SIEMENS

POLYDOROS SX 65/80

AX

Replacements of Parts

POLYDOROS SX 65/80

PL SX

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The document corresponds to the version/revision level effective at the time of system delivery. Revisions to hardcopy documentation are not automatically distributed.

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General Remarks

Required Documents

- Wiring Diagram X2206 for POLYDOROS SX 65/80
- RX63-055.842.01... POLYDOROS SX65/80 Adjustment Instructions

Required Tools and Test Equipment

- Standard installation tool kit
- Service PC per ARTD
- PC connection cable, 5 m 99 00 440

General Safety Information

Safety Note

⚠WARNING

Safety Notes!

➪ **When carrying out the work steps and checks, the product-specific safety information contained n the documents as well as the general safety information must be observed.**

Safety Measures

- Prior to taking any action in the generator, it must be switched off using the power **OFF** switch on the D160 .

⚠WARNING

Line voltage!

➪ **With the generator switched off, there is line power present on the T1 transformer and at the D160 switch-on circuit (see Wiring Diagram X2169-10/X2206-10). After switching off the generator, there are still approx. 600 V DC present for the inverter! This is indicated by the LEDs V135 and V136 on the D110 (X2169-16/X2206-16) and LED V89 on the D220 goes on (X2169-19/X2206-19). The voltage dissipates within approx. 1.5 minutes to 0 V; the LEDs go off at approx. 30 V.**

- To switch off power to all parts of the system (generator and connected equipment), set the system switch to the **OFF** position.
- To prevent unintentional triggering of high voltage or of radiation, set the SS switch (S1) on the D100 to **OFF**.
- Remove or install the component only with the generator switched off; when doing this, observe ESD guidelines.

⚠WARNING

While performing these work steps, provide appropriate radiation safety measures.

➪ **Checks or adjustments that must be performed with radiation switched on are labeled with the radiation warning symbol ☢ .**

Product-specific Remarks

Cage Clamp Technique

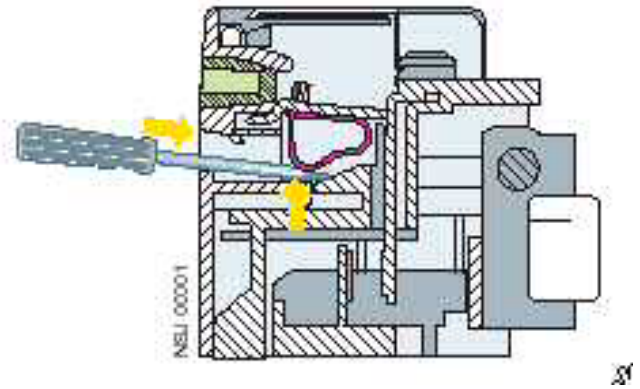
Step	Installation Step
	Insert the screwdriver into the square actuation opening all the way until it stops. The screwdriver blade automatically holds the cage clamp open.

Fig. 1: Cage clamp technique, Step 1

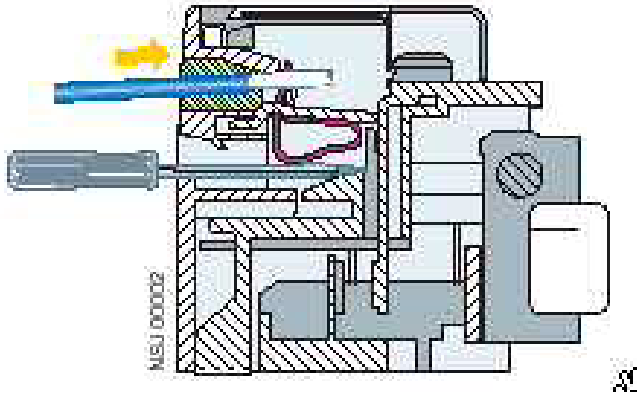
	Insert the lead into the oval connection opening.

Fig. 2: Cage clamp technique, Step 2

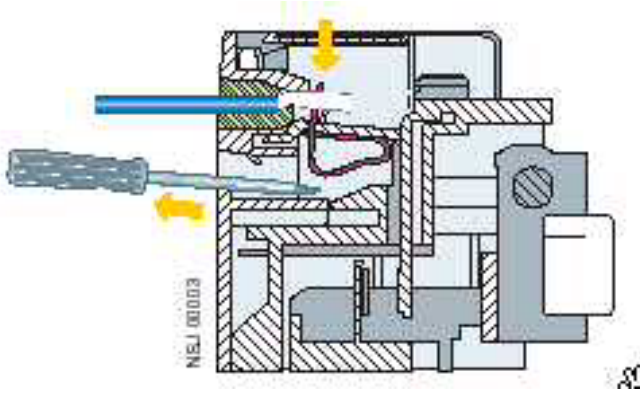
	Pull the screwdriver back out. When this is done, the clamp closes and the lead is securely clamped.

Fig. 3: Cage clamp technique, Step 3

Overview of Components

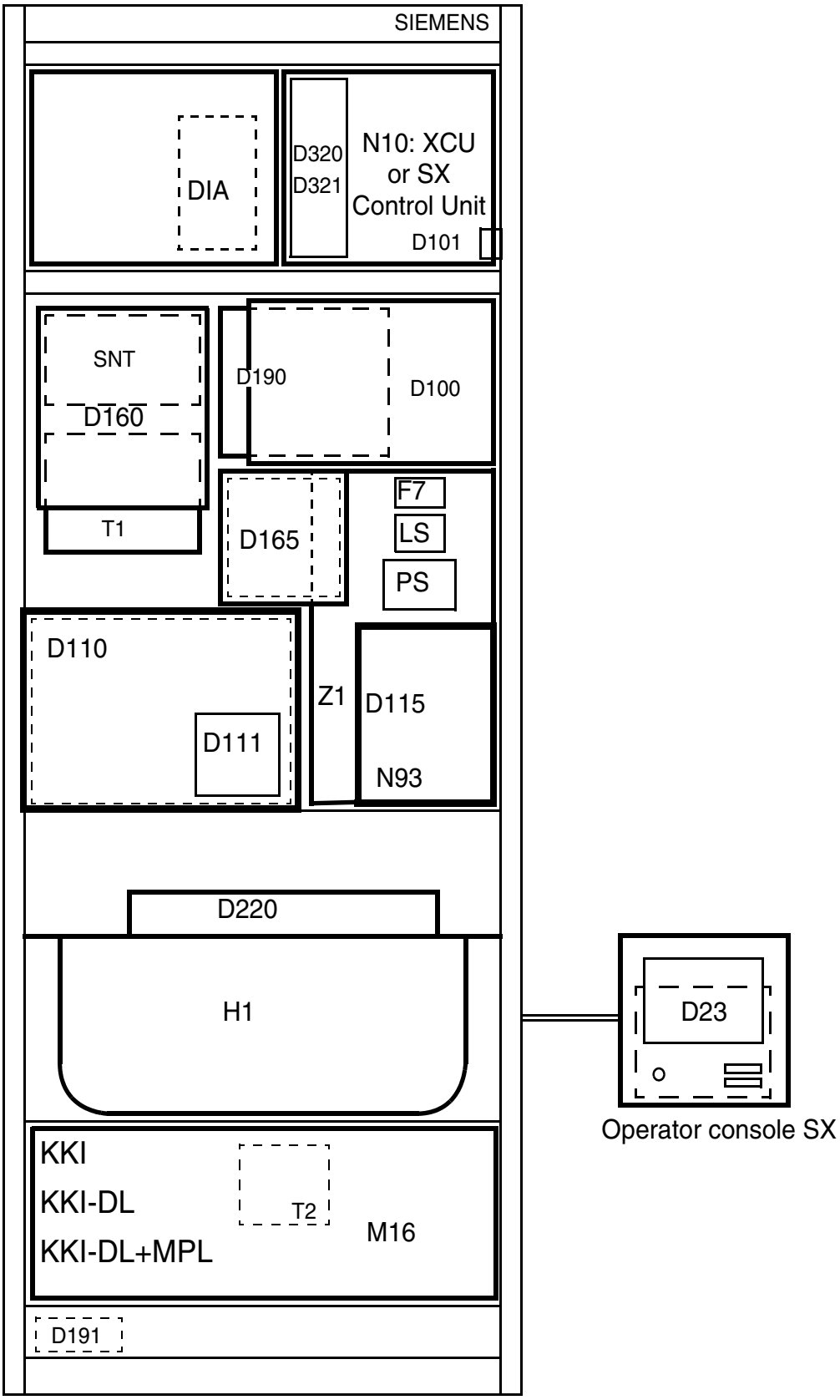


Fig. 4:

D100 Master Board, Part No.: 37 75 256

Used in:

- POLYDOROS SX65/80 up to Serial No.: 02832

NOTE

The D100, Part No.: 37 75 256 was modified with Upgrade 5.5 from the POLYSTAR TOP (RXD7-200.061.09...) to introduce the new DCM and Video Loop options. The modification was made known by a new Part No., 37 52 370. In a replacement part situation, the D100, Part No.: 57 61 270, can be used.

Replacement:

- D100, Part No.: 57 61 270

Jumpers and Bridges:

- Jumper X19.15 --- X19.16 must be removed for the connection to the D190

NOTE

Compatibility between the D100 and D115:

- **With the D100, Part No.: 3775256 and 3752370, the SMD resistance, R1001 (0 Ohm), on the D115 board, Part No.: 7125086, has been removed.**
- **With the D100, Part No.: 5761270, the D115 board, Part No.: 7125086, is operated with SMD resistance, R1001, without change.**

Replacing the D100

- Remove the D100
- In a replacement part situation, the D100 is shipped out with a jumper on the X19.15---16 connector. Remove it to create the cable connection to the D190.
- Switch the D100.J15 PROM from the board that is replaced to the new board
- Install the new D100 board
- The generator must be switched on for at least 10 minutes (operating temperature)
- Perform a fluoro attachment adjustment

  SSW: <POLYDOROS SX Service> <Adjustment> <FC Attachment Adjustment>
- Perform a mAs relay adjustment

  SSW: <POLYDOROS SX Service> <Adjustment> <mAs Relay Adjustment>
- Warm up the X-ray tube

  SSW: <POLYDOROS SX Service> <Adjustment> <Warm Up>

D100 Master Board, Part No.: 57 61 270

Used in:

- POLYDOROS SX65/80 beginning with Serial No.: 02833

Jumpers and Bridges:

- Jumper X19.15 --- X19.16 should be removed for the connection to the D190
- Solder bridge X9900 (delay for Iontomat) may not be present
- Solder bridge X21 must be present, otherwise no heating download is possible

NOTE

Compatibility between the D100 and D115:

- **With the D100, Part No.: 3775256 and 3752370, the SMD resistance, R1001 (0 Ohm), on the D115 board, Part No.: 7125086, has been removed.**
- **With the D100, Part No.: 5761270, the D115 board, Part No.: 7125086, is operated with SMD resistance, R1001, without change.**

Replacing the D100

- Remove the D100
- In a replacement part situation, the D100 is shipped out with a jumper on the X19.15---16 connector. Remove it to create the cable connection to the D190.
- Switch the D100.J15 PROM from the board that is replaced to the new board
- Install the new D100 board
- The generator must be switched on for at least 10 minutes (operating temperature)
- Perform a fluoro attachment adjustment

  SSW: <POLYDOROS SX Service> <Adjustment> <FC Attachment Adjustment>
- Perform a mAs relay adjustment

  SSW: <POLYDOROS SX Service> <Adjustment> <mAs Relay Adjustment>
- Warm up the X-ray tube

  SSW: <POLYDOROS SX Service> <Adjustment> <Warm Up>

D101 Exposure Triggering from the Remote Control Console, Part No.: 38 48 079

Replacing the D101

- A mechanical replacement only; no programming or adjustment required.

D110 Inverter, Part No.: 37 73 897

Replacing the D110

- A mechanical replacement only; no programming or adjustment required.

NOTICE

Short circuit!

➪ **When replacing the D110, pay attention to the mounting screws and insulation washers so that a short circuit to other components (e.g. the heat sink) does not occur.**

Speed Info 098/2000/AX

In the following generators, the inverter should only be replaced completely in a replacement part situation:

- POLYDOROS SX65/80 Part No.: 38 27 172
  - Inverter replacement part
- POLYDOROS LX30/50 Part No.: 11 75 293
  - Inverter replacement part
- POLYDOROS LX30/50 Lite Part No.: 38 48 897
  - Inverter replacement part
- POLYDOROS LX80 Part No.: 57 59 134
  - Inverter replacement part

D111 Fluoro Option Board, Part No.: 37 75 272

Replacing the D111

- A mechanical replacement only; no programming or adjustment required.

D115 Starter, Part No.: 11 71 201

Used with:

- POLYDOROS SX65/80 up to Serial No.: 06137

Replacement:

- D115, Part No.: 71 25 086

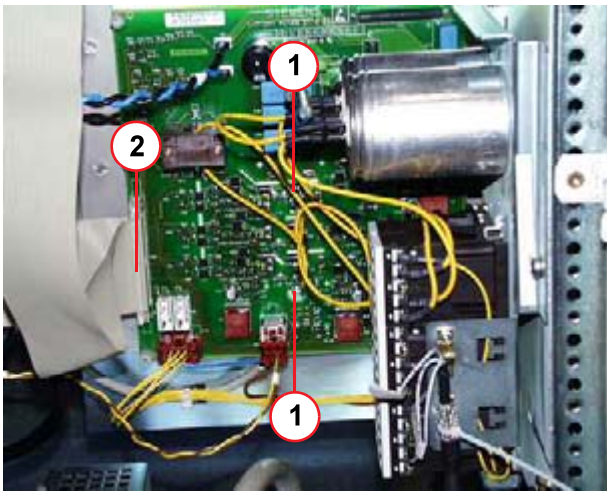


Fig. 5: D115 Starter

Pos. 1 2 Allen screws

Pos. 2 D115.X20

Replacing the D115

- D115, 2 items Remove the M5 Allen screws (1/Fig. 5 / p. 14) with lock washers and washers.
- Remove the 5 plastic nuts.
- Disconnect the D115.X20 cable (2/Fig. 5 / p. 14).
- Remove the D115 board towards the front and off the studs.
- Apply heat conducting paste to the IGBT module on the new D115 board.
- Instal the new D115 board and secure it in place with the plastic nuts.
- Tighten the two M5 Allen screws with lock washers and washers through the board (1/Fig. 5 / p. 14).
- Tighten the 5 plastic nuts.
- Plug in the X20 cable (2/Fig. 5 / p. 14) on the D115.
- Plug in any cables that were removed on the D115 per the designations.

