

Data Sheet

Keypads Monobloc 3x4, 4x4

- Magnetic recall (tactile feeling, constant pressure point, long life)
- Full travel (reliable contact)
- Double contact (minimum bounce time)
- Self-cleaning contact (low contact resistance)
- High protection (IP 67 for outdoor application)
- Temperature range -40 °C ... +70 °C
- Changeable key tops marking by customer (possibility of individual marking)



General

The Monobloc keypads are designed and manufactured to the highest quality standards. The robust rugged design makes them absolutely dust and water proof.

The full stroke keys give an excellent tactile feedback. The patented magnetic retract mechanism ensures a long service life of the product.

Monobloc keypads are available with 1 x 4, 3 x 4 and 4 x 4 keys.

The 1 x 4 Monobloc keypads are delivered without connection print. The 3 x 4 and 4 x 4 Monobloc keypads are available without electronics, and with electronics of 3...15V or 24V.

Monobloc keypads are available with embedded keys (KNM2) or with raised keys (KNM3).

The key tops can be exchanged individually. In addition, different key marking sets are available.

For more detailed information about key top sets please refer to special documentation.

Technical Data

Keypads without connection prints and electronics

Mechanical

Housing / membrane	Crastin / Silicon rubber
Key travel	1,35 mm
Actuating force	2,2 N ± 0,4N
Connection	Soldering pins
Service life	5 x 10 ⁶ operations

Electrical

Contact surface	Make contact (4µ Ni / 2µ Au)
Supply voltage	max. 42 V ≅
Test voltage	2.000 V≅
Nom. current (Ω load)	max. 125 mA≅
Contact rating	max. 2 W
Contact resistance	≤ 150 mΩ
Insulation resistance	> 10 ² MΩ
Bounce time	< 5 ms

Environment

Application class as per DIN40040	GSF
Temperature range	-40 °C...+70 °C
Storage range	-40 °C...+70 °C
Humidity, warmth	75% annual average, 95% 30 days

Protection class (DIN)

IP 67

Technical Data

Keypads with 3...15V electronic

Mechanical

Housing / membrane	Crastine / Silicone rubber
Key travel	1.35 mm
Actuating force	2.2 N ± 0.4 N
Connections	Flat band connector, 20 pins

Electrical

Supply voltage	TTL: +5 V ± 5 %, 1 mA CMOS: +3 V...+15 V, 1 mA
Output level	TTL fan out = 1
Output logic	positive
Locking	n-key-rollover
Strobe	static (as long as a key is pressed) „H“ = Data output stable „L“ = Data output unstable
Data output	parallel 4 bit buffered
Activation	„H“ = Data output disabled „L“ = Data output enabled

Environment

Application class as per DIN 40040	HVF
Temperature range	-25 °C...+55 °C
Storage temperature	-40 °C...+70 °C
Humidity, warmth	75% annual average, 95% 30 days

Protection class (DIN) IP 67

Keypads with 24 V electronic

Mechanical

Housing / membrane	Crastin / Silicone rubber
Key travel	1.35 mm
Actuating force	2.2 N ± 0.4 N
Connections	Flat band connector, 20 pins, with strain relief Sub-D connector, 25 pins

Electrical

Supply voltage	11 V...30 VDC
Consumption	26 mA @ 11...30 VDC
Output logic	positive
Optocoupler output	max. 30 V / 60 mA @ 470 Ω load
Locking	n-key-rollover
Strobe	static (as long as a key is pressed) „H“ = Data output stable „L“ = Data output unstable
Data output	parallel 4 bit buffered
Activation	-24...+3 VDC Data output enabled +4...+30 VDC Data output disabled

Environment

Application class as per DIN 40040	HSF
Temperature range	-25 °C...+70 °C
Storage temperature	-40 °C...+85 °C
Humidity, warmth	75% annual average, 95% 30 days

Protection class (DIN) IP 67

Characteristics of material: page 12.

