TIANJIN FREYA AUTOMATION TECHNOLOGY CO., LTD.

QT SERIES ELECTRIC ACTUATOR

ENGINEERING CREATIVE SOLUTIONS FOR FLUID SYSTEMS

INTRODUCTION

• QT-type part-turn electric valve actuator is suitable for controlling 90° rotation valves such as butterfly valves, ball valves, and plug valves. This product has the characteristics of high efficiency, high reliability, high protective performance, and low noise. It can be operated on-site or controlled remotely. It can be widely used in petroleum, chemical industry, power plants, water treatment, papermaking, and other industries.

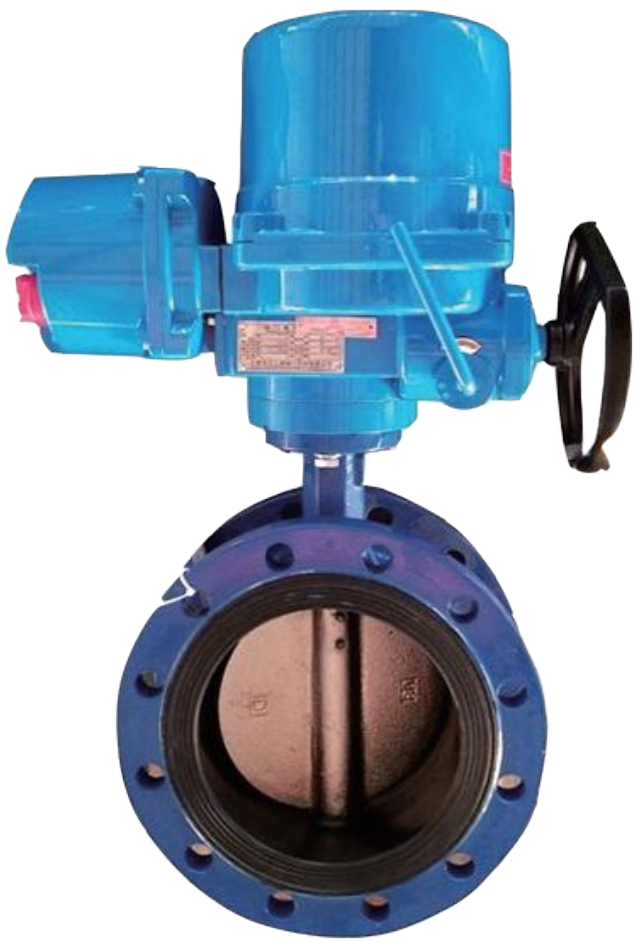
• Freya controls designs, produces and provides high-quality actuators and services related to valve automation.

• With our many years of experience in the field of automation, we have launched the QT series of electric actuators, which are compact, rugged, reliable and can be fully integrated into complex control systems.

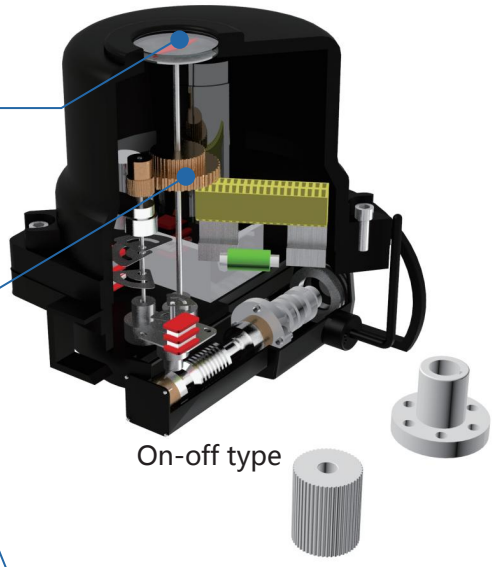
• We are always ready to provide you with our QT series actuators and accessories as well as quality services.

FEATURES

- Compact and robust construction, lightweight while providing high output torque (Max 10000Nm).
- Wide range of torque variation (From min 60Nm to max 10000Nm).
- Hard anodized aluminum housing inside and outside with external powder coating for use against severe industrial environment.
- Enclosure uses radial seals & O-rings that provide protection to waterproof IP67 (NEMA 4 & 6) and optional watertight lP68.
- Dual mounting base lSO5211 standard and KV standard.
- Removable drive bushing for easy machining and mounting.
- Self-locking provided by double worm gearing (no brake required).
- Auto-declutching manual override handwheel with padlockable auto/manual switchable lever.
- Reliable mechanical torque sensing system providing safe operation in overload condition.
- Large size window and indicator provides better position indication from a distance.
- Number of local position control options to provide easy commissioning and feld operation.
- Digitalized control components.



CONSTRUCTION



On-off type

Position indication

The mechanical indicator can continuously indicate the degree of valve opening, which consists of multi-stage gears with adjustable gears to accommodate a wide range of revolutions.

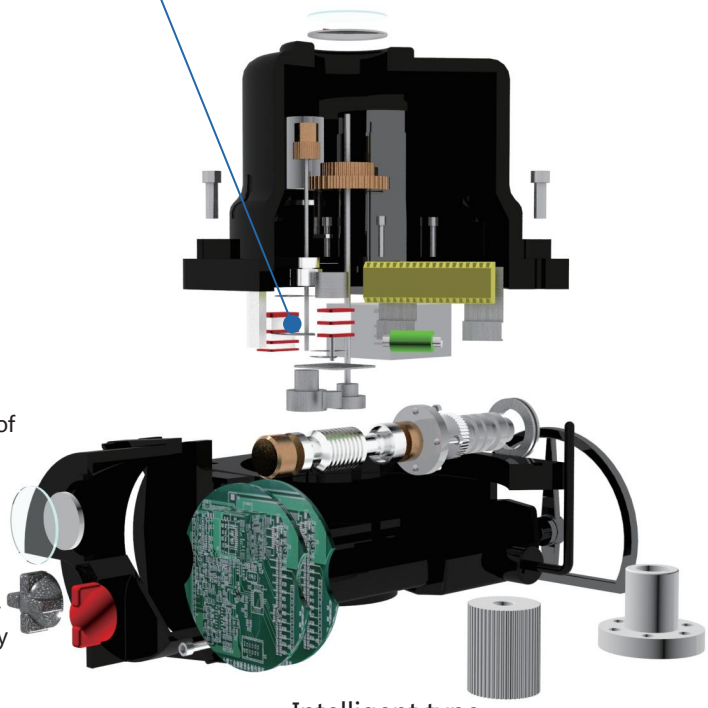
Cam and limit switch

It is fastened by two screws, and the setting is simple. Each cam can be set independently. Once set up, each cam remains in this position forever.

