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# Jaeun Offshore Wind Power HMI Manual

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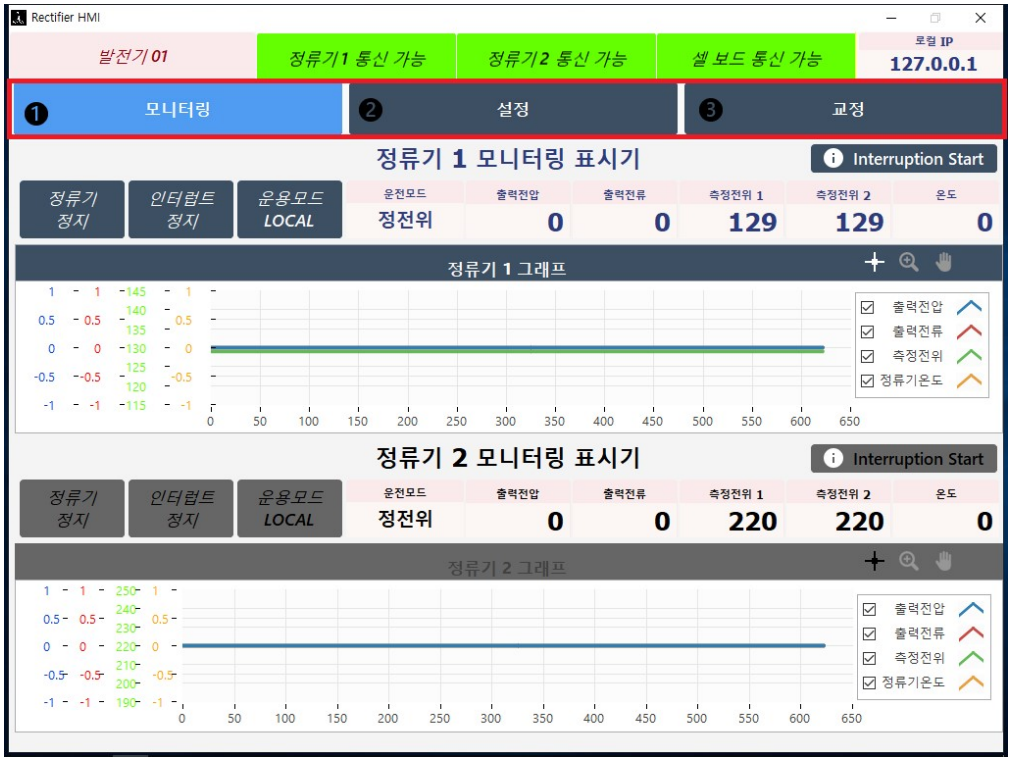
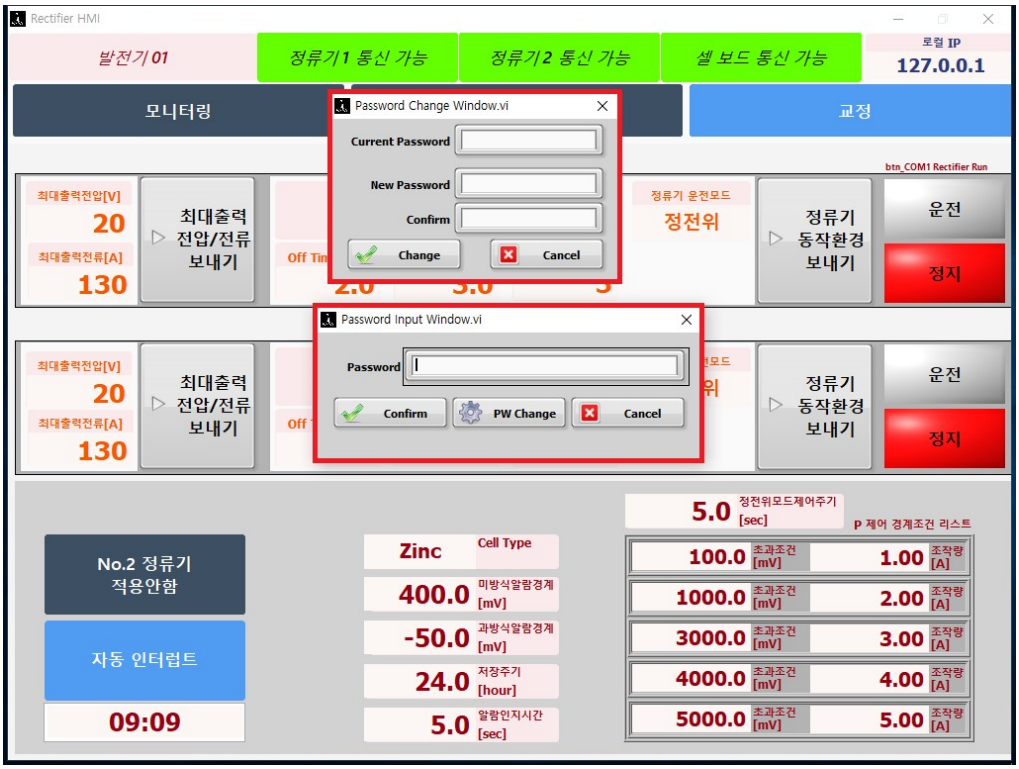
## 1. HMI main screen

