
NETWORK
ANALYZERS

NETWORK ANALYZERS

SAM3001

Alternating current

General features

The **SAM3001** network analyzer is a new generation of electrical parameter monitoring equipment, capable of real-time measurement, with only **1 DIN module** dimensions for parameter analysis. It measures up to 32 three-phase circuits or 96 single-phase circuits. It has minimum and maximum values.

- **Output relay:** 0.12A / 280V AC
  0.12A / 400V DC
- **Communication:** RS485 port
  Modbus RTU
- Fast connection
- Optional display
- Voltage crest factor

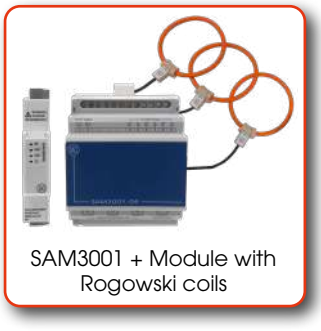
Measurement module	SAM3001-M21A	SAM3001-M1A	SAM3001-M1B
Auxiliary voltage	Self-powered	Universal V aux. (45-275V) AC/DC	
Digital outputs	1 (solid state relay)	—	—
RS485 serial port	HRB Connector	HRB Connector	Terminal block
Tariffs	4	4	4

Optional Display

Additional options*	Model
Communication module	SAM3001-02
Display LCD module	SAM3001-03
Power supply module	SAM3000-04
Rogowski sensor module	SAM3000-05

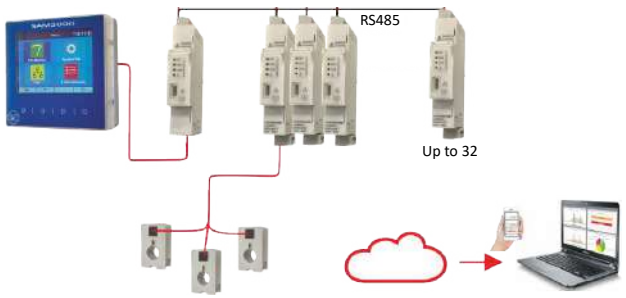
*A power supply module is required to install the display or communication module.

Measuring parameter	Accuracy	SAM3001		
		M21A	M1A	M1B
Three-phase voltage and current	0,2 %	•	•	•
Total and partial power and power factor	0,5 %	•	•	•
Frequency (Hz)	0,01	•	•	•
Imported and exported active energy (EP+/EP-)	0,5s	•	•	•
Apparent energy	0,5 %	•	•	•
Four quadrant reactive energy	2 %	•	•	•
THD (V, I)	Class A	•	•	•
Sub-harmonics (V, I)	Class A	31	31	31
Unbalance (V, I)	Class B	•	•	•
Maximum / minimum / average demand	-	•	•	•



SAM3001 + Module with Rogowski coils

Transformer type	Range	Model
(S1) 5A closed adapter	5 A / 2.5mA	TU5M3K
(S2) Standard	100 ~ 600 A / 80 mA	TU_M3K
(S3) 5A open adapter	5A / 330mV	TA5M3K
(S4) Split core	100 ~ 600 A / 330mV	TA_M3K
(S4) Rogowski	600 ~ 3000 A / 330mV	RC_F3K



SAM3000

Alternating current

General features

The **SAM3000** network analyzer is a new generation of electrical parameter monitoring equipment, capable of real time measurement, energy metering or network quality analysis with status monitoring and alarm functions. It measures up to 32 three-phase circuits or 96 single-phase circuits.

- **Output relay:** 0.12A / 280V AC
  0.12A / 400V DC
- **Communication:** RS485 port
  Modbus RTU
- Fast connection
- Optional display
- Voltage crest factor

M. module	SAM3000-011	SAM3000-012	SAM3000-M21	SAM3000-M22
Auxiliary voltage	24 V DC		Self-powered	
Digital outputs	1	1	1	1
Digital inputs	2	2	2	2
Tariffs	-	4	-	4
RS485 serial port	Terminal block			

Analyzer +
Communication module

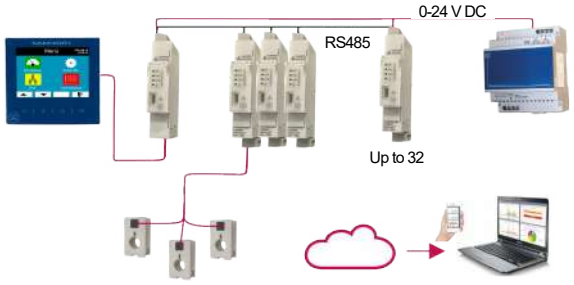
Additional options*	Model
Communication module	SAM3000-02
Display LCD module	SAM3000-03
Power supply module	SAM3000-04
Rogowski sensor module	SAM3000-05

*A power supply module is required to install the display or communication module.

