

Description

Intelligent and complex systems as well as the electrification of loads currently play a decisive role in the development of on-board electrical systems.

The SCS200 is the right answer to these requirements. It is an intelligent power distribution system, allowing decentralised control and monitoring of loads via the CAN bus. The design features a pcb-based power distribution in a compact IP66/67 enclosure.

The SCS200 modules are plug & play solutions that allow you to reduce wiring time and save space. Comprehensive diagnostic capabilities (integral load protection, load current and voltage measurement, output status) and the integrated CAN connection of the SCS200 allow predictive maintenance and the implementation of load management.

Applications


Scope of applications:

- Agricultural machinery, construction machinery, special vehicles, trucks and buses
- Decentralised power distribution below the ECU
- Vehicle modernisation and easy system extension through a standard CAN component

Benefits

- Predictive maintenance and load management through comprehensive diagnostic functions (current, voltage, status)
- Reduction of wiring time through plug-and-play design with CAN connection
- Space-saving and flexible installation through a compact IP66/67-rated enclosure
- Enhanced safety through integral electronic load protection

Approvals

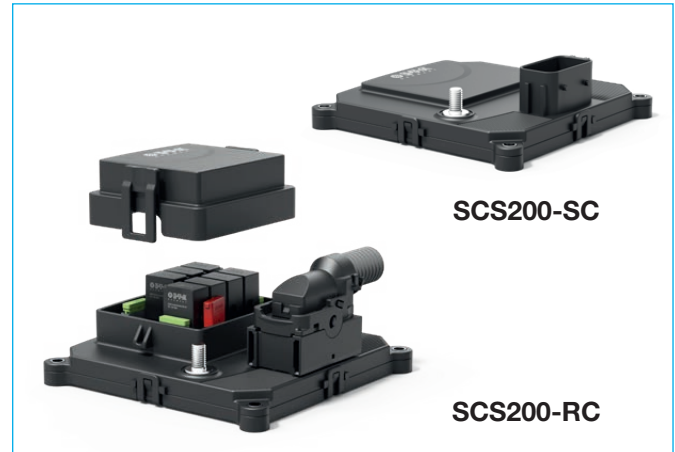
Approval authority	Logo	Directive	Approval logos
KBA	E1 10R-059019	ECE-R10	

Compliance



Variant examples

Part numbers	Short description
SCS200-SC08-00-01-C1-01	8 load outputs, fully electronic, DC 12 V, J1939
SCS200-SC12-00-01-C1-01	12 load outputs, fully electronic, DC 12 V, J1939
SCS200-SC12-00-02-C4-01	12 load outputs, fully electronic, DC 24 V, CANopen
SCS200-SC12-00-04-C4-01	12 load outputs, fully electronic, DC 48 V, CANopen
SCS200-RC08-00-01-C1-01	8 load outputs relays and fuses, DC 12/24V (unpopulated), J1939



Technical data SCS200-SC... (T_{AMB} = 25 °C at U_N = 12 V)

Rated voltage	DC 12 V
Operating voltage range	9 V ... 16 V
Rated current per channel	8-channel version: 4 x 30 A, 4 x 10 A 12-channel version: 4 x 30 A, 8 x 10 A
Total current	8-channel version: 120 A 12-channel version: 150 A
Analog inputs	6 analog inputs (0 – 10 V) ³⁾
Temperature range ¹⁾	-40 ... +85 °C
Closed current	< 0.5 mA
Electronic load protection	trip current 1: 1.3 x I _N trip delay 1: 200 ms trip current 2: 3 x I _N (channels 1-4: max. 60 A, channels 5-12: max. 22.5 A) trip delay 2: 30 ms (can be deactivated via software)
Bus communication	CAN 2.0B / SAE J1939 250 kBits/s (CANopen and 500 kBits/s available soon)
Degree of protection	IP66, IP67 to ISO 20653
Environmental tests	to ISO 16750
EMC	to ECE-R10 (E1)
Reverse polarity protection	supply terminals (reverse polarity non-conductive) and load outputs (reverse polarity conductive)
Short circuit resistance	30 A channel > 100 A at 16 V 10 A channel > 60 A at 16 V
Voltage drop ²⁾	channel 1-4 (at 24 A): max. 50 mV channel 5-12 (at 8 A): max. 75 mV
Vibration	RMS acceleration 57.9 m/s ²
Shock resistance	50 g/6 ms half-sine
Housing material	PA66-GF25FR V-0
Mass	410 g
Dimensions	159 x 159 x 44 mm

