

# Data Sheet for Angle Sensors

## Optical Encoders

## Series MOL40



- Optical resolution 10 to 5000 pulses per revolution
- Metal housing, ball bearing
- 40 mm housing diameter
- 6 or 8 mm shaft diameter
- Output: NPN, Open Collector, Linedriver, Push Pull
- 2 m signal cable
- Shaft coupling included in delivery

The robust encoder design of the MOL40 series is particularly suitable where high operational shaft speeds and a long service life are required. The MOL40 is established on the market for many years in hundreds of applications and is a guarantor of high reliability. The linedriver option provides a reliable measurement value transmission over long distances between encoder and evaluation unit.

Electrical Data	Push Pull "B"	Open Collector "K"	Voltage Output "NPN"	Line Driver "N"
Output channels	A, B, Z			A, A/, B, B/, Z, Z/
Number of pulses	10..5000 pulses per rev. (other pulses per revolution on request)			
Output voltage low	Residual voltage 0.4 VDC			Residual voltage max. 0.5 VDC
Output voltage high	@VSUP=5 VDC VSUP -2.0 VDC @VSUP12..24 VDC min. VSUP -3 VDC	Residual voltage max. 0.4 VDC	Residual voltage max. 0.4 VDC	@VSUP=5 VDC min. 2.5 VDC @VSUP 12..24 VDC min. VSUP -3.0 VDC
Limit frequency	300 kHz			
Supply voltage	12..24 VDC ±5 % 5 VDC ±5 %			
Current consumption (no load)	≤ 80 mA		≤ 50 mA	
Output load	(High) max. 30 mA (Low) max.10 mA	max. 30 mA	max. 10 mA	(High) max. -20 mA (Low) max. 20 mA
Insulation voltage 1.)	≥ 100 MOhm @ 500 VDC			
Insulation resistance 1.)	750 VAC (1 min.)			
Output electronics	Push Pull	Open Collector	Voltage output NPN	Linedriver
Switch-on delay	max. 1 µs			max. 0.5 µs

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### Mechanical and Environmental Data, Miscellaneous

Mechanical angle of rotation/stroke 1.)	360° without stop
Bearing	Ball bearing
Max. operational speed	5000 rpm
Operational torque @ RT 1.) 2.)	≤ 0.4 Ncm
Operating temperature range	-10..+70 °C
Storage temperature range	-25..+85 °C
Protection grade (IEC 60529) standard	IP50
Vibration (IEC 68-2-6, Test Fc)	10..55 Hz (1 min.); 1.5 mm; each 2 h in X, Y, Z
Shock (IEC 68-2-27, Test Ea)	max. 50G
Housing diameter	40 mm
Housing depth	31 mm
Shaft diameter	6 mm, 8 mm
Shaft type	Solid shaft
Max. radial load	< 19.61 N
Max. axial load	< 9.81 N
Connection type	Standard: round cable 2 m, Ø5 mm Option: 250 mm, Ø5 mm signal cable with plug (standard: 6 pol., linedriver: 8 pol.)
Connection position	Radial
Sensor mounting	Threaded holes in the sensor front (screws not included in delivery)
Mass	app. 120 g
Fastening parts included in delivery	none
Accessory included in delivery	Ø6 mm shaft coupling
Material shaft	Stainless steel
Material housing	Aluminium
Material disc	Plastic
Immunity ESD	± 4 kV (CE standard)

