

**KOWA DUAL LINE LUBRICATING SYSTEMS**

**KS,KW TYPE MEASURING VALVES**

**INSTRUCTION MANUAL**

**KWK KOWA CORPORATION**

**2019.5.9**

## Introduction

Thank you very much for purchasing the KOWA DUAL LINE LUBRICATING SYSTEM. This Instruction Manual has been compiled as a practical guide for the operation and maintenance of lubricating system which incorporates the model KS,KW TYPE MEASURING VALVES.

All descriptions contained here in are based on the standard system, which may, therefore, be different from those of the purchased system. Such a problem can be solved by referring to the final specifications. However, it is required to understand that some changes caused by the modification of equipment may not be described in the final specifications.

## Guarantee

The guaranteed period for this system will be one year from the commencement of operation. Any defect or failure occurring during the guaranteed period, for which KWK is liable in design and manufacturing, shall be corrected and / or eliminated by KWK without compensation.

However, any defect or failure caused by improper operation which is not described in this Instruction Manual shall not be guaranteed, even though the defect or failure occurs with the guaranteed period.

## PRECAUTIONS OF SAFETY

Before the installation, operation, maintenance and inspection, read carefully this instruction manual and other accompanying documents for correct service. Familiarize with the knowledge of equipment, information of safety and all of cautionary instructions for service.

The precautions of safety is shown in each equipment of the centralized lubricating system by using safety mark.

Particular attention should be called to the places where these safety marks are given.

The safety marks are divided into "WARNING" and "CAUTION".

**WARNING**

If mishandled; In case a dangerous situation may occur, it could result in death or serious injury.

**CAUTION**

If mishandled; In case a middle injury or light injury, and in case a physical damage may occur.

For the matter being mentioned in the CAUTION, it may result in an importance according to circumstances, The important content is given to all of safety mark, and obey it without fail.

This system provides the max. working pressure 21MPa(210kg/cm<sup>2</sup>).

When each equipment is disassembled and inspected, stop the operation of pump, and release the pressure to perform the operation as 0MPa(0kg/cm<sup>2</sup>).

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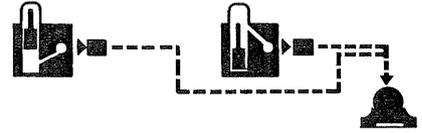
# 1. 分配弁選択のポイント Hints for selection of measuring valves

## KS形(シングル吐出口)

- 1ヶの吐出口から多量の吐出量が得られます。
- 給油ピストンは並列作動形ですから、不用吐出口は盲プラグができます。
- 給油量は各吐出口単位で個々に調整が可能です。
- 給油ピストン毎に指示棒が付いていますので個々に給油確認ができます。
- 調整ネジで給油量の調節ができます。
- 定量分配方式ですので、常に一定の吐出量が得られます。

## KS type (Single discharge port type)

- An abundant delivery may be obtained from one discharge port.
- Since lubricating pistons operate in parallel system, unused discharge ports may be covered with blind plug.
- Lubricating grease quantity may be adjusted in individual discharge ports.
- Each piston is provided with indicator stem for monitoring of state of lubrication.
- Grease quantity can be adjusted with adjusting screw.
- Measured discharge mechanism-specified quantity of grease is always discharged from each discharge port.
- A constant rate measuring system is incorporated to provide always a constant discharge rate.

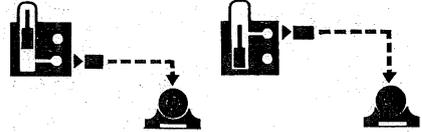


## KW形(ダブル吐出口)

- 吐出口が倍数になっているため、給油口数の多い場合に最適。
- 給油ピストンは並列作動形です。
- 給油口数の調整は左端1ヶ所のみ可能で、連通ポート盲ネジをはずすことにより行います。この場合吐出量は倍量となります。
- 給油ピストン毎に指示棒が付いていますので個々に給油確認ができます。
- オイル用は、9.8MPa以下でご利用下さい。
- 調整ネジで給油量の調節ができます。

## KW type (Double discharge port type)

- Discharge ports are provided in multiple. This is ideally suited for the case when there are many lubricating ports.
- Lubricating pistons are operated in parallel system.
- Adjustment of the number of lubricating ports is possible only in one place at the left end. This is carried out by removing the blined screw of the communicating port. The discharge rate will be doubled by this adjustment.
- Each piston is provided with indicator stem for monitoring of state of lubrication.
- Pressure is less than 9.8MPa for oil service.
- Grease quantity can be adjusted with adjusting screw.



## 2.

# KS形分配弁(シングル吐出口) KS SERIES MEASURING VALVES (Single Discharge Port Type)

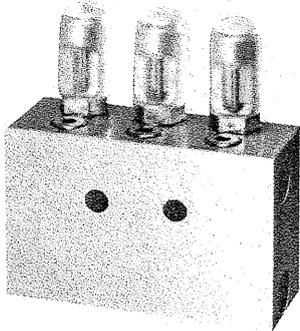
### 概要 GENERAL DESCRIPTION

KS形分配弁は、デュアルラインに使用される可変容量形吐出弁で、ポンプから2本の主管に交互に圧送される潤滑剤の圧力により作動し、各給油ポイントへ計量吐出機構で給油します。分配弁の動作は、それぞれのメインピストンに設けたインジケータシステムにより確認できます。又、このメインピストンのストロークを調整ネジを調整することによって吐出量を変更することができます。

シングル吐出口とは、メインピストンの往復吐出量を分配弁内部で、1つの吐出口に合流させたものです。仕様等に記載してある「吐出量 $\text{cm}^3/\text{ストローク}$ 」とはメインピストンの片側の動きに対する吐出量を表示しています。従って主管2本に交互に潤滑剤が圧送され、分配弁が作動したとしますとメインピストンは1往復したことになりますので、1個の吐出口からの量は $\text{cm}^3/\text{ストローク} \times 2$ となり倍量出したこととなります。

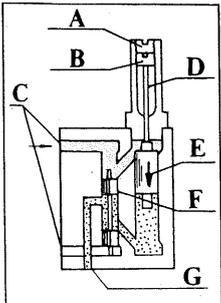
The KS measuring valve is a variable delivery valve used in dualines. It is operated by the pressure of the lubricant pumped into the two main supply lines alternately from the pump, and feeds the lubricant to the lubricating points by way of the metering discharge mechanism. The action of measuring valves may be checked by the indicator stem provided on each main piston. The discharge capacity may be controlled by adjusting the stroke of main piston by turning the adjusting screw.

In the single discharge port type, the deliveries in the reciprocal stroke of the main piston are combined into one discharge port inside the valve. The discharge capacity ( $\text{cm}^3/\text{stroke}$ ) mentioned in catalogue refers to the delivery by one side action of the main piston. Therefore, when lubricant is sent into two main supply lines alternately and the measuring valve is operated accordingly, the main piston makes one full reciprocal stroke, and the output from one discharge port is twice as large as the specified discharge capacity.



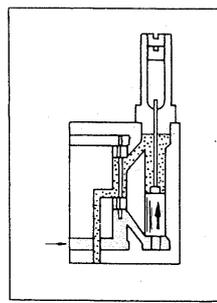
### 作動説明 PRINCIPLE OF OPERATION

- |              |                 |
|--------------|-----------------|
| A. ロックネジ     | Lock screw      |
| B. 調整ネジ      | Adjusting screw |
| C. 供給口       | Supply ports    |
| D. 指示棒       | Indicator stem  |
| E. メインピストン   | Main piston     |
| F. パイロットピストン | Pilot piston    |
| G. 吐出口       | Discharge line  |



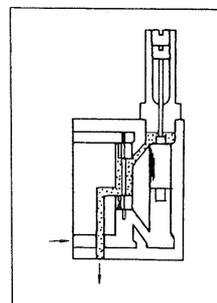
**1** 供給口からの加圧された潤滑剤により、パイロットピストンが押し下げられ、メインピストン上部への油路を開く。メインピストンは矢印方向に押し下げられる。

Pressurized lubricant entering valve forces pilot piston down, allowing pressure to be applied to top of main piston. Main piston begins to move down.



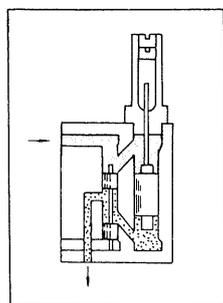
**2** メインピストンが押し下げられることにより、下部側の潤滑剤は油路を通してパイロットピストンに達し、吐出口へ押し出されます。

Main piston moving down under pressure forces lubricant from its chamber, past the lower land of the pilot piston and out the discharge line to the bearing.



**3** 次に供給ラインが切り替わり、下側の供給口に加圧潤滑剤が作用し、パイロットピストンを押し上げ、メインピストン下部への油路を開く。メインピストンは矢印方向に押し上げられる。

Pressurized lubricant entering valve forces pilot piston up, allowing pressure to be applied to bottom of main piston. Main piston begins to move up.



**4** メインピストン上昇に伴い上部側の潤滑剤は油路を通してパイロットピストンに達し、吐出口へ押し出されます。

Main piston moving up under pressure forces lubricant from its chamber, past the upper land of the pilot piston and out the discharge line to the bearing.

