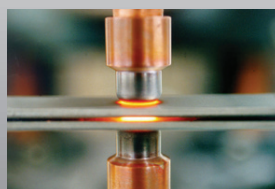
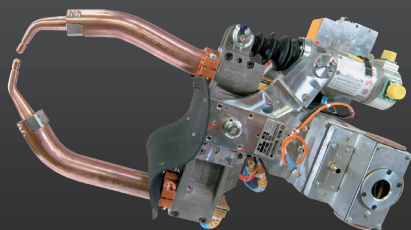




WELDING TECHNOLOGIES



TRAINING RESISTANCE WELDING



Quality without compromise

www.arotechnologies.com

Presentation

AROSERVICE Training Department offers a variety of sessions aimed to provide you with a good understanding of all of the principles of resistance welding.

These training sessions are designed to help with the comprehension, command and analysis of welding solutions. They permit the optimal use of ARO products in your own context and following your own specific requirements and will contribute to improved productivity and quality.

Our Trainers

Our Trainers are the same ARO Technicians who provide ARO's Customer Service.

They are regularly confronted with the same technical problems as you and are able to share their experience.

Their training is adapted to the type of course taken.

On-site Training

Our Trainers will travel to your location for a better transfer of know-how and to best match your expectations.

Each course is prepared to suit your applications. The programmes can be adapted upon specific request to go beyond one day's training..

Our Training Center

ARO is a Registered Training Centre (Registration Number 52 72 00924 72) and is equipped with the very latest technological evolutions allowing both a concrete and practical learning experience in an ideal environment.

Each participant receives paperwork including product operating manuals adapted for each type of training.

At the end of the course, ARO issues each person with a Training Certificate for the equipment as well as a Training Evaluation Report.



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(Implementation and programming)

Trainees: Operators and technicians

Required level : The basics of welding machines

Additional training : The resistance welding

Requirement : Get an installation in operating mode

Maxi. : 6 persons

Duration: 1 day

PURPOSE

- Connect the welding cabinet
- Program weld timer
- Use cabinet / installation
- Analyse welding faults
- Provide first level maintenance



DETAILED TRAINING SCHEDULE

Theory time table (1/3 of training) :

1. General description
 - 1.1 Reminds on resistance welding
2. Principle
 - 2.1 The power unit board
 - 2.2 % I_{max} welding mode

Practice time table (2/3 of training) :

3. Program weld timer
 - 3.1 Display
 - 3.2 Welding cycle parameters
 - 3.3 Programming principle
4. Practice
 - 4.1 Programming and running of welding cycles
 - 4.2 Simulation of problems
5. Connection
 - 5.1 Input / Output description
 - 5.2 Removing and replacing the welding controller
 - 5.3 Diagnosis of simple faults
 - 5.4 First level maintenance

(Implementation on workstation)

Trainees : Operators

Required level : The basics of resistance weld

Additional training : The resistance welding

Requirement : Get an installation in operating mode

Maxi. : 6 persons

Duration: 1 day

PURPOSE

- Program a welding cycle (description / explanation)
- Reset welding faults
- Change electrodes
- Electrodes dressing (function and impact)
- Select a welding program



DETAILED TRAINING SCHEDULE

Theory time table (1/3 of training) :

1. General description
 - 1.1 Reminds on resistance welding
2. Principle
 - 2.1 The power unit board / inverter MF
 - 2.2 % I_{max} welding mode
 - 2.3 Current control
3. Programming weld controller
 - 3.1 Principle
 - 3.2 Display concept
 - 3.3 Welding parameters
4. Connexions
 - 4.1 I/O descriptions
 - 4.2 Remove and replace welding controller
 - 4.3 Analysis of basic problems
 - 4.4 First level maintenance

Practice time table (2/3 of training) :

5. Indoor practice
 - 5.1 Programming and execution of simples programs
 - 5.2 Resetting faults
6. On site practice
 - 6.1 Visualisation of existing programs
 - 6.2 Execution of existing programs
 - 6.3 Reset faults
 - 6.4 Electrodes dressing
 - 6.5 Electrodes changing
 - 6.6 Resetting spot counters

(Programming and maintenance)

Trainees : Technicians

Required level : The basics of electricity, mechanical and resistance weld

Additional training : ARODMS, ARONET

Requirement : Get an installation in operating mode

Maxi. : 6 persons

Duration : 2 days

PURPOSE

- Navigate inside menus
- Calibrate force and current
- Learn MFDC
- Select a welding mode
- Program weld controller (advanced)
- Run a wear compensation
- Analyse basic faults
- Connect the timer
- Provide first level maintenance
- Backup welding parameters on customer's laptop
- Configure field bus parameters



DETAILED TRAINING SCHEDULE

Theory time table (1/4 of training) :

1. General description
 - 1.1 Reminds on resistance welding
2. Principle
 - 2.1 The power unit board/inverter MF
 - 2.2 % I_{max} welding mode
 - 2.3 Current regulation
 - 2.4 Welding control
3. Programming weld controller (advanced)
 - 3.1 Principle
 - 3.2 Display concept
 - 3.3 Welding parameters
 - 3.4 Wear compensation
 - 3.5 Configuration mode
 - 3.6 The executing screens
 - 3.7 Field bus specificities

Practice time table (3/4 of training) :

4. Program execution
 - 4.1 Programming and running of weld programs
 - 4.2 Programming and running of wear compensation
 - 4.3 Welding faults simulation
5. On site practice
 - 5.1 Servo valve calibration
 - 5.2 Current calibration
 - 5.3 MFDC learning
6. Maintenance of the welding cabinet
 - 6.1 Input /Output descriptions
 - 6.2 Weld timer replacement
 - 6.3 Analysis of problems
 - 6.4 Providing first level maintenance
7. ARODMS
 - 7.1 Principle
 - 7.2 Backup of welding parameters on customer's laptop

(Implementation on workstation)

Trainees : Operators

Required level : The basics of resistance weld

Additional training : ARODMS, welding guns

Requirement : Get an installation in operating mode (CW+gun)

Maxi. : 6 persons

Duration: 1 day

PURPOSE

- Program a welding cycle (description / explanation)
- Reset welding faults
- Electrodes changing
- Electrodes dressing (function and impact)
- Select a welding program



DETAILED TRAINING SCHEDULE

Theory time table (1/3 of training) :

1. General description
 - 1.1 Reminds on resistance welding
 - 1.2 Cabinet description
2. Principle
 - 2.1 The power unit board
 - 2.2 % I_{max} welding mode
 - 2.3 Current regulation & control
3. Programming weld controller (descriptions/explanations)
 - 3.1 Programming principle using ARODMS/POCKET
 - 3.2 The welding parameters
 - 3.3 The wear compensation parameters
 - 3.4 The configuration mode

Practice time table (2/3 of training) :

4. Practice
 - 4.1 Programming and running of weld programs
 - 4.2 Programming and running of wear compensation
 - 4.3 Welding faults simulation
 - 4.4 Resetting faults
 - 4.5 Electrodes dressing
 - 4.6 Electrodes changing
 - 4.7 Resetting spot counters

