

sigma microPAC[®]

Programmable Automation Controller

Compact, with on-board I/O and expansion capability

sigma microPAC is a micro Programmable Automation Controller ideal for applications where process variables such as temperature, pressure, flow, level, etc. have an essential role.

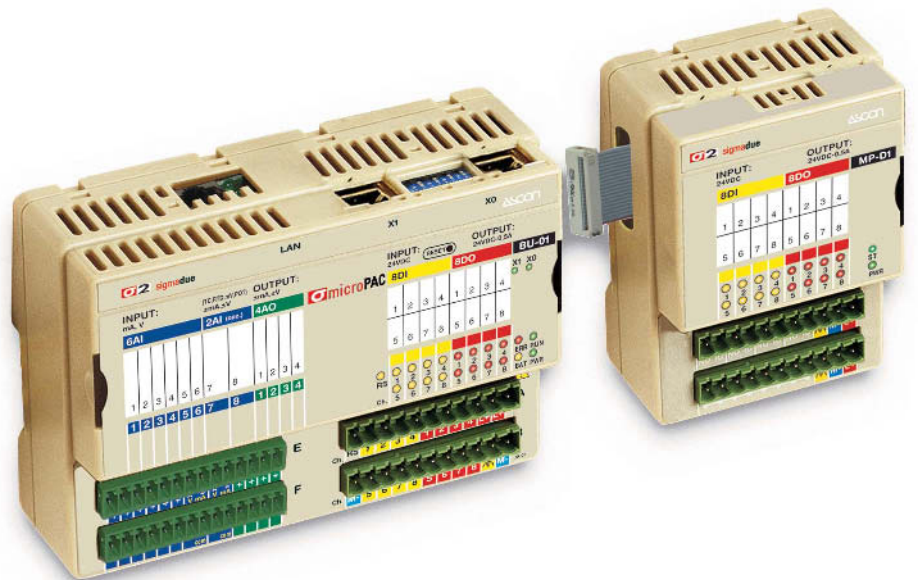
sigma microPAC adds powerful and accurate process control with easy and quick management of logic and sequence control typical of PLCs.

The **sigma microPAC** consists of a CPU with 8 digital inputs, 8 digital outputs, up to 8 analogue inputs and up to 4 analogue outputs. Up to two expansion modules can be added to the basic unit for up to 40 digital inputs and 40 digital outputs.

Programming is compliant with IEC/EN 61131-3 standards.

Six international programming languages are available with a large library of Ascon function blocks dedicated to process and logic/sequence control.

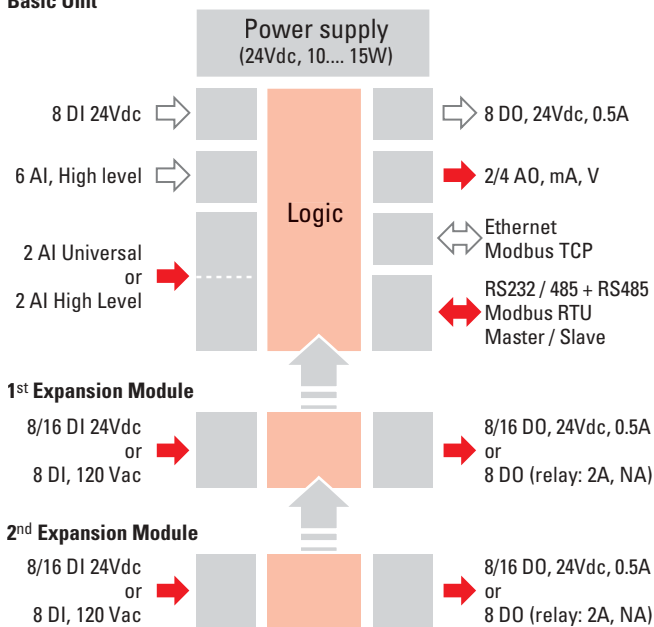
sigma microPAC is ideal for complete machine control and small processes such as climatic chambers, kilns, autoclaves, boilers, etc....



Technical data

Hardware Resources

Basic Unit



Notes: - The channels represented with are optional resources
 - One or two expansion modules can be fitted to the basic unit with direct connection to the CPU.
 Additional expansion can be obtained by connecting, via the RS485 port, external digital and analog sigma I/O Modbus modules.

