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Programmable Process Limit Alarm with Analog Output.

DAT 5024-AO

FEATURES

- **Universal configurable input for: mV, Tc, RTD, Resistance, Potentiometer, V and mA**
- **Two independent alarm trips relays SPDT programmable as high alarm or low alarm**
- **Trip level and hysteresis adjustable by potentiometer, Delay time adjustable from 1 to 25 seconds**
- **High accuracy**
- **Also configurable by PC using CVPROG cable**
- **One analogue output configurable by PC**
- **On-field reconfigurable**
- **Galvanic isolation among all the ways**
- **CE/UKCA mark**
- **Suitable for DIN rail mounting in compliance with EN-50022 and EN-50035**

GENERAL DESCRIPTION

The DAT5024-AO device is able to accept at its input a wide range of normalized voltage or current signals; it is also able to interface directly to thermocouple or resistance thermometer temperature sensors. The current input makes it possible to connect both active and passive sensors and converters, since a power source (Vaux) is available to power these devices. The thresholds can be configured using DIP-switches both as a maximum and as minimum. The trip level is set by acting on the potentiometer located on the front of the enclosure. It is also possible to set, through potentiometer, the hysteresis and the delay time for the thresholds. If the configuration is performed by dip switches, the analogue output is 4-20mA by default in relation to the ranges in the *"Input type"* table.
Through PC programming it is possible to set the type of input, the intervention and release thresholds, the delay and the analogue output without using the test points and the potentiometers. The software programming procedure can be performed by interfacing the device to the Personal Computer, using the special CVPROG cable provided by DATEXEL and sold separately, without the device having to be connected to an external power supply.
The galvanic isolation eliminates all the effects due to the mass loops that may be present, allowing the use of the device even in the most severe environmental conditions. It is housed in a plastic enclosure of 20.5 mm thickness suitable for DIN rail mounting in compliance with EN-50022 and EN-50035 standards.

USER INSTRUCTIONS

The power, input and output connections must be made in according to the "Connections" section.
It is possible to configure the converter on field via dip-switches, referring to the "Configuration tables", and the potentiometers as shown in the section "Setting and adjustment of thresholds". The configuration via dip-switches can also be done when the module is powered.
For the PC configuration, use the special CVPROG cable.

TECHNICAL SPECIFICATIONS (Typical @ 25 °C and in nominal conditions

INPUT

Input type	Min	Max	Min Span
TC (CJC int./ext.)			
J	-200°C	1200°C	100°C
K	-200°C	1300°C	100°C
S	0°C	1750°C	400°C
R	0°C	1750°C	400°C
B	0°C	1820°C	400°C
E	-200°C	1000°C	100°C
T	-200°C	400°C	100°C
N	-200°C	1300°C	100°C
Voltage			
mV	-100 mV	+90 mV	5 mV
mV	-100 mV	+200 mV	10 mV
mV	-100 mV	+800 mV	20 mV
RTD (2, 3, 4 wires)			
Pt100	-200°C	850°C	50°C
Pt1000	-85°C	185°C	30°C
Ni100	-60°C	180°C	50°C
Ni1000	-60°C	150°C	30°C
RES. (2, 3, 4 wires)	0 Ω	500 Ω	50 Ω
	0 Ω	2000 Ω	50 Ω
Pot.(Rnom < 50KΩ)	0 %	100 %	10 %
Voltage	-10 V	10 V	1 V
Current	0 mA	20 mA	1 mA

Accuracy (1)	
mV, TC	the higher of ±0.1% and ±12 uV
RTD	the higher of ±0.1% and ±0.2°C
Res.	the higher of ±0.1% and ±0.15
Potentiometer	± 0.05 % f.s.
Voltage	the higher of ±0.1% and ± 2 mV
mA	the higher of ±0.1% and ± 6 uA
mV, V, mA	± 0.5 % f.s (opt. HS)
Linearity (1)	
TC, RTD	± 0.1 % f.s.
mV, V, mA	± 0.05 % f.s.
Input impedance	
TC, mV	>= 10 MΩ
mA	~22 Ω
Line resistance influence (1)	
TC, mV	<=0.8 uV/Ohm
RTD 3w (50Ω max balanced)	0.05%/Ω
RTD 4w (100Ω max balanced)	0.005%/Ω
RTD excitation current	
RTD, Res	400 uA
CJC Comp.	± 1°C

