# Rotary Cam Switch

Catalog 9003CT1301R06/16

2016

**Class 9003** 



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#### **Product Overview**

#### **Features**

The Class 9003K2 rotary cam switch is a versatile means of providing inexpensive logic control. The Type K2 cam switch is available with:

- Up to 12 switching positions
- Up to 20 contacts
- Attractive operator/handle appearance
- Standard or custom configured sequences
- Acceptance in countries worldwide

#### Components

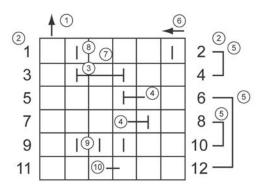
A complete rotary cam switch includes the following components.

- Contact Block Assembly: There are two ways of ordering a 9003K2 rotary cam switch contact block assembly.
  - If the desired contact sequence can be found on pages 3–5, order the catalog number of the device.
  - If the contact sequence cannot be found on pages 3–5, use the keysheet on page 9. Indicate the exact contact configuration desired. Devices will be assembled at the factory according to this keysheet.
- **Operator/handle**: See page 6. The operator/handle selection depends on the application and size of the rotary cam switch.
- Legend Plate (optional): Many operators/handles come standard with a blank legend plate. If not included—or, if additional legend plates are needed—see page 7.
- Accessories (optional): See page 7.

## **Contact Sequence/Wiring**

Refer to the diagrams on pages 3-5, as necessary.

- ① The vertical arrow indicates contact status at the 0° (up) handle position.
- ② Terminal identification: terminals 1 and 2 are one contact.
- 4 Contacts 5-6 and 7-8 overlap between positions 4 and 5.
- § Jumpers are factory-installed between terminals 2 and 4; 6 and 12; and 8 and 10.
- © The horizontal arrow indicates spring-return-to-previous-position.
- ⑦ Contact 1–2 is open in position 3.
- ® Contact 1–2 is closed in position 2.
- A vertical bar (|) in adjacent boxes indicates that the contact might open when switching between adjacent positions.
- © Contact 11–12 closes momentarily when switching from position 3 to 4. This contact is not closed at position 3 or at position 4.



NOTE: This illustration is for the example only.

#### **Contact Ratings**

The following contact rating tables are to be used when properly sizing a 9003K2 rotary cam switch to a particular application. Table 1 reflects the ratings to UL specifications. The UL file is E164864. The 9003K2 is UL Listed in accordance with guide NLRV. Table 2 contains the contact ratings in accordance with German specification VDE 0660. The CSA file is LR 44087, Class 3211 05.

Table 1: UL Ratings

Contact	Maximum	General		Horsepower	, 1 Phase—2	2 pole, 60 Hz			Horsepower	, 3 Phase—3	pole, 60 Hz	
Block Assembly	Voltage	Purpose	110–120 V	200–208 V	220-240 V	440–480 V	550–600 V	110–120 V	200–208 V	220–240 V	440–480 V	550–600 V
K2	300 V	12 A	0.5 hp	1 hp	1 hp	_	_	1.5 hp	2 hp	3 hp	_	_





#### Table 2: Electrical Ratings (VDE 0660)

<del></del>	ons	t as k	Contin			Uti	lizatior A	n Cate C1	gory			Utilization Category AC2 and AC3				Utilization Category AC11			Operational Voltages									
ntact Blo	f Dimensi	ed Current oad Break Switch (I <sub>a</sub> )	Alr (1)	<sub>12</sub> ) peso	In Free Air		Po 3 Ph 3 Po	ase	Rating	1 Ph	ase ole		Ra ationa Phase		٠	1 11	Pole	For	•	gs a Sta	rters	C	d Opera Current 1 Phase	l <sub>e</sub>	ated ulation oltage	Switch	ergency Switch	ergency Switch
ၓ	Shafi	Rate Lo S	lı Free	Encl	(I <sub>e</sub> )	220 V	415 V	500 V	660 V	240 V	415 V	220 V	415 V	500 V	660 V	240 V	415 V	220 V	415 V	500 V	660 V	240 V	415 V	500 V	Inst V	Main	Eme Stop	Eme
	mm [1]	Α	Α	Α	А	kW	kW	kW	kW	kW	kW	kW A	<u>k₩</u> A	kW A	<u>k₩</u>	kW	kW	kW	kW	kW	kW	Α	Α	Α	٧	٧	V	٧
K2	6	20	20	16	16	6	10.5	14	14	4.5	7.5	2.2 8.5	<u>4</u> 8.5	4 6.5	<u>4</u> 5	1.3	2.2	2.5	4.5	4.5	4.5	4	3	2	660	500	660	500

[1] All dimensions are in millimeters. To convert to inches, divide by 25.4.



