

Master Vac

KES

KES D-B052

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1. Scope of Application

This standard specifies the Master Vac. (hereinafter referred to as 'MV') of the vacuum booster equipment for automobile brakes.

2. Purpose

This standard aims at securing proper quality by standardizing specifications.

Remark: This standard and a drawing communicates together our requirement.

3. Report of Evaluation Result

The quality evaluation results at each stage from development to mass production shall be submitted to Kia according to the Appendix.

4. Definition of Terminology

(1) Full Load Working Point

When input increased in vacuum condition, the point difference in pressure acting on the power piston becomes maximum and increase of output is equal to increase of input.(㉓ of Fig. A)

(2) Jump Up

Characteristic that the output jumps up step by step at a certain input point.(㉔ of Fig. A)

(3) Servo ratio

The ratio of the input against the output in the range not exceeding the full load working point.

(4) Single MV: Having one vacuum chamber (refer Fig. B)

Tandem MV: Having two vacuum chambers (refer Fig. B)

Fig.A Input-Output Diagram

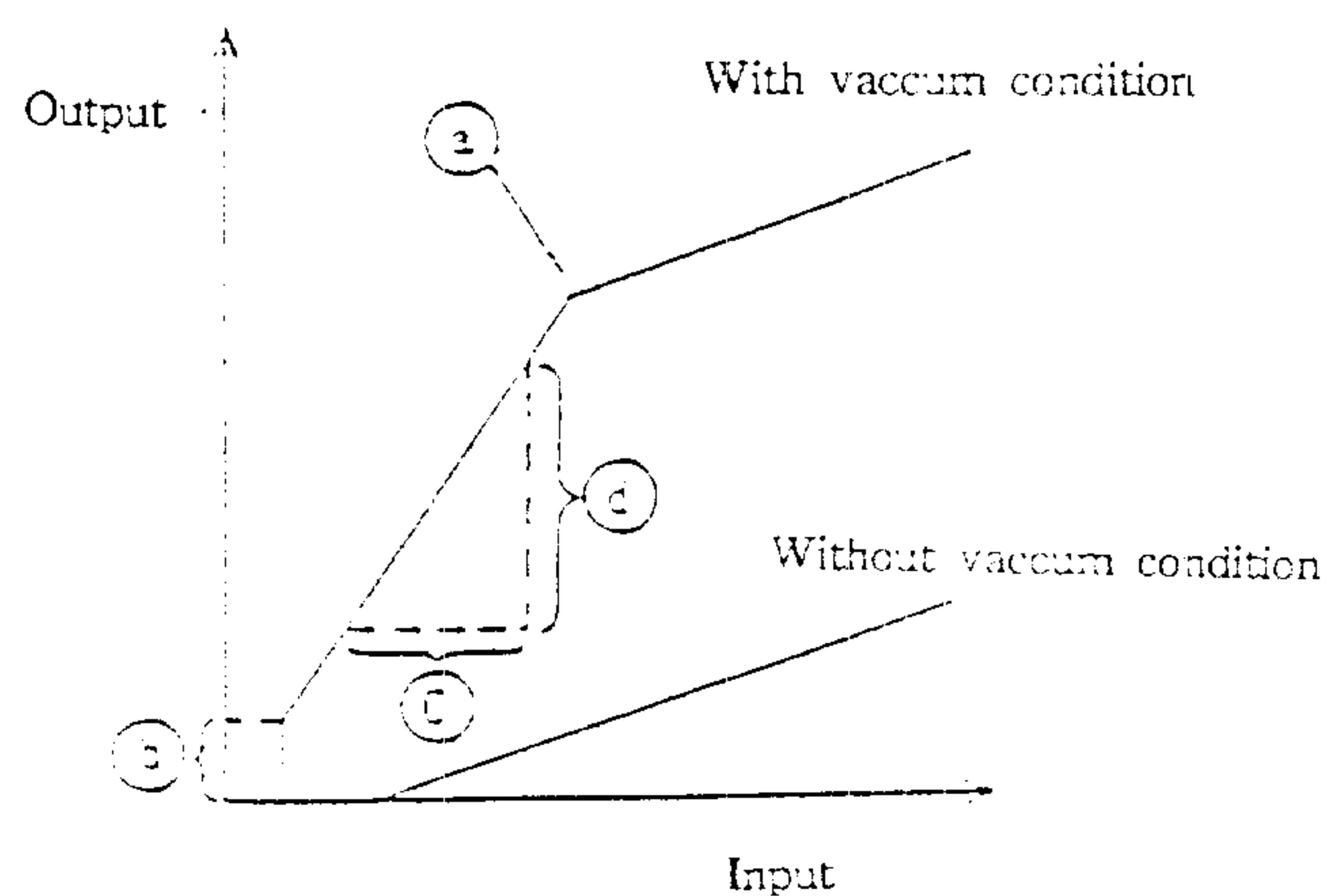
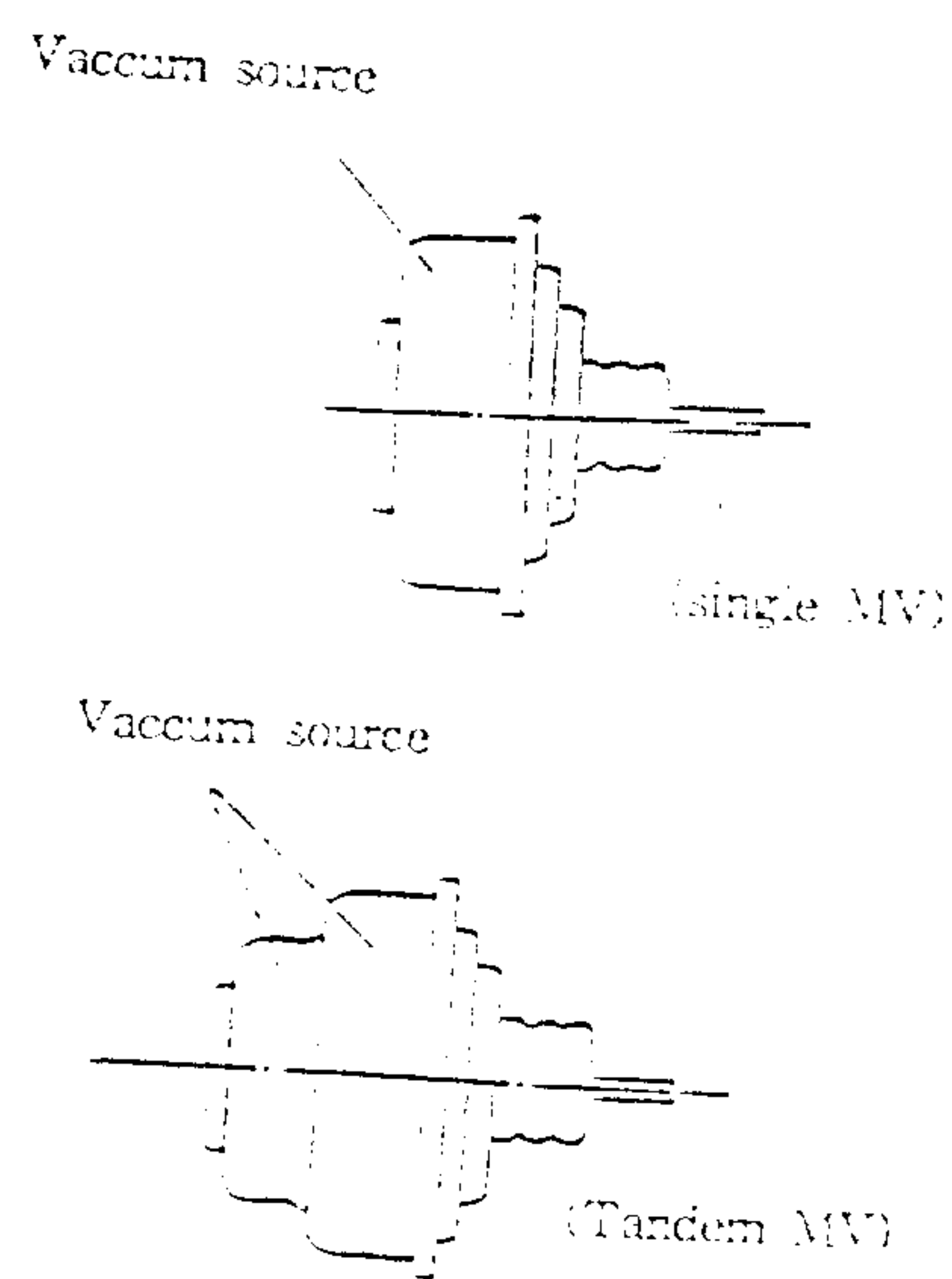


