

General Product Information

PRODUCT STANDARD / COMMENTS ON DEFINITIONS USED / CE MARKING / CONFORMITY TO COMPONENT STANDARDS / NATIONAL APPROVALS / PROTECTION

Product standard equipment standard

The product standard only contains minimum requirements. Attention is drawn to the fact that appliance specifications might contain requirements additional to or deviating from those specified in the relevant product standards.

Comments on definitions used

Please be aware that the specifications nominal value used in the German part of the Schurter catalogue and the data sheets, is synonymous with rated value. The difference between these two values is a pure matter of definition. In order to avoid any unnecessary complications we will continue to use the specifications nominal value.

CE marking acc. to EU-directives

CE marking is the only marking which indicates that a product conforms to the relevant EU-directive.



This means that the CE-mark is no quality or standard conformity mark but only an administration mark. SCHURTER products are covered by the low voltage directives 2006/95/EEC. Those are valid for equipment and appliances with rated voltage values between AC 50 V to AC 1000 V as well as DC 75 V to DC 1500 V. The CE marking of SCHURTER parts will be found on the label of the smallest packing unit. On request we will submit a CE conformity statement for each component. CE conformity statements and approvals can also be retrieved from the internet under <http://www.schurter.com>.

Conformity to component standards, national approvals

National testing institutions are testing according to national and international standards or other generally recognized rules of technology. Their certification/approval-marks confirm the observance of the safety requirements which electric appliances must fulfil.

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		Electrical Certification
	VDE	Verband Deutscher Elektrotechniker
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	UMF	
	UL	Underwriters' Laboratories (USA, Canada)
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	UL	Underwriters' Laboratories (USA)
	UL	Underwriters' Laboratories (USA, Canada)
	CSA	Canadian Standard Association, Component Acceptance Service
	CSA	Canadian Standard Association
	CCC	Chinese Compulsory Certification
	CQC	Chinese Quality Certification (voluntary)
	PSE	Japan Electrical Safety and Environment technology Laboratories
	KTL	Korea Testing Laboratory
	TÜV	Technischer Überwachungsverein
	NF	Norme française
	SEV	Schweizerischer Elektrotechnischer Verein
	SEMKO	Svenska Elektriska Materielkontrollanstalten
	FIMKO	Finnish Electrical Inspectorate
	KEMA	Keuring van Elektrotechnische Materialien
	IMQ	Instituto italiano del marchio di qualità

National approvals

In addition to the combined UL/CSA approvals, most of the SCHURTER components are also approved by one of the European certification bodies like VDE (Germany), Electrosuisse (Switzerland) or SEMKO (Sweden). The safety testing of all these European certification bodies are based on the common European safety standards. With the harmonisation effort in Europe, the different national European certification bodies have lost their importance and SCHURTER

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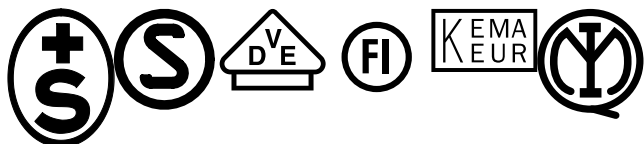
has decided to maintain only one European approval (e.g. VDE, SEV or SEMKO) in future. The others will not be renewed once they have expired.

Because UL and CSA are not members of the CENELEC, the standards of UL and CSA are not harmonised yet with the European standards. However, UL and CSA are trying to harmonize their standards with each other. Where possible, SCHURTER will apply for the combined cULus or cURus approval.

Further to development in Asia, SCHURTER has obtained national approvals from China, Japan and Korea.

Information about approvals

SCHURTER products are certified according to EN / IEC standards and carry country specific approvals in Europe.



During the last few years European countries made much effort to reduce their approval marks to one generally accepted mark. The ENEC approval mark replaces (wherever possible) the previous approval mark. The ENEC mark is offered by all national certification bodies that signed for the European certification agreement (CCA)*.

SCHURTER decided to reduce the variety of European approval marks. For new approbations of SCHURTER parts only the ENEC will be mentioned in the future:



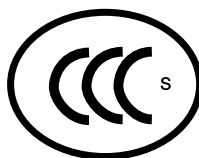
Approvals for the US and Canada are according to the UL and CSA standards:



As UL and CSA are not a member of CENELEC these two are not according to the European approval marks. Wherever possible SCHURTER want to acquire the combined cULus approval mark:



Since Aug. 1st. 2003 the Chinese approval mark is required for a lot of products to import to China. SCHURTER strives to get the approvals for the concerned products.