Speed Info R 154-98

If the D115 board is replaced in a replacement part situation, it is recommended that the following checks be performed:

- Check of the D100 board:
  - Part No.: 57 61 270 or Part No.: 37 75 256 with Rev. 05 - Rev. 06
  - If this is not the case, replace the D100 board.
- Check the control signals "AN0 - AN5" from the D100 to the D115.
  - Switch the POLYDOROS SX65/80 **OFF**
  - Set the S2 switch “ZK” on the D100 to **OFF**
  - Switch the POLYDOROS SX 65/80 **ON**
  - Check the control signals on the D100.X65 "AN0 - AN5" with an oscilloscope, see Wiring Diagram X2206. The individual voltage pulses of the AN0 - AN5 control signals should be approx. 13V. If the control signals are less than 10V, replace the D100.
  - Switch the POLYDOROS SX 65/80 **OFF**
  - Set the S2 switch "ZK" on the D100 to **ON**

D115 Starter, Part No.: 71 25 086

Used with:

- POLYDOROS SX65/80 beginning with Serial No.: 06138

Jumpers and Bridges:

- With the D100, Part No.: 5761270, is operated with SMD resistance, R1001, without change.
- With the D100, Part No.: 3775256 and 3752370, the SMD resistance, R1001 (0 Ohm) (Fig. 6 / p. 17), must be removed on the D115 board (unsolder).

Replacing the D115

- D115, 2 items Remove the M5 Allen screws (1/Fig. 5 / p. 14) with lock washer and washer.
- Remove the 5 plastic nuts.
- Unplug the following plug-in connections:
  - D115.X20 (2/Fig. 5 / p. 14)
  - X5 and X6 (intermediate circuit voltage)
  - X7, X8 and X9 (rotating anode cable)

NOTE

If the D115 with Part No.: 1171201, is replaced by Part No.: 7125086 in a replacement part situation, the D115.X21 plug-in connection must also be unplugged.

- Remove the D115 board off the spacer studs towards the front.
- Apply heat conducting paste to the IGBT module on the new D115 board.
- Insert the new D115 board and loosely fasten it in place with the plastic nuts.
- Tighten the two M5 Allen screws with lock washer and washer through the board (1/Fig. 5 / p. 14).
- 5 items Tighten the plastic screws.
- Plug the following plug-in connections back in:
  - D115.X20 (2/Fig. 5 / p. 14)
  - X5 and X6 (intermediate circuit voltage)
  - X7, X8 and X9 (rotating anode cable)

NOTE

If the D115 with Part No.: 1171201, is replaced by Part No.: 7125086 in a replacement part situation, the D110.X21 --- D115.X21 cable connection is eliminated without replacement.

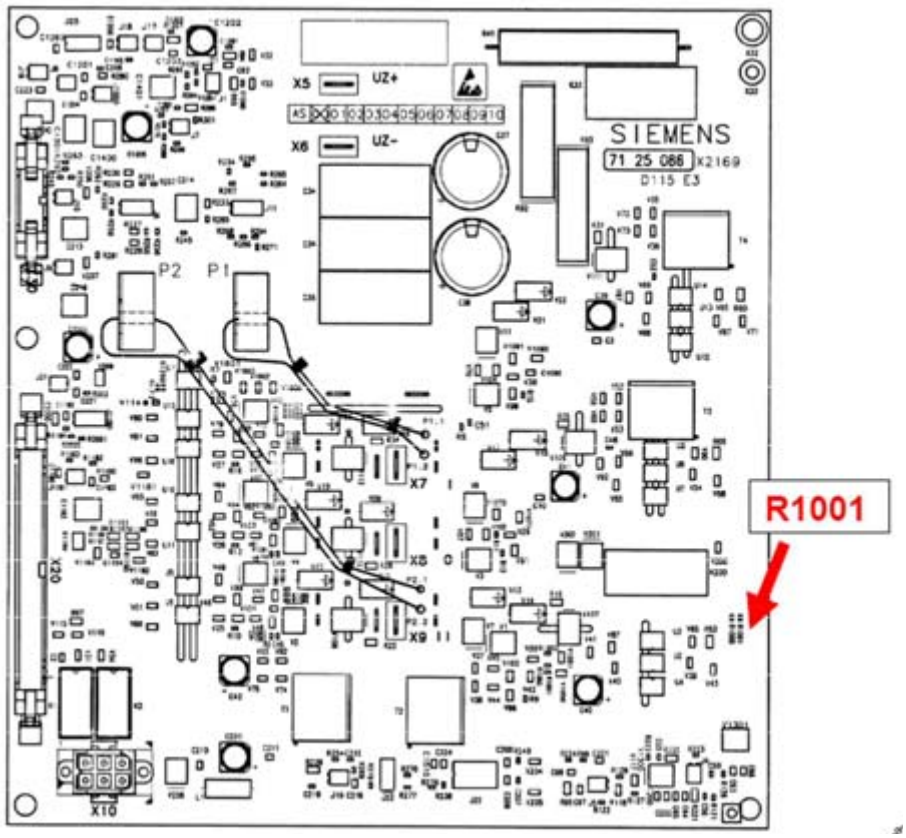


Fig. 6: D115, Part No.: 7125086: R1001

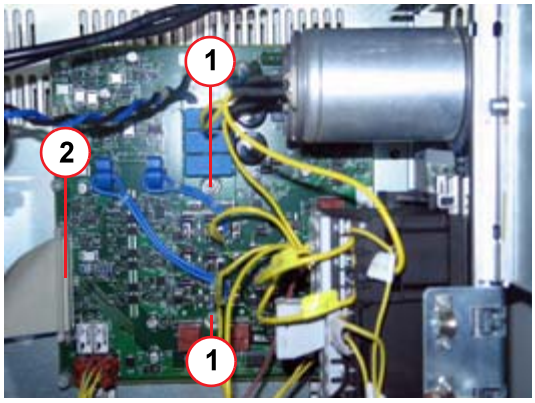


Fig. 7: D115 Starter, Part No.: 7125086

Pos. 1 2 Allen screws

Pos. 2 D115.X20

D160 Switch-on Circuit, Part No.: 37 74 788

Used in:

- POLYDOROS SX65/80 up to Serial No.: 02247

Replacement:

- D160, Part No.: 56 58 906

Jumpers and Bridges:

- X20 - X21 - X22 - X23 - X24 - X25 = 50Hz/60Hz power line frequency adaptation:

Power Line Frequency	D160 Jumper Position	
50 Hz	X20---X21	X23---X24
60 Hz	X21---X22	X24---X25

- X38 = Radiation display:
  - with HK (main contact) X38.1---2
  - with ZB (prep) X38.2---3
- X8.1---2 = 24V/29V ~ max. 1A connected to the K15 contact for Fluoro ON to control the "Fluoro room light" X8.2---3 = K15 potential-free contact to control "Fluoro room light" or "Fluoro video recorder"
- X61 - X62 - X63 = temperature switch (OPTI 154) / oil pressure switch / door contact

Function	OPTI 154 tube unit connected	No OPTI 154 tube unit connected	Without oil pressure switch or door contact	With oil pressure switch or door contact
WS 1 = X61	1---2	1-/-/-2	3---4	3-/-/-4
WS 2 = X62	1---2	1-/-/-2	3---4	3-/-/-4
WS 3 = X63	1---2	1-/-/-2	3---4	3-/-/-4

Replacing the D160

- A mechanical replacement only; no adjustment is required.
- For programming, see section: Jumpers and Bridges

NOTE

The D160.X121 --- D320.X1 cable included in the shipment should be replaced only if a combination (labeled with *) occurs as described in the following Compatibility List.

With a replacement of the D160 --- D320 cable, the HOST ID changes and thus the "variable password" and the corresponding licenses.

D160 --- D320 Compatibility List for a Replacement Situation

D160, Part No.	D320, Part No.	XCS SW	Service SW	Cable connection D160 --- D320	
37 74 788	37 74 143	All	All	D160.X12 --- D320.X1	
56 58 906	37 74 143	All	All	D160.X12 --- D320.X1	
74 63 958	37 74 143	All	All	D160.X12 --- D320.X1	
37 74 788	56 58 963	up to VB04C	up to VD04B	D160.X12 --- D320.X1	
56 58 906	56 58 963	beginning with VB05C	beginning with VE00C	D160.X121 --- D320.X1	*
74 63 958	56 58 963	beginning with VB05C	beginning with VE00C	D160.X121 --- D320.X1	*
74 63 958	74 64 048	beginning with VB05C	beginning with VE00C	D160.X121 --- D320.X1	*

D160 Switch-on Circuit, Part No.: 56 58 906

Used in:

- POLYDOROS SX65/80 from Serial No.: 02248 to Serial No.: 05231

NOTE **The K100 time relay is no longer configured beginning with Rev. 05.**

Replacement:

- D160, Part No.: 74 63 958

Jumpers and Bridges:

- X20 - X21 - X22 - X23 - X24 - X25 = 50Hz/60Hz power line frequency adaptation:

Power Line Frequency	D160 Jumper Position	
50 Hz	X20---X21	X23---X24
60 Hz	X21---X22	X24---X25

- X38 = External radiation display:
  - X38.1---2 with HK (main contact)
  - X38.2---3 ZB (prep)
- X8.1---2 = 24V/29V~ max. 1A connected to the K15 contact with fluoro ON for control of the "Fluoro room light" X8.2---3 = K15 potential-free contact for control of "Fluoro room light" or "Fluoro video recorder"
- X61 - X62 - X63 = temperature switch (OPTI 154) / oil pressure switch / door contact

Function	OPTI tube unit connected	No OPTI 154 tube unit connected	Without oil pressure switch or door contact	With oil pressure switch or door contact
WS 1 = X61	1---2	1-/-/-2	3---4	3-/-/-4
WS 2 = X62	1---2	1-/-/-2	3---4	3-/-/-4
WS 3 = X63	1---2	1-/-/-2	3---4	3-/-/-4

- X6 - X7 = Separable plug-in jumper for "Check for inadmissible ground loops" (only with D160 "E2")
- X8 = Fluoro contact (only with D160 "E2")
  - X8.1---2 potential-related fluoro contact for room light control at X64.5 and X64.6
  - X8.2---3 potential-free fluoro contact for room light control at X64.5 and X64.6

Replacing the D160

- A mechanical replacement only; no adjustment is required.
- For programming, see the section: Jumpers and Bridges

NOTE

The D160.X121 --- D320.X1 cable included in the shipment should be replaced only if a combination (labeled with *) occurs as described in the following Compatibility List.

With a replacement of the D160 --- D320 cable, the HOST ID changes and thus the "variable password" and the corresponding licenses.

D160 --- D320 Compatibility List for a Replacement Situation

D160, Part No.	D320, Part No.	XCS SW	Service SW	Cable connection D160 --- D320	
37 74 788	37 74 143	All	All	D160.X12 --- D320.X1	
56 58 906	37 74 143	All	All	D160.X12 --- D320.X1	
74 63 958	37 74 143	All	All	D160.X12 --- D320.X1	
37 74 788	56 58 963	up to VB04C	up to VD04B	D160.X12 --- D320.X1	
56 58 906	56 58 963	beginning with VB05C	beginning with VE00C	D160.X121 --- D320.X1	*
74 63 958	56 58 963	beginning with VB05C	beginning with VE00C	D160.X121 --- D320.X1	*
74 63 958	74 64 048	beginning with VB05C	beginning with VE00C	D160.X121 --- D320.X1	*

Speed Info R 124-98

The new D160 with Part No.: 56 58 906 is compatible with the D160 with Part No.: 3774788 and has:

- 2 additional connectors, X60 and X65, for system peripherals (see Wiring Diagram X2206-11-4)
- A time relay, K100, that switches off the XCU-HD Unit with a delay of approx. 550ms (see Wiring Diagram X2206-12-5)
- An additional connector, X121 with cable, that is needed if a new D320 with Part No.: 56 58 963 is used to process the new control signals "XRAY_DIS (external radiation interruption)" and "EMCY_GEN (emergency power operation).

The new D320 with Part No.: 56 58 963 is compatible with the D320 with Part No.: 3774143 and has:

- A piggy-back D321 board (see Wiring Diagram X2206-11A-1)
- 2 fiber optic cable connections (U1, U2) for system applications (FD Thorax)

Additional Monitoring Devices, Displays with the D160, Part No.: 5658906:

- Video recorder start or room light control with fluoro ON / OFF (see Wiring Diagram X2206-11)

Potential-free contact (max. 230V~, 4A)

- External radiation display (see Wiring Diagram X2206-11)

Additional control signals that can be processed with the D160, Part No.: 56 58 906 and the D320 with Part No. 56 58 963:

- X-Ray Disable Switch
  - A potential-free switch can be connected to D160.X65.1 and D160.X65.2 that when actuated, prevents unintentional triggering of radiation; to do this, remove the jumper that is on the D160.
- "Emergency Power Supply" Control Signal
  - Connect the two cables from the emergency power supply ON potential-free contact, D160.X65.3 and D160.X65.4; for this, remove the jumper that is on the D160.

NOTE

Requirements: D160.X121 --- D320.X1 connection cable (shipped along with the new D160 board, Part No.: 56 58 906) XCU software beginning with VB05C (= Service SW beginning with VE00C)

D160 Switch-on Circuit, Serial No.: 74 63 958

Used with:

- POLYDOROS SX65/80 beginning with Serial No.: 05232

Jumpers and Bridges:

- X20 - X21 - X22 - X23 - X24 - X25 = 50Hz/60Hz power line frequency adaptation:

Power line frequency	D160 jumper position	
50 Hz	X20---X21	X23---X24
60 Hz	X21---X22	X24---X25

- X38 = External radiation display:
  - X38.1---2 with HK (exposure)
  - X38.2---3 with ZB (prep)
- X8.1---2 = 24V/29VAC, max. 1A on the K15 working contact with Fluoro ON for control of X8.2---3 "Fluoro room light" = potential-free K15 working contact for control of the :Fluoro room light" or "Fluoro video recorder".
- X61 - X62 - X63 = temperature switch (OPTI 154) / oil pressure switch / door contact

Function	OPTI 154 tube unit connected	OPTI 154 tube unit not connected	Without oil pressure switch or door contact	With oil pressure switch or door contact
WS 1 = X61	1---2	1-/-/-2	3---4	3-/-/-4
WS 2 = X62	1---2	1-/-/-2	3---4	3-/-/-4
WS 3 = X63	1---2	1-/-/-2	3---4	3-/-/-4

- X6 - X7 = separatable plug-in jumper for "Check for inadmissible ground loops" (only with D160 "E2")
- X8 = Fluoro contact (only with D160 "E2")
  - X8.1---2 potential-related fluoro contact for room light control to X64.5 and X64.6
  - X8.2---3 potential-free fluoro contact for room light control to X64.5 and X64.6

Replacement for D160

- Only a mechanical replacement, no programming is required.
- For the programming, see the section: Jumpers and Bridges

NOTE

The D160.X121 --- D320.X1 cable included in the shipment should be replaced only if a combination (labeled with *) occurs as described in the following Compatibility List.

With a replacement of the D160 --- D320 cable, the HOST ID changes and thus the "variable password" and the corresponding licenses.

