SIEMENS

Drive Converter Cabinet
Bucyrus Shovel 182M AC

Operation & Maintenance Manual Edition 06.2010

Doc No.: A5E02606385J/ 4M-2601-1645709

Order No: 102252549

2.1 Warranty

NOTES

If the Drive Converter Cabinet or its components are returned to Siemens under warranty conditions, the following information is absolutely necessary for the warranty claim to be honoured. While sending back the component, use the return authorization form, to give details about failure, which is enclosed in Annexure C. The filled form along with the data requested to be enclosed basically which contains following information:

- Fault memory log
- Description of equipment failure
- Installation location of component
- Drive Converter Cabinet Serial number

Siemens reserves the right to request additional information.

The components must be packed carefully. Damages incurred during transport are not covered by the warranty.

Failure to comply with this instruction manual will limit the manufacturer's warranty coverage.

2.2 Further Instructions

WARNING

- When in operation, electrical equipment contains components that are under dangerous voltage.
- The magnetic field inside the Shovel from the DCC can disturb an active heart pacemaker and therefore entry of persons with active heart pacemakers in this area is forbidden.
- Only appropriately qualified and trained personnel may work on this DCC or be in its vicinity.
- This personnel must be completely knowledgeable about all warnings and service measures as specified in this instruction manual.
- The successful and safe operation of this DCC is dependent on appropriate transportation and proper storage, erection and installation as well as careful operation and maintenance.
- Failure to adhere to these safety warnings can result in death, severe bodily injury or property damage!

Test voltages for the dielectric tests:

Electric circuit (SK)	Test Voltage AC 50 Hz, application time	Test Voltage DC	Insulation Resistance as per IEC 60146-1-1
SK1 against surroundings IEC 61287-1, Tab. F.1	4600 V, 10 s	6510V, 10 s	≥ 2 MOHM / DC 500V
SK2 against surroundings IEC 60349-2 Table 4: $U_{rp}/\sqrt{2}$=460V	1920 V, 60 s	3260 V, 60 s	≥ 1 MOHM / DC 500V
SK3 against surroundings IEC 60077-1, Table 8: Ui=120 V	1500 V, 60 s	2121 V, 60 s	≥ 1 MOHM / DC 500V
SK4 against surroundings IEC 60077-1, Table 8: Ui=130 V	1500 V, 60 s	2121 V, 60 s	≥ 1 MOHM / DC 500V
SK5 against surroundings IEC 60571, Ch.10.2.9.2: Un=DC110V	1000 V, 60 s	1410 V, 60 s	≥ 1 MOHM / DC 500V
SK6 against surroundings IEC 60571, Ch.10.2.9.2: Un=DC24V	500 V, 60 s	710 V, 60 s	≥ 1 MOHM / DC 500V

AC examination has preferably to be used for type checking.

If for any reason, it is necessary to repeat the dielectric test of the converter, the value of voltage for the second and the following tests shall be reduced to 80% of the U_p take into consideration that the dielectric test affects the quality of insulation.

DC link circuit

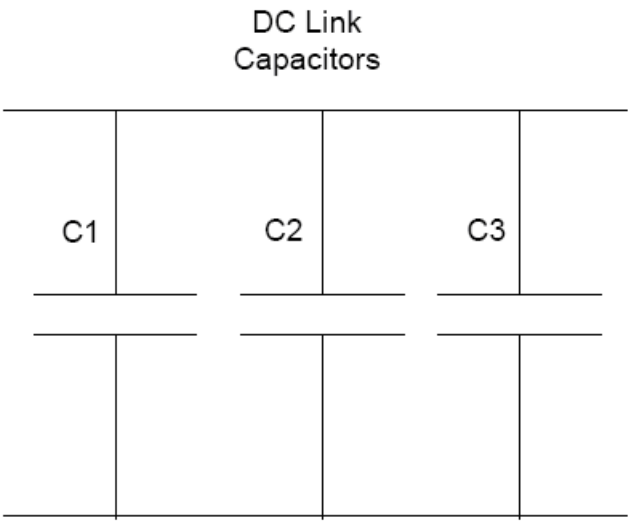


Fig.3-7 DC link circuit

The DC link capacitor is required as an energy storage unit. It provides the reactive power and serves to smooth the DC link voltage. Capacitor C1 to C3 each of 3mF is put in parallel as shown in Fig.3-7. Hence the total bank has a capacity of 9mF.

Capacitive Earth fault Detection

In the DCC, DC link is connected to earth by resistors R41 and R42 and the earth-leakage-detector is in the DC-link circuit. Resistor R41, R42, Capacitor C75 and Voltage Transducer (QPSW) U33 form the earth leakage detector. Fig. 3-8 below shows the scheme:

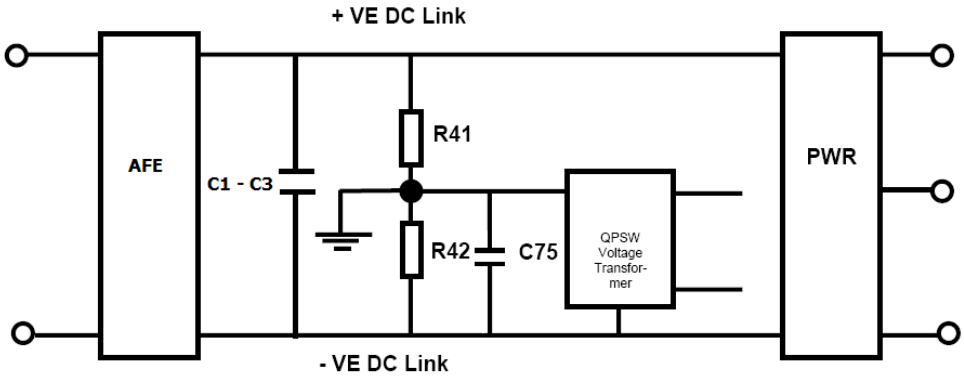


Fig. 3-8 Earth fault detection circuit

Since R41 = 99K, R42 = 33K, during normal operation the transducer depicts ¼ of the total DC link voltage. A tolerance of ± 30 % (referring to ¼ of the DC link circuit voltage) is to be taken into consideration. (Refer to Fig. 3-12 for the waveform)

In case of an earth fault the measured voltage changes because of process of reversal of charge.

Following circuits explains this phenomenon:

The DCC will be packed in Siemens factory in a packing box on a transport pallet as shown in Fig 4-2.

