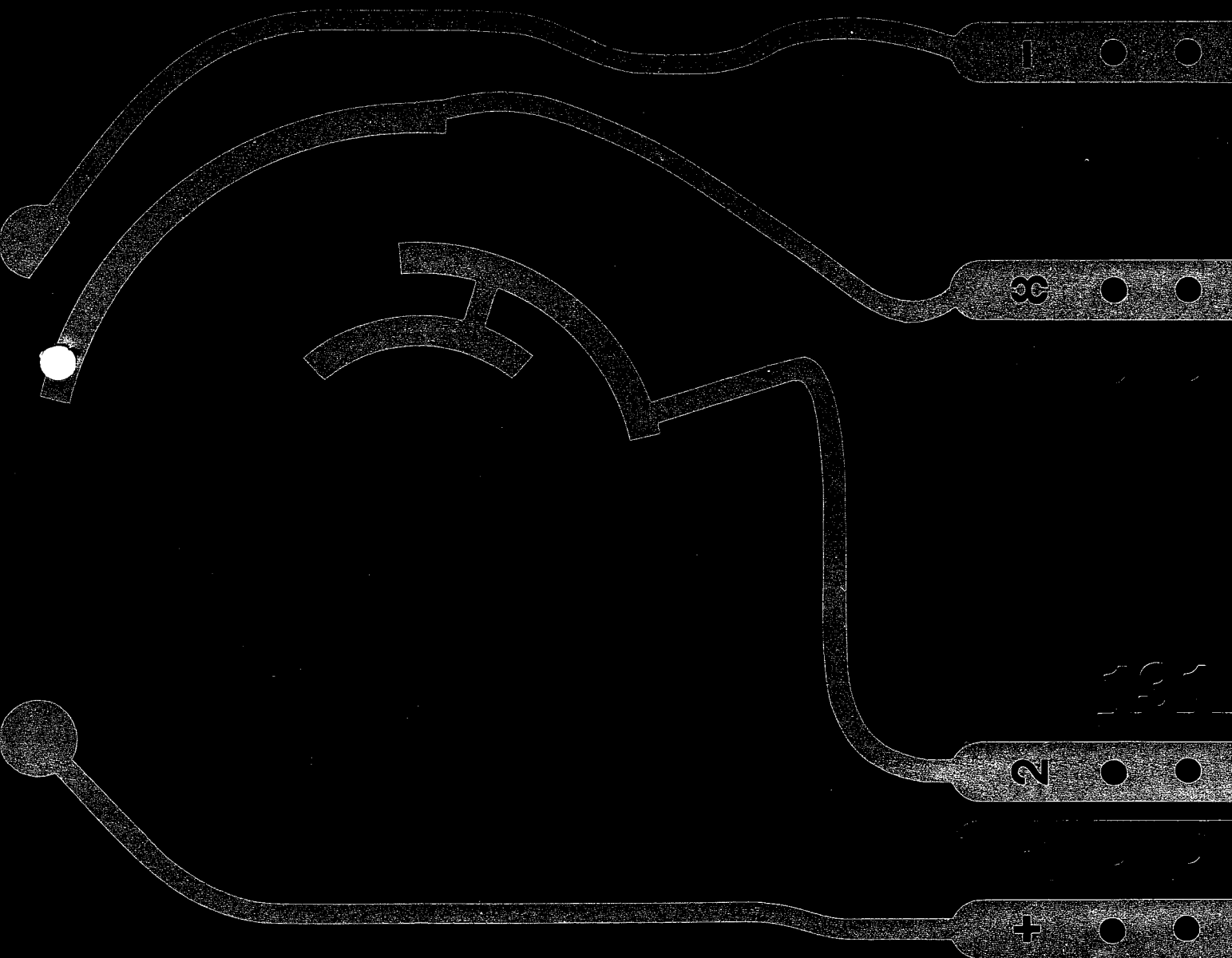


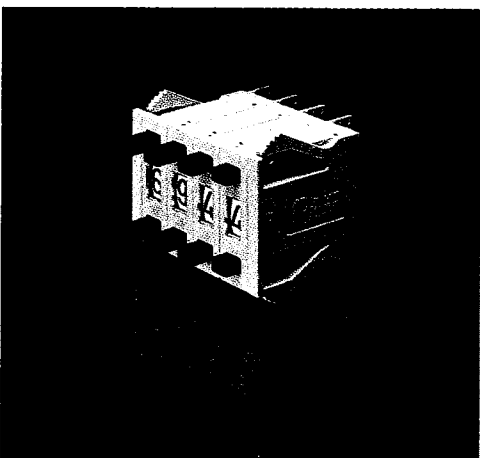
# Hartmann Dual Push-Button Code Switches



# Special Features

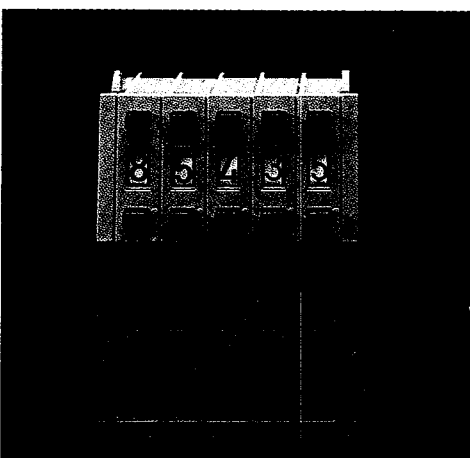
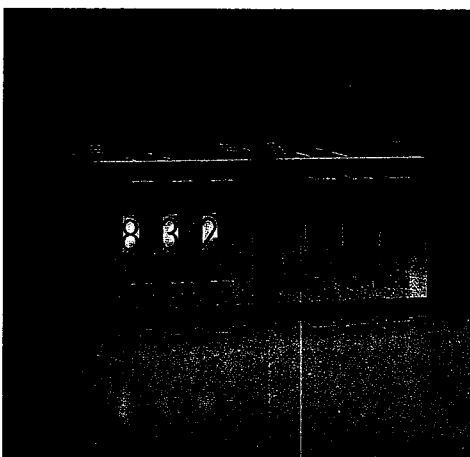
## Dummy switches with no Electrical Function

Only the display is required for these components. They are electrically inoperable and can be supplied in all sizes. The dummy switch is designated with the letter X, eg: SMC-X-2.



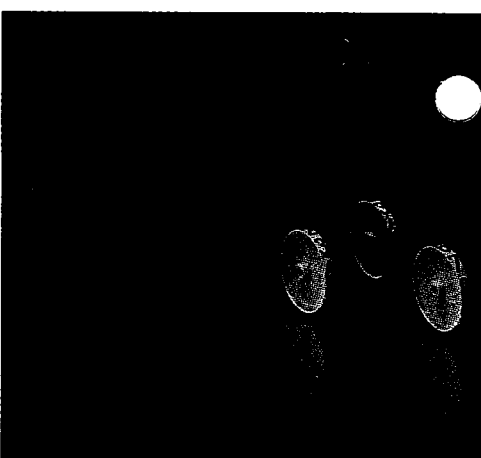
## Illuminated Drums

Types MHE and MICO are illuminated by two parallel-connected discreet miniature lamps each 5V/50mA and with a life of 10000 operating hours. All other types use LEDs. This diode is rated at 20mA, and for 5V, a series resistor of 180 ohms is required. Some switches are not available with illumination, due to physical size limitations. Please see the plan on pages 4 and 5. The letter "O" at the end of the part number designates illumination, eg: MICO-131-AK-2-O.



## Special printing on Number Drums

Numerous stamps are already available. In addition, other options are possible on request. Special printing details should be added clearly to the order. The first symbol of the special printing will appear in the original position of digital 0.



## Extended Push-Buttons

In the case of 10 digit types SMC, MICO and MHE extended push-buttons can be supplied. Please note the plan on pages 4 and 5. The letter "V" together with the required length designates this special type, eg: SMC-131-AK-2-V3.5.

## Coloured Printing

So as to indicate a minus range or negative values, or to make important settings stand out, all types can be supplied with the red symbols.

## Stopped Switches

All 10-digit switches can be stopped with the exception of the PICO. In the case of types SMC, MICO and MHE this is done in the factory and cannot be adjusted. The stopping of DPS types and the SMC-D can be done either in the factory or, subsequently, by the customer.

Order example:

The letter "B" (stopping) and two figures at the end of the part number designate the required switch position.  
e.g. required positions: 2, 3, 4, 5, 6 – add B26 at the end of the part number.  
B82 would be: switching from 8 through 0 to 2.

## Coloured Number Drums

In the case of 10-digit switches, the drum can be delivered standard black and white; Drums are also available in red, green or yellow with black printing. Add details of special colour requirement to the order.

## Special Codes

Special codes are already available for all types. With sizeable quantities and reasonable acceptance of costs, just about any requirements can be met, provided it is technically feasible.

# Product Information

---

With this catalogue we would like to introduce you to our programme of dual push-button code switches and accessories. Special types can be supplied for each of the ten basic types, to satisfy most requirements.

Should you, however, require a type which we have not listed, please write and ask us about it. We will do everything to comply with your wishes, so long as they are technically feasible.

No doubt you have long been aware of the advantages of Hartmann dual push-button code switches.

The digits are large and can be read several metres away.

The covered digital display prevents dirt and dust getting inside the switch and interfering with the positive contacts.

This cover ensures that the digits retain their clear printing and are not rendered unrecognizable through

continuous touching during the setting process.

The switches are easy to operate, even for unskilled people.

The digits are clearly visible and incorrect positioning reduced.

For multi-switch assembly you do not require screws; the switches are merely plugged together.

The contact resistance is low and consistent.

The life of all switches is over 1 million switching cycles.

The mechanical function is very sophisticated and the switching is very positive.

All switch enclosures are made of heat-resisting, non-combustible Noryl SE1.

The printed circuit is epoxy glass fibre G10.

The contact parts are nickel-plated and have an abrasion-resistant hard gold overlay.

We ensure the quality of our products

by constant checks and tests and by the electronic final inspection.

Under the motto "quality ensures our success", we have been producing dual push-button code switches since 1967, and this policy has ensured success.

Our task for the 1980s will be to maintain present standards and, where possible, utilize our wide experience to achieve further improvements.

Hartmann Gerätebau GmbH & Co. KG

## Contents

	Page
Summary	4-5
Series: DPS8 and DPS8S	6-7
DPS9	8-9
DPS10	10-11
PICO and PICO-D	12-13
SMC and SMC-D	14-15
MICO	16-17
MHE	18-19
Standard codes	20
Connections	20
Connectors	21
Decade resistor switches	22-23
Distributors	24
Representatives	24

All dimensions in this catalogue are given in mm.

The tolerance range is in accordance with "DIN 7168 fine".

We reserve the right to undertake modifications in the interest of technical progress.

The catalogue represents the latest level of technology on the day it was published.

Please therefore investigate whether all details still apply if you want to stipulate your own requirements.

