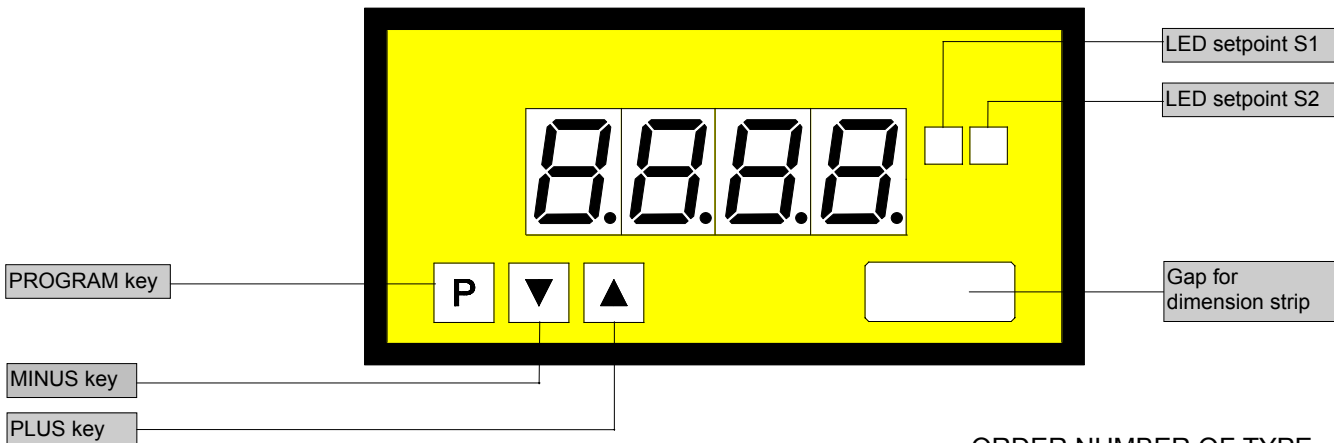# Frequency metering 0.01 Hz – 9999 Hz with 2 setpoints

- free scalable indication and setpoints 0 up to +9999
- standard: sensor supply, min/max memory - option: analogue output
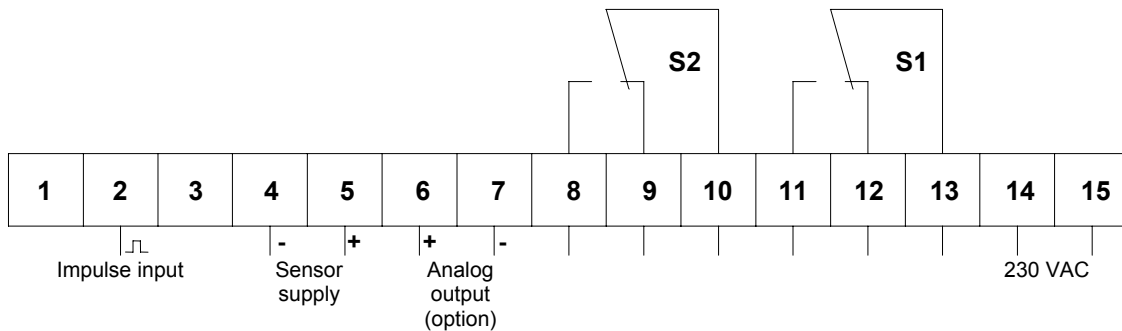- mounting into panels with thickness up to 50 mm

96x48

8888

LED setpoint S1

LED setpoint S2

PROGRAM key

Gap for dimension strip

MINUS key

PLUS key

ORDER NUMBER OF TYPE
PFL 4.307.1522B

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

S2   S1

Impulse input — Sensor supply — Analog output (option) — 230 VAC

Connections for Namur and 3-wire NPN and PNP see last page.

