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FREQUENCY DIVIDER

- Optocoupled input for OPTO (SENSUS), NAMUR, REED, NPN, PNP, photoelectric sensors
- Power supply for external sensor 12 Vdc, 100 mA
- Selectable divider value between 1...9999 (up to 3 decimal places)
- Divider value visible on display
- Outputs:
  - static NPN / PNP (optocoupled) 30mA@24V,
  - SPST REED relay 250mA@100V
- Adjustable pulse length between 2...250 ms
- LED indication : power supply, input signal , output
- Housing suitable for installation on rail DIN 2M

1.0 PACKING LIST

- ❑ User's manual (this document)
- ❑ safety precautions and notes
- ❑ device

2.0 SAFETY PRECAUTIONS

Read the warnings supplied with the machine carefully before using the instrument (see packaging list supplied with the product).
The instruments is a electronic instrument, thus it must not be considered a machine; consequently; it is not subjected to the requirements fixed by CEE 89/392 Directive (Directive relating to Machinery).
If the instrument is used as part of a machine, it cannot be supplied if the machine does not meet the Directive requirements. The instrument marking does not release the customer from fulfilling the obligations provided by the law concerning his end-item.
Before installation check device model and provide an appropriate power supply (see paragraph 3.6 on this manual). Provide an adequate protection on power supply circuit; it is recommended to use a time-delay 300mA fuse. This device has internal surge protection.

Before applying the power supply to see the model exactly that it is being install (you see paragraph 4.5).

3.0 GENERAL DESCRIPTION

Device is a frequency divider and is provided with:

- ❑ optocoupled input for OPTO (Sensus), NAMUR, REED, NPN (10...30 Vdc), PNP (10...30 Vdc), photoelectrical sensor
- ❑ power supply for external sensor (12Vdc / 100 mA max)
- ❑ max input frequency: static 400 Hz
  reed 15 Hz
- ❑ output: static NPN/PNP (optocoupled) 30 mA / 24V
  relay REED (SPST contact) 250 mA / 100V
- ❑ adjustable pulse length from 2 to 250 ms
- ❑ adjustable divider from 1 to 9999 with 0, 1, 2, 3 decimal places
- ❑ DP display indication of: power supply (PWR)
  active input (IN)
  active output (OUT)

3.1 WORKING CYCLE

Each input pulse is counted, DP "IN" show pulse input.
When divider value is reached, an output pulse is generated and il DP "OUT" shows it.
Decimal part is stored and totalized for next output pulse.

Example 1: Divider = 2
Every 2 input pulse, device generate 1 output pulse.
Example 2: Divider = 53,4
At 54th input pulse, device generate 1 output pulse and store in memory value 0,011236 [(54/53,4) -1] that will be counted for next pulses.

6.4 ACCESSORIES AND OPTIONS

Not available

6.5 WARRANTY AND SERVICE

6.5.1 WARRANTY

The device is covered by a warranty for manufacturing defects, valid for 12 months from the date of purchase. The warranty does not cover devices that have been tampered with, improperly repaired or used in a manner that does not conform to the user manual.

6.5.2 REPAIR

All repair operations must be carried out by the manufacturer or by an authorized representative. Pack the instrument carefully, enclose both a brief description and a full description of the nature of the malfunction with the package, and send to the manufacturer.

6.0 TECHNICAL SPECIFICATIONS

6.1 GENERAL SPECIFICATIONS

PACKAGE
DIN rail mounting
Width: 2 din module (36 mm)
Height: 90 mm
Depth: 68 mm
Weight: 100g
Protection level: IP20
Connection by two screw terminal blocks 6+6 poles

DIGITAL INPUT
Signal: NPN, PNP, OPTO (SENSUS), namur, optoelectronic, solaris
Impendence : 2000 ohm

EXTERNAL SENSOR SUPPLY
Voltage: 12 Vdc
Current: max 100 mA

POWER SUPPLY
Voltage: 24 Vdc; 24 Vac
Max consumption 1,5 W; 1,5 VA
Tolerance: ±10%

