

# Technical data



## Ampacities of insulated conductors (From 1999 NEC Table 310-16)

Size	Temperature rating of conductor						Size
	60° C (140° F)	75° C (167° F)	90° C (194° F)	60° C (140° F)	75° C (167° F)	90° C (194° F)	
Types TW UF	Types FEPW RH, RHW THHW THW THWN XHHW USE, ZW	Types TBS, THWN-2 THW-2, SA, SIS, FEP FEBP, MI RHH, RHW-2 THHN, THHW USE-2, XHH XHHW XHHW-2, ZW-2	Types TW UF	Types RH, RHW THHW THW THWN XHHW USE	Types TBS SA, SIS THHN THHW THW-2, THWN-2 RHH, RHW-2 USE-2 XHH, XHHW XHHW-2, ZW-2	Types TW UF	
AWG kcmil	Copper			Aluminum or copper-clad			AWG kcmil
18	—	—	14	—	—	—	—
16	—	—	18	—	—	—	—
14★	20	20	25	—	—	—	—
12★	25	25	30	20	20	25	12★
10★	30	35	40	25	30	35	10★
8	40	50	55	30	40	45	8
6	55	65	75	40	50	60	6
4	70	85	95	55	65	75	4
3	85	100	110	65	75	85	3
2	95	115	130	75	90	100	2
1	110	130	150	85	100	115	1
1/0	125	150	170	100	120	135	1/0
2/0	145	175	195	115	135	150	2/0
3/0	165	200	225	130	155	175	3/0
4/0	195	230	260	150	180	205	4/0
250	215	255	290	170	205	230	250
300	240	285	320	190	230	255	300
350	260	310	350	210	250	280	350
400	280	335	380	225	270	305	400
500	320	380	430	260	310	350	500
600	355	420	475	285	340	385	600
700	385	460	520	310	375	420	700
750	400	475	535	320	385	435	750
800	410	490	555	330	395	450	800
900	435	520	585	355	425	480	900
1000	455	545	615	375	445	500	1000
1250	495	590	665	405	485	545	1250
1500	520	625	705	435	520	585	1500
1750	545	650	735	455	545	615	1750
2000	560	665	750	470	560	630	2000

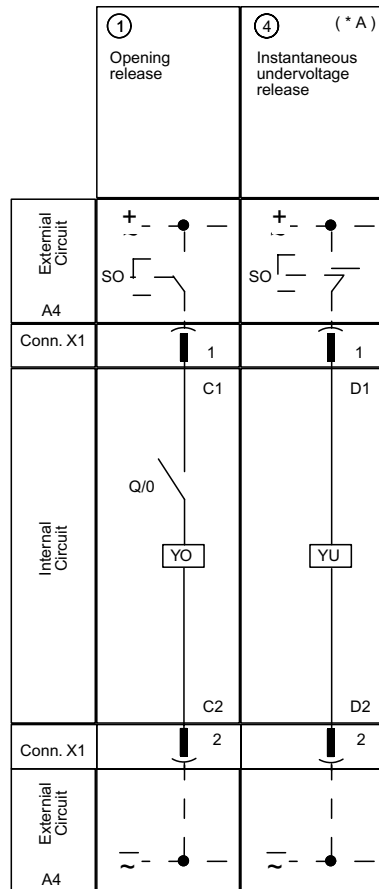
★Unless otherwise specifically permitted elsewhere, the overcurrent protection for conductor types marked with a star (★) shall not exceed 15 amperes for No. 14, 20 amperes for No. 12, and 20 amperes for No. 10 copper; or 15 amperes for No. 12 and 25 amperes for No. 10 aluminum and copper-clad aluminum after any correction factors for ambient temperature and number of conductors have been applied.