## 特長 FEATURES

1. 確実な計量分配給油：給油ポイント毎に最適な量を給油します。
2. 堅牢な構造で確実な作動：動作部分は、パイロットピストンとメインピストンからなるシンプルな構成ですから、故障がほとんどなく、その動作が確実です。
3. 給油ポイント毎に給油確認可能：各インジケータシステムの動きにより確認。
4. 20.6MPa の高压で使用できます  
圧力が高いと配管を細くする事も可能で、信頼性の高い給油が行えます。
5. 高精度の機械加工による優れた高性能分配弁。  
分配弁はMC、ホーニング盤等により精密加工されているため、特に摺動部は高精度で、耐久性、機能性に優れています。

1. Accurate measuring - - - an optimum amount of lubricant is supplied to each lubricating point.
2. Rigid structure, secure operation - - - moving parts are built in a simple structure consisting only of pilot piston and main piston, so that the operation is secure and is almost free of troubles.
3. Checking of lubrication in every lubricating point - - - the state can be checked by observing the indicator stem(s).
4. Usable at a high 20.6MPa pressure  
At high pressure, the piping diameter can be reduced, and highly reliable lubrication may be realized.
5. Excellent performance by high precision machining

Because of precision machining by MC, honing machine, etc., the precision of sliding parts is particularly high, and the durability and functions are excellent.

## 仕様 SPECIFICATION

形式 Model	吐出口数 Number of dis. ports	吐出量 (cm <sup>3</sup> /stroke) Dis. capacity		調整ネジ 1回転当りの 吐出量 (cm <sup>3</sup> /rev) Adjustment	最高使用圧力 (MPa) Working Pressure (MAX.)	取付ボルト (付属) Mounting bolts (Attachment)	重量 (kg) Weight	パイロットピストン 操作油量 (cm <sup>3</sup> ) Operative Vol. for pilot piston
		MAX.	MIN.					
KS-31	1	1.2	0.2	0.06	20.6	M8×65	1.2	0.6
KS-32	2						2.0	1.2
KS-33	3						2.8	1.8
KS-34	4						3.7	2.4
KS-41	1	2.5	0.6	0.10			1.4	0.63
KS-42	2						2.3	1.26
KS-43	3						3.2	1.89
KS-44	4						4.0	2.52
KS-51	1	5.0	1.2	0.15			1.5	0.63
KS-52	2						2.5	1.26
KS-53	3						3.5	1.89
KS-54	4						4.6	2.52

## 寸法表 DIMENSIONS

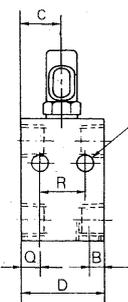
Model	A	B	C	D	E	F	G	H	I	J	K	L	M	N	P	Q	R	S	T	U	X	Y
KS-31	—	8	21.5	44	—	—	—	10.5	26	—	18	42	—	116	46	10	24	—	—	—	1/4	3/8
KS-32,33,34	29	8	21.5	—	73	102	131	10.5	26	45	18	42	79	116	48	36.5	—	—	29	58	1/4	3/8
KS-40	32	9	24	49	81	113	145	9	28.5	—	12.5	54	—	129	49.5	10.5	28	60	91	123	1/4	3/8
KS-50	37	9.5	25.5	53	90	127	164	13	33	—	11	57	—	132	51	10	33	70	107	144	1/4	3/8

注) KS-32は取付穴が1ヶ所です。

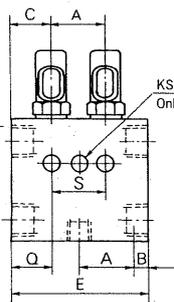
(NOTE: KS-32, Measuring valve has one mounting hole)  
(mm)

### KS-30, KS-40, KS-50 分配弁

#### 1口 (1 Dis.port)

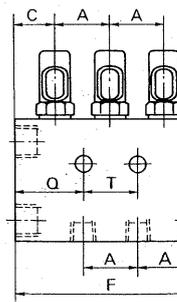


#### 2口 (2 Dis.ports)

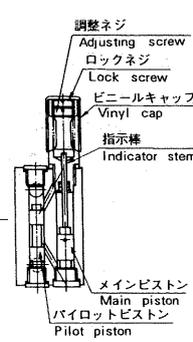
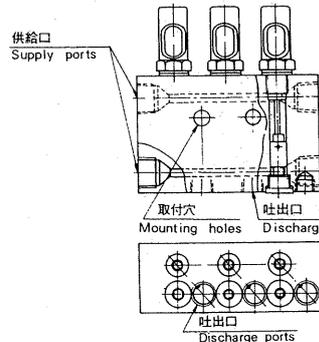
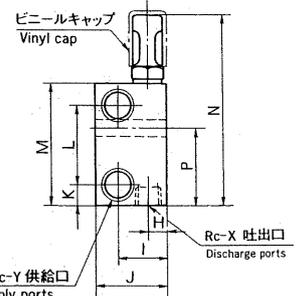
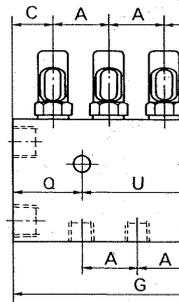


KS-32のみ  
Only

#### 3口 (3 Dis.ports)



#### 4口 (4 Dis.ports)



分配弁構造図  
Sectional View

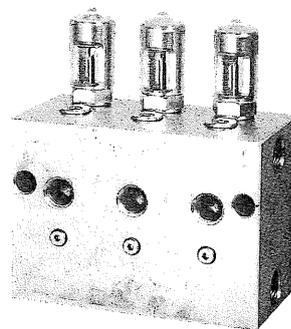
## 取扱上の注意 CAUTION AT OPERATION

- ① オイル用は9.8MPa以下でご使用下さい。
- ② 作動圧力は1MPa以下です。
- ③ 使用温度範囲は-20～+70°Cです。
- ④ 使用しない吐出口にはプラグ (R1/4) をして下さい。
- ⑤ 吐出量調整は指示棒ケース内の調整ネジで行ないます。  
調整後はロック用ネジで十分固定して下さい。
- ⑥ 屋外、塵埃、輻射熱などに対しては保護カバーを取付けて下さい。

- 1 The maximum working pressure of measuring valve using oil should be 9.8MPa.
- 2 The working pressure is 1MPa or lower.
- 3 Range of working temperature is -20～+70°C.
- 4 Plug (R1/4) discharge ports unused.
- 5 Discharge capacity can be adjusted by a adjusting screw in indicator stem case. After adjustment, securely fix the screw with lock screw.
- 6 Install protection cover against outdoor use, dirt, radiation heat etc.

# KW形分配弁 (ダブル吐出口)

KW SERIES MEASURING VALVES  
(Double Discharge Port Type)



## 概要 GENERAL DESCRIPTION

KW形分配弁は、KS形分配弁と基本的には同じですが、吐出口が2個、すなわちダブル吐出口を持つ点が異なります。ダブル吐出口とは、メインピストンの往動時の吐出量と、復動時の吐出量をそれぞれ単独に取り出すようにしたものです。仕様等に記載してあります「吐出量 $\text{cm}^3/\text{ストローク}$ 」の値が、メインピストンの往・復動のいずれかの動きによって吐出される1つの吐出口の量を示します。

The KW measuring valve is similar to the KS measuring valve in structure and function except that it has two discharge ports. That is, in the double discharge port type, the delivery by "going" main piston and that by "returning" main piston are picked up independently. The discharge capacity ( $\text{cm}^3/\text{stroke}$ ) mentioned in catalogue refers to the delivery by either way of action of the main piston.

## 特長 FEATURES

KS形分配弁の特長に加えて

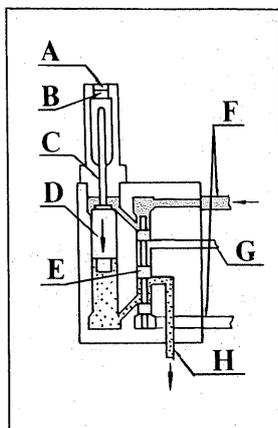
1. KS形に比べて給油ポイントを倍数受け持つことができます。
2. 奇数の給油ポイントに対しては、左端のダブル吐出口をシングル吐出口に変更することができ、簡単に対応できます。  
(但し、左端の1個以外は不可)
3. 取付寸法が同じで接続が容易  
KW-30・50形は取付寸法が同じですので、弁と弁の接続、弁と弁の交換が簡単にでき、シンプルな配管が行えます。

In addition at the features of KS series measuring valves:

1. A multiple of measuring points may be lubricated as compared with the number of lubricating points in KS.
2. For odd-number lubricating points, the double discharge ports at the left end may be modified to single type (but modification is impossible in other positions).
3. Mounting dimensions are identical, connection is easy.

Since the mounting dimensions of KW 30, 50 are identical, the valves can be connected or replaced easily, and the piping may be simplified.

## 作動説明 PRINCIPLE OF OPERATION

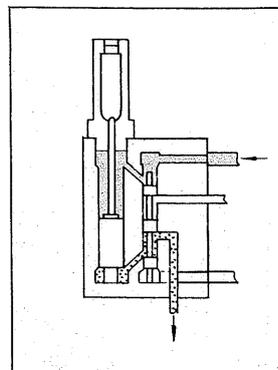


A. ロックネジ	Lock screw	E. パイロットピストン	Pilot piston
B. 調整ネジ	Adjusting screw	F. 供給口	Supply ports
C. 指示棒	Indicator stem	G. 吐出口 (A)	Discharge line
D. 主ピストン	Main piston	H. 吐出口 (B)	Discharge line

### 1

供給口からの加圧された潤滑剤により、パイロットピストンが押し下げられ、メインピストン上部への油路を開く。メインピストンは矢印方向に押し下げられる。

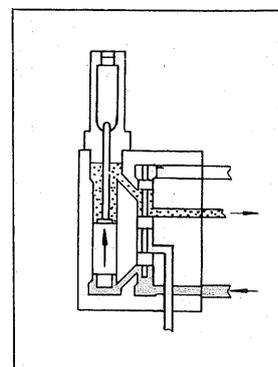
Pressurized lubricant entering valve forces pilot piston down, allowing pressure to be applied to top of main piston. Main piston begins to move down.



