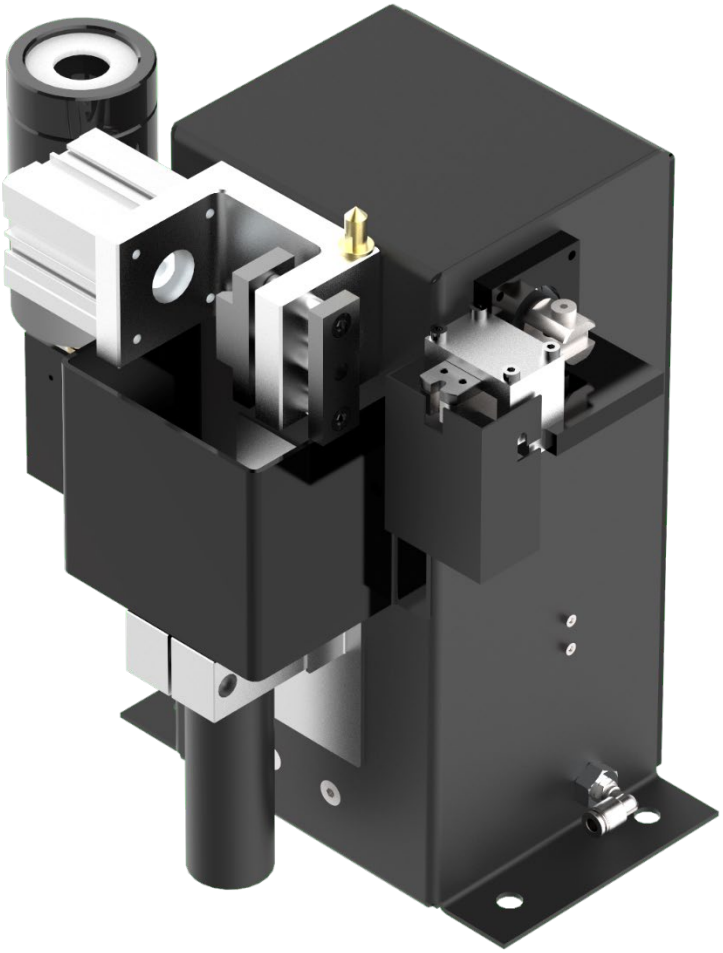
EDR torches®
Evolution Design Robotics

INSTRUCTION MANUAL
Clean station CS2



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CE

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1 Safety instructions



To prevent severe injury to operators or damage to the equipment, please strictly observe the operating instructions. Prior to the operation of the equipment or related facilities, all personnel must read and follow the instructions.

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1. According to the provisions of *Machinery Directive 2006/42/EC*, this product is considered to be semi-finished,so it cannot be put into use.The product is official operation permissible only when the final product is in line with the relevant provisions of the directive.
2. The automatic nozzle cleaner will potentially generate hazards on human body and the environment. Hence,only personnel who undergone professional training are allowed to operate the equipment, the same is true for equipment debugging and maintenance. Please strictly comply with the relevant safety instructions.
3. Please strictly obey the provisions of accident safety precautions and related safety regulations at home country and abroad.
4. Use of CS2 nozzle cleaner is merely allowed within the scope of technical parameters mentioned in the instructions. Please use parts peculiar provided by Company for robotic connections. This nozzle cleaner can only be applied to mechanized welding torch, and doesn't support the cleaning of manual welding torch.
5. This equipment is only allowed in the protection area. Irrelevant personnel should be evacuated during operation. The installation personnel should set up suitable electric interlocking circuit.
6. Before start-up, the nozzle cleaner must be fixed in the working range of the robot by 4 bolts. Do mind the danger of overturn of the nozzle cleaner!
7. Prior to any operation of the CS2 welding gun cleaner, such as installation and maintenance, compressed air source must be cut off,and the connecting line voltage must be discharged. Guard against the damage caused by unintentional operation.
8. During installation and maintenance within the working range of the robot, the whole system must be in the off state, so that absolute safety can be ensured even in case of unintentional operation, such as operating errors. All protective measures adopted must be kept in place, and away from the hazardous area. If ignored, there is the danger of being accidentally injured by the robot. When using the CS2 gun cleaner, there might be the dangers of electric shock, being wounded by pneumatic rotating parts and being burned or punctured by welding wire. Danger of damage to other system components due to short circuit also exists.
9. Maintenance of wires and water pipes must be regularly conducted to prevent damage and aging. Professional technical personnel should regularly check the operation of the nozzle cleaner. The nozzle cleaner should only be used after the maintenance.
10. Change of the equipment system at will without permission is prohibited.
11. Alterations to the equipment can only be made after the written consent of the manufacturer.

