RQ/RQM RANGE

Intelligent electric actuator

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YANGZHOU LUOTUOKE INSTRUMENT CO.，LTD

Catalogue

I.General

RQ/RQM Range Intelligent electric actuator is a new generation of intelligent products. The advanced digital integrated chip at a massive scale, the professional digital torque sensor, digital displacement sensor, full Chinese menu operation and display, electro-mechanical structure design create its perfect functions, excellent performance, lightness, beauty, simple debugging and operation. This range fits many kinds of valves better to consist the execution units so that it can be widely used in the automation control system of the power plants, petroleum, ,steel, chemicals, oil pipelines , sewage treatment and other automatic control system. Meet frequently modulate the control, but also meet the requirements of intermittent control.

The standard number and name that this product performed: Q/ZTK01-2011< Intelligent electric actuator>、GB 3836.1-2010<Explosive Atmospheres Part I: Equipment General requirements>、<GB3836.2-2010 Explosive Atmospheres Part II: Equipment Protection by Explosion-proof Enclosures "d".

1.the main features of the remote intelligent electric devices

* The use of large-scale integrated chips, powerful, high level of accuracy.
* Mechatronics design, small size and light weight
* Use professional pressure sensor output shaft torque value, thus improving the accuracy of torque measurement, the error rate ≤5% and dynamic monitoring, showing over-torque, stall alarm can be
* Displacement sensor using a Hall sensor, and digital pulse signal quantization process, so the basic error of opening and closing parts of a positioning accuracy of precision
* Function electric devices, parameter setting, commissioning and on-site electrical operations are set via a handheld infrared remote control, without the need to open the lid
* Full Chinese and character display, menu-driven operation, intuitive, easy to learn, easy to understand, easy to operate.

2.Functions of the intelligent electric actuator

*travel limit protection

* torque limit protection

* the function of status indication contact

1) midway limit 2) electric devices are opening 3) electric devices are turned off 4) electric running

5) Local Stop 6) local control 7) remote control 8) Open interlock

9) closed interlock 10) hand-wheel operation 11) to open the valve torque trip 12) off valve torque trip

13) stroke torque trip

***Valve alarm function**

1) Over-torque alarm function a、shut torque b、open torque

2) The stall alarm function a、close direction stall b、opening direction stall

* Control the alarm function 1) Emergency (ESD) protection alarm 2) off the signal protection

***Electrical equipment alarm function**

1) The motor overheating protection
2) Control box overheating protection
3) Internal power failure protection
4) Lack of power, out of phase protection
5) Internal System Fault Protection
6) The current valve position signal of loss of protection
7) Local wiring fault alarm
* Instantaneous reverse protection
* Local control Jog / self-holding selection function
* Contact mode selection function
*External interlock protection conditions control and protection functions
* Two-wire control torque bypass protection
* ESD protection beyond the protection
* interrupt setting function
* The extra indication contact functions
* Remote control setting function
* Electric device display function
* Three-phase power phase sequence automatic identification function

II.Model Specification

Model Specification

a)、Multi-turn intelligent electric actuators

b)、Linear intelligent electric actuators

c)、Angular travel intelligent electric actuators

According to the working system、power sustained rate and power frequency per hour:

a)、Valve intelligent electric actuators (reversible、intermittent running, 25% of sustained rate, power frequency per hour less than 630 times)

b)、Modulating intelligent electric actuators(reversible、intermittent running, 25% of sustained rate, power frequency per hour more than 630 times but less than 1,200 times)

so the types of intelligent electric actuators can be divided into:

1)RQ range multi-turn intelligent electric actuators

2)RQM range multi-turn modulating intelligent electric actuators

3)RQML range linear modulating intelligent electric actuators

4)RQMOW range angular travel intelligent electric actuators

5)RQMOW range angular travel modulating intelligent electric actuators

Specifications of intelligent electric actuators can be found in form 1，2，3，4，5，6，7

III.the main technical parameters

***Input signal :**(I) analog signal a.4-20mA.DC input impedance250Ω b. 0-10mA.DC input impedance250Ω
(II)switching signal

***Output signal :** (I) valve feedback signal： 4-20mA.DC Load resistor750Ω or less

***the torque、speed、route、time are introduced in form 1,2,3,4,5,6,7**

***the power consumption of the intelligent electric actuators are introduce in form 1and 2**

***the basic error:**(I) IF、IFM multi-turn intelligent electric actuators ≤±1%
(II) Standard angular travel intelligent electric actuators and angular travel modulating intelligent electric actuators : ≤±1%
(III) IFML linear intelligent electric actuators ≥ 25mm ≤±1%

***dead zone:** 0.1% ~9.9% modulateable default settings: ≤±0.5%

***midway limit:** the setting range of open limit 40% ~ 100%
the setting range of close limit 0% ~60%

***clearance:**

(I) RQM multi-turn modulating intelligent electric actuators ≤ 1
(II) RQ multi-turn standard intelligent electric actuators ≤ 1°
(III) RQML linear intelligent electric actuators ≤1mm
(IV)Modulating angular intelligent electric actuators ≤ 1°
(V) Standard angular intelligent electric actuators≤ 1°

*** inhibit running time**： 0 ~99 seconds adjustable

***power supply:**

three-phase three-wire voltage: 220V, 380V, 415V, 440V, 460V
frequency voltage： 220V， 380V
frequency: 50/60Hz

***the protection level of the enclosure:** IP68

*** Explosion Level:**

(I) remote control with intrinsically safety: ib II BT4
(II) Explosion proof intelligent electric actuators： d II BT4, d II CT4

*** Touching capacity of output:** 220.AC,5A; 30V.DC,5A

***Using environment conditions**

(I) Environmental temperature: -25℃ ~ +70℃ （Explosion proof actuators -20℃ ~ +60℃
(II) Relative temperature 5% ~ 98%
(III) atmospheric pressure： 86 ~ 106kPa
(IV) air medium： non-corrosive gases in the atmosphere around

*anti-interference index:

a. external field ≤ 400A/m, 50 Hz
b. common mode disturbance 250V, 50Hz
c. chain mode interference AC signal with the effective value 1V
frequency:50Hz phase0 ~ 360°
d. static discharge: 4kV
e. Electrical transient burst: power supply 1000V, input terminal 500V
f. radio-frequency interference: frequency80 ~ 1000MHz
Test field 3V/m , distance: 1 m
g. Surge interference: 1kV

Specification of IF range multi-turn intelligent valve electric actuators Form 1

Model	Revolutions Per Minute of output	Nominal Torque(N.m)	Max Stem Diameter of Valve(mm)	Motor Power(kW)	Rated Current(A)	the type of the flange IS05210	Notes	Fuse A
RQ10	18 24 36 48	34 34 34 34	26(32)	0.13	0.65	F10		5
RQ12	18 24 36 48	81 81 81 68	26(32)	0.26	1.2	F10		10
RQ18	18 24	108 108	26(32)	0.26	1.2	F10		10
RQ20	18 24 36 48	203 203 203 203	38(51)	0.81	2.1	F14	side hand-wheel can be added (i=10:1)	20
RQ25	18 24 36 48	400 400 298 244	38(51)	1.3	3.3	F14	side hand-wheel can be added i=10:1)	30
RQ35	18 24 36 48	610 610 540 474	54(67)	2.06	5	F16	side hand-wheel can be added (i=15:1)	50
RQ40	18 24 36 48	1020 1020 845 680	64(76)	2.14	5.5	F25	side hand-wheel can be added (i=15:1)	60
RQ70	18 24	1490 1490	70(83)	2.91	8.0	F25	side hand-wheel can be added (i=15:1) (i=20:1)	80
	36 48	1290 1020		4.41	11.8			
RQ90	18 24 36 48	2030 2030 1700 1350	70(83)	4.46	12.0	F30	side hand-wheel can be added i=15:1) (i=20:1)	80
RQ91	144	1355	70(83)	13.98	35	F25	side hand-wheel can be added (i=15:1) (i=45:1)	120
RQ95	24	3000	70(83)	5.81	14	F30		80
RQ70/IS35	12	5000	155	5.59	12.5	F35	side hand-wheel can be added (i=15:1) (i=45:1)	80
RQ70/IS35	4.5	8000		4.41	11.8	F35		
RQ70/IS40.1	3	10000	175	4.41	11.8	F40		
RQ70/IS40.2	3.27	12000		4.41	11.8	F40		
RQ90/IS40.3	3.27	16000		4.46	12	F40		

We suggest that the speed shouldn't be too fast when being installed on the valve directly because of the wear from the drive bush.

Specification of IF range multi-turn intelligent electric actuators Form 2

Model	Revolutions Per Minute of output	Nominal Torque(N.m)	Max Valve (mm)	The Axial Load Rating(KN)	Motor Power(kW)	Rated Current(A)	the type of the flange IS05210	Notes	Fuse A
RQM10	18 24 36 48	17 17 15.6 13.6	32	44	0.13	0.65	F10		5
RQM12	18 24 36 48	34.0 34.0 30.0 37.0	32	44	0.26	1.2	F10		10
RQM20	18 24 36 48	81.0 81.0 68.0 54.0	51	100	0.81	2.1	F14	side hand-wheel can be added (i=10:1)	20
RQM25	18 24 36 48	152.0 152.0 129.0 102.0	51	100	0.96	3.3	F14	side hand-wheel can be added (i=10:1)	30
RQM35	18 24 36 48	271.0 271.0 253.0 203.0	54)	150	2.64	5.5	F16	side hand-wheel can be added (i=15:1)	50
RQM40	18 24 36 48	453 453 372 300	64(76)	220	2.14	5.5	F25	side hand-wheel can be added (i=15:1)	60
RQM70	18 24	596 596	70(83)	220	2.91	8.0	F25	side hand-wheel can be added (i=15:1) (i=20:1)	80
	36 48	516 408			4.41	11.8			
RQM90	18 24 36 48	810 810 680 540	70(83)	334	4.46	12.0	F25	side hand-wheel can be added (i=15:1) (i=20:1)	80
RQM95	24	1200	70(83)	445	5.81	14	F30	side hand-wheel can be added (i=15:1) (i=45:1)	80
RQM70/IS35	12	2000	155	700	5.59	12.5	F35		80
RQM70/IS35	4.5	3200			4.41	11.8			
RQM70/IS40.1	3	4000	175	1100	4.41	11.8	F40		
RQM70/IS40.2	3.27	4800			4.41	11.8			
RQM70/IS40.3	3.27	6400			4.46	12			

We suggest that the speed shouldn't be too fast when being installed on the valve directly because of the wear from the drive bush.

RQ/MOW range angular travel intelligent valve electric actuators Form3

No	Types of Electric Actuators	Output Shaft Torque	Stroke Time	No	Types of Electric Actuators	Output Shaft Torque	Stroke Time
1	RQ10/MOW3-40	540 5400 500 430	33 25 17 13	13	IF20/MOW6R-140	6180 6180 5150 4120	116 88 58 44
2	RQ10/MOW3-70	710 710 650 570	58 44 29 22	14	IF25/MOW7-60	7012 7012 5920 4670	50 38 25 19
3	RQ12/MOW4-40	1080 1080 970 860	33 25 17 13	15	IF35/MOW7-60	---- 14000 9350 9350	---- 38 19 13
4	RQ12/MOW4-70	1420 1420 1280 1130	58 44 29 22	16	IF20/MOW7R-180	10730 10730 8940 7154	150 113 75 56
5	RQ18/MOW4-40	1730	25	17	IF40/MOW8-60	21420 21420 17745 14280 14280	50 38 25 19 13
6	RQ12/MOW5R-80	1960 1960 1770 1570	66 50 34 25	18	IF25/MOW8R-180	20120 20120 16990 13410	150 113 75 56
7	RQ18/MOW5-70	--- 2270	--- 44	19	IF70/MOW9-60	31290 31290 27090 21420 21420	50 38 25 19 13
8	RQ20/MOW5-40	2600 2600 2170 1730	33 25 17 13	20	IF35/MOW9R-180	38480 38480 36080 28860	150 113 75 56
9	RQ12/MOW5R-120	2910 2910 2620 2330	100 75 50 38	21	IF90/MOW9-60	42630 42630 35700 28455 28455	50 38 25 19 13
10	RQ20/MOW5-70	4000 4000 4000 4000	58 44 29 22	22	IF40/ MOW10R-180	48100 48100 38480	56 36 28
				23	IF95/MOW10-60	65000	38
11	RQ20/MOW6-70	3410 3410 2840 2270	58 44 29 22	24	IF95/MOW12-80	80000	50
				25	IF90/MOW12R-120	100000	75
				26	IF95/MOW12R-120	120000	75
12	RQ18/MOW6R-140	4120	88	27	IF95/MOW12R-160	130000	100
				28	IF95/MOW12R-180	155000	112.5

