

ACCESSORIES AND OPTIONS

Industrial Linear Actuator

IP Enclosures Protection Indexes

Indicates the degree of the mechanical insulation of the motor body.

- 1st figure: indicating level of protection against penetration of solid bodies.
- 2nd Figure: Indicating degree to which the motor is waterproof.

0	No Protection	0	No Protection
1	Protected against solid matters (over Ø 50mm)	1	Protected against drops of water falling vertically
2	Protected against solid matters (over Ø 12mm)	2	Protected against drops of water falling up 15 degrees
3	Protected against solid matters (over Ø 2.5mm)	3	Rain proof fixture
4	Protected against solid matters (over Ø 1mm)	4	Splash proof fixture
5	Dust proof	5	Water jet proof
6	Fully dust proof	6	Wave proof
7	N/A	7	Watertight immersion fixture
8	N/A	8	Watertight immersion fixture for a long time

Motor Choice Guideline

Motor Type

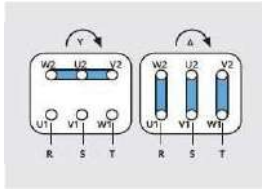
Version	DC	Direct Current
	AC	Alternate Current
	PD	Special motor flange (provide drawing)
Voltage	DC	V12 / V24 / OTHER
	AC	220V 1PH, 220V 3PH, 380V 3PH, 525V 3PH
	MT	MULTIVOLTAGE
TYPE (Only For AC)	T	3-phase
	M	1-phase
	AT	3-phase with brake
	AM	1-phase with brake
Size	AC	IEC 50/56/63/71/80/90/100/112/132
Pole (Only for Ac Motor)	2	
	4	
	6	

Ac Motor Options

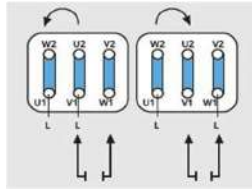
Motor flange	IEC56 B14 / IEC63 B14 / IEC71 B14 / IEC80 B14 / IEC90 B14 / IEC100 B14 / IEC112 B14
Service Rate	S3 30% (standard for 3-phase - single phase)
Insulation Class	F standard specify when different from F
Protection Degree	IP54(motor standard) IP55 IP65

Motor Connection

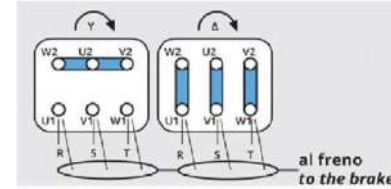
3-Phase motor



Single phase motor (DC)



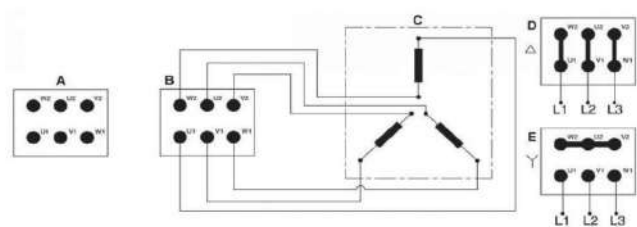
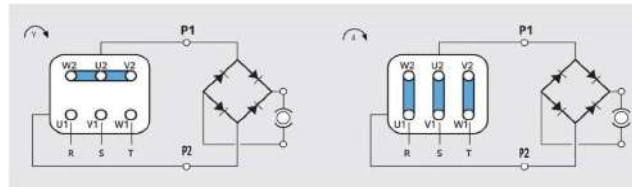
3-Phase brake motor (AC)- With power supply



3-Phase brake motor (AC)
Separate power supply

- A. Motor Terminal Board
- B. Auxiliary Terminal Board
- C. Brake
- D. Delta Connection
- E. Star Connection

3-Phase brake motor (DC)



BRAKE

FECC

DC brake

DC electrified Brakes used single-phase and three-phase motors. Supply voltage: 230 V (single-phased) $\pm 10\%$ 50/60 Hz. The brake is powered directly from the motor's power supply (standard). FECC brakes have a slower reaction time when compared to CA brakes but are quieter.

Motors with a separate power supply to the brake can be available on request. In this case, the brake needs a separate power supply from the motor and its code becomes FECC-AS-24 Vdc

FECA

AC brake

Electromagnetic brake for AC motors, available only for three-phase motors, IEC63 model or above. Supply voltage: 230V (three-phase) $\pm 10\%$ 50/60 Hz. The brake is powered directly by the motor's power supply. FECA brakes have quicker reaction time when compared to DC brakes but are noisier. It is suggested when there are multiple uses in a short period, and/or a high braking torque is required.

