# Kübler

# Signal converter

| Signal converter | SK 1D-1A2RS | Digital - Analog / Serial |

This compact signal converter with pulse inputs for two incremental encoders or measuring systems allows converting a frequency as well as sum, a difference, a product or a ratio between two frequencies into an analog signal. The integrated RS232 interface transmits the result of the connected inputs in the form of a serial signal.
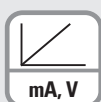
The module can be easily and conveniently mounted in a cabinet on a standard DIN rail.

RoHS

| **DC** 18 ... 30 V | **max.** 1 MHz | mA, V | RS 232 485 | 000000 |
|---|---|---|---|---|
| Power supply | Input frequency | Analog output | Interfaces | DIN-rail mounting |

## Characteristics

- Extremely short conversion time of only 1 ms (f > 2 kHz).
- Variable input frequency (adjustable from 0.1 Hz to 1 MHz).
- Convenient parameterizing by TEACH function or with a PC.
- Direction of rotation of the output signal is determined by the polarity.
- Variable linearization curves thanks to programmable digital filter and setting possibility.
- Converts also the sum, difference, product or ration between two frequencies.
- Analog output with ±10 V or 0 or 4 ... 20 mA.
- RS232 or RS485 interface for serial read-out of the encoder frequency.

## Benefits

- Integration of fast frequency inputs in the PLC.
- Frequency monitoring possible also with an analog input.
- Usable in combination with encoders and sensors.
- Wide range of converter control possibilities (HTL, TTL / RS422).

## Order no.

| Signal converter | **8.SK.1D-1A2RS** | *Scope of delivery* - Signal converter - Manual |
|---|---|---|

## Connection technology

| | | Order no. |
|---|---|---|
| **Cordset, pre-assembled** | Sub-D male contacts, 9-pin, with cable outlet 70° single-ended 2 m [6.56'] PVC cable [1] | **8.0000.6V00.0002.0082** |
| **Connector, self-assembly** | Sub-D male contacts, 9-pin, with cable outlet 70° | **8.0000.514A.0000** |

Further accessories can be found in the accessories section or in the accessories area of our website at: www.kuebler.com/accessories.
Additional connectors can be found in the connection technology section or in the connection technology area of our website at: www.kuebler.com/connection_technology.
You will find an overview of our systems and components for Functional Safety and the corresponding software in the safety technology section or under www.kuebler.com/safety.

[1] Other lengths available.

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## Technical data

### Electrical characteristics

| | |
|---|---|
| **Power supply** | 18 ... 30 V DC (residual ripple ≤ 10 % at 24 V DC) |
| **Power consumption** (no load) | approx. 75 mA at 24 V (auxiliary voltage) |
| **Reverse polarity protection of the power supply** | yes |
| **Type of connection** | screw terminal, 1.5 mm$^2$ |
| **Encoder supply** | |
| output voltage | + 5.5 VDC / ±5 % |
| output current | max. 250 mA |
| **Conformity and standards** | |
| EMC guideline 2014/30/EU | EN 61000-6-2, EN 61000-6-3, EN 61000-6-4 |
| RoHS guideline 2011/65/EU | EN 50581 |

### Mechanical characteristics

| | | |
|---|---|---|
| **Material** | housing | plastic |
| **Mounting** | | 35 mm DIN rail (acc. to EN 60715) |
| **Dimensions (W x H x D)** | | 40 x 79 x 91 mm [1.57 x 3.11 x 3.58"] |
| **Protection** | | IP20 |
| **Weight** | | approx. 190 g [6.70 oz] |
| **Working temperature** | | 0°C ... +45°C [+32°F ... +113°F] non condensing |
| **Storage temperature** | | -25°C ... +70°C [-13°F ... +158°F] non condensing |
| **Failure rate** (MTBF in years) | | 75.2 a continuous operation at 60°C [140°F] |

