Resolver-to-digital converter

MSX-RDC-17

Signals converter

Converts the position data of a sinusoidal encoder into a 5V square digital signals

4 different resolution settings

Working principle

The MSX-RDC-17 is a device allowing the conversion of sinusoidal signals from a resolver into digital signals. The MSX-RDC-17 supplies the resolver and handles the acquisition of the resolver data. The reference signal supplied by the converter is injected into the main winding of the resolver. The output signals of the resolver are read and converted by the MSX-RDC-17. It converts the position value transmitted by the resolver into digital incremental output signals. The resolution of the incremental output can be adjusted via the switch on the front of the MSX-RDC-17.

Features

Converter supply
- Nominal voltage: 5 V

Resolver reference signal
- Amplitude : 7 V_{pp} (differential)
- Frequency: 10 kHz

Resolver inputs (sin/cos)
- Amplitude ranging from 2,3 V_{pp} to 4 V_{pp}

Incremental encoder output
- Output signals: incremental A+, A-, B+, B-, Index+, Index-
- Output type: differential, RS422
- Resolution: 10-/12-/14-/16-bit

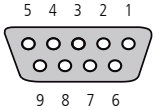
Power supply connector
For the power supply of the MSX-RDC-17, a 4-pin screw terminal is fixed on the bottom side of the housing.

Pin No.	Signal
1	$+V_S$ (5 V)
2	Ground
3	Ground
4	$+V_S$ (5 V)

The Ground and the supply pins are connected internally with each other. For less current flow over the terminals, please connect all four pins externally with each other!

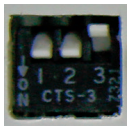
Resolver connector
The resolver has to be connected to the 9-pin D-Sub female connector on the front side of the MSX-RDC-17.

Pin No.	Signal
1	Ref-
2	Not connected
3	Not connected
4	Not connected
5	SIN+
6	SIN-
7	Ref+
8	COS+
9	COS-
Shield	PE



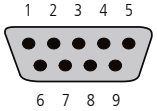
Switch
On the front side of the MSX-RDC-17, a switch panel with three switches is installed. Switches 1 and 2 are used for setting the resolution of the incremental encoder output. Switch 3 allows you to reset the MSX-RDC-17. To do a reset, you have to switch on switch 3 for a short time and then switch it off again. Please do not leave switch 3 switched on permanently, because the MSX-RDC-17 is not functional with this switch position!

1	2	3	
OFF	OFF	OFF	16-bit resolution
OFF	ON	OFF	14-bit resolution
ON	OFF	OFF	12-bit resolution
ON	ON	OFF	10-bit resolution
X	X	ON	Whole device in reset state



Incremental encoder output
The incremental encoder signals are available at the 9-pin D-Sub male connector of the MSX-RDC-17.

Pin No.	Signal
1	Ground
2	Index-
3	Index+
4	A-
5	A+
6	Not connected
7	$+V_S$
8	B-
9	B+
Shield	PE



Phone: +49 7229 1847-0 info@addi-data.com
Fax: +49 7229 1847-222 www.addi-data.com

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Specifications

Dimensions:	118 x 23 x 100 mm
Weight:	100 g

Converter supply

Nominal voltage:	+5 V
Supply voltage:	+4.9 V to +5.25 V
Current consumption at 5 V:	140 mA (at 100 rps / 16-bit resolution)
Reverse voltage protection:	-6 V

Resolver reference signal

Amplitude:	7 V_{pp} (differential)
Frequency:	10 kHz
Max. output current:	100 mA

Resolver inputs (sin/cos)

