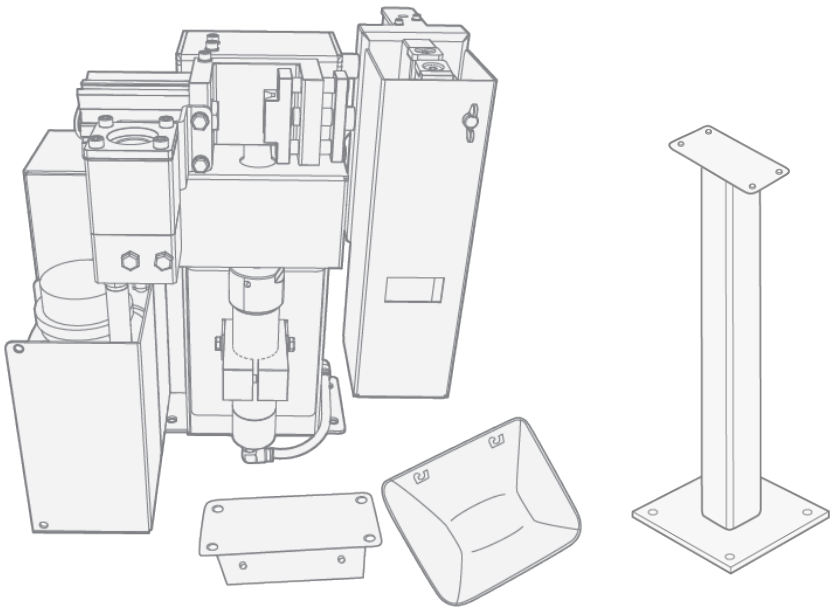
GX-R Cleaning & Cutting Station



CONTENTS

1. GENERAL

These instructions describe the GX-R Cleaning & Cutting Station equipment used as a part of a robotic welding station for cleaning the robot welding torch gas nozzle. The equipment consists of the cleaning device, the wire cutter device and the stand for the assembly.

Read all the instructions related to your robot welding station carefully. For your own safety, and that of your working environment, pay particular attention to the safety instructions delivered with the equipment.

The equipment mentioned in this manual is intended for professional use in an industrial environment.

Disclaimer

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2. SAFETY

Safety information and symbols

The design of the device is based on state-of-the-art technology and generally accepted safety regulations. Commissioning, operation, maintenance and repair of the device shall only be performed by qualified personnel with welding experience. They shall read, understand and observe the complete operating instructions. Always keep the operating instructions on site. All danger and safety signs must be clearly readable and should not be removed or damaged. They shall not be covered, pasted over or defaced.

Operator errors and misuse can lead to risks for:

- life and limb of the operator
- the device and other assets of the operator
- the efficient operation of the device.

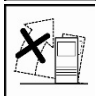
Keep other people, especially children, away from the operating area during operation. If, however, persons are present in this area, they must be thoroughly instructed regarding all current safety requirements. The safety regulations and accident prevention regulations of the respective site and country shall be strictly adhered to.

Never reach into the cleaning reamer or wire cutter during operation. There is a high risk of injury, especially crushing of or cuts to the upper extremities. There is also a risk of limbs or clothing being pulled into the cleaning device.

Electric shocks can be fatal. Never touch live parts on the inside or outside of the device. All cables must be secured, undamaged and insulated. Defective cables and connections must be replaced immediately. Only operate the device on a network equipped with earthed conductors. The device must be checked regularly by a qualified electrician. Always disconnect power supply when working on the device.

Keep out of the robot's working area. Observe the safety information when the device is integrated into the main system. Also observe the safety instructions of the robot manufacturer.

The device is only safe to operate when assembled, installed and maintained by trained personnel. Commissioning and maintenance should only be performed by authorized and qualified personnel.



The device can tip over and endanger peoples' lives. Make sure the device cannot overturn. Properly assemble and install the device on an even, solid and vibration-free base and mount it securely.

Never carry out any modifications or attach additional components without the manufacturer's permission. Additional components may only be attached with the express authorization of manufacturer. Only use original replacement parts or wearing parts. All defective parts must be replaced immediately.

Besides periodical check of the device by a qualified electrician, a safety check is required after each modification to the device, after removal or addition of components and after repairs and maintenance or at least every 12 months.

Caution, the device starts fully automatically.
The site operator must integrate this product into a master safety system if installed in an area that must be accessible for adjustment and maintenance work. In these instances, it is necessary to ensure that the overall plant is shut down and secured against accidental operation, e.g. as a consequence of a control malfunction.

