

Power Compact ***400/400W***

Halvautomat
Semi-automatic
Halbautomat
Semi-automatique

Bruksanvisning och reservdelsförteckning
Instruction manual and spare parts list
Betriebsanweisung und Ersatzteilverzeichnis
Manuel d'instructions et liste des pièces détachées

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INTRODUCTION

Semi-automatic welding (MIG/MAG)

MIG is the abbreviation for METAL INERT GAS and concerns welding with an inactive shielding gas, generally Argon or a mixture of gases (MIX-GAS).

MAG means METAL ACTIV GAS and it concerns welding with an active shielding gas, generally carbon dioxide (CO²).



WARNING



ARC WELDING AND CUTTING CAN BE INJURIOUS TO YOURSELF AND OTHERS. TAKE PRECAUTIONS WHEN WELDING. ASK FOR YOUR EMPLOYER'S SAFETY PRACTICES WHICH SHOULD BE BASED ON MANUFACTURERS' HAZARD DATA.

ELECTRIC SHOCK - Can kill

- Install and earth the welding unit in accordance with applicable standards.
- Do not touch live electrical parts or electrodes with bare skin, wet gloves or wet clothing.
- Insulate yourself from earth and the workpiece.
- Ensure your working stance is safe.

FUMES AND GASES - Can be dangerous to health

- Keep your head out of the fumes.
- Use ventilation, extraction at the arc, or both, to keep fumes and gases from your breathing zone and the general area.

ARC RAYS - Can injure eyes and burn skin.

- Protect your eyes and body. Use the correct welding screen and filter lens and wear protective clothing.
- Protect bystanders with suitable screens or curtains.

FIRE HAZARD

- Sparks (spatter) can cause fire. Make sure therefore that there are no inflammable materials nearby.

MALFUNCTION - Call for expert assistance in the event of malfunction.

READ AND UNDERSTAND THE INSTRUCTION MANUAL BEFORE INSTALLING OR OPERATING.

PROTECT YOURSELF AND OTHERS!

TECHNICAL DESCRIPTION

TECHNICAL DESCRIPTION

Power Compact is a MIG/MAG compact welding machine. The machine is designed for production welding of thin sheet metal and thick plate and complies with the requirements for high capacity. The machine is fan-cooled and the standard configuration is for bead (2stroke, 4 stroke) spot or interval welding.

The machine has 40 voltage stages (4x10). The welding current can be adjusted with a potentiometer graduated from 1 to 10 and the machine has a separate mains switch with an LED. The burn-back time can be adjusted between 0-12 seconds. The feed unit is fitted with gears for smooth electrode feed.

The Power Compact 400 have space for an in-built 300 mm wire reel (15kg) and in standard specification have a gas bottle rack, front wheels of castor type, and large rubber rear wheels for ease of handling and transportation.

The top of the machine is fitted with a small tray and a large tool box with lock and hasp. Both these are fitted with a rubber mat and provide excellent storage spaces for tools, nozzles etc.

PC 400 is available in two different specifications:

1. with air-cooled PC 400 welding gun.
2. with built-in water cooling until for the water-cooled PC 400 W welding gun.

The machine is supplied complete with welding gun, 3 metres of hose, 3,5 metres of return cable with clamp, an OKC connector, 5 metres of fitted mains cable and a metre gas hose with hose clamps.

The Power Compact 400 is a 3-phase design. Refer to the table for voltage options.

TECHNICAL DATA

Mains supply	PC 400 3-phase 50 Hz	PC 400 3-phase 50 Hz
Voltage (V)	230	400/415/500
Fuse, slow (A)	35	20
Cable area (mm ²)	6	2,5

NOTE! 4x2,5 mm² supply cable is supplied as standard. When connecting to 230 V mains, this supply cable must be replaced with a 4x6 mm² cabler by a qualified tradesman.

