ANDERSON EUROTECH
VALVES AND INSTRUMENTS

AE INTELLIGENT INTEGRATED ELECTRIC ACTUATOR

Products and Solutions

To Measure, Monitor and Control

Flow | Pressure | Level | Temperature | Analytical

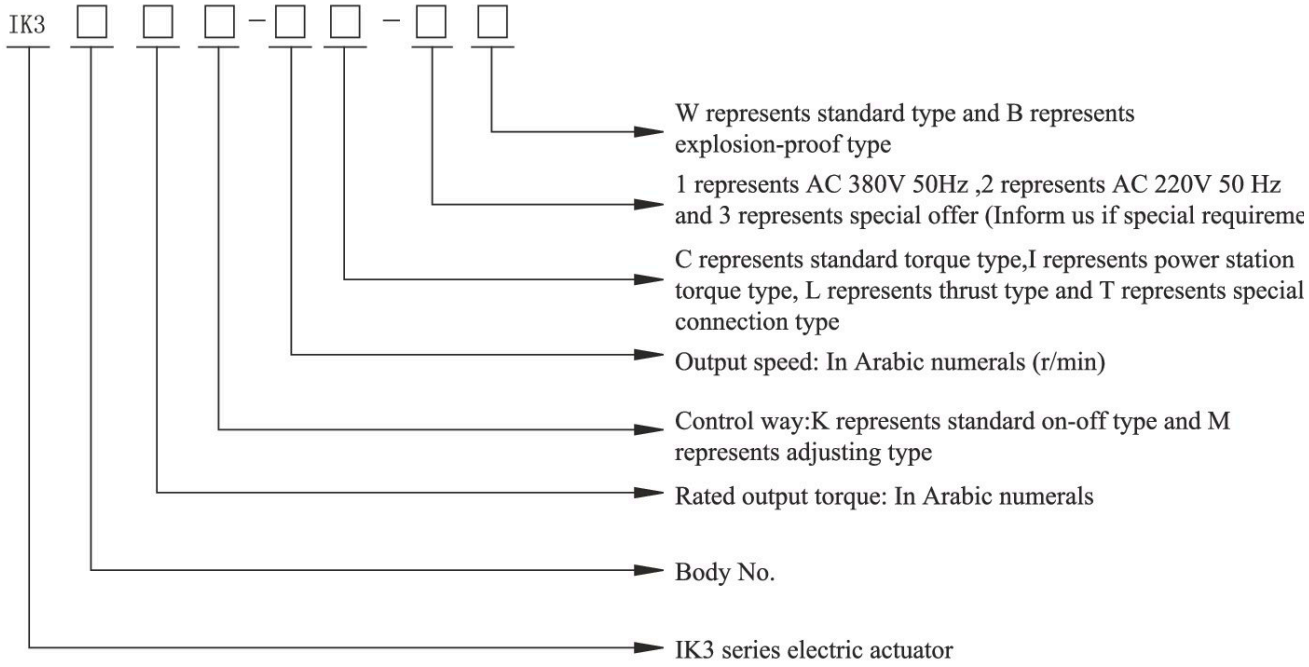
For The Process Industries

I General

A new generation IK3 series multi-turn electric actuators are suitable for linear travel valves which are the essential drives fo opening、closing or adjusting valves, such as gate valve、globe valve etc, and also have remote-control, centralized-control or self-control device on valves. The product has multi-function、stable performance、advanced control system, small size, light weight, easy maintenance and simple operation etc advantages. The actuators are popular and widely applied in the oil, chemicals, electric power, metallurgy, recycled paper, water treatment and other industries.

Ball valve、butterfly valve ect are needed turbo-worm reducers, please confirm the information when need turbo-worm reducer.

II Model Representation



For example IK3110K-18C-1W

IK3 means actuator is multi-turn type, No 1 body, output torque is 100 N.m, standard control on-off type, output speed 18 r/min, standard flange connection and power AC 380V 50 Hz.

III Structure Design of Standard Type & Explosion-proof Type

1.The performance of this product conforms to the stipulation of JB/T8528-1997《General Valve Electric Actuator Technical Conditions》; Its explosion-proof performance conforms to the stipulations of 6B3836 .1-2000 《Electrical Apparatus for Explosive Gas Atmospheres Part1 ： General Requirements》,GB3836.2-2000《Electrical Apparatus for Explosive Gas Atmosphere's Part 2 : the explosion-proof type "d"》 explosion-proof enclosures and JB/T8529-1997《 Explosion-proof valve Electric Actuator Technical Conditions》.

2.Surrounding Mediums: The outdoors type is used for environment free of combustible, explosive and corrosive mediums; The explosion-proof type includes d Ⅰ and d ⅡBT4; d Ⅰ is for non- working surface of coal mining; and d ⅡBT4 can be applied for the environment ⅡA 、 ⅡB T1-T4 where the explosive gases mixture meets the requirements.

IV Main Function

1. Set actuator without opening cover with non-invasive design.
2. LCD display in Chinese and English.
3. Control buttons are double-sealed and dustproof design.
4. Remote control.
5. No battery design, automatic memory when power off.
6. High voltage protection and input & output signals are photo electric isolation.
7. More than four single chip computer for processing and changing data with high act speed.
8. It has phase-lack, overheat, override etc protection, ensure that actuator runs well.
9. During actuator changing phase, it has a best time of delay for not damaging actuator suddenly.
10. It has action and reaction function for practical situation.
11. Actuator working times can be accumulated in memory.
12. Silicon components control all output and improve actuator's quality.
13. Offer with ESD function.
14. Offer with multi-error alarm function.
15. Remote control can be applied external power supply: DC24V-DC60V, AC110V-AC220V.
16. Adjust type can be used as standard type.
17. These series atuators provide machine operation, local operation, remote operation and remote input control,remote external power supply control.
18. Offer with sensitivity adjust function.
19. Offer with machanical torque measure device.
20. Offer with sensor error protection function.
21. Offer with travel limit protection.

V Main Parameters

1. Power Supply AC 380V (±5%), AC 220V(±5%)
2. Frequency 50Hz (±0.4%)
3. Ambient Temp -20℃ To +70℃ Intelligent on-off Type and -20℃ To +60℃Intelligent Adjusting Type
4. Ambient Humidity ≤95% (At 25℃)
5. Height above sea level ≤1000m
6. Input & Output signal 4-20mA
7. Basic Error ≤±1%
8. Travel Control repetitiveness error ≤±1%
9. Ingress Protection IP67
10. Explosion Level ExdIIBT4
11. Model Representation Please check Form 1-2
12. Inform us if special order

AE INTELLIGENT INTEGRATED ELECTRIC ACTUATOR

Form 1 Intelligent on-off Type Model Representation

Model	Torque (N.m)	Max Stem Diameter (mm)	Manual Ratio	AC380V			AC220V			Approx Weight (kg)
				Output Speed (r/min)	Power (KW)	Current (A)	Output Speed (r/min)	Power (KW)	Current (A)	
IK3110	100	28	1:1	18	0.25	1.7	18	0.25	3.0	30
IK3115	150	28	1:1	18	0.37	2.5	18	0.37	4.0	30
IK3220	200	40	1:1	18/24	0.37/0.55	2.5/3.5	18	0.55	5.5	35
IK3230	300	40	1:1	18/24	0.55/0.75	3.5/5.5	18	0.75	7.0	35
IK3345	450	48	1:1	18/24	0.75/1.1	5.5/6.3				64
IK3360	600	48	1:1	18/24	1.1/1.5	6.3/8.0				65
IK3490	900	60	1:1	18/24	1.5/2.2	8.0/10				109
IK3412	1200	60	1:1	18/24	2.2/3.0	10/11				110
IK3518	1800	70	21.5:1	24	4.0	12				200
IK3525	2500	70	21.5:1	24	5.5	15				203
IK3635	3500	75	22.5:1	18	7.5	19				308
IK3650	5000	75	22.5:1	18	11	23				310
IK3780	8000	80	67.5:1	18	11	23				487
IK37100	10000	100	67.5:1	18	13	29				490

Notes:
1. With rated voltage, stall motor current and rated current ratio is 7, and the value of allowance is ensure value 20%
2. We supply the electric actuators of other rotational speeds according to the uses' requirements: 12/18/24/36/48/60(r/min) etc.