Measuring parameter	Accuracy	SAM3000			
		011	012	M21	M22
Three-phase voltage and current	0,2 %	•	•	•	•
Total and partial power and power factor	0,5 %	•	•	•	•
Frequency (Hz)	0,01	•	•	•	•
Imported and exported active energy (EP+/EP-)	0,5s	•	•	•	•
Apparent energy	0,5 %	•	•	•	•
Four quadrant reactive energy	2 %	•	•	•	•
THD (V, I)	Class A	•	•	•	•
Sub-harmonics (V, I)	Class A	–	63	–	63
Unbalance (V, I)	Class B	–	•	–	•
Tariff energy	–	–	•	–	•
Maximum / minimum / average demand	–	–	•	–	•

Split core transformers

Transformer type	Range	Model
(S1) 5A closed adapter	5 A / 2.5mA	TU5M3K
(S2) Standard	100 ~ 600 A / 80 mA	TU_M3K
(S3) 5A open adapter	5A / 330mV	TA5M3K
(S4) Split core	100 ~ 600 A / 330mV	TA_M3K
(S4) Rogowski	600 ~ 3000 A / 330mV	RC_F3K



AHM3

Alternating current - LCD display

General features

The **AHM3** network analyzer is designed to calculate and measure the electrical parameters of a network, such as voltage, current, frequency, power, power factor, energy, harmonic components, etc.

AHM3-SMTP version

Remote data reading and configuration via web. Alarm notification setup via e-mail. Reading of up to 16 tariffs, CO_2 carbon footprint calculation, and cost breakdown by communication port.

- **Rated voltage (Un):** 3x400 / 690 V AC
- **Current input:** x/1 ó x/5 A
- **Auxiliary voltage:** 80 - 270 AC / DC
- **Dimensions:** 96x96mm
- **Output relay:** 250 V/5A AC
  30 V/5A DC
- **Communication:** RS485 port
  Modbus RTU
- **Refresh rate:** 250ms

General features	Model
Standar analyzer	AHM3
Rogowski version*	AHM3-RC
Web server version	AHM3-SMTP

* Rogowski coils not included

Easy - wire RJ12

AHM3-RC (Rogowski version)

Measuring parameters	Unit	Accuracy
Voltage (phase-phase and phase-neutral)	V	0,2%
Phase and neutral current	A	0,2%
Active, reactive and apparent power	kW, kvar, kVA	0,2%
Power factor (Cos ϕ)	PF	0,5%
Frequency	F	± 0,01 Hz
THD current and voltage	A, V	Class A
Active positive and negative power	kWh	Class 0,5s
Inductive and capacitive reactive power	kvarh	Class 2
Voltage and current RMS harmonics	A, V	1-63
Voltage and current unbalance	%	•
Maximum demand I, P, Q and S	A, kW, kvar, kVA	•
Hour meter	h: min	•

Additional modules	Model
Passive Rogowski coil	70 / 120 / 200 mm
Memory module: 8 MB	DM 1
Module 2 analogue inputs: mA	DM 2
Module 2 analogue inputs: PT100	DM 3
Module 2 analogue inputs: TC (J, K or E)	DM 4
Module 2 analogue outputs: mA	DM 5
Module 2 analogue inputs + 2 digital outputs	DM 6
Module 4 digital inputs	DM 7
Module 2 output relays	DM 8
Module 1 digital input AC	DM 9
Communication module Profibus - DP VO	DM 10
Ethernet communication module (Modbus/TCP)	DM 11
M. Ethernet communication (Modbus/TCP) / Web server (SMTP)	DM 11 - 2
Communication module WIFI: Modbus/TCP	DM 12
Communication module GPRS: Modbus/TCP, SMS	DM 13

AHM1

Alternating current - LCD display

General features

The **AHM1** network analyzer is designed to calculate and measure the electrical parameters of a network, such as voltage, current, frequency, power, power factor, energy, harmonic components, etc.

