INDICADOR UNIVERSAL DE PANEL

8-C48-2R

UN SOLO APARATO PARA TODAS LAS FUNCIONES

alimentación
universal
24.. 230VAC/DC

DPF
sensors
www.dpfsensors.com

ENTRADA
UNIVERSAL

EXCITAC.

mA

RTD

V

Pot.

Tc

SALIDAS

Relé1

Relé2

SSR
PNP (12V)

DIGITAL

ENTRADA

C1

196.5
218.2

SET

UL   c ℞ Us

Panel 48 x 48 x 97 - Doble display
Regulación ON / OFF, PID. Entrada digital

2 CARACTERÍSTICAS TÉCNICAS

ENTRADA

i	Intensidad:	**4/20mA, 0/20mA**
	Impedancia	**51Ω**
	Excitación auxiliar	**12V/20mA**

V **mV**	Tensión DC:	**0/10V**
		0/60mV
	Opcional: 0/100V	
	Impedancia	**1MΩ**

Pot	Potenciómetro	**..6K, ..150K**
Pt	Pt100, Pt500, Pt1000	
Ni	Ni100	
PTC	PTC 1K	
NTC	NTC 10K (B3435K)	
Termopar	J, K, S, R, T, E, N, B	
	compensación temperatura unión fría 0/50ºC	
	precisión unión fría 0,1ºC/ºC	

DISPLAYS ..2

PROCESO. 4 dígitos verdes. Altura 10,2mm.
CONSIGNA. 4 dígitos rojos. Altura 7,7mm.

ENTRADA DIGITAL

Contacto libre potencial o PNP 12/24V

PRECISIÓN

Máximo error global	**0,3%**
Error de linealidad	**0,1%**
Deriva térmica	**i 0,8µA/ºC** **V 0,3mV/ºC**
Resolución salida analógica	**4.000ptos. (12bits)**

AISLAMIENTO

Clase de protección contra descargas eléctricas
Frontal de clase II
Aislamiento reforzado: Alimentación, salida relé y frontal.
Aislamiento reforzado: Salida relé y entrada.

ALIMENTACIÓN

AC ALTERNA/ **DC** CONTINUA Universal	**24.. 230VAC/VDC** (50/60Hz)
Margen	**±15%**
Consumo máximo	**5,5VA**

NORMATIVAS CE UL c US

Cumple con normas EMC 2004/108/EC (compatibilidad electromagnética)
y directiva de baja tensión (DBT) 2006/95/EC para ambientes industriales.
Inmunidad a interferencias de acuerdo con EN 50082-1 / EN 50082-2
Emisión de perturbaciones de acuerdo con EN 50081-1 / EN 50081-2
Certificado UL, US

SALIDA 1 ▷ *1 Relé*

RELÉ

1 Contacto NO	**SPST-NO**
Intensidad máxima	**2A**
Tensión máxima	**250VAC**
Vida eléctrica del relé	**100.000 operaciones**

SALIDA 2 ▷ *1 Relé*

RELÉ

1 Contacto NO	**SPST-NO**
Intensidad máxima	**2A**
Tensión máxima	**250VAC**
Vida eléctrica del relé	**100.000 operaciones**

SALIDA 3 ▷

SSR **Control relés estáticos** **PNP**

Tensión máxima	**12V**
Intensidad máxima	**30mA**
Opcional sincronizado con Red	*-2R-S*

-2R

AMBIENTALES

Temperatura de trabajo	**- 10/+60ºC**
Temperatura de almacenamiento	**- 40/+80ºC**
Tiempo de calentamiento	**5 minutos**
Coeficiente de temperatura	**50ppm/ºC**
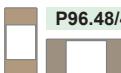
FORMATO

Dimensiones	**51x51x97mm**
Protección frontal	**IP65 con goma**
Protección caja	**IP20**
Bornas	**enchufables codificadas**
Plástico autoextinguible	**PCABS UL94V0**
Cable conexión ≤2,5mm^2, 12AWG 250V/12A	
Peso	**130grs.**
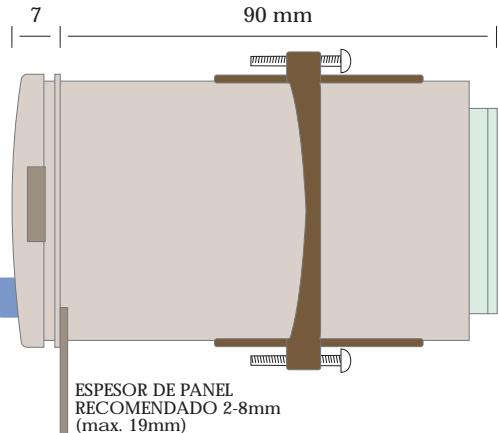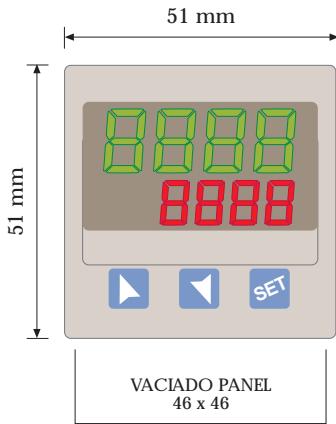
ADAPTADOR   *Accesorio opcional*

P96.48/48.48   adaptador panel de 48x48 a 96x48
uso en vertical u horizontal

51 mm

51 mm

VACIADO PANEL
46 x 46

7 | 90 mm

ESPESOR DE PANEL
RECOMENDADO 2-8mm
(max. 19mm)

Indice

Introducción

Gracias por adquirir este controlador multifunción y compacto.

Con el modelo xxxxx-2R se pueden realizar con un único aparato multitud opciones con diversos sensores de entrada y señales de proceso, y con la universal alimentación con rango extendido de 24..230 Vac/Vdc. Los distintos sensores son configurables y salidas de rele y control para SSR. Permite reducir el stock y racionalizar la inversión teniendo una mayor y rápida disposición de los aparatos.

1   Guia de seguridad de las lineas

Leer cuidadosamente las normas de seguridad y instrucciones de programación de este manual antes de usar y conectar el dispositivo. Desconectar la alimentación antes de configurar el hardware o conectarlo. Solamente personal cualificado deberá acceder al uso y configuración del dispositivo. Y siempre de acuerdo a los datos tecnicos y caracteristias reflejadas en este manual. No deseche aparatos eléctricos junto con los residuos domésticos. Para cumplir la Directiva Europea 2002/96 / CE relativa a los equipos eléctricos y electrónicos y su ley nacional de aplicación, herramientas eléctricas que han llegado al final de su vida se deben recoger por separado y trasladar a una planta de reciclado respetuosa con el medio ambiente.

