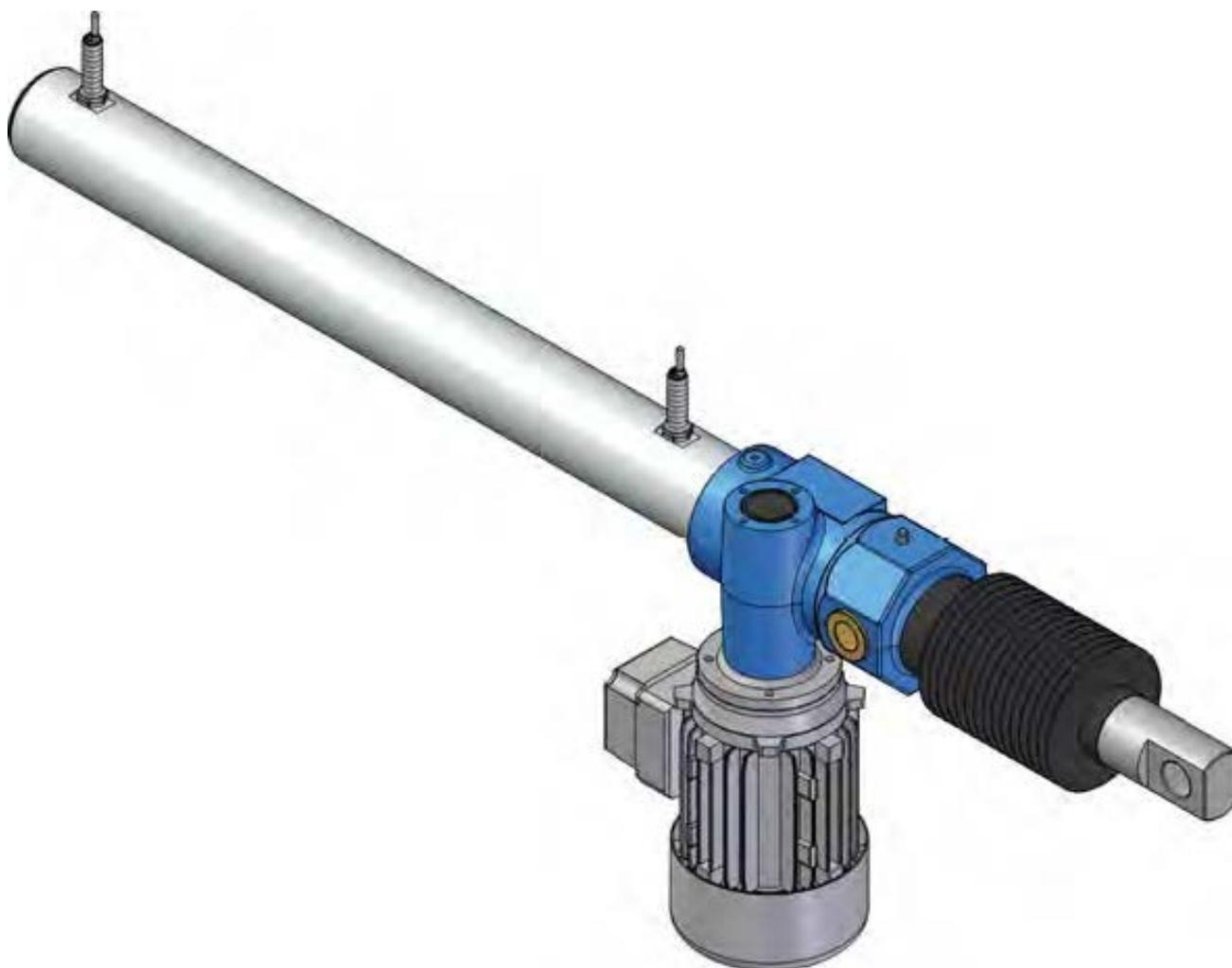


Linear actuators

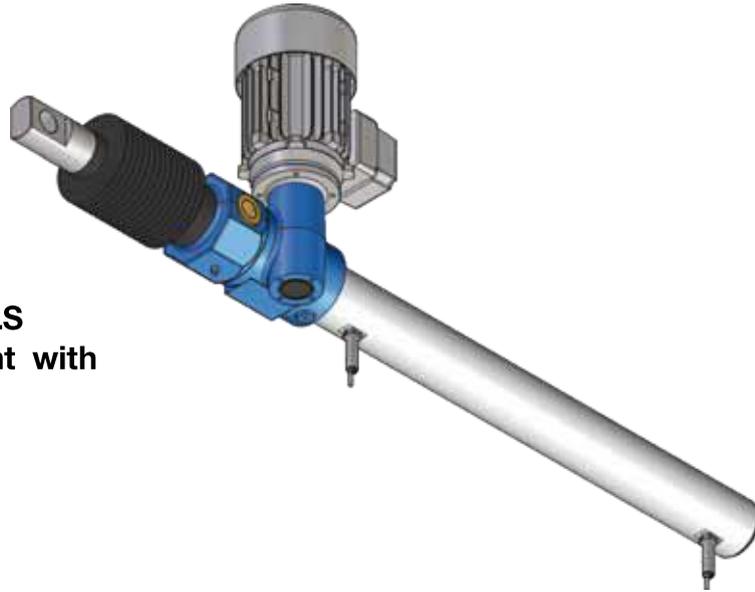
ACLS serie

Installation and maintenance