### 2

メインピストンが押し下げられることにより下部側の潤滑剤は油路を通過してパイロットピストンに達し、吐出口 (B) へ押し出されます。

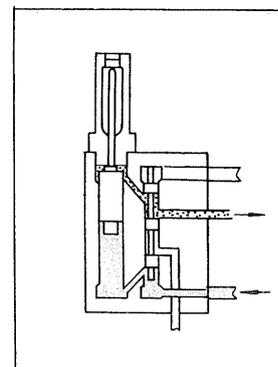
Main piston moving down under pressure forces lubricant from its chamber, past the lower land of the pilot piston and out the discharge line (B) to the bearing.



### 3

次に供給ラインが切り、下側の供給口に加圧潤滑剤が作用し、パイロットピストンを押し上げ、メインピストン下部への油路を開く。メインピストンは矢印方向に押し上げられる。

Pressurized lubricant entering valve forces pilot piston up, allowing pressure to be applied to bottom of main piston. Main piston begins to move up.



### 4

メインピストン上昇に伴い、上部側の潤滑剤は油路を通過してパイロットピストンに達し、吐出口 (A) へ押し出されます。

Main piston moving up under pressure forces lubricant from its chamber, past the upper land of the pilot piston and out the second discharge line (A) to the bearing.

## ダブル吐出口からシングル吐出口 への変換及びその機能説明

B-B断面図に示してある通り、左端底面吐出口から⊕ドライバーにて、連通プラグを取り外していただきますと、このポート(正面と底面)が連通します。必要な方向の吐出口を1つご利用いただくとシングル吐出になります。この場合、他の1ヶ所の吐出口はメクラプラグします。このように連通させてシングル吐出口に変換できますのは、左端1ヶ所のみです。吐出量は、KS形での説明の通り、給油ポイントへの給油量は倍量となります。

### Change from double discharge ports to single discharge port, and principle of operation

As shown in section B-B, remove the communicating plug from the discharge port at the bottom of the left end by using a Phillips screwdriver, then this port communicates in all ways. Use one discharge rection, then single discharge port design is made. In this case, shut off all other ports with blind plugs. Such modification by communicating to make a single discharge port is possible, however, only at the left end. The discharge capacity is doubled, as explained in the description of KS series, when lubricating points.

## 仕様 SPECIFICATION

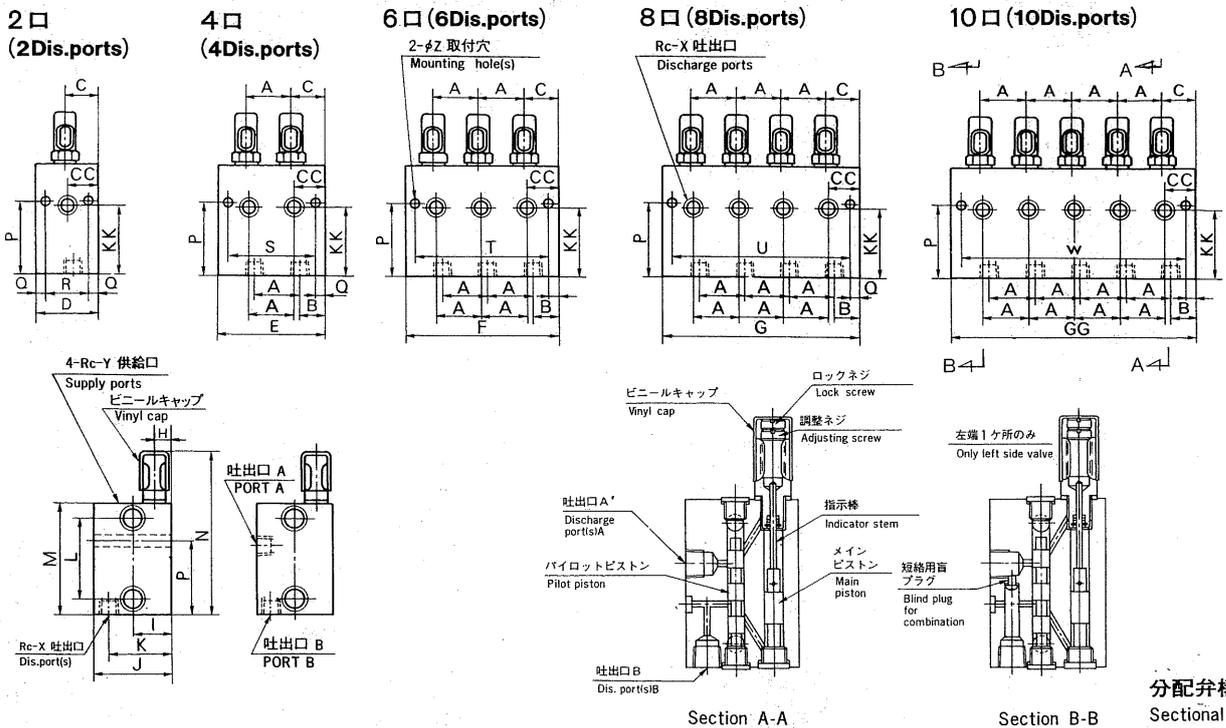
形式 Model	吐出口数 Number of dis. ports	吐出量 (cm <sup>3</sup> /stroke) Dis. capacity		調整ネジ 1回転当りの 吐出量 (cm <sup>3</sup> /rev) Adjustment	最高使用圧力 (MPa) Working Pressure (MAX.)	取付ボルト (付属) Mounting bolts (Attachment)	重量 (kg) Weight	パイロットピストン 操作油量 (cm <sup>3</sup> ) Operative Vol. for pilot piston
		MAX.	MIN.					
KW-32	2	1.2	0.2	0.06	20.6	M8×75L	1.5	0.4
KW-34	4						2.5	0.8
KW-36	6						3.5	1.2
KW-38	8						4.5	1.6
KW-310	10	5.0	1.2	0.15			5.5	2.0
KW-52	2						1.5	0.4
KW-54	4						2.5	0.8
KW-56	6						3.5	1.2
KW-58	8	4.5	1.6					

## 寸法表 DIMENSIONS

Model	A	B	C	CC	D	E	F	G	GG	H	I	J	K	KK	L	M	N	P	Q	R	S	T	U	W	X	Y	Z
KW-30	32	18	24	22	45	76	108	140	172	12	27	54	44	49	57	79	116	52	7	31	62	94	126	158	1/4	3/8	9
KW-50																	132										

(mm)

### KW-30, KW-50 分配弁



分配弁構造図  
Sectional View

## 取扱上の注意 CAUTION AT OPERATION

- ① オイル用は9.8MPa以下でご使用下さい。
  - ② 作動圧力は1MPa以下です。
  - ③ 使用温度範囲は-20～+70°Cです。
  - ④ 吐出量調整は指示棒ケース内の調整ネジで行います。調整後はロック用ネジで十分固定して下さい。
  - ⑤ 屋外、塵埃、輻射熱などに対しては保護カバーを取付けて下さい。
  - ⑥ 左端1ヶ所のみ吐出口B内のプラグを外せばAB吐出口が合流します。この場合、この部分の吐出量は倍量となります。
  - ⑦ 左端1ヶ所のみ吐出口B内のプラグを外せばAB吐出口が合流します。(B-B断面図参照) この場合、この部分の吐出量は倍量となります。
- 1 The maximum working pressure of measuring valve using oil should be 9.8MPa.
  - 2 The working pressure is 1MPa or lower.
  - 3 Range of working temperature is -20 ~ +70°C.
  - 4 Discharge capacity can be adjusted by an adjusting screw in indicator stem case. After adjustment, securely fix the screw with lock screw.
  - 5 Install protection cover against outdoor use, dirt, radiation heat and etc.
  - 6 Discharge port(s) A (or B) is the same as Discharge port(s) A' (or B'). (see sectional view of A-A.)  
In case of using the Dis. port(s) A' and B', plug up to the Dis. port(s) A and B with the attached blind plugs.
  - 7 To combine the output of the two discharge ports of only left side valve, remove the blind plug in the Dis. port B. (see sectional view of B-B)  
In this case the quantity of lubricant will be doubled.

4. Specifications of measuring valve list

Measuring valve size	Model	Discharge ports	Discharge capacity (cm <sup>3</sup> /st)		Adjustable amount cm <sup>3</sup> /one revolution of screw	Mounting bolts (Attachment)	Mass (kg)	Pipe joints	
			Max.	Min.				Inlet	Discharge
KS-30	KS-31	1	1.2	0.2	0.06	M8 × 65L	1.2	Rc3/8	Rc1/4
	KS-32	2					2.0		
	KS-33	3					2.8		
	KS-34	4					3.7		
KS-40	KS-41	1	2.5	0.6	0.10		1.4		
	KS-42	2					2.3		
	KS-43	3					3.2		
	KS-44	4					4.0		
KS-50	KS-51	1	5.0	1.2	0.15		1.5		
	KS-52	2					2.5		
	KS-53	3				3.5			
	KS-54	4				4.6			
KW-30	KW-32	2	1.2	0.2	0.06	1.5			
	KW-34	4				2.5			
	KW-36	6				3.5			
	KW-38	8				4.5			
	KW-310	10				5.5			
KW-50	KW-52	2	5.0	1.2	0.15	1.5			
	KW-54	4				2.5			
	KW-56	6				3.5			
	KW-58	8				4.5			

①The working pressure is 0.98MPa or lower.

②Working pressure : 20.6MPa

[The maximum working pressure of measuring valve using oil should be 10MPa]

③Applicable grease : NLGI No.00~No.1

## 5. Mounting measuring valve

### (1) Mounting measuring valve

(a) It isn't advisable to attach the measuring valves directly to the main supply pipes.

Unlike the case attached to the branch pipes, direct attaching to the main supply pipes makes it difficult to continue operation of the system when the measuring valves must be removed for piping line improvement in future or troubles.

It also can cause error motion of the whole system due to air allowed into the main pipes.

(b) When measuring valves are connected in series, limit the number of pieces to about 3, in principle. When more than three measuring valves are used, branch a separate pipe from the main pipe for the piping connection.

