SEABERY SOLUCIONES
www.seabery.es

SOLDAMATIC

AUGMENTED REALITY EDUCATIONAL TECHNOLOGY FOR WELDING TRAINING

Manufacturer keeps the right of modifying his equipments without previous notice. Pictures and draws, descriptions and technical characteristics are not contractual and do not compromise our responsibility.

Security warnings

Electrical discharges can cause death.
The device must only be connected to power supply and plugs connected to earth.
Risk of electrical accident: the equipment should only be manipulated and opened by authorized personnel and never when the device is still connected to power supply.

Maintenance and fixing activities must only be taken by technical team authorized personnel. Warranty will be lost in case of non authorized device manipulations.

Instructions inform about the correct use of the device so you can take the best of it withouth any risk. So we recommend to read carefully the instructions before using the device, in particular those regarding to security.

Environmental conditions for use

This welding training technology can operate without any risk in a place with enough room between +10°C and +40°C (+50ºF y +104ºF)

Some key points to get advantage of SOLDAMATIC:

- First of all we would like to thank you very much for choosing our new SOLDAMATIC EDUCATIONAL to help you modernize and improve your welding training processes.

- SOLDAMATIC has been designed and developed to introducing competitive technological innovation to help welding training institutions, attending current and future increasing government and market demands for competent welders in different sectors.

- We work for supporting our clients to achieve their objectives of qualifying more welding professionals, locally, in less time and in a cost-effective way, contributing to increase countries and companies competitiveness for growth and employment generation

- This does not pretend to be a welding guide. It is a guide to use SOLDAMATIC EDUCATIONAL welding training solution. If you need welding training orientation we can help you through our partnerships with welding experts worldwide.

- We have also started to build a SOLDAMATIC community so that different users worldwide can share their experiences and take the best profit of our technology to accomplish your welding training objectives. **We can help you train more qualified welders, in less time, safely, sustainably and reducing your welding training costs**. You can keep up to date by following us in our web channels

- SOLDAMATIC is an innovative technological solution designed to help welding students of different levels to acquire the right capacities, welding sensations and skills without physical risks, saving money and reducing environmental impact, by reducing the real workshop training time. It is an educational solution to help both students and trainers to improve their learning experience.

- To complete their welding training, students should expend some time practicing the skills acquired by using SOLDAMATIC in real recognized workshops under qualified professional supervision and the right security measures.

- SOLDAMATIC is complementary to real welding equipments and workshops in welding learning process, contributing to enhance it and make it much more attractive for students and efficient for training centers and welding trainers. That is the reason why the use of SOLDAMATIC is recommendable and applicable for the whole of welding training programs.

- **AUGMENTED REALITY:** SOLDAMATIC is the first educational technology which applies this artificial vision technology to this kind of trainings. The student can work in a real environment, with all the real elements used in workshops (welding torches, welding helmet, work pieces, etc.) and we use our augmented reality technology to make all those elements interact, to draw computer generated graphics welding effects, offering the most realistic welding training experience ever seen until the moment.

1. GENERAL FEATURES OF OUR WELDING TRAINING EDUCATIONAL TECHNOLOGY

The welding simulator **SOLDAMATIC** performs the most advanced computer-simulation techniques using artificial vision technology, AUGMENTED REALITY, to create a real welding-like environment, so the user will get the same results as in real welding.

SOLDAMATIC WHAT MAKE US DIFFERENT

- Augmented Reality: The more realistic TRAINING experience
- Remote maintenance and updates (new materials, etc.)
- Adaptable to specific client needs, according the different training requirements of clients world wide (Latam, North America, Europe, Russian Federation; Africa and Asia Pacific)
- Price: The most competitive in the global marketplace.

WELDING SIMULATORS GENERAL ADVANTAGES

Adaptable to different welding training institutions requirements, helping them make welding training process:

- Attractive for young students; highly improves motivation
- Efficient
- Suitable
- Scalable
- Safe
- Affordable
- Sustainable
- Different welding standards (EWF, AWS, etc.)

The Soldamatic simulator includes real and also simulated welding tools (welding torches and mask + workpieces + electrode stick + filler rod) for the different welding processes: stick welding (SMAW, MMA), MIG-MAG (GMAW, FCAW) or TIG (GTAW). These peripherals are connected to Soldamatic Central Unit in the same way as it is in real welding equipment, using real connectors, therefore the student will become familiar with its use, adjustments and procedures.

In addition to the welding training experience performed in the student-simulator, the master software is oriented to help the teachers managing their courses: network, control over student-simulators in real time, upload of theory modules, design, analysis and evaluation of welding exercises, reports, upgrades for workpieces, gases, electrode sticks, base materials, etc., specialization in different economy sectors needs (automotive, naval, aeronautics, off-shore, mining, etc.).

This simulator works in a Virtual Classroom format in which the teacher monitors in real time all the students' performances of welding exercises, which will be saved in their personal profile and can be reviewed later. Another feature that helps the teacher evaluating the welding exercises is the Analysis Module which represents graphically the performance made by the student and at the same time analyzes it from the point of view of physical skills and possible welding defects. This feature is very useful for the teacher to review and comment the exercises together with the students.

SOLDAMATIC APPLICATIONS

TODAY

- New welders training

COMING UP AND AVAILABLE BY REMOTE SOFTWARE UPDATINGS

- Advanced welders practices
- Specific sectors (automotive, oil&gas, petroleum, mining, aeronautics, aerospace, infrastructures, energy) welding training
- Welders recruiting processes
- Standards Homologations and Certifications: Currently working with specialist welding advisors in several countries

2. GETTING STARTED.

SOLDAMATIC demo units includes the **Master-software** and the **Student-simulator. Soldamatic Server required to connect up to 1 soldamatic to configure a virtual classroom is not included**.

The **Master-software** allows to manage the activity of the student simulator through the Virtual Classroom, and every matter regarding the training activities such as courses, students, exercises and theory management.

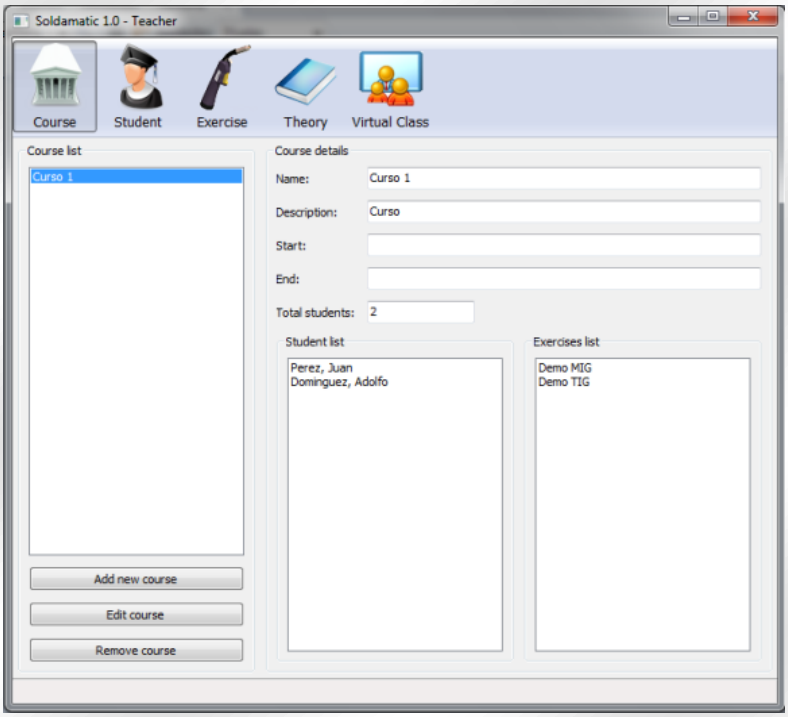
The **student-simulator** is provided with all the items that you would need to make a real weld, and in which the student performs all the exercises assigned by the teacher and even watches the theory modules.

In the student simulator the student can only see and work with those exercises previously configured by the teacher in the teacher software. That way the teacher can manage each individual student training depending on their performance.

SOLDAMATIC Master-software:

It is an specific software provided by Seabery Soluciones. It has to be installed in a PC with these minimum requirements:

- Operating System Windows Vista or 7.
- Processor 32 bits (x86) 2.2GHz 3MB.
- RAM 2GB.
- Graphic board 512MB DirectX 9.0c compatible: NVidia GeForce GT440 o superior; ATI Radeon HD5000 o higher.
- Hard Disc 1 GB.



