

# KUBE 7<sup>SPEED</sup> SERIES

TEMPERATURE | SPEED CONTROL



## CONTROLLERS | PROGRAMMERS

### CONSTANT SPEED

#### DESPITE LOAD CHANGES AND SUPPLY VARIATIONS

- Direct output with 24 VDC motor control;
- Speed detection without sensor;
- Setting the cooking time or a speed;
- Automatic calibration;
- Smart start / stop (only with oven in temperature).

### TEMPERATURE CONTROL

- Outputs for electric heating elements or gas;
- Universal input;
- Up to 3 outputs + speed output.

### CHOOSE YOUR SET UP

- 4 cooking times + 4 independent temperatures, or
- 4 recipes (temperature and time).

#### APPLICATION FIELDS

- TUNNEL OVENS: FOR PIZZA, FOR PASTRY, ETC .;
- MACHINES FOR FOOD TREATMENT: SHAPING MACHINES FOR MOZZARELLAS, CHOCOLATE TEMPERING MACHINES, GRINDERS, ETC .;
- COOLING TUNNEL
- CHEMICAL LABORATORIES: THERMO SHAKERS, REFRIGERATED CENTRIFUGES, BAIN-MARIE STIRRER CONTROLS, BELT TOASTERS, ETC .;
- WIPERS, DIE WASHING MACHINES;
- PACKAGING: ADHESIVIZERS, CONTINUOUS THERMO-SEALERS, SMALL SHRINKING TUNNELS, SMALL THERMAL PACKERS, ETC .;
- CONTROL OF SMALL PUMPS.

## MOTOR SPEED CONTROL OUTPUT

It **simplifies** the use permitting to set temperature and "cooking time"; the controller will automatically convert the time in the corresponding speed.



It **simplifies** the machine: controller, power supply and motor are all you need.

It **defines your "Standard"**.

Using the recipes (temperature + time) it is possible to switch from one "cooking" recipe to another one with maximum speed, maintaining the optimal standard for the specific processing.

It **guarantees speed (time) regardless of load**

The control module continuously detects the speed of motor and compensates for any unwanted changes.

## INDEPENDENT TIMER

Timer function with 5 different operating modes.

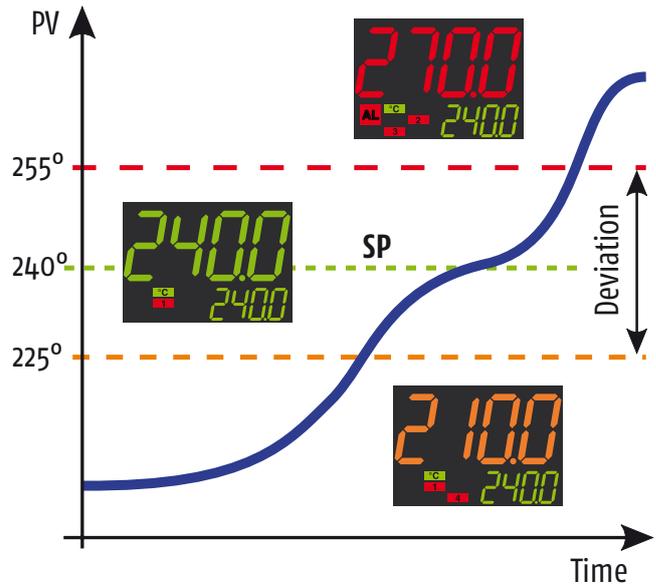
Time base programmable as h/min, min/s, s/s·10<sup>-1</sup>.

Start/Hold/Reset commands programmable from digital input and/or from "C" key.

The Timer function works in parallel, but independently of the adjustment.

## 3 COLOUR DISPLAY

The colour of the main display changes depending on process value. Colour change thresholds are programmable.



Immediate and intuitive process status acknowledgement, even at great distance.

This function can be disabled by the user.