1.) According IEC 60393

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

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## Order Code

Description	Selection: <b>standard=black/bold</b> , possible <i>options=grey/italic</i>						
<b>Series</b>	<b>MOL40</b>						
<b>Shaft:</b> <b>Ø6 x 15 mm</b> <i>Option Ø8 x 15 mm</i> <i>Option shaft length in mm</i> <i>Option shaft diameter in mm (≤2,5 mm)</i>		<b>6</b> 8 <i>Ax,xx</i> <i>Dx,xx</i>					
<b>Resolution in pulses per revolution:</b> <i>Option 10 ppr.</i> <i>Option 50 ppr.</i> <i>Option 100 ppr.</i> <i>Option 256 ppr.</i> <b>360 ppr.</b> <i>Option 500 ppr.</i> <i>Option 1000 ppr.</i> <b>1024 ppr.</b> <i>Option 1200 ppr.</i> <i>Option 1500 ppr.</i> <i>Option 1800 ppr.</i> <i>Option 2000 ppr.</i> <i>Option 2048 ppr.</i> <i>Option 2500 ppr.</i> <i>Option 3000 ppr.</i> <b>3600 ppr.</b> <i>Option 5000 ppr.</i>							
<b>Supply voltage:</b> <b>12..24 V</b> <i>Option 5 V (*)</i>						<b>1224</b> 5	
<b>Output signal:</b> <i>Option A+B</i> <b>A+B+Z</b>						<i>B</i> <b>BZ</b>	
<b>Output electronics:</b> <i>Option Push Pull (*)</i> <i>Option Open Collector (*)</i> <i>Option voltage output (NPN) (*)</i> <b>Line Driver</b> (output voltage 5V/DC)							<i>B</i> <i>K</i> <i>NPN</i> <b>N</b>
<b>Electrical Connection (radial):</b> <b>Round cable 2 m cable length</b> <i>Option round cable with plug (0,25 m cable length)</i> <i>Option round cable user defined cable length [x,xx meter] without plug</i> <i>Option round cable user defined cable length [x,xx meter] with plug</i>							- <i>ST</i> <i>CVRX,XX</i> <i>CVRX,XX ST</i>

(\*) The option VSUP 5 V can be linked to a minimum order quantity in conjunction with the options B, K, NPN.  
Please inquire the minimum order quantity in combination with the product order code from MEGATRON.

## Order example MOL40

### Requirement:

Shaft diameter 6 mm, resolution 360 pulses per revolution, supply voltage 12..24 V, 2 channels A+B and Index, output electronics line driver, 2 m signal cable length

**Example for order code:** MOL40 6 360 1224 BZ N

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

For example:

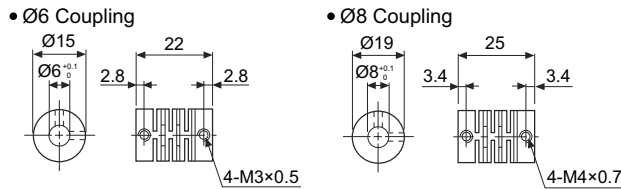
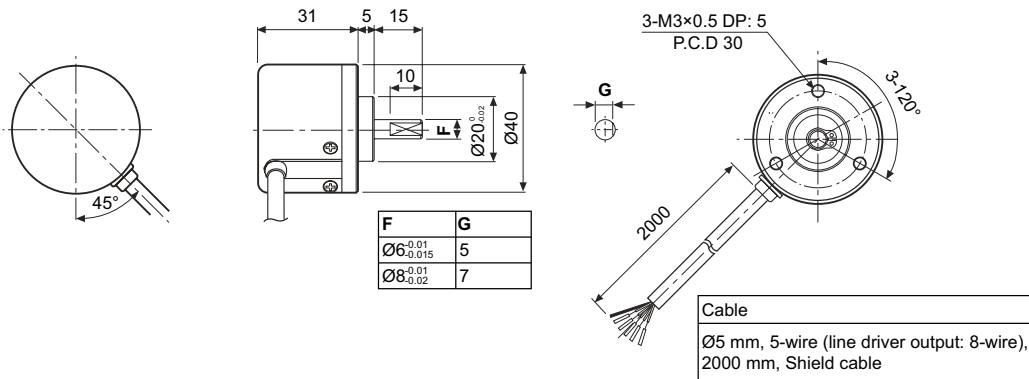
- Other resolutions
- Special cable length
- Modified shaft shape
- Special cable and connector design

