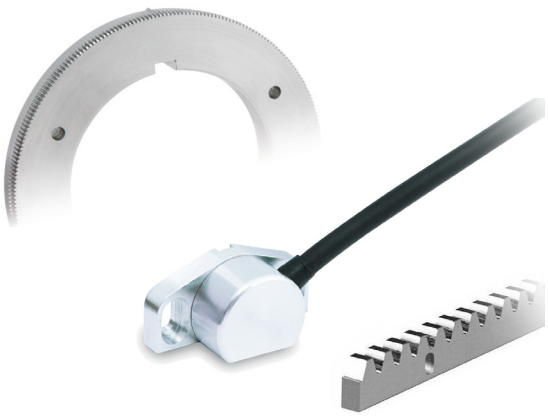
Series **SMG**

- High speed gear and tooth sensor
- Position & speed feedback
- Compact design with IP68 protection
- Easy & precise alignment thanks to keyway
- For rotary targets (gears) with M0,3 & M0,5
- For linear targets with 1, 2, 3 mm pitch structures



SMG

ENVIRONMENTAL SPECIFICATIONS	
Shock:	250 g, 6 ms acc. to CEI EN 60068-2-27
Vibrations:	10 g, 5-2000 Hz acc. to CEI EN 60068-2-6
Protection:	IP68
Operating temperature range:	-25°C ÷ +85°C (-13°F +185°F)
Storage temperature range:	-40°C ÷ +100°C (-40°F +212°F)

MECHANICAL SPECIFICATIONS	
Dimensions:	see drawing
Electrical connections:	Lika Hi-flex cable M8 0,3 m or M12 8 pin inline plug
Gap between sensor/target:	SMG03: 0,19 mm max. SMG05: 0,31 mm max. SMG1: 0,2 mm max. SMG2: 0,4 mm max. SMG3: 0,6 mm max.
Travel speed (mechanical):	max 16 m/s
Measurement length:	for linear targets: target length - 2 teeth each side

ELECTRICAL SPECIFICATIONS	
Interpolation factor:	up to 100 (only digital output)
Repeat accuracy:	Push-Pull, Line Driver: ±1 increment 1Vpp: max. 1% of period lenght
Output circuits:	1Vpp sine/cosine, Line Driver, Push-Pull
Output signals:	AB /AB, AB0 /AB0
Input frequency:	200 kHz max.
Power supply:	+5Vdc ±5%
Consumption:	25 mA typ., 50 mA max.
Protection:	against short-circuit
EMC:	acc. to EN 61000-6-2 level 3

MATERIALS	
Housing materials:	Anticorodal, UNI EN AW-6082
Materials of target wheel/rack:	Ferromagnetic steel
Width of target:	min. 4 mm, min. 8 mm with refference

ACCESSORIES	
E-M12F8:	M12 8 pin mating connector
EC-M12F8-LK-M8-050:	cordset 5 meters with M12 conn.
EC-M12F8-LK-M8-100:	cordset 10 meters with M12 conn.

SMG - linear applications

				Resolution (pulses/tooth) vs. max. possible speed (m/s)				
Sensor	Order code	Edge distance (µsec)	Max. counting frequency (MHz)	100	32	16	8	1
SMG1	-	0,60	1,66	3,20	10,00	20,00	40,00	200,00
	H	0,20	5,00	10,00	30,00	60,00	120,00	240,00
SMG2	-	0,60	1,66	6,40	20,00	40,00	80,00	400,00
	H	0,20	5,00	20,00	60,00	120,00	240,00	480,00
SMG3	-	0,60	1,66	9,6	30,00	60,00	120,00	600,00
	H	0,20	5,00	30,00	90,00	180,00	360,00	720,00
SMG03	-	0,60	1,66	3,00	9,00	18,00	36,00	180,00
	H	0,20	5,00	9,00	27,00	54,00	108,00	180,00
SMG05	-	0,60	1,66	5,00	15,00	30,00	60,00	300,00
	H	0,20	5,00	15,00	45,00	90,00	180,00	300,00

other resolutions available on request

SMG - rotary applications

			SMG03, SMG05 Fi values vs. Resolution				
Order code	Edge distance (µsec)	Max. counting frequency (MHz)	100	32	16	8	1
-	0,60	1,66	3,33	10,42	20,83	41,67	200,00
H	0,20	5,00	10,00	31,25	62,50	125,00	200,00

