



# Modular DIN rail components Installation contactors

# ESB / EN installation contactors

## Overview, features and benefits

### Introduction

ABB offers a complete range of equipment for controlling, remote switching and protecting electrical installations in buildings as hotels, hospitals, shopping centers, office centers and domestic applications.

ESB and EN installation contactors are designed to match the Modular DIN rail components for common use in dedicated panels providing high safety and finger protection.

### The range

The ESB range includes 4 ratings from 20 A to 63 A with 2 to 4-pole version. The EN contactor range offers 3 types from 20 A to 40 A with an additional manual switch in front.

### Features and benefits

#### Flexible use for many application

ESB20 ... ESB63 can be used for DIN rail as well as for industrial applications:

- Resistive loads such as electric heaters, water heaters, etc.
- Motors, pumps
- Lamp switching and controls (Building installation)

#### High comfort due to hum-free operation

The installation contactor types ESB24/EN24...ESB63/EN63 operate free from vibration, thanks to their DC coil technology. This feature has high value in building installations where hum-free and silent operations are important for people's farewell.

#### High protection against overvoltages and current peaks

- Built-in surge protection for ESB24 ... ESB63
- ABB tested lamp table provides secure planning

#### Approvals available

Certificates for CE, CCC, UL/CSA, GOST, as well as household or ship approvals available. Other approvals on request.

#### Compact and optimized design

Installation contactors with MDRC design have a very compact size. A powerful ESB63, max. operating current 63 A fits in a small enclosure with only 60 mm depth.

#### Cost savings

- Low power consumption of DC coils (ESB24, ESB40, ESB63)
- Better logistics, because AC/DC coil supply requires less variants
- Significantly reduced space compared to industrial contactors

#### High availability and safety of EN types

EN types have contactor properties, but also have a special hand operating function. This provides customers with the following features

- Manual control in case of failure is always available
- Easier and faster commissioning
- Time savings on maintenance and testing of equipment








### Contactor types

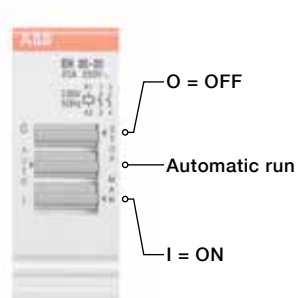
		ESB20	ESB24	ESB40	ESB63
Remote controlled					
Remote and manually controlled		EN20	EN24	EN40	-
Module width	mm	18	36	54	54
coil types		AC operated	AC / DC operated	AC / DC operated	AC / DC operated

### Main Pole - Utilization Characteristics according to IEC

Rated operational voltage $U_o$ max.	V		AC: 250, DC: 220	AC: 400, DC: 220		
Utilization category AC-1 / AC-7a for air temperature close to contactor < 55 °C						
Max. rated operational current $I_o$ AC-1 / AC-7a						
N.O.	A	20	24	40	63	
N.C.	A	20	24	30	30	
Utilization category AC-3 / AC-7b for air temperature close to contactor < 55 °C						
Max. rated operational current $I_o$ AC-3 / AC-7b						
230 V - 1 phase	A	9	9	22	30	
400 V - 3 phases	A	-	9	22	30	
Rated operational power AC-3						
230 V - 1 phase	kW	1.1	1.3	3.7	5	
400 V - 3 phases	kW	-	4	11	15	

### Accessories

	Aux. switches	2 NO	-	EH04-20	
		1 NO + 1 NC	-	EH04-11	
	Distance piece		-	ESB-DIS	
	Sealing covers		-	ESB-PLK 24	ESB-PLK 40/63



