

## How can a charging station for electric vehicles be set up simply and safely?

### Requirement

In order to supply electric vehicles with electric power, charging stations and car parks must be equipped with charging points. This means combining different functionalities with attractive design. The right low-voltage energy distribution components must be used to suit the prevailing charging power, environmental conditions and location. Pre-defined solution packages are expected here to be scaled in functionality and performance class. The charging stations must comply with the applicable standards and connection conditions, such as IEC 61851.



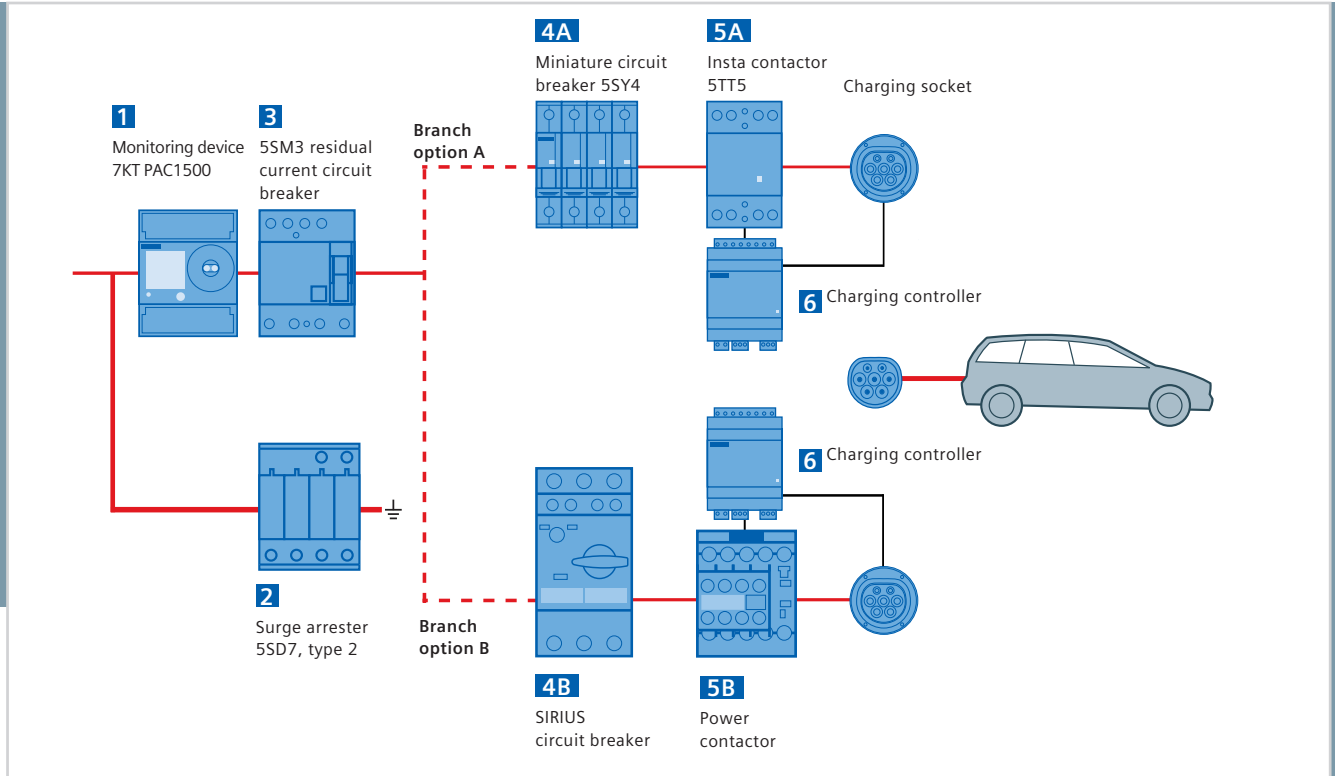
**Reliable**  
electromobility

Charging an electric vehicle

Our answer:

# Standard-compliant protection, switching and measuring equipment for scalable solutions

Siemens offers the right protection, switching and measuring equipment for installing in charging stations. The products meet the requirements regarding short-circuit protection, climatic environmental conditions, system configuration and safety engineering.



Branch option A contains a miniature circuit breaker and an Insta contactor, Branch option B contains a circuit breaker and a power contactor from the SIRIUS product range.