Amplitude:	between 2,3 V_{pp} and 4 V_{pp}

Incremental encoder output

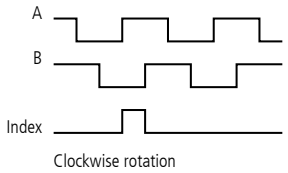
Output signals:	A+, A-, B+, B-, Index+, Index-
Output type:	Differential, RS422
Nominal voltage:	+5 V
Max. output current:	100 mA
Resolution:	Selectable via switch: 10-bit 12-bit 14-bit 16-bit
A/B pulses per revolution	10-bit : 256 12-bit : 1024 14-bit : 4096 16-bit : 16384
Accuracy	10-bit : ± 21,1 arc min 12-bit : ± 5,3 arc min 14-bit : ± 1,3 arc min 16-bit : ± 0,3 arc min
Maximum rotation speed	10-bit : 2500 rpm 12-bit : 1000 rpm 14-bit : 500 rpm 16-bit : 125 rpm
Settling time (input: step 10°)	10-bit : typ. 0,6 ms 12-bit : typ. 2,2 ms 14-bit : typ. 6,5 ms 16-bit : typ. 27,5 ms
Settling time (input: step 179°)	10-bit : typ. 1,5 ms 12-bit : typ. 4,75 ms 14-bit : typ. 10,5 ms 16-bit : typ. 45 ms

Environmental conditions

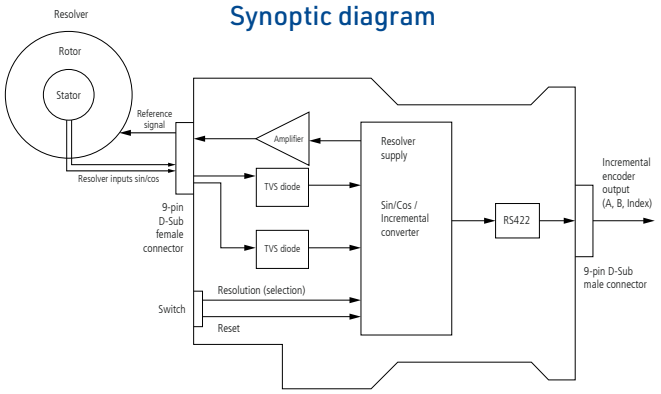
Operating temperature:	0-60°C (with forced ventilation)
Storage temperature:	-25°C to +70°C
Relative air humidity at indoor installation:	50% at +40°C 80% at +31°C

Signals (encoder output)

An Index pulse is generated when the absolute angular position passes through 0.



Synoptic diagram



Resolver compatibility

The resolver used must meet the following characteristics:
- Input impedance (DC) ≥ 50 Ohms
- Transformation ratio ≤ 0.50

Feel free to contact us specifying the reference of your resolver for further information.

Intended use

The resolver-to-digital converter MSX-RDC-17 has to be used as electrical equipment for measurement, control and laboratory pursuant to the standard DIN EN IEC 61010-1.
The power supply for the resolver-to-digital converter MSX-RDC-17 must fulfil the requirements of DIN EN IEC 62368-1 and DIN EN 55032 or IEC/CISPR 32 and DIN EN 55024 or IEC/CISPR 24.

Usage restrictions

The resolver-to-digital converter MSX-RDC-17 must not be used as a safety-related part (SRP).
The resolver-to-digital converter MSX-RDC-17 must not be used for safety-related functions, for example for emergency stop functions.
The resolver-to-digital converter MSX-RDC-17 must not be used in potentially explosive atmospheres.
The resolver-to-digital converter MSX-RDC-17 must not be used as electrical equipment according to the Low Voltage Directive 2014/35/EU.

Limits of use

All safety information and the instructions on this datasheet must be followed to ensure proper intended use.
Uses of the resolver-to-digital converter beyond these specifications are considered as improper use. The manufacturer is not liable for damages resulting from improper use.
The resolver-to-digital converter must remain in its anti-static packaging until it is installed.
Please do not delete the identification numbers of the resolver-to-digital converter or the warranty claim will be invalid.

Ordering information

MSX-RDC-17
Resolver-to-digital converter, conversion into digital signals, 4 different resolution settings.

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