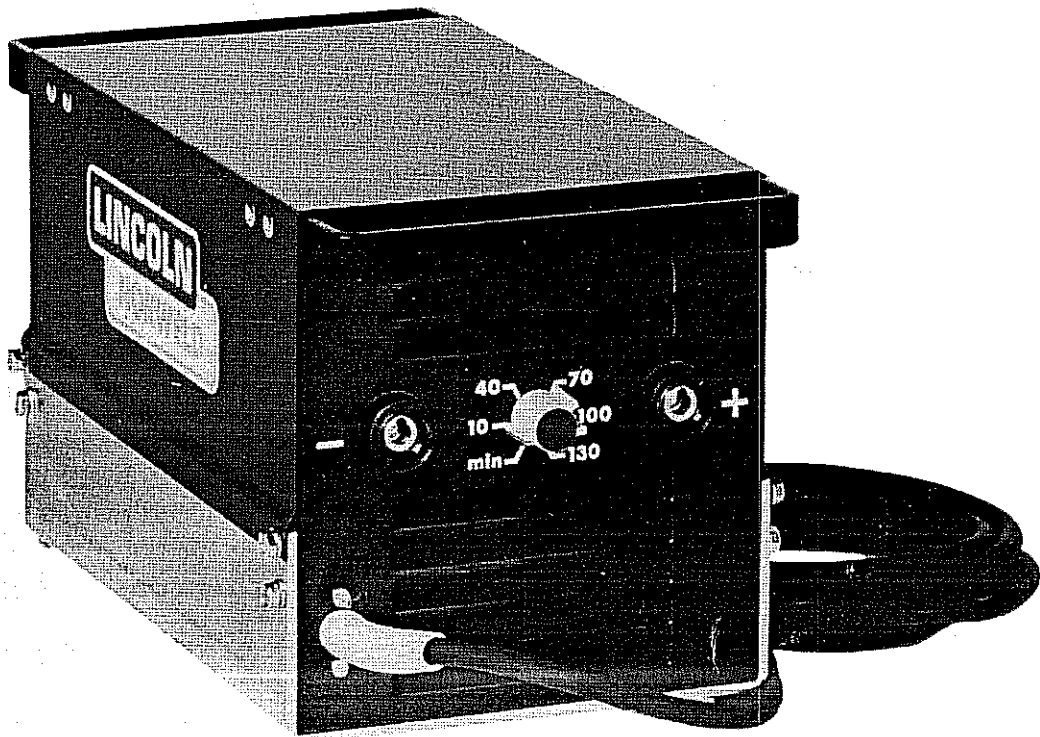


Welding rectifier NL-130



OPERATING MANUAL

SAFETY DEPENDS ON YOU

Lincoln Norweld welding equipment is designed and built with safety in mind. However, your overall safety can be increased by proper installation . . . and thoughtful operation on your part.

**DO NOT INSTALL, OPERATE OR REPAIR THIS EQUIPMENT
WITHOUT READING THIS OPERATING MANUAL**

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Description

NL-130 is a single phase thyristor controlled welding rectifier. Compact design and low weight makes it an ideal choice for repair and construction work in agriculture and industry.

The main parts are the transformer, the choke and two thyristor modules (TM1 and TM2, fig. 3). Transformer and choke are dipped in a varnish and baked for long life and moisture protection.

A front mounted potentiometer (R27) provides stepless single range current control from approx. 5A to 130A max. output. A fan cools the system and a thermostat (F1) protects it against overload.

A choke (L1) smooth the current before it is fed into the arc. The welding current is monitored by a feedback loop to provide favourable dynamic response and VA-curves.

The welder may be supplemented with an adaptor (fig. 6) for TIG-welding with scratch start, which in many cases is a satisfactory alternative to HF start.

For easy transport a handy two wheel trolley is available (fig. 7).

The welding rectifier may be converted to a gasless flux cored wire welding equipment by installing a small wire feeder (fig. 8) on top.

Specifications

| | | | | | | |
|-----------------|---|------|------|------|-------------------------------|--------------------|
| Output: | | | | | Miscellaneous: | |
| Duty cycle | % | 100 | 60 | 20 | Phase | 1 |
| Welding current | A | 60 | 75 | 130 | Frequency | 50-60Hz |
| Arc voltage | V | 22.4 | 23.0 | 25.2 | No load losses (approx.) | 70W |
| Power | W | 1344 | 1725 | 3276 | No load voltage (max.) | 42V |
| Input: | | | | | Current range | 5-130A |
| Current at 220V | A | 13.4 | 16.5 | 29.4 | Line fuse (slow blow) at 220V | 16A |
| Current at 380V | A | 7.8 | 9.6 | 17.0 | Line fuse (slow blow) at 380V | 10A |
| Power | W | 1962 | 2635 | 5959 | Primary cable at 220V | 2.5mm ² |
| Power factor | | 0.66 | 0.72 | 0.90 | Primary cable at 380V | 1.5mm ² |
| Efficiency | | 0.69 | 0.66 | 0.56 | Insulation class | H |
| | | | | | Protection | IP23 |
| | | | | | Weight | 29kg |

