

INSTRUCTION BOOK

NS737 POSITIONER

No. E 204



NAKAKITA

NAKAKITA SEISAKUSHO CO.,LTD.

Head Office : Factory : 1-1Fukunominami-machi, Daito-shi, Osaka, JAPAN. Telephone : (072) 871-1341
Telex : 5349-129 NAKAKITA DIT (072) 871-7871
Tokyo Office : 17-27-1chome, Hamamatsu-chou, Minato-ku, Tokyo, JAPAN. Telephone : (03) 3431-7201
Telex : 242-2458 NAKAKITA SEISAKUSHO TOK
Kitakyusyu Office : 17-14-3chome, Kyomachi, Kokurakita-ku, Kitakyusyu-shi, JAPAN.
Telephone : (093) 531-5481~5482.



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1. INTRODUCTION

This Positioner is a servo control mechanism for air operated automatic control system. Typical usage and features are:

- (1) Can be used as a double-acting positioner of actuator as well as a single-acting positioner of actuator, because this model has a double-acting pilot valve.
- (2) Dynamic characteristics are far better than any other positioner as a large capacity pilot valve is employed in the Nozzle - Flapper circuit.
- (3) Application covers direct operation and reverse operation of both actuator and positioner pilot.
- (4) Two models available; Rotary type for direct rotary feed-back, and Lever type for lever feed-back connection.

2. SPECIFICATIONS

Model	NS737-S	NS737-D	NS737-S-C	NS737-D-C
	single-acting Lever type	double-acting Lever type	single-acting cam type	double-acting cam type
Supply pressure	140~700 kPa			
Signal pressure	20~100 kPa (Split ranging possible)		20~100 kPa	
Restoring angle(stroke)	5° ~ 30° (13 ~ 100 mm)		90°	
Sensitivity	Less than 1 mmHg			
Linearity (less than)	±1%	±2%		
Hysteresis (less than)	1%			
Repeatavity (less than)	±0.5%			
Supply pressure effect (Max.)	0.3%/10 kPa	1%/100 kPa	0.3%/10 kPa	1%/100 kPa
Max. Air consumption	10 Nℓ/min	20 Nℓ/min	10 Nℓ/min	20 Nℓ/min
Pressure gauge	SIG	0~200 kPa		
	SUP	0~300 kPa (DIAPHRAGM ACTUATOR), 0~1000 kPa (CYLINDER ACTUATOR)		
	OUT	0~200 kPa (OUTPUT PRESS. 20~100 kPa) 0~1000 kPa (OTHER) 0~300 kPa (OUTPUT PRESS. 40~200 kPa)		

* 1) 1/4" pipe connection parts, and 1/8" gauge ports.

2) NS737- $\frac{S}{D}$ -C is of linear characteristics.

