ROTARY GEAR LIMIT SWITCHES

For more than 65 years, **Giovenzana International B.V.** has been designing and producing rotary gear limit switches, offering now four different series.

Rotary gear limit switches are used to control the movement of industrial machinery when it's necessary to measure movement based on the rotation angle and/or the number of shaft revolutions, providing upper, lower and/or intermediate limits for moving machinery and mechanisms.

Usually connected to the motor shaft, the rotary gear limit switch uses a series of gears and cams to activate a microswitch when the appropriate number of rotations is reached. This is generally used to stop the motor when a moving load has reached the desired position or final positions.

The device, through a gear transmission, controls a cam system operating on 2, 4 or more microswitches that after a certain number of revolutions predispose the motor or the equipment to the start or stop.
Each cam is equipped with a "micrometric" adjustable register screw that operates in an independent way, so it is possible to calibrate the opening and closing of each microswitch according to the necessary requirements.
The gear transmission system allows to choose different ratios and can be supplied in a bi-protruding shaft version or with linear control (potentiometer or encoder).

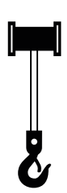
Each series of rotary limit switch has specific features which reduce time and costs for installation and maintenance.

Giovenzana International B.V. offers rotary gear limit switches with standard input ratios from 1:12 to 1:400 (custom input ratios are available on request up to 1:1482). They can be configured with maximum 6 contacts and combined with encoders and potentiometers to reach your own needs. We can offer snap action switches and different cam type to meet customers requirements.

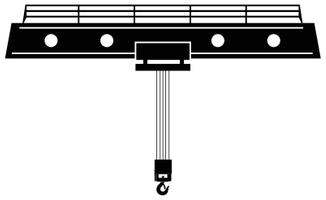
The wide range of the input ratios (standards and customized) available in our series, make every customers and applications needs satisfied.

APPLICATIONS

Giovenzana rotary limit switches are suitable for several applications: from lifting machinery to industrial overhead doors and boat lifts, from theatre lighting hoists to renewable energy systems, like wind turbines.



HOIST



CRANE



INDUSTRIAL DOORS



WIND TURBINES

SERIES



FGR0



FGR1



FGR2



FGR3

FEATURES

- The revolutions of the shaft are transmitted to a cam switch mechanism, through which mechanical switching contacts are actuated.
- Different ratios (also direct ratios) are available for the rotary gear limit switches of the FGR series.
- The switch can be equipped with a maximum of 8 switching contacts.
- Positive opening NC contacts for safety functions.
- Each cam can be individually adjusted to the desired position and thus enables flexible definition of end positions and reference points. More accurate adjustment of cams by means of screws.
- To reduce abrasion and rust, the transmission and guide shafts of the gears are made of stainless steel.
- The circumferential rubber gasket provides great protection against dust and water, allowing IP66 protection to be easily achieved for the entire products range.
- The optimised interior allows quick and easy cabling.

