

General information

Factory modifications



Control cover accessories – A9-A750

Description	Control suffix ①
Start-stop pushbutton	A
Fwd-rev-stop pushbutton	B
2 position selector switch (Std. ON-OFF)	C
3 position selector switch (Std. HAND-OFF-AUTO)	D
Pilot light, Red, RUN (Std.)	E
Pilot light, Green, RUN	R
Pilot light suffix + V= Neon bulb	V
Pilot light suffix + X= LED bulb	X
Start-stop pushbutton & pilot light	F
Fwd-rev-stop pushbutton & pilot light	G
2 position selector switch & pilot light	H
3 position selector switch & pilot light	J
Fast-slow-stop pushbuttons	K
Fast-slow-stop pushbuttons & pilot light	L
Fast-slow-off-auto selector switch	M
Emergency stop	P
F suffix + 1NO & 1NC auxiliary contact	T
J suffix + 1NO & 1NC auxiliary contact	U
Pushbutton (standard START)	Y

Special modifications

Contact configuration	Suffix code ①
Contactor	
Coil surge suppressor	S
Auxiliary relays	
Type N control relay (4 pole)	CR
Electronic timer	
1.5 – 30, On Delay	TN30
5 – 100, On Delay	TN100
1.5 – 30, Off Delay	TF30
5 – 100, Off Delay	TF100
Phase failure phase reversal with over and undervoltage relays	PFPR
Ground fault protection	GFP
For multi-speed controllers	
Compelling relay	CPR
Accelerating relay	ACR
Decelerating relay	DCR
Meters & metering	
Current transformer	CT
Ammeter (including C.T.)	AM
Ammeter & ammeter switch	AMS
Voltmeter	VM
Voltmeter & voltmeter switch	VMS
Elapsed time meter	ETM
Operation counter	OC
Wattmeter	WM
Miscellaneous	
Lightning arrester	LA
Space heater, 100W with thermostat	SH

Control circuit transformer (standard VA) – A9 - A750 ②

Standard size with fused secondary			Coil suffix	Starter size	CCT VA
Primary	Secondary	Hz			
				A9 – A40	45 ③
				A9 – A40	50
				A50 – A75	75
				A95 – A110	100
200/208V	110V	50/60	0	A145 – A185	150
220/240V	110/120V	50/60	7	A210 – A300	250
440/480V	110/120V	50/60	8	A400 – A460	150
550/600V	110/120V	50/60	9	A580 – A750	250

Control circuit transformers do include two primary fuses and one secondary fuse.

- ① Add this suffix to the last digit of the catalog number.
- ② Consult factory if additional VA is required.
- ③ Does not include primary fusing.
- ④ A400 - A750 utilizes the AF wide range coil with a lower coil consumption than A210 - A300.

Additional auxiliary contact blocks — A9 – A750

Contact configuration	Suffix code ①
1 N.O.	10
1 N.C.	01
2 N.O.	20
1 N.O. & 1 N.C.	11
2 N.C.	02
4 N.O.	40
3 N.O. & 1 N.C.	31
2 N.O. & 2 N.C.	22
1 N.O. & 3 N.C.	13
4 N.C.	04
3 N.O. & 3 N.C.	33

Reduced voltage & multi-speed starters —

Starter size	Non-fusible switch price adder
A9	\$ 990
A12	990
A16	990
A26	990
A30	990
A40	990
A50	1152
A63	1230
A75	1494
A95 – A110	2310
A145	3042
A185	3300
A210	3450
A260	3744
A300	4200
A400	6600
A460	8200
A580	8400
A750	9000

Hazardous location enclosure accessories, NEMA 7 & 9

Item	Catalog ① Suffix No.
3R Breather/drain	A
Start PB green	B
Stop PB red	C
St/St dual PB	D
Em. Stop mush momentary	E
Em. Stop mush maintained	F
Black PB N.O. auxiliary	G
Black PB N.C. auxiliary	H
Pilot light	J
Illuminated PB	K
Push-to-test pilot light	L
Potentiometer	M
2-Pos Selector Maintained	N
2-Pos Selector spring L to R	P
2-Pos Selector spring R to L	Q
3-Pos Selector sw. main.	R
3-Pos Selector spring L to R	S
3-Pos Selector spring R to L	T
3-Pos Selector spring to C	U
2-Pos Selector key operated	V
3-Pos Selector key operated	W

