



Purpose of Instruction

This operating instruction presents a summary of safety measures as well as advice in handling and commissioning for Schramm enclosures.

General Description and Safety Information

Prior Installation, the empty enclosure shall be stored under dry conditions. The empty enclosure must be clean and undamaged when it is installed.

In particular, the following must be observed when installing:

- + national safety regulations
- + national workplace health and safety regulations
- + national installation and set-up regulations
- + generally accepted engineering standards
- + the safety information contained in these operating instructions
- + the data and rated operating conditions on the name plate and rating plate (if applicable)

Function and purpose of the Enclosure

The empty enclosures is made of fiber-glass-reinforced polyester, so called GRP. With a standard protection degree of IP65 / IP54, depending on single wing / double wing door, the enclosures provide a high level storage of the equipment inside and separate it from the ambient conditions. This protection from the outside is vital for many devices in order to avoid any malfunction due to rain, UV-rays, dirt, dust and aggressive vapors which could harm the devices. Please note that the degree of protection can be reduced by integrated options that have a lower degree of protection.

The option "reduced surface resistance" enables the enclosures to be situated in hazardous areas together with Ex equipment and components. For Ex-applications the reduced surface resistance option must be considered as a mandatory option. In case of Ex application please make sure that adequate earthing is provided.

Insulated enclosures provide enhanced protection from extreme temperatures and contribute to minimizing heat losses and energy consumption when electrical heating or air conditioning is applied. Various options are available to fulfill the individual requirements of each customer's application. To guarantee an optimum customization we recommend contacting your Schramm sales representative who can support you with the full range of Schramm's capabilities. The catalogue available on the website www.schramm-gmbh.de also shows the main standards.

The enclosures themselves are manufactured under the strict surveillance of Schramm's internal quality management system which is certified in accordance to ISO 9001 standard. The requirements of EN 61439-1 (low-voltage switchgear combinations) and DIN EN 62208 (empty enclosure - general requirements) are also satisfied, provided applicable.

The following types of enclosures are available:

Series P4:	Protection boxes
Series PV:	Compact cabinets, single layer, not insulated
Series KS:	Compact cabinets, GRP-sandwich, insulated
Series E:	Element cabinets, GRP-sandwich, insulated
Series ESK:	Element shelters, GRP-sandwich, insulated
Series KVS:	Cable distribution socket for PV / KS / E

Technical Data of enclosure material GRP

Thermal Conductivity of different enclosure wall thicknesses:

80mm GRP sandwich, $k = 0,35 \text{ W/m}^2\text{K}$, ESK-enclosures
 40mm GRP sandwich, $k = 0,75 \text{ W/m}^2\text{K}$, ESK-enclosures
 20mm GRP sandwich, $k = 1,2 \text{ W/m}^2\text{K}$, ESK/E0x/KS-enclosures
 5 – 7 mm GRP, $k = 5 \text{ W/m}^2\text{K}$, PV-enclosures

Ambient temperature: -60°C to $+80^\circ\text{C}$

Operating temperature: -60°C to $+100^\circ\text{C}$

Dielectric strength basic polyester: 55 kV/mm
 (acc. to DIN 53481)

Creep resistance basic polyester: KC 600
 (acc. to DIN 53480)

Combustibility basic polyester: proven at 700°C
 (acc. to VDE 0471, Section 2/4.75)

Dimensional stability basic polyester: 200°C
 (Martens, acc. to DIN 53458)

Tropical conditions: "resistant"
 (to mold / termites acc. to CEI 68-2-3)

UV-Resistance: "stable"
 (acc. Xenotest 1000 hours)

Electrical Surface Resistance, standard: $\approx 10^{12} \Omega$

Reduced ESR. for Ex-Zone, optional: $< 10^9 \Omega$
 (acc. to EN 60079-0)

Decontaminability: "excellent"

Waste Utilization: "household waste"

Ingress protection, double wing door: IP 54^X

Ingress protection, single wing door: IP 65^Y
 (acc. to EN 60529)

X / IP 54: Dust Protection: The entry of dust is not completely prevented, however the amount is small enough that a satisfactory operating mode is maintained. Protection against Water Spray: Water, regardless from which direction it comes in contact with the housing, will not have any damaging effects. No water will enter.

