hps

Accessories

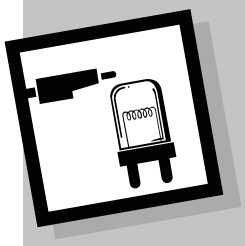
Connecting Leads and Plugs

SystemTechnik

Lehr- + Lernmittel GmbH
Altdorfer Strasse 16
88276 Berg / Germany

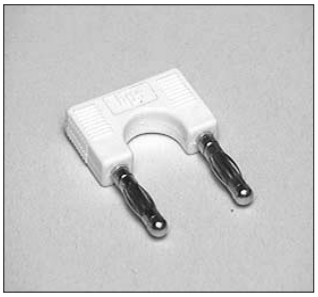
Phone: + 49 751 / 5 60 75 80
Telefax: + 49 751 / 5 60 75 17
Internet: www.hps-SystemTechnik.com
E-mail: export@hps-SystemTechnik.com

Contents



Accessories

Connecting Plugs (4 mm)

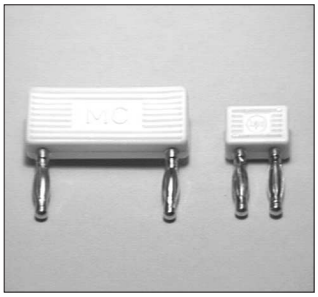


Type 9101

with two gold-plated laminated plugs,

- Plug diameter: 4 mm
- Plug spacing: 19 mm
- Colour: white

Connecting Plugs (2 mm)

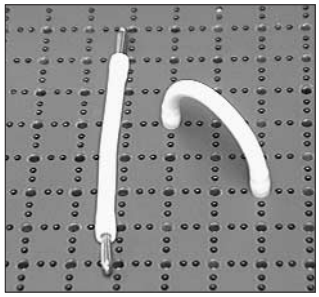


Type 9101.17 / Type 9101.1

with two gold-plated laminated plugs

- Plug diameter: 2 mm
- Plug spacing:
  Type 9101.17: 19 mm
  Type 9101.1: 5 mm
- Colour: white

Connecting Plug (4 mm), flexible



Type 9101.5

with two cluster plugs for connections up to a jack distance of approx. 60 mm
ill.: hps Universal Assembly Board, Type 1012

- Plug diameter: 4 mm
- Colour: white

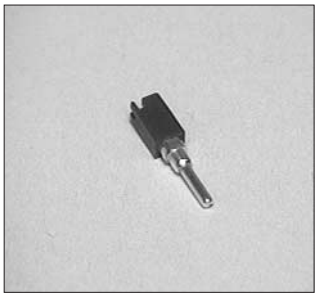
Quick Grip Plug (4 mm)

Type 9101.2

with one laminated plug (nickel-plated) and a quick grip device for clamping wires up to a diameter of 3 mm

- Plug diameter: 4 mm
- Colour: black

Quick Grip Plug (2 mm)



Type 9101.3

for fixing wires up to a diameter of 1 mm

- Plug diameter: 2 mm
- Colours: black, red

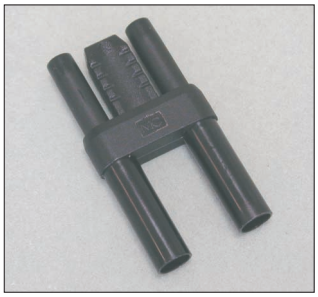
Safety Connecting Plug (4 mm)

Type 9101.4

with two contact-protected plugs, brass, gold-plated

- Plug diameter: 4 mm
- Plug spacing: 19 mm
- Colour: black

Safety Connecting Plug (4 mm)



Type 9101.7

with two contact-protected plugs and additional two safety jacks

- Plug and jack diameter: 4 mm
- Plug and jack spacing: 19 mm
- Colour: black

Accessories

Branching Point (with 4 mm plug)

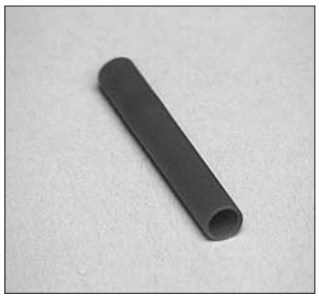
Type 9101.8

with gold-plated laminated plug for plugging into 4 mm jacks, e. g. on the hps Universal Assembly Boards and Universal PCBs

There are 6 jacks on the top for taking 0.4 ... 1.0 mm wires and one jack for a 2 mm plug.

- Plug diameter: 4 mm
- Colour: red

Junctions



Type 9101.14

Type 9101.14
fits the connection of two 4 mm laminated plugs

Type 9101.15
fits the connection of two 2 mm laminated plugs

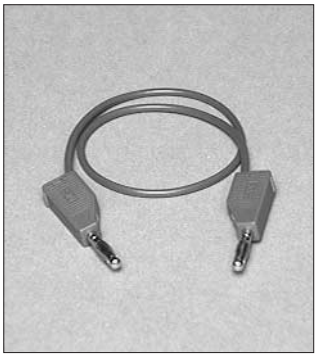
Type 9101.16
fits the connection of a 2 mm laminated plug and a 4 mm laminated plug

The Junctions are insulated for contact-protected connection of laminated plugs.

- Colours: red, blue, yellow, black

Accessories

Connecting Leads (4 mm)



Types 9102.1 ... 9102.5

Length	Type
30 cm	9102.1
60 cm	9102.2
100 cm	9102.3
150 cm	9102.4
200 cm	9102.5

with gold-plated laminated plugs, PVC-insulated, highly flexible, axial 4 mm jack in the plug head

- Plug diameter: 4 mm
- Load: approx. 19 A
- Contact resistance: approx. 0.2 mΩ
- Litz: 1.0 mm^2
- Colours: red, black, blue, yellow, green

Set of Connecting Leads Set (4 mm)

Type 9102.9

Length	Qty.
30 cm	10
60 cm	15
100 cm	10
150 cm	5

technical data same as for Types 9102.1 ... 9102.5

consisting of 40 connecting leads

- Colours: red, black, blue, yellow, green

Safety Connecting Leads (4 mm), with fixed isolating sleeve

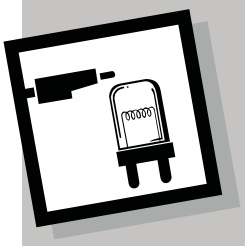
Types 9102.30 ... 9102.35

Length	Type
25 cm	9102.30
50 cm	9102.31
75 cm	9102.32
100 cm	9102.33
150 cm	9102.34
200 cm	9102.35

with gold-plated laminated plugs, additional axial jack in the plug head, PVC-insulated, highly flexible

The plugs are equipped with a fixed isolating sleeve for protection against accidental contact.

- Plug diameter: 4 mm
- Jack diameter: 4 mm
- Contact resistance: approx. 0.3 mΩ
- Load: approx. 32 A
- Litz: 2.5 mm^2
- Colours: red, black, blue, yellow, green, brown, white, grey, violet, green-yellow



Connecting Leads

Accessories

Set of Safety Connecting Leads (4 mm), with fixed isolating sleeve

Type 9102.10

Length	Qty.
30 cm	10
60 cm	15
100 cm	10
150 cm	5

technical data same as Types 9102.30 ... 9102.35

- Colours: red, black, blue, yellow, green

Connecting Leads (2 mm)

Types 9103.1 ... 9103.5

Length	Type
7.5 cm	9103.1
20 cm	9103.5
30 cm	9103.2
50 cm	9103.3
100 cm	9103.4

with gold-plated laminated plugs, PVC-insulated, highly flexible, axial 2 mm jack in the plug head

- Plug diameter: 2 mm
- Load: 10 A
- Contact resistance: approx. 0.6 mΩ
- Litz: 0.5 mm^2
- Colours: red, black, blue, yellow, green

Accessories

Sets of Connecting Leads (2 mm)

Type 9200.1 und
Type 3910.1

Type 9200.1

Length	Qty.
7.5 cm	24
20 cm	24
50 cm	12

- Colours:
  red, black, blue, yellow, green

Type 3910.1

Length	Qty.
7.5 cm	22
20 cm	12
30 cm	12
50 cm	14

- Colours:
  blue, yellow, green, grey

technical data same as
Types 9103.1 ... 9103.5

Connecting Leads (BNC / BNC)

Types 9102.13-1 ...
9102.13-5

equipped with BNC plugs at both ends

Z = 50

Length	Type
100 cm	9102.13.1
150 cm	9102.13-2

Z = 75

Length	Type
100 cm	9102.13-5

Connecting Leads (BNC / BNC), insulated

Type 9102.14-1

equipped with BNC plugs at both ends
The BNC plugs are insulated for safe handling.

- Length: 1 m
- Z = 50 Ω

Connecting Leads (BNC/two 4 mm plugs)

Types 9102.13-3 ...
9102.13-6

Z = 50

Length	Type
100 cm	9102.13-3
150 cm	9102.13-4

Z = 75

Length	Type
100 cm	9102.13-6

BNC plug at one end, other end two 4 mm plugs, for adapting 4 mm jacks to BNC jack

Accessories

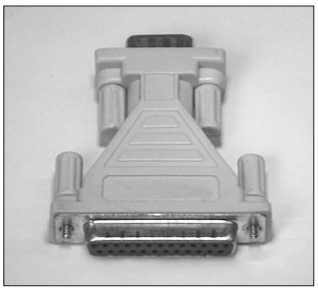
Connecting Lead RS 232

Type 9102.50

one end SUB-D plug (9-pin), other end SUB-D jack (9-pin)

- Configuration: 1:1
- Length: 2 m
- Cast version

Adapter RS 232

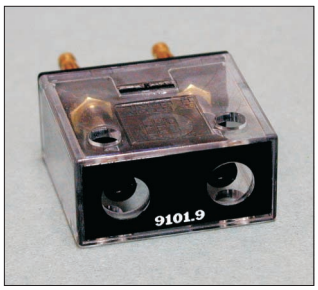


Type 9102.51

for interface lead, one end SUB-D plug (9-pin), other end SUB-D jack (25-pin)

- Cast version

Adapter 4 mm / 4 mm

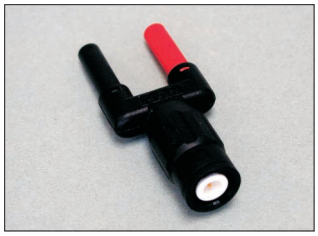


Type 9101.9

one end two 4 mm laminated plugs, other end two 4 mm safety jacks, for adapting 4 mm jacks to 4 mm safety plugs

- Plug and jack spacing: 19 mm
- Consisting of an unbreakable transparent plastic housing

Adapter BNC / 4 mm



Type 9101.22

one end BNC plug, other end two 4 mm safety jacks, for adapting BNC jack to 4 mm safety plugs

- Jack spacing: 19 mm
- Colours: black and red

Adapter BNC / 4 mm

Type 9101.10

one end BNC plug, other end two 4 mm jacks, for adapting BNC jack to 4 mm plugs

Adapter BNC / 4 mm

Type 9101.11

one end BNC jack, other end two 4 mm laminated plugs with additional two 4 mm jacks, for adapting BNC plugs to 4 mm jacks

- Plug spacing: 19 mm
- Plug diameter: 4 mm

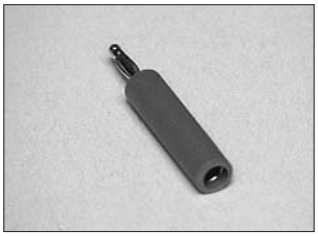
Adapter 4 mm / 2 mm

Type 9101.12

one end 4 mm laminated plug, other end 2 mm jack, for adapting 4 mm jack to 2 mm plug

- Colours: black, blue, yellow, red

Adapter 2 mm / 4 mm



Type 9101.13

one end 2 mm laminated plug, other end 4 mm jack, for adapting 2 mm jack to 4 mm plug

- Colours: black, blue, yellow, red

hps

Accessories

Plug-in Components

SystemTechnik

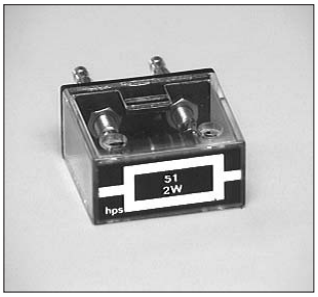
Lehr- + Lernmittel GmbH
Altdorfer Strasse 16
88276 Berg / Germany

Phone: + 49 751 / 5 60 75 80
Telefax: + 49 751 / 5 60 75 17
Internet: www.hps-SystemTechnik.com
E-mail: export@hps-SystemTechnik.com

Contents

Accessories

Film Resistors



Types 9104...
Types 9105...
Types 9310...