Permissible loading	
35%	400 A/34 V
60%	315 A/30 V
100%	225 A/25 V
Electrode sizes	Steel 0,6-1,2, Al 1,0-1,2 Stainless 0,6-1,2, Rutile elect.1,0-1,2
Electrode bobbin	Type 25 15 kg ø 300 mm
Voltage steps	40 (4x10)
Indutance sockets	3
Electrode feed speed	1-17 m/min
Weld time (spot and interval)	0,2-2 s
Pause time	0,2-2 s
Adjustable post burn time	0-250 ms
Post gas flow	0-12 s
Control voltage	42 V AC
Open circuit voltage	18-46 V
Power factor λ	0,95 at 400 A
Efficiency η	0,80 at 400 A
Class of enclosures type	IP 21 AF
Weight	130 kg (air) 140 kg (water)
Dimensions:(LxWxH)	945x430x860

Power Compact 400 complies with EC 974.

IP

IP -The code describes the degree of protection provided by the casing, against the penetration of fixed objects and water.

Equipment mark **IP 21** is designed for indoor use, while **IP 23** is also intended for outdoor use.

TECHNICAL DATA

Order numbers:

Power Compact 400: 230/400 -415 V 3 phase 50/60 Hz 466 070-880

Power Compact 400: 415/440/500/550 V 3 phase 50/60 Hz 466 070-881

Power Compact 400 W: 230/400 -415 V 3 phase 50/60 Hz 466 120-880

Power Compact 400 W: 415/440/500/550 V 3 phase 50/60 Hz 466 120-881

Water-cooled welding gun (PC 400 W)

Power Compact 400 W has a built-in-water-cooling system for cooling the welding gun.

The main components of the system are:

- Tank holding ca 1.6 litres of coolant (50% water, 50% glycol).
- Turbine type pump. The motor is connected to a single phase, 230 volt terminal on the control transformer and is fitted with a start capacitor.
- Radiator of copper tube with aluminium cooling flanges.
- Fan for forced air cooling.

The cooling unit is equipped with a filler inlet, a bleed vent, and quick connectors for cooling water.

INSTALLATION

Unpacking

After unpacking fit the wheels and gas bottle tray. Refer to the instructions and assembly details on the packaging or Instructions for Use.

Electrical connections

Check first to ensure that the electricity supply point has the correct fuses (see power supply connection) and that the machine is connected to the correct voltage. **CAUTION!** When connecting to 220 V, the existing supply cable must be replaced with 4x6 mm² cable (refer to the table on power supply connection). When fitting the power supply connector, it is essential for the green/yellow conductor on the supply cable to be connected to the connector's grounding screw. The other three conductors (3 phase) are connected to the remaining terminals marked **L1 L2 L3** Without any particular order.

CAUTION!

Installation of connectors to a heavy current supply must be carried out by an authorised person.

Return welding clamp

The clamp is fitted to the return connector with the washers. Screw and nuts supplied. Make sure that the connection is properly tightened so that it cannot work loose.

Connecting the welding torch

The torch is connected on the front of the machine. Using the key provided, slacken the hex-socket screws in the connecting block. Insert the end of the torch hose into the block, making sure that it bottoms properly. Then tighten again with the key.

Connector nozzle

The connector nozzle is screwed in right at the front of the swan neck's connector pipe. Refer to the instructions and the spare parts list for PSF 400, PSF 401 W which is found in the same plastic bag as the gun. This specifies suitable sizes for different electrode dimensions. Before the connector nozzle can be fitted, the outer gas nozzle must be removed. The connector nozzle is carefully screwed tight with a suitable pair of pliers. The gas nozzle is then pushed on sufficiently far so that the front faces of the two nozzles are in line.

Electrode feed roller

Make sure that the correct feed rollers and grooves are used for the relevant electrode dimensions. Each feed roller has guide grooves for two different electrode thicknesses. The feed roller shall have the correct marking for the respective electrode facing you. The feed roller is undone by loosening the screw in the centre.

Move the pressure arm out of the way and screw out both the (M2,5mm) screws using the allen key supplied. Remove the inlet nozzle by turning it a quarter of a turn. The feed roller can then be removed and turned or replaced with another suitable feed roller. When replacing the gears, the feed roller is first removed in the same manner.