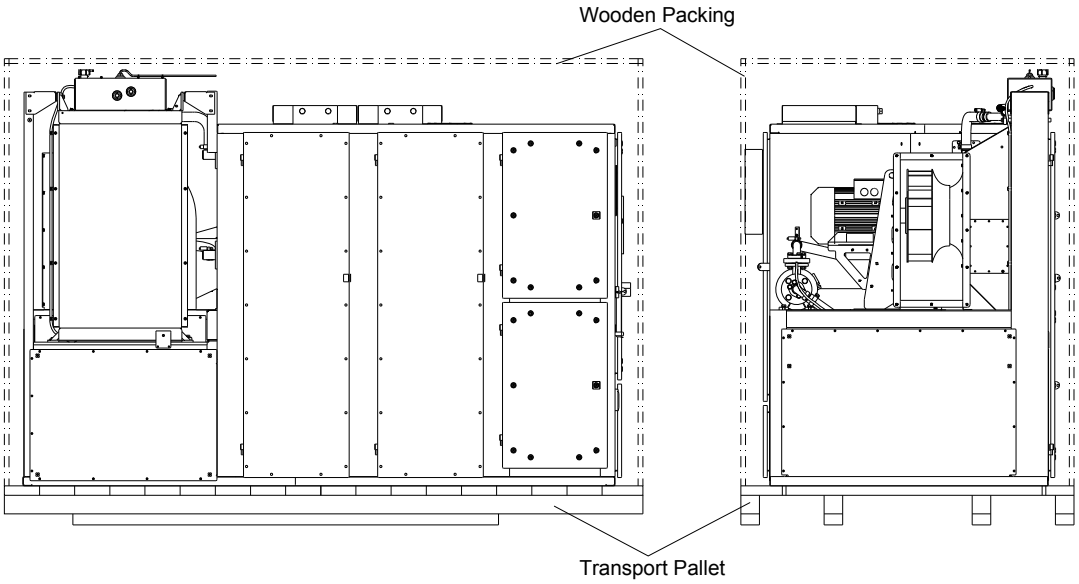


Fig. 4-2: DCC packed in packing box.

The DCC along with the transportation pallet is transported by crane as shown in Fig 4-3. Without the transportation pallet, the DCC should be transported by using Ring Bolt with Metric thread which rotates in 360° (Recommended Type: RUD VLBG (4) Size: M20 Make: Carl Stahl) Location for fixing the eyebolts is given on top side of the DCC as shown in Fig. 4-4.

Important Note:

- The crane harness must always be retained at all the four locations as shown in Fig. 4-4.
- Fixed type eyebolts (eyebolts which do not rotate) should never be used for lifting the DCC
- The height of the crane harness used must be adjustable for each individual hoisting point. It must be adjusted so that when the DCC is hoisted, it remains in a horizontal position (**observe the center of gravity**).
- The crane and crane harness must be as a minimum, suitable for the DCC weight (Approx. 5000 kg).
- The crane harness must be long enough so that there is a minimum angle of 60° between the harness and the horizontal axis.

5.3 Welding of the DCC on the machine

Shovel DCC for 182MAC is not designed to be directly welded on the machine on any type of surface. It is designed to be mounted on special base frame using nut and bolts. It is highly not recommended to do any welding activity directly on the DCC which may cause the failure of the electronics in the DCC.

In case if it is must that DCC has to be welded on the machine then this activity must be carried out with extreme care under expert's supervision. Following general notes should be considered:

- If any parts do not fit together, NEVER adjust the DCC housing by bending it or hammering it in form. Always adjust the counterpart, which must fit together with DCC.
- NEVER weld surface of DCC with paint.
- Take all necessary ESD precautions while handling all sensitive electronic components as given in Operation & Maintenance Manual of DCC.
- Take care that during welding the covers of DCC are closed so that nothing inside gets damaged due to welding arcs.
- Always connect the return line of the welding transformer as close as possible to the welded joint, so that the currents and voltage cannot spread.

Following procedure is given to avoid failures of electronics during mounting of DCC by welding method but it does not gives guarantee of non-failures.

1) Remove the paint from surface of DCC which is to be welded and clean it properly. Do not weld the surface of DCC with paint. Also protect the paint on other surface of DCC from being burned away.
2) Seal original DCC mounting holes provided in non ventilated sections of DCC to keep IP54 level intact.
3) Connect DCC and base frame to earth. Cabinet earthing points at AFE reactors and in PLC connection field.
4) Remove all power & control connections including screen connections to the DCC if they are connected at the customer connections provided.
5) Disconnect all cable connections (power cables, control cables including shield connections, earthing cables) from the maintenance station computer and its HMI.
6) Remove all the front plug connectors of the SIBAS controller.
7) Close all covers of DCC correctly before welding activity.
8) Put DCC on the base frame.
9) Take care that the DCC is oriented in correct way.
10) Take care that there is no gap between the DCC and the base frame. If there is a gap, put metal sheets between DCC and base frame, so that all gaps disappear.
11) Before welding check whether the cable entry locations from the bottom are as per proper.
12) Weld DCC to the base plate.
13) After welding clean the welding areas.
14) Remove welding cinder & rust.
15) Paint welded area with primer and later with the final paint.

2	Cooling system	Cooling medium specimen, analysis	Refer to Chapter 6.5
3	Cooling system	Check that the cooling medium connection seals for leaks	Refer to Chapter 6.6
4	Coolant pump	Check for vibration, noise in operation, damage and leaks	Refer to the Operating Instructions of the coolant pump
5	Door gaskets	Apply grease (jelly) on door gaskets to prevent adhesion/ sticking of gasket to cabinet	Nil
6	Air conditioner	Check air conditioner fans	Nil

Interval 4 – I4			
No.	**Component**	**Maintenance work**	**Cross-reference**
1	DC link capacitor	Check the capacitance value	Refer to Chapter 6.10
2	Blower	Check the Blower for heat exchanger	Refer to Chapter 6.11
3	DCU	Check DCU fans	SIBAS equipment manual

2 x I4 - the same activities as I4 - and in addition			
No.	**Component**	**Maintenance work**	**Cross-reference**
1	Main blower fan motor	Bearings of motor: Replace in qualified workshop	Refer to Chapter 6.11 and the Operating Instructions of the central fan
2	Internal cooler	Bearings of motor: Replace and overhaul in qualified workshop	Refer to Chapter 6.9 and the instructions of the indoor coolers
3	Door gaskets	Replace the gaskets on maintenance cover	Refer to Chapter 6.16

R2 – overhaul 1			
No.	**Component**	**Maintenance work**	**Cross-reference**
1	Cooling system	Replace the cooling liquid	Refer to Chapter 6.7
2	Cooling medium pump	Replace the coolant pump and overhaul in an authorized workshop	Refer to Chapter 6.8
3	DCC	Clean the inside space	Refer to Chapter 6.12
4	Switching devices	Check the main and auxiliary contacts of the contactors as well as the busbar connections in the converter	Refer to Chapter 6.13

Danger

It must be absolutely ensured that the DC link is completely discharged!