Motors with separated brake power supply and tensions in the range 24-690 Vac - 50/60 Hz can be available on request. In this case, the brake needs a separate power supply from the motor and its code becomes FECA- AS-230 Vac 50 HZ

Separate brake power supply: Achieved using an auxiliary terminal board, with fixed brake coil terminals, located inside the motor terminal box

Nb: For all motors equipped with inverters, the brake must always have a separate power supply.

OPTIONS	LS	Hand Release Lever	AB	2'shaft
	OTHER	Advise	NONE	leave blank

Electric / Electronic Stroke Control Devices

Actuators can host different stroke control systems: simple micro-switches (mechanical or magnetic) able to provide a signal to handle motor supply (ON-OFF operation), or electronic devices for servo-mechanisms.



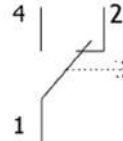
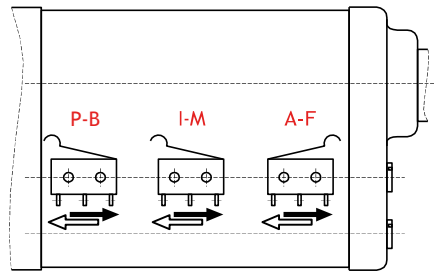
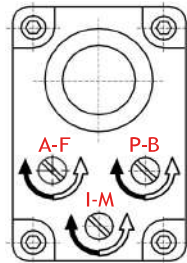
All wiring operations of actuator (motor and stroke control devices) must be done with power switched off. If not, both operator and actuator are at risk.

Limit Switches Integrated in to Cover-tube (Only for ALI1 and ALI1-P Model)

This model is equipped with two limit switches (featuring one contact each). A version with a third limit switch, central positioning, is available. Intermediate position changes according to push-rod moving direction. Tuning is adjusted by turning screws on actuator header. Each clockwise turn of the screw allows the micro switch to go 0.7 mm. forth, towards the header itself.

Look at the drawing to see how it works; letters have the following meaning:

A-F front
I-M intermediate
P-B back



Limit Switches Features:

- Housing: Glass fiber reinforces PA66
- Mechanism: Snap-action coil spring mechanism with stainless steel spring. Change over, normally closed / normally open
- Mechanical life: 5×10^6 cycle minimum (impact free actuation)

Changeover single-contact, cam-actuated micro-switches integrated onto actuator gearbox, getting movement by a small gearing connected to lead screw. The system is thus protected and compact, but its limit lies in long strokes: since the stroke is directly related to cams angle of rotation, with long strokes this device is not able to perform. Furthermore, its stopping precision and repeatability are negatively affected by actuator non-self-locking condition. A potentiometer is also available for some of the gearbox ratios (hence speeds) and limited lengths of the stroke to be controlled.



- In case integrated mechanical limit switches are delivered already adjusted, manual rotation of push-rod will cause adjustment loss!
- Running against the mechanical stop causes serious damage to actuator's mechanical stroke limit device!

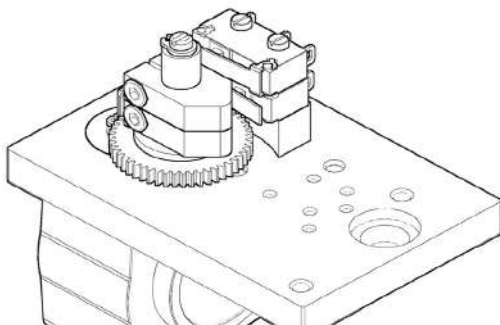
Ordering Key References:

- 2FC1 2 micro
- 3FC1 3 micro

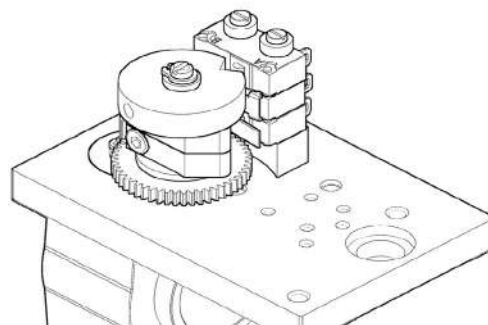
Limit Switches Features:

- Housing: heat-sealed phenolic / melamine resin
- Mechanism: Snap-action coil spring mechanism with bronze/ beryllium spring. Change over, normally closed / normally open
- Mechanical life: 3×10^5 cycle minimum (impact actuation)

