



SIPROTEC 5 Hardware

V1.00

Technical Data

Extract from manual C53000-G5040-C002-1, chapter 7

Energy Automation

SIEMENS

**NOTE**

For your own safety, please observe the warnings and safety instructions contained in this manual.

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Preface

Purpose of the Manual

This manual describes the hardware of the SIPROTEC 5 device family and provides general information on the product structure, the modules and technical data.

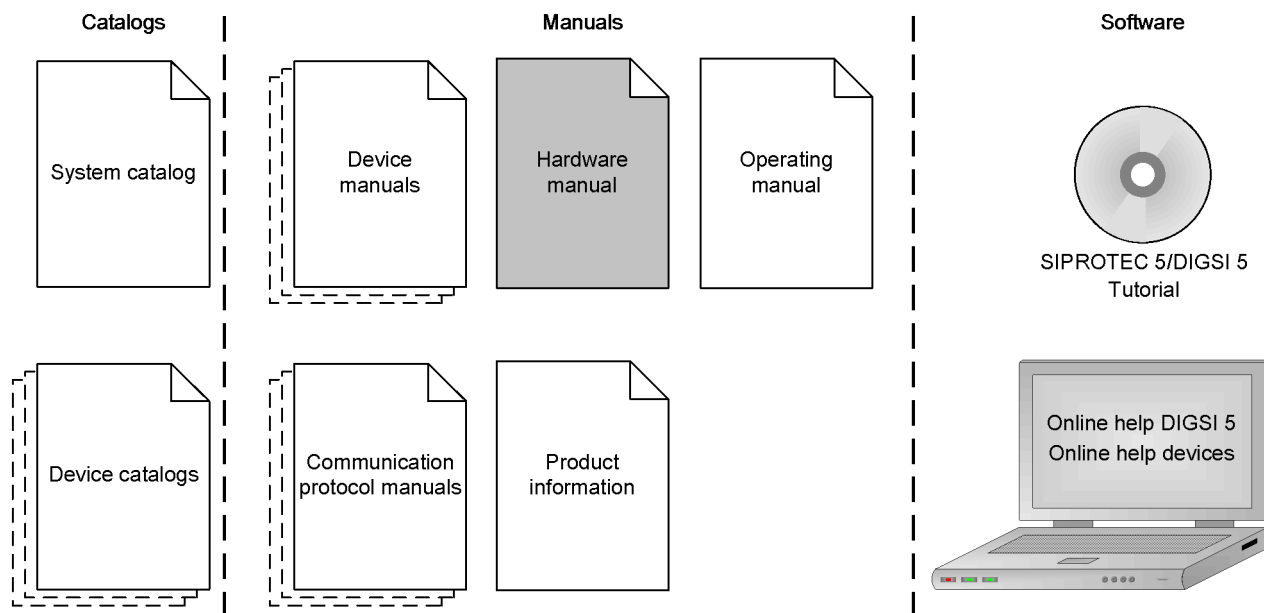
Target Audience

Protection-system engineers, commissioning engineers, persons entrusted with the setting, testing and maintenance of automation, selective protection and control equipment, and operating personnel in electrical installations and power plants.

Scope

This manual applies to the SIPROTEC 5 device family, configuration version V1.0.

Further Documentation

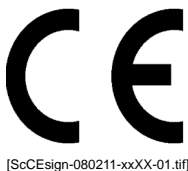


- Device manuals

Each Device manual describes the functions and applications of a specific SIPROTEC 5 device. The printed manual and the online help for the device have the same informational structure.

- **Hardware manual**
The Hardware manual describes the hardware components and device combinations of the SIPROTEC 5 device family.
- **Operating manual**
The Operating manual describes the basic principles and procedures for operating and assembling the devices of the SIPROTEC 5 range.
- **Communication protocol manuals**
The Communication protocol manuals contain a description of a specific protocol for communication within the the SIPROTEC 5 device family and to higher-level network control centers.
- **Product information**
The Product information includes general information about device installation, technical data, limit values for input and output modules, and conditions when preparing for operation. This document is provided with each SIPROTEC 5 device.
- **DIGSI 5 online help**
The DIGSI 5 online help contains a help package for DIGSI 5 and CFC.
The help package for DIGSI 5 includes a description of the basic operation of software, the DIGSI principles and editors. The help package for CFC includes an introduction to CFC programming, basic examples of CFC handling, and a reference chapter with all CFC blocks available for the SIPROTEC 5 device family.
- **SIPROTEC 5/DIGSI 5 Tutorial**
The tutorial on the DVD contains brief information about important product features, more detailed information about the individual technical areas, as well as operating sequences with tasks based on practical operation, and a brief explanation.
- **System catalog**
The system catalog describes the SIPROTEC 5 system features.
- **Device catalogs**
The device catalogs describe the device-specific features such as the scope of functions, hardware and applications.

Indication of Conformity



This product complies with the directive of the Council of the European Communities on harmonization of the laws of the Member States relating to electromagnetic compatibility (EMC Council Directive 2004/108/EC) and concerning electrical equipment for use within specified voltage limits (Low Voltage Directive 2006/95/EC).

This conformity has been proved by tests performed according to the Council Directive in accordance with the generic standards EN 61000-6-2 and EN 61000-6-4 (for EMC directive) and with the standard EN 60255-27 (for Low Voltage Directive) by Siemens AG.

The device is designed and manufactured for application in an industrial environment. The product conforms with the international standards of IEC 60255 and the German standard VDE 0435.

Other Standards

IEEE Std C 37.90

The technical data of the product is approved in accordance with UL.

File E194016



IND. CONT. EQ.
69CA

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Additional Support

For questions about the system, please contact your Siemens sales partner.

Support

Our Customer Support Center provides a 24-hour service.

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Internet <http://www.siemens.com/energy/power-academy>

Safety Information

This manual is not a complete index of all safety measures required for operation of the equipment (module, device). However, it comprises important information that must be noted for purposes of personal safety, as well as in order to avoid material damage. Information is highlighted and illustrated as follows according to the degree of danger.



DANGER

DANGER means that death or severe injury **will** result if the measures specified are not taken.

- ✧ Comply with all instructions, in order to avoid death or severe injuries.
-



WARNING

WARNING means that death or severe injury **may** result if the measures specified are not taken.

- ✧ Comply with all instructions, in order to avoid death or severe injuries.
-



CAUTION

CAUTION means that or medium-severe or slight injuries **can** occur if the specified measures are not taken.

