

Caution: If the actuator has a limit switch, Please make sure the limit switch is connected before operating the actuator.



LINEAR MOTION

Dezhou Lude Transmission Equipments CO.,LTD
NO.2758 Mengyin Road, Economic&Technical Development Zone, Dezhou, Shandong, China
TEL: 0086-534-2765998 2761998
E-mail: ludetransmission@gmail.com china@ludetransmission.com
Web: www.ludetransmission.com



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Lude Transmission

Instruction Manual For Linear Actuators





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This manual has to be considered an integrant part of the product; it includes the basic information for a proper installation, setting at work and maintenance of the Linear Actuators. Reading the short information reported in if you can obtain an appropriate knowledge of the product to prevent an anomalous use of the product itself, and to plan a correct maintenance.

Subject to the conditions stated herein, Lude Transmission Co., Ltd will repair or replace, without any charge, any parts proven to have been defective in material or workmanship. Lude Transmission Co., Ltd does not assume the responsibility for the direct or indirect consequences of any improper use, not correspondent to the declared performances of the actuator indicated in the technical catalogues.

The non-compliance with the use and maintenance instructions indicated in the manual will cause the immediate invalidation of the warranty terms, and will completely release Lude Transmission Co., Ltd from any responsibility for possible damages caused to things or people.

Lude Transmission Co., Ltd and its authorized distributors' services is at the disposal of customers in order to give, during the selection and/or design process, all technical support necessary for a proper application of the Linear Actuators.

Lude Transmission Co., Ltd reserves the right to introduce ameliorative changes and variations to the products and to this manual without notifying it.



1 INSTALLATION AND COMMISSIONING

1.1 Positioning and fixing of actuators

1.1.1 If the length of the actuator has to be set differently (actuator more extended or more retracted) in order to make its installation easier, it has to be done as follows:

ATTENTION: Do not set the length of the actuator over its extreme values (Minimum - L_c and Maximum - L_a , see Fig. 1.1)

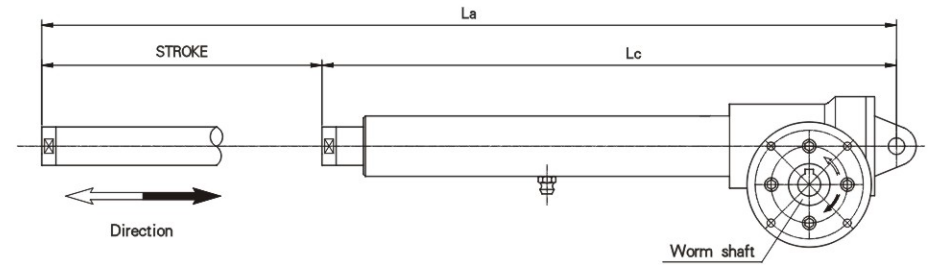


Fig. 1.1 Minimum - L_c and Maximum - L_a

- A. Actuator without anti-turn device (AR): screw - unscrew the push rod manually;
- B. Actuator with anti-turn device (AR), with electrical motor without brake: turn the motor fan manually;
- C. Actuator with anti-turn device (AR), with electrical motor with brake or with electrical motor without fan: take off the electric motor, turn the input shaft manually, in order to reach the push rod to the necessary position.

1.1.2 Check that all plant fixing elements are well machined and cleaned, and that they fit the dimensions of the actuators fixing elements they have to be fixed to.

1.1.3 Fit the actuator to the plant in order to have ONLY axial load applied to the actuator (see Fig. 1.2).

ATTENTION: Actuator and plant can not be guaranteed if side or not axial loads are applied to the actuator.



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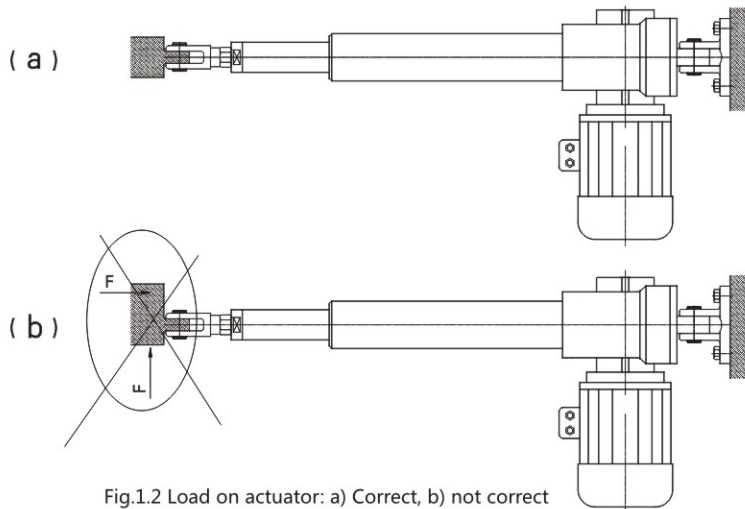