Order Numbers

Configuration	Connection mode	embedded keys	raised keys
Keypad Monobloc 3 x 4 without PCB / without electronics			
Standard, without PCB	Soldering pins	KNM20S34	KNM30S34
Outputs 1 out of 12, on PCB	Soldering pins	KNM21S3401	KNM31S3401
Outputs 1 out of 12, on PCB	Wire wrap pins	KNM21S3402	KNM31S3402
Outputs 1 out of 12, on PCB	Flat band connector	KNM21S3403	KNM31S3403
Direct output, on PCB	Soldering pins	KNM22S3401	KNM32S3401
Direct output, on PCB	Wire wrap pins	KNM22S3402	KNM32S3402
Direct output, on PCB	Flat band connector	KNM22S3403	KNM32S3403
Matrix output XY, on PCB	Soldering pins	KNM23S3401	KNM33S3401
Matrix output XY, on PCB	Wire wrap pins	KNM23S3402	KNM33S3402
Matrix output XY, on PCB	Flat band connector	KNM23S3403	KNM33S3403
Keypad Monobloc 4 x 4 without PCB / without electronics			
Standard, without PCB	Soldering pins	KNM20S44	KNM30S44
Outputs 1 out of 16, on PCB	Soldering pins	KNM21S4401	KNM31S4401
Outputs 1 out of 16, on PCB	Wire wrap pins	KNM21S4402	KNM31S4402
Outputs 1 out of 16, on PCB	Flat band connector	KNM21S4403	KNM31S4403
Direct output, on PCB	Soldering pins	KNM22S4401	KNM32S4401
Direct output, on PCB	Wire wrap pins	KNM22S4402	KNM32S4402
Direct output, on PCB	Flat band connector	KNM22S4403	KNM32S4403
Matrix output XY, on PCB	Soldering pins	KNM23S4401	KNM33S4401
Matrix output XY, on PCB	Wire wrap pins	KNM23S4402	KNM33S4402
Matrix output XY, on PCB	Flat band connector	KNM23S4403	KNM33S4403
Keypad Monobloc 3 x 4 with 3...15 V electronic			
Output 5 V TTL and CMOS compatible	Flat band connector 20 pins*	KNM26S34	KNM36S34
Keypad Monobloc 4 x 4 with 3...15 V electronic			
Output 5 V TTL and CMOS compatible	Flat band connector, 20 pins*	KNM26S44	KNM36S44
Keypad Monobloc 3 x 4 with 24 V electronic			
Encoder and optocoupler output 11...30 V	Flat band connector, 20 pins*	KNM29S34CB	KNM39S34CB
Encoder and optocoupler output 11...30 V	Sub-D connector, 25 pins*	KNM29S34CR	KNM39S34CR
Keypad Monobloc 4 x 4 with 24 V electronic			
Encoder and optocoupler output 11...30 V	Flat band connector, 20 pins*	KNM29S44CB	KNM39S44CB
Encoder and optocoupler output 11...30 V	Sub-D connector, 25 pins*	KNM29S44CR	KNM39S44CR

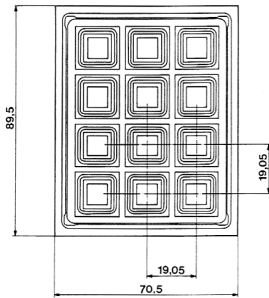
*Connector included

For order information's of key top sets, fixing sets and sealing rubber please refer to special documentation.

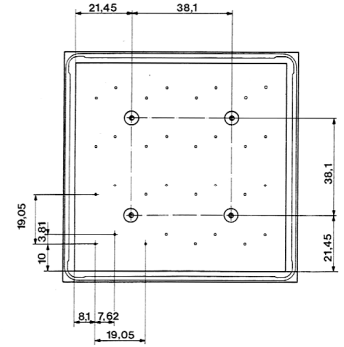
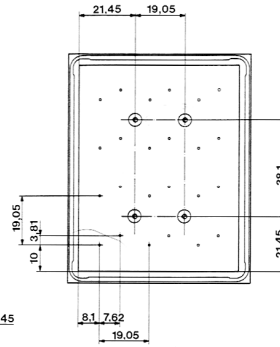
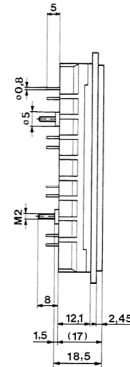
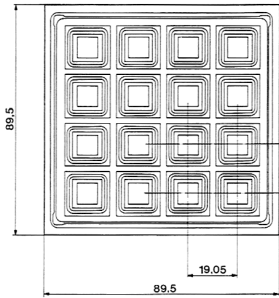
Dimensions keypads without PCB / without electronics