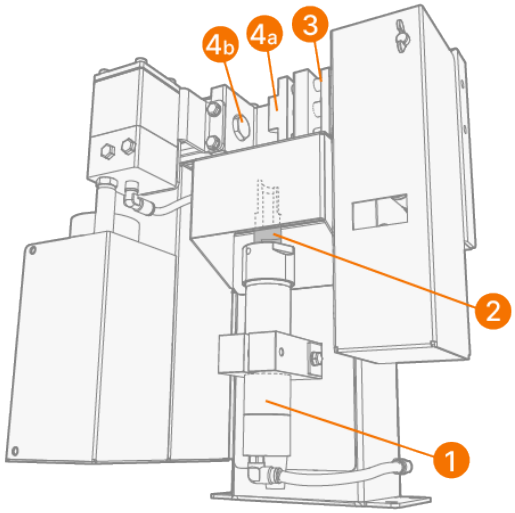
Protect hands, face and eyes from flying cutting scrap and anti-spatter fluid!
Trained personnel working with the device must wear protective goggles. There is a risk of eye injuries caused by anti-spatter fluid leaking from the device and dirt particles from the weld metal. If anti-spatter fluid or dirt particles do come in contact with eyes, consult a doctor immediately. Protect hands, face and eyes from flying cutting scrap and anti-spatter fluid.

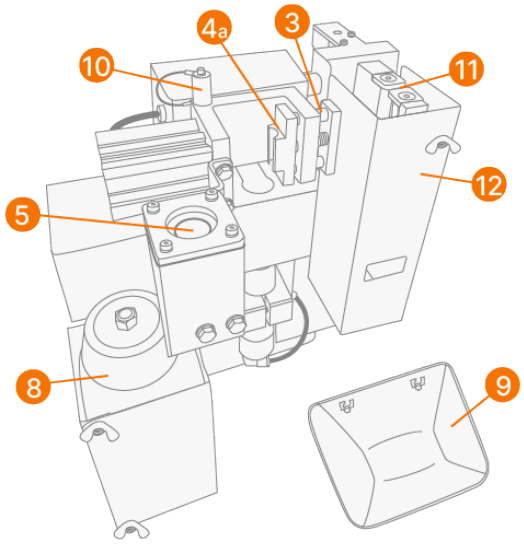
Other important notices for GX-R Cleaning & Cutting Station

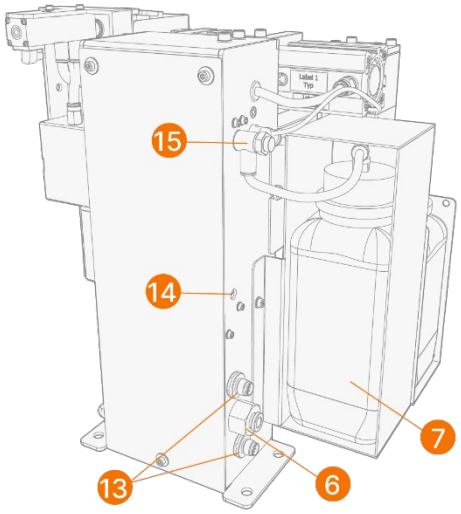
1. The **GX-R Cleaning & Cutting Station** should be used exclusively as a gas nozzle cleaning device within the scope of its technical data.
2. During assembly, commissioning and maintenance, ensure that the **GX-R Cleaning & Cutting Station** is never accidentally put into operation. The **GX-R Cleaning & Cutting Station** may be activated automatically or unintentionally by other people. Accidental activation is also possible when the 5/2-way solenoid valve is operated manually.
3. The specified operating pressure of max. 8 bar must not be exceeded. The compressed air supply should be properly connected to the air supply.
4. The specified operating voltage of 24 V DC must be strictly adhered to. The **GX-R Cleaning & Cutting Station** must be properly connected according to the wiring diagrams given in these instructions.
5. When performing maintenance work, the compressed air and 24 V DC power supply must be interrupted. Failure to comply may result in a risk of injury from exploding **GX-R Cleaning & Cutting Station** parts and a risk of fatal electric shock. When interrupting the compressed air and power supply, it must be ensured that the device is depressurized and de-energized for the duration of the work.
6. As a standalone unit, the **GX-R Cleaning & Cutting Station** should only be operated with the casing closed. The casing should only be removed for maintenance operations.
7. If the **GX-R Cleaning & Cutting Station** is operated under conditions where caustic or aggressive vapours or fluids are present, the manufacturer must be consulted for approval.
8. When shutting down the installation, ensure that no handling devices (e.g. robots) are inside the **GX-R Cleaning & Cutting Station**.
9. Before starting installation work in the working range of the robot, for your own safety, make sure that all safety measures have been taken and will remain in effect while you are in the danger area.
10. Keep the **GX-R Cleaning & Cutting Station** insulated/isolated from the welding ground contact (welding equipment's earth return connection). Failure to do so may result in interrupted wire inch during the wire cutting procedure due to accidental contact.

