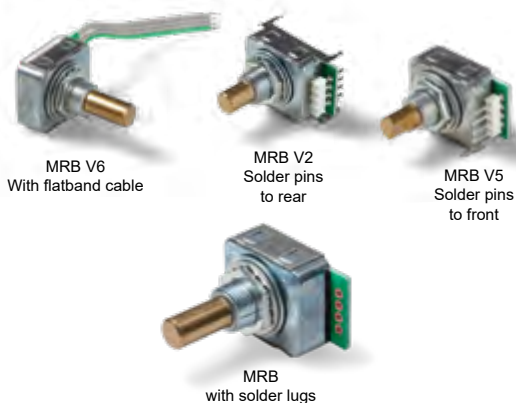


# Data Sheet for Panel Encoders

## Optoelectronic Panel Encoder

## Series MRB



- Very compact design, ideal for small installation spaces
- Choice of different operational torques for bearing
- Choice of different operational forces for push button switch
- 25 or 16 pulses per revolution
- With 5V supply voltage low power consumption  $\leq 10$  mA
- From shaft side IP protection grade IP55
- With or without detent, push button switch
- Various electrical connection variants

The extremely compact MRB series offers a wide range of options for compatibility with a wide range of applications. The competitive price structure also makes this panel encoder interesting for low-end applications.

Electrical Data Sensor	MRB without detent	MRBC with detent	MRBT without detent with switch	MRBCT with detent and switch
Output signal	A, B			
Number of pulses	25 pulses per rev., 16 pulses per rev.			
Output voltage high	@ Supply Voltage 3.3V $\geq$ (Supply Voltage -0.3V) / @ Supply Voltage 5V $\geq$ (Supply Voltage -0.5V)		@Supply Voltage 3.3V / 5V $\geq$ (Supply Voltage -0.5V)	
Output voltage low	$\leq 0.4$ V max.		$\leq 0.5$ V max.	
Limit frequency	200 Hz			
Supply voltage	5 V $\pm 10\%$ , 3.3 V $\pm 10\%$			
Power consumption (no load)	Supply Voltage 3.3V < 20 mA Supply Voltage 5V < 10 mA			
Insulation voltage 1.)	250 VAC, 1 min			
Insulation resistance 1.)	100 MOhm @ 250 VDC			
Output electronics	CMOS			

Mechanical and Environmental Data Sensor	MRB without detent	MRBC with detent	MRBT without detent with switch	MRBCT with detent and switch
Mechanical angle of rotation /stroke 1.)	360° without stop			
Number of detents per rev.	-	25 (25 detents per rev.) / 16 (16 detents per rev.)	-	25 (25 detents per rev.) / 16 (16 detents per rev.)
Lifespan 2.)	> 1 Mio. shaft revolutions (High Torque > 0,1 Mio. Udr.)			
Bearing	Sleeve Bearing			
Operational torque / detent torque	$\leq 0.4$ Ncm	-	$\leq 0.4$ Ncm	-
Without detent	-	<0.4 $\pm 0.1$ Ncm	-	<0.4 $\pm 0.1$ Ncm
With detent light torque	-	<0.6 $\pm 0.2$ Ncm	-	<0.6 $\pm 0.2$ Ncm
With detent standard torque	-	<1.05 $\pm 0.35$ Ncm	-	<1.05 $\pm 0.35$ Ncm
With detent medium torque	-	<1.6 $\pm 0.5$ Ncm	-	<1.6 $\pm 0.5$ Ncm
With detent high torque	-	-	-	-
Operating temperature range	0 °C up to +55 °C			
Storage temperature range	-40 °C up to +85 °C			
Protection grade shaft side standard (IEC 60529)	IP40			
Option D (with shaft sealing)	IP55			

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Series MRB

Mechanical and Environmental Data Sensor	MRB without detent	MRBC with detent	MRBT without detent with switch	MRBCT with detent and switch
Vibration (IEC 68-2-6, Test Fc)	Sine wave vibration with a swing speed of 10 to 55 to 10 Hz for 1 minute and a total amplitude of 1.5 mm is added in the 3 axis direction for each axis for 2 hours. The axis shall be in the horizontal position. (5.9 to 176 m / equivalent)			
Shock (IEC 68-2-27, Test Ea)	Apply regular sine half wave impact with peak acceleration 490 m/s <sup>2</sup> (50 G) working time 11 ms to each of three directions in six directions.			

