



1XLR

**AUXILIARY SWITCHES
FOR
MV/HV EQUIPMENT**

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Vaccum Auxiliary Switch

ZKF Series
Vaccum Auxiliary Switch..... 03

Part 2

Auxiliary Switch

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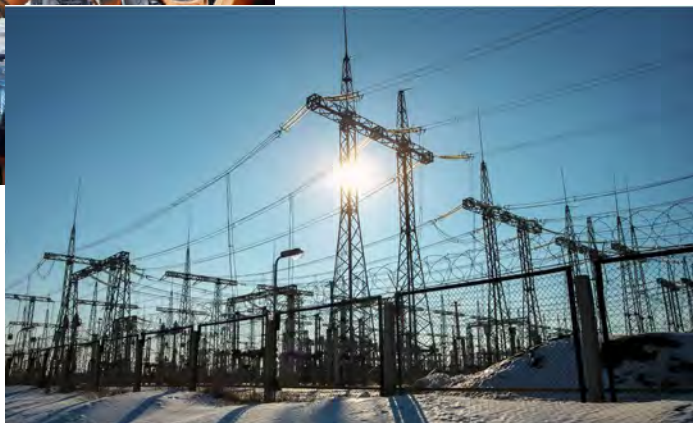
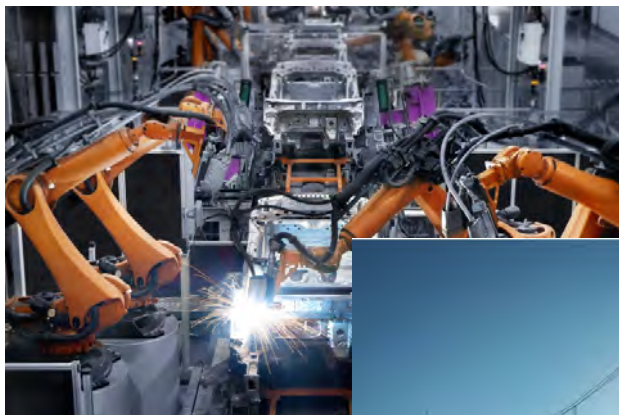
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ZKF Series Vacuum Auxiliary Switch

Products Overview

Nowadays, F series auxiliary switch often adopts mechanical friction contacting mode, with universal disadvantages of stiff work, poor environmental suitability, low protection grade, and short service life. Especially when the bus-bar voltmeter or the protection switches the double bus-bar system, incident happens because of stiff work.

To resolve this problem, we choose vacuum reed switch to instead of mechanical contact, which are adopted in series ZKF vacuum auxiliary switches. Its advantages present as follow: making and breaking well; operation life is 100,000 times; few maintenance; and excellent compatibility. ZKF series is widely used for relay's circuit switch and signal acquisition circuit. This series also applies to protection circuit, electromagnetic lock circuit, secondary circuit of disconnect switch, and breaker's double controlling intermediate circuit.

Features of Structures and capability

The core part of the vacuum auxiliary switch is enclosed as an unit to strengthen the reliability. The motion part-rotor is assembled with permanent magnet steel, and placed in the stator, but no friction with the stator, so revolving shaft moves flexibly without jamming.

The top of the switch adopts quick-acting mechanism. When the shaft swings to the situation of 750, with the influence of energy storing switch, the shifting tip drives the rotor to move quickly and stop over at the terminal point. The terminal uses the combination screw and washer, which can rise and fall automatically when the bolt is tight and loose, and it's also convenient for wiring.

The superiority of ZKF series vacuum auxiliary switch as below.

01. Adaptable

The switch with mechanical contact sometimes causes stiff work when the contact is corroded quickly in corrosive environment, such as F series. Different from F series, ZKF series' contacts are enclosed in vacuum tube, so that they can still have good making and breaking capacity even it's surrounded with dust, damp, and corrosion. To meet various requirements from clients, ZKF series are of different installing ways, different angles of rotation, and different central heights. ZKF series can replace F series, excludes the situation of being the main auxiliary contacts for the breaker.

02. Long Lifetime & Antijamming

The reed switch in ZKF series can be used for over 100,000 times, and its lifetime is much longer than the mechanical contacts. The permanent magnet steel, which controlling the making and breaking process, is made of rare earth magnet, and it's ferromagnetic. The configuration of the switch can resist the interference from the magnetic field and electric field effectively.

03. High Mechanical Strength & little overhauling

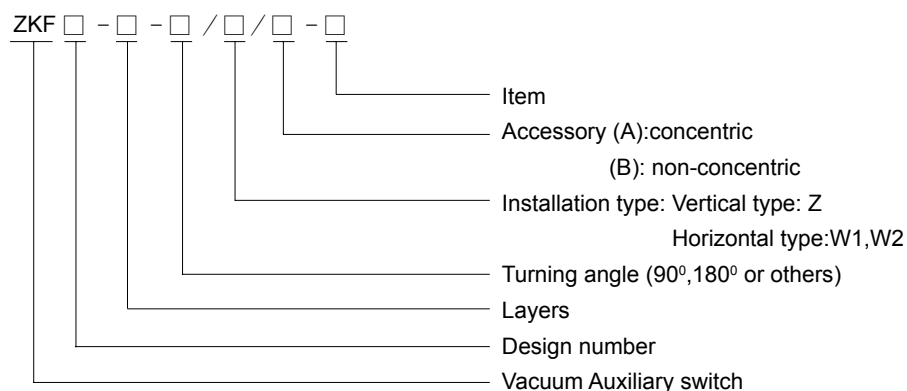
The parts of F series are loose that they often require overhauling. Differently, ZKF series uses epoxy to seal the center part-vacuum reed switch with connection bar into the stator. With the high mechanical strength, it saves trouble because loosening contacting happens rarely.

04. Good Electrical Contact

F series auxiliary switch adopts mechanical friction contacting mode, and the friction area is usually blackened because of the electric arc, which seriously influences the contact. However, the contacts of ZKF series work under vacuum or inert gases. and create no electric arc under rated current to make sure good contact.

ZKF Series Vacuum Auxiliary Switch

Type sign



Technical References

Parameters	Unit	References				
Rated Voltage	V	AC		DC		
		110	220	48	110	220
Maximal Breaking Current	A	5	2.6	5	2	1
Maximal Making Current	A	7	5	5	5	3
Breakdown Voltage	VDC	700				
Contact Resistance	mΩ	<100				
Insulation Resistance	MΩ	>1000				
1Min.Power frequency withstand voltage	V	2000				
Level of protection		IP55				
Mechanical life	times	100,000				
Layers		2~12				
Anti-interference Capability		The contact makes and breaks normally under the interferences of common-rode, differential mode, radiated electromagnetic field, and electrostatic field.				
Permission ambient temperature		-30°C~+60°C				
Height above sea level		≤ 3000m				
Relative humidity		Daily mean temperature ≤ 95%, monthly mean temperatre ≤ 90%				

PS: ZKF series applies to protection circuit, electromagnetic lock circuit, secondary circuit of disconnect switch, and breaker's double controlling intermediate circuit.

ZKF Series Vacuum Auxiliary Switch

Contact Number

From the numbers near the terminals, 1 is the bottom of left corner, according to the counter-clockwise, the other contacts are 2-3-4.

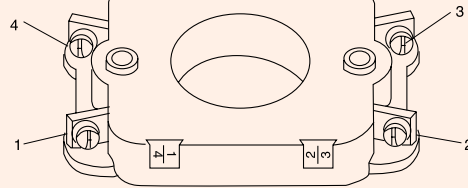


Fig.1

Layers	1	2	3	4	5	6	7	8	9	10
Contact(NO)	1-2	5-6	9-10	13-14	17-18	21-22	25-26	29-30	33-34	37-38
Contact(NC)	3-4	7-8	11-12	15-16	19-20	23-24	27-28	31-32	35-36	39-40

Rotating Direction

Pay attention to the rotating direction when installing ZKF series switch.

At the back sight of the switch, the shaft should move among the range of position place ($0^{\circ}\sim 90^{\circ}$).

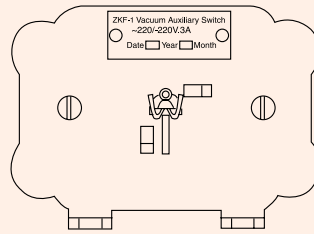


Fig.2

ZKF1-□-□/Z-□ Drawing



ZKF1-6/Z

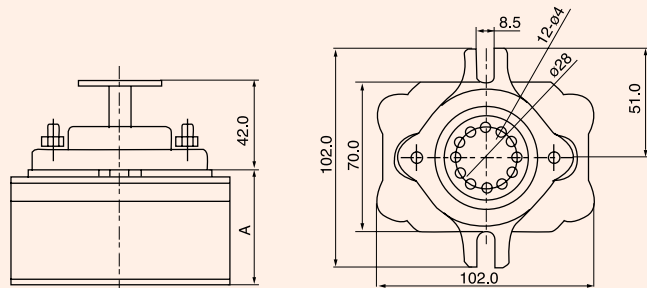


Fig.3

Item	Size(mm)
	A
ZKF1-2-□/Z	53
ZKF1-3-□/Z	71
ZKF1-4-□/Z	89
ZKF1-5-□/Z	107
ZKF1-6-□/Z	125
ZKF1-7-□/Z	143
ZKF1-8-□/Z	161
ZKF1-9-□/Z	179
ZKF1-10-□/Z	197

ZKF Series Vacuum Auxiliary Switch

ZKF1-□-□/W2-□ Drawing



ZKF1-6/W2

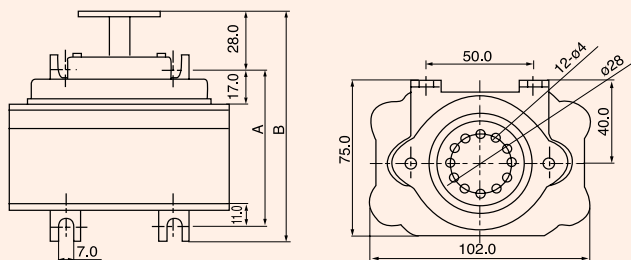


Fig.4

Type	Size(mm)	
	A	B
ZKF1-2-□/W2	75	110
ZKF1-3-□/W2	93	128
ZKF1-4-□/W2	111	146
ZKF1-5-□/W2	129	164
ZKF1-6-□/W2	147	182
ZKF1-7-□/W2	165	200
ZKF1-8-□/W2	183	218
ZKF1-9-□/W2	201	236
ZKF1-10-□/W2	219	254

ZKF2-□-□/Z-□ Drawing



ZKF2-8/Z

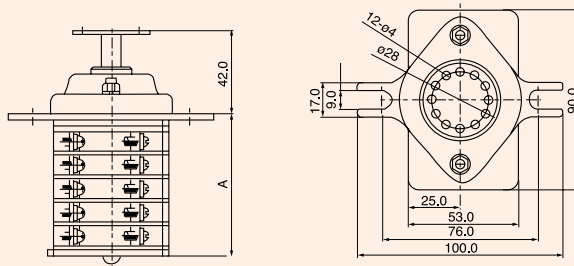


Fig.5

Item	Size(mm)	
	A	
ZKF2-2-□/Z	36	
ZKF2-3-□/Z	48	
ZKF2-4-□/Z	60	
ZKF2-5-□/Z	72	
ZKF2-6-□/Z	84	
ZKF2-7-□/Z	96	
ZKF2-8-□/Z	108	
ZKF2-9-□/Z	120	
ZKF2-10-□/Z	132	

ZKF Series Vacuum Auxiliary Switch

ZKF2-□-□/W1(W2)-□ Drawing



ZKF2-8/W1



ZKF2-8/W2

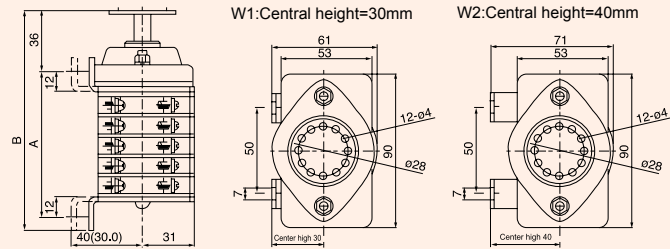


Fig.6

Type	Size(mm)	
	A	B
ZKF2-2-□/W1(W2)	51	95
ZKF2-3-□/W1(W2)	63	107
ZKF2-4-□/W1(W2)	75	119
ZKF2-5-□/W1(W2)	87	131
ZKF2-6-□/W1(W2)	99	143
ZKF2-7-□/W1(W2)	111	155
ZKF2-8-□/W1(W2)	123	167
ZKF2-9-□/W1(W2)	135	179
ZKF2-10-□/W1(W2)	147	191

Installation Method

3 kinds of installation methods for ZKF series: vertical installation(Z), horizontal installation (W1),horizontal installation (W2).Customization is also available.