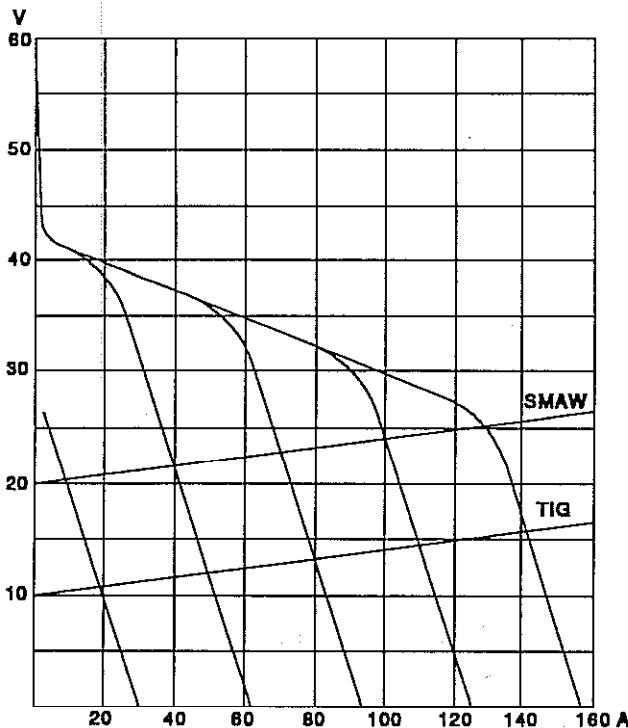


Fig.1, VA-curves

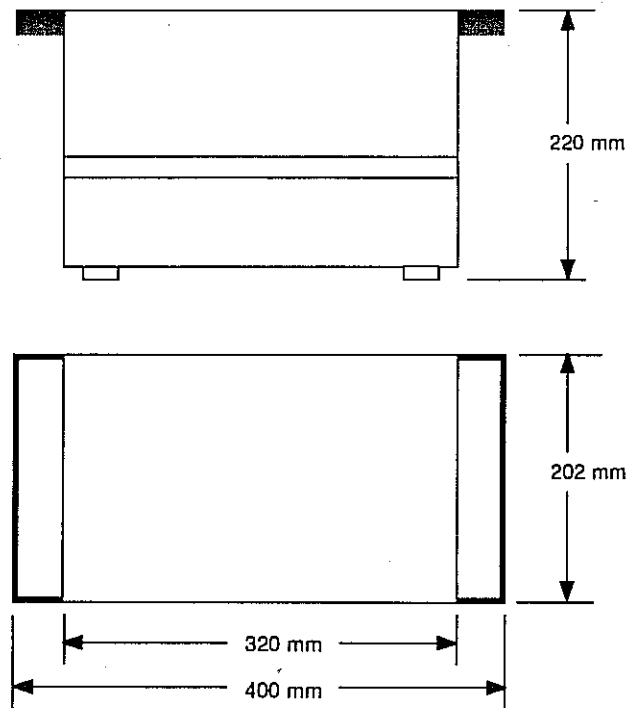


Fig.2, Dimensions

Standards

The welding rectifier is built according to International Standard ISO 700: "Power sources for manual metal arc welding with covered electrodes and for the TIG-process." The following requirements are abstracts from the standard:

- 2.2.2. Max. ambient 40 degr. C
 Daily average ambient 30 degr. C
 Yearly average ambient 20 degr. C
 Minimum ambient -10 degr. C
- 4.8.1. Load voltage at the output terminals for covered electrodes:
 $U_2 = 20 + 0.04 \times I_2$
 Load voltage at the output terminals for TIG-welding:
 $U_2 = 10 + 0.04 \times I_2$
- 4.10. Conventional welding duty: 0.6, comprising 3 minutes under load and 2 minutes no load. (The sum of welding time and no load time during one period is called averaging, or integration time).
- 9. Indication accuracy, +/- 10%.