SCHURTER will check if a voluntary CQC registration can be done when a product does not apply with a Chinese standard.



Further information:
<http://www.enec.com>

Approval Industry Links

* members of ENEC agreement:

Reference	Key	Country
01	IMQ	Italy
02	KEMA	Netherlands
03	VDE	Germany
04	SEV	Switzerland
05	SEMKO	Sweden

IP DEGREES OF PROTECTION PROVIDED BY ENCLOSURES (IP CODE)

Standards IEC 60529; EN 60529 and DIN 40050

Scope

These standards apply to the classification of degrees of protection provided by enclosures for electrical equipment with a rated voltage not exceeding 72.5 kV.

Object

The object of these standards is to give:

a) Definitions for degrees of protection provided by enclosures of electrical equipment as regards:

1. Protection of persons against access to hazardous parts inside the enclosure
2. Protection of the equipment inside the enclosure against ingress of solid foreign objects
3. Protection of the equipment inside the enclosure against harmful effects due to the ingress of water.

b) Designations for these degrees of protection.

c) Requirements for each designation.

d) Tests to be performed to verify that the enclosure meets the requirements of these standards.

Designations

The degree of protection provided by an enclosure is indicated by the

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IP code.

Elements of the IP code and their meanings

A brief description of the IP code elements is given in the following table.

IP xy	Meaning for the protection of equipment	Meaning for the protection of persons
	Against ingress of solid foreign objectif	Against access to hazardous parts with
x = 0	(non protected)	(non protected)
x = 1	50 mm diameter	back of hand
x = 2	12.5 mm diameter	finger
x = 3	2.5 mm diameter	tool
x = 4	1.0 mm diameter	wire
x = 5	dust protected	wire
x = 6	dust tight	wire
	Against ingress of water with harmful effects	
y = 0	(non protected)	
y = 1	vertically dripping	
y = 2	dripping (15° tilted)	
y = 3	spraying	
y = 4	splashing	
y = 5	jetting	
y = 6	powerful jetting	
y = 7	temporary immersion	
y = 8	continuous immersion	
y = 9K	high pressure, i.e. steam jet cleaning	

Information about IP Protection

Information about IP protection levels may vary depending on mounting or application for the various components. Following explanations are supplemented for this purpose.

There are cases where more than one IP value is mentioned for a product. Then this values are separated by a slash or by the term "or". This information is given for families or on series level to indicate that there are different variants with respective IP protection degrees. In some cases there will be further information about the respective conditions to ensure the tightness said. e.g.. 40 / 54 with sealing kit

IP Protection from Front Side

This mounting perspective means the protection against the ingress of foreign substances from the outside into the interior of the appliance. Accordingly, it comes to the sealing of the offered component against the housing and also the sealing of moveable elements which are accessible from the outside.

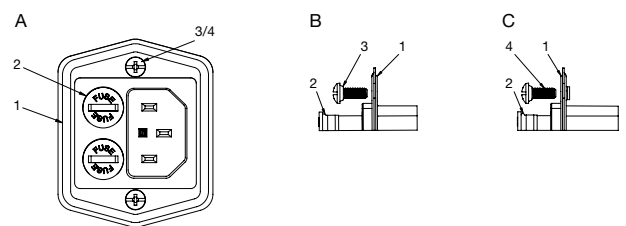
IP Protection from Rear Side

This is basically the opposite to the mounting of the front side. The listed IP value means the protection level from the rear side of the selected part, so it is focusing on the inside of the appliance. This information can be important when there is an intention of potting the components inside the housing. This specification is also noted

whether a component is suitable for this process.

Detailed IP Information According to Product Feature

If the IP rating of a component is particularly high, then the respective sealing areas have to be addressed in detail in order to explain the requirements for a successful sealing. These detailed mounting instructions are correspondingly provided for the respective products. The sealing from the component towards the housing is the primary goal. Accordingly here the seal is described against the flange and the attachment area. In addition, more information coming from the moving parts, or even the insertion region. Mounting standard versionA) front viewB) detail front mounting typeC) detail rear mounting type



A) Front view B) Details of front mounting C) Details of rear mounting
1) sealing of flange 2) sealing of fuseholder 3) sealing of screw hole (front mounting type: sealing ring on screw head) 4) sealing of screw hole (rear mounting type: sealing on screw thread)

Information on IP Protection in Unmated and Inserted State

In connector systems, the operating condition is taken into account if a unit has to be tight under current supply, this corresponds to the so-called inserted state. 6100-3 with sealing kit IP 54