Model **AHM1-RC**: Rogowsky version.
Model **AHM1-T**: Data storage for 3 years
Model **AHM1-TCP**: includes Ethernet communication

- **Rated voltage (Un):** 3x400 / 690 V AC
- **Indirect measurement:** x/1 or x/5 A
- **Auxiliary voltage:** 80 - 270 AC/DC
  Optional: 24V
- **Programmable current and voltage**
- **Dimensions:** 96x96mm
- **Output relay:** 250 V/5A AC
  30 V/5A DC
- **4 quadrant measurement**
- **Refresh rate:** 400ms

AHM1-RC (Rogowski version)

Models	Com. RS485	Memory	Memory	Digital inputs	Contact outputs	4 current inputs	Tariffs
AHM1B							
AHM1BC	•						
AHM1	•	8MB		2	2		4
AHM1-RC	•	8MB		2	2		4
AHM1-4CTS	•	8MB		2	2	•	4
AHM1 (TCP/IP)	•	8MB		2	2		4
AHM1 (TCP/IP/ BACNET)	•	8MB		2	2		4
AHM1-T	•		128MB	2	2		4
AHM1-T (TCP)	•		128MB	2	2		4

Measuring parameters	Unit	Accuracy
Voltage (phase-phase and phase-neutral)	V	0,2%
Phase and neutral current	A	0,2%
Active, reactive and apparent power	kW, kvar, kVA	0,2%
Power factor (Cos ϕ)	PF	0,5%
Frequency	F	± 0,01 Hz
THD current and voltage	A, V	Class A
Active positive and negative power	kWh	Class 0,5s
Inductive and capacitive reactive power	kvarh	Class 2
Voltage and current RMS harmonics	A, V	1-31
Voltage and current unbalance	%	•
Maximum demand I, P, Q and S	A, kW, kvar, kVA	•
Energy consumption	kWh	•
Hour meter	h: min	•

ASM3-PV

Alternating current - LCD

General features

The **ASM3-PV** is designed to calculate and measure the electrical quantities of a network such as voltage, current, frequency, power, Energía, etc. The analyser can measure directly up to 1000V phase to phase, making it ideal for connection to inverters in photovoltaic systems.

- **Rated voltage (Un):** 3x462 / 800 V AC
- **Indirect measurement:** x/1 A ó x/5 A
- **Auxiliary voltage:** 80 - 270 AC / DC
- **Dimensions:** 96x96mm
- **Communication:** RS485 port
- Current and voltage programmable

General features	Model
Analyzer module	ASM3-PV
Analyzer module with TCP communication	ASM3-PV-TCP

Measuring parameters	Unit	Accuracy
Voltage (phase-phase and phase-neutral)	V	0,5%
Phase and neutral current	A	0,5%
Active, reactive and apparent power	kW, kvar, kVA	0,5%
Power factor (Cos ϕ)	PF	0,5%
Maximum demand I, P, Q and S	A, kW, kvar, kVA	0,5%
Frequency	F	± 0,01 Hz
THD current and voltage	A, V	Class A
Active positive and negative power	kWh	Class 0,5s
Inductive and capacitive reactive power	kvarh	Class 2
Voltage and current RMS harmonics	A, V	1-31
4 quadrants measurement and energy	kW, kvar	0,5s
Voltage and current unbalance	%	•

SNG96

Alternating current - LCD

General features

The SNG96 is a three-phase 4-wire mains analyzer with programmable microprocessor and LCD display with integrated keypad.

- **Rated voltage (Un):** 400 V CA
- **Auxiliary voltage:** Self-powered
- **Measurement range:** 50 - 600 V (line - line)
  0 - 120% In
- True RMS value
- **Rated current (In):** 5A
- **Dimensions:** 96x96mm
- **Communication:** RS485 port
- **Frequency:** 45-65Hz

General features	Model
Standard analyzer	SNG96
Analyzer with RS485 communication	SNG96C

Measuring parameters	Accuracy	SNG96	SNG96C
Voltage (line - line and line - neutral)	0,3%	•	•
Line and neutral current	0,3 %	•	•
Import. / export. active energy (EP+/EP-)	0,5 %	•	•
Import. / export. reactive energy (EQ+/EQ-)	1 %	•	•
Frequency (Hz)			•
Active, reactive and apparent power			•
Power factor (Cos φ)			•
Maximum demand (I)		•	•

MAR144

Alternating current - LED

General features

Programmable microprocessor based unit, with 3 LED displays for measurement indication and integrated keyboard.

