Installation Contactors Z-SCH

These switching devices have been designed and rated particularly for modular installation in modular distribution boxes for electrical installation or cabinets with device covers. The innovative technology of the electrical AC magnet system of these switching devices, permits reducing the switching noise and suppressing humming while ensuring reliability and high contact forces in modular devices requiring little space. Thanks to these characteristics, the application requirements on systems and equipment in offices and residential areas are fully met.

The installation contactors Z-SCH are suitable for switching 1-phase or 3-phase consumers up to 63 A. These devices for universal use in systems and installations for buildings permit implementation of the following applications and control functions:

- Switching of lighting systems
- Switching of electrical heating systems
- Switching of ventilation systems
- Switching of air conditioning systems and fans
- Switching of heat pumps
- Switching of electrically controlled (motor-operated) roller doors/gates, and blinds
- etc.

The installation contactors of series Z-SCH meet the requirements of standards IEC 61095 and IEC 60947.

IEC 61095 deals with "Electromechanical contactors for household and similar purposes." Compliance with this standard means meeting very high demands in terms of safety for humans and property.

IEC 60947 deals with "Electromagnetic contactors in electrical system manufacturing."

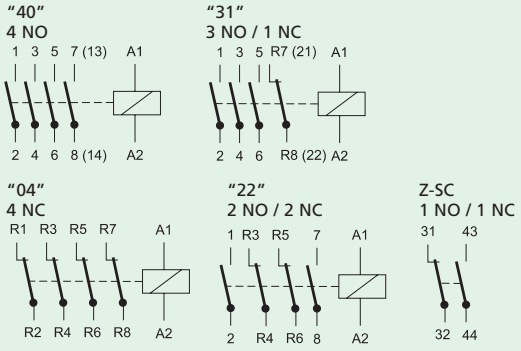
Safety:

- Finger and hand touch safe
- Front-side switch position indicator
- Hardly flammable materials and chlorine-free and halogen-free plastics are used

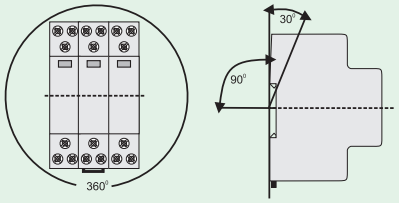
Advantages:

- Low switching noise
- No humming
- Easy to connect thanks to large terminals with captive connecting screws of type Pozidrive which are supplied open and equipped with a screwdriver guide for automatic wiring.
- Versions with different contacts configurations
- Simple snap-on fastening of 35 mm DIN rail
- In devices with 25 ... 63 A, flexibility is further enhanced by clip-on auxiliary switch Z-SC (contacts 11), laterally to the right.
- Plenty of space and easy access for coil feed connection
- Power ratings of 25, 40, 63A AC1 to meet field requirements.

Connection diagrams Z-SCH



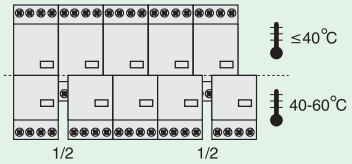
Permitted Installation Positions



Packing Density at full contact load

Z-SCH

It is recommended to use spacer Z-DST (0.5 MU) in case of ambient temperature higher than 40 °C.

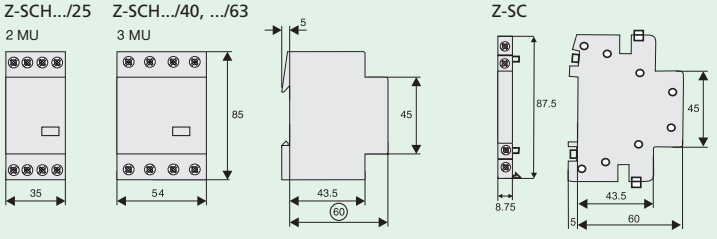


Dimensions [mm]