Fig.B Type of Master Vac



5. Specifications Indicated in Drawings

- (1) Size of MV
- (2) Type of MV (Single or Tandem)
- (3) Shape of MV

Shape of vacuum ejection, front shell shape, rear shell shape and length of operating load

- (4) Standard value of effective stroke for push lod
- (5) Standard value of servo ratio
- (6) Standard value of jump up
- (7) Standard temperature for test of high temperature working
- (8) Standard value of shell rigidity

6. Evaluation Standard

Evaluation Standard for the MV shall conform to Table 1.

Remark 1. The way of reading evaluation items and methods in Table 1 shall conform to the following example.

Evaluation Item		Evaluation Method	
Durability	Vibration resistance	First evaluation	7.5.1 First Evaluation Method
	• Operating force of slider	Second evaluation (Evaluation item tested after evaluating the vibration resistance)	7.3.1 Second Evaluation Method
	•• Noise	Third evaluation (Evaluation item tested after evaluating the operating force)	7.3.7 Third Evaluation Method

Remark 2. The quality ranks shall be represented by A, AR, B, C.
The definitions shall conform to KMS Q410001 (Determination and Procedure of Quality Ranking).

Table 1

Evaluation Item		Evaluation Standard	Evaluation Rank	Evaluation Method
Performance	Effective stroke of push rod	The standard value indicated in the drawing or more	A	7.2.1
	Operating rods play stroke	0.5mm or less	A	7.2.2
	Airtightness	Vacuum level drop amount: 25mm Hg {3.3 kPa} or less	A	7.2.3
	Input output characteristics	① Servo ratio Standard value ± 0.15 for Single Type Standard value ± 0.20 for Tandem Type ② For Jump Up Standard value $\pm 5\text{kgf}$ {49N} ③ Working starting point $6.5 \pm 1.5 \text{ kgf}$ {64 $\pm$ 15N}	A	7.2.4
	Responsiveness	0.3 sec or less	A	7.2.5
	Return characteristic	1.5 sec or less	A	7.2.6
	Quick Pressure characteristics	Maximum input load up to 8 mm stroke shall be 40 kgf {392N} or less	A	7.2.7
	Low temperature working	—	A	7.2.8
	• Airtightness	Vacuum level drop amount: 25mmHg {3.3KPa} or less	A	• 7.2.3
	• Input output characteristic	① Servo ratio shall be 80% or more of the normal temperature output characteristics. ② Jump up shall be 80% or more of the normal temperature output characteristics	A	• 7.2.4

Table 1 (Continued)