Linear Actuators ACLS Series

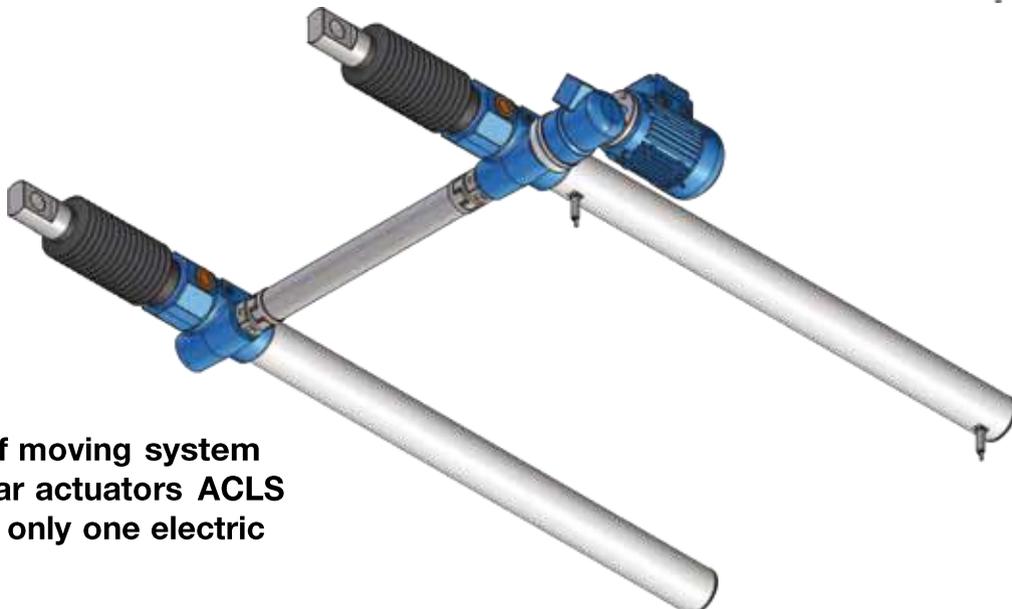
**Linear Actuators ACLS
Series rear attachment with
bushes**