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Optical Encoders

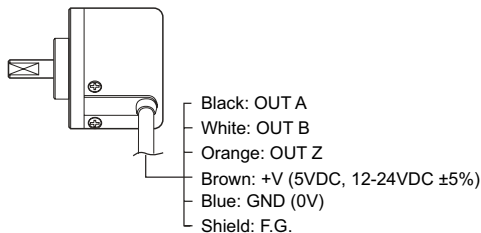
Series MOL40

## Drawing

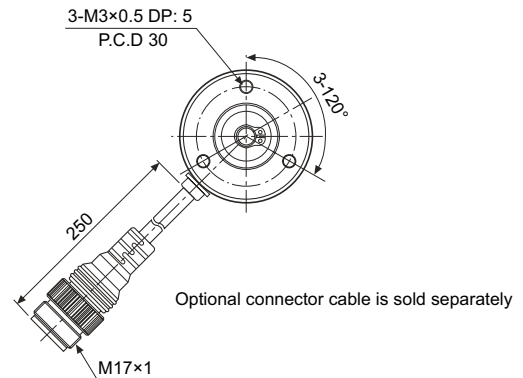


Dimensions in mm

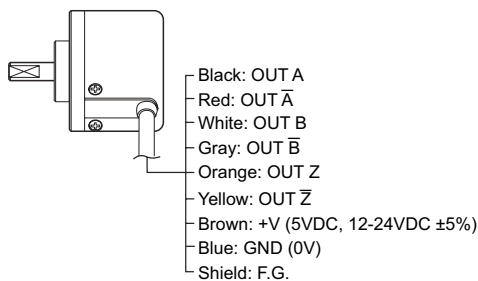
### Totem pole output / NPN open collector output / Voltage output



Unused wires must be insulated.  
The metal case and shield wire of encoder should be grounded (F.G.).



### Line driver output



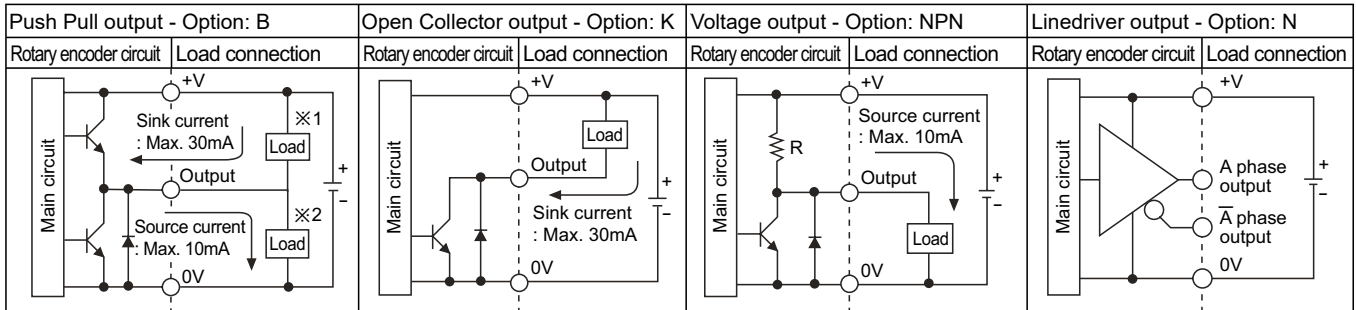
### Totem pole output / NPN open collector output / Voltage output



Totem pole output/ NPN open collector output/ Voltage output			Line driver output		
Pin No	Function	Cable color	Pin No	Function	Cable color
①	OUT A	Black	①	OUT A	Black
②	OUT B	White	②	OUT $\bar{A}$	Red
③	OUT Z	Orange	③	+V	Brown
④	+V	Brown	④	GND	Blue
⑤	GND	Blue	⑤	OUT B	White
⑥	F.G.	Shield	⑥	OUT $\bar{B}$	Gray
			⑦	OUT Z	Orange
			⑧	OUT $\bar{Z}$	Yellow
			⑨	F.G.	Shield

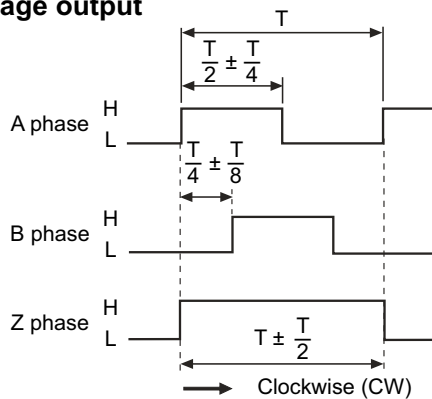
F.G. (field ground): It should be grounded separately.

### Output Diagram



### Output Waveform

Totem pole output /  
NPN open collector output /  
Voltage output



※Z reverse phase output is optional.

### Line driver output

