

# INSTALLATION AND START-UP MANUAL

REGOLATORE  
MULTIPROCESSORE  
DIGITAL CONTROLLERS  
TIPO / TYPE  
**NX2-00**



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Dichiarazione di Conformità 2006/95/EC	Declaration of conformity 2006/95/EC
Certificato UL	UL Certification

# CONFLOW

 s.p.a.

FLOW CONTROL SOLUTIONS

**Servizio Assistenza - Servicing Department**  
Via Lecco, 69/71 - 20864 AGRATE BRIANZA (MB) - ITALY  
Telefono - Phone : +39 - (0)39 - 651705 / 650397  
Fax : +39 - (0)39 - 654018  
E-mail: [servicing@conflow.it](mailto:servicing@conflow.it)  
Web: [www.conflow.it](http://www.conflow.it)

## 1 - INFORMAZIONI GENERALI E DI SICUREZZA

Prima di installare il regolatore NX2-00 prendere visione delle seguenti informazioni.



**ATTENZIONE** Utilizzare un circuito di protezione esterno in caso di guasto del circuito di regolazione potrebbe portare ad un problema serio. Questo strumento non dispone di un interruttore di potenza e di un fusibile, quindi predisporli sul quadro di comando (fusibile 250V, 0,5A).



**ATTENZIONE** Utilizzare una tensione nominale stabile e corretta per evitare danni o problemi. Per evitare scosse elettriche o danni, non dare potenza/ tensione fino a quando il cablaggio è completato.



**ATTENZIONE** Non usarle il regolatore in un luogo esposto a gas combustibile o in ambienti potenzialmente esplosivi.



**ATTENZIONE** Per evitare malfunzionamenti, scosse elettriche o incendi, questa unità non deve essere smontata o riparata. Non toccare i terminali per evitare scosse elettriche o malfunzionamenti.



**ATTENZIONE** Spegnere l'alimentazione prima di montare o rimuovere lo strumento. Per garantire un funzionamento continuo e sicuro dello strumento, si raccomanda manutenzione periodica, alcune parti sono limitate nella vita.

## 2 - ISTRUZIONI DI MONTAGGIO

### 2.1 - MONTAGGIO NOTE GENERALI

Fissare le staffe (2 unità all'interno dell'imballo) nelle apposite asole sopra e sotto il regolatore e stringere contro la parete del pannello con il cacciavite.



**ATTENZIONE** Con INPUT termocoppia utilizzare un cavo compensato. Per evitare disturbi induttivi dei fili di ingresso separare la rete elettrica di potenza dai fili di uscita. All'accensione occorre un tempo per la preparazione del contatto di uscita, quando il segnale di uscita viene utilizzato per un circuito di sincronizzazione esterna, collegare un rele' di ritardo.



**ATTENZIONE** Lo strumento ha protezione IP65 solo se installato con l'apposita guarnizione che si trova nell'imballo.

## 1 – GENERAL AND SAFETY INFORMATION

Before installing digital controller NX2-00 take good notice of following information.



**WARNING** Use an external protection circuit if a fault in the control loop could possibly lead to a serious problem. This instrument do not have a switch for power and a fuse, so please set them if it is needed (fuse rating 250V, 0,5A). Turn OFF the power before



**WARNING** Use a rated voltage to prevent damage or trouble. To avoid electrical shock or damage, do not turn ON the power until the wiring is completed.



**WARNING** Do not use it at a place exposed to combustible or explosive gas.



**WARNING** To avoid malfunction, electrical shock or fire, this unit must not be disassembled or repaired. Do not touch the terminals to avoid electrical shock or malfunction.



**WARNING** Turn OFF the power supply before mounting or removing the instrument. To ensure continuous and safe operation of the instrument, periodical maintenance is recommended, some parts are limited in life.

## 2 - INSTALLATION INSTRUCTONS

### 2.1 - INSTALLATION GENERAL INFO

Attach the brackets (2 units inside packing) on the fixed halls and tighten with screwdriver.



**WARNING** Use a compensating cable with thermocouple. To avoid inductive noise to input wires separate from the power supply and output wires. Keep input wires away from output and use shielded wires to earth. Time for preparation of contact output is required at power ON, when the output signal is used for an external interlock circuit, connect a delay relay.



**WARNING** The instrument has IP65, use rubber packing when installing the instrument to panel.

### 3 – INGRESSI E USCITE - INFORMAZIONI

Scegliere il codice e il corrispondente tipo di ingresso e uscita.

