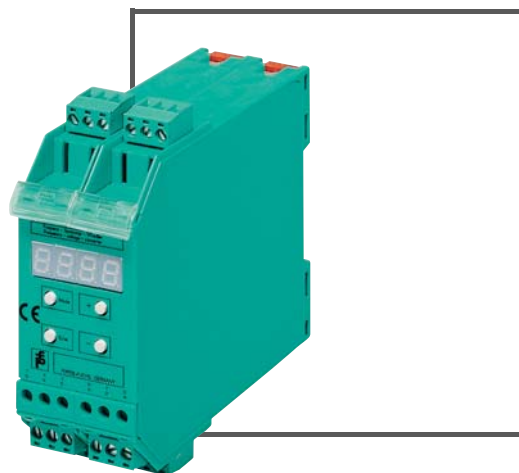


MANUAL

# KFU8-FSSP-1.D

Frequency voltage converter  
(40 kHz version)



CE

With regard to the supply of products, the current issue of the following document is applicable: The General Terms of Delivery for Products and Services of the Electrical Industry, published by the Central Association of the Electrical Industry (Zentralverband Elektrotechnik und Elektroindustrie (ZVEI) e.V.) in its most recent version as well as the supplementary clause: "Expanded reservation of proprietorship"

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# 1 Safety

## 1.1 Introduction

### 1.1.1 Contents

This document contains information that you need in order to use your product throughout the applicable stages of the product life cycle. These can include the following:

- Product identification
- Delivery, transport, and storage
- Mounting and installation
- Commissioning and operation
- Maintenance and repair
- Troubleshooting
- Dismounting
- Disposal



**Note!**

This document does not substitute the instruction manual.



**Note!**

For full information on the product, refer to the instruction manual and further documentation on the Internet at [www.pepperl-fuchs.com](http://www.pepperl-fuchs.com).

The documentation consists of the following parts:

- Present document
- Instruction manual
- Datasheet

Additionally, the following parts may belong to the documentation, if applicable:

- EU-type examination certificate
- EU declaration of conformity
- Attestation of conformity
- Certificates
- Control drawings
- Additional documents

### 1.1.2 Target Group, Personnel

Responsibility for planning, assembly, commissioning, operation, maintenance, and dismounting lies with the plant operator.

Only appropriately trained and qualified personnel may carry out mounting, installation, commissioning, operation, maintenance, and dismounting of the product. The personnel must have read and understood the instruction manual and the further documentation.

Prior to using the product make yourself familiar with it. Read the document carefully.

### 1.1.3 Symbols Used

This document contains symbols for the identification of warning messages and of informative messages.

## Warning Messages

You will find warning messages, whenever dangers may arise from your actions. It is mandatory that you observe these warning messages for your personal safety and in order to avoid property damage.

Depending on the risk level, the warning messages are displayed in descending order as follows:



### ***Danger!***

This symbol indicates an imminent danger.

Non-observance will result in personal injury or death.



### ***Warning!***

This symbol indicates a possible fault or danger.

Non-observance may cause personal injury or serious property damage.



### ***Caution!***

This symbol indicates a possible fault.

Non-observance could interrupt the device and any connected systems and plants, or result in their complete failure.

## Informative Symbols



### ***Note!***

This symbol brings important information to your attention.



### **Action**

This symbol indicates a paragraph with instructions. You are prompted to perform an action or a sequence of actions.

## 2 Product Description

### 2.1 Device description

The frequency voltage/current converter KFU8-FSSP-1.D is a device for displaying and monitoring periodical signals which occur in almost all areas of process automation, i.e. from general frequencies to specific speeds.

The input signals are evaluated and converted into a frequency or speed by a powerful  $\mu$ -controller in accordance with the cycle method. The  $\mu$ -controller calculates a voltage or current value proportional to the input frequency and produces it with a digital/analog converter in accordance with the selected limit value of the measurement range.

You can select either of the following analog signals:

- 0 V ... 10 V
- 2 V ... 10 V
- 0 mA ... 20 mA
- 4 mA ... 20 mA

The pulse output produces the input frequency which is subdivided by the adjustable factor of 1 ... 9999.