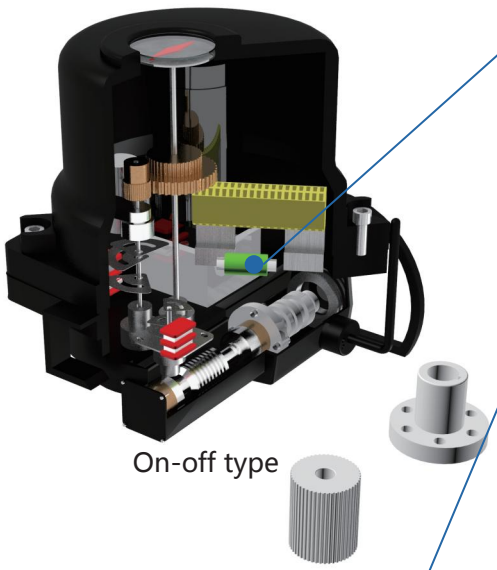
Torque switch

Torque limit, when the actuator outputs torque, the main worm equipped with butterfly spring
groups at both ends bears the thrust, the butterfly spring is compressed, and the worm undergoes an shaft displacement proportional to the output torque. The size of the displacement is converted by the crank into the rotation angle of the torque shaft. The adjustable cam installed on the torque shaft triggers the corresponding torque switch to realize over-torque protection or send over-torque fault signal function.

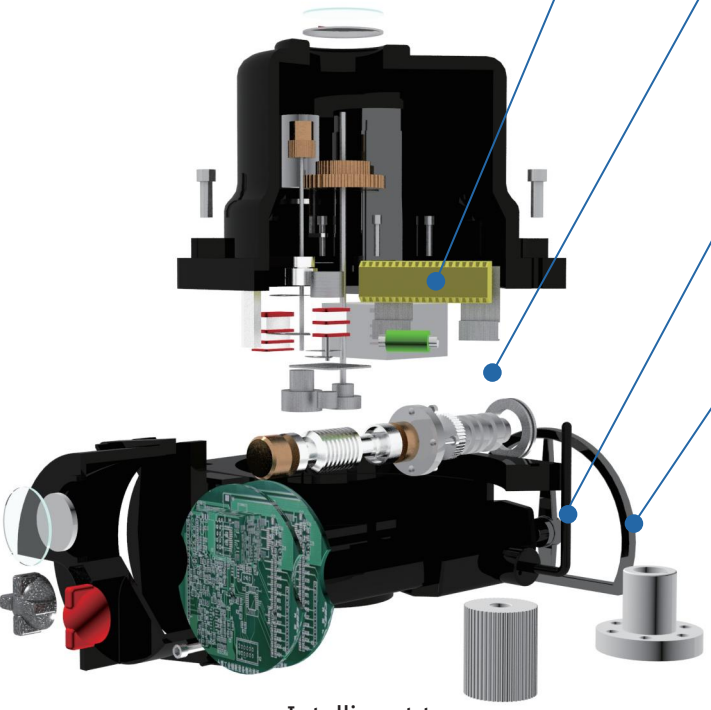
QB series explosion-proof electric valve actuator products are based on GB3836.1-2010 "Explosive Environment Part 1: General Requirements for Equipment" and GB3836.2-2010 "Explosive Environment Part 2: Equipment Protected by Explosion-proof Enclosure "d". It is stipulated that mechatronic products designed and manufactured must be reviewed, tested, and approved by a nationally recognized explosion-proof review agency, and obtain an explosion proof certificate. The explosion-proof mark is ExdTBT4Gb. Its technical parameters and connection dimensions refer to the ordinary type.



Intelligent type



On-off type



Intelligent type

Moisture-proof heater

A heater is installed inside the actuator to remove the damage caused by internal condensation to electrical components.

Terminal block

There are enough terminals to make it user-friendly, with up to 22 terminals ensuring a tight and secure wire connection.

Motor

The independently detachable valve-specific motor has high starting torque, small inertia, and a built-in thermal protector to prevent damage caused by overheating of the motor. The insulation grade is F.

Handwheel

The handwheel directly drives the output shaft to rotate and is used to manually operate the valve during debugging or emergency situations.

Hand/electric switch

By operating the hand /electric lever, manual drive is engaged. Energization of the
motor automatically re-engages power operation. (The hand /electric lever is lockable in order to prevent from mistaken operation.)

STANDARD SPECIFICATION

Protection grade	Standard IP65, optional IP67 IP68
Power supply	Three-phase AC380V---460V 50/60Hz Single-phase: AC110V-AC240V 50/60hz
Duty cycle(on-off)	S2-15min
Duty cycle(modulating)	S4-25%
Motor	Squirrel cage induction motor
Limit switches	1 each for open and close (SPDT 250VAC/16A rating)
Torque switches	1 each for open and close (SPDT 250VAC/16A rating)
Stall protection	Build-in overheat protection
Travel angle	90°
Position indicator	Continuous mechanical indicator with arrow
Manual override	De-clutchable
Self locking	Provided by double worm gearing (no brake)
Mechanical stopper	1 each for each travel end (open and close), external & adjustable
Space heater	5W(110/220VAC) for anti-condensation
Cable entries	Standard configuration: 2xG 1 ''explosion-proof 2xG 1 1/4''
Terminal block	Screw and lever push type (spring loaded)
Ambient temperature	Standard: -20～+70℃ Optional: -20～+60℃ Optional low-temperature type: -60～+70℃
Ambient humidity	90%RH max (Non-condensing)
External coating	Dry powder (Polyester)
Anti-corrosion grade	Epoxy powder coating, meeting NEMA 4X anti-corrosion grade
Explosion-proof grade	Exd IICT4 GB IECEx ATEx customized certification can be provided
Ex degree	IECE × ATEx custom certification available
Position transmitter	Potentiometer output resistance is1kΩ.Two-wire system valve transmitter output 4~20mA DC signal
Functions	LCD Chinese / English display window and local operation function Self phase sequence identifying and phase disconnection protection Infrared setting and control Fault self-diagnosis technology Modbus, Profidbus DP, Hart
Signal	A: Remote passive dry contact, signal short pulse (Inching). B: Remote passive dry contact, signal long pulse (hold). C: Active DC24V signal. D: Active AC220V signal. E: Eemote DC4-20mA (modulating) signal. F: Remote DC1-5V, 0-10V (modulating) signals
Feedback signal	A: Open, close, stop signals (passive dry contact). B: Fault signal (passive dry contact). C: Valve position signal (DC4-20mA, DC1-5V, DC0-10V) D: Remote control signal (passive dry contact)