Form 2 Intelligent Adjusting Type Model Representation

Model	Torque (N.m)	Max Stem Diameter (mm)	Manual Ratio	Output Speed (r/min)	AC380V		AC220V		Approx Weight (kg)
					Power (KW)	Current (A)	Power (KW)	Current (A)	
IK3110	100	28	1:1	18	0.25	1.7	0.25	3.0	30
IK3115	150	28	1:1	18	0.37	2.5	0.37	4.0	30
IK3220	200	40	1:1	18	0.37	2.5	0.55	5.5	35
IK3230	300	40	1:1	18	0.55	3.5	0.75	7.0	35
IK3345	450	48	1:1	18	0.75	5.5			64
IK3360	600	48	1:1	18	1.1	6.3			65
IK3490	900	60	1:1	12	1.5	8.0			109
IK3412	1200	60	1:1	12	2.2	10			110
IK3518	1800	70	21.5:1	12	3.0	11			200
IK3525	2500	70	21.5:1	12	4.0	12			203
IK3635	3500	75	22.5:1	12	5.5	15			308
IK3650	5000	75	22.5:1	12	7.5	19			310

Notes:
1. With rated voltage, stall motor current and rated current ratio is 7, and the value of allowance is ensure value 20%
2. We supply the electric actuators of other rotational speeds according to the uses' requirements: 12/18/24/36/48/60(r/min) etc.

VI Infrared Remote Control Selection & Description(Check Pic 1)

1.A general type remote control is working for corresponding actuator, so point at certain actuator within 0.75m, or it will make neighbor actuator work at the same time.

2.C distance type remote control is working for special occasion , can be used within 10m.

Notes: Replace battery regularly in case remote control runs out battery.

VII Non-invasive Achievement

1.Design Concept

A. Set actuator without opening cover with ingle-chip design

B. Set actuator without opening cover with remote control design

2. Advantages

A. Avoid dust、humidity without opening cover

B. Test actuator even in raining or inflammable occasion

Pic 1 Remote Control

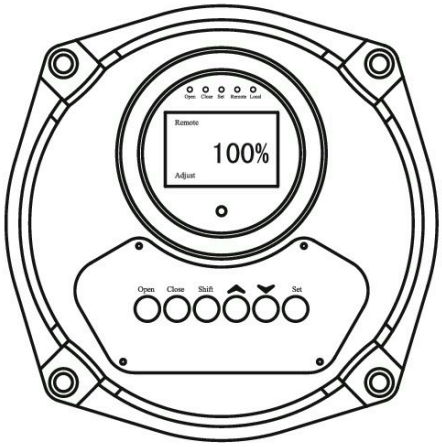
VIII Operation Instruction

1.There are six buttons on the display. Press button “open” or “close” in order to open or close valve in normal work state to enter the system. It’s temporary state when press button “open” or “close”shortly, and it’s maintain state when press button “open” or “close” longer. It’s stop state when press button “open” or “close” after maintain state. Press button “shift” in order to shift the local & remote state and get reset after errors removing. Press button “shift” to enter system, first shift to local state and local indicator light is on, then keep pressing button “set” in 3 seconds and set indicator light is on which means entering data set state. Press “∧” or “∨” when needed.In set state, press button “set” around 3 seconds then set indicator light is off which means exit set system.

2. Shift to manual position and use handwheel when needed.

3. Remote control

IX LCD Operation Panel (Check Pic 2)



