

## RM08

### Miniature Rotary Magnetic encoder

The RM08 is a compact, sealed, high-speed magnetic encoder designed for use in space-constrained applications. The non-contact two-piece design eliminates the need for seals or bearings and ensures long-term reliability and easy installation.

Designed for direct integration into high-volume OEM applications, the RM08 encoder can be used in a variety of applications including motor control and industrial automation. The encoder housing has a diameter of only 8 mm and offers a degree of protection to IP68.

SUPER SMALL  
SIZE

HIGH SPEED

EASY  
INSTALLATION



### Features and benefits

- ▶ Super small – 8 mm diameter
- ▶ Non-contact, frictionless design
- ▶ High-speed operation up to 30,000 rpm
- ▶ Accuracy up to  $\pm 0.3^\circ$
- ▶ Resolutions up to 12 bit
- ▶ Analogue sinusoidal, incremental, SSI and linear voltage output formats



MOTOR CONTROL



MEDICAL



PAN/TILT POSITIONING



GRIPPER



INDUSTRIAL AUTOMATION

## General information

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The encoder consists of a magnet/ magnetic actuator and a separate sensor board. The rotation of the magnetic actuator is sensed and processed by a custom encoder chip in the body, to provide analogue, incremental, SSI or linear voltage outputs. The RM08 encoders use the AM4096 sensor, see [the AM4096 data sheet](#) for details.

RM08 readhead



+

Magnet



=

RM08 system



## Product range

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### RM08AC

Analogue sinusoidal output with a single sine/cosine period per revolution.

### RM08I

Incremental with 8 to 1,024 pulses per revolution (up to 4,096 counts per revolution).

### RM08S

Synchro serial interface (SSI) with up to 4096 positions per revolution.

### RM08Vx

Linear voltage output in a range of variants.

# Storage and handling

## Operating and storage temperature

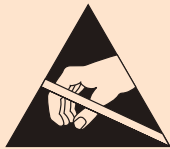
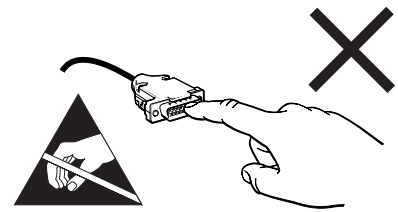
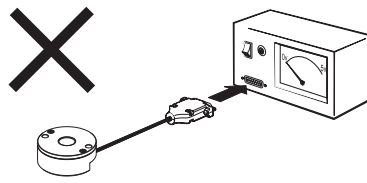
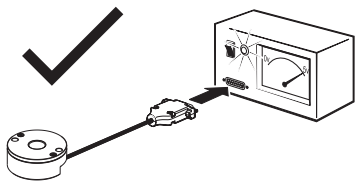


-40 °C to +85 °C  
 -25°C to +85°C (limited by LD boards for IC and SC output)

## Humidity



Up to IP68



**Readhead is ESD sensitive - handle with care.**

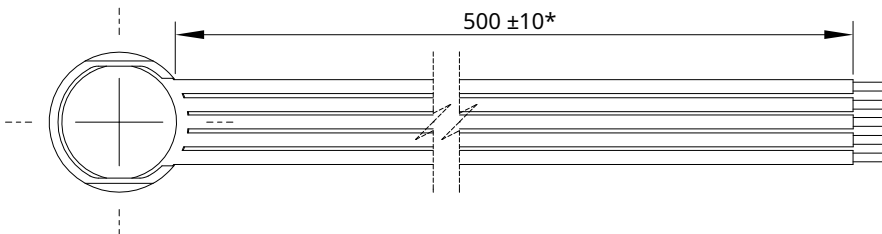
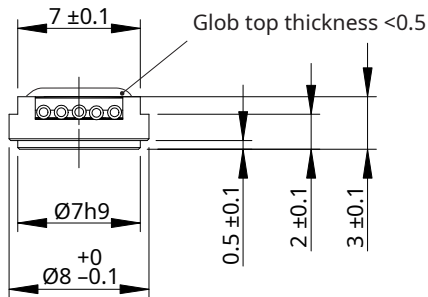
Do not touch electronic circuit, wires or sensor area without proper ESD protection or outside of ESD controlled environment.

