Instruction manual

RPB 320/420/520 Power source

505 890-102
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Arc Welding & Application Equipment

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1 Introduction

This manual is intended for use by technicians with appropriate electrical training for fault-tracing and repair.

The product complies with the demands for CE marking.

1.1 Safety

Many components in this power source are connected to mains voltage potential.

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 manufactures's hazard data.

Electric shock - Can kill

- Install and earth the welding equipment in accordance with applicable standards.
- Do not touch live electrical parts or electrodes with bare hands, wet gloves or wet protecting clothing.
- Insulate yourself from earth and from 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 protecting clothing.
- Protect bystanders with suitable welding helmets or curtains.

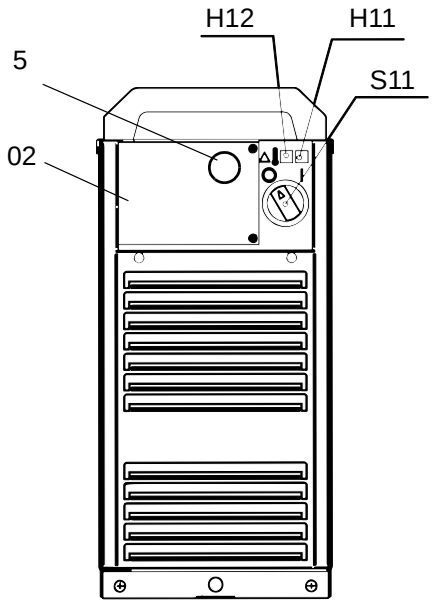
Fire hazard

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

Malfunction - Call for expert assistance

1.2 Description

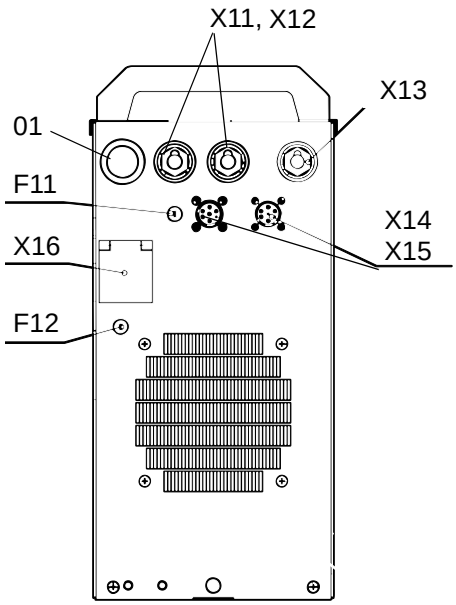
1.2.1 Front panel



S11	Main switch	I/O
02	Mounting opening for control panel	
H11	Indicating lamp	I/O
H12	Indicating lamp for thermal protection	
5	Welding dynamics control	

Figure 1. Power source RPB 320, front

1.2.2 Rear panel



01	Mains cable grommet	
F11	Fuse for control panel	6.3 A, Slow
F12	Fuse for mains terminal	1,0 A Slow
X11	Welding and return cable connection	Parallel
X12	Welding and return cable connection	Parallel
X13	Welding and return cable connection	
X14 **X15**	Control cable connection	Parallel
X16	By productive earhed outlet isolated safety transformer, *RPB 420/520*	1~”230V/ 250VA”

Figure 2. Power source RPB 320, rear panel

2 Start-up

2.1 Placing

Place the power source on a steady, horizontal, dry and dust-free foundation.

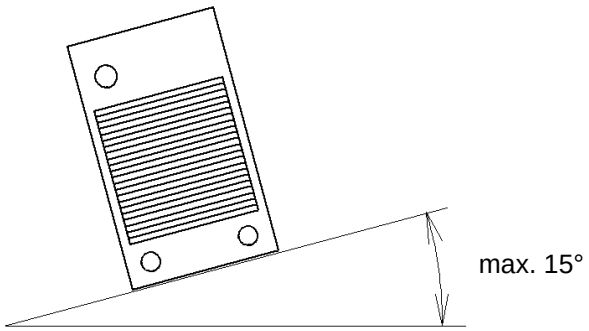


Figure 3. max. 15°, IEC 974-1, EN 60 974-1

- Preferably place the machine above floor level.
- Make sure there is **at least** 20 cm free space behind and in front of the power source for the cooling air to circulate.
- Protect the power source from heavy rain and under hot conditions also from direct sunlight.

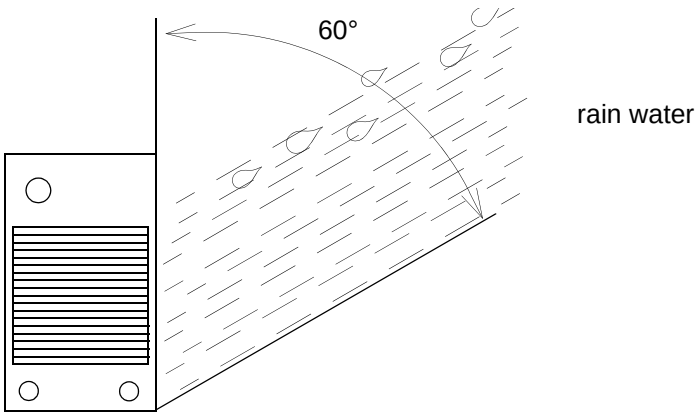


Figure 4.

Degree of protection of machine IP23, allows at its maximum the water spray coming in 60º angle to hit machine's outer covering.

See to that the machine is positioned away from line of particle spray, created by grinding tools etc.

2.2 Connection to the mains

The power source is supplied with 5 m mains cable without plug.

Note! Mounting or replacing the mains connection cable and plug shall only be executed by an expert.

Note! For the mounting of the cable, first remove the right-hand side panel.

To be observed when mounting the mains cable:

Pass the cable through the hole on the rear of the power source and lock it by way of the cable retainer (05). Connect the phase conductor of the cable to the connections L1, L2 and L3. Connect the yellow/green earth conductor to the connection.

If a 5-conductor cable is used the zero conductor is to be connected to N.

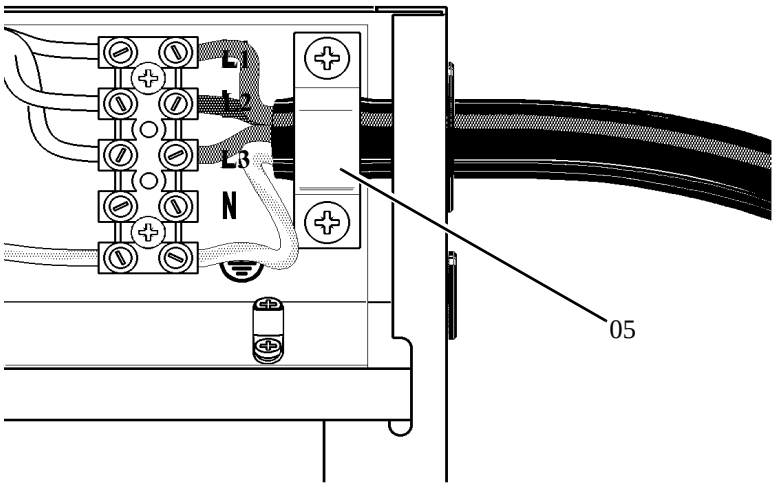


Figure 5. Mains cable

Mains cable cross section and fuse sizes at 100% load of the power source:

	RPB 320	**RPB 420**	**RPB 520**
Nominal voltage Mains voltage range	400V 3~ 360V 440V	400V 3~ 360V 440V	400V 3~ 360V 440V
Fuses	25A	25A	35A
Connection cable *mm^2	4 x 2,5 S	4 x 6,0 S	4 x 6,0 S

*S-type cables include a yellow/green conductor for protective earthing.