Trainees : Technicians

Required level : The basics of electricity, mechanical and resistance weld

Additional training : ARODMS, ARONET, welding guns

Requirement : Get an installation in operating mode (CW+gun), current meter, force meter, PC ARODMS and/or Pocket

Maxi. : 6 persons

Duration: 2 days

PURPOSE

- Program welding timer using ARODMS / POCKET
- Calibrate force and welding current
- Chose a welding mode
- Run a wear compensation
- Analyse welding faults
- Reset faults
- Provide first level maintenance
- Backup welding parameters on customer's laptop



DETAILED TRAINING SCHEDULE

Theory time table (1/4 of training) :

1. General description
 - 1.1 Reminds on resistance welding
 - 1.2 Cabinet description
2. Principle
 - 2.1 The power unit board
 - 2.2 % I_{max} welding mode
 - 2.3 Current regulation & control
3. Specificity
 - 3.1 Analyse of the electric diagram

Practice time table (3/4 of training) :

4. Programming weld controller
 - 4.1 Programming principle using ARODMS/POCKET
 - 4.2 Configuration of the system
 - 4.3 The welding parameters
 - 4.4 The wear compensation parameters
 - 4.5 The control screens
 - 4.6 Force and current calibration
5. Practice
 - 5.1 Programming and running of weld programs
 - 5.2 Programming and running of wear compensation
 - 5.3 Welding faults simulation
 - 5.4 Resetting faults
 - 5.5 Electrodes dressing
 - 5.6 Electrodes changing
 - 5.7 Resetting spot counters
6. Maintenance
 - 6.1 I/O descriptions
 - 6.2 Removing and replacing the welding controller
 - 6.3 The cooling system
 - 6.4 The air system
 - 6.5 Analysis of basic problems
 - 6.6 First level maintenance
 - 6.7 Backup welding parameters on customer's laptop

(Implementation on workstation)

Trainees : Operators

Required level : The basics of resistance weld

Additional training : ARODMS, welding guns

Requirement : Get an installation in operating mode (T1400+gun)

Maxi. : 6 persons

Duration: 1 day

PURPOSE

- Program a welding cycle (description / explanation)
- Reset welding faults
- Change electrodes
- Dress electrodes (function and impact)
- Select a welding program



DETAILED TRAINING SCHEDULE

Theory time table (1/3 of training) :

1. General description
 - 1.1 Reminds on resistance welding
 - 1.2 Cabinet description
2. Principle
 - 2.1 The power unit board
 - 2.2 % I_{max} welding mode
 - 2.3 Current regulation & control
3. Programming weld controller (descriptions/explanations)
 - 3.1 Programming principle using ARODMS/POCKET
 - 3.2 The welding parameters
 - 3.3 The wear compensation parameters
 - 3.4 The configuration mode

Practice time table (2/3 of training) :

4. Practice
 - 4.1 Programming and running of weld programs
 - 4.2 Programming and running of wear compensation
 - 4.3 Welding faults simulation
 - 4.4 Resetting faults
 - 4.5 Electrodes dressing
 - 4.6 Electrodes changing
 - 4.7 Resetting spot counters

(Programming and maintenance)

Trainees : Technicians

Maxi. : 6 persons

Required level : The basics of electricity, mechanical and resistance weld

Duration : 2 days

Additional training : ARODMS, ARONET, Welding guns

Requirement : Get an installation in operating mode (T1400+gun), current meter, force meter, PC ARODMS and/or Pocket

PURPOSE

- Program welding timer using ARODMS/POCKET
- Calibrate force and welding current
- Chose a welding mode
- Run a wear compensation
- Analyse welding faults
- Reset faults
- Provide first level maintenance
- Backup welding parameters on customer's laptop



DETAILED TRAINING SCHEDULE

Theory time table (1/4 of training) :

1. General description
 - 1.1 Reminds on resistance welding
 - 1.2 Cabinet description
2. Principle
 - 2.1 The power unit board
 - 2.2 % I_{max} welding mode
 - 2.3 Current regulation & control
3. Specificity
 - 3.1 Analyse of the electric diagram

Practice time table (3/4 of training) :

4. Programming weld controller
 - 4.1 Programming principle using ARODMS/POCKET
 - 4.2 Configuration of the system
 - 4.3 The welding parameters
 - 4.4 The wear compensation parameters
 - 4.5 The control screens
 - 4.6 Force and current calibration
5. Practice
 - 5.1 Programming and running of weld programs
 - 5.2 Programming and running of wear compensation
 - 5.3 Welding faults simulation
 - 5.4 Resetting faults
 - 5.5 Electrodes dressing
 - 5.6 Electrodes changing
 - 5.7 Resetting spot counters
6. Maintenance
 - 6.1 I/O descriptions
 - 6.2 Removing and replacing the welding controller
 - 6.3 The cooling system
 - 6.4 The air system
 - 6.5 Analysis of basic problems
 - 6.6 First level maintenance
 - 6.7 Backup welding parameters on customer's laptop

(Implementation on workstation)

Trainees : Operators**Required level :** The basics of resistance weld**Additional training :** ARODMS**Requirement :** Have a functioning test station and out production**Maxi. :** 6 persons**Duration :** 1 day**PURPOSE**

- Program a welding cycle (description / explanation)
- Reset welding faults
- Change electrodes
- Dress electrodes (function and impact)
- Select a welding program

**DETAILED TRAINING SCHEDULE****Theory time table (1/3 of training) :****Practice time table (2/3 of training) :**

1. General description
 - 1.1 Reminds on resistance welding
 - 1.2 Cabinet description

2. Principle
 - 2.1 The power unit board
 - 2.2 % I_{max} welding mode
 - 2.3 Current regulation & control

3. Programming weld controller (descriptions/explanations)
 - 3.1 Programming principle using front panel
 - 3.2 The welding parameters
 - 3.3 The wear compensation parameters
 - 3.4 The configuration mode

4. Practice
 - 4.1 Run an INIT
 - 4.2 Open and close the gun
 - 4.3 Run a welding program
 - 4.4 Simulation and reset of welding faults
 - 4.5 Electrodes dressing and electrodes changing
 - 4.6 Resetting spot counters

(Programming and maintenance)

Trainees : Technicians

Required level : The basics of electricity, mechanical and resistance weld

Additional training : ARODMS, ARONET, Welding guns

Requirement : Have a functioning test station and out production

Maxi : 6 persons

Duration : 4 days

PURPOSE

- Identify iBox menus
- Configure cabinet (AC/MF)
- Program iBox using front panel
- Program iBox using ARODMS
- Calibrate the gun
- Learn MFDC
- Connect the cabinet
- Perform Communication with robot
- Analyse faults
- Provide maintenance cabinet