D160 --- D320 Compatibility List for a Replacement Situation

D160, Part No.	D320, Part No.	XCS SW	Service SW	Cable connection D160 --- D320	
37 74 788	37 74 143	All	All	D160.X12 --- D320.X1	
56 58 906	37 74 143	All	All	D160.X12 --- D320.X1	
74 63 958	37 74 143	All	All	D160.X12 --- D320.X1	
37 74 788	56 58 963	up to VB04C	up to VD04B	D160.X12 --- D320.X1	
56 58 906	56 58 963	beginning with VB05C	beginning with VE00C	D160.X121 --- D320.X1	*
74 63 958	56 58 963	beginning with VB05C	beginning with VE00C	D160.X121 --- D320.X1	*
74 63 958	74 64 048	beginning with VB05C	beginning with VE00C	D160.X121 --- D320.X1	*

D165 Rectifier, Part No.: 37 74 929

Used with:

- POLYDOROS SX65/80 beginning with Serial No.: 01001 to Serial No.: 03023

Replacement:

- D165 Update Kit, Part No.: 57 61 460 (includes the D165 with Part No.: 74 63 362, 3 rectifier modules, Part # 77 34 817 and installation materials).

Replacing the D165

- Disconnect the X11, X12, X31 and X22 plug-in connections on the D165 and, if necessary, label them.
- Remove the 8 threaded connections and L1_IN, L2_IN, L3_IN, UZP and UZN cables.
- Remove the D165 board with Part No.: 37 74 929 by removing the 3 plastic knurled nuts.
- Remove the 3 washers on the threaded studs; they are no longer needed.
- Replacement of the three rectifier modules, V1 - V3
- Place 1 washer from the update kit on each of the threaded studs (4/Fig. 8 / p. 26).
- Place the D165 board with Part No.: 74 63 362 on the diode modules and secure it in place with the nine M5x10 screws and the L1_IN, L2_IN, L3_IN, UZP and UZN cables and tighten the screws to a torque of 3Nm.
- Place a washer (4/Fig. 8 / p. 26) and a serrated contact washer (5/Fig. 8 / p. 26) from the update kit on the X32 threaded stud connection and secure them with the M3 hex nut included in the shipment (6/Fig. 8 / p. 26).
- Secure the two other threaded studs with the plastic knurled nuts (7/Fig. 8 / p. 26).
- Reestablish the X11, X12, X31 and X22 plug-in connections on the D165.

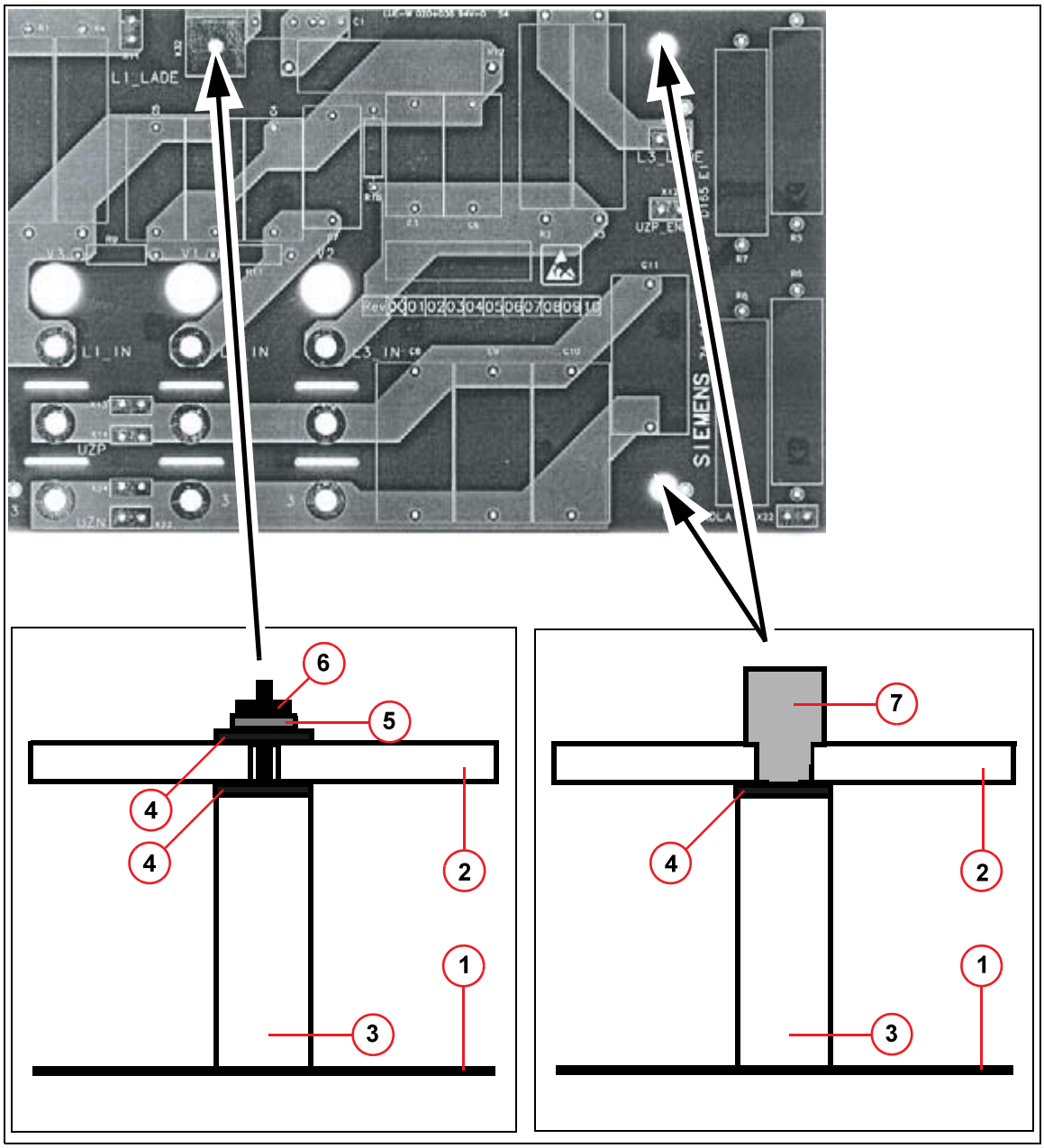


Fig. 8: D165, Part No.: 74 63 362

Pos. 1 Installation plate
Pos. 2 D165 board
Pos. 3 Spacer studs
Pos. 4 Washer
Pos. 5 Serrated contact washer
Pos. 6 M3 hex nut
Pos. 7 Plastic knurled nut

D165 Rectifier, Part No.: 57 61 429

Used in:

- POLYDOROS SX65/80 beginning with Serial No.: 03024 to Serial No.: 05355

Replacement:

- D165 Update Kit, Part No.: 57 61 460 (includes the D165 with Part No.: 74 63 362, 3 rectifier modules, Part # 77 34 817 and installation materials).

Replacing the D165

Replacing the D165

- Disconnect the X11, X12, X31 and X22 plug-in connections on the D165 and, if necessary, label them.
- Remove the 8 threaded connections and L1_IN, L2_IN, L3_IN, UZP and UZN cables.
- Remove the D165 board with Part No.: 37 74 929 by removing the 3 plastic knurled nuts.
- Remove the 3 washers on the threaded studs; they are no longer needed.
- Replacement of the three rectifier modules, V1 - V3
- Place 1 washer from the update kit on each of the threaded studs (4/Fig. 9 / p. 28).
- Place the D165 board with Part No.: 74 63 362 on the diode modules and secure it in place with the nine M5x10 screws and the L1_IN, L2_IN, L3_IN, UZP and UZN cables and tighten the screws to a torque of 3Nm.
- Place a washer (4/Fig. 9 / p. 28) and a serrated contact washer (5/Fig. 9 / p. 28) from the update kit on the X32 threaded stud connection and secure them with the M3 hex nut included in the shipment (6/Fig. 9 / p. 28).
- Secure the two other threaded studs with the plastic knurled nuts (7/Fig. 9 / p. 28).
- Reestablish the X11, X12, X31 and X22 plug-in connections on the D165.

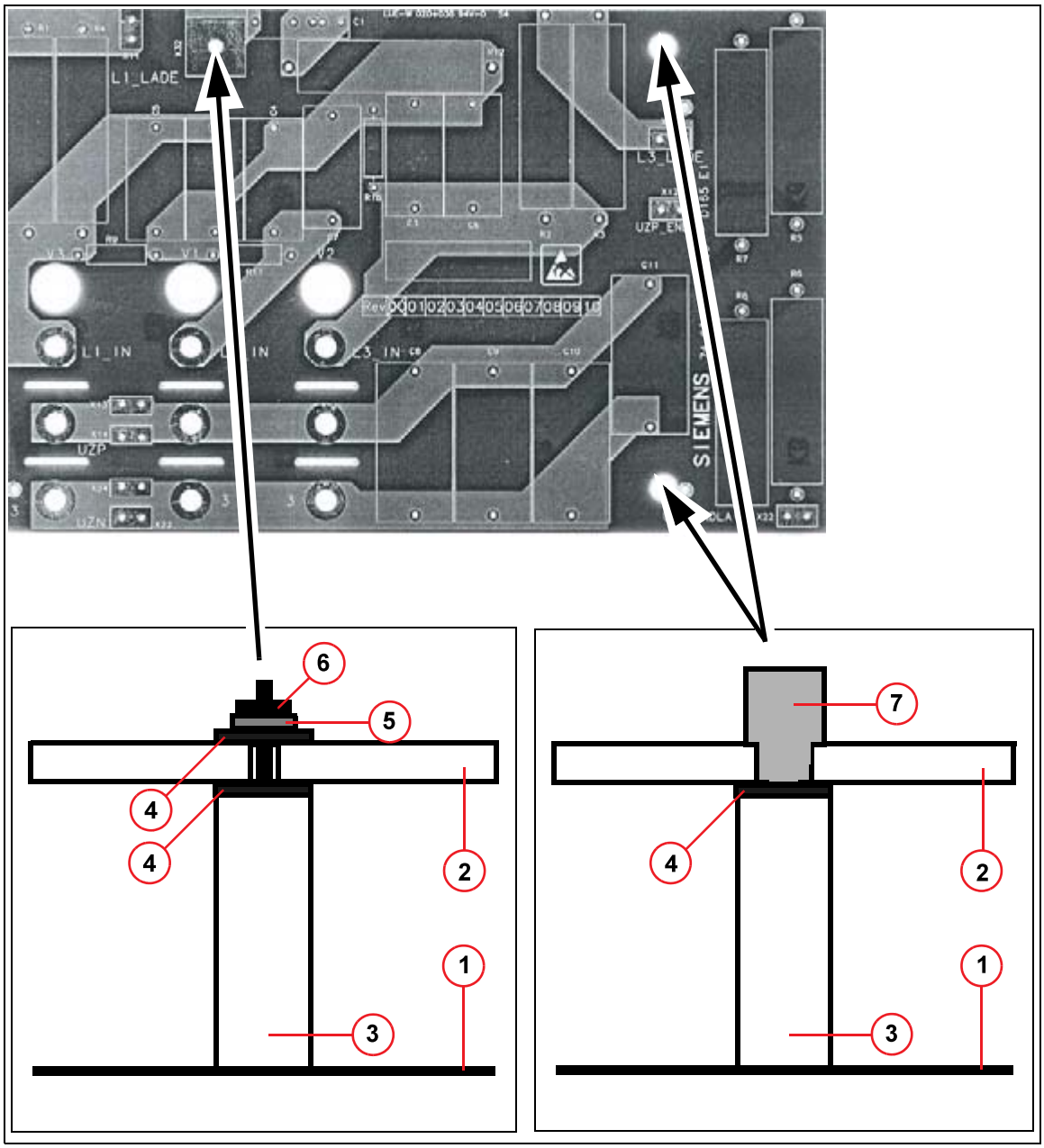


Fig. 9: D165, Part No.: 74 63 362

Pos. 1	Installation plate
Pos. 2	D165 board
Pos. 3	Spacer studs
Pos. 4	Washer
Pos. 5	Serrated contact washer
Pos. 6	M3 hex nut
Pos. 7	Plastic knurled nut

D165 Rectifier, Part No.: 74 63 362

Used with:

- POLYDOROS SX65/80 beginning with Serial No.: 05356

NOTE	**The D165 board with Part No.: 74 63 362 cannot be obtained alone. In a replacement situation, order the D165 Update Kit, Part No.: 57 61 460. This update kit includes the D165 with Part No.: 74 63 362, 3 rectifier modules, Part # 77 34 817 and installation materials.**

Replacing the D165

- Disconnect the X11, X12, X31 and X22 plug-in connections on the D165 and, if necessary, label them.
- Remove the 8 threaded connections and L1_IN, L2_IN, L3_IN, UZP and UZN cables.
- Remove the D165 board by removing the 2 plastic knurled nuts and the M3 hex nut.
- Replacement of the three rectifier modules, V1 - V3
- Place the D165 board with Part No.: 74 63 362 on the diode modules and secure it in place with the nine M5x10 screws and the L1_IN, L2_IN, L3_IN, UZP and UZN cables and tighten the screws to a torque of 3Nm.
- Place the washer (4/Fig. 10 / p. 30) and the serrated contact washer (5/Fig. 10 / p. 30) on the X32 threaded stud connection and secure them with the M3 hex nut (6/Fig. 10 / p. 30).
- Secure the two other threaded studs with the plastic knurled nuts (7/Fig. 10 / p. 30).
- Reestablish the X11, X12, X31 and X22 plug-in connections on the D165.