### Functions:

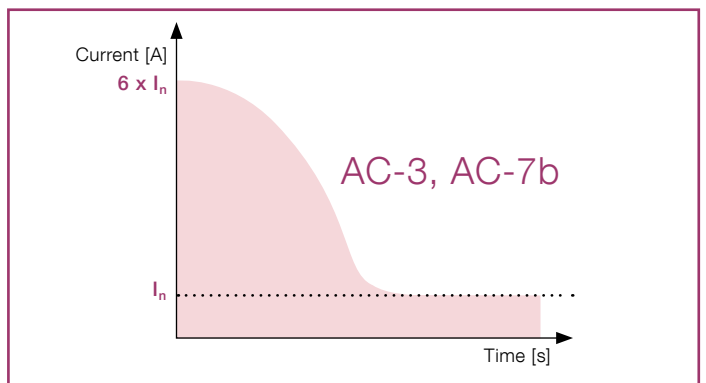
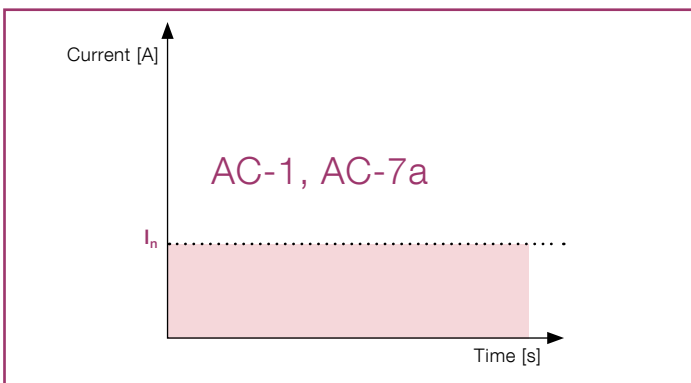
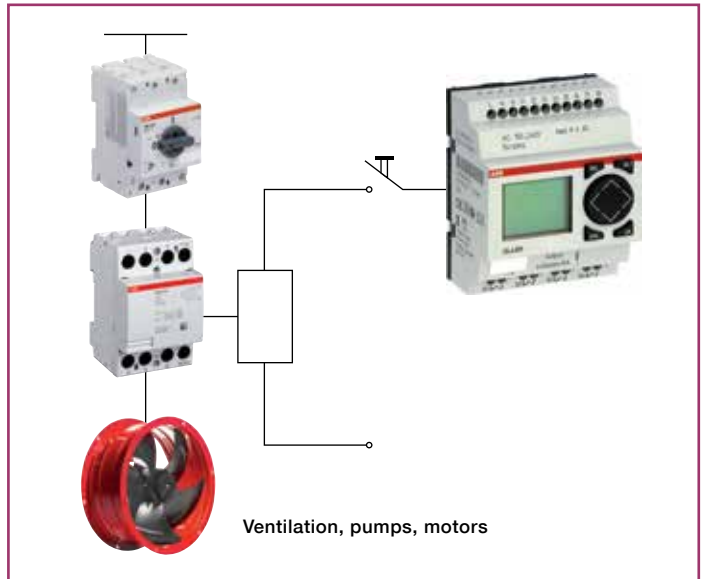
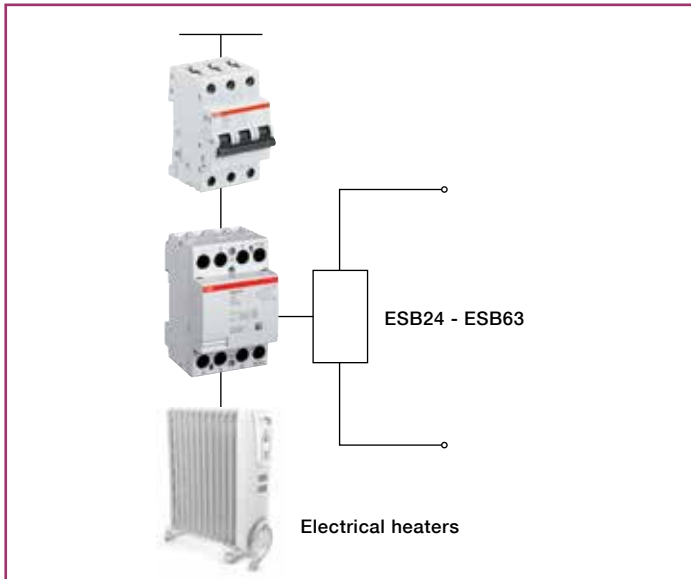
- Switch in position „AUTO“: standard control
- Switch in position „0“: Supply to coil interrupted
- Switch in position „I“: Manually switched on (a trigger signal to the coil terminal initiates the switch moving into „AUTO“ position)