2 Quality assurance

Strict examination will be conducted on each nozzle cleaner before delivery.
Company promises that the equipment has no defect in materials and processes, and can operation normally according to the intended application upon shipping.
● According to relevant laws and regulations, Company provides quality assurance for equipment with deficiency in processes and materials, but consumable parts are not included in this range.
The quality assurance does not include any damage or functional deficit to the equipment caused by the following reasons:
● Overload, abuse or use against the intended application
● Damage caused by collision or accident
● Operation against the instructions
● Improper installation or assembly
● Delayed daily maintenance
● Alteration of equipment factory settings
● Chemical effect
● Wear and consumption after normal use
In addition to replacement and maintenance of defective products, Company shall not assume other responsibilities.

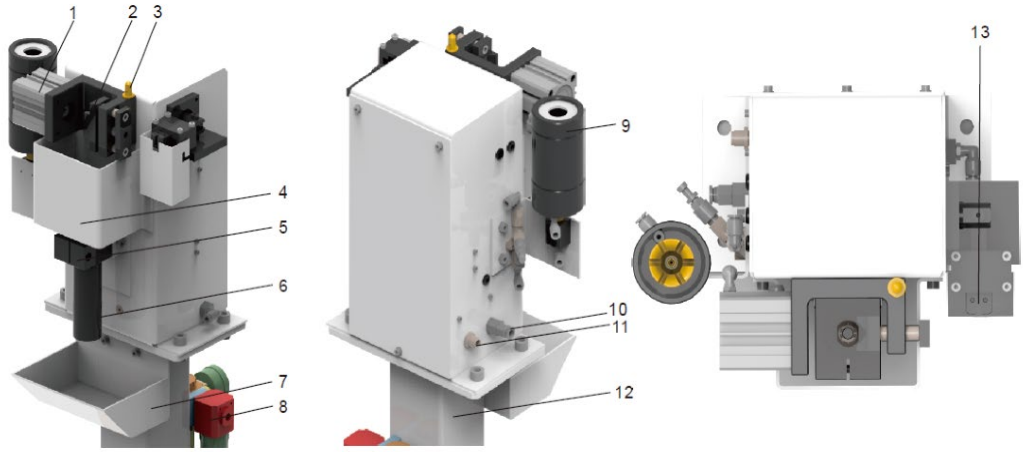
3 Technical parameters

3.1 Application field and overview
CS2 pneumatic nozzle cleaner is specially designed for robot welding gun and automatic welding gun equipped with automatic welding system, such as welding robot. The gun cleaning station is operated by the robot and the equipment will give feedback signal to the robot.
Some gun cleaners are also equipped with automatic wire shearing device, which is electrically triggered by robot controller.
The protective shell of the nozzle cleaner is equipped with TCP pointer.
Advantages of CS2 pneumatic gun cleaner:
● Automatic nozzle cleaning, no need of manual operation
● Short cleaning time and highly efficient
● Removal of splash that is hard to be removed
● To prevent quality problems caused by pollution during welding.
3.2 Function overview
Prior to cleaning, the welding gun nozzle should be fixed on the cleaner.
Grinding technology is needed in the cleaning process. Different types of Robotic welding torch should use
the corresponding reamers. Reamerscan be ordered separately as needed. Appropriate type of reamer
is selected based on type of the welding torch, nozzle and contact tip. To ensure the best cleaning quality,
right type of reamer must be selected. During cleaning, the reamer reaches into the welding gun nozzle,
and circles around the contact tip. By doing so, the welding slag is removed from gap between the nozzle
and the contact tip.
After cleaning, anti-sling agent should be spayed into the torch head.
After the starting signal is sent out by the station, automatic gun cleaning process begins.
After the wire shearing machine is equipped(optional), the ends of the welding wire can be sheared