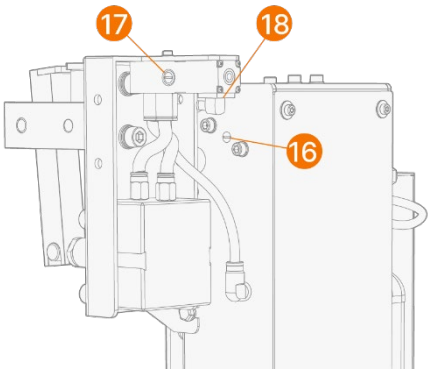
If questions arise in connection with these instructions that cannot be fully answered, always consult with the manufacturer before initiating any activity.

3. EQUIPMENT PARTS









Pos.	Description
1	Pneumatic motor
2	Cleaning reamer
3	Gas nozzle fixing and adjustment unit
4a	Gas nozzle fixing piece
4b	Gas nozzle clamp
5	Spraying cylinder - Leather encapsulated external spraying - Spray nozzle, d=2.0 mm, aluminum SW8, L=16 mm, M6 thread
6	Air connection, 1/4", complete
7	Plastic bottle for anti-spatter fluid, 1 liter - Recommended anti-spatter fluid AOS-75R
8	Plastic bottle 0.75 l, filter venting
9	Dirt collector
10	Robot measuring spike with protective cap
11	Wire cutters
12	Wire cutter housing
13	M12x1 device plug, 4-pin, mounted on housing
14	Manual activation of reamer up/down drive and nozzle clamp
15	Fluid hose connector and valve for adjustment (dosage connection)
16	Manual activation of fluid spray
17	Manual activation of wire cutter
18	Connector for wire cutter solenoid

For spare parts list, contact your local Kemppi representative.

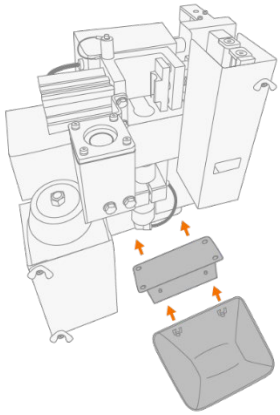
4. INSTALLATION AND PROGRAMMING OF GX-R CLEANING STATION

The **GX-R Cleaning & Cutting Station** may be installed in any position and direction with some restrictions: **the plastic container for anti-spatter fluid must always be vertical**. If necessary, the bottle holder, as well as the container for anti-spatter fluid, must be rotated accordingly.

Keep the **GX-R Cleaning & Cutting Station** insulated/isolated from the welding ground contact (welding equipment's earth return connection). Failure to do so may result in interrupted wire inch during the wire cutting procedure due to accidental contact.

Warning: the device can overturn and pose an immediate danger to life. Secure the **GX-R Cleaning & Cutting Station** on a vibration-free foundation using four M8x16 screws. Alternatively, you can also use the available support for the **GX-R Cleaning & Cutting Station**, and properly install using washers, spring washers and nuts.

Install the dirt collector holder to the underside of the gas nozzle cleaning device and install the dirt collector cup. Note that the holder itself must be installed under the cleaning station's base plate.



Risk of accidents when making pneumatic and electrical connections!
Please observe the safety information in the "Safety" chapter.

Cleaning reamer / Selecting cleaning reamer

Before commissioning, check that the proper gas nozzle cleaning reamer for the welding torch has been installed. Non-compliance may cause a high risk of damage to the welding torch.

For selecting the proper cleaning reamer, the internal diameter of the gas nozzle to be cleaned must be established. In addition, the external diameter of the contact pipe or the welding tip must be determined.

The external diameter of the selected cleaning reamer should have a diameter of at least 0.5 mm smaller than the internal diameter of the gas nozzle. The diameter difference may be up to 1 mm to achieve good cleaning results.

The internal diameter of the selected cleaning reamer should have a diameter of at least 0.5 mm bigger than the external diameter of the welding tip or contact pipe. The diameter difference may be up to 1 mm to achieve good cleaning results.

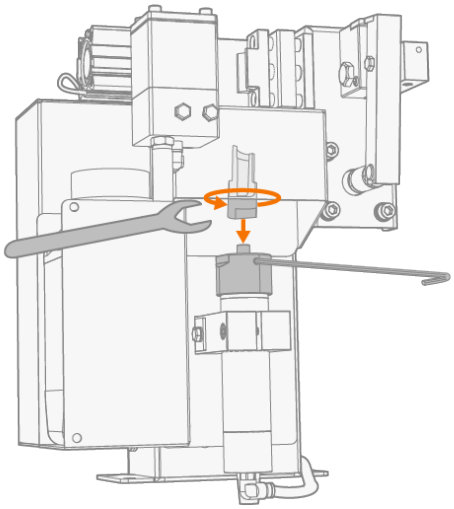
In the following table, you will find an overview of the available standard reamers for Flexlite GXe and GX-R welding torches. Special sizes are available on request.