Fig.1.2 Load on actuator: a) Correct, b) not correct

1.2 Electric connection

1.2.1 Connect the stroke limit device (if present) and the electric motor to the control unit of the plant (see Fig.1.7). The electric connections of the motor into the terminal board have to be carried out following the precautions indicated by manufacturers (see Fig. 1.3). For actuators with DC motor or AC singlephase motor, it is possible to fix the shifting direction immediately.

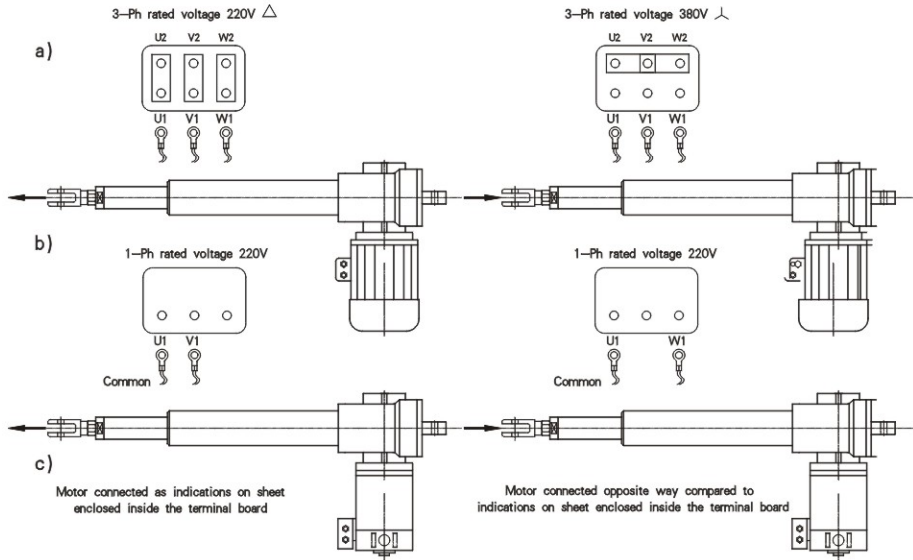


Fig.1.3 Connection of electric asynchronous motor in terminal board

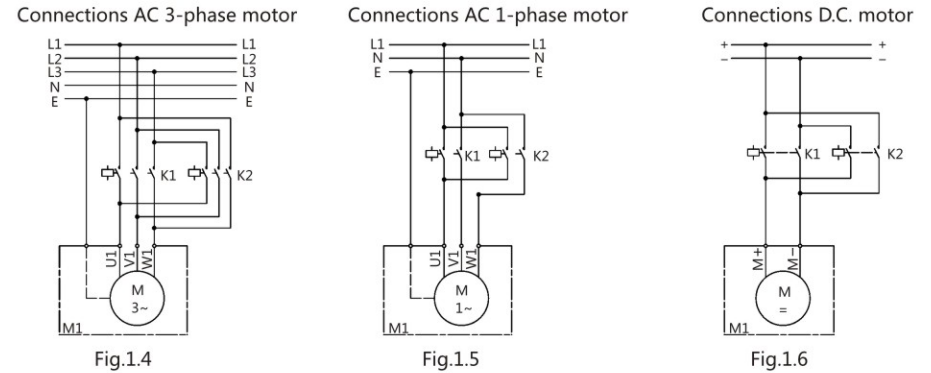
a) AC three-phase-motor connection b) AC single-phase-motor connection c) DC motor connection



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1.2.2 Electric connection to the net

The following examples of electric connections to the net of AC 3-phase, AC 1-phase and DC motors are shown. See fig1.4 , 1.5 , 1.6.



1.2.3 Limit switches devices

To the actuator, the devices we manufacture to be applied are three types, control circuit see fig.1.7.