**Note!**

Close attention was paid to the special case of speed measurement during the development of the device. The indicators and inputs can therefore occur in Hz or in rpm.

Furthermore, in applications involving slow processes, where sensors deliver multiple pulses per revolution, it is possible to automatically operate with the actual speed of the drive by specifying the number of pulses per revolution.

The input or output signal is displayed on a 7-segment LED display on the front of the device. The display has 4 digits and up to 3 decimal places. The parameterization is performed using the 4 buttons below the display.

The frequency voltage/current converter can be operated with a 115 V<sub>AC</sub>, 230 V<sub>AC</sub> or 24 V<sub>DC</sub> power supply. When an alternating voltage is connected, a 24 V<sub>DC</sub> source is available for the sensor.

The circuits in this component device are separated from mains by reinforced/double insulation (basic + supplementary).



**Note!**

All currently available two, three or four-wire proximity switches and incremental rotary encoders are acceptable as sensors. Moreover, two terminals are reserved for the connection of proximity switches as per DIN 19234 (NAMUR).

## 3 Operation

### 3.1 Operating mode

#### Signal frequency

The frequency voltage/current converter processes input signals of 0.001 Hz ... 9999 Hz or speeds of 0.02 rpm ... 9999 rpm. Signals not having a duty rate of 1:1 must have a minimum pulse pause or pulse duration of 40  $\mu$ s in order to be detected with certainty behind the input filter.

#### Measurement underrange, message

This message appears when no input signal is recognized.

#### Measurement overrange, message

The preset display and measurement range was exceeded.



#### **Note!**

Select a wider measurement range.

#### Very low signal frequencies, displayed value is not valid, message

During the measurement of very low signal frequencies, the measuring system has detected that the signal has fallen below the last computed frequency. The time between the last two signal edges has already elapsed. The device is now waiting for the next positive signal edge in order to compute the next measured value. Here, 'XXX' represents the positions of the first three digits of the last measured value.

#### Self test, message

When the power supply is switched on, the device performs a self test. The message appears when it is established that there is an error, for example during the check summation of the EEPROM data; in this state, the output relay behaves as if there has been a power failure. The error message can be cleared by switching the supply voltage off and on again.



#### Error message



#### **Note!**

If, when switching on again, the error message  appears, then the factory presets were loaded.

1. Enter the parameters again.
2. Switch the device off and back on again.
  - ↳ The normal function of the output relay is restored.

### 3.2 Setup mode

#### Transition operating mode → setup mode



#### Starting setup mode

Press the "Mode" and "+" buttons at the same time.

↳ The display shows the parameters in text form.

**Note!**

You can modify the parameters in the parameter value display (flashing digits). The parameters come into effect temporarily until the operating voltage is interrupted.

**Transition setup mode → operating mode****Exiting setup mode**

Press the "Enter" and "+" buttons at the same time.

↳ The parameters are stored in an EEPROM in a non-volatile manner.

**Button functions for the parameter display**

"+"	Switch to next parameter.
"-"	Switch to previous parameter.
"Mode"	Switch modes of parameter display.
"Enter" and "+"	Closes parameter editor and stores all parameters in the EEPROM.

**Button functions for the parameter value display (one digit flashes)**

"+"	Increase the value of the flashing digit.
"-"	Decrease the value of the flashing digit.
"Mode"	Move flashing digit.
"Enter" and "+"	Transfer from parameter value display to parameter display.

**Pulse divider** 

(factory preset: 1 pulse/revolution)

Applications involving slow processes are frequently equipped with sensors which provide several pulses per revolution. In the rotational speed measuring function, the device undertakes the conversion to the actual value of rpm by inputting the numerical value (of pulses/revolution), i.e. both the indication and the input of the measurement range end value are obtained from the actual rate of rotation of the drive.

Range: 1 ... 1200

**Measurement range full scale reading** 

(factory preset: 9999)

In frequency measurement, the set value is measured in Hz or in speed measurement it is measured rpm (depending on **function selection**) it determines the frequency or speed at the analog output of the maximum voltage of 10 V or the maximum current of 20 mA.

Range: see display and measurement range.

**Teaching in**

Press the "Mode" button only and then press "Enter".

↳ The frequency or speed of the current pending input signal are taught in.

