EH-POSITIONER

ELECTRO-HYDRAULIC POSITIONER

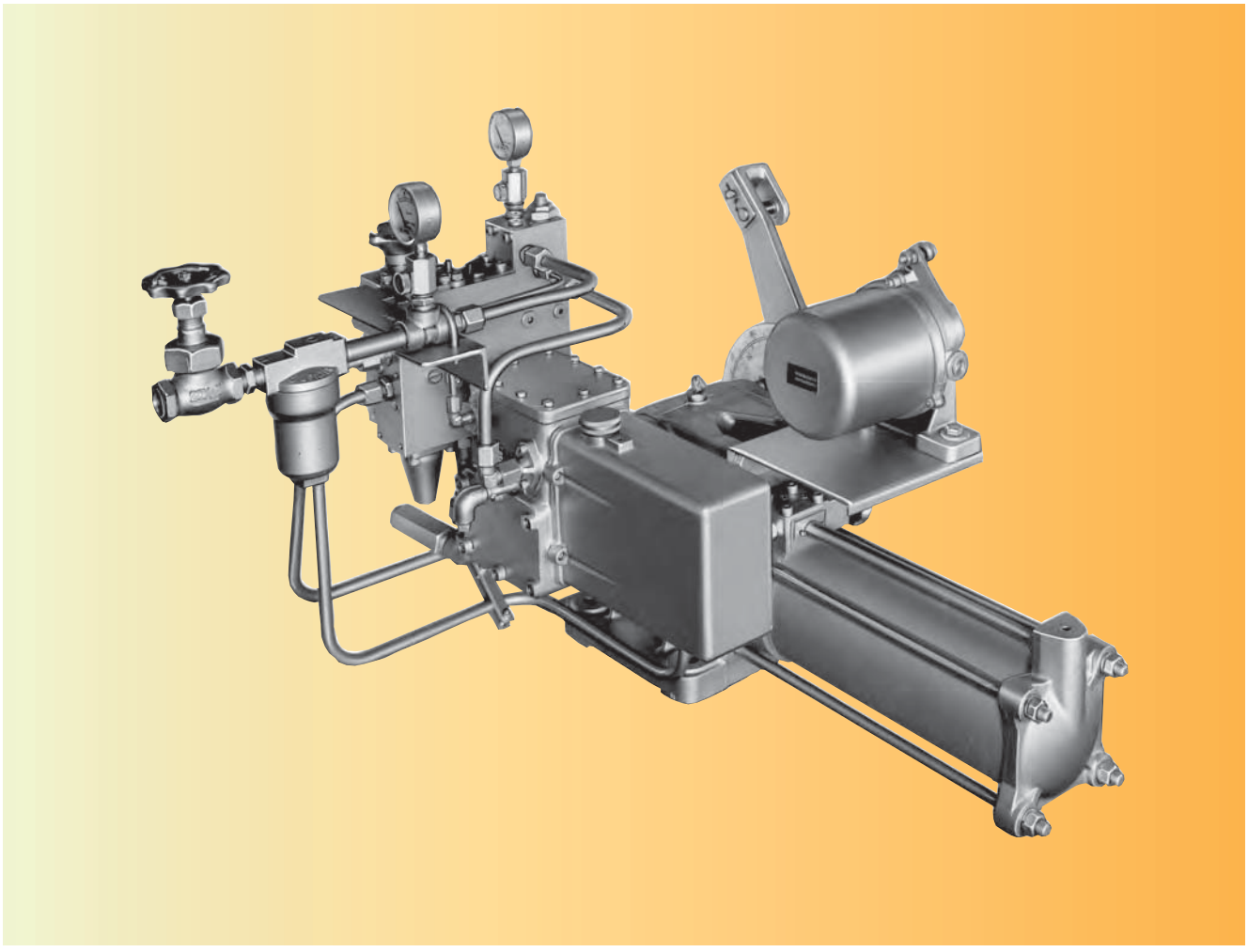
MODEL **EHJ21**

INTRODUCTION

The EH positioner is a kind of electro-hydraulic actuator that has the ability to convert direct-current signals(4 to 20 mA DC)from an electronic controller to change the rotational angle of a work cylinder crank arm.
It is integrally combined with a crank type work cylinder,and the main body is composed of electro-hydraulic converter and feedback mechanism.
The rotational angle of the crank type work cylinder is 90 degress, and it is possible to adjust the angle over the whole span of DC input signals from 0 to 90 degrees.