**DETAILED TRAINING SCHEDULE****Theory time table (1/4 of training) :**

1. General description
 - 1.1 Reminds on resistance welding
 - 1.2 Principle of a servo motor
 - 1.3 Function of force sensor
2. Principle
 - 2.1 The iBox WCC
 - 2.2 The welding board
 - 2.3 The power unit board/MFDC inverter
 - 2.4 The drive
 - 2.5 The electric diagram
 - 2.6 Communication with the robot (explanations)
3. Programming
 - 3.1 Display concept
 - 3.2 Programming principle
 - 3.3 The welding parameters
 - 3.4 The calibration parameters
 - 3.5 The identification parameters
 - 3.6 The diagnostic parameters
 - 3.7 The maintenance parameters
4. Faults
 - 4.1 List

Practice time table (3/4 of training) :

5. Gun calibrations
 - 5.1 Upload gun's parameters
 - 5.2 Opening calibration
 - 5.3 Force calibration
 - 5.4 Learning MFDC
 - 5.5 Current calibration
 - 5.6 Measurements
6. Services execution (from robot in case of Robotician)
 - 6.1 Service INIT
 - 6.2 Service WELDING
 - 6.3 Service DRESSING
 - 6.4 Service CHANGING electrodes
 - 6.5 Case of interruptions inside services
7. Maintenance
 - 7.1 Removing parts (if out of production)
 - 7.2 Analysis of Basic faults
 - 7.3 First level maintenance
 - 7.4 Simulation of problems

(Programming and maintenance, advanced level)

Trainees : Specialists

Required level : The basics of electricity, mechanical and resistance weld

Additional training : ARODMS, ARONET, Welding guns

Requirement : Have a functioning test station and out production

Maxi. : 6 persons

Duration : 4 days

PURPOSE

- Identify iBox menus
- Configure cabinet (AC/MF)
- Program iBox using front panel
- Program iBox using ARODMS
- Calibrate gun's opening
- Calibrate gun's force
- Learn MFDC
- Calibrate current
- Connect the cabinet
- Suit with robot's Communication
- Analyse faults
- Provide maintenance cabinet



DETAILED TRAINING SCHEDULE

Theory time table (1/4 of training) :

Practice time table (3/4 of training) :

- | | |
|---|---|
| <ol style="list-style-type: none"> 1. General description <ol style="list-style-type: none"> 1.1 Reminds on resistance welding 1.2 Principle of a servo motor 1.3 Function of force sensor 2. Principle <ol style="list-style-type: none"> 2.1 The iBox WCC 2.2 The welding board 2.3 The power unit board/MFDC inverter 2.4 The drive 2.5 The electric diagram 2.6 Communication with the robot (advanced) 3. Programming <ol style="list-style-type: none"> 3.1 Display concept 3.2 Programming principle 3.3 The welding parameters 3.4 The calibration parameters 3.5 The identification parameters 3.6 The diagnostic parameters 3.7 The maintenance parameters 4. Faults <ol style="list-style-type: none"> 4.1 List | <ol style="list-style-type: none"> 5. Gun calibrations <ol style="list-style-type: none"> 5.1 Upload gun's parameters 5.2 Set gun's parameters 5.3 Opening calibration 5.4 Force calibration 5.5 Learning MFDC 5.6 Current calibration 5.7 Measurements 6. Services execution (from robot in case of Robotician) <ol style="list-style-type: none"> 6.1 Service INIT 6.2 Service WELDING 6.3 Service DRESSING 6.4 Service CHANGING electrodes 6.5 Case of interruptions inside services 6.6 Measurements 7. Maintenance <ol style="list-style-type: none"> 7.1 Removing parts (if out of production) 7.2 Analysis of basic faults 7.3 First level maintenance 7.4 Simulation of problems 7.5 Backup welding parameters on customer's laptop |
|---|---|

(Implementation on workstation)

Trainees : Operators

Required level : The basics of resistance weld

Additional training : ARODMS

Requirement : Get an installation in operating mode (cabinet+gun)

Maxi. : 6 persons

Duration : 1 day

PURPOSE

- Reset welding faults
- Change electrodes
- Dress electrodes (function/impact)



DETAILED TRAINING SCHEDULE

Theory time table (1/2 of training) :

1. General description
 - 1.1 Reminds on resistance welding
 - 1.2 Notions of dynamic resistance
2. The system
 - 2.1 Presentation of the cabinet
 - 2.2 Description of the gun
 - 2.3 The cable
3. Programming (description)
 - 3.1 Principle of programming using ARODMS/POCKET
 - 3.2 Notions of calibrate

Practice time table (1/2 of training) :

4. Practice on site
 - 4.1 Running of welding cycles on different steels and thicknesses
 - 4.2 Simulation and reset of welding faults
 - 4.3 Reset faults
 - 4.4 Electrodes dressing and electrodes changing
 - 4.5 Resetting spot counter

Trainees : Technicians

Required level : The basics of electricity, mechanical and resistance weld

Additional training : Resistance weld, ARODMS, ARONET, Welding guns

Requirement : Get an installation in operating mode (cabinet+gun)

Maxi. : 6 persons

Duration : 4 days

PURPOSE

- Weld in standard mode
- Use start up wizard
- Weld in adaptive mode
- Optimize and validate AW calibration
- Dress and change electrodes
- Perform faults
- Provide maintenance cabinet



DETAILED TRAINING SCHEDULE

Theory time table (1/4 of training) :

Practice time table (3/4 of training) :

- | | |
|---|---|
| <ol style="list-style-type: none"> General description <ol style="list-style-type: none"> Reminds on resistance welding Principle of resistance welding area Principle of dynamic resistance Implementation The system <ol style="list-style-type: none"> Presentation of the cabinet Description of the gun The cable How to use ARODMS <ol style="list-style-type: none"> Presentation Kind of files Files recovery How to use the pocket <ol style="list-style-type: none"> Presentation Accessible parameters | <ol style="list-style-type: none"> Welding in standard mode <ol style="list-style-type: none"> Description Programming Practice Services <ol style="list-style-type: none"> Dressing Changing caps Practice Welding in adaptive mode <ol style="list-style-type: none"> First level Use wizard Following of parameters Practice Optimize and validate AW calibration <ol style="list-style-type: none"> Interpreting AW calibration file Interpreting curves Practice Maintenance <ol style="list-style-type: none"> List of different faults First level maintenance Provide first level maintenance Simulation of problems |
|---|---|

Trainees : Technicians

Required level : The basics of electricity, mechanical and resistance weld

Additional training : Specific program

Training in Château du Loir or ARO sites

Maxi. : 6 persons

Duration : 3 days

PURPOSE

- Know ARO Controls products
- Differentiate between timers for manual guns/robot guns
- Characterize AC/MF technologies
- Analyse field bus technologies
- Understand resistance welding notions
- Learn how to program (HMI, ARODMS, POCKET)
- Calibrate a gun
- Backup welding parameters
- Dress and change electrodes



DETAILED TRAINING SCHEDULE

Theory time table (1/3 of training) :

1. General description
 - 1.1 Reminds on resistance welding
 - 1.2 Welding in AC
 - 1.3 Welding in MF
 - 1.4 Notion of dynamic resistance
2. ARO Controls products
 - 2.1 Manuals guns cabinets
 - 2.2 Electrical guns cabinets
 - 2.3 Field bus