Accessories for A/AF/AL & AE contactors



CAL5-11



CA5-10

Auxiliary contact blocks – Standard

Positioning	Maximum number of contact blocks	Contact Description	Catalog number
Front mounting (single pole)	4 blocks: A9 – A26 AE9 – AE26 AL9 – AL26	1 N.O. 1 N.C.	CA5-10 CA5-01
	5 blocks: A30, A40, AE30, AE40, AL30, AL40 6 blocks: A45 – A110 AE45 – AE110 AF45 – AF110		1 N.O. Early make 1 N.C. Late break
Front mounting (4 pole)	1 block: A9 – A26-40-00 A30 – A110 AE9 – AE110	4 N.O. 3 N.O. & 1 N.C. 2 N.O. & 2 N.C. 4 N.C. 2 N.O./2 N.C.Ⓢ	CA5-40E CA5-31E CA5-22E CA5-04E CA5-11/11E
	1 block: A9 – A40-30-10 AL9 – AL40-30-10		3 N.O. & 1 N.C. 2 N.O. & 2 N.C. 1 N.O. & 3 N.C. 4 N.C. 4 N.O. 2 N.O./2 N.C.Ⓢ
Side mounting (2 pole)	2 blocks: A9 – A75, AE9-AE45 1 block: AE50 – AE75, AL9 – AL40	1 N.O. & 1 N.C.	CAL5-11
	1 block: A/AE/AF95 - A/AE/AF110		CAL18-11
	2 blocks: A145 – A300, AF145-AF1650 2 blocks: A145 – A300, AF145-AF1650		1 N.O. & 1 N.C. (inside L or R) 1 N.O. & 1 N.C. (outside, L or R)

Auxiliary contact blocks – Front mounting, switching low voltage and low current

Positioning	Maximum number of contact blocks	Contact Description	Degree of protection	Catalog number
Front mounting (single pole)	4 blocks: A9 – A26 AE9 – AE26 AL9 – AL26	1 N.O. 1 N.C. 1 N.O. 1 N.C.	IP40 IP40 IP40 IP40	CE5-10D0.1 CE5-01D0.1 CE5-10D2 CE5-01D2
	5 blocks: A30, A40, AE30, AE40, AL30, AL40 6 blocks: A45 – A110 AE45 – AE110 AF45 – AF110			1 N.O. 1 N.C. 1 N.O. 1 N.C.

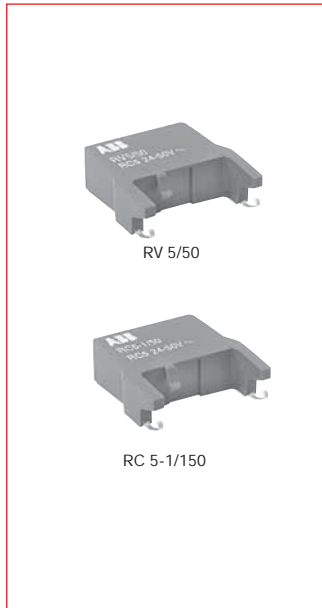
Ⓢ Includes 1 N.O. & 1 N.C. overlapping

Accessories

Surge suppressors for A/AE/AL/EK contactors

Across the line
contactors


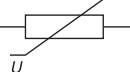
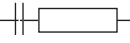
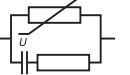
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Surge suppression device

