IQL ELECTRIC LINEAR ACTUATOR
Installation & Operation Manual

DOC no: (IQL-M0100/06/12)

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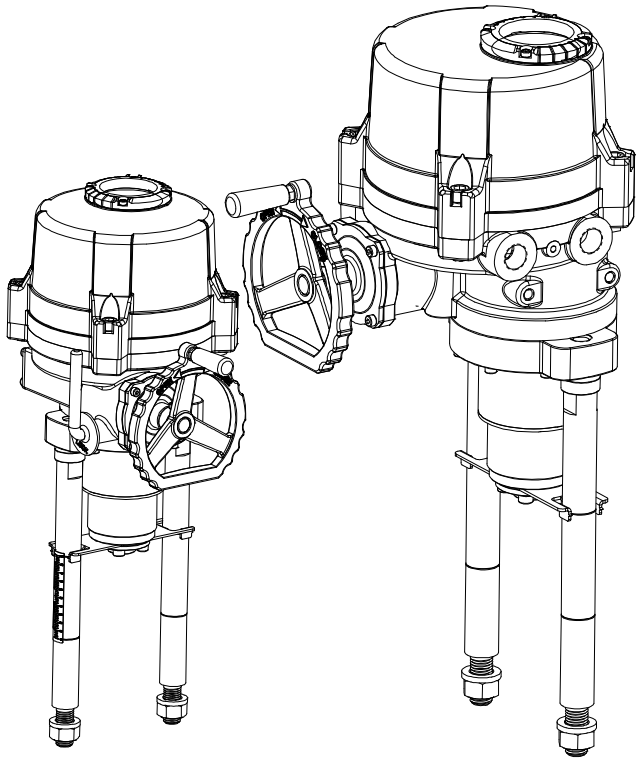
Index



1) Precaution before installation

Dangers when ignoring instruction for safety

IQL actuator is designed to reserve consideration for providing most safe operation and performance. However if operation is carried out by the personnel, not properly trained or not well instructed, and if actuators are not properly handled out of instruction of this manual, it may cause serious damages to the life of operator, his body, other property, and reduce the performance, functions and safety of actuators.

⚠ **Caution: Any dangers and damages caused by un-proper operation, which are not accordance with the instructions in this manual, are out of the supplier responsibility.**

2) Basic safety instruction

- Operation must be carried out by the personnel skilled and well trained.
- All instructions in this manual must be followed during installation, operation, changing of operating conditions, regular maintenance and other works for securing the safety.

⚠ **Caution: Any dangers and damages caused by un-proper modification and change without prior notification to factory is out of suppliers responsibility.**

- Before opening the cover, make sure to check all incoming power off.

3) Others

- After operation, temperature on surface of motor can be hot.
  Make sure not to touch it by bare hand.
- Wires for Input and output signal must be isolated from other high voltage power lines.

2. Long term Storage

1) Actuators must be stored on ventilated and dry place like shelves and wooden pallet.
2) Actuators must be protected from serious vibration, dust and mechanical damages.

3. Operating principle

IQL actuators are engineering device to providing thrust force to move valves and the force which comes out from the drive shaft is generated by the motor with multi stage of reducing gearing.

Actuator is mounted on valve supported by the two pillars, and pillars can be different depending on valve types.

Drive shaft transfer the pushing force through stem nut to valve shaft, and total stroke which valve can move are limited by adjustable two limit switches which are on each end(Up : open, down: close)

Manual operation can be ready by pulling the auto/manual lever toward hand-wheel and wiring should be done as per the wiring diagram attached inside of actuator cover.

4. Environmental condition

Ambient temperature	-4 to 158F or -20 to +70C
Duty cycle (IEC34-1)	S2 30 min Max S4 1,200 start/h 50% ED
Enclosure protection (EN60529)	IP66
Space heater (Heating resistor)	5W

5. Manual operation

When mounting actuator on valve or during setting limit switches, actuator should be operated by manual hand-wheel.

A. By pulling auto/manual lever toward hand-wheel, manual operation can be possible, and once power is applied, auto/manual lever will automatically return to auto operation.