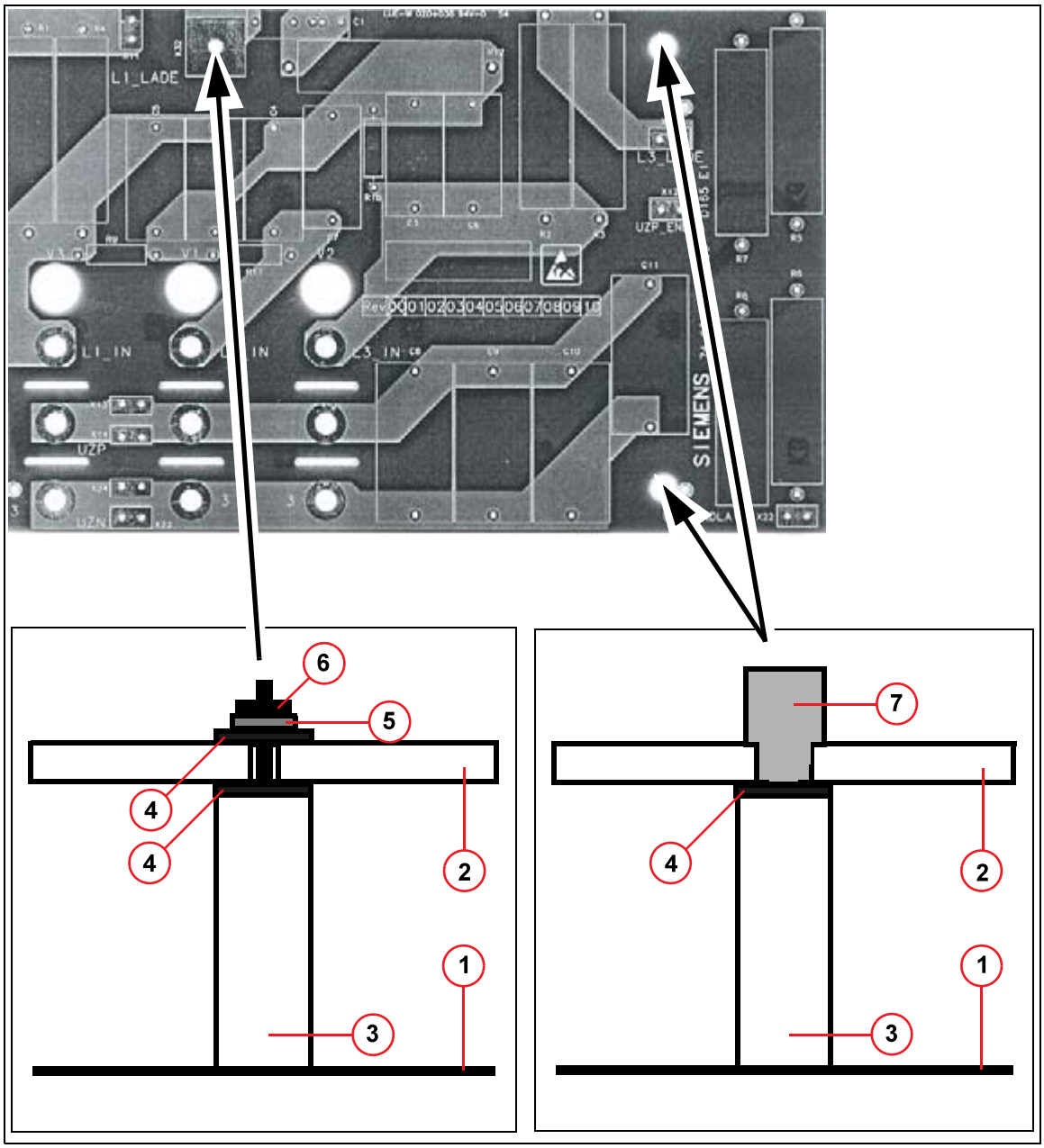


Fig. 10: D165, Part No.: 74 63 362

Pos. 1	Installation plate
Pos. 2	D165 board
Pos. 3	Spacer studs
Pos. 4	Washer
Pos. 5	Serrated contact washer
Pos. 6	M3 hex nut
Pos. 7	Plastic knurled nut

D190 Iontomat PN, Part No.: 37 74 127

Used in:

- POLYDOROS SX65/80 up to Serial No.: 03470

Replacement:

- D190 Iontomat PN, Part No.: 71 27 397

Jumpers and Bridges:

- X2 = Normal / Download
  - X2.1---2 = Normal Mode

Replacing the D190

- Remove the D100
- Switch the D190.J35 PROM from the board that is replaced to the new board.
- Replace the D190
- Reinstall the D100.
- Perform an iris adjustment

  SSW: <POLYDOROS SX Service> <Adjustment> <TV Iris Adjustment>

D190 Iontomat PN, Part No.: 71 27 397

Used in:

- POLYDOROS SX65/80 beginning with Serial No.: 03471

Jumpers and Bridges:

- X2 = Normal / Download
  - X2.1---2 = Normal Mode

Replacing the D190

- Remove the D100
- Switch the D190.J35 PROM from the board that is replaced to the new board.
- Replace the D190
- Reinstall the D100
- Perform an iris adjustment

  SSW: <POLYDOROS SX Service> <Adjustment> <TV Iris Adjustment>

D191 Chamber Switch-over, Part No.: 37 74 820

Replacing the D191

- A mechanical replacement only; no programming or adjustment required.

D220 Heating Board, Part No.: 87 14 362

Used in:

- POLYDOROS SX65/80 up to Serial No.: 02178

Replacement:

- D220, Part No.: 56 58 864

Replacing the D220

- A mechanical replacement only; no programming is required.
- Warm up the X-ray tube

  SSW: <POLYDOROS SX Service> <Adjustment> <Warm Up>

Speed Info R 118-98

The new D220 heating circuit board with Part No.: 56 58 864 is compatible with Part No.: 87 14 362 (in the POLYDOROS SX 65/80 & LX 30/50 & LX 30/50 Lite & TOSRAD Generator 80KW) and with Part No.: 97 51 876 (in the POLYDOROS SX 50/80) and will be shipped as the replacement in the future.

In a replacement situation, depending on the generator, program the X200 and X201 jumpers on the D220.

With the POLYDOROS SX 65/80:

Jumper	Position
X200	1 --- 2 installed
X201	1 --- 2 installed

D220 (Part No.: 56 58 864) board layout

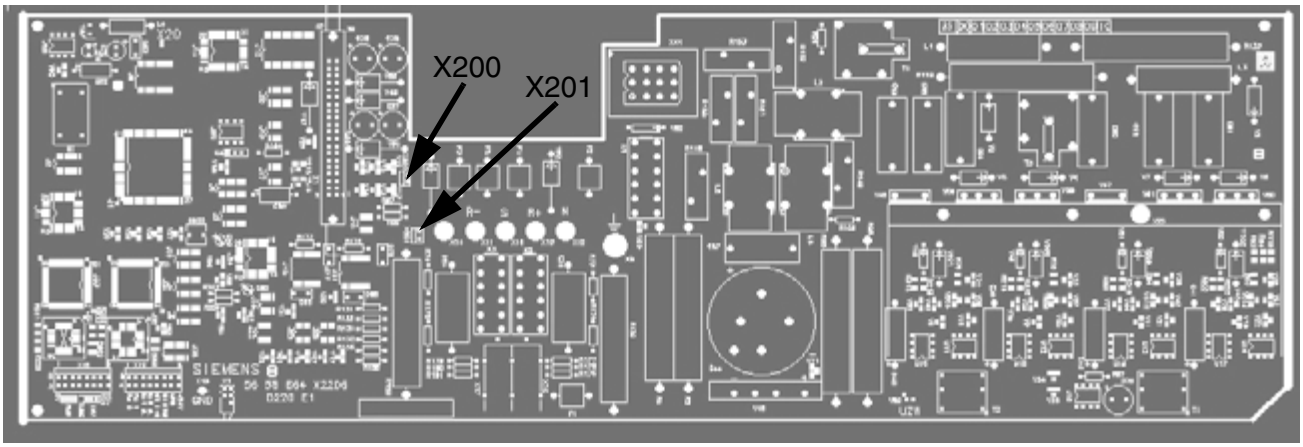


Fig. 11:

D220 Heating Board, Part No.: 56 58 864

Used in:

- POLYDOROS SX65/80 beginning with Serial No.: 02179

Jumpers and Bridges:

- Program the new D220 heating circuit board with Part No.: 56 58 864 depending on the generator.

  For the POLYDOROS SX 65/80:

Jumper	Position
X200	1 --- 2 installed
X201	1 --- 2 installed

D220 (Part No.: 56 58 864) board layout

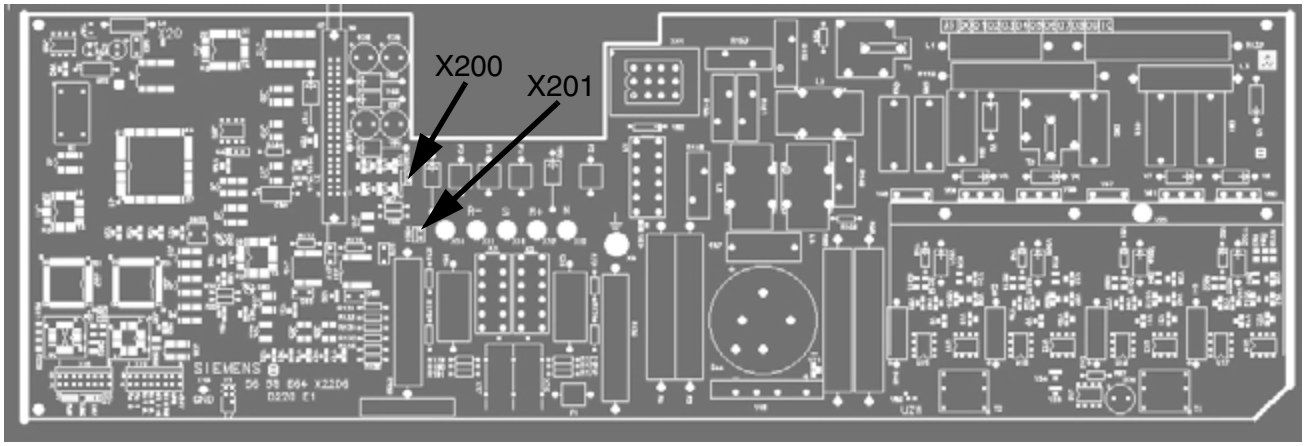


Fig. 12:

Replacing the D220

- For the programming, see the section: Jumpers and Bridges.
- Warm up the X-ray tube

  SSW: <POLYDOROS SX Service> <Adjustment> <Warm Up>

D220 230V Interface, Part No.: 86 93 111

Replacing the D220

- A mechanical replacement only; no programming or adjustment required.

D230 Console Controller, Part No.: 11 75 574

Used in:

- SX control console, Part No.: 31 57 554 up to Serial No.: 05480

Replacement:

- D230 console constroller, Part No. 48 19 640

Jumpers and Bridges

- D230.S5 must be set to XCS.

Replacing the D230

- Switch the D230.J12 PROM from the board to be replaced to the new board.

Speed Info R 002-99

NOTICE

Risk of short circuit!

➪ **Prior to beginning service work on the touchscreen control console (unplugging or plugging in the D230.X48 or D160.X9 console cable) the generator should be disconnected from line power using the main system switch. Otherwise there is a risk of generating short-circuits on the D230.X48 or D160.X9 console connector, because the +24V control voltage that is present from the generator switch-on circuit can damage the D230 board in the control console.**

➪ **If the touchscreen control console or the D230 board is replaced in a replacement part situation, make a note of the X-console firmware (D230.J12). The replacement part (touchscreen control console and D230) is always shipped with the currently valid version for the exposure station. If only a lower or a higher version is released as defined in the system compatibility list, the X-console firmware (D230.J12) from the console that is replaced should be used.**

Speed Info R 146-98

Up to this time, the entire control console with Part No. 31 57 554 X2076 had to be replaced in a service situation. For cost reasons, a decision has been made to make the D230 console controller available as a replacement part.

The Part No. of the D230 is: **48 19 640 X2076**

Touchscreen Screensaver

- **Hardware Requirements:**

  The D230 with Part No.: 48 19 640 has the hardware requirements for screensaver operation.

  The cable required for connecting **D230.X1 --- Display.J3** is packed along with the D230 replacement part.

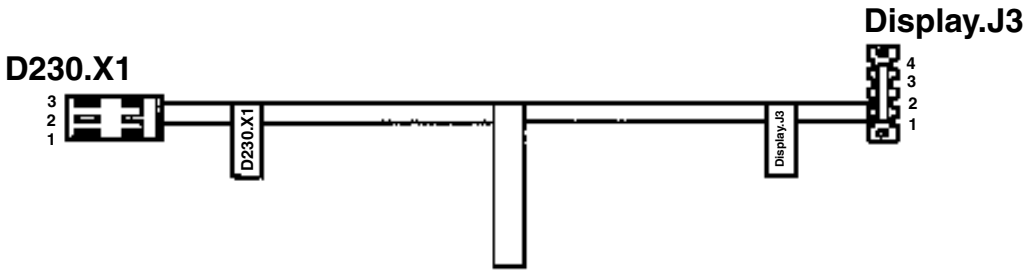


Fig. 13:

- Software requirements
  - Screensaver operation is possible beginning with control console FW "VC00X" (D230.J12).
- Connect the c able D230.X1 --- Display.J3

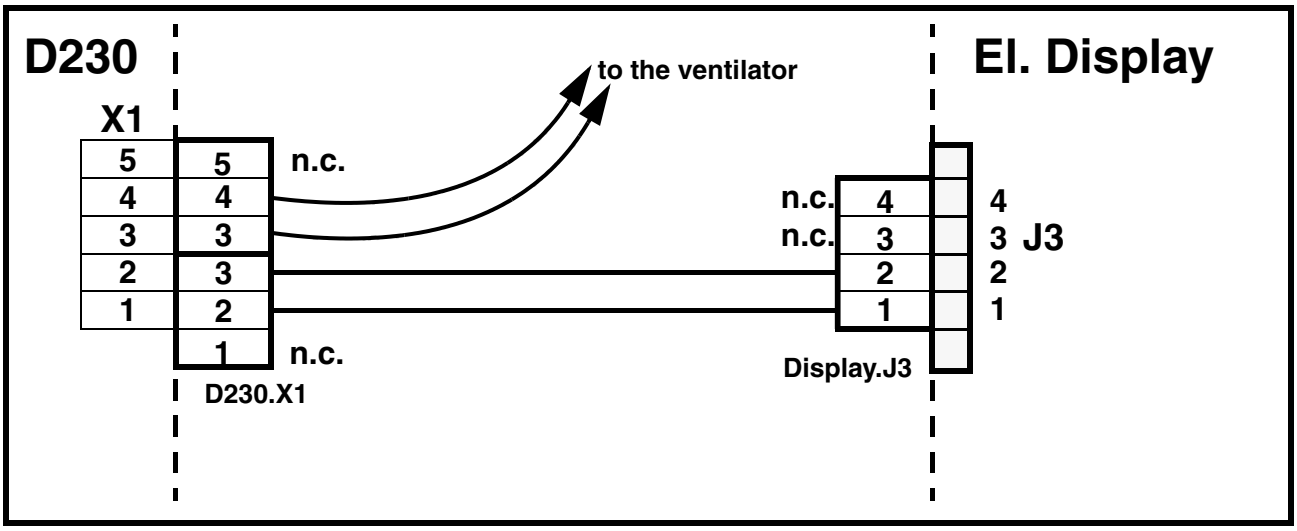


Fig. 14:

Screensaver

- Select the generator in the SSW and under <Configure> <Site Structure> <Site Adjustments> set the "turn on after" screen to = **activate** and **20** (min).