INSTALLATION

The following feed rollers are available for Power Compact 400

369 557-001 0,6-0,8 mm (steel, stainless)
369 557-002 0,8-1,0 mm (steel, stainless)
369 557-003 1,0-1,2 mm (steel, stainless) ¹⁾
369 557-004 1,0-1,2 mm (flux cored wire)
369 557-006 (1,0-1,2 mm) (aluminium) ²⁾

¹⁾ 1.0-1.2 mm (steel, stainless) is supplied as standard with Power Compact 400.

The feed rollers are available to order as accessories.

²⁾ We recommend that you change to a knurled pressure roller when carrying out more continuous welding with cored wire. Part number 466 262-001.

Bobbin, electrode feed and pressure arm

The bobbin is mounted on the hub so that the electrode is fed from underneath into the electrode guide. Two catches on the hub retain the bobbin. On a new bobbin, the electrode end is pushed in and twisted to one side. When the electrode is undone, remember to hold the end of the electrode so that it does not roll up and get tangled. Cut off the crooked end of the electrode, straighten the point and remove all sharp edges and burrs with a file so that the electrode can run through the electrode hose's soft electrode guides. Do this carefully. It is easy for a sharp electrode to puncture the electrode guide and the wall of the welding hose thus causing serious damage to the function of the welding gun.

Push the electrode into the protruding electrode guide on the feed unit's inlet side and feed the electrode in by hand to the rollers. Before the wire is fed any further through the feed unit's guide nozzle, move the pressure arm with its roller to one side. The electrode can now be fed by hand through the guide nozzle and into the welding hose. Move the pressure roller back into position. The application pressure of the feed rollers is factory adjusted but can be altered where necessary with the screw on the pressure arm. A useful guide for sporadic adjustment is not to set the pressure greater than is necessary to retard the electrode in the welding gun by pressing the contact nozzle against a piece of wood or similar object so that the electrode just slips in the feed unit. If a greater pressure is set, the result can be that the electrode will tangle at the outlet nozzle if the electrode sticks to the weld. This is difficult to rectify and is furthermore quite unnecessary. Another disadvantage associated with excessive pressure is that the electrode will be rolled flat. This causes unnecessary wear on the electrode guide and causes poorer contact in the contact nozzle in the gun.

Gas hose

Connect the gas hose between the solenoid of the machine and the reducer valve of the gas bottle. If the hose feels stiff, it can be softened up by flushing the ends or submersing them in hot water. To fit the hose, insert it through the hole on the back of the machine under the bracket. Thread a hose clamp onto each end of the hose. Slide the hose onto the respective valve nipples with bending movements and tighten the hose clamps securely. This operation is easier if the nipples are moistened with water first.

Gas, gasbottle and reducer valve

The next step is to connect the valve to the gas bottle but first placing the gasket provided with the valve onto the valve seat.

NOTE!

Gas bottles have different connecting threads for reduction valves according to the type of gas.

Use pure argon for aluminium. For stainless steel, use argon with a mixture of about 2 % oxygen.

Mixed gases generally consist of 80 % argon and 20 % CO²

The union nut on the valve is then threaded on to the gas bottle connection and is tightened using a suitable wrench. Check to make sure that the hose nipple union is also thoroughly tightened.

Welding electrode feed and gas flow adjustment

Connect the machine to the mains and the earth return to the workpiece. Make sure that the machine is not covered over and that the flow of cooling air is not restricted. Set the coarse position switch to 1. It is advisable to set the electrode feed to a middle position. Straighten out the gun hose. The electrode can be fed forward by pressing the button directly on the feed unit (cold electrode feed) or by pressing the gun control. Take care when the electrode exits from the gun since it can cause an injury. One of the finesses of the PC is that the gas flow can be measured without having to lift the pressure arm. Press the current switch and set the coarse position switch straight up on the gas symbol so that only the solenoid is opened without power being applied when you press the gun control. The soft funnel on the flow meter is set down on top of the gas nozzle and kept there while the control on the gun is pressed in. The gas flow is then adjusted with the reduction valve so that the ball in the flow meter shows the correct flow quantity which should be between 8 and 10 litres. Excessive gas does not damage the weld but it is unnecessary.