## Highlights

### Comprehensive portfolio for maximum safety

- Control modules for charging interfaces
- Field-proven, high-quality protection, switching, measuring and monitoring equipment
- Wide range of circuit breakers and miniature circuit breakers with accessories such as remote drive and auxiliary circuit switches
- Universal-current-sensitive residual-current circuit breakers (RCCBs) type B (SIQUENCE)
- Monitoring device 7KT PAC1500 with communication interface

### Standard compliance

- The products meet configuration functionality requirements for electric vehicle charging stations in accordance with IEC 61851 and IEC 60364

### Customer-friendly design

- Simple installation and wiring since all components are suitable for DIN rail mounting

**Siemens offers products for charging stations matched according to rated performance classes:**

Example of single-phase charging station, 230 V, 3 kW	Order no.
Charging controller 230 V supplied, for charging interfaces 16 A, 230 V charging mode 3 – Alternative: charging controller 24 V supplied, for charging unit 16 A, charging mode 3 – Alternative: charging controller with Ethernet interface stand-alone 24 V supplied, for charging unit 6...80 A charging mode 3	5TT3 200-2KK20 5TT3 200-2KK30 6FE1021-3CM10-2AA0
Surge arrester, type 2, 350 V AC (with remote signaling)	5SD7 461-1
RCCB, type B, 30 mA, 25 A – recommended (or RCCB, type A super resistant <a href="#">[K]</a> , 30 mA, 25 A)	5SM3 322-4 (5SM3 312-6KK01)
MCB, 16 A, 1+N, C char., 10 kA	5SY4 516-7
Insta contactor, 2 NO contacts, 20 A	5TT5 800-0
Optional: Measuring device 7KT PAC1500	7KT1 530
Enclosure (e.g. ALPHA SIMBOX WP 280 x 410 x 140 mm)	8GB1 371-3

Example of single-phase charging station, 230 V, 7 kW	Order no.
Charging controller for charging unit 32 A, charging mode 3 – Surge arrester, type 2, AC 350 V (with remote signaling) – Alternative: charging controller with Ethernet interface stand-alone 24 V supplied, for charging unit 6...80 A charging mode 3	5TT3 20-4KK20 5SD7 461-1 6FE1021-3CM10-2AA0
RCCB, type B, 30 mA, 40 A – recommended (or RCCB, type A super resistant <a href="#">[K]</a> , 30 mA, 40 A)	5SM3 324-4 (5SM3 314-6KK01)
MCB, 32 A, 1+N, C char., 10 kA	5SY4 532-7
Insta contactor, 4 NO contacts, 63 A	5TT5 850-0
Optional: Measuring device 7KT PAC1500	7KT1 530
Enclosure (e.g. ALPHA SIMBOX WP 280 x 410 x 140 mm)	8GB1 371-3

Example of 3-phase charging station, 400 V, 11 kW	Order no.
Charging controller 230 V supplied, for charging unit 16 A, charging mode 3 – Alternative: charging controller 24 V supplied, for charging unit 16 A, charging mode 3 – Alternative: charging controller with Ethernet interface stand-alone 24 V supplied, for charging unit 6...80 A charging mode 3	TT3 200-2KK20 5TT3 200-2KK30 6FE1021-3CM10-2AA0
Surge arrester, type 2, AC 350 V (with remote signaling)	5SD7 464-1
RCCB, type B, 30 mA, 25 A – recommended (or RCCB, type A super resistant <a href="#">[K]</a> , 30 mA, 25 A)	5SM3 342-4 (5SM3 342-6KK01)
Branch option A	Miniature circuit breaker, 16 A, 3+N, C char., 10 kA
	Insta contactor, 4 NO contacts, 63 A
Branch option B	SIRIUS circuit breaker 11...16 A, 3-pole, 55 kA
	SIRIUS power contactor, 4-pole, 18 A (AC-1), coil AC 230 V, 50/60 Hz
Optional: Measuring device 7KT PAC1500	7KT1 543
Enclosure (e.g. ALPHA SIMBOX WP 463 x 410 x 140 mm)	8GB1 372-3