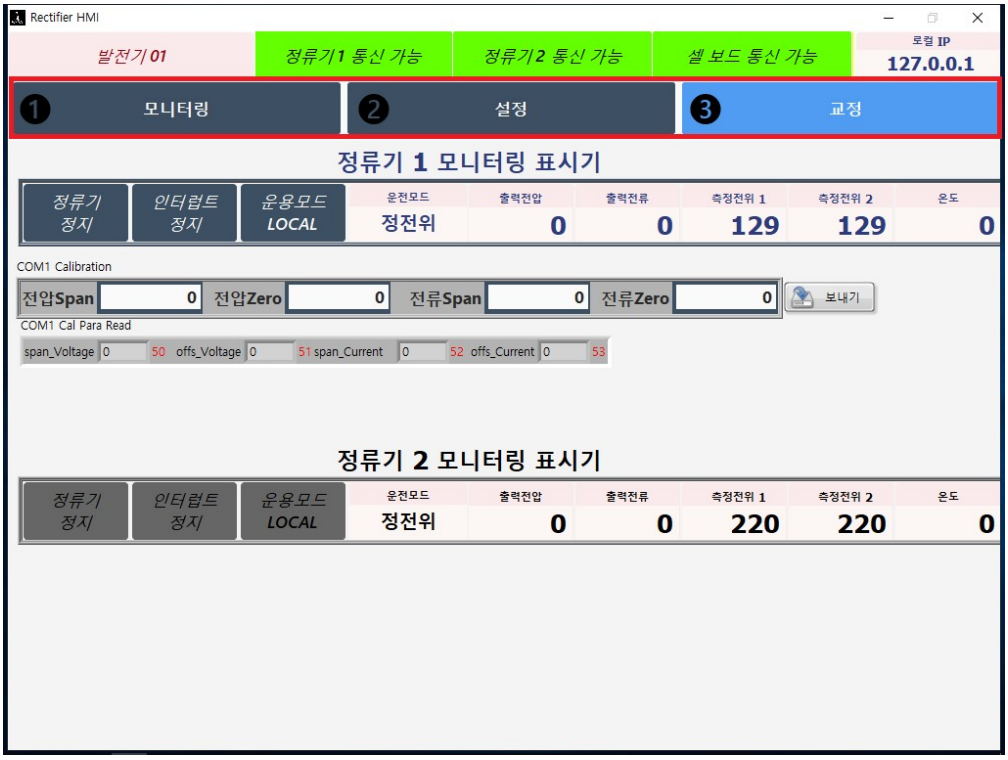
### A. Basic screen for each menu

[Settings screen]




[Monitoring screen]






[Calibration screen]

◆ 1) Monitoring, 2) Settings, 3) Calibration You can enter the corresponding screen through each button.

In case of calibration, you can access the calibration screen by entering a separate password.

You can also change your password in that window.

