

Installation instructions for PU-Overvoltage in Mains Control.

This equipment may only be installed by fully qualified personnel. Please note: the local installation regulations specific to the country of use must be observed.

1. Application

The PU-C overvoltage serves for the protection of low voltage consumer's installations and electronic devices against surges resulting from atmospheric discharges (lightning) or switching operations. The PU-C meets the requirements of IEC 61643-1 01/02 Class II, VDE 0675, part 6, class C 11/89, draft and DIN VDE 0675. Part 6, A2, 10/96 and ÖVE SN 60 part 4 and part 1 and the Ö Norm 8001. Highly efficient metal-oxide varistors are used for voltage limiting components. For the PU 3+1C we use a spark gap between L-PE or PE-N.

2. Notes on installation

2.1 Site of installation

The PU-C

The PU-C must be installed in the meter cubicle or distributing cabinet in such a way that the terminal room is protected against unauthorised access. The overvoltage protection must be installed by trained service personnel. The regulations covering the construction of a installation with overvoltage protective equipment is described in VDE V 0100 part 534; 4/99: Selection and construction of operating equipment. This norm (in preparation) is in conjunction with the following norms.

- 1 IEC 60364-4-43 "Protection from overvoltage resulting from atmospheric conditions and resulting from switching activity."
- 2 IEC 61024-1 "Protection of buildings against lightning strikes".
- 3 IEC 61312-1 "Protection against electromagnetic lightning impulse".

2.2 Electrical connection

The PU-C overvoltage protection must be connected with short lines between the (outer) supply conductor (L1, L2, L3) and the neutral conductor (N) and the earth (PE) of the consumer's installation. The parallel routing of non-protected lines and protected lines must be avoided. For connection examples, see figures 1 and 2.

2.2.1 Connection to (outer) supply conductor and neutral conductor.

As a rule, the same conductor cross-section is selected for the connecting lines to the PU arrester as for the (outer) supply conductor (L1, L2, L3) and the neutral conductor (N). In the event of a reduction of the cross-section, a protective device (e.g. service fuse) must be provided for short-circuit protection of the connecting lines. The arrester terminals must not be used as tee-off terminals. The PU-C back-up fuse can be selected up to a maximum of 125 A. Series connected residual-current devices (RCD) must be surge proof.

Notes:

Use a 3-pole PU-C in a TN-C-S network, (see picture 1/ if the PEN line is used separately as PE and N, then select a 4-pole PU 4 C or the PU 3+1 C).

According to DIN VDE 0100-534/A1 10/96, it is possible in a TT network to install a 4-pole PU-C protector, together with an arrester disconnecter. The module PU 3+1C (old name PU 4 C TT) catalogue number 841637, offers the best installation prerequisites if a potential transfer is to be avoided without the use of an arrester disconnecter.

The PU 3 C for 385 V is to be installed in IT networks with 230 V line-to-line voltage.

2.2.2 Connection to earth

The arrester's earth conductor must be connected by the shortest possible route ($\leq 0,5\text{m}$) to the earth terminal of the consumer's installation. Longer connection lines reduce the efficiency of the overvoltage protector. Parallel routing with other electrical lines must be avoided. The earthed equipotential bonding strip is available for connection with the equipotential bonding of electrical consumer's installations (see figures 1 and 2).

- ° It must always be ensured that the arrester earth is connected with the consumers installation.
- ° For TN systems, the PEN conductor and the earth conductor of the arrester must be interconnected.
- ° The PEN conductor of the electricity supply company must not be used as an earth electrode.
- ° Where the PE rail or PEN rail of a distribution board is used as an earth terminal, these must be connected via a separated earth conductor to the earth electrode of the consumer's installation.

The cross-section of the arrester earth conductor is determined, as with the main equipotential bonding conductors, according to table 1. The conductor must have 0,5 times the cross-section of the main protective conductor, the upper limit is fixed at 25 mm² Cu. A lower limit of 10 mm² Cu is required.

	Cross section mm ²		
	≤ 16	25	≤ 35
Main protective conductor - from the power source or - house service box or main distribution board outgoing protective conductor.			
Supply conductor	≤ 35	50	≥ 70
Earth conductor of arrester	10	16	25
Table 1			

3. Functional check

PU overvoltage arresters must be subjected to a visual inspection, especially during thunderstorms. If the colour of the inspection window turns red, the arrester must be replaced by trained service personal.

3.1 Maintenance

If the charge eliminator shows a red window as in 3., it must be replaced with a new one by trained service personal. The individual charge eliminators are pluggable and encoded according to their voltage. The varistor arrester must be removed when measuring the insulation resistance according to DIN VDE 0100 part 610. To remove, pull on the upper parts of the varistor.