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# **Contact Block Assembly**

A complete rotary cam switch consists of the following: a contact block assembly (see Table 3); an operator/handle (see Tables 6–9); a legend (see Table 12); and any required accessories (see Table 11).

Table 3: Contact Block Assembly: 2–4 Contacts 2 and 3 Contacts

# Switching Angle **Panel Mounting** Contact Sequence Wiring Diagram Type [1] 45° K2B001S 45° K2B001UA K2B002A 45° 45° K2B002GA 45° K2B002NA K2B002QA 45° K2B003T 45° K2B004T 45° K2B006T 45° K2C002LA K2C003A 45° 45° K2C003GA 45° K2C003NA 45° K2C003QA K2C007T 45° [1] When ordering, add prefix 9003 to the Type number.

#### 4 Contacts

Contact Sequence	Switching	Panel Mounting			
Wiring Diagram	Angle	Type [1]			
1   1   2 3   1   1   4 5   1   1   6 7   1   1   8	45°	K2D002S			
1	45°	K2D002UA			
† 2 3 2 4 5 1 1 6 7 1 8	45°	K2D003LA			
1   1   2   3     4   5     1   6   7     1   8	45°	K2D004A			
1 2 3 4 4 5 1 1 8	45°	K2D004GA			
1	45°	K2D004NA			
† 1 1 2 3 4 5 5 1 1 6 6 7 1 8	45°	K2D004QA			
1	30°	K2D005T			
1 2 3 1 4 5 1 6 7 1 8	30°	K2D012GA			
1	45°	K2D012NA			
1	45°	K2D012QA			

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# Rotary Cam Switch, 9003K2 Contact Block Assembly: 5–7 Contacts

A complete rotary cam switch consists of the following: a contact block assembly (see Table 4); an operator/handle (see Tables 6–9); a legend (see Table 12); and any required accessories (see Table 11).

Table 4: Contact Block Assembly: 5–7 Contacts

#### 5 and 6 Contacts

#### 6 and 7 Contacts

Contact Sequence Wiring Diagram	Switching Angle	Panel Mounting Type [1]	Contact Sequence Wiring Diagram	Switching Angle	Panel Mounting Type [1]
1	45°	K2E003WA	1 2 4 4 5 H 6 7 H 8 9 H 1 10 11 12	45°	K2F013GA
1	45°	K2E005A	1 2 2 3 1 4 5 1 6 6 7 1 1 8 9 1 1 10 11 12	45°	K2F013NA
1 1 2 3 1 4 5 1 6 7 1 8 9 1 1 10	45°	K2E005NA	† 2 3   1   4 5   1   6 7   1   8 9   1   10	45°	K2F013QA
1	45°	K2E005QA	1   2 3   1 4 5   6 7   1 8 9   1 10	60°	K2F013UA
1	45°	K2F003SA	1	45°	K2F022GA
1	45°	K2F006A	1	45°	K2F022NA
1	45°	K2F003UA	1	45°	K2F022QA
1   1   2   2   3   1   4   5   1   1   6   6   7   1   1   8   9   1   1   10   11   11   12   12	45°	K2F006NA	1	45°	K2G007NA
1	45°	K2F006QA	1 1 2 4 4 5 5 1 1 6 8 9 1 1 10 10 11 12 13 1 1 14	45°	K2G007QA
[1] When ordering, add prefix 9003 to the Typ	L pe number.		1 2 4 4 5   1 6 6 7   1 8 9   1 10 11   12 13   1 14	45°	K2G007A

A complete rotary cam switch consists of the following: a contact block assembly (see Table 5); an operator/handle (see Tables 6–9); a legend (see Table 12); and any required accessories (see Table 11).

