

**BELT PROTECTION UNIT**

**CTS 700 BSD**

**BELT SPEED MONITORING UNIT**

**OPERATIONS**

**AND**

**INSTALLATION MANUAL**

**BELT SPEED MONITORING UNIT**

## **TYPE: CTS 700 BSD**

The CTS 700 series belt speed detection unit can be mounted at any point on the conveyor structure.

### **BELT SPEED DETECTION**

The belt speed detection unit consists of a roller mounted on a beam attached to a pair of stanchions that are bolted to the conveyor stringers. The roller rests against the bottom of the trough side of the belt.

The termination box consists of an enclosure that is made of high impact poly-carbonate UV stabilized and carries a rating of IP65 degree of protection.

### **BELT SLIP DETECTION**

The belt speed detection unit consists of a roller mounted on a beam attached to a pair of stanchions that are bolted to the conveyor stringers. The roller rests against the bottom of the trough side of the belt.

The termination box consists of an enclosure that is made of high impact poly-carbonate UV stabilized and carries a rating of IP65 degree of protection.

## **Features**

- Belt Slip and Under-Acceleration monitoring
- Up to speed output
- Tachometer mode for standard monitoring
- Dynamic mode for startup monitor and slip detection
- 110v and 220v selectable input voltage
- User friendly menu interface
- Fully configurable to suite requirements

**Static Mode Operation**

The CTS 700 BSD in static mode will monitor just the speed of the speed roller. The unit will just report the speed of the conveyor belt in meters per second or feet per minute. Static mode of operation is used for standard potential free contact (N/O).

**Dynamic Mode Operation**

Dynamic mode is used in conjunction with the conveyor’s switchgear. An output from the main contactor is wired to the CTS 700 BSD drive input. When the drive starts up, the drive input is energized and the CTS 700 BSD will go in to an acceleration-monitoring mode. After the belt is up to speed, the up-to-speed contact closes and the unit will go in to normal speed monitoring mode. If the drive in signal is lost, the unit will go back in to standby. The CTS 700 BSD will close the “up-to-speed” relay in standby, and will only open in the case of an error (under-speed or drive signal is lost). The relay will only stay open for approximately 2 seconds, then close again. This mode of operation removes the need for a bypass timer over the centrifugal switch in the MCC panel while the belt is starting up. The speed of the belt is also setup in the menu system or it can be updated while the belt is running and can also be displayed in meters per second or feet per minute.

**Tachometer Mode Operation**

The tachometer mode is for usage in general applications without a C.T. Systems roller. The unit can be configured to switch on at a set RPM. (it is also configurable to how many pulses are received per revolution). The CTS 700 BSD unit will display in the current speed in RPM.

**Menu Operation for Static Mode**

To enter in to the menu, press ENTER and ACCEPT “x” represents speed in meters per second or feet per minute.

STATIC MODE Speed – 0.0x
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Press “ENTER” to go in to the menu, press “NEXT” to exit back to standby.

ENTER SETUP ENT=YES    NEXT=NO
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System mode is to set up what mode of operation is desired.

SYSTEM MODE ENTER                      NEXT
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Press “ENTER” to change the setting or “NEXT” to go to the next option.

The modes available are STATIC, DYNAMIC and TACHOMETER. Use the “UP” and “DOWN” buttons to select the mode that is required. (Set to STATIC for this option) Press “ENTER” to accept the mode and go to the next option.

Display Unit is used to select what units are desired on the display. Press “ENTER” to change the units or “NEXT” to go to the next option.

DISPLAY UNIT
ENTER                      NEXT

The Units available are METRIC (meters/second) and IMPERIAL (ft/min). Use the “UP” and “DOWN” button to select the desired display unit. Press “ENTER” to accept the setting and go to the next option.

To set the RUN speed, press “ENTER”. Or press the “NEXT” button to advance to the next option.