Input air pressure	oil-free dry compressed air，6-8bar
Work environment temperature	+5℃to +50℃
Air consumption	about 10L/S
Air motor	about 425rpm，maximum torque: 6.3Nm
Control voltage	24V DC
Control current	Imax=0.15A
Anti-sling agent bottle capacity	500ml
Wire cutting capacity	solid welding wire：maximum of 1.6mm
	flux-cored wire：maximum of 3.2mm
Cutting time	about 0.5s

3.4 Complement usage
According to the provisions of European Machinery Directive –6/42/EC, pneumatic gun cleaner is a semi-finished equipment. In view of personal safety, the equipment must be further assembled to become
more complete, so as to ensure its safety. For example, in normal operation, other personnel should be
prevented from adjacent area of the working area of the equipment. Each equipment must be equipped
with detailed instructions.
Semi-finished equipment can not be put into production and use, only after the equipment is equipped
with other devices and in accordance with the provisions of Machinery Directive 2006/42/EC, can it be
put into use.
3.5 Intended application
1. This equipment requires professional personnel to operate, and is merely applied to commercial and
industrial use. For accident and damage due to improper operation, the manufacturer shall not assume any responsibility or obligation.
2. Within the range of technical parameters, automatic gun clear is only suitable for cleaning robot welding gun and automatic welding gun.
3. The assembly, operation and maintenance of the gun cleaner must be performed by professional personnel undergone training,so as to operate under best performance and the most reliable state of the equipment. Please strictly obey relevant provisions in the instructions concerning assembly, operation and maintenance.
4. Oil-free dry compressed air must be used. The anti-sling agent provided by the manufacturer is needed for the fueling injection equipment, but the agent does not provide any additional protection to
other equipment. To achieve the purpose of economization and environmental protection, Thelma Company suggests the least amount of anti-sling agent in operation.
5. During transport, storage and operation, the equipment must be kept dry.
6. The ambient temperature for use of the equipment is within the range of +5℃ to +50℃, if used beyond
this temperature range, special measures may be required.

4 Parts and Components



Serial number	Parts name	Functional descriptions
1	Clamping cylinder	Automatic clamping welding nozzle
2	Locater block	Fixing welding gun sprayer nozzle
3	TCP positioning pin	TCP positioning points
4	Reamer protective cover	Preventing ejection of splash
5	Motor mounting base	Adjusting height of pneumatic motor
6	pneumatic motor	Driving reamer for cleaning
7	welding slag collection box	Collecting welding slag
8	Air source processing unit(optional)	Providing dry lubricant air source
9	Anti-sling Unit	Spraying anti-sling agent
10	Air connection port	Connecting 8mm air pipe
11	8-pin Aviation plug	Controlling interface by robot
12	Nozzle cleaner support(optional)	Elevating the height of the cleaner
13	Wire shearing device	Wiping out needless welding wire

5 Installation



4.1 Preparatory work
Warning! Necessary protective measures must be taken when the installation is conducted
in the robot operating area. Measures should be taken to ensure the safety of the staff and always keep them working in a certain region . Please strictly obey the safety requirements in the safety instructions!