BENEFITS

› High protection class degree

› Extreme temperature resistance: -30°C to +70°C

› Easy use, resistance and durability

› Guaranteed safety

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	FGR0	FGR1
GENERAL CHARACTERISTICS		
CASE	Self-extinguishing thermoplastic material	Thermoplastic glass fiber reinforced material
PROTECTION CLASS	IP67 - IEC / EN 60529	IP65 - IEC / EN 60529
RATIO	1:12, 1:25, 1:33, 1:50, 1:75, 1:100, 1:150, 1:200, 1:400	1:12, 1:33, 1:50, 1:75, 1:100, 1:150, 1:200, 1:400
DIRECT RATIO	1:25, 1:50	1:50, 1:75, 1:100
SHAFT TYPE	Stainless steel mounted on self-lubricating bush protected by sealing rings on both sides Double overhang shaft version available on request	Stainless steel Double overhang shaft version available on request
FIXING TYPE	Base fixing Front fixing (flanged)	Base fixing Front fixing (flanged)
MICRO SWITCHES	Nr 4 max - micrometric adjustment of roller lever (long life)	Nr 4 max - micrometric adjustment of roller lever (long life)
CAM BLOCK	Self-lubricating with transparent support for easier cam viewing	Self-lubricating with transparent support for easier cam viewing
CABLE ENTRY	M16 (max 2)	M16 or M20 (max 4)
AMBIENTAL TEMPERATURE	Operating: -25°C ... +70°C Storage: -30°C ... +70°C	Operating: -25°C ... +70°C Storage: -30°C ... +70°C
ELECTRICAL CHARACTERISTICS		
MICRO SWITCHES CONNECTIONS	MFI.3 - 6.3 x 0.8 faston terminal MFI.3STP - Screws M3 for wire 1.5 mm² with plate protection	MFI.7 - 6.3 x 0.8 faston terminal
STANDARD CONFORMITY	IEC / EN 61058-1, UL 1054, EN 60204-1, EN 60947-1, EN 60947-5-1	IEC / EN 61058-1, UL 1054, EN 60204-1, EN 60947-1, EN 60947-5-1
MARKING	CE, cRUus, CCC, EAC	CE, cRUus, CCC, EAC
RATED INSULATION VOLTAGE - Ui	250V	250V
RATHED THERMAL CURRENT - Ith	8A	8A
RATHED OPERATING CURRENT Resistive Load	8A - 250 V AC	8A - 250 V AC
RATHED OPERATING CURRENT Inductive Load	3A - 250 V AC	3A - 250 V AC
RATHED IMPULSE WITH-STAND VOLTAGE - Uimp	1500 V	1500 V
POSITIVE OPENING	NC positive opening	NC positive opening
CONTACT BLOCKS	1NC - 1 NO changeover snap action / silver plated - self cleaning	1NC - 1 NO changeover snap action / silver plated - self cleaning
PROTECTION CLASS	IP40 (IP00 terminals) in according to EN 60529	IP40 (IP00 terminals) in according to EN 60529
OPTIONS		
DOUBLE OVERHANG SHAFT	Available	Available
POTENTIOMETER	According to customer request	-
ENCODER	-	-
CAM SHAPES	5 different cam shapes	5 different cam shapes
PINIONS	On request	20 different pinion shapes

	FGR2	FGR3
GENERAL CHARACTERISTICS		
CASE	Aluminium housing / self-extinguishing cover V0 UL94	Thermoplastic glass fiber reinforced material
PROTECTION CLASS	IP65 - IEC / EN 60529	IP66
RATIO	-	From 1:8 to 1:3572 (according to the configuration)
DIRECT RATIO	1:12, 1:33, 1:50, 1:100, 1:200	-
SHAFT TYPE	Steel mounted on ball bearings Double overhang shaft version available on request	AISI 304 Stainless steel mounted on ball bearings Double overhang shaft version available on request
FIXING TYPE	Base fixing Front fixing (flanged)	Base fixing
MICRO SWITCHES	Nr 6 max - micrometric adjustment	Nr 8 max - micrometric adjustment of roller lever (long life)
CAM BLOCK	Self-lubricating	Self-lubricating with transparent support for easier cam viewing
CABLE ENTRY	M20 (max 2)	M20 (max 3)
AMBIENTAL TEMPERATURE	Operating: -25°C ... +70°C Storage: -30°C ... +70°C	Operating: -40°C ... +90°C Storage: -40°C ... +90°C
ELECTRICAL CHARACTERISTICS		
MICRO SWITCHES CONNECTIONS	MFI.7 - 6.3 x 0.8 faston terminal	MFI.7 - 6.3 x 0.8 faston terminal
STANDARD CONFORMITY	IEC / EN 61058-1, UL 1054, EN 60204-1, EN 60947-1, EN 60947-5-1	IEC / EN 61058-1, UL 1054, EN 60204-1, EN 60947-1, EN 60947-5-1
MARKING	CE, cRUus, CCC, EAC	CE, cRUus, CCC, EAC
RATED INSULATION VOLTAGE - Ui	250V	250V
RATHED THERMAL CURRENT - Ith	8A	8A
RATHED OPERATING CURRENT Resistive Load	8A - 250 V AC	8A - 250 V AC
RATHED OPERATING CURRENT Inductive Load	3A - 250 V AC	3A - 250 V AC
RATHED IMPULSE WITH-STAND VOLTAGE - Uimp	1500 V	1500 V
POSITIVE OPENING	NC positive opening	NC positive opening
CONTACT BLOCKS	1NC - 1 NO changeover snap action / silver plated - self cleaning	1NC - 1 NO changeover snap action / silver plated - self cleaning
PROTECTION CLASS	IP40 (IP00 terminals) in according to EN 60529	IP40 (IP00 terminals) in according to EN 60529
OPTIONS		
DOUBLE OVERHANG SHAFT	Available	Available
POTENTIOMETER	-	According to customer request
ENCODER	-	According to customer request
CAM SHAPES	3 different cam shapes	5 different cam shapes
PINIONS	20 different pinion shapes	20 different pinion shapes

FGR1
Rotary gear limit switch

Rotary gear limit switch

The **FGR1** is a device used to control and measure the movement of industrial machines by measuring the rotation angle and/or counting the number of revolutions of a shaft.