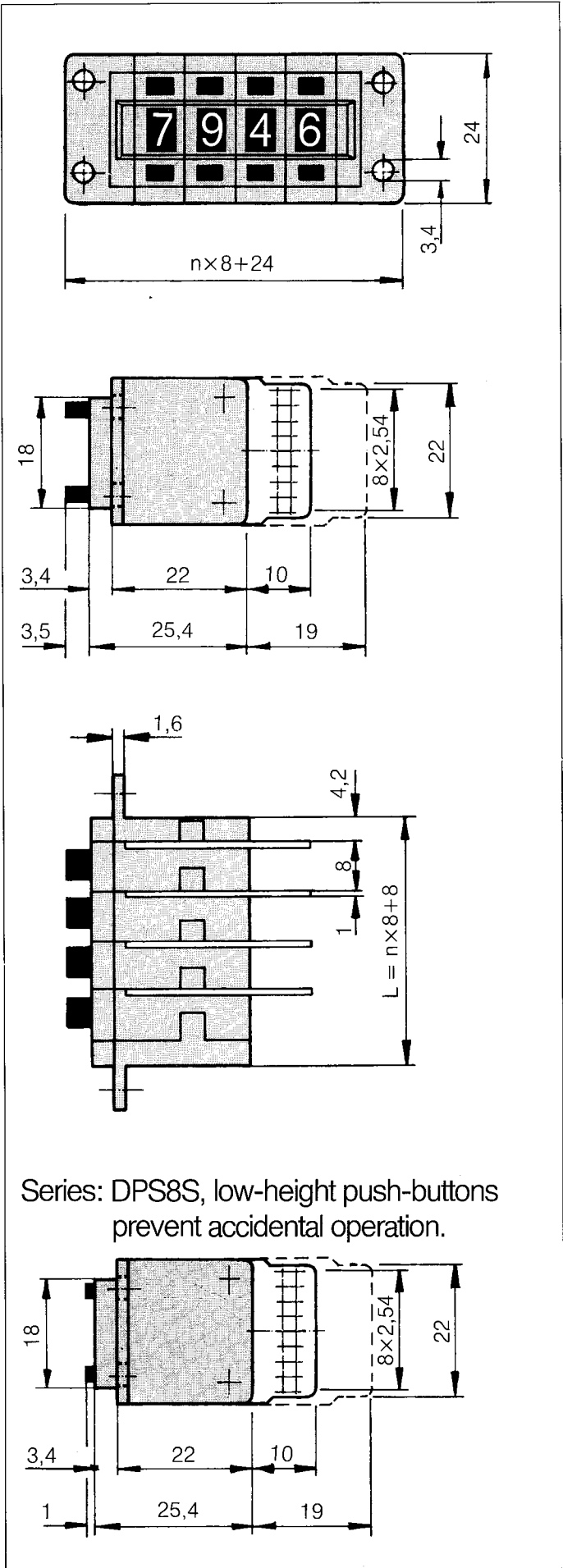
Issue 08

# Dual Push-Button Code Switches: Summary

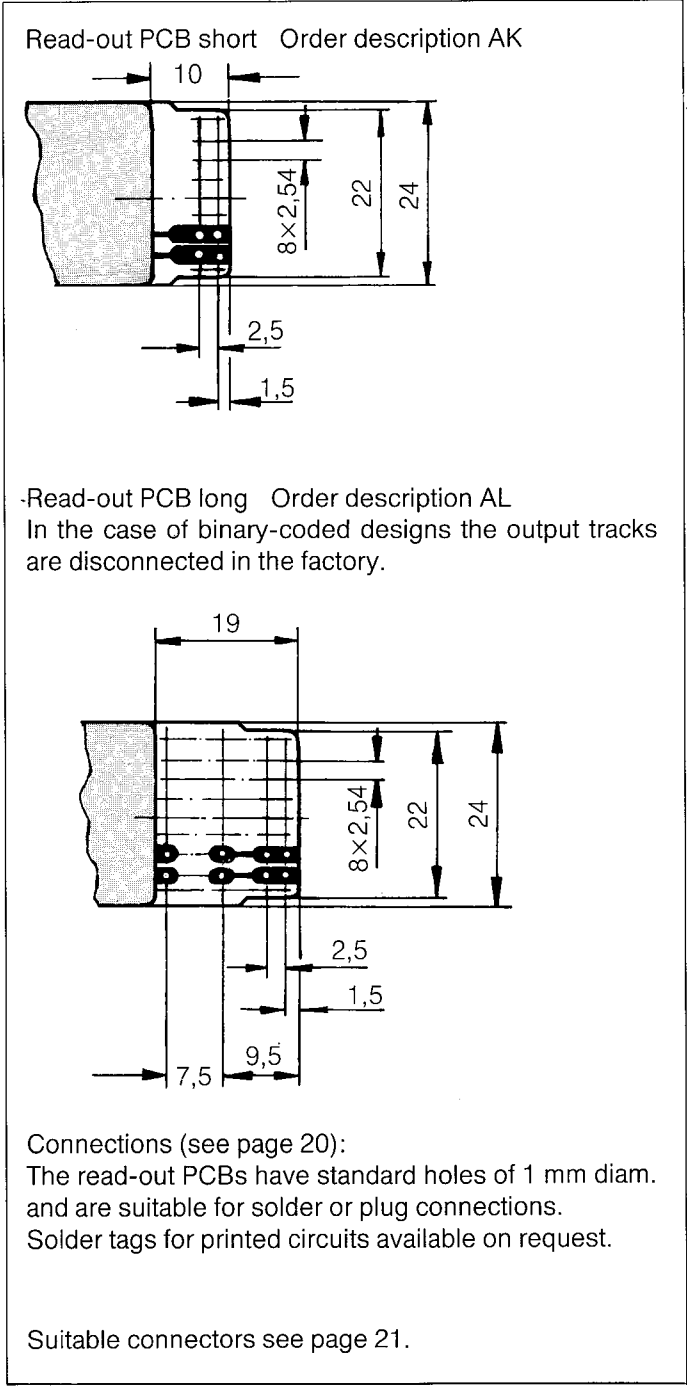
Series			DPS8	DPS8S	DPS9
Dimensional drawings on page			6/7	6/7	8/9
Standard versions					
Height of front			18 mm	18 mm	33 mm
Width of front			8 mm	8 mm	8 mm
Installed depth with PCB			32 mm	32 mm	39 mm
Assembly from the front					■
Assembly from the rear			■	■	
Codes	Switch Positions	Printing			
111 Decimal	10	0–9	■	■	■
131 BCD	10	0–9	■	■	■
137 BCD Complement	10	0–9	■	■	■
141 BCD+Complement	10	0–9			■
300 BCD 0–11	12	0–11			
301 Hexadecimal	16	0–9 A–F	■	■	■
400 Change-over switch	10	+, –, +, etc.	■	■	■
Electrical Data					
Operating voltage			max. 60 V	max. 60 V	max. 60 V
Contact load static			max. 1 A	max. 1 A	max. 1 A
Contact load dynamic (ohmic load)			max. 100 mA	max. 100 mA	max. 100 mA
Contact resistance type AK measured from the supply line to the output			<100 mOhm	<100 mOhm	<100 mOhm
Technical Data					
Permissible ambient temperature			–20...+80°C	–20...+80°C	–20...+80°C
Expected life (switching cycles)			>10 <sup>6</sup>	>10 <sup>6</sup>	>10 <sup>6</sup>
Actuating force			approx. 4 N	approx. 4 N	approx. 4.5 N
Weight			approx. 4 g	approx. 4 g	approx. 6.5 g
Standard Colours					
Design 1	Housing		grey	grey	grey
	Drum		black	black	black
	Printing		white	white	white
Design 2	Housing		black	black	black
	Drum		black	black	black
	Printing		white	white	white
Special Features					
Number of switch positions: Please note which types offer the following features:			10	10	10
			16	16	16
Stopping at factory			■	■	■
Stopping by customer			■	■	■
Illumination with 1 x LED (transparent drum)			■ ■	■ ■	■ ■
Illumination with 2 filament lamps each 5 V/60 mA					
Special printing			■ ■	■	■ ■
Drum red, green, yellow			■	■	■
Digits red			■ ■	■ ■	■ ■
Push-buttons extended by 1 mm					
1.5/3.5/5.5 mm					

DPS10 10/11	PICO 12/13	PICO-D 12/13	SMC 14/15	SMC-D 14/15	MICO 16/17	MHE 18/19
33 mm	15 mm	15 mm	24 mm	24 mm	32 mm	44 mm
10 mm	7.62 mm	7.62 mm	7.62 mm	7.62 mm	11 mm	12 mm
39 mm	24 mm	24 mm	32 mm	32 mm	56 mm	56 mm
■	■	■	■	■	■	■
			■			
■	■	■	■	■	■	■
■	■	■	■	■	■	■
■	■	■	■	■	■	■
■			■		■	■
			■			■
■		■	■	■	■	■
■	■	■	■	■	■	■
max. 60 V	max. 60 V	max. 60 V	max. 60 V	max. 60 V	max. 60 V	max. 60 V
max. 1 A	max. 0.5 A	max. 0.5 A	max. 1 A	max. 1 A	max. 1 A	max. 1 A
max. 100 mA	max. 100 mA	max. 100 mA	max. 100 mA	max. 100 mA	max. 100 mA	max. 100 mA
<100 mOhm	<100 mOhm	<100 mOhm	<100 mOhm	<100 mOhm	<120 mOhm	<120 mOhm
-20...+80°C	-20...+60°C	-20...+60°C	-20...+80°C	-20...+80°C	-20...+80°C	-20...+80°C
>10 <sup>6</sup>	>10 <sup>6</sup>	>10 <sup>5</sup>	>10 <sup>6</sup>	>10 <sup>6</sup>	>10 <sup>6</sup>	>10 <sup>6</sup>
approx. 4.5 N	approx. 3 N	approx. 3 N	approx. 4 N	approx. 4 N	approx. 5 N	approx. 4.5 N
approx. 7.5 g	approx. 2 g	approx. 2 g	approx. 4 g	approx. 4 g	approx. 10.5 g	approx. 15 g
grey	grey	grey	grey	grey	grey	grey
black	white	black	white	white	white	white
white	black	white	black	black	black	black
black	black	black	black	black	black	black
black	black	black	black	black	black	black
white	white	white	white	white	white	white
10	10	10	10	10	10	10
16		16	12	16	16	16
			16			
■			■	■	■	■
■				■		
■ ■	■		■ ■	■ ■		
					■ ■	■ ■
■ ■	■	■ ■	■ ■ ■	■ ■	■ ■	■ ■
■			■	■	■	■
■ ■	■	■ ■	■ ■ ■	■ ■	■ ■	■ ■
				■		
			■			

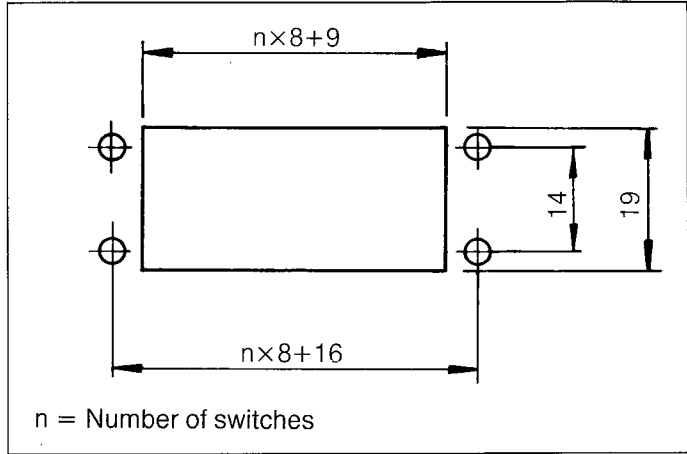
Dimensions



Print types

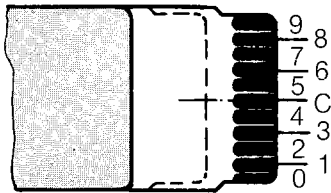


Cut-out

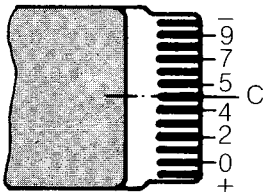


Connection layouts

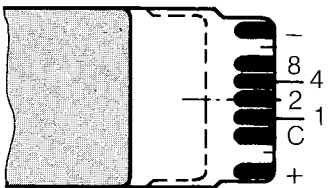
Decimal No. 111  
(module 2.0 mm)



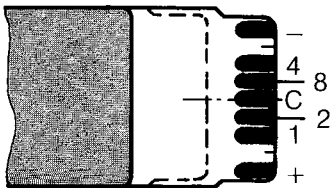
Illuminated version (module 1.7 mm)



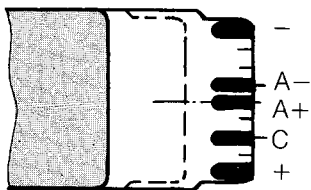
\*BCD No. 131  
BCD-Complement No. 137



Hexadecimal No. 301



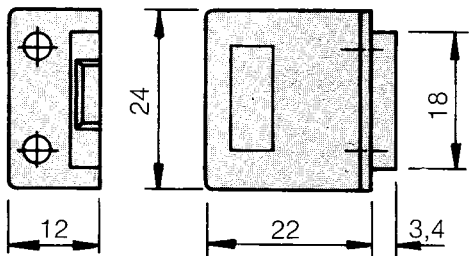
Change-over switch No. 400



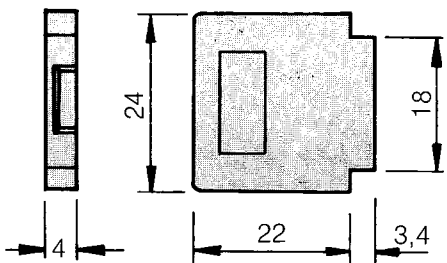
\*The switching mode is shorting (make before break);  
i.e. even during actuation at least one output is  
connected to input C.