Mechanical and Environmental Data Sensor	MRB without detent	MRBC with detent	MRBT without detent with switch	MRBCT with detent and switch
Housing diameter / length	19 x 21.2 mm			
Housing depth	min. 8.9 mm / max. 9.8 mm			
Shaft diameter	6 mm			
Shaft type	Solid shaft			
Max. radial load	< 1 N			
Max. axial load	< 1 N (max. 15s: Push 100 N / Pull 50 N)			
Connection type	Solder lugs, solder pin's, flatband cable AWG28			
Connection position	Radial			
Sensor mounting	Bushing			
Mass	app. 18 g			
Fastening parts included in delivery	Hex nut (AF12), flat washer and tooth washer For option D with additional sealing ring			
Fastening torque mounting nut	< 1 Nm			
Material shaft	Brass			
Material housing	Die-Cast Zinc plated			
Material disc	Thermoplastic			

## Electrical Data Push Button Switch

Max. voltage push button switch	12 VDC
Max. current push button switch	10 mA
Resistance push button switch	< 200 mOhm

## Mechanical Data and Environmental Data Push Button Switch

Lifespan push button switch	> 0.5 Mio. operations
Travel of push button switch	0.2 ±0.1 mm
Operational force of push button switch	3.2 ±1 N (Standard) / 4 ±1 N (Medium) / 5 ±1 N (High)

1.) According IEC 60393

2.) Determined by climatic conditions according to IEC 68-1, para. 5.3.1 without load collectives

# Data Sheet for Panel Encoders

Optoelectronic Panel Encoder

Series MRB

## Order Code

Description	Selection: <b>standard=black/bold</b> , possible <i>options=grey/italic</i>									
<b>Series</b>	<b>MRB</b>									
<b>Detent:</b>										
<b>Without detent</b>										
<b>With detent</b>										<b>C</b>
<b>Push button switch:</b>										
<b>Without push button switch</b>										
<b>With push button switch (3.2 ±1N actuating force) and detent or without detent and push button switch (4 ±1N actuating force)</b>										<b>T</b>
<i>Option push button switch medium 4 ±1 N (only with detent)</i>										<i>TM</i>
<i>Option push button switch high 5 ±1 N (with or w/o detent)</i>										<i>TH</i>
<b>Pulses per revolution:</b>										
<b>25 pulses (detent) per revolution</b>										<b>25</b>
<i>Option 16 pulses (detents) per revolution</i>										<i>16</i>
<b>Supply voltage:</b>										
<b>5 V</b>										<b>5</b>
<b>3.3 V</b>										<b>3,3</b>
<b>Output signal: A+B</b>										<b>B</b>
<b>Shaft sealing:</b>										
<b>Standard without shaft sealing</b>										
<i>Option D with shaft sealing</i>										<i>D</i>
<b>Electrical connection:</b>										
<b>Standard with solder lugs</b>										
<b>Solder pins to rear</b>										<b>V2</b>
<i>Option solder pins to front</i>										<i>V5</i>
<i>Option flatband cable 150 mm (AWG28)</i>										<i>V6</i>
<b>Shaft length / diameter:</b>										
<b>Ø 6 x 20 mm</b>										
<i>Option Ø6 x 16 mm</i>										<i>A16</i>
<i>Option Ø6 x 16 + Ø4 x 8 mm (only with push button)</i>										<i>V7</i>
<i>Option shaft length in mm</i>										<i>Ax,xx</i>
<i>Option shaft diameter in mm</i>										<i>DMx,xx</i>
<b>Operational torque:</b>										
<b>Without detent: torque ≤ 0.4 ±0,1 Ncm</b>										
<b>With detent: torque &lt; 0.6 ±0.2 Ncm</b>										
<i>Option with detent: light torque &lt; 0.4 ±0.1 Ncm</i>										<i>LT</i>
<i>Option with detent: medium torque &lt; 1.05 ±0.35 Ncm*</i>										<i>MT</i>
<i>Option with detent: high torque &lt; 1.6 ±0.5 Ncm*</i>										<i>HT</i>

\*If the MT or HT option is required in combination with push-button, TM or TH option must be selected

\*If the TM option is required, then MT or HT must be selected

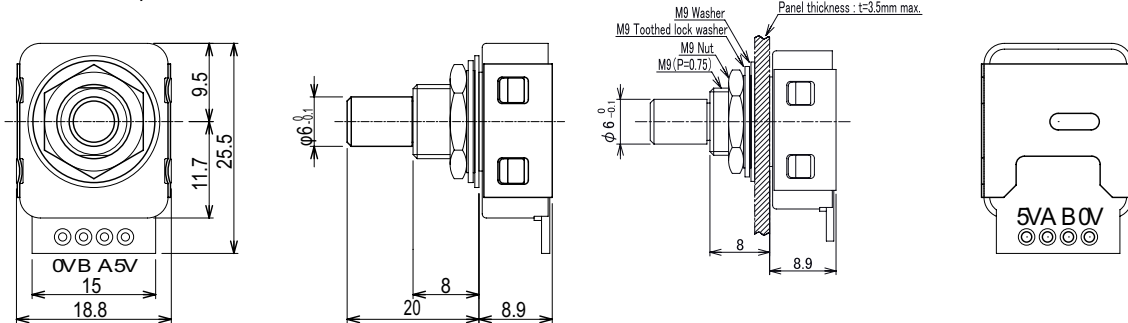
## For higher quantities or on-going demand, additional options are available as described below