CPU specifications

Processor	32 bit ARM
Program memory	2 MB Flash
Dynamic memory	16 MB RAM
Retentive memory	64 kB redundant
Memory data retention	10 years (with replaceable battery)
Real Time Clock	standard
Timer resolution	1 ms maximum
Computing speed	70 Mips
Minimum cycle time	≥5ms (typical 10ms)
Minimum response time	Acquisition time of inputs + execution time of cycles
Communications port (std.)	Ethernet 10 Mb base T (programming, configuration) Modbus TCP (supervision)
Communications port (option; only 1 Modbus Master can be used)	1RS485 Modbus RTU (Master/Slave) 1RS232/485 Modbus RTU (Master/Slave) for Supervision, expansion Modbus I/Os or generic ASCII for Modem connection
Front LED indications	for digital I/O, communications ports and CPU diagnostic

General and environmental specifications

Power supply voltage	24 Vdc (-15...+25%)
Power consumption	10 W (+5 W with both the expansions)
Reverse polarity protection	Standard
Isolation class	II (50 Vrms), EN61010-1
Vibration resistance	10...57Hz, 0.0375mm, 57...150Hz, 0.5g (3 axis)
Shock resistance	15g
Operating temperature	0...55°C; (humidity: 5... 95%)
Storage temperature	-40...70°C
CE compliance	EN 61131-2
Approvals	CE, UL and cUL
Protection	IP20
Dimensions / weight	See drawing

High level Analogue inputs

6 configurable, scalable (std.)	0...10V, 0/1...5V, 0...1V - 0/4...20mA
2 configurable, scalable (option)	±10V, ±5V, ±1V - 0/4...20mA
Acquisition time	standard inputs: 170 ms, optional inputs: 40 ms,
Resolution	16 bit
Accuracy	0.1% of span
Input impedance	>100 kΩ (V); 300 Ω (mA)
Isolation	800 V between Power supply and logics

Universal Analogue inputs

2 configurable, scalable (option)	±50 mV, ±100 mV, ±300 mV, ±1.25 V high impedance, TC (J, K, L, N, R, S, T), Pt100 (3 wire), Pt1000 and potentiometer (0.1... 10kΩ)
Acquisition time	60 ms
Resolution	16 bit
Accuracy	0.1% of span
Input impedance	10 MΩ (V)
Cold junction compensation	≤1°C/20°C ambient temperature
Isolation	800 V between Power supply and logics 40 Vpp between the 2 channels (differential inputs)

Analogue outputs

2/4 configurable (option)	±10 V (±25 mA max.), 0/4... 20 mA
Update time	35 ms
Resolution	13 bit
Accuracy	0.1% of span
Isolation	800 V between Power supply and logics

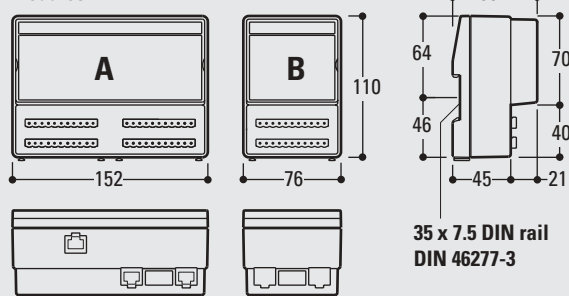
Digital inputs

8, up to 40 (with the expansions)	24 Vdc (ON: 5...30V, OFF: 0...3V) or
8 + 8/16 max. (with the expansions)	8 at 24 Vdc + 8/16 max. at 120 Vac
Max. input frequency	80 Hz
Type	Sink
Protection	Reverse polarity and overvoltage
Isolation	800 V between Power supply and logics
Status indicator	1 LED (yellow) /channel
Compliance	IEC/EN 61131-2 (type 2)

Digital outputs

8, up to 40 (with the expansions)	24Vdc, 0.5 A or
Type	Source (PNP)
Protection	Overvoltage and short circuit
Isolation	800V between Power supply and logics
8 + 8/16 max. (with the expansions)	8 at 24 Vdc + 8/16 relays (2A, 240 Vac, NA)
Status indicator	1 red LED (red) /channel