## Packaging

Each encoder is packed individually in an antistatic bag.

## Dimension drawings

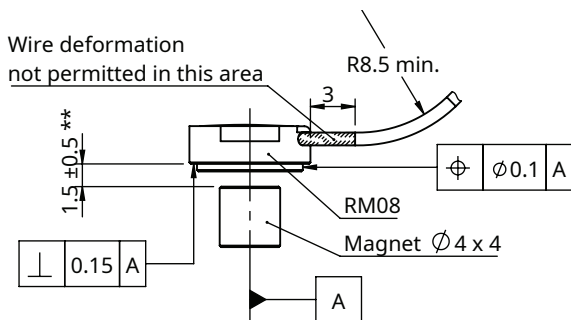
Dimensions and tolerances are in mm. Dimensions without tolerance values are in accordance with ISO 2768-m.



\* For cable lengths over 0.5 m, see [FAQ](#).

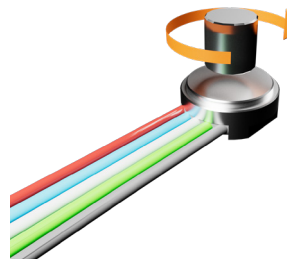
The number of wires depends on the output type.

## Installation drawing



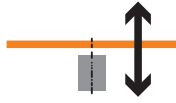
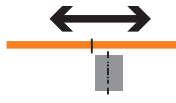
\*\* 1 mm ± 0.2 mm for Ø3 × 1 mm magnet



For more information see [Part numbering](#).



Clockwise rotation of magnet.

## Installation tolerances

<b>Mounting distance</b>	See installation drawings of encoder assemblies on <a href="#">page 4</a> .	
<b>Radial displacement (concentricity)</b>	±0.1 mm	

 - Encoder  
  - Magnet

## Technical specifications

### Mechanical data

<b>Encoder housing material</b>	Aluminium
<b>Encoder mass</b>	<2 g (with 200 mm long wires)
<b>Wire thickness</b>	AWG30
<b>Magnet material</b>	SmCo (Sm <sub>2</sub> Co <sub>17</sub> ), NiCuNi coated
<b>Magnet mass</b>	0.4 g
<b>Shock</b>	Half-sine 100 g, according to IEC 60068-2-27, Ed. 4
<b>Steady-state acceleration</b>	700 g, according to IEC 60068-2-27, Ed. 2

### Environmental data

<b>Temperature</b>	Operating	-40 °C to +85 °C
	Storage	-40 °C to +85 °C
<b>Environmental sealing</b>	IP68*	

\* IP protection is ensured only when a mating connector with an equal or higher IP rating is used.

## Electrical connections

Output type							
AC		ID		SD		Vx	
Signal	Wire colour	Signal	Wire colour	Signal	Wire colour	Signal	Wire colour
V <sub>dd</sub>	Red	V <sub>dd</sub>	Red	V <sub>dd</sub>	Red	V <sub>dd</sub>	Red
GND	Blue	GND	Blue	GND	Blue	GND	Blue
Sin	White	Z	White	Clock	White	V <sub>out</sub>	Green
Cos	Grey	B	Green	Data	Green		
		A	Grey				

### Output type

IC (LDB01)



SC (LDB02)



Pin nr.	Signal	Pin nr.	Signal
1	A+	1	V <sub>dd</sub>
2	A-	2	GND
3	B-	3	Data+
4	B+	4	Data-
5	Z+	5	CLK-
6	Z-	6	CLK+
7	GND		
8	V <sub>dd</sub>		

