

# 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).

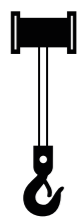
Each series of rotary limit switch has specific features which reduce time and costs for installation and maintenance.

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.

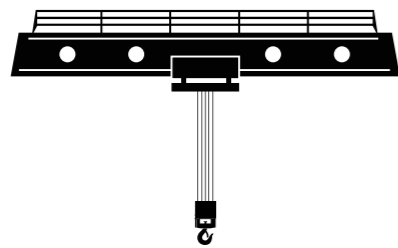
The wide range of the input ratios (standards and customized) available in our series, make every customers and applications needs satisfied.

## APPLICATIONS

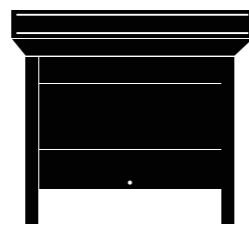
Giovenzana rotary limit switches are suitable for several applications: from lifting machinery to industrial overhead doors and boat lifts, from theatre lighting hoists to renewable energy systems, like wind turbines.



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

# FGRO

## Rotary gear limit switch



### Rotary gear limit switch with overall reduced sizes

The **FGRO** is a device for controlling revolutions of rotating components or the angular position of industrial or construction machinery. A typical application is for small cranes. Also suitable for different applications such as automatic doors or automatic roofs in greenhouses. The unit, through a system of gears and cams transmission, controls 2 or 4 microswitches so, after a certain number of revolutions, predispose the motor or the equipment to the start or stop operation.

The microswitches have a calibration screw that works independently on each cam; so you can calibrate the opening and closing of each micro according to the necessary functional requirements.

The system change allows you to choose different ratios from 1:12 to 1:1480.

### General features

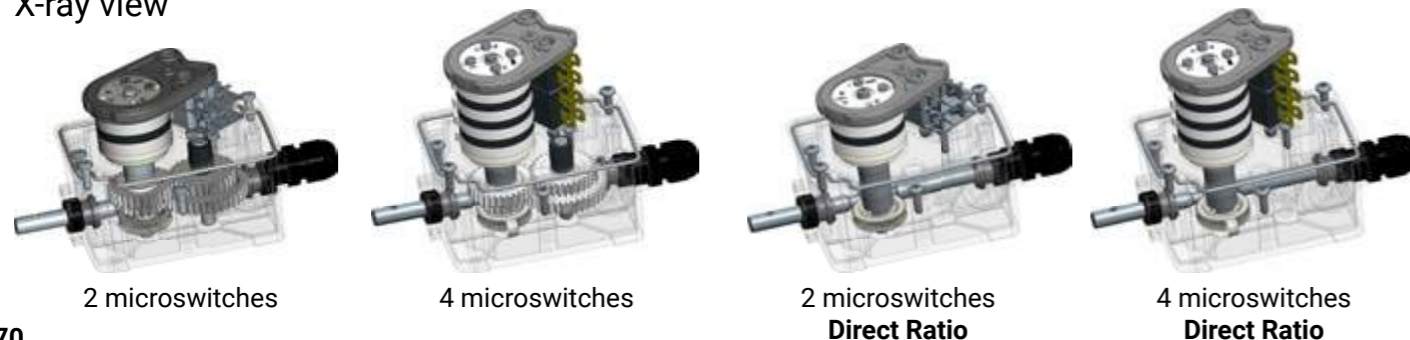
- Different versions available:
  - base fixing;
  - front fixing (with standard flange and flange with increased lead);
  - with double overhang shaft (on request).
- Overall size is reduced.
- Two different cover heights depending on whether the device is equipped with 2 or 4 microswitches.
- IP67 protection class (IEC / EN 60529).
- Available in different ratios: 1:12, 1:25, 1:33, 1:50, 1:75, 1:100, 1:150, 1:200, 1:400 (optional on request).
- Available in direct ratio: 1:25, 1:50 (others direct ratio on request).
- Micro switches:
  - device available with 2 or 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