Joint preparation

The joint to be welded must be prepared. During welding, those parts of the workpiece heated by the arc melt and this molten material mixes with the weld metal of the wire or electrode. To make sure that fusion is good and to avoid impurities in the molten pool, it is necessary to clean the surfaces of the joint carefully. Therefore, use a wire brush to remove rust, paint and other forms of contamination where welding is to be carried out. The area to be welded must also be dry.

Fit-up between the parts to be welded together must be adjusted so that the joint gap is uniform from end to end. In the case of light-gauge materials, welding can either be done from one side or both, depending on the strength required. For heavier materials, start with a root bead and then fill up the joint with a sufficient number of passes.

INSTALLATION

Fumes and gas

In most cases, fumes will not imply a danger to the welder as long as there is adequate ventilation around the welding site. When welding in confined spaces or when working on, for example, galvanized material, extra efficient ventilation will be required.

Arc flash

The electric arc radiates an intensely strong light or flash which can harm the eyes. Therefore, never look directly into the arc without using a screen fitted with a proper welding window. Never use a welding screen which has a scratched welding window. Should you, despite precautions, be exposed to welding flash, this can give eye trouble. A suitable eye bath or flushing the eyes with water can reduce the symptoms.

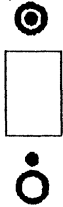
Risk of fire

Sparks and drips from the weld can cause a fire. Make sure there are no flammable materials or objects in the vicinity of the welding work. Remember that the heat generated by welding can also cause a fire in, for example, a tank which has contained or contains flammable fluids.

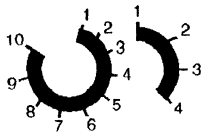
Words of advice

1. Plan your welding. Make sure that the workpiece ends are correctly positioned, plan where to do any tack-welding, starting position, accessibility, preparation of the weld, etc.
2. If possible, sit when welding. In this way you will be able to work steadier and a comfortable working position is beneficial to welding results.
3. As far as possible, always support your arms. Even if you can only support yourself on an elbow or by your shoulder, this is much better than "shooting from the hip". In some situations, you can get good forward support by placing your suitably protected hand on the workpiece and moving your hand along the joint as welding proceeds.
4. Do a "milk run" before starting to weld, moving the torch along the joint to make sure that you can actually reach all parts of it. Try angling the torch on tricky parts before you actually start welding.
5. If possible, make sure that the torch is held in such a way that you can always see the weld. In this way, you can be more sure of getting the kind of welding results you are looking for.
6. Before commencing welding, do a try-out on a clean test plate so as to find the appropriate welding parameters and machine settings.

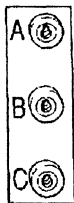
How to select welding data
(seam welding)



Switch the power supply on by means of the main switch. This will cause the light-emitting diode in the switch to light up.

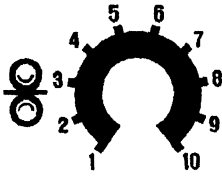


Set the voltage by first turning the coarse position control graduated 1-4 and then the fine position switch graduated 1-10 to a suitable position. **NOTE!** Do not adjust the voltage control while welding!



Socket A is usually best for lightweight material whereas socket C is best for heavier material. The choice of induction socket is usually a matter of personal preference and also depends on the shield gas mix.

INSTALLATION



The electrode feed speed (the weld current) is set with the potentiometer (item) graduated 1-10. In the case of bead welding, you can use the method selector to select the position ↓↑ (2 stroke) or the alternate position ↑↓ (4 stroke). In the case of 2 stroke, the welding operation is started when the gun control is pressed and stops when the control is released. When you use the 4 stroke position, the welding sequence starts when you press the control. Welding continues when you release the control. The sequence stops when you press the control once again.

