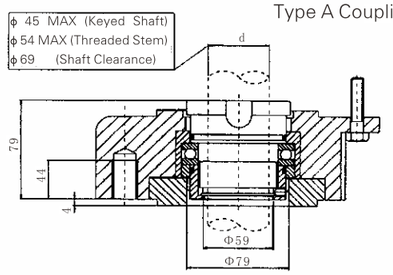
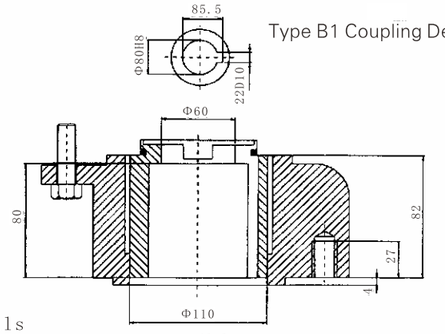
IA/IM35 output shaft joining mode and dimension

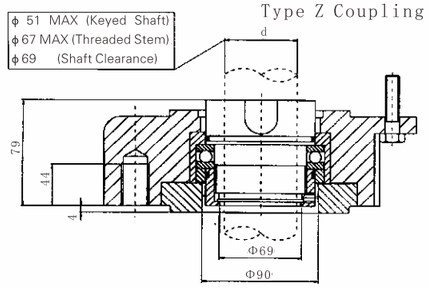
Type A Coupling Details



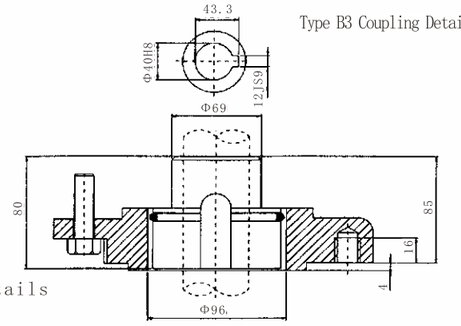
Type B1 Coupling Details



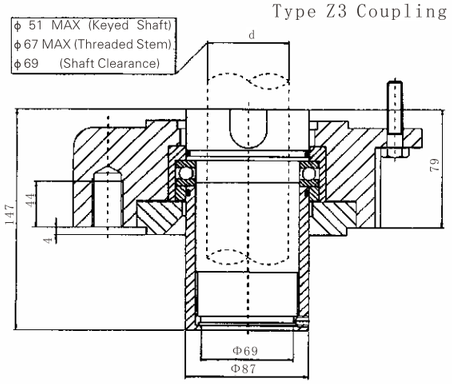
Type Z Coupling Details



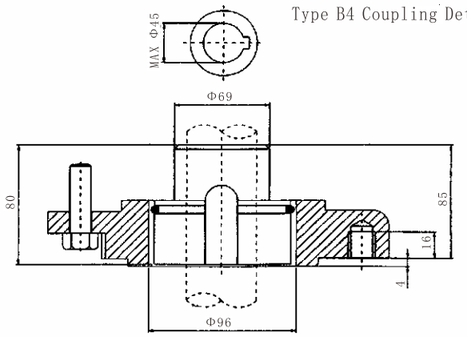
Type B3 Coupling Details



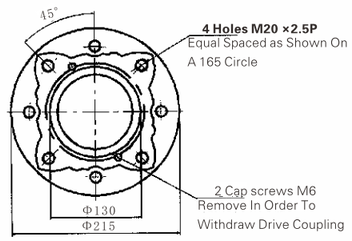
Type Z3 Coupling Details



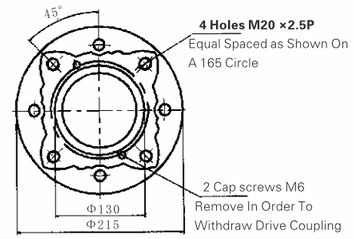
Type B4 Coupling Details



Type A/Z/Z3 Base F16

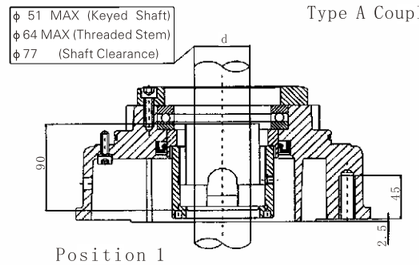


Type B1/B3/B4 Base F16



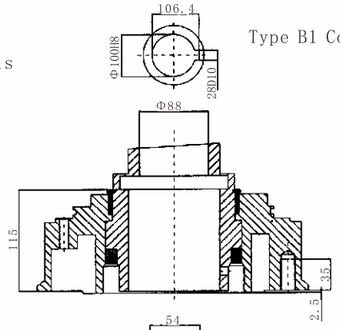
IA40 output shaft joining mode and dimension