other resolutions available on request

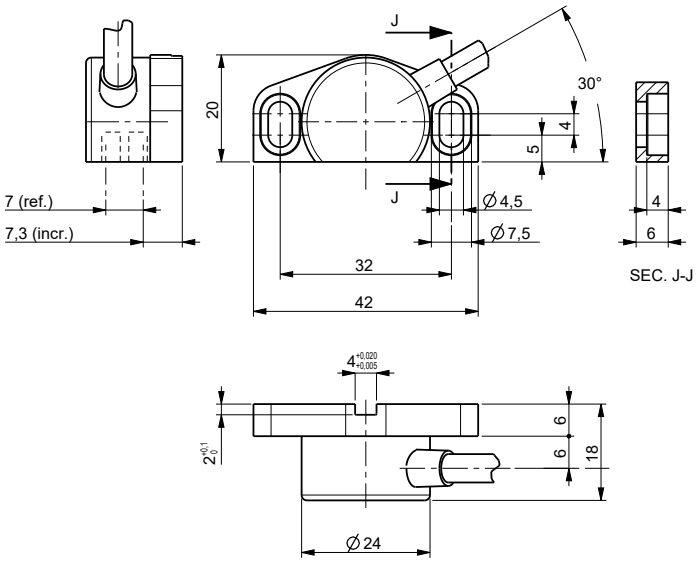
Calculation formula

Fi = Input frequency (kHz). See table above for Fi values according to Edge distance and Resolution
Z = Nr. of teeth (depending on the selected tooth-wheel)

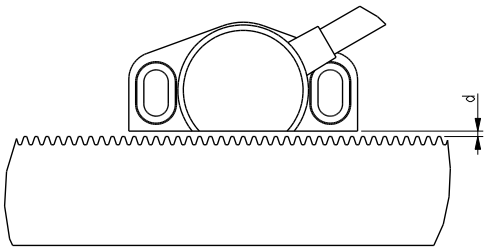
$$\text{RPM} = \frac{\text{Fi} \times 60000}{\text{Z}}$$

Example:
SMG03-L-1-16-N-L1-H and a tooth-wheel with 512 teeth
Fi= 20,83
Z = 512

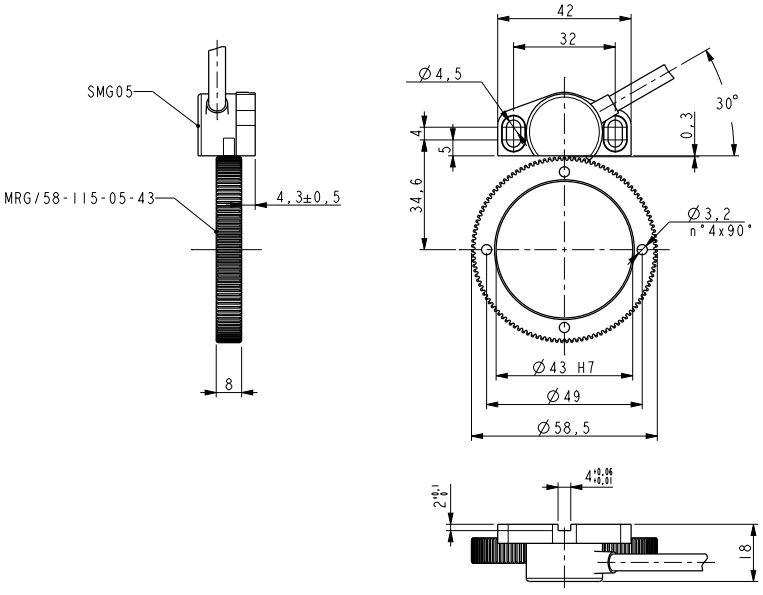
RPM max. = 62,50 x 60000 / 512 = 7324 rpm max.