Current ZKF series applies to the status that the oprating shaft and the switch shaft are concentric, and also applies to non-concentric status. These two styles can be achieved by accessory A or acessory B. A can be used to install different rotating angle in the concentric status.

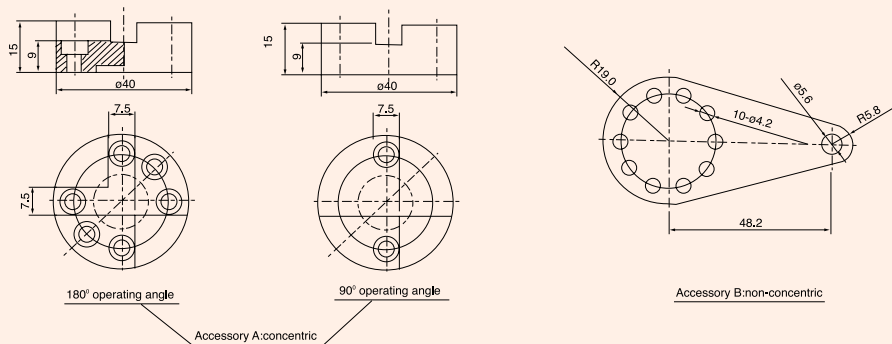


Fig.7Fig.8

Ordering Instruction

Please indicate:

- Product's name,item(includes pairs of contacts or NO/NC numbers, style, and installation type)
- Quantity
- With/without operative connecting lever

F9 Series Auxiliary Switch

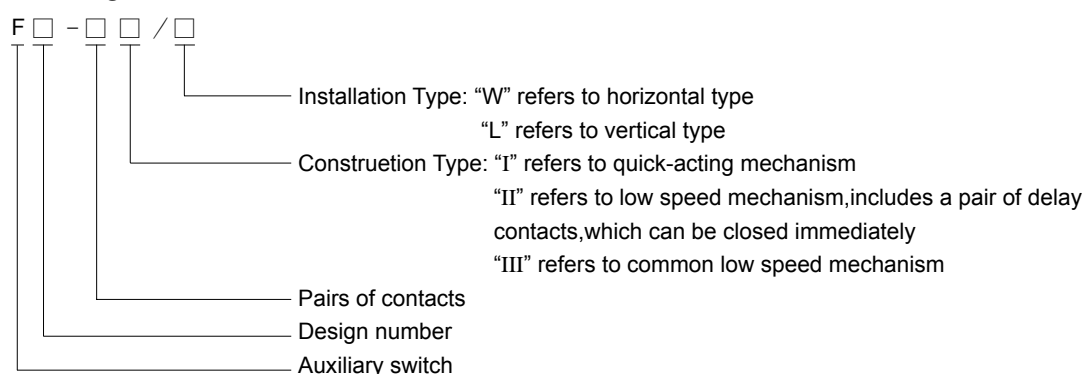
Application

This series applies to the HV operating mechanism's switching on, switching off, interlock, and controlling of signal circuit. It also applies to HV switchgears, and can be used as transfer switch of cubicle switch.

Working Conditions

- Ambient Temperature($-40^{\circ}\text{C} \leq t \leq 40^{\circ}\text{C}$)
- Height above sea Level($h \leq 3000\text{m}$)
- $t=+25^{\circ}\text{C}$, relative air humidity $\leq 90\%$
- Oscillatory acceleration $\leq 15\text{m/s}^2$
- Situation of no sharp pounding, no explosion risk, no inductive dust, no air destroying insulators of corroding metal and so on.

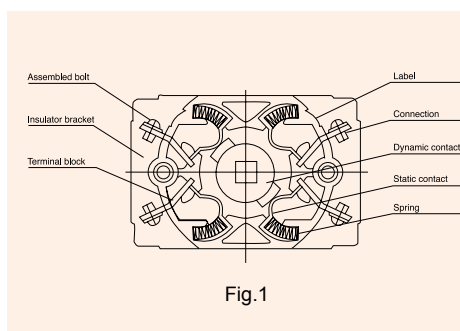
Type sign



References

Rated Voltage			DC 48V 110V 220V, AC 110V, 220V
Rated Current			10A
Rated Breaking Current	DC	220V, $I=20\text{m/s}$	4A
		110V, $I=20\text{m/s}$	8A
	AC	220V, $\cos \phi=0.4$	12.5A
Mechanical Lifetime			30,000 times
Electric Lifetime			20,000 times

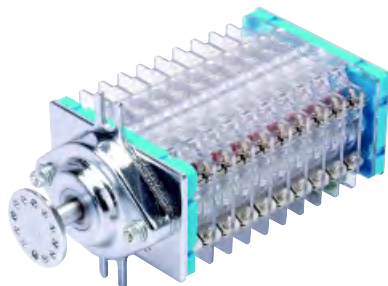
Mechanical Features



F9 series is composed of several layers. Inner structure of F9 series as below: Numbers on both sides of the upward part stand for the contacts. In each layer, the contacts on diagonal line construct a NO/NC circuit, which is achieved by the sign on the operating shaft. The contact of dynamic & static contacts adopt circumference slide compression type, and pressure between contacts comes from specific compression spring, which is non-conductive and far away from the running part. In addition, the turning joint of the static contact is welded by bare copper wire, and this makes the through-flow be more reliable. Delay quick-acting mechanism has flexible operation, delays exactly, and cuts over rapidly. Quick-acting mechanism begins to force the dynamic contact to move quickly when the master arm turns to $65^{\circ}\sim 75^{\circ}$, and stop at the final position. Thus, it achieves both delay and quick-acting functions.

F9 Series Auxiliary Switch

Quick-acting type of F9(Drawing)



F9-20I/L

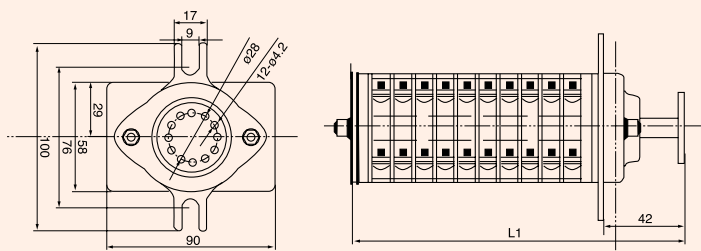
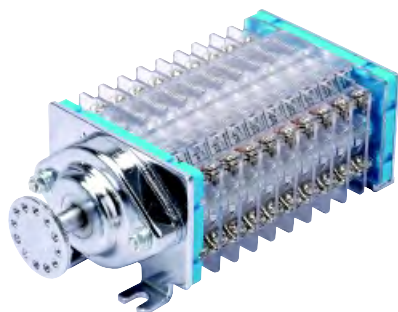


Fig.2

NO/NC	2	3	4	5	6	8	10	11	12
Layers	2	3	4	5	6	8	10	11	12
L1(mm)	94	106	118	130	142	166	190	202	214

Quick-acting & Horizontal type of F9(Drawing)



F9-20I/W

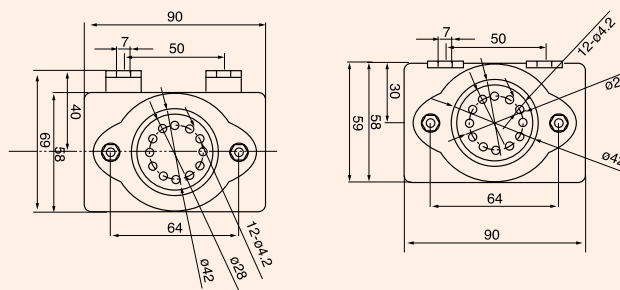


Fig.3

Fig.4

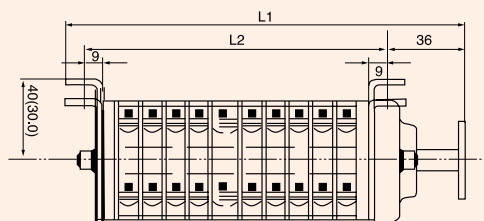
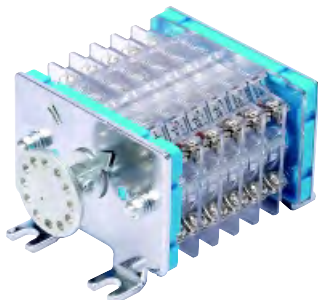


Fig.5

NO/NC	2	3	4	5	6	8	10	11	12
Layers	2	3	4	5	6	8	10	11	12
L1(mm)	100	112	124	136	148	172	196	208	220
L2(mm)	57	69	81	93	105	129	153	165	177

F9 Series Auxiliary Switch

Low speed & Horizontal type of F9 (Drawing)



F9-12III/W

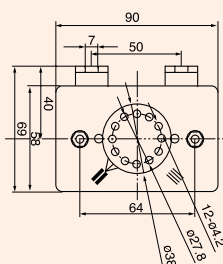


Fig.6

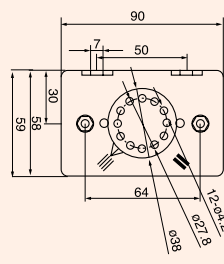


Fig.7

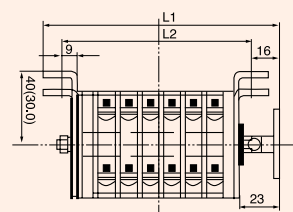
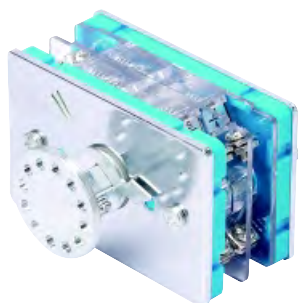


Fig.8

NO/NC	2	3	4	5	6	8	10	11	12
Layers	2	3	4	5	6	8	10	11	12
L1(mm)	79	91	103	115	127	151	175	187	199
L2(mm)	59	71	83	95	107	131	155	167	179

Low speed & Vertical Type of F9(Drawing)



F9-4III/LH

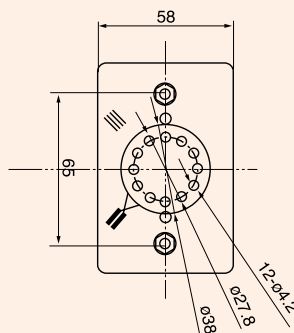
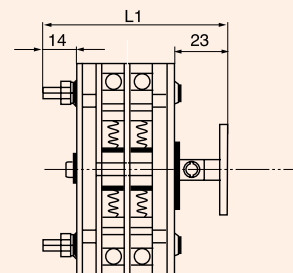