Evaluation Item		Evaluation Standard	Evaluation Rank	Evaluation Method
Performance	• Input output characteristic	③ Working starting point : $6.5 \pm 1.5\text{kgf}$ { $64 \pm 15\text{N}$ }	A	• 7.2.4
	High temperature working	—	A	7.2.3
	• Airtightness	Vacuum drop amount: 25mmHg { 3.3kPa } or less		• 7.2.3
	• Input and output characteristics	① Servo ratio : 80% or more of the normal temperature output characteristic ② Jump up: 80% or more of the normal temperature output characteristic ③ Working starting point: $6.5 \pm 1.5\text{kgf}$ { $64 \pm 15\text{N}$ }	A	• 7.2.4
Rigidity and Strength	Shell rigidity (1)	Standard value indicated in the drawing or more	A	7.3.1
	Shell rigidity (2)	Change in the Push Rod dimension : 0.3mm or less	A	7.3.2
	Heavy load strength	No irregularities such as destruction, deformity, or friction wear of parts. Permanent warpage of Front Shell : 1mm or less	A	7.3.3
	• Airtightness	Vacuum drop amount: 25mmHg { 3.3kPa } or less	A	• 7.2.3
	• Input output characteristics	① Servo ratio Single Type MV: standard value ± 0.15 Tandem Type MV: standard value ± 0.20 ② Jump up : standard value $\pm 5\text{kgf}$ { $\pm 49\text{N}$ } ③ Working starting point : $6.5 \pm 1.5\text{kgf}$ { $64 \pm 15\text{N}$ }	A	• 7.2.4

Table 1 (Continued)

Evaluation Item		Evaluation Standard	Evaluation Rank	Evaluation Method																
Durability	Normal temperature working durability	No irregularities such as destruction deformity or friction wear of parts.	A	7.4.1																
	• Airtightness	Vacuum level drop amount:25mmHg { 3.3kPa } or less	A	• 7.2.3																
	• Input output characteristics	Changed output value before the test shall be as following value or less. <table><tr><td>MV diameter (mm)</td><td>Changed output value Kgf {N}</td></tr><tr><td>5 {130}</td><td>12 {118}</td></tr><tr><td>6 {155}</td><td>14 {137}</td></tr><tr><td>7 {180}</td><td>16 {157}</td></tr><tr><td>8 {205}</td><td>18 {176}</td></tr><tr><td>9 {230}</td><td>20 {196}</td></tr><tr><td>7 + 8 {180 - 205}</td><td>20 {196}</td></tr><tr><td>8 + 9 {205 - 230}</td><td>20 {196}</td></tr></table>	MV diameter (mm)	Changed output value Kgf {N}	5 {130}	12 {118}	6 {155}	14 {137}	7 {180}	16 {157}	8 {205}	18 {176}	9 {230}	20 {196}	7 + 8 {180 - 205}	20 {196}	8 + 9 {205 - 230}	20 {196}	A	• 7.2.4
	MV diameter (mm)	Changed output value Kgf {N}																		
	5 {130}	12 {118}																		
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8 {205}	18 {176}																			
9 {230}	20 {196}																			
7 + 8 {180 - 205}	20 {196}																			
8 + 9 {205 - 230}	20 {196}																			
High temperature working durability	No irregularities such as destruction,deformity or friction wear of parts	A	7.4.2																	
	• Airtightness	Vacuum level drop amount:25mmHg { 3.3kPa } or less	A	• 7.2.3																

Table 1 (Continued)

Evaluation Item		Evaluation Standard	Evaluation Rank	Evaluation Method																
Durability	• Input Output characteristics	Changed output value before the test shall be as following value or less <table><tr><th>W Diameter in (mm)</th><th>Changed output Kgf (N)</th></tr><tr><td>5 (130)</td><td>12 (118)</td></tr><tr><td>6 (155)</td><td>14 (137)</td></tr><tr><td>7 (180)</td><td>16 (157)</td></tr><tr><td>8 (205)</td><td>18 (176)</td></tr><tr><td>9 (230)</td><td>20 (196)</td></tr><tr><td>7 + 8 (180 + 205)</td><td>20 (196)</td></tr><tr><td>8 + 9 (205 + 230)</td><td>20 (196)</td></tr></table>	W Diameter in (mm)	Changed output Kgf (N)	5 (130)	12 (118)	6 (155)	14 (137)	7 (180)	16 (157)	8 (205)	18 (176)	9 (230)	20 (196)	7 + 8 (180 + 205)	20 (196)	8 + 9 (205 + 230)	20 (196)	A	• 7.2.4
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9 (230)	20 (196)																			
7 + 8 (180 + 205)	20 (196)																			
8 + 9 (205 + 230)	20 (196)																			
	Low Temperature working durability	No irregularities such as destruction, deformation or friction wear of parts.	A	7.4.3																
	• Airtightness	Vacuum level drop amount: 25mmHg {3.3kPa} or less	A	• 7.2.3																
	• Input and output characteristics	Changed output value before the test shall be as following value or less	A	• 7.2.4																

