



**DAMIEN**  
*TECHNOLOGIE*



**USER'S GUIDE**

***DAMIEN 11 000 M***  
***ADAPTIVE***  
***RESISTANCE SPOT WELDING UNIT***

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## 1. RECOMMENDATIONS

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Dear customer,

Thank you for buying a DAMIEN 11000M ADAPTIVE spot welder.

DAMIEN's products are characterized by their quality, reliability and their ease of use.

For safety reasons and to take full benefit of their performances, we strongly suggest you to read all the recommendations, in particular the section "Operating and Safety Instructions". Disregard of the instructions can endanger the user and damage the spot welder, and may lead to a loss of warranty.

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### **Warning**

- This spot welder is intended for use by qualified and trained personnel only.
- **Thank you for carefully reading this manual before use.**
- Damien technologie shall not be liable for accidents caused by the following:
  - Welder misuse or use for a different purpose other than the one intended
  - Voluntary damage or destruction
  - Modification or disabling of the security or control systems
  - Electric installation not in conformity with law, or not conforming to the specific needs of this welder.
  - Operation with open case.
  - Disrespect of the instructions described in the section "Operating and Safety Instructions".
- Follow the manufacturers recommendations relative to the protection of electrical/electronic systems (air-bag systems, computers, battery, ...) in regards to electric welding.

### **OPERATING AND SAFETY INSTRUCTIONS – PERSONNEL PROTECTION**

- Never attempt to un-mount or adjust the gas spring of the balanced arm.
- When welding, use insulated gloves, adequate protective glasses, and adequate clothing of nonflammable nature, to protect against possible fused metal projections, and burning by contact with hot parts (electrode arm and tips, guns cables, ...).
- Do not wear jewelry or any metallic object, which could conduct electric currents and cause burning.
- The welding machine generates an intense magnetic field which can interfere or affect the functioning of some equipment



**It is strictly forbidden for persons wearing a pacemaker or any metallic prosthesis to use a spot welder, or even be in its proximity when it is powered up.**

- Put the double-sided pneumatic gun in its place after each use. Stay away from any of the pneumatic gun's mobile parts as long as the compressed air supply or the electric supply has not been disconnected from the welder. The squeeze force on the electrodes can reach more than 600 lbs.
- Never use the machine without the cover or front panel on.
- Never use the welder without ground connection.
- All cables connected with the instrument must be checked periodically. If there is any damage the cables must be repaired or replaced by our authorized personel.
- Inform and warn the persons, who are or could be in proximity of the welding area, of the Safety instructions described in this section.

## OPERATING AND SAFETY INSTRUCTIONS – WORK ENVIRONMENT

- The welder must never be operated if wet or in very humid environment.
- Never weld tanks which are containing or have contained flammable liquids (gas, oil, ...), or even operate the welder in their proximity.
- Specific Safety rules apply when working in environments where flammable liquids are present.
- Make sure the room is correctly ventilated, in order to remove eventual smoke or toxic gases.
- Only competent welders must perform welds, which will be required to resist a high level of mechanical stress.