Ambient temperature °C	Correction factors						Ambient temperature °F
	For ambient temperatures other than 30° C (86° F) multiply the allowable ampacities shown above by the appropriate factor shown below.						
21 – 25	1.08	1.05	1.04	1.08	1.04	1.05	70 – 77
26 – 30	1.00	1.00	1.00	1.00	1.00	1.00	78 – 86
31 – 35	.91	.94	.96	.91	.94	.96	87 – 95
36 – 40	.82	.88	.91	.82	.88	.91	96 – 104
41 – 45	.71	.82	.87	.71	.82	.87	105 – 113
46 – 50	.58	.75	.82	.58	.75	.82	114 – 122
51 – 55	.41	.67	.76	.41	.67	.71	123 – 131
56 – 60	—	.58	.71	—	.58	.71	132 – 140
61 – 70	—	.33	.58	—	.33	.58	141 – 158
71 – 80	—	—	.41	—	—	.41	159 – 176

# Circuit diagrams

## Duty releases

### S1<sup>①</sup>



### Legend

- - Figure number of diagram
- A4 - Example switchgear and connections for control and signalling, outside the circuit-breaker
- Q/0 - Auxiliary contacts of the circuit-breaker
- SO - Pushbutton or contact for opening the circuit-breaker

### Incompatibility:

The circuits indicated in the following figures cannot be powered simultaneously on the same circuit-breaker:  
1 - 4 - 5 - 6    2 - 3

### Availability:

Connectors X1 and X2 are only supplied to order for circuit breakers S1 - S2.

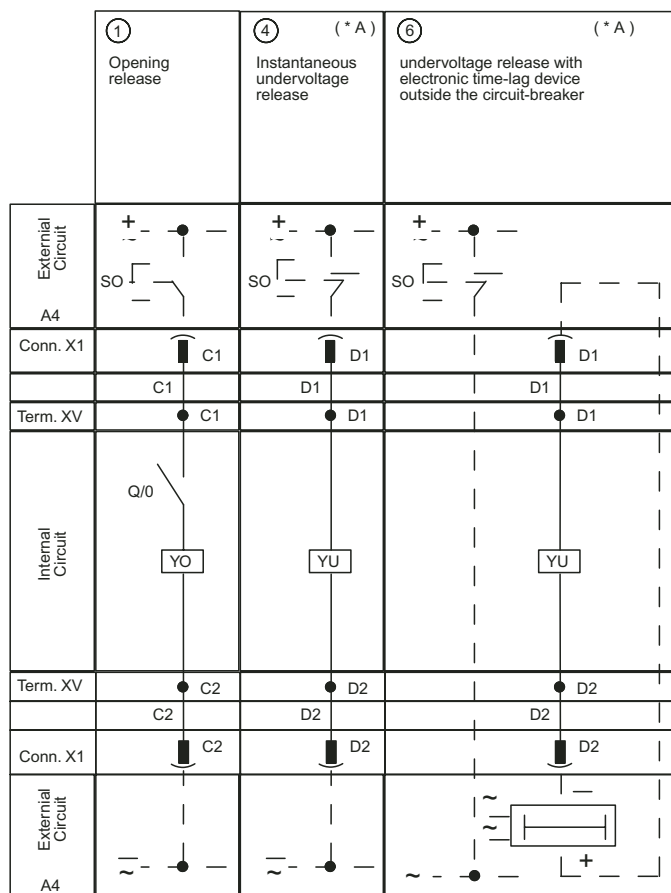
### Notes:

(\* A) The undervoltage release is powered from upstream circuit-breaker or by an independent power supply: closing of the circuit-breaker is only allowed when the release is energized (the closing lock is implemented mechanically).

# Circuit diagrams

## Duty releases

### S3 – S7



### Legend

- - Figure number of diagram
- A4 - Example switchgear and connections for control and signalling, outside the circuit-breaker
- Q/0 - Auxiliary contacts of the circuit-breaker
- SO - Pushbutton or contact for opening the circuit-breaker

### Incompatibility:

The circuits indicated in the following figures cannot be powered simultaneously on the same circuit-breaker:  
1 - 4 - 5 - 6    2 - 3