Pluggable, consisting of an unbreakable transparent plastic housing with two gold-plated laminated plugs. The circuit symbol is printed in white on the front.

- Plug spacing: 19 mm
- Plug diameter: 4 mm
- Tolerance on resistance: +/-5 %
- Max. load : 2 W (1.0 MΩ ... 10 MΩ: 0.5 W)
- Housing dimensions: 38 x 19 x 35 mm (w x d x h)

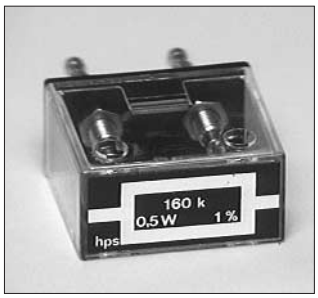
Type numbers (0.2 Ω ... 10 MΩ)

value	type
0.2 Ω	9105.1-1*
0.5 Ω	9105.1-2
1.0 Ω	9105.1-3
1.2 Ω	9105.2-1
1.5 Ω	9105.3-1
1.8 Ω	9105.4-1
2.2 Ω	9105.6-1
2.7 Ω	9105.7-1
3.3 Ω	9105.8-1
3.9 Ω	9105.9-1
4.7 Ω	9105.1-4
5.6 Ω	9105.10-1
6.8 Ω	9105.11-1
8.2 Ω	9105.12-1
10 Ω	9104.1-1
12 Ω	9104.1-15
15 Ω	9104.1-16
18 Ω	9104.1-17
22 Ω	9104.1-2
27 Ω	9104.1-18
33 Ω	9104.1-19
39 Ω	9104.1-20
47 Ω	9104.1-3
56 Ω	9104.1-4
68 Ω	9104.1-5
82 Ω	9104.1-6
100 Ω	9104.1-7
120 Ω	9104.1-8
150 Ω	9104.1-9
180 Ω	9104.1-21
220 Ω	9104.1-10
270 Ω	9104.1-22
330 Ω	9104.1-14
390 Ω	9104.1-11
470 Ω	9104.1-12
560 Ω	9104.1-23
680 Ω	9104.1-13
820 Ω	9104.1-24
1.0 kΩ	9104.2-1
1.2 kΩ	9104.2-2
1.5 kΩ	9104.2-3
1.8 kΩ	9104.2-25
2.2 kΩ	9104.2-4
2.7 kΩ	9104.2-26
3.3 kΩ	9104.2-5
3.9 kΩ	9104.2-27
4.7 kΩ	9104.2-6
5.6 kΩ	9104.2-28
6.8 kΩ	9104.2-7
8.2 kΩ	9104.2-8
10 kΩ	9104.2-9
12 kΩ	9104.2-10
15 kΩ	9104.2-11
18 kΩ	9104.2-12
22 kΩ	9104.2-13
27 kΩ	9104.2-14
33 kΩ	9104.2-15
39 kΩ	9104.2-16
47 kΩ	9104.2-17
56 kΩ	9104.2-29
68 kΩ	9104.2-24
82 kΩ	9104.2-18
100 kΩ	9104.2-19
120 kΩ	9104.2-30
150 kΩ	9104.2-20
180 kΩ	9104.2-31
220 kΩ	9104.2-21
270 kΩ	9104.2-32
330 kΩ	9104.2-22
390 kΩ	9104.2-33
470 kΩ	9104.2-23
560 kΩ	9104.2-34
680 kΩ	9104.2-35
820 kΩ	9104.2-36
1.0 MΩ	9104.3-1
1.2 MΩ	9104.3-5
1.5 MΩ	9104.3-6
1.8 MΩ	9104.3-7
2.2 MΩ	9104.3-2
2.7 MΩ	9104.3-8
3.3 MΩ	9104.3-3
3.9 MΩ	9104.3-9
4.7 MΩ	9104.3-10
5.6 MΩ	9104.3-11
6.8 MΩ	9104.3-12
8.2 MΩ	9104.3-13
10 MΩ	9104.3-4

* Wire resistor

Accessories

Precision Resistors



Types 9107...

Pluggable, consisting of an unbreakable transparent plastic housing with two gold-plated laminated plugs. The circuit symbol is printed in white on the front.

- Plug spacing: 19 mm
- Plug diameter: 4 mm
- Tolerance on resistance: +/-1 %
- Max. load: 0.5 W
- Housing dimensions: 38 x 19 x 35 mm (w x d x h)

value	type
1 kΩ	9107.2-1
2 kΩ	9107.2-2
4 kΩ	9107.2-3
8 kΩ	9107.2-4
10 kΩ	9107.2-5
20 kΩ	9107.2-10
22 kΩ	9107.2-6
40 kΩ	9107.2-11
80 kΩ	9107.2-12
100 kΩ	9107.2-7
160 kΩ	9107.2-13
220 kΩ	9107.2-8
500 kΩ	9107.2-9
1 MΩ	9107.3-1
2 MΩ	9107.3-2

Accessories

Power Resistors (10 W)

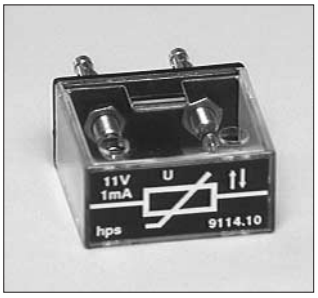
Types 9310 ...

Pluggable, consisting of an black metal housing, with two gold-plated laminated plugs.
The circuit symbol is printed in white on the front.

- Plug spacing: 19 mm
- Plug diameter: 4 mm
- Housing dimensions: 35 x 19 x 51 mm (w x d x h)
- Tolerance on resistance: +/-5 %
- Max. load: 10 W

value	type
1 Ω	9310.1-1
2.2 Ω	9310.1-2
5.1 Ω	9310.1-3
10 Ω	9310.1-4
15 Ω	9310.1-5
22 Ω	9310.1-6
33 Ω	9310.1-7
43 Ω	9310.1-8

VDR Resistor

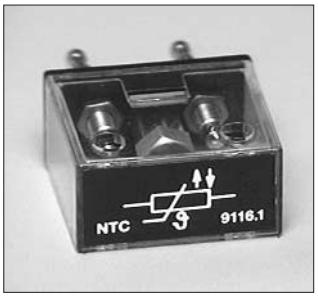


Type 9114.10

Pluggable, consisting of an unbreakable transparent plastic housing with two gold-plated laminated plugs. The circuit symbol is printed in white on the front.

- Plug spacing: 19 mm
- Plug diameter: 4 mm
- U_{rms} = 14 V / U_{DC} = 18 V
- Housing dimensions: 38 x 19 x 35 mm (w x d x h)

NTC Resistors



Types 9116...

Pluggable, consisting of an unbreakable transparent plastic housing with two gold-plated laminated plugs. The circuit symbol is printed in white on the front.

- Plug spacing: 19 mm
- Plug diameter: 4 mm
- Housing dimensions: 38 x 19 x 35 mm (w x d x h)
- Tolerance on resistance: +/-10 %
- Limit temperature: 125 °C

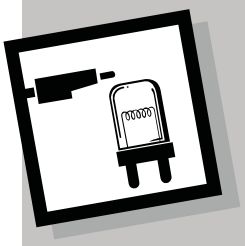
Type 9116.1

- Description: K 252
- Nominal resistance: R_{20} = 4,7 kΩ

Type 9116.4

with series resistor 200 Ω

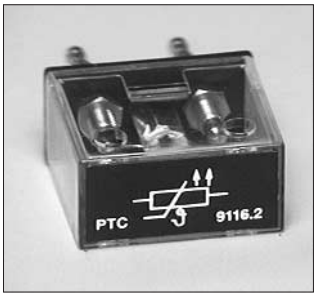
- Description: K 164
- Nominal resistance: R_{25} = 470 Ω



Resistors
Potentiometers

Accessories

PTC Resistors (P 330 - C 11)

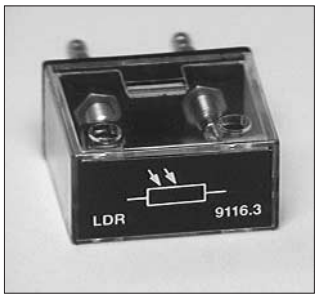


Type 9116.2

Pluggable, consisting of an unbreakable transparent plastic housing with two gold-plated laminated plugs. The circuit symbol is printed in white on the front.

- Plug spacing: 19 mm
- Plug diameter: 4 mm
- Operating voltage:
  U_{max} = 30 V (bei 40 °C)
- Nominal resistor:
  $R_{60} \approx 80\ \Omega$
- Housing dimensions:
  38 x 19 x 35 mm (w x d x h)

LDR Resistors (FW 200)



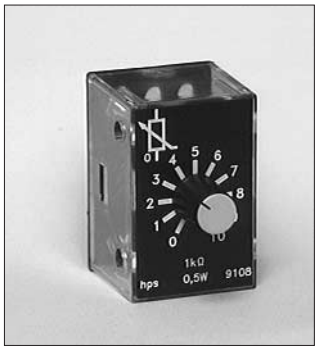
Type 9116.3

Pluggable, consisting of an unbreakable transparent plastic housing with two gold-plated laminated plugs. The circuit symbol is printed in white on the front.

- Plug spacing: 19 mm
- Plug diameter: 4 mm
- Resistance value:
  R_{01} = 8.3 kΩ
  R_{05} = 85 kΩ
  R_{10} = 255 kΩ
- Operating voltage:
  U_{max} = 200 V
- Power:
  P_{max} = 200 mW
- Housing dimensions:
  38 x 19 x 35 mm
  (w x d x h)

The light, e. g. from Light Source Type 9122.1, enters on the left side of the housing.

Variable Potentiometer



Types 9108...

Pluggable, consisting of an unbreakable transparent plastic housing with three gold-plated laminated plugs, rotary knob with scale 0 ...10 on the top side of the housing

- Plug arrangement in 19 mm grid
- Plug diameter: 4 mm
- Tolerance on resistance: +/-20 %
- Max. load: 0.5 W
- Housing dimensions:
  38 x 57 x 35 mm
  (w x d x h)

value	type
100 Ω	9108.1-1
220 Ω	9108.1-2
470 Ω	9108.1-3
1.0 kΩ	9108.2-1
4.7 kΩ	9108.2-2
10 kΩ	9108.2-3
22 kΩ	9108.2-4
47 kΩ	9108.2-5
100 kΩ	9108.2-6
500 kΩ	9108.2-7
1.0 MΩ	9108.3-1
100 kΩ (log. / 0.25 W)	9108.4-1

Accessories

Power Potentiometer (4 W)

Types 9109...

Pluggable, consisting of an unbreakable transparent plastic housing with three gold-plated laminated plugs, rotary knob with scale 0 ...10 on the top side of the housing

- Plug arrangement in 19 mm grid
- Plug diameter: 4 mm
- Tolerance on resistance: +/-20 %
- Max. load: 4 W
- Housing dimensions: 38 x 57 x 35 mm (w x d x h)

value	type
100 Ω	9109.4
560 Ω	9109.1
1 kΩ	9109.2
4.7 kΩ	9109.3
with loop series resistor 100 Ω / 2 W	
1 kΩ	9109.9

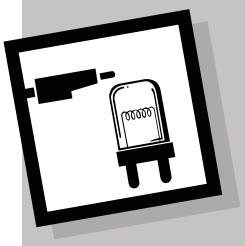
Power Potentiometer (20 W)

Types 9109...

Pluggable, consisting of an black metal housing, with three gold-plated laminated plugs, rotary knob with scale 0 ...10 on the top side of the housing

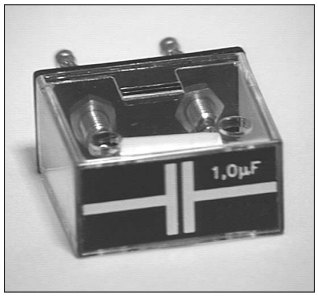
- Plug arrangement in 19 mm grid
- Plug diameter: 4 mm Max. load: 20 W
- Tolerance on resistance: +/-10 %
- Housing dimensions: 67 x 56 x 66 mm (w x d x h)

value	type
4.7 Ω	9109.6
1 kΩ	9109.5



Accessories

Capacitors

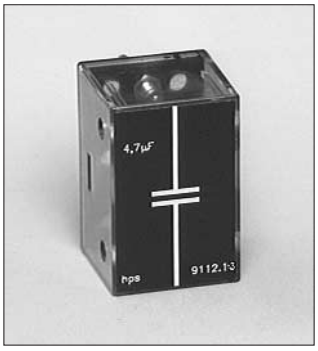


Types 9110...

