

Construction

- Polar tantalum capacitors with solid electrolyte
- Conventional Ta-MnO₂ technology
- Flame-retardant plastic case (UL 94 V-0)
- Optionally tinned or gold-plated terminals



Features

- Outstanding reliability
- High volumetric efficiency
- Excellent solderability
- Stable temperature and frequency characteristics
- Low leakage current, low dissipation factor
- Low self-inductance
- High resistance to shock and vibration
- Suitable for use without series resistor
(recommended operating voltage see “General Technical Information”, page 111, 4.4)
- Very low failure rate
- Operating temperature up to 150°C

Applications

- Automotive electronics (safety applications e.g. airbag, ABS or motor management)
- Measuring and control engineering
- Medical engineering
- DC/DC converters
- Telecommunications (e.g. mobile phones, private branch exchanges)
- Data processing (e.g. laptops, main frames)

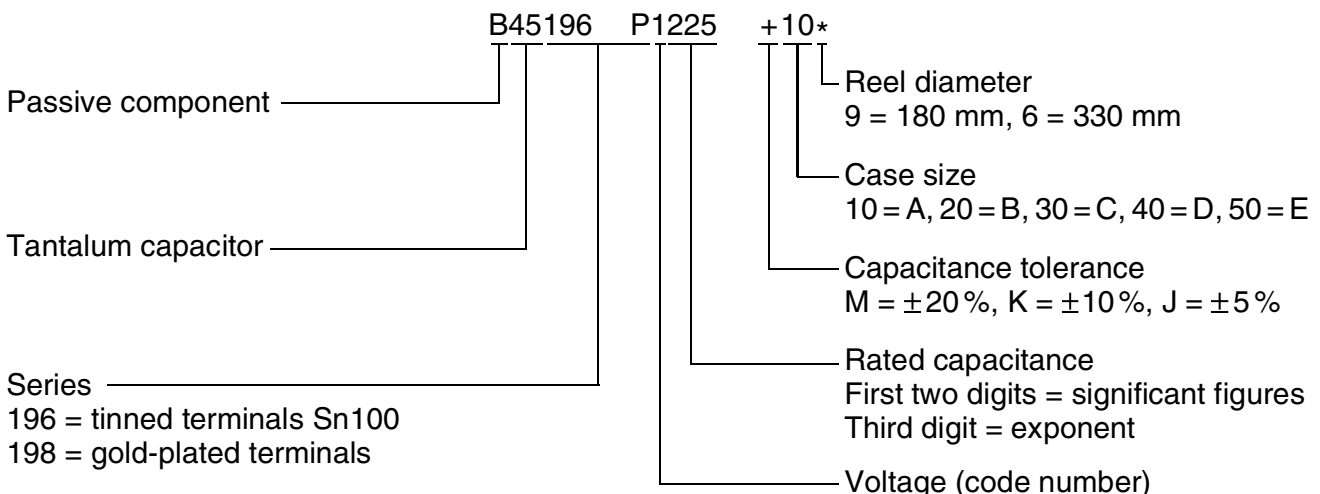
Soldering

Suitable for reflow soldering (IR and vapor phase) and wave soldering

Delivery mode

Taped and reeled in accordance with IEC 60286-3

Ordering code structure





Specifications and characteristics in brief

For characteristic curves see “General Technical Information”, page 107 ff.

	Performance	
Series	B45196P	B45198P
Technology	Ta-MnO ₂	Ta-MnO ₂
Terminals	Tinned	Gold-plated
Rated voltage V_R (up to 85 °C)	4 ... 50 Vdc	
Rated capacitance C_R	0,10 ... 150 µF	
Capacitance tolerance	±10%, ±20% ±5% (on request)	
Operating temperature	–55 ... +125 °C	
Failure rate	At 40 °C; $\leq V_R$, $R_S \geq 3 \Omega/V$ (1 fit = $1 \cdot 10^{-9}$ failures/h)	
$C_R \cdot V_R \leq 330 \mu F \cdot V$	$\leq 0,8$ fit	
$C_R \cdot V_R > 330 \mu F \cdot V$	$\leq 2,5$ fit	
Service life	> 500 000 h	
Leakage current (V_R , 5 min, 20 °C)	10 nA/µC	
Detail specification (tinned terminals)	CECC 30801-801/-802	
IEC climatic category	To IEC 60068-1 55/125/56 (–55/+125 °C; 56 days damp heat test)	

For performance types, individual tests are carried out under more extreme conditions, supplementary to the tests specified by CECC.