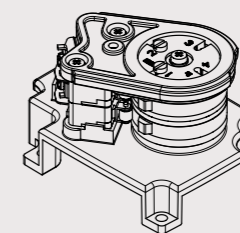


### Available codes

**FGRO**  
Internal cam pack  
2 microswitches



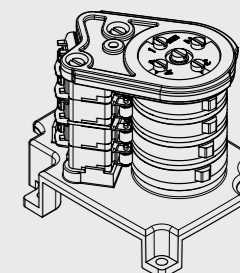
**MFI.3**



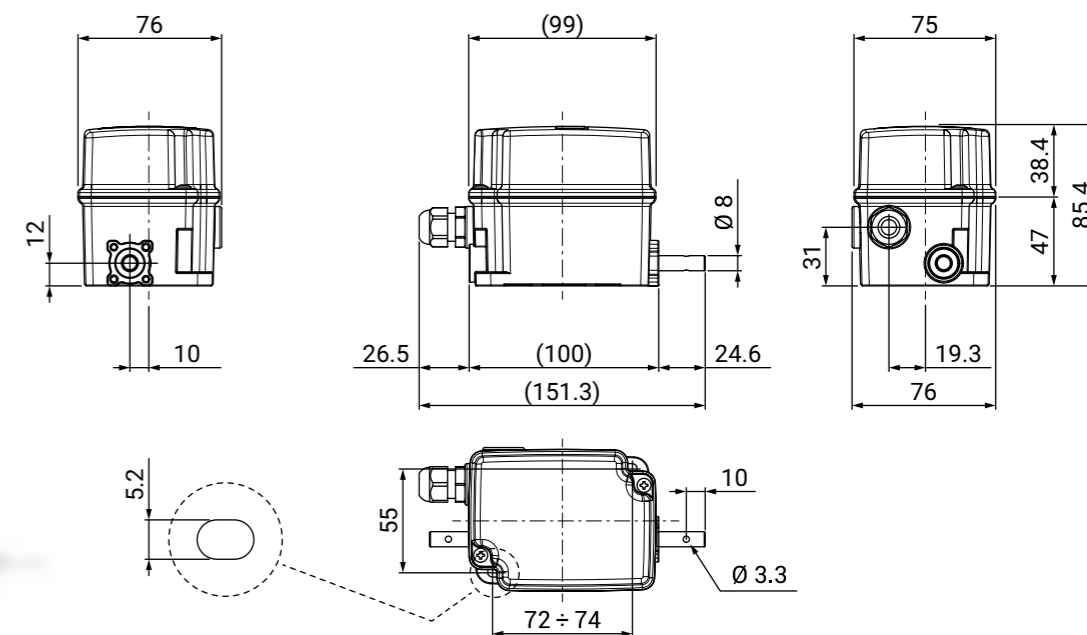
**FGRO**  
Internal cam pack  
4 microswitches



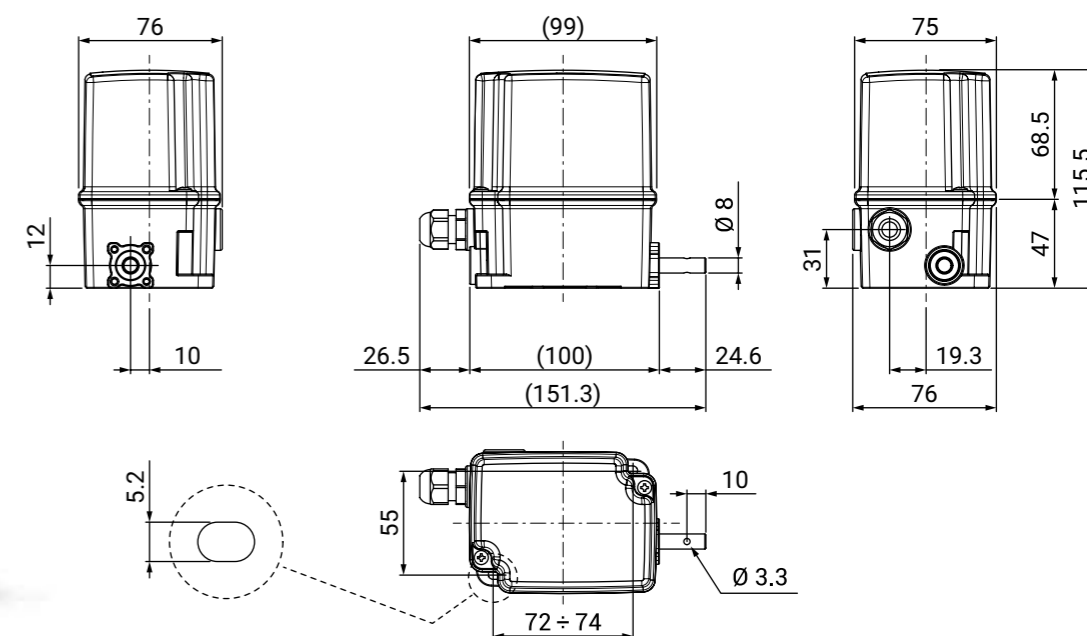
**MFI.3**



**Base fixing**  
2 microswitches



**Base fixing**  
4 microswitches



## Coding system

The FGR0 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.