#### INGRESSO RTD Tipi – Codici - Campi

TIPO	CODICE	CAMPO
• KPt100	20	-199.9~ 500.0°C
• Pt100	21	-199.9~ 640.0°C

#### INGRESSO TC Tipi e Campi

TIPO	CODICE	CAMPO
• K	2	-199.9 ~ 999.9°C
• J	3	-199.9 ~ 999.9°C
• E	4	-199.9 ~ 999.9°C
• T	5	-199.9 ~ 400.0°C
• R	6	0 ~ 1700°C
• B	7	0 ~ 1800°C
• S	8	0 ~ 1700°C
• L	9	-199.9 ~ 900.0°C
• N	10	-200 ~ 1300°C
• U	11	-199.9 ~ 400.0°C
• W	12	0 ~ 2300°C
• PL2	13	0 ~ 1390°C

#### INGRESSO DC Tipi – Codici - Campi

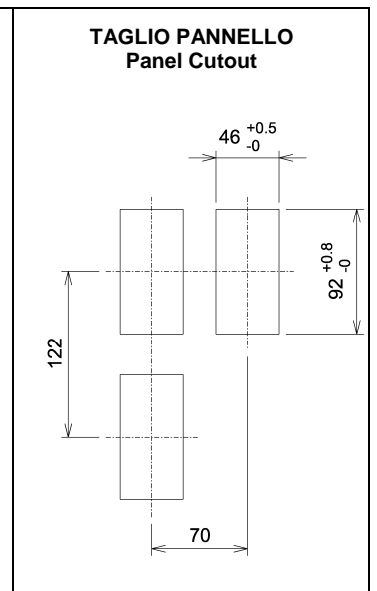
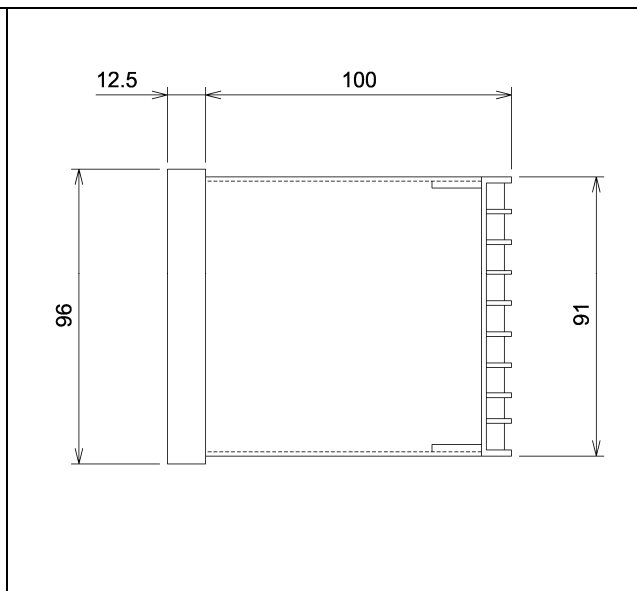
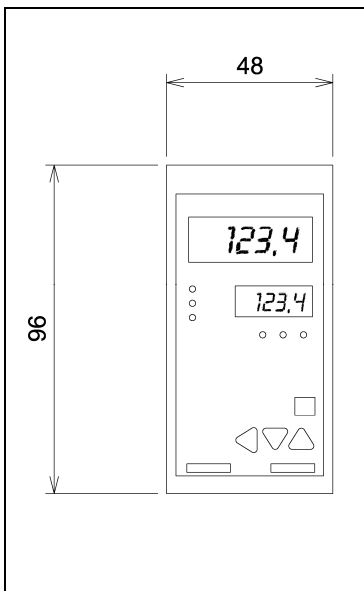
TIPO	CODICE	SEGNALE
• DC Voltage	30	1 ~ 5 V
	32	-10 ~ 20 mV
	33	0 ~ 100 mV
• DC Current	30 (1)	4 ~ 20 mA

(1) Montare la resistenza 250 Ω (compresa) sui terminali di ingresso

#### USCITE

CODICI	USCITA 1		USCITA 2	
	Uscita Relè	SSR/SCR	Uscita Relè	Ritrasm.
0	ON-OFF	-	AL2 Allarme 2	Ritrasmis. In uscita
1	-	SSR		
2	-	SCR (4-20 mA)		
3	Relay	-		

#### DIMENSIONI in mm



### 3 – INPUT & OUTPUT INFORMATION

Choose the code and the correspondent input and output type.

#### INPUT RTD Types – Codes - Ranges

TYPE	CODE	RANGE
• KPt100	20	-199.9~ 500.0°C
• Pt100	21	-199.9~ 640.0°C

#### INPUT TC Types and ranges

TYPE	CODE	RANGE
• K	2	-199.9 ~ 999.9°C
• J	3	-199.9 ~ 999.9°C
• E	4	-199.9 ~ 999.9°C
• T	5	-199.9 ~ 400.0°C
• R	6	0 ~ 1700°C
• B	7	0 ~ 1800°C
• S	8	0 ~ 1700°C
• L	9	-199.9 ~ 900.0°C
• N	10	-200 ~ 1300°C
• U	11	-199.9 ~ 400.0°C
• W	12	0 ~ 2300°C
• PL2	13	0 ~ 1390°C

#### INPUT RTD Types – Codes - Ranges

TYPE	CODE	SIGNAL
• DC Voltage	30	1 ~ 5 V
	32	-10 ~ 20 mV
	33	0 ~ 100 mV
• DC Current	30 (1)	4 20 mA

(1) Put resistance 250 Ω(included) at both input terminals

#### OUTPUT

CODE	OUT 1		OUT 2	
	Relay Output	SSR/SCR	Relay Output	Retransm.
0	ON-OFF	-	AL2 Allarm 2	Retransm. output
1	-	SSR		
2	-	SCR (4-20 mA)		
3	Relay	-		