# Output types

## AC – Analogue sinusoidal outputs

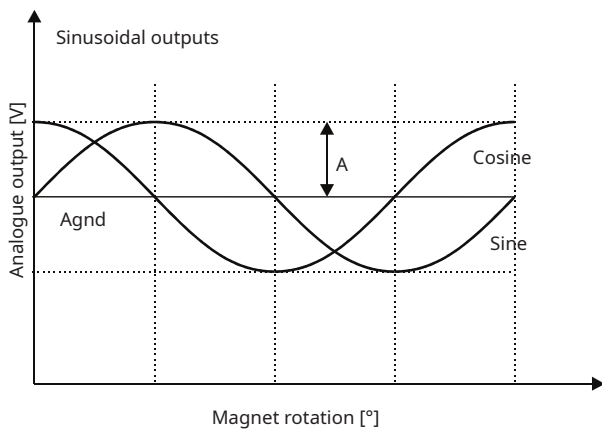
2 channels  $V_A$   $V_B$  sinusoids (90° phase shifted, single ended)

### Specifications

<b>Power supply</b>	$V_{dd} = 5\text{ V or }3.3\text{ V } \pm 5\%$	
<b>Current consumption</b>	Typ. 26 mA	
<b>Outputs</b>	Signal amplitude (A)*	0.8 V $\pm 0.2$ V
	Signal offset (Agnd)	1.55 V $\pm 5$ mV
	Phase difference	90° $\pm 0.2^\circ$
<b>Maximum speed</b>	30,000 rpm	
<b>Operating temperature</b>	-40 °C to +85 °C	

\* Valid for  $\varnothing 4 \times 4$  mm magnets only

### Timing diagram for clockwise rotation of magnet



## IC – Incremental, RS422

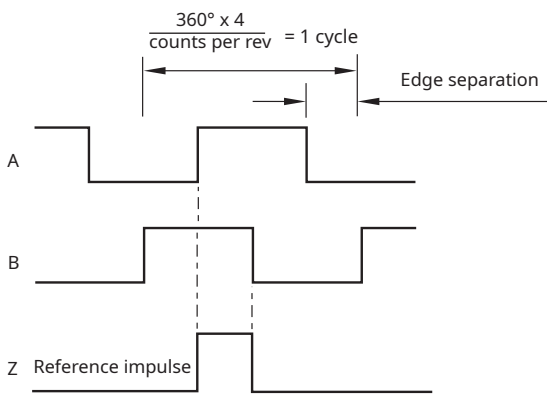
Square wave differential line driver to RS422

### Specifications

<b>Power supply</b>	$V_{dd} = 5\text{ V or }3.3\text{ V} \pm 5\%$
<b>Current consumption</b>	Typ. 26 mA
<b>Output signals</b>	A, B, Z, A-, B-, Z- (RS422)
<b>Accuracy*</b>	Typ. $\pm 0.3^\circ$
<b>Hysteresis</b>	0.17°
<b>Resolution</b>	32, 64, 128, 256, 512, 1024, 2048, 4096 cpr
<b>Maximum speed</b>	30,000 rpm
<b>Operating temperature</b>	-25 °C to +85 °C (limited by LDB01)

\* Valid for  $\varnothing 4 \times 4$  mm magnets only.

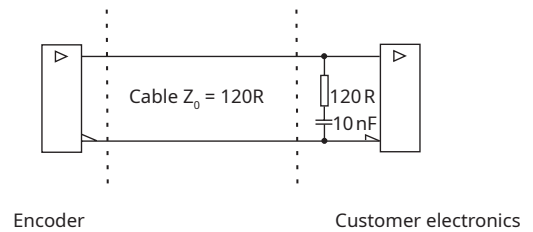
### Timing diagram



B leads A for clockwise rotation of magnetic actuator.