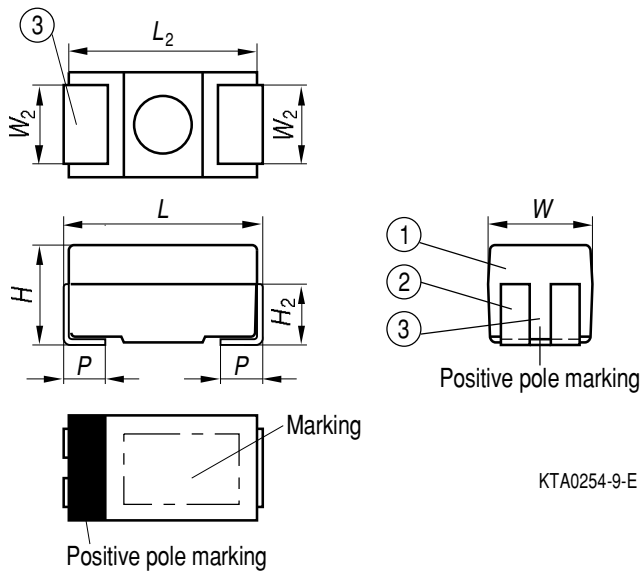
Examples:

Damp heat	85 (+2) °C, 85 ... 90 % relative humidity
Rapid temperature change	100 cycles, –55 °C/+125 °C, 30 min.
Surge voltage	10 ⁴ charge cycles
Impulse test	10 ⁶ cycles

Types B45196P can be operated at temperatures up to 150 °C (under development: 175 °C).

Maximum working voltage at 150 °C: 0,5 V_R

Details for this operating condition must be agreed upon between supplier and customer.

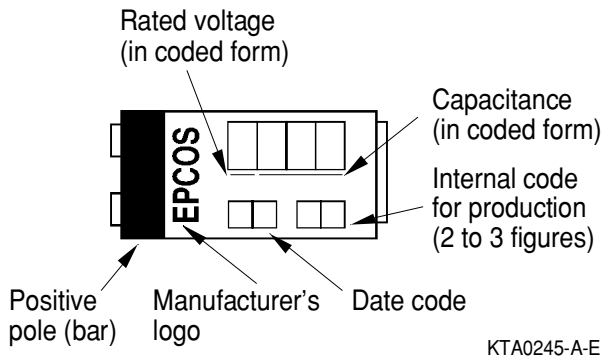
Dimensional drawing


- ① Encapsulation: molded epoxy resin
- ② NiFe; tinned surface Sn100 or gold-plated
- ③ Reduced slot length for case size A

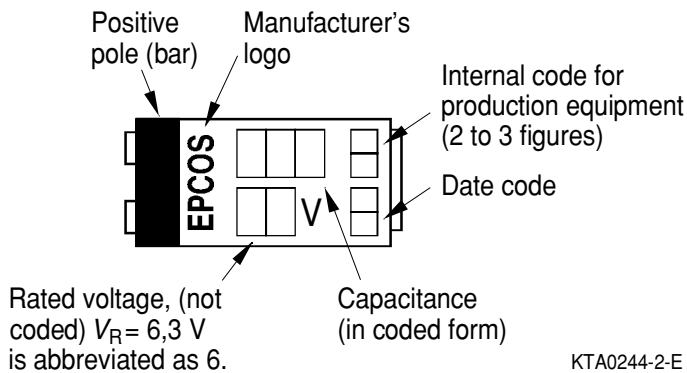
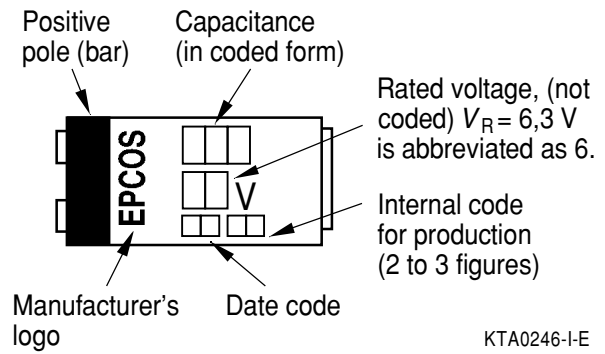
Case size	Dimensions in mm (inches)						
	L	W	H	L ₂ typ.	W ₂ ± 0,1 ±(,004)	H ₂ typ.	p ± 0,3 ±(,012)
A (10)	3,2 ± 0,2 (,126±,008)	1,6 ± 0,2 (,063±,008)	1,6 ± 0,2 (,063±,008)	3,0 (,118)	1,2 (,047)	1,0 (,039)	0,8 (,031)
B (20)	3,5 ± 0,2 (,138±,008)	2,8 ± 0,2 (,110±,008)	1,9 ± 0,2 (,075±,008)	3,3 (,130)	2,2 (,087)	1,2 (,047)	0,8 (,031)
C (30)	6,0 ± 0,3 (,236±,012)	3,2 ± 0,3 (,126±,012)	2,5 ± 0,3 (,098±,012)	5,8 (,228)	2,2 (,087)	1,5 (,059)	1,3 (,051)
D (40)	7,3 ± 0,3 (,287±,012)	4,3 ± 0,3 (,169±,012)	2,8 ± 0,3 (,110±,012)	7,1 (,280)	2,4 (,094)	1,6 (,062)	1,3 (,051)
E (50)	7,3 ± 0,3 (,287±,012)	4,3 ± 0,3 (,169±,012)	4,1 ± 0,3 (,157±,012)	7,1 (,280)	2,4 (,094)	1,6 (,062)	1,3 (,051)