Pluggable, consisting of an unbreakable transparent plastic housing with two gold-plated laminated plugs. The circuit symbol is printed in white on the front.

- Plug spacing: 19 mm
- Plug diameter: 4 mm
- Housing dimensions: 38 x 19 x 35 mm (w x d x h)
- Tolerance of capacity: +/-20 %
- Operating voltage, max.: min. 100 V

The types 9112… marked * in the list below have a bigger housing.



Types 9112...

- Plug spacing: 38 mm
- Housing dimensions: 38 x 57 x 35 mm (w x d x h)

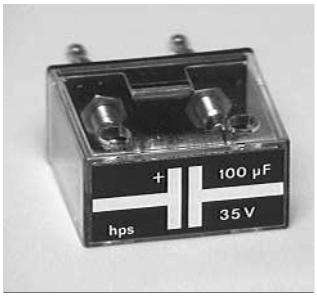
Single types (10 pF ... 10 µF)

value	type	value	type	value	type	value	type
10 pF	9110.1-10	560 pF	9110.1-8	33 nF	9110.2-9	4.7 µF	9112.1-3*
15 pF	9110.1-11	680 pF	9110.1-9	47 nF	9110.2-10	10 µF	9112.1-4*
22 pF	9110.1-12			68 nF	9110.2-12		
33 pF	9110.1-1	1 nF	9110.2-1			* big housing	
47 pF	9110.1-2	1.5 nF	9110.2-2	0.1 µF	9110.3-1		
56 pF	9110.1-3	2.2 nF	9110.2-3	0.15 µF	9110.3-5		
68 pF	9110.1-13	3.3 nF	9110.2-4	0.22 µF	9110.3-2		
100 pF	9110.1-4	4.7 nF	9110.2-5	0.33 µF	9110.3-6		
150 pF	9110.1-14	6.8 nF	9110.2-6	0.47 µF	9110.3-3		
220 pF	9110.1-5	10 nF	9110.2-7	0.68 µF	9110.3-7		
330 pF	9110.1-6	15 nF	9110.2-11	1 µF	9110.3-4		
470 pF	9110.1-7	22 nF	9110.2-8	2.2 µF	9112.1-2*		

For safety reasons the components must not be operated at voltages higher than the maximum permissible protective low voltage.

Accessories

Electrolytic Capacitors



Types 9111...

pluggable, consisting of an unbreakable transparent plastic housing with two gold-plated laminated plugs. The circuit symbol is printed in white on the front.

- Plug arrangement in 19 mm grid
- Plug diameter: 4 mm
- Tolerance of capacity: +50 %... -20 %
- Housing dimensions: 38 x 19 x 35 mm (w x d x h)

The types 9112… marked * in the list below have a bigger housing.

Types 9112...

- Housing dimensions: 38 x 57 x 35 mm (w x d x h)

Single types 2.2 F ... 2200 F)

value		type
2.2 µF/63 V	polarized	9111.1-1
4.7 µF/63 V	polarized	9111.1-2
10 µF/63 V	polarized	9111.1-3
22 µF/63 V	polarized	9111.1-4
22 µF/63 V	non-polarized	9112.1-9*
47 µF/63 V	polarized	9111.1-5
47 µF/40 V	non-polarized	9112.1-10*
100 µF/35 V	polarized	9111.2-1
100 µF/40 V	non-polarized	9112.1-11*
220 µF/35 V	polarized	9112.1-13*
470 µF/35 V	polarized	9112.1-5

value		type
1000 µF/35 V	polarized	9112.1-14*
2200 µF/25 V	polarized	9112.1-6*

Electrolytic capacitor
with reverse polarity protection diode (1N 4007)

47 µF/63 V	9111.1-6
470 µF/16 V	9111.2-2

* big housing

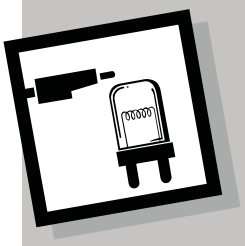
For safety reasons the components must not be operated at voltages higher than the maximum permissible protective low voltage.

Variable Capacitor

Type 9113

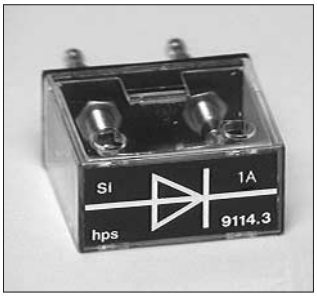
Pluggable, consisting of an unbreakable transparent plastic housing with two gold-plated laminated plugs. The circuit symbol is printed in white on the front.

- Plug spacing: 38 mm
- Plug diameter: 4 mm
- Capacity continuously adjustable fxrom 20 ... 200 pF
- Housing dimensions: 38 x 57 x 35 mm (w x d x h)



Accessories

Diodes



Types 9114...

Pluggable, consisting of an unbreakable transparent plastic housing with two gold-plated laminated plugs. The circuit symbol is printed in white on the front.

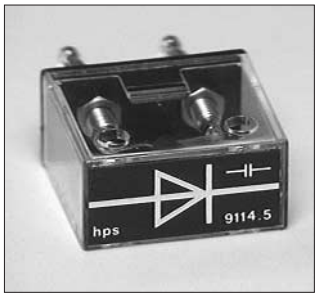
- Plug spacing: 19 mm
- Plug diameter: 4 mm
- Housing dimensions: 38 x 19 x 35 mm (w x d x h)

Diodes						
kind	I_F	U_R	U_{RM}	U_F at I_F		**Type**
Si	200 mA	75 V	100 V	1 V	10 mA	**9114.1**
Ge	30 mA	90 V	115 V	1.05 V	10 mA	**9114.2**
Si	1 A	1000 V	1000 V	1.3 V	1 A	**9114.3**

U_R = reverse voltage
U_{RM} = inverse peak voltage
U_F = forward voltage
I_F = forward current

For safety reasons the components must not be operated at voltages higher than the maximum permissible protective low voltage.

Varactor Diode



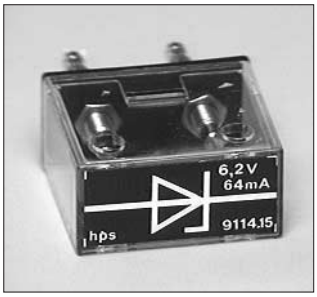
Type 9114.5

Pluggable, consisting of an unbreakable transparent plastic housing with two gold-plated laminated plugs. The circuit symbol is printed in white on the front.

- Plug spacing: 19 mm
- Plug diameter: 4 mm
- Reverse voltage: U_{max} = 30 V
- Diode capacity: C_D = 5 pF...28 pF
- Housing dimensions: 38 x 19 x 35 mm (w x d x h)

Accessories

Zener Diodes



Types 9114...

Pluggable, consisting of an unbreakable transparent plastic housing with two gold-plated laminated plugs. The circuit symbol is printed in white on the front.

- Plug spacing: 19 mm
- Plug diameter: 4 mm
- Housing dimensions: 38 x 35 x 19 mm (w x d x h)

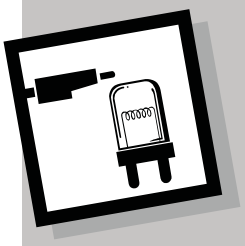
The types 9115… marked * in the list below have a bigger housing.

Types 9115...

- Plug spacing: 38 mm
- Housing dimensions: 38 x 57 x 35 mm (w x d x h)

Zener diodes			
I_Z (mA)	U_Z (V)	U_Z (V), tolerance values	**Type**
130	3.3	3.1...3.5	**9114.14**
90	4.7	4.4...5.0	**9114.7**
210	4.7	4.4...5.0	**9115.3***
64	6.2	5.8...6.6	**9114.15**
160	6.2	5.8...6.6	**9115.1***
40	10	9.4..10.6	**9114.8**
105	10	9.4..10.6	**9115.2***
32	12	11.4...12.7	**9114.16**
86	12	11.4...12.7	**9115.4***
27	15	13.8...15.6	**9114.17**
71	15	13.8...15.8	**9115.5***
44	22	20.8...23.3	**9114.9**
16	24	22.8..25.6	**9114.18**
45	24	22.8..25.6	**9115.6***

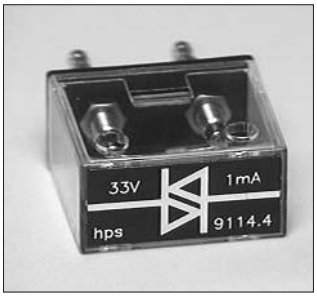
U_Z = Zener voltage
I_Z = Zener current
* big housing



Semiconductor Components

Accessories

Diac

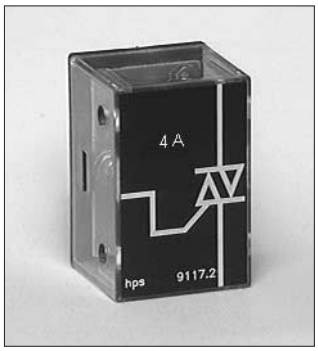


Type 9114.4

Pluggable, consisting of an unbreakable transparent plastic housing with three gold-plated laminated plugs. The circuit symbol is printed in white on the front.

- Plug spacing: 19 mm
- Plug diameter: 4 mm
- Break down voltage: (symmetrical) U_{BR} = 32 V (+/-4V)
- Break down current: I_{BRF}, I_{BRR} = 0.4 mA typ. 1.0 mA max.
- Peak current: I_{max} = 1 A (at t = 20 µS) Backward voltage: (symmetrical) ΔU = 5 V typ.
- Housing dimensions: 38 x 19 x 35 mm (w x d x h)

Triac



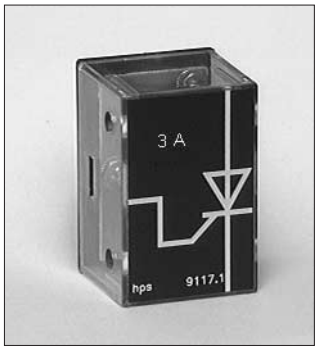
Type 9117.2

Pluggable, consisting of an unbreakable transparent plastic housing with three gold-plated laminated plugs. The circuit symbol is printed in white on the front.

- Plug arrangement in 19 mm grid
- Plug diameter: 4 mm
- Inverse peak voltage: U_{DRM} = 400 V [1)]
- Continuous effective current: I_{TRMS} = 4 A
- Ignition current: I_{GT} = 10 mA
- Housing dimensions: 38 x 57 x 35 mm (w x d x h)

[1)] For safety reasons the components must not be operated at voltages higher than the maximum permissible protective low voltage.

Thyristor



Types 9117.1

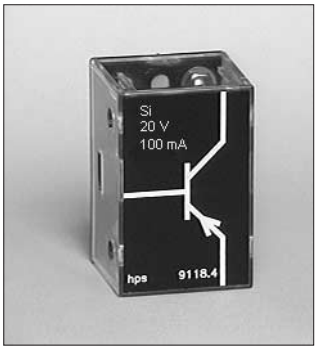
Pluggable, consisting of an unbreakable transparent plastic housing with three gold-plated laminated plugs. The circuit symbol is printed in white on the front.

- Plug arrangement in 19 mm grid
- Plug diameter: 4 mm
- Max. positive and negative inverse peak voltage: U_{DRM}, U_{RRM} = 400 V [1)]
- Limiting value of mean on-state current: (average value) I_{TAVM} = 3 A
- Ignition current: I_{GT} = 10 mA
- Ignition voltage: U_{GT} = 1.5 V
- Housing dimensions: 38 x 57 x 35 mm (w x d x h)

[1)] For safety reasons the components must not be operated at voltages higher than the maximum permissible protective low voltage.