4. DRAWING OF CONSTRUCTION

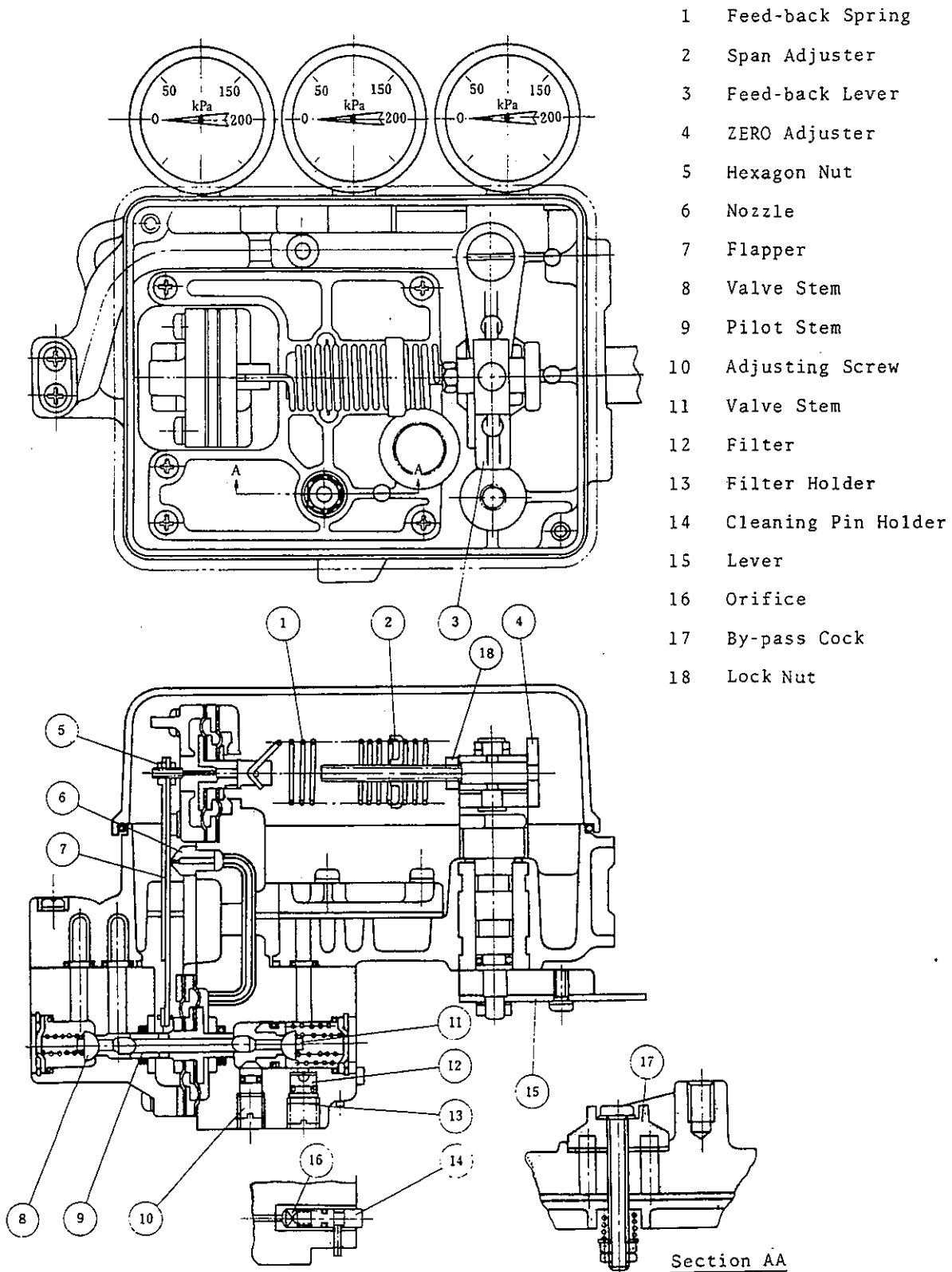
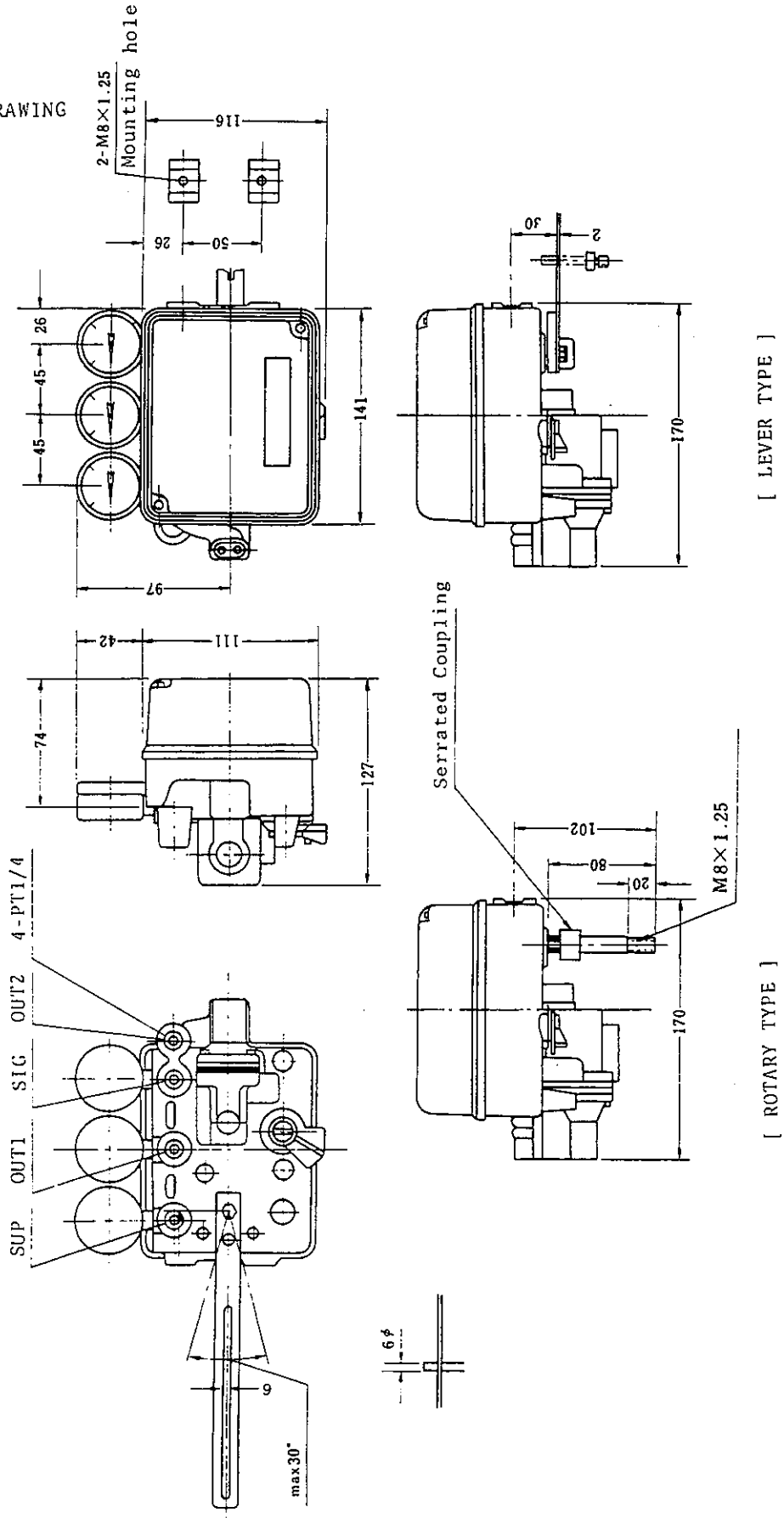


