Base Load Power Hub (BLPH)

SAT REPORT – TELECOM EQUIPMENT

Document Number: 1724000452-QC-RE-00010

Document Class: 3

02	09/04/2025	Issue for Information (IFi)	L.Pizzigati	G.Rossini	S.Montanari
01	11/10/2024	Issue for Information (IFi)	L.Pizzigati	G.Rossini	M.Manenti
00	09/08/2024	Issue for Information (IFi)	L.Pizzigati	L.Cavallini	M.Manenti
Rev.	Date	Description	Prepared	Reviewed	Approved
FORES ENGINEERING					

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Revision / Change Log

Rev.	Description
00	Issue for Information (IFI)
01	Issue for Information (IFi)
02	Issue for Information (IFi)

HOLDS LIST

No.	Description
1	
2	
3	
4	

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1 INTRODUCTION

1.1 PROJECT OVERVIEW

Crosswind, a Shell and Eneco joint venture, was awarded the tender to develop the offshore Hollandse Kust Noord (HKN) wind farm, located 18.5km off the coast of Netherlands near the town of Egmond aan Zee. The consortium plans to have HKN operational in 2023 with an installed capacity of 759MW generating at least 3.3TWh per year. This is sufficient renewable power to supply more than 1 million Dutch households with green electricity.

Offshore wind farms produce intermittent electricity and balancing these dips and peaks and integrating this electricity into the national energy system requires new technologies. For this reason, the offshore wind farm will include several new technologies that could be implemented at full-scale in the future. The new technologies being explored include a floating solar park, a short-duration battery storage as well as long-term storage via green hydrogen produced by water electrolysis and subsequently consumed in a fuel cell. The combination of these individual measures, herein referred to as the Base Load Power Hub (BLPH) will ensure a continuous power supply regardless of the wind situation.

1.1.1 Project Location

The Hollandse Kust Noord (HKN) wind farm is located 18.5km off the coast of the Netherlands near the town of Egmond aan Zee.

