



SIMPLE, FAST AND ERROR-FREE SELF-ASSEMBLY

# Star-delta motor start

## Preferred circuitry

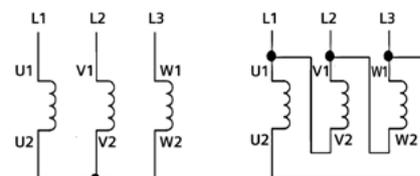
A star-delta (wye-delta) circuit reduces the starting current to 1/3 of the current compared to the current values for direct-on-line starting. However, when switching over from the star connection to the delta connection, the motor may be subjected to compensation processes, reinforced by an unfavorable constellation of line frequency and rotor field, which could result in higher current peaks than would be the case if the stationary motor were connected directly in the delta circuit.

An unfavorable scenario could lead to the following problems:

- Tripping of short-circuit protection devices,
- Welding or substantial contact erosion of the delta contactor,
- High dynamic load on the motor.

When connecting the motor using the **preferred circuitry**, the switchover currents from the star to the delta connection can be reduced.

This can avoid the problems mentioned above.



Correct connection of the motor phases for clockwise rotation

### Circuit favorable for clockwise rotation

<b>U1:</b>	L1	<b>U2:</b>	L3
<b>V1:</b>	L2	<b>V2:</b>	L1
<b>W1:</b>	L3	<b>W2:</b>	L2

### Circuit favorable for counter-clockwise rotation

<b>U1:</b>	L1	<b>U2:</b>	L3
<b>V1:</b>	L3	<b>V2:</b>	L2
<b>W1:</b>	L2	<b>W2:</b>	L1

**SIEMENS**

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# SIRIUS star-delta combinations for IE3/IE4 motors up to 90 kW



- As complete device combinations already wired and tested
- As individual components for self-assembly
- Simple, fast and error-free self-assembly due to wiring kits and pluggable function modules
- Spring-loaded connection technology up to 22 kW
- Thermal or electronic overload relay possible for motor overload protection
- Current monitoring relay for motor overload protection **and** idling monitoring, monitoring for cable break/phase failure possible; monitoring of the application (e.g. idling with defective V-belt, dry-running pump, etc.)