Type A Coupling Details

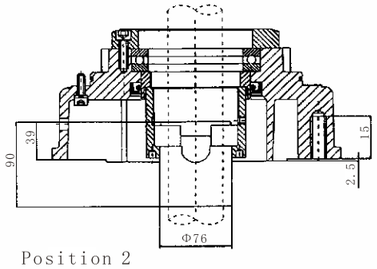


Position 1

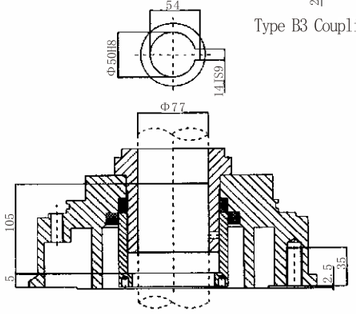
Type B1 Coupling Details



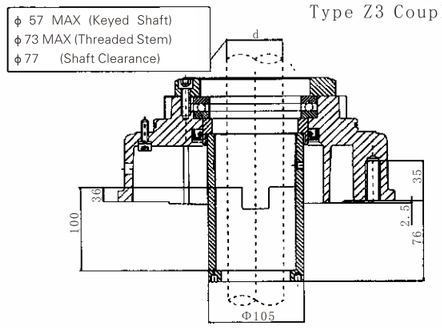
Position 2



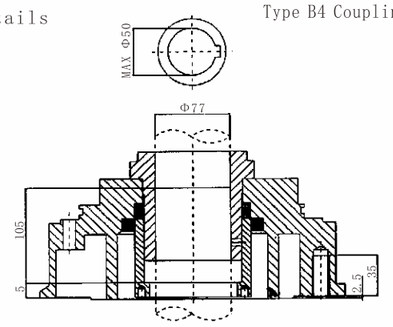
Type B3 Coupling Details



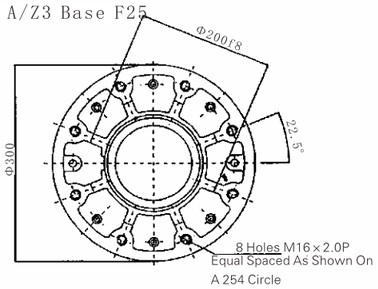
Type Z3 Coupling Details



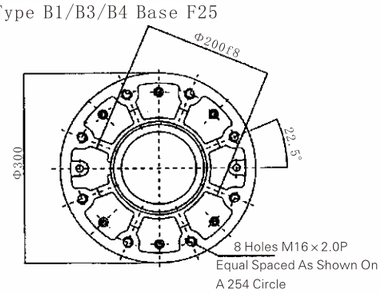
Type B4 Coupling Details



Type A/Z3 Base F25

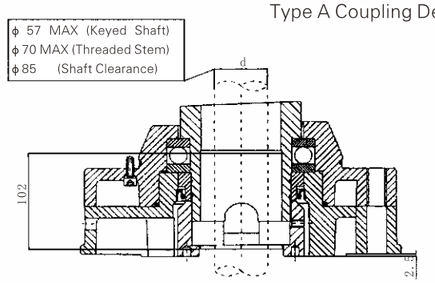


Type B1/B3/B4 Base F25

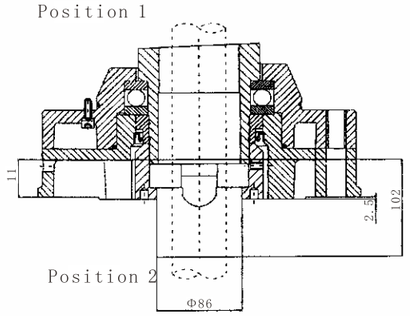


IA70 output shaft joining mode and dimension

Type A Coupling Details

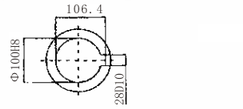


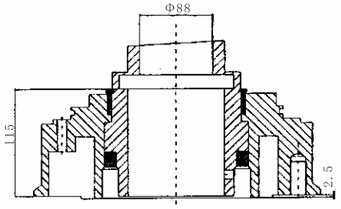
Position 1



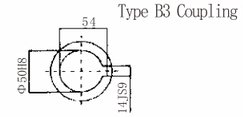
Position 2

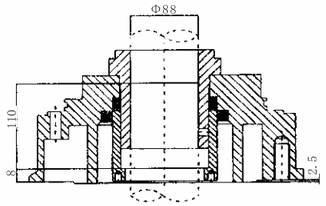
Type B1 Coupling Details



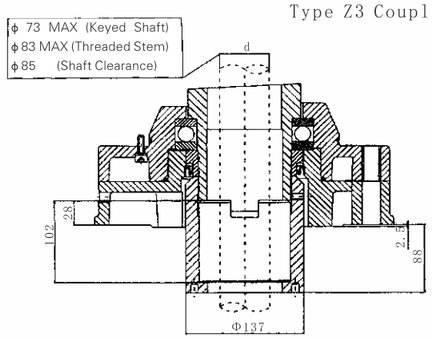


Type B3 Coupling Details

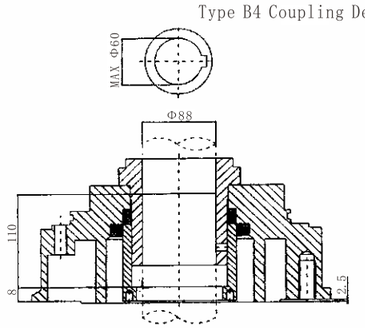




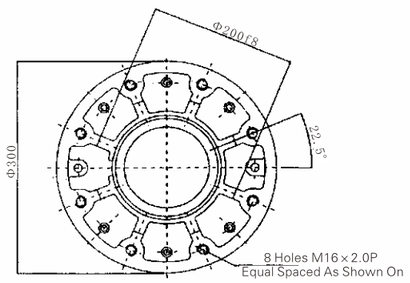
Type Z3 Coupling Details



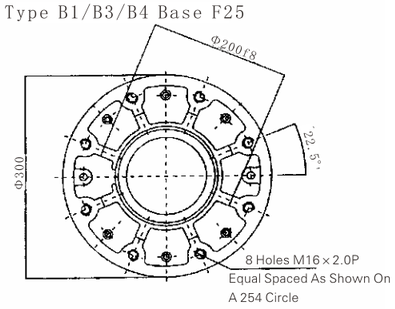
Type B4 Coupling Details



Type A/Z3 Base F25

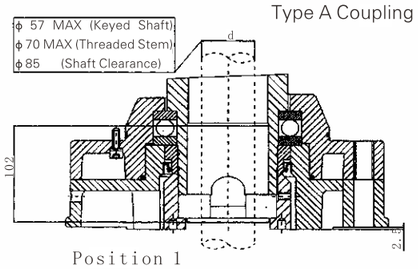


Type B1/B3/B4 Base F25

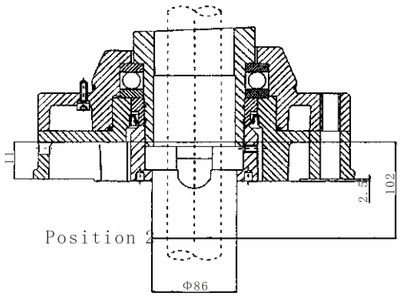


IA90 output shaft joining mode and dimension

Type A Coupling Details

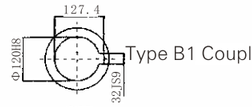


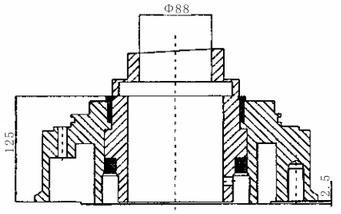
Position 1



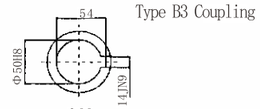
Position 2

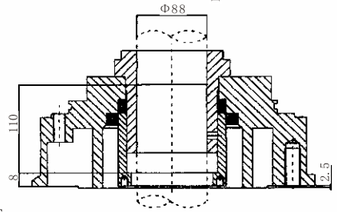
Type B1 Coupling Details



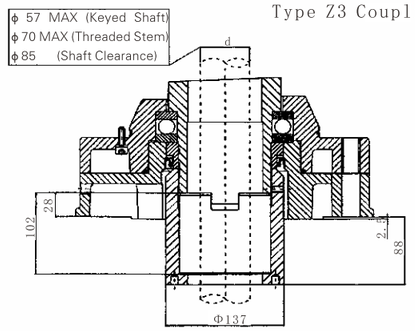


Type B3 Coupling Details

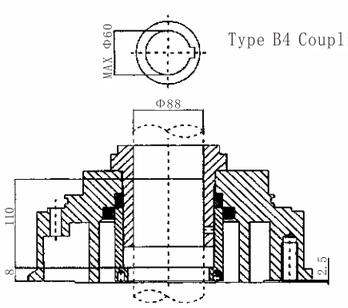




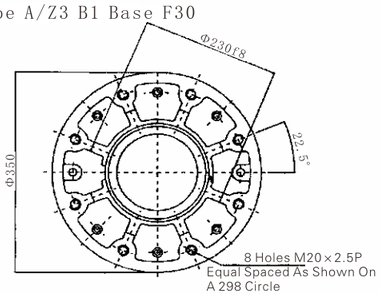
Type Z3 Coupling Details



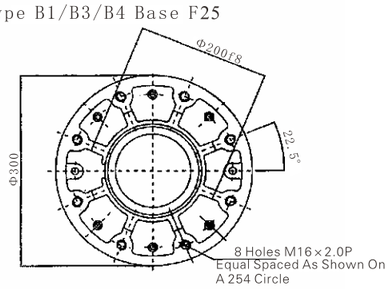
Type B4 Coupling Details



Type A/Z3 B1 Base F30

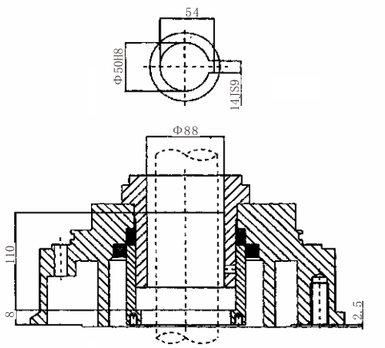


Type B1/B3/B4 Base F25

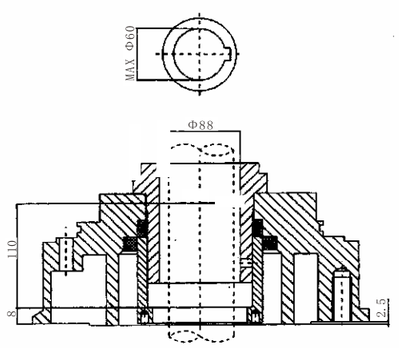


Ia91 output shaft joining mode and dimension

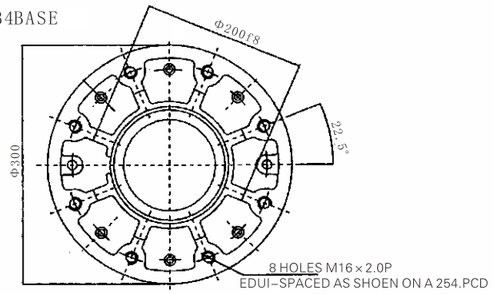
Type B3 Coupling Details



Type B4 Coupling Details

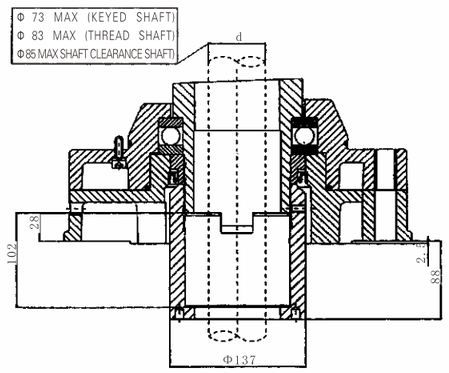


TYPEB3/B4BASE

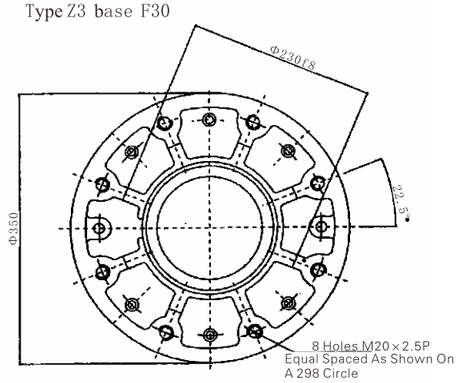


Ia95 output shaft joining mode and dimension

Type Z3 coupling details



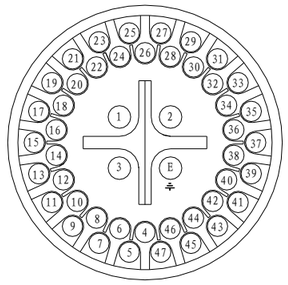
Type Z3 base F30



Ⅶ Connections

The connection modes of the intelligent actuator are corresponding the functions customer fitted link as the actuator functions to meet with the requirement of the automation control system. The actuator own the function and opposite terminals as shown:

