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1.3 Introduction

The ArcSpray 600 A antiCOR automatically controlled high performance arc spray equipment is based on the experience of more than 40 years of user-oriented thermal spray technology.

This equipment combines modern ergonomic design as well as German engineering and craftsmanship to form an integrated electric arc spray power supply and control system of ultimate standard. All legal regulations - especially the German Standards VDE and VDMA - as well as the *Maschinenschutzgesetz* are observed.



This manual is part of the equipment and should be read carefully before commissioning.

Please observe that the manufacturer's guarantee expires if anything of the installation is altered or damaged due to wrong handling. This applies to any interference with safety measures too.

The legal guarantee according to German Standards VDE and VDMA will not be extended hereby.

The manufacturer warrants the equipment against defects in material and workmanship for a period of 365 days from the date of purchase.

This warranty does of course not include spares due to natural wear like contact tubes, atomizer nozzles, feed rollers, wire conduits, TEFLON® cores, etc.

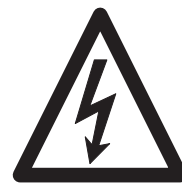
The manufacturer makes no warranties, either expressed or implied, regarding the merchantability of the equipment or its fitness for any particular purpose nor will the manufacturer in any event be liable for direct, indirect, special, incidental, or consequential damages resulting from the use of the equipment.



2 Safety Precautions

2.1 Principal Safety Rules

- ☐ Handle the antiCOR pistol carefully.
- ☐ Never point the pistol towards other personnel or combustible material. Carelessness may result in an accident or damage by fire!
- ☐ Never look into the arc zone of pistol without first ensuring that the air and power supplies to the pistol are switched off!
- ☐ Before removing the hood or side panels of the power source, always interrupt the mains, i.e. disconnect power supply cable from the power supply!
- ☐ When spraying, always use suitable respiratory protection, wear eye-shields and ear defenders!



Provided that the equipment is properly set up, regularly maintained and used correctly, electric arc spraying does not present any specific danger.

However, like most industrial processes, malpractices and careless use can create hazards for personnel and damage to equipment.

Ideally, equipment should be operated in rooms or enclosures specially prepared to extract fumes, reduce noise levels and prevent direct viewing of the spraying head.

However, in most cases the type of components being treated, or low production levels do not offer such conveniences and a number of hazards peculiar to thermal spraying are experienced in addition to those commonly encountered in production or processing industries.

To avoid accidents the following safety precautions should therefore be taken when spraying with the antiCOR pistol:

2.2 Noise

All metal spraying equipment uses compressed gases which create noise. Sound levels vary with the type of arc spraying equipment, the material being sprayed and the operating parameters. Typical sound pressure levels taken 1 metre behind the arc spray nozzle are 102-106 dB(A).

- ☐ Specially designed enclosures should be used - whenever possible - to attenuate these noise levels.
- ☐ In any case the operator and helping personnel must carry good quality ear defenders.



PANORAMA Fresh-Air
Helmet with Arc Shield



2.3 Light

Electric arc spraying produces ultra-violet light which may damage delicate body tissues. Spray booths and enclosures should be fitted with ultra-violet absorbent dark glass.

- ❑ The operator and other personnel in the vicinity should wear eye-shields including ultra-violet eye protection according to the safety standards for arc welders.
- ❑ If there is no separate spraying room available portable screens should be fitted around the unit, to isolate the arc spraying from other workshop personnel.

2.4 Dust and Fumes

The atomisation of molten materials produces a certain amount of dust and fumes. Proper extraction facilities are vital, not only for personal safety, but to minimise entrapment of re-frozen particles in the sprayed coating.

- ❑ An efficient dust extraction unit should be employed. If by special circumstance, e.g. when spraying outside, adequate ventilation cannot be provided, suitable respiratory protection should be given to operators and personnel working in the spraying area (see fig.).
- ❑ The metal spraying process, by its very nature, produces quantities of fine metallic dusts and vapours, and, while some of the metals sprayed are non-toxic, the inhalation of any dusts is unpleasant, can irritate respiratory tracts and is, therefore, highly undesirable.

Certain materials offer specific known hazards.

- ❑ All finely divided metal particles are potentially pyrophoric and none should be allowed to accumulate.

This dictates that metal spraying dusts must be adequately and safely removed from spraying rooms and areas.

Particular attention should be given to regular cleaning of any dust accumulations on walls, doors, ledges, beams and joints. Especially when spraying aluminium this is of greatest importance.

- ❑ Certain materials like aluminium and zinc may react with water to evolve hydrogen. This is potentially explosive and special precautions are necessary in fume extraction equipment - especially if water wash systems are used.
- ❑ Fumes of certain materials, notably zinc and zinc alloys are unpleasant to smell, and, in certain individuals, may cause a fever-type reaction. This may occur some time after spraying and usually subsides rapidly. If it does not, medical advice must be sought.

 **Therefore complete respiratory protection must be given to operator and adjacent personnel!**

2.5 Electricity

Electric arc pistols operate at low voltages (below 45 DC) but at relatively high currents. They may be safely hand held. The power supply units are connected to 380-400 volts AC sources

and must be treated with the normal caution afforded to such equipment.

2.6 Compressed Air

The air supply to spraying pistols is at high pressure. It should not be directed towards people.

Any breathing equipment used with the thermal spraying process must be supplied with air of breathing quality.

All OSU-Hessler power sources can be equipped with an optional breathing air pack consisting of prefilter and activated carbon filter directly connected to the front of the power source.

By rapid action hose coupling the operator's helmet can be connected, thus ensuring clean breathing air at all times which conforms to current legislation on breathing air quality.

This breathing air pack can be delivered with the complete equipment or retrofitted later whenever necessary.



Breathing Air Pack

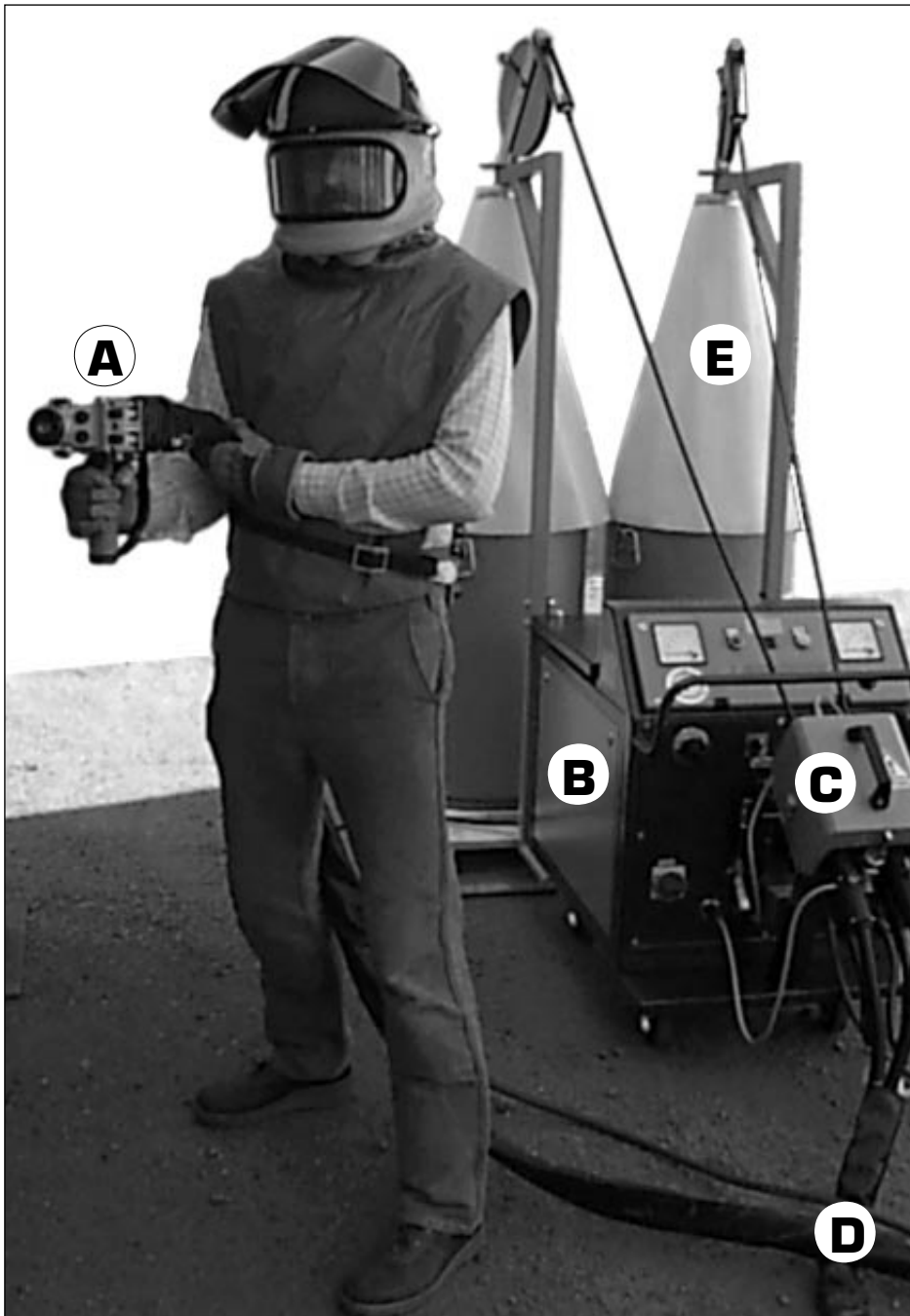
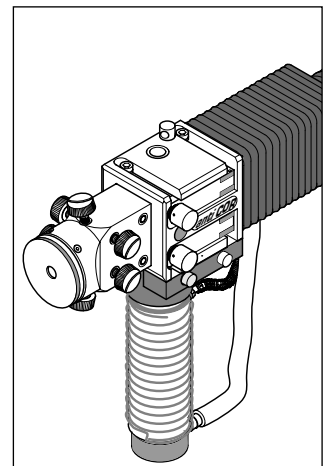


Fig. 1)
Complete Equipment

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antiCOR-Pistol

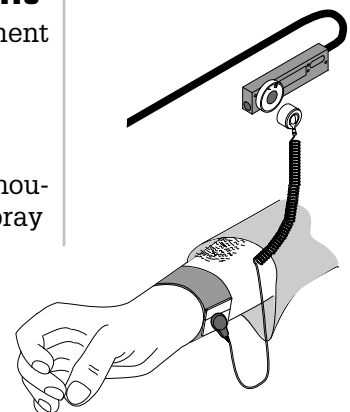


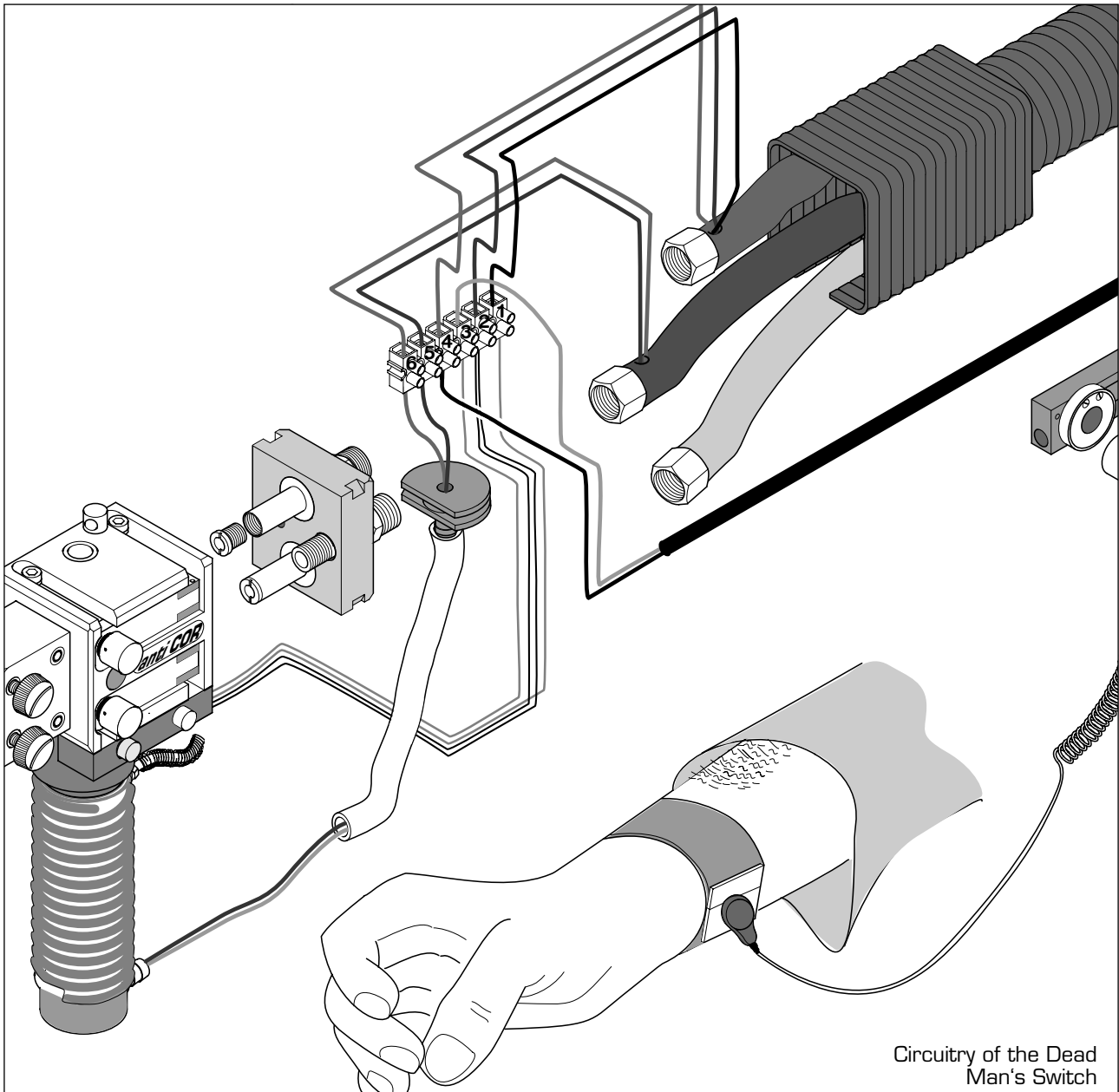
3 General Description of the Complete Equipment

Fig. 1) above shows the complete equipment. Each component is described in detail in the following paragraphs.

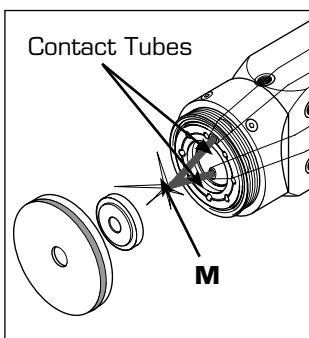
3.1 Lightweight antiCOR Pistol

The antiCOR arc spray pistol (A) consists of an insulating housing of synthetics, a nozzle assembly, which forms the spray stream from the metal as it melts in the arc and a DC-motor which simultaneously serves as handle. ON-& OFF push-button contacts are executed as dead man's switch, i.e. in case the pistol slips off the operator's hand, a contact cable connected by bracelet to the operators arm tears off and the spray process immediately stops.





Circuitry of the Dead Man's Switch



Melting Point

Two live copper contact tubes (nozzles) guide the wires to the „melting point“ M in front of the nozzle system (see fig.).

The pistol can be equipped with contact tubes for 2.0 mm or 2.5 mm wire-diam. The modern closed atomizer system was especially designed for the spraying of a very fine zinc layer structure and excellent bonding aluminium layers.

All wearing parts are exchangeable by means of only a few or no tools.

The pistol is connected with the push-feeder and power source by a cable's & hose's package. Normally the push-feeder is mounted on a small console in front of the power source or on the separate zinc wire drum's feeder

Push-feeder and somewhat faster running DC-motor of antiCOR pistol transport the two wires (electrodes) from the the twin reel wire stand or the drums feeder installation to the pistol's nozzle system. The wires meet in the „short circuit point“ and are mol-

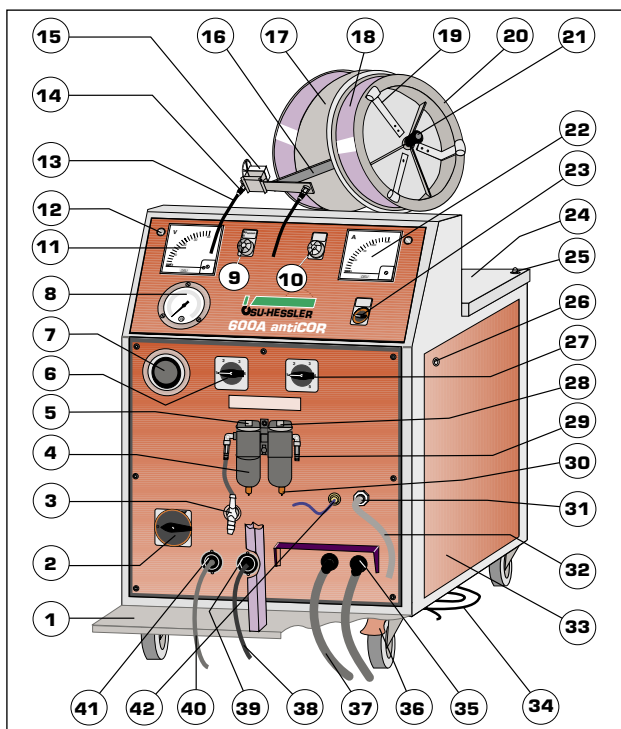
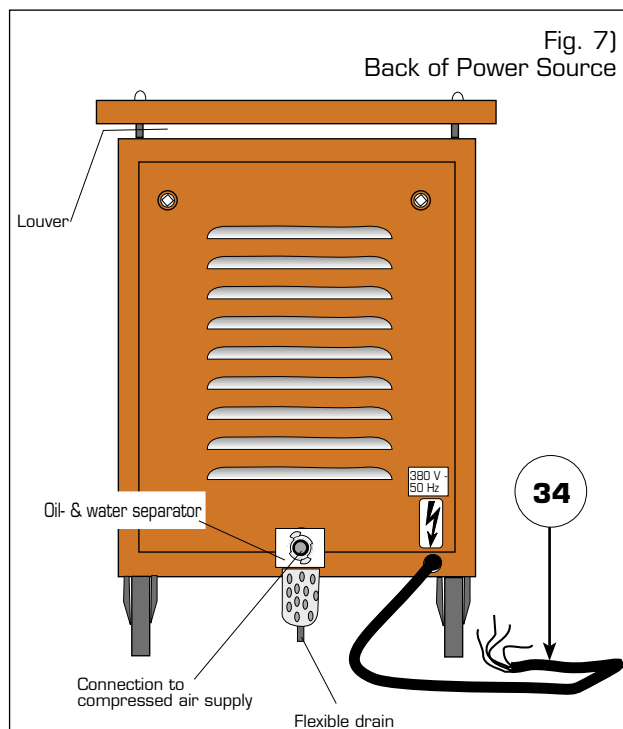


Fig. 2)
600 A Power Source



3

ten in the electric arc. Simultaneously the molten particles are projected by compressed air onto the surface to be sprayed.

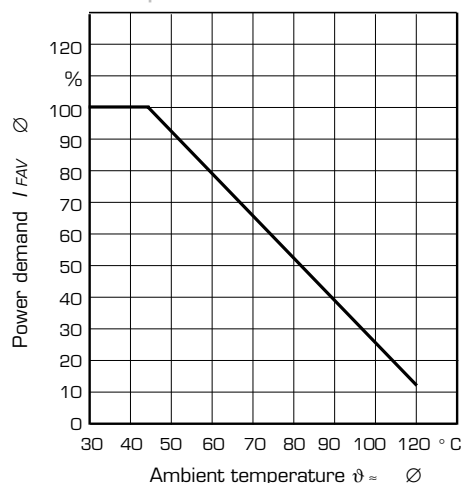
3.2 600 A Special Power Pack

Automatically controlled high performance power source with built-in controls, range selector, vernier, main switch and all necessary connections.

A four-terminal rubber main current cable (fig. 2, 34) is leading to the three-phase electrical supply. The rectifier is inherently ventilated, the ambient temperature should not surpass 32° centigrades. The rectifier is designed for dissipating the heat being developed at 100% duty cycle, at which the warmest spot of the copper-plates will not exceed 85° centigrades. The rectifier can be used of course at temperatures between -40° and +75° centigrades. However in case of environment temperatures more than +32° centigrades, amperage and voltage have to be decreased according to table "Permissible power demand...".

The power unit must not be covered with any material whatsoever as this will disturb the ventilation and even damage the machine. The power source works with max. 600 A at 100% duty cycle. Short overloads will not affect the operation of the machine. In case of overloads of the nominal maximum capacity, the whole system switches off automatically after 2 seconds.

At the back of the power source the connection of the compressed air supply is made to an oil- & water separator (see fig. 7).



Permissible power demand in dependence of the ambient temperature

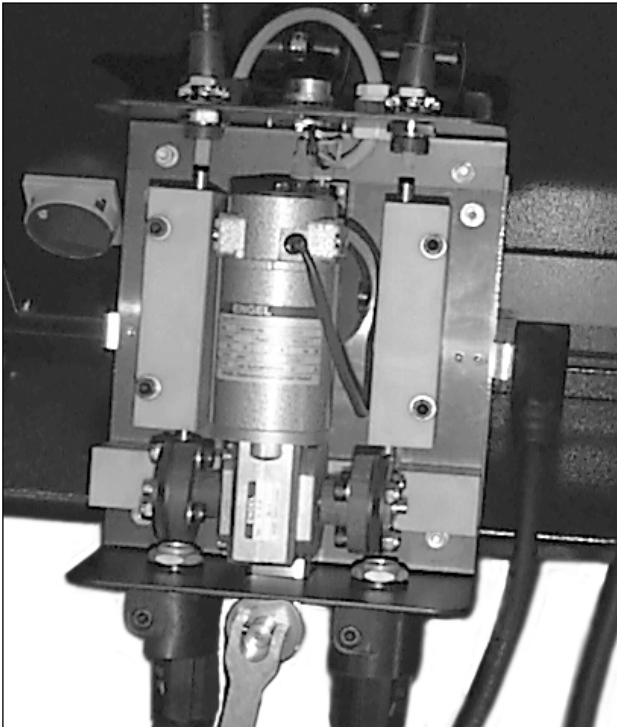


Abb. 4)
Push-Feeder]



antiCOR Pistol

3.3 Wire Feed System

Due to the extraordinary push-pull feeder system a distance of 8-10 m between pistol and wire supply is possible. Whilst the DC-motor with feed rollers pulls the wires to the nozzle system, this process is simultaneously assisted by the strong push feeder system at the other end of the cable's package.

The push-feeder is fixed on a small console at the front of the power source or the separate wire drums assembly. The two feeders are adjusted to one another guaranteeing a synchronous wire transport.