Marking

Case size A



Case size B



Case sizes C, D, E

Voltage coding for case size A

Rated voltage	4	6,3	10	16	20	25	35	50
Code letter	G	J	A	C	D	E	V	T

Capacitance coding

1st and 2nd digit	Capacitance in pF
3rd digit	Multiplier: 4 = 10^4 pF 5 = 10^5 pF 6 = 10^6 pF 7 = 10^7 pF

Date coding

Year	Month	
M = 2000	1 = January	7 = July
N = 2001	2 = February	8 = August
P = 2002	3 = March	9 = September
R = 2003	4 = April	O = October
S = 2004	5 = May	N = November
T = 2005	6 = June	D = December

In addition to the year and month of manufacture, the stamp includes another two or three figures which internally allow us an assignment to production equipment.

Overview of available types

Series	B45196P, tinned terminals B45198P, gold-plated terminals									
V_R (Vdc) up to 85 °C	4	6,3	10	16	20	25	35	50		
C_R (μF) ¹⁾										
0,10							A	A		
0,15							A	B		
0,22							A	B		
0,33							A	B		
0,47						A	A	B	C	
0,68					A	A	B	C		
1,0				A	A	A	B	C		
1,5			A	A	A	B	C	D		
2,2		A	A	A	B	B	C	D		
3,3	A	A	A	A	B	C	C	D		
4,7	A	A	A	B	B	C	C	D		
6,8	A	A	B	A	B	C	C	D	E	
10	A	B	A	B	C	C	C	D	E	
15	A	B	B	C	C	C	D	E		
22	B	C	B	C	C	D	D	E		
33	B	C	C	D	D	D				
47	C	C	D	C	D	D				
68	C	D	C	D	D					
100	D	D	D							
150	D	D	E							

Upon request

1) Additional ratings upon request



Technical data and ordering codes

V_R up to 85°C (up to 125°C) [up to 150°C] Vdc	C_R μF	Case size	$\tan \delta_{\max}$ (20°C, 120 Hz)	$I_{lk, \max}$ (20°C, V_R , 5 min) μA	$Z_{\max}$ (20°C, 100 kHz) Ω	Ordering code ¹⁾ Tinned terminals
4	3,3	A	0,045	0,5	5,9	B45196P0335+10*
(2,5)	4,7	A	0,045	0,5	4,6	B45196P0475+10*
[2]	6,8	A	0,045	0,5	3,9	B45196P0685+10*
	10	A	0,045	0,5	2,9	B45196P0106+10*
	10	B	0,045	0,5	2,7	B45196P0106+20*
	15	A	0,045	0,6	2,7	B45196P0156+10*
	15	B	0,045	0,6	2,6	B45196P0156+20*
	22	B	0,045	0,9	1,8	B45196P0226+20*
	22	C	0,045	0,9	1,7	B45196P0226+30*
	33	B	0,045	1,3	1,5	B45196P0336+20*
	33	C	0,045	1,3	1,5	B45196P0336+30*
	47	C	0,045	1,9	1,1	B45196P0476+30*
	68	C	0,045	2,7	0,9	B45196P0686+30*
	68	D	0,045	2,7	0,8	B45196P0686+40*
	100	D	0,06	4,0	0,6	B45196P0107+40*
	150	D	0,06	6,0	0,6	B45196P0157+40*