For example:

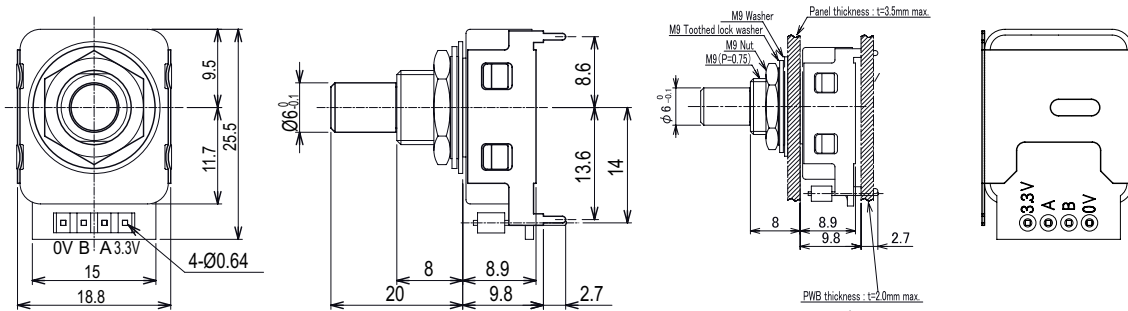
- Other resolutions
- Other number of detents
- Customized detent torque
- Special shaft design
- Special cable and connection design
- Extended operating temperature range 0..70°C
- Protection grade from shaft side IP6x