**Linear Actuators ACLS
Series rear attachment with
pins**



**Example of moving system
with 2 linear actuators ACLS
Series and only one electric
motor**

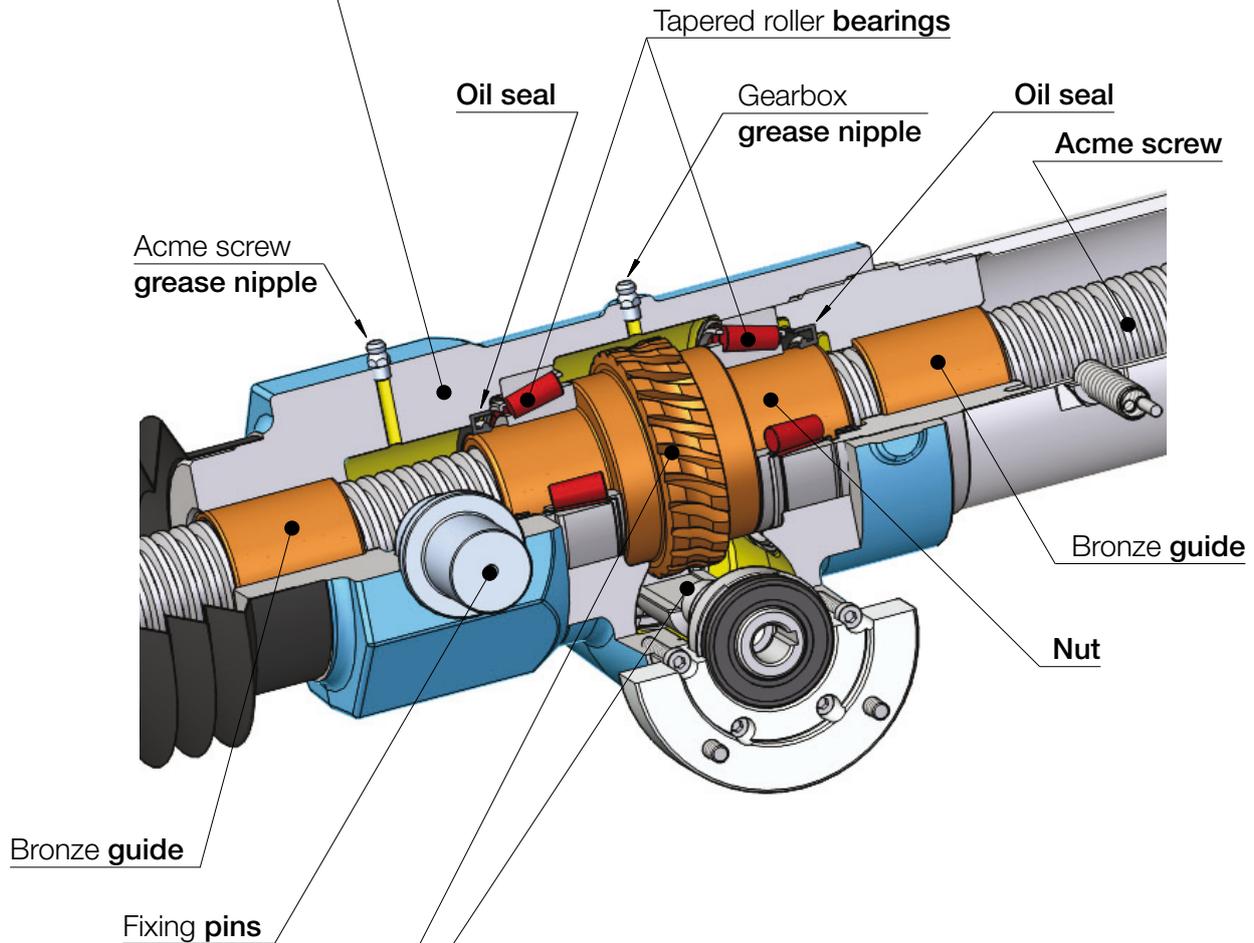


5.1 MANUFACTURING FEATURES

Housing:

designed and manufactured in monobloc form to obtain a compact body able to sustain heavy axial loads and have a high rigidity.

Material: grey cast iron EN-GJL-250 (UNI EN 1561)



Input drive:

precision worm gear

geometric design for high efficiency,

involute profile ZI (UNI 4760 Part 4), low angular backlash.

Worm shaft in case hardened steel 20 MnCr 5 (UNI EN 10084), with thread and input shafts ground.