**Analog output** 

(factory preset: 0 V ... 10 V)

Selection of the analog output signal. You can only use the current output (terminals 5 and 6) or current output (terminals 4 and 5).

Parameter value	Analog output
0	0 V ... 10 V
1	2 V ... 10 V
2	0 mA ... 20 mA
3	4 mA ... 20 mA

### Display function

(factory preset: frequency or speed)

The display shows the determined frequency or speed in Hz and rpm (depending on **Function selection**) or the output voltage in V or the output current in mA (depending on the selection in the **Analog output**) menu item.

Display function	Function selection	Analog output	Display
0	0	-	Frequency in Hz
	1	-	Rotational speed in rpm
1	-	0	Voltage in V
	-	1	Voltage in V
	-	2	Current in mA
	-	3	Current in mA

### Display rate

(factory preset: 0.33 s)

In order to ensure good readability of the display, the time taken to indicate the current measured value in the display can be selected between 0.01 s and 2.5 s.



#### **Note!**

The display rate influences neither the time required to calculate the measured value nor the switching characteristics of the output relay.

### Display and measurement range

(factory preset: 0 ... 9999)

Four measuring and display ranges are available for frequency measurement and three measuring and display ranges are available for speed measurement:

Display in parameter editor	Frequency range in Hz	Speed range in rpm	Number of decimal places
0000	0 ... 9999		0
000.1	0,0 ... 999,9		1
00.02	0,0 ... 99,99		2
0.003	0,0 ... 9,999	----	3

Example:

The maximum permissible rotational speed of the drive is 600.5 rpm. You can select the first two measuring ranges. Select the second measurement range in order to fully utilize the accuracy of the display.



**Message** CFP

This message appears when an attempt has been made to change the range in such a way that previously input limiting values lie outside the display and measuring range, or the respective places following the decimal point would be cut off.

**Division factor for the pulse output** dFO

(factory preset: 1)

If the division factor is set to 1, the pulse output goes to high level approx. 10 µs after the positive slope of the input signal and to low level approx. 10 µs after the negative slope.

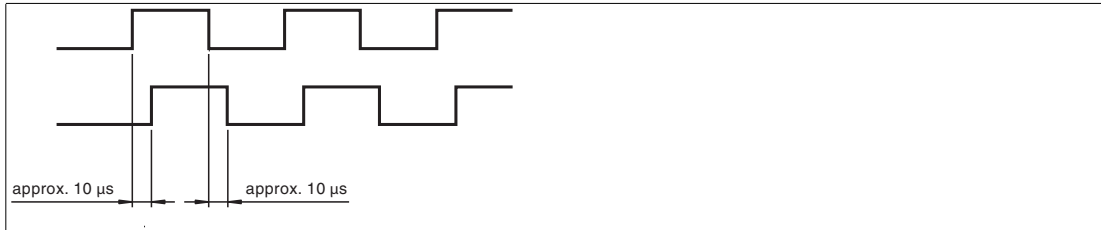


Figure 3.1 Division factor 1

With division factors greater than 1, the pulse output goes to approx. 20 µs after the first positive input signal slope.

For even division factors the output level goes approx. 20 µs after the 'division factor'/2-period to low level for the following periods.

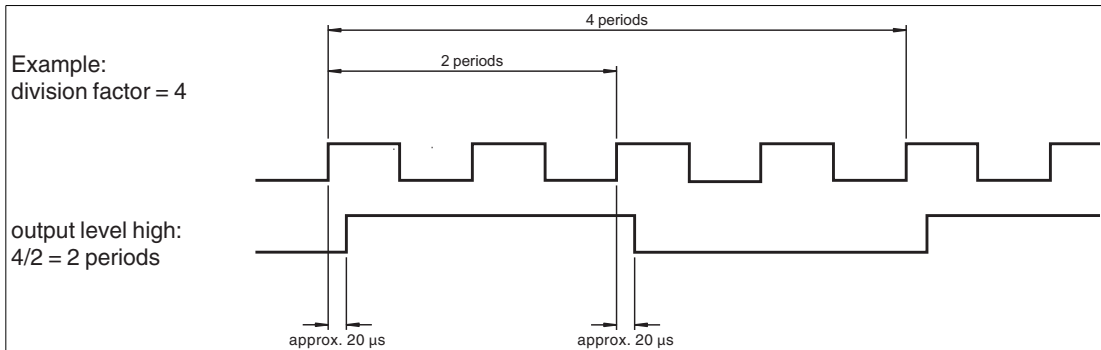


Figure 3.2 Division factor 4

For uneven division factors the output level goes approx. 20 µs after the ('division factor'-1)/2 period to low level for the following periods.