Modules

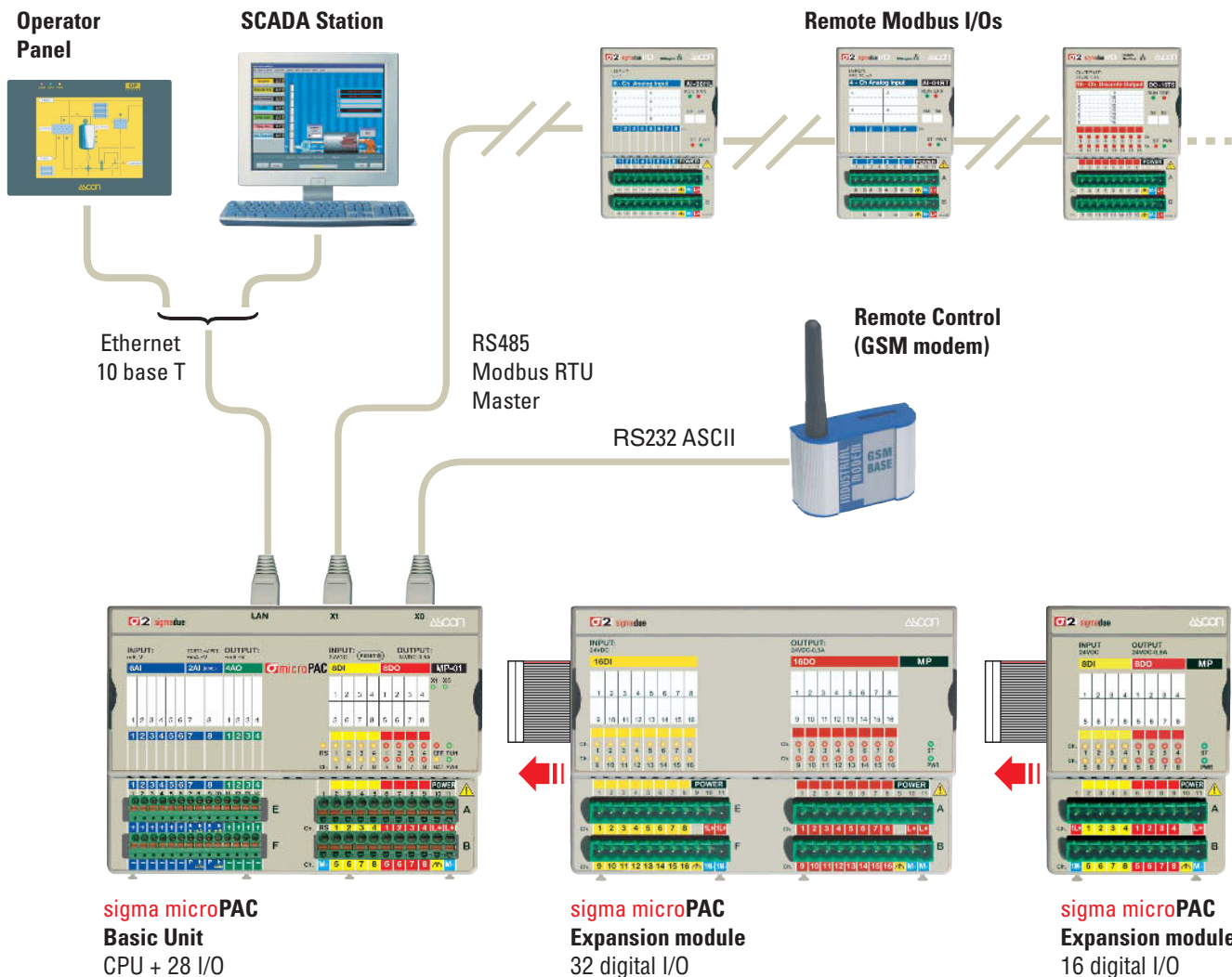


- A** - Basic unit (weight 460g)
- Expansion module with 16 DI + 16 DO (weight: 400g)
- B** Expansion module with 8 DI + 8 DO (weight: 220 g)

Terminal blocks(option)



Configuration diagram



sigma microPAC Basic Unit
CPU + 28 I/O

sigma microPAC Expansion module
32 digital I/O

sigma microPAC Expansion module
16 digital I/O

Programming

sigma microPAC offers the maximum flexibility the design of control strategies.

- Environment: OpenPCS (Ascon Edition) multi-tasking, standard IEC 61131-3 (EN 61131-3).
- 6 programming languages:
 - IL - Instruction List.
 - ST - Structured Text.
 - LD - Ladder Diagram.
 - FBD - Function Block Diagram.
 - SFC - Sequential Function Chart.
 - CFC - Continuous Function Chart.
- Diagnostics / Debug: integrated on-line.

Advanced functions

Ascon libraries include a large number of function blocks, macroblocks, on-line documentation, functional examples in a complete IEC 61131 environment; allowing the user to quickly customize their application.

The Ascon libraries include the following function blocks:

- Advanced P.I.D. single action and heat/cool with overshoot control.
- Cascade, Ratio, and Override control.
- Complete controller block ready to use.
- Auto-tuning.
- Auto/Manual station with bumpless control.
- Programming of cycles, process sequences and production recipes.

Function blocks for GSM/GPRS modems are available for remote control.

Expansion of HW resources

The I/O resources of sigma microPAC can be expanded by using dedicated expansion modules described in this bulletin, and/or any other remote analogue or digital I/O with Modbus RTU protocol.