## Product selection for self-assembly of classic star-delta (wye-delta) starters up to 90 kW, normal starting Class 10

Rating data AC-2 and AC-3 at 400 V/50 Hz		Self-assembly					Fully wired and tested combination	Relay expansion Set value motor rated current x 0.58					
Motor power in kW	Operational current in A	Line contactor	Delta contactor	Star contactor	Wiring kit incl. mechanical interlock	Star-delta (wye-delta) function module		Thermal overload relay	Current setting value in A	Electronic overload relay	Current setting value in A	Current monitoring relay	Measuring range in A
<b>Control voltage 230 V 50 Hz</b>													
3	7							3RU2116-1F□0	3.5...5				
4	9	3RT2015-□AP01	3RT2015-□AP02	3RT2015-□AP02			3RA2415-8XF31-□APO	3RU2116-1H□0	5.5...8				
5.5	12				3RA2913-2BB□			3RU2116-1J□0	7...10	3RB3016-1T□0	4...16	3RR2141-□AW30	1.6...16
7.5	16	3RT2017-□AP01	3RT2017-□AP01				3RA2416-8XF31-□APO	3RU2116-1K□0	9...12.5				
11	25	3RT2018-□AP01	3RT2018-□AP01	3RT2016-□AP02			3RA2417-8XF31-□APO	3RU2116-4A□0	11...16				
15	32						3RA2425-8XF32-□AL2	3RU2126-4C□0	17...22				
18.5	40	3RT2026-□AP00	3RT2026-□AP00	3RT2024-□AP00			3RA2426-8XF32-□AL2	3RU2126-4D□0	20...25	3RB3026-1V□0	10...40	3RR2142-□AW30	4...40
22	55	3RT2027-□AP00	3RT2027-□AP00	3RT2026-□AP00	3RA2923-2BB□			3RU2126-4P□0	30...36				
<b>Type of connection:</b>													
Screw terminal = 1, B		↑ 1	↑ 1	↑ 1	↑ 1			↑ B		↑ B		↑ 1	
Spring-loaded terminal = 2, C, E		2	2	2	2			C		E		2	
30	65			3RT2026-1AP00			3RA2434-8XF32-1AL2	3RU2136-4GB0	36...45				
37	80	3RT2035-1AP00	3RT2035-1AP00	3RT2027-1AP00	3RA2933-2C		3RA2435-8XF32-1AL2	3RU2136-4HB0	40...50				
45	86	3RT2036-1AP00	3RT2036-1AP00				3RA2436-8XF32-1AL2	3RU2136-4QB0	47...57	3RB3036-1WB0	20...80	3RR2143-1AW30	8...80
55	115	3RT2037-1AP00	3RT2037-1AP00	3RT2035-1AP00	3RA2933-2BB1	3RA2816-0EW20	3RA2437-8XF32-1AL2	3RU2136-4KB0	62...73				
75	150	3RT2045-1AP00	3RT2045-1AP00	3RT2036-1AP00			3RA2445-8XF32-1AL2		80...100	3RB3046-1XB0	32...115	-	-
90	160	3RT2046-1AP00	3RT2046-1AP00	3RT2037-1AP00	3RA2943-2C		3RA2446-8XF32-1AL2						
<b>Control voltage 24 V DC</b>													
3	7							3RU2116-1F□0	3.5...5				
4	9	3RT2015-□BB41	3RT2015-□BB42	3RT2015-□BB42			3RA2415-8XF31-□BB4	3RU2116-1H□0	5.5...8				
5.5	12				3RA2913-2BB□			3RU2116-1J□0	7...10	3RB3016-1T□0	4...16	3RR2141-□AW30	1.6...16
7.5	16	3RT2017-□BB41	3RT2017-□BB41				3RA2416-8XF31-□BB4	3RU2116-1K□0	9...12.5				
11	25	3RT2018-□BB41	3RT2018-□BB41	3RT2016-□BB42			3RA2417-8XF31-□BB4	3RU2116-4A□0	11...16				
15	32						3RA2425-8XF32-□BB4	3RU2126-4C□0	17...22				
18.5	40	3RT2026-□BB40	3RT2026-□BB40	3RT2024-□BB40			3RA2426-8XF32-□BB4	3RU2126-4D□0	20...25	3RB3026-1V□0	10...40	3RR2142-□AW30	4...40
22	55	3RT2027-□BB40	3RT2027-□BB40	3RT2026-□BB40	3RA2923-2BB□			3RU2126-4P□0	30...36				
<b>Type of connection:</b>													
Screw terminal = 1, B		↑ 1	↑ 1	↑ 1	↑ 1			↑ B		↑ B		↑ 1	
Spring-loaded terminal = 2, C, E		2	2	2	2			C		E		2	
30	65			3RT2026-1BB40			3RA2434-8XF32-1NB3	3RU2136-4GB0	36...45				
37	80	3RT2035-1NB30	3RT2035-1NB30	3RT2027-1BB40	3RA2933-2C		3RA2435-8XF32-1NB3	3RU2136-4HB0	40...50				
45	86	3RT2036-1NB30	3RT2036-1NB30				3RA2436-8XF32-1NB3	3RU2136-4QB0	47...57	3RB3036-1WB0	20...80	3RR2143-1AW30	8...80
55	115	3RT2037-1NB30	3RT2037-1NB30	3RT2035-1NB30	3RA2933-2BB1	3RA2816-0EW20	3RA2437-8XF32-1NB3	3RU2136-4KB0	62...73				
75	150	3RT2045-1NB30	3RT2045-1NB30	3RT2036-1NB30			3RA2445-8XF32-1NB3		80...100	3RB3046-1XB0	32...115	-	-
90	160	3RT2046-1NB30	3RT2046-1NB30	3RT2037-1NB30	3RA2943-2C		3RA2446-8XF32-1NB3						

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# SIRIUS star-delta combinations for IE3/IE4 motors up to 500 kW