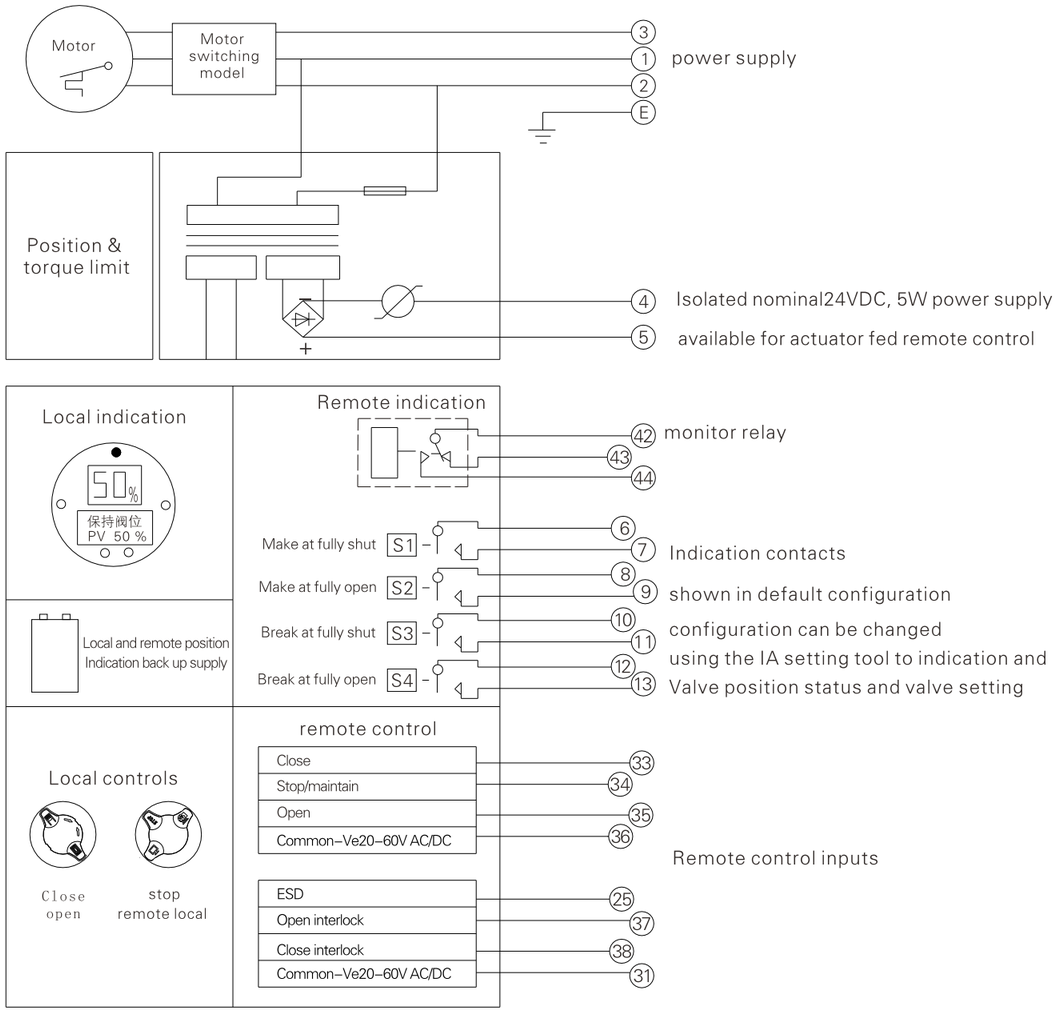
These terminals used as following are essential configured terminal others are applicable for extra indication contacts or optional functions.



① ② ③	Power supply
Ⓔ	Earth wire
④	Internal 24VDC supply (_)
⑤	Internal 24VDC supply (+)
⑥ ⑦	Indication contact S1, close normally open
⑧ ⑨	Indication contact S2, open normally open
⑩ ⑪	Indication contact S3, close normally closed
⑫ ⑬	Indication contact S4, open normally closed
⑭ ⑮	Indication contact S5, close normally open
⑯ ⑰	Indication contact S6, open normally open
⑱ ⑲	Indication contact S7, torque trip mid travel normally open
⑳ ㉑	Indication contact S8, torque trip mid travel normally open
㉒	Valve position signal output (+)
㉓	Valve position signal output (_)
㉔	Valve torque signal output (+)
㉕	ESD signal
㉖	Analogue signal input (+)
㉗	Analogue signal input (+)
㉘	
㉙	
㉚	Valve torque signal output (–)
㉛	ESD open interlock/close interlock/common ve
㉜	
㉝	remote close
㉞	Remote close/remote open /stop /maintain control terminal
㉟	remote open
㊱	Remote close/remote open /stop /maintain common–VE
㊲	Open interlock
㊳	close interlock
㊴	Flomatic/auto control terminal
㊵	
㊶	manual /auto 24VDC common–VE
㊷ ㊸ ㊹	monitor relay
㊺	
㊻	
㊼	

Actuator circuit diagram–basic

IA actuator basic circuit diagram 3000–000, drawn in mid–travel power off



Option control and indication equipment

The infer-red setting tools enable options to be configured

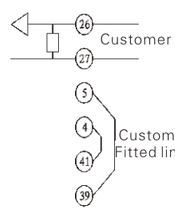
for applicable circuit diagram refer to page33. 34

Actuator circuit diagram–options
Optional control and indication equipment

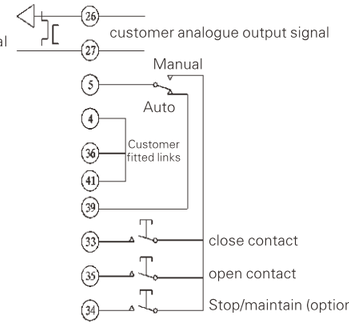
Extra indication contacts

shown in default configuration, configuration can be changed using the IA setting tool to indication, status and alarm setting. Contacts are shown in not true state

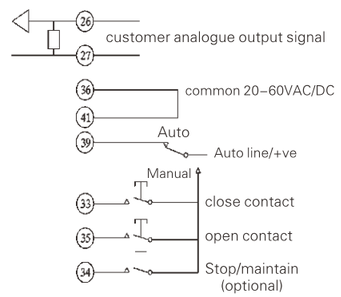
Analogue folomatic control only



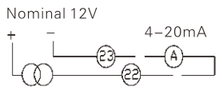
Analogue folomatic control with internally fed remote manual override



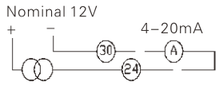
Analogue folomatic control with internally fed remote manual override



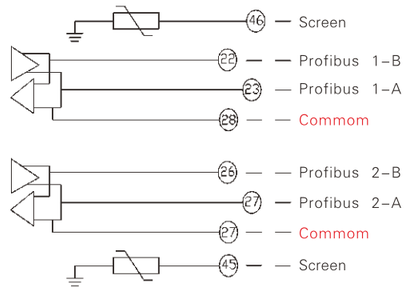
Valve position–CPT



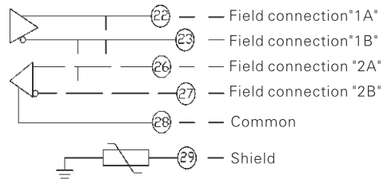
Valve torque– CTT



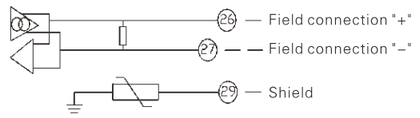
Profibus--DP



Modbus wire 2/ wire 4 RS485 Highway



Foundation fieldbus



Actuator circuit diagram-number code

Standard control and indication options

Basic IA ranges actuator circuit diagram 3000–000 and IM range circuit diagram 3000–000 include local control and indication station, remote open/stop/close/ESD and interlock control and 4 confinable indication contacts

Function parameter								
Circuit diagram								
Type	IA IM	3 5						
Remote indication contact	Basic contacts S1–S4 +Extra indication contacts S5–S8	0 1						
Remote analogue indication	No remote analogue indication Valve position–internally fed 4–20mA CPT Valve torque internally fed 4–20mA CTT Valve position +Valve torque（CPT+CTT）		0 1 2 3					
Actuator power supply	3–phase Single phase option			0 1 2				
Control polarity	Positive switching control（neg common） Negative （pos common）				— N			
Analogue control	No analogue control Analogue proportional control					0 1		
Speed control	Single speed 2–speed control interrupt timer						0 1	
Actuator fed control supply	Basic24V DC actuator fed remote control supply							0

Note：*CTT：valve torque feedback signal **CPT：valve position feedback signal
The type, circuit diagram, function optional can be noticed in order

Fieldbus system control options

Function parameter								
Circuit diagram								
Type	IA IM	3 5						
Digital aux output	No digital aux output Digital aux output		0 1					
Actuator power supply	3–phase Single phase option			0 1 2				
Fieldbus system	Modbus Modbus dual redundant Profibus Foundation					4 5 6 8 9		
Speed control	Single speed 2–speed control interrupt timer						0 1	
Actuator fed control supply	Basic24V DC actuator fed remote control supply							0

Note:1+noticed in order that type ,circuit diagram ,function optional

Eergency Shut Down and interlock control circuits

ESD and interlock control circuit may be added to any of the remote or analogue circuit.Emergency shut down ESDsignal will overmide any existing local or remote signal.The actuator can be configurel to open,closeor stay put as a response to an ESDsignal.ESD signals must be derived form a latching contact.The actuator can be configured to respand to an ESD from a makingorbreaking contact.