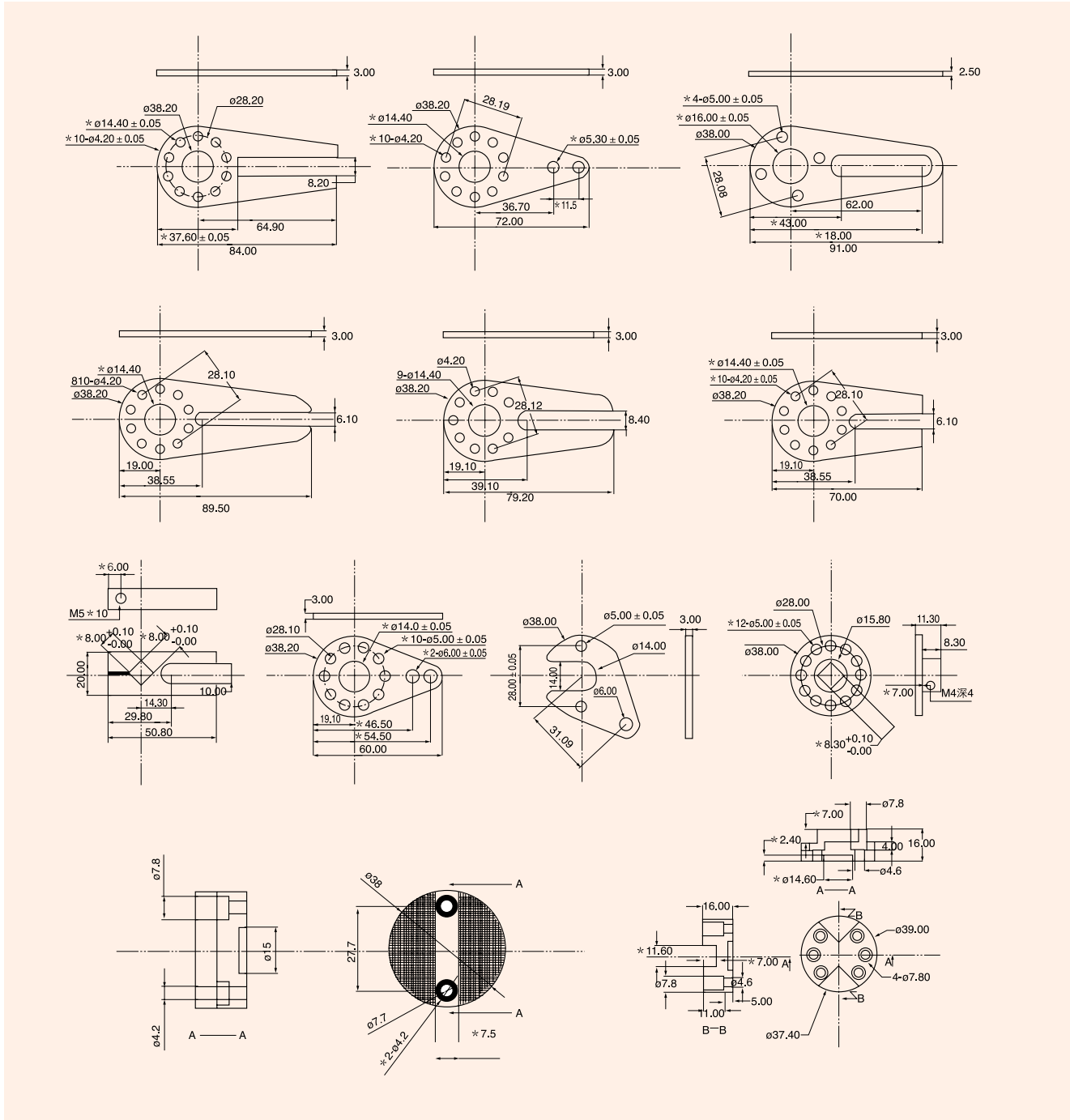
Fig.9



NO/NC	2	3	4	5	6	8	10	11	12
Layers	2	3	4	5	6	8	10	11	12
L1(mm)	78	90	102	114	126	150	174	186	198

F9 Series Auxiliary Switch

Alternative handle as below



Ordering instruction

Please indicate:

- Product's name, item (includes pairs of contacts or NO/NC numbers, style, and installation type)
- Quantity
- With/without operative connecting lever

F10 Series Auxiliary Switch

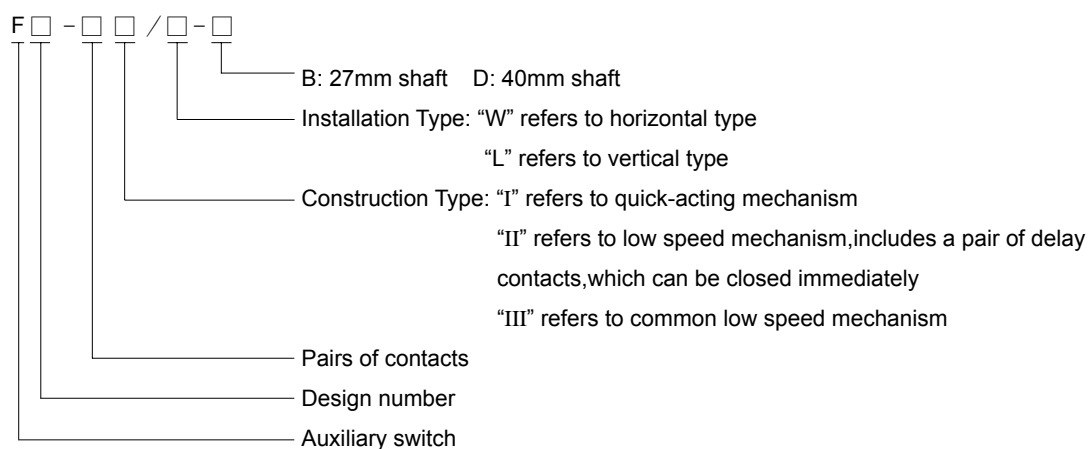
Application

This series applies to the HV operating mechanism's switching on, switching off, interlock, and controlling of signal circuit. It also applies to HV switchgears, and can be used as transfer switch of cubicle switch.

Working Conditions

- Ambient Temperature($-40^{\circ}\text{C} \leq t \leq 40^{\circ}\text{C}$)
- Height above sea Level($h \leq 3000\text{m}$)
- Monthly mean relative air humidity $\leq 90\%$, Daily mean relative air humidity $\leq 95\%$
- Oscillatory acceleration $\leq 15\text{m/s}^2$
- Situation of no sharp pounding, no explosion risk, no inductive dust, no air destroying insulators or corroding metal and so on.

Type sign



Annotation: 1. One circuit is composed of one pair of contacts.

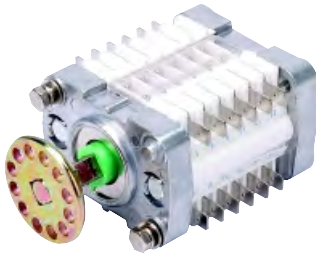
2. One layer has one pair of delay contacts at most, and delay time is around 20ms.

References

Rated Voltage			DC 48V 110V 220V, AC 220V
Rated Current			10A
Rated Breaking Current	DC	220V, V=20m/s	3A
		110V, V=20m/s	6A
	AC	220V, $\cos \phi = 0.4$	10A
Mechanical Lifetime			30,000 times
Electric Lifetime			20,000 times

F10 Series Auxiliary Switch

Drawing



F10-10III/LB

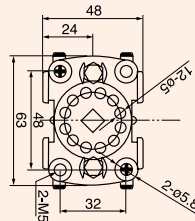


Fig.1

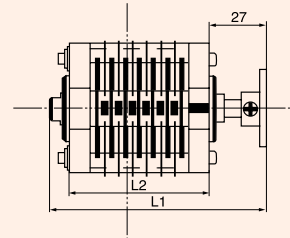


Fig.2

NO/NC	2	3	4	6	8	10	11	12	16
Layers	3	4	5	7	9	11	12	13	17
L1(mm)	75	82	89	103	117	131	138	145	173



F10-8III/W4

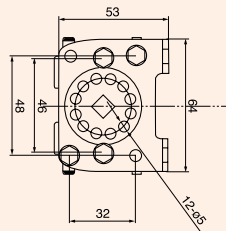


Fig.3

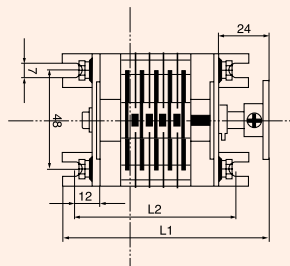


Fig.4

NO/NC	2	3	4	6	8	10	11	12	16
Layers	3	4	5	7	9	11	12	13	17
L1(mm)	85	92	99	113	127	141	147	155	183
L2(mm)	64.5	71.5	78.5	92.5	106.5	113.5	120.5	127.5	155.5



F10-8III/W3

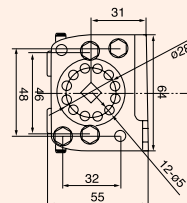


Fig.5

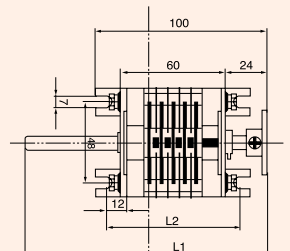


Fig.6

NO/NC	4
Layers	5
L1(mm)	140
L2(mm)	78.5

F10 Series Auxiliary Switch

Drawing



F10-16III/LD

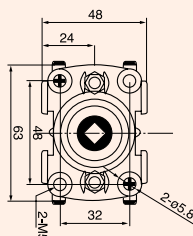


Fig.7

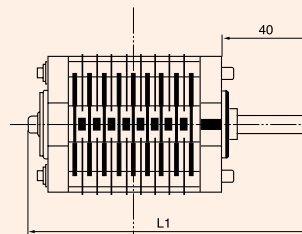
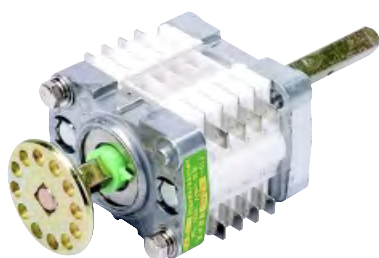


Fig.8

NO/NC	2	3	4	5	6	7	8	9	10	11	12
Layers	3	4	5	6	7	8	9	10	11	12	13
L1(mm)	89	96	103	110	117	124	131	138	145	152	159