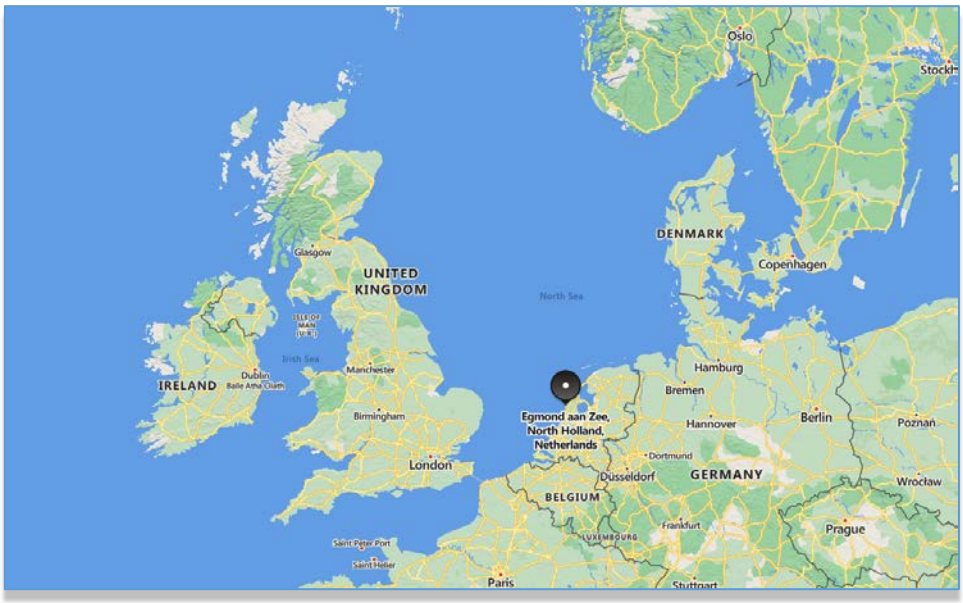


Figure 1 HOLLANDSE KUST NOORD WIND PARK Location Map

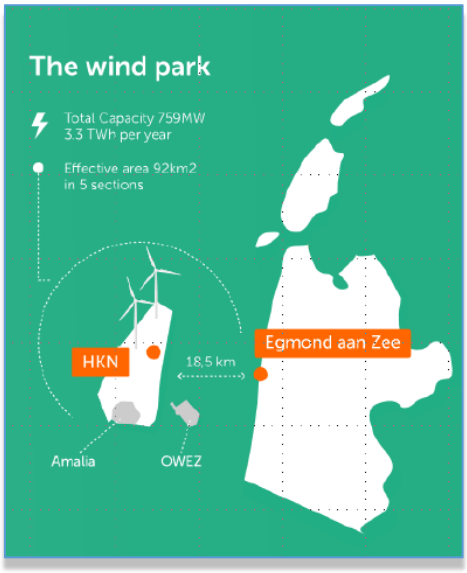


Figure 2 - Wind Park Details

The wind farm will consist of No. 69 x 11.5MW wind turbine generators each to be installed on a dedicated monopile structure. A 70th monopile located on coordinates E 590719.1, N 5841602.3 is reserved for installing the platform accommodating the BLPH. The monopile structure was designed and installed by Van Oord Offshore Wind (VooW) and therefore not part of the BLPH scope.

1.1.2 Project Concept

All components included in the BLPH will be integrated onshore on a topsides and installed in an offshore location within the boundaries of the HKN wind farm. At its simplest, the BLPH will store energy during periods of high electricity generation from renewable sources (a wind turbine generator and the floating solar PV farm) and release it during periods of low generation. In practice. It is expected that the energy stored will supplement generation from renewable sources to ensure that at least 1.0MW of power is exported to the electrical grid regardless of wind/solar availability.

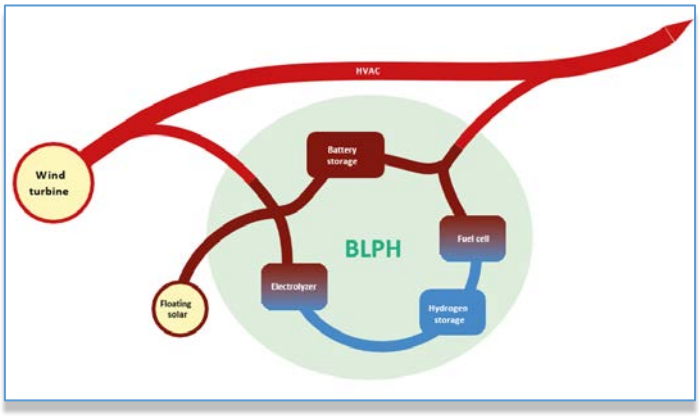


Figure 3 – BLPH Concept

Electricity in the BLPH will be stored in the form of electrons in a battery energy storage system (BESS) as well as converted into green hydrogen via water electrolysis. When the power output from the connecting wind turbine drops to below 1 MWe, the BLPH will return its stored energy to supplement the remaining power

output. This will be by discharging the BESS, while stored hydrogen will be converted back into electricity using a fuel cell to extend the discharge duration.

The purpose of the BLPH s to function as a testbed for the integration of energy storage technologies with renewable generation. It is expected that equipment installed on the BLPH will operate as Normally Unmanned Installation for at least two (2) years with no or minimal maintenance and it will have its own independent control room with the ability to communicate with Crosswind's control room.

2 DOCUMENT SCOPE

This document lists the checks and the tests to be carried out to verify conformity to supply specification of project equipment.

2.1 REFERENCES

Doc. No.	Description
1724000452-TL-DS-00005	EQUIPMENT DATASHEETS – TELECOM EQUIPMENT
1724000452-TL-LIS-00006	EQUIPMENT AND SPECIAL TOOLS LIST – TELECOM EQUIPMENT
1724000452-COM-LIS-00014	SPARE PARTS LIST – TELECOM EQUIPMENT

Table 1 - Reference Documents

2.2 DEFINITIONS AND ABBREVIATIONS

COMPANY or Client (CPY):	CROSSWIND
CONTRACTOR (CTR):	ROSETTI MARINO S.p.A.
PROJECT:	HOLLANDSE KUST NOORD WIND PARK Project

Table 2 - Definitions and Abbreviations

3 SAT REPORT

3.1 VISUAL AND DIMENSIONAL CHECK REPORT

3.1.1 IDCS MATERIAL

Test Name / Test N°	MATERIAL VISUAL AND DIMENSIONAL CHECK	
Test Scope	Perform visual and mechanical check of IDCS material	
ITP Reference		
Reference Documents	1724000452-TL-DS-00005 EQUIPMENT DATASHEETS – TELECOM EQUIPMENT 1724000452-TL-LIS-00006 EQUIPMENT AND SPECIAL TOOLS LIST – TELECOM EQUIPMENT	
Equipment Involved	Items from 1 to 27 in the Equipment List	
Requirements	Measuring tape	
Prerequisites	/	
Notes	/	