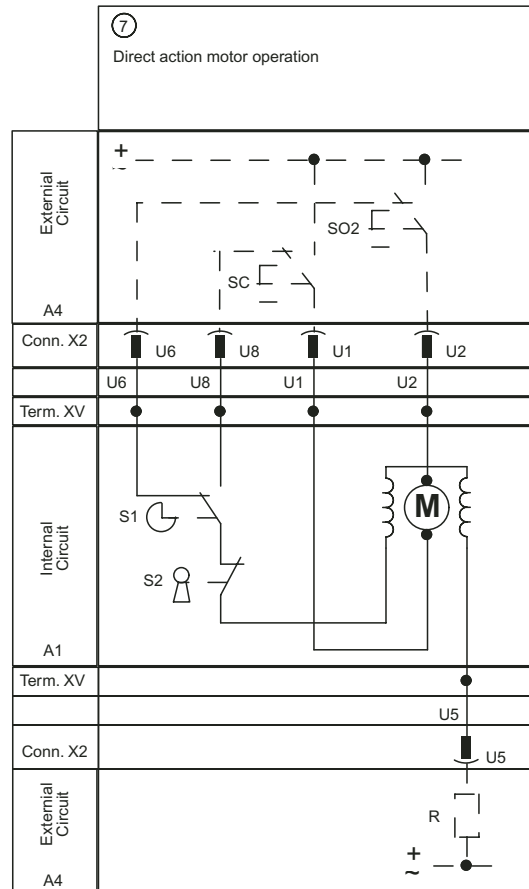
### Availability:

Connectors X1 and X2 are only supplied to order for circuit breakers S1 -S2.

### Notes:

(\* A) The undervoltage release is powered from upstream of the circuit-breaker or by an independent power supply: closing of the circuit-breaker is only allowed when the release is energised (the closing lock is implemented mechanically).

## Circuit diagrams Motor operators S3 – S5



### Legend

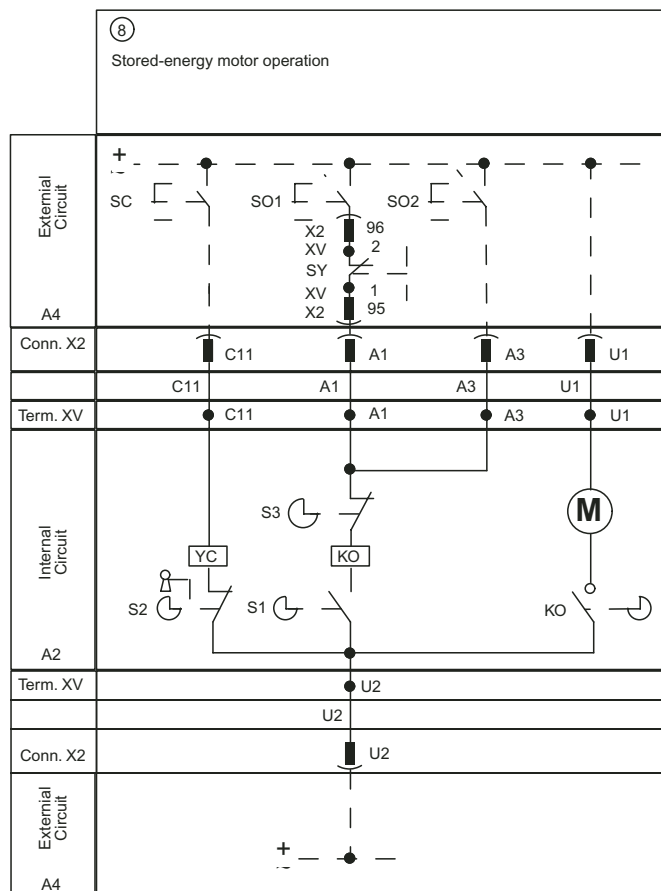
- O- Figure number of diagram
- A1 - Applications of the circuit-breaker
- A4 - Example switchgear and connections for control and signalling, outside the circuit-breaker
- M - For S6 -S7: motor for opening the circuit-breaker and loading the closing springs of the circuit-breaker
- S1 - For S3 - S4 - S5: position contact operated by a circuit-breaker cam for S6 - S7: contact controlled by the motor operated cam: closes when the circuit-breaker reaches it's closed position and opens when the circuit-breaker reaches its open position (doesn't switch when the circuit breaker goes into its tripped position)
- S2 - For S3 - S4 - S5: safety contact operated by:
  - key lock (if mounted)
  - padlock device
  - local control Allen key
- SC - Pushbutton or contact for closing the circuit-breaker.  
For circuit breakers S3 - S4 -S5, the operating mechanism must have a time of not less than 100ms
- S02 - Pushbutton or contact for opening the circuit-breaker.  
For circuit breakers S3 - S4 - S5, the operating mechanism must have a time of not less than 100 ms (see instructions for resetting the circuit-breaker after the releases have tripped).