STATIC OUTPUT
Signal: NPN, PNP
Voltage 5…30 Vdc
Max current 30 mA
Load: resistive, inductive
Protection: self- resetting 50mA fuse

REED OUTPUT
Signal: voltage-free contacts
Voltage 10…100 Vdc/Vac
Max current 250 mA
Load: resistive

6.2 WORKING ENVIRONMENT

6.2.1 WORKING TEMPERATURE
Working temperature range : –10…50°C

6.2.2 HUMIDITY
0…95% - not condensing

6.2.3 ELECTROMAGNETIC COMPATIBILITY EEC
According to directive CEE 2004/108
Immunity for industrial environments EN61000-6-2
Emission standard for industrial environments EN61000-6-4

6.2.4 ELECTRICAL SECURITY
According to directive CEE 2006/95
Safety requirements for electrical equipment EN61010-1

6.3 STORAGE

Storage temperature -20…60°C;
Relative humidity up to 95 not condensing
A dry, dust-free environment is recommended
Avoid exposure to corrosive acid vapors
Do not wash the products with water
Prevent liquids from entering into the internal circuits

4.0 PREPARATION FOR THE USE

4.1 FIRST PREPARATION

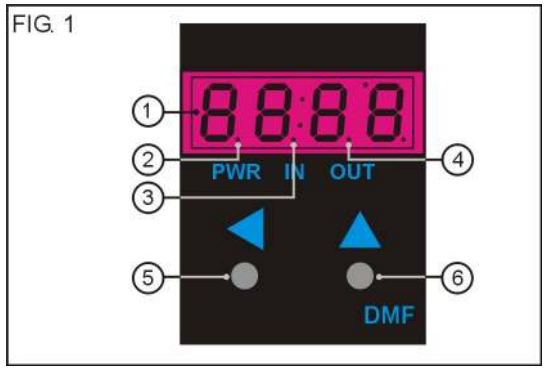
The device is suitable for DIN rail mounting.

4.2 ASSEMBLY AND INSTALLATION

To fix with joint into the DIN guide on the top (the top is without black spring) and to press the lower whit joint into the spring hook. (for to easy the joint press the black spring with a screwdriver)
Before to connect the device see you figure 2 and paragraph 4.6 (Electrical connections).
Connect the device without power supply.