General features

- Different versions available:
  - base fixing;
  - front fixing;
  - with double overhang shaft.
- IP65 Protection class.
- Available in different ratios: 1:12, 1:33, 1:50, 1:75, 1:100, 1:150, 1:200, 1:400 (optional on request).
- Available in direct ratio: 1:50, 1:75, 1:100 (others direct ratio on request).
- Micro switches:
  - device available with 4 microswitches;
  - the working point is adjustable with a calibration screw;
  - each switch has 1NO + 1NC inside;
  - positive opening for NC contacts.

Compliance and certifications

- 2014/35/UE - 2014/33/UE - 2011/65/UE - 2015/863/UE
- EN 60947-1 (2007/A1 : 2011/A2 : 2014)
- EN 60947-5-1 (2004/A1 : 2009/AC : 2004/AC : 2005)
- EN 60204-1 (2006/A1 : 2009)
- EN 60529 (1991/A1 : 2000/A2 : 2013)
- EN 50581 (2012)
- IEC 63000 (2016)





Base Fixing versions

X-ray view



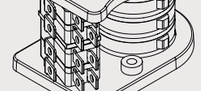
4 microswitches



4 microswitches
Direct Ratio

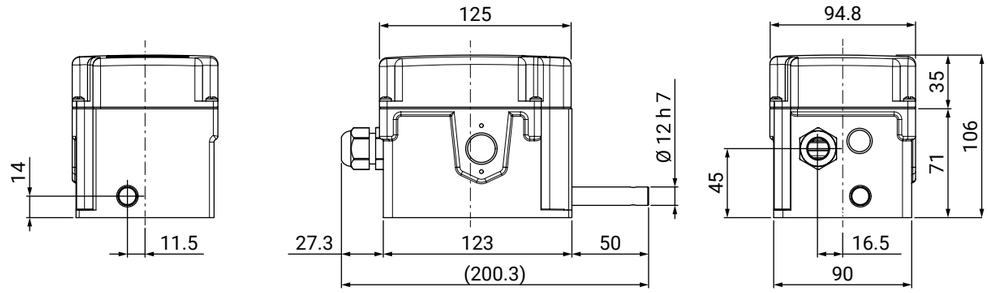
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FGR1
Internal cam pack
4 microswitches