#### DIMENSIONS mm

#### 4 - COLLEGAMENTI ELETTRICI

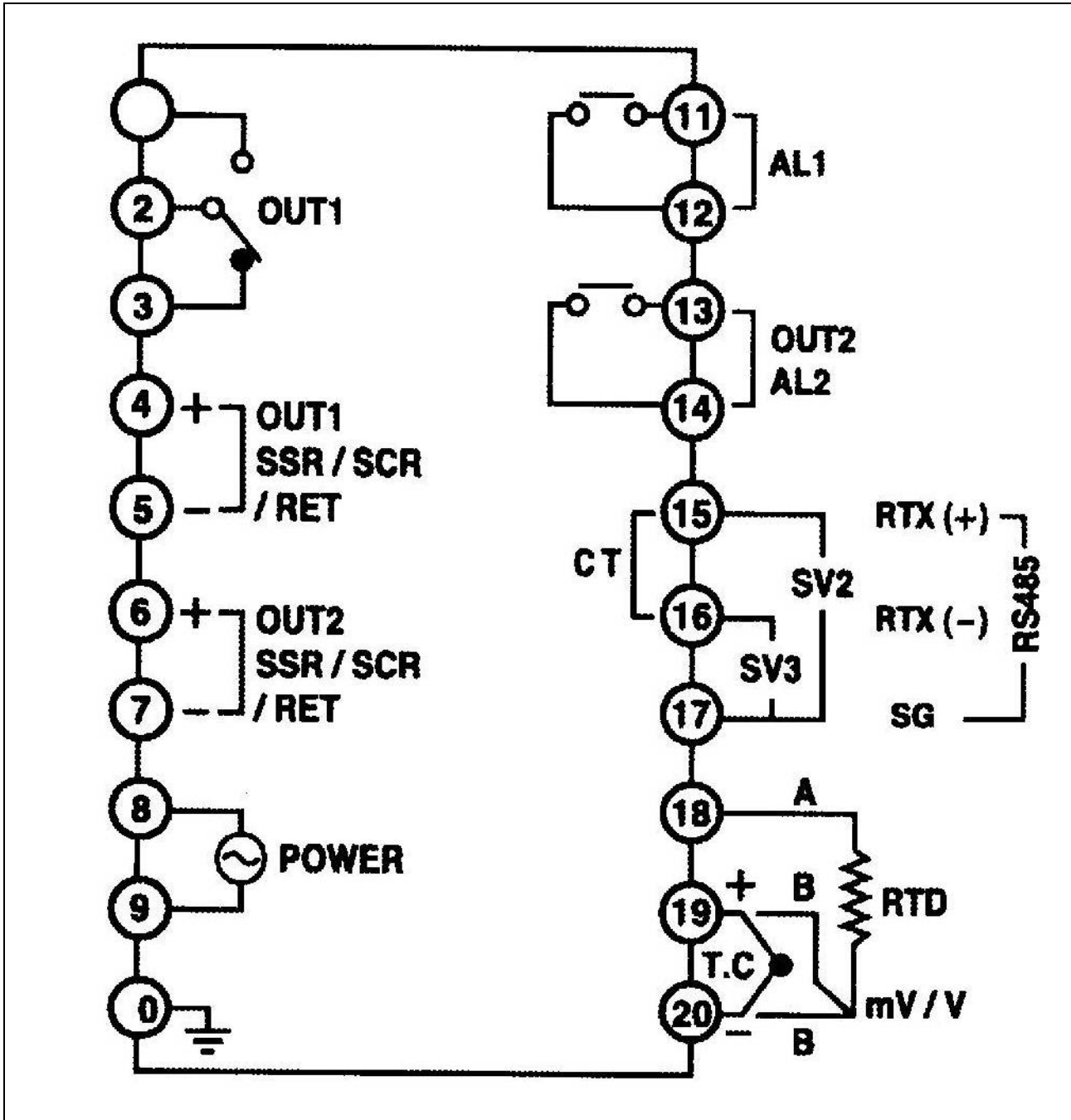
Eseguire i collegamenti elettrici secondo lo schema sotto riportato, sul fianco dello strumento è riportato lo stesso schema serigrafato.

