

## Line-up terminal

### Terminal's elements

#### Insulation part

The material of the insulating body of the terminals type VS PA is PA 6.6 polyamide (self-extinguishable - colour of ebony acc. to RAL 1014) which is made of polyamide resin and has higher temperature resistance, it is thermal stabilized and is resistant to aging. Polyamide 6.6 has good geometrical stability and excellent mechanical resistance. The material satisfies regulation according to IEC 695-2-1. It is suitable for use in temperature range from -40 C to +100 C according to IEC 216 rules. In the mentioned range the material remains unchanged. It is resistant to oils, greases, salts, several alkaline solutions and to low percentage of acid concentration. It is resistant to micro-organisms, bacteria, fungi, enzymes and termites. The design of the insulation body of the terminal consider the regulations of air and creepage distances of nominal voltage according IEC 947-1.

#### Terminal body

The terminal body of 2,5 mm<sup>2</sup> connecting elements are made from brass, others are made from steel. The body is equipped with a hole with thread for obtaining screw pressure. In the final phase of the production the bodies of brass are treated by coating with Ni and other are treated by coating with 12 microns of zinc and with blue pasivation. In this way galvanically and corrosion protection is obtained. The terminal body has excellent mechanical characteristics and they are not subject to mechanical deformation in ordinary use, which are prescribed with IEC 947-1 regulations. Terminal bodies are equipped with body nose (except terminal body VS 2.5 PA). So, it is avoided to insert cable under body if the terminal body is closed or half closed.

#### Conducting bar

The conducting bar is made of copper and is galvanically protected with 6 microns tin in surface. The coating provides ideal conducting characteristics and better surface contact, at the same time the corrosion effect is reduced.

#### Conducting bushes

They are made of brass containing a high percentage of cooper and they are protected against atmospheric corroding agents, chemical corrosion and marine corrosion by galvanic treatment.

#### Screws

The screws are made of steel, treated to have a hard coating and they obtain a high tightening torque. Screws are equipped with metric threads according ISO and are galvanically protected against corrosion with 8 microns zinc. Screws are designed to sustain mechanical tightening torque according to IEC 947-1.

### Current carrying capacity of conduct

The table below lists the test currents of the individual conductor cross sections as specified in the European standard IEC 947-7-1. Terminal blocks that are tested with this load must maintain the tolerance limits specified in the standard (e.g. maximum temperature rise).

Test currents in acc. with IEC 947-7-1 table V									
Rated cross section [mm <sup>2</sup> ]	0,5	0,75	1	1,5	2,5	4	6	10	16
Test current [A]	6	9	13,5	17,5	24	32	41	57	76
Rated cross section [mm <sup>2</sup> ]	25	35	50	70	95	120	150	185	240
Test current [A]	101	125	150	192	232	269	309	353	415

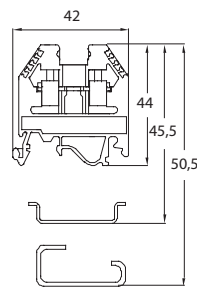
#### Tightening screw torque of terminal blocks

IEC 947-7-1 specifies mechanical tests for judging the quality of the connection elements. According to these tests conductors should be connected by tightening the terminal block screws with a certain torque. The value of the torque depends on the dimensions of the terminal block screw and is shown in the table below. The relatively low torque allows safe connections.

Extract from IEC 947-1 table IV				
Thread	Head screw with slot		Head screw without slot - hexagon nut	
	Tightening torque [Nm]	Maximal tightening torque [Nm] Steel screw	Steel screw	
M2,5	0,4	0,7	-	-
M 3	0,5	1,0	-	-
M 3,5	0,8	1,4	-	-
M 4	1,2	2,0	1,2	2,0
M 5	2,0	4,0	2,0	4,0
M 6	2,5	5,0	3,0	6,0
M 8	3,5	-	6,0	12,0
M 10	4,0	-	10,0	20,0