- ✧ Comply with all instructions, in order to avoid moderate or minor injuries.
-

NOTICE

NOTICE means that property damage **can** result if the measures specified are not taken.

- ✧ Comply with all instructions, in order to avoid property damage.
-



NOTE

Important information about the product, product handling or a certain section of the documentation, which must be given particular attention.

Qualified Electrical Engineering Personnel

Only qualified electrical engineering personnel may commission and operate the equipment (module, device) described in this document. Qualified electrical engineering personnel in the sense of this manual are people who can demonstrate technical qualifications as electrical technicians. These persons may commission, isolate, ground and label devices, systems and circuits according to the standards of safety engineering.

7 Technical Data

7.1	Analog Inputs	136
7.2	Supply Voltage	137
7.3	Binary Inputs	138
7.4	Relay Outputs	139
7.5	Light-Emitting Diodes in the On-Site Operation Panel	141
7.6	Time-Synchronization Interface	142
7.7	Electrical Tests	143
7.8	Mechanical Tests	146
7.9	Climatic Stresses	147
7.10	Operating Conditions	148
7.11	Reference Conditions and Influencing Variables	149
7.12	Approvals	150
7.13	Design Data	151
7.14	Assembly Dimensions	153
7.15	Name Plate	159
7.16	Name Plate, UL Approval, Base Module	160
7.17	Name Plate, UL Approval, Expansion Module	161
7.18	Battery	162

7.1 Analog Inputs

Current Inputs

All current, voltage and power data are specified as RMS values.		
Rated frequency f_{rated}	50 Hz, 60 Hz	
Protection-class current transformer	Rated current I_{rated}	Measuring range (device-dependent)
	5 A	500 A
	5 A	100 A
	1 A	100 A
	1 A	20 A
Instrument transformer	Rated current I_{rated}	Measuring range
	5 A	8 A
	1 A	1.6 A
Consumption per current circuit at rated current	Approx. 0.1 VA	
Thermal rating (protection-class current and instrument transformers)	500 A for 1 s	
	150 A for 10 s	
	20 A continuously	
	25 A for 3 min	
	30 A for 2 min	
Dynamic load carrying capacity	1250 A one half wave	

Voltage Input

All current, voltage and power data are specified as RMS values.	
Rated frequency f_{rated}	50 Hz, 60 Hz
Measuring range	200 V
Input impedance	200 k Ω
Thermal rating	230 V continuously

MT ANAI-CA-4EL Module

Connector type	8-pole terminal multiple contact strip
Differential current input channels	4
Measuring range	DC -24 mA to +24 mA
Error limit	0.5 % of measuring range
Input impedance	140 Ω
Conversion principle	Delta-sigma (16 bit)
Permissible potential difference between channels	DC 20 V
Galvanic separation from ground/housing	AC 500 V, DC 700 V
Permissible overload	DC 100 mA continuously
Measurement repetition	200 ms

7.2 Supply Voltage

Integrated Power Supply			
The following modules contain a power supply: PS201 – Power supply of the base module and of the 1st device row CB202 – Plug-in module assembly with integrated power supply, for example to accommodate communication modules			
Auxiliary rated voltage V _H	DC 24 V/DC 48 V	DC 60 V/DC 110 V/DC 125 V/ DC 220 V/DC 250 V or AC 115 V/AC 230 V, 50 Hz / 60 Hz	
Permissible voltage ranges	DC 19 V to 60 V	DC 48 V to 300 V DC 80 V to 265 V	
Overvoltage category, IEC 60255-27		III	
Superimposed alternating voltage, peak-to-peak, IEC 60255-11	≤ 15 % of the DC auxiliary rated voltage (applies only to direct voltage)		
Inrush current		≤ 18 A	
Recommended external protection		Miniature circuit breaker 6 A, characteristic C according to IEC 60898	
Internal fuse		2 A time-lag, AC 250 V, DC 300 V, UL recognized SIBA type 179200 or Schurter type SPT 5x20	
Power Consumption (Life Relay Active)			
	DC	AC 230 V/50 Hz	AC 115 V/50 Hz
1/3 base module without plug-in modules	13 W	33 VA	24 VA
1/6 expansion module	3 W	6 VA	6 VA
1/6 plug-in module assembly without plug-in modules	3.5 W	14 VA	7 VA
Plug-in module for base module or plug-in module assembly (for example, communication module)	< 5 W	< 6 VA	< 6 VA
Stored-energy time on outage or short circuit of the auxiliary voltage	At least 50 ms		

7.3 Binary Inputs

Rated voltage range	DC 24 V to 250 V (bipolar)	
Current consumption, picked up	Approx. DC 0.4 mA (independently of the operating voltage)	
Pickup time	Approx. 3 ms	
Dropout time	Approx. 4 ms	
Switching thresholds	Adjustable with DIGSI 5	
	Range 1 for 24 V and 48 V and 60 V Operating voltage	V DC _{low} ≤ 10 V V DC _{high} ≥ 19 V
	Range 2 for 110 V and 125 V Operating voltage	V DC _{low} ≤ 44 V V DC _{high} ≥ 88 V
	Range 3 for 220 V and 250 V Operating voltage	V DC _{low} ≤ 88 V V DC _{high} ≥ 176 V
Maximum permitted voltage	DC 300 V	
The binary inputs contain interference suppression capacitors. In order to ensure EMC, use the terminals shown in the terminal diagrams/connection diagrams to connect the binary inputs to the common potential.		

7.4 Relay Outputs

Standard Relay (type S)

Switching capacity	On: 1000 W/VA Off: 30 VA; 40 W ohmic; 25 W/VA at $L/R \leq 40$ ms
AC and DC contact voltage	250 V
Permissible current per contact (continuous)	5 A
Permissible current per contact (switching on and holding)	30 A for 1 s (make contact)
Short-time current across closed contact	250 A for 30 ms
Total permissible current for contacts connected to common potential	5 A
Switching time (OOT ¹)	≤ 10 ms
Rated data of the output contacts	DC 24 V, 8 A, general purpose DC 48 V, 0.8 A, general purpose DC 240 V, 0.1 A, general purpose AC 240 V, 5 A, general purpose AC 120 V, 248.7 W AC 250 V, 373 W B300 R300
Interference suppression capacitors across the contacts	4.7 nF, ± 20 %, AC 250 V

1. OOT (Output Operating Time) additional delay of the output medium used

Fast Relay (Type F)