2   Identificación de modelo

Alimentación 24..230 Vac/Vdc +/-15% 50/60 Hz – 5,5 VA

XXXXX-3S	3 Out SSR + D.I. (entrada digital)
XXXXX-2R	2 Reles (2A) + 1 SSR + D.I. (entrada digital)
XXXXX-2R-S	2 Reles (2A) + 1 SSR sincronizado con la alimentacion de red + D.I.

3   Datos técnicos
3.1   Características generales

Displays	4x 0,40" pulgadas displays + 4 x 0,30" pulgadas displays
Temperatura de trabajo	0-45 °C - Humedad 35..95 HR%
Protección	IP65 panel frontal (con goma) IP20 caja y terminales
Material	PC ABS UL94VO auto- extinguible
Peso	130 g
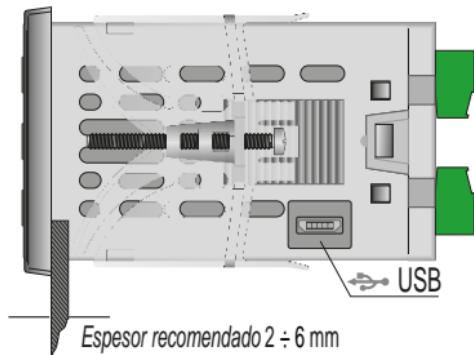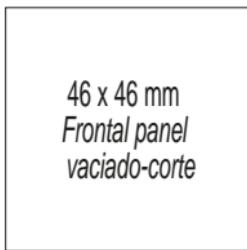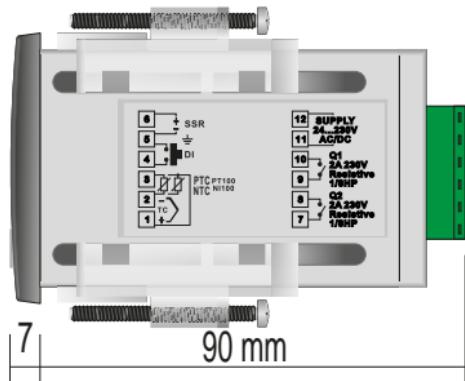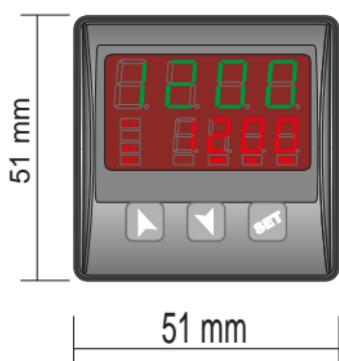
3.2   Caracteristicas de Hardware

Alimentación	24..230 Vac/Vdc ±15% 50/60 Hz	Consumo: 5.5 VA.
Entrada analógica	**1**: AN1 Configurable via software. **Input**: Termopares tipo K, S, R, J, T, E, N, B. compensación automatica de unión fria desde 0..50°C. **Termoresistencia**: PT100, PT500, PT1000, Ni100, PTC1K, NTC10K (β 3435K). **Input V/I**: 0-10 V, 0-20 or 4-20 mA, 0-60 mV. **Pot. input**: 6 kΩ, 150 kΩ.	Tolerancia (25 °C) +/-0.3% ±1 digito (F.s.) para termopares, termoresistencias y V/mA. Precisión de unión fria 0.1 °C/°C. **Impedancia**: **0-10 V**: Ri>110 kΩ **0-20 mA**: Ri<50 Ω **4-20 mA**: Ri<50 Ω **0-60 mV**: Ri>500 kΩ
salida Relés	**2** reles (XXXXX48-2R) (XXXXX-2R-S) Configurable comando y/o salida alarma.	Contactos 2 A - 250 V~. carga resistiva. 12V/30mA.
Salida SSR	**3** SSR (DIS48-3S). **1** SSR (DIS48-2R) (DIS48-2R-S). Configurable comando salida y/o alarma de salida.	

3.3   Caracteristicas de Software

Regulación	ON-OFF con hysteresis.
algoritmos	P, P.I., PID, P.D. con tiempo proporcional.
Banda proporcional	0..9999 °C o °F
tiempo integral	0,0..999,9 sec. (0 excluido)
tiempo derivativo	0,0..999,9 sec. (0 excluido)
Funciones control	Tuning Manual o automatico, alarma seleccionable, protección de comandos y consignas de alarmas, activación de funciones atraves de entrada digital.

4   Dimensiones y instalación

51 mm

51 mm

7

90 mm

46 x 46 mm
*Frontal panel
vaciado-corte*

⇔ USB

Espesor recomendado 2 ÷ 6 mm
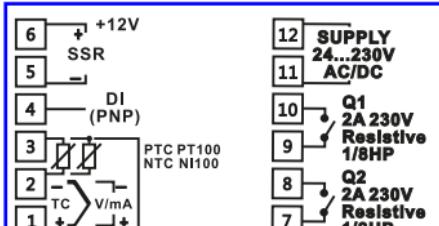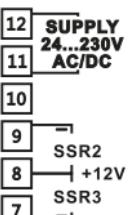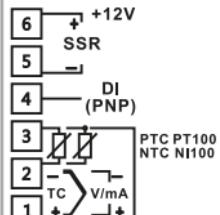
# 5   Conexiones eléctricas

Aunque este controlador ha sido diseñado para resistir las perturbaciones mas graves presentes en ambientes industriales, seguir las siguientes precauciones:
• Separar las lineas de control de las de potencia.

• Evitar la cercania de grupos de telerruptores, contactores electromagneticos, motores de gran potencia y de igual forma usar los filtros apropiados en cada aplicación.
• Evitar la cercania de grupos de potencia, en particualr si son a control de fase.

5.1   Diagrama de conexiones

XXXXX-3S   XXXXX-2R   XXXXX-2R-S

Alimentación

12 SUPPLY 24...230V **11 AC/DC**	Alimentación conmutada de rango extendido 24..230 Vac/dc ±15% 50/60 Hz – 5,5 VA (aislada galvanicamente).

AN1 Entrada analogica
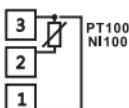
|	
2 – **1 TC +**	**Para termopares K, S, R, J, T, E, N, B.** • Respetar la polaridad. • para posibles extensiones, usar cable compensado y terminales adecuados para cada tipo de termopar (compensados) • Si se utiliza cable apantallado, solo se debe conectar en uno de los extremos
3 PT100 NI100 **2** **1**	**Para termoresistencias PT100, Ni100.** • Para conexión a 3 hilos usar cable de la misma sección. • Para conexión a 2 hilos cortocircuitar los bornes 1 y 3. • Cuando se usa cable apantallado , la pantalla debe estar conectada a tierra, en un sólo extremo. RED 3 WHITE 2 RED 1
3 PTC NTC **2**	**Para termoresistencias NTC, PTC, PT500, PT1000 y potenciometros lineales.** Cuando se usa cable apantallado, la malla debe estar conectada solamente a una de las tierras del bucle de corriente.
6 +12V **2 –** **1 V/mA +**	• Para señales normalizadas de tensión o corriente. • Respetad la polaridad. • Cuando se usa cable apantallado, la malla debe estar conectada solamente a una de las tierras del bucle de corriente.
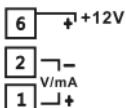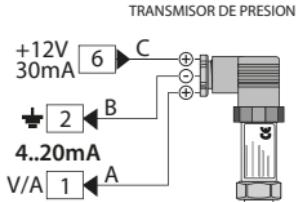
TRANSMISOR DE PRESION

+12V 30mA 6 C

2 B

4..20mA

V/A 1 A
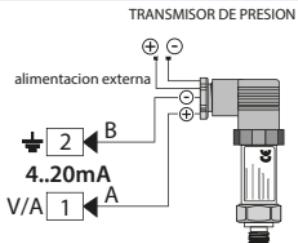
Para señales lineales 0/4..20 mA con sensores de 3 hilos alimentados por el propio indicador.