D230 Console Controller, Part No.: 48 19 640

Used in:

- SX control console, Part No.: 31 57 554 beginning with Serial No.: 05481

Jumpers and Bridges

- D230.S5 must be set to XCS

Replacing the D230

- Switch the D230.J12 PROM from the board that was replaced to the new board.
- Perform a language download for the displayed texts on the touchscreen console (possible only beginning with D230.J12, Version "VC01A"):
  - SSW: select <Component> <PLSX Desk>
  - Select Desk language to be loaded and the corresponding language.
  - Select Load language data set.
  - Exit the service window with Done.
  - Make a backup on Site data disk 6-
  - Exit the XCS service.
  - Switch the system off and back on.

Speed Info R 002-99

NOTICE

Risk of short circuit!

➪ **Prior to beginning service work on the touchscreen control console (unplugging or plugging in the D230.X48 or D160.X9 console cable) the generator should be disconnected from line power using the main system switch. Otherwise there is a risk of generating short-circuits on the D230.X48 or D160.X9 console connector, because the +24V control voltage that is present from the generator switch-on circuit can damage the D230 board in the control console.**

➪ **If the touchscreen control console or the D230 board is replaced in a replacement part situation, make a note of the X-console firmware (D230.J12). The replacement part (touchscreen control console and D230) is always shipped with the currently valid version for the exposure station. If only a lower or a higher version is released as defined in the system compatibility list, the X-console firmware (D230.J12) from the console that is replaced should be used.**

D292 AP-XCS KK Interface, Part No.: 38 26 893

Replacement:

- D292 AP-XCS KK interface, complete, Part No.: 38 27 297

Jumpers and Bridges

- S1 = Programming for tomo
  - S1.1 = tomo for G1 and G2
  - S1.2 = tomo for G3 and G4
- X200 = exposure triggering
  - X200.2---3 = normal mode (exposure triggering from the generator console)
  - X200.1---2 = exposure triggering from the G1 unit
- X201 = not equipped
- X1 - X2 = XCS connector
  - D292.X1 --- D320.X3S
  - D292.X2 --- XCS unit or terminal resistor

NOTE	**Make sure there is good contact of the XCS cable connector and of the terminal connector, Part No.: 31 57 174!**

Replacing the D292

- Switch the D292.J2 PROM from the board that was replaced to the new board.

D320 XCS Controller, Part No.: 37 74 143

Used in:

- POLYDOROS SX65/80 up to Serial No.: 02247

Replacement:

- D320, Part No.: 56 58 963

Jumpers and Bridges

- X3.US - X3.S = XCS connection
  - On the X3.US and X3.S connectors, there must be either:
    1 terminal resistor plugged in
    1 terminal resistor and one XCS cable plugged in
    2 XCS cables plugged in
- X4.US - X4.S = XCS connection
  - On the X4.US and X4.S connectors, there must be either:
    1 terminal resistor plugged in
    1 terminal resistor and one XCS cable plugged in
    2 XCS cables plugged in

NOTE

Make sure there is good contact of the XCS cable connection and of the terminal connector, Part No.: 31 57 174!

- X20 = not equipped
- X21 = not equipped

Replacement the D320

- A mechanical replacement only; no programming or adjustment required.

D160 --- D320 Compatibility List for a Replacement Situation

D160, Part No.	D320, Part No.	XCS SW	Service SW	D160 --- D320 cable connection
37 74 788	37 74 143	All	All	D160.X12 --- D320.X1
56 58 906	37 74 143	All	All	D160.X12 --- D320.X1
74 63 958	37 74 143	All	All	D160.X12 --- D320.X1
37 74 788	56 58 963	up to VB04C	up to VD04B	D160.X12 --- D320.X1

D160, Part No.	D320, Part No.	XCS SW	Service SW	D160 --- D320 cable connection
56 58 906	56 58 963	beginning with VB05C	beginning with VE00C	D160.X121 --- D320.X1
74 63 958	56 58 963	beginning with VB05C	beginning with VE00C	D160.X121 --- D320.X1
74 63 958	74 64 048	beginning with VB05C	beginning with VE00C	D160.X121 --- D320.X1

Speed Info R 028-99

If a new D320 board is used in a replacement part situation in the XCU-HD, the following error messages can appear on the D320 following the first switch-on:

- F.7. = NV RAM checksum error (Error log section)
- F.8. = NV RAM checksum error (tube unit documentation section)
- F.9. = NV RAM checksum error (password section)
- F.A. = NV RAM checksum error (tube load calculator section)

After additional switch-on routines (2-3 times) only error message F.7. (NV RAM checksum error, error log section) remains. This error disappears only if an error has been saved.

This behavior of the D320 board is normal if it is not booted up with a completely configured XCU-HD Unit (download and configuration completed).

D320 XCS Controller Kit, Part No.: 56 58 963

Used in:

- POLYDOROS SX65/80 beginning with Serial No.: 02248 to Serial No.: 05231

NOTE	**The ACS firmware is permanently soldered beginning with Rev. 02!**

Comprised of:

- D320 XCS controller, Part No.: 37 74 143
- D321 signal adapter, Part No.: 56 58 831

Jumpers and Bridges

- X3.US - X3.S = XCS connection
  - On the X3.US and X3.S connectors, there must be either:
    1 terminal resistor plugged in
    1 terminal resistor and one XCS cable plugged in
    2 XCS cables plugged in
- X4.US - X4.S = XCS connection
  - On the X4.US and X4.S connectors, there must be either:
    1 terminal resistor plugged in
    1 terminal resistor and one XCS cable plugged in
    2 XCS cables plugged in

NOTE	**Make sure there is good contact of the XCS cable connections and of the terminal connector, Part No.: 31 57 174!**

- X20 = not equipped
- X21 = not equipped

Replacing the D320

- A mechanical replacement only, no programming or adjustment required.

D160 --- D320 Compatibility List for a Replacement Situation

D160, Part No.	D320, Part No.	XCS SW	Service SW	D160 --- D320 cable connection
37 74 788	56 58 963	up to VB04C	up to VD04B	D160.X12 --- D320.X1

D160, Part No.	D320, Part No.	XCS SW	Service SW	D160 --- D320 cable connection
56 58 906	56 58 963	beginning with VB05C	beginning with VE00C	D160.X121 --- D320.X1
74 63 958	56 58 963	beginning with VB05C	beginning with VE00C	D160.X121 --- D320.X1
74 63 958	74 64 048	beginning with VB05C	beginning with VE00C	D160.X121 --- D320.X1

Speed Info R 124-98

The new D160 with Part No.: 56 58 906 is compatible with the D160 with Part No.: 3774788 and has:

- Two additional connectors, X60 and X65, to the system periphery (see the X2206-11-4) Wiring Diagram.
- A K100 time relay6 that delays switch off of the XCU-HD unit approx. 550 ms (see the X2206-12-5 Wiring Diagram).
- An additional connector, X121, with cable that is needed when a new D320 with Part No.: 56 58 963 is installed to process the new "XRAY_DIS (external interrupt of radiation)" and "EMCY_GEN (emergency power mode) control signals.

The new D320 with Part No.: 56 58 963 is compatible with the D320 with Part No.: 3774143 and has:

- a piggyback D321 board (see the X2206-11A-1 Wiring Diagram)
- Two fiber optic cable connectors (U1, U2) for system applications (FD Thorax)

Additional Monitoring Devices, Displays with the D160, Part No.: 5658906:

- Video recorder start or room light control with Fluoro ON / OFF (see the X2206-11 Wiring Diagram)

Potential-free Contact (max. 230 VAC, 4A)

- External radiation display (see Wiring Diagram X2206-11)

Additional Control Signals that can be Processed with the D160, Part No.: 56 58 906 and the D320 with Part No. 56 58 963:

- X-Ray Disable Switch
  - A potential-free switch can be connected to D160.X65.1 and D160.X65.2 that when actuated, prevents unintentional triggering of radiation; to do this, remove the jumper that is on the D160.
- "Emergency Power Supply" Control Signal
  - Connect the two cables from the emergency power supply ON potential-free contact, D160.X65.3 and D160.X65.4; for this, remove the jumper that is on the D160.

NOTE

Requirements: D160.X121 --- D320.X1 connection cable (shipped along with the new D160 board, Part No.: 56 58 906) XCU software beginning with VB05C (= Service SW beginning with VE00C)

D320 XCS Controller Installation Kit, Part No.: 74 64 048

Used with:

- POLYDOROS SX65/80 beginning with Serial No.: 05232

NOTE	**The ACS firmware is permanently soldered in place!**

Consisting of:

- D320 XCS Controller, Part No.: 74 63 784
- D321 Signal Adapter, Part No.: 74 64 055

Jumpers and Bridges

- X3.US - X3.S = XCS connection
  - On the X3. US and X3.S connectors, either:
    1 terminal resistor must be installed,
    1 terminal resistor and an XCS cable must be installed,
    2 XCS cables must be installed.
- X4.US - X4.S = XCS connection
  - On the X4. US and X4.S connectors, either:
    1 terminal resistor must be installed,
    1 terminal resistor and an XCS cable must be installed,
    2 XCS cables must be installed.

NOTE	**Make sure there is good contact of the XCS cable connections and of the terminal connector, Part No.: 31 57 174!**

- X20 = not installed
- X21 = not installed

Replacing the D320

- Only a mechanical replacement, no programming or adjustment is required.

D160 --- D320 Compatibility List for a Replacement Situation

D160, Part No.	D320, Part No.	XCS SW	Service SW	D160 --- D320 cable connection
74 63 958	74 64 048	beginning with VB05C	beginning with VE00C	D160.X121 --- D320.X1

SX Control Console, Part No.: 12 90 373

Replacement:

- SX control console, Part No.: 31 57 554

Replacing the Control Console

- Switch the D230.J12 PROM from the control console being replaced to the new D230 board in the new control console.

SX Control Console, Part No.: 31 57 554

Jumpers and Bridges

- D230.S5 must be set to XCS.

Replacing the SX Control Console

- Switch the D230.J12 PROM from the control console that was replaced to the new D230 board in the new control console.

Speed Info R 002-99

NOTICE

Risk of short circuit!

➪ **Prior to beginning service work on the touchscreen control console (unplugging or plugging in the D230.X48 or D160.X9 console cable), disconnect the generator from power at the main system switch. Otherwise there is a risk that short circuits can be generated at the D230.X48 or D160.X9 console connector, because the +24V that are present in the generator switch-on circuit can damage the D230 board in the control console.**

➪ **If the touchscreen control console or the D230 board is replaced in a spare part situation, pay attention to the X-console firmware (D230.J12). The replacement part (touchscreen control console and D230) is always shipped out with the current applicable version for exposure stations. If only a lower or a higher version is released per the System Compatibility List, use the X-console firmware (D230.J12) from the console being replaced.**

Speed Info R 146-98

In a service situation, up to this time the entire control console with Part No. 31 57 554 X2076 had to be replaced. For cost reasons, a decision has been made that the D230 console controller will be available as a replacement part.

The Part No. of the D230 is: **48 19 640 X2076**

Touchscreen Screensaver

- **Hardware prerequisites:**

  The D230 with Part No.: 48 19 640 has hardware prerequisites for screensaver operation.

  The cable required for the connection **D230.X1 --- Display.J3** is packed along with the D230 replacement part.

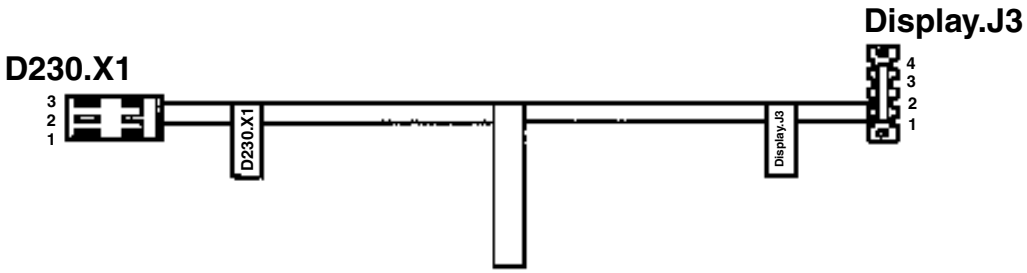


Fig. 15:

- **Software prerequisites:**

  Operation of a screensaver is possible beginning with control console FW "VC00X" (D230.J12).

- Connect the D230.X1 --- Display.J3 cable

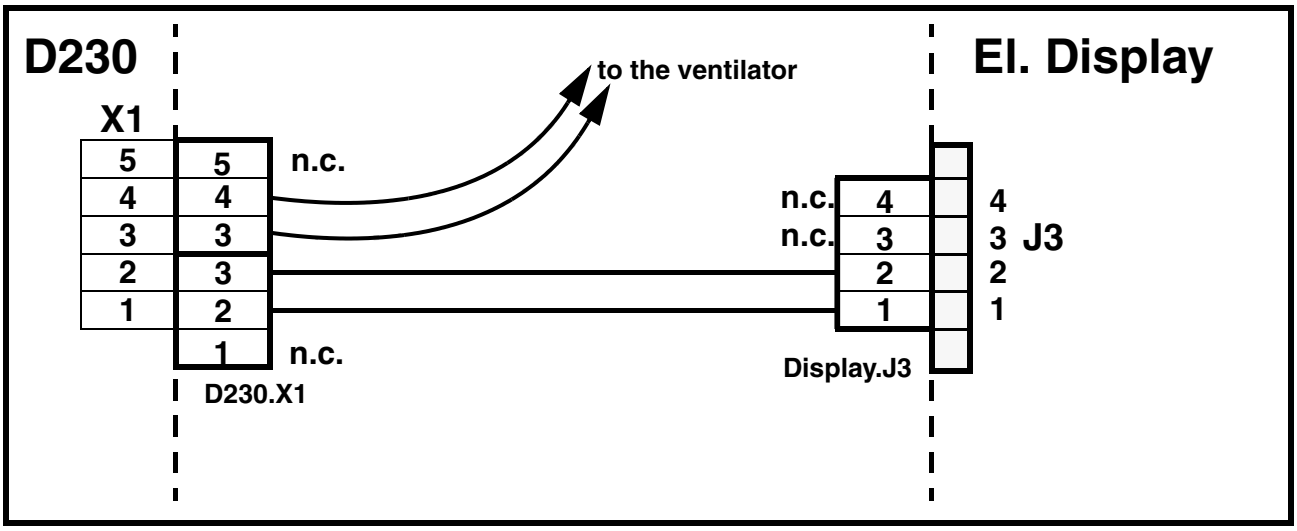


Fig. 16:

Screensaver

Select the generator in the SSW and under <Configure> <Site Structure> <Site Adjustments>, set the checkbox "turn on after" = **activate and 20** (min).

H1 High Voltage Transformer, Part No.: 86 09 364

Replacing the H1

- A mechanical replacement only; no programming required.
- Carry out a warm-up of the X-ray tube
  SSW: <POLYDOROS SX Service> <Adjustment> <Warm Up>

K1 Power Breaker, Part No.: 31 39 805

Used with:

- POLYDOROS SX65/80 beginning with Serial No.: 05180

Breaker Attachments:

- RC element, Part No.: 73 60 985

Replacement:

- K1 Breaker, SX Spare Parts Set, Part No.: 74 63 560

NOTE

In many cases, only the main switch components (contacts) are defective. If welded contacts or contact seats are so badly burned that the base material becomes visible (4a/Fig. 17 / p. 51), replace them.