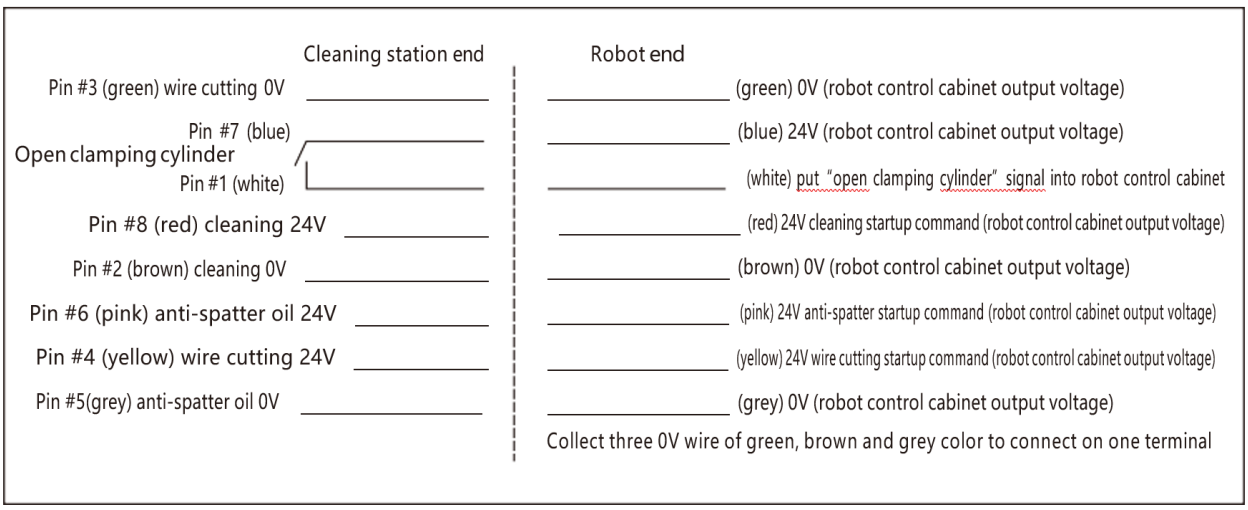
4.2 Installation of welding gun cleaner
After selection of the installation area, please follow the instructions described below:
● The nozzle cleaner should be placed in the restricted area of the robot.
● The nozzle cleaner must be placed in a waterproof and dry environment.
● Before start-up, the gun cleaner station must be firmly fixed in the specified location. The 4 bolt holes on the base of the torch cleaner are use to fix the cleaner, and the support is used as an accessory to fix the gun cleaner on the ground. The support must be fixed on the ground with firm bolt, then the station will be firmly fixed to the support by bolts.
● The gun cleaner must be placed within the operating range of the robot, in doing so, the robot arm can
smoothly place the welding gun or nozzle vertically into the gun cleaner.
Maintenance can be carried out from each side of the gun cleaner.