The color of indicator light

Open ---Red

Close ---Green

Set---Yellow

Remote---Yellow

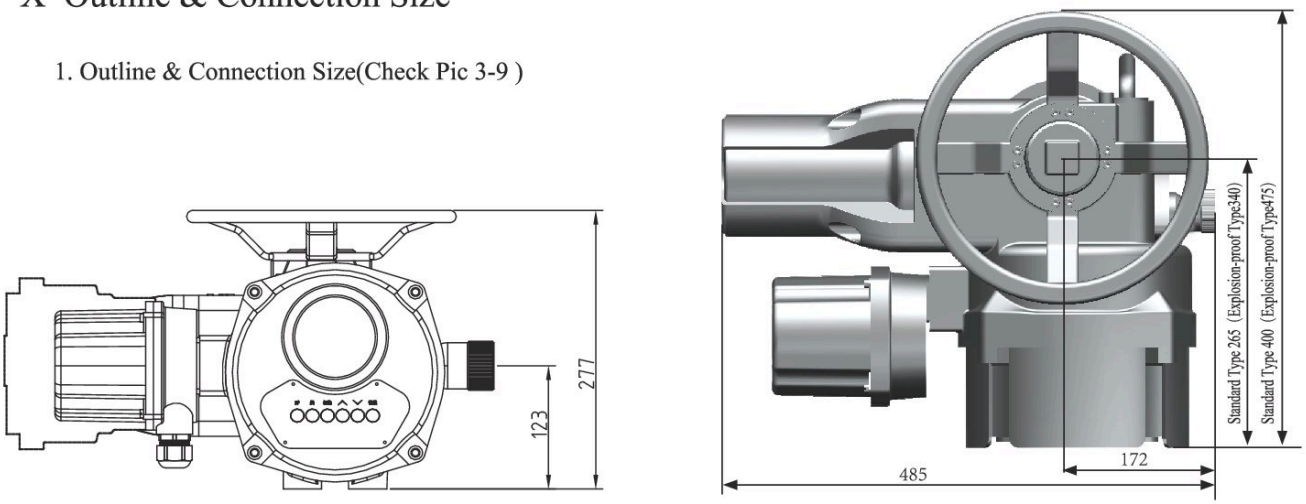
Local---Yellow

If need other color of indicator lights, please inform us when order

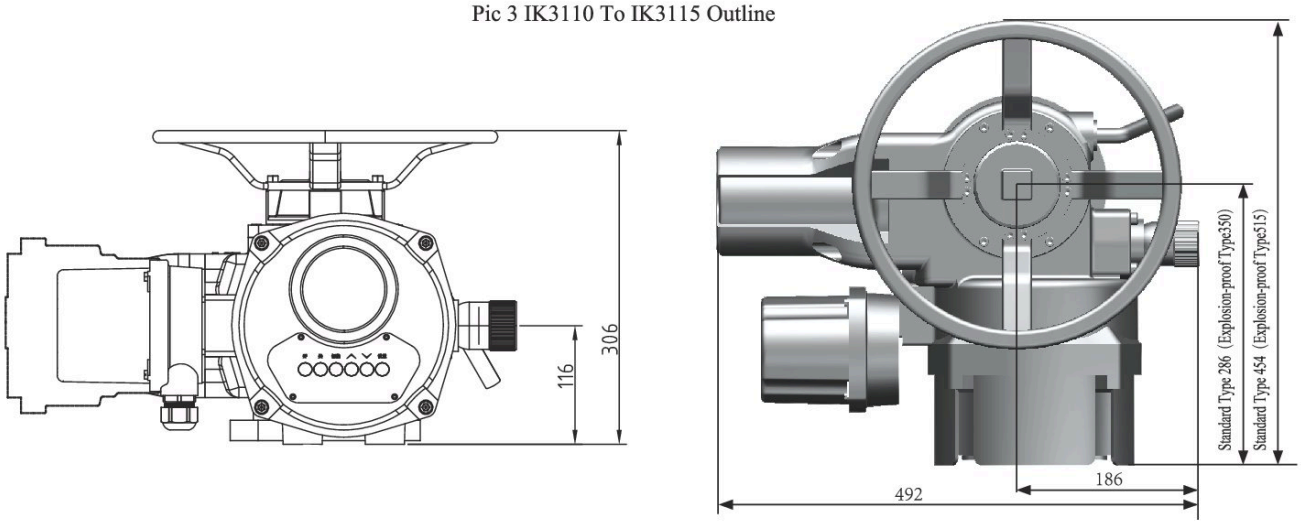
Pic 2 LCD Operation Diagram

X Outline & Connection Size

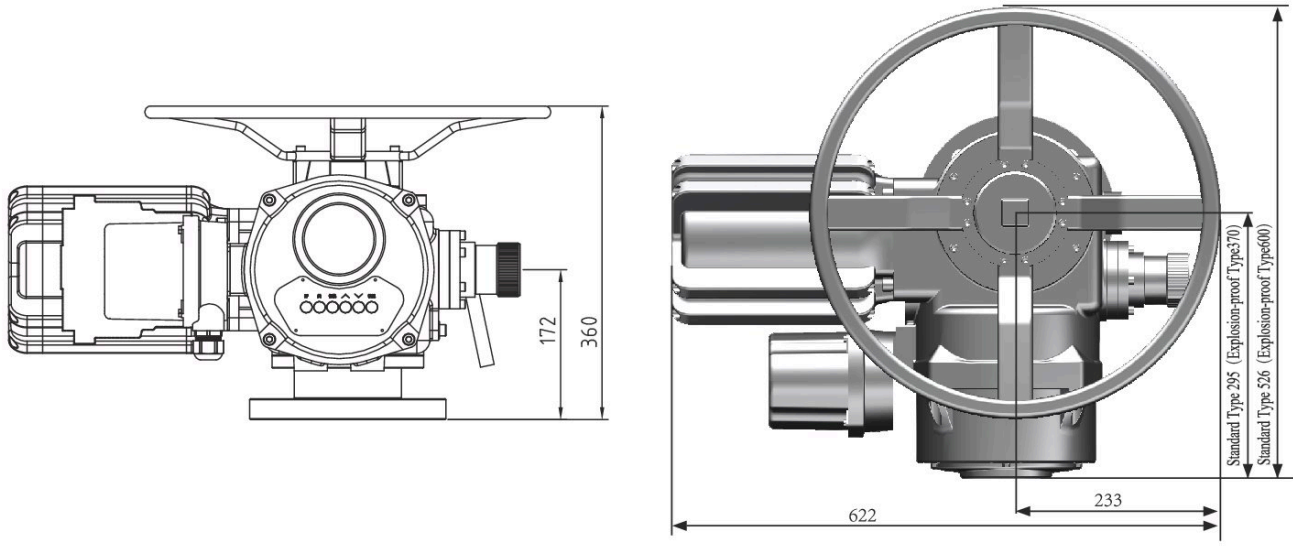
1. Outline & Connection Size(Check Pic 3-9)