If this is not carefully observed this can result in death, severe bodily injury and significant material damage.

Carefully observe the instructions provided by the equipment manufacturer!

We recommend using a capacitance measuring bridge to measure the capacitance of the complete DC link.

Total Capacitance of DC link	Test points		Permissible capacitance value	
	From	To	Min	Max
C1,C2,C3	XP1	XN1	9 mF	9.9 mF

If value of capacitance of complete DC link is not in range then remove individual capacitors from DC link as given in 7.16 & measure capacitance value of each capacitor.

Capacitance	Test points		Permissible capacitance value	
	From	To	Min	Max
Individual Capacitor	2 or 3 terminals of capacitor (-ve)	1 or 4 terminals of capacitor (+ve)	3 mF	3.3 mF

If one or several capacitance values are no longer in the permissible range then they must be immediately replaced.

6.11 Main blower fan motor: Replacing the bearings

The bearings in the central fan must be replaced at regular intervals. To do this the main blower fan must be removed.

- Remove the fan, refer to Chapter 7.12
- A Siemens repair facility or another suitable specialist company should replace the motor bearings.

6.12 DCC: Cleaning the inner space

- Open all of the covers
- Remove coarse dirt using a vacuum cleaner
- Blow-out the dirt from the edges and corners using compressed air (dry, free of grease, max. 8 bar). Never use compressed air to clean electronic modules!

7.3.3 Replacing

Removing

- Remove power cable connection from output side busbar cable no. 11004(1x), 11005(1x), 11006(1x), 11110(2x), 11111(2x), 11112(2x), 11103(1x), 11102(1x), 11101(1x), 11108(1x), 11107(1x), 11109(1x) by unscrewing Hex nut M12, plain, spring washer (pos 616, 613, 612) using 18 no. bit & torque wrench.
- Remove power cable connection from input side busbar cable no. 10901(1x), 10902(1x), 10903(1x), 10701(1x), 10702(1x), 10703(1x) by unscrewing hex nut M12, plain, spring washer (pos 616, 613, 612) using 18 no. bit & torque wrench.
- Remove all electrical connections of motor module from shield bracket by unscrewing 4mm clamp (pos 692), Torx screw M3*89 (pos 648) using kombi screw driver.
- Remove switch module (pos 180) one by one by unscrewing hex screw M10, plain, spring washer (pos 631, 629, 630) using 16 no. bit & torque wrench.
- Remove motor module (pos 170) by unscrewing hex screw M10, plain, spring washer (pos 625, 629, 630) using 16 no. bit & torque wrench.
- Remove mounting bracket from cabinet by unscrewing hex screw M10, plain, spring washer (pos 631, 629, 630) using 16 no. bit & torque wrench.

Installing

- Assembly of Switch module to be done outside of the panel
- Take switch module, place it on table, Mount Busbar (Top rear-pos 26, Top front-pos 25, bottom rear-pos 29) (18x) on three modules by screwing Hex screw 3/8 " 16 UNC,plain,spring washer (pos 633, 629, 630) using 13 no bit & torque wrench.
- Apply torque 15 Nm, Mark torque points with marker pen.
- Mount bracket (pos 20) on cabinet by screwing hex screw M10, plain, spring washer (pos 625, 629, 630) using 16 no bit & torque wrench.
- Apply torque 50 Nm, mark torque points with marker pen.
- Mount motor module (pos 170) on bracket by screwing Hex screw M10, plain, spring washer (pos 625,629,630) using 16 no bit & torque wrench.
- Apply torque 50 Nm, mark torque points with marker pen.
- Mount three switch module(pos 180) one by one on bracket by screwing hex screw M10, plain, spring washer (pos 631,629,630) using 16 no bit & torque wrench.
- Apply torque 50 Nm, mark torque points with marker pen.
- Mount power cable connection to output side busbar (Top rear-pos 26, Top front pos-25) cable no.11004(1x), 11005(1x), 11006(1x), 11110(2x), 11111(2x), 11112(2x), 11103(1x), 11102(1x), 11101(1x), 11107(1x), 11108(1x), 11109(1x) by screwing Hex screw M12*35 (pos.620,for single connection), Hex screw M12*45 (pos 615 for double connection) , hex nut M12,plain,spring washer (pos 616, 613, 612) using 18 no bit & torque wrench.
- Also mount power cable connection to input side busbar (Bottom rear pos,29) cable no, 10901(1x), 10902(1x), 10903(1x), 10701(1x), 10702(1x), 10703(1x) by screwing Hex screw M12*35 (pos.620, for single connection), hex screw M12*45 (pos 615 for double connection), hex nut M12,plain,spring washer (pos,616,613,612) using 18 no bit & torque wrench.
- Apply torque 50 Nm, mark torque points with marker pen.
- Tie all power cable to tie rod using cable ties & tie gun.

CAUTION

- Weight of the IGBT module is 43 kg approximately.
- Antifrogen N that has been used has a corrosive effect. Further, Antifrogen N that has leaked can cause short-circuits. This is the reason that each time the cooling water connections are opened, the phase module and especially the modules located below it, must be carefully cleaned and any Antifrogen N that has leaked must be removed.

Installing modules

- Mount IGBT module into the panel on FRP Guide rail
- Tight the screws in the panel by using extension tool 101584869 & torque wrench. Torque 10 Nm.
- Mount power cables of respective IGBT modules as follows.