FEATURES

- Usable as an actuator for various electronic controllers.
- The actuating speed is high and a large actuating force can be obtained because actuation is performed by using hydraulic pressure on reception of an electrical signal.
- Maintenance is easy and reliability is high because of a moving coil system incorporating a hydraulic jet pipe and a stable permanent magnet.
- When installing multiple actuators in one location,it is lower in cost,smaller in power consumption,and easier in maintenance to use several EH positioners with one hydraulic pump unit, rather than using actuators furnished with individual hydraulic pump units.
- Since the interior of the jet pipe relay section is pressurized,the hydrauric pump unit can be freely located,either the higher position or lower position from the EH positioner is selectable.Oter open type jet pipe controller brands have no such facility.
- Various safety devices can be mounted.
  (1)If the automatic signal becomes ineffective,the EH positioner can be operated by C-valve by manual opetation or remote control.
  (2)If the hyrauric source is down due to power failure or other trouble,the EH positioner can be driven with the safety device. (ie.accumulator)
  (3)In case of emegency,the EH positioner can be run to the safe side,that is either to the open position or to the closed position,and can be fixed in the position.



SPECIFICATIONS

Input signal ····· 4 to 20mA DC*
Moving coil resistance ····· 470Ω(at25℃) $^{+0}_{-50}$ Ω
Control action ····· Proportional action
Floating band ····· 15%
Hysterisis ····· 1%(without load)
Linearity ····· ±2%
Jet pipe hydraulic pressure ····· 0.6 to 1.2 MPa
Allowable internal pressure ····· 0.5MPa†
Installation position····· Horizontal**
Ambient temperature ····· −20℃ to +40℃☆
····· (For i2G4:−10℃ to +40℃)
Range of hydraulic-oil viscosity during operation ···20 to 80cSt
Color ····· Silver
Explosion-protection construction ····· Can be supported
Type of explosion protection ····· Intrinsic safety construction i2G4 ††
Approval No.24282 ★

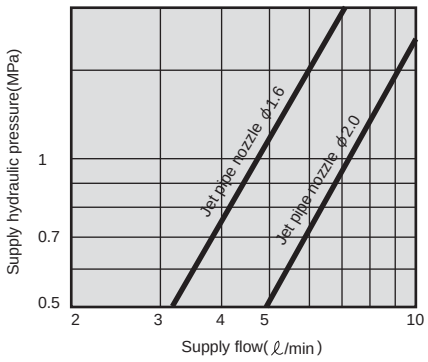
Notes:
1. ＊Also manufactuable in the input specification of 10 to 50mA.
2. ＊＊ "Horizontal" refers to the surface of top cover.If not horizon-tal, the zero point must be adjusted at the site.
3. †As the difference between internal pressure and jet pipe pressure, more than 0.6MPa is required.
4. †† Input-signal currents must be in the 4mA to 20mA range.
5. ★ Combined with a Yamatake-manufactured insulation barrier (8907/51-24/45)
6. ☆ If this equipment is to be used for extended periods of time at a temperature of 40℃ or higher,a certain number of special components will be required.Please contact NIRECO Sales Department for further details in such a case.

Table 1 Specifications of EH positioner by work cylinder.

	CY-70K5	CYM-70K5	CY-90K5	CY-130K5	CYH-130K5
Operating torque N・m (at differential pressure kgf/cm)	23～34.5	23～34.5	59～90	123～183	123～183
Piston diameter mm	70	70	90	125	125
Piston area cm	38.5	38.5	63.5	123	123
Piston stroke mm	127	127	200	212	212
Crank arm rotation	90˚	90˚	90˚	90˚	90˚
Max.booster pressure MPa	—	3	1.5	1.5	5
Mass＊ kg	45	52	74	115	235

＊ Front accessories are excluded from the mass.For example,the mass of the C-valve is to be added to the above values in case of the positioner with the C-valve.(EHJ alone:10kg)

REQUIRED OIL FLOW(Oil pump delivery)
In cases where the EH positioner is equipped with a jet pipe only and is not provided with a hydraulic booster,the required hydraulic oil flow is as indicated by the straight line representing the use of a jet pipe of nozzle ϕ 2.0 mm in Fig.1.When a hydraulic booster is provided,the required flow of hydraulicoil can be obtained by adding the flow obtained from Fig.2 to the flow obtained from another straight line that represents the use of jet pipe of nozzle ϕ 1.6 mm in Fig.1.