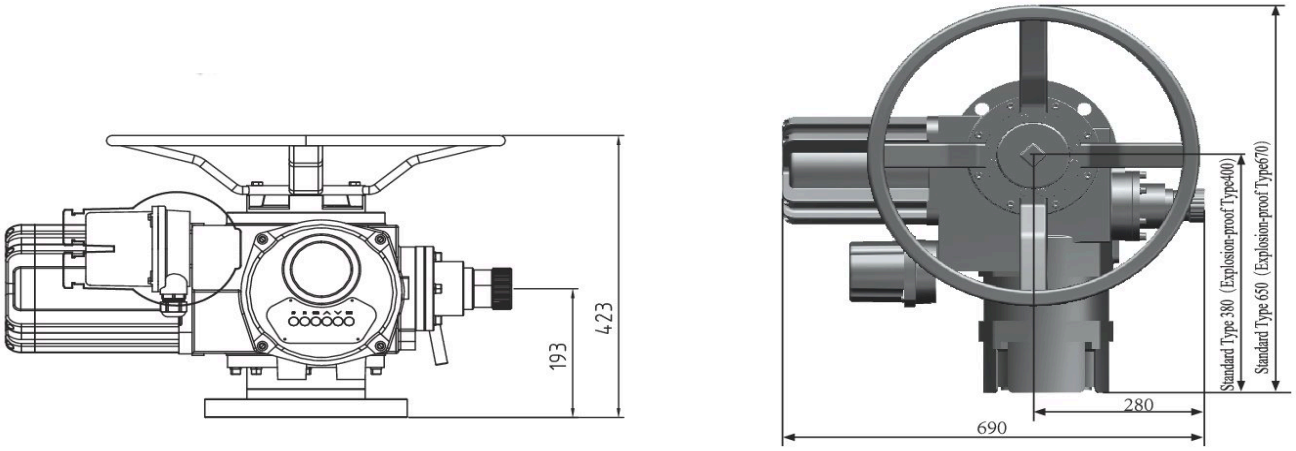
Pic 3 IK3110 To IK3115 Outline



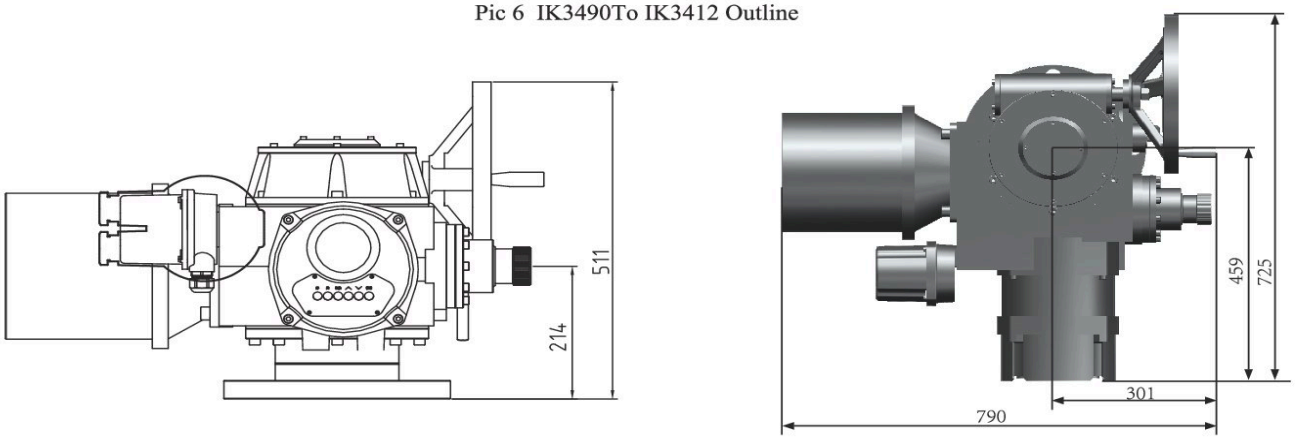
Pic 4 IK3220 To IK3230Outline



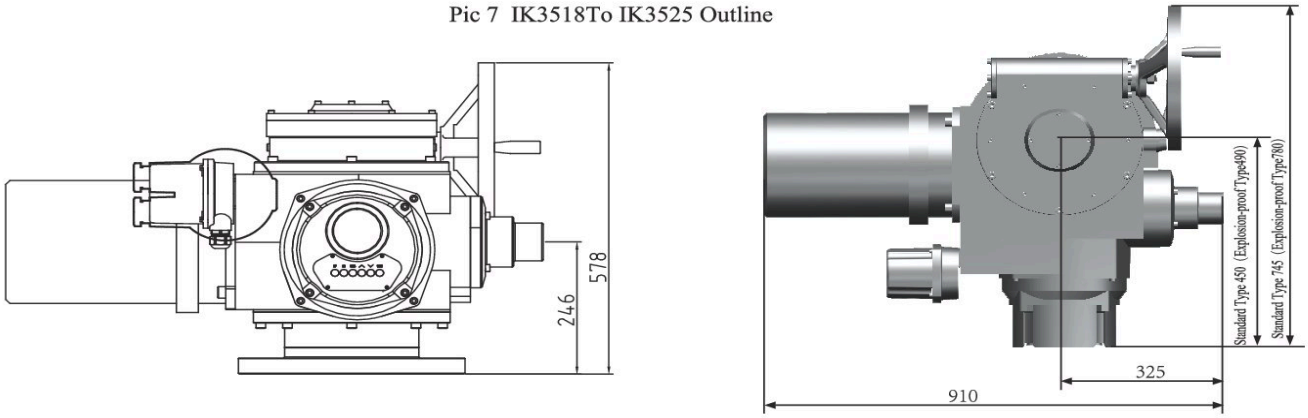
Pic 5 IK3345To IK3360 Outline



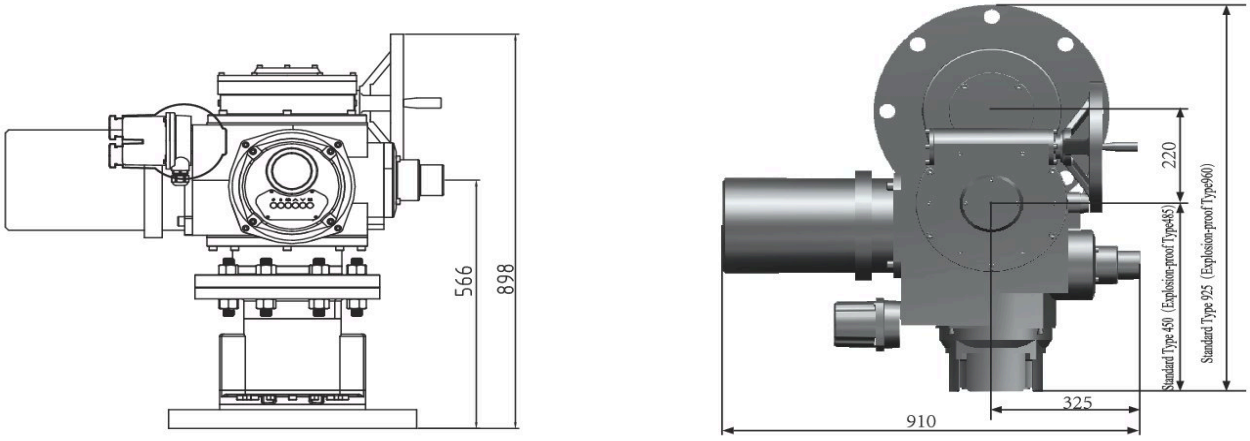
Pic 6 IK3490To IK3412 Outline



Pic 7 IK3518To IK3525 Outline



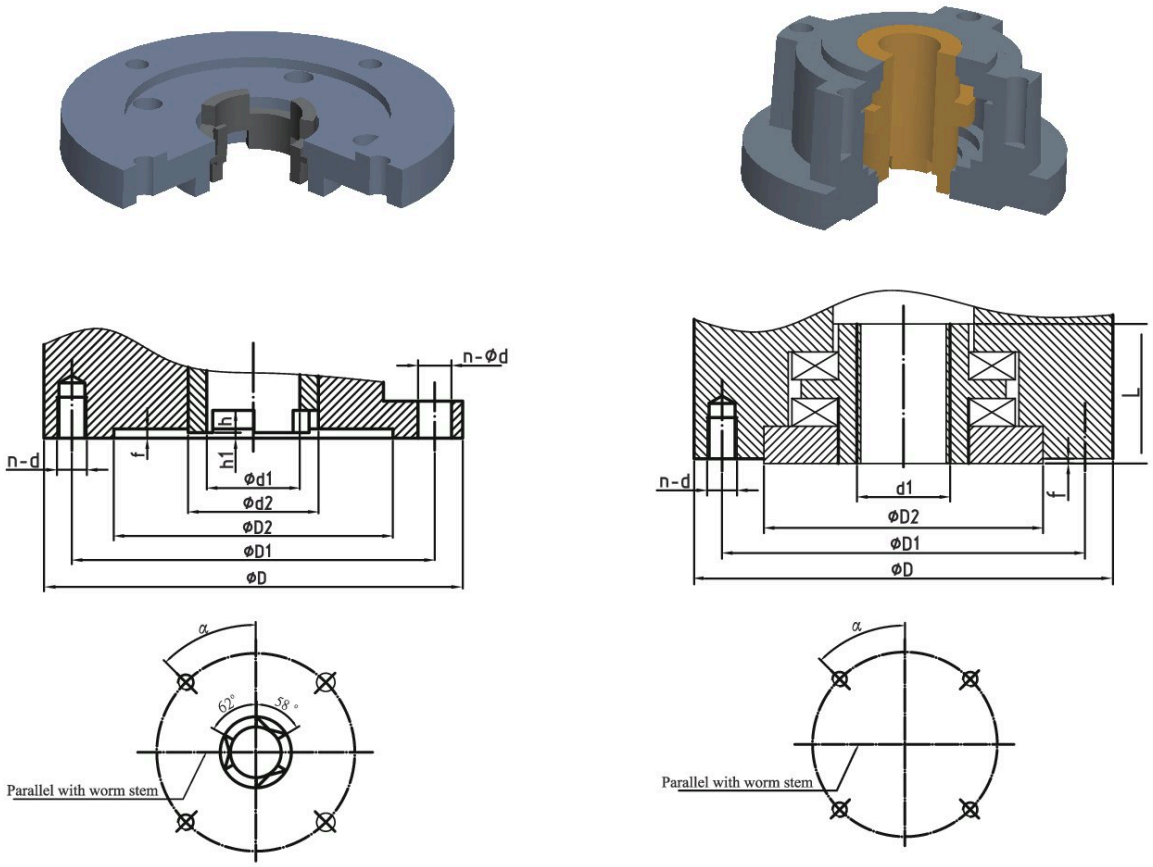
Pic 8 IK3635To IK3650 Outline



Pic 9 IK3780 To IK37100 Outline

2.Connection to Valve Diagram(Check Pic 10-11and Form 3)

The connection to valve is divied into torque type and thrust type. The standard of torque type is JB/2920 and thrust GB/T12222-2005.