Fig. 2 Cross Section Diagram (Standard Type)

5. OUTER DRAWING



[LEVER TYPE]

[ROTARY TYPE]

Fig. 3 Dimensions (Std. type)

6. INSTALLATION & ADJUSTMENT

6-1 Installation & Piping

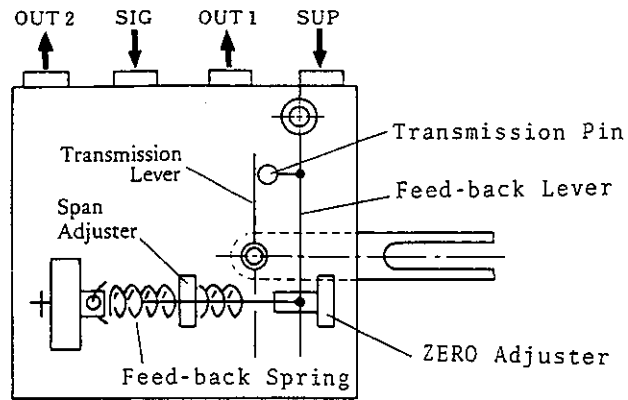


Fig. 4 Main Parts for installation and adjustment

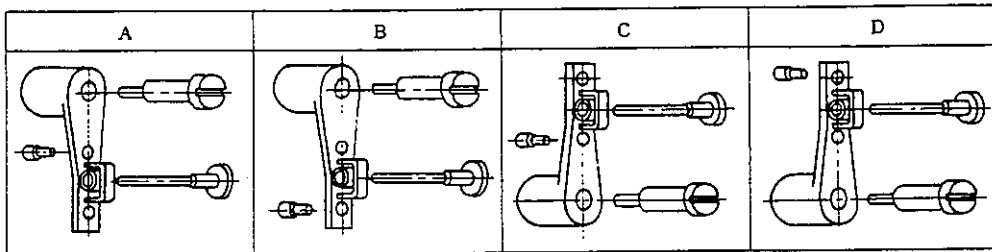


Fig. 5 Installation - Transmission pin & Feed-back lever

6-1-1 Single-acting Actuator (NS737-S)