¹⁾ Ampacity see derating (user manual SCS200)

²⁾ Cannot be ensured over the entire life span

³⁾ Input 1 to 3 can be used for physical module addressing (PMA)

Technical data SCS200-SC... (T_U = 25 °C at U_N = 24 V)

Rated voltage	DC 24 V
Operating voltage range	9 V ... 32 V
Rated current per channel	2 x 25 A, 10 x 10 A Parallel connection of the 10 A load outputs possible (3 x 25 A, 9 x 10 A possible at 100 A total current)
Total current	120 A
Analog inputs	5 analog inputs (0 – 10 V) ³⁾
Temperature range ¹⁾	-40 ... +85 °C
Closed current	< 1 mA
Electronic load protection ⁴⁾	Trip current 1: 1,3 x I _N Trip delay 1: 200 ms Trip 2: 3 x I _N (channels 1-3: max. 75 A, channels 4-12: max. 30 A) Trip delay 2: 30 ms (can be deactivated via software)
Bus communication	CAN 2.0B / SAE J1939 / CANopen 250 kBits/s (500 kBits/s available soon)
Degree of protection	IP66, IP67 to ISO 20653
Environmental tests	to ISO 16750
EMC	to ECE-R10 (E1)
Reverse polarity protection	Supply terminals (reverse polarity non-conductive) and load outputs (reverse polarity conductive for 60s to ISO16750-2)
Short circuit resistance	25 A channel: > 100 A at 32 V 10 A channel: > 60 A at 32 V
Voltage drop ²⁾	Channel 1-3 (at 20 A): max. 60 mV Channel 4-12 (at 8 A): max. 60 mV
Vibration	RMS acceleration 57.9 m/s ²
Shock resistance	50 g/6 ms half-sine
Housing material	PA66-GF25FR V-0
Mass	410 g
Dimensions	159 x 159 x 44 mm

¹⁾ Ampacity see derating (user manual SCS200)

²⁾ Can't be ensured over the entire life span.

³⁾ Input 1 to 3 can be used for physical module addressing (PMA)

⁴⁾ Differentiation of CAN diagnostic information between trip current 1 & 2

Technical data SCS200-SC... (T_U = 25 °C at U_N = 48 V)

Rated voltage	DC 48 V (Load) DC 12/24 V (Control)
Operating voltage range	9 V ... 60 V (Load) ⁵⁾ 9 V ... 32 V (Control)
Rated current per channel	3 x 15 A, 9 x 10 A Parallel connection of the 10 A load outputs possible
Total current	90 A
Analog inputs	5 analog inputs (0 – 10 V) ³⁾
Temperature range ¹⁾	-40 ... +85 °C
Closed current	< 1 mA
Electronic load protection ⁴⁾	Trip current 1: 1,3 x I _N Trip delay 1: 200 ms Trip 2: 3 x I _N (channels 1-3: max. 45 A, channels 4-12: max. 30 A) Trip delay 2: 30 ms (can be deactivated via software)
Bus communication	CAN 2.0B / SAE J1939 / CANopen 250 kBits/s (500 kBits/s available soon)
Degree of protection	IP66, IP67 to ISO 20653
Environmental tests	to ISO 16750
EMC	to ECE-R10 (E1)
Reverse polarity protection	Supply terminals (reverse polarity non-conductive) and load outputs (reverse polarity conductive)
Short circuit resistance	15 A channel: > 90 A at 32 V 10 A channel: > 60 A at 32 V
Voltage drop ²⁾	Channel 1-3 (at 12 A): max. 60 mV Channel 4-12 (at 8 A): max. 75 mV
Vibration	RMS acceleration 57.9 m/s ²
Shock resistance	50 g/6 ms half-sine
Housing material	PA66-GF25FR V-0
Mass	410 g
Dimensions	159 x 159 x 44 mm

¹⁾ Ampacity see derating (user manual SCS200)

²⁾ Can't be ensured over the entire life span.