GX-R	M10	W011483		W021182	SP801288
				W021186	SP801297
				W026133	SP801298
				W026194	SP801299
				W026208	SP801300
		W013203		W021182	SP801301
				W021186	SP801302
				W026133	SP801303
				W026194	SP801312
				W026208	SP801304
GXe-C				W026193	SP801299
				W026193	SP801312

Reamer compatibility with Flexlite GXe and GX-R.

Replacing cleaning reamer

For replacing the cleaning reamer, a hole is provided on the side of the motor cap used for fitting the motor cap. Use a screwdriver or similar tool to hold the motor cap in place when tightening or untightening the cleaning reamer in place.



As an alternative to the above method, there is a 36 mm flat section in the top part of the motor cap, which can also be used to hold the motor cap stationary with a suitable wrench.

Turn the cleaning reamer anticlockwise to remove it from the motor cap, or clockwise to tighten it in place. The cleaning reamer itself is equipped with a 17 mm flat section for a wrench for this purpose.

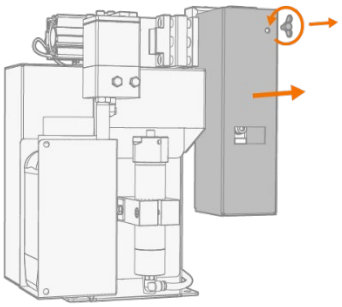
Observe the safety information!

Setting up cleaning reamer and gas nozzle

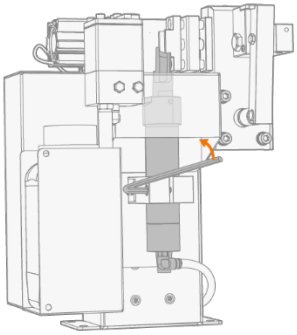
The insertion depth of the cleaning reamer must be determined based on the torch and reamer geometry. As required, you can shift the clamped motor vertically on the motor holder using the clamping screw (Allen screw) at the front.

After shifting, you must retighten the clamping screw properly. **Non-compliance will result in a risk of damage/destruction of the robot torch.**

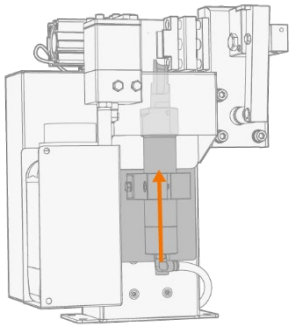
1. **Interrupt the compressed air supply until work is finished!**
2. If the wire cutter housing is in place, remove it.



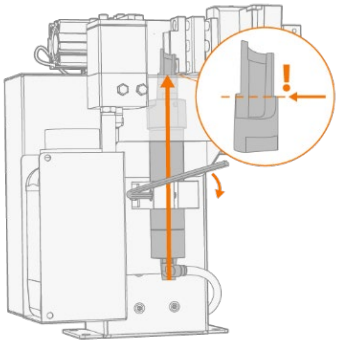
3. Loosen the Allen screw in the motor holder.



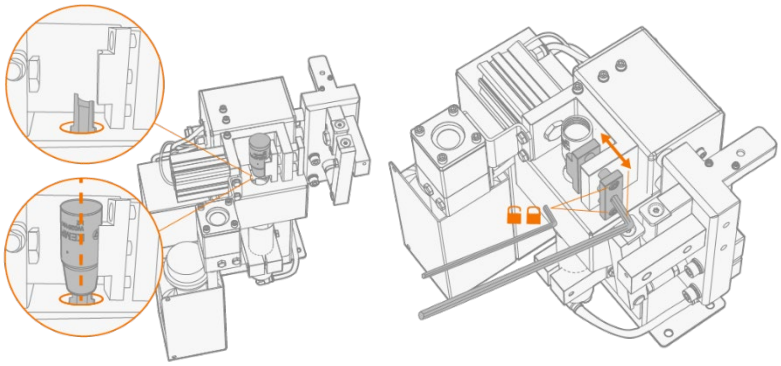
4. Bring the motor holder into the topmost position.



5. Manually push the motor with the cleaning reamer mounted into the cleaning position.
6. Tighten the Allen screw to fix the cleaning motor in this position in the motor holder.



