CROSSWIND

TECHNICAL QUERY
Hollandse Kust Noord

No. TQ :	CW-ROS-TQ-0013	Rev:	D

Originating Party	Crosswind						
Subject	BESS Key Interlock						
Author	S. Bremner	TQ Aconex unique number: CWHKN-INN-BPH-TQ-00049					
Interface TQ - from		TQ interface source Aconex unique number:					
Type	Query		X	Interface			
	Deviation			Derogation (SHALL[PS])			
	Note: No deviations nor derogations which have an adverse effect on HSSE will be granted						
Workpackage							
Area(s) of application	Design & Eng.	X	Procurement		Construction		
	Commissioning		Operations		Other		
Issue date	03-04-2024		Urgent reply 5 days	X	Routine reply 10 days		
Close-out date	04-06-2025						
Closed-out by	S. Bremner		TQ status:		Closed-out		

1. Description

Reference documents / Aconex unique numbers:

For the BESS package, there is an open point from the SAFOP Review Qworkshop as detailed below.

Sr No.	Item	Description	Recommendation	Action	Responsible
32	Electrocution by direct contact	Manual operation (door opening, entrance etc.) training, guidelines and safety indicators	Check IEC and Dutch standard on live rooms	1. Review the standards and ensure compliance. 2. Ensure the possibility of locking electrical spaces while not under maintenance to avoid unwanted access	Freqcon

To resolve this issue, Crosswind are proposing the following system for Key Interlock.

Proposed Solution

It is proposed to use Castel captive key interlock system (or similar) to restrict access to the BESS PCS transformer enclosure by interlocking the BESS feeeder switchgear in MV Switchbaord SG-100D1 to ensure that the MV supply to the transformer is de-energised & safe before the transformer enclosure doors can be opened.

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Suggested Sequence of Operation

1. The 6.6kV BESS latched contactor feeder in MV switchboard SG-100D1 to be fitted with Castell safety Interlock & PCS (Transformer doors) key.

The FS/Q switchgear interlocks are designed to control the operation of HV/LV switchgear.

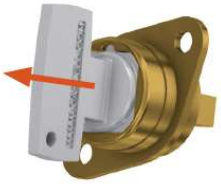
FS/Q switchgear interlock

1 **Key is trapped, HV/LV circuit is closed.**



While the key is trapped, the isolator is closed providing the power supply.

2 **Turn and release key to open the HV/LV circuit.**



Turning the key opens the isolator. The key can then be released.

3 **Key is free and the HV/LV circuit is open.**



The free key can be used to operate either a parallel supply stream or an access interlock.

The FS/Q switchgear interlocks are available in a clockwise or in an anti-clockwise mounting position.

A set range of rotational movement and spigot lengths are available (see page 5 for ordering details).

2. When BESS switchgear is isolated and earthed, the trapped PCS key can be released from the BESS feeder switchgear. The PCS key can be taken to the BESS PCS container.

3. PCS key can be inserted into the Access Interlock on the PCS container transformer door, to release the bolt to open the transformer door.

AI single key access interlock
(bolt trapped - key free)

1 **Key is free, bolt is trapped**



While the key is free, the bolt of the AI is trapped in the mechanism. The door is locked.

2 **Insert and turn key, then turn and release bolt**



By inserting and turning the key in the AI, the bolt is then free to be turned and released, which will trap the key in the lock.

3 **Key is trapped, bolt is unlocked**



The key stays trapped while the bolt is released and the door is open.

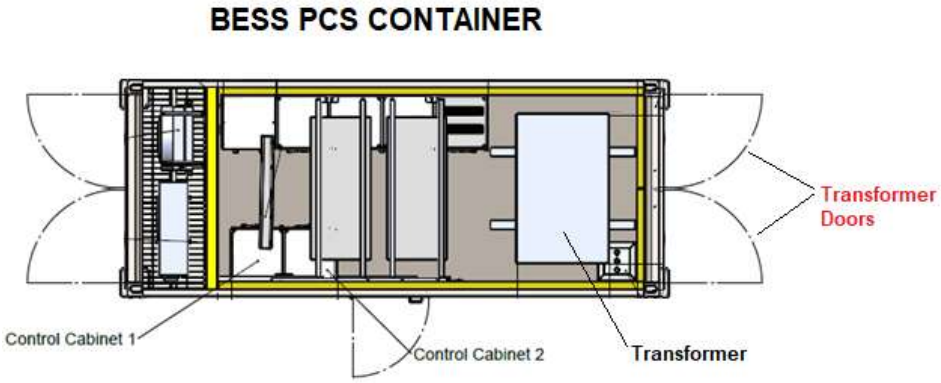
Transformer will remain de-Energised until sequence is reversed.