If the spacing between measuring valves is 0.5 meter or shorter, however, up to 5 measuring valves can be attached.

(c) To confirm the lubricating operation of measuring valves easily, the branch pipes should be connected correctly to the measuring valves so that the indicator rods of the respective measuring valves move in the same direction. In a more detailed explanation, all pipes branched from No.1 discharge line should be connected to the upper ports of the respective measuring valves.

(The same result may be obtained even if the pipes branched from No.1 line are connected to the lower ports of the measuring valves.)

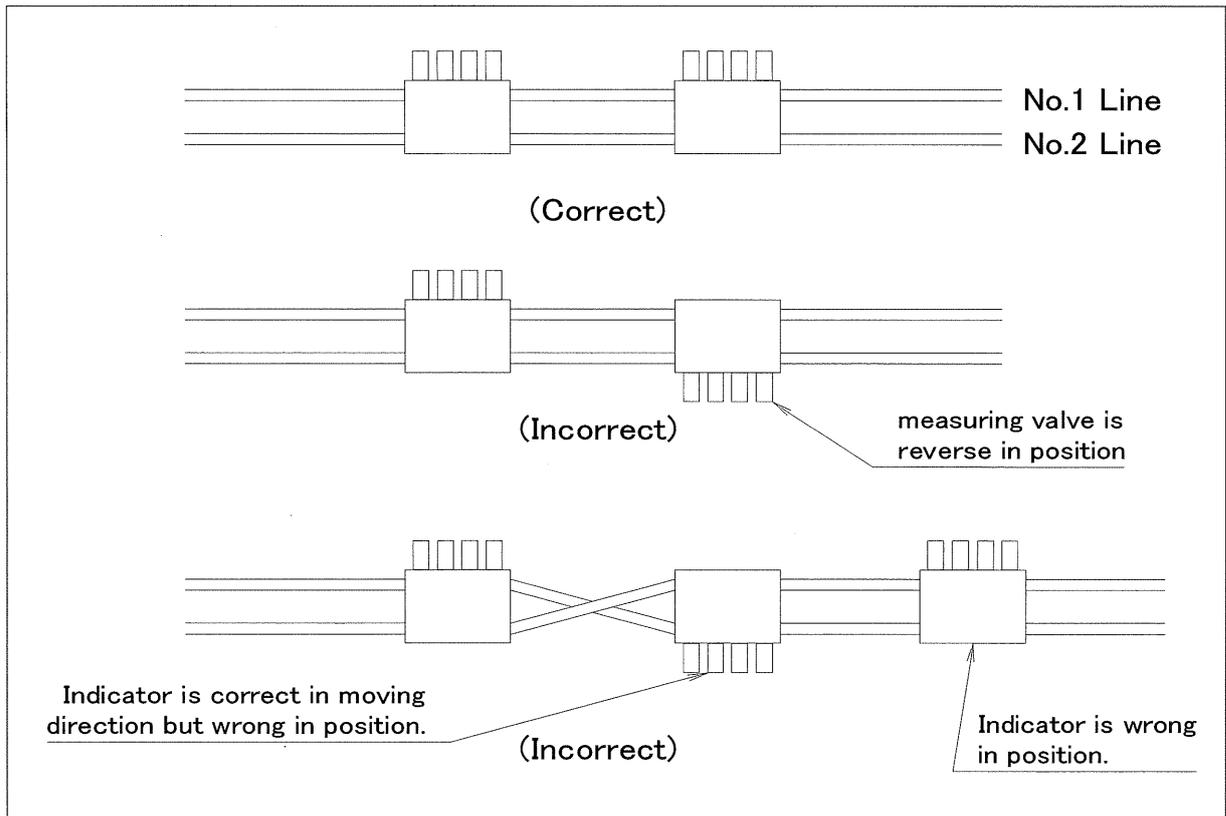


Fig.4 Connection of measuring valve

(d)The measuring valve should be mounted on a support exclusively used for this purpose or separately fabricated base plate equivalent to the aforementioned support. The measuring valve should be installed at the location as close to the lubricating point as possible, where its indicator rods can be seen easily from the surrounding areas, and where the amount of supplied grease can be adjusted easily.

(e)The measuring valve should be protected with a steel plate cover, when being installed as the dusty location often splashed with water and subject to a high radiation heat.

(f)Blank the ends of the measuring valves attached to the branch pipes and main supply pipes with a high-pressure plug.

## (2)Connection of sub-supply pipes

(a)Since the pressure required for greasing the back pressure of bearing and resistance of the sub-supply pipes reaches the maximum operating pressure, it is necessary to use the material which withstands the pressure of 30 kg/cm<sup>2</sup> for the piping from the measuring valves to the points of lubrication.

For the piping, 8A (1/4B) steel pipes or 6  $\phi$  and 8  $\phi$  copper pipes are used.

(b)When the bearings are submitted to a high back-pressure, prevent reverse flow of grease and error motion of the measuring valves by using check valves or inverseflow check valves. (Select the piping material carefully as the withstand pressure of the sub-supply pipes also changes in this case.)

(c)Bearings must be composed so as to ensure discharge of old grease.

For sealed type bearings, it is necessary to lead the filled grease to the outside by attaching a relief valve to the bearings.

(d)When the lubricating points of a machine include any moving part which slides, a flexible hose must be used.

## 6. Confirmation of Actuation Measuring Valve

1) Check the measuring valve one by one, and check to see whether the indicating rod comes out upward or retracts downward.

2) If the measuring valve that the indicating rod does not move is found, see the sub-paragraphs

Operate the lubricating pump, wait for automatic stop, and check for possible operation.

(a) When operated;

Examine the sub-supply pipe and bearing.

a) Check the sub-supply pipe for no breakage.

b) Set the pressure gauge to a tip of grease gun, supply directly grease from the sub-supply pipe to the bearings, and examine the back pressure.

Conceivable causes are:

b)-1. The bearing is originally high in back pressure.

b)-2. The inside of bearing is filled with grease, whose escape is not provided, and the piston of measuring valve is not able to operate. In this instance, the relief valve is mounted on the bearing.

b)-3. Inadequate design and machining to bearing.

(b) When not operated;

a) In most cases, foreign materials in the piping enter the measuring valve and the piston is sticking thereby.

(Normal measuring valve operates at 9.8MPa or less.)

b) Take the following measures:

b)-1. Whenever the lubricating pump is operated once, gradually increase the change-over pressure until the indicating rod moves. When the lubricating rod moves, add 1~2MPa to its change-over pressure, and set the pressure adjusting screw. Perform the setting within 4~18MPa in the adjustment of change-over pressure.

b)-2. When the operation is not made by increasing the pressure, carry out the cleaning of the measuring valve.

## 7.MAINTENANCE AND INSPECTION

### Inspection

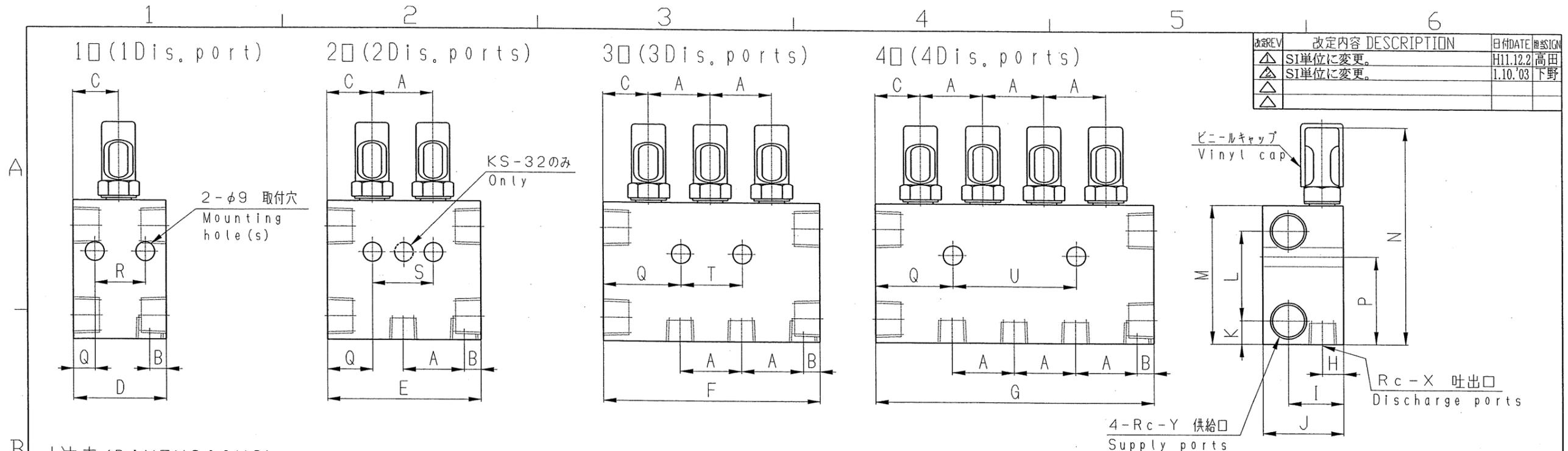
Periodcally inspect the following items :

- 1) Operation of indicating rod of measuring valve
- 2) Possible leakage from piping
- 3) Possible breakage of equipment

### 9. Trouble shooting and remedy

It is recommended for better results that the cause of a trouble or failure should be detected by tracing simple defects first.