3.4 Cable's- & Hose's Packages

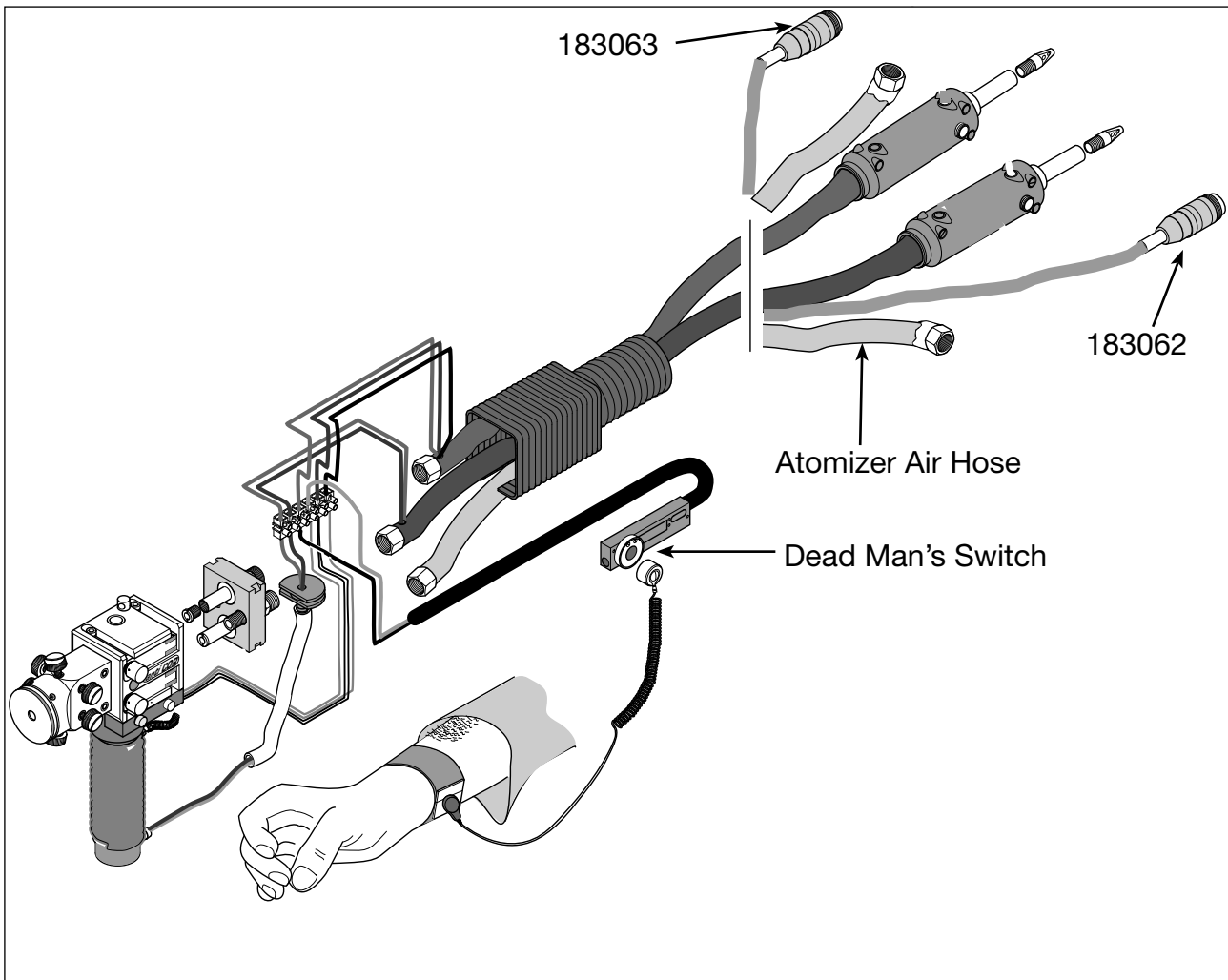
The connection between antiCOR pistol and push-feeder as well as power source and twin reel wire stand or drums dispenser for zinc wires consists of:

- 2 hollow cables carrying current and copressed air, this helps cooling the cable package and prewarming the atomizer air –
- 2 wire guidings with TEFLON®-cores feeding the wires –
- 1 three-pole control cable ON/OFF
- 1 five-pole motor supply cable for the DC motors of pistol and push-feeder.
- 1 cooling air-hose for protecting the motor of the pistol

If the attached drums dispenser is used, the two wires are fed through two 1.8 m long insulating hoses (guidings) directly into the push-feeder mounted on a small console in front of the power source. If the twin reel wire stand ist used, thtwo short insulating hoses (13) lead directly into the push-feeder.



Fig. 19)
Drums Dispenser with
Push-Feeder



If a separate drum's dispenser is used, an additional supply cable's package of any length between power source and push-feeder is used, consisting of

- 2 massive 120 sqmm flexible cables carrying current from +/- connections of power source to sockets of push-feeder –
- 1 fibrous PVC-air hoses for atomizer air –
- 1 three-pole control cable extension ON/OFF with TUCHEL-coupling –
- 1 motor supply cable extension for the DC pistol- & push-feeder motors (see as well page 4-2) –

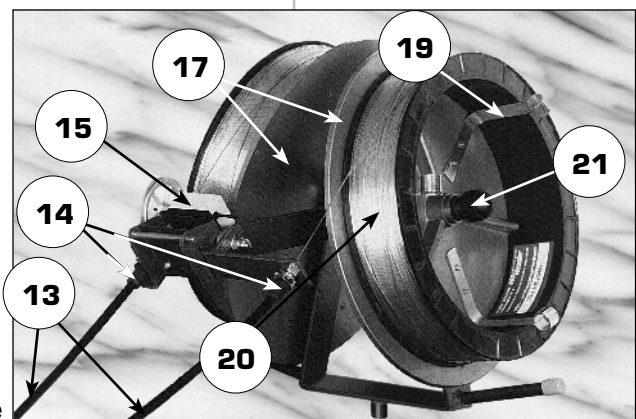
Cable's - & Hoses's Package

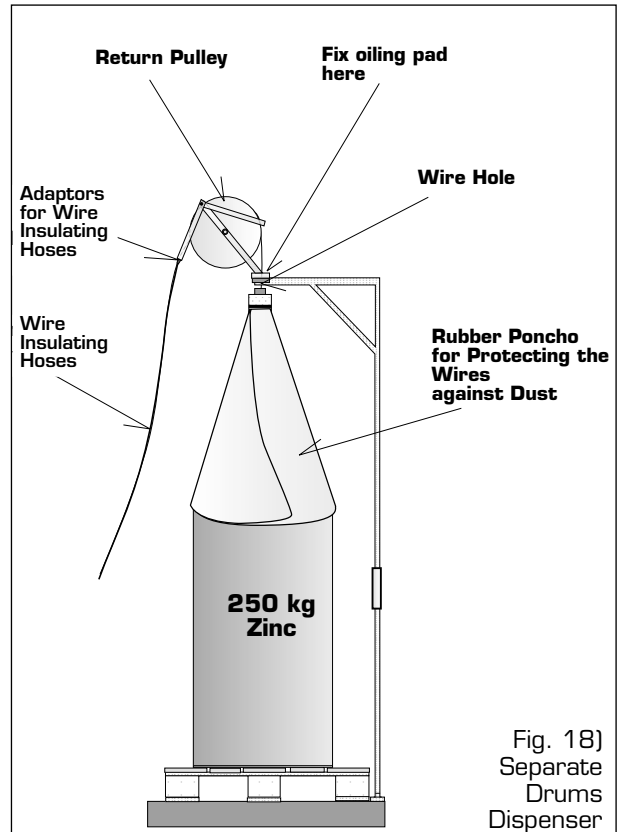
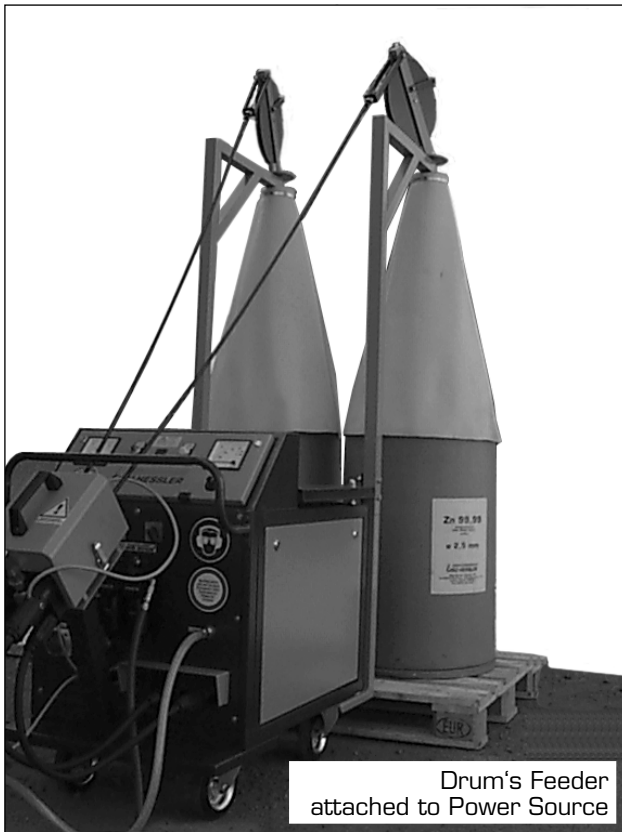
3.5 The Twin Reel Wire Stand

Insulated wire reel adaptors (fig. 24, 17) complete with brakes (21), pivot and optional wire-meter counter (15). The trilateral expandable plate spring adjustment (19) allows changing of the wire reels (20) within seconds.

The free speed of rotation of the wire reel adaptors can be reduced by turning the brake nuts (21) clockwise.

Fig. 24)
Twin Reel Wire Stand

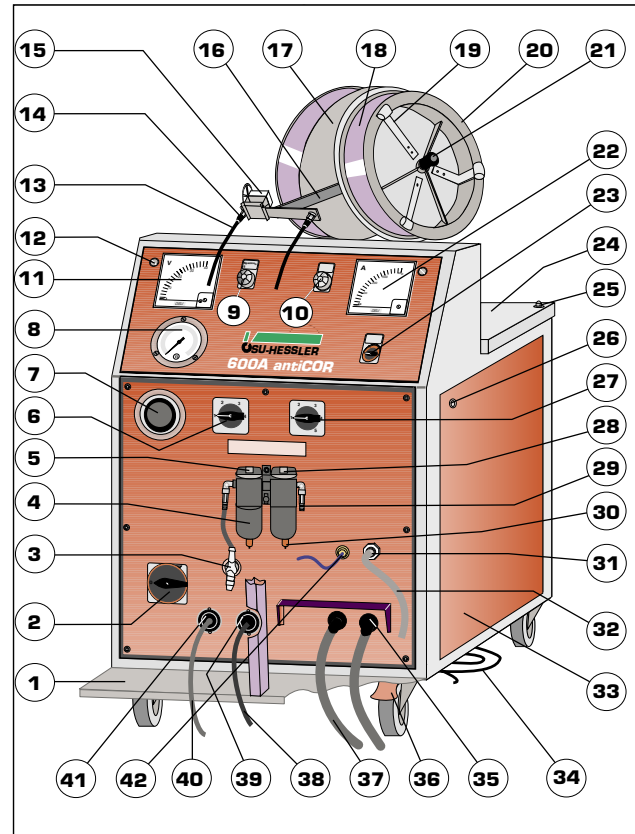




The two wire guidings (13) are connected directly with the push-feeder.

3.6 The Wire Drums Dispenser for Zinc Wire

In case of using zinc in 250 kg drums, either the attached or the separate wire drums dispenser has to be used. Two gallows with wire return pulleys insulated from each other feed the two wires out of the wire drums into the wire guidings (wire insulating hoses), which are connected directly with the push-feeder in front of the power source or dispenser.



4

4 Instructions for Operating

4.1 Unpacking & Assembling

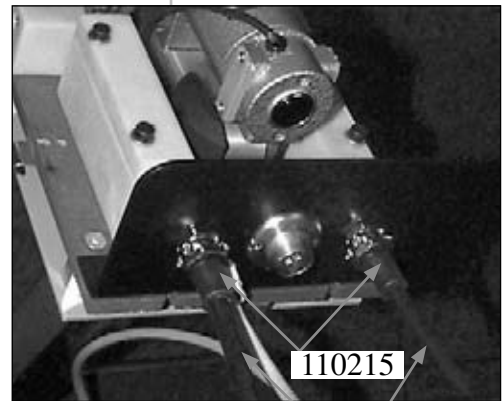
Remove all packing material from power pack and check the items against delivery note or invoice.

For assembling the complete machine, lay components straight on the floor and make necessary connections and assembly as follows:

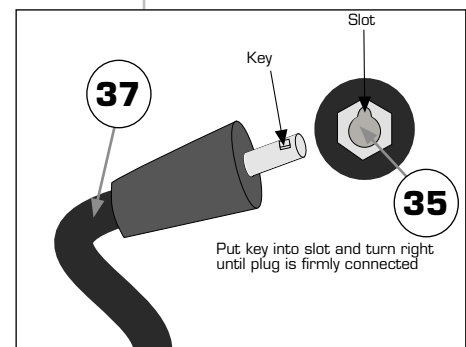
- 1) Erect attached or separate drums dispenser and screw push-feeder (black power connections) onto small console in front of power source or separate drums dispenser; the two short wire guidings have to be connected to the push-feeder by help of the two rubber funnels (110215).

In case of using wire reels the twin wire reel stand has to be put onto the power source and the two short wire guidings have to be connected to the push-feeder on console in front of power source.

The connection between power source and pistol is done by an air cooled cable package of up to 10m of length. The plugs are inserted into the sockets (35) of the power source. Put keys of the plugs into slots of the sockets and turn right until plugs are firmly connected.



Wire Guidings



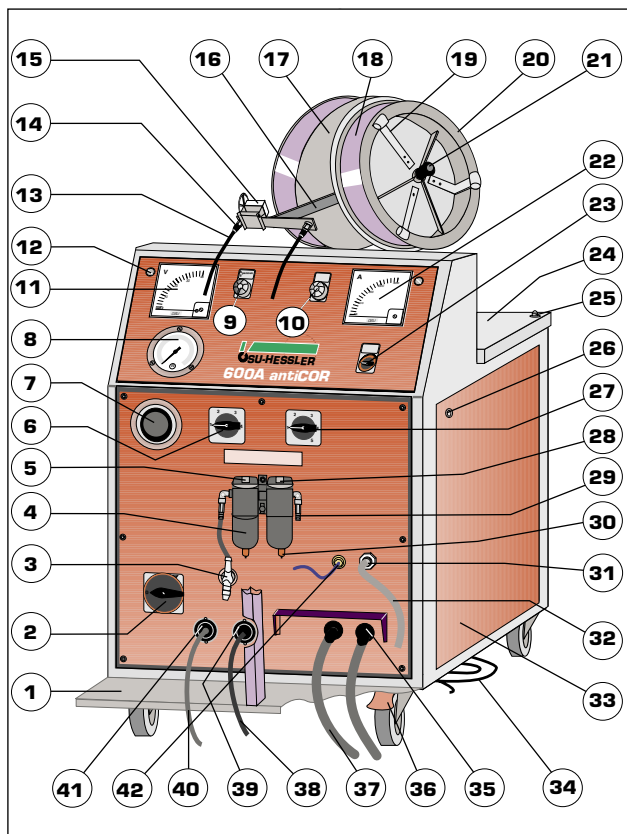
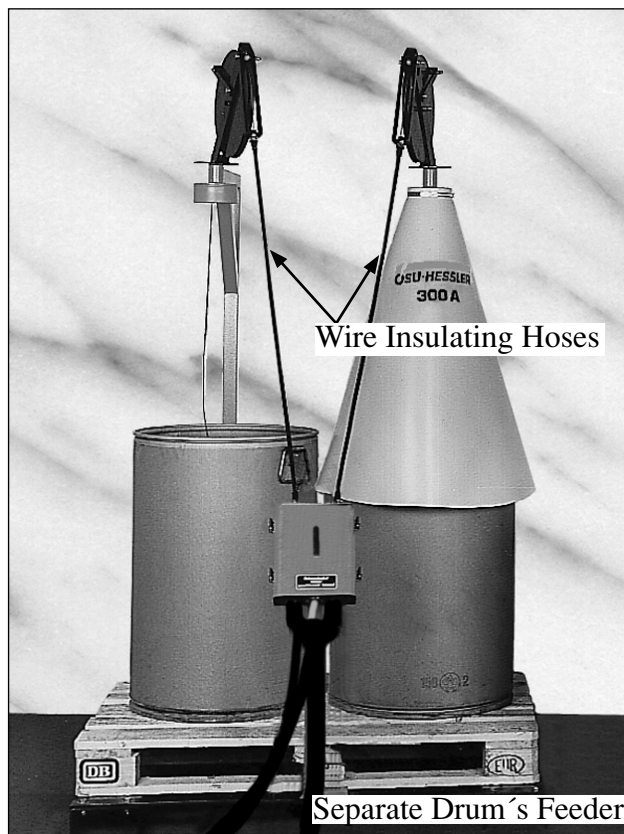


Fig. 2
600A Power Source



Connect 5-pole TUCHEL-plug (183062) of push-feeder with socket (39) of power source (DC-motors supply cable).

⚠ A good connection is very important; loose current connections will cause loss of power and may damage machinery!

Screw connections of atomizer air hoses onto connection (31) at power source and fasten with help of a spanner –

Screw 3-pole TUCHEL-plug (183063) of the ON/OFF-control cable into socket (41) of power source –

Connect 5-pole TUCHEL-coupling (183073) of the motor supply cable with rear plug-connection (183065) of push-feeder –

Connect cooling air cable of pistols' cable package to the power source (42).

3) If a separate drums dispenser is used (see fig. above) and if the power source is not positioned directly next to it, take the additional supply cable's package and make connections between push-feeder on console in front of drums dispenser and power source as follows:

❑ The two couplings of the additional supply cable's package are connected to the two connections of the pistols' cable package, whilst the plugs are inserted into the sockets (35) of the power source. Put keys of the plugs into slots of the sockets and turn



Drum's Feeder
attached to Power Source

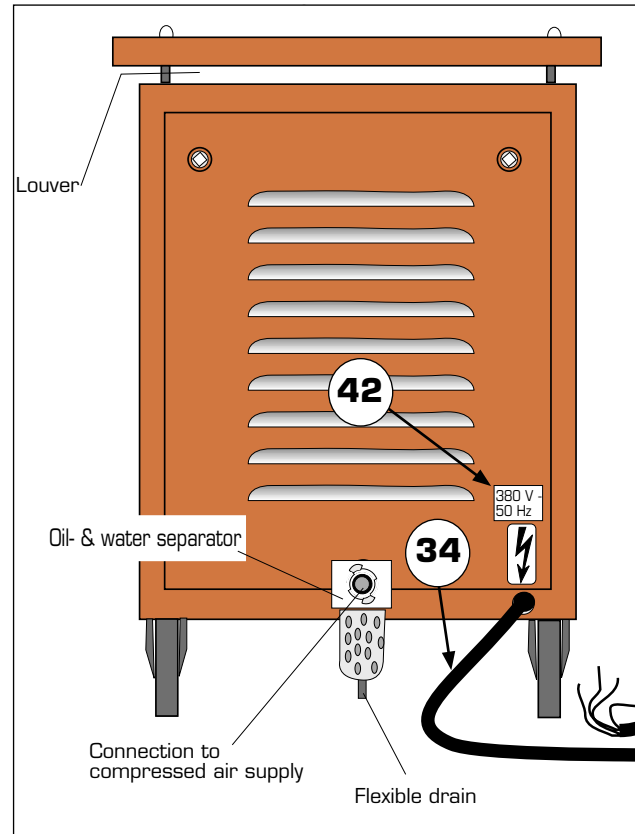


Fig. 7)
Back of Power Source

right until plugs are firmly connected –.

- ❑ Screw connection of atomizer air hose onto connection (31) at power source and fasten with help of a spanner; the other end has to be connected with the hose nozzle of the corresponding hose of the pistol's cable package –
- ❑ Screw 3-pole TUCHEL-plug integrated in the supply cable's package (183063) of the control cable into socket (41) of power source; the other end has to be connected with the of the corresponding TUCHEL-plug of the pistol's cable package –
- ❑ Screw 5-pole TUCHEL-plug (183062) of the supply cable's package into socket (39) of power source and connect TUCHEL-coupling with the corresponding TUCHEL-plug (183062) of push-feeder –

⚠ Take care that all electrical connections are carefully and firmly made; loose current connections will cause loss of power and may damage machinery!

4.2 Installation to Power

The 4 m four-terminal rubber main cable (fig. 7; 34) for connection to the power supply is situated at the back of the OSU-Hessler power pack.

⚠ WARNING: do not connect this cable under no circumstances to the mains of the workshop before

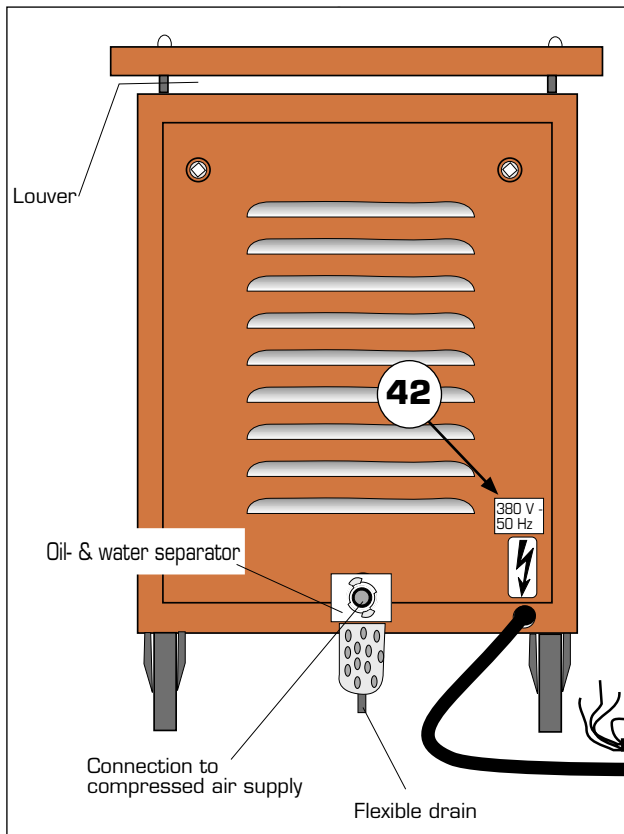


Fig. 7)
Back of Power Source

Main Switch OFF

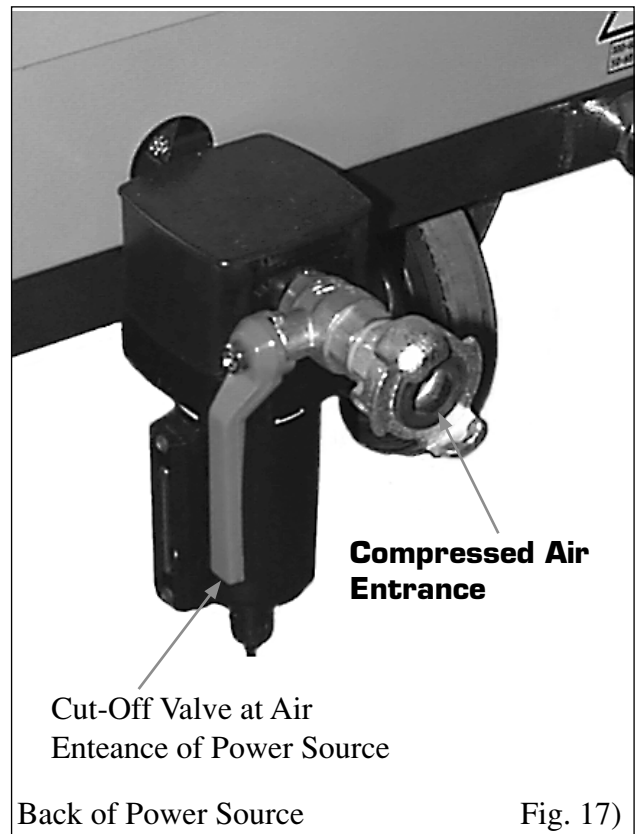
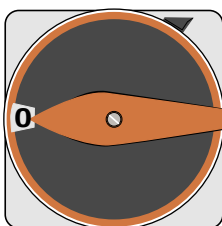


Fig. 17)

checking the input voltage tapplings to ensure these are correct for the electricity supply to be used. As standard the machine is adjusted to 380/400 V 3-phase, 50/60 Hz current only.

Other voltages are not possible unless the machine was ordered for these!

The mains have to be protected with fuses 3 x 32 Amp.