Practice time table (2/3 of training) :

3. How to program
 - 3.1 HMI programming
 - 3.2 ARODMS programming
 - 3.3 Pocket programming
 - 3.4 Programming and running of weld programs
 - 3.5 Programming and resets of wear compensation
4. How to calibrate a gun (pneumatical/electrical)
 - 4.1 Force calibration
 - 4.2 Intensity calibration
 - 4.3 MF training
 - 4.4 Le calibrage en position
5. ARODMS
 - 5.1 Principle
 - 5.2 Save to weld parameter on PC

Trainees : Technicians

Required level : The basics of IT

Additional training : ARO products

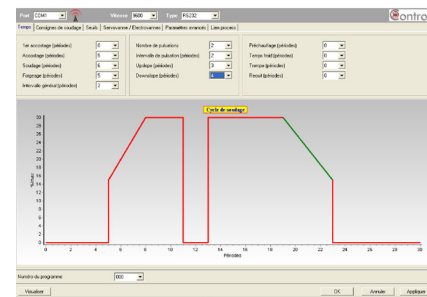
Requirement : PC + key ARODMS + cable with timer

Maxi. : 6 persons

Duration : 1 day

PURPOSE

- Save weld parameter
- Program weld timer out line
- Reload programs in timer
- Print weld parameter
- Develop a fast programmation (Integration)
- Install software
- Update software



DETAILED TRAINING SCHEDULE

Theory time table (1/4 of training) :

1. General description
 - 1.1 Reminds on resistance welding
 - 1.2 Following of weld parameter evolution
2. Principle
 - 2.1 Programming connection range
 - 2.2 Handshake CPS/PC

Practice time table (3/4 of training) :

3. Program weld controller
 - 3.1 Programs parameter access
 - 3.2 Electrodes parameter access
 - 3.3 Programming parameter access
 - 3.4 Spot number access
4. Practice
 - 4.1 Programming and running of weld programs
 - 4.2 Programming and running of wear compensation
 - 4.3 Welding faults simulation
 - 4.4 Diagnosis assistance
5. Use
 - 5.1 Install software
 - 5.2 Save of weld parameters
 - 5.3 Download the weld parameters in timer
 - 5.4 Following of weld parameters
6. Integration
 - 6.1 Copy of timer
 - 6.2 Copy of program

(Programming and maintenance)

Trainees : Maintenance / method engineer

Maxi : 6 persons

Required level : The basics of IT

Duration : 1 day

Additional training : ARO products

The training takes place in room. The practices take place on demonstration network.

PURPOSE

- Control network of several weld controller
- Intervene on a timer of network
- Save the signatures
- Make a follow-up of weld parameters from audit mode
- Use the different files on Windows
- Change a timer from network
- Analyse the faults



DETAILED TRAINING SCHEDULE

Theory time table (1/3 of training) :

1. General description
 - 1.1 Reminds on resistance welding
 - 1.2 Following of weld parameter evolution
2. Principle
 - 2.1 Supervision of weld timer
 - 2.2 Architecture
 - 2.3 Cabling RS485 / Ethernet
 - 2.4 Transmitters and ending
3. HMI
 - 3.1 Description of menus
 - 3.2 The icons and flags

Practice time table (2/3 of training) :

4. Weld timer access
 - 4.1 Identification and supervision of weld controller
 - 4.2 Programs parameter access
 - 4.3 Electrodes parameter access
 - 4.4 Programming parameter access
 - 4.5 Spot number access
5. Recording
 - 5.1 Recording of signatures
 - 5.2 Following of PSI (opening angle of thyristors)
6. Audit
 - 6.1 Running audit mode
 - 6.2 Seeing of differences working/reference
 - 6.3 Exploitation of audits files
7. Analysis of faults
 - 7.1 Creations of criteria and method profiles
 - 7.2 Production of fault graphics
8. Maintenance
 - 8.1 Identifying faults
 - 8.2 Solving faults
 - 8.3 Replacement of CPS (detailed)

(Programming and configuration, advanced level)

Trainees : Administrator**Maxi. :** 6 persons**Required level :** Knowledge in IT**Duration :** 2 days**Additional training :** ARO products**Requirement :** The training takes place in room. Some practices take place on site. (max 2 trainees)**PURPOSE**

- Management of users
- Configuration of network
- Supervision of network of several cabinets
- Servicing a network cabinet
- Saving signatures
- Follow-up of welding parameters from audit mode
- Using difference Windows files
- Backup and restore of ARONET database

**DETAILED TRAINING SCHEDULE****Theory time table (1/4 of training) :****Practice time table (3/4 of training) :**

- | | |
|--|--|
| <ol style="list-style-type: none"> 1. General description <ol style="list-style-type: none"> 1.1 Reminds on resistance welding 1.2 Monitoring welding parameter updates 2. Principle <ol style="list-style-type: none"> 2.1 Supervision of welding timer unit 2.2 Architecture 2.3 Wiring RS485 /Ethernet 2.4 Repeaters / End of Line 3. HMI <ol style="list-style-type: none"> 3.1 Presentation of menus 3.2 Icones and flags | <ol style="list-style-type: none"> 4. ARONET configuration <ol style="list-style-type: none"> 4.1 User management 4.2 Index and archive management 4.3 Language manangement 4.4 Problem solving management 4.5 CPS transfer management 4.6 Diagnosis management 4.7 Failure code management 4.8 General parameter management 5. Access to welding timer unit <ol style="list-style-type: none"> 5.1 Identification and supervision of CPS 5.2 Access to welding timer parameters 6. Recordings <ol style="list-style-type: none"> 6.1 Recording of signatures 6.2 Monitoring of modification journals 7. Audit <ol style="list-style-type: none"> 7.1 Launch of audit mode 7.2 Display of differences exploitation/reference 7.3 Processing of audit files 8. Procedures <ol style="list-style-type: none"> 8.1 Global archiving 8.2 Data base management via ADMIN DB 8.3 Restore database 8.4 Up-date and monitoring of ARONET versions |
|--|--|

(Theory and practical application)

Trainees : Machine adjuster, maintenance and method technicians

Required level : Knowledge about mechanical and electricity

Additional training :

Requirement : Video-projector, PC, technical documents

Maxi. : 6 persons

Duration : 2 days

PURPOSE

- Understand and master the resistance welding process
- Acquire a good method of approach to the settings
- Optimize welding parameters to enable welding of different metals
- Optimize welding cycle times
- Improve QUALITY by weld analysis and control
- Create a weldability area
- Use the measuring device
- Increase staff awareness of Safety rules



DETAILED TRAINING SCHEDULE

Theory time table (1 day) :

Practice time table (1 day) :

