

Installation Guide

RPC eSVG IP 54

Power Factor Correction – efficient Static Var Generator

Nominal Current **100A-600A**

Nominal Voltage **220V – 480V (50Hz / 60Hz)**



Version 01/2026



General
Industry



Marine



Oil & Gas



Water
Treatment



Data
Center



Buildings

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1. Important Information

1.1 About the manual

These present operating instructions are the translation of the original instructions, which were composed in the official EU language German.

These operating instructions shall ensure safe operation of and with the filter module REVCON RPC-eSVG. They contain security advices which must be observed and information which is necessary for an undisturbed operation of the units and for the exploitation of all advantages of the system.

All persons who work on and with the filter module REVCON RPC-eSVG must have accessible the operating instructions, or the equal chapters of the operating instructions for other with this option equipped REVCON products available. All persons must follow the relevant notes and designations.

The operating instructions must be complete and perfectly legible. Please read this manual carefully and follow all safety precautions before moving, installing, operating and servicing the RPC-eSVG Filter, if ignored, physical injury or death may occur, or damage may occur to the devices.

1.2 Terms and definitions

Filter module

For „Filter module REVCON RPC-eSVG“ the term „Filter module“ will be used.

Drive controller

For the frequency inverter which is used together with the power feedback unit in the following the term „Controller“ is used

Drive system

For a drive system with harmonic filter, power feedback units, controller and other components of the drive system in the following the term „Drive system“ is used.

1.3 Type code

The type code is part of the name plate and contains important information about the active harmonic filter.

RPC –eSVG 125 – 480 – 50/60 – 54 – A

① Code	② Nr.	③ detaillied designation	④ Detailed signification
Short form	①	Product designation	RPC: Revcon PF Correction
Product type	②	Product type	eSVG: Static Var Generator
Nominal current	③	Nominal reactive power	125: 125 kVAr
Voltage class	④	Voltage class	480: 220-480V
Mains frequency	⑤	Mains frequency	50/60: 50Hz and 60Hz
IP	⑥	IP degree of protection	54: IP54
Version	⑦	A, N , UXX or NUXX	A:3P3W- N:3P4W- UXX 3P3W with Free place- NUXX 3P4W with free place

1.4 Name plate



Serien-Nr. / Serial no.

Artikel-Nr. / Article no.

Typ / Type

Spannung / Voltage

Optionen / Options

I RMS / MAX

Gewicht / Weight

Umgebungstemp. / Ambient Temp.

Schutzart / Protection

ELTROPLAN-REVCON GmbH

Active PFC

254603618

35090010

RPC-eSVG 125-480-50/60-54-A

3 x 380 - 480 V AC / 50/60Hz

-

150A / 150A

190 Kg

Max 40°

IP 54



Made in Germany

1.5 Legal regulations

Marking	Name plate	CE-marking	Manufacturer/Seller
	Filter modules REVCON® RPC-eSVG are clearly marked by the content of the nameplate	Conformable to EG directive "low-voltage"	ELTROPLAN-REVCON Edisonstraße 3 59199 Bönen Germany
Intended use	RPC REVCON® eSVG • only to use under the terms of this operating instructions and the required operational conditions • are components – to reduce the reactive power and harmonic distortions of the electrical network by inductive/capacitive loads and specific B6 rectifiers and inverters – to fit in a machine – to assembly with other components to a machine together • are electric equipment to assembly in a electrical enclosure or similar • locked up operations rooms • conform to the protection requirements of the EG directive "low-voltage " • are no machines in terms of the EG directive "machines" • are no household appliances, but components which are determined only for the further application in commercial use Drive system with RPC module REVCON® eSVG • conform to the EG directive "Electromagnetic Compatibility", if they are installed by the specifications of the CE-typical drive control system • are applicable – in the public electrical network and closed electrical networks. – in the industrial sector and in living areas as well as in business units. The responsibility for the compliancy of the EG directive with the machine application is one for the user.		
Liability	• The indicated information, technical data and notes in this operating instruction were updated at the time of the printing. No demands for changing a delivered filter module can be asserted by the information, figures and descriptions of these operating instructions. • The represented process engineering notes in this operating instructions and circuit details are suggestions, which transferability on the respective application must be verified. For the suitability of the specified procedures and circuit suggestions accepts the ELTROPLAN-REVCON GmbH no guarantee. • The data in these operating instructions describe the characteristic of the products without ensuring them. • No Liability will be taken over for damages and malfunctions which result by: – disregard of the operating instructions – arbitrary changes on the filter module – operating errors – improper works on and with the inverter		
Warranty	• Warranty conditions: Refer to the sales - and delivery conditions of the ELTROPLAN-REVCON GmbH. • Immediately announce guarantee claims after the discovery of defects or faults • The warranty expires in all cases, in which even no liability claims can be asserted.		
Disposal	Material	Recycling	Disposal
	Metal	●	-
	Plastic	●	-

	PCB		●
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2. Safety precautions

2.1 What this chapter contains

Please read this manual carefully and follow all safety precautions before moving, installing, operating and servicing the RPC eSVG, if ignored, physical injury or death may occur, or damage may occur to the devices.

If any physical injury, death, or damage to the devices occurs for ignoring to the safety precautions in the manual, our company will not be responsible for any damages and we are not legally bound in any manner.

2.2 Safety definitions and warning symbols

All Safety definitions have a uniform layout:

- The pictogram shows the kind of danger
- The signal word characterizes the severeness of danger
- The note describes the danger and suggest how to avoid the danger.



Signal Word **Mot de signal**

Note

Noter

	Used Pictogram	Instruction	
Warning of personal injury Avertissement de blessure corporelle		Imminent danger by electricity <i>Danger imminent par l'électricité</i>	Danger! Danger! Warns of an immediate imminent danger. In case of disrespect, death or severe injury may happen. <i>Avertit d'un danger imminent immédiat. En cas de manque de respect, la mort ou des blessures graves peuvent survenir.</i>
		Warning of an imminent danger <i>Avertissement d'un danger imminent</i>	Warning Avertissement Warns of a possible, very dangerous situation. In case of disrespect, death or severe injury may happen. <i>Avertit d'une situation possible et très dangereuse. En cas de manque de respect, la mort ou des blessures graves peuvent survenir.</i>
		Dangerous Situation <i>Situation dangereuse</i>	Caution! Mise en garde! Warns of a possible, dangerous situation. In case of disrespect, minor injury may happen. <i>Avertit d'une situation possible et dangereuse. En cas de manque de respect, des blessures mineures peuvent survenir.</i>
		Warning of hot surface <i>Avertissement de surface chaude</i>	Warning! Avertissement Warns of touching of a hot surface. In case of disrespect, burnings may happen <i>Avertit de toucher une surface chaude. En cas de manque de respect, des brûlures peuvent survenir</i>
Warning of property damages Avertissement de dommages matériels		Harmful Situation <i>Situation préjudiciable</i>	Stop! Arrêter Warns of possible property damage. In case of disrespect, the system and it's environment may be damaged <i>Met en garde contre d'éventuels dommages matériels. En cas de non-respect, le système et son environnement peuvent être endommagés</i>
Useful information and hints for using Informations utiles et conseils d'utilisation		Information <i>Information</i>	Note! Noter! Marks a general, useful hint. If it is observed, usage of the system will be easier <i>Marque une indication générale et utile. S'il est observé, l'utilisation du système sera plus facile</i>



Safety and application notes for drive systems

(following Low Voltage Directive 2006/95/EG)

1. General

During operation, eSVG modules may have, according to their type of protection, live, bare, in some cases also movable or rotating parts as well as hot surfaces.

Non-authorized removal of required cover, inappropriate use, incorrect installation or operation, creates the risk of severe injury to persons or damage to material assets.

Further information can be obtained from the documentation.

All operations concerning transport, installation and commissioning as well as maintenance must be carried out by qualified, skilled personnel (IEC 364 and CENELEC HD 384 or DIN VDE 0100 and IEC-Report 664 or DIN VDE 0110 and national regulations for the preventions of accidents must be observed).

According to this basic safety information qualified skilled personnel are persons who are familiar with the erection, assembly, commissioning and operation of the product and who have the qualifications necessary for their occupation.

2. Application as directed

eSVG modules are components which are designed for installation in electrical systems or machinery.

When installing in machines, commissioning of the eSVG module (i.e. the starting of operation as directed) is prohibited until it is proven, that the machine corresponds to the regulations of the EC Directive (2006/42/EC) (Machinery Directive); EN 60204 must be observed.

Commissioning (i.e. starting operation as directed) is only allowed when there is compliance with the EMC-Directive (2004/108/EC).

The eSVG modules meet the requirements of the Low-Voltage Directive (2006/95/EEC). The harmonized standards of the prEN 50178/DIN VDE 0160 series together with EN 60439-1/DIN VDE 0660 part 500 and EN 60146/DIN VDE 0558 are applicable for the power feedback unit. The technical data and information on the connection conditions must be obtained from the nameplate and the documentation and must be observed in all cases.

3. Transport, storage

Notes on transport, storage and appropriate handling must be observed. At non-observance any warranty expires. The eSVG unit has to be protected from inadmissible stress. The transport is only valid in original packaging and in the thereon by pictograms marked transport position. In particular during transport and handling no components are allowed to be bent and / or isolating distances may not be altered. The modules are equipped with electrostatic sensitive devices, which may be damaged by improper handling. Therefore, it has to be avoided to get in contact with electronic components. If electronic components are damaged mechanically the module must not be put into operation, as it cannot be ensured, that all relevant standards apply. **This safety information must be kept!**

4. Erection

The modules must be erected and cooled according to the regulations of the corresponding documentation.

The eSVG modules must be protected from inappropriate loads. Particularly during transport and handling, components must not be bent and / or isolating distances must not be changed. Touching of electronic components and contacts must be avoided.

eSVG modules contain electro-statically sensitive components which can easily be damaged by inappropriate handling. Electrical components must not be damaged or destroyed mechanically (health risk are possible!).

5. Electrical Connection

When working on live eSVG modules, the valid national regulations for the prevention of accidents (e.g. VBG 4) must be observed. Before any installation or connection works, the plant has to be switched off and to be secured properly.

The electrical installation must be carried out according to the appropriate regulations (e.g. cable cross-sections, fuses, PE-connection). More detailed information is included in the documentation. When using the eSVG module with controllers without safe separation from the supply line (to VDE 0100) all control wiring has to be include in further protective measures (e.g. double insulated or shielded, grounded and insulated).