Mount a 4-pole male plug to the loose end of the main cable. Main cable earth = yellow green. The plug must have an earth screw.

Before connecting the plug to the mains socket, note that the main switch (fig. 2, 2) is on position out!

Every time the equipment is moved to another work-place check whether the supply voltage corresponds to the input voltage tapplings!

A stick-on label (42) above the cable entrance of the power supply cable informs about the input voltage tapplings of the machine.

4.3 Installation to Compressed Air

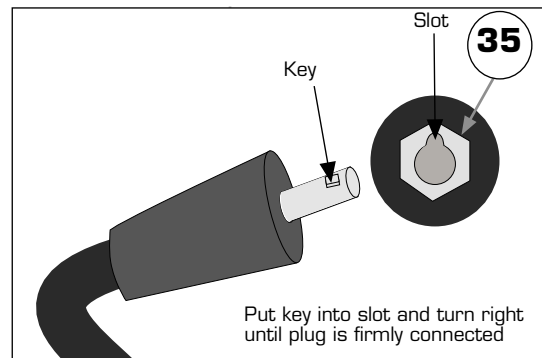
The main air supply with 3/4" or better 1" high pressure air hose is done by means of a claw-coupling to the cut-off valve at the oil- & water separator at the back side of the power pack (fig. 17). Use at least 3/4" pipe due to the air consumption of between 60 - 75 m³/h.

Open cut-off valve for compressed air at the machine's air entrance.

4.4 Preparations for Operating

If the equipment has been assembled as described proceed as follows:

- ❑ switch off main switch at power source (fig. 2; 2) –
- ❑ lay pistol with cable's package straight on the floor –
- ❑ open pressure lever 143050 of push-feeder by moving into vertical direction to lift wire pressure rollers –
- ❑ Now feed in wires, which are either available on plastic reels, basket coils or endless in 100-250 kg drums.



a) Use of Zinc or Aluminium Wire Reels

- ❑ fit two wire reels on the twin reel wire stand (fig. 24), take the wires and straighten about 200 mm off the leading ends. Round the ends with flat file included in the tools and push the wires into the short wire insulating hoses connected with the push-feeder on the console in front of the power source.

Push the wires through the wire guiding tubes of the push-feeder under the transport rollers until their ends protrude approx. 100 - 150 mm into the pistol's cable package –

- ❑ close pressure lever 143050 –
- ❑ unscrew radial nozzle 151095 of pistol's nozzle system and take out nozzle disc 151090 –
- ❑ switch on main switch at power source (fig. 2; 2) and press the wire feed button on the power source. Now the two wires are transported by the push-pull system through the cable's package until they protrude approx. 100-200 mm out of the contact tubes of the antiCOR pistol –
- ❑ Take the cutting pliers out of the tools and cut off the wire ends approx. 3-5 mm in front of the contact tubes so they do not touch each other –
- ❑ refit nozzle disc 151090 and radial nozzle 151095 to the pistol –

The two wires have to be transported without any slipping, i.e. the wire pressure screw (fig. 20) must be adjusted in such a way by pressure lever that the push-feeder can be stopped, if one wire is held back by hand.

The wire pressure of the push-feeder can be increased by turning the pressure screw in clockwise direction and decreased by turning anticlockwise.

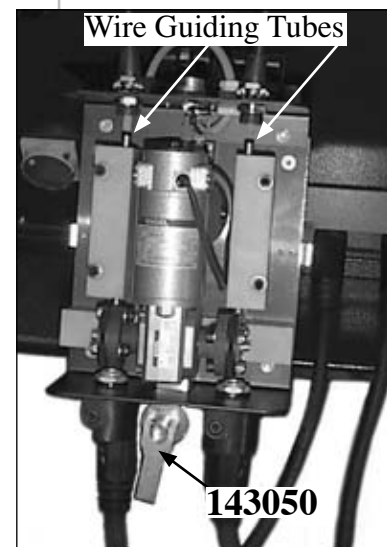
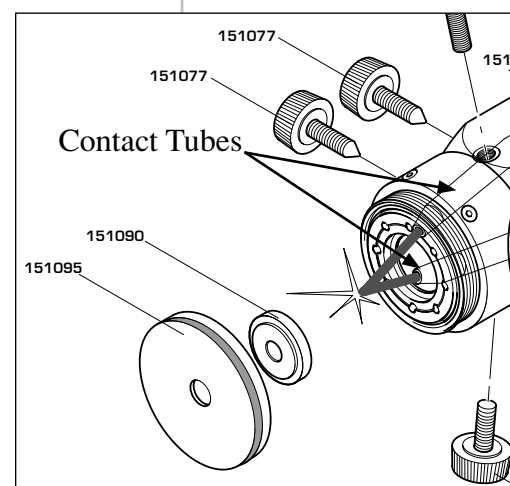
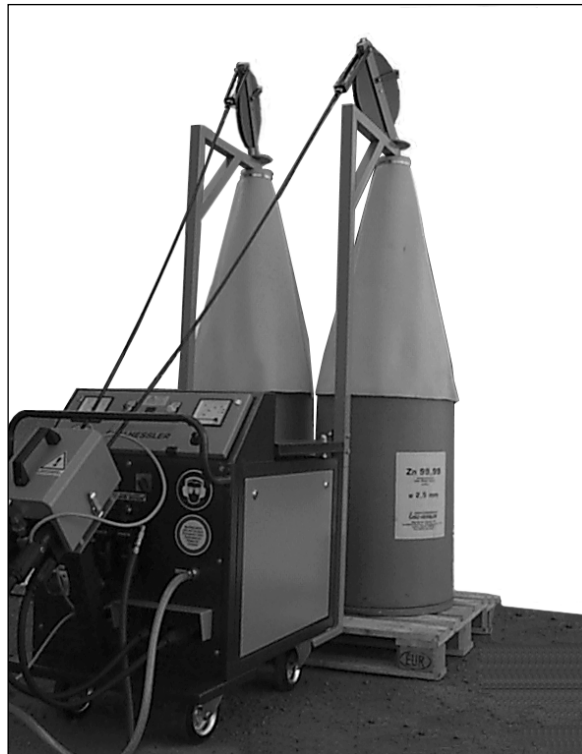


Fig.24) Twin Wire Reel Stand

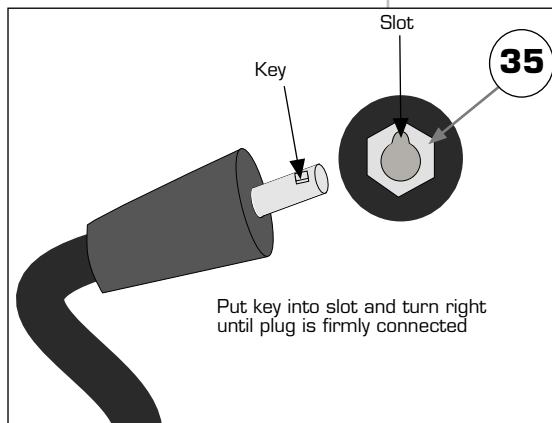




Drum's Feeder attached to the Back of the Power Source

For turning lift pressure lever 143050 and turn in corresponding direction.

- If after spraying new wires have to be inserted, the short wire ends between feed rollers of pistol and contact tube tips have to be seized with flat tongs and drawn out off the front of the nozzle tips.



b) Use of Zinc Wire Drums

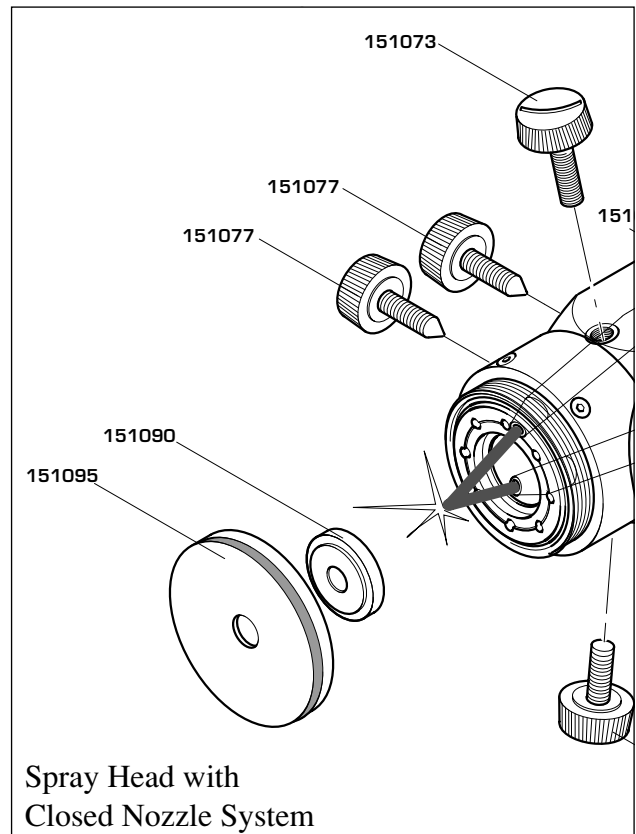
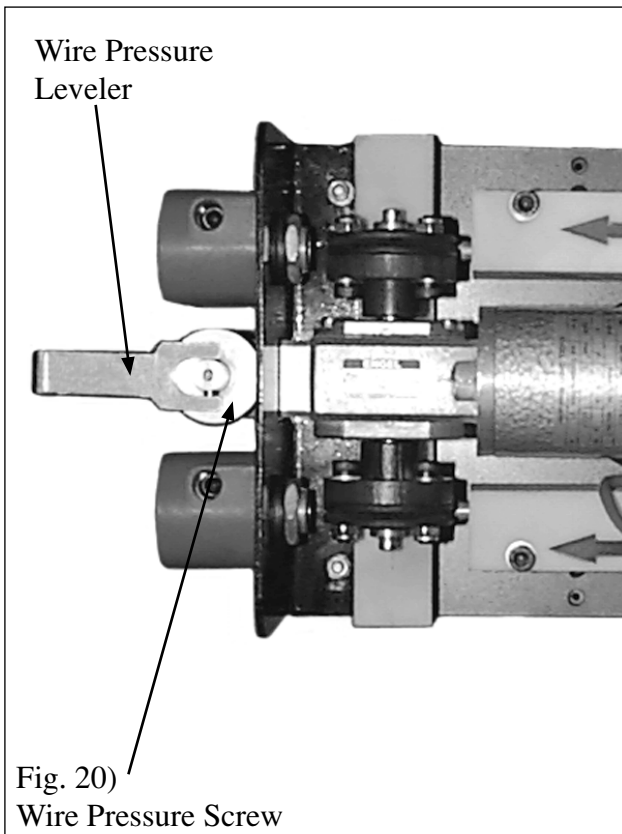
- Put the pallet with 2 wire drums on the special drums dispenser, look for the wire ends, straighten about 200 mm off the leading ends. Round the ends with the flat file included in the tools and push the wires through the wire holes over the return pulleys into the 1.8 m wire insulating hoses of the push-feeder on the console in front of the power source or into the 1.3 m wire insulating hoses of the push-feeder on the console in front of a separate drum's dispenser.

The following procedure has to be done as described under a).

It is important, that the copper contact tubes are in line with each other.

Their position can be checked by feeding wires through both tubes and ensuring that the wire ends touch exactly in front of the centre of the acceptance for nozzle disc 151085.

From time to time the nozzle system should be sprayed with TEFLON® spray to avoid short-circuits. Dust and spray particles must be removed periodically or continually, if the spray process is done in small tube or bore diameters where high dust quantities are generated.



Now the equipment is ready for spraying.

Notice:

The operator and nearby personnel should wear eye-shields, as required for electric arc welding!

(Even better are Respiratory Light-Weight Protection Helmets with arc shield flap. These helmets protect as well face and neck against the ultra-violet radiation)

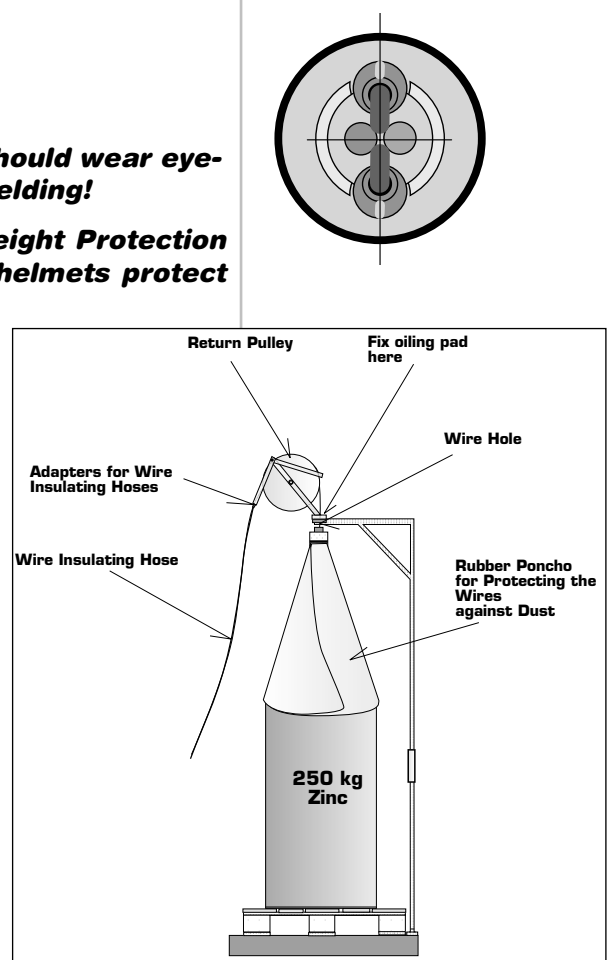
Both wires are inserted, the current at the mains (fig. 2, 2) is switched on, the green (9) and the white (10) signal lamps glow.

The pressure reducer for atomizer air should be adjusted between 3.5-4.5 bar by turning the hand-wheel (fig. 2, 7) of the air pressure gauge. Check the atomizer pressure at the corresponding manometer (8).

At a supply pressure of 2 - 2,5 bar or less the white control lamp (fig. 2; 10) extinguishes and the equipment cannot be switched on.

4.5 Operating Voltage Step-Up Switches

Range selector (fig. 2, 27) and vernier (6) are both situated in the primary circuit of the trafo and connect or disconnect the primary coils in 20 steps. The potential difference



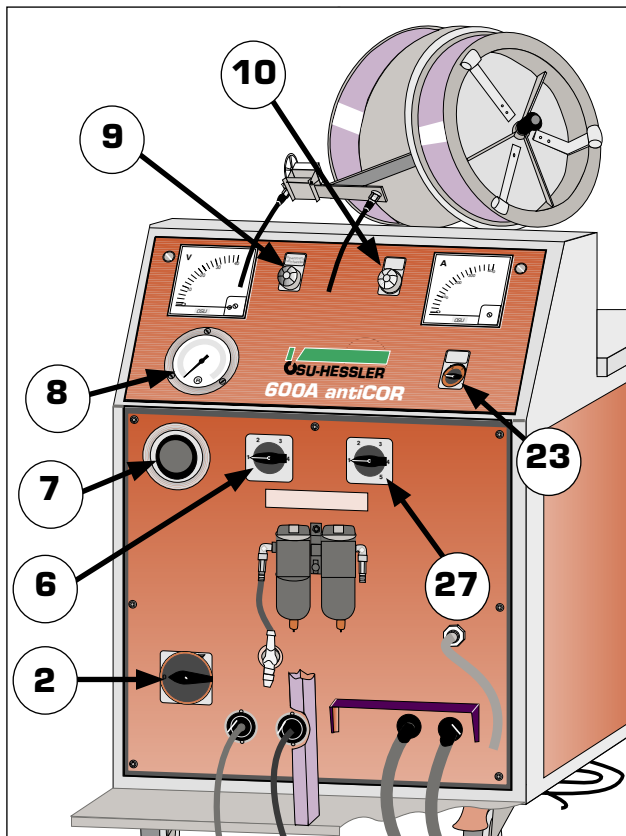


Fig. 2)
300 A Power Source

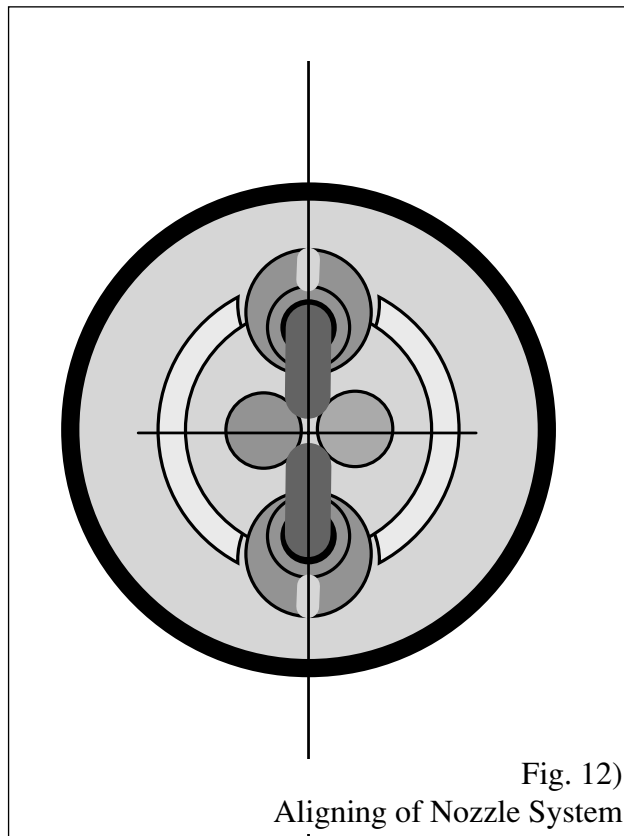
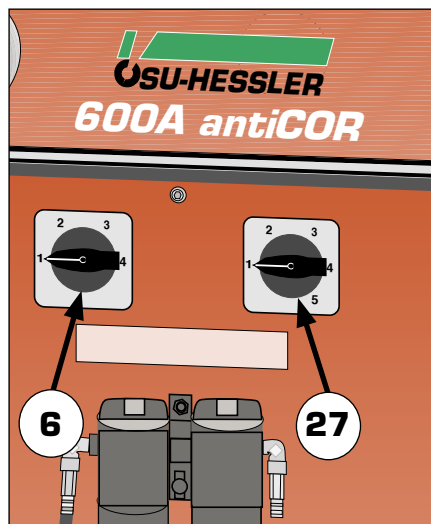


Fig. 12)
Aligning of Nozzle System



from step to step is 1,0 V to 1,5 V. At position 1 of each range selector and vernier the lowest voltage is adjusted, at position 5 of range selector and position 4 of vernier the highest voltage is adjusted.

Turn the range selector (27) on position 2, vernier (6) on position 2.

If at whatever rate of wire-feed the amperage is for example 100 A at position 2 of range selector the indicated voltage may be too high for a good spraying. To get the optimum voltage the range selector has to be switched down on lower positions until the arc is beginning to flutter or breaks down. This shows that the voltage to maintain the arc is too low. Now switch off main switch (2) first, then switch the vernier or - if the vernier is already on pos. 4 - the range selector on to the next higher step (vernier then has to be reduced to step 1). If now the arc is stable, the optimum voltage is obtained.

It is obvious that from any other amperage than 100 A can be proceeded as well to get the lowest voltage at a given wire feed.

When spraying zinc voltage before actual spraying (no-load operation voltage) should be adjusted as follows:

Desired Spray Capacity	100 A	200 A	600 A
No-Load/Load	21/19 V	23/20V	28/23V

4.6 Operating ON/OFF

To start the spraying process, check that the main switch (fig. 2, 2) is on pos. I. Now operate green ON-push-button-contact of pistol.

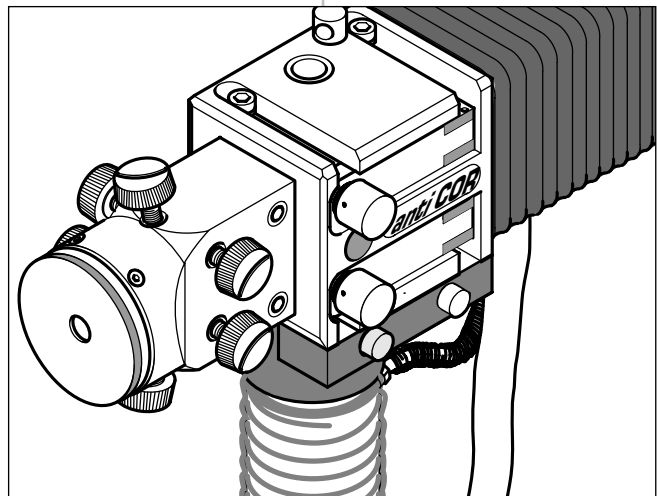
As the machine is equipped with an automatic, the arc cannot be ignited until the main switch (2) and switch-ON at the pistol are operated. For safety purposes the pistol owns an ON-contact and a separate OFF-contact.

If for example the electric power supply fails during spraying, the machine must be newly started by operating the ON-contact again when supply power is back.



4.7 Operating Wire Feed/Spray Capacity

Point pistol onto the workpiece and press ON-push-button contact. The wire-feed starts and the proper spraying process begins. If the poti (23) is turned clockwise, the DC motors run faster and the rate of wire-feed increases; if poti is turned anti-clockwise, the rate of wire feed (spray capacity) decreases. With increasing wire-feed the amperage rises, i.e. amperage = spray capacity.



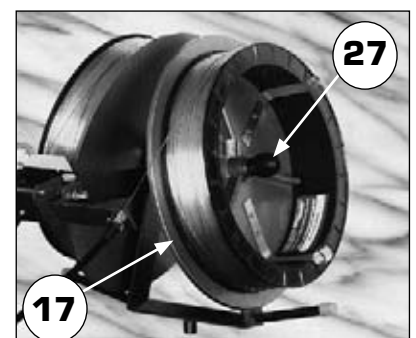
One of the main principles of arc spraying:
The higher the amperage the higher the spray capacity!

The power pack is adjusted to the rated 600 A at 100% duty cycle. Loads exceeding this amperage automatically switch off the whole equipment (see as well part „6 Possible Faults, their Cause and Remedy“).

Even if the power source is rated 600 A at 100% duty cycle, the adjustment of max. 550 A is recommended, because the load exceeding the 550 A is less economic, due to a much higher temperature of the arc which causes a higher burning rate of the used wire. This will help achieving optimal spray results.

Both wires have to be pushed forward completely proportionate. If this is not the case, the wire transport has to be checked.

The wire-reel adaptors bearing the wire spools must be regulated by putting on the brakes (21) in such a way that the wires are under a slight tension to avoid forward motion of the reel adaptors (17).



4.8 DC Motor of antiCOR Spray-Pistol

Due to the high performance of the 600 A equipment it is necessary to use different motors in the handspray pistol. During the order of the equipment was specified if Zn or Al has to be sprayed.

For switching to another material the motor has to be changed, this is very important when switching from Zn to Al.