3 Controls and utilization

3.1 Main switch ON/OFF (I/O)

When the switch is set to position **I** the indicating lamp (**H11)** on the front goes on to indicate that the power source is ready for use.

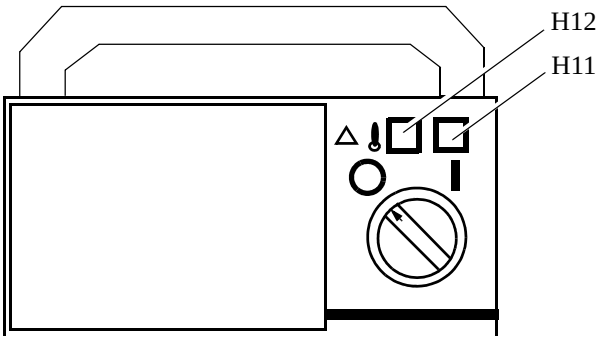


Figure 6. Main switch I/O

WARNING!

Always switch the power source on and off by way of the main switch. Never use the plug for the purpose.

3.2 Indicating lamps

There are two indicating lamps (H11, H12) on the power source, se Figure 6.:

The green lamp (H11) for stand-by mode is always on when the power source is connected to the mains and the main switch is in position I.

The yellow lamp (H12) for thermal cut-out goes on when the thermostat has tripped as a result of overheating. The fans cool the power source and when the lamp goes out the power source is ready for use again (resetting takes place automatically).

3.3 The function of the fan

RPB 320 has one fan and RPB 420/520 has two fans running simultaneously.

- The fans run for a while when the main switch is turned to position I.
- The fans go on when the power source after a period of welding is heated and stops 1-10 minutes after the welding is terminated.
- At idle running the fans enter into function for about 60 sec. every 30 min.

4 Maintenance/Service

The degree of utilization as well as exterior conditions influence the demand for service of the power source to a high extent. Sensible use and preventive maintenance will guarantee problem-free operation.

4.1 Cables

Check the condition of the welding and return cable every day.

Note! Never use damaged cables!

Make sure the connection cables conform to the regulations valid.

Note! Repair and mounting of mains connection cables shall only be executed by an authorized electrician.

4.2 Power source

Note! Unplug the cable from the wall socket and wait about 2 min. (due to capacitor discharge) before removing the cover plate.

Check the following points at least once every six months:

- The electrical connections of the machine - clean oxidized components and tighten loose parts.

Note! Before the connection work is started, inform yourself about the right tightening torques.

- Clean the inner parts of the power source from dust and filth, using a soft brush and a vacuum cleaner.

Note! Do not use compressed air as there is a risk that filth hereby can get packed even harder in the apertures of the cooling profiles!

Note! Do not use high-pressure washing!

Note! Repair of the power source is only to be executed by an authorized electrician.

4.3 Functional trouble

Note! In the event of functional trouble, please contact your nearest FAC/ABB agency.

Check the service points before sending the power source to the workshop.

4.3.1 Thermal overload protection

The yellow indicating lamp for thermal overload (H12) goes on when the thermostat has tripped as a result of overheating of the power source.

The thermostat trips if the power source is continuously overloaded beyond the normal values, or if the circulation of the cooling air is blocked.

The fans cool the power source, and when the lamp goes out the power source is ready for use again (resetting takes place automatically.)

4.3.2 Fuses for control current

The fuse (F11, 6.3 A, slow) on the rear of the power source functions as a protection for the terminal of the remote control cable X14-15.

The supply voltage unit for extra equipment (single-phase, alternating current, 30V/ 240 VA) has a separate fuse (F12 1.0 A, slow).

Note! Use the same type and size of fuse as indicated beside the fuse holder.

WARNING!

The guarantee is not valid for damage caused by incorrect fuse size.

4.3.3 Over-voltage and under-voltage on the mains

The primary circuits of the machine are protected against sudden, short over-voltages.

The machine is designed for continuously withstanding 3 x 440V, (see Technical Data: 415V +6%). Check that the voltage remains within the permissible limits, particularly when the voltage is supplied by for example a generator, driven by an internal combustion engine.

If there is under-voltage on the mains (below 300 V) the control of the power source automatically ceases to function.

4.3.4 Phase dropout on the mains

Phase dropout leads to considerably worse welding properties compared to normal conditions, or that it is not possible to start the power source at all.

Phase dropout can be caused by:

1. A tripped mains fuse
2. A defect mains cable
3. Bad connection of the mains cable to the terminal block or to the socket outlet.

4.3.5 Control of welding dynamics (fig. 1)

The MIG and MAG welding dynamics are controlled over the same potentiometer.

Setting the MIG and MAG welding dynamics:

The setting of the MIG/MAG welding dynamics influences the stability of the welding and the amount of spatter coming up.

The welding result can be optimized for each type of wire and each mixture of shielding gas by way of the setting.

-9...-1 A soft arc is used to cause less spatter.

