SIEMENS

POLYDOROS IT / IT-S

AX

Replacements of Parts

POLYDOROS IT / IT-S

POLYDOROS IT / IT-S

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Document revision level

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See Configuration

General Information

see (COPL-136.843.02 / General)

General Safety Information

see (COPL-136.843.02 / General Safety Information)

Additional Safety Measures with the Power Storage Unit, ESU, Installed

see (COPL-136.843.02 / Additional Safety Measures with the Power Storage Unit, ESU, Installed)

Service with the Control Consoles

see (COPL-136.843.02 / Service with the control consoles)

General Information

Required Documents

- Start-up Instructions COPL-136.812....
- Troubleshooting Instructions COPL-136.840.02...
- Replacement of Parts COPL-136.841.01....
- Adjustment Instructions COPL-136.842.02....
- Configuration Instructions COPL-136.842.02....
- Wiring Diagram COPL-136.844.03...

Required tools and test equipment

All tools, test equipment and aids, with the exception of the "standard service tool kit", are listed and specified in the Service Tools Catalogue.

- Torque wrench, 1 Nm to 12 Nm (1/4" drive) 34 30 063
- Fluke 187 Digital Multimeter 99 94 831
- Fluke Scopemeter 199 CM 73 92 074
- High voltage dummy plugs (Set: 2 connectors, 3-pole) 16 21 791
- Heat conductive paste (to replace the D115) 20 48 650

Overview of the Generator

Overview of the Generator Cabinet

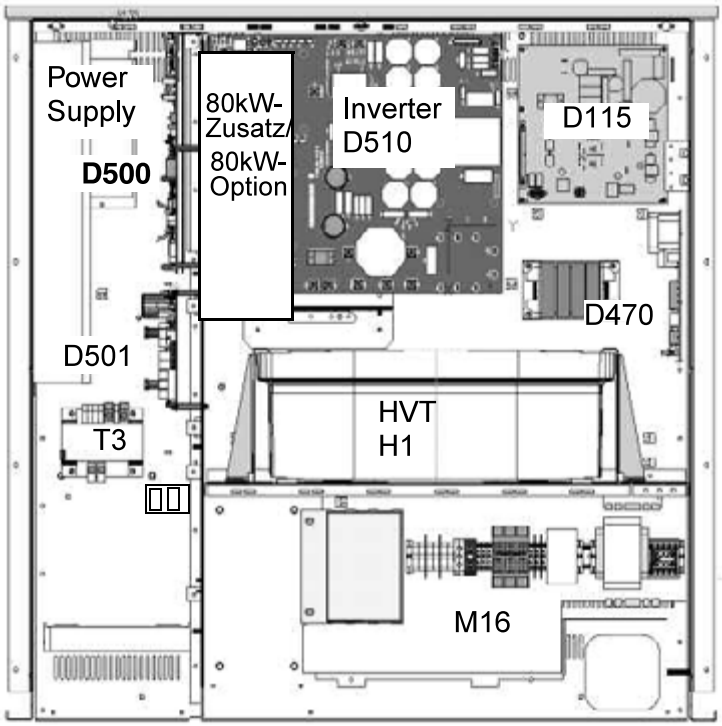

Fig. 1:

Overview of the Control Consoles

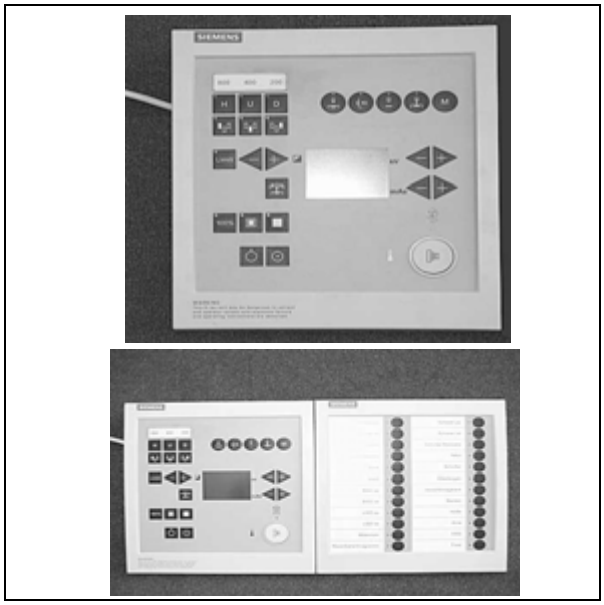

Fig. 2: Control console (standard) / organ console (option)

Fig. 3: Touchscreen Option

D 500 Main Control Board

Remarks regarding the Board

NOTE

The replacement part "D500 board" is shipped without the D300 (MCB3) and D502 (dongle).

- **The following data is stored on the board:**
  - All configuration and adjustment data
  - The error log, the tube unit data and the exposure counter.
  - The organ program data (only if a control console with the organ expansion is installed).

  With the installed Touch Panel, the organ program data and names are stored on the flash card in the Touch Panel.

NOTE

After replacing the board, the configuration, adjustment, organ program data must be determined again or entered.

Replacing the Board

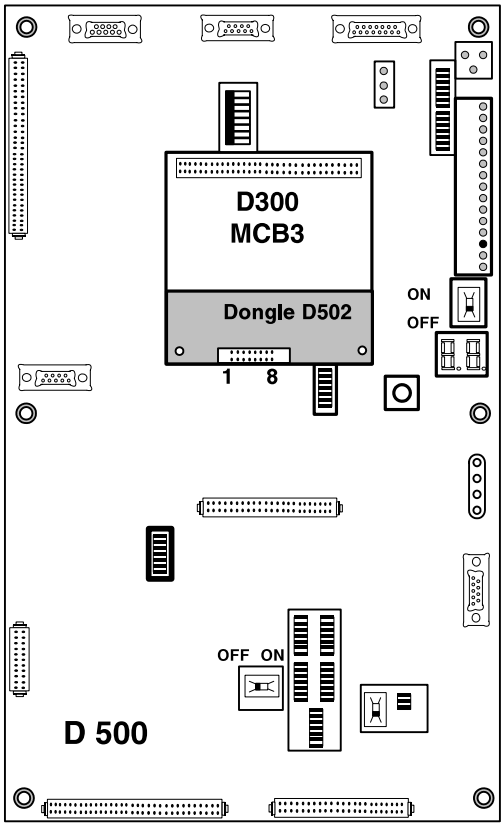

Fig. 4:

Removing the Board

- If present, remove the D502 board (dongle) from the D300.
- Remove the plastic knurled nuts from the D300 board (MCB3) and remove the board.
- Disconnect the ground wire connection at D500.X7.
- Unplug all connectors on the board.
- Remove the plastic knurled nuts with which the is secured in place.
- Remove the board.

Installing the Board

- Transfer the jumpers, bridges and switch positions from the old board to the new one.
- If applicable, check the jumpers and bridges. The switch positions must be checked per the Wiring Diagram.
- Install the D300 board (MCB 3) and secure it in place with the plastic knurled nuts.
- If present, install the D502 board (dongle).
- Install the board.
- Secure the board in place with the plastic knurled nuts.
- Reconnect all plug-in connections.

- Reconnect the ground wire connection at D500.X7.
  - **Torque 4.25 Nm**

Configuration following Replacement of the Board

- The configuration of the generator must be performed per the Configuration List. The list and performance of the configuration is described in the instructions (CO-PL-136.843.03 / Configuration Lists).

Adjustments following Replacement of the Board

- The following adjustments absolutely must be performed in the sequence described:
  - Adjustment/ Stat. Inverter Adjust
  - Adjustment/ Tube Warm-up
  - Adjustment/ Learn Filament
  - Adjustment/ mAs Relay Adjust
- Performance of the adjustment is described in the instructions (COPL-136.842.02 / POLYDOROS IT / IT-S).

D 300, MCB 3

Remarks regarding the Board

NOTE

The "D300 Board" replacement part is always shipped with the latest SW version. Either with VA.., VC.. VD.. depending on the Part Number that was ordered. The SW version must be appropriate for the generator (Compatibility List).

Replacing the Board

Removing the Board

- If present, remove the D502 board (dongle) from the D300.
- Remove the plastic knurled nuts with which the D400 (MCB 3) is secured on the D500.
- Carefully remove the D300 from the D500.

Installing the Board

- Place the D300 on the D500.
- Install the D300 board (MCB 3) and secure it in place on the D500 with the 4 plastic knurled nuts.
- If present, install the D502 board (dongle).

Configuration following Replacement of the Board

- Checking the SW Version
  - The SW version should be the same as the previously installed version. If needed, check the SW version against the Compatibility List.
  - With the Touch Panel, absolutely also check the compatibility with the SW in the Touch Panel.

- The check of the SW version must be performed per the Configuration List. The list and performance of the configuration is described in the instructions (COPL-136.843.03 / Configuration Lists).

Adjustment following Replacement of the Board

- n.a.

D 502 Dongle

Remarks regarding the Board

NOTE

The D502 board (dongle) enables the generator SW options.

The dongle is specially programmed for each customer order prior to shipment of the generator.

Thus, a replacement part can be shipped only with the Part and Serial Number of the original generator.

Replacing the Board

Removing the Board

- If present, remove the D502 board (dongle) from the D300.

Installing the Board

- Place the D502 replacement board (dongle) on the D300.

Configuration following Replacement of the Board

- n.a.

Adjustment following Replacement of the Board

- n.a.

D 501 Interface Board

Remarks regarding the Board

n.a.

