

【Intelligent Manipulator】

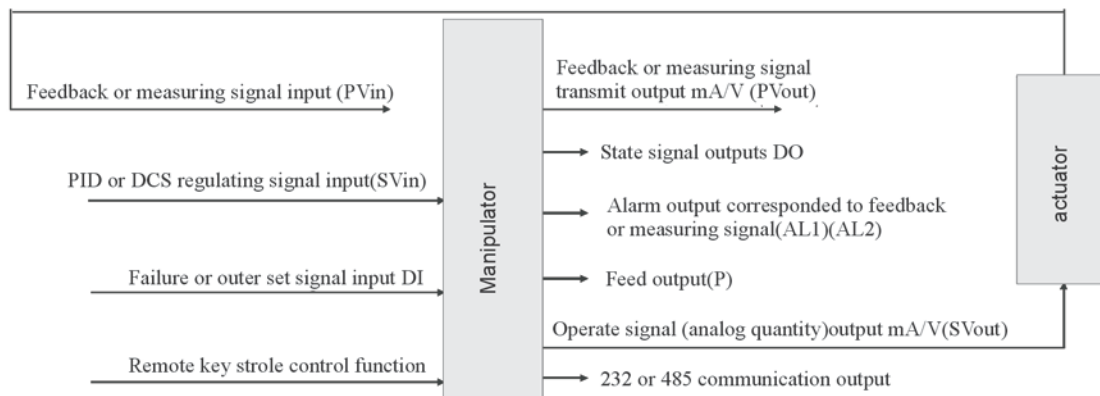
> Product outline

Intelligent manipulator is matching product of PID regulator or DCS and other system, which mainly use to manual regulation under the system running or special condition and to carry out operate as a backup instrument when main machine has happened failure or maintenance. According to field requirement. it provides high-brightness double LED numeric display or high resolution double light column add double LED numeric display, and 160×80, 96×96 and other exterior installation dimensions selectable by user.

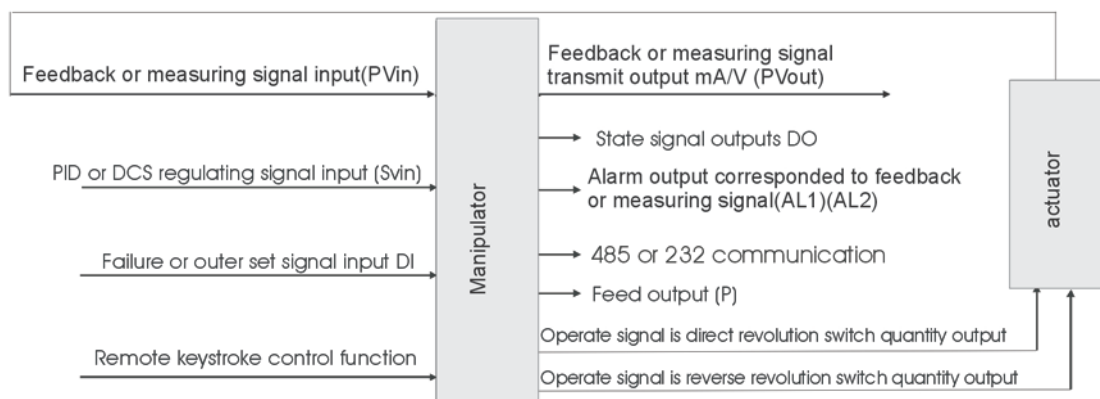
> Mainly technical parameter function characteristic

Intelligent manipulator has manual/automatic control, high/lower amplitude limiting of operation output, follow control and preset control functions and so on. Operational signal has two kinds: one is analog quantity output of direct/reverse action (also called Q type manipulator); the other is direct / reverse revolution switch quantity output (also called D type manipulator), shown as the following block figure (1), (2):

Manipulator signal is analog quantity output (Q type) block diagram (1)



Manipulator signal is direct/reverse revolution (D type) switch quantity output block diagram (2)



1. PID or DCS regulation signal input SVin:

Intelligent manipulator receive the signal of 0~10 mA / 4~20 mA / 0~5V / 1~5V sent from DCS or intelligent regulator.