6 Compressed air source

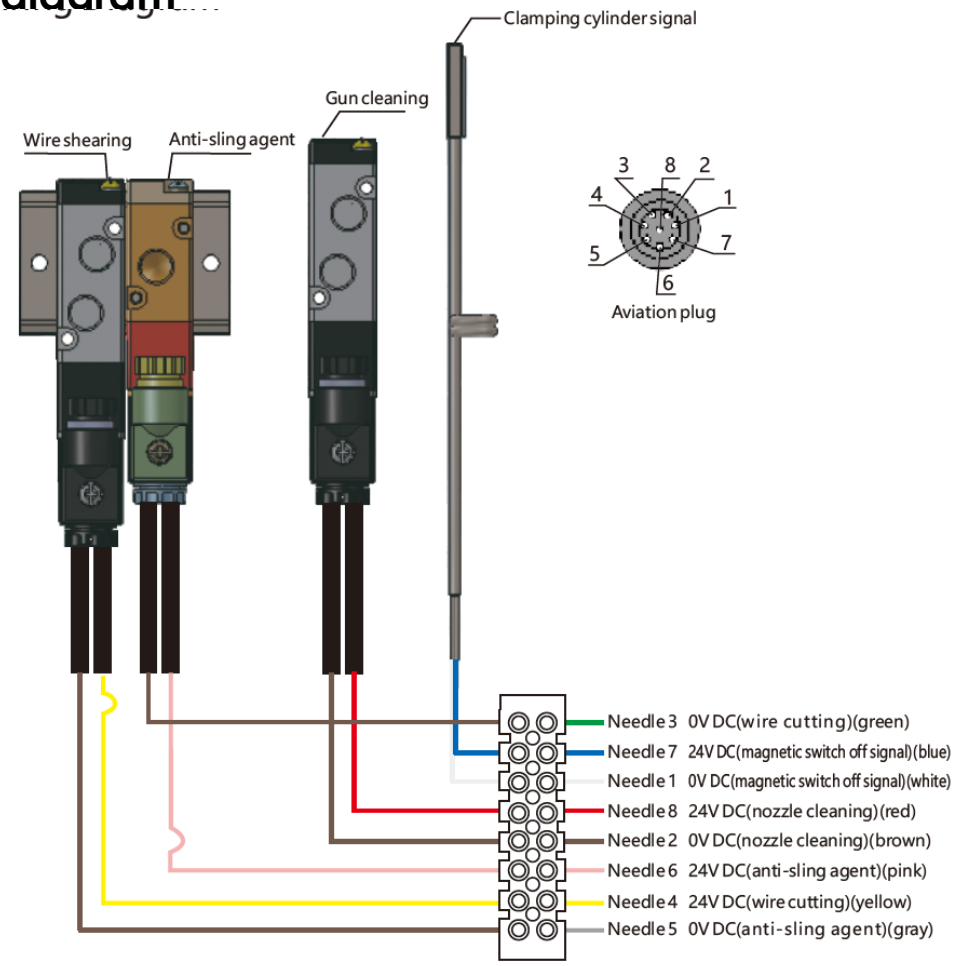
1. 8mm air pipe is inserted into the air source connector, with the air pressure of 6-8bar.
2. It's recommended to install oil-water separator or air source processing equipment to the upstream of gas source of the gun cleaner, and the pressure is adjustable, the maximum air flow rate should be no more than 1000L/min, which will greatly increase the service life of pneumatic components.

7 Circuit connection with robot

The gun cleaner station must be provided with rubber power cord to control the entire process, generally, the device is controlled by robot.



8 Wiring diagram

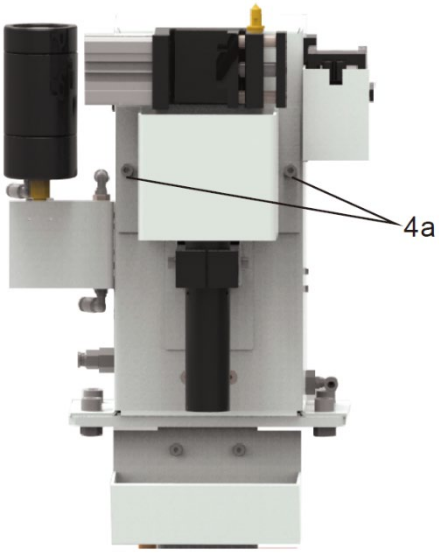


9 Assembly of welding gun

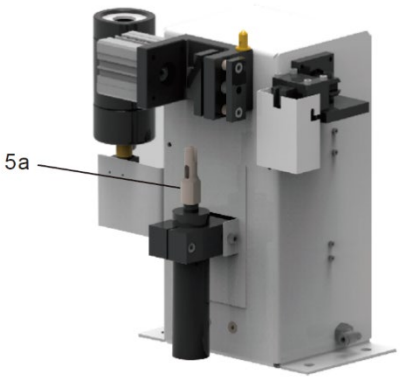


Danger!
Be sure that the nozzle cleaner is off prior to the following operations.
The connection between air source (7) of the nozzle cleaner and the connector to robot (8) must be disconnected, and the aviation plug should be taken out.
Please strictly obey the safety requirements in the safety instructions!