Accessories

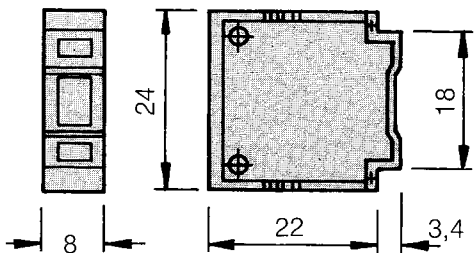
Pair of side covers with mounting angles  
Order description DPS8-P/W



Pair of side covers Order description DPS8-P



Dummy housing Order description DPS8-L

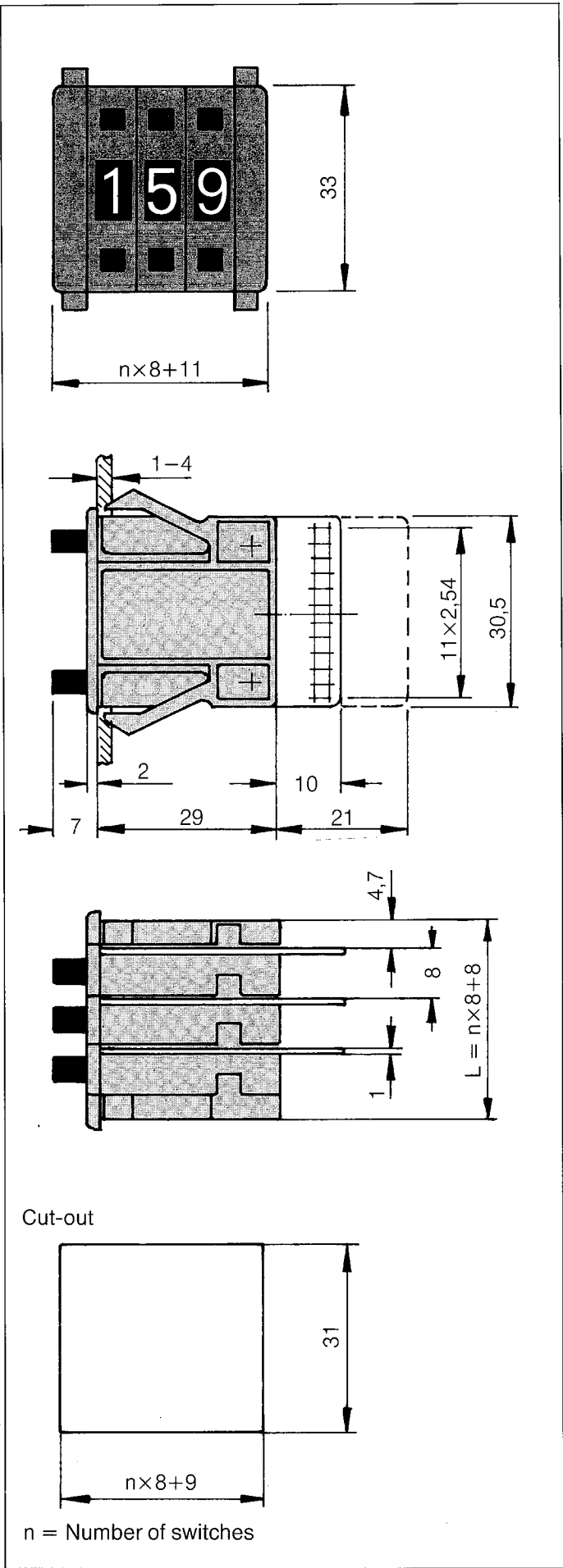


Order examples

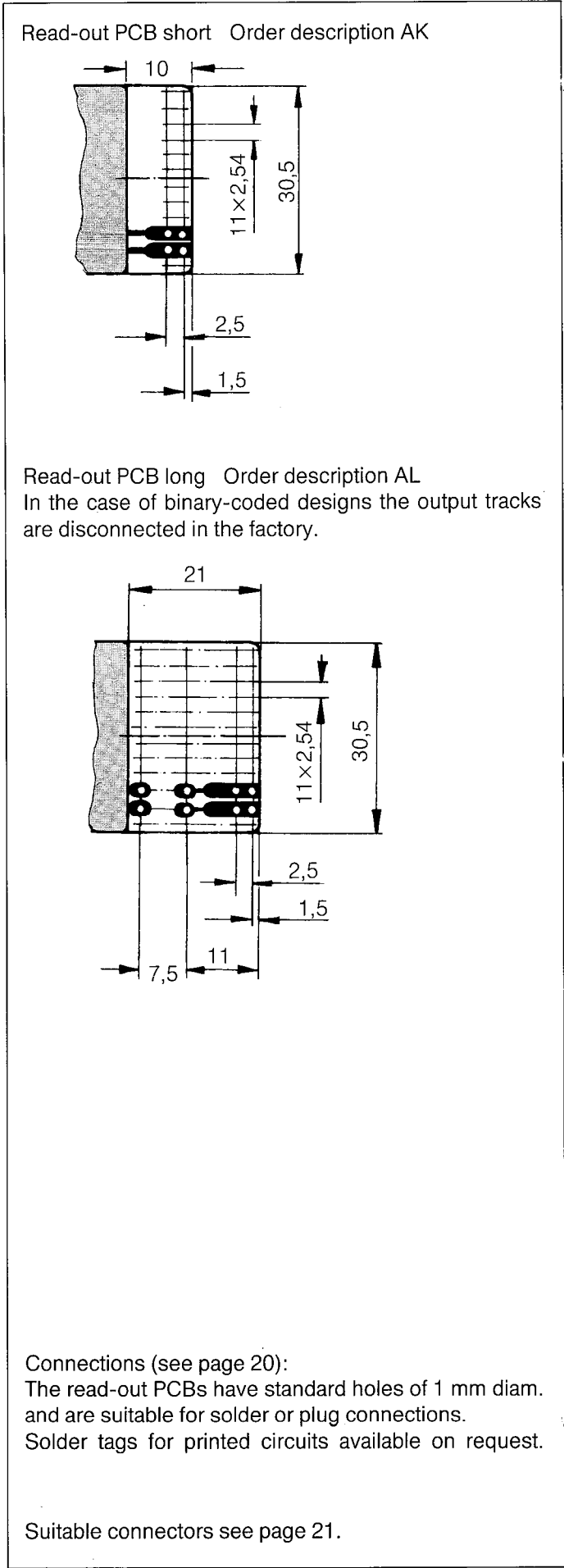
Description DPS8-111-AK-1  
Series \_\_\_\_\_  
Coding \_\_\_\_\_  
Read-out PCB short \_\_\_\_\_  
Housing colour grey \_\_\_\_\_

Description DPS8-131-AL-LS-2  
Series \_\_\_\_\_  
Coding \_\_\_\_\_  
Read-out PCB long \_\_\_\_\_  
Connection: solder tags \_\_\_\_\_  
Housing colour black \_\_\_\_\_

Dimensions



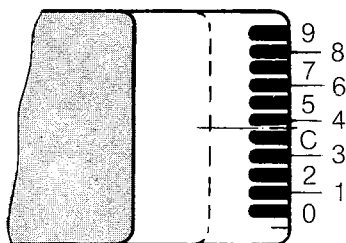
Print types



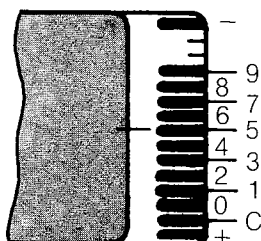


## Connection layouts

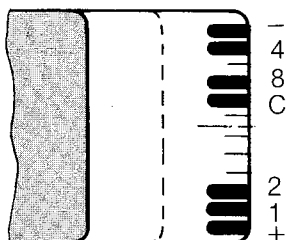
Decimal No. 111



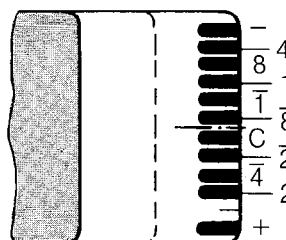
Illuminated version (module 2 mm)



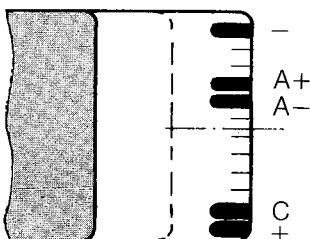
- \* BCD No. 131
- BCD-Complement No. 137
- \* Hexadecimal No. 301



BCD+Complement No. 141



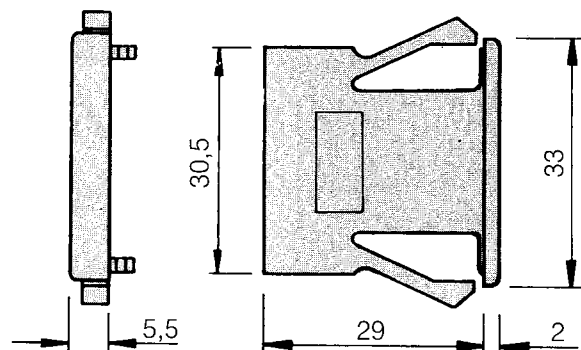
Change-over switch No. 400



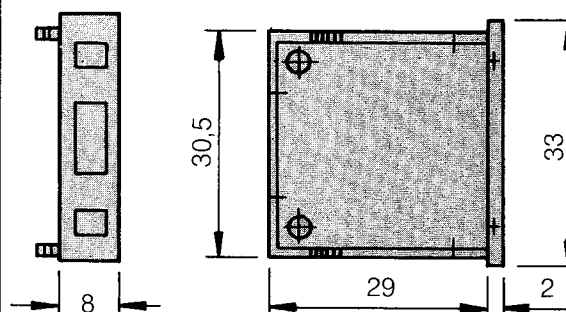
- \* The switching mode is shorting; i.e. even during actuation at least one output is connected to input C.

## Accessories

Pair of side covers Order description DPS9/10-P



Dummy housing Order description DPS9-L

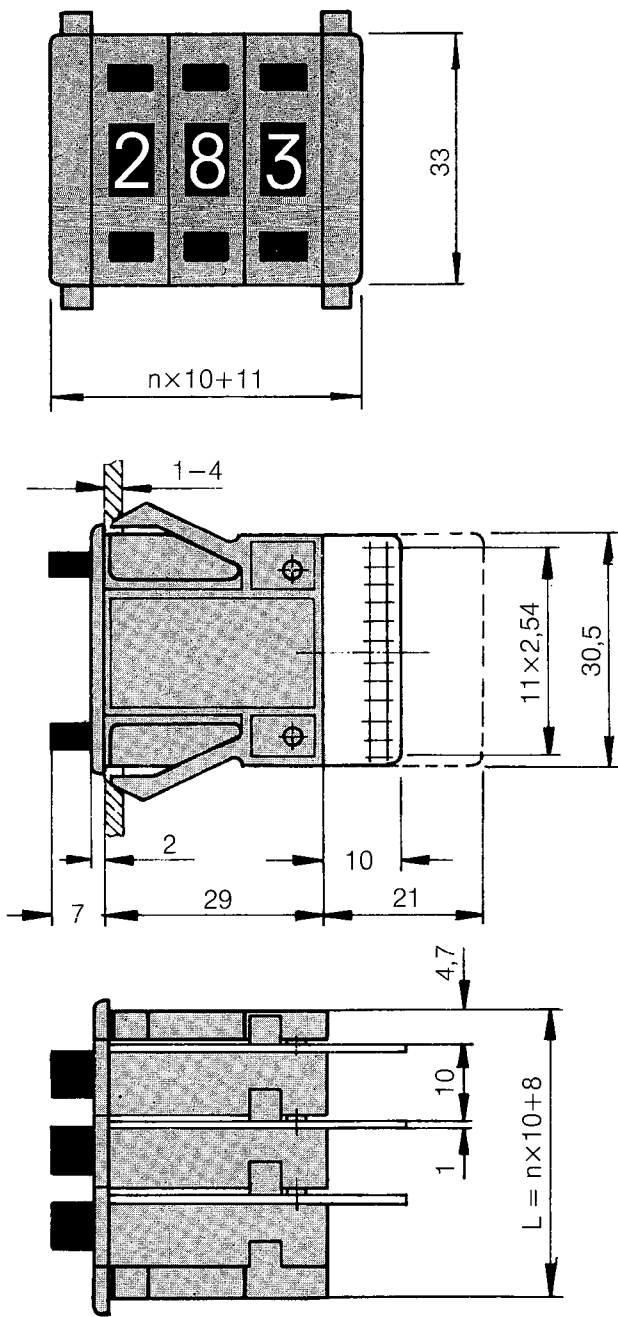


## Order examples

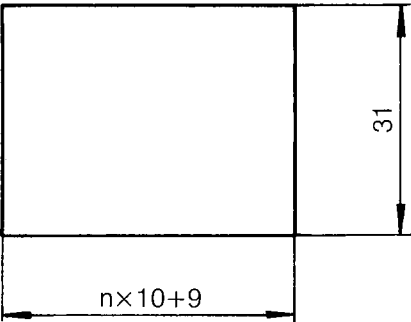
Description DPS9-111-AK-1  
 Series \_\_\_\_\_  
 Coding \_\_\_\_\_  
 Read-out PCB short \_\_\_\_\_  
 Housing colour grey \_\_\_\_\_

Description DPS9-131-AL-LS-2  
 Series \_\_\_\_\_  
 Coding \_\_\_\_\_  
 Read-out PCB long \_\_\_\_\_  
 Connection: solder tags \_\_\_\_\_  
 Housing colour black \_\_\_\_\_

Dimensions



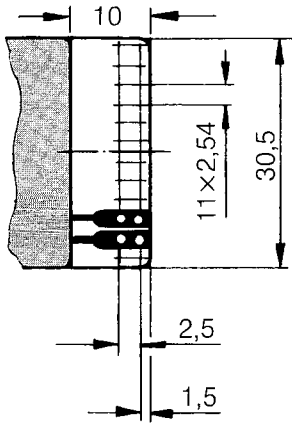
Cut-out



n = Number of switches

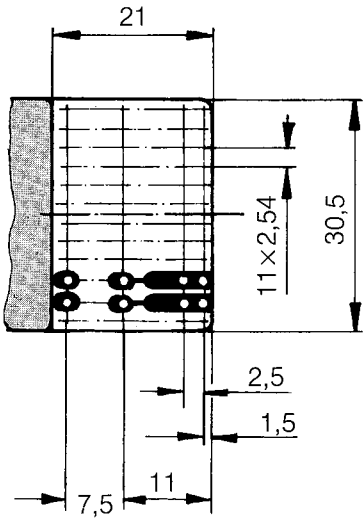
Print types

Read-out PCB short Order description AK



Read-out PCB long Order description AL

In the case of binary-coded designs the output tracks are disconnected in the factory.

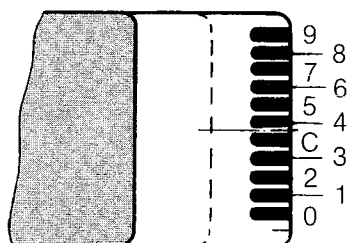


Connections (see page 20):  
The read-out PCBs have standard holes of 1 mm diam. and are suitable for solder or plug connections. Solder tags for printed circuits available on request.