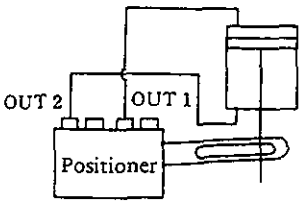
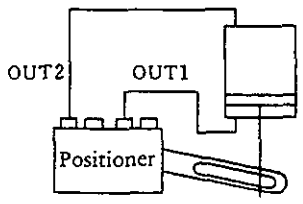
Table 1

Actuator	Signal/Output	Signal range	Installation style (Ref. Fig. 5)	OUT 1	OUT 2
	Increase/Increase	20~100 kPa	A	Used	Plugged
		1/2 Split	D		
	Increase/Decrease	20~100 kPa	C	Plugged	Used
		1/2 Split	B		
	Increase/Increase	20~100 kPa	C	Used	Plugged
		1/2 Split	B		
	Increase/Decrease	20~100 kPa	A	Plugged	Used
		1/2 Split	D		

6-1-2 Double-acting Actuator (NS737-D)

(i) Lever Type

Table 2

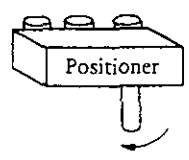
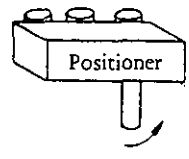
Operation	Signal range	Installation style (Ref. Fig. 5)	Piping
Direct	20~100 kPa	A	
	1/2 Split	D	
Reverse	20~100 kPa	C	
	1/2 Split	B	

Note: The position of the pin feed-back lever of cam-lever type is "B".

(ii) Cam Type (NS737-^S/_D-C)

For Torque actuator

Table 3

Operation	Signal range	Cam face	Piping
Direct	20~100 kPa	D	Clockwise 
Reverse	20~100 kPa	R	Counter Clockwise 

Notes: Install the positioner to the revolution direction of the feedback shaft.
The direction should be determined by viewing from the drive shaft or valve shaft side.

6-2 Adjustment

6-2-1 Stroke Adjustment

Stroke can be adjusted by changing the effective number of turns of the Feed-back Spring (1). The Span Adjuster (2) is for this adjustment. For shorter stroke, decrease the number of effective turns.

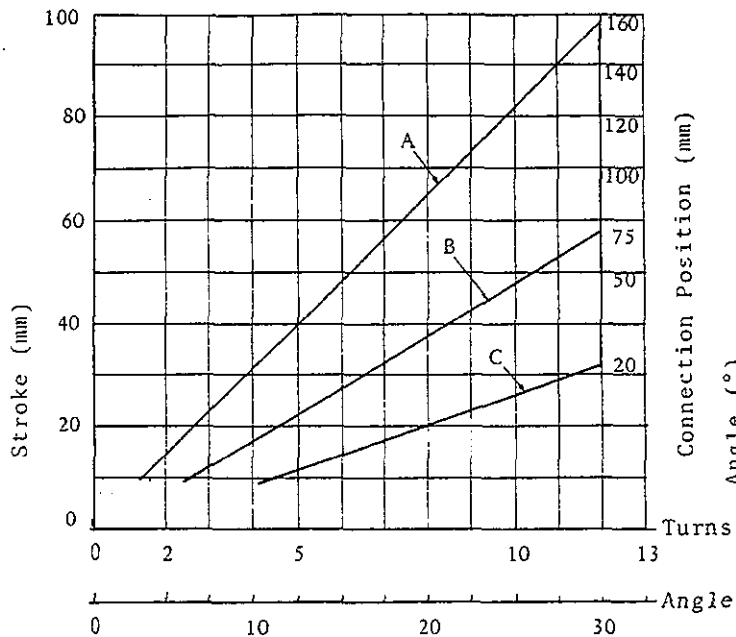


Fig. 7 Nos. of turns/Stroke
(Lever type)

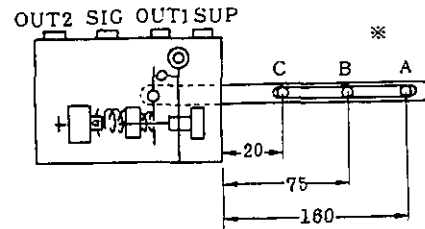


Fig. 6 Connection Position

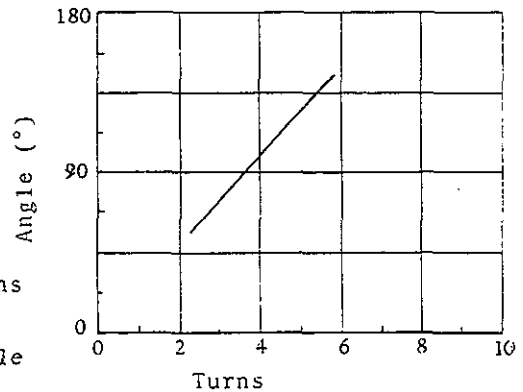


Fig. 8 Nos. of turns/Stroke
(Rotary type)

Notes: The connect positions of A, B, and C concern the standard actuator.