Y / IP 65: Dust tight: No entry of dust. Protection against Water Spray: Water, regardless from which direction it comes in contact with the housing, will not have any damaging effects. No water will enter.

Rated voltage / current: based on equipment

Transportation and Storage

The enclosures should be shipped in an upright position if possible so that potential apurtenance, installed equipment and roof overhangs do not get damaged. In this regard the weight distribution needs to be taken into consideration to avoid tilting during transportation with fork lifter or other handling devices. Proper fixation to the pallet is one provision to minimize the risk of tilting.

All cabinets with exception of the protection boxes are not stackable. Protection boxes of Series P4 are relatively small and light. As they have a rigid shell it is possible to create stacks of up to 3 layers for not equipped boxes. In case of equipped boxes the weight of equipment as well as out sticking equipment needs to be considered individually. In special cases the boxes can also be delivered in disassembled condition which is not a standard. Consequently, this mode of transport needs to be discussed upfront.

Each completely mounted enclosure should be individually packed as a minimum with a suitable cardboard box, protection foam strips on each free edge, wrapping foil around the enclosure and a pallet at the bottom. In case of equipment and apurtenance sticking out of the enclosure, adequate provisions need to be made that the other surrounding enclosures do not get damaged even in case of sudden shocks which can occur during transport. This means for instance that adequate distance elements need to be applied as well as intermediate separation material between the layers of boxes. Any openings should be sealed to avoid undesired ingress of dust, dirt, etc..

Card boxes are delivered on pallets which depend on cabinet dimensions and therefore do not follow ISO/EURO standards.

For international transport Schramm recommends wooden crates as mechanical protection from the outside. Preferably heat-treated wood shall be applied to avoid any vermin (IPPC). If Schramm provides wooden crates these crates will not be stackable unless explicitly requested. As the enclosures are suitable for outdoor installation, the packaging does not have to be in a sealed foil.

For ESK shelters, which are the biggest enclosures, it has to be checked individually whether the above described packing can be simplified. Shelters usually come with a SS floor and fixing brackets on which the shelter can be attached to the vehicle of transport. In

case of simplified transport, the shelters need to be handled with care throughout the complete transportation process. Due to the packing on pallets or wooden crates in an unsealed condition, the storage at the final destination should be in a weather protected area. This means at least a dry storage under a roof.

In case of equipped enclosures attention needs to be directed to heavy equipment, especially if it is shaped in a way that it creates torque on the mounting-struts / plates. In these cases the equipment needs to be supported for the unlikely case of road bumps, sudden shocks etc.. In case of land transport on very bumpy roads supports should even be considered for medium weights. Also, any form of vibration during transport needs to be eliminated.

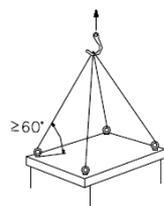
IMPORTANT NOTICE: Before accepting the delivered goods, the recipient needs to do a proper check of the integrity and completeness. In case of any damages or missing goods the recipient immediately needs to claim the findings at the forwarder and collect a signature as well as contact details of the delivering company/person. These provisions will ensure that any further claims can be handled on an objective basis.

Installation and Mounting

The enclosures are designed for wall mounting or standing upright on a basement or socket. They should be mounted and dismantled in such way that the required protection degree is maintained intact and that no damage of the material occurs.

Before fixing the enclosure to the final location of installation the enclosure as well as the place of installation should be checked to be free from dirt, chemicals and other potentially harmful influences. Furthermore, the enclosure should not be exposed to internal or external heat factors which cause an excess of the maximum allowable operating temperature.