## OPERATING AND SAFETY INSTRUCTIONS – SERVICE REPAIR

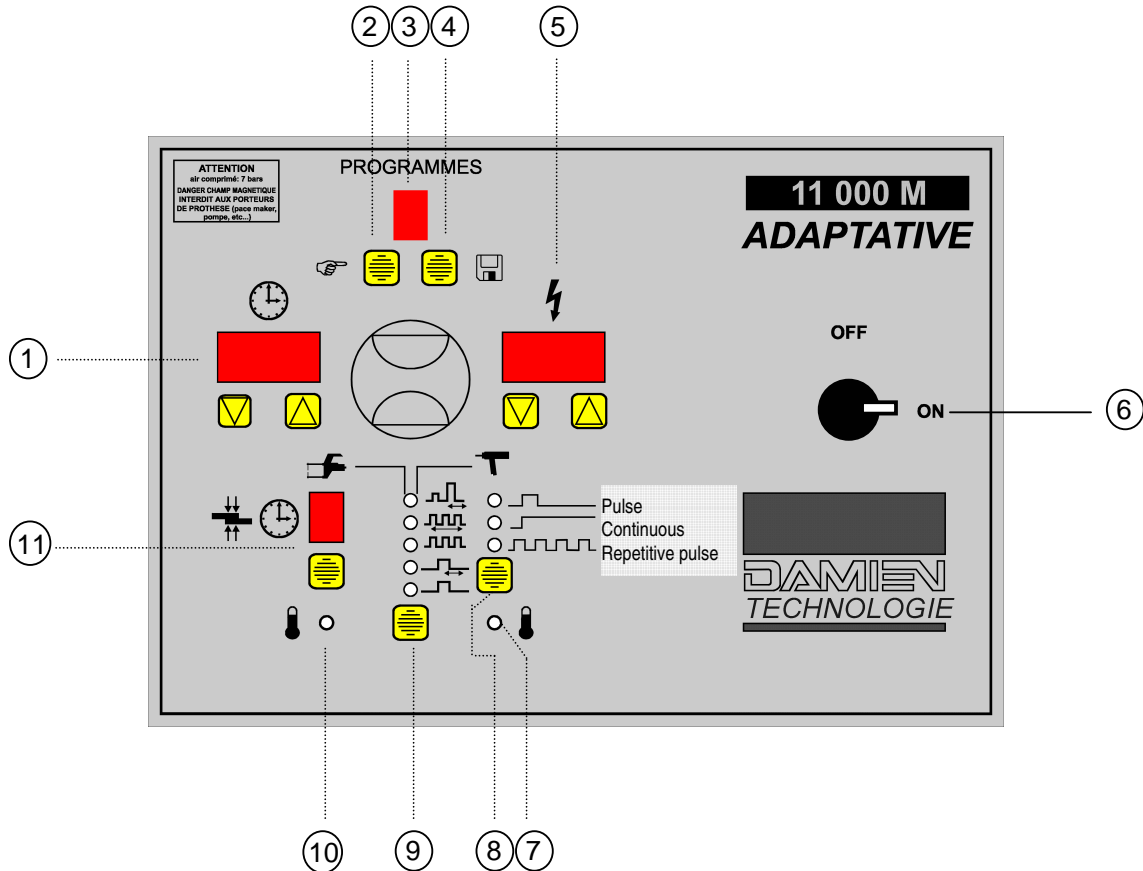


**CAUTION:** The exchange of electronic parts (e.g. EPROMs for software update) by an authorized technician is allowed only if the instrument is disconnected from power supply and from the compressed air supply.

- Any Service Repair on the welder should be performed only by a technician authorized by Damien technologie, and only with the welder disconnected from power and air supplies.
- Make sure the machine has cooled down enough before to do repairs.

