Ascon Tecnologic S.r.l.
via Indipendenza 56,
27029 - Vigevano (PV)
Tel.: +39 0381 69871,
Fax: +39 0381 698730

Configurable Multi-input, Multi-output or Multi-set point Controller

XS Series

CE

INSTRUCTION MANUAL

MIU.XS-6/96.10/E

COD J30-154-1AXS ING

Ascon Tecnologic Srl

www.ascontecnologic.com

GENERAL INDEX

1 • IDENTIFICATION OF MODEL

Thank you for choosing an ASCON controller

The instruments of the XS series belong to the last generation of microprocessor based controller, are universal, very powerful but simple to use.
They are fitted with AUTO-TUNE and EXPERT-TUNE, an auxiliary for system start-up, and serial communication for introduction into a distributed control network.
They are complete because all possible variables are always present.
Configuration of the instrument permits determination of the operating mode according to the application required.

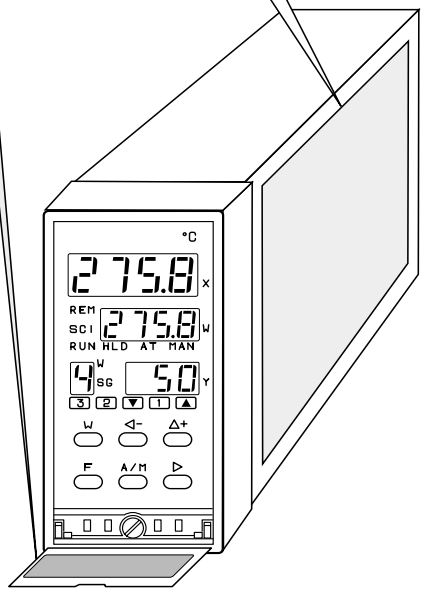
1.1 Identification of model

Model code

XS -A B C D /

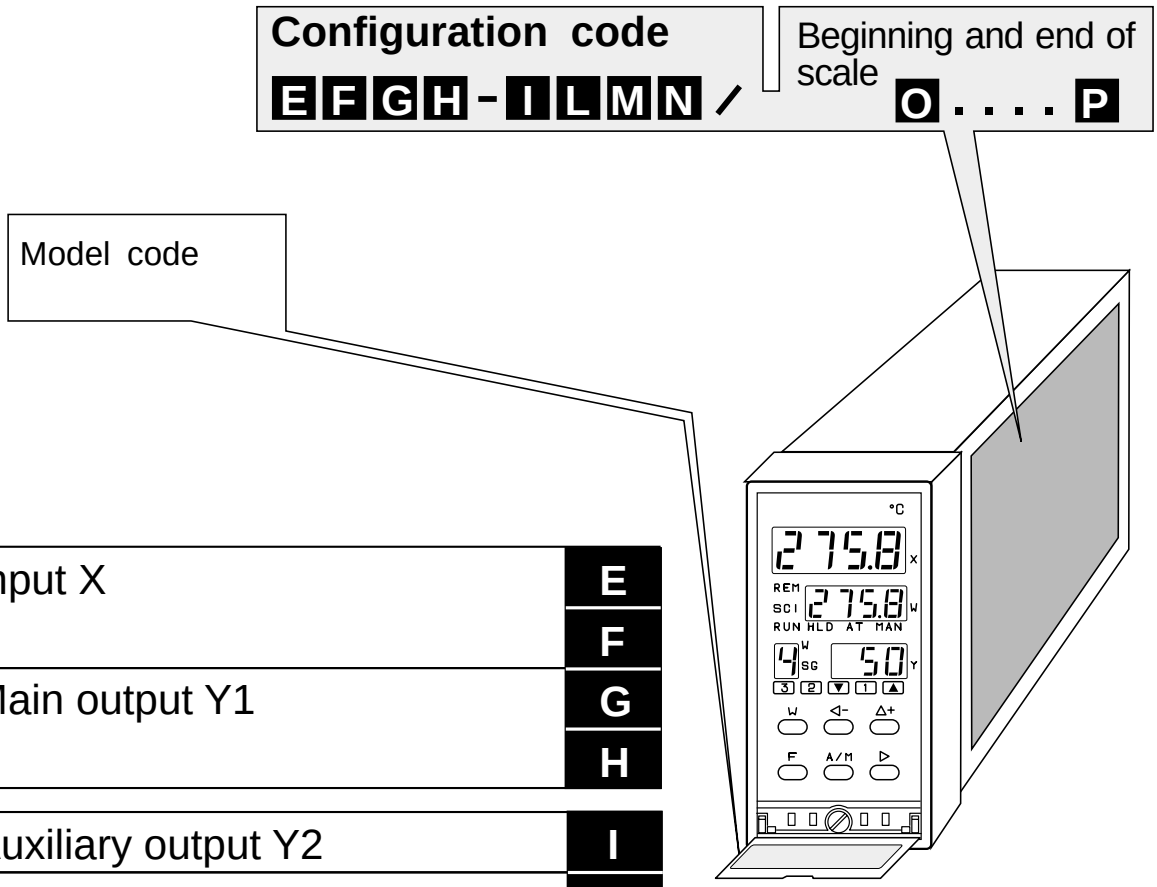
Configuration code

Beginning and end of scale



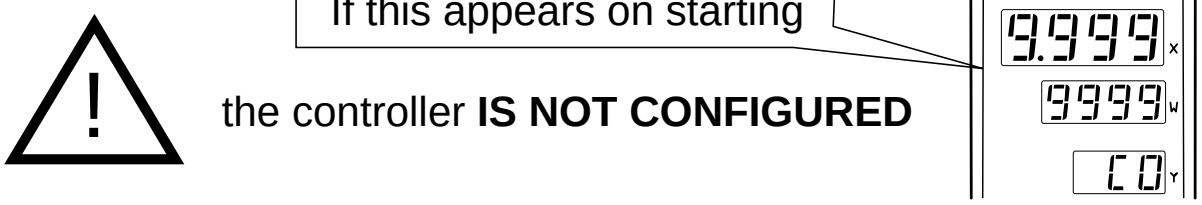
Power supply		**A**
100 …240 V 50/60 Hz		**3**
16 …28 V 50/60 Hz and 20…30 Vdc		**5**
OPTIONS	**Serial communications**	**B**
	None	**0**
	20mA C.L. Std Ascon protocol	**1**
	20mA C.L. Modbus/Jbus protocol	**2**
	Retransmission output Y4	**C**
	None	**0**
	Fitted (4...20 mA or 0...10 Vdc)	**1**
	Set point	**D**
	Standard (up to 4 mem. or Loc./Rem.)	**0**
	Time-programmable (11 segments)	**1**

