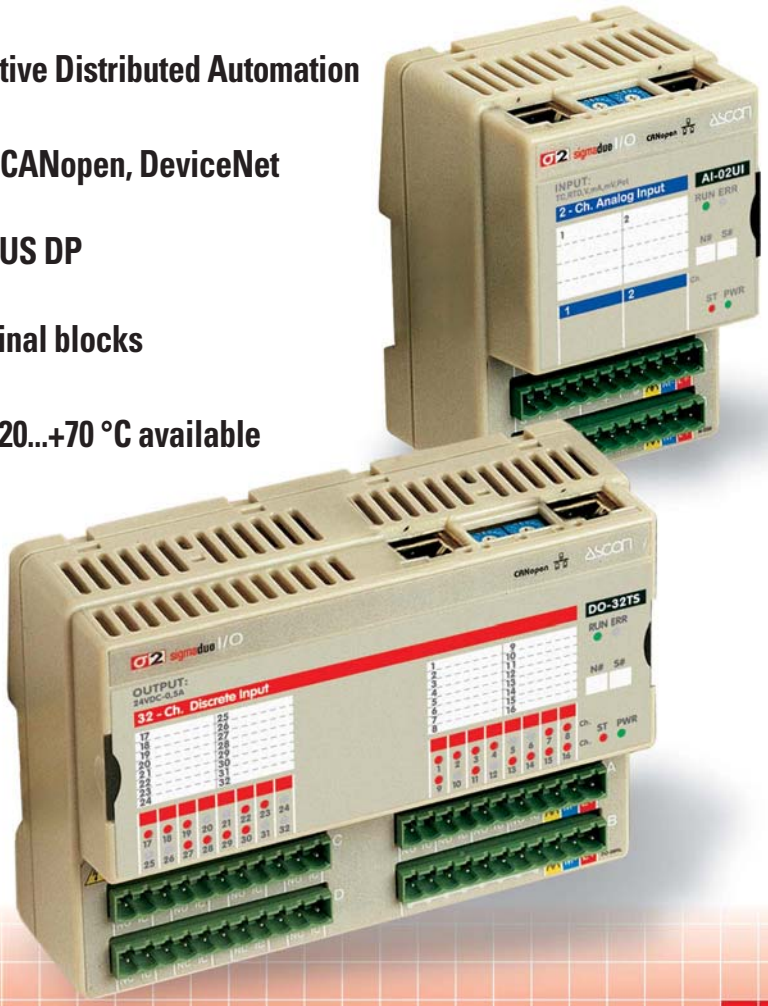
BT. 03.01 S2/E

σ2 SERIES

Stand-alone remote I/O modules for Fieldbus Solutions sigma**due**® series

These highly modular devices uniquely combine complete programmability, high performance analogue and digital I/O, into a series of powerful, compact and autonomous modules, with direct interface to any control unit (PCs, PLCs, DCS or Operator Panels).

- **Stand alone modules for effective Distributed Automation**
- **Fully software configurable**
- **Built-in Fieldbus Interface for CANopen, DeviceNet and Modbus**
- **Network Adapters for PROFIBUS DP and Ethernet**
- **Easy wiring with built-in terminal blocks**
- **DIN rail mounting**
- **Extended temperature range -20...+70 °C available**



E

ISO 9001 Certified

ASCON spa
20021 Bollate - (Milano) Italy - Via Falzarego, 9/11 - Tel. +39 02 333 371 - Fax +39 02 350 4243
www.ascon.it - sales@ascon.it

Remote I/O modules for effective distributed automation
Each module has embedded fieldbus interface and power supply: therefore the modules can be distributed along the plant or on board of machines, in order to reduce engineering, mounting and wiring costs.

Multifunction modules for high flexibility
Through software configuration, sigmadue® I/O modules can be used for different purposes.
For example a module can be used at the same time for state and counter inputs, state and PWM outputs.
Some sigmadue® modules boast universal analogue inputs and can be configured for different sensors.
The availability of 8, 16 and 32-channel modules provides great flexibility, fitting many different applications.

Processing capability on board
The embedded microprocessor allows local signal conditioning and data handling, such as linearisation, data scaling, engineering units conversion, alarm handling, etc.. .
This relieves the PC or PLC CPU from a considerable load of computing power, thus improving performance and bus efficiency.