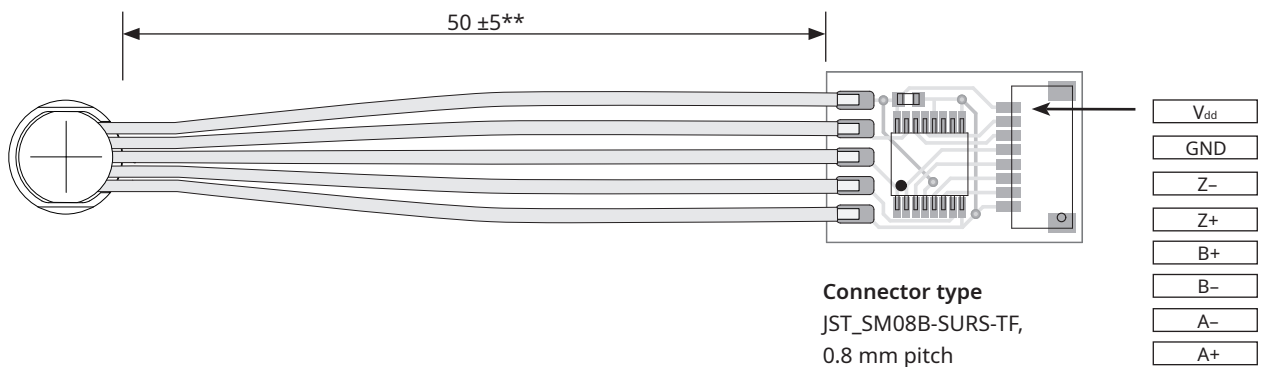
### Recommended signal termination

For data output lines only



### RM08 with line driver board (LDB01)

Dimensions and tolerance in mm



\*\* Differential output available with soldered LDB01 and added strain relief on 50 mm distance from the RM08.

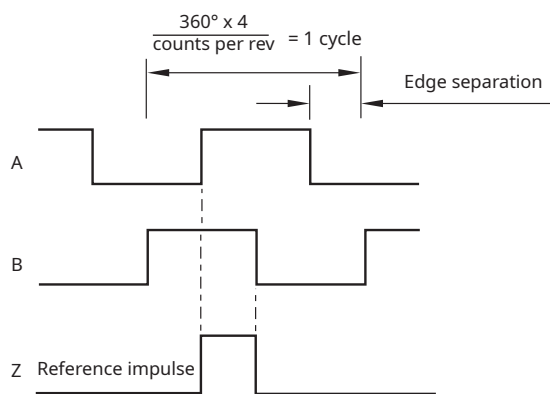
## ID – Incremental, single-ended, 5 V

### Specifications

<b>Power supply</b>	$V_{dd} = 5\text{ V or }3.3\text{ V} \pm 5\%$
<b>Current consumption</b>	Typ. 26 mA
<b>Output signals</b>	A, B, Z (single-ended)
<b>Accuracy*</b>	Typ. $\pm 0.3^\circ$
<b>Hysteresis</b>	0.17°
<b>Resolution</b>	32, 64, 128, 256, 512, 1024, 2048, 4096 cpr
<b>Maximum speed</b>	30,000 rpm
<b>Operating temperature</b>	-40 °C to +85 °C

\* Valid for  $\varnothing 4 \times 4$  mm magnets only.

### Timing diagram



B leads A for clockwise rotation of magnetic actuator.

## SC – Absolute binary synchro-serial interface (SSI)

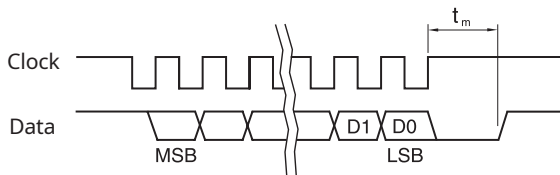
Serial encoded absolute position measurement

### Specifications

<b>Output code</b>	Natural binary
<b>Power supply</b>	$V_{dd} = 5\text{ V or }3.3\text{ V} \pm 5\%$
<b>Current consumption</b>	Typ. 26 mA
<b>Data output</b>	Serial data (RS422)
<b>Data input</b>	Clock (RS422)
<b>Clock frequency</b>	$\leq 4\text{ MHz}$
<b>Accuracy*</b>	Typ. $\pm 0.3^\circ$
<b>Hysteresis</b>	0.17°
<b>Resolution</b>	32, 64, 128, 256, 512, 1024, 2048, 4096 cpr
<b>Maximum speed</b>	30,000 rpm
<b>Operating temperature</b>	-25 °C to +85 °C (limited by LDB02)

\* Valid for  $\varnothing 4 \times 4\text{ mm}$  magnets only.