0 Recommended basic setting for all types of wire.

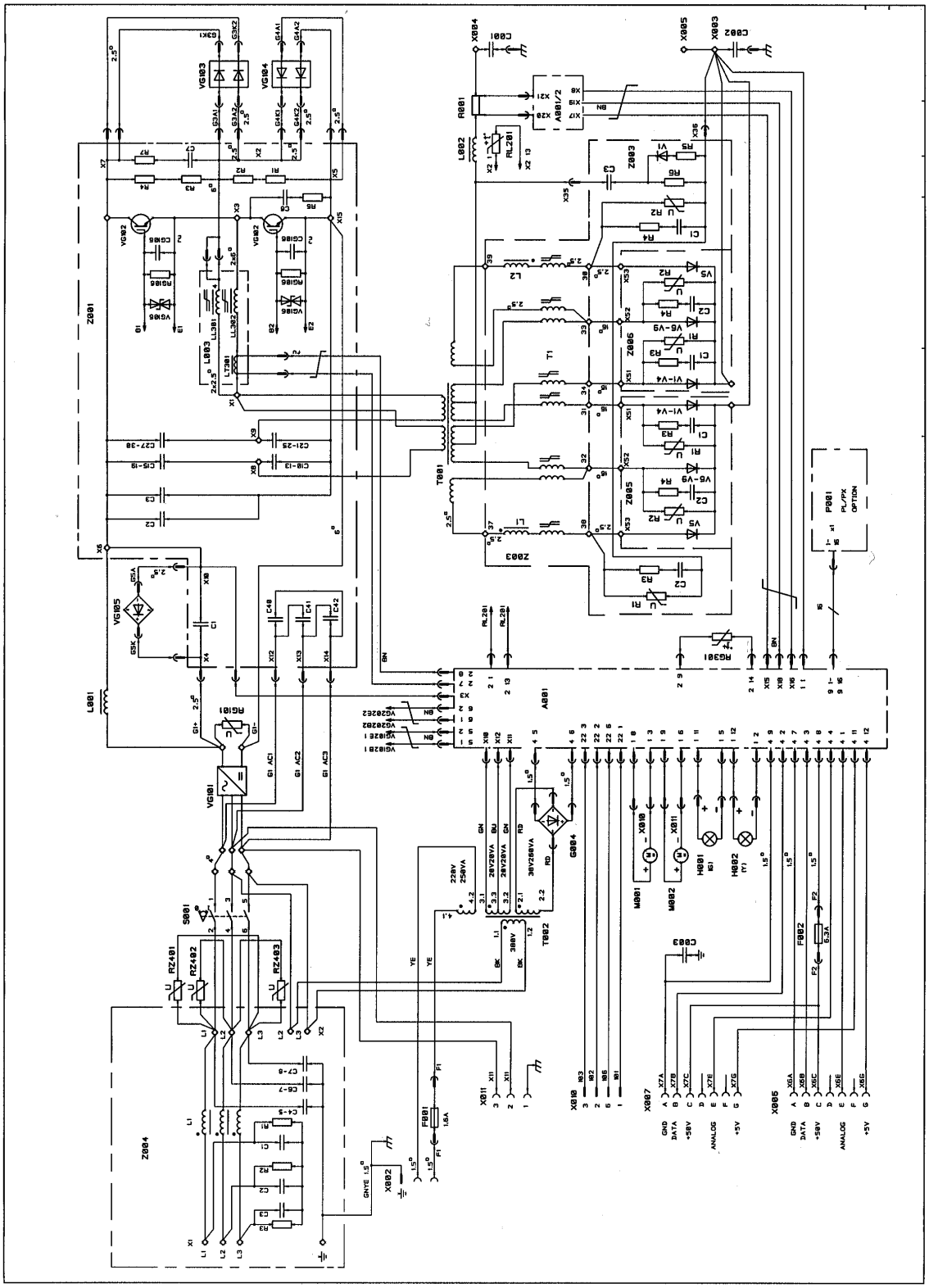
1...9 A hard arc is used to maximize the stability of the arc within the short-arc range, for example, or for steel welding using 100% CO_2 shielding gas, (position 7...9).

5 Technical Data

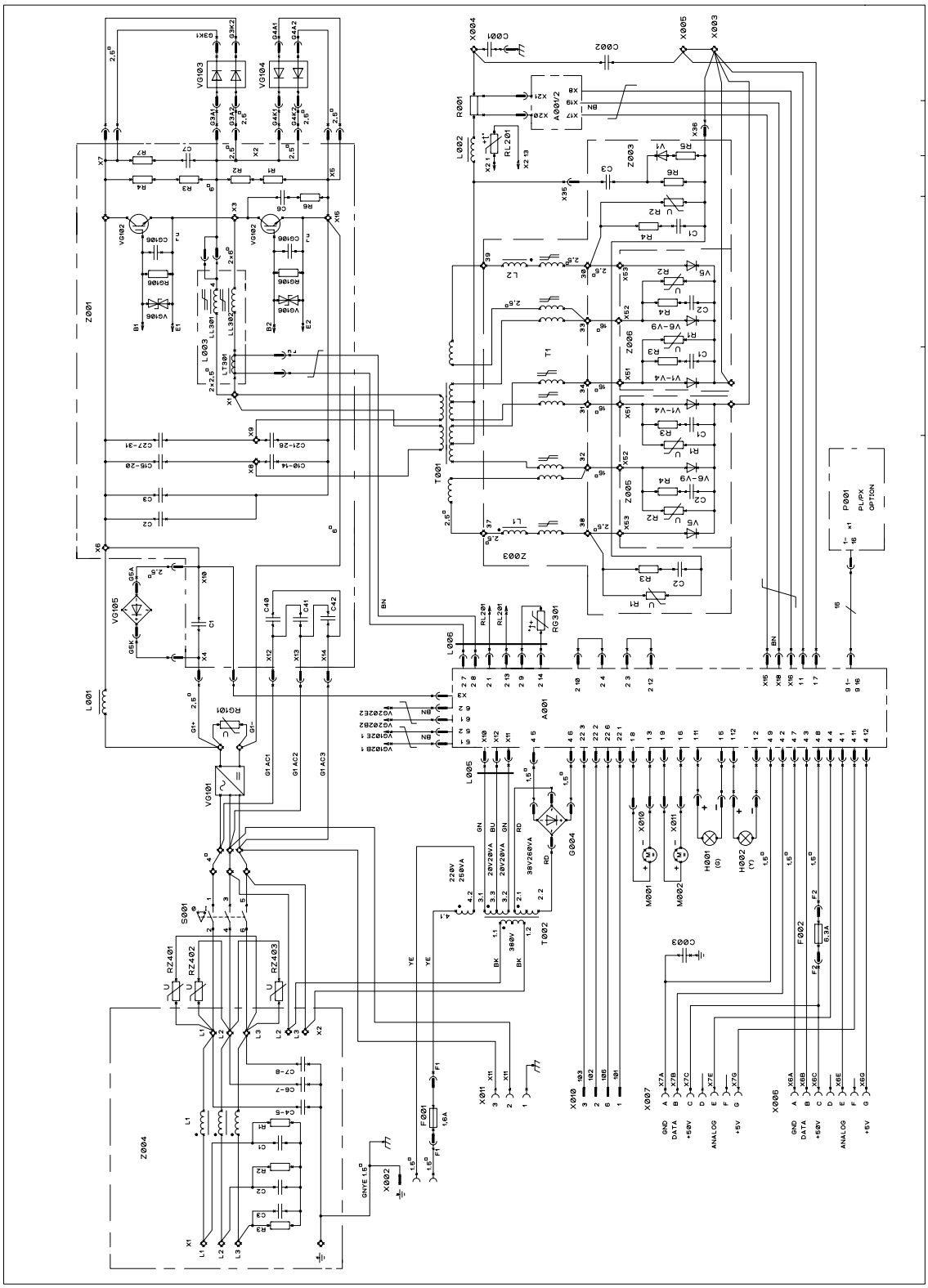
		RPB 320	**RPB 420**	**RPB 520**
Electric connection, 3-phase a.c.	50/60 Hz	400 V ±10%	400 V ±10%	400 V ±10%
Connection power	80% duty cycle 100% duty cycle	320 A/14,6 kVA	420 A/19,7 kVA 400 A/18,6 kVA	520 A/26,6 kVA 440 A/20,0 kVA
Connection cable and fuses		4x6S - 5m/25 A slow		
Permissible load Max. 40º(rated values)	80% duty cycle 100% duty cycle	320 A/32,8 V	420 A/36,8 V 400 A/36 V	520 A/40.0 V 440 A/37,6 V
Setting range for welding current and voltage (steppless)	MIG/MAG	10 V...36 V	10 V...41 V	10 V...45 V
Max. welding voltage		46 V/300 A	46 V/400 A	50 V/500 A
Open-circuit voltage		ca 65 V	ca 65 V	ca 65 V
No-load power		< 75 W	< 75 W	< 75 W
Efficiency at rated values		ca 85%	ca 85%	ca 85%
Power factor at rated values		ca 0,93	ca 0,93	ca 0,93
Storing temperature		-40...+60 °C	-40...+60 °C	-40...+60 °C
Working temperature		-20...+40 °C	-20...+40 °C	-20...+40 °C
Temperature class		H (180 °C)/B (130 °C)	H (180 °C)/B (130 °C	H (180 °C)/B (130 °C
Protection class		IP 23	IP 23	
Outer dimensions without handle	Length Width Height	530 mm 230 mm 520 mm	530 mm 230 mm 520 mm	530 mm 230 mm 520 mm
Weight		37 kg	41 kg	48 kg
Terminal 230V X16		Single fase, alternating current, 230 V/250 VA slow fuse 1,0 A	Single fase, alternating current, 230 V/250 VA slow fuse 1,0 A	Single fase, alternating current, 230 V/250 VA slow fuse 1,0 A