Wormwheel in bronze EN 1982 – CuSn12-C.

Linear actuators ACLS Series

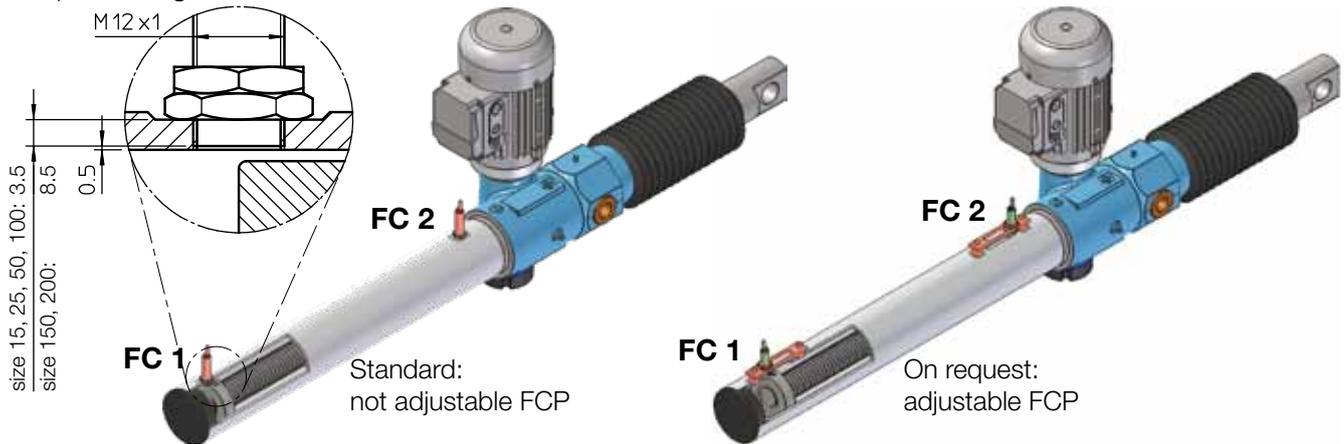
5.6 ACCESSORIES

INDUCTIVE PROXIMITY STROKE END SWITCHES Code FCP

The INDUCTIVE PROXIMITY STROKE END SWITCHES FCP allow the actuator to stop before reaching the internal mechanical stop avoiding damage. They can be also used to fix intermediate positions along the actuator stroke length.

The INDUCTIVE PROXIMITY STROKE END SWITCHES are fixed directly on the actuator protective tube in the required position and are activated by the ferrous-metal ring, which is positioned at the acme screw end.

In case the screw jack is not stopped after the sensor activation, when the ferrous-metal ring moves away, the sensor restores the original state (becomes deactivated). In case the limit switches are used to stop the actuator, an electric connection with electric check is recommended, in order to prevent that the actuator keeps moving in the same direction.



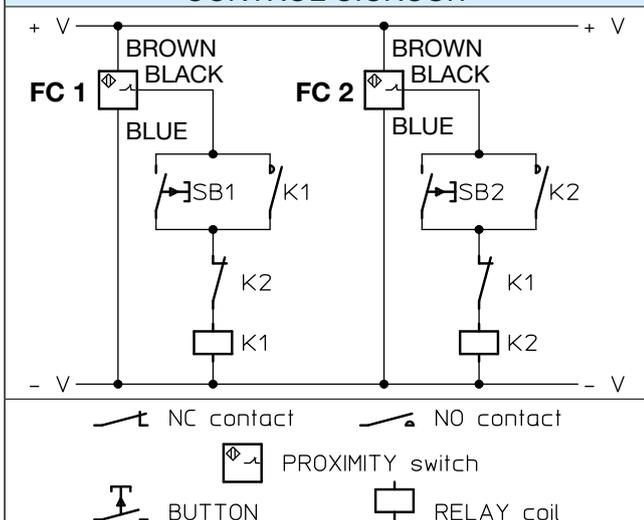
- RETRACTED ACTUATOR (Lc): sensor FC 1
- EXTENDED ACTUATOR (La): sensor FC 2

In the standard arrangement, the position of the switches along the tube is not adjustable and it is not angularly fixed. Execution with angular position according to customer's requirements is available on request. Execution with axial adjustment of the sensors position is also available on request.