OPTIONS AVAILABLE

Mechnical

Symbol	Description	Remark
EX	Explosion proof (Ex d II B T4)	Approved by KTL, ATEX, NEPSI
WT	Watertight (IP68), temporary submersible	
ALS	Auxiliary limit switches (Max 2 for each travel end)	
ATS	Auxiliary torque switches (Max 2 for each travel end)	
EXT	Extended travel angle (up to 120°, 135°, 180°, 270°)	
SV	Variation in torque and operating speed	Please consult before ordering

Remote monitoring and control

PK	Potentiometer kit (output signal: 0 – 1 KΩ) High resolution potentiometer and precisely machined gearing are directly engaged with drive shaft to feedback Continuous position of valve
CT	Current transmitter (output signal: 4-20mA)
Signal Confguration	Remote position controller (input and output signal) Input: 4-20mA, 0-10VDC, 2-10VDC, 1-5VDC, 0-5VDC Output: 4-20mA Option: 0-10VDC, 2-10VDC, 1-5VDC, 0-5VDC Auto-calibration Reverse operating direction

Local control

The actuator adopts magnetic rotation switch, it can achieve the control states switch between the local and remove in the case of complete isolation with the electrical cabinet, as well as control of opening and closing the valve, and parameter setting of the electric unit (intelligent type).

Main power : 3Ph/220/380/440 VAC; 1Ph/110/220 VAC
Option : 24 VDC (Internal power)
Magnetic selector switches

Open/Close & Local/Stop/Remote
Reversing electric contactors, transformer, phase detector, auto-phase discriminator

Local Lamp Indication:
•Power – White(on), Remote : Blue(on)
•In case of Close Torque Switch Trip –Yellow(on) + Green (fickering)
•In case of Open Torque Switch Trip –Yellow(on) + Red (fickering)
•Full Close – Green(on), Closing – Green(fickering)
•Full Open – Red (on), Opening – Red (fickering)
*Options available: PK, CT, RPC(modulating), IP68, explosion proof

TECHNICAL PARAMETERS (220V SINGLE-PHASE)

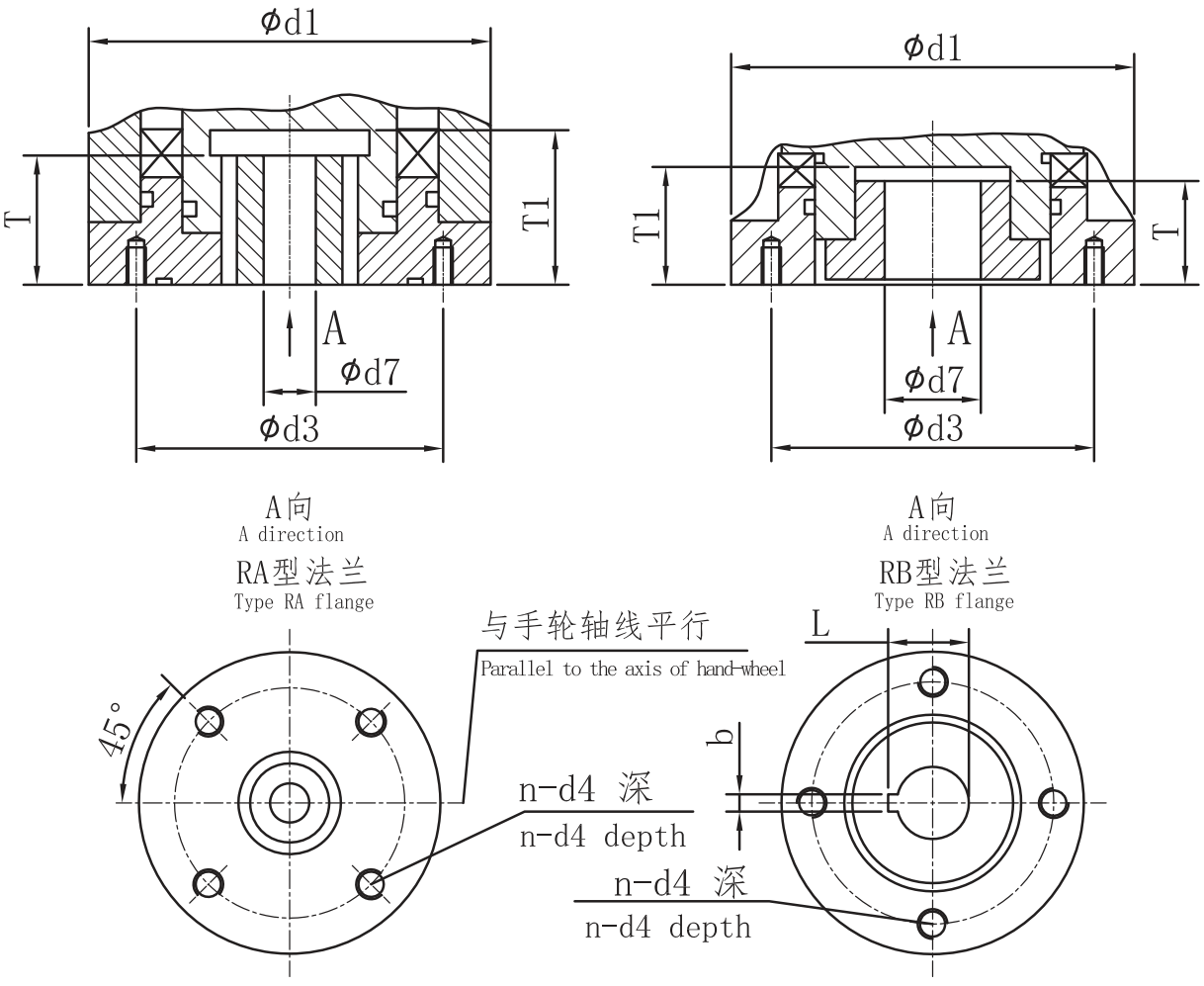
Model	Spec.	Output torque (N·m)	Output speed (r/min)	Travel time (s)	Maximum stem diameter (mm)	Motor power (Kw)	Motor current (A)		Electric capacity 450V	Handwh-eel turns	Reference Weight (KG)
							Rated	Jam			
QT1	QT04	40	1	17.5	14	0.01	0.45	0.7	4	8.5	6
	QT06	60	1	17.5	22	0.015	0.55	0.75	7	8.5	9
	QT09	90	1	17.5	22	0.025	0.7	1.1	7	8.5	10
QT2	QT5	50	1	20	22	0.025	0.7	1.1	7	10.5	12
	QT10	100	1	20	22	0.025	0.7	1.1	7	10.5	12
			2	10	22	0.025	0.7	1.1	7	10.5	12
	QT15	150	1	20	32	0.04	1.1	1.3	10	10.5	13
			2	10	32	0.04	1.1	1.3	10	10.5	13
	QT20	200	1	20	32	0.04	1.1	1.3	10	10.5	13
			2	10	32	0.04	1.1	1.3	10	10.5	13
QT3	QT30	300	0.5	26	32	0.04	1.2	1.5	10	12.8	17
			1	13	32	0.04	1.2	1.5	10	12.8	17
	QT40	400	0.5	26	32	0.06	1.2	1.8	12	12.8	18
			1	13	32	0.06	1.2	1.8	12	12.8	18
QT4	QT60	600	0.5	26	42	0.09	2	3.2	15	14.5	22
			1	13	42	0.09	2	3.2	15	14.5	22
	QT80	800	0.5	26	42	0.18	3	4	30	14.5	23
			1	13	42	0.18	3	4	30	14.5	23
	QT100	1000	0.5	26	42	0.2	3.3	4.5	30	14.5	25
			1	13	42	0.2	3.3	4.5	30	14.5	25
QT4/JS	QT150	1500	0.15	90	50	0.18	3	4	20	43	48
			0.3	45	50	0.18	3	4	20	43	48
	QT200	2000	0.15	90	50	0.2	3.3	4.5	20	43	50
			0.3	45	50	0.2	3.3	4.5	20	43	50
	QT250	2500	0.15	90	50	0.2	3.3	4.5	20	43	50
			0.3	45	50	0.2	3.3	4.5	20	43	50