No.	Descriptions	Causes	Remedies
(1)	Indicator rod of some measuring valves fail to operate.	a. Bearings are blocked.	a. Check the bearings and improve.
		b. Sub-supply pipes are broken.	b. Check and repair the sub-supply pipes.
		c. Changed over pressure of hydraulic operated reversing valve is too low.	c. Adjust the changed over pressure.
		d. Sticking of measuring valve due to dust clogging.	d. Overhaul the measuring valve or replace.
		e. Branch pipe is too long.	e. Lower the flow resistance by increasing the changed over pressure or by making the branch pipe larger.
(2)	All the measuring valves fail to operate.	Refer to above item (3) in this case as alarm is given.	
(3)	Alarm Lighting. When the control power switch is turned off once and to ON again, the pump operates but the Alarm Lighting again soon and the pump comes to a stop.	Grease retarding is resulted.	
		a. Reverse rotation of motor.	a. Exchange the two phases of the three phases.
		b. Air is trapped in the pump.	b. Draw out the air from the pail.
		c. The grease used is too hard to be adsorbed.	c. Change the grease with softer one.
		d. Mis-connection of the piping system.	d. Check and correct the piping.
		e. Grease leakage from the main or branch pipe.	e. Check and repair the piping.
		f. Excessive air allowed in the main or branch pipe.	f. Disconnect the piping at several points, and operate the pump to draw out the air.
		g. Inadequate setting of protective timer.	g. Set the timer at lubricating time +5 minutes.
		h. Malfunction of limit switch or mis-wiring.	h. Check the limit switch (push by hands) or repair.
		i. Dust is caught by the relief valve.	i. Overhauling.
		j. Malfunction of hydraulic-operated reversing valve, sticking of piston, or loosening due to wear.	j. Disassemble for repair or replace.
k. Insufficient discharge quantity or discharge pressure due to wear of cylinder or plunger.	k. Replace the pump assy.		



REV	改定内容 DESCRIPTION	日付 DATE	担当者 SIGN
△	SI単位に変更。	H11.12.2	高田
△	SI単位に変更。	1.10.'03	下野
△			
△			

B 寸法表 (DIMENSIONS)

Model	A	B	C	D	E	F	G	H	I	J	K	L	M	N	P	Q	R	S	T	U	X	Y
KS-31	-	8	21.5	44	-	-	-	10.5	26	45	18	42	79	116	46	10	24	-	-	-	1/4	3/8
KS-32, 33, 34	29	8	21.5	-	73	102	131	10.5	26		18	42		116	48	36.5	-	-	29	58	1/4	3/8
KS-40	32	9	24	49	81	113	145	9	28.5		12.5	54		129	49.5	10.5	28	60	91	123	1/4	3/8
KS-50	37	9.5	25.5	53	90	127	164	13	33		11	57		132	51	10	33	70	107	144	1/4	3/8

注) KS-32は取付穴が1ヶ所です。(NOTE: KS-32, Measuring valve has one mounting hole)

注記。

- 1 オイル用は10MPa以下でご使用下さい。
- 2 作動圧力は1MPa以下です。
- 3 使用温度範囲は-20~+70°Cです。
- 4 使用しない吐出口にはプラグ (PT1/4) をして下さい。
- 5 吐出量調整は指示棒ケース内の調整ネジで行います。調整後はロック用ネジで十分固定して下さい。
- 6 屋外、塵埃、輻射熱などに対しては保護カバーを取付けて下さい。

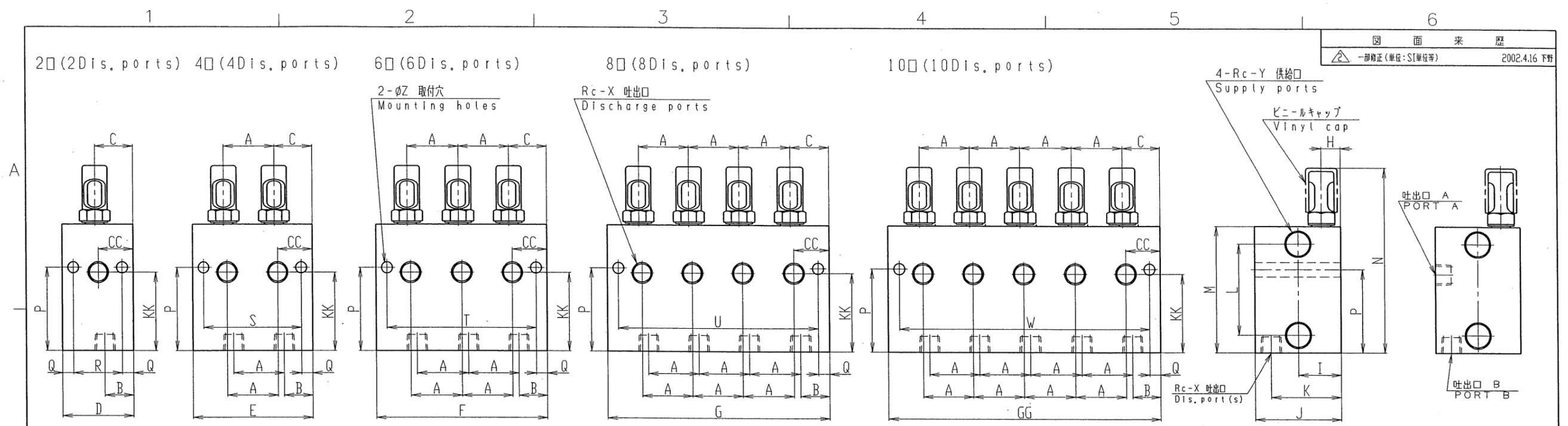
C 仕様 (SPECIFICATION)

形 式 Model	吐出口数 Number of dis. ports	吐出量 (cm <sup>3</sup> /stroke) Dis. capacity		調整ネジ1回転 当りの吐出量 (cm <sup>3</sup> /rev) Adjustment	最高使用圧力 (MPa) Working Pressure (MAX.)	取付ボルト (付属) Mounting bolts (Attachment)	質 量 (Kg) Mass	パイロットピストン 操作油量 (cm <sup>3</sup> ) Operative Vol. for pilot piston
		MAX.	MIN.					
KS-31	1	1.2	0.2	0.06	20.6	M8x65	1.2	0.6
KS-32	2							
KS-33	3							
KS-34	4							
KS-41	1	2.5	0.6	0.10	20.6	M8x65	1.4	0.63
KS-42	2							
KS-43	3							
KS-44	4							
KS-51	1	5.0	1.2	0.15	20.6	M8x65	1.5	0.63
KS-52	2							
KS-53	3							
KS-54	4							

CAUTION AT OPERATION

1. The maximum working pressure of measuring valve using oil should be 10MPa.
2. The working pressure is 1MPa or lower.
3. Range of working temperature is -20~+70°C.
4. Plug (R1/4) discharge ports unused.
5. Discharge capacity can be adjusted by a adjusting screw in indicator stem case. After adjustment, securely fix the screw with lock screw.
6. Install protection cover against outdoor use, dirt, radiation heat etc.

CHECKED BY 15.7.10	DRAWN BY K. TANAKA	KS-30, KS-40, KS-50 分配弁 組立図
SEAL OFF 野 宮	DESIGNED BY K. TANAKA	
DWG. No. KS-803860		SCALE 1 / 1
CFD. No. CODE No.		
KOWA CORP. OSAKA JAPAN		
3RD ANGLE PROJECTION		



寸法表 (DIMENSIONS)

Model	A	B	C	CC	D	E	F	G	GG	H	I	J	K	KK	L	M	N	P	Q	R	S	T	U	W	X	Y	Z
KW-30									172								116							158	1/4	3/8	9
KW-50	32	18	24	22	45	76	108	140	-	12	27	54	44	49	57	79	-	52	7	31	62	94	126	-			

注記.

- 1 オイル用は9.8MPa (100kg/cm<sup>2</sup>) 以下でご使用下さい。
- 2 作動圧力は0.98MPa (10kg/cm<sup>2</sup>) 以下です。
- 3 使用温度範囲は-20~+70°Cです。
- 4 吐出量調整は指示棒ケース内の調整ネジで行います。調整後はロック用ネジで十分固定して下さい。
- 5 屋外、塵埃、輻射熱などに対しては保護カバーを取付けて下さい。
- 6 左端1ヶ所のみ吐出口B内のプラグを外せばAB吐出口が合流します。この場合、この部分の吐出量は倍量となります。

CAUTION AT OPERATION

1. The maximum working pressure of measuring valve using oil should be 9.8MPa (100kg/cm<sup>2</sup>).
2. The working pressure is 0.98MPa (10kg/cm<sup>2</sup>) or lower.
3. Range of working temperature is -20~+70°C.
4. Discharge capacity can be adjusted by a adjusting screw in indicator stem case. After adjustment, securely fix the screw with lock screw.
5. Install protection cover against outdoor use, dirt, radiation heat etc.
6. To combine the output of the two discharge ports of only left side valve, remove the blind plug in the Dis. port B. (see sectional view of B-B)  
In this case the quantity of lubricant will be doubled.