Example of 3-phase charging station, 400 V, 22 kW	Order no.
Charging controller for charging unit 32 A, charging mode 3 – Surge arrester, type 2, AC 350 V (with remote signaling) – Alternative: charging controller with Ethernet interface stand-alone 24 V supplied, for charging unit 6...80 A charging mode 3	5TT3 200-4KK20 5SD7 464-1 6FE1021-3CM10-2AA0
RCCB, type B, 30 mA, 40 A – recommended (or RCCB, type A super resistant <a href="#">[K]</a> , 30 mA, 40 A)	5SM3 344-4 (5SM3 344-6KK01)
Branch option A	MCB, 32 A, 3+N, C char., 10 kA
	Insta contactor, 4 NO contacts, 63 A
	Optional: according to charging mode: miniature circuit breaker, 16 A, 3+N, C char., 10 kA
Branch option B	SIRIUS circuit breaker 27...32 A, 3-pole, 55 kA
	SIRIUS power contactor, 4-pole, 40 A (AC-1), coil AC 230 V, 50 Hz, integral auxiliary contacts 1 NO contact + 1 NC contact
	Optional: according to charging mode*: SIRIUS circuit breaker, 11...16 A, 3-pole, 55 kA
	Optional: according to charging mode*: SIRIUS power contactor, 4-pole, 18 A (AC-1), coil AC 230 V, 50/60 Hz
Optional: Measuring device 7KT PAC1500	7KT1 543
Enclosure (e.g. ALPHA SIMBOX WP 463 x 410 x 140 mm)	8GB1 372-3

Example of 3-phase charging station, 400 V, 43 kW		Order no.
Surge arrester, type 2, AC 350 V (with remote signaling) – Charging controller with Ethernet interface stand-alone 24 V supplied, for charging unit 6...80 A charging mode 3		5SD7 464-1 6FE1021-3CM10-2AA0
RCCB, type B, 30 mA, 80 A – recommended (or RCCB, type A super resistant <b>[K]</b> , 30 mA, 80 A)		5SM347-4 (5SM3 347-6KK01)
Branch option A	MCB, 63 A, 3+N, C char., 10 kA	5SY4 663-7
	Insta contactor, 4 NO contacts, 63 A	5TT5 850-0
	Optional: according to charging mode: miniature circuit breaker, 16 A, 3+N, C char., 10 kA	5SY4 616-7
	Optional: according to charging mode: miniature circuit breaker, 32 A, 3+N, C char., 10 kA	5SY4 632-7
Branch option B	SIRIUS circuit breaker 45...63 A, 3-pole, 55 kA	3RV10 41-4JA10-0DA0
	SIRIUS power contactor, 4-pole, 100 A (AC-1), coil AC 230 V, 50 Hz	3RT13 44-1AP00
	Optional: according to charging mode*: SIRIUS circuit breaker 11...16 A, 3-pole, 55 kA	3RV20 21-4AA10-0DA0
	Optional: according to charging mode*: SIRIUS power contactor, 4-pole, 40 A (AC-1), coil AC 230 V, 50 Hz, integral auxiliary contacts 1 NO contact + 1 NC contact	3RT23 26-1AP00
	Optional: according to charging mode*: SIRIUS circuit breaker 27...32 A, 3-pole, 55 kA	3RV20 21-4EA10-0DA0
	Optional: according to charging mode*: SIRIUS power contactor, 4-pole, 18 A (AC-1), coil AC 230 V, 50/60 Hz	3RT23 16-1AP00
Optional: Measuring device 7KT PAC1500		7KT1 543
Enclosure (e.g. ALPHA SIMBOX WP 463 x 410 x 140 mm)		8GB1 372-3

Accessories		
Auxiliary circuit switch, 1 NO contact + 1 NC contact (RCCB)		5SW3 300
Remote drive (RCCB)		5ST3 051
Auxiliary circuit switch, 1 NO contact + 1 NC contact (miniature circuit breaker)		5ST3 010
Remote drive (miniature circuit breaker)		5ST3 050
Auxiliary circuit switch, 1 NO contact + 1 NC contact (Insta contactor)		5TT5 910-1
Auxiliary switch with mirror contacts (1 NO contact + 1 NC contact) for SIRIUS power contactor (charging station 16 A, 32 A)		3RH29 11-1HA11
Auxiliary switch (1 NO contact + 1 NC contact) for SIRIUS power contactor (charging station 16 A, 32 A)		3RH19 21-1CA10
Link module circuit breaker/SIRIUS power contactor (charging station 16 A)		3RA19 21-1DA00
Auxiliary switch (1 NO contact + 1 NC contact) for SIRIUS circuit breaker (charging station 63 A)		3RV29 01-1E
Signaling switch for tripping method for SIRIUS circuit breaker (charging station 16 A, 32 A)		3RV29 21-1M
Signaling switch for tripping method for SIRIUS circuit breaker (charging station 63 A)		3RV19 21-1M

When used with remote drive, cost savings with 2-in-1 device (RCBO)		
RCBO, type A, 30 mA, 16 A, C char., 1P+N, 10 kA		5SU1 354-7KK16
RCBO, type A, 30 mA, 32 A, C char., 1P+N, 10 kA		5SU1 354-7KK32
Remote drive (RCBO)		5ST3 050

Subsystems		
Fully configured, pre-assembled and tested subsystems can also be supplied for setting up charging stations based on the above sample combinations of individual products.		6FE1086* on request


\* Charging modes in accordance with IEC 61851.