Accessories

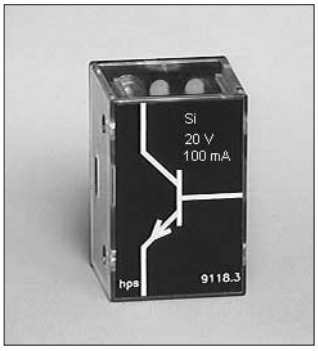
Transistors



Types 9118...

with base contact left

Pluggable, consisting of an unbreakable transparent plastic housing with three gold-plated laminated plugs. The circuit symbol is printed in white on the front.



Types 9118...

with base contact right

The Transistors are supplied with base contact left or base contact right (not Type 9118.1).

- Plug arrangement in 19 mm grid

Types 9117...

in metal housing

- Plug diameter: 4 mm
- Housing dimensions: 38 x 57 x 35 mm (w x d x h)

The types 9117… marked * in the list below have a powder-coated light metal housing.

- Housing dimensions: 55 x 54 x 36 mm (w x d x h)

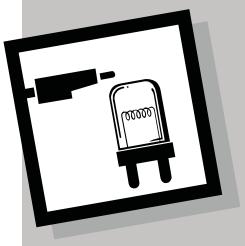
Transistors							
kind	base contact	U_{CE0}	U_{EB0}	U_{CBO}	I_C	P_{tot}	**Type**
PNP	left	-24 V	-10 V	-32 V	-200 mA	0.9 W	**9118.1**
PNP	left	-20 V	-5 V	-20 V	-100 mA	0.3 W	**9118.4**
PNP	right	-20 V	-5 V	-20 V	-100 mA	0.3 W	**9118.12**
PNP	left	-40 V	-5 V	-40 V	-1 A	3.2 W	**9118.7**
PNP	right	-40 V	-5 V	-40 V	-1 A	3.2 W	**9118.10**
NPN	left	20 V	6 V	50 V	100 mA	0.5 W	**9118.2**
NPN	right	20 V	6 V	50 V	100 mA	0.5 W	**9118.3**
NPN	left	40 V	7 V	80 V	1 A	3.7 W	**9118.5**
NPN	right	40 V	7 V	80 V	1 A	3.7 W	**9118.6**
NPN	left	60 V	7 V	90 V	15 A	12 W	**9117.3***
NPN	right	60 V	7 V	90 V	15 A	12 W	**9117.31***
with base series resistor (180 Ω / 2 W)							
NPN	left	40 V	15 V	80 V	1 A	3.7 W	**9118.15**

U_{CE0} = collector-emitter voltage
U_{EB0} = emitter-base voltage
U_{CB0} = collector-base voltage

I_C = collector current
P_{tot} = total power loss

For safety reasons the components must not be operated at voltages higher than the maximum

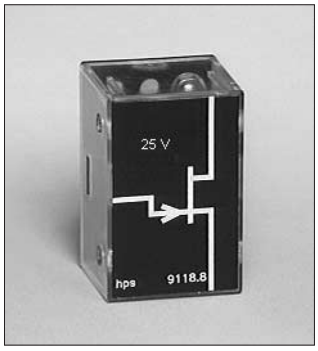
* metal housing



Semiconductor Components

Accessories

Junction Gate Field-effect Transistors



Types 9118...

Pluggable, consisting of an unbreakable transparent plastic housing with three gold-plated laminated plugs. The circuit symbol is printed in white on the front.

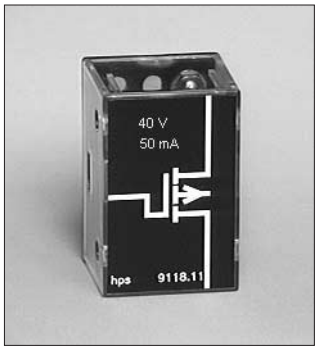
The N-channel transistor is supplied with gate contact left or right.

- Plug arrangement in 19 mm grid
- Plug diameter: 4 mm
- Housing dimensions: 38 x 57 x 35 mm (w x d x h)

Junction Gate Field-effect transistors							
kind	gate contact	$+U_{DS}$	U_{GS}	U_{DG}	I_{GF}	P_{tot}	**Type**
N-channel	left	25 V	-25 V	25 V	10 mA	200 mW	**9118.8**
N-channel	right	25 V	-25 V	25 V	10 mA	200 mW	**9118.19**
P-channel	left	20 V	20 V	-20 V	-10 mA	200 mW	**9118.20**

U_{DS} = drain-source voltage
U_{GS} = gate-source voltage
U_{DG} = drain-gate voltage
I_{GF} = gate current
P_{tot} = total power loss

MOS Field-effect Transistor



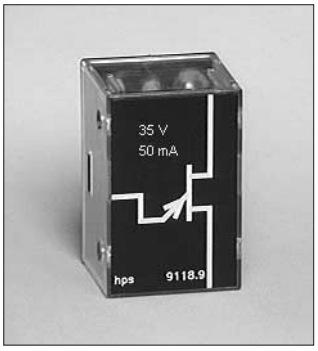
Type 9118.11

Pluggable, consisting of an unbreakable transparent plastic housing with three gold-plated laminated plugs. The circuit symbol is printed in white on the front.

- Drain-source voltage: U_{DS} = -40 V
- Drain-gate voltage: U_{DG} = -40 V
- Drain current: I_D = -50 mA
- total power loss: P_{tot} = 375 mW
- Gate contact: left
- Plug arrangement in 19 mm grid
- Plug diameter: 4 mm
- Housing dimensions: 38 X 57 x 35 mm (w x d x h)

Accessories

Unijunction Transistor

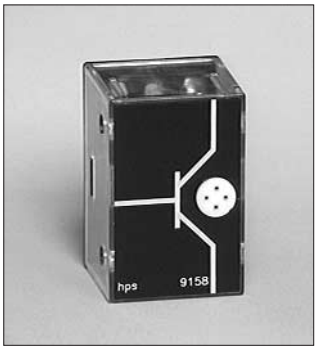


Type 9118.9

Pluggable, consisting of an unbreakable transparent plastic housing with three gold-plated laminated plugs. The circuit symbol is printed in white on the front.

- Plug arrangement in 19 mm grid
- Plug diameter: 4 mm
- Emitter-base reverse voltage: $-U_{EB}$ = 30 V
- Inter-base voltage B_1 / B_2: U_{BB} = 35 V
- Emitter current: I_E = 50 mA
- total power loss: P_{tot} = 300 mW
- Housing dimensions: 38 x 57 x 35 mm (w x d x h)

Transistor Socket

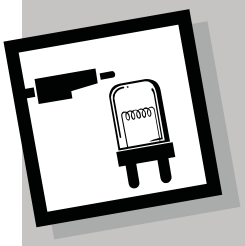


Type 9158

Pluggable, consisting of an unbreakable transparent plastic housing with three gold-plated laminated plugs.

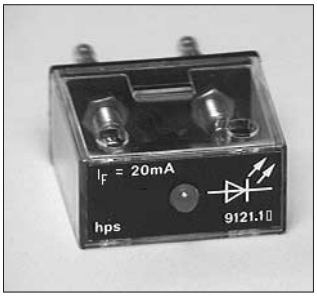
Apart from the circuit symbol the top of the housing is provided with a four-pin plug-in socket for connecting commercial transistors.

- Plug arrangement in 19 mm grid
- Plug diameter: 4 mm
- Housing dimensions: 38 x 57 x 35 mm (w x d x h)



Accessories

LEDs



Types 9121...

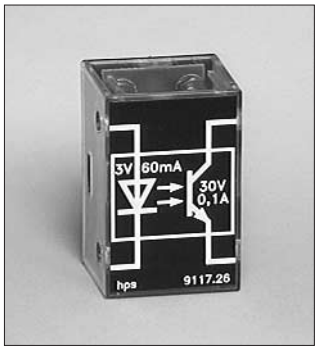
Pluggable, consisting of an unbreakable transparent plastic housing with two gold-plated laminated plugs. The circuit symbol is printed in white on the front.

- Plug spacing: 19 mm
- Plug diameter: 4 mm
- Housing dimensions: 38 x 19 x 35 mm (w x d x h)

Colour	Type	U_R	U_F (at I_F = 20 mA)
green	**9121.10.1**	5 V	2.0 V...2.6 V
yellow	**9121.10.2**	5 V	2.0 V...2.6 V
red	**9121.10.3**	5 V	1.6 V...2.0 V
with series resistor			
red	**9121.12**	5 V	15 V / 20 mA

U_R = reverse voltage
I_F = forward current
U_F = forward voltage

Transistor Coupler



Type 9117.26

Pluggable, consisting of an unbreakable transparent plastic housing with four gold-plated laminated plugs.

The circuit symbol is printed in white on the front.

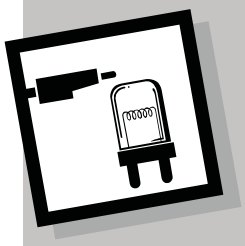
- Plug arrangement in 19 mm grid
- Plug diameter: 4 mm
- Housing dimensions: 38 x 57 x 35 mm (w x d x h)

Technical data of the Ga-As-LED:

- Reverse voltage: U_R = 3 V
- Forward current: I_F = 60 mA
- Total power loss: P_{tot} = 100 mW
- Forward current: (at I_F = 10 mA) U_F = 1.2...1.7 V

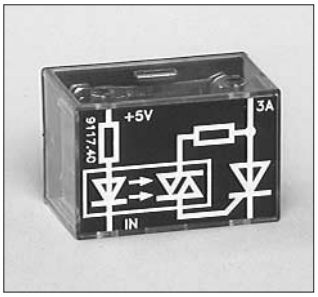
Technical datas of the phototransistors:

- Collector-emitter voltage U_{CE0} = 30 V
- Collector current: I_C = 100 mA
- Total power loss: P_{tot} = 150 mW



Accessories

Thyristor Coupler



Type 9117.40

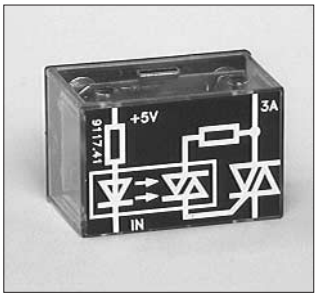
Pluggable, consisting of an unbreakable transparent plastic housing with four gold-plated laminated plugs.

The circuit symbol is printed in white on the front.

- Plug arrangement in 19 mm grid
- Plug diameter: 4 mm
- Max. positive and negative inverse peak voltage of the Thyristors: U_{DRM}, U_{RRM} = 600 V
- Continuous effective current: I_{TRMS} = 3 A
- Voltage range: 24 V...230 V (AC); 50...60 Hz
- Control current: 10 mA (at 5 V) The control input is TTL compatible (active low) and galvanically isolated from the load side.
- The Thyristor Coupler can be used to switch loads by means of TTL pulses.
- Housing dimensions: 57 x 38 x 35 mm (w x d x h)

For safety reasons the components must not be operated at voltages higher than the maximum permissible protective low voltage.

Triac Coupler



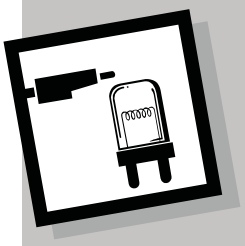
Type 9117.41

Pluggable, consisting of an unbreakable transparent plastic housing with four gold-plated laminated plugs.

The circuit symbol is printed in white on the front.

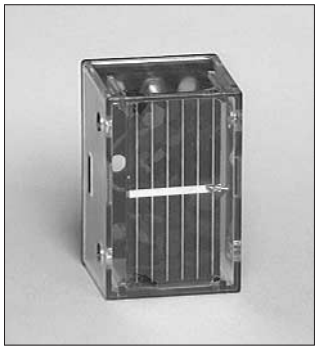
- Plug arrangement in 19 mm grid
- Plug diameter: 4 mm
- Inverse peak voltage and continuous effective current of the Triacs: U_{DRM} = 600 V I_{TRMS} = 3 A
- Voltage range: 24 V... 230 V (AC); 50 ... 60 Hz
- Control current: 10 mA (at 5 V) The control input is TTL compatible (active low) and galvanically isolated from the load side.
- The Triac Coupler can be used to switch loads by means of TTL pulses.
- Housing dimensions: 57 x 38 x 35 mm (w x d x h)

For safety reasons the components must not be operated at voltages higher than the maximum permissible protective low voltage.