Procedure

Step	Description	Acceptance Criteria	Pass	Fail	N.A.
1	Visual dimensional check	Equipment in compliance with related Data sheet			
2	Mechanical damage check	No mechanical damage			
3	Equipment quality check	Equipment in compliance with related Data sheet			
4	Equipment quantity check	Quantity of supplied devices in compliance with Equipment List			

Remarks

			Name and surname	Signature
Test attendant	**Completed by**	**FORES**		
	Witness by	**ROSETTI MARINO**		
		CROSSWIND		
		DATA		

3.1.2 NAVIGATION AIDS MATERIAL

Test Name / Test N°	MATERIAL VISUAL AND DIMENSIONAL CHECK	
Test Scope	Perform visual and mechanical check of navigation aids material	
ITP Reference		
Reference Documents	1724000452-TL-DS-00005 EQUIPMENT DATASHEETS – TELECOM EQUIPMENT 1724000452-TL-LIS-00006 EQUIPMENT AND SPECIAL TOOLS LIST – TELECOM EQUIPMENT	
Equipment Involved	Items from 28 to 39 in the Equipment List	
Requirements	Measuring tape	
Prerequisites	/	
Notes	/	

Procedure

Step	Description	Acceptance Criteria	Pass	Fail	N.A.
1	Visual dimensional check	Equipment in compliance with related Data sheet			
2	Mechanical damage check	No mechanical damage			
3	Equipment quality check	Equipment in compliance with related Data sheet			
4	Equipment quantity check	Quantity of supplied devices in compliance with Equipment List			

Remarks

			Name and surname	Signature
Test attendant	**Completed by**	**FORES**		
	Witness by	**ROSETTI MARINO**		
		CROSSWIND		
		DATA		

3.1.3 RADIO SYSTEM MATERIAL

Test Name / Test N°	MATERIAL VISUAL AND DIMENSIONAL CHECK	
Test Scope	Perform visual and mechanical check of UHF portable radio	
ITP Reference		
Reference Documents	1724000452-TL-DS-00005 EQUIPMENT DATASHEETS – TELECOM EQUIPMENT 1724000452-TL-LIS-00006 EQUIPMENT AND SPECIAL TOOLS LIST – TELECOM EQUIPMENT	
Equipment Involved	Items from 40 to 45 in the Equipment List	
Requirements	Measuring tape	
Prerequisites	/	
Notes	/	

Procedure

Step	Description	Acceptance Criteria	Pass	Fail	N.A.
1	Visual dimensional check	Equipment in compliance with related Data sheet			
2	Mechanical damage check	No mechanical damage			
3	Equipment quality check	Equipment in compliance with related Data sheet			
4	Equipment quantity check	Quantity of supplied devices in compliance with Equipment List			

Remarks

			Name and surname	Signature
Test attendant	**Completed by**	**FORES**		
	Witness by	**ROSETTI MARINO**		
		CROSSWIND		
		DATA		

3.1.4 SPARE PARTS

Test Name / Test N°	MATERIAL VISUAL AND DIMENSIONAL CHECK	
Test Scope	Perform visual and mechanical check of spare parts	
ITP Reference		
Reference Documents	1724000452-TL-DS-00005 EQUIPMENT DATASHEETS – TELECOM EQUIPMENT 1724000452-COM-LIS-00014 SPARE PARTS LIST – TELECOM EQUIPMENT	
Equipment Involved	Items listed in the Spare Part List	
Requirements	/	
Prerequisites	/	
Notes	/	

Procedure

Step	Description	Acceptance Criteria	Pass	Fail	N.A.
1	Visual dimensional check	Equipment in compliance with related Data sheet			
2	Mechanical damage check	No mechanical damage			
3	Equipment quality check	Equipment in compliance with related Data sheet			
4	Equipment quantity check	Quantity of supplied devices in compliance with Equipment List			

Remarks

			Name and surname	Signature
Test attendant	**Completed by**	**FORES**		
	Witness by	**ROSETTI MARINO**		
		CROSSWIND		
		DATA		

3.2 FUNCTIONAL TEST

3.2.1 DMR UHF RADIO POWER UP AND VERIFY CONFIGURATION UPLOADED

Test Name / Test N°	RADIO POWER UP AND VERIFY CONFIGURATION UPLOADED	
Test Scope	Verify the correct power up and the Configuration Uploaded of the DMR UHF Radios.	
ITP Reference		
Reference Documents	1724000452-TL-DS-00005 EQUIPMENT DATASHEETS – TELECOM EQUIPMENT 1724000452-TL-LIS-00006 EQUIPMENT AND SPECIAL TOOLS LIST – TELECOM EQUIPMENT	
Equipment Involved	Item 40 and 41 in the Equipment List	
Requirements	/	
Prerequisites	Handheld radio battery shall be charged	
Notes	/	

