DATEXEL

Frequency Converter Trip Amplifier with Relay Output DAT4540R
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UNI EN ISO 9001:2008

Isolated F/V, F/I Converter Configurable by Dip-Switch or PC, Relay Outputs
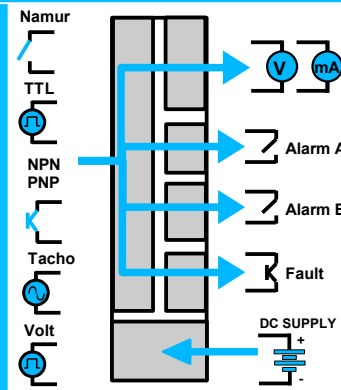## DAT 4540

FEATURES

- **Measure of the frequency for the following digital contacts input:**
  Namur, TTL, NPN, PNP, Tachometer , Volt
- **Configurable output as current or voltage**
- **Double optional trip alarm**
- **Fault alarm condition for Namur sensor**
- **Configurable by Dip-switch or PC**
- **High accuracy**
- **On-field reconfigurable**
- **Galvanic insulation among all ways**
- **EMC compliant – CE mark**
- **Suitable for DIN rail mounting in according to EN-50022 and EN-50035 standards**

Namur
TTL
NPN PNP
Tacho
Volt
V mA
Alarm A
Alarm B
Fault
DC SUPPLY +
-

CE Pb lead-free RoHS Compliant

GENERAL DESCRIPTION

The isolated frequency converter DAT 4540 is able to measure, up to 20 KHz, the frequency of TTL, Namur, NPN, PNP and Tachometer digital signals. In function of programming, the measured values are converted in a current or voltage signal. Moreover two relays are available in order to be programmed as trip alarm (version "-R"). For the Namur input is continuously checked the integrity of the sensor; in case of fault (short circuit or interruption), on the transistor output is generated an alarm.
The device guarantees high accuracy and performances stability both versus time and temperature.
The programming is made by the dip-switch located in the window on the side of the enclosure. By means of dip-switches it is possible to select the input type and range and the output type without recalibrate the device.
By PC, the user can program all the parameters of the devices for his own necessities.
The galvanic isolation on all ways (input, outputs and power supply) eliminates the effects of all ground loops eventually existing and allows the use of the converter in heavy environmental conditions found in industrial applications.
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 INSTRUNCTIONS

The converter must be powered by a direct voltage applied to the terminals Q and R.
The analogue channel measures the value from the sensor connected to the terminals the I, L, G, H and transmits the output measure on the terminals N, M, O and P.
The connections for the trip alarms are available between th terminals A-B-C-D and S-T-U-V (version -R); the digital contact (N.C.) of the Fault alarm for the Namur sensor is available between the terminals E-F. The input and output connections must be made as shown in the section "Connections".
It is possible to configure the converter on field by dip-switch or Personal Computer as shown in the section " Programming ". The configuration by dip-switches can be made also if the device is powered (note: after the configuration the device takes some seconds to provide the right output measure).

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

INPUT

Namur (DIN 19234)
Low level Trig.	< 1.2 mA
High level Trig.	> 2.1 mA
Aux. Voltage	8.2 V – 8 mA
Impedance	~ 1000 Ohm
Interruption Alarm	< 0.2 mA
Short Circuit Alarm	> 7.0 mA

TTL
Low level Trig.	< 0.8 V
High level Trig.	> 2.0 V
Impedance	> 20 KOhm

PNP
Low level Trig.	< 4.0 V
High level Trig.	> 7.0 V
Aux. Voltage	17 V – 20 mA
Impedance	~ 2.2 KOhm

Tacho
Max.Voltage	30 Vpp
Low level Trig.	< -50 mV
High level Trig.	> +50 mV
Impedance	> 100 Kohm

Voltage (programmable)
Trigger Level	0.05 V ÷ 7.0 V
Aux. Voltage	5 ÷ 17 V @ 20 mA
Impedance	> 20 Kohm

Frequency	0.1 Hz ÷ 20 KHz
Sample Time	< 50ms + period

ANALOGUE OUTPUT

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

Output calibration
Current	± 7 uA
Voltage	± 5 mV

Aux. Voltage	>12V @ 20 mA

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.