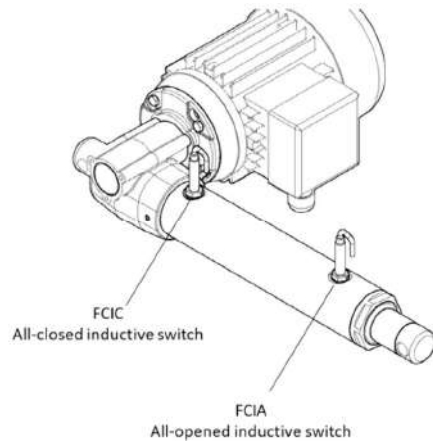
2FC1



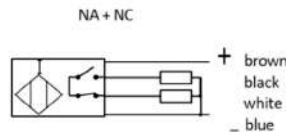
3FC1



Inductive Sensors/ Proximity Limits



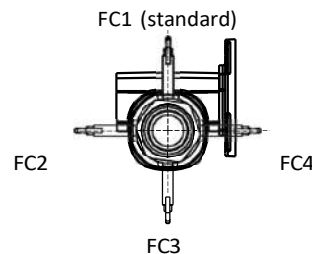
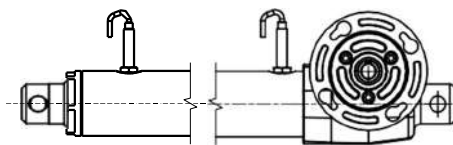
FCI Inductive Limit Switches	
DC voltage	5 ÷ 40 Vdc
Temperature range	25° ÷ 75°
Protection level	IP67
Switch status indicator	Yellow Led



Ordering Key References

- 2FCI 2 sensors NO + NC

FCI Position



Magnetic Limit Switches FCM

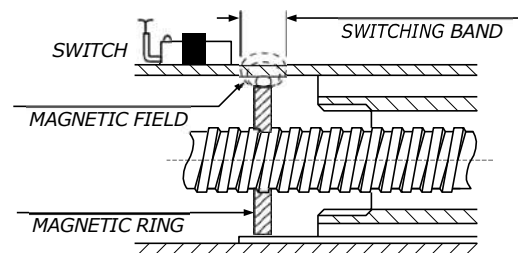
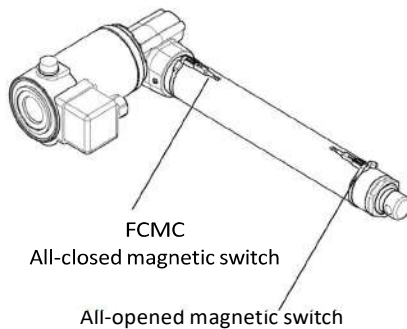
Magnetic sensors are activated by a magnetic field generated by a magnetic ring fixed to the nut.

These reads are mounted on outer tube with brackets; outer tube shall therefore be built with non-magnetic materials. The magnetic switches are fixed as shown in the figure; the customer can rotate at will by adjusting the bracket.



Due to the size of the magnetic switches and to the so called switching band generated by the internal magnet the maximum working stroke is reduced by a few millimeters. This switching band width differs according to actuator's size.

FCMA



FCM Magnetic Limitswitch			
Performance	Reed NC (standard)	Reed NO	PNP
DC voltage	5 / 130 V	5 / 130 V	5 / 30 V
AC voltage	5 / 130 V	5 / 130 V	5 / 30 V
25°C Current	200 mA	200 mA	500 mA
Power	6 W	10 W	6 W
Supply cable	PVC 2 x 0,14 mmq	PVC 2 x 0,14 mmq	PVC 3 x 0,14 mmq
Cable length		2000 mm	
Protection		IP67	

Circuit Reed Nc

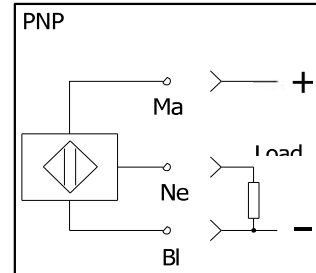
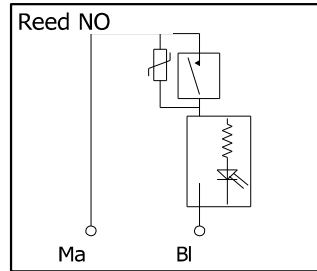
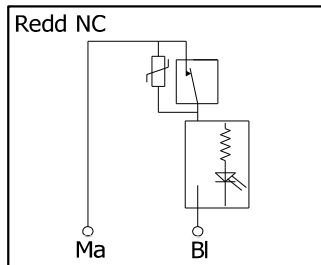
Circuit with normally closed Reed switch protected by a varistor against overvoltage's caused when switching off, with LED indicator

Circuit Reed No

Circuit with normally open Reed switch protected by a varistor against over voltages caused when switching off, with LED indicator

Circuit PNP

Circuit with Hall-effect switch and PNP outlet. Protected against overvoltage spikes and reverse of polarity. With LED indicator)



