



WAVE NG

Z Version

USER MANUAL

V 6.1.0 - 01/03/2018

This manual describes the WAVE NG Z features. It includes manual for training application (Used with ZSpace system) and for the dashboard (a web application to manage the training).



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1. INTRODUCTION

This document is the user manual for WAVE NG Z-EDU training application.

This application is intended to run on a ZS-300 system.



Figure 1: ZSpace

In order to start the application, switch on your ZS-300 systems, log-in and run the WAVE NG application from the Desk shortcut.

2. TRAINING APPLICATION

The WAVE NG training application's user interface is displayed once the application is started.

Use the stylus (or any integrated welding tool provided with the system) to interact with the application.

2.1 DISPLAY AREA

The WAVE NG screen can be divided into three distinct zones:

- The Status Area located on top of each page,
- The Page content in the middle area,
- The Navigation Area located at the bottom of each page.

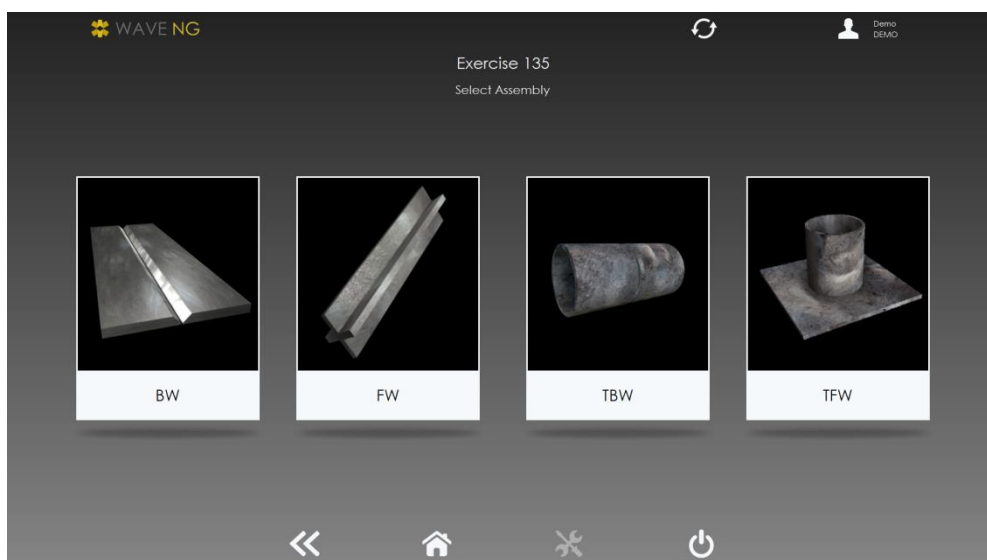


Figure 2: WAVE NG Display area

Upper and lower areas are always visible from one page to another. We will now describe their contents.

2.1.1 Status area



It indicates to the user the system status (from left to right):

- Connection status with the server,
- Logged-in user name.

2.1.1.1 Connection status

An indicator tells you if the system is currently communicating with the server.


This indicator appearance is explained below:

	The system is currently communicating with the server.
	The system uses local data. In local mode, only a default user is available and results are not saved.


2.1.2 Navigation area

The navigation area enables the user to quickly access the common functionalities on every page of the application. Some of these functionalities might be disabled depending on the current page.


2.1.2.1 Previous page

	This item enables the user to navigate back to the previous page. This item is disabled when there is no previous page where to navigate.
---	---


2.1.2.2 Main page

	This button enables the user to directly come back to the entry page (the visible page after identification).
---	---

2.1.2.3 Settings

	This button gives the user access to application settings, like the language for instance.
---	--

2.1.2.4 Closing session

	This button enables the user to close his working session or to quit the application.
---	---

2.2 LOG IN

Once the system launched, the user has access to the log-in page (see figure below); the authentication process is compulsory to start an exercise.

To log-in, the user should select his name and first name in the recommended list. If a user name does not appear in the list, the user can use navigation buttons to move up and down the complete list.

Password must be entered on the virtual numerical keyboard with the active tool.

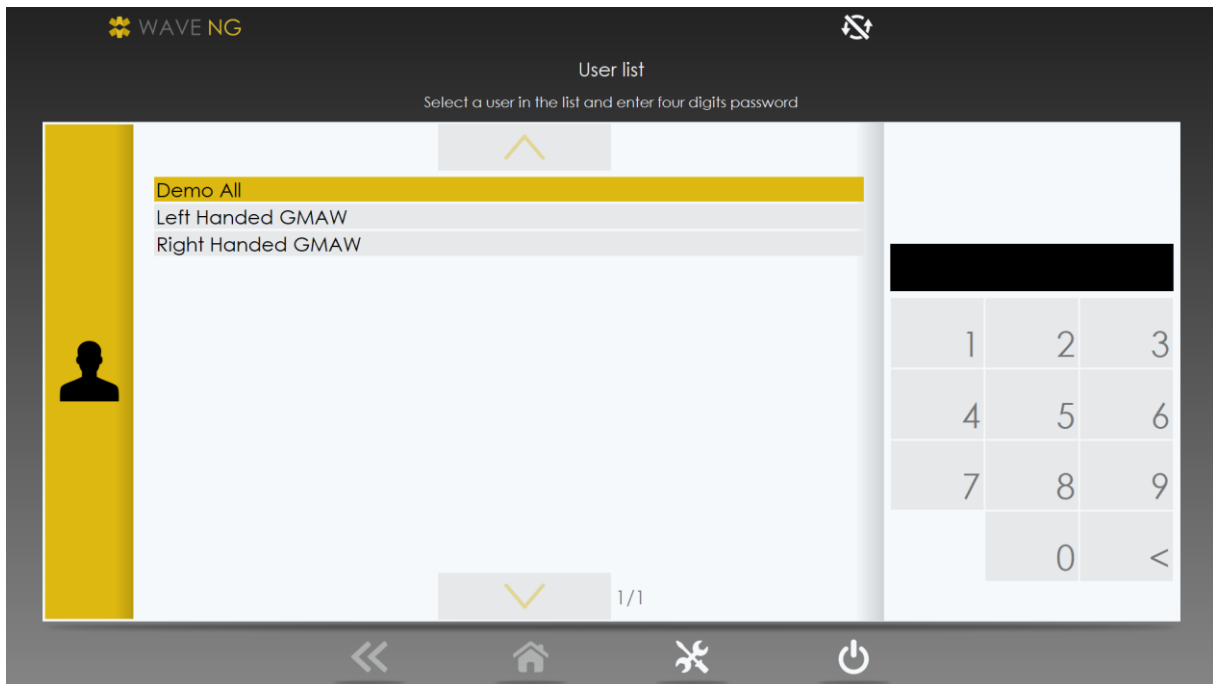


Figure 3: Log-in page

2.3 SELECTING AN EXERCISE

2.3.1 Non ordered curriculum

Exercises are selected through a series of screens used to gradually refine your choices.