Power supply 115 VAC
(connection via terminal 14 and 15)   **PFL 4.307.1422B**

Power supply 24 VDC
- galv. insulated - (15= plus, 14= minus)   **PFL 4.307.1722B**

Options
- Green LED
- Protection IP54
- Protection IP65
- Plug in terminal with protection IP40
- Plug in terminal with protection IP54
- Plug in terminal with protection IP65
- Sensor supply 10 VDC/20 mA
- Sensor supply 10 VDC/20 mA   *(supply voltage 24 VDC galvanically insulated))*

The sensor supply is galvincally insulated from the measuring input!
- Analog output 0-10 VDC (12 bit)
- Analog output 0-20 mA/load 500 Ω (12 bit)
- Analog output 4-20 mA/load 500 Ω (12 bit)
- Analog output 0-10 VDC (12 bit)   *(supply voltage 24 VDC galvanically insulated)*
- Analog output 0-20 mA/load 500 Ω (12 bit)   *(supply voltage 24 VDC galvanically insulated)*
- Analog output 4-20 mA/load 500 Ω (12 bit)   *(supply voltage 24 VDC galvanically insulated)*
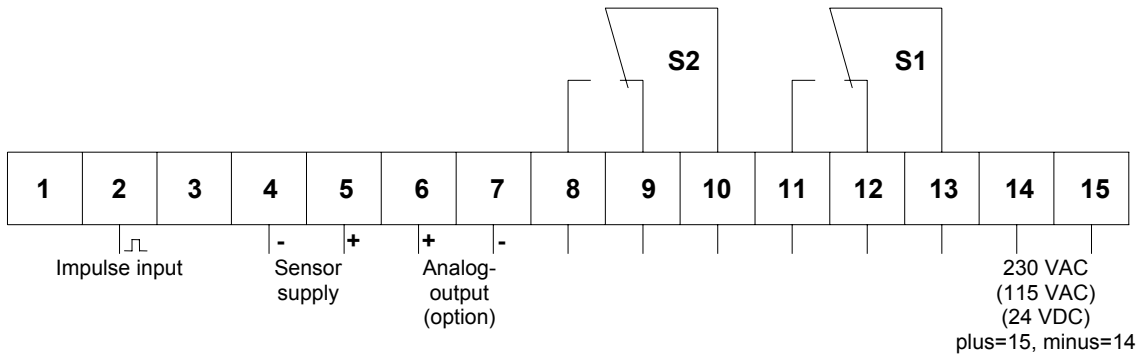- Other power supplies on demand

Technical data

Dimensions	Housing	96 x 48 x 134 mm, including screw terminal
	Assembly cut out	$92.0^{+0.8}$ x $45.0^{+0.6}$ mm
	Fastening	special quick plastic clamp proper to fix in wall thickness up to 50 mm
	Housing material	PC/ABS-plastic blend, colour black, UL94V-0
	Protective system	at the front IP40
		connection IP00
	Weight	approx. 0.35 kg
	Connection	at the rear side via screw terminals up to 2.5 mm^2
Input	Sensors	Namur, 3-wire pick up, impulse input
		High/Low level ---> 10 V/< 6 V – U_{in} max. 30 V
	Input resistance	Ri at 10 V $\geq$ 55 KΩ; at 20 V $\geq$ 2.5 kΩ; at 30 V $\geq$ 1.5 kΩ
	Input frequency	0.01 Hz – 9999 Hz
Output	Sensor supply	24 VDC/50 mA – 10 VDC/20 mA (other sensor supplies/performances on demand)
		The sensor supply is galvanically insulated from the measuring input!
	Relay output	charge 230 VAC/5 A – 30 VDC/2 A, with ohm resistive burden
	Switching cycles	0.5 * 10^5 at max. contact rating
		5 * 10^6 mechanically
		Separation appropriate to DIN EN 50178/ specification appropriate to DIN EN60255.
	Analogue output	0-10 VDC (12 bit) } The analogue output is galvanic insulated from the
		0-20 mA (12 bit) - load 500 Ohm } measuring input!
		4-20 mA (12 bit) - load 500 Ohm
Accuracy	Resolution	0 up to +9999
	Measuring fault	+/-0.04 % of the input frequency
	Measuring principle	frequency/pulse width measuring
	Temp. drift	~40 ppm/K
Power unit	Supply voltage	230/115 VAC +/- 10 % (50-60 Hz), 24 VDC +/-10 % galvanic insulated
	Power consumption	approx. 5 VA
Indication	Display	LED with 7 segments, 14 mm high, red
		4-digit = indication 9999
	Overflow	indication of four transversal bars
	Indication time	from 0.2 up to 10.0 seconds adjustable
Ambient conditions	Working temperature	0 up to + 60 $^\circ$C
	Storing temperature	-20 up to + 80 $^\circ$C
Housing:		