TECHNICAL PARAMETERS (380V THREE-PHASE)

Model	Spec.	Output torque (N·m)	Output speed (r/min)	Maximum stem diameter (mm)	Motor power (Kw)	Motor current (A)		Travel time (s)	Reference weight (KG)
						Rated	Jam		
QT1	QT06-1	60	1	22	0.025	0.3	0.6	15	9
	QT09-1	90			0.025				
QT2	QT05-1	50	1	22	0.025	0.3	0.6	18	10
	QT10-1	100	1		0.025	0.3	0.6	18	10
	QT10-2		2		0.04	0.6	0.9	9	12
	QT15-1	150	1	32	0.04	0.6	0.9	18	12
	QT15-2		2		0.06	0.7	1.1	9	13
	QT20-1	200	1		0.06			18	
	QT20-2		2		0.06			9	
QT3	QT30-0.5	300	0.5	32	0.06	0.5	1	24	17
	QT30-1		1		0.06			12	
	QT30-2		2		0.09	0.8	1.7	6	18
	QT40-0.5	400	0.5		0.09			24	
	QT40-1		1		0.09			12	
	QT40-2		2		0.09			6	
QT4	QT60-0.5	600	0.5	42	0.12	1	2	28	22
	QT60-1		1					14	
	QT60-2		2		0.18	1.5	2.5	7	25
	QT80-0.5	800	0.5					28	
	QT80-1		1					14	
	QT80-2		2					7	
	QT100-0.5	1000	0.5					28	
	QT100-1		1					14	
QT4/JS	QT150-0.3	1500	0.3	50	0.18	1.3	2.2	45	48
	QT200-0.3	2000			0.2	1.8	3	45	50
	QT250-0.3	2500							

Note: When the output shaft speed is 2r/min, the output shaft of the product does not self-lock. Please pay attention when the valve has self-locking requirements.

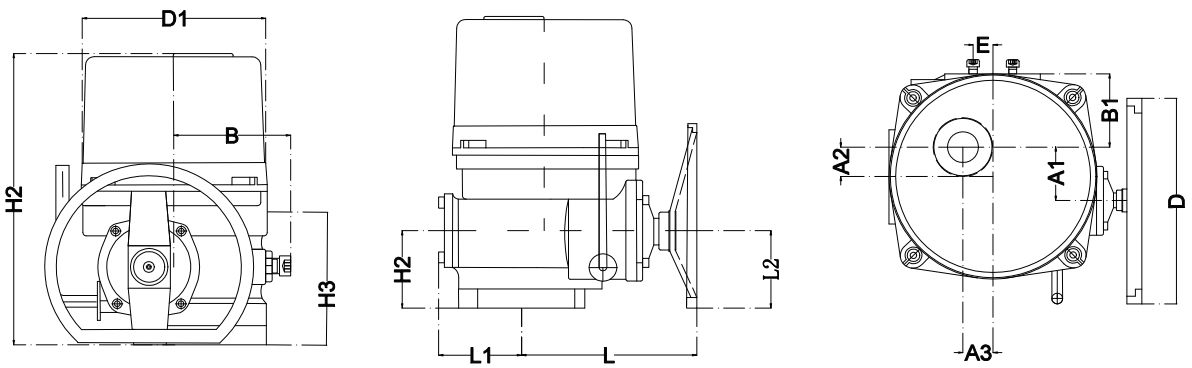
QT1-QT4 FLANGE STRUCTURE AND DIMENSIONS



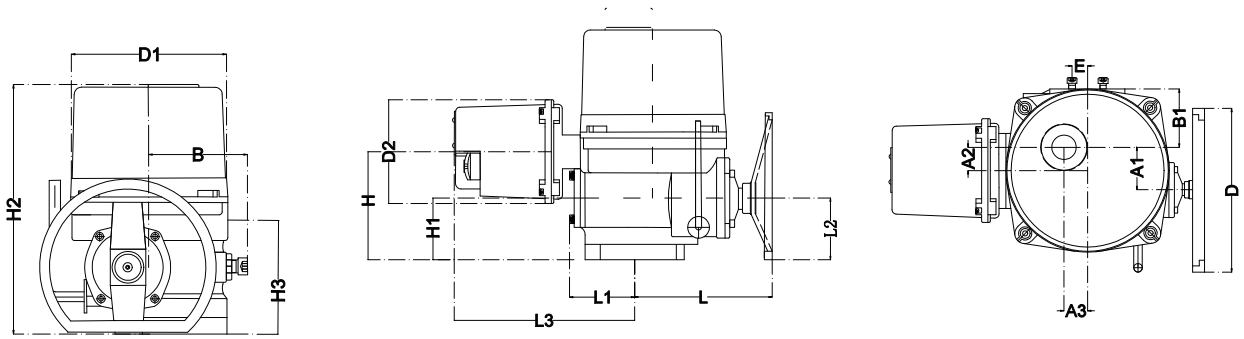
Code / Model	Flange size		φd1	φd3	Standard size	Reserved size	Maximum allowed	b	l	t	t	n-d4 depth h
QT1	RA	F05	102	50	/	10	22	/	/	30	43	4-m6 depth 12
		F07		70						40		4-m8 depth 12
	RB	2″		57.15	12.6			3	14			4-m6 depth 10
		3″										
QT2	RA	F05	125	50	/	10	22	/	/	45	49	4-m6 depth 12
		F07		70		15	32			46		4-m8 depth 14
		F10		102								4-m10 depth 15
	RB	2″		57.15	12.6	10	22	3	14	45		4-m6 depth 10
		2.5″										
		3″										
		4″		69.85	15.77	15	32	5	18.07	46		4-m8 depth 15
		5″			18.92				21.22			
		6″										
QT3	RA	F10	145	102	/	15	32	/	/	46	52	4-m10 depth 15
QT4	RA	F12	175	125	/	20	42	/	/	58	63	4-m12 depth 18
		F14		140								4-m16 depth 25
	RB	8″		88.9	22.10			5	24.4			4-m10 depth 15
		10″			28.45			8	31.75			4-m12 depth 20
		12″		107.95	31.6			8	34.9			
		14″										