Replacing the Board

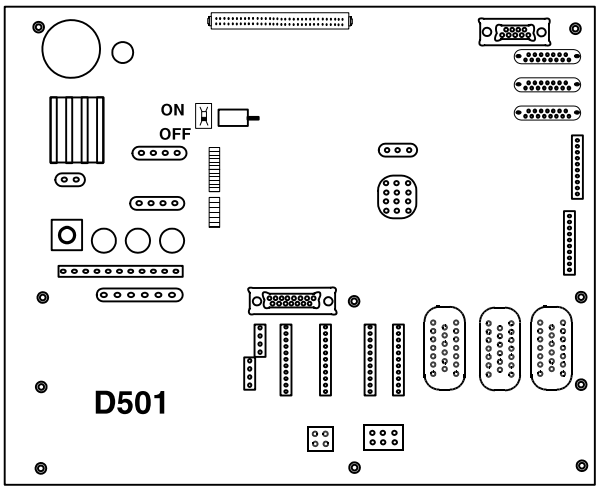

Fig. 5:

Removing the Board

- Disconnect the ground wire connection at D501.X20.
- Unplug all connectors on the board.
- Remove the plastic knurled nuts with which the is secured in place.
- Remove the board.

Installing the Board

- Transfer the jumpers, bridges and switch positions from the old board to the new one.
- If applicable, check the jumpers and bridges. The switch positions must be checked per the Wiring Diagram.
- Install the board.
- Secure the board in place with the plastic knurled nuts.
- Reconnect all plug-in connections.
- Reconnect the ground wire connection at D501.X20.
  - **Torque 4.25 Nm**

Configuration following Replacement of the Board

- n.a.

Adjustments following Replacement of the Board

- n.a.

Replacing the Fuses on the D501

NOTE	**No additional work steps are required to replace the fuses.**

D 470 FIL_Power Board, Filament Board

Remarks regarding the Board

n.a.

Replacing the Board

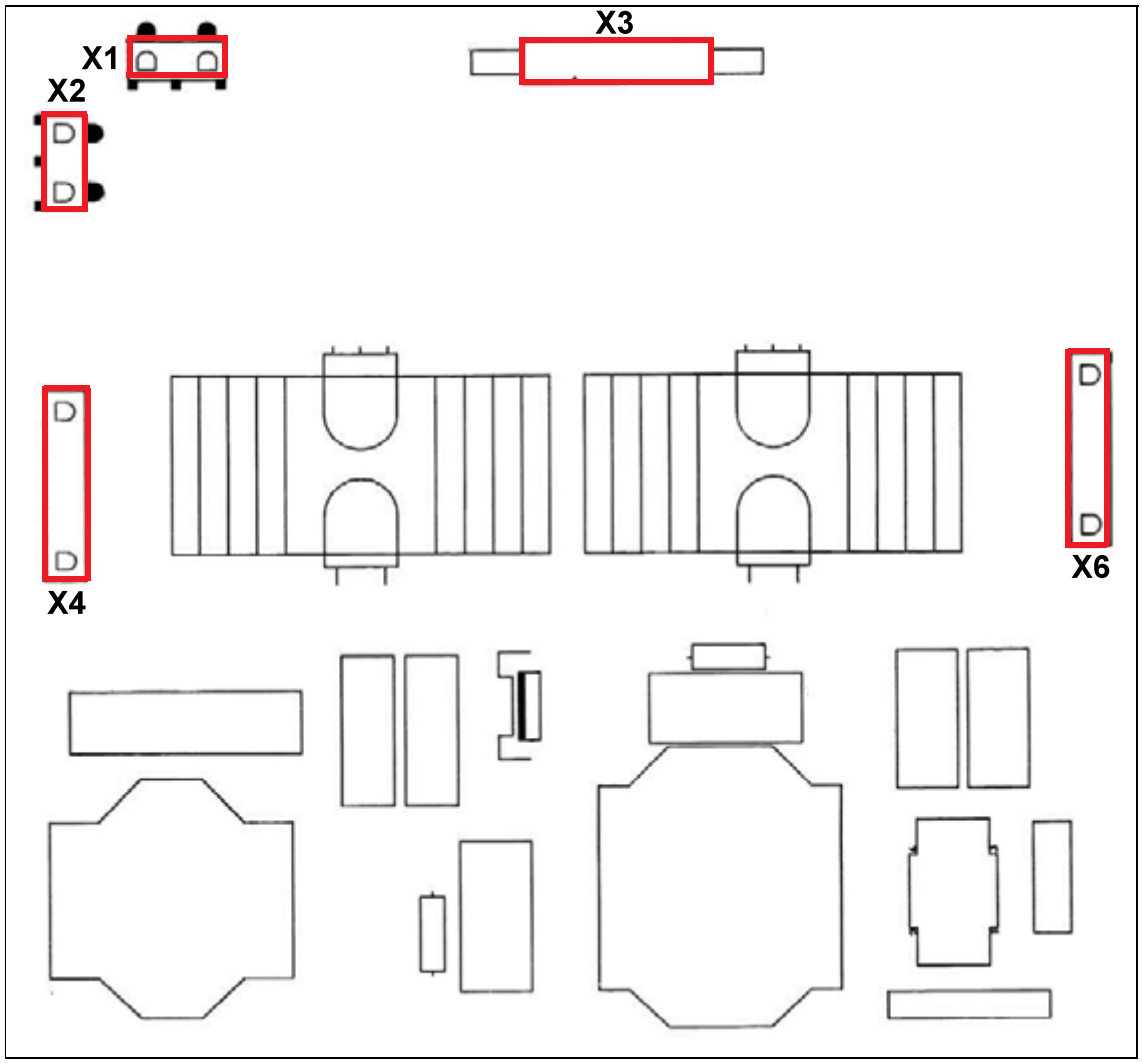

Fig. 6: D470 FIL power board

Removing the Board

- Unplug all connectors on the board.
- Remove the plastic knurled nuts with which the is secured in place.
- Remove the board.

Installing the Board

- Install the board.

- Secure the board in place with the plastic knurled nuts.
- Reconnect all plug-in connections.

Configuration following Replacement of the Board

- n.a.

Adjustments following Replacement of the Board

- The following adjustments absolutely must be performed in the sequence described:
  - Adjustment/ Learn Filament
- Performance of the adjustment is described in the instructions (COPL-136.842.02 / POLYDOROS IT / IT-S).

D 115 Rotating Anode Starter Unit

Remarks regarding the Board

NOTE

Heat conducting paste with the Part No. 20 48 650 is absolutely required (the plate on which the IGBT modules are installed is also called the "heat sink").

Replacing the Board

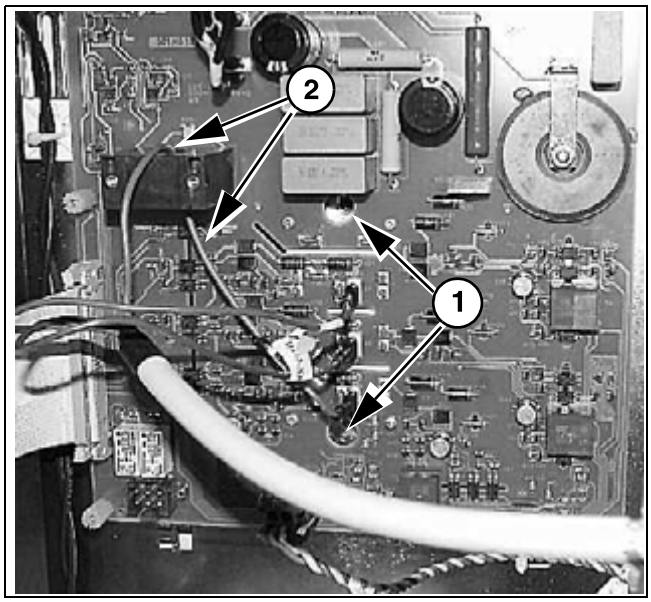

Fig. 7:

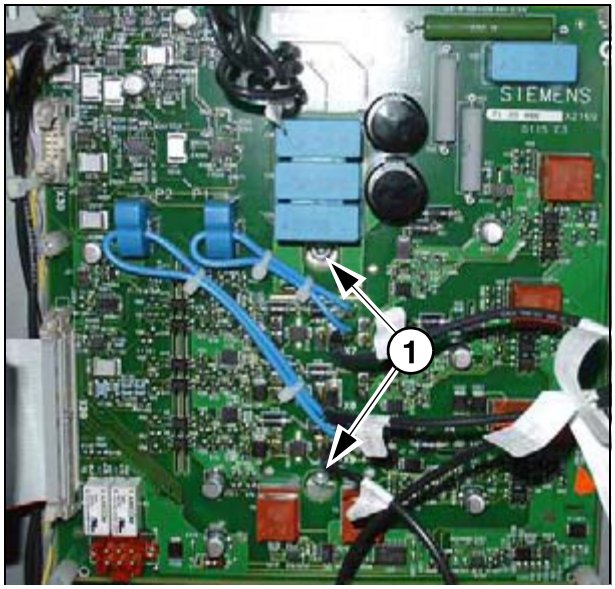

Fig. 8:

Removing the Board

- Unplug all connectors on the board.
- Remove the plastic knurled nuts with which the is secured in place.
- Remove the 2 mounting screws (1/Fig. 7 / p. 18) and (1/Fig. 8 / p. 18).
- Remove the board.