F10-8III/LB

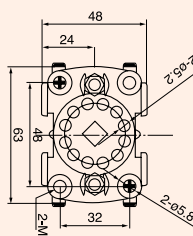


Fig.9

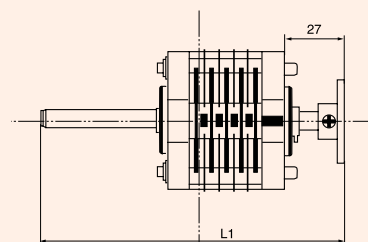


Fig.10

NO/NC	4
Layers	5
L1(mm)	140



F10-12III/LBJ

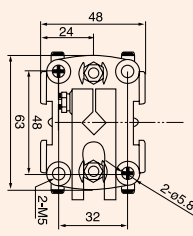


Fig.11

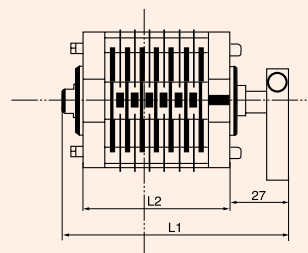
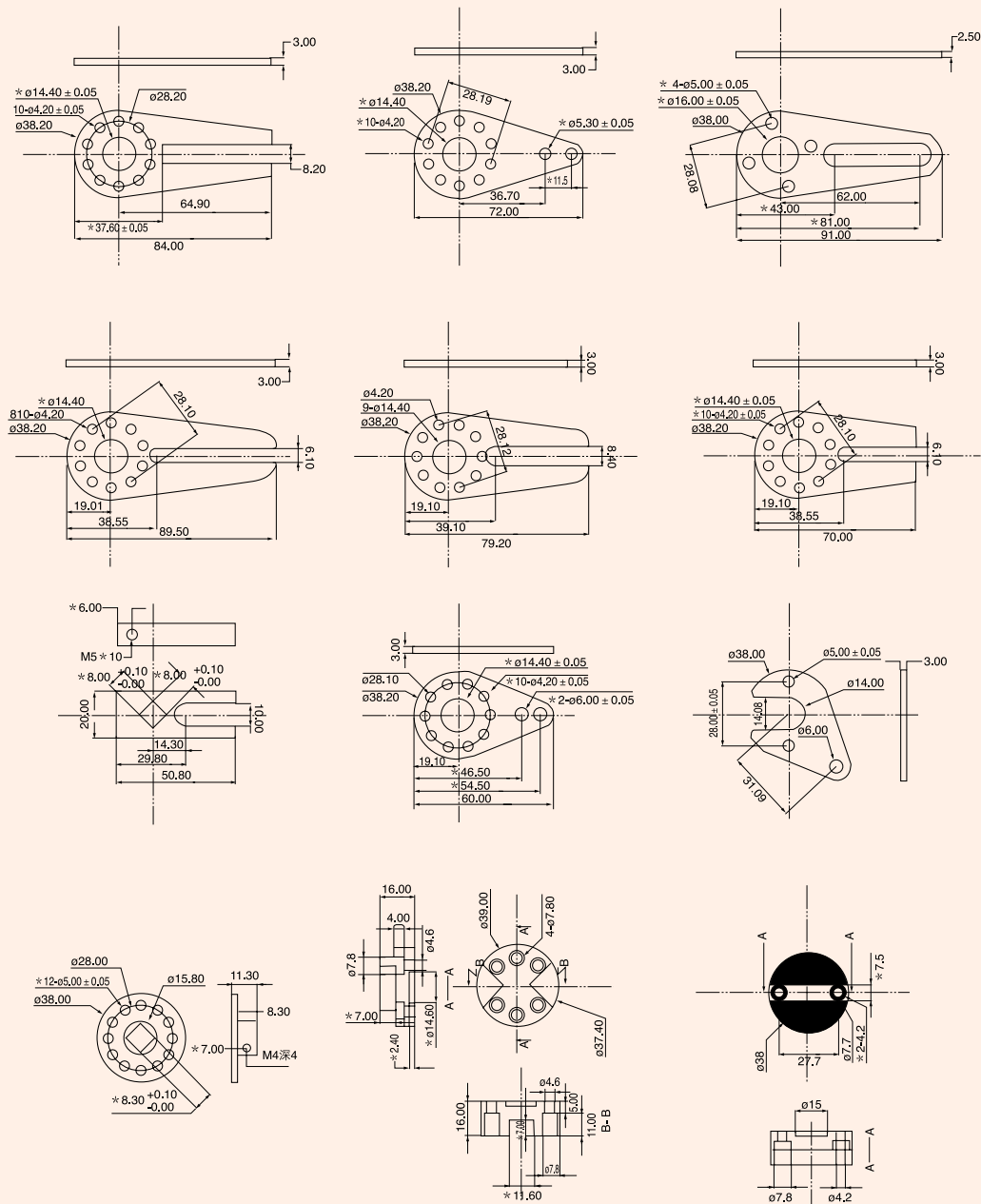


Fig.12

NO/NC	5	6	8	11
Layers	6	7	9	12
L1(mm)	89	103	117	138

F10 Series Auxiliary Switch

Alternative Handle Below



Ordering Instruction

Please indicate:

- a. Product's name,item(includes pairs of contacts or NO/NC numbers, style, and installation type)
- b. Quantity
- c.With/without operative connecting lever

F11 Series Auxiliary Switch

Application

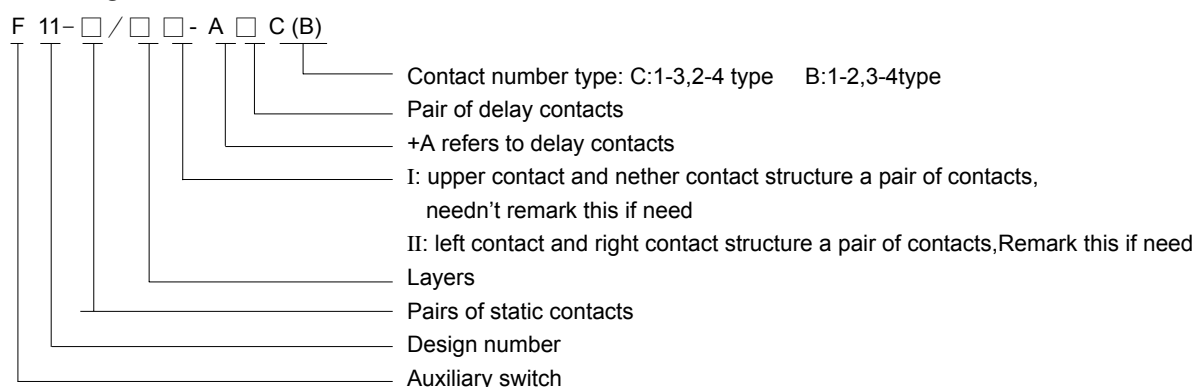
This series applies to the HV operating mechanism's switching on, switching off, interlock, and controlling of signal circuit. It also applies to HV switchgears, and can be used as transfer switch or cubicle switch.

F11 series is direct driving type, and each layer contains one pair of static contacts. The contacts are of two kinds: one is time lag, another is not. Delay contacts can counteract the operative time lag of TBJ, and instantaneous contacts resolve the problem that electronic parts are often burned out as they are electriferous for a long time. It's totally enclosed type, and applies to severe atmosphere.

Working Conditions

- Ambient Temperature ($-40^{\circ}\text{C} \leq t \leq 40^{\circ}\text{C}$)
- Height above sea Level ($h \leq 3000\text{m}$)
- Daily mean relative air humidity $\leq 95\%$, Daily mean water vapor pressure $\leq 2.2\text{ KPa}$, monthly mean relative air humidity $\leq 90\%$, monthly mean water vapor pressure $\leq 1.8\text{ KPa}$.
- Oscillatory acceleration $\leq 15\text{m/s}^2$
- Situation of no sharp pounding, no explosion risk, no inductive dust, no air destroying insulators of corroding metal and so on.

Type sign



References

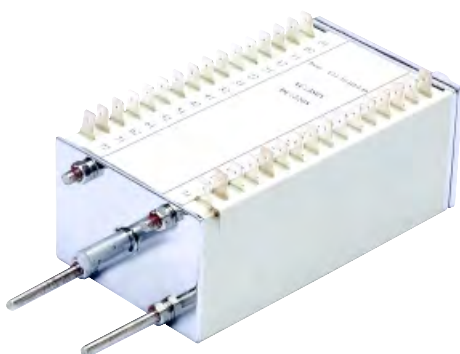
Parameter	AC		DC	
Rated Voltage	110V	220V	220V	380V
Rated Current	10A		10A	
Rated breaking Current	6A	3A	10A	
	t=20ms		cos φ=0.4	
Short-Time Withstand Current			30ms at 100A	
Lifetime	20,000 times		20,000 times	
1 min Industrial frequency withstand voltage	2,500V		2,500V	

F11 Series Auxiliary Switch

Drawing

Item	Delay contacts	Layers	Pairs of contacts
F11-□/□-A2	YES	9,13,17,21,27	6,10,14,18,24
F11-□/□	No	5,9,13,17,23	4,8,12,16,22

a. F11-□/□-A2B Drawing



F11-16

Item	Layers	L1(mm)	L2(mm)
F11-6/9-A2	9	138	76
F11-10/13-A2	13	168	106
F11-14/17-A2	17	198	136
F11-18/21-A2	21	228	166
F11-24/27-A2	27	273	211
F11-4/5	5	108	46
F11-8/9	9	138	76
F11-12/13	13	168	106
F11-16/17	17	198	136
F11-22/23	23	243	181

Dimensions:

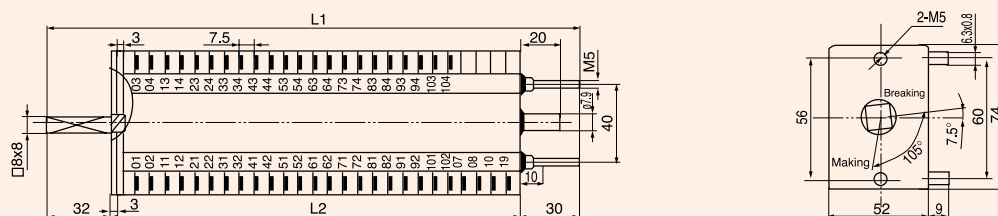


Fig. (2) F11-24/27-A2B Connection Status

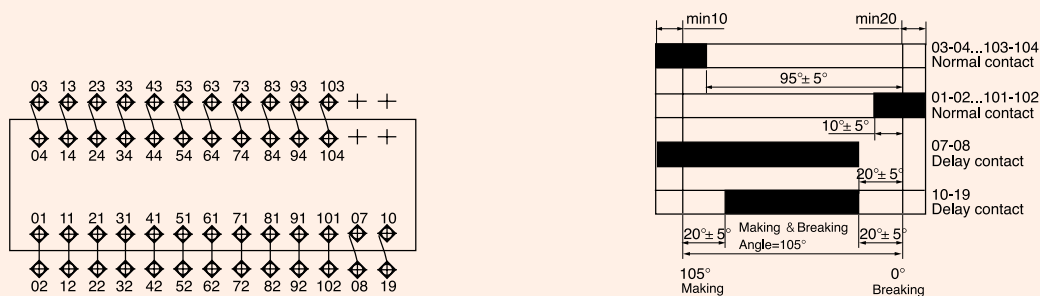
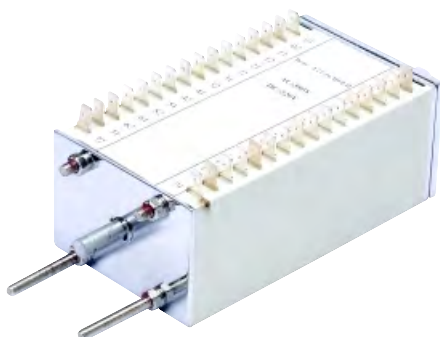


Fig. (1) F11-24/27-A2B Drawing

F11 Series Auxiliary Switch

b. F11-24/25II-B Drawing



F11-16

Item	Layers	L1(mm)	L2(mm)
F11-4/5II	5	111	49
F11-8/9II	9	141	79
F11-12/13II	13	171	109
F11-16/17II	17	201	139
F11-20/21II	21	231	169
F11-24/25II	25	261	199

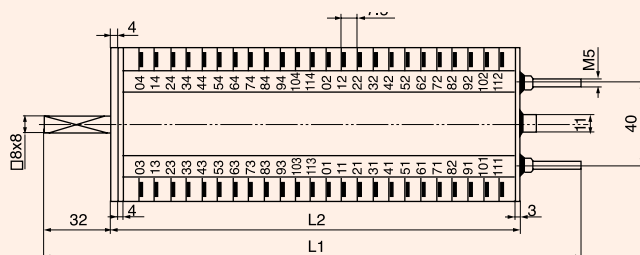
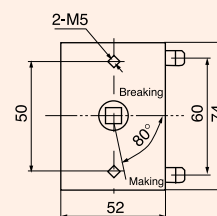
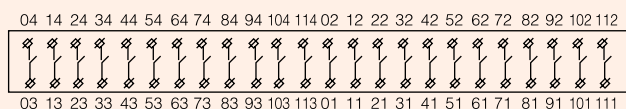


Fig. (3)F11-24/25II-B Drawing



Switching status of contacts



Connecting angle of contacts

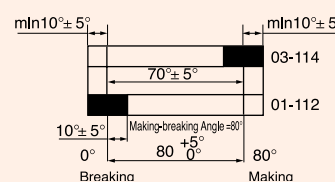


Fig. (4)F11-24/25II-B Connection Status

Structure & Working principle

a. Structure

F11 series auxiliary switch is composed of several parts. Insulated substrate resists heat, and dynamic contact is high elastic AgNi, with features of simple structure, reliable contact, big breaking current, good insulation performance, and long lifetime.

b. Working principle

F11 series is direct driving type, and the shaft is moved with the force from handle or belt. Dynamic contacts are pushed to move with shaft. The process of switching-on and switching-off is achieved by the contact or separating of dynamic contact and static contact.