Accessories

Solar Cell

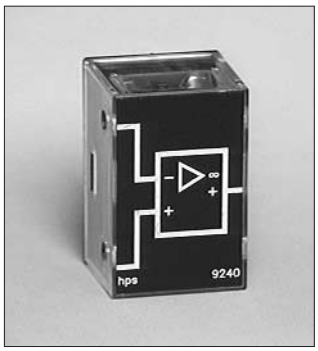


Type 9117.28

Pluggable, consisting of an unbreakable transparent plastic housing with two gold-plated laminated plugs.

- Plug spacing: 38 mm
- Plug diameter: 4 mm
- Housing dimensions: 38 x 57 x 35 mm (w x d x h)
- Short-circuit current: I_k = 290 mA
- No-load current U_L = 570 mV U_L = 440 mV (at EV = 1000 lx)
- Photo current: I_P = 280 mA (at U_A = 400 mV)

Operational Amplifier



Type 9240

Pluggable, consisting of an unbreakable transparent plastic housing with five gold-plated laminated plugs.

The circuit symbol is printed in white on the front.

- Plug arrangement in 19 mm grid
- Plug diameter: 4 mm
- Housing dimensions: 38 x 57 x 35 mm (w x d x h)
- Type: 741
- Operating voltage: +/-15 V
- Offset voltage: 7.5 mV
- Voltage amplification: > 15000
- Input voltage: +/-12 V
- Output voltage: (at R_L > 2 kΩ) +/-10 V
- Input resistance: > 300 kΩ

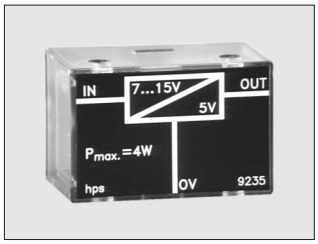
Power supply and connection of the operational amplifier is done via five lamella plugs on the bottom of the housing.

Type 9240.1

(without picture)

Power supply of the operational amplifier type 9240.1 is done via two 4 mm jacks on the top side of the housing.
Connection of the operational amplifier is done via three lamella plugs on the bottom of the housing.

Voltage Regulator 5 V

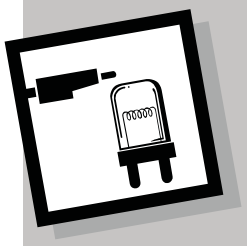


Type 9235

Pluggable, consisting of an unbreakable transparent plastic housing with three gold-plated laminated plugs.

The circuit symbol is printed in white on the front.

- Plug arrangement in 19 mm grid
- Plug diameter: 4 mm
- Input voltage: +7 V DC ... +15 V DC
- Output voltage: 5 V DC
- Output current: 0.8 ... 0.4 A
- Housing dimensions: 57 x 38 x 35 mm (w x d x h)
- Weight ca. 50 g



Special Components

Accessories

Light Source

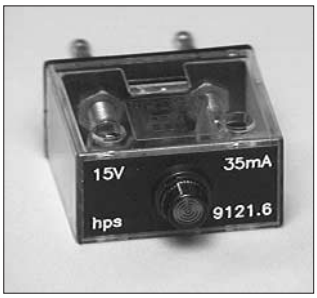
Types 9122.1

Pluggable, consisting of an unbreakable transparent plastic housing with two gold-plated laminated plugs. The circuit symbol is printed in white on the front.

- Plug spacing: 19 mm
- Plug diameter: 4 mm
- Housing dimensions: 38 x 19 x 35 mm (w x d x h)
- Nominal current: 12 V (max.)
- Power: 1 W

The light comes out of the right side of the housing. The Light Source can be used in combination with the LDR Resistor Type 9116.3.

Lamps



Types 9121...

Pluggable, consisting of an unbreakable transparent plastic housing with two gold-plated laminated plugs.

- Plug spacing: 19 mm
- Plug diameter: 4 mm
- Housing dimensions: 38 x 19 x 35 mm (w x d x h)

Colour	Type	nominal voltage	current input
green	**9121.1**	15 V	82 mA
gren	**9121.6**	15 V	35 mA
red	**9121.2**	15 V	82 mA
blue	**9121.3**	15 V	82 mA

Lamp Holder (E 10)

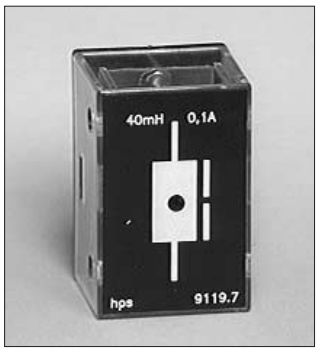
Type 9121.8

Pluggable, consisting of an unbreakable transparent plastic housing with two gold-plated laminated plugs.

- Plug spacing: 19 mm
- Plug diameter: 4 mm
- Housing dimensions: 38 x 19 x 35 mm (w x d x h)

Accessories

Coils (with air gap)



Types 9119...

Pluggable, consisting of an unbreakable transparent plastic housing with two gold-plated laminated plugs.

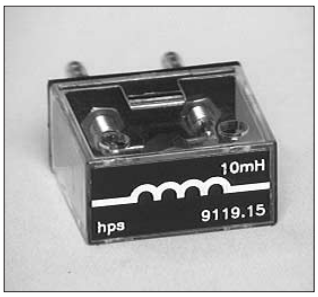
The circuit symbol is printed in white on the front.

- Plug spacing: 38 mm
- Plug diameter: 4 mm
- Housing dimensions: 38 x 57 x 35 mm (w x d x h)
- Current: max. 50 mA

The coils with type numbers 9119.5 … 9119.10 are provided with an inductance coil.

The type 9119.15 marked * in the list below has a small housing.

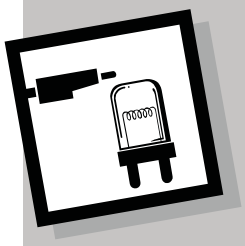
- Housing dimensions: 38 x 19 x 35 mm (w x d x h)
- Plug spacing: 19 mm



Type 9119.15

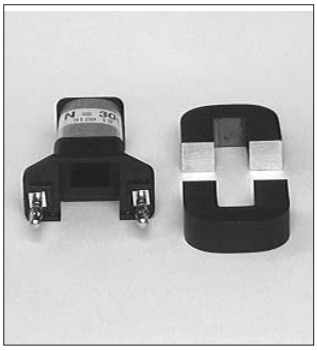
value		type
10 mH	(4 Ω)	9119.5
10 mH	(21 Ω)	9119.15*
20 mH	(6 Ω)	9119.6
40 mH	(8 Ω)	9119.7
80 mH	(12 Ω)	9119.8
100 mH	(13 Ω)	9119.9
200 mH	(19 Ω)	9119.10

* small housing



Accessories

Experimenting Transformer



Type 9120.23

The Experimenting Transformer consists of a two-part tape wound core and five coils.

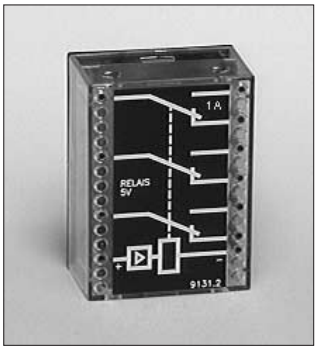
- **Winding turns:**
  N = 100 (1 piece)
  N = 300 (2 piece)
  N = 900 (2 piece)

The coils are equipped with two gold-plated lamella plugs for use with the hps Assembly Boards (19 mm grid).

- Plug spacing: 38 mm
- Plug diameter: 4 mm
- Dimensions
  Coils:
  48 x 25 x 58 mm
  (w x d x h)

  Tape wound core:
  (composite)
  38 x 13 x 68 mm
  (w x d x h)

Relay (with driver)



Type 9131.2

Pluggable, consisting of an unbreakable transparent plastic housing with two gold-plated laminated plugs. The circuit symbol is printed in white on the front.

- Plug arrangement in 19 mm grid
- Plug diameter: 4 mm
- Housing dimensions:
  75 x 56 x 35 mm
  (w x d x h)

The Relay has three change-over contacts which are connected to 2 mm jacks on the top of the housing.

The operating voltage (5 V DC) is supplied via the plugs on the bottom of the housing.
An integrated driver stage switches the relay by means of TTL pulses.

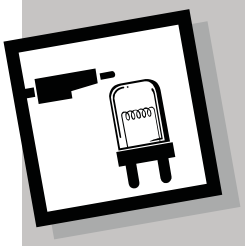
The switching state is indicated by an LED.

- Operating voltage:
  5 V DC
- Input of the drivers:
  TTL-signal
- Input current: 100 µA

Relay contacts:

- Material: Ag
- Switching current:
  1 A (DC/AC)
- Switching voltage:
  100 V (DC/AC)
- Switching power:
  30 VA
- Contact resistance:
  50 mΩ

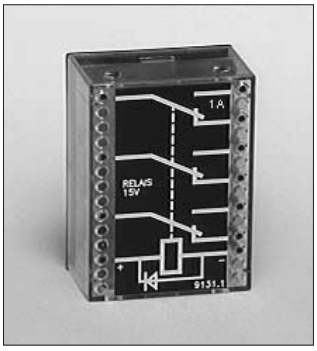
For safety reasons the components must not be operated at voltages higher than the maximum permissible protective low voltage.



Special Components

Accessories

Relay (without driver)



Types 9131...

Pluggable, consisting of an unbreakable transparent plastic housing with two gold-plated laminated plugs. The circuit symbol is printed in white on the front.

- Plug arrangement in 19 mm grid
- Plug diameter: 4 mm
- Housing dimensions: 75 x 56 x 35 mm (w x d x h)

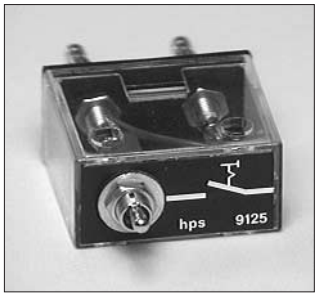
The Relay has three change-over contacts which are connected to 2 mm jacks on the top of the housing.

The coil can be connected either via two 4 mm plugs on the bottom of the housing or via two 2 mm jacks on the top of the housing.

Type	relay contacts					relay coil		
	material	power	switching current	switching voltage	contact resistance	nominal DC voltage	winding turns	winding resistance
9131.1	Ag/Pd	30 VA	1 A (DC/AC)	100 V (DC/AC)	60 mΩ	15 V	3120	210 Ω +/- 21 Ω
9131.3	Ag/Pd	30 VA	1 A (DC/AC)	100 V (DC/AC)	60 mΩ	5 V	1200	40 Ω +/- 4 Ω

For safety reasons the components must not be operated at voltages higher than the maximum permissible protective low voltage.

Toggle Switch (on/off, single-pole)



Type 9125

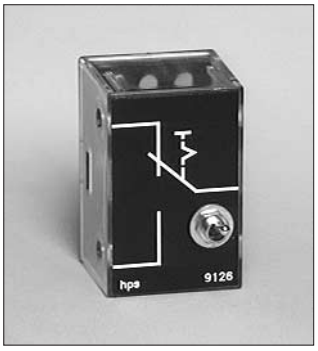
Pluggable, consisting of an unbreakable transparent plastic housing with two gold-plated laminated plugs. The circuit symbol is printed in white on the front.

- Plug spacing: 19 mm
- Plug diameter: 4 mm
- Housing dimensions: 38 x 19 x 35 mm (w x d x h)
- Switching current: 5 A (at 120 V AC; 28 V DC)
- Switching current: 2 A (at 250 V AC)
- Contact resistance of the Toggle Switch: 10 mΩ

For safety reasons the components must not be operated at voltages higher than the maximum permissible protective low voltage.

Accessories

Change-over Switch (single-pole)



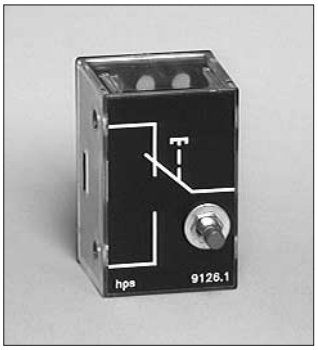
Type 9126

Pluggable, consisting of an unbreakable transparent plastic housing with two gold-plated laminated plugs. The circuit symbol is printed in white on the front.