If required,ESD operation can be configured to override the motor thermostat,local stop,active interlocks or interrupter timer option.

Overriding the motoer thermostat duing ESD will invalidate hazardous area certification .Unless specified with order the actuator will be dispatched set for the following :active high signal (contact making),close on ESD.ESD will not override motor thermostat,local stop, active interlock or interrupter timer.

Change in ESD configuration are made using the supplied IA setting tool.

Interlock circuit contact

The default setting is for the interlock function turned off,If interlock facilitier are required the IA setting tool can be used to configure the interlocksON.

Interlocks are active in both local and remote control.If only one interlock is required,the other must be linked out as shown.

Key

4 24V DC –ve

31 ESD/IL common20–60VAC/DC

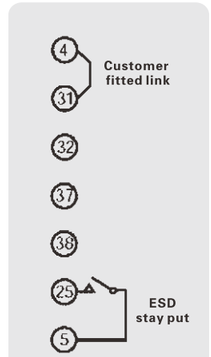
37 open interlock

38 close interlock

25 ESD/thermostat by pass

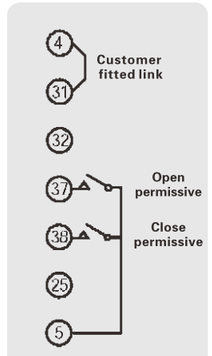
5 24V DC +ve

ESD control circuit

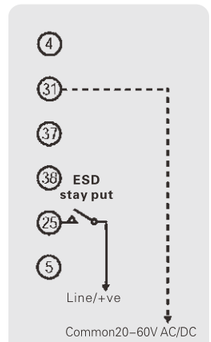


▲ ESD-internally fed

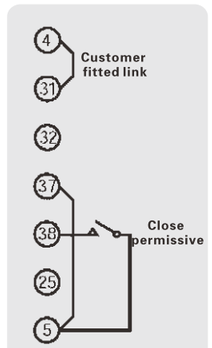
interlock control circuits



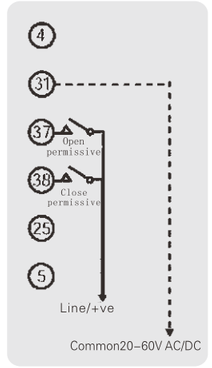
▲ open/close interlock active-internally fed



▲ ESD-internally fed



▲ Close interlock active-internally fed



▲ Open/close interlock active-internally fed

Remote control circuit
Remote control system wiring schematicsfor standard IA are shown

Standard actuators are dispatched without terminal links.

A commissioning lag located in the terminal compartment includes terminal screws, spare cover O rings, actuator circuit diagram, and the installation and maintains instruction. The actuator including the IA setting tool will be indication with a yellow label on the terminal compartment cover.

Remote control inputs are onto–isolated interfaces with a surge immunity of 2KV.Standard control is positive switching (negative switching is available of specified).

The basic IA remote control of intellegent equipments can be controlled using remote control signals defined as follows:

Customer fed control circuit supply:

with in the ranges 20–60V AC/DC.

Actuator fed control circuit supply:

24VDC,5W rated.

The current drawn for each control input:

5mA at 24VDC

Minimum ON voltage: 20V

Maximum OFF voltage: 3V

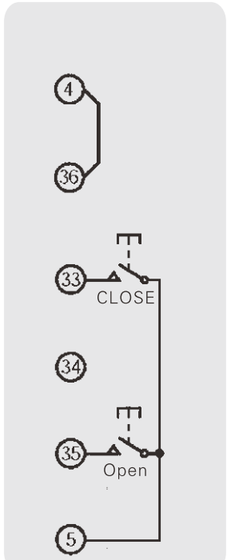
Minimum signal duration: 300ms.

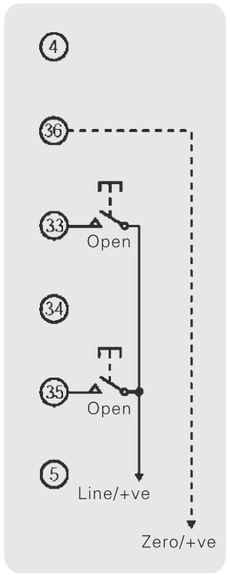
Maximum remote control cable capacitance:

2μF core to core

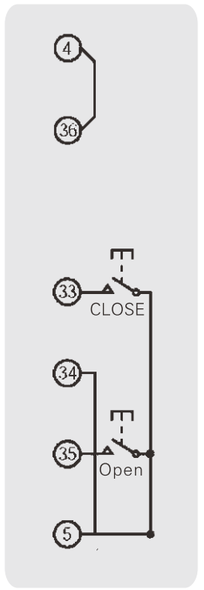
*IM series the shortest time for signal: 100ms

Open/close push–to–run control

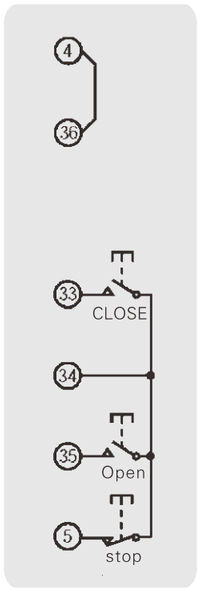




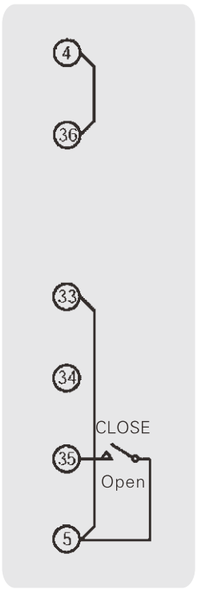
Open/close maintained control with mid–travel



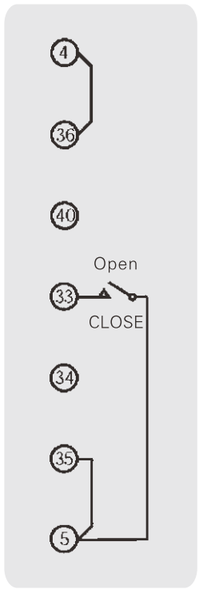
Open/stop/close maintained control



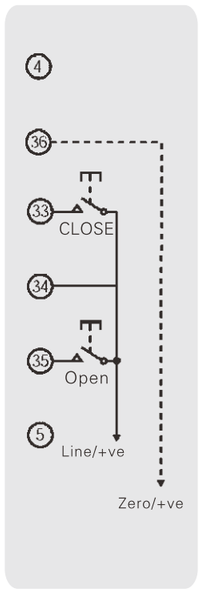
Two–wire control;energize to open, de–energize to close (configure for open priority) customer to link5–33

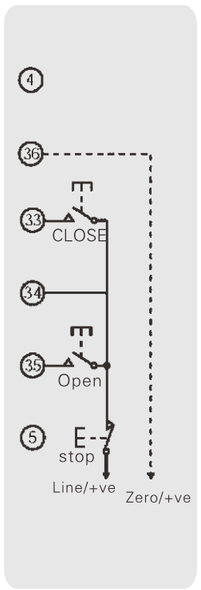


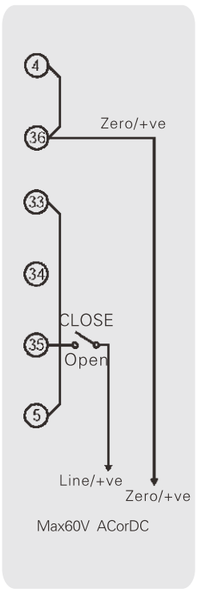
Two–wire control; energize to close, de–energize to open(configure for close priority)customer to link5–33

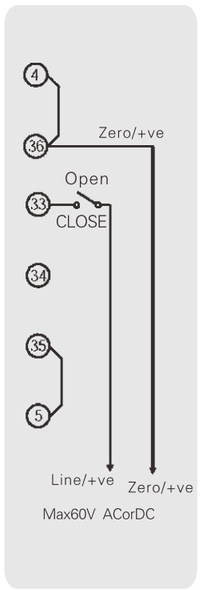


Internally fed circuifs









Exterlly fed circuifs

≡ checkout

Checking IA/IM range multi-turn actuator

3–phase power supply can be connected to the terminal ① ② ③， the input signal source 4–20mA.DC can be connected to the terminal ㉖、㉗.Fitted link the terminal ④and ㊶ terminal ⑤and ㊴. local operating: with the red selector positioned at 'local', If the actuator internal setting is set as maintained Operating the adjacent black knock (clockwise).the actuator will be turned to close ,unless turning the red selector to the 'stop'.If internal setting of the actuator is set as push–to–turn, pushing the black knock (clockwise). The actuator will be turn to close, once the adjacent black knock is free. The actuator will be stopped.