111 mm

96 mm

48 mm

43 mm

89 mm

131 mm
(with plug in terminal 148 mm)

126 mm
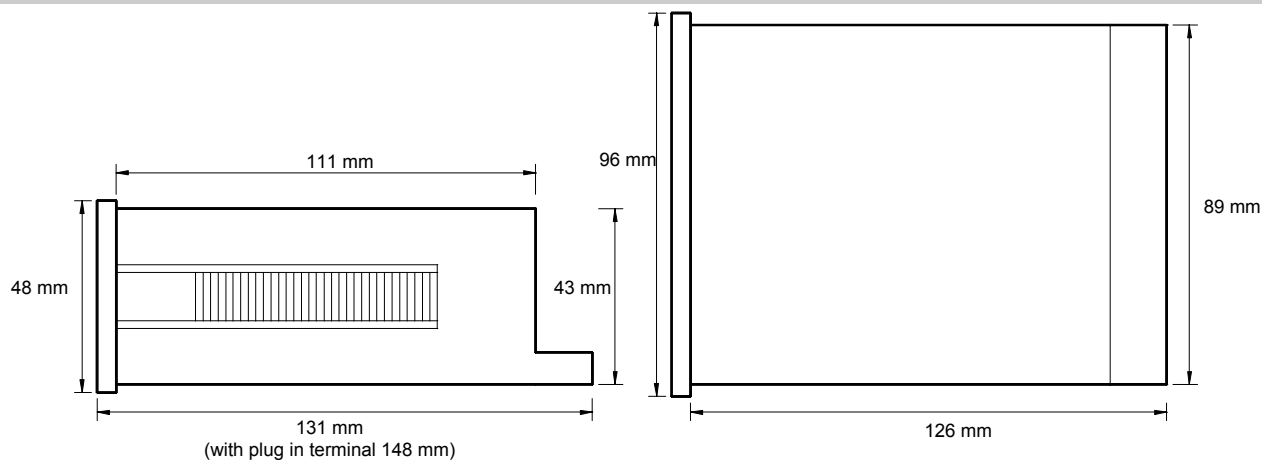
CE-sign
For unlimited use of the instrument within the directives for electromagnetic compatibility 89/336/EC frequency input wires have to be used with shielded cable and cable's shield connected to earth ground at one end only.

Connection diagram, programming, remarks

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

Impulse input   Sensor supply   Analog-output (option)   230 VAC (115 VAC) (24 VDC) plus=15, minus=14

Setting

1. Connect the instrument according to the wiring diagramm.
2. After power on, the instruments runs into a lamptest and returns back to the standard mode. (SCAN will be indicated)
3. Connect the desired input frequency to the measuring input.
4. Pressing the **P**-key enters the program mode with indication of „**P1**" on the display.
5. Pressing the **P** and ▲ key simultaneously steps through the different program numbers.
6. Pressing ▲ or ▼ key shows the current values.
7. To change values use ▲ or ▼ key.
8. Otherwise the remaining values will be memorized automatically 7 seconds after the last touch of key with leaving program mode.
   While the first measuring the display shows SCAN.

For guarantee of a high solution, one should ensure that a frequency is registered under program number 3 with many decimal digits, see also, programming example.

Additional key-functions in standard mode for indication of min/max values.

Simultaneously pressing of ▼ and ▲ key deletes and actualizes min/max-memory.
▲ key enters max-memory.
▼ key enters min-memory.