A13: 10703 (2x), 10704, 10705

A11: 10701 (2x), 10702 (2x)

- By screwing hex screw M12X30, HT spring washer and plain washer (pos.no110,111,125) Using 18 no bit and torque wrench and apply torque of 50 Nm
- Mount connector of respective IGBT module as follows:

A13: A13X1, A13X2

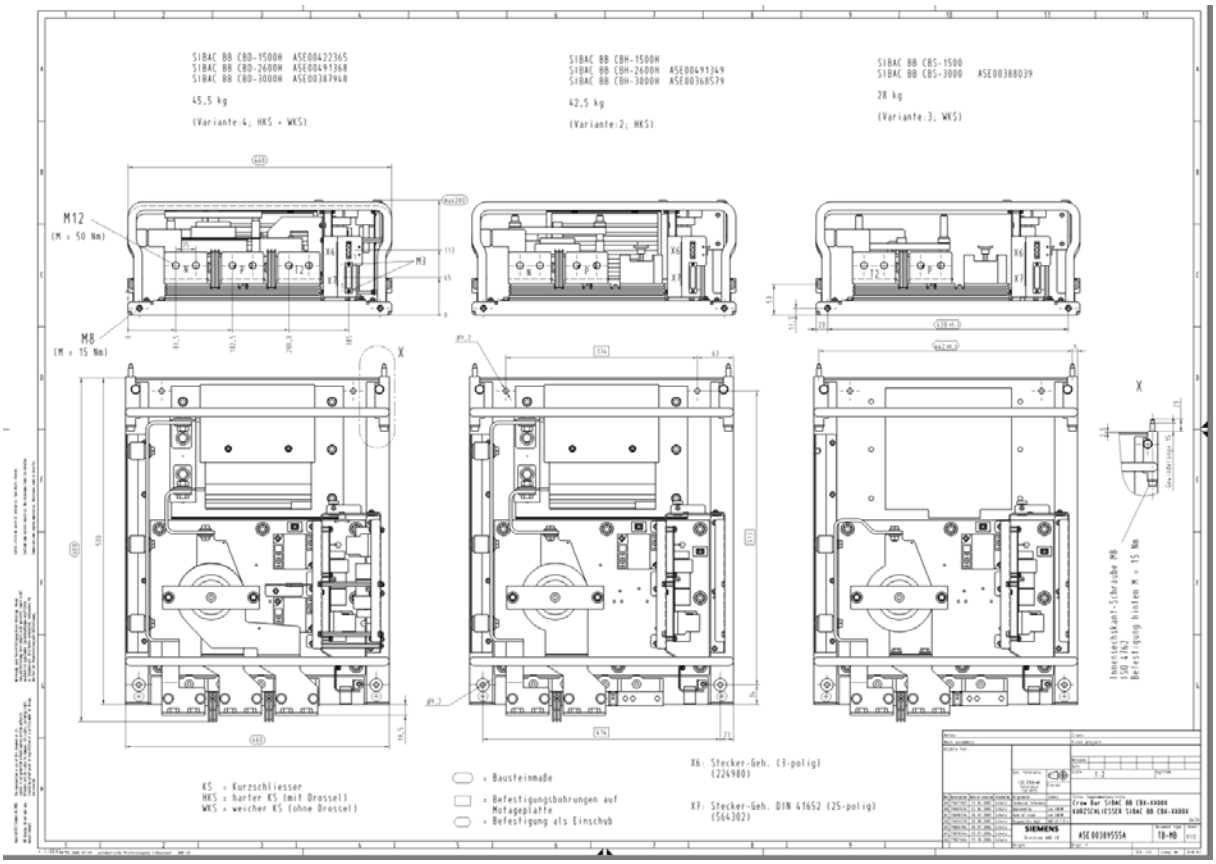
A11: A11X2, A11X1

- Mount respective coolant input output pipes
- Mount locking bracket at front by M8 screw, plain washer & spring washer with bit no 13 & torque wrench Torque 25 Nm

CAUTION

When installing the phase module ensure that the color codes match. The color of the coding plate of the phase module to be installed must match that of the coding plate attached to the DCC frame.

7.7.4 Drawing



7.7.5 Technical data

Surrounding conditions

Air temperature in built in room: -40°C to +70°C

Storage temperature: -40°C to +85°C

Condition	Class	Standard
Climatic ambient conditions	5K2, temperatures - see above	IEC 60721 - 1 - 3 -5
Biological ambient conditions	5B1	IEC 60721 - 1 - 3 -5
Chemically active materials	5C2, however no salt mist and salt water	IEC 60721 - 1 - 3 -5
Mechanically active materials	5S1	IEC 60721 - 1 - 3 -5
Contaminating agents	5F1	IEC 60721 - 1 - 3 -5
Pollution	PD 2	EN 50124 - 1

Electrical data

Maximum average DC link voltage over the life span of the component	1850 VDC
Maximum DC link voltage at which the crowbar should fire	2600 VDC
Maximum DC link voltage which can be applied to the crowbar without ignition	3200 VDC

- Using an ohmmeter measure the value of resistance which should be 3.15 Ohm (±5%).
- If the resistor presents mechanical alterations or the measured value is different than above then the resistor/resistors needs to be replaced.