7. Place and hold the detached gas nozzle in the cleaning position, with the bottom edge of the gas nozzle positioned about 1-2 mm above the reamer casing.
8. Adjust the gas nozzle fixing piece against the gas nozzle so that the cylindrical surface of the gas nozzle is in parallel contact with the gas nozzle fixing piece.



9. Functional test with the welding torch in cleaning position and gas nozzle detached:
   - Bring the lifting device manually into the topmost position
   - The cleaning reamer must surround the welding head parts without touching them.
10. Functional test with the welding torch in the cleaning position and gas nozzle attached:
    - Bring the lifting device manually into the topmost position
    - The gas nozzle reamer must go into the gas nozzle without touching it.

Anti-spatter fluid to be used

Only use AOS-75R as the anti-spatter fluid. Other anti-spatter fluid can result in significant reductions in function. In the case of damage, all warranty claims are invalidated.

Check the anti-spatter fluid and fill level in the plastic container on a regular basis.
Approx. 15-20 mm^3 of anti-spatter fluid is enough for each spraying. The amount of anti-spatter fluid is relative to the respective application.

The following generally applies: Use only the necessary amount of the anti-spatter fluid.

Manual function test with manual operation

You can test the basic function of the gas nozzle cleaning device using a screwdriver and by manually activating (item 14) the reamer up/down drive and nozzle clamp. No electrical connection is required if 6 bar/87 psi is applied to the device.

Spraying gas nozzle with anti-spatter fluid

Observe the safety instructions when using anti-spatter fluid.

After the gas nozzle has been cleaned, the pneumatic motor runs back to the start position.

The gas nozzle is not tensioned when it is in the motor's start position. This is indicated by the limit switch of the clamping cylinder being open. After cleaning the reamer, run the robot torch gas nozzle to a depth of approximately 5 mm into the spraying cylinder (item 5) so that the leather seals the inside of the cylinder. The diameter of the leather must be about 1-2 mm less than the external diameter of the gas nozzle.

The system sprays anti-spatter fluid into the gas nozzle by switching the robot output. Anti-spatter fluid is suctioned from the 1-liter plastic container, it exits the spray nozzle inside the spraying cylinder and dampens the gas nozzle inside and in front of the head with anti-spatter fluid. Choose the distance from the spray nozzle to match the desired dampening effect.

The recommended spraying time is 0.5 seconds. You can, however, vary it via the robot output. Adjust

the spraying amount using the setting screw on the throttle valve. Turning it clockwise yields less anti-spatter fluid, turning it anticlockwise yields more anti-spatter fluid. The recommended setting is approximately two rotations open. For information on specifying the amount, refer to the Maintenance section.

When commissioning the device, use a flathead screwdriver to operate the manual actuation of the spray valve (item 16) until the spray mist is visible on the spray jet (rotate by about 90° clockwise to spray, and by about 90° counterclockwise to stop spraying). After manual actuation, turn the manual actuation screw back to the original position.

The following generally applies: Use only the necessary amount of the anti-spatter fluid.

To catch excess anti-spatter fluid, place the 0.75 liter bottle in the bottle holder. The excess anti-spatter fluid flows from the spray cylinder into the bottle via a hose. **Empty the 0.75 liter bottle on a regular basis.**

Spraying via dosage connection

The station is equipped with a fluid hose connection including a dosage adjustment valve. At the dosage connection, the spraying quantity of the anti-spatter fluid is determined and changed only via the time of the robot output. Recommended spraying time is 0.4 to 0.6 seconds.

Purging through robot hose package

While the robot welding torch is moving in the gas nozzle cleaning device and in its immediate vicinity, you must not carry out purging (at high pressure) from through the hose package.

Information on robot program sequence

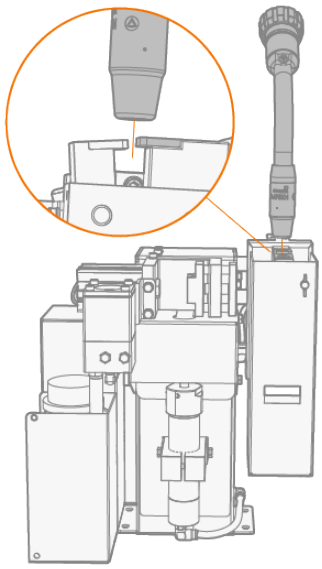
1. Input S1 ´Limit switch of clamping cylinder back/open´, X2/4 = I.
   (GX-R Cleaning Station is ready for operation and in the initial position.)
2. Move the torch into cleaning position.
3. Set cleaning output, X1/3 = I, (solenoid valve Y1=I).
   Length 3 - 5 seconds until motor is in end position at top.
   (Pneumatic motor rotates, gas nozzle is clamped, sliding unit moves upwards.)
4. After setting cleaning output: After about 1.5 seconds poll whether S1 ´Limit switch of clamping cylinder is back/open´, X2/4 = 0. *(If gas nozzle is not clamped: EMERGENCY STOP.)*
5. Signal S2 ´Limit switch of motor at top´ after 3-5 seconds PIN X2/2 = I, if not: EMERGENCY STOP.
6. Cancel cleaning output, X1/3 = O, (solenoid valve Y1=O).
   (Sliding unit moves downwards. If at bottom, pneumatic motor stops, clamping cylinder of gas nozzle opens.)
7. If motor is in initial position, Signal S1 ´Limit switch of clamping cylinder back/open´, X2/4 = I.
8. If S1 ´Limit switch of clamping cylinder back/open´, X2/4 = I does not return after 8 seconds from start of cleaning, EMERGENCY STOP.
9. Run the robot to the spraying position.
10. Set spray output for time T, X1/1 = I, (solenoid valve Y2=I).
11. Do not run torch from cleaning position until spraying time T has elapsed.