2. Manipulator signal output

a、Q type manipulator output (Svout): 0~10 mA / 4~20 mA / 0~5V / 1~5V signal, it can directly drive actuator, frequency converter or drive electric regulating valve again from servo amplifier or drive pneumatic thin-film valve from electrical converter and valve positioner. When manipulator is in

automatic work condition, its signal input SVin and operation output signal correspondently is straight-through. in order to realize automatic control of actuator by DCS system or regulator. When in manual work state, its function likes a manipulator, and operational signal output value can direct be modified by increase / decrease key on the panel.

b. D type manipulator output direct/reverse revolution control signal. When manipulator is in automatic work state, its function likes servo amplifier, it carry out regulating control according to the error of input SVin signal and feedback signal of actuator, to ensure actual valve position is following valve position given signal at once and realize automatic control. When manipulator in manual state, its function likes a manipulator, and by the increase or decrease key on the panel can directly operate direct/reverse revolution output signal for which signal 3 ampere relay normal-open contact or 5 ampere capacity bi-directional thyristor, or SSR trigger signal from DC 3 to 24V and so on may be selected.

3. Feedback or measuring signal input (PVin):

PVin signal is valve position signal sent from actuator (linear analog quantity or resistance signal), or field measuring signal. PVin is universal division number switchable input.

4. Feedback or measuring signal transmit output mA/V (PVout)

PVout output signal transmit output to forestage regulator or DCS system, makes system can monitor actual valve position or field measured value at any moment.

5. State signal output DO:

DO is passive switch quantity signal, when manual control, the manipulator outputs the switch quantity closed signal to forestage DCS system or regulator, after they are received DO state signal, then stop PID operation, and make operation signal output follow valve position feedback signal. After manipulator is switched from manual to automatic control, DO state signal is repealed, DCS system or forestage regulator with current output control value as original value to recover PID control. similarly, when manipulator is switched from automatic to manual control state, with current valve position given value as original value, start manual increment / decrement control, thus manual/automatic, automatic/manual state control switching of the manipulator is all non-interference switch.

6. 232 or 485 communication output

According to different option, manipulator may offer 232 or 485 communication function.

7. Failure or outer set signal DI

Manipulator may offer remote compelling manual input signal, the signal can accept dry node or level signal. and usually connect with failure state signal of the forestage DCS system or intelligent regulator, it is use when the forestage DCS system or intelligent regulator happened fault, the manipulator automatically switch into manual state, and makes value position keeping unchanged, to ensure actual valve position can be controlled in pregiven opening without runaway because forestage regulator or DCS system failure.

8. Alarm output corresponded feedback or measuring signal:

According to different option function and requirement of field control, manipulator may have one alarm (AL1) or two alarm (AL1, AL2) outputs, alarm value are corresponding to display value of feedback or measuring signal (PV).

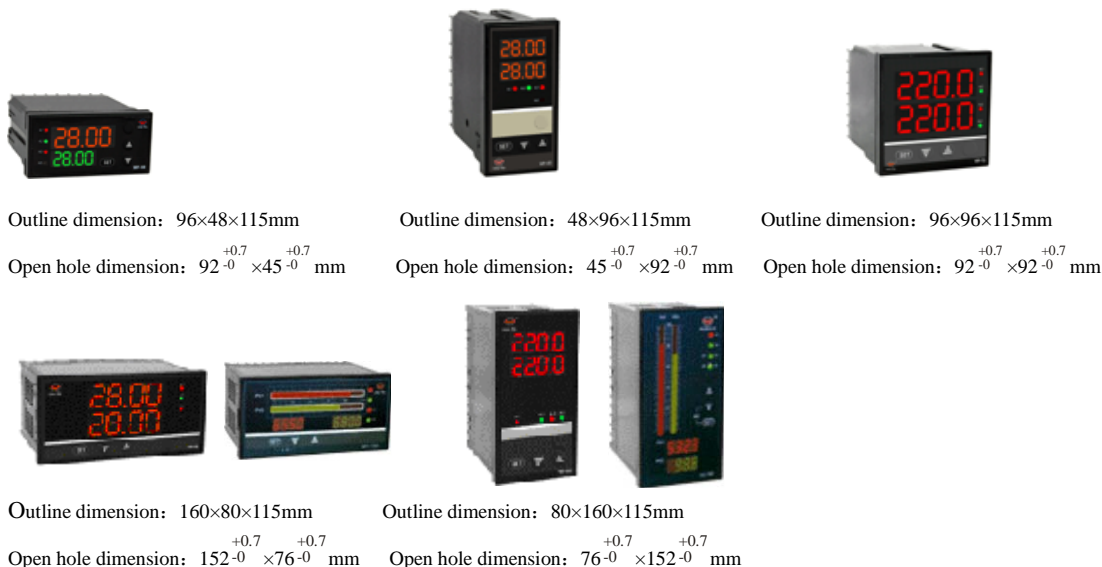
9. Feed output (P):

According to requirement for system control, manipulator may offer one group or two groups isolated each other capacity for 30 mA of DC 24 V feed.