Procedure

Step	Description	Acceptance Criteria	Pass	Fail	N.A.
1	Switch the radio on turning clockwise the main knob at the top of the radio itself	The radio display will light up showing “out of range” and the battery level			
2	From the menu, select Utilities→Radio Info To check on the site information, select **Site Info**.	Site Alias and site ID are shown on the screen. Site Alias : **OFFSHORE** Site ID : **1**			
3	From the menu, select Utilities→Radio Info To check on your radio ID and alias, select **My ID**.	Name and Number are shown on the screen. For UHF Radio mobile Y-89-06-THU-001: Name : **CW HKN – 5002** Number : **00005002** For UHF Radio mobile Y-89-06-THU-002: Name : **CW HKN – 5003** Number : **00005003**			
4	From the menu, select Utilities→Radio Info To check on the firmware and Codeplug versions, select **Versions**	Firmware Version and CP version are shown on the screen Firmware Ver.: **R02.22.03.1001** CP Version **: 22.23.06**			
5	To check on the latest software update information, select **SW Update**.	Updated Date and Updated Time are shown on the screen Updated Date: **2024-07-19** Updated Time: **08.53.07**			

Remarks

			Name and surname	Signature
Test attendant	**Completed by**	**FORES**		
	Witness by	**ROSETTI MARINO**		
		CROSSWIND		
		DATA		

3.2.2 VHF MARINE POWER UP AND COMMUNICATION TEST

Test Name / Test N°	RADIO POWER UP AND COMMUNICATION TEST	
Test Scope	Verify the correct power up and communication of the VHF Handheld Marine Radios.	
ITP Reference		
Reference Documents	1724000452-TL-DS-00005 EQUIPMENT DATASHEETS – TELECOM EQUIPMENT 1724000452-TL-LIS-00006 EQUIPMENT AND SPECIAL TOOLS LIST – TELECOM EQUIPMENT	
Equipment Involved	Item 32 and 33 in the Equipment List	
Requirements	/	
Prerequisites	VHF Radios are supposed to be already switched off	
Notes	/	

Procedure

Step	Description	Acceptance Criteria	Pass	Fail	N.A.
1	Tune the VHF radios on the same simplex channel within the International Marine channel list (e.g. Channel 11 corresponding to frequency 156.550MHz).	Both radios will be operating on the same simplex Marine channel.			
2	1) Pressing the Push To Talk switch (PTT) on the first portable radio unit and speaking in close proximity of the handset microphone a voice message will be received by the second radio. 2) Pressing the Push To Talk switch (PTT) on the second portable radio and speaking in close proximity of its integrated microphone, a voice message will be received by the first radio.	1) Second radio receives voice messages from first radio. 2) First radio receives voice messages from second radio Half duplex bidirectional communications can be instated between the radios.			
3	Connect the Twin cup headset and the PTT Control Unit (SAVOX C-C440 Ex) to the VHF Handheld marine Radio	When external equipment is connected to the radio, the right side of the display will show a headset.			
4	1) Pressing the external Push To Talk switch (PTT) on the first portable radio unit and speaking in close proximity of the handset microphone a voice message will be received by the second radio. 2) Pressing the external Push To Talk switch (PTT) on the second portable radio and speaking in close proximity of its integrated microphone, a voice message will be received by the first radio.	1) Second radio receives voice messages from first radio. 2) First radio receives voice messages from second radio Half duplex bidirectional communications can be instated between the radios.			
5	Disconnect the Twin cup headset and the PTT Control Unit (SAVOX C-C440 Ex) to the VHF Handheld marine Radio	When external equipment is disconnected to the radio, the right side of the display will not show a headset.			

Remarks

			Name and surname	Signature
Test attendant	**Completed by**	**FORES**		
	Witness by	**ROSETTI MARINO**		
		CROSSWIND		
		DATA		

3.2.3 VHF MARINE RADIO ADDITIONAL FEATURES TEST

Test Name / Test N°	VHF MARINE RADIO ADDITIONAL FEATURES TEST	
Test Scope	The scope of this test is to verify some additional features of the VHF RADIO	
ITP Reference		
Reference Documents	1724000452-TL-DS-00005 EQUIPMENT DATASHEETS – TELECOM EQUIPMENT 1724000452-TL-LIS-00006 EQUIPMENT AND SPECIAL TOOLS LIST – TELECOM EQUIPMENT	
Equipment Involved	Item 32 and 33 in the Equipment List	
Requirements		
Prerequisites		
Notes	/	

