Ballard Power Systems Europe A/S
Majsmarken 1
9500 Hobro
Denmark

Revision history		
Rev.	**Date.**	**Description**
001	29/10/2024	First Issue
002	25/11/2024	Updated based on changes in ATEX Register Rev004

Document Title:	**BLPH Project - ATEX Zone Components Maintenance**
Document Number:	K559-2254-CWIWP4202202-N01-004
Revision:	Rev002
Sequence Number:	004
File Name:	K559-2254-CWIWP4202202-N01-004Rev002
Purchaser Job:	K559-2254
Purchase Order:	CWIWP4202202
Code:	N01
Requsition Number:	n/a
Customer:	CrossWind C.V., Rotterdam, The Netherlands

ATEX Zone components maintenance



This Document is valid only at time of Printing.
Any Copies made are considered uncontrolled unless stamped otherwise in red.
Ballard Power Systems Europe A/S
Majsmarken 1
DK-9500 Hobro
contact@ballardeurope.com
+45 8843 5500
ballard.com
Specifications and descriptions in this document were in effect at the time of publication. Ballard Power Systems, Inc. reserves the right to change specifications, product appearance or to discontinue products at any time.

1.0 Disclaimer

NOTE: READ THIS BEFORE ATTEMPTING ANY PROCEDURES DESCRIBED IN THIS MANUAL

There are inherent risks in the operation of a fuel cell module that can result in death or bodily injury or loss or damage to property. It is therefore necessary for the customer to take all prudent safety precautions in the installation, use, and maintenance of this device. Persons who install, operate, and service the device are required to be technically qualified and experienced in working with electrical equipment, compressed gases, and H2.

This manual includes certain safety guidelines and recommendations; however, this manual is not intended to cover all situations. The customer is responsible for determining the suitability of the customer's particular design or application, and for ensuring the safe operation, maintenance, and storage of the device and any systems into which it is integrated. Ballard Power Systems Europe A/S ("BPSE") cannot be responsible for the use of the device in ways, or as part of systems, that deviate from the operating recommendations in the manual. The customer is responsible for being aware of, and complying with, all applicable laws and regulations. BPSE has limited its liability for damages incurred by the customer or its personnel in the contract documents pursuant to which the device is provided to the customer. Please refer to those documents for additional information.

Procedures described in any part of the manual can only be attempted once the customer has read this entire manual. Failure to follow any instruction or recommendation could result in death or bodily injury or loss or damage to property.

BPSE intends for the device to be installed, operated, and serviced only by approved technically qualified and experienced people who understand the principles of fuel cell technology, are aware of the safe operating limits of fuel cells, and are familiar with the risks posed by operating a fuel cell module. BPSE relies on customers to use their own knowledge and experience when installing, operating, and servicing the device. BPSE also relies on the people using this manual to be familiar with common terms and abbreviations used in the manual.

Information in this manual is subject to change without notice. BPSE makes no commitment to update or keep current the information in this manual and reserves the right to make updates or other changes to this manual and/or to the products described in this manual, at any time without notice. Updates and other changes to the manual may be posted on the BPSE website and may be accessed through the customer portal; it is the customer’s responsibility to check for any such updates or changes.

Copyright

The statements in this document must not be changed without special notification from Ballard Power Systems Europe A/S. Furthermore, Ballard Power Systems Europe A/S does not commit to any further obligations with this document.

Under no circumstances may the whole or parts of this publication be copied, reproduced, stored in a retrieval system, or translated into another language, unless written permission from BPSE has been obtained.