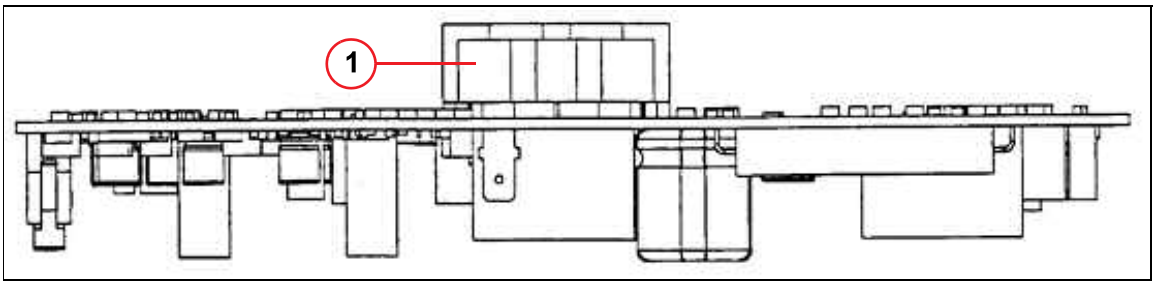

Fig. 9: D115 rotating anode starter, cross sectional view

Pos. 1 IGBT module

Installing the Board

- Apply a paper-thin layer of heat-conducting paste on the IGBT module (1/Fig. 9 / p. 18).
- Install the board.
- Secure the board in place with the plastic knurled nuts.
- Reinstall the 2 mounting screws (1/Fig. 7 / p. 18).
  - **Torque 5.0 Nm**
- Reconnect all plug-in connections.

NOTE	**The cable (2/Fig. 7 / p. 18) to the D115 X9 connector absolutely must be laid through the coil.**

Configuration following Replacement of the Board

- n.a.

Adjustments following Replacement of the Board

- n.a.

HSE high voltage transformer

Remarks regarding the Board

NOTE

Due to the weight of the replacement part, 2 persons are required for the replacement.

Replacing the High Voltage Transformer

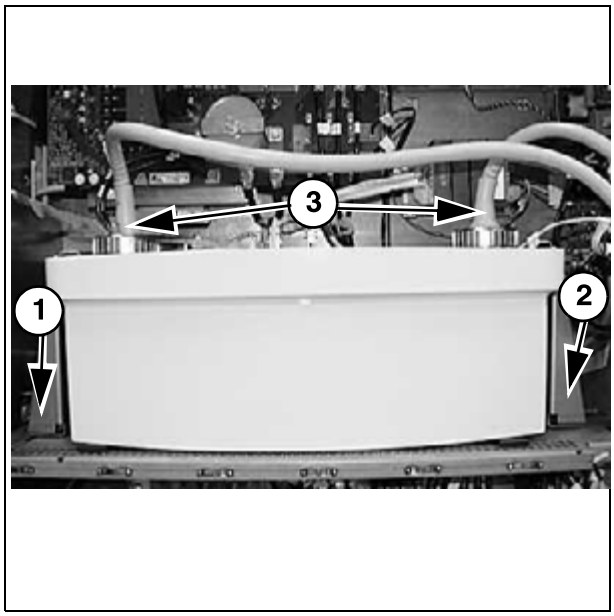

Fig. 10:

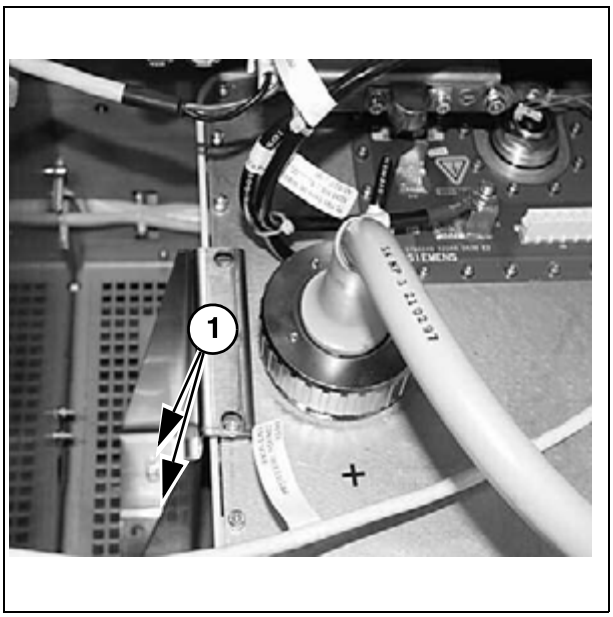

Fig. 11:

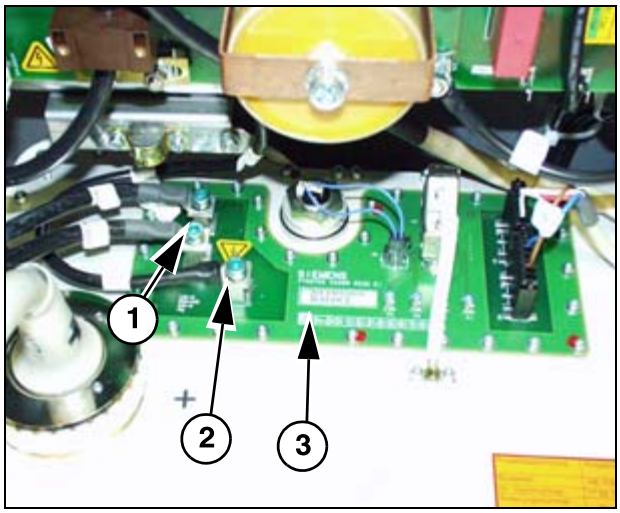

Fig. 12:

Removing the High Voltage Transformer

NOTE	**The D530 or D532 board (3/Fig. 12 / p. 20) is part of the high voltage transformer. The board designation depends on the generator. The board is not a replacement part and must remain installed.**

- Remove the mounting bracket screws (1/Fig. 11 / p. 20) on the left and right and remove the mounting bracket (1, 2/Fig. 10 / p. 20).
- Unplug the following cable connections:
  - High voltage cables (3/Fig. 10 / p. 20).
  - Ground wire connection ⏚ (2/Fig. 12 / p. 20).
  - Unplug all plug-in and threaded connections on the D530/D532 board.
- Pull the high voltage transformer with the D530/D532 board out of the generator cabinet.

Installing the High Voltage Transformer

- Unpack the new high voltage transformer from the transport packaging and lift it out.
- Insert the new high voltage transformer into the generator cabinet and position it. Reinstall the mounting brackets.
- Reconnect the 2 power cables (1/Fig. 12 / p. 20).
  - **Torque 4,25 Nm**
- Reconnect all D530/D532 plug-in connections.
- Insert the high voltage cable (3/Fig. 10 / p. 20) (insert the new corona disks moistened with silicon oil).
- Tighten the collar on the high voltage cable (3/Fig. 10 / p. 20) and secure it.
- Connect the ground wire ⏚ (2/Fig. 12 / p. 20).
  - **Torque 4.25 Nm**

Configuration following Replacement of the High Voltage Transformer

- n.a.

Adjustments following Replacement of the High Voltage Transformer

- The following adjustments absolutely must be performed in the sequence described:
  - Adjustment/ Stat. Inverter Adjust
  - Adjustment/ Tube Warm-up
  - Adjustment/ Learn Filament
  - Adjustment/ mAs Relay Adjust
- Performance of the adjustment is described in the instructions (COPL-136.842.02 / POLYDOROS IT / IT-S).

D 510 Inverter

Remarks regarding the Board

NOTE	The inverter is shipped only as a complete assembly.

Replacing the Inverter:

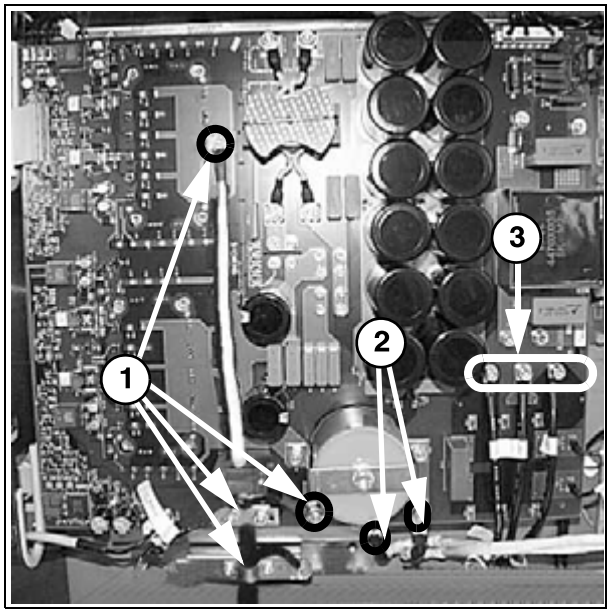

Fig. 13:

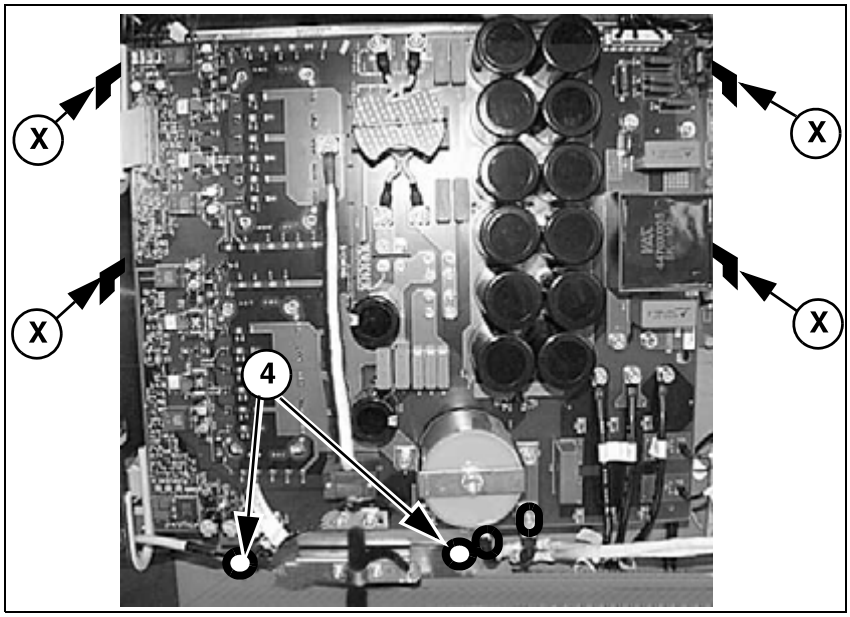

Fig. 14:

Removing the Inverter

NOTE	**The 80 kW option must first be removed for the POLYDOROS IT 65/80.** **To do this, disconnect the connections of the option on the D510 (X34, X40, X42, X44) and remove the option.**

- Carefully remove the connections and clamps for the power cable (1, 2/Fig. 13 / p. 22) and disconnect the cable.
- Disconnect the cable connections, one by one (3/Fig. 13 / p. 22) and reinsert the screws one at a time after disconnecting the cable (a rectifier is located on the rear that is secured in place with just the connection screws (3/Fig. 13 / p. 22)).
- Unplug all plug-in and threaded connections on the D510 board.

