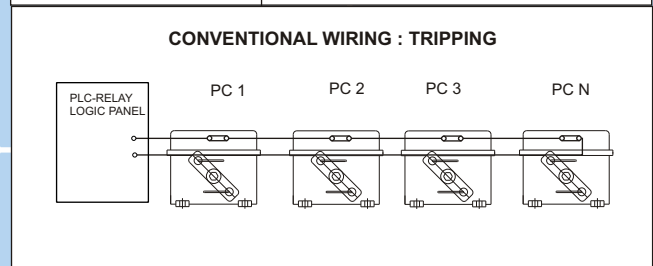
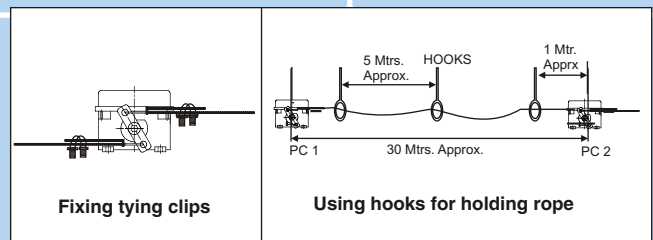
Protocontrol developed special models of pull cord switches for use on applications like automobile conveyors.

This switch is to be mounted over the head and nylon rope hangs freely. When operator wants to stop conveyor / machine he pulls the rope. The switch resets when rope is pulled once again. Design with two separate ropes for "Operate" and "Reset" is also available.

### Pull cord Switch, Single side rope with reset button

#### Type : PC HR

One side operated switch for small machines / conveyors. The switch is provided with built in reset button. The switch gets latched when rope is pulled and resets when push button is pressed



PO POSR  
Vertical Mounting Single Rope



PC HR  
Single Side Rope With  
Reset Button



**APPLICATION:**

The switch allows smooth running of the conveyor and protects it from damages by over swaying which can occur due to uneven loading of material, worn out idler roller bearings etc.

**OPERATION:**

Belt-sway switch is generally mounted on both side, preferably at about every 30 meters and near the edge of the conveyor belt. A small clearance is allowed between contact roller and the belt edge to allow the normal running of the belt with acceptable swaying. When swaying exceeds normal limit, the belt edge pushes the contact roller, which drives the switch and operates the contacts. The switch resets automatically when the belt resumes normal running.

**CONSTRUCTION :**

The switch is housed in dust and weatherproof enclosure with IP 65 grade of protection. The contact roller is supported on bush / ball bearings for friction free operation. Roller mechanism is of self reset type. The enclosure is epoxy painted to withstand harsh climate.

**FEATURES :**

- Heavy duty enclosure for dusty industrial use
- Special tubular silicon gasket
- Standard Cast Al. Special enclosures like DMC / Cast Iron or Flameproof( for use in hazardous areas)
- Retaining type stainless steel screws
- Heavy duty contacts
- Special rubber seal (O ring) on shaft for better protection against ingress of dust & dirt
- Performance tested at reputed third party lab for 20,000 operations.
- Models with indicating lamp, junction box

**STANDARD SPECIFICATIONS:**

- Reset : Auto / Spring Reset Type
- Enclosure: Weatherproof, field mounting Type, IP 65 Cast Al / Cast Iron, epoxy painted, colour light gray (standard) other colour are available as per requirement.
- Output Contacts : 1 NO + 1 NC / 2 NO + 2 NC / 2 NC / 4 NC
- Contact Rating for standard models: 16 Amp resistive at 440 VAC
- DMC (FRP) enclosure for use in corrosive environment.
- Special flame proof enclosure for use in hazardous area, Group Ila, I Ib IIc

**OPTIONAL ACCESSORIES:**

- Separate junction Box for termination of cables.
- Indicating lamp: Long life red LED indicating lamp for indication of operated belt sway switch. Please specify lamp voltage.
- Addressable Type Belt Sway Switches : Protocontrol offer complete solution for monitoring of entire plant switches at a centralized location. Please send us conveyor details (No. Of switches per conveyor, conveyor layout etc). For more details refer our catalogue on : Trip Indicator.
- Hermetically sealed reed contacts for use in extreme dusty and corrosive conditions : Contact Rating for models with reed switch contact : 30 VA, 24 V DC / 230 V AC, 1 Amp. (Please specify your control voltage)

**Standard Model****With Terminal Strip****With Junction Box****Flameproof Model****Belt Sway switch with Special roller Position : D****Switch with Mounting Bracket**

## OPTIONAL COMMISSIONING SPARES

Following accessories are offered optionally with Pull cord switches. These accessories are specially developed in reducing installation time of switches.

- Mounting Plate, Mild Steel 3 mm : MP
- Height adjustable mounting Bracket : To adjust switch at site so that the roller is aligned with belt edge : MB
- Cable Gland : CG

Mounting Plate : MP

Mounting Bracket : MB



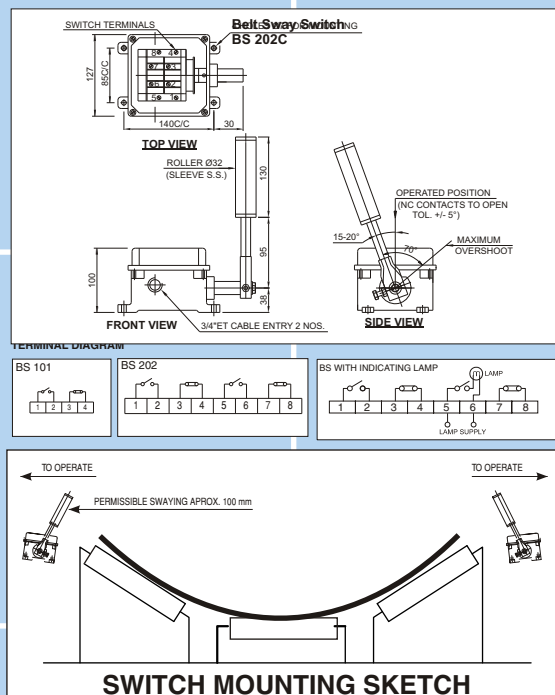
Cable Glands : CG



Canopy- Protective Plate :PP



Switch Mounting Arrangement



### Gr.4: contd.

Mounting Plate (Type 1) for Pull Cord, Belt Sway & Heavy Duty Limit Switch, Powder Coated, Light Grey	MP
Height Adjustable Mounting Bracket (Type 2) for Belt Sway Switch, Powder Coated, Light Grey	MB
S.S. TAGE PLATE	TP

### Gr.5 : Special

Special Colour (colour other than our Standard colour option i.e. Light Grey, IS 631)	S
Additional Certifications: CCOE (Gr 2 should be F, FCI)	C
Roller position for Belt Sway Switch , Roller at Centre, Operating 1-0-1	D
Cable entry size other than 3/4 inch	O