1.2 Configuration code



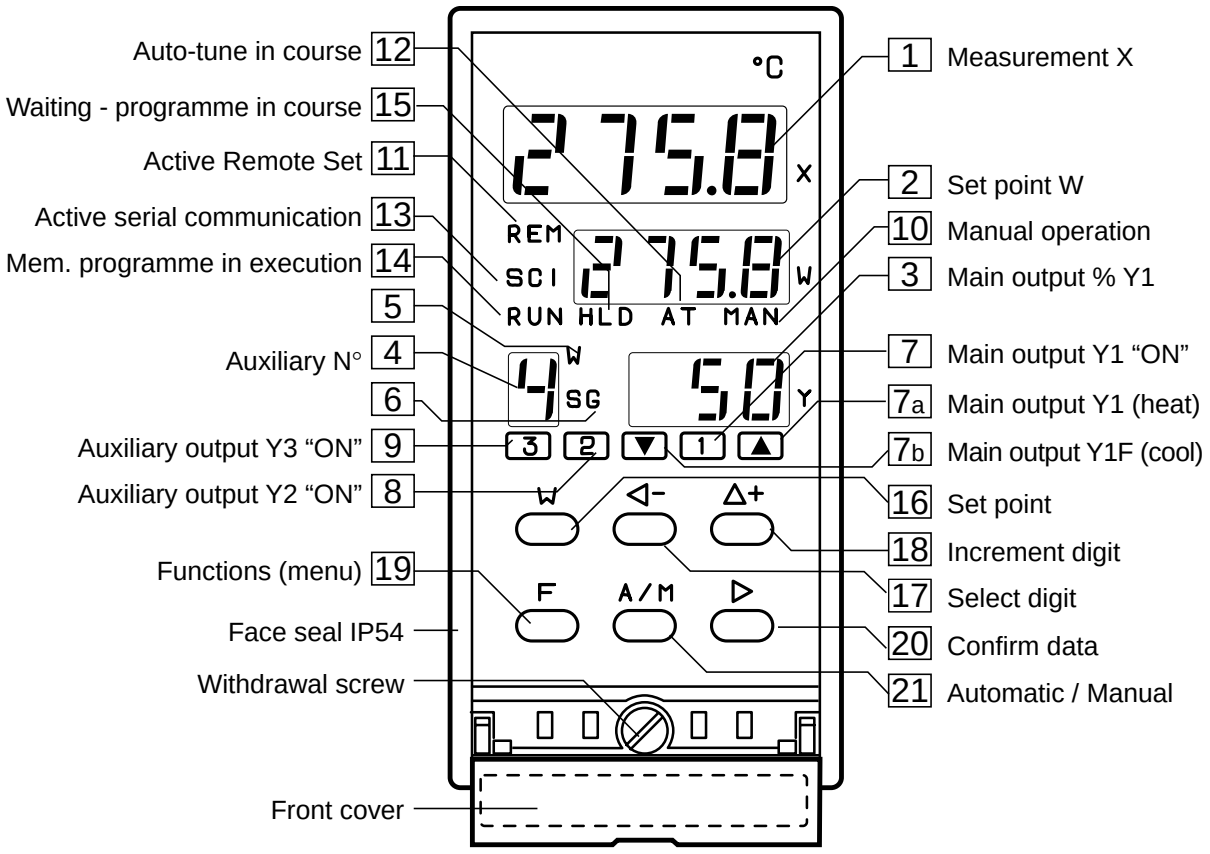
1st part	Input X	E F
	Main output Y1	G H
2nd part	Auxiliary output Y2	I
	Auxiliary output Y3	L
	Retransmission output Y4	M
	Set point W	N
	Beginning and end of scale (for configurable scales only)	O P

The controller is normally configured in the factory.



In order to configure the controller, follow the configuration procedure reported in the enclosed leaflet

2 • FUNCTION OF KEYS AND DISPLAYS

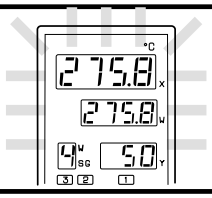


NUMERIC INDICATORS X, W, Y, N°

1- Measure X (green) 10 275.8 X	The value of measure X is expressed in engineering units. If above end of scale 8888 If below beginning of scale -888 - In programmation: displays parameter values - In configuration: displays the values of the 1st part of the configuration code (see enclosed leaflet)
2- Set point W (green) 7.5 275.8 W	Displays the operating Set point value (Local or Remote) - In programmation: displays the parameter codes - In configuration: displays the index values of the 2nd part of the configuration code (see enclosed leaflet)
3- Output Y1 (green) 7.5 50 Y	Displays the value of main output Y1 from 0...100% (from - 100 to 100% for Y1 with dual action) - In configuration: Displays the mnemonic code Co
4- Auxiliary N° (green) 7.5 4 W SG a 4 W b 4 SG	Normally off, lights up to display a - the selected N° of 1 of the 4 stored Set points , in which case led 5 "W" lights up too b - the N° of the segment in execution (option with programmable set, see chapter 11) in this case, led 6 "SG" lights up too

2 • FUNCTION OF KEYS AND DISPLAYS

LEDS FOR OUTPUT STATE		
7 - Output Y1 (red) 1	Lit with output Y1 “ON” De-activated with continuous or dual action discontinuous output	
7a - Output Y1 (heat) ▲	Lit with output Y1 (heat) “ON”	**Only for HEAT/COOL dual action discontinuous control**
7b - Output Y1F (cool) ▼	Lit with output Y1F (cool) “ON”	
8 - Output Y2 (red) 2	Lit with output Y2 “ON”	
9 - Output Y3 (red) 3	Lit with output Y3 “ON”	

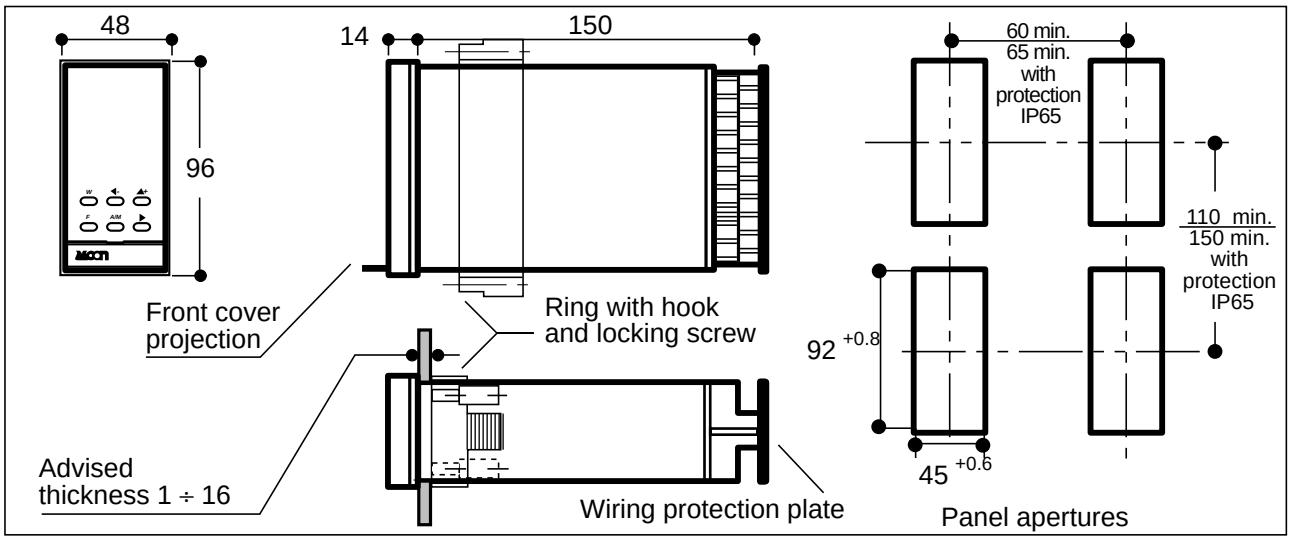
LEDS FOR OPERATING STATE		
10 - Manual (green) ***MAN***	Lit in Manual operation	
11 - Remote (green) ***REM***	Lit when the Remote Set point is operating (if off, the operating Set point is the Local one)	
12 - Auto-Tune (green) ***AT***	Lit when Auto-Tune or Expert-Tune is AT in course	
13 - Serial comm. (green) ***SCI***	Permanently lit when the serial communication is enabled to write. Flashes with signal in transit	
14 - In execution (green) ***RUN***	When lit indicates that the stored programme is in course	**Only for Set programmable option**
15 - Waiting (green) ***HLD***	When lit indicates the temporary suspension of the programme in course	
Loop - Break - Alarm 	With output Y3 active and configured as Loop Break Alarm, the front displays X and W are flashing (see p. 14)	