High performances
Accuracy class: 0,1%, and 16 bit resolution for analogue I/O.
Analogue sampling: from 5ms max. total conversion time.
Transfer of input data on fieldbus network: 5ms max. for all I/O.

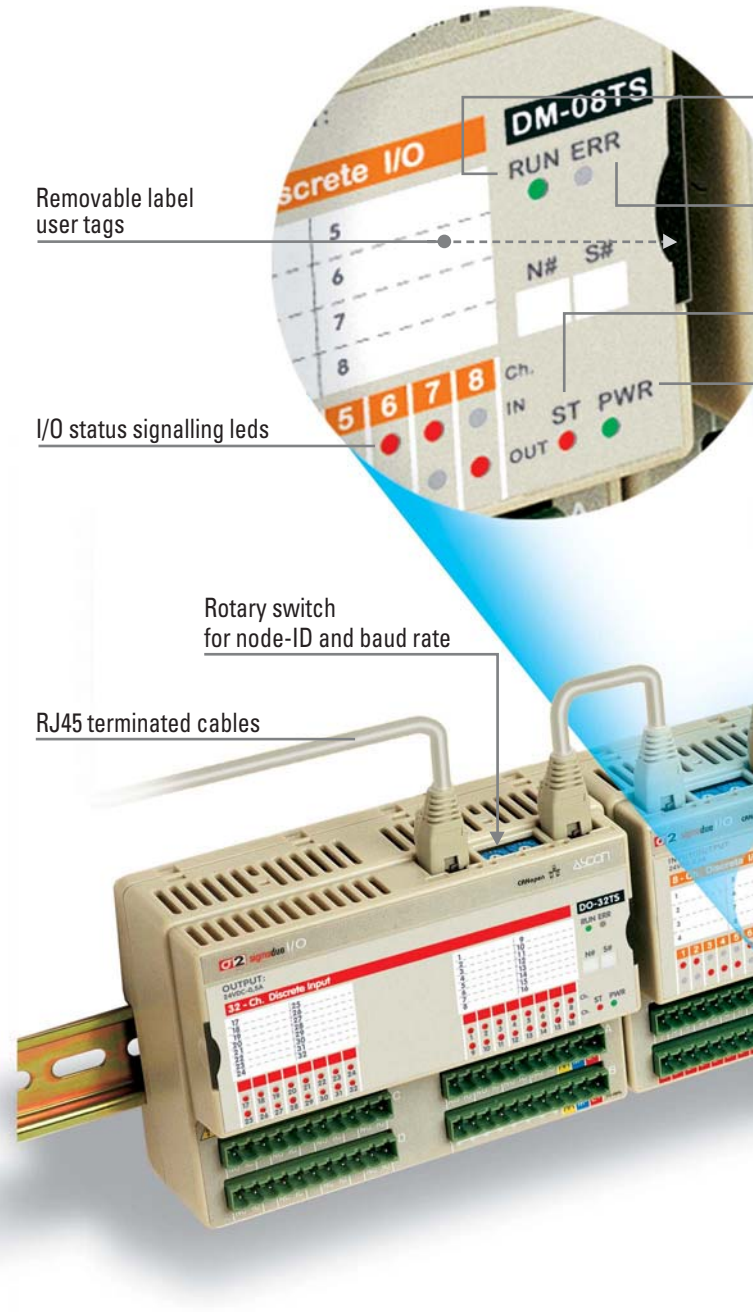
Easy installation and Quick Wiring
- Bus Connection: two RJ45 connectors on each module for fast hot swap
- Removable terminal block plugs
- Screw or spring clamp type plugs
- Additional Terminal Block available to make an easier wiring of field signals just added by a "click".

Fieldbus technology
- Built-in fieldbus interface for CANopen, DeviceNet or RS485 Modbus
- Network Adapters for PROFIBUS DP and Ethernet.

CANopen is successfully employed in many industrial control systems: the very flexible applications layer and many optional functionalities perfectly match network designer needs.

DeviceNet is based on a object-oriented communication model and designed to connect simple devices.

Modbus is one of the best known communication protocols, implemented by hundreds of vendors, in a very large number of devices.