6 Diagram

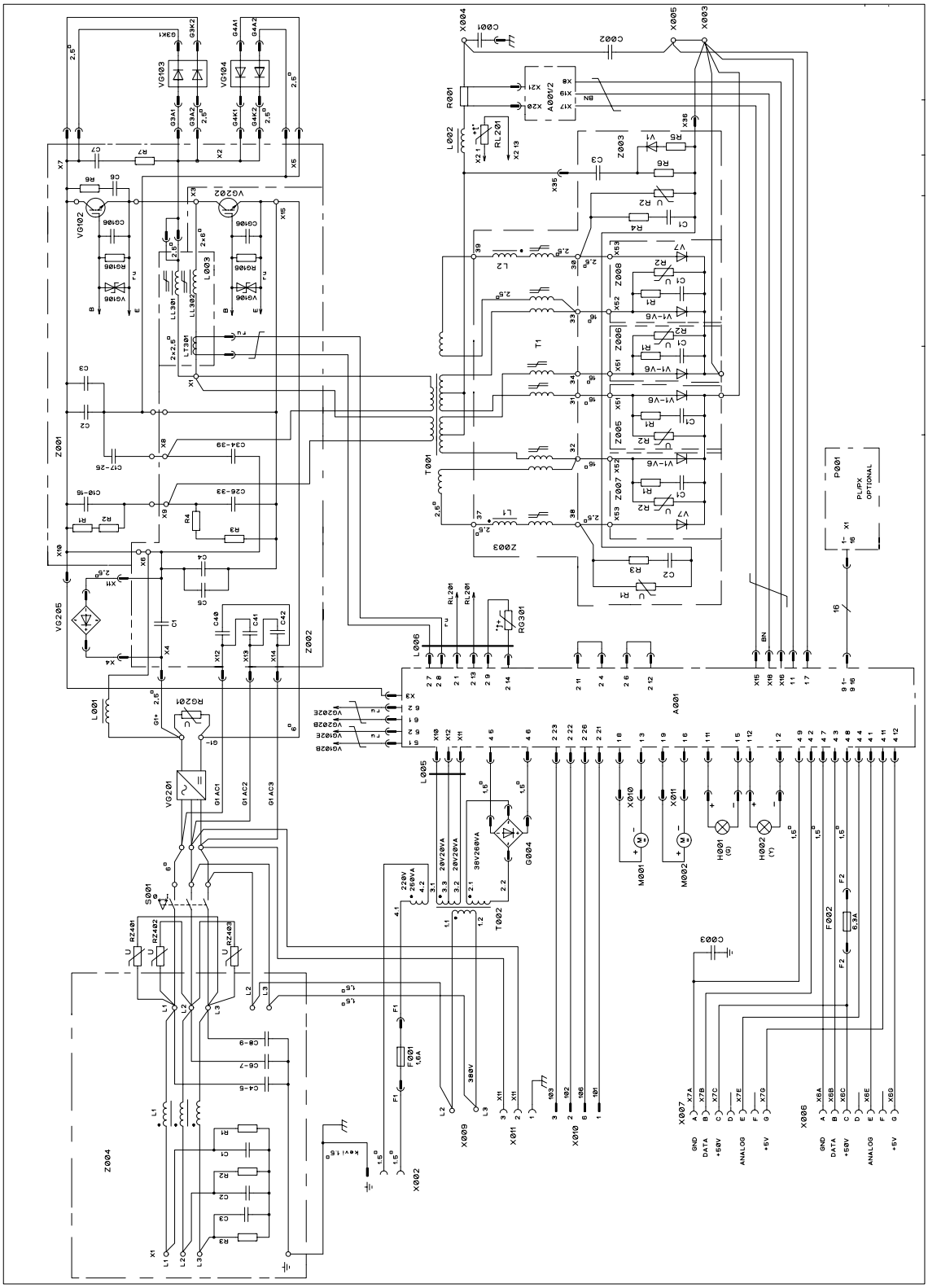
6.1 RPB 320



6.2 RPB 420



6.3 RPB 520



Diagram

7 Reservdelsförteckning/*Spare Parts List*

Reservdelar beställs genom ABB Welding Systems AB. Vid beställning var vänlig uppge typ och tillverkningsnummer samt benämningar och beställningsnummer enligt reservdelsförteckningen.

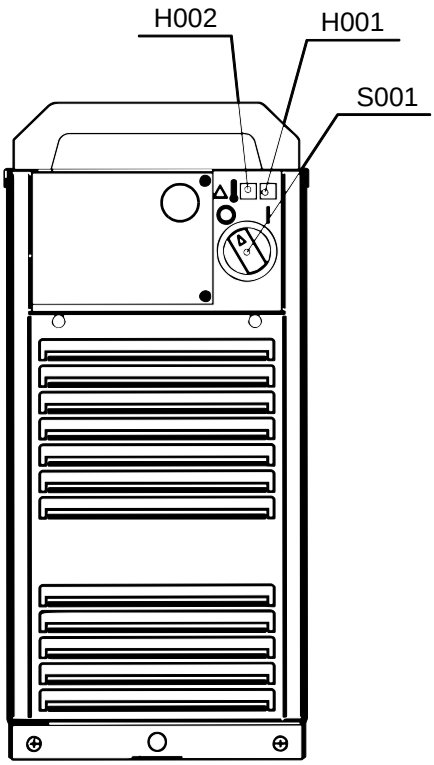
Rätt till ändring av specifikationer utan avisering förbehålles.

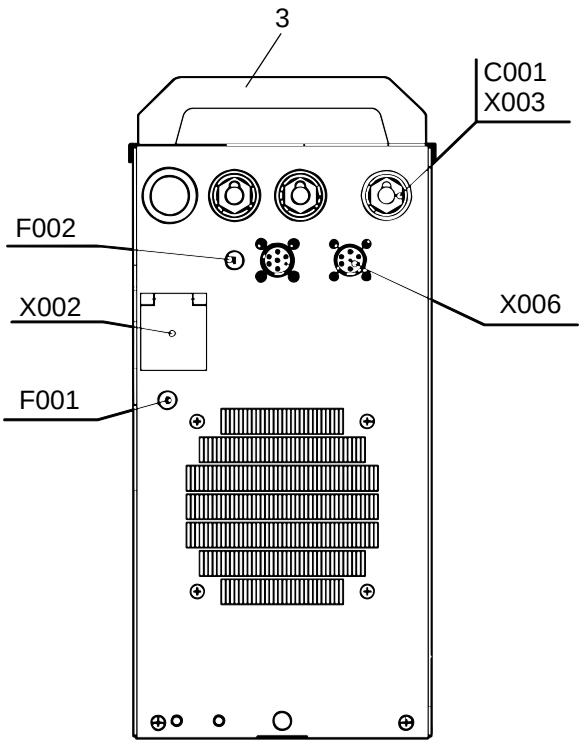
Spare parts are to be ordered from ABB Welding Systems Ltd. Kindly indicate type of unit, serial number, denominations and ordering number according to the spare parts list.