Notes concerning the installation in compliance with EMC – such as screening, grounding, arrangement of eSVGs and laying of cables – are included in the chapter installation of this documentation. These notes must be also observed in all cases for eSVG modules with the CE-mark. The compliance with the required limit values demanded by the EMC legislation is the responsibility of the manufacturer of the system or machine.

6. Operation

Systems where eSVG modules are installed, if applicable, have to be equipped with additional monitoring and protective devices according to the valid safety regulations e.g. law on technical tools, regulations for the prevention of accidents, etc. After disconnecting the eSVG module the supply voltage, live parts of the eSVG module and power connections must not be touched immediately, because of possibly charged capacitors. For this, observe the corresponding labels on the drive controllers.

During operation, all covers and doors must be closed

7. Maintenance and service

The manufacturer's documentation must be observed.

The product-specific safety and application notes in these Operating Instructions must also be observed!!

2.3 General safety information

- These safety regulations are not entitled to completeness. In case of questions please contact our technicians.
- When commissioning the eSVG module is compliant with the state of the art. The eSVG module generally allows safe operation.
- The statements of this manual describe the attributes of the products without guaranteeing them.
- The eSVG module unit may expose persons, the power feedback units itself and other material to danger, if
 - non-qualified personal works at and with the eSVG module
 - the eSVG module is used in opposite to its purpose.
- eSVG modules have to be projected in a way, that they fulfil their function and don't expose persons to danger, if they are mounted correctly and are used in accordance with their purpose. This applies also for the interplay with the whole plant.
- The units, operational data and circuit details described in this manual have to be understood analogously and have to be checked for transferability to each application.
- Use the drive system only in flawless condition.
- Modifications of the eSVG modules without consultation of a REVCON®-technician are not allowed generally .
- The warranty given by us expires, if the unit is modified or (even partially) dismantled or if it is used in contradiction to our instructions.
- The constructor of the plant, who has to know the technical guidelines, bears the responsibility for the correct selection and arrangement of the electrical components.
- Putting into operation of the eSVG module unit is only admissible at VDE-conform nets of electrical power supply. Non observance may damage the device!
- In accordance with the corresponding standards and guidelines the operation on even for a short time over-compensated networks ($\cos\varphi \leq 1$) respectively on un-choked compensation-units is not admissible. If this is done nevertheless, overvoltage will occur (caused by oscillating currents), which may damage all connected components, especially electronic units like controllers and eSVG modules.

Stop!



Undisturbed and safe operation of the eSVG module is possible only if the hints of this instruction are observed.

If they are not observed, in some cases malfunctions and damages may occur:

- Observe specified mains voltage.
- Power and control cables must be installed with distance (> 15cm)
- Use screened / twisted control wires. Connect screen to PE at both ends!
- Ensure good grounding of drive, motor and filter module. Connect the screen of power cables to ground extensive at both ends.(remove lacquer)!
- Observe star layout for grounding of cabinets and systems (AVOID ground loops!)
- The filter module is designed for fixed mounting and electrical connection.

2.4 Safety responsible persons

Operator

- The operator is any natural or legal person who is using the system or let someone use the system.
- The operator and / or the safety responsible person must take care for:
- all relevant rules , guidelines and laws must be observed
- only qualified personnel will work with and on the system
- the manual will be available for the personnel during working at the system.
- unqualified personnel will be forbidden to work on the system.

Qualified personal

Stop!



- Qualified technical personnel are persons, who
 - have appropriate training, knowledge and experience
 - are informed about relevant specifications, standards and accident prevention regulations
 - are trained in the installation and operation of relevant systems
 - are able to recognize and avoid possible dangers
 (Definition for qualified personnel in accordance to IEC 364)
-

2.5 Specification of wires and cables

- The used wires and cables must comply the relevant standards at place of installation and operation.
- Rules regarding minimum PE cross section must be observed in any case!

2.6 Rest danger



Danger!

ELECTRIC SHOCK, DAMAGE OR ARC FLASH

After switching off the mains supply all terminals may stay live for up to fifteen minutes!

Before touching, verify that no voltage is present.

Failure to comply will result in death or serious injury



Danger!

Arc Flash CHOC ÉLECTRIQUE, DOMMAGES OU ARC ÉLECTRIQUE

Pour l'entretien, débranchez toute l'alimentation électrique.

- Attendez 15 minutes. – Vérifiez qu'il n'y a pas de tension

Le défaut de le faire peut entraîner la mort ou des blessures graves.

3. Fast start

3.1 What this chapter contains

This chapter describes the basic guidelines for installation and commissioning of RPC-ESVG, which should be observed for fast and easy usage.

3.2 First check when unpacking

Please check the goods during and immediately after receipt on the following characteristics:

1	Please check the packaging for intactness and dryness. If this is not the case, immediately get in contact with the sender.
2	Please check if the type-code on the packaging matches the ordered product. If this is not the case, immediately get in contact with the sender.
3	Please check for any kind of moisture inside the packaging and for any kind of damages at the product. If this is not the case, immediately get in contact with the sender.
4	Please check if the type code on the packaging matches the data on the name plate. If this is not the case, immediately get in contact with the sender.
5	Please check if the packaging contains all accessories including manual. If this is not the case, immediately get in contact with the sender.

3.3 Suitability for the application

Please check if all current transformers and the the adjusted parameters are suitable for the application before you start up the RPC-eSVG for the first time.

3.4 Environment conditions

Please check and consider the following environment conditions before starting the installation:

1	Check for the ambient temperature to be below 40°C. If it is higher, consider the following derating: $>40^{\circ}\text{C} <45^{\circ}\text{C} = 10\%$ $\geq 45^{\circ}\text{C} <50^{\circ}\text{C} = 20\%$ $\geq 50^{\circ}\text{C} <55^{\circ}\text{C} = 30\%$ $\geq 55^{\circ}\text{C} = 100\% \text{ (off)}$ Ambient temperature above 40°C will affect the lifetime!
2	Check for the ambient temperature to be above -10°C. If it is lower, a heater must be installed.
3.	Check for the installation height to be below 1000m above sea level. If it is higher, consider derating of 1%/100m. This would mean that a RPC-eSVG 100A at 2000 a.s.m.l. must be loaded with not more than 90A. Operation above 4000m is not acceptable.
4	Check for ambient moisture to be below 90%. If the moisture is higher, measures for reduction of moisture must be taken.
5	Check for no direct sunlight exposition of the RPC-eSVG and for no dust impact. If that could happen, countermeasures must be taken.

3.5 Check of the installation

Perform this check AFTER installation but BEFORE first powering up:

1	Check the correct mounting and wiring of the current transformer (CT). The wiring used must comply with the requirements of components (CT, RPC-eSVG) and of place of installation.
3.	Check that power and controls wires are installed separately and that EMC guidelines are observed.
4	Check the grounding of the system and components for compliance with guidelines and requirements of the drives.
5	Check if the clearance between the components comply with the requirements of these instructions.
6	Check if the installation meets the requirements of these instructions. The RPC-eSVG must be mounted in an upright position.
7	Check if the EPO connector is equipped with a short circuit wire. This is mandatory to ensure that the RPC-eSVG will NOT start at first powering up.

3.6 Simplified commissioning

The REVCAN RPC-eSVG is a largely automated product for reduction of reactive power and harmonics (30% of its capacity).

Complete the simplified commissioning as described below BEFORE first usage:

1	Check all parameters of the monitoring system on your computer
2	Check the correct wiring of the current transformers
3	If several products are used in parallel, check for compliant adjustment of the parameters.
4	If the RPC-eSVG has not been powered up for >4 month, wait 1 hour before starting it (RUN).

Hint: If the result of reactive power compensation is not satisfying, please check the parameters once again firstly, wiring (especially polarity) of the current transformers secondly. If everything is o.k. modify the phase angle of the system to achieve even better results.



Stop!

If RPC-eSVG is started (RUN) not observing step 4, the product may be damaged severely.



Hint!

This manual contains hints on current transformers in several chapters. As during installing the current transformers one can cause a lot of issues, all hints are summarised in chapter 9.

4. Product-Overview

4.1 What this chapter contains

This chapter describes the function principle, the characteristics of the product and dimensions.

4.2 RPC-eSVG in Cabinet

Non-linear Loads (e.g. frequency converter) load the mains with reactive power and distorted (non-sinewave) currents. Reactive loads (inductors) load the mains with reactive power. Such currents increase losses in wires and transformers and cause distorted voltage, which stress all connected loads in multiple manners (e.g. resulting in reduced lifetime). RPC-eSVG measure the distorted currents and generate for reactive current and odd harmonics up 13th a phase shifted compensation current. The sum of distorted load current and compensation current results in (with the exception of even and higher harmonics) a (nearly) sinewave grid current. The required nominal current of the RPC-eSVG depends on the nominal current of the load and its distortion.

All combinations of RPC-eSVG are installed in a VX cabinet from manufacturer Rittal and using all there rules and standards for IP ratings, mechanical specifications and earth connections. All cabinets are designed for a Short-circuit strength of $IK=50KA$. The cabinets are fitted with load break switch, fuses for each filter module and fan system with speed control and EC technology. The control voltage of 230V are supplied from Main circuit over safety transformer.