The charge eliminator compatible with the rated voltage of the plant must be re-installed.

Technical Data:		PU xC	PU xC	PU xC	PU xC	PU xC	PU 3+1 C	PU 3+1 C
Max. Voltage V~	U _c	280	385	75	130	550	280	385
Rated diversion current of top part	i _{sn}	20 kA	20 kA	15 kA	20 kA	20 kA	20 kA	20 kA
Max. test current per Unit								
1-way block	i _{smax}	40 kA	40 kA	15 kA	40 kA	40 kA	40 kA	40 kA
2-way block	i _{smax}	70 kA	70 kA	40 kA	70 kA	70 kA		
3-way block	i _{smax}	100 kA	100 kA	100 kA	100 kA	100 kA		
4-way block	i _{smax}	100 kA	100 kA	100 kA	100 kA	100 kA	100 kA	100 kA
Operating temperature range		- 40 °C to + 80 °C						
Conductor size		16- 25 mm ² (stranded wire) 6- 10 mm ² (solid wire) 10 - 25 mm ² (flexible)						
Assembly		Snap-on mounting on 35 mm top-hat rails according to DIN 43 880 A1. draft 6.81						
Colour		Light grey, RAL 7035					orange orange	
Material		Polyamide 6.6						
Protection IEC 529 :		IP 20						
Dimensions								
1-way block complete		width 18 mm						
2-way block complete		width 36 mm						
3-way block complete		width 54 mm						
4-way block complete		width 72 mm						
Depth		55.0 mm						
		<ul style="list-style-type: none"> For DC-Applications please contact the manufacturer. 						

4. Connection of remote signalling unit

4.1 Remote signalling by means of monitoring modules

Type PU x CR

As the signalling contact in the PuxCR is a change-over contact, connections are made to terminals 11/14 (normally open contact) and/or to terminals 11/12 (normally closed contact).

The terminals 11/12 are closed during normal operations (window green). At the same time, the terminals 11/14 are opened (window red). In the case of a malfunctioning (window red) the terminals 11/14 are closed and the terminals 11/12 are opened.

The connection is carried out with stranded conductors (e.g. NYM), whereby parallel conductor routing of supply lines and the earth conductor must be avoided. Replacing a suppressor circuit with a surge suppressor reduces interference in and around the analysing unit.

4.2 Remote signalling by means of light barrier Type PU-O/S-E

Every PU-C is automatically suitable for telemonitoring purposes and can be retrofitted at any given time. Mount the transmitter on the left, and the receiver on the right next to the PU blocks on the top-hat rail and connect both devices to 230 V. Subsequently connect the remote signalling unit to terminals 11 and 14 and/or 11 and 12, described in item 4.1. The system can now be used to simultaneously monitor up to 40 overvoltage arresters.

Technical Data :	PU x-CR Monitoring module with relay output	PU O/S -E Receiver/transmitter	
Max. permissible switching voltage	250 V~, 24 V-	250 V~	Un 230 V~
Max. permissible switching current	1 A, 2 A	250 mA	I _N 40 mA
Signalling contact	1 Change-over contact		

4.3 Overvoltage Protection with the 3+1 PU module

The PU3+1C 230/400V fulfils the requirements of the die VDE 0100, Part 531/A and the PU3+1C 385V fulfils the requirement of the Ö-Norm 8001-§18.

Between the Phase L and the Neutral N are plugable Varistors and between the Neutral N and the Earth PE is a plugable spark gap.

If the charge eliminator shows a red window as in 3., it must be replaced with a new one by trained service personal.

4.4 Special Instruction for installation into metal Cabinets

To reach the clearance of the PU into metal cabinets these facts has to be done:

A plastic gap WTW part No 1058800000 or the WEW/2 part No. 106120 0000 has to be installed at the side of the PU to the metal Cabinet.

If you use the PU x CR with the monitoring contact, you have to reduce the voltage of the monitoring System to 48V.

Special for the PU with U_c: 550V, you have to put the plastic cover into the hole for the screwdriver after installation. These plastic cover is packed in the box together with the PU for UC :550V


4.3 Approvals

PU x C for 230/400 V mains control according to ÖVE SN 60 part 4 and part 1.



All PU's with U_c: 130V, 280V, 385V, 550V are approved by the IEC 61643-1 and marked with CE.



The PU's with U_c : 130V, 280V, 550V are UL  approved.

