WAVE NG

Z Version

USER MANUAL

V 6.0.0 – 15/08/2017

This manual describes the WAVE NG Z features. It includes manual for training application (Used with ZSpace All-in-One) and for the dashboard (a web application to manage confidential 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 zSpace 300.

Figure 1: ZSpace

To start it, switch on your zSpace 300, log-in and run the WAVENG application from its shortcut.

2. TRAINING APPLICATION

The WAVE NG training application 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 content of the page in the middle area,
- The navigation area located at the bottom of each page.

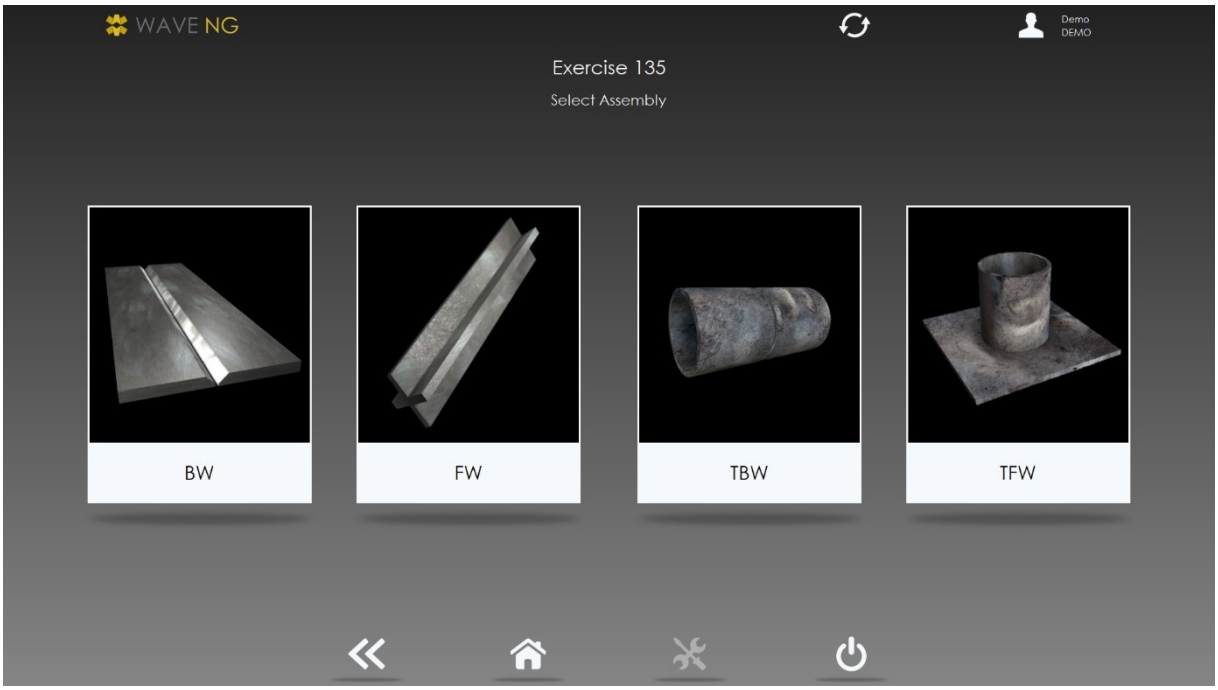


Figure 2: WAVE NG Display area

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:

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

2.1.2 Navigation area

The navigation area enables to quickly access the common functionalities of all the application pages. Some of these functionalities might be disabled depending on the page which the user is on.

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 which the user can navigate to.

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 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

Users have access to the log-in page as it is shown below after system starts; the authentication is compulsory to be able to work. To do so, the user should select his name and first name in the suggested list. If a user name is not in the list, users can use navigation buttons to enable moving on to the entire user list.

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

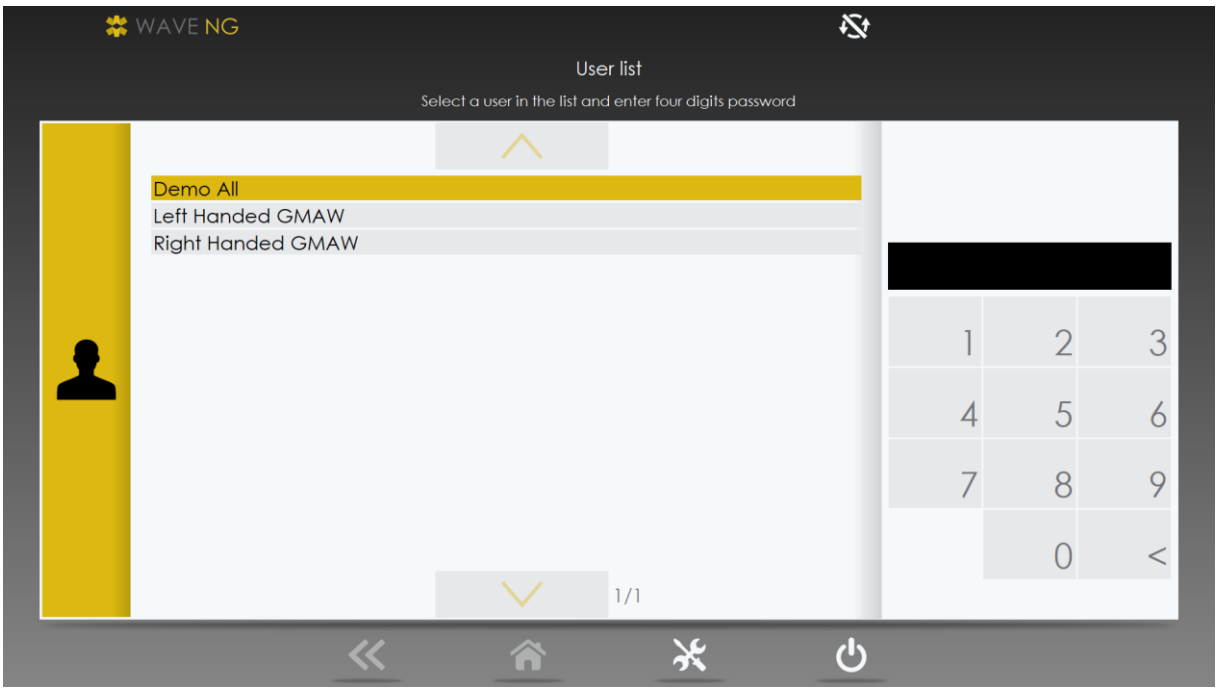


Figure 3: Log-in page

2.3 SELECTING AN EXERCISE

2.3.1 Non ordered curriculum

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

Throughout the exercise selection process, you can access the following option 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 even be possible to directly access an exercise only when this exercise is included in the curriculum.**
- **The screen copies supplied subsequently are illustrations of some choices that you can make.**