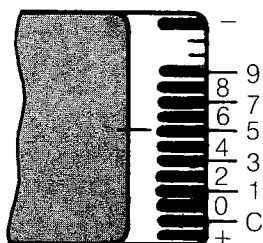
Suitable connectors see page 21.

## Connection layouts

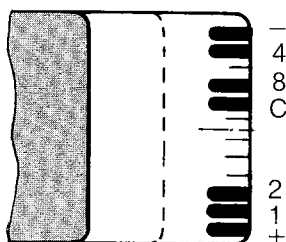
Decimal No. 111



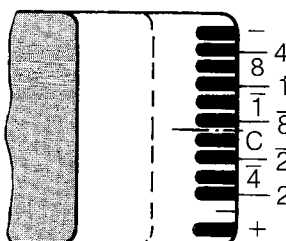
Illuminated version (module 2 mm)



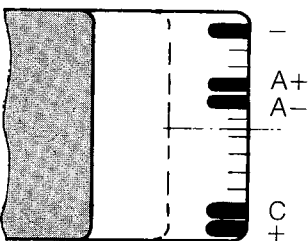
- \* BCD No. 131
- BCD-Complement No. 137
- \* Hexadecimal No. 301



BCD+Complement No. 141



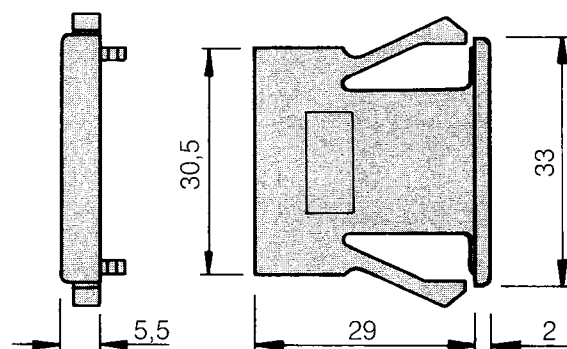
Change-over switch No. 400



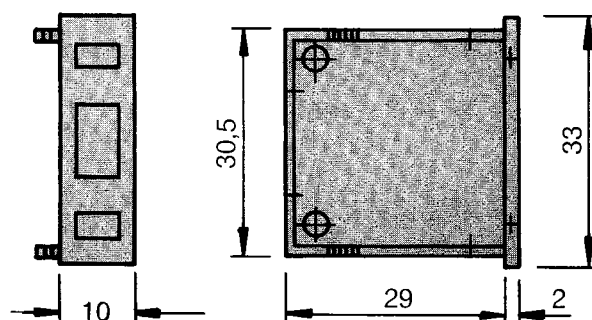
\* The switching mode is shorting; i.e. even during actuation at least one output is connected to input C.

## Accessories

Pair of side covers Order description DPS9/10-P



Dummy housing Order description DPS10-L



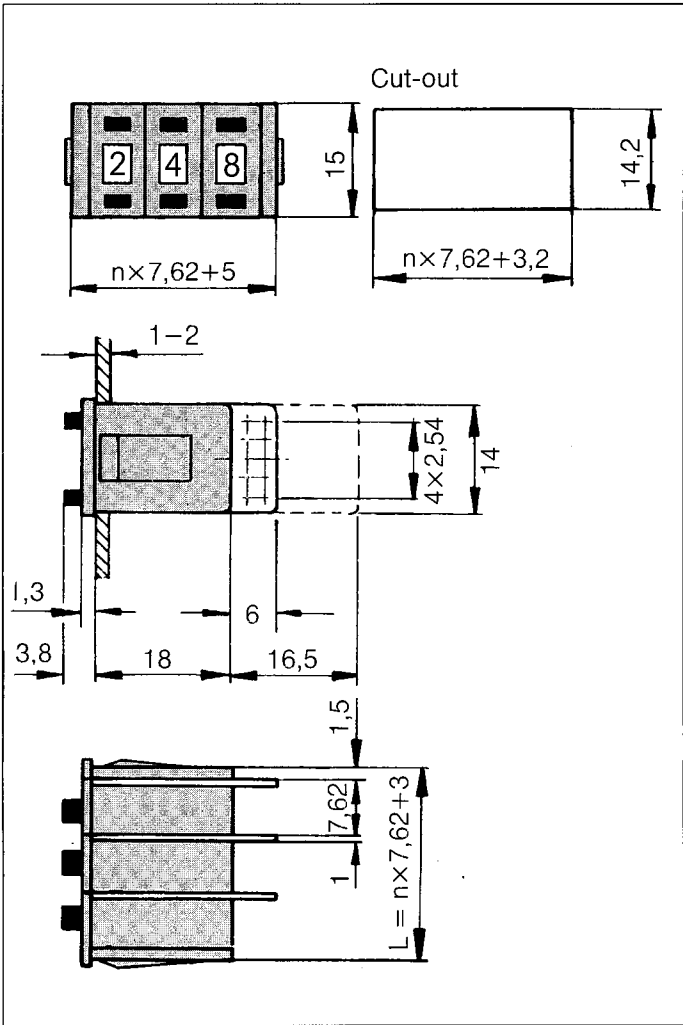
## Order examples

Description DPS10-111-AK-1  
 Series \_\_\_\_\_  
 Coding \_\_\_\_\_  
 Read-out PCB short \_\_\_\_\_  
 Housing colour grey \_\_\_\_\_

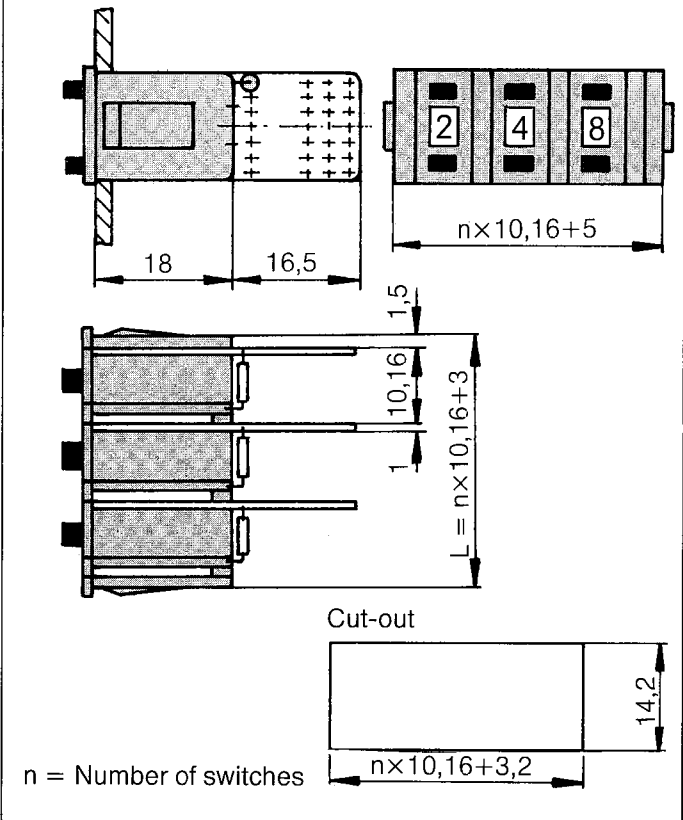
Description DPS10-131-AL-LS-2  
 Series \_\_\_\_\_  
 Coding \_\_\_\_\_  
 Read-out PCB long \_\_\_\_\_  
 Connection: solder tags \_\_\_\_\_  
 Housing colour black \_\_\_\_\_

# Series: PICO—D with click-action and PICO

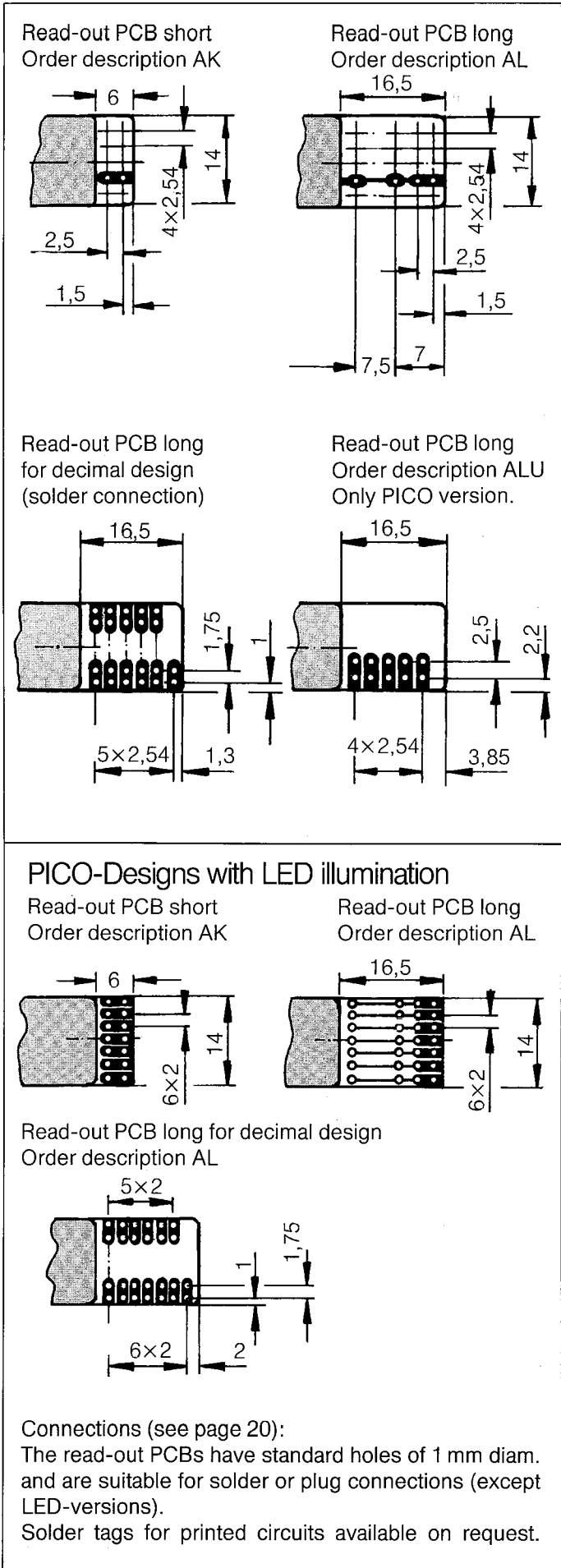
## Dimensions



## PICO-Design with LED illumination



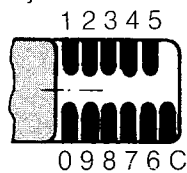
## Print types



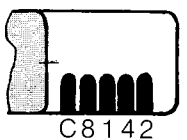
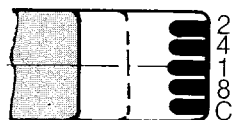
## Connection layouts

### Series: PICO

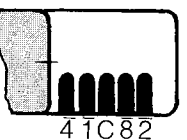
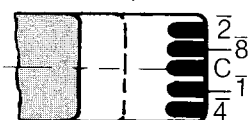
Decimal No. 111  
(only solder connection)



BCD No. 131



BCD-Complement No. 137

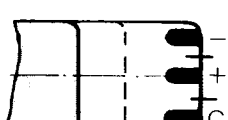
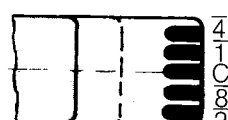
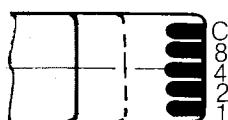
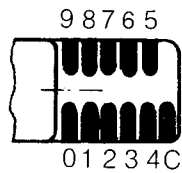


Change-over switch No. 400



Hexadecimal No. 301

### Series: PICO-D



## PICO-Design with illumination

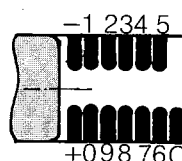
The LED is connected to a series resistor (180 ohms) in the spacer plate type PICO-A.

The operating voltage is 5VDC.

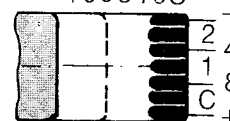
Switch and spacer plate form one unit.

The drum is illuminated by an opening in the switch cover.