Rights reserved to alter specifications without notice.

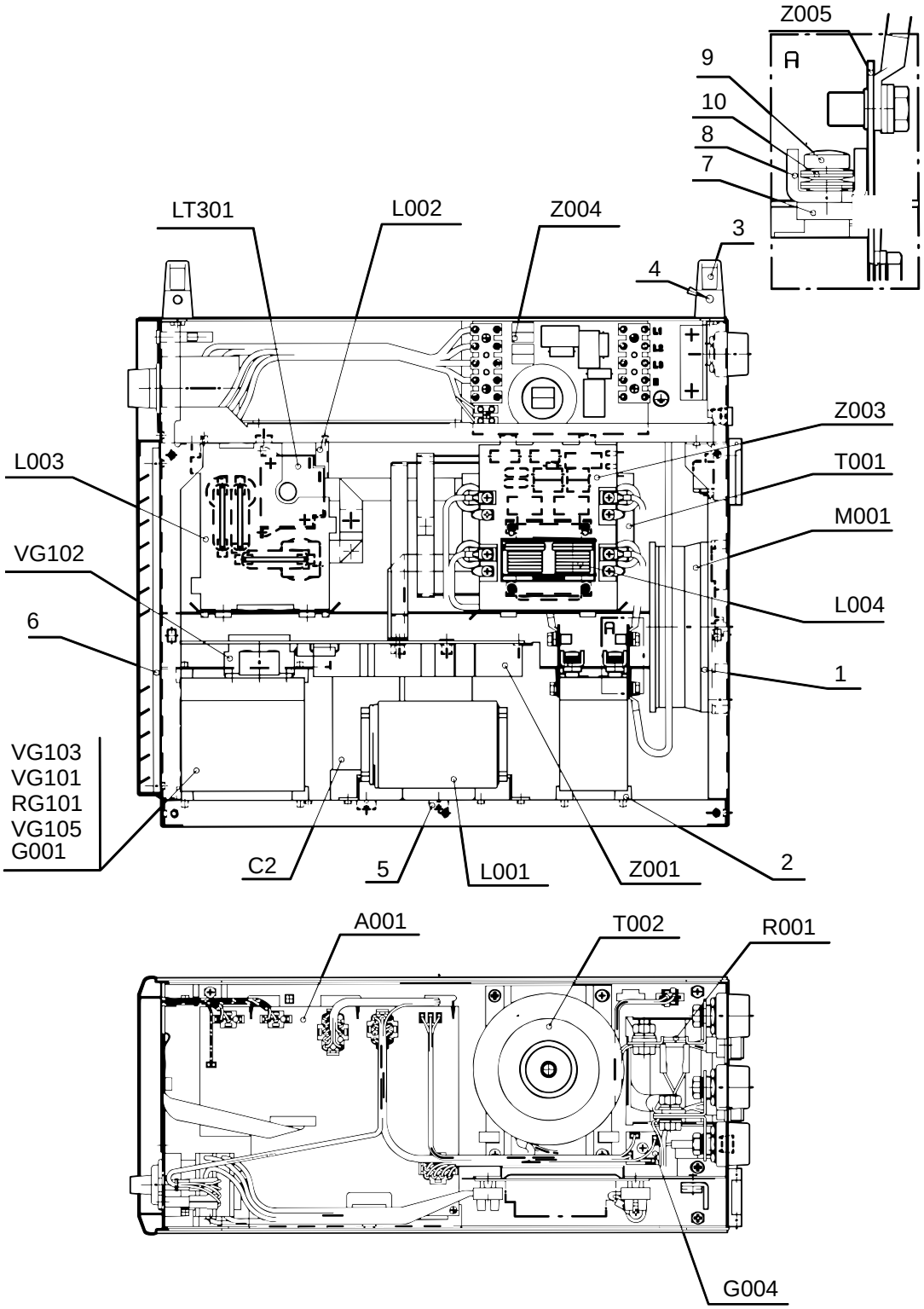
7.1 RPB 320

Positions-nummer ***Position number***	**Antal** ***Quantity***	**Beställningsnummer** ***Ordering number***	**Benämning**	***Denomination***	**Anmärkningar** ***Remarks***
C001	3	4222073	Kondensator	Capacitor	0.1UF/250VAC
F001	1	9772519	Säkring 1	Fuse 1	1,6A Trög 5 x 20 1,6A Delayed 5 x 20
F002	1	9772525	Säkring 6	Fuse 6	6,3A Trög 5 x 20 6,3A Delayed 5 x 20
F002	2	9772551	Säkringsdosa + mutter	Fuse box + nut	
H001	1	9775730	Signallampa	Signal lamp	Grön Green
H002	1	9775729	Signallampa	Signal lamp	Gul Yellow
S001	1	9760502	Huvudbrytare	Main switch	
X002	1	9770872	Vägguttag	Wall socket	
X003	3	9771540	Maskinkontakt för svets-kabel	Machine socket for weld-ing cable	
X006	2	9770081	Kontaktdon	Control connector	7-polig hon 7 poles female
X006	14	9770437	Kontakt mil.	Terminal mil	Hona/ female flat 0,5-1,5
3	2	2062900	Plasthandtag	Plastic handle	