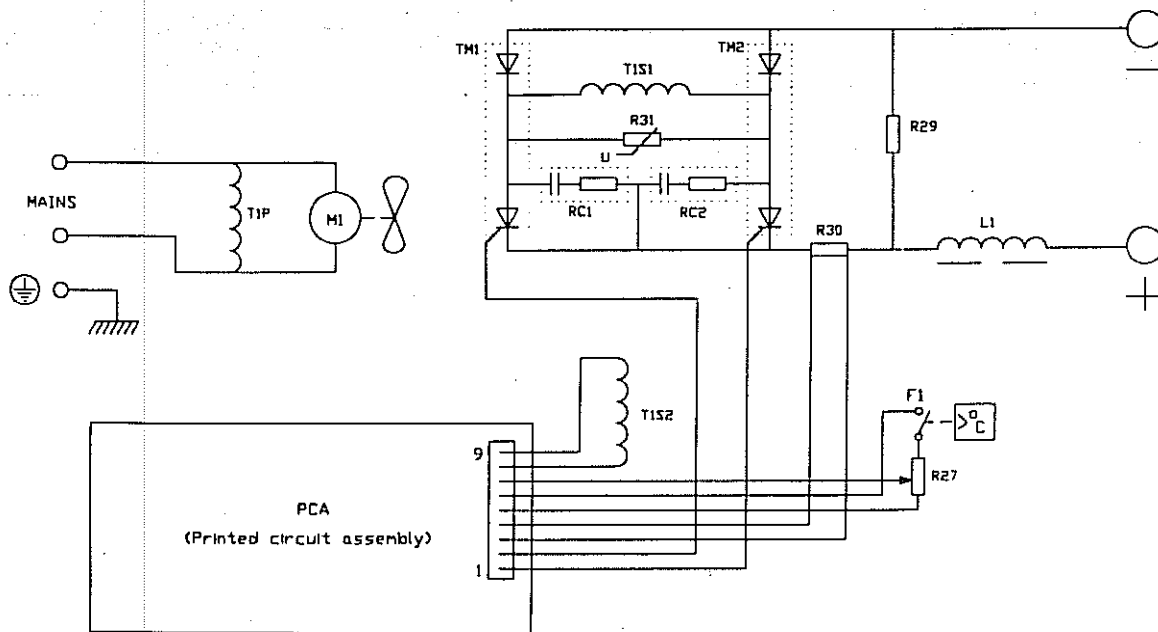


Fig. 3, Schematic diagram

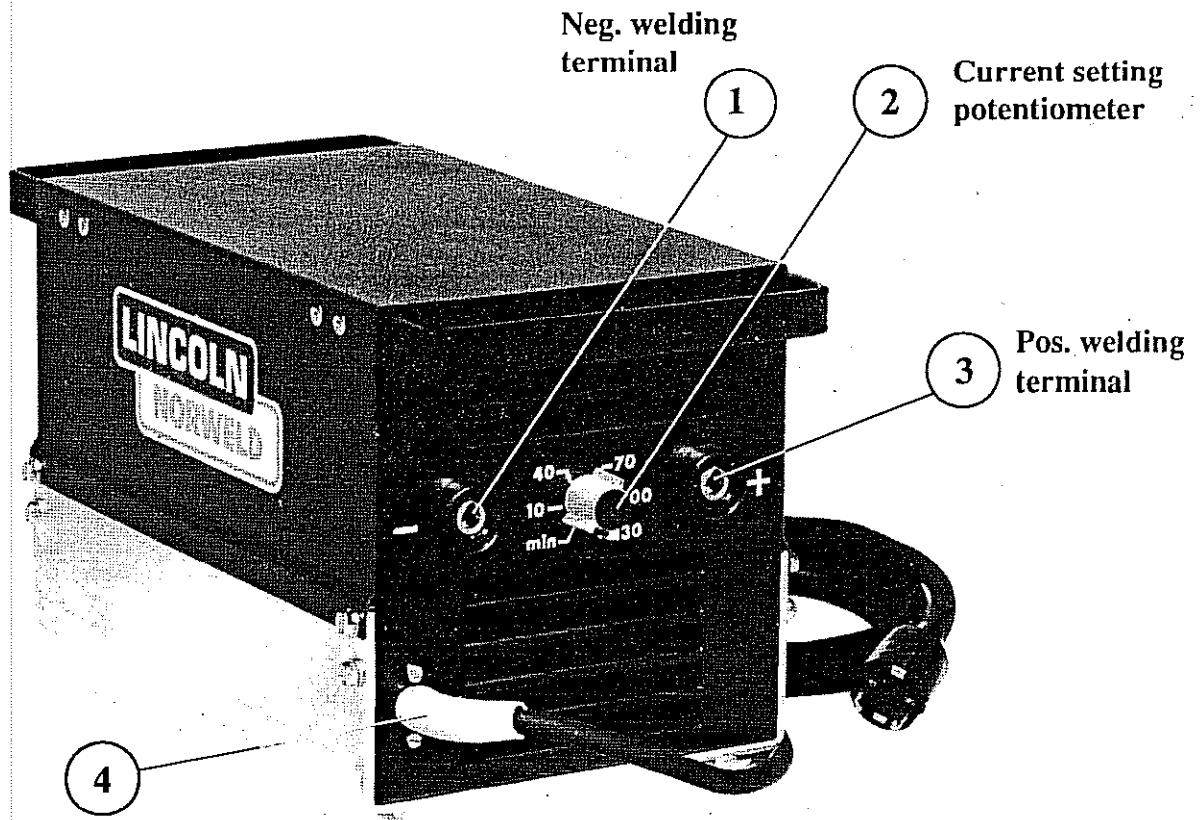


Fig. 4. Front

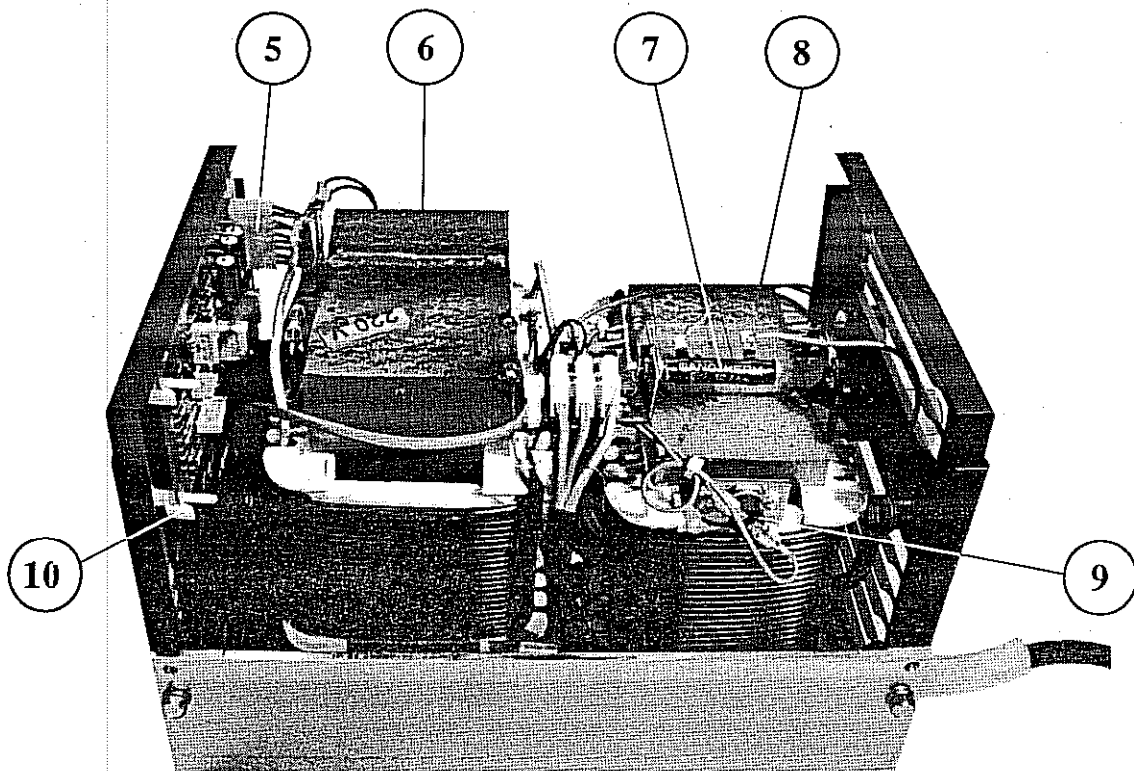


Fig. 5. Cover removed

Spare parts

| Fig. | Pos. | Code | Description | Order no. |
|-------------|------|-------|---|-----------|
| 4 | 1,3 | | Terminal, DIX, BEM25 | 410 373 |
| 4 | 2 | | Knob | 411 835 |
| 4 | 2 | R27 | Potentiometer, 10k | 410 001 |
| 4 | 4 | | Strain relief | 422 170 |
| 5 | 5 | PCA | Control circuit | 410 456 |
| 5 | 6 | T1 | Transformer, 220V | 410 035 |
| 5 | 6 | T1 | Transformer, 380V | 410 027 |
| 5 | 7 | R29 | Resistor, 100 ohm 15W, with leads | 410 092 |
| 5 | 8 | L1 | Choke | 410 043 |
| 5 | 9 | F1 | Thermostat | 433 920 |
| 5 | 10 | M1 | Fan, 220V | 410 068 |
| <i>Note</i> | - | TM1,2 | Thyristor module, 90A 400V | 410 050 |

Note: Modules are not visible on fig. 5.