Mounting on	Voltage range	Catalog number
AE9 to AE110 AL9 to AL40	12 – 32 VDC 25 – 65 VDC 50 – 90 VDC 77 – 150 VDC 150 – 264 VDC	RT5/32 RT5/65 RT5/90 RT5/150 RT5/264
A9 to A110; AE9 to AE110 AL9 to AL40	24 – 50 VAC/VDC 50 – 133 VAC/VDC 110 – 250 VAC/VDC 250 – 440 VAC/VDC	RV5/50 RV5/133 RV5/250 RV5/440
A9 to A40	24 – 50 VAC 50 – 133 VAC 110 – 250 VAC 250 – 440 VAC	RC5-1/50 RC5-1/133 RC5-1/250 RC5-1/440
A45 to A300	24 – 50 VAC 50 – 133 VAC 110 – 250 VAC 250 – 440 VAC	RC5-2/50 RC5-2/133 RC5-2/250 RC5-2/440
EK110 to EK210	24 – 48 VAC 110 – 415 VAC	RC-EH250/48 RC-EH250/415
EK370 to EK550	48 – 110VAC	RC-EH800/110
EK110 to EK550	24 – 125VDC	RC-EH800/110
EK370 to EK550	220 – 600VAC	RC-EH800/600

Technical data

Type	Control circuit	Opening time growth factor	Residual overvoltage or clipping voltage	Remarks
RT 5 /... transil diode 	32 DC 65 DC 90 DC 150 DC 264 DC	2.5 to 3	50 V 100 V 150 V 210 V 390 V	Advantages <ul style="list-style-type: none"> • Good energy absorption • Unpolarized system Drawback <ul style="list-style-type: none"> • Simple, reliable system • A certain delay on drop out which does not however reduce contactor breaking capacity.
Varistor 	RV 5/... 50 AC/DC 133 AC/DC 250 AC/DC 440 AC/DC	1.1 to 1.5	132 V 270 V 480 V 825 V	Advantages <ul style="list-style-type: none"> • High energy absorption; good damping • Unpolarized system Drawback <ul style="list-style-type: none"> • Clipping as from U_{vdr}, thus voltage front up to this point
RC 5-1/... or RC 5-2/... RC-EH 300/... 	see table above AC	1.2 to 3	2 to 3 x U_c	Advantages <ul style="list-style-type: none"> • Very fast clipping • Attenuation of steep fronts and thus of high frequencies • No operating delays
Varistor + RC 	RC-EH ... 800/110 AC/DC 800/600 AC	1.1 to 1.5	205 V 1100 V	Advantages <ul style="list-style-type: none"> • High energy absorption: good damping • Unpolarized system • The RC system damps the voltage front under the U_{vdr}* threshold.

* U_{vdr} = Varistor operating voltage (voltage dependent resistor), tolerance $\pm 10\%$

Accessories for A/AE/AL/AF contactors



Terminal lug kits (Set of 3)

Wire range	For contactor	Catalog number
6 – 250 MCM	A145 – A185	ATK185
4 – 400 MCM	A210 – A300	ATK300
(2) 4-500 MCM	A210 – A300	ATK300/2
(2) 2/0 – 500 MCM	AF400 – AF580	ATK580/2
(3) 2/0 – 500 MCM	AF580 – AF750	ATK750/3
(4) 4/0 – 500 MCM	AF1350	ATK1350/4
(4) 1/0 – 750 MCM	AF1350 – AF1650	ATK1650/4
(6) 1/0 – 750 MCM	AF1350 – AF1650	ATK1650/6

Contact kits

	For contactors	Catalog number
3 Pole	A/AE/AF50	ZL50
	A/AE/AF63	ZL63
	A/AE/AF75	ZL75
	A/AE/AF95	ZL95
	A/AE/AF110	ZL110
	A/AF145	ZL145
	A/AF185	ZL185
	A/AF210	ZL210
	A/AF260	ZL260
	A/AF300	ZL300
	AF400	ZL400
	AF460	ZL460
	AF580	ZL580
	AF750	ZL750
	AF1350	ZL1350
AF1650	ZL1650	
4 Pole	A/AE45	ZLT45
	A/AE50	ZLT50
	A/AE75	ZLT75
3 Pole	UA50	ZLU50
	UA75	ZLU75
	UA95	ZLU95
	UA110	ZLU110

Mechanical latches

For contactors	Catalog number
A9 - A75, AE45 - AE75, & AL9 - AL40	WB75A-★

★ - Coil voltage suffix. Refer to Coil Voltage Selection chart and substitute the desired coil voltage suffix for the ★.