H002
H001
S001


3
C001
X003
F002
X002
X006
F001

Positions-nummer ***Position number***	**Antal** ***Quantity***	**Beställningsnummer** ***Ordering number***	**Benämning**	***Denomination***	**Anmärkningar** ***Remarks***
A001	1	4297590	Styrkort	Control card	
C2	3	9755264	Kondensator	Capacitor	75UF
G001	1	3131330	Primärenhet	Primary unit	RPB 420 kompl. RPB 420 compl.
G004	1	9750126	Diodbrygga	Diod bridge	
LT301	1	9777537	Strömtransformatorer	Current transformer	
L001	1	3131370	Primärdrossel	Primary choke	
L002	1	3134080	Sekundärdrossel	Secondary choke	
L003	1	3131490	Kommuteringsenhet	Commutation unit	
L004	1	3143100	Drossel	Choke	
M001	2	9544214	Ventilator	Cooling fan	
RG101	1	4222075	Varistor	Varistor	
R001	1	4261810	Shunt motstånd	Shunt resistor	
T001	1	2059610	Huvudtransformator	Main transformer	RPB 420
T002	1	9777918	Hjälptransformator	Auxiliary transformer	
VG101	1	9750170	Likriktarenhet	Rectifier unit	
VG102	1	4270360	Reservdel	Spare part	IGBT-TRANS. RPB 320
VG103	2	4277680	Diodenhet	Diode unit	2 x 20A
VG105	1	9750126	Diodbrygga	Diode bridge	
Z001	1	4296420	Huvudkretskort	Main circuit card	RPB 320
Z003	1	4288810	Filterkort	Filter card	RPB 320/420
Z004	1	4277580	Filterkort	Filter card	M5000
Z005	2	4288470	Diodkort	Diode card	RPB 320/420
1	1	2069250	Isolering för fläkt	Insul. for cooling fan	
2	16	2059530	Fäststycke för avkylprofil	Fasten piece for cool profil	
4	1	9412690	Fyrkantsmutter§	Square nut	
5	3	4268110	Stöd för kondensator	Support for capacitor	
6	1	4273790	Filterplåt	Filter plate	
7	2	4288430	Gummi	Rubber	
8	2	4288420	Pressbalk	Straining beam	
9	4	9433068	Spårskruv	Slot headed screw	M6x25
10	16	9480207	Tallriksfjäder	Cup spring	12.5x6.2x0.7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VG101
RG101
VG105
G001
C2
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L001
Z001
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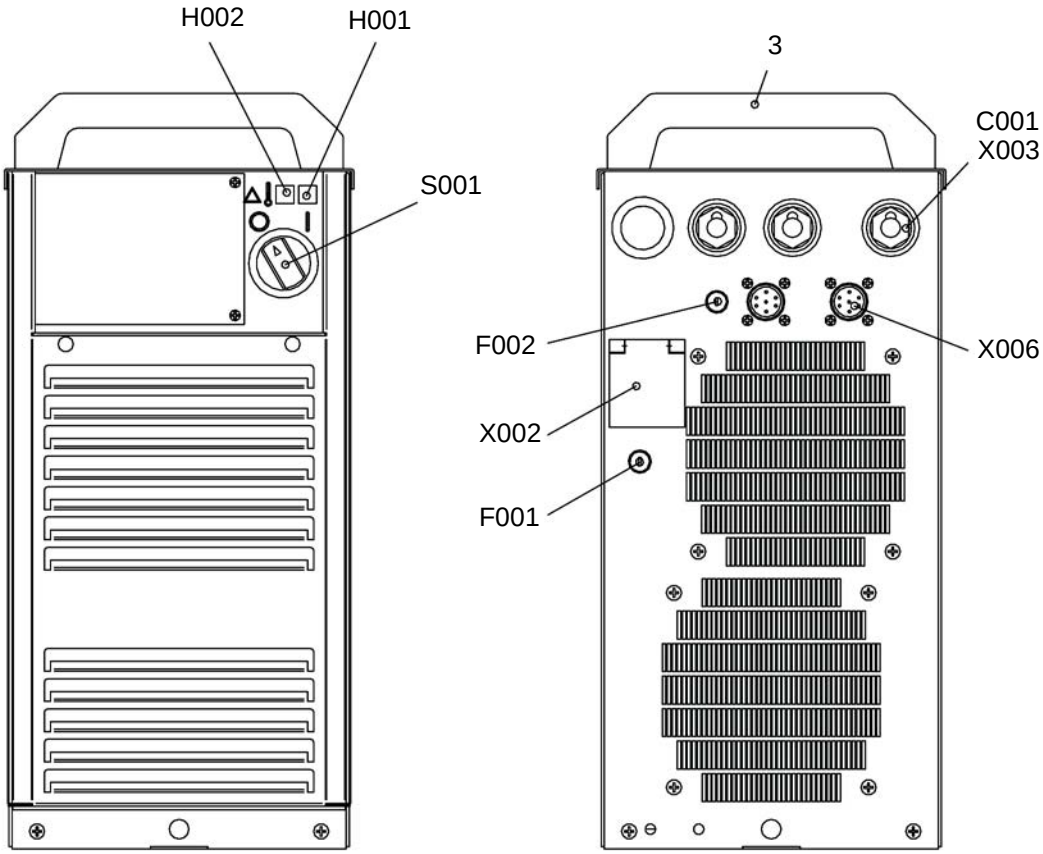
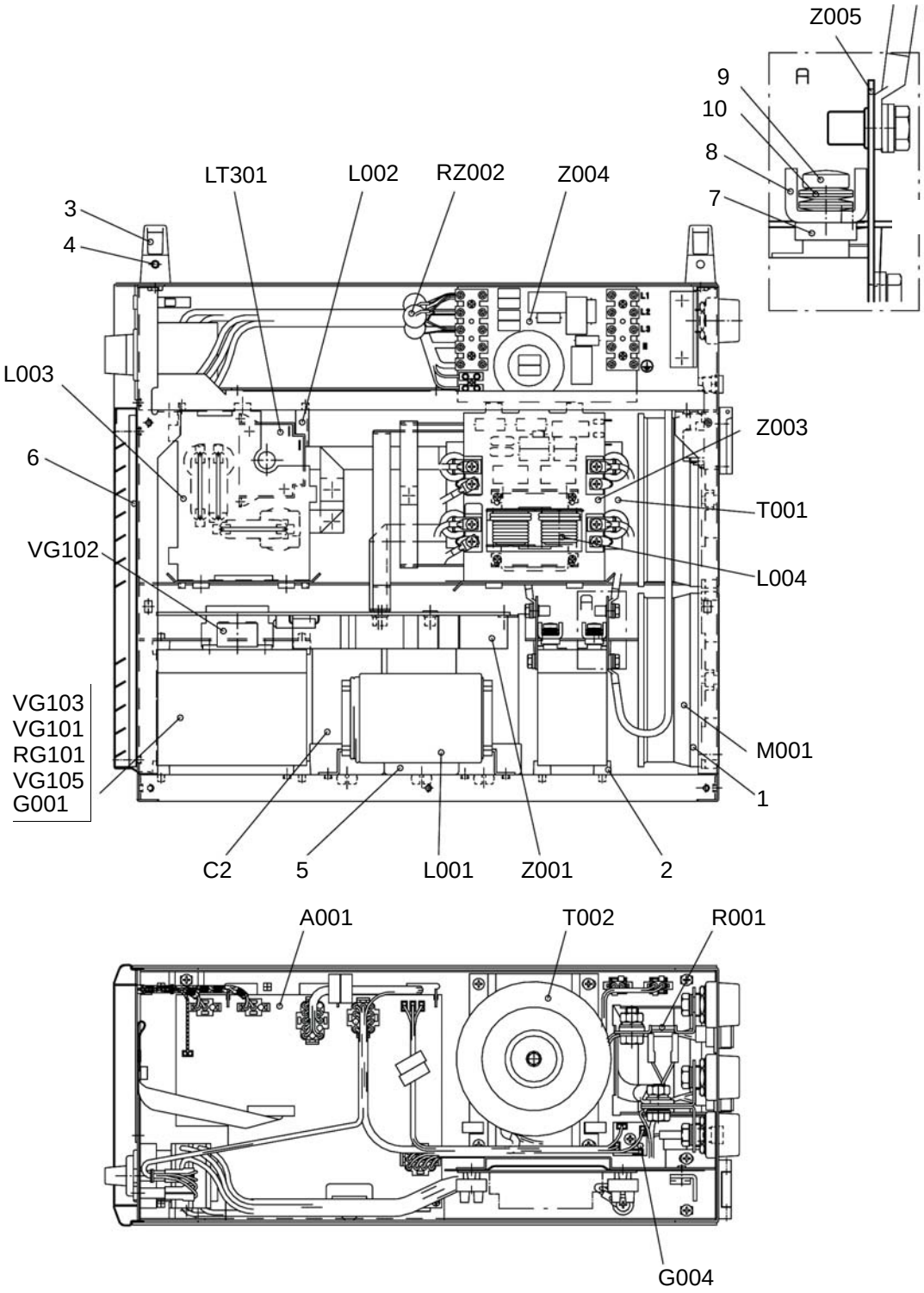
A001
T002
R001
G004