4.3 FRONT VIEW

FIG. 1

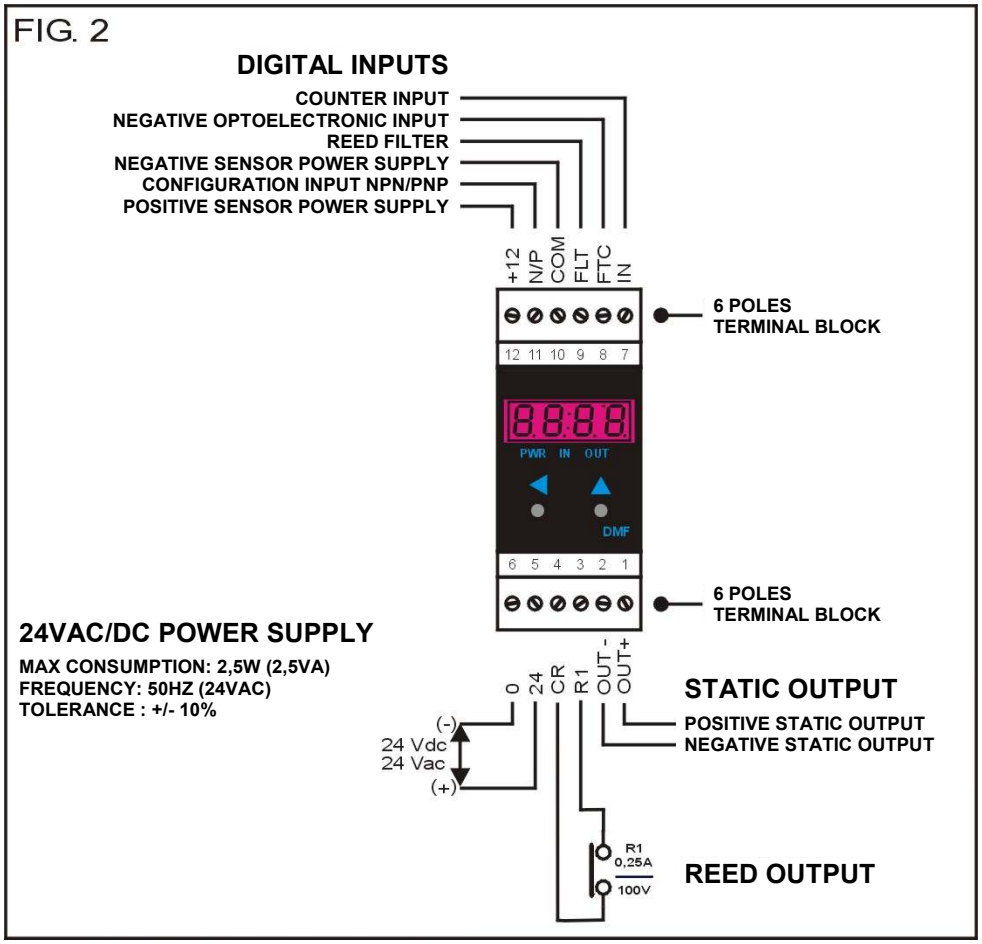


1	=	4-digit LED display	[1]
2	=	decimal point PWR for power supply indication	[2]
3	=	decimal point IN for active input indication	[2]
4	=	decimal point OUT for active output indication	[2]
5	=	SHIFT button for: enable change parameter value	
		digit selection during parameter change	
		exit and save parameter change	
6	=	UP button for: enter programming menu	
		Increase selected digit during parameter change	

[1] active only during parameter change
[2] active only on duty

4.4 CONNECTIONS

FIG. 2



4.5 POWER SUPPLY

Verify the code of the device and to apply the correct power supply.

Model	Power supply voltage
DMF	24 Vac / 24 Vdc ± 10%

It is recommended to provide protection from supply over voltage, as they will permanently damage the device.

5.3 LOCAL CONTROL

It is possible to control device using the following local control buttons (see Fig.1):

FIG 1	Button	Function
5	**SHIFT**	Start changing a parameter Select another digit during parameter change Store and confirm parameter change
6	**UP**	Enter programming mode Increase selected digit during parameter change

5.4 REMOTE CONTROL

Device is provided with the following remote controls: (see paragraph 4.4 “Connections” and 4.6 “Electrical connections”):

- ❑ digital input (including power supply for external sensor)
- ❑ NPN/PNP static output
- ❑ REED output

5.4.1 DIGITAL INPUT

See fig. 2; device has one optocoupled digital input (IN).
Impedance: 2000 ohm
Logical level 0: 0…3V
Logical level 1: 6…30 Vdc
Maximum cable length: 3 meters.

5.4.2 STATIC OUTPUT

Device has one optocoupled static output.
Maximum insulation voltage: 250V.
Can be connect in NPN (see fig. 3) or PNP (see fig. 4) mode.
Voltage: 10... 30 Vdc
Maximum current: 30 mA.
Protected against short-circuit with a self-resetting fuse.
Maximum cable length: 3 meters.

5.4.3 REED OUTPUT

SPST contact.
Maximum voltage: 100V.
Maximum current: 250 mA.
Coil is optocoupled to reduce any inductive return noise on main board.

5.4 MAINTENANCE

The device does not have any parts that require maintenance.

5.1.2 POWER ON
When device is powered on, pulse counter start from zero as device has no memory of previously counted pulse.