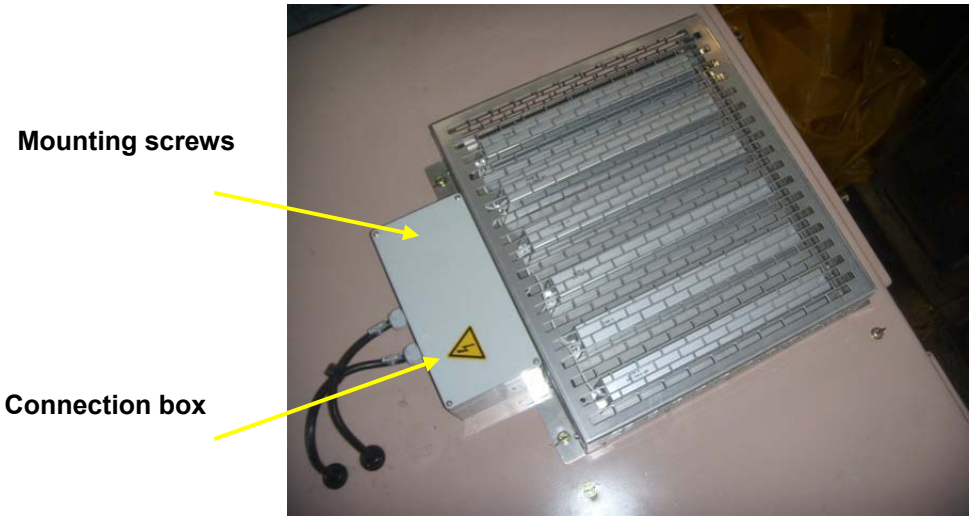
7.11.3 Replacing

Removing

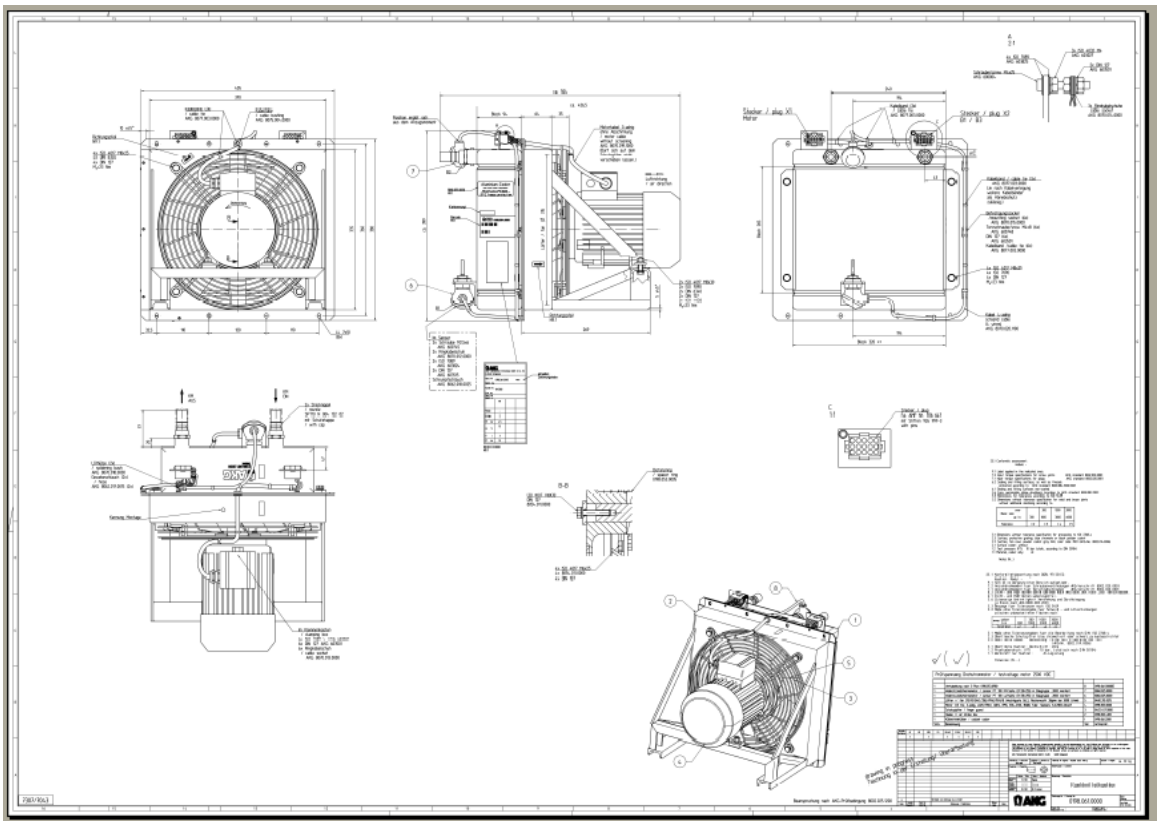
- Unscrew hex mounting screws M8 x 16 using 13 no. bit and torque wrench.
- Open the connection box of the resistor.
- Remove the power cable connections 10704, 10705 from connection box of the resistor R33.1 and 10706, 10707 from connection box of the resistor R33.2 .
- Remove the resistor box as a complete unit

Installing

- Mount resistor with hex mounting screws M8 x 16 using 13 no. bit and torque wrench. Torque 25 Nm.
- Open the connection box of resistor unit
- Connect the power cables 10704, 10705 to connection box of the resistor R33.1 and 10706, 10707 to connection box of the resistor R33.2.
- Close the connection box properly



7.14.4 Drawing



7.14.5 Technical data

Electrical data	
Rated voltage	415 V
Frequency	50 Hz
Power	1.1 kW
Protection class	IP55

Output voltage ripple	≤100 mV_{pp}
Functions	
Inhibit function	Switches ON or OFF the output voltage without switching OFF the input voltage
DC output voltage detection level (low value)	<21VDC
DC output voltage detection level (high value)	≥21VDC
Displays	
Equipment off	Green LED off
Equipment ON	Green LED glows
Equipment in current limit	Green LED blinks(hiccup mode)
Environment conditions	
Operating temperature	-40 to +70°C
Short time operating temperature(15min)	+70 to +85°C
Transport and storage	-40 to 85°C
Humidity	Relative humidity≤75%, as annual average, 95% for 30 days in a year continuous, 95-100% on other days occassionally
Protection and monitoring functions	
Current limit	6.6<I_a<7.3A
Response to short circuit	Hiccup mode
Output overvoltage protection	26 to 27V. Fixed, retentive switch OFF. Reset by switching OFF the input voltage or through inhibit.

7.21 VOLTAGE TRANSDUCER,300V

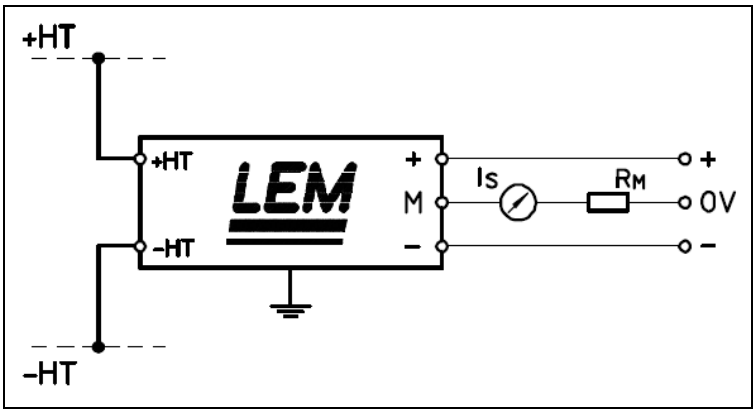
Bucyrus Part no: 62055573

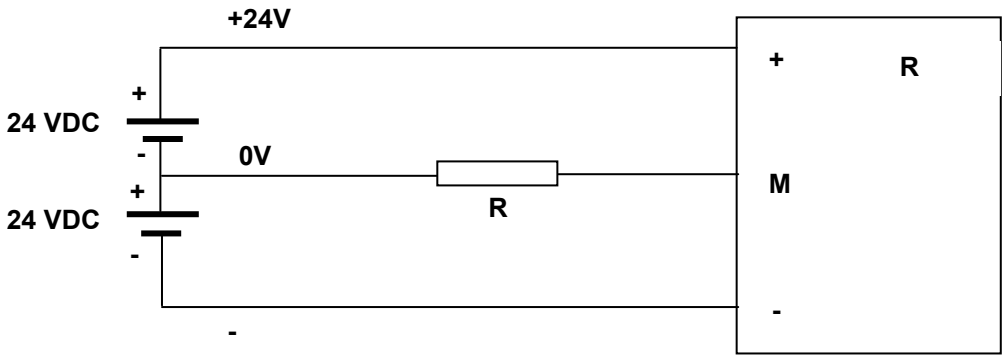
Component designation: U34, U35

7.21.1 Description

These transducers are used to measure the line voltage as well as for the synchronization with the line voltage. Following is the electrical data of the synchronizing voltage transducers.