³⁾ Input 1 to 3 can be used for physical module addressing (PMA)

⁴⁾ Differentiation of CAN diagnostic information between trip current 1 & 2

⁵⁾ According to ISO21780, the nominal voltage range goes up to 52 V; at 54 V the transient voltage limit is defined and from 54V the overvoltage range begins, which causes the SCS200 to switch off the load outputs for self-protection when detected.

Technical data SCS200-RC... (T_{AMB} = 25 °C at U_N = 12 V/24 V)

Rated voltage	DC 12 V/24 V
Operating voltage range	9 V ... 32 V
Rated current per channel	4 x 30 A, 4 x 10 A
Total current	120 A
Analog inputs	6 analog inputs (0 – 10 V) ³⁾
Temperature range ¹⁾	-40 ... +85 °C
Closed current	12 V < 1.2 mA 24 V < 2.4 mA
Electronic load protection	trip current 1: 1.3 x I _N trip delay 1: 200 ms trip current 2: 3 x I _N (channels 1-4: max. 60 A, channels 5-8: max. 22.5 A) trip delay 2: 30 ms (can be deactivated via software)
Fail-safe	ATO fuses as back-up elements (not included in the delivery)
Bus communication	CAN 2.0B / SAE J1939 250 kBits/s (CANopen and 500 kBits/s available soon)
Degree of protection	IP66, IP67 to ISO 20653
Environmental tests	to ISO 16750
EMC	to ECE-R10 (E1)
Reverse polarity protection	Supply (reverse polarity non-conductive)
Short circuit resistance	depending on the relays fitted. Example: TE V23074-A2002-A403 (30A channel): > 100 A at 24 V E-T-A ESR10-NC2A4HB-00-D2-10A (10 A channel) > 60 A at 24 V
Voltage drop ²⁾	channel 1-4 (at 24 A): max. 50 mV channel 5-12 (at 8 A): max. 75 mV
Vibration	RMS acceleration 57.9 m/s ²
Shock resistance	50 g/6 ms half-sine
Housing material	PA66-GF25FR V-0
Mass	630 g (fully populated)
Dimensions	159 x 159 x 62 mm

¹⁾ Ampacity see derating (user manual SCS200)

²⁾ Cannot be ensured over the entire life span

³⁾ Input 1 to 3 can be used for physical module addressing (PMA)

Ordering information

Type	
SCS200	Intelligent power distribution board - Smart Control Systems
Load outputs	
SC	Semiconductors
RC	Relay sockets and ATO circuit breaker sockets
Number of channels	
08	8 load outputs
12	12 load outputs (only with SC version)
Assembly	
00	standard (with RC version without relays and fuses)
Supply voltage	
01	12 VDC (SC version only)
02	24 VDC (SC version only)
03	12/24 VDC (RC version only)
04	48 VDC (SC version only)
CAN standard	
C1	SAE J1939 compatible
C2	SAE J1939 compatible, without integrated CAN termination
C3	CANopen compatible
C4	CANopen compatible, without integrated CAN termination
Software configuration	
01	standard configuration, locally configurable via CAN

SCS200-SC 08 - 00 - 01 - C1 - 01 ordering example

The versions SC for 12V and RC for 12/24V are currently not available as CANopen version. In addition, the functionality of these versions is limited to the existing functionality and will be updated to the new features soon.

CAN communication CAN 2.0B/SAE J1939 / CANopen

Receive (Rx)

- Switch load outputs ON and OFF
- Query of measured values per load output
 - current and voltage
- Query of analog outputs
- Query of total current and U_{Bat}
- Query of load output status
 - switching status and error diagnosis (ON, OFF, overload, open load)
- Activate sleep mode
- Initialise module
 - ON and OFF delay per channel (0.5 s ... 2.7 hrs)
 - Module ID
 - Rated current per channel
 - 10 A channels: 1 A ... 10 A
 - 30 A channels: 5 A ... 30 A
 - Paralell connection of load outputs
 - PMA state
 - Safe states

Send (Tx)

- Total current and U_{Bat} (accuracy: ± 3 A or $\pm 3\%$ at U_N)
- Load current per channel (accuracy: ± 0.5 A)
- Voltage applied per channel (accuracy: $\pm 3\%$ at U_N)
- Voltage values of analog inputs (0 – 10 V, accuracy: ± 200 mV)
- Error diagnosis per channel (normal, trip 1 (overload), trip 2 (short circuit), open load)
- Switching conditions of load outputs
- Information regarding the module configuration
- Heart beat according to CANopen
- Diagnosis information can be send cyclically or up on request

The SCS200 supports address claiming to SAE J1939-81.
The SCS200 supports LSS according to CiA 305.