Carry out a test weld on a clean test piece. A number of different fault symptoms may appear. These are also described in the instructions for use. The following is a description of the more obvious ones.

- The weld lies on top of the material and does not spread. Action: increase the coarse position switch to a higher value.
- A hole is melted in the material. This is caused by an excessive welding current - reduce the level with the coarse control.
- The electrode bounces against the surface of the workpiece. Reduce the feed speed so that the electrode is "allowed to melt". This phenomenon is also caused by unclean materials or a poor return cable connection.
- A tendency for the light arc to burn up towards the contact nozzle. The cause is probably inadequate electrode feed speed-increase the welding data. This may also be caused by the electrode slipping against the feed rollers. Increase the pressure in this case. The fault may also be caused by an incorrect contact nozzle.

Spot Welding (•••)

In most cases, spot welding is done from one side to join two overlapping plates.

For spot welding purposes, the torch must be fitted with a special gas nozzle which has two support legs.



Select the timer setting (t1) for spot welding, from 1-10. The spot welding time can be set steplessly between 0,2 and 2 sec. For welding current and wire feed speed settings, see the recommendation table.

Pull the trigger. When the set spot weld time has elapsed, the process is automatically interrupted without the trigger needing to be released.

A new welding process commences when the trigger is pulled again. Max plate thickness when spot welding is about 2 mm. If the plates are of different thicknesses, weld from the thin side.

Interval Welding (---)

This form of welding is particularly suitable when working with very thin or inferior plate or when the gap size is large since it gives a cooler weld.



Set the potentiometer graded 1-10 for welding time, and the potentiometer (t2) graded 1-10 for pause duration. Both welding time and pause duration can be set steplessly between 0,2 and 2 sec.

For welding current and wire feed speed settings, see the recommendation table.

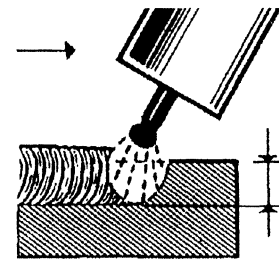
Pull the trigger to start the welding process. When the set welding time has elapsed, the process is automatically interrupted and starts again after the set pause duration- after which the process is repeated.

The process continues as long as the trigger is pulled. The molten pool of metal is cooler and the risk of burning through is considerably reduced.



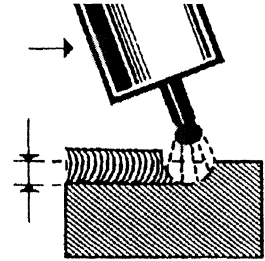
INSTALLATION

A factor which affects the depth of penetration is how the welding gun is moved along when welding. The depth increases if the gun is dragged along.



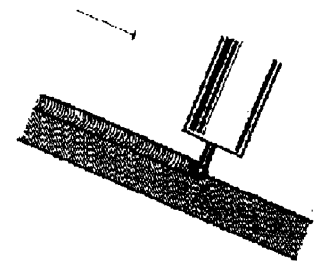
bc03d006

The depth is reduced if the gun is pushed along instead.



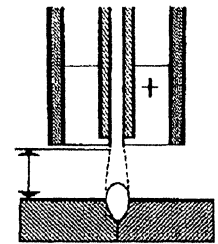
bc03d007

Downward welding, with the gun pointing downwards reduces the depth of penetration considerably and the depth is least with vertical downward welding. The depth increases with upward welding.



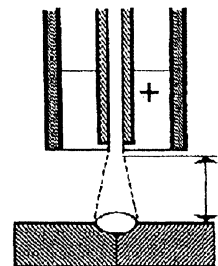
bc03d008

A short arc produces a greater penetration.



bc03d009

A long arc produces a shallower penetration but also increases the risk of weld spatter.



bc03d010



bc07d003

Gas post flow

Power Compact 400 has adjustable gas post flow from 0-12 seconds. When supplied from ESAB, the machine is set to 0 seconds, i.e. no gas post flow.

The potentiometer for adjusting the gas post flow is located inside the machine above the feed unit. CAUTION! Use a small screwdriver and adjust carefully.