7.21.2 Testing





- Isolate the power supply by switching off the Drive power contactor and lock out the main power supply and auxiliary power supply.
- Using a voltmeter check the DC bus to make sure that all capacitors have discharged. Use adequate meter so as to measure a voltage of 2000VDC.
- Connect two 24V DC power supplies in series. Connect +ve of first power supply to + terminal and –ve of second power supply to terminal - terminal. Connect central point M of PT with resistance R (of 1KΩ) in series and voltmeter (Fluke 189 or equivalent) across R to the –ve of first power supply. Set current limit of power supplies to 100mA.
- Using a variac give a voltage of 150VAC between the input terminals +HT and –HT.

7.25.3 Replacing

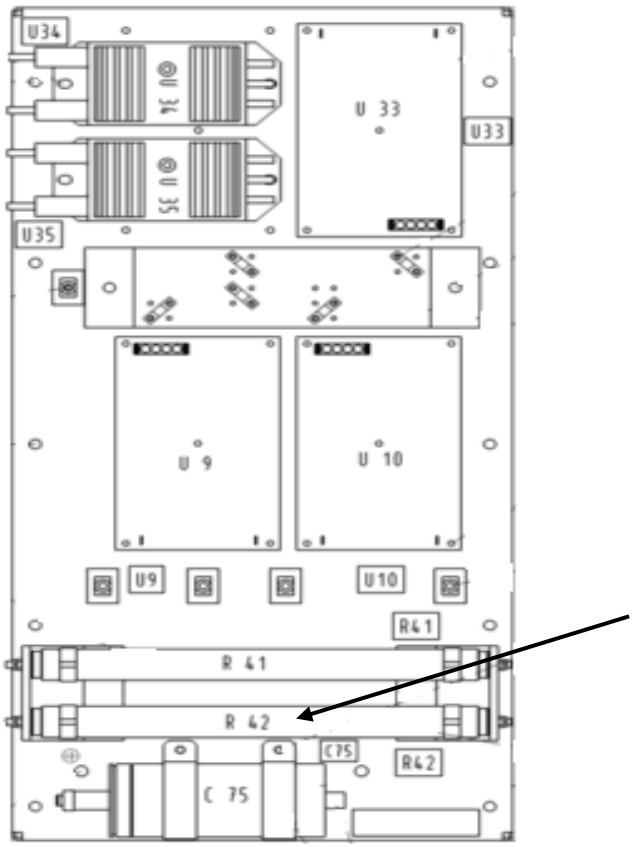
Removing the resistor

- Disconnect all electrical connction from resistor.
- Take out resistor from ceramic guide clamps by removing hex nut M4 using 7 no. bit and torque wrench.
- Remove cramic guide clamps on both sides by removing hex screw M6 x 16 using 10 no. bit and torque wrench.

Installing the resistor

- Mount cramic guide clamps on plate both sides by using hex screw M6 x 16 with 10 no. bit and torque wrench. Torque 10 Nm.
- Mount resistor on clamps by using hex nut M4 with 7 no. bit and torque wrench. Torque 1.9 Nm. Use ceramic & special clinger washer between ceramic clamp & resistor.
- For details refer assembly drawing for precharging plate assembly.
- Make over all electrical connections of resistor as per circuit diagram.
- Tie all cables using cable tie to LKC socket properly.
- Check all connections.

7.25.4 Drawing



7.29 AUX. CONTACTOR, 120VAC

Bucyrus Part no: 62056670

Component designation: K5, K6, K7, K8, K9

7.29.1 Description

3RH1122-2AK20 is an auxiliary contactor with 120 VAC coil used in control circuit.

7.29.2 Testing

- Isolate the power supply by switching off the drive power contactor and lock out the main power supply and Auxiliary power supply.
- Using a voltmeter, check the DC Bus to make sure that all capacitors have discharged. Use an adequate meter for a DC level of 2000 V.
- Check magnetic components (e.g., coil) and insulating parts (e.g., components of plastic) for dirt/dust and damage.
- Check the disconnecting switch for smooth action (turn switch off/on by hand).
- Give externally 120VAC to the coil of the contactor. The contactor should pick up. Check the contact resistance between auxiliary contacts. It should be ideally 0 Ohms.
- If the above conditions are not satisfied replace the contactor.

7.29.3 Drawing

7.29.4 Technical data

General details:	
Size of the contactor	S00
Item designation	
• according to DIN EN 61346-2	K
• according to DIN 40719 extendable after IEC 204-2 / according to IEC 750	K

7.33 POWER SUPPLY (QUINT-PS-100-240AC/24DC/40A)

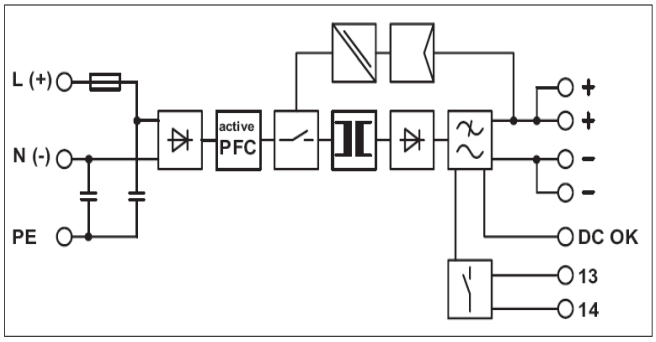
Bucyrus Part no: 62056738

Component designation: G01

7.33.1 Description

The power supply is used to provide 24VDC voltage required for the simatic I/O's, to operate the main and auxiliary contactors, to operate the transfer switch.