Protection according to IEC 61024-1, IEC 61312-1
 Protection according to IEC 60364-4-443

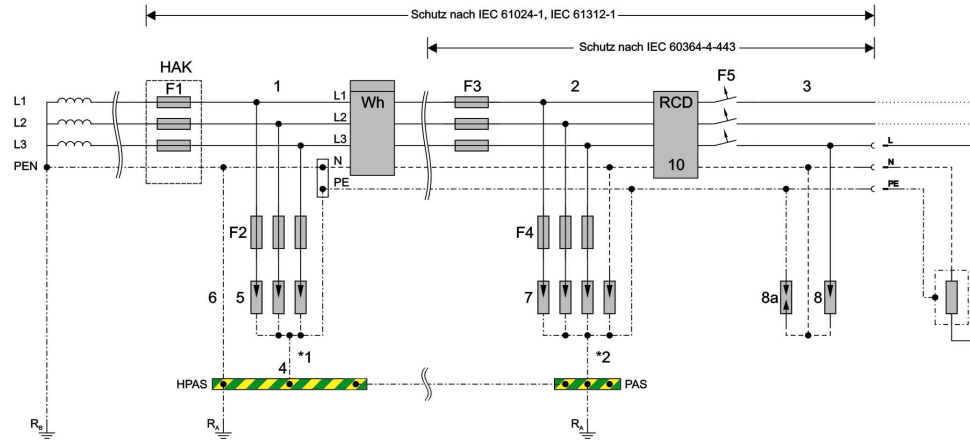


Fig. 1 Overvoltage protective equipment in TN network

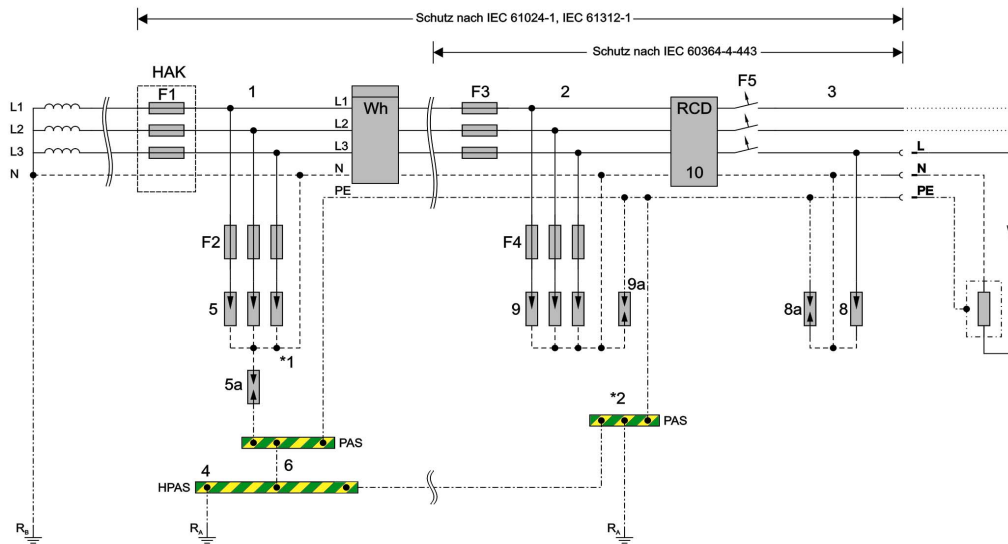


Fig. 2 Overvoltage protective equipment in TT Network with the 3+1 PU Module

1	Main supply system
2	Electrical circuit distributor
3	Branch circuit area
4	Main equipotential bonding strip
5	Overvoltage protection protective equipment Class I for lightning protection potential equalizer
5a	3+1 PU Unit with N-PE Lightning current arrester
6	Main equipotential bonding conductor
7	Overvoltage protection-protective equipment Class II PU 3 C / PU 4 C
8	Overvoltage protection-protective equipment Class III PU D in the TN System
8a	Overvoltage protection-protective equipment Class III PU D in the TT System
9	9a Overvoltage protection protective equipment Class II PU 3+1 C for TT System
10	RCD (Residual-current device)
11	Arrester disconnector
HAK	Service panel
R	Earth
Re	Equipment earth
Wh	Measuring device
F1	Input terminal fuse
F2	Fuse for PUxB necessary only by max. 160 A (depending on type of routing), if F1> 160 A.
F3	Fuses for Electrical circuit distributor
F4	Fuse for PUxC necessary only by max. 125 A (depending on type of routing), if F1> 125 A.
F5	Circuit breaker 16 A
*1)	Construction before taking measurements should be agreed with the local ESC.
*2)	If a lightning protecting equipotential equalizer exists, then it must be connected to the earthable points of the overvoltage protective equipment.