The supply flow is determined by supply pressue. The flow through cylinder is about 70% of the value indicated in fig.1

Fig.1 Jet pipe supply flow

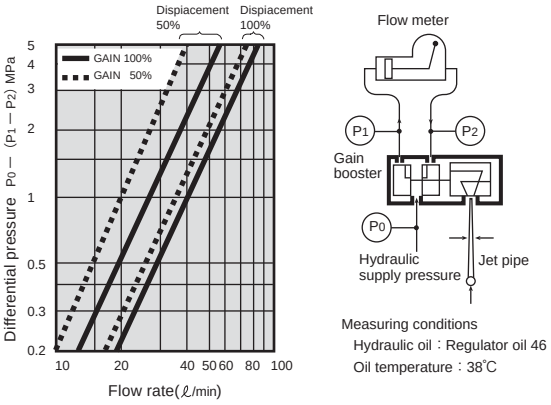


Fig.2 Flow characteristic of C-valve equipped with hydraulic booster

OPERATING PRINCIPLE

The operating principle of the EH positioner is shown in Fig. 3. As shown in the illustration, the moving coil is situated within a magnetic field, and the jet pipe relay is connected through a lever. Therefore, when a current signal is applied into the moving coil, the coil moves, the lever is displaced about the seal diaphragm, and the jet pipe moves.The jet pipe injects oil toward two adjacent orifices (distributor block). The orifices connect with their respective ends of the work cylinder.
When the jet pipe is located in the middle of these two orifices, the pressure is equalized at both ends of the cylinder, and the piston stands still in this position.

When the input current signal varies from this balanced position, for example, when the moving coil moves upward, the jet pipe injects oil toward the lower orifice. As a result, the piston moves, and the crankshaft rotates counterclockwise.This rotation moves the feedback lever, and the jet pipe is moved back to the central position by the feedback spring. Therefore, the piston stops at this position.
Since the electrical current and the force generated by the moving coil are proportional to each other and the cam has linear characteristics, the rotational angle of crank arm becomes proportional to the compression of the feedback spring. In other words,the crank arm rotational angle is proportional to the input electrical current.

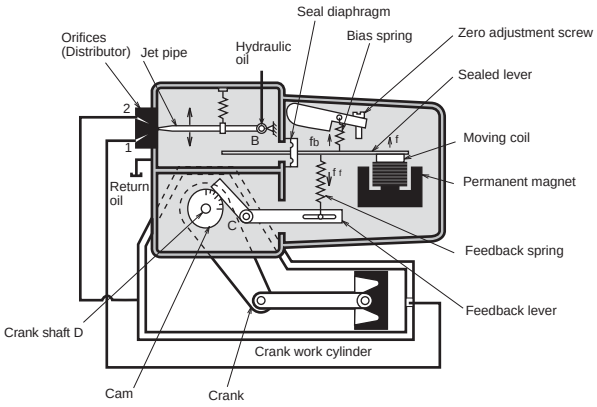


Fig.3 Operating principle(1)

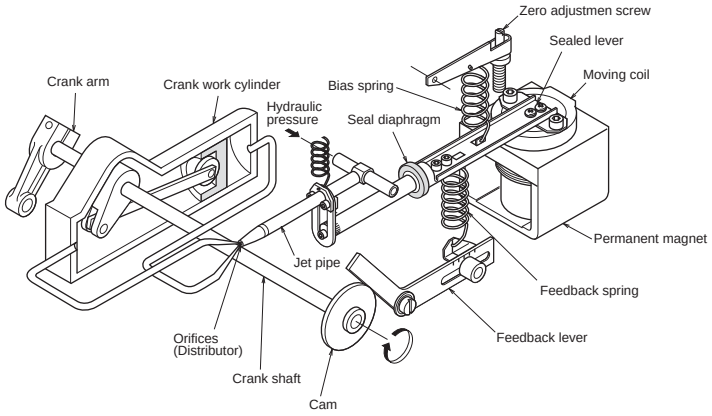


Fig.4 Operating principle(2)