Instructions

After power on the instrument with the inbuilt microcontroller starts with an initial program activating lamp test and readout of memorized parameters in an EEPROM. In case of loosing parameters or any defects in hardware the system generates an error message „HELP". This function prevents damage from the peripherals and human life, totally reset is required. After a new power on, the system remains in lamptest while pressing **P**-key. Then the unit storages the default parameters and is ready for a new programming.
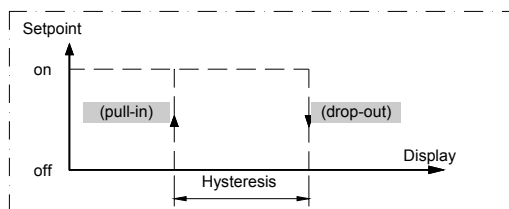
Setpoints

The following diagrams are showing the switching operation of PFE4 relay contacts. The hysteresis is free programmable.
There are two kinds of operation:

Example: operation current
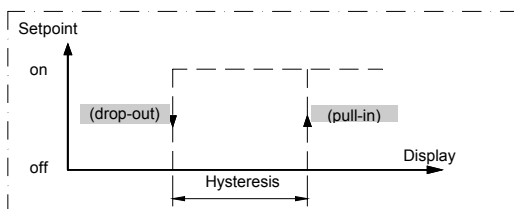
Example: quiescent current

Operation current means that the relay contact will be pulled in if reaching the adjusted setpoint.

Quiescent current means that the relay contact will be dropped out if reaching the adjusted setpoint.

Program table, example of programming

Program table 1

Program Number (PN)	Function	Remark	Display	Basic parameter after reset
1	Input of desired indication value		0 up to +9999	1000
2	Setting of decimal point for indication value	Press ▲ for desired decimal point		no decimal point
3	Setting of input frequency Adjust the numerically maximum value.	Setting in Hz The decimal point remains unconsidered.		1000.
4	Setting of decimal point for input frequency (corresponds with selected measuring range) The position of the decimal point corresponds to the multiplier.	Press ▲ for desired decimal point x corresponds f*1 x,x corresponds f*0,1 x,xx corresponds f*0,01 x,xxx corresponds f*0,001	0001 to 9999 000,1 to 999,9 00,01 to 99,99 0,001 to 9,999	no decimal point
5	Input of final value for analog output	Option	0 up to +9999	1000
6	Input of offset for analog output	Option	0 up to +9999	0
7	Setting delay (last input flank up to indication value „0")	Adjustment range: 1 up to 250 seconds	1 up to 250 seconds	10
8	Input of display time		0.2 up to 10.0 s	1.0

During indication times> 7 seconds, the most supreme input frequency is limited as follows:

Indication time (s)	Maximum frequnecy
7	9000
8	8000
9	7000
10	6500

Exceeding the limit is indicated by transversal bars „- - - -"

**The maximally permissible input frequency is controlled by 16 kHz, the device receives a reset above this frequency through the built-in watchdog.**

Program table 2
(setpoints)

S1 PN	S2 PN	Function	Display	Basic parameter after reset
61	66	Setpoint	0 up to +9999	500 / 600
62	67	Hysteresis	0 up to +9999	1
63	68	Quiescent current	0	-
		Operating current	1	1

Example for programming

Input: Frequency
Measuring value: 0 - 8.5 Hz
Indication: 0 Hz = 0.0   8.5Hz=300.0
Display refr. time: 2.0 seconds
Setpoints: S1 ==>   60.0 and quiescent current
                      relay pull in = 58.0 ==>hysteresis of 2.0
           S2 ==>   150.0 and operating current
                      relay drop out = 80.0 ==>hysteresis of 70.0
Analog output: 0 V output   ==>   display 0.0   ==>   measuring value 0 Hz
                      10 V output ==>   display 300.0 ==>   measuring value 8.5 Hz

P	▼	▲

PROGRAM key   MINUS key▼   PLUS key▲
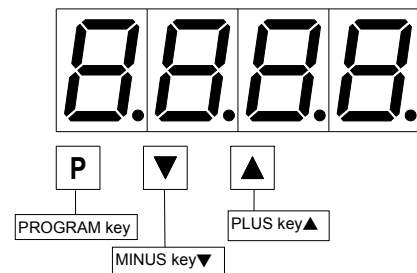
The basic adjustments concerning to the following program example are the ground parameters after a total reset occuring through a power on with pressing **P**-key (see previous page).