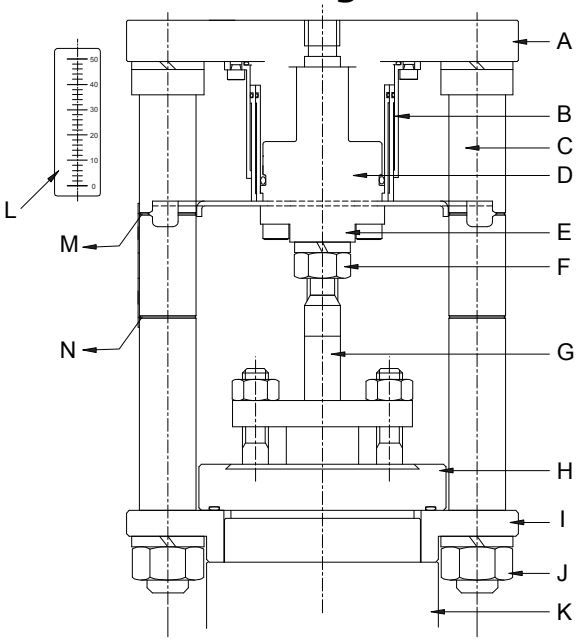
B. **In case of IQL08~25**, there are the force switches for open and close and 2 Limit Switches and 2 Auxiliary Switches. When you want to limit the full open and close positions by the force switches, you only set the Auxiliary Limit Switches and leave the limit switches at the previous positions (Open and Close).

C. Mechanical setting should be properly done.

Caution: 1) Don't operate hand-wheel with extremely excessive force

2) Total mechanical stroke should be limited between upper limit and lower limit, and when setting is done over this range, it may cause serious problem in the performance and operation of actuator.

6. Parts for mounting actuator on valve



A. Base(Actuator flange)
B. Folding stack
C. Pillar D. Socket
i. Coupler F. Stem nut
G. Valve stem
H. Lock-nut
I. Mounting Plate
J. Nut K. Valve body
L. Stroke scale
M. Upper Stroke Limit
N. Lower Stroke Limit

7. Mounting Actuator on Valve

IQL actuator can be easily applicable to various types of valves.

Warning! 1. Before completing setting the limit switches (Open/Close), make sure not to supply any electric power to actuator at any case, and setting limit switches should be done by manual operation.

Caution! 1. Upper stroke limit and lower stroke limit are marked on pillar to indicate the mechanical maximum stroke, and when mounting the actuator onto the valve, total stroke of valve should be set between these two limits.

2. So, the length of valve stem should be carefully decided after checking all dimension of the pillar, valve stem and other related parts, and make sure the valve stroke should be within this range after mounting.

Actuator should be properly mounted on the valve supporting by 2 pillars.
Referring to the dimension of pillar and other parts which are related to mounting, and following procedure should be considered when mounting actuator on valve.

1) Separating Coupler, machine threads in coupler (Female) properly as per the threads of valve stem (male). (Pay attention not to loose the screws when separating Coupler).
2) Prepare for the flange on valve to assemble with lower part of pillar which

threads parts of pillar can go through, and this flange can be different depending on valve type.

3) Mounting flange on valve and tighten by locking device.
4) Making the lower part of pillar goes through flange holes, and assembly it with spring washer and nuts, but make sure not to tighten it up so much.
5) Two lines are marked at upper and lower of Pillar indicating upper and lower stroke limit, and valve total stroke should be in this range. So, after checking the max stroke of valve, mount actuator properly so that max stroke of valve may not set out of this range.
6) Assemble machined Coupler with valve stem, and tighten it with nut from the bottom. Don't forget to insert spring washer.
7) Using manual hand-wheel, make actuator move down and assemble coupler with actuator shaft together. And between actuator shaft and coupler, must insert indicator plate without fail (Attention to the direction of indicator).
8) Tighten the nuts onto the threads of pillars which came out from the hole of flange.
   Make sure end of pillar must be completely inserted into the hole of flange.

Caution! 1. Before tightening nut on valve flange, double check if ends of pillar are completely inserted into the holes of mounting flange. If not, correct the position of pillar or flange.

8. Setting Limit Switch

Caution! Before setting limit switch, make sure not to operate actuator by electric power.
Otherwise, it may cause damage to actuator or valve.