5.2 PROGRAMMING
As soon as device enter programming mode, display is enabled for parameters configuration.

Parameter	Label on display	Range		Default
		min	max	
Decimal point	dP	0	3	0
Divider	diU	1	9999	1
Pulse length	t	2	250	20

5.2.1 ENTERING
Press UP button to enter programming mode.
Display show for one second label “dP” and after value currently stored.
Pressing again UP button, other parameters label will show up:
- “diU”
- “t”

5.2.2 CHANGE PARAMETER VALUE
To change parameter value keep pressed SHIFT button for 1 second, then one of the digit will start blinking.
From this moment:
- use UP button to change selected digit
- use SHIFT button to change selected digit (number of selectable digits depends on maximum range allowed on that parameter)

5.2.3 STORE NEW PARAMETER VALUE
To confirm and store new parameter value, keep pressed SHIFT button for 1 second, then selected digit will stop blinking.

5.2.4 PARAMETER DECIMAL POINT “dP”
- 0: no DP (9999)
- 1: one DP (999,9)
- 2: two DP (99,99)
- 3: three DP (9,999)

5.2.5 PARAMETER DIVIDER “diU”
Range for this parameter is from 1 to 9999.
Selectable decimal point (with parameter “dP”) is shown on display.

5.2.6 PARAMETER OUTPUT PULSE LENGTH “t”
Range for this parameter is from 2 to 250 ms.

5.2.7 EXIT PROGRAMMING MODE
Press UP button to exit from programming mode, after parameter “t”.
In any case, if is not pressed any button for 60 seconds, device will exit from programming mode.

4.6 ELECTRICAL CONNECTIONS
There are two 6-pole electrical blocks for device electrical connections. One in the bottom part (terminals 1…6) and one in the top part (terminals 7…12)

4.6.1 POWER SUPPLY
24 Vdc : terminal 5 (24, positive) and 6 (0, negative)
24 Vac : terminal 5 (24) and 6 (0)

4.6.2 REED OUTPUT
terminal 4 (CR)
terminal 3 (R1)

4.6.3 STATIC OUTPUT (NPN/PNP)
Positive : terminal 1 (OUT+)
Negative : terminal 2 (OUT-)

FIG. 3 STATIC NPN OUTPUT

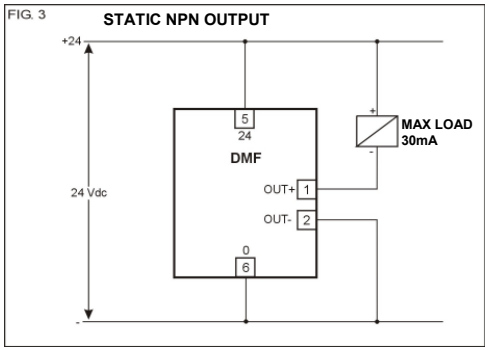
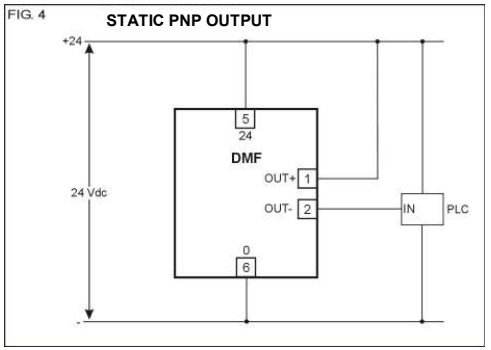


FIG. 4 STATIC PNP OUTPUT



4.6.4 COUNTER INPUT

4.6.4.1 NPN INPUT
Connect terminal 11 (N/P) with terminal 12 (+12) (see fig. 5)
Fast input for static sensors (max 400 Hz): positive = 12 (+12)
negative = 10 (COM)
output = 7 (IN)

4.6.4.2 PNP INPUT
Connect terminal 11 (N/P) with terminal 10 (COM) (see fig. 6)
Fast input for static sensors (max 400 Hz): positive = 12 (+12)
negative = 10 (COM)
output = 7 (IN)

4.6.4.3 OPTOELECTRONIC SENSOR INPUT
Connect terminal 11 (N/P) with terminal 10 (COM) (see fig. 7)
Fast input for static sensors (max 400 Hz): positive = 12 (+12)
negative = 8 (FTC)
output = 7 (IN)

4.6.4.4 OPTO (SENSUS) INPUT

Connect terminal 11 (N/P) with terminal 12 (+12) (see fig. 8)
Input for NAMUR static sensors (max 400 Hz): positive = 7 (IN)
negative = 10 (COM)