ALIMENTAZIONE 100 - 240 V AC 50/60 Hz

#### 4 - WIRING DIAGRAM - TERMINAL ARRANGEMENT

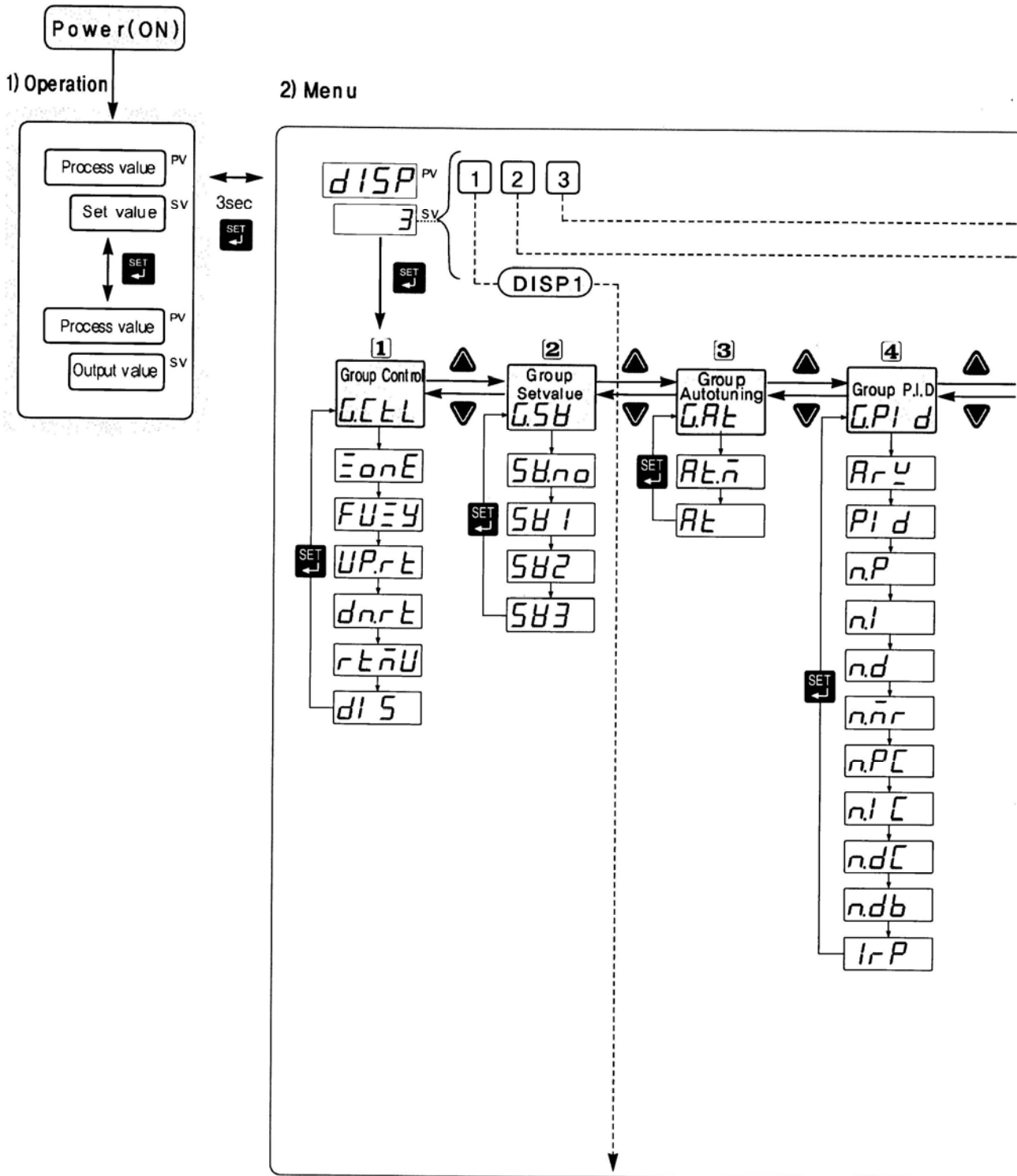
Make the electrical connections according to the following diagram, on the side of the instrument it is given the same screen-printed pattern.