- **Rated voltage (Un):** 100 - 110 - 230 - 400 - 440 V AC
- **Indirect measurement:** x/1 A or x/5 A
- **Auxiliary voltage:** 63,5 / 110V or 230/400 V AC
- **Digital inputs:** Up to 4 (optional)
- **Contact outputs:** 2
- **Dimensions:** 144x144mm
- **Communication:** RS485 port
  Modbus RTU
- Current and voltage programmable
- 4 quadrant measurement
- Maximum and minimum values
- True RMS value

Network type	Models
Single phase	MAR 144
3 phase balanced 3 or 4 wire	MAR 144 - I
3 phase unbalanced, 3 wire, 2 systems	MAR 144 - II
3 phase unbalanced, 4 wire, 3 systems	MAR 144 - 3

Measuring parameters	Unit	Accuracy
Voltage (phase-phase and phase-neutral)	V	0,2%
Phase and neutral current	A	0,2%
Active and reactive power	kW, kvar	0,2%
Apparent power	kVA	0,4%
Power factor (Cos ϕ)	PF	0,4%
Frequency	F	0,2%
Active positive and negative power	kWh	1%
Inductive and capacitive reactive power	kvarh	2%

Additional options
Communication: Digital output RS 485 or RS 232
Auxiliary voltage 18 / 72 V DC
Aux. v. universal 45-275 AC/DC
Input voltage isolation (internal transformers)
4 Digital inputs
Analogue output 4 - 20 mA (incl. voltage isolation)
10 programmable relays

Additional accessories
Connection cable (2m.) from MAR (RS 232) to PC (DB9)
Connection cable (2m.) from MAR (RS 485) to IFRA (Converter)
Connection cable (2m.) from IFRA (Converter) to PC (DB9)

AR3DC-RS485

Direct current

General features

Equipment with programmable microprocessor, LCD display, designed to measure variables in a low voltage continuous current network.

- **Rated voltage (Un):** 12, 24 or 48 V DC
- **Rated current:** 10, 20 or 40A
- **Current (external shunt):** ≥ 50 A .. / 60 mV
- **Aux. voltage:** Self-powered
- **Dimensions:** 3 modules, 52x90mm
- Shunt rated primary current (for indirect measurement)
- **Communication:** RS485 port Modbus RTU
- **Contact outputs:** 1 (optocoupler)
- **Direct output:** bidirectional
- Up to 32 devices per line
- Alternative measurement of values every 2 sec.

General features	Model
DC Analyzer module	AR3DC-RS485

Measuring parameters	Unit	Accuracy
Voltage (phase-phase and phase-neutral)	V	0,5%
Phase and neutral current	A	0,5%
Active power	kW	0,5%
Active positive and negative power	kWh	1%
Ampere-hour (+) / (-)	Ah+ / Ah-	1%

AR4DCT

Direct current - Hall effect sensor

General features

The **AR4DCT** analyzer is designed to measure voltage, current, power and energy in DC systems using hall effect sensors.

Its RS485 serial output allows easy monitoring. It includes a temperature sensor, an LCD display and a rated voltage of 1500V DC.

- **Rated voltage (Un):** 1500 V CC
- **Rated current:** ± 4 V CC
- **Aux. voltage :** 80 - 270 V
- **Dimensions:** 4 modules, 70x90mm
- **Hall effect sensors:** 9 - 33 currents
- **Communication:** RS485 port Modbus RTU
- **Power:** bidirectional
- **Optional:** 4 Digital inputs and 2 outputs

General features	Model
DC basic analyzer with temperature sensor	AR4DCT
Current expansion module with 12 inputs*	MR4DC
Digital input and relay output expansion module	DIO-02
12 V power supply	PS02

* Up to 2 MR4DC modules can be added to the main unit.