4.3 Product-characteristics

General Data	
Mains voltage	220-480V (+10% / -15%)
Network type	3 phase without or with neutral 3P3W / 3P4W
Nominal current	100-600 A
Electrical data	
Mains frequency	50Hz / 60Hz (±5Hz)
Harmonic compensation	1.-13. Harmonics (odd only)
Response time	20µs
Full response time	5ms
Filter performance	>96%
Switching frequency	40kHz-60kHz, typical 50kHz
Technology	Advanced SIC
System topology	Two level topology
Function	Harmonic compensation, power factor correction, three phase balancing
User-Interface & Remote monitoring	
HMI	Option
Communication protocol	RS485
PC-Software	V3.2.3
Efficiency	
η	>98.2%
Power loss (100% load)	See table....
Installation / Configuration	
Noise	<60db
Cooling	Forced air cooling
Air flow requirement	>2800m³/h
Mounting	Floor mounting Rittal VX Cabinet
Parallel configuration	Max. 4
Extensions	Modules in parallel
Protection level	IP54
Cable entering	bottom
RFI level	class A
Environmental	
Ambient temperature	-10°C~40°C
Temperature-Derating	Derating above 40°C (10%/5K)
Maximum temperature	50°C
Relative Humidity	10%~80% Class F without condensation
Altitude	below 1000m
Altitude Derating	above 1000m (5%/1000m to 4000m)
Weight, Dimensions	
Weight	See Table....
Dimensions W*D*H(mm)	See Table....
Certifications	
Certifications	CE
Transport/Storage	
Ambient temperature (Transport)	-25°C~+70°C (following DIN EN 50178)
Ambient temperature (Storage)	-25°C~+55°C (following DIN EN 50178)

4.3 Product-overview

4.3.1 Available current ratings, weight and power loss - 3P3W wiring

Active Filter type IP 54	Active Filter inside		Weight in [Kg]	Power- loss in [W]	cabinet Type
	psc.	Standard Active Filter types IP 20			
RPC-eSVG 85-480-50/60-54_A	1	RHF Active 100-480-50/60-20-A	183	1883	CA400
RPC-eSVG 125-480-50/60-54_A	1	RHF Active 150-480-50/60-20-A	185	2625	
RPC-eSVG 170-480-50/60-54_A	2	RHF Active 100-480-50/60-20-A	244	3311	CA600
RPC-eSVG 210-480-50/60-54_A	1	RHF Active 150-480-50/60-20-A	246	4061	
	1	RHF Active 100-480-50/60-20-A			
RPC-eSVG 250-480-50/60-54_A	2	RHF Active 150-480-50/60-20-A	248	4821	
RPC-eSVG 295-480-50/60-54_A	1	RHF Active 150-480-50/60-20-A	315	5789	CA800
	2	RHF Active 100-480-50/60-20-A			
RPC-eSVG 335-480-50/60-54_A	2	RHF Active 150-480-50/60-20-A	317	6549	
	1	RHF Active 100-480-50/60-20-A			
RPC-eSVG 375-480-50/60-54_A	3	RHF Active 150-480-50/60-20-A	319	7289	
RPC-eSVG 420-480-50/60-54_A	2	RHF Active 150-480-50/60-20-A	390	7992	
	2	RHF Active 100-480-50/60-20-A			
RPC-eSVG 460-480-50/60-54_A	3	RHF Active 150-480-50/60-20-A	392	8732	
	1	RHF Active 100-480-50/60-20-A			
RPC-eSVG 500-480-50/60-54_A	4	RHF Active 150-480-50/60-20-A	394	9472	

Table 1 : RPC-eSVG technical data with RPC-eSVG modules 100A and 150A

4.3.2 Available current ratings, weight and power loss - 3P4W wiring

RPC-eSVG type IP 54	RPC-eSVG inside		Weight in [Kg]	Power- loss in [W]	cabinet Type
	psc.	Standard RPC-eSVG types IP 20			
RPC-eSVG 85-480-50/60-54-N	1	RPC-eSVG 85-480-50/60-20-A	186	1883	CA400
RPC-eSVG 125-480-50/60-54-N	1	RPC-eSVG 125-480-50/60-20-A	188	2625	
RPC-eSVG 170-480-50/60-54-N	2	RPC-eSVG 85-480-50/60-20-A	249	3311	CA600
RPC-eSVG 210-480-50/60-54-N	1	RPC-eSVG 125-480-50/60-20-A	251	4061	
	1	RPC-eSVG 85-480-50/60-20-A			
RPC-eSVG 250-480-50/60-54-N	2	RPC-eSVG 125-480-50/60-20-A	253	4821	
RPC-eSVG 295-480-50/60-54-N	1	RPC-eSVG 125-480-50/60-20-A	321	5789	CA800
	2	RPC-eSVG 85-480-50/60-20-A			
RPC-eSVG 335-480-50/60-54-N	2	RPC-eSVG 125-480-50/60-20-A	323	6549	
	1	RPC-eSVG 85-480-50/60-20-A			
RPC-eSVG 375-480-50/60-54-N	3	RPC-eSVG 125-480-50/60-20-A	325	7289	
RPC-eSVG 420-480-50/60-54-N	2	RPC-eSVG 125-480-50/60-20-A	398	7992	CA1000
	2	RPC-eSVG 85-480-50/60-20-A			
RPC-eSVG 460-480-50/60-54-N	3	RPC-eSVG 125-480-50/60-20-A	400	8732	
	1	RPC-eSVG 85-480-50/60-20-A			
RPC-eSVG 500-480-50/60-54-N	4	RPC-eSVG 125-480-50/60-20-A	402	9472	

Table 1 : RPC-eSVG technical data with RPC-eSVG modules 100A and 150A

4.3.3 Available current ratings, weight and power loss - 3P3W wiring and spare place

RPC-eSVG type IP 54	RPC-eSVG inside		Weight in [Kg]	Power- loss in [W]	cabinet Type
	psc.	Standard RPC-eSVG types IP 20			
RPC-eSVG 125-480-50/60-54-U150	1	RPC-eSVG 125-480-50/60-20-A	248	2701	CA600
RPC-eSVG 170-480-50/60-54-U150	2	RPC-eSVG 85-480-50/60-20-A	315	3669	CA800
RPC-eSVG 210-480-50/60-54-U150	1	RPC-eSVG 125-480-50/60-20-A	317	4429	
	1	RPC-eSVG 85-480-50/60-20-A			
RPC-eSVG 250-480-50/60-54-U150	2	RPC-eSVG 125-480-50/60-20-A	319	5169	
RPC-eSVG 295-480-50/60-54-U150	1	RPC-eSVG 125-480-50/60-20-A	390	5872	CA1000
	2	RPC-eSVG 85-480-50/60-20-A			
RPC-eSVG 335-480-50/60-54-U150	2	RPC-eSVG 125-480-50/60-20-A	392	6612	
	1	RPC-eSVG 85-480-50/60-20-A			
RPC-eSVG 375-480-50/60-54-U150	3	RPC-eSVG 125-480-50/60-20-A	394	7352	

Table 1 : RPC-eSVG technical data with RPC-eSVG modules 150A

4.3.4 Available current ratings, weight and power loss - 3P4W wiring and spare place

RPC-eSVG type IP 54	RPC-eSVG inside		Weight in [Kg]	Power- loss in [W]	cabinet Type
	psc	Standard RPC-eSVG types IP 20			
RPC-eSVG 125-480-50/60-54-NU150	1	RPC-eSVG 125-480-50/60-20-A	248	2701	CA600
RPC-eSVG 170-480-50/60-54-NU150	2	RPC-eSVG 85-480-50/60-20-A	315	3669	CA800
RPC-eSVG 210-480-50/60-54-NU150	1	RPC-eSVG 125-480-50/60-20-A	317	4429	
	1	RPC-eSVG 85-480-50/60-20-A			
RPC-eSVG 250-480-50/60-54-NU150	2	RPC-eSVG 125-480-50/60-20-A	319	5169	
RPC-eSVG 295-480-50/60-54-NU150	1	RPC-eSVG 125-480-50/60-20-A	390	5872	CA1000
	2	RPC-eSVG 85-480-50/60-20-A			
RPC-eSVG 335-480-50/60-54-NU150	2	RPC-eSVG 125-480-50/60-20-A	392	6612	
	1	RPC-eSVG 85-480-50/60-20-A			
RPC-eSVG 375-480-50/60-54-NU150	3	RPC-eSVG 125-480-50/60-20-A	394	7352	

Table 1 : RPC-eSVG technical data with RPC-eSVG modules 150A

4.3.5 Available Option HMI

Active Filter type IP 54 option	Order code	psc.	Description
RHF-Active HMI Modul 10.1	R00012100	1	10.1 inch capacitive touch linux PC for panel installation and installed RHF-Active software for communication with one or several RHF-Active modules.

The HMI module is not included in the previously mentioned items and must be ordered as an optional component for the individual control cabinets!
In this case, the HMI module is installed in the control cabinet door and is programmed for the corresponding filter type.