POWER SUPPLY 100 - 240 V AC 50/60 Hz



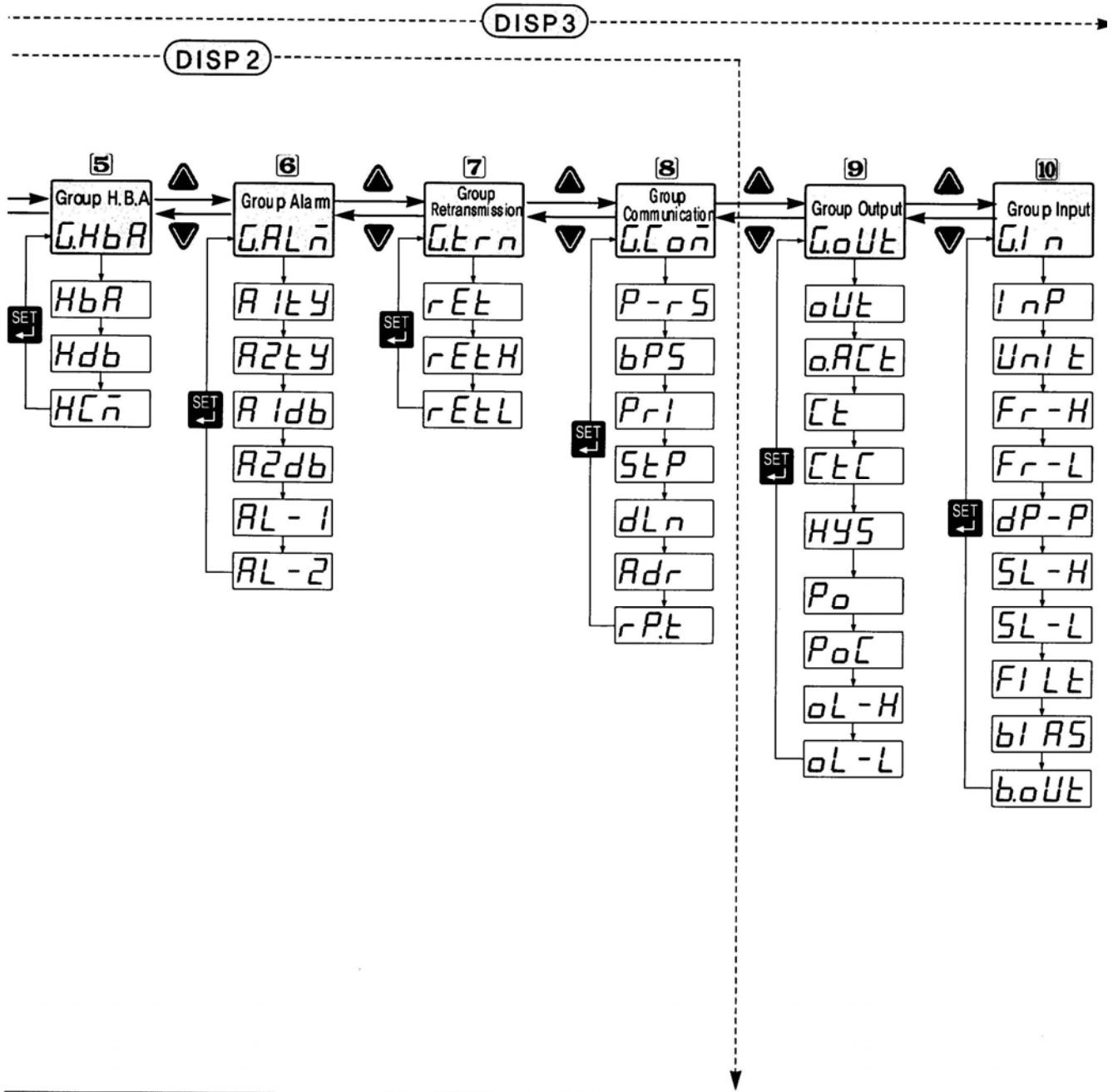
5 - TABELLA DEI PARAMETRI

5 - TABLE OF SETTING ITEMS




5 - TABELLA DEI PARAMETRI segue

5 - TABLE OF SETTING ITEMS follows



## 6 – PANNELLO e FUNZIONI

## 6 – NAME and FUNCTIONS OF FRONT PANEL



SV2-SV3 = Si illuminano quando vengono visualizzati SV2-SV3  
SV2-SV3 = Lights when the SV2-SV3 is displayed

OUT = Si illumina quando l'uscita è ON  
OUT = Lights when the control output is ON

AT = Lampeggia quando l'Autotuning funziona  
AT = Flickers when the auto tuning operates

Usare questo tasto per selezionare la cifra da inserire  
Used to select digit for changing

Usato per diminuire il valore di set e per selezionare la modalità di impostazione  
Used to decrease set-values and to select setting mode

PV = Valore di processo temperatura o pressione  
PV = Process value temperature or pressure

SV = Valore da impostare  
SV = Set value

AL1 / AL2= Si illumina quando AL1 o AL2 è operativo  
AL1 / AL2 = Lights when the AL1 or AL2 operates

SET = Tasto di impostazione, per selezionare i parametri, e per registrare il valore impostato. Premere questo tasto per 3 secondi per visualizzare la modalità di impostazione, il valore impostato e il valore di processo  
SET = Used to change from the operation mode to the setting mode, to select parameters, and to register set value. Press this key for 3 seconds to display setting mode, set value and process value

Usato per aumentare il valore di set e per selezionare la modalità di impostazione  
Used to increase set-values and to select setting mode

## 7 - TARATURA

Per entrare nella programmazione premere



per 3 secondi, appare **dl SP** (display valore di fabbrica 3) modalità di selezione, quindi premere una seconda volta

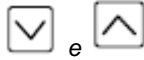


Nota pratica :

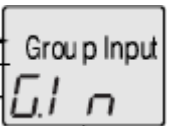


Premendo il tasto per 3 secondi il regolatore torna alla schermata di base.  
Se si attende 30 secondi il regolatore torna alla schermata di base.

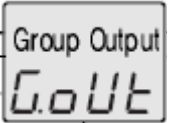
Appaiono i gruppi:



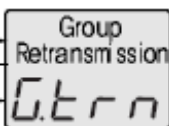
con i tasti e si accede a tutti i sotto menù di programmazione



INGRESSI



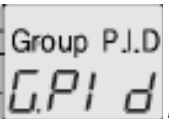
USCITE



RITRASMISSIONE



ALLARMI



PID



AUTOTUNING



SET POINT REMOTO

## 7 - SETTING METHOD

To enter inside control group push



for 3 seconds, it appears **dl SP** (display factory setting3) selection mode, than push second time

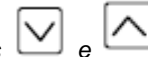


Practice Note:

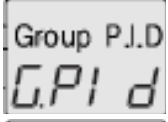
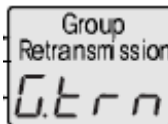
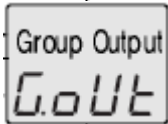
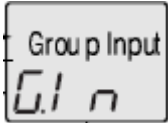


Pressing the button for 3 seconds, the controller returns to the basic screen.  
If you wait 30 seconds the controller returns to the basic screen.