In these cases, switch component set, Part #46 77 167, must be ordered.

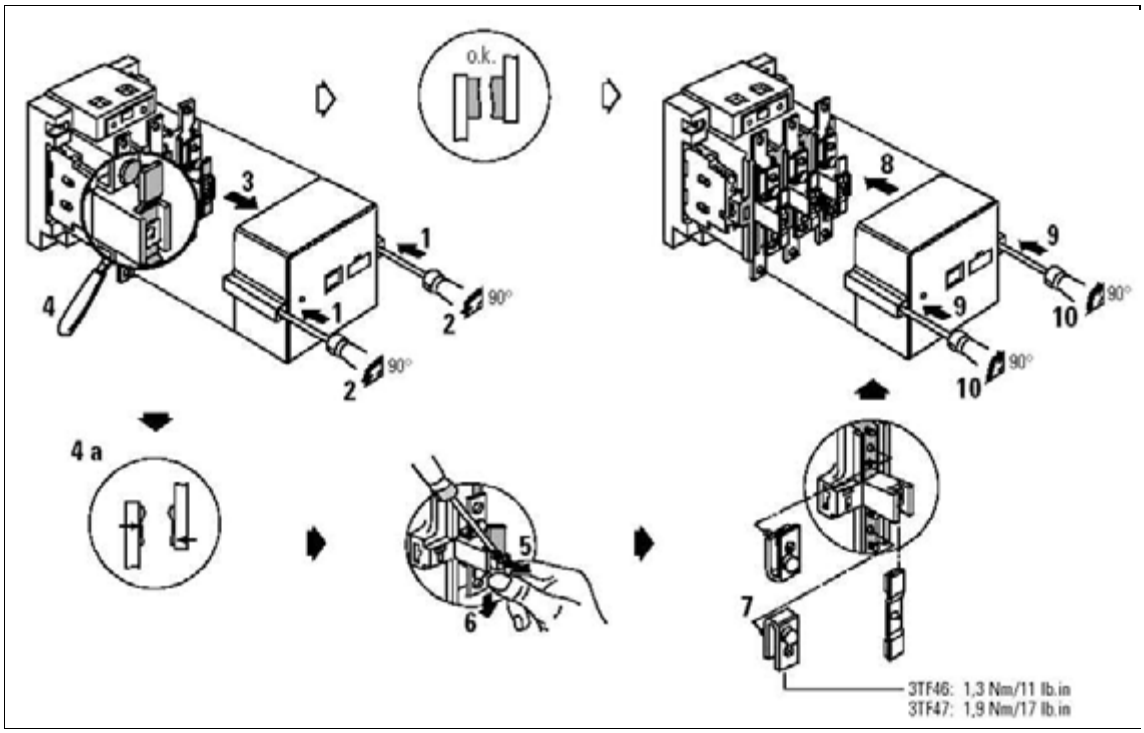


Fig. 17: Replacing the main circuit components (contacts)

K1 Breaker, SX Spare Parts Set, Part No.: 74 63 560

Used with:

- POLYDOROS SX65/80 beginning with Serial No.: 05180

Consisting of:

- K1 Power Breaker, Part No.: 77 49 018 (1/Fig. 18 / p. 52)
- RC element, Part No.: 77 50 214 (3/Fig. 18 / p. 52)
- Auxiliary switch, Part No.: 77 50 206 (2/Fig. 18 / p. 52)
- Adapter plate with cap rail and end clamp (4/Fig. 18 / p. 52)

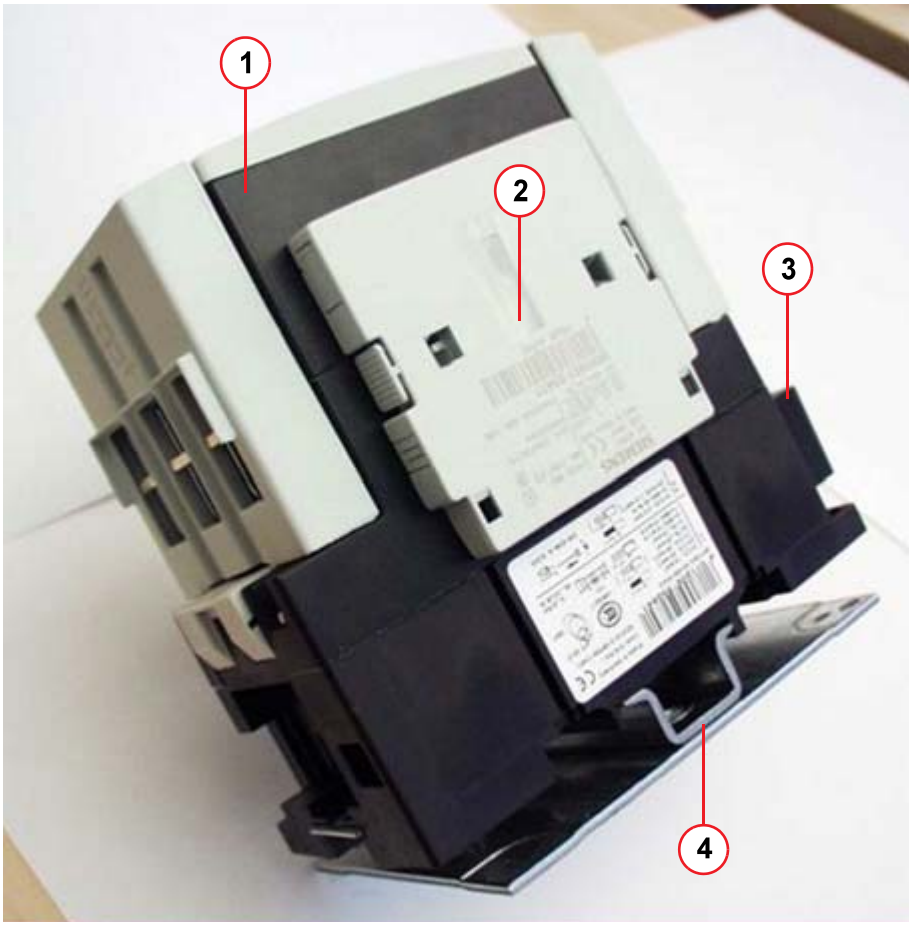


Fig. 18: K1 breaker, SX Spare Parts Set, Part No.: 74 63 560

Pos. 1 K1 power breaker
Pos. 2 Auxiliary switch
Pos. 3 RC element
Pos. 4 Adapter plate with cap rail

Replacing the K1 Breaker:

- Disconnect the connection cables for the K1 Power Breaker, Part No.: 31 39 805
- Remove the K1 Power Breaker, Part No.: 31 39 805

- Remove the breaker from the "K1 Breaker, SX Spare Parts Set" from the cap rail (Bild rechts/Fig. 19 / p. 53)

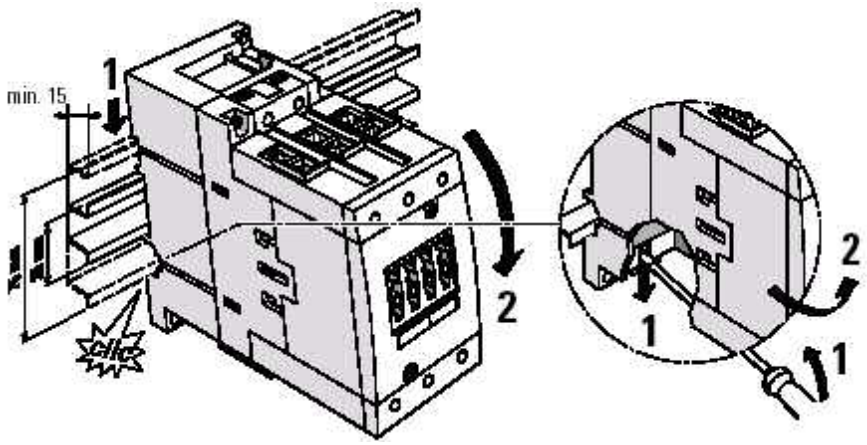


Fig. 19: K1 breaker

- Install the adapter plate at the location of the old K1 breaker using the two screws.
- Place the K1 breaker on the cap rail (Bild links/Fig. 19 / p. 53)
- Reconnect the cables to the K1 breaker.

NOTE

The A1 / A2 coil connections for the K1 power breaker, Part No.: 77 49 018 and the auxiliary switch, Part No.: 77 50 206 are no longer designed with screw connectors, but use the cage clamp technique (Cage Clamp Technique / p. 7).

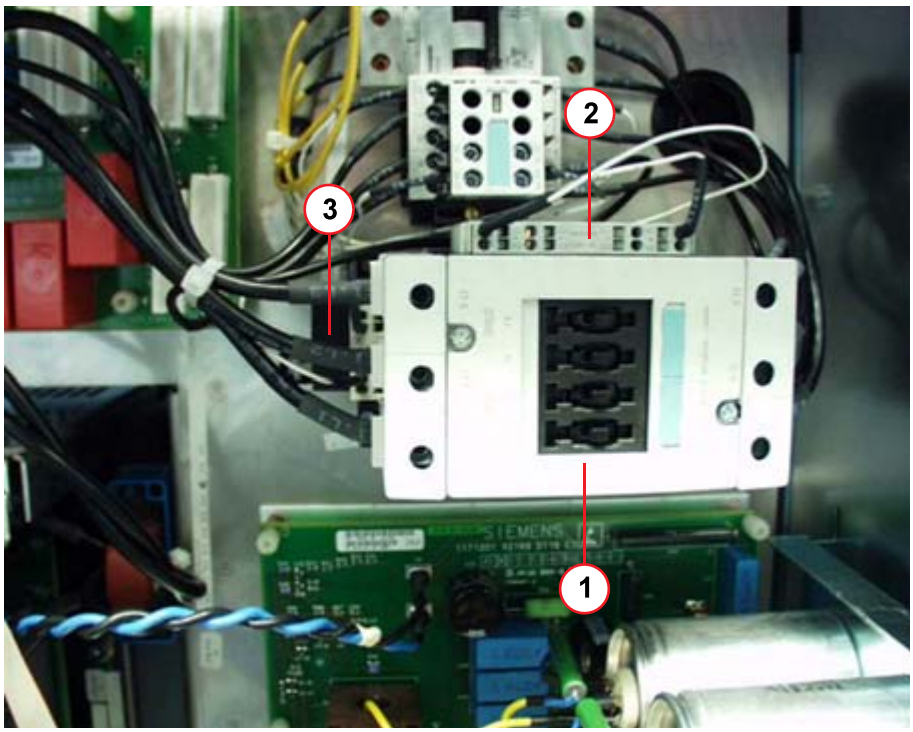


Fig. 20: K1 power breaker in the POLYDOROS SX65/80

Pos. 1 K1 power breaker

Pos. 2 Auxiliary switch

Pos. 3 RC element

K1 Power Breaker, Part No.: 77 49 018

Used with:

- POLYDOROS SX65/80 beginning with Serial No.: 05181

Breaker Attachments:

- RC element, Part No.: 77 50 214
- Auxiliary switch, Part No.: 77 50 206

Replacing the K1

- a mechanical replacement only

NOTE

The A1 / A2 coil connections for the K1 power breaker, Part No.: 7749018 and the auxiliary switch, Part No.: 7750206 are no longer designed with screw connectors, but uses the cage clamp technique (Cage Clamp Technique / p. 7).

K2 Charge Breaker, Part No.: 46 75 369

Replacement:

K2/K5 breaker set, Part No.: 57 61 403 includes:

- Breaker, Part No: 30 77 880
- Auxiliary circuit block, Part No.: 30 74 721
- Installation note, RX63-055.038.05...

Designation	"Old" Part No.	"New" Part No.	"Old" model	"New" model
K2 (LS)	46 75 369	30 77 880	3TF 2010	3RT 1516-1GX20-0AA2
K2-Hilfsschalterblock	46 82 498	30 74 721	3TX 4401-1A	3RH 1911-1FA20

Replacing the K2 Charge Breaker:

Required relabeling of the connection cables to the "new" breaker

Cable label ("old")	Designation	Connections to new breaker ("new")	Designation
K2.21	Auxiliary circuit block	K2.R1	Breaker
K2.22	Auxiliary circuit block	K2.R2	Breaker
K2.L1	Breaker	K2.1	Breaker
K2.T1	Breaker	K2.2	Breaker
K2.L2	Breaker	K2.3	Breaker
K2.T2	Breaker	K2.4	Breaker
K2.13	Breaker	K2.53	Auxiliary circuit block
K2.14	Breaker	K2.54	Auxiliary circuit block

NOTE

The new breaker is a hum-free DC voltage breaker with integrated rectifier bridge. For this reason, RC circuity is no longer necessary! The function of noise suppression is handled by the bridge rectifier.

K3 Stator Breaker, Part No.: 46 85 871

Used with:

- POLYDOROS SX65/80 beginning with Serial No.: 05180

Breaker Attachments:

- Overvoltage limiter, Part No.: 46 87 166

Replacing the K3

- a mechanical replacement only
- Connecting the Stator Cable

Stator	K3 connection
Tube unit 1.I	K3. R2
Tube unit 1.0	K3. R4
Tube unit 1.II	K3. R6
Tube unit 2.I	K3.2
Tube unit 2.0	K3.4
Tube unit 2.II	K3.6

K31 / K32 Stator Breaker, Part No.: 30 77 880

Used with:

- POLYDOROS SX65/80 beginning with Serial No.: 05181

Replacing the K31 / K32

- a mechanical replacement only
- Connecting the Stator Cable

Stator	K31, K32 connection
Tube unit 1.I	K31.R2
Tube unit 1.0	K31.R4
Tube unit 1.II	K32.R2
Tube unit 2.I	K31.2
Tube unit 2.0	K31.4
Tube unit 2.II	K32.2

K4 Unit Breaker, Part No.: 46 70 899

Used with:

- POLYDOROS SX65/80 beginning with Serial No.: 05084

Breaker Attachments:

- RC element, Part No.: 73 60 985

Replacing the K4

- a mechanical replacement only

K4 Unit Breaker, Part No.: 77 50 230

Used with:

- POLYDOROS SX65/80 beginning with Serial No.: 05085

Breaker Attachments:

- RC element, Part No.: 77 50 222

NOTE

K4 Unit Breaker, Part No.: 77 50 230 is available in 2 versions:

- **Model 3RT1016-1AX21-0AA3 with AC combination coil**

  With this model, the RC element, Part No.: 7750222 must be installed.