### Incremental input X1 + X2

| | | |
|---|---|---|
| **Level** | RS422 | Differential voltage > 1 V |
| **HTL characteristic** | TTL | LOW: 0 ... 0.5 V / HIGH: 2.5 ... 5.3 V |
| | HTL | LOW: 0 ... 3 V / HIGH: 10 ... 30 V NPN / PNP |
| **HTL internal resistance** | | Ri ≈ 4.75 kOhm |
| **Tracks** | | A, /A, B, /B |
| **Frequency** | TTL symmetrical | max. 1 MHz at RS422 and TTL |
| | HTL asymmetrical | max. 200 kHz at HTL and TTL |
| **Measurement accuracy** | | 0.02%, ±1 digit |

### Control input

| | |
|---|---|
| **Use** | Proximity switch or commands |
| **Signal level** | LOW < 3 V / HIGH >10 V |
| **Pulse duration** | min. 5 ms |

### Analog output X1 + X2

| | |
|---|---|
| **Voltage** | ±10 V (external load max. 5 kOhm) |
| **Current** | 0/4 ... 20 mA (load max. 270 Ohm) |
| **Resolution** | 14 bit |
| **Accuracy input** | 0.1% |
| **Resolution per bit** | 1.25 mV / 2.5 µA |
| **Reaction time** (in normal operation) | approx. 1 ms depending on sampling time and frequency, (fin > 2 kHz); 1/f in (fin < 1 kHz) |
| **Zero setting time** (in case of sudden interruption) | 5 ms (without average value), 700 ms (max. average value) |

### Serial interface X3

| | |
|---|---|
| **Format** | RS232 or RS485 |
| **Baud rate** (switchable) | 600, 1200, 2400, 4800, 9600 (standard), 19200, 38400 Baud |
| **Operating modes** | PC mode or Printer mode |
| **Type of connection** | Sub-D female contacts, 9-pin |

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**Terminal assignment**
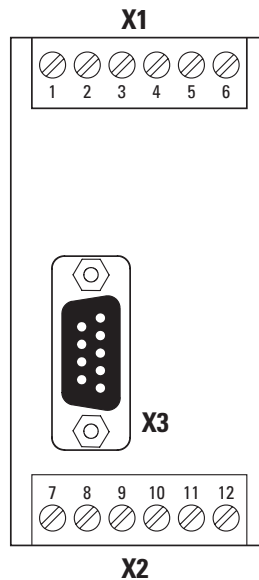


| Interface | Function | Screw terminals, 2 x 6-pin | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Signal: | 0 V | +V | A | $\overline{A}$ | B | $\overline{B}$ | $V_{out}$ | $I_{out}$ | Contr | 0 V | GND | 5.5 $V_{out}$ |
| **Connection X1, X2** | Power supply | Pin : | 6 | 5 | – | – | – | – | – | – | – | – | – | – |
| | Input TTL | Pin : | – | – | 9 | 8 | 3 | 2 | – | – | 10 | – | 12 | 11 |
| | Input HTL | Pin : | – | – | 9 | – | 3 | – | – | – | 10 | – | 12 | 11 |
| | Analog output | Pin : | – | – | – | – | – | – | 1 | 7 | 10 | 4 | – | – |

| Interface | Function | Sub-D female contacts, 9-pin | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Signal: | 0 V | TxD | RxD | T+ | T- | R+ | R- |
| **Connection X3** | RS232 | Pin : | 5 | 3 | 2 | – | – | – | – |
| | RS485 (2-wire) | Pin : | – | – | – | 8 | 7 | – | – |
| | RS485 (4-wire) | Pin : | – | – | – | 8 | 7 | 6 | 1 |

+V :            Power supply
0 V :           Encoder power supply ground GND (0 V)
A, $\overline{A}$ :        Incremental output channel A (Cosine)
B, $\overline{B}$ :        Incremental output channel B (Sine)
$V_{out}$ :          Voltage output (+/- 10 V)
$I_{out}$ :          Current output (0 ... 20 mA / 4 ... 20 mA)
Contr :         Control input
GND :           Power supply ground GND (0 V)
T+, T- :        Transmit +/- (RS485)
R+, R- :        Receive +/- (RS485)
TxD :           Transmit (RS232)
RxD :           Receive (RS232)

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**Dimensions**
Dimensions in mm [inch]

40 [1,57]

79 [3,13]

91 [3,58]

74 [2,91]