ELECTRIC FEATURES

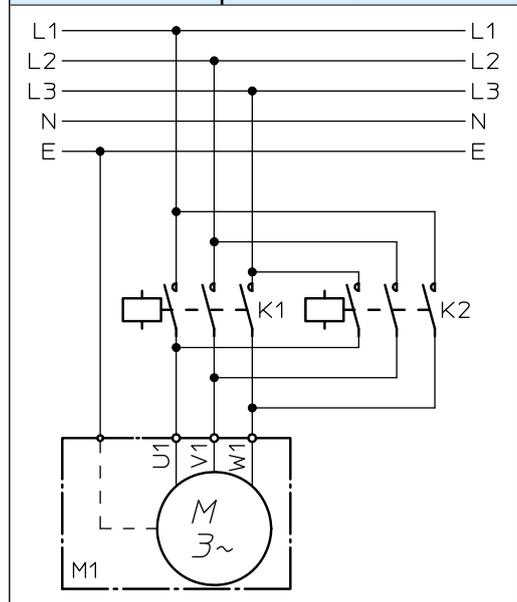
Type:	inductive, PNP
Contact:	normally CLOSED (NC)
Voltage:	(10 ... 30) V DC
Max. output current:	200 mA
Voltage drop (activated switch)	< 3 V (at 200 mA)
Wires:	3 x 0.2 mm ²
Cable length:	2 m

CONTROL CIRCUIT



WIRING DIAGRAM

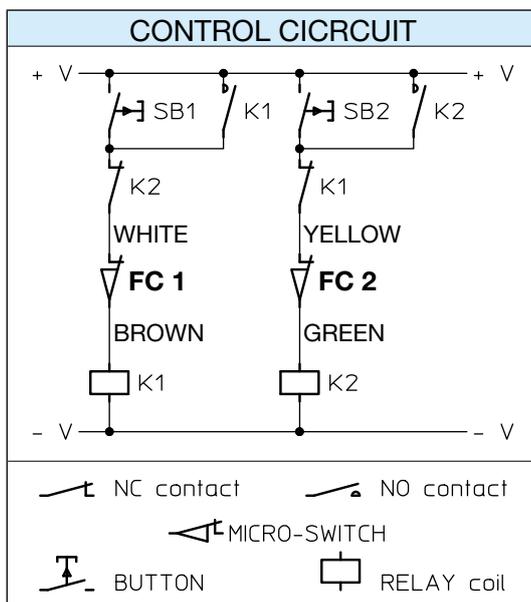
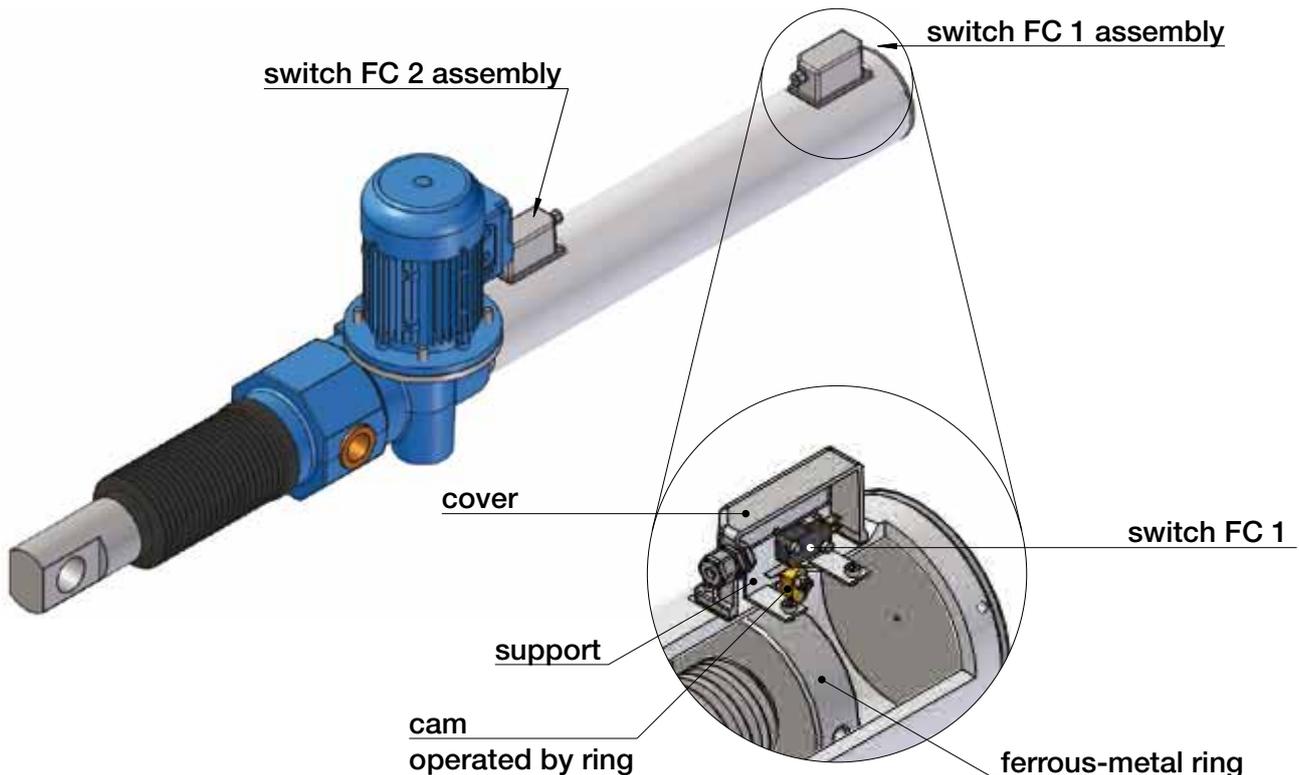
AC 3-phase motor