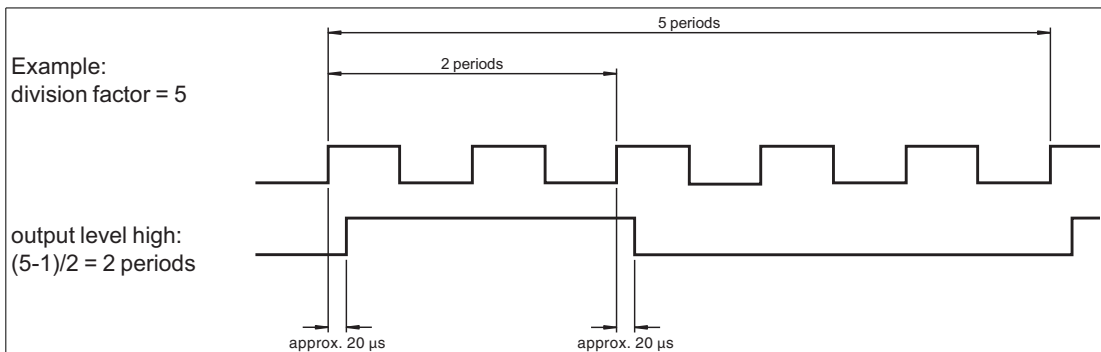


Figure 3.3 Division factor 5

Range: 1 ... 9999

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**Software version number** **Note!**

You can only read out the version number of the software.



## 4 Service and Maintenance

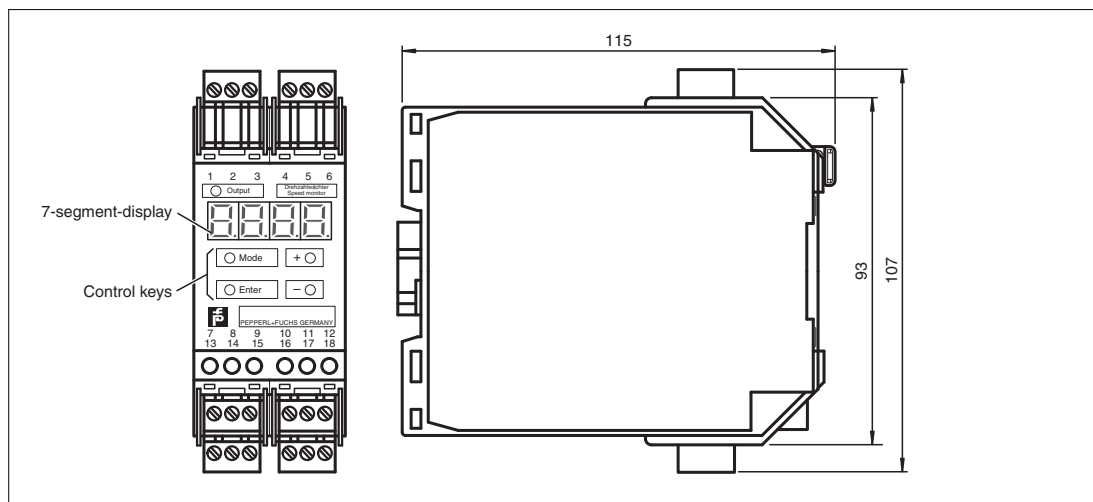
The device is designed and constructed to function stable over long periods of time. For this reason, regular cleaning or maintenance is unnecessary.