Two types of the setting limit switches can be possible depending on specific cases. Setting depending on limit switch independently and setting limit switch depending on limit/Force.

And each setting the limit switches should be done according to the operation type of the valve.

Basic Principles

2-way type valve (Through-valve) requires Force/limit at the close position first, and then requires limit independent at the open position.

3-way valve requires force/limit set for both ends.

Force/Limit setting

By using manual hand-wheel, set Close limit switch as below.

Checking the indicator, make sure close setting point is not over the lower limit on Pillar.

1) By turning the manual hand-wheel, set the close Limit switch as below table.
Warning: Close Setting Point should be less than the bottom of the Pillar line.

2) To set the Close Limit exactly is very important, User can use as below ways.

3)

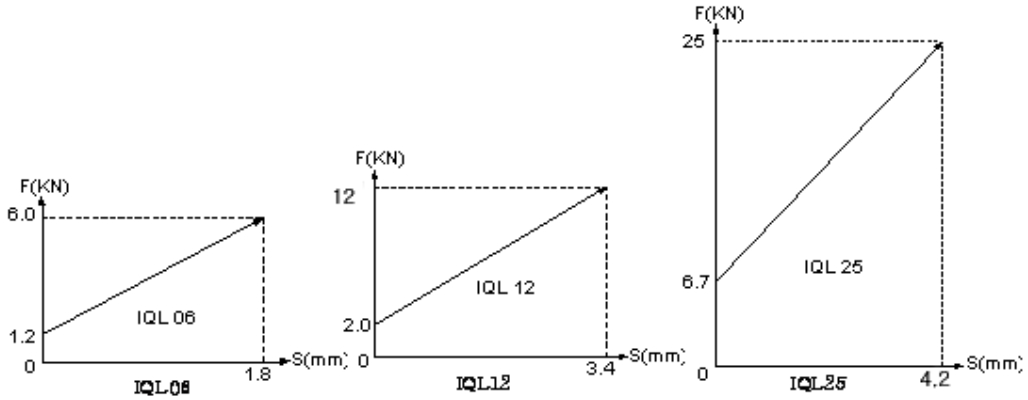
A. When User can see inside of the valve, please make the valve full close by manual hand-wheel until the valve cone reaches the seat. At this position, please make the disc spring compressed fully by turning the Manual hand-wheel as below table.

B. When dropping Fluid (Water or Air Pressure) into one way of the valve, after checking the position there is no leakage, User can set the limit switches by turning the manual hand-wheel as below table.

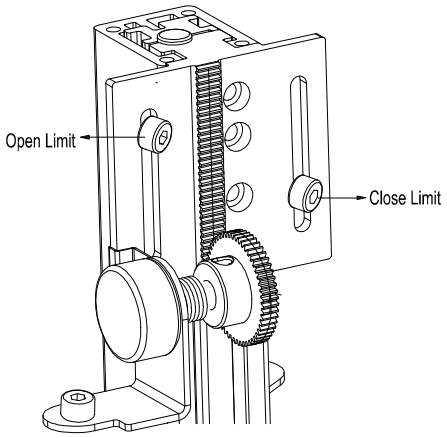
C. In case that User can't see inside of the valve.
After turn the Manual hand wheel until the hand-wheel doesn't turn, turn the Manual hand-wheel in the reverse direction as below table.
Warning: Please don't turn the hand-wheel fiercely.

IQL model	04	06	08	10	12	20	25
A	+1.5	+2	+2	+3	+3	+3	+4
B	+0.5	+1	+0.5	+1	+1	+1	+1
C	-2	-1.5	-2	-1.5	-1.5	-3	-2

4) Below graphs are indication between compressed length of disc spring in mm, and force.
Depending on models, make actuator move by hand wheel until disc springs are compressed as per the graph shown. For example of IQL06, if compressed length from the marked point is 1.8mm, it equals to 6KN force, and set limit switch at this point as close.



5) Loosening screw of cam in close limit, move the cam until the cam activate the limit switch, fix the screw.
6) By using manual hand-wheel, try actuator move open and close for several times, check if close setting is correct or not.
7) Check if the length of compressed disc spring is correct or not, and if necessary, set limit switch again.
8) After close setting, put stroke scale on pillar based on close point.