Measuring parameters	Unit	Accuracy
Voltage	V	0,2%
Current	A	0,2%
Active power	kW	0,2%
Imported and exported active power	kWh	Class 1
External temperature sensor input (Pt100)	°C	2%

TMC-C

Direct current

General features

Programmable microprocessor instrument with 3 LCD displays, designed for display of measured values and integrated keyboard.

- **Rated voltage (Un):** 24, 48, 110, 230 ó 400 V DC. Optional 1000V DC.
- **Aux. voltage :** 110, 230, 400 V AC / 24, 48 V DC
- **Communication:** RS485 port or RS232
- **Dimensions:** 144 x 144mm
- Shunt rated primary current

General features	TMCc	TMCc-H
Pulse/contact/alarm outputs	2	2
Analogue output	4-20mA	–
Local display up to 8 parameters	•	•
Display programmable	•	•
Current In: .../ 60 mV DC	•	–
0 - 1000 V and 8 x (+/- 4 V for hall effect sensor)	–	•

Measuring parameters	Unit	Accuracy
Voltage (phase-phase and phase-neutral)	V	0,5%
Phase and neutral current	A	0,5%
Active power	kW	0,5%
Active positive and negative power	kWh	1%
Ampere-hour (+) / (-)	Ah+ / Ah-	1%

Additional options
Communication: RS 485 digital output. Modbus RTU protocol
Auxiliary power supply: 24, 48 V DC or universal 45/275 V AC/DC

Alternating Current

			AHM3	ASM3-PV	AHM1-B	
						
GENERAL FEATURES						
Rated voltage			3 x 400 / 690 V AC	3 x 462 / 800 V AC	3 x 400 / 690 V AC	
Rated current			X/5 A - X/1 A	X/5 A - X/1 A	X/5 A - X/1 A	
Auxiliary voltage			80-270 V AC/DC	80-270 V AC/DC	80-270 V AC/DC	
Dimensions			96 x 96 mm	96 x 96 mm	96 x 96 mm	
IP protection degree			IP 65 (Front) IP 20 (Body)	IP 65 (Front) IP 20 (Body)	IP 65 (Front) IP 20 (Body)	
COMMUNICATIONS						
RS485 (Modbus)			•	•		
RS232 (Modbus)			(Optional)			
Ethernet TCP/IP						
Memory			(Optional)			
OTHER FEATURES						
Digital inputs			(Optional)			
Contact output			(Optional)			
ELECTRICAL MEASURES	**Unit**					
Electrical parameters			63	49	58	
Voltage (Line - Neutral)	V, kV	L1, L2, L3	•	•	•	
Voltage (Line - Neutral)	V, kV	Max/Min	•		•	
Voltage (Line - Neutral)	V, kV	Total		•		
Voltage (Line - Line)	V, kV	L1, L2, L3	•	•	•	
Voltage (Line - Line)	V, kV	Max/Min	•		•	
Voltage (Line - Line)	V, kV	Total		•		
Current	A, kA	L1, L2, L3	•	•	•	
Current	A, kA	Max/Min	•		•	
Current	A, kA	Max. Demand	•	•	•	
Current	A, kA	Total	•	•	•	
Active power (P)	kW, MW, GW	L1, L2, L3 & total	•	•	•	
Active power (P)	kW, MW, GW	Max/Min	•		•	
Active power (P)	kW, MW, GW	Max. Demand	•	•	•	
Reactive power (Q)	kvar, Mvar, Gvar	L1, L2, L3, & total	•	•	•	
Reactive power (Q)	kvar, Mvar, Gvar	Max/Min	•		•	
Reactive power (Q)	kvar, Mvar, Gvar	Max. Demand	•	•	•	
Apparent power (S)	kVA	L1, L2, L3 & total	•	•	•	
Apparent power (S)	kVA	Max/Min	•	•	•	
Apparent power (S)	kVA	Max. Demand	•		•	
Power factor (Cos ϕ)	PF	L1, L2, L3 & total	•	•	•	
Power factor (Cos ϕ)	PF	Max/Min	•		•	
Frequency	Hz	Total	•	•	•	
Imported active energy (EP+) & (EP-)	kWh, MWh, GWh	Total	•	•	•	
Imported reactive energy (EQ+) & (EQ-)	kvarh, Mvarh,Gvarh	Total	•	•	•	
Reactive power	kvarh, Mvarh,Gvarh	Q1, Q2, Q3, Q4	•	•		
Tariffs			16			
Backup energy	kWh	Total	•	•	•	
Hour meter	h: min	Total	•	•	•	
THD voltage and current	V y A	L1, L2, L3	•	•	•	
Harmonics RMS-U and RMS-I	%	L1, L2, L3	1-63		1-31	
Unbalance -U and -I	%	Total	•		•	
Voltage crest factor	-	Total				
Current k factor	-	Total				
Voltage and frequency deviation	-	-				
Demand record	-	Max				
Max/Min & average value record	-	Max / min				
Off-limit alarm record	-	-				
SOE event record	-	-				
Voltage swell/sag & interruption record	-	-				