Lifting shall be conducted according to SCHRAMM instructions. Lifting is generally possible at lifting eyes on the roof or at lifting brackets at the base frame. Fixing brackets are for fixing only but not for transport. Custom instructions are available on request. The following recommendation is generally valid.



Lifting Eye Bolts
stainless steel

If wall penetrating equipment has to be added or dismantled, ensure, when assembling that all sealings are done properly in order to keep the IP rating.

With respect to the low weight of GRP and potentially big surfaces of the enclosure special attention needs to be directed to proper fixation, especially for floor mounted enclosures. Influences as wind, rain, snow and others can put severe loads onto the enclosure structure. In this matter also the underlying floor should be checked to be in proper and absolutely even condition. If the floor is not even the enclosure is bending and the doors are likely to not close properly.

Electrical Protection is vital for the safety. The requirements defined in EN 61439-1, by means of protective earth circuits must be adhered to. An inner PE connection must be foreseen and should be connected to the mounting plate, assembly rack or different internal metallic surface. When you are installing the inner PE conductor, be sure that the conductor will not rotate or become loose. Torque the screwed connection to provide sufficient contact pressure using a split washer or similar. For Ex-applications the enclosure surface itself also needs to be connected to the protective earth. Always be aware that serious injury or death can be a consequence of improper protective earth (PE) conductor.

Cable and wire entries as well as sealing bungs made of metal or cold impact resistant plastic can be used. Unused openings for cable and wire entries must be closed with plugs. The cable and wire entries must be installed so that self-loosening is prevented and the permanent sealing of the cable and wire entry locations can be

guaranteed. The distances between the cable entries should be chosen so that a torque wrench can be used to tighten the cable and wire entries and check nuts. The tightening torques must be observed for the installation of the cable and wire entries.

In general, also the following must be observed when installing:

- + national safety regulations
- + local workplace health and safety regulations
- + local installation and set-up regulations
- + generally accepted engineering standards
- + the safety information contained in these operating instructions
- + the data and rated operating conditions on the name plate and rating plate

In case of any queries or questions at site which are directed to Schramm please provide the reference number given on the Schramm Tag plate which is always placed at the inside of the (right) door wing. Beside the reference some photos of the problem and the overall installation are helpful and desirable. The contact details are listed at the end of this manual.

Start-up and Commissioning

Before you apply power for the first time, you must at least check the points below in addition to site specific practices which cannot be covered by this general instruction. More detailed instructions for selected actions mentioned below are available from SCHRAMM on request.

- + Is the enclosure properly installed on even ground?
- + Fixation to the ground / foundation is properly done in order to prevent the cabinet from falling over?
- + Is the base frame of the enclosure sealed to the ground to avoid ingress of humidity which becomes harmful to the equipment? (applicable in case of cutouts in the floor etc.)
- + Does the enclosure show any visual damages?
- + Are the gaskets of the door fully intact and is the door closing properly?
- + Are there any foreign objects in the enclosure which need to be removed?
- + Is the wiring space clean and free from undesired parts so there is no danger of short circuits?
- + Are mounting and device screws of equipment / auxiliary structures (mounting plates etc.) securely fastened?
- + Are cable and wire entries securely fastened and seal?
- + Are all feedthroughs done correctly and comply with the specified IP rating?
- + Have all unused openings been closed with adequate plugs, bungs or similar?
- + Are potential lifting lugs at the roof fastened (before and after lifting)?

Operating, Maintenance and Service

Any enclosure must be installed, supervised, maintained and kept in good conditions by the owner of the plant. Only skilled workers are allowed to do maintenance and the elimination of disturbance work. Instructions for selected service actions and repairs are available on request from SCHRAMM.

Attention: Always disconnect the voltage supply before starting to work at the enclosure.

Do not perform any independent repair of defective empty enclosures. Either contact SCHRAMM for help or send it back to SCHRAMM. Unauthorized repairs and disassembly will automatically eliminate warranties and liabilities.

For spare parts, please refer to SCHRAMM website or sales staff.

Schramm service address:

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