B. HMI operation keyboard

◆ You can enter numbers using the pop-up keyboard on the following settings screen. When you touch the keyboard in the red box at the bottom right, a pop-up keyboard appears. The keyboard can move its position by dragging and manipulate numbers.

# 2. How to operate HMI settings

## A. Basic setting operation

① Generator 01 refers to the wind generator on which the corresponding ICCP is installed.

② It shows the communication status of rectifiers 1/2, and the cell board. And it displays as enabled/disabled.

③ It indicates the current LOCAL IP address.

④ This is where you can set the maximum output voltage and current value.
The voltage is set to a maximum of 20V and the current is set to a maximum of 130A.
Due to the rectifier limit specifications, it is not recommendable to adjust it any further than the maximum settings.

⑤ Save the value set through 'The maximum output voltage/current send' button.

⑥ Save the entered values through 'The rectifier operation environment send' button.

⑦ The operation stop button determines whether the rectifier is currently operating or not.

'Driving' is indicated in green and 'Stopping' is indicated in red.

B. Rectifier operation mode

[3 types of rectifier operation mode input settings].

◆ For constant voltage and constant current, enter the manually set voltage and manually set current in the next input box. For constant potential, enter the reference potential setting value.

When touching the rectifier operation mode box, three modes are entered as shown in the following picture.

◆ The input fields for constant current and constant voltage are as follows.

[Constant voltage, constant current, constant potential mode]

① In constant voltage mode, adjust the value only for the manually set voltage.

② In constant current mode, adjust the value only for the manually set current.

③ In constant potential, numeric adjustment is possible only for the reference electrode potential.
Additionally, the voltage and current entry fields are hidden in constant potential mode.

C. interrupt

[Example of Interrupt OFF, ON TIME, Repeat count setting]

◆ Off Time and On Time determine the maintenance time of Off and On when interrupted. OFF and ON can be set from a minimum of 1 second to a maximum of 10 seconds.

The number of repetitions determines how many times Off and On will be repeated.

However you can input at least 0 to 99 times, but it is recommended not to use it more than 50 times as it may have a negative effect on the SMPS.

Example photo) Interrupt operation

SMPS in operation >> (off and maintained) Off Time 2 seconds
>> (On and maintained) On Time 3 seconds >> Repeat OFF and ON at 3 times

## D. Electrostatic potential settings and alarm operation details

① Use the 'No.2 Rectifier Apply/Not apply' button to determine whether or not to use the No.2 rectifier.
Depending on application, only the monitoring graph is displayed/hidden.

② The 'Automatic interrupt' button determines whether or not to automatically operate the interrupt by enabling or disabling it.
When performing an automatic interrupt, enter the time in the box at the bottom to determine when to perform the interrupt operation.
Manual operation is possible even during automatic activation.

③ Determine the cell type of the reference electrode and select between [Zinc and AgCl].
When you select the corresponding electrode, the limit values of the under-protection and over-protection alarms at the bottom appear.
It changes depending on the type of electrode.

④ Change the under-protection and over-protection alarm limit values.
Decide whether an alarm will sound when a certain value is exceeded.

⑤ Determine the interval for saving SMPS status in the log.
It can be set in units of time. The default is 24 hours and can be set at least 0.1 second unit.

⑥ When the limit value is exceeded according to the alarm recognition time setting value,
Decide how long the delay will be before the alarm sounds.

Example) Alarm limit value exceeded >> "Alarm recognition time" >> Alarm operation

⑦ Set the time in seconds at the constant potential mode control cycle.
As much as the amount exceeded from the constant reference potential setting value every second of that time, Check the excess condition and adjust the current amount to the operating amount that suits the condition.

Example) When the reference potential is 220mV and the current is 320mV, if it exceeds 100, the manipulated amount is 1A.