Z-SCH.../25 2 MU

Z-SCH.../40, .../63 3 MU

Z-SC



For types and art. numbers see page 54

Technical Data of Installation Contactors Z-SCH

Values according to IEC 61095, EN 61095, VDE 0660, IEC 60947-4-1, EN 60947-4-1, VDE			Z-SCH/25/..	Z-SCH/40/..	Z-SCH/63/..	Z-SC
Utilisation category AC1 (e.g. heating system)						
Rated operational current I_n (=I_{th}) open	at 60 °C	A	25	40	63	-
Service life of switching element		S x 10^6	0.1	0.1	0.1	-
Rated operational powern AC-1						
	220 - 240 V	kW	9.5	16	25	-
	380 - 415 V	kW	17	27.5	43	-
Utilisation category AC3 (Switching of 3-phase AC motors)						
Rated operational currentd I_n		A	9	27	30	-
Service life of switching elementu		S x 10^6	0.15	0.15	0.15	-
Rated power of 3-phase AC motors 50-60 Hz	230-240 V	kW	2.5	8	8.5	-
	380-415 V	kW	4	12.5	15	-
Utilisation category DC1 (Switching of resistive loads, L/R ≤ 15 ms) values for make contacts						
1-pole	24 V DC	A	25	40	63	-
	48 V DC	A	22	25	26	-
	60 V DC	A	18	19	21	-
	110 V DC	A	5	7	8	-
	220 V DC	A	0.5	0.7	0.7	-
2-pole in series	24 V DC	A	25	40	63	-
	48 V DC	A	25	40	44	-
	60 V DC	A	25	33	36	-
	110 V DC	A	16	17	18	-
	220 V DC	A	4	5	6	-
3-pole in series	24 V DC	A	25	40	63	-
	48 V DC	A	25	40	63	-
	60 V DC	A	25	40	61	-
	110 V DC	A	25	31	34	-
	220 V DC	A	10	15	16	-
4-pole in series	24 V DC	A	25	40	63	-
	48 V DC	A	25	40	63	-
	60 V DC	A	25	40	63	-
	110 V DC	A	25	40	63	-
	220 V DC	A	15	20	21	-
Utilisation category DC3 and DC55 (Switching of inductive load, L/R ≤ 15 ms) values for make contacts						
1-pole	24 V DC	A	15	23	25	-
	48 V DC	A	5	10	10	-
	60 V DC	A	4	5	5	-
	110 V DC	A	1	1.5	1.5	-
	220 V DC	A	0.1	0.3	0.3	-
2-pole in series	24 V DC	A	25	40	45	-
	48 V DC	A	17	23	25	-
	60 V DC	A	13	15	15	-
	110 V DC	A	5	5	5	-
	220 V DC	A	0.5	1	1	-
3-pole in series	24 V DC	A	25	40	63	-
	48 V DC	A	25	40	45	-
	60 V DC	A	25	30	30	-
	110 V DC	A	15	15	15	-
	220 V DC	A	3	4	4	-
4-pole in seriesi	24 V DC	A	25	40	63	-
	48 V DC	A	25	40	63	-
	60 V DC	A	25	40	63	-
	110 V DC	A	25	40	45	-
	220 V DC	A	8	10	10	-
Main Switching Elements (U_{imp} = 4 kV)						
Rated insulation voltage U_i		V AC	440	440	440	440
Rated operational voltage U_e		V AC	300	600	600	600
Mechanical endurance		S x 10^6	1	1	1	1
Auxiliary Switching Elements (U_{imp} = 4 kV)						
Rated insulation voltage U_i		V AC	440	440	440	440
Nominal thermal current = I_{th}	40 °C	A	25	40	63	10
	60 °C	A	25	40	63	6
Utilisation category AC15						
(Controlling of electromagnetic load)						
Rated operational current I_e	220-240 V	A	-	-	-	3
	380-415 V	A	-	-	-	2
	440 V	A	-	-	-	1.6
Utilisation category DC13						
(Controlling of electromagnetic load at DC))						
Rated operational current I_e per pole	24-60 V	A	-	-	-	2
	110 V	A	-	-	-	0.4
	220 V	A	-	-	-	0.1