Turn the red selector to"remote"(clockwise).The actuator receives the input signal from the terminal ㉖、㉗ If the input signal valve is less than the valve of the valve position led back signal. The actuator will run towards to close direction until the tolerance valve of the signals is less than the control dead band setting. If the input signal valve is more than the valve of the valve direction until the tolerance valve of the two signals is less than the control (setting)

Turning the red selector to "local"position .You can operate with the setting tool. Press the ⓘ Button. The actuator set maintained will run towards close direction until closed If the actuator is push–to–turn. It will be closed, once you release the ⓘ Button It will be stopped .So as the open button.

The default settings have been set and checked.

≅ the setting and operating of the functions parameters

(丨) operating mode

1、local operating

A、electrical operating

There are two knobs under the display window. The red one is the selector knob. It can be positioned three positions; "remote","stop"and "local". The black one is the operating knob .Turn it clockwise to close the valve and turn it anticlockwise to open the valve. When the select knob is on the local position, turn the black knob clockwise to let the equipment start to close the valve.

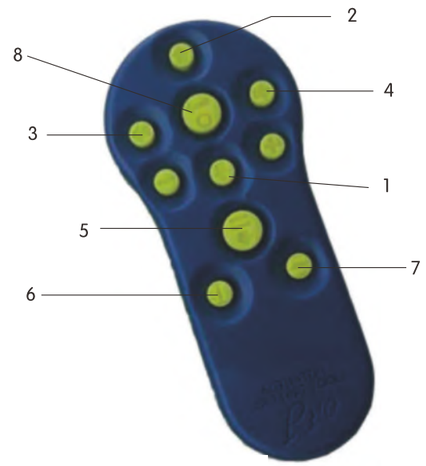
B、manual operating

Turn the red selector to the local position. Press the hand/auto lever into "hand"position and turn the hand wheel to engage the clutch. If it is difficulty to press the lever, You can press the lever while turning the hand wheel .

2、infrared local operation

the operation functions of the setting tool

1) key display next function or decrease
2) key display last function or decrease
3) key enter displayed function or valve
4) key return back displayed status
5) key stop actuator
6) key close actuator
7) key open actuator
8) key extended function



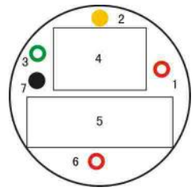
Turn the red selector to the "local"
Position .You can set the functions and parameters by using the setting tool
3 Remote control: turn the red selector to the"remote"
Position. The actuator will accept the standard controlling signal to open, to close or stop

(二) setting functions and parameters

Turn the red selector to the local position .You can set the limit, torque, functions and parameters by operating the four keys at the function and parameter area on the setting tool.

1、display of the actuator

Display the indication of the actuator position the display screen consist of:



"fig"Display screen

1) Red indicate "open"position
2) Yellow indicate"mid–travel"position
3) Green indicate"closed"position
4) LCD1–indicate valve position
5) LCD2– indicate the operating states
6) Actuator alarm indicator lamp (red)
7) Infra red receiver

On power up. The actuators liquid crystal display screen is back–lit with a "soft amber"light and one of the indicator lamps will be on ,dependent on position .The display screen will show percentage open or an and of travel symbol (see figs)

As standard, red lamp signifies valve open. Yellow intermediate and green lamp signifies valve closed.

Open :red lamp and open icon

mid–travel: yellow lamp and percentage open

closed: green lamp and closed icon

With the main power supply switched off the LCD screen in powered lay a battery dose not support screen bake–lighting or position indicator lamps

2. Display–Moving states indication

This display consists of : (A) Normal indication （B）alarm indication

A´ Normal indication`` –––––Display the percentages open of the valve position and input signal

–––––Display the percentages open of the valve position and the percent of the Torque valve

White the red selector turned to the"local"or "stop"position. Press the key, the display will be changed from percentages of valve position &input signal into–display the percentages open of the valve position and the percent of the torque valve. The time retained of this display is about 30 seconds.

Display the percentages open of the valve position and input signal:

Stop state

close state

open state

Display the percentages open of the valve position and the percent of the torque valve:

Stop state

close state

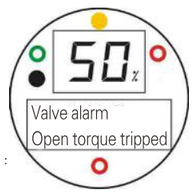
open state

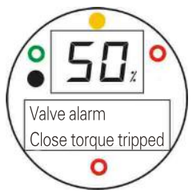
B、Alarm indication

（Ⅰ）valve alarm：

1) torque tripped alarm

torque tripped alarm indication as shown:





The actuator will be "trip–off" of the valve of torque more than configured torque valve. And electrical operation at the same direction is inhibited. The alarm will remain displayed until entering setting state.

2) Valve stalled alarm indication

Valve stalled alarm as shown:

Close stalled

Open stalled

The control circuits are detecting the valve position, while actuator moving .If the control system of the actuator sent a instruction to run, but can not detect any change of the valve position in 7 seconds. It will send a valve stalled alarm and jump off the contact. The operation in the same direction is inhibited .Note: entering setting state, the stalled alarm will be release.

Ⅱ control alarm indication:

1）ESD alarm

The position of the actuator can be presented to open, close or stay put, while an ESD signal is applied, once the ESD signal disappear ,The control alarm will not be displayed.

2）Signal Lost Alarm

The position of the actuator can be presented to open, close or stay put, The indication will display the signal lost of the control alarm while the input signal is lost. Once the signal appear ,The control alarm will be disappear.

Ⅲ Actuator alarm：

1）phase lost alarm

The actuator will send an instruction to cut off the power supply of the motor and display the alarm on indicate window ,while it check the one of the phase voltage lost .Until power supply is normal. The alarm will

2）inner communication error alarm

The actuator display alarm and disable electric operation ,while the control circuit can not receive any signals of the valve position .The alarm indication disappear until the control circuit receive thesignalsagain.

3) overheating alarm

Once the temperature of the motor raise to the limited value. The alarm display and disable the electric operation. The alarm indication will be disappear until the temperature cold down under the limited

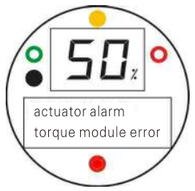
4) battery low alarm

The battery alarm is displayed when the actuator detect battery is low, the alarm will be disappear until exchanging battery.

5) local module error alarm

The local module error alarm is displayed when the connection between the local PCB in the controller box and main PCB or the magnetic steel in the operator knob or in the red selector is out of the question.

6)torque module error alarm

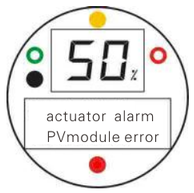


The actuator display the torque module error alarm while the control circuits checked the torque signal is

7)24V error alarm

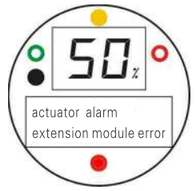
The actuator display the 24V error alarm when the control circuit detected the inner supplyisfailure .

8)PV module error alarm



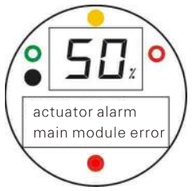
Once the position circuit is failure . The actuator will display the PVmodule error alarm .

9)extension module error alarm



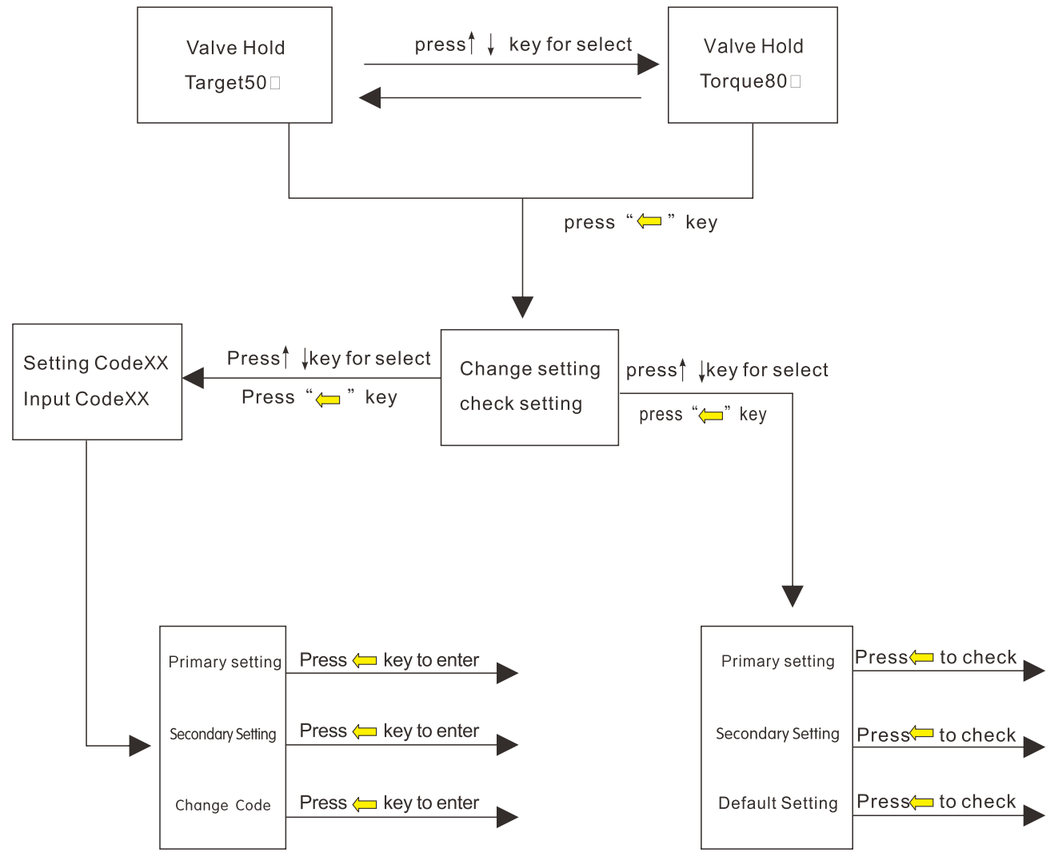
If the communication or connection between the extension module and main module is failed . The extension module error alarm.