**Line-up terminal VS 2,5 PA**

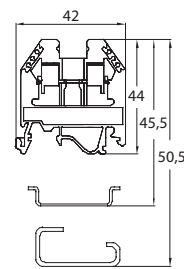
dimensions	
thickness of terminal [mm]	5
av. tolerance of engaging on terminals rail [mm]	+0,1
stripping length of conductor [mm]	7
cross-section of conductors	
cross-section of single wire [mm <sup>2</sup> ]	0,5-4,0
cross-section of fine wire [mm <sup>2</sup> ]	0,5-2,5
cross-section of fine wire [mm <sup>2</sup> ]	0,5-2,5
cross-section of multiple wire [mm <sup>2</sup> ]	0,4-25
nominal value (IEC 947-1)	
nominal voltage [V]	660
nominal current [A]	24
nominal cross-section [mm <sup>2</sup> ]	2,5



M3

**Line-up terminal VS 4 PA**

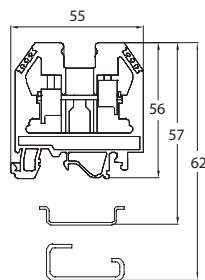
dimensions	
thickness of terminal [mm]	6
av. tolerance of engaging on terminals rail [mm]	+0,1
stripping length of conductor [mm]	7
cross-section of conductors	
cross-section of single wire [mm <sup>2</sup> ]	1,5-6,0
cross-section of fine wire [mm <sup>2</sup> ]	1,5-4,0
cross-section of fine wire [mm <sup>2</sup> ]	1,5-4,0
cross-section of multiple wire [mm <sup>2</sup> ]	1,5-4,0
nominal value (IEC 947-1)	
nominal voltage [V]	660
nominal current [A]	32
nominal cross-section [mm <sup>2</sup> ]	4,0



M3

**Line-up terminal VS 6 PA**

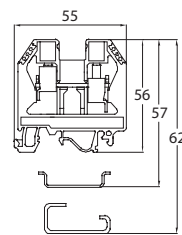
dimensions	
thickness of terminal [mm]	8
av. tolerance of engaging on terminals rail [mm]	+0,1
stripping length of conductor [mm]	9
cross-section of conductors	
cross-section of single wire [mm <sup>2</sup> ]	1,5-10,0
cross-section of fine wire [mm <sup>2</sup> ]	2,5-6,0
cross-section of fine wire [mm <sup>2</sup> ]	2,5-6,0
cross-section of multiple wire [mm <sup>2</sup> ]	2,5-6,0
nominal value (IEC 947-1)	
nominal voltage [V]	660
nominal current [A]	41
nominal cross-section [mm <sup>2</sup> ]	6,0



M3

**Line-up terminal VS 10 PA**

dimensions	
thickness of terminal [mm]	10
av. tolerance of engaging on terminals rail [mm]	+0,1
stripping length of conductor [mm]	10
cross-section of conductors	
cross-section of single wire [mm <sup>2</sup> ]	2,5-10,0
cross-section of fine wire [mm <sup>2</sup> ]	4,0-10,0
cross-section of fine wire [mm <sup>2</sup> ]	2,5-10,0
cross-section of multiple wire [mm <sup>2</sup> ]	4,0-10,0
nominal value (IEC 947-1)	
nominal voltage [V]	660
nominal current [A]	57
nominal cross-section [mm <sup>2</sup> ]	10,0

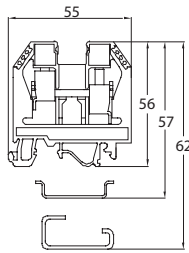


M4

SPOJ

**Line-up terminal VS 16 PA**

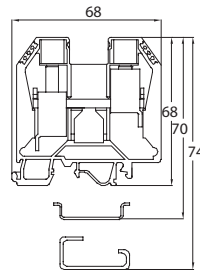
dimensions	
thickness of terminal [mm]	12
av. tolerance of engaging on terminals rail [mm]	+0,1
stripping length of conductor [mm]	11
cross-section of conductors	
cross-section of single wire [mm <sup>2</sup> ]	4-16
cross-section of fine wire [mm <sup>2</sup> ]	6-16
cross-section of fine wire [mm <sup>2</sup> ]	4-16
cross-section of multiple wire [mm <sup>2</sup> ]	10-25
nominal value (IEC 947-1)	
nominal voltage [V]	660
nominal current [A]	76
nominal cross-section [mm <sup>2</sup> ]	16