Throughout the exercise selection process, the user can access the following options by selecting the appropriate button in the navigation bar:

- Return to the previous screen by clicking on the « previous page » button,
- Return to the main screen by selecting the « main page » button,
- Log off from the application using the « disconnect » button.

➤ **Notes**

- **Some screens become optional if those choices are not included in the curriculum. For this reason, in some cases, the selection of exercises will not follow the sequence described below. It will only be possible to directly access an exercise if this exercise is included in the curriculum.**
- **The screen copies supplied subsequently are illustrations of some choices that the user can make.**

2.3.1.1 Selecting the assembly type

Up to four types of assemblies are proposed:

- BW (butt),
- FW (fillet),
- PFW (pipe fillet),
- PBW (pipe butt weld)

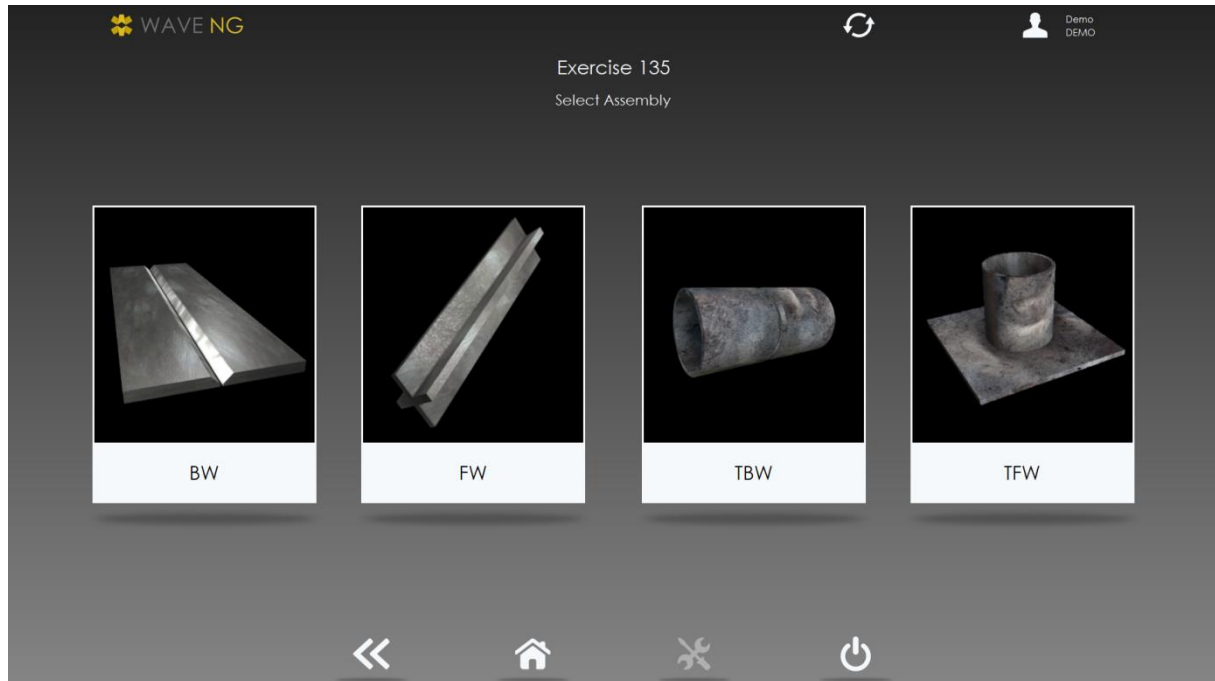


Figure 4: Assembly selection

2.3.1.2 Selecting the position

The proposed position choices depend on the assembly type.

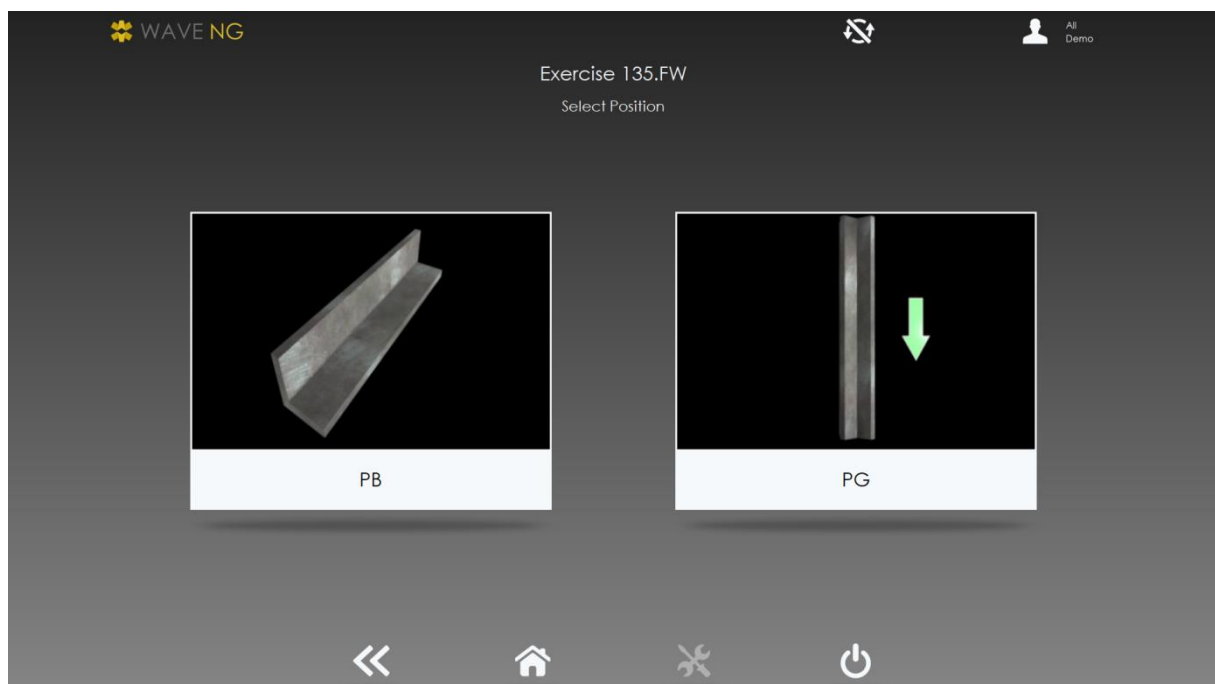


Figure 5: Position selection

2.3.1.3 *Selecting the welding direction (optional)*

You can select the welding direction (forehand or backhand) when working with the horizontal position.