Transport

NL-130 may be lifted in and out of a car boot by one person. Before lifting make sure that every cover fastening screw is in place. If the cover has been removed, the self tapping screws should be guided into the old threads when reinstalling the cover. Cutting new threads may lead to loss of screw grip.

Do not drop NL-130 abruptly on the floor. This may damage the base plate which is acting as a cooling fin for the thyristor modules. The thermal resistance between the base and the modul may increase and damage the modules.

Do not hold NL-130 by the front handle and drop it on the floor so that the rear panel hits the floor. This may displace the fan bearing.

If found inconvenient to carry a handy trolley (fig. 7) is available.

Maintenance and care

NL-130 is a reliable piece of equipment with few moving parts. However, to prevent trouble and poor welding results it should be handled with care.

Make sure that the fan always has free passage of air. From time to time remove the cover and take away accumulated dust and dirt. How often this should be done depends upon use and environment.

Also check and retighten the module clamping screws which are accessible from the base underside. Use 4-6Nm torque when retightening.

Defective thyristor modules

Do not open defective modules. The insulation material between the semiconductors and the base is beryllium oxide, which in a pulverized form can be very toxic.

Trouble shooting

| Symptom | Possible cause | Remedy |
|---|---|---|
| Line fuses are blowing. | Smaller fuses than recommended. | Change to correct size. |
| | Wrong fuse type. | Change to slow blow. Slow blow fuses are necessary because of the high in-rush current that may occur. |
| | Faulty thyristor module. | Replace the thyristor module. Make sure that the mounting surface on the base plate is flat and clean. Use a suitable heat compound and tighten with 4 Nm torque. |
| Cuts out when welding. | Demand is higher than rated (20% duty cycle at 130A). Thermostat has tripped. | Reduce current or duty cycle. Let the rectifier idle until the thermal switch resets. |
| No welding current. Fan is operating | Loose gate leads. | Check and correct. |
| | Faulty control circuit. | Replace the PCA (located on the back panel). |
| Only max. or min. current. | Faulty potentiometer (R27). | Check and replace. If the potentiometer is taken out of the circuit and measured with an ohm meter it shall read approx. 10 kohm. |
| No welding current. Fan not operating. | Blown line fuse. | Check and replace. |
| | Poor contact in the line plug. | Tighten the plug terminal screws. |
| | Broken lead near the plug. | Cut the cable at the break and reinstall the plug. |

TIG-adaptor

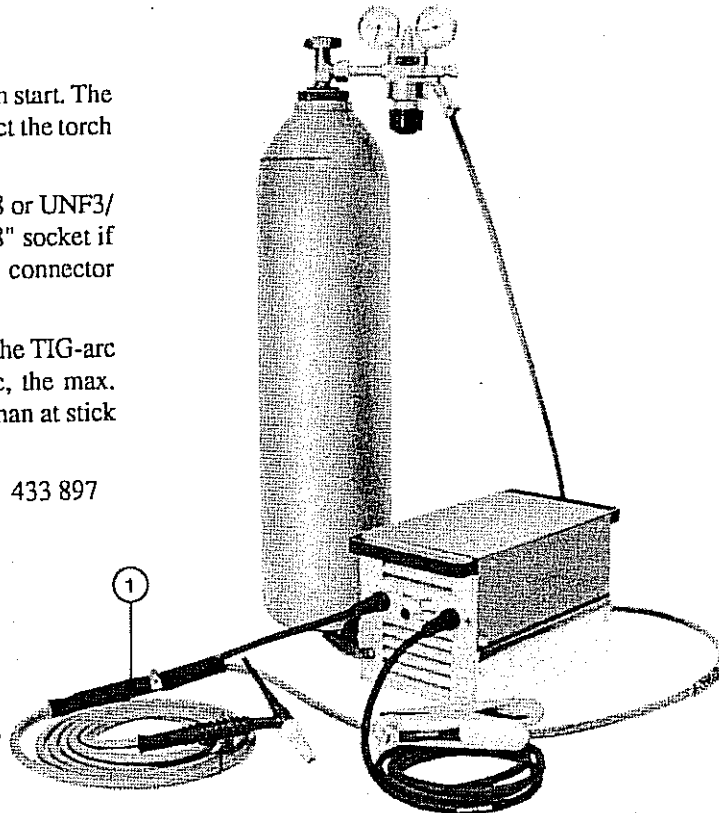
NL-130 is excellent for TIG-welding with scratch start. The adaptor (fig. 6 pos. 1) makes it possible to connect the torch to gas and power supply.

It can be used for guns fitted with UNF 5/8"-18 or UNF3/8"-24 connectors. Unscrew and set aside the 3/8" socket if the gun has 5/8" threads. Upon request the 3/8" connector may be replaced by other types.