2.3.1.1 Selecting the assembly type

Up to four assemblies types are proposed:

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

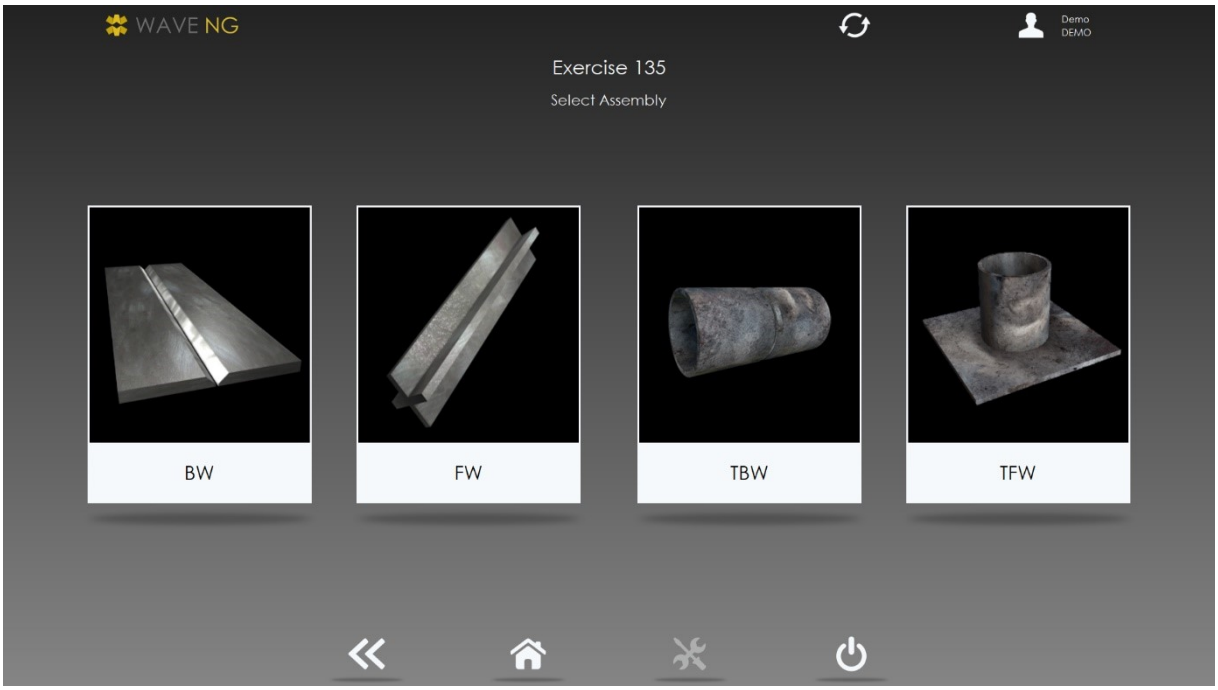


Figure 4: Assembly selection

2.3.1.2 Selecting the position

The proposed position choices depend on the assembly type.