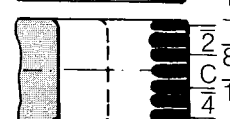
Decimal No. 111



BCD No. 131

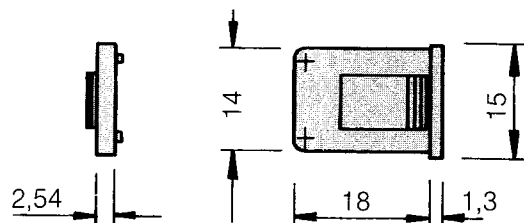


BCD-Complement No. 137

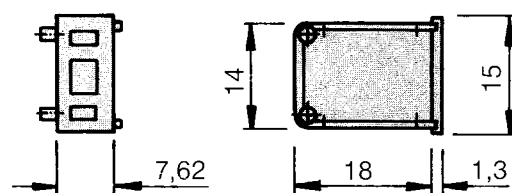


## Accessories

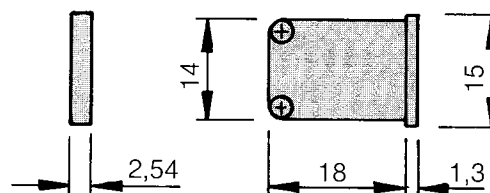
Pair of side covers Order description PICO-P



Dummy housing Order description PICO-L



Spacer plate Order description PICO-A



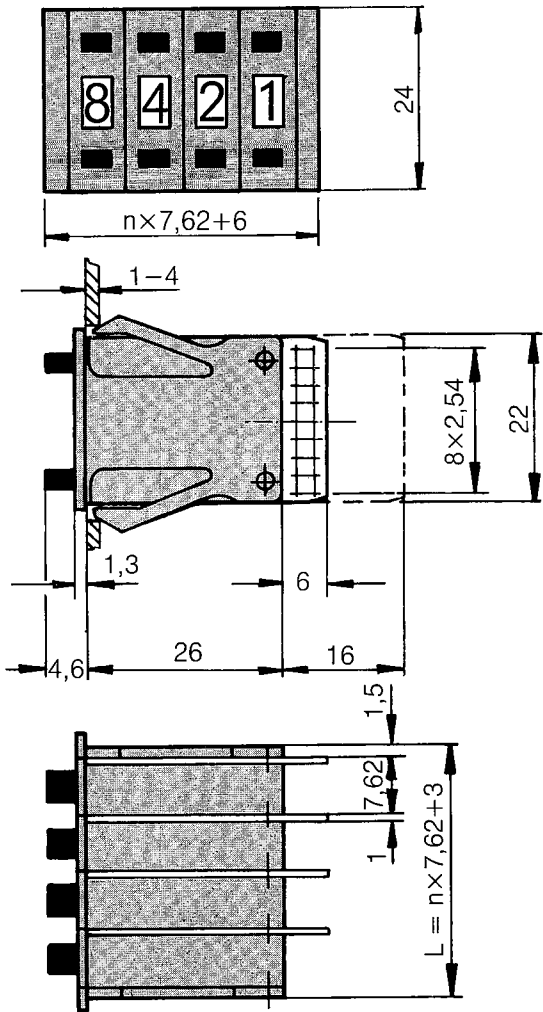
## Order examples

Description \_\_\_\_\_ PICO-137-AK-1  
Series \_\_\_\_\_  
Coding \_\_\_\_\_  
Read-out PCB short \_\_\_\_\_  
Housing colour grey \_\_\_\_\_

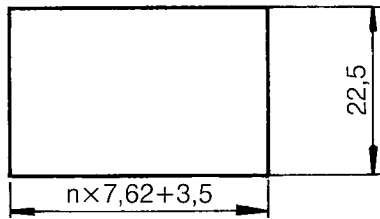
Description \_\_\_\_\_ PICO-131-AL-LS-2  
Series \_\_\_\_\_  
Coding \_\_\_\_\_  
Read-out PCB long \_\_\_\_\_  
Connection: solder tags \_\_\_\_\_  
Housing colour black \_\_\_\_\_

# Series: SMC—D with click action and SMC

## Dimensions



### Cut-out

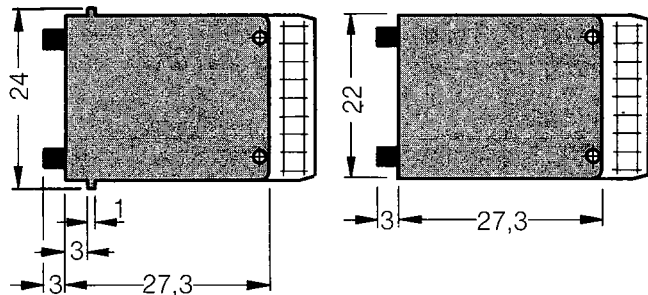


n = Number of switches

### Special Feature of type SMC:

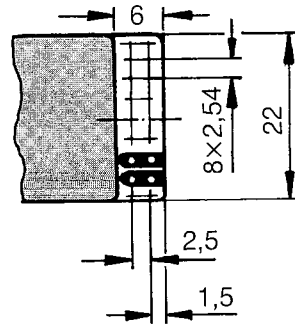
#### Assembly from the rear

Order description SMCR/N    Order description SMCR



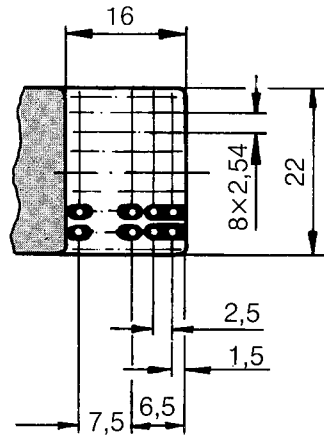
## Print types

Read-out PCB short    Order description AK



Read-out PCB long    Order description AL

In the case of binary-coded designs the output tracks are disconnected in the factory.



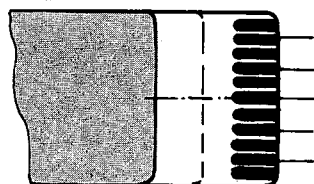
Connections (see page 20):

The read-out PCBs have standard holes of 1 mm diam. and are suitable for solder or plug connections. Solder tags for printed circuits available on request.

Suitable connectors see page 21.

## Connection layouts

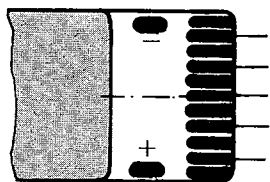
Decimal No. 111  
(module 2 mm)



Series  
SMC SMC-D

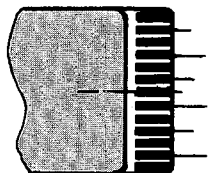
0 <sub>1</sub>	9 <sub>8</sub>
2 <sub>3</sub>	7 <sub>6</sub>
4 <sub>5</sub>	5 <sub>C</sub>
6 <sub>7</sub>	4 <sub>3</sub>
8 <sub>9</sub>	2 <sub>1</sub>
C <sub>0</sub>	0

Illuminated read-out PCB long



0 <sub>1</sub>	9 <sub>8</sub>
2 <sub>3</sub>	7 <sub>6</sub>
4 <sub>5</sub>	5 <sub>C</sub>
6 <sub>7</sub>	4 <sub>3</sub>
8 <sub>9</sub>	2 <sub>1</sub>
C <sub>0</sub>	0

Illuminated read-out PCB short  
(module 1.7 mm)

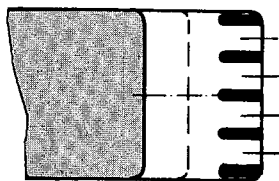


-0	9-
1 <sub>2</sub>	7 <sub>8</sub>
3 <sub>4</sub>	5 <sub>6</sub>
5 <sub>6</sub>	4 <sub>C</sub>
7 <sub>8</sub>	2 <sub>3</sub>
9 <sub>C</sub>	0 <sub>1</sub>
+	+

\* BCD No. 131. BCD-Complement No. 137

\* BCD 0-11 No. 300 (SMC-D not supplied)

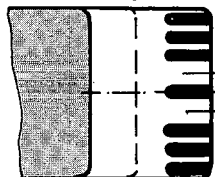
Hexadecimal No. 301



C	C
8	8
4	4
2	2
1	1

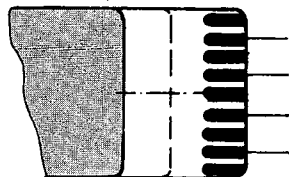
No. 131 No. 137

Illuminated version



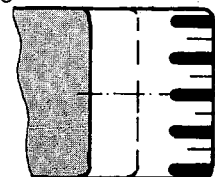
-	C	-
8	2	8
4	4	4
2	8	2
1	1	1
+	+	+

BCD+Complement No. 141



8
4
2
1
C
8
4
2
1

Change-over switch No. 400

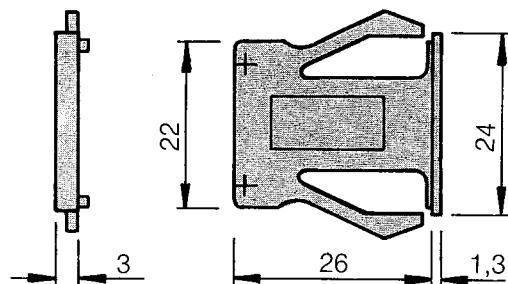


-	-
A-	A-
C	C
A+	A+
+	+

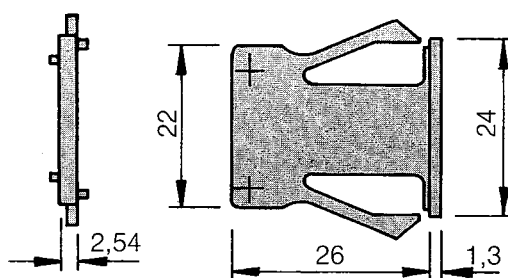
\* The switching mode is shorting; i.e. even during actuation at least one output is connected to input C.

## Accessories

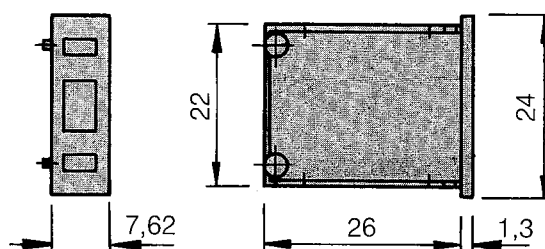
Pair of side covers Order description SMC-P/K



Spacer plate Order description SMC-A



Dummy housing Order description SMC-L



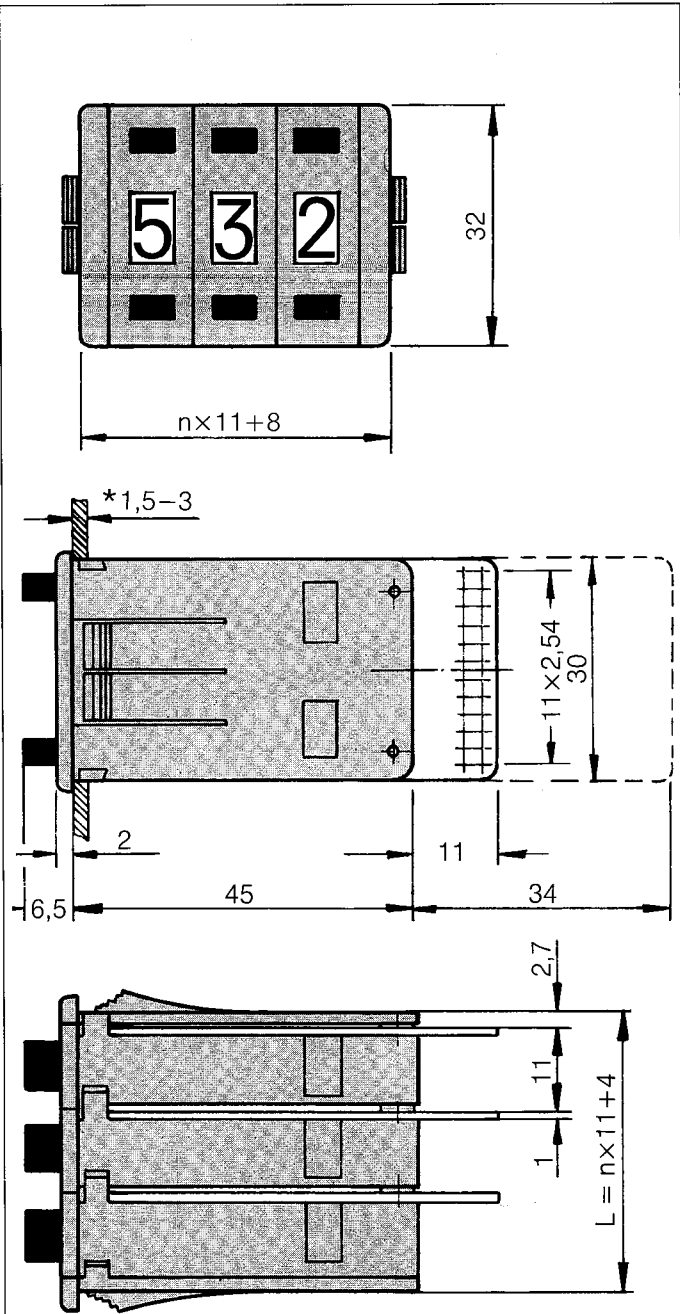
## Order examples

Description \_\_\_\_\_ SMC-D-111-AK-1  
 Series \_\_\_\_\_  
 Coding \_\_\_\_\_  
 Read-out PCB short \_\_\_\_\_  
 Housing colour grey \_\_\_\_\_

Description \_\_\_\_\_ SMC-131-AL-LS-2  
 Series \_\_\_\_\_  
 Coding \_\_\_\_\_  
 Read-out PCB long \_\_\_\_\_  
 Connection: solder tags \_\_\_\_\_  
 Housing colour black \_\_\_\_\_

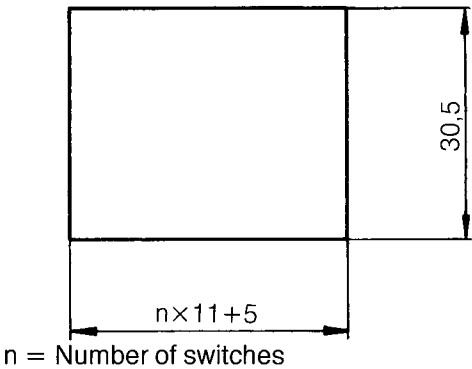
# Series: MICO

## Dimensions



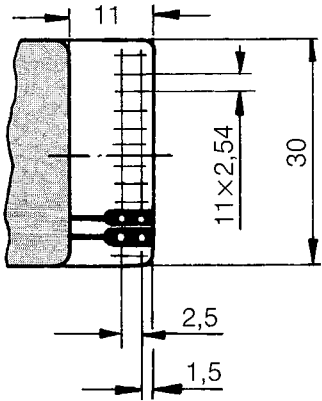
\* With the MICO-H screw elements, the MICO switch can be mounted into front panels of up to 7 mm thickness.