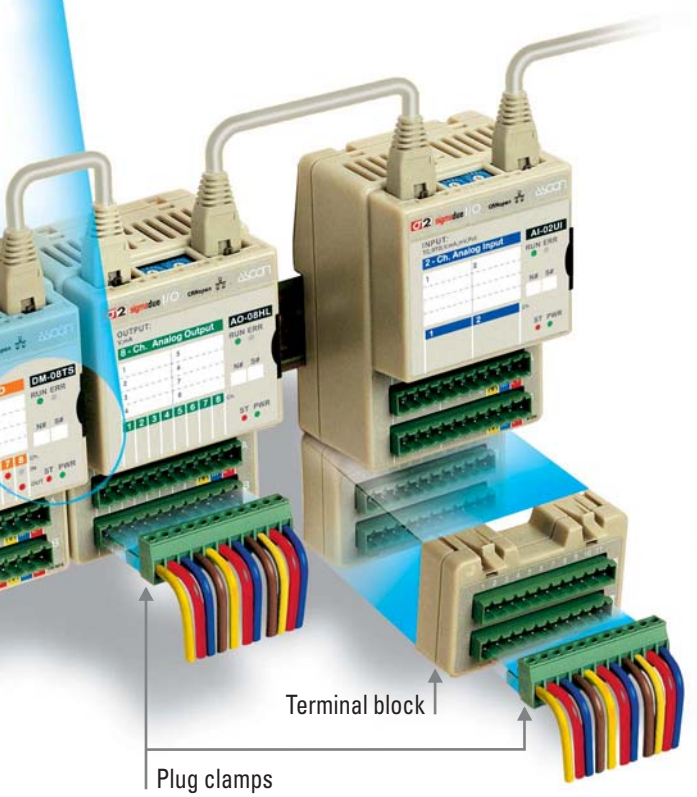


Analogue modules

Model	Ch.s	Inputs	Outputs	Resolution class	Isolation class	Accuracy	Acq. time	Functions	Remarks
AI-02UI	2	Universal: RTD, TC, mA, mV, V, Potentiometer		16bit	2.5kV	0.1%	20ms	Linearisation, Scaling, Enginering Units, Limits, Autotare, Autozero	Isolation between the two inputs High accuracy High Speed
AI-08TC	8	TC, mV		16bit	800V	0.1%	60ms	Linearisation, Scaling, Enginering Units, Limits	Differential inputs
AI-04RT	4	RTD, TC, mV		16bit	800V	0.1%	120ms	Linearisation, Scaling, Enginering Units, Limits	
AI-08DP	8	mA, V dual polarity		16bit	800V	0.1%	10ms	Limits, Offset, Scaling	Fast acquisition
AI-08HL	8	mA, V		16bit	800V	0.1%	10ms	Limits, Offset, Scaling	Fast acquisition
AO-08DP	8		mA, V dual polarity	16bit	800V	0.1%	20ms	Limits	High accuracy High Speed
AO-08HL	8		mA, V	16bit	800V	0.1%	20ms	Limits	High accuracy High Speed

MODULES FOR EFFECTIVE DISTRIBUTED AUTOMATION

LED name	Status	Meaning
RUN	ON	Operational
	Blinking	Pre-operational (CANopen)
	Single flash	STOPPED
	OFF	Device in RESET state
ERR	ON	BUS OFF
	Single flash	Warning limit reached
	Double flash	Error Control Event
	Triple flash	Sync Error (CANopen)
	OFF	No error. Device working
ST	ON	DIAG Error
	Blinking	INIT and DIAG running
	Single flash	Baud rate setting
	OFF	Module OK and ready
PWR	ON	Module Power Supply ON
	OFF	Module Power Supply OFF