Because of sloping VA-curves and the fact that the TIG-arc operates at a lower voltage than the MMA-arc, the max. current at TIG-welding is approx. 10% higher than at stick welding.

TIG-adaptor UNF5/8"-3/8"Order no. 433 897

**Fig.6
TIG-adaptor**



Trolley

The rectifier weighs only 29kg and may be carried by one person. However, transport may be considerably eased by means of a trolley (fig. 7). Place the rectifier on the trolley frame, tilt it backwards by the handle and move. Be careful, the rectifier is not fastened to the trolley.

TrolleyOrder no. 433 889

Welding cable set

The set contains a 25mm² ground cable with DIX- connector and ground clamp, and a welding cable with connector and torch for stick welding.

Welding cable set Order no. 398 594

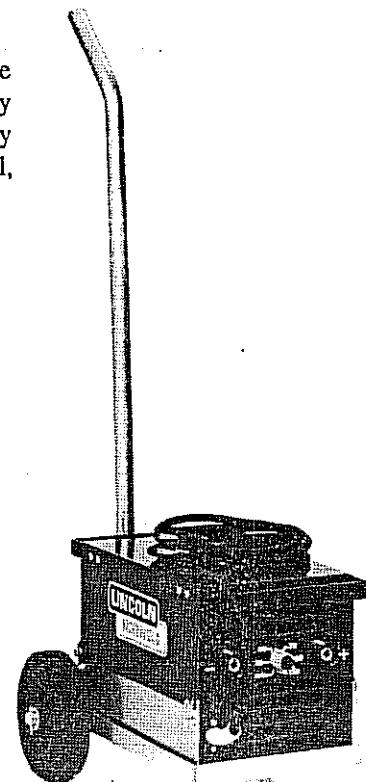


Fig. 7, Trolley

WF-130

WF-130 may be converted to a gasless flux cored wire welding equipment for 0.8mm wire. Remove the cover and install WF-130 on top. Pull out the connector on the NL-130 circuit card and plug the connector into WF-130. Adjust the small transformer in in WF-130 for the correct voltage.

Then connect the 2-poled terminal block (fig.9, pos.2) to the NL-130 line terminal block. Establish connection between the negative welding terminal of the rectifier and the wire feeder gun terminal (fig. 9, pos.1). Install the new cover

(not shown on the picture) The control circuit in NL-130 has no function in the converted welder.

Note that gun and wire spool must be ordered separately. NL-130 may be delivered in several colours. Standard is red.