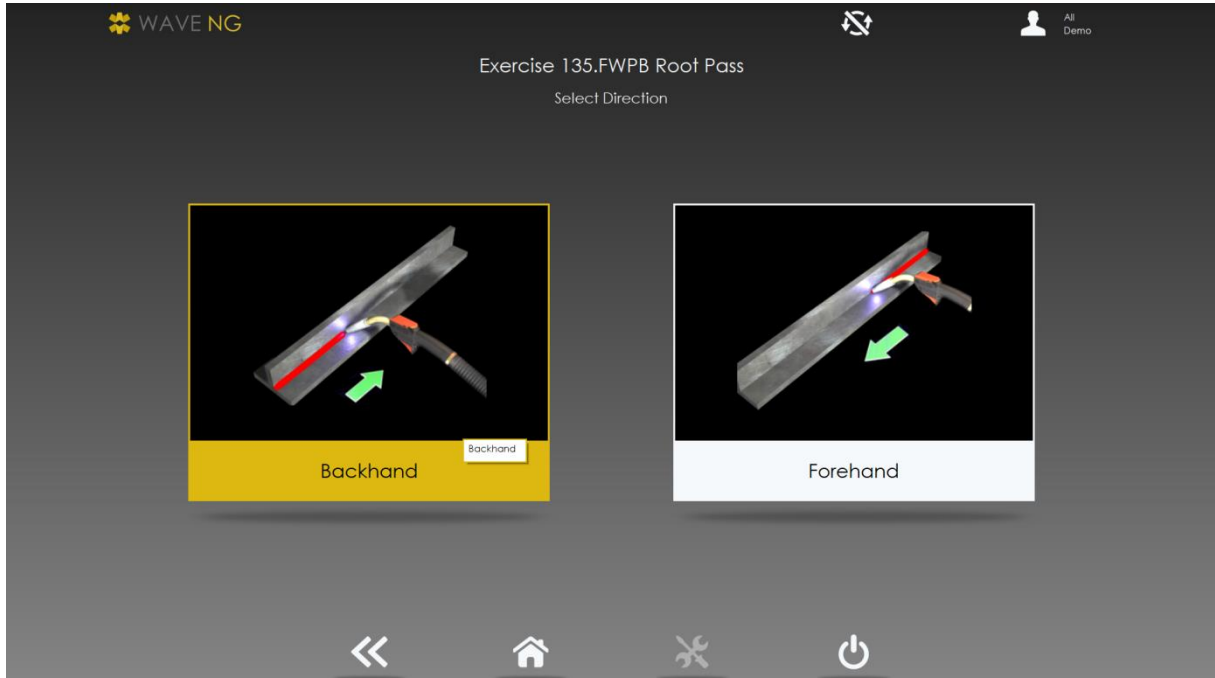


Figure 6: Selecting direction

2.3.2 **Ordered curriculum**

When the user works on an ordered curriculum, he has access to the global view of his curriculum directly after the login page.

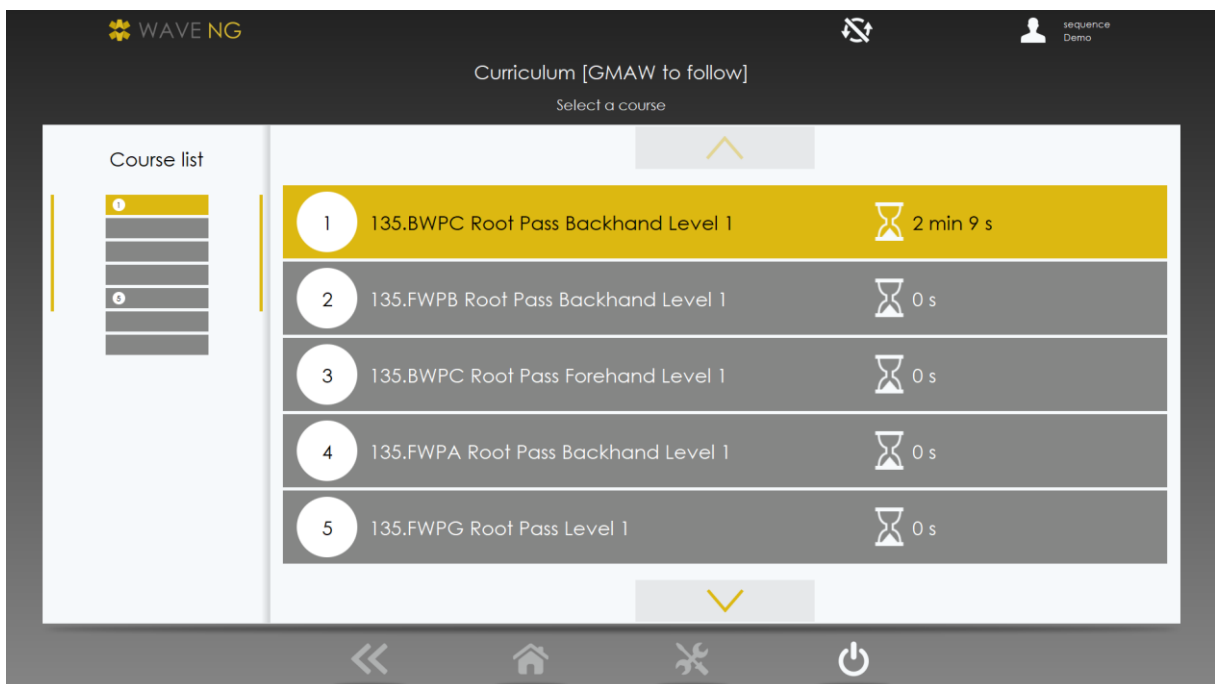


Figure 7: Ordered curriculum

This page displays the name of the active curriculum.

On the left side of the screen, a column of buttons shows the curriculum exercises numbers as well as each exercise status:

- Grey: not started yet,
- Yellow: ongoing,
- Red: time spent on the exercise longer than recommended,
- Green: validated.



This column of buttons contains an outlined area corresponding to the details of five exercises displayed with further details on the right zone of the page.

Details for each exercise are:



- Rank of the exercise,
- Name of the exercise,
- Time spent on the exercise,
- Progress rate in the steps.

The user must click on the current exercise (yellow) to go to the next page. If the curriculum includes more than five exercises, user can navigate between exercises with arrows below and above the list.

2.4 EXERCISE CONFIGURATION

2.4.1 Level selection page

2.4.1.1 Non ordered curriculum

Once an exercise selected, the user can choose between three difficulty levels.

The result value depends on each exercise.

The tolerance range decreases when the difficulty level gets higher.