NOTE	**Hold the inverter unit only by the inverter support plate and remove it! The board would break from the weight or there would be hairline cracks in the board.**

- Remove the two screws for the inverter support plate (4/Fig. 14 / p. 22).
- Slightly press up the complete inverter unit on the inverter support plate until the unit mounting brackets (X/Fig. 14 / p. 22) come away from the back wall of the generator cabinet, then remove the complete unit from the generator cabinet.

Installing the D510 Inverter

- Hook the new inverter unit onto the back wall (X/Fig. 14 / p. 22) and secure it in place.
- Insert the two screws for the inverter support plate (4/Fig. 14 / p. 22).
- Disconnect the screws for the cable, one by one (3/Fig. 13 / p. 22) and secure the cables one at a time (a rectifier is located on the rear that is secured in place with just the connection screws).
  - **Torque 5.0 Nm**
- Plug in the power cable (1, 2/Fig. 13 / p. 22) and tighten the screws.
  - **Torque 4.25 Nm**
- Place on the clamps for the power cable (1, 2/Fig. 13 / p. 22).
- Connect all plug-in and threaded connections on the D510 board.

NOTE	**The 80 kW option must be installed for the POLYDOROS IT 65/80.** **To do this, connect the connections of the option on the D510 (X34, X40, X42, X44).**

Configuration following Replacement of the Inverter

- n.a.

Adjustments following Replacement of the D510 Inverter

- The following adjustments absolutely must be performed in the sequence described:
  - Adjustment/ Stat. Inverter Adjust
  - Adjustment/ Tube Warm-up
  - Adjustment/ Learn Filament
  - Adjustment/ mAs Relay Adjust
- Performance of the adjustment is described in the instructions (COPL-136.842.02 / POLYDOROS IT / IT-S).

AC-DC converter

Replacing the Converter

NOTE

Following replacement of the AC-DC converter, a test and possibly an adjustment of the 5V is required.

The -15 Volt and +15 Volt are derived from the 5 V adjustment.

Removing the AC-DC Converter

- Disconnect the SNT.PE ground wire connection (2/Fig. 15 / p. 25).
- Unplug the two plug-in connections; to do this, slightly press back the front latching tab on the plug-in connector (3/Fig. 15 / p. 25).
- Remove the mounting screws. (1/Fig. 15 / p. 25).
- Slightly slide up the AC-DC converter and pivot it out.
- Remove the AC-DC converter from the mounting plate (mounting plate is needed for the replacement part).

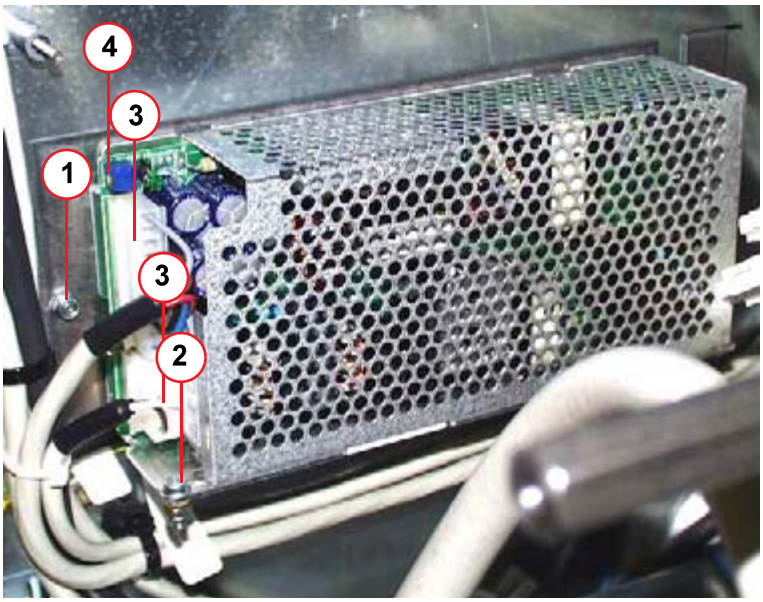

Fig. 15: AC-DC converter

Pos. 1	Mounting nut
Pos. 2	Ground wire connection
Pos. 3	Plug-in connector
Pos. 4	Potentiometer for 5V adjustment

Installing the AC-DC Converter

- Install the AC-DC converter on the mounting plate.
- Install the AC-DC converter.
- Reconnect the two plug-in connectors (3/Fig. 15 / p. 25).
- Disconnect the SNT.PE ground wire connection (2/Fig. 15 / p. 25).

Adjustment following Replacement of the AC-DC Converter

NOTE

For the setting values and test points, see the "D500 Test Points" Wiring Diagram.

T3 Transformer

Replacing the T3 Transformer

Removing the T3 Transformer

- Disconnect all cable connections.
- Remove the 4 mounting nuts (with washers on the back wall) with which the T3 is installed and lift out the transformer.

Installing the T3 Transformer

- Install the replacement transformer and secure it in place with the M5 self-locking nuts;
  - **Torque 3 Nm**
- Connect all cable connections.

Replacing the Fuses for the T3 Transformer

NOTE	**No additional work steps are required to replace the fuses.**

Lpar (D511) Parallel Limiter

Replacing the Lpar Parallel Limiter for the D510 Inverter

Removing the Lpar Parallel Limiter

- Disconnect the TF2L_2.1 and TF2L.2.2 (temperature sensor) plug-in connections.
- Remove the D510 .X34 and X35 (limiter) threaded connection.
- Remove the 4 mounting screws for the limiter and take out the limiter.

Installing the Lpar Parallel Limiter

- Install the limiter and secure it in place with washers and M6 self-locking nuts;
  - **Torque 1.9 Nm**

- Reconnect the D510 .X34 and X35 (HF limiter) threaded connection;
  - **Torque 4.25 Nm**
- Reconnect the TF2L_2.1 and TF2L.2.2 (temperature sensor) plug-in connectors.

Configuration following Replacement of the Lpar Parallel Limiter

- n.a.

Configuration following Replacement of the Lpar Parallel Limiter

- The following adjustments absolutely must be performed in the sequence described:
  - Adjustment/ Stat. Inverter Adjust
- Performance of the adjustment is described in the instructions (COPL-136.842.02 / POLYDOROS IT / IT-S).

Standard Console

Remarks regarding the Standard Console

n.a.

Replacing the Standard Console

Replacing the Standard Console

- Remove the bottom cover panels on the new and old console.
- Plug in the connected cables from the old to the new console.
- Reinstall the bottom cover panels.

Configuration following Replacement of the Standard Console

- The brightness of the display can be adapted to the surrounding conditions.
  - Control Console/ Settings/ Display Light
- Configuration of brightness is described in (COPL-136.843.02 / Configuration Instructions).

Adjustments following Replacement of the Standard Console

- n.a.

Organ Expansion Control Console

Remarks regarding the Organ Expansion Control Console

NOTE

The organ expansion control console includes only organ program keys. The organ programs are stored on the D500 board. The organ names must be labeled by the customer (technician).

Replacing the Organ Expansion Control Console

Replacing the Organ Expansion Control Console

- Remove the bottom cover panels on the new and old console.
- Plug in the connected cables from the old to the new console.
- Reinstall the bottom cover panels.

Configuration following Replacement of the Organ Expansion Control Console

- n.a.

Adjustments following Replacement of the Organ Expansion Control Console

- n.a.

Touch Panel

Remarks regarding the Touch Panel

NOTE

The "Touch Panel" replacement part is shipped with a flash card.

This flash card installed in the replacement part is always shipped with the latest SW version. If it is certain that replacement of only the "Touch Panel" is necessary, the flash card from the old Touch Panel should be used.

If in doubt, install the flash card from the new console; in this case, the customer organ programs from the old flash card must be saved on the new one.

For the procedure, see "Flash Card in the Touch Panel".

Replacing the Touch Panel

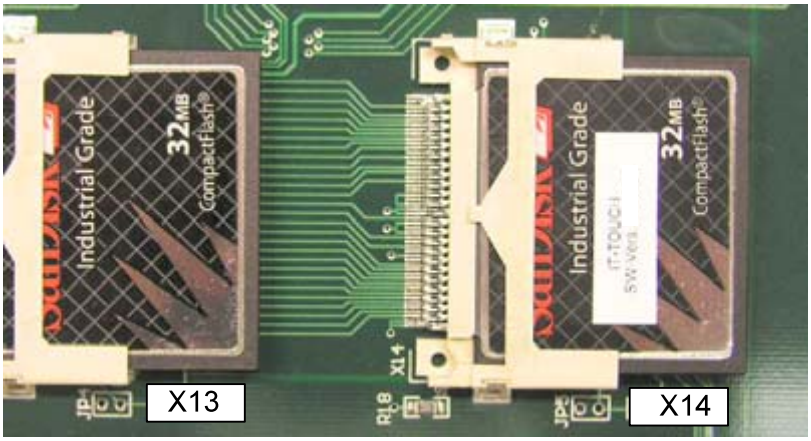

Fig. 16:

Replacing the Touch Panel

- Remove the bottom cover panels on the new and old console.
- Disconnect the cables on the old console.
- Remove the flash card cover panels on the console.
- Insert the flash card from the old console into the X14 connector (Fig. 16 / p. 31) in the new console. Plug the new flash card into the old console at X14.
- Connect the cables.
- Reinstall the cover panels.