RQ/MOW range angular travel intelligent valve electric actuators Form4

No	Types of Electric Actuators	Output Shaft Torque	Stroke Time	No	Types of Electric Actuators	Output Shaft Torque	Stroke Time
1	RQM10/MOW3-40	225 225 210 180	33 25 17 13	12	IFM/MOW6R-140	---- 1730	---- 88
2	RQM10/MOW3-70	300 300 270 240	58 44 29 22	13	IFM20/MOW6R-140	2600 2600 2200 1750	116 88 58 44
3	RQM12/MOW4-40	450 450 400 360	33 25 17 13	14	IFM25/MOW7-60	3000 3000 2500 2000	50 38 25 19
4	RQM12/MOW4-70	600 600 550 475	58 44 29 22	15	IFM35/MOW7-60	5800 3950 3950	38 19 13
5	RQM18/MOW4-40	---- 725	---- 25	16	IFM20/MOW7R-180	4500 4500 3800	150 113 75
				17	IFM40/MOW8-60	3000 8400	56 38
6	RQM12/MOW5R-80	825 825 740 660	66 50 34 25	18	IFM25/MOW8R-180	8450 8450 7150 5650	150 113 75 56
				19	IFM70/MOW9-60	12500	38
7	RQM18/MOW5-70	----- 950	---- 44	20	IFM35/MOW9R-180	16200 16200 15200 12200	150 123 75 56
				21	IFM90/MOW9-60	16000	38
				22	IFM90/MOW10-60	18000	38
8	RQM20/MOW5-40	1100 1100 910 725	33 25 17 13	23	IFM40/MOW10R-180	---- 18250 18250 15400	--- 56 36 28
9	RQM12/MOW5R-120	1200 1200 1100 980	100 75 50 38	24	IFM95/MOW10-60	26000	38
				25	IFM95/MOW12-80	32000	50
				26	IFM90/MOW12R-120	40000	75
10	RQM20/MOW5-70	1400	44	27	IFM95/MOW12R-120	48000	75
11	RQM20/MOW6-70	1440 1440 1200 960	58 44 29 22	28	IFM95/MOW12R-160	52000	100
				29	IFM95/MOW12R-180	62000	112.5

RQ/ML range Linear valve intelligent electric actuators Form 5

Model of electric actuator	RQML 10				RQML 12			
Model of the flange IS05210	F10				F10			
the screw diameter/lead(mm)	26/5				26/5			
the max stroke(mm)	115				115			
the output speed(mm/s)	1.5	2	3	4	1.5	2	3	4
the output thrust(kN)	7.94	7.94	7.3	6.35	15.9	15.9	14.3	12.7

Model of electric actuator	RQML 20					RQML 20				
Model of the flange IS05210	F14					F14				
the screw diameter/lead(mm)	36/6					38/15				
the max stroke(mm)	115					115				
the output speed(mm/s)	1.8	2.4	3.6	4.8	7.2	4.5	6.0	9.0	12	18
the output thrust(kN)	24.26	24.26	20.22	16.17	14.15	16.7	16.7	13.9	11.1	8.9

Model of electric actuator	RQML 25					RQML 25				
Model of the flange IS05210	F14					F14				
the screw diameter/lead(mm)	36/6					38/15				
the max stroke(mm)	115					115				
the output speed(mm/s)	1.8	2.4	3.6	4.8	7.2	4.5	6.0	9.0	12	18
the output thrust(kN)	45.49	45.49	38.41	30.33	30.33	31.3	31.3	26.4	20.85	20.85

Model	Power W	Output 18 rpm	Output 24 rpm	Output 36 rpm	Output 48 rpm
RQ10	100	20	20	17	15
RQ12	120	27	24	20	17
RQ18	180	32	28	22	
RQ20	370	81	81	81	63
RQ25	500	142	142	127	108
RQ35	1300	252	232	184	147

220VAC/50Hz The form of the linear electric actuators output shaft thrust Form 7 kN

Model	Power W	Output 18 rpm	Output 24 rpm	Output 36 rpm	Output 48 rpm
RQM10	100	8.3	8.3	7.0	6.25
RQM12	120	11.2	11.2	8.3	7.0
RQM18	180	13.3	11.6	9.1	
RQM20	370	33.7	33.7	33.7	26.3
RQM25	500	59.1	59.1	53	45
RQM35	1300	105	97	76.6	61

IV.Working Principle

RQ/RQM range intelligent electric actuators are driven by three phase servo motors to turn the output shaft through the turbine worm reducer. There is a “Hand/Auto” switching mechanism in the reduction gearbox. When the hand is in the “Hand” position, operating handwheel can turn the output shaft by the clutch. “Hand/Auto” switching mechanism will return, then the clutch and the worm gear will mesh when the actuator is operated electrically so that the output shaft will be driven by the three-phase servo motor. At the same time a torque transducer is installed on the drive worm shaft of the actuator. The stroke will be transferred to the position sensor on the output shaft by meshing the bevel gear.

The intelligent remote control of the multi-turn intelligent actuator can receive standard analog current control signals and switch control signals. Meanwhile compared with the position signals on the valve sensor, it can complete the position control through positioning the output of the electrical actuator to the input signals. It can also position to the a previously programmed position through interlock control, 2-wire control or even signals.

The intelligent remote control of the multi-turn intelligent actuator can completely satisfy the requirements of the control system, give right orders, trigger the 3-phase relays to make the electromotor connected to the 3-phase power and keep the actuator running normally unless the torque value of the output is more than rated torque value or preset torque value during intermediate running.

Multi-turn intelligent actuator is based on the non-intrusive design. Use the hand-held remote control to modify and configure settings of the parameter, functions of the electrical actuators.

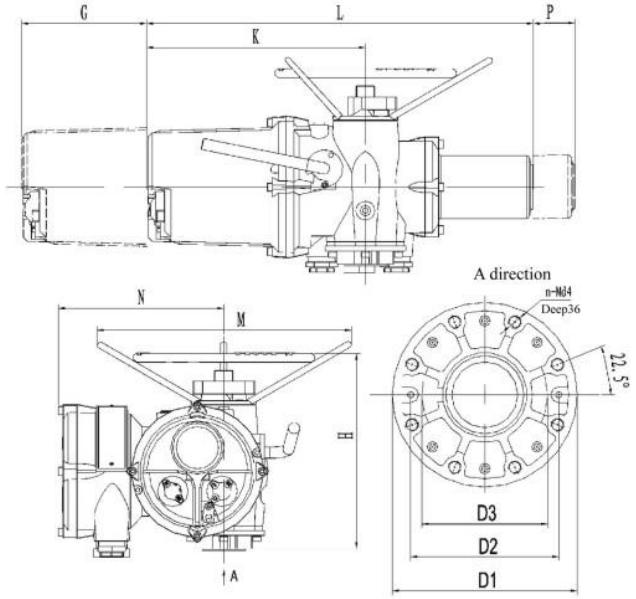
RQML intelligent electric actuator is based on IFM multi-turn intelligent electric actuator, additional trapezoidal lead screw nut, flange bracket ad adjust travel agencies combination. Converting multi-turn torque and speed into linear of the stroke and the axial stroke.

Intelligent Angular electric actuator which based on Multi-turn intelligent actuator matches with the two-stage worm reduction gearbox.

V.Shape and Installation dimensions of the intelligent electric actuator

(I)Shape and Installation dimensions of IF/IFM range multi-turn intelligent electric actuator

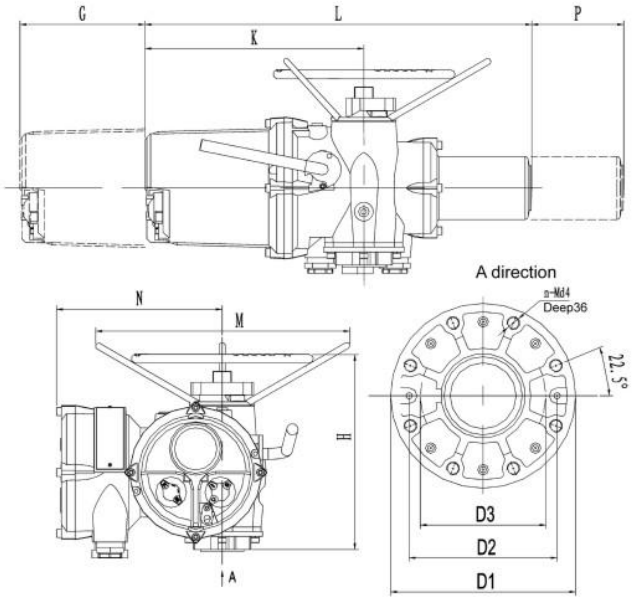
1.Shape and Installation dimensions of IF/IFM 10/12/18/20/25/35 multi-turn intelligent electric actuator



(mm)

Model of the electric actuator	G	H	K	L	M	N	P	D1	D2	D3	n-Md4
RQ/RQM10/12/18	180	320	320	560	Φ300	265	180	Φ125	Φ102	Φ70	4-M10
RQ/RQM20	180	380	340	678	Φ508	280	220	Φ176	Φ140	Φ100	4-M16
RQ/RQM25	180	380	340	678	Φ508	280	220	Φ176	Φ140	Φ100	4-M16
RQ/RQM35	180	420	365	715	Φ762	302	226	Φ215	Φ165	Φ130	4-M20

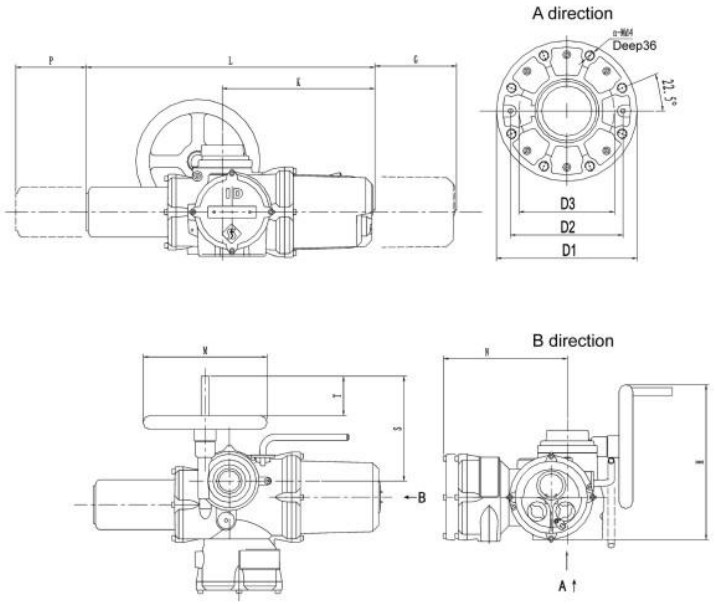
2.Shape and Installation dimensions of RQ40 multi-turn



(mm)

Model of the electric actuator	G	H	K	L	M	N	P	D1	D2	D3	n-Md4
RQ40	180	460	450	900	**Φ830**	358	282	**Φ300**	**Φ254**	**Φ200**	8-M16

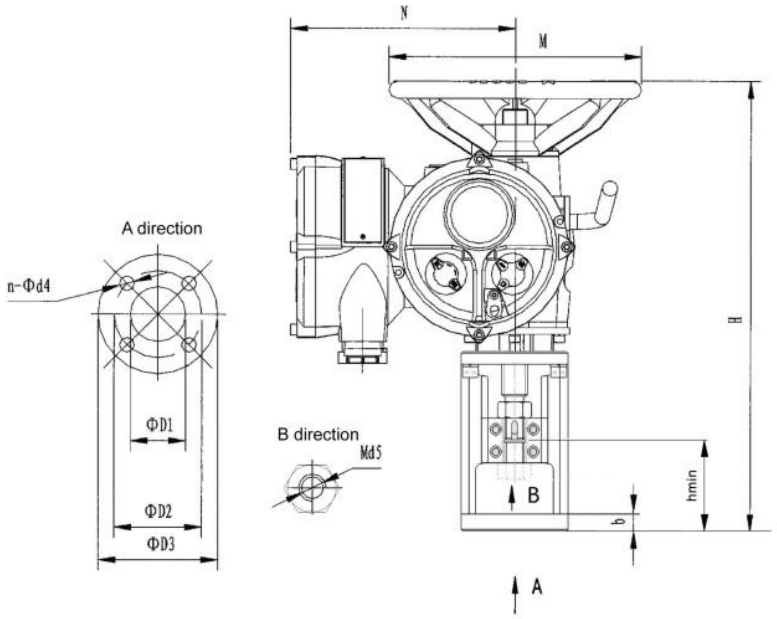
3.Shape and Installation dimensions of RQ 70/90/91/95 multi-turn



(mm)

Model of the electric actuator	G	H	K	L	M	N	P	S	T	D1	D2	D3	n-Md4
RQ70	230	557	503	1024	Φ432	358	335	438	116	Φ300	Φ254	Φ200	8-M16
RQ91	230	577	503	1048	Φ432	358	480	438	116	Φ300	Φ254	Φ200	8-M16
RQ90/95	230	577	503	1024	Φ432	358	335	438	116	Φ350	Φ298	Φ230	8-M20

(II)Shape and Installation dimensions of RQML linear intelligent actuator



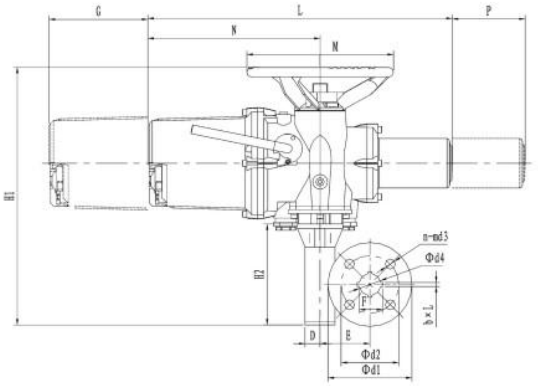
(mm)