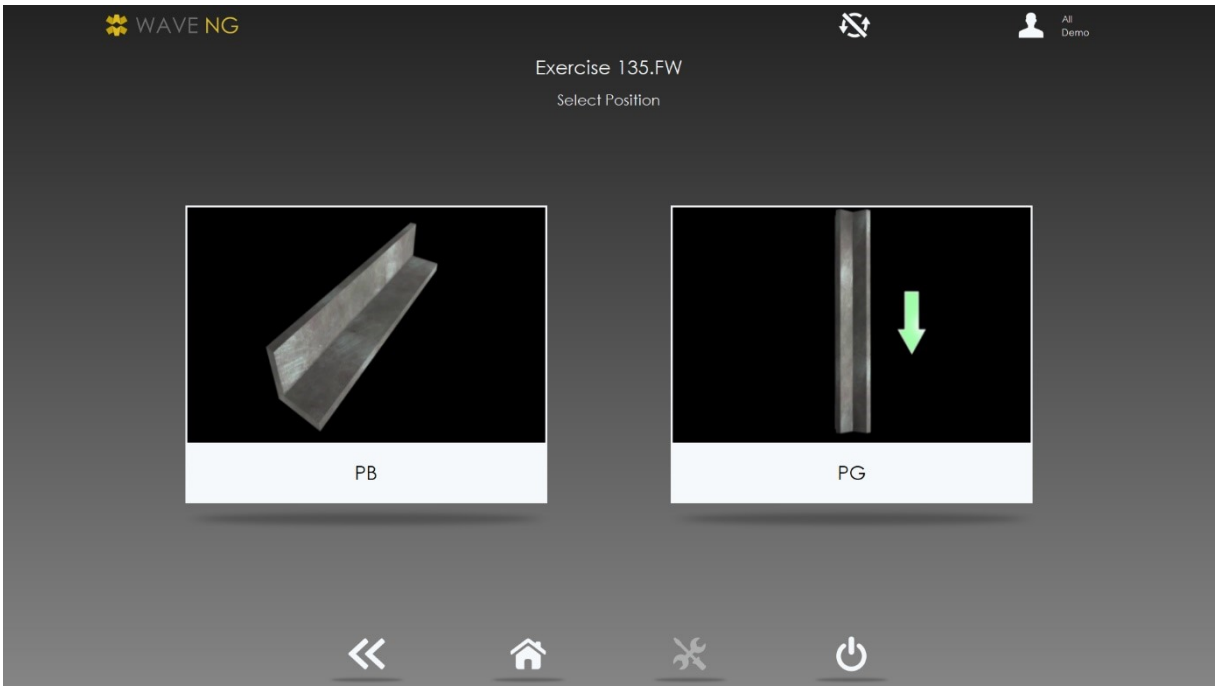


Figure 5: Position selection

2.3.1.3 Selecting the welding direction (optional)

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

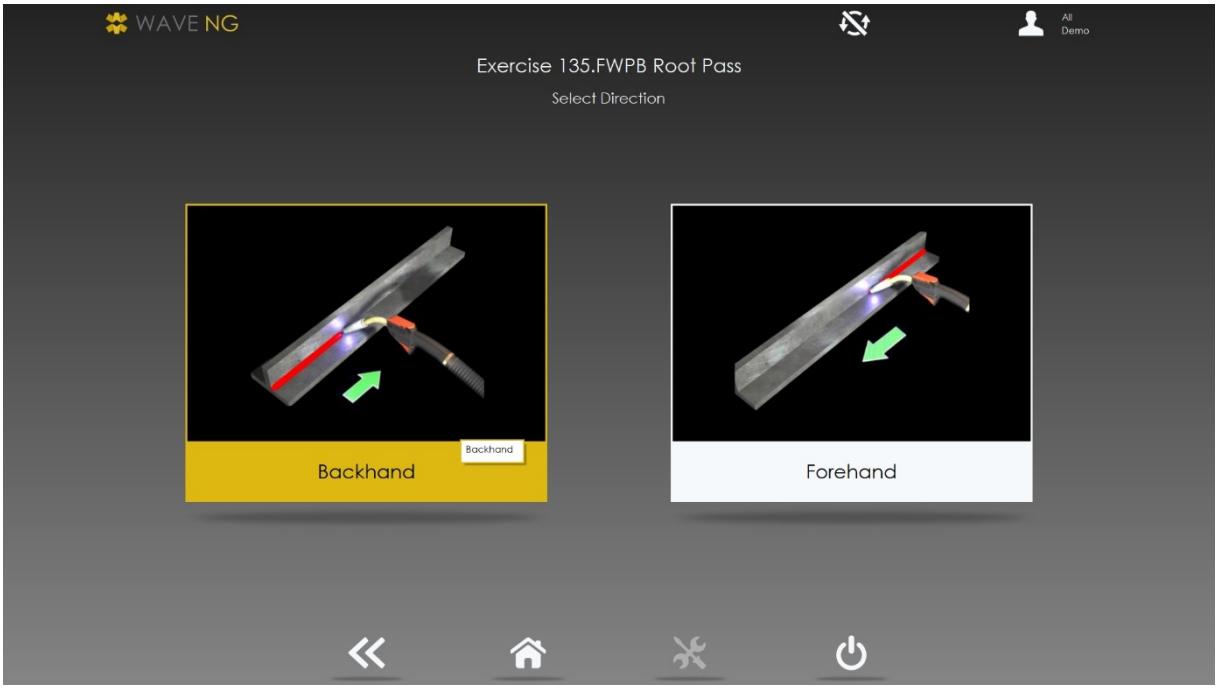


Figure 6: Selecting direction

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.

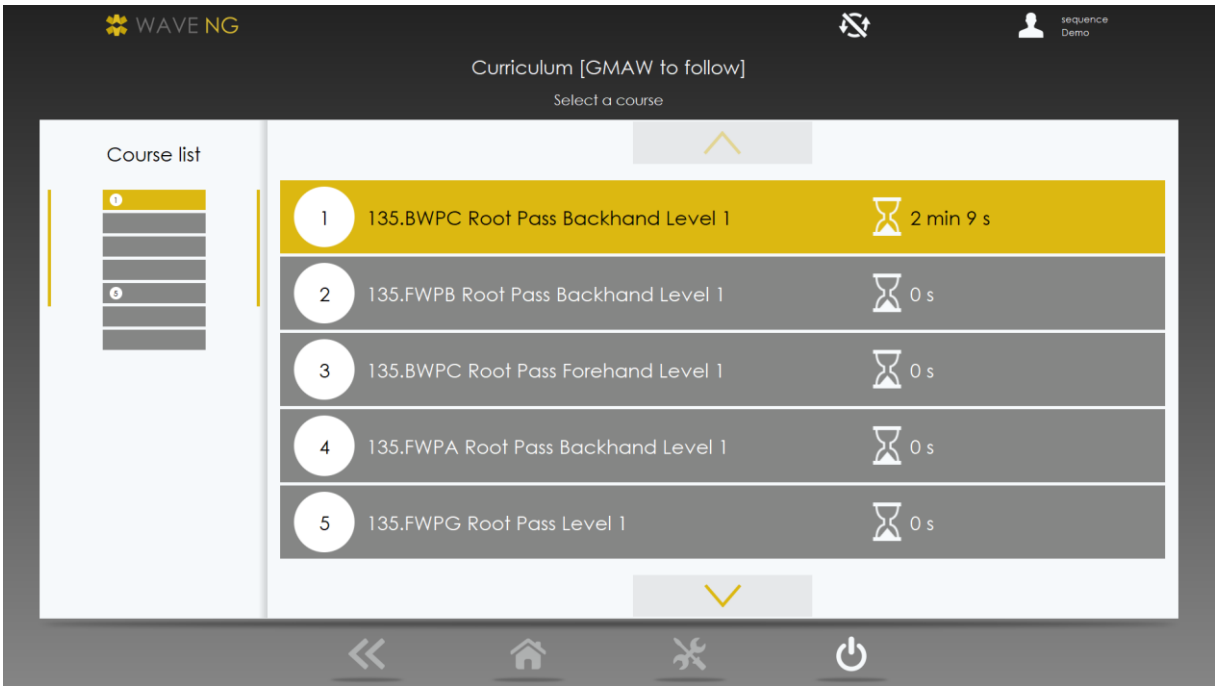


Figure 7: Ordered curriculum

This page displays the name of the worked curriculum.

On the left side, a list of buttons gives the curriculum exercise number as well as each exercise status:

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

This list contains an outlined area corresponding to the details of five exercises displayed in the right zone of the page.