2. DESCRIPTION

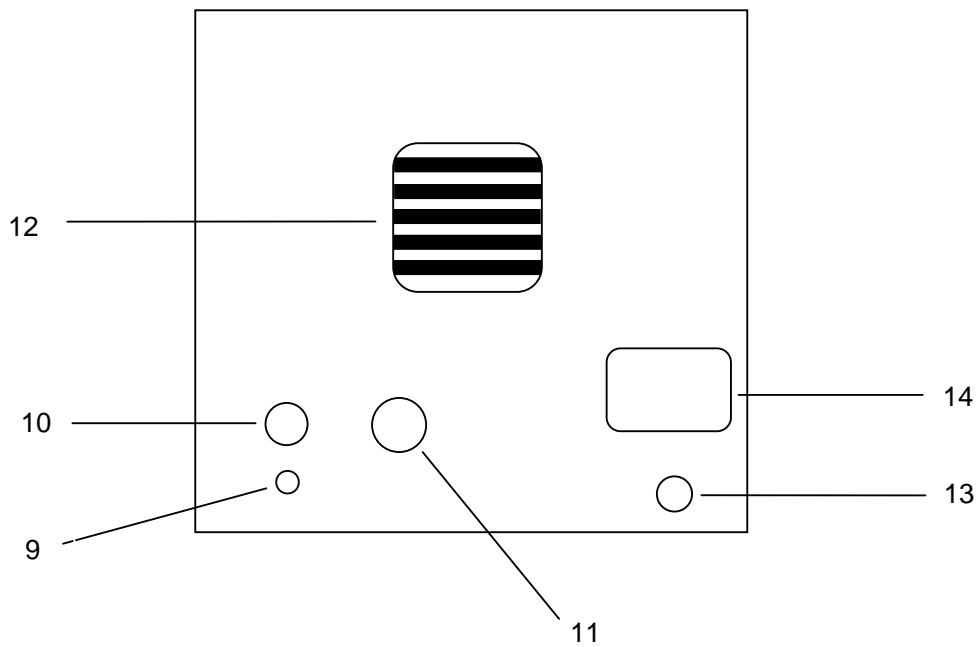
2.1. FRONT PANEL



- ① Digital display of the welding time (in hundreds of second)
- ② Program display (0 to 9)
- ③ Program Selection
- ④ Program Recording
- ⑤ Digital display of the welding current (in percent of the maximum current)
- ⑥ ON/OFF Switch
- ⑦ Single sided Gun overheating indicator
- ⑧ Welding mode selection. From top to bottom: pulse (Double-sided Gun + one-sided gun), continuous for carbon heating (one-sided gun), repetitive pulse for seam welding (one-sided gun)
- ⑨ Current waveform selection. From top to bottom: pre-pulse + 1 pulse adaptive mode, 3 pulses+ adaptive mode, 3 pulses non adaptive, 1 pulse adaptive mode, 1 pulse non adaptive)
- ⑩ Double sided Pneumatic Gun overheating indicator

⑪ Hold Time (3 = 1 sec, 6 = 2 sec, 9 = 3 sec)

2.2. REAR PANEL



9 - Compressed air input

10 - Air Pressure adjustment (max pressure: 8 bars – 115 PSI)

11 - Pressure gauge

12 - Fan

13 – Cord for connection to mains (220V or 400V depending on models)

14 – Identification label

### **3. TECHNICAL DATA**

#### *3.1. GENERAL CHARACTERISTICS*

Transformer Winding	Copper
Supply Voltage	400 V or 220V depending on model
Fuses	32 A @ 400V, 50A @ 220V
Maximum welding current	6500 A RMS
Off load output voltage	6 to 0 V
Welding capacity	Double-sided Gun: 3 + 3 mm One-sided Gun: 1,5 mm
Cables length	Double-sided Gun: 2 m One-sided Gun: 1,7 m
Welding parameter adjustment	Digital
Welding time	0.01 to 1s, 0.01s steps
Double sided Gun closing	Pneumatic
Double sided Gun opening	Pneumatic
Cables cooling	Automatic air cooling
Guns cooling	Automatic air cooling
Electrodes cooling	Automatic air cooling
Transformer cooling	Air cooled with fan

#### *3.2. WEIGHT AND DIMENSIONS*

X-Gun weight (with 155 mm arms + electrodes, without cables)	3,7 kg
X-Gun cables weight	6,2 kg
Single sided gun weight with cable	3,7 kg
Single sided gun ground cable weight	2,4 kg
Welding unit weight (with cables)	63,0 kg
Trolley weight	23,0 kg
Balanced adjustable arm weight	32,0 kg
Welding unit dimensions (L x h x w)	59 x 40 x 33 (cm)
Dimensions (L x h x w) of welder on trolley	75 x 120 x 48 (cm)

#### *3.3. THE POWER TRANSFORMER*

The power transformer is the essential part of the machine. Damien's transformers are oversized with primary and secondary windings in pure copper, with class I insulation and a thermal switch protection in case of over-heating.