Model of the electric actuator	N	M	H	b	ΦD1	ΦD2	ΦD3	N-Φd4	Md5	Route	hmin
RQML10	265	300	660	22	60	80	140	2-Φ10	M8	10	86
										16	79
										25	74
RQML12	265	300	660	22	80	105	140	4-Φ12	M12×1.25	40	105
								4-Φ14	M16×1.5	60	114
RQML20	280	508	720	30	95	118	200	4-Φ12	M12×1.25	40	105
								4-Φ14	M16×1.5	60	114
								4-Φ18	M20×1.5	100	95
RQML25	280	508	720	30	100	130	200	4-Φ14	M16×1.5	60	114
								4-Φ18	M20×1.5	100	95

(III)Shape and Installation dimensions of Angular Intelligent electric actuator

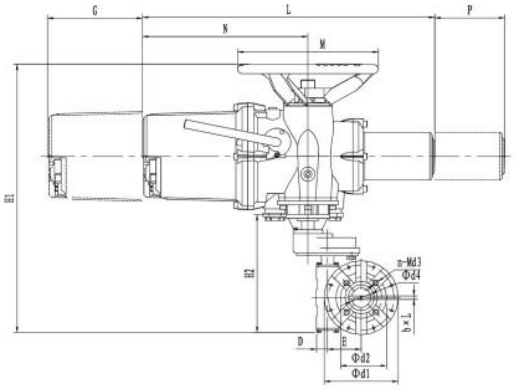
1.Direct installation form

A.First level deceleration



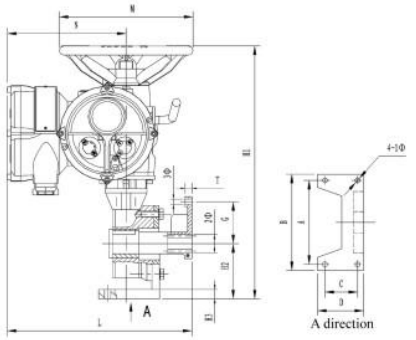
Model of the electric actuator	D	E	H_1	H_2	G	L	M	N	P	b×L	Φd_1	Φd_2	N−md_3	max diameter can be allowed	second-level decelerator	
															input flange	output flange
RQ10/MOW3−40 RQM10/MOW3−40 RQ10/MOW3−70 RQM10/MOW3−70	35	76	524	204	180	560	Φ300	320	180	14×80	170	102	4−M10 deep 22 45° uniform distribution	45	F10	F14
RQ12/MOW4−40 RQM12/MOW4−40 RQ12/MOW4−70 RQM12/MOW4−70 RQM18MOW4−40	39	102	570	250	180	560	Φ300	320	180	18×90	230	140	4−M16 deep 22 45° uniform distribution	60	F10	F14
RQ18/MOW5−70	50	136	640	320	180	560	Φ300	320	180	22×105	285	165	4−M20 deep 16 45° uniform distribution	76	F14	F16
RQ20/MOW5−40 RQM20/MOW5−40	50	136	700	320	180	678	Φ508	340	220	22×105	285	165		76	F14	F16
RQ20/MOW6−70 RQM20/MOW6−70	50	178	710	330	180	678	Φ508	340	220	28×143	375	254	8−M16 deep 16 22.5° uniform distribution	102	F14	F25
RQ25/MOW7−60 RQM25/MOW7−60	70	210	845	465	180	678	Φ508	340	220	28×143	450	254	8−M16 deep 24 22.5° uniform distribution	127	F14	F25
RQ35/MOW7−60 RQM35/MOW7−60	70	210	885	465	180	715	Φ762	365	260	28×143	450	254		127	F16	F25

B.Second level deceleration



Model of the electric actuator	D	E	H_1	H_2	G	L	M	N	P	b×L	Φd_1	Φd_2	N−md_3	max diameter can be allowed	second-level decelerator	
															input flange	output flange
RQ12/MOW5R−80 RQM12/MOW5R−80 RQ12/MOW5R−120 RQM12/MOW5R−120	50	150	767	447	180	560	Φ300	320	180	22×105	285	165	4−M20 deep 20 45°uniform distribution	76	F10	F16
RQ18/MOW6R−140	50	192	777	457	180	560	Φ300	320	180	28×143	375	254		102	F10	F25
RQ20/MOW6R−140 RQM20/MOW6R−140	50	192	837	457	180	678	Φ508	320	220	28×143	375	254	4−M20 deep 20 45°uniform distribution	102	F14	F25
RQ20/MOW7R−180 RQM20/MOW7R−180	70	210	1035	655	180	678	Φ508	340	220	28×143	450	254	4−M20 deep 20 45°uniform distribution	127	F14	F25
RQ25/MOW8R−180 RQM25/MOW8R−180	87.5	245	1105	725	180	678	Φ508	340	220	40×120	520	254	8−M16 deep 24 225°uniform distribution	153	F14	F25
RQ35/MOW9R−180 RQM35/MOW9R−180	85	280	1320	900	180	715	Φ762	365	260	40×120	590	298	8−M20 deep 30 225°uniform distribution	178	F16	F30
RQ40/MOW10R−180	100	343	1412	952	180	900	Φ830	450	320	40×120	725	356	8−M30 deep 36 225°uniform distribution	203	F25	F35
RQ35/MOW11R−360 RQM35/MOW11R−360	125	450	1406	986	180	715	Φ762	365	260	52 x 230	972	406	8−M30 deep 36 225°uniform distribution	250	F16	F40

2.Local installation form



Model of the electric actuator	A	B	C	D	G	H1	H2	H3	L	M	N	1Φ	Max diameter can be allowed2Φ	3Φ	T
RQ10/MOW3-40 RQM10M/MOW3-40 RQ10/MOW3-70 RQM10-MOW3-70	220	245	130	160	100	618	128	20	380	Φ300	Φ260	Φ12	Φ36	Φ14	14
RQ12/MOW4-40 RQM12/MOW4-40 RQ12/MOW4-70 RQM12-MOW4-70 RQM18/MOW4-70	320	360	130	160	120	645	170	20	435	Φ300	Φ260	Φ14	Φ37	Φ16	23
RQ18/MOW5-70	390	420	180	210	165	725	215	20	450	Φ300	Φ260	Φ14	Φ61	Φ20	23
RQ20/MOW5-40 RQM20/MOW5-40	390	430	180	210	165	785	215	20	465	Φ508	Φ260	Φ14	Φ61	Φ20	25
RQ12/MOW5R-80 RQM12/MOW5R-80 RQ12/MOW5R-120 RQM12-MOW5R-120	390	430	180	210	165	790	215	20	465	Φ300	Φ286	Φ14	Φ61	Φ20	25
RQ20/MOW6-70 RQM20/MOW6-70	430	480	200	250	170	875	280	25	470	Φ508	Φ260	Φ14	Φ61	Φ30	25
RQ18/MOW6R-140	430	480	200	250	170	830	250	25	470	Φ300	Φ260	Φ14	Φ61	Φ30	25
RQ20/MOW6R-140 RQM20/MOW6R-140	430	480	200	250	170	890	250	25	534	Φ300	Φ286	Φ14	Φ61	Φ30	25
RQ25/MOW7-60 RQM25/MOW7-60	510	560	270	315	170	1005	295	30	488	Φ508	Φ286	Φ22	Φ61	Φ30	25
RQ35/MOW7-60 RQM35/MOW7-60	510	560	270	305	170	1050	300	30	510	Φ762	Φ305	Φ22	Φ80	Φ30	25
RQ20/MOW7R-180 RQM20/MOW7R-180	510	560	270	315	170	1010	300	30	510	Φ762	Φ305	Φ22	Φ80	Φ30	25
RQ25/MOW8R-180 RQM25/MOW8R-180	590	640	320	370	250	1105	340	35	525	Φ762	Φ305	Φ22	Φ80	Φ30	35
RQ35/MOW9R-180 RQM35/MOW9R-180	700	785	340	395	290	1295	395	35	552	Φ762	Φ365	Φ30	Φ125	Φ33	36
RQ40/MOW10R-180	816	896	385	450	320	1412	460	55	618	Φ830	Φ450	Φ33	Φ130	Φ40	40
RQ35/MOW11R-180 RQM35/MOW11R-180	860	940	440	520	320	1406	480	40	572	Φ762	Φ365	Φ40	Φ160	Φ50	35

VI.Installation requirements and connection ways of the intelligent electric actuator

Before installing the electric actuator, you had better choose suitable space according to the outline dimension of the actuator so that the electric actuator should be installed so that should be installed in an accessible position and location for easy servicing and maintenance. Meanwhile, there should be enough space for movements of the detachable components when being adjusted, repaired and maintained.

Check the installation size of the flange and ensure the drive bush is fitted down to the valve. Or you can remove the drive bush on the base of the actuator and process it into the shape which can fit the valve, then refit it.

The end face size of the flange connected to the Linear and angular travel intelligent electric actuator is to ISO5210 standard. If clients have any special demands, please note clearly in the contract or contact technicians in our company.

Although the output end face size of the flange connected to multi-turn intelligent electric actuator is to ISO5210 standard, considering the output shaft force, drive connected parts are thrust model and non-thrust model.

There are two bases: the base for IF/IFM10, 12, 18, 20, 25 and 35 is removable; the base for IF 40, 70, 90, 91 is integral.

These two bases have the flange and drive bush to ISO5210 standard.

Electric actuator of IF/IFM10, 12, 18, 20, 25 and 35 model

Thrust model

A type
used for RQ/RQM 10—35 models

Z type
used for RQ/RQM 20—35 models
fit for larger diameter valve shaft

Z3 type
used for RQ/RQM 20—35 models
fir for larger diameter and longer valve shaft

Non-thrust model

B1 type

B3 type

B4 type

In the removable thrust base, thrust bearing is designed to be fully enclosed and permanently lubricated.

In the integral thrust base, thrust bearing is designed to be lubricated by the lubricants from the gearbox in the intelligent electric actuator. No matter the removable or integral thrust base, there is appropriate thrust force to prevent any load applying on the gear of the electric actuator.

Electric actuator of RQ40, 70, 90, 91 and 95 model

Thrust model

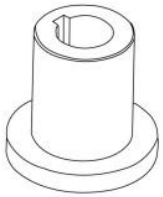
A type position1
used for RQ40, 70 and 90 models

A type position 2
used for RQ40, 70 and 90 models

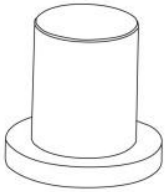
Z3 type
fit for larger diameter
and longer valve shaft

Non-thrust model

B1 type
used for RQ40, 70 and 90 models
with bigger fixing holes
holes and keyway are to ISO standard



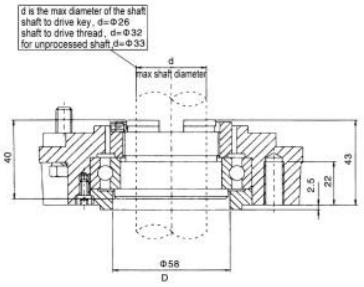
B3 type
used for RQ40, 70 90 and 91 models
with bigger fixing holes
holes and keyway are to ISO standard



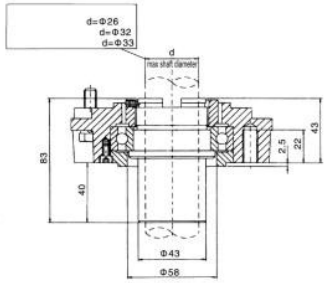
B4 type
used for RQ40, 70 90 and 91 models
solid drive bush must
be machined by clients.