SMG on linear tooth structures



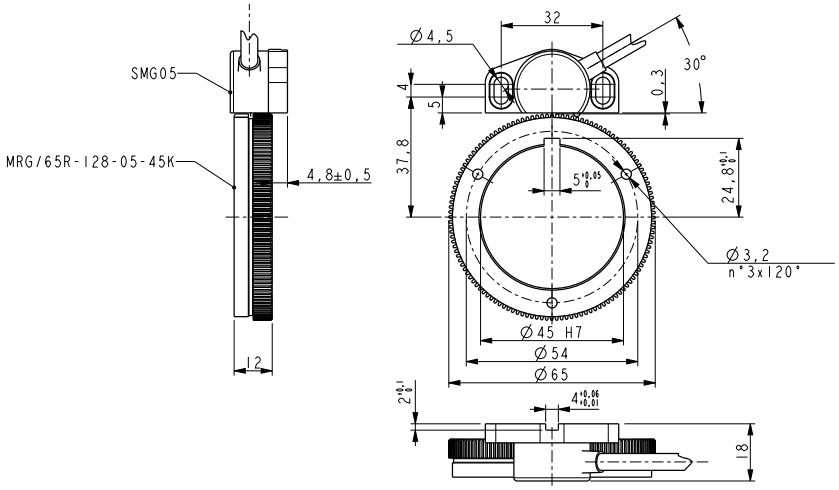
Toothed-structure with pitch 1, 2, 3 mm on linear targets
(contact Lika for further information)