Appear groups:



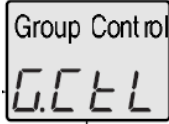
with buttons e you can access all the sub programming menu





## 8 – GRUPPO DI CONTROLLO

Il gruppo di controllo



Prevede il seguente sotto menù

## 8 – CONTROL GROUP

Control group

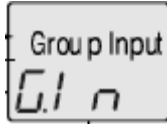


It provides the following submenu

Signal	Name	Operation	Display condition	Initial Value
	Control group display	Set a control mode	—	—
	Zone selection 1	OFF / ON	Always display	OFF
	Fuzzy function selection	OFF / ON	P.I.D control	OFF
	Initial increasing temperature	OFF / EUS (0 ~ 100 %)	Always display	OFF
	Initial decreasing temperature	OFF / EUS (0 ~ 100 %)	Always display	OFF
	Time unit	HOUR / MIN	Always display	HOUR
	External contact input selection	OFF / ON (Refer to chart 1)	Always display	OFF

## 9 – SELEZIONE INGRESSI

Una volta entrati nel sotto menù



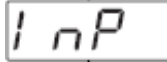
Selezionare tutti sottopunti,

per entrare premere

per selezionare premere o

per confermare premere

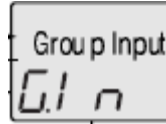
Per quanto riguarda il sottopunto



inserire il codice indicato a pagina n°2

## 9 – INPUT TYPE SELECTION

Once in the submenu



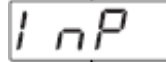
Select all sub-points,

To enter push

To select push o

To confirm push

As for the sub



enter the code shown on page n ° 2


Signal	Name	Description	Condition	Initial value
	Input group	Input type and mode selection	—	—
	Input signal selection	Refer to input signal and range (P.2)	Always display	Selection NO.1
	Measurement range unit	°C, °F	Thermocouple or R.T.D	°C
	High limit	Refer to input signal and range	Always display	1370
	Low limit	( Notice : FR-H > FR-L )	Always display	-200
 	Decimal point (on voltage input)	Thermocouple or R.T.D : decimal point of instrument / DC Voltage : 0 ~ 3	On voltage input (mV, V)	1
	Maximum on scale (on voltage input)	-1999~9999	On voltage input (mV, V)	100.0
	Minimum on scale (on voltage input)	Notice : SL-H > SL-L Decimal point : according to DP-P		0.0
	PV filter	OFF/1 ~ 120sec	Always display	OFF
	PV bias	EUS (-100.0 ~ 100.0 %)	Always display	EUS(0.0 %)
	Burn-out	OFF / UP / DOWN	Always display	UP



## 10 – SELEZIONE USCITE


Una volta entrati nel sotto menù

Group Output  
G.oUt

Selezionare tutti sottopunti,

per entrare premere 

per selezionare premere  o 

per confermare premere 

Per quanto riguarda il sottopunto

oUt


inserire il codice indicato a pagina n°2



## 10 – OUTPUT GROUP SETTING

Once in the submenu

Group Output  
G.oUt

Select all sub-points,

To enter push 











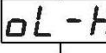
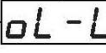
To select push  o 

To confirm push 

As for the sub

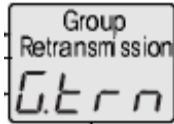
oUt

enter the code shown on page n ° 2

Signal	Name	Description	Condition	Initial value
	Output group	Output type and mode selection	—	—
	Output signal	Refer to type of control output	Always display	( 0 / 3 )
	Output operation	REV : Reverse DIR : Direct action	Output code 1~3	REV
	Cycle time	1 ~ 1000 sec	Relay / SSR	30 sec
 	Cycle time of cooling output	1 ~ 1000 sec	Output code 4~12	30 sec
	Hysteresis of universal type	EUS(0.0 ~ 100.0 %)	ON/OFF Control	EUS(0.5 %)
	Hysteresis of Heating/Cooling type	0.0 ~ 10.0 %	Heating/Cooling	0.5 %
	Output volume when input disconnection Output 1 (Out1)	Universal : -5.0 ~ 105.0 % Heating / Cooling : 0.0 ~ 105.0 %	Always display	0.0 %
	Output volume when input disconnection Output 2 (Out2)	0.0 ~ 105.0 %	Heating / Cooling	0.0 %
	Maximum value of output	Universal : OL-L + 1Digit ~ 105.0 % Heating / Cooling : 0.0 ~ 105.0 %	PID Control	100.0 %
	Minimum value of output	Universal : -0.5 %~ OL-H-1Digit Heating / Cooling : 0.0~ 105.0 %	PID Control	0.0 % 100.0 %