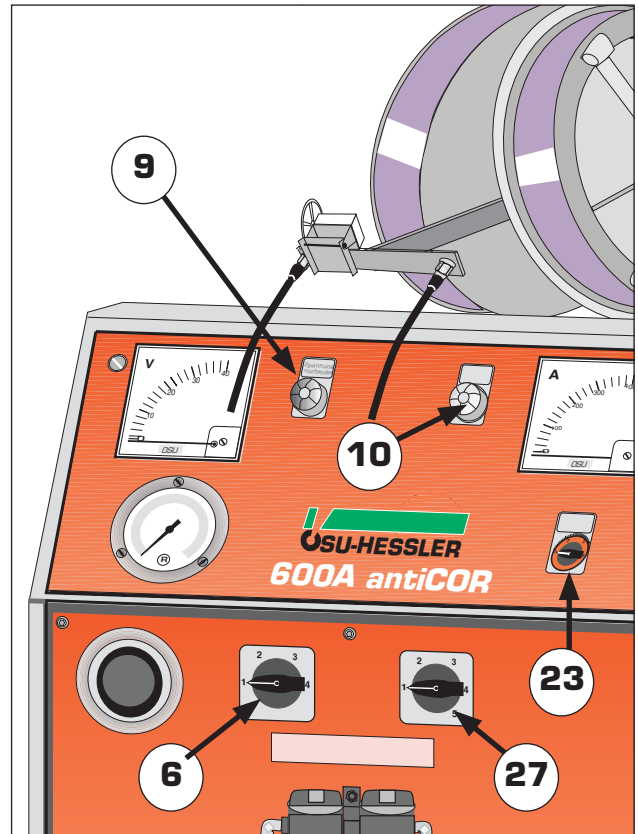
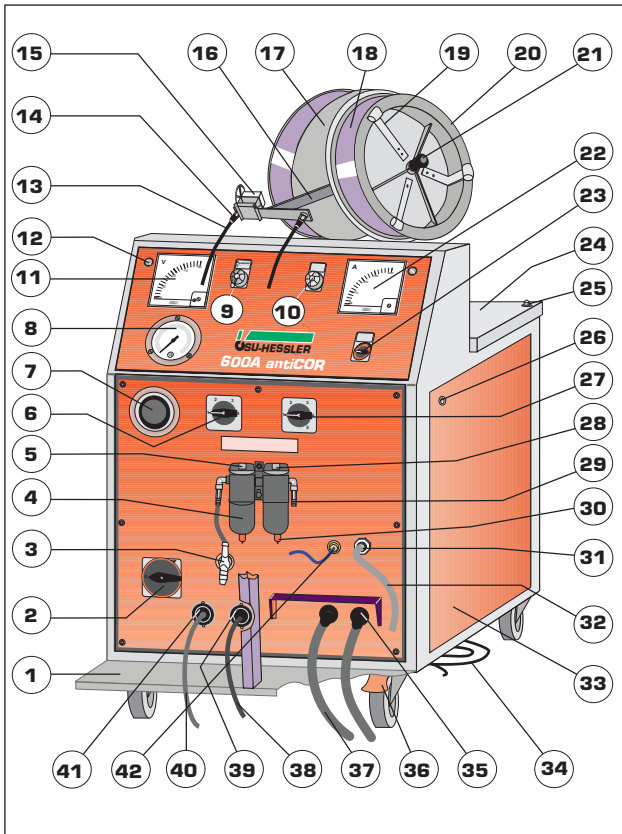


Warning:

Operating the equipment optimized for Zn-wire with Al-wire will damage the motor in the handspray pistol.

If switching from Al-wire to Zn-wire without changing the motor the maximum spray-capacity (600 A) of the equipment can not be reached.





5

5 Description of the Thermal ArcSpray Process & Fundamentals for Perfect Spraying

5.1 Preliminary Remark

Operating the 600 A antiCOR Arc Spray Equipment is simple when proceeded as described in chapters 4.4-4.7.

For a better understanding this chapter will explain the mutual dependencies of amperage, voltage, and wire feed. When once the operator has grasped these dependencies, he will at once realize occurring faults and irregularities and know how to remedy them.

5.2 Function of the Equipment

All settings as described under part 4 are done. Voltage range selector (fig. 2, 27) is on position 2, vernier (6) on pos. 3. The equipment is switched off.

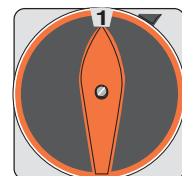
a) Sequence of operation „to switch on“ - see as well wiring diagram:

The main switch at the front of the power pack is switched on. The white (10) and green control lamps (9) light up and show readiness for service.

The white lamp does not light up until compressed air is connected and sufficient air pressure of at least 2.0-2.5 bar is available.

By operating the pistol's green ON-push-button contact the automatic spray process is initiated, i.e. current and atomi-

Main Switch ON



DESCRIPTION OF THE THERMAL ARC SPRAY PROCESS

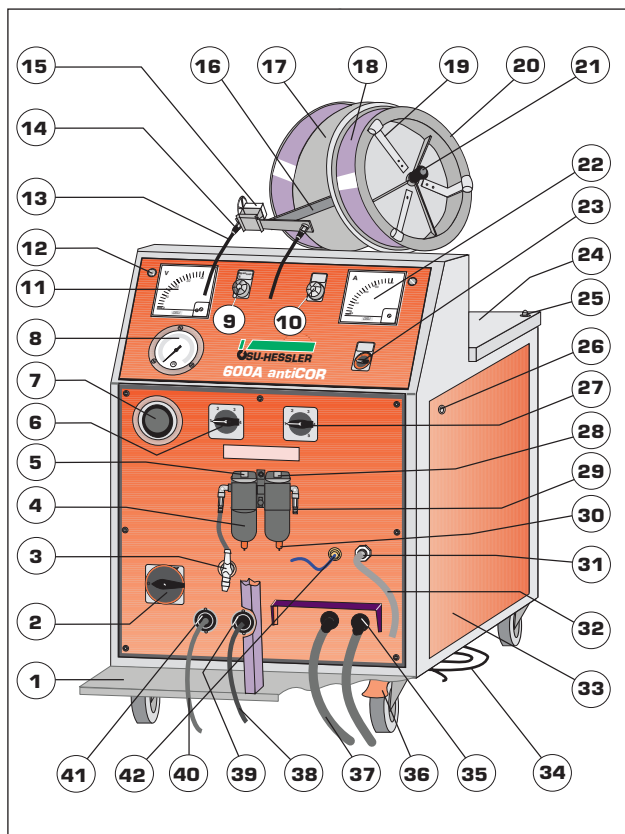


Fig. 2)
600A Power Source

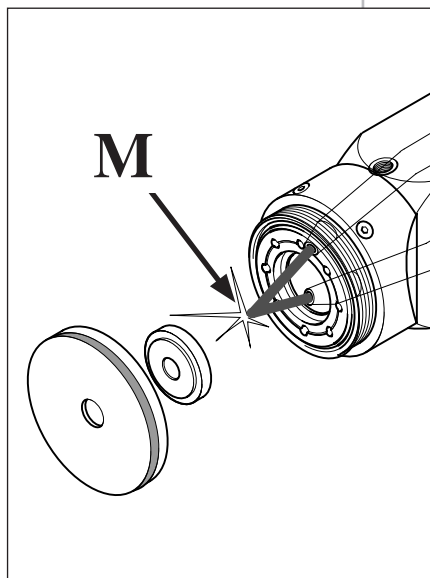
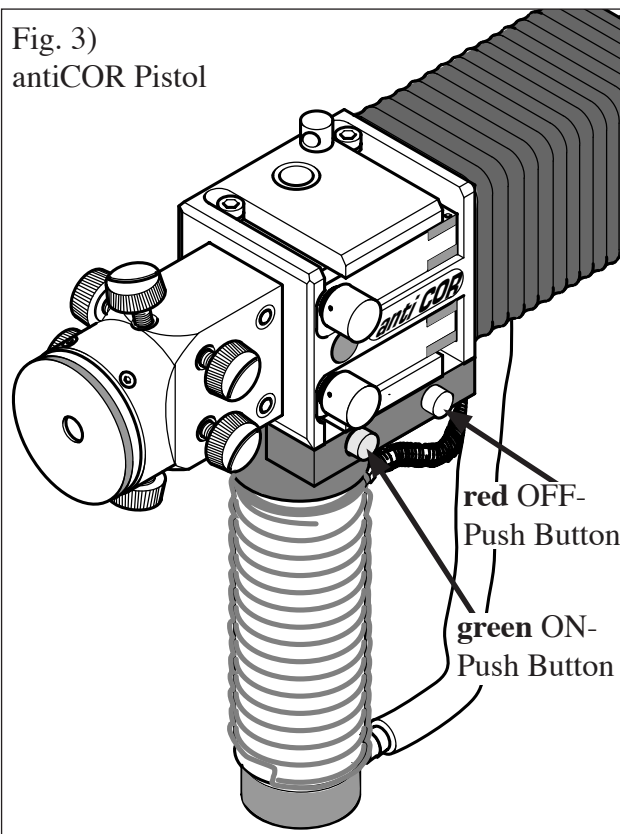


Fig. 3)
antiCOR Pistol



zer air are activated immediately whilst current for the wire feed DC-motors is released with a short delay of approx. 1-2 seconds. This is controlled by correlative time lag relays. The actual spray process starts, when the two wires are transported and meet each other in the "short circuit point" M.

Before thus starting the spray process - range selector and vernier should be adjusted to approx. 25 V.

The wire feed = spray capacity is adjusted by regulating the poti (23) at the power source. Turning clockwise increases wire speed (and amperage), turning anti-clockwise reduces wire speed (amperage drops).

b) Sequence of operation „to switch off“:

When operating OFF-contact at antiCOR-pistol wire feed is immediately interrupted, spraying stops.

Atomizer air and spray current switch off after a retardation of approx. 1,5 - 2 sec.

c) Automatic „switch off“ of the equipment:

If during spraying the maximum amperage (spray capacity) of 600 A is exceeded, the equipment switches off automatically.

Before restarting the machine the amperage has to be reduced at the poti (23) accordingly.



5.3 Fundamentals concerning the mutual Dependence of Current (Amperage), Voltage and Wire-Feed

Operate the machine as described under part 4. Then consider the indicating instruments, i.e. ammeter and voltmeter.

You may see for example:

ammeter showing 170 amps

voltmeter showing 25 volts.

At these properties the two spraying wires are running at a certain wire feed through the pistol. If now the wire feed is accelerated by turning the poti (23) for the wire feed mechanism, the current shown on the ammeter increases.

If at the same time the arc would be observed through dark glasses, it would be found, that the elongated arc (gaseous cloud) at the initial 25 volts becomes shorter with faster wire speed and the hitherto wide spray jet concentrates. In the meantime the voltage drops.

Now increase the rate of wire feed still more whilst observing ammeter and voltmeter. Then at a too low voltage the arc extinguishes, the spraying stops and the machine switches off. The ammeter showed its utmost value.

If now the wire feed rate is reduced again or voltage adjusted to a higher setting, spraying can be started anew. If amperage, i.e. spray capacity is adjusted beyond 30 A, the machine switches off automatically as well.

First principle:

If the rate of wire feed be increased - thus increasing the melting capacity - the voltage drops and the current (amperage) rises -

If the rate of wire feed be reduced - thus reducing the melting capacity - the voltage rises and the current (amperage) decreases.

5.4 The recommended Voltage Setting

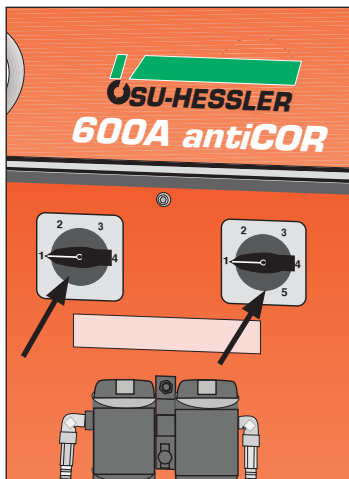
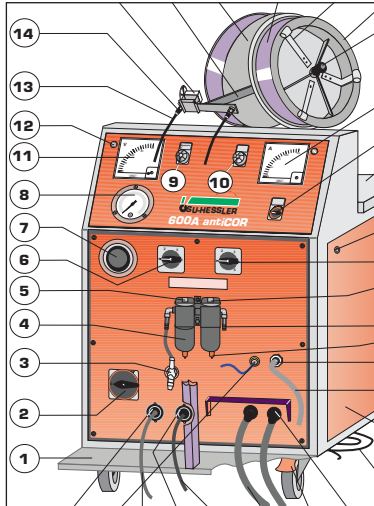
It is absolutely necessary to work with the shortest possible arc and thus with the lowest voltage, consistent with stability of the arc, as this ensures:

- ☐ the smallest size of spray particles -
- ☐ the highest melting capacity for current consumed -
- ☐ the minimum „burn out“ loss of alloy constitutes from the wires
- ☐ the best concentration of the spray jet.

Accordingly, the voltage - shown on the voltmeter - must be set as low as possible when spraying normal deposits. The recommended voltages under load are about 19-23 volts for zinc and 25-29 volts for aluminium

See as well part 8 “SETTING TABLES, USE OF WIRES, APPLICATIONS”.

Fig. 2)
300 A Power Source



Voltage Step-Up Switches

Note: As the indicating instruments at the power source produce tolerances, it is possible that the actual values vary from the table values by 1-2 volts.

As the structure as well as the roughness of the sprayed layer are just as dependent from the co-operation of amperage and voltage as from the length of the current-carrying cables connecting power pack and pistol, the following rule should be observed as well:

The finest layer-structure is obtained, if - at a given amperage - the lowest voltage is adjusted.

Example:

The equipment is working at 200 A, the layer structure is getting too rough. Operate OFF-contact and set voltage range selector or vernier to a lower position. Switch on again spray pistol and repeat this procedure of reducing voltage until at a certain position the arc does not ignite correctly and starts sputtering.

Assuming this happens at position 3 of range selector & pos. 1 of vernier. Now switch on to the next higher setting, i.e. position 2 or 3 of vernier. After this the equipment sprays the finest structure possible with the particular wire quality.

Attention!

Always operate OFF-contact at AAC pistol or switch off main switch (fig. 2, 2) when step-up switches are operated.

5.5 Influence of Atomizer Air on Layer Structure

In addition the structure of the sprayed layer can be influenced by the atomizer air. The higher the pressure of the atomizer air, the finer the structure. Nevertheless an atomizer-air pressure of 6 bar should never be exceeded as otherwise the melted particles are cooled down too much which impairs good adhesion.

5.6 Fundamentals for Perfect Spraying

In this chapter all inescapable technical conditions for perfect working of the machine are systematically and precisely formulated. If the operator takes the trouble just to check these points carefully, he will have the certainty that the machine will work perfectly. It is worthwhile carrying out this check every time completely in order to become acquainted with all the requirements for the functioning of the machine.

All possibly occurring faults in working are to be attributed to one or more of the following enumerated requirements not being fulfilled.

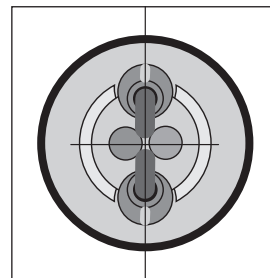
Therefore the following part „POSSIBLE FAULTS, THEIR CAUSE AND REMEDY“ will refer to the indications made in this chapter.

The machine functions satisfactorily

- ☐ If the spray wires run freely and easily from the wire reels or out of the drums through the cables and feeder to the spray pistol –



- ❑ If the direct current generated is conducted continuously on to the wires –
- ❑ If the two contact tubes (wire nozzles) are exactly in one line (see fig.) so that the spray-wires meet exactly at the short circuit point over the centre of the acceptance for the nozzle disc with considerable pressure.



5.6.1 Satisfactory Wire Reel-Off and Feed

are guaranteed under the following conditions

- a) After placing the wire reels on the wire reel adaptors, any possible tying wires or tapes must be removed!

The wire must be properly wound onto plastic reels. Coils must lie neatly against one another, and on no account must the wire jam against the side, e.g. with cardboard reels of at least 5 mm to avoid shifting off the coils.

The end of the wire must be fixed by pushing through a hole provided in the gland of the plastic reel.

Wire drums for 250 kg zinc must have a core to avoid tumbling together of wire coils.

- b) The wires must have a smooth surface without any drawing lubricant, rust formation, verdigris, pores or butt welding seams, which are not correctly ground off. Otherwise this may lead to breaks in contact and sputtering of the gun, which, in turn, leads to the spraying of coarse particles.

Bits of wire ends may be sprayed off when using wire of minor quality. These coarse particles have to be removed from the sprayed surface with a chisel to avoid severe consequences.

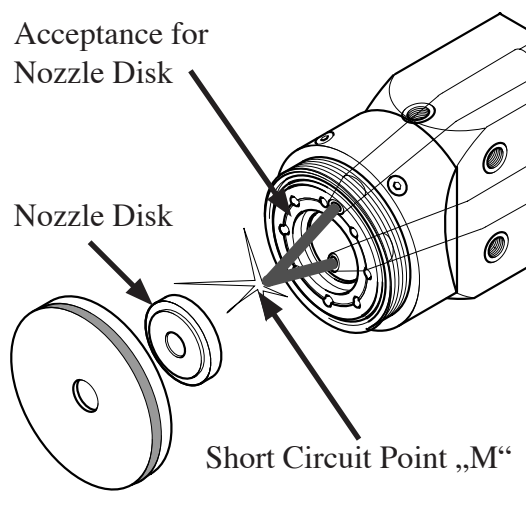
If the quantity of debris is appreciable and is allowed to enter the system it will be collected at each location where the bore changes to a smaller diameter. These locations are: the entry to the flexible wire conduit; the entry to the wire feeders and the entry to the contact tubes.

Apart from this the DC-motors for the wire-feeders have to work against high resistance, which may cause heavy wear in the gearing systems.

Zinc and aluminium wires supplied by OSU-Hessler comply with all these quality suppositions!

- c) The basic requirement of the flexible wire feed conduits is to provide electrical insulation between the wires. Inevitably friction must be overcome when pulling wire through the cable's package and the magnitude of the load depends on the curvature. Therefore the cable's package should lie as straight as possible. Avoid any loops of the package!

It is possible to produce a condition where the wire cannot be pulled through the cables. Conduit friction is easily redu-



5



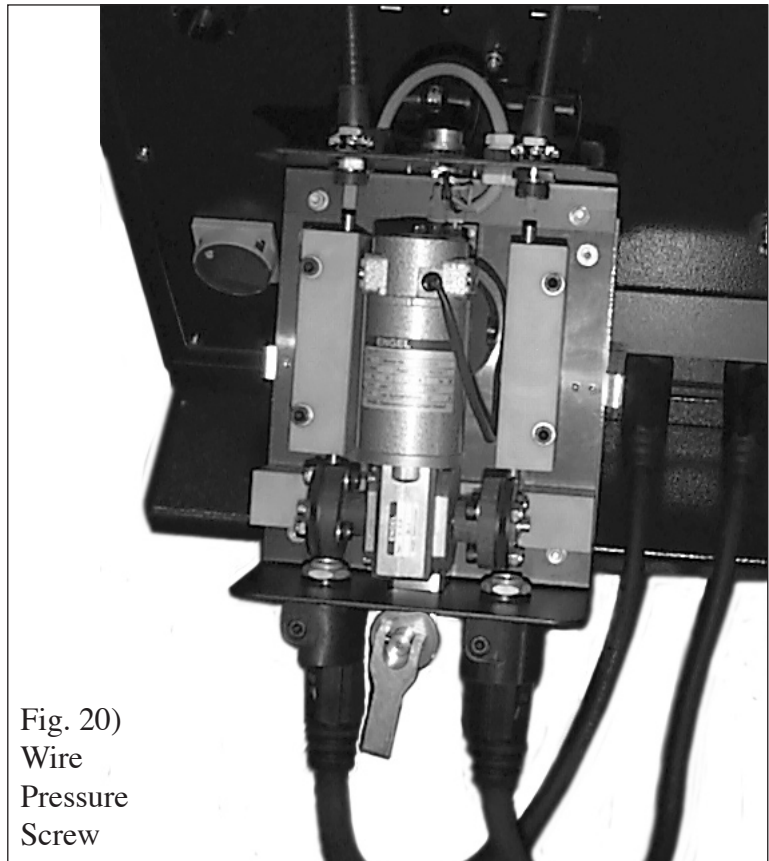


Fig. 20)
Wire
Pressure
Screw

ced to acceptable levels by an occasional light application of OSU-Hessler Wire Oil. Avoid over-oiling since this tends to wet the nozzle system. Apply sparingly every few hours (using about one teaspoonful every 2-3 days). It is best applied to a folded pad over the wire where it enters the wire conduits of the push-feeder.

- d) When, during spraying, the coil of wire approaches its end, i.e. when there are only a few turns left on the reel, the operator must take care that, with the unfeeding of the last coils, he cuts off in time the wire end from its fixing on the reel.

If he does not, the wire feeding is suddenly braked, the feeding mechanism is violently stopped, which may possibly lead to serious damages in the feeder systems. The remaining wire-ends between pistol's nozzle system and feed-rollers have to be drawn out from the nozzle end before new wires are inserted.

- e) All bores and passages of pistol and wire guides must be large enough, i.e. free from possible dirt adhering inside.
- f) It is necessary, that the two wires are firmly gripped by the feeders. If wire pressure is not sufficient it can be easily increased by turning the pressure screw (see as well page 4-7).

Nevertheless do not overtighten to avoid the two wires to become squeezed, which may result in transport resistance in the contact tubes.



5.6.2 Full Current Conduction to the Spray Wires

Full current conduction, i.e. satisfactory transmission of the current on to the wires is only possible if the following requirements are fulfilled:

- The current cables between power pack and spray pistol must be firmly connected at all ends.
- The two contact tubes (nozzles) must make perfect contact with the current carrying terminals in the spray-pistol.

To do this pull out complete spray head after having loosened the fixing screws 448320 with a hexagon socket screw key.

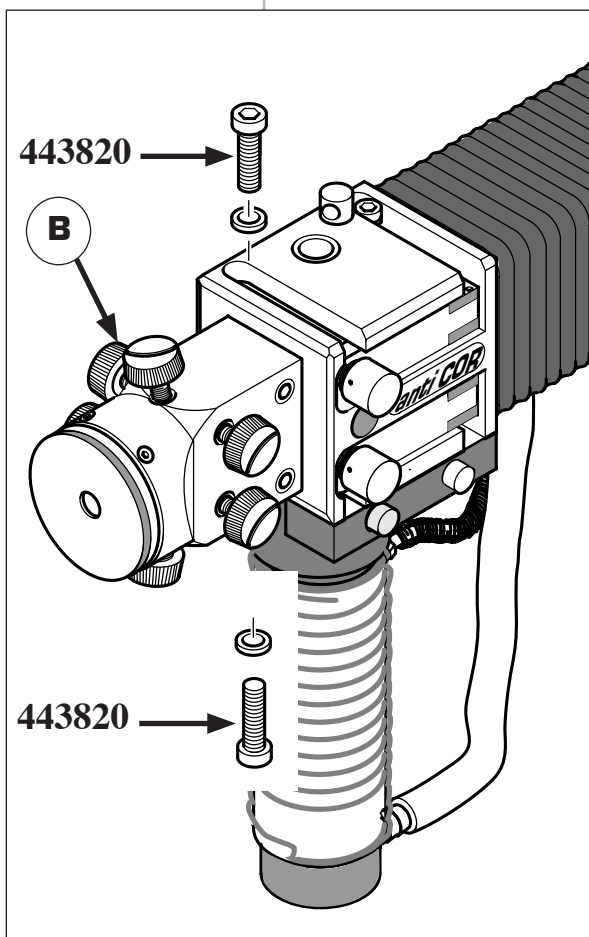
Open threaded pins (A), loosen knurled screws (B) on all sides and pull out contact tubes from the rear of the spray head.

Checks

Wipe off any grease from the contact tubes. Take some emery cloth and sharply rub over the tubes at the terminal faces of the unarched parts, to make good contact surfaces.


Check whether the bores of the contact nozzles are not worn out in the horizontal or vertical di-rection. The greater the wear, the smaller the contact surfaces between nozzle-tips and spray-wire; the worse the current transfer the greater the resistance of the wires being pushed through the tubes.

Adjust nozzles with adjusting (B) screws to make wires meet correctly in front of atomizer nozzle.