Table of Contents

1.0 Disclaimer 2
2.0 General information 4
2.1 Introduction 4
2.2 ATEX Zone maintenance safety 4
2.3 Coolant media 4
2.4 De-energization 4
2.5 Components installed inside the ATEX zone 5
3.0 Maintenance tasks on components in ATEX zone 7
3.1 Hydrogen Heater 7
3.1.1 Hydrogen Heater cooling media 7
3.1.2 Level sensor – IFM LMT01A 7
3.1.3 Heating element - JEVI D-8640 7
3.2 H2 Solenoid Shut-off valve – Emerson ACSO 8

List of Figures

Figure 1: ATEX zone 4

List of Tables

Table 2-1: List of components in ATEX zone 5

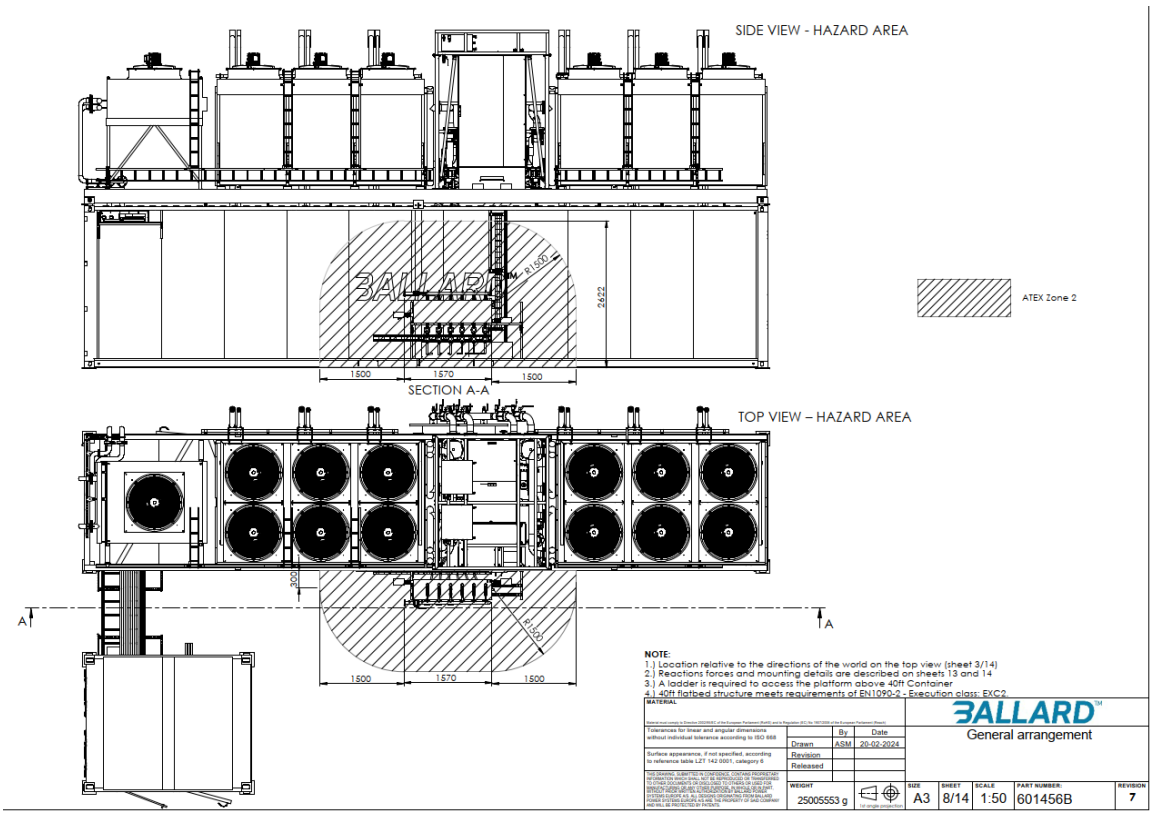
This Document is valid only at time of Printing.
Any Copies made are considered uncontrolled unless stamped otherwise in red.
Ballard Power Systems Europe A/S
Majsmarken 1
DK-9500 Hobro
contact@ballardeurope.com
+45 8843 5500
ballard.com
Specifications and descriptions in this document were in effect at the time of publication. Ballard Power Systems, Inc. reserves the right to change specifications, product appearance or to discontinue products at any time.

2.0 General information

2.1 Introduction

This document serves to supply information regarding the needed maintenance on components that exists inside the ATEX zone.

Figure 1: ATEX zone



Source document: General arrangement - K559-2254-CWIWP4202202-B01-001Rev008

2.2 ATEX Zone maintenance safety



The defined EX zone is classified as Zone 2.

Only approved personnel are allowed to work in the ATEX Zone.