The magnetic stroke length limit device FCM, fixed with clamps on the outer tuber are activated by the magnetic ring fixed on the travelling push. The minimal distance between the reed switches must be of at least 10mm, it is adjustable. See fig 1.8

The electric stroke length limit device FCE consists of 2 switches installed inside a sealed aluminium fixed on the outer tuber, are activated by the adjustable rings. See fig 1.9

The inductive proximity stroke limit device FCP, fixed directly on the outer tuber in the required position, it is not adjustable. The control circuit of the FCP indicated by manufacturers. See fig 1.10

All limit switches above are normally closed, and must connect the control circuit.

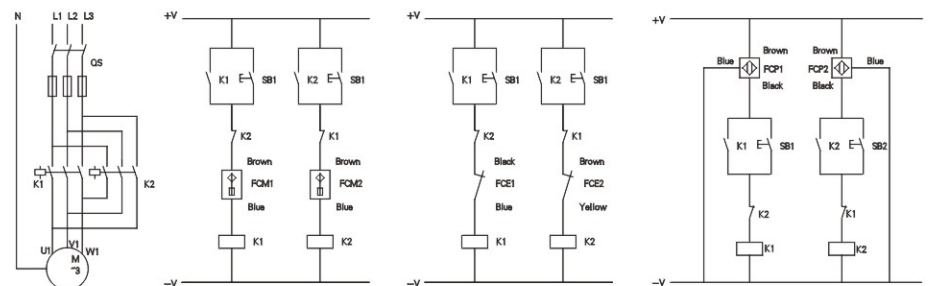


Fig.1.7



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1.3 Shifting direction check of actuators

A. Actuators with electric motor:

1.3.1 Check if the push rod shifting direction is compatible to the indications on the control unit, by powering the electric motor on very briefly. If not:

- a) Actuator with three-phase motor: invert any wire pair (U1↔V1, or U1↔W1, or V1↔W1) into the terminal board, see Fig. 1.3 a
- b) Actuator with single-phase motor: change the contact V1↔W1, see Fig. 1.3 b
- c) Actuator with direct current motor: invert contacts of the two motor supply cables.

B. Actuators without electric motor:

1.3.2 See Fig. 1.1, to clarify the relationship of the input shaft rotation direction with pushrod linear movement direction.

1.3.3. Turn the input shaft manually, in order to see the shifting direction.

1.4 Check of extreme working positions

1.4.1 Check if the extreme dimensions of the actuator are compatible with extreme positions of the plant component that has to be moved.

A. Actuator without stroke limit device:

- a) Measure the initial length of the actuator;
- b) Run the actuator gradually from the control unit, in order to reach the plant to its more distant extreme position;

ATTENTION: Check continuously the current actuator length during the motion, it must not go over the extreme values (Minimum - Lc and Maximum - La) Repeat the same procedure for the other plant extreme position.

B. Actuator with magnetic stroke limit device:FCM

- a) Measure the initial length of the actuator;
- b) Run the actuator gradually from the control unit, in order to reach the plant to its more distant extreme position;

ATTENTION: Check continuously the current actuator length during the motion, it must not go over the extreme values (Minimum - Lc and Maximum - La) Repeat the same procedure for the other plant extreme position.

Repeat the same procedure for the other plant extreme position.

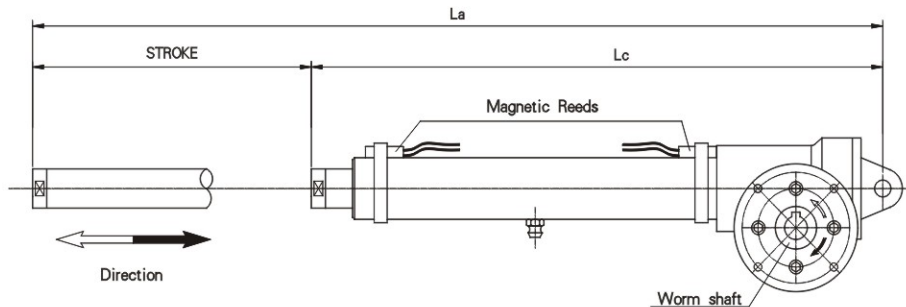


Fig.1.8: Actuator with magnetic stroke limit device



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C. Actuator with electric stroke limit device:FCE

- a) Measure the initial length of the actuator;
- b) Run the actuator gradually from the control unit, in order to reach the plant to its more distant extreme position;

ATTENTION: Check continuously the current actuator length during the motion, it must not go over the extreme values (Minimum - Lc and Maximum - La)

c) If necessary, adjust the axial position of the corresponding slider of the electric stroke limit device (see Fig. 1.9), in order to adjust the extreme position of the actuator;

Repeat the same procedure for the other plant extreme position.