Table 1 (Continued)

Evaluation Item		Evaluation Standard	Evaluation Rank	Evaluation Method																
Durability		<table><tr><td>MV Diameter in (mm)</td><td>Changed output value kgf (N)</td></tr><tr><td>5 {130}</td><td>7 {69}</td></tr><tr><td>6 {155}</td><td>9 {88}</td></tr><tr><td>7 {180}</td><td>11 {108}</td></tr><tr><td>8 {205}</td><td>13 {127}</td></tr><tr><td>9 {230}</td><td>15 {147}</td></tr><tr><td>7+8 {180 - 205}</td><td>15 {147}</td></tr><tr><td>8+9 {205 - 230}</td><td>15 {147}</td></tr></table>	MV Diameter in (mm)	Changed output value kgf (N)	5 {130}	7 {69}	6 {155}	9 {88}	7 {180}	11 {108}	8 {205}	13 {127}	9 {230}	15 {147}	7+8 {180 - 205}	15 {147}	8+9 {205 - 230}	15 {147}		
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	9 {230}	15 {147}																		
	7+8 {180 - 205}	15 {147}																		
8+9 {205 - 230}	15 {147}																			
Vibration resistance	No irregularities such as destruction, deformation or friction wear of parts.	A	7.4.4																	
• Airtightness	Vacuum level drop amount: 25mmHg{3.3kPa} or less	A	• 7.2.3																	
• Input and Output Characteristics	① Servo ratio Single Type MV: standard value ± 0.15 Tandem Type MV: Standard value ± 0.20 ② Jump up: standard value $\pm 5\text{kgf}\{\pm 49\text{N}\}$ ③ Working starting point : $6.5\pm 1.5\text{kgf}\{64\pm 15\text{N}\}$	A	• 7.2.4																	
Environmental Resistance	Corrosion Resistance (1)	No corrosion product, swelling peel-off, of the paint film of 2mm or more in diameter per every 100cm ² of the paint film and no deterioration of paint film and no deterioration of paint film	A	• 7.5.1																
	Corrosion Resistance (2)	To satisfy the following performance and strength	—	7.5.2																

Table 1 (Continued)

Evaluation Item		Evaluation Standard	Evaluation Rank	Evaluation Method
Environmental Resistance	• Airtightness	Vacuum level drop amount: 25mmHg {3.3kPa} or less	A	• 7.2.3
	• Input output characteristics	① Servo ratio Single Type MV: Standard Value ± 0.15 Tandem Type MV: Standard Value ± 0.2 ② Jump Up: Standard Value $\pm 5\text{kgf}$ ($\pm 49\text{N}$) ③ Working starting Point : 6.5 $\pm$ 1.5kgf {64 $\pm$ 15N}	A	• 7.2.4
	• Heavy load strength	No irregularities such as destruction, deformation or friction wear of parts. Permanent warpage of Front shell: 1mm or less	A	• 7.3.3
	Low Temperature working durability	No destruction or deformation of the parts	A	7.5.3
	• Airtightness	Vacuum level drop amounts: 25mmHg{3.3kPa}	A	• 7.2.3
	• Input output characterstics	① Servo ratio Single Type: standard value ± 0.15 Tandem Type: standard value ± 0.20 ② Jump-Up: standard value $\pm 5\text{kgf}$ ($\pm 49\text{N}$) ③ Working starting point : 6.5 $\pm$ 1.5kgf {64 $\pm$ 15N}	A	• 7.2.4