2 • FUNCTION OF KEYS AND DISPLAYS

KEYS		
16 - Set Point 	Standard configuration: (1 Local + 4 storable used for: • modifying the Set point • recalling the 4 memorized Set points (see enclosed leaflet) Remote Set configuration: (1 Local + 1 Remote) used for: • passing from Local to Remote Set point and viceversa (see enclosed leaflet) Programmed Set configuration: (see chapter 11) • to recall the Local operating Set point • to start, stop, start again the execution of the memorized programme	
17 - Digit selection 	Selects the digit to be modified (see enclosed leaflet) In Manual operation, decrements the value of main output Y1	**Keys for modifying numeric values of any data**
18 - Increment digit 	Increments the value of the flashing digit, from 0.9 In manual operation increments the value of main output Y1	
19 - Functions 	Permits access to menu of functions to be programmed	**Keys for data programming and processing**
20 - Enter 	Enter or Scroll of values and modes of operation	
21 - Auto/Man 	Passage from Automatic to Manual operation and viceversa	

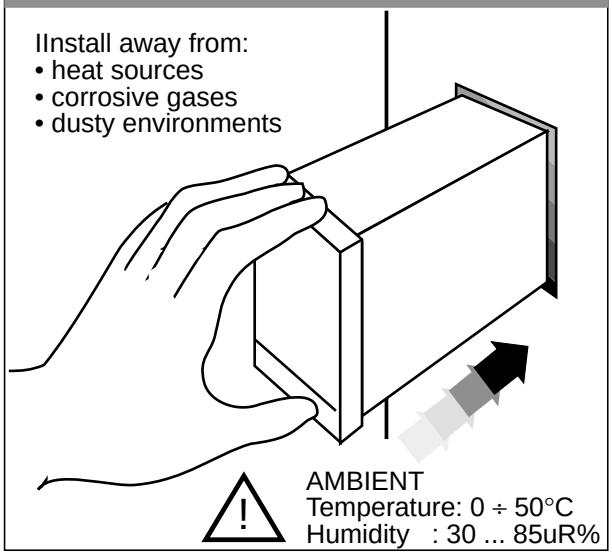
3 • DIMENSIONS - INSTALLATION

3.1 - Overall dimensions (in compliance with DIN 43700)

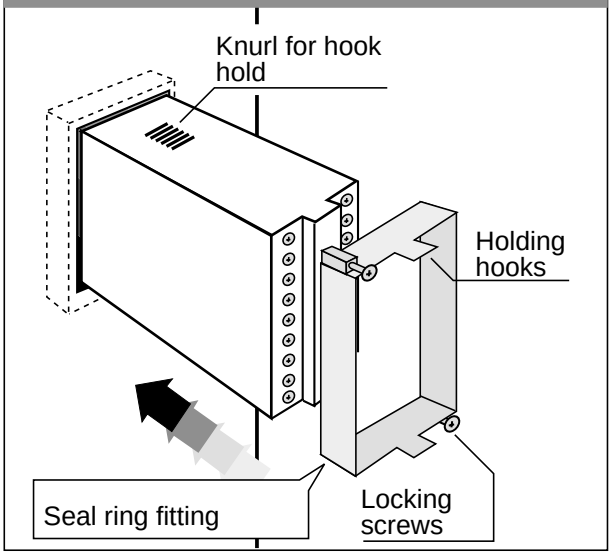


3.2 - Panel installation

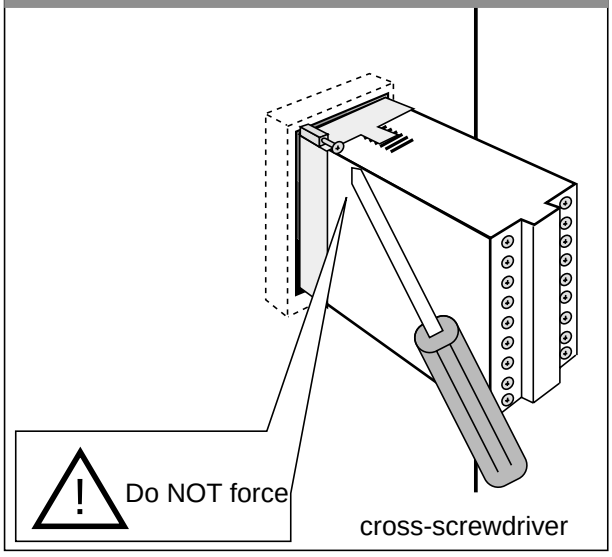
A • Panel fitting



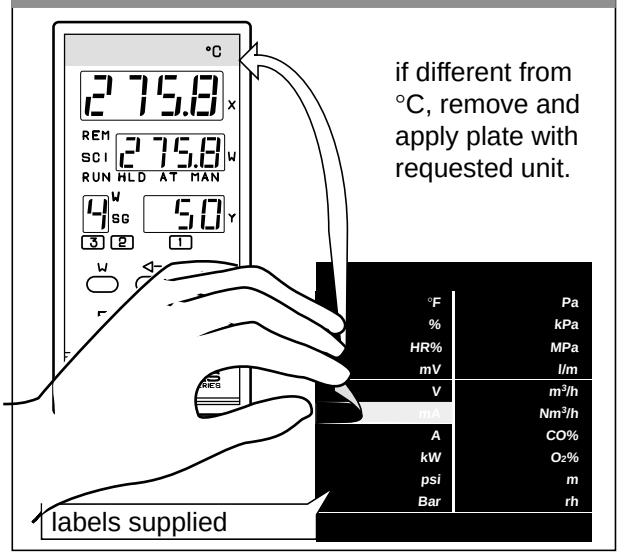
B • Fixing with ring



C • Screw locking



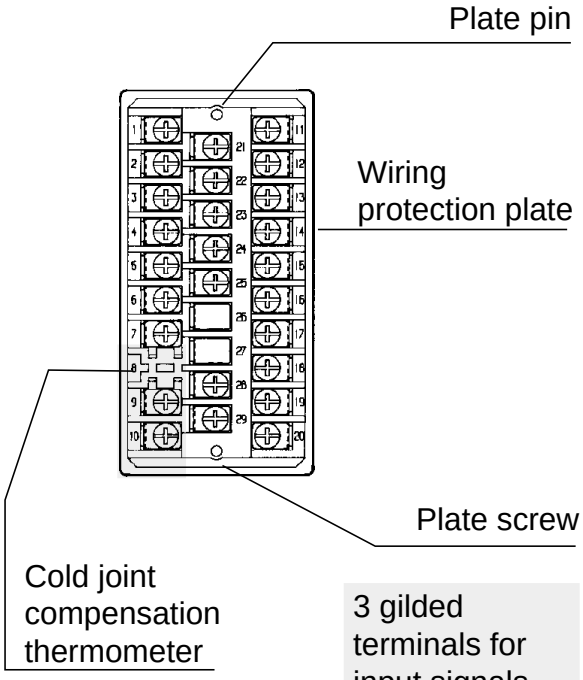
D • Plate for engineering units



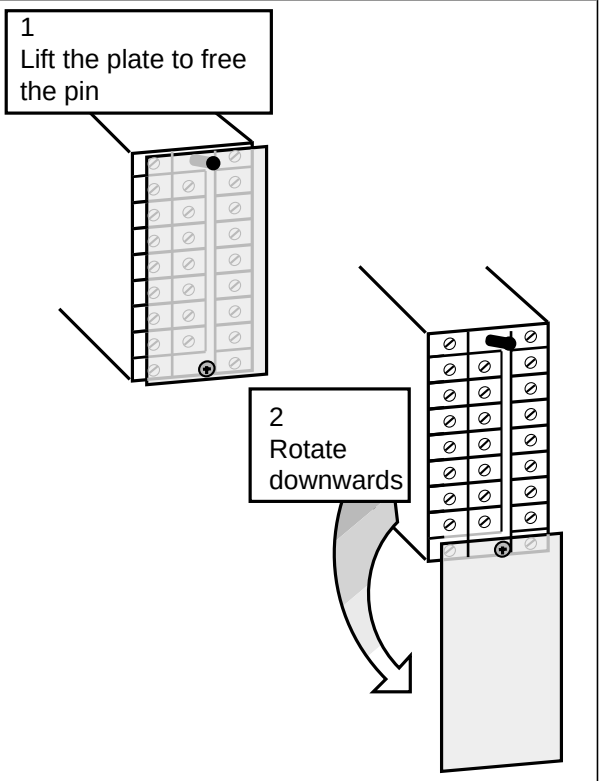
4 • ELECTRICAL WIRING

A • Terminal board

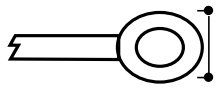
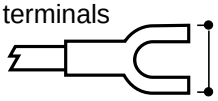
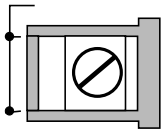
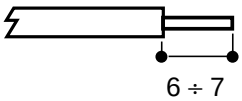
28 screw terminals M3.5