NOTE

The "Touch Panel" replacement part must be returned with a flash card. Otherwise not credit will be issued!

Configuration following Replacement of the Touch Panel

- The Touch Panel itself must first be calibrated, otherwise it is possible that the display and the effective radio buttons of the touch panel will not match.
- The brightness of the display can be adapted to the surrounding conditions.
  - Control Console/ Settings/ Display Light Status 06_2005: The brightness is always set to the max., regardless of what was selected.
- Calibration of the Touch Panel and configuration of the brightness is described in the instructions (COPL-136.843.03 / Configuration Lists).

Adjustments following Replacement of the Touch Panel

- n.a.

Flashcard in the Touch Panel

Remarks regarding the Flash Card

NOTE

The "Flash card" replacement part is always shipped with the latest SW version. Because of this, it is absolutely necessary to pay attention to the SW compatibility to the generator per the Compatibility List.

The organ programs (names and dates) for one replacement part can only be default programs. If a BACKUP is available, the customer organ programs can be transferred.

Replacing the Flash Card

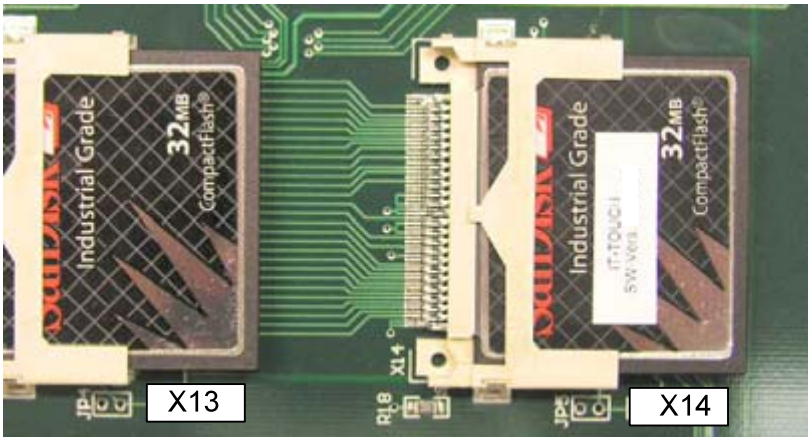

Fig. 17:

Replacing the Flash Card

- Remove the bottom cover panels on the console.
- Disconnect the cables on the console.
- Remove the flash card cover panels on the console.
- Remove the old flash card from the X14 connector.

NOTE

If the old Flash card is not completely defective, the customer organ programs can be transferred.

Transferring the Organ Programs:

- Plug the old Flash card into the X13 connector (Fig. 17 / p. 33).
- Plug the new Flash card into the X14 connector (Fig. 17 / p. 33).
- Switch on the generator to copy the customer OGPs.
- Switch off the generator.
- Remove the old flash card from the X13 connector.

If an additional backup Flash card is available

Transfer the organ programs:

- Plug the backup Flash card into the X13 connector (Fig. 17 / p. 33).
- Plug the new Flash card into the X14 connector (Fig. 17 / p. 33).
- Set the D500 S1 service switch to the service position.
- Switch on the generator.
- After calibrating the Touch Panel, initiate **Configuration, Control console settings Organ Programs Backup**
- Switch off the generator.
- Remove the backup flash card from the X13 connector.

If a backup is available on a separate data medium

Transfer the organ programs:

- Copy the backup file with the SPC from the "data medium" to the new Flash card.
- Copy only the "org.bin" file to the new Flash card.

NOTE	**Under no circumstances copy, move or rename other files. Since this is a "BOOTABLE" Flash card; every change can lead to malfunctions (Touch Panel does not boot).**

- Plug the new Flash card into the X14 connector (Fig. 17 / p. 33).

If no backup is available

Transfer the organ programs:

- Plug the new Flash card into the X14 connector (Fig. 17 / p. 33).

NOTE	**The organ programs (names and dates) must be entered manually at the Touch Panel.**

- Connect the cables.
- Reinstall the cover panels.

Configuration following Replacement of the Flash Card

- The Touch Panel itself must first be calibrated, otherwise it is possible that the display and the effective radio buttons of the touch panel will not match.

- The brightness of the display can be adapted to the surrounding conditions.
  - Control Console/ Settings/ Display Light, Status 06_2005: The brightness is always set to the max., regardless of what was selected.
- Calibration of the Touch Panel and configuration of the brightness is described in the instructions (COPL-136.843.03 / Configuration Lists).

Adjustments following Replacement of the Flash Card

- n.a.

80 kW Option

Remarks regarding the 80 kW Option

n.a.

Replacing the 80 kW Option

Replacing the 80 kW Option

- Unplug the connections on the D510 inverter (X34, X40, X42, X44).
- Remove the old 80 kW option and install the new one.
- Plug in the connections on the D510 inverter (X34, X40, X42, X44);
  - **Torque 4.25 Nm**

Configuration following Replacement of the 80 kW Option

- n.a.

Adjustments following Replacement of the 80 kW Option

- The following adjustments absolutely must be performed in the sequence described:
  - Adjustment/ Stat. Inverter Adjust
- Performance of the adjustment is described in the instructions (COPL-136.842.02 / POLYDOROS IT / IT-S).

Replacing the X-ray Tube Unit

Remarks regarding the X-ray Tube Unit Replacement

NOTE

Mechanical replacement very much depends on the unit and is thus not described in these instructions.

If the same type of tube unit is installed, only the adjustment and clearing of the exposure counter is necessary. If a new tube unit model is installed, the configuration must be performed completely. X-ray tube units with 2-phase stators can be installed only if the option is installed.

Configuration following Replacement of the Same Model X-ray Tube Unit

- n.a.

Adjustments following Replacement of the X-ray Tube Unit

- The following adjustments absolutely must be performed in the sequence described:
  - Adjustment/ Stat. Inverter Adjust
  - Adjustment/ Tube Warm-up
  - Adjustment/ Learn Filament
  - Adjustment/ mAs Relay Adjust
- Performance of the adjustment is described in the instructions (COPL-136.842.02 / POLYDOROS IT / IT-S).

Removing the Single-Tank X-ray Tube Unit

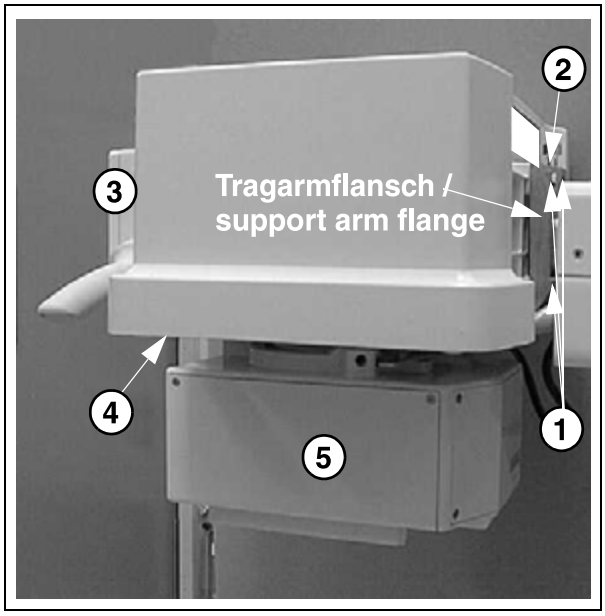

Fig. 18:

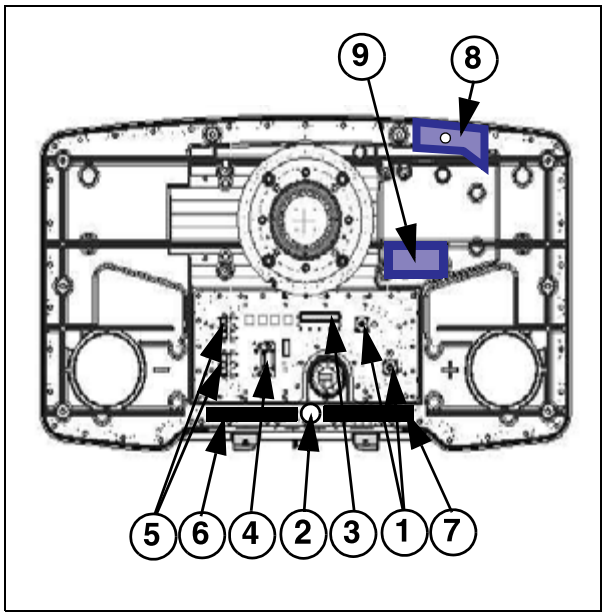

Fig. 19:

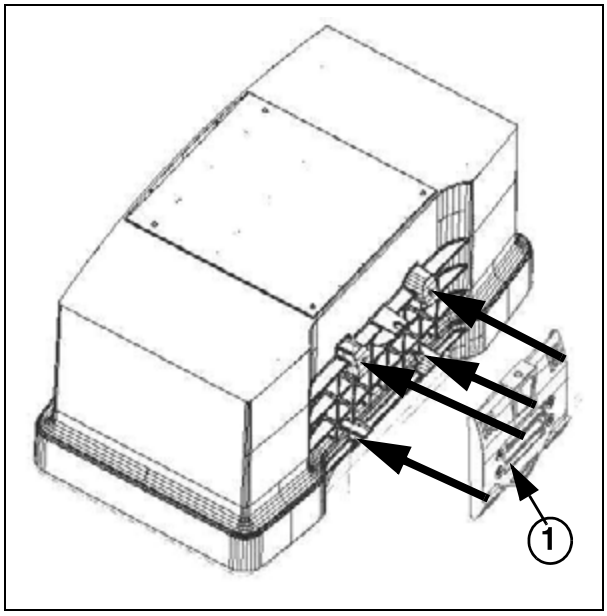

Fig. 20:

- Remove the collimator and disconnect the connection cable (5/Fig. 18 / p. 38).
- Remove the top cover on the single tank, disconnect the ground wire (4/Fig. 18 / p. 38).
- Disconnect all single tank cables (Fig. 19 / p. 38) and strain relief parts (6, 7/Fig. 19 / p. 38).
- Disconnect the unit control console and connection cables (3/Fig. 18 / p. 38).
- Disconnect the mounting parts in the single tank (8, 9/Fig. 19 / p. 38).