仕様 (SPECIFICATION)

形 式 Model	吐出口数 Number of dis. ports	吐出量 (cm <sup>3</sup> /stroke) Dis. capacity		調整ネジ1回転 当りの吐出量 (cm <sup>3</sup> /rev) Adjustment	最高使用圧力 Working Pressure (MAX.)	取付ボルト (付属) Mounting bolts (Attachment)	質 量 (Kg) Mass	パイロットピストン 操作油量 (cm <sup>3</sup> ) Operative Vol. for pilot piston
		MAX.	MIN.					
KW-32	2	1.2	0.2	0.06	20.6MPa (210Kg/cm <sup>2</sup> )	M8×75L	1.5	0.4
KW-34	4							
KW-36	6							
KW-38	8							
KW-310	10							
KW-52	2	5.0	1.2	0.15			1.5	0.4
KW-54	4							
KW-56	6							
KW-58	8							

CHECKED BY 下野 2002.4.16 SEC. CHIEF	DRAWN BY K. TANAKA	KW-30, KW-50 分配弁 組立図
DESIGNED BY K. TANAKA		
KOWA CORP. OSAKA JAPAN		DWG. No. KS-803859
3RD ANGLE PROJECTION		SCALE 1/1

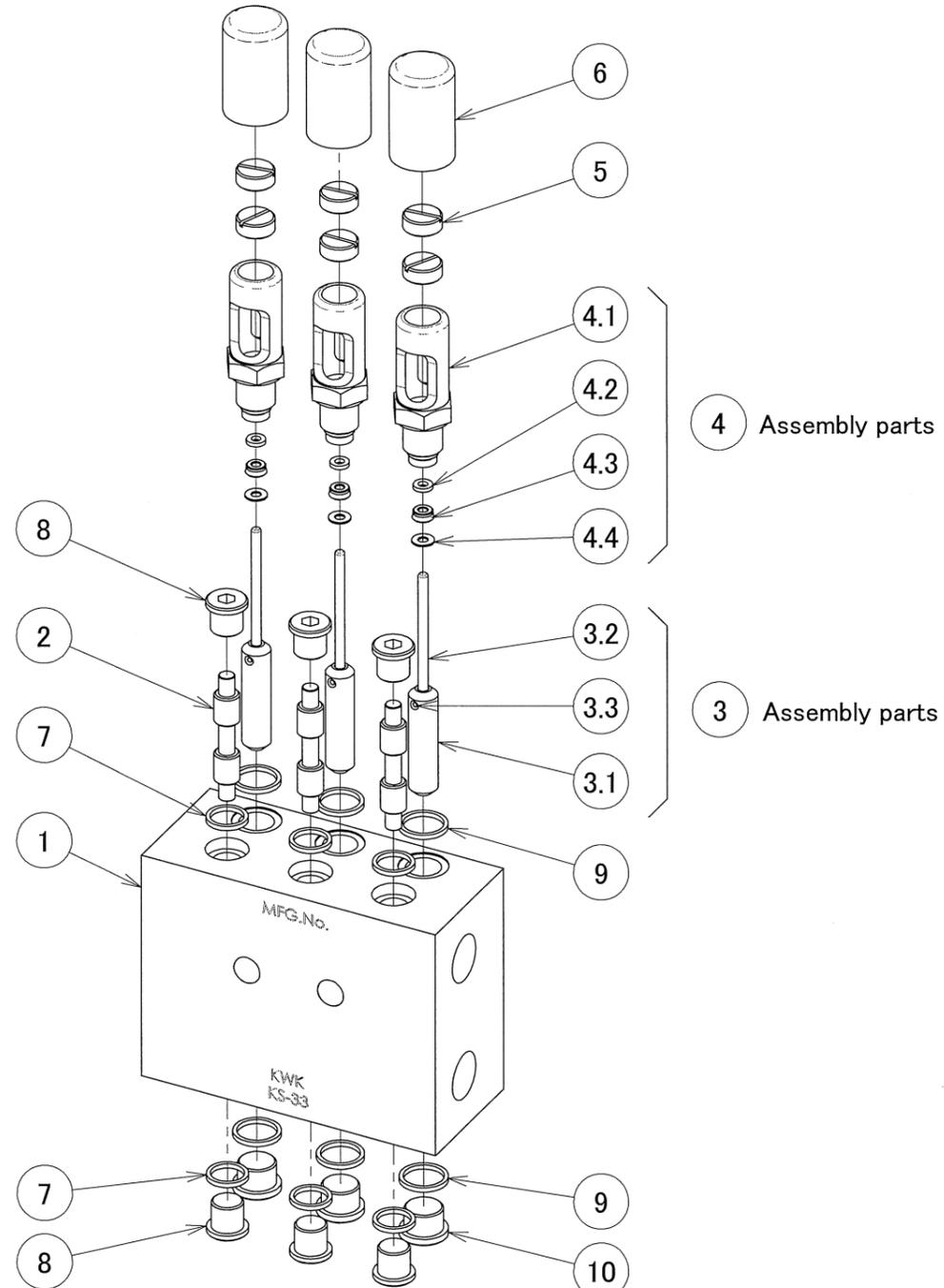
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A

B

C

D



No.	Name	Part number	Quantity	Mass	Note
10	Seated plug	X2007	3	8.77	M12 × 10L
9	Copper packing	X3008	6	0.72	φ 15 × φ 12.5 × 1.5t
8	Seated plug	X2006	6	6.51	M10 × 11L
7	Copper packing	X3006	6	0.62	φ 13 × φ 10.5 × 1.5t
6	KS, KW-30 indicator rod cap	G8010	3	5.15	KS-800218
5	Adjusting screw	G8007	6	4.51	KS-800478
4.4	Plain washer	PW-M3	1	0.120	M3
4.3	SK seal	SKSEAL-P3	1	0.07	P3
4.2	Backup ring T3	BUR-P3-E	1	0.06	P3 Endless
4.1	KS, KW-30 indicator rod guide	-	1	40.11	KS-800462
4	KS, KW-30 indicator rod guide ASS'Y	G8002	3	40.36	KS-800462
3.3	Parallel pin	-	1	0.111	1.5 × 8L
3.2	KS, KW-30 measuring valve indicator rod	-	1	2.58	KS-800516
3.1	KS, KW-30 piston	-	1	17.03	KS-800516
3	KS, KW-30 main piston ASS'Y	G2020	3	19.73	KS-800516
2	KS-30 pilot piston	G1120	3	11.56	KS-800461
1	KS-33 body	G1103	1	2367.61	KS-800442

CUSTOMER

SPECIFICATION

CHECKED BY	DRAWN BY
<i>M.S.</i>	oosumi
2019.5.9	2019.5.7
APPROVED BY	DESIGNED BY
<i>Shimomura</i>	kato
2019.5.9	2019.5.7

KS-30 Measuring valve  
Disassembly

**KOWA CORP.**  
OSAKA JAPAN

DWG.No.

eSA-KS-30

CFD.No.

CODE No.

3RD ANGLE PROJECTION

SCALE

1:2

DATE OF ISSUE

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製造

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出図日

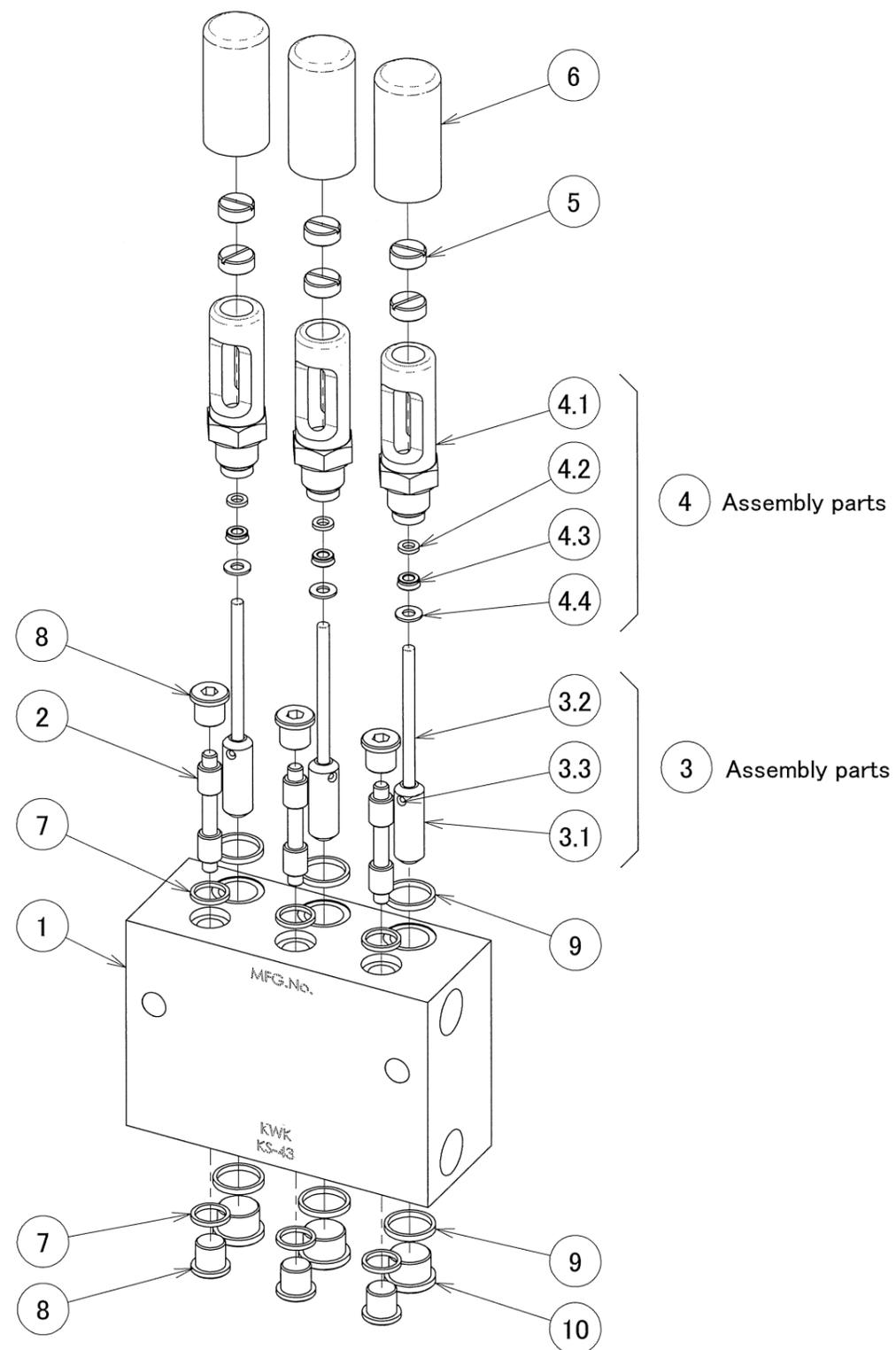
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No.	Name	Part number	Quantity	Mass	Note
10	Seated plug	X2009	3	12.76	M14 × 11L
9	Copper packing	X3010	6	1.10	φ 17 × φ 14.5 × 2t
8	Seated plug	X2006	6	6.51	M10 × 11L
7	Copper packing	X3006	6	0.62	φ 13 × φ 10.5 × 1.5t
6	KS-40 indicator rod cap	G8011	3	7.67	KS-800219
5	Adjust screw	G8007	6	4.51	KS-800478
4.4	Plain washer	PW-M4	1	0.309	M4
4.3	SK seal	SKSEAL-P4	1	0.08	P4
4.2	Backup ring T3	BUR-P4-E	1	0.08	P4 Endless
4.1	KS-40 indicator rod guide	-	1	70.07	KS-800465
4	KS-40 indicator rod guide ASS'Y	G8003	3	70.54	KS-800465
3.3	Parallel pin	-	1	0.198	2 × 8L
3.2	KS-40 measuring valve indicator rod	-	1	5.78	KS-800517
3.1	KS-40 piston	-	1	15.83	KS-800517
2	KS-40 main piston ASS'Y	G2021	3	21.81	KS-800517
2	KS-40,50 pilot piston	G1021	3	11.70	KS-800464
1	KS-43 body	G1107	1	2594.44	KS-800447