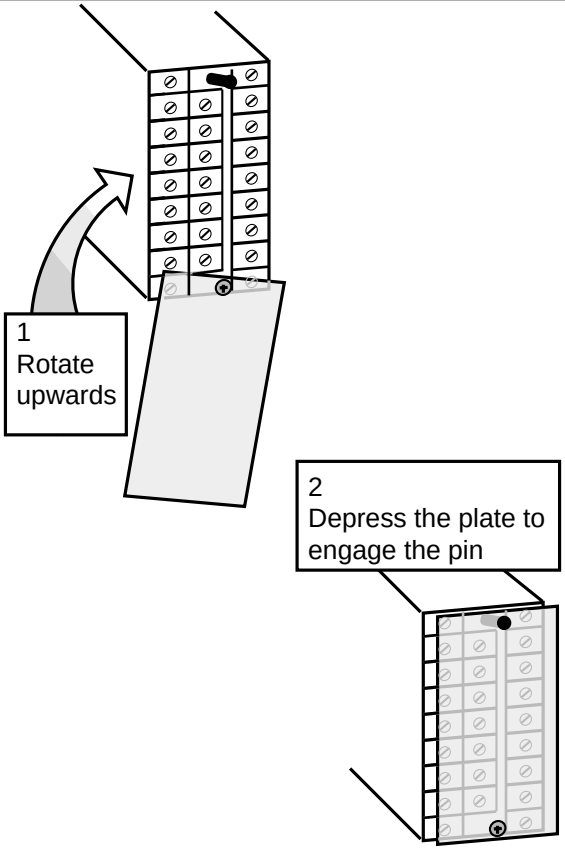
B • Freeing the terminals



C • Effecting the connections

	Cable section	wires N°	
With eyelet terminals  6.9 max.	0.25 ÷ 2.5 AWG 22 ÷ 14	2	
With fork terminals  6.9 max.		1	7 
With tinned wire  6 ÷ 7		2	
Preferential			

D • Protecting the terminal board



4 • ELECTRICAL WIRING

Although this controller is designed to resist the heaviest disturbances present in industrial environments (level IV of standard (IEC 801-4), it is advised to keep to the following precautions:

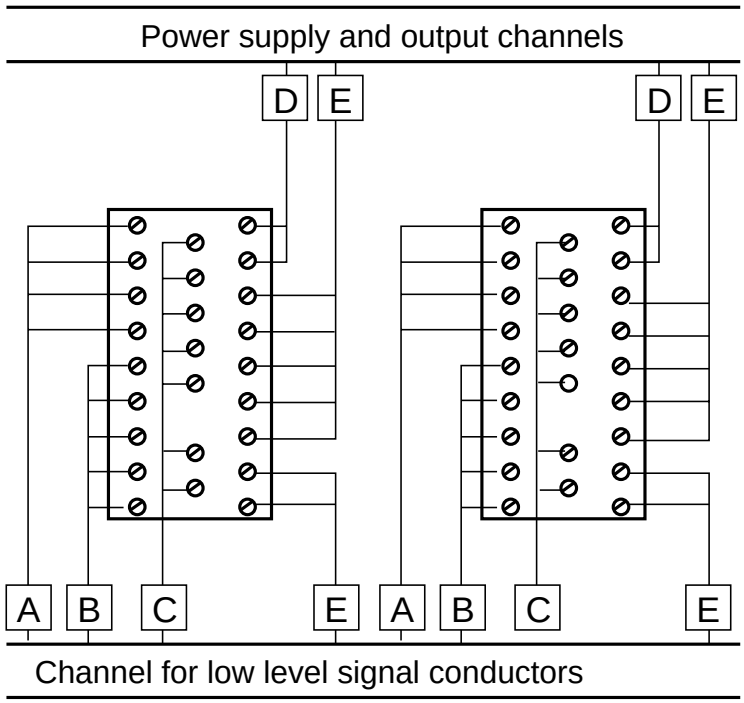
Precautions

Single out supply line from power line

Keep away from teleruptors, electromagnetic contactors and powerful motors

Keep away from power groups, in particular if with phase control

Advised conductor course



Serial communication A

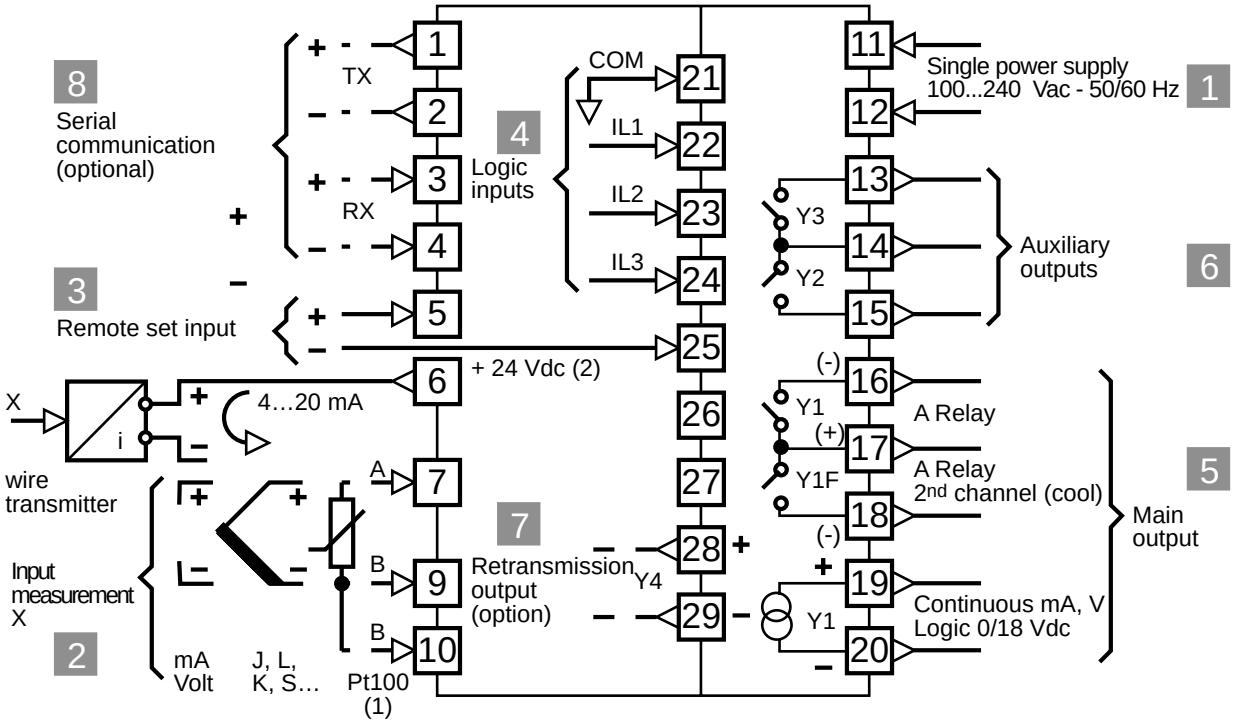
Analogic inputs B

Logic inputs and analogic signals C

Input D

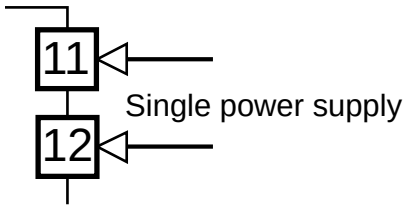
Outputs E

Wiring diagram



4 • ELECTRICAL WIRING

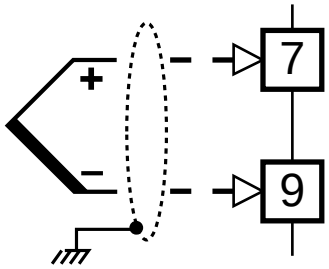
1 • Single power supply



"Switching" type
• Standard: 100 to 240 Vac - 15% + 10%
• for low tension: 24 Vac -15% + 10%
24 Vdc ±15%
Absorbed power 4VA