# Circuit diagrams

## Motor operators

### S6 – S7

Isomax  
MCCBs

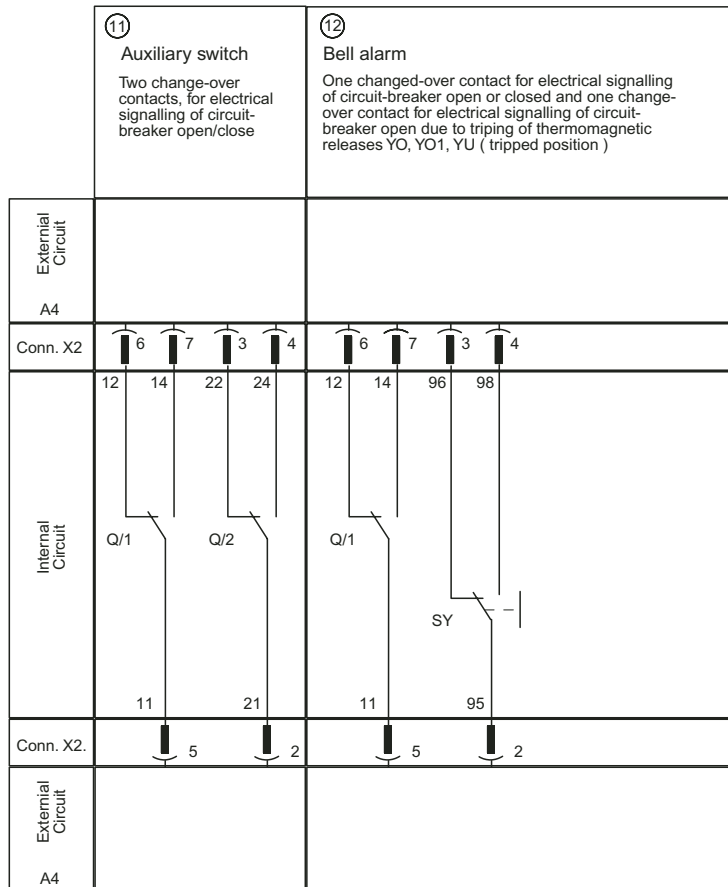


### Legend

- O- Figure number of diagram
- A1 - Applications of the circuit-breaker
- A2 - Applications of the motor operators
- A4 - Example switchgear and connections for control and signalling, outside the circuit breaker
- S1 - For S3 - S4 - S5: position contact operated by a circuit breaker cam for S6 - S7: contact controlled by the motor operated cam: closes when the circuit breaker reaches its closed position and opens when the circuit breaker reaches its open position (doesn't switch when the circuit breaker goes into its tripped position)
- S2 - For S3 - S4 - S5: safety contact operated by:
  - key lock (if mounted)
  - padlock device
  - local control Allen key
- SC - Pushbutton or contact for closing the circuit breaker. For circuit breakers S3 - S4 - S5, the operating mechanism must have a time of not less than 100ms
- SO1 - Pushbutton or contact for opening the circuit breaker
- SO2 - For circuit breakers S3 - S4 - S5, the operating mechanism must have a time of not less than 100ms (see instructions for resetting the circuit breaker after the releases have tripped)
- SY - Contact for electrical signalling of circuit breaker open due to tripping of thermomagnetic releases, YO, YO1, YU (tripped position)
- KO - For S6 - S7: opening and spring-loading relay with held position make contact, released by a cam of the motor operator when the circuit breaker reaches its open position and the closing springs have been loaded
- M - For S6 - S7: motor for opening the circuit breaker and loading the closing springs of the circuit breaker
- X1 - Connectors for the auxiliary circuits of the circuit breaker
- X2 - For circuit breakers S1 - S2 supplied for order only
- XV - Terminal block for accessories
- YC - Closing release