Ordering instruction

Please indicate:

- Product's name, item (includes pairs of contacts or NO/NC numbers, style, and installation type)
- Quantity
- With/without operative connecting lever

F11-A Series Auxiliary Switch

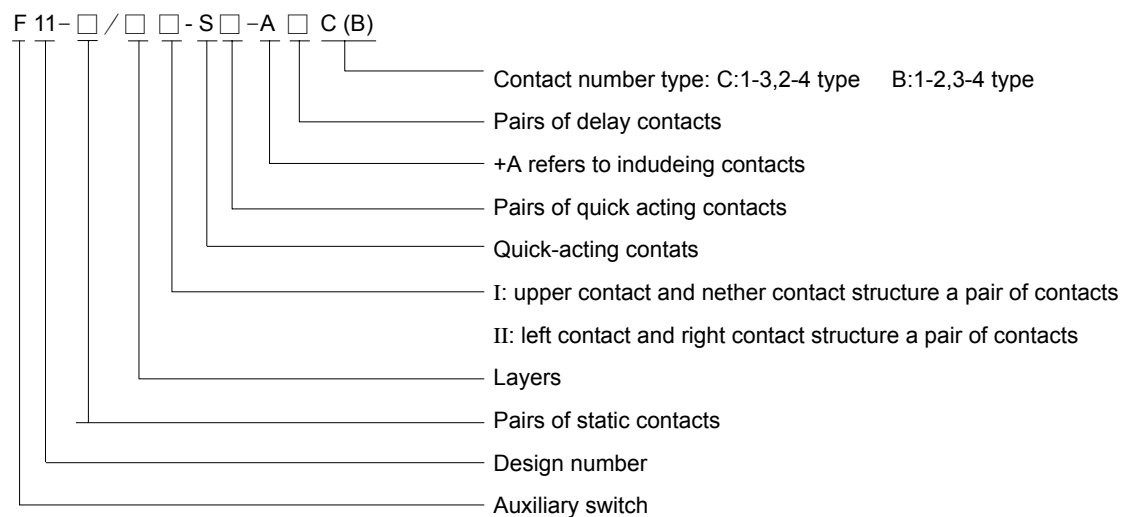
Application

The on-off time of HV circuit breaker is the key time parameter which influences the breaking capacity of circuit breaker. This series with delay contacts has properly resolved HV circuit breaker's on-off problem.

Working Conditions

- Ambient Temperature($-40^{\circ}\text{C} \leq t \leq 40^{\circ}\text{C}$)
- Height above sea Level($h \leq 3000\text{m}$)
- Daily mean relative air humidity $\leq 95\%$, Daily mean water vapor pressure $\leq 2.2 \text{ KPa}$, monthly mean relative air humidity $\leq 90\%$, monthly mean water vapor pressure $\leq 1.8 \text{ KPa}$.
- Oscillatory acceleration $\leq 15\text{m/s}^2$
- Situation of no sharp pounding, no explosion risk, no inductive dust, no air destroying insulators of corroding metal and so on.

Type sign



References

Parameter	AC		DC	
Rated Voltage	110V	220V	220V	380V
Rated Current	10A		10A	
Rated breaking Current	6A	3A	10A	
	t=20ms		cos φ=0.4	
Short-Time Withstand Current			30ms at 100A	
Lifetime	20,000 times		20,000 times	
1 min Industrial frequency withstand voltage	2,500V		2,500V	

F11-A Series Auxiliary Switch

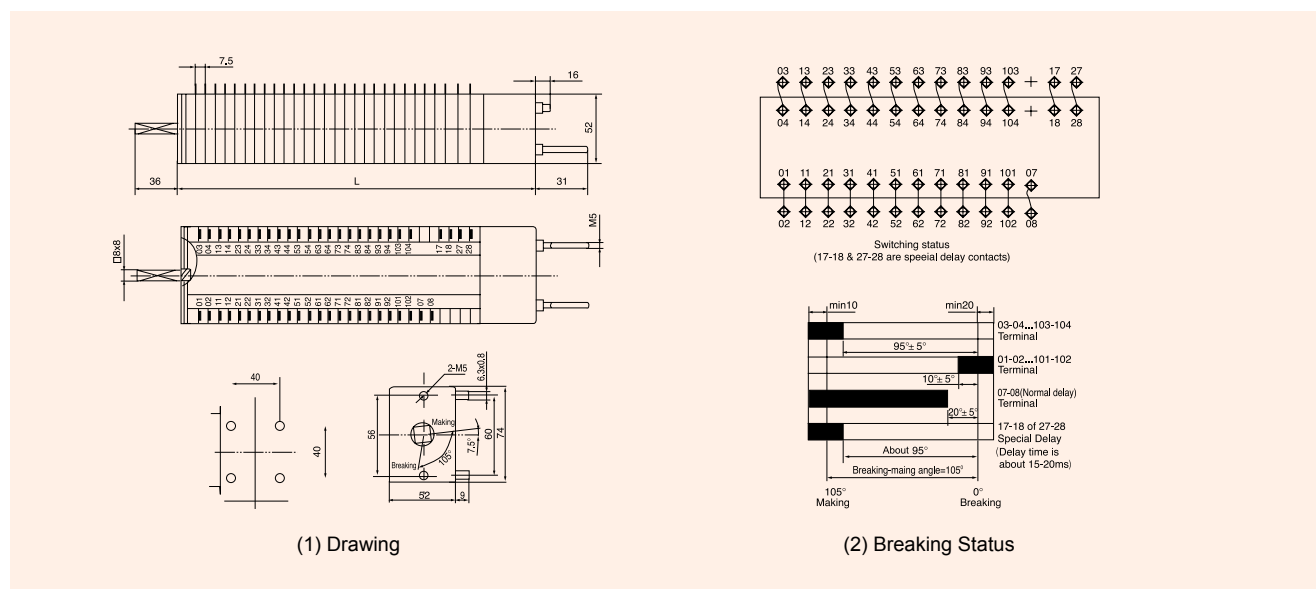
Drawing

a: F11-□/□-S2-A1B



Item	L(mm)	Remark
F11-9/13-S2-A1B	128	A pair of normal delay contacts & two pairs of quick-acting delay contacts
F11-13/17-S2-A1B	168	
F11-17/21-S2-A1B	198	
F11-21/25-S2-A1B	228	
F11-25/29-S2-A1B	258	

Dimensions:



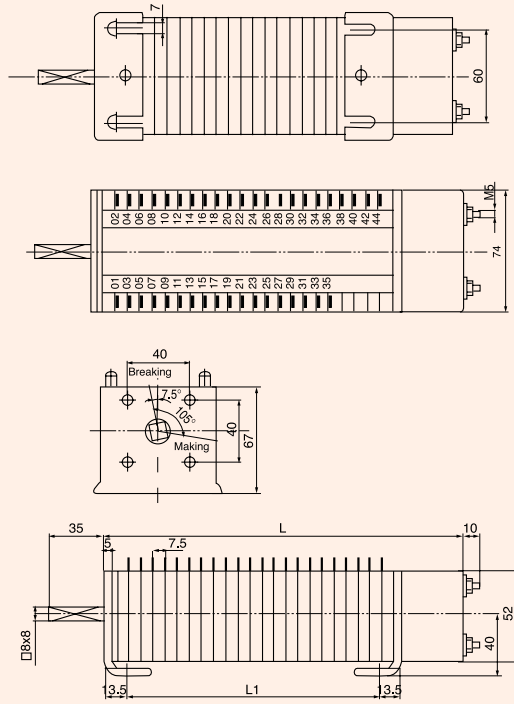
b: F11-□/□-S2□W



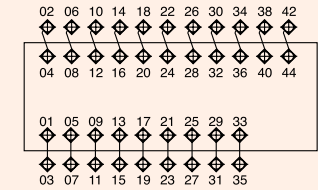
Item	L(mm)	L1(mm)	Remark
F11-10/13-S2CW	146	84	Two pairs of quick-acting contacts
F11-12/15-S2CW	161	99	
F11-14/17-S2CW	176	114	
F11-16/19-S2CW	191	129	
F11-18/21-S2CW	206	144	
F11-20/23-S2CW	221	159	
F11-22/25-S2CW	236	174	
F11-24/27-S2CW	251	189	
F11-26/29-S2CW	266	204	

F11-A Series Auxiliary Switch

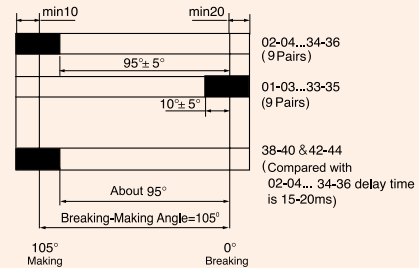
Dimensions:



(3) Drawing



Switching status of open position
(38-40 & 42-44 are low pairs of special delay contacts)



(4) Breaking Status

Structure & Working Principle

a. Structure

F11-A quick-acting delay auxiliary switch's drawing & installation size are signed as above.

b. Working principle

F11 series is direct driving type, and the shaft is moved with the force from handle or belt. Dynamic contacts are push to moved with shaft. The process of switching-on and switching-off is achieved by the contact or separating of dynamic contact and static contact. F11-A series contains 3 pairs of delay contacts; 1 pair of normal delay contacts 07-08, and 2 pairs of special delay contacts 17-18 & 27-28. Normal delay contacts drive the dynamic contacts with the main shaft, changing the length of static contacts to complete the delay. The dynamic contacts of special delay contacts are assembled on a small shaft, which is separated from the main shaft, and this can delay 15-20 ms.

Ordering instruction

Please indicate:

- Product's name, item (includes pairs of contacts or NO/NC numbers, style, and installation type)
- Quantity
- With/without operative connecting lever

F12 Series AC/DC Auxiliary Switch

Application

F12 series auxiliary switch is the part of HV operating mechanism, and applies to its switching on, switching off, interlock, and controlling of signal circuit.

Main features

Specific DC contacts control the closing coil and switching-off coil in DC 220V or 110V, and the breaking current can up to be 10A in DC 220V.

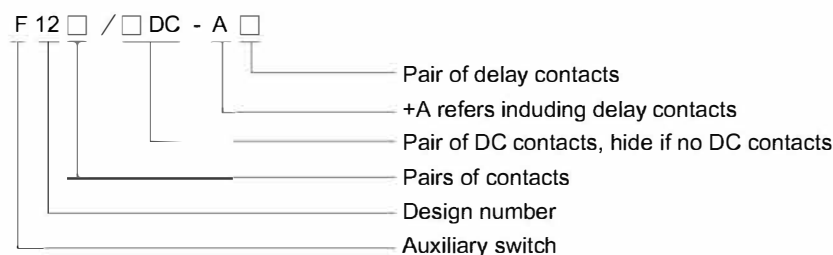
Contact is AgNi double-break bridging contact,with reliable connecting capacity,oxidation & corrosion resistance.

Long lifetime and using conveniently.

Working Conditions

- Ambient Temperature($-40^{\circ}\text{C} \leq t \leq 40^{\circ}\text{C}$)
- Height above sea Level($h \leq 3000\text{m}$)
- Daily mean relative air humidity $\leq 95\%$,Daily mean water vapor pressure $\leq 2.2 \text{ KPa}$, monthly mean relative air humidity $\leq 90\%$,monthly mean water vapor pressure $\leq 1.8\text{KPa}$.
- Oscillatory acceleration $\leq 15\text{m/s}^2$
- Situation of no sharp pounding, no explosion risk,no inductive dust, no air destroying insulators of corroding metal and so on.

Type sign



For example: F12-16/6DC:F12 series auxiliary switch, 16 pairs of contacts, 8 layers, 6 pairs(3 layers)are DC contacts.

F12-20-A4:F12 series auxiliary switch,20 pairs of contacts, 4 pairs of contacts among them are delay contacts.

