# Conveyor Remote Isolation

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Remote Isolation of a Conveyor on a Bramco Conveyor Control and Management System type CCMS is;

“The ability to cause the removal of Mains Electrical Power from all entities on the system whose operation may cause movement of the conveyor componentry”

All Bramco Conveyor Control Stations [CCS] may be equipped with **Isolation Select** switching, therefore provide isolation facilities at every CCS along the conveyor. The pull keys all have locking facilities incorporated.

Remote Isolation will provide;

1. The removal of power from all the entities on a conveyor that cause motivation of the carrying surface of the system.
2. The processing of information that the power supplies and motivating entities are in fact isolated from electrical power.
3. Supplying Isolation Effected to the person requesting the isolation.

The CCMS system comprises;

1. A master or Main Control Panel unit [MCP] which is normally located at the head end of the conveyor.
2. A 6 cored Signal Line Cable [SLC] is installed along the full length of the conveyor to an End of Line [EOL] termination panel.
3. Conveyor Control Stations [CCS} are located and coupled to the control cable at normally 100 metre centres along the conveyor. (These may be centres greater than 100M on very long system).

**Main Control Panel**

The Main Control Panel [MCP] supplies and controls;

1. The control power for all equipment coupled to the control system.
2. It generates and supplies the data communication power for the electronic control elements mounted in the CCS along the system.
3. Bramco employs an emergency extra stop control relay [SLC2] which is supplied on the SLC cable and is monitored by the MCP.
4. Monitors and controls the system through constant communication to the EOL panel terminating equipment.

The End of Line panel terminates the SLC cable and provides:-

a. Termination of the SLC2 relay signal line in a measurably constant manner.
b. Terminates the Data Highway and provides a returned measured signal to the MCP control unit.
c. Where required provides additional power to the system.

**End of Line Panel**

The Conveyor Control Stations provide;

1. The stop/start switching of the analogue SLC2 relay.
2. Provides the switched location monitoring of the SLC2 circuitry.
3. The stop/start witching of the dual second stop digital control node.
4. Provides the switched location monitoring of the digital circuitry.
5. Controls the charging, controlling and monitoring of the Pre Start Warning [PSW] sounders mounted on each CCS unit.


**Conveyor Control Station - CCS**

The Bramco CCMS system is a dual stop Conveyor Control System employing an Analogue and separate Digital control system. The system is complete with monitoring of all stop locations, system faults, system fault locations and a monitored PSW warning facility. The system also offers a remote Isolation Request facility which provides safety for maintenance people functioning on or around the conveyor during maintenance and repair operations.


**Pre Start Warning – PSW400**

The CCMS system is a FAIL SAFE system independently rated to categories SIL5 and CAT4 as a completely supplied Bramco system. These categories apply when all equipment used in the stop control of the conveyor are Bramco manufactured and supplied.

This applies particularly to our main panel Controller [ICMS], our Bramco BK400 Pull Keys, our PSW400 sounders, our End of Line components and our Analogue Relays [SLC2].

The **Digital** system on the CCMS provides the **Isolation Request** function. The MCP central control is our Integrated Control Management [digital control] System [ICMS] which scans the electronic stop control nodes on the system continuously. A switch turned to the isolate position is recorded by the ICMS on its digital scan and a relay [DR2] in the ICMS controller is energised. The CCS station requesting the isolation should be locked out with an appropriate locking device in the isolate position. A danger tag is to be attached to the lock.


**ICMS Control Module**

**NOTE;**

1. **All switches are manufactured with the isolate position following a trip position on the switches. The isolate function will not operate if the conveyor control does not see a trip request first.**
2. **The isolate request is NOT actuated and completed until the LED's on the side of the pull key on the CCS unit are turned on.**
3. **The LED's will only be activated on the CCS pull key calling for the isolation. No other LED's on any other pull keys will be activated.**

Whilst in an ISOLATED STATE from 1 position, an isolation request will be accepted from other CCS pull keys. When confirmed, the LED's will be turned on at the requesting pull key.

**BK400S: locked in Isolate Position**

**Isolation Confirmation LED**

The output of the DR2 relay is used by the conveyor provider or customer to trip the main circuit breaker and removing all Mains Electric Power from the conveyor drive motors.

When the breaker is tripped, as a minimum, a normally closed contact when the breaker is open is to be connected to the inputs on the Bramco ICMS unit. When this is closed, following an isolation request, the ICMS unit will signal the CCS pull key and the LED's on the side of the pull keys will be turned **ON. The system is now isolated.**

