

# SEC3IO / SEC3IO-SA

## Datasheet



IPCOMM GmbH

Walter-Bouhon-Strasse 4

90427 Nuremberg

Germany

Phone: +49 911 18 07 91-0

Fax: +49 911 18 07 91-10

Internet: <http://www.ipcomm.de>

Email: [info@ipcomm.de](mailto:info@ipcomm.de)

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## Processor / Memory / Mass Storage

CPU	ARM Cortex-A8 1 GHz
RAM	256 MB DDR3L
Flash	512 MB SLC NAND

## Power Supply

Voltage	$U_{PWR1/2}$ : 12 / 24 / 48 V DC (9 – 60 V DC)
Power consumption	Max. 10 W (typ. 4 W without USB)
Line cross-section	0.129 – 3.31 mm <sup>2</sup> (AWG 26...12, solid or stranded wire)
Features	Redundant power supply with fault contact

## Interfaces

Ethernet interface	2x RJ45 10/100BASE-T
Serial interface	2x RJ45 RS232 / RS422 / RS485 Baud Rate: 300 – 115200 Baud
USB interface	2 x USB 2.0 up to 480 Mbps “high speed”
Digital Input	8x Digital Input Input voltage: 0 – 24 V DC ( $U_{DI1-8\_max}$ : 30 V DC) Input level low: $\leq 2.96$ V DC $\pm 1\%$ Input level high: $\geq 3.49$ V DC $\pm 1\%$ Input impedance: $1.28$ M $\Omega$ $\pm 2\%$ Sampling rate: max. 500 Hz $\pm 5\%$  Line cross-section: 0.129 – 3.31 mm <sup>2</sup> (AWG 26...12, solid or stranded wire)
Digital Output	8x Digital Output (MOSFET P-Channel high side) Input voltage $V_{SO}$ : 9 – 24 V DC - $U_{VSO\_max}$ : 30 V DC - $I_{VSO\_max}$ : 4 A Output voltage: $U_{DO1-8} = V_{SO} - \{0.4 \text{ V @ } 0 \text{ A .. } 1 \text{ V @ } 0.5 \text{ A}\}$ Max. output current: 500 mA Max. switching frequency: $t_{impulse} \leq 2$ kHz $\pm 25\%$ Overcurrent protection - switchover to high-impedance state in the event of a fault: - if 500 mA limit is exceeded - when switching on load $\geq 350$ mA - switch-off time in case of error: 65 $\mu$ s $\pm 5\%$ (with 22 $\Omega$ and $U_{VSO} = 24$ V DC) - deactivation switch-off of outputs can be reset by software  Line cross-section: 0.129 – 3.31 mm <sup>2</sup> (AWG 26...12, solid or stranded wire)

## Diagnostics (Status LEDs)

PWR	Power LED
USR	LED freely configurable by software
CPU	LED to show different software conditions
COM1 / COM2	Send and receive LED for serial interfaces
ETH0 / ETH1	Link and activity LED for Ethernet interfaces
DI 1 – 8	Status LED for digital input (green if high level)
DO 1 – 8	Status LED for digital output (green if output active; red if output deactivated due to error)

## Additional Functions and Features

Battery buffered real time clock	Supported by a lithium battery (CR2032)
State relay "FAIL"	Changeover switch controlled by software
Hardware watchdog	
Temperature monitoring	
Power supply monitoring	
Overvoltage protection	The power supply and all interfaces are ESD, surge, and burst protected (see EMC)

## Housing

Body material	Steel chassis
Mounting	35 mm DIN-Rail
International Protection Marking	IP30
Rotating parts	None
Dimensions (W x H x D)	approx. 65 mm x 124 mm x 139 mm
Weight	approx. 0.65 kg

## Operating Environment

Operating temperature	-20 °C to 60 °C
Storage temperature	-40 °C to 85 °C
Relative humidity	5% to 95% not condensing