Series KNM2 without PCB

Monobloc 3x4

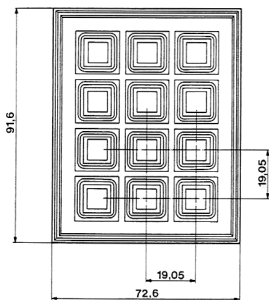


Monobloc 4x4

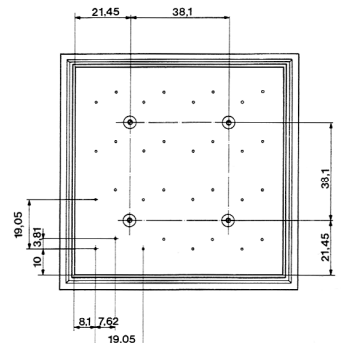
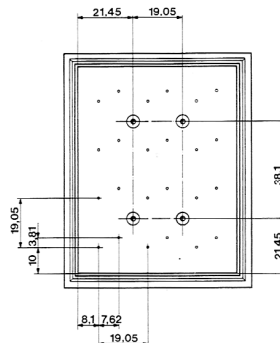
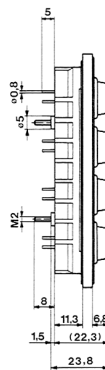
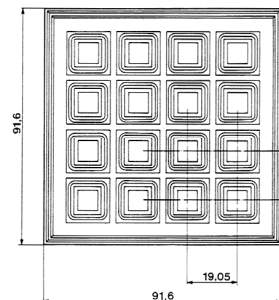


Series KNM3 without PCB

Monobloc 3x4

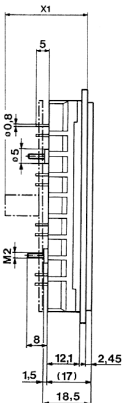


Monobloc 4x4

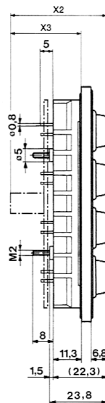


Series KNM2 and KNM3 with PCB (without electronics)

KNM2



KNM3

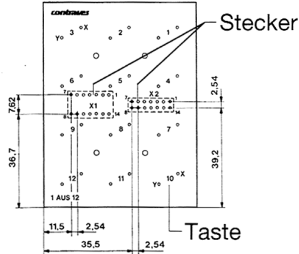


	KNM2	KNM3	
Connection mode	X1	X2	X3
Soldering pins	22.65 mm	30.4 mm	19.4 mm
Wire wrap pins	31.65 mm	39.4 mm	28.4 mm
Flat band connector	31.15 mm	38.9 mm	27.9 mm

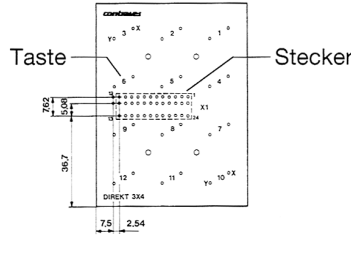
PCB-connections keypad without electronics

Monobloc 3 x 4

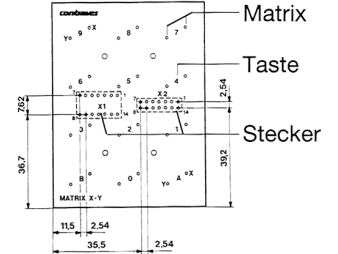
Outputs 1 out of 12



Direct output



Matrix output XY



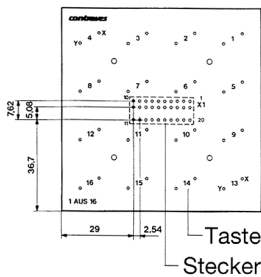
Key	Connector X1/X2
1	1/3
2	1/5
3	1/7
4	1/2
5	1/4
6	1/6
7	1/13
8	1/11
9	1/9
10	1/12
11	1/10
12	1/8

Key	Connector X1	Key	Connector X1
1X	6	7X	23
1Y	5	7Y	24
2X	8	8X	21
2Y	7	8Y	22
3X	12	9X	15
3Y	11	9Y	16
4X	2	10X	19
4Y	1	10Y	20
5X	4	11X	17
5Y	3	11Y	18
6X	10	12X	13
6Y	9	12Y	14

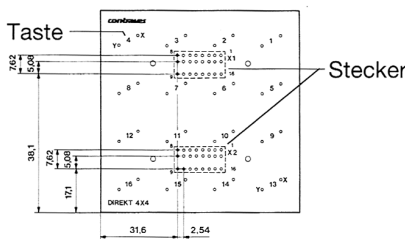
Key	Connector Matrix X1/X2
0	X0/Y0 4/5
1	X1/Y0 3/5
2	X2/Y0 2/5
3	X3/Y0 1/5
4	X0/Y1 4/6
5	X1/Y1 3/6
6	X2/Y1 2/6
7	X3/Y1 1/6
8	X0/Y2 4/7
9	X1/Y2 3/7
A	X2/Y2 2/7
B	X3/Y2 1/7

