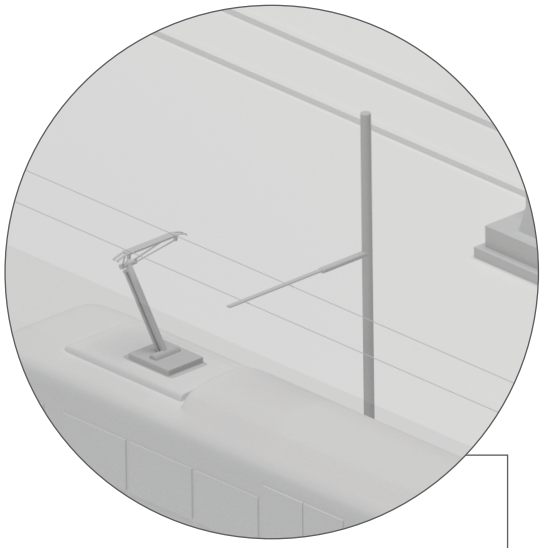
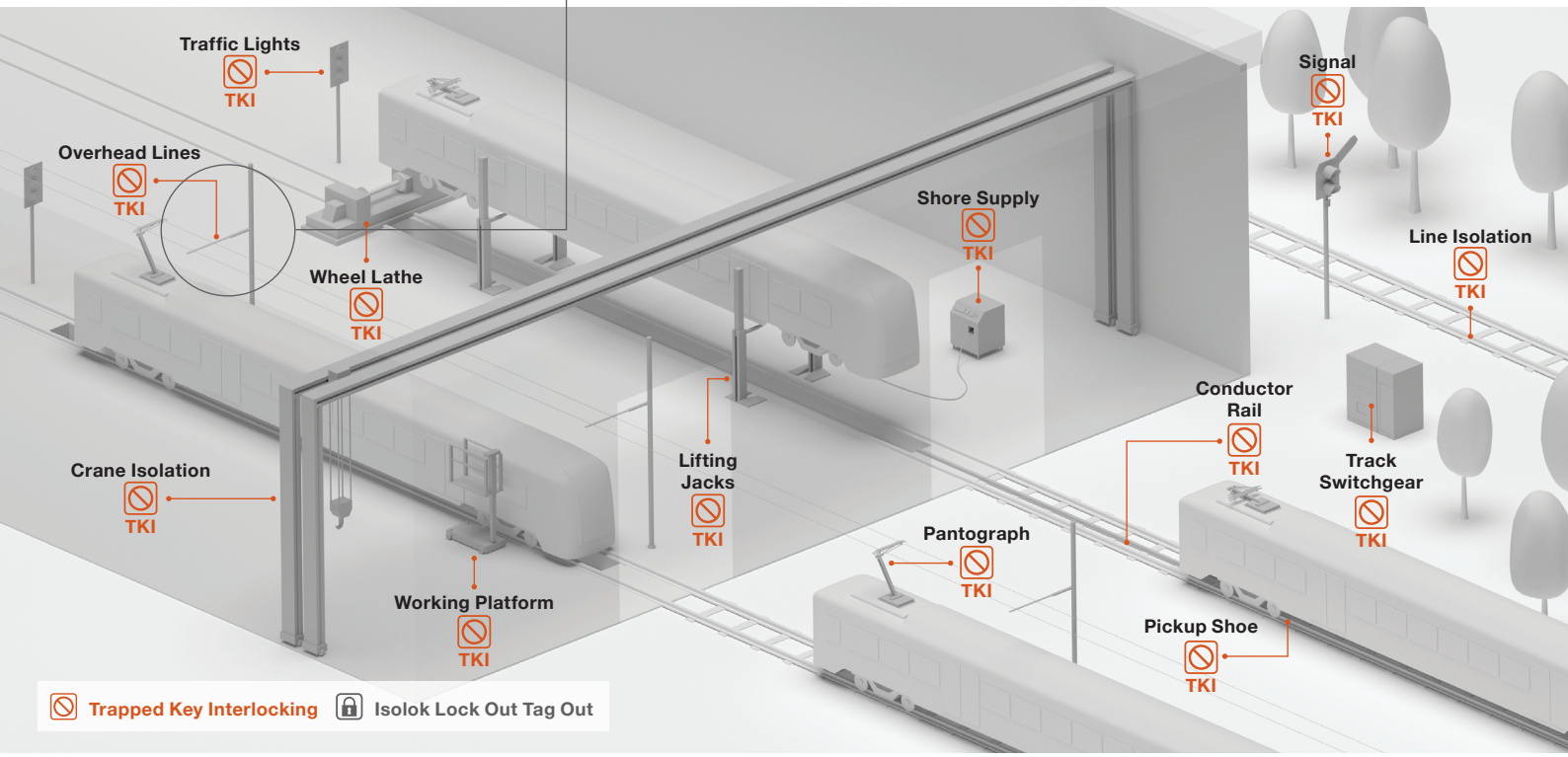


Overhead Line

The Risk

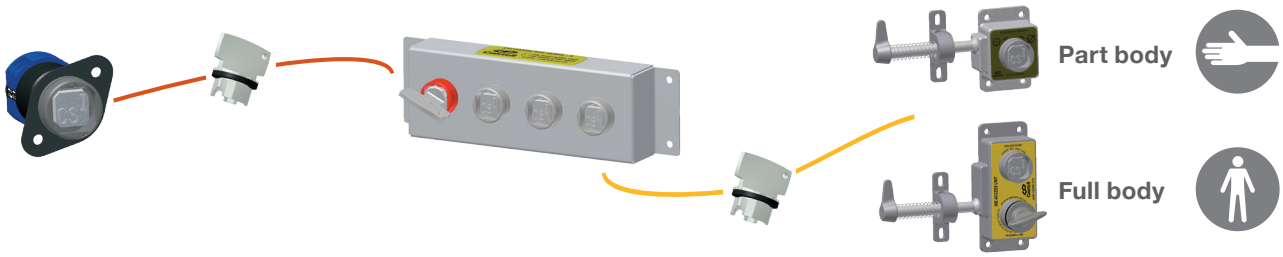
Overhead rail power lines create a specific hazard around arc flash, this is compounded by a danger from moving vehicles. Therefore before any work can be undertaken on rolling stock, the overhead lines need to be isolated, earthed and the rolling stock immobilised.

Rail Transport



Castell Solution

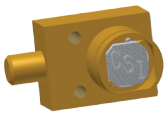
1 Isolation **2 Key Exchange** **3 Access Control**



Benefits

1) Overhead lines are isolated correctly before work can start on the rolling stock
2) Work is carried out is a sequential procedure and short cuts are not possible.
3) The system can be implemented as a complete safety system encompassing access and equipment.
4) The system can be combined with traffic signals to give a visual indication of when the system is safe.

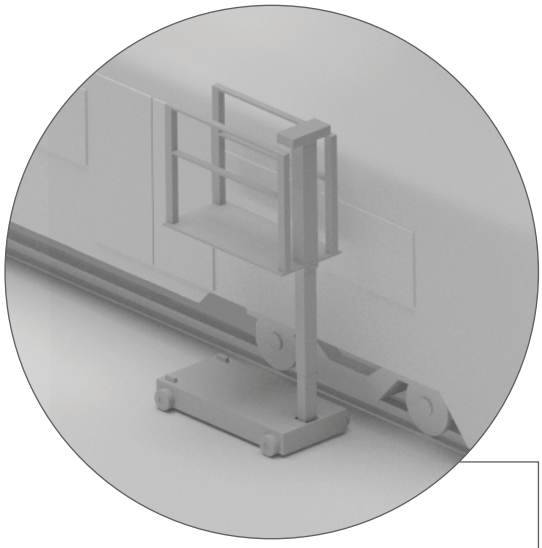
Products

Isolation	Exchange	Access	
Ensuring that the overhead lines are isolated and earthed using simple K Bolt interlocks.	The released key that ensures equipment is isolated and earthed is inserted into an exchange unit. This typically changes depot lights from red to green to indicate safe state.	The system can release multiple access keys to enable the use of high level access and equipment.	
K Bolts 	KSE20 	AI 	AIE 

High Level Working Platforms

Rail Transport
Application Note

Castell

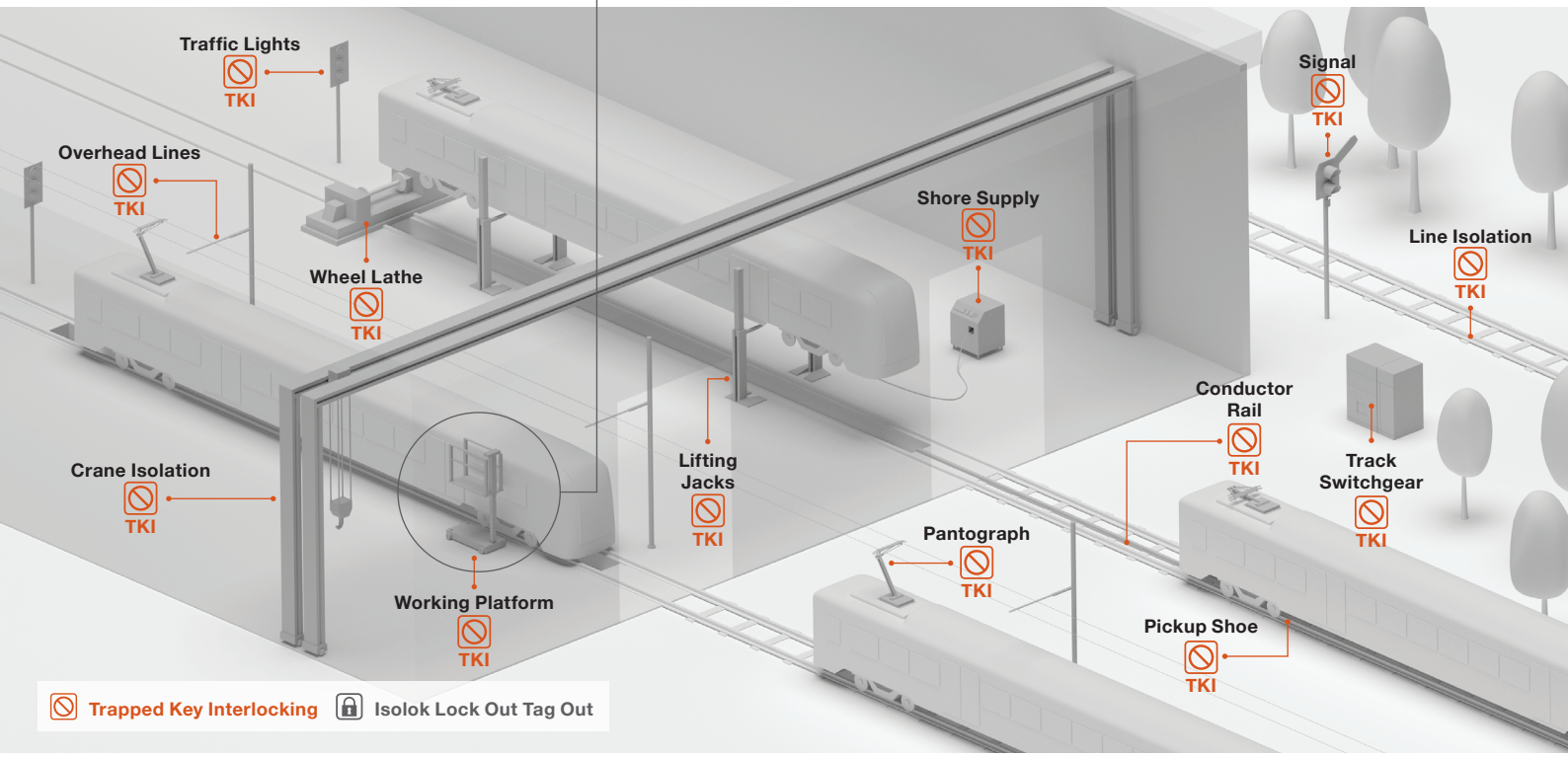


High Level Working Platforms

The Risk

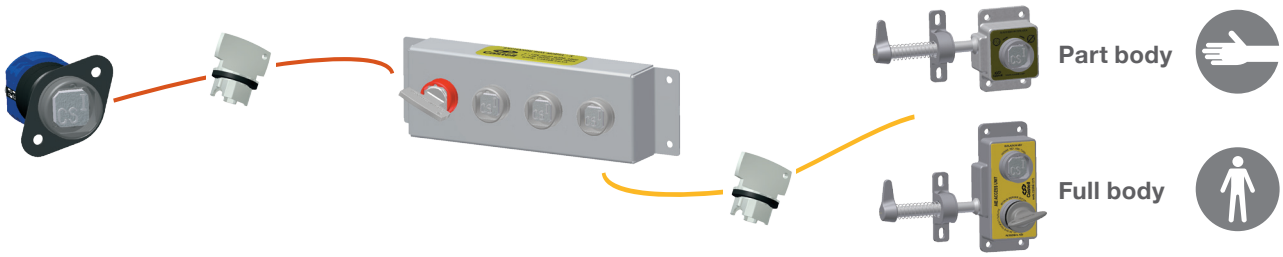
Using high level access platforms to work on pantograph equipment whilst the system is live creates risk around arc flash and hazard from moving rolling stock.

