Thermocouple to Digital PLC Module
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UNI EN ISO 9001:2008

A/D interface for PLC
4 input channels for mV, Tc
DAT 6021

FEATURES

- Acquisition of analogue signals on PLC's digital I/O
- analogue input to any PLC or micro PLC
- Up to 16-bit resolution with Full Scale high accuracy
- 4 input channels
- Configurable input for ± 1 V or Tc type J,K, R,S,B,E,T,N
- Configurable by DIP-switch
- Galvanic isolation at 2000 Vac on three ways
- EMC compliant – CE mark
- Suitable for DIN rail mounting in compliance with EN 50022 and EN-50035

GENERAL DESCRIPTION

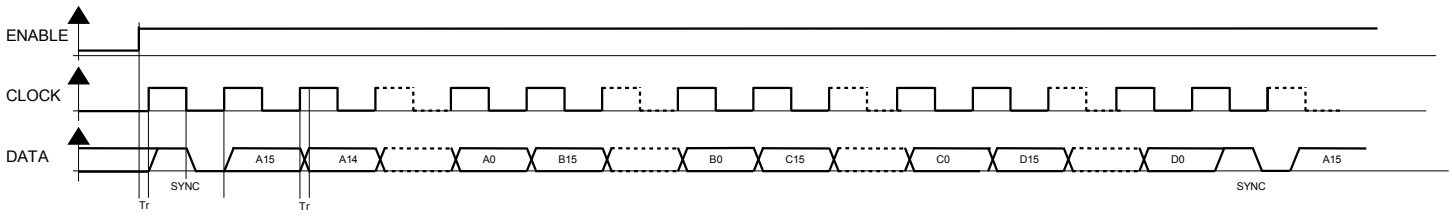
The device DAT6021 is designed to measure, amplify and linearise 4 analogue signals coming from Tc and mV sensors in a 16 bits resolution digital words that contain the input values. The digital signal is transferred to PLC by one of its digital inputs. The data transfer must be controlled by the PLC by the generation of a clock signal over one of its digital ports.
It is housed in a plastic enclosure of 12.5 mm thickness suitable for DIN rail mounting in compliance with EN-50022 and EN-50035 standards.

USER INSTRUCTIONS

Before to install the device, read carefully the section "Installation instructions"
Connect the power supply, the PLC and the analogue inputs as shown in the section "Wiring".
If necessary, configure the devices by dip-switch on the side of the device as shown in the section "Configuration"
I LED "PWR" and "DATA" indicates the status of the device: refer to the section "Light Signalling" to verify the device working.

DATA ACQUISITION PROCEDURE (example in the picture)

To get data from the device, the PLC must generate an enabling signal (ENABLE) and a clock (CLK) to the proper device's terminals. If the enable is high, at each rise edge of the clock signal, the device provides on the data line (DATA) one of the bit of reading. Each word is built of 1 synchronism bit followed from 16 bit for each analogue input. Each word has 65 bits length. The rise edge of the ENABLE signal allow the reset of reading cycle.



TECHNICAL SPECIFICATIONS (Typical at 25 °C and in nominal conditions)

Input type	Min	Max
Voltage		
50 mV	-50 mV	+50 mV
100 mV	-100 mV	+100 mV
500 mV	-500 mV	+500 mV
1000 mV	-1000mV	+1000mV
Thermocouple		
J	-210 °C	+1200 °C
K	-210 °C	+1372 °C
R	-50 °C	+1767 °C
S	-50 °C	+1767 °C
B	+400 °C	+1825 °C
E	-210 °C	+1000 °C
T	-210 °C	+400 °C
N	-210 °C	+1300 °C

Input channels: 4

Input calibration (1) ±0.05% f.s.

Linearity (1)
mV ±0.1% f.s.
Tc ±0.2%f.s.

Cold junction compensation ± 0.5 °C

ANALOGUE INPUT

Input impedance
mV, Tc >=1 MΩ

Thermal drift (1)
Full Scale ± 0.005 % / °C

CJC thermal drift
Full Scale ± 0.02 %/ °C

Input line impedance influence (1)
mV, Tc < 0.8 uV/Ohm

Warm-up time 3 minutes for Tc

Sampling time ~ 0.5 sec.