5. PROGRAMMING AND OPERATION OF GX-R CUTTING STATION

Keep the **GX-R Cleaning & Cutting Station** insulated/isolated from the welding ground contact (welding equipment's earth return connection). Failure to do so may result in interrupted wire inch during the wire cutting procedure due to accidental contact.

Programming of GX-R Cutting Station

1. Put welding torch or welding wire in cutting position.
   (Position: middle of blade, adjacent to fixed blade.)

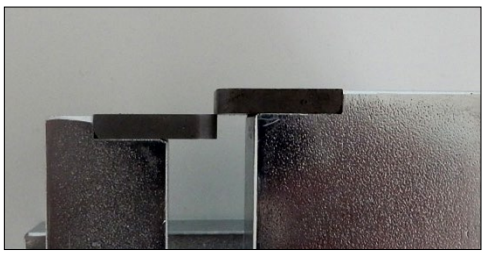


2. Set outlet 24 V DC (high) for Y4.
3. Remove outlet 24 V DC (low).
4. Wire cutter opens.
5. Bring welding torch to the cleaning position.

The **GX-R Cutting Station** wire cutter may also be operated manually during setup, provided it is connected to compressed air (6 bar).

Operation of GX-R Cutting Station

With the GX-R Cutting Station, the wire of the robot welding torch is cut off when the movable mass runs under the fixed blade.



6. MAINTENANCE

To keep the equipment operational for years, the following points regarding maintenance and service must be observed.

GX-R Cleaning Station


Each time before commissioning:

- Check gas nozzle reamer for wear, and replace if necessary
- Check fluid level of anti-spatter fluid, and top up if necessary
- Carry out a general visual check of device.

Daily:

- Remove all deposited anti-spatter fluid and contamination.

Weekly:

- Check anti-spatter fluid container for contamination.

Quarterly:

- Open device and purge with compressed air
- Lightly oil the guide shafts of the sliding unit.

Annually:

- Arrange safety check by qualified electrician, check of functions, changes in device, repair, service and maintenance status.

Note: If compressed air quality results in increased motor wear, it might be advisable, despite maintenance-free motors, to install a maintenance unit. In this case, it is important to use a suitable pneumatic oil. Contact your local Kemppi representative for more information.

GX-R Cutting Station


Before each start-up:

- Check cutter for wear, replace if necessary
- General visual check of device

Weekly:

- Check anti-spatter fluid container for contamination

Quarterly:

- Open device and purge with compressed air, carefully lubricate guide shafts of pneumatic cylinder

Annually:

- Safety check by skilled electrician, check functions, changes in device, repair, service and maintenance status

Note: If compressed air quality results in increased motor wear, it might be advisable, despite maintenance-free motors, to install a maintenance unit. In this case, it is important to use a suitable pneumatic oil. Contact your local Kemppi representative for more information.

7. TROUBLESHOOTING

Descriptions of faults, possible causes and troubleshooting with the **GX-R Cleaning Station**:

Pneumatic motor is not running

Cause: Faulty tappet valve

- Solution: Check function of tappet valve, replace if necessary

Cause: Pneumatic motor has a mechanical fault

- Solution: Check function of pneumatic motor, replace if necessary.

Pneumatic motor does not run UP/DOWN

Cause: Solenoid valve has a mechanical/electrical fault

- Solution: Check function of solenoid valve, replace if necessary

Cause: No 24 V DC supply to valve

- Solution: Check 24 V DC supply to valve

Cause: Not possible to regulate one-way restrictor

- Solution: Open and close one-way restrictor, replace if necessary

Cause: Faulty seal on sliding piece cylinder

- Solution: Replace sliding piece, if necessary, replace seal.