Switching capacity	On: 1000 W/VA Off: 30 VA; 40 W ohmic; 25 W/VA at $L/R \leq 40$ ms
AC and DC contact voltage	250 V
Permissible current per contact (continuous)	5 A
Permissible current per contact (switching on and holding)	30 A for 1 s (make contact)
Short-time current across closed contact	250 A for 30 ms
Total permissible current for contacts connected to common potential	5 A
Switching time (OOT ¹)	≤ 5 ms
Rated data of the output contacts	AC 120 V, 8.5 A, general purpose AC 277 V, 6 A, general purpose AC 277 V, 522.2 W AC 347 V, 4.5 A, general purpose B300 R300
Interference suppression capacitors across the contacts	4.7 nF, ± 20 %, AC 250 V

1. OOT (Output Operating Time) additional delay of the output medium used

High-Speed Relay with Semiconductor Acceleration (Type HS)

Switching capacity	On/Off: 1000 W/VA
Contact voltage	AC 200 V, DC 250 V
Permissible current per contact (continuous)	5 A
Permissible current per contact (switching on and holding)	30 A for 1 s (make contact)
Short-time current across closed contact	250 A for 30 ms
Total permissible current for contacts connected to common potential	5 A
Switching time (OOT ¹)	≤ 1 ms
Rated data of the output contacts	B150 Q300

1. OOT (Output Operating Time) additional delay of the output medium used

7.5 Light-Emitting Diodes in the On-Site Operation Panel

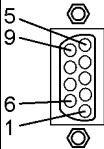
Base Module

Status	Color	Quantity
RUN	Green	1
ERROR	Red	1
Routable (adjustable with DIGSI 5) Only the defined color can be used in operation.	2-colored: red or green	16

Expansion Module

Status	Color	Quantity
Routable	Red	16 optional

7.6 Time-Synchronization Interface

Time synchronization	External synchronization sources, for example, DCF77 IRIG B signal (IRIG-B000 telegram format) Internal RTC (real time)
Connection	Rear D-Sub 9  <small>[DwDsubBu-040211-xxXX-01.tif]</small>
Rated signal voltages	DC 5 V, DC 12 V or DC 24 V (optional)
Test voltage	AC 500 V with 50 Hz

Signal Levels/ Burdens	Signal Rated Input Voltage, DC		
	5 V	12 V	24 V
V _{IHigh}	6.0 V	15.8 V	31.0 V
V _{ILow}	1.0 V at I _{ILow} = 0.25 mA	1.4 V at I _{ILow} = 0.25 mA	1.9 V at I _{ILow} = 0.25 mA
I _{IHigh}	4.5 mA to 9.4 mA	4.5 mA to 9.3 mA	4.5 mA to 8.7 mA
R _I	890 Ω at V _I = 4 V	1930 Ω at V _I = 8.7 V	3780 Ω at V _I = 17 V
	640 Ω at V _I = 6 V	1700 Ω at V _I = 15.8 V	3560 Ω at V _I = 31 V

7.7 Electrical Tests

Standards

IEC 60255 (product standards)

IEEE Std C37.90

UL 508

VDE 0435

Further standards are listed for the individual tests.

Insulation Test

Standards	IEC 60255-27 and IEC 60870-2-1
Voltage test (component testing), current-measuring inputs, voltage -measuring inputs, relay outputs	AC 2.5 kV 50 Hz
Voltage test (component testing), Auxiliary voltage, binary inputs	DC 3.5 kV
Voltage test (component testing), only isolated communication and time-synchronization interfaces and analog inputs (module position E, F, M, N, and P)	AC 500 V/50 Hz or DC 700 V
Surge immunity test (type test), all circuits except communication and time synchronization interfaces and analog inputs, class III	5 kV (peak value) 1.2 μ s/50 μ s 0.5 J 3 positive and 3 negative impulses at intervals of 1 s

EMC Interference Immunity Tests (Type Tests)

Standards	IEC 60255-1, -22 and -26 (product standards) EN 61000-6-2 (generic standard) VDE 0435
Electrical disturbance tests – 1 MHz burst immunity tests, IEC 60255-22-1, class III	2.5 kV (peak value) 1 MHz $\tau = 15 \mu$ s 400 impulses/s Test duration 2 s $R_i = 200 \Omega$
Electrostatic discharge tests IEC 60255-22-2, class IV IEC 61000-4-2, class IV	8 kV contact discharge 15 kV air discharge Both polarities 150 pF $R_i = 330 \Omega$
Radiated electromagnetic field immunity IEC 60255-22-3, class III IEC 61000-4-3, class III	10 V/m 80 MHz to 1 GHz and 1.4 GHz to 2.7 GHz 80 % AM 1 kHz
Radiated electromagnetic field immunity Spot frequencies IEC 60255-22-3 IEC 61000-4-3, class III	10 V/m 80 MHz/160 MHz/380 MHz/450 MHz/ 900 MHz/1.85 GHz/2.15 GHz 80 % AM 1 kHz Operational time > 10 s

Electrical fast transient/burst immunity IEC 60255-22-4, class A IEC 61000-4-4, class IV	4 kV 5 ns/50 ns 5 kHz Burst length 15 ms Repetition rate 300 ms Both polarities Ri = 50 Ω Test duration 60 s	
Surge immunity test class III IEC 60255-22-5, IEC 61000-4-5	Auxiliary voltage	Common mode: 2 kV/4 kV ¹ , 12 Ω , 9 μ F Differential mode: 1 kV, 2 Ω , 18 μ F
	Measurement inputs, binary inputs and relay outputs (no differential mode testing)	Common mode: 4 kV, 42 Ω , 0.5 μ F Differential mode: 1 kV, 42 Ω , 0.5 μ F or varistor
Immunity to conducted disturbances induced by radio frequency fields, class III IEC 60255-22-6, IEC 61000-4-6	10 V, 150 kHz to 80 MHz, 80 % AM, 1 kHz	
Power frequency magnetic field immunity test	IEC 60255-1 0.5 mT	IEC 61000-4-8, Class IV 30 A/m (continuous) 300 A/m for 3 s
Standard for Surge Withstand Capability (SWC) IEEE Std C37.90.1	2.5 kV (peak value) 1 MHz τ = 15 μ s 400 impulses per s Test duration 2 s Ri = 200 Ω Common mode and differential mode test	
Standard for Fast Transient Surge Withstand Capability IEEE Std C37.90.1	4 kV 5 ns/50 ns 5 kHz Burst length 15 ms Repetition rate 300 ms Both polarities Ri = 50 Ω Test duration 60 s Common mode and differential mode test	
Standard for Withstand Capability of Relay Systems to Radiated Electromagnetic Interference from Transceivers (Keying test) IEEE Std C37.90.2	35 V/m 80 MHz to 1000 MHz	
Damped oscillatory wave immunity test IEC 61000-4-18	100 kHz, 1 MHz, 2.5 kV (peak value) 3 MHz, 10 MHz, 30 MHz, 2 kV (peak value)	