Rail Transport



Castell Solution

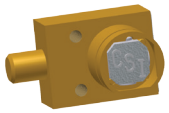
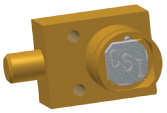
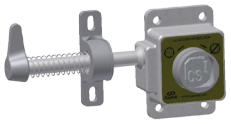
1 Isolation **2 Key Exchange** **3 Access Control**



Benefits

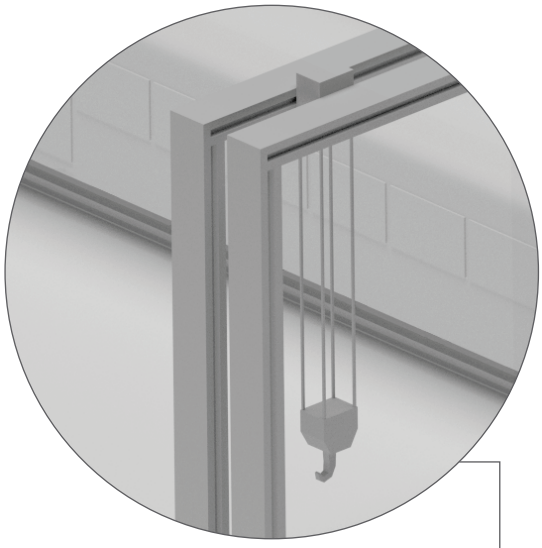
1) Overhead lines are isolated correctly before work can start on the rolling stock
2) Work is carried out is a sequential procedure and short cuts are not possible.
3) Through the use of multiple access keys the system can only be re-energised once all the access keys have been returned. Therefore multiple processes can be made safe.
4) The system also provides protection from strike hazards from moving rolling stock. Trains can not be moved until all access keys are returned.

Products

Isolation	Exchange	Access	
Ensuring that the overhead lines are isolated and earthed using simple K Bolt interlocks.	The released key that ensures equipment is isolated and earthed is inserted into an exchange unit. This typically changes depot lights from red to green to indicate safe state.	Multiple keys can then be released to allow access to working platforms/ ladders etc.	
K Bolts 	KSE20 	K Bolts 	AI  AIE 

Crane Isolation

Rail Transport
Application Note

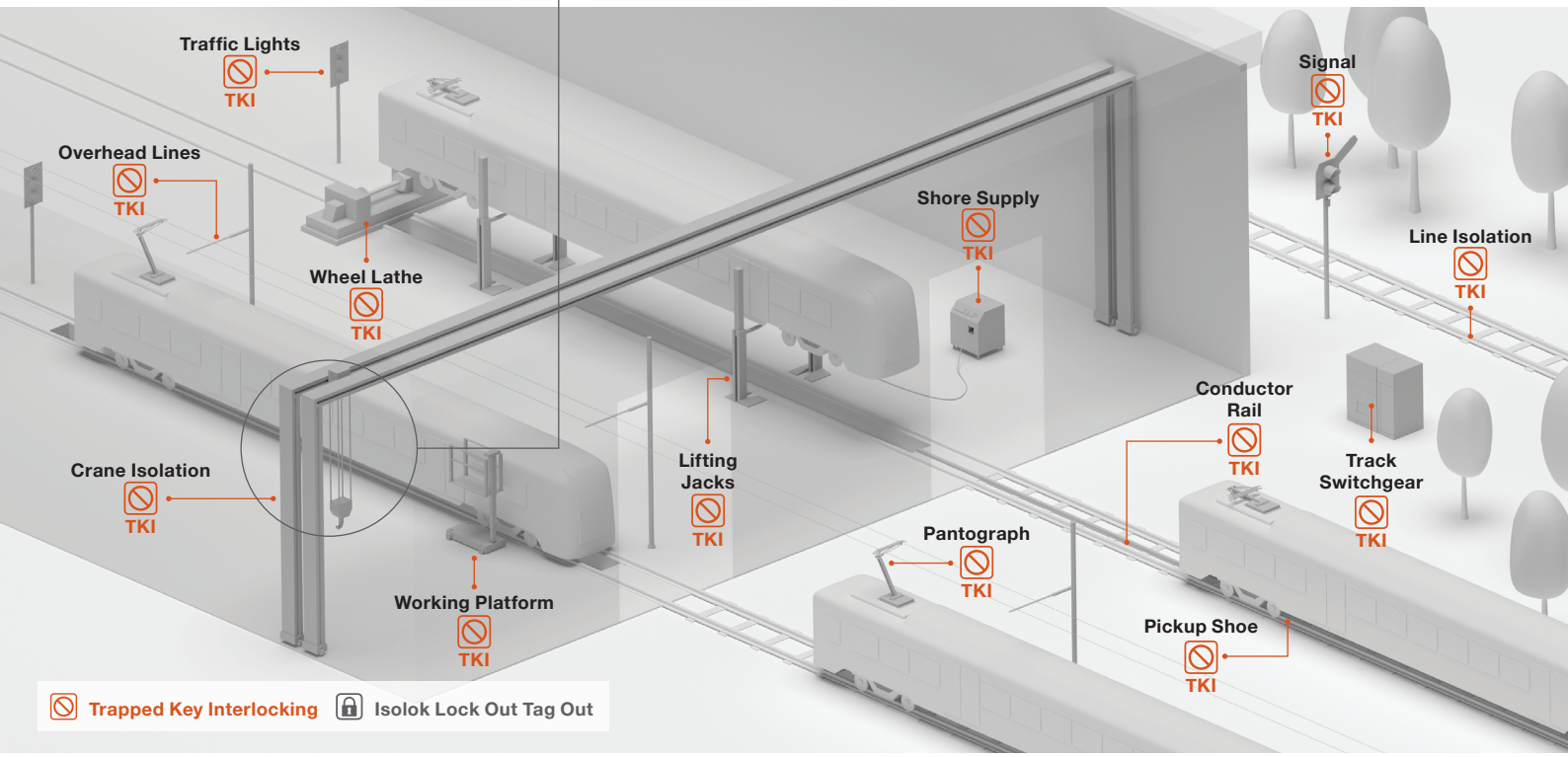


Crane Isolation

The Risk

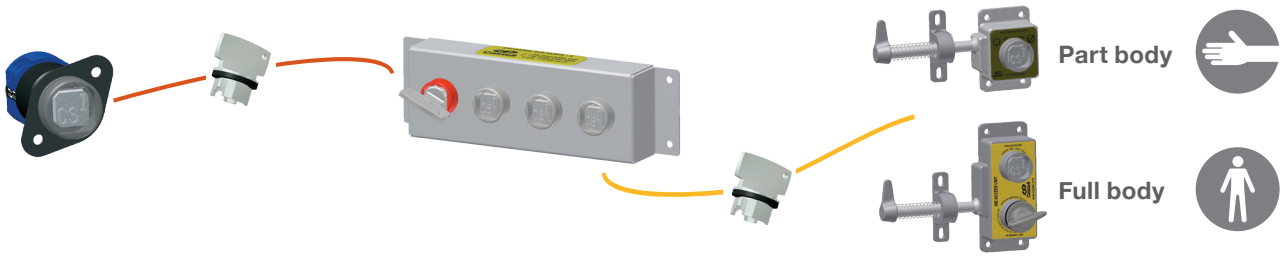
Using cranes whilst the overhead lines are live create a number of risks. The danger of operating equipment whilst high voltage is present, the danger of personnel being in the hazardous area whilst equipment is moving and the danger from lift equipment when rolling stock can move.

Rail Transport



Castell Solution

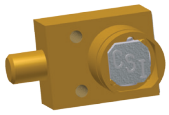
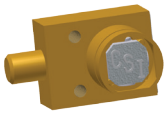
1 Isolation **2 Key Exchange** **3 Access Control**



Benefits

1) Overhead lines are isolated correctly before work can start on the rolling stock.
2) Work is carried out in a sequential procedure and short cuts are not possible.
3) The system can be designed to ensure that personnel are prevented from gaining access to the dangerous area whilst cranes are being operated.
4) Rolling stock is immobilised whilst the crane is in operation.

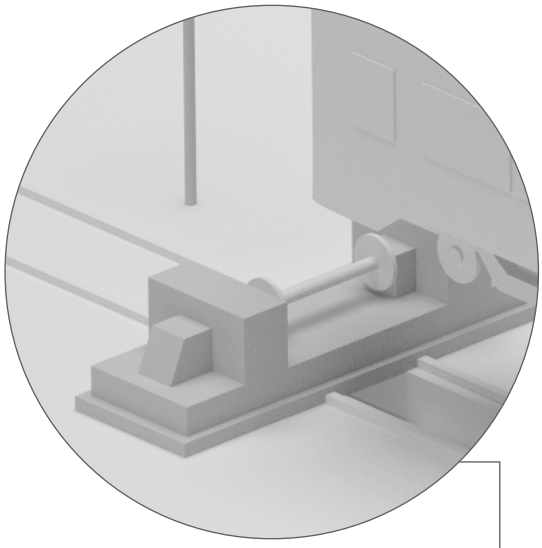
Products

Isolation	Exchange	Access	
Ensuring that the overhead lines are isolated and earthed using simple K Bolt interlocks.	The released key that ensures equipment is isolated and earthed is inserted into an exchange unit. This typically changes depot lights from red to green to indicate safe state.	Multiple keys can then be released to allow activation of cranes and hoists	
K bolts 	KSE20 	K Bolts 	KS20 
		KSS20 	

Wheel Lathe

Rail Transport
Application Note

Castell

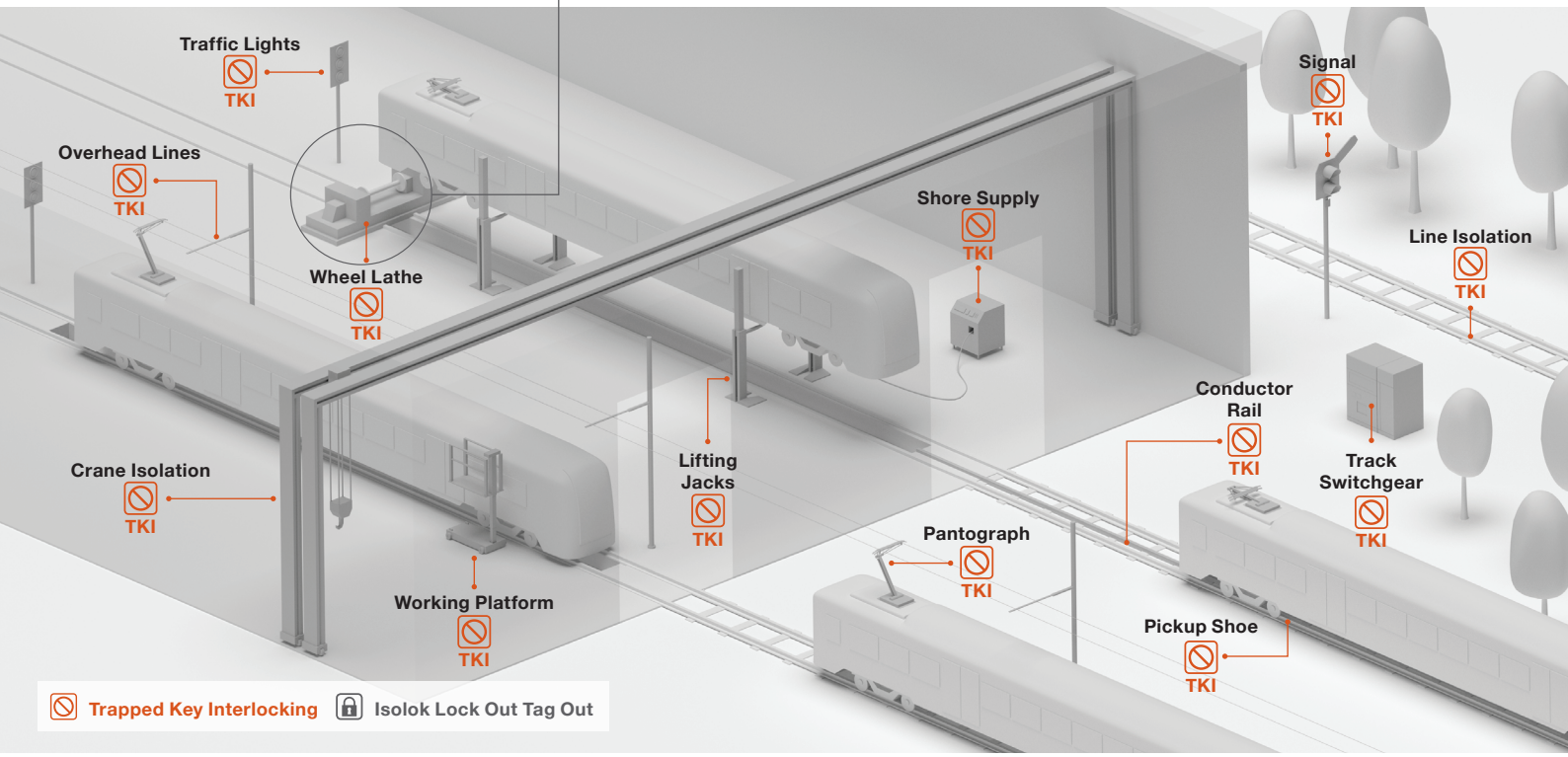


Wheel Lathe

The Risk

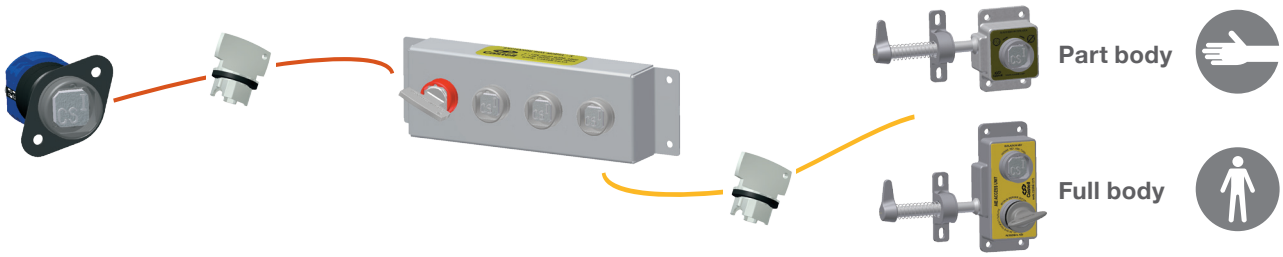
Using equipment such as wheel lathes whilst high voltage is present creates risk of both arc flash and danger from moving rolling stock.