QT1-QT4 ACTUATOR DIMENSIONS

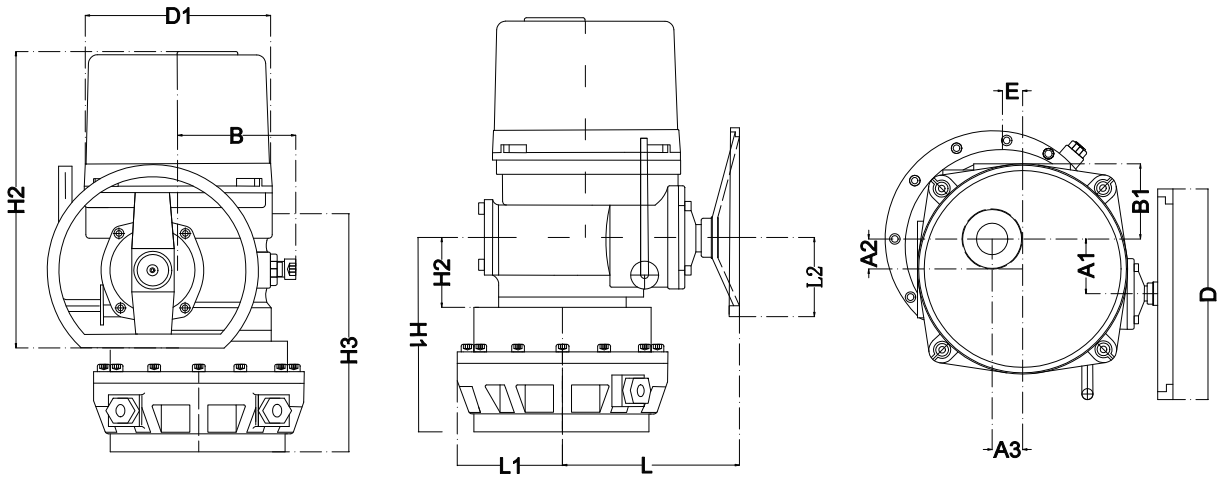
QT1-3 Ordinary type



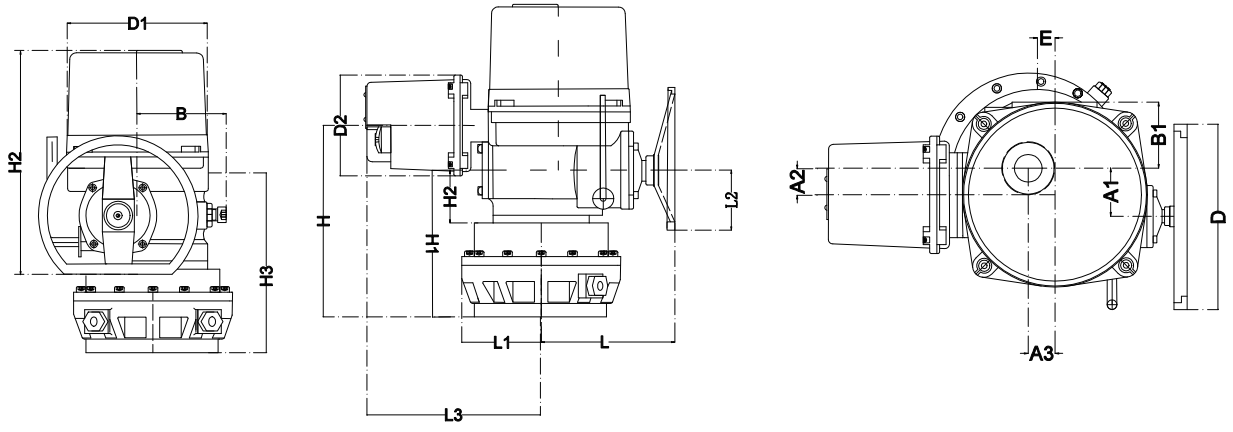
QT1-3 integral type



QT4-5 ordinary type



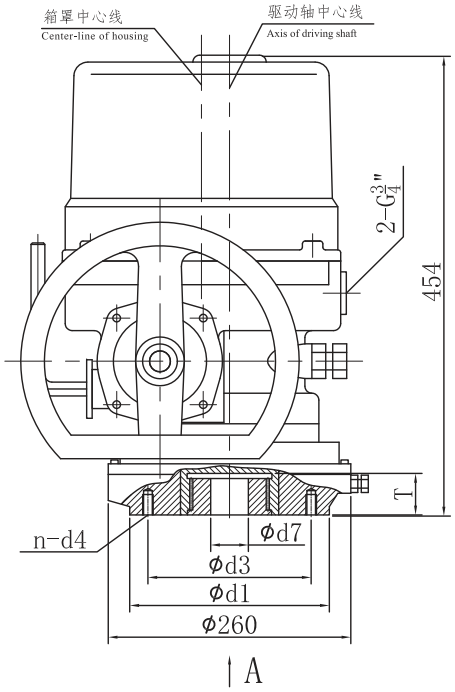
QT4-5 integral type

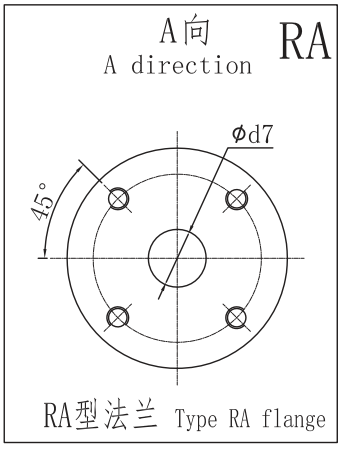


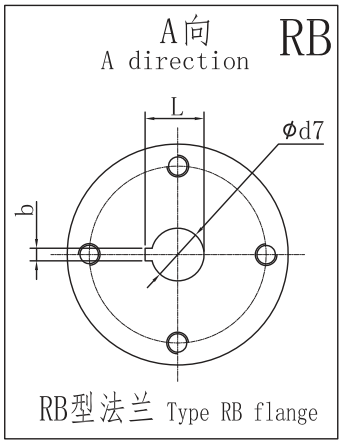
Model	A1	A2	A3	B	B1	D	D1	D2	E	H	H1	H2	H3	L	L1	L2	L3
QT1	44	17	36	75	68	102	170	166		126	60	256	109	179	62	60	300
QT2	49.5	22.5	30	85	77.5	200	200	166		130	64	263	113	187	85	76	320
QT3	60	33	35	100	77	250	220	166	27.5	136	70	298	119	202	88	76	323