1. With main protection

EMC Electromagnetic Emission Tests (Type Tests)

Standards	IEC 60255-25 (product standard) EN 61000-6 (generic standard)
Radio noise voltage to lines, only auxiliary voltage IEC-CISPR 11	150 kHz to 30 MHz limit class A
Interference field strength IEC-CISPR 11	30 MHz to 1 GHz limit class A
Harmonic currents in voltage supply systems IEC 61000-3-2	Not applicable (see EN 61000-3-2, section 7, power consumption < 75 W)
Voltage fluctuations and flicker in voltage supply systems IEC 61000-3-3	Not applicable (see EN 61000-3-3, section 6; no significant flicker)

7.8 Mechanical Tests

Vibration and Shock Stress in Stationary Use

Standards	IEC 60255-21 and IEC 60068
Oscillation IEC 60255-21-1, class 2 and IEC 60068-2-6	Sinusoidal 10 Hz to 60 Hz: ± 0.075 mm (0.0031 in) amplitude 60 Hz to 150 Hz: 10 m/s^2 acceleration frequency sweep 1 octave/min 20 cycles in 3 axes perpendicular to one another
Shock IEC 60255-21-2, class 1	Semi-sinusoidal Acceleration 50 m/s^2 Duration 11 ms 3 shocks each in both directions of the 3 axes
Oscillation in an earthquake IEC 60255-21-3, class 2 and IEC 60068-3-3	Sinusoidal 1 Hz to 35 Hz vertical axis: frequency sweep 1 octave/min 1 cycle in 3 axes perpendicular to one another 1 Hz to 8 Hz: ± 7.5 mm (0.3 in) amplitude (horizontal axes) 1 Hz to 8 Hz: ± 3.5 mm (0.14 in) amplitude (vertical axis) 8 Hz to 35 Hz: 20 m/s^2 acceleration (horizontal axes) 8 Hz to 35 Hz: 10 m/s^2 acceleration (vertical axis)

Vibration and Shock Stress During Transport

Standards	IEC 60255-21 and IEC 60068
Oscillation IEC 60255-21-1, class 2 and IEC 60068-2-6	Sinusoidal 5 Hz to 8 Hz: ± 7.5 mm (0.3 in) amplitude 8 Hz to 150 Hz: 20 m/s^2 acceleration frequency sweep 1 octave/min 20 cycles in 3 axes perpendicular to one another
Shock IEC 60255-21-2, class 1 and IEC 60068-2-27	Semi-sinusoidal Acceleration 150 m/s^2 Duration 11 ms 3 shocks each in both directions of the 3 axes
Continuous shock IEC 60255-21-2, class 1 and IEC 60068-2-29	Semi-sinusoidal Acceleration 100 m/s^2 Duration 16 ms 1000 shocks each in both directions of the 3 axes

7.9 Climatic Stresses

Temperatures

Type test (in compliance with IEC 60068-2-1 and IEC 60068-2-2, test bd for 16 h)	-25 °C to +85 °C
Temporarily permissible during op- eration (tested for 96 h)	-20 °C to +70 °C Readability of the display may be impaired below -10 °C and above +55 °C.
Recommended for uninterrupted duty (in compliance with IEC 60255-1)	-10 °C to +55 °C
Limit temperatures for continuous storage	-25 °C to +55 °C
Limit temperatures for transport	-25 °C to +70 °C

Humidity

Permissible humidity stress	≤ 75 % relative humidity on the annual average Up to 93 % relative humidity on 56 days a year
	Devices suffering from condensation are not capable of operating! Arrange the devices so that they are not exposed to direct sunlight or extreme temperature changes. This will prevent condensation formation in the devices.

Use

Up to 2000 m (78 740.16 in) above sea level

7.10 Operating Conditions

The protection device is designed for flush mounting in conventional relay rooms and systems, such that electromagnetic compatibility (EMC) is ensured with proper flush mounting.

Siemens additionally recommends:

- Use contactors and relays that work within the same cabinet or the same relay panel with digital protection equipment, only with suitable quenching equipment.
- With switchgear as from 100 kV, provide external connecting leads with shielding grounded on both sides that is capable of carrying current. No special measures are necessary in medium-voltage systems.
- It is not permitted to remove or plug in individual modules under live voltage. Some components are electrostatically sensitive in the removed state. Pay attention to the ESD specifications (**E**lectrostatically **S**ensitive **D**evices) when handling such devices. There is no danger for the components in the installed state.

7.11 Reference Conditions and Influencing Variables

Reference Conditions

Measurand current I	$I_{\text{rated}} \pm 1\%$
Measurand voltage V	$V_{\text{rated}} \pm 1\%$
Frequency f	$f_{\text{rated}} \pm 1\%$
Sine waveform, total harmonic distortion	$\leq 5\%$
Ambient temperature T_a	$23\text{ °C} \pm 1\text{ °C}$
Auxiliary voltage V_a	$V_{\text{Hrated}} \pm 1\%$
Warmup time	$\geq 15\text{ min}$
External fields/external influences	None

Influencing Variables on Pickup and Dropout Thresholds

Auxiliary voltage $0.8 V_{ar}$ to $1.2 V_{ar}$	$\leq 0.2\%$
Ambient temperature -10 °C to 55 °C	$\leq 0.5\%/10\text{ K}$
Frequency 45 Hz to 65 Hz	$\leq 1\%$
Harmonics	
• Up to 10 % of 3rd harmonics	$\leq 1\%$
• Up to 10 % of 5th harmonics	$\leq 1\%$
Warm-up	$\leq 0.3\%$
Transient excess pickup in fundamental component measurement method for $\tau > 100\text{ ms}$ (with complete asymmetry)	$\leq 5\%$
EMC interference	$\leq 5\%$

7.12 Approvals

UL-listed/UL-approved

Base module	IND. CONT. EQ. 69CA
Expansion module	IND. CONT. EQ. 69CA

7.13 Design Data

Masses

	Device Size Weight				
Type of construction	1/3	1/2	2/3	5/6	1/1
Flush-mounting device	4.8 kg	8.1 kg	11.4 kg	14.7 kg	18.0 kg
Surface-mounting device with integrated on-site operation panel	7.8 kg	12.6 kg	17.4 kg	22.2 kg	27.0 kg
Surface-mounting device with detached on-site operation panel	5.1 kg	8.7 kg	12.3 kg	15.9 kg	19.5 kg