RUN SPEED
ENTER                      NEXT

To change the speed, press the “UP” and “DOWN” buttons to set the RUN speed of the belt. This option can also be set up while the belt is running. Press “ENTER” to accept the run speed to go on to the next option.

Press “ENTER” to change the trip percent or “NEXT” to advance to the next option. The trip percent is calculated from the RUN SPEED, if your speed is at 1.0m/s and the TRIP percent is at 10% then the unit will trip out at 0.9m/s (10% of run speed) Use the “UP” and “DOWN” buttons to select what the percentage fluctuation may be. A typical value for the trip percent is 10% and this setting can be anything from 1 % to 20%. Press “ENTER” to accept this setting and go on to the next option.

TRIP PERCENT
ENTER                      NEXT

Press “ENTER” to save all the setting you have changed or press “NEXT” to abort the setup session. On abort, all the old settings are restored.

SAVE SETTINGS
ENT=YES      NEXT=NO

In Dynamic mode, the CTS 700 BSD will monitor the speed of the belt and close a relay when the belt is up to speed. The reaction time of the relay is about two seconds. This mode of operation is a complete mimic of the classical centrifugal switch. To set the RUN speed of the unit while the belt is in motion, press the UP button for three seconds and then release, the unit will update to the current speed.

### **Menu operations for Dynamic Mode**

To enter in to the menu, press “ENTER” and “ACCEPT”

STANDBY
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together. “x” represents speed in m/s or ft/min.

Press “ENTER” to change the CTS 700 BSD setting or “NEXT” to go back to standby.

ENTER SETUP ENT=YES    NEXT=NO
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System mode is to set up what mode of operation is desired. Press “ENTER” to change the setting or “NEXT” to go to the next option.

SYSTEM MODE ENTER                  NEXT
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The modes available are STATIC, DYNAMIC and TACHOMETER. Use the “UP” and “DOWN” buttons to select the mode that is required.(Set to DYNAMIC for this option) Press “ENTER” to accept the mode and go to the next option.

Display Unit to select what type of units are desired on the display. Press “ENTER” to change the type of unit or “NEXT” to go to the next option.

DISPLAY UNIT ENTER                  NEXT
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The Units available are METRIC (meters/second) and IMPERIAL (ft/min). Use the “UP” and “DOWN” button to select the desired display unit. Press “ENTER” to accept the setting and go to the next option. To set the RUN speed of the CTS 700 BSD, press “ENTER” or, press the “NEXT” button to advance to the next option.

RUN SPEED ENTER                  NEXT
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To change the speed, press the “UP” and “DOWN” buttons to set the RUN speed of the belt. This option can also be set up while the belt is running. Press “ENTER” to accept the run speed to go on to the next option.

Press “ENTER” to change the trip percent or “NEXT” to advance to the next option. The trip percent is calculated from the RUN SPEED, if your RUN speed is at 1.0m/s and the TRIP percent is at 10% then it will trip out at 0.9m/s (10% of run speed) Use the “UP” and “DOWN” buttons to select what the percentage fluctuation may be. A typical value for the trip percent is 10% and this setting can be anything from 1 % to 20%. Press “ENTER” to accept this setting and go on to the next option.

TRIP PERCENT ENTER                  NEXT
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This option is used to set the time when the belt starts moving from when the drive is energized. This option is allows all the motors/coupling etc. to get to speed before the belt starts to move. Press “ENTER” to change the time or press “NEXT” to go to the next option. Use the “UP” and “DOWN” buttons to select the time that is required for the belt to start moving. This time can be from five seconds to twenty seconds. Press “ENTER” to accept the time.

MOVEMENT TIME ENTER                  NEXT
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This option is to set the time intervals between checking for acceleration. Press “ENTER” to change, or NEXT to advance to the next option.

ACCELERATE TIME ENTER                  NEXT
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Use the “UP” and “DOWN” buttons to select the time between checks. The belt must accelerate at least 0.1 m/s between checking. If the belt does not accelerate in that time, the CTS 700 BSD will lock out and return to standby with the message “ACCELERATE FAIL”. Press “ENTER” to accept the time.