Conexión de la polaridad.
A= salida + sensor
B= comun sensor -
C= Sensor alimentación (+12Vdc / 30mA)

TRANSMISOR DE PRESION

⊕ ⊖
alimentacion externa

2 B

4..20mA

V/A 1 A
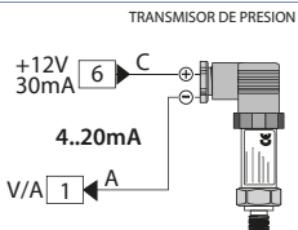
Para señales lineales 0/4..20 mA con alimentación externa del sensor.

Conexión de la polaridad.
A= salida + sensor
B= Salida - sensor

TRANSMISOR DE PRESION

+12V 30mA 6 C

4..20mA

V/A 1 A

Para sensores de 0/4..20 mA de 2 hilos PASIVOS.

Conexión del sensor:
A= Sensor output (-)
C= Sensor supply (+12Vdc / 30mA)
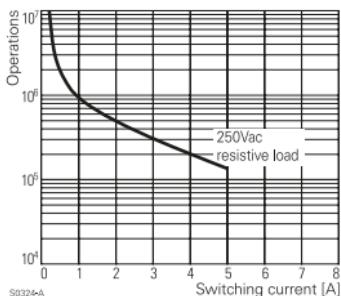
Reles de salida Q1 - Q2

10 Q1 2A 230V Resistive 1/8HP
9

8 Q2 2A 230V Resistive 1/8HP
7

Capacidad de contactos 5 A / 250 V~ carga resistiva.

Nota: ver gráfico siguiente.

Capacidad electrica Q1 / Q2.
2 A, 250 Vac, carga resistiva, 10^5 operaciones.
20/2 A, 250 Vac, $\cos\varphi = 0.3$, 10^5 operaciones.
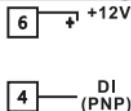
S0324-A

salida SSR

6 $\quad$ +12V	
$\quad$ SSR	salida de comando SSR command 12 V / 30 mA.
5	

entrada Digital
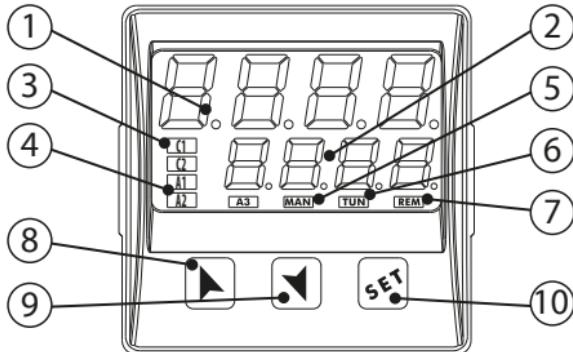
6 $\quad$ +12V	entrada digital PNP
	modo de actuación segun el parametro dЦt ı.
4 $\quad$ DI (PNP)	⚠ **para activar la entrada digital, cortocircuitar pins 4 y 6.**

6 Funciones de Display y teclas

6.1 Indicadores numericos (Display)

1	*1234*	Normally displays the process. During configuration phase, it displays the parameter being entered.
2	*1234*	Normally displays the setpoint. During configuration phase, it displays the parameter value being entered.

6.2 Meaning of Status Lights (Led)

3	**C1**	ON when the output command is on.
4	**A1 A2**	ON when the corresponding alarm is active.
5	**MAN**	ON when the "Manual" function is on.
6	**TUN**	ON when the controller is running an "Autotuning" cycle.
7	**REM**	ON when the controller communicates via serial port (USB).

6.3 teclas

8	▲	• Incrementa el setpoint principal. (valor del comando). • During configuration phase, allows to slide through parameters. Together with SET it modifies them. • Pressed after SET increases alarm setpoint.
9	▼	• Decrementa el setpoint principal • During configuration phase, allows to slide through parameters. Together with SET it modifies them. • Pressed after SET decreases alarm setpoint.
10	SET	• Allows to display alarm setpoints and runs the Tuning function. • Allows to modify configuration parameters.

7 Controller Functions
7.1 Modifying Main Setpoint and Alarm Setpoint Values

Setpoint value can be modified by keyboard as follows:

	Press	Display	Do
1	▲ or ▼	Value on display 2 changes.	Increase or decrease main setpoint.
2	SET	Visualiza el valor de la alarma en el display 1.	
3	▲ or ▼	Value on display 2 changes.	Increase or decrease the alarm setpoint value.

7.2 Auto-Tuning

Tuning procedure to calculate regulation parameters can be manual or automatic according to selection on parameter 8 ($P. \iota.d.$).

7.3 Manual Tuning

Manual procedure allows the user a greater flexibility to decide when to update PID algorithm parameters. After selected $\Pi Rn.$ on parameter 8 ($P. \iota.d.$), the procedure can be activated in two ways:

• **Running Tuning by keyboard**:

Press SET until display 1 shows the writing $tunE$ with display 2 showing oFF, press ▲, display 2 shows on.

TUN led switches on and the procedure starts.

• **Running Tuning by digital input**:

Select $tunE$ on parameter 25 $d\bar{u}t. \iota$. At first activation of digital input (commutation on front panel) **TUN** led switches ON while at second activation switches off.

7.4   Automatic Tuning

Automatic tuning procedure has been conceived to give user the possibility to have a clear regulation also without knowledge of PID regulation algorithm. Setting $Auto$ on parameter 8 $P.\,\iota.d.$, the controller will check process oscillations and will modify PID parameters.

7.5   Soft-Start

At starting the controller can follow a gradient expressed in units (ex. Degree/Hour) to reach the setpoint.

Enter this gradient on parameter 21 $5FE.\vec{u}.$ with the chosen units/hour: at next activation the controller will execute the Soft-Start function.

If parameter 24 $5.E\,\iota\vec{n}.$ is different from 0, after switch-on and elapsing the time set on parameter 24 , setpoint does not follow the gradient anymore, but it reaches final setpoint with maximum power.