Typical ordering code **PC 202 C JB IL D CG D**

### Model Selection for

#### Pull Cord, Belt Sway and Heavy Duty Limit Switch, Damaged Belt Detector :

#### Gr.1. : Series :

Pull Cord Switch, Manual reset type	PC
Belt Sway Switch (Self reset type)	BS
Smart Addressable Pull Cord Switch, Manual reset type To be used with Trip Indicator (To be ordered separately)	SPC
Smart Addressable Belt Sway Switch (Self reset type) To be used with Trip Indicator (To be ordered separately)	SBS
Belt Sway Switch ( Self Reset Type) with two sets of contacts ( 1 NO+ 1 NC for alarm and 1 NO + 1 NC for Trip) Gr2. must be 202	BS2C
Heavy Duty Limit Switch ( Self Rest Type ) with direction dependent contacts ( 1 NO + 1 NC each direction ), (Gr. II must be 202 or 004)	HDLS SR2C
Heavy Duty Limit Switch: Spring Return Type	HDLS SR
Heavy Duty Limit Switch: Toggle (Stay Put) Type V lever	HDL SPV2
Damaged Belt Detector Rope Type	DBD R

#### Gr.2: Number of Contacts:

1 NO + 1 NC	101
2 NO + 2 NC	202
2 NC (Recommended for Smart switches, Gr. 1 option: SPC and SBS)	002
4 NC	004
1 NO + 1 NC, Reed Sw. Contact 24 V DC, 30 VA	101 RD
2 NO + 2 NC, Reed Sw. Contact, 24 V DC, 30 VA	202 RD

#### Gr.3: Enclosure:

Cast Al, Improved Protection, IP 65	C
Corrosion resistance, DMC enclosure, IP 65	D
Flame proof enclosure IP 65, Cast AL, LM6	F
Flame proof enclosure IP 65, Cast Iron	FCI
Cast Iron, IP 65	CI

#### Gr.4: Accessories: (Add suffix If required)

No accessories	NO ADDER
Separate Junction Box (Gr. 3 should not be F, FCI)	JB
Indicating Lamp AC Supply (Gr. 3 should not be F, FCI)	IL A
Indicating Lamp 24V DC Supply (Gr. 3 should not be F, FCI)	ILD
Mechanical Flag Indication (Gr. 1 should be PC)	MF
Special, Separate reset Lever (G1.1 should be PC, Gr. 3 should not be F, FCI)	RL
Switch without separate JB but with terminal strip	TS
Cable Gland, single compression Type, Brass	CGS
Cable Gland, double compression Type, Brass	CG
Cable Gland, double compression Type, Flame Proof, Brass (Recommended when Gr 3 selection is F, FCI)	CGF
Cable Gland, double compression Type, SS	CGSS
Additional Canopy- Protective Plate (3 mm, MS)	PP

# ELECTRONIC SPEED SWITCH / SPEED MONITOR / ZERO SPEED SWITCH SERIES : ESM

Now a day in material handling plants under / over speed monitor is one of the essential control and safety device.

## APPLICATION :

Electronic Speed Monitor is used to monitor speed of conveyors, crushers, rolling mills, agitators, mixers, stirrers, screw conveyors, and other industrial machinery. This device actuates relay contacts at preset speed. Using these contacts desired control action such as zero speed protection / under speed protection / over speed protection can be achieved.

## OPERATION:

The basic principle of speed monitor is comparison of pulses received from sensor with standard pulses. The unit consists of two parts: "SENSOR PROBE" and CONTROL UNIT. The sensor is to be installed with its sensing face in close proximity of rotating object. On this object, flags are to be fixed. The sensor produces strong electromagnetic waves, which get disturbed by the flags, giving rise to corresponding pulses. These pulses are fed to the control unit where they are compared with standard pulses to sense the speed.

## ADVANTAGES:

- It senses speed by non-contact way. No moving parts. No wear and tears of rollers or misalignment of couplings.
- Easy speed setting.
- Built in initial by-pass time delay arrangement.
- Speed setting possible from 1 RPM to 5000 RPM in optional ranges.
- Totally enclosed sensor, works in presence of dust, dirt water, oil & chemicals.
- Direction sensing and speed monitoring of various locations from single point is possible
- Intrinsically Safe Sensors and speed switches with Flameproof Enclosures are available for use in Hazardous area

## SPECIFICATIONS:

### Sensor Probe :

Totally enclosed, IP 67, Inductive Type, suitable for use in harsh, dusty and oily environment. Do not effected by immersion under dust and water.

Enclosure : Tubular, Ni-Cr plated Brass enclosure, M 30 size with two check nuts (Refer group 4 of ordering proforma for other options)

Sensing distance : 10 - 12 mm nominal, 8-10 mm operational

### Control Unit :

**Enclosure :** Field mounting IP 65, Cast Al / Din Rail IP 30 / Corrosion proof DMC-SMC (FRP) / Cast Al Flame Proof (Refer Gr.2 of ordering proforma.)

**Output :** 2 NO + 2 NC relay contact, Rating 5 Amp resistive at 230 V AC) (For other combination of contacts refer Gr. 7 or ordering proforma).

With LED indication for Supply ON, Sensor ON and Relay ON.  
Initial Time Delay : Initial time delay facility to allow the rotating mechanism to achieve the desired speed is provided. Standard delay is 0-30 sec. This delay is available in Under Speed / Zero speed Monitors

## OPTIONAL COMMISSIONING SPARES: Refer Gr 10 in ordering proforma

- Junction box for sensor probe, 3 terminals : JB
- Flag Assembly : F
- Mounting Bracket for Sensor Probe : MS
- Mounting Plate for mounting control unit, MS, 3 mm : MP
- Cable Gland : CG



ESM 1R  
DIN RAIL ENCLOSURE



ESM 1W, FIELD MOUNTING  
ENCLOSURE



ESM 1F, FLAME PROOF MODEL



ESM 2,6, FIELD MOUNTING  
DIGITAL DISPLAY



Mounting Plate : MP



FLAG ASSEMBLY: F

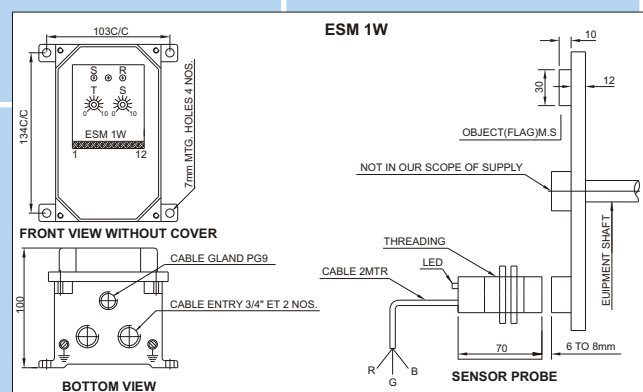
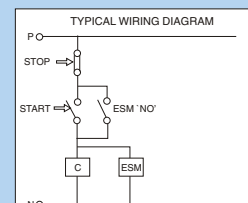


JUNCTION BOX : JB



MOUNTING BRACKET  
FOR SENSOR PROBE : MS

TERMINAL DIAGRAM													
SUPPLY				SENSOR				RELAY					
0	1	2	3	4	5	6	7	8	9	10	11	12	13
1	2	3	4	5	6	7	8	9	10	11	12	13	14





**Series ESM is available in- following versions.**

### CONVEYOR UNDER SPEED ZERO SPEED SWITCH SERIES: ESM 1

Specially developed for conveyor application. Detects conveyor belt breakage, overload, bearing damage and provide relay contacts for interlocking. The sensor is to be mounted in front of tail end pulley. Fix required number of objects (flags) on the pulley and these objects are sensed by sensor. This model is provided with potentiometric setting.