1) Replace 196P by 198P for gold-plated terminals
+ Code letter for capacitance tolerance: M = $\pm 20\%$, K = $\pm 10\%$ (J = $\pm 5\%$ upon request)
* Code number for reel diameter: 9 = 180 mm, 6 = 330 mm



B45196P, B45198P

Performance – High Reliability 150°C



V_R up to 85°C (up to 125°C) [up to 150°C] Vdc	C_R μF	Case size	$\tan \delta_{\max}$ (20°C, 120 Hz)	$I_{lk, \max}$ (20°C, V_R , 5 min) μA	$Z_{\max}$ (20°C, 100 kHz) Ω	Ordering code 1) Tinned terminals
6,3 (4) [3,2]	2,2	A	0,045	0,5	6,5	B45196P1225+10*
	3,3	A	0,045	0,5	4,6	B45196P1335+10*
	4,7	A	0,045	0,5	3,6	B45196P1475+10*
	6,8	A	0,045	0,5	2,9	B45196P1685+10*
	6,8	B	0,045	0,5	2,7	B45196P1685+20*
	10	A	0,045	0,6	2,7	B45196P1106+10*
	10	B	0,045	0,6	2,1	B45196P1106+20*
	15	B	0,045	0,9	1,8	B45196P1156+20*
	15	C	0,045	1,0	1,7	B45196P1156+30*
	22	B	0,045	1,4	1,5	B45196P1226+20*
	22	C	0,045	1,4	1,3	B45196P1226+30*
	33	C	0,045	2,1	1,1	B45196P1336+30*
	47	C	0,045	3,0	0,8	B45196P1476+30*
	47	D	0,045	3,0	0,8	B45196P1476+40*
	68	C	0,045	4,3	0,8	B45196P1686+30*
	68	D	0,045	4,3	0,6	B45196P1686+40*
100	D	0,06	6,3	0,6	B45196P1107+40*	
150	D	0,06	9,5	0,5	B45196P1157+40*	

Upon request

1) Replace 196P by 198P for gold-plated terminals

+ Code letter for capacitance tolerance: M = $\pm 20\%$, K = $\pm 10\%$ (J = $\pm 5\%$ upon request)

* Code number for reel diameter: 9 = 180 mm, 6 = 330 mm

V_R up to 85°C (up to 125°C) [up to 150°C] Vdc	C_R μF	Case size	$\tan \delta_{\max}$ (20°C, 120 Hz)	$I_{lk, \max}$ (20°C, V_R , 5 min) μA	$Z_{\max}$ (20°C, 100 kHz) Ω	Ordering code ¹⁾ Tinned terminals
10 (6,3) [5]	1,5	A	0,045	0,5	6,5	B45196P2155+10*
	2,2	A	0,045	0,5	4,6	B45196P2225+10*
	3,3	A	0,045	0,5	3,6	B45196P2335+10*
	4,7	A	0,045	0,5	2,9	B45196P2475+10*
	4,7	B	0,045	0,5	2,7	B45196P2475+20*
	6,8	A	0,045	0,7	2,7	B45196P2685+10*
	6,8	B	0,045	0,7	2,1	B45196P2685+20*
	10	B	0,045	1,0	1,8	B45196P2106+20*
	10	C	0,045	1,0	1,7	B45196P2106+30*
	15	B	0,045	1,5	1,5	B45196P2106+20*
	15	C	0,045	1,5	1,4	B45196P2156+30*
	22	C	0,045	2,2	1,1	B45196P2226+30*
	33	D	0,045	3,3	0,8	B45196P2336+40*
	47	C	0,045	4,7	0,8	B45196P2476+30*
	47	D	0,045	4,7	0,6	B45196P2476+40*
	68	D	0,045	6,8	0,6	B45196P2686+40*
	100	D	0,06	10	0,6	B45196P2107+40*
	150	E	0,06	15	0,5	B45196P2157+50*
16 (10) [8]	1,0	A	0,030	0,5	6,5	B45196P3105+10*
	1,5	A	0,045	0,5	5,2	B45196P3155+10*
	2,2	A	0,045	0,5	4,3	B45196P3225+10*
	3,3	A	0,045	0,6	3,4	B45196P3335+10*
	3,3	B	0,045	0,6	3,0	B45196P3335+20*
	4,7	B	0,045	0,8	2,1	B45196P3475+20*
	6,8	B	0,045	1,1	1,8	B45196P3685+20*
	6,8	C	0,045	1,1	1,7	B45196P3685+30*
	10	C	0,045	1,6	1,4	B45196P3106+30*
	15	C	0,045	2,4	1,1	B45196P3156+30*
	22	C	0,045	3,6	1,0	B45196P3226+30*
	22	D	0,045	3,6	0,8	B45196P3226+40*
	33	D	0,045	5,3	0,7	B45196P3336+40*
	47	D	0,045	7,5	0,6	B45196P3476+40*