Circuit diagram



7.33.2 Testing

- Isolate the power supply by switching off the drive power contactor and locking out the main and auxiliary power supplies.
- Using a voltmeter, check the DC Bus to make sure that all capacitors have discharged. Use an adequate meter for a DC level of 2000 V.
- Remove the input and output cables from the power supplies.
- Check continuity between the L and N on the input side and between + and – on the output side of both the power supplies. Continuity should not be observed.
- If above test is successful the power supplies should be tested individually with an input voltage of 120VAC.
- Check the output voltage in each case. The output voltage should be 24VDC (+/-1%).
- In case any deviation is observed in the output voltage, adjust the output voltage to 24VDC by adjusting the POT whose location on the power supply is shown at position 5 in the figure below.

7.38 DIGITAL O/P MODULE (24V DC 32 CH)

Bucyrus Part no: 62056683

Component designation: A114-D18

7.38.1 Description

The SM 422; DO 32 x 24 VDC/0.5 A is a digital output module with the following characteristics

- 32 outputs, isolated in a group of 32, that is, all outputs are connected to a common ground
- Output current 0.5 A
- Nominal load voltage: 24 VDC

7.38.2 Technical data

Dimensions and Weight	
Dimensions WxHxD (mm)	25 x 290 x 210
Weight	approx. 600 g
Module-Specific Data	
Number of outputs	32, 24 VDC
Cable length	
• Unshielded	600 m
• Shielded	1000 m
Voltages, Currents, Potentials	
Nominal load voltage L+ Permissible range	24 VDC 20.4 V to 28.8 VDC
Total current of the outputs (for each supply voltage group of 8 outputs)	
• Up to 35 °C	4 A
• Up to 60 °C	2 A
Galvanic isolation	yes, using optocouplers
• In groups of	32
Current consumption	
• from S7-400 bus (5 VDC)	max. 200 mA typically 160 mA
• From load current supply L+ (without load)	max. 30 mA
Power losses of the module	typically 4 W
Status, Interrupts, Diagnostics	
Status indicated	yes, green LED per channel
Interrupts	none
Diagnostic functions	none

Data for Selecting an Actuator	
Output voltage	
• At signal "1"	min. L+ (-0.3 V)
Output current	
• At signal "1" Nominal value Permissible range	 0.5 A 5 mA to 0.6 A
• At signal "0" (residual current)	max. 0.3 mA
Lamp load	max. 5 W
Parallel switching of 2 outputs (same group)	
• For enhancing performance	possible
• For logic operations	possible
Setting a digital input	yes
Switching frequency max.	
• At resistive load	100 Hz
• At inductive load	2 Hz at 0.3 A 0.5 Hz at 0.5 A
Switching delay	max. 1 ms
Inductive cutoff voltage limited (internally) to	- 27 V
Short-circuit protection of the output[1]	yes, electronically clocked
• Switching threshold	0.7 to 1.5 A
Test voltage	
Voltage check	
• Between output group and central grounding point	500 VDC
• Between S7-400 bus and central grounding point	500 VDC

7.42.3 Technical data

Mode Selector Switch

You can select the operating mode of the CPU using the mode selector switch.

The mode selector is a key switch with three settings. You can use different protection levels and restrict program changes or startup possibilities (transition from STOP to RUN) to specific personnel.

Receptacle for memory cards

You can insert memory cards into this receptacle.

There are two types of memory cards:

- RAM cards
  With the RAM card, you can expand the load memory of a CPU.

- Flash cards
  With the Flash card, you can store your user program and your data safe from power failures (even without a backup battery). You can program the Flash card either in the programming device or in the CPU. The Flash card also expands the load memory of the CPU.

Multipoint Interface (MPI)

You can connect the following devices, for example, to the multipoint interface:

- Programming devices
- Operator interface devices
- Further S7-400 or S7-300 programmable controllers.
  Use bus connectors with slanted outgoing cables.

You can also use the MPI interface as a PROFIBUS-DP interface. For this purpose you can reconfigure the MPI interface under STEP 7 in the SIMATIC manager.

PROFIBUS-DP Interface

You can connect the distributed I/O, programming devices/operator panels, and other DP master stations to the PROFIBUS-DP interface.

7.44.4 Technical data

DIP switches:
The 8-switch DIP switch on the housing frontis used for setting the profibus address of the device and the CAN operating mode.
The switches are counted from bottom to top.

Switch	Function		
8	**Mode**	**ON=CANopen**	**OFF= Layer 2**
7		2^6	+64
6		2^5	+32
5		2^4	+16
4		2^3	+8
3	Profibus	2^2	+4
2	address	2^1	+2
1		2^0	+1

Dimensions	114 x 18 x 108 mm (LxWxH)
Weight Approx.	120 g
CAN interface	
Type:	ISO/DIN 11898-2, CAN high speed physical layer
Transmission rate:	10kbps to 1Mbps
Protocol:	CAN open master
	CAN 2.0A(11 bit)
Pin:	3 way screw type terminal.
Profibus DP interface	
Type:	Profibus DPto EN50 170
Transmission rate:	19.2 kbps to 12 Mbps
Pin:	SUB D-connector, 9-Way
Power supply:	
Voltage:	+24VDC
Current consumption:	180 mA(type)
Permissible ambient conditions:	

Front-mounted integrated mouse	X	—

Power loss *)

	12" TFT Key panel	15" TFT Key panel	12" TFT Touch panel	15" TFT Touch panel	17" TFT Touch panel	19" TFT Touch panel
Efficiency of the power supply 86%						
Control unit	30 W	30 W	30 W	30 W	50 W	53 W
Computer unit	75 W	75 W	75 W	75 W	75 W	75 W
PCI cards (17.5 W each)	35 W	35 W	35 W	35 W	35 V	35 W
Panel PC 677B	105 W	105 W	105 W	105 W	125 W	128 W
Panel PC with 2 PCI plug-in cards	140 W	140 W	140 W	140 W	160 W	163 W

*) The specified values apply to the maximum configuration of the device

Weight

Panel PC 677B	12" TFT Key panel	15" TFT Key panel	12" TFT Touch panel	15" TFT Touch panel	17" TFT Touch panel	19" TFT Touch panel
Weight of complete unit	11.89 kg	16.01 kg	12.51 kg	14.44 kg	17.2 kg	16.8 kg
Control unit	4.89 kg	9.01 kg	5.51 kg	7.44 kg	10.2 kg	9.8 kg

Panel PC 677B

Complete unit	Temperature in cabinet	Ambient temperature Cabinet	Comment
Installed in cabinet, different temperatures	50 °C	40 °C	• Maximum PCI load 15 W • Optical drives may not be operated with a temperature > 40° C.
Installed in cabinet, same temperature inside and outside	45 °C	45 °C	• Complete configuration, maximum PCI load 30 W (2

7.50 SITOP DC UPS MODULE 24V

Bucyrus Part no: 62059290

Component designation: G10

7.50.1 Description

This UPS module is used to give backup power & do safe shut down of host computer in DCC. It communicates with host computer with USB interface and gives information about supply conditions. Communication software in host computer can make safe shut down in case of supply power failure to UPS.