DIGITAL INTERFACE
Voltage on terminals typical 24 Vdc (30 Vdc max.)
ON state > 9 Vdc
Input impedance
(ENABLE, CLK) 4.7 KOhm
Minimum output load
(DATA) 560 Ohm (2)

Max. clock signal frequency 500 Hz
Rise / Fall time (Tr) <0.2 ms

POWER SUPPLY

Supply voltage	18 .. 30 Vdc
Current consumption	30 mA @ 24 Vdc
Reverse polarity protection	60 Vdc max
Max. current consumption	45 mA

ISOLATION

Inputs – PLC	2000 Vac 50 Hz, 1 min.
Power supply – Inputs	2000 Vac 50 Hz, 1 min.
Power supply – PLC	2000 Vac 50 Hz, 1 min.

ENVIRONMENTAL CONDITIONS

Operative Temperature	-10°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 50 g.

EMC (for industrial environments)

Immunity	EN 61000-6-2
Emission	EN 61000-6-4

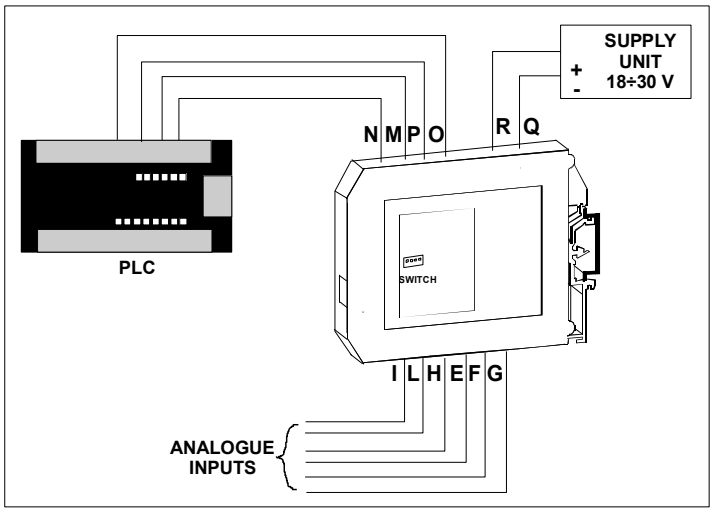
(1) referred to input Span (difference between max. and min. values)
(2) The load on the output DATA is controlled with the current taken from the ENABLE signal

INSTALLATION INSTRUCTIONS

The DAT 6021 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 case:
- If panel temperature exceeds 45°C device powered by an high power supply voltage: > 27 Vdc.

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.

CABLING



PROGRAMMING TABLE

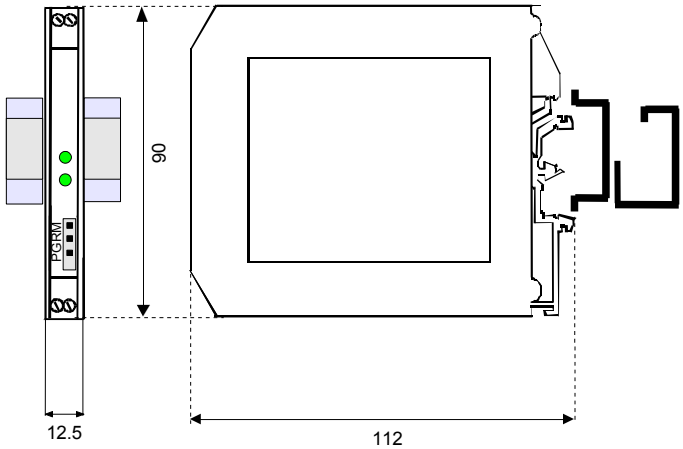
SW4	Filter (CLK)
	1 ms (500 Hz)
●	10 ms (50 Hz)