	Size	Weight
Detached on-site operation panel	1/3	1.9 kg
Detached on-site operation panel	1/6	1.1 kg

Base-Module Dimensions

Type of Construction (Maximum Dimensions)	Width x Height x Depth in mm (in inches)
Flush-mounting device	145 x 268 x 228.5 (5.71 x 10.55 x 9)
Surface-mounting device with integrated on-site operation panel	145 x 314 x 337 (5.71 x 12.36 x 13.27)
Surface-mounting device with detached on-site operation panel	145 x 314 x 230 (5.71 x 12.36 x 9.06)

Dimensions of the Device Rows

Type of Construction (Maximum Dimensions)	Width x Height x Depth in mm (in inches)				
Type of construction	1/3	1/2	2/3	5/6	1/1
Flush-mounting device	145 x 268 x 228.5 (5.71 x 10.55 x 9)	220 x 268 x 228.5 (8.66 x 10.55 x 9)	295 x 268 x 228.5 (11.61 x 10.55 x 9)	370 x 268 x 228.5 (14.57 x 10.55 x 9)	445 x 268 x 228.5 (17.52 x 10.55 x 9)
Surface-mounting device with integrated on-site operation panel	145 x 314 x 337 (5.71 x 12.36 x 13.27)	220 x 314 x 337 (8.66 x 12.36 x 13.27)	295 x 314 x 337 (11.61 x 12.36 x 13.27)	370 x 314 x 337 (14.57 x 12.36 x 13.27)	445 x 314 x 337 (17.52 x 12.36 x 13.27)
Surface-mounting device with detached on-site operation panel	145 x 314 x 230 (5.71 x 12.36 x 9.06)	220 x 314 x 230 (8.66 x 12.36 x 9.06)	295 x 314 x 230 (11.61 x 12.36 x 9.06)	370 x 314 x 230 (14.57 x 12.36 x 9.06)	445 x 314 x 230 (17.52 x 12.36 x 9.06)

Expansion-Module Dimensions

Type of Construction (Maximum Dimensions)	Width x Height x Depth in mm (in inches)
Flush-mounting device	75 x 268 x 228.5 (2.95 x 10.55 x 9)
Surface-mounting device with integrated on-site operation panel	75 x 314 x 337 (2.95 x 12.36 x 13.27)
Surface-mounting device with detached on-site operation panel	75 x 314 x 230 (2.95 x 12.36 x 9.06)

Minimum Bending Radii of the Connecting Cables between the On-Site Operation Panel and the Base Module

Fiber-optic cable	R = 50 mm (1.97 in) Pay attention to the length of the cable protection sleeve, which you must also include in calculations.
D-Sub cable	R = 50 mm (1.97 in) (minimum bending radius)

Degree of Protection According to IEC 60529

For the equipment in the surface-mounting housing	IP50
For the equipment in the flush-mounting housing	Front IP51 Rear panel IP50
For operator protection	IP2X for current terminals IP1X for voltage terminals
Degree of pollution, IEC 60255-27	2

UL Note

Type 1 if mounted into a door or front cover of an enclosure.