Rail Transport



Castell Solution

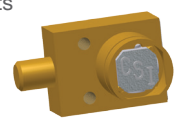
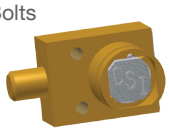
1 Isolation **2 Key Exchange** **3 Access Control**



Benefits

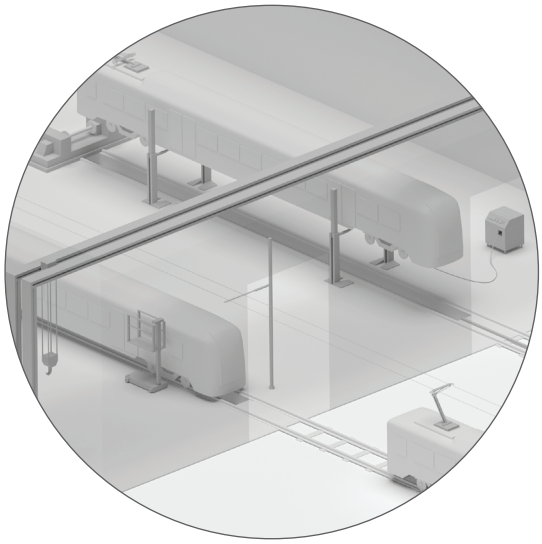
1) Overhead lines are isolated correctly before work can start on the rolling stock.
2) Work is carried out is a sequential procedure and short cuts are not possible.
3) Rolling stock is immobilised whilst the lathe is in operation.
4) Access can be prevented to the working area whilst the lathe is in operation.

Products

Isolation	Exchange	Access	
Ensuring that the overhead lines are isolated and earthed using simple K Bolt interlocks.	The released key that ensures equipment is isolated and earthed is inserted into an exchange unit. This typically changes depot lights from red to green to indicate safe state.	The released key is then used to power up the Lathe. The key can not be released until the Lathe is reset to a home position.	
K Bolts 	KSE20 	K Bolts 	KS20 
		KSS20 	

Electrical Equipment (General)

Rail Transport
Application Note

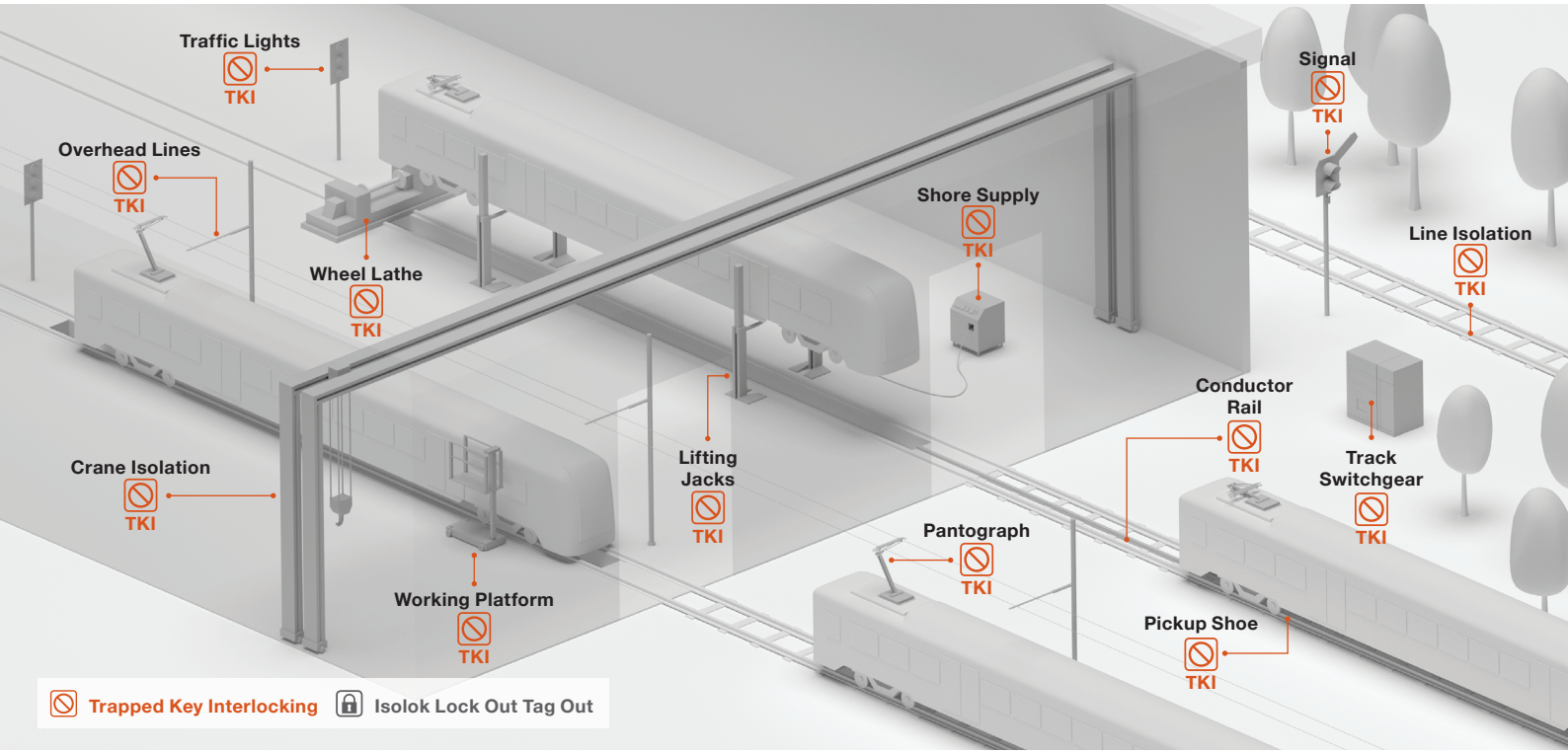


Electrical Equipment (General)

The Risk

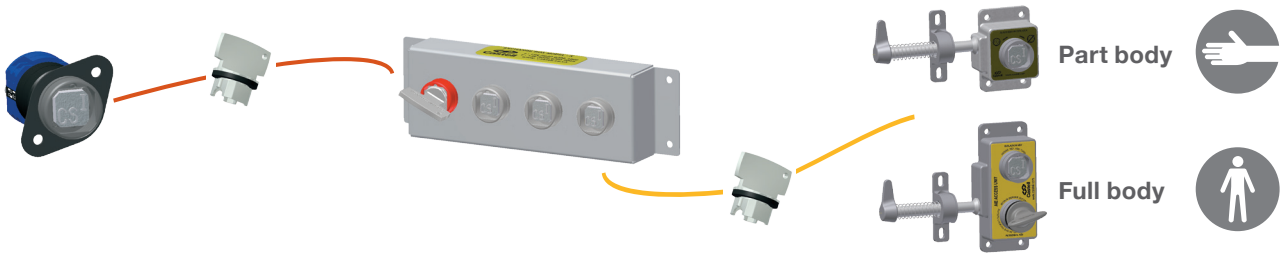
Using electrical equipment whist high voltage could be present creates risk from arc flash and from moving vehicles.

Rail Transport



Castell Solution

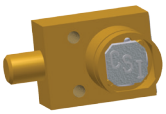
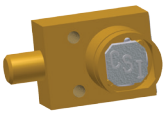
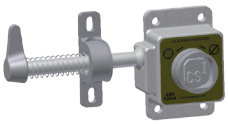
1 Isolation **2 Key Exchange** **3 Access Control**



Benefits

1) Overhead lines are isolated correctly before work can start on the rolling stock
2) Work is carried out is a sequential procedure and short cuts are not possible.
3) Rolling stock is immobilised whilst the equipment is in operation.
4) Multiple processes can be interlocked to ensure safety in the complete operational area.

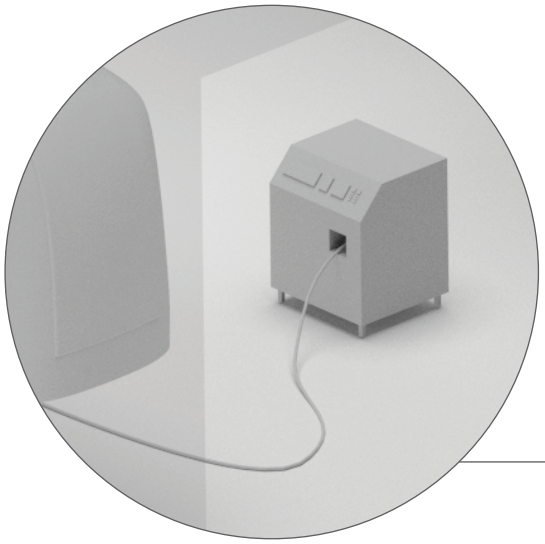
Products

Isolation	Exchange	Access	
Ensuring that the overhead lines are isolated and earthed using simple K Bolt interlocks.	The released key that ensures equipment is isolated and earthed is inserted into an exchange unit. This typically changes depot lights from red to green to indicate safe state.	Multiple keys can then be release to allow electrical equipment to be operated.	
K Bolts 	KSE20 	K Bolts 	AI 
		KS20 	KSS20 

Electric Shore Supply

Rail Transport
Application Note

Castell

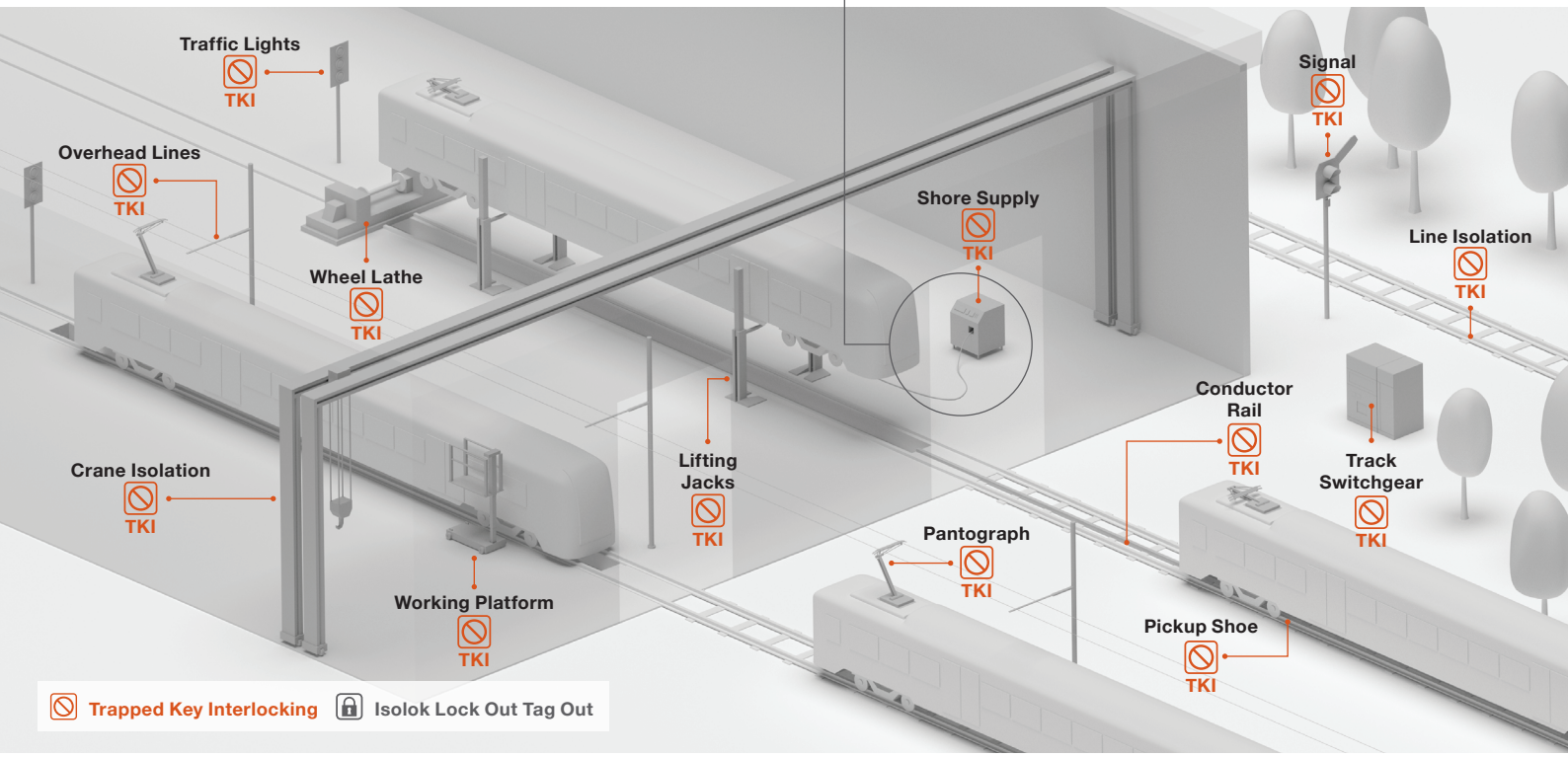


Electric Shore Supply

The Risk

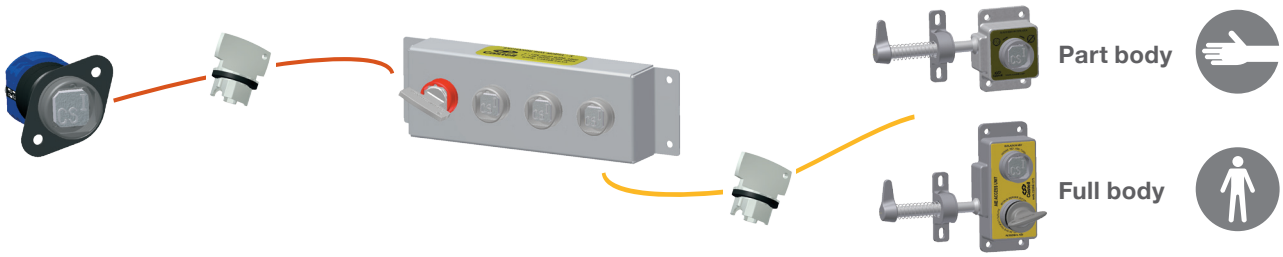
Overhead power supply and depot power supply could be connected simultaneously, resulting in arc flash damage and or injury.