Table 5: Contact Block Assembly: 8-10 Contacts

#### 8 Contacts

# Panel Mounting Contact Sequence Wiring Diagram Switching Angle Type [1] 45° K2H004S 45° K2H004UA 45° K2H008NA 309 K2H008QA 45° K2H014GA K2H014NA 45° 45° K2H014QA K2H032NA 459 K2H032QA 45°

#### 9 and 10 Contacts

1		Type [1]  K21009NA  K21009QA
1	)°	K21009QA
1		
1	50	K2l023GA
1	<b>j</b> o	K21023NA
	5°	K21023QA
†		
[1] When ordering, add prefix 9003 to the Type number.	5°	K2K005SA

# Rotary Cam Switch, 9003K2 **Operators and Handles**

# **Operators and Handles**

Table 6: **Selection of Operators and Handles** 

For single-hole mounting of the 9003K2 rotary cam switches in a 22 mm diameter hole. Protection category is IP65.

Operator	Description	Style	Black Bezel / Black Knob	Chrome Bezel / Black Knob	Yellow Bezel / Red Knob
	Bezel—Small round similar to 9001D3 and D4 operators	Knob	KAA1H	KBA1H	1
	Does not include blank legend plate	Key [1]	KAA1S	_	_
	Bezel—Large round	Knob	KAA2H	_	-
	Does not include blank legend plate	Key [1]	_	_	_
	Chrome XB2B Style Standard Handle Requires KZ127 Adapter—Page 7	Knob	_	KAXZ1M12	-
	Chrome XB2B Style Extended Handle Requires KZ127 Adapter—Page 7	Knob	_	KAXZ1C12	_
		30° Key		KAXZ1S131	
	Chrome XB2B Style Key Handle (Ronis 455)	45° Key		KAXZ1S141	
Committee (Second	Requires KZ127 Adapter—Page 7	60° Key	_	KAXZ1S161	
	ricquired N2127 Adapter 1 age 7	90° Key		KAXZ1S191	
	Bezel-45 x 45 mm	Knob	9003KAC1B	KBC1H	KCC1LZ
9	Includes blank legend plate	Key [1]	KAC1S	KBC1S	_
	Bezel—60 x 60 mm	Knob	KAD1H	9003KBD1C699	KDD1PZ
	Includes blank legend plate	Key [1]	_	9003KBD1S	

 $^{[1]}$  Add the key withdrawal code to the Type number. See Table 10.

#### Table 7: 9003K2 Rotary Cam Switches with 90° switching angle and only two positions

Operator	Description	Black Bezel / Black Knob	Yellow Bezel / Red Knob
	For Size K2 Bezel: 60 x 60 mm Mounting: 22 mm (7/8 in.)	_	KCD1PZ
18	Uses standard marking 9-30 (see page 11) No other markings available		

#### Table 8: 4-hole mounting of the 9003K2 rotary cam switch

Suitable for panel mounting or base mounting of contact block assemblies. Use with the KZ141 mounting plate (see Table on 11 page 7). Protection category is IP40. For gaskets, see Table on 11 page 7.

Operator	Description (includes blank bezel legend)	Black Legend / Black Knob	Chrome Legend / Black Knob	Yellow Legend / Red Knob
	For size K2 Bezel 45 x 45 mm	9003KAE1B	9003KBE1B	KCE1LZ
	For size K2 Bezel 60 x 60 mm	9003KAF1C	9003KBF1C	9003KCF1M

#### 4-hole mounting of 9003K2 rotary cam switches with 90° switching angle and only two positions Suitable for panel mounting or base mounting of contact block assemblies. Use with the KZ141 mounting plate (see Table on 11 page 7).

Operator	Description	Black Operator / Black Knob	Yellow Operator / Red Knob
	For size K2 Bezel 60 x 60 mm Uses standard marking 9-30 (see page 11) No other markings available.	KAF1PZ	KCF1PZ

#### Table 10: **Key Withdrawal Codes**

Angle	Code
30°	Not available
45°	16
60°	1
90°	6

When ordering a key operator for a contact block assembly, specify the switching angle of the contact block assembly. From Table 10, choose the appropriate suffix for the desired switching angle, and add this suffix to the end of the operator/handle's

Example: 45° switching for a KAC1S operator/handle is KAC1S16.