For types and art. numbers see page 54

				Z-SCH/25/..	Z-SCH/40/..	Z-SCH/63/..	Z-SC
Trip **Coil** Power	Rated voltage of coils		V AC	24, 230	230	230	230
⏦	Switching on		VA	14 - 18	33 - 45	33 - 45	-
	Holding		VA	4.4 - 8.4	7	7	-
			W	1.6 - 3.2	2.6	2.6	-
Operating range of trip coils							
Coil voltage range (multiplication factor) U_e				0.85 - 1.1	0.85 - 1.1	0.85 - 1.1	-
Pv Power loss per current path			W	2	3	7	0.5
Pvges. Power loss		1-pole	W	5.2	5.6	5.6	-
per device		2-pole	W	7.2	8.6	16.6	-
at nominal current load		3-pole	W	9.2	11.6	23.6	-
		4-pole	W	11.2	14.6	30.6	-
Surface temperature at front side							
Max. value according to IEC / EN / VDE			°C	40	40	40	-
Typical values in case of duty of all poles			°C	25	27	31	-
Surface temperature at lateral side							
Max. value according to IEC / EN / VDE			°C	50	50	50	-
Typical values in case of duty of all poles			°C	35	27	40	-
Terminal over-temperature (new device)							
Max. value according to IEC / EN / VDE			°C	65	65	65	-
Typical values in case of duty of all poles			°C	44	36	48	-
Switching noise (on and off)							
Typical mean values			dB	80	78	78	-
Terminal capacity							
Main conductor	one or several wires		mm^2	1.5 - 10	2.5 - 25	2.5 - 25	0.5 - 2.5
	fine wires		mm^2	1.5 - 6	2.5 - 16	2.5 - 16	0.5 - 2.5
	fine wires with wire end sleeve		mm^2	1.5 - 6	2.5 - 16	2.5 - 16	0.5 - 1.5
	number of conductors per terminal			1	1	1	2
Coil	one or several wires		mm^2	0.75 - 2.5	0.75 - 2.5	0.75 - 2.5	-
	fine wires		mm^2	0.5 - 2.5	0.5 - 2.5	0.5 - 2.5	-
	fine wires with wire end sleeve		mm^2	0.5 - 1.5	0.5 - 1.5	0.5 - 1.5	-
	number of conductors per terminal			1	1	1	-
Weight			kg / unit	0.22	0.36	0.36	0.026
Short circuit protection (main circuit)							
Maximum nominal current of fuse							
Co-ordination type (1)		gL /gG	A	35	63	80	-
Short circuit protection (auxiliary circuit)							
Maximum nominal current of fuses							
Short-circuit current 1 kA, without fusing							
of contacts		gL /gG	A	-	-	-	10
Switching times at control voltage U_s ±10 %							
		Make delay	ms	9 - 15	11 - 15	11 - 15	-
		Break delay	ms	4 - 8	6 - 13	6 - 13	-
		Arc duration	ms	10 - 15	10 - 15	10 - 15	-

Installation Contactors Z-SCH for Lighting Systems

The decisive factors are the type, connection and current consumption of lamps during switch-on and in permanent operation. Only 90 % of the continuous current of switching devices should be used in view of higher current consumption as a result of increases of voltage. The maximum number of lamps per phase that can be operated by a switching device is dependent on the nominal current and making current of lamps on the one hand, and on the continuous current and making capacity of the switching devices on the other. Thus, e.g. in lead-lag circuits, the continuous current of contactors can be used, while this is not possible in fluorescent tubes with separate compensation.

					Z-SCH/25/..	Z-SCH/40/..	Z-SCH/63/..	Z-SC
Utilisation category AC-1	Rated operational current 60 °C		I_e pro AC-1	A	25	40	63	-
resistive load	Making capacity:		Root mean square	A	165	300	400	-
			Peak value	A	233	424	565	-
Utilisation category AC-5a	Rated operational power		cosφ = 0.5	kW	1.3	3.4	5.5	-
discharge lamps, fluorescent tubes	220-240 V~		cosφ = 0.9	kW	0.4	1.6	2.1	-
	DUO			kW	3.7	6.3	10	-
Utilisation category AC-5b	Rated operational power			kW	1.8	3.6	5.1	-
incandescent lamps	220-240 V~							

Incandescent Lamps

The incandescent lamp filament has a very low ohmic resistance when it is cold. Therefore, when switching on, there is a high peak current (up to 20x I_n).
When switching off, only the nominal current is switched off.