## evoTUNE

evoTune is a technological evolution of the "classic" auto-tuning method. Performs auto-tuning in all operating conditions.

At evoTune start-up the instrument evaluates the current situation (set point, current process measurements etc.) and establishes the best tuning solution.

Set point change made during auto-tuning, restarts process according to the new conditions.



## CUSTOMIZED PARAMETER SEQUENCE

Providing a user-defined operator interface has been, until now, a privilege of "custom" solutions.

The KUBE Line allows to customize operator parameters making safe and easy the instrument use.



## SPECIFICATIONS

DISPLAY		KM7/ KR7/ KX7/ KRD7	
Dual LED	Main display:	4 digit h 10.9 mm (KR) or 15.5 (KM and KX) dynamic 3 colours: red, green and amber or 1 fixed selectable colour (KM)	
	Secondary display:	4 digit h 6 mm (KR), 7.6 mm (KM) or 10 mm (KX) green colour	
	Bargraph:	-	21 segments Bargraph (KX)
INPUTS			
Universal input	Thermocouples:	J (-50... +1000°C/-58... +1832°F), K (-50... +1370°C/-58... +2498°F); S/R (-50... +1760°C/-58... +3200°F), T (-70... +400°C/-94... +752°F); Infrared sensors J or K;	
	RTD:	Pt100 3 wires and Pt1000 2 wires (-200... +850°C/-328... +1562°F);	
	Thermistors:	PTC KTY81-121 (-50... +150°C/-58... +302°F), NTC 103-AT2 (-50... +110°C/-58... +230°F);	
	Linear signals:	0/12... 60 mV, 0/4... 20 mA, 0/1... 5 V, 0/2... 10 V.	
Measurement accuracy	±0.5% span ±1 digit, (±1% span ±1 digit for T/c type S)		
Digital inputs	1 free voltage contact + 1 (available when I/O 4 = DI2) programmable as voltage (24 VDC) or free voltage contact		
OUTPUTS			
Up to four	Speed OUT:	PWM with feedback control for motor speed. 24 VDC max 4 A.	
	OUT 1 and Out 2 (*):	Relay SPST-NO 2 A/240 VAC; voltage output for SSR driving SSR 13 V max. @ 1 mA, 10.5 V min. @ 15 mA ±10% or relay SPST-NO 2 A/ 240 VAC (for servomotor control)	
	OUT 3 programmable:	Voltage output for SSR driving SSR 13 V max. @ 1 mA, 10.5 V min. @ 22 mA ±10% or transmitter power supply or 2nd Digital Input	
FUNCTIONAL			
Control	PID single or double action, On/Off, On/Off with Neutral Zone. Autotune, Selftune and <i>ev0</i> Tune. Overshoot control		
Alarms	3 alarms configurable as absolute, deviation, band		
Set Point	4 Set Points selectable + 4 speed selectable individually or as a recipe		
Serial Communication	TTL (standard) + RS485 (optional for KR7 and KRD7, not available for KM7 and KX7), protocol: MODBUS RTU		
Baud rate	1200... 38400 baud selectable (8 bit + 1 stop bit no parity)		
Worked hours/days counter	With 2 simultaneous functions: cumulative non-erasable and resettable with alarm		
Evogreen	Time based Display switch-off, selectable		
Programmer (optional)	Up to 8 segments with "guaranteed soak"		
Timer (optional)	Independent with 5 operating modes		
GENERAL			
Power supply	24 VAC/DC ±10%, 100... 240 VAC/DC (-15... +10%), 50/60 Hz, power consumption 7 VA max.		
Temperature	Operating: 0... 50°C (32... 122°F); Storage: -20... +70°C (-4... +158°F)		
Relative humidity	20... 95 RH% without condensation		
Conformity	EN 61010-1, EN 61326		

\*: For servomotor drive, both **Out 1** and **Out 2** are relay output (see " How to order": Out 1 and Out 2 = code "M").