## 11 – RITRASMISSIONE

Una volta entrati nel sotto menù



Selezionare tutti sottopunti,

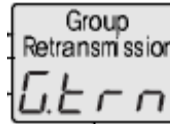
per entrare premere

per selezionare premere o

per confermare premere

## 11 – RETRANSMISSION

.Once in the submenu



Select all sub-points,

To enter push

To select push o

To confirm push

Signal	Name	Description	Condition	Initial value
	Retransmission group	Set retransmission mode	※Reference	—
	Retransmission type or Power for sensor	PV / SV / Output volume (MV) / Power for sensor (SPS)	Optional	PV
	High limit of retransmission	Thermocouple / R.T.D : FR -H ~ FR- L DC voltage : SL -H ~ SL-L	PV / SV	
	Low limit of retransmission	but, RET. H > RET.L		

## 12 – SETUP GRUPPO ALLARMI

Ci sono 2 uscite di allarme disponibili per Regolatore.  
Nel gruppo allarmi le impostazioni sono fatti per la modalità,  
banda morta e il valore di ogni allarme.  
Fare riferimento alla pagina seguente per i 22 diversi tipi di  
funzioni di allarme

. Una volta entrati nel sotto menù



Selezionare tutti sottopunti,

per entrare premere

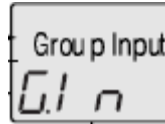
per selezionare premere o

per confermare premere

## 12 – ALARM SETUP GROUP

There are 2 alarm outputs available per controller.  
In alarm group, setting are made for mode, dead band and  
value of each alarm.  
Refer to next page for the 22 different types of alarm  
functions.

Once in the submenu



Select all sub-points,

To enter push

To select push o

To confirm push

Signal	Name	Description	Condition	Initial value
	Alarm group	Set alarm mode	—	—
	Type of Alarm 1	OFF / 1 ~ 22 Refer to "Alarm type and code"	Always display	1
*	Type of Alarm 2			2
	Dead band of Alarm 1	EUS ( 0.0 ~ 100.0 % )	Always display	EUS(0.5 %)
*	Dead band of Alarm 2			
	Set value of Alarm 1	PV alarm, Deviation alarm EU ( -100.0 ~ 100.0 % )	Always display	EU(100.0 %) EU(0.0 %)
*	Set value of Alarm 2			

※ Reference : Display lamp will be OFF when output ON in inverted type.

12 – SETUP GRUPPO ALLARMI segue

12 – ALARM SETUP GROUP to be continued

(Notice) : Display lamp will be ON when output OFF in inverted type.

Hysteresis  ( Δ : Set point , -▲ : Minus Alarm set point , ▲ : Alarm set point )

Code NO.	Alarm type	Function
1	High absolute value	
2	Low absolute value	
3	High deviation value	
4	Low deviation value	
5	High deviation value (inverted)	
6	Low deviation value (inverted)	
7	High · Low deviation value	
8	High · Low band	
9	High absolute (inverted)	
10	Low absolute (inverted)	
11	High absolute with hold function	
12	Low absolute with hold function	
13	High deviation with hold function	
14	Low deviation with hold function	
15	High deviation with hold function (inverted)	
16	Low deviation with hold function (inverted)	
17	High · Low deviation with hold function	
18	High · Low band with hold function	
19	High absolute value with hold function (inverted)	
20	Low absolute value with hold function (inverted)	
21	Heater break alarm 1 ( HBA 1 )	

### 13 – SELEZIONE P.I.D.

Una volta entrati nel sotto menù



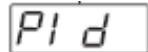
Selezionare tutti sottopunti,

per entrare premere

per selezionare premere o

per confermare premere

Nell'ambito del parametro



è possibile selezionare i seguenti codici (banda) :

- 1) solo P (proporzionale)
- 2) P+I (proporzionale+integrale)
- 3) P+I+D (proporzionale+integrale+derivata)

### 13 – P.I.D. SELECTION

Once in the submenu



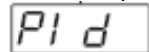
Select all sub-points,

To enter push

To select push o

To confirm push

Within the parameter



is possible to select the following codes ( band)

- 1) solo P (proportional)
- 2) P+I (proportional+integral)
- 3) P+I+D (proportional+integral+derivative)

Signal	Name	Description	Condition	Initial value
	P.I.D group	Set P.I.D mode	—	—
	Anti Reset Wind-Up	Auto / 50.0 ~ 200.0 %	P.I.D control	Auto
	P.I.D group selection	0 / 1~3	Always display	0
	n. Proportional band(P)	0.1 (H/C TYPE:0.0) ~ 999.9 %	P.I.D group	5.0 %
	n. Integral time (I)	OFF / 1 ~ 6000 sec.	Always display	240 sec.
	n. Derivative time (D)	OFF / 1 ~ 6000sec.	Always display	60 sec.
	n. Manual reset	-5.0 ~ 105.0 %	Integral time: OFF	50.0 %
	n. Proportional band of cooling side (P)	0.0(ON/OFF 제어) / 0.1 ~ 999.9	Heating • Cooling type	5.0 %
	n. Integral time of cooling side (I)	OFF / 1 ~ 6000 sec.	Heating • Cooling type	240 sec.
	n. Derivative time of cooling side (D)	OFF / 1 ~ 6000 sec.	Heating • Cooling type	60 sec.
	n. Hysteresis	-100.0 ~ 50.0 %	Heating • Cooling type	3.0 %
	n. Zone point	EU (0) < 1.RP < 2.RP < EU (100.0 %)	ZONE = ON	EU(100.0 %)