Monobloc 4 x 4

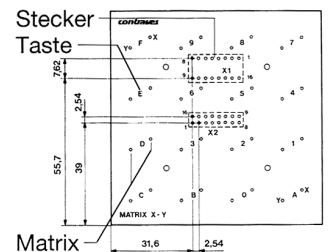
Outputs 1 out of 16



Direct output



Matrix output XY



Key	Connector X1/X2
1	11/2
2	11/4
3	11/6
4	11/8
5	11/1
6	11/3
7	11/5
8	11/7
9	11/20
10	11/18
11	11/16
12	11/14
13	11/19
14	11/17
15	11/15
16	11/13

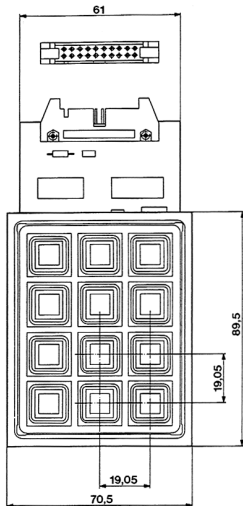
Key	Connector X1	Key	Connector X2
1X	2	9X	2
1Y	1	9Y	1
2X	4	10X	4
2Y	3	10Y	3
3X	6	11X	6
3Y	5	11Y	5
4X	8	12X	8
4Y	7	12Y	7
5X	10	13X	10
5Y	9	13Y	9
6X	12	14X	12
6Y	11	14Y	11
7X	14	15X	14
7Y	13	15Y	13
8X	16	16X	16
8Y	15	16Y	15

Key	Connector Matrix X1/X2
0	X0/Y0 1/5
1	X1/Y0 2/5
2	X2/Y0 3/5
3	X3/Y0 4/5
4	X0/Y1 1/6
5	X1/Y1 2/6
6	X2/Y1 3/6
7	X3/Y1 4/6
8	X0/Y2 1/7
9	X1/Y2 2/7
A	X2/Y2 3/7
B	X3/Y2 4/7
C	X0/Y3 1/8
D	X1/Y3 2/8
E	X2/Y3 3/8
F	X3/Y3 4/8

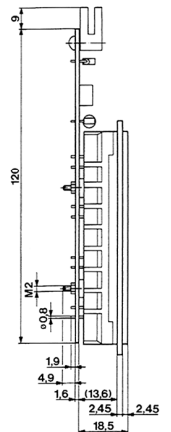
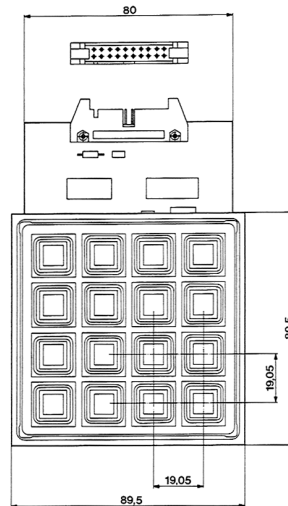
Dimensions keypads with 3...15 V electronic

Series KNM2 with 3...15 V electronic

Monobloc 3x4

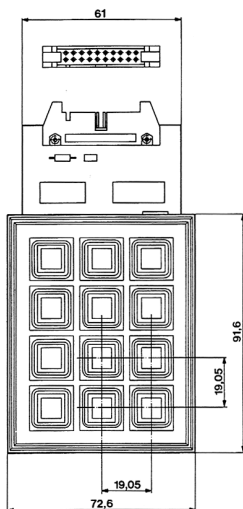


Monobloc 4x4

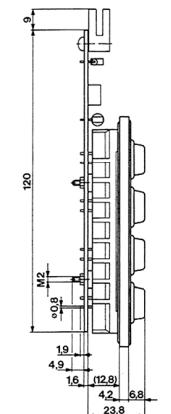
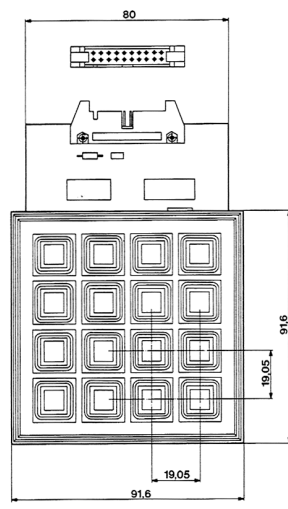