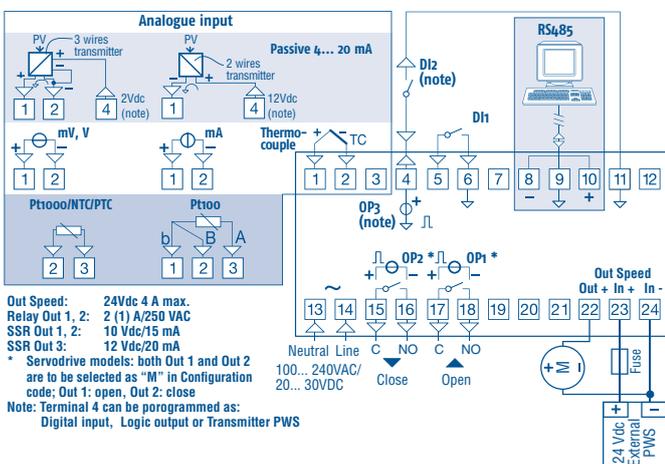
**KR7**



**Mechanical characteristics**

FEATURE	
Housing	Self-extinguishing plastic UL 94 v0
Mounting	Front panel
Dimensions	78 x 35 x 78 mm (W x H x D)
Panel cut-out	71 x 29 (-0... +0.6 mm)
Weight	140 g approx.
Terminals	24 terminals for cables from 2.5 mm <sup>2</sup> (AWG22... AWG14): - on fixed or removable terminal block with screw terminals; - on removable terminal block with spring-load terminals
Protection degree	IP 65 panel mounted with gasket (IP20 for screw terminals) In conformity with En 60070-1 (internal use only)

**Electrical connections**



**How to order**

**Model**  
 KR7 = Controller with feedback control of the belt speed  
 KR7T = Controller with belt speed control+ timer  
 KR7P = Controller with belt speed control+ timer + programmer

**Power supply**  
 H = 100... 240 VAC  
 L = 24 VAC/DC

**Analogue input + Digital Input DI1 (standard)**  
 C = J, K, R, S, T, PT100, PT1000 (2 wires), mA, mV, V  
 E = J, K, R, S, T, NTC, PTC, mA, mV, V

**SPEED Output**  
 S = PWM output for 24 Vdc 4A motor control

**Output 1 (Out 1)**  
 M = Relay SPST-NO 2 A (note)  
 O = VDC for SSR  
 R = Relay SPST-NO 2 A (resistive load)

**Output 2 (Out 2)**  
 - = Not available  
 M = Relay SPST-NO 2 A (note)  
 O = VDC for SSR  
 R = Relay SPST-NO 2 A (resistive load)

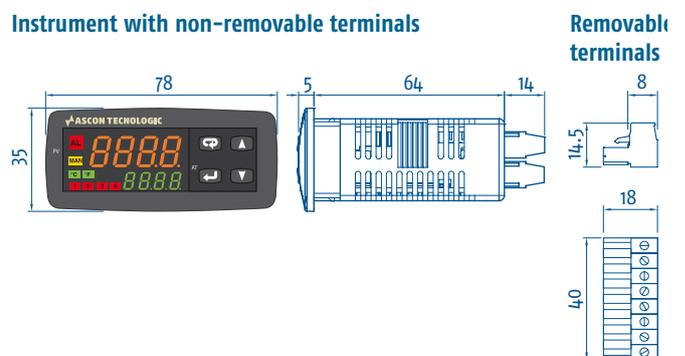
**Input/Output 3 (Out 3)**  
 D = Output 3 (VDC for SSR)/Pow. Supply/Dig. Input DI2

**Serial Communications**  
 - = TTL Modbus  
 S = RS485 Modbus + TTL Modbus

**Connection type**  
 - = Standard (screw terminals not removable)  
 E = Removable screw terminals  
 M = Removable spring terminals  
 N = Removable terminals (the fixed part only)

\*: For servomotor drive, both **OUT 1** and **OUT 2** codes must be selected as "M".