RQ/RQM10/12/18 output shaft connection mode

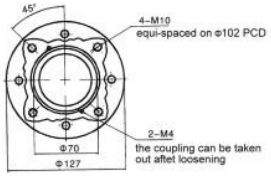
A type



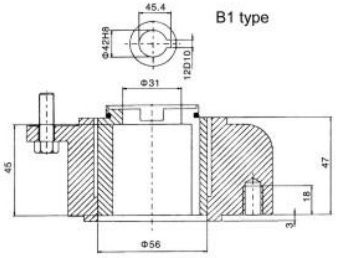
Z3 type



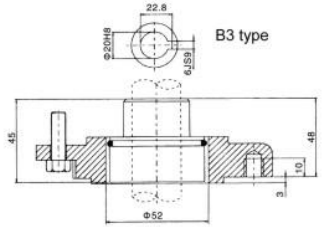
F10 base for A1/Z3 type



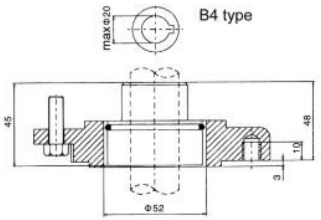
B1 type



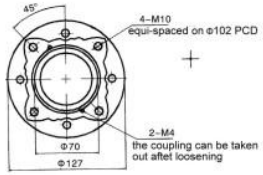
B3 type



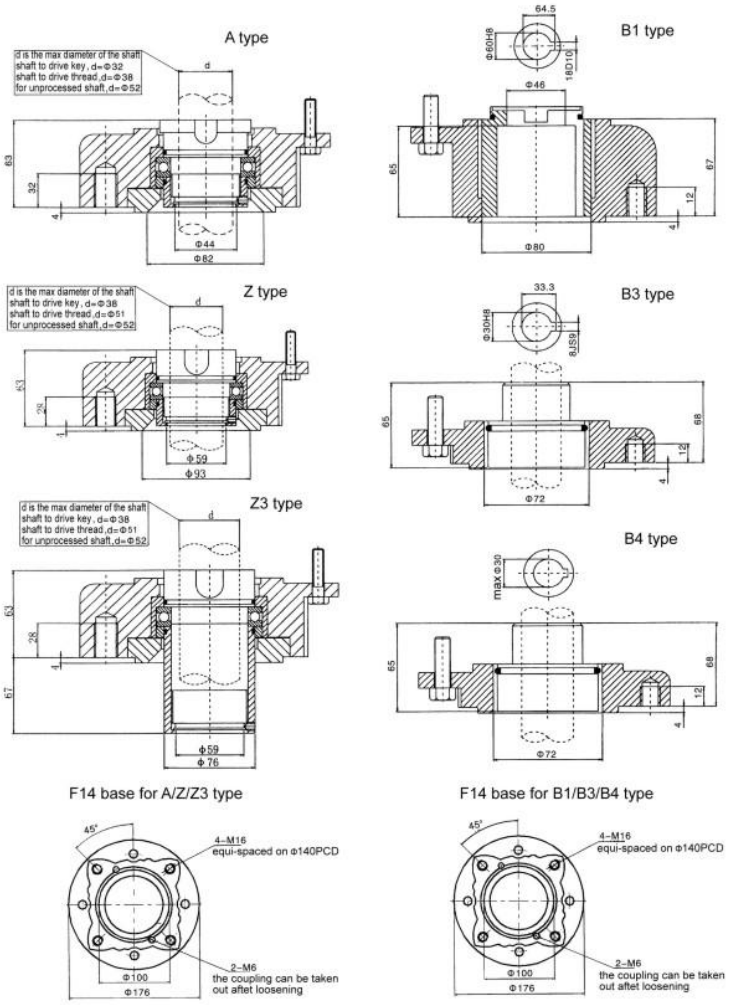
B4 type



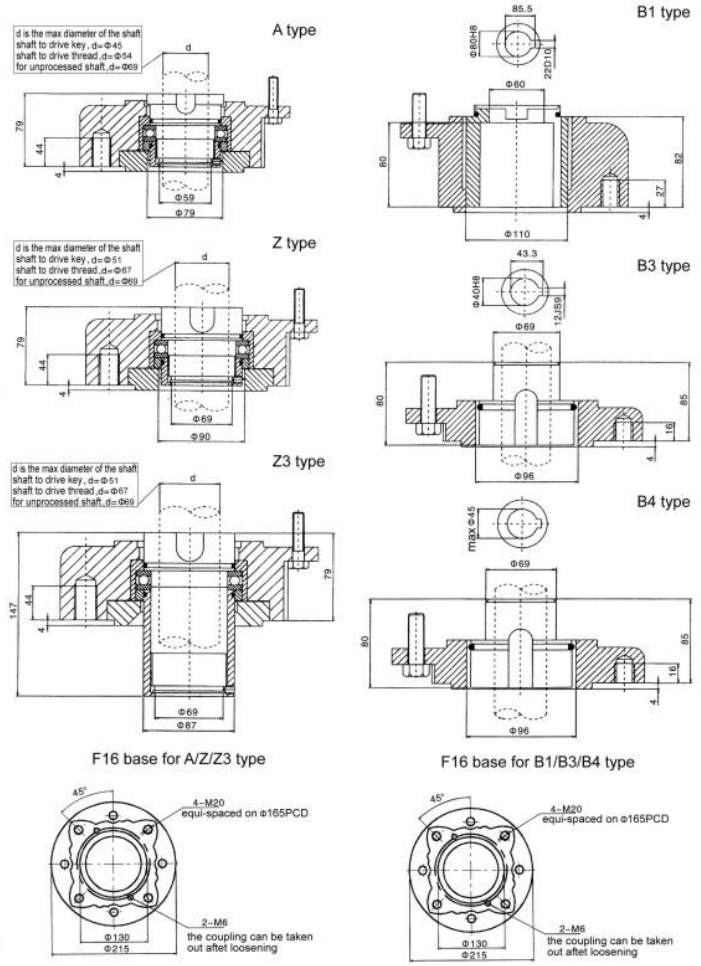
F10 base for B1/B3/B4 type



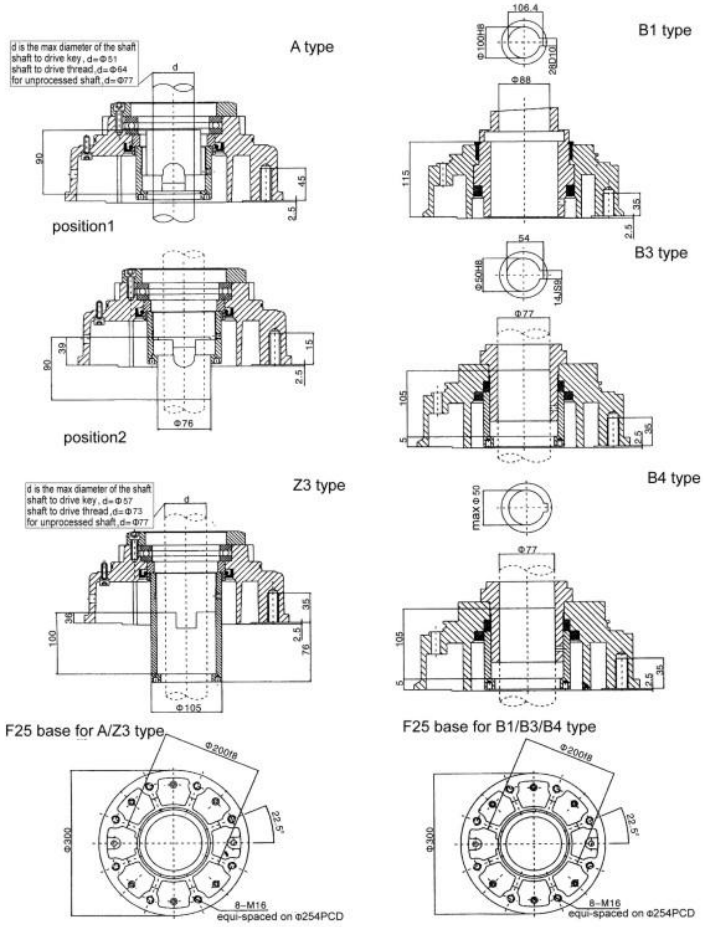
RQ/RQM 20/25 output shaft connection mode



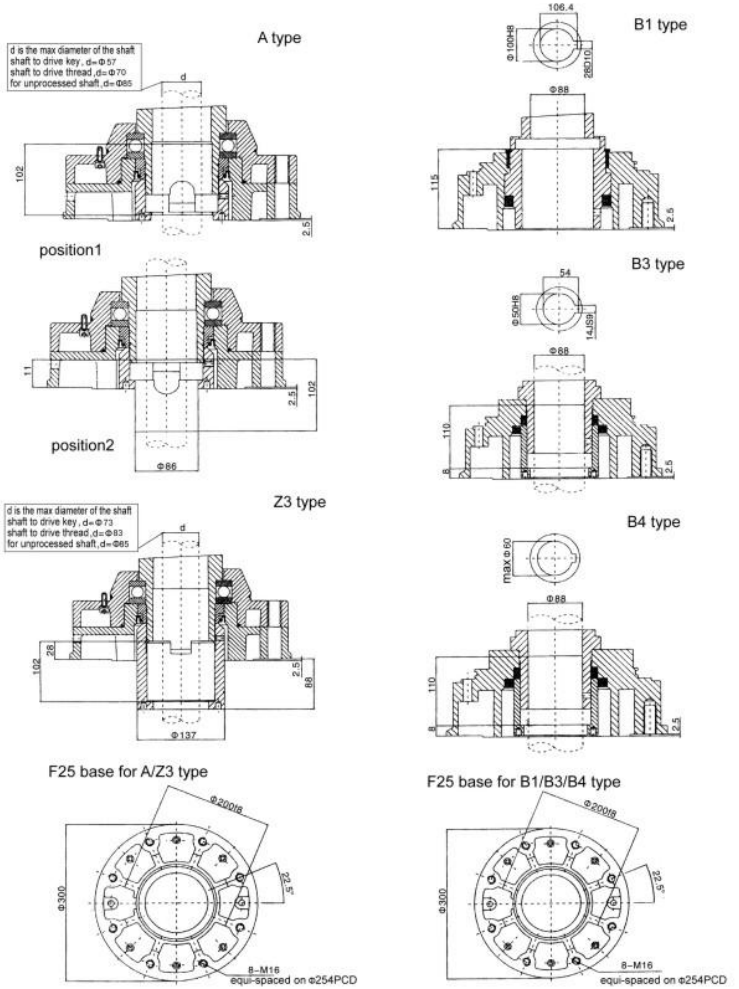
RQ/RQM 35 output shaft connection mode



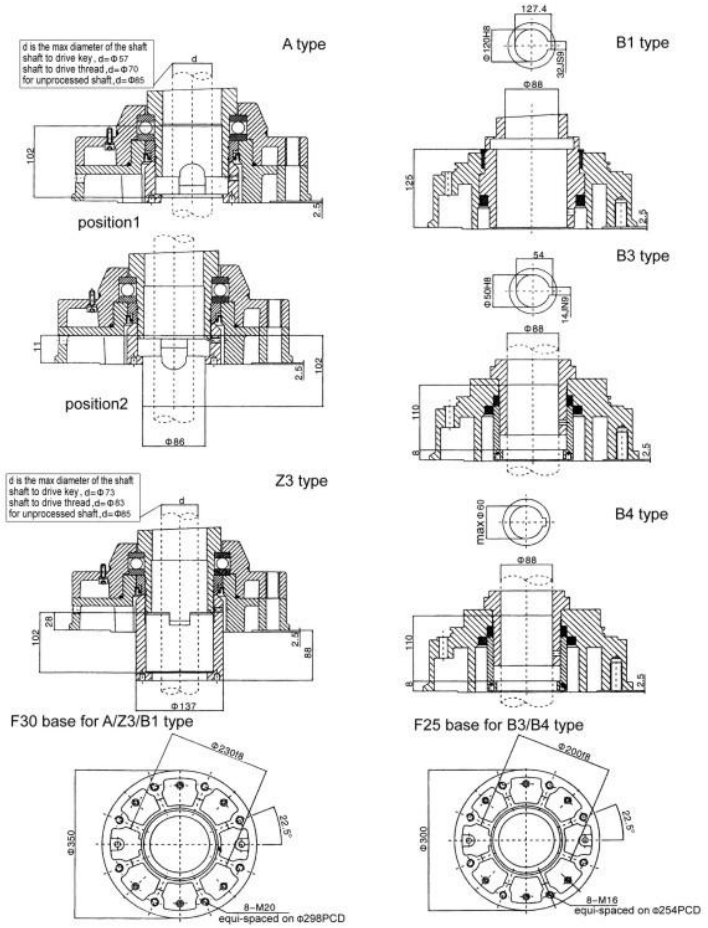
RQ40 output shaft connection mode



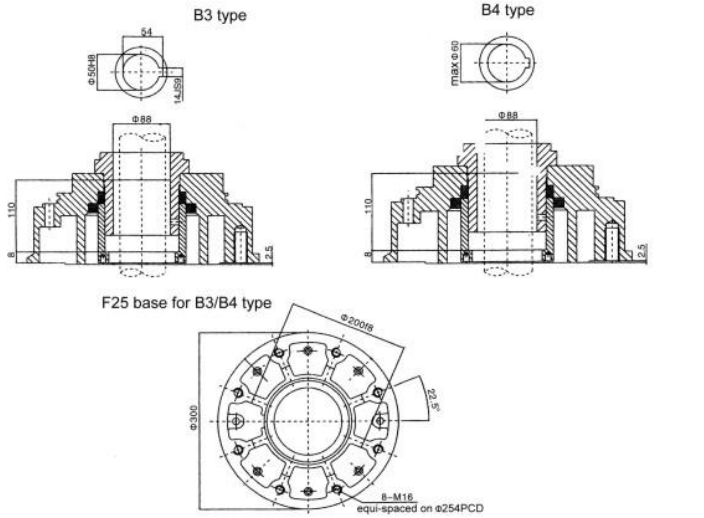
RQ70 output shaft connection mode



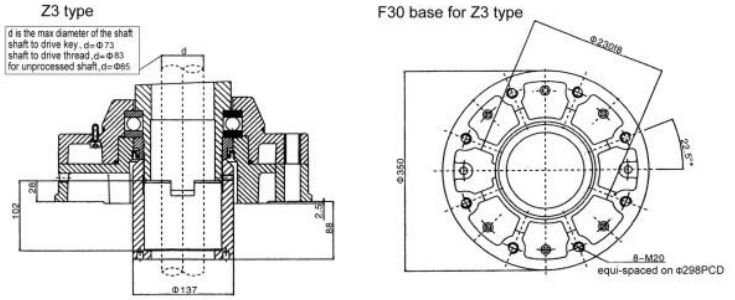
RQ90 output shaft connection mode



RQ91 output shaft connection mode



RQ95 output shaft connection mode



VII.Adjusting of the intelligent electric actuator

1.The main features of the remote intelligent electric devices

1.1 Site operation

there are two knobs on the actuator cover. One is for mode options (red knob) and the other is for operations (black knob). “red knob” should be positioned in “Site” when site electric operations are enabled, then use “black knob” to control the actuator.