Upon request

1) Replace 196P by 198P for gold-plated terminals

+ Code letter for capacitance tolerance: M = ± 20 %, K = ± 10 % (J = ± 5 % upon request)

* Code number for reel diameter: 9 = 180 mm, 6 = 330 mm

V_R up to 85°C (up to 125°C) [up to 150°C] Vdc	C_R μF	Case size	$\tan \delta_{\max}$ (20°C, 120 Hz)	$I_{lk, \max}$ (20°C, V_R , 5 min) μA	$Z_{\max}$ (20°C, 100 kHz) Ω	Ordering code ¹⁾ Tinned terminals
20 (13) [10]	0,68	A	0,030	0,5	7,8	B45196P4684+10*
	1,0	A	0,030	0,5	5,9	B45196P4105+10*
	1,5	A	0,045	0,5	5,2	B45196P4155+10*
	2,2	B	0,045	0,5	3,6	B45196P4225+20*
	3,3	B	0,045	0,7	2,7	B45196P4335+20*
	4,7	B	0,045	1,0	1,9	B45196P4475+20*
	4,7	C	0,045	1,0	1,7	B45196P4475+30*
	6,8	C	0,045	1,4	1,3	B45196P4685+30*
	10	C	0,045	2,0	1,1	B45196P4106+30*
	15	C	0,045	3,0	1,0	B45196P4156+30*
	15	D	0,045	3,0	0,9	B45196P4156+40*
	22	D	0,045	4,4	0,7	B45196P4226+40*
	33	D	0,045	6,6	0,6	B45196P4336+40*
25 (16) [12,5]	0,47	A	0,030	0,5	8,5	B45196P5474+10*
	0,68	A	0,030	0,5	6,5	B45196P5684+10*
	1,0	A	0,030	0,5	5,2	B45196P5105+10*
	1,5	B	0,045	0,5	4,2	B45196P5155+20*
	2,2	B	0,045	0,6	3,0	B45196P5225+20*
	3,3	C	0,045	0,9	2,0	B45196P5335+30*
	4,7	C	0,045	1,2	1,6	B45196P5475+30*
	6,8	C	0,045	1,7	1,4	B45196P5685+30*
	6,8	D	0,045	1,7	1,1	B45196P5685+40*
	10	C	0,045	2,5	1,1	B45196P5106+30*
	10	D	0,045	2,5	0,9	B45196P5106+40*
	15	D	0,045	3,8	0,7	B45196P5156+40*
	22	D	0,045	5,5	0,6	B45196P5226+40*

1) Replace 196P by 198P for gold-plated terminals

+ Code letter for capacitance tolerance: M = $\pm 20\%$, K = $\pm 10\%$ (J = $\pm 5\%$ upon request)