EXTERNAL DIMENSIONS

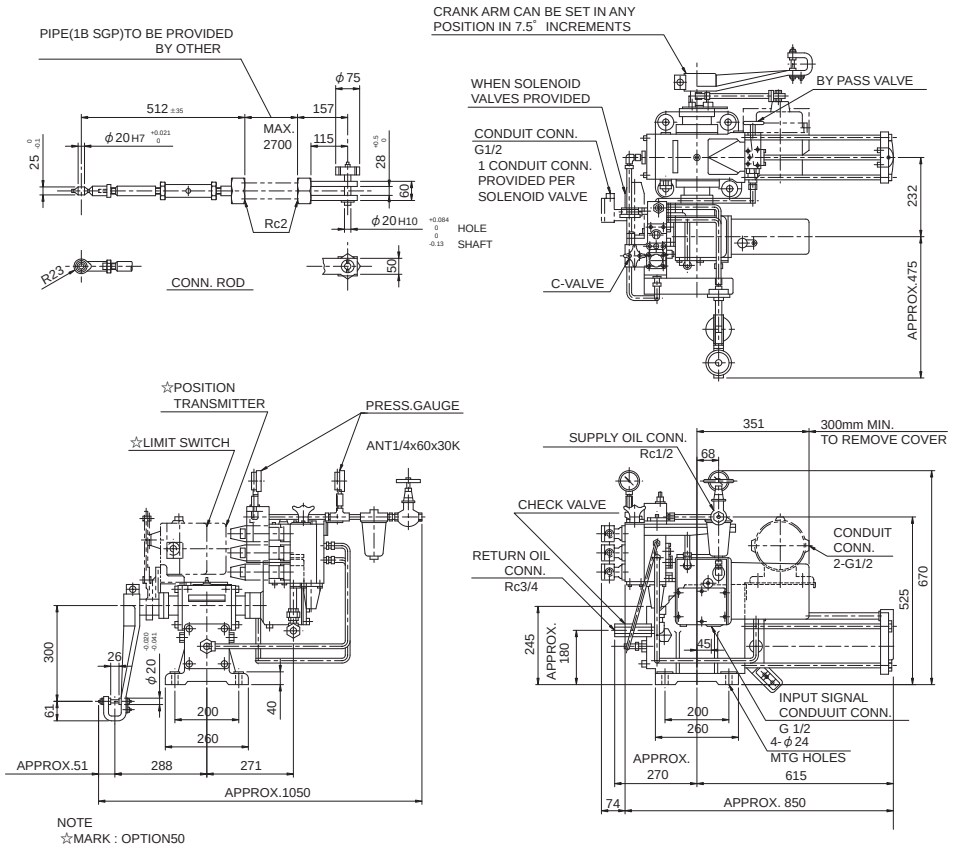
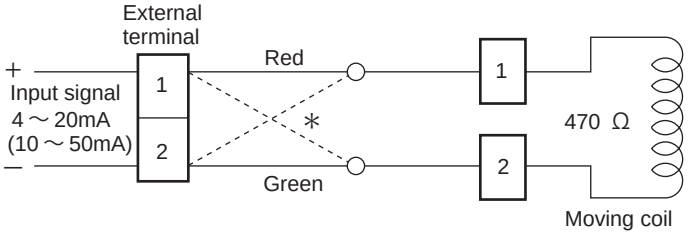


Fig.5 EH-Positioner with CY130K5 Dimensions



Note: ∗ Dotted line represents wiring for reverse action.

Fig.6 Wiring

MODEL NUMBER

EHJ21 – MODEL

	2	4 to 20mA DC			Input signal
	5	10 to 50mA DC			
	G	4 to 20mA DC Intrinsic safety construction			
	FO	OPEN(Port 1)		＊Forward action	Action
	FG	CLOSE(Port 2)			
	RO	OPEN(Port 1)		＊everse action	
	RC	CLOSE(Port 2)			
	1	CV1.A54SM1	Provided with distributer block	FO,RC	C-valve
	2	CV1.A54SM2		FC,RO	
	3	CV2.A54SM1	3MPa, Provided with hydraulic booster	FO,RC	
	4	CV2.A54SM2		FC,RO	
	5	CV2.A54SH1	5MPa, Provided with hydraulic booster	FO,RC	
	6	CV2.A54SH2		FC,RO	
	N	None			Remote operation
	Right table	Provided with solenoid valve			

	N	Less than 1.2MPa	—	—	＊＊ Additional equipment (1)
	1		—	—	ACC
	2		MN3	HP	—
	3		MN3	HP	ACC
	4	Over than 1.2MPa	MN2	—	—
	5		MN1	—	ACC
	6		MN1	HP	—
	7		MN1	HP	ACC
	1	Over 0.6 and under 1MPa FH9MJ.G1			Hydraulic supply
	2	Over 1 and under 2MPa FH9MF.G1			
	3	Over 2 and under 5MPa FH9ME.G2			