Series KNM3 with 3...15 V electronic

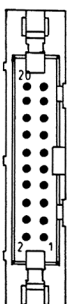
Monobloc 3x4



Monobloc 4x4



Connector pins keypads with 3...15 V electronic



Flat band connector

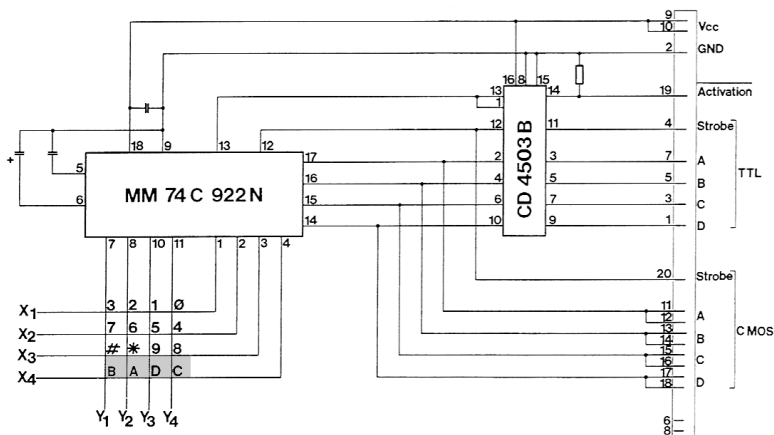
- 1 - D
- 2 - GND
- 3 - C
- 4 - STROBE
- 5 - B
- 6 - NC
- 7 - A
- 8 - NC
- 9 - V_{cc}

TTL

- 11 - A
- 12 - B
- 13 - C
- 14 - D
- 15 - C
- 16 - D
- 17 - D
- 18 - D
- 19 - ACTIVATION
- 20 - STROBE

CMOS

Bloc schematics keypads with 3...15 V electronic



■ 4 x 4

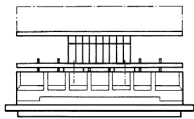
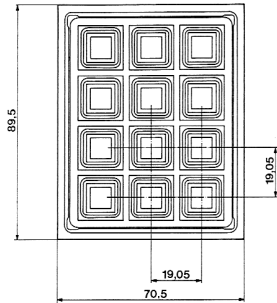
Truth table keypads with 3...15 V electronic

Key		Data outputs				Strobe
3 x 4	4 x 4	D	C	B	A	
0	0	0	0	0	0	1
1	1	0	0	0	1	
2	2	0	0	1	0	
3	3	0	0	1	1	
4	4	0	1	0	0	
5	5	0	1	0	1	
6	6	0	1	1	0	
7	7	0	1	1	1	
8	8	1	0	0	0	
9	9	1	0	0	1	
A	A	1	0	1	0	
B	B	1	0	1	1	
	C	1	1	0	0	
	D	1	1	0	1	
	E	1	1	1	0	
	F	1	1	1	1	

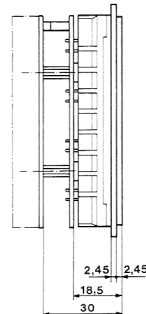
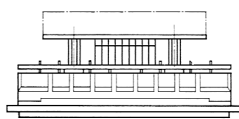
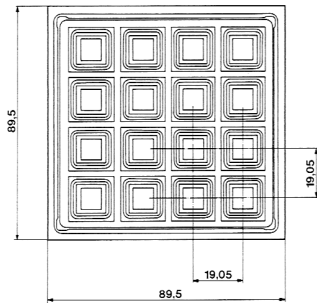
Dimensions keypads with 24 V electronic

Series KNM2 with 24 V electronic

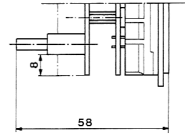
Monobloc 3x4



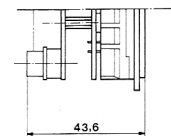
Monobloc 4x4



Flat band connector

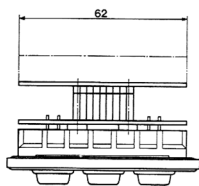
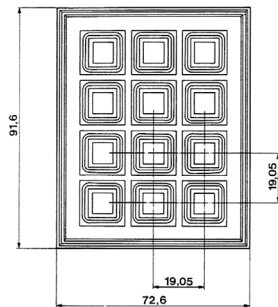