**Dimensions (mm)**





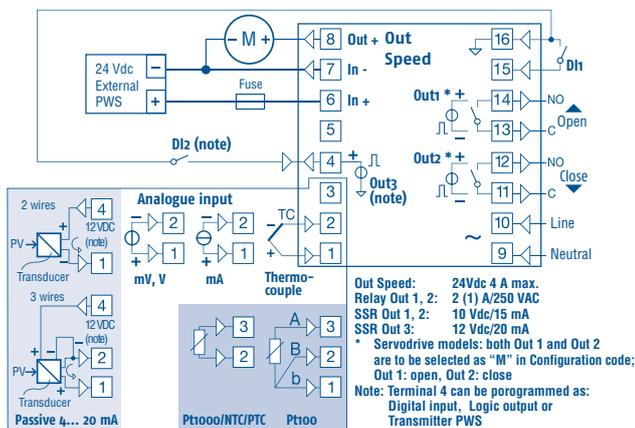
## KM7



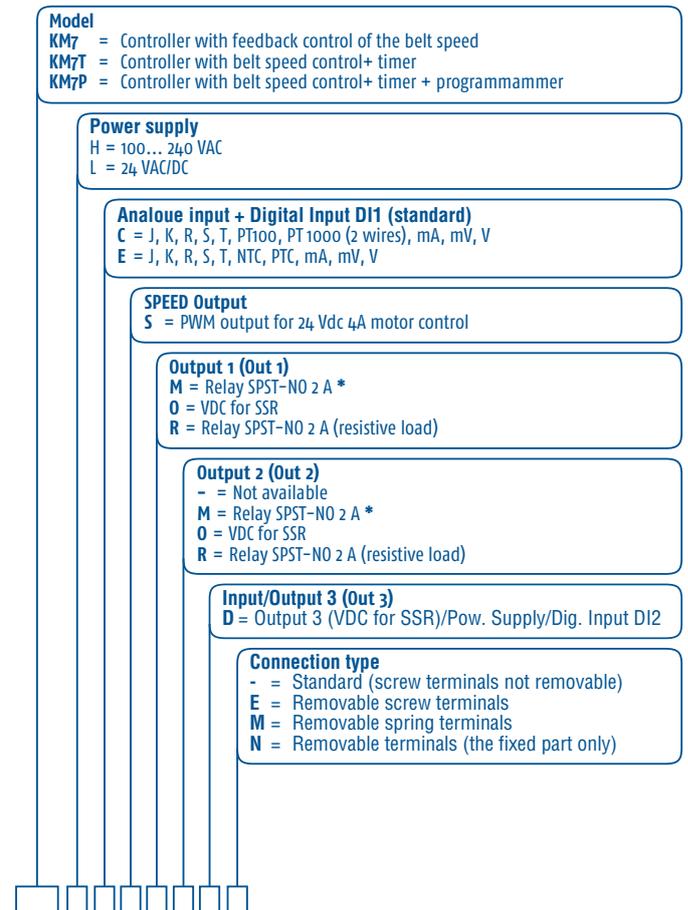
### Mechanical characteristics

FEATURE	
Housing	Self-extinguishing plastic UL 94 v0
Mounting	Front panel
Dimensions	48 x 48 x 62 mm (W x H x D)
Panel cut-out	45 x 45 (-0... +0.6 mm)
Weight	120 g approx.
Terminals	16 terminals for cables from 2.5 mm <sup>2</sup> (AWG22... AWG14): - on fixed or removable terminal block with screw terminals; - on removable terminal block with spring-load terminals
Protection degree	IP 65 panel mounted with gasket (IP20 for screw terminals) In conformity with En 60070-1 (internal use only)