- **Model 3RT1016-1GX21-0AA2 with DC coil and integrated jumper rectifier (hum-free version)**

  With this model, the RC element, Part No.: 7750222 can (but must not) be removed because its function is already implemented by the integrated jumper rectifier.

Replacing the K4

- a mechanical replacement only

K5 Starter Unit Breaker, Part No.: 30 77 880

Replacement:

K2/K5 breaker set, Part No.: 57 61 403 includes:

- Breaker, Part No.: 30 77 880
- Auxiliary circuit block, Part No.: 30 74 721 (not required to replace the K5)
- Installation Note, RX63-055.038.05...

Desnigation	“Old” Part No.	“New” Part No.	“Old” model	“New” model
K5 (starter)	46 85 863	30 77 880	3TF 2082	3RT 1516-1GX20-0AA2

Replacing the K5 Starter Breaker:

No relabeling of the connections cable to the “new" breaker required!

NOTE

The new breaker is a hum-free DC voltage breaker with integrated rectifier bridge. For this reason, RC circuity is no longer necessary! The function of noise suppression is handled by the bridge rectifier.

K6 Fluoroscopy Breaker, Part No.: 46 95 649

Replacement:

K6 breaker set, Part No.: 57 61 411 includes:

- Breaker, Part No.: 46 95 649
- Auxiliary circuit block, Part No.: 46 95 656
- Installation Note, RX63-055.038.05...

Designation	"Old" Part No.	"New" Part No.	"Old" model	"New" model
K6 (fluoro option)	46 95 649	46 95 649	3TK 3520-0AB0	3RT 1535-1AB00
K6 auxiliary circuit block	46 95 656	46 95 656	3TK 7910-3A	3RH 1921-1EA11

Replacing the K6 Fluoroscopy Breaker:

Required relabeling on the connections cables on the "new" breaker

Cable label ("old")	Designation	Connections on breaker ("new")	Designation
K6.13	Auxiliary circuit block	K6.63	Auxiliary circuit block
K6.14	Auxiliary circuit block	K6.64	Auxiliary circuit block

KKI-AP KK Interface for Workstations, Part No.: 38 27 297

Comprised of:

- D292 KK interface for the XCS workstation, Part No.: 38 26 893

Jumpers and Bridges on the D292

- S1 = Programming for tomo
  - S1.1 = Tomo for G1 and G2
  - S1.2 = Tomo for G3 and G4
- X200 = exposure triggering
  - X200.2---3 = Normal Mode
  - X200.1---2 = exposure triggering from unit G1
- X201 = not equipped
- X1 - X2 = XCS connection
  - D292.X1 --- D320.X3S
  - D292.X2 --- XCS unit or terminal resistor

NOTE	**Make sure there is good contact of the XCS cable connection and of the terminal connector, Part No.: 31 57 174!**

Replacement

- Switch the D292.J2 PROM from the board that was replaced to the new board.

KKI-DL KK Interface for Fluoro, Part No.: 37 75 322

Comprised of:

- D400 connector panel, Part No.: 38 48 145 or 57 59 340
- D410 XCS KKI-DL, Part No.: 38 48 160
- D420 XCS Interface, Part No.: 38 48 186

Replacement

- Switch the D420.J28 PROM from the KKI-DL interface that was removed to the D420 board of the new KKI-DL interface.

NOTE	**Make sure there is good contact of the XCS cable connection and of the terminal connector, Part No.: 31 57 174!**

KKI-DL/MPL KK Interface for DL/MPL, Part No.: 56 58 880

Comprised of::

- D400 connector panel, Part No.: 38 48 145 or 57 59 340
- D410XCS KKI-DL, Part No.: 38 48 160
- D420 XCS Interface, Part No.: 38 48 186
- D430 MPL power supply, Part No.: 56 58 724

Jumpers and Bridges on the D430

- D430.S1 = reference value definition for the multiplier voltage
  - D430.S1.1 = U-MPL reference value definition using the J3 digital potentiometer
  - D430.S1.2 = U-MPL reference value definition using the R19 spindle potentiometer

Replacement

- Switch the D420.J28 PROM from the KKI-DL interface that was removed to the new on the D420 KKI-DL interface board.

NOTE	**Make sure there is good contact of the XCS cable connection and of the terminal connector, Part No.: 31 57 174!**

N10 XCU-HD Unit, Part No.: 38 27 123

Used in:

- POLYDOROS SX65/80 up to Serial No.: 02732

Replacement:

- SX Control Unit, Part No.: 58 95 292

Prerequisite:

- Service Software beginning with VD04A

Replacing the XCU-HD Unit

- Use the service software from the site to save the data on a backup diskette:
  - Insert the backup diskette into drive A:.
  - In the window "XCS Service Application - Main Program / Data /, select “Backup to disk" and perform the routine.
- Remove the XCU-HD Unit
- Take the D320 board from the XCU-HD Unit that was removed and install it in the new SX Control Unit.
- Install the XCU-HD Unit
- **Downloading the XCU Software**
  - Switch off the generator.
  - Insert the XCU loadware disk into the XCU-HD Unit drive.
  - Switch on the generator, **wait** until the SW is downloaded, approx. 3-4 min (no more drive activity).
  - After completing the programs, an acoustical signal is sounded.
  - Successful completion: **"TOOT-TA-TOOT"** (three sounds)
  - Incorrect completion, "no acoustical signal and /or green LED on the HDD stays on".
  - Switch off the generator.
  - Remove the XCU loadware disk.
  - Switch on the generator, wait for the boot routine to finish.
  - The system must boot up without problem.
- Carry out a restore of the previously made backup.
  - Insert the backup diskette into drive A:.
  - In the window "XCS Service Application - Main Program / Data / select “Restore from disk" and perform the routine.
- Log into the XCU-HD Unit with the XCS SSW.

NOTE

To regenerate the file structure in the XCU, all screens in the Site Structure must be confirmed with O.K/SAVE.

- Select the window XCS Service Application-Main Program/Configure/**Site Structure**.
- In the Configure window: **Site structure**, confirm all screens with OK, and exit the last window Configure/Site Structure/Site Adjustment with **SAVE**.
- Exit the following message window with OK.

NOTE

Make sure there is good contact of the XCS cable connection and of the terminal connector, Part No.: 31 57 174!

Speed Info R 081-99

CMOS Battery Life

With some returns, we have found that the CMOS battery was discharged. The battery manufacturers talk about a lifetime or more than 10 years, but in practical operation, a lifetime of no more than 3 years is assumed.

We recommend that the battery (Part No.: 46 97 611) in the XCU-HD Unit be replaced annually, e.g. when there is a service call or regularly scheduled maintenance.

The battery connection on the XCU-HD Unit is laid out in duplicate so that the new battery can be installed and then the used one can be removed. In addition, an adhesive label should be placed on the XCU-HD Unit housing with a note of the date when the battery was replaced.

NOTE

The CMOS configuration of the XCU-HD Unit can be lost, e.g. if the battery is discharged or if the battery cable has been disconnected. Before the entire XCU-HD Unit is replaced, the restore routine described in Speed Info R 022-98 can be performed to restore the CMOS configuration.

Speed Info R 039-99

NOTE

In a replacement part situation for the XCU-HD Unit, it is shipped out with Rev. level 07 or higher. EIDE hard disks are used with this Rev. 07. Prerequisite for operation without function disturbances is service software beginning with VD04A, because this SW includes the XCU software that switches to the operating system that supports the EIDE hard disks.

Speed Info R 022-98

Loss of the CMOS Configuration

The CMOS configuration for the CPU-HD Unit can be lost if, e.g. the battery is discharged or the battery cable has been disconnected. Before the entire CPU HD Unit is replaced, the following restore routine can be performed to restore the CMOS configuration.

Required Materials:

- 1 AT keyboard (with connector DIN 5 Pin 180°)

- 1 battery, Part No. 46 97 611
- 1 Config diskette, Part No.: 38 27 123 (included in the CPU-HD Unit shipment)

Procedure:

- Switch the POLYDOROS SX 65/80 **OFF**
- Replace the battery
- Connect the AT keyboard to the CPU-HD Unit "X20".
- Insert the Config diskette into the floppy drive of the CPU-HD Unit.
- Switch the POLYDOROS SX 65/80 **ON**
- When the green LED on the floppy drive indicates no more activity, press F1 on the keyboard.
- When the green LED on the floppy drive again shows no more activity, press **ENTER** twice to conclude the boot routine.
- Make sure that the CPU-HD Unit is on the A:\ Prompt. To get this, enter **DIR** and **ENTER**, the green LED on the floppy drive will show no more activity. When the LED indicates no more activity, start the routine again at the beginning.
- Enter **PUTCMOS.EXE und ENTER** at the keyboard; during the download routine, the LED on the floppy drive again shows activity.
- After completing the download routine, a three-sound acoustical signal.
- When the green LED on the floppy drive shows no more activity, the Config diskette can be removed and a restart can be initiated.

NOTE	**If the battery has not yet been replaced, do not switch off. Instead perform a restart using CTRL and ALT and DEL.**

SX Control Unit, Part No.: 58 95 292

Used in:

- POLYDOROS SX65/80 beginning with Serial No.: 02733 to Serial No.: 05231

Replacement:

- XCS Control Unit, Part No.: 70 09 207

Prerequisite:

- Service software beginning with VD04A

Replacing the SX Control Unit

- Using the service software that is present on site, save the data on a backup diskette:
  - Insert the backup diskette into drive A:.
  - In the window "XCS Service Application - Main Program / Data / select “Backup to disk" and perform the routine.
- Remove the SX Control Unit.
- Remove the D320 board from the SX Control Unit that was removed and install it in the new SX Control Unit.
- Install the SX Control Unit.

NOTE	**POLYDOROS SX65/80 beginning with Serial No.: 04024, the SX Control Unit is installed on the mounting plate turned 90°. In a replacement situation, the SX control unit is shipped with the old status (valid up to Serial No. 04023). In a replacement situation, beginning with Serial No.: 04024, remove the SX control unit from the mounting plate by removing the 4 screws and install it again turned 90°.**

- Download the XCU software
  - Switch off the generator.
  - Insert the XCU loadware disk into the SX Control Unit drive.
  - Switch on the generator, **wait** for the SW to download, approx. 3-4 min (no more drive activity).
  - After the programs are completed, an acoustic signal will sound.
  - Successful completion: **"TOOT-TA-TOOT"** (three sounds)
  - Incorrect completion: "no acoustic signal and /or green LED on the HDD stays on".
  - Switch off the generator.
  - Remove the XCU loadware disk.
  - Switch on the generator, wait for the boot routine to finish.
  - The system must boot up without error.
- Perform a restore of the backup that was made previously.
  - Insert the backup diskette into drive A:.
  - In the window, "XCS Service Application - Main Program / Data / select “Restore from disk" and perform the routine.

NOTE

To regenerate the file structure in the XCU, all screens in the Site Structure must be confirmed with O.K/SAVE.

- Log in to the SX control unit using the XCS SSW.
  - Select the window XCS Service Application-Main Program/Configure/**Site Structure**.
  - In the Configure window:: **Site structure**, confirm all screens with OK, exit the last window Configure/Site Structure/Site Adjustment with **SAVE**.
  - Exit the following message windows with OK.

NOTE

Make sure there is good contact of the XCS cable connections and of the terminal connector, Part No.: 31 57 174!

XCS Control Unit, Part No.: 70 09 207

Used with:

- POLYDOROS SX65/80 beginning with Serial No.: 05232 to Serial No.: 06780

Prerequisite:

- Service software beginning with VD04A

Replacing the XCS Control Unit

- Save the data on a backup diskette using the service software that is present on site:
  - Insert the backup diskette into drive A: .
  - Select "XCS Service Application - Main Program / Data / Backup to disk" in the window and perform the backup.
- Removing the XCS Control Unit
- Remove the D320 board from the XCS control unit that was removed and install the new XCS control unit.
- Installing the XCS Control Unit

NOTE	**In a replacement situation, the XCS control unit is installed turned 90°. In a replacement situation, remove the SX control unit from the mounting plate by removing the 4 screws and install it again turned 90°.**

- Downloading the XCU Software
  - Switch off the generator.
  - Insert the XCU loadware disk into the XCU control unit drive.
  - Switch on the generator, **wait** until the SW has downloaded, approx. 3-4 min. (no further drive activity).
  - After the program has ended, an acoustic signal sounds.
  - Successful completion: **"TOO-TA-TOOT"** (three sounds).
  - Incorrect completion, "no acoustical signal and / or the green LED on the HDD stays on".
  - Switch off the generator.
  - Remove the XCU loadware disk.
  - Switch on the generator, wait for the boot routine to finish.
  - The system must boot up without problem.
- Perform a restore of the previously made backup.
  - Insert the backup diskette into drive A: .
  - Select "XCS Service Application - Main Program / Data / Restore from disk" in the window and perform the backup.

NOTE	**To regenerate the file structure in the XCU, all screens in the Site Structure must be confirmed with O.K./SAVE.**

- Log on to the XCS control unit with the XCS SSW.
  - Select the XCS Service Application-Main Program/Configure/**Site Structure** window.
  - In the Configure window: **Site structure**, confirm all screens with OK; exit the last Configure/Site Structure/Site Adjustment window with**SAVE**.
  - Exit the message window that follows with OK.

NOTE	**Make sure there is good contact of the XCS cable connections and of the terminal connector, Part No.: 31 57 174!**

XCS Control Unit 2, Part No.: 102 80 821

Used with:

- POLYDOROS SX65/80 beginning with Serial No.: 06781

Prerequisite:

- Service software beginning with VF00G (XCU SW VB06A)

Replacing the XCS Control Unit

- Save the data on a backup diskette using the service software that is present on site:
  - Insert the backup diskette into drive A: .
  - Select "XCS Service Application - Main Program / Data / Backup to disk" in the window and perform the backup.
- Removing the XCS Control Unit
- Remove the D320 board from the XCS control unit that was removed and install the new XCS control unit.
- Installing the XCS Control Unit

NOTE	**In a replacement situation, the XCS control unit is installed turned 90°. In a replacement situation, remove the SX control unit from the mounting plate by removing the 4 screws and install it again turned 90°.**

- Downloading the XCU Software
  - Switch off the generator.
  - Insert the XCU loadware disk into the XCU control unit drive.
  - Switch on the generator, **wait** until the SW has downloaded, approx. 3-4 min. (no further drive activity).
  - After the program has ended, an acoustic signal sounds.
  - Successful completion: **"TOO-TA-TOOT"** (three sounds).
  - Incorrect completion, "no acoustical signal and / or the green LED on the HDD stays on".
  - Switch off the generator.
  - Remove the XCU loadware disk.
  - Switch on the generator, wait for the boot routine to finish.
  - The system must boot up without problem.
- Perform a restore of the previously made backup.
  - Insert the backup diskette into drive A: .
  - Select "XCS Service Application - Main Program / Data / Restore from disk" in the window and perform the backup.