## Cut-out

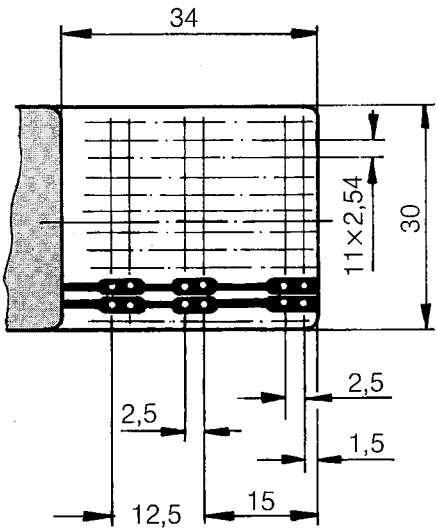


## Print types

Read-out PCB short Order description AK



Read-out PCB long Order description AL



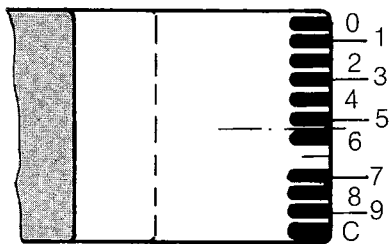
Connections (see page 20):  
The read-out PCBs have standard holes of 1 mm diam. and are suitable for solder or plug connections. Solder tags for printed circuits available on request.

Suitable connectors see page 21.

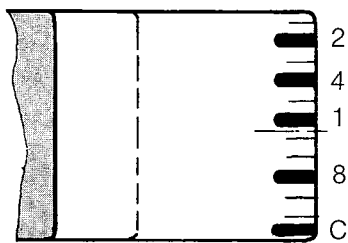


Connection layouts

Decimal No. 111



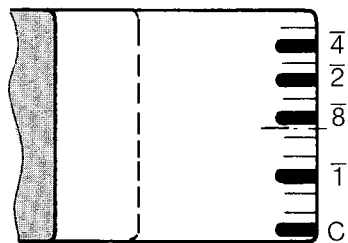
BCD No. 131



Illuminated  
version

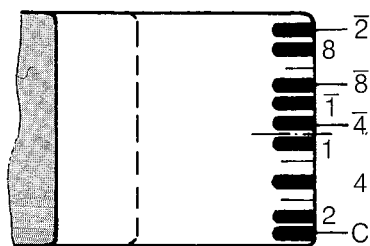
1  
4  
2  
8  
C  
+

BCD-Complement No. 137

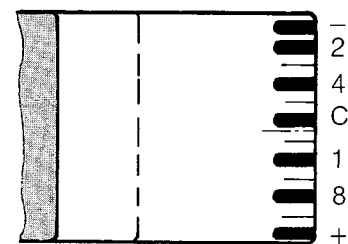


1  
4  
2  
8  
C  
+

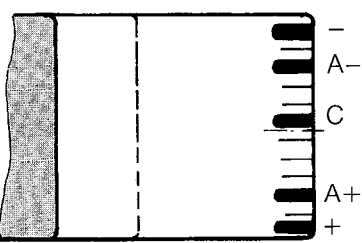
BCD+Complement No. 141



Hexadecimal No. 301

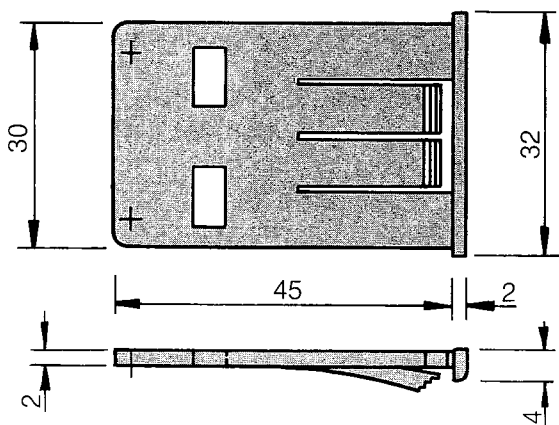


Change-over switch No. 400

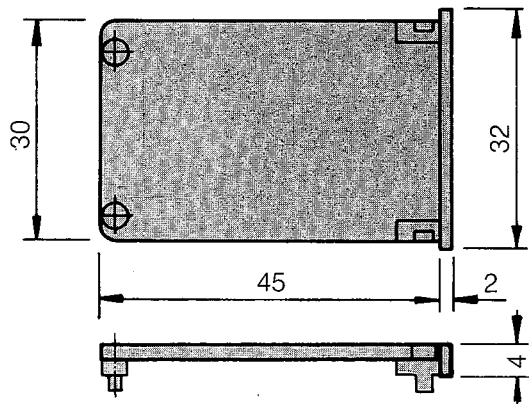


Accessories

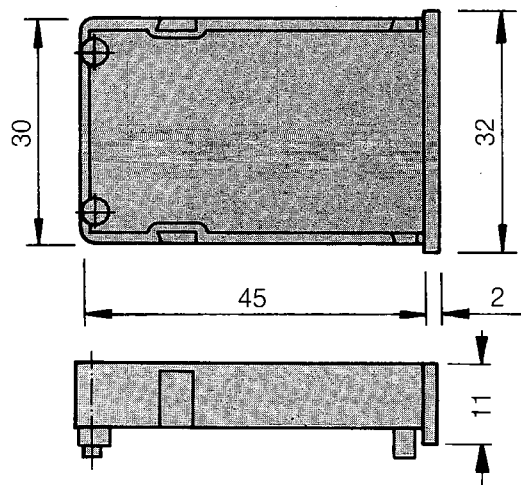
Pair of side covers Order description MICO-P/K



Spacer plate Order description MICO-A



Dummy housing Order description MICO-L

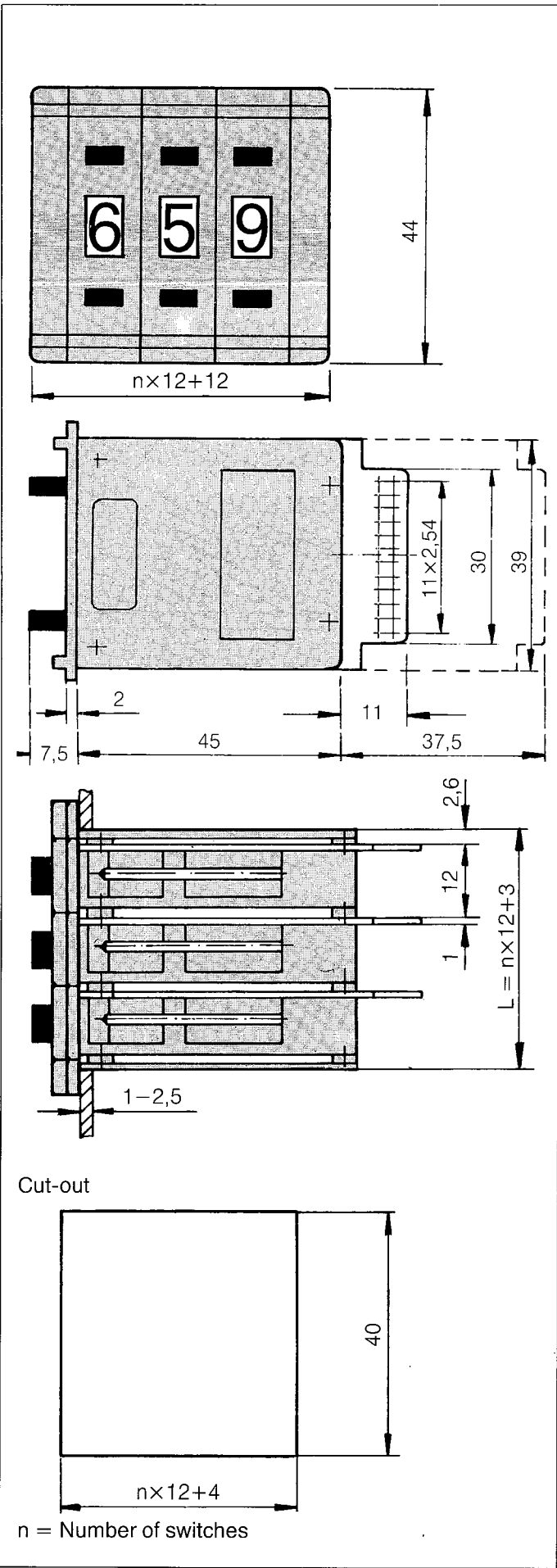


Order example

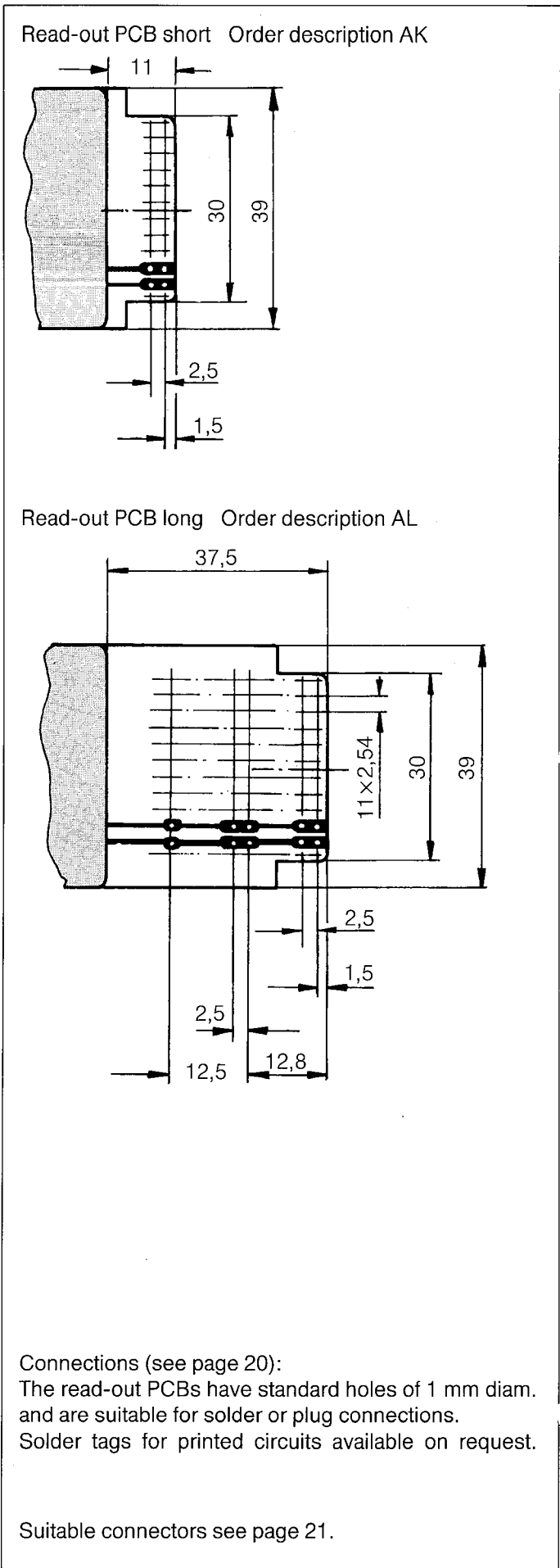
Description MICO-131-AL-LS-2  
Series \_\_\_\_\_  
Coding \_\_\_\_\_  
Read-out PCB long \_\_\_\_\_  
Connection: solder tags \_\_\_\_\_  
Housing colour black \_\_\_\_\_