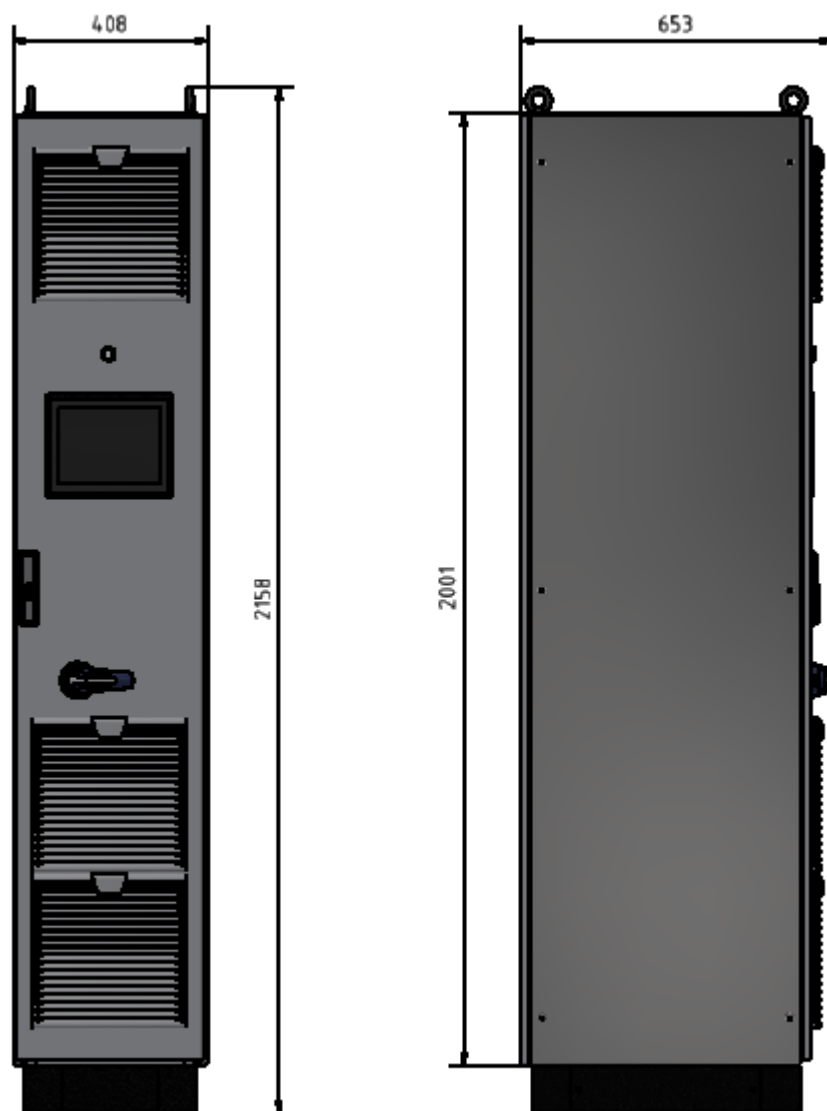
5. Installation instructions

5.1 What this chapter contains

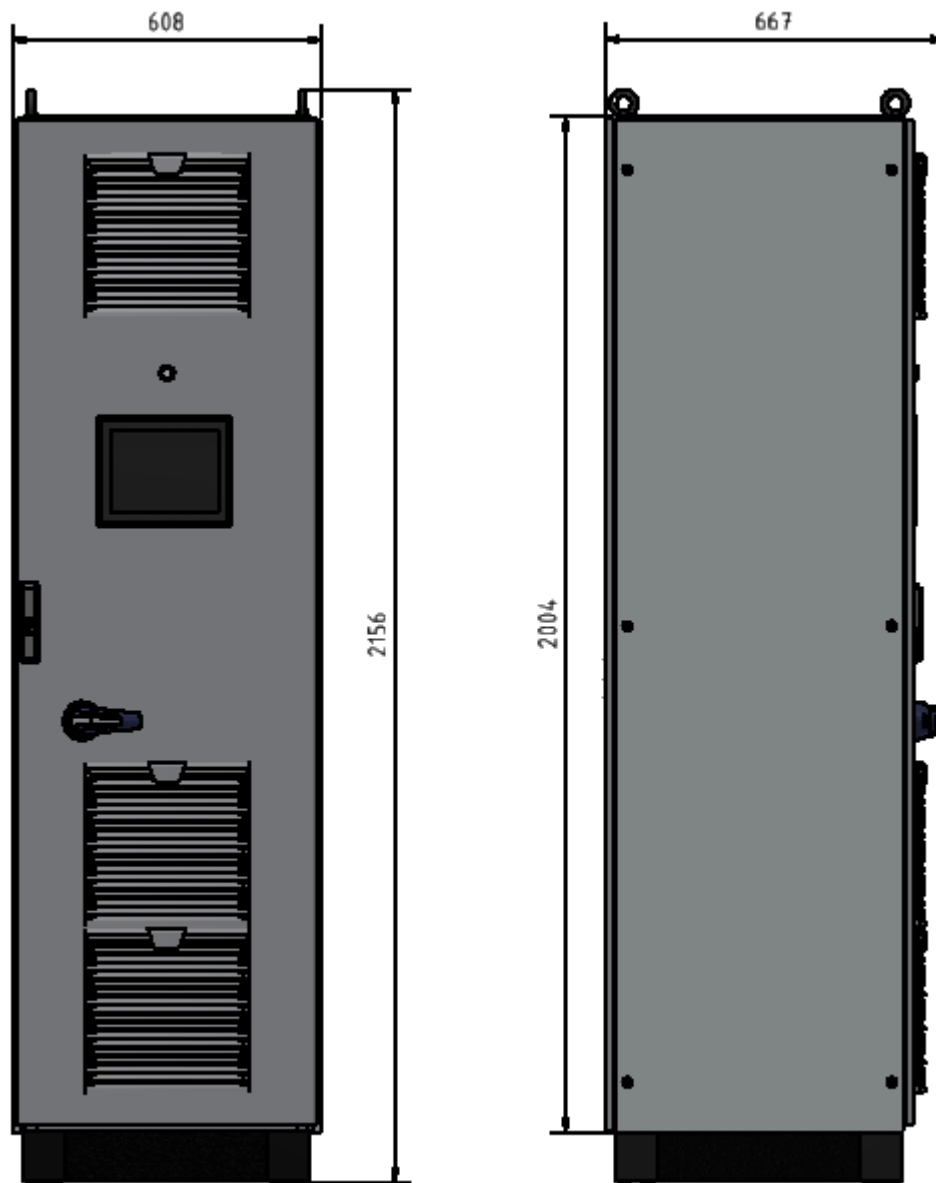
This chapter describes mechanical and electrical installation.