Ordering example:
 WF-130
 Gun, ME-140 30GL
 Spool, 15-0.8mm

Order no. 435 354
 Order no. 435 347
 Order no. 435 348

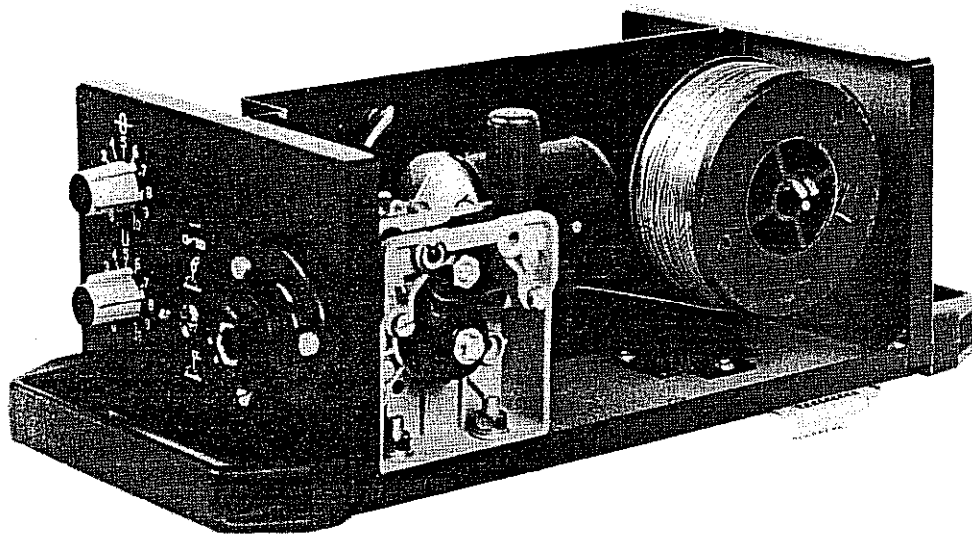


Fig. 8, Wire feeder

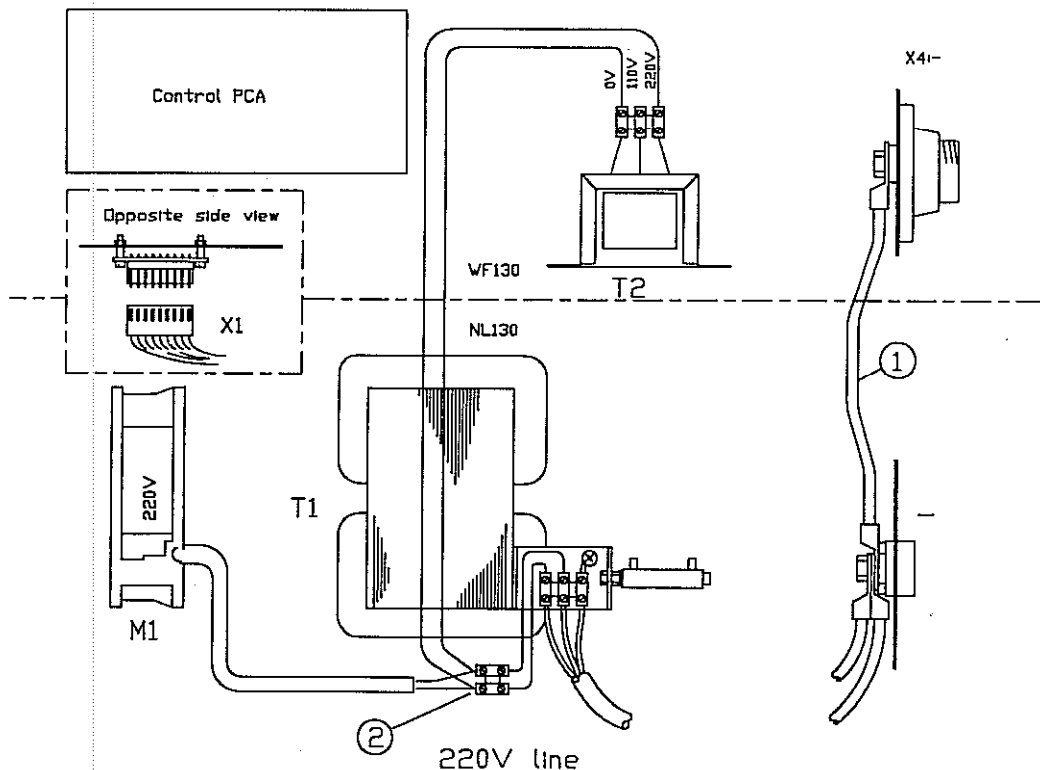


Fig.9.
 Connections
 for 220V

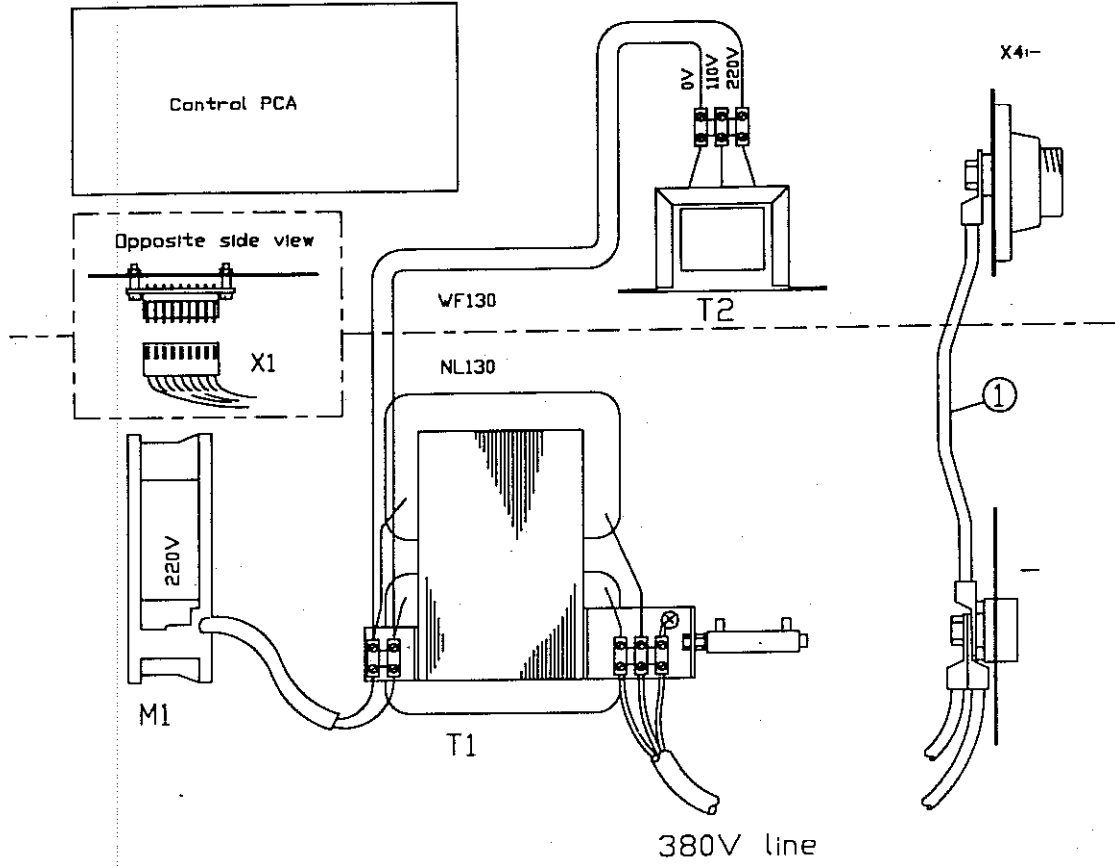


Fig.10.
WF-130. Connection for 380V

Connection to the line

Usually the line cord comes installed on the machine. If not, let the line connection be done by a competent electrician or a suitably trained person. Avoid installing larger fuses than recommended. Use the recommended cross section, or larger if possible.

Check that the rectifier is built or connected for the same nominal voltage as the power line and is properly grounded through the line cord. The yellow-green wire in the line cord must only be used for grounding purposes. It should be cut a bit longer than the other wires. If the strain relief fails the ground connection is then likely to be the last one to be pulled out of the terminal.

Welding.

Connect the welding cables to the output terminals (fig. 4 pos. 1 and 3). Make sure that the DIX contacts are in a locked position (twist it to the right). Make sure that the work clamp has good contact with the work piece. Clean the work piece at the contact point if necessary. Bad welding cable connections may lead to burned contacts and unsatisfactory welding results.

Which electrode polarity to be used depends upon electrode and welding position. Follow the instructions given by the electrode manufacturer.

Set the current potentiometer on the front (fig. 4 pos. 2) in a position corresponding to the needed current. The scale is calibrated at nominal line voltage and at standard load voltage, measured on the output terminals. Actual current may differ, and the scale should therefore only be regarded as a guide line.

Plug the rectifier to the line. The fan shall now be rotating and blow air out of the louvers in the front. Check that the rectifier has free passage of cooling air. Start welding and make necessary current adjustments with the potentiometer on the front. Do not operate the line switch while welding. Switch off when finished.

Electrode data

| AWS Standard | Diameter (mm) |
|---------------------------------|---------------|
| E-6013/E-6012 | 2.5-3.25-4.0 |
| E-6010 | 2.5-3.25 |
| E-7014 | 3.25-4.0 |