FGR0	-	0012	M	-	4	A	-	E1	-	01
Series	-	Nr. gear ratio	Shaft type	-	Nr. contacts	Contacts type	-	Options	-	Progressive versions
			M = single shaft B = double overhang shaft			A = MFI.3 (standard) B = MFI.3STP (on request)		E = Encoder P = Potentiometer		Not standard shaft, cams, pinions, colors, logos, extra accessories, etc...
STANDARD ENCODING							OPTIONAL ENCODING			

## Available codes

**Base fixing**  
2 microswitches



**Base fixing**  
4 microswitches



**Double overhang shaft**  
2 microswitches



**Double overhang shaft**  
4 microswitches



FGR0-0012M-2A

FGR0-0025M-2A

FGR0-0033M-2A

FGR0-0050M-2A

FGR0-0075M-2A

FGR0-0100M-2A

FGR0-0150M-2A

FGR0-0200M-2A

FGR0-0400M-2A

FGR0-0012M-4A

FGR0-0025M-4A

FGR0-0033M-4A

FGR0-0050M-4A

FGR0-0075M-4A

FGR0-0100M-4A

FGR0-0150M-4A

FGR0-0200M-4A

FGR0-0400M-4A

FGR0-0012B-2A

FGR0-0025B-2A

FGR0-0033B-2A

FGR0-0050B-2A

FGR0-0075B-2A

FGR0-0100B-2A

FGR0-0150B-2A

FGR0-0200B-2A

FGR0-0400B-2A

FGR0-0012B-4A

FGR0-0025B-4A

FGR0-0033B-4A

FGR0-0050B-4A

FGR0-0075B-4A

FGR0-0100B-4A

FGR0-0150B-4A

FGR0-0200B-4A

FGR0-0400B-4A

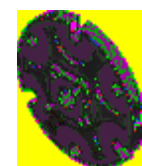
**Front fixing**  
2 or 4 microswitches



**FGR0 Body with long shaft** (see technical drawings to page 72)



+



**11706002**  
standard flange



**11706019**  
flange with increased lead

### AVAILABLE CONTACT TYPES

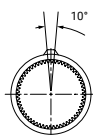


**MFI.3**



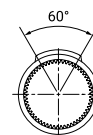
**MFI.3STP**

### AVAILABLE CAM SHAPES



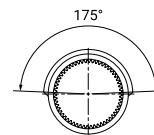
**16020081**

A (10°) - STANDARD



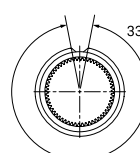
**16020097**

B (60°)



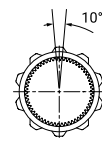
**16020094**

C (180°)



**16020095**

D (opposite)



**16020093**

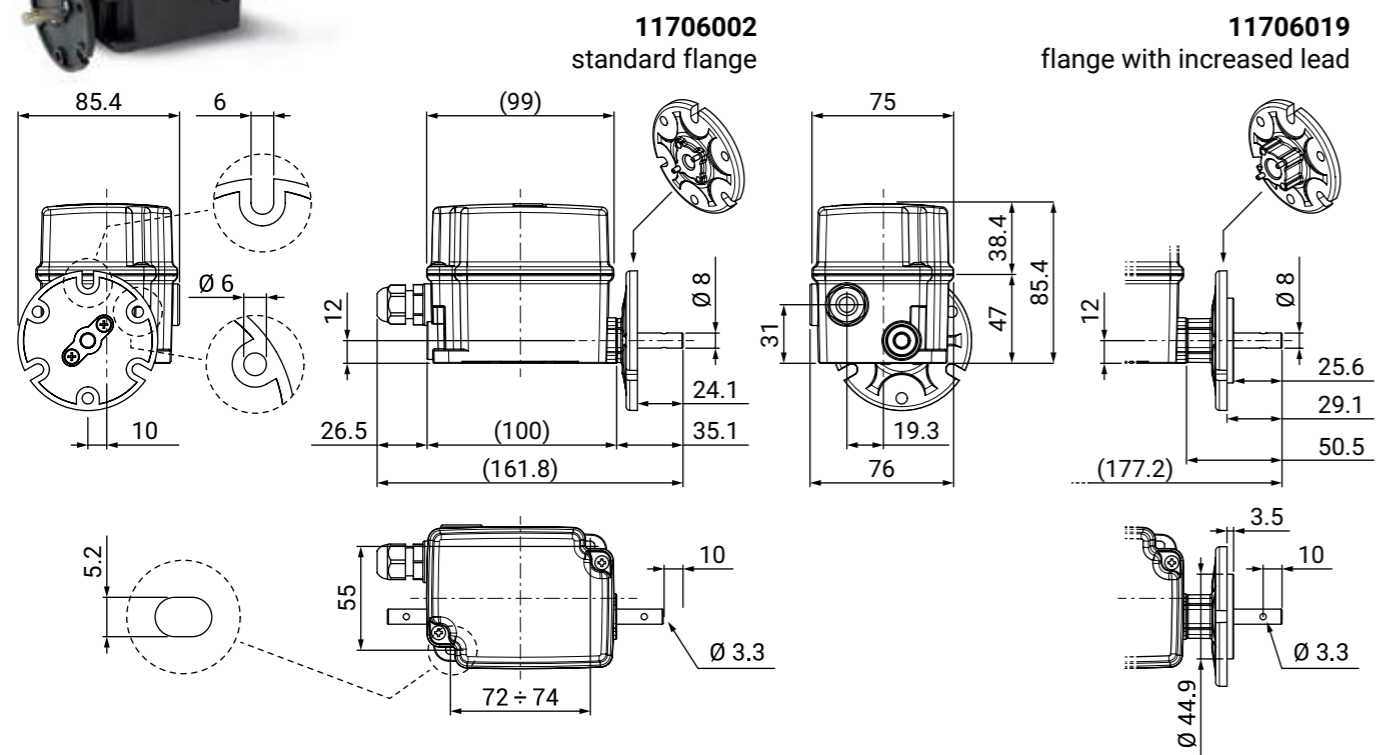
E (10 tips)