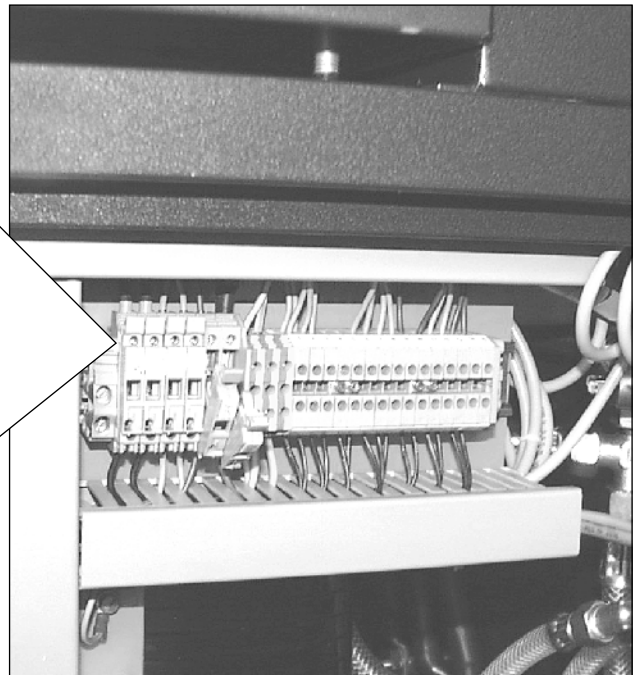
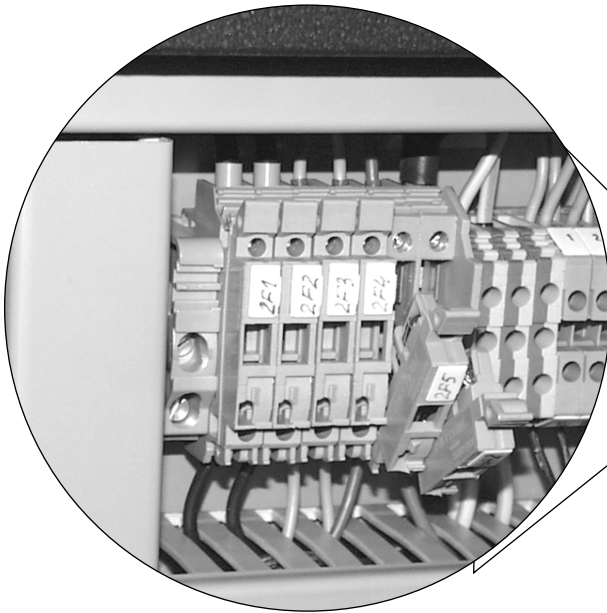


- Trackings by dust deposits must be avoided!

The metal dust which is produced when spraying without satisfactory exhaust or ventilation penetrates spray-pistol and power source and may, with a sufficient thick layer produce actual current interruptions. If at the same time the contact tips or tubes are worn, these trackings may lead to lasting sputtering or even cut off the arc.

 **Therefore blow out antiCOR spray pistol, push-feeder and all electrical connections regularly!**





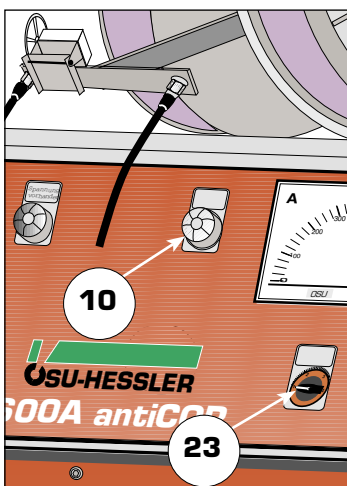
6 Possible Faults, their Cause and Remedy

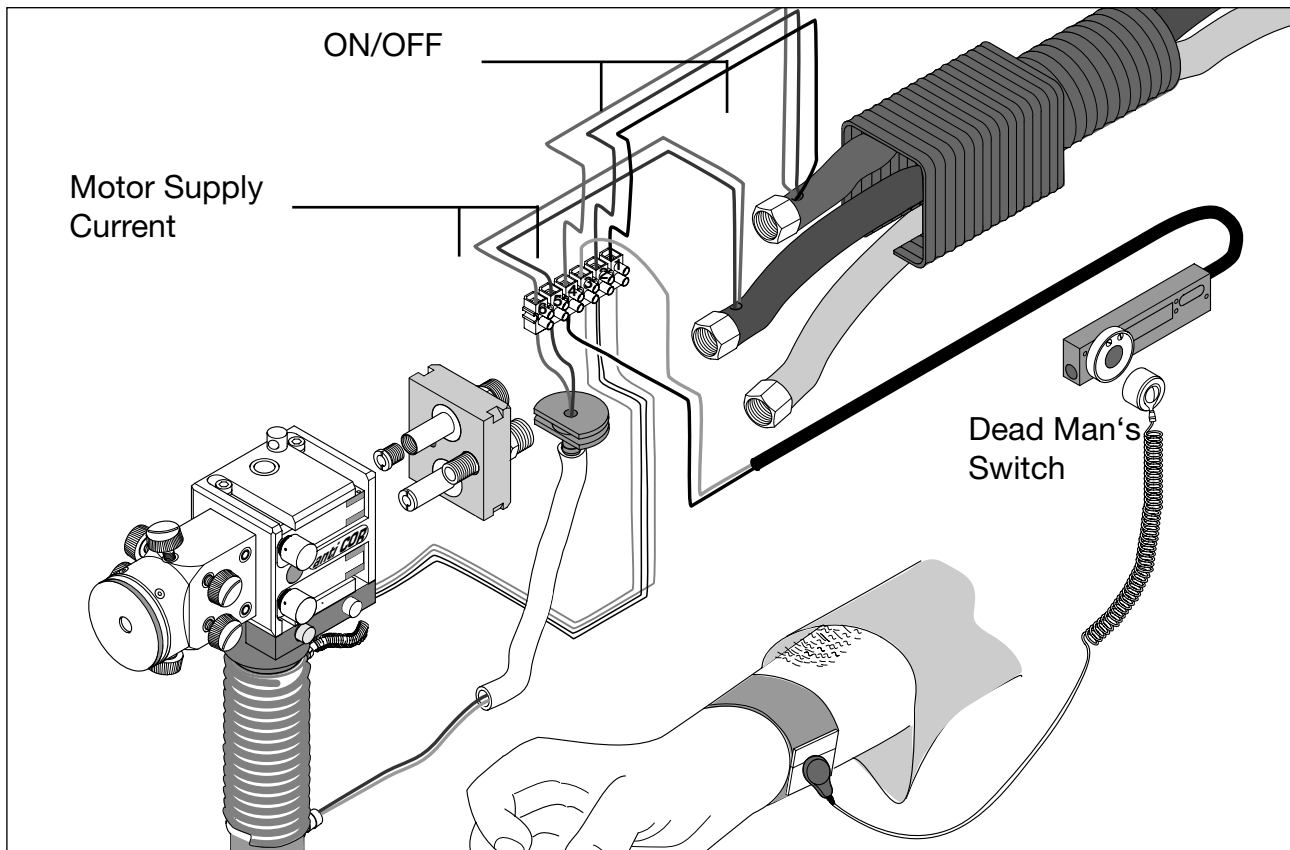


Note: Always switch off the equipment at the main switch (fig. 2, 2) when controls have to be made, faults to be looked up or tubes (nozzles) to be changed or adjusted.

6

FAULTS	CAUSE	REMEDY
No atomizer air and no current when operating ON-contact at pistol	a) No compressed air available	a) Open valve between compressed air supply and power source, check if cut-off valve at the air entrance of the power source is open (see page 4-4) and that compressed air is available
	b) No current	<p>b1) Check if all current connections are properly made; check if main switch is on position ON (fig.2; 2)</p> <p>b2) Check if the plugs of the signal current cable (fig. 2; 41) and motor supply cable (fig. 2; 39) are inserted in the appropriate sockets of the power pack</p> <p>b3) Check fuses of the electrical distribution mains and phases RST</p> <p>b4) Check 6 fuses inside power source; for this purpose take off left side panel of power source and hinge down fuse holders (see fig. above) in the left upper side of power source</p>
	c) Air-pressure is too low – white control lamp (fig. 2, 10) does not light up	c) Air pressure control breaks contact to ON-contact and control lamp (fig. 2, 10) until pressure of at least 2 - 3 bar is attained. Check that at least 3.5-5.0 bar are attained.





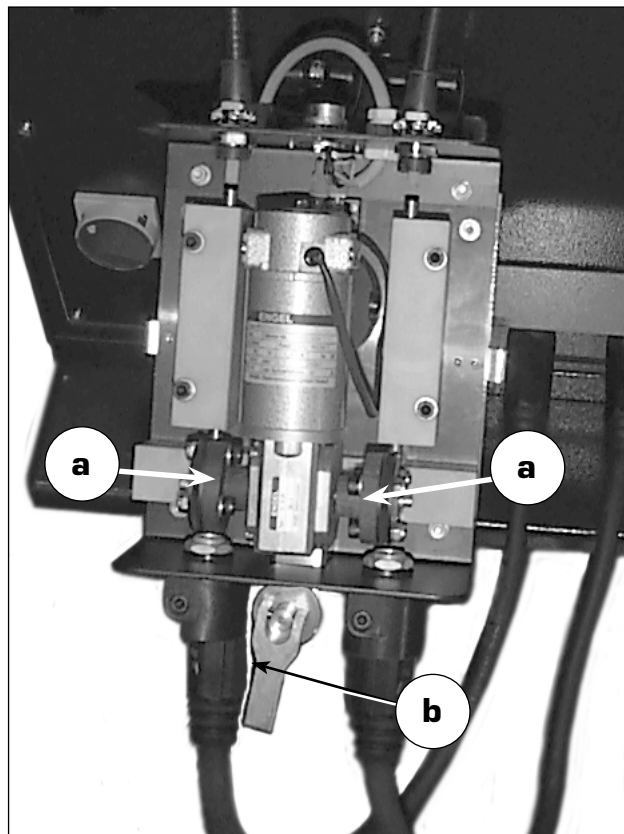
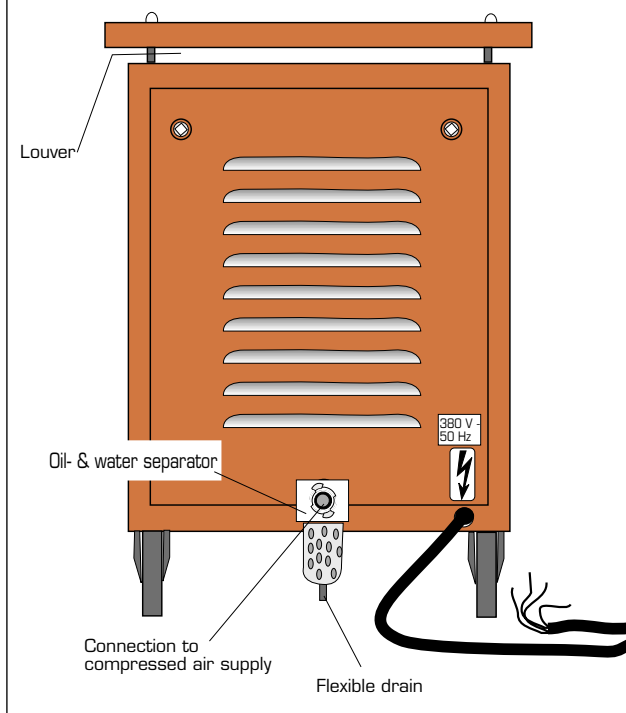
FAULTS

CAUSE

REMEDY

	d) ON/OFF contact or manometric switch inside power source are defective	d) Renew corresponding components
	e) Cable connections of control cable are broken	e) Renew appropriate cable connections
Wires feed without spraying for 1-2 seconds; no indication at the ammeter	f) No voltage available	f) Check if all current connections are properly made - see as well b1) - b3)
Spray process interrupts	g) Wire speed too high	g) Reduce speed of the DC motors at the poti (23) (see fig. on page 6-1)
	h) Voltage too low	h) Increase voltage by adjusting vernier (fig. 2, 5) and/or range selector (fig. 2, 27)
	i) Contact tubes are misaligned	i) Align tubes as described under part 5
	j) Bores of contact tubes are badly worn	j) Replace with new contact tubes See page 7-3
	k) TEFLON®-cores of 8 m cable's package or in the short wire guidings are worn	k) Renew - see part 7.3
Spray jet is interrupted, splutters, or cuts off	l) Wire feed is uneven	l1) Increase pressure slightly on wire rollers (a) by turning pressure lever (b) (see fig. on page 6-3); avoid excess pressure

Fig. 7)
Back of Power source



FAULTS

CAUSE

REMEDY

Spray jet is interrupted, splutters, or cuts off

m) Bad contacts

- l2) Check correct unfeeding of wires out of the drums or off the twin reel wire stand - see as well part 5.6
- l3) Ensure that cable's package possibly rests without any loops on the floor
- l4) Ensure that cable's package is not buckled or crimped by treading or crossing. Ensure that TEFLON® cores are not worn out
- l5) Ensure that only perfect zinc wire is used!
- m1) Check that all current connections between power source and pistol are firmly connected
- m2) The contact tubes must have perfect contact with the terminals of the pistol. Ensure that they are both clamped securely - see as well page 5-7
- m3) Excessive wear in the bores of the contact tubes reduce the contact between tubes and wires, which also reduces current transfer
- m4) metal dust has accumulated to a thick layer either in the power source or the pistol. Therefore, remove all dust from the pistol and clean the interior of

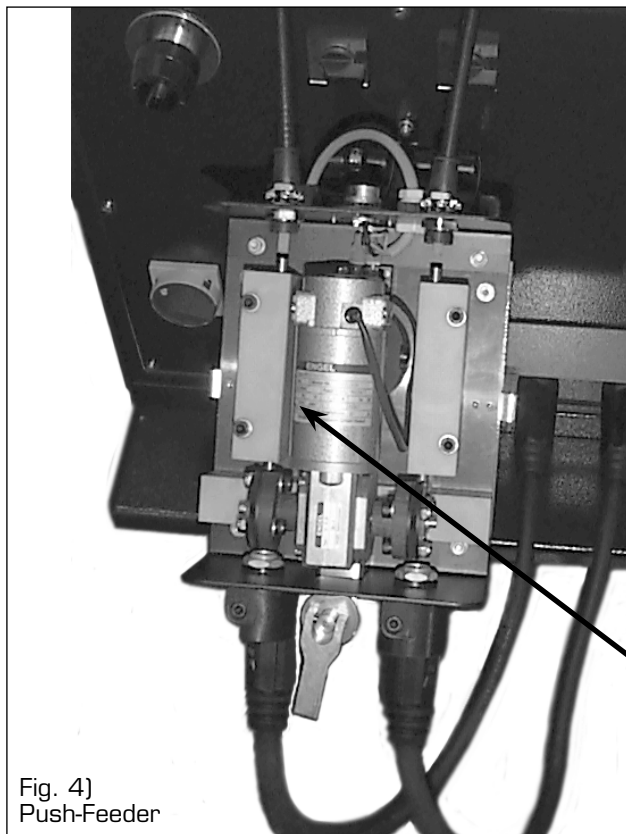
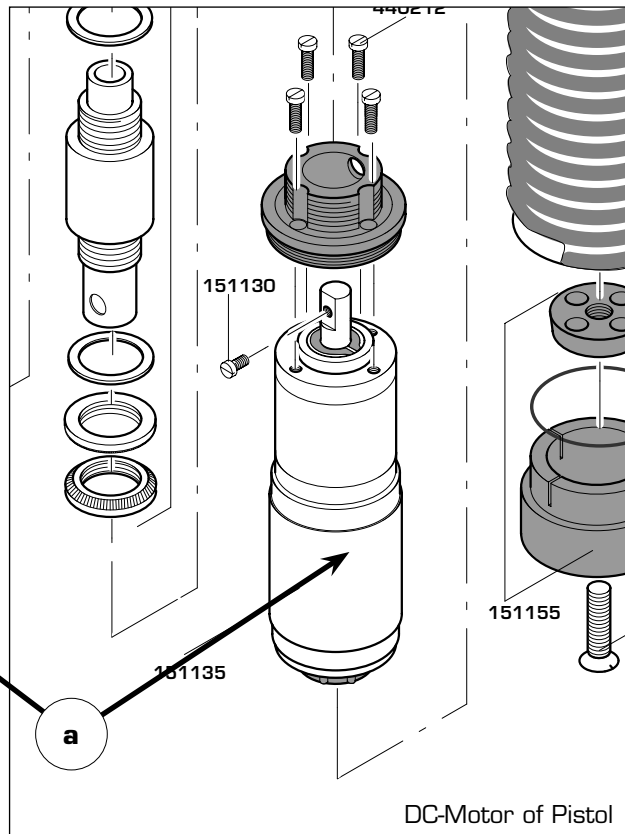


Fig. 4)
Push-Feeder



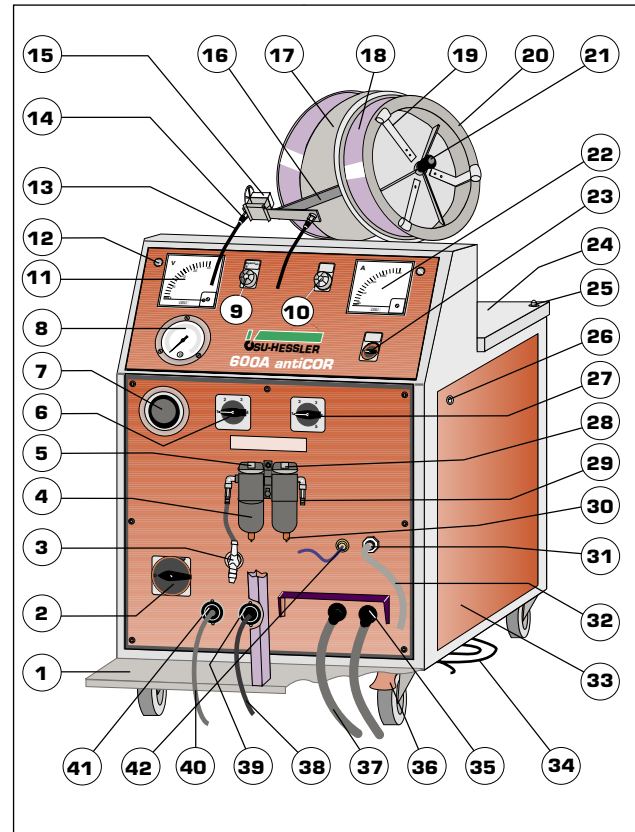
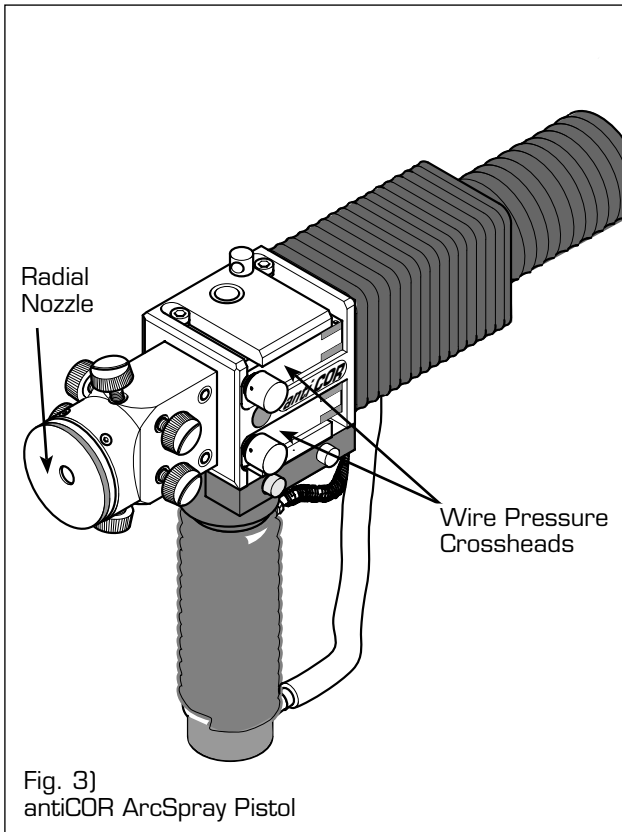
DC-Motor of Pistol

FAULTS	CAUSE	REMEDY
		the power pack with compressed air
Spray current interrupts, wires feed, green and white control lamps glow	n) Transformer or rectifier inside power source are defective	n) Renew respective components
Equipment switches off, all control lamps switch off	o) Fuses of the electrical distribution mains or 24 V fuse of equipment are defective	o) Check and renew, if necessary; the 10 A fuses for the 24 V circuitry are inside the power pack on the left side; for this purpose the left machine panel has to be taken off
Equipment switches off	p) Spray current (amperage) too high	p) Reduce wire feed by turning poti (fig. 2; 23) at power source
Pistol can neither be started nor be switched off	q) ON- or OFF-contacts are defective	q) Renew respective connections, switches or control cable
Sprayed layer shows black pores	r) Water or oil is blown on the surface by	r) Standard machine oil- & water separator (see fig. 7 above) is not sufficient due to bad air supply or long supply lines. Insert additional oil- & water separator between air entrance at the back of power source and pressure air supply
Wire transport interrupts or stops	s) One of the DC motors (a) of pistol or push-feeder is defective	s) Renew motor; it is useful always to have one spare motor in stock

Possible Faults, Their Cause and Remedy

- | | |
|--|---|
| t) Wire got stuck on wire reel or in drums dispenser | t) Check twin wire reel stand or drums dispenser; use only perfect wires from OSU-Hessler Company |
|--|---|





7 Maintenance & Spares

7.1 Keep clean Power Source and antiCOR Spray-Pistol

At all times, maintain the equipment in a clean condition; disturbances then will be reduced to a minimum.

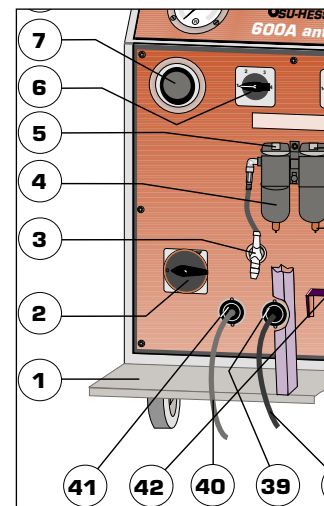


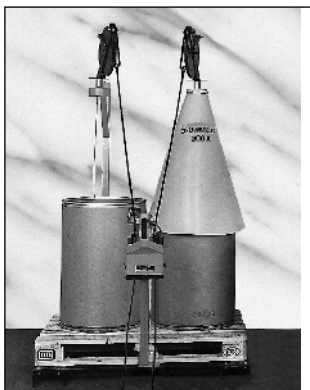
Before doing any maintenance work on the pistol or the push-feeder switch off power source at main switch (fig. 2, 2); when doing maintenance work on the power source, always interrupt mains, i.e. disconnect power supply from the mains!

Remember, when dealing with electrical equipment, that short circuits are likely to occur if metallic dusts are allowed to accumulate near live contacts. It is, therefore advisable to clean the spray-pistol once daily with clean and oil-free compressed air. For this purpose the power source is equipped with a blast pistol and hose which has to be connected to the blast air outlet of the power source (fig. 2, 3).

Therefore it is recommended to do the following regularly:

After Spray Time of	Maintenance Work to be done
every 8 hours	Take off radial nozzle of pistol, open upper and lower wire pressure crossheads and blow out all dust
every 30-50 hours	Dismantle nozzle system and clean all parts; renew defective components





Separate Drum's Feeder for Zinc Wire in 250 kg Drums

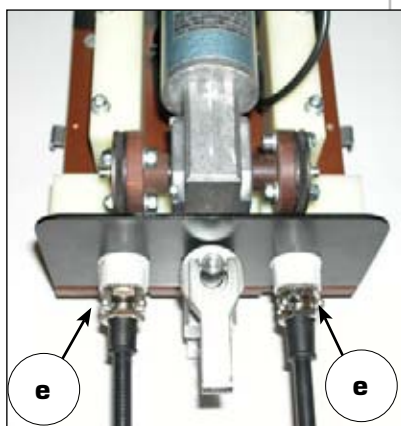


Fig.15)
Current-/Air adaptor cable

After spray Time of	Maintenance work to be done
every 50-100 hours	Check all mechanical and electrical connections as well as all compressed air hoses
every 200 hours	Take off cover (24) and side panels (33) of power source and carefully blow out with compressed air; check all electrical and pneumatical connections.