CUSTOMER

SPECIFICATION

CHECKED BY	DRAWN BY
M.S	oosumi
2019.5.9	2019.5.7
APPROVED BY	DESIGNED BY
Shimizu	kato
2019.5.9	2019.5.7

KS-40 Measuring valve  
Disassembly

**KOWA CORP.**  
OSAKA JAPAN

DWG.No.

eSA-KS-40

CFD.No.

CODE No.

3RD ANGLE PROJECTION

SCALE

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DATE OF ISSUE

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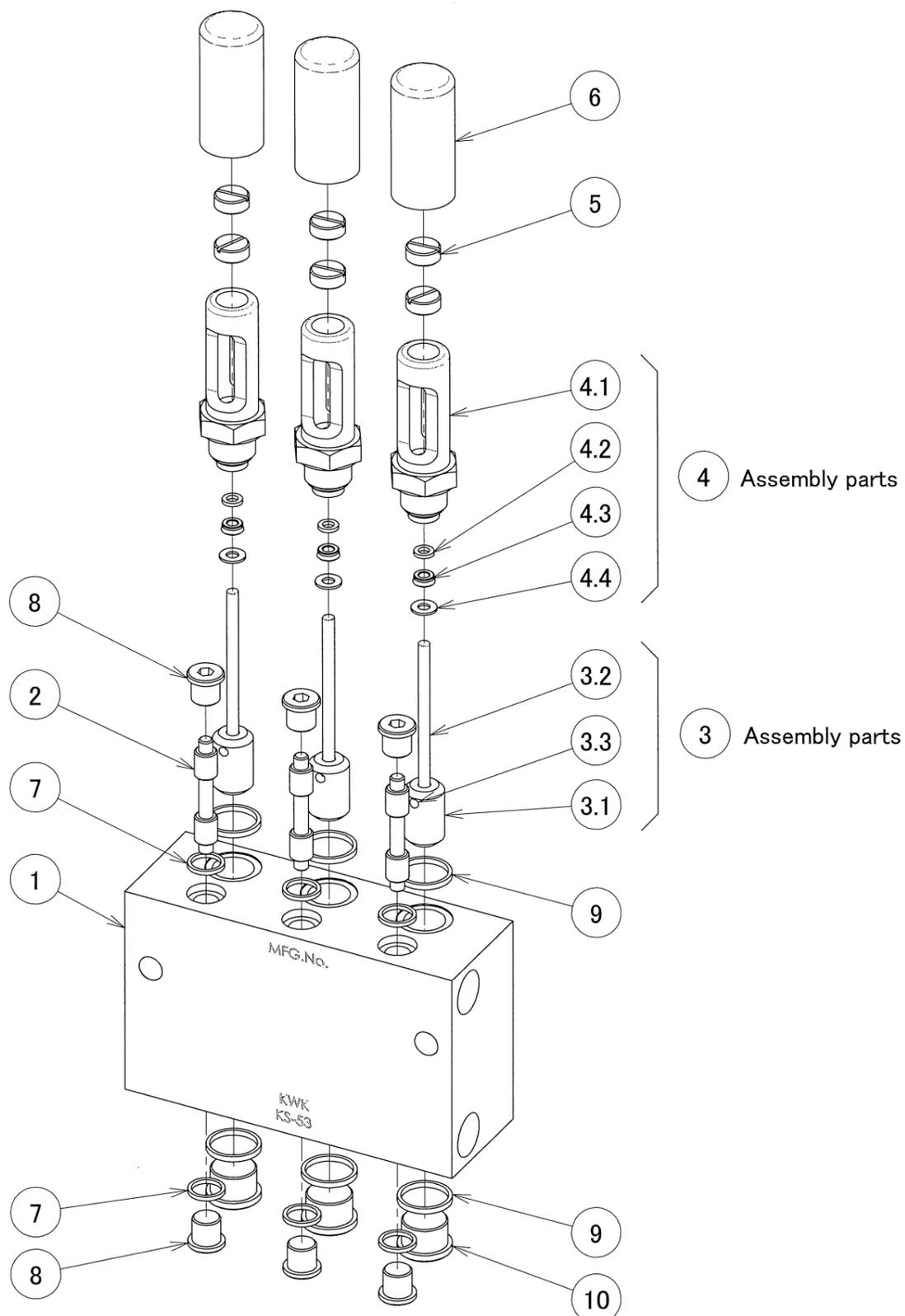
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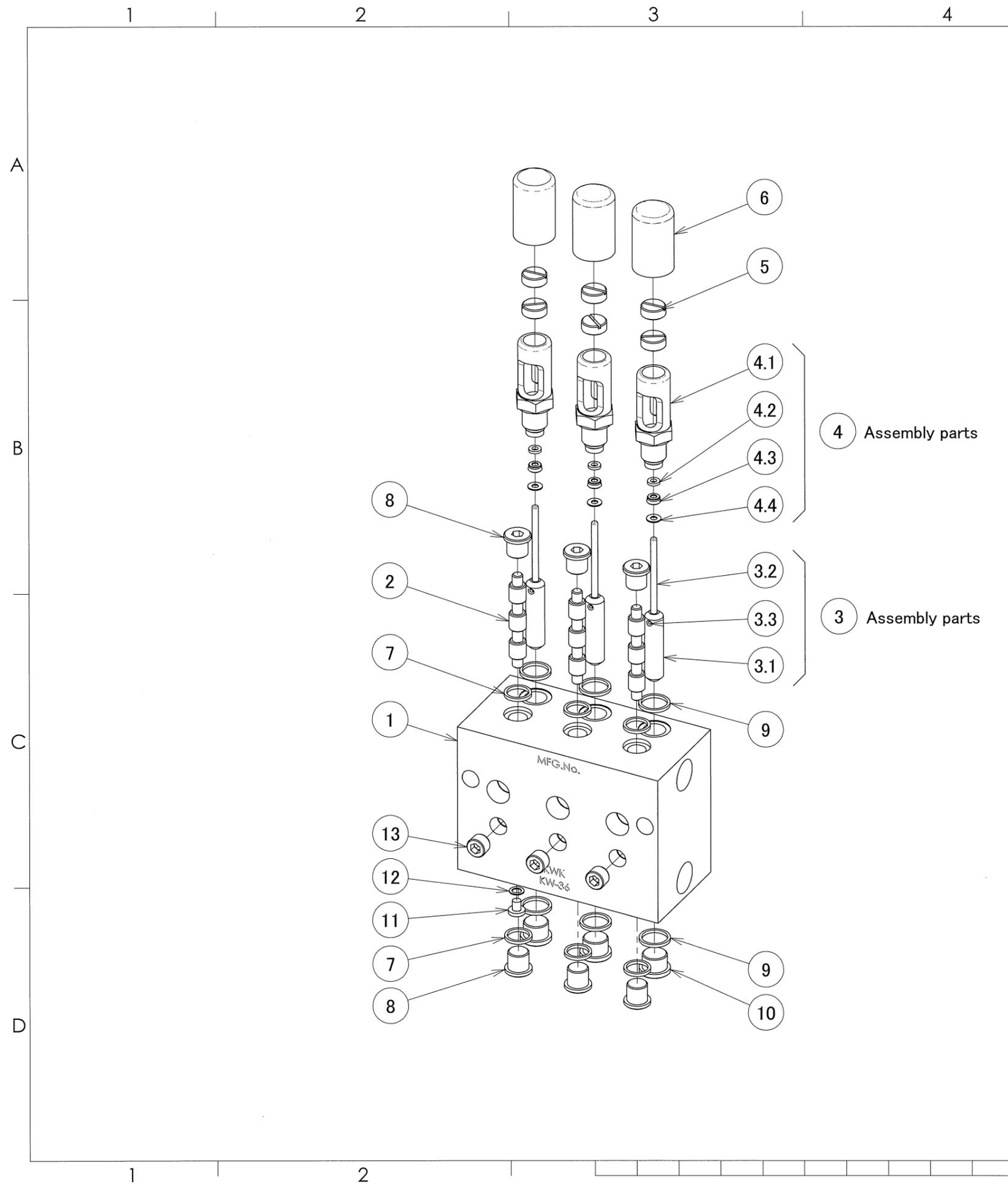
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No.	Name	Part number	Quantity	Mass	Note
10	Seated plug	X2010	3	18.18	M16 × 12L
9	Copper packing	X3011	6	1.24	φ 19 × φ 16.5 × 2t
8	Seated plug	X2006	6	6.51	M10 × 11L
7	Copper packing	X3006	6	0.62	φ 13 × φ 10.5 × 1.5t
6	KS, KW-50 indicator rod cap	G8012	3	8.16	KS-800220
5	Adjusting screw	G8007	6	4.51	KS-800478
4.4	Plain washer	PW-M4	1	0.309	M4
4.3	SK seal	SKSEAL-P4	1	0.08	P4
4.2	Backup ring T3	BUR-P4-E	1	0.08	P4 Endless
4.1	KS, KW-50 indicator rod guide	-	1	84.38	KS-800468
4	KS, KW-50 indicator rod guide ASS'Y	G8004	3	84.85	KS-800468
3.3	Parallel pin	-	1	0.198	2 × 8L
3.2	KS, KW-50 measuring valve indicator rod	-	1	6.18	KS-800518
3.1	KS, KW-30 piston	-	1	23.88	KS-800518
3	KS, KW-50 main piston ASS'Y	G2031	3	30.26	KS-800518
2	KS-40,50 pilot piston	G1021	3	11.70	KS-800464
1	KS-53 body	G1111	1	2882.63	KS-800452

CUSTOMER			
SPECIFICATION		KS-50 Measuring valve Disassembly	
CHECKED BY M.S 2019.5.9	DRAWN BY oosumi 2019.5.7	DWG.No. eSA-KS-50	
APPROVED BY Shimomura 2019.5.9	DESIGNED BY kato 2019.5.7		
KOWA CORP. OSAKA JAPAN		CFD.No.	
3RD ANGLE PROJECTION		CODE No.	
SCALE 1:2		DATE OF ISSUE	MFG.No.