Request your **optional encoding!**

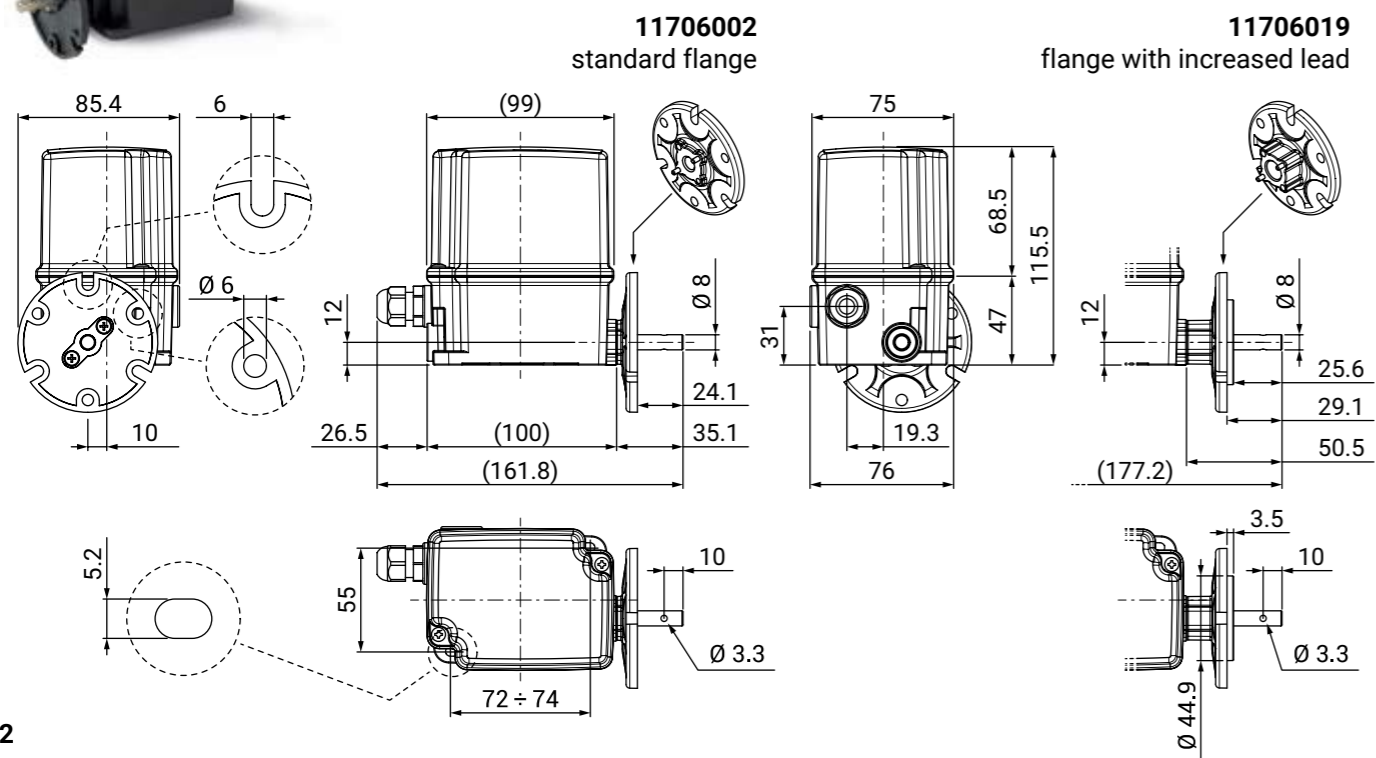
## Available codes



**Front fixing**  
2 microswitches



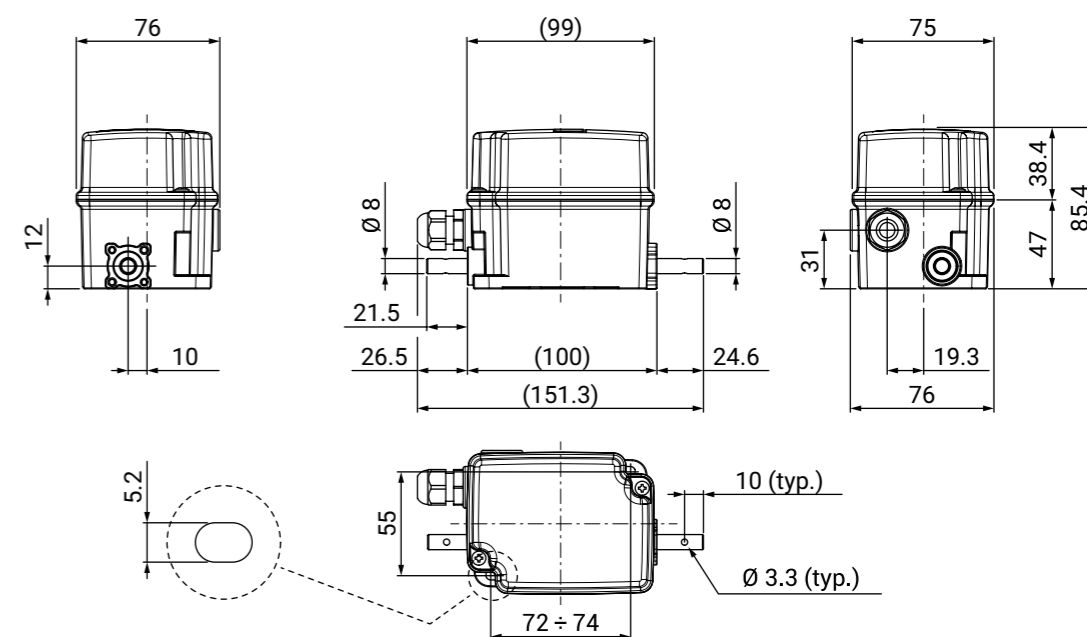
**Front fixing**  
4 microswitches



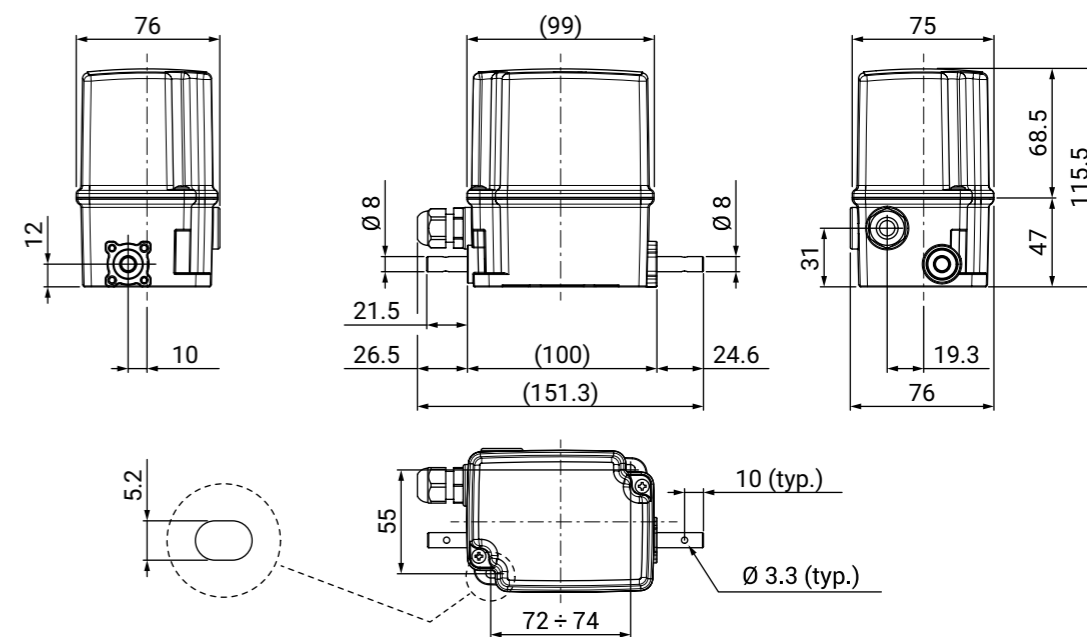
## Available codes



**Double overhang shaft**  
2 microswitches



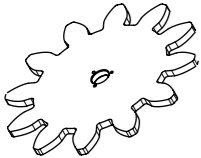
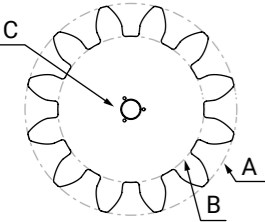
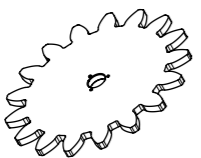
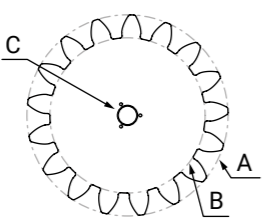
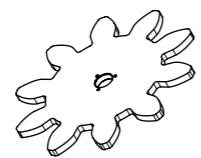