1.1.1 Inching Operation

Turn “black knob” to “Close” and hold, the actuator will move to the closing direction. Once the knob is loosened, the knob will go back to the original location, the movement to the closing direction will stop immediately; turn “black knob” to “Open” and hold, the actuator will move to the opening direction. Once the knob is loosened, will be similar to the movement to the closing direction, the action of actuator will stop immediately.

1.1.2 Holding Operation

Turn “black knob” to “Close”, the actuator will move to the closing direction. Once the knob is loosened, the knob will go back to the original location, but the movement to the closing direction will continue until stopping condition is met. (such as over torque, to the close limit and so on); the operation when turning “black knob” to “Open” is similar to the movement to the closing direction.

1.2 Site Operation

When the Mode Option Knob (red knob) is positioned in “Stop”, all electric operations of the actuator will be inhibited.

1.3 Remote Operation

1.3.1 Remote Switching Control

Conditions of entering remote switching control mode: 1. the Mode Option Knob is positioned “Remote”; 2. No voltage supply on Terminal 25 in the junction box of the actuator.

1.3.2 Remote Analogue Control

Conditions of entering remote analogue control mode: 1. the Mode Option Knob is positioned “Remote”; 2. voltage supply on Terminal 25 in the junction box of the actuator; 3. According to the “working parameter settings” in Section 2.4.4.3, re-mark the control proportional control current which is given by users.

2. Working Parameter Settings of the actuator

2.1 Keys that Mode buttons stand for:

Enter key: mode button from “Stop” to “Local”, to hereafter refer to as press enter key

Back key: mode button from “Stop” position to “Remote” position , to hereafter refer to as press Back key

2.1.1 Keys that Operation buttons stand for:

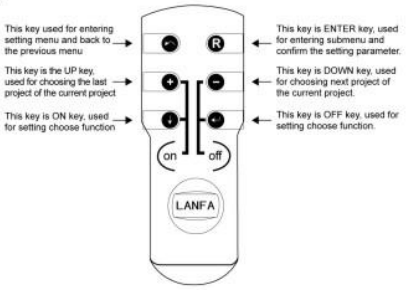
down key: operation button “Close” position, to hereafter refer to as press down key

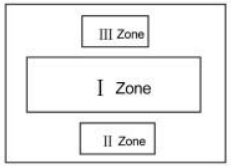
+ key: operation button “Open” position, to hereafter refer to as press + key

2.2 LCD

The layout of this actuator with a lattice graphics LCD is I Zone. II Zone and III Zone.

I Zone is valve display area to show current valve value in the form of valve stroke percentage in a real time; II zone is control mode display; III zone is motion and alarm information display (refer to “ Alarm Information followed) When entering the menu of working parameter settings, LCD will use unified I Zone, II Zone and III Zone.

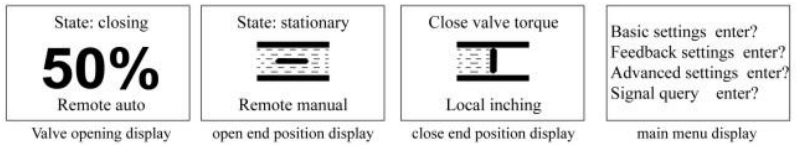




2.3 Power On Self Test of system

After power on, the control system of the actuator self-check instruction, code area, data area and A/D transformation function in turn. If everything is OK through the self-check, valve display area of LCD will show current valve stroke percentage, all contents in alarm area will be erased. If one option is non-normal, the mode of this non-normal option will be shown on the alarm area all the time, and control system will never accept and operation, wait to be dealt with.

The actuator is power on, after the initialization, the whole LCD will show the valve stroke percentage in large font. In valve limit positions, the display of the valve opening will shown by simulating butterfly valve graphical modes.



Valve opening display | open end position display | close end position display | main menu display

2.4 Working Parameter Settings

NOTE 1: For the menu operation, the display will automatically return to the non-setting view without key operation in 1 minute. Moreover, after each menu operation, the operator had better use “Back” until exit the setting view, return to working status view, then the valve stroke percentage in non-setting view can be seen when the motor is running.

NOTE 2: after entering the menu operation, the final setting item or the final setting value which is displayed for the first time is the last store values. Users can check the previous values according to this feature.

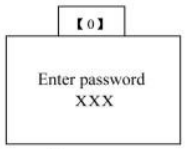
2.4.1 Entering the menu

Hold the mode button on “Local” position, use any key of “UP, DOWN, BACK/RETURN or ENTER” on the handheld setting controller. Or hold the mode button on “Stop” position, and hold the operation button on “Open” position for 3 seconds, control system will enter the working setting menu view.

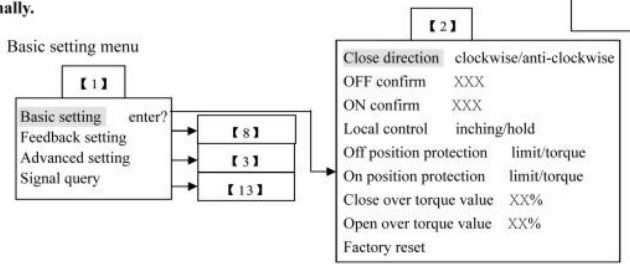
If the user has set the password, the screen first displays the password view to require the user to input the password, in order to prevent unauthorized personnel from changing the parameter which has been set. If the password is set as 0, the password view will be skipped and to the working setting menu directly.

If the password is wrong, the screen will display “PASSWORD INCORRECT ” after pressing “ENTER”. It will disappear after 2 seconds, the user can re-enter the password.

NOTICE: in order to have convenient following description and display, we use “【】” to mean selected menu. In the menu view of in the LCD, the selected item will highlighted, the non-selected item will be shown normally.



2.4.2 Basic setting menu



In menu【1】,use keys “UP” and “DOWN” to choose necessary item, then press the key “ENTER”, the appropriate submenu as shown above will be displayed. There are 9 setting options in the basic setting menu 【2】, such as “Close direction”, “OFF confirm”, “ON confirm”, “Local control”, “Off position protection”, “On position protection”, “Close over torque value”, “Open over torque value”, “Factory reset”.

2.4.2.1 Close direction

In menu 【2】, the previous setting value(clockwise or anti-clockwise) will be displayed on the right of the line after selecting “ Close direction”. Pressing the key “Back” will return to the previous menu, and the previous values won’t be changed. Users can check the previous values according to this feature. (The following is similar, not be repeated). Switch setting values between “clockwise” and “anti-clockwise” by using the key “+” and “-”. Use “ENTER” to save the selected setting value.

2.4.2.2 OFF Confirm

The order of the limit setting is unlimited; users can set OFF first then ON, also can set ON first then OFF.

In menu【2】, after selecting “OFF Confirm”, the per then thousand value(0~10000) which is output from absolute encoder but represents the current location coding will be displayed on the right of the line. Turn the valve to the Close limit by hand; or place the mode button at the “Local” position, press the key “Open” or “CLOSE” on the handheld setting controller also turn the valve to Close limit electrically by the Operate button. Then press the key “ENTER”, the red light on the LCD flashes twice then be on, it means the actuator has labeled this position as the Close limit. If the users press the key “BACK” before pressing the key “ENTER”, then the Close limit will not be set and return to the previous menu.

2.4.2.3 ON Confirm

In menu【2】, after selecting “ON Confirm”, the per then thousand value(0~10000) which is output from absolute encoder but represents the current location coding will be displayed on the right of the line. Turn the valve to the Open limit by hand; or place the mode button at the “Local” position, press the key “Open” or “CLOSE” on the handheld setting controller also turn the valve to Open limit electrically by the Operate button. Then press the key “ENTER”, the green light on the LCD flashes twice then be on, it means the actuator has labeled this position as the Open limit. If the users press the key “BACK” before pressing the key “ENTER”, then the Open limit will not be set and return to the previous menu.

Notice 1: per ten thousand value 0 and 10000 are respectively the maximum value and the minimum value of the absolute encoder, they are overlapping. During the process of setting Open, Close position, the whole route can go past this coincidence point, but it should be ensured that the whole route won’t go beyond the range which the absolute encoder represents.

Notice 2: if it is necessary to set the other side limit after setting one side limit, shouldn’t exit from the original setting item, and run to the other side limit position, then enter the other side setting items to confirm, or the stall alarm fault will occur.

2.4.2.4 Local Control

In menu 【2】, after selecting “Local Control”, previous setting value(inching/hold) will be shown on the right of the line. Switch setting values between “inching” and “hold” by using the key “+” and “-”. Use “ENTER” to save the selected setting value.

2.3.2.5 Off position protection

In menu 【2】, after selecting “Off position protection”, previous setting value(limit/torque) will be shown on the right of the line. Switch setting values between “limit” and “torque” by using the key “+” and “-”. Use “ENTER” to save the selected setting value.

2.4.2.6 On position protection

In menu 【2】, after selecting “On position protection”, previous setting value(limit/torque) will be shown on the right of the line. Switch setting values between “limit” and “torque” by using the key “+” and “-”. Use “ENTER” to save the selected setting value.

2.4.2.7 Close over torque value

In menu 【2】, after selecting “Close over torque value”, previous setting value(percentage of rated torque) will be shown on the right of the line. Change the setting value between range 30% to 100% by using the key “+” and “-”. Use “ENTER” to save the selected setting value.

2.4.2.8 Open over torque value

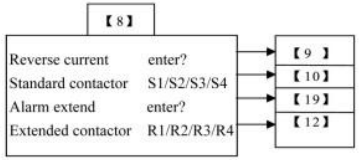
In menu 【2】, after selecting “Open over torque value”, previous setting value(percentage of rated torque) will be shown on the right of the line. Change the setting value between range 30% to 100% by using the key “+” and “-”. Use “ENTER” to save the selected setting value.

2.4.2.9 Factory reset

If the parameter is set confusingly during the menu setting, users can use this item to restore the factory default except “ On” “Close” and “Closing direction” parameter during the route.

2.4.3 Feedback setting menu

In menu 【1】, select the item “Feedback settings” and press “ENTER” to go into menu 【8】, as clearly shown in the picture on the right.

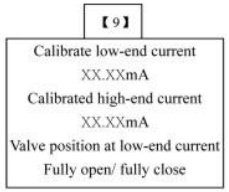


2.4.3.1 Reverse current

The actuator send the current position to the central control room in the form of 4mA~20mA. If users think that 4mA~20mA is not exact, this function can be used to be calibrated.

In menu 【8】,use the key “UP” or “DOWN” to select “Reverse current” and press “ENTER” to display the menu【9】.

2.4.3.1.1 Calibrate low-end current



In menu 【9】, use the key “UP” or “DOWN” to select “Calibrate low-end current”, previous setting value will be shown on the right of the line. Now the actuator will feedback corresponding current value (4mA) to 0% valve forcedly for users to check. The feedback 4mA is thought to be inexact, users can use the key “UP” or “DOWN” to adjust the actuator feedback current value. When meeting the demands, use the key “ENTER” to save the changes.

2.4.3.1.2 Calibrate high-end current

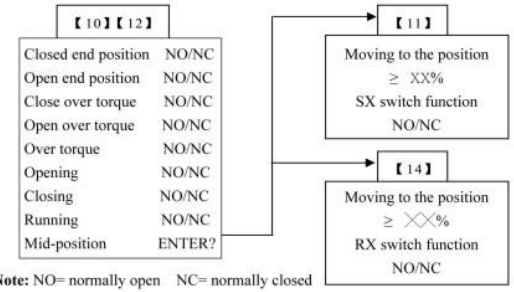
In menu 【9】, use the key “UP” or “DOWN” to select “Calibrate low-end current”, previous setting value will be shown on the right of the line. Now the actuator will feedback corresponding current value (20mA) to 100% valve forcedly for users to check. The feedback 20mA is thought to be inexact, users can use the key “UP” or “DOWN” to adjust the actuator feedback current value. When meeting the demands, use the key “ENTER” to save the changes.

2.4.3.1.3 Valve position value at low-end current

In menu 【9】, use the key “UP” or “DOWN” to select “Valve position value at low-end current”, previous setting value(fully open / fully shut) will be shown on the right of the line to show the valve position value which feedback low-end current (4mA) represents. After selecting required items, use the key “ENTER” to save the changes.

After selecting “Valve position value at low-end current”, the valve position value which feedback high-end current (20mA) represents is determined too. Also it is mutually exclusive with percentage valve position which corresponds to low-end current. For example, “Valve position value at low-end current” is positioned at “fully open”, the valve position value which high-end current represents is “fully shut”.