Ordering Key References

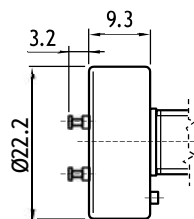
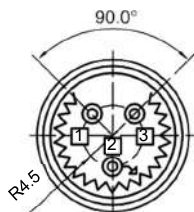
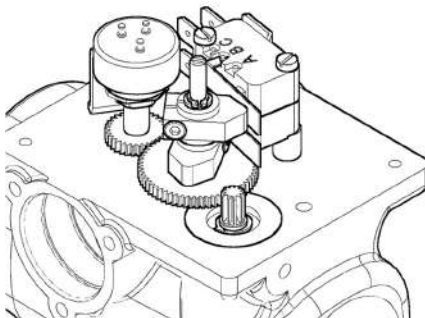
- 2FCM0 2 Sensors circuit Reed NC (standard version without prior information)
- 2FCM1 2 Sensors circuit Reed NO
- 2FCM2 2 Sensors PNP

Integrated Limit Switches and Potentiometer

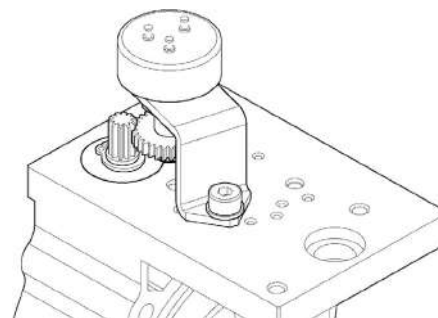
- Stroke Control Devices Assembly Potentiometer

Absolute feedback for actuator position monitoring: it can be installed alone or together with limit switches, so to achieve end positions control also. Potentiometer movement comes from the same gearing of the integrated limit switches therefore has the same limit: long strokes cannot be controlled. Please refer to each actuator performance table to know max achievable length. Furthermore, potentiometer electric angle cannot always be achieved. NB: not available for ALI1, ALI1-P and L series.

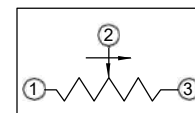
Version with Limitswitches and Potentiometer



Version with Potentiometer



Symbol



Ordering Key References

- POT01A 1 kOhm
- POT05A 5 kOhm
- POT10A 10 KOhm (standard)

N.B. to be adjusted by end-user

Potentiometer	
Performances	Type (A)
Max. angle	340° ± 3°
Resistance	1K / 5K / 10K (standard)
Independent linearity	± 2%
Tolerance	± 20%
Coefficient of temperature resistance	± 600 ppm / °C

GUIDELINE DIMENSIONS ONLY

Incremental Encoder

An incremental rotative transducer converts spinning movement into digital pulses. It can be installed on actuator, by using a longer worm-screw extension (rotating at the same speed of the motor) and coming out from the gearbox on opposite side of motor, or directly on AC or DC motors. Its digital output allows relative (not absolute) feedback on actuator position, hence, every time machinery is resettled, encoder shall be given the zero position.

Encoder On Dc Motor

Model	Encoder Features	Wiring Diagram	Type
ALI1 ALI1-P	- Power supply 5 V - 24Vdc (+10%) - PUSH-PULL 2 channel - 4 ppr square wave - Max output current 20 mA + 15%for each channel		See wiring diagram ALI1
ALI2 ALI2-P ALI3	- Power supply 5 V - 20 Vdc - NPN Open Collector 2 channel - 1 ppr square wave - Max output current 100 mA		E01
L02 L03	- Power supply 5 V - 24 Vdc (+10%) - PUSH-PULL 2 channel - 4 ppr square wave - Max output current 20 mA + 15%for each channel		E00

Encoder Mounted on Ac Motors

- Bidirectional incremental encoder, with (standard) or without zero-pulse, protection IP54.
- Available ppr: 50 / 100 / 200 / 400 / 512 / 1000 / 1024 (standard)
- Available output circuits: Line Drive 5 Vdc (standard)/ Push Pull 24 Vdc / Open Collector NPN 10 -30 Vdc / Open Collector PNP 10 -30 Vdc.

Encoder on Dc Motor

E01 NPN 2 channel ppr

Encoder on Ac Motor

E05 Push Pull 1024 ppr
E06 Line Drive 1024 ppr (standard)
E07 Open Collector NPN
E08 Open Collector PNP

Encoder on Actuator Housing

E00 Push Pull 2 channel 4 ppr
E09 Push Pull 1024 ppr
E10 Line Drive 1024 ppr
E11 Open Collector NPN
E12 Open Collector PNP
E13 Encoder not considered above (according to customer request)

L02 & L03

E00 Push Pull 2 channel 4 ppr

Encoder Options per Model (On Request)

X : on request

	E00	E01	E05	E06	E07	E08	E09	E10	E11	E12	E13
ALI2-DC		X									
ALI2-AC			X	X	X	X					
ALI2-P		X									
ALI3-DC		X									
ALI3-AC			X	X	X	X					
ALI4	X		X	X	X	X	X	X	X	X	
ALI4-P	X		X	X	X		X	X	X	X	

	E00	E01	E05	E06	E07	E08	E09	E10	E11	E12	E13
HP5		X									
ALI5	X		X	X	X	X	X	X	X	X	
ALI5-P			X	X	X	X					
AV3			X	X	X	X					
L02	X										
L03	X										
EC			X	X	X	X					
HRS	X		X	X	X	X	X	X	X	X	

Ordering Key

According to the options desired, add the identification letters at the end of ordering key related to the product chosen.