M4

**Line-up terminal VS 35 PA**

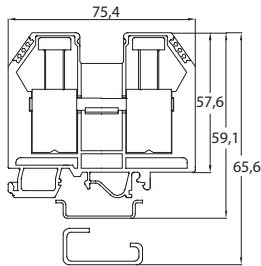
dimensions	
thickness of terminal [mm]	16
av. tolerance of engaging on terminals rail [mm]	+0,1
stripping length of conductor [mm]	15
cross-section of conductors	
cross-section of single wire [mm <sup>2</sup> ]	6-35
cross-section of fine wire [mm <sup>2</sup> ]	10-35
cross-section of fine wire [mm <sup>2</sup> ]	6-35
cross-section of multiple wire [mm <sup>2</sup> ]	10-50
nominal value (IEC 947-1)	
nominal voltage [V]	660
nominal current [A]	125
nominal cross-section [mm <sup>2</sup> ]	35



M6

**Line-up terminal VS 70 PA**

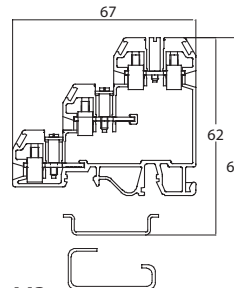
dimensions	
thickness of terminal [mm]	20
av. tolerance of engaging on terminals rail [mm]	+0,2
stripping length of conductor [mm]	20
cross-section of conductors	
cross-section of single wire [mm <sup>2</sup> ]	10-35
cross-section of fine wire [mm <sup>2</sup> ]	10-70
cross-section of fine wire [mm <sup>2</sup> ]	10-35
cross-section of multiple wire [mm <sup>2</sup> ]	10-95
nominal value (IEC 947-1)	
nominal voltage [V]	660
nominal current [A]	192
nominal cross-section [mm <sup>2</sup> ]	70



M8

**Sensor terminal block VS 2,5 IN**

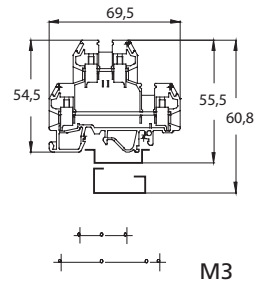
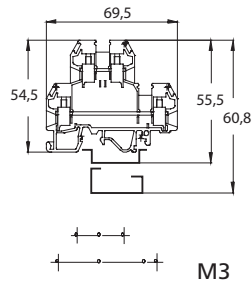
dimensions	
thickness of terminal [mm]	5,1
av. tolerance of engaging on terminals rail [mm]	+0,2
stripping length of conductor [mm]	8
cross-section of conductors	
cross-section of single wire [mm <sup>2</sup> ]	0,3-4
cross-section of fine wire [mm <sup>2</sup> ]	0,3-2,5
nominal value (IEC 947-1)	
nominal voltage [V]	440
nominal current [A]	24
nominal cross-section [mm <sup>2</sup> ]	2,5