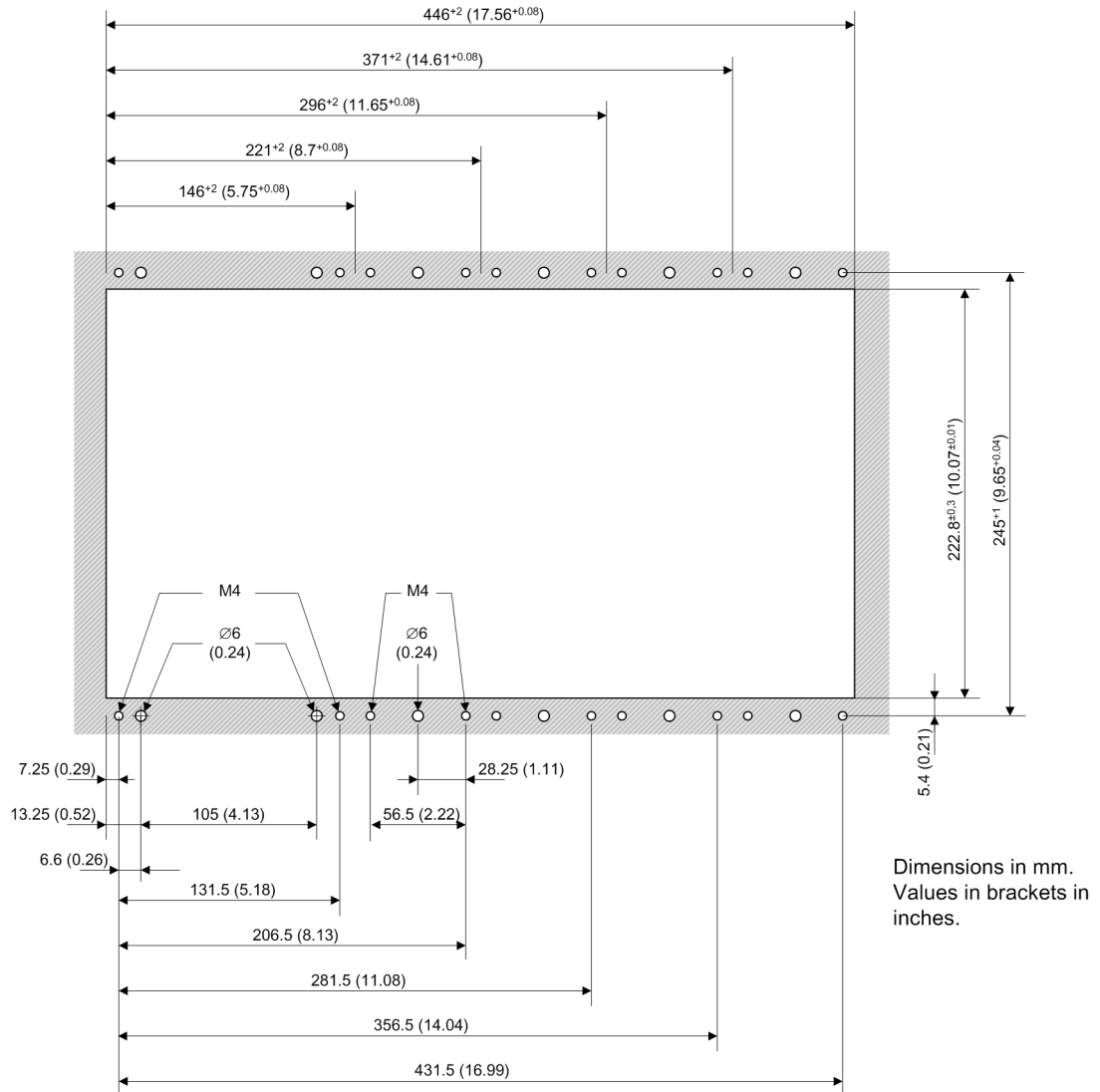
Tightening Torques for Terminal Screws

Type of Cable ¹	Current Terminal	Voltage Terminal
Power line with ring-type lug	2.7 Nm	No ring-type lug
Stranded wires with bootlace ferrules or pin-type lugs	2.7 Nm	1.0 Nm
Solid conductor, bare (2 mm ² (0.08 in ²))	2.0 Nm	1.0 Nm

1. Use copper cables only.

7.14 Assembly Dimensions

Flush-Mounting Device



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Figure 7-1 Cut-Out Widths and Drilling Pattern

Table 7-1 Cut-Out Widths

	Width of the Assembly Opening
1/3 device (base module)	146 ⁺² mm (5.75 ^{+0.08} in)
1/2 device (base module with one expansion module)	221 ⁺² mm (8.7 ^{+0.08} in)
2/3 device (base module with 2 expansion modules)	296 ⁺² mm (11.65 ^{+0.08} in)
5/6 device (base module with 3 expansion modules)	371 ⁺² mm (14.61 ^{+0.08} in)
1/1 device (base module with 4 expansion modules)	446 ⁺² mm (17.56 ^{+0.08} in)

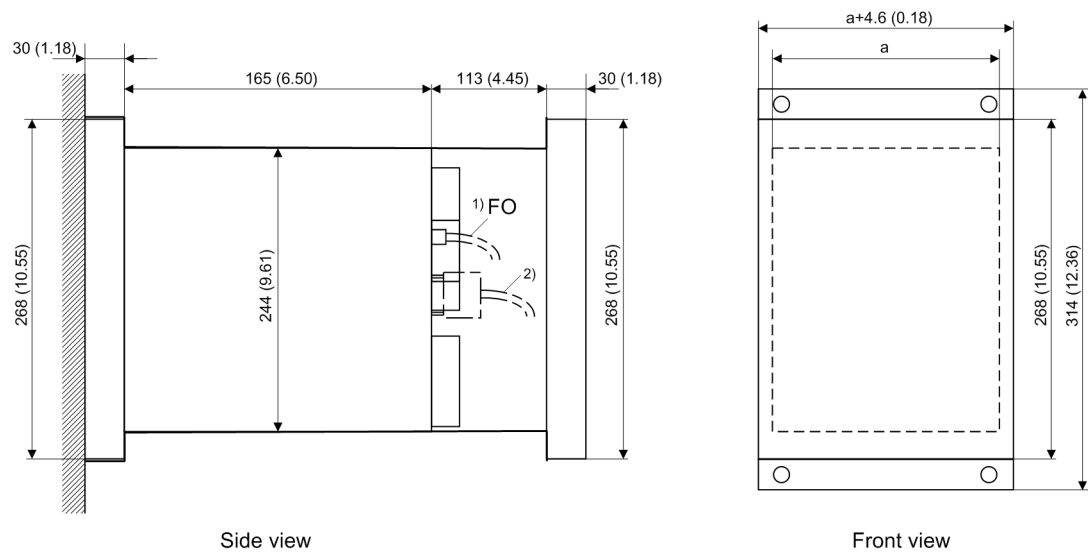
	Dimension a Housing Widths in mm (in inches)
1/3 device	145 (5.71)
1/2 device	220 (8.66)
2/3 device	295 (11.61)
5/6 device	370 (14.57)
1/1 device	445 (17.52)

Technical drawing of a rectangular plate with dimensions and hole locations. The plate has a width of 426.5 mm (16.79 inches) and a height of 300 mm (11.81 inches). There are two rows of holes: a top row and a bottom row. The bottom row has 8 holes, with the first hole on the left having a diameter of $\varnothing 6$ (0.24 inches). The horizontal distances from the left edge to the centers of the holes in the bottom row are: 426.5 mm (16.79 inches) to the 8th hole, 351.5 mm (13.84 inches) to the 7th hole, 276.5 mm (10.89 inches) to the 6th hole, 201.5 mm (7.93 inches) to the 5th hole, 126.5 mm (4.98 inches) to the 4th hole, 56.5 mm (2.22 inches) to the 3rd hole, and 0 mm to the 2nd hole. The top row has 8 holes, with the first hole on the left having a diameter of $\varnothing 6$ (0.24 inches). The horizontal distances from the left edge to the centers of the holes in the top row are: 426.5 mm (16.79 inches) to the 8th hole, 351.5 mm (13.84 inches) to the 7th hole, 276.5 mm (10.89 inches) to the 6th hole, 201.5 mm (7.93 inches) to the 5th hole, 126.5 mm (4.98 inches) to the 4th hole, 56.5 mm (2.22 inches) to the 3rd hole, and 0 mm to the 2nd hole. The vertical distance between the top and bottom rows of holes is 300 mm (11.81 inches).

Dimensions in mm.
Values in brackets in inches.

[DwBohrGe-070211-enUS-01.tif]

Figure 7-2 Device-Drilling Pattern



Dimensions in mm. Values
in brackets in inches.

Attention!

- 1) For FO cables, a minimum bending radius $R = 50 \text{ mm}$ (1.97 inch) must be considered according to the type.
- 2) For D-sub connector plugs, the axial length of the plug + cable bending radius must be considered.
Minimum bending radius $R = 50 \text{ mm}$ (1.97 inch)

[DwOSOPin-070211-enUS-01.tif]

Figure 7-3 Devices with Integrated On-site Operation Panel, Dimensions from the Side and Front Views

Refer to [Table 7-2](#) for the variable dimension a.