Robot does not run into or out of cleaning position

Cause: Gas jet signal is still set

- Solution: Check limit switch of clamping cylinder, replace if necessary.

Anti-spatter fluid is not sprayed in

Cause: Incorrect anti-spatter fluid used

- Solution: Use anti-spatter fluid recommended by the manufacturer

Cause: Spray amount too low

- Solution: Use throttle valve to increase spray amount, at 300704 length the spraying time

Cause: Spraying valve(s) blocked or faulty

- Solution: Check spraying valve(s); if necessary, clean or replace

Cause: Faulty solenoid valve

- Solution: Check function of solenoid valve, replace if necessary

Cause: Faulty tappet valve

- Solution: Check function of tappet valve, replace if necessary

Cause: Signal breaker defective

- Solution: Check function of signal breaker, replace if necessary.

Anti-spatter fluid is sprayed in unevenly

Cause: Spray amount too low

- Solution: Use butterfly valve to increase spray amount

Cause: Spraying valves set incorrectly

- Solution: Check setting of spraying valves and adjust if necessary

Cause: Spraying valve(s) blocked or faulty

- Solution: Check spraying valve(s); if necessary, clean or replace.

Gas nozzle or torch cleaned badly or damaged

Cause: Compressed air motor set incorrectly on vertical axis

- Solution: If necessary, adjust setting of compressed air motor

Cause: Gas nozzle clamped in incorrect position

- Solution: Adjust jig

Cause: Incorrect choice of reamer for the gas nozzle and welding tip in question

- Solution: Dimension the reamer correctly

Cause: Gas jet is not linear to the gas jet fixing piece

- Solution: Machine the gas nozzle fixing piece.

Welding rod bends during cleaning

Cause: Rod is soft

- Solution: Before cleaning, withdraw the rod to the tip of the welding tip.

8. TECHNICAL DATA

8.1 GX-R Cleaning Station

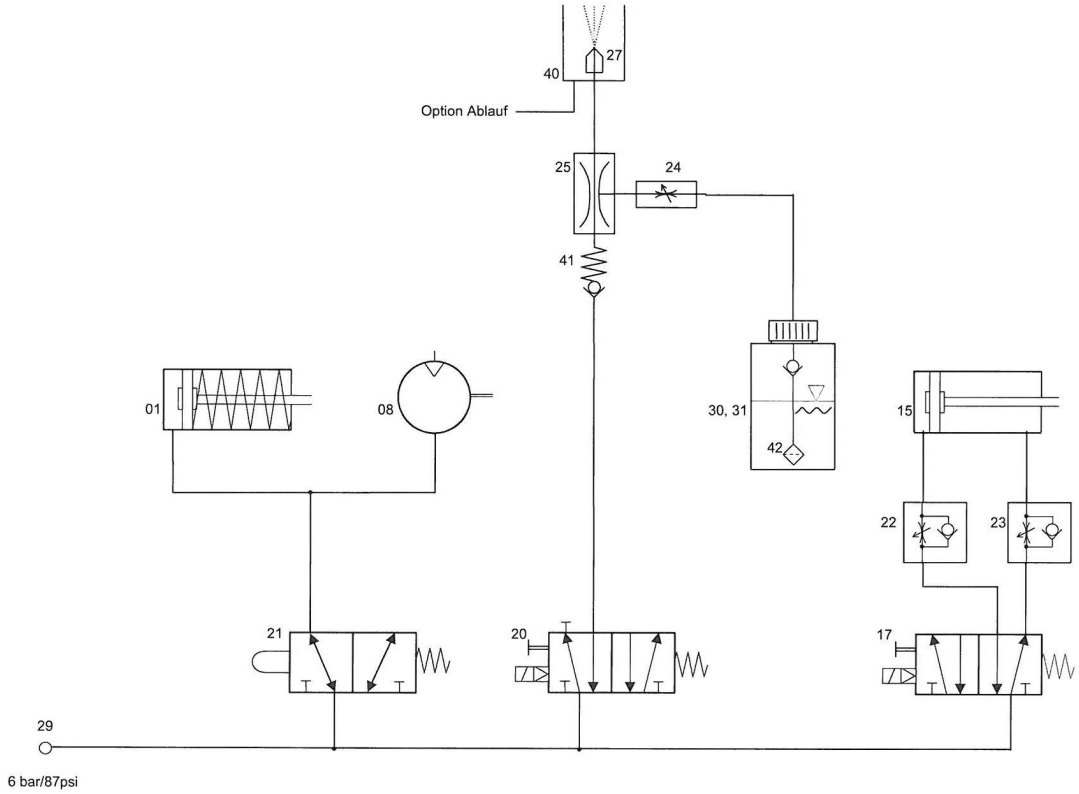
Program sequence:	Electro-pneumatic
Supply voltage:	24 V DC
Power:	I max = 0.3 A
Compressed air:	6 bar, 87 psi (max. 8 bar)
Air consumption:	~ 7 liters/second
Cleaning cycle:	~ 5-7 seconds