Details for each exercise are:

- Rank of the exercise,
- Name of the exercise,
- Time spent on the exercise,
- Percentage of progress in the exercise steps.

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 exercise with arrows below and above the list.

2.4 EXERCISE CONFIGURATION

2.4.1 Level selection page

2.4.1.1 Non ordered curriculum

User may have the choice between three levels of difficulties regarding exercises included in the curriculum.

A level is defined by target values and tolerances range on each parameter. Tolerance range is lowering when level gets harder.

Level page displays expected values for each parameter (speed, straightness, distance and angles). You can see each value by selecting the level name (beginner, advanced, expert).

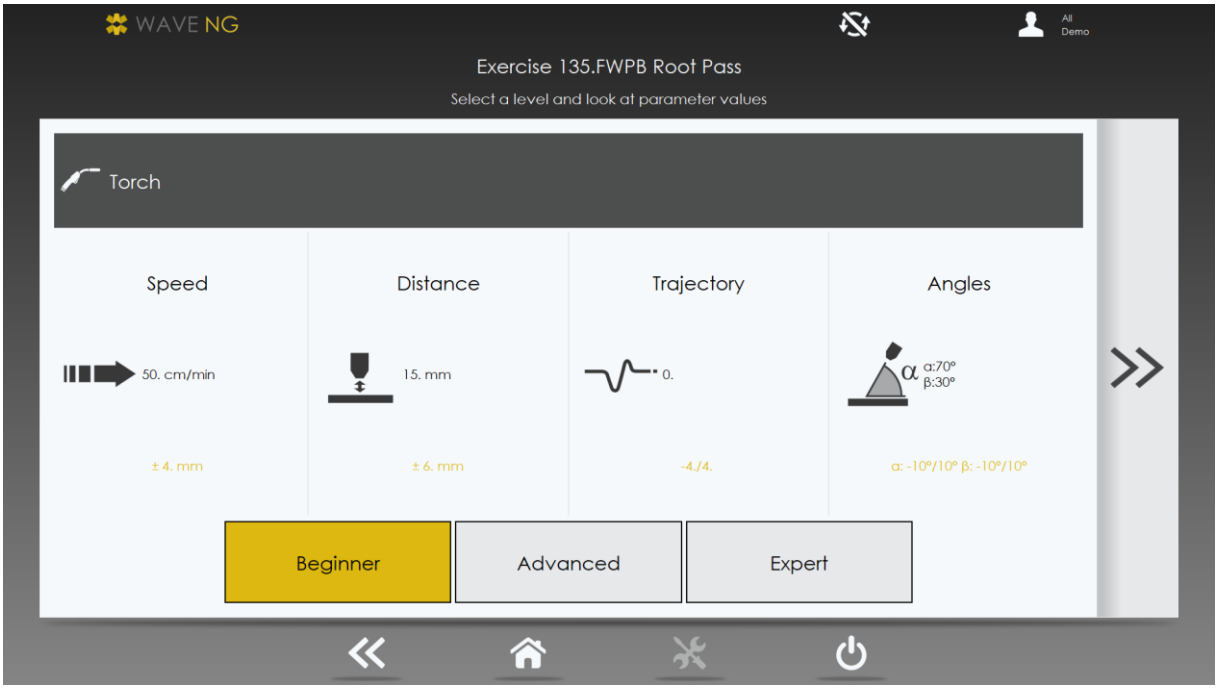


Figure 8: Level page

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

2.4.1.2 Ordered curriculum

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

2.4.2 Step selection page

Steps in a training path include a set of parameters. User will only be tracked on parameters included in a step. Step selection page displays a list of steps with their active parameters.

2.4.2.1 Non ordered training path

When a training path is non ordered, user can choose whatever step he wants.

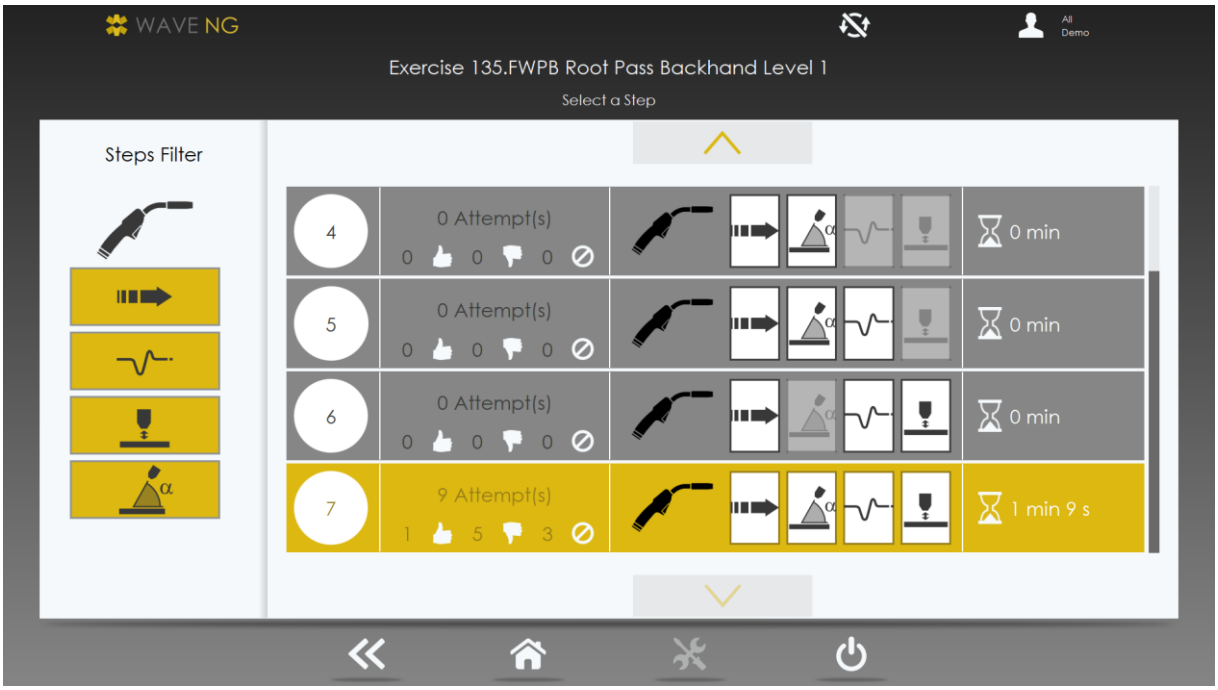


Figure 9: Step selection

A step filter is available on the left; select/unselect a parameter in the step in order to show/hide steps with this parameter.