## E. Log

| | A | B | C | D | E | F | G | H | I | J |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Time | Event Name | Generator Number | Rectifier Number | Control Mode | [V] | [A] | [mV] | [mV] | [℃] |
| 2 | 2023-10-25 9:05 | 정류기 1 통신 불능 | 1 | 1 | 정전위 | 0 | 0 | -862 | 18 | 0 |
| 3 | 2023-10-25 9:07 | 자동 인터럽션 시간설정 변경 (설정시간 : 21시 59분) | 0 | 0 | 정전위 | 0 | 0 | 0 | 0 | 0 |
| 4 | 2023-10-25 9:07 | 정류기 1 통신 불능 | 1 | 1 | 정전위 | 0 | 0 | -863 | 18 | 0 |
| 5 | 2023-10-25 9:07 | 자동 인터럽션 시간설정 변경 (설정시간 : 23시 33분) | 0 | 0 | 정전위 | 0 | 0 | 0 | 0 | 0 |
| 6 | 2023-10-25 9:07 | 자동 인터럽션 시간설정 변경 (설정시간 : 10시 59분) | 0 | 0 | 정전위 | 0 | 0 | 0 | 0 | 0 |
| 7 | 2023-10-25 9:07 | 정류기 2 통신 불능 | 1 | 2 | 정전위 | 0 | 0 | 23 | 22 | 0 |
| 8 | 2023-10-25 9:07 | 과방식 경고 | 1 | 1 | 정전위 | 0 | 0 | -863 | 18 | 0 |
| 9 | 2023-10-25 9:07 | 기준전극 오차 경고 | 1 | 1 | 정전위 | 0 | 0 | -863 | 18 | 0 |
| 10 | 2023-10-25 9:08 | 기준전극 오차 경고 | 1 | 2 | 정전위 | 0 | 0 | 23 | 22 | 0 |
| 11 | 2023-10-25 9:08 | 자동 인터럽션 시간설정 변경 (설정시간 : 09시 09분) | 0 | 0 | 정전위 | 0 | 0 | 0 | 0 | 0 |
| 12 | 2023-10-25 9:08 | 자동 인터럽션 시작(설정시간 : 09시 09분) | 0 | 0 | 정전위 | 0 | 0 | 0 | 0 | 0 |
| 13 | 2023-10-25 9:09 | 인터럽트 | 1 | 1 | 정전류 | 0.5 | -0.5 | -863 | 18 | 13.9 |
| 14 | 2023-10-25 9:12 | 인터럽트 | 1 | 1 | 정전류 | 6.5 | -0.5 | 0 | 0.1 | 14 |

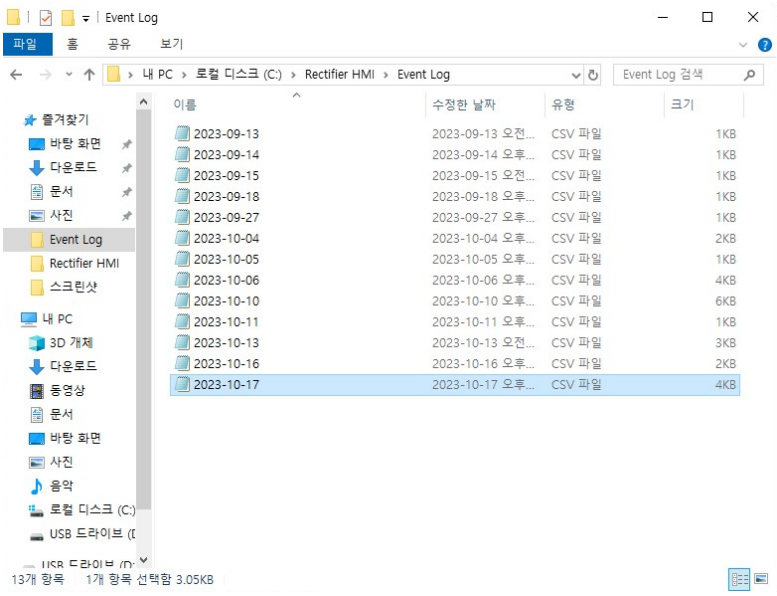
[Log screen]

◆ Log generation standards are [Period Storage, Alarm, Interrupt].

The default period storage is to save the rectifier status once per 24 hours. Since it is saved based on the PC clock, be careful not to manipulate the PC time setting.

When an alarm occurs, the log is saved along with the corresponding event type.

Automatic interrupt operates once at a specified time per 24 hours.
Interrupt occurrences are saved as log.
For automatic and manual interrupts, the log is saved 1 second after pressing the interrupt button.