7.50.2 Testing

UPS module sends 3 hardwired signals to PLC DI module from which PLC monitors the status of UPS. In normal operation, the green LED (o.k.) is illuminated and relay contact X2.2 – X2.3 (o.k.) is closed. In floating operation, the yellow LED (Bat) is illuminated and relay contact X2.1 – X2.2 (Bat) closed. When the "Battery not ready" signal is active, the red LED (Alarm) is illuminated and relay contact X2.4 – X2.5 (Alarm) closed. Alarm signal can be due to "OFF" operating state, no battery module connected, reversed polarity or defective battery (battery voltage < 18.5V) or open circuit between battery and UPS module.

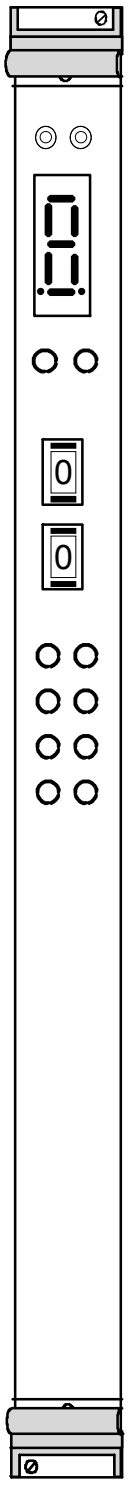
7.50.3 Replacing

Removing

- Remove the UPS module connections cables from connectors X1, X2 & X3 on UPS module.
- Remove the UPS module pluged on the DIN rail channel.
- Take out the UPS module from DCC

Installing

- Mount the UPS module in DCC on DIN rail channel
- Make the connections to UPS as per circuit diagram



2 bushes: bridged = "EEPROM can be written on"

7segment-display

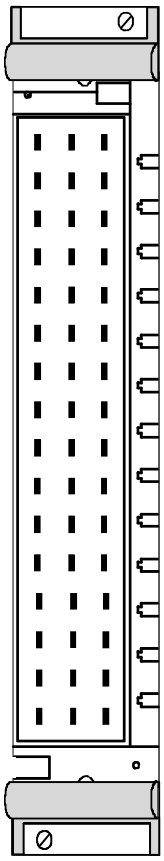
2 LEDs: red = TOTAL INHIBIT
yellow = RESET

2 BCD switches

8 LEDs (yellow)

7.54.4 Technical data

7.58.3 Diagram



48-pole

7.58.4 Technical data

Order number:		6FH9413-3B
Backplane connector:	X1	64-pin plug connector to DIN 41612 small SIBAS bus
Front panel connector:	X2	48-pin plug connector to DIN 41612
Slot width:		4 TE
Weight:		Approx. 200g
Component ambient temperature:		- 40 °C ... + 85 °C
Power supply:		+ 5V ± 5%, approx. 10mA + 15V ± 3% approx. 85mA - 15V ± 3% approx. 85mA

Component ambient temperature:	-40 °C to +85 °C
Structure:	Printed circuit board in single-size Euroformat (100 mm * 160 mm)
Standards (if applicable):	VDE 0160, VDE 0110, LES-DB, EN 50155, IEC 60571, EN 50121-3-2, Ed. 2000, EN 60000-4-5
Power supply:	+5 V ± 5 %, max. current consumption 200 mA
Inputs (X1)	
Input voltage	5 V HCMOS level
Connection of port inhibit input BINEN[01-08]#	Do not connect (open) or wrap to "M"
Control voltage U_{ANST}	3 V < U_{ANST} ≤ 15.5 V, max. current consumption 10 mA
Outputs (X2)	
Number of outputs	8
DC voltage at X2	≤ 55 V
Permissible output current I_A	≤ 2.0 A
Leakage current in the disabled state	≤ 250 µA
Switching frequency	
Ohmic load	≤ 2.5 kHz
Effect of short-circuit protection	> 45 A
Maximum resistance R_L of the entire conductor loop for short-circuit protection	< 0.2 Ω
Minimum length l_{LTGMIN} of the battery supply lines	3 m
Overload strength	Outputs are not continuously overload-proof
Voltage U_{SCHUTZ} of the overvoltage protection	≥ 95 V
Parallel connection of outputs	
Number of parallel branches	Maximum of two channels each (four pairs)
Current reduction factor K_P in the case of parallel connection	0.85 i. e. I_P ≤ 1.7* I_A

waiting time, the voltages still have not stabilized then the PSU is switched off. In the event of a fault, the inverter pulses are inhibited and the power supply units are switched off.

7.65.2 Testing

- Ensure the breaker Q07 is OFF.
- The 110V DC power supply is connected to the PSU at the Front panel Connector. Check for loose connection and ensure the connections are good.
- Switch ON the breaker Q07. Check the 110V DC Power Supply to the card with a multimeter. The measured voltage should be 110V + 5%. The power 110V DC can be measured across terminals X1A & X1D.
- If the 110V DC is available, then the PSU will generate the six Power supply voltages for the SIBAS rack.
- Check individual power supply units by observing the yellow LED on the Front panel of each power supply. If the LED is ON, it indicates the power supply is OK.
- Flip the Q07 breaker ON and OFF as many times to ensure all the individual power supplies are OK. If the power supplies do not get ON at all, then the PSU unit is defective then replace the PSU unit

7.65.3 Replacing

- Switch off the 110V DC supply by making the breaker Q07, OFF. Also ensure that there is no voltage across terminals X1A & X1D.
- Pull out the card from the rack by unscrewing the top and bottom fixing screw.
- Replace the PSU unit with a new unit.
- Switch ON breaker Q07. Check all the individual power supply modules are ON

Caution: The module must not be plugged in or removed during operation.