2.4.2.2 Ordered training path

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

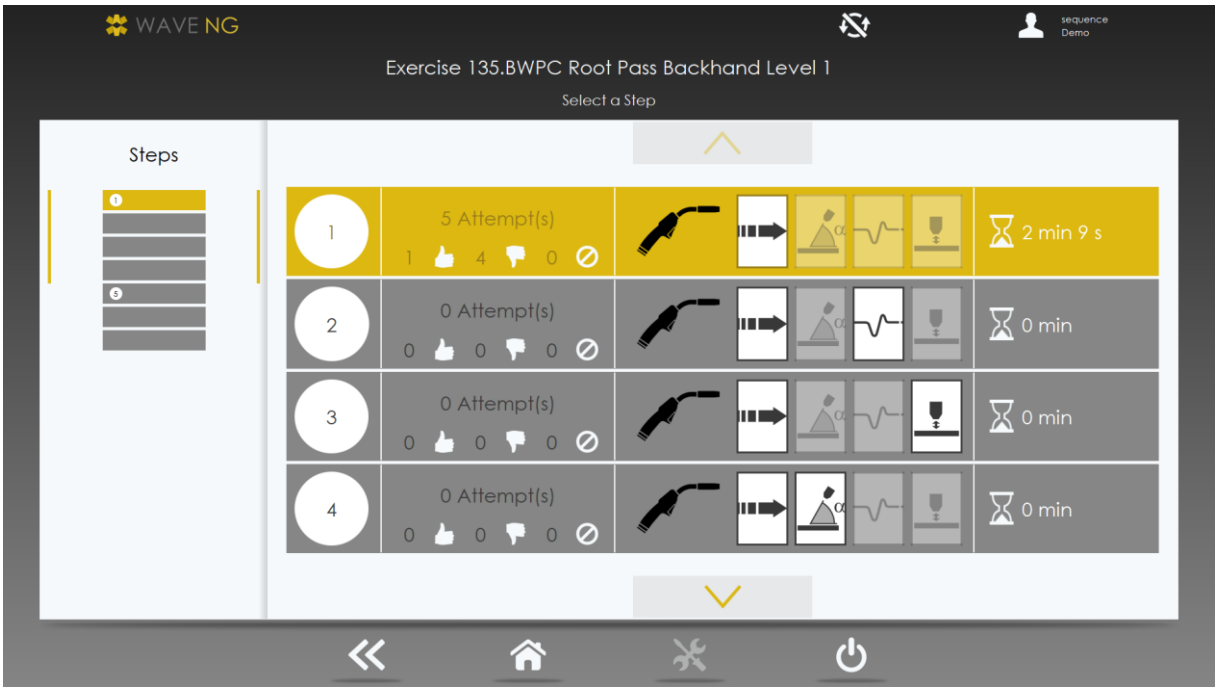


Figure 10: Ordered training path

Note:

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

2.5 PERFORMING THE EXERCISE

When executing the exercise, the piece to be welded is represented in 3D format on the screen.

The torch tool is represented and follows user position and orientation.

Figure 11: MAG torch

At the beginning of your work and each time you will pause during the welding, information about the exercise will be displayed.

2.5.1 Start and finish an exercise

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

To finish an exercise, follow the speed guide to the end of the welding area, once reached the exercise will stop and a message is display inviting you to go to the result page.

If you release the tool button before the end of the welding area, the exercise will be in a pause state and a message is displayed, restart where you stopped to continue the exercise. If you exit the exercise before finishing it, the try will be tagged as invalid.

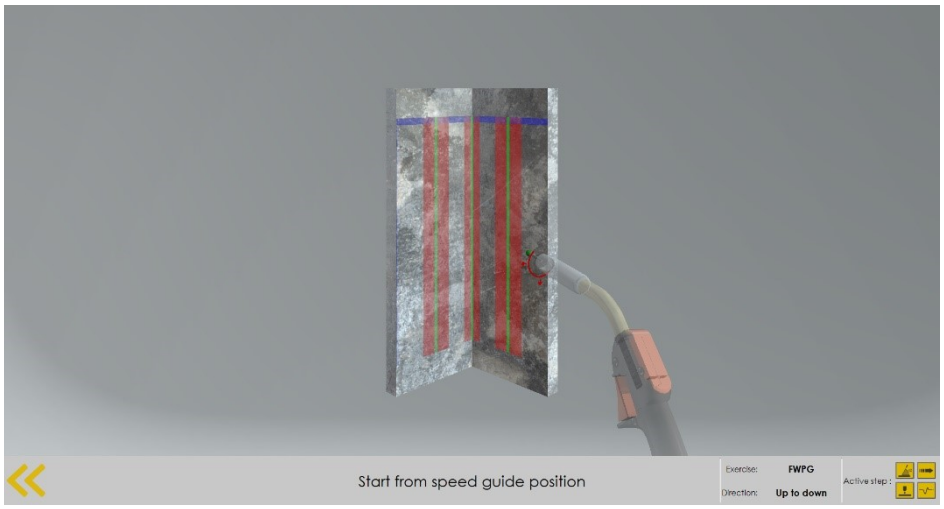


Figure 12: Exercise 3D screen

2.5.2 Exercise sequence

If the guides are active, you must be careful with respect to the error indicators in order to apply a corrective action. The visual metaphors of each guide are governed by the following rules:

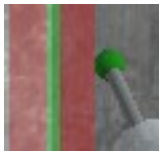
- A **red** signal appears when you are out of tolerance,
- A **yellow** signal means that you are within tolerance but approaching the limit zone,
- A **green** sign indicates the correct position to reach.

2.5.3 Description of visual guides

2.5.3.1 Trajectory

Good trajectory, the cross is on the green line representing the trajectory to follow.