Press “ENTER” to save all the setting you have changed or press “NEXT” to abort the setup session. On abort, all the old settings are restored.

SAVE SETTINGS ENT=YES    NEXT=NO
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In the dynamic mode, the CTS 700 BSD requires an input from the drive contactor. In this mode the CTS 700 BSD removed the need for an UP-TO-SPEED timer in the MCC panel since the unit has an internal timer and the output has been customized for this application. A Typical wiring diagram in the dynamic mode is in the DIAGRAMS section of the operations manual. The output in dynamic mode has the following characteristics. The relay is closed most of the time unless the unit is in the menu or an error has occurred. If an error has occurred, the unit will open the relay for 2 seconds and then return to standby with the error message on the second line of the display (the relay is closed again in standby). To set the RUN speed of the unit while the belt in motion, press the “UP” button for three seconds and then release (the CTS700BSD/MD will update to the current speed).

The drive in contact is used to tell the CTS 700 BSD that the drive has been energized which puts the unit in to the “waiting for movement” state. Once movement has been sensed, the unit will check the acceleration of the belt until it is up to speed. When the belt get up to speed, it will check the speed and verify that the belt is running. Within the unit is a relay which will open on any error condition. Which are as follows:

ACCELERATION WAS NOT DETECTED DURING STARTUP  
DRIVE IN SIGNAL LOST  
UNDER-SPEED DETECTONS  
MENU ACCESSING  
FATAL UNIT ERROR

### **Tachometer mode Operation**

To enter in to the menu, press “ENTER” and “ACCEPT” (together, at the same time).

TACHO MODE 0.0 RPM
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Press “ENTER” to change the setting or “NEXT” to go

ENTER SETUP ENT=YES    NEXT=NO
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back to standby.

System mode is used to set up the mode of operation. Press “ENTER” to change the setting or “NEXT” to go to the next option.

SYSTEM MODE
ENTER                      NEXT

The modes available are STATIC, DYNAMIC and TACHOMETER. Use the “UP” and “DOWN” buttons to select the mode that is required.(Set to TACHOMETER for this option) Press “ENTER” to accept the mode and go to the next option.

Press “ENTER” to set the pulses per revolution or “NEXT” to advance to the next option. This option is used to define the the number of pulses per revolution of the speed roller (the CTS roller has 8 pulses/revolution). This can be anything from 1 pulse / rev to 200 pulses/rev. To accept the pulse count, press “ENTER” to advance to the next option.

PULSES / REV
ENTER                      NEXT

To set the run speed of the device, press the “ENTER” button otherwise, press the “NEXT” button. Use the “UP” and “DOWN” buttons to set the RPM. This setting does not increment by one, it uses the pulses / rev to calculate the RPM. Press “ENTER” to accept the RPM and advance to the next option.

RUN SPEED
ENTER                      NEXT

Press “ENTER” to change the trip percent or “NEXT” to advance to the next option. The trip percent is calculated from the RUN SPEED, if your run speed is at 100 RPM and the TRIP percent is at 10% then the unit will trip out at 90 RPM (10% of run speed). Use the “UP” and “DOWN” buttons to select what the deviation may be. A typical value for the trip percent is 10% and this setting can be anything from 1 % to 20%. Press “ENTER” to accept this setting and go on to the next option.

TRIP PERCENT
ENTER                      NEXT

Press “ENTER” to save all the setting you have changed or press “NEXT” to abort the setup session. On abort, all the old settings are restored.

SAVE SETTINGS
ENT=YES                  NEXT=NO

In tachometer mode, the CTS 700 BSD is a general-purpose tachometer relay. This can be used to monitor anything that requires a relay output to indicate up-to-speed. To set the RUN speed of the unit while the machinery is in motion, press the UP button for three seconds and then release, it will update to the current speed.