### Drawing without pushbutton

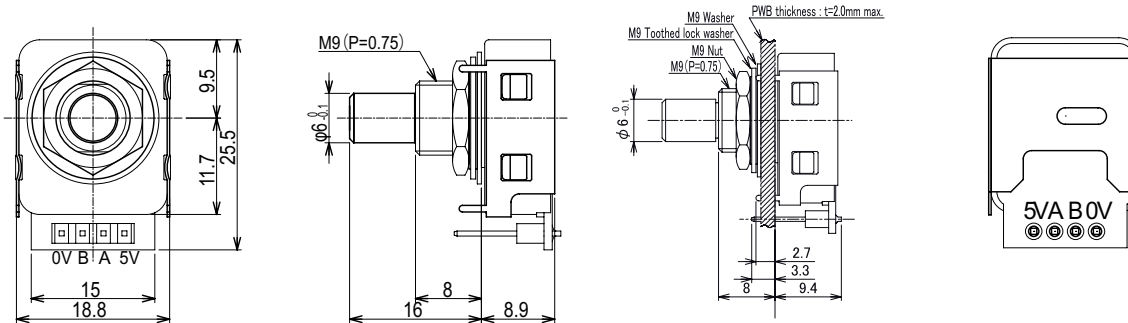
MRB without push button - standard



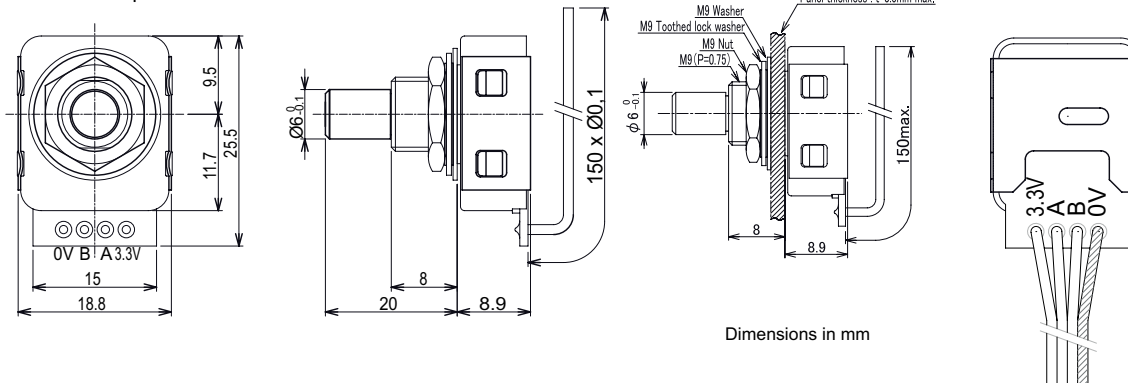
MRB without push button - V2



MRB without push button - V5



MRB without push button - V6



Dimensions in mm

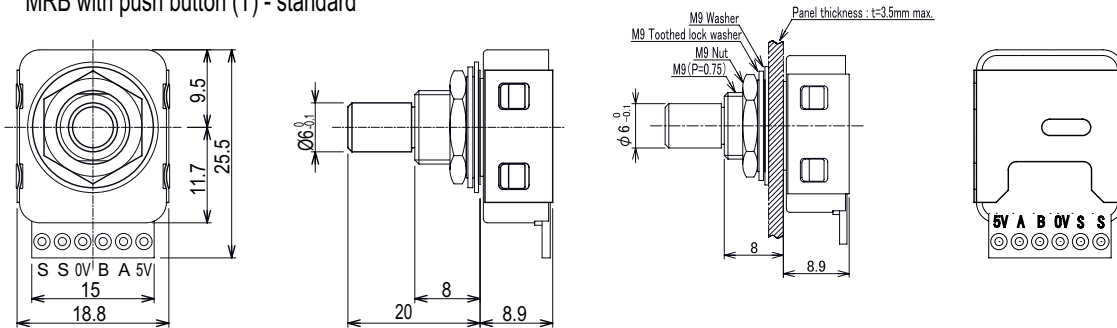
# Data Sheet for Panel Encoders

## Optoelectronic Panel Encoder

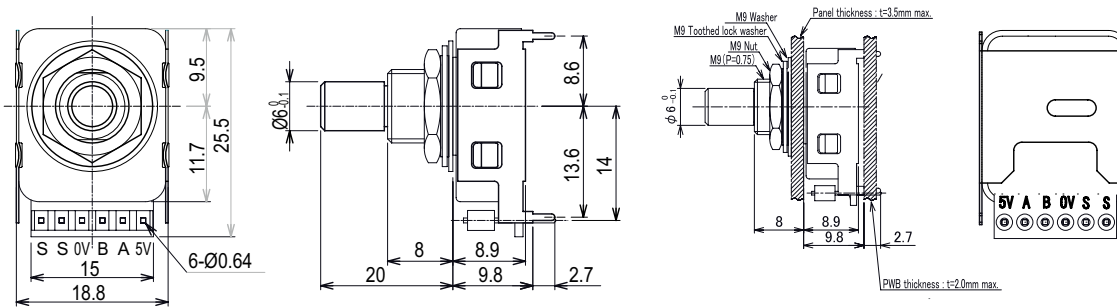
## Series MRB

### Drawing with pushbutton

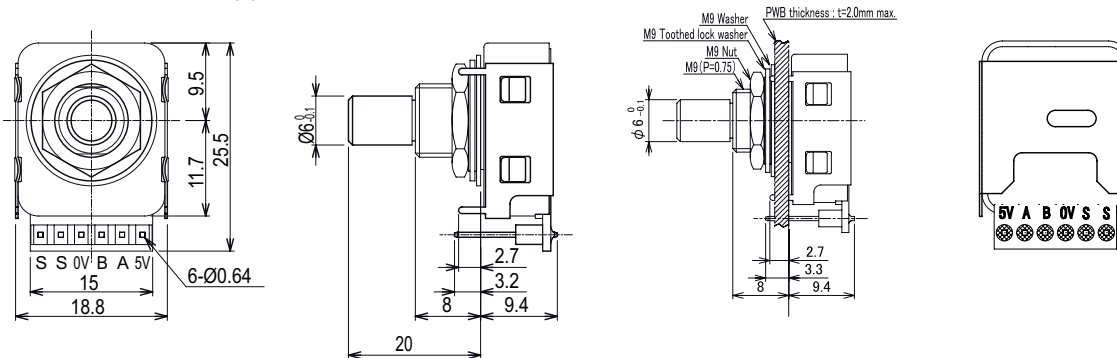
MRB with push button (T) - standard



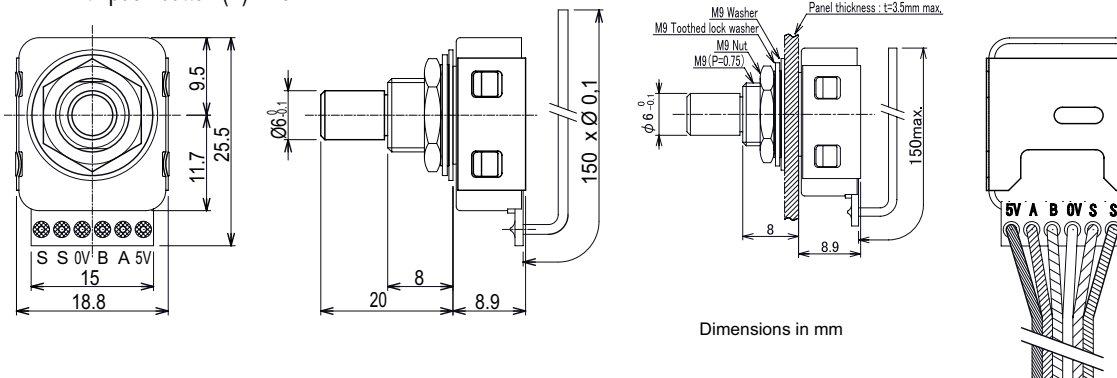
MRB with push button (T) - V2



MRB with push button (T) - V5



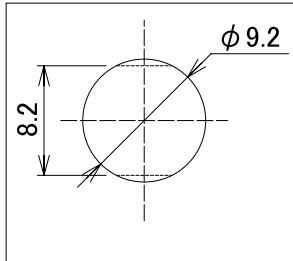
MRB with push button (T) - V6



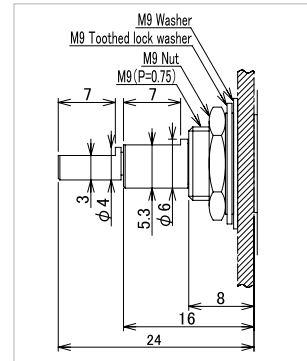
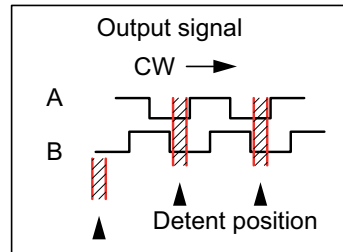
Dimensions in mm