The Difficulty level is defined by a **result value** and a **tolerance range** on each parameter.

Speed	Distance	Trajectory	Angles
 50. cm/min ± 4. mm	 15. mm ± 6. mm	 0. -4.74.	 $\alpha: 70^\circ$ $\beta: 30^\circ$ $\alpha: -10^\circ/10^\circ \beta: -10^\circ/10^\circ$

You can check **these values** by selecting the level name (beginner, advanced, expert).

The expected values for each parameter (speed, straightness, distance and angles) are displayed according to the chosen level.

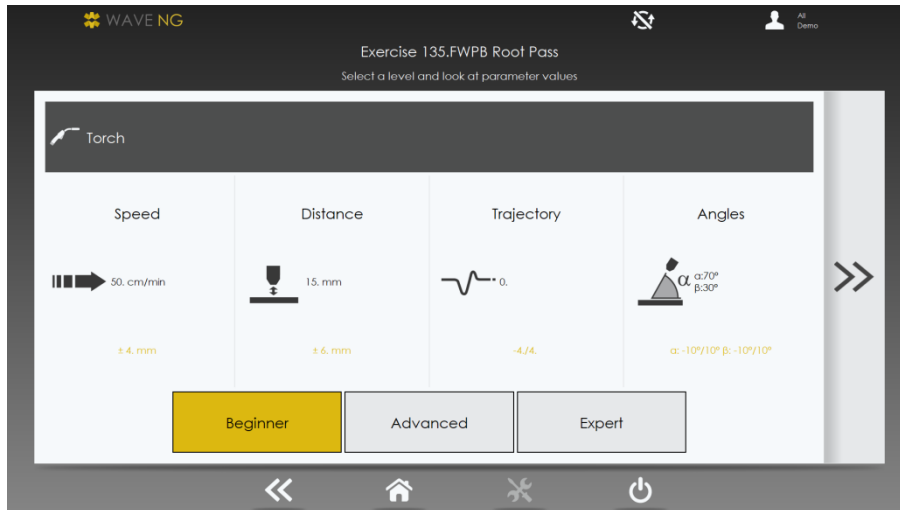


Figure 8: Level page

You can move to the next page by selecting the >> button on the right side of the screen.

2.4.1.2 Ordered curriculum

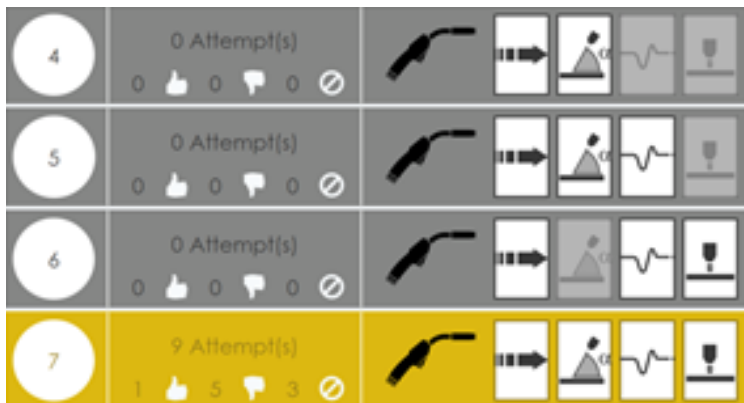
When a user works on an ordered curriculum, level cannot be selected and only one choice is visible.

2.4.2 Step selection page

Steps in a training path include a set of parameters. The user will only be tracked on the specific parameters included in a particular step.

The Step selection page displays a list of steps with their active parameters.

I.e. in the image Below: Step 4 includes the parameters Trajectory + Angles



2.4.2.1 Non ordered training path

When a training path is not ordered, the user can choose whatever step he wants.

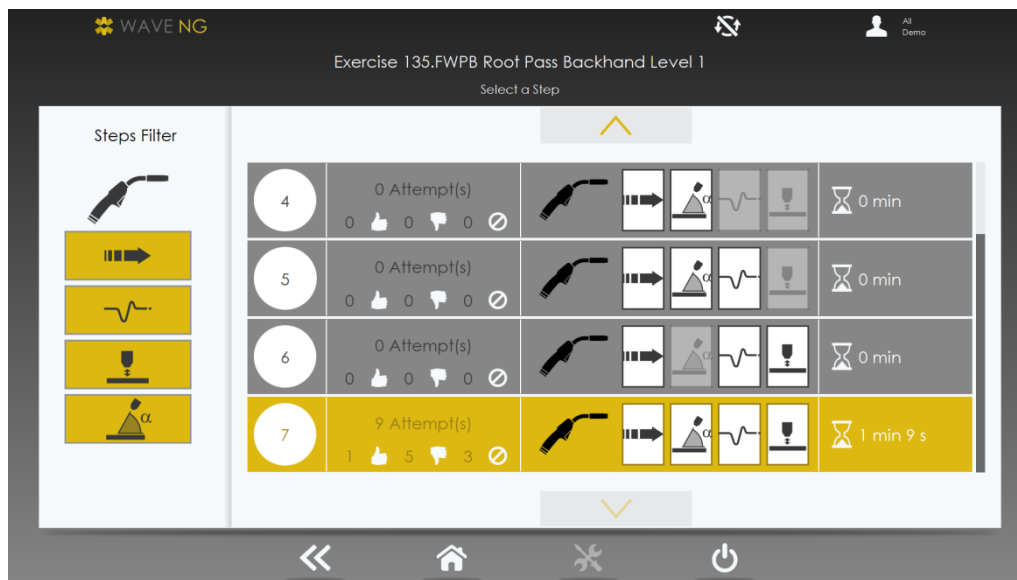


Figure 9: Step selection

A step filter is available on the left side of the screen for the user to select/unselect the active parameters he wishes to practice. This filter enables the user to show/hide steps in the list with a particular parameter.

2.4.2.2 Ordered training path

When a training path is ordered, the user cannot choose a specific step. He has to validate each recommended step in the previously defined order.