Procedure

Step	Description	Acceptance Criteria	Pass	Fail	N.A.
1	Power up the VHF RADIO and verify that radio operates with channels according to the radio Regulations Channels : 6 12 17 67 73 78A 8 13 19A 68 74 79A 9 14 20A 69 75 L) 87 10 15 27A 71 76 L) 88 11 16 28A 72 77	Check that the channels are displayed on the screen			
2	Locking the keypad: To lock the keypad, press and hold the Light/Lock button. To unlock the keypad, press and hold the Light/Lock button again.	The display shows a key symbol when the keypad is locked.			
3	Using Squelch control To activate Squelch control, press the SQ key. To set the Squelch level, press ↑ (closing) or ↓(opening).	The display shows the Squelch level while it is adjusted, e.g. “SQ 5”.			

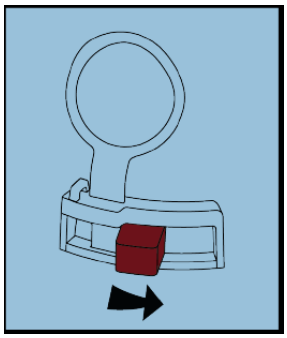
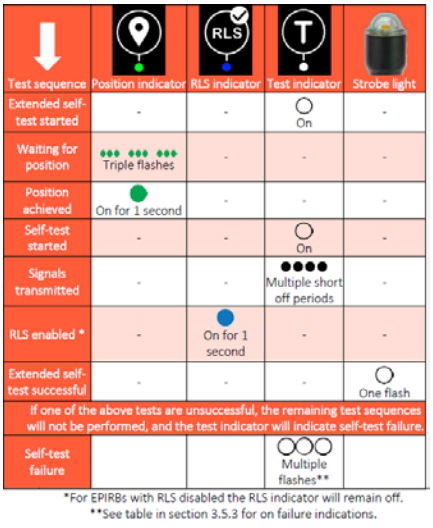
Remarks

			Name and surname	Signature
Test attendant	**Completed by**	**FORES**		
	Witness by	**ROSETTI MARINO**		
		CROSSWIND		
		DATA		

3.2.4 EPIRB TEST MODE

Test Name / Test N°	EPIRB TEST MODE	
Test Scope	During the normal self-test, the main functionality of the EPIRB is tested. A test signal is transmitted on all frequencies (121.5 MHz, AIS and 406 MHz). These test signals will not be recognized as distress signals. While transmitting the test signals the battery and the transmitted signals are tested.	
ITP Reference		
Reference Documents	1724000452-TL-DS-00005 EQUIPMENT DATASHEETS – TELECOM EQUIPMENT 1724000452-TL-LIS-00006 EQUIPMENT AND SPECIAL TOOLS LIST – TELECOM EQUIPMENT	
Equipment Involved	Item 30 and 31 in the Equipment List	
Requirements	This Test can be only done and passed if the EPIRB is programmed before Testing.	
Prerequisites	EPIRB must be configured before test and registered before use. This allows the SAR authorities to retrieve information about you and your emergency contacts in an emergency.	
Notes	/	

Procedure

Step	Description	Acceptance Criteria	Pass	Fail	N.A.
1	To perform the extended self-test, do the following steps within a period of 3 seconds: 1. Move the switch to test position 2. Release to middle position 3. Move the switch to test position and release when the white test indicator lights up. 	The white test indicator LED will light up and the green GNSS indicator LED will start flashing in sequences of 3 fast flashes. This indicates that the EPIRB is searching for a validated position. When a valid position is found the green GNSS indicator LED will remain lit for approximately 1 second and a normal self-test will continue. The top light will flash once at the end of the text if the extended self-test is successful. 			

Test sequence	Position indicator	RLS indicator	Test indicator	Strobe light
Extended self-test started	-	-	On	-
Waiting for position	Triple flashes	-	-	-
Position achieved	On for 1 second	-	-	-
Self-test started	-	-	On	-
Signals transmitted	-	-	Multiple short off periods	-
RLS enabled *	-	On for 1 second	-	-
Extended self-test successful	-	-	-	One flash
If one of the above tests are unsuccessful, the remaining test sequences will not be performed, and the test indicator will indicate self-test failure.				
Self-test failure			Multiple flashes**	

*For EPIRBs with RLS disabled the RLS indicator will remain off.
**See table in section 3.5.3 for on failure indications.

Remarks

			Name and surname	Signature
Test attendant	**Completed by**	**FORES**		
	Witness by	**ROSETTI MARINO**		
		CROSSWIND		
		DATA		