Setting limit switch independent

1) Place the actuator at the point need to be set by actuator's manual hand wheel.
2) Loosening cam of correspondence with its limit switch and move the cam until it activate limit switch. And tighten screw at the point.

9. Wiring and Connection

Caution 1. When wiring, make sure to place proper sealant to secure the sealing between cable entry and gland, so that water outside doesn't flow into actuator inside.

1) Electrical wiring attached inside of cover is provided for individual actuator only, since wiring can be different depending on required specifications, double check all the specification before wiring.
2) Standard motor of IQL actuator has its own thermal protector, and if temperature of motor is over the limit, it cuts electricity in the line, so that actuator may not get the thermal damage.

10. Commissioning

Open cover and place the actuator in the middle of total stroke of valve by using manual hand-wheel.

1) Supply the main power.
2) Supply open signal for about 5~10 seconds, check if operating direction is correct and vise versa. If direction is reverse, exchange the signal line each other.
3) When the main power is 3 phase electricity, checking operating direction must be done before normal operation. Otherwise, actuator or valve may get fatal damage!
4) Keep supplying the signal until the cam activates the limit switch, and if necessary, set the cam correctly again!

11. Maintenance

1) If actuator is under normal condition and maintained as per described in this manual, there is no more special instruction for the maintenance and no need to refill the grease or lubricant into actuator.
2) Actuators need to be clean and dry condition under operation and storage.

12. Spare Part

1) Handling and during operation, if there is any parts damaged or lost, replacement can be supplied separately upon request. Please consult with local distributors or agent to get the necessary parts.
2) If reason of trouble is proven as parts own, that part can be replaced without extra cost.

13. Others

1) Test and inspection report are to be provided together with actuator, and so pay attention not to loose these documentations for maintenance and repair in future if necessary.
2) For more detail information, please contact local distributor or agent, so that more technical and detail service will be provided.

General technical data

		IQL 04	IQL 06
Force (Max)		4	6
Stroke (Max)		40	40
Positioning speed		0.7 / 0.83 mm/sec (50/60Hz)	0.7 / 0.90 mm/sec (50/60Hz)
Manual override		Handwheel with switchable declutchable lever	
Enclosure	**E**	IP66	
Cable entry		2 - NPT 3/4" TAP	
Position indicator		Gradulation on pillar pointed by carrier plate	
Housing		Aluminum alloy hard anodized for anti-corrosion	
Painting		Epoxy powder coated	
Ambient temperature	**°C]**	-20 °C ~ +70 °C	
Operating mode IEC34-1, 8		S2 30 Min S4 1200 c/h 50%ED	
Weight		9	9

Actuator speed and electric data

Rated current (A)		1 Phase				3 Phase				AC/DC
		110VAC		220VAC		380VAC		440VAC		
		50Hz	60Hz	50Hz	60Hz	50Hz	60Hz	50Hz	60Hz	24V
	IQL 04	0.45	0.44	0.26	0.25	0.3	0.31	0.28	0.40	3.0
	IQL 06	0.49	0.48	0.29	0.28	0.32	0.33	0.30	0.42	3.5
Motor protection		Thermal switch, Class F insulation								
Space heater		5 W (110/220VAC) for anti condensation								
		1 each for open/close (SPDT 10A 250VAC rating)								

Valve mounting

		IQL 04	IQL 06
Valve stem threads	mm	M20 (Max)	M20 (Max)
PCD on flange	mm	100	100
Pillar Threads		M16	M16
Mounting direction		Any direction except for heading downward	
Pillar material		Non corrosive material	