7.2 RPB 420

Positions-nummer ***Position number***	**Antal** ***Quantity***	**Beställningsnummer** ***Ordering number***	**Benämning**	***Denomination***	**Anmärkningar** ***Remarks***
C001	3	4302000	RC-skydd	RC-protection	
F001	1	9772519	Säkring 1	Fuse 1	1,6A Trög 5 x 20 1,6A Delayed 5 x 20
F002	1	9772525	Säkring 6	Fuse 6	6,3A Trög 5 x 20 6,3A Delayed 5 x 20
F002	2	9772551	Säkringsdosa + mutter	Fuse box + nut	
H001	1	9775730	Signallampa	Signal lamp	Grön Green
H002	1	9775729	Signallampa	Signal lamp	Gul Yellow
S001	1	9760502	Huvudbrytare	Main switch	
X002	1	9770872	Vägguttag	Wall socket	
X003	3	9771540	Maskinkontakt för svetskabel	Machine socket for welding cable	DIX 70/95 Hona/Female
X006	2	9770081	Kontaktdon	Control connector	7-polig hon 7 poles female
X006	14	9770437	Kontakt mil.	Terminal mil	Hona/ female flat 0,5-1,5
3	2	2062900	Plasthandtag	Plastic handle	


H002
H001
S001
3
C001
X003
F002
X006
X002
F001

Positions-nummer ***Position number***	**Antal** ***Quantity***	**Beställningsnummer** ***Ordering number***	**Benämning**	***Denomination***	**Anmärkningar** ***Remarks***
A001	1	4297590	Styrkort	Control card	
C2	3	9755268	Kondensator	Capacitor	25UF/700VDC
G001	1	3131500	Primärenhet	Primary unit	RPB 420 kompl. RPB 420 compl.
G004	1	9750126	Diodbrygga	Diod bridge	
LT301	1	9777537	Strömtransformatorer	Current transformer	
L001	1	3131320	Primärdrossel	Primary choke	
L002	1	3134780	Sekundärdrossel	Secondary choke	
L003	1	3131490	Kommuteringsenhet	Commutation unit	
L004	1	3143100	Drossel	Choke	
M001	2	9544214	Ventilator	Cooling fan	
RG101	1	4222075	Varistor	Varistor	
R001	1	4261810	Shunt motstånd	Shunt resistor	450A/60MV
T001	1	2059610	Huvudtransformator	Main transformer	RPB 420
T002	1	3145010	Hjälptransformator	Auxiliary transformer	
VG101	1	9750170	Likriktarenhet	Rectifier unit	
VG102	1	4270370	Reservdel	Spare part	IGBT-TRANS. RPB 420
VG103	2	4277680	Diodenhet	Diode unit	2 x 20A
VG105	1	9750126	Diodbrygga	Diode bridge	
Z001	1	4293730	Huvudkretskort	Main circuit card	RPB 420
Z003	1	4288810	Filterkort	Filter card	RPB 320/420
Z004	1	4277580	Filterkort	Filter card	M5000
RZ401	1	4286200	Varistor	Varistor	
Z005	2	4288470	Diodkort	Diode card	RPB 320/420
1	1	2069250	Isolering för fläkt	Insul. for cooling fan	
2	16	2059530	Fäststycke för avkylprofil	Fasten piece for cool pro-fil	
4	1	9412690	Fyrkantsmutter§	Square nut	
5	3	4268110	Stöd för kondensator	Support for capacitor	
6	1	4273790	Filterplåt	Filter plate	
7	2	4288430	Gummi	Rubber	
8	2	4288420	Pressbalk	Straining beam	
9	4	9433068	Spårskruv	Slot headed screw	M6x25
10	16	9480207	Tallriksfjäder	Cup spring	12.5x6.2x0.7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RG101
VG105
G001
Z003
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M001
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C2
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L001
Z001
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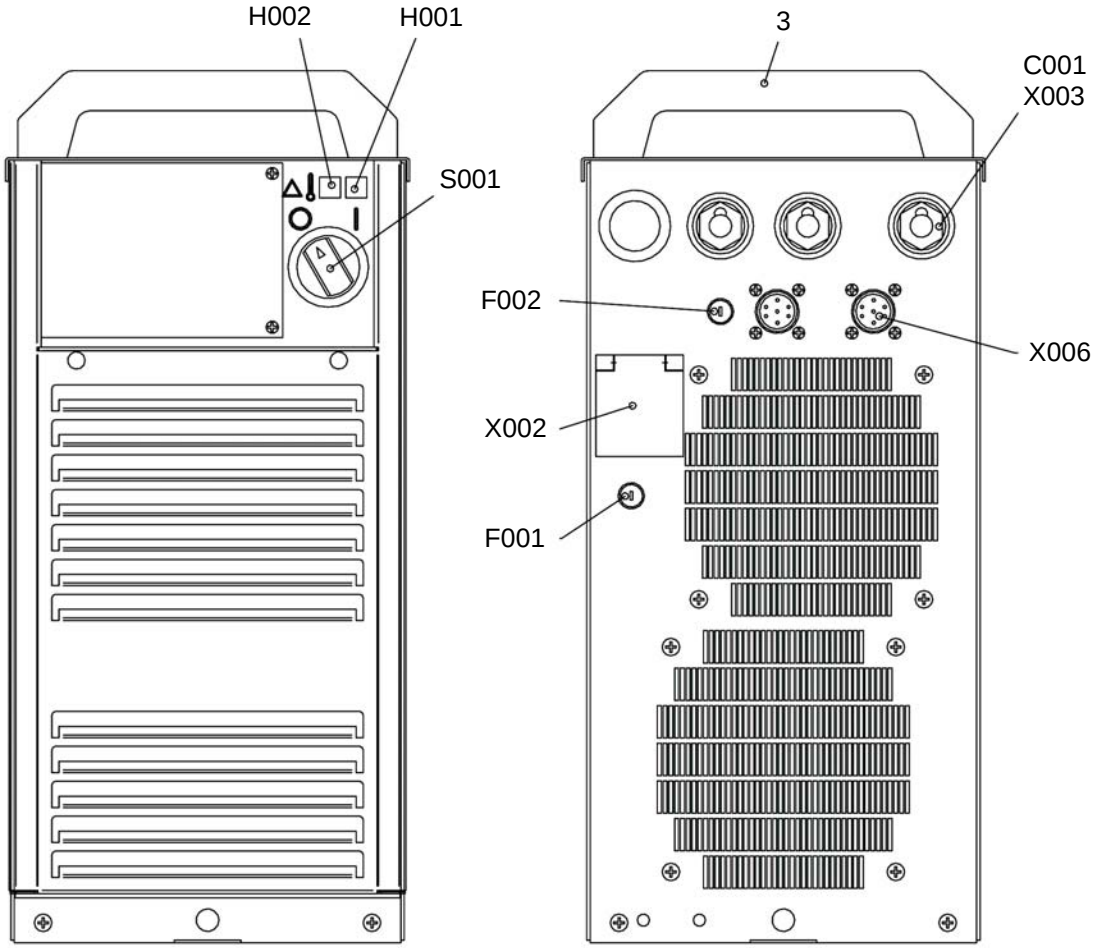
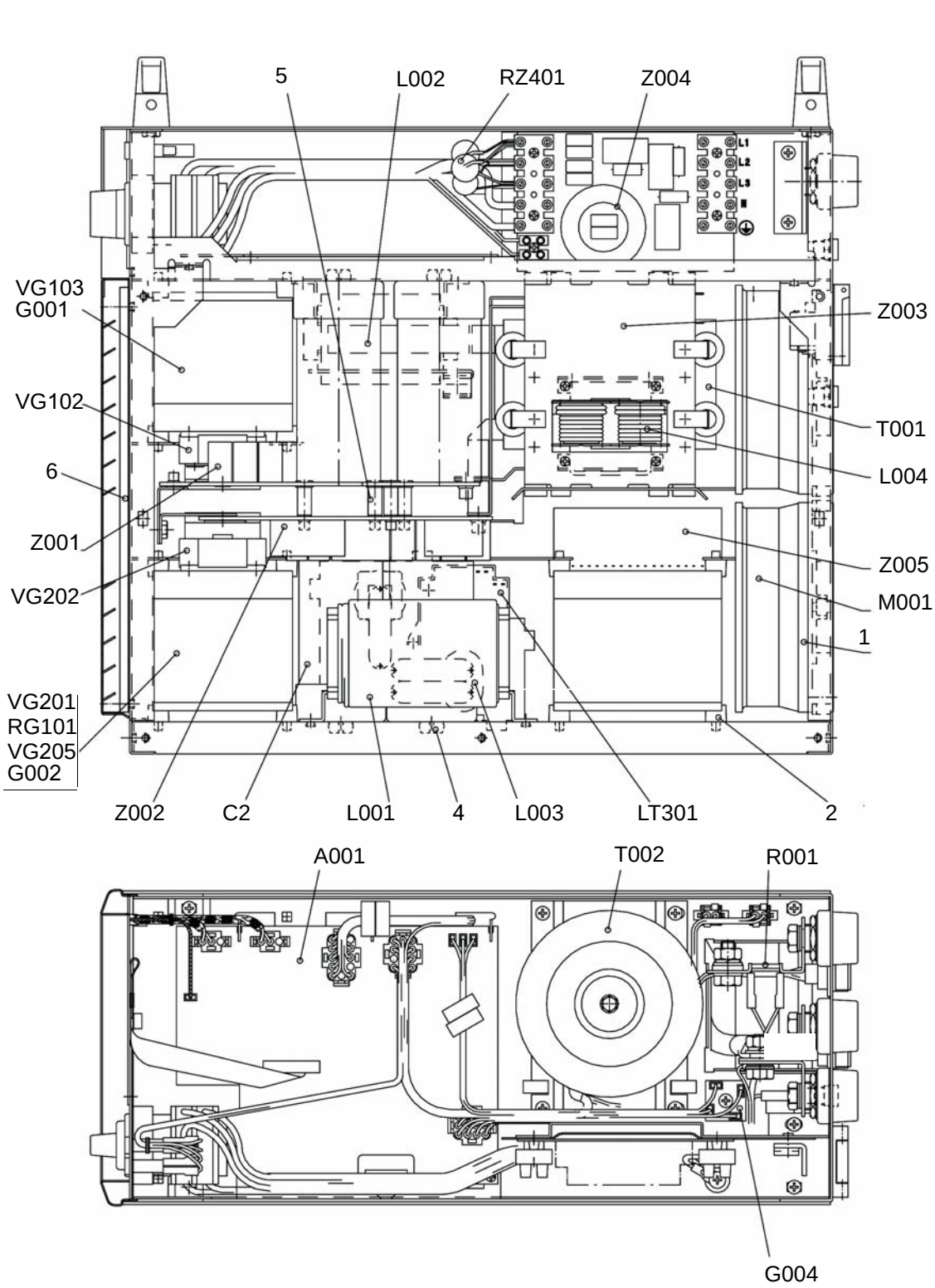
A001
T002
R001
G004

