



ISHWIR

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## **Application Note: PowerCentre Hardwire-trip**

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## 1. Scope

Additional safety interlocking has been requested by the End-User to have a failsafe trip of all belt drive circuits when the pullkey system is activated where the PowerCentre is used at belt drives.

The pullkey system is a major safety system used by End-Users and the interlocking or tripping circuit must comply with;

- Failsafe operation
- A hardwired topology

This note covers the basic operation of the Hardwired trip system used on the PowerCentre at belt drives.

## 2. Overview

PowerCentre's used at belt drives are controlled through an End-User PLC installed in the PowerCentre PLC enclosure. The programming of the PLC is the responsibility of the End-User and the incorrect functioning of the PLC program or internal component failure could result in conditions where despite activation of external field emergency stop devices, the system does not function as intended.

To mitigate this risk, it was requested to install an additional hardwired interlock circuit to trip all PowerCentre drive circuits used to power the belt drive.

PowerCentre belt drive circuits are housed in a number of separate enclosures and the Hardwired safety circuit between the enclosures must be Intrinsically Safe (IS) to ensure risks are mitigated based on the PowerCentre safety philosophy. The Hardwired safety circuit must also fail to safety and allow start-up of the belt drives once the Hardwired safety circuit is healthy.

## 3. IMPORTANT NOTE

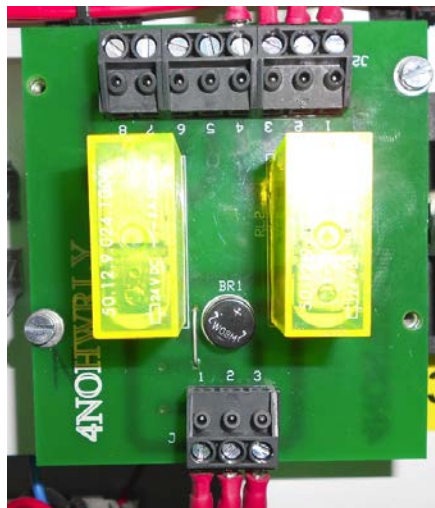
The Hardwired safety circuit is not to be used as an isolation circuit. Correct procedures for isolation and lockout of the PowerCentre to allow work on the PowerCentre System (Including field equipment) must be followed.

Note: *Whilst the Hardwired safety circuit is activated, no belt drive circuit will operate. The drive circuits will become healthy once the remote external field pullkey system is restored and once the Hardwired safety circuit is healthy, can the PLC start the belt drive circuits as per the PLC program.*

## 4. Operation

The master Hardwired safety circuit interlock wiring is located inside the PLC enclosure and is derived from the Pull-key Control Unit which is approved separately by the OEM of the Pull-key.

The interlock from the Pull-key Controller employs an EXPANSION SLAVE SAFETY RELAY to provide 4 individual contacts which switch the IS powered interlocks for the power circuits housed in adjacent drive enclosures.



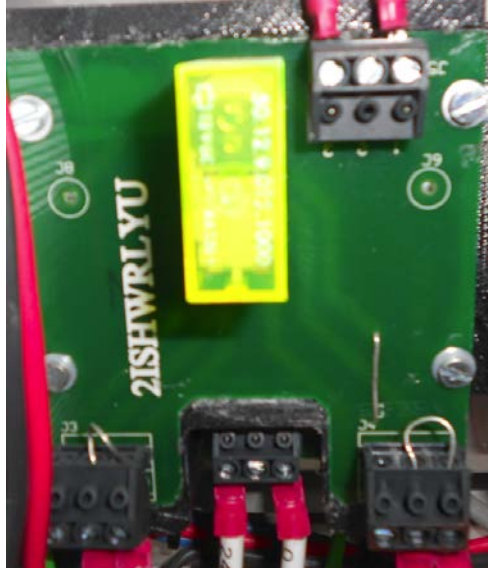
**Photo of the EXPANSION SLAVE SAFETY RELAY**



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The relay contacts are approved to switch IS circuits by virtue of the clearance and creepage distances between the coil (NON IS) and the contacts.

The HARDWIRED IS INTERLOCK RELAYS for the power circuits require an auxiliary NON IS 24Vdc power supply and are housed in the Power Drive enclosures.



**Photo of the HARDWIRED IS INTERLOCK RELAY**

The output interlock circuit from this relay is Intrinsically Safe and is wired to the contacts of the EXPANSION SLAVE RELAY in the PLC compartment. Each Hardwired IS relay has two output contacts for interlocking with the certified Dimako proprietary PEFLO protection relay and is wired to the auxiliary trip input.

When the EXPANSION SLAVE RELAY is deactivated by the Pull-Key Controller the Dimako PEFLO protection relays installed at each belt drive power circuit will trip and indicate Auxiliary Interlock Trip.

PEFLO Auxiliary Interlock Trip indication



**Photo of PEFLO protection relay**



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A special safety relay is used for both the HARDWIRED IS INTERLOCK RELAY and the EXPANSION SLAVE RELAY, based on EN50205B, that has both high physical separation between adjacent contacts and a forcibly guided contact system.

The relay also gives a short time isolation of up to 6KV between the coil and relay contacts