	Power	Current	Z-SCH/25/..	Z-SCH/40/..	Z-SCH/63/..	Z-SC
Utilisation category AC-5b	W	A	ks	ks	ks	
Incandescent lamps	60	0.27	28	58	85	-
	100	0.45	17	35	51	-
	200	0.91	8	17	25	-
	300	1.36	5	11	16	-
	500	2.27	3	7	10	-
	1000	4.5	1	3	5	-
	max. number of lamps per current path at 230 V, 50 Hz					

For types and art. numbers see page 54

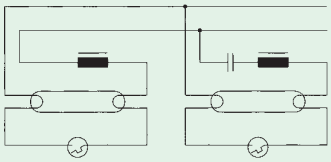
Fluorescent Tubes, Mercury Arc Lamps

High- and low pressure discharge lamps with mercury vapour, with or without fluorescent-coated glass body are perfectly identical in their electrical behaviour.
In order to limit the operational current and pre-conduction current, and to achieve the initial peak voltage, reactance coils are used as ballast. Capacitors are used for compensation of the resulting reactive current, which are either connected in series with the coil (lead-lag circuit) or parallel to the mains (separate compensation, very rarely used now). The high making current in case of separate compensation (max. 30 x nominal current of the capacitor) which goes down quickly is usually attenuated considerably by the feed line.

Utilisation category AC-5a		
Fluorescent tubes	Fluorescent lamps without comp. or with series comp.	$I = I_{eAC1} \times 0.5$
	Lead-lag circuit (2x..)	$I = I_{eAC1} \times 0.35$
	Fluorescent tubes parallelkomp	$I = I_{Peak} / 100$ (take into account compensation capacitor)
I / I_{Lampe} = number of connectable lamps per current path	Fluorescent tubes with electronic ballast	$I = I_{Peak} / 50$
	Mercury arc lamps,HD without compensation	$I = I_{eAC1} \times 0.5$
	Mercury arc lamps,HD with compensation	$I = I_{Peak} / 100$ (take into account compensation capacitor)

Utilisation category AC-5a		Power	Current	Capacitor	max. number of lamps per current path at 230 V, 50 Hz			
Lamp Types		W	A	µF	Z-SCH/25/..	Z-SCH/40/..	Z-SCH/63/..	Z-SC
	Fluorescent lamps without compensation or with series compensation	11	0.16	-	75	210	310	-
		18	0.37	2.7	30	90	140	-
		24	0.35	2.5	30	90	140	-
		36	0.43	3.4	25	70	140	-
		58	0.67	5.3	17	45	70	-
		65	0.67	5.3	16	40	65	-
		85	0.8	-	14	35	60	-
	Fluorescent tubes lead-lag circuit	11	0.07	-	2 x 110	2 x 220	2 x 250	-
		18	0.11	-	2 x 55	2 x 130	2 x 200	-
		24	0.14	-	2 x 44	2 x 110	2 x 160	-
		36	0.22	-	2 x 33	2 x 70	2 x 100	-
		58	0.35	-	2 x 22	2 x 46	2 x 70	-
		65	0.35	-	2 x 16	2 x 40	2 x 60	-
		85	0.47	-	2 x 11	2 x 30	2 x 40	-
	zářivky se sériovou kompenzací	18	0.37	2.7	30	90	140	-
		24	0.35	2.5	30	90	140	-
		65	0.67	5.3	16	40	65	-
	Fluorescent tubes with parallel comp.	11	0.16	2.0	30	100	140	-
		18	0.37	2.0	20	70	90	-
		24	0.35	3.0	15	55	75	-
		36	0.43	4.5	10	38	51	-
		58	0.67	7.0	6	25	30	-
		65	0.67	7.0	5	24	28	-
		85	0.8	8.0	4	18	23	-
	Fluorescent tubes with electronic ballast	18	0.09	-	40	100	150	-
		36	0.16	-	20	50	75	-
		58	0.25	-	15	30	55	-
	Mercury arc lamps. high pressure without compensation e.g.: HQL, HPL	50	0.61	-	18	38	55	-
		80	0.8	-	14	28	40	-
		125	1.15	-	9	20	28	-
		250	2.15	-	5	11	15	-
		400	3.25	-	4	7	10	-
		700	5.4	-	2	4	6	-
		1000	7.5	-	1	3	4	-
	Mercury arc lamps, high pressure with compensation e.g.: HQL, HPL	50	0.28	7	7	32	46	-
		80	0.41	8	5	25	35	-
		125	0.65	10	3	16	22	-
		250	1.22	18	2	8	12	-
		400	1.95	25	1	5	7	-
		700	3.45	45	1	3	4	-
		1000	4.8	60	-	2	3	-