NOTE: The key is removable in all positions. The replacement key is ZBD8D1.

**NOTE:** All dimensions are in millimeters. To convert to inches, divide by 25.4.



# Accessories, Legends, and Dimensions

Table 11: Accessories

Operator	Description	Туре
	Shroud 4 contacts	KZ35
	Ring Nut Wrench— for use with D1 and D2 operators/handled listed on page 6.	S Z01
(° °	Gasket for panel mounting contact block assemblies— used with the	mm KZ65
	operators/handles listed on page 6 to provide IP65 protection. 60 x 60 r	mm KZ66
	Replacement ring nut for all K style operators/handles listed on page 6.	KZ30
	Mounting adapter for use with a chrome KAXZ style handle	KZ127
	Multi-mounting front mounting plate for use with the operators from Tables 8 and 9 on page 6.	KZ141

Figure 1: Panel Mount

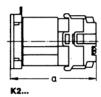




Table 12: Legends

	Additional legend See page 6 to dete	Туре					
		Holder with blank legend	KZ13				
	45 x 45 mm bezel	Blank legend only	KZ76				
50 0		Empty holder only	KZ14				
{ }	60 x 60 mm bezel	Holder with blank legend	KZ15				
00		Blank legend only	KZ77				
0		Empty holder only	_				
	Bezel insert for blank legend plate						
	Size	Color	Туре				
	45 x 45 mm bezel	Silver	KZ18				

Table 13: Replacement Knobs

For K2 Operators	Handle Code [1]	Color	Length (d)	Туре
	А	Black	29 mm	KZ26
T IN I	В	Black	34 mm	KZ27
)   d	С	Black	42 mm	KZ28
	D	Black	57 mm	KZ29

 $\ensuremath{^{[1]}}$  The Handle Code is the last letter of the operator/handle Type number.

Table 14: Contact Block Assembly Depth

Number of Contacts	K2 Length Dimension a [1] (mm)	K2 Length Dimension a [1] (mm)	
1–2	52.5	11–12	102.5
3–4	62.5	13–14	112.5
5–6	72.5	15–16	122.5
7–8	82.5	17–18	132.5
9–10	92.5	19–20	142.5

<sup>[1]</sup> Dimension a for the 9003K2 is for 4-hole mounting operator/handles. Add 18 mm to dimension a when using single-hole mounting operator/handles.

Figure 2: With Shrouds

mm	K2	
b	48	
С	26	



# Rotary Cam Switch, 9003K2 Key Sheet / Order Form

# **Key Sheet / Order Form**

# **Using the Key Sheet**

If the desired contact sequence cannot be found on pages 3–5, fill out the key sheet on page 9 by following the instructions below. An example of a completed key sheet is on page 10.

- 1. Check the box for K2 (20 A).
- 2. Fill out the product quantity in the box provided.
- 3. Verify front mounting by checking the box labeled Front Mounting.
- 4. If ordering a base/contact block only, check the box for 22 mm plastic or 22 mm metal mounting. Then fill out the following (see Steps 8–9):
  - 3 Switching angle (positions)
  - Contact scheme and jumpers (pre-wired)
- 5. If ordering a complete switch (base/contact block, head, legend), check the box labeled Complete Switch. Then fill out the following (see Steps 6–9):
  - ① Operating head reference
  - 2 Legend reference
  - 3 Switching angle (positions)
  - Contact scheme and jumpers (pre-wired)
- 6. Operating head reference ①: specify the catalog number of the operating head
- 7. Legend reference 2: specify the catalog number of the legend
- 8. Switching angle (positions) 3 and special legend marking:
  - a. Choose the switching angle increments:
    - 30° or 60°
    - 45° or 90°
  - b. Fill in the legend markings desired at the positions indicated. Zero degrees is always straight up.

**NOTE:** The rotation of the operator will stop clockwise at the top (0° position), unless you check the box labeled Full Rotation through 360°.

- 9. Contact scheme and jumpers (pre-wired) 4:
  - a. For pre-wired jumpers, draw a horizontal line between the terminals to be jumpered, as shown in the example on page 10.
  - b. Refer to the Legend at the bottom of page 9 for contact sequences (for example, X indicates contact closure). See page 10 for examples of how to fill in this portion of the key sheet.