A _____ Stainless steel	N _____ Manual driving with safety limit switch
AA _____ Industry version	O _____ Body integrated Swiveling shafts (on request)
B _____ Bellows boot	OA _____ Front Swiveling plate (on request)
CG _____ Bell flange with coupling (on request)	OP _____ Rear Swiveling plate (on request)
E _____ Silicon seals	P _____ Handwheel and safety-switch
FX _____ Anti -corrosion painting	PO _____ Rear-pipe for swinging movement (on request)
G _____ Safety nut	S _____ Torque limiter
H _____ Handwheel	T _____ Additional shaft
L _____ Anti-rotation device	Z _____ Low noise
MN _____ Manual driving for ALI1 and ALI1-P models	N.DIS _____ Drawing number: Request of no standard options

Examples:

- Ordering key for standard product
ALI5/0300/M01/CA-400-50-T-71-2-0,55/B5+AB/M0-FC1/1/E05 /2FC2/P0T01A/P1/A1
- Ordering key for standard product + options
ALI5/0300/M01/CA-400-50-T-71-2-0,55/B5+AB/M0-FC1/1/E05 /2FC2/P0T01A/P1/A1/A/B/T

Other Options

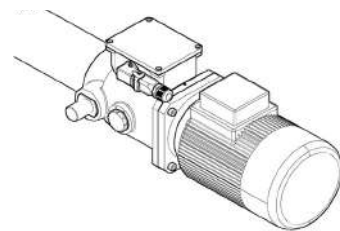
Option A - Stainless Steel

The stainless-steel version includes front rear and push rod in stainless steel (X5CrNi18-10). For AV3 and EC models the push rod is in double chromed.

Option AA - Steel Industry Version

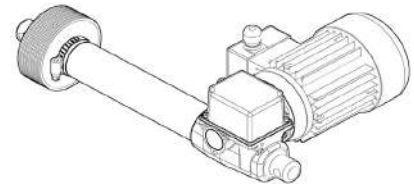
The steel industry version includes:

- Larger limit switches box
- Brass gears and cams
- Metal connectors
- Silicon seals
- Mechanical limiter with warning sensor
- Handwheel for manual driving (standard position; optional P and H)
- Front end with shock absorber



Option B - Bellows Boot

Bellows boot protects push rods: pharmaceutical and food industries or aggressive environments are typical examples of applications where this option can be required.



Option E - Silicon Seals

Silicon seals are available as a replacement to those of NBR, except models ALI1 and ALI1-P. For actuators with Option AA (Steel industry version) Silicon seals are included.

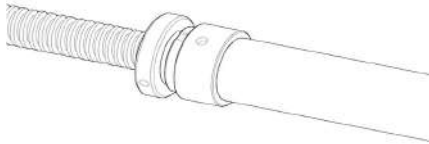
- T NBR -30°C +110°C
- T Silicon -50°C +200°C

Option FX - Protective Painting

Anti-corrosion coating used on all metals and many other materials also against aggressive agents such extreme sea water, industrial fumes, acid rain, etc. ... It also has excellent resistance to impact and abrasion.

Option G - Safety Nut

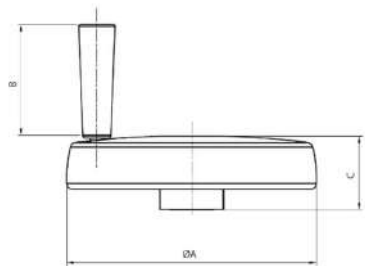
The safety nut has been designed to start working only in case of main nut maximum wear. This safety nut is connected to the main bronze nut and travels with it along the stroke. When the bronze nut is completely worn out, the steel nut starts working on acme screw until it comes to a complete grip to acme screw. This kind of nut can work in both directions and that is integral with the load in both compression or traction (pushing / pulling)



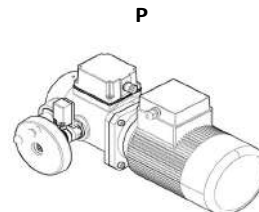
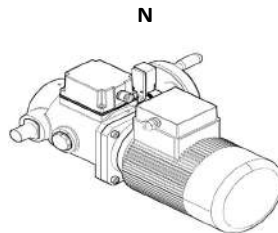
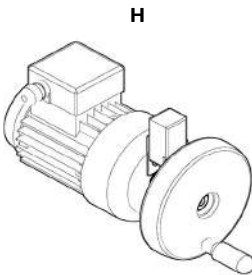
Option H, N, P - Handwheel and Safety-Switch Unit

Option allowing actuator driving back in case power supply fails or some other inconvenience occurs. Second shafts on the back of the motors or extended worm-screws coming out from gearbox (see Encoder paragraph) can be manually turned with hand wheels, so to let actuator move without power supply for load disengagement. Gearing ratio and screw pitch determine number of revolutions to be done to run whole actuator's stroke be aware that this number can be quite high.