1. General description
 - 1.1 General principles : Joule Law
 - 1.2 Electrical resistance at stake
 - 1.3 The weld parameters and their influence
 - 1.4 Spot weld : analysis of the weld
2. The welding machine
 - 2.1 Constitution of machine
 - 2.2 Machine capacity, rate, thermal intensity
 - 2.3 Operating principle
 - 2.4 Timer presentation and setting
 - 2.5 Electrode wear compensation
3. Resistance welding practice
 - 3.1 Direct welding spot and variable
 - 3.2 Welding projection
 - 3.3 Welding seam, butt and bracing
 - 3.4 Welding steel, stainless steel and alu
4. The electrodes
 - 4.1 Electrodes geometry
 - 4.2 Welding rules
 - 4.3 The cooling
 - 4.4 The dressing
5. Safety rules
 - 5.1 Increase staff awareness of safety rules
 - 5.2 Use of material

6. Practice and method
 - 6.1 Welding test, creation of weldability area
 - 6.2 Optimize the settings and the weld quality on customers application
 - 6.3 Visual and destructive controls
 - 6.4 Troubleshooting
 - 6.5 Regulation and parameter setting of the sequence
 - 6.6 Particular test following customer request and technical possibilities

Trainees : Machine adjuster, maintenance and method technicians

Required level : Knowledge about mechanical and electricity

Additional training :

Requirement : Video-projector, PC, technical documents

Maxi. : 6 persons

Duration : 3 days

PURPOSE

- Understand and master the resistance welding process
- Acquire a good method of approach to the settings
- Optimize welding parameters to enable welding of different metals
- Optimize welding cycle times
- Improve QUALITY by weld analysis and control
- Create a weldability area
- Use the measuring device
- Increase staff awareness of safety rules



NB

This training on 3 days is more in depth on the practical side than the same training on 2 days page 21

DETAILED TRAINING SCHEDULE

Theory time table (3x 1/2 day) :

Practice time table (3x 1/2 day) :

1. General description
 - 1.1 General principles : Joule Law
 - 1.2 Electrical resistance at stake
 - 1.3 The weld parameters and their influence
 - 1.4 Spot weld : analysis of the weld
2. The welding machine
 - 2.1 Constitution of machine
 - 2.2 Machine capacity, rate, thermal intensity
 - 2.3 Operating principle
 - 2.4 Timer presentation and setting
 - 2.5 Electrode wear compensation
3. Resistance welding practice
 - 3.1 Direct welding spot and variable
 - 3.2 Welding projection
 - 3.3 Welding seam, butt and bracing
 - 3.4 Welding steel, stainless steel and alu
4. The electrodes
 - 4.1 Electrodes geometry
 - 4.2 Welding rules
 - 4.3 The cooling
 - 4.4 The dressing
5. Safety rules
 - 5.1 Increase staff awareness of Safety rulesé
 - 5.2 Use of material

6. Practice and method
 - 6.1 Welding test, creation of weldability area
 - 6.2 Optimize the settings and the weld quality on customers application
 - 6.3 Visual and destructive controls
 - 6.4 Troubleshooting
 - 6.5 Regulation and parameter setting of the sequence
 - 6.6 Particular test following customer request and technical possibilities

Trainees : Operators, machine adjusters, maintenance technicians

Required level : The basics of electricity and mechanical

Additional training :

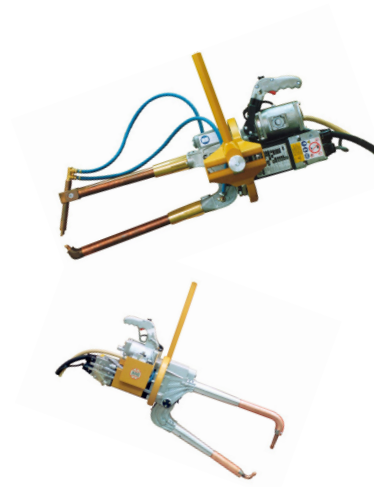
Requirement :

Maxi. : 6 persons

Duration : 3 days

PURPOSE

- Understand and master the resistance welding process
- Acquire a good method of approach to the settings
- Optimize welding parameters to enable welding of different metals
- Optimize welding cycle times
- Improve QUALITY by weld analysis and control
- Create a weldability area
- Use the measuring device
- Increase staff awareness of safety rules



DETAILED TRAINING SCHEDULE

Theory time table (3x 1/2 day) :

1. Guns presentation
 - 1.1 General description
 - 1.2 Electrical connection
 - 1.3 Pneumatic connection
 - 1.4 Cooling system
2. The resistance welding
 - 2.1 General principles
 - 2.2 Welding parameters
 - 2.3 Principle of Control Cabinet
 - 2.4 Manual gun
3. The welding control unit
 - 3.1 General description
 - 3.2 Programmation
 - 3.3 The basics of repair

Practice time table (3x 1/2 day) :

4. X and C gun disassembly / reassembly method
 - 4.1 Electrode-holders
 - 4.2 Coupling assembly
 - 4.3 Pneumatic cylinder
 - 4.4 Mobile arm
 - 4.5 Shunt and sleeve
 - 4.6 Electric junction box
 - 4.7 Welding transformer
 - 4.8 Front of the foundry
 - 4.9 The Gyro
5. Gun control
6. Preventive maintenance

Trainees : Operator, Machine adjusters, Maintenance technicians

Required level : The basics of electricity and mechanical

Additional training :

Requirement :

Maxi. : 6 persons

Duration : 2 days

PURPOSE

- Connect the gun
- Simple troubleshooting
- Read and understand the various assembly and cabling plans
- Adjust the gun running
- Put the preventive maintenance procedure in place
- Make measures during the maintenance
- Calculate the welding rate



DETAILED TRAINING SCHEDULE

Theory time table (1 day) :

1. Guns presentation
 - 1.1 General description
 - 1.2 Electrical connection
 - 1.3 Pneumatic connection
 - 1.4 Cooling system
2. Ergonomics gun
 - 2.1 Regulation of gun position
 - 2.2 Regulation of spring balancer
 - 2.3 Use of the gun
3. The cylinder pneumatique
 - 3.1 Functioning description
 - 3.2 Analysis of pneumatic system
 - 3.3 Function rules

Practice time table (1 day) :

4. Disassembly / Reassembly method
 - 4.1 Electrode-holders
 - 4.2 Coupling assembly
 - 4.3 Pneumatic cylinder
 - 4.4 Mobile arm
 - 4.5 Shunt and sleeve
 - 4.6 Electric junction box
 - 4.7 Welding transformer
 - 4.8 Front of the foundry
 - 4.9 The Gyro
5. Gun control
6. Preventive maintenance

Trainees : Operators, Machine adjusters, Maintenance technicians

Required level : The basics of electricity and mechanical

Additional training :

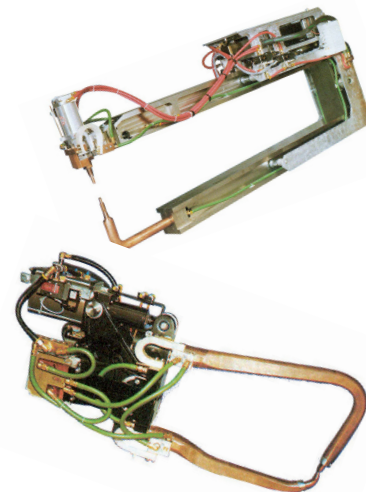
Requirement :

Maxi. : 6 persons

Duration : 2 days

PURPOSE

- Connect the gun
- Simple troubleshooting
- Read and understand the various assembly and cabling plans
- Adjust the gun running
- Put the preventive maintenance procedure in place
- Make measures during the maintenance



DETAILED TRAINING SCHEDULE

Theory time table (1 day) :

1. Guns presentation
 - 1.1 General description
 - 1.2 Electrical connection
 - 1.3 Pneumatic connection
 - 1.4 Cooling system
2. The resistance welding
 - 2.1 General principles
 - 2.2 The welding parameters
 - 2.3 Control cabinet principle
3. Functioning
 - 3.1 General description
 - 3.2 Running regulation
 - 3.3 Articulation
 - 3.4 Analysis equalising functioning
 - 3.5 Secondary system (arms, shunt...)