7.6   Automatic/Manual Regulation for % Output Control

This function allows to select automatic functioning or manual command of the output percentage.

By parameter 69 $Au.\vec{n}H.$ it is possible to select two modes.

1 **First selection** ($En.$) pressing $\boxed{\text{SET}}$ display 1 shows $P.{-}{-}{-}$, while on display 2 appears $Auto.$

Press $\boxed{\blacktriangle}$ to select $\vec{n}Hn$ mode; it is now possible to modify the output percentage using $\boxed{\blacktriangle}$ and $\boxed{\blacktriangledown}$. To back to automatic mode, using the same procedure, select $Auto$ on display 2: **MAN** led switches off and functioning backs to auomatic.

2 **Second selection** ($En.5E.$) enables the same functioning, but with two important variants:
- If there is a temporary power failure or after switch-off, manual functioning as well as the previous output percentage value will be maintained at restarting.
- If the sensor breaks during automatic functioning, controller moves to manual mode while maintaining the output percentage command unchanged as generated by the PID immediately before breakage.
  Ex: on an extruder the resistance percentage command (load) is kept also in case of input sensor failure.

7.7   Digital input functions

On DIS48 digital input can be enabled by parameter 25 $d\vec{u}E.\,\iota.$
- $2.5Pu.$: Switch between two setpoint thresholds: with digital input active regulates on SET2, otherwise on SET1;
- $run.$: Regulation is enabled only with digital input active;
- $EunE$: Enables/disables Tuning, if parameter 8 $P.\,\iota.d.$ is set on $\vec{n}Hn.$;
- $Au.\vec{n}H.$: (Automatic/Manual) if par. 19 $Au.\vec{n}H.$ is set on $En.$ or $En.5E.$, DIS48 regulates in

manual mode if digital input active, otherwise the regulation is automatic..
- *Rct.t.*: (Action Type) heating regulation with inactive digital input; Cooling regulation with active digital input;
- *o.r5t*: (Outputs Reset) allows to reset the outputs if Manual reset should be configured for command output and/or alarm outputs.

7.8   Memory Card (optional)

Parameters and setpoint values can be easily copied from one controller to others using the MEMORY CARD.
Enter the Memory Card **with the controller not connected to power supply.**
At starting display 1 visualizes *NENo* while display 2 visualizes *5t iP* (**only if into the Memory are stored correct values**). Pressing ⬆ display 2 visualizes *LoRd*. Press SET to confirm. The controller loads the new values and restarts.

NB: parameters may be copied only on controllers of the same model!

⚠ Updating Memory Card.

To update the memory card values, follow the procedure previously described, setting *5t iP* on display 2 so as not to load the parameters on controller.
Enter configuration (password 1234): Exiting configuration mode, the settings will be automatically saved on Memory card.

7.9   Regulation control (only on xxxxx-2R-S)
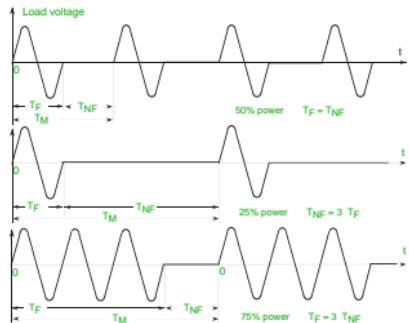
DIS48 integrates different types of control for the regulation of the SSR command output, selecting parameter 43 *o.ct.t.* as follows:

t iNE	**Time control**

Activation and deactivation of the output is related to the time selected on parameter 52 *c.t.*. Ex. selecting a time of 10s and supposing a 30% percentage, the output will remain active for 3s and inactive for 7s.

b5t.F.	**Burst fire control**

The "Burst-fire" control (1 cycle) is a duty cycle mode which consists of supplying a series of complete mains voltage cycles to the load.

At 50% power, the modulation time is 40ms:
• 1 firing cycle (20ms at 50Hz)
• 1 firing cycle (20ms at 50Hz)

For a setpoint less than 50%:
• The firing time remains constant (1 cycle)
• The non-firing and modulation time increases

For a setpoint greater than 50%:
• The non-firing time remains constant (1 cycle)
• The firing and modulation time increases.

$A.bt.F.$ Advanced Burst fire control

In order to minimise power fluctuation during the modulation period, the "advanced Burst fire" SSR output firing mode uses:
· A complete number of cycles for firing
· A complete number of half-cycles for non-firing

For a percentage less than 66%, SSR output firing takes place as in the "Burst fire" mode (see $b5t.F.$)

For a setpoint greater than 66% in "Advanced Burst fire" mode:
· The non-firing time is constant at one half-cycle
· Firing takes place over whole cycles.
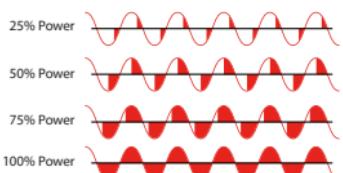
In a 'short-wave infrared' application, 'advanced Burst fire' firing mode reduces the brightness of the infrared elements and thus minimises annoying visual flickering.

In a short-wave infrared application, "advanced Burst fire" firing mode reduces the brightness of the infrared elements and thus minimises annoying visual flickering.

$PH5.A.$ CONTROL POR ANGULO DE FASE

If this mode is active, the regulation is done through the phase choking

Using a no zero-crossing SSR, the DIS48 synchronizes with the power supply volage (necessarily AC) and determines when to activate the output to create the right choking.

F.PH.A. **Fixed Phase angle control**

If this mode is active, the regulation is done as per "time control" (t iNE), but during the activation it is managed a fixed choking selected on parameter 45 F.P.A.P...

8 Configuración

For configuration parameters see par. 10.

	Press	Display	Do
1	**SET** for 3 sec.	Display 1 shows 0000 with the 1st digit flashing, while display 2 shows PASS.	
2	▲ or ▼	Modify the flashing digit and move to the next one pressing **SET**.	Enter password 1234.
3	**SET** to confirm	Display 1 shows the first parameter while display 2 shows the value.	
4	▲ or ▼	Slide up/down through parameters.	
5	**SET** ▲ or ▼	Increase or decrease the visualized value pressing **SET** and an arrow key.	Enter the new data which will be saved on releasing the keys. To change another parameter return to point 4.
6	▲ + ▼ togheter	End of configuration parameter change. The controller exits from programming.	

8.1 Carga de los valores por defecto de fábrica

This procedure allows to restore factory settings of the device.

	Press	Display	Do
1	**SET** for 3 sec	Display 1 shows 0000 with the 1st digit flashing, while display 2 shows PASS.	
2	▲ or ▼	Modify the flashing digit and move to the next one pressing **SET**.	Enter password 9999.
3	**SET** to confirm	The device loads default settings	Turn off and restart the device.