## 5 Anhang

### 5.1 Terminal assignment

Term. 1: Sensor power supply GND	Term. 10: Not connected
Term. 2: Pulse output	Term. 11: Power supply 24 V <sub>DC</sub> , L +
Term. 3: Not connected	Term. 12: Power supply 24 V <sub>DC</sub> , L -
Term. 4: Analog output I -	Term. 13: Sensor power supply GND
Term. 5: Analog output U +	Term. 14: PNP, NPN input - (cathode)
Term. 6: Analog output U -	Term. 15: PNP, NPN input + (anode)
Term. 7: Sensor power supply + 24 V <sub>DC</sub>	Term. 16: Power supply 230 V <sub>AC</sub> , L1
Term. 8: NAMUR input L -	Term. 17: Power supply 115 V <sub>AC</sub> , L1
Term. 9: NAMUR input L +	Term. 18: Power supply AC, N

### 5.2 Dimensions, operating and display devices



"Mode" and "+":

Start parameter editor

"+":

Advance to next parameter selection or increase the value of the flashing digit

"-":

Advance to next parameter selection or decrease the value of the flashing digit

"Mode":

Display parameter value (right digit flashes) or shift the flashing digit to the left

"Enter":

Exit parameter value display, the device now operates temporarily with the altered parameter.

"Enter" and "+":

Exit parameter editor, the parameters are now stored in the EEPROM in a non-volatile manner.



5.3 Connection diagram

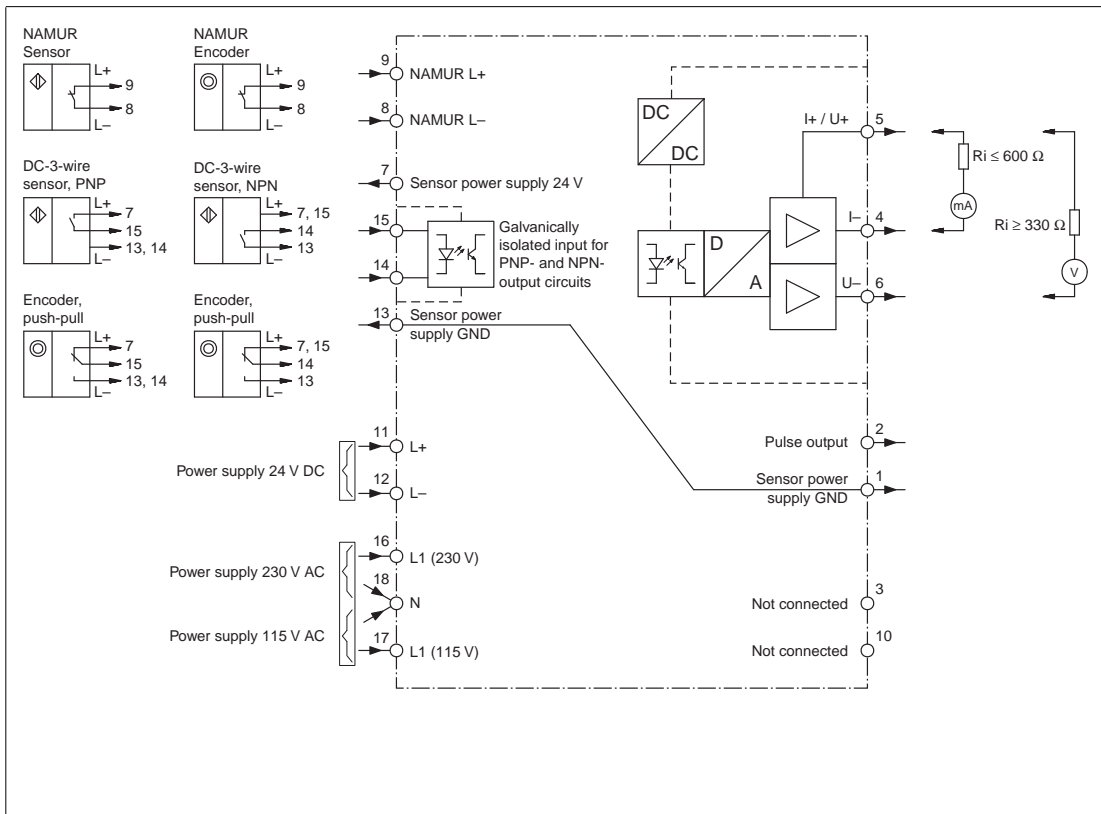


Figure 5.1 Connection diagram



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