Suitable speed range is to be selected from six optional speed ranges 1-10, 10-100.5-50, 50-500,100-1000 and 500- 5000 RPM. With supply ON', Relay ON' and 'SENSOR LED Indication.

NO contact is to be used in interlocking circuits. With built in initial bypass time delay circuit to allow the conveyor to achieve normal speed at the time of starting.

Special models also has a facility to multiply speed range x10 & x100. (Refer ord. proforma Gr.3 option 9). Hence one common model can be used for all conveyor speeds.

### SALIENT FEATURES : ESM 1 W / ESM 1 F

- Most compact and easy to use
- Easy speed setting by potentiometer
- Built in initial bypass time delay to bypass speed switch at the
- time of starting the conveyor
- Robust totally enclosed, IP 67, Inductive type Speed Sensor
- Field mounting Die cast Al enclosure for controller, IP 65
- Potential free relay contacts for interlocking

### MODELS AVAILABLE IN SERIES ESM 1:

- Speed Switch type ESM 1W xx T: Weatherproof, field mounting IP 65 enclosure, Thumb-wheel setting
- Speed Switch type ESM 1R : Din Rail mounting, IP 30 Panel mounting enclosure ,Potentiometric setting
- Speed switch type ESM 1 F: Flame-proof enclosure for use in hazardous area with intrinsically safe sensor and control circuit. Certified by competent authority.

## ADDITIONAL SPECIAL MODELS

### MINIATURE COMBINES SPEED SENSOR + CONTROLLER : ESM 1 B2

Developed for small conveyor. Sensor as well as controller circuit housed in sensor probe size M30 .It actuates output device when speed of equipment drops below set value. Speed setting and initial time delay adjustment done with miniature trim pots at the back of sensor. Output device like relay ( in DC Models ) or contactor ( in AC models) is to be housed in panel.



Combined Sensors + Controller  
ESM B2

### MICRO CONTROLLER BASED, SPEED INDICATOR SWITCH SERIES: ESM 2/6

#### FEATURES :

Micro Controller based circuitry packed with customer friendly features.

Same speed monitor is used for indication of rotational speed of tail end pully (RPM) or linear speed of conveyor (MPM) by simply entering scaling factor.

**Selectable number of flags :** Enter number of flags which are available at site, speed monitor will get automatically calibrated for these flags

- Relay contact O/P for Tripping
- Digital Display
- Adjustable trip delay
- Settable hysteresis
- Special models for combined under over speed monitoring duty
- Special models with 4-20mA/RS232/RS485 retransmission facility.

### DIGITAL TACHOMETER SERIES: ESM 5

It receives input from Transducer (like Proximity switch) or analog input (from transmitter) and indicates speed in RPM, MPM or any other unit. Rotational / linear speed indication is possible. The unit is enclosed in panel mounting (cutout 92 x 92) or dust proof, field mounting or flame proof enclosure.



MICRO CONTROLLER  
BASED, SPEED  
INDICATOR SWITCH



DIGITAL TACHOMETER

### WIND SPEED INDICATOR : ANEMOMETER

Protocontrol make wind speed Anemometer is consist of a sturdy wind sensor (Cup Generator) and wind velocity indicator. The wind speed is sensed by a three-cup rotor assembly. Sensor is fitted with the cup such that when cup shaft rotates with speed, pulses are generated. The electronic unit is housed in field mounting IP 65 housing. It provides digital display of speed as well as provides relay contact when speed exceeds set limit. Models with retransmission O/P (4-20 mA) with respect to wind speed are available.



ANEMOMETER

Model Selection for ELECTRONIC SPEED SWITCH		ESM
<b>Gr.1: Application</b>		
Electronic Speed Switch for Under Speed Monitoring		1
Electronic Speed Switch with Digital Display		2
Electronic speed switch for over speed monitoring		4
Electronic Speed Indicator (No control O/P)		5
Electronic Under + Over Speed switch with Digital Display		6
<b>Gr. 2 : Enclosure for Control Unit</b>		
Din Rail Mounting (35 mm), Safe area use, (Group 1 Should not be 2,5,6)		R
Din Rail Mounting (35 mm) intrinsically safe circuit (Group 1 Should not be 2, 5, 6)		N
Field Mounting, Cast Al, IP 65, Powder Coated, Colour Light Gray, IS 631 For other colour options, refer Gr 10)		W
Field Mounting, DMC (FRP)		D
Front Panel Mounting, IP 30 (Group 1 must be 2, 5)		P
Flame Proof, Field Mounting Cast Al, IP 65, (Sensor Group must be N, NO) Powder Coated, Colour Light Gray, IS 631		F
Flame proof Field Mounting, Cast Iron, IP 65, ( Group 4 must be N, NO) Powder Coated, Colour Light Gray, IS 631 For other colour options, refer Gr 10)		FCI
Field mounting Cast Iron IP 65, Powder Coated, Colour Light Gray, IS 631 For other colour options, refer Gr. 10		CI
Combined Sensor + Controller housed in sensor probe (Gr. 1 should be 1, Gr.4: S/H/E, Gr. 5 should be 1, Gr.7 : 6/7, Gr.8 : L)		B2
<b>Gr. 3: Contact Actuation Speed Range:</b>		
Only Indicator, 1-9999 RPM,(2 flags) (Specify type of sensor) Gr.1 selection must be 5)		0
1-10 RPM (8 flags)		1
5-50 RPM (4 Flags)		2
10 - 100 RPM (4 Flags)		3
100 -1000 RPM (4 Flags)		4
50 -500 RPM (4 Flags)		5
500 -5000 RPM (2 Flags)		6
1000-10000 RPM (2 Flags)		7
Other (Please specify)		8
5-5000 RPM by speed range selector (Gr. 2 should not be B2,)		9
<b>Gr.4: Sensor Probe</b>		
Inductive, Tubular threaded, with two check nuts, Ni Chrome Plated Brass with 2 Mtr 3 core PVC cable Specify Cable Length in Mtr. (if sensor cable other than 2 Mtr.) after prefix ( for Ex. S 10 for M 30 sensor with 10 Mtr. cable )		
M30 Sensing range 10-12 mm nominal, 8-10 mm operational		S
M50 Sensing range 15-17 mm nominal, 12-15mm operational		E
M70 Sensing range 25-30 mm nominal, 20-25 mm operational		H
Intrinsically Safe, for Use in hazardous area, Sensing range 10-12 mm		N
Intrinsically safe, other than M30		NO
Square Type, Plastic Sensing range 50 mm nominal, 40 mm operational		B