Coil voltage selection chart — mechanical latches for A, AE & AL contactors

50 Hz (AC/DC)	60 Hz (AC)	Voltage code	50 Hz (DC)	60 Hz (AC)	Voltage code
24	24 – 28	01	220 – 230	220 – 255	06
42	42 – 48	02	230 – 240	230 – 277	05
48	48 – 55	03	380 – 415	380 – 440	07
110	110 – 127	04	415 – 440	440 – 480	08

Range: WB75A for contactors A9 – A75, AL9 – AL40, AE45 – AE75 and control relays N and NL.

Description: WB75A block: contains a mechanical latching device with electromagnetic impulse unlatching (AC or DC) or manual unlatching. Captive screw type connecting terminals, built-in cable clamps, M 3.5 (=, -) posidrive 1 screw with screwdriver guidance, delivered untightened and protected against accidental direct contact.

Operation: After closing, the contactor continues to be held in the closed position by the latching mechanism should the supply voltage fail at the contact coil terminals.

Contactor opening can be controlled:

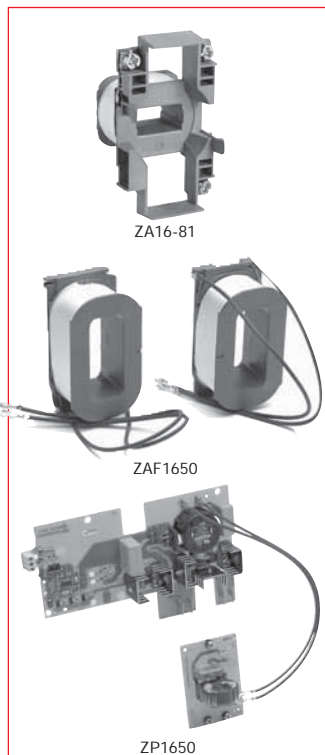
- Electrically by an impulse* (AC or DC) on the WB75A block coil. The coil is not designed to permanently energized.
- Manually by pressing the pushbutton on the front face of the WB75A block.

Mounting: WB75A is clipped onto the front face of the contactor.

Identification markers

Mounting on	Coil voltage	Catalog number
A/AE/AL/AF9 – A/AE/AL/AF110	Pack of 50	BA5-50

Accessories for A/AE/AL/AF contactors Coils & coil voltage codes



Coils — AC operated

For contactors	Catalog number
A9 – A16	ZAI16-★
A26 – A40	ZAI40-★
A45 – A75	ZAI75-★
A95 – A110	ZAI110-★
A145 – A185	ZAI185-★
A210 – A300	ZAI300-★

Coils — DC operated

AE9 – AE16	ZAE16-★
AE26 – AE40	ZAE40-★
AE45 – AE75	ZAE75-★
AE95 – AE110	ZAE110-★
Auxiliary including an insertion contact and a varistor for DC operated contactors	CCL18-01
AE95 – AE110	

Coils — AC/DC operated (coil and printed circuit board except ZAF1650)

AF45 – AF75	ZAF75-★
AF95, AF110	ZAF110-★
AF145 – AF185	ZAF185-★
AF210 – AF300	ZAF300-★
AF400, AF460	ZAF460-★
AF580, AF750	ZAF750-★
AF1350, AF1650 (Set of 2 coils only)	ZAF1650-★

Printed circuit board — AC/DC operated

AF1350 – AF1650	ZP1650
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★ – Coil voltage suffix. Refer to Coil Voltage Selection charts below and substitute the desired coil voltage code for the ★.