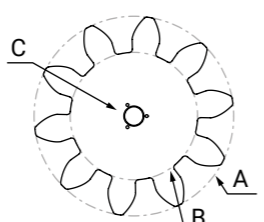
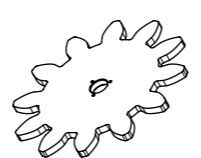
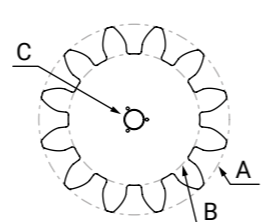
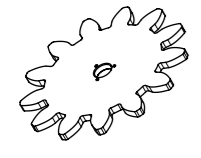
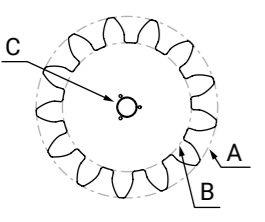
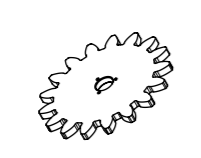
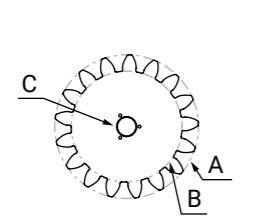

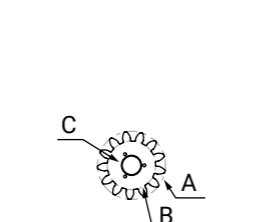
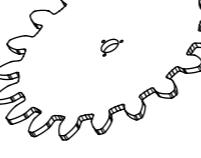
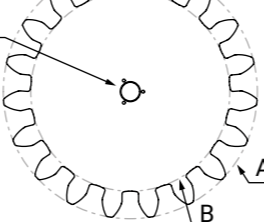
**Double overhang shaft**  
4 microswitches





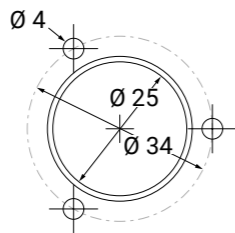
**Water jet cut pinions**

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

 	 	 	 
<b>16020051</b> <b>M20 - Z12</b> A = Ø 280 / B = Ø 193.2	<b>16020052</b> <b>M14 - Z17</b> A = Ø 266 / B = Ø 205.24	<b>16020053</b> <b>M22 - Z10</b> A = Ø 264 / B = Ø 168.52	<b>16020054</b> <b>M18 - Z12</b> A = Ø 252 / B = Ø 173.88
 	 	 	 
<b>16020055</b> <b>M16 - Z13</b> A = Ø 240 / B = Ø 170.56	<b>16020056</b> <b>M10 - Z17</b> A = Ø 190 / B = Ø 146.6	<b>16020057</b> <b>M6 - Z13</b> A = Ø 90 / B = Ø 63.96	<b>16020070</b> <b>M16 - Z19</b> A = Ø 336 / B = Ø 263,2