Special Cast Al heavy duty enclosure for sensor probe (For M 30 & M 50 sensor)		D
Other (Please Specify)		O
Magnetic pickup (Specify No of gear teeth and Min and Max RPM)		M
<b>Gr. 5: Time Delay</b>		
Adjustable Initial Time Delay (3-30 sec) and fixed NTD		1
Adjustable Nuisance Time Delay Initial Time Delay both		2
Other (please specify)		3
<b>Gr.6: Control Supply Voltage</b>		
110 / 230 VAC 50 Hz.		S
24 VDC		U
Other (Please Specify)		V
<b>Gr.7: Out Put Contact</b>		
2 NO + 2 NC, 5 Amp (Not available when Gr.2 is R, N, F, FCI)		1
2 C/O, 5 Amp (To be selected when Gr. 2 is R, N, F, FCI)		2
2 NO+2 NC 10 Amp (Not available when Gr.2 is R, N F, FCI)		4
Other (Please Specify)		5
Solid state O/P for AC Load 150 mA (Gr.2 should B2 and Gr. 6 should be 6		6
Solid State O/P for DC, PNP, Load 250 mA (Gr.2 should B2 and Gr. 6 should be U/S		7
<b>Gr.8: Setting</b>		
Potentiometric		P
Thumbwheel		T
Key pad (Gr. 1 selection must be 2, 6)		K
Only indicator (Gr.1 selection must be 5), No contact O/P		O
Dual Set Point (One C/O relay contact for under and one for over speed setting) Gr. 1 selection should be 6		D
Multi turn Trim pot (Gr.2 should be B2)		L
<b>Gr.9:Optional facility (Add suffix if required)</b>		
Re-Transmission O/P, 4-20mA Isolated		1
MODBUS, RS 485 (Gr 1 selection should be 2, 6 ) ( Gr 2 should not be R,N,F,FCI,B2)		2
<b>Gr.10: Optional Accessories: (Add suffix If required)</b>		
Extra Junction Box for sensor, 3 Terminals, IP 65		JB
Flag Assembly for Sensor probe		F
Mounting Bracket for Sensor		MS
Mounting Plate for Control Unit		MP
Cable Gland, double compression Type, Brass for control unit		CG
<b>Gr. 11 : Special (Add suffix If required)</b>		
Special colour for Field Mounted Control Unit (Gr 2 Must be W, F, CI)		S
Additional Certifications: CCOE (Gr 2 should be F, FCI)		C

Typical ordering code: ESM 1 W 3 S 1 S 1 P JB

## ADDRESSABLE TYPE PULLCORD INDICATION SYSTEM TRIP INDICATOR

Unique, proven product for large material handling plants where multiple numbers of switches are connected in series. Trip Indicator is developed to give exact indication of operated switch in control room

### ADVANTAGES :

- Most advanced method of locating operated Switch with Instant indication, & tripping, Time required to search for operated switch is eliminated.
- Communication through two core cable only, less cable cost and cable laying cost
- Interchangeable Communicating card
- RS 232 / RS-485 MODBUS O/P, PLC interface for fault logging.
- Binary O/P: Optional
- Miniature size of communication cards Fail safe circuit
- Specially suitable for high length conveyors
- Scrolling Display of multiple operated switch
- Roll call Feature: Indicates missing of communication card.
- General field problems like : Cable open. Cable short are indicated on Trip Indicator
- Redundant O/P: Optional
- Trip Indicator: Effective working even if switches are filled with water

### PRINCIPLE OF OPERATION :

A small communication card is to be wired inside the conventional safety switch. The trip indicator is to be installed in suitable location like control room. When any switch is operated, the location number of operated switch is displayed on the Trip Indicator. The trip indicator is also provided with relay output which can be interlocked with existing relay logic circuit. For additional safety, Protocontrol offers Adaptor Units for hard wire tripping, eliminating high voltage wires going to the switch compartment. This provides additional safety against effect of cable capacitance and damage due to wiring of high voltage wires to communication circuit.

### FUNCTIONAL DESCRIPTION :

Various models are available depending on number of safety switches/ length of belt, number of conveyors, configuration of communication o/p etc. However all models will have following basic features. When any safety switch is operated, the O/P relay of trip indicator is operated, tripping conveyor INSTANTLY. Operated switch number is also displayed and communicated to PLC / DCS as per requirement. All safety features are incorporated along with special features as mentioned below.

### To offer you stand alone Trip Indicator please inform us :

1. No of Pull Cord switches / Belt Sway connected to one Trip Indicator
2. No of groups connected to one Trip Indicator (We recommend grouping of one conveyor to one trip indicator )
3. Length of conveyor
4. Location of Trip Indicator
5. Type of O/P required from Trip Indicator : MODBUS , Binary , Analogue
8. Whether hard wire tripping is insisted or Trip Contact from Trip Indicator is to be used for tripping.

### We also offer complete plant management system for pull cord switches.

To offer you most appropriate system, we require following details

1. Plant Layout informing conveyor numbers and locations
2. No of Belt Sway and Pull Cord Systems on each conveyor
3. No of groups per conveyor ( like Belt Sway and Pull Cord ) and number of Groups per Trip Indicator
3. Length of conveyor
4. Location of Trip Indicator
5. Location of Panels for multiple trip indicators
6. Make of DCS and communication
7. Type of O/P required from Trip Indicator : MODBUS , Binary , Analogue