[Log storage location and format]

◆ The log is saved with a CSV extension in the Event Log folder in the HMI installation folder.

Files are created by updating the date every day.

At the top of the content, the category that matches the data value is entered.

When viewing data in an Excel file, unit values and categories are entered for each row.

F. Alarm

◆ Alarms include 1) Over-protection, 2) Under-protection, 3) Reference electrode potential error,

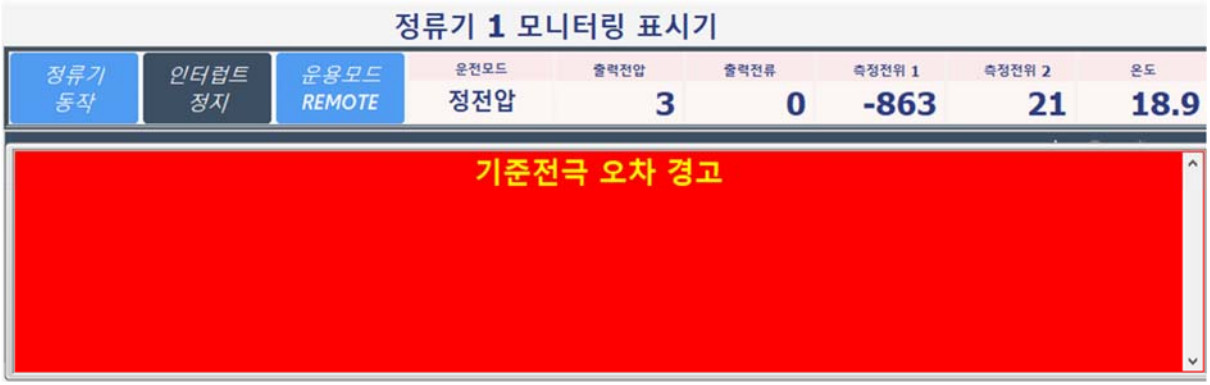
4) Rectifier communication unavailable, 5) Cell board communication unavailable

1) The over-protection alarm occurs when the measured potential value is lower than the over-protection alarm limit value entered in the settings screen. It triggers an alarm after a delay period specified as the alarm recognition time, and if the lower value is maintained.

Example) Reference electrode potential -100mV, over-protection limit value -50mV → After alarm recognition time → Over-protection warning

2) The under-protection alarm occurs when the measured potential value is higher than the under-protection alarm limit value entered in the settings screen. It triggers an alarm after a delay period specified as the alarm recognition time, and if the excess value is maintained.

Example) Reference electrode potential 500mV, over-protection limit value 400mV → After alarm recognition time → Under-protection warning




3) The reference electrode potential error warning occurs when there is a difference of 5mV or more in the reference electrode potential while the potential is being maintained. The warning alarm occurs after the alarm recognition time, and if the difference of 5mV or more continues.

4) An alarm occurs when communication between the cell board and LOCAL is not possible. If communication with the cell board is interrupted, it operates after a delay equal to the alarm recognition time.

5) Rectifier communication unavailable warning occurs when communication with the SMPS control board is impossible.

All alarms are manually operated and are turned off with one touch.

# 3. Monitoring screen description and graph operation method

① The current operating status of the rectifier is displayed as running or stopped.

② When the interrupt is manually or automatically operated, 'Interrupt ON' is displayed.

③ LOCAL and REMOTE are displayed depending on the operating mode location.

④ Depending on the operation mode, it is displayed as (constant potential, constant current, constant voltage).

⑤ The running voltage value is displayed.

⑥ The output current value is displayed.

⑦ The current potential values of reference electrodes 1 and 2 are displayed.

⑧ The current temperature value of the corresponding SMPS is displayed.