Practice time table (1 day) :

4. Disassembly / Reassembly method
 - 4.1 The electrode-holders
 - 4.2 The electrical junction box
 - 4.3 The position detectors
 - 4.4 The pneumatic cylinders
 - 4.5 The shunts and the conductors
 - 4.6 The articulation
 - 4.7 The welding transformer
 - 4.8 The pneumatic distributors
5. Gun control
6. Preventive maintenance

Trainees : Operators, Machine adjusters, Maintenance technicians

Required level : The basics of electricity and mechanical

Additional training :

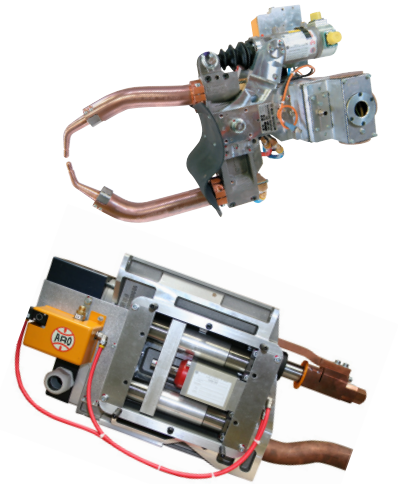
Requirement : Have a robot and various gun type at your disposal

Maxi. : 6 persons

Duration : 5 hours

PURPOSE

- Maîtriser le réglage Détalonnage / Equilibrage pour différentes positions de travail
- Read and understand the electrical and pneumatical drawing
- Diagnosis the simple faults



DETAILED TRAINING SCHEDULE

Theory time table :

1. Guns presentation
 - 1.1 C guns
 - 1.2 X guns
 - 1.3 Pneumatic connection
 - 1.4 Electrical connection
2. X guns
 - 2.1 The double articulation
 - 2.2 Classic equalising
 - 2.3 Reverse equalising
3. Functioning
 - 3.1 Functioning description
 - 3.2 Pneumatic system
 - 3.5 Regulation following positions

Practice time table :

4. Practice
 - 4.1 Regulation of various guns type and various positions

Trainees : Operators, Machine adjusters, Maintenance technicians

Required level : The basics of electricity and mechanical

Additional training :

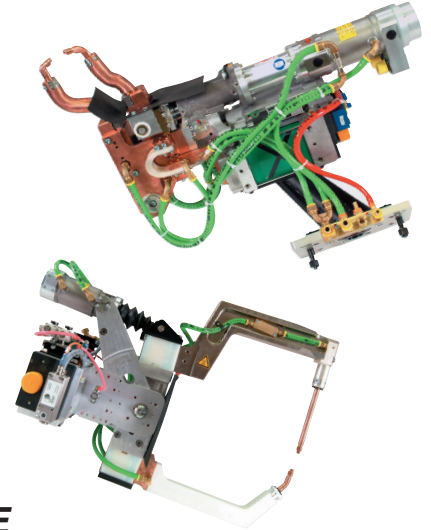
Requirement :

Maxi. : 6 persons

Duration : 2 days

PURPOSE

- Connect the gun
- Simple troubleshooting
- Read and understand the various assembly and cabling plans
- Replace the units worn out or broken
- Put the preventive maintenance procedure in place
- Make measures during the maintenance



DETAILED TRAINING SCHEDULE

Theory time table (1 day) :

1. Guns presentation
 - 1.1 General description
 - 1.2 Electrical connection
 - 1.3 Pneumatic connection
 - 1.4 Cooling system
2. The resistance welding
 - 2.1 General principles
 - 2.2 The welding parameters
 - 2.3 Control cabinet principle
3. Functioning
 - 3.1 General description
 - 3.2 Electric cylinder
 - 3.3 Articulation
 - 3.4 Analysis equalising functioning
 - 3.5 Secondary system (arms, shunt...)

Practice time table (1 day) :

4. Disassembly / Reassembly method
 - 4.1 Electrode-holders
 - 4.2 Electrical junction box
 - 4.3 Servomotor
 - 4.4 Equalising cylinder
 - 4.5 Shunts and conductors
 - 4.6 Articulation
 - 4.7 Welding transformer
 - 4.8 Pneumatic distributors
5. Gun control
6. Preventive maintenance

Trainees : Operators, Machine adjusters, Maintenance technicians

Required level : The basics of electricity and mechanical

Additional training :

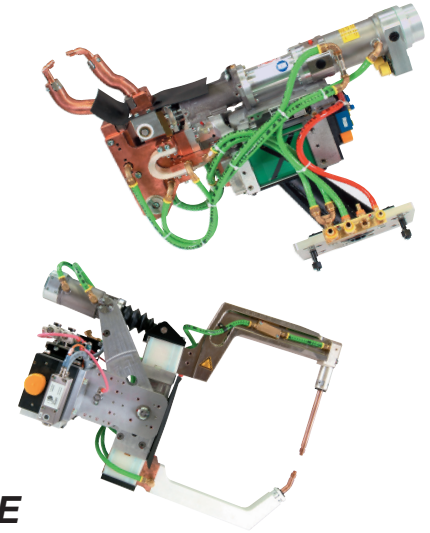
Requirement :

Maxi. : 6 persons

Duration : 3 days

PURPOSE

- Connect the gun
- Simple troubleshooting
- Read and understand the various assembly and cabling plans
- Replace the units worn out or broken
- Put the preventive maintenance procedure in place
- Make measures during the maintenance



DETAILED TRAINING SCHEDULE

Theory time table (1 day) :

1. Guns presentation
 - 1.1 General description
 - 1.2 Electrical connection
 - 1.3 Pneumatic connection
 - 1.4 Cooling system
2. The resistance welding
 - 2.1 General principles
 - 2.2 The welding parameters
 - 2.3 Control cabinet principle
3. Functioning
 - 3.1 General description
 - 3.2 Electric cylinder
 - 3.3 Articulation
 - 3.4 Analysis equalising functioning
 - 3.5 Secondary system (arms, shunt...)