5.2 Mechanical drawings

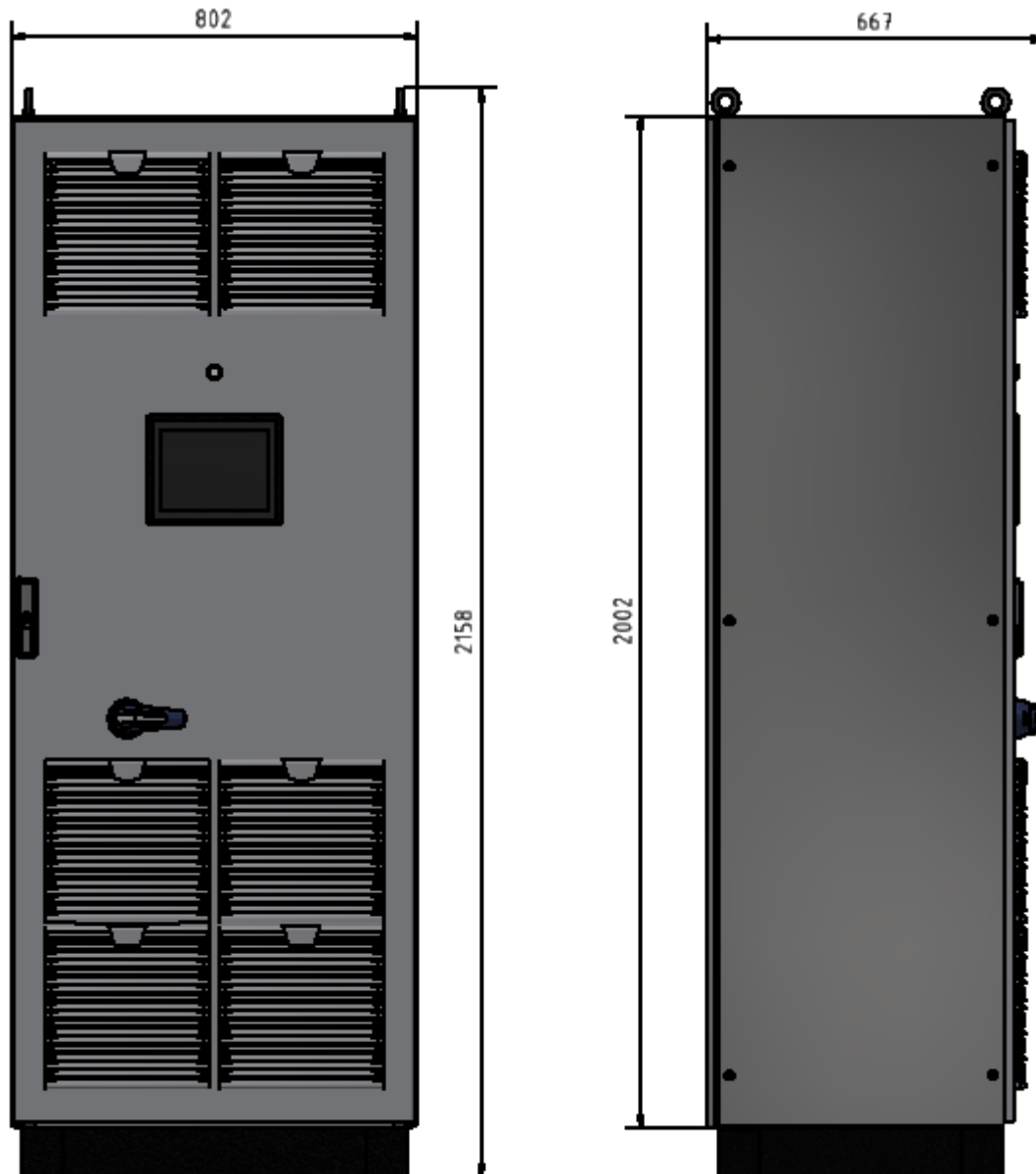
5.2.1 Mechanical drawing CA400 cabinet



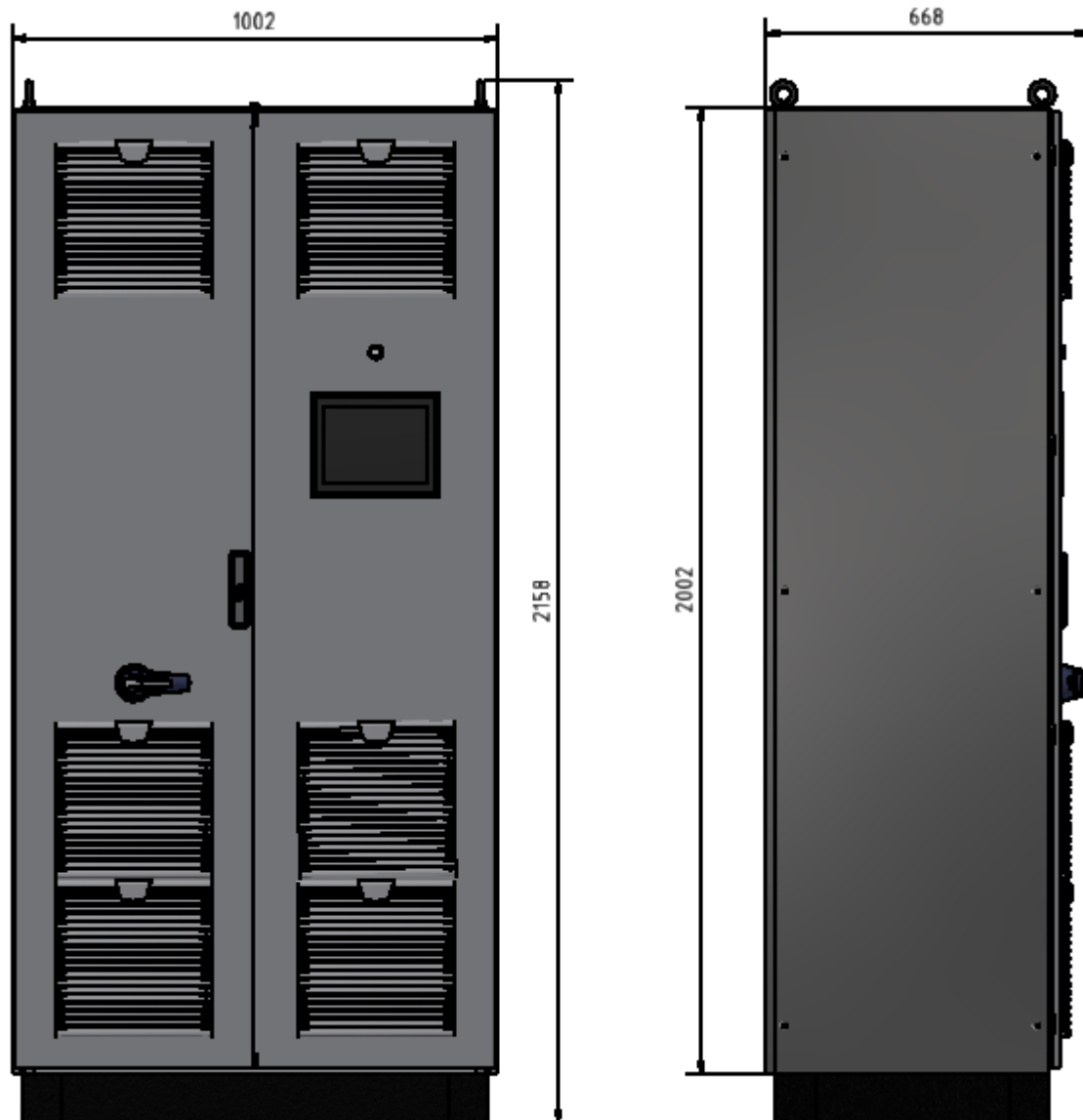
5.2.2 Mechanical drawing CA600 cabinet



5.2.3 Mechanical drawing CA800 cabinet

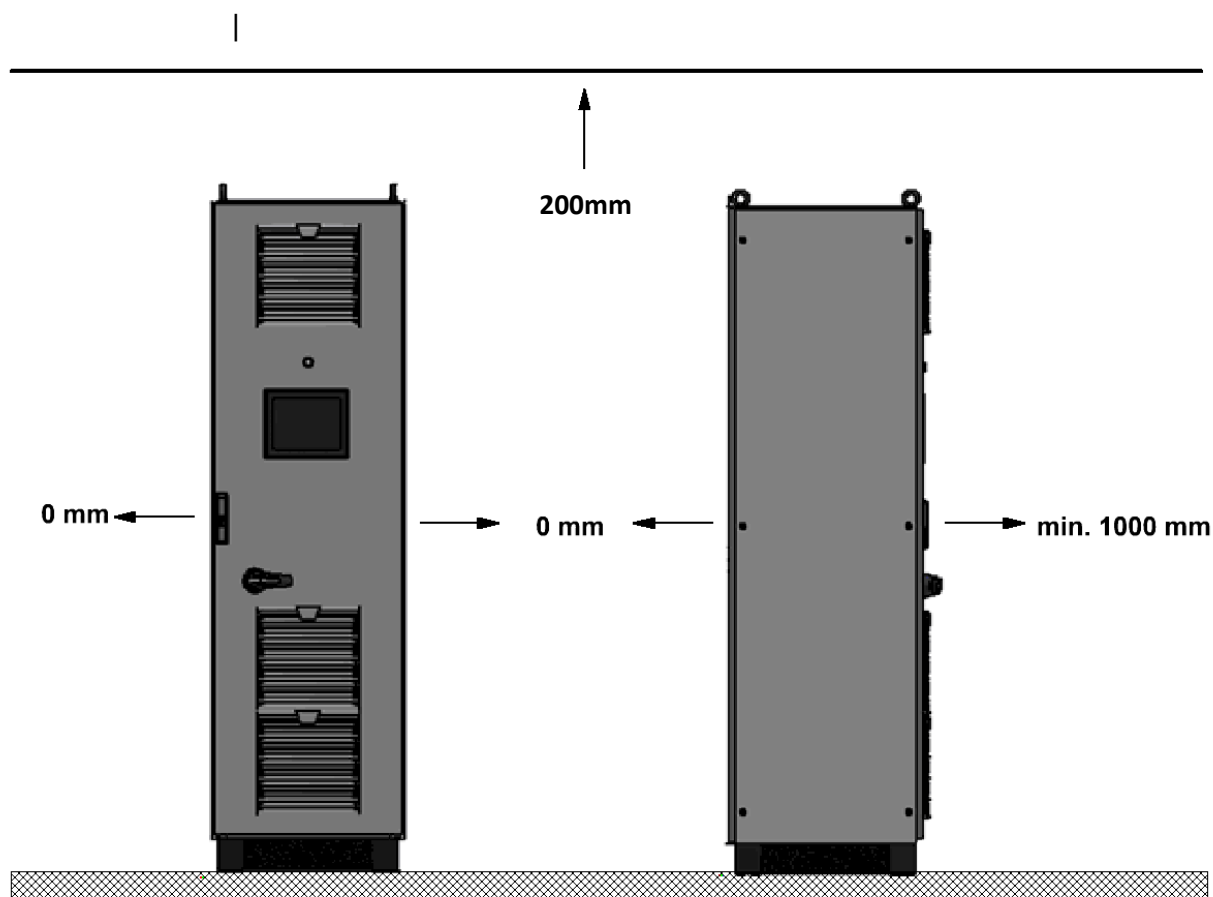


5.2.4 Mechanical drawing CA1000 cabinet



5.2.5 Mechanical installation

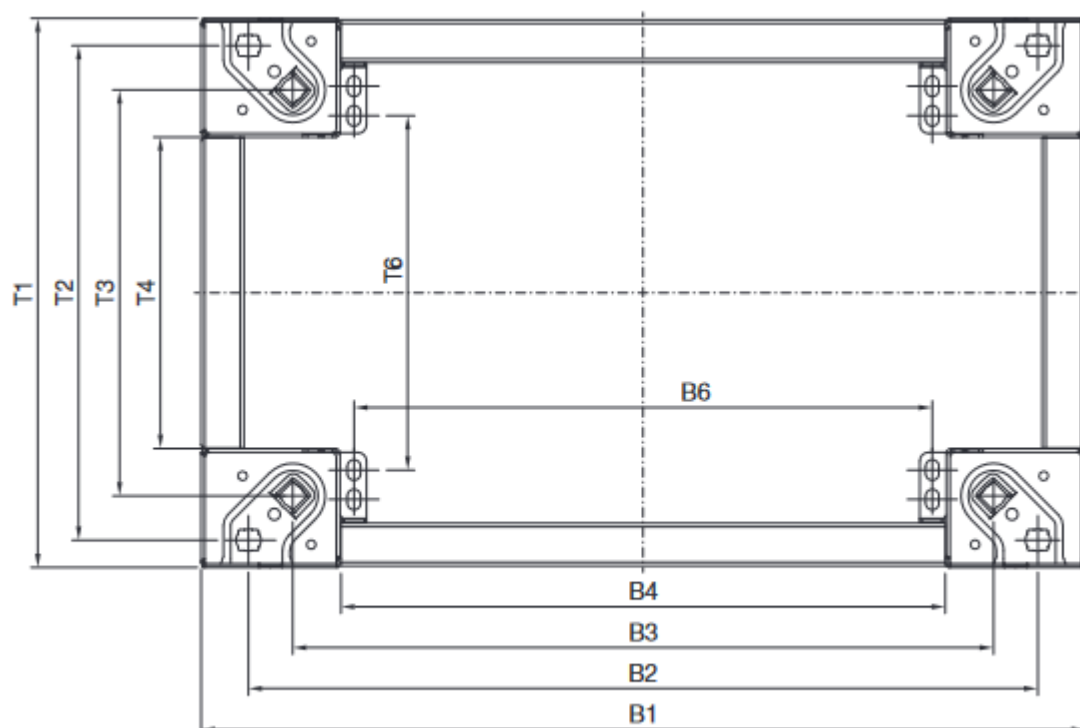
For safe and undisturbed operation, it is mandatory to follow those instructions for mechanical installation:



1. Clearance between RPC-eSVG and other cabinets and walls
≥0mm Side by side (left/right)
2. Min. Clearance distance RPC-eSVG in front:
≥1000mm
3. Min. clearance in vertical direction (top):
200mm

5.2.6 Mechanical installation on the floor

Each control cabinet is supplied with a 100 mm base. The dimensions for mounting can be found below.

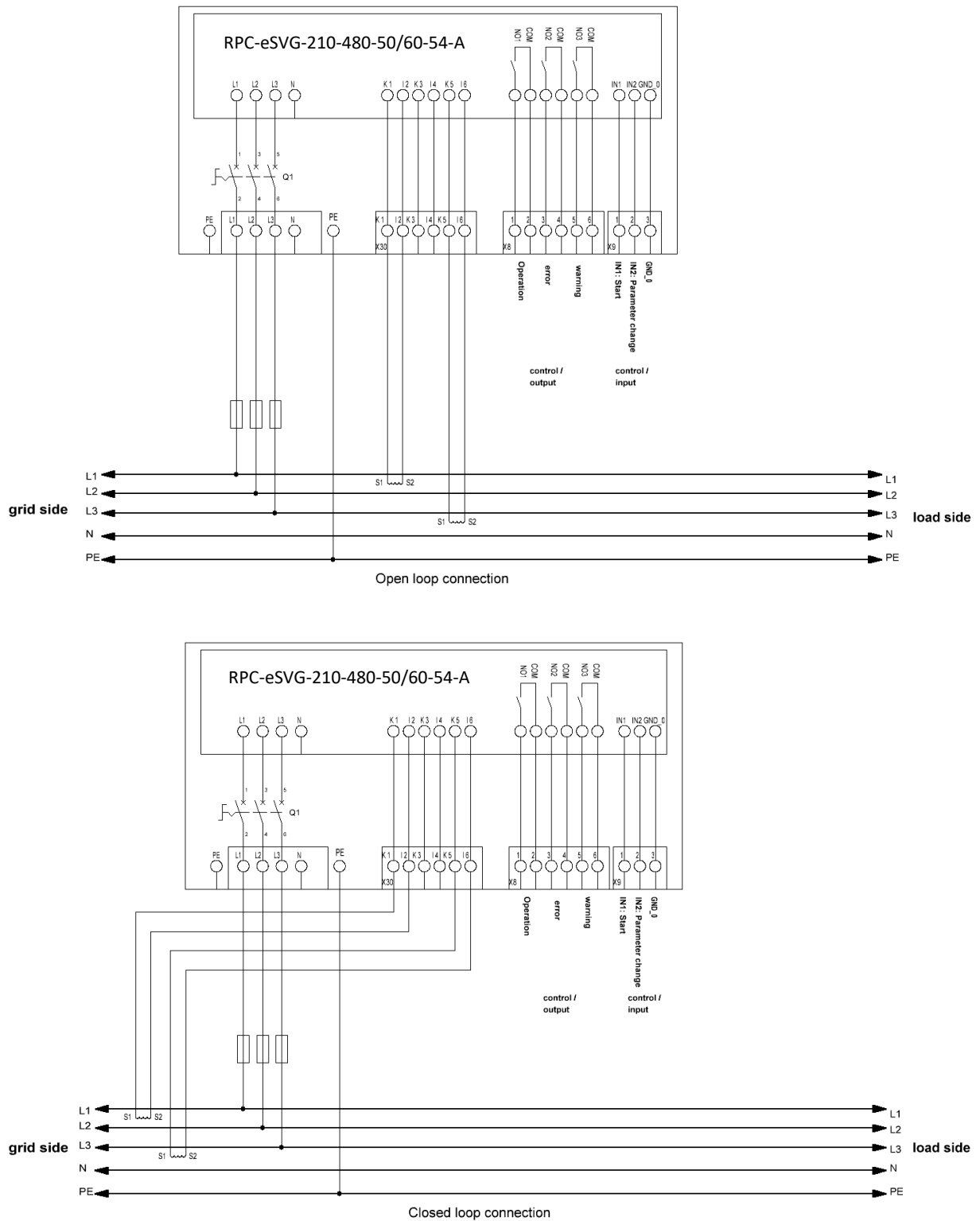


Active Filter type IP 54	height	width	B1	B2	B3	B4	B5	B6	B7
CA400	100	400	399	335	275	210	151	192	179
CA600	100	600	599	535	475	410	351	392	379
CA800	100	800	799	735	675	610	551	592	579
CA1000	100	1000	999	935	875	810	751	792	779