7.3 RPB 520

Positions-nummer ***Position number***	**Antal** ***Quantity***	**Beställningsnummer** ***Ordering number***	**Benämning**	***Denomination***	**Anmärkningar** ***Remarks***
C001	3	4302000	RC-skydd	RC-protection	
F001	1	9772519	Säkring 1	Fuse 1	1,6A Trög 5 x 20 1,6A Delayed 5 x 20
F002	1	9772525	Säkring 6	Fuse 6	6,3A Trög 5 x 20 6,3A Delayed 5 x 20
F002	2	9772551	Säkringsdosa + mutter	Fuse box + nut	
H001	1	9775730	Signallampa	Signal lamp	Grön Green
H002	1	9775729	Signallampa	Signal lamp	Gul Yellow
S001	1	9760611	Huvudbrytare	Main switch	
X002	1	9770872	Vägguttag	Wall socket	
X003	3	9771540	Maskinkontakt för svets-kabel	Machine socket for weld-ing cable	DIX 70/95 Hona/Female
X006	2	9770081	Kontaktdon	Control connector	7-polig hon 7 poles female
X006	14	9770437	Kontakt mil.	Terminal mil	Hona/ female flat 0,5-1,5
3	2	2062900	Plasthandtag	Plastic handle	


H002
H001
S001
3
C001
X003
F002
X006
X002
F001

Positions-nummer ***Position number***	**Antal** ***Quantity***	**Beställningsnummer** ***Ordering number***	**Benämning**	***Denomination***	**Anmärkningar** ***Remarks***
A001	1	4297590	Styrkort	Control card	
C2	3	9755268	Kondensator	Capacitor	25UF/700VDC
G001	1	3131330	Primärenhet	Primary unit	RPB 420 kompl. RPB 420 compl.
G004	1	9750126	Diodbrygga	Diod bridge	
LT301	1	9777537	Strömtransformatorer	Current transformer	
L001	1	3131320	Primärdrossel	Primary choke	
L002	1	3134070	Sekundärdrossel	Secondary choke	
L003	1	3131490	Kommuteringsenhet	Commutation unit	
L004	1	3143100	Drossel	Choke	
M001	2	9544214	Ventilator	Cooling fan	
RG101	1	4222075	Varistor	Varistor	
R001	1	4261810	Shunt motstånd	Shunt resistor	450V/60MV
T001	1	2059290	Huvudtransformator	Main transformer	RPB 420
T002	1	3145010	Hjälptransformator	Auxiliary transformer	
T002	1	3145170	Hjälptransformator	Auxiliary transformer	
VG201	1	9750173	Likriktarenhet	Rectifier unit	
VG102	1	4270380	Reservdel	Spare part	IGBT-TRANS. RPB 520
VG103	2	4277680	Diodenhet	Diode unit	2 x 20A
VG202	1	4270380	IGBT-modul	IGBT-module	
VG205	1	9750126	Diodbrygga	Diode bridge	
Z001	1	4296430	Huvudkretskort	Main circuit card	RPB 520
Z002	1	4296440	Huvudkretskort	Main circuit card	RPB 520
Z003	1	4288810	Filterkort	Filter card	RPB 320/420
Z004	1	4277580	Filterkort	Filter card	M5000
Z005	2	4291310	Diodkort	Diode card	RPB 520
1	1	2069250	Isolering för fläkt	Insul. for cooling fan	
2	16	2059530	Fäststycke för avkylprofil	Fasten piece for cool pro-fil	
3	1	9412690	Fyrkantsmutter	Square nut	
4	3	4268110	Stöd för kondensator	Support for capacitor	
5	4	4261520	Bult		
6	1	4273790	Filterplåt	Filter plate	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L002
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