Figure 3: 9003K2 Cam Switch Order Form

Order No.				Det:					9003K2 (20 A):											
<b>Date :</b> Agency:						Pro	duct				Ero	nt mo	untir				$\overline{}$			
	Branch:								ntity	:			FIO	iit iiic	unun	ıy				
Customer:												ck on	y (no	opera	ting he	ad):				
Address:												ž 22 pl		Ť	9	⊘ 22 m	netal:			
										Con	nplet	e:	(3	4						
Delivery instructions:						Com	plete	switch	(base		•	ock, he	ad, leg	gend)						
,												ete: (	_	3	4					
Product reference:								_				stic m	ountin	_		_				
Туре: К											ting hea		ence:		9003	3K				
3 Switching ang		itions	)			_			(2)	Legen	d refere		ntina	سطانيي	matal l		900	3KZ.		
30° or 60°		0	4		45	° or 9	90°			0				WILIT	netal l					
		4	<b>∠</b> '²								ting hea		ence:		KAX	Z				
	2222	1	`3			4		:	2	Legen	d refere						XBC	Υ .		
( <b>XX</b> )			itions		-{/	$\mathcal{K}$	<del>),</del>	- ,	Δer	er die	Sped gram o		gend	marki		oer for	m·			
		- , pos	sitions		×	$\Rightarrow$	ر ـ ـ .	,	7.5	- ula					7.5		 		F.	ΛX
	!						i	'	7				Ш				$\overline{}$		· ′	•
12									Acc	essor	ies / c	omme	nts:							
Full rotation through	360°:																			
4 Contact scheme	and ju	mpers	(pre-v	vired):																
	1	`3	<b>,</b> 5	7	Şġ	11	13	15	17	19	21	23	25	<b>.</b> 27	<sup>29</sup>	31	33	35	37	39
	)	1 4	1 6	1 8	1 10	12	1 14	16	18	20	22	24	26	28	30	32	 34	36	] 38	40
	Ī	Ì	Ĭ	Ĭ	Ĭ	Ī	İ	Ĭ	Ĭ	Ĭ	Ī	_[	Ĭ	Ĭ	Ĩ	Ĭ	Ĭ	Ĭ	Ĭ	Ĭ
*  ,	1	3	5	7	9	11	13	15	17	19	21	23	25	27	29	31	33	35	37	39
* X	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40
	-																			
	-																			
	1												-							
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	1																			
		ĺ																		
	Key wit						ators; I	by def	ault, w	/ithdra	wal in	all po	sition	S.						
_	ditions fo ng return						ition af	ter a 90	)° angle	(for ma	aximum	of 3 c	ontacts	simulta	neously	·)				
Contact closed in	×		ct close		×		act close		×		ct close			×		ap of tw		*	Conta	
1 position.	×	2 posi			Ħ	betwe	naintain en seve		丈	betwe	aintaine en two	ed	*			cts betv ositions		<u> </u>	on pr	apping evious
		→ (for ar	ngle >=	45 )	×	succe positi	essive ons			position	ons				-				and n positi	
Check the box to	confirm	n selec	tion								Fill in	with te	ext							