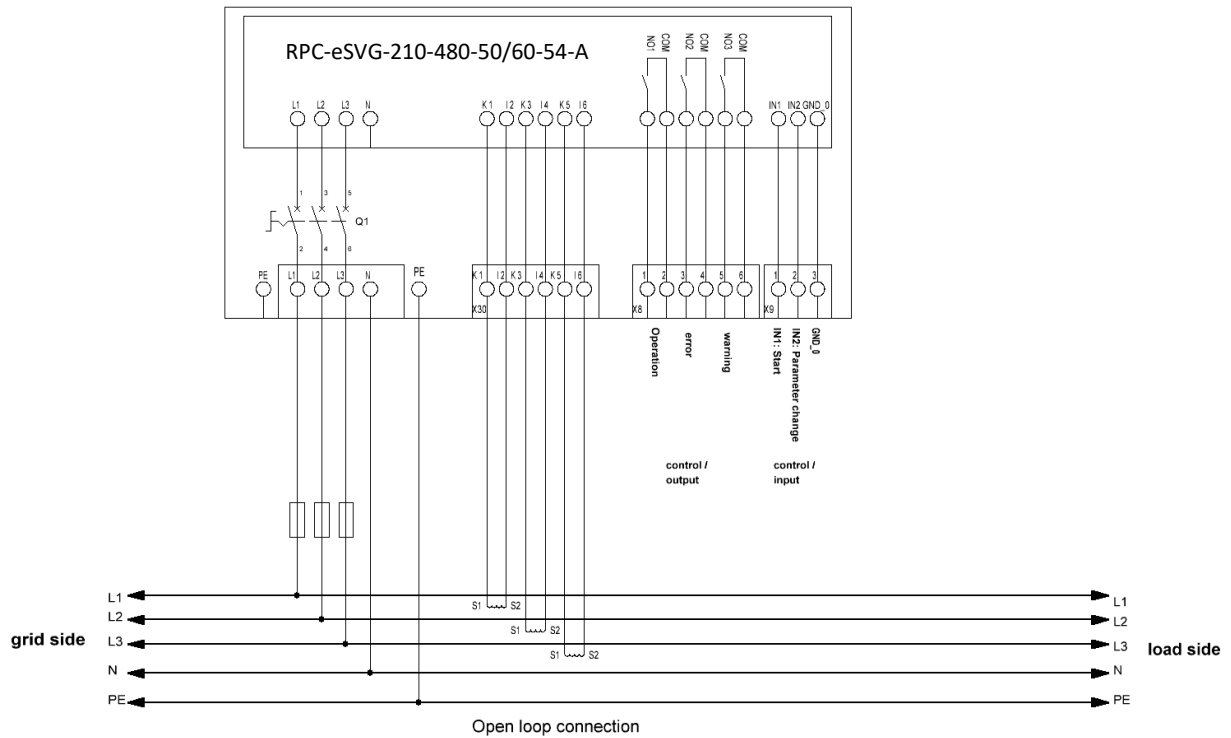
Active Filter type IP 54	height	deph	T1	T2	T3	T4	T6
CA400-1000	100	600	572	535	475	411	440

5.3 Electrical wiring:

5.3.1 3P3W wiring

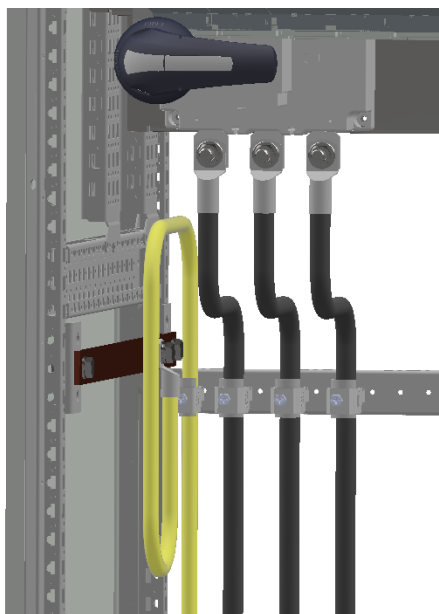


5.3.2 3P4W wiring

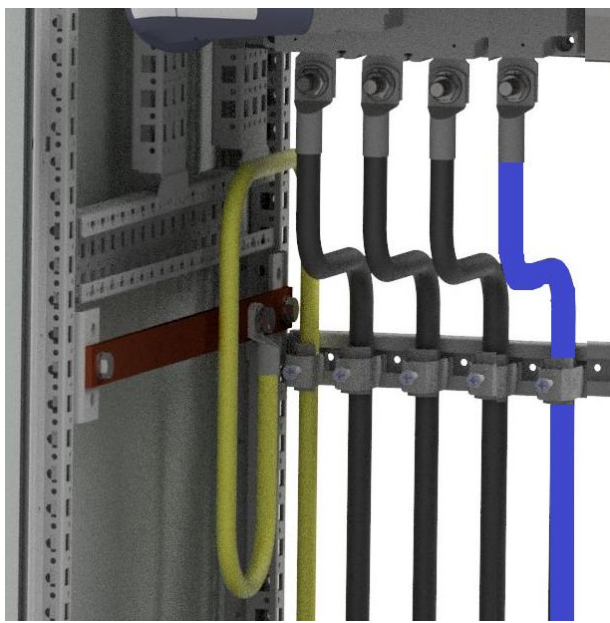


5.3.2 4 power wiring

The mains connection cables L1, L2, L3, (N) are connected to the respective load-break switch in all control cabinet combinations. The protective conductor connection is always connected to the busbar on the left side of the control cabinet.



3P3W connection



3P4W connection

5.3.5 power wiring

Conductor cross-sections and torques for power cables

RPC-eSVG type IP 54	Q1 terminals L1 / L2 / L3 / (N)			PE			
	min. cable cross selections	max. cable cross selections	Termination	Torque	tools	Type	Torque
	[mm² (AWG/MCM)]	[mm² (AWG/MCM)]		[Nm (in-lB)]			[Nm (in-lB)]
RPC-eSVG 85-480-50/60-54-A(N)	70 (00)	70 (00)	Cable lug M8	6 (53) +/- 10%	ratchet and wrench 17mm	M10	24 (212) +/- 10%
RPC-eSVG 125-480-50/60-54-A(N)	70 (00)	185 (350)	Cable lug M10	18 (159) +/- 10%	ratchet and wrench 19mm		
RPC-eSVG 170-480-50/60-54-A(N)	95 (4/0)	240 (500)	Cable lug M10	18 (159) +/- 10%	ratchet and wrench 19mm		
RPC-eSVG 210-480-50/60-54-A(N)	120 (250)						
RPC-eSVG 250-480-50/60-54-A(N)	150 (300)						
RPC-eSVG 295-480-50/60-54-A(N)	185 (400)	2x185 (2x400)	Cable lug M10	24 (212) +/- 10%	ratchet and wrench 19mm		
RPC-eSVG 335-480-50/60-54-A(N)	2x120 (2x250)						
RPC-eSVG 375-480-50/60-54-A(N)	2x120 (2x250)						
RPC-eSVG 420-480-50/60-54-A(N)	2x150 (2x300)	2x240 (2x500)	Cable lug M10	24 (212) +/- 10%	ratchet and wrench 19mm		
RPC-eSVG 460-480-50/60-54-A(N)	2x150 (2x300)						
RPC-eSVG 500-480-50/60-54-A(N)	2x185 (2x400)						

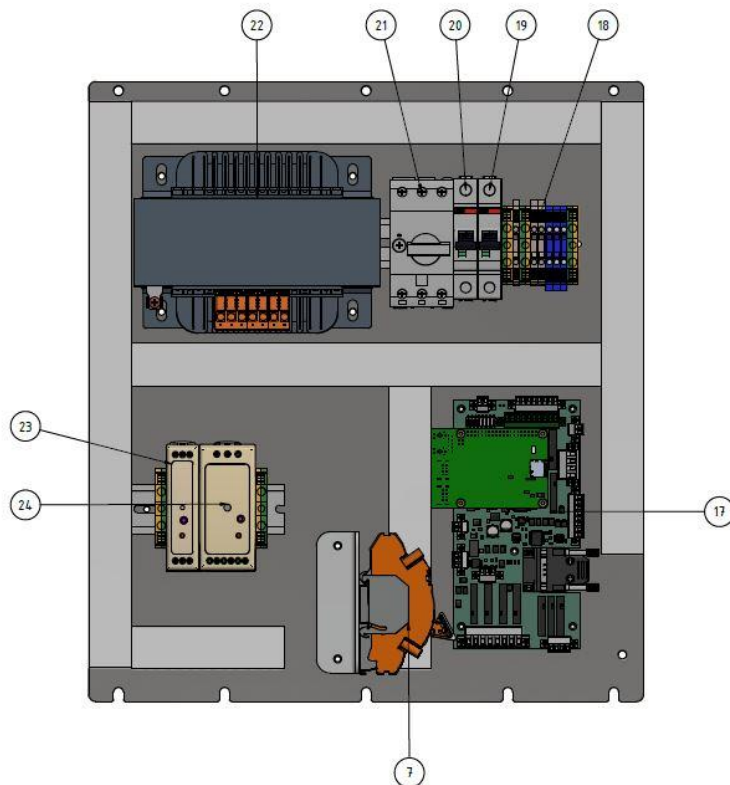
Conductor cross-sections and torques for power cables for cabinets