- A : Large-sized diaphragm actuator
- B : Small-sized diaphragm actuator.
- C : Cylinder actuator.

6-2-2 Zero Adjustment

Turn Zero Adjuster (4) to vary the tensile strength of the Feed-back Spring (1). (Adjust after loosening the Lock Nut (18).)

6-2-3 Sensitivity Adjustment

Use Adjusting Screw (10) to adjust hunting control system and the sensitivity of Positioner. However, the sensitivity is preset before shipment from plant.

Do not touch the adjusting screw, unless the sensitivity is poor for the type of the actuator in question.

7. MAINTENANCE AND CAUTION

7-1 Maintenance

The unit hardly needs the daily maintenance work and only following points have to be checked from time to time.

- (1) Check for the leakage at the pipes and joints for the compressed air.
The leakage from the compressed air often causes the unexpected troubles like the reduced working force at the operation section or the deteriorated characteristics.
- (2) Inspect if the supply air is clean or not.
Most of the positioner troubles are caused by the dust, oil, moisture, etc. in the supply air, which make the pilot section defective.
- (3) Use the fixed throttle cleaning pin 14 and make the cleaning of the fixed throttle 16 before the operation start and once every 1 ~ 3 months.
In this positioner, the filter 12 is provided at the in-flow side where the fixed throttle 16 of the nozzle is located so that the trouble may not occur due to the plugging of the fixed throttle 16. However, the cleaning of the fixed throttle 16 must be made before the operation is started after the test run, and once every 1 ~ 3 months.
- (4) In case the supply air contains the mist or dust, be sure to make the cleaning of the filter 12 of the positioner, when the actuator is put out of the operation at the time of periodical inspection, etc.

7-2 Instructions for piping arrangement

- (1) Air line filter or Mist Separator should be used in the supply air line in order to prevent impurities from entering the positioner.
- (2) Do not use lubricator in the supply line because a Nozzle-Flapper system is employed in this positioner. Use a greasy lubricant for actuator. If the actuator requires air line lubrication, install a lubricator in the output air line as shown below: (Fig. 9)

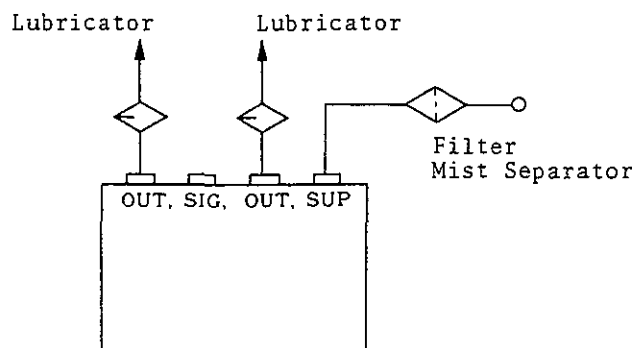


Fig. 9 In case of install Lubricator

8. TROUBLE SHOOTING

Troubles	Causes	Corrections
Insufficient output pressure OR No change-over between OUT 1 and OUT 2.	Fixed orifice (16) is clogged	Clean the orifice with pin (14)
	Filter (12) element is clogged	Clean the element
	Pipe line leakage	Check the lines and replace
	Nut (5) is loose	Tighten the nut
Hunting	Fixed orifice (16) is clogged	Clean the orifice with pin (14)
	Hunting signal pressure	Check signal circuit
Inferior sensitivity	Signal line leakage	Check signal line
	Inferior adjustment of adjusting screw (10)	Readjustment of adjusting screw (10)
	Nut (5) is loose	Tighten the cock
Excessive air consumption	By-pass cock is loose	Fasten the cock
	Stuck dust on valve stems (8)(11)	Clean the stems