Items required

FS/Q Switchgear Interlock FS_Q_Jan_23.pdf (castell.com)
FS System Key, KEYS_Oct_22.pdf (castell.com)
AI Single Key Access Interlock, AI_Jan_2023.pdf (castell.com)

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Freqcon / Suretank will provide suitable mounting on plates the two PCS container access doors to the transformer enclosure (as below) to allow mounting of the Single key access system (Castell or similar) as per the attached datasheet. No other equipment necessary.



COMPANY requests CONTRACTOR to provide engineering design to supply, install and commission suitable Interlocking kit system complete consisting of:

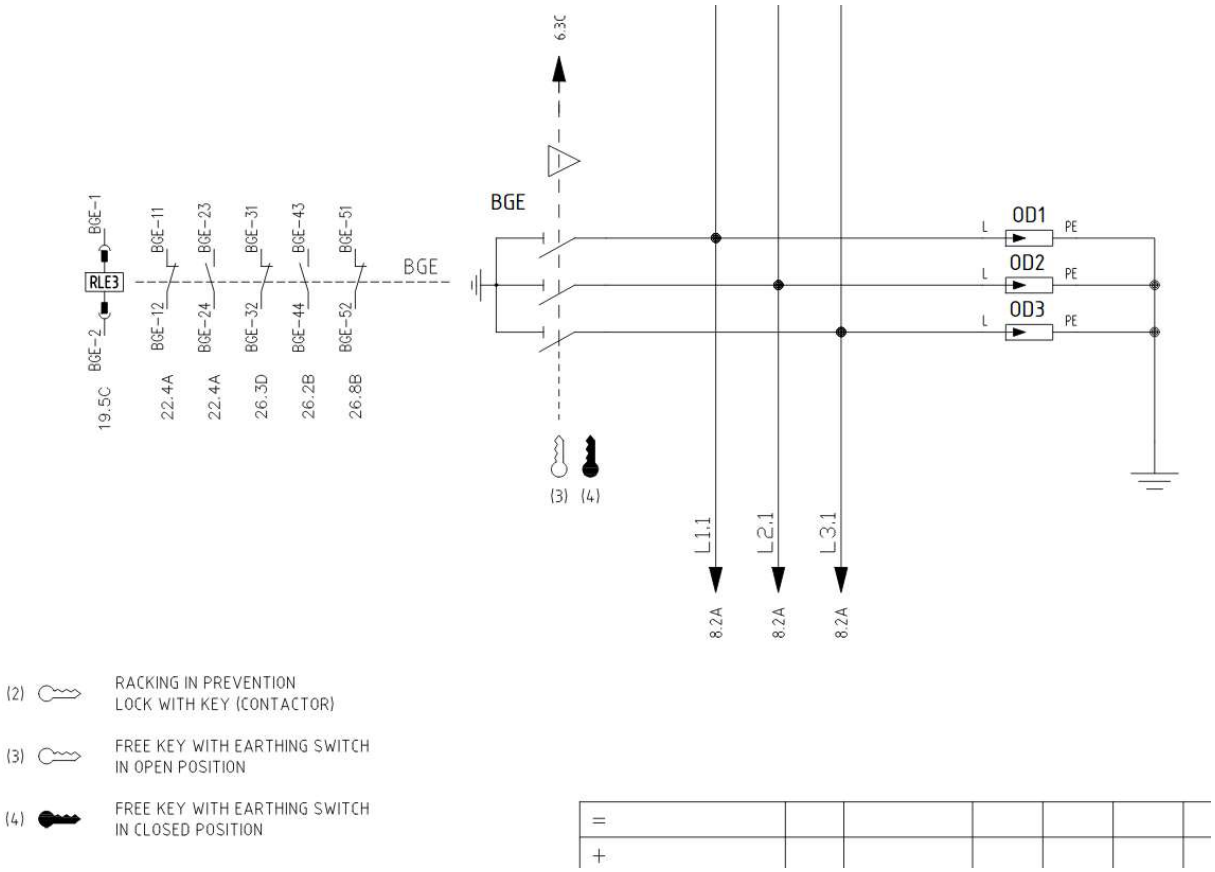
1. Switchgear interlock system suitable for the MV switchgear and earth switch
2. System Key – matched to switchgear interlock and Access Bolt Interlock
3. Single Key Access bolt interlock that will be mounted on plates provided by Freqcon/Suretank.