10)main module error alarm

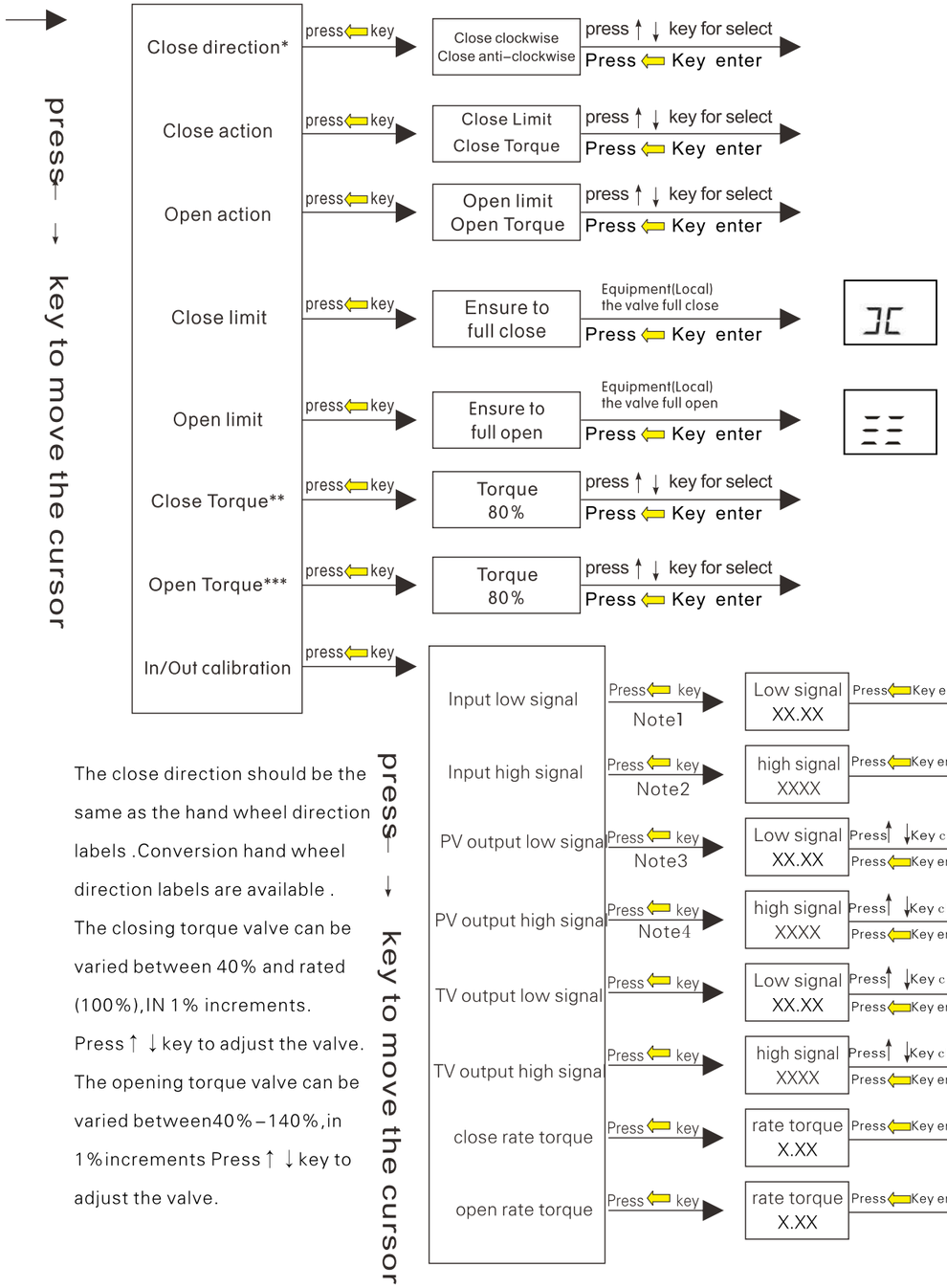


When the communication between the control circuit chip and the memory chip is tailed. The actuator will display the main module error alarm.

3.The functions 、 parameters setting .



3.1 Primary functions and parameters setting



The close direction should be the same as the hand wheel direction labels .Conversion hand wheel direction labels are available .

The closing torque valve can be varied between 40% and rated (100%),IN 1% increments.

Press ↑ ↓ key to adjust the valve.

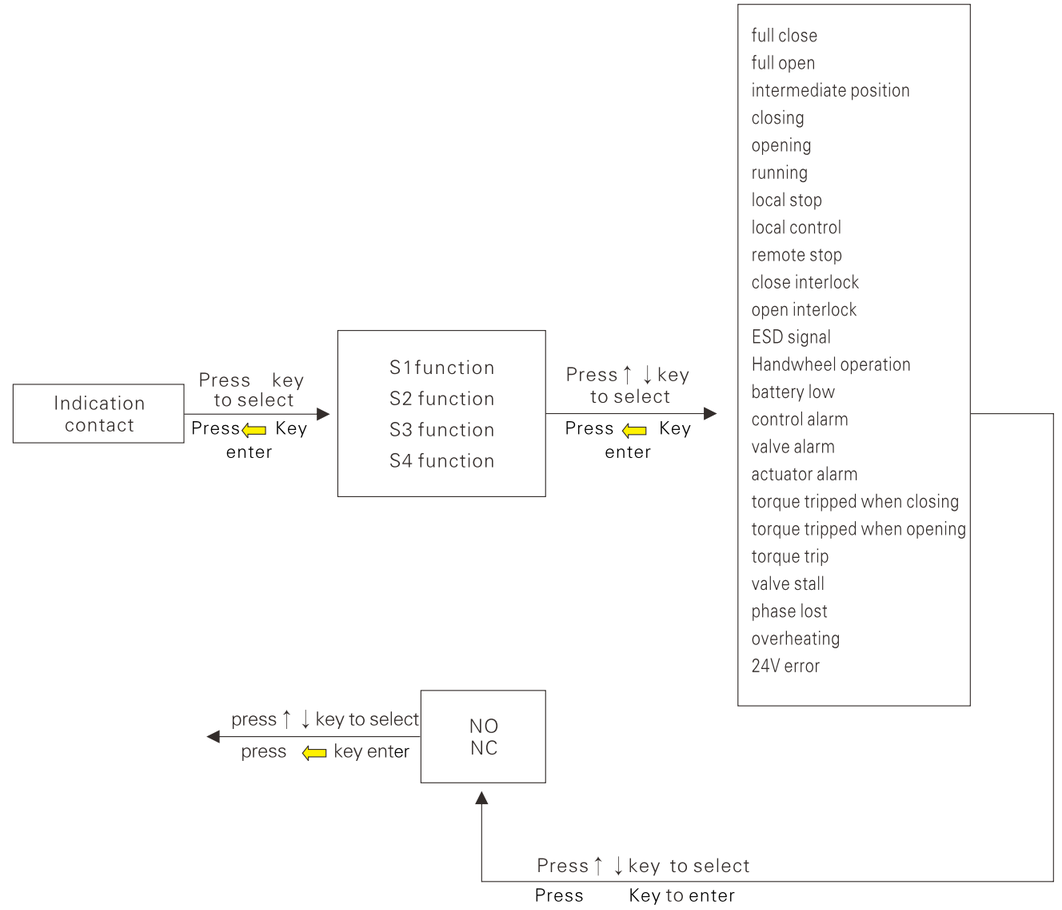
The opening torque valve can be varied between40%–140%,in 1%increments Press ↑ ↓ key to adjust the valve.