Teacher software manual available

- SOLDAMATIC Student

The student-simulator is the result of a cutting-edge design and development and it represents the set of items needed for a real welding. Therefore a training classroom should have one master-PC and as simulators as students wanted to be trained simultaneously.

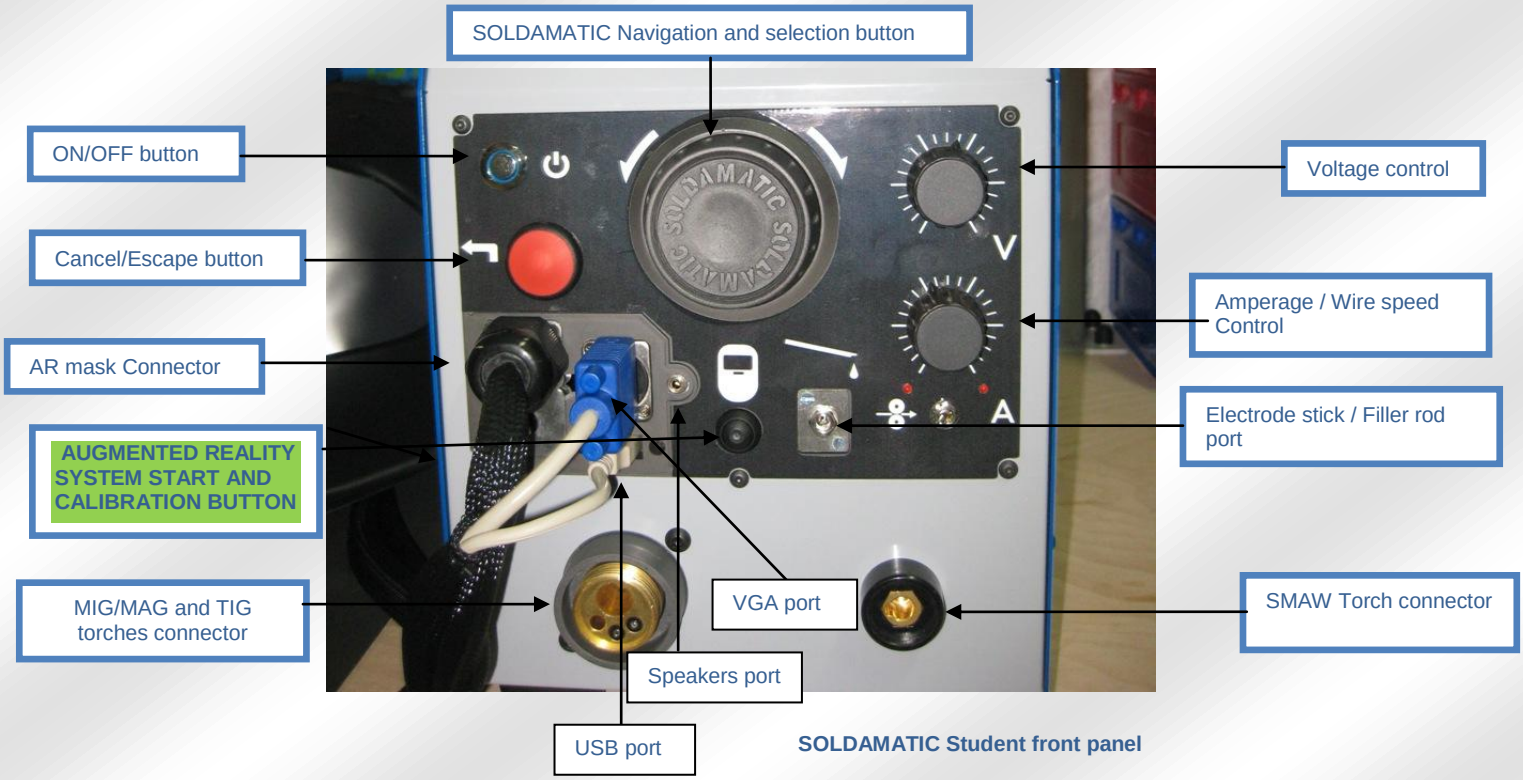
The student-simulator is made up of a portable central unit looking like a real welding equipment, real welding torches for stick welding (SMAW, MMA), MIG-MAG welding (GMAW, FCAW), and TIG welding (GTAW), simulated electrode stick and simulated filler rod, and welding mask with cameras and head-mounted displays (set which with you will enjoy the incredible Augmented Reality vision technology) and a set of work pieces with the standard sizes and joints.

Welding equipment/central unit: Information system equipment designed to have the same aspect as a real welding machine, to be portable (8kgs) and with all the hardware architecture required to support our AUGMENTED REALITY simulation system. It has a LCD display that handles menus navigation and select between theory, exercises and welding procedures and parameters. During a welding performance the teacher could watch in this display the same as the student is seeing through

her/his Augmented Reality welding mask. The LCD display also shows the results of the analysis module.

The welding equipment/central unit also has a control panel in which you can find the connectors for the welding torches, and also the controls for voltage, amperage and wire speed. This panel also has the button for starting the Augmented Reality artificial vision system and the connectors for the welding mask.

Welding training equipment/central unit

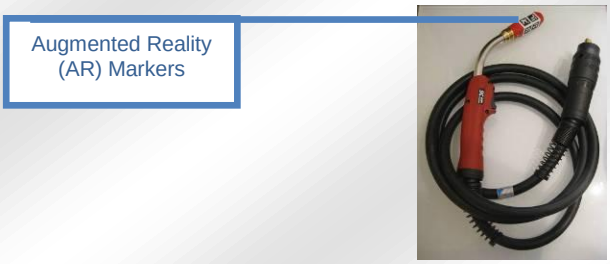


SOLDAMATIC Student front panel

Simulated electrode stick: simulated coated electrode that works with the work pieces the same as in real welding, and incorporates some bright dot markers needed to work with the Augmented Reality

system. This electrode stick can be used with a regular commercial torch connected to the welding equipment/central unit through a real welding connector. The electrode stick has been designed with a shape, weight and size similar to a real electrode to get the student used to it.

MIG-MAG (GMAW, FCAW) welding torch: real welding torch with markers ready to work with the Augmented Reality system. The torch is connected to a real welding connector in the *welding equipment/central unit*. MIG-MAG (GMAW, FCAW) welding is a semi-automatic or automatic process that uses a continuous wire feed as an electrode and an inert (MIG) or semi-inert (MAG) gas mixture to protect the weld from contamination. The wire can be solid (GMAW) or cored consisting on a steel electrode surrounding a powder fill material (FCAW). With SOLDAMATIC, the student selects first the shielding gas and the wire's type and diameter, and once he is welding he could manage the wire speed with the control in the welding equipment.



TIG (GTAW) torch and simulated filler rod: real TIG (GTAW) torch with markers ready to work with the Augmented Reality system. The torch is connected to a real welding connector in the *welding equipment/central unit.* The filler material is made by a simulated filler rod that works the same as in real welding, which incorporates 3 led markers to be identified by the Augmented Reality system. The student can manage the material filling by touching slightly with the rod in the welding join, exactly as it happens in real welding. The filler rod has been designed with a shape, weight and size similar to a real filler rod to get the student used to it.

AUGMENTED REALITY TECHNOLOGY SOME IMPORTANT TIPS

To make the welding torches and simulated electrode stick and filler rod work properly with the Augmented Reality system and be clearly identified in the 3D real space, the student must see the **AR MARKERS** directly at any time. The **AR MARKERS** are the green and blue codes distributed in the work pieces, the top red neck in the MIG/MAG and TIG welding torches and the 3 led lights aligned in the stick and rod.

The augmented reality markers system is designed so that the student can learn the **CORRECT WELDING POSTURE**, absolutely key to become a good welder.

Augmented Reality is an artificial vision technology, light is very important for the system to work properly, so keep out of direct exposing sun light areas, direct focus lights, etc.