Pic 10 Torque Type Connection Diagram

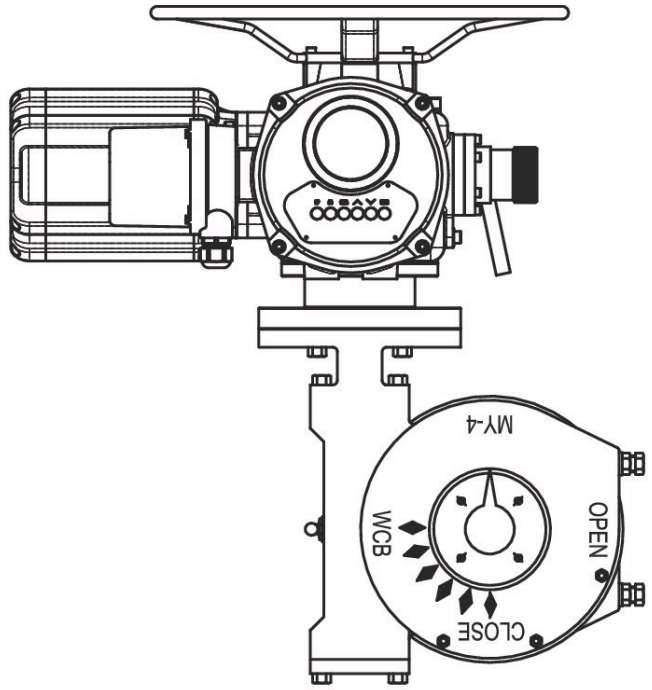
Pic 11 Thrust Type Connection Diagram

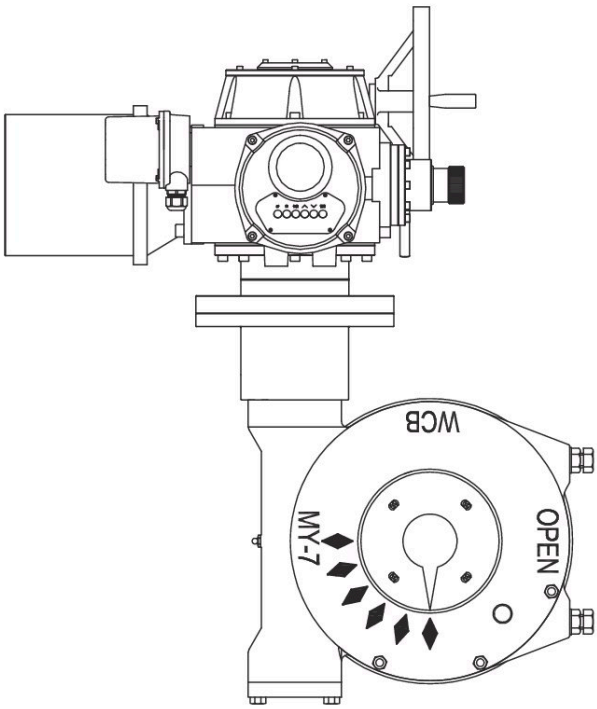
Form 3 Connection Size

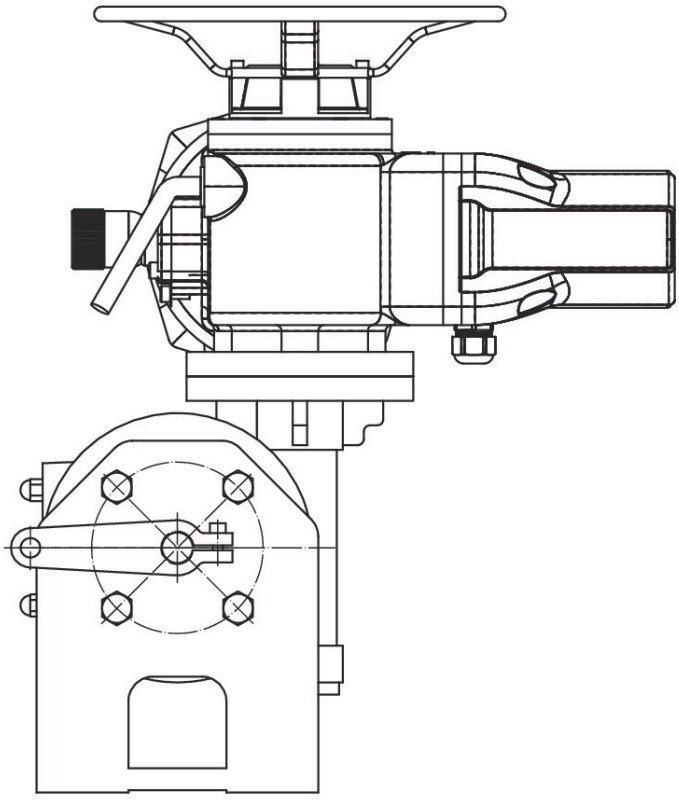
Model	Torque Type JB2920												Thrust Type GB/T12222-2005									
	Flange Size	D	D1	D2 (H9)	h1	f	h	d1	d2	d	n	α	Flange Size	D	D1	D2 (f8)	f	d1 max	d	L	n	α
IK3110/3115	2	145	120	90	2	4	8	30	45	M10	4	45°	F10	125	102	70	4	T28	M10	51	4	45°
	2 I	115	95	75			6	26	39	M8												
IK3220/3230	3	185	160	125			10	42	58	M12			F14	175	140	100	4	T36	M16	64		
	3 I	145	120	90			8	30	45	M10												
IK3345/3360	4	225	195	150		5	12	50	72	Φ18			F16	210	165	130	5	T44	M20	79		
IK3490/3412	5	275	235	180			14	62	82	Φ22			F25	300	254	200		T60	M16	88	8	22.5°
	5 I	230	195	150			12	50	72	Φ18												
IK3518/3525	6	330	285	220	3	6	16	72	98	Φ26			F30	350	298	230		T70	M20	128		
IK3635/3650	7	380	340	280			20	80	118	Φ22	8	22.5°	F35	415	356	260		T80	M30	138		
IK3780	8	430	380	300			25	83	128	Φ26												
IK37100	9	510	450	360		8	30	103	158	Φ33												

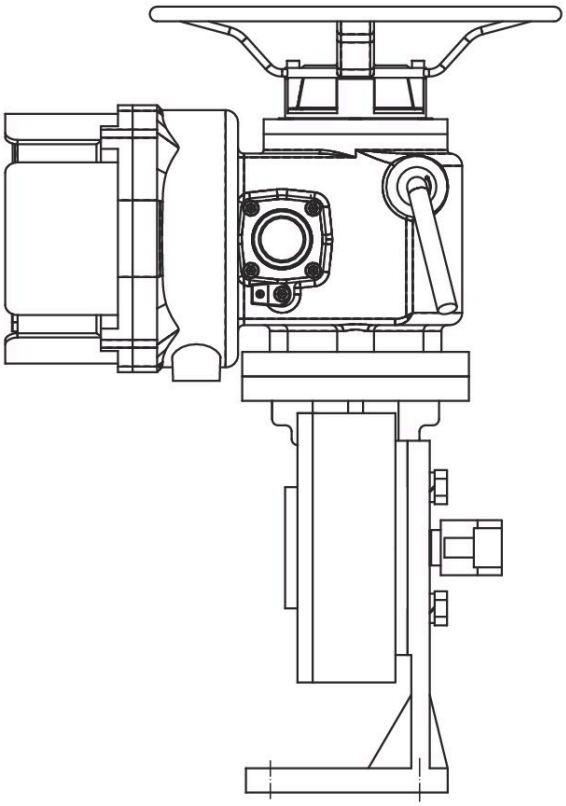
The flange size with I is power station type flange size, without I is common type flange.

10.3 Combination of electric actuator & turbo-worm reducer









XI Structure & Working Principle

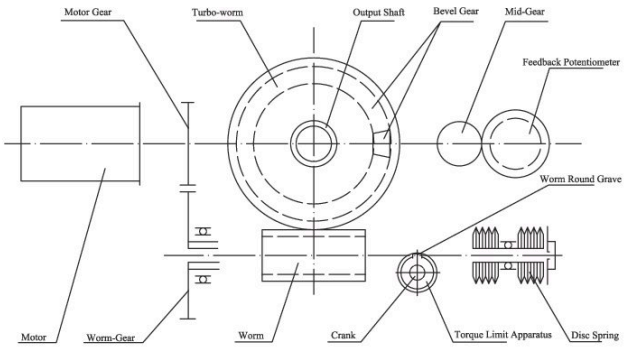
1.IK3 electric actuator consist of motor, speed reducer, torque limit apparatus, encoder, intelligent module, local operating screen, manual-electric shift organization, handwheel and electrical components. Standard type utilizes round pilot and O-ring seal; explosion-proof type has the same of seal design with standard type. It's added with explosion-proof surface and adopts explosion-proof wiring box method. Check Pic 12.

2.Standard type actuator uses YDF motor and explosion-proof type uses YDF series motor.

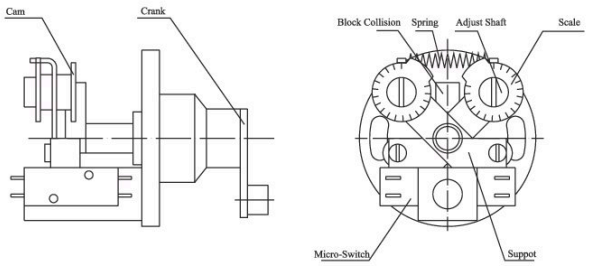
3.Speed reducer consist of a pair of spur gear and worm-gear unit. The power of motor transfers to the output by speed reducer shaft.

4.Torque limit apparatus: general components for whole series;it's structure please check pic 13. whhen a certain amount of torque is applied to output shaft, worm rotates and move to drive the crank which in turn causes the block collision to press the cam and raise the support will lift until the micro switch disconnects the power source and stops the motor so as to control the output and protect the valve.

5. Motor gear rotates with worm-gear.As worm gear rotating, output shaft led by clutch rotating finally. Electric operation is always priority. Bevel gear is rotating while output shaft is working both at manual & electric operation. Meanwhile check the change of the valve position by valve encoder.



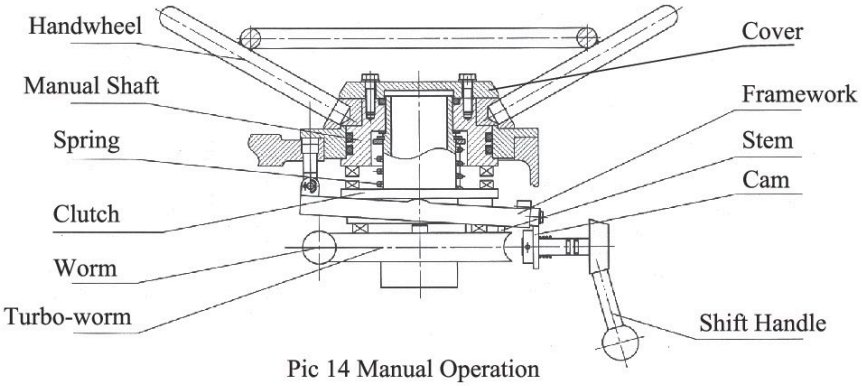
Pic 12 Electric Actuator Working Principle



Pic 13 Torque Limit Appararus

6. Electric atuator is Semi-automatic shifting and please check Pic 14. It consists of switch handle, cam, vertical bar, framework, idle clutch, pressed spring, manual axis, handwheel and ect. When operating by handwheel,first push the handle to manual operation direction, cam will rotate following the handle which rises the framework move along the axis, meanwhile the idle clutch will be upped and press the spring. When push at a certain position, the idle clutch is off the worm-gear meshing with handwheel, which makes the force of handwheel transfer to the output shaft by the idle clutch that is manually state.

When the framework is elevated to a certain position, the vertical bar installed on thr framework up rights on the worm surface, supporting framework to avoid idle clutch falling, the handle can be stopped, then operate it by handwheel. When the worm drives following the motor, the vertical posts will fall down, the idle clutch moves rapidly to the worm under the force of the pressed spring, meshing with the worm wheel, with handwheel torn off and it becomes electric state.



Pic 14 Manual Operation

XII Remote Control & Electrical Connection

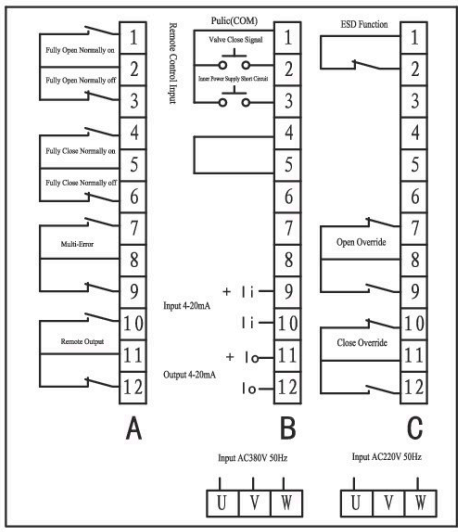
1.Unload wiring cover from actuator body.