References

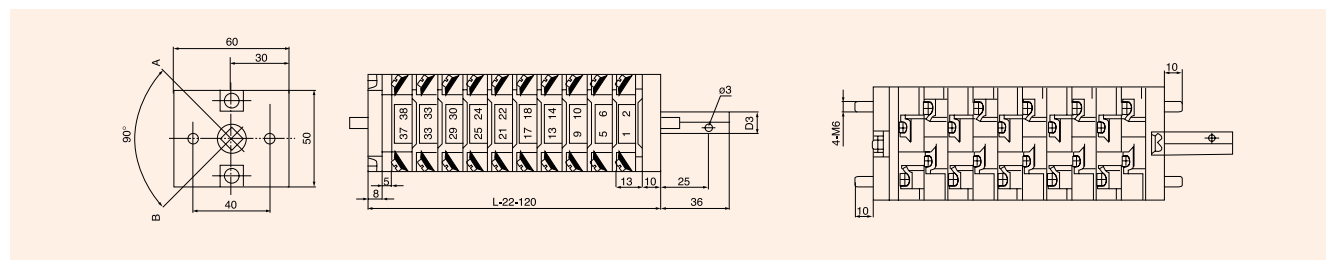
Parameter	DC		AC	
Rated Voltage	110V	220V	220V	380V
Rated Current	6A	3A	10A	
Rated breaking Current	20A	10A	70A	
	$t=20\text{ms}$		$\cos \Phi = 0.4$	
Short-Time Withstand Current			30ms at 100A	
Lifetime	20,000 times		20,000 times	
1 min Industrial frequency withsatand voltage	2,500V		2,500V	

F12 Series AC/DC Auxiliary Switch

Structure

- a. AgNi double-break bridging contact
- b. Magnetic arc contacts are available if required
- c. Delay contacts are available according to client's requirement.

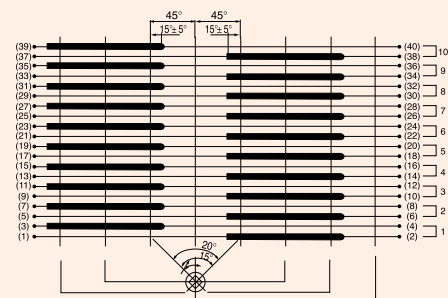
Drawing



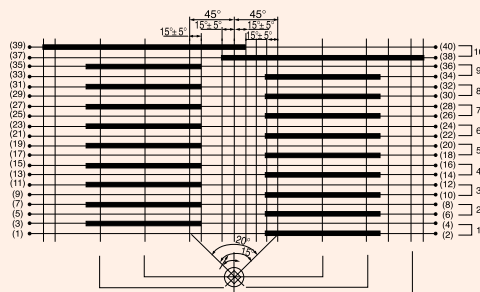
Size \ Item	F12-12	F12-16	F12-20	F12-24	F12-28
L	101	127	153	179	205

Switching Diagram

a. F12-20 normal switching diagram



b. F12-20-A2 with delay diagram



Ordering Instruction

Please indicate:

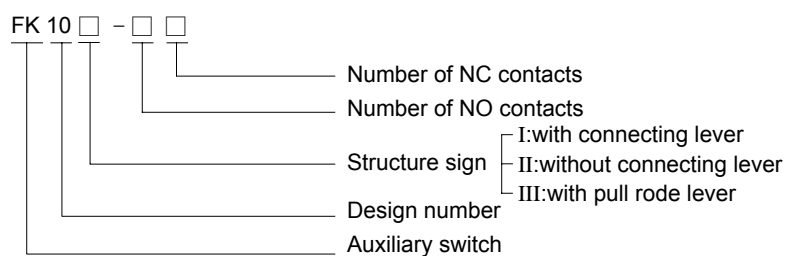
- a. Product's name,item(includes pairs of contacts or NO/NC numbers, style, and installation type)
- b. Quantity
- c.With/without operative connecting lever

FK10 Series Auxiliary Contact

Application

FK10 Series applies to AC vacuum contactor, solenoid switch, contactor, breaker and so on. For its contact is in quarantine, it applies to environment of dust. The contacts could be customized to be laged.

Type Sign



Main Technical Parameter

Rated voltage: AC 660V

Rated Frequency: 50Hz

Rated Current: 15A

Operative Parameter

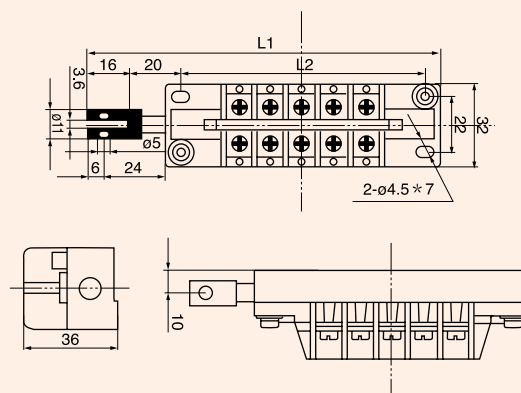
Actuating Force	Contact Pressure (NC contact)	Actuating Length	Electrode travel	Constriction Resistance	Delay Length
≤ 16N	>0.55N	4mm	>3mm	<50mΩ	± 0.3mm

Drawing

a. FK10-I- □ □ Series



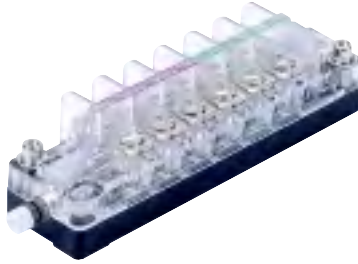
FK10-I-50



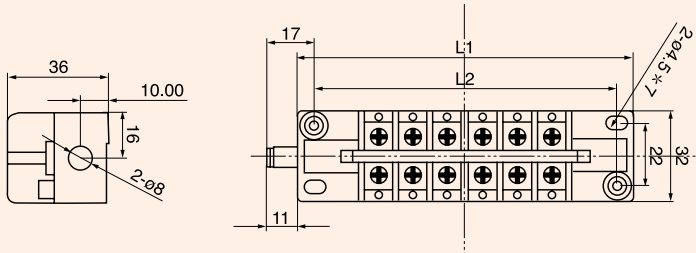
NO/NC	1NO+2NC	2	3NO+2NC	3	4	5
Layers	3	4	5	6	8	10
L1(mm)	100	112.5	125	137.5	162.5	187.5
L2(mm)	70	82.5	95	107.5	132.5	157.5

FK10 Series Auxiliary Contact

b. FK10-II-□□ Series



FK10-II-33

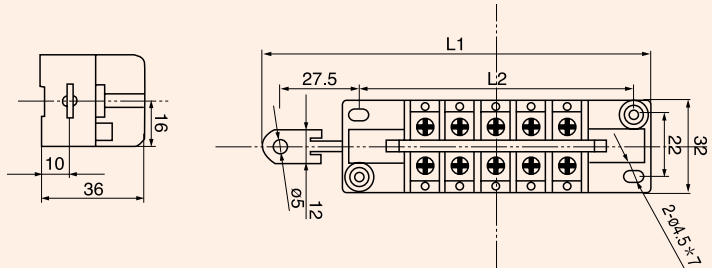


NO/NC	1NO+2NC	2	3NO+2NC	3	4	5
Layers	3	4	5	6	8	10
L1(mm)	93.5	106	118.5	131	156	181
L2(mm)	70.5	83	95.5	108	133	158

c. FK10-III-□□ Series



FK10-III-32



NO/NC	2	3NO+2NC	3	4
Layers	5	6	8	10
L1(mm)	135	147.5	172.5	197.5
L2(mm)	95.5	108	133	158

Ordering Instruction

Please notice:

- There are 3 kinds of connecting lever: "I", "II", "III".
- Number of NO/NC you need
- Number of layers
- With/without delay contacts

NK2G,NK2,NK3 Series Auxiliary Contact



NK2-1



NK2G-1



NK3-1

Application

It applies to AC vacuum contactor, solenoid switch, contactor, breaker and so on. Item NK3-1 includes three make-break contacts, and item NK2-1(A) includes two make-break contacts("A" refers to timelag). If one of these contacts breaks after contacting, delay length should be no less than 0.3mm.

Lifetime:

Electric lifetime $>30 \times 10^4$ times

Mechanical lifetime $>10 \times 10^5$ times

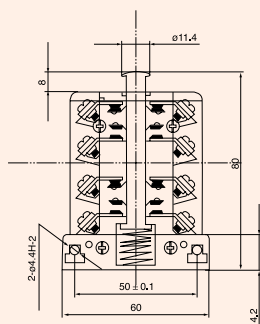
Electrical Load

Current Type	On-condition				Off-condition			
	Voltage(V)	Current(A)	Cos ϕ	T=0.95ms	Voltage(V)	Current(A)	Cos ϕ	T=0.95ms
AC	380	7.8	0.7 ± 0.05	/	380	7.8	0.4 ± 0.05	/
DC	220	0.27	/	300 ± 45	220	0.27	/	300 ± 45

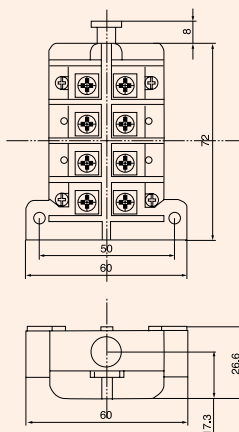
Action Options

Item	Max. Actuating Length (mm)	Min.Contact Over Travel (mm)	Max. Actuating Force (N)	Min.Contact Force (N)
NK2-1	2.5	3	14	0.55
NK2-1A				
NK2G-1				
NK3-1	3	1.5	20	0.8

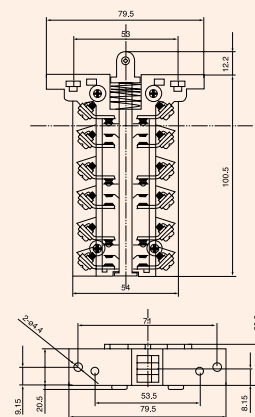
Drawing



NK2-1



NK2G-1



NK3-1

NK6 Series Auxiliary Contact



NK6-1

Application

This series applies to AC vacuum contactor, solenoid switch, contactor, breaker and so on. NK6-1(A) includes two make-break contacts("A" refers to timelag). If one of these contacts breaks after contacting, delay length should be no less than 0.5 mm.

Lifetime

Electric lifetime $>30 \times 10^4$ times

Mechanical lifetime $>10 \times 10^5$ times

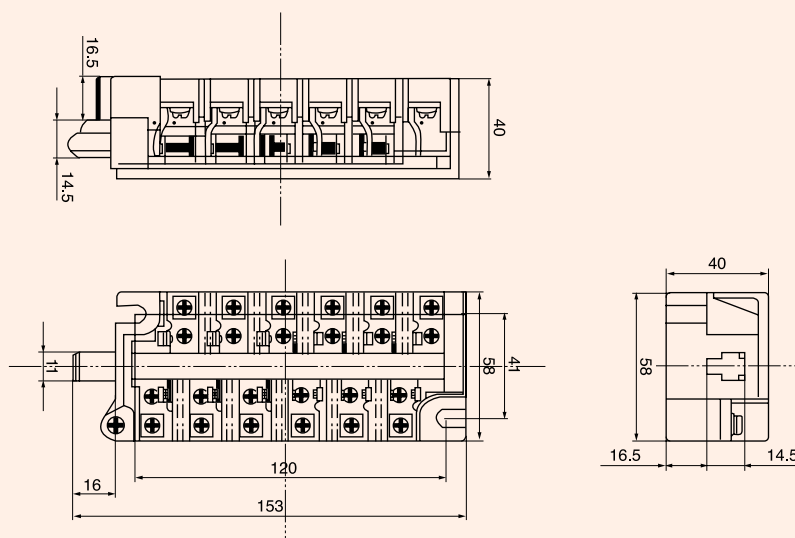
Electrical Load

Current Type	On-condition				Off-condition			
	Voltage(V)	Current(A)	cos ϕ	T0.95ms	Voltage(V)	Current(A)	cos ϕ	T=0.95ms
AC	380	15	0.7 \pm 0.05	/	380	1.5	0.4 \pm 0.05	/
DC	220	0.55	/	300 \pm 45	220	0.55	/	300 \pm 45

Action Options

Item	Max.Actuating length(mm)	Min.Contact over travel(mm)	Min.Delayed length (mm)	Max.Actuating force(N)	Min.Contact force(N)
NK6-1	8-10	2.5-3.5	/	20	0.8
NK6-1A	8-10	2.5-3.5	0.5	20	0.8

Drawing



CSK Series Magnetic Arc Switch

Introduction

CSK series magnetic arc switch applies to transferring mechanical movement to electrical sign, and also used for machine tools, mechanical engineering & automation, constrained motion, actuating mechanism and automatic program controlling.