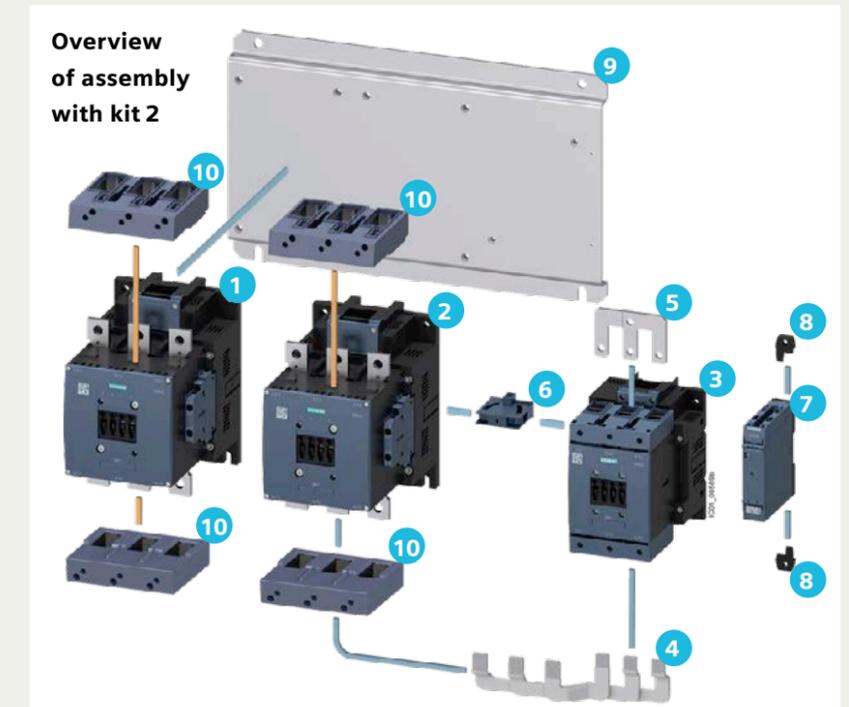
Video  
Assembly

- Product selection for self-assembly
- Please order the individual components for the star-delta combination separately, see kit 1–3
- Fast and error-free self-assembly using wiring kits
- Electronic overload relay possible for motor overload protection

## Product selection for self-assembly of classic star-delta (wye-delta) starters up to 110 kW, normal starting Class 10, with suitable accessories for wiring

Rating data AC-2 and AC-3 at 400 V/50 Hz		1	2	3	Set value motor rated current x 0.58		
Motor power in kW	Operational current in A	Line contactor	Delta contactor	Star contactor	Wiring accessories incl. mechanical interlock	Electronic overload relay	Current setting value in A
Control voltage 230 V 50 Hz							
110	225	3RT1054-6AP36	3RT1054-6AP36	3RT2045-1AP00	Kit 1	3RB2056-1FW2	50...200
132	265	3RT1055-6AP36	3RT1055-6AP36	3RT2046-1AP00			
160	300	3RT1056-6AP36	3RT1056-6AP36	3RT2047-1AP00	Kit 2	3RB2066-1GC2*	55...250
200	400	3RT1064-6AP36	3RT1064-6AP36	3RT1054-6AP36			
250	500	3RT1065-6AP36	3RT1065-6AP36	3RT1055-6AP36	Kit 3	3RB2066-1MC2*	160...630
355	690	3RT1075-6AP36	3RT1075-6AP36	3RT1064-6AP36			
400	750			3RT1065-6AP36			
500	810	3RT1076-6AP36	3RT1076-6AP36	3RT1066-6AP36			

\* Touch protection between contactor and overload relay, article number 3RT1966-4EA3



## Wiring accessories



Order as individual components	Box terminal block for			Wiring module bottom	Wiring module Line-delta contactor for one supply line	Star jumper	Adapter for mechanical interlock S6 - S3	Touch protection cover	Mechanical interlock	Timing relay with star-delta (wye-delta) function		Base plate for assembly of the combination	Push-in lugs for timing relay
	3RT105... (size S6)	3RT106... (size S10)	3RT107... (size S12)							1...20s	3...60s		
<b>Kit 1</b>	Quantity	4	-	1	1	1	1	-	1	1 (select as alternative)		1	2
	Article No.	3RT1955-4G	-	-	3RA1953-3G	3RA1953-3D	3RT1946-4BA31	3RA1954-2G	-	3RA1954-2A	3RP2574-1NW30	3RP2576-1NW30	3RA1952-2E
<b>Kit 2</b>	Quantity	2	4	-	1	-	-	as required	1	1 (select as alternative)		1	2
	Article No.	3RT1955-4G	3RT1966-4G	-	3RA1963-3E	-	3RT1956-4BA31	-	3RT1956-4EA1	3RA1954-2A	3RP2574-1NW30	3RP2576-1NW30	3RA1962-2E
<b>Kit 3</b>	Quantity	-	2	4	1	-	-	as required	1	1 (select as alternative)		1	1
	Article No.	-	3RT1966-4G	3RT1966-4G	3RA1973-3E	-	3RT1966-4BA31	-	3RT1956-4EA1	3RA1954-2A	3RP2574-1NW30	3RP2576-1NW30	3RA1972-2E

## More information:

Learn more about SIRIUS Industrial Controls: [www.siemens.com/sirius-control](http://www.siemens.com/sirius-control)

Learn more about SIRIUS star-delta combinations: [www.siemens.com/sirius-star-delta](http://www.siemens.com/sirius-star-delta)

Learn more about SIRIUS for IE3/IE4 motors: [www.siemens.com/sirius-energy-efficiency](http://www.siemens.com/sirius-energy-efficiency)

In Siemens Industry Online Support “Preferred Circuitry Configuration for Clockwise and Counter-clockwise Motor Rotation”: [www.siemens.com/sios](http://www.siemens.com/sios) – entry ID: 24499345

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