4.6.4.5 NAMUR INPUT

Connect terminal 11 (N/P) with terminal 12 (+12) (see fig. 9)
Input for NAMUR static sensors (max 400 Hz): positive = 7 (IN)
negative = 10 (COM)

4.6.4.6 MODULARIS SENSOR INPUT

Connect terminal 11 (N/P) with terminal 12 (+12) (see fig. 10)
Input for modularis sensors (max 400 Hz): white = 7 (IN)
brown = 10 (COM)

4.6.4.7 REED INPUT

Connect terminal 11 (N/P) with terminal 12 (+12) (see fig. 11)
Connect terminal 9 (FLT) with terminal 10 (COM) (see fig. 11)
Mechanical contact (no power supply) between terminal 7 (IN) and 10 (COM)

FIG. 5
SENSOR WITH NPN OUTPUT

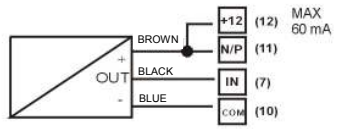


FIG. 6
SENSOR WITH PNP OUTPUT

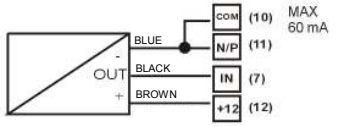


FIG. 7
OPTOELECTRONIC SENSOR

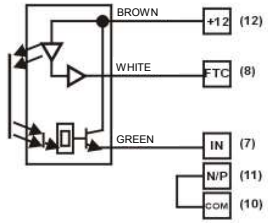


FIG. 8
OPTO SENSOR (SENSUS)

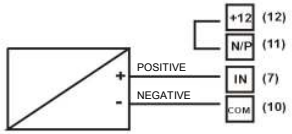


FIG. 9
NAMUR SENSOR

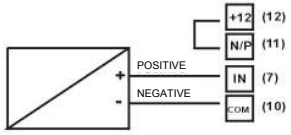


FIG. 10
MODULARIS SENSOR

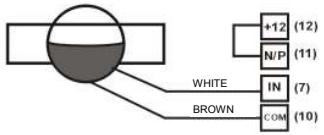
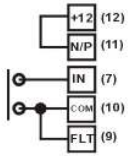


FIG. 11
REED OUTPUT SENSOR



4.7 CHECK FUNCTIONALITY

Provide power supply to device.
Decimal point “PWR” must lit.
Decimal point “IN” show incoming pulse from sensor
Decimal point “OUT” show generated output pulse

4.8 STORAGE

There is no need for calibration if the device doesn’t work for a long time.

5.0 HOW TO USE THE DEVICE

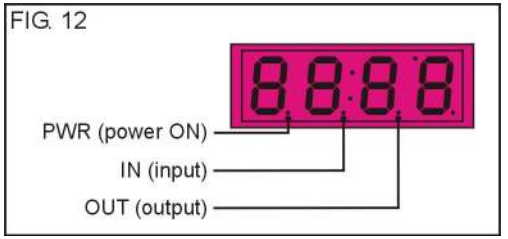
Device works as a pulse divider and interface with different input signal (NPN, PNP, OPTO, reed).
Divider can be set as integer or rational number between 1,000 and 9999.
It is suitable for measure conversion in liter or cubic meter for pulse output coming from a water meter.

5.1 OPERATIONS

Diplay is off except three DP showing:

- PWR (power supply)
- IN (input active)
- OUT (output active)

FIG. 12



5.1.1 WORKING CYCLE

Each input pulse is counted, DP “IN” show pulse input.
When divider value is reached, an output pulse is generated and il DP “OUT” shows it.
Decimal part is stored and totalized for next output pulse.
Output pulse length can change between 2 and 250 ms, according to parameter “t”.

Example 1: Divider = 2
Every 2 input pulse, device generate 1 output pulse.
Example 2: Divider = 53,4
At 54th input pulse, device generate 1 output pulse and store in memory value 0,011236 [(54/53,4) -1] that will be counted for next pulses.