Those features allow:

- a higher output power
- less heating
- a longer life time

## 4. INSTALLATION & SETUP

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### 4.1. INSTALLATION – POWER SOURCE

The welding machines are equipped with a 3-wire cord which have 3 colors: blue, brown and Yellow/Green.

For safety reasons, you must imperatively connect the Yellow/Green wire to the electrical ground; never connect it to the AC line.

The 2 other wires must be connected to the AC line, 220V or 400V depending on the Welder model.

Contact you vendor if you are not sure what the voltage rating of your machine is.

Make sure that the electrical plug you are connecting to the welder's cord:

- is in conformity with electrical norms
- is rated 32A minimum for 400V, 50A for 220V
- has a ground connection
- is in good condition
- is protected with fuses of 32A minimum for 400V, 50A for 220V. You may need to use delayed fuses in case your have trouble with your current fuses.

The machine is equipped with a 10m long power cord. Make sure you do not leave the cord winded in order to let the cable cool itself. **Do not** use an extension cord.

### 4.2. INSTALLATION – COMPRESSED AIR

Hook the compressed air supply to the fast connector (label 9 on the rear panel drawing).

The input air pressure should never be more than 8 bars (115PSI), and no less than 6 bars (85 PSI).

The Air pressure of your welder must be adjusted between 6 and 7 bars (85 to 100SI) (see label 11 on the rear panel drawing).

## 5. THE PNEUMATIC DOUBLE SIDED GUN

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One of the great advantages of the DAMIEN 11000M adaptive spot welder, is the ability to work with the spotter or pneumatic gun back and forth, without having to perform any cable connection or switching.

The double sided 'X' Gun is equipped with a powerful pneumatic cylinder. The top button opens the gun; the bottom button closes the gun and welds.

### 5.1. AIR PRESSURE ADJUSTMENT

The pressure gauge (label 11 on the rear panel drawing) indicates the actual pressure of air used to open and close the pneumatic cylinder of the double-sided Gun. The squeezing force is directly proportional to the indicated pressure.

The knob next to the pressure gauge (label 11 on the rear panel drawing), allows the user to adjust this pressure.

The pressure is an essential element of spot welding:

- An insufficient pressure will cause the metal to spatter and the presence of a crater on the weld. In extreme cases it can create a hole in the metal sheet.
- An excessive pressure can cause a significant dent in a metal sheet and a lip around the weld.

To adjust the air pressure (and thus the squeeze force) :

- pull the knob (label 11 on the rear panel drawing)
- turn it clock-wise to decrease the pressure, counter clock-wise to increase it
- push the knob to lock.

### 5.2. ELECTRODE ARM AND TIP ADJUSTMENT

#### 5.2.1. Electrode tip sharpening

During the welding machine's life, the electrode tips have the tendency to "mushroom" and need to be regularly sharpened to have a contact diameter of 4 to 6 mm. The electrode contact diameter will give you the diameter of the weld nugget.

One general criterion of resistance spot-welding is that the weld shall have a minimum nugget diameter of  $5 \cdot t^{1/2}$ , "t" being the thickness of the steel sheet in mm. Thus, a spot weld made in two sheets, each 1 mm in thickness, would generate a nugget 5 mm in diameter according to the  $5 \cdot t^{1/2}$ -rule.

A well-sharpened electrode tip insures a better welding quality. We recommend you to use DAMIEN electrode sharpener.

A slightly rounded electrode can decrease the weld marking and spattering, and is necessary for the one-sided gun electrode tip to be more tolerant of perpendicularity inaccuracy.

### 5.2.2. Electrode arm adjustment

- Before use of the double-sided Gun, it is recommended to check the arm alignment: when the gun is closed, the electrode arms should be parallel and the electrode tips should be in contact and aligned.
- To check the double-sided gun electrode adjustment, set the welding current to 001 (minimum) and push the weld trigger with nothing in between the tips. You should hear a 'click' when the two tips come in contact with each other.
- Make sure the screws securing the electrode arms and electrode tips are completely tightened.
- In normal open position, the space between the electrodes should be about 30mm.