Dimensions			
Model	A	B	C
ALI2-ALI3-ALI4-ALI5-EC1-EC2-EC3-EC4	Ø 150	65	44
AV3-EC5	Ø 250	90	66



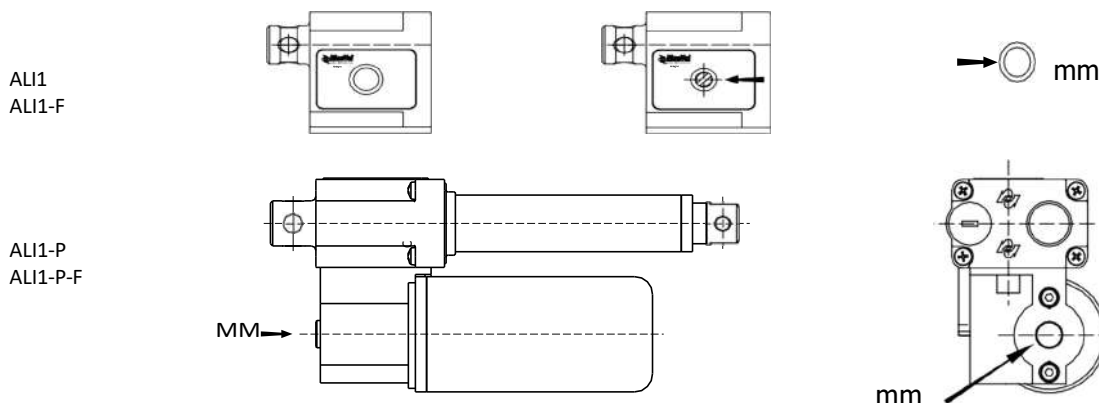
- **Option H** For all models in A.C. Only for EC model with safety limit switch MS
- **Option N & P** Only for model EC With safety limit switch MS



WARNING - Before connecting the motor to power supply, you must connect power to safety microswitch positioned on handwheel: so you can disconnect motor from power supply pressing safety switch and be able to work in safe conditions

Option MM - Manual Driving on ALI1 and ALI1-P

A manual driving system is available, for emergency situations, in the ALI1 / ALI1-F and ALI1-P / ALI1-P-F models. By removing the cap support, movement can be controlled using a screwdriver. In this way the shaft of the actuator can move forward and backwards



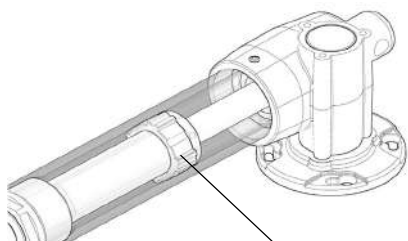
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Address: [320 B Percheron Road, Kyalami, Midrand, 1684](#)
GPS Coordinates: [S 25.98115° / E 028.06869°](#)

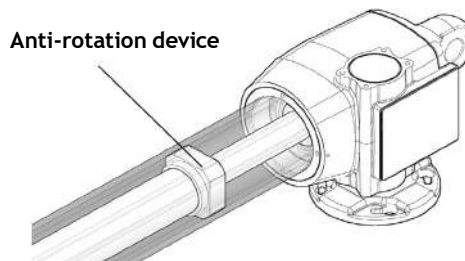
Option L - Anti-Rotation Device

The Anti-rotation device avoids push rod spinning around its own axis when travelling it is essential in case of not guided load. When the anti-rotation device is selected, the front-end is oriented to the rear-end in the assembly phase.

The anti-rotation device is made in different ways depending on the actuator's model.



Anti-rotation device



Anti-rotation device

Option S - Torque Limiter

It is assembled between motor and gearbox to prevent occasional overload. Available for DC and AC motors with IEC flange.

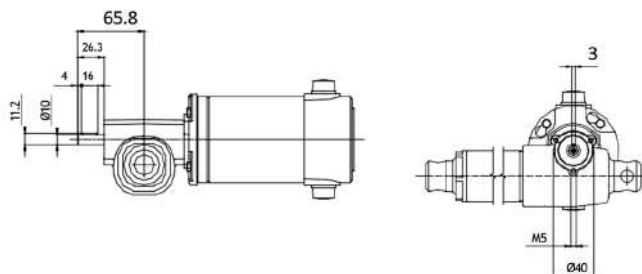
As to dimensions contact Technical Department.