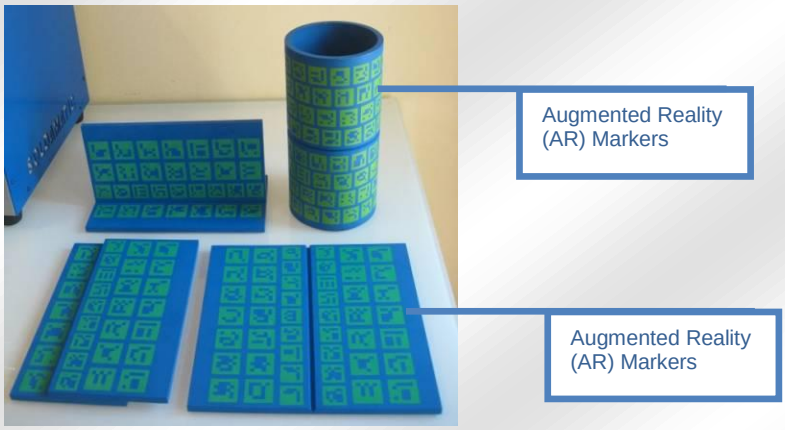
If you notice that you cannot perform the weld instead of having the right parameters selected, probably you are not seeing properly the markers through the Augmented Reality welding mask. Then you must move slightly the torch/electrode/rod to each side until you can weld.

P**AY ATTENTION TO THE HELP ICONS DISPLAYED IN THE SCREEN**, warnings about correct position of the head, the welding torches and the electrode stick and rod will be displayed to help the student get the right welding position.

Augmented Reality welding mask: *real welding mask* which has two high resolution micro-cameras and a 3D head-mounted micro displays. This set lets you enjoy the incredibly innovative experience of Augmented Reality. Both the SOLDAMATIC accessories (work pieces, torches, electrode and filler rod) and the real environment are shown to the user through the head-mounted displays and they interact to creating a real-time augmented reality where an the most realistic simulated welding experience is possible. The welding mask also have led lights with a power selector in the front panel of Soldamatic, that are used to maintain environmental light conditions stable, as Augmented Reality is an artificial vision technology, light is very important for the system to work properly.

Welding mask with micro-cameras and 3D Video Glasses inside

Work Pieces: *Standard welding training work pieces prepared to work with SOLDAMATIC Augmented Reality system.*



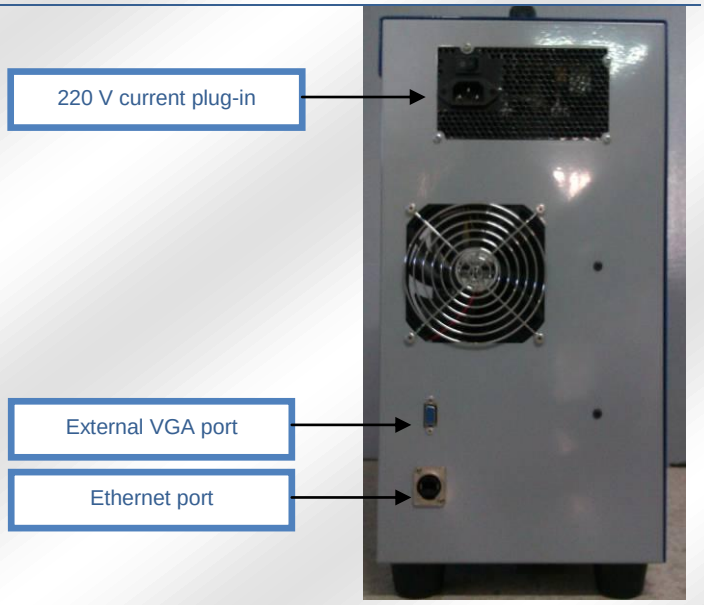
3. INSTALLING SOLDAMATIC.

Installing SOLDAMATIC is easy and safe, and you do not need to have previous specific technical knowledge. You just have to follow these steps, and if you have any doubt or experience any problem during installation please ask your local distributor or our support team.

CONNECT SOLDAMATIC STUDENT CPU

1. **To the power supply**
2. **To the router to connect it to teacher laptop**

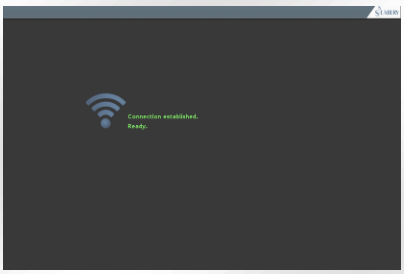
When you want to upgrade your system, connect it to your internet connection gatetway



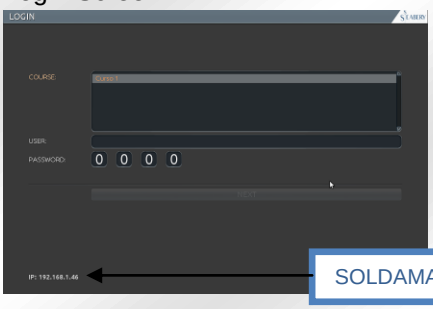
INSTALL THE MASTER SOFTWARE IN A LAPTOP AND CONNECT IT TO THE SOLDAMATIC STUDENT

1. Install the teacher software supplied in the Seabery flash memory to your laptop
2. Notice in which directory the installation is done
3. Once the software is installed you have to connect both the SOLDAMATIC Student and the laptop with the TEACHER to a ROUTER (Not supplied). Direct connection is also possible if you configure your laptop to work as a server and you run the DHCP service. Consult your IT network support.

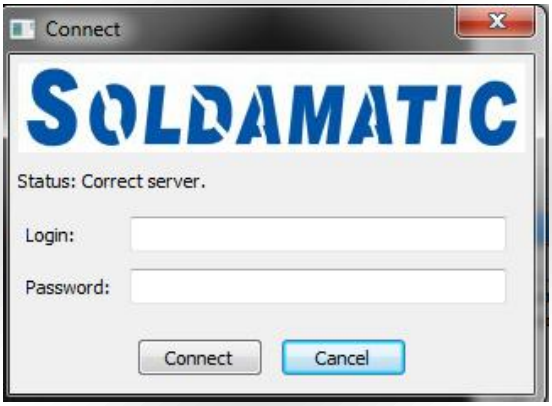
4. Start SOLDAMATIC student and when you are in the login screen, you will see the IP Address assigned by the router. Write it down.



Login Screen



5. In the laptop with the teacher software, look for the file" localserver.ini" in the directory where you installed the teacher and write the IP address of SOLDAMATIC Student. Save the changes.
6. Double Click the teacher software icon
7. Login the teacher



User: admin
Pwd: 1234

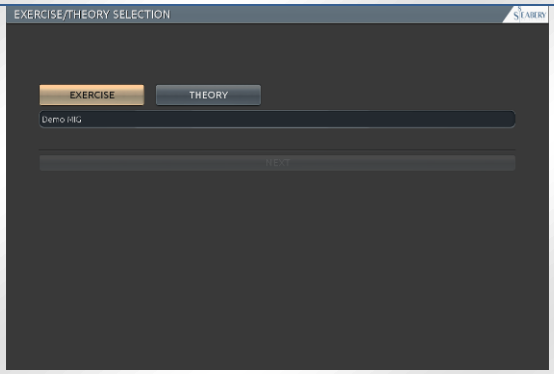
You must be inside. Navigate and try to add new students, exercises, etc.

4. STARTING UP WITH SOLDAMATIC

INITIAL LOGIN SCREEN

For demo purposes use the default “user”
and password= 0000. Use the SOLDAMATIC central button to enter password, move through the menus, by turning the wheel button left and right and pushing to select. Red button is used to go back, escape or cancel

SELECT EXERCISES OR THEORY



SELECT WELDING PARAMETERS

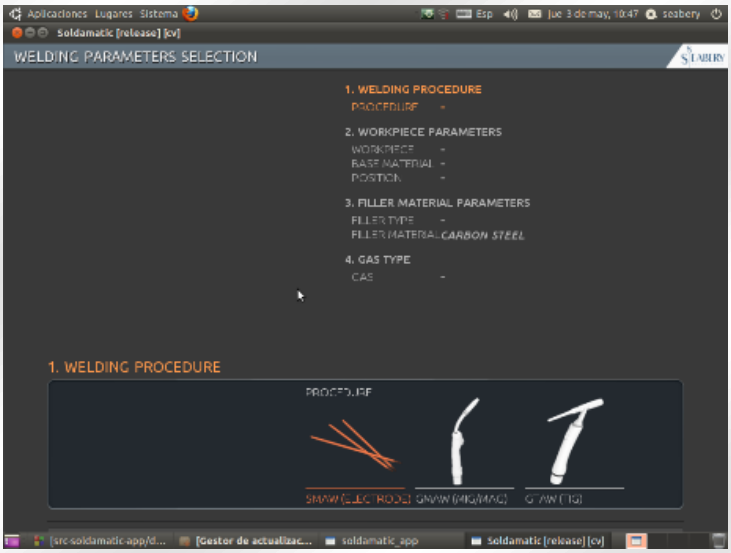
Once the student has logged to SOLDAMATIC, he will also be able to see the theory and execute the exerciser previously assigned by the teacher in the teacher software.