5.6 ACCESSORIES

9 @7 HF 7 GFC ?9 9B8 GK #7 <9G 7 cXY. : 7

The ELECTRIC STROKE END SWITCHES FC allow to limit the actuator stroke avoiding to reach the extreme positions (mechanical stops) and preventing damage. The device consists of two switch assemblies, each of them consisting of one miniature electric switch (FC 1, FC 2) fixed to the relative support, a switch operating cam, rotating around the relative support pin when operated by the ferrous-metal ring fixed to the acme screw end and a spring that allows the return of the cam to its neutral position, thus deactivating the switch; the entire assembly is covered by an aluminium cover and sealed by a rubber seal. Each assembly determines one of the two extreme positions of the push rod (Lc or La), but it can not be used to fix any intermediate position. The position of the assembly along the outer tube is not adjustable.



The ELECTRIC STROKE END SWITCHES FC must be connected to the electric control circuit to guarantee the motor switch off and to prevent damages to the actuator and the application equipment. The relevant WIRING DIAGRAM is on page 35F*.

The ELECTRIC STROKE END SWITCHES FC equipped with 2 multi-core cables $2 \times 0.75 \text{ mm}^2$, standard length 1.5 m, longer cable on request. The wire colours are indicated in the CONTROL CIRCUIT on the left.

RATED CONTACT VALUES			
Voltage	250 V AC	125 V AC	125 V DC
Current (resistive load)	16 A	16 A	0.6 A
Current (inductive load)	10 A	10 A	0.6 A

The ELECTRIC STROKE END SWITCHES FC are available for actuators ACLS100, ACLS150 and ACLS 200.

5.6 ACCESSORIES

69 @CK G DF CH97 HCB 7 cXY. 6

When the actuators are used in severe environment conditions with contaminant agents that can damage the seal scraper between the outer protective tube and the push rod, BELLOWS protection can be useful.

Bellows made of special materials for severe environments are available upon request.