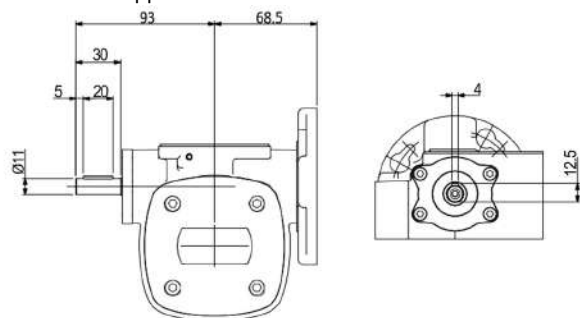
Torque limiter reacts at 150-160% of nominal load. Torque limiter cannot be used as stroke control device with actuator getting to mechanical end-stops. In this way you will lose the torque limiter setting and get it useless.

Option T - Shaft on Motor Opposite Side (Available Only on ALI4 And ALI5)

Shaft on motor opposite side on ALI4 e ALI4-F



Shaft on motor opposite side on ALI5



Option Z - Low Noise Version

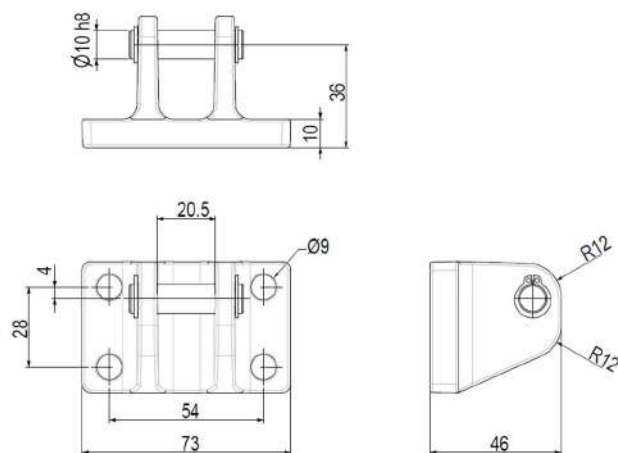
It is a version with special solutions for noise reduction.

Bracket For Front and Rear Ends

To mount actuators having rear connection P1 / P2 and front head A1 and A4 the brackets are available for the ALI2, ALI3, ALI4 and ALI5 series.