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



The band is red. You are 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 regarding the distance to the piece. These lines move away from the piece centre when you move the tool away from the screen, and they come closer when you bring the tool towards the screen. If the two lines come together, the tool is in contact.

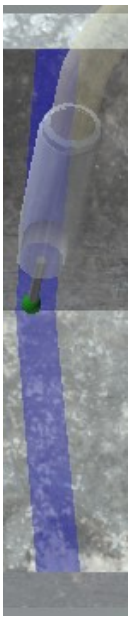
When the parameter is correct, the blue lines are in the centre of each metal piece.

When the parameter approaches the limit values, two yellow bands appear at the centre of the pieces to be welded. You must then correct your work 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. You must then correct your work by lining up the blue and green lines.

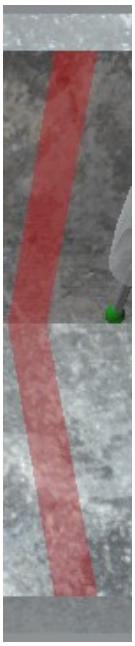
2.5.3.3 Speed

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



Good speed, the strip is blue.

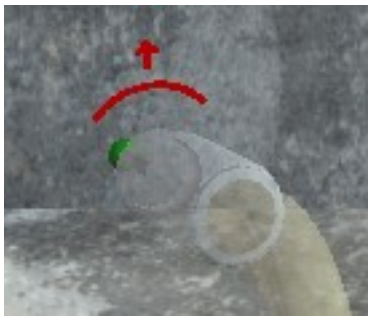
A yellow strip, you are too fast or too slow and will soon leave the tolerances.



A red strip, you are too fast or too slow and out off 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 is not visible.



A yellow guide, you will soon leave the tolerances

A red guide, you are out of tolerances

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 his exercise. This page is divided into 2 parts:

- The upper one displays a 3D replay of what the user just did. Two welding tools are visible, a blue one giving the best motion possible, and a regular one, showing what the user did.

- The lower one gives additional information like the success rate, duration and performance per parameter.

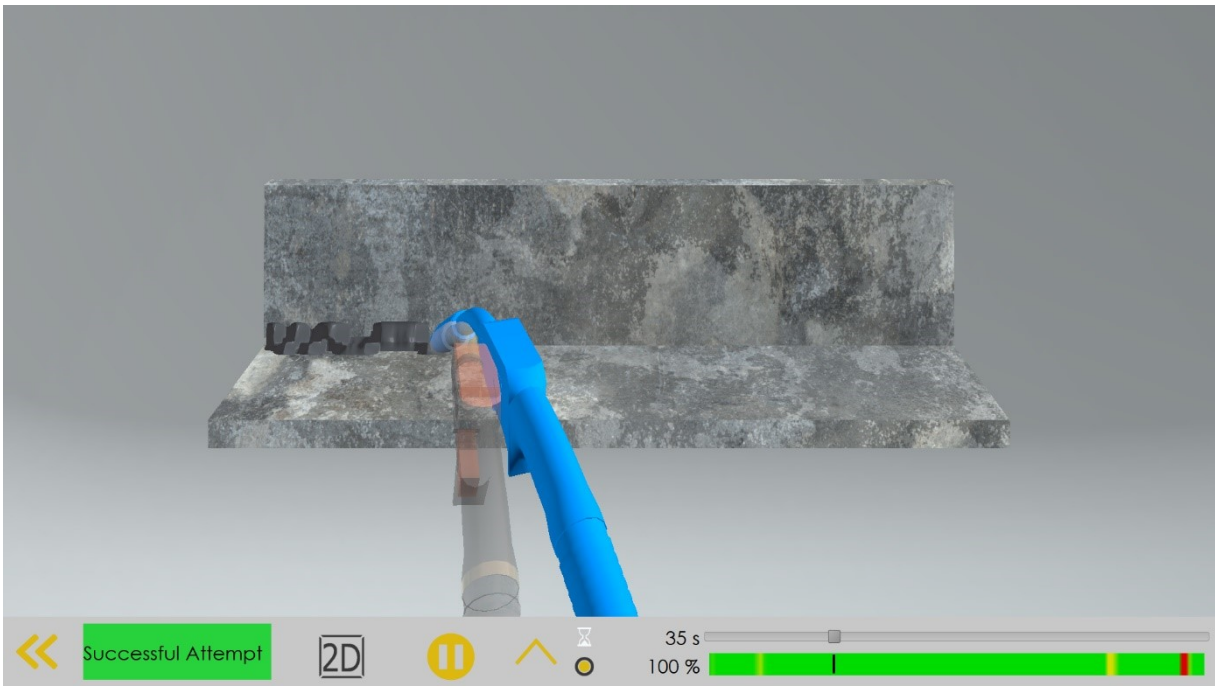
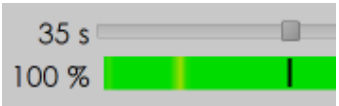


Figure 13: Results page – global overview

Here is more information regarding what is available in the lower part, from left to right:

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

	These buttons provide means to expand/collapse result details.
	These radio buttons provide means to focus the reply on a specific parameter (only available for distance and angle).
	The last part includes global information regarding 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 stayed in the tolerance area and mastered the parameter at this level. The coloured chart gives a visual indication: - Red: out of tolerance. - Yellow: near the tolerance limit. - Green: close to the target value.

When the user click on the expand button, the lower part is expended and display success rate and coloured chart per parameter.

Figure 14: Results page - details

2.7 CONFIGURATION

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

You'll need to restart the application to take into account the modification.