* Code number for reel diameter: 9 = 180 mm, 6 = 330 mm

V_R up to 85°C (up to 125°C) [up to 150°C] Vdc	C_R μF	Case size	$\tan \delta_{\max}$ (20°C, 120 Hz)	$I_{lk, \max}$ (20°C, V_R , 5 min) μA	$Z_{\max}$ (20°C, 100 kHz) Ω	Ordering code ¹⁾ Tinned terminals
35 (23) [17,5]	0,10	A	0,030	0,5	28	B45196P6104+10*
	0,15	A	0,030	0,5	23	B45196P6154+10*
	0,22	A	0,030	0,5	15	B45196P6224+10*
	0,33	A	0,030	0,5	11	B45196P6334+10*
	0,47	A	0,030	0,5	10	B45196P6474+10*
	0,47	B	0,030	0,5	8,0	B45196P6474+20*
	0,68	B	0,030	0,5	5,5	B45196P6684+20*
	1,0	B	0,030	0,5	4,4	B45196P6105+20*
	1,5	C	0,045	0,6	3,3	B45196P6155+30*
	2,2	C	0,045	0,8	2,2	B45196P6225+30*
	3,3	C	0,045	1,2	1,7	B45196P6335+30*
	4,7	C	0,045	1,7	1,3	B45196P6475+30*
	4,7	D	0,045	1,7	1,0	B45196P6475+40*
	6,8	D	0,045	2,4	0,9	B45196P6685+40*
	10	D	0,045	3,5	0,7	B45196P6106+40*
	15	E	0,045	5,3	0,5	B45196P6156+50*
	22	E	0,045	7,7	0,5	B45196P6226+50*
50 (33) [25]	0,10	A	0,030	0,5	27	B45196P7104+10*
	0,15	B	0,030	0,5	22	B45196P7154+20*
	0,22	B	0,030	0,5	15	B45196P7224+20*
	0,33	B	0,030	0,5	11	B45196P7334+20*
	0,47	C	0,030	0,5	6,5	B45196P7474+30*
	0,68	C	0,030	0,5	5,5	B45196P7684+30*
	1,0	C	0,030	0,5	3,3	B45196P7105+30*
	1,5	D	0,045	0,8	2,8	B45196P7155+40*
	2,2	D	0,045	1,1	2,0	B45196P7225+40*
	3,3	D	0,045	1,7	1,1	B45196P7335+40*
	4,7	D	0,045	2,4	0,9	B45196P7475+40*
	6,8	E	0,045	3,4	0,5	B45196P7685+50*
	10	E	0,045	5,0	0,5	B45196P7106+50*

■ Upon request

1) Replace 196P by 198P for gold-plated terminals

+ Code letter for capacitance tolerance: M = ± 20 %, K = ± 10 % (J = ± 5 % upon request)

* Code number for reel diameter: 9 = 180 mm, 6 = 330 mm

Herausgegeben von EPCOS AG

Unternehmenskommunikation, Postfach 80 17 09, 81617 München, DEUTSCHLAND

☎ ++49 89 636 09, FAX (0 89) 636-2 26 89

© EPCOS AG 2002. Vervielfältigung, Veröffentlichung, Verbreitung und Verwertung dieser Broschüre und ihres Inhalts ohne ausdrückliche Genehmigung der EPCOS AG nicht gestattet.

Bestellungen unterliegen den vom ZVEI empfohlenen Allgemeinen Lieferbedingungen für Erzeugnisse und Leistungen der Elektroindustrie, soweit nichts anderes vereinbart wird.

Diese Broschüre ersetzt die vorige Ausgabe.

Fragen über Technik, Preise und Liefermöglichkeiten richten Sie bitte an den Ihnen nächstgelegenen Vertrieb der EPCOS AG oder an unsere Vertriebsgesellschaften im Ausland. Bauelemente können aufgrund technischer Erfordernisse Gefahrstoffe enthalten. Auskünfte darüber bitten wir unter Angabe des betreffenden Typs ebenfalls über die zuständige Vertriebsgesellschaft einzuholen.

Published by EPCOS AG

Corporate Communications, P.O. Box 80 17 09, 81617 Munich, GERMANY

☎ ++49 89 636 09, FAX (0 89) 636-2 26 89

© EPCOS AG 2002. Reproduction, publication and dissemination of this brochure and the information contained therein without EPCOS' prior express consent is prohibited.

Purchase orders are subject to the General Conditions for the Supply of Products and Services of the Electrical and Electronics Industry recommended by the ZVEI (German Electrical and Electronic Manufacturers' Association), unless otherwise agreed.

This brochure replaces the previous edition.

For questions on technology, prices and delivery please contact the Sales Offices of EPCOS AG or the international Representatives.

Due to technical requirements components may contain dangerous substances. For information on the type in question please also contact one of our Sales Offices.