### Timing diagram

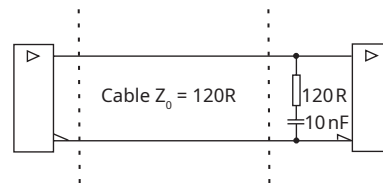


$$\text{Clock} \leq 4\text{ MHz} \quad 12.5\ \mu\text{s} \leq t_m \leq 20.5\ \mu\text{s}$$

Position increases for clockwise rotation of magnetic actuator.

### Recommended signal termination

For data output lines only

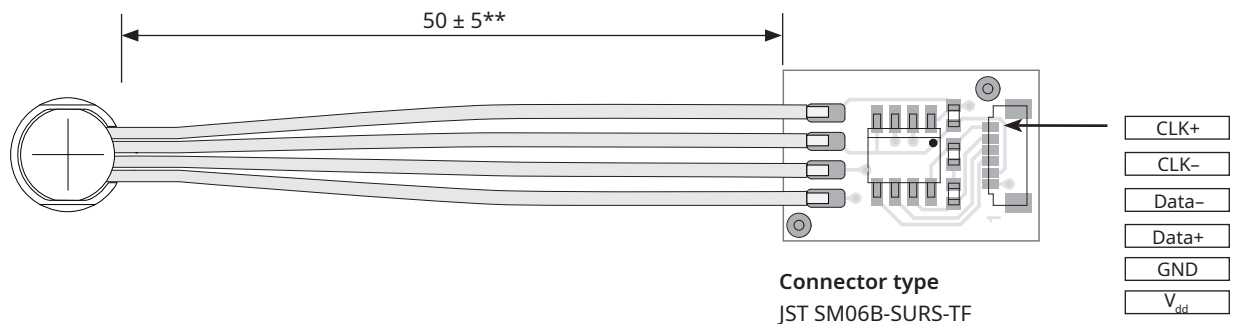


Encoder

Customer electronics

### RM08 with line driver board (LDB02)

Dimensions and tolerance in mm



\*\* Differential output available with soldered LDB02 and added strain relief on 50 mm distance from the RM08.

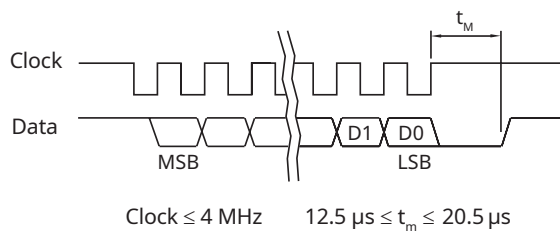
## SD – Absolute binary synchro-serial interface (SSI)

### Specifications

<b>Output code</b>	Natural binary
<b>Power supply</b>	$V_{dd} = 5\text{ V}$ or $3.3\text{ V} \pm 5\%$
<b>Current consumption</b>	Typ. 26 mA
<b>Data output</b>	Data (single ended)
<b>Data input</b>	Clock (single ended)
<b>Clock frequency</b>	$\leq 4\text{ MHz}$
<b>Accuracy*</b>	Typ. $\pm 0.3^\circ$
<b>Hysteresis</b>	$0.17^\circ$
<b>Resolution</b>	32, 64, 128, 256, 512, 1024, 2048, 4096 cpr
<b>Maximum speed</b>	30,000 rpm
<b>Operating temperature</b>	$-40\text{ }^\circ\text{C}$ to $+85\text{ }^\circ\text{C}$

\* Valid for  $\varnothing 4 \times 4\text{ mm}$  magnets only.

### Timing diagram



Position increases for clockwise rotation of magnetic actuator.