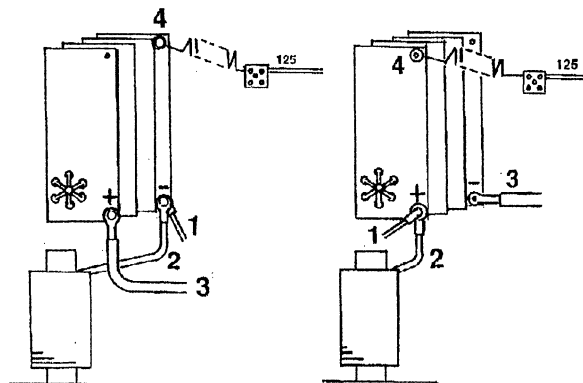
bc03d011

Burn-back time

Power Compact has adjustable burnback time from 0-250 ms. This is preset when supplied from ESAB. The potentiometer is located inside the machine above the feed unit.

CAUTION! In most cases, the preset value should be used. Adjustment should be carried out only in special cases by qualified persons.

Use a small screwdriver and adjust carefully.



bc07d004

Changing polarity

When the welding with certain flux cored wire (see the package) the machine must be connected with reverse polarity, i.e. the gun is connected to (-) and the return cable to (+). The resistance coil must also be reconnected from (-) to (+) at the diode bridge.

The connection is reversed on the diode bridge as shown above. CAUTION! The power supply shall be disconnected and the polarity change carried out by a person with the required competence.

INSTALLATION

Disturbances causing irregular arc or blacking out

FAULT	POSSIBLE CAUSE
Wire does not move forward despite rotation of feed rollers	1. Pressure roller inadequately loaded 2. Dirt in wire guide and/or contact nozzle
Irregular wire feed	1. Faulty contact nozzle 2. Dirt in groove of feed roller 3. Feed roller groove faulty
Arc will not strike	Poor contact between earth return and workpiece
Arc too long and irregular	Voltage too high
Very small arc	Voltage too low
Pores	Incorrect gas flow. Rec. 8-10 l/ min. Inadequate gas shielding due to spatter in nozzle. Draughty workplace. Welding distance too long and/or welding torch wrongly held. Damp, oily, rusty workpiece.
Poor filling up	Welding speed too high. Current too low relative to welding speed.
Lack of fusion	Irregular movement of torch. Voltage too low
Spatter	Voltage too high. Gas nozzle dirtygasmunstycke
Uneven joint	Wire tip too long. Current too high relative to voltage. Welding speed too low.
Poor penetration	Current too low relative to voltage

NOTE! Faults in the electrical parts such as the control circuits, relays, switches, transformers, etc, should only be attended to by a proficient service technician.

OPERATION

NOTE! If an air cooled welding gun is to be used the outlet respective inlet water connections on the wire feed unit should be connected together using the enclosed water coupling Ord No. 442 811-880.

Working principle

The pump draws cooled water from the tank and pumps it through the welding gun which is connected to the unit using quick connectors. The hot water from the gun is recirculated through the radiator and back into the tank.

NOTE! There is a thermal fuse on the return line (red hose) in the main coupling of the welding gun. If this fuse trips, the welding current is cut off. (To replace the fuse see the instruction book for the PSF 401 W).

MAINTENANCE

PC 400 require a minimum of maintenance and service. Under normal operating conditions, the machine should be blown clean with compressed air at reduced pressure once a year. When used in dusty or dirty areas, the machine must be blown clean more often.

Checking the coolant level, PC 400 W

When the machine is in constant use the coolant level should be checked regularly (once a week):

- Check the level in the tank at the column on the front.
- Top up the tank if the level is at or below

NOTE! Before adding coolant it should be mixed well in a separate container. (50% water and 50% glycol). Coolant is poured in via the inlet towards the rear of the machine. After filling up, switch on the machine and allow the coolant to circulate. Recheck the level again and top up if necessary. Check that all connections are tight and there are no leaks.