M3

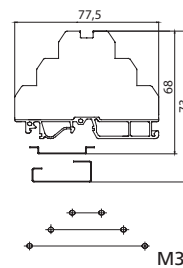
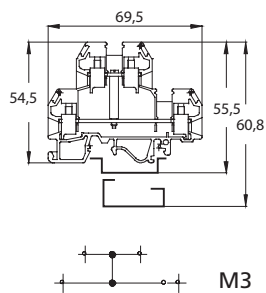
Double level line-up terminal VS 2,5 NA	
dimensions	
thickness of terminal [mm]	5
av. tolerance of engaging on terminals rail [mm]	+0,1
stripping length of conductor [mm]	8
cross-section of conductors	
cross-section of single wire [mm <sup>2</sup> ]	0,3-4,0
cross-section of fine wire [mm <sup>2</sup> ]	0,3-2,5
nominal value (IEC 947-1)	
nominal voltage [V]	440
nominal current [A]	24
nominal cross-section [mm <sup>2</sup> ]	2,5

Double level line-up terminal VS 4 NA	
dimensions	
thickness of terminal [mm]	6
av. tolerance of engaging on terminals rail [mm]	+0,1
stripping length of conductor [mm]	8
cross-section of conductors	
cross-section of single wire [mm <sup>2</sup> ]	0,3-6,0
cross-section of fine wire [mm <sup>2</sup> ]	0,3-4,0
nominal value (IEC 947-1)	
nominal voltage [V]	440
nominal current [A]	32
nominal cross-section [mm <sup>2</sup> ]	4



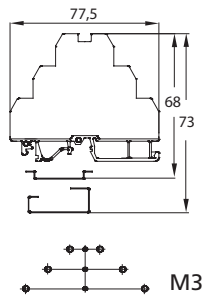
Double level line-up terminal VS 4 NA1	
dimensions	
thickness of terminal [mm]	6
av. tolerance of engaging on terminals rail [mm]	+0,1
stripping length of conductor [mm]	8
cross-section of conductors	
cross-section of single wire [mm <sup>2</sup> ]	0,3-6,0
cross-section of fine wire [mm <sup>2</sup> ]	0,3-4,0
nominal value (IEC 947-1)	
nominal voltage [V]	440
nominal current [A]	32
nominal cross-section [mm <sup>2</sup> ]	4

Three level line-up terminal VS 2,5 NA3	
dimensions	
thickness of terminal [mm]	6
av. tolerance of engaging on terminals rail [mm]	+0,1
stripping length of conductor [mm]	8
cross-section of conductors	
cross-section of single wire [mm <sup>2</sup> ]	0,3-4,0
cross-section of fine wire [mm <sup>2</sup> ]	0,3-2,5
nominal value (IEC 947-1)	
nominal voltage [V]	440
nominal current [A]	24
nominal cross-section [mm <sup>2</sup> ]	2,5



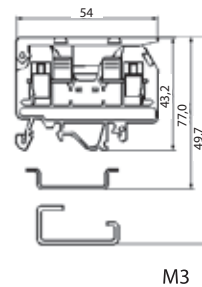
**Three level line-up terminal VS 2,5 NAI3**

dimensions	
thickness of terminal [mm]	6
av. tolerance of engaging on terminals rail [mm]	+0,1
stripping length of conductor [mm]	8
cross-section of conductors	
cross-section of single wire [mm <sup>2</sup> ]	0,3-4,0
cross-section of fine wire [mm <sup>2</sup> ]	0,3-2,5
nominal value (IEC 947-1)	
nominal voltage [V]	440
nominal current [A]	24
nominal cross-section [mm <sup>2</sup> ]	2,5



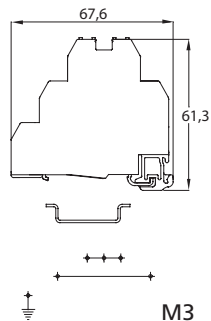
**Line-up terminal with fuse holder VSV 4**

dimensions	
thickness of terminal [mm]	8
av. tolerance of engaging on terminals rail [mm]	+0,2
stripping length of conductor [mm]	7
cross-section of conductors	
cross-section of single wire [mm <sup>2</sup> ]	1,4-4,0
cross-section of fine wire [mm <sup>2</sup> ]	0,3-4,0
nominal value (IEC 947-1)	
nominal voltage [V]	440
nominal current [A]	32
nominal cross-section [mm <sup>2</sup> ]	4