OUTPUT

Thermal drift (1)	
Full scale	± 0.01% / °C
CJC	± 0.01% / °C
Aux. Voltage	>18V @ 20mA

ANALOGUE OUTPUT

Output type	Min	Max	Min Span
Current	0 mA	20 mA	4 mA
Voltage	0 V	10 V	1 V

Output resolution	
Current	7 uA
Voltage	4 mV
Aux. Voltage	>12V @ 20mA
Burn-out values	
Max. output value	22 mA or 11 V
Min. output value	0 mA or -0.6 V
Output load Resistance - Rload	
Current output	< 500 Ω
Voltage output	> 10 KΩ
Short circuit current	30 mA max.
Response time (10÷ 90%)	about 400 ms
option HS for mV,V,mA	50 ms

ALARM TRIP

Relays Output	N° 2 SPDT
Contact rating	2A , 250 Vac
	2A , 30 Vdc
Max Voltage	250 Vac (50/60 Hz) 110 Vdc
Isolation	coil-to-contacts: 4000Vac
	between contacts: 1000Vac
Trip level (*)	adjustable from 2% to 98% f.s.
Hysteresis (*)	adjustable from 0,5% to 10% f.s.
Delay (*)	adjustable from 1 to 25 sec.
Adjustment accuracy (*)	0,3% f.s.

(*) parameters valid only in case of configuration by dip-switch and potentiometers

(1) referred to the input Span (difference between max. and min.)

GENERAL SPECIFICATIONS

Power supply voltage	20 .. 30 Vdc
Reverse polarity protection	60 Vdc max
Current consumption	
Current output	90 mA max.
Voltage output	70 mA max.

ISOLATION

Among all the ways	1500 Vac,50 Hz, 1 min

ENVIRONMENTAL CONDITIONS

Operative Temperature	-20°C .. +60°C
Storage Temperature	-40°C.. +85°C
Humidity (not condensed)	0 .. 90 %
Maximum Altitude	2000 m
Installation	Indoor
Category of installation	II
Pollution Degree	2

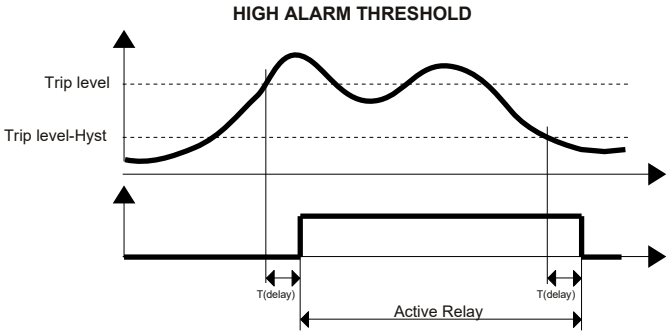
MECHANICAL SPECIFICATIONS

Material	Self-extinguish plastic
IP Code	IP20
Wiring	wires with diameter 0.8÷2.1 mm² /AWG 14-18
Tightening Torque	0.8 N m
Mounting	in compliance with DIN rail standard EN-50022 and EN-50035
Weight	about 125 g

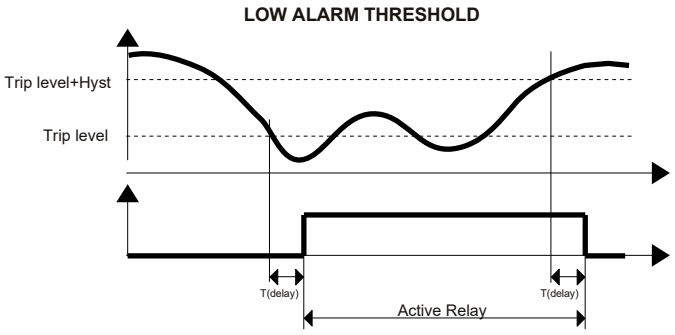
CERTIFICATIONS

EMC (for industrial environments)	
Immunity	EN 61000-6-2
Emission	EN 61000-6-4
UKCA (Ref S.I. 2016 N°1091)	
Immunity	BS EN 61000-6-2
Emission	BS EN 61000-6-4

THRESHOLD OPERATION



For the **high alarm** the relay goes on when the input signal is higher than the trip level and after the delay time. The relay goes off only when the input signal is lower than the trip level minus the hysteresis value or when reaches the minimum value of the input scale and after the delay time.