# Applications with load behavior diagrams

## Resistive loads



## Motor loads



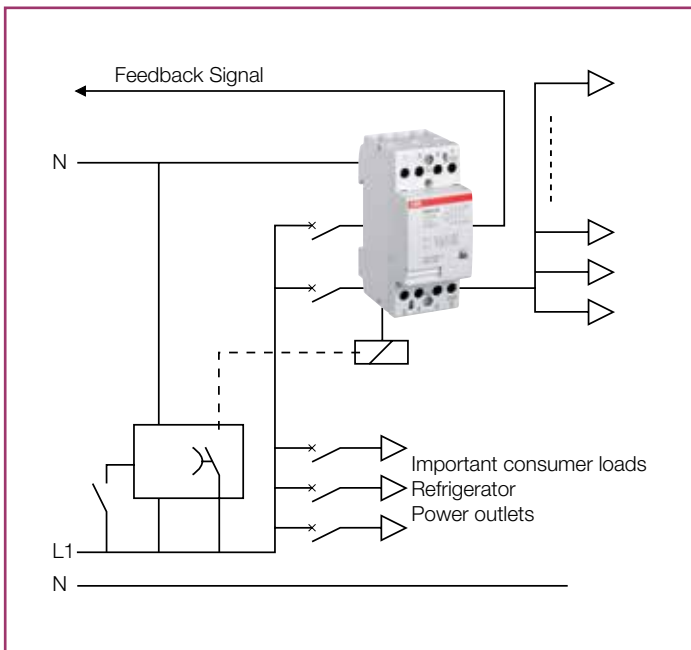
### Resistive loads

Resistive loads such as heaters, water heaters, etc., according to utilization category AC-1, IEC60947-4-1 have a constant operating current as well as the same inrush current.

### Motor loads

Motor starts cause high inrush currents that can reach 6 to 8 times the operating current in a time range up to 10 sec. The technical data take into account those starting phases according to the utilization category AC-3 referring to IEC60947-4-1

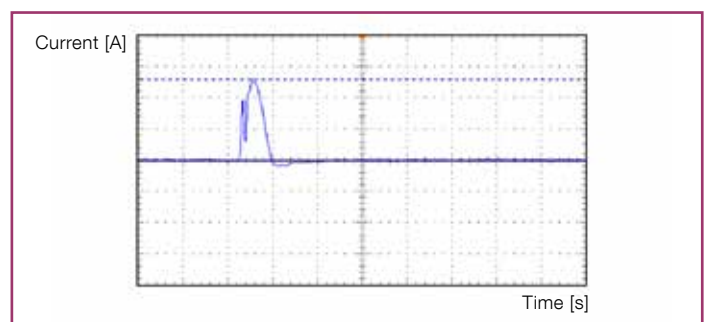
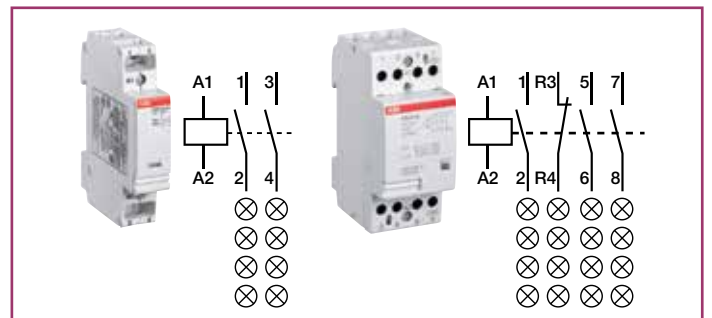
## Mixed loads



### Mixed loads

Load shedding circuits and access control with card readers for example, apartments, houses or shops can be realized with ESB20, ESB24, ESB40 and ESB63. When leaving the facilities a complete shutdown of the whole power supply or even individual circuits can be realized.

## Lamp loads



### Lamp loads

Lamp loads cause capacitive inrush current peaks that can be a multiple of the operating current. Depending on the types of lamps and wiring strategies, the main contacts of a contactor will be loaded very different. The use of conventional or electronic ballasts have an additional big impact. The ABB lamp table takes into account the various parameters.



# Lamp table for ESB / EN installation contactors

Please notice:

Switching lamps is a capacitor load application where high inrush current peaks could occur. These are influenced by the length and cross section of the wire as well as the type of power supply unit and specifications of the lamp brand. For example long cables can increase the possible number of lamps per pole. The table shows the allowed max. current for 1 pole and considers already the startup current peaks.

The following selection table shows the current values and the maximum switchable capacitor load for compensated lamps. These two limits have to be considered in the selection of contactors.