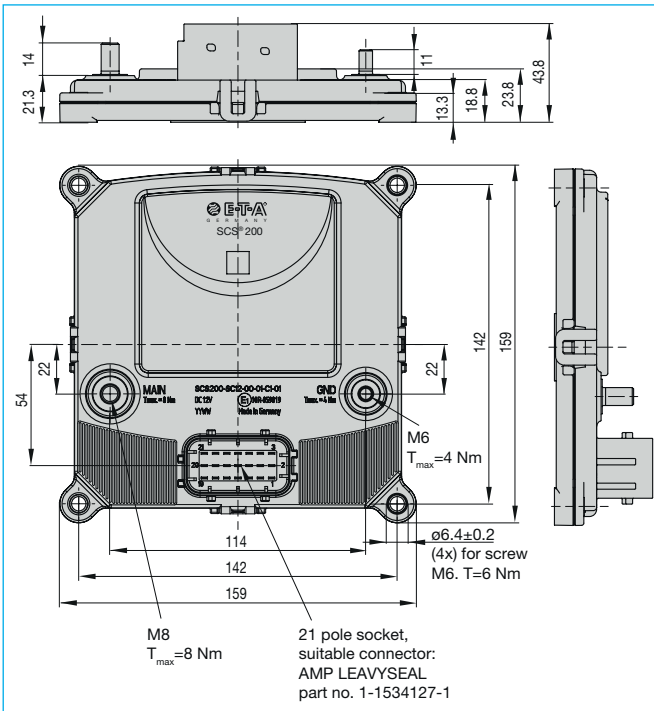
No special configuration software required for initialising/configuring the module.

For listing all pertinent CAN frames (DBC, SYM and EDS files available) and other information, please observe the separate user manual:



SCS[®]200
<https://www.e-t-a.de/qr1042/>

Dimensions SCS200-SC...



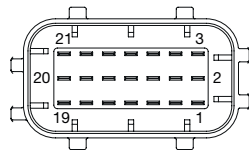
Pin assignment SCS200-SC08...

Main terminals

U_{Bat}: M8 screw terminal (marking: MAIN)
GND: M6 screw terminal (marking: GND)

21-pole connector

Mating plug: Tyco AMP LEAVYSEAL
1-1534127-1



Pin	Name	Description
1	n.c.	not connected
2	LOAD_8	10 A load
3	LOAD_4	30 A load
4	n.c.	not connected
5	IN_A_1	Analogue input 1 / PMA 1
6	LOAD_7	10 A load
7	n.c.	not connected
8	IN_A_3	Analogue input 3 / PMA 3
9	LOAD_3	30 A load
10	n.c.	not connected
11	IN_A_4	Analogue input 4
12	LOAD_6	10 A load
13	IN_A_2	Analogue input 2 / PMA 2
14	IN_A_5	Analogue input 5
15	LOAD_2	30 A load
16	IN_A_6	Analogue input 6
17	WAKE_SIGNAL_IN	CAN wake up input
18	LOAD_5	10 A load
19	CAN_H_OUT	CAN high
20	CAN_L_OUT	CAN low
21	LOAD_1	30 A load

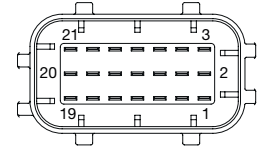
Pin assignment SCS200-SC12...