9B7 C89F 7 cXY. 9B7 4

Hall-effect encoder, incremental, bi-directional

Resolution: 4 pulses per revolution

Output: PUSH-PULL
2 channels (phase difference 90°)

Input voltage: (8 ... 32) Vdc

Max. commutable current: 100 mA

Max output voltage drop:

with load connected to 0 and $I_{out} = 100 \text{ mA}$: 4.6 V

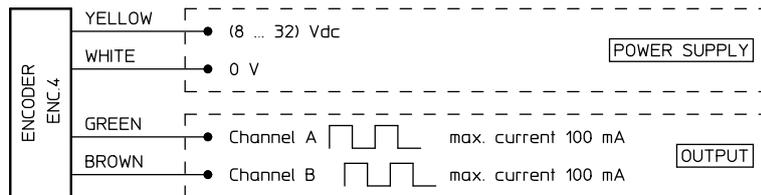
with load connected to + V and $I_{out} = 100 \text{ mA}$: 2 V

Protection:

- against short circuit
- against input polarity inversion
- against any incorrect output connection

Cable length: 1.3 m

Protection: IP 55



5.7 SPECIAL DESIGNS

According to specific application requirements, special designs can be carried out on standard actuators.

Some possible options are for example:

- acme screw in stainless steel AISI 303
- lubricants for high or low ambient temperature
- seals in VITON or silicone

Thanks to the long experience and know-how, S@F is able to support customers in selecting the right actuator version and accessories suitable for specific environment and installation conditions.

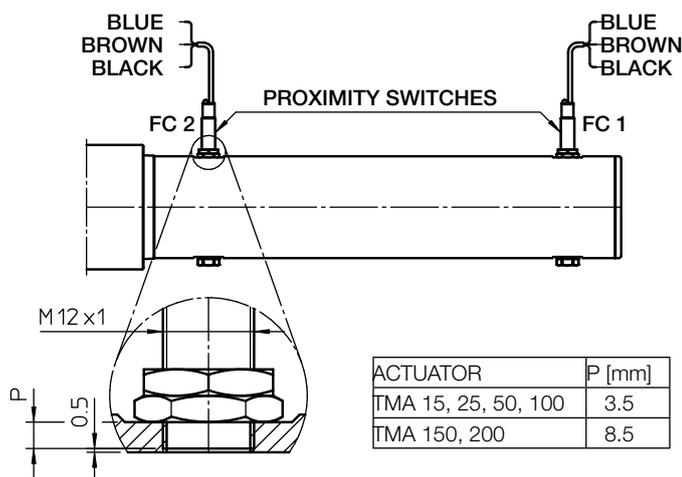
PROXIMITY STROKE END SWITCHES **FCP** □

The PROXIMITY STROKE END SWITCHES **FCP** has proximity sensors FC 1 and FC2.

- type: inductive, PNP
- contact: **normally CLOSED**
- supply voltage: (10 ... 30) V DC
- max. output current: 200 mA
- max. voltage drop (activated sensor): < 3 V (ref. 200 mA)

FC1 - sensor for RETRACTED ACTUATOR position
FC2 - sensor for EXTENDED ACTUATOR position

SINGLE SENSOR WIRING:



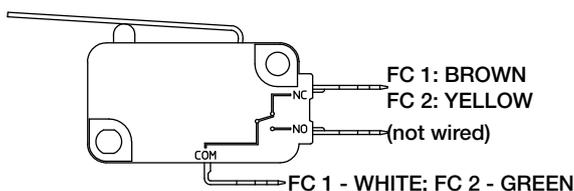
ELECTRIC STROKE END SWITCHES **FC** □

The ELECTRIC STROKE END SWITCHES **FC** has miniature switches FC 1 and FC 2.

- contact: **normally CLOSED**
- voltage: 250 V DC / 125 V DC / 125 V DC
- current: 16 A / 16 A / 0.6 A (resistive load)
10 A / 10 A / 0.6 A (inductive load)

FC1 - switch for RETRACTED ACTUATOR position
The wires that connect the switch FC 1 are WHITE and BROWN.
FC2 - switch for EXTENDED ACTUATOR position
The wires that connect the switch FC 2 are GREEN and YELLOW.