D-Sub

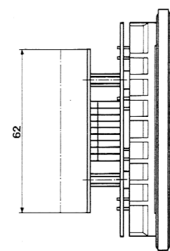
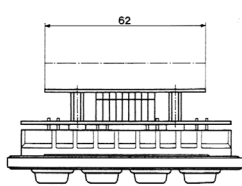
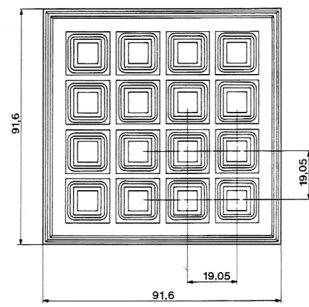


Series KNM3 with 24 V electronic

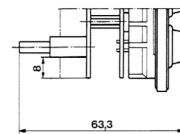
Monobloc 3x4



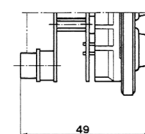
Monobloc 4x4



Flat band connector

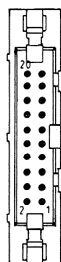


Sub-D connector



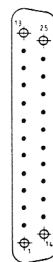
Connector pins keypads with 24 V electronic

Flat band connector



1 - D	11
2 - SUPPLY 0V (GND)	12
3 - C	13
4 - COMMON COLLECTOR	14
5 - B	15
6 - STROBE	16
7 - A	17
8 - ACTIVATION GND	18
9 - GND	19 - ACTIVATION *
10 - SUPPLY +11...30V	20

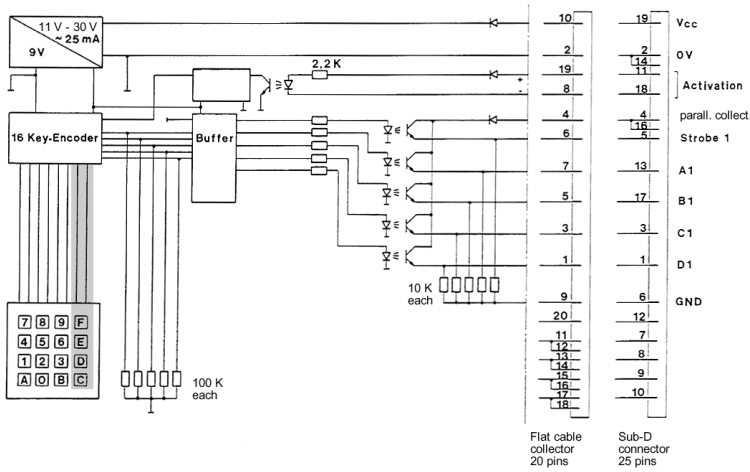
Sub-D connector



1 - D	14 - SUPPLY 0V (GND)
2 - SUPPLY 0V (GND)	15 - N.C.
3 - C	16 - COMMON COLLECTOR
4 - COMMON COLLECTOR	17 - B
5 - STROBE	18 - ACTIVATION GND
6 - GND	19 - SUPPLY +11...30V
7 -	20 -
8 -	21 -
9 -	22 -
10 -	23 -
11 - ACTIVATION *	24 -
12 -	25 -
13 - A	

N.C.