2 • "X" measurement input

A - For thermocouples J-L-K-S-R



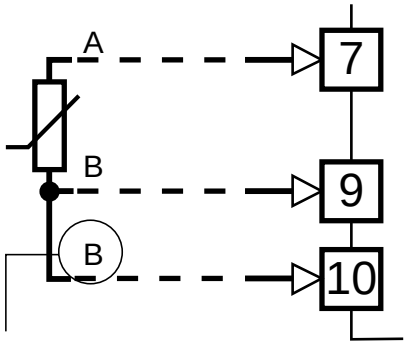
Line: max. 150 Ω

• Respect polarities

• For eventual extensions, use a compensated cable suitable for the type of thermocouple used

• The eventual screen is well earthed at only one end

B - For RTD Pt100



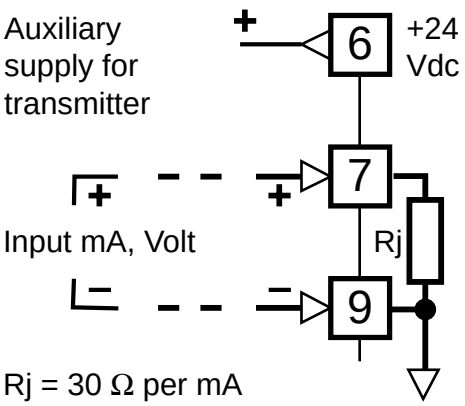
for 3-wire connection only
Line: max. 20 Ω per wire

• For 3-wire connection, use cables of same section (min. 1 sq.mm)

• For 2-wire connection, use cables of adequate section (min. 1.5 sq.mm.)

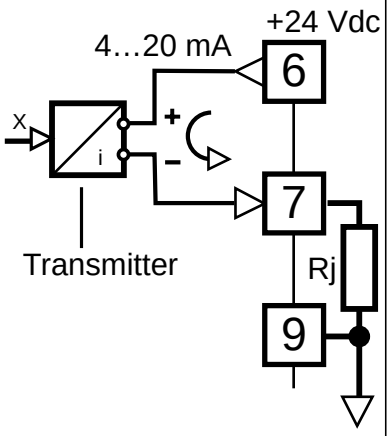
Note:
with a 15 m. probe-controller distance and a 1.5 sq.mm. section cable, the error is about 1°C.

C • Continuous, mA, Volt

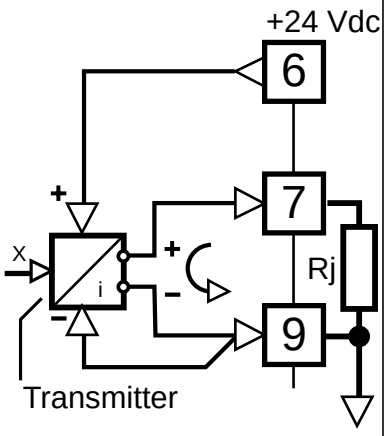


Rj = 30 Ω per mA
Rj = 10 KΩ per Volt

For 2-wire transmitter

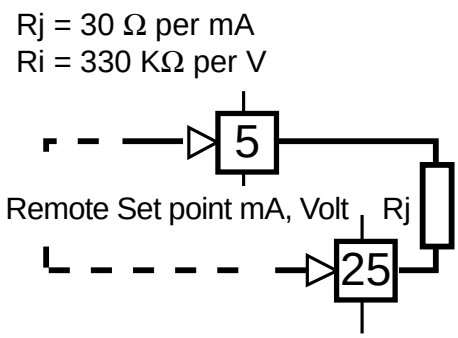


For 3 or 4-wire transmitter



4 • ELECTRICAL WIRING

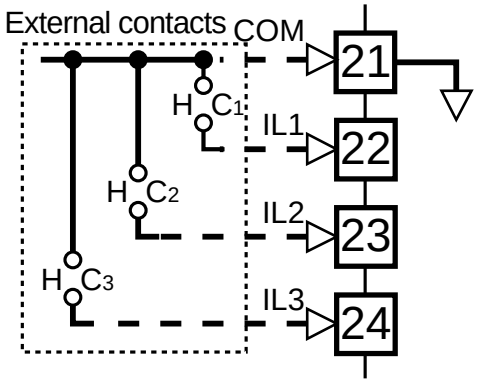
3 • Remote Set point input



In current 4..20 mA
In voltage 0..10 Vdc

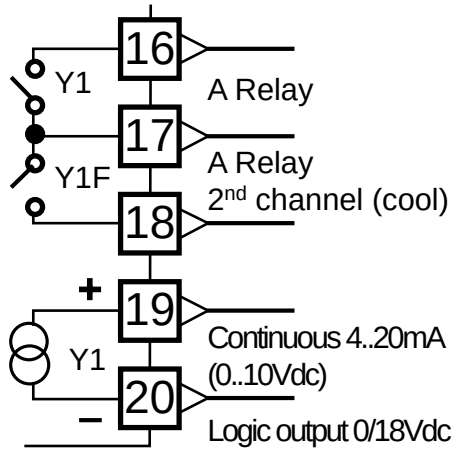
NOT galvanically isolated

4 • Logic inputs



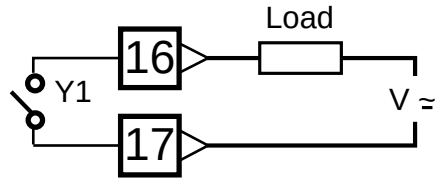
An impulsive (2 sec. at least) closing of contacts C1, C2, C3, permits the passage from AUTO/MAN, from Local/Remote Set point, recalling the 4 memorized Set points and launching of the programmed Set point. (see p. 16)

5 • Main output Y1



Universal and galvanically isolated. 2 relays are simultaneously present for discontinuous output with single or dual action (HEAT:COOL) and the signal for standard continuous output 4..20mA (or 0..10Vdc) which can also be Logic output 0/18Vdc).

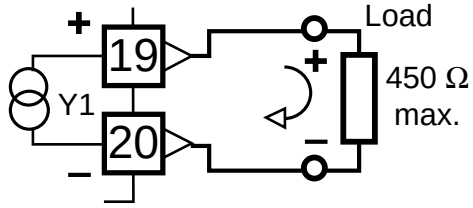
A • Single with Relay



NA contact, capacity 5A/250Vac for resistive loads (transition 2 x 10 (coeff.5) min. at 5A/250Vac)

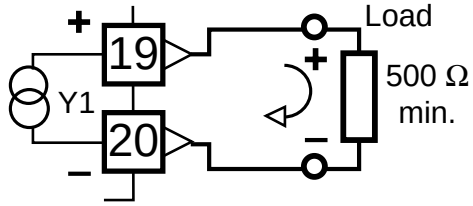
5 • Main output Y1 (continued)

B • single in current



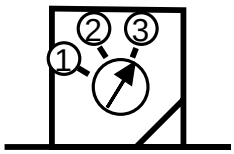
Continuous output 4..20mA galvanically isolated

C • single in voltage



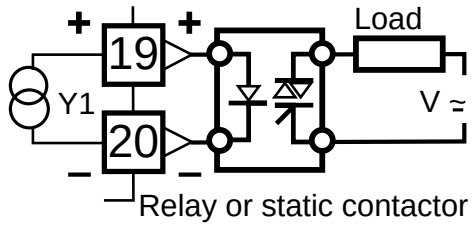
Continuous output 0..10Vdc galvanically isolated