NETWORK ANALYZERS

	AHM1-BC	AHM1	SAM3001	SNG96	SNG96C	MAR144
						
	3 x 400 / 690 V AC	3 x 400 / 690 V AC	3 x 220 / 380 V AC	400 V AC	400 V AC	3x 230/400V AC
	X/5 A - X/1 A	X/5 A - X/1 A	2,5 mA; 80 mA; 330 mV	X/5 A	X/5 A	x/5A - x/1A
	80-270 V AC/DC	80-270 V AC/DC	Self-powered (SAM3000: 24VDC)	Self-powered	Self-powered	63,5 - 110 V AC 230 - 400 V AC
	96 x 96 mm	96 x 96 mm	1 DIN	96 x 96 mm	96 x 96 mm	144 x 144 mm
	IP 65 (Front) IP 20 (Body)	IP 65 (Front) IP 20 (Body)	IP20 Display module IP67	IP 54 (Front) IP 65 (Opc. front cover)	IP 54 (Front) IP 65 (Opc. front cover)	IP 54 (Front) IP 20 (Body)
	•	•	•		•	•
						Optional
		AHM1-TCP/IP AHM1- RC				
		•				
		2				4 (Optional)
		2	1			2
	62	62	71	13	20	23
	•	•	•	•	•	•
	•	•	•			•
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	1-31	1-31	1-63			
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Direct Current

			AR4DCT	AR3DC	
					
GENERAL FEATURES					
Rated voltage			1500 V DC	12, 24 or 48 V DC Optional 125 V DC	
Rated current			Hall effect sensor: 4 V DC	Direct: 10, 20, 40 A DC Shunt: In/60 V DC	
Auxiliary voltage			80-270 V AC/DC	Self-powered	
Dimensions			4 DIN	3 DIN	
IP protection degree			IP 20	IP 20 | Optional IP 54	
COMMUNICATIONS					
RS485 (Modbus)			•	•	
RS232 (Modbus)					
OTHER FEATURES					
Digital inputs			(Optional)		
Contact outputs			(Optional)	1	
Analogue outputs					
ELECTRICAL MEASURES	**Unit**				
Electrical parameters			10	8	
DC voltage	A, kA	Total	•	•	
DC voltage	A, kA	Max/Min	•		
Current	A, kA	Max/Min	•		
Current	A, kA	Max. Demand	•		
DC current	A, kA	Total	•	•	
DC current	A, kA	Max/Min	•		
DC current	A, kA	Max. Demand	•		
Active power (P)	kW, MW, GW	Total	•	•	
Ampere Hour (+)	Ah+	Total		•	
Ampere Hour (-)	Ah-	Total		•	
Rated shunt current	Ip	Total		•	
Import active energy (EP+) & (EP-)	kWh, MWh, GWh	Total	•	•	
Export active energy (EP+) & (EP-)	kWh, MWh, Gwh	Total		•	
Outdoor temperature measurement	°C	-	•		

	TMCC	TMCC-H
		
	24, 48, 110, 230, 400 V DC Optional 1000 V DC	24, 48, 110, 230, 400 V CC Optional 1000 V CC
	Shunt: In/60 V DC	0 - 1000 V y 8 x (+/- 4 V hall effect sensor)
	110, 230 or 400 V AC / 24, 48 V DC	110, 230 or 400 V AC / 24, 48 V DC
	144x144	144x144
	IP 20 | Optional IP 54	IP 20 | Optional IP 54
	(Optional)	(Optional)
	•	•
	2	2
	1 AO (4-20 mA)	
	8	8
	•	•
	•	•
	•	•
	•	•
	•	•
	•	•
	•	•
	•	•