7.2 Maintenance of the Feed-Gear Mechanism

The push-pull wire feed gear mechanism itself is submitted to high dynamic strain and should have the best care. It is recommended to check the feed rollers after approx. 300-400 hours of operation. In case they are worn, replace.

7.3 Replacement of the TEFLON® Cores

Inside the cable package between power-source and pistol are integrated 2 wire guidings where the TEFLON® cores are integrated through which the wires are fed.

In spite of its excellent sliding behaviour and its high wear resistance these TEFLON® cores are subject to wear after a certain time of use. You may imagine that after throughput of several kilometers the slightly knurled wire acts like a band saw.

After spraying of approx. 5 ts of zinc wire or whenever there are difficulties in wire transport, the TEFLON® cores should be checked and replaced if necessary.

This is done as follows:

- ☐ Feed out wire ends which are still in the cables by spraying and pull out short wire ends still in the pistol with flat tongs; pull wire ends out of the contact tubes
- ☐ Switch off power source at main switch (fig. 2; 2)
- ☐ Straighten the cable's package with pistol and lay straight on floor; loosen plugs for wire guidings from push-feeder by loosening the screws (e)
- ☐ Pull out the used TEFLON® core (c).
- ☐ Repeat same procedure with other wire guiding.

New TEFLON®'s are inserted as follows:

- ☐ Insert new TEFLON® hose into the wire guiding still attached to the pistol until it stopps; cut off end of TEFLON® core until only 10-15 mm are protruding from the wire guidings' end.
- ☐ Reinsert wire guiding in the push feeder and tighten with spanner.
- ☐ Repeat same procedure with other cable.

7.4 Maintenance of the antiCOR Arc Pistol

Perfect condition of the nozzle system is of greatest importance for perfect functioning of the pistol.

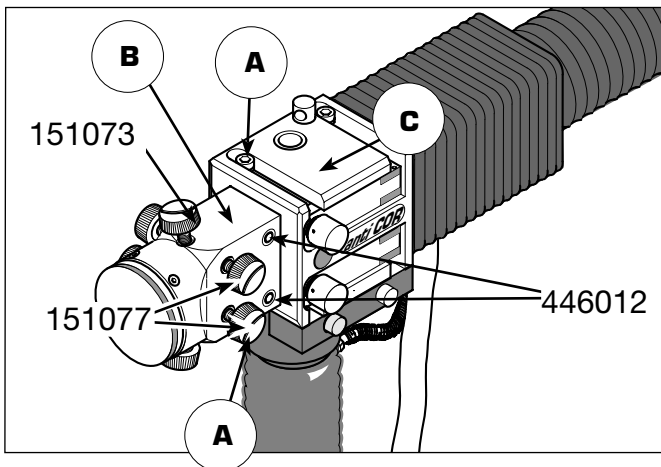
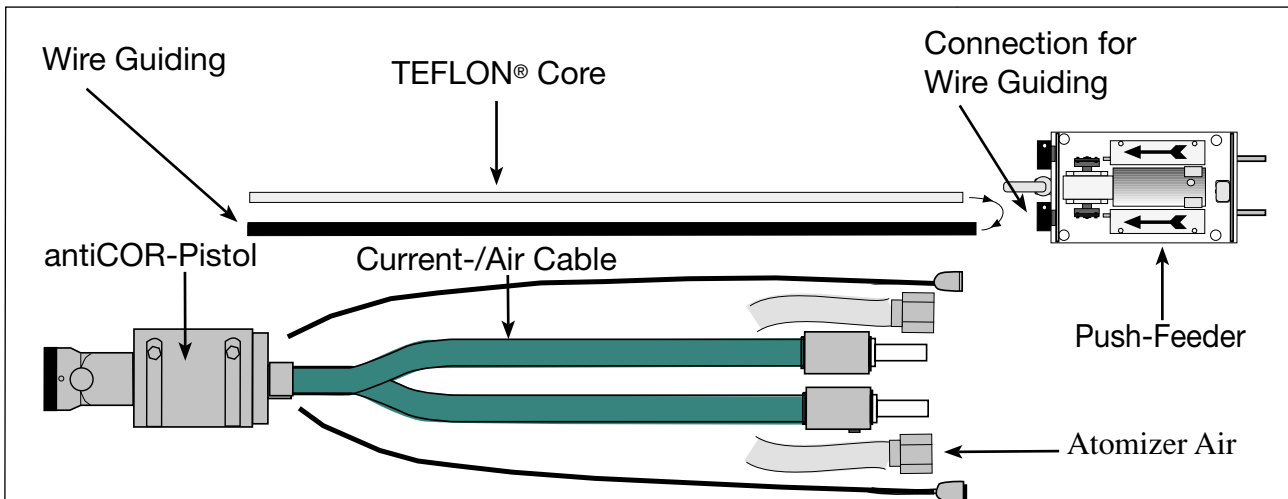


Fig. 3) antiCOR Arc Pistol

Check whether the bores of the contact nozzles are not worn out in the horizontal or vertical direction. The greater the wear, the smaller the contact surfaces between nozzle-tips and spray wire; the worse the current transfer the greater the resistance of the wires being pushed through the tubes.

Wipe off any grease from the contact tubes. Take some emery cloth and sharply rub over the tubes at the terminal faces of the un-arched parts, to make good contact surfaces.

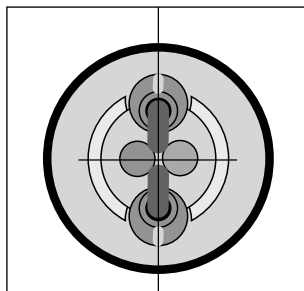
👉 Possibly replace with new ones!

To change nozzles loosen upper and lower IB-cheese head screws (A) with an appropriate hexagon socket screw key (available in the tools set delivered with the machine).and pull out complete spray head (B).

Now open threaded pins 446012, loosen knurled screws 151077 and 151073 on all sides and pull out contact tubes from the rear of the spray head.

Fit new contact tubes into the spray head, adjust carefully and fix with threaded pins 446012. Eventually adjust with knurled screws, put spray head back to pistol body and fix carefully with IB-cheese head screws (A).

The two contact tubes have to be adjusted so that the two wire



Adjusting of Contact Tubes

tips meet exactly.

7.5 Maintenance of the Oil- & Water Separator

Oil- and moisture free air at a constant pressure is necessary for the satisfactory functioning of the equipment. To achieve this a filter is installed at the entrance of the compressed air at the backside of the power source (fig. 7).

This filter (fig. 8) consists mainly of a plastic bowl with integrated metal bowl guard, 5 µm-felt filter element, drip pan, and manual drain.

Certain compressor oils, chemicals, household cleaners, solvents, paints and fumes will attack plastic bowls and can cause bowl failure.

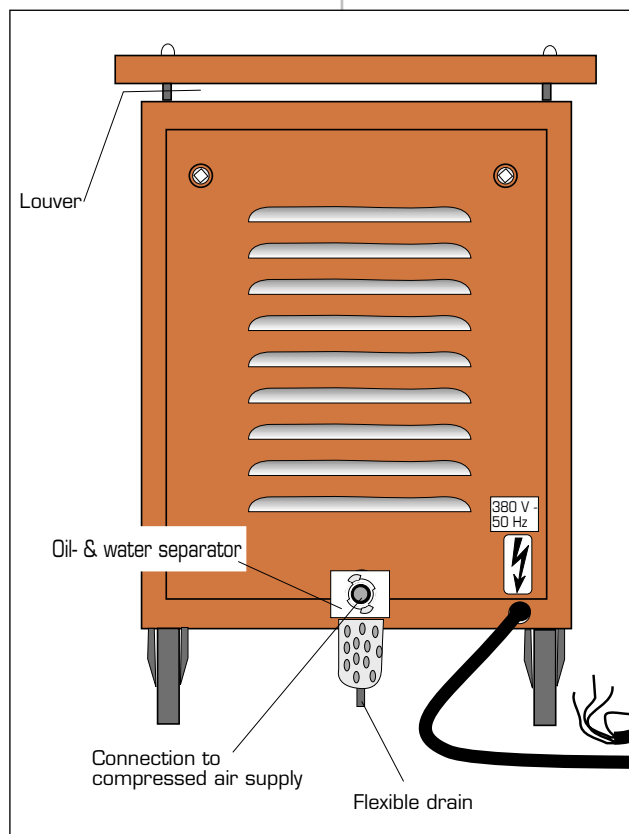


The polycarbonate plastic bowl has to be drained daily by turning clockwise (!) the manual drain knob! Do not forget to shut the drain by turning anti-clockwise.

Every 6 - 8 weeks - according to the quality of the local air supply - the rigid felt filter element has to be removed and cleaned by washing it with kerosene or similar cleaner compatible with polycarbonate. Blow dry with air blow gun.

Dirt accumulation in the plastic bowl itself has to be washed off with soap and water or kerosene. Beware of materials which will attack polycarbonate. Immediately replace any crazed, cracked, damaged or deteriorated plastic bowl.

Fig. 7)
Back of Power Source



Input air pressure is not allowed to be higher than 10 b. If so, an additional air pressure reducer has to be installed before the air entrance of the power source!

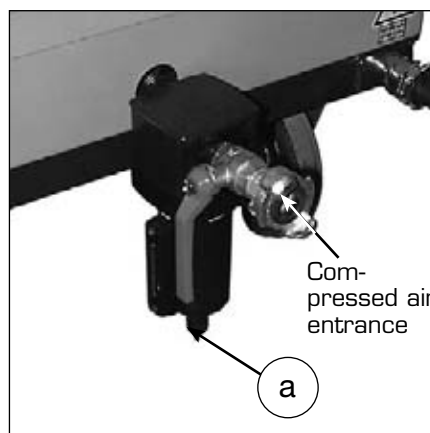


Fig. 8)
Oil- & Water Separator (Filter) at the back of the power source behind the compressed air entrance



7.6 Spares

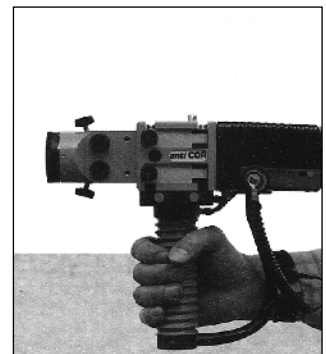
Normally every part has its own 6-digit purchase order number (Id.-No.). If not, please quote the drawing number of the part or respective figure.

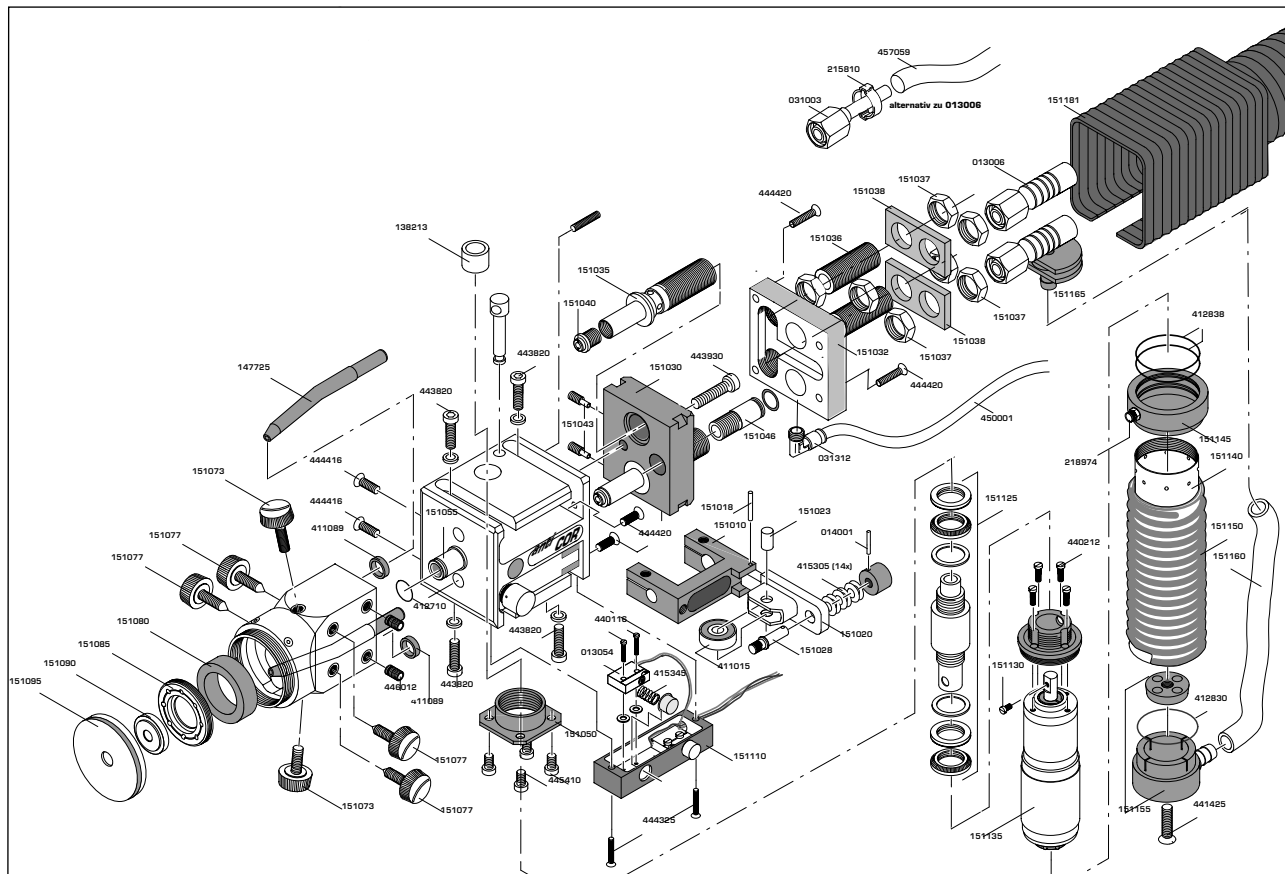
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100	100.1

I. Parts for antiCOR Arc Pistol

013006	Connection for current/wire guiding hose
013054	Micro-switch ON & OFF with short cable
014001	Steel cylinder pin 2 x 16 mm
031003	Hose bush 6 mm with union 3/8" right
031312	L-plug-in threaded joint 1/8" for hose 4/6"
138213	Needle bush
147720	Contact tube for 2.0 mm zinc wire
147725	Contact tube for 2.5 mm zinc wire
148720	Contact tube for 2.0 mm aluminium wire
148725	Contact tube for 2.5 mm aluminium wire
150120	Type antiCOR arc pistol for 2,5 mm zinc-wire complete with wide-spray nozzle and DC motor
151005	Pistol housing without components
151009	Upper current deviation piece 600 A
151014	Lower current deviation piece 600 A

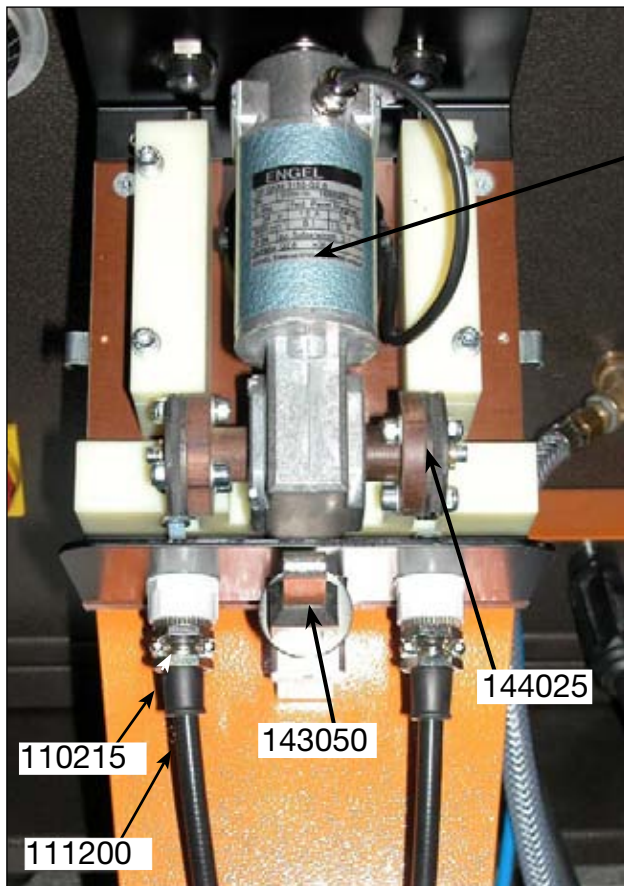
Fig. 3)
antiCOR Arc Spray Pistol





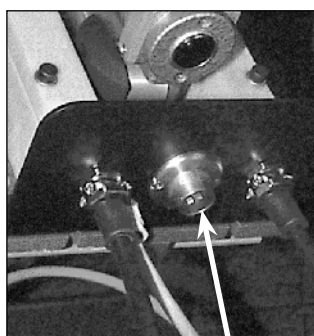
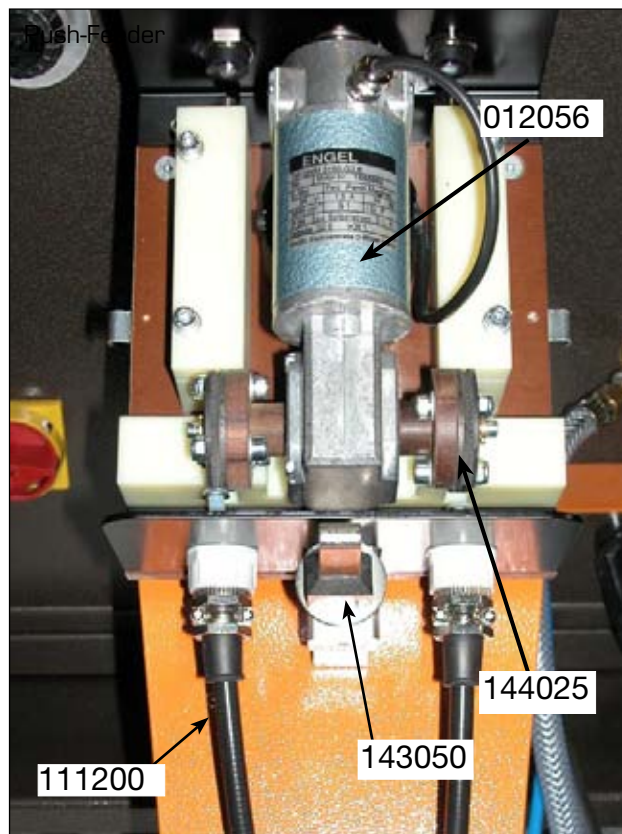
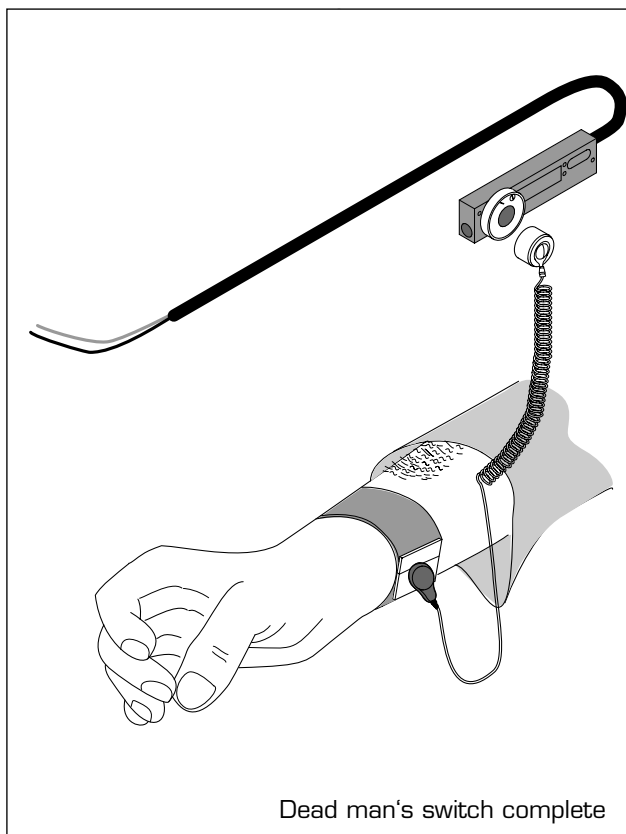
Id.-No.	Designation of Part
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151018	Axle of wire pressure crosshead
151020	Upper wire pressure crosshead
151023	Bearing axis
151025	Lower wire pressure crosshead
151028	Pressure screw with head (incl. 415305)
151030	Air deflector
151032	Air distributor plate
151035	Contact piece
151036	Air/current nipple 3/8"
151037	Hexagon nut
151038	CU-Connector 25 x 5 x 50 mm
151040	Wire entrance
151043	Locking piston screw
151045	Atomizer air connection piece
151046	Atomizer air screw
151050	Motor flange
151055	Neck tube
151070	Spray head antiCOR without components
151073	Knurled screw M6 x 13 mm
151077	Knurled screw M6 x 17 mm
151080	Distance piece
151085	Acceptance for nozzle disc
151089	Atomizer nozzle disk for 2.0 mm wire-ø
151090	Atomizer nozzle disk for 2.5 mm wire-ø
151093	Radial nozzle for 2.0 mm wire-ø
151095	Radial nozzle for 2.5 mm wire-ø
151097	antiCOR wide-spray atomizer nozzle
151099	Nozzle nut for wide-spray atomizer nozzle



Push-Feeder

Id.-No.	Designation of Part
151110	Switch housing without components
151125	Wire feed roller unit complete for 2.0 mm & 2.5 mm wire-ø
151130	Driving screw
151134	DC-motor for zn-wire
151136	DC-motor for al-wire
151140	Al-housing with flange for DC-motor
151145	Air diffuser ring
151150	Protective covering for DC-motor
151155	Cover for DC-motor
151160	Hose for DC-motor
151165	Antikink hose connection
151181	Antikink trumpet
151190	Dead man's switch complete
215810	hose clamp for air hose 10 mm i.d.
411015	Ball bearing EL 27-1 (stamp 627-2RS1)
411089	Packing ring G 9 x 13 x 3 mm
412710	O-ring 10 x 1.5 P H(F75)
412830	O-ring 30 x 2 mm
412838	O-ring 38 x 2 mm
415305	Saucer spring for wire pressure mechanism
415345	Pressure spring for switches ON/OFF
440116	Cheese head screw M 2 x 16, 16 mm of length (galvanized)
440212	Cheese head screw M 3 x 12, 12 mm of length (galvanized)
441425	Countersunk head screw M 6 x 25 galvanized
443820	IB-cheese head screw M5 x 20 (galvanized)
443930	IB-cheese head screw M6 x 30
444325	IB-cheese head screw M3 x 25
444416	IB-cheese head screw M4 x 16