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## Circuit diagrams Auxiliary contacts S1<sup>①</sup>



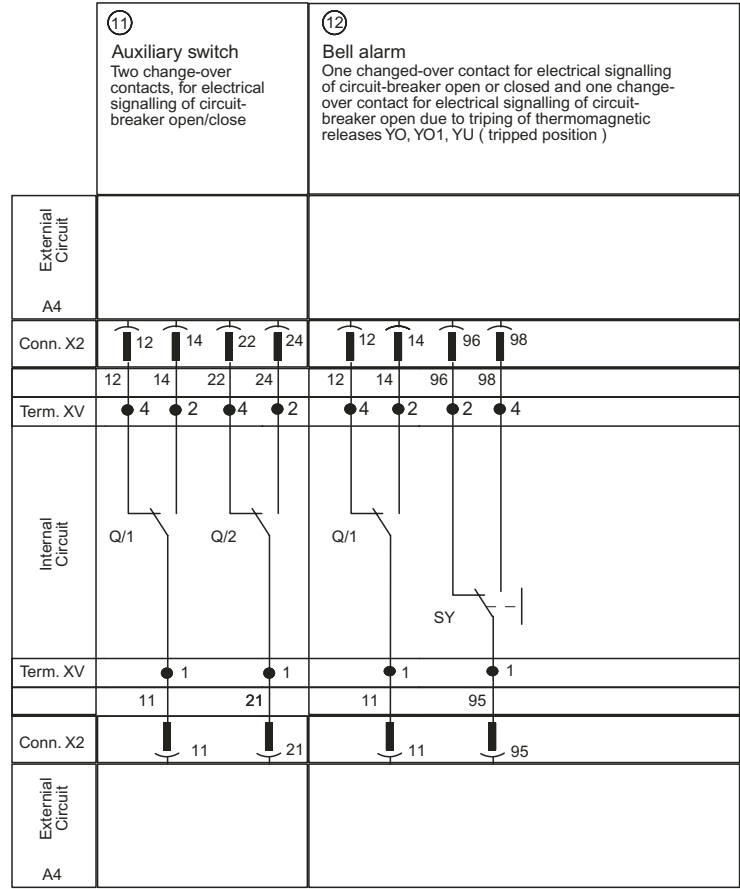
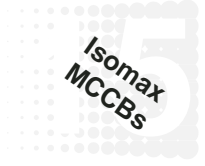
### Legend

- O- Figure number of diagram
- A4 - Example switchgear and connections for control and signalling, outside the circuit breaker
- Q/1...2 - Auxiliary contacts of the circuit breaker
- SY - Contact for electrical signalling of circuit breaker open due to tripping of thermomagnetic releases YO, YO1, YU (tripped position)

# Circuit diagrams

## Auxiliary contacts

### S3 – S7



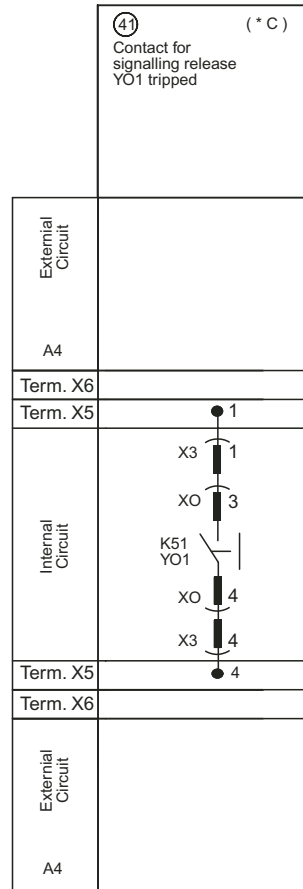
### Legend

- O- Figure number of diagram
- A4 - Example switchgear and connections for control and signalling, outside the circuit breaker
- Q/1...2 - Auxiliary contacts of the circuit breaker
- SY - Contact for electrical signalling of circuit breaker open due to tripping of thermomagnetic releases YO, YO1, YU (tripped position)