- Plug spacing: im 19 mm grid
- Plug diameter: 4 mm
- Housing dimensions: 38 x 57 x 35 mm (w x d x h)
- Switching current: 5 A (at 120 V AC; 28 V DC)
- Switching current: 2 A (at 250 V AC)
- Contact resistance des Change-over Switch: 10 mΩ

For safety reasons the components must not be operated at voltages higher than the maximum permissible protective low voltage.

Push-button Switch

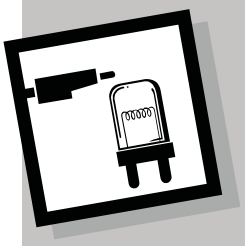


Type 9126.1

Pluggable, consisting of an unbreakable transparent plastic housing with two gold-plated laminated plugs. The circuit symbol is printed in white on the front.

- Plug arrangement in 19 mm grid
- Plug diameter: 4 mm
- Housing dimensions: 38 x 57 x 35 mm (w x d x h)
- Switching current: 1 A (at 120 V AC; 28 V DC)
- Contact resistance of the Push-button Switch: 10 mΩ

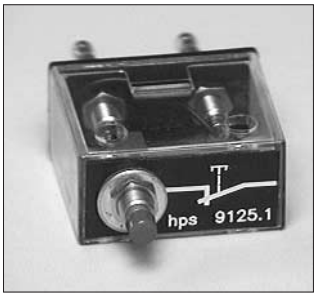
For safety reasons the components must not be operated at voltages higher than the maximum permissible protective low voltage.



Special Components

Accessories

Push-button Switch (NCC)



Type 9125.1

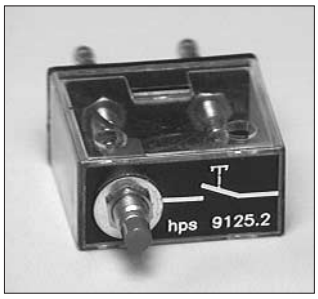
Pluggable, consisting of an unbreakable transparent plastic housing with two gold-plated laminated plugs. The circuit symbol is printed in white on the front.

- Plug spacing: 19 mm
- Plug diameter: 4 mm

- Housing dimensions: 38 x 19 x 35 mm (w x d x h)
- Switching current: 1 A (at 120 V AC; 28 V DC)
- Contact resistance of the Push-button Switch: 10 mΩ

For safety reasons the components must not be operated at voltages higher than the maximum permissible protective low voltage.

Push-button Switch (NOC)



Type 9125.2

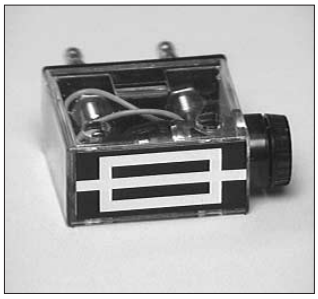
Pluggable, consisting of an unbreakable transparent plastic housing with two gold-plated laminated plugs. The circuit symbol is printed in white on the front.

- Plug spacing: 19 mm
- Plug diameter: 4 mm

- Housing dimensions: 38 x 19 x 35 mm (w x d x h)
- Switching current: 1 A (at 120 V AC; 28 V DC)
- Contact resistance of the Push-button Switch: 10 mΩ

For safety reasons the components must not be operated at voltages higher than the maximum permissible protective low voltage.

Fuse Holder



Type 9129

Pluggable, consisting of an unbreakable transparent plastic housing with two gold-plated laminated plugs. The circuit symbol is printed in white on the front.

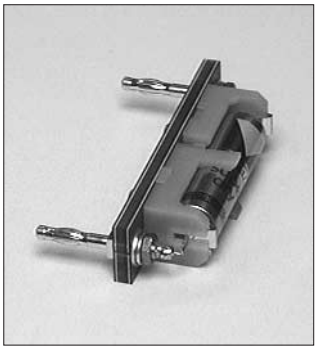
- Plug spacing: 19 mm
- Plug diameter: 4 mm

- Housing dimensions: 38 x 19 x 35 mm (w x d x h)

The Fuse Holder is suitable for accommodating fuses with a diameter of 5 mm and a length of 20 mm at maximum.

Accessories

Battery Holder

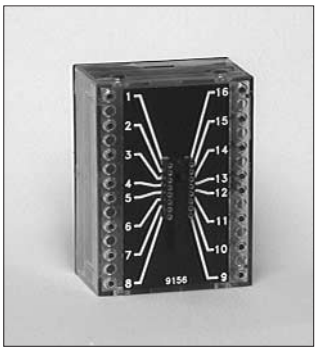


Type 9128

Pluggable (two gold-plated laminated plugs), consisting of a sturdy plastic housing with penlight battery

- Plug spacing: 76 mm
- Plug diameter: 4 mm
- Dimensions: 86 x 19 x 24 mm (w x d x h)

IC Socket (dual-in-line)



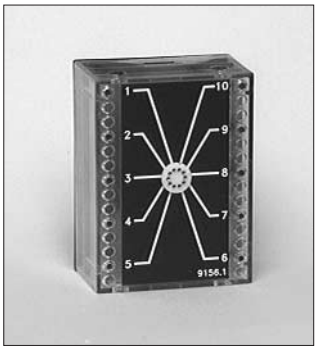
Type 9156

Pluggable, consisting of a sturdy transparent plastic housing with two gold-plated laminated plugs.

- Plug spacing: 57 mm
- Plug diameter: 4 mm
- Housing dimensions: 75 x 56 x 35 mm (w x d x h)

The IC socket is used for accommodating IC components (dual-in-line) with up to 16 pins.
The connections are fed out through 2 mm jacks and are numbered. The socket is fitted with a removal wedge for easy withdrawal of the IC component.

IC Socket (TO)



Type 9156.1

Pluggable, consisting of a sturdy transparent plastic housing with two gold-plated laminated plugs.

- Plug spacing: 57 mm
- Plug diameter: 4 mm
- Housing dimensions: 75 x 56 x 35 mm (w x d x h)

The IC socket (10-pin) is used for plugging transistors and integrated circuits into TO 5 and TO 8 housings.

The connections are fed out through 2 mm jacks and are numbered.

Accessories

IC Socket (dual-in-line, 28-pin)

Type 9156.3

Pluggable, consisting of a sturdy transparent plastic housing with two gold-plated laminated plugs.

- Plug spacing: 57 mm
- Plug diameter: 4 mm
- Housing dimensions: 75 x 56 x 35 mm (w x d x h)

The IC socket serves to accommodate IC components (dual-in-line) with up to 28 pins.

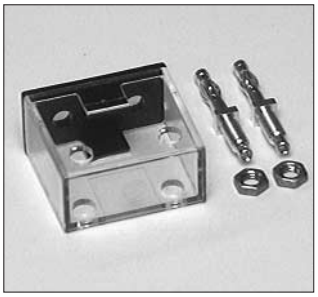
The connections are fed out through 2 mm jacks and are numbered.

Dual-in-line ICs can be used in narrow and wide versions.

The socket is fitted with a quick-release device for easy removal of the IC component.

Accessories

Empty Housings



Type 9150 and Type 9150.1

Pluggable, consisting of an unbreakable transparent plastic housing with two gold-plated laminated plugs.

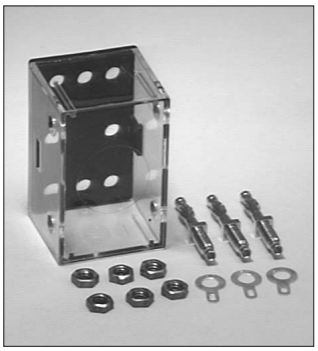
- Plug spacing: 19 mm
- Plug diameter: 4 mm
- Housing dimensions: 38 x 19 x 35 mm (w x d x h)

Type 9150
with 2 plugs and 2 nuts (see Type 9160)

Type 9150.1
without plugs and nuts

You can install commercially available components such as resistors, capacitors, diodes etc. in the empty housing yourself.

Empty Housing



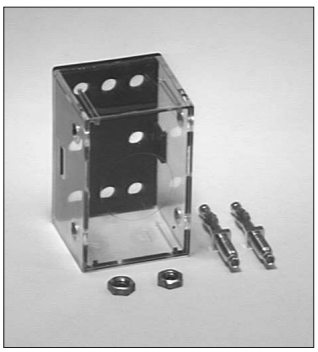
Type 9151.1

Pluggable, consisting of an unbreakable transparent plastic housing with two gold-plated laminated plugs.

- Plug arrangement in 19 mm grid
- Plug diameter: 4 mm
- Housing dimensions: 38 x 57 x 35 mm (w x d x h)
- With 3 plugs, 6 nuts and 3 solder lugs (see Type 9160)

You can install commercially available components such as transistors in the empty housing yourself.

Empty Housings



Type 9152.5

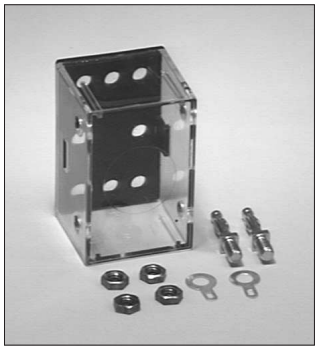
Pluggable, consisting of an unbreakable transparent plastic housing with two gold-plated laminated plugs.

- Plug arrangement in 19 mm grid
- Plug diameter: 4 mm
- Housing dimensions: 38 x 57 x 35 mm (w x d x h)
- With 2 plugs and 2 nuts (see Type 9160)

You can install commercially available components such as capacitors in the empty housing yourself.

Accessories

Empty Housings



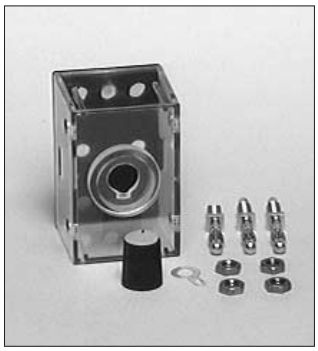
Type 9152.6

Pluggable, consisting of an unbreakable transparent plastic housing with two gold-plated laminated plugs.

- Plug arrangement in 19 mm grid
- Plug diameter: 4 mm
- Housing dimensions: 38 x 57 x 35 mm (w x d x h)
- With 2 plugs, 4 nuts and 2 solder lugs (see Type 9160.1)

You can install commercially available components or modules in the empty housing yourself.

Empty Housing



Type 9152.4

Pluggable, consisting of an unbreakable transparent plastic housing with three gold-plated laminated plugs (2 with solder sink), 4 nuts, one solder lug and a knob with a 6 mm clamp

There is an opening (9 mm diameter) in the housing cover for installing potentiometers.

- Plug arrangement in 19 mm grid
- Plug diameter: 4 mm
- Housing dimensions: 38 x 57 x 35 mm (w x d x h)

Empty Housing

Type 9153

Black metal housing, with three gold-plated laminated plugs.

- Plug arrangement in 19 mm grid
- Plug diameter: 4 mm
- Housing dimensions: 54 x 54 x 36 mm (w x d x h)
- Colour: black

You can install commercially available components such as transistors, triacs, thyristors in the empty housing yourself.

Accessories

Empty Housing

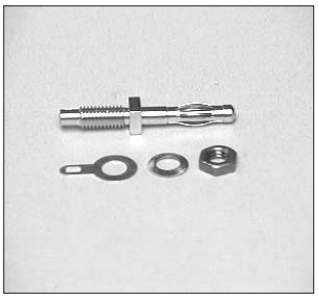
Black metal housing, with two gold-plated laminated plugs.

- Plug arrangement in 19 mm grid
- Plug diameter: 4 mm
- Housing dimensions: 35 x 19 x 51 mm (w x d x h)

You can install commercially available 2-pole components in the empty housing yourself.