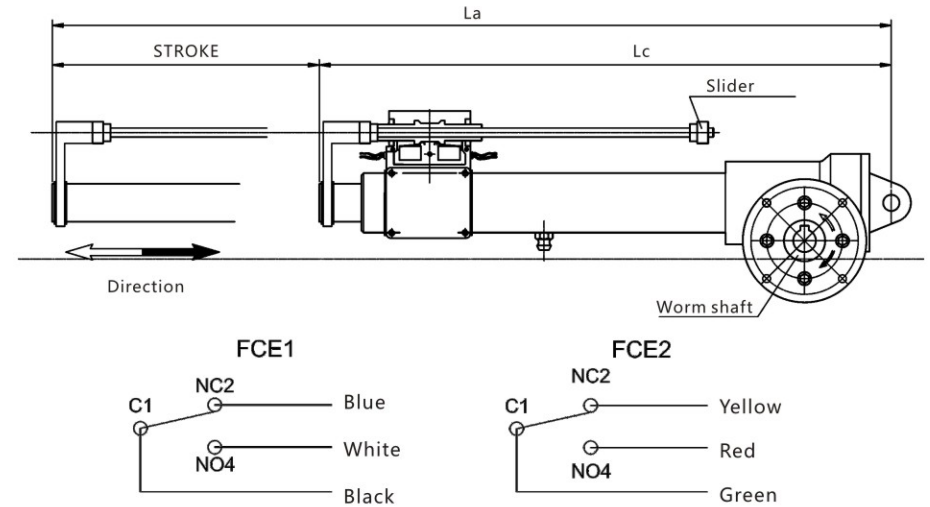


Fig.1.9: Actuator with electric stroke limit device

D. Actuator with proximity stroke limit device FCP (See Fig.1.10), as same as above.

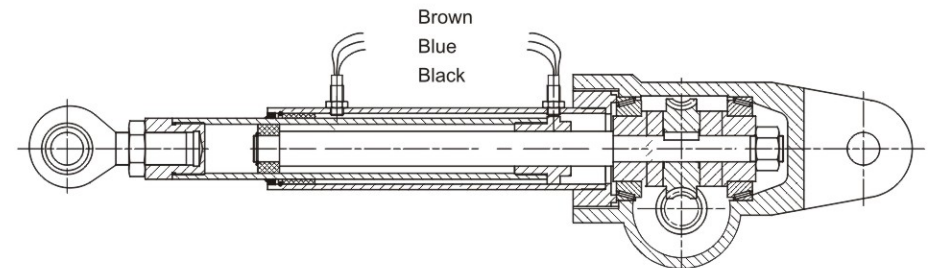


Fig.1.10 Actuator with proximity stroke limit device

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1.5 Commissioning

1.5.1 Carry out one complete working cycle, without load.

1.5.2 Carry out more complete working cycles, increasing gradually the load, until the load is maximum.

2 MAINTENANCE

2.1 Gearbox lubrication of actuators

Inside the gearbox are placed the worm gear and bearings dedicated to support the applied load. For them we anticipate that the use of the proper grease will provide long life lubrication. The lubricant MOBIL EP3 or the equivalent, recommended by Lude Transmission Co., Ltd., the quantity sees Table2.1.

2.2 Lubrication of transmission parts

A, ACME SREW ACTUATORS (Series LAP)

The acme screw - nut are long life grease lubricated, during the assembly of the actuator. The lubricant MOBIL XHP222 or the equivalent, recommended by Lude Transmission Co., Ltd., the quantity sees Table2.1. Periodically, the front scraper should be checked for grease loss, especially when the actuator works in downward position.

B. BALL SCREW ACTUATORS (Series LBP)

Table 2.1 Lubricants - type, quantity

Actuator	Worm gearbox		Actuating parts	
	Lubricant	Qty [g]	Lubricant	Quantity
				For any additional 1m of stroke [g]
LAP/LBP 22	MOBIL EP3 or the equivalent	30	MOBIL XHP222 or t he equivalent	100
LAP/LBP 25		45		150
LAP/LBP 28		60		200
LAP/LBP 32		60		300
LAP/LBP 35		90		400
LAP/LBP 40		130		500
LAP/LBP 56		350		700
LAP/LBP 63		700		950
LAP/LBP 80		1.5kg		1.2kg
LAP/LBP 120		2.5kg		1.5kg
LAP/LBP 200		3.6kg		2.0kg

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2.3 Maintenance reference charts

ATTENTION: The plant must be stopped and power supply must be off before beginning any maintenance operation.