## Circuit diagrams

### Auxiliary contacts

#### S4 – S7



#### Legend

- O- Figure number of diagram
- A4 - Example switchgear and connections for control and signalling, outside the circuit breaker
- K51/YO1 - Electrical signalling of alarm for release YO1 tripped due to overcurrent or "trip test"
- X3 - Connectors for the circuits of the microprocessor-based overcurrent release (with plug in or withdrawable circuit breakers, the connectors are pulled out at the same time as the circuit breaker)
- XO - Connector for the opening solenoid YO1

#### Incompatibility:

The circuits indicated in the following figures cannot be powered simultaneously on the same circuit breaker:  
11 - 12 - 13 41 - 42 - 43 - 44

#### Availability:

Connectors X1 and X2 are only supplied to order for circuit breakers S1 - S2.

#### Notes:

(\*C) The electrical signalling contact for the microprocessor-based overcurrent release, shown in Fig. 41, has the following electrical characteristics:

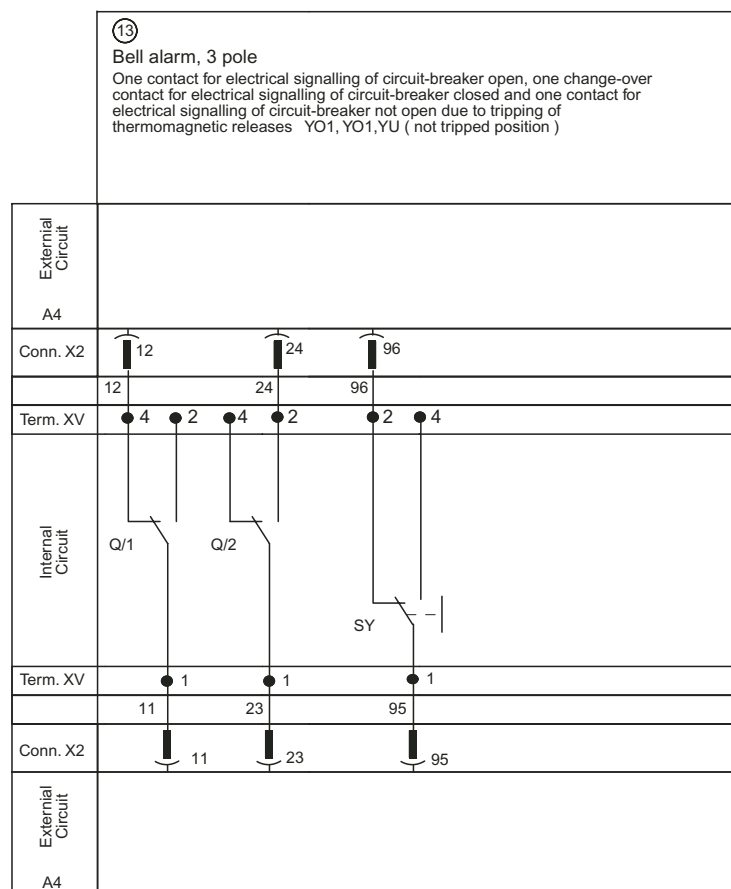
- rated voltage = 24V
- breaking capacity (resistive load) = 3 W/VA
- maximum interrupted current = 0.5A
- For S4 - S5 available with PR212/P release only