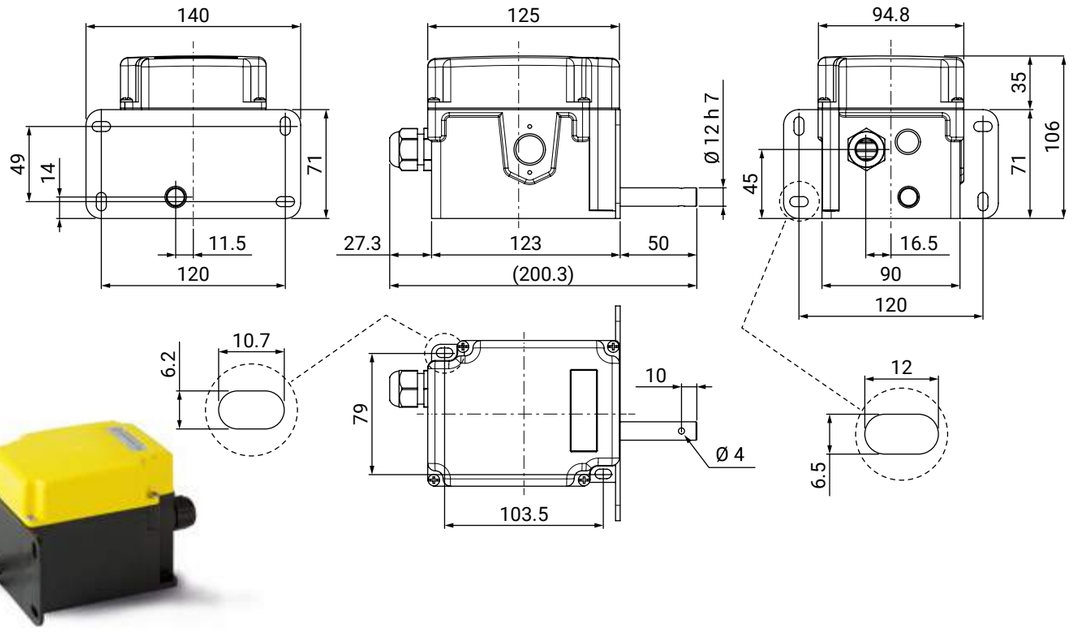
MFI.7

Available codes





Base fixing
4 microswitches

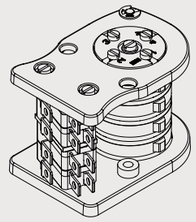


Front fixing
4 microswitches

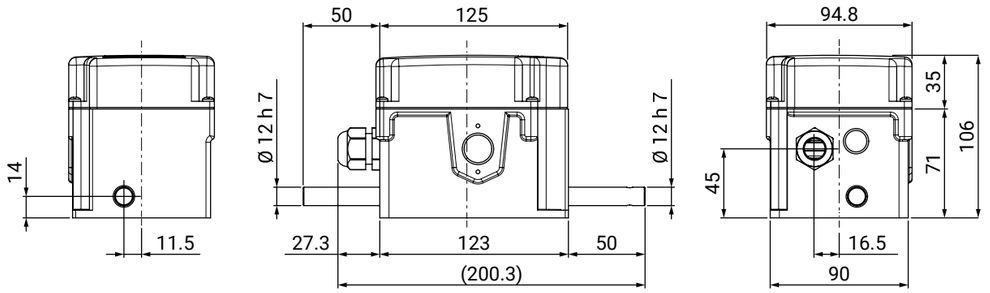
FGR1
Internal cam pack
4 microswitches



MFI.7



Available codes





Double overhang shaft
4 microswitches

Coding system

The **FGR1** coding system is very clear: each block of digits identifies a specific function. The code provides all the informations that can be used to specify each customization.

FGR1	0012/0400	0-2-3-4	B	51-73	F	-	01
Series	**Nr. gear ratio**	**Micro/ cams**	**Shaft type**	**Pinion type**	**Flange**	**-**	**Options**
	Between shaft and cam pack output.	**0** = None **2** = Nr. 2 **3** = Nr. 3 **4** = Nr. 4	**Blank** = Single shaft **B** = Double overhang shaft	Last two numbers of the pinion code. (refers to pages 86-87).	**Blank** = Without **F** = With flange	-	Progressive versions
STANDARD ENCODING							**OPTIONAL ENCODING**

Available codes

Base fixing 4 microswitches	**Front fixing** 4 microswitches	**Double overhang shaft** 4 microswitches
		
FGR100124	**FGR100124F**	**FGR100124B**
FGR100334	**FGR100334F**	**FGR100334B**
FGR100504	**FGR100504F**	**FGR100504B**
FGR100754	**FGR100754F**	**FGR100754B**
FGR101004	**FGR101004F**	**FGR101004B**
FGR101504	**FGR101504F**	**FGR101504B**
FGR102004	**FGR102004F**	**FGR102004B**
FGR104004	**FFGR104004F**	**FGR104004B**

AVAILABLE CONTACT TYPES

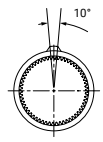


MFI.7

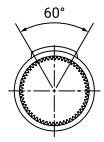


MFI.7STP
On request

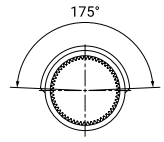
AVAILABLE CAM SHAPES



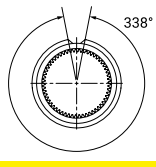
16020081
A (10°) - **STANDARD**



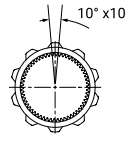
16020097
B (60°)



16020094
C (180°)



16020095
D (opposite)



16020093
E (10 tips)

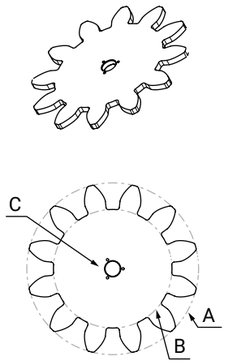
GIOVENZANA INTERNATIONAL B.V.