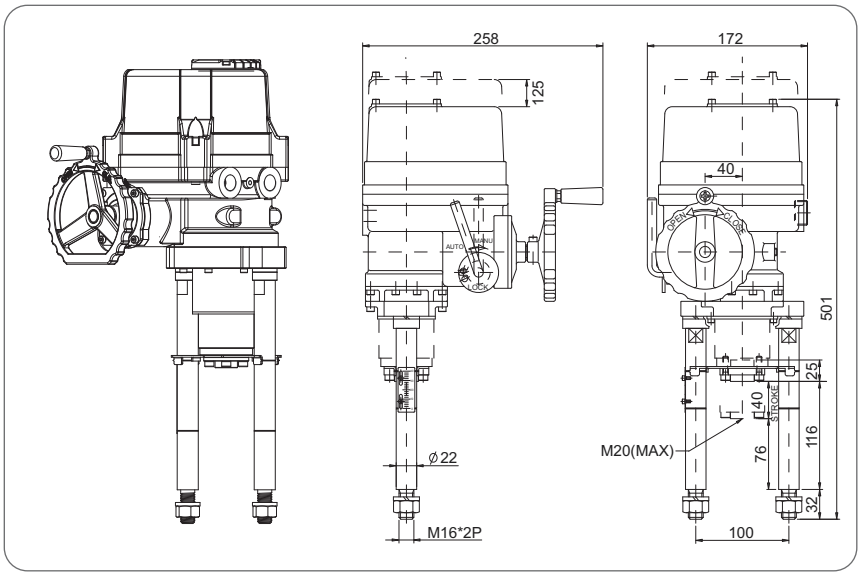
Available optional controls

Remote position control	**RPC**	4-20mA input/output, Selectable other signal
Potentiometer	**PK**	0~1Kohm feedback
Current transmitter	**CT**	4-20mA output
AC/DC Converter	**ADC 16**	AC to DC converter

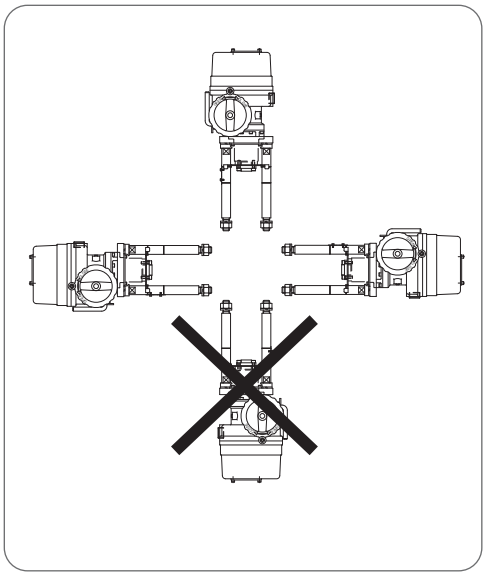
Local control

Local control (1phase)	**LP4**	Local control unit
Local control (3phase)	**LM4**	LP4 with reversing contactor and transformer
Explosion proof Exd IIB T4	**Nepsi**	

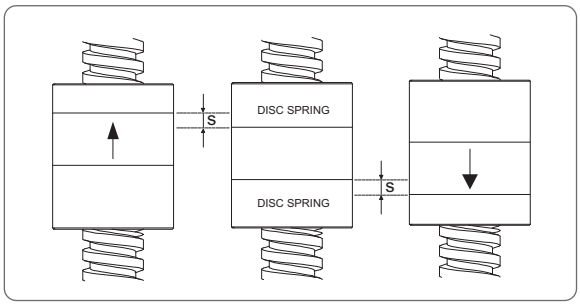
Dimensions(mm)