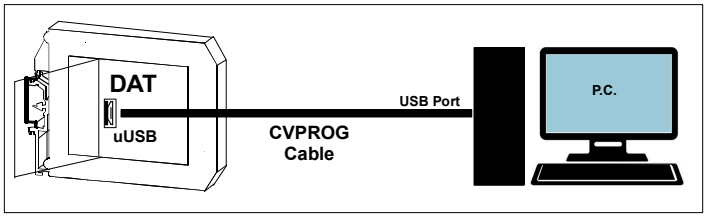


For the **low alarm** the relay goes on when the input signal is lower than the trip level and after the delay time. The relay goes off only when the input signal is higher than the trip level plus the hysteresis value or when reaches the maximum value of the input scale and after the delay time.

CONFIGURATION BY PC

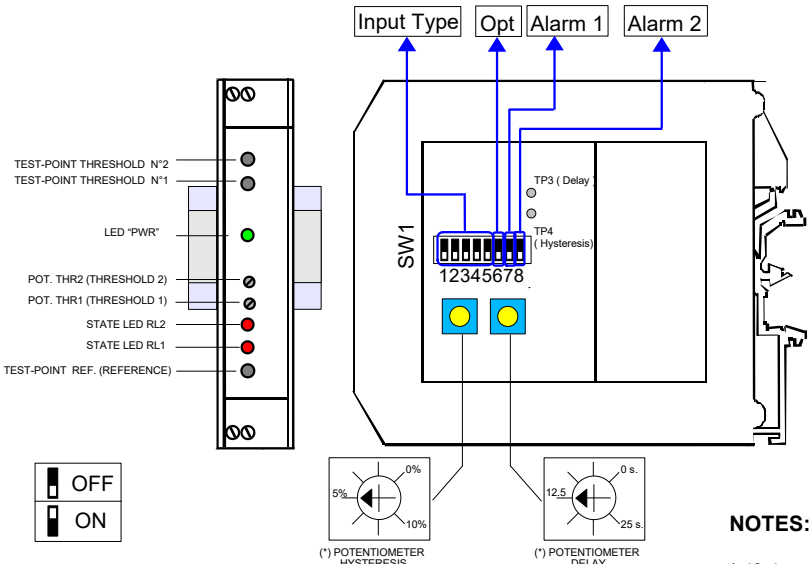
By the DATAPRO configuration software it is possible to:
- Set the default settings of the module
- Set the threshold values, the type, the hysteresis and the delay independently of the potentiometers
- Set the options not available via the dip-switches
  (break level, High Speed function, etc ...)
- Read the input and output measurements in real time
- Follow the dip-switch configuration wizard

To configure the device, follow the procedure below:
1) Open the plastic door on the side of the device
2) Connect the CVPROG cable to the Personal Computer and to the microUSB port
3) Make sure the dip-switches are all OFF (EPROM configuration - see TAB.1)
3) Open the configuration program.
4) Select the COM port to which the device is connected.
5) Press the "Open COM" button.
6) Select the "Program" window
7) Set the programming data.
8) Press the "Write" button to send the programming data.



Warning: during the whole procedure the device must always be powered and the connection cable must not be disconnected.
For detailed information on the operation of the configuration program, refer to the relevant operating manual.

CONFIGURATION BY DIP-SWITCH



1) Open the door on the side of the device.