2.Actuator's wiring

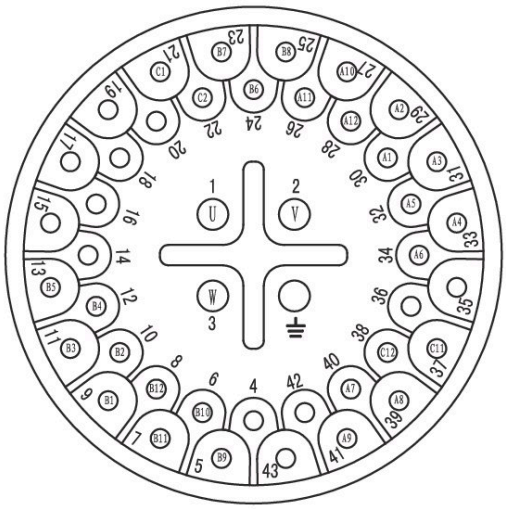
a.Supply power must be confirmed as same as the data on lable;

b.The two line entrances of standard type is M27*1.5; the two line entrances of explosion-proof type is M42*2

c.Check Pic 15 with wiring terminals diagram of standard on-off type and adjusting type.
d.Check Pic 16 and Form 4 with wiring terminals diagram of explosion-proof on-off type and adjusting type.
e.Check Pic 17-18 & Form 4 with cable installation diagram of explosion-proof type.
f.The schematic clearance between conductive parts with different potential in wiring box should meet the following requirements:
Not less than 6mm with 220 voltage, not less than 8mm with 380 voltage. There are two conduits on electric compartment, one for power cable and the other for control cable. Power cable must be provided with earth wire, connected with earthed terminal on patch board. The diameter of cable dimension please check Pic 18 &Form 5. Compress the sealing ring after wiring and keep the shore hardness of sealing ring in 44 to 45 degree. The sealing ring should be replaced timely when it's damaged or aging.



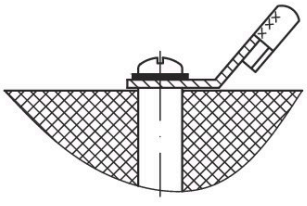
Pic 15 Wiring Terminals Diagram of Standard on-off Type



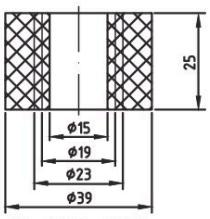
Pic 16 Wiring Terminals Diagram of Explosion-proof on-off Type

Form 4 Terminal Wiring Form

NO	Representation	NO	Representation	NO	Representation
1	AC380V or AC220V Input	18	Close Override Passive Output Public End	36	Multi-Error Passive Output Normally-Off End
2	AC380V or AC220V Input	19	Close Override Passive Output Normally-Off Contact	37	Multi-Error Passive Output Normally-On End
3	AC380V Input	20	Close Override Passive Output Normally-On Contact	38	Reserve
⏚	Grounded	21	ESD Control Signal Input End	39	Reserve
4	Reserve	22	ESD Control Signal Input End	40	Reserve
5	4 to 20 mA Control Input (+)	23	Reserve	41	Reserve
6	4 to 20 mA Control Input (−)	24	Reserve	42	Reserve
7	4 to 20 mA Feedback Output (+)	25	Reserve	43	Reserve
8	4 to 20 mA Feedback Output (−)	26	Remote Passive Output Public End		Reserve
9	On-off Type Remote Control Input Public End	27	Remote Passive Output Normally-On Contact		
10	On-off Type Remote Open Valve Signal	28	Remote Passive Output Normally-Off Contact		
11	On-off Type Remote Close Valve Signal	29	Fully Open Passive Output Public End		
12	Inner Power Supply Control when 12/13 Short Circuit	30	Fully Open Passive Output Normally-On Contact		
13	Inner Power Supply Control when 12/13 Short Circuit	31	Fully Open Passive Output Normally-Off Contact		
14	Open Override Passive Output Public End	32	Fully Close Passive Output Public End		
15	Open Override Passive Output Normally-Off Contact	33	Fully Close Passive Output Normally-On Contact		
16	Open Override Passive Output Normally-On Contact	34	Fully Close Passive Output Normally-Off Contact		
17	Reserve	35	Multi-Error Passive Output Pubilc End		



Pic 17 Terminals Connection

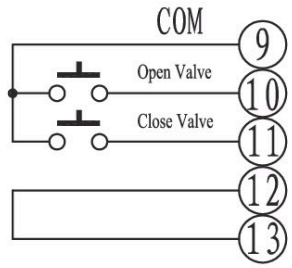


Pic 18 Seal Ring

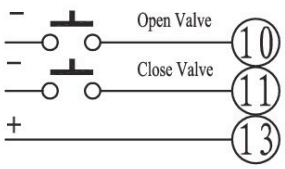
Form 5 Diameter of Cable

The inner diameter in the concentric groove of sealing ring(mm)	Φ 15	Φ 19	Φ 23
The nomial diameter of entrance cable permitted(mm)	Φ 15±1	Φ 19±1	Φ 23±1

12.3 Remote Control Wiring()

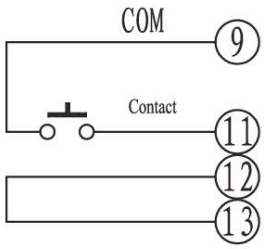


Pic 19 Inner Supply DC24V Input

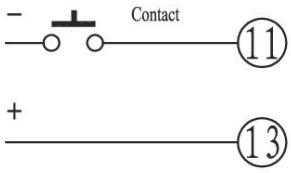


Pic 20 Outside Supply DC24V Input

(1)The option of On-Off Type remote control: Inner supply DC24V input(Pic 19), Outside supply DC24V input(Pic 20), and when remote control way is set as “FO”, “valve open” or “valve close” contact closure circuit while at work mode, when contact break circuit while at stop mode. When remote control way is set as “F1”, “valve open” or “valve close” contact inching while at maintain work mode, when “open” or “close”contact inching after maintaining the signals while at desist command mode. Actuator can be stopped at any middle position

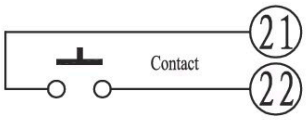


Pic 21 Inner Supply DC24V Input

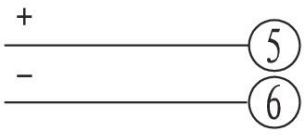


Pic 22 Outside Supply DC24V Input

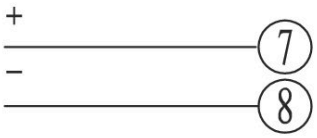
(2)The option of On-Off Type remote control: Inner supply DC24V input(Pic 21), Outside supply DC24V input(Pic 22), and when remote control way is set as “F2”, contact closure circuit while valve opens, and contact break circuit while valve closes. When remote control way is set as “F3”, contact closure circuit while valve closes, and contact break circuit while valve opens. Actuator can NOT be stopped at any middle position.



Pic 23 Remote ESD Input



Pic 24 Remote 4-20mA Input



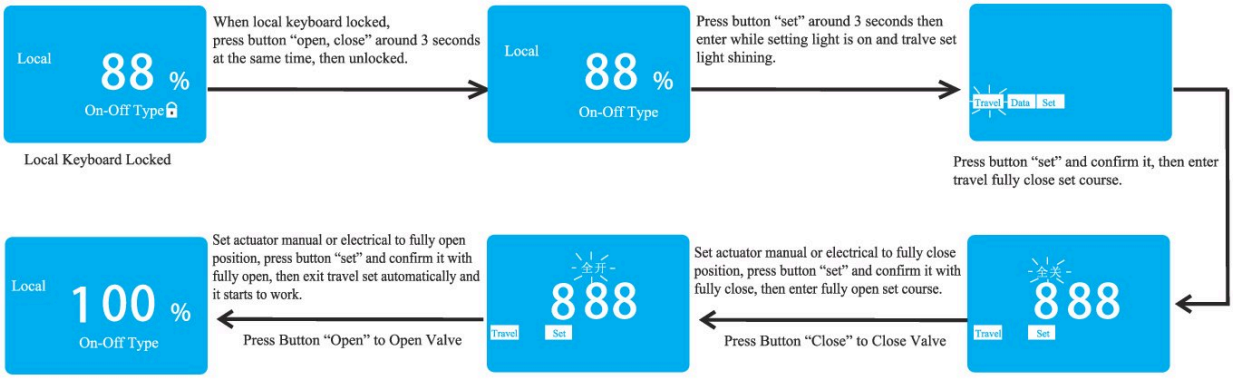
Pic 25 Remote 4-20mA Output

(3) When contact closure circuit, remote ESD input mode is active(Pic 23); Valve position feedback (Pic 25); Analog quantity control of Ajusting type(Pic 24).