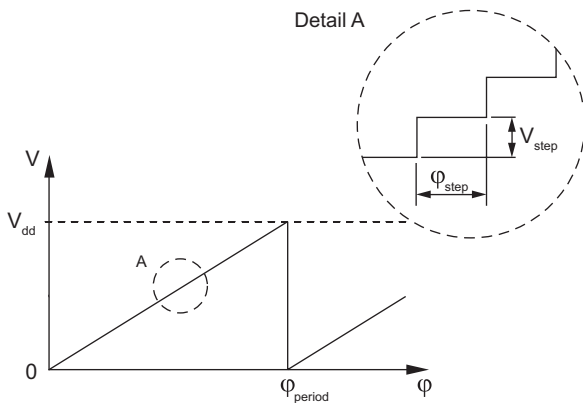
## Vx – Linear voltage output

Alternative for potentiometers

### Specifications

<b>Power supply</b>	$V_{dd} = 5\text{ V} \pm 5\%$
<b>Current consumption</b>	Typ. 26 mA
<b>Output voltage</b>	0 V to $V_{dd}$
<b>Output loading</b>	Max. 10 mA
<b>Resolution of DAC</b>	10 bit
<b>Nonlinearity</b>	1 %
<b>Maximum speed</b>	30,000 rpm
<b>Operating temperature</b>	-40 °C to +85 °C

### Timing diagram



$\phi_{\text{period}}$	$N_{\text{period}}$	$N_{\text{step}}$	$\phi_{\text{step}}$
<b>360°</b>	1	1,024	0.35°
<b>180°</b>	2	1,024	0.18°
<b>90°</b>	4	1,024	0.09°
<b>45°</b>	8	512	0.09°

$$\phi_{\text{step}} = \frac{\phi_{\text{period}}}{N_{\text{step}}} \quad V_{\text{step}} = \frac{V_{\text{dd}}}{N_{\text{step}}}$$

- $\phi_{\text{period}}$  = Angle covered in one period (one sawtooth)
- $V_{\text{period}}$  = Output voltage range for one period
- $\phi_{\text{step}}$  = Step angle (angular movement needed to register a change in the position)
- $V_{\text{step}}$  = Output voltage range for one step
- $N_{\text{period}}$  = Number of periods in one revolution
- $N_{\text{step}}$  = Number of steps in one period

### Output type and electrical variant

Rotation \ $\phi_{\text{period}}$	360°	180°	90°	45°
<b>Clockwise</b>	VA	VB	VC	VD
<b>Counterclockwise</b>	VE	VF	VG	VH

# Part numbering

RM08 ID 00 12B 02 L 2 G 00

## Output type

- AC - Analogue sinusoidal
- IC - Incremental, RS422 \*
- ID - Incremental, single ended
- SC - Absolute binary synchro-serial (SSI), RS422 \*
- SD - Absolute binary synchro-serial (SSI), single ended
- Vx - Linear voltage output 0 - 5 V, supply 5 V DC:

	360°	180°	90°	45°
CW	VA	VB	VC	VD
CCW	VE	VF	VG	VH

## Shaft size

- 00 - N/A (standard)

## Resolution

For AC:

- 01S - One sine/cosine period per revolution

For IC, ID, SC and SD (counts/positions per revolution):

Binary		
12B - 4096	09B - 512	06B - 64
11B - 2048	08B - 256	05B - 32
10B - 1024	07B - 125	

For Vx:

- 10B - 1024 counts/positions per revolution

## Cable length (length of leads)

- 02 - 0.2 m (max. 0.5 m) (for AC, ID, SD and Vx only)
- 50 - 50 mm (for IC and SC only)

For cable lengths above 0.5 m, see [FAQ](#).

## Connector

- L - Leads only (no connector)
- U - Line driver board with JST connector

## Body style and cable exit

- 2 - Cylindrical body, radial cable/leads exit

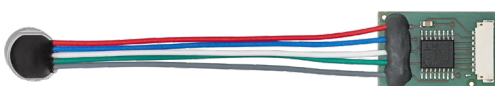
## Environment and material

- G - IP68, no EMC grade, aluminium body (standard)

## Special requirements

- 00 - No special requirements (standard)
- 33 - 3.3 V power supply

\* Differential output available with soldered LDB01/LDB02 and added strain relief on 50 mm distance from the RM08. See image below.