### 5.2.3. Electrode tips adjustment

- Set the welding current to 001 (label 3- on front panel figure)
- Unscrew slightly one of the electrode tip's securing screws
- Push and maintain the close trigger, to keep the pneumatic gun closed
- Move the free electrode tip in front of the other one (if it is not aligned you may have to adjust the electrode arm – see previous section)
- Release the trigger
- Move the electrode tip 2 to 3 mm towards the other tip, so make sure the 2 tips will touch each other. Tighten the screws.
- Push the trigger once more, you should hear a 'click' when the two tips come in contact with each other, and see a slight deformation of the tips under the squeeze force applied by the pneumatic cylinder.

### 5.3. *WELD TIME AND CURRENT ADJUSTMENT*

The Weld time and current should be adjusted for each type of metal sheet. The following table shows examples of welding parameters for some particular steel types and thickness. Please note that those parameters are just indicative and can vary depending on the steel's nature and your electrical supply.

## DAMIEN 11 000 M ADAPTIVE

Metal sheet thickness in mm	Weld Current (%)	Weld Time (in hundreds of s)
0,6 + 0,6	100	006
0,8 + 0,8	100	008
1 + 1	100	010
1,5 + 1,50	100	015
2 + 2	100	020
3 + 3	100	050
Coated steel 0,8 + 0,8	100	020
Coated steel 1 + 1	100	030
Coated steel 1,5 + 1,5	100	040
Galvanized 0,8 + 0,8	100	035
Galvanized 1 + 1	100	045
Galvanized 1,5 + 1,5	100	060

It is generally recommended to work weld with high current and short weld time, which limits the formation of the heat ring around the weld, and thus the metal sheet deformation. It also improves the duty cycle.

**IMPORTANT:** Never use both guns simultaneously.

When you are done with one of the gun, put it back in its place, at the right side of the welder for the double-sided gun, and the left side for the one-sided gun.

Avoid to have any metallic part (metal sheet, tool, ...) in contact with the double sided gun jaw or the gun's body/arms during the welding process.

### 5.4. WELDING

A short pulse on the pneumatic gun trigger will bring the electrode tips together, then the gun will open to its normal position.

By keeping the trigger pressed, the following sequence is performed:

- *Squeeze time*: the electrodes close and squeeze the pieces to weld.
- *Weld time*: After a short time the current is applied
- *Hold Time (cooling time)*: The electrodes are maintained closed during the hold time to wait for the weld to cool down before to release the pressure.
- If the trigger is released, the arms open. If the trigger is maintained, the arms stay closed and a new welding sequence is started.

For an optimal job, it is preferable to place the top tip in contact with the part to weld at the desired position.

### 5.5. HOLD TIME

Hold time is the time, after the welding, when the electrodes are still applied to the sheet to chill the weld. Considered from a welding technical point of view, the hold time is the most

interesting welding parameter. Hold time is necessary to allow the weld nugget to solidify before releasing the welded parts, but it must not be too long as this may cause the heat in the weld spot to spread to the electrode and heat it. The electrode will then get more exposed to wear. Further, if the hold time is too long and the carbon content of the material is high (more than 0.1%), there is a risk the weld will become brittle. When welding galvanized carbon steel a longer hold time is recommended.

DAMIEN's 11000M adaptive welder allows you to adjust precisely the Hold Time from 0 to 3s. (label 5 on front panel figure) for optimal welding quality.

### **5.6. WIDE ARM OPENING**

By pressing the top button, the arms open wide.

It allows welding in particularly difficult locations. It also allows to open the arms in case the electrodes are stuck.

## **6. MULTI-PURPOSE ONE SIDED GUN (SPOTTER)**

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One of the great advantages of the DAMIEN 11000M adaptive spot welder, is the ability to work with the spotter or pneumatic gun back and forth, without having to perform any cable connection or switching.

The one sided gun is a very practical tool for multi purpose applications.