XIII Data Settings of Actuators

A Intelligent on-off Type Test Process

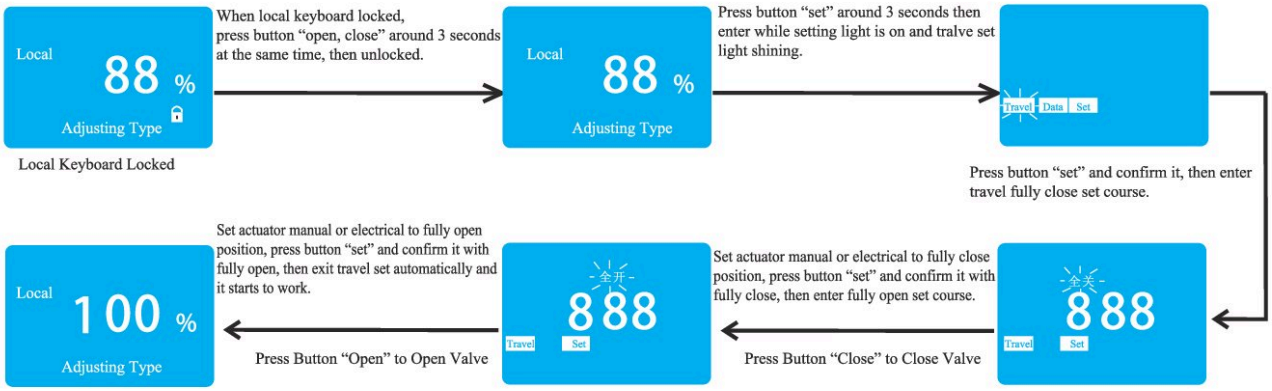
1 Travel Set



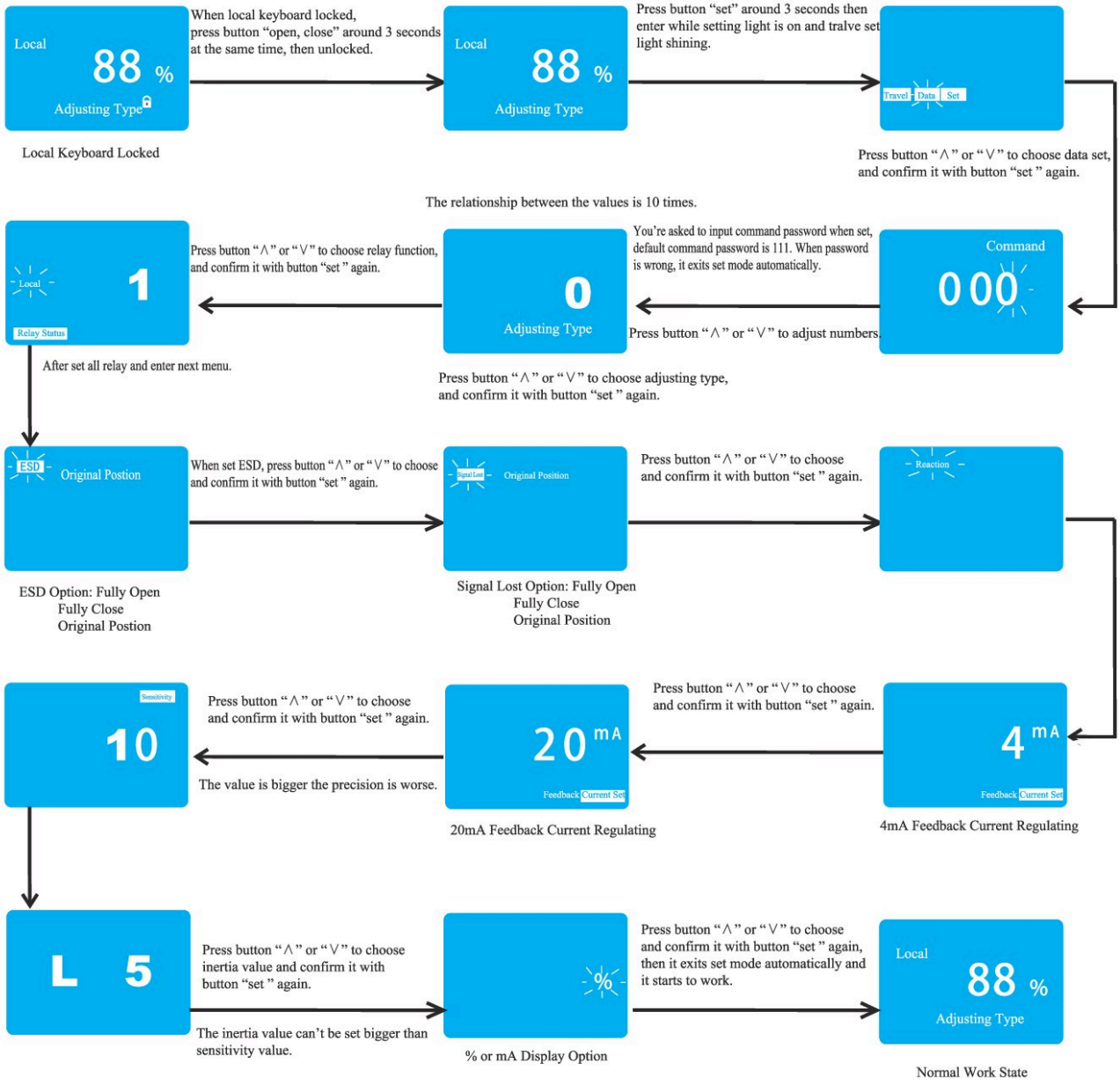
2 Data Set

B Intelligent Adjusting Type Test Process

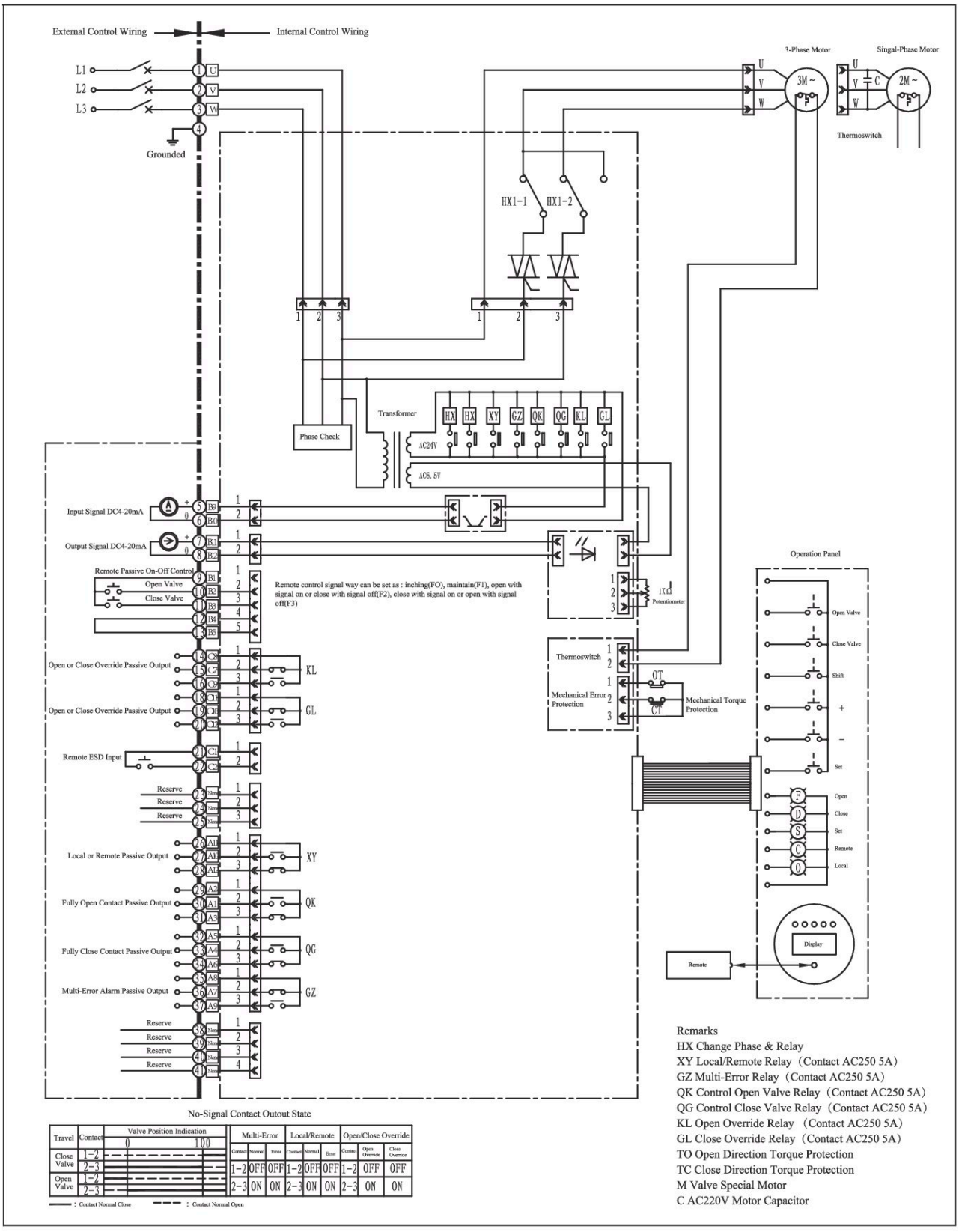
1 Travel Set



2 Data Set



XIV Intelligent on-off Type & Intelligent Adjusting Type Function Diagram



No-Signal Contact Outout State

Travel	Contact	Valve Position Indication 0 100	Multi-Error Contact	Multi-Error Normal	Multi-Error Error	Local/Remote Contact	Local/Remote Normal	Local/Remote Error	Open/Close Override Contact	Open/Close Override Open Override	Open/Close Override Close Override
Close Valve	1-2		1-2	OFF	OFF	1-2	OFF	OFF	1-2	OFF	OFF
	2-3		2-3	ON	ON	2-3	ON	ON	2-3	ON	ON
Open Valve	1-2										
	2-3										

——— : Contact Normal Close - - - - : Contact Normal Open

Remarks
HX Change Phase & Relay
XY Local/Remote Relay（Contact AC250 5A）
GZ Multi-Error Relay（Contact AC250 5A）
QK Control Open Valve Relay（Contact AC250 5A）
QG Control Close Valve Relay（Contact AC250 5A）
KL Open Override Relay（Contact AC250 5A）
GL Close Override Relay（Contact AC250 5A）
TO Open Direction Torque Protection
TC Close Direction Torque Protection
M Valve Special Motor
C AC220V Motor Capacitor

XV Installation & Disassembling

1. Installation with valve

a.The motor should be horizontal and the cover of electric compartment is recommended to be horizontal or vertical so as to be convenient for lubrication,wiring, maintenance and manual operation. And the handwheel must not be installed vertically downward.

b.Installation space should be enough for checking and disassembling.

c.The axial clearance of installment and jaw linkage is not less than 1 to 2 mm.

d. For rising-stem valve,please check if the length of stem extension comforms with the length of stem cap.

e.When installing, disassembling or adjusting actuator, explosion-proof cover surface and sealing parts must not be damaged, and must be coated with anti-rusty oil.

f. when disassembling actuator, turn the handwheel for a while make sure that valve is in open position.

2.Installation with Pipe

Lift valve and try to connect with pipe at right joint. Don't lift actuator but valve, especially actutaor's handwheel. Insure valve is in stable position before installation.

XVI Maintenance

Keep actuator in a cool and dry place if it's no need to beinstalled immediately. If actuator is installed but without wiring, please use PTFE metal sealto cover the entance of cable.

XVII Order Notice

1.If there is special requirement of product model, torque(open or close), inform us when order or we provide our own model.

2.Actuator working in explosive environment must be described clearly.

3.Please specify connection dimension standard, stem diameter and extension length clearly. If connection dimension is different from user's guide, please contact us for solutions.

4.Clockwise rotation of handwheel represents closing valve; and vice versa.

5. We also supply actuator with other output speed according to clients' requirements.

XVIII Errors & Solutions

No	Error	Cause	Solution
1	Nothing on display Or indicator lamp Off	No power supply or power cord off	Check the power supply
		Fuse on wiring board broken	Replace fuse as the same type
		Socket component of display off	Check wiring of socket component
		Circuit element of display broken	Contact for repair or change display
		Circuit element of main board broken	Contact for repair or change main board
2	Button on display Doesn't work	Socket component of display off	Check wiring of socket component
		Button on display broken	Contact for repair or change display
		Button of actuator installed wrongly	Contact for repair or change button
		Circuit element of main board broken	Contact for repair or change main board
3	No respondence of remote control	Battery runs out	Replace SR2025 Type battery
		Remote operate distance shorten	Replace SR2025 Type battery
		Circuit board of remote broken	Contact for repair or change remote

4	Overheat on display or actuator doesn't work when operate it	Motor in high temp when over-work	Cool motor and use it after solving problem