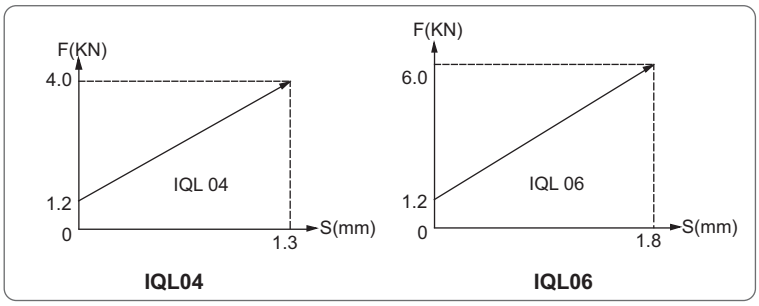
Correct mounting direction



Setting closing(opening) force

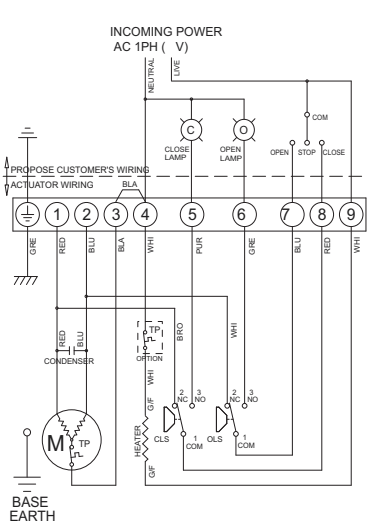


Disc spring arrangement

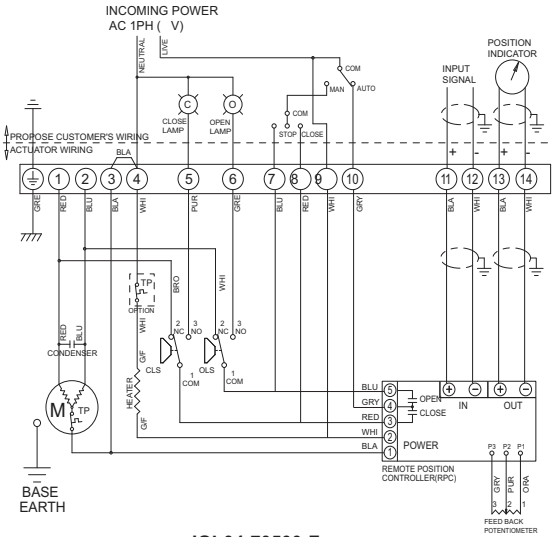


F : Closing(opening) force S : Amount of disc spring compression

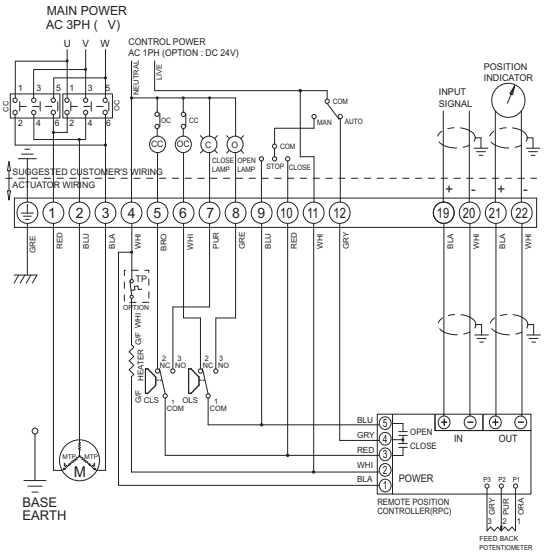
Standard wiring



IQL04-70000-F
AC 110V/220V, 50/60Hz, 1PH
OPEN-CLOSE



IQL04-70500-F
AC 110V/220V, 50/60Hz, 1PH
Modulating : RPC



IQL04-80500-F
AC 380V/440V, 50/60Hz, 3PH
Modulating : RPC

General technical data

		IQL 08	IQL 10	IQL 12
Force (Max)		8	10	12
Stroke (Max)		50	50	50
Positioning speed		0.9 / 1.1 mm/sec (50/60Hz)	0.9 / 1.1 mm/sec (50/60Hz)	0.9 / 1.1 mm/sec (50/60Hz)
Manual override		Handwheel with switchable declutchable lever		
Enclosure	**E**	IP66		
Cable entry		2 - NPT 3/4" TAP		
Position indication		Gradulation on pillar pointed by carrier plate		
Housing		Aluminum alloy hard anodized for anti-corrosion		
Painting		Epoxy powder coated		
Ambient temperature	**°C]**	-20 °C ~ +70 °C		
Operating mode IEC34-1, 8		S2 30 Min S4 1200 c/h 50%ED		
Weight		18	18	18

Actuator speed and electric data

		1 Phase				3 Phase				AC/DC
		110VAC		220VAC		380VAC		440VAC		
		50Hz	60Hz	50Hz	60Hz	50Hz	60Hz	50Hz	60Hz	24V
Rated current (A)	IQL 08	0.92	0.88	0.48	0.46	0.18	0.17	0.17	0.16	2.90
	IQL 10	0.95	0.91	0.50	0.48	0.19	0.18	0.18	0.17	3.20
	IQL 12	0.98	0.94	0.52	0.50	0.20	0.19	0.19	0.18	3.50
Motor protection		Thermal switch, Class F insulation								
Space heater		5 W (110/220VAC) for anti condensation								
Limit switch		2 each for open/close (SPDT 10A 250VAC rating)								
		1 each for open/close (SPDT 10A 250VAC rating)								