### *6.1. AIR SUPPLY*

It is very important to not disconnect the air supply that is used for cable and electrode cooling.

### *6.2. GROUND CABLE CONNECTION*

- A good grounding is required for quality work.
- The GROUND cable should always be ATTACHED to the RECEIVING part (typically the car body), i.e. on the metal sheet opposing the one you are applying the gun.
- Clean the metal sheet at the location you attach the ground cable.
- Clean the top metal sheet on the area you want to weld on both sides.
- Attach securely the ground cable as close as possible to the weld location (with a strong blocking clamp)
- Avoid any obstacles between the ground attachment and the welding such as a door hinge.

### *6.3. WELDING WITH THE COPPER ELECTRODE*

- Select the pulse mode (label 8 on front panel figure)
- Place the straight electrode in the gun, flat side inside, and tighten the bottom screw
- Position the electrode perpendicular to the metal sheet to weld, apply a constant pressure (typically 20lbs).
- Make sure the 2 metal sheets are in contact at the weld location.
- Press the trigger. The welding will be done according the parameter you selected.

If the pressure applied by the user on the electrode is insufficient, the metal will spatter during the welding.

For the best results:

- Start to weld the spot furthest away from the ground connection, then weld closer and closer to the ground.
- For welding galvanized and coated steel, select the pre-pulse + pulse waveform (label 8 on front panel figure), the first pulse eliminates the coating, the second welds.

### 6.4. NUT, BOLT, WASHER, RIVET WELDING

- Select the pulse mode (label 8 on front panel figure)
- Select the electrode holder for the item you want to weld, and tighten the locking screw.
- Position the gun electrode on the metal sheet and apply moderate pressure.
- Press the trigger. The welding will be done according the parameter you selected.

### 6.5. CARBON SHRINKING

- Select the continuous mode (label 8 on front panel figure)
- Put the carbon electrode in the gun and tighten moderately the screw.
- Press continuously on the trigger
- Apply the electrode on the metal sheet while doing a circular motion on the area to process, from the outer area to the inner.
- When the sheet is hot enough, cool it down with a wet sponge.

### 6.6. STITCH WELDING

- Select the repetitive pulse mode (label 8 on front panel figure)
- Put the half circular electrode in the gun
- Press continuously on the trigger while applying a rotation movement to the gun, in order to roll the electrode on the metal sheets.
- The welding pulses are repetitive, which creates a stitch weld pattern on the path of the electrode.

### 6.7. WELD TIME AND CURRENT

The weld time and current will depend of the type of job, and some typical parameters are shown in the following table.

Please note that those parameters are only indicative and can vary depending of the steel's nature and your electrical supply. We strongly suggest testing the parameters first on an equivalent metal sheet.

Mode	Job Type	Current	Weld Time
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**DAMIEN 11 000 M ADAPTIVE**

Continuous	Carbon shrinking	Variable	
Pulse	Dent Pulling	60	0,01 to 0.05
Pulse	Pins M5 X 18	60	0,10
Pulse	Rivets D3 X 4,5	60	0,03
Pulse	Washer	Variable	0,05
Pulse	Straight Electrode welding		
	0,6 + 0,6 mm	100	0,08
	0,8 + 0,8 mm	100	0,10
	1 + 1 mm	100	0,15
	1,5 + 1,5 mm	100	0,30
	Coated steel 0,8 + 0,8 mm	100	0,10
	Coated steel 1 + 1 mm	100	0,20
Repetitive pulse	-Stitch welding with half circular electrode Steel 0,8 + 0,8 mm	100	0,03

## 7. COOLING

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The DAMIEN 11000M adaptive welder is equipped with a high performance automated cooling, allowing high repetition rate and safe operation.

### 7.1. THE TRANSFORMER

A fan located on the welder's rear panel cools the Transformer. The forced air cooling is active as long as the main switch is turned on.