		ESB20/EN20	ESB/EN24	ESB/EN40	ESB63
Permitted compensating capacity per phase	C <sub>max</sub> [μF]	75	100	350	500
<b>Lamp types</b>		Maximum load of the current paths during switching of electric lamps I <sub>e</sub> [A]			
Incandescent and halogen lamps (230 V)	I <sub>e</sub> [A]	6	7	20	30
Mixing lamps without ballast	I <sub>e</sub> [A]	6	7	20	30
Fluorescent lamps with conventional ballast					
single lamp uncompensated	I <sub>e</sub> [A]	9	22	36	56
single lamp parallel compensated	I <sub>e</sub> [A]	3	3.5	10	15
series compensation, duo circuit	I <sub>e</sub> [A]	9	22	36	56
Fluorescent lamps with electronic ballast or CFL	I <sub>e</sub> [A]	3	7	20	30
LED lamps	I <sub>e</sub> [A]	3 <sup>1)</sup>	7	20	30
High pressure mercury-vapor lamps					
single lamp without compensation	I <sub>e</sub> [A]	9	11	18	28
single lamp with parallel compensation	I <sub>e</sub> [A]	3	3.5	10	15
Halogen metal-vapor lamps					
single lamp without compensation	I <sub>e</sub> [A]	9	11	18	28
single lamp with parallel compensation	I <sub>e</sub> [A]	3	3.5	10	15
High pressure sodium-vapor lamps					
single lamp without compensation	I <sub>e</sub> [A]	9	11	18	28
single lamp with parallel compensation	I <sub>e</sub> [A]	3	3.5	10	15
Low pressure sodium-vapor lamps					
single lamp without compensation	I <sub>e</sub> [A]	9	11	18	28
single lamp with parallel compensation	I <sub>e</sub> [A]	3	3.5	10	15
Electronic ballast devices	I <sub>e</sub> [A]	3	7	20	30

<sup>1)</sup> Valid for max. inrush of 50 × I<sub>e</sub>

## Example for lamp load calculation:

Due to many varieties of lamps and ballasts we advice to take the current load as base for reference.

The lamp table considers already the inrush peaks and other lamp parameters.

The formula  $I=P/U$  can be used for calculation if only the voltage and power is known.

Please see the following examples for a reliable project lamp calculation

- Fluorescent lamp with conventional ballast, uncompensated,  
the lamp operating current I = 1.5 A, voltage U = 230 V  
1 pole of ESB24 can be loaded with max. 22 A, see lamp table => 22A/1.5A = 14.66 => 14 lamps  
1 pole of ESB20 can be loaded with max. 9 A, see lamp table => 9A/1.5A = 6 => 6 lamps

Please use the referring value in the table stated above and divide it with the current stated on the lamp. This will lead into the number of lamps which can be switched.

E.g.: ESB24 used for LED lamps: 7 A (= 7000 mA) / 85 mA = 82.23 => 82 lamps



# ESB / EN installation contactors

## AC / AC-DC operated – with screw terminals



ESB20

1SBC103017F0014



ESB24

1SBC103018F0014



ESB40

1SBC103019F0014



ESB63

1SBC103020F0014



EN20

1SBC103021F0014



EN24

1SBC103022F0014



EN40

1SBC103023F0014



EH 04- ...

2CDC221001S0012



ESB-DIS

SST 30692R



ESB-PLK 24

SST 31292R

### Introduction

ESB20/EN20 contactors are used for the control of single phase loads up to 20 A.

They operate with an AC coil. ESB24/ESB40/ESB63/EN24/EN40 contactors are used for the control of single and three-phases loads up to 63 A. Due to their DC solenoid actuator, they can be connected to AC or DC voltages. This provides following benefits:

- Hum-free operating system, low power consumption, integrated high overvoltage protection.
- One add-on auxiliary contact block for side mounting can be used with ESB24, ESB40, ESB63 and EN24, EN40