- Remove the 4 mounting screws on the support arm flange on the tube unit support arm (1/Fig. 18 / p. 38), (Fig. 20 / p. 38) for the single tank.
- Remove the single tank from the stand support arm and reinstall the single tank parts.

Installing the Single-Tank X-ray Tube Unit

- Lift the new single tank X-ray tube unit out of the transport packaging and position it near the stand support arm (Fig. 21 / p. 40), (Fig. 22 / p. 40), (Fig. 23 / p. 40), (Fig. 24 / p. 40), (Fig. 25 / p. 41), (Fig. 26 / p. 41) and (Fig. 18 / p. 38).

Fig. 21:

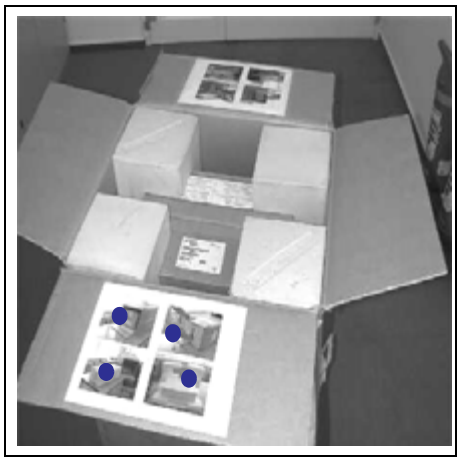

Fig. 22:

Fig. 23:

Fig. 24:

Fig. 25:

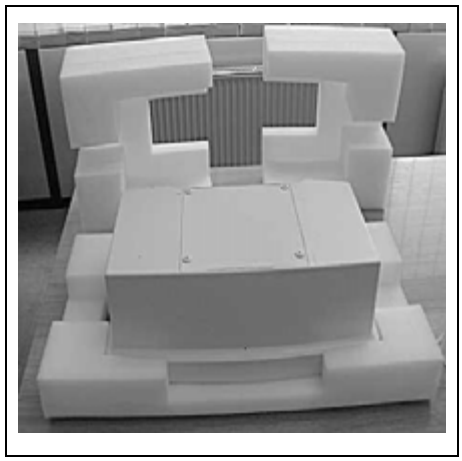

Fig. 26:

- Secure the stand support arm with the support arm flange using the 4 mounting screws (see removal) on the single tank X-ray tube unit (1/Fig. 18 / p. 38); (Fig. 20 / p. 38).
- Connect the 4 cables for the single tank X-ray tube unit as follows:
  - Connect the power cable (W530) to X11 and X13 (1/Fig. 19 / p. 38), connect the shielding of the power cable to the PE grounding point (2/Fig. 19 / p. 38),

⚠CAUTION **Danger!**

➪ **The nuts for the connection of the power cable (1/Fig. 19 / p. 38) must be tightened to a torque of 4.5 Nm and the nuts for the shielding must be "hand-tight" (2/Fig. 19 / p. 38)!**

  - Connect the rotating anode cable (W_ST101) to X5 (3/Fig. 19 / p. 38),
  - Connect the signal cable (W523) to X7 (4/Fig. 19 / p. 38),
  - Connect the heating cable to X1 and X3 (5/Fig. 19 / p. 38).
- Install the unit control console.
- Lay the cables to the unit control console (3/Fig. 18 / p. 38); when doing this, lay the cables to the controller under the cover panel of the single tank X-ray tube unit (4/Fig. 18 / p. 38).
- Secure the cables to the mounting plate (8/Fig. 19 / p. 38) and on the plate (9/Fig. 19 / p. 38).
- Install the strain reliefs (6, 7/Fig. 19 / p. 38) and make sure that the shieldings are under the strain reliefs.
- Plug in the ground wire for the top cover panel (4/Fig. 18 / p. 38) on the single tank X-ray tube unit and then place the top cover panel on the bottom of the single tank X-ray tube unit (4/Fig. 19 / p. 38).
- Lay the collimator cable to the collimator and connect it (5/Fig. 18 / p. 38).
- Level the single tank X-ray tube unit (2/Fig. 18 / p. 38).
- Tighten the 4 screws (1/Fig. 18 / p. 38).
  - Torque **10 Nm**

- Install the collimator (5/Fig. 18 / p. 38) and adjust it.
- Read out the X-ray tube data and make a note of it.
- Perform the new adjustments:

  - Static Inverter adjust - Tube warm up - Learn filament; for this, see the instructions (COPL-136.842.02 / POLYDOROS IT / IT-S).
- Pack the defective single tank in the transport packaging so it is correct for shipping (Fig. 21 / p. 40).

Replacement part situation: Power Storage Unit (Option)

Wiring Diagram

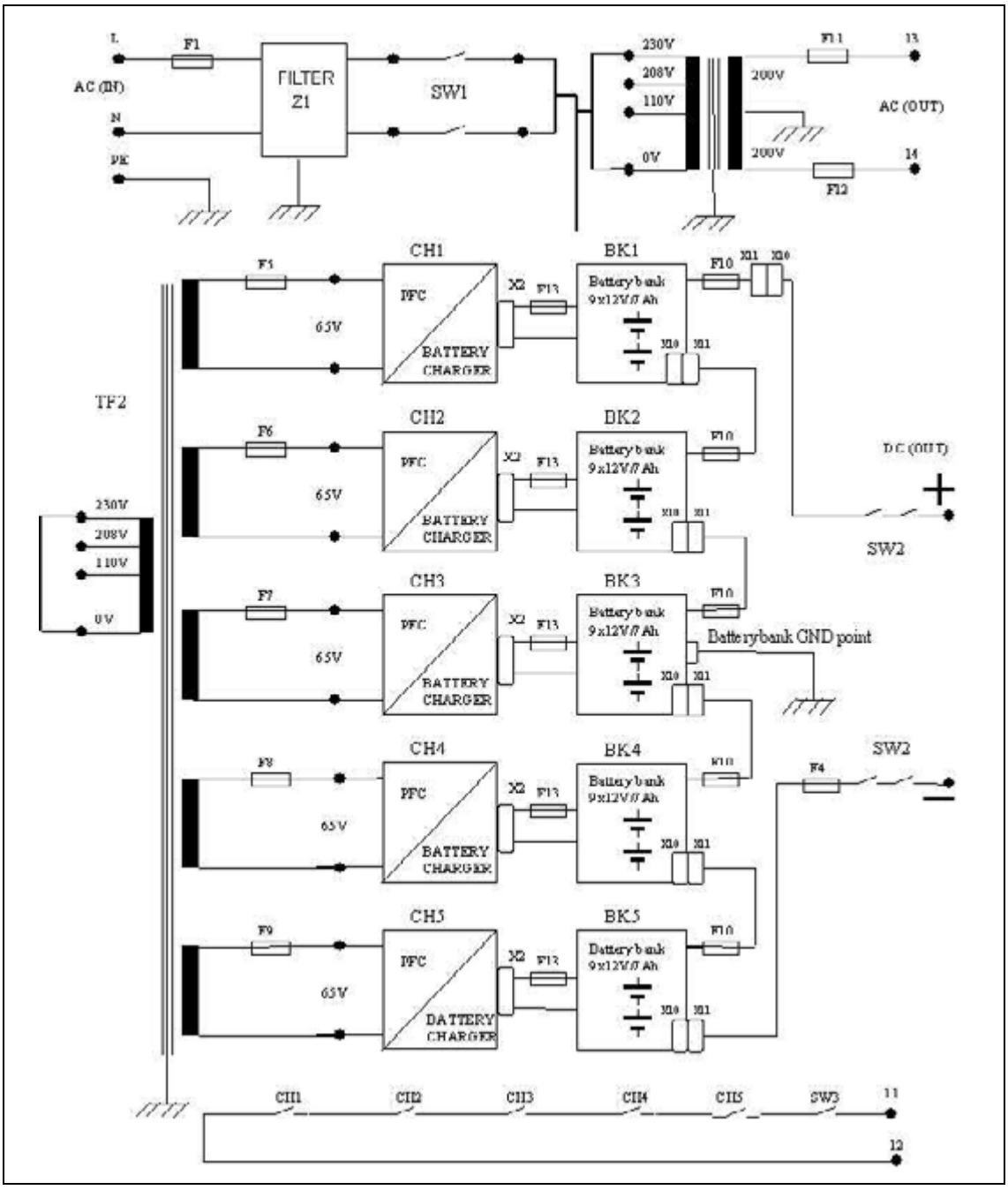

Fig. 27:

Overview of the Cabinet

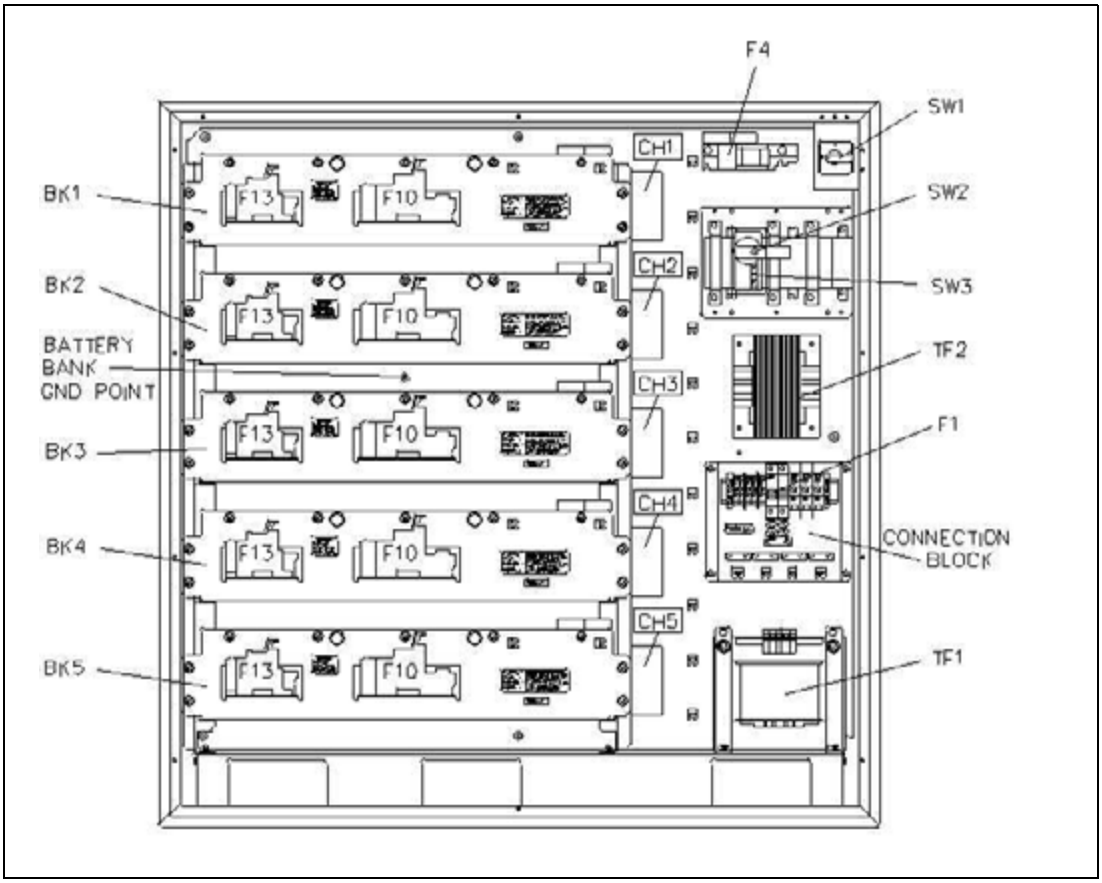

Fig. 28:

SW1:	Line power input switch
SW2:	DC voltage output switch
SW3:	Auxiliary contact of SW2
TF1:	AC Transformer
TF2:	Battery charger transformer
CH1…5:	D120 battery charger board
BK1…5:	Battery bank
F1:	Main breaker
F4:	DC output breaker
F5…F9:	TF2 fuse
F10:	Battery bank output fuse
F11, F12:	TF1 fuse
F13:	Battery bank output fuse
Battery bank GND point:	Test connection for battery bank 3

Power connection

NOTE

Depending on the power input voltage, connect the TF1 and TF2 transformers, see (Fig. 27 / p. 43) and the description on the transformer.

The F1 fuse also depends on the power input voltage:

- **with 230V and 208V = 10A fuse**
- **with 110V = 20A fuse**

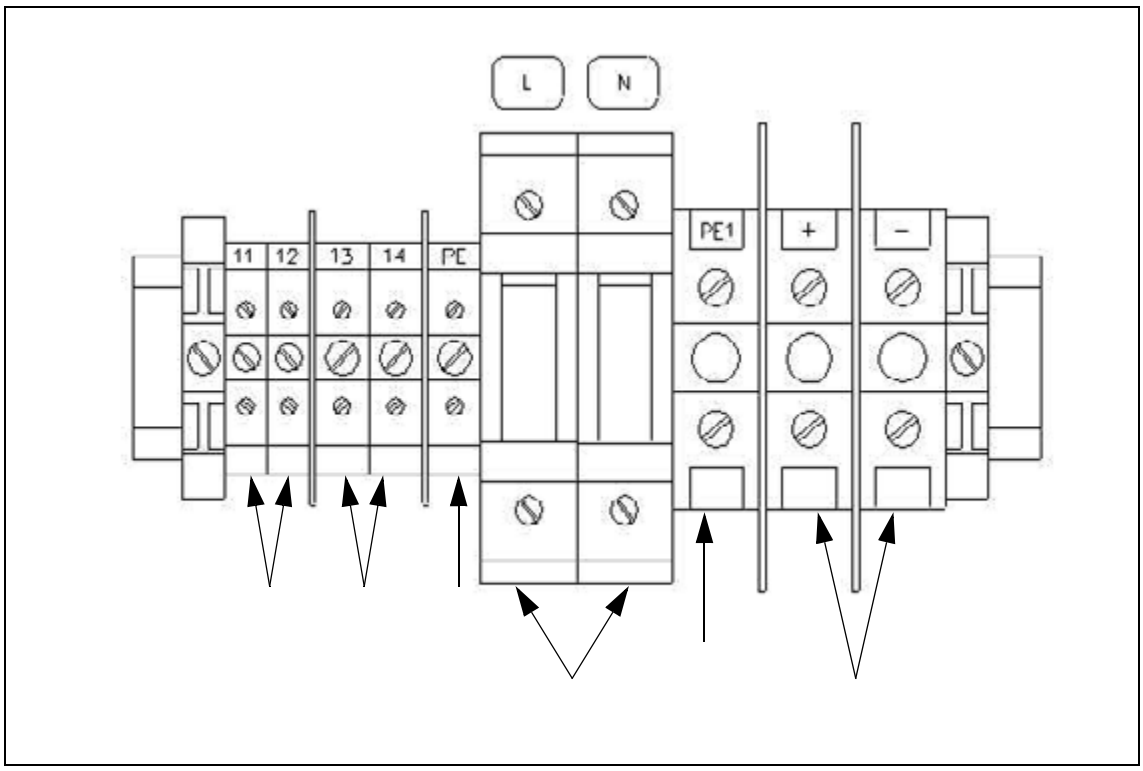

Fig. 29:

1. 11 - 12: 24V DC for "ESU ready" signal
2. 13-14: AC output voltage (400 V) for POLYDOROS IT
3. PE: Grounding point for power line input voltage
4. L - N: Power line input voltage (230 V - 208 V - 110 V)
5. PE 1: Grounding point for DC output voltage
6. + - :DC output voltage (approx. 585V)
   + : Positive connection point
   - : Negative connection point

D120 battery charger board

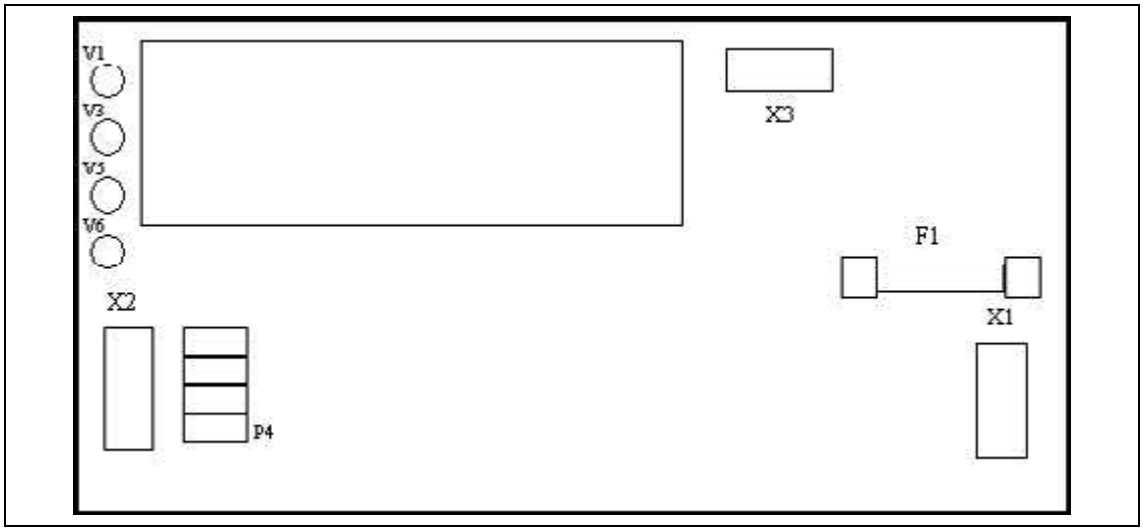

Fig. 30:

Cable plug-in connector

- X1: 65V AC input voltage from TF2
- X2: DC output voltage for battery bank
- X3: ESU ready" signal

Fuses

- F1: 2 AT
- F2: n.a.

LEDs

- V1 (yellow): On (Power ON)
  Goes on when the output voltage from the PFC (Power Factor Correction) is OK.
- V3 (green): LD (Charge ON)
  Goes on when the charge is above 95% of the floating voltage (123V).
- V5 (green): RDY ("ESU ready" signal)
  Goes on when the ESU ready signal is OK.
- V6 (red): WAR ("Warning").
  Goes on when the temperature at the heat sink is too high or the battery voltage is too low. Battery charging is not possible.

Troubleshooting

- No battery output voltage (approx. 585V) at terminal + and - (6/Fig. 29 / p. 45):
  - Checking the F10 and F4 fuses
  - Checking the X10 and X11 plug-in connectors
  - Checking the SW2 = ON switch

- No battery output voltage (approx. 292V) at terminal + or - and PE1 (5, 6/Fig. 29 / p. 45):
  - Checking the ground connection from battery bank 3 between battery 4 and 5 with cabinet housing.