### Electrical connections

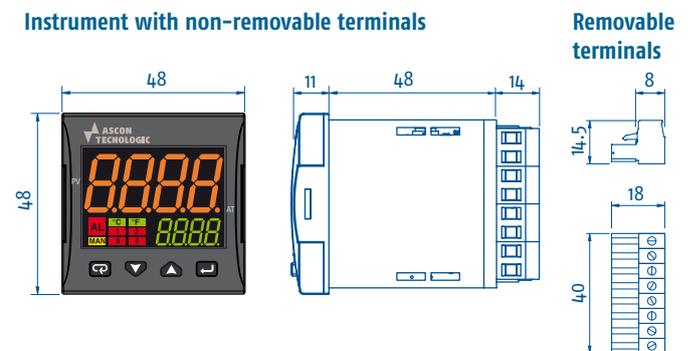


### How to order



\*: For servomotor drive, both **OUT 1** and **OUT 2** codes must be selected as "M".

### Dimensions (mm)





**KX7**



**Mechanical characteristics**

FEATURE	
Housing	Self-extinguishing plastic UL 94 v0
Mounting	Front panel
Dimensions	48 x 96 x 75.9 mm (W x H x D)
Panel cut-out	45 x 89 (-0... +0.6 mm)
Weight	160 g approx.
Terminals	16 terminals for cables from 2.5 mm <sup>2</sup> (AWG22... AWG14): - on fixed or removable terminal block with screw terminals; - on removable terminal block with spring-load terminals
Protection degree	IP 65 panel mounted with gasket (IP20 for screw terminals) In conformity with En 60070-1 (internal use only)

**How to order**

**Model**  
**KX7** = Controller with feedback control of the belt speed  
**KX7T** = Controller with belt speed control+ timer  
**KX7P** = Controller with belt speed control+ timer + programmer

**Power supply**  
 H = 100... 240 VAC  
 L = 24 VAC/DC

**Analogue input + Digital Input DI1 (standard)**  
 C = J, K, R, S, T, PT100, PT1000 (2 wires), mA, mV, V  
 E = J, K, R, S, T, NTC, PTC, mA, mV, V

**SPEED Output**  
 S = PWM output for 24 Vdc 4A motor control

**Output 1 (Out 1)**  
 M = Relay SPST-NO 2 A (note)  
 O = VDC for SSR  
 R = Relay SPST-NO 2 A (resistive load)

**Output 2 (Out 2)**  
 - = Not available  
 M = Relay SPST-NO 2 A (note)  
 O = VDC for SSR  
 R = Relay SPST-NO 2 A (resistive load)

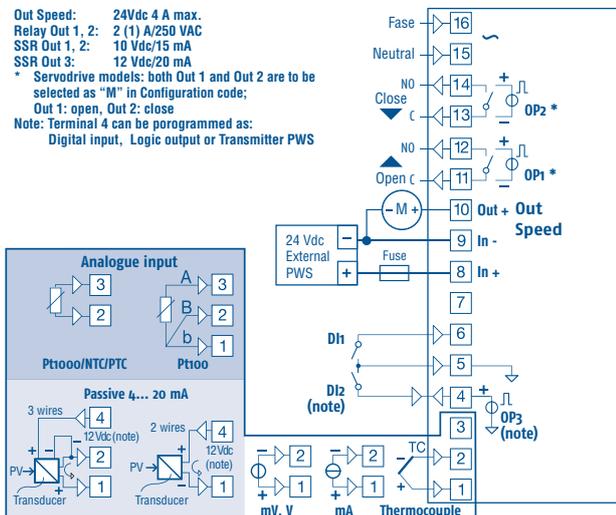
**Input/Output 3 (Out 3)**  
 D = Output 3 (VDC for SSR)/Pow. Supply/Dig. Input DI2

**Connection type**  
 - = Standard (screw terminals not removable)  
 E = Removable screw terminals  
 M = Removable spring terminals  
 N = Removable terminals (the fixed part only)