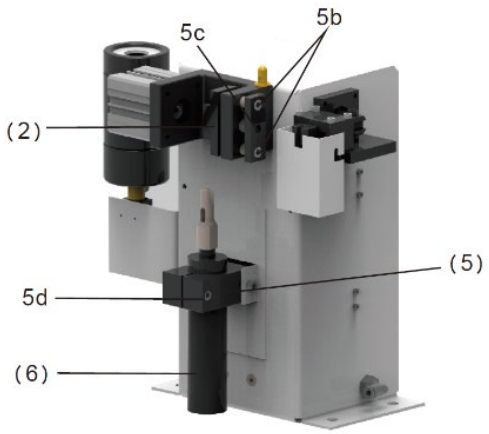
1.Reamer adjustments
1.1 Unscrew the two socket head cap screws (4a) on the reamer
protective cover(4) with tool ,remove the protective cover (4)
of the reamer.



1.2 Replace the reamer, fix the pneumatic motor head with one
wrench, then unscrew the reamer (5a) counterclockwise with
another wrench, tighten the new reamer (5a)clockwise.



1.3 Place the welding torch above the cleaner, make sure the welding torch nozzle at the center of the reamer and parallel to the reamer.
Adjust the height of welding torch, the clamping cylinder clamp the cylindrical part of the torch nozzle.

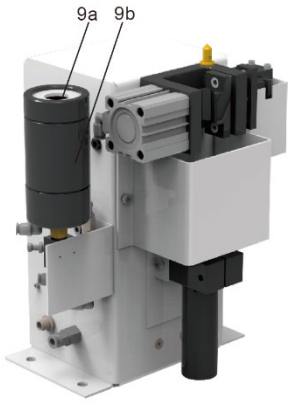


1.4 Manually push up the cleaner motor until the reamer enters the welding gun nozzle. The gap between the reamer and the welding gun nozzle is identical around the circumference.If necessary, adjust the position of the welding torch.
1.5 Remove the welding gun nozzle, check whether the reamer uniformly wraps the contact tube.
1.6 Gently move the welding torch vertically up, remount the welding torch nozzle.
1.7 Loosen the 2 outer hexagon bolts (5b) with a wrench.
1.8 Adjust bolt (5c) with a wrench to make the fixed block (2) of the welding gun nozzle to fix the nozzle. Ensure that the torch neck is not pushed to the other side. Note: This is the locating position. Double check the gun nozzle is parallel to the reamer and nozzle fixed block; Check to ensure the nozzle is locked on the cylinder surface by the clamping cylinder. If necessary, make adjustment in a timely manner.
1.9 Now tighten the 2 outer hexagon bolts(5b) with uniform strength
1.10 Remove the torch nozzle.
1.11 Move the welding torch to the cleaning position.
1.12 Loosen the bolts (5d) on the pneumatic motor support with a wrench. Move the pneumatic motor upwards, tighten the bolts.
1.13 Manually push up the whole gun cleaner, i.e., the pneumatic motor (6) and the motor support (5), and stop at the highest position. At this position, check the distance required for reamer to enter the nozzle.
1.14 If the depth that reamer reaches into the welding torch is not deep enough, loosen the bolts (5d) on the pneumatic motor support (5), move the pneumatic motor and the support upwards accordingly to the required depth and re-tighten the fastening bolt.
1.15 Manually push up the nozzle cleaner again, namely, the motor (6) and the support (5), until it cannot be moved any more, if the depth in which rotation reamer inserted into the welding gun is still not deep enough, readjust the motor position.
1.16 Repeat steps i and j, until the rotation reamer inserts into the welding torch at an accurate depth, that is, when the whole torch cleaner is pushed up to the highest position, ensure that the reamer doesn't contact any parts of the welding torch head. Any contact to the welding torch will cause damage to the parts such as the welding gun or the rotation reamer.
1.17 After the final adjustment of the position, tighten the fastening screws.
1.18 Mount the reamer protective cover (4) and tighten the two socket head cap screw (4a).

Note!
Regularly check whether the torch cleaner (pneumatic motor / support) is free to move up and down. In the replacement of contact tip, nozzle, diffuser and insulating sleeve, please pay attention to the effect to the nozzle cleaner.
When the reamer enters the welding gun, any contact to the nozzle, diffuser or insulating sleeve should be avoided!