Incorrect welding parameters will not allow the student to execute the exercise (for example if you choose SMAW welding, you can not use any Gas)

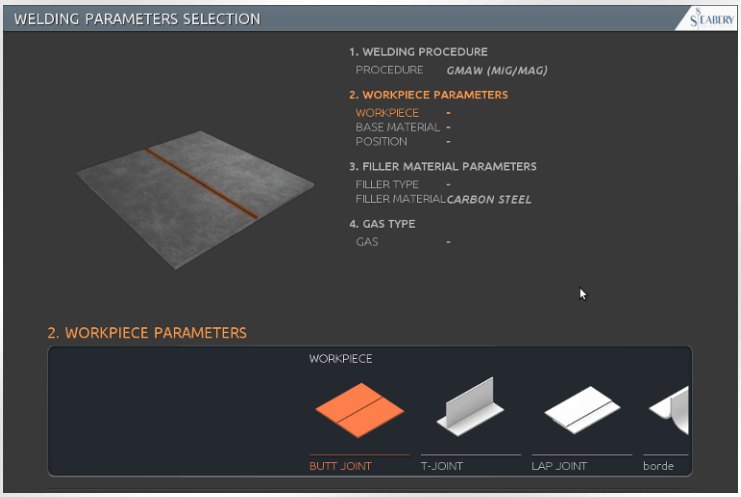
The teacher can decide if he prefers to assign students open exercises so that the student can choose the different parameters or deactivate some options, depending on each student learning level and teacher criteria.

The theory is also assigned by the teacher in the teacher software (uploading pdf files), so that each student will see only the lessons, and programs previously assigned by the teacher.