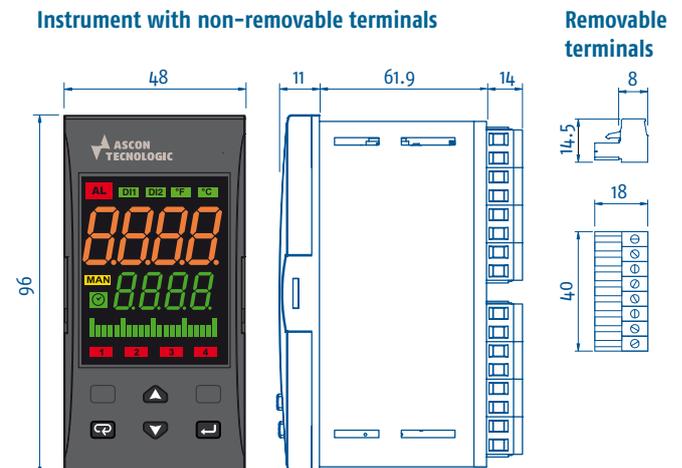
\*: For servomotor drive, both **OUT 1** and **OUT 2** codes must be selected as "M".

**Electrical connections**

Out Speed: 24Vdc 4 A max.  
 Relay Out 1, 2: 2 (1) A/250 VAC  
 SSR Out 1, 2: 10 Vdc/15 mA  
 SSR Out 3: 12 Vdc/20 mA  
 \* Servodrive models: both Out 1 and Out 2 are to be selected as "M" in Configuration code;  
 Out 1: open, Out 2: close  
 Note: Terminal 4 can be programmed as:  
 Digital input, Logic output or Transmitter PWS



**Dimensions (mm)**





## KRD7



### Mechanical characteristics

FEATURE	
Housing	Self-extinguishing plastic UL 94 v0
Mounting	On Omega DIN rail
Dimensions	78 x 35 x 78 mm (W x H x D)
Panel cut-out	71 x 29 (-0... +0.6 mm)
Weight	140 g approx.
Terminals	24 terminals for cables from 2.5 mm <sup>2</sup> (AWG22... AWG14): - on fixed or removable terminal block with screw terminals; - on removable terminal block with spring-load terminals
Protection degree	IP20 In conformity with En 60070-1 (internal use only)

### How to order

**Model**  
**KRD7** = Controller with feedback control of the belt speed  
**KRD7T** = Controller with belt speed control+ timer  
**KRD7P** = Controller with belt speed control+ timer + programmer

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**Power supply**  
**H** = 100... 240 VAC  
**L** = 24 VAC/DC

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**Analogue input + Digital Input DI1 (standard)**  
**C** = J, K, R, S, T, PT100, PT 1000 (2 wires), mA, mV, V  
**E** = J, K, R, S, T, NTC, PTC, mA, mV, V

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**SPEED Output**  
**S** = PWM output for 24 Vdc 4A motor control

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**Output 1 (Out 1)**  
**M** = Relay SPST-NO 2 A (note)  
**O** = VDC for SSR  
**R** = Relay SPST-NO 2 A (resistive load)

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**Output 2 (Out 2)**  
 - = Not available  
**M** = Relay SPST-NO 2 A (note)  
**O** = VDC for SSR  
**R** = Relay SPST-NO 2 A (resistive load)

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**Input/Output 3 (Out 3)**  
**D** = Output 3 (VDC for SSR)/Pow. Supply/Dig. Input DI2

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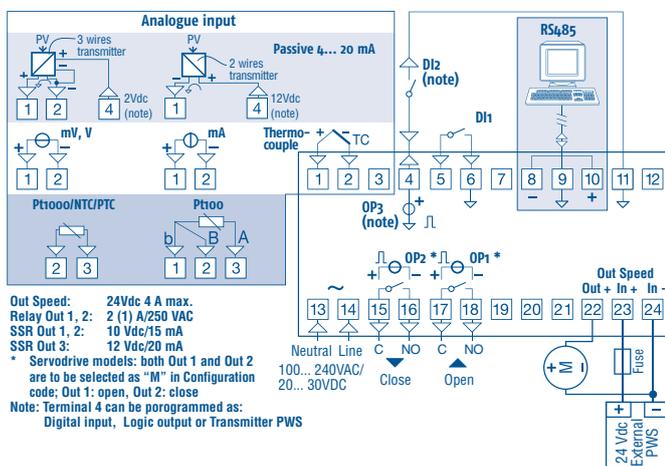
**Serial Communications**  
 - = TTL Modbus  
**S** = RS485 Modbus + TTL Modbus