Bloc schematics keypads with 24 V electronic



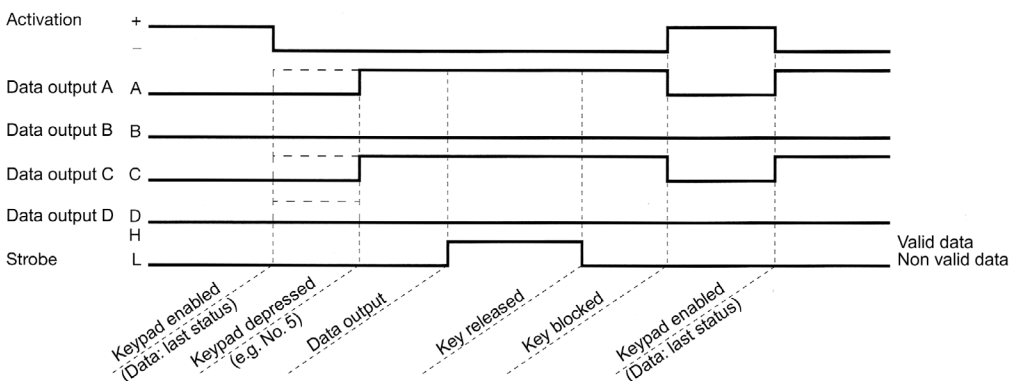
4 x 4

Truth table keypads with 24 V electronic

Key		Activation*		Data output				Strobe	
3 x 4	4 x 4	+19/11	-8/16	D	C	B	A	Opto	
x	x	1	0	0	0	0	0	0	
none	none	X 1 0 0	X 1 0 1	Last status				0	
0	0			0	0	0	0	1	1
1	1			0	0	0	1	0	
2	2			0	0	1	0	0	
3	3			0	0	1	1	0	
4	4			0	1	0	0	0	
5	5			0	1	0	1	0	
6	6			0	1	1	1	0	
7	7			0	1	1	1	1	
8	8			1	0	0	0	0	
9	9			1	0	0	0	1	
A	A			1	0	1	0	0	
B	B			1	0	1	1	0	
	C			1	1	0	0	0	
	D			1	1	0	1	0	
	E			1	1	1	1	0	
	F	1	1	1	1	1			

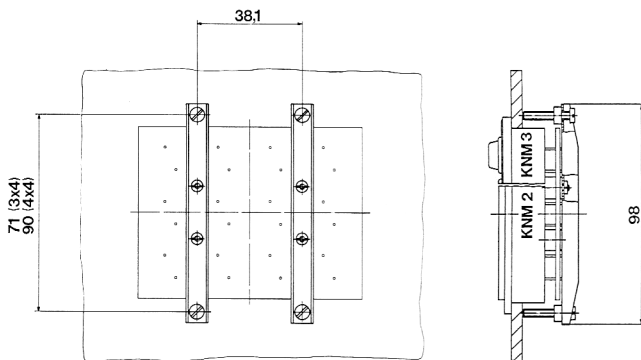
* see technical data, page 2

Timing Diagram keypads with 24 V electronic

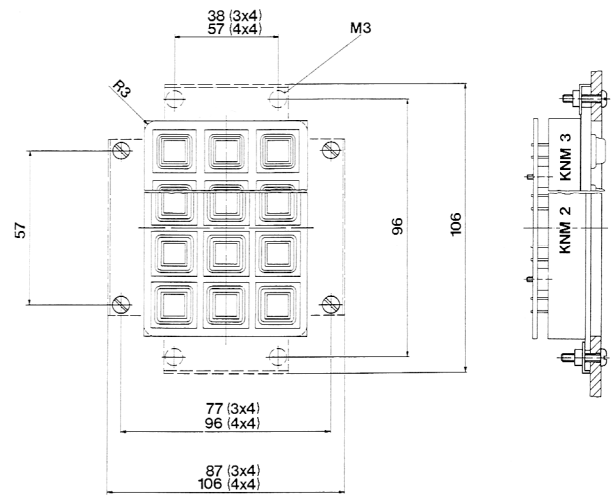


Keypad installation

Front mounting



Rear mounting

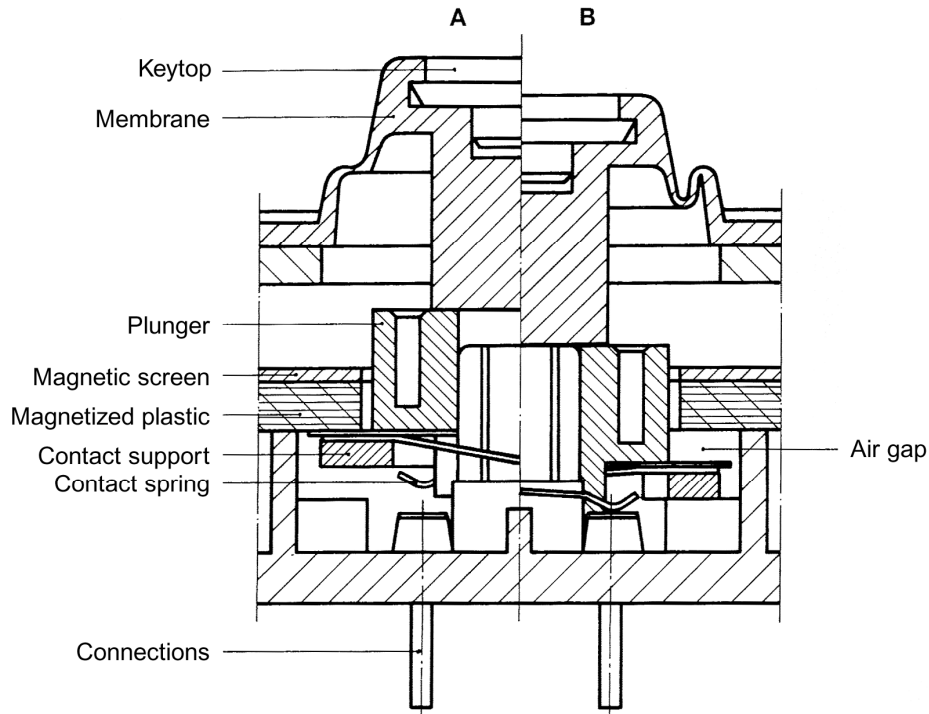


For more detailed information about fixing sets and sealing rubber of Monobloc keypads 3x4 and 4x4 please refer to special documentation.