| E-7018/E-7016, low hydrogen | 2.5-3.25 |
| Hard surfacing | 3.25 |
| Stainless, 300 series | 2.5-3.25 |
| Aluminium | 2.5-3.25-4.0 |
| Brass and bronze | 2.5-3.25 |
| Cast iron | 2.5-3.25 |
| Cutting and gouging (no oxygen) | 2.5-3.25-4.0 |

Chart above is a sampling of the wide range of usable stick electrodes.

Electric shock

When you remove the cover for maintenance or repair make sure that the rectifier is disconnected from the power line. Take care to avoid electric shock if you need to have the rectifier connected to the line to do adjustments. Accidental contact with the lines or with one of the lines and ground is very dangerous, and may cause heart fibrillation which is a fatal condition, with no practical first aid treatment known. In an emergency situation switch off the current and remove the victim from the rectifier and try artificial respiration.

Fire prevention

Fires in connection with welding is often due to carelessness. Fires rarely occur in production work because safeguards usually are adequate. Most fires are caused by portable equipment, and can be prevented by proper precautions.

Don't weld in or near rooms containing flammable vapors, liquids, lint, dust or exposed loose combustible material. When necessary to weld near wooden constructions, or in locations where combustible material cannot be removed or protected, fire extinguishing equipment should be at hand.

Eye and skin protection

The operator must use a shield or helmet to protect eyes and skin from the intense ultraviolet rays. Avoid exposing other parts of the body by using suitable clothes and gloves. This will prevent the skin from being exposed to the harmful ultraviolet rays that are present.

Ventilation

Health hazards from welding operations are few and can be guarded against by simple precautions. Hazards may arise from gases, fumes or dust caused by the material being welded or from electrode coating. Such hazards can normally be avoided by proper ventilation.

Warranty

Norweld Industrier AS guarantees this equipment to be free from defects in design, materials and manufacture 1 (one) year from the date of delivery to the customer. This warranty does not cover damage caused by transport or improper usage. Nor does it cover wear from normal use. More detailed warranty information can be obtained upon request ("Warranty terms and procedure for handling claims").