Main terminals

U_{Bat}: M8 screw terminal (marking: MAIN)
GND: M6 screw terminal (marking: GND)

21-pole connector

Mating plug: Tyco AMP LEAVYSEAL
1-1534127-1

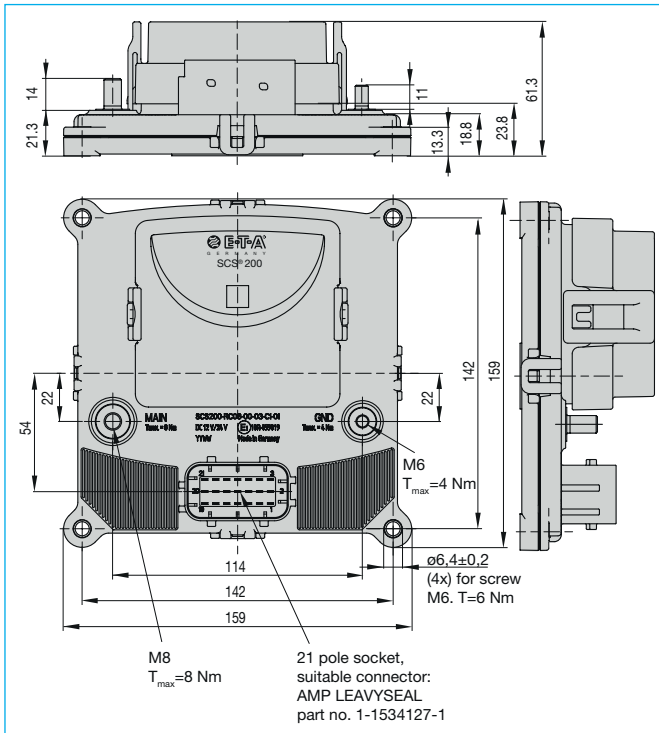


Pin	Name		Description	
	12 V	24 V/48 V	12 V	24 V/48 V
1	LOAD_9		10 A load	
2	LOAD_8		10 A load	
3	LOAD_4	LOAD_3	30 A load	10 A / 15 A load ²⁾
4	LOAD_10		10 A load	
5	IN_A_1		Analogue input 1 / PMA 1	
6	LOAD_7		10 A load	
7	LOAD_11		10 A load	
8	IN_A_3		Analogue input 3 / PMA 3	
9	LOAD_3	LOAD_6	30 A load	10 A load
10	LOAD_12		10 A load	
11	IN_A_4		Analogue input 4	
12	LOAD_6	LOAD_4	10 A load	
13	IN_A_2		Analogue input 2 / PMA 2	
14	IN_A_5		Analogue input 5	
15	LOAD_2		30 A load	25 A / 15 A load ²⁾
16	IN_A_6	U_Control	Analogue input 6	Logic Supply ¹⁾
17	WAKE_SIGNAL_IN		CAN wake up input	
18	LOAD_5		10 A load	
19	CAN_H_OUT		CAN high	
20	CAN_L_OUT		CAN low	
21	LOAD_1		30 A load	25 A / 15 A load ²⁾

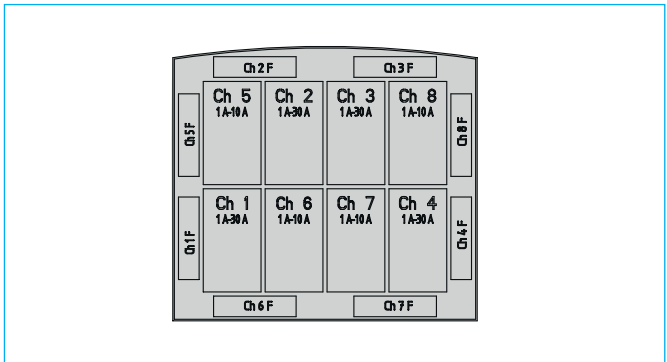
¹⁾ For the 24 V & 48 V version, pin 16 is used as a separate supply voltage pin for the controller instead of analog input 6 (IN_A_6).

²⁾ For the 24 V version, load outputs 1 & 2 are designed for a maximum current of 25 A and for the 48 V version for a maximum current of 15A. Reducing the total current to 100 A for the 24 V variant allows load output 3 to be used with 25 A (24 V). At the 48 V variant load output 3 can be used with 15 A without any derating of the total current.

Dimensions SCS200-RC...



Channel assignment SCS200-RC08-...