Please ask for catalog for more details

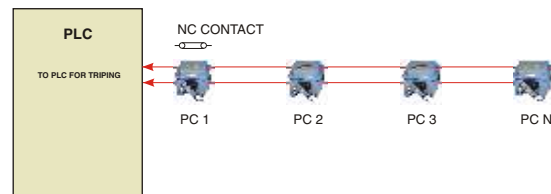


Trip Indicator

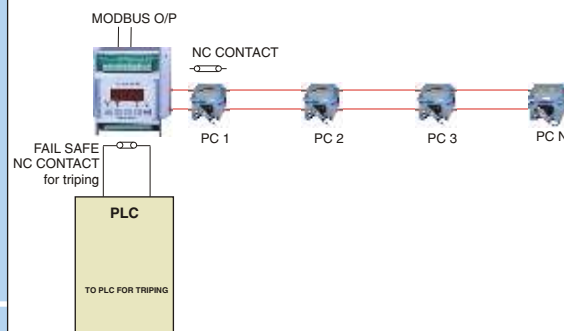


Trip Indicator Plant Management Panel

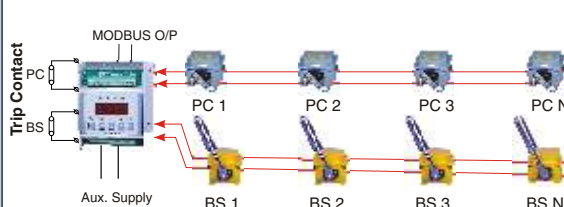
### CONVENTIONAL WAY OF WIRING



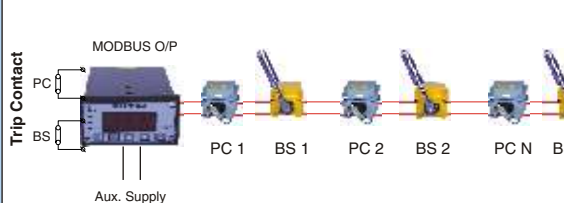
### TRIPPING AND INDICATION WITH PROTOCONTROL TRIP INDICATOR



### WIRING USING SEPERATE GROUP FOR PULL CORD AND BELT SWAY SWITCH



### WIRING USING SINGLE GROUP FOR PULL CORD SWITCH AND BELT SWAY SWITCH





Ask for this feature	Protocontrol TRA	Why this feature is provided
Is it with Key Pad?		<b>Makes this system fully Smart &amp; addressable</b>
Can you wire BS and PC in single loop but you get separate relay contact and Indication at Indicator?		Reduce cabling cost nearly to half. Indicator recognize Type of safety switch & informs operated safety switch is PC/ BS or ZSS even in single loop.
Does allocated switch number remains same even after removing few switches from loop?		Even if any switch is removed for maintenance the allotted number for other should not change
Is it auto addressable Type?		Makes commissioning simple
Can you bypass particular switch from Indicator, keeping balance loop in circuit (with password Entry for extra safety)?		Increased safety as Pull Cord Loop always in circuit
Can your Indicator Detect SHORT / OPEN in loop WITH LOCATION? i.e. cable open between 8 & 9 or cable short between 44- 45?		Indication of Cable Open and Cable Short fault with Location. Unique feature introduced first time in India.
Is your Indicator is having output (4- 20mA) with SELECTABLE RESOLUTION?		Better resolution in 4-20 mA loop
Can 4-20 mA O/P be made suitable when number of switches in loop are more?		HEX analog type output : 4-20 mA can be available with 1 mA resolution up to 256 safety switches. and with 0.5 mA resolution up to 1024 safety switches
Can your Indicator provide separate analog output even in common loop?		We give separate analogue O/P in common loop as per operated switch number.
Is O/P can be Interfaced to PC ?		Protocontrol offers RS 485 O/P with MODBUS. Other options like Profibus/ ethernet etc will be available using additional converters
Is your addressable type Indication System is really Smart ?		Key pad enabled Trip Indication is Smart

Protocontrol developed TRA series to overcome drawbacks faced by ordinary Pull Cord Indication Systems. Trip Indicator TRA provides all features required by end user and makes this indicator really Smart. Trip Indicator series TRA is cost effective as well as technologically updated solution for your conveyor indication system.

**PLEASE CALL OUR EXPERT FOR DETAILED DISCUSSION, OR INFORM DETAILS ASKED ON PAGE 11 SO AS TO OFFER YOU SOLUTION.**

## APPLICATION:

Heavy duty limit switch are extensively used on EOT cranes, conveyors, transfer cars, elevators, steel mills and mobile / material handling equipments for sensing of end limits and position sensing.

## OPERATION:

The equipment pushes the switch roller / lever actuating the switch contacts. The heavy duty actuating mechanism is designed to absorb hits of heavy machinery without damaging the internal mechanism.

Limit switches are enclosed in heavy duty weatherproof enclosure. The roller/ lever handle can be provided with different sizes and design to suit specific requirement.

## CONSTRUCTION :

The switch is housed in dust and weatherproof enclosure with IP 65 grade of protection. The contact roller / lever can be provided in various shapes.

## STANDARD SPECIFICATIONS :

- Enclosure: Weatherproof, field mounting Type, IP 65 Cast Al/Cast Iron, epoxy painted, colour light gray (standard) other colour are available as per requirement. DMC (FRP) enclosure for use in corrosive environment.
- Output Contacts : Standard Contact Combination :2NC/4NC
- Direction dependent . One set will actuate when roller is turned to left and another set will actuate when roller is turned to right. When direction dependent actuation is not required, these contacts are to be wired in series.
- Optional Contact Combination : 1 NO + 1 NC / 2 NO + 2 NC  
The contact set will actuate when roller is turned to either direction.
- Contact Rating for standard models: 16 Amp resistive at 440 VAC Output Contacts: 1 NO + 1 NC / 2 NO + 2 NC
- Contact Rating for standard models : 16 Amp resistive at 440 VAC
- Special flame proof enclosure for use in hazardous area, Group IIa, IIb IIc

## OPERATING MECHANISM

Two types of levers are available.

1. Spring Return roller lever : SR
2. Toggle / Snap Action/ Stay Put V Lever : SP V

## OPTIONAL COMMISSIONING SPARES

- Separate junction Box for termination of cables : JB
- Cable Gland : CG
- Mounting Plate : MP

## ORDERING PROFORMA :

Please refer ordering proforma on page No. 7 to select required model number

## LIMIT SWITCHES POSITION SWITCHES : Series LS

Robust, Al Die cast limit switches are offered for use in heavy material handling industries.

1. Limit Switches
2. Oil Tight Limit Switches

Switches are available with variety of operating heads (plunger, roller, spring etc) to suit various applications and with different contact combinations.

Please ask for detailed catalogue.



Spring Return Roller Lever  
HDLS SR



With Junction Box  
Toggle Action V Lever  
HDLS SPV



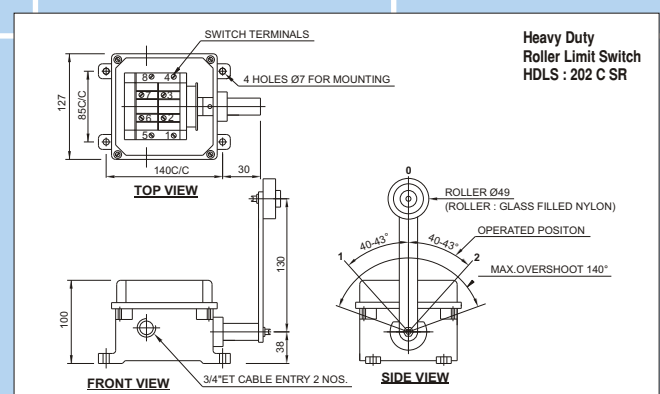
With Junction Box  
Toggle Action V Lever  
HDLS SPV2



Cable Glands : CG



Mounting Plate : MP



LIMIT SWITCHES

Protocontrol developed entire new range of RF Admittance / Capacitance / Tilt type / Ultrasonic-Radar Type Chute Block switches and Boot level Switches.

We are pioneer in designing first Disc Type Chute Block switch in India which is suitable for sensing level of almost all solids. By introducing concept of coat guard circuit, the problem of false tripping due to deposition of material on probe is completely eliminated.

Various technics are developed depending on use and material to be sensed.