RELAY OUTPUTS

Relay Outputs (Only for version "-R")
N° 2 SPDT
Max. Load (Resistive)	250 Vac, 2A
Isolation between terminals	1000 Vac max

Transistor Output
Max. load (Resistive)	30 Vdc, 100mA

POWER SUPPLY

Power supply voltage	20 .. 30 Vdc
Reverse polarity protection	60 Vdc max

Current consumption
Current output	90 mA max.
Voltage output	30 mA max.
(+ 10mA for each Relay output active)	

ISOLATION
Among all 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 90 g.

EMC (for industrial environments)
|	
Immunity	EN 61000-6-2
Emission	EN 61000-6-4

PROGRAMMING

CONFIGURATION BY PC

By software DATESOFT 2.5 and later releases it is possible to:
- set the default programming of the device;
- program the options not available with the dip-switch; (burn-out level, CJC offset, etc...);
- read, in real time, the input and output measures;
- follow the dip-switches configuration wizard.

To configure the device follow the next steps:
1) Power-on the device.
2) Open the protection plastic label on the front of the device.
3) Connect the interface PRODAT to the PC (COM port) and to the device (PGRM connector).
4) Open DATESOFT2.5 .
5) Select the COM port in use.
6) Click on "Open COM".
7) Click on "Program".
8) Set the programming data.
9) Click on "Write" to send the programming data to the device.
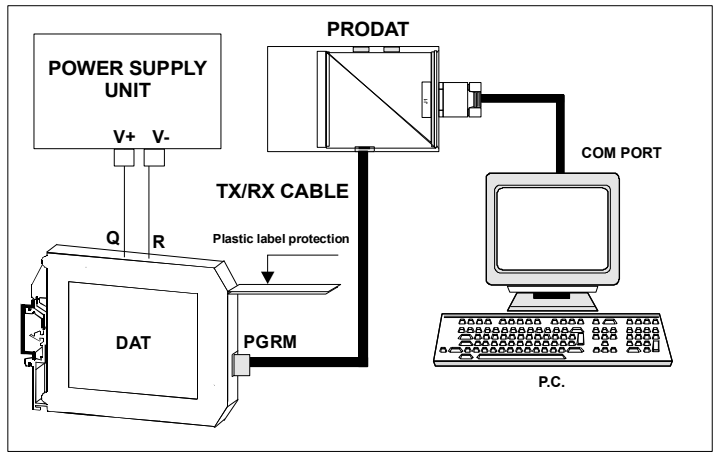
Warning: during these operations the device must always be powered and the TX/RX cable always connected.
For information about DATESOFT refer to the software's user guide.

CONFIGURATION BY DIP-SWITCH

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

2) Set the input type by the dip-switch SW1 [1..2] (see TAB.1)

3) Set the output type by the dip-switch SW1 [3..4] (see TAB.2)

4) Set the input Full Scale value by the dip-switch SW2 [1..6] (see TAB.3)

5) Set the multiplication factor by the dip-switch SW2 [7..8] (see TAB.3)

EX. of configuration:

- Input type: Namur
- Output type: 0÷10 V
- Full scale: 125 Hz
- Mult. Factor: (12,5 * 10)
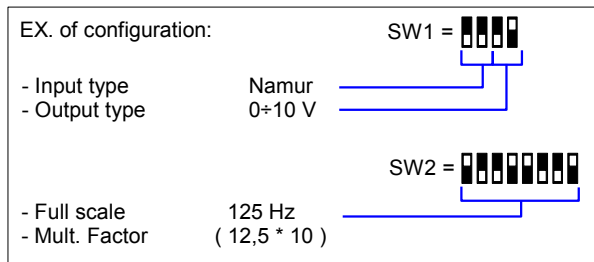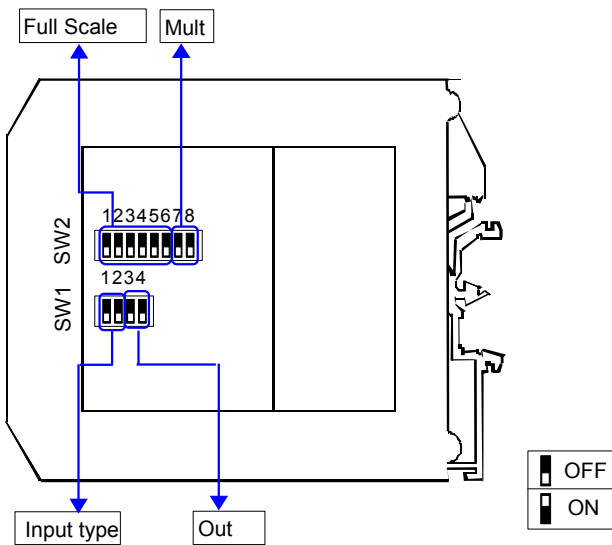
NOTE:
- It is also possible to see how to set the dip-switches using the wizard of the configuration software (connect the device to the PC following the procedure described in the section "Configuration by PC")

DIP-SWITCH CONFIGURATION TABLES

TAB.1 Input type

SW1 1 2	
	Namur
	Tacho
	TTL
	PNP

Tab.2 Output type

SW1 3 4	
	0-20 mA
	4-20 mA
	0-10 V
	0-5 V

TAB.3 – Full Scale settings

Mult. Factor SW2 7 8	Mult	Full Scale SW2 1 2 3 4 5 6	Hz	SW2 1 2 3 4 5 6	Hz	SW2 1 2 3 4 5 6	Hz	SW2 1 2 3 4 5 6	Hz
	1000		Default		8		16		24
	100		0.5		8.5		16.5		24.5
	10		1		9		17		25
	1		1.5		9.5		17.5		25.5
			2		10		18		26
			2.5		10.5		18.5		26.5
			3		11		19		27
			3.5		11.5		19.5		27.5
			4		12		20		28
			4.5		12.5		20.5		28.5
			5		13		21		29
			5.5		13.5		21.5		29.5
			6		14		22		30
			6.5		14.5		22.5		30.5
			7		15		23		31
			7.5		15.5		23.5		31.5

OFF / ON

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 and the device is powered with high power supply value (> 27 Vdc).
- Use of output active current.
- Use of the input auxiliary supply .