RPC-eSVG type IP 54	Q1 terminals L1 / L2 / L3 / (N)					PE	
	min. cable cross selections	max. cable cross selections	Termination	Torque	tools	Type	Torque
	[mm² (AWG/MCM)]	[mm² (AWG/MCM)]		[Nm (in-lb)]			[Nm (in-lb)]
RPC-eSVG 125-480-50/60-54-(N)U150	150 (300)	240 (500)	Cable lug M10	18 (159) +/- 10%	ratchet and wrench 19mm	M10	24 (212) +/- 10%
RPC-eSVG 170-480-50/60-54-(N)U150	185 (400)	2x185 (2x400)	Cable lug M10	24 (212) +/- 10%			
RPC-eSVG 210-480-50/60-54-(N)U150	2x120 (2x250)						
RPC-eSVG 250-480-50/60-54-(N)U150	2x120 (2x250)						
RPC-eSVG 295-480-50/60-54-(N)U150	2x150 (2x300)	2x240 (2x500)	Cable lug M10	24 (212) +/- 10%			
RPC-eSVG 335-480-50/60-54-(N)U150	2x150 (2x300)						
RPC-eSVG 375-480-50/60-54-(N)U150	2x185 (2x400)						

Conductor cross-sections and torques for power cables for cabinets with free place

5.3.6 Control plate

All cabinets are designed with the same control plate to supply 230V for the fan-system, 24VDC for control supply and 12VDC for HMI supply. This plate is mounted on the right side of the cabinet.

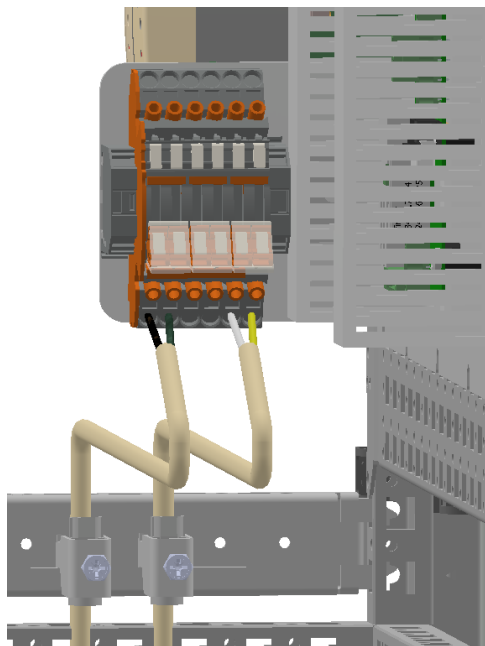


Designation	
7	CT terminals X30
17	control board
18	230V terminals X1-X2
19	fuse for Powersupply
20	Fuse for fan system
21	Fuse for Autotransformer
22	Autotransformer
23	Powersupply 24V for control supply
24	Powersupply 12V for HMI supply

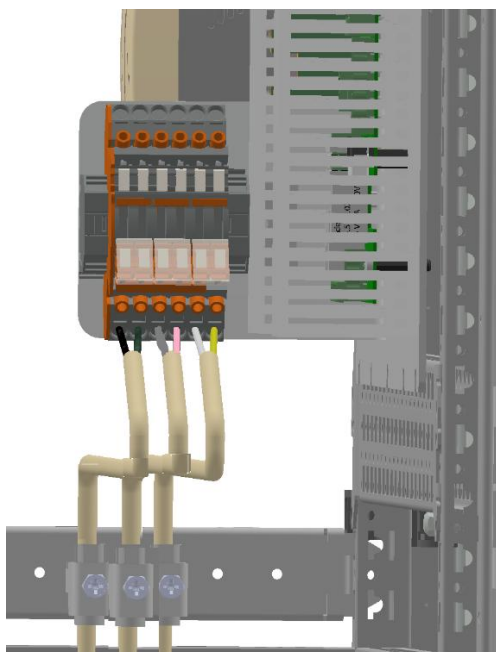
5.3.7 CT terminal

The current transformer terminals are designed for 3P3W operation for 2 current transformers. (L1+L3)
The middle connection remains free.

In the 3P4W system, the transformer connection is also provided for phase L2.



3P3W connection



3P4W connection

Terminal label	Function / Terminal
CT_A	CT S1 in Phase A (L1)
GND	CT S2 in Phase A (L1.1)
CT_B	CT S1 in Phase B (L2)
GND	CT S2 in Phase B (L2.1)
CT_C	CT S1 in Phase C (L3)
GND	CT S2 in Phase C (L3.1)
PE	Protective wire / screening

Hint: To achieve best performance of RPC-eSVG the pairs CT_A+GND, CT_B+GND and CT_C+GND should be twisted.

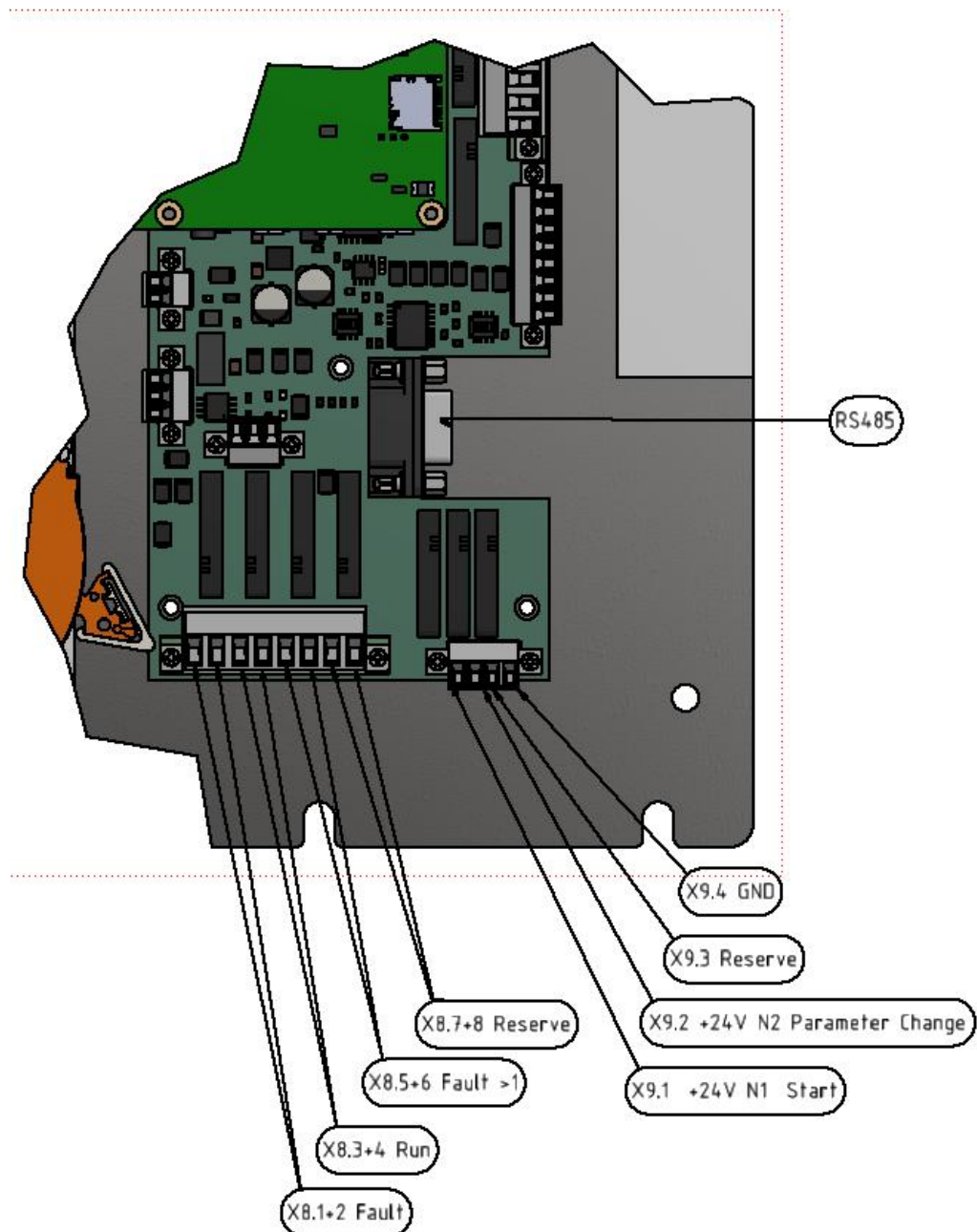


Stop!

If a current transformer is installed in phase L2 in the customer system during 3P3W operation, it must be short-circuited at the transformer terminal!

5.3.8 control wiring

The picture below shows a part of the control board for costumer connections.



output terminal X8	X8 1+2 (NO1)*	X8 3+4 (NO2)*	X8 5+6 (NO3)**
mains drop/power failure	open	open	open
standby	closed	closed	closed
Run	closed	open	closed
Failure one module	open	closed	closed
Failure more than one module	open	closed	open

* NO1 amd NO2 same logic like a single module

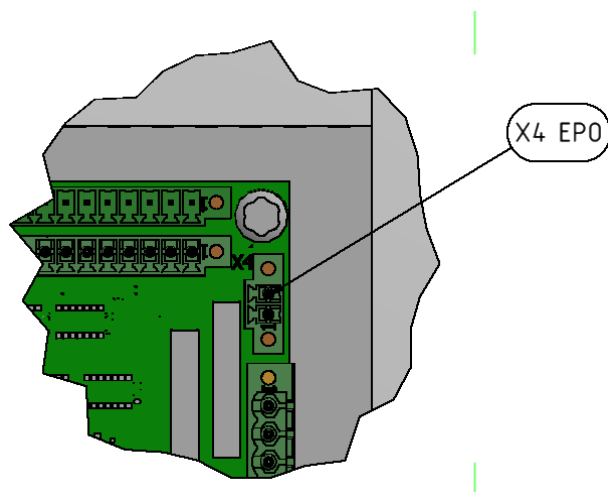
** NO3 no output contact on a single module

input terminal X9	control
X9.1	+24V IN1: Start
X9.2	+24V IN2: Parameter change
X9.3	reserve
X9.4	GND_0

Terminal RS485	Function
GND O	GND
485+	485 Interface for remote control by a computer. A standard-485-communication interface requires screened or twisted wires. If the wire length exceeds 1m, GND must be connected.
485-	

5.3.9 EPO

The picture below shows a part of control board for EPO function.