Program advices

Pressing the **P**-key enters **always** the program mode with program number 1. The „**P1**" begins to blink in change with the current value after 3 seconds. After further 4 seconds the system leaves the program mode and goes to the standard mode. In Program mode pressing ▼ or ▲ key selects the current values which are free scalable with both the keys. All parameters will be memorized automatically after leaving program mode.

Example for programming

Programming.
Switch power on!

Lamp test

```
8.8.8.8.
```

Standard mode

```
        0
```

Enter program mode

```
P       1
```
☞ [P] [ ] [ ]

To memorized value with ▼ or ▲.

```
1000
```
[ ] [▼] [▲]

Set free scalable value

```
3000
```
[ ] [▼] [▲]

To program number 2 with **P** and ▲

```
P       2
```
[P] [ ] [▲]

To memorized value with ▼ or ▲.

```
        0
```
[ ] [▼] [▲]

Set decimal point

```
      0.0
```
[ ] [ ] [▲]

To program number 3 with **P** and ▲

```
P       3
```
[P] [ ] [▲]

To memorized value with ▼ or ▲.

```
1000.
```
[ ] [▼] [▲]

Set the free scalable input frequency in
Hz. Decimal point unconsidered.

```
8500.
```
[ ] [▼] [▲]

To program number 4 with **P** and ▲

```
P       4
```
[P] [ ] [▲]

To memorized value with ▼ or ▲.

```
8500
```
[ ] [▼] [▲]

Set decimal point

```
8.500
```
[ ] [▼] [▲]

To program number 7 with **P** and ▲

```
P       7
```
[P] [ ] [▲]

To memorized value with ▼ or ▲.

```
      10
```
[ ] [▼] [▲]

To program number 8 with **P** and ▲

```
P       8
```
[P] [ ] [▲]

To memorized value with ▼ or ▲.

```
      1.0
```
[ ] [▼] [▲]

Set display time

```
      2.0
```
[ ] [▼] [▲]

**The following programming steps are
necessary for setpoint programming of
S1 and S2 only.**

To program number 61 with **P** and ▲

```
P       61
```
[P] [ ] [▲]

To memorized value with ▼ or ▲.

```
    50.0
```
[ ] [▼] [▲]

Set free scalable value of setpoint S1.

```
    60.0
```
[ ] [▼] [▲]

To program number 62 with **P** and ▲.

```
P       62
```
[P] [ ] [▲]

To memorized value with ▼ or ▲.

```
      0.1
```
[ ] [▼] [▲]

Set hysteresis of S1.

```
      2.0
```
[ ] [▼] [▲]

To program number 63 with **P** and ▲.

```
P       63
```
[P] [ ] [▲]

To memorized value with ▼ or ▲.

```
        1
```
[ ] [▼] [▲]

Set quiescent current.

```
        0
```
[ ] [▼] [▲]

To program number 66 with **P** and ▲

```
P       66
```
[P] [ ] [▲]

To memorized value with ▼ or ▲.

```
    60.0
```
[ ] [▼] [▲]

Set free scalable value of setpoint S2.

```
  150.0
```
[ ] [▼] [▲]

To program number 67 with **P** and ▲

```
P       67
```
[P] [ ] [▲]

To memorized value with ▼ or ▲.

```
      0.1
```
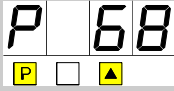[ ] [▼] [▲]

Example for programming, connection diagrams

Set hysteresis of S2.