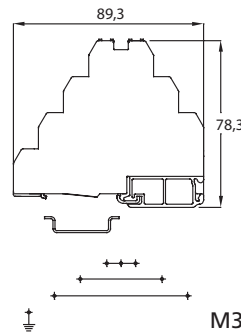
**Multi level line-up terminal with ground VS 2,5 PE2**

dimensions	
thickness of terminal [mm]	6
av. tolerance of engaging on terminals rail [mm]	+0,1
stripping length of conductor [mm]	8
cross-section of conductors	
cross-section of single wire [mm <sup>2</sup> ]	0,3-2,5
cross-section of fine wire [mm <sup>2</sup> ]	0,3-4,0
nominal value (IEC 947-1)	
nominal voltage [V]	440
nominal current [A]	32
nominal cross-section [mm <sup>2</sup> ]	4



**Multi level line-up terminal with ground VS 2,5 PE3**

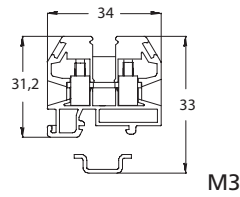
dimensions	
thickness of terminal [mm]	6
av. tolerance of engaging on terminals rail [mm]	+0,1
stripping length of conductor [mm]	8
cross-section of conductors	
cross-section of single wire [mm <sup>2</sup> ]	0,3-2,5
cross-section of fine wire [mm <sup>2</sup> ]	0,3-4,0
nominal value (IEC 947-1)	
nominal voltage [V]	440
nominal current [A]	32
nominal cross-section [mm <sup>2</sup> ]	4



Ground terminal blocks VSPE have different layout - they are closed type for insulating parts in green and yellow colour combination made from PA 6.6 materials. External dimensions of ground terminals are compatible with all line-up terminals of VSN and PA family of the same cross-section. With combined base which conducts directly from electric wire to mounting rail EN 50035 or EN 50022 where the line-up terminal is mounted without the need of additional mounting space. The mounting and dismounting to the bar 32 and 35 shall be done with an inner long screw which together with the spring washer assures the correct position of mounting rail.

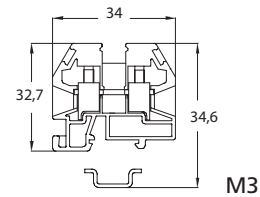
**Mini line-up terminal VS 2,5 PAM**

dimensions	
thickness of terminal [mm]	5,1
av. tolerance of engaging on terminals rail [mm]	+0,2
stripping length of conductor [mm]	8
cross-section of conductors	
cross-section of single wire [mm <sup>2</sup> ]	0,3-4,0
cross-section of fine wire [mm <sup>2</sup> ]	0,3-2,5
nominal value (IEC 947-1)	
nominal voltage [V]	440
nominal current [A]	24
nominal cross-section [mm <sup>2</sup> ]	2,5



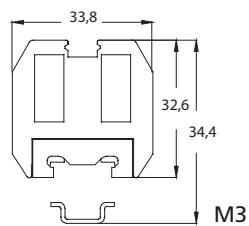
**Mini line-up terminal VS 4 PAM**

dimensions	
thickness of terminal [mm]	6
av. tolerance of engaging on terminals rail [mm]	+0,2
stripping length of conductor [mm]	8
cross-section of conductors	
cross-section of single wire [mm <sup>2</sup> ]	0,3-6,0
cross-section of fine wire [mm <sup>2</sup> ]	0,3-4,0
nominal value (IEC 947-1)	
nominal voltage [V]	440
nominal current [A]	32
nominal cross-section [mm <sup>2</sup> ]	4,0