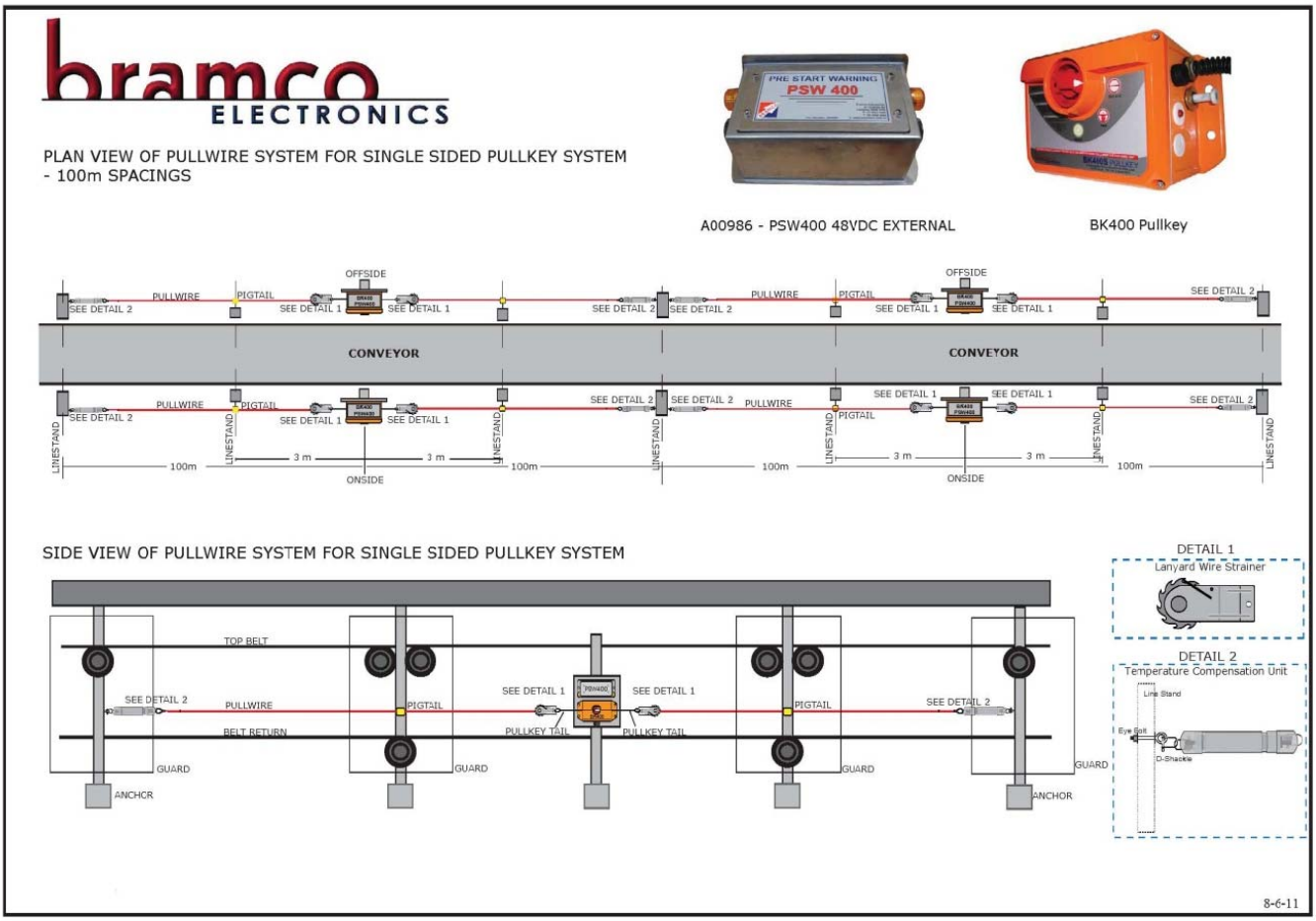
The Bramco system will accommodate any number of drive stations on long conveyors. The system just described is the basic single drive configuration.

Every drive mechanism on a conveyor has to be isolated. The isolation must include the weight towers when used, winch take up units, dual or triple drive units. The conveyor **must not move** at all whilst people are in close contact during maintenance activities. The power must be removed from every motor which implies tension of any form to the conveyor. The tripped state of every electrical switching device used to supply power to any and all drives must be connected correctly and checked before the input to the ICMS signalling "Isolation is completed" is supplied to the ICMS unit.

Where conveyors have intermediate and tail end drives as well as the principal drive unit and perhaps remote conveyor tensioning apparatus, the ICMS will signal each and every powered section on the conveyor. The removal of power from each drive section will be signalled to a relay at each station and the output from each will be received by the ICMS controller. When every relay connected at every drive has answered the ICMS, it will signal the CCS pull key and the conformation LED's will be turned on. The system will **NOT** confirm the isolate conformation if any relay has not signalled appropriately for whatever reason.

Conveyors today can be very complex electrical and electronic controlled devices. The use of PLC controllers is common place and proof the ICMS unit needs to confirm the isolation complete configuration is often the function of the PLC controller. Care must be taken with gravity weight towers for conveyor tensioning on long conveyors. These must be blocked off from movement even with the power removed from the electrical lifting devices. If they move under gravity the conveyor will move. Hydraulic tensioning devices on take up should be de-pressurised as they may have a pressure relief device trip and the conveyor may move.

There are so many aspects to be considered when a remote isolation facility is being considered on a conveyor. Bramco does not install conveyor systems. A risk assessment is necessary for every conveyor installation requiring remote Isolation.

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