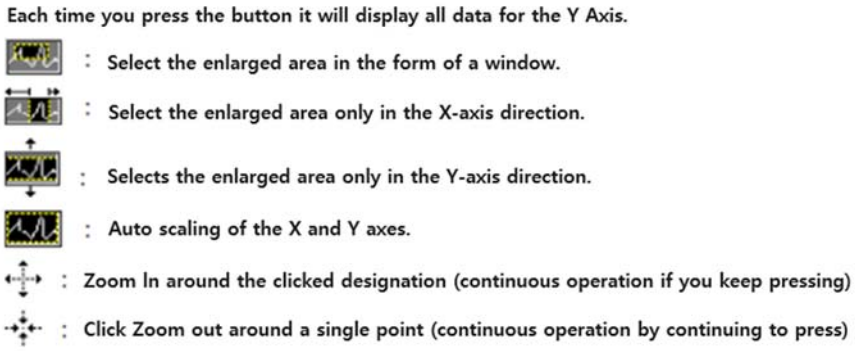
⑨ When manually operation the interrupt, pressing the corresponding button immediately activates the interrupts specified in the settings screen (OFF, ON, and the repetition count).

⑩ Voltage, current, measured potential, and temperature are displayed on the graph.

⑪ Graph Manipulation Toolbar

⑪-1.Cursor movement button.

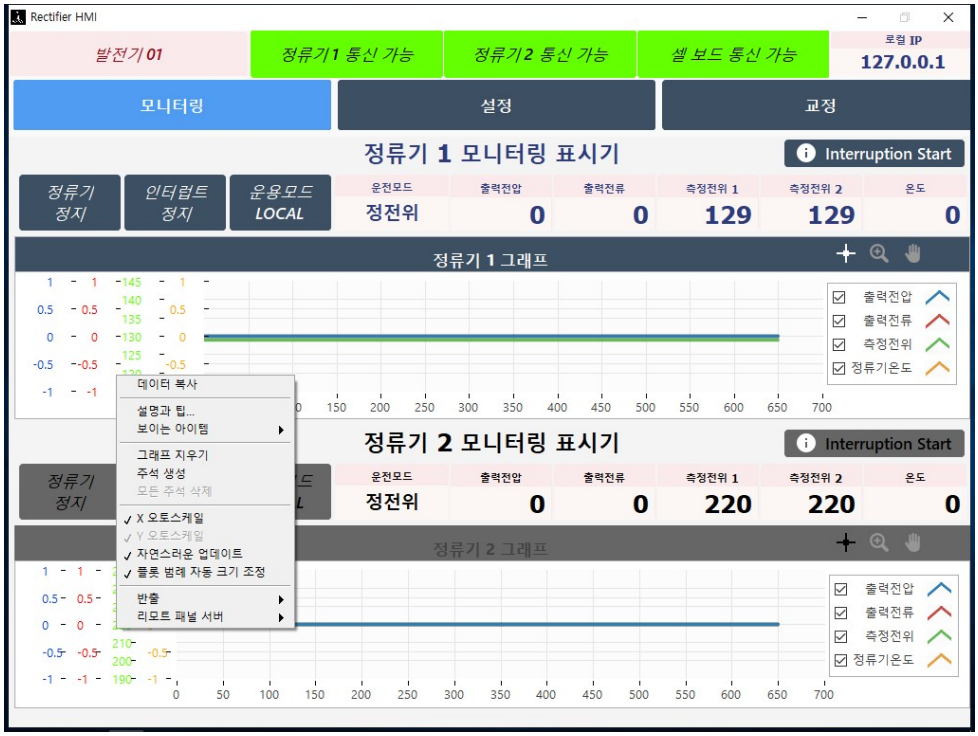
⑪-2.Graph zoom in and zoom out buttons




⑪-3.Panning tool button

The screen moves by dragging the graph to the desired point.

⑪-4Graph scale manipulation




◆ Autoscale is specified so that the scale is automatically adjusted for the X and Y axes of the graph.

When using graph manipulation tools, you must turn off autoscale.

## FCC Information

This device complies with part 15 of the FCC Results. Operation is subject to the following two conditions :

(1) This Device may not cause harmful interface, and

(2) This device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for CLASS B digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try correct the interference by one or more of the following measures:

1.1. Reorient or relocate the receiving antenna.

1.2. Increase the separation between the equipment and receiver.

1.3. Connect the equipment into an outlet on a circuit different from that to which receiver is connected.

1.4. Consult the dealer or experienced radio/TV technician for help.

## WARNING

Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.