Type 9153.1

Laminated Plug

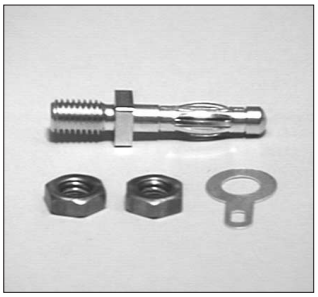


gold-plated, for 4 mm jacks, with nut, serrated washer and solder lug

- Plug diameter: 4 mm
- Plug length: 20 mm
- Total length: 38 mm

Type 9160

Laminated Plug



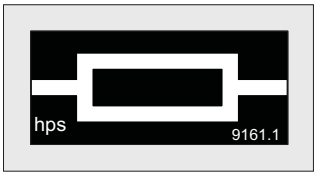
gold-plated, for 4 mm jacks, with 2 nuts and solder lug

- Plug diameter: 4 mm
- Plug length: 19 mm
- Total length: 30 mm
- Without solder sink

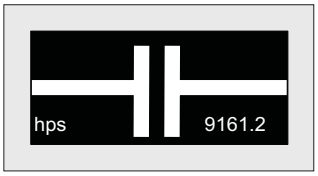
Type 9160.1

Accessories

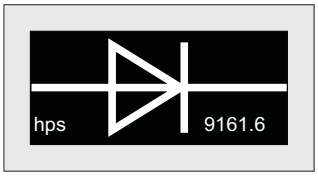
Stickers



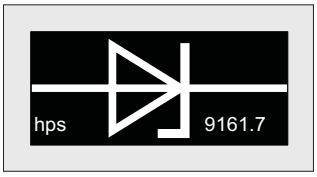
Type 9161.1



Type 9161.2



Type 9161.6



Type 9161.7

Type 9161.8

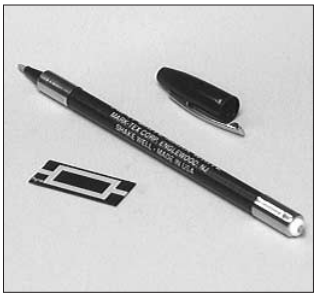
self-adhesive, made of black plastic foil with printed symbol (except Type 9161.8), for labelling the Empty Housing Type 9150

- Dimensions: 34 x 15 mm

The Stickers are supplied on DIN A5 sheet of 35 pieces.

Sticker	Type
Resistor	9161.1
Capacitor	9161.2
Diode	9161.6
Z-diode	9161.7
Blank (for labelling yourself)	9161.8

Marking Pen



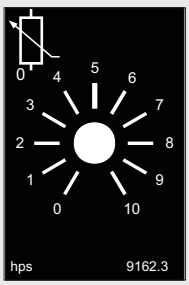
Type 9161.20

for labelling the pluggable components

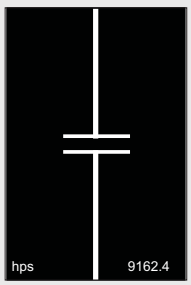
- Colour: white

Accessories

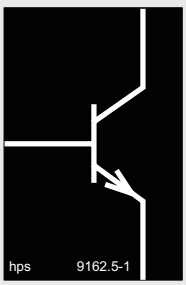
Stickers



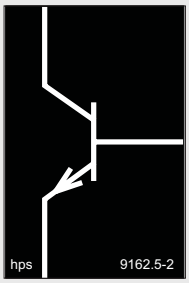
Type 9162.3



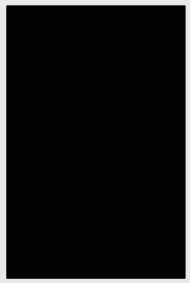
Type 9162.4



Type 9162.5-1



Type 9162.5-2



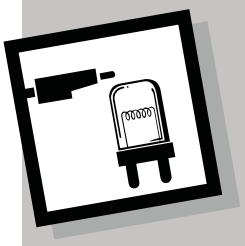
Type 9162.5-5

self-adhesive, made of black plastic foil with printed symbol (except Type 9162.5-5), for labelling the Empty Housings Types 9151.1, 9152.4 and 9152.5

- Dimensions: 34 x 52 mm

The Stickers are supplied on DIN A5 sheets of 9 pieces.

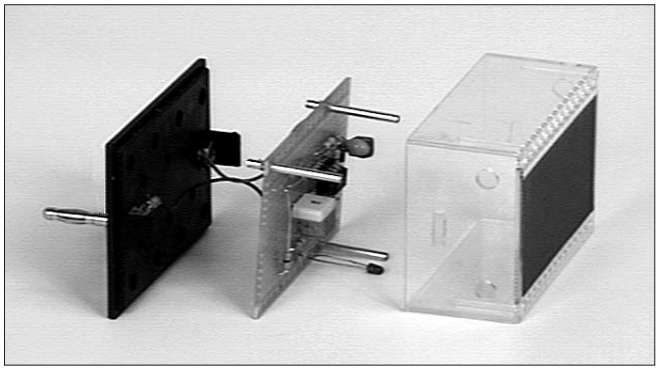
Sticker	Type
Potentiometer	9162.3
Capacitor	9162.4
Transistor, NPN (base left)	9162.5-1
Transistor, NPN (base right)	9162.5-2
Transistor, PNP (base left)	9162.5-3
Transistor, PNP (base right)	9162.5-4
Blank (for labelling yourself)	9162.5-5



Assembly Kit

Accessories

Assembly Kit



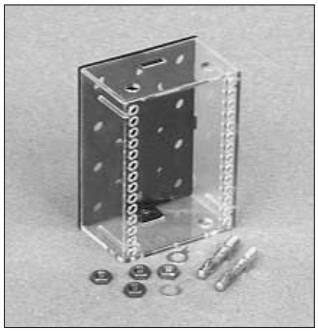
Assembly arrangement

The assembly kit has been designed to manufacture your own plug-in modules with simple to complex electrical/electronic circuits, also outside the hps standard programm. It consists of the following individual components:

- Empty Housing (Type 9152.7)
- Sticker for labelling the Empty Housing (Type 9162.5-6)
- Universal PCB (Type 9167 or Type 9167.1)
- Jacks (Type 9168)

The individual components of the Assembly Kit are listed below.

Empty Housing



Type 9152.7

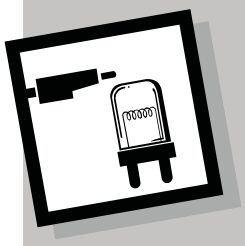
The Empty Housing is designed for installing the Universal PCB. It consists of a top section made of unbreakable transparent plastic and a sturdy bottom section made of black fibre-glass reinforced plastic.

Drill holes are arranged in the bottom section in a 19 mm grid for fixing in laminated plugs.

The top and bottom sections are connected by two quick-release catches; this enables fast, easy closing and opening of the housing. The Universal PCB is installed by a clamp, additional screwing is not necessary.

There are 14 holes drilled on the front of the top section on both the right and left hand long sides for pushing through the jacks soldered into the Universal PCB.

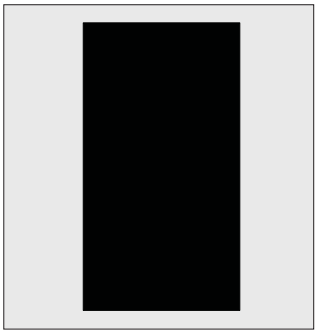
- Distance of the installed Universal PCB to the housing top section: 18 mm
- Distance of the installed Universal PCB to the housing bottom section: 9 mm
- Accessories included with the Empty Housing: 2 Laminated Plugs (4 mm), Type 9160.1, with solder lugs and nuts
- Housing dimensions: 75 x 56 x 35 mm (w x d x h)



Assembly Kit

Accessories

Sticker



Type 9162.5-6

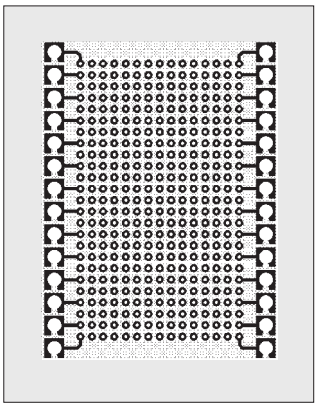
The Sticker consists of a self-adhesive black plastic foil and is used to label the Empty Housing Type 9152.7.

The Marking Pen Type 9161.20 is recommended for labelling.

- Dimensions:37.5 x 70 mm

The Sticker is supplied on DIN A5 sheets of 6 pieces.

Universal PCB (with dot grid)



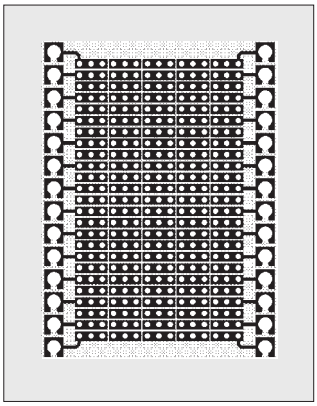
Type 9167

for manufacturing your own plug-in modules in connection with the Empty Housing Type 9152.7

There are 14 holes (2.8 mm diameter) drilled on the right and left hand long sides of the Universal PCB for soldering in the Jacks (Type 9168).

- Material: 1.5 mm epoxy
- Dimensions of one Universal PCB: 70 x 52 mm
- Number of holes: 375, arranged in 2.54 mm grid, 1 mm diameter
- Delivered in lots of 12 on a panel
- Dimensions of panel: 250 x 260 mm

Universal PCB (with line grid)



Type 9167.1

for manufacturing your own plug-in modules in connection with the Empty Housing Type 9152.7

There are 14 holes (2.8 mm diameter) drilled on the right and left hand long sides of the Universal PCB for soldering in the Jacks (Type 9168).

- Material: 1.5 mm epoxy
- Dimensions of one Universal PCB: 70 x 52 mm
- Number of holes: 375, arranged in 2.54 mm grid, 1 mm diameter
- Delivered in lots of 12 on a panel
- Dimensions of panel: 250 x 260 mm

Jack

Type 9168

for soldering in the Universal PCBs Types 9167 and 9167.1, with collar for spacing

The Jack connects the Universal PCBs electrically to the top section of the housing (for measuring points or other connections).

- Material: brass (tinned)
- Internal diameter: 2.0 mm
- External diameter: 2.5 mm
- Length: 27 mm

The Jacks are delivered in packs of 100.

hps

Accessories

Bench and Demonstration Racks

Mechanical Accessories

SystemTechnik

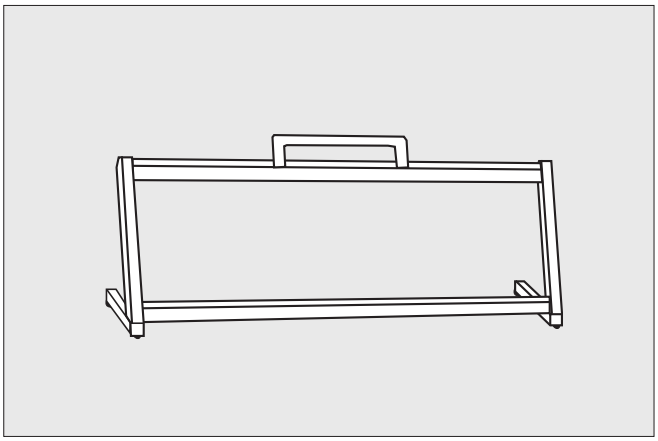
Lehr- + Lernmittel GmbH
Altdorfer Strasse 16
88276 Berg / Germany

Phone: + 49 751 / 5 60 75 80
Telefax: + 49 751 / 5 60 75 17
Internet: www.hps-SystemTechnik.com
E-mail: export@hps-SystemTechnik.com

Contents

Mechanical Accessories

Bench Rack (single)



Type 8111

The Bench Rack accommodates hps Demonstration Boards and Boards in the sizes
95 x 297 mm (w x h)
133 x 297 mm (w x h)
266 x 297 mm (w x h)
532 x 297 mm (w x h).

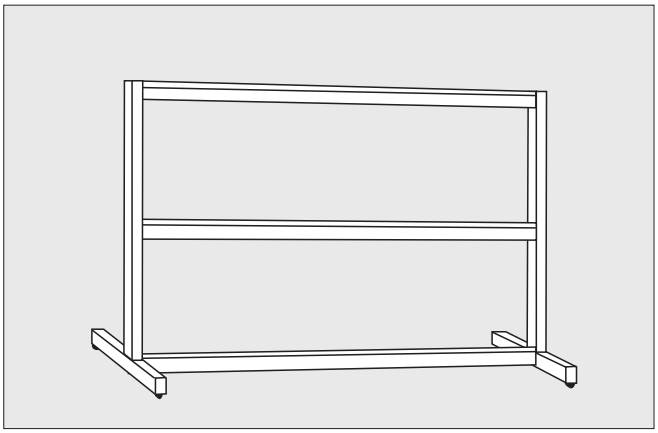
The sides are made of powder-coated, silver-coloured square steel bar tubes, the two cross members of ano-dised aluminium H-section rails.

The sides are screwed to the aluminium H-section rails.

The Bench Rack is tilted slightly backwards and is fitted with four rubber mounts to prevent it from slipping on the bench.