SINGLE SWITCH WIRING:



WARNING!

1. The values **Lc** (RETRACTED ACTUATOR length), **La** (EXTENDED ACTUATOR length) and **C** (STROKE) are the extreme limit values.
2. **BEFORE** using the linear actuator:
 - verify the input shaft rotating direction and the acme screw running direction;
 - make sure that the motor and the limit switches are correctly connected and that the correct voltage is used.
3. **Alignment check:** the load must be in line with the actuator. No off-set or radial loads are allowed.

NOTE: _____

WORMGEAR LUBRICANT: _____

SCREW – NUT LUBRICANT: _____

Linear actuators ACLG Series

Conditions on delivery

If not otherwise specific required, SNT linear actuators are supplied with the following conditions:

- lubrication: according to the tables on page 204 and 205; in case of particular application requirements (ambient temperature, food industry, environment with ionizing radiations, environment that requires biodegradable lubricants), a suitable lubricant can be supplied for the specific environment (for more details, please, contact SNT); on request, actuators can be supplied with the lubricant agreed with the customer;
- painting: all outer surfaces of the actuator that can be subject to rust are painted with 1 epoxy coating blue colour RAL 5010; on request, the painting can be done with specific colours and specification agreed with the customer with separate quotation;
- shaft protection: input shafts are protected with removable plastic covers;
- packaging: the kind of packaging is agreed with the customer based on quantity of the products, final destination and means of transport; packaging is not included in selling price.

Installation - Maintenance - Lubrication

Transport and handling

It is recommended to handle the linear actuators with particular care and attention during transportation and handling to avoid damage on mechanical parts and/or accessories and to prevent any risk to the personnel in charge of such operations. The package should be handled in the safest way during transport and handling. In case of doubt, please, contact **SNT** to get the correct instructions and prevent any kind of damage!

Storage

During storage, linear actuators shall be protected against atmospheric agents and dust or other pollution to the push rod, moving parts and attachments.

In case of long storage periods, for example more than 6 months, it is necessary to move the input shafts to avoid damaging of the ring seals. Furthermore, all non-painted parts should be maintained properly lubricated to prevent oxidation.

Installation

Linear actuators must be installed to work with push or pull axial load only, lateral and radial loads are not allowed. The front and rear fixing attachments must be aligned.

The installation of two or more actuators, connected to work in synchronized movement, requires particular attention on the following two aspects:

- alignment of the load support points;
- use of connecting shaft and couplings with high torsional rigidity to ensure a perfect synchronism of all points of support.

Commissioning and use

SNT linear actuators are supplied with the type and quantity of lubricant specified in the relevant table.

Before actuator commissioning and activation, the following checks must be carried out:

- verify the motor shaft turning direction and the related push rod travelling direction;
- verify the stroke end switches position: the given limits cannot be exceeded;
- check the right connection of the electric motor (direction of rotation and motor supply voltage) and, if it is the case, of the mechanical transmission.

During commissioning and tests, do not exceed the **ACTUATOR DUTY CYCLE PERMISSIBLE F_i [%]**! Any misuse can cause over-heating and premature damage.

Maintenance

Scheduled maintenance shall be carried out on linear actuators depending on the relevant use and environment conditions.

The gearbox of the linear actuator is long-life lubricated. Additional lubrication should be done only in case of verified leakage of lubricant.

SNT Linear actuators

Lubricants

Linear actuators ACLS Series

ACTUATOR	INPUT DRIVE		LINEAR DRIVE		
				for actuator C500	for each additional 100 mm of stroke
ACLS 015	grease: ENI MU-EPO	0.1 kg	grease: SHELL Gadus S2 U460L 2	0.13 kg	0.02 kg
ACLS 025		0.5 kg		0.18 kg	0.03 kg
ACLS 050		1 kg		0.26 kg	0.03 kg
ACLS 100		2 kg		0.35 kg	0.05 kg
ACLS 150		3 kg		0.4 kg	0.05 kg
ACLS 200		5.2 kg		0.5 kg	0.06 kg



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