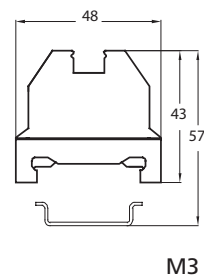
**Ground terminal VS 4 PEM**

dimensions	
thickness of terminal [mm]	7,2
av. tolerance of engaging on terminals rail [mm]	+0,2
stripping length of conductor [mm]	8
cross-section of conductors	
cross-section of single wire [mm <sup>2</sup> ]	0,3-4,0
cross-section of fine wire [mm <sup>2</sup> ]	0,3-4,0
nominal value (IEC 947-1)	
nominal current [A]	34
nominal cross-section [mm <sup>2</sup> ]	4



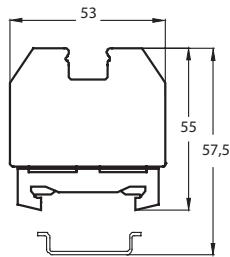
**Ground terminal block VS 4 PE**

dimensions	
thickness of terminal [mm]	7,5
av. tolerance of engaging on terminals rail [mm]	+0,2
stripping length of conductor [mm]	7
cross-section of conductors	
cross-section of single wire [mm <sup>2</sup> ]	1,5-6,0
cross-section of fine wire [mm <sup>2</sup> ]	0,5-4,0
nominal value (IEC 947-1)	
nominal current [A]	35
nominal cross-section [mm <sup>2</sup> ]	4



**Ground terminal block VS 6 PE**

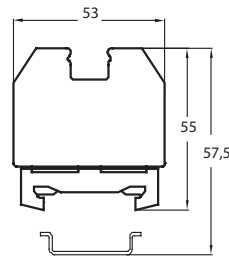
dimensions	
thickness of terminal [mm]	9
av. tolerance of engaging on terminals rail [mm]	+0,2
stripping length of conductor [mm]	7
cross-section of conductors	
cross-section of single wire [mm <sup>2</sup> ]	1,5-10,0
cross-section of fine wire [mm <sup>2</sup> ]	2,5-6,0
nominal value (IEC 947-1)	
nominal current [A]	43
nominal cross-section [mm <sup>2</sup> ]	6



M3

**Ground terminal block VS 16 PE**

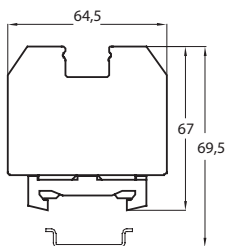
dimensions	
thickness of terminal [mm]	12
av. tolerance of engaging on terminals rail [mm]	+0,2
stripping length of conductor [mm]	10
cross-section of conductors	
cross-section of single wire [mm <sup>2</sup> ]	4-16
cross-section of fine wire [mm <sup>2</sup> ]	6-16
cross-section of fine wire [mm <sup>2</sup> ]	10-25
nominal value (IEC 947-1)	
nominal current [A]	70
nominal cross-section [mm <sup>2</sup> ]	16



M4

**Ground terminal block VS 35 PE**

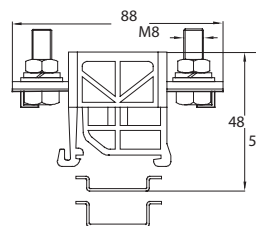
dimensions	
thickness of terminal [mm]	16
av. tolerance of engaging on terminals rail [mm]	+0,2
stripping length of conductor [mm]	15
cross-section of conductors	
cross-section of single wire [mm <sup>2</sup> ]	6-35
cross-section of fine wire [mm <sup>2</sup> ]	10-35
cross-section of fine wire [mm <sup>2</sup> ]	10-50
nominal value (IEC 947-1)	
nominal current [A]	95
nominal cross-section [mm <sup>2</sup> ]	35



M6

**High current line-up terminal VSU 70**

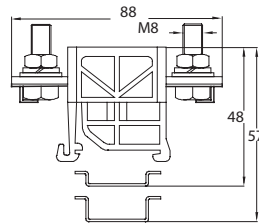
dimensions	
thickness of terminal [mm]	42
av. tolerance of engaging on terminals rail [mm]	+0,3
cross-section of conductors	
cross-section of conduction rail	25x3
nominal value (IEC 947-1)	
nominal voltage [V]	1000
nominal current [A]	192
nominal cross-section [mm <sup>2</sup> ]	70