MRG/58 tooth-wheel specification

Order code	MRG/58-115-05-43
Nr. of teeth	115
Reference mark	no
Use with	SMG05

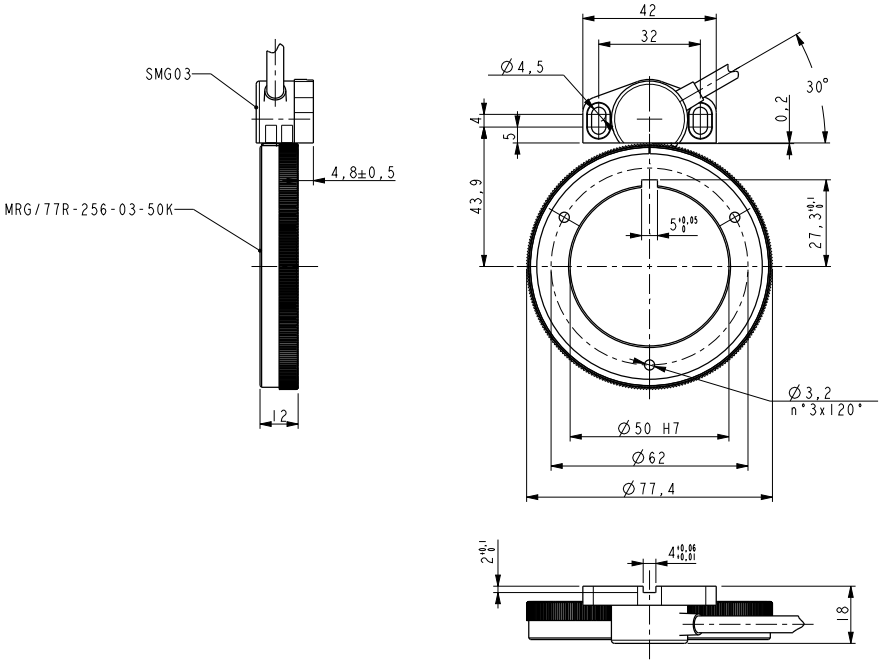
SMG05 - MRG/58



SMG05 - MRG/65R

MRG/65R tooth-wheel specification

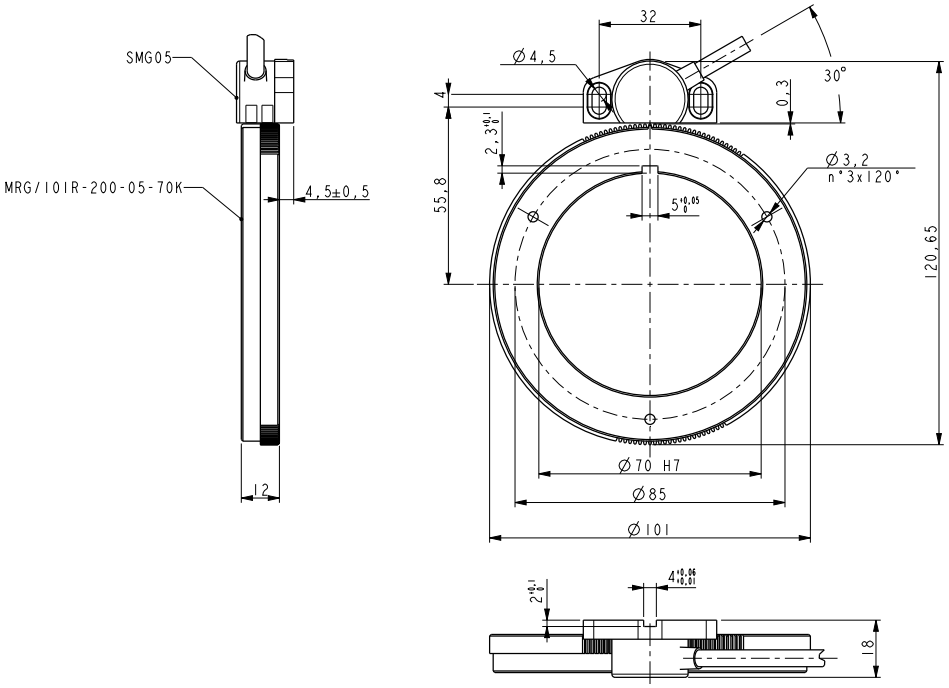
Order code	MRG/65R-128-05-45K
Nr. of teeth	128
Reference mark	yes
Use with	SMG05



SMG03 - MRG/77R

MRG/77R tooth-wheel specification

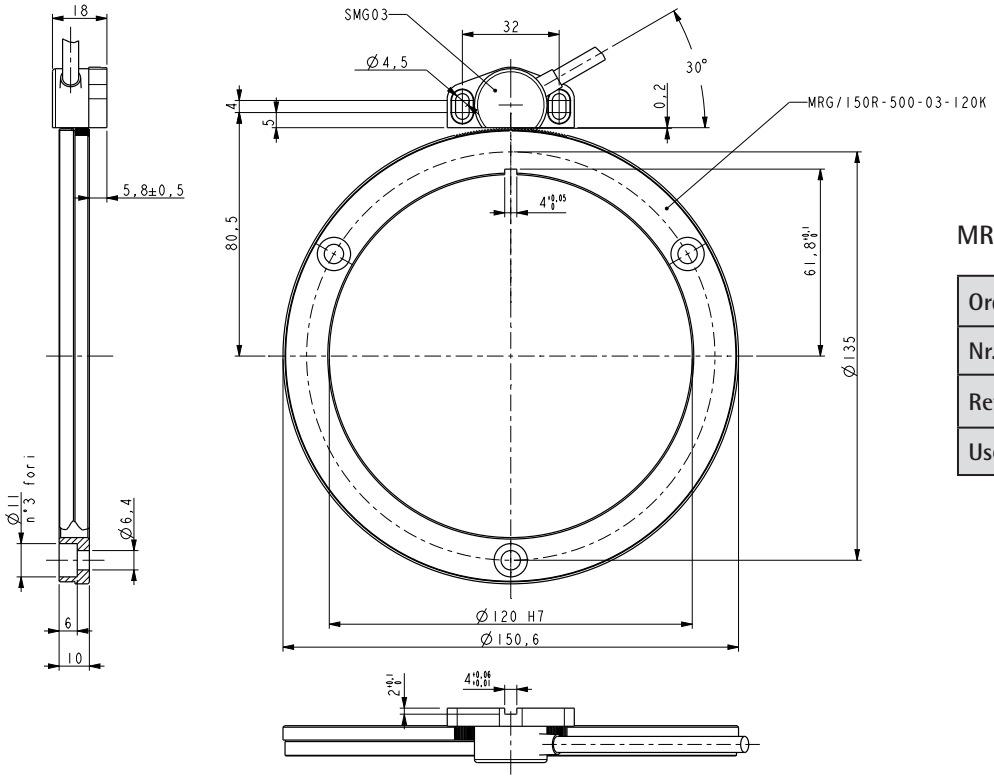
Order code	MRG/77R-256-03-50K
Nr. of teeth	256
Reference mark	yes
Use with	SMG03



SMG05 - MRG/101R

MRG/101R tooth-wheel specification

Order code	MRG/101R-200-05-70K
Nr. of teeth	200
Reference mark	yes
Use with	SMG05