10. Remote keystroke control function:

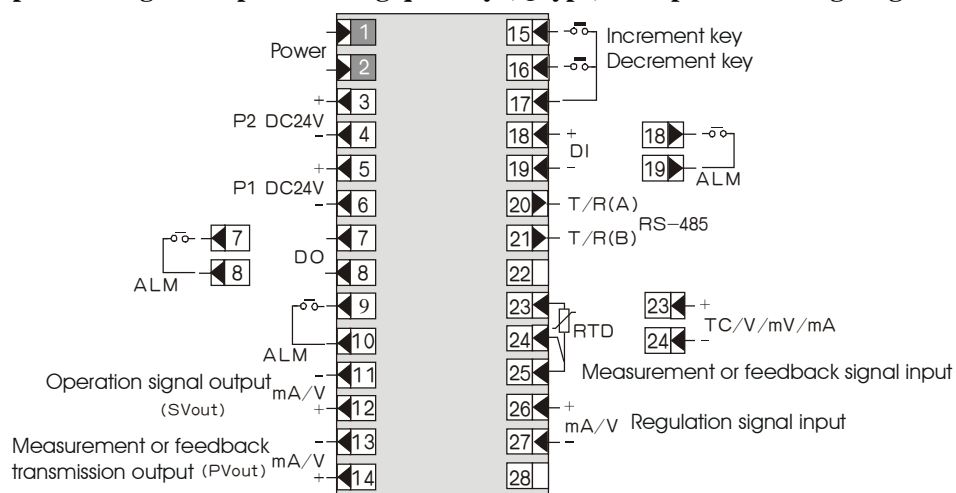
According to technology requirement of field control, manipulator can connect with dry node or level control signal supplied for remote operational instrument, its function is the same as each operational key function on the panel.

➤ Outline and open dimension



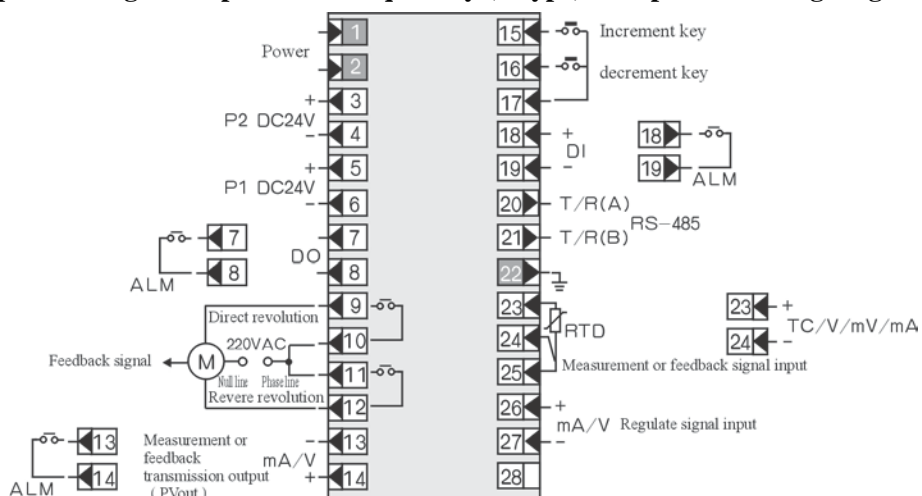
> Instrument wiring diagram for intelligent manipulator 160×80, 80×160

Operation signal output is analog quantity (Q type) manipulator wiring diagram 1



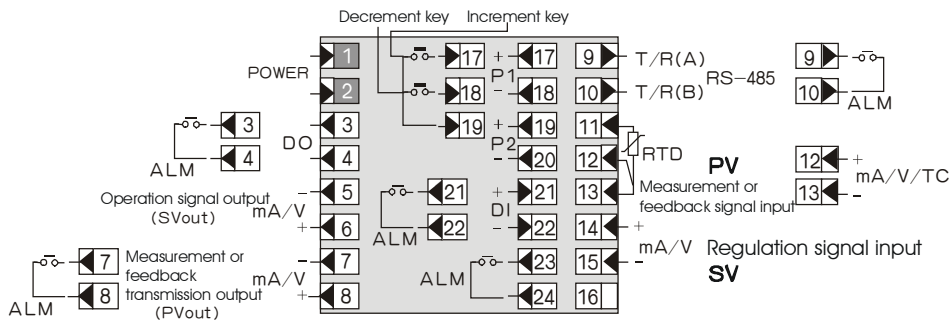
> Wiring diagram for intelligent manipulator 160×80, 80×160