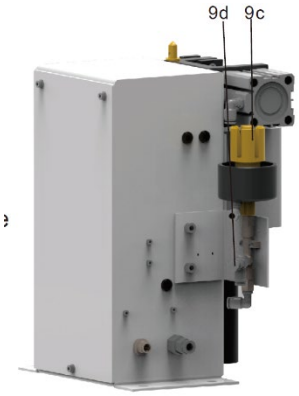
2.Anti-sling agent debugging

2.1 Unscrew the upper cover (9a) of the anti-sling agent box and the box body (9b) counterclockwise.



2.2 Move the welding torch above the anti-sling agent positioning column (9c), vertically move the welding torch downward until a small gap exists between the torch and the positioning column (9c). At this time, the torch position is the position of the anti-sling agent.
2.3 The usage amount of anti-sling agent depends on the air pressure and the valve settings. Under the fixed air pressure, the emitted dose of the anti-sling agent is adjusted by regulating valve (9d).
2.4 If anti-sling agent isn't sprayed to the inner region of the welding torch head, agent dose should be increased; if anti-sling agent drops from the gun sprayer nozzle, agent does should be reduced.

3.Determination of wire-cutting position
3.1 Adjust the welding torch to specified height in front of the wire cutting machine, and set a starting point.
3.2 Insert the welding torch into the wire cutting machine, ensure that the welding gun is parallel to the wire shearing blade and placed in the middle of two blades. Make sure that the gun nozzle won't touch the outer shell of wire cutting machine.In the robotic system, this action is stored as a 'wire cutting' process.
3.3 At this position, the robot sends out a "wire cutting" signal. The signal should last about 0.5 seconds.
4. Preparatory work of the nozzle cleaning station is ready
4.1 Reconnect the nozzle cleaner control wire and the compressed air.
4.2 Trigger the fuel spray device, if necessary, repeat spraying the anti-sling agent, until the agent is evenly sprayed.



Note：
After the gun cleaner is pressurized, it will perform temporarily automatic injection. Ensure that nobody is in the effective region of the fuel spray nozzle. The relevant operations of the gun cleaner can be used to release or control the fuel spray machine. After compressed air is connected to the nozzle cleaner, the cleaner might be activated unexpectedly. Make sure that nobody stays there, and safety prevention actions should be taken when close to the cleaner! There is the danger of generating severe shearing or squeezing injuries, besides, clothing or hair might be rolled into a rotating part!

10 Start-upcleanercontroller



Note!
Prior to starting the nozzle cleaner system, all the assembly must be checked in accordance with the manufacturer's instructions and application safety rules.

In order to ensure that the gun cleaner has been completely assembled, the following points must be checked:
1. The nozzle cleaner should be placed at a permanent stable position in the robot unit.
2. The equipment should be installed in the isolation region, and people are evacuated from the nozzle cleaner station during the operation of the equipment.
3. The assembly of the nozzle cleaner should be completed and correct (reamer, wire shearing blade, anti-sling agent, protective cover).
4. The overall installation process should be completed.
5. The mandatory nozzle cleaning program should be installed to the robot program.
6. All wires and pipelines have been fixed properly to prevent damage and destruction.
7. Make sure all technical parameters are right.
The nozzle cleaner is now ready to operate.

11 Service and maintenance



Note!
Prior to maintenance in the robot working region, for safety purpose, necessary
protective measures must be taken, and people should stay at where they are.
Strictly obey the relevant requirements in "safety instructions"!

The following are appropriate maintenance measures that should be taken on the CS2 pneumatic gun cleaner system at different time intervals:
Daily:
★ Check the liquid level of the anti-sling agent box.
★ Check all exposed wires to ensure that no damage occurs, such as breaking and tearing.
★ Check to determine whether the reamer is damaged, such as breaking and tearing
★ Use compressed air to clean the reamer
★ Check the cleaning effect
Monthly:
★ Blow the nozzle cleaner with compressed air.
★ Remove the anti-sling agent attached on the nozzle cleaner.
★ Check to ensure that all bolts are fastened in place
If damage of the nozzle cleaner is detected, usage is only permitted after repairing by professional personnel. If necessary, the whole nozzle cleaner must be replaced for maintenance.