- V1 "ON" LED (yellow) does not go on:
  - No input voltage at D120.X1 (approx. 65VDC).
  - Fuses F5 - F9 on TF2 transformer defective
  - Check the X1 plug-in connector
  - F1 fuse on D120 is defective
  - Replace the D120 board

- V6 "Warning" LED (red) goes on:
  - The temperature at the heat sink is too high, wait until it cools down.
  - No connection between the battery bank and D120 battery charger board, check the X2 plug-in connector, F13 fuse and the internal jumpers for the battery bank (*).
  - Replace the D120 board.
  - Battery bank voltage is too low, replace the battery bank (*).
  - (*) = This situation is detected only if the system is in operation.

- V5 "RDY" LED (green) does not go on and V6 "WAR" (red) goes on:
  - SW2 switch = OFF
  - Checking the X3 plug-in connection between the D120 boards

- V5 "RDY" LED (green) goes off during an exposure:
  - Battery bank is not sufficiently charged, wait until the charge routine has finished.
  - Battery is slowly getting bad, replace with a new battery bank.

Replacing the Battery Banks in the ESU Cabinet

⚠CAUTION

The SW1 and SW2 switches must be switched off!

The F4, F10 and F13 fuses must all be removed!

- ➪ **When removing the battery banks, take note that when there is complete cabling, approx. 600 V of direct current are present!**
- ➪ **The individual battery banks are shipped fully charged! 108 V of direct current is present on one battery bank!**

NOTE

Individual batteries in a battery bank may not be replaced.

In a replacement part situation, a battery bank must always be replaced completely.

Old and new battery banks can be operated in the ESU cabinet because each battery bank has its own D120 battery charger board.

- Unplug the plug-in connection for the X11 and X2 battery banks to be replaced.

- Replace one or more battery banks.
  - Remove the two mounting screws on both the left and right of the battery bank.
  - When removing the middle battery bank, the ground connection must be disconnected.
  - When lifting out the battery bank, take note that the weight of the battery bank is 30 kg.
  - When installing the middle battery bank, the jumper (between batteries 4 and 5) must be removed (Fig. 31 / p. 49) and instead the ground connection must be connected as shown in (Fig. 32 / p. 49).

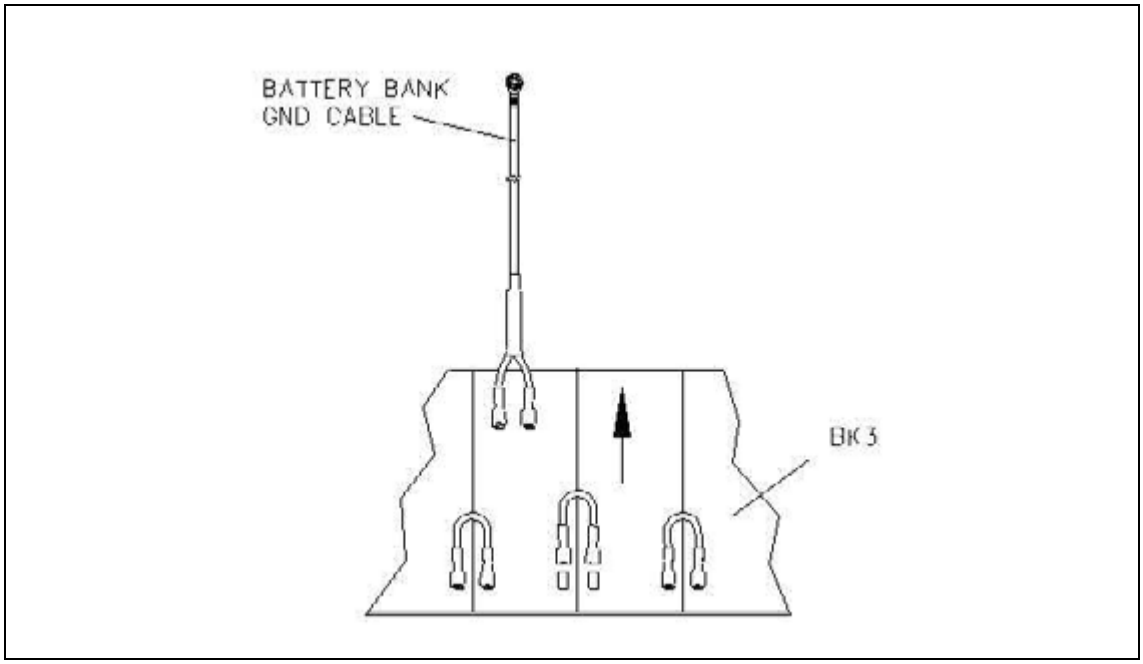

Fig. 31:

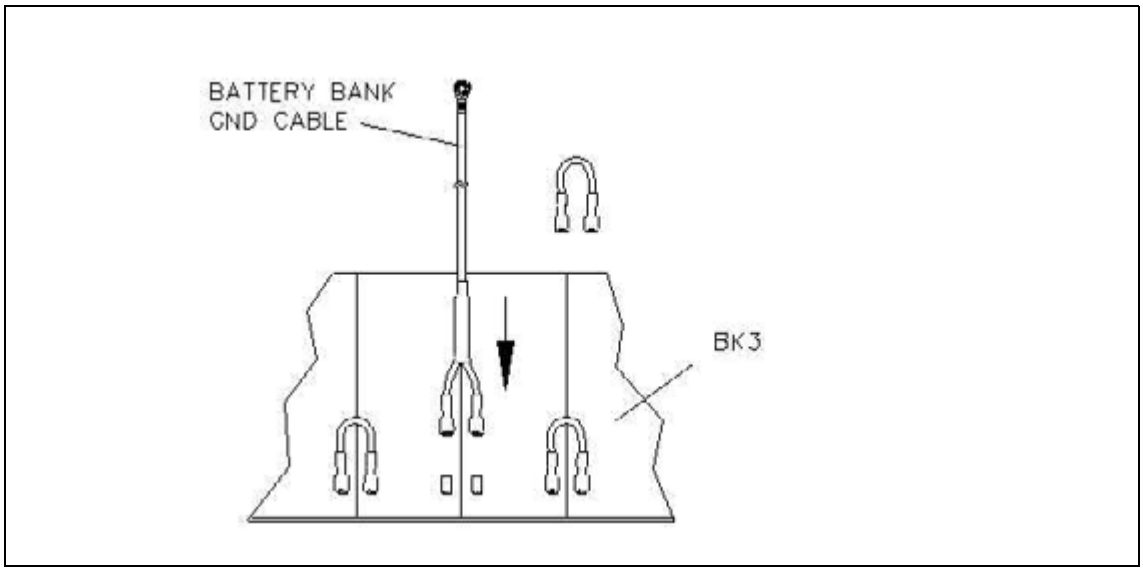

Fig. 32:

- Connect the battery banks to each other (X11 and X2 plug-in connections) as shown in (Fig. 27 / p. 43).

⚠CAUTION **Short circuit!**

➪ **Make sure that the battery banks are correctly cabled! Each bank must be connected to the one on top, not to itself! This would cause a short circuit!**

- Reinsert the F4 and F10 fuses.
- Switch on the SW2 switch.
- Check the battery output voltage at terminal + and - (6/Fig. 29 / p. 45); it must be approx. 585V.

⚠CAUTION **Short circuit!**

➪ **If there is no voltage present, the connections, connectors, fuses, battery ground cable and internal jumpers of the batteries must be checked!**

- Check half the battery output voltage at terminal + and PE1 (5, 6/Fig. 29 / p. 45); it must be approx. 292V.
- Check half the battery output voltage at terminal - and PE1 (5, 6/Fig. 29 / p. 45); it must be approx. 292V.
- Reinsert the F13 fuses.
- Switch on the SW1 switch.
- Check the AC output voltage at terminals 13 and 14 (2/Fig. 29 / p. 45); it must be approx. 400V.
- When battery charging is completed, check the "ESU ready" signal at terminals 11 and 12 (1/Fig. 29 / p. 45); it must be approx. 0V (24V DC = battery charging is not yet completed).

Replacing the TF1 Transformer

⚠CAUTION **When replacing the the battery charger board, take note that when there is complete cabling, approx. 600 V of direct current are present!**

➪ **The SW1 and SW2 switches must be switched off!**

- Depending on the power line input voltage, connect the TF1 transformer, see (Fig. 27 / p. 43) and the description on the transformer.
- Switch the SW1 and SW2 switches back on.

Replacing the TF1 Transformer

⚠CAUTION

When replacing the the battery charger board, take note that when there is complete cabling, approx. 600 V of direct current are present!

➪ The SW1 and SW2 switches must be switched off!

- Depending on the power line input voltage, connect the TF2 transformer, see (Fig. 27 / p. 43) and the description on the transformer.
- Switch the SW1 and SW2 switches back on.

Replacing the SW1 Switch

⚠CAUTION

When replacing the the battery charger board, take note that when there is complete cabling, approx. 600 V of direct current are present!

➪ The SW1 and SW2 switches must be switched off!

- Remove the F1 fuse.
- Replace the SW1 switch.
- Reinsert the F1 fuse.
- Switch the SW1 and SW2 switches back on.

Replacing the SW2 Switch

⚠CAUTION

When replacing the the battery charger board, take note that when there is complete cabling, approx. 600 V of direct current are present!

➪ The SW1 and SW2 switches must be switched off!

- Remove the F4 and F10 fuses from the BK1 battery bank.
- Replace the SW2 switch.
- Reinsert the F10 fuse into the BK1 battery bank.
- Switch the SW1 and SW2 switches back on.

No changes; initial publication.