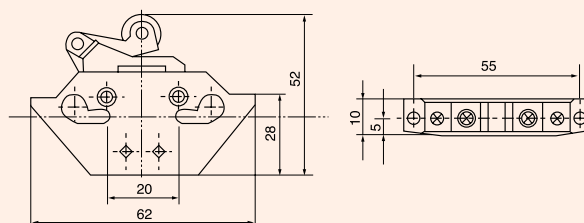
Drawing

1NO+1NC CSK-11



Working voltage: AC 380V DC 220V

Breaking capacity: AC 380V, 8A DC220V,3A

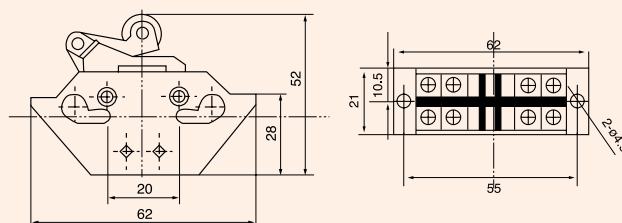


2NO+2NC CSK-22



Working voltage: AC 380V DC 220V

Breaking capacity: AC 380V, 8A DC220V,3A

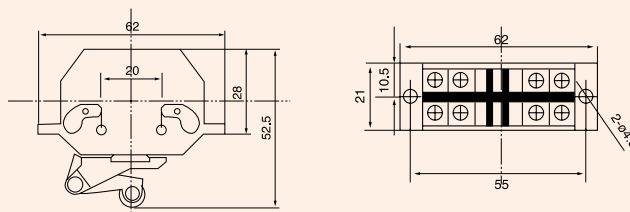


2NO+2NC CSK-11-22



Working voltage: AC 380V DC 220V

Breaking capacity: AC 380V, 8A DC220V,3A

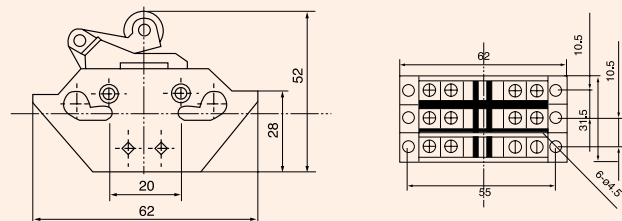


3NO+3NC CSK-11-33



Working voltage: AC 380V DC 220V

Breaking capacity: AC 380V, 8A DC220V,3A



SK Series Snap Action Switch

Application

Snap-action switches have been in use for decades and proved their reliability in innumerable applications.

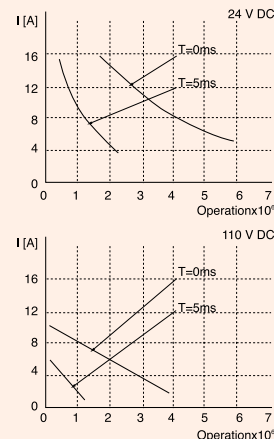
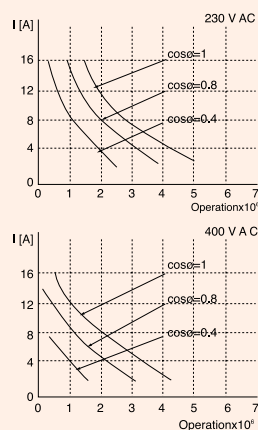
SK series switches are with double-break contacts, snap-action mechanism and positive opening operation which ensure a forced breaking of the normally closed contacts in case of spring failure or once the contacts have become welded together due to a short-circuit. This makes them ideally suited for use in safety related applications.

A characteristic feature of the SK series switch is the rapid motion of its contact bridge induced by the force of a pretensioned spring. This allows the handling of high electric loads at a slow actuating speed. Its rigid contact bridge is the cause of its high electrical rating, and thanks to its compact design the switch will fit in the most confined spaces.

Electrical Rating And Service Life

The curves are based on the results of electrical life tests carried out under laboratory conditions. The values are representative, but they are no guaranteed features.

The electrical life depends on external conditions such as rated voltage and current, type of load(resistive, capacitive, inductive), and operating frequency. Dust and harmful substances for instances result in a shorter contact life.



Maximum Breaking Capacity(inductive Load)

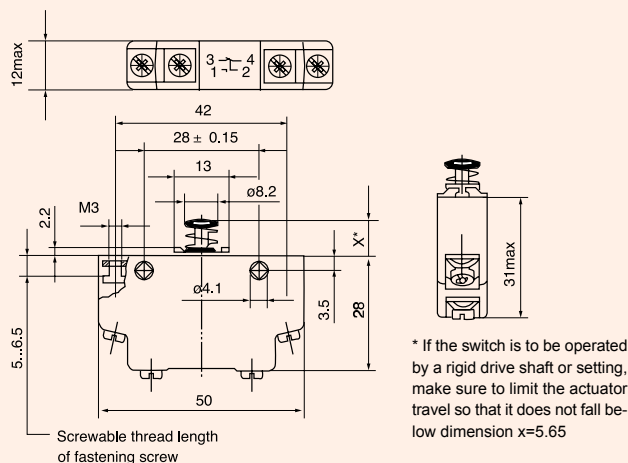
By switching off DC voltages arcs are generated. The maximum breaking capacity of a switch is ,therefore, determined by its breaking capacity for 20 operating cycles during which the arc gets still extinguished. The table shows the maximum breaking capacity values of the SK series switch for various voltages and time constants. In determining the electrical rating and operating life of a switch its maximum breaking capacity is reflected. However increased numbers of operations apply (see below).

Switching voltage	Maximum breaking capacity SK	Time constant L/R(msec)					
		5	10	20	30	40	50
DC 24V	without optional SK	>25A	>25A	>25A	>25A	>25A	>25A
	with magnetic blowout	>25A	>25A	>25A	>25A	>25A	>25A
DC 80V	without optional SK	16A	13.5A	8.5A	5.5A	4.5A	2.5A
	with magnetic blowout	>25A	>25A	24A	15A	10A	7A
DC 110V	without optional SK	6A	4A	2.7A	2A	1.5A	1.1A
	with magnetic blowout	21A	18A	12A	8A	5A	3.5A
DC 230V	without optional SK	1A	0.8A	0.7A	0.6A	0.5A	0.4A
	with magnetic blowout	1.3A	1A	0.9A	0.8A	0.7A	0.6A

Attention: With permanent currents exceeding $I_{th2}=10A$ either use the switch only for a short time of under a reduced maximum ambient temperature.

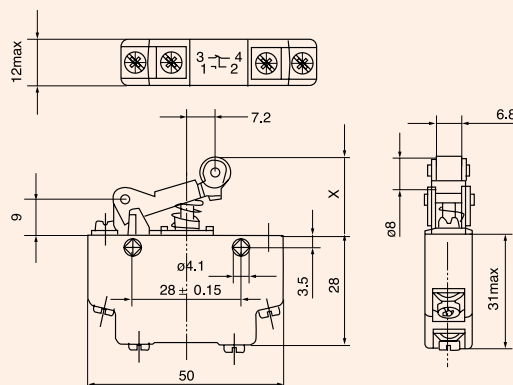
SK Series Snap Action Switch

SK-II a Pushbutton(standard)



Actuator position	Actuator travel (X)	Note
Free position	8.85mm±0.20mm	To ensure the proper workig of the positive opening operation it is necessary to depress the plunger to the point of total positive opening travel. However, it must not be squeezed beyond tatal travel
Operating position	6.60mm±0.35mm	
Release position	7.80mm±0.35mm	
Total positive opening travel	5.85mm	
Total travel position	5.65mm	
Differential movement (between operating and release position)	1.30mm(typical)	Circuit Diagram:

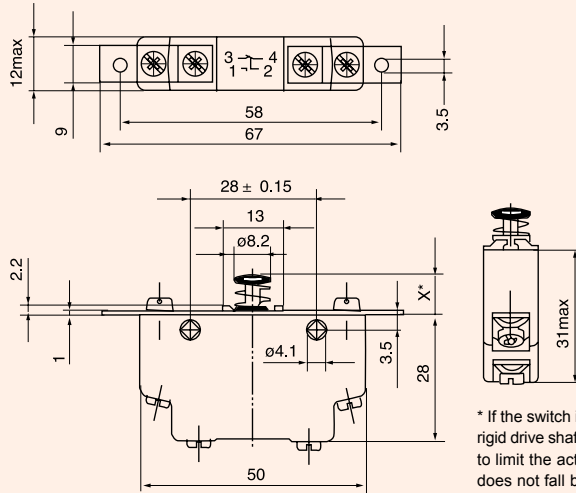
SK-II b Roller Lever



Actuator position	Actuator travel (X)	Note
Free position	20.25mm±0.35mm	Note:To ensure the proper workig of the positive opening operation it is necessary to depress the plunger to the point of total positive opening travel. However, it must not be squeezed beyond tatal travel
Operating position	16.60mm±0.5mm	
Release position	18.40mm±0.5mm	
Total positive opening travel	13.60mm	
Total travel position	13.30mm	
Differential movement (between operating and release position)	20.20mm(typical)	Circuit Diagram:

SK Series Snap Action Switch

S800 c Mounting brackets



Specification

Actuator position	Actuator travel (X)	Note
Free position	8.85mm±0.20mm	<p>Note: To ensure the proper work of the positive opening operation it is necessary to depress the plunger to the point of total positive opening travel. However, it must not be squeezed beyond total travel</p> <p>Circuit Diagram:</p>
Operating position	6.60mm±0.35mm	
Release position	7.80mm±0.35mm	
Total positive opening travel	5.85mm	
Total travel position	5.65mm	
Differential movement (between operating and release position)	1.30mm(typical)	

CSK-01 Series Magnetic Arc Switch

Application



The DC contact block to IEC947-5-5 EN 60947 DIN VDE 0660-200 and VDE0670/7& 20 is used for signalling and annunciation applications.

The snap-action mechanism prevents slow contact opening when the plunger is operated slowly. Quenching of the arc that occurs with DC is supported by two-capacity permanent magnets. These are arranged so that the polarity can be ignored when connecting +/- cabling.

However, the polarity of the quenching magnets must be noted when installing the contact blocks to prevent the magnets adversely affecting each other. Two rent colours are available for polarity identification of the magnets when fitted (see diagram below).

The contact blocks may only be installed on non-magnetizable materials with screws, etc. made of non-ferrous metal. The self-cleaning silver contacts are designed for low switching frequency, low currents and voltages. The screw connection M3.5 at the side is suitable for 2 conductors max. 2.5mm². The plug-in connection at the top 4.8 x 0.8 mm DIN 46247.

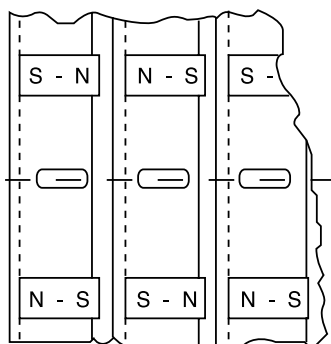
Several contact blocks can be plugged on top of each other and operated jointly.

The plug-type terminals are then only accessible on the top unit.

The contact blocks can be provided with shock protection to DIN VDE 0106 Part 100.

Please consult our technical department in the event of:

application in extreme nuisance, confined switching points or increased breaking current.