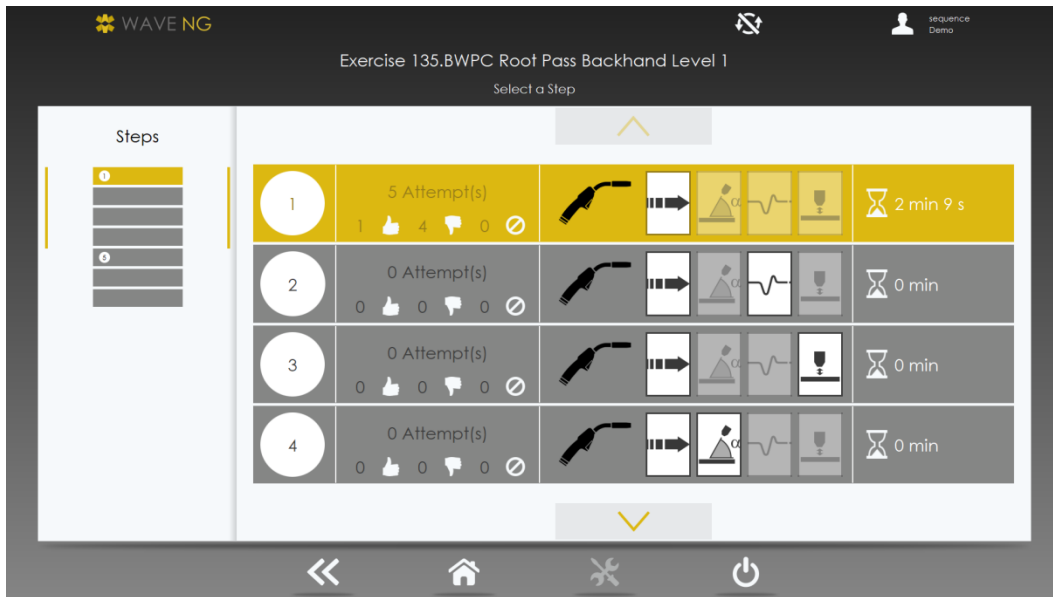


Figure 10: Ordered training path

Note:

When the system is in local mode, all steps are available.

2.5 PERFORMING THE EXERCISE

In an exercise, the piece to be welded is represented in a 3D format on the screen.

The torch tool is also represented on the screen and follows the user movements in live (same position and orientation).



Figure 11: MAG torch

Information about the exercise will be displayed at the exercise start and then each time the user will pause during the welding exercise.

2.5.1 Start and finish an exercise

To start an exercise, the user simply needs to click and hold the tool button and follow the speed guide (see 2.5.3.3).

To finish an exercise, the user will need to follow the speed guide to the end of the welding area. Once the end of the welding area reached, the exercise will stop and a message will appear inviting the user to go to the result page.

If the user releases the tool button before the end of the welding area, the exercise will be paused and a message will be displayed. To restart, the user will have to position its cursor where he paused to continue the exercise. If the user exits the exercise before finishing it, the try will be tagged as invalid.

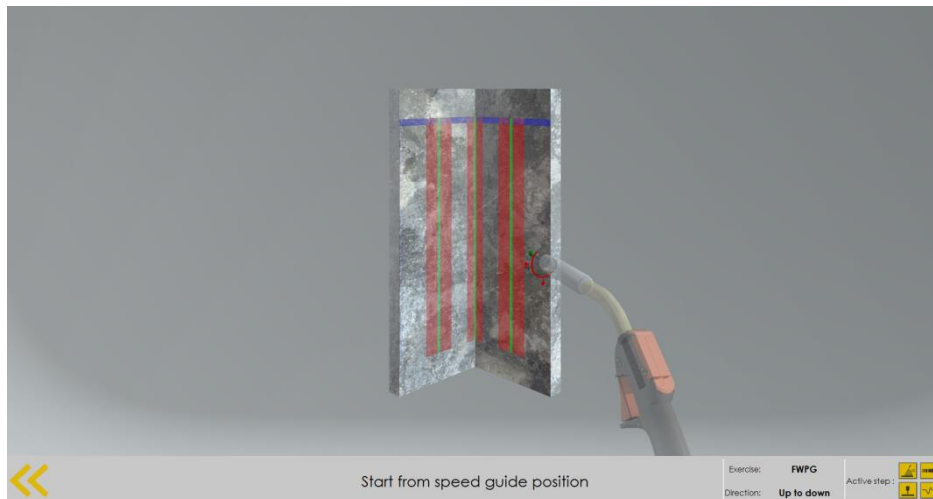


Figure 12: Exercise 3D screen

2.5.2 Exercise sequence

If guides are active, the user must respect the error indicators in order to correct its welding position. The visual colour metaphors represent the following rules:

- A **red** signal appears when the user is out of tolerance,
- A **yellow** signal means that the user is within tolerance but approaching the limit zone,
- A **green** sign indicates the correct welding position.

2.5.3 Description of visual guides

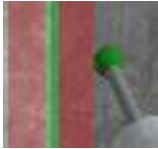
2.5.3.1 Trajectory



Good trajectory, the tip is on the green line (representing the trajectory to follow).



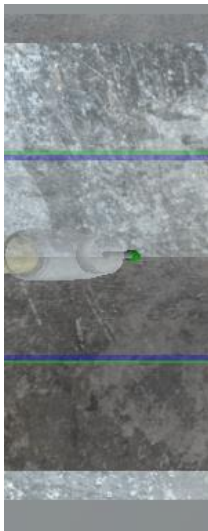
A yellow band appears around the perfect value of the trajectory. The user will soon leave the tolerances.



The band is red. The user is outside the tolerances for the trajectory.

2.5.3.2 Nozzle to work distance

Two blue lines (on each side of the piece centre) provide an indication on the **distance to the piece**. These lines move away from the piece centre when the user moves the tool away from the screen, and they come closer when the user brings the tool towards the screen. If the two lines come together, the tool is in contact with the piece.



When the parameter is correct, the blue lines are in the centre of each metal piece.



When the parameter approaches the limit values, two yellow bands appear at the centre of the piece to be welded. The user must then correct its welding position by lining up the blue lines and the green lines.



When the parameter moves out of the limit values, two red areas appear on the piece to be welded. The green lines indicate the ideal value. The user must then correct its position by lining up the blue and green lines.

2.5.3.3 Speed

A blue strip provides an indication on the speed to follow. The user must follow it all the time.

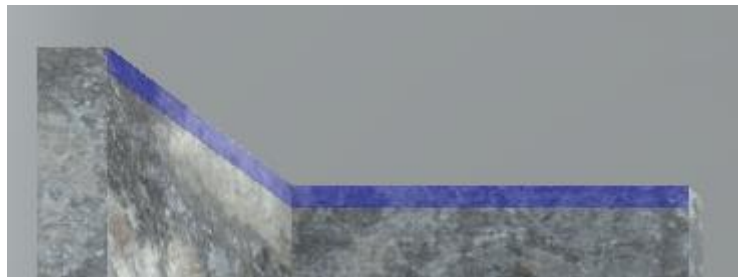
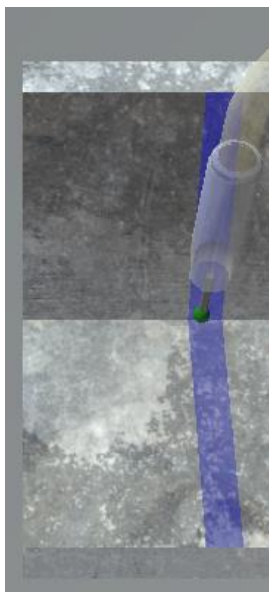
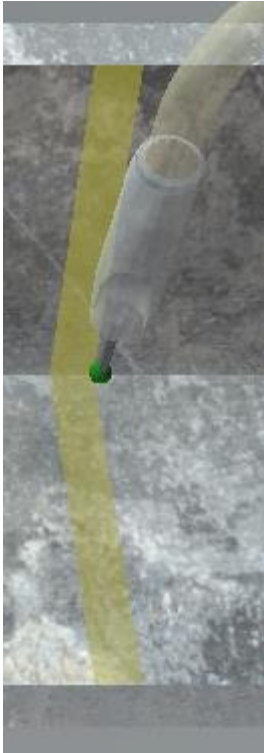


Figure 13: Speed guide



When the parameter is correct, the strip is blue.