Position the switch set inside the controller too



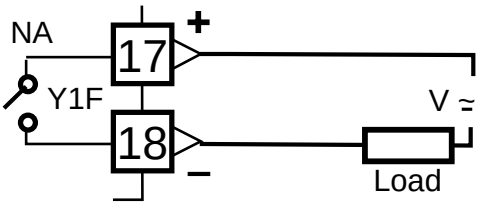
① Continuous output 4...20mA Standard
② Continuous output 0...10Vdc
③ Logic output 0...18Vdc

D • single logic

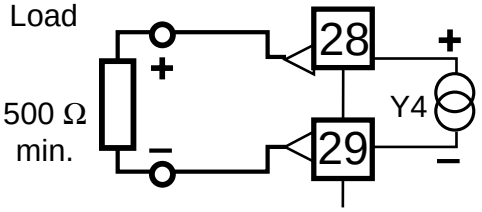


Output 0/18Vdc (20mA max.) galvanically isolated

E • Dual action relay

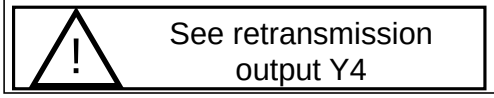


F • Continuous dual action



Retransmission output Y1F (option)

galvanically isolated
4...20mA, 10Vdc max. or
0...10Vdc, 20mA max.



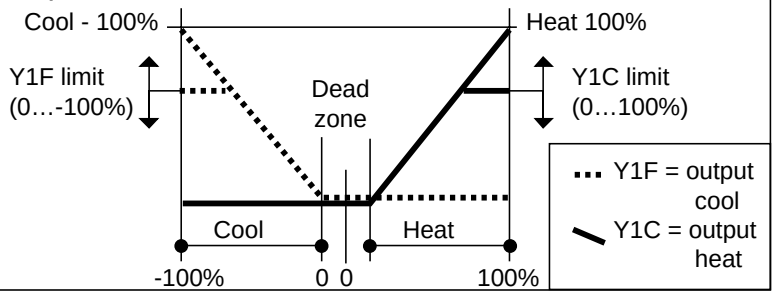
For controllers with dual action output Y1 (example: Heat-Cool), an extra output Y1F with Relay is available for the cooling action. If a continuous output is desired for cooling, use the retransmission output Y4 (option) configured for retransmission of the signal: Y1F (cool). Possible combinations for Y1 dual are:

Terminals	16 - 17		19 - 20				16-17	19 - 20	
Y1 ▲ (Heat)	R	R	L	L	C	C	R	C	L
Y1 ▼ (Cool)	R	L*	R	L*	L*	R	C	C	C
Terminals	17 - 18						28 - 29		

where: R = Relay L = Logic C = continuous (mA or Volt)
*version on request

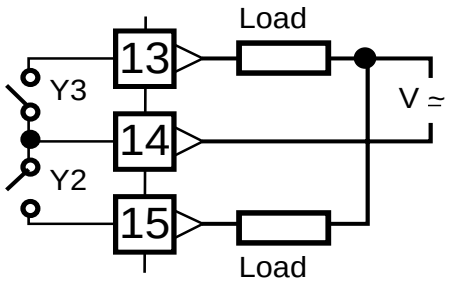
For Y1 cool, R is the extra relay of Y1, while C is the retransmission output Y4 configured to retransmit Y1 cool: 4...20mA or 0...10 Volt.

Output feature of dual action controllers



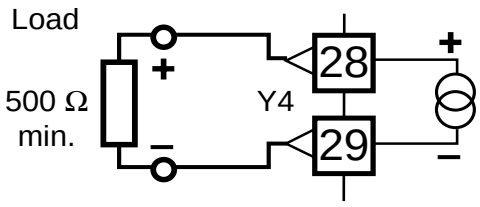
4 • ELECTRICAL WIRING

6 • Auxiliary outputs Y2 (see p. 13)



NA contacts, capacity 5A/250Vac for resistive loads (transitions 2x10 (coeff.5) min. at 5A/250Vac)

7 • Retransmission output Y4 (option)

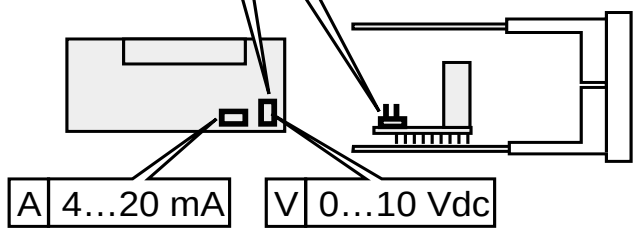


Retransmission output Y1F (option)

Retransmission:
of measurement X
of Set point W
of output Y1F (Cool)

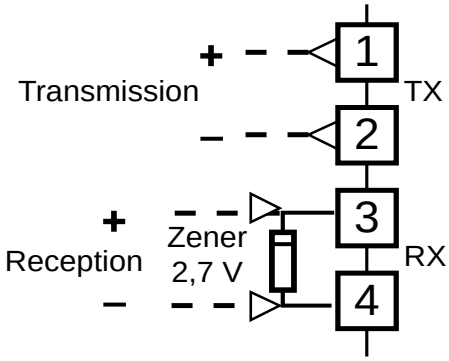
Galvanically isolated 4..20mA, 10Vdc max. or 0..10Vdc, 20mA max.

Passing from 4..20mA (standard) to 0..10Vdc, by moving a JUMPER inside the controller



If the retransmission signal must be changed (4…20 mA 0…10 V or viceversa) it is necessary to perform a new calibration to return to the declared tolerance (±0.1%). Standard calibration is for mA, to receive an instrument with the desired Voltage calibration, specify the proper **M** Configuration Code in the order module

8 • Serial communication (option)

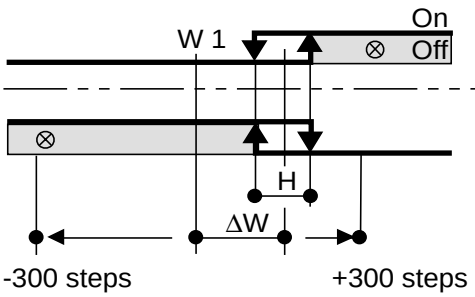
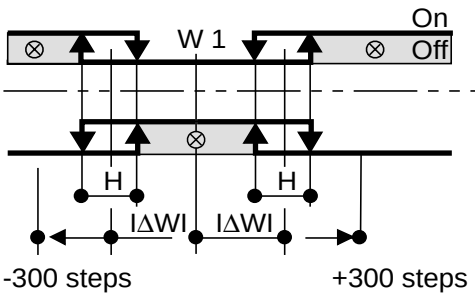
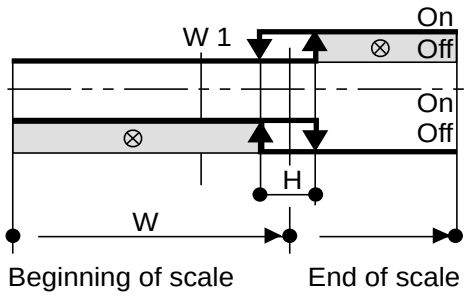


Note
Zener 2,7 V Only for 20mA C.L.

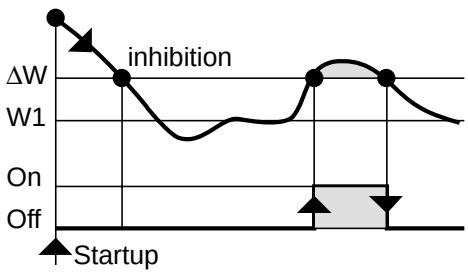
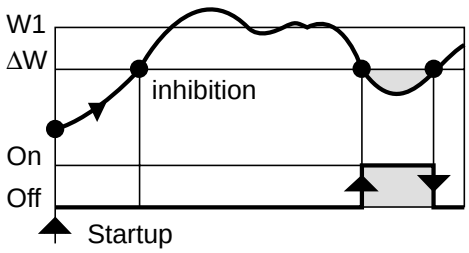
Interface 20mA C.L. passive and galvanically isolated

Consult Directions for use "SERIAL COMMUNICATION SUPPLEMENT" MIU-CS/E supplied separately.