Rail Transport



Castell Solution

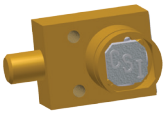
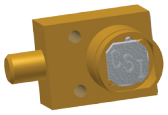
1 Isolation **2 Key Exchange** **3 Access Control**

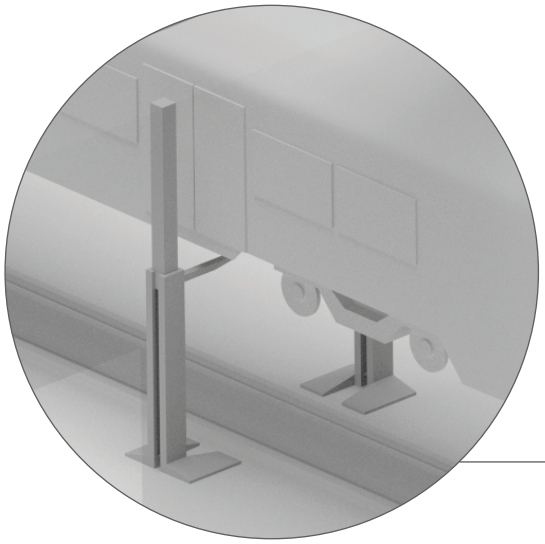


Benefits

1) Shore supplies are isolated correctly before work can start on the rolling stock
2) Work is carried out is a sequential procedure and short cuts are not possible.
3) The system can be implemented as a complete safety system encompassing access and equipment.
4) The system can be combined with traffic signals to give a visual indication of when the system is safe.

Products

Isolation	Exchange	Access	
Ensure that the train is isolated from the track before the shore supply from the depot can be inserted.	K bolts are typically used on the rail shoe isolators.	Once all the rail shoes have been isolated they are inserted into a KL lock which allows the shore supply cable to be connected to the train.	
K bolts 	KSE20 	K bolts 	KL bolts 

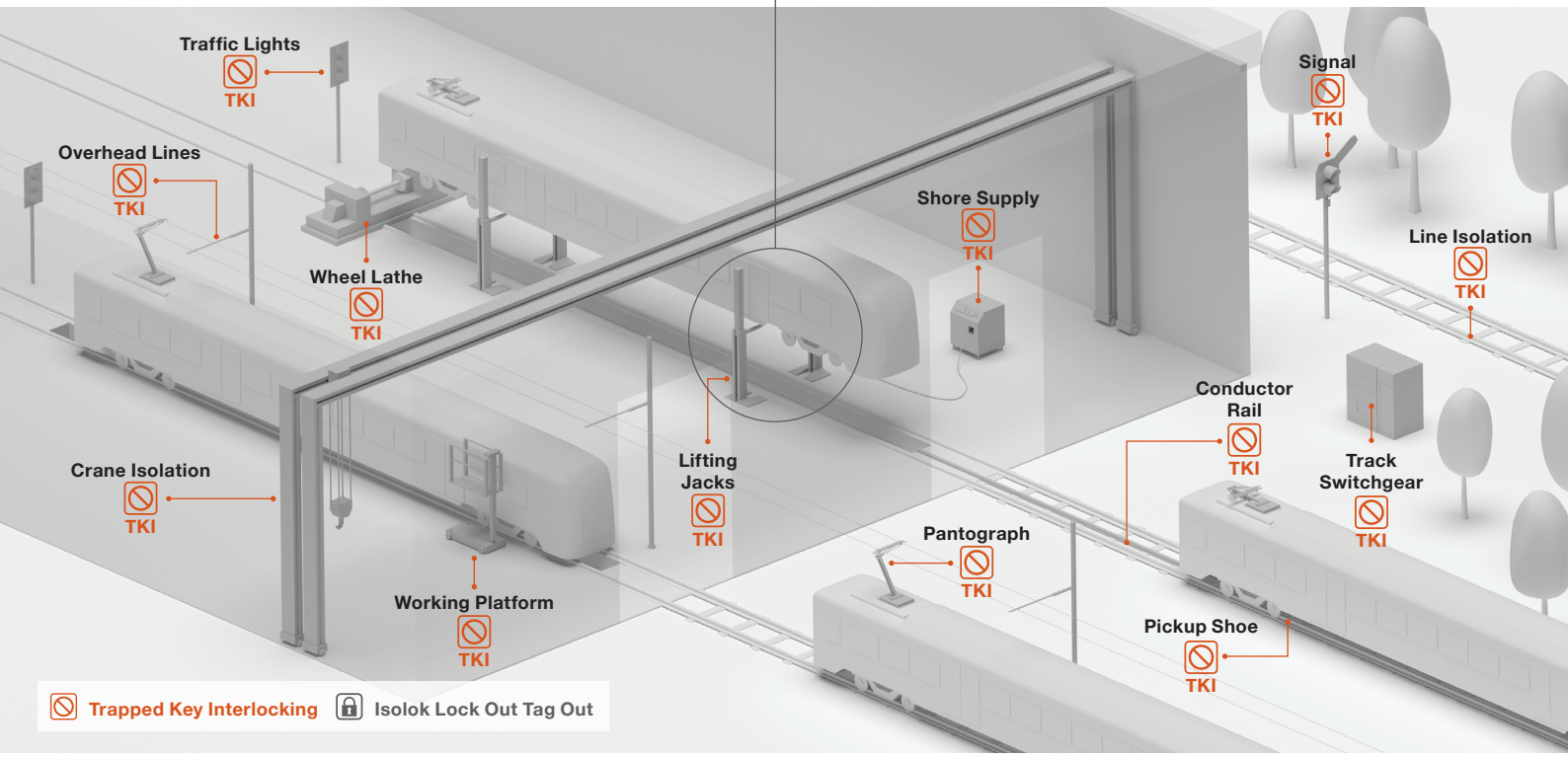


Lifting Jacks

The Risk

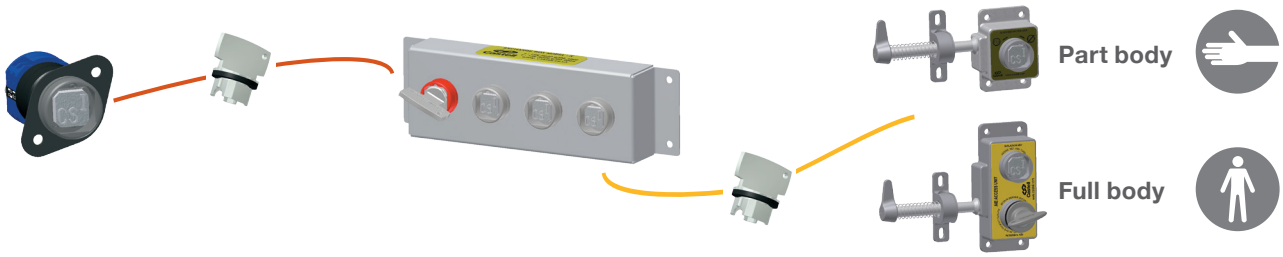
Using lifting equipment whilst high voltage is present creates a number of risks. The danger of operating the lifting equipment while the high voltage is present creates the risk of arc flash, and the risk of personnel being in the hazardous area whilst the equipment is being used.

Rail Transport



Castell Solution

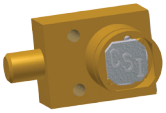
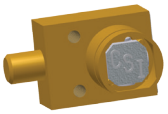
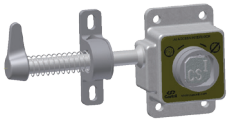
1 Isolation **2 Key Exchange** **3 Access Control**



Benefits

1) Overhead lines are isolated correctly before work can start on the rolling stock
2) Work is carried out is a sequential procedure and short cuts are not possible.

Products

Isolation	Exchange	Access	
Ensuring that the overhead lines are isolated and earthed using simple K Bolt interlocks.	The released key that ensures equipment is isolated and earthed is inserted into an exchange unit. This typically changes depot lights from red to green to indicate safe state.	The released keys are then take to the lifting jacks to allow operation. Keys can only be removed once the jacks are put back into home position.	
K bolts 	KSE20 	K Bolts 	AI 
		KS20 	KSS20 

Pantograph Isolation

Rail Transport
Application Note

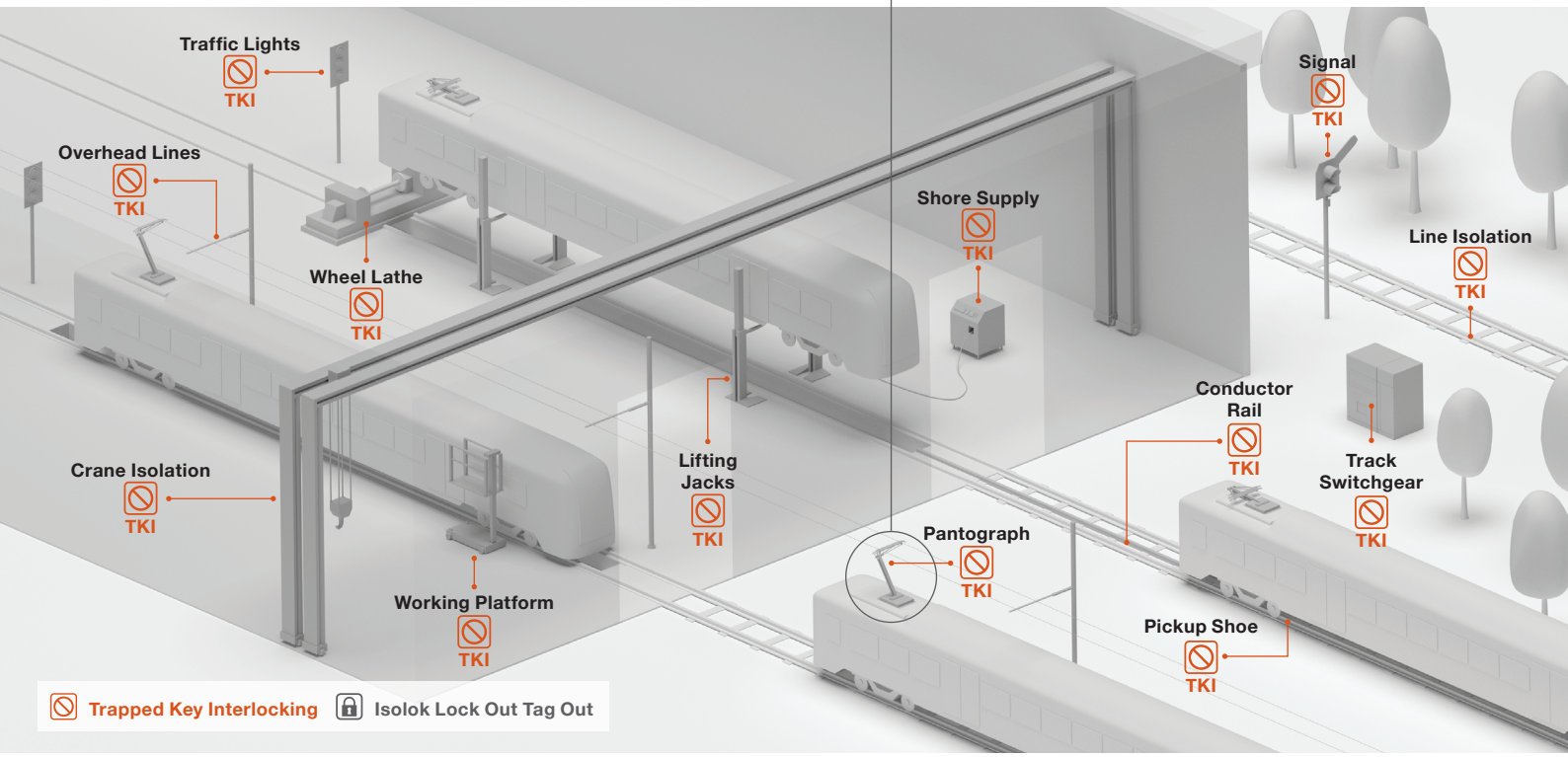
Castell

Pantograph Isolation

The Risk

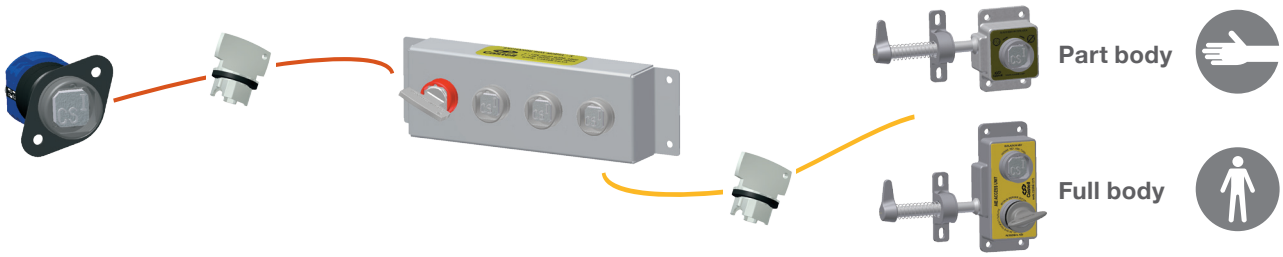
Whilst the pantograph is in the raised position there is significant risk to personnel whilst working on electrical equipment and from moving rolling stock.