9   Tabla de configuración de parametros

Para mostrar los parametros STANDARD introducir la clave 1234 y para los
avanzados 5678 Introducir password 1357 para acceder al listado completo

1 $5En.$ **Sensor (Password 1234)**

Configuración entrada analógica

$tc.t$	Tc-K (**por defecto**)	-260 °C..1360 °C
$tc.5$	Tc-S	-40 °C..1760 °C
$tc.r$	Tc-R	-40 °C..1760 °C
$tc.J$	Tc-J	-200 °C..1200 °C
$tc.t$	Tc-T	-260 °C..400 °C
$tc.E$	Tc-E	-260 °C..980 °C
$tc.n$	Tc-N	-260 °C..1280 °C
$tc.b$	Tc-B	100 °C..1820 °C
Pt	Pt100	-100 °C..600 °C
$Pt1$	Pt100	-100 °C..140 °C
$n1$	Ni100	-60 °C..180 °C
ntc	NTC10K	-40 °C..125 °C
Ptc	PTC1K	-50 °C..150 °C
$Pt5$	Pt500	-100 °C..600 °C
$Pt1t$	Pt1000	-100 °C..600 °C
$0-10$	0..10 V	
$0-20$	0..20 mA	
$4-20$	4..20 mA	
$0-60$	0..60 mV	
$Pot.1$	Potenciometro fino a 6 kOhm	
$Pot.2$	Potenciometro fino a 150 kOhm	

2 $d.P.$ **Punto decimal (Password 1234)**

Selecciona número de puntos decimales

0	No visualiza decimales (**por defecto**)
0.0	1 decimal
0.00	2 decimales
0.000	3 decimales

3 $dEGr.$ **tipo de grados (Password 1234)**

Selecciona el tipo de grados

$°c$	Celsius (**por defecto**)
$°F$	Fahrenheit

4 *Lo.L.i.* **Lower Linear Input (Password 1234)**

Analogue input lower range limit only for linear signals. Ex.: with input 4...20 mA this parameter takes value associated to 4 mA.

-**999..+9999** [digit[1]] (degrees.tenths for temperature sensors), **Default**: 0.

5 *uP.L.i.* **Upper Linear Input (Password 1234)**

Analogue input upper range limit only for linear signals. Ex.: with input 4...20 mA this parameter takes value associated to 20 mA.

-**999..+9999** [digit[1]] (degrees.tenths for temperature sensors).**Default**:1000

6 *c.out* **Command Output (Password 1234)**

Select command output type

c. o1	Command on Q1 relay output **Default.** (Q2->AL1; SSR->AL2)
c.55r	Command on SSR output (Q1->AL1; Q2->AL2)
c.o1.2	Command on Q1 and Q2 output (Q1 n.o.; Q2 n.c; SSR->AL1)

7 *Act.t.* **Action type (Password 1234)**

HEAt	Heating (N.A.) (**Default**)
cooL	Cooling (N.C.)

8 *P.i.d.* **PID (Password 1234)**

Select functioning (on/off or PID) and autotuning type

d i5.	Disabled (on/off) (**Default**)
Auto	Automatic (P.I.D. automatic calculation of parameters)
u5Er	User (P.I.D. parameters calculated by manual tune or tune once)
oncE	Once (P.I.D. parameters calculation only once at starting)
NAn.	Manual (P.I.D. automatic parameters calculation by keyboard)

9 *Lo.L.5.* **Lower Limit Setpoint (Password 1234)**

-999..+9999 [digit[1]] (degrees.tenths for temperature sensors), **Default**: 0.

10 *uP.L.5.* **Upper Limit Setpoint (Password 1234)**

-999..+9999 [digit[1]] (degrees.tenths for temperature sensors), **Default**: 1750.

11 *o.cAL.* **Offset Calibration (Password 5678)**

Value added/subtracted to the process value (ex: usually correcting the ambient temperature value).

-999..+1000 [digit[1]] for linear sensors and potentiometers.

-200.0..+100.0 (degrees.tenths for temperature sensors),

Default 0.0.

12 𝑮.𝒄𝑹𝑳. **Gain Calibration (Password 5678)**

Value multiplied to the process value to calibrate the working point. Ex: to correct the range from 0...1000°C showing 0...1010°C, set the parameter to -1.0.
-99.9%..+100.0%, **Default**: 0.0.

13 𝒄. 𝑯𝒀. **Command Hysteresis (Password 1234)**

Hysteresis in ON/OFF
-999..+999 [digit1] (degrees.tenths for temperature sensors). **Default** 0.2.

14 𝒄. 𝑳𝒅. **Command Led (Password 5678)**

State of the OUT1 led corresponding to the relevant contact
- 𝑜.𝑐.   ON with open contact
- 𝑐.𝑐.   ON with closed contact (**Default**)

15 𝒄. 𝑺.𝑬. **Command State Error (Password 5678)**

State of contact for command output in case of error
- 𝑜.𝑐.   Open contact (**Default**)
- 𝑐.𝑐.   Closed contact

16 𝒄. 𝑺.𝑷. **Command Setpoint Protection (Password 1234)**

Allows/denies modifications of command setpoint value
- 𝐹𝑟𝐸𝐸   Modifiable by the user (**Default**)
- 𝐿𝑜𝑐ʜ   Locked

17 𝒄. 𝒓𝑬. **Command Reset (Password 5678)**

Type of reset for command contact (always automatic in P.I.D. functioning)
- 𝐴𝑟𝐸.   Automatic Reset (**Default**)
- 𝛱𝑟𝐸.   Manual Reset
- 𝛱𝑟𝐸.𝑆. Manual Reset Stored (keeps relay status also after an eventual power failure)

18 𝒄. 𝒅𝑬. **Command Delay (Password 5678)**

Command delay (only in ON / OFF functioning).
-900..+900 seconds.. **Default**: 0.
Negative: delay in switching off phase.
Positive: delay in activation phase.

19 𝑹𝒖.𝜫𝑹. **Automatic / Manual (Password 1234)**

Enables automatic/manual selection.
- 𝑑 𝑖𝑆.   Disabled (**Default**)
- 𝐸𝑛.   Enabled
- 𝐸𝑛.𝑆ʜ. Enabled stored

21 $5Ft.G.$ **Softstart Gradient (Password 5678)**

Rising gradient for Soft-Start

0   Disabled. **Default**

1-9999   (degrees/hour).

24 $5.t.iN.$ **Softstart Time (Password 5678)**

Max. Softstart duration: the process will follow the gradient only for the time set on parameter, than moves to the max. power.

00.00   Disabled. **Default**

00.01-24.00 hh.mm

25 $dGt.i.$ **Digital Input (Password 1234)**

Digital input functioning (see par. 7.7)

$d i5.$ Disabled (**Default**)

$2.5Pu$ 2 setpoint thresholds

run Run

$tunE$ Tune (impulsive digital input). Parameter 8 $P.i.d.$ must be set as $NAn.$

$Au.NA.$ Automatic/Manual

$Act.t.$ Regulation type

$o.r5t$ Output reset (impulsive digital input)

26 $d.i.c.t.$ **Digital Input Contact Type (Password 1234)**

Select the digital input inactive contact.