5 • Y2 - Y3 AUXILIARY OUTPUTS

Deviation 	Active high (above) Active low (under)	Set point W (1) -300...+300 steps compared to W1
Band 	Active out (above) Active in (under)	Set point I WI (1) -0...300 steps compared to W1
Independent 	Active high (above) Active low (under)	Set point (1): from beginning to end of scale

(1) - The Set point of Y2 and Y3 is not limited by the limits of the main Set point W1, but only by the scale span.

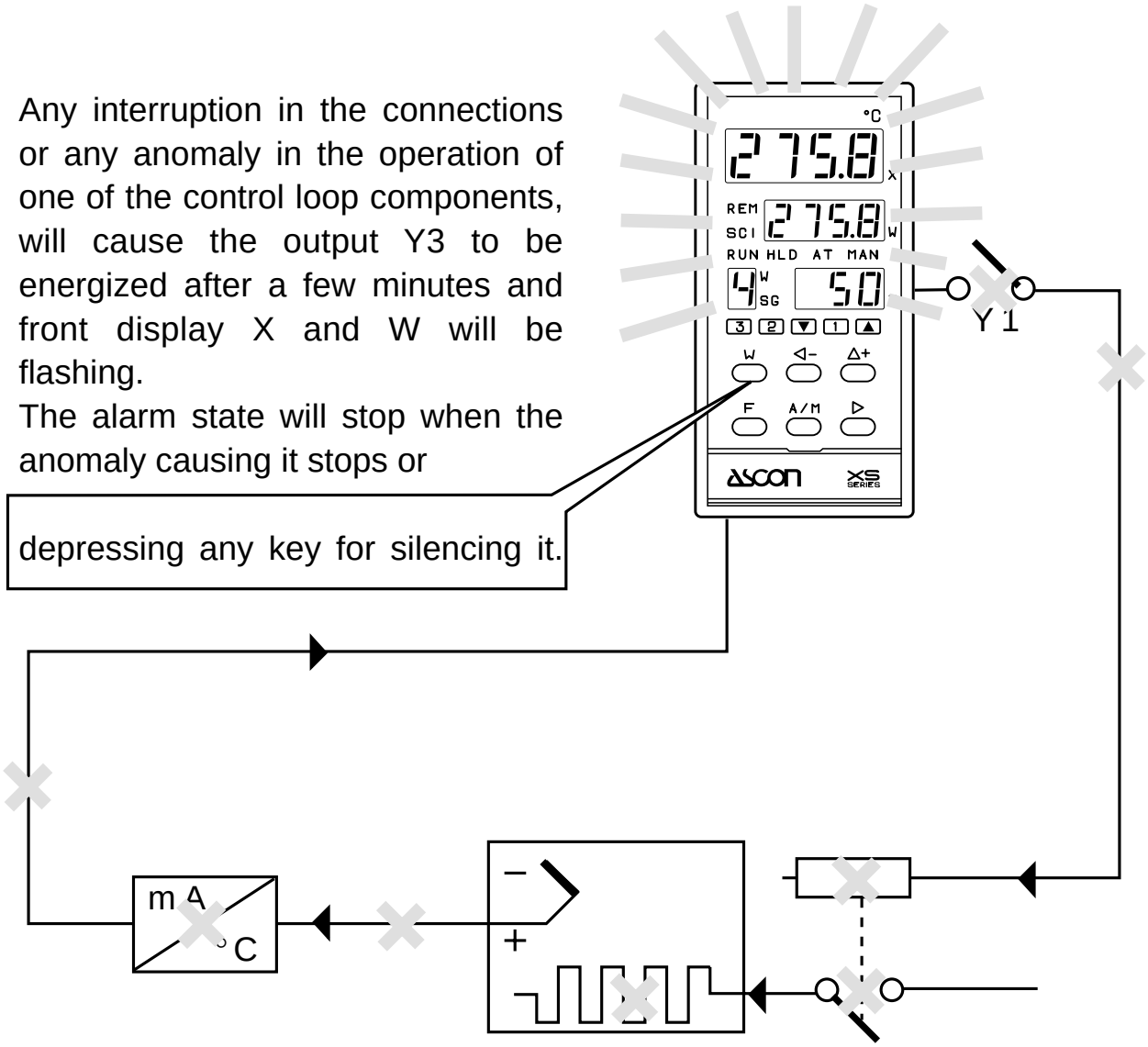
Deviation with startup inhibition  	Active high (above) Active low (under)	Set point W (1) -300...+300 steps compared to W1

5 • Y2 - Y3 AUXILIARY OUTPUTS

"Loop-Break-Alarm" LBA (control loop defect/interruption)

Any interruption in the connections or any anomaly in the operation of one of the control loop components, will cause the output Y3 to be energized after a few minutes and front display X and W will be flashing.
The alarm state will stop when the anomaly causing it stops or

depressing any key for silencing it.



With ON - OFF action "LBA" feature is not available

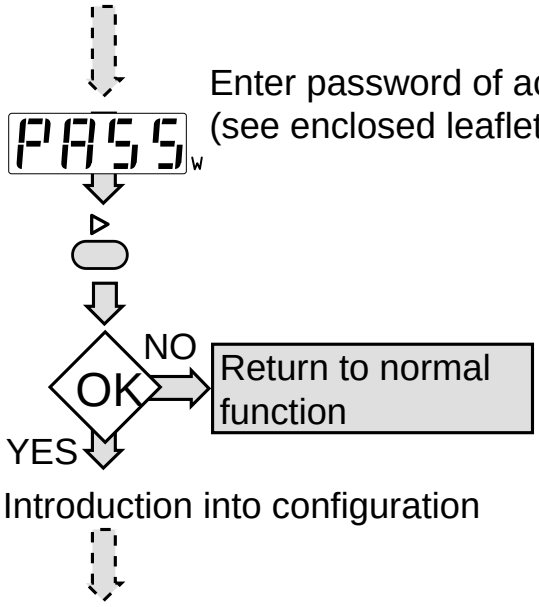
Time-programmable intervention

Only available with the Programmable Set point option.
The ON or OFF state of the auxiliary outputs Y2 and/or Y3 can be selected for every segment of the programme.
(See chapter 11)

6 • PASSWORD

In order to prevent tampering or inadvertent alterations of the configuration or of some important parameters at the programming stage, 2 passwords have to be entered.

6.1 Password of access to configuration 3333



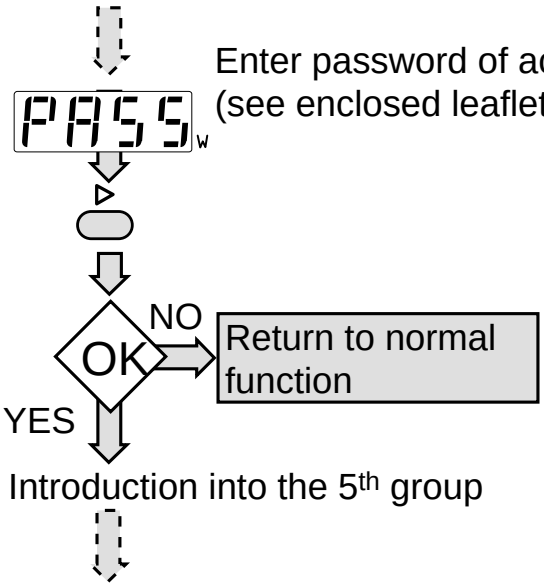
Enter password of access to configuration (see enclosed leaflet))

3333

Return to normal function

Introduction into configuration

6.2 Password of access to the 5th parameter group 1111



Enter password of access to the 5th group (see enclosed leaflet)