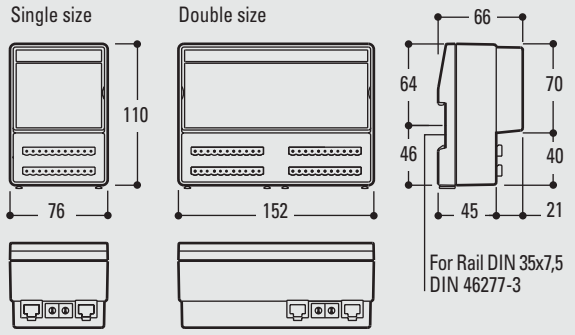


Common Features

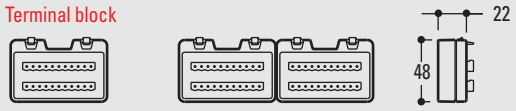
Electrical	
Power Supply:	24Vdc nominal (min 18V, max 30V)
Three ways isolation:	I/O to Logic - Logic to Fieldbus Power Supply to all circuits
Environmental	
Operating temperature:	-10...+65 °C standard -20...+70 °C extended
Storage temperature:	-40...+85 °C
Relative humidity:	5...95%, non condensing
Vibrations (3 axes):	10..57Hz, 0.0375 mm / 57...150Hz, 0.5g
Shock (3 axes):	15g, 11ms half sine
General	
Mounting:	on DIN rail, vertical, free air
Protection degree:	IP20
CE Marking:	EN 50081-2, EN 50082-2, EN 61010

Dimensions

I/O modules



Terminal block



Digital modules

Model	Channels I	Channels O	Size	Input Voltage	Output Voltage	Output Current	Isolation Class	Functions: Counters	Edge detect	Latch	PWM	Pulse	Remarks
DI-16LV	16		Single	24Vdc		–	800V		✓	✓			Optoisolated Sink (PNP)
DI-32LV	32		Double	24Vdc		–	800V		✓	✓			
DO-16TS		16	Single		24Vdc	0.5A	800V					✓	High Side Transistor
DO-16TP		16	Single		24Vdc	2A	800V					✓	High Side Transistor
DO-32TS		32	Double		24Vdc	0.5A	800V						High Side Transistor
DO-04TX		4	Single		24Vdc	6A	800V					✓	High Side Transistor
DO-04RL		4	Single		250Vac	2A (SPST) 1A (SSR)	4000V					✓	SPST Relay SSR Relay
DO-08RL		8	Double		250Vac	2A (SPST) 1A (SSR)	4000V					✓	SPST Relay SSR Relay
DM-08TS	8 I/O		Single	24Vdc	24Vdc	0.5A	800V	✓	✓	✓	✓	✓	Optoisolated Sink (PNP) Input or/and High Side Trans. Output
DM-16TS	8	8	Single	24Vdc	24Vdc	0.5A	800V		✓	✓			
DM-32TS	16	16	Double	24Vdc	24Vdc	0.5A	800V		✓	✓			

sigmadue® I/O line ANALOGUE I/O MODULES

sigmadue-I/O	
AI-02UI	2-channel Universal Analogue Input

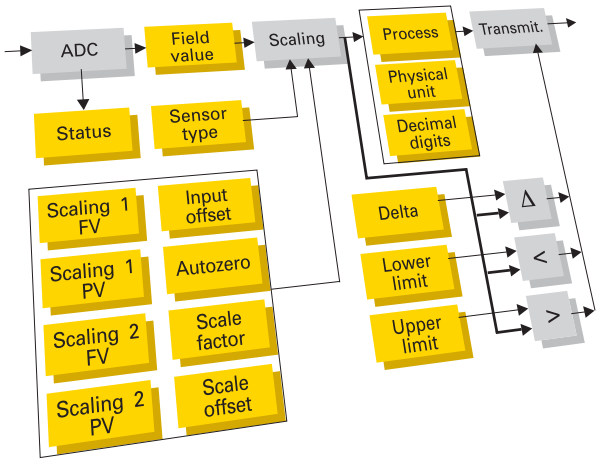


HIGH PERFORMANCE

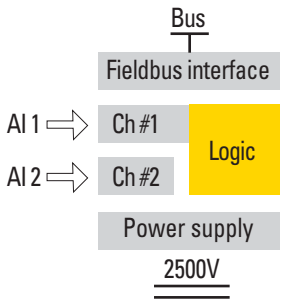
The sigma**due**® I/O AI-02UI is a 2.5 kV isolation class, analogue input module for acquisition and signal conditioning of thermocouple, RTD, Volt, milliVolt, milliamps, and potentiometer signals.
A special thermocouple input or programmable custom scale can be downloaded.
The two input channels are independent and fully configurable in a separate way.

Block diagram
The Device Profile supported is the CiA DS 404: Measuring Devices and Closed Loop Controllers, as far as the Analogue Input function block is concerned.

Diagram for each channel:



Isolation



- Channel to Channel: 2500V
- Logic to Serial Bus: 2500V
- Logic to Power Supply: 2500V

Functions
Signal conditioning, linearisation, scaling, engineering units, limits, autotare, autozero, moving average or repeating average, ...