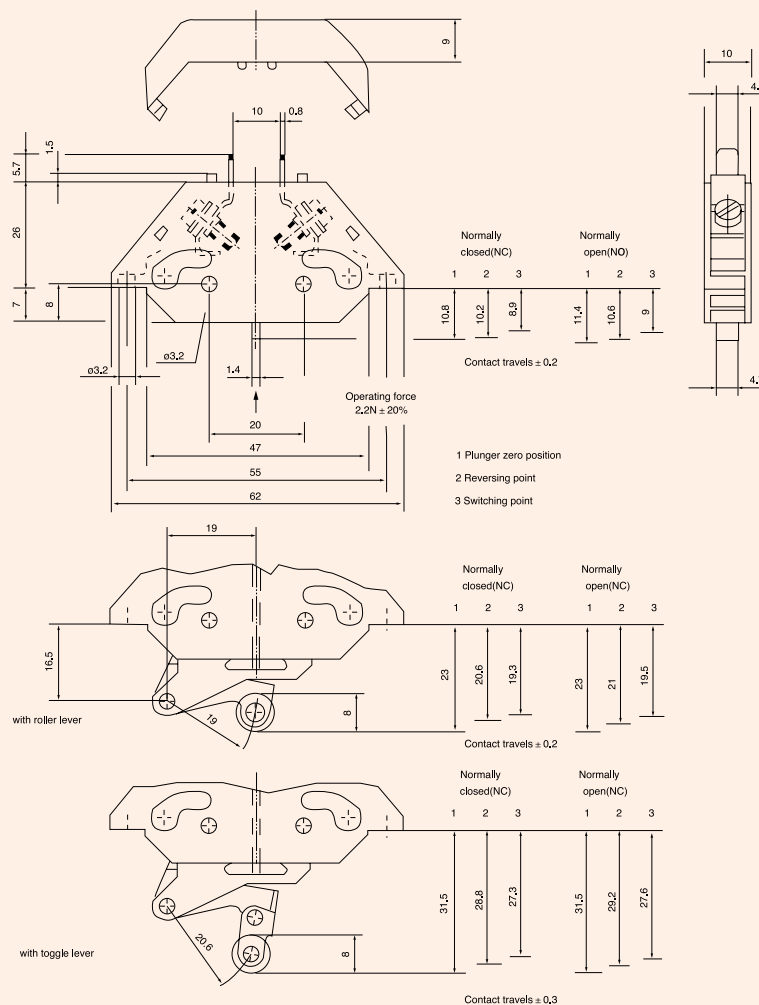
Unless otherwise requested, equal quantities translucent/ blue or yellow/green will be supplied.

Switching capacity			
	NC	NO	Time constant
DC 250V	2A	1A	20ms
DC 125V	4A	3A	20ms
DC 50V	6A	6A	20ms
DC 30V	10A	10A	20ms
AC 250V	6A	6A	15ms
Permissible ambient temperature	2 million operating cycles 50.000 operating cycles at 2A 250V DC L/R 20ms		
Mechanical life Electrical service life	Operation -40°C to +60°C Storage -50°C to +80°C		
Climate resistance Damp heat constant Damp heat cyclic Degree of protection	DIN IEC 68 part 2-3 DIN IEC 68 part 2-30 IP 40 IEC 529 DIN 40050		

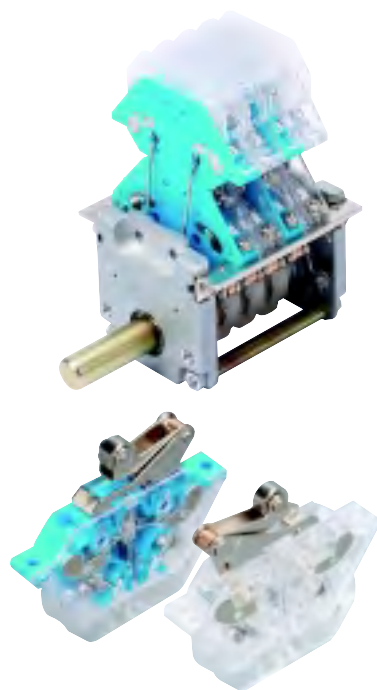
CSK-01 Series Magnetic Arc Switch

Pos.				Weight gramm	
1	DC-contact Normally closed(NC)			20	
	Colour code translucent or blue				
2	DC-contact normally open(NO)			20	
	Colour code yellow or green				
3	Shock protection KEG 142 to DIN VDE 0106 Part 100				
4	Roller lever			10	
5	Toggle lever(switching in one direction only)			15	
6	Plug-in connection at side 4.8 x 0.8mm(2 pieces)				
7	Contacts Sliver coated				
8	Contact without quenching magnets(for AC only)				
9	Contact without quenching magnets(for AC only) and without snap-action mechanism				

Drawing



GF2-CSK Series Cam Switch



Application

The cam switch GF2-CSK is used as a signal and annunciation switch in HV systems. This rugged switching device to IEC 947-5-5 EN 60947 DIN VDE 0660-200 and VDE 0670/4 & 20 has cam disks made of insulation material that can be set at 10° intervals. The switching rating of the contacts (NC with snap-action mechanism) is 6A 250V AC 15 or 2A 250V DC. Time constant L/R=20ms.

No contacts can also be supplied. The DC contact blocks are designed to permit series assembly, which can then be operated simultaneously.

This requires additional components for mounting the contacts.

Mechanical life: 2 million operating cycles

Permissible ambient temperature: Operation -40°C to +60°C


Storage -50°C to +80°C

Climate resistance

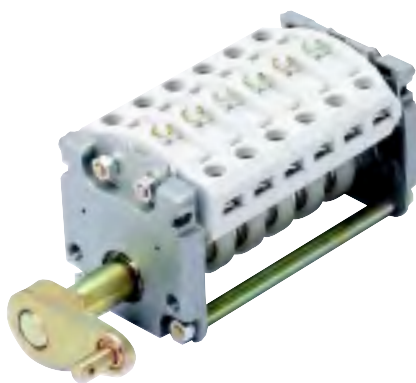
Damp heat constant: DIN IEC 68 part 2-3

Damp heat cyclic: DIN IEC 68 part 2-30

Degree of protection (in housing): IP 65 IEC 529 DIN 40050

Pos.		
1	Cam switch	No. of contacts 2
2	with free shaft end 12mm ø standard	4
3	or 12mm hexagonal	6
4	Switching program	8
5		10
6		12
7		14
8	or to your contact-arrangement	16
9	Switching program to your contact-arrangement	2
10	Components for mounting series contacts on top	4
11	with DC-contacts	8
12		12
13		16
14		
15	Second free shaft end 12mm ø standard or 12mm hexagonal	
16	Spring return in 0-position	
17	Switching sequence 4-0-4	
18	Mounting angles 2 pieces each signal-cam controller	
19	Link lever for shaft 12mm ø standard or 12mm hexagonal	
21	Plastic-cover (Astralon)	up to max 4
22	(Dust and shock protection)	8
23		12
24		16
25	Shock protection KEG 142 for DC-contacts to DIN VDE 0106 Part 100	
30		
31		

GF2 Series Cam Switch



Application

The cam switch GF2 is used as a signal and annunciation switch in HV systems. This rugged switching device to IEC 947-5-4 EN 60947 DIN VDE 0660-200 has cam disks made of insulation material that can be set at 10° intervals. The switching rating of the contacts (positively opened) is 4A 350V AC 15 res.1A 24V DC13.

Mechanical life:6 million operating cycles

Permissible ambient temperature:Operation -40°C to +60°C

Storage -50°C to +80°C

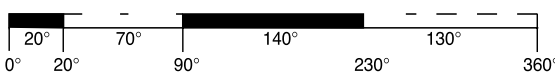
Climate resistance

Damp heat constant:DIN IEC 68 part 2-3

Damp heat cyclic:DIN IEC 68 part 2-30

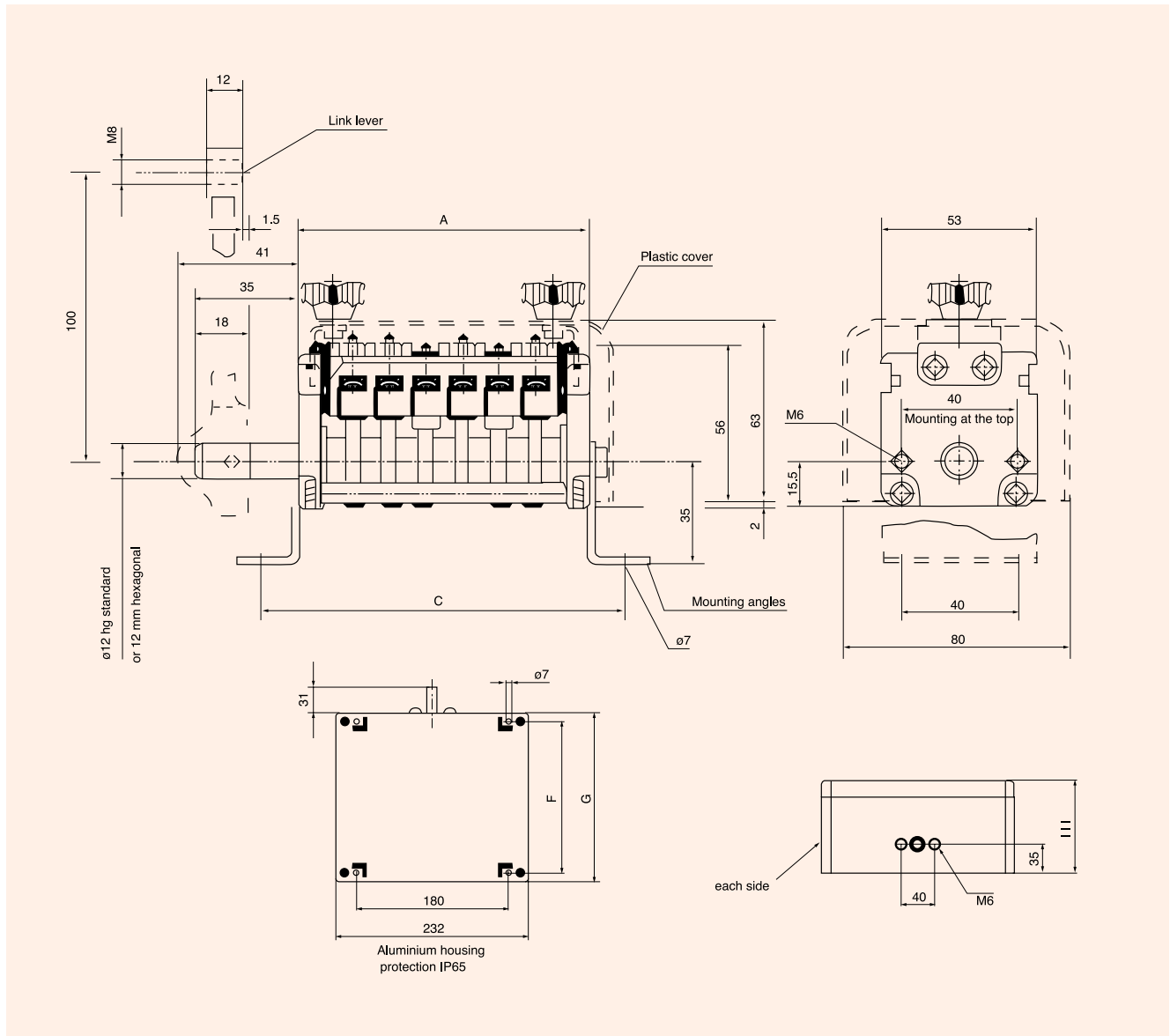
Degree of protection(in housing):IP 65 IEC 529 DIN 40050

Specification

Pos.					
1	Cam switch	No.of contact	2		
2	with free shaftend 12mm ø standard		4		
3	or 12mm hexagonal		6		
4	Switching program		8		
5			10		
6			12		
7			14		
8	or to your contact-arrangement		16		
9	Switching program to your contact-arrangement		2		
10					
11	Second free shaftend 12mm ø standard or 12mm hexagonal				
12	Spring return in 0-position				
13	Switching sequence 4-0-4				
14	Mounting angles 2 pieces each signal-cam controller				
15	Link lever for shaft 12mm ø standard or 12mm hexagonal				
21	Plastic-cover(Astralon)	up to max.	4		
22	(Dust and shock protection)		8		
			12		
			16		

GF2 Series Cam Switch

Drawing



Type	No. of contact	Dimens.A	Dimens.C	Housing	Dimens.F	Dimens.G
2	2	50	75	U 23/20	180	202
4	4	75	100			
6	6	100	125			
8	8	125	150			
10	10	152	177			
12	12	177	202	U 23/28	260	280
14	14	202	227			
16	16	227	252			

+7 (499) 380-73-40

inf@klemsan-rus.com

105005 Moscow, Aptekarskyi per. , 4-3

WWW.KLEMSAN-RUS.COM