3.2secondary functions and parameters setting

1、Indication contacts
2、Control method
3、CPT
4、Point signal
5、Remote control source
6、interrupter
7、Extra indication contacts

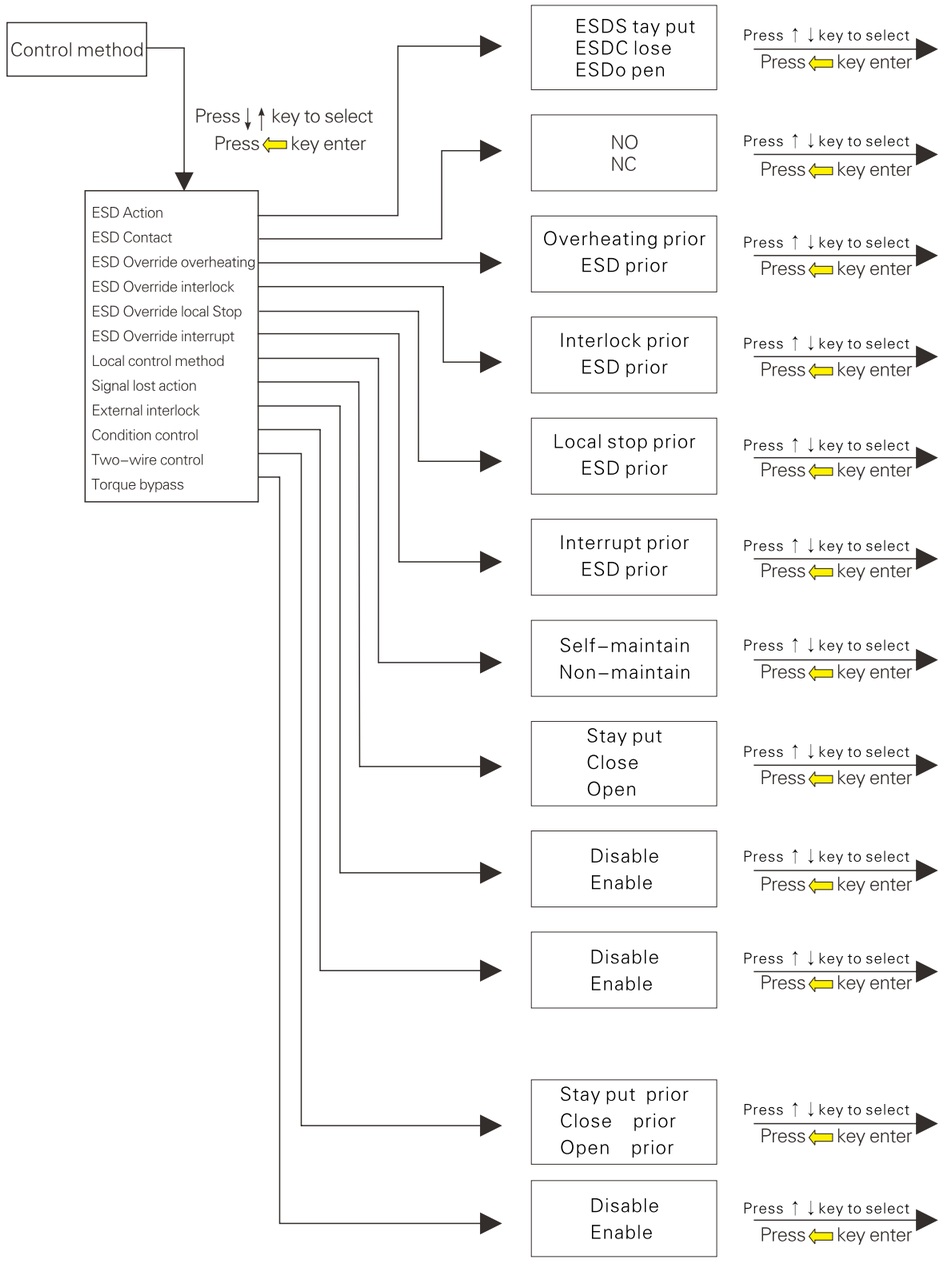
3.2.1、indication contacts

Every contact of the indication contact S1、S2、S3、S4 can be set as following functions .you can press the ↑ ↓ key to select the function and press the ⇦ key to enter



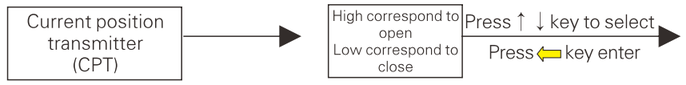
3.2.2 Control Method

The setting of control methods are response with the operating for ESD. Local control 、 remote interlock、condition control and torque bypass.

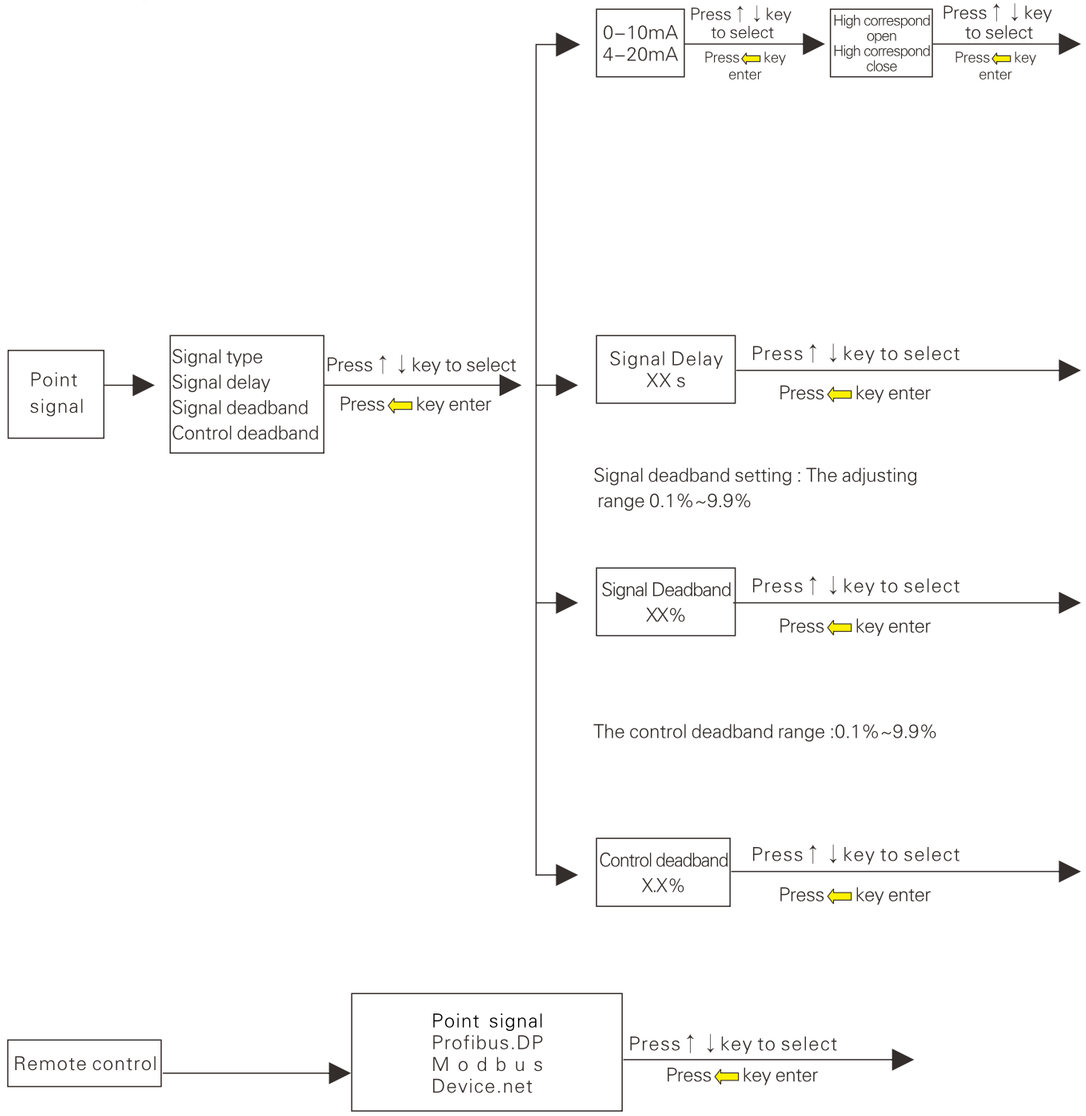


3.2.3 Current Position Transmitter (CPT)

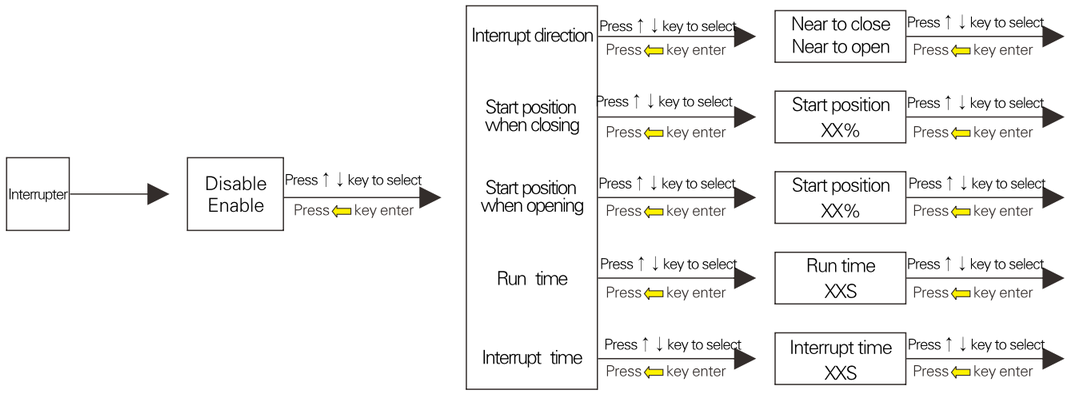
The function of the CPT is to generate an analogue signal 4–20mA, Correspond with the valve position. with"High correspond open". The CPT operates close =4mA,open=20mA.If close=20mA,open=4mA is required to select "Low correspond close"



3.2.4 Point signal



3.2.6、Interrupt Setting



Interrupt direction select Near to close or Near to open

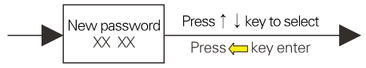
That will determine the action of Start position when close or Start position when open When Interrupt direction is set to Near to close Timer operation will start while closing.

