

# Resolver-to-digital converter, 5V or 24V



The MSX-RDC-17 is a device for supplying and acquiring a resolver. It converts the position value given by the resolver into a digital incremental output signal. The resolution of the incremental encoder output is one of four values configured by ADDI-DATA at the factory.

## Contact us!

## Features

### Power supply

- Nominal voltage:
  - 5 V variant: +4.9 to +5.25 V, 135 mA @ 100 rps / 16-bit
  - 24 V variant: +6.5 to +36 V, current 60 mA
- Overvoltage protection:
  - 5 V variant: 5V TVS (Vbr 6.4-7 V, Vclamp 9.2 V, 400 W)
  - 24 V variant: 36 V TVS (Vbr 40-44 V, Vclamp 58.1 V, 400 W)

## 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	+VS
2	Ground
3	Ground
4	+VS

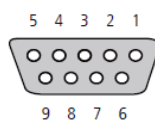


The Ground and the supply pins are connected internally with each other. For less current flow over the terminals, please connect all four pins externally with each other!

## 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



## MSX-RDC-17\_5V

## MSX-RDC-17\_24V

### Available functions:

#### Resolver-to-digital converter

#### Conversion of resolver signals into digital signals

#### 4 factory-set resolution settings

### Resolver output/input

- Frequency: programmable 2 kHz to 20 kHz in 250 Hz steps

Factory-configured by ADDI-DATA, not user-modifiable

### Incremental encoder output

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

Factory-configured by ADDI-DATA, not user-modifiable

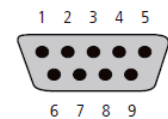
## Reset button

On the front side of the MSX-RDC-17, a recessed reset button is provided. Pressing the button briefly performs a hardware reset of the device, reinitializing the resolver-to-digital converter and restoring normal operation. The button is intended for occasional use only, it does not need to be held and should not be actuated during normal operation.

## 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	+VS
8	B-
9	B+
Shield	PE



## Specifications

Dimensions:	118 x 23 x 100 mm (L x B x H)	
Weight:	100 g	
<b>Mounting options</b>		
DIN-rail:	Standard	
PCB screw mounting:	The MSX-RDC-17 PCB exposes mounting holes allowing the bare board to be screwed directly into a customer enclosure for integration use cases.	
<b>Power supply</b>		
	<b>5 V</b>	<b>24 V</b>
Nominal voltage:	+5 V	+24 V
Supply voltage:	+4.9 V to +5.25 V	+6.5 V to +36 V
<b>Current consumption</b>		
In load:	135 mA	60 mA
<i>(at 100 rps / 16-bit resolution)</i>		
At IDLE:	54 mA	40 mA
Overshoot protection:	5 V	36 V
<b>Resolver output/input</b>		
<b>Output reference signal</b>		
Amplitude:	Programmable 7.2 Vpp to 21.6 Vpp differential (approx. 2.55 Vrms to 7.63 Vrms), +/- 5 % tolerance	
Frequency:	Programmable 2 kHz to 20 kHz, 250 Hz step	
Max. output current:	100 mA	
Input signals	2.3-4 Vpp <i>An adjustable input attenuator stage allows the converter to accept resolver feedback up to the full excitation range. Factory configured by ADDI-DATA</i>	
<b>Incremental encoder output</b>		
Output signals:	A+, A-, B+, B-, Index+, Index-	
Output type:	Differential, RS422	
Nominal voltage:	+5 V	
Max. output power:	350 mW at 20°C. <i>See the section Power dissipation calculation.</i>	
Resolution:	Programmable, <i>Factory-configured by ADDI-DATA:</i>	A/B pulse / revolution:
	10-bit	256
	12-bit	1024
	14-bit	4096
	16-bit	16384
Accuracy:	+/- 5 arcmin +1 LSB	
Max. speed:	Depends on the resolution: 10-bit: 2500 rps 12-bit: 1000 rps 14-bit: 500 rps 16-bit: 125 rps	

## 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. The operating temperature ranges from -40 °C to +85 °C. Configuration management: internal STM32L010C6T6 microcontroller programs excitation voltage, excitation frequency and monitors LOT (Loss of Tracking) and DOS (Degradation of Signal) faults. Configuration is factory-set by ADDI-DATA, not user-accessible.

## 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.

## Power dissipation calculation :

Generally a Resolver is given with a complex impedance written as :

$$Z = R + jL\omega$$

For the power dissipation calculation, we will need the magnitude of the impedance :

$$|Z| = \sqrt{R^2 + L^2\omega^2}$$

The power dissipated by the MSX-RDC-17 is then calculated with this equation :

$$P_{wd} = \frac{62.4 \times V_P}{\pi \times |Z|} - \frac{2 \times R \times V_P^2}{|Z|^2}$$

Where  $V_P$  is the voltage amplitude of the chosen excitation voltage divided by 2.

$$\text{If you want } 7.2V_{rms}, \text{ then } V_P = \frac{7.2\sqrt{2}}{2} \approx 5.1V$$

Then check that  $P_{wd}$  is inferior to the max power dissipation at ambient temperature  $P_{wdT_a}$  given below :

$$P_{wd25^\circ C} = 350mW,$$

$$P_{wd25^\circ C} = 330mW,$$

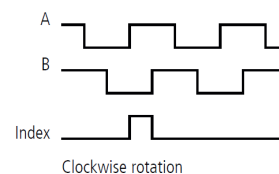
$$P_{wd30^\circ C} = 325mW,$$

$$P_{wd35^\circ C} = 310mW,$$

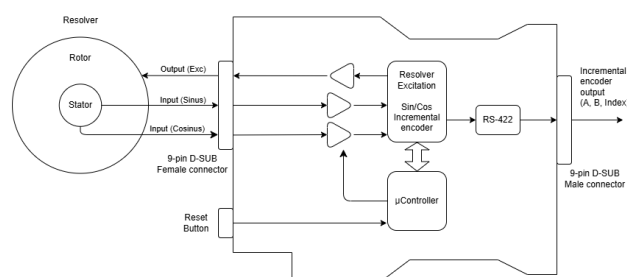
$$P_{wd40^\circ C} = 290mW$$

## Index signal (incremental encoder output)

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



## Block diagram



## 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.

## Additional information required

When placing your order, please provide us the following details:

- Response Frequency
- Resolution
- Amplitude reference signal
- Reference of the resolver