Rail Transport



Castell Solution

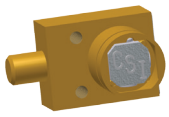
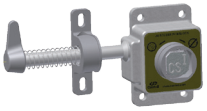
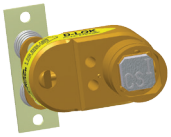
1 Isolation **2 Key Exchange** **3 Access Control**



Benefits

1) Access is only granted when the system is in the safe state.
2) The system cannot be short cut or steps missed out.
3) The system can only be re-energised when all electrical cabinets are closed and safe.
4) The system can be coded uniquely for each carriage and train.

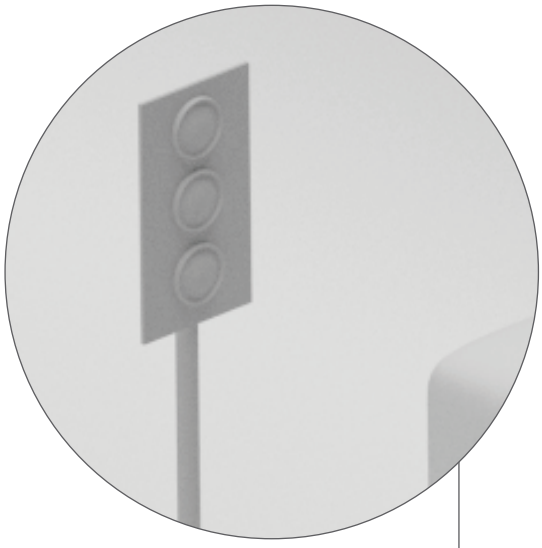
Products

Isolation		Exchange	Access	
The pantograph is lowered and a key is released either through mechanical interlocking or using solenoid control when the pantograph is lowered and earthed.		When the key from the pantograph power is removed this can be used to release a number of access keys for electrical cabinets.	The keys released from the exchange box are used to gain access to electrical cabinets.	
K Bolts 	KSUPS 	X Box 	AI 	AIE 
KSS 			D-Lock 	

Traffic Lights

Rail Transport
Application Note

Castell

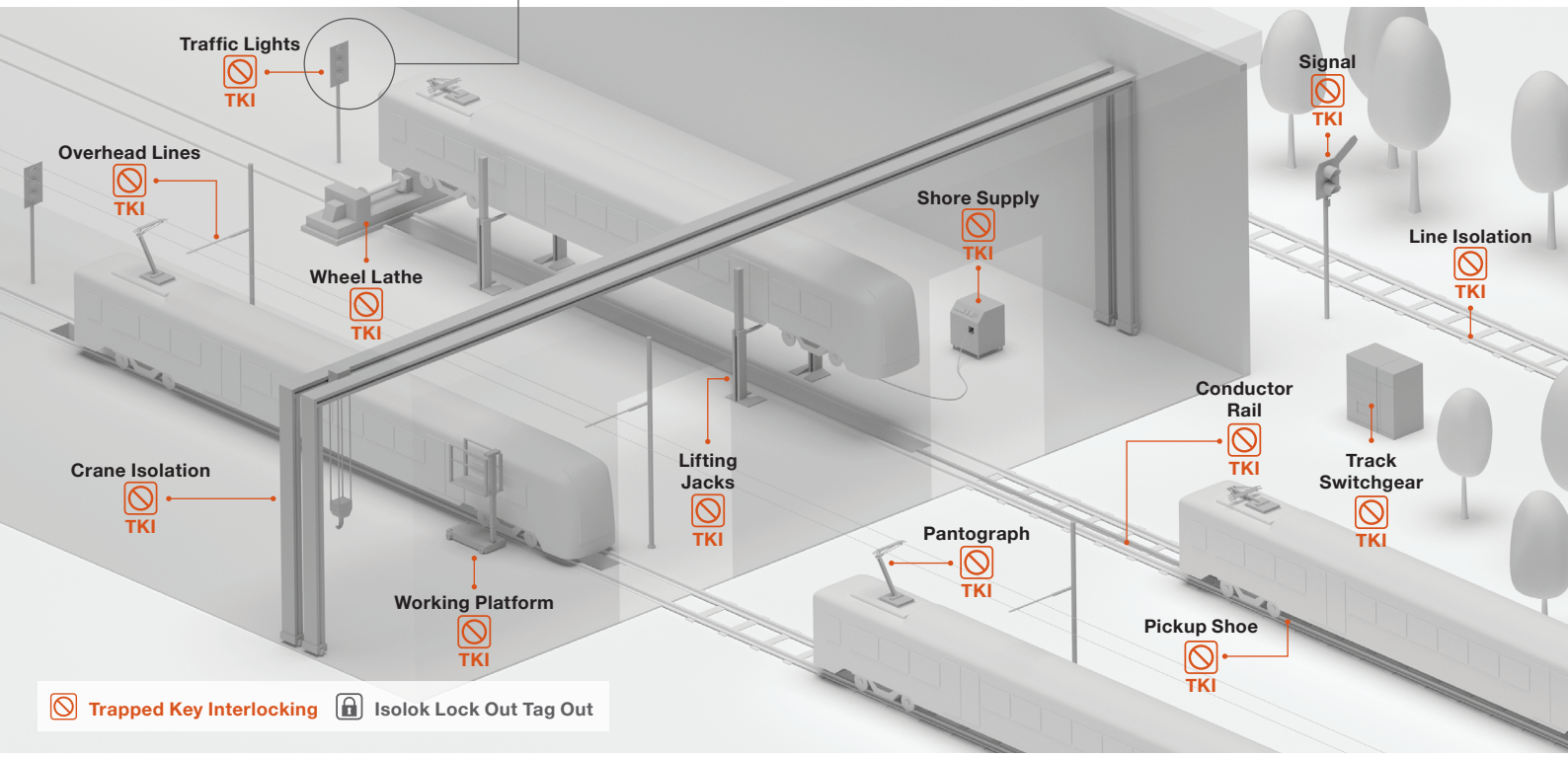


Traffic Lights

The Risk

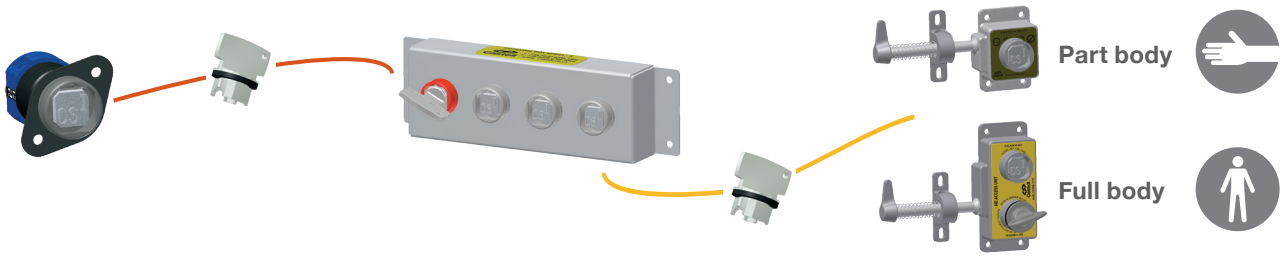
Traffic lights need to change condition from Red to Green to indicate that the overhead line is isolated. The risk is that lights could be changed without disconnecting the power.

Rail Transport



Castell Solution

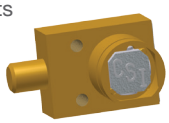
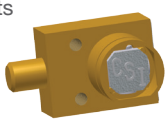
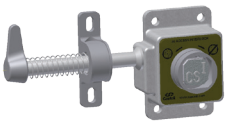
1 Isolation **2 Key Exchange** **3 Access Control**



Benefits

1) Power has been isolated and traffic light conditions has changed to reflect safe operation.
2) The process is interlocked with the power disconnected.
3) The system cannot be short cut or steps missed out.
4) The process can be interlocked with other operations to ensure safe operation and access.

Products

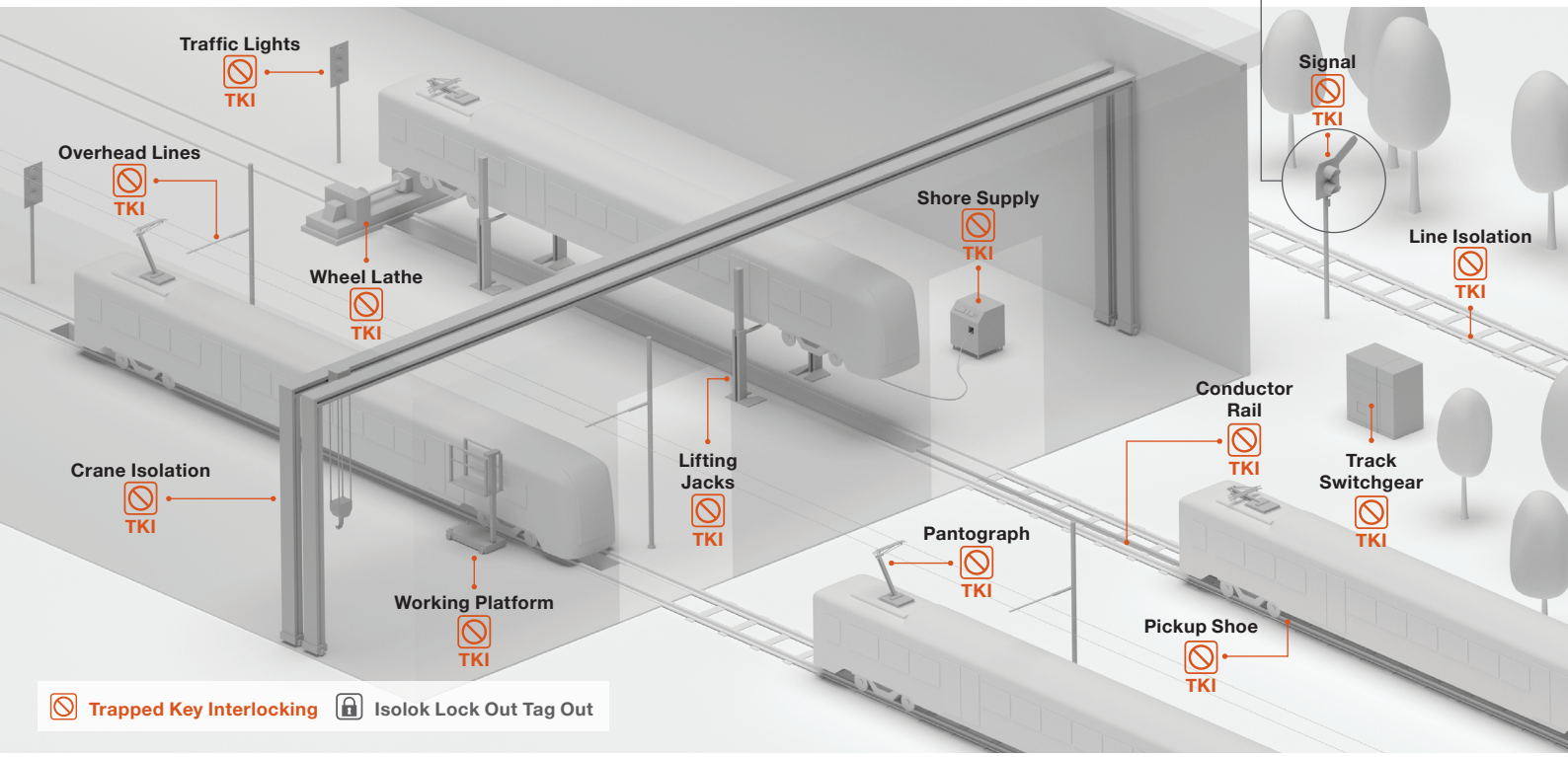
Isolation	Exchange	Access	
Over head lines are isolated and earthed using simple K Bolt interlocks.	Released key is taken inside the maintenance depot and inserted into KSE20 unit and turned.	This changes the Traffic lights from Red to Green and allows additional maintenance keys to be released (trapping the power key).	
K Bolts 	KSE20 	K Bolts 	Al 
		KS20 	KSS20 

Signal Power

The Risk

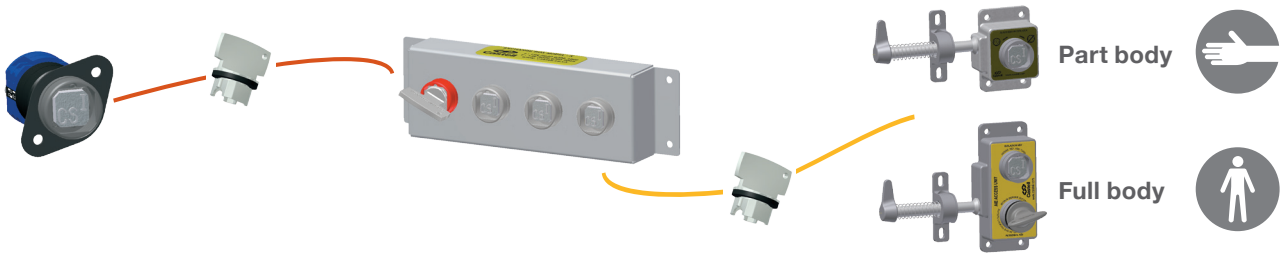
Where multiple power supplies can be used to supply signal power there is a risk that two supplies can be connected at the same time leading to arc flash.