- Dimensions: (w x h x d) 850 x 420 x 260 mm
- Length of the aluminium H-section rails: 810 mm
- Weight: 3.1 kg

Bench Rack (double)



Type 8112

The Bench Rack accommodates hps Demonstration Boards and Boards in the sizes
95 x 297 mm (w x h)
133 x 297 mm (w x h)
266 x 297 mm (w x h)
532 x 297 mm (w x h).

The sides are made of powder-coated, silver-coloured square steel sections, the three cross members of anodised aluminium H-section rails.

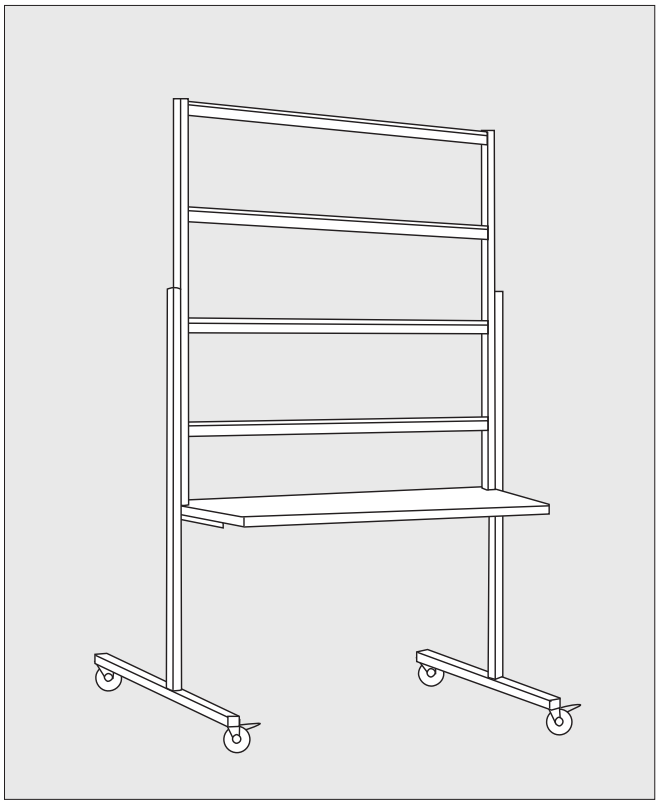
The sides are screwed to the aluminium H-section rails.

The Bench Rack is fitted with four rubber mounts to prevent it from slipping on the desk.

- Dimensions: (w x h x d) 850 x 695 x 310 mm
- Length of the aluminium H-section rails: 810 mm
- Weight: 4.5 kg

Demonstration Rack

Demonstration Rack



Type 8121

The Demonstration Rack accommodates hps Demonstration Boards and Boards in the sizes
95 x 297 mm (w x h)
133 x 297 mm (w x h)
266 x 297 mm (w x h)
532 x 297 mm (w x h).

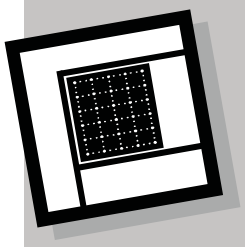
The sides are made of powder-coated, silver-coloured square steel sections, the four cross members of anodised aluminium H-section rails.

The sides are screwed to the aluminium H-section rails.

The Demonstration Rack also has a shelf with dimensions 1130 x 400 x 22 mm (fine chipboard, resopal-coated, hemp-coloured).

The Demonstration Rack is fitted with 4 castors (two with brakes) for easy transport.

- Dimensions:
  1170 x 1950 x 650 mm
  (w x h x d)
- Length of the aluminium H-section rails: 1090 mm
- Weight: 22 kg



Storage Cabinet

Type 8132

The Storage Cabinet consists of a demonstration rack which is hinged for tilting backwards and a two-door cabinet.

The demonstration rack accommodates hps Demonstration Boards and Boards in the sizes
95 x 297 mm (w x h)
133 x 297 mm (w x h)
266 x 297 mm (w x h)
532 x 297 mm (w x h).

The sides of the demonstration rack are made of powder-coated, silver-coloured square steel sections, the two cross members of anodised aluminium H-section rails.

The sides are screwed to the aluminium H-section rails.

The hemp-coloured cabinet is made of 19 mm thick fine, resopal-coated chipboard. The top board is 30 mm thick.

The shelves are laid out with grooved mats for storing the hps Demonstration Boards.

Four PE-contact sockets are mounted on the left hand side of the cabinet; these can be connected to the mains by an 8 m long power cable (light equipment connection).

There is a storage board for the power cable which can be inserted in the grooved mats inside the cabinet.

The Storage Cabinet is fitted with 4 castors (2 with brakes) for easy transport. The doors of the cabinet have locks, the keys fit both locks.

- Dimensions: (w x h x d) 1300 x 1950 x 600 mm
- Length of the aluminium H-section rails: 1245 mm
- Weight: approx. 110 kg

Equipment Shelf, H-Section, Grooved Mat

Mechanical Accessories

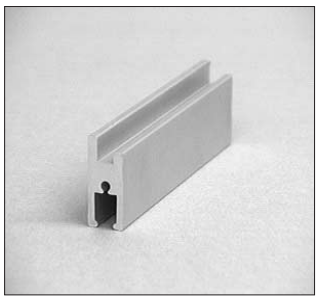
Equipment Shelf

Type 8135

The equipment shelf is used to stand equipment on, e. g. an oscilloscope or a multimeter.
To do this, it is mounted on the H-section rail of the hps Demonstration Rack.
The Equipment Shelf can be slid into the grooved mat in the Storage Cabinet (Type 8132) for storage.

- Material of the plate: 5 mm thick laminate
- Colour: blue
- Dimensions: 297 x 420 x 48 mm (w x d x h)
- Weight: 1.1 kg

Aluminium H-Section Rail



Type 8184

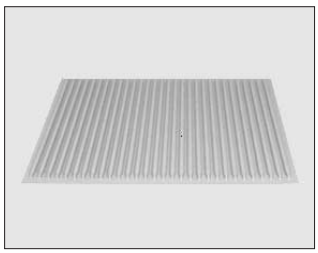
The Aluminium H-Section Rails are used to mount hps Demonstration Boards.

They are available cut accurately to all millimetre lengths (max. 6 m).

There is a 5 mm thread at both ends except on the maximum length of 6 m. Also available without thread on request.

- Dimensions: 40 x 16 mm
- Weight per metre: 1 kg

Grooved Mat



Type 8185.5

The Grooved Mat can be stuck into the storage cabinet for sliding in hps Demonstration Boards.

- Material: plastic
- Colour: grey
- Dimensions: 618 x 530 x 10 mm (w x d x h)
- Weight: 0.5 kg

Mechanical Accessories

Bare Boards

Types 8181.1... 8181.4

The Bare Boards can be used universally. They consist of 5 mm thick laminate, matt blue in colour. They are available in four sizes.

Type 8181.1

- Dimensions: 95 x 297 mm (w x h)
- Weight: 0.3 kg

Type 8181.2

- Dimensions: 266 x 297 mm (w x h)
- Weight: 0.6 kg

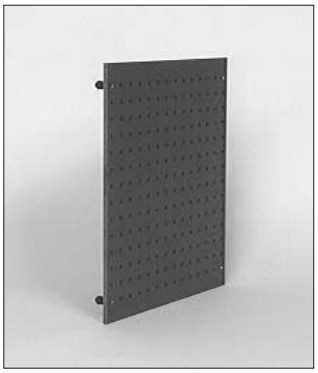
Type 8181.3

- Dimensions: 532 x 297 mm (w x h)
- Weight: 1.2 kg

Type 8181.4

- Dimensions: 133 x 297 mm (w x h)
- Weight: 0.3 kg

Storage Board



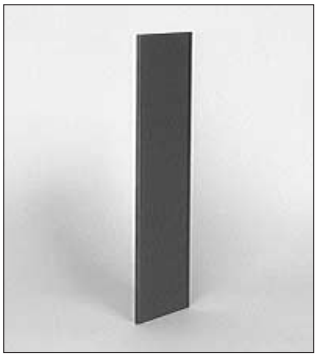
Type 8182

This Board allows clear storage of pluggable hps components for fast accessibility. The Board is drilled with 196 holes (ϕ 4.2 mm) in a 19 mm grid.

There are four rubber mounts on the rear for spacing and preventing the Board from slipping on the desk.

- Material: 5 mm thick laminate
- Colour: matt blue
- Dimensions: 266 x 297 x 23 mm (w x h x d)
- Weight: 0.57 kg

Storage Board



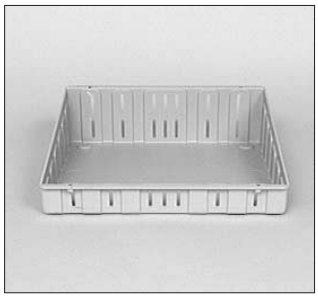
Type 8182.2

This Board is designed for storing connecting leads with 2 mm plugs.
104 holes (ϕ 2.1 mm) are drilled in the board in a 20 mm grid.

- Material: 5 mm thick laminate
- Colour: matt blue
- Dimensions: 95 x 297 mm (w x h)
- Weight: 0.19 kg

Mechanical Accessories

Plastic Covers (angled)



Types 8186.6 ... 8186.8

for covering the rear of hps Demonstration Boards

- Material: plastic, grey
- With air vents
- With four rubber mounts to prevent slipping on the bench

Type 8186.6

- With 4 threaded inserts M3
- Dimensions: 265 x 275 x 80 mm (w x h x d)
- Weight: 0.45 kg

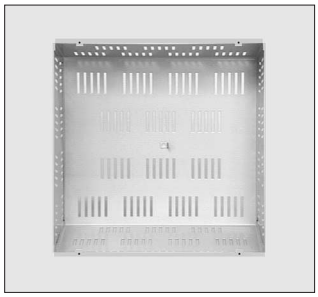
Type 8186.7

- With 6 threaded inserts M3
- Dimensions: 530 x 275 x 80 mm (w x h x d)
- Weight: 0.77 kg

Type 8186.8

- With 4 threaded inserts M3
- Dimensions: 131 x 275 x 80 mm (w x h x d)
- Weight: 0.18 kg

Metal Covers (angled)



Types 8186.16 ... 8186.18

for covering the rear of hps Demonstration Boards

- Material: sheet steel, powder-coated (grey)
- With air vents

Type 8186.16

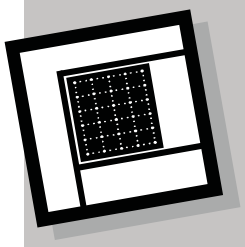
- With 4 threaded inserts M3
- Dimensions: 265 x 274 x 154 mm (w x h x d)
- Weight: 1.4 kg

Type 8186.17

- With 6 threaded inserts M3
- Dimensions: 531 x 274 x 154 mm (w x h x d)
- Weight: 2.3 kg

Type 8186.18

- With 4 threaded inserts M3
- Dimensions: 133 x 274 x 154 mm (w x h x d)
- Weight: 0.93 kg



Empty Cases (Box)

Type 8182.13

The Boxes can be used for installing hps Boards with the dimensions
266 x 297 mm (w x h)
532 x 297 mm (w x h).

They ar available in two versions.

Type 8182.12

for installation of one Board with dimensions 532 x 297 mm (w x h) or of two Boards with the dimensions 266 x 297 mm (w x h) in the bottom of the Box.

- Dimensions:
  580 x 450 x 155 mm
  (w x d x h)
- Weight: 4.0 kg

Type 8182.13

same as Type 8182.12 but with the possibility of additionally installing one Storage Board with the dimensions 532 x 297 mm (w x h) or two Storage Boards with the dimensions
266 x 297 mm (w x h) in the top of the Box.

- Dimensions:
  580 x 450 x 200 mm
  (w x d x h)
- Weight: 4.2 kg

Threaded inserts M3 are built into the bottom of the Box and with Type 8182.13 also in the top of the Box for fixing the Storage Boards or Boards.
These are arranged in the bottom of the BOx so that a Board can be inserted in the Box at an ergonomically favourable angle.

Empty Cases (Box)

Other features of the Box:

- Storage compartment for accessories and small parts in the bottom of the Box, lid with magnetic catch
- Rugged housing, lockable, with sturdy handle and rubber reinforced corners, removable lid
- Colour of the Box: brown-black
- Material: ABS plastic