IEC Rated current $\theta \leq 40^\circ\text{C}$ AC-1/AC-7a A	IEC Rated motor load AC-3/AC-7b kW	Control voltage $U_c$		Type	Order code	Pkg qty	Weight (1 pcs)		
		V 50Hz	V 60Hz						
<b>2 main poles</b>									
20	1,1	24 V	28 V	ESB20-20	GHE3211102R0001	10	0.14		
		230 V	264 V	ESB20-20	GHE3211102R0006	10	0.14		
		24 V	28 V	ESB20-02	GHE3211202R0001	10	0.14		
		230 V	264 V	ESB20-02	GHE3211202R0006	10	0.14		
		24 V	28 V	ESB20-11	GHE3211302R0001	10	0.14		
		230 V	264 V	ESB20-11	GHE3211302R0006	10	0.14		
24	4	24 V	24 V	ESB24-20	GHE3291402R0001	5	0.28		
		230...240 V	230...240 V	ESB24-20	GHE3291402R0006	5	0.28		
40	22	24 V	24 V	ESB40-20	GHE3491402R0001	3	0.38		
		230 V	230 V	ESB40-20	GHE3491402R0006	3	0.38		
<b>3 or 4 main poles</b>									
24	4	24 V	24 V	ESB24-40	GHE 3291102R0001	5	0.28		
		230...240 V	230...240 V	ESB24-40	GHE 3291102R0006	5	0.28		
		24 V	24 V	ESB24-04	GHE 3291202R0001	5	0.28		
		230...240 V	230...240 V	ESB24-04	GHE 3291202R0006	5	0.28		
		24 V	24 V	ESB24-22	GHE 3291302R0001	5	0.28		
		230...240 V	230...240 V	ESB24-22	GHE 3291302R0006	5	0.28		
		24 V	24 V	ESB24-31	GHE 3291602R0001	5	0.28		
		230...240 V	230...240 V	ESB24-31	GHE 3291602R0006	5	0.28		
		40	22	24 V	24 V	ESB40-40	GHE 3491102R0001	3	0.40
				230...240 V	230...240 V	ESB40-40	GHE 3491102R0006	3	0.40
24 V	24 V			ESB40-22	GHE 3491302R0001	3	0.40		
230 V	230 V			ESB40-22	GHE 3491302R0006	3	0.40		
24 V	24 V			ESB40-31	GHE 3491602R0001	3	0.40		
230 V	230 V			ESB40-31	GHE 3491602R0006	3	0.40		
63	30	24 V	24 V	ESB40-30	GHE 3491502R0001	3	0.39		
		230 V	230 V	ESB40-30	GHE 3491502R0006	3	0.39		
		24 V	24 V	ESB63-40	GHE 3691102R0001	3	0.42		
		230...240 V	230...240 V	ESB63-40	GHE 3691102R0006	3	0.42		
		230 V	230 V	ESB63-31	GHE 3691602R0006	3	0.42		
		<b>EN types with manual switch, 2-pole and 4-pole</b>							
20	1.1	24 V	28 V	EN20-20	GHE3221101R0001	10	0.14		
		230 V	264 V	EN20-20	GHE3221101R0006	10	0.14		
24	4	24 V	24 V	EN24-40	GHE3261101R0001	5	0.24		
		230...240 V	230...240 V	EN24-40	GHE3261101R0006	5	0.24		
		24 V	24 V	EN24-31	GHE3261601R0001	5	0.24		
		230...240 V	230...240 V	EN24-31	GHE3261601R0006	5	0.24		
40	22	24 V	24 V	EN40-40	GHE3421101R0001	3	0.41		
		230...240 V	230...240 V	EN40-40	GHE3421101R0006	3	0.41		
		24 V	24 V	EN40-31	GHE3421601R0001	3	0.41		
		230...240 V	230...240 V	EN40-31	GHE3421601R0006	3	0.41		
		<b>Ordering details accessories</b>							
		Designation			Type	Order code	Pkg qty	Weight (1 pcs)	
Aux. switches	2 N.O. 1 N.O. + 1 N.C.		EH04-20 ① EH04-11 ①	GHE3401321R0001 GHE3401321R0002	10 10	0.023 0.023			
Distance piece			ESB-DIS	GHE3201902R0001	10	0.002			
Sealing covers			ESB-PLK 24	GHE3201903R0001	10	0.002			
			ESB-PLK 40/63	GHE3401903R0001	10	0.003			

### Ordering details accessories

Designation			Type	Order code	Pkg qty	Weight (1 pcs)
					pcs	kg
Aux. switches	2 N.O. 1 N.O. + 1 N.C.		EH04-20 ① EH04-11 ①	GHE3401321R0001 GHE3401321R0002	10 10	0.023 0.023
Distance piece			ESB-DIS	GHE3201902R0001	10	0.002
Sealing covers			ESB-PLK 24	GHE3201903R0001	10	0.002
			ESB-PLK 40/63	GHE3401903R0001	10	0.003

① Mounting onto ESB/EN 20 not possible.

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