Fluorescent lamps in DUO connection (cos φ = 1)



For types and art. numbers see page 54

Metal Halide Lamps

Metal halide lamps are a version of high-pressure mercury arc lamps with higher luminous efficiency and fidelity of colour (metalloids [halogens] added to the mercury fill up the Hg-spectrum with its many gaps). Ballast and ignition devices are necessary. Starting time 3 ... 5 minutes at 1.4 - 2 x I. After switching on, it is not possible to light the lamp again immediately (lamp extinguishes after a power cut-off of only 1/2 period). Therefore, in many cases in important facilities ionisation of part of the lamps is maintained by switching over to 415 V, 500 Hz (e.g. to an emergency power supply). In this case, the lamp lights immediately after the mains voltage is on again. Otherwise, this would take several minutes. When using suitable ignition devices, the lamps can be lit again immediately.

I / I_{Lampe} = number of connectable lamps per current path	Metal halide lamps (HQI) without compensation	$I = I_{eAC1} \times 0.5$
	Metal halide lamps (HQI) with compensation	$I = I_{Peak} / 100$ (take into account compensation capacitor)
	Transformer for low voltage halogen lamps	$I = I_{Peak} / 50$

	Power	Current	Capacitor	max. number of lamps per current path at 230 V, 50 Hz			
Lamp Types	W	A	µF	Z-SCH/25/..	Z-SCH/40/..	Z-SCH/63/..	Z-SC
Metal halide lamps without compensation e.g.. HQI, HPI	35	0.53	-	24	45	65	-
	70	1	-	14	24	35	-
	150	1.8	-	8	13	18	-
	250	3	-	5	8	12	-
	400	3.5	-	4	6	10	-
	1000	9.5	-	1	2	4	-
	2000	16.5	-	-	1	2	-
Metal halide lamps with compensation e.g.. HQI, HPI	35	0.25	6	8	38	50	-
	70	0.45	12	4	20	28	-
	150	0.75	20	2	12	17	-
	250	1.5	33	1	7	10	-
	400	2.1	35	1	5	7	-
	1000	5.8	95	-	2	3	-
	2000	11.5	148	-	1	1	-
Transformers for low-voltage halogen lamps	20	-	-	52	110	174	-
	50	-	-	24	50	80	-
	75	-	-	16	35	54	-
	100	-	-	12	27	43	-
	150	-	-	9	19	29	-
	200	-	-	5	14	23	-
	300	-	-	4	9	14	-

Sodium Vapour Lamps

For 200 W, 1200 mm high-pressure lamps and low-pressure lamps, reactance coils are used as ballast. For smaller lamps, stray field transformers can be used as ballast. Take into account, the long starting period.

Low pressure lamps:

Without compens.: Making curr. 1 x XI_e, cosφ = 0.3; starting time 5 .. 10 min
Decisive for selection of device: 60 % continuous current
$I = I_{eAC1} \times 0.6$

With compensation: Making curr.: 20 x XI_e, cosφ = 0,45; starting time 5 .. 10 min (at 1.6 x I_n), $I = I_{Peak}/200$

High pressure lamps:

Without compens.: Making curr. 1.4 x XI_e, cosφ 0.5; starting time 5 .. 10 min
Decisive for selection of device: 60 % continuous current
$I = I_{eAC1} \times 0.6$

With compensation: Making curr.: 20 x XI_e, cosφ = 0.95; starting time 5 .. 10 min (at 1,6 x I_n)