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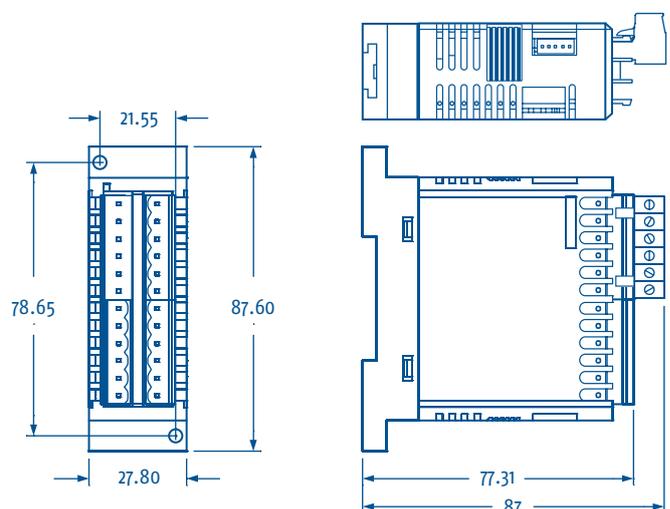
**Connection type**  
 - = Screw terminals  
**E** = Screw terminals pitch 5.00  
**M** = Removable spring terminals  
**N** = Removable terminals pitch 5.00 (the fixed part only)

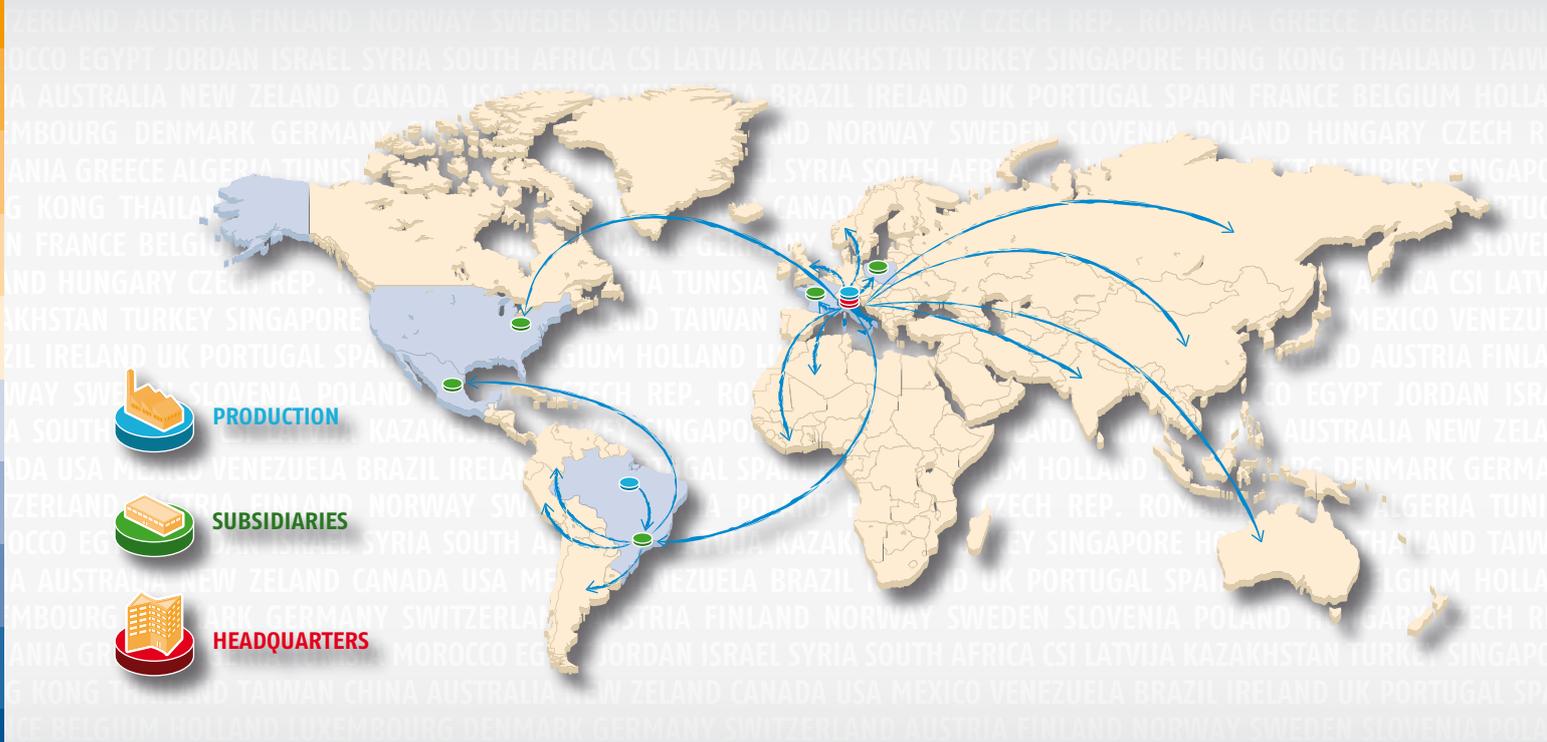
\*: For servomotor drive, both **OUT 1** and **OUT 2** codes must be selected as "M".