### 7.2. THE CABLE COOLING

One of the advantages of the DAMIEN 11000M adaptive welder, is its automated cables and guns air cooling, which is turned on only if necessary, thus using a minimal amount of air. Each tool cable's cooling is independently turned on when its temperature exceeds a certain level, and turned off below a certain temperature.

#### Recommendation:

We recommend waiting for the cable's cooling to be completed before to power off the welder.

### 7.3. THERMAL PROTECTION

In case of overheating, one or both red lights on the front panel are turned on (See front panel picture, label 7 and 10). While in overheating, the welder doesn't allow the user to weld, however since the two tools have an independent thermal protection management, it is possible to use one tool while the other is in overheating.

If a tool is in overheating, wait a few minutes for the red light to turn off, and the welder to be available for use.

## **8. MAINTENANCE**

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- REGULARLY CHECK THE CONDITION OF THE ELECTRODE TIPS, SHARPEN THEM WHEN NEEDED.

### *8.1. GENERALITIES*

- Keep the electrode tips clean. Clean with a file or sand paper.
- Sharpen the electrode tips when mushroomed.
- Keep the cable protection in good condition.
- Put each tool back on its support after use.
- Keep the welder away from metal projection
- Change the electrode tips when too short

Many models of arms and tips are available to meet the needs of auto body welding. The electrode arms are in copper alloy, with a diameter of 20mm. The electrode tips are in copper alloy, 10 or 12mm diameter.

### *8.2. PNEUMATIC CYLINDER:*

To insure the long life of your pneumatic cylinder, make sure the air you use has a low humidity rate (add an air dryer to your air supply if needed). It is good practice to inject a few drops of oil in the air input connection of the welder (See rear panel picture, label 9)

## 9. WELDER TROUBLESHOOTING

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### 9.1. ERROR CODES

The welder performs an auto test at each power up, and displays a blinking error code if an error has been detected.

**Error code 1:** The thermal sensor in the one-sided gun cable is disconnected. The causes can be:

- The green 4 wire connector plugged into the electronic control board is not in place or one of the wires is pulled out.
- The thermal sensor inside the one-sided gun cable is broken. The cable needs to be replaced.

**Error code 2:** The thermal sensor in the one-sided gun cable is grounded. The causes can be:

- The thermal sensor inside the one-sided gun cable is shorted or in contact with the power cable. The cable needs to be replaced.

**Error code 3:** The thermal sensor in the double-sided gun cable is disconnected. The causes can be:

- The green 4 wire connector plugged into the electronic control board is not in place or one of the wires is pulled out.
- The thermal sensor inside the double-sided gun cable is broken. The cable needs to be replaced.

**Error code 4:** The thermal sensor in the double-sided gun cable is grounded. The causes can be:

- The thermal sensor inside the double-sided gun cable is shorted or in contact with the power cable. The cable needs to be replaced.

**Error code 5:** Line synchronization problem. The cause can be the following:

- The blue wire coming out from the electronic control board is disconnected, or connected to the wrong AC line on the Power Switch.
- The thyristor control wires (2 red and 2 yellow) are disconnected or misconnected.
- The thyristor or the electronic board is defective.

**Error code 6:** Line synchronization problem. The cause can be the following:

- The electronic board is defective.

**Error code 8:** The wide opening control of the double-sided gun is grounded. The causes can be:

- The wide opening control wire is grounded and needs to be replaced.
- The wide opening control wire inside the double-sided gun is grounded. Open the double-sided gun handle to check the wiring.

**Error code 9:** The weld trigger control of the double-sided gun is grounded. The causes can be:

- The weld trigger control wire is grounded and needs to be replaced.
- The weld trigger control wiring inside the double-sided gun is grounded. Open the double-sided gun handle to check the wiring.

**Error code 10:** The weld trigger control of the one-sided gun cable is grounded. The causes can be:

- The weld trigger control wire is grounded and needs to be replaced.
- The weld trigger control wiring inside the one-sided gun is grounded. Open the double-sided gun handle to check the wiring.