Operation signal output is switch quantity (D type) manipulator wiring diagram 2

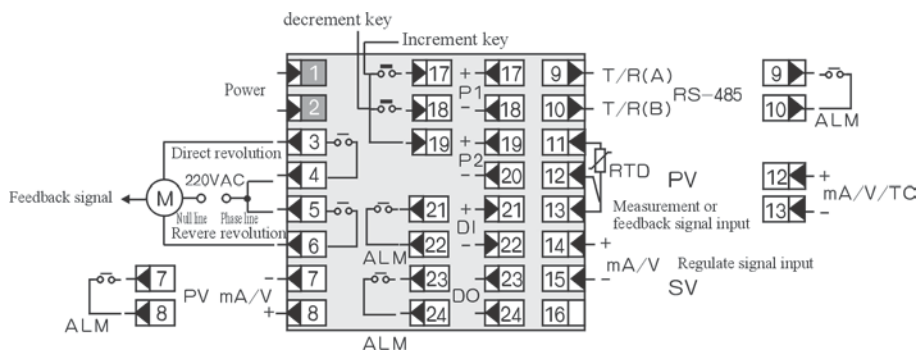


> Instrument wiring diagram for intelligent manipulator 96×96, 96×48, 48×96

Operation signal output is analog quantity (Q type) manipulator wiring diagram 3

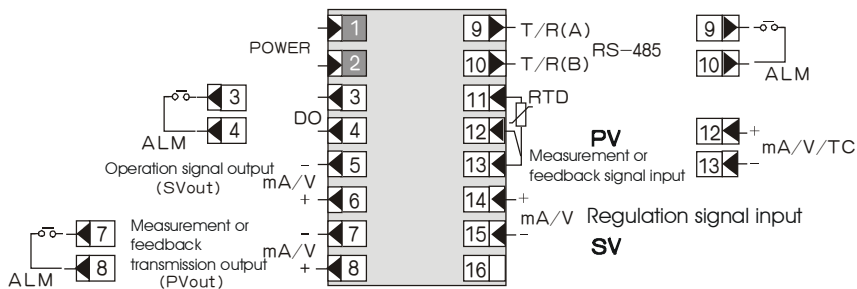


Operation signal output is switch quantity (D type) manipulator wiring diagram 4

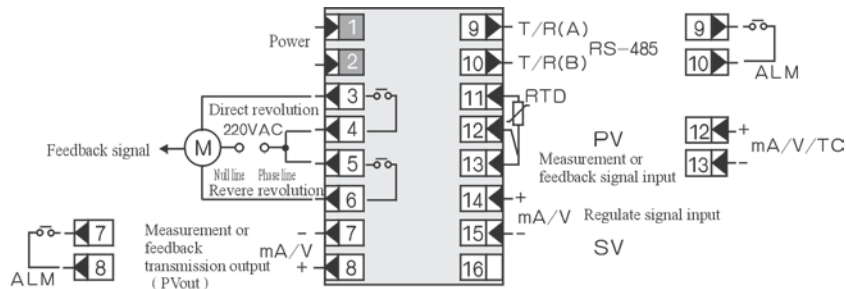


> Instrument wiring diagram for intelligent manipulator 96x96, 96x48, 48x96

Operation signal output is analog quantity (Q type) manipulator wiring diagram 5

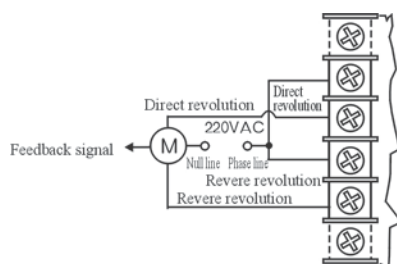


Operation signal output is switch quantity (D type) manipulator wiring diagram 6

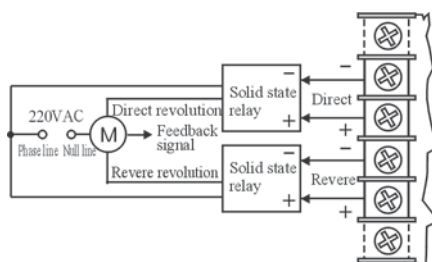


>> External wiring diagram for operation signal of intelligent manipulator

Direct-reverse control signal is bi-directional thyristor output wiring diagram 7