### Electrical connections



### Dimensions (mm)





Ascon Tecnologica s.r.l.  
viale Indipendenza, 56 · 27029 Vigevano (PV) Italy  
tel +39 0381 69 871 · fax +39 0381 69 87 30

[info@ascontecnologic.com](mailto:info@ascontecnologic.com)  
[www.ascontecnologic.com](http://www.ascontecnologic.com)

**COMPANY WITH  
MANAGEMENT SYSTEM  
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= ISO 9001 =  
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Ascon Tecnologica France  
BP 76 · 77202 - Marne La Vallee Cedex 1  
tel +33 1 64 30 62 62 · fax +33 1 64 30 84 98  
[info@ascontecnologic.fr](mailto:info@ascontecnologic.fr)  
[www.ascontecnologic.fr](http://www.ascontecnologic.fr)

Ascon Polska Sp. z o.o.  
KOCHCICE ul. Kochanowicka 43  
42-713 Kochanowice  
tel +48 34 35 33 619 · fax +48 34 35 33 884  
[info@ascon.pl](mailto:info@ascon.pl)  
[www.ascon.pl](http://www.ascon.pl)

Ascon Tecnologica - North America  
111 Brook Park Road  
Cleveland, OH 44109  
tel. +1 216 485 8350 ext. 229  
[info@ascontec-na.com](mailto:info@ascontec-na.com)  
[www.ascontecnologic.com/en](http://www.ascontecnologic.com/en)

Coelmatic Ltda  
Rua Clélia 1810 - Lapa  
Sao Paulo - SP - CEP 05042-001- Brazil  
tel. +55 11 2066-3211 · fax +55 11 3046-8601  
[info@coel.com.br](mailto:info@coel.com.br)  
[www.coelmatic.com.br](http://www.coelmatic.com.br)

Coelmatic SAPI SA de CV  
Dr. Pedro Noriega #1099 - Col Terminal  
Monterrey, Nuevo León - CEP 64570  
tel. +52 81 8104 1012  
[info@coelmatic.com.mx](mailto:info@coelmatic.com.mx)  
[www.coelmatic.com.mx](http://www.coelmatic.com.mx)



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