SPARE PARTS & ACCESSORIES

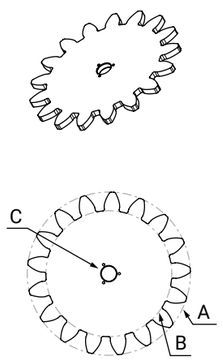
Rotary gear limit switch

Water jet cut pinions

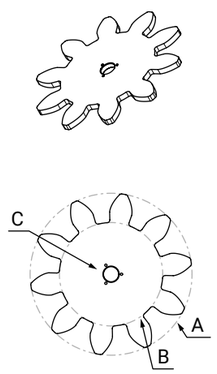
Our measuring pinions are specially manufactured for use with encoders and geared limit switches.
Pinions thickness = 10 mm.



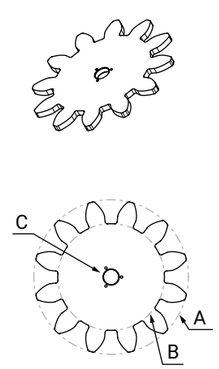
16020051
M20 - Z12
A = Ø 280 / B = Ø 193.2



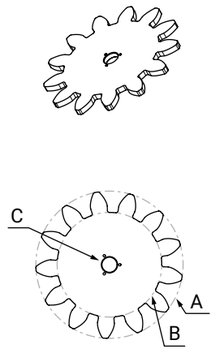
16020052
M14 - Z17
A = Ø 266 / B = Ø 205.24



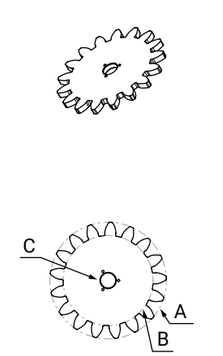
16020053
M22 - Z10
A = Ø 264 / B = Ø 168.52



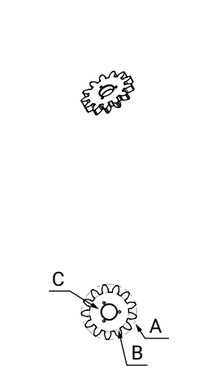
16020054
M18 - Z12
A = Ø 252 / B = Ø 173.88



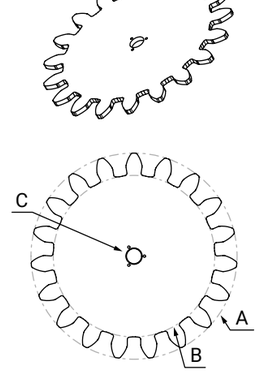
16020055
M16 - Z13
A = Ø 240 / B = Ø 170.56



16020056
M10 - Z17
A = Ø 190 / B = Ø 146.6



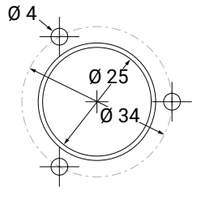
16020057
M6 - Z13
A = Ø 90 / B = Ø 63.96



16020070
M16 - Z19
A = Ø 336 / B = Ø 263,2

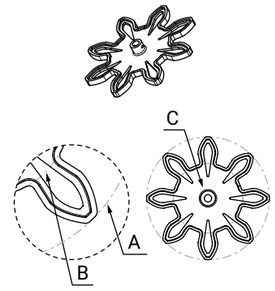
Detail C

For all previous pinions.
Finished product measurements.

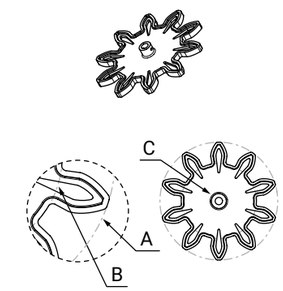




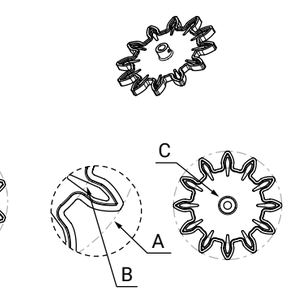
Injection moulded pinions



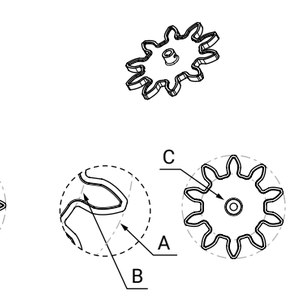
16020058
M20 - Z8
A = Ø 200 / B = Ø 113.2