Valve mounting

		IQL 08	IQL 10	IQL 12
Valve stem threads	mm	M20 (Max)	M20 (Max)	M20 (Max)
PCD on flange	mm	100	100	100
Pillar Threads		M16	M16	M16
Mounting direction		Any direction except for heading downward		
Pillar material		Stainless steel, carbon steel with special surface treatment		

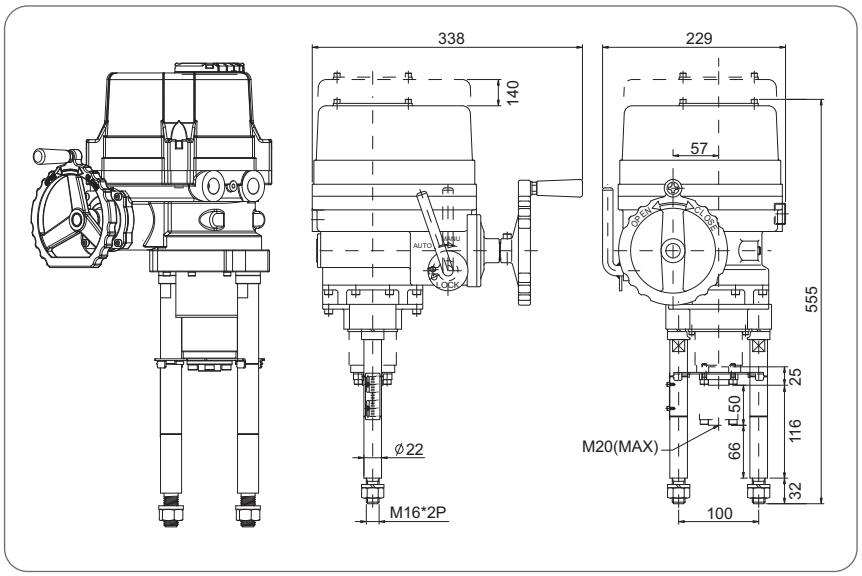
Available optional controls

Remote position control	**RPC**	4-20mA input/output, Selectable other signal
Potentiometer	**PK**	0~1Kohm feedback
Current transmitter	**CT**	4-20mA input / output, Optional others
AC/DC Converter	**ADC 16**	AC to DC converter

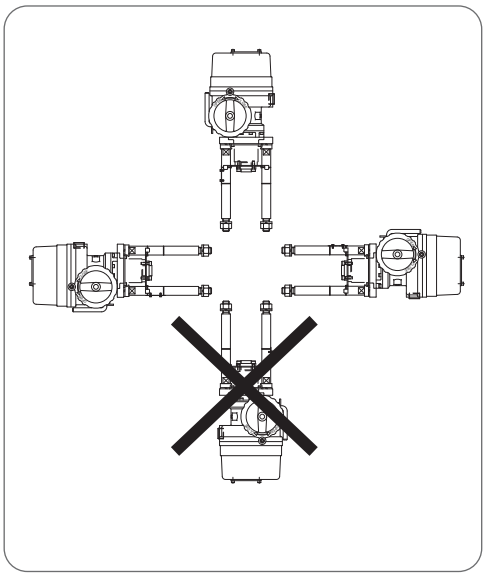
Local control

Local control (1phase)	**LP4**	Local control unit
Local control (3phase)	**LM4**	LP4 with reversing contactor and transformer
Integral unit	**ICM1/2**	Local controller with phase discriminator
Battery back up unit	**BP**	Fail safe (Fail position either open/close/stay put)
Explosion proof Exd IIB T4	**Nepsi**	

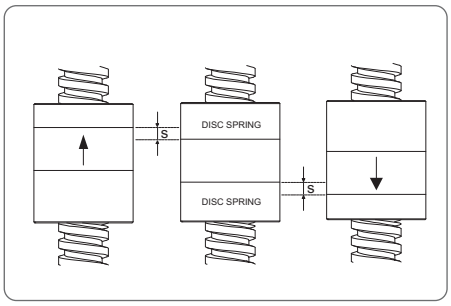
Dimensions(mm)