Coil voltage selection — AC operated for A9 – A300; UA26 – UA110

VAC (50Hz)	VAC (60Hz)	Voltage Code
24	24	81
26	28	16
28	32	17
42	42	82
48	48	83
60	60	73
100	100 – 110	74 ②
110	110 – 120	84
110 – 115	115 – 127	89 ③
120	140	29
125 – 127	150	30
175	208	34
190	220	36
200	200 – 220	75 ②
220 – 230	230 – 240	80
230 – 240	240 – 260	88
230 – 240	277	42
230/400	—	62 ①
—	230/400	63 ①
380 – 400	400 – 415	85
400 – 415	415 – 440	86
—	480	51
440	500	53
500	600	55
550	—	56
660 – 690	—	58

Coil voltage selection — DC operated for AE contactors

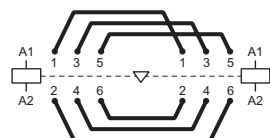
VDC	Voltage code AE contactors
12	80
24	81
42	82
48	83
50	21
60	84
75	85
110	86
125	87
220	88
240	89
250	38

Coil voltage selection — AC/DC operated for AF50 – AF1650

VAC & VDC 40-60 Hz	Suffix Code
24 – 60 VDC	68 ④
20 – 60 VDC	72 ⑤
48 – 130 VAC/VDC	69
100 – 250 VAC/VDC	70 ⑦
250 – 500 VAC/DC	71 ⑥

① Only for A9 – A16.
 ② Not for A145 – A300
 ③ A145 – A300 at 60 Hz, 115V only
 ④ AF400 – AF750, DC only
 ⑤ AF45 – AF300
 ⑥ AF400 - AF750 only
 ⑦ Only option for AF1350 - AF1650

Accessories for A/AE/AL/AF contactors



BEM circuit diagram



BES110 connection diagram



BED...

Connection kits for reversing

Mounting on 3 pole contactors	Catalog number
A/AE/AL9 – A/AE/AL16 A/AE/AL26 A/AE/AL30, A/AE/AL40	BEM16-30 BEM26-30 BEM40-30
A/AE/AF50 – A/AE/AF75 A/AE/AF95, A/AE/AF110 A/AF145 – A/AF185 A/AF210 – A/AF300	BEM75-30 BEM110-30 BEM185-30 BEMA300-30
AF400 – AF460 AF580 – AF750	BEM460-30 BEM750-30

Application

Connections between the main poles of **two 3 pole contactors** mounted side by side so that they operate as reversing contactors.

Description

The connection kits for reversing contactors are made up of three reversing connections and three phase to phase connections.

- BEM16-30 — Insulated, solid, rigid copper wires
- BEM26 and 40-30 — Insulated, stranded, rigid copper wires
- BEM75 and 110-30 — Insulated, solid copper bars

Connection kits for phase to phase

Mounting on 3 pole contactors	Catalog number
A/AE/AF50, A/AE/AF75 A/AE/AF95, A/AE/AF110 A/AF145 – A/AF185 A/AF210 – A/AF300	BES75-30 BES110-30 BES185-30 BESA300-30
AF400 – AF460 AF580 – AF750	BES460-30 BES750-30

The connection kit for phase to phase contactors is made up of three phase to phase bus bars.

Connection kits for wye-delta starters

Mounting on contactors		Catalog number
Line and delta contactor	Wye contactor	
A30 A40	A26 A26	BED40U
A50 A63	A30 A40	BED50U
A75 A95 A110 A145 A185 A210	A50 A75 A95 A110 A145 A185	BED75U BED95U BED110U BED145U BED185U BED210U
A260/A300	A210	BED300U
AF400/AF460	A260/A300	BED400U
AF460	AF400	BED460U
AF580	AF400/AF460	BED580U
AF750	AF580	BED750U

Application

Connections between the main poles of a wye-delta starter.

Description

The connection kits for wye-delta starters are made up of:

- Three line contactor/wye contactor connections — line side.
- Three wye contactor/delta contactor connections — load side.
- The shorting connection for the "S" contactor.

BED40U – Insulated, stranded, rigid copper wires.