Rail Transport



Castell Solution

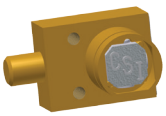
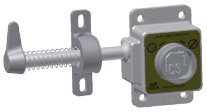
1 Isolation **2 Key Exchange** **3 Access Control**

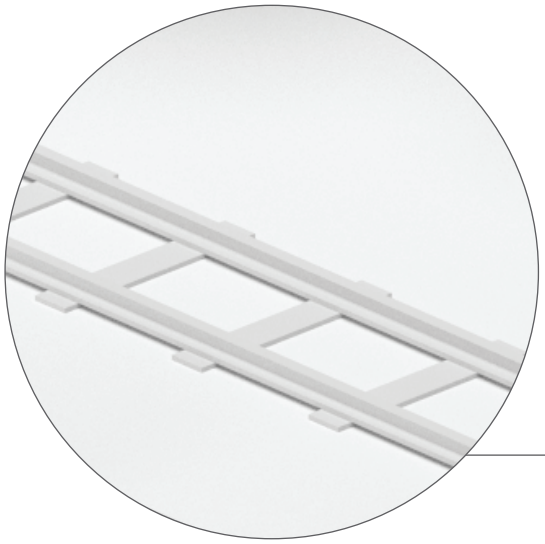


Benefits

1) The system ensure that only one supply can be connected at a time.
2) The system can encompass safe access.
3) The system can be designed to include UPS, Generator and Multiple Incomers.
4) The system cannot be short cut or steps missed out.

Products

Isolation	Exchange	Access	
FS and K Bolts can be used to interlock the incoming supplies to ensure that only one supply can be present at any time (Rail network power, local power, UPS, generator).	The keys used to control the supply can be also used to provide safe access to multiple cabinets through the use of an exchange box.	Access can be provided for part body using AI or D-Locks and AIE for full body cabinet access.	
K Bolts 	X Box 	AI 	AIE 
FS Locks 		D-Lock 	

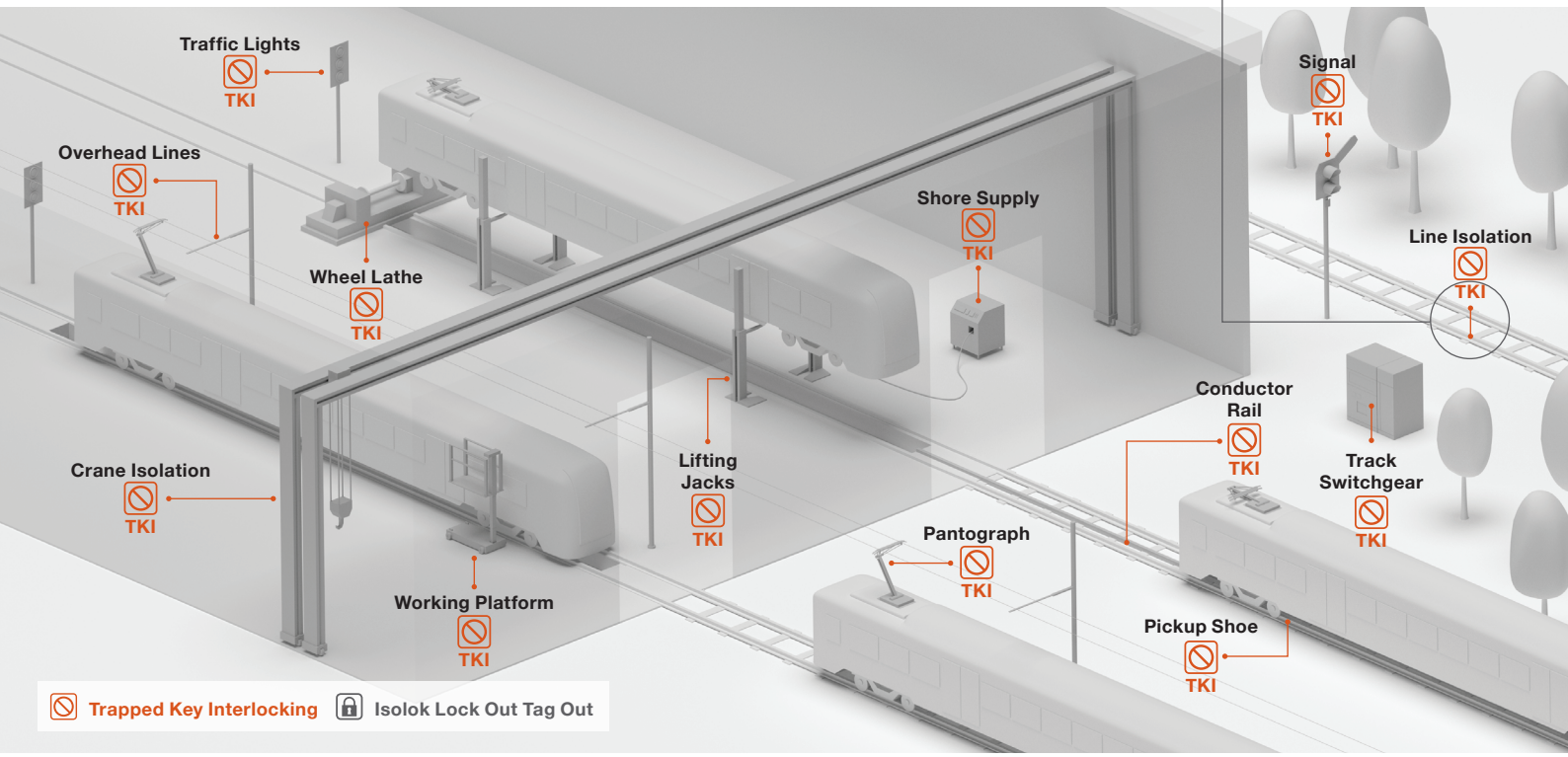


Line Isolation

The Risk

Uncontrolled personnel access to rail lines whilst in operation creates a risk from moving vehicle strikes and danger from electrocution.

Rail Transport

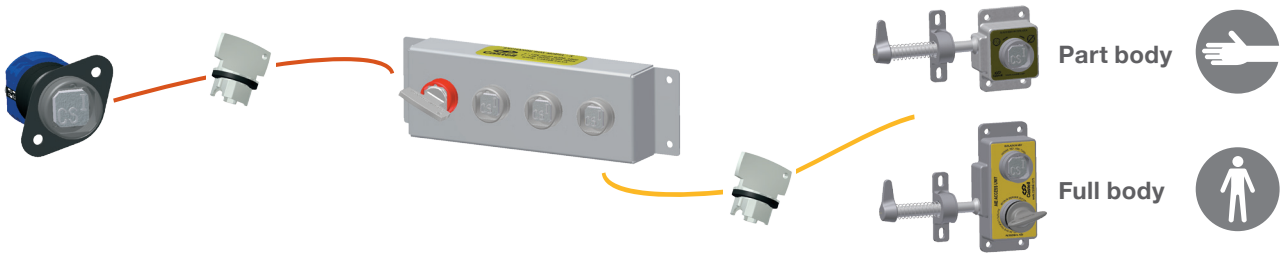


Castell Solution

1 Isolation

2 Key Exchange

3 Access Control

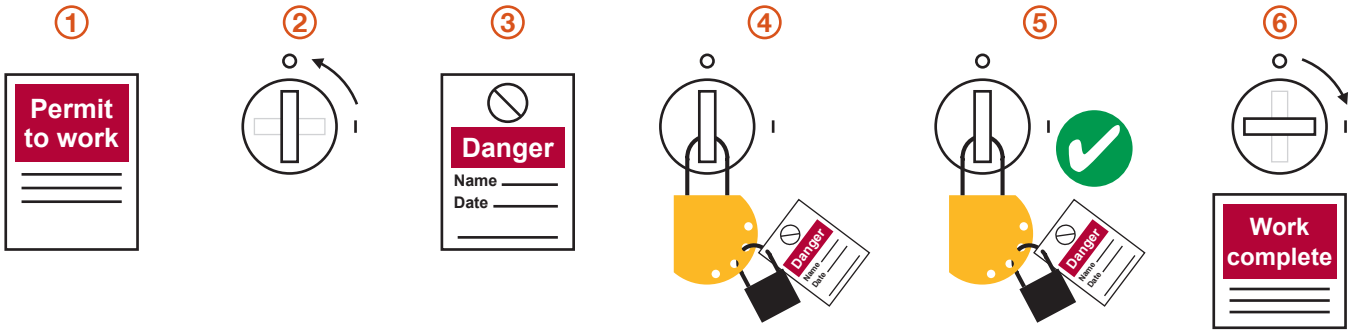


Benefits

1) The employees on the line are protected whilst working.
2) The signal control centre is automatically contacted reducing communication time.
3) The signals can be interlocked with the access system preventing trains travelling on the line.
4) The system can be combined with other operations in a more sophisticated system.

Products

Isolation	Access
KSS is used to request isolation from the signal control centre. When the signals are set to isolate the rail line then the key is released.	Access is controlled via the personnel key. This can be enhanced using lock out tag out.
KSS 	Key 



1. Notify personnel when service work is to be carried out.

2. Isolate power on equipment/ energy sources.

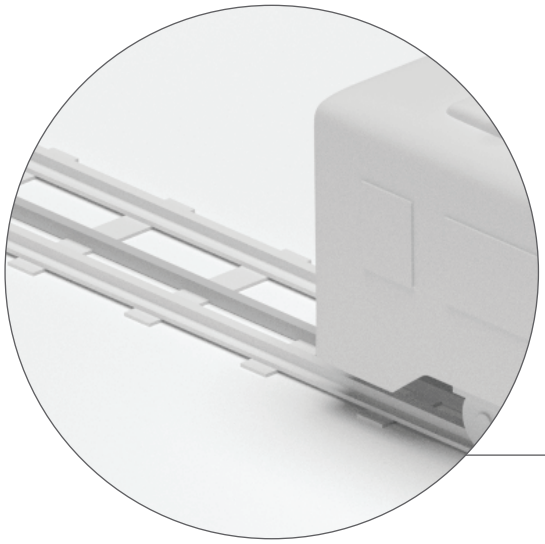
3. Assign tags with information relating to the work to be carried out.

4. Lock out equipment using tags, padlocks, and clasps.

5. Test to ensure equipment is isolated.

6. When the work is complete; communicate equipment is back in use.

Isolation
The use of Iso-Lok padlocks and clasps can be used to isolate machinery by engineers. In a lock out tag out system where each engineer has individual padlocks the clasp allows each engineer working on the equipment to use their padlock to lock out the machine. This ensures the machine cannot be turned on until each engineer has finished their task and removed their padlock.