Please observe the applicable regulations and environmental conditions, such as humidity, temperature, etc.

## Main components required

		Product	Description of functions
1		<b>Measuring device</b> <b>7KT PAC1500</b>  <b>Order no.</b> <b>7KT1 5</b>	Digital electric meters record the active and reactive energy with high accuracy. They are available in calibrated versions – in accordance with the new measuring instruments directive 2004/22/EC (MID). They can thus also be used for billing of the energy drawn.
2		<b>Surge arrester 5SD7,</b> <b>type 2</b>  <b>Order no.</b> <b>5SD7 4</b>	Lightning conductors and surge arresters protect the charging infrastructure and the electric vehicle against overvoltages and surge currents. Failure of a device can be reported via remote signaling.
3		<b>Residual current circuit</b> <b>breaker 5SM3</b>  <b>Order no.</b> <b>5SM3</b>	Residual current circuit breakers are used for personnel and property protection, protection against fire and additional protection in the event of direct contact. A universal current-sensitive residual current circuit breaker Type B (SIQUENCE) is recommended for the charging station. In addition to AC and pulsing DC residual currents, it also detects smooth DC residual currents and thus secures the desired protection function in case of all residual current types.
4A		<b>Miniature circuit</b> <b>breaker 5SY4, 10 kA</b>  <b>Order no.</b> <b>5SY4</b>	Miniature circuit breakers offer reliable protection against overload and short circuit. They can be supplemented with additional components and can thus also be integrated into a control system to allow the operating status of the charging station to be detected.
4B		<b>SIRIUS</b> <b>circuit breakers</b> <b>27...32 A, 3-pole, 55 kA</b>  <b>Order no.</b> <b>3RV20 21-4EA10-0DA0</b>	SIRIUS circuit breakers offer reliable protection against overload and short circuit, even in case of ambient temperatures up to 70 °C (up to 60 °C without derating). The devices enable low-cost and fault-proof installation and are also optionally available with spring-loaded terminals and connection module for the circuit breaker and contactor. In addition, versions with overload relay function are available, making mechanical restarting superfluous after an overload trip. Auxiliary and signaling switches, available as accessories, communicate the current switching status as well as the tripping method.
5A		<b>Insta contactor 5TT5</b>  <b>Order no.</b> <b>5TT5 8</b>	Insta contactors switch the voltage supply on and off at the charging sockets. They are switched by the charging station controller.
5B		<b>SIRIUS power contactor</b> <b>4-pole, 40 A (AC-1)</b> <b>integrated auxiliary</b> <b>contacts 1 NO + 1 NC</b> <b>contact</b>  <b>Order no.</b> <b>3RT23 26-1AP00</b>	SIRIUS power contactors switch the power supply of the charging sockets on and off, with a long life span and at ambient temperatures up to 70 °C (60 °C without derating). The auxiliary contacts available as accessories are designed as mirror contacts in accordance with IEC EN60947-4-1. This meets the requirements for safety technology in personnel protection. Basic devices and accessories are optionally available with spring-loaded terminals.
6		<b>SIPLUS ECC1000 CM-100</b>  <b>Order no.</b> <b>5TT3 2</b>	The charging controller enables charging in charging mode 3 in accordance with the IEC standard. It communicates with the electric vehicle, identifies the charging cable, and controls and monitors the switching devices and the plug interlock. The charging controller thus ensures maximum safety for the charging operation. Communication between the charging column and the electric vehicle by means of a pulse-width modulated signal.

## Main components required

		Product	Description of functions
6		<b>SIPLUS ECC2000 CM-230</b>  Order no. 6FE1021-3CM10-2AA0 CM-230 standalone  Order no. 6FE1021-3CM10-1AA0 CM-230 managed	Optional. In addition to the functions of the charging controller CM-100 the CM-230 has an integrated Ethernet interface which makes communication with an intelligent load management possible.

## Further information

For details on individual products:

[www.siemens.com/lowvoltage](http://www.siemens.com/lowvoltage)

[www.siemens.com/sirius](http://www.siemens.com/sirius)

For technical assistance regarding the use of products:

[www.siemens.com/lowvoltage/technical-support](http://www.siemens.com/lowvoltage/technical-support)

[www.siemens.com/automation/support-request](http://www.siemens.com/automation/support-request)

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