NOTE	**To regenerate the file structure in the XCU, all screens in the Site Structure must be confirmed with O.K./SAVE.**

- Log on to the XCS control unit with the XCS SSW.
  - Select the XCS Service Application-Main Program/Configure/**Site Structure** window.
  - In the Configure window: **Site structure**, confirm all screens with OK; exit the last Configure/Site Structure/Site Adjustment window with**SAVE**.
  - Exit the message window that follows with OK.

NOTE

Make sure there is good contact of the XCS cable connections and of the terminal connector, Part No.: 31 57 174!

SNT Circuit Power Supply, Part No.: 46 77 134

Replacing the Circuit Power Supply

The Lambda power supply, Part No.: 46 77 134 with the designation NS-LAM 026C is being replaced by the CSM-Sirius Med. The contact allocations for the output voltages are thus different.

The following comparison of contact allocations shows the differences:

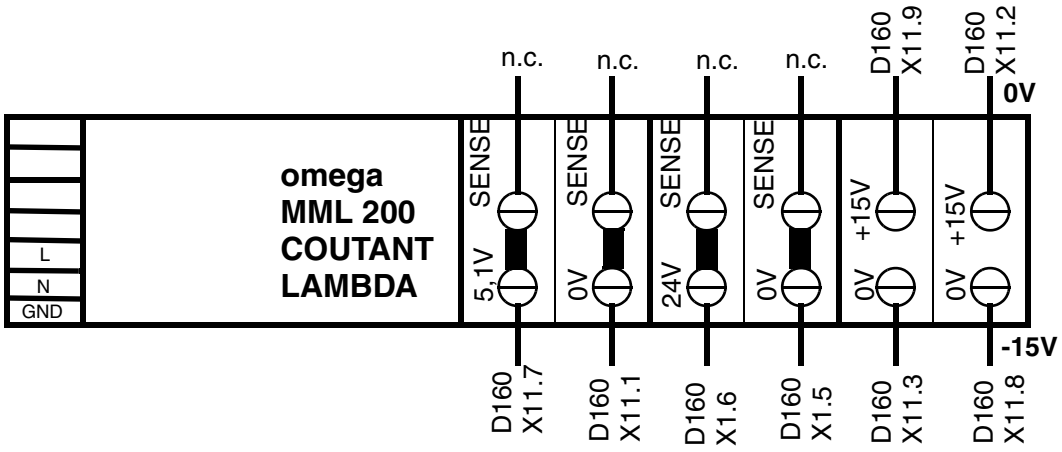


Fig. 21:

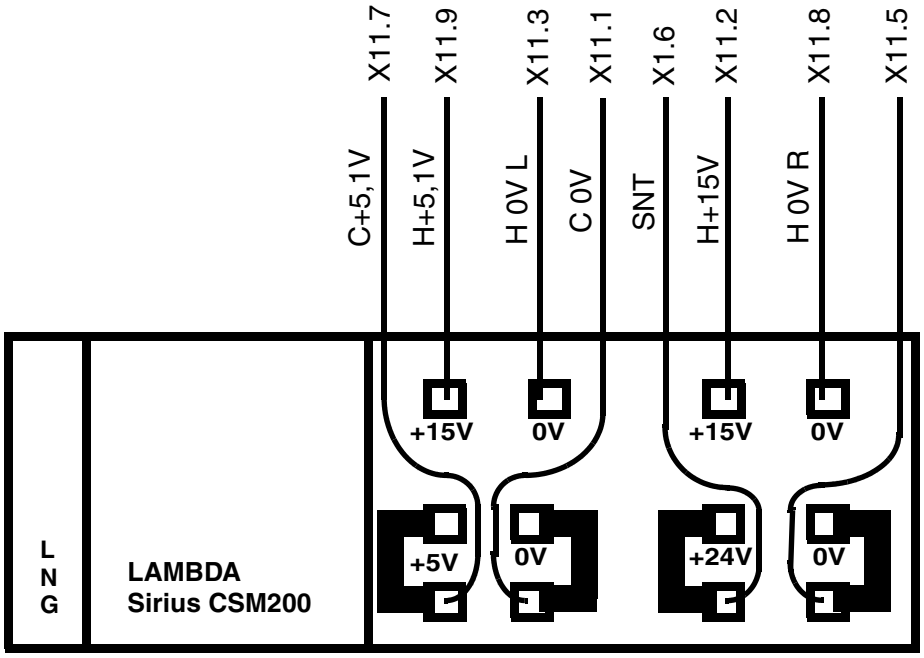


Fig. 22:

- The LAMBDA power supply is located behind the D160. It is preferable to remove the D160 when replacing the power supply.
- Remove the black plastic cover on the bottom of the power supply and disconnect the L, N and ground cables.
- Check to make sure that all connected cables on the terminal strip are clearly labeled, then disconnect them.

- Replace the LAMBDA power supply and connect it per (Fig. 21 / p. 75) (Fig. 22 / p. 75) or Wiring Diagram X2206.

Speed Info R 083-98

Dose fluctuations can be caused by a defective Lambda power supply (Part No. 46 77 134). In this instance, the 15V are overlaid by a low-frequency hum voltage. Lambda power supplies (Part No.: 46 77 134) with the date code 01.96 to 06.97 are affected. A **high-frequency hum voltage** (clock frequency from the circuit power supply) does **not cause dose fluctuations**.

A measurement of the hum voltage using a multimeter or oscilloscope can not be used to determine whether the hum voltage is low-frequency or high-frequency (a spectrum analyzer would be suitable for the measurement).

Because of this, perform the following to check the error profile:

- Place a homogeneous object in the beam path (e.g. water) and trigger continuous fluoroscopy.
- If brightness fluctuations can be observed in the fluoro image, or if a much too dark image appears for this object (low kV and mA), replace the power supply.
- The error profile described in Speed Info R 057-98 does not mention a defective power supply, but a defective D100 (see the following note).

NOTE

Speed Info R 057-98

Error profile with a failure of the D100 PDA sensor system:

In an error situation, the D100 sends out the value "zero" as the actual value for the brightness of the I.I. output. The reason for this is that the 5V voltage regulator in the current limiter is going and thus the power supply voltage for the "EPLD" (component for measuring field selection) is too low.

- **With the POLYDOROS IS-A/C, there is an abort of radiation with the ANGIOMATIC ERROR 00D4 "Dose less than 5% with indirect technique"**
- **With the POLYDOROS SX 65/80, there is a white fluoro image because the dose control goes to the upper limit (max. KV and mA).**

Select the generator in SSW and under <Configure> <Site Structure> <Site Adjustments> at the checkbox "turn on after" = **activate and 20** (min) (Fig. 23 / p. 77).

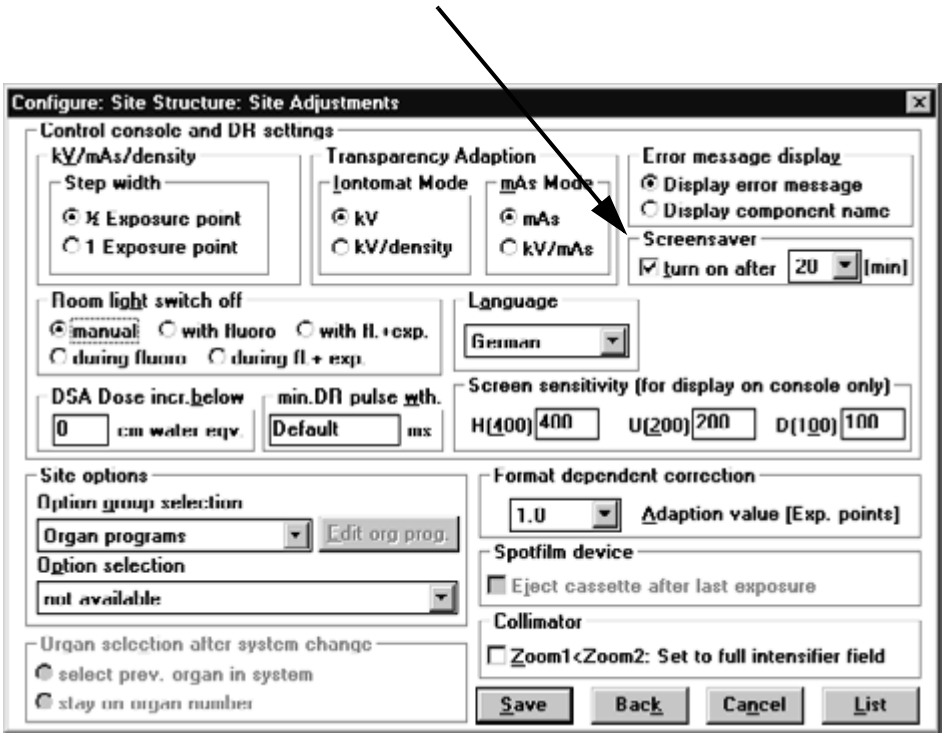

Configure: Site Structure: Site Adjustments
Control console and DR settings
kV/mAs/density
Step width
½ Exposure point
1 Exposure point
Transparency Adaption
Iontomat Mode
kV
kV/density
mAs Mode
mAs
kV/mAs
Error message display
Display error message
Display component name
Screensaver
turn on after 20 [min]
Room light switch off
manual
with fluoro
with fl.+exp.
during fluoro
during fl.+exp.
Language
German
DSA Dose incr.below
0 cm water eqv.
min.DR pulse wth.
Default ms
Screen sensitivity (for display on console only)
H(400) 400
U(200) 200
D(100) 100
Site options
Option group selection
Organ programs
Edit org prog.
Option selection
not available
Format dependent correction
1.0
Adaption value [Exp. points]
Spotfilm device
Eject cassette after last exposure
Collimator
Zoom1<Zoom2: Set to full intensifier field
Organ selection after system change
select prev. organ in system
stay on organ number
Save
Back
Cancel
List

Fig. 23:

T1 Transformer, Part No.: 97 51 801

Used in:

- POLYDOROS SX65/80 up to Serial No.: 01184

Replacing the T1

- Remove the D160
- Replace the T1
- Reinstall the D160

T1 Transformer, Part No.: 97 51 884

Used in:

- POLYDOROS SX65/80 beginning with Serial No.: 01185

Replacing the T1

- Remove the D160.
- Replace the T1
- Reinstall the D160

T2 Pre-transformer, Part No.: 48 19 756

Used in:

- POLYDOROS SX65/80 with 440V / 480V nominal line voltage

Power line voltage	Line power range	PL SX 65 maximum line current	PL SX 80 maximum line current
440 V	396 V ... 484 V	157 A_{eff}	190 A_{eff}
480 V	432 V ... 528 V	155 A_{eff}	175 A_{eff}

Replacing the T2

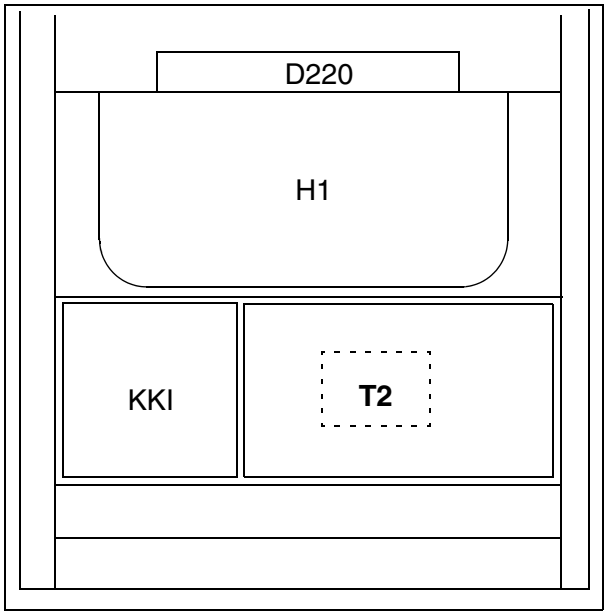


Fig. 24:

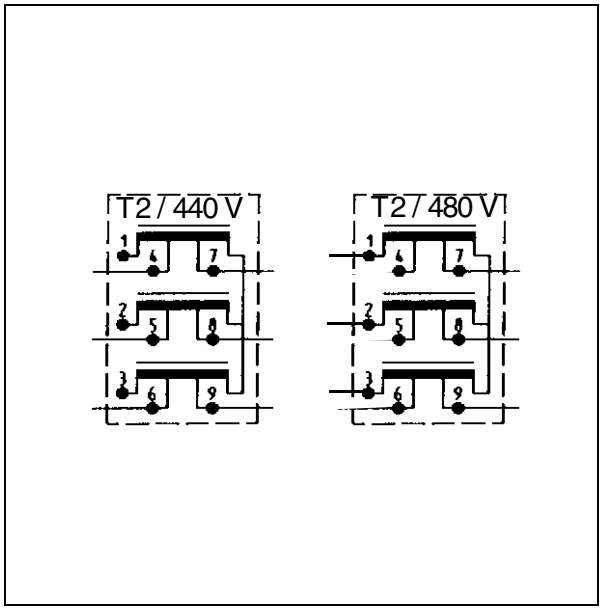


Fig. 25:

- The T2 pre-transformer is installed at the factory per the BZ. Subsequent installation location (Fig. 24 / p. 80).
- Disconnect the cables that are connected to the F1, F2, F3 fuses from the K20 terminal strip and connect them to terminals 7, 8, 9 of the T2 pre-transformer per Wiring Diagram X2206/10.
- Install the pre-transformer using the screws that are included in the shipment.
- Connect the cables that are included in the shipment between the K20 power connection terminal and the T2 pre-transformer per Wiring Diagram X2206-10 (440 V or 480 V connection) (Fig. 25 / p. 80).

W1 Inverter, Part No.: 38 27 172

Replacing the W1

- Only a mechanical replacement, no programming is required.
- Perform the Fluoro Attachment adjustment

  SSW: <POLYDOROS SX Service> <Adjustment> <FC Attachment Adjustment>

Speed Info 098/2000/AX

With the following generators, the complete inverters should be replaced in a replacement part situation:

- POLYDOROS SX65/80 Part No.: 38 27 172
  - Inverter replacement part
- POLYDOROS LX30/50 Part No.: 11 75 293
  - Inverter replacement part
- POLYDOROS LX30/50 Lite Part No.: 38 48 897
  - Inverter replacement part
- POLYDOROS LX80 Part No.: 57 59 134
  - Inverter replacement part

Z1 Power Line Filter, Part No.: 46 95 557

Replacing the Z1

- A mechanical replacement only; no programming or adjustment required.

Version 11 versus Version 10

Chapter	Changes
POLYDOROS SX65/80	The following sections were **changed**: • (Speed Info R 154-98 / p. 15) Correction of the D100 Part Numbers in Speed Info R 154-98. • (D292 AP-XCS KK Interface, Part No.: 38 26 893 / p. 40) Replacement Part Nos. listed. The following section was **added**: • (XCS Control Unit 2, Part No.: 102 80 821 / p. 73)