## RF Admittance Disc Probe: Series: RFLS D: Chute Block Switch for hoppers :

Suitable for sensing material jamming in a compact chute. Designed for mounting at the bottom of the hopper. As the disc probe does not come in the path of the material it does not block the passage and hence does not affect the material flow. Ideal for almost every material solid, powder, granule, dry and wet having particle size up to 30 mm

## RF Admittance Rod Probe: Series RFLS R : Chute Block switches/ Boot Level Sensor / Level Switch:

The probe is to be inserted in the walls of hopper at required level point. When material level rises and touches the probe the contact is actuated. Suitable for almost every material solid, powder, granule, dry and wet having particle size up to 30 mm. As the probe is to be inserted in the hopper user has to ensure proper location for minimum abrasion. Provide proper canopy for long use.

## RF Admittance Rope Probe: Series RFLS C : Chute Block / Stock Pile Level switch for Top level Mounting

The probe is to be hung from the top in the hopper. The probe length is selected such that the bottom tip reaches at required level point. When material level rises and touches the probe the contact is actuated. Suitable for almost every material solid, powder, granule, dry and wet having particle size up to 30 mm. As the probe is to be hung in the hopper user has to ensure that the falling material flow does not fall directly on the sensor.

## Tilt Probe: Series TLS 602: Chute Block switch for hoppers

The TILT probe is to be hung from the top in the hopper or supported on the walls of hopper at required locations. When material level rises, makes a cone in the hopper. When the material touches the probe and the probe gets tilted, the contact is actuated. Suitable for almost every material solid, powder, granule but only for dry free flowing solids. As the probe is to be hung in the hopper user has to ensure that the falling material flow does not fall directly on the sensor.

We strongly recommend our customer to send following details to suggest most appropriate device

1. Size of hopper, chute ( Please send drawing of chute )
2. Mounting Location and suitability
3. Material to be sensed and its particle size
4. Confirm the material is with moisture contains or free flowing
5. Supply voltage
6. The controller is to be located with the sensor or remote type ( to overcome vibration )
7. Ensure that the sensor is protected in hopper
8. Abrasion properties of material ( to prove suitable coating on sensor probe )



DISC TYPE : RFLS D



ROD TYPE : RFLS R

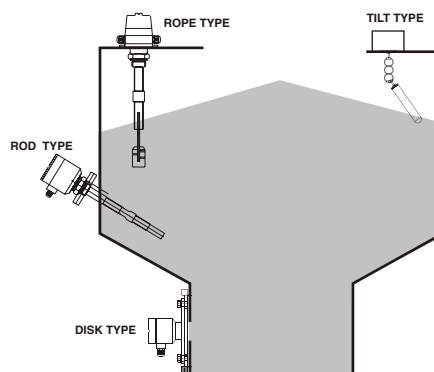


ROPE TYPE : RFLS C



TILT TYPE : TLS

## MOUNTING LOCATIONS OF CHUTE BLOCK SWITCHES





In material handling industries variety of level sensors are used. Rough operating conditions in material handling plants demands for reliable and robust design of sensor and control circuit.

With a experience of more than 26 years in this field Protocontrol offers variety of level switches for use in hoppers, silos, bucket elevators & stacker reclaimer for sensing level of cement, clinker, coal, sand, iron ore, fly ash, alumina, sinter, limestone and coke.

We offer simple level switch to complex level transmitter. Few applications are:

- Level switches and transmitters for liquid sumps and slurry
- Level Switch for powder, granules and solids
- Boot Level Detector on bucket elevators
- Stock pile level detection for boom conveyor
- Sensing level of crushed stone and ore in quarry
- Sensing level in clinker silo
- Level sensing of cement silo
- Level sensing of coke, coal in steel and power plants
- Level sensing for cereals, rice, husk, paddy & flour.
- Sensing level of fertilisers, chemicals and raw materials
- Sensing level of fly ash in power plants

We offer :

**Level Switches and transmitters for Liquid and slurry :**

- Cable Ended Level Switch
- Displacer Type Level Switch
- Side Mounted and Vertically Guided Level Switches
- Conductivity Type Level Switches
- Ultrasonic and Radar level Transmitters for liquids

**Vibrating Fork Type Level Switch: Series VFLS**

For free flowing, non sticky powders and granules. Particle size up to 10 mm.

**Vibrating Rod Type Level Switch: Series VRLS**

For mud, slurry and powders

**Paddle Type Level Switch : Series : PLS**

Simple level switch powder and granules provided with heavy duty motor which do not burn under locked rotor condition

**RF admittance Type Level Switch: Series RFLS**

Suitable for almost all powder, granules, mud and solids having particle size up to 30 mm. Heavy duty construction with special coat guard circuit making it immune to the deposition on the probe.

Special probe for working in high abrasion area and having temp range up to 450 degree cent.

**Diaphragm Type Level Switch: Series DLS**

Reliable and low cost level switch for sensing level of dry and free flowing powder and granules. Boot level detector for bucket elevator, level switch for sensing level of food grains

**Tilt Type Level Switch-Stock Pile Level Switch for booms : Series TLS 602**

Developed for sensing level of stockpile on stacker-reclaimer or sensing level of material in hopper. The freely hanging probe when gets tilted with material switch is actuated. Reliable level switch for heavy solids and lumps.

**ULTRASONIC AND RADAR LEVEL TRANSMITTERS :**

Non-contact measurement

Specially offered for dusty and corrosive environments

Long range products up to 50 Meters

Analogue 4-20 mA O/P

Local Indication

Offered with communication O/P for SCADA

Ask for detailed catalogue



Cable Ended Float Switch



SIDE MOUNTING LEVEL SWITCH



RF CAPACITANCE  
LEVEL TRANSMITTER



VIBRATING FORK TYPE



PADDLE TYPE



TILT TYPE : TLS



DIAPHRAGM TYPE  
LEVEL SWITCH : DLS



RF ADMITTANCE  
LEVEL SWITCH



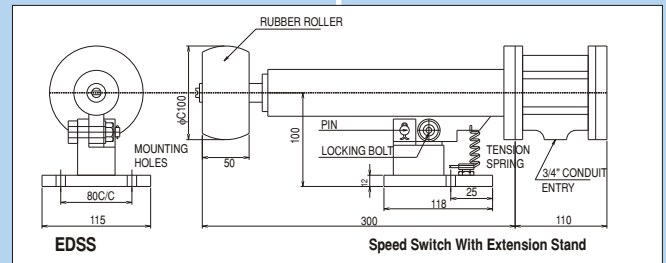
ULTRASONIC TYPE



RADAR TYPE

## ELECTRODYNAMIC SPEED SWITCH WITH EXTENSION STAND : Series EDSSES:

It is electro dynamic type speed switch do not require Aux. power supply. Generates 1 C/O contact for forward and 1 C/O contact for reverse speed. Please specify linear speed of conveyor in M/Min.



## DAMAGED BELT DETECTOR / BELT WAIR MONITOR ROPE TYPE: Series DBD R:

Conveyor belts are subject to wear and tear during operation. Repairs like vulcanization and splicing have to be carried out from time to time. In large conveyor plants, impending belt damages are not always noticed in advance. Protocontrol make Damaged Belt Detector Series: DBD enables the following belt damages to be detected at an early stage.