2. Response

Reference documents / Aconex unique numbers
1723002197-EL-DG-00017 - SG-100D1 MV SWBD 6,6kV - FUNCTIONAL DIAGRAM BESS FEEDER A-8500

As shown on the project documentation relevant to the 6.6 kV switchgear SG-100D1, each breaker/contactor trolley, as well each earthing switch is provided with keys interlocked with the corresponding mechanism.
In particular, as shown on the schematic drawing 1723002197-EL-DG-00017, the earthing switch on the BESS feeder is provided with the two keys shown in the following extract:

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Key 4 is free only when the earthing switch (BGE) is closed. Once the key is removed the earthing switch can not be open anymore, until the key is inserted again in the block.
This key cover exactly the function required in this technical query. i.e. the FS/Q switchgear interlock.

To comply with the requirement, it will be enough to ring the key 4 of SG-100D1 on BESS feeder with the key of the interlock to be installed on the PCS container door.

Once the earthing switch is closed the key 4 will be free, together with the door block key, which can be inserted in the block making possible unlocking and opening the door.

Contractor confirms that the design of the 6.6 kV switchgear is in line with the requirement and there is no need of any modification or additional device.

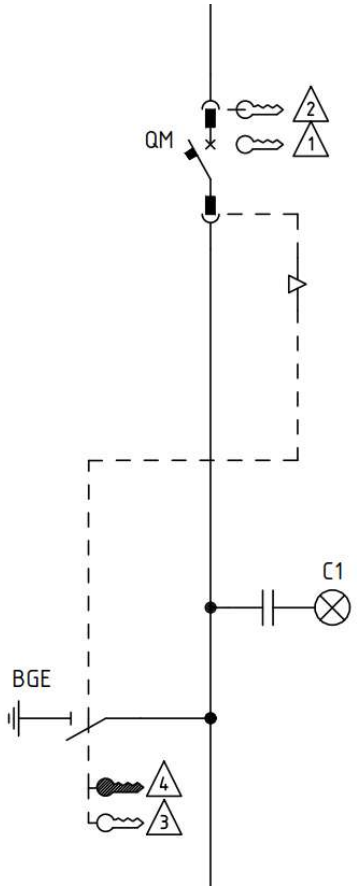
With respect to the PCS container, Contractor will not take care of supply and installation of any further key block, being these part of the BESS Supplier scope of work.

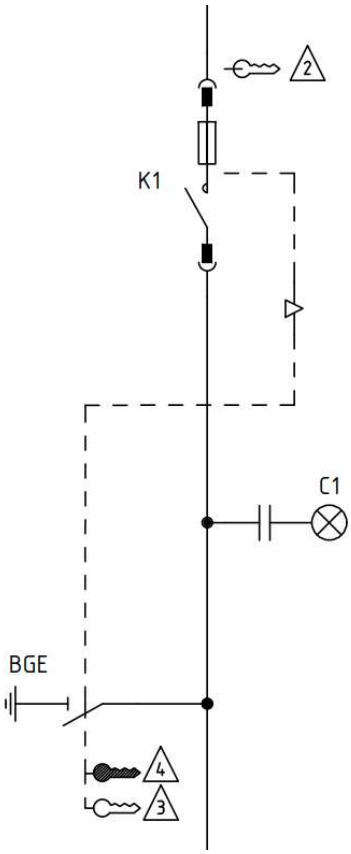
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3. Engineer's Response
Reference documents / Aconex unique numbers
Company acknowledges the use of the indicated key 4 as a proper way to ensure protection when operating on the BESS transformer. To maintain an easy setup, company advise contractor to free-issue a suitable lock assembly compatible with Key 4 that Freqcon/Suretank will then install on the BESS container in the reserved place on the transformer door.