## Approval, Standards and Conformity

Approval	CE (Industrial)
Standards	EN 61000-6-2: 2005 EN 61000-6-3: 2007+ A1:2011 EN 61850-3: 2014 <sup>1)</sup> (only SEC3IO-SA)
Conformity	RoHS REACH WEEE

## Electromagnetic Compatibility (EMC) – Emission Requirements

EN 55016-2-1:2014	Conducted emission on power supply lines in the frequency range 150 kHz - 30 MHz
EN 55016-2-1:2014	Conducted emission on telecommunication lines in the frequency range 150 kHz - 30 MHz
EN 55016-2-3:2010 + A1:2010 + AC:2013 + A2:2014	Radiated emission in the frequency range 30 MHz – 1 GHz
EN 55016-2-3:2010 + A1:2010 + AC:2013 + A2:2014	Radiated emission in the frequency range 1 GHz – 6 GHz

## Electromagnetic Compatibility (EMC) – Immunity Requirements

EN 61000-4-2: 2009	Electrostatic discharge (ESD) - Contact discharge $\pm 6$ kV - Air discharge $\pm 8$ kV
EN 61000-4-3: 2006 + A1:2008 + A2:2010	Immunity to RF electromagnetic fields in the frequency range 80 – 3000 MHz, Test level 10 V/m
EN 61000-4-4: 2012	Immunity to fast transients (Burst) - DC power port $\pm 2$ kV - Signal lines $\pm 2$ kV
EN 61000-4-5: 2014	Immunity to surges on power supply lines (Surge) - DC power port: line <-> ground $\pm 1.2$ kV - DC power port: line <-> line $\pm 1$ kV
EN 61000-4-5: 2014	Immunity to surges on shielded signal lines (Surge) - Shielded lines $\pm 1$ kV
EN 61000-4-5: 2014	Immunity to surges on unshielded signal lines (Surge) - Unshielded lines $\pm 1$ kV
EN 61000-4-6: 2014	Immunity to conducted interference induced by radio-frequency fields in the frequency range 150 kHz – 80 MHz, Test level 10 V
EN 61000-4-12: 1995 + A1:2001	Immunity to ring wave - Frequency 100 kHz / 1MHz - Power port DC $\pm 1.25$ kV line to line - Data lines $\pm 2.5$ kV line to ground

EN 61000-4-16: 1998 + A:2004 + A2:2011	Immunity to conducted interference induced by low-frequency fields <ul style="list-style-type: none"> <li>- Short (1s)                    16⅔ Hz / 50 Hz / 60 Hz – 100 V</li> <li>- Continuous                    16⅔ Hz / 50 Hz / 60 Hz – 10 V</li> <li>- 15 Hz – 150 Hz:    10 to 1 V</li> <li>- 150 Hz – 1.5 kHz: 1 V</li> <li>- 1.5 kHz – 15 kHz: 1 to 10 V</li> <li>- 15 kHz – 150 kHz: 10 V</li> </ul>
EN 61000-4-17: 1999 + A2:2009	Immunity to Ripple on DC input power port <ul style="list-style-type: none"> <li>- DC 10% Un</li> </ul>
EN 61000-4-18: 2007 + A1:2010	Immunity to damped oscillatory waves <ul style="list-style-type: none"> <li>- Frequency 100 kHz / Repetition rate 40 s</li> <li>- Frequency 1 MHz / Repetition rate 400 s</li> <li>- Power port DC <ul style="list-style-type: none"> <li>DC ± 1.25 kV line to line</li> <li>DC ± 2.5 kV line to ground</li> </ul> </li> <li>- Data lines ± 2.5 kV line to ground</li> </ul>
EN 61000-4-29: 2000 <sup>1)</sup>	Immunity to voltage dips and interruptions on DC input power port <ul style="list-style-type: none"> <li>- 0 % Un on PWR1 – 0.05 s</li> </ul>

**SEC3IO-SA; IEC 61850-3; EN 61850-3: 2014**

The SEC3IO-SA hardware model meets the special requirements for electromagnetic compatibility and power supply described in Part 3 of the IEC 61850 standard.

<sup>1)</sup> Only with the hardware model SEC3IO-SA.