Surface-mounting Devices with Detached On-site Operation Panel

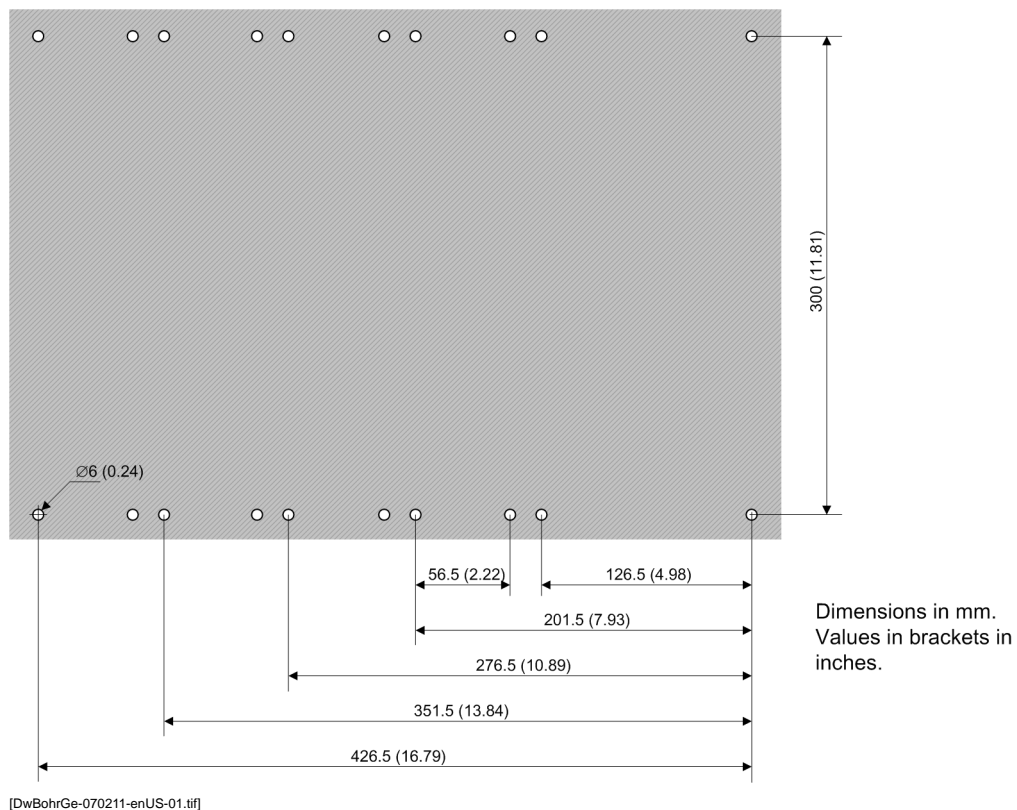


Figure 7-4 Device-Drilling Pattern

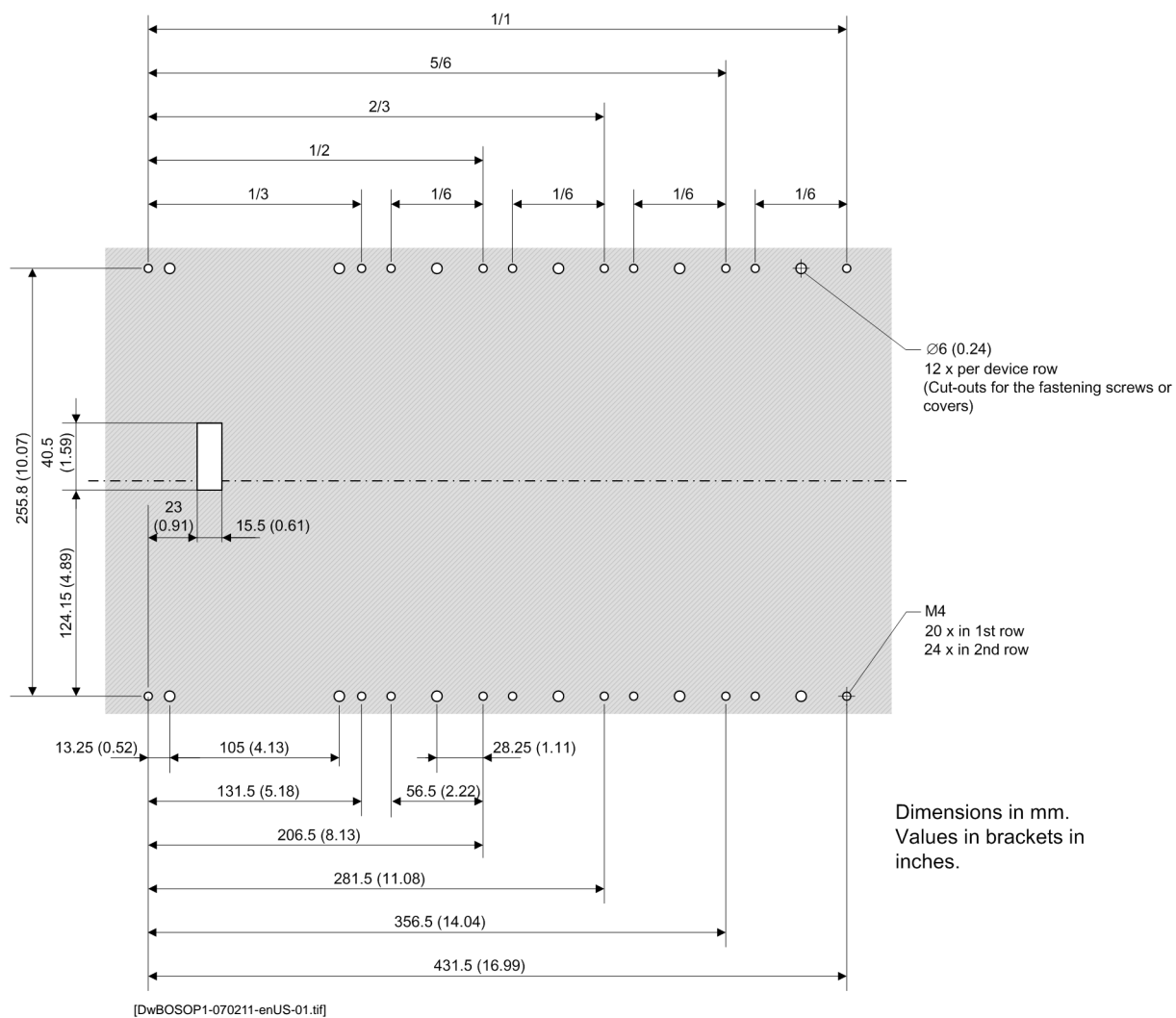
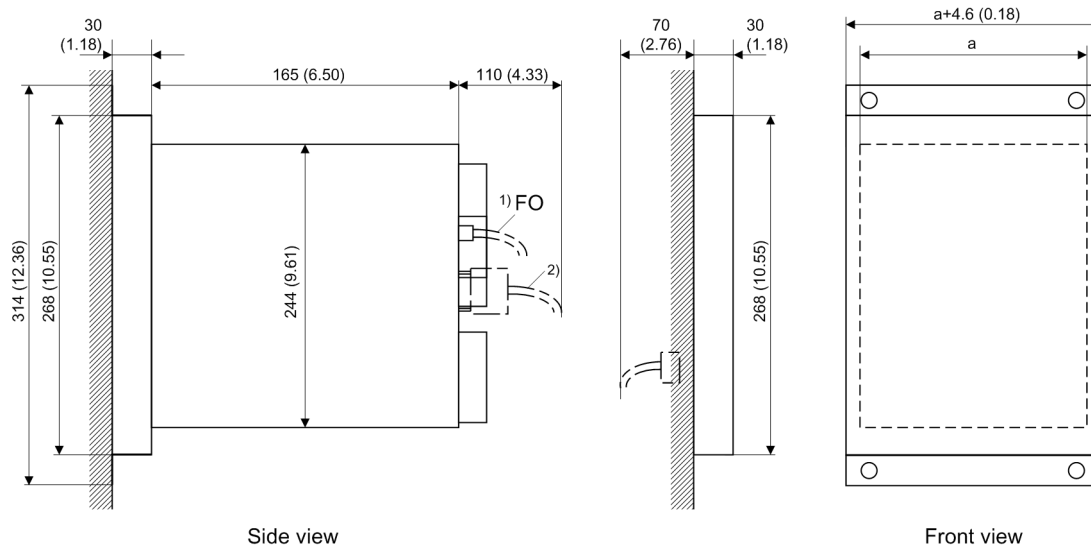