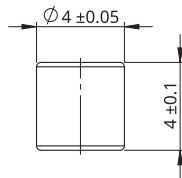


### Table of available combinations

Series	Output type	Shaft size	Resolution	Cable length	Connector	Body style and cable exit	Environment and material	Special requirements
RM08	AC	00	01S	02	L	2	G	00 / 33
	IC			50	U			
	ID		05B / 06B / 07B / 08B / 09B / 10B / 11B / 12B	02	L			
	SC		50	U				
	SD		02	L				
	Vx	10B			00			

## Magnetic actuator and magnet ordering information

### Magnet for direct recessing in non-ferrous shafts

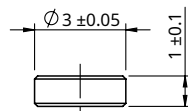


**Fixing:** Adhesive (recommended – LOCTITE 648 or 2701)

**Part numbers:**

For resolutions up to 9 bit absolute (512 cpr incremental)  
**RMM44A2A00** (individually packed) – for sample quantities only  
**RMM44A2C00** (packed in tubes)

For resolutions from 10 bit absolute (800 cpr incremental) and above  
**RMM44A3A00** (individually packed) – for sample quantities only  
**RMM44A3C00** (packed in tubes)



**Part numbers:**

**RMM3010A1B00**

RMM3010 magnets are only tested (not graded). Specified accuracy cannot be achieved by using magnet RMM3010

# Accessories

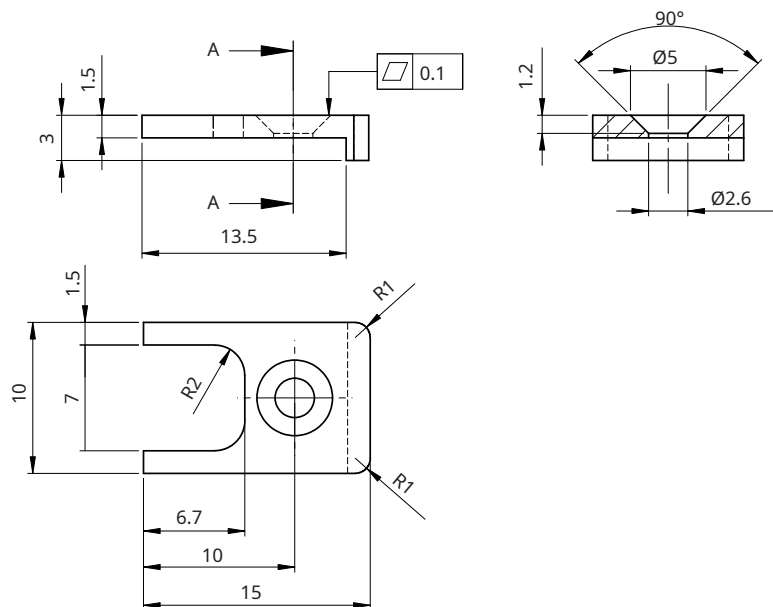
## Mounting bracket



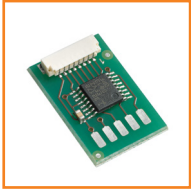
ACC014

### Dimensions

Dimensions and tolerances are in mm.



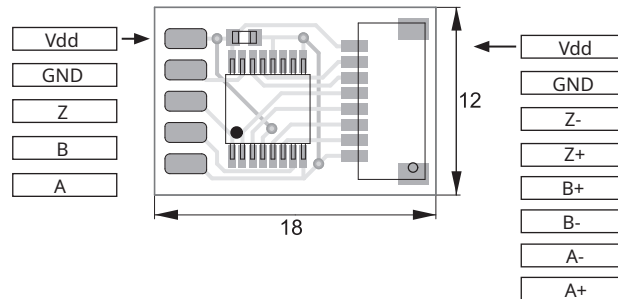
## Line drive board for incremental output - LDB001



LDB001

### Dimensions

Dimensions and tolerances are in mm.