**Detail C**


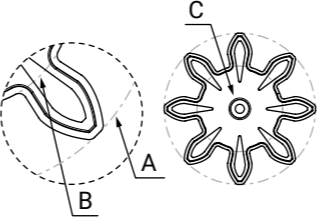

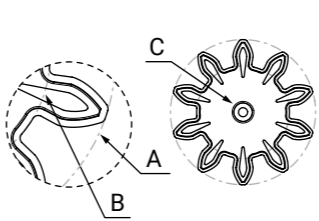

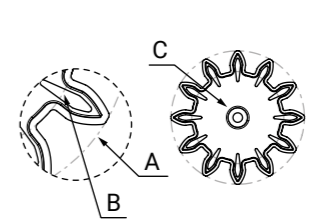
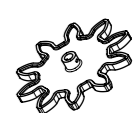
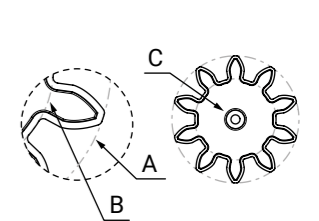

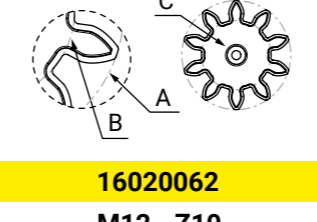
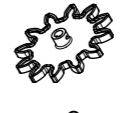
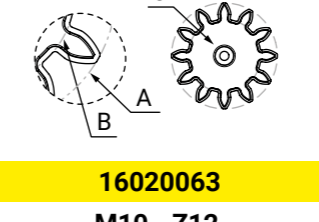

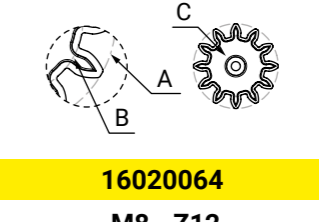

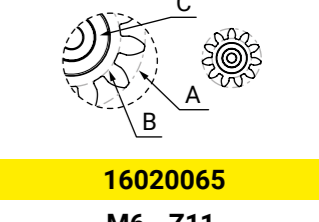

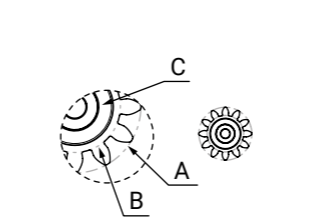

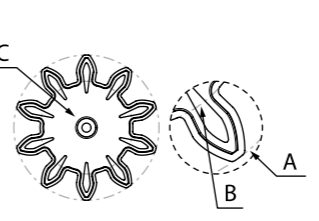

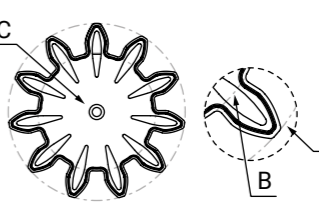

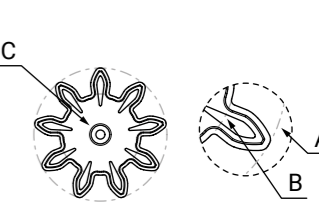
For all previous pinions.  
Finished product measurements.



**SPARE PARTS & ACCESSORIES**

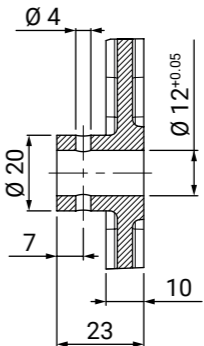
Rotary gear limit switch

**Injection moulded pinions**

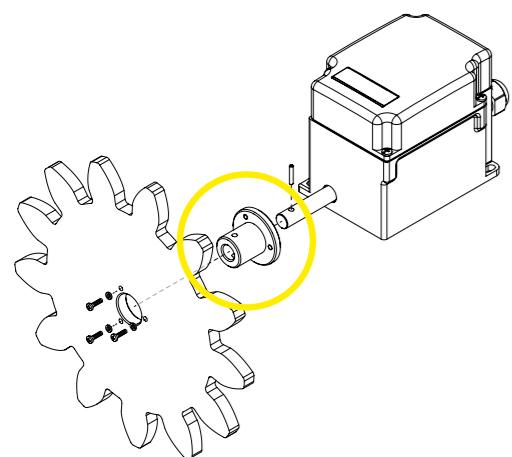
 	 	 	 
<b>16020058</b> <b>M20 - Z8</b> A = Ø 200 / B = Ø 113.2	<b>16020059</b> <b>M13 - Z10</b> A = Ø 192 / B = Ø 122.56	<b>16020060</b> <b>M12 - Z12</b> A = Ø 176.4 / B = Ø 121.716	<b>16020061</b> <b>M14 - Z10</b> A = Ø 168 / B = Ø 107.24
 	 	 	 