Figure 7-5 On-Site Operation Panel Drilling Pattern



Attention!

- 1) For FO cables, a minimum bending radius $R = 50$ mm (1.97 inch) must be considered according to the type.
- 2) For D-sub connector plugs, the axial length of the plug + cable bending radius must be considered.
Minimum bending radius $R = 50$ mm (1.97 inch)

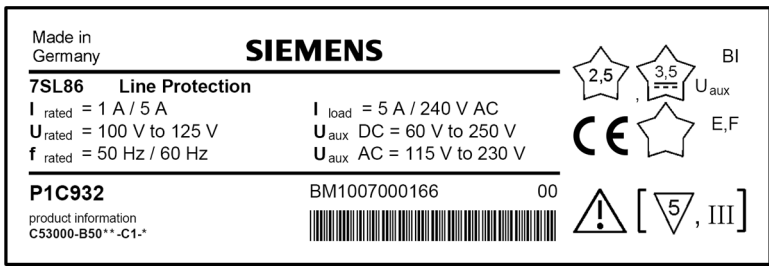




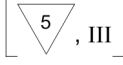


[DwOSOPab-070211-enUS-01.tif]

Figure 7-6 Devices with Detached On-Site Operation Panel, Dimensions in the Side and Front Views



Refer to [Table 7-2](#) for the variable dimension a .

7.15 Name Plate



The name plate is explained by way of example in the following table. The name plate is located on the device.

	
[DwNamepl-260511-xxXX-01.tif]	
7SL86	Device type or, in the case of expansion modules, designation of the module
Line protection	Product group
I_{rated} , U_{rated} , f_{rated}	Rated values (which are specified when current and/or voltage transformers are placed on the module.)
I_{load}	This value is specified when relays are placed on the module
U_{aux}	Values for the power supply
P1XXXXXXXXXXXXXXXXXX	Technical numbering system (TNS), maximum 18 digits
Product information C53000-B50**-C1-*	Product information order number ** Language encoding, * current edition
BM1007000166	Serial number
	Label barcode
[ScBarcode-070211-xxXX-01.tif]	
	Insulation testing of the voltage inputs, current inputs, and binary outputs with AC 2.5 kV
[DwSy25KV-040211-xxXX-01.tif]	
	Insulation testing of the power supply (U_{aux}) and binary inputs (BI) with DC 3.5 kV
[DwSy35KV-040211-xxXX-01.tif]	
	Insulation testing of all sealed-off interfaces with AC 500 V, DC 700 V
[DwS500KV-040211-xxXX-01.tif]	
E, F	Designation of the ports onto which the plug-in modules are plugged
	5-kV impulse voltage testing [type testing] in compliance with Class III
[DwSyStos-040211-xxXX-01.tif]	
	European conformity declaration
[DwSymbCE-040211-xxXX-01.tif]	
	Pay attention to the overall documentation for the device (Product information, Device manual, Hardware manual, Operating manual, and Communication protocol manuals)
[DwSyManu-040211-xxXX-01.tif]	

7.16 Name Plate, UL Approval, Base Module

 <p>IND. CONT. EQ. 69CA t_{Surr}: max. 70°C normal op.</p> <p>For additional output ratings see product information.</p>	
<p>[ScULZuBa-040211-xxXX-01.TIF]</p>	
 <p>[ScSyULZu-040211-xxXX-01.tif]</p>	<p>UL approved for Canada and the USA</p>
<p>IND. CONT. EQ.</p>	<p>Industrial Control Equipment</p>
<p>69CA</p>	<p>Control number</p>
<p>t_{Surr}: max. 70 °C normal op.</p>	<p>The ambient temperature must not exceed 70 °C or 126 °F during normal operation.</p>
<p>For additional output ratings, see Product information</p>	<p>For additional output ratings, see Product information.</p>

7.17 Name Plate, UL Approval, Expansion Module

 <p>IND. CONT. EQ. 69CA t_{Surr}: max. 70°C normal op.</p> <p>Listed accessory for use with manufacturer's protective relay.</p> <p>[ScUIZuEr-040211-xxXX-01.TIF]</p>	
 <p>[ScSyUIZu-040211-xxXX-01.tif]</p>	UL approved for Canada and the USA
IND. CONT. EQ.	Industrial Control Equipment
69CA	Control number
t _{Surr} : max. 70 °C normal op.	The ambient temperature must not exceed 70 °C or 126 °F during normal operation
Listed accessory for use with manufacturer's protection device.	Approved accessory for use with a protection device from Siemens

7.18 Battery

Type	CR2032 Button cell Lithium
Voltage	3 V
Capacity	230 mAh