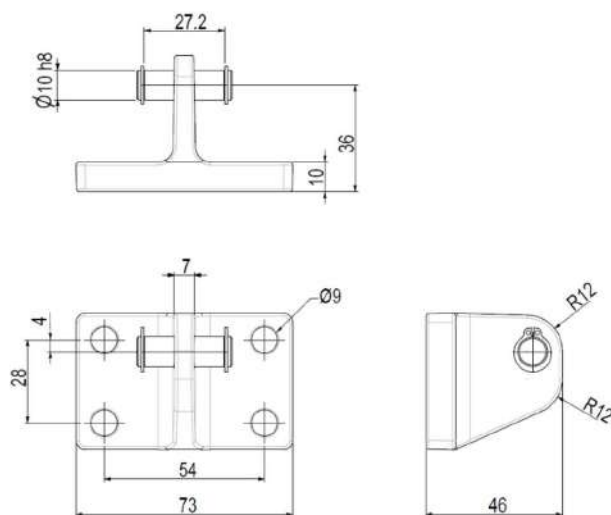
SAA0002

Asymmetric bracket for front and rear ends ALI2



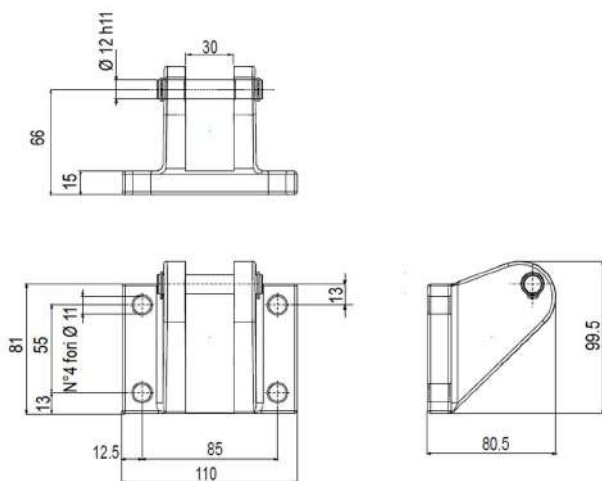
SAA0003

Asymmetric bracket for front and rear ends ALI3



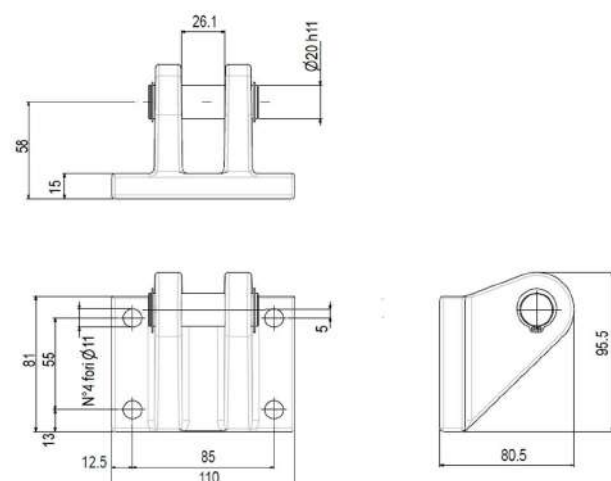
SAA0004

Asymmetric bracket for front and rear ends ALI4



SAA0005

Asymmetric bracket for front and rear ends ALI5



t: + (27) 011 468 1881 c: + (27) 074 465 1744
e: 01@**BirCraft**.co.za w: www.BirCraft.co.za

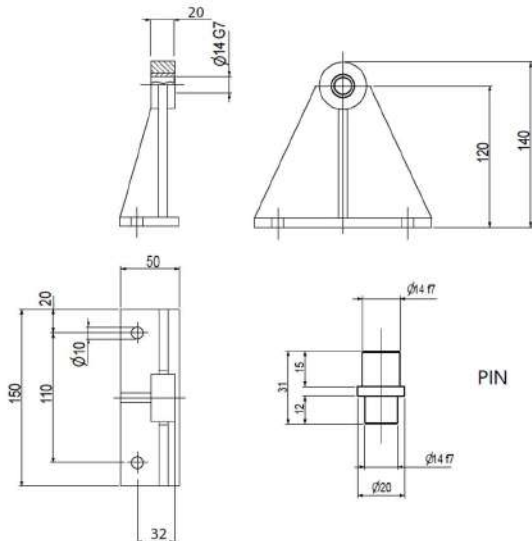
Address: [320 B Percheron Road, Kyalami, Midrand, 1684](#)
GPS Coordinates: [S 25.98115° / E 028.06869°](#)

Swivelling Shafts Holder

To mount actuators series EC, four sizes of shaft holders. The SP element is formed by two components.

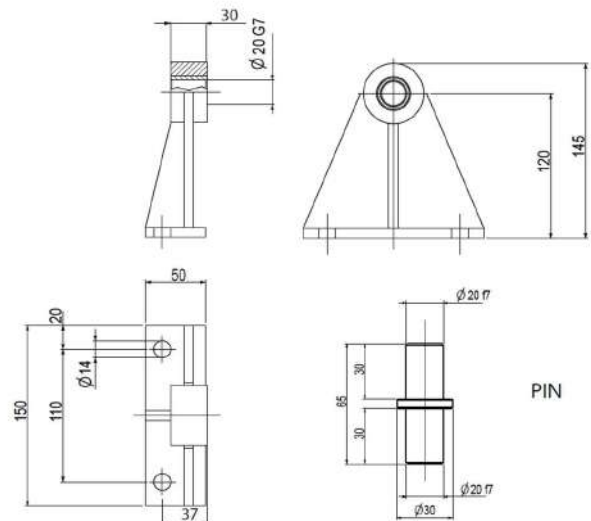
SP0014

Kit of 2 shaft holders for EC1



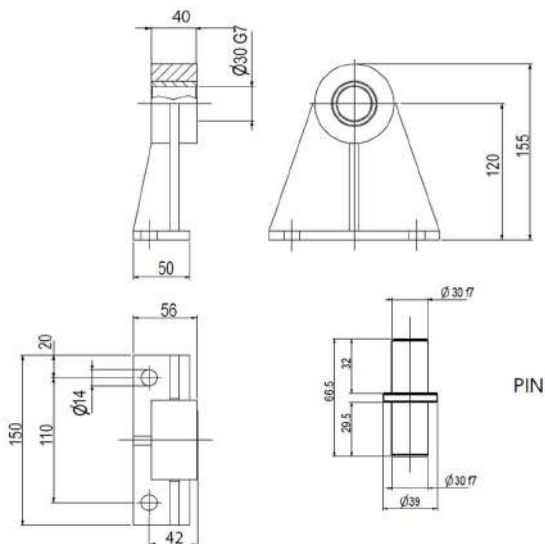
SP0020

Kit of 2 shaft holders for EC2



SP0030

Kit of 2 shaft holders for EC3



SP0040

Kit of 2 shaft holders for EC4 / EC5