<b>16020062</b> <b>M12 - Z10</b> A = Ø 144 / B = Ø 91.92	<b>16020063</b> <b>M10 - Z12</b> A = Ø 140 / B = Ø 96.6	<b>16020064</b> <b>M8 - Z12</b> A = Ø 112 / B = Ø 77.28	<b>16020065</b> <b>M6 - Z11</b> A = Ø 78 / B = Ø 51.96
 	 	 	 
<b>16020066</b> <b>M5 - Z12</b> A = Ø 70 / B = Ø 48.3	<b>16020068</b> <b>M16 - Z20</b> A = Ø 192 / B = Ø 122.56	<b>16020069</b> <b>M18 - Z11</b> A = Ø 234 / B = Ø 155.81	<b>16020071</b> <b>M16 - Z19</b> A = Ø 176 / B = Ø 107.285

**Detail C**

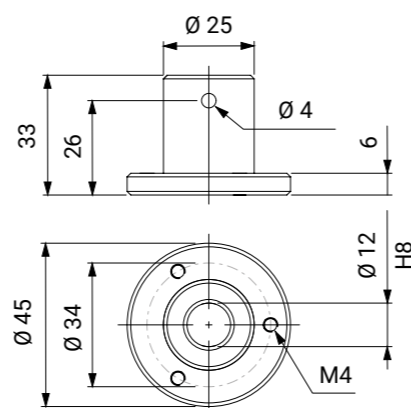
For all previous pinions.



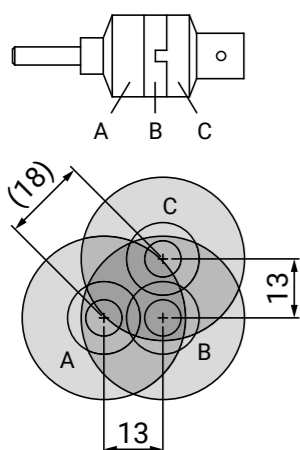
### Metal sleeve for water jet cut pinions



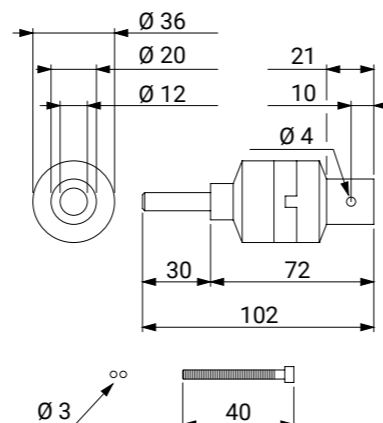
**16020050**



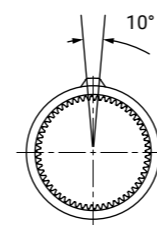
### Oldham coupling



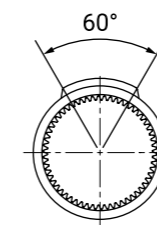
**FGH**



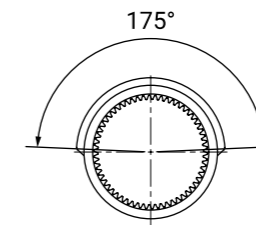
### Cam shapes for FGR0, FGR1, FGR3



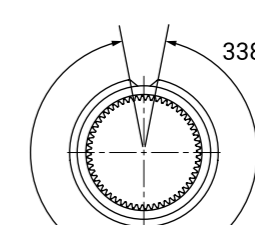
**16020081**  
A (10°) - STANDARD



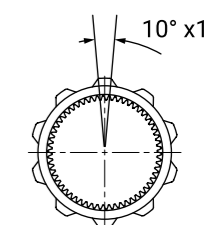
**16020097**  
B (60°)



**16020094**  
C (180°)

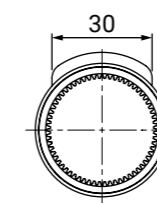


**16020095**  
D (opposite)

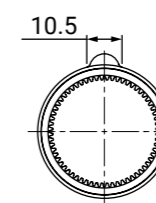


**16020093**  
E (10 tips)

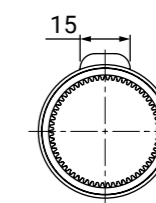
### Cam shapes for FGR2



**11703015**  
A (30°) - STANDARD



**11703019**  
B (15°)



**11703013**  
C (90°)

Available customised versions on request.