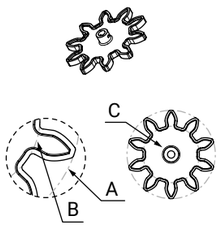
16020059
M13 - Z10
A = Ø 192 / B = Ø 122.56



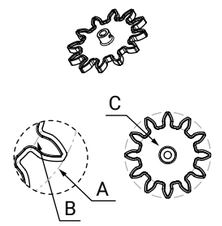
16020060
M12 - Z12
A = Ø 176.4 / B = Ø 121.716



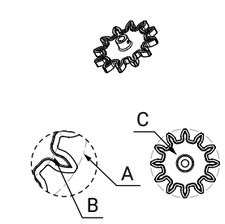
16020061
M14 - Z10
A = Ø 168 / B = Ø 107.24



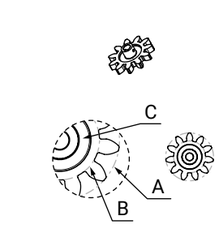
16020062
M12 - Z10
A = Ø 144 / B = Ø 91.92



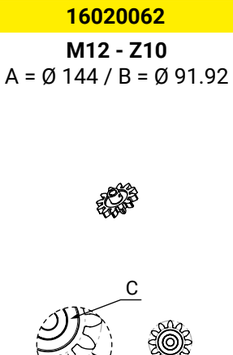
16020063
M10 - Z12
A = Ø 140 / B = Ø 96.6



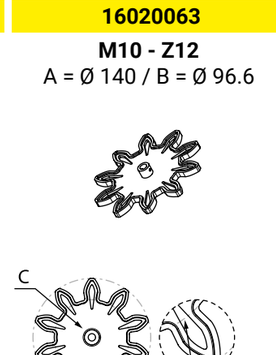
16020064
M8 - Z12
A = Ø 112 / B = Ø 77.28



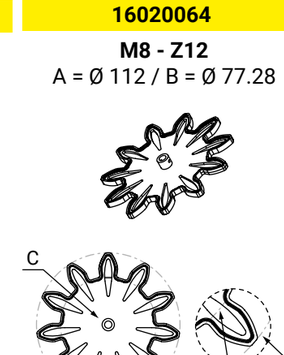
16020065
M6 - Z11
A = Ø 78 / B = Ø 51.96



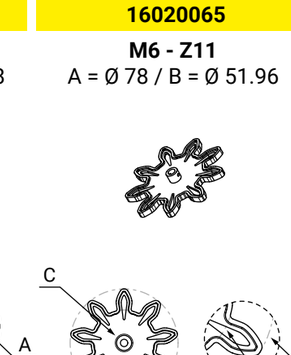
16020066
M5 - Z12
A = Ø 70 / B = Ø 48.3



16020068
M16 - Z20
A = Ø 192 / B = Ø 122.56



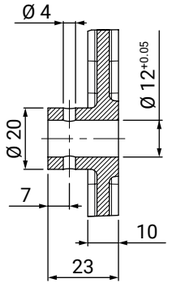
16020069
M18 - Z11
A = Ø 234 / B = Ø 155.81



16020071
M16 - Z19
A = Ø 176 / B = Ø 107.285

Detail C

For all previous pinions.