When the parameter approaches the limit values, the strip turns to yellow; the user is too fast or too slow and will soon leave the tolerances.



When the user is out of tolerances, the strip turns to red; the user is too fast or too slow and will soon leave the tolerances.

2.5.3.4 Orientation

The orientation is represented by two angles; the work angle and the travel angle.

The visual guide for the each angle is a torus arc and an arrow pointing toward the direction where to correct the angle. These guides are added around the tip of the tool, when the angle is good, the guide will not appear.

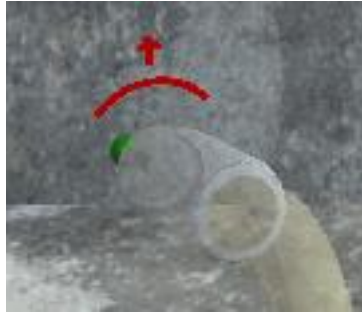


Figure 14: Angles guide



When the parameter approaches the limit values, the guide turns to yellow, meaning that the user will soon leave the defined tolerances.



When the user is out of tolerances, the guide turns to red.

2.6 RESULTS

The results of the exercises are analysed and displayed on this page. An overview of results is provided when the user obtains access to this page just after the completed exercise. This page is divided into 2 parts:

- The upper part displays a 3D replay of what the user just realised. Two welding tools are visible, a blue one giving the best motion, and a regular one, showing how the user welded.
- The lower part gives additional information on the completed exercise: success rate, duration and performance per parameter.

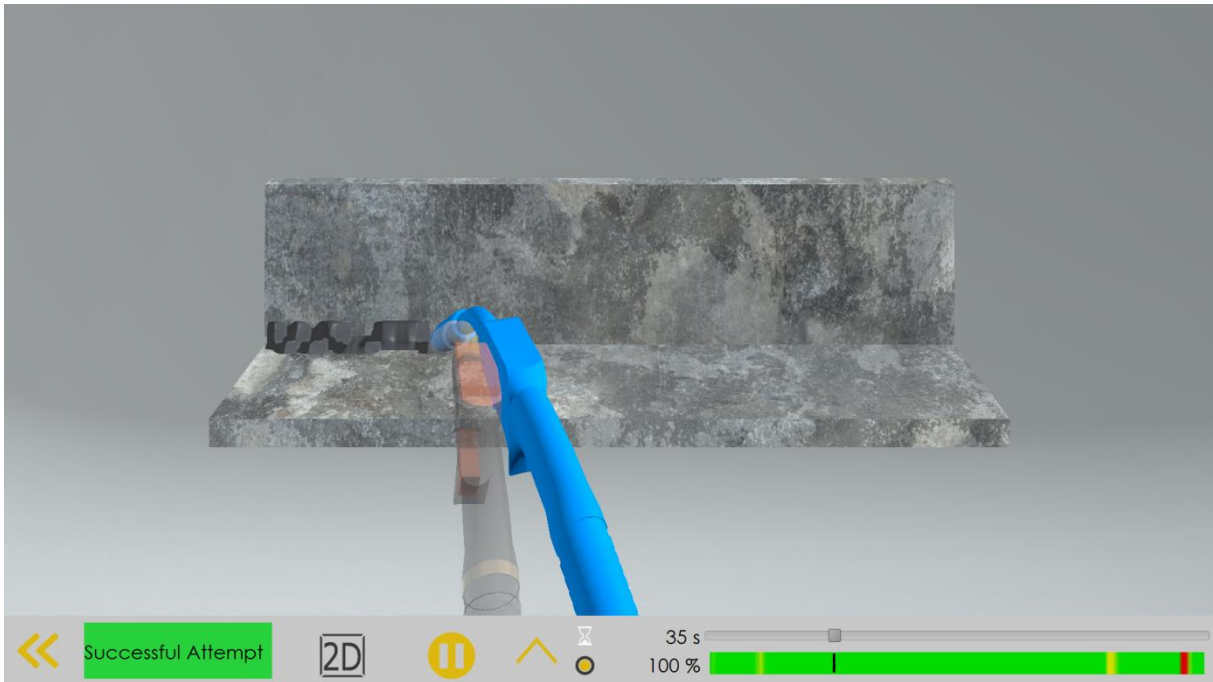

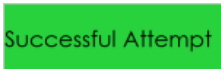




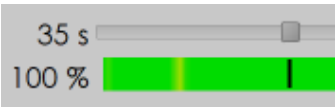


Figure 15: Results page – global overview

Here is more information on the available elements in the lower part, from left to right:

	<p>This button is used close the result page and go back to the progress page.</p>
	<p>This label gives the result status, either successful or failed.</p>
	<p>These buttons provide means to turn off/on the stereoscopic rendering for the 3D replay.</p>
	<p>These buttons provide means to pause/play the 3D replay.</p>

	<p>These buttons provide means to expand/collapse result details.</p>
	<p>These radio buttons provide means to focus the replay on a specific parameter (available for overall, distance and angle charts).</p>
	<p>The last part includes global information on the result. The duration (in second) and the global success rate followed by a coloured chart. The percentage represents the level of accuracy of the trainee, 100% means that the trainee remained in the tolerance area and mastered the parameter at this level.</p> <p>The coloured chart gives an indication of the user's performance over time:</p> <ul style="list-style-type: none"> - Red: out of tolerance. - Yellow to green gradient: near the tolerance limit. - Green: around the target value.

When the user clicks on the “expand button”, the lower part is expended and displays a more detailed success rate and coloured chart per parameter.



Figure 16: Results page - details

2.7 CONFIGURATION

The user can access and perform some configuration actions when clicking on the settings button.

He will need to restart the application in order to take into account any modifications.

2.7.1 Settings tab

On this tab, the user can see current configuration and settings options.