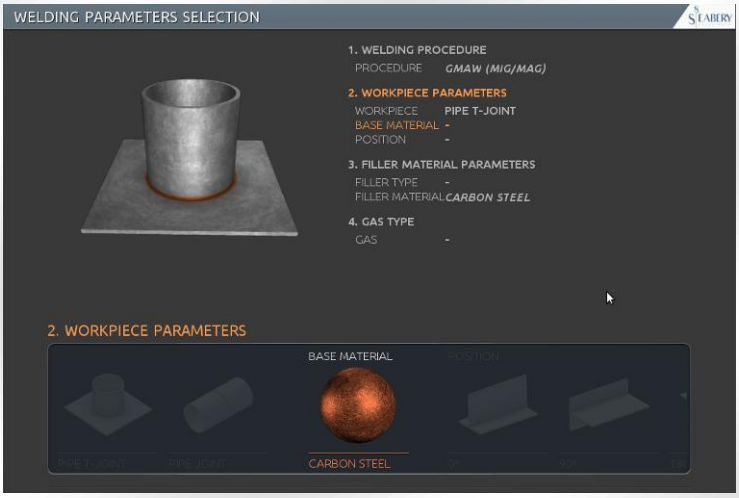
WELDING PROCEDURE



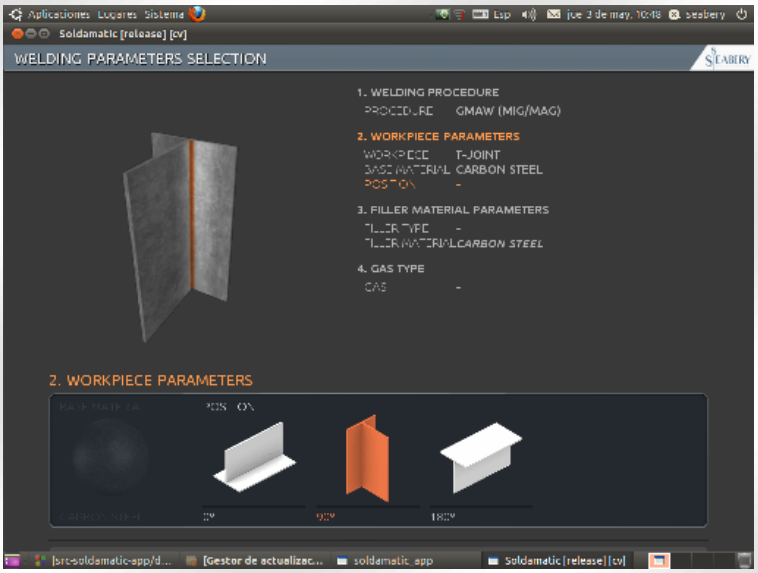
WORK PIECE PARAMETERS: Workpiece



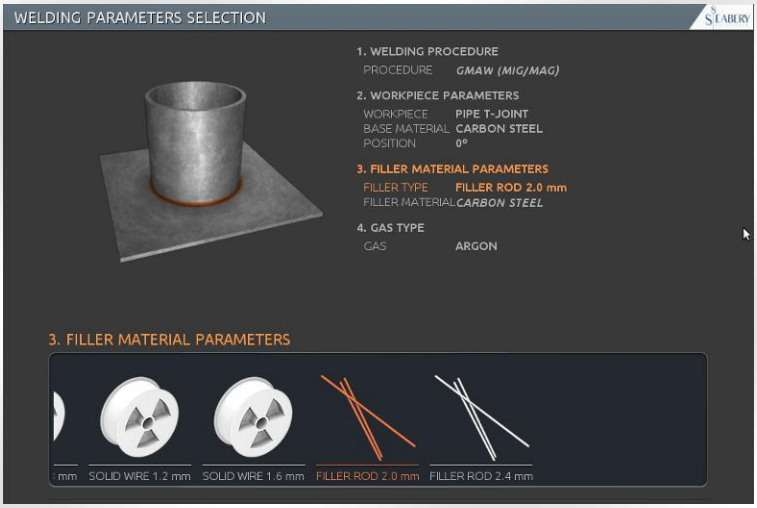
WORK PIECE PARAMETERS: Base material



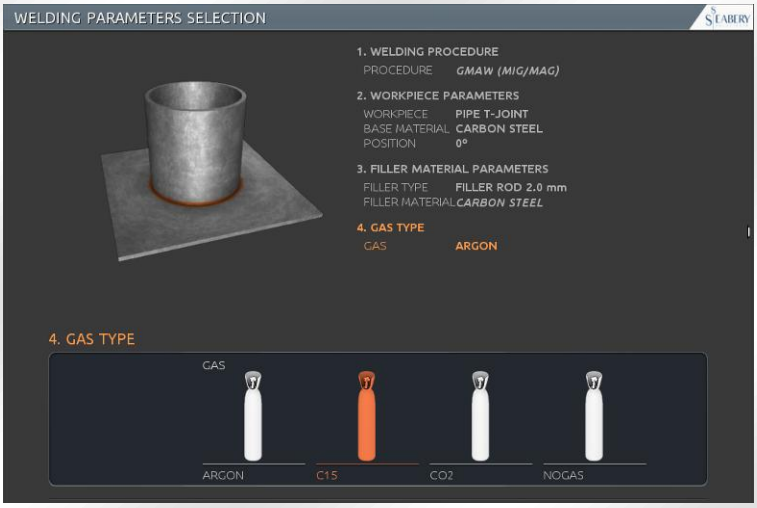
WORK PIECE PARAMETERS: Position



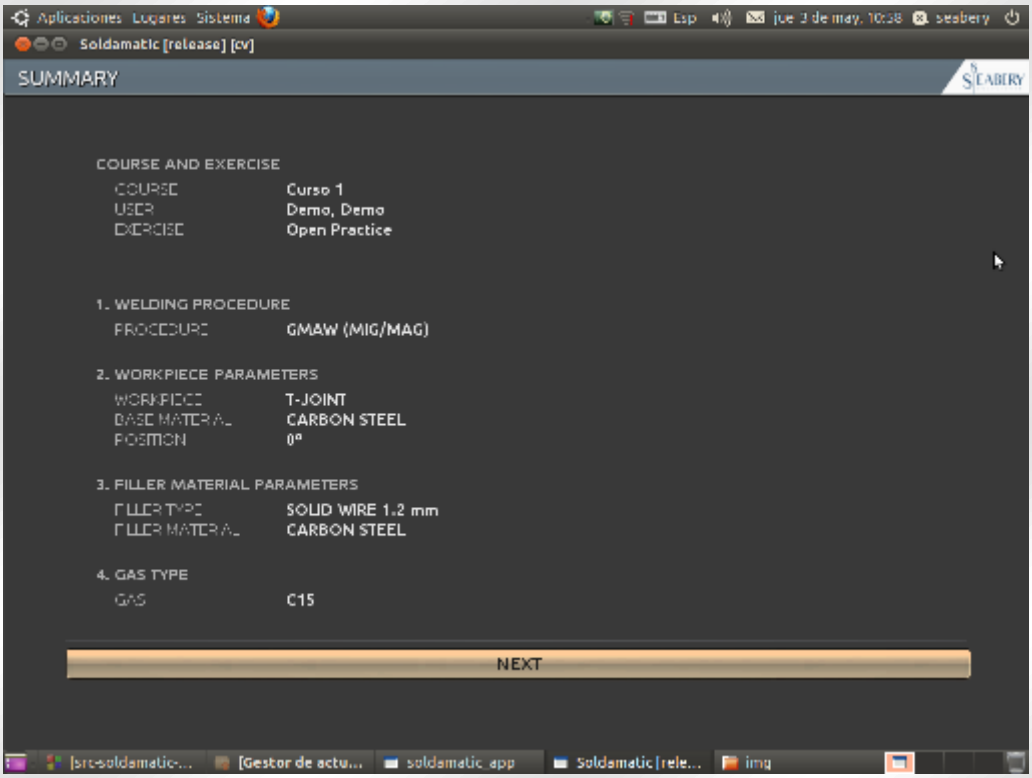
FILLER MATERIAL PARAMETERS:



GAS PARAMETERS:



SUMMARY OF THE EXERCISE



PREPARE THE ELEMENTS FOR YOUR WELDING PRACTICE

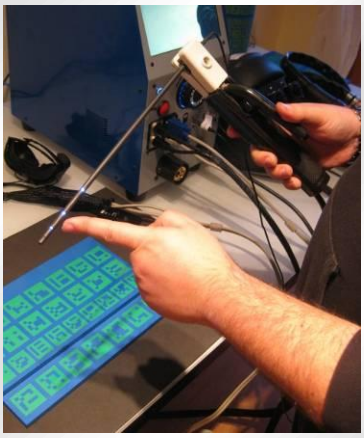
Welding Torch (example, MMA, SMAW)

Work Piece

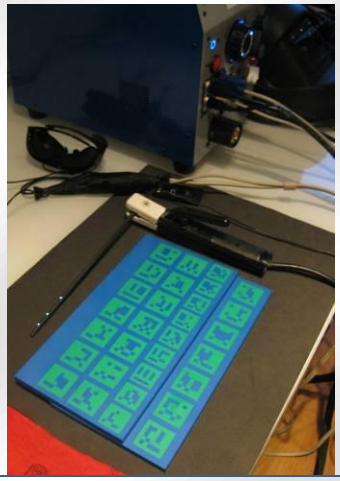
Connect the SMAW torch

Connect the electrode stick

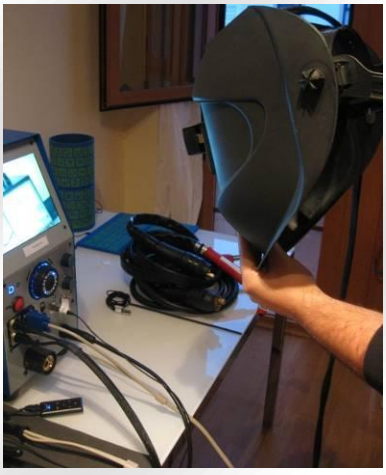
Insert the electrode stick in the SMAW torch

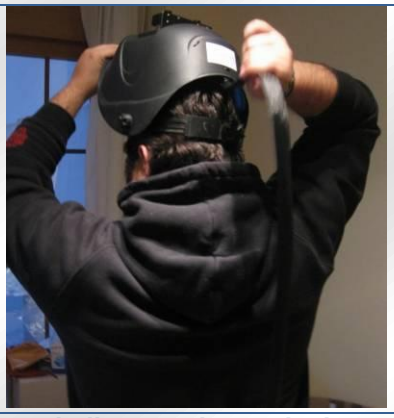


Select the work piece



PUT ON THE AUGMENTED (AR) REALITY WELDING MASK



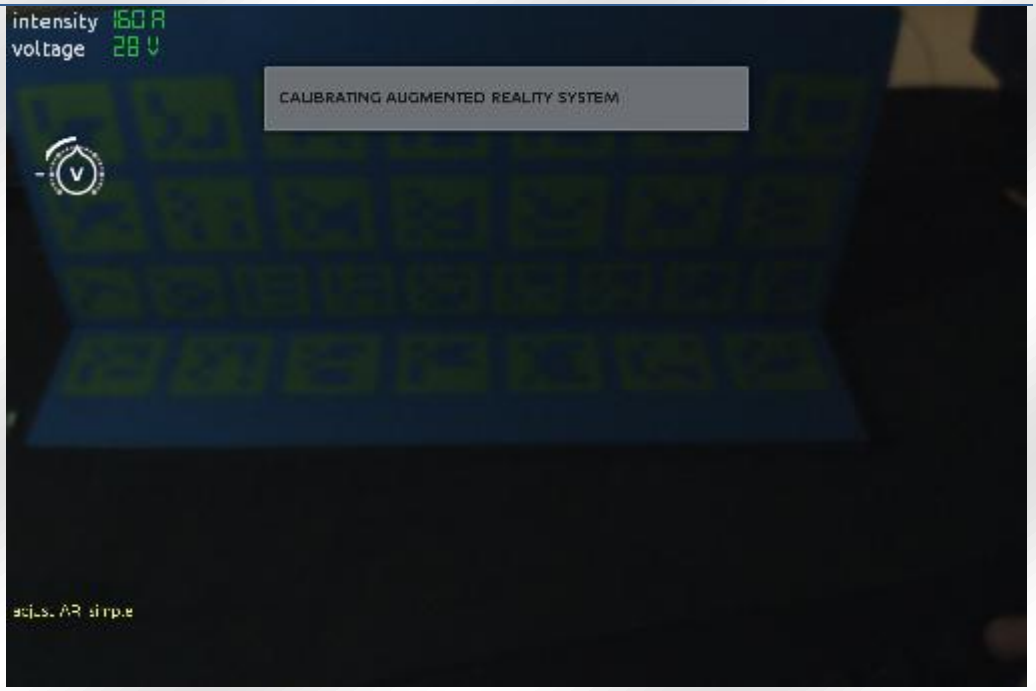


START SOLDAMATIC AUGMENTED REALITY SYSTEM

Look direct to the work piece, you have to see the whole piece in the screen

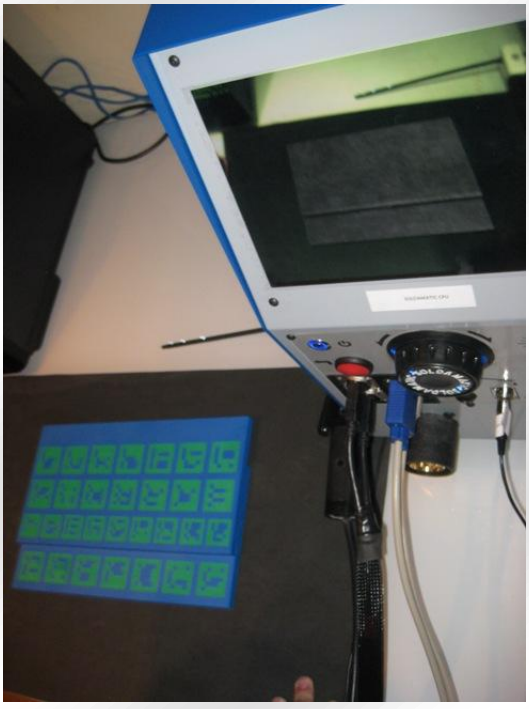
While looking at the work piece push the button with the mask icon in the middle of the SOLDAMATIC front panel

Remain looking at the work piece while the augmented reality system is calibrating the cameras and adjusting to the environmental light conditions.



The first time you start using SOLDAMATIC in a new environment and when the system is shut down, you have to use the **Long Augmented Reality (AR) calibrating adjustment** by pushing the AR button holding during 3 seconds. If light conditions remain the same, you only have to use the **Short Augmented Reality (AR) adjustment**, just push the button once.