Technical data

Common features	
Resolution:	16bit
Conversion time:	20ms
Accuracy class:	0.1%
Overvoltage protection	
TC input	
TC J	-200...+600 °C -328...+1112 °F
TC K	-200...-1370 °C -328...+2498 °F
TC L	-200...+600 °C -328...+1112 °F
TC T	-200...+400 °C -328...+752 °F
TC N	0...+1300 °C +32...+2372 °F
TC R	0...+1600 °C +32...+2912 °F
TC S	0...+1760 °C +32...+3200 °F
Others (W3, W5, B,...)	downloadable.
Cold junction compensation accuracy:	1 °C/20 °C
RTD input	
PT100 2,3 or 4 wires connection	-200...+600 °C -328...+1112 °F
PT1000 2 wires connection	-200....+600°C -328...+1112 °F
Potentiometer input	
Potentiometer range:	100Ω.. 10kΩ
Current input	
0/4...20mA Input impedance:	< 300Ω
Voltage input	
0...150mV or 0...10V Input impedance:	> 20kΩ
Custom input	
Non-linear custom curve can be programmed on different available ranges:	20mV, ±40mV, ±80mV, 150mV, 10V, 20mA

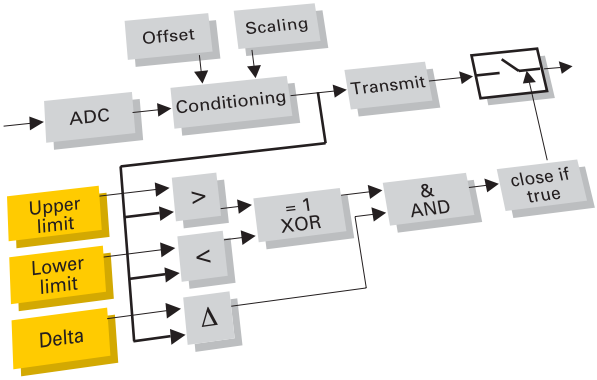
sigmadue-I/O	
AI-08HL	8-ch configurable V, mA, Analogue Input
AI-08TC	8-ch configurable Thermocouple AI
AI-04RT	4-ch configurable RTD or TC AI
AI-08DP	8-ch configurable V Dual Polarity, mA, Analogue Input



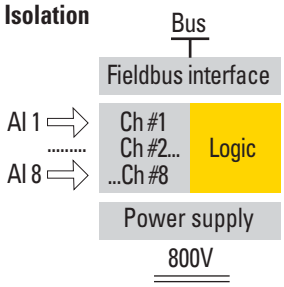
The I/O AI-08HL and AI-08DP are 8 channel fast analogue input modules for high level signals.
The I/O AI-08TC is a 8 channel with differential analogue input module for thermocouple and low level signals.
The I/O AI-04RT is a 4 channel with differential analogue input module for RTD, thermocouple and low level signals.

Block diagram
The Device Profile supported is the CiA DS 401 (Generic I/O modules) for AI-08HL and AI-08DP, and CiA DS 404 (Measuring Devices) for AI-08TC and AI-04RT.

Diagram for each channel:



Isolation



- Logic to Power Supply: 800V
- Logic to Serial Bus: 800V

Technical data

Common Features	
Resolution:	16bit
Accuracy class:	0.1%
Overvoltage protection	
Conversion time	
AI-08HL, AI-08DP	10ms
AI-08TC:	50ms
AI-04RT:	120ms
TC input (AI-08TC, AI-04RT)	
TC J	-200...+600 °C -328...+1112 °F
TC K	-200...+1370 °C -328...+2498 °F
TC L	-200...+600 °C -328...+1112 °F
TC T	-200...+400 °C -328...+752 °F
TC N	0...+1300 °C +32...+2372 °F
TC R	0...+1600 °C +32...+2912 °F
TC S	0...+1760 °C +32...+3200 °F
Cold junction compensation accuracy:	1°C/20°C
RTD input (AI-04RT)	
PT100 2 or 3 wires connection	-200...+600°C -328...+1112 °F
PT1000 2 wires connection	-200...+600°C -328...+1112 °F
Current input (AI-08HL)	
0 (4)...20mA	
Input impedance:	< 300Ω
Voltage input	
-50...+50mV	(AI-08TC and AI-04RT)
-300...+300mV	(AI-08TC and AI-04RT)
-1...+1V	(AI-04TC and AI-04RT)
0...+10V	(AI-08HL)
-10...+10V	(AI-08DP)
Input impedance:	> 100kΩ