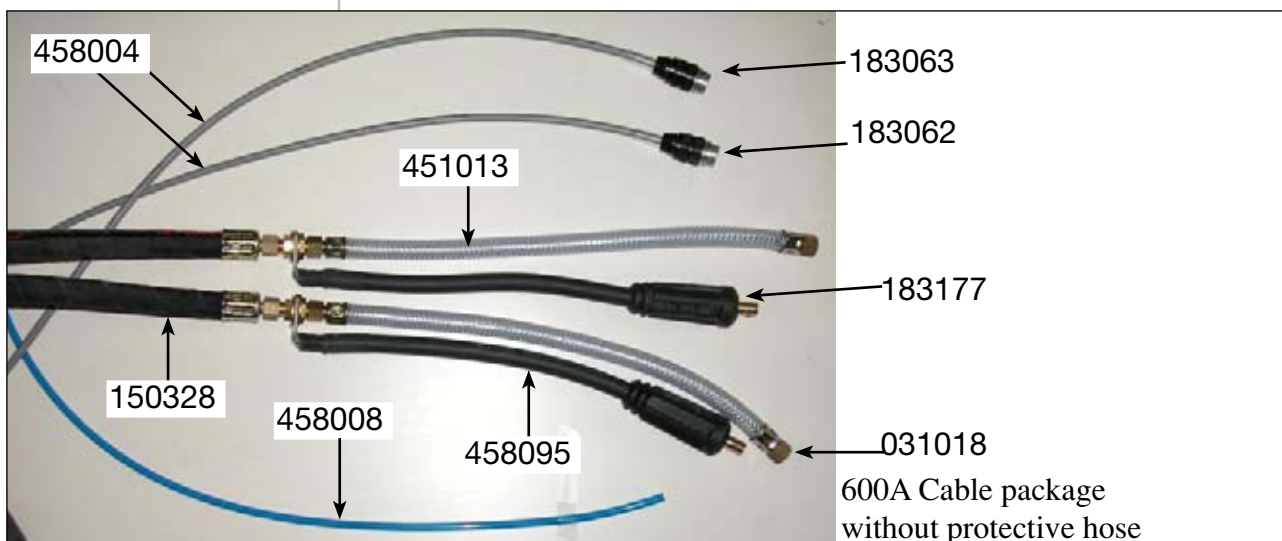
183062 Tichel-plug
5-pole of push-feeder

Id.-No. Designation of Part

444420	IB-cheese head screw M4 x 20
445410	IB-socket head screw M5 x 10
446012	Threaded pin M6 x 12
450001	Polyethylene hose
457059	Wire guiding hose 6 x 2 mm

II. Parts for Wire Push Feeder

012056	DC-push-feeder motor with bilateral axle, 34 V 80 rpm
110215	Clamped joint with rubber socket for fixing of insulating hose
140129	Push wire feeder type S for 2.5 mm zinc wire-diam.
142075	Spring green (soft) for wire-feeder head



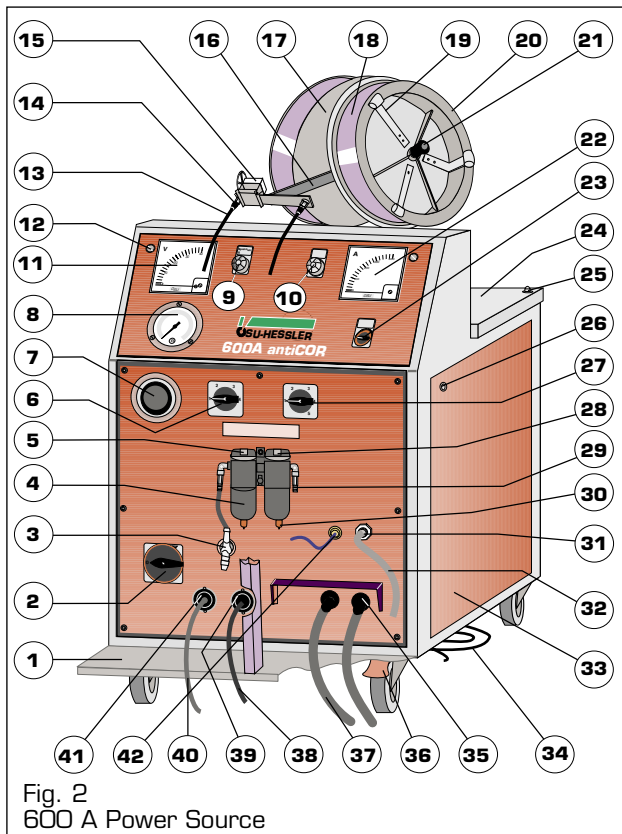
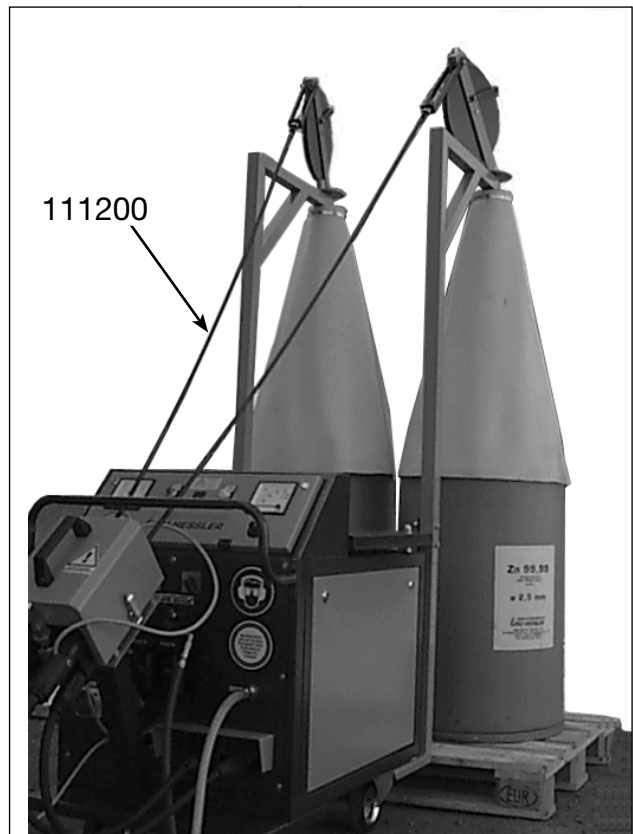


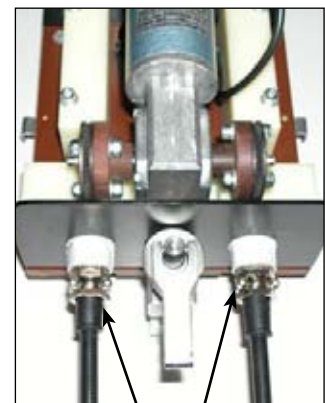
Fig. 2
600 A Power Source



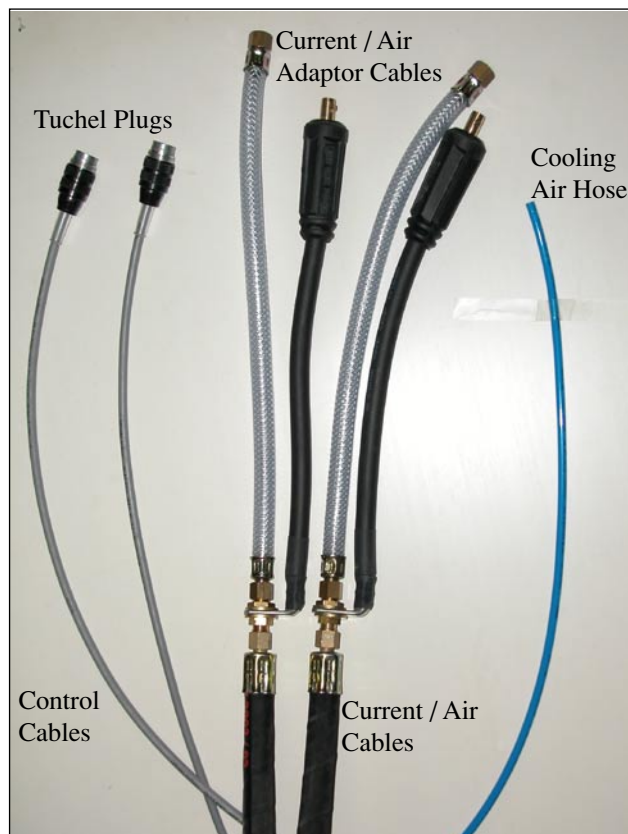
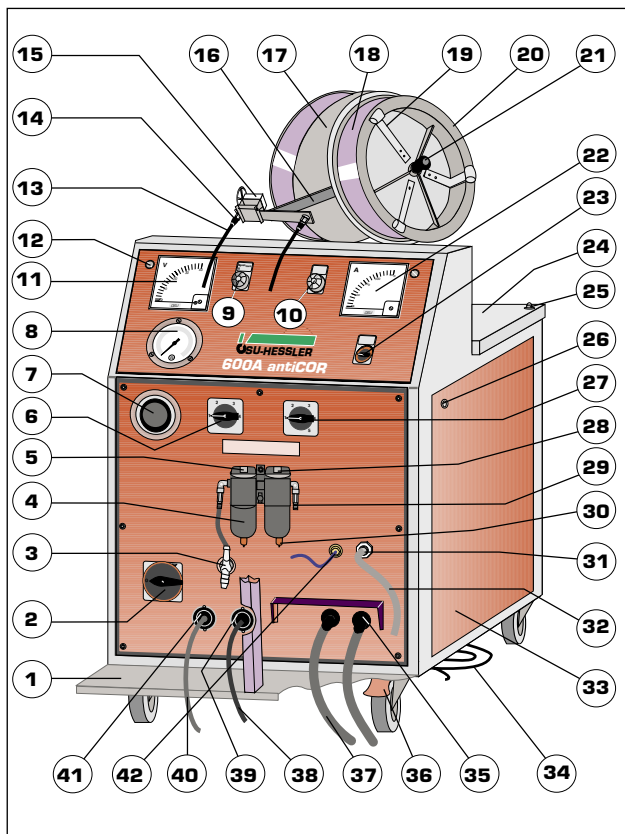
Id.-No.	Designation of Part
143050	Motor bolt, receiving bush & pressure lever for push-feeder
144022	Wire guiding for push/pull feeder
144025	Feed roller complete for 2.5 mm wire-ø
144027	Distance tube for feed roller push/pull
144050	Aluminium traverse for wire pressure
144070	Cover with handle for push-feeder
183052	TUCHEL-socket 5-pole
183062	TUCHEL-plug for control cable 5-pole
411036	Grooved ball bearing S4 - 1 Z (stamp 6200 - 2 RS1)
415358	Pressure spring - hard

III. Cables & Hoses with Accessories

031018	Hose nozzle 13 mm with union nut R3/8"
111200	Wire guiding hose 7/10 mm endless - price per m
140139	Supply cable's package 95 qmm, 10 m of length between power source and push-feeder on console of separate drum's feeder
150308	antiCOR cable package with all connections - length 8.0 m
150310	antiCOR cable package with all connections - length 10 m
150328	antiCOR current / air cable - length 8.0 m
150330	antiCOR current / air cable - length 10 m
151190	Dead man's switch complete
151195	Switching magnetic contact with bracelet
151308	TEFLON®-core 8.0 m of length
151310	TEFLON®-core 10.0 m of length
183052	TUCHEL-socket 5-pole (Fig. 2 39)
183053	TUCHEL-socket for control cable 3-pole (Fig. 2 41)
183062	TUCHEL-plug 5-pole for control cable
183063	TUCHEL-plug 3-pole for control cable



110215



Id.-No.	Designation of Part
---------	---------------------

183073	TUCHEL-coupling for control cable 3-pole (to push-feeder)
183177	Spray current cable plug DIN 70-95
451013	PVC-fabric hose 13 x 3.5 mm for atomizer air
458004	Control cable 4 x 0.75 mm - endless
458008	PA-Hose 8/6 for rapid plug connection
459028	Protective hose 60 x 1.5 mm for cable package 150308, 150310

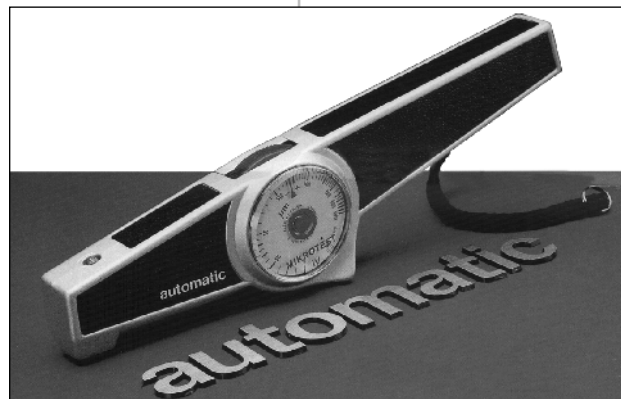
IV. Electrical Parts for Power Source

051009	Relay DIL 2 M 24 V, 50-60 Hz
051014	Contactor relay DIL R 22, 24 V
051020	Time lag relay TE 69-A, multifunction
051021	Time lag relay TE 11-10-A, 5-10 sec
051210	Protective motor switch Z1 - 40.0 A , 220 V
051216	Base EZ1 for protective motor switch Z1
051501	Fixing adapter BE3 for indicator light
051525	Lamp socket EF for indicator light
051530	Adaptor RL-GN for green indicator light (fig. 9)
051532	Adaptor RL-WS for white indicator light (fig. 10)
180066	Main switch (fig. 2)
180076	Camshaft controller (vernier), 3-pole, 4 steps (fig. 6)
180077	Camshaft controller (range selector), 3-pole, 5 steps (fig. 27)
180097	Rotary current transformer 400V/50-60 Hz, 600 A
180996	One-phase control transformer 400 V, output 24 V/42 V/220 V
181003	Single-phase control trafo 400 V
181009	One-phase control transformer 400V for 500/600 A
181027	Silicon rectifier 600 A
181034	Control board DR 1.100 42 V, WS 3A



Special Air-Filter System
for Operator's Mask

MIKROTEST
Thickness Gauge



Id.-No.	Designation of Part
181037	Poti 10 kOhm, 0,15 W
181038	Turning knob with scale for poti (fig.② 23)
181039	Cover for manometric switch 183140
183052	TUCHEL-socket 5-pole (fig.② 39)
183053	TUCHEL-socket 3-pole (fig.② 41)
183093	Fuse 2 A, 5 x 20 mm, mittelträge
183095	Fuse 6,3 A, 5 x 20 mm, mittelträge
183138	Ammeter CBC 96 0-800 A (fig.② 22)
183140	Diaphragm pressure control device
183146	Atomizer air solenoid valve 1/2" 24/50 Hz
183159	Voltmeter 0-40 V, 45° (fig.② 11)
183175	Current cable panel jack DIN 70/95 (fig.② 35)
185003	Shunt resistance 800 A - 60 mV without testing wire

V. Pneumatic Parts

031600	Rapid action coupling R 3/8" i.w. made of brass (fig.② 3)
183199	Pressure gauge 1/2" with nut for wire feed- & atomizer air (fig.② 7)
183500	Sub-micro-prefilter M18-C2-000 for breathing air filter unit (fig.② 5)
183510	Activated carbon filter M18-C2-X00 for breathing air filter unit (fig.② 28)
183580	Air filter F28-C4-SL00
214217	Manometer ø63 mm, 0-10 b (fig.② 8)
293210	Blow-off pistol with 1.5 mm bore, hose nozzle 6 mm i.w.

VI. Miscellaneous

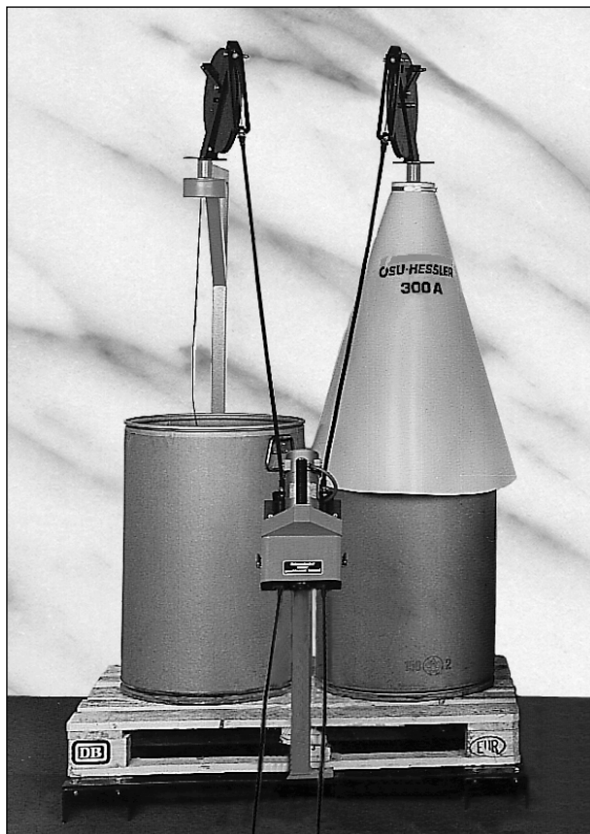
030512	Thickness gauge MIKROTEST IV, measuring range 0-1000 my
110201	Wire reel adaptor (single) made of plastic with springs (fig.② 17)
110202	Brake spring for wire reel adaptor axle (fig.② 21)
110208	Fitting piece for taking small wire coils D200-5
110215	Clamped joint with rubber socket for fixing of insulation hoses (fig.② 14)
110217	Fixing clamp for wire reel adaptor (fig.② 19)

7

Air-Filter at the Back of
the Power Source



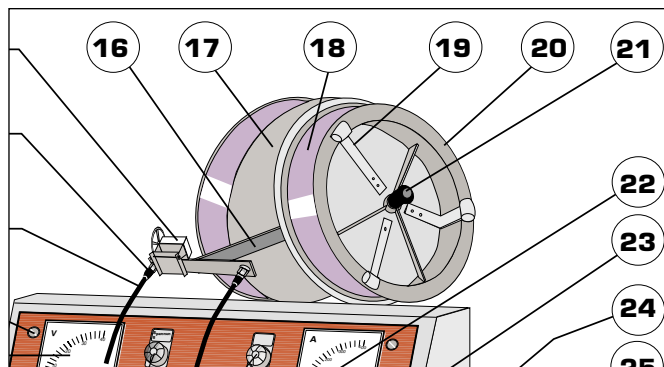
183580



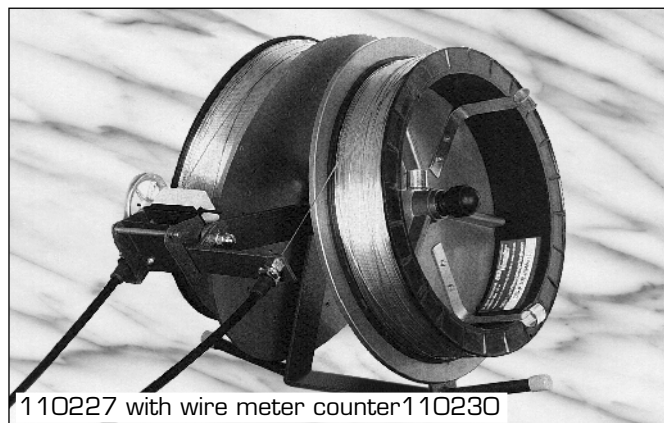
Separate Drum's Feeder Installation 140141 with console 140140 for Push-Feeder



Drum's Feeder for 250 kg Zinc Wire Drums fixed to the Power Source
Id.-No. 140142



Twin Wire Reel Stand



110227 with wire meter counter 110230

Id.-No.	Designation of Part
110227	Twin wire reel stand complete but without wire-meter counter (fig. 2 16)
110230	Support for wire-meter counter with counter and measuring wheel (cannot be used with the drum's feeder)
110233	Wire meter counter acceptance with holder for drum's feeder installation
140140	console for push-feeder
140141	Drum's feeder single stand
140142	Drum's feeder attached to the power source
183550	air filter system for operators mask
420018	Set of special tools
460135	PANORAMA protection helmet with tinted visor for arc spraying
460154	Breathing air hose 5 m of length with all connections for PANORAMA & CASCO helmets
460155	Breathing air hose 10 m of length with all connections for PANORAMA & CASCO helmets

8 Setting Tables, Use of Wires, Applications

According to quality and grade of wire-surface as well as working conditions of the equipment the DC motors of the push-pull system require different power to feed the wires with a constant speed to the short circuit point in front of the pistol's nozzle system. Therefore it is impossible to obtain exactly the same spray-capacity with different wires at one certain adjustment of wire speed.

On that account in the following Spray Tables all data for wire-feed are only to be considered as approximate values!

8.1 Criteria for Melting (Spraying) Capacity of Zinc Wire

The only criteria for the melting capacity per hour are current (amperage - generated by wire feed) and voltage. Thus, when the volts and amps listed in columns 2 and 3 are read off, the melting (spraying) capacity listed in col. 5 of the below Spray Table will be reached.

Small differences result from inaccuracies of the indicating instruments, different melting points and from electrical losses due to bad contacts.

Zinc should normally be sprayed with 18 - 20 volts under load (voltage measured at the contact nozzles - the voltmeter indicates a 1 - 2 higher voltage, depending from the length of the power cables from power pack to pistol).

It is advisable to work with a wire speed not below 40-50 amps to avoid voltage fluctuations with possible interruptions of spraying.

Spray Table

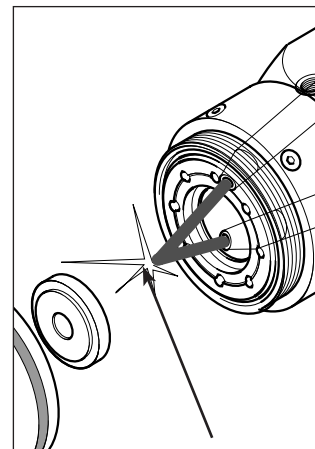
Column 1 Wire Quality*	Column 2 Indicated at Voltmeter	Column 3 Indicated Amperage	Column 4 Wire-feed (one side) in m/min.	Column 5 Spraying Capacity in KGs/hour
Zinc	23	80	1,9	8,0
Zinc	22	100	3,3	10,0
Zinc	21	150	3,5	15,0
Zinc	20	200	4,6	20,0
Zinc	20	300	7,14	30,0
Zinc	21	400	9,52	40,0
Zinc	21	600	14,28	60,0

*in 2.5 mm wire-ø

8.2 Adjustment of Operating Circuit Voltage

If the power source is switched on without wire feed the voltmeter shows the no-load circuit voltage. When the spraying process starts, i.e. the wire is transported, the no-load circuit voltage falls down to the operating circuit voltage. On the average this fall of potential is 2-4 volts.

The following no-load and corresponding operation circuit voltages can be adjusted (whereas the working amperage has of course some fundamental influence as well as the local supply voltage - i.e.: if the local supply voltage is for example 400 V no-load and operating voltage will of course be higher at a given setting than with a local 380 V/400 V supply voltage):



Short-Circuit Point



Voltage Setting Table:

Pos. of Range selector	Pos of vernier	No-load circuit voltage	Operating circuit voltage*
Pos. 1	Pos. 1	18,2 V	14,5 V
	Pos. 2	18,8 V	15,0 V
	Pos. 3	19,3 V	15,5 V
	Pos. 4	19,8 V	16,0 V
Pos. 2	Pos. 1	20,9 V	17,1 V
	Pos. 2	21,4 V	17,6 V
	Pos. 3	22,0 V	18,2 V
	Pos. 4	22,6 V	18,7 V
Pos. 3	Pos. 1	23,8 V	20,0 V
	Pos. 2	24,4 V	20,6 V
	Pos. 3	25,1 V	21,3 V
	Pos. 4	26,0 V	22,2 V
Pos. 4	Pos. 1	27,5 V	23,7 V
	Pos. 2	28,5 V	24,7 V
	Pos. 3	29,5 V	25,7 V
	Pos. 4	30,7 V	26,7 V
Pos. 5	Pos. 1	32,8 V	29,0 V
	Pos. 2	34,0 V	30,2 V
	Pos. 3	35,2 V	31,4 V
	Pos. 4	36,9 V	33,1 V

* Operating circuit voltage measured at the contact nozzles is of course lower - the voltmeter indicates a 1 - 2 higher voltage, depending from the length of the power cables from power pack to pistol. The operating circuit voltage is influenced by the amperage as well (parameter for spraying capacity). When adjusting the voltage setting, the fundamental rule for arc-spraying should be observed:



Always work with the shortest possible arc and thus with the lowest possible voltage at a pre-set amperage (spray capacity)!