### Drawing

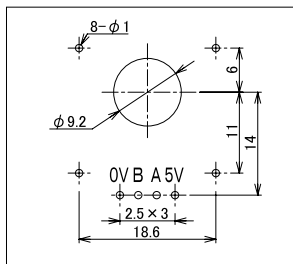
Mounting hole dimension (mm):



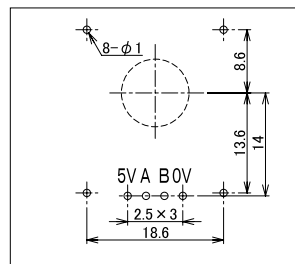
V7 shaft dimension (mm):



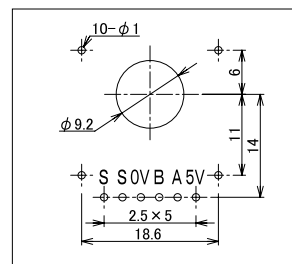
PCB mounting hole dimensions (mm):



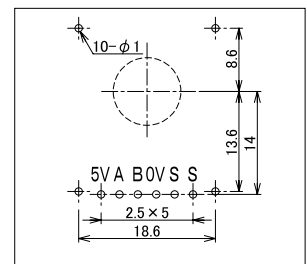
MRB without push button V5



MRB without push button V2



MRB with push button V5



MRB with push button V2

### Terminal number

1	3. 3V/5V	Supply
2	A	Signal A
3	B	Signal B
4	0V	Ground

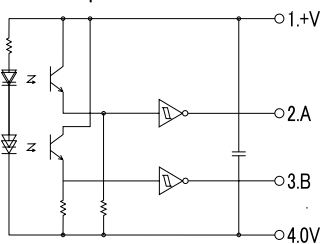
1	3. 3V/5V	Supply
2	A	Signal A
3	B	Signal B
4	0V	Ground
5	S	Push Switch
6	S	Push Switch

MRB without push button

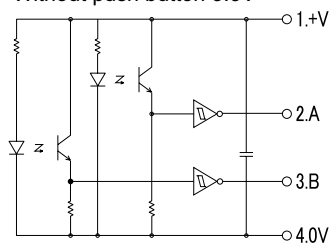
MRB(C)T with push button

### Circuit

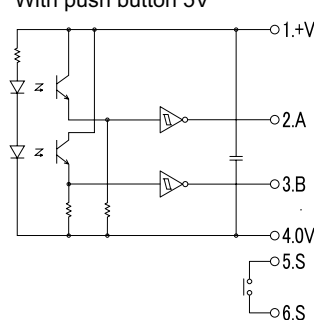
Without push button 5V



Without push button 3.3V



With push button 5V



With push button 3.3V