Functions
Signal conditioning, linearisation, scaling, engineering units, limits.

sigmadue-I/O	
AO-08HL	8-channel Analogue Output
AO-08DP	8-channel Dual Polarity Analogue Output

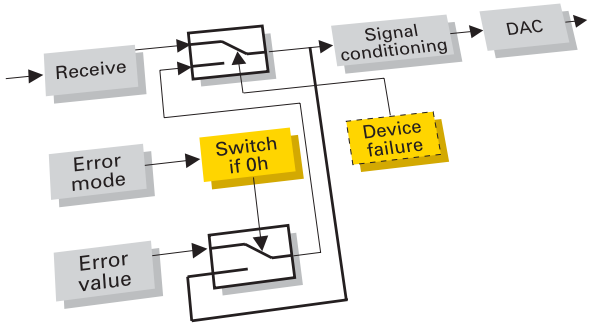


HIGH PERFORMANCE

The I/O AO-08HL is a 8 channel analogue output module for high level signals. Every channel can be selected as voltage or current output. Voltage output range is 0...10V (±10 Vin AI-08DP). Current output range is 0/4...20mA.

Block diagram
The Device Profile supported is the CiA DS 401 (Generic I/O modules).

Diagram for each channel:

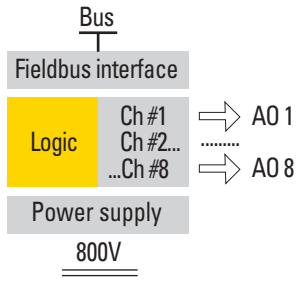


Technical data

Common features	
Resolution:	16bit
Accuracy:	0.1%
Conversion time:	20ms
Output impedance:	
- V output	min. 600Ω
- mA output	max. 600Ω
Protection	
Overvoltage - Overload	
Isolation	
Logic to Power Supply:	800V
Logic to Serial Bus:	800V

Functions
Ramp, triangle or saw-tooth output wave, 16 points output linearisation.

Isolation



- Logic to Power Supply: 800V
- Logic to Serial Bus: 800V

sigmadue® I/O line DIGITAL I/O MODULES

sigmadue-I/O	
DI-16LV	16-channel Digital Input
DO-16TS	16-channel Digital Output
DO-16TP	16-channel 2A Digital Output
DM-08TS	8-channel Digital Input or Output
DM-16TS	16-channel 8 Digital Input + 8 Digital Output
DO-04RL	4-channel Relay/SSR Digital Output
DO-04TX	4-channel 6A Digital Output

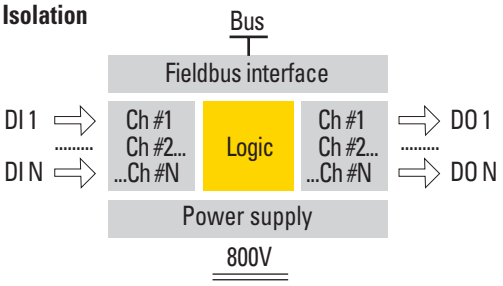


sigmadue-I/O	
DI-32LV	32-channel Digital Input
DO-32TS	32-channel Digital Output
DM-32TS	32-channel 16 Digital Input + 16 Digital Output
DO-08RL	8-channel Relay Digital Output



The broad line of sigmadue I/O Digital modules from 4 to 32 channels per module, mixed Input and Output and advanced functions can fit any application in an effective way for space, cost and communication efficency.