Note !
The following instructions must be obeyed to prevent injury or damage to the system or individuals.
1. Maintenance can only be carried out by experienced personnel.
2. Improper maintenance or operation mighty lead to accidental injury.

12 Reamer specification

Nozzle Inner diameter (mm)	Contact tip external diameter (mm)	Reamer external diameter (mm)	Reamer inner diameter (mm)	Pneumatic welding torch cleaner article number	Article number of electric welding gun cleaner
10	6	9	7	ANC-0907-40	ENC-0907-40
11	6	10	7	ANC-1007-40	ENC-1007-40
12	6	11	7	ANC-1107-40	ENC-1107-40
13	6	12	7	ANC-1207-40	ENC-1207-40
13	8	12	9	ANC-1209-40	ENC-1209-40
14	8	13	9	ANC-1309-40	ENC-1309-40
15	8	14	9	ANC-1409-40	ENC-1409-40
16	8	15	9	ANC-1509-40	ENC-1509-40
13	9	12	10	ANC-1210-40	ENC-1210-40
14	9	13	10	ANC-1310-40	ENC-1310-40
15	9	14	10	ANC-1410-40	ENC-1410-40
16	9	15	10	ANC-1510-40	ENC-1510-40
15	10	14	11	ANC-1411-40	ENC-1411-40
16	10	15	11	ANC-1511-40	ENC-1511-40
17	10	16	11	ANC-1611-40	ENC-1611-40
18	10	17	11	ANC-1711-40	ENC-1711-40
18	12	17	13	ANC-1713-40	ENC-1713-40
19	12	18	13	ANC-1813-40	ENC-1813-40
20	12	19	13	ANC-1913-40	ENC-1913-40

1. Choose the correct specification of reamer according to the contact tip and the nozzle.
2. The reamer inner diameter should be 1mm larger than external diameter of the contact tube.
3. The reamer external diameter should be 1mm smaller than inner diameter of the nozzle.
4. Reamers of more specifications can be customized.

13 Trouble Solution guideline

Problems	The possible reasons	Corrective action
Gun cleaner does not start	No compressed air in the gun cleaner station	Check connection and air source
	No signal input by robot control site	Check the connection and the program, check the signal, check the control wire of the nozzle cleaner.
Clamping cylinder opening signal does not start	Program order error	If necessary, check the compressed air source and its settings.
	Circuit connection error	Check the connection and the program, check the signal, check the control line of the gun cleaner.
Cleaning effect is not desirable	Reamer error	Change the reamer according to the reamer selection table, if necessary, replace it.
	Reamer damaged or badly worn	Replace the reamer.
	Reamer isn't aligned to the gun neck	Change the reamer according to the reamer selection table, if necessary, replace it.
	Splatter and welding slag difficult to be removed are on the welding gun	Confirm that the infiltration of anti-sling agent is normal, increase the injection quantity of anti-sling agent,only use the recommended anti-sling liquid
Cleaning begins before the cleaning signal is sent by the robot	Control line connection error	Check the circuits according to the circuit diagram
	Short circuit or loosening plug or control line	Detection and exclusion
Wire cutting machine does not work	No compressed air	Check the compressed air source
Abnormal function of fuel spray unit	Program order error	Check the compressed air source
	No anti-sling agent	Ensure the correct infiltration of anti -sling agent,if necessary,adjust nozzle of the anti-sling agent;If necessary, increase the supply of anti-sling agent

NOTES:

EDRtorches, S.L.
Calle Miguel Angel Blanco 28
CP. 46138-Rafelbuñol-Valencia-Spain.
0034 963 558 893 – infor@edrtorches.com
www.edrtorches.com

www.edrtorches.com