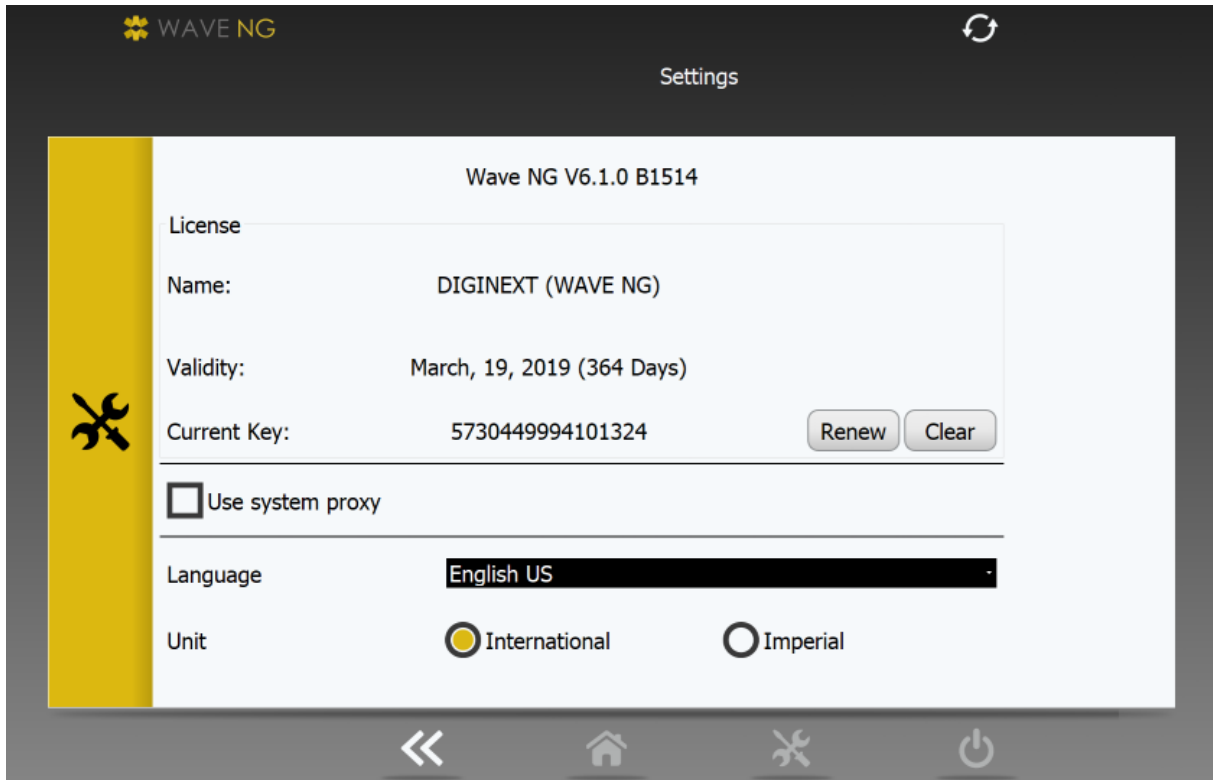


Figure 17: Settings tab

2.7.1.1 License

This section displays the current license key used and its expiration date. If no license key has been entered, the system uses a demonstration mode valid for 60 days.

To enter a key or renew it (and connect the system to a server), click on the renew push button, a new window is displayed and you can enter your license key (leaving the field blank will cancel the modification). To remove the existing key, click on the clear push button. Please note that renewing or clearing a license key will remove any existing information.

2.7.1.2 Proxy configuration

The user can activate the use of a proxy for network request. If checked, the application will use the Windows proxy settings.

2.7.1.3 Language selection

The user can choose the application language. If he does not select a specific language, the system language will be chosen.

2.7.1.4 Unit system

The user can select the SI or US unit system. This will not affect statistics or the trainee's evaluation only the way the value are displayed.

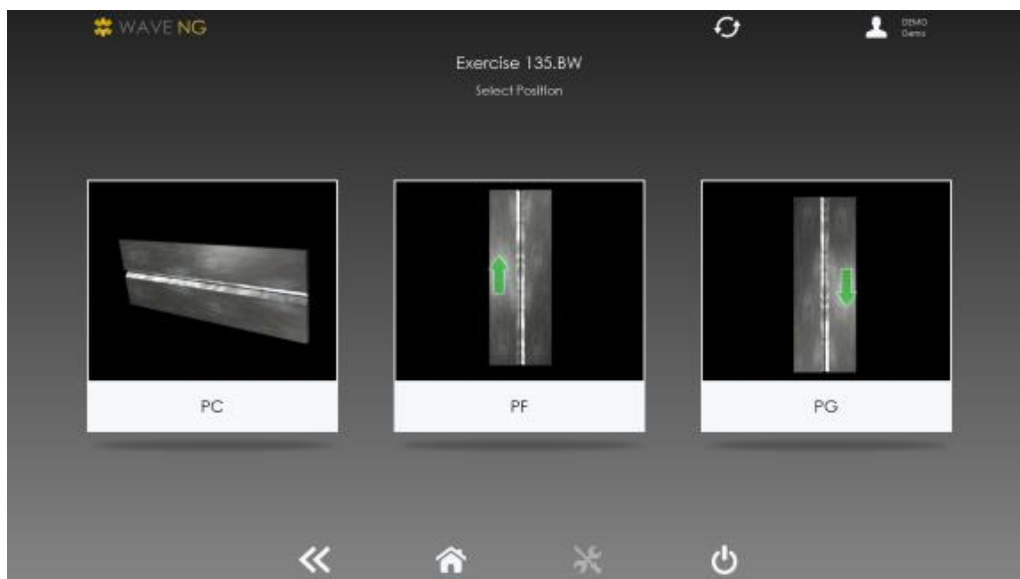
2.8 AVAILABLE EXERCISE FOR WAVENG Z

Here is the complete list of available exercises for this version:

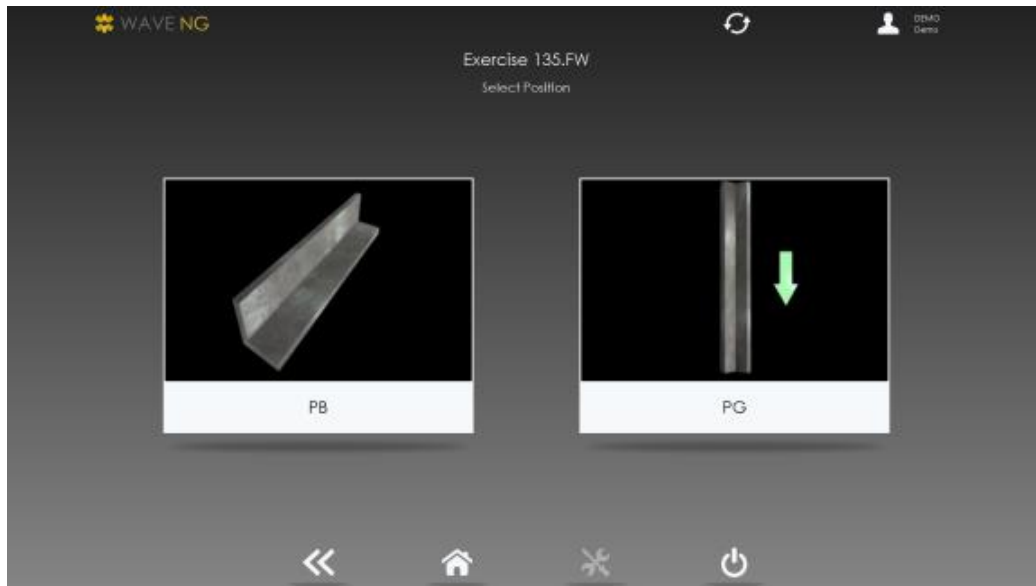
Process: GMAW (135)

Assembly, position and direction (per assembly):

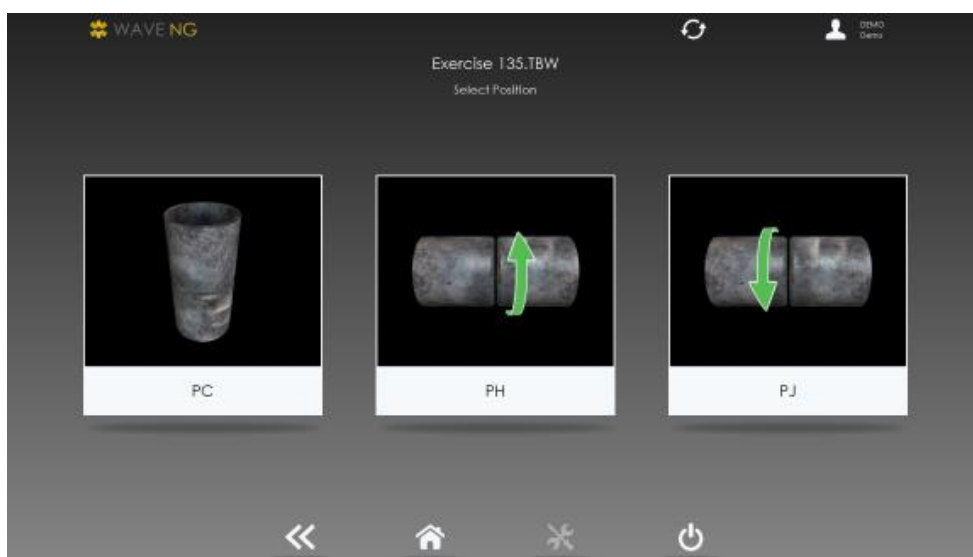
- BW
 - PC (horizontal vertical)
 - Backhand,
 - Forehand
 - PF (vertical up)
 - PG (vertical down)



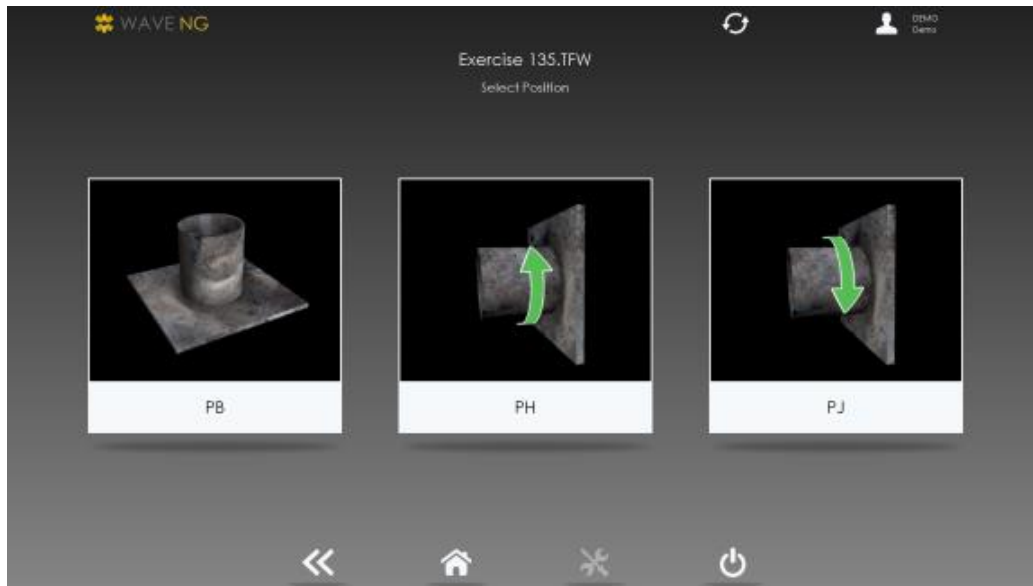
- FW
 - PB (horizontal vertical),
 - Backhand,
 - Forehand
 - PG (vertical down)



- PBW
 - PC (horizontal vertical)
 - PH (vertical up)
 - PJ (vertical down)



- PFW
 - PB (horizontal vertical)
 - Backhand,
 - Forehand
 - PH (vertical up)
 - PJ (vertical down)



3. VULCAN

The WAVE NG Z-EDU software is compliant with VULCAN, the pedagogical follow-up tool that allows analysing the trainees' performances on the simulator and accompanies the instructor in the teaching process. By tracking the trainees' results on the simulator, VULCAN is the base on which the instructor can rely to give feedback to his trainees, to follow their progress and track their difficulties without being physically with them.

For a detailed guide on the use of VULCAN, please refer to the document *UserManual_VULCAN_EN*.

4. SOFTWARE INSTALLATION

This chapter describes the WAVE NG Z training system installation steps.

4.1 GENERAL DESCRIPTION

WAVE NG – Z products comes with 2 modules:

- A Web server (in the cloud), including the control centre (used with a Web browser),
- A training application to install on a ZSpace 300 hardware system.

Data is exchanged between modules through the network. The user needs a WAVE NG Z web server to access a full featured version (manage profiles, follow user results, customize exercises parameters, add curriculum ...). However, the training system can be used in a standalone mode with a default profile and curriculum but without any score recording.

4.2 SOFTWARE INSTALLATION

The user needs to run the WAVE NG Z installation program. An automated installation program will guide him step-by-step throughout the application installation. The software comes with a 60 days demonstration license. The user can update his license in the settings menu (see 2.7.1 Settings tab).