Isolation

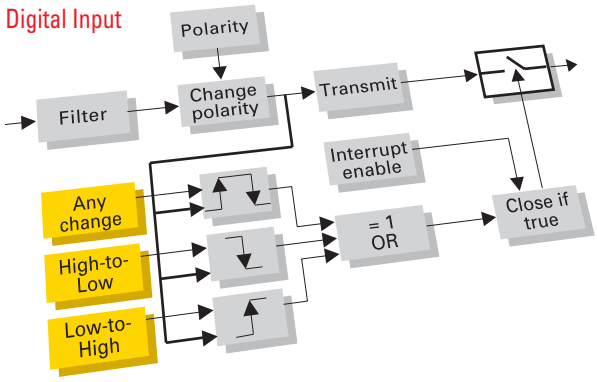


Block diagram

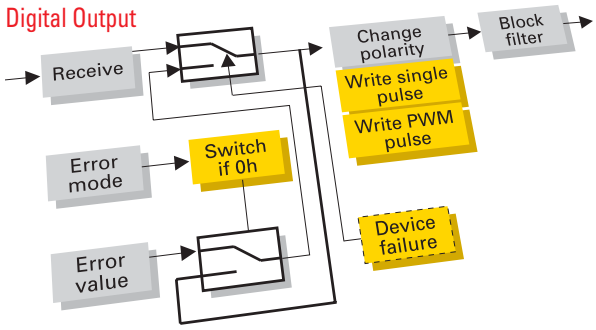
All modules support Device Profile CiA DS 401 (Generic I/O modules).

Diagram for each channel:

Digital Input



Digital Output



Technical data

Digital Input	
Input type:	24V nominal (EN61131-2, type 2)
Signal voltage (0):	-3...+5V
Signal voltage (1):	11...+30V
Input impedance:	5kΩ
Digital Output	
Rated voltage:	24V (10...30Vdc)
Rated current/channel:	0.5 A (DO-XX-TS, DM-XX-TS) 2A (DO-XX-TP) 6A (DO-XX-TX)
Relay Output	
Relay:	SPST, 2A/250Vac
SSR:	1A/250Vac

Functions

Input	DM-08TS	DI-16LV	DI-32LV DM-16TS DM-32TS
Read Input	✓	✓	✓
Read Pulse Frequency[1)]	✓		
Read Pulse width	✓		
Pulse counting	✓		
Edge detect	✓	✓	✓
Latch input	✓	✓	✓
Read Input monostable	✓	✓	
Reset latch	✓	✓	✓
Output	DM-08TS	DO-16TS DO-04RL DO-04TX DO-08RL DO-16TP	DM-16TS DM-32TS DO-32TS
Force Output	✓	✓	✓
PWM Pulse generation[2)]	✓		
Single Pulse generation[3)]	✓	✓	

1) Frequency: 0...20kHz - 2) PWM: max. period 65s, max. frequency 4kHz - 3) Pulse: min. 5ms, max. 65s

FIELDBUS INTERFACES AND ACCESSORIES

Fieldbus Technology

The sigmadue I/O series can be integrated in the most commom fielbus networks:

Native interfaces

CAN-bus Every module can be provided with built-in CAN-bus interface, with **CANopen** protocol according to CiA DS401 or DS404 profiles, and operating as a network slave node.

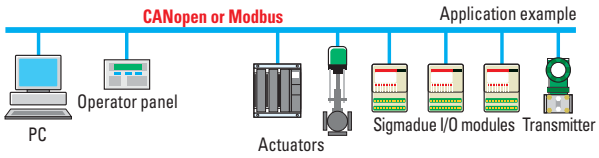
- CAN 2.0b controller with physical connection according to ISO 11898;
- Galvanic isolation via high-speed opto-coupler;
- Transmission data rate up to 1Mb/s.

DeviceNet protocol has to come.

RS485

Every module can be provided with built-in serial RS-485 interface with Modbus protocol, operating as a network slave node.

- Two wire RS485 serial
- Galvanic isolation
- Transmission data rate up to 19.2kb/s.



sigmadue-I/O	Network adapter
NA-00PB	PROFIBUS DP slave
NA-00ET	Ethernet



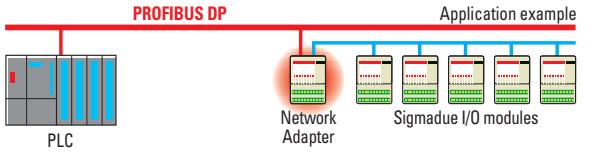
Profibus DP

Direct integration on PROFIBUS DP fieldbus networks is made via Network Adapter sigmadue I/O NA-00PB.
The NA operates as slave node on PROFIBUS DP side, extending data exchange to the sigmadue I/O modules.

- PROFIBUS DP slave SPC3 controller according EN 50170
- Galvanic isolation via high-speed opto-coupler.
- Transmission data rate up to 12Mb/s with automatic baud rate detection.

Ethernet

Sigmadue I/O NA-00ET provides Ethernet connection to the sigmadue I/O modules for accessing field I/O data via internet/intranet technology.
IEEE 802.3 10baseT.