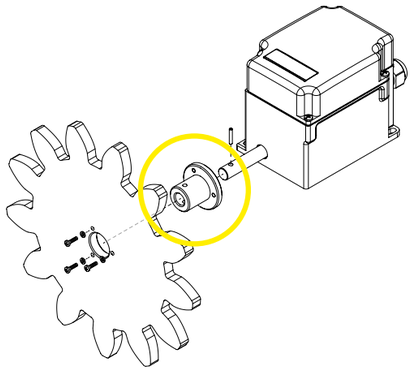




SPARE PARTS & ACCESSORIES

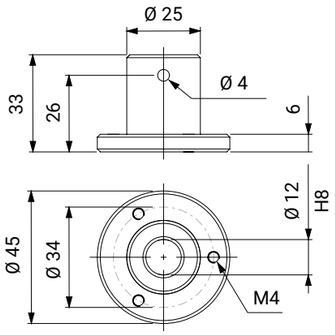
Rotary gear limit switch

Metal sleeve for water jet cut pinions

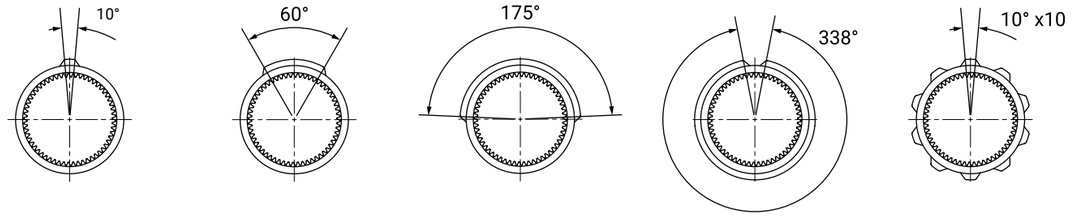




16020050

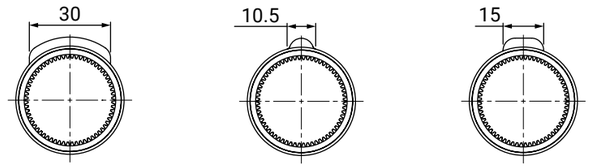


Cam shapes for FGR0, FGR1, FGR3



16020081	16020097	16020094	16020095	16020093
A (10°) - **STANDARD**	**B** (60°)	**C** (180°)	**D** (opposite)	**E** (10 tips)

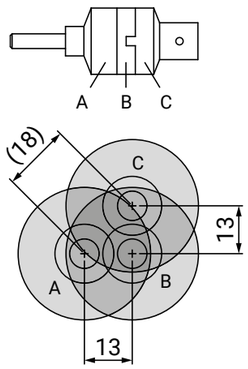
Cam shapes for FGR2



11703015	11703019	11703013
A (30°) - **STANDARD**	**B** (15°)	**C** (90°)

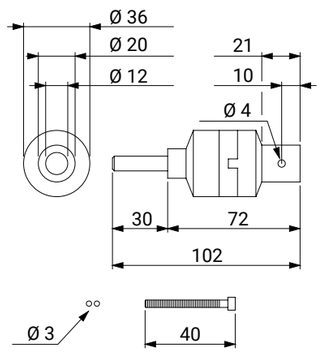
Available customised versions on request.

Oldham coupling





FGH



GIOVENZANA INTERNATIONAL B.V.









	FGR0	FGR1
GENERAL CHARACTERISTICS		
CASE	Self-extinguishing thermoplastic material	Thermoplastic glass fiber reinforced material
PROTECTION CLASS	IP67 - IEC / EN 60529	IP65 - IEC / EN 60529
RATIO	1:12, 1:25, 1:33, 1:50, 1:75, 1:100, 1:150, 1:200, 1:400	1:12, 1:33, 1:50, 1:75, 1:100, 1:150, 1:200, 1:400
DIRECT RATIO	1:25, 1:50	1:50, 1:75, 1:100
SHAFT TYPE	Stainless steel mounted on self-lubricating bush protected by sealing rings on both sides Double overhang shaft version available on request	Stainless steel Double overhang shaft version available on request
FIXING TYPE	Base fixing Front fixing (flanged)	Base fixing Front fixing (flanged)
MICRO SWITCHES	Nr 4 max - micrometric adjustment of roller lever (long life)	Nr 4 max - micrometric adjustment of roller lever (long life)
CAM BLOCK	Self-lubricating with transparent support for easier cam viewing	Self-lubricating with transparent support for easier cam viewing
CABLE ENTRY	M16 (max 2)	M16 or M20 (max 4)
AMBIENTAL TEMPERATURE	Operating: -25°C ... +70°C Storage: -30°C ... +70°C	Operating: -25°C ... +70°C Storage: -30°C ... +70°C
ELECTRICAL CHARACTERISTICS		
MICRO SWITCHES CONNECTIONS	MFI.3 - 6.3 x 0.8 faston terminal MFI.3STP - Screws M3 for wire 1.5 mm² with plate protection	MFI.7 - 6.3 x 0.8 faston terminal
STANDARD CONFORMITY	IEC / EN 61058-1, UL 1054, EN 60204-1, EN 60947-1, EN 60947-5-1	IEC / EN 61058-1, UL 1054, EN 60204-1, EN 60947-1, EN 60947-5-1
MARKING	CE, cRUus, CCC, EAC	CE, cRUus, CCC, EAC
RATED INSULATION VOLTAGE - Ui	250V	250V
RATHED THERMAL CURRENT - Ith	8A	8A
RATHED OPERATING CURRENT Resistive Load	8A - 250 V AC	8A - 250 V AC
RATHED OPERATING CURRENT Inductive Load	3A - 250 V AC	3A - 250 V AC
RATHED IMPULSE WITH-STAND VOLTAGE - Uimp	1500 V	1500 V
POSITIVE OPENING	NC positive opening	NC positive opening
CONTACT BLOCKS	1NC - 1 NO changeover snap action / silver plated - self cleaning	1NC - 1 NO changeover snap action / silver plated - self cleaning
PROTECTION CLASS	IP40 (IP00 terminals) in according to EN 60529	IP40 (IP00 terminals) in according to EN 60529
OPTIONS		
DOUBLE OVERHANG SHAFT	Available	Available
POTENTIOMETER	According to customer request	-
ENCODER	-	-
CAM SHAPES	5 different cam shapes	5 different cam shapes
PINIONS	On request	20 different pinion shapes