When it is finished you will see the work piece with the **real aspect** of a carbon steel coupon and **you can start welding!**



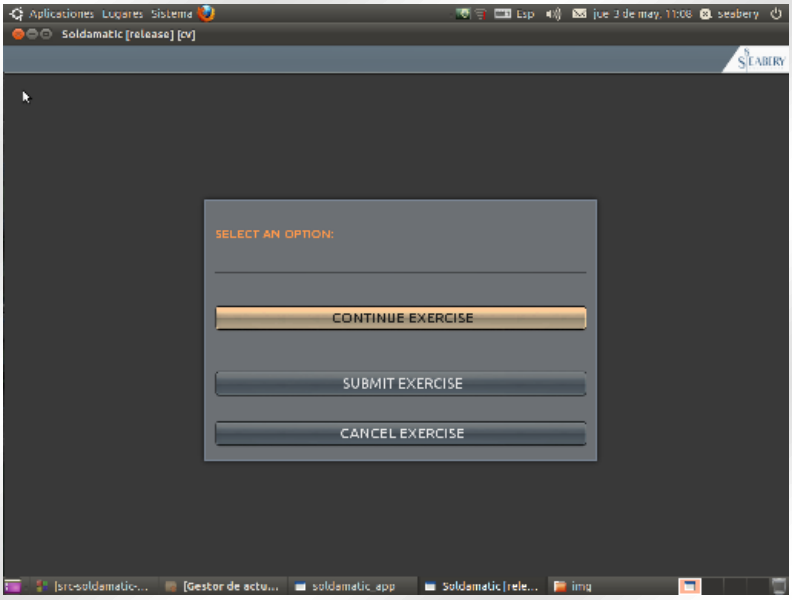
Welding parameters supported by Soldamatic simulator standard version

MIG-MAG (GMAW, FCAW) WELDING:	TIG (GTAW) WELDING:	STICK (SMAW, MMA) WELDING :
Shielding gas: • C15 (15% de CO2) • EN 439-M2 (4) • CO2 • EN 439-C1 (1) Base material: • Carbon steel Filler material (wire): • Carbon steel Wire type • Solid Wire diameter (mm): • 0,8 mm • 1,2 mm • 1,6 mm	Shielding gas: • Argón EN 439-I (1) Base material: • Carbon steel Filler material (rod): • Carbon steel Rod diameter (mm): • 2,0 mm • 2,4 mm	Base material: • Carbon steel Filler material (electrode stick): • Carbon steel Electrode stick type: • Basic • Rutile Diámetro del electrodo: • 2,5 mm • 3,2 mm

This simulator has been designed to be upgraded easily with new features by software downloads connecting to our SOLDAMATIC SERVECE CENTER. To know all the options available please contact your local distributor or visit www.seabery.es.

5. EXERCISES ANALYSIS MODULE

From the exercise, the student can escape to the following screen, pushing red button in the front panel:



Continue exercise: The student restarts the exercise in the point she/he paused it

Submit exercise: The student has finished the exercise and wants to tape it and see the diagnostic analysis of her/his performance

Cancel exercise: The student want to go back to the parameters definition initial screen without taping the exercise.

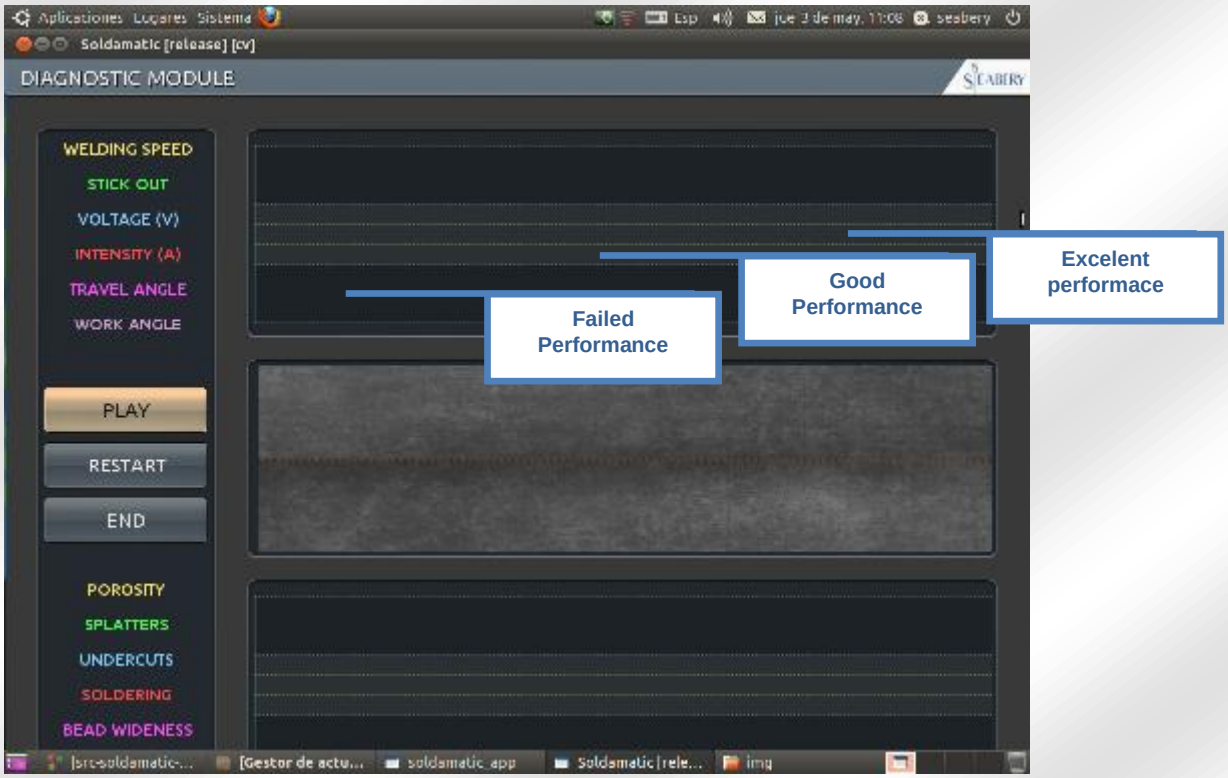
SOLDAMATIC ANALYSYS BASIC MODULE

Both the teacher and the student can restore the video of the exercise and see her/his performance regarding the following welding training skills and parameters:

- **Welding Speed**
- **Stick Out**
- **Voltage**
- **Intensity**
- **Travel Angle**
- **Work angle**

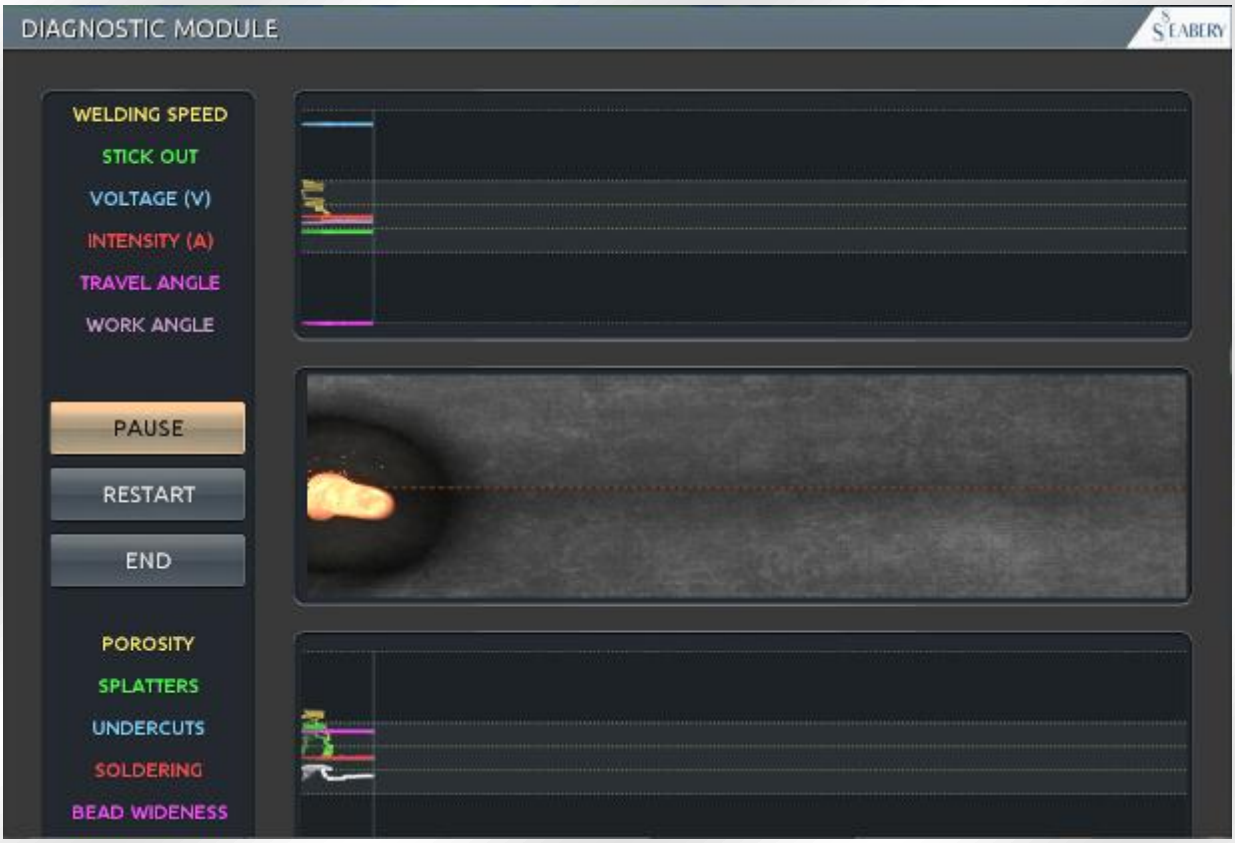
Pushing play button, the video of the exercise will start playing and the graphics in the above half of screen for each welding training skills and parameters will start drawing. There is a line for each one, color identified.