Practice time table :

4. Disassembly / Reassembly method
 - 4.1 Electrode-holders
 - 4.2 Electrical junction box
 - 4.3 Servomotor
 - 4.4 Equalising cylinder
 - 4.5 Shunts and conductors
 - 4.6 Articulation
 - 4.7 Welding transformer
 - 4.8 Pneumatic distributors
5. Gun control
6. Preventive maintenance

Trainees : Operators, Machine adjusters, Maintenance technicians

Required level : The basics of electricity and mechanical

Additional training :

Requirement :

Maxi. : 6 persons

Duration : 1 day

PURPOSE

- Connect the gun
- Simple troubleshooting
- Read and understand the various assembly and cabling plans
- Replace the units worn out or broken
- Make measures during the maintenance
- Set up the preventive maintenance



DETAILED TRAINING SCHEDULE

Theory time table (2 days) :

1. Guns presentation
 - 1.1 General description
 - 1.2 Electrical connection
 - 1.3 Pneumatic connection
 - 1.4 Cooling system
2. The resistance welding
 - 2.1 General principles
 - 2.2 The welding parameters
 - 2.3 Control cabinet principle
3. Functioning
 - 3.1 General description
 - 3.2 Electric cylinder
 - 3.3 Articulation
 - 3.4 Analysis equalising functioning
 - 3.5 Secondary system (arms, shunt...)

Practice time table :

4. Disassembly / Reassembly method
 - 2.1 Electrode-holders
 - 2.2 Electrical junction box
 - 2.3 Servo motors
 - 2.4 Shunts and conductors
 - 2.5 Articulation
 - 2.6 Welding transformer
 - 2.7 Equalizing module and equalizing cylinder
5. Preventive maintenance

Trainees : Operators, Machine adjusters, Maintenance technicians

Required level : The basics of electricity and mechanical

Additional training :

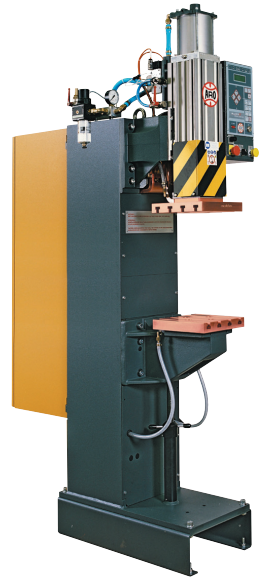
Requirement :

Maxi. : 6 persons

Duration : 1 day

PURPOSE

- Master the weld machines regulation
- Simple troubleshooting
- Read and understand the various assembly and cabling plans
- Change the defective units
- Put the preventive maintenance procedure in place
- Make measures (current, force)



DETAILED TRAINING SCHEDULE

Theory time table :

1. Weld machines presentation
 - 1.1 Constitution
 - 1.2 Electrical connection
 - 1.3 Pneumatic connection
 - 1.4 Cooling system
2. The control unit
 - 2.1 Programmation display screen
 - 2.2 Configuration mode
 - 2.3 Realisation of program
 - 2.4 I/O
3. Use
 - 3.1 Setting height of lower table
 - 3.2 Setting of adjustable exhausts
 - 3.3 Setting of electrodes

Practice time table :

4. Assembly / disassembly method, maintenance
 - 4.1 Welding transformer
 - 4.2 Cylinder
 - 4.3 Control cabinet
 - 4.4 Shunts and conductors
 - 4.5 Insulations
 - 4.6 Pneumatic distributors
5. Diagnosis of faults
 - 5.1 Simulation of faults
6. Preventive maintenance

Trainees : Operators, Machine adjusters, Maintenance technicians

Required level : The basics of electricity and mechanical

Additional training :

Requirement :

Maxi. : 6 persons

Duration : 2 days

PURPOSE

- Understanding the welding process
- Acquiring a good method of approach to settings
- Mastering the settings of welding machines
- Making diagnosis of simple faults
- Reading and understanding the different assembly and connection drawings
- Changing faulty parts
- Implementing preventative maintenance procedures
- Carrying out measurements (current, force)



DETAILED TRAINING SCHEDULE

Theory time table :

1. Presentation of welding machines
 - 1.1 Constitution
 - 1.2 Electrical connection
 - 1.3 Pneumatic connection
 - 1.4 Cooling system
2. The resistance welding
 - 2.1 General principles
 - 2.2 The welding parameters
 - 2.3 Spot weld
 - 2.4 The rules of welding
 - 2.5 Electrodes
 - 2.6 Resistance welding applications
3. The welding cabinet
 - 3.1 Presentation of welding timer
 - 3.2 Setting of parameters
 - 3.3 Machine capacity, cadence and thermal intensity
 - 3.4 Selecting a program

Practice time table :

4. Welding practice
 - 4.1 Welding trials, visual and destructive controls
 - 4.2 Optimising settings and welding quality
5. Utilisation, Maintenance
 - 5.1 Welding transformers
 - 5.2 Cylinders
 - 5.3 Control cabinets
 - 5.4 Shunts and conductors
 - 5.5 Insulations
 - 5.6 Pneumatic distributors
 - 5.7 Setting of lower arm
6. Diagnosis of faults
7. Preventive maintenance

Trainees : Operators, Machine adjusters, Maintenance technicians

Required level : The basics of electricity and mechanical

Additional training :

Requirement :

Maxi. : 6 persons

Duration : 1 day

PURPOSE

- Mastering the setting of welding machines
- Simple troubleshooting
- Reading and understanding the various assembly and cabling drawings
- Changing faulty units
- Implementing procedures of preventative maintenance
- Taking measurements (current, force)



DETAILED TRAINING SCHEDULE

Theory time table :

1. Presentation of welding machine
 - 1.1 Constitution
 - 1.2 Electrical connection
 - 1.3 Cooling system
2. The electric cylinder
 - 2.1 Principle of functioning
3. iBox control cabinet
 - 3.1 Carrying out welding programs
 - 3.2 Data saving
 - 3.3 Input / Output

Practice time table :

4. Utilisation
 - 4.1 Setting the height of the lower table
 - 4.2 Setting of electrodes
5. Principle of assembly / disassembly, maintenance
 - 5.1 Welding transformers
 - 5.2 Electric cylinders
 - 5.3 Control cabinet
 - 5.4 Shunts and conductors
 - 5.5 Insulation
6. Diagnosis of faults
 - 6.1 Fault simulation
7. Preventive maintenance

DIAGNOSIS ASSISTANCE OF FAULT ON GUN AND AC AND MFDC WELDING CABINET

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Trainees : Maintenance technicians

Required level : The basics of electricity and mechanical

Additional training :

Requirement :

Maxi. : 6 persons

Duration : 1 day

PURPOSE

- Understanding welding parameters
- Simple troubleshooting
- Reading and understanding the various assembly and cabling drawings
- Changing faulty units
- Taking measurements (current, force)



DETAILED TRAINING SCHEDULE

Theory time table :