# Series: MHE

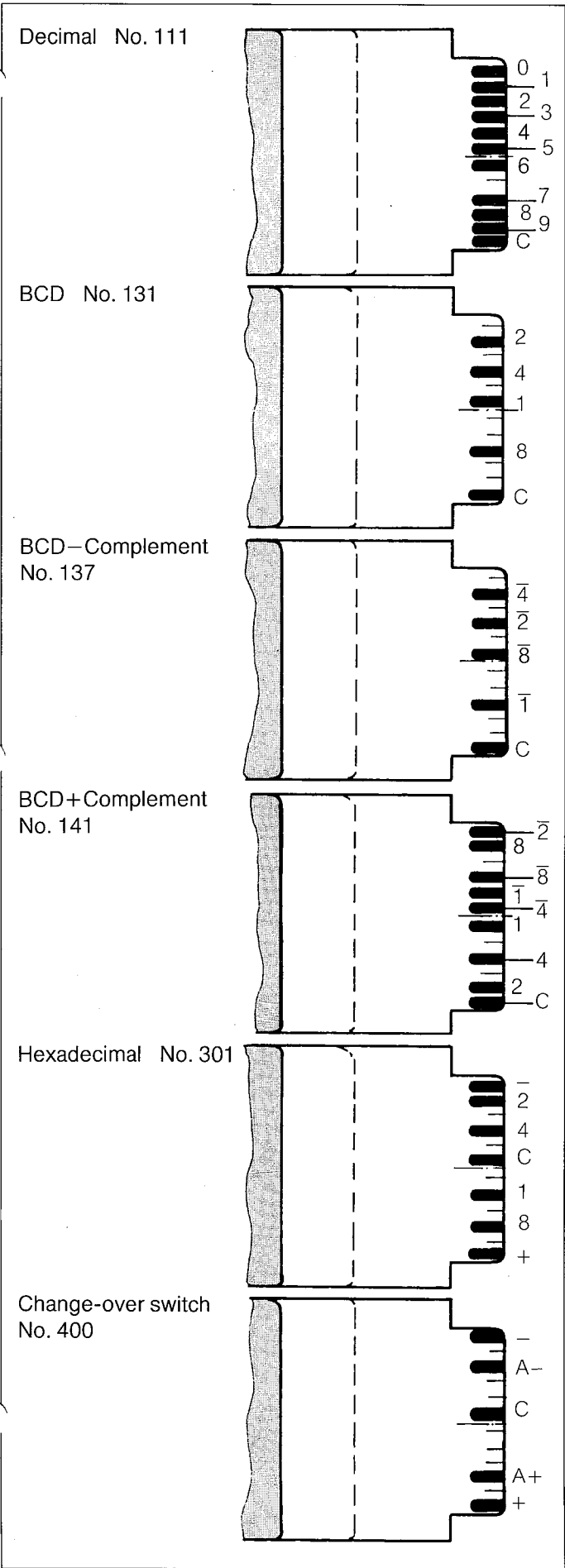
## Dimensions



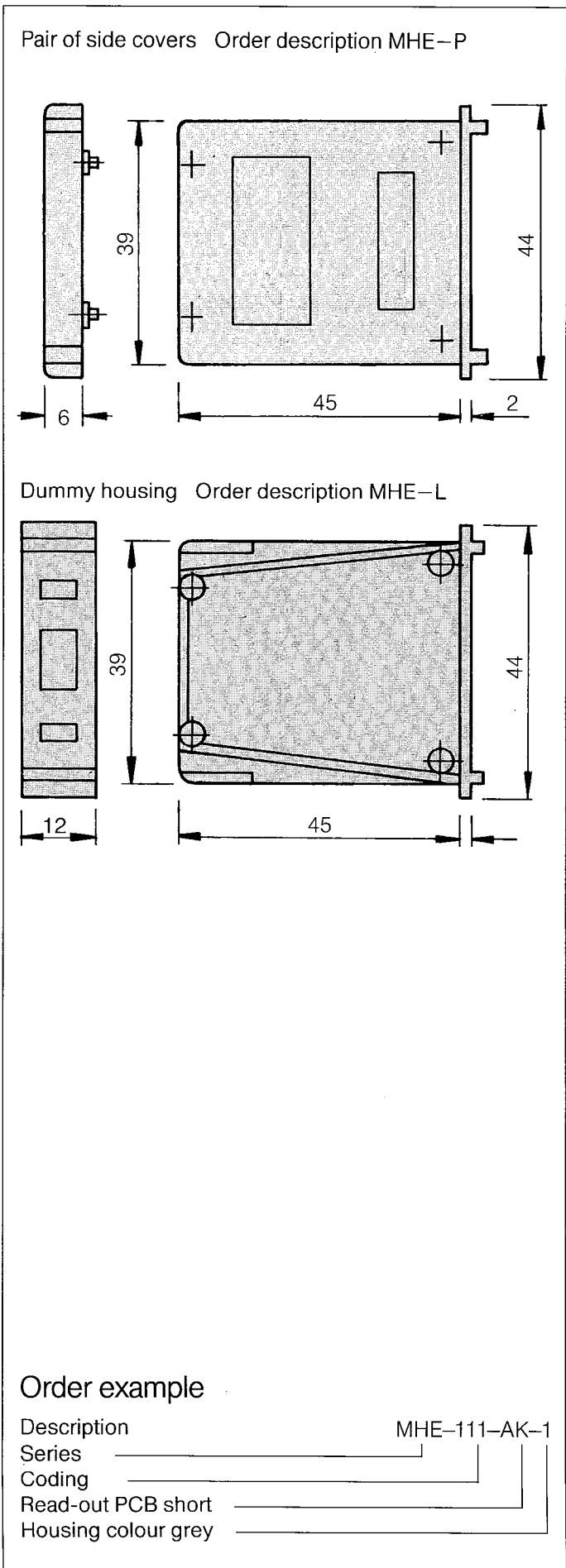
## Print types



Connection layouts



Accessories



# General information

## Standard Codes

Series	Available coding number						
	111	131	137	141	300	301	400
DPS8	X	X*	X			X	X
DPS9	X	X*	X	X		X*	X
DPS10	X	X*	X	X		X*	X
PICO	X	X	X				X
PICO-D	X	X	X			X	X
SMC	X	X	X	X	X*	X	X
SMC-D	X	X*	X			X	X
MICO	X	X	X	X		X	X
MHE	X	X	X	X		X	X

\* The switching mode is shorting; i.e. even during actuation at least one output is connected to input C.

### Code Tables

Code No. 131

BCD					
	C	1	2	4	8
0	•				
1	•	•			
2	•		•		
3	•	•	•		
4	•			•	
5	•	•		•	
6	•		•	•	
7	•	•	•	•	
8	•				•
9	•	•			•

Code No. 137

BCD-Compl.					
	C	1	2	4	8
0	•	•	•	•	•
1	•	•	•	•	•
2	•	•	•	•	•
3	•		•	•	•
4	•	•	•		•
5	•	•		•	•
6	•	•			•
7	•				•
8	•	•	•	•	
9	•	•	•		

Code No. 301

Hexadecimal					
	1	2	4	8	C
0					•
1	•				•
2		•			•
3	•	•			•
4			•		•
5	•	•		•	•
6		•	•	•	•
7	•	•	•	•	•
8				•	•
9	•			•	•
A		•	•	•	•
B	•	•		•	•
C			•	•	•
D	•	•	•	•	•
E		•	•	•	•
F	•	•	•	•	•

Code No. 300

BCD 0-11					
	C	1	2	4	8
0	•				
1	•	•			
2	•		•		
3	•	•	•		
4	•			•	
5	•	•		•	
6	•		•	•	
7	•	•	•	•	
8	•				•
9	•	•			•
10	•		•		•
11	•	•	•		•

Code No. 400

Change-over switch			
	C	A+	A-
+	•	•	
-	•		•
+	•	•	
-	•		•
+	•	•	
-	•		•
+	•	•	
-	•		•
+	•	•	
-	•		•

Code No. 111

Decimal										
	C	0	1	2	3	4	5	6	7	8
0	•	•								
1	•		•							
2	•			•						
3	•				•					
4	•					•				
5	•						•			
6	•							•		
7	•								•	
8	•									•
9	•									•

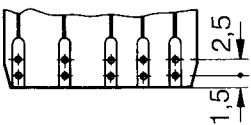
Code No. 141

BCD + Compl.										
	C	1	2	4	8	1	2	4	8	
0	•					•	•	•	•	
1	•	•					•	•	•	
2	•		•			•		•	•	
3	•	•	•					•	•	
4	•			•		•	•		•	
5	•	•	•				•		•	
6	•		•	•		•		•		
7	•	•	•	•					•	
8	•			•	•	•	•	•		
9	•	•			•	•	•	•		

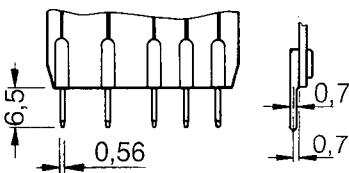
Special codes on request

## Connections

Standard hole  
of 1 mm diam.



Solder tags for  
printed circuits  
(order description LS)



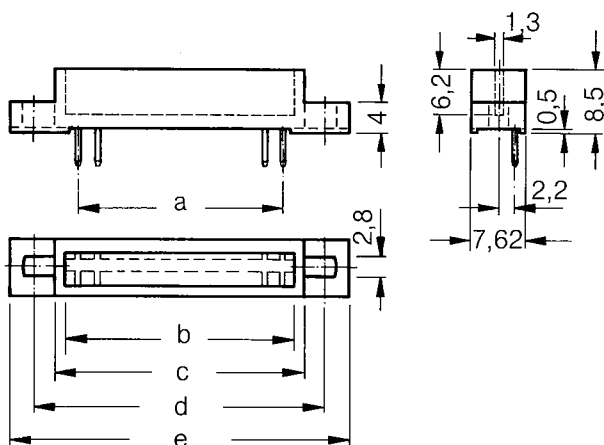
For your notes

# Connectors for 1 mm Printed Circuit Boards

## Dimensions

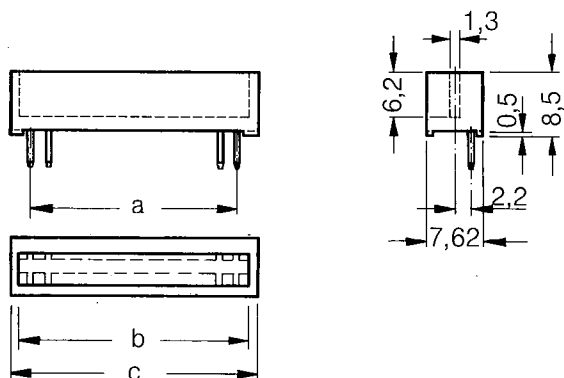
### Series: A

with mounting flange



Number of poles	a	b	c	d	e
9 (SMC, DPS8)	8 × 2,54	22,2	24	30	36
12 (MICO, MHE, DPS9/10)	11 × 2,54	30,5	33	39	45

### Series: B



Number of poles	a	b	c
5 (PICO)	4 × 2,54	14,2	15,2
9 (SMC, DPS8)	8 × 2,54	22,2	24
11 (SMC, DPS8)	10 × 2,0	22,2	24
12 (MICO, MHE, DPS9/10)	11 × 2,54	30,5	33

## General

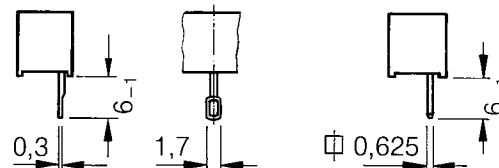
### Connection modes

Solder lug (only module 2.54)

Order description L

Solder tag

Order description LS



### Order examples

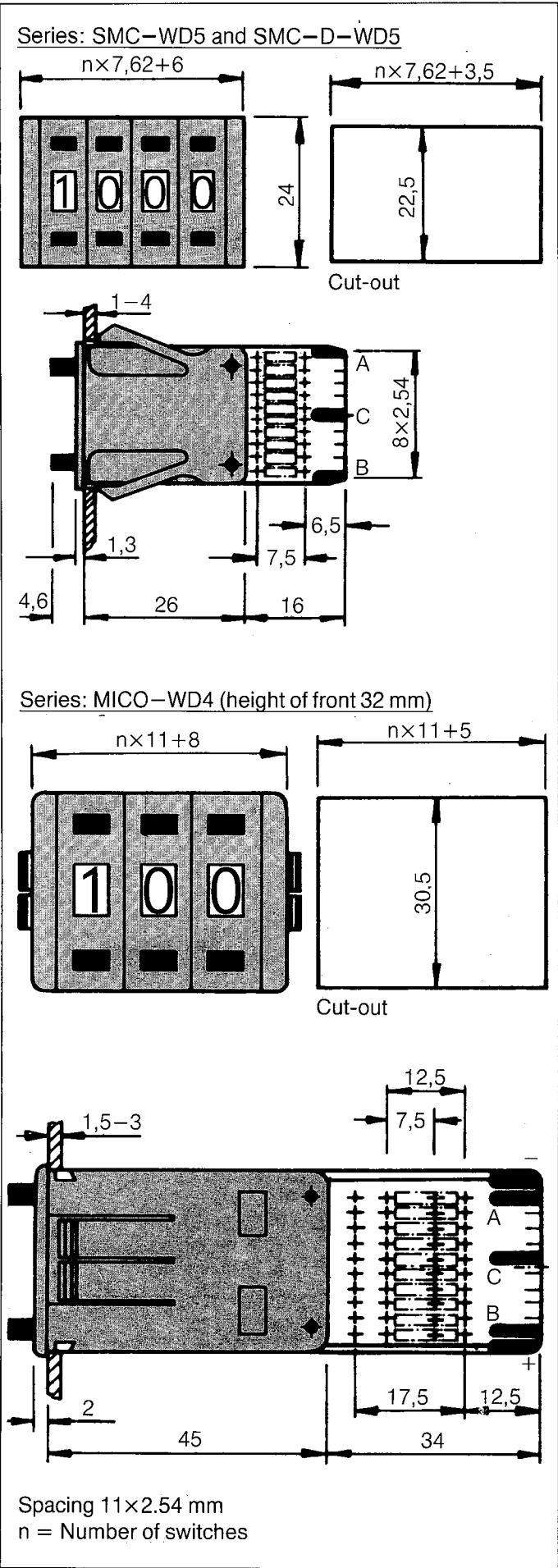
Description A9LS  
 Series \_\_\_\_\_ A 9 LS  
 Number of poles \_\_\_\_\_  
 Connection mode \_\_\_\_\_