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.
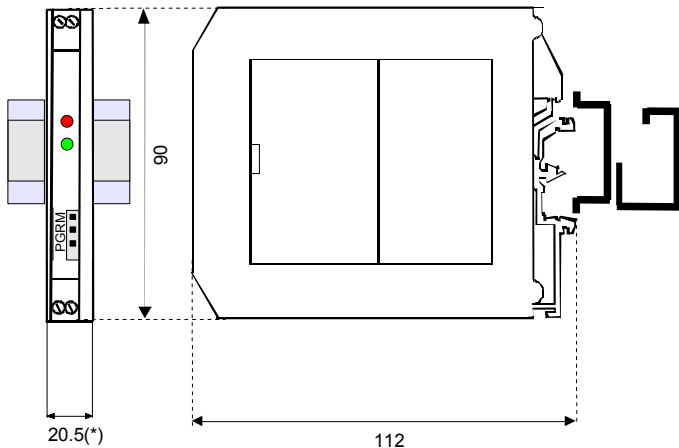Install the device in a place without vibrations.
Moreover it is suggested to avoid routing conductors near power signal cables (motors, induction ovens, inverters etc...) and to use shielded cable for connecting signals.
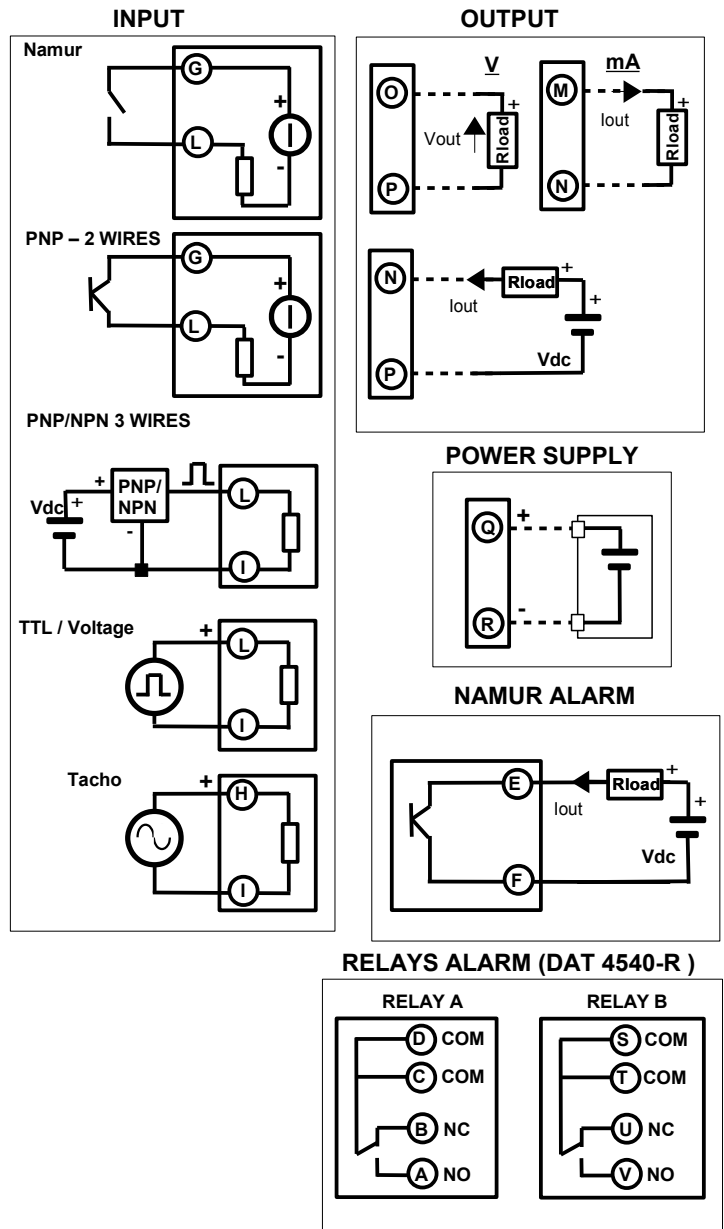
ISOLATION STRUCTURE

DIMENSIONS (mm)

90

20.5(*)

112

(*) **NOTE**:
"-R" Version: 20.5 mm thickness
Standard Version: 12.5 mm thickness

CONNECTIONS

INPUT

Namur

PNP – 2 WIRES

PNP/NPN 3 WIRES

TTL / Voltage

Tacho

OUTPUT

POWER SUPPLY

NAMUR ALARM

RELAYS ALARM (DAT 4540-R)

RELAY A	RELAY B
D COM	S COM
C COM	T COM
B NC	U NC
A NO	V NO

LIGHT SIGNALLING

LED	COLOUR	STATE	DESCRIPTION
PWR	GREEN	ON	Device powered
		OFF	Device not powered
		BLINKING	Wrong dip-switch setting
ALARM	RED	ON	Trip Alarm or Fault Alarm active
		OFF	Trip Alarm or Fault Alarm not active

HOW TO ORDER

The device is provided as requested on the Customer's order.
Refer to the section "Programming" to determine the input and output ranges.
In case of the configuration is not specified, the parameters must be set by the user.

ORDER CODE EXAMPLE:

DAT 4540 | -R | / | TTL | / | 10 kHZ | / | 4 ÷ 20 mA |

- Version with Relay outputs
- Input type
- Input Full scale
- Output range

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