70.0
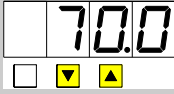
To program number 68 with **P** and ▲.
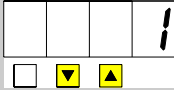
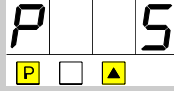**P 68**

To memorized value with ▼ or ▲.

1

Programming finished.

All programmed values will be memorized after 7 seconds. Jumps back into standard mode automatically.

The program numbers 5 and 6 are available with option analogue output only.
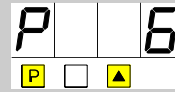
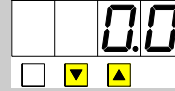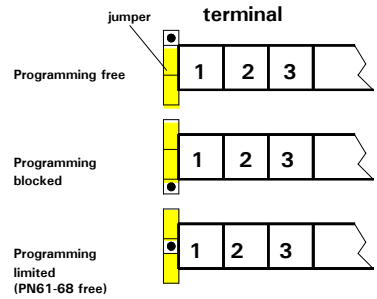To program number 5 with **P** and ▲

P 5

To memorized value with ▼ or ▲.

100.0

Set free scalable final indication value for analog output.

300.0

To program number 6 with **P** and ▲

P 6

To memorized value with ▼ or ▲.
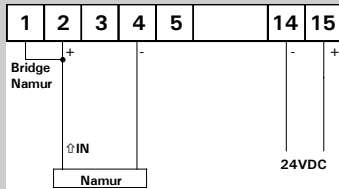
0.0

Programming finished.

All programmed values will be memorized after 7 seconds. Jumps back into standard mode automatically.

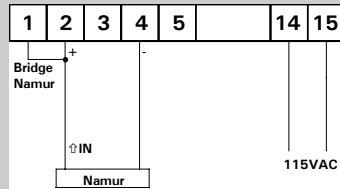**Setting possibilities of the jumper field on the rear side.**

jumper   terminal

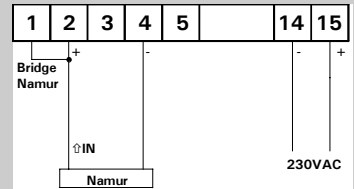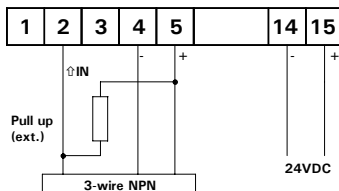**Programming free** | 1 | 2 | 3 |

Programming blocked | 1 | 2 | 3 |

Programming limited (PN61-68 free) | 1 | 2 | 3 |

Terminal for transmitter connection

Namur

| 1 | 2 | 3 | 4 | 5 | | 14 | 15 |

Bridge Namur
⇧IN
Namur
24VDC

Namur

| 1 | 2 | 3 | 4 | 5 | | 14 | 15 |

Bridge Namur
⇧IN
Namur
115VAC

Namur

| 1 | 2 | 3 | 4 | 5 | | 14 | 15 |

Bridge Namur
⇧IN
Namur
230VAC

3-wire NPN

| 1 | 2 | 3 | 4 | 5 | | 14 | 15 |

⇧IN
Pull up (ext.)
3-wire NPN
24VDC

3-wire NPN

| 1 | 2 | 3 | 4 | 5 | | 14 | 15 |

⇧IN
Pull up (ext.)
3-wire NPN
115VAC

3-wire NPN

| 1 | 2 | 3 | 4 | 5 | | 14 | 15 |

⇧IN
Pull up (ext.)
3-wire NPN
230VAC

3-wire PNP

| 1 | 2 | 3 | 4 | 5 | | 14 | 15 |

⇧IN
Pull up (ext.)
3-wire PNP
24VDC

3-wire PNP

| 1 | 2 | 3 | 4 | 5 | | 14 | 15 |

⇧IN
Pull up (ext.)
3-wire PNP
115VAC

3-wire PNP

| 1 | 2 | 3 | 4 | 5 | | 14 | 15 |

⇧IN
Pull up (ext.)
3-wire PNP
230VAC