Direct-reverse revolution control signal is SSR solid-state relay wiring diagram 8



> Type spectrum table for intelligent manipulator

Model													Explanation		
WP-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
Display feature															Horizontal type double-screen numeric display
	S														Vertical type double-screen numeric display
	T														Vertical type double screen double light column display
	TX														Horizontal type double screen double light column display
Outline dimension		4													96×48 mm (horizontal type),48×96 mm (vertical type)
		8													160×80 mm (horizontal type), 80×160 mm (vertical type)
		9													96×96 mm
Control action			35												Manipulator control
Communication mode				0											No communication interface
				2											RS-232C communication interface
				8											RS-485 communication interface
Operation signal output (SV out)					1										Relay direct-reverse revolution control output (D type)
					2										(4~20) mA output (Q type)
					3										(0~10) mA output (Q type)
					4										(1~5) V output (Q type)
					5										(0~5) V output (Q type)
					6										SCR direct-reverse zero-crossing control output (D type)
					7										SSR control output signal (D type)
					8										Special specification operation signal output
Feedback or measurement transmission output (PV out)					0										No transmission output
					2										(4~20) mA output
					3										(0~10) mA output
					4										(1~5) V output
					5										(0~5) V output
PV input code						<input type="checkbox"/>	<input type="checkbox"/>								See "input type table"
SV input code							<input type="checkbox"/>	<input type="checkbox"/>							12 ~ 16 in the input type table
															When out of factory setup at division number of user's ordering, if no demand then it is approved "12"

Feedback or measured value alarm mode	H				High limit alarm	If no this fuction,it may be omitted.
	L				Lower limit alarm	
State signal DO output	R				Relay	(manual/automatical switch connection signal) without this function may be omitted
	T				TTL level	
Failure or outlay DI input		M			Outer set input (compelling manual function) (there is not the function, can be omitted)	
Remote keystroke control			B		It correspond to panel keystroke input (there is not the function, can be omitted)	
Feed output				P	One-way DC 24 V feed output	Without this function can be omitted
				2P	Two-way DC24V feed output	
Supply mode				T	AC (90~265) V switch power supply	

> Additional explanations for option and wiring diagram

As field control system demand to intelligent manipulator in every function exist difference and limit in installation size and wire terminal number, it is appears that the same terminal marks two or three kinds of different function in above wiring diagram. Like in the wiring diagram (1), No. 7, 8 terminals can defined as state signal output DO (manual closed/automatic break) and alarm output ALM. The instrument calibrate the customer requirement function when out of factory, after leaving calibrate cannot revise. Calibrated function in above each wiring diagram is the function of intelligent manipulator normal meter, otherwise is specific meter, double numeric + double light column display only limited use to 160×80, 80×160 outline dimension instrument. If have unused function can be omitted in the above diagram, for specific meter is by the random wiring diagram shall prevail, when ordering please the customer correct choose mode.

Option as example:

For example 1: Technical requirement: 1. The instrument is backup meter of DCS system; 2. DCS system regulation signal is 0~10 mA; 3. Actuator drive signal is 4~20 mA; 4. actuator feedback signal is 4~20 mA; 5. DCS system receives 1~5 V monitoring signal; 6. DCS system receives manual, automatic state signal; 7. DCS system outputs failure signal; 8. System needs 485 communication; 9. Double screen display of the instrument for outline dimension is 160×80 and 96×96, Option as follows:

- ※ For 160×80 installation model double screen digital display type as: WP-D835-824-1213-RM
- ※ For 96×96 installation model type as: WP-D935-824-1213-RM

For example 2: Technical requirement: 1. The instrument is backup meter of PID regulator; 2. PID regulation signal is 4~20 mA; 3. Actuator drive signal is 4~20 mA; 4. Actuator feedback signal is 1~5 V; 5. PID regulator receive 4~20 mA monitoring signal; 6. PID regulator receives manual, automatic state signal; 7. PID regulator outputs failure signal; 8. System needs a group of 24 V feed; 9. System needs two-limited alarm control output; 10. Double screen double light column display of the instrument for outline dimension is 80×160, option as follows:

- ※ For 80×160 installation model double screen + double light column display option as: WP-T835-024-1412-HL-RM-P