8.2 GX-R Cutting Station

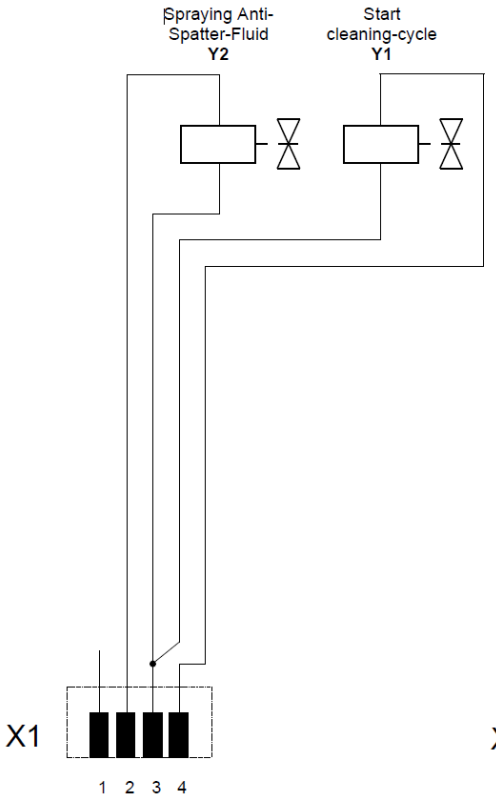
Program sequence:	Electro-pneumatic
Supply voltage:	24 V DC
Power:	I max = 0.15 A
Compressed air:	6 bar, 87 psi (max. 8 bar)
Air consumption:	0.1 liters/second

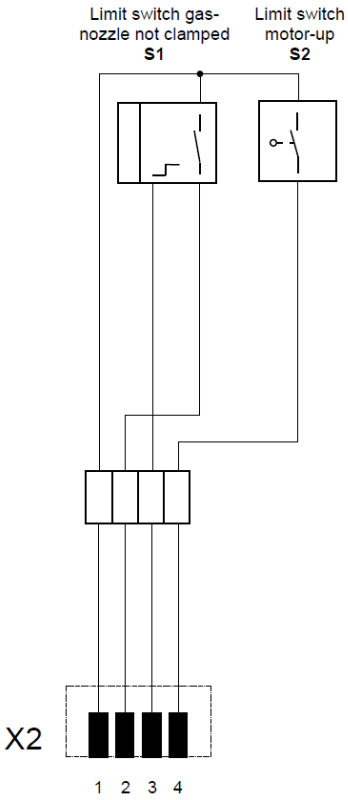
9. DIAGRAMS OF GX-R CLEANING STATION

Pneumatic system diagram of GX-R Cleaning Station



Wiring diagram of GX-R Cleaning Station





X1 top socket
Solenoid valve Y1
Motor up/down
U=24VDC
I =0.125A

Solenoid valve Y2
Spraying
U=24VDC
I =0.125A

X2 bottom socket
Limit switch S2
Motor at top
U=24VDC
I =0.01A

Limit switch S1
Clamping cylinder back
U=24VDC
I =0.01A

X1 PIN No. Designation

1 br	open
2 ws	24 VDC spraying solenoid valve
3 bl	0 VDC
4 sw	24 VDC motor up/down solenoid valve

br = brown, ws = white, bl = blue, sw = black

X2 PIN No. Designation

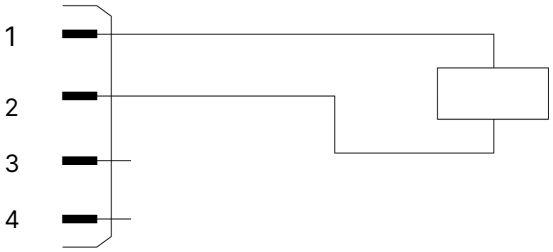
1 br	24 VDC continuous voltage
2 ws	Input of limit switch Motor at top
3 bl	0 VDC
4 sw	Input of limit switch clamping cylinder back

10. DIAGRAMS OF GX-R CUTTING STATION

Wiring diagram GX-R Cutting Station



Clamping strip
Wire cutter
Pin



Pin 1 (black) = Output Y4, 24 VDC, cut welding wire
Pin 2 (blue) = 0 VDC
Pin 3 = Empty
Pin 4 = Empty

Y4
3/2-way / 5/2-way solenoid valve
24 VDC, 105 mA

Pneumatic diagram of GX-R Cutting Station