1111

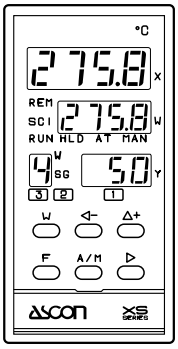
Return to normal function

Introduction into the 5th group

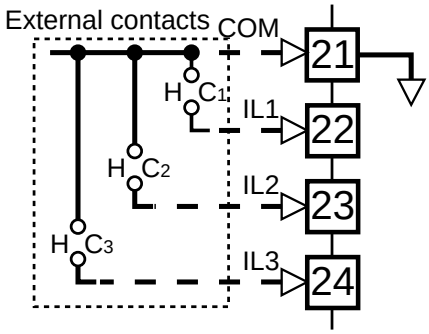
9 • MODIFYING THE OPERATING STATE

Modifications may be carried out through:

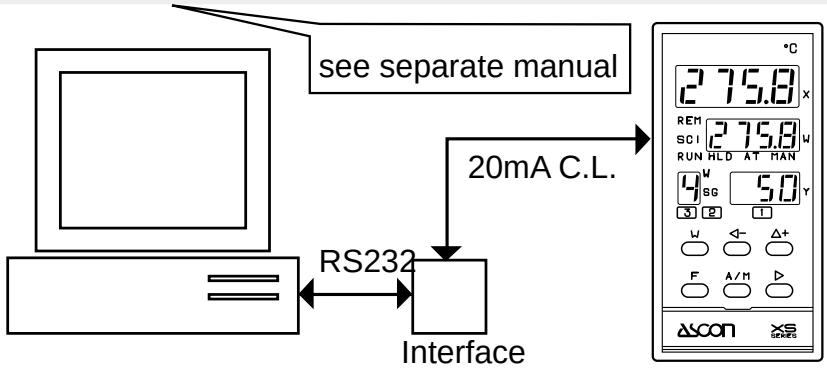
commands from keyboard



external contacts on logic inputs



commands via serial



With external contacts on logic inputs IL1, IL2, IL3

Impulsives closing for at least 2 sec., of contacts C1, C2, C3, permits modification of state or of Set point.

IL1	IL2	IL3	Type of modification			
C1	C2	C3	Version with standard Set point (note1) 1 Local + 4 Memorized	Version with standard Set point 1 Local + 1 Remote	Version with programmable Set point (option)	
			No action			
ON			Passage from REMOTE to LOCAL			
	ON		Passage from AUTOMATIC to MANUAL			
ON	ON		Passage from MANUAL to AUTOMATIC			
		ON	Local Sp. = Memorized Sp. 1	passage Local Sp. to Remote Sp.	Programme startup	RUN
ON		ON	Local Sp. = Memorized Sp. 2	—	Passage to successive segment (NEXT)	
	ON	ON	Local Sp. = Memorized Sp. 3	—	Temporary stop of programme	HLD
ON	ON	ON	Local Sp. = Memorized Sp. 4	—	Restart after stop of programme	

Note 1: Is possible to fix the selected Set point holding closed the relative contacts. While they are closed is possible to make changment from Auto/Man or Man/Auto but it is not possible to change Set point

12 • TECHNICAL DATA

Accuracy (a25°C amb.)	0.2% ± 1 digit (for input with RTD Pt100 and thermocouples)		
	0.1% ± 1 digit (for input in current and voltage)		
Input "X" (configurable)	RTD Pt100	Pt100Ω @ 0°C, (IEC 751)	With configurable scale field
	Thermocouples	J-K-S-R (IEC 584), L (DIN 43710)	
	Continuous current	4..20mA, 0..20mA, Ri 30Ω	
	Continuous voltage	0..1Vdc, 0..10Vdc, Ri 10KΩ	
Auxiliary inputs	3 of logic type (control of operating and Set point states)		
Set point (standard version)	1 Local + 4 storable		
	Distinct ascent and descent gradient slope	0.1...120.0% scale/min. or step gradient	
	Higher and lower limit	from beginning to end of scale	
programmable **Set point** (option)	from 3 to 11 segments (1 initial and 1 final)		
	Segment duration	from 0.1 to 540 min. (about 9 h.) 0...9999 min (on request)	
	Number of repetitions	1..9999	
Local/Remote **Set point**	In current	4..20mA, Ri30Ω	Not isolated accuracy: 0.1% at 25°C.
	In voltage	0..10Vdc, Ri 330kΩ	
Control mode	Algorithm	PID, PI, PD, P or On - Off	
	Proportional band (P)	0,5..999.9%	
	Integral action time (I)	0.1..100min., excludable	
	Derivative action time (D)	0.01..10min., excludable	
	Cycle time	1..200 sec. (for discontinuous control)	
	Hysteresis	0.1..10% (for on-off control)	
	Feed-Forward action	0..500% excludable scale span	
	Approach High and Low	0.01..twice the proportional band	
	Dead zone	±0.0…5% for dual action (heat-cool) control	
Auto - Tune	For automatic parameter adjustment (One shot)		
Expert - Tune	For continuous optimization of the parameters during normal operation.		
Auto/Man Station	With bumpless action, AUTO/MAN transfer via keyboard, logic input and serial communication.		

12 • TECHNICAL DATA

Main output Y1 (configurable)	Single or dual, with direct or reverse action			
	Discontinuous	Relay with dual action 2 contacts NA, 5A/250Vac, 2x10 coeff.5 transitions		
		Logic	0.18 Vdc, 20mA max. (for static relays)	galvanically isolated
	Continuous	Current	4..20mA(450Ω max.,10 Volts max.)	
		Voltage	0..10Vdc(450Ω min. 20 mA max.)	
	Maximum output		10..100% (1st channel △) -10..-100% (2nd channel ▽)	
Auxiliary outputs Y2 - Y3 (configurable)	Relay		2 contacts NA, 5A/250Vac, 2x10(coeff.5) transitions	
	Action mode		active high (above the set point) active low (below the set point)	
	Hysteresis		0,1..10%	
	Type of Set point		deviation	± 300 steps (with or without inhibited startup)
			band	0..300 steps
			independent	from beginning to end of scale
	Special functions		Loop-Break-Alarm (signal of control loop defect)	
			time-programmable (only for Set programmable option)	
Retransmission output Y4 (option)	Current		4..20mA(450Ω max.,10Vdc max.)	galvanically isolated
	Voltage		0..10Vdc(500Ω min.,20mA max.)	
Serial commnication (option)	Interface 20mA C.L. passive and galvanically isolated For other data, see manual MIU,XS-CS/E			
Protections	Access to parameters		On three levels for: modification, indication only, no access	
	Immunity to disturbances		level IV, standard IEC 801-4	
	All significant data are stored in a non-volatile memory			
Single power supply	Standard model		100..240V, 48..63Hz, -15% + 10% 250 Vac max	
	Low voltage model		24V, 48..63Hz, -15% + 10% or 24Vdc ± 15%	
	Absorbed power		about 4VA	
Auxiliary power supply	24Vdc ± 10%, 20mA max.		for 2-wire or 3 or 4-wire transmitter	
General features	Isolation group		C according to VDE 0110	
	Climatic group		KWF according to DIN 40040	
	Ambient temperature		0...50°C., humidity 35...85uR%	
	Protection		Front:IP54 standard (IP65 with Kit AXIP65- 1) Cover: IP30, terminal board IP20	
	Material		Self-extinguishing UL94V1	
	Weight		about 480 g.	
	Dimensions		48 x 96, depth 150mm, according to DIN 43700	

WARRANTY

The equipment is guaranteed free from manufacturing defects for 1 year after installation, for a maximum of 18 months after delivery.
Faults caused by use other than that described in these operating instructions are excluded from the warranty

Ascon Tecnologic S.r.l.
via Indipendenza 56,
27029 - Vigevano (PV)
Tel.: +39 0381 69871,
Fax: +39 0381 698730