2) Set the type of input on the dip-switches SW1 [1..5] (see TAB.1)

3) Set the type of threshold on the dip-switches SW1 [7..8] (see TAB.2A and TABLE 2B)

4) Set, if required, the options on the SW1 dip-switch [6] (see TABLE 3)

EXAMPLE: SW1 =

- Input Type	Pt100
- Option	3 wires
- Alarm 1	Low
- Alarm 2	High

TAB.1 – Input Type

SW1 1 2 3 4 5		SW1 1 2 3 4 5		SW1 1 2 3 4 5	
	EPROM *		Tc J		Res. 2KΩ
	90 mV		Tc K		Res. 500Ω
	200 mV		Tc R		Pt100
	800 mV		Tc S		Ni100
	10 V		Tc T		Pt 1K
	20 mA		Tc B		Ni 1K
			Tc E		Pot. <500Ω
			Tc N		Pot. <50KΩ

NOTES:

* If the dip-switches SW1 [1..5] are all set to the OFF position ("EPROM"), the entire configuration set via PC will be loaded
* Possible incorrect configurations on the dip-switches will be signalled with the PWR LED flashes.
* **If the dip-switch SW1 [6] is set to the ON position and a measurement is being performed for RTD or 2-wire resistor, it is necessary to short-circuit the I-L and G -H terminals.**

TAB.2A Alarm 1

SW1 7	LEVEL
	High
	Low

TAB.2B Alarm 2

SW1 8	LEVEL
	High
	Low

TAB.3 Options

SW1 6	CJC	RTD/RES
	External	3 wires
	Internal	2/4 wires

ALARM TRIP SETTING AND ADJUSTMENT

The level of the thresholds is set by acting on the potentiometers placed on the front of the enclosure. To determine the correct operation of the thresholds, follow the next steps:
1- Set the desired "Input Type" via the bank of switches SW1 referring to TAB.1. Set the Option (dip 6) where required TAB.3.

2- Calculate the value corresponding to the threshold, in function of the measurement scale, in according to the following formula:

V = ((threshold - min) / (max - min)) * 4

The "max" and "min" values are listed in the "Input types" table of the Technical Specifications and "threshold" is the desired value expressed in the same unit of measurement.

3 - The value obtained, which will be between 0 and 4, indicates the voltage in Volt to which the potentiometers "THR1" must be set for the threshold n ° 1 and "THR2" for the threshold n° 2. The value of the potentiometers can be checked by measuring, by means of a voltmeter, the voltage on the test-points "TP1" for the threshold n° 1 and "TP2" for the threshold n° 2. The potentiometers and test-points for set the thresholds are placed on the front of the container.

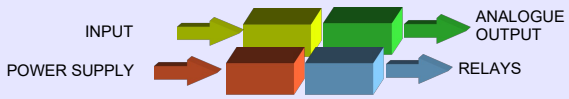
4 - Set the type of threshold (maximum or minimum) for the threshold "1" and for the "2" threshold through the dip-switches 7 and 8 of "SW1" accessible from the door on the side of the container.

5 - Adjust the hysteresis and delay level, by acting on the accessible potentiometers by opening the door on the side of the container, measuring the voltage on the "TP3" test points for the delay and "TP4" for the hysteresis.

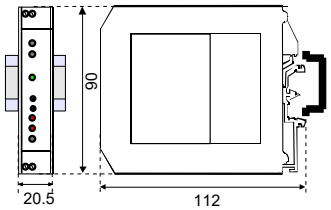
The value of the thresholds and hysteresis is set by acting on the relative potentiometers, which provide a 0-4V continuous voltage proportional to the input signal scale (0 volts correspond to the minimum value and 4V corresponds to the full scale) on the test points (TP1 , TP2). Both measurements must refer to the "REF" test point.

NOTES:
- The maximum value of the thresholds is limited to 98% of the input range, while the minimum value is limited to 2%.
- The minimum hysteresis value is fixed at 0.5% of the input range.
- The "threshold + hysteresis" and "threshold-hysteresis" values are limited so as not to exceed the limits of the measurement scale.
- The delay time delays both the switching on and the relay. The minimum time between switching on and off a relay is approximately 1 second.
- The hysteresis level and the delay time are the same for both thresholds.
- It is possible to configure a different hysteresis value for each threshold only via PC.