● = Switch ON

* Specify in phase of order

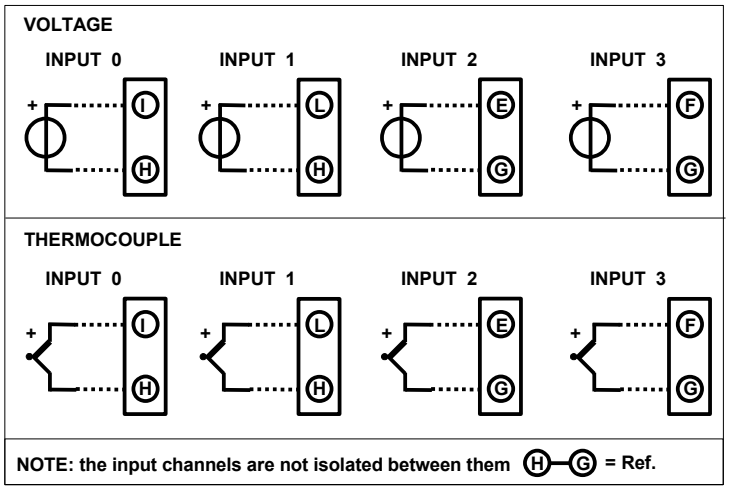
SW3	SW2	SW1	Input *	
			TAB. A	TAB. B
			Tc J	50 mV
		●	Tc K	100 mV
	●		Tc T	500 mV
	●	●	Tc E	1000 mV
●			Tc R	----
●		●	Tc S	----
●	●		Tc B	----
●	●	●	Tc N	----

DIMENSIONS (mm)

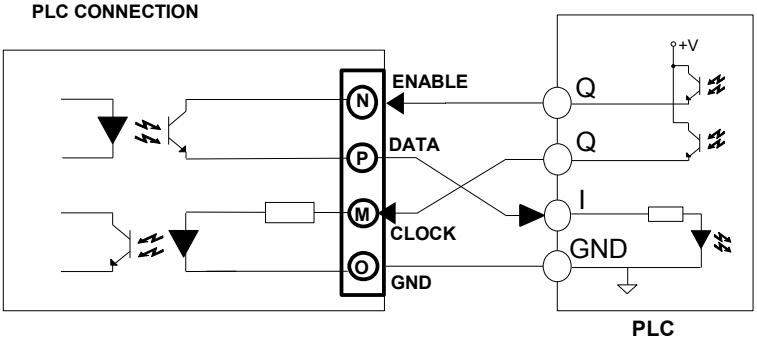


WIRING

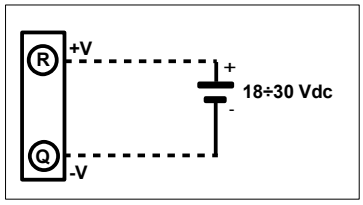
ANALOGUE INPUTS CONNECTIONS



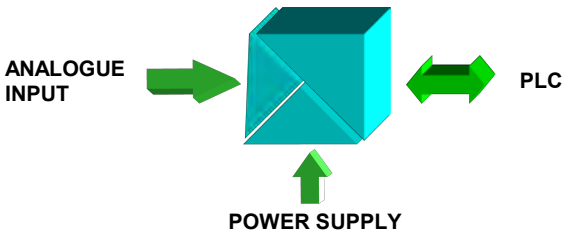
PLC CONNECTION



POWER SUPPLY CONNECTIONS



ISOLATION STRUCTURE



LIGHT SIGNALLING

LED	COLOUR	STATE	DESCRIPTION
PWR	GREEN	ON	Device powered
		OFF	Device not powered
DATA	GREEN	ON	"DATA" Line = 1
		OFF	"DATA" Line = 0

HOW TO ORDER

In phase of order it is necessary to specify the type of table for the input.
The DAT 6021 is supplied as requested from the Customer. Refer to the section "Programming table" for the available options

DAT 6021 / A / Tc K / 10mS

- A: Table: A : Thermocouples B : mV
- Tc K: Input type (see programming table)
- 10mS: CLK filter

= Requested
= Optional