SMG03 - MRG/150R

MRG/150R tooth-wheel specification

Order code	MRG/150R-500-03-120K
Nr. of teeth	500
Reference mark	yes
Use with	SMG03

Order code

SMG03 SMG05	-	XX ⓐ	-	XXXX ⓑ	-	X ⓒ	-	XXXX ⓓ	-	X ⓔ	/Sxxx ⓕ

ⓐ **OUTPUT CIRCUITS & POWER SUPPLY**
Y1 = Push-Pull (AB), +5Vdc ±5%
L1 = Line Driver (AB /AB), +5Vdc ±5%

ⓑ **RESOLUTION**
0001 = 1 pulse/tooth
0008 = 8 pulses/tooth
0016 = 16 pulses/tooth
0032 = 32 pulses/tooth
100 = 100 pulses/tooth

ⓒ **INDEX**
N = without
R = with reference type R

ⓓ **CABLE TYPE & LENGTH**
L003 = cable output 0,3 m
Lxx0 = cable out. x m (max. length 10m)
M005 = 0,5 m cable + M12 8 pin inline plug

ⓔ **EDGE DISTANCE**
(see edge distance selection)
- = 0,6 µs *(standard value)*
H = 0,2 µs

ⓕ **CUSTOM VERSION**

Order code

SMG03 SMG05	-	XX ⓐ	-	XXXX ⓑ	-	X ⓒ	-	XXXX ⓓ	/Sxxx ⓔ

ⓐ **OUTPUT CIRCUITS & POWER SUPPLY**
V1 = 1 Vpp sine/cosine (AB /AB), +5Vdc ±5%

ⓑ **RESOLUTION**
0001 = 1 pulse/tooth

ⓒ **INDEX**
N = without
R = with reference type R (1Vpp level)

ⓓ **CABLE TYPE & LENGTH**
L003 = cable output 0,3 m
Lxx0 = cable out. x m (max. length 10m)
M005 = 0,5 m cable + M12 8 pin inline plug

ⓔ **CUSTOM VERSION**

Order code

SMG1 SMG2 SMG3	-	XX ⓐ	-	XXXX ⓑ	-	X ⓒ	-	XXXX ⓓ	-	X ⓔ	/Sxxx ⓕ

ⓐ **OUTPUT CIRCUITS & POWER SUPPLY**
Y1 = Push-Pull (AB), +5Vdc ±5%
L1 = Line Driver (AB /AB), +5Vdc ±5%

ⓑ **RESOLUTION**
0001 = 1 pulse/tooth
0008 = 8 pulses/tooth
0016 = 16 pulses/tooth
0032 = 32 pulses/tooth
100 = 100 pulses/tooth

ⓒ **INDEX**
N = without
R = with reference type R

ⓓ **CABLE TYPE & LENGTH**
L003 = cable output 0,3 m
Lxx0 = cable out. x m (max. length 10m)
M005 = 0,5 m cable + M12 8 pin inline plug

ⓔ **EDGE DISTANCE** *(see edge distance selection)*
- = 0,6 µs *(standard value)*
H = 0,2 µs

ⓕ **CUSTOM VERSION**

Order code

SMG1 SMG2 SMG3	-	XX ⓐ	-	XXXX ⓑ	-	X ⓒ	-	XXXX ⓓ	-	X ⓔ	/Sxxx ⓕ

ⓐ **OUTPUT CIRCUITS & POWER SUPPLY**
V1 = 1 Vpp sine/cosine (AB /AB), +5Vdc ±5%

ⓑ **RESOLUTION**
0001 = 1 pulse/tooth

ⓒ **INDEX**
N = without
R = with reference type R (1Vpp level)

ⓓ **CABLE TYPE & LENGTH**
L003 = cable output 0,3 m
Lxx0 = cable out. x m (max. length 10m)
M005 = 0,5 m cable + M12 8 pin inline plug

ⓔ **EDGE DISTANCE**
(see edge distance selection)
- = 0,6 µs *(standard value)*
H = 0,2 µs

ⓕ **CUSTOM VERSION**

Document release	Date	Description
1.0	June 2024	New order code and new technical drawing on page 100 ("SMG on linear tooth structures")