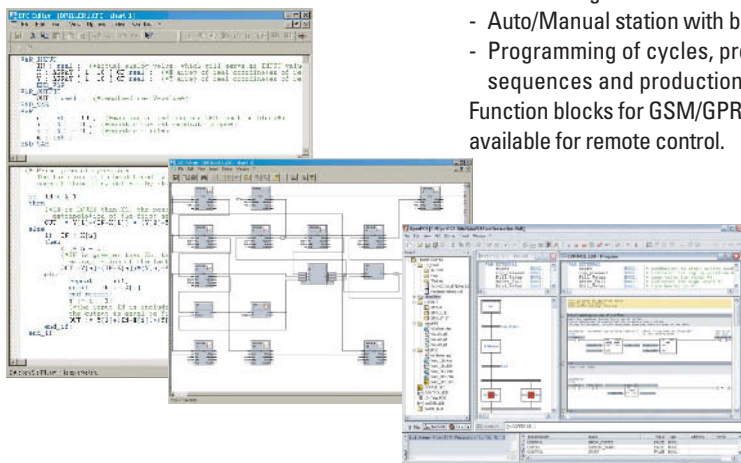
The remote I/O with Modbus RTU protocol offered by Ascon are:

- IO-MB/AI-08HL (8 AI, 0...10 V, 0/4...20 mA).
- IO-MB/AI-08TC (8 AI for TC and mV).
- IO-MB/AI-04RT (4 AI, for TC and mVR).
- IO-MB/AO-08HL (8 AO, 0...10 V, 0/4...20 mA).
- IO-MB/DI-16LV (16 DI, 24 Vdc).
- IO-MB/DO-16TS (16 DO, 24 Vdc, 0.5 A).
- IO-MB/DM-08TS (8 channel modules; each channel can be configured as DI 24 Vdc or DO 24 Vdc, 0.5 A).

Integration with Operator Panels / PCs / and SCADA Systems

Integration is managed by the Ethernet connection with Modbus TCP protocol and/or with the RS232/485 connection over Modbus RTU protocol.

Ascon offers a wide range of TFT touch screen colour operator panels from 4.3" to 12.1".

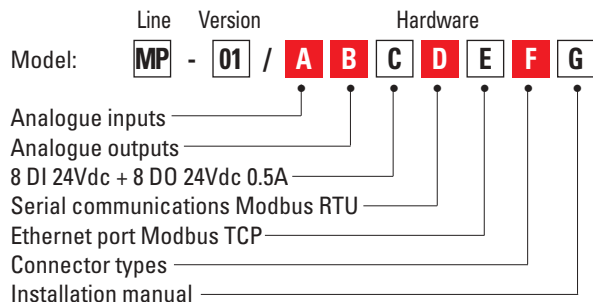


Ordering codes



S E R I E S

Basic Unit (CPU with integrated I/O)



Analogue inputs	A
6 analogue inputs - High level (mA, V)	0
6 analogue inputs - High level (mA, V) + 2 analogue inputs - (mA, V bipolar)	1
6 analogue inputs - High level (mA, V) + 2 universal inputs (TC, RTD, mV, pot.)	2

Analogue outputs	B
None	0
2 analogue outputs - 0/4... 20 mA, ±10V	1
4 analogue outputs - 0/4... 20 mA, ±10V	2

Digital I/O	C
8 DI 24Vdc + 8 DO 24Vdc 0.5A	0

Serial communications	D
Not fitted	0
RS232/485 + RS485 Modbus RTU	1

Other communications port	E
Ethernet port Modbus TCP	0

Type of connector	F
Terminal blocks, screw terminals	V
Terminal blocks, spring terminals	M

Installation manual	G
English (std.)	0

I/O Expansion modules

MP-D1/08-08/M0 Digital expansion module with 8 Inputs (24 Vdc) and 8 Outputs (24 Vdc, 0.5 A), terminal blocks with spring terminals and manuals in English language

MP-D2/08-08/M0 Digital expansion module with 8 Inputs (24 Vdc) and 8 Relay Outputs (2A, NO), terminal blocks with spring terminals and manuals in English language

MP-D4/08-08/M0 Digital expansion module with 8 Inputs (120 Vac) and 8 Relay Outputs (2A, NO), terminal blocks with spring terminals and manuals in English language

MP-D1/16-16/M0 Digital expansion module with 16 Inputs (24 Vdc) and 16 Outputs (24 Vdc, 0.5 A), terminal blocks with spring terminals and manuals in English language

Note: /M0 terminal blocks with spring terminals;
/V0 terminal blocks with screw terminals.

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