ISOLATION STRUCTURE



MECHANICAL DIMENSIONS (mm)



LIGHT SIGNALLING

LED	COLOR	STATE	DESCRIPTION
PWR	GREEN	ON	Device powered
		OFF	Device not powered
		BLINKING	Wrong dip-switches settings
RELAY 1 RELAY 2	RED	ON	Trip alarm active
		OFF	Trip alarm not active

The symbol reported on the product indicates that the product itself must not be considered as a domestic waste.
It must be brought to the authorized recycle plant for the recycling of electrical and electronic waste.
For more information contact the proper office in the user's city , the service for the waste treatment or the supplier from which the product has been purchased.

INSTALLATION INSTRUCTIONS

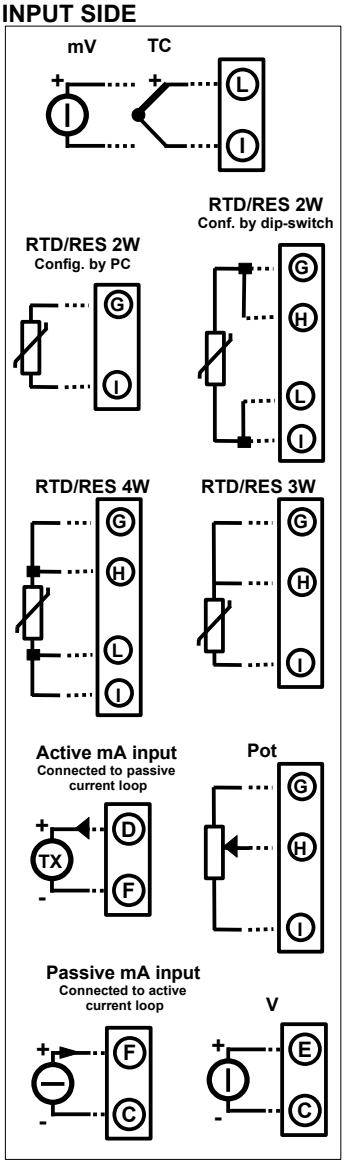
The device is suitable for fitting to DIN rails in the vertical position.
For optimum operation and long life follow these instructions:

When the devices are installed side by side it may be necessary to separate them by at least 5 mm in the following cases:
- If panel temperature exceeds 45°C.
- Use of low power supply value (< 24 Vdc).
- Use of active current input.
- Use of active current output.

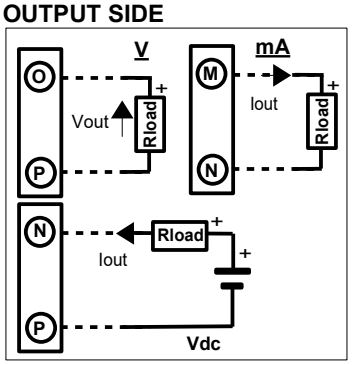
Make sure that sufficient air flow is provided for the device avoiding to place raceways or other objects which could obstruct the ventilation slits. Moreover it is suggested to avoid that devices are mounted above appliances generating heat; their ideal place should be in the lower part of the panel.
Install the device in a place without vibrations.
Moreover it is suggested to avoid routing conductors near power signal cables (motors, induction ovens, inverters etc...) and to use shielded cable for connecting signals.

CONNECTIONS

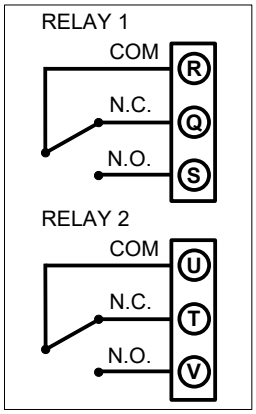
INPUT SIDE



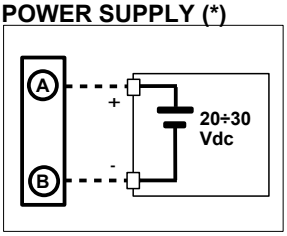
OUTPUT SIDE



CONTACTS OF RELAYS



POWER SUPPLY (*)



(*) Note: the device must be powered using a power supply unit classified NEC class 2 or SELV

HOW TO ORDER

The device is provided as requested on the Customer's order.
(specify all the necessary parameters in the order).

ORDER CODE EXAMPLE:

DAT5024-AO