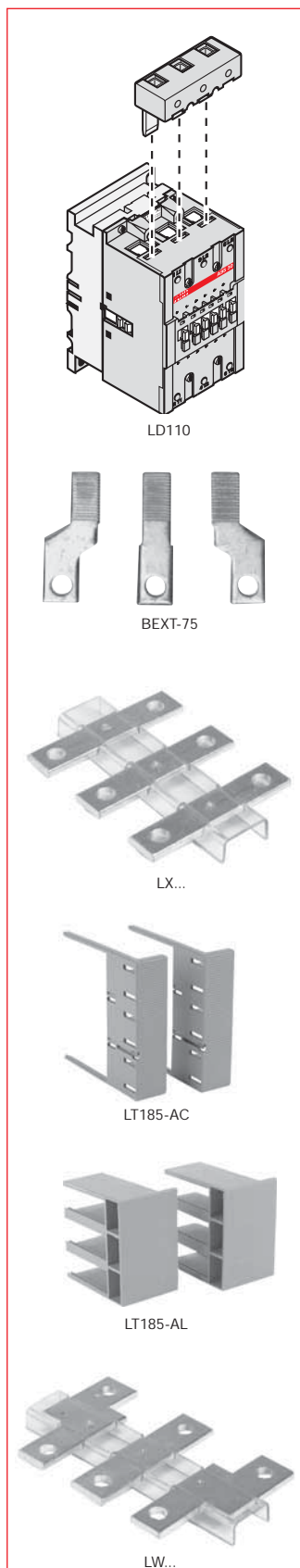
BED50U thru BED750U — Insulated, solid copper bars.

The above connection sets allow a mechanical interlock unit to be mounted between the wye and delta contactors if required.

Accessories for A/AE/AL/AF contactors

Across the line
contactors

1



Additional terminal blocks

Mounting on 3 pole contactors	Wire range	Catalog number
A/AE/AL9 – A/AE/AL16 (set of 2)	16 – 6	LD-16
A/AE/AL26 (set of 2)	14 – 6	LD-26
A/AE/AL30 – A/AE/AL40	12 – 4	LD-40
A/AE/AF50 – A/AE/AF75	10 – 2	LD-75
A/AE/AF95 – A/AE/AF110	8 – 1	LD-110

Utilization – The LD series terminal block is designed to increase the connection capacity of the contactor on which it is mounted. The LD 75 and LD110 terminal blocks are mounted in the three independent apertures located above the built-in connectors.

Terminal extensions

Mounting on contactors	Catalog number
A/AE/AF50 – A/AE/AF75	BEXT-75
A/AE/AF95, A/AE/AF110	LW-110
A/AF145 – A/AF185	LX185
A/AF210 – A/AF300	LX300
AF400 – AF460	LX460
AF580 – AF750	LX750

Application

They are designed to increase the width of the contactor terminal pads to allow larger connectors to be mounted.

Description

Terminal extension sets contain 3 bars.

Terminal shrouds — two pieces

For contactor	Catalog number
A/AF145 – A/AF185 for flush mount	LT185-AC
A/AF145 – A/AF185 for extended mount	LT185-AL
A/AF145 – A/AF185 for shorting bar LY...between A(F)145 / A(F)185 & TA200DU	LT185-AY
A/AF210 – A/AF300 for flush mount	LT300-AC
A/AF210 – A/AF300 for extended mount	LT300-AL
A/AF210 – A/AF300 for shorting bar LY300	LT300-AY
AF400 – AF460 for flush mount	LT460-AC
AF400 – AF460 for extended mount	LT460-AL
AF580 – AF750 for flush mount	LT750-AC
AF580 – AF750 for extended mount	LT750-AL