Description B12L  
 Series \_\_\_\_\_ B 12 L  
 Number of poles \_\_\_\_\_  
 Connection mode \_\_\_\_\_

### Technical data

Plastic material	Noryl glassfibre reinforced GFN2—SE1 (self-extinguishing, non-drip group 1)
Contact material	Solder tags and solder lugs Au over Ni on Sn-Bz
Contact spacing	5.9 and 12 poles = 2.54 mm 11 poles = 2.0 mm
Contact loading	1 A
Operating voltage	60 V
Contact resistance	< 15 mOhms
Insulation resistance	> 10 <sup>12</sup> mOhms
Test voltage	500 V ~
Permissible ambient temperature	−40°C to +100°C
Insertion force per contact	approx. 2 N
Withdrawal force per contact	approx. 1.8 N
Plugging frequency	after 100 plugging actions technical values are all within limits

Dimensions



Specification

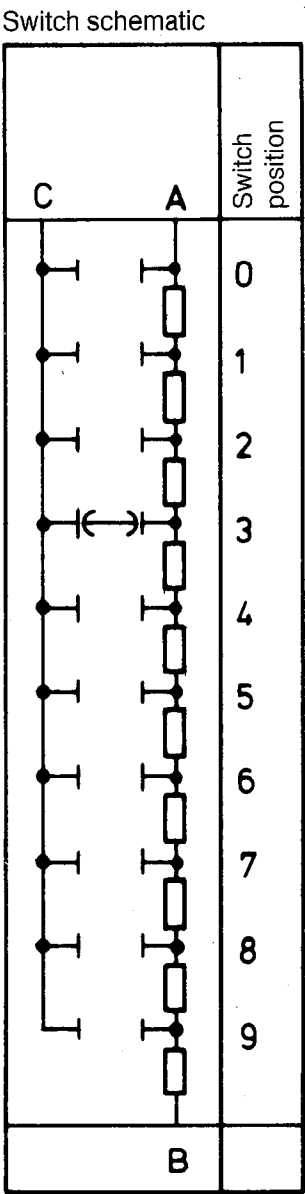
The SMC-WD5 and MICO-WD4 have the same dimensions as the standard SMC and MICO switches. Both types can be used as decade resistor switches or voltage dividers. Switches can be supplied with resistors already mounted, if required.

**Switching decade resistors**  
A resistor chain of 10 individual resistors is connected between A-B. The resistance between A-C is zero at position 0 and, if each resistor has a value of 10 ohms, the resistance would be 90 ohms at position 9.

Alternatively, between B-C the resistance change would be from 100 ohms at position 0 to 10 ohms at position 9.

**Voltage divider**  
When used as a voltage divider the voltage applied between A-B is divided into 10 steps. The switch can be used to give a voltage summation or subtraction by taking the output from between A-B or A-C respectively.

The general catalogue data for the SMC (p. 14/15) and MICO (p. 16/17) applies.

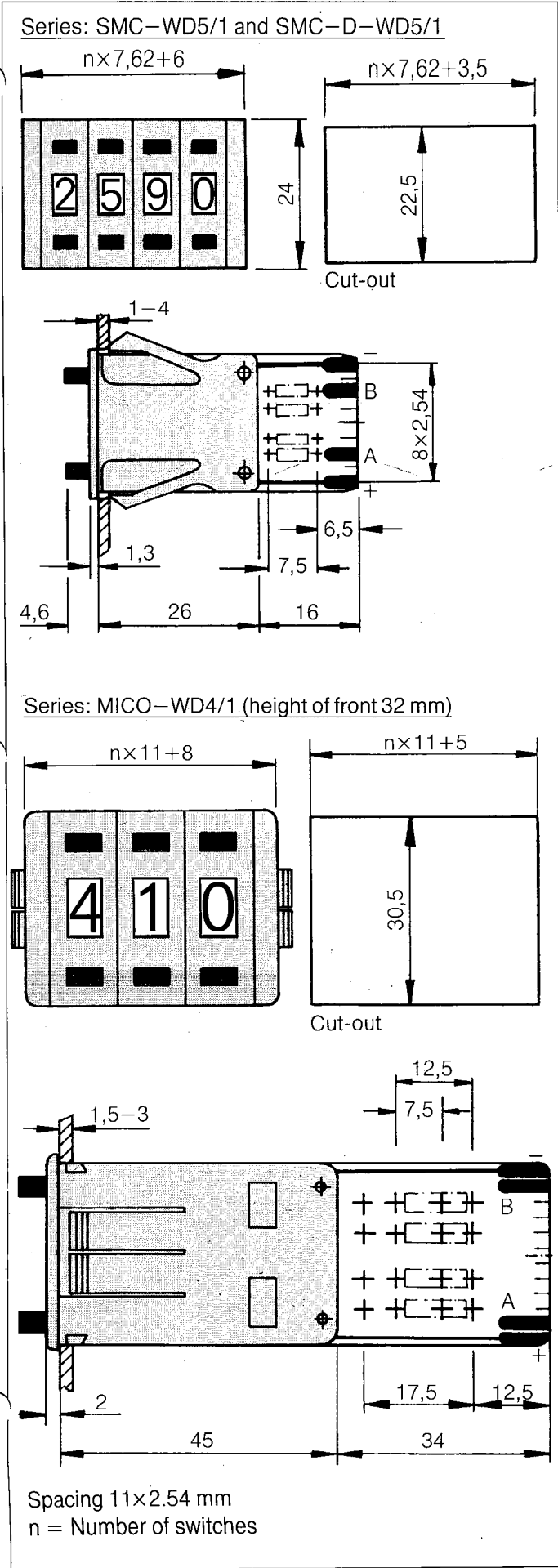


Order example

Description \_\_\_\_\_  
Series \_\_\_\_\_  
Coding \_\_\_\_\_  
Housing colour grey \_\_\_\_\_

SMC-WD5-1

Dimensions



Specification

The SMC-WD5/1 and MICO-WD4/1 have the same dimensions as the standard SMC and MICO switches. Switches can be supplied with resistors already mounted, if required.

The switch allows decade resistance switching from 0-9 to be achieved using only 4 individual resistors. The resistors are chosen so that R2 is twice the value of R1 and R4 four times the value of R1.

To obtain decade resistance changes between 0 and 900 ohms R1 would be 100 ohms, R2 equal to 200 ohms and the two R4 resistors 400 ohms each.

Corrections are made to points A and B.

The general catalogue data for the SMC (p. 14/15) and MICO (p. 16/17) applies.

Switch schematic

	A	R1	R2	R4	R4	B
0	•					•
1	•	□				•
2	•		□			•
3	•	□	□			•
4	•			□		•
5	•	□			□	•
6	•		□	□		•
7	•	□	□	□		•
8	•			□	□	•
9	•	□		□	□	•

Order example

Description \_\_\_\_\_ MICO-WD4/1-1  
Series \_\_\_\_\_  
Coding \_\_\_\_\_  
Housing colour grey \_\_\_\_\_

# Hartmann Gerätebau GmbH & Co. KG

Hartmann produced their first dual push-button code switch in 1967. The product offers a wide range of advantages and has won world-wide recognition.

Hartmann now offers the widest choice of dual push-button code switches. The modern technology used in the works at Eckersdorf near Bayreuth and Baiersdorf near Erlangen enables efficient and economical production.

The separate production areas have been deliberately designed to be independent.

The tool making department has the latest equipment and is the basis

for the high quality of our products. New moulding equipments guarantee complete uniformity of all plastic parts.

The printed circuit boards are produced in-house. Screen-printing is available for volume production and photo-printing for samples. Betascope and measurement techniques are used to test the precious metal thickness after plating. Highly trained staff complement the automatic assembly line.

Our constant tests on materials and operations are your guarantee of quality.

Final test on every switch is carried out electronically.

## Representatives

### USA

ALCO Electronic Products Inc.  
1551 Osgood Street,  
North Andover Mass. 01845

### Switzerland

Metronic AG  
Dübendorfstrasse 333,  
8051 Zürich

### Sweden

Pulsteknik A.B.  
Postbox 13110,  
40252 Göteborg 13

### Japan

Soltan Co Ltd.  
2-7-2, Shin-Yokohama  
Kohoku-Ku, Yokohama

### Denmark

Electromatic Handels A.S.  
Postbox 86, 8370 Hadsten

### Netherlands

Van Reijssen Electronica b.v.  
Schieweg 73, 2627 AT Delft

### Great Britain

Radiatron Components Ltd.  
76 Crown Road, Twickenham  
TW1 3ET

### Finland

OY Elmika A.B.  
PL 202, 02101 Espoo 10

### France

Sorelia S.A.  
51-53, rue Edouard Vaillant  
F-92704 Colombes Cedex

### Austria

Burisch GmbH & Co. KG  
Scheydgasse 31, 1210 Wien

### Italy

Alhof di A. Hofmann srl  
Via Poggi 14, 20131 Milano

### Comecon States

ELRA  
Mühlfeldgasse 1,  
1020 Wien

### South-Africa

South Continental Dev. Ltd.  
P.O. Box 56420,  
Pinegowrie 2123

### Israel

MSR Engineering & Dev. Ltd.  
P.O. Box 273, Holon 58100

### Spain

Amitron S.A.  
Avenida Valladolid, 47-A  
28008 Madrid

### New-Zealand

Leatham Electronics Ltd.  
P.O. Box 1284, Wellington

### Belgium

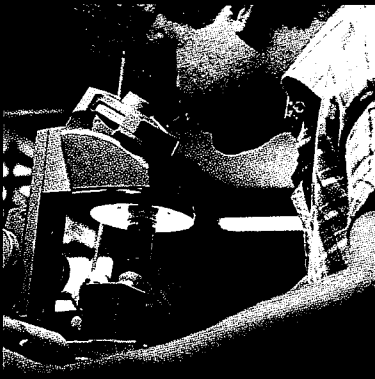
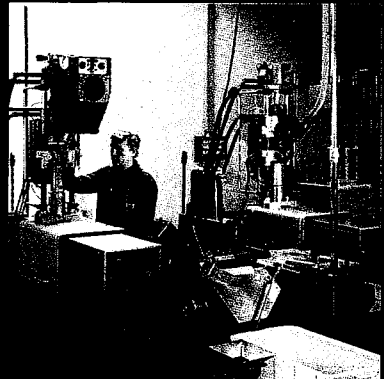
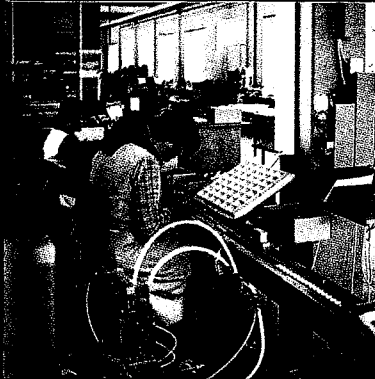
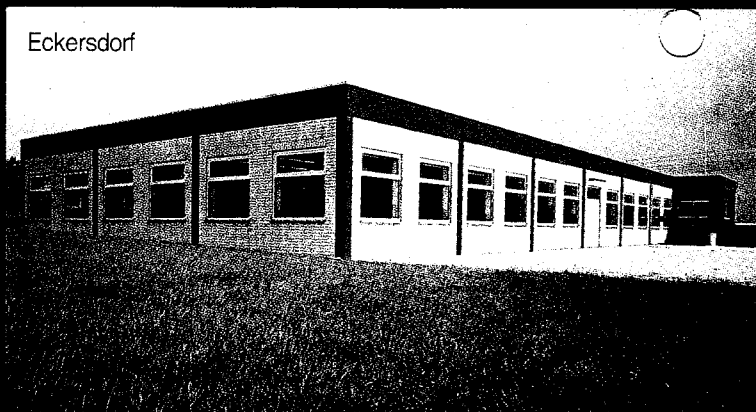
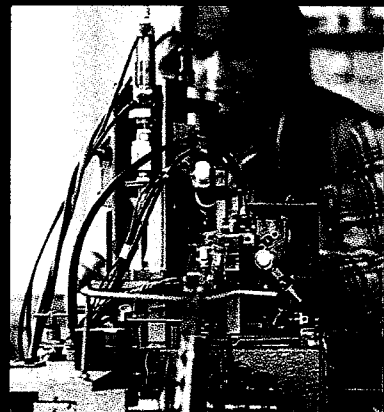
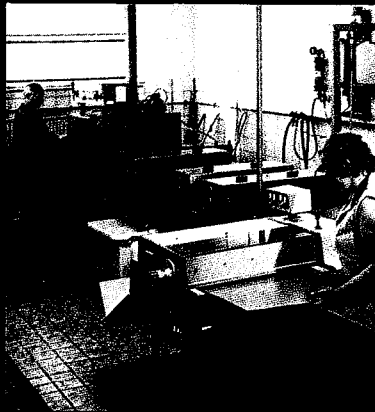
Electromatic SANV  
Rue St. Denis 282  
1190 Bruxelles

### Norway

Danel A.S.  
Box 219  
2001 Lillestrom

### Luxemburg

Omicron S.A.  
1019 Luxemburg



**Hartmann  
Gerätebau**

Fritz Hartmann Gerätebau  
GmbH & Co. KG

Verwaltung: Industriestraße 3  
D-8523 Baiersdorf

Tele. 09133/833, Telex (17) 01338