- Parts of the belt have come off in shreds.
- Steel ropes stand off from the belt.
- Belt edges are torn.
- Facing of repair point have come off.
- Slices are defective.
- Sharp object protruding through the belt fabric.

Damaged Belt Detector is to be mounted in pairs, positioned on either side of the belt. The units are connected by two spans of special PVC coated cable. One end of the cable mounts permanently to a support bracket and the other end is connected to a spring loaded ball located in a DBD unit. The switch gets actuated when an object or broken belt surface sweeps away one or both cables pulling spring loaded ball out of socket



**DAMAGED BELT DETECTOR ROPE TYPE**



**ELECTRODYNAMIC SPEED SWITCH WITH EXTENSION STAND**

### SPECIFICATION OF SERIES DBD R

Enclosure: Heavy Duty Cast Al, IP 65  
Output: 2 NO + 2 NC contact rated for 10 Amp resistive at 230 V AC supplied with tripping cable length of 3 Meter  
Supplied with bracket

**Note:** As to protect the conveyor for entire cross section, two damaged belt detectors are required per location.

We therefor recommend to process your order in pairs ( 2 Nos).

## DAMAGED BELT DETECTOR / BELT WAIR MONITOR INFRARED TYPE: Series DBD I

Many a times in normal running, some sharp objects gets locked in the chute plate. This sharp object cuts the belt surface and material start falling down the belt. To detect this damage Protocontrol offers infrared type damaged belt detector. Infrared type light beam curtain is fixed below the belt. In the case of belt damage, material pieces or dust starts falling down through the belt slit. When the light beams are obstructed by falling material through conveyor, same is detected and alarm is activated. Special electronic circuit for use in dusty environment is developed by Protocontrol.

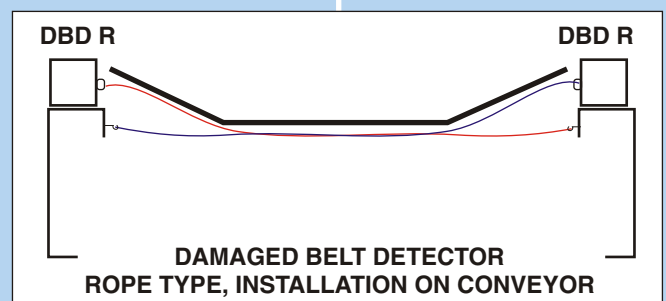
### SPECIFICATION of Series DBD I:

#### Sensing Unit :

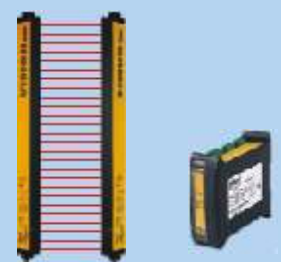
Sensing area Approx: Length 350 mm  
Sensing Gap (Belt Width): 1.5 Mtr./ 2 Mtr.  
Enclosure for sensing unit: Al

#### Control Unit

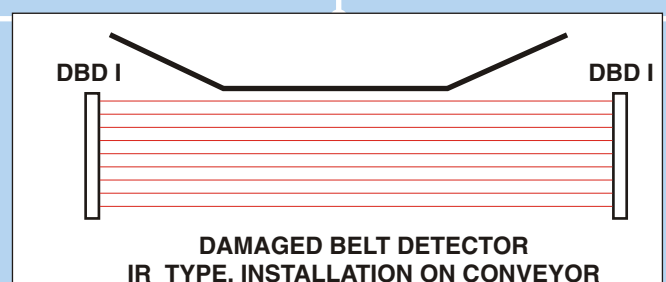
Supply: 230 V AC  
Enclosure: Field mounting, IP 65/ Din Rail Panel mounting IP30  
Output : 2 C/O relay contact, Rating 5 Amp resistive at 230 VAC



**DAMAGED BELT DETECTOR ROPE TYPE, INSTALLATION ON CONVEYOR**



**DAMAGED BELT DETECTOR INFRARED TYPE**



**DAMAGED BELT DETECTOR IR TYPE, INSTALLATION ON CONVEYOR**

### MATERIAL FLOW SWITCH FOR CONVEYOR :

**Series : MFS**

The flow switch is designed to produce signal if the flow at any critical point is interrupted. The switch can generate alarm when the belt is running without material

#### OPERATION :

The switch consists of paddle and counter weight assembly and switch assembly. Material on conveyor and switch remains in operated position lifts the paddle. When flow stops the paddle is allowed to pivot and actuates the switch. The switch is adjustable type and switch actuation at predetermined points is possible.

### BELT LOADING MONITOR: Series : BLM

Belt loading monitor is a simple and robust device to detect loading of material on the belt conveyor. It consists of a roller assembly which is to be installed below the belt. Due to loading on the belt, the roller makes contact with the belt. The belt pushes the roller down and operates the limit switch contact. The contacts are used in control circuit for interlocking purpose. The enclosure for switch is cast Al / DMC suitable for outdoor mounting.

#### SPECIFICATIONS :

Control Supply: 230 V AC, 50 Hz

Output: 2 C/O relay contact, Rating 5 Amp resistive at 230 V AC

Enclosure: Field mounting IP 65, Cast Al

### BELT LOADING MONITOR WITH ZERO SPEED SWITCH: BLM ESM

It detects belt loading as well as generates alarm when speed of the conveyors reduces preset value.

Sensor probe is housed in the roller assembly. The pulses are fed to separate control unit which produces relay contact.

### DE INTERLOCKING SWITCH / AUTO-MANUAL CONTROL STATION

Protocontrol offer de-interlocking switches / auto manual stations for conveyors. The conveyor can be manual started at field by isolating it from main control like DCS. Various programs and logics are available as per customer's specifications. The enclosure is cast mounting type with start stop buttons.

### ANTI COLLISION SWITCH FOR CRANES : Infrared Type

This product finds applications on cranes having long travels like in stock yard. When two cranes are moving on same rail extra protection is required to be provided when they approach each other and enter in danger zone. Anti Collision switch prevents accidents of cranes. Works on principle of infrared light. The modulated beam when gets reflected by approaching crane is detected and contacts are actuated.

### ANTICOLLISION SWITCH : Radar type

- Special Frequency Modulated Continuous Wave ( FMCW) radar technology for detection of moving as well as stationary objects
- Sensing function unaffected by wind, rain, fog, light and humidity
- Easy programming by DIP switches, no PC required
- Adjustable sensing field, ignore objects beyond set point
- Special models having large Sensing distance up to 40 meters
- No licencing required as operation at ISM band
- Supply 12-24 V DC , PNP or NPN output
- Rugged IP 67 housing withstands harsh environment



**MATERIAL FLOW SWITCH**



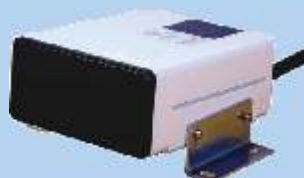
**BELT LOADING MONITOR**



**DE INTERLOCKING SWITCH**



**ANTI COLLISION SWITCH**



**ANTI COLLISION SWITCH : INFRARED TYPE**



**ANTI COLLISION SWITCH : RADAR TYPE**



Protocontrol offers Industrial Junction Boxes, Push Button Station, Local Control Stations and Pendant Control Stations in weatherproof as well as flameproof enclosures. These enclosures are specially designed for use in heavy industries. Special care is taken in designing cover & gasket making them truly industrial. Suitable size and number of cable entries holes are made as per customer request.