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4 Assembly parts

3 Assembly parts

No.	Name	Part number	Quantity	Mass	Note
13	Hexagon socket plug	HS-PG-1/8U	3	3.21	R1/8
12	Copper packing	X3002	1	0.10	φ7 × φ4.5 × 0.5t
11	Cross Recessed Machine Screw	PNS-M4 × 5L	1	1.361	M4 × 5L
10	Seated plug	X2007	3	8.77	M12 × 10L
9	Copper packing	X3008	6	0.72	φ15 × φ12.5 × 1.5t
8	Seated plug	X2006	6	6.51	M10 × 11L
7	Copper packing	X3006	6	0.62	φ13 × φ10.5 × 1.5t
6	KS, KW-30 indicator rod cap	G8010	3	5.15	KS-800218
5	Adjusting screw	G8007	6	4.51	KS-800478
4.4	Plain washer	PW-M3	1	0.120	M3
4.3	SK seal	SKSEAL-P3	1	0.07	P3
4.2	Backup ring T3	BUR-P3-E	1	0.06	P3 Endless
4.1	KS, KW-30 indicator rod guide	-	1	40.11	KS-800462
4	KS, KW-30 indicaor rod guide ASSY	G8002	3	40.36	KS-800462
3.3	Parallel pin	-	1	0.111	1.5 × 8L
3.2	KS, KW-30 type measuring valve indicator rod	-	1	2.58	KS-800516
3.1	KS, KW-30 piston	-	1	17.03	KS-800516
3	KS, KW-30 main piston ASSY	G2020	3	19.73	KS-800516
2	KW-30, 50 pilot piston	G2024	3	14.27	KS-800520
1	KW-36 body	G2107	1	3066.08	KS-800055

CUSTOMER			
SPECIFICATION			
CHECKED BY	DRAWN BY	<b>KW-30 Measuring valve</b> <b>Disassembly</b>	
<i>M.S.</i>	<i>oosumi</i>		
2019.5.9	2019.5.7		
APPROVED BY	DESIGNED BY		
<i>Shimizu</i>	<i>kato</i>		
2019.5.9	2019.5.7		
<b>KOWA CORP.</b> <b>OSAKA JAPAN</b>		DWG.No.	eSA-KW-30
		CFD.No.	
3RD ANGLE PROJECTION		CODE No.	
		SCALE	1:2
		DATE OF ISSUE	MFG.No.

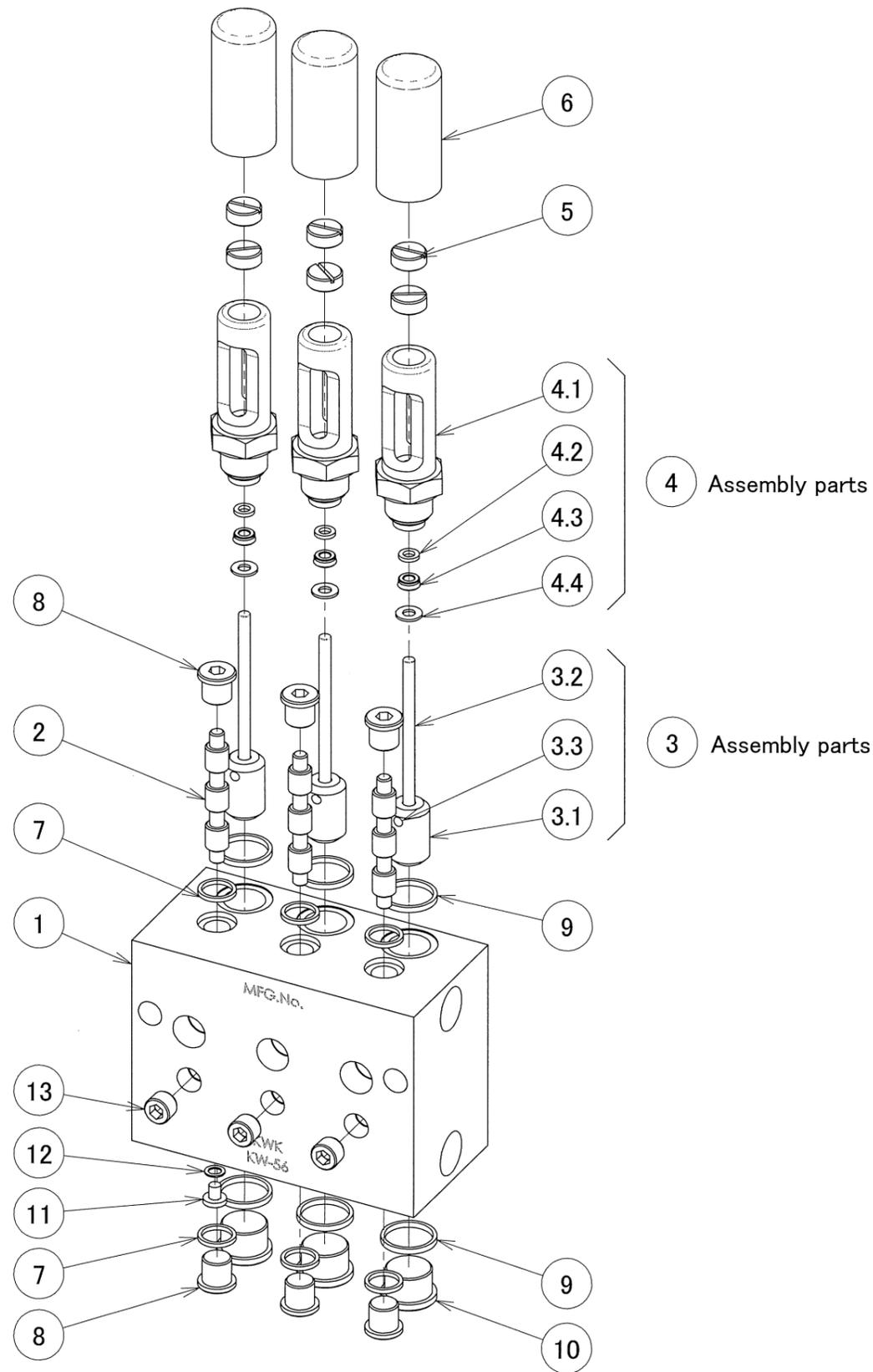
協議印

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複写部数

A3  
出図日

A  
B  
C  
D



13	Hexagon socket plug	HS-PG-1/8U	3	3.21	R1/8
12	Copper packing	X3002	1	0.10	$\phi 7 \times \phi 4.5 \times 0.5t$
11	Cross Recessed Machine Screw	PNS-M4 $\times$ 5L	1	1.361	M4 $\times$ 5L
10	Seated plug	X2010	3	18.18	M16 $\times$ 12L
9	Copper packing	X3011	6	1.24	$\phi 19 \times \phi 16.5 \times 2t$
8	Seated plug	X2006	6	6.51	M10 $\times$ 11L
7	Copper packing	X3006	6	0.62	$\phi 13 \times \phi 10.5 \times 1.5t$
6	KS, KW-50 indicator rod cap	G8012	3	8.16	KS-800220
5	Adjusting screw	G8007	6	4.51	KS-800478
4.4	Plain washer	PW-M4	1	0.309	M4
4.3	SK seal	SKSEAL-P4	1	0.08	P4
4.2	Backup ring T3	BUR-P4-E	1	0.08	P4 Endless
4.1	KS, KW-50 indicator rod guide	-	1	84.38	KS-800468
4	KS, KW-50 indicator rod guide ASS'Y	G8004	3	84.85	KS-800468
3.3	Parallel pin	-	1	0.198	2 $\times$ 8L
3.2	KS, KW-50 measuring valve indicator rod	-	1	6.18	KS-800518
3.1	KS, KW-50 piston	-	1	23.88	KS-800518
3	KS, KW-50 main piston ASS'Y	G2031	3	30.26	KS-800518
2	KW-30, 50 pilot piston	G2024	3	14.27	KS-800520
1	KW-56 body	G2117	1	2907.61	KS-800053
No.	Name	Part number	Quantity	Mass	Note

CUSTOMER			
SPECIFICATION		KW-50 Measuring valve Disassembly	
CHECKED BY	DRAWN BY	DWG.No. eSA-KW-50 CFD.No. CODE No. 3RD ANGLE PROJECTION SCALE 1:2 DATE OF ISSUE MFG.No.	
M.S.	oosumi		
2019.5.9	2019.5.7		
APPROVED BY	DESIGNED BY		
Shimono	kato		
2019.5.9	2019.5.7		

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