$o.c.$ Open contact (**Default**)

$c.c.$ Closed contact

27 $AL.1$ **Alarm 1 (Password 1234)**

Alarma 1 selección.

$d i5.$ Desactivada (**por defecto**)

$A. AL.$ Absoluta / valor umbral referido al proceso

$b. AL.$ Alarma de banda. relativa y simetrica al setpoint. El valor AL1 se añade +/-

$H.d.AL.$ Alarma relativa sumandose (+) al setpoint.

$L.d.AL.$ Alarma relativa restandose (-) al setpoint.

28 $AI.5.o$ **Alarm 1 State Output (Password 1234)**

Alarm 1 output contact and intervention type.

$n.o. 5.$ (N.O. Start) Normally open, active at start (**Default**)

$n.c. 5.$ (N.C. Start) Normally closed, active at start

$n.o. t.$ (N.O. Threshold) Normally open, active on reaching alarm [1]

$n.c. t.$ (N.C. Threshold) Normally closed, active on reaching alarm[1]

---

[1] *On activation, the output is inhibited if the controller is in alarm mode. Activates only if alarm condition reappers, after that it was restored..*

29 $A.I.HY.$ **Alarm 1 Hysteresis (Password 1234)**

-99.9..99.9 °C/°F. **Default**: 0.5.°C

30 $A.I.Ld.$ **Alarm 1 Led (Password 5678)**

Defines the state of A1 led corresponding to the relative contact
- $o.c.$ ON with open contact
- $c.c.$ ON with closed contact (**Default**)

31 $A.I.S.E.$ **Alarm 1 State Error (Password 5678)**

State of contact for alarm 1 output in case of error
- $o.c.$ Open contact (**Default**)
- $c.c.$ Closed contact

32 $A.I.SP.$ **Alarm 1 Setpoint Protection (Password 1234)**

Does not allow the user to modify setpoint
- $FrEE$ modificable por el usuario (**por defecto**)
- $Loc\vdash$ bloqueada
- $H\,idE$ bloqueada y se apaga en pocos segundos

33 $AI.rE.$ **Alarm 1 Reset (Password 5678)**

Type of Reset for contact of alarm 1
- $ArE.$ Automatic Reset (**Default**)
- $NrE.$ Manual reset (by keyboard) `SET`
- $NrE.S.$ Manual Reset Stored (keeps relay status also after an eventual power failure)

34 $A.I.dE.$ **Alarm 1 Delay (Password 5678)**

-900..+900 secondi. **Default**: 0.
Negative: delay in alarm output phase
Positive: delay in alarm entry phase.

35 $AL.2$ **Alarm 2 (Password 1234)**

Alarm 2 selection.
- $d\,iS.$ Disabled (**Default**)
- $A.\ AL.$ Absolute / threshold, referring to process
- $b.\ AL.$ Alarma de banda.
- $H.d.AL.$ Upper deviation alarm
- $L.d.AL.$ Lower deviation alarm

36 $A.2S.o$ **Alarm 2 State Output (Password 1234)**

Alarm 2 output contact and intervention type.
- $n.o.\ S.$ (N.O. Start) Normally open, active at start (**Default**)
- $n.c.\ S.$ (N.C. Start) Normally closed, active at start
- $n.o.\ t.$ (N.O. Threshold) Normally open, active on reaching alarm[2]
- $n.c.\ t.$ (N.C. Threshold) Normally closed, active on reaching alarm[2]

37 $A.2.HY.$ **Alarm 2 Hysteresis (Password 1234)**

-99.9..99.9 °C/°F. **Default**: 0.5.°C

38 $A.2Ld.$ **Alarm 2 Led (Password 5678)**

Defines the state of A2 led corresponding to the relative contact
- $o.c.$ ON with open contact
- $c.c.$ ON with closed contact (**Default**)

39 $A.2S.E.$ **Alarm 2 State Error (Password 5678)**

State of contact for alarm 2 output in case of error
- $o.c.$ Open contact (**Default**)
- $c.c.$ Closed contact

40 $A.2SP.$ **Alarm 2 Setpoint Protection (Password 1234)**

Does not allow the user to modify setpoint
- $FrEE$ Modifiable by the user (**Default**)
- $Lock$ Locked
- $H\ idE$ Locked and hidden

41 $A2.rE.$ **Alarm 2 Reset (Password 5678)**

Type of Reset for contact of alarm 2
- $ArE.$ Automatic Reset (**Default**)
- $NrE.$ Manual reset (by keyboard) [SET]
- $NrE.S.$ Manual Reset Stored (keeps relay status also after an eventual power failure)

42 $A.2.dE.$ **Alarm 2 Delay (Password 5678)**

-900..+900 secondi. **Default**: 0.
Negative: delay in alarm output phase
Positive: delay in alarm entry phase.

---

[2] *On activation, the output is inhibited if the controller is in alarm mode. Activates only if alarm condition reappers, after that it was restored.*

43 *o.cL.t.* **Output Control Type (Password 5678)**   **solo modelo -2RS**
Select output control type in case of PID regulation
t.iՈE	Time control **Default**
b5t.F.	Burst fire control
R.bt.F.	Advanced Burst fire control
PH5.R.	Phase angle control
F.PH.R.	Fixed Phase angle control

44 *PH5.d.* **Phase Displacement (Password 5678)**   **solo modelo -2RS**
Select the phase displacement in case of inductive load when using the phase angle control
-90..90 degrees.> **Default** 0°.

45 *F.P.R.P.* **Fixed Phase Angle Percentage (Password 5678)**   **solo modelo -2RS**
Select the output % when "Fixed Phase Angle" control is selected.
10.0..90.0% .> **Default** 80.0%

46 *L.L.P.P.* **Lower Limit Phase Angle Percentage (Password 5678)**   **solo -2RS**
Select the min. value for the command output % with Phase Angle control.
0..40%, **Default**: 10%.

47 *u.L.P.P.* **Upper Limit Phase Angle Percentage (Password 5678)**   **solo -2RS**
Select the max. value for the command output % with Phase Angle control
60..100%, **Default**: 90%.

48 *P.b.* **Proportional Band (Password 5678)**
Process intertia in °C/°F
0 ON / OFF if t.i. is equal to 0 (**Default**)
1-9999 °C/°F

49 *i.t.* **Integral Time (Password 5678)**
Process inertia in seconds.
0.0-999.9 seconds (0 = integral disabled), **Default** 0.0

50 *d.t.* **Derivative Time (Password 5678)**
Normally ¼ of integral time.
0.0-999.9 seconds (0 = derivative disabled), **Default** 0.0

51 *d.b.* **Dead Band (Password 5678)**
0-1000 [digit1] (degrees.tenths for temperature sensors) (**Default**: 0)

52 $c.t.$ **Cycle Time (Password 5678)**

(for P.I.D. on remote control switch 15 sec., for P.I.D. on SSR 1 sec.)
1-300 seconds (**Default**:15s) If par.6 $c.out$ is set as $c.55r$, (**Default**:2s).