4. Response
Reference documents / Aconex unique numbers **1723002197-EL-DG-00056 - SG-100D1 HV SWBD 6,6kV – OPERATION SEQUENCES AND KEY INTERLOCK**
As discussed and as per doc. N. **1723002197-EL-DG-00056 - SG-100D1 HV SWBD 6,6kV – OPERATION SEQUENCES AND KEY INTERLOCK** for the key interlocks, as well as on the other drawings relevant to the switchgear, each breaker/contactor trolley, as well each earthing switch is provided with keys interlocked with the corresponding mechanism. Here below some additional details: Imesa purchases the complete system of circuit breaker or contactor and earthing switch from ABB and the key system is coming from Italian supplier Giussani (https://www.giussanilocks.com/en/). These are the keys 1 to 4 for the breaker columns and 2 to 4 for the columns with fuses and contactor, as shown in the following sketches:

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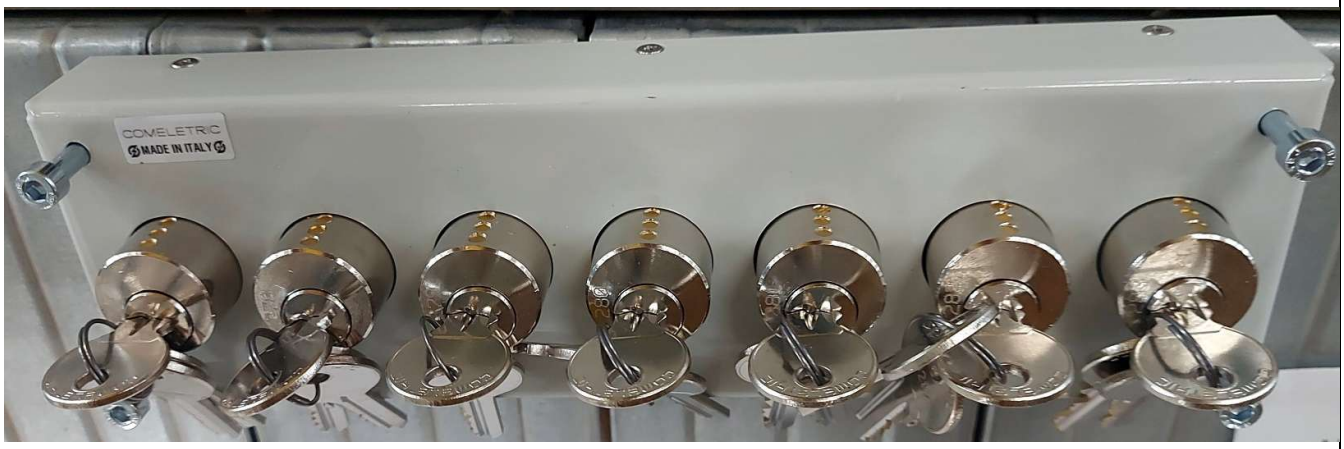




The key distributor installed on the measure cubicle to manage the busbar earthing switch, as shown at page 6 of attached drawing, is purchased from Comelectric (https://www.comeletric.it/interlocking-devices/?lang=en&_gl=1*1fa0q1n*_up*MQ..*_ga*MjA5NjEzMjczOC4xNzE3NTQ0NTAx*_ga_EDJ8J0CRNL*MTcxNzU0NDQ5OS4xLjEuMTcxNzU0NDUxNS4wLjAuMA..).

Please find here a picture of a key distributor similar to the one will be used for our project:

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With respect to the interlock with the BESS transformer door, CTR's proposal is to ring together the key 4 of the drawing (i.e. the key free with the earthing switch closed) with the key necessary to open the BESS door, so that this key will be released and can be used only after closing the earthing switch.

Here below a picture of the ring normally used to ring together two or more keys (This ring is normally welded to avoid any possibility of separate the keys):



CTR kindly asks CPY to acknowledge the above already discussed solution rather than having a single key.

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5. Engineer's Response
Reference documents / Aconex unique numbers
Company Acknowledges the proposed solution. The access key to the PCS container main door (hosting BESS transformer) as well as key of the Castell Lock locking the transformer access door (inside the container) will be provided to CTR to be ringed together upon commissioning.

6. Response
Reference documents / Aconex unique numbers
CTR will perform this activity under instruction and supervision by CW/Freqcon, before the BLPH onshore integrated test.

7. Engineer's Response
Reference documents / Aconex unique numbers

8. Response
Reference documents / Aconex unique numbers

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