	1	CY70K5	Piston 70φ 1.5MPa	Work cylinder
	2	CYM705K5	Piston 70φ 3MPa	
	3	CY90K5	Piston 90φ 1.5MPa	
	4	CY130K5	Piston 125φ 1.5MPa	
	5	CYH130K5	Piston 125φ 5MPa	
	0	None		Crank arm
	1	Crank arm(Standard setting)		
	3	Variable crank arm		
	N	None		Additional equipment (2)
	1	FM1C.1□—LS0	Synchro type valve opening transmitter	
	2	FM1C.1□—LS2		
	3	FM2C.01□—LS0	Synchro type position transmitter	
	4	FM2C.01□—LS2		
	5	FM2C.11□—LS0		
	6	FM2C.11□—LS2		
	7	FPC-LS0 Potentio type position transmitter		
	8	FPC-LS2 Potentio type position transmitter		
	9	LSC.2 Limit switch		
	10	LSC.3 Limit switch		
	13	FM1C.4□—LS0－0	Explosion proof aperture transmitter	
	14	FM1C.4□—LS2－0		
	15	FM2C.04□—LS0－0		
	16	FM2C.04□—LS2－0		
	17	FM3C.2—0 Explosion proof limit switch		
	18	FM3C.3—0 Explosion proof limit switch		

	0	Except synchro type		Power supply for sinchro
	1	AC100V 50/60Hz, AC110V 60Hz		
	2	AC200V 50/60Hz, AC220V 60Hz		

	Y		For special specifications,symbol Y is affixed and details are listed.

Solenoid valve	Auto			Stop			Port 1			Port 2			Installation method		
	S1	S3	S2	S1	S3	S2	S1	S3	S2	S1	S3	S2	S1	S3	S2
E11□		○			×									A	
E12□		×			○									B	
E21□	○	○		○	×		×	×					B	A	
E22□	×	○		×	×		○	×					A	A	
E23□	×	×		×	○		○	○					A	B	
E24□		○	○		×	○					×	×		A	B
E25□		○	×		×	×					×	○		A	A
E26□		×	×		○	×					○	○		B	A
E31□	○	○	×	○	×	×	×	×	×	○	×	○	B	A	A
E32□	×	○	○	×	×	○	○	×	○	×	×	×	A	A	B
E33□	×	○	×	×	×	×	○	×	×	×	×	○	A	A	A
E34□	×	×	×	×	○	×	○	○	×	×	○	○	A	B	A
N	None														

□ is as follows
Ⓐ 110V50/60Hz 110V60Hz Ⓒ 220V50/60Hz 220V60Hz
Ⓓ DC12V Ⓔ DC24V Ⓕ DC48V Ⓖ DC100V
○Mark:Energized
×Mark:Deenergized
In case of explosion proof d2G4,symbol "E" is replaced by "G".

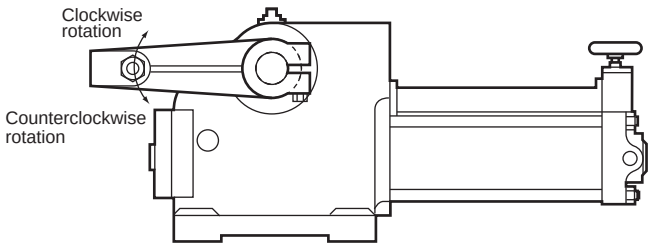
Notes 1. ＊Foward action:Crank arm rotates couterclockwise at input signal increase
＊Reverse action:Crank arm rotates clockwise at input signal increase
Notes 2. The aperture scale shall be standard on all models.
Notes 3. Explanations of ＊＊ additional equipment(1)

Manifold for C-valve		Hand pump	Accumulator
MN1	Press reducing valve Check valve	HP	ACC Install accumulator on separate stand.※
MN2	Press reducing valve	Model	
MN3	Check valve	TOP-220HAFR	

Notes 4. The specifications of the moving coil and spring are as follows:

Model	Input signal	Moving coil	Bias spring	Feedback spring
2	4-20mA	470Ω (MG-MS-14)	YS2413.2-05	YS2413.3-02
5	10-50mA	〃	YS2423.0-11	YS2423.0-12
G	4-20mA	470Ω (Normal)MG1003.0 (Reverse)MG1004.0	YS2413.2-05	YS2413.3-02

Notes 5. In the case of models desighed to intrinsic safety explosion-proof construction specifica-tions,anti-hunting capacitors must not be installed.



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