# Circuit diagrams

## Auxiliary contacts

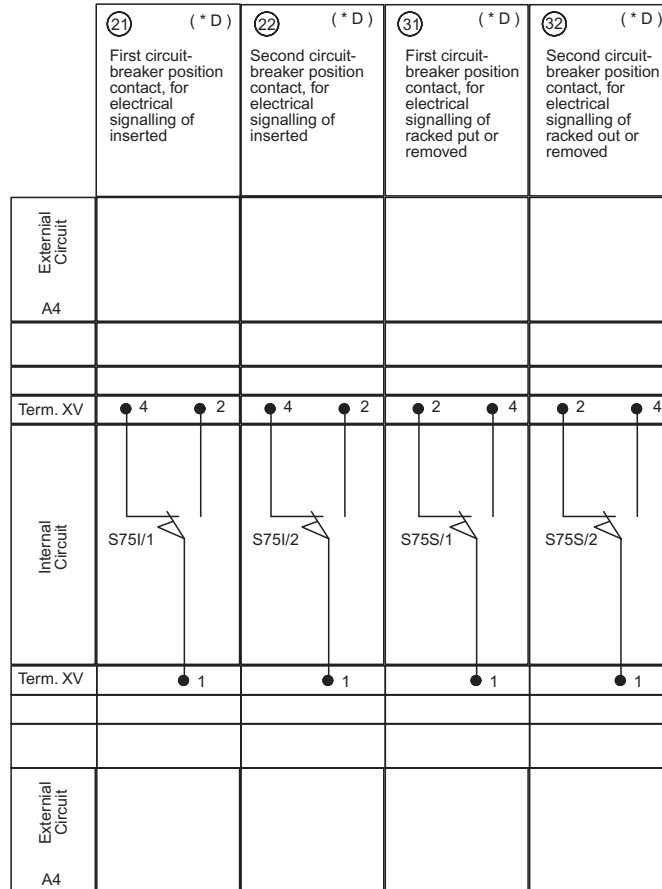
### S6 – S7



### Legend

- O- Figure number of diagram
- A4 - Example switchgear and connections for control and signalling, outside the circuit breaker
- Q/1...2 - Auxiliary contacts of the circuit breaker
- SY - Contact for electrical signalling of circuit breaker open due to tripping of thermomagnetic releases YO, YO1, YU (tripped position)

## Circuit diagrams Position contacts S3



### Legend

- O- Figure number of diagram
- A4 - Example switchgear and connections for control and signalling, outside the circuit breaker
- S75I/1...5 - Contacts for electrical signalling of circuit breaker in inserted position (only for plug in or withdrawable circuit breakers, see Note D.)
- S75S/1...5 - Contacts for electrical signalling of circuit breaker in removed or racked out position (only for plug in or withdrawable circuit breakers, see Note D.)

### Incompatibility

The circuits indicated in the following figures cannot be powered simultaneously on the same circuit breaker:  
20 - 21 - 31, 22 - 32, 23 - 33, 24 - 34, 25 - 35

### Notes

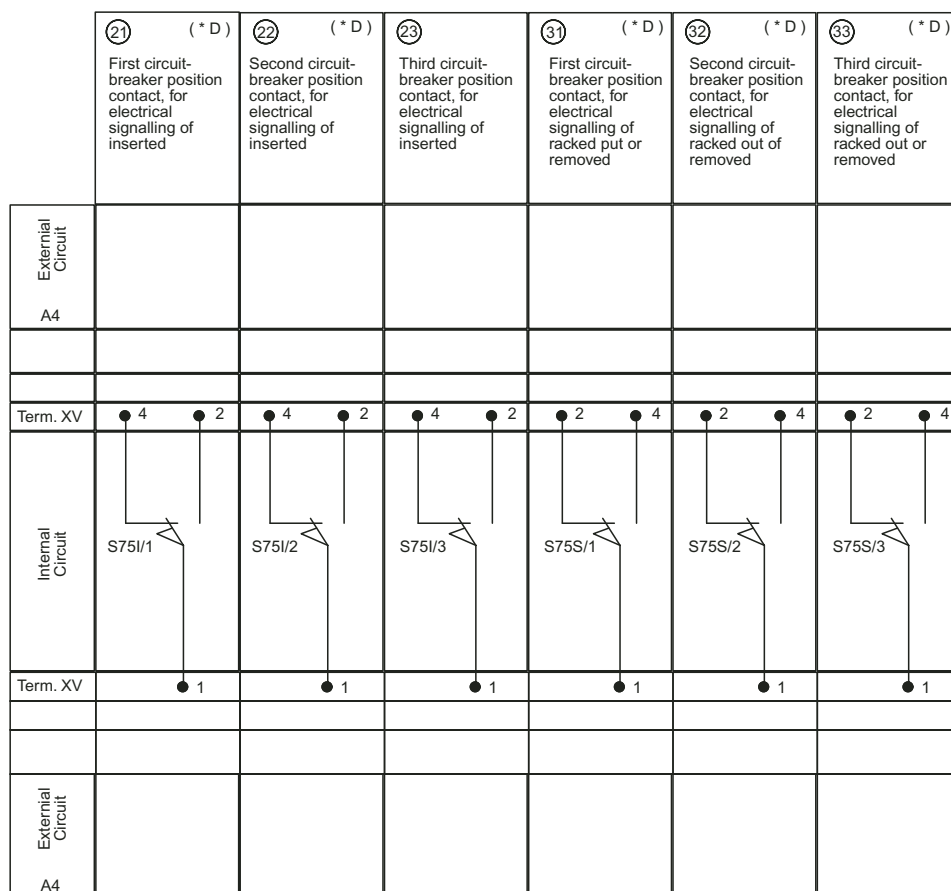
(\*D) The circuit breaker can be mounted with position contacts S75I and S75S in any combination up to a maximum of:

- Total of 2 contacts for S3
- Total of 3 contacts for S4, S5
- Total of 5 contacts for S6, S7

# Circuit diagrams

## Position contacts

### S4 – S5



### Legend

- O- Figure number of diagram
- A4 - Example switchgear and connections for control and signalling, outside the circuit breaker
- S75I/1...5 - Contacts for electrical signalling of circuit breaker in inserted position (only for plug in or withdrawable circuit breakers, see Note D.)
- S75S/1...5 - Contacts for electrical signalling of circuit breaker in removed or racked out position (only for plug in or withdrawable circuit breakers, see Note D.)

### Incompatibility

The circuits indicated in the following figures cannot be powered simultaneously on the same circuit breaker:  
20 - 21 - 31, 22 - 32, 23 - 33, 24 - 34, 25 - 35

### Notes

(\*D) The circuit breaker can be mounted with position contacts S75I and S75S in any combination up to a maximum of:

- Total of 2 contacts for S3
- Total of 3 contacts for S4, S5
- Total of 5 contacts for S6, S7

## Circuit diagrams Position contacts S6 – S7

	⑳ (*D)	㉑ (*D)	㉒ (*D)	㉓ (*D)	㉔ (*D)	㉕ (*D)	㉖ (*D)	㉗ (*D)	㉘ (*D)	㉙ (*D)
	First circuit-breaker position contact, for electrical signalling of inserted	Second circuit-breaker position contact, for electrical signalling of inserted	Third circuit-breaker position contact, for electrical signalling of inserted	Fourth circuit-breaker position contact, for electrical signalling of inserted	Fifth circuit-breaker position contact, for electrical signalling of inserted	First circuit-breaker position contact, for electrical signalling of racked out	Second circuit-breaker position contact, for electrical signalling of racked out	Third circuit-breaker position contact, for electrical signalling of racked out	Fourth circuit-breaker position contact, for electrical signalling of racked out	Fifth circuit-breaker position contact, for electrical signalling of racked out
External Circuit										
A4										
Term. XV	● 4 ● 2	● 4 ● 2	● 4 ● 2	● 4 ● 2	● 4 ● 2	● 2 ● 4	● 2 ● 4	● 2 ● 4	● 2 ● 4	● 2 ● 4
Internal Circuit	S75I/1	S75I/2	S75I/3	S75I/4	S75I/5	S75S/1	S75S/2	S75S/3	S75S/4	S75S/5
Term. XV	● 1	● 1	● 1	● 1	● 1	● 1	● 1	● 1	● 1	● 1
External Circuit										
A4										

### Legend

- O- Figure number of diagram
- A4 - Example switchgear and connections for control and signalling, outside the circuit breaker
- S75I/1...5 - Contacts for electrical signalling of circuit breaker in inserted position (only for plug in or withdrawable circuit breakers, see Note D.)
- S75S/1...5 - Contacts for electrical signalling of circuit breaker in removed or racked out position (only for plug in or withdrawable circuit breakers, see Note D.)

### Incompatibility

The circuits indicated in the following figures cannot be powered simultaneously on the same circuit breaker:  
20 - 21 - 31, 22 - 32, 23 - 33, 24 - 34, 25 - 35

### Notes

(\*D) The circuit breaker can be mounted with position contacts S75I and S75S in any combination up to a maximum of:

- Total of 2 contacts for S3
- Total of 3 contacts for S4, S5
- Total of 5 contacts for S6, S7