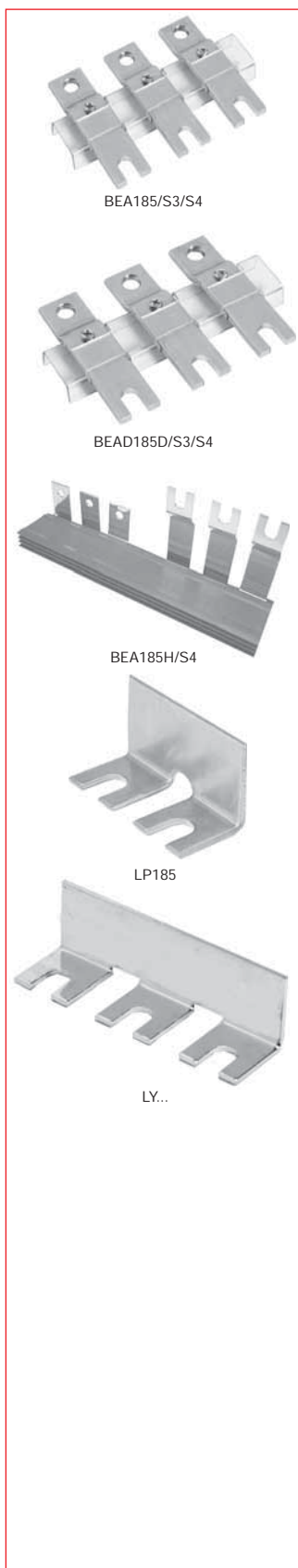
Terminal enlargements

For contactor	Catalog number
A/AF95 – A/AF110	LW110
A/AF145 – A/AF185	LW185
A/AF210 – A/AF300	LW300
AF400 – AF460	LW460
AF580 – AF750	LW750

Arc chutes

For contactor	Catalog number
A/AF145 – A/AF185	ZW185
A/AF210 – A/AF300	ZW300
A/AF400 – A/AF460	ZW460
A/AF580 – A/AF750	ZW750
AF1350 – AF1650	ZW1650

Accessories for A/AE/AF contactors



Vertical connection bars between contactor and MCCB — three bars

MCCB	For contactor	Catalog number
T1	A/AE/AF50 – A/AE/AF75	BEA75/T1
T3	A/AE/AF95 – A/AE/AF110	BEA110/T3
T3	A/AF145 – A/AF185	BEA185/T3
S3, S4	A/AF145 – A/AF185	BEA185/S3/S4
T4	A/AF145 – A/AF185	BEA185/T4
T4	A/AF210	BEA210/T4
T5	A/AF210 – A/AF300	BEA300/T5
T5	A/AF400 – A/AF460	BEA400/T5
T5	A/AF580 – A/AF750	BEA750/T5
S5	A/AF210 – A/AF300	BEA300/S5
S5 ^①	AF400 – AF460	BEA400/S5
S6	AF400 – AF750	BEA750/S6

Vertical connection bars between contactor and MCCB — three bars

MCCB	For contactor	Catalog number
S3, S4	A/AF145 – A/AF185	BEA185D/S3/S4
S4	A/AF210 – A/AF300	BEA210D/S4
S5	A/AF210 – A/AF300	BEA300D/S5
S5	AF400 – AF460	BEA400D/S5
S6	AF400 – AF750	BEA750D/S6

To be used when power take off is needed (IP00) or with other bus bars. (EX: Reversing, IP20)

Horizontal connection busbars between contactor and MCCB — three bars

MCCB	For contactor	Catalog number
S3, S4	A/AF145 – A/AF185	BEA185H/S4
S4	A/AF210 – A/AF300	BEA210H/S4
S5	A/AF210 – A/AF300	BEA300H/S5
S5	AF400 – AF460	BEA400H/S5
S6	AF400 – AF460	BEA460H/S6
S6	AF580 – AF750	BEA750H/S6

Shorting bars, 2 pole

For contactor	Catalog number
A/AF145 – A/AF185	LP185
A/AF210 – A/AF300	LP300
AF400 – AF460	LP460
AF580 – AF750	LP750

Shorting bars, 3 pole

For contactor	Catalog number
A/AE45 – A/AE/AF75	LF75
A/AE/AF95 – A/AE/AF110	LY110
A/AE/AF145 – A/AE/AF185	LY185
A/AE/AF210 – A/AE/AF300	LYA300
AF400 – AF460	LY460
AF580 – AF750	LY750

① Not for use with flange handles.