53 $L.L.o.P.$ **Lower Limit Output Percentage (Password 5678)**

Selects min. value for command output percentage
0..100%, **Default**: 0%.

54 $u.L.o.P.$ **Upper Limit Output Percentage (Password 5678)**

Selects max. value for command output percentage
0 – 100%, **Default**: 100%.

55 $5.d.tu.$ **Setpoint Deviation Tune (Password 5678)**

Selects the deviation from the command setpoint for the threshold used by
autotuning to calculate the P.I.D. parameters
0.0-500.0°C/°F. **Default**: 30.0.

56 $\Pi.G.tu.$ **Max Gap Tune (Password 5678)**

Selects the max. process-setpoint gap beyond which the automatic tune
recalculates PID parameters
0.1..50.0°C/°F. **Default:** 1.0°C

57 $\Pi n.P.b.$ **Minimum Proportional Band (Password 5678)**

Selects the min. proportional band value selectable by the automatic tune.
0.0..100.0°C/°F. **Default: 5**.0°C

**58** $\Pi R.P.b.$ **Maximum Proportional Band (Password 5678)**

Selects the max. proportional band value selectable by the automatic tune.
0.0..300.0°C/°F. **Default:** 50.0°C
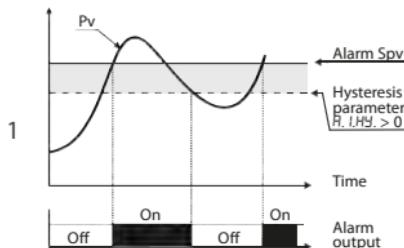
**59** $\Pi n.i.t.$ **Minimum Integral Time (Password 5678)**

Selects the min. integral time value selectable by the automatic tune.
0.0..999.9 secondi. **Default**: 40.0s.
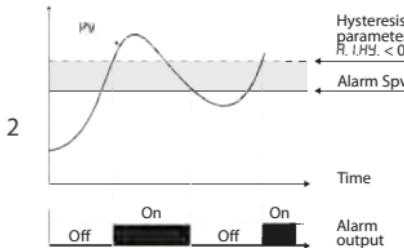
10 modos de actuación de alarmas
Alarma absoluta o umbral de alarma (seleccionar $A. \ AL.$)
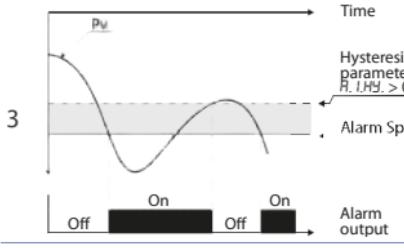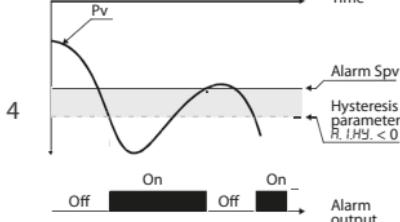
Absolute alarm with controller in heating functioning (Par. 7 $Act.t.$ selected $HEAt$) and hysteresis value greater than "0" (Par.29 $A. \ l.HY. > 0$).*

Absolute alarm with controller in heating functioning (Par.7 $Act.t.$ selected $HEAt$) and hysteresis value less than "0" (Par.29 $A. \ l.HY. < 0$).*
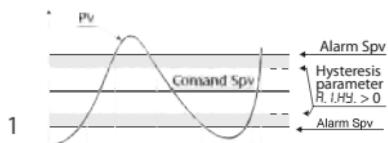
Absolute alarm with controller in cooling functioning (Par.7 $Act.t.$ selected $CooL$) and hysteresis greater than "0" (Par.29 $A. \ l.HY. > 0$).*
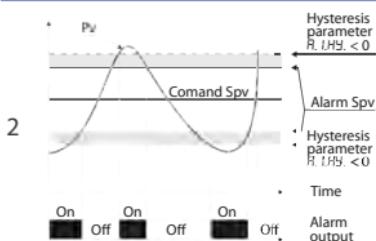

Absolute alarm with controller in cooling functioning (Par.7 $Act.t.$ selected $CooL$) and hysteresis value less than "0"(Par.29 $A. \ l.HY. < 0$).*
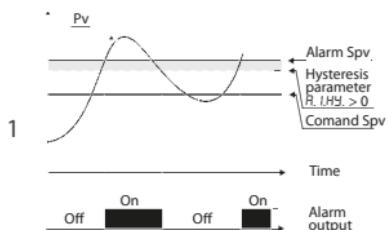
Band Alarm (b. AL. selection)

1
Band alarm hysteresis value greater than "0" (Par.29 A. I.HY. > 0).*

Alarm Spv
Hysteresis parameter A. I.HY. > 0
Alarm Spv
Comand Spv
Pv
Time
On On On
Off Off Off
Alarm output

2
Band alarm hysteresis value less than "0" (Par.29 A. I.HY. < 0).*

Hysteresis parameter A. I.HY. < 0
Alarm Spv
Hysteresis parameter A. I.HY. < 0
Comand Spv
Pv
Time
On On On
Off Off Off
Alarm output
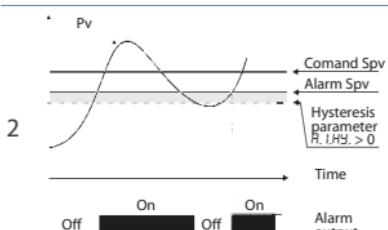
*   *The example refers to alarm 1; the function can also be enabled for alarm 2.*

Upper Deviation Alarm (H.d.AL. selection)
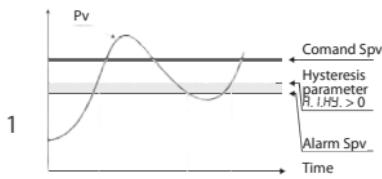
1
Upper deviation alarm value of alarm setpoint greater than "0" and hysteresis value greater than "0" (Par.29 A. I.HY. > 0).**

Alarm Spv
Hysteresis parameter A. I.HY. > 0
Comand Spv
Pv
Time
On On
Off Off
Alarm output

2
Upper deviation alarm value of alarm setpoint less than "0" and hysteresis value greater than "0" (Par.29 A. I.HY. > 0).**

Comand Spv
Alarm Spv
Hysteresis parameter A. I.HY. > 0
Pv
Time
On On
Off Off
Alarm output
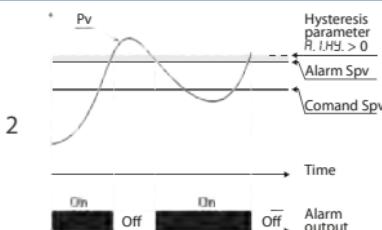
Lower Deviation Alarm (L.d.AL. selection)

1. Lower deviation alarm value of alarm setpoint greater than "0" and hysteresis value greater than "0" (Par.29 A. I.HY. > 0).**

2. Lower deviation alarm value of alarm setpoint less than "0" and hysteresis value greater than "0" (Par.29 A. I.HY. > 0).**

** a) The example refers to alarm 1; the function can also be enabled for alarm 2 .b) With hysteresis value less than "0" (A. I.HY. < 0) the dotted line moves over the alarm setpoint.