## 14 – AUTO TUNING



### ATTENZIONE !

Si prega di non usare la funzione Auto tuning nei seguenti casi :

- Processi con risposta rapida – portata e pressione
- Processi che temporanea uscita on / off
- Processi che enorme carico
- Processo con rischio di effetto negativo sulla qualità del prodotto,

Il Regolatore Digitale ha due tipi di Auto-Tuning come STD e LOW.

STD (tipo standard)

LOW (utilizzare questa selezione quando si deve sopprimere "overshoot")

**AUTO TUNING:** attiva automaticamente i parametri, calcola e imposta il P.I.D. ottimale e le costanti ARW.

La funzione di Auto Tuning può essere attivata in qualsiasi momento durante il processo, mentre il processo è in "salita" o quando il processo è "stabilizzato".

Auto Tuning non viene utilizzato quando si seleziona "OFF" in modalità di selezione.

Una volta entrati nel sotto menù



Selezionare tutti sottopunti,

per entrare premere

per selezionare premere o

per confermare premere

## 14 – AUTO TUNING



### WARNING !

Please do not use Auto tuning in following cases :

- Quick response control process – flow and pressure control
- Process which temporary on/off output is not allowed
- Process which huge load on operation unit is not allowed
- Process with risk of bad effect on product quality by changing of SV is over allowed range

This Digital controller has two type of Auto-Tuning as STD and LOW.

STD ( standard type )

LOW ( use this selection where overshoot is to be suppressed )

**AUTO TUNING :** the function measures automatically the parameters, computes and set the optimum P.I.D. and ARW constants.

Auto Tuning function can be activated at any time during the process, while process is rizing or when process is stabilized.

Auto Tuning is not operated when selecting "OFF" in selection mode

Once in the submenu



Select all sub-points,

To enter push

To select push o

To confirm push

Signal	Name	Description	Condition	Initial value
	Auto tuning group	Indicates Auto tuning	—	—
	Auto tuning type	Standard (STD) : <i>Std</i> / Low PV (LOW) : <i>Low</i>	ABS	STD
	Auto tuning start	OFF / 1~3 / <i>AUTO</i> (AUTO)	ABS	OFF




## 15 – IMPOSTAZIONE DEL SET REMOTO (SV)



Nel gruppo di impostazione valori set (SV), è possibile impostare 3 tipi di set remoto (1,2,3 SV) dal pannello frontale, è possibile anche selezionare ogni valore da segnale da contatto esterno .


Una volta entrati nel sotto menù



Selezionare tutti sottopunti,

per entrare premere 

per selezionare premere  o 

per confermare premere 


## 15 – SET VALUE (SV) SETUP GROUP



In the set value ( SV) setup group, you can setup 3 kinds in advance (1,2,3 SV) then select each value by external contact signal (or the button on the front panel).


Once in the submenu


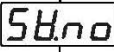

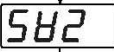
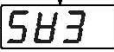


Select all sub-points,

To enter push 

To select push  o 

To confir push 

Signal	Name	Description	Condition	Initial value
	Display setup of SV	group for set value	—	—
	Select number of set value.	1~3 (Selected SV is displayed and controlled)	Always display	1
	1st SV setup mode	* EU(0.0 ~ 100.0 %)		EU(0.0 %)
	2nd SV setup mode	EU(0.0 ~ 100.0 %)		EU(0.0 %)
	3rd SV setup mode	EU(0.0 ~ 100.0 %)		EU(0.0 %)

\* EU : Engineering unit.

# EC Declaration of Conformity

**HANYOUNG NUX**

Digital Temperature Controller

NX series

(NX2, NX3, NX4, NX7, NX9)

Certificate No. : HY-31HM003

Reference Report No. : DRSCCEL1208-0021

The above product has successfully demonstrated that its product is in compliance with

Low voltage Directive 2006/95/EC  
EN 61010-1 (Third Edition) :2010

We, the undersigned, hereby declare that the equipment specified above conforms to the above Directive(s). In case of alteration of the product, not agreed upon by us, this declaration will lose its validity.

Date of Issue : August, 31, 2012

Manufacturer Signature  
President

*Y. S Han*



**QUYX2.E171428**  
**Process Control Equipment, Electrical - Component**

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**Process Control Equipment, Electrical - Component**

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**HANYOUNG NUX CO LTD**

E171428

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INCHEON, 402-200 REPUBLIC OF KOREA

**Temperature controllers**, Models NP200, NP100, PX2, PX3, PX7, PX9.

Model RT9.

Models DX2, DX3, DX4, DX7, DX9 Series.

Models NX2, NX3, NX4, NX7, NX9 Series.

Marking: Company name or trademarks  
model designation.

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