# Frequency Converter
## Sin-Cos encoder

Product Insert

**R912010841**
**Edition 01**

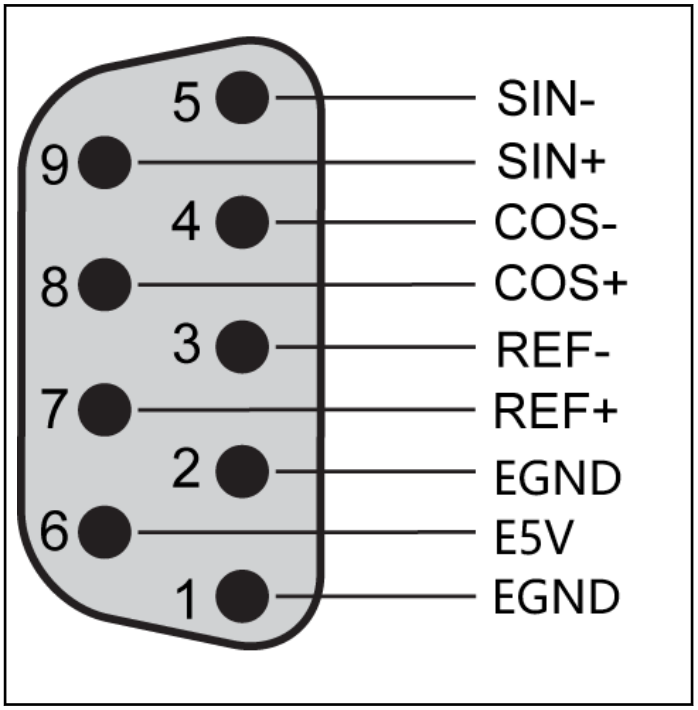
## 1 Start

Sin-Cos encoder card is one standard extension card for Rexroth frequency converter series of xFC x61x. This Sin-Cos encoder card has to be used with extension card module together.

## 2 Technical Data

| | |
|---|---|
| Encoder power supply | Output voltage: 5 V (typical), accuracy: ±5% |
| | Max. output current: 300 mA |
| Encoder input signal | Waveform: sine-wave voltage signal |
| | Differential voltage: 0.6–1.2 Vpp; typical value: 1 Vpp |
| | Maximum common-mode voltage: 3 V |
| | Max. frequency: 400 kHz |
| Interface type | DB9 (female connector) |

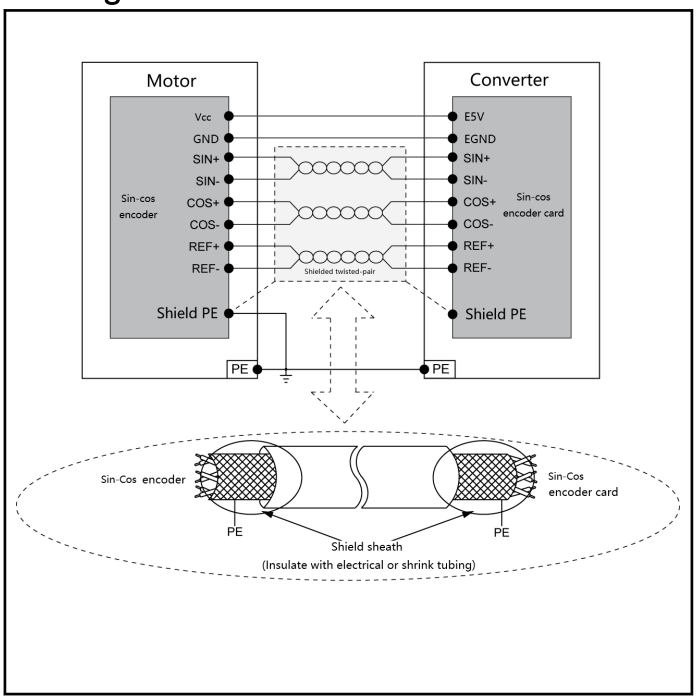
## 3 Terminals Mapping




## 4 Terminals Description

| Pin number | Terminal | Signal function |
|---|---|---|
| Pin 9 | SIN+ | SIN+ input signal |
| Pin 5 | SIN- | SIN- input signal |
| Pin 8 | COS+ | COS+ input signal |
| Pin 4 | COS- | COS- input signal |
| Pin 7 | REF+ | REF+ signal for sine/cosine encoder |
| Pin 3 | REF- | REF- signal for sine/cosine encoder |
| Pin 6 | E5V | Encoder 5 V power supply |
| Pin 1 | EGND | Encoder power ground |
| Pin 2 | EGND | Encoder power ground |

## 5 Wiring




Connect the wire according to the diagram above strictly and ensure:

1. The power supply of frequency converter has been switched off before wiring.
2. Motor and frequency converter must grounded.
3. Using shielded twisted-pair cable. Twisted-pair strictly in accordance with the differential pairs on the wiring.
4. Sin-Cos encoder cable and motor power cable have to be routed separately from each other.
5. The maximum length of the Sin-Cos encoder cable is 50 m.
6. The PE terminal of the Sin-Cos encoder card is connected to the metal shell of the DB9 interface.

## 6 Parameter

| Code | Name | Setting range | Min. | Default | Attri. |
|---|---|---|---|---|---|
| H7.01 | Encoder direction | 0: Forward<br>1: Reverse | 1 | 0 | ◆ |

Parameter H7.01 is used to change the phase sequence, if the encoder phases are reversely connected.

| Code | Name | Setting range | Min. | Default | Attri. |
|---|---|---|---|---|---|
| H7.05 | Encoder wiring break detection level | 0.0 (No protection)<br>0.1...1,000.0 rpm | 0.1 rpm | 0.0 rpm | ◆ |
| H7.06 | Encoder wiring break detection time | 0.1...10.0 s | 0.1 s | 1.0 s | ◆ |

If measured speed is smaller than encoder wiring break detection level [H7.05] and keeps for more than encoder wiring break detection time [H7.06], wiring break error "EIbE" is detected.
This function can be disabled by setting [H7.05] = 0.0.

| Code | Name | Setting range | Min. | Default | Attri. |
|---|---|---|---|---|---|
| H7.07 | Encoder phase order error detection time | 0.0 (No protection)<br>0.1...100.0 s | 0.1 s | 1.0 s | ◆ |

If measured speed direction is different from running direction and keeps for more than encoder phase order error detection time [H7.07], phase order error "EPOE" is detected.
This function can be disabled by setting [H7.07] = 0.0.

| Code | Name | Setting range | Min. | Default | Attri. |
|---|---|---|---|---|---|
| H7.35 | Pulses per revolution of encoder | 1...20,000 | 1 | 1024 | ◆ |

Parameter H7.35 is used to set the number of pulses per revolution of the Sin/Cos encoder.
Please correctly set this parameter under vector control with encoder before running.

## 7 Type Code

| Typecode | Description |
|---|---|
| FEAE04.2-EN5-NNNN | xFC x61x Sin-Cos encoder card |

# 8 Diagnosis

## 8.1 Error Code

| Error code | Display | Description | Possible reason | Solution |
|---|---|---|---|---|
| 70 | EIbE | Encoder input broken wire error | 1. Encoder connection problem<br>2. Encoder error | 1. Check encoder connection cable<br>2. Replace encoder |
| 71 | EPOE | Encoder phase order error | 1. Wrong wiring between encoder and encoder card<br>2. Improper parameter setting of encoder | 1. Check wiring<br>2. Set parameters related to encoder properly |

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