QT4	70	43	38	115	87	250	260	166	/	144	78	342	127	225	106	76	341
QT5	70	43	38	130	130	250	260	166	/	234	185	449	234	225	130	76	341

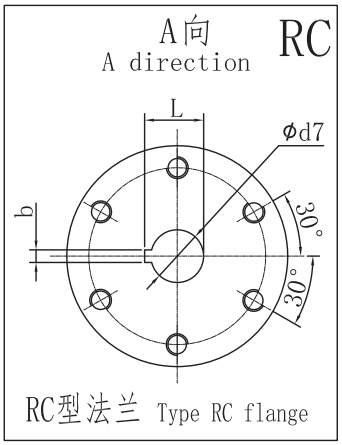
INSTALLATION DIMENSIONS DRAWING

QT4/JS installation dimensions drawing





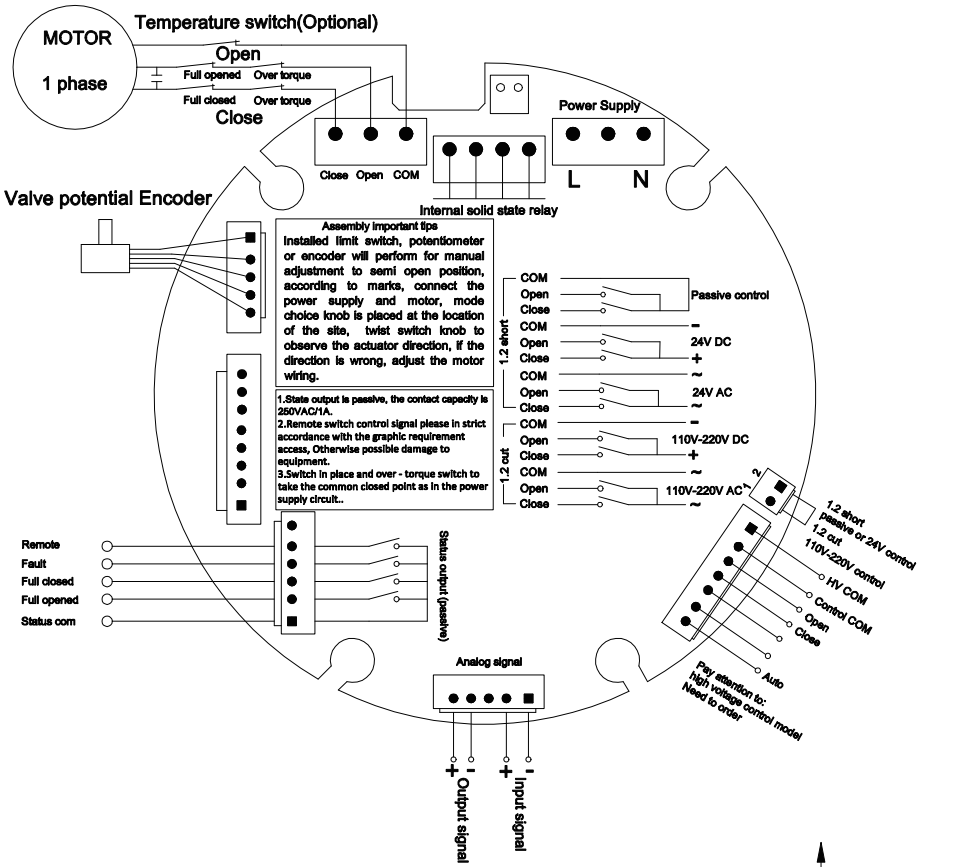


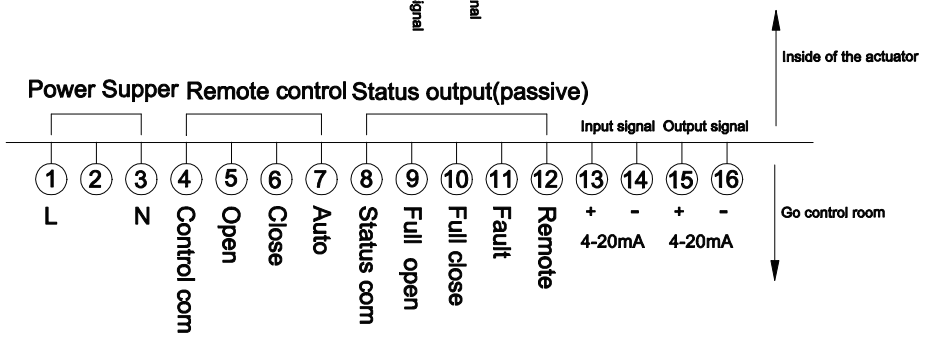


Flange model	Flange diameter/ flange code	φd1	φd3	Standard size	Reserved size	Max. allowed	b	l	nd-4	T
RA	F14	175	140	/	20	50	/	/	4-m16	77
	F16	210	165						4-m20	
RB	16″	215	158.7	33.15	20	50	10	36.45	4-m18	77
	18″			38.00				41.3		
	20″			41.15				44.5		
RC	Q120	215	165	/			/	/	6-m16	77