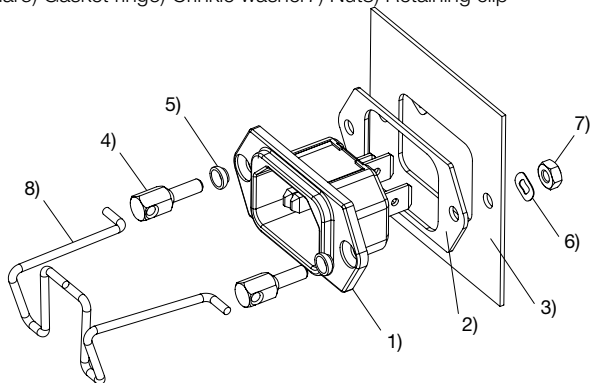
Otherwise, it may happen that a device must be sealed for transport or cleaning phase in which the power supply cable is not connected to the device. This mentioned case is referred to IP protection when unmated..

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Available products to enhance the IP protection level are listed as accessory products. It is important that the necessary components are used according to the specifications as for example using a connector with the proposed cord retainer.

6100-3 incl. sealing kit for IP 541) Appliance inlet 6100-3 with factory-mounted inlet gasket 2) Flat gasket 3) Chassis 4) Pillar 5) Gasket ring 6) Crinkle washer 7) Nut 8) Retaining clip



1) Appliance inlet 6100-3 with factory-mounted inlet gasket 2) Flat gasket 3) Chassis 4) Pillar 5) Gasket ring 6) Crinkle washer 7) Nut 8) Retaining clip

Product Overview with IP Protection Level Indication

The IP values are depending on the product range optional or recommended selection criteria in the catalog refinement search. The complementary accessories and matching components are referenced in the respective product data sheets.

PROTECTION AGAINST ELECTRIC SHOCK

1. Protection against direct and indirect contact general terms

The protection against electric shock on electric equipment as well as their components are divided into the following parts:

- Protection against direct contact with live parts concerns all measures for the protection of human beings and animals against hazards which result from direct contact with live parts of electric equipment and their components.
- Protection against indirect contact is the protection of human beings and animals against hazards which result from contact of live parts ¹⁾ of electric equipment as well as components thereof, which have become live due to an insulation failure.

¹⁾ Accessible, conductive part, which is not conductive normally but which may be conductive due to a failure.

2. Protection against direct contact with live parts e.g. of a fuseholder

The data sheets of the relevant components inform about the taken measures.

3. Protection against indirect contact

Measures for the protection against indirect contact on electrical equipment are defined according to IEC 61140 by the 4 protection classes 0, I, II, III. Each protection class includes two protection measures. Even if one of these measures should fail, no electric shocks will occur.

Protection class	Main protective measures
0	1. Basic insulation between live parts and accessible conductive parts. 2. Earth-free location, non-conducting environment.
I	1. Basic insulation between live parts and accessible conductive parts. 2. Means are provided for the connection of accessible conductive parts of the equipment to the protective (earthing) conductor in the fixed wiring of the installation in such a way that accessible conductive parts cannot become live in the event of a failure of the basic insulation.
II	1. Basic insulation between live parts and accessible conductive parts. 2. Additional insulation. Basic and supplementary insulation are summarised under the term "double insulation". Under certain circumstances also a "reinforced insulation" (single insulation system) may guarantee an equivalent protection against electric shock as a "double-insulation" does. No terminal for a protective conductor is allowable. A possibly existing protective conductor must not be connected and has to be insulated like any live part.
III	1. Functional insulation. 2. Supply at safety extra-low voltage SELV (the circuit is isolated from the mains supply by such means as a safety isolating transformer). The protection against electric shock is in this case completely based on the supplying by SELV-circuits ($U \leq 42$ V). Higher voltages are not generated in the equipment. No terminal for a protective conductor is allowable.

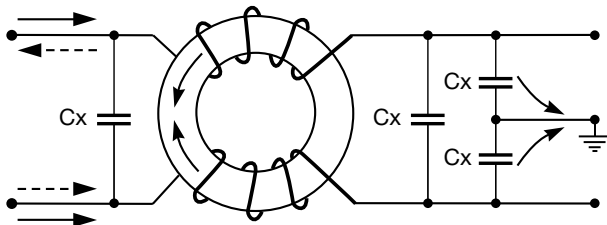
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Test voltages

Chokes for	Between connections	Inner and outer insulation
AC	$4.3 U_R$ VDC	$2 U_R + 1500$ VAC, but at least 2000 VAC
DC	$3 U_R$ VDC	$2 U_R + 1500$ VDC