8.3 Determination of exact Melting Capacity

Read off the wire length measurer (optional) how many meters of zinc wire per unit of time running through (use stop-watch or seconds hand of wrist-watch):

Example:

Indicator reading 235 m; Zinc 2,5 mm wire-diameter.

If you read at the wire-meter counter a used quantity of 235 m, a total quantity of 470 m was sprayed, because two wires are used at the same time.

The weight of 1 m zinc wire in 2,0 mm diam. = 23.8 grams

The weight of 1 m zinc wire in 2,3 mm diam. = 29.7 grams

The weight of 1 m zinc wire in 2,5 mm diam. = 37.0 grams

i.e. $470 \times 37,0$ grams = 17390 grams or 17,4 kg/unit of time.

(to coat 1 m^2 with 0.1 mm layer thickness o.97 kg = 1 kg of zinc wire is required)

The weight of 1 m aluminium wire in 2,0 mm diam. = 8.6 grams

The weight of 1 m aluminium wire in 2,3 mm diam. = 11.3 grams

The weight of 1 m aluminium wire in 2,5 mm diam. = 13.2 grams

(to coat 1 m^2 with 0.1 mm layer thickness approx. o.35 kg of aluminium wire is required)

8.4 Capacity Tables concerning the Spraying of Zinc & Aluminium

a) Zinc

Amperage	Spray Capacity in kgs/hour
60 A	6.0
100 A	10.0
150 A	15.0
200 A	20.0
300 A	30.0 (max. capacity of 300 A Equipment)
400 A	40.0 (max. capacity of 400 A Equipment)
600 A	60.0 (max. capacity of 600 A Equipment)

Amperage divided by 10 = spraying capacity of zinc in kgs per hour

b) Aluminium

Amperage	Spray Capacity in kgs/hour
60 A	1.8
100 A	3.0
150 A	4.5
200 A	6.0
300 A	9.0 (max. capacity of 300 A Equipment)
400 A	12.0 (max. capacity of 400 A Equipment)
600 A	18.0 (max. capacity of 600 A Equipment)

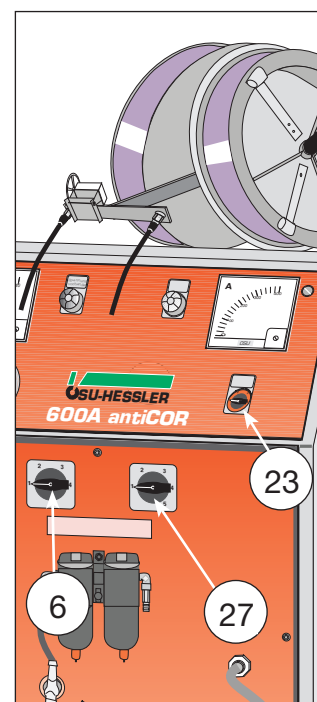
Amperage divided by 33.33 = spraying capacity of aluminium in kgs per hour

For all diameters of a wire quality the spraying capacity in kgs of material per hour is the same at a given amperage. To get the desired capacity the wire feed of the machine has to be altered. This is done by varying the speed of the wire-feed motors at the poti (fig. 2; 23), i.e. a smaller wire diameter is running faster through the pistol than a bigger one.

By turning the range selector (fig. 2, 27) and vernier (6) you should always choose the lowest possible operating voltage at a given amperage (=kgs/h).

8.5 Wire Consumption for 0,1 mm Coating Thickness per 1 m^2

Wire Quality	Specific Weight	kg/m ² /0,1 mm layer thickness
Zinc (Zn 99,995)	7.13	0,97
Aluminium (Al 99,5)	2.70	0,37



8.6 Anti-Corrosion Spraying of Construction Work

8.6.1 Scope and Purpose

This chapter applies to the protection against corrosion of steel construction work by arc spraying of zinc in the case of new buildings and of repair work. In the case of new buildings, it is preferable to sand-blast and spray before assembly, either at manufacturer's works or on the building site.

Steel structures within the meaning of this chapter are structures which require a strength calculation or a building inspectorate authorization. Some general principles are outlined how steel structures and components of steel structures can be provided with a high grade protection against corrosion by arc spraying of coats of zinc, and how good mechanical properties can be imparted at the same time to the sprayed coatings.

8.6.2 Preconditions

The preconditions for durable protection against corrosion include thorough cleaning and preparation of the surfaces to be protected, to be followed immediately if possible by thermal spraying competently carried out and resulting in an adequately thick coat of sprayed-on metal.

Thermally sprayed coats shall be provided with suitable additional coatings, e.g. of paint, if they are exposed to the atmosphere; if they are immersed in water or buried in the ground, they must be provided with suitable additional coatings.

The surfaces requiring protection must remain dry while the work is being carried out, and this must be ensured by suitable means in the event of bad weather.

Only structures with surfaces requiring protection which are easily accessible for preparation and spraying can be effectively protected. All sharp edges and crevices must be avoided. Steel structures consisting of solid web girders, tubes and components with other types of hollow cross-section are particularly well suited to thermal spraying. Because of their smooth surfaces, welded structures are preferable to revetted or bolted structures. Areas susceptible to contact corrosion must be protected by suitable means, to be agreed with purchaser.

8.6.3 Execution of Work

8.6.3.1 General

The surfaces shall be prepared by sandblasting, in order to create an adequate degree of cleanliness and of roughness.

All welding splatter, welding dribble and welding beads shall be removed from workpieces and welding seams. Welding seams shall be sand-blasted with particular care and attention.

The condition of the technically clean joint face achieved by preparation must not exhibit any change up to the time the coat is sprayed on.

Steel structures shall be sprayed in their entirety or in sections, depending on size. Friction faces for high strength bolted fastenings and flanks shall be left untouched.

These assembly joints, and if necessary also any flaws or damaged patches on the previously applied sprayed-on coat shall be sand-blasted and sprayed after completion of erection of the steel



structure, and if necessary suitably touched up with paint. This shall be done without damaging the sprayed-on coats already applied.

The sprayed-on coats must be fine-grained and of uniform structure.

8.6.3.2 Selection of Coating Metals

Zinc is recommended:

for town and country atmosphere, for industrial atmospheres, for sea air, in the case of exposure to heat, not exceeding 200° C in a dry atmosphere, and not exceeding 60° C in aqueous media.

Aluminium is recommended:

for sea atmosphere - especially in the offshore industry, for chimneys, in the case of exposure to heat exceeding 200°.

8.6.3.3 Coat Thicknesses

In the case of additional coatings applied subsequently, it has been found that a thickness of the sprayed-on coat of 100 μ in the case of zinc has given good results, for surfaces exposed to the atmosphere and immersed in water or buried underground.

In the case of surfaces with sprayed-on coats which are not subsequently provided with an additional coating (such as occur occasionally), the thickness of the sprayed-on coat should be increased accordingly.

Thickness of the sprayed-on coat may measure up to 10% less than the specified value laid down in the specification at not more than 10% of the points measured.

8.6.4 Inspection and Testing of the sprayed-on Coat

8.6.4.1 Visual Assessment

A comparison with glass paper (emery paper) of granulation 100 to 200 will give an adequate indication for the visual assessment of the fineness of grain.

8.6.4.2 Measurement of Coat Thickness

Measurement of the thickness of coat on steel structures or finished parts can be carried out conveniently with the aid of coat thickness measuring instruments designed for non-destructive testing. The correct use of these test methods and the proper assessment of the results demand expert knowledge.

The unavoidable range of error of non-destructive measurement methods should be pointed out, and this is made even worse by variations in surface roughness.

8.6.4.3 Testing the adhesive Strength

The testing of the adhesive strength shall be mutually agreed because there are different methods for the determination of the adhesive tensile strength of the sprayed-on coats when subjected to tensile stress at right angles to the adhesion surface on special test specimens.

8.6.5 Sealing

8.6.5.1 Sealers

Sealers are low viscosity fluids containing an inert resin binder in a solvent; they may be clear (unpigmented) or pigmented and coloured. The sealer impregnates the natural pores in the



sprayed metal, improving the appearance and reducing retention of dirt so that the coating keeps clean, the electro-chemical sacrificial action of the coating which prevents rusting in the event of mechanical damage remains fully operable.

8.6.5.2 When Sealing should be applied

Sealing is normally recommended as a final treatment of sprayed metal. It now supersedes the practice of applying a full multi-coat paint system on top of sprayed metal, which has proved to be unnecessary and at times positively harmful, as thick layers of degraded paint can retain moisture that actively promotes corrosion of the metal beneath.

8.7 Advice for the Installation of a Typical Work Place for Arc Spraying

8.7.1 On-Site Anti-Corrosion Spraying

Of structural steelwork, tanks, shiphulls, masts, pipelines, bridges, etc. In this case the large radius of action of the equipment is useful and the power pack can be positioned outside the immediate neighbourhood of the operator.

8.7.2 Spraying at a Permanent Location

Where zinc and aluminium spraying is to be done on a continuous basis inside enclosed rooms, some form of ventilation equipment is required. The requirements for this equipment will depend upon the conditions, and range all the way from simple spray booth or lathe hood to an elaborate room and dust collecting system.

Dust collectors are required whenever the volume of dust to be exhausted by snorkel exhaust units or spray booths will become a nuisance or - what will be the rule today - when laws and codes require dust collectors and specify the max. content of specific dust in mg/Ncbm. of air allowed on the outgoing side.

At this stage it should once more be reminded that aluminium dusts are explosive under certain circumstances. Therefore appropriate dust ventilation and filter equipment is absolutely necessary.

8.7.3 Dust Removal

On this occasion it is pointed out once more to the great importance of a sufficient exhaust and filter system for good layer quality. In this respect the ventilation has to serve two purposes:

a) Dust removal:

Provided surface preparation is satisfactory, loose dust is probably the most significant factor adversely affecting the adhesion of sprayed material deposits. The high spraying rates of the arc unit make the dust inevitable. Accordingly, it is essential that efficient dust extraction be employed especially in closed rooms.

It is even recommended that an additional jet of compressed air be set ahead of the pistol to remove surface dust from the work.

b) Cooling:

It is even recommended that an additional jet of compressed air be set from outside onto the tube for simultaneous cooling of tube and thus the sprayed layer.

It should always be observed that the operator has to wear appropriate fresh-air helmet as well as eye-protection.

This is an absolute necessity when materials like nickel, chromium, and bronzes are sprayed. See as well part 2 "Safety Precautions".



9 Preparation of Surfaces for Thermal Arc Spraying, Sealing, and Dust Removal

Sprayed coatings adhere to surfaces mainly by mechanical and physical means; in a few instances, metallurgical or chemical bonding may occur to a small degree. Whatever the mechanism of adhesion, it is vital that the surface to be sprayed is clean and adequately roughened. Over 80% of coating failures are due to poor or incorrect surface preparation.

Generally the following methods of preparation can be distinguished:

- Degreasing
- Gritblasting
- Rough Machining
- Combined Techniques
- Preheating

9.1 Preconditions

Careful, expert preparation of the surface followed as quickly as possible by spraying are the preconditions for adequate adhesion of the sprayed coating. The permissible duration of any interruption is governed by the combination of materials involved and by the factors acting on the prepared surface, e.g. moisture, dust and vapours.

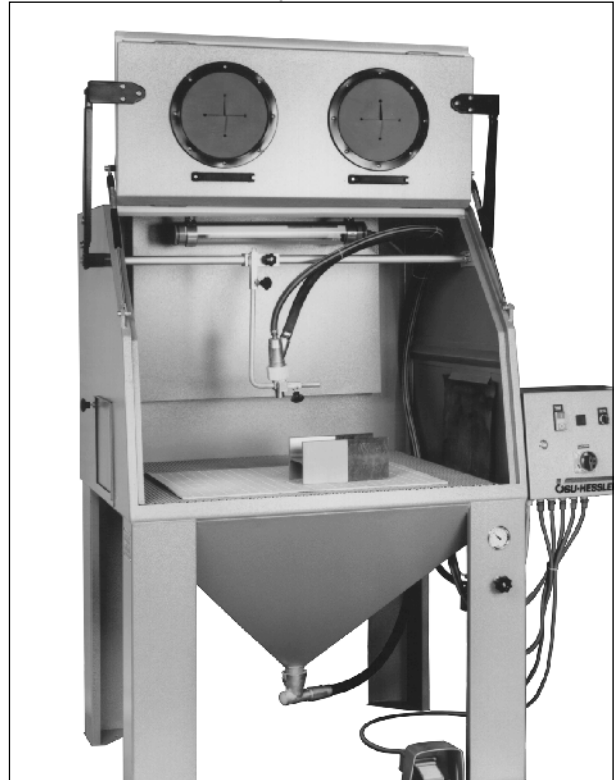
The metal surface shall be so prepared that a technically clean bonding face results.

This means freedom from scale, oxides and other impurities such as oil, grease and the like. In addition, the surfaces shall as a rule be roughened. The roughness of the surface is intended to provide effective bonding for the sprayed coating.

An appropriate most widely used method of roughening metal surfaces is blasting, which can be done either in small cabinets - for small parts (see figs.), with free blasters or by airless blast cleaning. Weld spatter shall be removed and welds shall be prepared with special care.

The surfaces requiring protection must remain dry while the work is being carried out, and this must be ensured by suitable means if sprayed outside in the event of bad weather.

Prior to treatment of the surfaces by blasting it is essential for impurities of an oily and greasy nature to be carefully removed. This can be done with solvents, by heating or by exposure to ultrasound or steam jets.



Sandblasting Cabinet (Suction Principle)



Free Blasters of Different Sizes

9.2 Grit Blasting

9.2.1 Level of Cleanliness

For blasting preparatory to thermal spraying the standard level of cleanliness Sa3 as specified in Swedish Standard SIS 05 59 00 is required in all cases.

This means that scale, rust and coatings are completely removed (when observed without magnification).

For blasting with compressed air the air used shall be dry and free of oil.

9.2.2 Abrasives

All abrasives shall be clean and dry. They shall not have been used previously for any other purpose which might have introduced deleterious impurities, for example for removing coatings or for blasting surfaces which were oily or otherwise contaminated. Suitable roughness is produced only by coarse abrasives.

The solid abrasives predominantly used for surface preparation are fused alumina, silicon carbide, chilled iron grit and copper smelter. Their type, grain size range, grain shape, hardness and behaviour of impact (e.g. splitting, rounding), in combination with the impact energy and the blasting angle, determine the cleaning effect and efficiency as well

as roughness of the blasted surface. For blasting with fused alumina and/or chilled iron grit different particle sizes from 0,5 - 1,5 mm have proved satisfactory. For blasting by using slag a suitable degree of surface roughness can be achieved with particle sizes from 0,5 to 2,0 mm.

Intensive research work about the significance of surface preparation upon the bond strength of sprayed zinc coatings on mild steel gave evidence to the fact that grit condition is the most important factor in obtaining good bond strengths. Blasting angle is an important factor as well and should never be less than 30°.

9.2.3 Types of Abrasives:

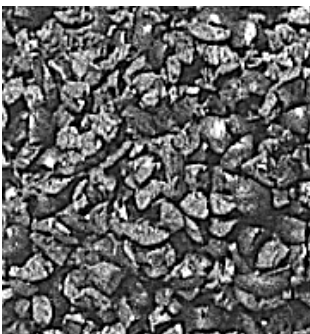
Chilled Iron Grit

This is by far the most used abrasive for metal spraying. It is an excellent general purpose abrasive to

- (a) its relatively high density, which gives high particle energies,
- (b) its slow rate of breakdown and



Pressure Blast Cabinet with separate Pressure Vessel & Abrasive's Container




Chilled Iron Grit



(c) the retention of sharp cutting edges on the particles.

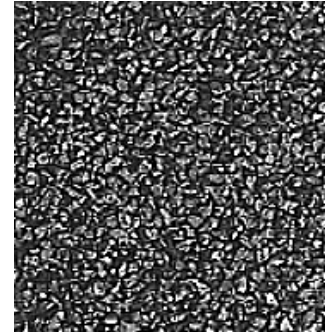
Crushed Slags (Expendable Abrasive)

An alternative to chilled iron grit when reclamation is not possible, as is case on many site jobs. While quite effective for "once-only" use, they are not suitable for reclamation and re-use, due to their rapid breakdown to dust.

 **Crushed slags should never be used in cabinet blast equipment.**

Ceramic Grits (Aluminium Oxide and Silicon Carbides)

Used where the base material has a hardness greater than 360HV which cannot be effectively blasted by chilled iron grit. They can be used at lower than normal blasting pressures and are effective when "Suction or Syphon Blasting". They are therefore well suited to the preparation of thin metal surfaces which may distort if blasted with chilled iron at conventional pressures. Non-metallic grits must not be used to prepare surfaces for coatings which are to be fused.



Fused Alumina

9.3 Rough Machining

This method is commonly applied to surfaces which are required to bear a thick deposit. It increases the surface area and provides a profile which will resist shearing between coating and substrate.

9.4 Preheating

Preheating is rarely needed, but is essential for certain substrates, e.g. glass, to prevent thermal shock - usually no further preparation is needed in these cases. Preheating is advisable when spraying bores or internal diameters with thick deposits. It is also recommended when environmental conditions are such that water (from burning gases or the atmosphere) may condense onto the workpiece during spraying. Care must be taken to avoid excessive temperatures (175°C maximum). Surfaces should be re-gritblasted immediately after heating to remove the thin oxide film which will form.

9.5 Care of the Prepared Surface

Prepared surfaces are chemically and physically very active. They must not be allowed to deteriorate or become contaminated. They must be handled with care and not touched with naked hands, ropes or slings. Clean, lint-free cotton gloves or sheets should be used to protect prepared surfaces during handling.

Spraying must begin as soon as possible after preparation. The allowable time interval depends on the material and on ambient conditions. It should not exceed four hours: in hot or humid conditions the maximum allowable delay may be very much less. If longer delays occur, the surface must be re-prepared unless special storage facilities are available.

9.6 Inspection and Testing of the Sprayed-on Coat

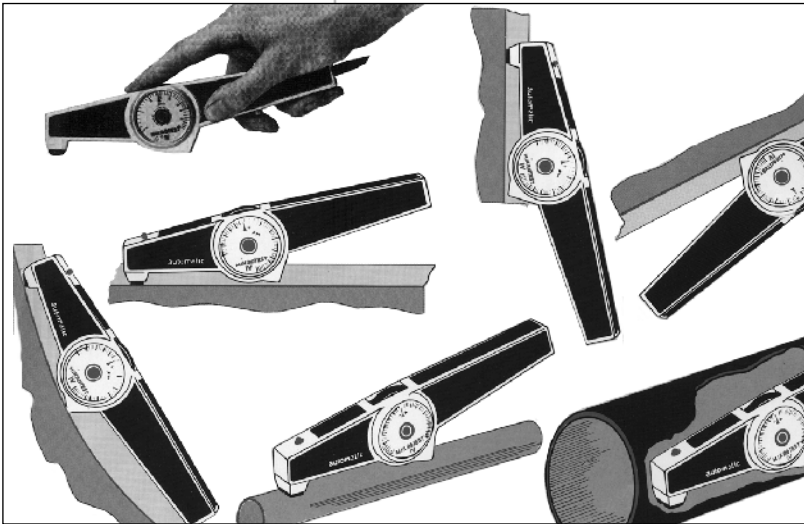
A comparison with glass paper (emery paper) of granulation 100 to 200 will give an adequate indication for the visual assess-

ment of the fineness of grain.

A photomicrograph can be prepared for checking purposes.

9.7 Measurement of Coat Thickness

Measurement of the thickness of coat on steel structures or finished parts can be carried out conveniently with the aid of coat thickness measuring instruments (see figs. on the right) designed for non-destructive testing.



The correct use of these test methods and the proper assessment of the results demand expert knowledge.

The unavoidable range of error of non-destructive measurement methods should be pointed out, and this is made even worse by variations in surface roughness, especially when sprayed inside tubes.

9.8 Testing the Adhesive Strength

The testing of the adhesive strength of zinc and aluminium layers shall be mutually agreed because there are different methods for the determination of the adhesive tensile strength of the sprayed-on coats when subjected to tensile stress at right angles to the adhesion surface on special test specimens.

9.9 Sealing

9.9.1 Sealers

Sealers are low viscosity fluids containing an inert resin binder in a solvent; they may be clear (unpigmented) or pigmented and coloured.

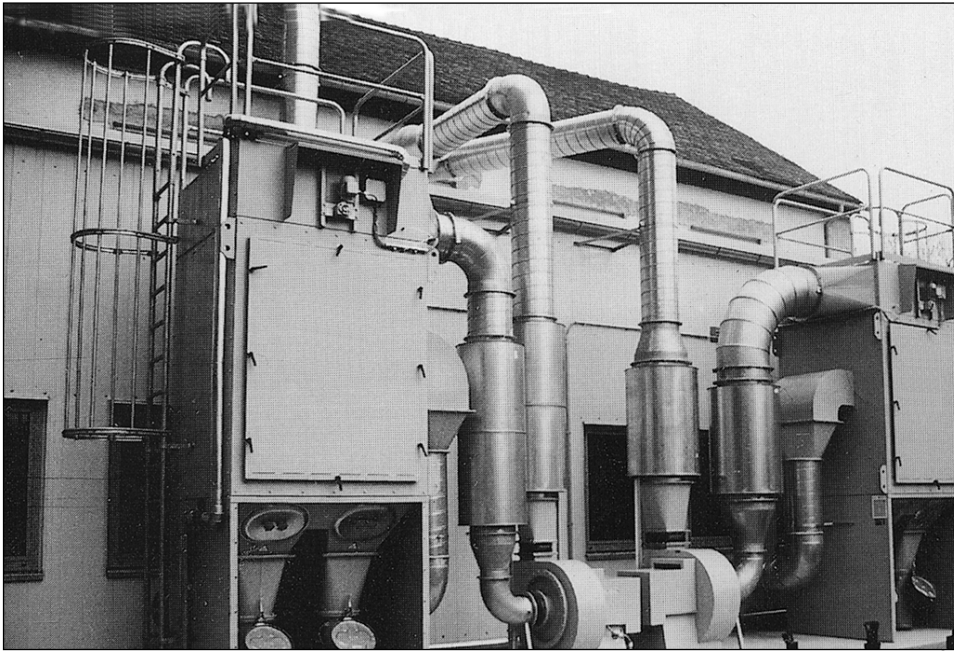
The sealer impregnates the natural pores in the sprayed metal, improving the appearance and reducing retention of dirt so that the coating keeps clean, the electrochemical sacrificial action of the coating which prevents rusting in the event of mechanical damage remains fully operable.

9.9.2 When Sealing should be applied

Sealing is normally recommended as a final treatment of sprayed metal. It now supersedes the practice of applying a full multi-coat paint system on top of sprayed metal, which has proved to be unnecessary and at times positively harmful, as thick layers of degraded paint can retain moisture that actively promotes corrosion of the metal beneath.



MIKROTEST Thickness Gauge



Dust Filter Equipment for a large Metallizing Hall

9.10 Dust Removal

Where metallizing is to be done on a continuous basis inside enclosed rooms, some form of ventilation and filter equipment is required. The requirements for this equipment will depend upon the conditions, and range all the way from simple spray booth or hood to an elaborate room and dust collecting system.

Dust collectors or filters are required whenever the volume of dust to be exhausted will become a nuisance or when laws and codes require dust collectors and specify the max. content of specific dust in mg/Ncbm. of air allowed on the outgoing side.

Provided surface preparation is satisfactory, loose dust is probably the most significant factor adversely affecting the adhesion of sprayed material deposits. The high spray rates of arc equipment make dust of zinc and aluminium inevitable. Accordingly, it is essential that efficient dust extraction be employed; especially when small tube diameters are to be sprayed with high capacity an efficient exhaust snorkel should be brought into immediate neighbourhood of the spraying spot.

It should always be observed that the operator has to wear appropriate fresh-air helmet as well as eye-protection.



CASCO Fresh-air Helmet with Arc Shield