WIRING DIAGRAM

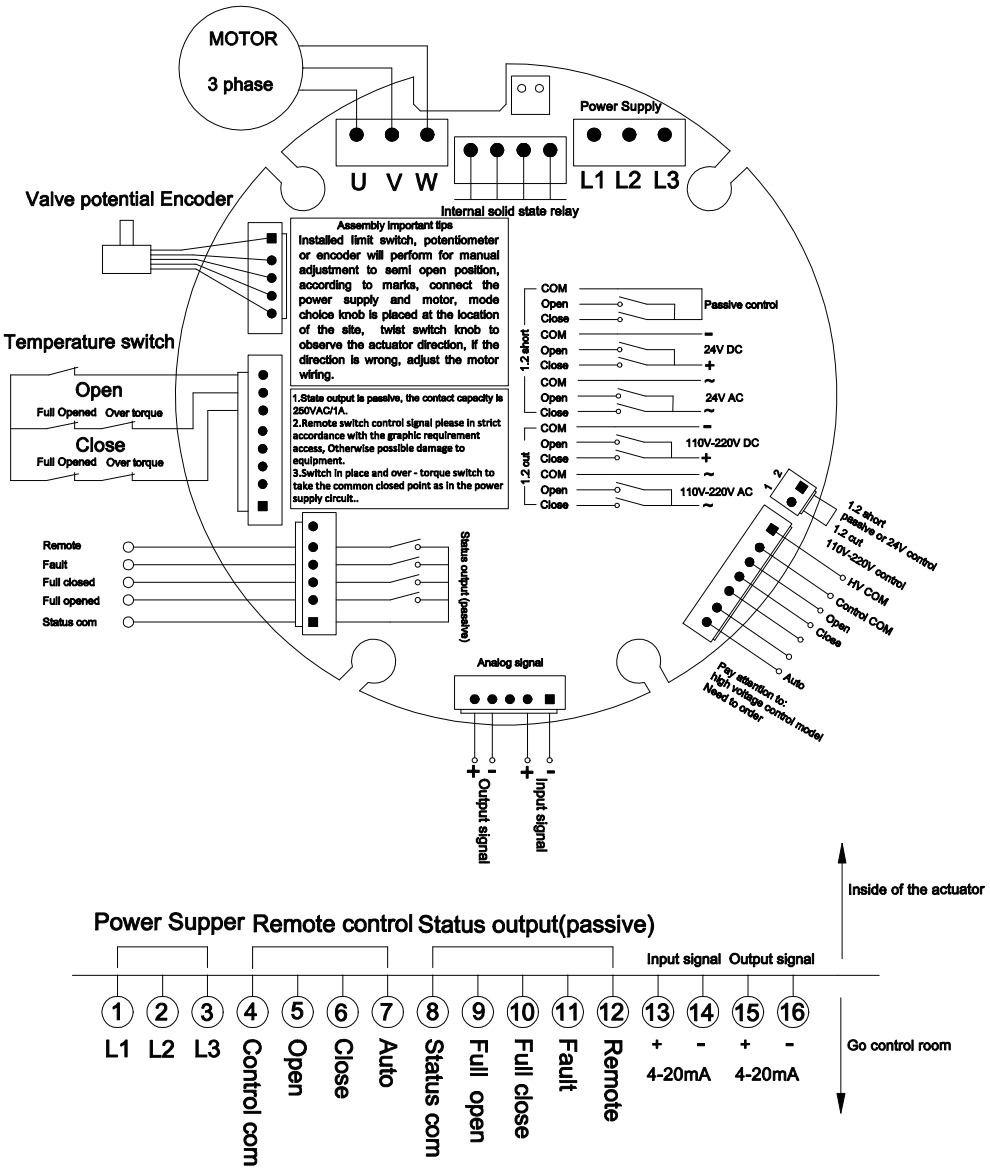
Intelligent electric actuator 220V wiring diagram





（The terminal sequence is subject of the drawing of the machine)

Intelligent electric actuator 380V wiring diagram

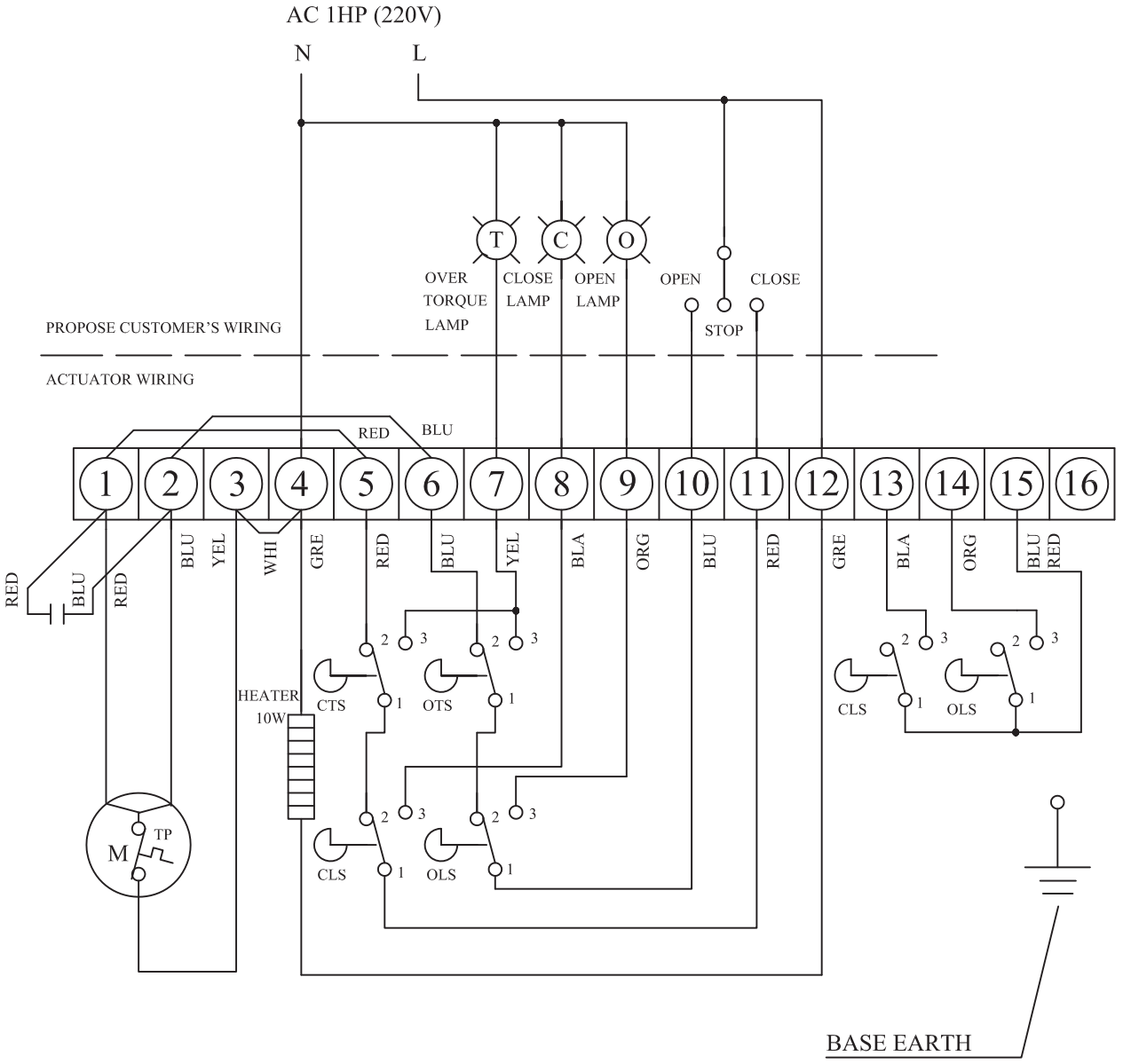


（The terminal sequence is subject of the drawing of the machine)