2.7.1 Setting tab

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

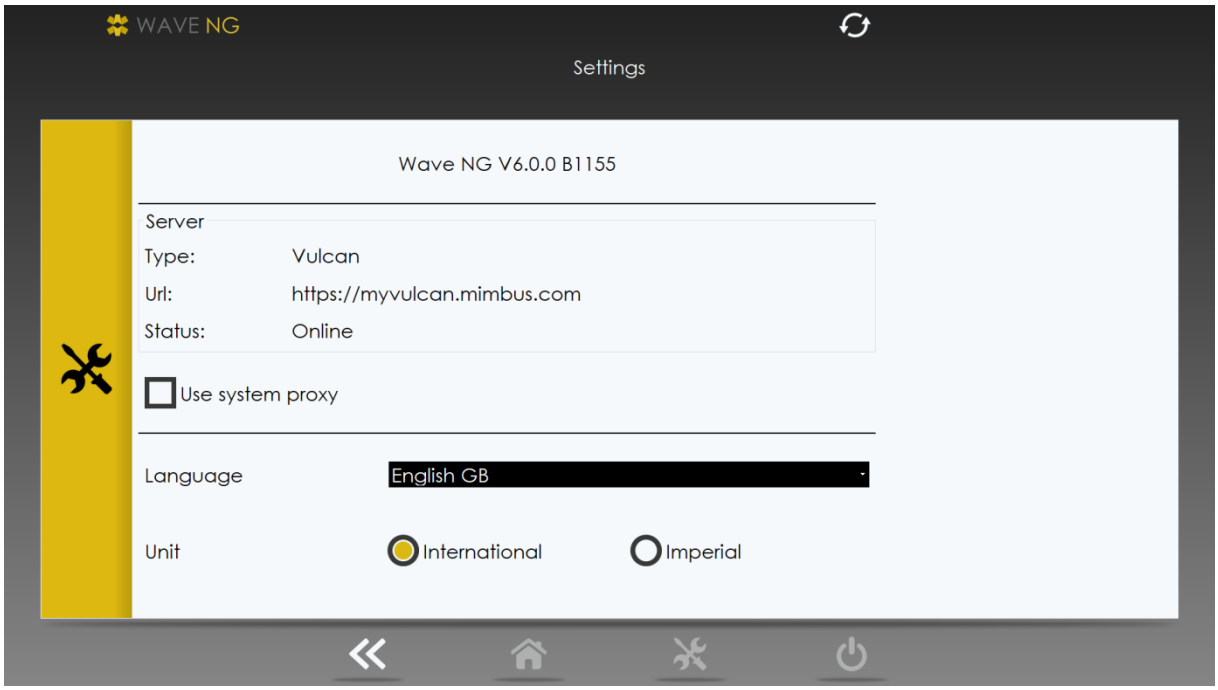


Figure 15: Settings tab

2.7.1.1 Server

This section displays the type of server used for user and result management, the server URL and the current connection status.

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 by default.

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.

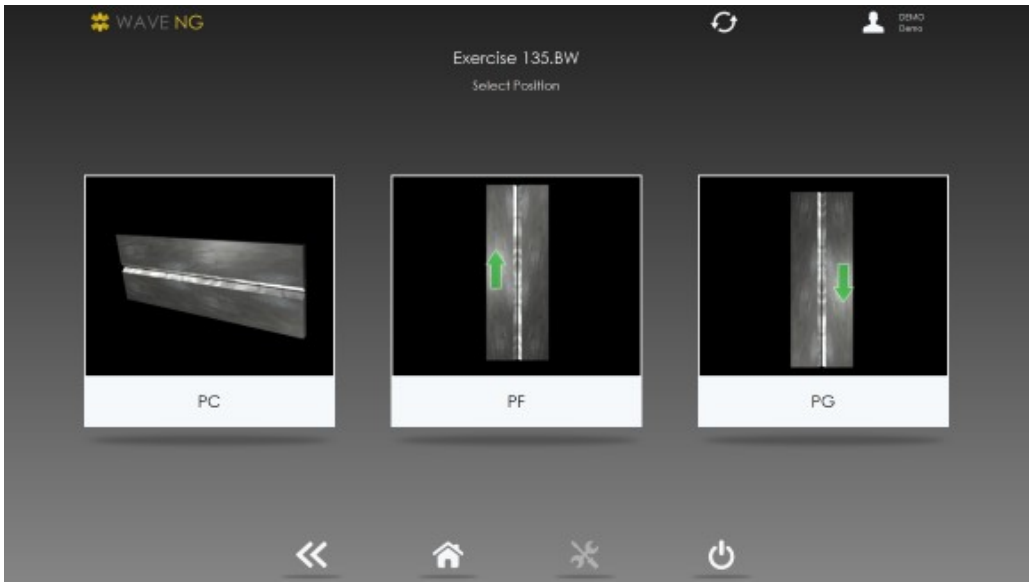
2.8 AVAILABLE EXERCISE FOR WAVENG Z

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

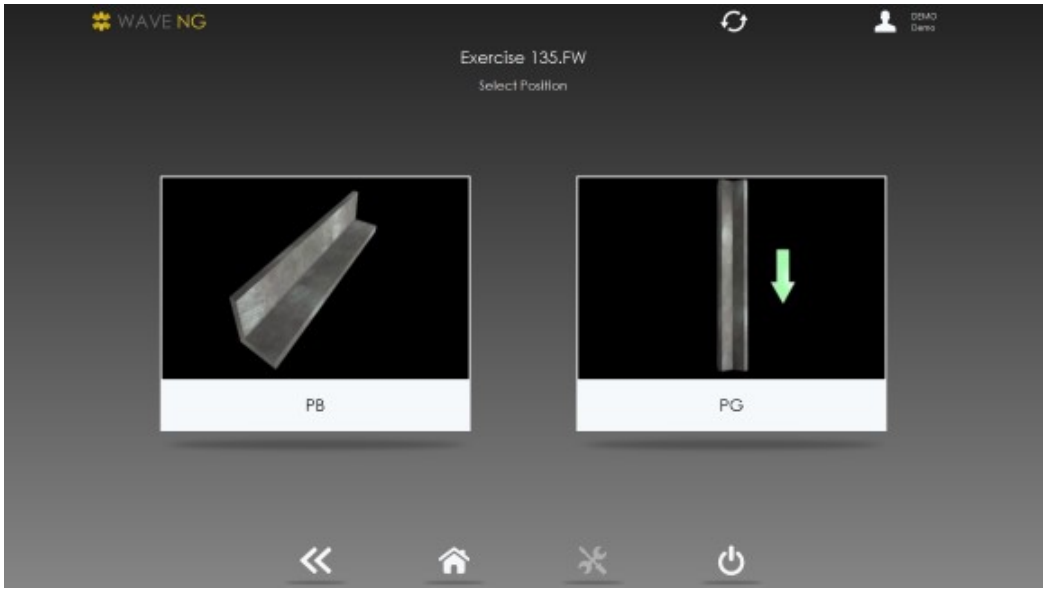
Process: GMAW (135)