2.4.3.2 Standard contactor



Note: NO= normally open NC= normally closed

SX(X=1、2、3、4) is a group of magnetic out switch(switch status won’t change if the power is down) used for indicating valve status. It can choose to be NO/NC when the any following item occurs. They are Closed end position, Open end position, Close over torque, Open over torque, Over torque, opening, closing, running, mid-position.

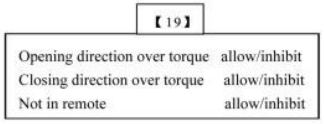
In menu 【8】,use the key “UP” or “DOWN” to select “standard contactor” and press “ENTER” to display the menu【10】.

Use the key “UP” and “DOWN” to select needed status item, use the key “+” and “-” to choose if the switch is normally closed or open. When meeting the demands, use the key “ENTER” to save the selected item.

If select “mid-position” and press the key “ENTER”, menu 【11】 will be shown to ask users to set specific mid-position and if the switch is NO/NC when moving to this position. First use the key “DOWN” to select “≥ XX%”, this item will show the previous setting value, the sign “≥” means greater and equal. Use the key “+” and “-” to choose needed value between the range 1%~99%, after meeting the demands, use the key “ENTER” to save the selected item.

2.4.3.3 Alarm extend

“Alarm extend” means alarm contactor has included alarm items except “Lack of power”, “the motor overheating”, “ESD effective”, “loss of analog control signal”, “remote open and closed simultaneously”, “in menu setting” and “Self-checking fault”.



In menu 【8】,use the key “UP” or “DOWN” to select “alarm extend” and press “ENTER” to display the menu 【19】.

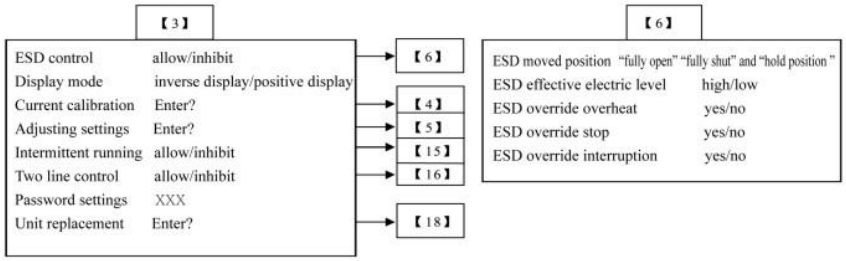
Use the key “UP” and “DOWN” to select needed setting items, use the key “+” and “-” to choose “allow” or “inhibit”. When meeting the demands, use the key “ENTER” to save the selected item. “allow” means that “alarm contactor” includes selected items, “inhibit” means that “alarm contactor” doesn’t include selected items. When meeting the demands, use the key “ENTER” to save the selected item.

2.4.3.4 Extension contactor

RX(X=1、2、3、4) is a group of non- maintenance out switch(switch status may change if the power is down) used for indicating valve status. It can be choose the following items which is the same as “ Standard contactor”. Use the key “UP” and “DOWN” to select needed status item, use the key “+” and “-” to choose if the switch is normally closed or open. When meeting the demands, use the key “ENTER” to save the selected item.

2.4.4 Advanced setting menu

In menu 【1】, select “ advanced setting” to enter menu【3】. As shown below.



2..4.4.1 ESD settings

In menu 【3】, use the key “UP” or “DOWN” to select “ESD control”, previous setting value(inhibit/allow) will be shown on the right of the line. “Inhibit” means ESD control is inhibited. “Allow” means ESD control is allowed. Use the key “+” OR “-” to select needed values, use “ENTER” to save the selected modification. When “ allow” is selected and press “ENTER” , menu 【6】 will be displayed.

2.4.4.1.1 ESD position

ESD means the actions of the actuator in case of emergency (ESD detected and ESD active signal appeared on control signal terminal.) There are three ESD actions: “fully open” “fully shut” and “protection”.

In menu 【6】, use the key “UP” and “DOWN” to select “ ESD position”, previous setting value(“fully open” “fully shut” and “inhibit”) will be shown on the right of the line. Use the key “+” and “-” to select needed value, press “ENTER” to save the selected modification.

2.4.4.1.1 ESD effective electric level

Output signal on the actuator ESD control signal terminal can be two electric levels: Non-voltage signal is called low electric level, voltage signal is called high electric level.

In menu 【6】, use the key “UP” and “DOWN” to select “ESD effective electric level”, previous setting value(“low” or “high”) will be shown on the right of the line. Use the key “+” and “-” to select needed value,

press “ENTER” to save the selected modification.

2.4.4.1.3 ESD override overheat

“ESD override overheat” means even if “actuator overheat” occurs, ESD control operation is still operated, otherwise, stop operating ESD control operation.

In menu 【6】, use the key “UP” and “DOWN” to select “ESD override overheat”, previous setting value(“yes” or “no”) will be shown on the right of the line. Use the key “+” and “-” to select needed value, press “ENTER” to save the selected modification.

2.4.41.4 ESD override stop

“ESD override stop” means even if the mode button is at “STOP” position, ESD control operation is still operated, otherwise, stop operating ESD control operation.

In menu 【6】, use the key “UP” and “DOWN” to select “ESD override stop”, previous setting value(“yes” or “no”) will be shown on the right of the line. Use the key “+” and “-” to select needed value, press “ENTER” to save the selected modification.

2.4.4.1.5 ESD override interruption

“ESD override interruption” means even if the mode button is at “interruptible outage”, ESD control is still in the form of “Uninterruptible”. Otherwise, ESD operations operated in the form of “interruptible outage” at the setting position of “interruptible outage”.

In menu 【6】, use the key “UP” and “DOWN” to select “ESD override interruption”, previous setting value(“yes” or “no”) will be shown on the right of the line. Use the key “+” and “-” to select needed value, press “ENTER” to save the selected modification.

2.4.4.2 Display mode

In menu 【3】, use the key “UP” and “DOWN” to select “Display mode”, previous setting value(inverse display or positive display) will be shown on the right of the line. Use the key “+” and “-” to select needed value, press “ENTER” to save the selected modification.

2.4.3 Current calibration

In menu 【3】, use the key “UP” and “DOWN” to select “Current calibration” to show the menu 【4】.

【4】

Control current calibration	
Calibrate low signal	XX mA
Calibrate high signal	XX mA

When the current 4mA~20mA of the actuator which is sent by users compared to the previous setting value is discriminating, users can use this function to re-set the current which is sent by users in order to make the actuator and 4mA~20mA current transmitting device have the same canonical measure. To improve the accuracy of the actuator control.

For convenience, we define 4mA as the signal of low-end (low signal for short), 20mA as the signal if high-end (high signal for short).

Low signal calibration: in menu 【4】, use the key “DOWN” to select “Calibrate low signal”, Acquired control current value(mA) by users will be shown on the right of the line. Meanwhile, users can send the low signal of the control current to the actuator, and press “ENTER” to save the Acquired control current value after current stabilization.

High signal calibration: in menu 【4】, use the key “DOWN” to select “Calibrate high signal”, Acquired control current value(mA) by users will be shown on the right of the line. Meanwhile, users can send the high signal of

the control current to the actuator, and press “ENTER” to save the Acquired control current value after current stabilization.

Users can use the control current calibration menu to inquire the current value which is sent by users. But the inquired values are not exact until the control current signal is calibrated.

2.4.4.4 Adjusting settings

In menu 【3】, use the key “UP” and “DOWN” to select “Adjusting settings” to show the menu 【5】.

【5】

Deadband adjustment	X.X%
Low signal valve	fully open/fully shut
Lost signal moved position	“fully open” “fully shut” and “hold position ”
Brake	XXmS

2.4.4.4.1 Deadband adjustment

Significance of the deadband: this function is effective in the mode of remote control. In this control mode, the actuator will work out the users wanted valve values according to the control current, then compare the value with the present valve value. If the absolute value of the difference is more than deadband value, the actuator starts to act to make the present valve close to expected valve. If the absolute value of the difference between present valve and users wanted valve is within the deadband range, the actuator stops. Setting proper deadband can protect the actuator shaking near the given valve.

In menu【5】,use the key “DOWN” to select “Deadband adjustment”, the previous setting value (0.1%~9.9%) will be shown on the right of the line or “self-adaption”. Users can use the key “+” and “ –” to adjust the deadband values. After selecting the needed deadband values, press the key “ENTER” to save the modification.

2.4.4.4.2 Low signal valve

Low signal valve: in the mode of remote current control, the valve open value which corresponds to low signal (4mA).

In menu 【5】, use the key “UP” or “DOWN” to select “Low signal valve”, previous setting value(fully open / fully shut) will be shown on the right of the line. Users can use the key “+” and “-” to change the choice. After selecting the needed deadband values, press the key “ENTER” to save the modification.

NOTE: valve open values corresponded to high end current and low end current is mutually exclusive. For example, when setting the low end current as fully shut, high end current corresponds automatically to valve fully open and vice versa.

2.4.3.2.3 Lost signal moved position

Lost signal: when the actuator is running in the form of auto-control mode and the control current is less than half of the low end current, control signal is thought to be lost (lost signal for short).

Lost signal moved position: Lost signal moved position defines the position where the actuator runs to when lost signal occurs. There are 3 optional values in this item: “hold position” “fully open” and “fully shut”. “ hold position” means remain in its place.

Use the key “+” and “ –” to select the needed values, press the key “ENTER” to save the modification.

2.4.4.4.4 Brake

“Brake” means when the actuator runs to the expected position then go on a short inverse knob in order to counteract the inertance of actuator movement. This can help improve the control accuracy.

In menu 【5】, use the key "DOWN" to select "Brake", the previous setting time value (mS) of the actuator inverse knob will be shown on the right of the line, use the key "+" and " –" to choose the needed value between the range 0~50mS. (0mS means non-brake), press the key "ENTER" to save the modification.

2.4.4.5 Intermittent running

"Intermittent running" means the running process of the actuator is not continuous but stop-and-run. This operation is set for clearance running when the valve is opening or closing. Clearance running allows the actuator operate ON/OFF in the form of pulse so that it can increase the route time to prevent hydraulic shock and liquid surge.

If this item is chosen as "inhibit", running process of the actuator is normally continuous running process; if this item is chosen as "allow", it will enter menu 【15】, users can set each sub item according to the needed condition of the intermittent running.

2.4.4.5.1 Open direction starting position

"Open direction starting position" means the starting position where the actuator starts the "intermittent running" during the open direction running process. Users can use the key "+" and " –" to choose the needed values between open value range 0~100%, and press the key "ENTER" to save the modification.

【15】

Open direction starting position	0~100%
Open direction end position	0~100%
Open direction route time	1~100%
Open direction stop time	1~100s
Closed direction starting position	0~100%
Closed direction end position	0~100%
Closed direction route time	1~100%
Closed direction stop time	1~100s

2.4.4.5.2 Open direction end position

"Open direction end position" means the starting position where the actuator ends the "intermittent running" during the end direction running process. Users can use the key "+" and " –" to choose the needed values between open value range 0~100%(NOTE: Open direction end position must be more over than open direction starting position), and press the key "ENTER" to save the modification.

2.4.4.5.3 Open/Closed direction route time

"Open/Closed direction route time" means the route value between each intermittent running at open direction when the actuator is operating (route times of Open direction and End direction can be set differently). Use the key "+" and " –" to choose the needed values between open value range 0~100%, and press the key "ENTER" to save the modification.

2.4.4.5.4 Open/Closed direction stop time value

"Open/Closed direction stop time" means the time values between each intermittent running at open direction when the actuator is operating (route times of Open direction and End direction can be set differently). Use the key "+" and " –" to choose the needed values between open value range 0~100sec, and press the key "ENTER" to save the modification.

2.4.4.5.5 Closed direction starting position

"Closed direction starting position" means the starting position where the actuator starts the "intermittent running" during the closed direction running process. Users can use the key "+" and " –" to choose the needed values between open value range 0~100%, and press the key "ENTER" to save the modification.

2.4.4.5.6 Closed direction end position

"Closed direction end position" means the starting position where the actuator ends the "intermittent running" during the end direction running process. Users can use the key "+" and " –" to choose the needed values between open value range 0~100%(NOTE: Closed direction end position must be more over than closed direction starting

position), and press the key "ENTER" to save the modification.

2.4.4.6 Two-wire control

"Two-wire control" means the actuator is operated electrically by remote two-wires. "Voltage signal open, non-voltage signal off" means when there is voltage signal on the connection wire between Central Control Room and actuator, the actuator does open operation; when there is non-voltage signal on the connection wire, the actuator does off operation. "Voltage signal off, non-voltage signal open" means when there is voltage signal on the connection wire between Central Control Room and actuator, the actuator does off operation; when there is non-voltage signal on the connection wire, the actuator does open operation. If "Two-wire control" is chosen as "NO", it is invalid.

In menu 【3】, use the key "UP" or "DOWN" to select "Two-wire control", "inhibit" and "allow" will appear on the right of the screen. If this item is chosen as "inhibit", "Two-wire control" is inhibited; If this item is chosen as "allow", "Two-wire control" is allowed. Use the key "+" and " –" to select the needed values, press the key "ENTER" to save the modification. When choosing "allow" and press "ENTER", menu 【16】 will be shown. Users can set each sub item according to the needed condition of Two-wire control.