2.3 Coolant media

Coolant is Proviflow Neo. Refer to Material Safety Data Sheets - K559-2254-CWIWP4202202-D05-001.

2.4 De-energization

De-energization of electrical components for maintenance must be done, ensuring that no ignition source ever exists in the EX-zone.

This Document is valid only at time of Printing.
Any Copies made are considered uncontrolled unless stamped otherwise in red.
Ballard Power Systems Europe A/S
Majsmarken 1
DK-9500 Hobro
contact@ballardeurope.com
+45 8843 5500
ballard.com
Specifications and descriptions in this document were in effect at the time of publication. Ballard Power Systems, Inc. reserves the right to change specifications, product appearance or to discontinue products at any time.

2.5 Components relevant to the ATEX zone

Table 2-1: List of components relevant to ATEX zone

Component	Device full tag	Manufacturer	Device/model/type	Service/ maintenance section
Hydrogen Heater	=HA01+DA02-CM01	Ballard	7003635	3.1
Level sensor – Hydrogen heater	=HA01+DA02-BL01	IFM	LMT01A - LMACE-A12E-QSKG-1/US/3D/3G	3.1.2
Connection wire – Level sensor	=HA01+DA02-BL01-WG01	IFM	ADOGH040MSS0010K04	N/A
Pressure Sensor – Hydrogen heater	=HA01+DA02-BP01	HUBA Control AG	Pressure Transducer 520 Series	N/A
Connection wire – Pressure sensor	=HA01+DA02-BP01-WG01	IFM	ADOGH040MSS0010K04	N/A
Temperature sensor – Hydrogen heater	=HA01+DA02-BT01	IFM	TT1050	N/A
Connection wire – Temperature sensor	=HA01+DA02-BT01-WG01	IFM	ADOGH040MSS0010K04	N/A
Heater element 1&2 - Hydrogen heater	=HA01+DA02-CM01-EA01...EA02	JEVI A/S	D-8640	3.1.3
Connection wires – Heater element 1&2	=HA01+DA02-EA01-WD01	Miltronic AB /Lapp Group	ÖLFLEX® CLASSIC 135 CH	N/A
	=HA01+DA02-EA02-WD01			
Cable glands – Heater element 1&2	=HA01+DA02-EA01	HAWKE	ICG 653 UNIV Os M20	N/A
	=HA01+DA02-EA02			
Solenoid Shut-off Valve, NC	=HA01+DA02-QM1.1...1.6	Emerson ASCO	NF X E210C488E 24/DC	3.2
	=HA01+DA02-QM2.1...2.6			
Solenoid Shut-off Valve cable gland	=HA01+DA02-QM1.1....16	HAWKE	501/421/O M20 421OM20	N/A
	=HA01+DA02-QM2.1...2.6			
H2 pipe wall passthrough	=HA01+DA02-XT01…06	Roxtec	EXRSB050000212	N/A
Sensor Ex Barrier*	=LA01+UC42-TF01	PR Electronics AS	9113B-U9	N/A
Container wall pass-through cable gland	=HA01+DA02-XT07…11	HAWKE	501/421/O M20 421OM20	N/A

This Document is valid only at time of Printing.
Any Copies made are considered uncontrolled unless stamped otherwise in red.
Ballard Power Systems Europe A/S
Majsmarken 1
DK-9500 Hobro
contact@ballardeurope.com
+45 8843 5500
ballard.com
Specifications and descriptions in this document were in effect at the time of publication. Ballard Power Systems, Inc. reserves the right to change specifications, product appearance or to discontinue products at any time.

Table 2-1: List of components relevant to ATEX zone				
Fuel Cell string Manual isolation valve	=HA01+DA02-QM01…06	Hy-lok	Hy-lok 110 Ball Valve	3.3
Main H2 manual isolation valve	=HA01+DA02-QM00	Armatec	DVC Type 1311, 131150032	N/A
H2 pipe wall passthrough	=HA01+DA02-XT01…06	Roxtec	EXRSB0500002121	N/A

*Not installed inside ATEX zone

This Document is valid only at time of Printing.
Any Copies made are considered uncontrolled unless stamped otherwise in red.
Ballard Power Systems Europe A/S
Majsmarken 1
DK-9500 Hobro
contact@ballardeurope.com
+45 8843 5500
ballard.com
Specifications and descriptions in this document were in effect at the time of publication. Ballard Power Systems, Inc. reserves the right to change specifications, product appearance or to discontinue products at any time.