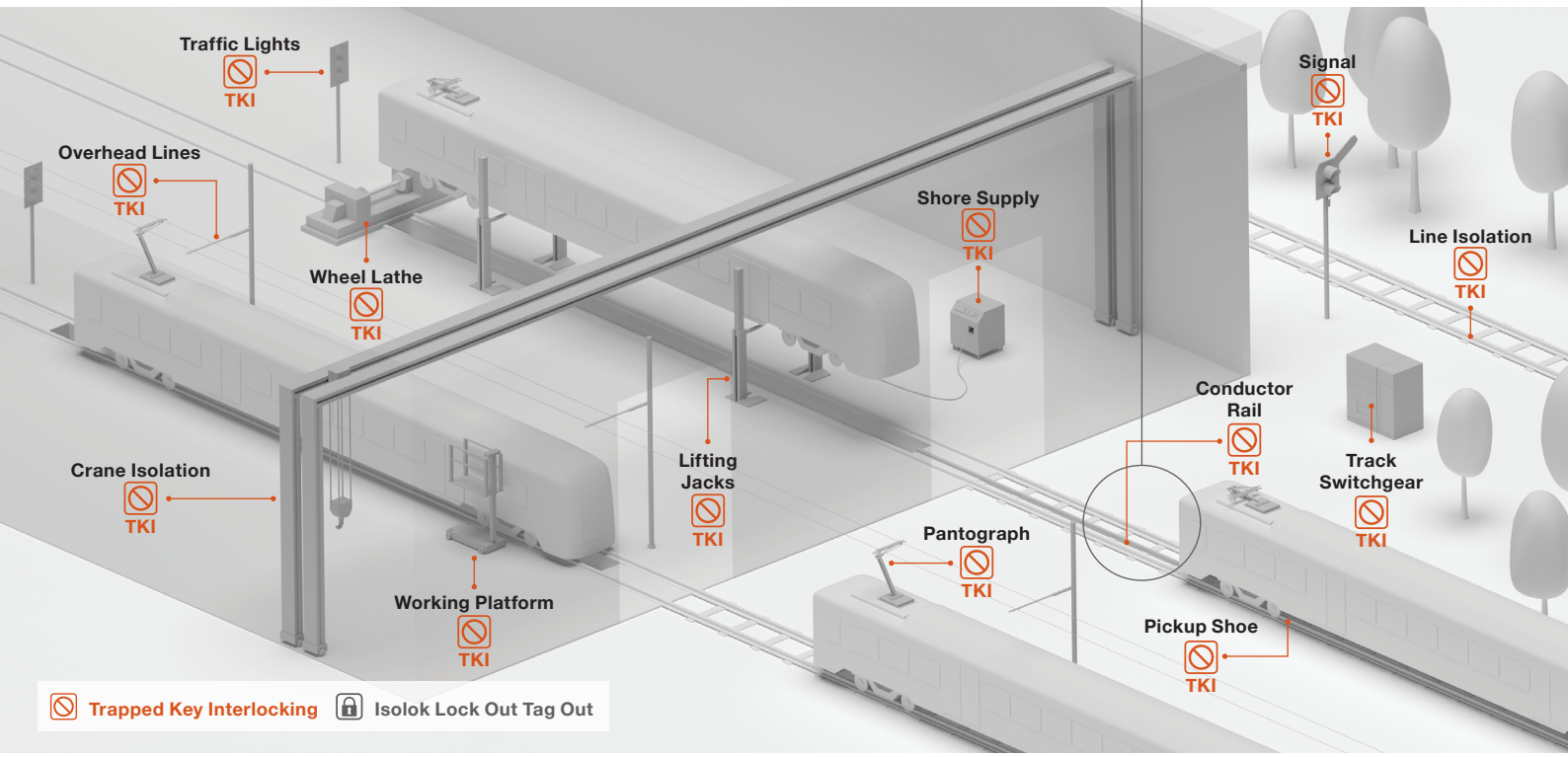


Conductor Rail

The Risk

Conductor rail power creates a specific hazard around arc flash, this is compounded by a danger from moving vehicles. Therefore before any work can be undertaken on rolling stock, the overhead lines need to be isolated, earthed and the rolling stock immobilised.

Rail Transport

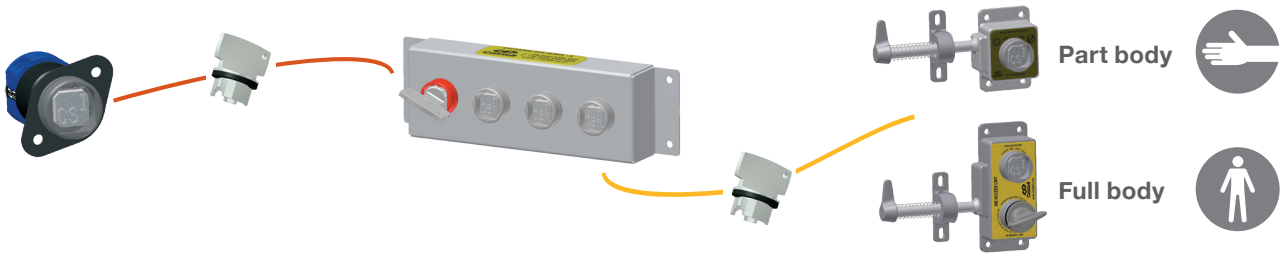


Castell Solution

1 Isolation

2 Key Exchange

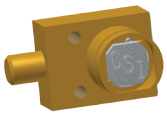
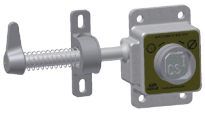
3 Access Control



Benefits

1) Overhead lines are isolated correctly before work can start on the rolling stock.
2) Work is carried out is a sequential procedure and short cuts are not possible.
3) The system can be implemented as a complete safety system encompassing access and equipment.
4) The system can be combined with traffic signals to give a visual indication of when the system is safe.

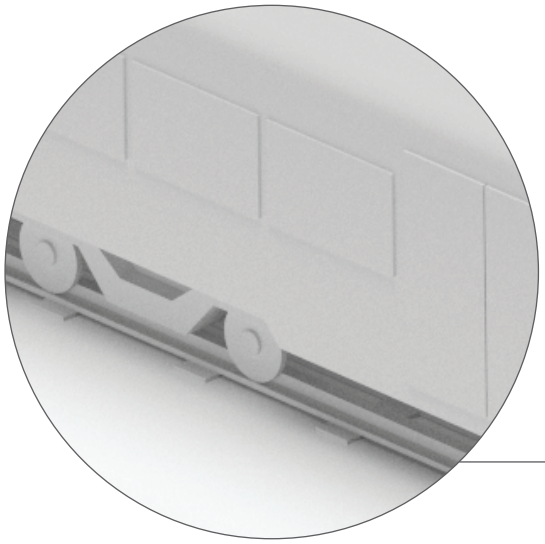
Products

Isolation	Exchange	Access	
Ensuring that the conductor rails are isolated and earthed using simple K Bolt interlocks.	The released key that ensures equipment is isolated and earthed is inserted into an exchange unit. This typically changes depot lights from red to green to indicate safe state.	The system can release multiple access keys to enable the use of high level access and equipment.	
K Bolts 	KSE20 	AI 	AIE 

Pickup Shoe

Rail Transport
Application Note

Castell

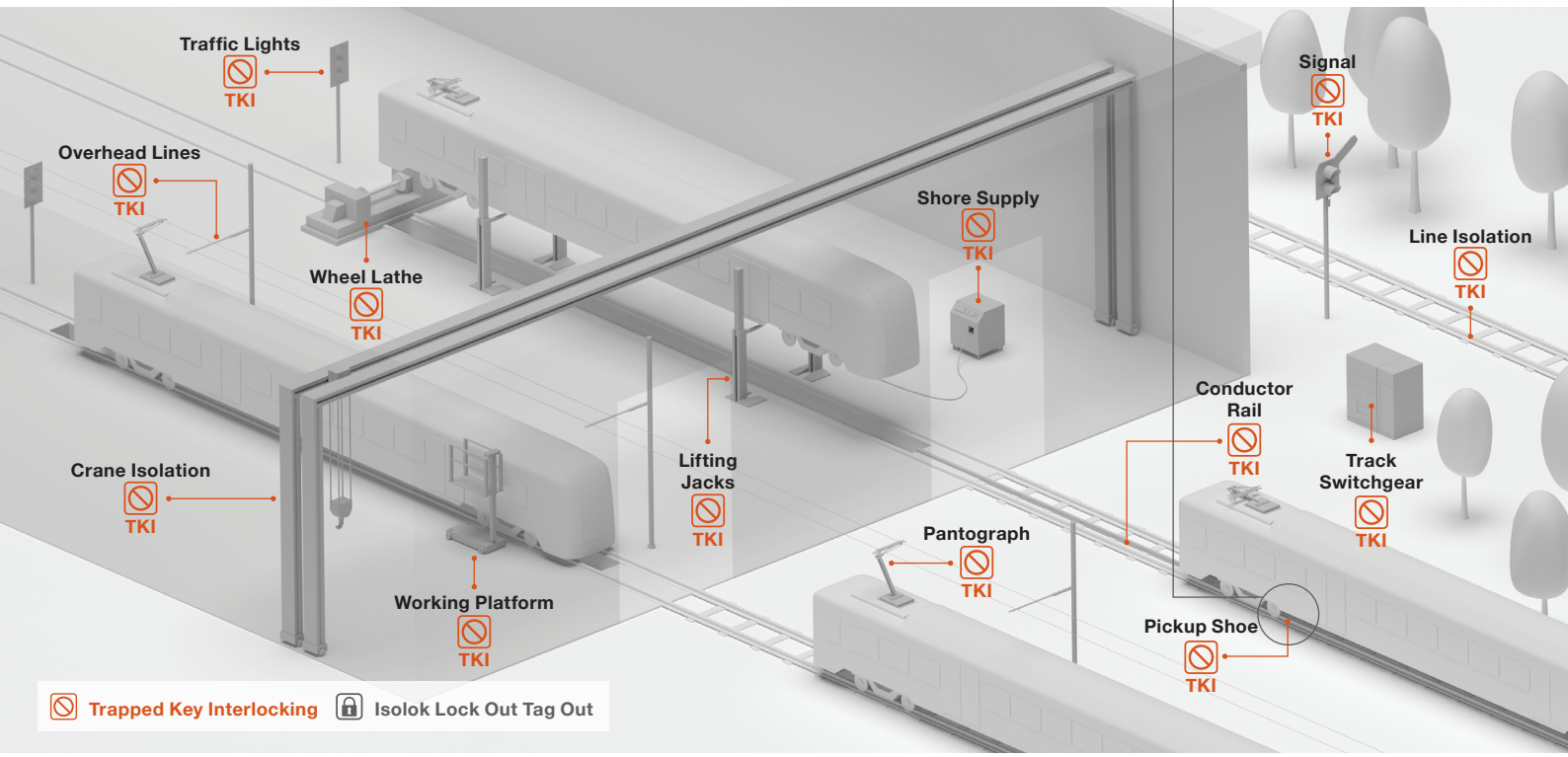


Pickup Shoe

The Risk

Pickup shoe supply and Depot power supply could be connected simultaneously, resulting in damage and or injury

Rail Transport



Castell Solution

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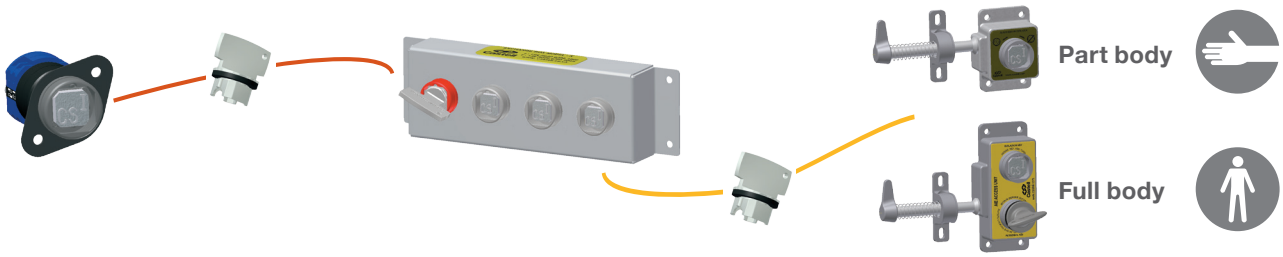
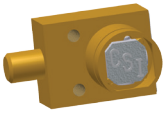
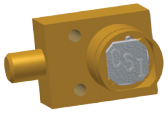
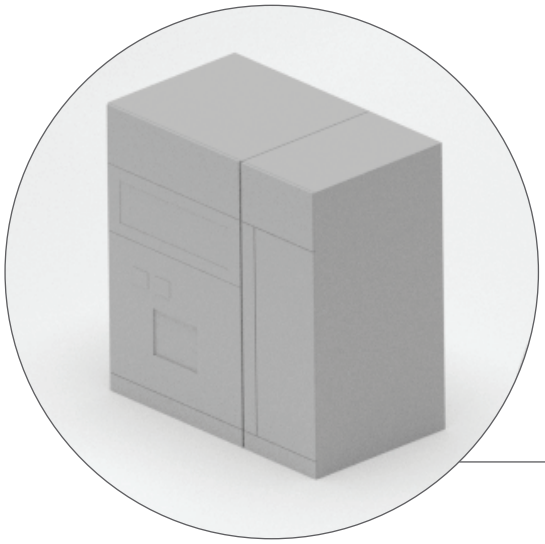


Benefits

1) Ensures that the shore supply cable supply and rail shoe gear are not connected at the same time.
2) Work is carried out is a sequential procedure (no short cuts).