Panel cut-outs

Series	Mounting	Monobloc 3 x 4	Monobloc 4 x 4
KNM2 / KNM3	front	82 x 63 mm	82 x 82 mm
KNM2	rear	79.4 x 60.4 mm	79.4 x 79.4 mm
KNM3	rear	max. 79 x 60 mm	79 x 79 mm

Functioning principle



A Off position

Magnetic circuit between magnetized plastic and contact support closed. Contact open.

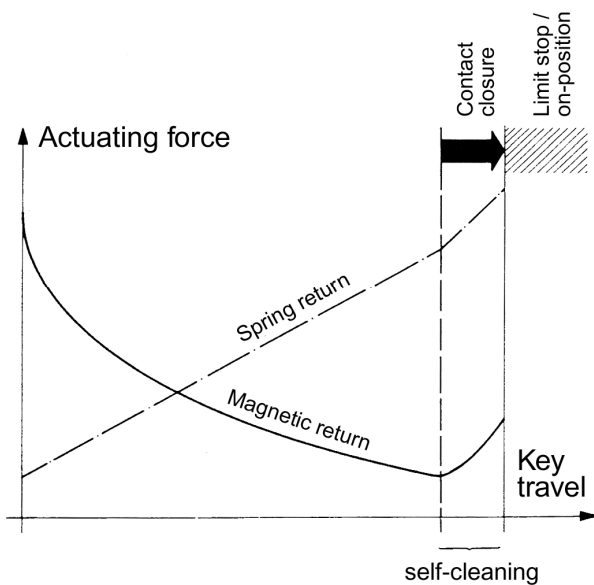
B On position

Magnetic circuit between magnetized plastic and contact support open. Contact closed.

The magnetized plastic attracts the contact support. The force of attraction is a maximum when the contact support lies on the magnetized plastic (off-position).
Depressing the key switch results in an air gap between magnetized plastic and contact support, thus overcoming the force of attraction (pressure point).

The force decreases until the contact is closed (on-position). The magnetic attraction returns the key plunger reliably to its off-position when the key switch is released.

Working diagram



Soldering instructions

Manual soldering

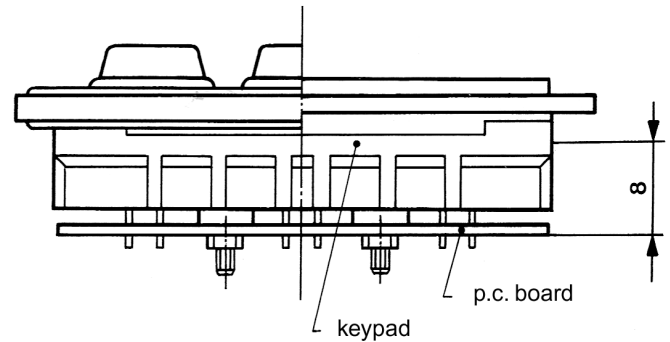
Soldering temperature	320 °C
Soldering time	3 Seconds

Wave soldering

Max. temperature in dip brazing	245 °C
Soldering time	3...4 Seconds
Preheating temperature	80 °C
Preheating time	30 Seconds

Cleaning

Do not immerse keypad more than 8 mm into the detergent (see sketch below).



Characteristics of material

Keypad housing

Polyester thermoplastic
Crastine XB 3035, fire protection class V-O as UL94

Membrane

Silicon rubber
Elastosil R420/60 black

Characteristics:

- ♦ Weatherproof and resistant to aging
- ♦ repulsive to water and adhesives
- ♦ physiologically neutral
- ♦ odourless and insipid
- ♦ resistant to ozone
- ♦ non corrosive
- ♦ bacteriological immunity
- ♦ ant vibrant effect at extreme temperatures
- ♦ radio-resistant
- ♦ easy to combine with other materials
- ♦ excellent dielectric data, such as high disruptive strength, creeping strength, resistant to electric arc and corona, low dissipation factor.

Ask for our list of resistance to chemicals or provide all details of your specific application.