1. Introduction of resistance welding
 - 1.1 The Joule law
 - 1.2 The welding parameters
2. AC welding cabinets
 - 2.1 Programming screens
 - 2.2 Functioning in % of I_{max}
 - 2.3 Functioning in setting
 - 2.4 Intensity control
 - 2.5 Configuration mode
 - 2.6 Making a program
3. MFDC cabinets
 - 3.1 Principle of functioning in MFDC
 - 3.2 Continuous current
4. Electrical connections
 - 4.1 Input / Output
 - 4.2 Field bus

Practice time table :

5. Maintenance
 - 5.1 Executions screens
 - 5.2 Input / Output
 - 5.3 Fault simulation
 - 5.4 Record of signals
 - 5.5 Saving parameters

Trainees : Operators, Machine adjusters, Maintenance technicians

Required level : The basics of electricity and mechanical

Additional training :

Requirement :

Maxi. : 6 persons

Duration : 2 days

PURPOSE

- Understanding the welding process
- Acquiring a good method of approach to settings
- Mastering the settings of welding machines
- Making diagnosis of simple faults
- Reading and understanding the different assembly and connection drawings
- Changing faulty parts
- Implementing preventative maintenance procedures
- Carrying out measurements (current, force)



DETAILED TRAINING SCHEDULE

Theory time table :

1. Présentation du matériel
 - 1.1 Constitution
 - 1.2 Electrical connection
 - 1.3 Pneumatic connection
 - 1.4 Cooling system
2. The resistance welding
 - 2.1 General principles
 - 2.2 The welding parameters
 - 2.3 Spot weld
 - 2.4 Welding rules
 - 2.5 Electrodes
 - 2.6 Resistance welding applications
3. The welding cabinet
 - 3.1 Presentation of welding timer
 - 3.2 Setting of parameters
 - 3.3 Machine capacity, cadence and thermal intensity
 - 3.4 Selecting a program

Practice time table :

4. Welding practice
 - 4.1 Welding trials, visual and destructive controls
 - 4.2 Optimising settings and welding quality
5. Utilisation, Maintenance
 - 5.1 Welding transformers
 - 5.2 Cylinders
 - 5.3 Control cabinets
 - 5.4 Shunts and conductors
 - 5.5 Insulation
 - 5.6 Pneumatic distributors
 - 5.7 Setting of lower arm
6. Diagnosis of faults
7. Preventive maintenance

Number of days	Unit Price in Euro without VAT
1 day	1 199.00

Standard price list in Metropolitan France : our prices do not include the costs of travel and accommodation of our trainer on customer site.
Consult the intervention price list to calculate these costs.

The «Export» training can be realised in French or English.
These trainings are not included in the board above. They are the subject of specific quotation.

Contact our AROSERVICE Team for more information.

AROSERVICE has the capacity to study on a case to case basis, the specific needs of candidates who wish to apply for training, in order to mobilize the necessary measures required to offset the consequences of a disability.



Means of access

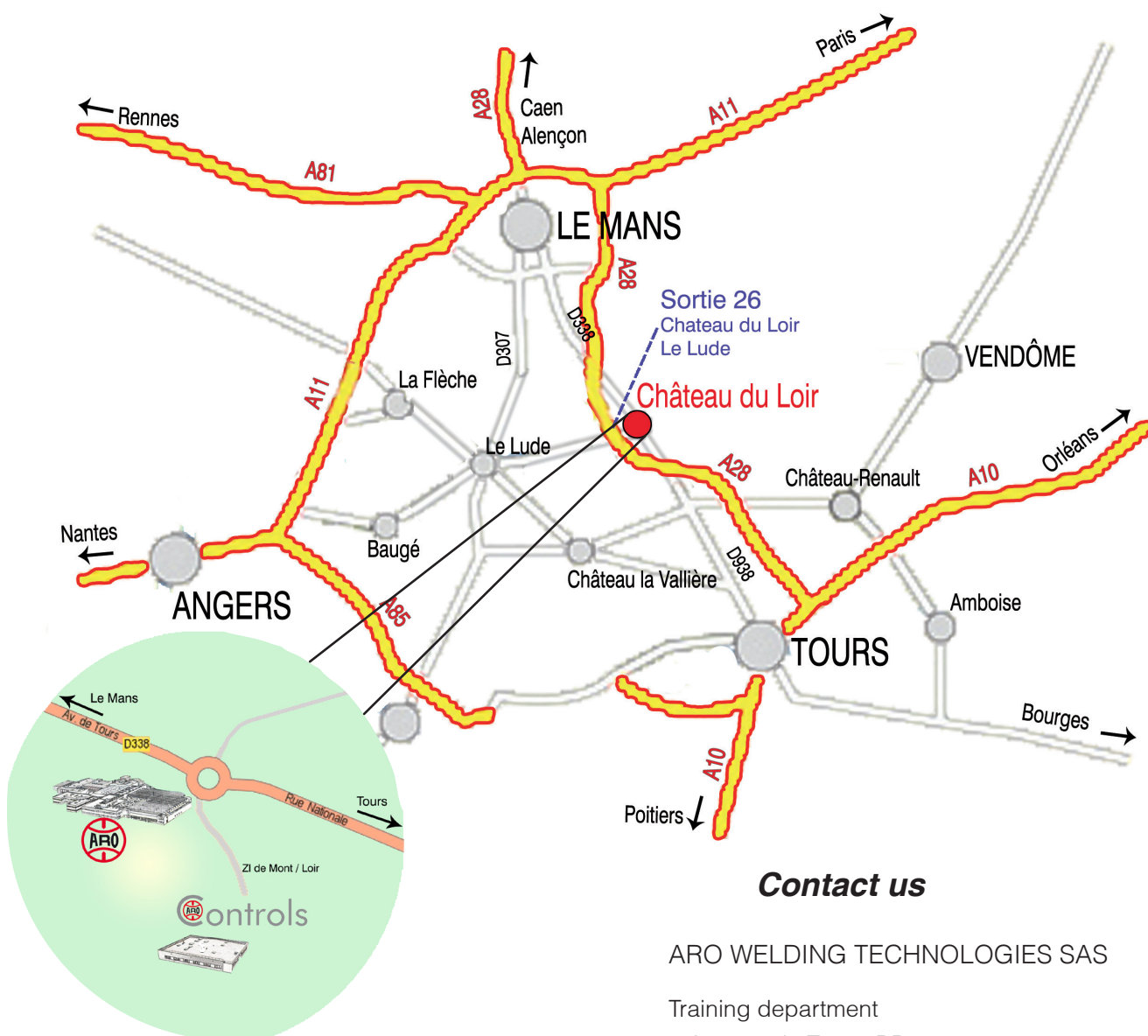
• From Paris (A11/A28) or Rennes (A81), take the motorway A28 until the exit 26 (Château du Loir / Le Lude).

ARO is located at the exit of Château du Loir (40km from Le Mans).

• From Nantes (A85) or Bordeaux and Orléans (A10), take the motorway A28 until the exit 26 (Château du Loir / Le Lude).

ARO is located at the entrance of Château du Loir (40km from Tours)

You can also take the train and rent a car in Tours or Le Mans.



Coordinates GPS

Latitude : 47.6903462 Longitude : 0.4253299

Contact us

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