Note: number of lamps

	Power	Current	Capacitor	max. number of lamps per current path at 230 V, 50 Hz			
	W	A	µF	Z-SCH/25/..	Z-SCH/40/..	Z-SCH/63/..	Z-SC
Sodium vapour lamps low-pressure without compensation	35	1.5	-	9	22	30	-
	55	1.5	-	9	22	30	-
	90	2.4	-	6	13	19	-
	135	3.5	-	4	10	13	-
	150	3.3	-	4	10	13	-
	180	3.3	-	4	10	13	-
	200	3.3	-	4	10	13	-
Sodium vapour lamps low-pressure with compensation	35	0.31	20	3	12	16	-
	55	0.42	20	2	8	14	-
	90	0.63	30	1	5	9	-
	135	0.94	45	1	3	6	-
	150	1	40	1	3	6	-
	180	1.16	40	1	2	5	-
	200	1.32	25	-	2	4	-
Sodium vapour lamps high-pressure without compensation	150	1.8	-	6	11	22	-
	250	3	-	5	7	13	-
	330	3.7	-	4	6	10	-
	400	4.7	-	2	5	8	-
	1000	10.3	-	1	2	4	-
Sodium vapour lamps high pressure with compensation	150	0.83	20	2	7	14	-
	250	1.5	33	2	4	8	-
	330	2	40	1	3	6	-
	400	2.4	48	1	2	5	-
	1000	6.3	106	-	1	2	-

For types and art. numbers see page 54

Utilisation Categories of Contactors

Type of current	Utilisation category	Typical Applications I = Making current, I_c = Breaking current, I_e = Rated operational current, U = Voltage, U_e = Rated operational voltage, U_r = Recovery voltage	Verification of electrical service life							Verification of switching capacity						
			Switching on				Switching off			Switching on				Switching off		
			I_e A	$\frac{I}{I_e}$	$\frac{U}{U_e}$	cosφ	$\frac{I_c}{Ie}$	$\frac{U_r}{Ue}$	cosφ	I_e A	$\frac{I}{I_e}$	$\frac{U}{U_e}$	cosφ	$\frac{I_c}{I_e}$	$\frac{U_r}{U_e}$	cosφ
AC	AC-1	Non-inductive or slightly inductive load Resistance furnaces	all values	1	1	0.95	1	1	0.95	all values	1.5	1.05	0.8	1.5	1.05	0.8
	AC-2	Slip ring motors: starting, switching off	all values	2.5	1	0.65	2.5	1	0.65	all values	4	1.05	0.65	4	1.05	0.8
	AC-3	Squirrel cage motors: starting, switching off (running motors[4])	$I_e \leqq 17$	6	1	0.65	1	0.17	0.65	$I_e \leqq 100$	10	1.05	0.45	8	1.05	0.45
			$I_e > 17$	6	1	0.35	1	0.17	0.35	$I_e > 100$	8	1.05	0.35	6	1.05	0.35
	AC-4	Squirrel cage motors: starting, plugging reversing, inching	$I_e \leqq 17$	6	1	0.65	6	1	0.65	$I_e \leqq 100$	12	1.05	0.45	10	1.05	0.45
			$I_e > 17$	6	1	0.35	6	1	0.35	$I_e > 100$	10	1.05	0.35	8	1.05	0.35
	AC-5	Switching of electric discharge lamp controls									3.0	1.05	0.45	3.0	1.05	0.45
	AC-5b	Switching of incandescent lamps									1.5[2]	1.05	[2]	1.05[2]	1.05	[2]
	AC-6a[3] AC-6b[3]	Switching of transformers Switching of capacitor banks														
	AC-7a	Slightly inductive loads in household appliances and similar applications	according to manufacturer specifications								1.5	1.05	0.8	1.5	1.05	0.8
	AC-7b	Motor loads for household appliances									8.0	1.05	[1]	8.0	1.05	[1]
	AC-8a	Switching of hermetically enclosed refrigerant compressor motors with manual reset of overload releases[5]									6.0	1.05	[1]	6.0	1.05	[1]
	AC-8b	Switching of hermetically enclosed refrigerant compressor motors with automatic reset of overload releases[5]									6.0	1.05	[1]	6.0	1.05	[1]
DC	DC-1	Non-inductive or slightly inductive load, Resistance furnaces	all values	1	1	1	1	1	1	all values	1.5	1.05	1	1.5	1.05	1
	DC-3	Shunt motors: starting, plugging, reversing, inching, dynamic braking	all values	2.5	1	2	2.5	1	2	all values	4	1.05	2.5	4	1.05	2.5
	DC-5	Series motors: starting, plugging, reversing, inching, dynamic braking	all values	2.	1	7.5	2.5	1	7.5	all values	4	1.05	2.5	4	1.05	2.5
	DC-6	Switching of incandescent lamps									1.5[2]	1.05	[2]	1.5[2]	1.05	[2]
according to IEC 947-4-1, EN 60 947 VDE 0660 Part 102																