### 9.2. **ONE-SIDED GUN (SPOTTER)**

#### 9.2.1. **Metal sheet heating**

- The carbon electrode heats up on and off:
  - The Mode selection is incorrect: select continuous mode
  - The trigger is not continuously pressed.
  - The carbon electrode is broken.
  - The electric contact between the carbon electrode and the electrode holder is not good.
- The carbon electrode goes on and burns quickly:
  - The carbon electrode is not suited: use DAMIEN's Carbon electrodes.
  - The weld current is too high (reduce the current)
- The sheet metal doesn't heat up, even though the carbon electrode is red.
  - The metal sheet is not clean
  - The pressure applied on the metal sheet is too low.

#### 9.2.2. **One-sided Gun Welding**

- The welds don't hold:
  - The pressure applied on the weld is too high and the bottom metal sheet is flexing under the pressure. The force you apply on the gun should depend on the thickness of the metal sheet.
  - The electrode tip is mushroomed and dirty (regularly sharpen and clean The electrode tip, the tip diameter should be 2.5 mm)
  - The ground contact is defective
  - The ground is too far away from the welding area.
  - The supply voltage is too low.
  - You are using an inappropriate extension cord.
  - The weld time is too short or the current too low.
  - There is a space between the two metal sheets you are attempting to weld or the metal is not clean.
  - The top metal sheet is too thick compared to the bottom one.
- The spot weld is indented.
  - The force applied on the Gun is too high for the metal sheet thickness.
  - The weld time and/or current is too high
- Excessive sparks during the welding.
  - The force applied on the Gun is too low
  - There is a space between the two metal sheets you are attempting to weld or the metal is not clean.

### 9.3. **DOUBLE SIDED GUN**

- The gun doesn't close or closes partially
  - Verify that you have the correct pressure on the air pressure gauge
  - The pneumatic cylinder is defective (replace it)
- The gun closes as soon as the power is turned on
  - The electronic control board is damaged
- The welding spots are excessively indented
  - The air pressure is excessive – reduce the pressure of the regulator in the rear panel.
  - The weld current is too high
  - The weld time is too long
- The welds don't hold
  - The weld current is too low
  - The weld time is too short
  - The metal sheets are not cleaned on their inner side
  - The electrode tips are mushroomed or not clean
  - You left the one-sided gun ground connection on the part to weld
  - If the transformer is doing an abnormal noise during the welding, the electronic control board is defective and needs to be replaced.
- Welding caused a crater or hole in the metal sheet
  - The electrode arms and/or tips are not correctly aligned – Make sure that when the gun is closed, the two tips are touching each other and slightly flexing.
  - The air pressure is too low
  - The pneumatic cylinder is defective
- The welder is doing repetitive welding
  - If the trigger is kept pressed, the welding cycle will repeat itself. Make sure you release the trigger as soon as the weld starts.
  - The trigger control cable is damaged and needs to be replaced.
- Excessive sparks during the welding.
  - The force applied on the Gun is too low
  - There is a space between the two metal sheets you are attempting to weld or the metal is not clean.

### 9.4. **WELDING UNIT DEFECT**

- The one-sided gun's air-cooling is active even though the cable is cold. No error code is displayed on the front panel.

- The one-sided gun's air-cooling valve is defective, change the 4<sup>th</sup> valve starting from the top.
- The double-sided gun's air-cooling is active even though the cable is cold. No error code is displayed on the front panel.
  - The double-sided gun's air-cooling valve is defective, change the 3<sup>rd</sup> valve starting from the top.
- Lack of power:
  - Check that the supply voltage is correct.
  - Check the internal connections (tighten the connection screws).
  - Check that the voltage on the one sided gun is in continuous mode with maximum weld current about 10 volts relative to ground.
    - If ok, check all the cables, electrode arm & tip connections (tighten the connection screws)
    - If not ok the electronic control board is defective.
- The welder blows up the fuses:
  - Check that your fuses rating is at least 32A delayed. Have an electrician check your installation.
  - If the transformer is doing an abnormal noise, the electronic control board is defective.