	FGR2	FGR3
GENERAL CHARACTERISTICS		
CASE	Aluminium housing / self-extinguishing cover V0 UL94	Thermoplastic glass fiber reinforced material
PROTECTION CLASS	IP65 - IEC / EN 60529	IP66
RATIO	-	From 1:8 to 1:3572 (according to the configuration)
DIRECT RATIO	1:12, 1:33, 1:50, 1:100, 1:200	-
SHAFT TYPE	Steel mounted on ball bearings Double overhang shaft version available on request	AISI 304 Stainless steel mounted on ball bearings Double overhang shaft version available on request
FIXING TYPE	Base fixing Front fixing (flanged)	Base fixing
MICRO SWITCHES	Nr 6 max - micrometric adjustment	Nr 8 max - micrometric adjustment of roller lever (long life)
CAM BLOCK	Self-lubricating	Self-lubricating with transparent support for easier cam viewing
CABLE ENTRY	M20 (max 2)	M20 (max 3)
AMBIENTAL TEMPERATURE	Operating: -25°C ... +70°C Storage: -30°C ... +70°C	Operating: -40°C ... +90°C Storage: -40°C ... +90°C
ELECTRICAL CHARACTERISTICS		
MICRO SWITCHES CONNECTIONS	MFI.7 - 6.3 x 0.8 faston terminal	MFI.7 - 6.3 x 0.8 faston terminal
STANDARD CONFORMITY	IEC / EN 61058-1, UL 1054, EN 60204-1, EN 60947-1, EN 60947-5-1	IEC / EN 61058-1, UL 1054, EN 60204-1, EN 60947-1, EN 60947-5-1
MARKING	CE, cRUus, CCC, EAC	CE, cRUus, CCC, EAC
RATED INSULATION VOLTAGE - Ui	250V	250V
RATHED THERMAL CURRENT - Ith	8A	8A
RATHED OPERATING CURRENT Resistive Load	8A - 250 V AC	8A - 250 V AC
RATHED OPERATING CURRENT Inductive Load	3A - 250 V AC	3A - 250 V AC
RATHED IMPULSE WITH-STAND VOLTAGE - Uimp	1500 V	1500 V
POSITIVE OPENING	NC positive opening	NC positive opening
CONTACT BLOCKS	1NC - 1 NO changeover snap action / silver plated - self cleaning	1NC - 1 NO changeover snap action / silver plated - self cleaning
PROTECTION CLASS	IP40 (IP00 terminals) in according to EN 60529	IP40 (IP00 terminals) in according to EN 60529
OPTIONS		
DOUBLE OVERHANG SHAFT	Available	Available
POTENTIOMETER	-	According to customer request
ENCODER	-	According to customer request
CAM SHAPES	3 different cam shapes	5 different cam shapes
PINIONS	20 different pinion shapes	20 different pinion shapes