# Rotary Cam Switch, 9003K2 Key Sheet / Order Form

Figure 4: Example—9003K2 Cam Switch Order Form

Order No.	9003K2 (20 A): X
Date :	Product Front mounting
Agency:	Product quantity:
Customer:	Base/contact block only (no operating head):
Address:	Ø 22 plastic: Ø 22 metal:
	Complete: 3 4
Delivery instructions:	Complete switch (base/contact block, head, legend)  Complete: 1 2 3 4
Product reference:	For 22 mm plastic mounting:
Туре: К	① Operating head reference: 9003KAC1B
3 Switching angle (positions)	2 Legend reference: 9003KZ18
30° or 60° 45° <b>or</b> 90°	or for mounting with metal base:
0 1	① Operating head reference:
↑····································	Legend reference: XBCY
	Special legend marking:
positions	As per diagram on left: As per form:
Transaction ( Substitution )	FAX
(11111)	Accessories / comments: KZ 36
Full rotation through 360°:	7.0000001100 / 001111101100
Contact scheme and jumpers (pre-wired):	
1 3 5 7 9 11 13 15	17 19 21 23 25 27 29 31 33 35 37 39
2 4 6 8 10 12 14 16	18 20 22 24 26 28 30 32 34 36 38 40
1 3 5 7 9 11 13 15 2 4 6 8 10 12 14 16	
2 4 0 0 10 12 14 10	18 20 22 24 26 28 30 32 34 36 38 40
A 330° × × × 0 × 0° × 1 × 1 × 1 × 1 × 1 × 1 × 1 × 1 × 1 ×	<del>                                     </del>
4 200	<del>1   1   1   1   1   1   1   1   1   1  </del>
1 30° × × × ×	
	<del>                                     </del>
(x) Key withdrawal position for key operators; by de	tault, withdrawal in all positions.
Conditions for provision of spring return function: <b>R</b> , Spring return to 30° from 0° position or to last position after a	10° angle (for maximum of 3 contacts simultaneously)
Contact closed in Contact closed with Contact closed	Contact closed Voverlap of two Contact
1 position. break between the 2 positions and maintained between several	and maintained between two between two between two
(for angle >= 45°)	positions and next positions
	Fill in with text
Oueov rue nov ro commu selection	I III III WILLI LOAL

# Legends—Standard and Special Markings

#### **Standard Markings**

The legend markings in Table 17 are standard for the  $45 \times 45$  mm and  $60 \times 60$  mm bezel operators. To order one of these size bezel operators with a standard marking, add the code of the desired marking from Table 17 as a suffix to the operator type number. Example: KBC1H4-3.

#### **Special Markings**

All other legend engraving is considered special. To order, clearly indicate the position of the desired marking. See Tables 15 and 16 for the maximum characters allowed on a specially engraved legend.

Table 15: Rectangular Legends

Туре	Legend Size	For Operator Size	Maximum Characters Per Position
KZ13 KZ76	42 x 13 mm	45 x 45 mm	12
KZ15 KZ77	57 x 27 mm	60 x 60 mm	17

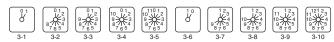
Table 16: Square Legends

	Туре		Size	(mm)	Maximum Characters		
Black	Silver	Yellow	Bezel	Legend	Per Position		
9003KZ17 9003KAC1B 9003KAE1B KAC1S	9003KZ18 KBC1H 9003KBE1B	KBC1S KCC1LZ KCE1LZ	45 x 45	42 x 42	3		
9003KZ20 KAD1H 9003KAF1C	9003KZ21 9003KBD1C699 9003KBF1C	9003KBD1S KDD1PZ 9003KCF1M	60 x 60	57 x 57	5		
KZ23	_	_	90 x 90	87 x 87	6		

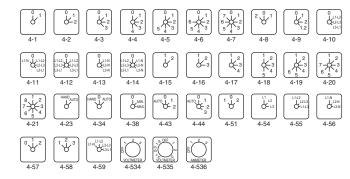
NOTE: Dimensions are in mm. To convert to inches, divide by 25.4.

# Table 17: Standard Markings

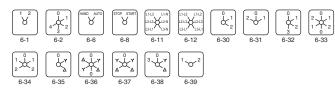
30° Marking



45° Marking



60° Marking



90° Marking

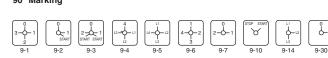
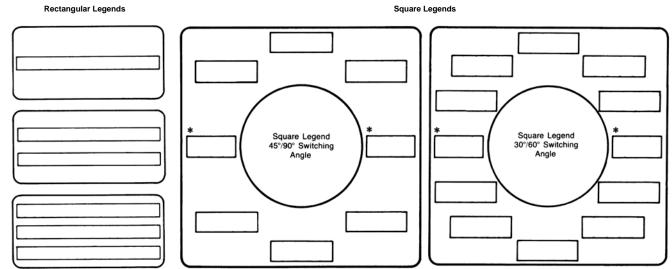


Figure 5: Positions of engravable locations on blank legends



Maximum number of characters for these positions is one less than the listed maximum in Tables 15 and 16.



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