## Cable assembly for LDB001



ACC033, ACC034

**Cable specifications** M-9693-2350-01-C

**Configuration** 10 × 0.0320 mm<sup>2</sup>

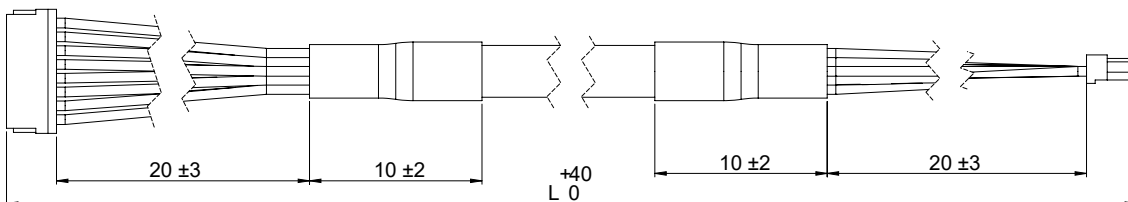
**Sheath color** Black

**Rated voltage** 30 V

**Temperature range** From -40 °C to +90 °C

### Dimensions

Dimensions and tolerances are in mm.



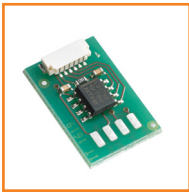
### Electrical connections

Pin	Wire color
1	Grey
2	Pink
3	Yellow
4	Green
5	White
6	Brown
7	Blue
8	Red

### Part number

	Cable length (L)
ACC033	1 m
ACC034	0.5 m

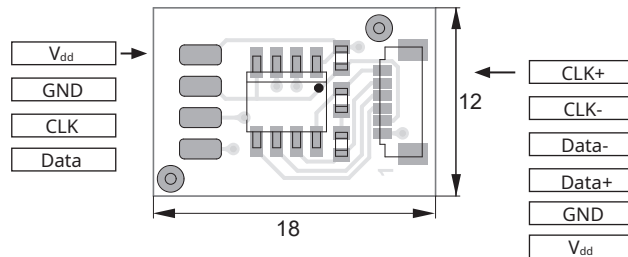
## Line drive board for SSI output - LDB02



**LDB02**

### Dimensions

Dimensions and tolerances are in mm.



## Cable assembly for LDB02



**ACC031, ACC032**

### Cable specifications

M-9693-2350-01-C

#### Configuration

10 × 0.0320 mm<sup>2</sup>

#### Sheath color

Black

#### Rated voltage

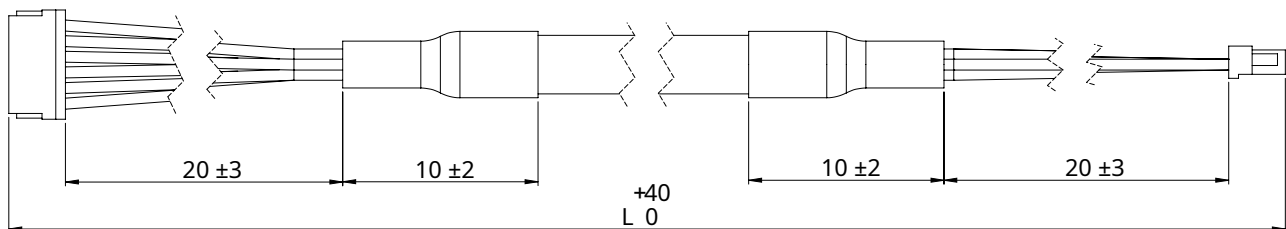
30 V

#### Temperature range

From -40 °C to +90 °C

### Dimensions

Dimensions and tolerances are in mm.



### Electrical connections

Pin	Wire color
1	Red
2	Blue
3	Green
4	Yellow
5	Brown
6	White

### Part number

	Cable length (L)
<b>ACC031</b>	1 m
<b>ACC032</b>	0.5 m

## Head office

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## Global support

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Visit our [website](#) to contact your nearest sales representative.

## Document issues

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Issue	Date	Page	Description
16	29. 5. 2025	General	New design of document, dimension drawing amended
17	24. 11. 2025	4	Installation drawing ride height amended
18	5. 2. 2026	13	Part numbering amended

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