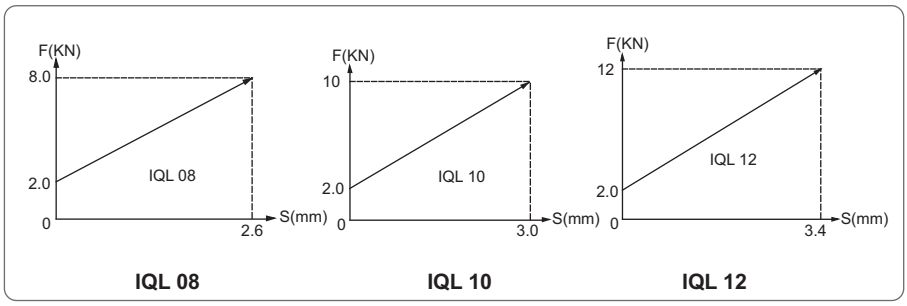
Correct mounting direction



Setting closing(opening) force

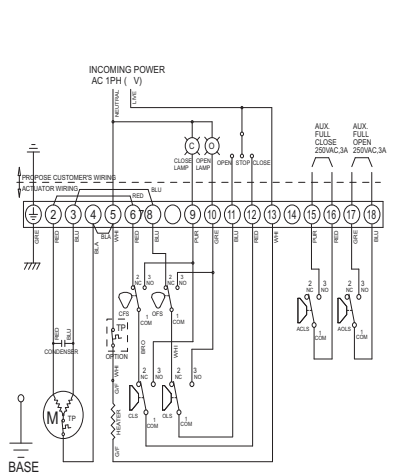


Disc spring arrangement

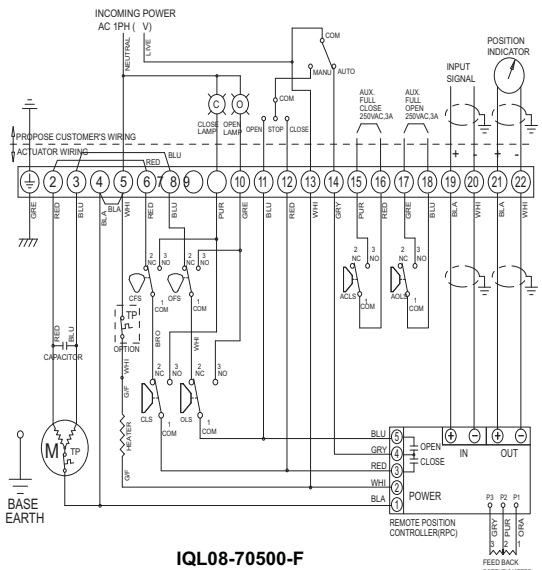


F : Closing(opening) force S : Amount of disc spring compression

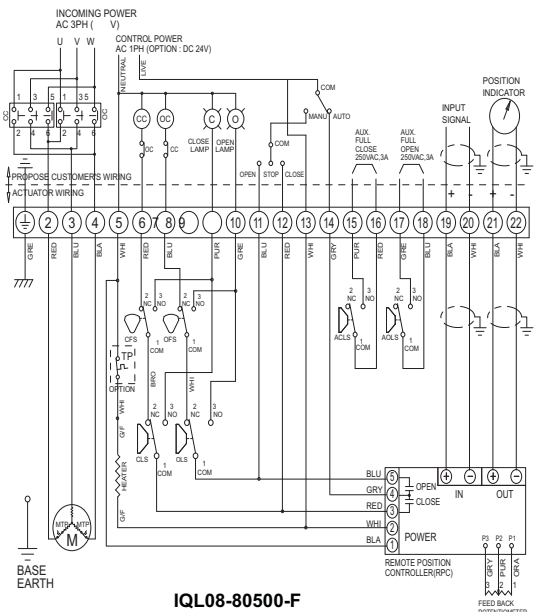
Standard wiring



IQL08-70000-F
AC 110V/220V, 50/60Hz, 1PH
OPEN-CLOSE



IQL08-70500-F
AC 110V/220V, 50/60Hz, 1PH
Modulating : RPC



IQL08-80500-F
AC 380V/440V, 50/60Hz, 3PH
Modulating : RPC