Cable cross sections and mounting method

Cross section of main terminal:

≥ 50 mm² (for positive supply voltage, GND terminal only for logic supply)

The cross section needs to be adjusted to the actual current and the operating temperature conditions. The temperature behaviour of the device improves with larger cross sections.

Cross section of load terminal:

30 A channels: AWG12 or 4 mm²

10 A channels: AWG12 or ≥ 2.5 mm²

The cross section needs to be adjusted to the actual current and the operating temperature conditions. The temperature behaviour of the device improves with larger cross sections.

Mounting screws:

M6, max. tightening torque 6 Nm
(not included in the scope of delivery)

Pin assignment SCS200- RC08-...

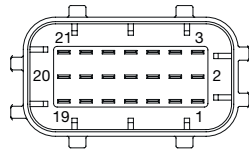
Main terminals

U_{Bat}: M8 screw terminal (marking: MAIN)

GND: M6 screw terminal (marking: GND)

21-pole connector

Mating plug: Tyco AMP LEAVYSEAL
1-1534127-1



Pin	Name	Description
1	n.c.	not connected
2	LOAD_8	10 A load
3	LOAD_4	30 A load
4	n.c.	not connected
5	IN_A_1	Analogue input 1 / PMA 1
6	LOAD_7	10 A load
7	n.c.	not connected
8	IN_A_3	Analogue input 3 / PMA 3
9	LOAD_3	30 A load
10	n.c.	not connected
11	IN_A_4	Analogue input 4
12	LOAD_6	10 A load
13	IN_A_2	Analogue input 2 / PMA 2
14	IN_A_5	Analogue input 5
15	LOAD_2	30 A load
16	IN_A_6	Analogue input 6
17	WAKE_SIGNAL_IN	CAN wake up input
18	LOAD_5	10 A load
19	CAN_H_OUT	CAN high
20	CAN_L_OUT	CAN low
21	LOAD_1	30 A load

Accessories: Population for SCS200-RC08-...

Note: The SCS200-RC08-00-03-xx-01 product version is delivered unpopulated. Accessories can be ordered additionally and are enclosed with the delivery.

Relays and fuses for 12 V DC: X22392701

Contents:

- 4 x 10 A micro-relay E-T-A ESR10-NC3A4HB-00-D1-10A
- 4 x 30 A micro-relay E-T-A ESR10-NC3A4HB-00-D1-30A
- 4 x 15 A blade-type fuse MTA 380029 blue
- 4 x 40 A blade-type fuse MTA 380035 orange

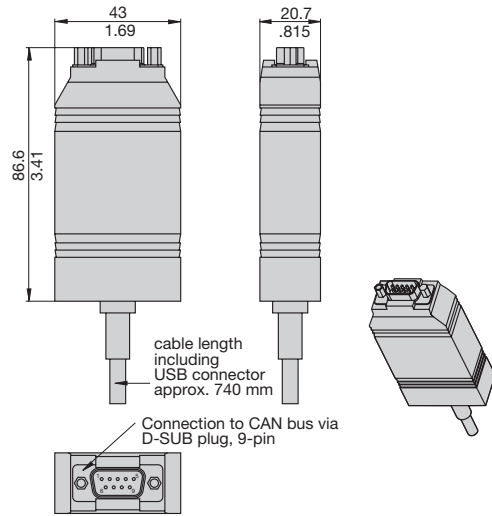
Relays and fuses for 24 V DC: X22392702

Contents:

- 4 x 10 A micro-relay E-T-A ESR10-NC3A4HB-00-D2-10A
- 4 x 30 A micro-relay Tyco V23074-A2002-A403
- 4 x 15 A blade-type fuse MTA 380029 blue
- 4 x 40 A blade-type fuse MTA 380035 orange

Accessories: USB/CAN converter

USB/CAN converter: XPP-USBC0
XPP-USBC1 (opto-decoupled)



Pin assignment D-SUB output plug

PIN	assignment
2	CAN-L
7	CAN-H

This is a metric design and millimeter dimensions take precedence. Applicable for nominal dimensions without direct tolerance indication: DIN ISO 286 ± IT 13. Refer to product datasheet for installation and safety instructions.