11   Table of Anomaly Signals

If installation malfunctions, controller will switch off regulation output and report the anomaly. For example, controller will report failure of a connected thermocouple visualizing E-05 (flashing) on display 1 and Prb. (sensor) on display 2. For other signals, see table below.

	Cause	What to do
E-01 EEP.E	Error in EEPROM cell programming.	Call Assistance.
E-02 SYS.E	Cold junction sensor fault or room temperature outside of allowed limits.	Call Assistance.
E-03 MEM.E	Error in Memory card programming.	Repeat Memory card programming.
E-04 EEP.E	Incorrect configuration data. Possible loss of calibration values.	Check if the configuration parameters are correct.
E-05 Prb.	Thermocouple open or temperature outside of limits.	Check the connection with the sensors and their integrity.
E-08 SYS.E	Missing calibration data.	Call Assistance.

12 Configuración EASY-UP (rápida)

To simplify the setting of parameters and the integration of the different components involved in the control system, we introduce the EASY-UP coding which allows to set sensors and/or command outputs in one single step.

By means of the code listed in the data sheet enclosed to the sensor or actuator (SSR, motorized valve, etc.) the EASY-UP coding will set the relevant main parameters on the controllers (ex. selection of PT100 on parameter "SEN" and the corresponding measuring range on parameters "Lower and Upper limits of the setpoint").

Different codes may be entered on the controllers in sequence to configure inputs, control output or retransmission of signal.

2200	PT100 (-100..500°C); ON/OFF with hysteresis 1°C on Q1; absolute Alarm 1 on Q2
2201	PT100 (-100..500°C); ON/OFF with hysteresis 1°C on SSR; absolute Alarm 1 on Q1
2204	PT1000 (-100..250°C); ON/OFF with hysteresis 1°C on Q1; absolute Alarm 1 on Q2
2205	PT1000 (-100..250°C); ON/OFF with hysteresis 1°C on SSR; absolute Alarm 1 on Q1
2250	PT100 (-100..500°C); PID automatic tune on Q1; absolute Alarm 1 on Q2
2251	PT100 (-100..500°C); PID automatic tune on SSR; absolute Alarm 1 on Q1
2300	TC J (-100..600°C); ON/OFF with hysteresis 1°C on Q1; absolute Alarm 1 on Q2
2301	TC J (-100..600°C); PID automatic tune on SSR; absolute Alarm 1 on Q1
2400	TC K (-100..850°C); ON/OFF with hysteresis 1°C on Q1; absolute Alarm 1 on Q2
2401	TC K (-100..850°C); PID automatic tune on SSR; absolute Alarm 1 on Q1

13 Resumen de configuración de parametros

fecha:	Modelo
Instalador	Sistema:
Notas:	

1	$SEn.$	Sensor (Password 1234)
2	$d.P.$	Decimal Point (Password 1234)
3	$dEGr.$	Degree (Password 1234)
4	$Lo.L.i.$	Lower Linear Input (Password 1234)
5	$uP.L.i.$	Upper Linear Input (Password 1234)
6	$c.out$	Command Output (Password 1234)
7	$Act.t.$	Action type (Password 1234)
8	$P.i.d.$	PID (Password 1234)
9	$Lo.L.S.$	Lower Limit Setpoint (Password 1234)
10	$uP.L.S.$	Upper Limit Setpoint (Password 1234)
11	$o.cAL.$	Offset Calibration (Password 5678)
12	$G.cAL.$	Gain Calibration (Password 5678)

13	c. HY.	Command Hysteresis (Password 1234)
14	c. Ld.	Command Led (Password 5678)
15	c. S.E.	Command State Error (Password 5678)
16	c. S.P.	Command Setpoint Protection (Password 1234)
17	c. rE.	Command Reset (Password 5678)
18	c. dE.	Command Delay (Password 5678)
19	Au.MA.	Automatic / Manual (Password 1234)
21	SFt.G.	Softstart Gradient (Password 5678)
24	S.t iM.	Softstart Time (Password 5678)
25	dGt. i.	Digital Input (Password 1234)
26	d. i.c.t.	Digital Input Contact Type (Password 1234)
27	AL.1	Alarm 1 (Password 1234)
28	A.1.5.o	Alarm 1 State Output (Password 1234)
29	A.1.HY.	Alarm 1 Hysteresis (Password 1234)
30	A.1.Ld.	Alarm 1 Led (Password 5678)
31	A.1.S.E.	Alarm 1 State Error (Password 5678)
32	A.1.SP.	Alarm 1 Setpoint Protection (Password 1234)
33	A1.rE.	Alarm 1 Reset (Password 5678)
34	A.1.dE.	Alarm 1 Delay (Password 5678)
35	AL.2	Alarm 2 (Password 1234)
36	A.2.5.o	Alarm 2 State Output (Password 1234)
37	A.2.HY.	Alarm 2 Hysteresis (Password 1234)
38	A.2.Ld.	Alarm 2 Led (Password 5678)
39	A.2.5.E.	Alarm 2 State Error (Password 5678)
40	A.2.SP.	Alarm 2 Setpoint Protection (Password 1234)
41	A2.rE.	Alarm 2 Reset (Password 5678)
42	A.2.dE.	Alarm 2 Delay (Password 5678)
43	o.cL.t.	Output Control Type (Password 5678)
44	PHS.d.	Phase Displacement (Password 5678)
45	F.P.A.P.	Fixed Phase Angle Percentage (Password 5678)
46	L.L.P.P.	Lower Limit Phase Angle Percentage (Password 5678)
47	u.L.P.P.	Upper Limit Phase Angle Percentage (Password 5678)
48	P.b.	Proportional Band (Password 5678)
49	i.t.	Integral Time (Password 5678)
50	d.t.	Derivative Time (Password 5678)
51	d.b.	Dead Band (Password 5678)
52	c.t.	Cycle Time (Password 5678)
53	L.L.o.P.	Lower Limit Output Percentage (Password 5678)

Notas

⚠️

Lea cuidadosamente esta guia de seguridad y las instrucciones de programación
contenidas en este manual antes de usar y conectar el aparato.

C E   c(UL)us   RoHS Compliant   ♻

2300.10.218-RevA
Software Rev. 1.06
300914