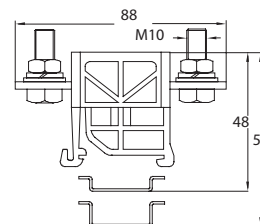
M8

High current line-up terminal VSU 95	
dimensions	
thickness of terminal [mm]	42
av. tolerance of engaging on terminals rail [mm]	+0,3
cross-section of conductors	
cross-section of conduction rail	25x4
nominal value (IEC 947-1)	
nominal voltage [V]	1000
nominal current [A]	232
nominal cross-section [mm <sup>2</sup> ]	95

High current line-up terminal VSU 120	
dimensions	
thickness of terminal [mm]	42
av. tolerance of engaging on terminals rail [mm]	+0,3
cross-section of conductors	
cross-section of conduction rail	25x5
nominal value (IEC 947-1)	
nominal voltage [V]	1000
nominal current [A]	269
nominal cross-section [mm <sup>2</sup> ]	120



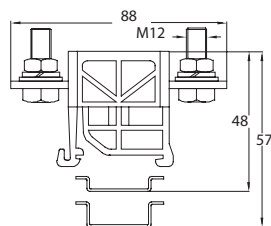
M8



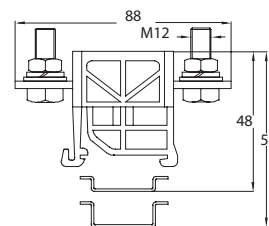
M10

High current line-up terminal VSU 185	
dimensions	
thickness of terminal [mm]	42
av. tolerance of engaging on terminals rail [mm]	+0,3
cross-section of conductors	
cross-section of conduction rail	25x8
nominal value (IEC 947-1)	
nominal voltage [V]	1000
nominal current [A]	353
nominal cross-section [mm <sup>2</sup> ]	185

High current line-up terminal VSU 240	
dimensions	
thickness of terminal [mm]	42
av. tolerance of engaging on terminals rail [mm]	+0,3
cross-section of conductors	
cross-section of conduction rail	25x10
nominal value (IEC 947-1)	
nominal voltage [V]	1000
nominal current [A]	415
nominal cross-section [mm <sup>2</sup> ]	240

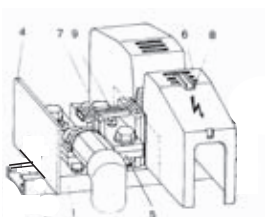


M12



M12

## Protective cover ZP 200



It maintains air gaps and creeping distances among cable lugs of conductors and protects the terminals against electric-shock hazard. It could be mounted on terminals VSU 70 to 150 connected with bridges, though in this case part of protective cover side wall should be cut along the line designed in the inferior. Cover, with the width identical to the width of terminals (42 mm) could be removed by means of screw driver. With terminals VSU 185 and 240 despite the bridging exclusively the usage of end plates KP VSU is required.



## Installation channels IKPS

In construction of distribution and switching equipment as well as in construction of electrical wiring there are various systems of either connection or wiring. The usage of wiring systems is increasing because they enable rapid intervention in the plant, i.e. substitution of conductors in case of failure. The advantage of wiring by means of plastic channels is the reduction of the assembly time to a minimum, space saving as well as aesthetic appearance. Channels are made of hard PVC and are resistant against acids, lyes and other chemicals. Constant temperature resistance is up to 60 °C. Channels IKP consist of the lower part where the conductors are inserted and covers.

The holes cut out from the side wall of the lower part of the channel are designed for the branching of the conductors to individual instruments. These holes are cut out so as to ease the insertion of conductor. In case a larger hole is required it could be enlarged with removal of the intermediate wall. The colour of channels is RAL 7030. Material is self-extinguished according to UL 94 V-0 and can be used for ship-building.