Te student and teacher can select and de select skills and parameters to focus on those they are more interested in, depending on each student performance.



In the below half of screen, more typical welding defects are measured:

- **Porosity**
- **Splatters**
- **Undercuts**
- **Soldering**
- **Bead wideness**


DIAGNOSTIC MODULE
SEABERY
WELDING SPEED
STICK OUT
VOLTAGE (V)
INTENSITY (A)
TRAVEL ANGLE
WORK ANGLE
PAUSE
RESTART
END
POROSITY
SPLATTERS
UNDERCUTS
SOLDERING
BEAD WIDENESS


Aplicaciones Lugares Sistema
Esp
jue 3 de may, 11:09
seabery
Soldamatic [release] [cv]
DIAGNOSTIC MODULE
SEABERY
WELDING SPEED
STICK OUT
VOLTAGE (V)
INTENSITY (A)
TRAVEL ANGLE
WORK ANGLE
PAUSE
RESTART
END
POROSITY
SPLATTERS
UNDERCUTS
SOLDERING
BEAD WIDENESS
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soldamatic_app
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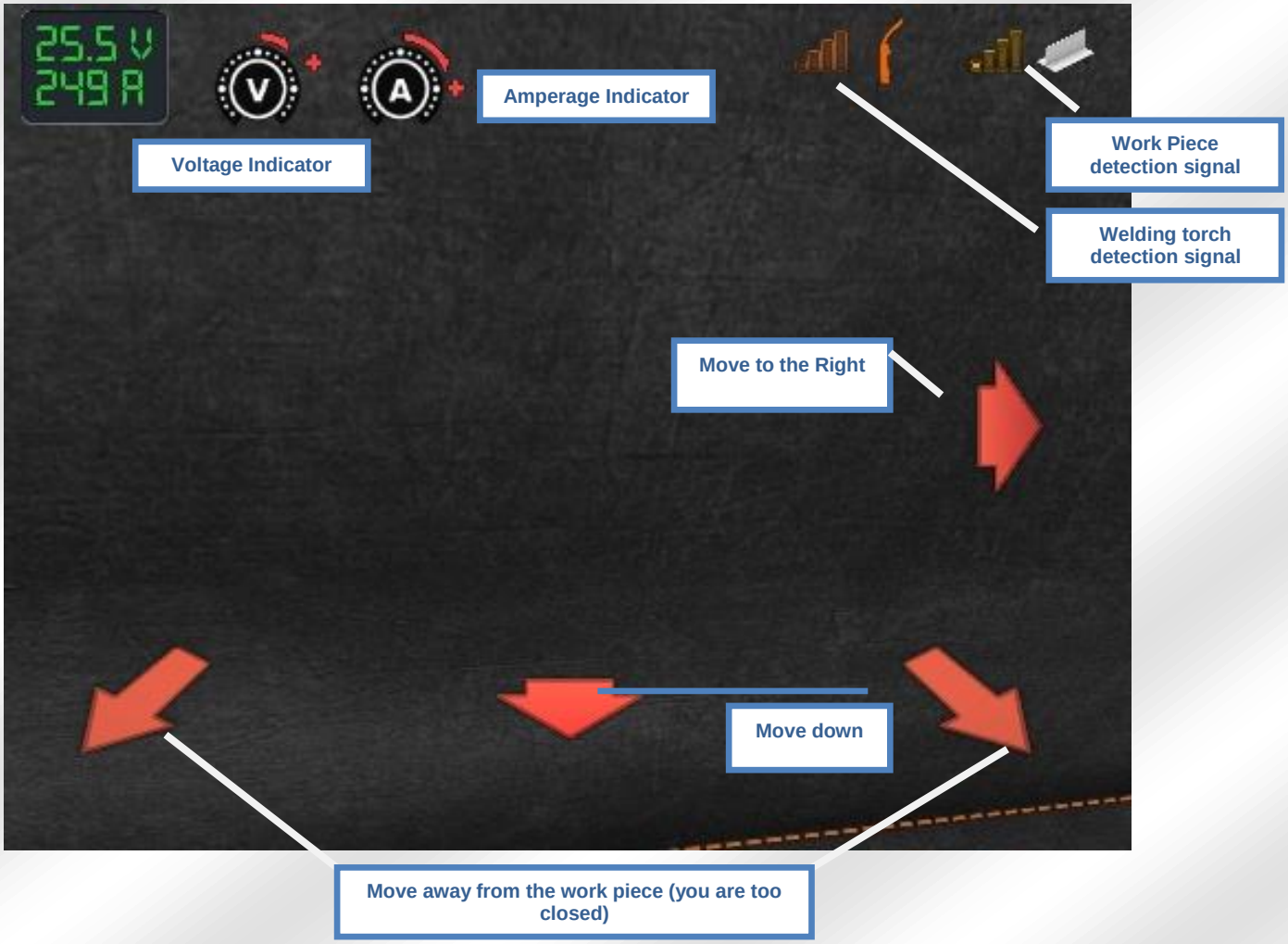
img

6. HELP ICONS SYSTEM

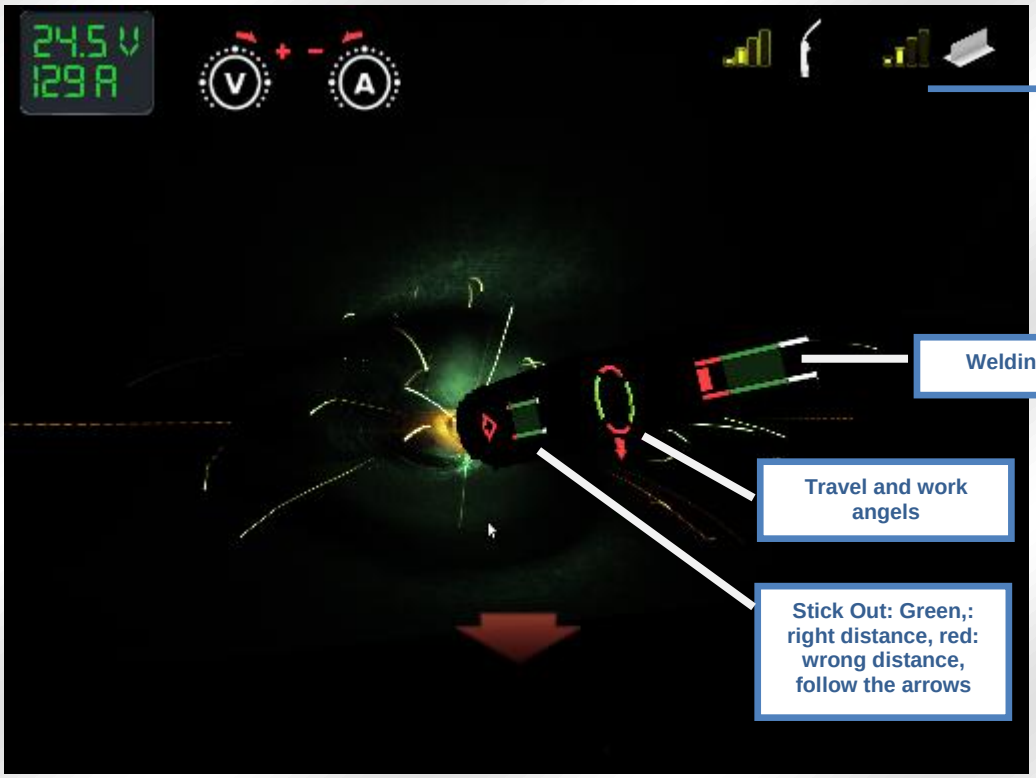
While exercise execution different help icons and warning system are displayed to help the student know how is he executing the exercise and correct and train the main welding skills to become a good welder:

- **Head (welding mask) position:** Different arrows indicate the student to move closer to the work piece, farer, to the right or to the left. They are always focused on the WELDING MASK position. The student head position is one of the most important skills to learn in welding training. The system is designed to make the student get use to the right welding position. PAY ATTENTION TO THE HELP ICONS WHILE WELDING.