X4 EPO Terminal	Function
GND_O	EPO connection for usage as part of EMERGENCY OFF line. If the contact to be wired here is closed, the EMERGENCY OFF function is active.
EPO	

A new RPC-eSVG will be supplied with a short circuit wire at the EPO connector. This is mandatory to ensure that the RPC-eSVG will NOT start at first powering up. If the RPC-eSVG has not been powered up for >4 month, wait 1 hour before starting it (RUN). To start the RPC-eSVG, switch off the supply voltage, disconnect the EPO connector (or remove the wire) and power it up again. The error will be cleared automatically and the product can be used.



Stop!

If RPC-eSVG is started (RUN) not observing this instruction, the product may be damaged severely.

5.3.10 Control wiring

Conductor cross-sections and torques for CT cables and control wiring

Active Filter type IP 54	CT terminals				
	min. cable cross selections [mm ² (AWG/MCM)]	max. cable cross selections [mm ² (AWG/MCM)]	Termination	Torque [Nm (in-lb)]	tools
CA400	2,5 (16)	Cable end sleeve 6 (10) Solid conductor 10 (8)	Push-in CAGE CLAMP	na	Screwdriver blade 5.5 x 0.8 mm
CA600					
CA800					
CA1000					

CT wiring connection

Active Filter type IP 54	control terminals PCB				
	min. cable cross selections [mm ² (AWG/MCM)]	max. cable cross selections [mm ² (AWG/MCM)]	Termination	Torque [Nm (in-lb)]	tools
CA400	0,5 (20)	1,5 (16)	Cable end sleeve	0,6 (5) +/- 10%	Screwdriver blade output 3.5 x 0.6 mm input 2.5 x 0.6 mm
CA600					
CA800					
CA1000					

Control wiring connection

6. External fuses from costumer side

6.1 What this chapter contains

To protect the cables and to ensure compliance with short-circuit current, it is necessary to install the following fuses in front of the RPC-eSVG.

Active Filter type IP 54	cabinet branch protection (customer side)
	max. fuses Typ. gG
CA400	250A
CA600	500A
CA800	630A
CA1000	800A

7. General information

7.1 Wiring Current Transformer

Remarks:

Routing of wires: The wires between RPC-eSVG and current transformers must be twisted pair cables. A correct function is only possible if the wiring matches exact the diagram below. If wires are interchanged, the reactive power and harmonics will not be reduced but amplified. To avoid interchanging of wires it is strongly recommended not to use any wire colour twice.

Wire cross section: The cross section of the wires has a significant influence on the quality of the control. Is the cross section too small in relation to the length of the wire, the resulting measurement will be too small to achieve a good control quality and good reduction of reactive power and harmonics.

$$A = \frac{2 \times d \times v \times I^2 \times \rho}{S}$$

The following values needed to be known:

S = Power of the current transformer (typical 2,5VA)

d = Distance (length of cableway) between RPC-eSVG and current transformer

v = Twisting factor (typical 1,5)

I = secondary current of the current transformer (typical 5A)

ρ = Rho = specific resistance of copper ($0,01786 \frac{\text{Ohm} \times \text{mm}^2}{\text{m}}$)

$$\text{Example: } A = \frac{2 \times 2\text{m} \times 1,5 \times 5^2 \times 0,01786 \frac{\text{Ohm} \times \text{mm}^2}{\text{m}}}{2,5\text{VA} \times \text{mm}^2} = 1,07\text{mm}^2$$

7.1.2 Selection of current transformers

Selection of current transformers depends on the load current of the application. Applicable are current transformers in the range of 5/5 to 10000/5. The transfer ratio must be adjusted in the correlated parameter of the software. For optimal performance, the nominal current of the current transformer must not be much higher than the load current of the application (e.g. load current 95A => current transformer 100A)

7.1.3 Modification of wiring when using current transformers with high ratio

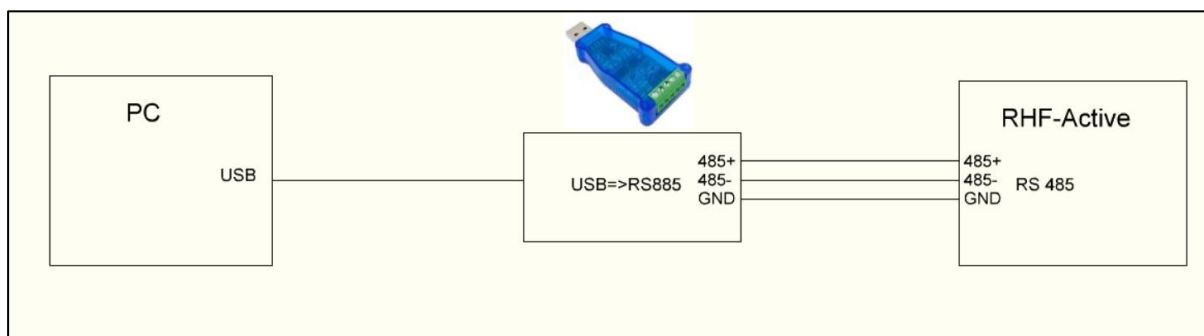
If there is no current transformer with optimal ratio available, at push through transformers the primary conductor may be lead through the transformer two or several times. Not only in this case it is very important to observe that the direction of energy flow in the conductor and the marked direction on the transformer match. The Software adjustment must be in accordance to the final ratio.

If e.g. a 100A CT is used, but the wire is loped through, the setting in the software must be 50A.

7.2 RS-485 and CAN Communication

Terminal label	Function
CANL	CAN connection for software update (for use of REVCON only)
CANH	
GND_O	GND
+7.5V	Aux supply. For use of REVCON only.
485+	485 Interface for remote control by a computer. A standard-485-communication interface requires screened or twisted wires. If the wire length exceeds 1m, GND must be connected.
485-	

Wiring example:



8. Supervision- and control software

8.1 What this chapter contains

This chapter contains guidelines for using the supervision and control software. There are hints how to check the parameters before commissioning and how to optimize them during operation.

This chapter has been shortened. For further information regarding connection and commissioning please refer to the RPC-eSVG commissioning guide.

8.2 Introduction in the system

There are two versions of the software:

Software-Version	Suitable for
RPC-eSVG Configuration V3.2.7 (or higher)	RPC-eSVG 100A, 150A

8.2.1 Log In

For connection of the RPC-eSVG to the PC the latest RPC-eSVG PC software should be used.

This can be downloaded from www.revcon.de or requested from info@revcon.de

During download of the software, please ensure your antivirus software is not changing the name or deleting the exe file: "RPC-eSVG -SiC.exe". Execute this exe to start the software. The following Login for easy access can be used:

Login: 01

Password: 010101

Higher access level can be requested from REVCON.

9. Maintenance and check of hardware

9.1 What this chapter contains

This chapter contains instructions for predictive maintenance of the RPC-eSVG.

9.2 Periodicity of maintenance

When installed in an appropriate environment the RPC-eSVG required minimal maintenance. The recommended maintenance is listed below.

Check		Task	Method
Environment conditions		Check of ambient temperature, humidity, vibrations and for absence of dust, gas, oil mist and water drops	Optical check and measurment of the parameters
		Ensure that no tools or other potentially dangerous components have been placed nearby	Optical check
Voltage		Measure voltage in power and control circuits	Measurement with multimeter
Supply lines		Check of system and cabinet	Check for loosen screws
			Check of absence of sparks, damages, dark colour due to overheating or aging of isolation
			Ensure that no dust or dirt is present
Cooling system	Fan	Check for abnormal sound emission or vibrations	Optical check or estimation of operation time based on maintenance files
		Check for loosen screws	Fix screws
		Check of absence of dark colour due to overheating or aging	Optical check or estimation of operation time based on maintenance files
	Air duct	Check for debris in the cooling system	Optical check

10. Error description and repair

10.1 What this chapter contains

This chapter describes known issues and their solving.

10.2 Typical errors and repairs

Error	cause	repair
RPC-eSVG wrong compensation (THDI rises)	Current transformer	Check wiring and polarity
	System settings	Check transformer ratio
RPC-eSVG insufficient compensation (THDI decreases but is higher than expected)	Phase angle	Setting the phase angle compensation with patience and carefully step by step, Trial and error iteration
	Low impedance	Low impedance of the connection result in very harmonic levels before compensation. It is highly recommended to install impedance as first counter measurement against harmonics (for Drives basically DC or AC chokes).
Error signal (red LED)	System settings	- Observe chapter 5.3.9! - Check for first error than for second
No communication	Software settings	Improve baud rate and/or interface selection

Further possible alerts and troubleshooting can be found in the RPC-eSVG commissioning guide.

11. Revcon

■ 11.1 Revcon Product Overview

1. REVCON® RLD

Power feedback units for short time operation
(Crane systems, discontinuous centrifugal, etc.)

2. REVCON® RHD

Power feedback units for continuous operation
(Engine test beds, escalators, wind energy plants, elevators etc.)

3. REVCON® RFE

Power feed and feedback units for continuous operation
(Engine test beds, escalators, wind energy plants, elevators etc.)

4. REVCON® RSU

Step- up converter for the generation of a current controlled, high output voltage from a lower input DC voltage.

5. REVCON® RSD

Step- down converter for the generation of a decreased output voltage from a higher DC voltage (AC input is also possible).

- Voltage controlled: A free selectable output voltage in wide limits

The required output voltage can be adjusted by set-point (0 ... 10V)

- Current controlled: A lower output voltage that adjusts free in dependence of the load

The required output current can be adjusted by set-point (0 ... 10V)

6. REVCON® EDC

Power supply module for multiple motor applications (supply of multiple drive controllers) without generator- operation

7. REVCON® RHF-8P/5P

Revcon Passive Harmonic filter. Reduces the harmonic distortion of a drive to <5% or 10%

8. REVCON® RHF-Hybrid

Combines the advantages of active and passive harmonic filter.

All products are available for 400V line voltage, the most also for 230V, 400V, 460V, 500V, 600V and 690V! According to the product power from 4 to 440kW can be transmitted, whereby the most products are appropriate for parallel connection, so that power ratings until the megawatt range can be achieved!

11.2 Revcon Contact

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