Enclosure certified by competent authority for WP and FLP protection

## SALIENT FEATURES

- Available in variety of material like Cast Al, DMC-SMC, FRP, Cast Iron, Sheet Metal and FRP
- Truly industrial grade having protection grade of IP 65 for use in field
- International grade superior finish with high grade powder coating with colour choice of customer
- Cover fitted with long life silicon cord gasket for long outdoor use
- Cover fitted with SS retaining type screws
- Special enclosures with integrated canopy

## PRODUCTS OFFERED

- Industrial Enclosures
- Cast Aluminium Push Button Stations
- Cast Aluminium Local Control Stations with Integrated Canopy
- Pendant Control Stations
- FRP Enclosures
- Flameproof Junction Boxes and Push Button Stations
- Cast Al Pole Boxes and Display Enclosures

## ACCESSORIES :

We also offer required accessories like:

- Cable Glands : Single Compression, Double Compression and Flameproof type
- Cable entry sealing plugs

Please specify following to select appropriate product.

- Size of J B / PBS (Otherwise inform number of Push buttons per JB so as to decide size)
- Number of stay put push buttons
- No of pushbuttons / Indicating Lamps if required
- No of terminals and size of terminals
- No of cable entries and size of cable entries
- MOC ( Cast Al / FRP / Cast Iron / Sheet metal )
- Enclosure grade (WP or FLP)
- Paint Shade if specific
- Make of hardware like Push Buttons and terminals if specific

Please ask for catalogue



Emergency Stop PBS



Pendant Control Station



Local Control Station



Local Control Station



Push Button Station



Push Button Station



Junction Box With Canopy



Flameproof JB

### CEMENT BAG COUNTER :

Protocontrol offer Cement Bag Counting system for online measurement of cement bags on conveyors.

It consists of:

- Sensor
- Bag Display System (Counter)
- Setting Terminal

Selection of sensor and sensor location plays vital role in performance of the system. Various types of sensors are developed considering diverse applications. The sensor can be 1. Limit Switch 2. Inductive Proximity Switch 3. Photoelectric Sensor. Large size bright display for target and for actual production. Display height of 2 inch / 4 inch making it visible from distance. Setting terminal can be hanging type or with wireless interface facility.

Please ask for detailed catalogue of the product.

### PULSE JET SEQUENCER TIMER:

Protocontrol offers different models of Pulse Jet Controller / Sequential Timer for Bag filters & the applications that requires sequential switching of output devices like solenoids, relays etc. The system has the application in ESP, Bag House in Chemical, Fertilizers, Food, Glass, Minerals & Metallurgical, Steel & Other Industrial Processes requiring Bag Filters & those requiring sequential operation of output devices for desired timing pulses.

### OPERATING PRINCIPLE :

It sequences the operation of various solenoids in the bag house. The sequential operation of the timer controls the ON & OFF time of the solenoid valve which in turn allows the compressed air injection for cleaning purpose. The required ON time, OFF time are adjustable by potentiometer (in case of Solid State Circuit or can be programmed by keypad in case of Microcontroller Based Circuit). The system is also responsible for giving the feedback signals like timer on, purge o/p, local, remote, enable & DP (potential free) outputs to the DCS system for further control operations. The Microcontroller Based Circuit also supports many optional features.

Please ask for detailed catalogue of the product.

### TURNKEY AUTOMATION PACKAGES FOR CONVEYORS AND MATERIAL HANDLING PLANTS

Protocontrol offers complete automation packages for material handling plants and process industries. With more than 22 years of experience in manufacturing of sensors & field instruments for material handling plants, Protocontrol is now geared up with execution of total turn key automation packages. We have team of project engineers & full set up for execution of total turn key project supported with full techno-commercial documentation / Design. Our expert engineering team can design, fabricate, wire electrical & instrumentation panels as per international standards.

We offer in house as well as at site programming on variety of PLC & SCADA as per site requirement & applications. We commit our self as self dependent project executers with our own support for devices like Trip Indicators & other field devices on conveyors. We also Work specially on long / multiple conveyor applications wherein Ethernet/ Distributed PLC / R IO Signaling / RS 485 communication with different PROTOCOL / Using RJ 45 or CAT networking with Ethernet Switches/ Gateways/ Wireless applications.



**CEMENT BAG COUNTER**



**JET PULSE SEQUENCER TIMER**



**CONTROL PANEL**

### We offer package including:

- Selection and finalizing specification of Field Devices
- Cable lying, wiring, Installation and commissioning of field devices and panels
- Supply of PCC, MCC, PLC, Electric Control Panels & Motor Control Panels
- Selection of automation platform
- Programming and working on PLC, HMI/ MMI, SCADA applications
- Industrial Ethernet and Communication Devices
- Machine Tool Automation with PLC, CNC & Drives Training

## OUR OTHER PRODUCTS



### PROXIMITY SWITCH : INDUCTIVE - CAPACITIVE - MAGNETIC - PHOTOELECTRIC-ULTRASONIC

Protocontrol manufactures more than 2600 types of proximity switches. These products are use for position, speed, and level sensing applications. We have specialized sensor to suit every application. Latest addition in our range is:

- Inductive Proximity Switch with extra long sensing range : 50 mm
- Capacitive Proximity Switch for powder sensing like Cement
- Proximity switch for use in hazardous area application : Namur Type
- Magnetic Proximity Switch : For high sensing range
- Ultrasonic Proximity Sensor for analog output



### TEMPERATURE SCANNER

- Winding Bearing Temperature Scanner
- WTI for Dry Cast Resin Transformers
- Thermistor Units with Thermistor
- Process Scanners
- Temperature Scanners with retransmission outputs
- Software or communication, SCADA /Ethernet and wireless communication



### SIGNAL CONDITIONING : TRANSMITTERS & INTERFACING DEVICES: POWER TRANSDUCERS

Protocontrol offers field sensors. We also bridge gap between field sensors and control room by offering variety of signal conditioning modules. These modules provide effective isolation, improve signal communication and hence improve plant performance. Fill the gap between sensors to control room by Protocontrol make signal conditioning modules.

- Head Mounted Temp. Transmitter
- Signal Transmitter / Signal Isolator
- Signal Converters
- Loop Powered field mounted isolated Temp. Tx.
- Pressure Transmitter
- Voltage / current transducer
- Watt / Var / Watt & Var Transducer
- Watt-Hr / Var-Hr Transducer
- Power Factor / Phase Angle Transmitter
- Mains Frequency Transducer
- Process Transmitters

Crown 2013 Mat handling 2000



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