- **Voltage: You have to work in the right ranges depending the parameters selection.**
- **Amperage: You have to work in the right ranges depending the parameters selection.**
- **Stick Out: Distance of the welding torch to the work piece**

- **Welding Speed**
- **Travel angel: Horizontal angel of the welding torch against the work piece**
- **Work angel: Vertical angels of the welding torch against the work piece**



7. WELDING PERFORMANCE.

Once the student has selected all the parameters needed for welding the system is ready to start the exercise. In this moment the student must wear the welding mask on and adapt the head-mounted displays to her/his head until he can see the image clearly. After that the student must initiate the Augmented Reality system by pushing the button in the front control panel while he/she is watching at the work piece.

IMPORTANT: starting the Augmented Reality system can take a few seconds and it is very important that the student watches the work piece at all time because the simulation software is provided with an intelligent auto-calibration system which detects the surrounding light and adapts itself to it to obtain the best performance results. Because of this the welding mask is equipped with a led light focus which creates a stable light environment in the working area, to let the artificial vision system identify rightly and let all the peripherals interact using our Augmented Reality technology

Once the system is auto-calibrated the student will see the carbon steel (in the standard version of SOLDAMATIC) work piece. The student is still watching and working with a real physical work piece, but this reality has been augmented with a virtual image that turns the work pierce into an almost real metal work piece used in a real workshop.

From here on the student must perform the welding with the selected parameters exactly as in real life, using some of the welding torches connected to the ***welding equipment/central unit*** as showed before.

IMPORTANT: for a correct recognition of the welding torches the student must see the markers at all time. These markers are placed in the arrow of the guns and have been designed to make its recognition easier when the student has a right welding position. If during the welding the student does not see any of the torch's markers it is possible that the system does not identify the torch and fail.

The welding must be performed by the student always according to the teacher explanations. SOLDAMATIC welding training simulator does not substitute the teacher work but it is complementary to real welding equipment during the practice and training first steps. So the student must have previous welding knowledge given by the teacher before using SOLDAMATIC simulator.

Once the exercise has been performed the student must push the ***Cancel/Escape button*** to start the ***Diagnostic and Analysis Module*** that will analyze the welding performance revealing the bugs and welding defects in the welding bead, helping the student to understand why them have appeared.

Note: this is not a welding guide, i.e., it is not a guide to learn how to weld but a guide about the SOLDAMTIC welding training simulator features. SOLDAMATIC is a simulation device designed to help the students practice welding safely and without waste of consumables, gases, etc., and also let them improve their skills and knowledge. It is therefore a very powerful tool both for teachers and students willing to enhance the training methods.

8. REMOTE MAINTENANCE AND UPGRADES.

You can upgrade your SOLDAMATIC just connecting it to your Internet connection. Keep always your SOLDAMATIC system optimized downloading all the system upgrades. Use also this system to upgrade the functionality of your SOLDAMATIC system on demand.

We can adapt to your specific welding training requirements so you can always get the best return on your investment

9. DECLARATION OF CONFORMITY

Nombre y dirección del fabricante: **Name and Address of the manufacturer:**	Seabery Soluciones, S.L. Calle Berdigón 8, 2ºC 21003 Huelva, SPAIN
Product	Educational Technology for welding training
Brand	Soldamatic
Model Number	ZYB; ZYBA
Machine Type	Soldamatic Educational 2012, V.1.0
Sku Number	Soldamatic 2012.1.0.xxxxx (x is for 0-9)
Name of Responsible Party	Seabery Soluciones S.L.
Address of Responsible Party	C/Berdigón, 8, 2ºC, 28003, Huelva, Spain
Contact Person	Seabery representative
Phone No.:	+34 959807473

Cumple los requerimientos de las Directivas:
Complies with the requirements of Directives: Directiva de Baja Tensión 2006/95/CE
Low Voltage Directive 2006/95/CE, as attested by conformity with the following harmonized standard:

- EN60950-1

Directiva EMC 2004/108/CE
EMC Directive 2004/108/CE, as attested by conformity with the following harmonized standard:

- EN55022, AS/NZS CISPR22, Class B
- EN55024
- EN61000-3-2 Class D
- EN61000-3-3

Directiva R & TTE 1999/5/CE

R & TTE Directive 1999/5/CE, as attested by conformity with the following harmonized standard:

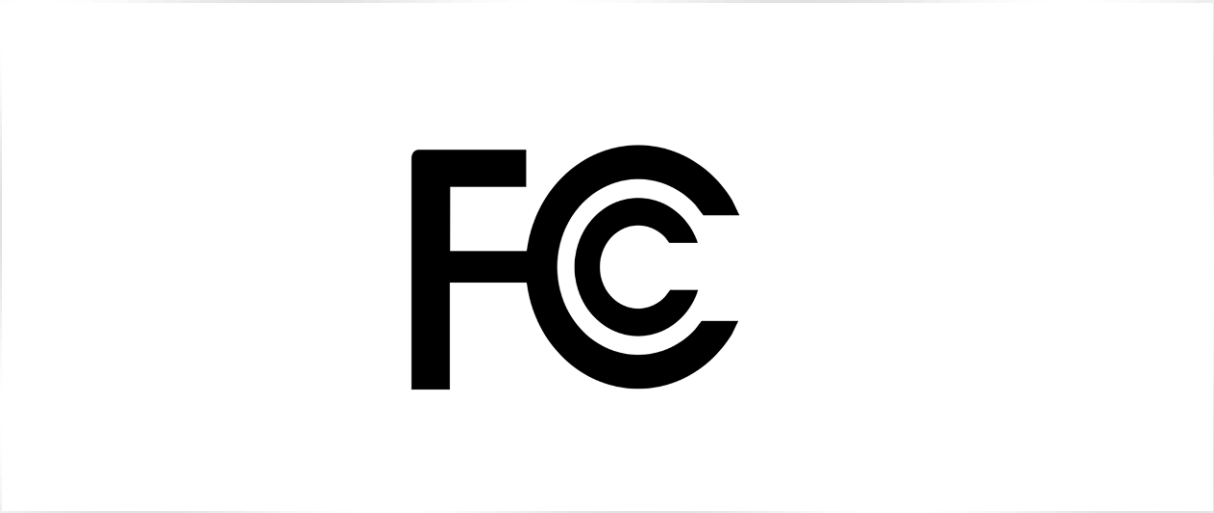
- Article 3.1 (a) Health and Safety
  - EN60950-1
  - EN62311
- Article 3.1 (B) EMC
  - EN301 489-1
  - EN301 489-3

○ EN301 489-17	
- Article 3.1 (B) Spectrum usages	
○ EN300 440-2 ○ EN300 328 ○ EN301 893	
Normas armonizadas aplicadas:	
Harmonized standards applied:	IEC 60950:1991
	EN 60950:1992 CISPR 24:1997 / EN 55024:1998 IEC 61000-3-2:1995 / EN 61000-3-2:1995 IEC 61000-3-3:1994 / EN 61000-3-3:1995 FCC Título 47 CFR TBR 21:1998, EG201 121:1998

1 de febrero de 2012
Feb 1st 2012

XXXXXXXXXXXXXXX
Responsable de Calidad
Quality Control Manager
SEABERY SOLUCIONES, S.L.
info@seabery.es

www.seabery.es



This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

The following local Manufacturer is responsible for this declaration

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