[1] cosφ = 0.45 for $I_e \leq 100$ A; cosφ = 0.35 for $I_e \leq 100$ A.
[2] The tests must be carried out with an incandescent lamp load connected.
[3] In this case, the test data must be derived from the test values for AC-3 or AC-4 according to a special table.
[4] Devices for utilisation category AC-3 may be used for occasional inching or plugging during a limited period, such as for setting up a machine. However, during this limited period of time, the number of operations must not exceed five per minute or ten in a ten minute period.
[5] Hermetically enclosed refrigerant compressor motor means a combination of a compressor and a motor both of which are housed in the same enclosure with no external shaft or shaft seals, the motor running in the refrigerant.

Utilisation Categories of Auxiliary Switches

Type of current	Utilisation category	Typical Applications I = Making current, I_c = Breaking current, I_e = Rated operational current, U = Voltage, U_e = Rated operational voltage, U_r = Recovery voltage, $t_{0.95}$ = the time in ms until 95 % of the stationary current has been reached, P = U_e x I_e = Rated power in Watts	Normal conditions of use						Divergent conditions of use					
			Switching on			Switching off			Switching on			Switching off		
			$\frac{I}{I_e}$	$\frac{U}{U_e}$	cosφ	$\frac{I}{Ie}$	$\frac{U}{Ue}$	cosφ	$\frac{I}{I_e}$	$\frac{U}{U_e}$	cosφ	$\frac{I}{I_e}$	$\frac{U}{U_e}$	cosφ
AC	AC-12	Control of resistive and solid state loads in optocoupler input circuits	1	1	0.9	1	1	0.9	-	-	-	-	-	-
	AC-13	Control of solid state loads with transformerisolation	2	1	0.65	1	1	0.65	10	1.1	0.65	1.1	1.1	0.65
	AC-14	Control of small electromagnetic loads (max. 72 VA)	6	1	0.3	1	1	0.3	6	1.1	0.7	6	1.1	0.7
	AC-15	Control of electromagnetic loads (above 72 VA)	10	1	0.3	1	1	0.3	10	1.1	0.3	10	1.1	0.3
			$\frac{I}{I_e}$	$\frac{U}{U_e}$	$t_{0.95}$	$\frac{I}{Ie}$	$\frac{U}{Ue}$	$t_{0.95}$	$\frac{I}{I_e}$	$\frac{U}{U_e}$	$t_{0.95}$	$\frac{I}{I_e}$	$\frac{U}{U_e}$	$t_{0.95}$
DC	DC-12	Control of resistive and solid state loads in optocoupler input circuits	1	1	1 ms	1	1	1 ms	-	-	-	-	-	-
	DC-13	Control of electromagnets	1	1	6xP[1]	1	1	6xP[1]	1.1	1.1	6xP[1]	1.1	1.1	6xP[1]
	DC-14	Control of electromagnetic loads with economy resistors in the circuit	10	1	15 ms	1	1	15 ms	10	1.1	15 ms	10	1.1	15 ms
according to IEC 947-4-1, EN 60 947 VDE 0660 Part 102														

[1] The value „6xP" is the result of an empirical relationship which is found to represent most direct current magnetic loads up to an upper limit of P = 50 W with 6 [ms]/[W] = 200 [ms]. Loads with a rated power above 50 W are composed of small loads located parallel to each other. Therefore, 300 ms is an upper limit independent of the power rating.

For types and art. numbers see page 54