2.4.4.7 Password settings

"Password settings" is used for setting password to make users enter setting menu when normally operating. This password is used to prevent unauthorized personnel modifying parameters which has been set.

【16】

Two-wire control
Voltage signal open, non-voltage signal off
Voltage signal off, non-voltage signal open

In menu 【3】, use the key "UP" or "DOWN" to select "Password settings", previous setting password will be shown on the right of the line, Use the key "+" and " –" to select the needed values, press the key "ENTER" to save the modification.

NOTE: when the password is set as 0, it means no password. Next time, enter the menu directly without password.

2.4.4.8 Component replacement

In menu 【3】, use the key "UP" or "DOWN" to select "component replacement" and press "ENTER" to show the menu 【18】.

The actuator has a data backup, After replacing mainboard, in menu 【18】, use the key "UP" or "DOWN" to select "Read parameter" and press "ENTER" to read information about actuator route and so on to mainboard without re-set limit.

【18】

After replacing mainboard
Read parameter OK?
After replacing coder
Transfer parameter OK?

2.4.4.8.2 Transfer parameter

When the valve coder of the actuator has been replaced, there will be no previous setting parameter in valve coder of the actuator. In order to prevent data errors when reading data after replacing the mainboard, data on the actuator mainboard must be backed up to valve coder. In menu 【18】, use the key "UP" or "DOWN" to select "transfer parameter" and press "ENTER" to backup the data on the actuator mainboard to the coder.

2.4.5 Signal query menu

In menu 【1】, select "Signal query" and press "ENTER" to go into menu 【13】, shown as the following.

【13】

Knob button signal	ENTER?	→ 【20】
Remote signal	ENTER?	→ 【21】
Torque display	YES/NO	
Factories query	ENTER?	→ 【23 】

【20】

Mode knob button STOP/LOCAL/REMOTE
Operation knob button ON/OFF/SPACE

2.4.5.2 Knob button signal

In menu 【13】, use the key "UP" or "DOWN" to select "Knob button signal" and press "ENTER" to show menu 【20】

2.4.5.1.1 Mode knob button position

In menu 【20】, after using the key "UP" or "DOWN" to select "Mode knob button position" , the position of "mode knob button" will be shown on the right of this line. Users can query the position of the mode knob button.

When mode knob button(red) is at "STOP" position, "STOP" on the right of "Mode knob button position" in menu 【20】 will be shown regularly, or irregularly.

When mode knob button(red) is at "LOCAL" position, "LOCAL" on the right of "Mode knob button position" in menu 【20】 will be shown regularly, or irregularly.

When mode knob button(red) is at "REMOTE" position, "ROMEOTE" on the right of "Mode knob button position" in menu 【20】 will be shown regularly, or irregularly.

NOTE: in this item, using mode knob button to operate "BACK" doesn't work.

2.4.5.1.2 Operation knob button position

In menu 【20】, after using the key "UP" or "DOWN" to select "Operation knob button position" , the position of "Operation knob button" will be shown on the right of this line. Users can query the position of the mode knob button.

When mode knob button(black) is at "ON" position, "ON" on the right of "Mode knob button position" in menu 【20】 will be shown regularly, or irregularly.

When mode knob button(black) is at "OFF" position, "OFF" on the right of "Mode knob button position" in menu 【20】 will be shown regularly, or irregularly.

When mode knob button(black) is at "SPACE" position, "SPACE" on the right of "Mode knob button position" in menu 【20】 will be shown regularly, or irregularly.

NOTE: In this item, when operating "DOWN" by operation knob button or query "OFF" position, LCD will display "OFF" for one second then enter the next item.

2.4.5.2 Remote signal

In menu 【13】, use the key "UP" or "DOWN" to select "Remote signal" and press "ENTER" to show menu 【21】.

2.4.5.2.1 Open remote signal

In menu 【21】, after selecting "Open remote signal", the screen will show if this signal is "presence" or "absence" on the right. Users can know the status of this signal with the information.

2.4.5.2.2 Remote closed signal

In menu 【21】, after selecting "Remote closed signal", the screen will show if this signal is "presence" or "absence" on the right. Users can know the status of this signal with the information.

【21】

Remote open signal	presence or absence
Remote closed signal	presence or absence
Remote hold signal	presence or absence
Remote auto signal	presence or absence
Remote ESD signal	presence or absence
Control current	XXmA

2.4.5.2.3 Remote hold signal

In menu 【21】, after selecting "Remote hold signal", the screen will show if this signal is "presence" or "absence" on the right. Users can know the status of this signal with the information.

2.4.5.2.4 Remote auto signal

In menu 【21】, after selecting "Remote auto signal", the screen will show if this signal is "presence" or "absence" on the right. Users can know the status of this signal with the information.

2.4.5.2.5 Remote ESD signal

In menu 【21】, after selecting "Remote ESD signal", the screen will show if this signal is "presence" or "absence" on the right according to the effective signals in "ESD settings". Users can know the status of this signal with the information.

2.4.5.2.6 Control current

In menu 【21】, after selecting "Control current", the screen will show the control current value which the actuator has collected. Users can know if this signal is regular or not.

2.4.5.3 Torque display

In menu 【13】, after selecting "Torque display", previous setting values "YES" or "NO" will be shown on the right of this line. If "YES" is selected, during regular electrical running process, (non-setting picture) present value will be shown in real time at the bottom of the screen (the percentage of the rated torque). Use the key "+" and " –" to choose the needed values and press the key "ENTER" to save the modification.

2.4.5.4 Factories query

"Factories query" is used for manufacturers to query the setting and operating data of the actuator before it leaves the factory. It doesn't open up for users.

2.5 Default setting when leaving the factory (settings when the users have no special requirements)

Closing direction: clockwise
2-wore control: inhibit
Local control: inching
password: 0
Closing position protection: limit
S1 switch: Closed end position ON
Open position protection: limit
S2 switch: Closed end position OFF
Closed torque value: 70%
S3 switch: Open end position ON
Open torque value: 70%
S4 switch: Open end position OFF
ESD control: inhibit
R1 switch: Closed over torque ON
Display mode: positive display
R2 switch: Open over torque ON
Deadband adjustment: 1%
R3 switch: Closed over torque OFF
Low signal valve: fully shut
R4 switch: Open end position OFF
Lost signal moved position: hold position
Alarm extending including closed over torque: inhibit (not include)
Brake: 0ms (no braker)
Alarm extending including open over torque: inhibit (not include)
Low end current valve: fully shut
Alarm extending including open over torque: inhibit (not include)
Intermittent running: inhibit

3.Alarm Information

1.If "fault command" appears on the alarm zone, it means inner commands which control the actuator is wrong. And make the "MONI-NC" terminal of the alarm relay and the "MONI-COM" closed. It can be solved by restoration or being powered off and re-up electricity. If these ways still don't solve the problem, Please contact the vendor.

2.If "fault problem" appears on the alarm zone, it means inner program field which controls the actuator is wrong. And make the "MONI-NC" terminal of the alarm relay and the "MONI-COM" closed. It can be solved by restoration or being powered off and re-up electricity. If these ways still don't solve the problem, Please contact

the vendor.
3.If "fault data" appears on the alarm zone, it means inner data field which controls the actuator is wrong. And make the "MONI-NC" terminal of the alarm relay and the "MONI-COM" closed. It can be solved by restoration or being powered off and re-up electricity. If these ways still don't solve the problem, Please contact the vendor.
4.If "fault A/D" appears on the alarm zone, it means inner A/D which controls the actuator is wrong. And make the "MONI-NC" terminal of the alarm relay and the "MONI-COM" closed. It can be solved by restoration or being powered off and re-up electricity. If these ways still don't solve the problem, Please contact the vendor.
5.If "close valve over torque" appears on the alarm zone, it means during the closing process, the actual torque value of the actuator is beyond the rated torque value, the actuator will stop the motor running and make a sign to stop moving to the opening direction. Moving for a short way to the opening direction or resetting "Closed over torque value" can delete open valve over torque sign.
6.If "open valve over torque" appears on the alarm zone, it means during the opening process, the actual torque value of the actuator is beyond the rated torque value, the actuator will stop the motor running and make a sign to stop moving to the closing direction. Moving for a short way to the opening direction or resetting "Open over torque value" can delete open valve over torque sign.
7.If "power failure" appears on the alarm zone, it means the actuator tests "power failure", the actuator will stop the motor running and make the "MONI-NC" terminal of the alarm relay and the "MONI-COM" closed.
8.If "power failure" appears on the alarm zone, it means the control current signal of 4mA~20mA has been lost, the actuator will operate as the setting values in "Adjustment settings" Item 3 "Lost signal moved position", and make the "MONI-NC" terminal of the alarm relay and the "MONI-COM" closed.
9.If "remote open coexists with remote closed" appears on the alarm zone, it means the actuator can receive the signals from "remote closed" and "remote open", the actuator will stop the motor running and make the "MONI-NC" terminal of the alarm relay and the "MONI-COM" closed.
10.If "fault turning" appears on the alarm zone, it means the actuator tests the incorrect turning of the valve during the running (maybe turning direction is wrong or there is something wrong with the absolute coder), the actuator will stop the motor running.
11.If "fault valve" appears on the alarm zone, it means the actuator can't test the changes in valve during the running (maybe the electric file isn't hung up or there is something wrong with the absolute coder), the actuator will stop the motor running.
12.If "ESD close valve" appears on the alarm zone, it means the actuator is operating "ESD close valve", and make the "MONI-NC" terminal of the alarm relay and the "MONI-COM" closed.
13.If "ESD open valve" appears on the alarm zone, it means the actuator is operating "ESD open valve", and make the "MONI-NC" terminal of the alarm relay and the "MONI-COM" closed.
14.If "ESD effective" appears on the alarm zone, it means there is still ESD control signal, try to make other electrical operations no matter local or remote invalid, and make the "MONI-NC" terminal of the alarm relay and the "MONI-COM" closed.
15.If "motor overheat" appears on the alarm zone, it means the temperature of the motor is too high, the actuator will stop the motor running. Try to make other electrical operations no matter local or remote invalid (except ESD operation), and make the "MONI-NC" terminal of the alarm relay and the "MONI-COM" closed.
16.If "motor stall" appears on the alarm zone, it means when the actuator is at fully shut position and moves to open direction, it can't test the changes in valve in5-10sec, and this alarm information will be given. Meanwhile,

the actuator will stop the motor running. This alarm shows there is a valve stuck situation or the output torque of the actuator doesn't conform to the valve.
17.If "fault current calibration" appears on the alarm zone, it means the control current is calibrated incorrectly, it must be calibrated again. Meanwhile restore this item into the factory default settings
NOTE: if there is no alarm, the "MONI-NO" terminal of the alarm relay and the "MONI-COM" are closed, but the "MONI-NC" terminal of the alarm relay and the "MONI-COM" are open.

4.Actuator circuit diagram

4.1 Instruction of circuit terminal numbers
IF/IFM Multi-turn intelligent electric actuators external wiring can be selected for line pressed type. This type of terminal can have a pressure connection of 0.8~2.5 mm². It is convenient and easy to operate. The circuit numbers of the patch plate is shown as below:

4.1.2 Wiring Terminal Numbers Introduction

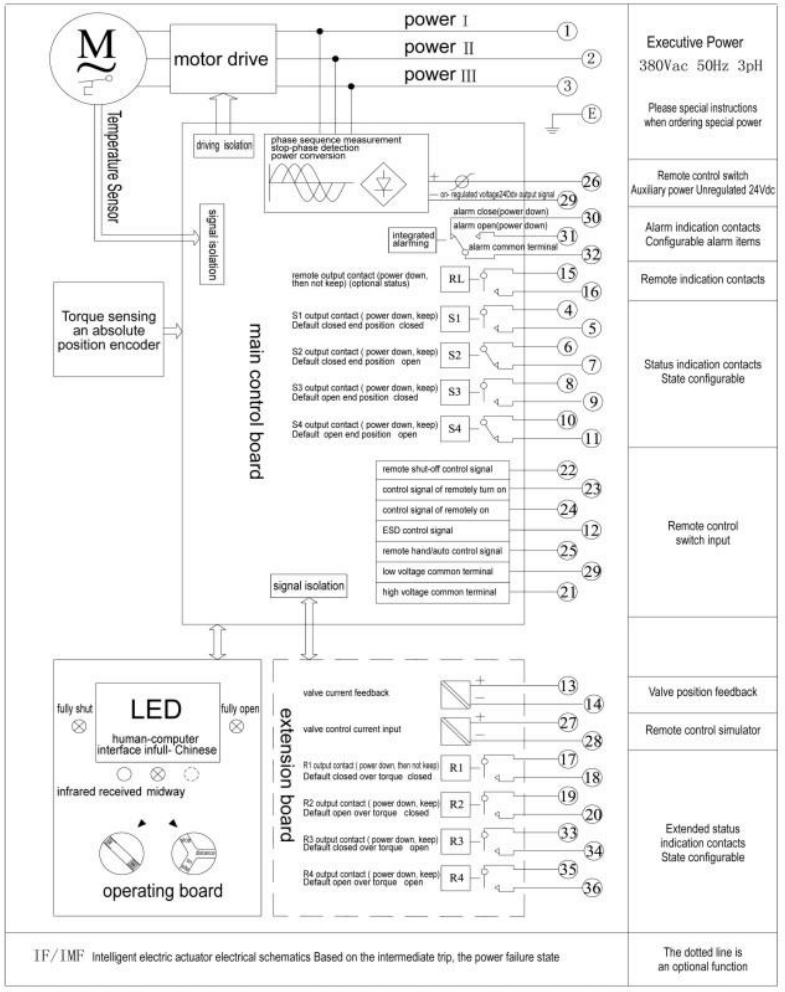
Wiring terminal numbers	Wiring terminal names	Wiring terminal meanings	Wiring terminal numbers	Wiring terminal names	Wiring terminal meanings
1	U **	AC input terminal 1	19	*R2-RELAY-1	R2 output contact 1
2	V **	AC input terminal 2	20	*R2-RELAY-2	R2 output contact 2
3	W **	AC input terminal 3	21	R-H-COM	Remote high voltage signal common terminal
4	S1-RELAY-1	S1 output contact 1(default closed end position on)	22	R-CLOSE	Remote closing control signal input terminal
5	S1-RELAY-2	S1 output contact 2(default closed end position on)	23	R-OPEN	Remote opening control signal input terminal
6	S2-RELAY-1	S2 output contact 1(default closed end position off)	24	R-HOLD	Remote maintain signal input terminal
7	S2-RELAY-2	S2 output contact 2(default closed end position off)	25	R-AUTO	Remote auto control signal input terminal
8	S3-RELAY-1	S3 output contact 1(default open end position on)	26	24Vdc	Unregulated power 24Vdc output terminal
9	S3-RELAY-2	S3 output contact 2(default open end position on)	27	*APC(+)	Valve control current input(+) terminal
10	S4-RELAY-1	S4 output contact 1(default open end position off)	28	*APC(-)	Valve control current input(-) terminal
11	S4-RELAY-2	S4 output contact 2(default open end position off)	29	R-L-COM/0V	Remote low voltage signal common terminal
12	ESD	ESD control signal input terminal	30	MONI-NC	Alarm output contact ON terminal(alarming)
13	*CPT(+)	Valve current feedback(+) terminal	31	MONI-NO	Alarm output contact OFF terminal(alarming)
14	*CPT(-)	Valve current feedback(-) terminal	32	MONI-COM	Alarm output contact common terminal
15	R-RELAY-1	Mode button in remote indication contact 1	33	*R3-RELAY-1	R3 output contact 1
16	R-RELAY-2	Mode button in remote indication contact 2	34	*R3-RELAY-2	R3 output contact 2
17	*R1-RELAY-1	R1 output contact 1	35	*R4-RELAY-1	R4 output contact 1
18	*R1-RELAY-2	R1 output contact 2	36	*R4-RELAY-2	R4 output contact 2

NOTE: 1、for one-phase actuators, terminal 1,2 connect to 110Vac or 220Vac, terminal 3 is free.

2、output contact rating are all 5A/250Va or 5A/30Vdc in the form

3、the items with * are optional, must be marked when ordering.

4.2 RQ/RQM intelligent electric actuator internal circuit diagram

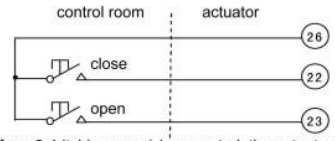


NOTE: To expand more status indication contacts or bus control and special control requirements, contact the supplier or the company.

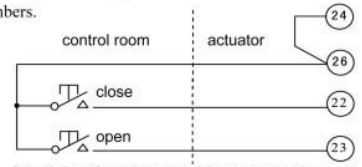
4.3 RQ/RQM intelligent electric actuator control circuit diagram

4.3.1 Remote switch quantity (manual) control

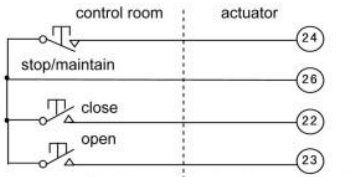
For actuators supported by internal 24Vdc low voltage control, external diagram can be found in form 3-1, 3-2 and 3-3. Numbers in small circles are wiring terminal numbers.



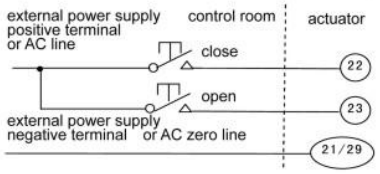
form 3-1 itching open/close control, the actuator can stop at any position on mid-way.



form 3-2 self-holding open/close control, the route is reversible, but the actuator can't stop on mid-way.



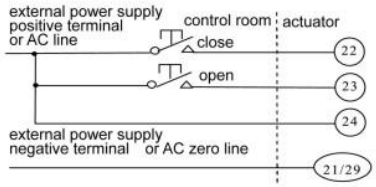
form 3-3 self-holding open、closed、stop control



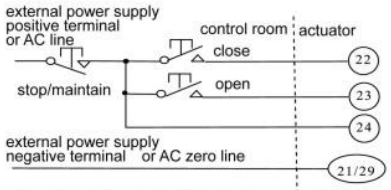
form 3-4 itching open/close control, the actuator can stop at any position on mid-way.

If external 24VDC or 220VAC is used to realize 3-line control, external diagram can be found in form 3-4, 3-5 and 3-6.

NOTE: If external 220VAC is used to control, the zero line is connected to Terminal 20. If external 24VDC is used to control, the negative terminal is connected to Terminal 29.

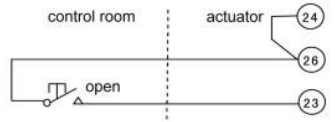


form 3-5 self-holding open/close control, the route is reversible, but the actuator can't stop on mid-way.

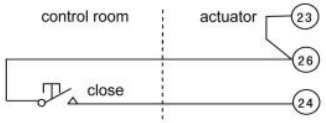


form 3-6 self-holding open、closed、stop control

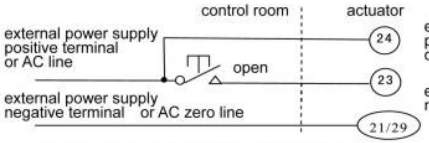
When the actuator is set as "Voltage signal open, non-voltage signal off", "Voltage signal open, non-voltage signal off" function can be realized by 2-wire control. When the actuator is set as "Voltage signal off, non-voltage signal closed", "Voltage signal off, non-voltage signal closed" function can be realized by 2-wire control. External diagram can be found in form 3-7, 3-8, 3-9 and 3-10.



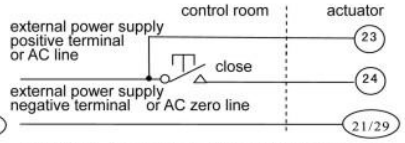
form 3-7 2-line control, Voltage signal open, non-voltage signal off



form 3-8 2-line control, Voltage signal off, non-voltage signal open



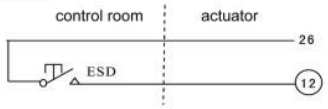
form 3-9 2-line control, Voltage signal open, non-voltage signal off



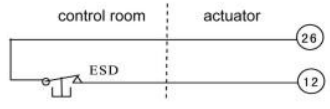
form 3-10 2-line control, Voltage signal open, non-voltage signal off

4.3.3 ESD control

Terminal 12 in the junction box is "ESD control" signal terminal. External diagram of "ESD control" can be found in form 3-11 and 3-12.



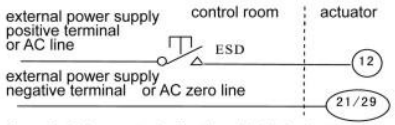
form 3-11 one-line ESD control, effective with high electric level



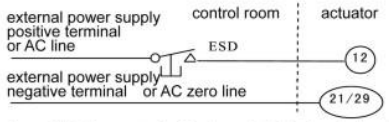
form 3-12 one-line ESD control, effective with low electric level

If external 24VDC or 220VAC is used to realize the control, external diagram can be found in form 3-13, and 3-14.

NOTE: If external 220VAC is used to control, the zero line is connected to Terminal 20. If external 24VDC is used to control, the negative terminal is connected to Terminal 29.



form 13, 2-line control, effective with high electric level

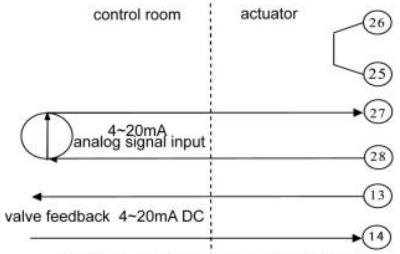


form 14, 2-line control, effective with high electric level

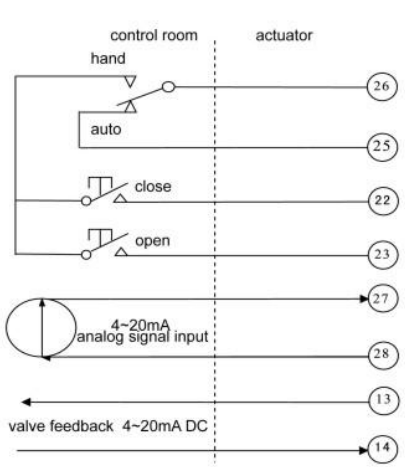
4.3.4 Optional remote analog quantity (auto) control

The actuator can accept 4~20mA analog signal control, the input signal line is to be connected to Terminal 27 and 28 in the junction box (must be marked when ordering). Regular analog signal diagram can be found in form 3-15. For the external diagram of remote hand/auto select control can be found in form 3-16. If external 24VDC or 220VAC is used to realize the control, the external diagram can be found in form 3-17.

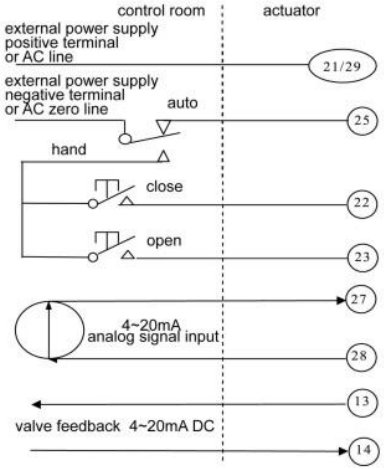
NOTE: If external 220VAC is used to control, the zero line is connected to Terminal 20. If external 24VDC is used to control, the negative terminal is connected to Terminal 29.



form 3-15 remote auto control circuit diagram



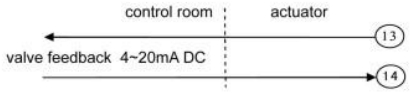
form 3-16 the circuit diagram of remote auto/hand control and select(select to be 24V power supply



form 3-17 the circuit diagram of remote auto/hand control and select(select to be 24VDC Or external high voltage

4.4 Optional position feedback signal

The actuator can provide 4~20mA position feedback signal, it can be output from the junction box on Terminal 13 and 14(must be marked when ordering). The maximum external load which is allowed sis 750Ω, accuracy is 0.5%. Form 3-18



form 3-18 position feedback circuit diagram

4.5 S1-S4 Status feedback

The actuator can provide a group of SX (X=1、2、3、4) magnetic holding output dry contact, it is output from the junction box on Terminal 4 to Terminal 11, it can feedback the valve status to the central control room. The valve status of SX output contact stands for can be any of the following: closed end position, open end position, closed over torque, open over torque, over torque, when opening, when closing, when running, mid-position, and contacts can be grouped locally, can also choose to be ON OR OFF when any of above items is occurring.

4.6 R1-R4 Status feedback

The actuator can provide a group of RX (X=1、2、3、4) non- maintenance output dry contact, it is output from the junction box on Terminal 17 to Terminal 20 and from Terminal 33 to Terminal 36, it can feedback the valve status to the central control room. The valve status of SX output contact stands for can be any of the following: closed end position, open end position, closed over torque, open over torque, over torque, when opening, when closing, when running, mid-position, and contacts can be grouped locally, can also choose to be ON OR OFF when any of above items is occurring.

4.7 Alarm information feedback

The actuator provides an alarm output dry contact of MONI non- maintenance, it is output from the junction box from

Terminal 30 to Terminal 32. It is used for feed backing kinds of alarm information the actuator to the central control room. Normally, when the alarm relay gets activated to make Terminal 31 and Terminal 32 connected. When the status of "Lack of power", "motor overheating", "remote open signal and closing signal simultaneously", "remote analog signal lost", "ESD signal existence", "the actuator is operating working parameter setting", "inner fault of the actuator" and "alarm contact setting includes alarm status" occur, all of these will make "MONI-NC" and Terminal "MONI-COM" of the actuator closed. Terminal 30 and Terminal 32 in the junction box will be connected, and Terminal 31 and Terminal will be open.

4.8 Remote status feedback

The actuator provides a non- maintenance output dry contact, it is output from the junction box from Terminal 15 to Terminal 16. It is used for feed backing the status of the mode button to the central control room. When the mode button is at "REMOTE" position, Terminal 15 and 16 are connected, otherwise, it is open. According to ordering requirement, When the mode button is at "REMOTE" position, Terminal 15 and 16 are open, otherwise, it is connected.