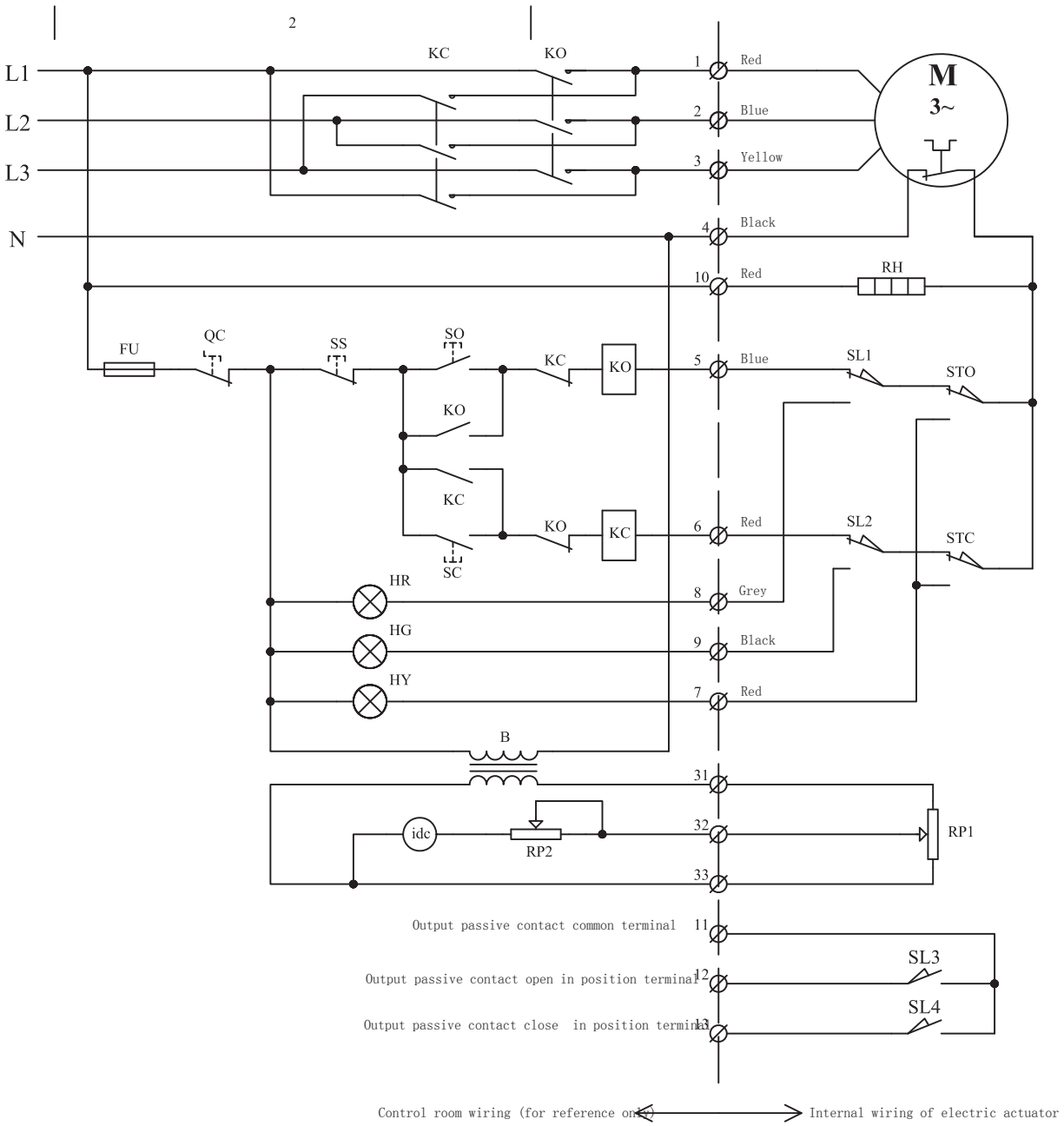
On-off electric actuator 220V wiring diagram

CLS:CLOSE LIMIT SWITCH (250VAC 6A)
OLS:OPEN LIMIT SWITCH (250 VAC 6A)
CTS:CLOSE TORQUE SWITCH(250VAC 6A)
OTS:OPEN TORQUE SWITCH:(250VAC 6A)
TP :THERMAL PROTECTOR (250VAC 15A)

CLS 1-2			
CLS 1-3			
OLS 1-2			
OLS 1-3			
CTS 1-3	x CLOSING TORQUE SWITCH INTERRUPTS CONTROL IF MECHANICAL OVERLOAD OCCURS DURING CLOSING CYCLE		
OTS 1-3	x OPENING TORQUE SWITCH INTERRUPTS CONTROL IF MECHANICAL OVERLOAD OCCURS DURING OPENING CYCLE		



On-off electric actuator 380V wiring diagram



ELECTRIC VALVE ACTUATOR QT SERIES ORDERING INFORMATION

Electric Actuator

Series	
XX	
QT	Eletric

Actuator size	
XX	
04	4
06	6
09	9
05	5
10	10
15	15
20	20
30	30
40	40
60	60
80	80
100	100
150	150
200	200
250	250

Power	
XX	
024	24
048	48
220	220
380	380
460	460

Voltage	
XX	
VAC	AC
VDC	DC

Phase	
X	
1	Single Phase
3	Three Phase

Name	
X	
EX	Exp. Proof
WT	IP67

Electric Actuator Ordering Examples
Example Part #: QT-04-220VAC (Standard)
Example Part #: QT-04-380VAC-EX (Explosion Proof)
Example Part #: QT-04-460VAC-3 (460 volt 3 phase unit)

Standard Product

Special Order Product

TIANJIN FREYA AUTOMATION TECHNOLOGY CO., LTD.

Tell: 022-27901003
Mail: tjfreya@tj-bnd.com
Web: www.tj-bnd.com
Add: Industrial Park, Zhongbei Town, Xiqing District, Tianjin