3.0 Maintenance tasks on components in ATEX zone

3.1 Hydrogen Heater



If the Hydrogen Heater has run recently, wait for it to cool down before touching it and components mounted.

The following components of the Hydrogen Heater have no defined service/maintenance tasks defined by their documentation.

- Pressure sensor
- Temperature sensor
- Cables to sensors
- Cables to heating elements
- Cable glands on JEVI D-8640 heating elements
- Cable glands on Solenoid Shut-off valve (H2)
- Sensor EX barrier
- General Hy-lok fittings

It is recommended that visual inspection on above-mentioned components is done.

3.1.1 Hydrogen Heater cooling media

The Hydrogen heater must have the coolant freeze-protection checked with the use of a refractometer regularly and changed as needed.

Coolant is 50/50% mixture of demineralized water and Proviflow Neo, which is an Ethylene-glycol based.

Criteria: minimum freezing point of -30°C

3.1.2 Level sensor – IFM LMT01A

Refer to Manufacturers (IFM) Operating Instructions – section 9.

- De-energize supply
- Check sensor tip for deposits and damage. Clean if badly soiled. In case of damage, replace the unit – the unit cannot be repaired.
- When reinstalling, carefully clean the probe neck and the installation slot, especially the sealing surface, with appropriate methods to ensure that the unit is resistant to ingress and without dead space.
- Re-energize supply.

3.1.3 Heating element - JEVI D-8640

Refer to Manufacturer's (JEVI) Installation, Operation and maintenance instructions, section 4.0

Maintenance free, however after 1 year of operation:

- De-energize supply (=LA01+UC30-FC41…42)
- Check the thermostat for damage

This Document is valid only at time of Printing.
Any Copies made are considered uncontrolled unless stamped otherwise in red.
Ballard Power Systems Europe A/S
Majsmarken 1
DK-9500 Hobro
contact@ballardeurope.com
+45 8843 5500
ballard.com
Specifications and descriptions in this document were in effect at the time of publication. Ballard Power Systems, Inc. reserves the right to change specifications, product appearance or to discontinue products at any time.

- Check connections inside junction box
- Re-assemble and verify correct connections
- Re-energize supply

If no heating is done when needed, check and press the manual reset button.

3.2 H2 Solenoid Shut-off valve – Emerson ACSO

Check for excessive wear – leakage tests

- Externally

  Potential leakage areas: Pipe connections (Hy-lok) and valve stem.

  Hy-lok connections have low probability of leakage. If leakage occur, refer to components manual for replacement.

  If leakage from valve stem, rebuild with manufacturer kit or replace component.
- Inline

  If inline leakage occurs, rebuild with manufacturer kit or replace component.

Leakage test:

- Close valve(s) on designated H2 line
- Lower pressure downstream
- Monitor pressure downstream for a set period
- Search for external leakages with applicable outdoor-use leakage detector.

3.3 Manual isolation valve – Hy-lok 110 Ball Valve

Refer to Manufacturers (Hy-lok) Instruction manual for maintenance.

Leakage test – Stem:

In case of stem leakage, tighten the Flange Nut. If the leakage remains after tightening, check damage to the stem, outer package and inner package. Replace parts or component(s) as needed,

Leakage test – Inline:

If the leakage happens inside the valve, ensure whether the valve is in fully closed condition. If the reason of leakage is seat damage, replace the seat or the component.

This Document is valid only at time of Printing.
Any Copies made are considered uncontrolled unless stamped otherwise in red.
Ballard Power Systems Europe A/S
Majsmarken 1
DK-9500 Hobro
contact@ballardeurope.com
+45 8843 5500
ballard.com
Specifications and descriptions in this document were in effect at the time of publication. Ballard Power Systems, Inc. reserves the right to change specifications, product appearance or to discontinue products at any time.