The frequency of maintenance operations will depend on the application and on the environmental conditions. The recommended frequency of maintenance operations in Table 2.2 is relevant for the following operating conditions:

Environmental temperature: (20 ~ 25)°C

Industrial application functioning;

Duty cycle: 20%/hour, for actuators Series LAP

Duty cycle: 100%/hour, for actuators Series LBP

(5 ~ 6) working hours a day.

Table 2.2 Main periodical maintenance operations

Frequency	Checklist	Possible action
Two weeks	Lubricant loss	Identification of lubricant loss and elimination of its cause, addition of lubricant
Monthly	Screw-nut backlash	Verification of working period and conditions, contact Lude Transmission Co., Ltd.,

3 ASSEMBLY & DISASSEMBLY INSTRUCTIONS

3.1 General notes

The disassembly, the substitution of actuator parts and the relative re-assembly need:

- Specialised people
- Appropriate equipment
- Knowledge of actuator construction fundamentals
- Respect of correct procedure

In case of uncertainty, please contact Lude Transmission Co., Ltd., or its authorised distributors' servicing.

3.2 Assembly and Disassembly . Fig.3.1 and Table3.2

ATTENTION:

- a) The plant must be stopped and power supply must be off before beginning any maintenance operation.
- b) Most threaded end need to loosen the threadseal - threadlock, and carry the threadlock - threadseal on the external thread.



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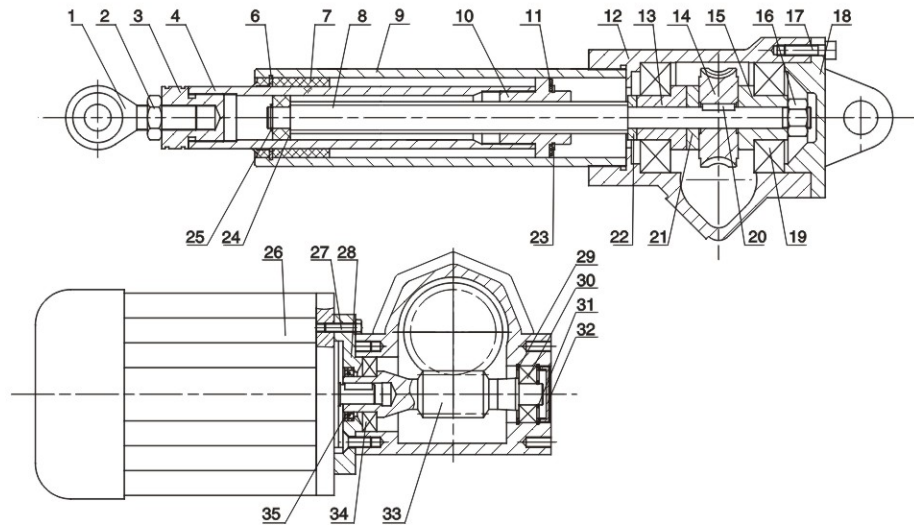


Fig.3.1 Assembling and disassembling of actuator

Table3.2

No.	Name	No.	Name	No.	Name
1	TS Ball joint	13	Support for bearing	25	Bolt screw
2	Shim nut	14	Worm wheel	26	Motor
3	Front attachment	15	Key	27	Motor flange
4	Push rod	16	Nut	28	Spring ring
5	Seeger-ring	17	Bolt screw	29	Bearing
6	Steel wire ring	18	Cover	30	Spring ring
7	Guide of push rod	19	Bearing	31	Cover
8	ACME screw	20	Round Dish	32	Worm shaft
9	Protective tube	21	Protection for bearing	33	Bolt screw
10	ACME nut	22	Spring ring	34	Bearing
11	Magnetic ring	23	Guide of ACME screw	35	Oil sealing
12	Housing	24	Spring ring		



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4 Ordinary fault and solution of linear actuator:

item	Phenomenon	Cause	Solution
1	Motor does not run when power on	Motor power off	Check wire connection and power to find whether the motor inputted with voltage
2	Motor humming does not run when power on	Wire is not connected well or overload	Check wire connection or decrease load
3	Motor overheated and burned when works	Overload; there is obstruct when mount the actuator on the equipment.	Decrease load, adjust the mounting position of front attachment and tail bracket