The percentage open less than the setting position of timer as while opening .The percentage open less than the setting position of timer; When Interrupt direction is set to Near to open Timer operation will start while opening the percentage open larger than setting position of timer as whil closing . The percentage open larger than the setting position of timer .

3.2.6The Setting of Extra indication contact:

The function of Extra indication contact is the same as indication contacts S1–S4.It enables to select the extended functions you needed.

3.3Change password



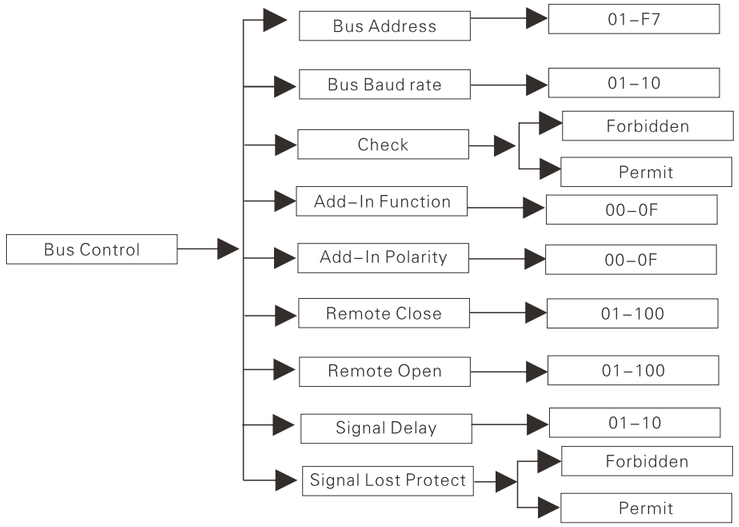
3.4Default setting

All actuator function and parameters are configured before dispatch ,to standard default setting .When site commissioning take place ,entered settings overwrite the default setting and these current settings are use for operation .

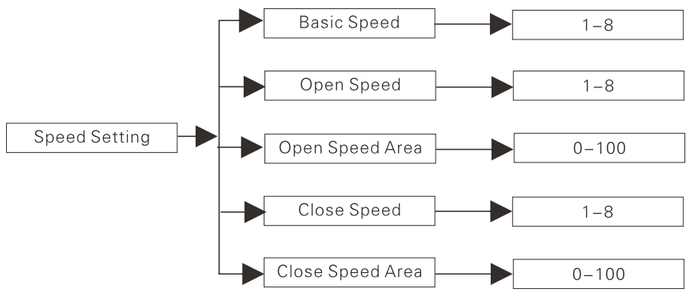
1) primary setting
   - 1.1 close direction clockwise
   - 1.2close action close on limit
   - 1.3open action open on limit
   - 1.4close torque 80% of rated
   - 1.5open torque 80% of rated
   - 1.6close limit To set
   - 1.7open limit To set

2) Secondary Setting
   - 2.1 Indication Contacts
     - 2.1.1 S1 indication contact Close NO
     - 2.1.2 S2 indication contact Open NO
     - 2.1.3 S3 indication contact Close NC
     - 2.1.4 S4 indication contact Open NC
   - 2.2 Control mode setting
     - 2.2.1 ESD Action Stay put
     - 2.2.2 Local Control Mode self–maintain
     - 2.2.3 Signal Lost Action Stay put
     - 2.2.4 ESD Contact NO
     - 2.2.5 ESD Override Overheating Overheating Prior
     - 2.2.6 ESD Override Interlock Interlock Prior
     - 2.2.7 ESD Override Local Stop Local Stop Prior
     - 2.2.8 ESD Override Interrupt Interrupt Prior
     - 2.2.9 External Interlock Disable
     - 2.2.10 Condition Control Disable
     - 2.2.11 Two–wire Control Open Prior
     - 2.2.12 Torque Bypass Disable
   - 2.3 CPT High correspond open
   - 2.4 Point signal
     - Input in signal mode 4–20mA
     - Signal Deadband 1.0%
     - Signal Delay 0.2S
     - Control Deadband 0.5%
   - 2.5 Remote Control Source Current signal
   - 2.6Interrupt setting Disable
   - 2.7Extra Indication Contacts
     - 2.7.1 S5 Indication contact close NO
     - 2.7.2 S6 Indication contact open NO
     - 2.7.3 S7 Indication contact Torque trip NC
     - 2.7.4 S8 Indication contact open NC

3.5 Field Bus Control



3.6 Speed Setting



X Transport and Storage

Transport to place of installation in sturdy packing .

Do not attach ropes or hooks to the handwheel for purpose of lifting by hoist.

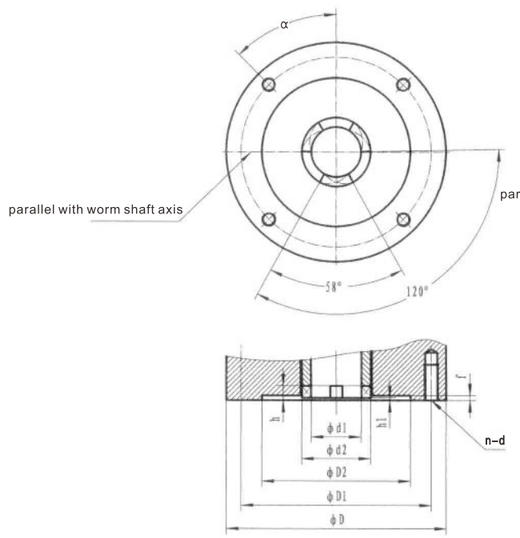
If actuator is mounted or valve ,attach ropes or hooks for the purpose of lifting by hoist to valve .

Store in well ventilated , dry place .

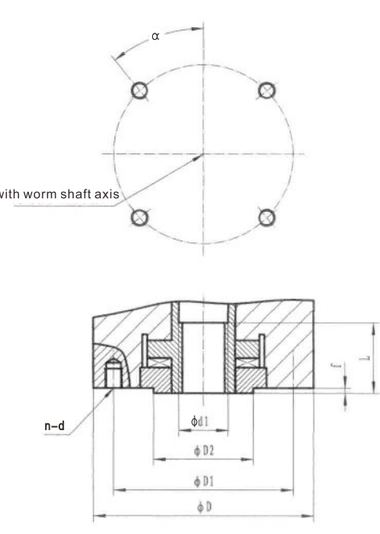
Protect against floor dampness by storage on a shelf or on a wooden pallet. If actuator be stored for a long time more than 12months,must be lubricate again.

XI Appendix

1、Torque dimension according to picture 1 and table 1
2、Thrust dimension according to picture 2 and table 2



Picture 1Torque dimension



Picture 2 Thrust dimension

Torque dimension **Table 1**

Torque JB2920											
Flange	D	D 1	D 2 (H9)	h 1	f	h	d1	d2	d	n	α
JB2	145	120	90	2	4	8	30	45	M10	4	45°
JB2I	115	95	75			6	26	39	M8		
JB3	185	160	125			10	42	58	M12		
JB3I	145	120	90			8	20	45	M10		
JB4	225	195	150		5	12	50	72	M16		
JB5	275	235	180			14	62	82	M20		
JB5I	230	195	150			14	50	72	M16		
JB7	330	285	220	3	6	16	72	98	M24		
JB8	380	340	280			20	83	118	M20	8	22.5°

Thrust dimension **Table2**

ThrustGB12222									
Flange	D	D 1	D 2 (f8)	f	d1 max	d	L	n	α
F10	125	102	70	3	T28	M10	40	4	45°
F14	175	140	100	4	T36	M16	55		
F16	210	165	130	5	T44	M20	70		
F25	300	254	200		T60	M16	90	8	22.5°
F30	350	298	230		T70	M20	110		
F35	415	356	260		T80	M30	150		