Assembly, position and direction (per assembly):

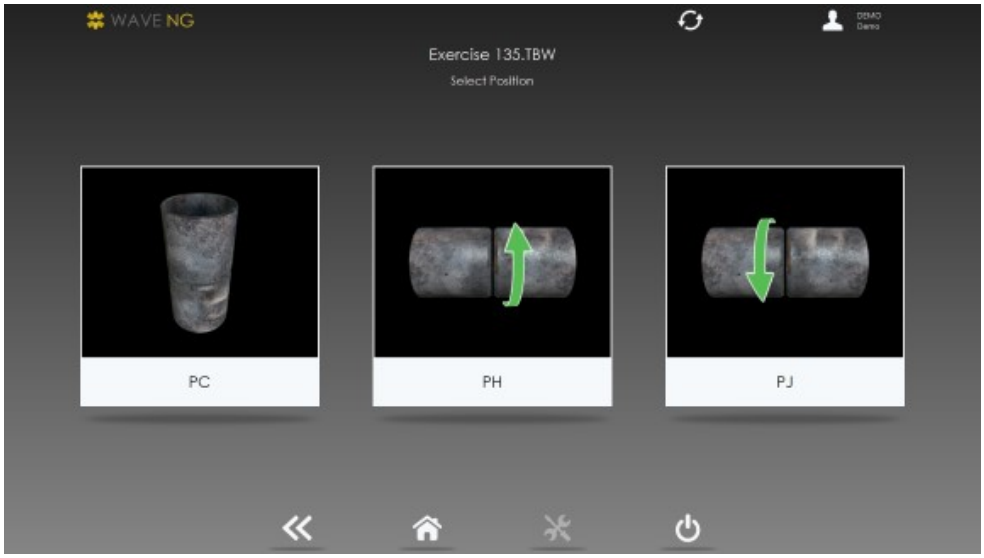
- BW
    - PC (horizontal vertical)
        - Backhand,
        - Forehand
    - PF (vertical up)
    - PG (vertical down)



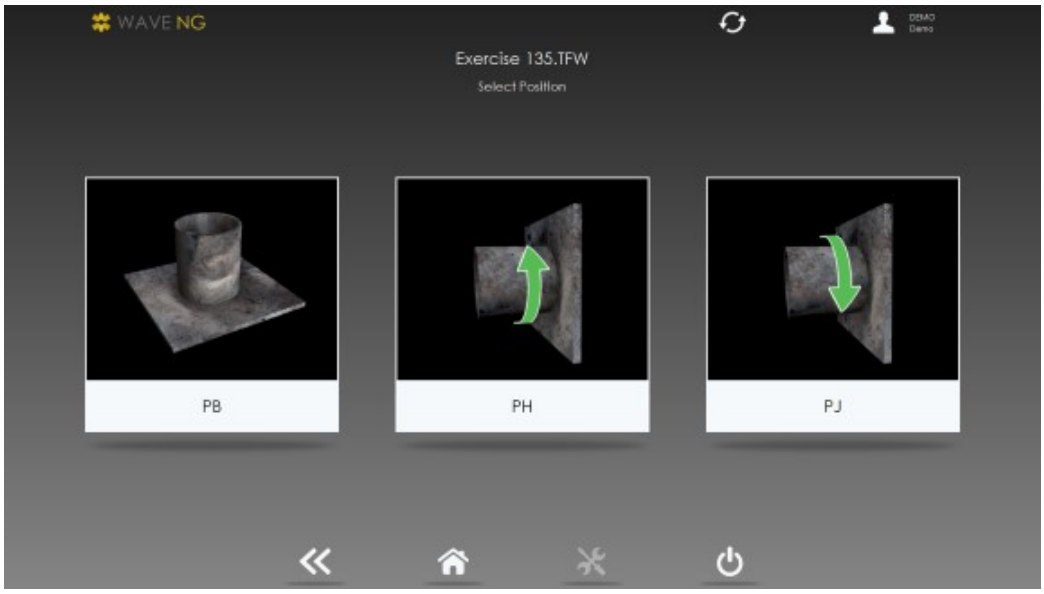
- FW
    - PB (horizontal vertical),
        - Backhand,
        - Forehand
    - PG (vertical down)



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



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



3. AVAILABLE EXERCISES ON VULCAN

Exercises in USER GUIDE		Exercises in Vulcan
135 BWPC backhand horizontal	=	135 2G Root Pass Backhand
135 BWPC backhand vertical	=	135 2G Root Pass Backhand
135 BWPC forehand horizontal	=	135 2G Root Pass Forehand
135 BWPC forehand vertical	=	135 2G Root Pass Forehand
135 BWPF vertical up	=	135 3G Root Pass (up)
135 BWPG vertical down	=	135 3G Root Pass (down)
135 FWPB backhand horizontal	=	135 2F Root Pass Backhand
135 FWPB backhand vertical	=	135 2 Root Pass Backhand
135 FWPB forehand horizontal	=	135 2F Root Pass Forehand
135 FWPB forehand vertical	=	135 2F Root Pass Forehand
135 FWPG vertical down	=	135 3G Root Pass (down)
135 PBWPC horizontal	=	135 Pipe 2G Root Pass Forehand
135 PBWPC vertical	=	135 Pipe 2G Root Pass Forehand
135 PBWPH vertical up	=	135 Pipe 5G Root Pass up
135 PBWPJ vertical down	=	135 Pipe 5G Root Pass down
135 PFWPB backhand horizontal	=	135 Pipe 2F Root Pass Backhand
135 PFWPB backhand vertical	=	135 Pipe 2F Root Pass Backhand
135 PFWPB forehand horizontal	=	135 Pipe 2F Root Pass Forehand
135 PFWPB forehand vertical	=	135 Pipe 2F Root Pass Forehand
135 PFWPH vertical up	=	135 Pipe 5G Root Pass
135 PFWPJ vertical down	=	135 Pipe 5G Root Pass