		Motor temp sensor broken	Contact for repair or change motor
		Circuit element of main board broken	Contact for repair or change main board
5	Actuator doesn't work when operate it with open valve and close valve on display	Position sensor socket component off	Check wiring of socket component
		Position sensor broken	Replace position sensor
		Screw of travel limit off	Check screw of travel limit
		Travel limit broken	Contact for repair or change travel limit
		Transit component off	Check transit component
		Transit component broken	Contact for repair or change transit component
		Circuit element of main board broken	Contact for repair or change main board
6	Actuator doesn't work when operate it with phase-lack on display	Power supply cord off	Check the power supply
		Power supply for main board unstable	Check the power supply of main board
		Contactor wiring off or broken	Checking wiring of contactor or change contactor
		Circuit element of main board broken	Contact for repair or change main board
7	Open overload or close overload	Over torque when valve open or in fully open position	Certain substance stuck in the pipe or valve and clean it
		Over torque when valve close or in fully close position	Certain substance stuck in the pipe or valve and clean it
		Short of start torque	Change actuator with larger torque
		Torque controller broken	Contact for repair or change torque controller
		Torque controller wiring off	Check torque controller wiring
		Machanical part of actuator broken	Contact for repair or change actuator
		Valve travel set wrongly or unset	Use it right after setting travle
		Circuit element of main board broken	Contact for repair or change main board
8	Motor lock-rotary	Actuator doesn't suit local environment	Change actuator with larger torque
		Certain substance stuck in the pipe or valve	Clean the pipe or valve
9	Motor doesn't stop when valve in right position	Valve travel set wrongly or unset	Check travel and reset travel
		Sensor error	Do follow No 5
		Circuit element of main board broken	Contact for repair or change main board
10	ESD on display	Remote wiring off	Check remote wiring
		Remote signal error or ESD error	Check ESD signal
		Socket component of main board off	Check socket component wiring
		Circuit element of main board broken	Contact for repair or change main board
11	Signal lost on display	Remote wiring off	Check remote wiring
		Remote 4-20mA signal error	Check remote 4-20mA signal
		Socket component of main board off	Check socket component wiring
		Circuit element of main board broken	Contact for repair or change main board

12	Actuator doesn't work with remote state after giving remote signal	Socket component of main board off	Check socket component wiring
		Actuator operate system is not at remote state	Shift work state to remote state
		Remote wiring error	Check remote wiring
		Wiring off	Checj wiring
		Circuit element of main board broken	Contact for repair or change main board
13	ripping operation when actuator works	Air switch small capacity or broken	Replace suitable air switch
		Actuator power wiring wrongly	Check wiring
		Actuator contactor broken	Replace same type of contactor
		Actuator motor broken	Replace same type of motor
14	Oil on actuator surface	Oil-lock screw off	Fasten oil-lock screw and wipe clean
15	No feedback signal	Terminal signal wiring wrongly	Check wiring
		Remote wiring off	Check remote wiring
		Socket component of main board off	Check socket component wiring
		Circuit element of main board broken	Contact for repair or change main board
16	Handwheel doesn't work	Shift device for manual & electrical locked	Rotate handwheel while shift following indicator direction
		Ring broken without following indicator direction	Contact for repair or change actuator
		Actuator broken or use handwheel without following indicator directon	Contact for repair or change actuator

ANDERSON EUROTECH
VALVES AND INSTRUMENTS

For Your Sales and After Sales, please contact:
Indonesia Sole Distributor
PT. Multi Sukses Pratama
Jl. Bandengan Utara No. 80
Rukan Bandengan Indah D No.20
Jakarta Utara, Indonesia
(62) (21) 29379590, 29379591, 68292838, 8822918 (62)
(21) 29379571
E-mail: sales@suksespratama.com