Temperature rise at nominal current: $\Delta T = 60^\circ\text{C}$
 Short-circuit strength:
 EN and VDE: not applicable
 SEV→: $25 \times I_N$ (2 half-waves)

Current compensated chokes in interference suppression filters



-----> Symmetric interference
 ———> Asymmetric interference

The main type of choke used in suppression filter engineering is the current compensated choke. This mainly damps the common mode interference. The differential mode parasitic current, or rather the magnetic flux they produce in the core, is compensated by means of a special type of winding. The relatively small attenuation of the differential mode parasitic currents can be balanced through the large, symmetrically connected capacitance C_x between the lines. Only the leakage inductance L_s of the choke is then of any importance.

$$L_{\text{leakage}} \approx \frac{L_{\text{nominal}}}{50} \text{ to } \frac{L_{\text{nominal}}}{100}$$

The high nominal inductance L_N active for common mode parasitic currents allows the insertion of small, earthed capacitances C_Y in a filter circuit. These capacitances are regulated by international standards for leakage currents.

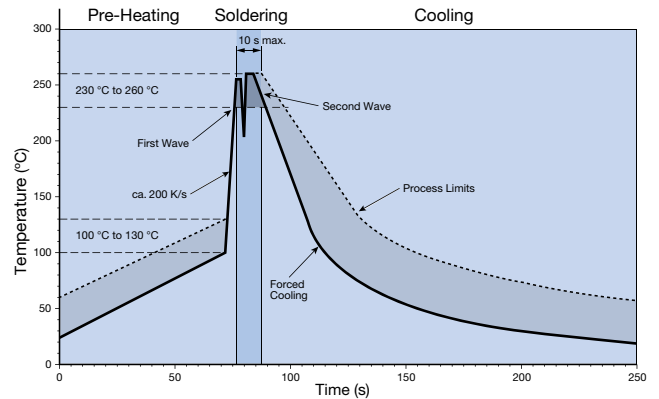
RF suppression capacitors: General information

All SCHURTER filters are fitted with class X or Y RF suppression capacitors in accordance with international standards (IEC, EN). These are mainly self-healing metallized paper, polyester or polypropylene types, tested against the standards of major countries around the world and approved as noise suppression capacitors. Class X capacitors are capacitors with unlimited capacity for those applications in which a failure caused by a short circuit cannot result in a dangerous electrical shock. Class Y capacitors are capacitors intended for an operating voltage $U_{\text{eff}} = 250$ V with increased electrical and mechanical safety and limited capacitance.

SOLDERING PROFILE

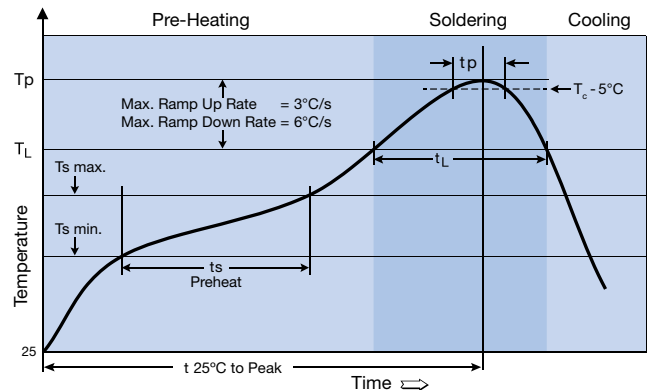
SCHURTER components for printed circuit boards are suitable for common solder processes. THT components can be wave soldered with a peak temperature of 230 to 260°C. SMD components are suitable for reflow soldering with a peak temperature of 260°C. Please note the soldering specification on the product data sheet.

Recommended Wave Soldering Profile



The solder temperature 230°C 260°C depends on the solder classification of the components.

Recommended Reflow Soldering Profile



Soldering Profile

Reflow feature	Pb-Free assembly	
Preheat	Temperature Min ($T_{s \text{ min}}$)	150°C
	Temperature Max ($T_{s \text{ max}}$)	200°C
	Time (t_p) for ($T_{s \text{ min}}$ to $T_{s \text{ max}}$)	60 - 120 secs
Ramp-up rate (T_L to T_p)	3°C / secs max.	
Liquidous temperature (T_L)	217°C	
Time (t_L) maintained above (T_L)	60 - 150 secs	
Time (t_p) below 5°C of max. peak temperature	30 secs max.	
Ramp-down rate (T_p to T_L)	6°C / secs max.	
Time 25°C to peak temperature	8 mins max.	
Peak temperature maximum	260°C	

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Soldering Profile

* The peak temperature depends also on the component volume (see JEDEC J-STD-020D)