Accessories

Power Supply Unit



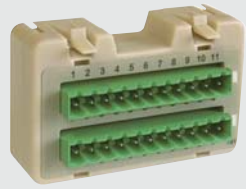
AP-S2/AL-DR45-24



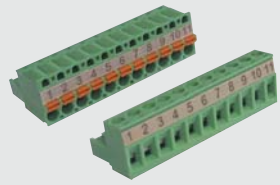
AP-S2/AL-DR120-24

Input Voltage:	88...264 Vac
Output Voltage:	24V, ±1%
Output rated current:	2A (DR-45-24), 5A (DR-120-24)
Protection:	Over voltage, Overload, auto recovery
Temperature:	-10...+50 °C
Mounting:	DIN Rail
Dimensions:	97 x 78 x 67 mm (DR-45-24), 65 x 125 x 103 mm (DR-120-24)

Cables and connectors



Additional Terminal Block 2x11 poles



Plug clamps available with screw or spring clamp option



RJ45 terminated cables are available with 14 cm or 22 cm standard lengths for easy daisy-chain connection of the I/O modules

Ordering codes

I/O modules

Model: **IO - A / B1 - B2 B3 - C D**

- Line
- Fieldbus interfaces
- Module function
- N° of channels
- Type of channel
- Type of out relay (RL)
- Manual language

Fieldbus interfaces	A
CANopen	C B
Modbus	M B
DeviceNet protocol has to come	D N

Module function	B1
Analogue input	A I
Analogue output	A O
Digital input	D I
Digital output	D O
Mix In/Out	D M

N° channels	B2
2 channels	02
4 channels	04
8 channels	08
16 channels	16
32 channels	32

Type of channels		B3
Analogue I/O	High level V, mA	H L
	RTD (Pt100)	R T
	Thermocouple	T C
	Universal	U I
	Dual Polarity	D P
Digital I/O	Low voltage 24V	L V
	Relay or SSR	R L
	Transistors 24Vdc, 0.5A	T S
	Transistors 24Vdc, 2A	T P
	Transistors 24Vdc, 6A	T X

Type of output RL (only for relay modules)	C
Modules other than RL	0
SPST Relay 250V-2A	0
SSR Relay 250V-1A	1

User manual	D
Italian/English (standard)	0
French/English	1
German/English	2
Spanish/English	3

Ordering example: mod. **IO - CB/AI - 02UI - 00**
2-channel configurable CANopen Universal Analog Input

B1 - B2 - B3 available combinations

B1	B2	B3
AI	02	UI
AI	08	HL
AI	08	TC
AI	04	RD
AO	08	HL
DI	16	LV
DI	32	LV
DO	16	TS
DO	32	TS
DO	16	TP
DO	04	RL
DM	08	TS
DM	32	TS
DM	16	TP
DO	04	TX
AI	08	DP
AO	08	DP
DO	08	RL

Network adapter modules

Model: **IO - A / NA - 00 B**

- Line
- Fieldbus interfaces
- Type of Network

Fieldbus interfaces	A
CANopen	C B
Modbus	M B
DeviceNet protocol has to come	D N

Type of Network	B
PROFIBUS DP	P B
Ethernet	E T

Ordering example: mod. **IO - CB/NA - 00PB**
PROFIBUS DP Network Adapter Module

Accessories

Power supply

- 45W - 24 Vdc/2A power supply
  mod.: AP-S2 / AL-DR45-24

- 120W - 24 Vdc/5A power supply
  mod.: AP-S2 / AL-DR120-24

Cables and connectors

- Additional terminal block
  mod.: AP-S2 / TB-211-1

- Screw clamp plug 11 poles
  mod.: AP-S2 / SPINA-V11

- Spring clamp plug 11 poles
  mod.: AP-S2 /SPINA-M11

- Screw clamp plug 5 poles
  mod.: AP-S2 / SPINA-V5

- Spring clamp plug 5 poles
  mod.: AP-S2 / SPINA-M5

- RJ45 terminated 14 cm segment cable
  mod.: AP-S2 / LOCAL-BUS76

- RJ45 terminated 22 cm segment cable
  mod.: AP-S2 / LOCAL-BUS152

- Bus termination adapter
  mod.: AP-S2 / TERM-CAN