Products

Isolation	Exchange	Access	
Ensure that the train is isolated from the track before the shore supply from the depot can be inserted.	K bolts are typically used on the rail shoe isolators.	Once all the rail shoes have been isolated they are inserted into a KL lock which allows the shore supply cable to be connected to the train.	
K Bolts 	KSE20 	K Bolts 	KL Bolts 

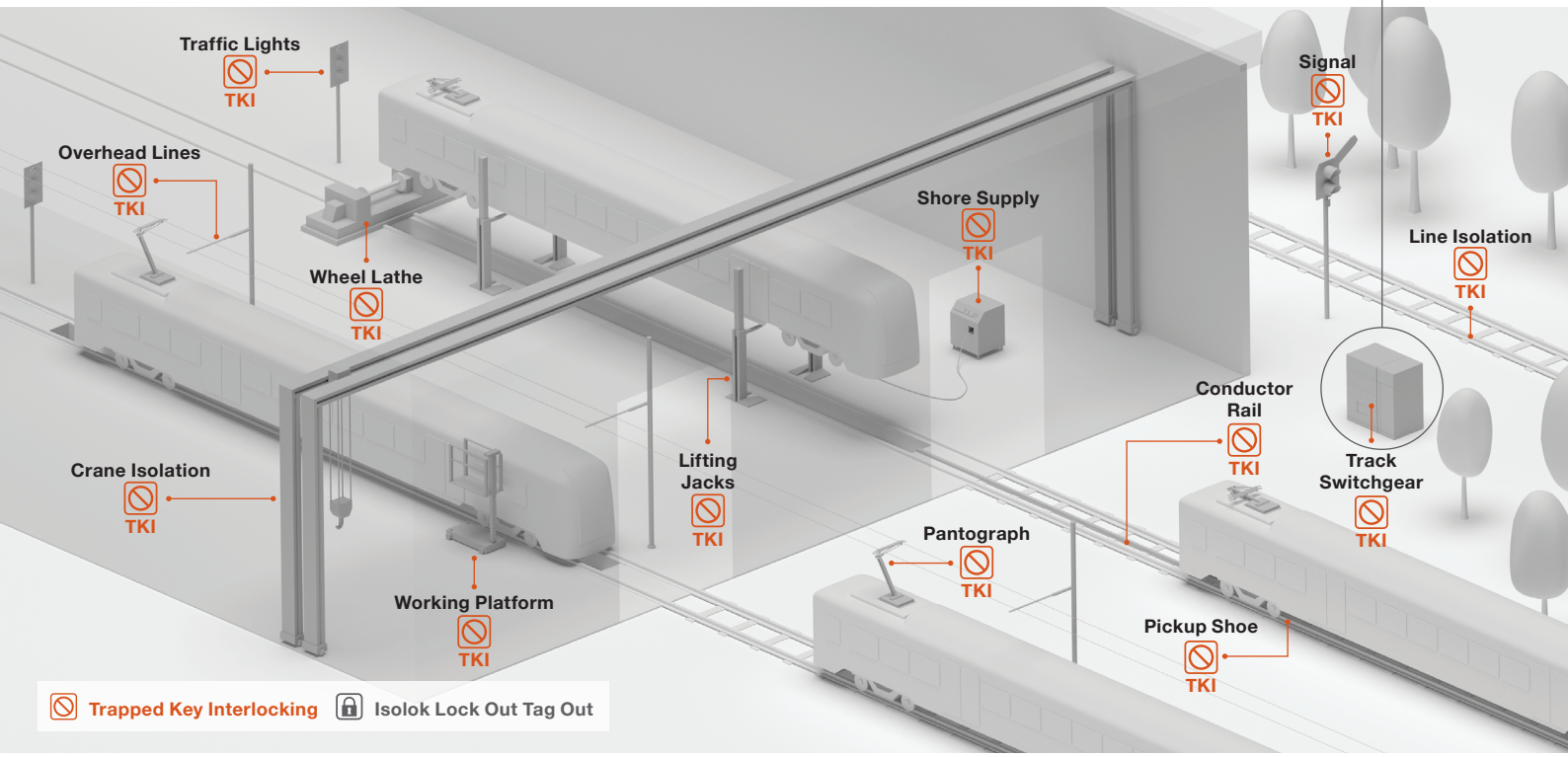


Track Switchgear

The Risk

Where multiple incomers can be used to supply the rail network there is a risk that two supplies can be connected at the same time, this creates equipment and personnel risk from arc flash.

Rail Transport

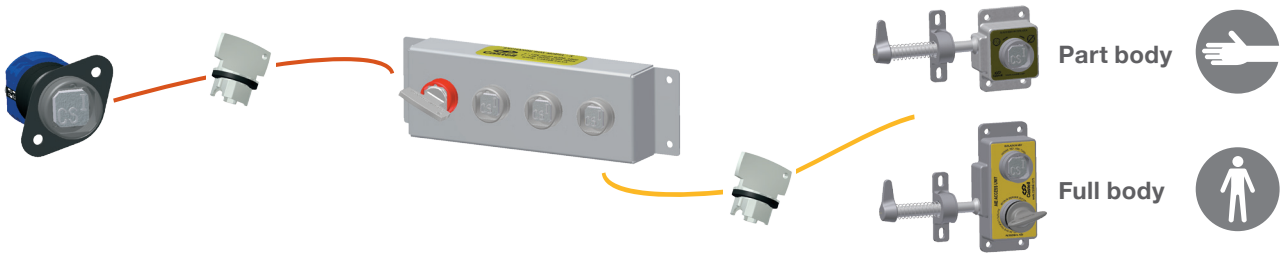


Castell Solution

1 Isolation

2 Key Exchange

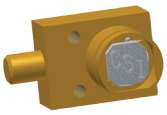
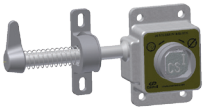
3 Access Control



Benefits

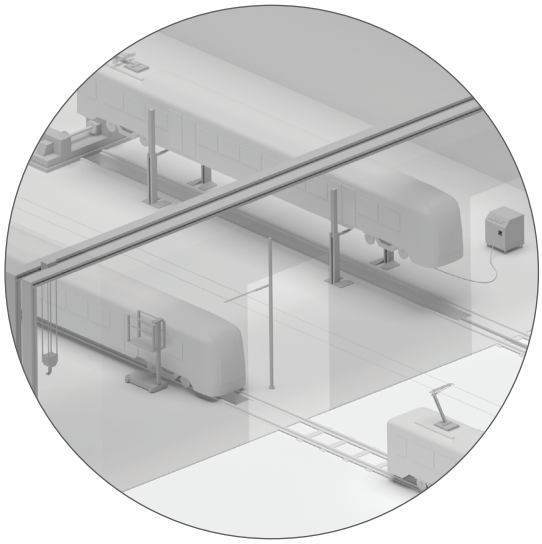
1) The isolation process is enforced by the interlock system ensuring only safe operation.
2) Work is carried out in a sequential procedure and short cuts are not possible.
3) Multiple incoming power feeds can be isolated to ensure that two sources of power cannot be connected simultaneously.
4) Safe access to electrical switchgear can be encompassed in to the system.

Products

Isolation	Exchange	Access	
FS and K Bolts can be used to interlock the incoming supplies to ensure that only one supply can be present at any time and earthing has taken place prior to access being granted.	The keys used to control the supply can be also used to provide safe access to multiple cabinets through the use of an exchange box.	Access can be provided for part body using AI or D-Locks and AIE for full body cabinet access.	
K Bolts 	X Box 	AI 	AIE 

Iso-Lok Lockout Tagout

Rail Transport
Application Note

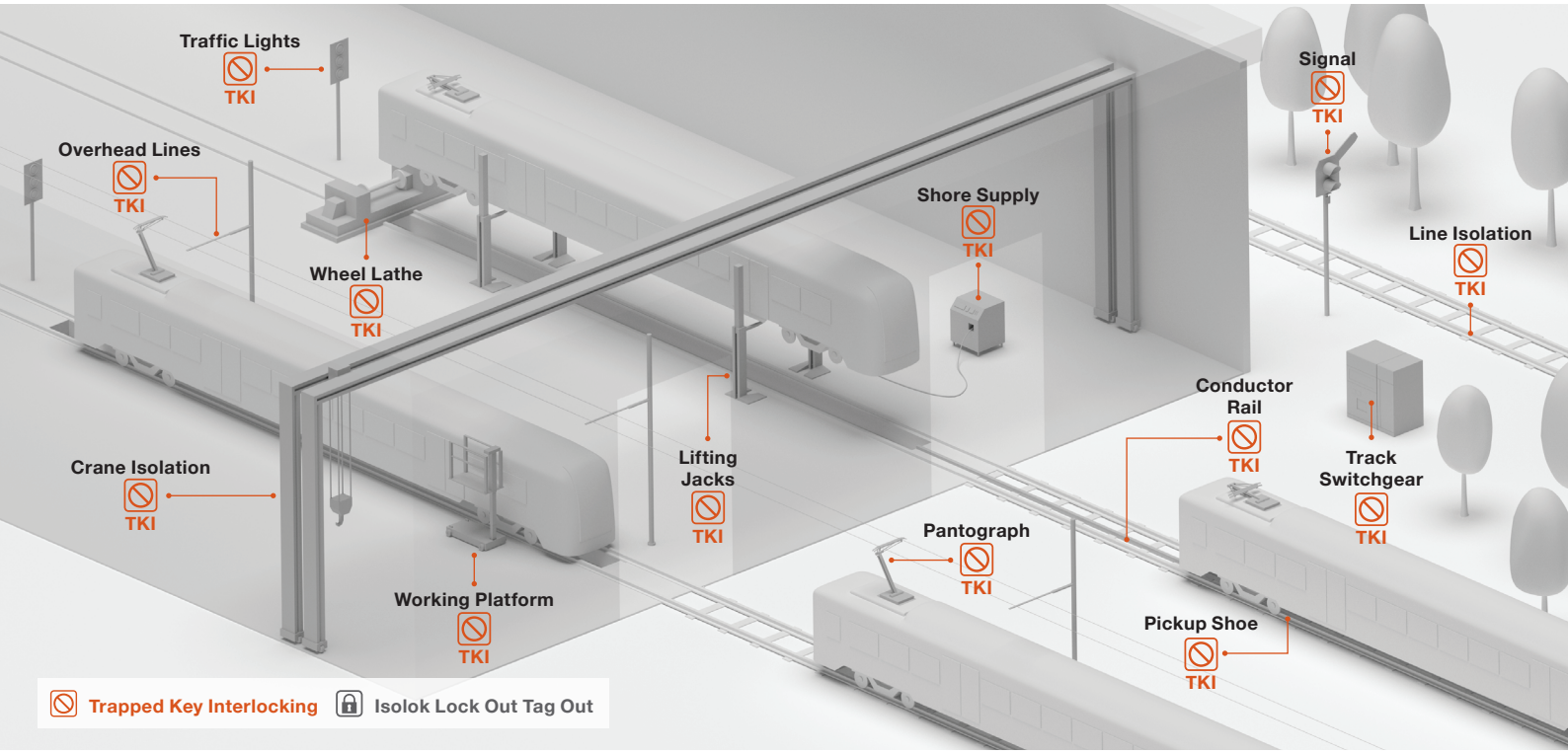


Maintenance

The Risk

During maintenance engineers can be working in an area or on equipment that is remote from the point of isolation. This may create hazards that are not normally present when the machinery is in normal operation.

Rail Transport

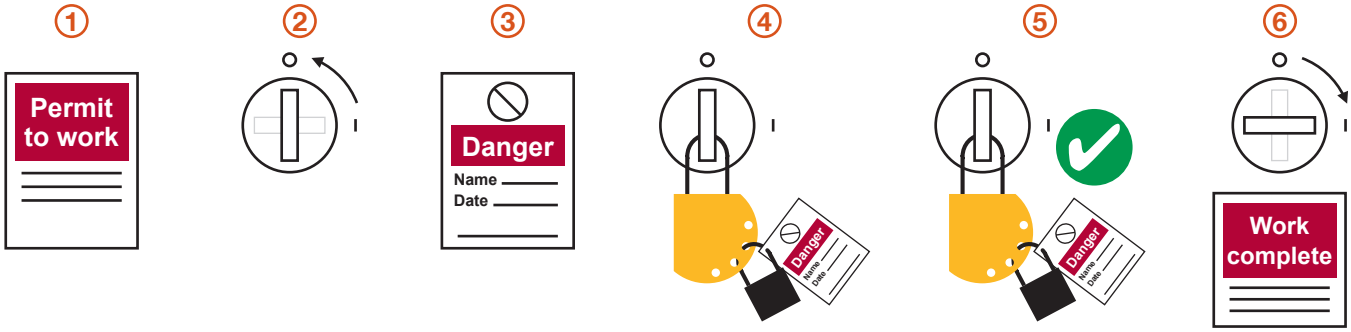


Iso-Lok
Lockout Tagout

Rail Transport
Application Note

Castell

Castell Solution



1. Notify personnel when service work is to be carried out.

2. Isolate power on equipment/ energy sources.

3. Assign tags with information relating to the work to be carried out.

4. Lock out equipment using tags, padlocks, and clasps.

5. Test to ensure equipment is isolated.

6. When the work is complete; communicate equipment is back in use.

Benefits

1) Lock out tag out offers a lower level of safety compared to trapped key interlocks. This makes the system more suitable for engineering intervention.
2) Castell provide Iso-Lok padlocks in a range of materials including stainless steel and brass. This ensures protection can be provided whatever the environment demands. The stainless steel range is suitable for the food industry.
3) Iso-Lok Padlocks are high quality hand built padlocks that are high integrity and are built to ensure that there is no chance of clashing (where one key fits a padlock with a different differ code).
4) Castell record all Iso-Lok differ codes for each padlock sold. This means that Castell can ensure that the same differ code is never shipped to a site unintentionally.

Products

Isolation

The use of Iso-Lok padlocks and clasps can be used to isolate machinery by engineers. In a lock out tag out system where each engineer has individual padlocks the clasp allows each engineer working on the equipment to use their padlock to lock out the machine. This ensures the machine cannot be turned on until each engineer has finished their task and removed their padlock.

Padlocks

Clasps

Cabinet

Valve

Station